EXTENDED
NFPA CODE COMPLIANCE EVALUATION
FOR THE
DONALD C. COOK NUCLEAR PLANT

PREPARED FOR:

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TABLE OF CONTENTS

TABLE OF CONTENTS
(Continued)

TABLE OF CONTENTS
(Continued)

LIST OF TABLES AND FIGURES

RECORD OF REVISIONS

REVISION	PAGE	DESCRIPTION OF REVISION
A	--	Issue for Comment
0	--	Original Issue
1	--	Revised for Clarification

1.0 EXECUTIVE SUMMA

1.1 Project Overview

This report documents the methodology, assumptions and results for the NFPA code compliance evaluation of the fire protection system in the areas listed below for the D.C. Cook Nuclear Plant.

"LIST OF PLANT FIRE AREAS REQUIRING VERIFICATION"

Fire Area	Fire Area Identification	Fire Zones Which Make Up the Fire Area	NFPA Code(s)
B	Unit 1 & 2 Turbine Building	79, 80, 84, 85, 90, 91 96, 97 * SEE NOTE 3	10, 13, 14 & 72D
B	Unit 1 & 2 Turbine Building	129, 130 * SEE NOTE 1	10 & 14
AAA CCC	Unit 1 & 2 Containment Charcoal Filter Unit & Reactor Coolant Pump Suppression/Detection Systems, Unit 1 & 2 Containment Cable Tray Detection Circuits.	66, 67, 68, 74, 75, 76, 101, 102, 103, 10[illegible] * SEE NOTE 4	10, 14, 15, 72D & 72E
---	Unit 1 & 2 Transformer and Turbine Wall Water Spray Systems	Yard	15, 72D & 72E
B	Unit 1 & 2 Diesel Fire Pump Room Sprinkler Systems.	28, 30 * SEE NOTE 2 & 4	10, 13, 14 & 72D

* NOTES

1. NFPA 10 & 14 will be verified for coverage between columns H-19, G-19, H-8 & G-8 only for Aux. Bldg. exposure protection.

2. Hose and extinguishers located in Fire Zone 142 will be used to verify adequate coverage of hazards within Fire Zones 28 & 30.

3. These fire zones will be verified for all portions of the fire zone within 40 feet of column line H, and auxiliary feed water pump rooms or safety related trays. The portions of the fire zones reviewed included the area bounded by column coordinates: Fire Zones #79-80 (Col. Lines H-23, H-14, G-26, G-18, GA-23, GA-26, E-18 and E-14); Fire Zones #84-85 (Col. Lines H-13, H-4, G-9, G-1, GA-4, GA-1, E-13 and E-9); Fire Zones #90-91 (Col. Lines

H-14, H-23, E-14, E-18, G-18, G-26 and GA-26); Fire Zones #96-97 (Col. Lines H-13, H-4, G-13, G-1, GA-4 and GA-1); Fire Zones #129 & 130 (Col. Lines H-8, H-19, G-8 and G-19). ⚠

4. Fire Zones #28 & 30 and fire areas AAA & CCC will have the entire area reviewed for compliance with the applicable NFPA Code.

1.2 Conclusions

The evaluation concluded that the fire protection systems for the extended areas reviewed of the Donald C. Cook Nuclear Plant are generally in compliance with the NFPA codes reviewed. The systems were evaluated against the code requirements for each NFPA code edition to determine compliance, noncompliance, and open items, as shown in Appendix A1 through A6 of this report. Noncompliance and open items identified for each code edition are identified in Sections 3.1 through 3.6 of this report. Deviations were reevaluated to determine whether each item could be deemed acceptable "as installed" based upon credited plant procedures or past practices at the plant. Deviations and open items which could not be justified are identified below, by specific code:

NFPA 10 - Portable Fire Extinguishers

1. Several areas have Class A combustibles without having extinguishers suitable for these Class A hazards within the 75' travel distance required by the code.

2. Many locations exceed the maximum travel distances from the area to an extinguisher.

3. The fire facilities drawings which identify the location of fire extinguishers do not depict the actual installed conditions.

4. Extinguishers were found to have their access obstructed or are installed in locations which are not properly marked.

5. Procedure 12-SHP 2270 FIRE.001 does not verify if the extinguisher is unobstructed, operating instructions are facing out or the fullness of each unit.

NFPA 13 - Installation of Sprinkler Systems

1. Fire Zones 79, 80, 90 and 91 had misaligned sprinklers for the cable tray systems.

2. Sectionalizing valve No. 1-FP-196 does not have a valve manual operator.

3. Hangers were missing on sprinkler piping in Fire Zones 80, 84, 91 and 96.

4. Improper installation of sprinklers were observed in Fire Zones 80, 96 and 97.

5. The areas system installed in Fire Zone 91 use 1/4" orifice nozzles which are less than the 1/2" orifice specified by NFPA 13.

6. Sprinklers for Fire Zones 79, 80, 84, 91 and 96 were painted.

7. Sprinklers were found to be missing in Fire Zones 79, 80, 84, 91, and 96.

8. Sprinklers were found to be obstructed in Fire Zones 91, 96 and 97.

9. Sprinklers are installed greater than 16 inches below the deck in Fire Zones 90, 91, 96 and 97.

NFPA 14 - Standpipe and Hose System

1. Hydraulic calculations should be performed to verify system water supply adequacy.

NFPA 15 - Water Spray Fixed Systems

1. Water supply graphs are not available for review to verify that the water supply is adequate for the system demands.

NFPA 72D - Proprietary Protective Signaling System

1. The Unit 1 and 2 RCP pump detector loop resistance value is not verified in current surveillance tests.

   (NOTE: This is a typical deficiency for NFPA 72E - Automatic Fire Detectors.)

Specific details, including the actual code sections, describing these deviations and open items are presented in Sections 3.1 through 3.6 of this report. These sections also provide the justifications presented for the deviations and open items.

2.0 INTRODUCTION

ABB Impell Corporation was contracted by American Electric Power Service Corporation, Indiana-Michigan Power Company, under Contract No. C-7275, to perform an extension of the previous NFPA code compliance evaluation, which was originally conducted by ABB Impell in May 1988. The fire protection systems included in this evaluation process are those systems installed in selected portions of the turbine building, containment, and yard areas at the D.C. Cook Nuclear Plant.

D.C. Cook in their January 31, 1977 Response to Appendix A to BTP APCSB 9.5-1 stated that: "All fire suppression systems have been designed and installed in accordance with the applicable NFPA Codes as follows: 12, 12A, 13, 14, 15 and 17." This document also states, in Section E, Fire Detection and Suppression, that: "Fire detection systems at the Cook Plant conform to the applicable portions of NFPA 72D except for the testing frequency specified in Paragraph 1232."

Although D.C. Cook did not commit to NFPA 10 and 72E, ABB Impell was requested by AEP to include these codes as part of the original review.

Subsequently, the NRC's April, 1990 Safety Evaluation Report stipulated that the D.C. Cook Nuclear Plant should comply with the above NFPA codes for additional areas of the plant. The NRC also indicated that the review should focus on the significant deficiencies previously identified under ABB Impell Report No. 09-0120-0123 dated May, 1988. Generally, these areas include those which contain safety related/safe shutdown components and/or cables or the potential exposure of those systems to a fire hazard in an adjacent fire zone. The "significant deficiencies" would be defined as those which would impact system effectiveness (i.e., nozzle spacing, obstructions, system materials installed, etc.), supervision (i.e., method of connection to Plant fire alarm system) and maintenance (i.e., surveillance performance and procedures.) For the purposes of this report and conservative approach, the deficiencies reviewed encompassed all the deficiencies noted in Impell Report No. 09-0120-0123.

2.1 Scope of Work

ABB Impell's scope of work was to determine the compliance, or noncompliance, of the fire protection systems installed in the selected areas to the specific NFPA code requirements (edition years identified by the AEPSC) which were in effect at the time the fire protection systems were designed and/or installed.

The areas of the plant, that were reviewed, included:

Those portions of the fire zone within 40 feet of column line H, and auxiliary feed water pump rooms or safety related trays. The portions of the fire zones reviewed included the area bounded by column coordinates: Fire Zones #79-80 (Col. Lines H-23, H-14, G-26, G-18, GA-23, GA-26, E-18 and E-14); Fire Zones #84-85 (Col. Lines H-13, H-4, G-9, G-1, GA-4, GA-1, E-13 and E-9); Fire Zones #90-91 (Col. Lines H-14, H-23, E-14, E-18, G-18, G-26, and GA-26); Fire Zones #96-97 (Col. Lines H-13, H-4, G-13, G-1, GA-4 and GA-1) Fire Zones 129 & 130 (Col. Lines H-8, H-19, G-8 and G-19). 

- Unit 1 & 2 Containment Charcoal Filter Unit and Reactor Coolant Pump Suppression/Detection Systems, Unit 1 & 2 Containment Cable Tray Detection Circuits and Extinguisher/Standpipe Hose reach throughout. (Fire Zone 66-68, 74-76, 101 through 104)

- Unit 1 & 2 Transformer and Turbine Wall Water Spray Systems (Yard)

- Unit 1 & 2 Diesel Fire Pump Room Sprinkler Systems (Fire Zone 28 & 30)

The NFPA Codes used for the evaluation included:

10 - Portable Fire Extinguishers; 1984 Edition

13 - Installation of Sprinkler Systems; 1971 Edition

14 - Installation of Standpipe and Hose Systems; 1971 Edition

15 - Water Spray Fixed Systems; 1973 Edition

72D - Installation, Maintenance and Use of Proprietary Protection Signaling Systems; 1967 Edition

72E - Automatic Fire Detectors; 1974 Edition

The NFPA standards referenced in this report can be found in ABB Impell Report No. 09-0120-0123, Rev. 0, Appendix A.

2.2 Methodology

ABB Impell conducted the code compliance review in three phases. Phase I identified the fire areas/zones containing or exposing safety related/safe shutdown equipment and also selected the NFPA Code section to be included in the code compliance review based on the "significant deficiencies" previously identified in ABB Impell Report No. 09-0120-0123. Phase II consisted of the actual code verification effort. Phase III will consist of the performance of engineering evaluations required to justify deficiencies identified during the Phase II process.

The identification of the fire areas/zones in the Phase I task was accomplished by reviewing the D.C. Cook Plant's Fire Hazards Analysis which described the fire areas/zones containing or exposing safety-related/safe shutdown equipment. Each of the identified NFPA code deficiencies in ABB Impell Report No. 09-0120-0123 were reviewed to determine which sections were considered significant and could have functional impact upon the adequacy of fire protection features in other areas of the D.C. Cook Nuclear Plant. For the purposes of this report and conservative approach, the deficiencies reviewed encompassed all the deficiencies noted in Impell Report No. 09-0120-0123.

Each of the codes and their respective sections were developed into a matrix, entitled Code Compliance Verification Checklist (CCVC) and shown in Appendix A1 through A6 in this report. This matrix identifies each code section to be verified, the verification method to be used (walkdown, document search or both) and a summary of the results of the evaluation.

To facilitate the verification process, two additional matrices were developed, a Walkdown Verification Checklist (WVD) and a Document Verification Checklist (DVC). These checklists list the applicable code sections; whether the installed systems did/did not comply or if the code sections were not applicable to the installed system; and comments for each noncomplying/not applicable section. The DVC had an additional column to identify the documents reviewed for verification of the specific code sections.

In Phase II, walkdowns were conducted to verify each of the code sections. The walkdowns were conducted by three teams of two engineers each. Each team was assigned two of the six codes to be verified. This effort was conducted at the D.C. Cook Plant during the period of July 23 through July 27, 1990. Upon completion of the walkdowns, the teams then completed the document search portion of the code verification effort.

Phase III of the work will involve the review of the deficiencies identified in Phase II and provide an engineering evaluation to justify the adequacy of the system arrangement for areas in which it was installed. These evaluations utilize the methodology from Generic Letter 86-10 and good engineering practices. Where reasonable justifications can not be provided for the deficiency being evaluated, ABB Impell will provide a recommendation for upgrading the system to provide compliance with the applicable code.

2.3 General Assumptions

This report utilized the following general assumptions shown below and the additional assumptions identified in Sections 3.1 through 3.6 of this report.

1. All drawings, procedures, design specifications and other documentation provided to ABB Impell for use on this project are the latest revision, most current, available.

2. Specifications and drawings were used to evaluate the piping, fittings and miscellaneous hardware used in the fire protection systems to confirm compliance with the requirements of the appropriate NFPA codes in effect at the time of installation.

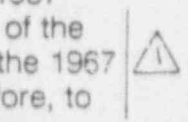
3. Workmanship and construction practices during installation of the systems complied with the code requirements in effect at the time.

4. It is assumed that all surveillance tests and procedures are properly implemented.

5. The review of certain systems within these structures shall be performed via documentation review only based on the following:

   - The Unit 1 containment (Fire Area AAA) will not be accessible due to the Plant being in operation.

   - The Unit 1 and 2 containment charcoal filter units due to ALARA concerns.

6. The new Alison control panels model number A888-M664/A recently installed for the Unit 1 main transformer and the Unit 2 start-up transformer, were reviewed for compliance with the requirements of NFPA 72D-1967 Edition. Although these panels were installed after 1986, the intent of the Code Section Requirements reviewed as part of this evaluation for the 1967 Edition, did not significantly change under the 1986 Edition. Therefore, to provide consistency, these panels were reviewed to the 1967 Edition. 

7. All fire zones within the turbine building identified in the Executive Summary and Section 2.1 of this report are based on reviewing those portions of the zone within 40 feet from column line H, the auxiliary feed water pump cubicles or safety related cable trays. The basis for this partial review assumes that a fire in the areas reviewed would be controlled, extinguisned or limited in the extent of its damage by the area's suppression system. It is also assumed that for a fire originating outside the areas reviewed, the Fire Protection features provided in those areas are adequate for their intended function.

3.0 CODE COMPLIANCE EVALUATIONS

This section provides a detailed review of each specific NFPA code evaluated. This review includes: the scope of work for each evaluation, what assumptions were made, and a table listing the deviations/open items from the specific code sections and the recommendations/justifications for each deviation or open item.

3.1 NFPA 10 - Portable Fire Extinguishers

3.1.1 Scope of Evaluation

The evaluation of the portable fire extinguisher system was reviewed under the 1984 edition of the code. Although the system was installed under different edition years from 1970 to 1984, the difference in the edition requirements were minimal and the 1984 edition year was deemed to be more applicable to the installed system.

The following areas were evaluated under the requirements of NFPA 10, 1984 Edition:

- These fire zones will be verified for all portions of the fire zone within 40 feet of column line H, and auxiliary feed water pump rooms or safety related trays. The portions of the fire zones reviewed included the area bounded by column coordinates: Fire Zones #79-80 (Col. Lines H-23, H-14, G-26, G-18, GA-23, GA-26, E-18 and E-14); Fire Zones #84-85 (Col. Lines H-13, H-4, G-9, G-1, GA-4, GA-1, E-13 and E-9); Fire Zones #90-91 (Col. Lines H-14, H-23, E-14, E-18, G-18 to G-26 and GA-26); Fire Zones #96-97 (Col. Lines H-13, H-4, G-13, G-1, GA-4 and GA-1) Fire Zones 129 & 130 (Col. Lines H-8, H-19, G-8 and G-19). 1

- Unit 1 & 2 Containment Fire Areas AAA & CCC (Fire Zone 66-68, 74-76, 101 through 104)

- Unit 1 & 2 Diesel Fire Pump Room Sprinkler Systems (Fire Zone 28 & 30)

- Extinguishers located in Fire Zone 142 were used to verify adequate coverage of hazards within Fire Zones 28 & 30.

The evaluation of the portable fire extinguisher system verified the following features:

1. Proper types of fire extinguishers have been provided based upon the characteristics of the anticipated fires.

2. Fire extinguishers have been properly distributed throughout the plant.

3. Procedures for the Inspection, Maintenance and Recharging of fire extinguishers are satisfactory.

3.1.2 Assumptions

The following assumption has been made for the evaluation of NFPA 10.

1. Service activities performed on the fire extinguisher by all outside service companies are performed in accordance with the appropriate sections of the code.

3.1.3 Deviations and Recommendations/Justifications

Portable fire extinguishers at the plant are in compliance with NFPA 10 except as identified by the open items and deviations listed in Table 3.1-1. The table also provides recommendations and/or justifications for these items.

3.1.4 References

WALKDOWN VERIFICATION CHECKLISTS

REF. NO.	DOCUMENT NUMBER	TITLE	REV. NO.	DATE
1	0120-164-001A	ABB Impell Calculation NFPA 10, 1984 Code Compliance Walkdown Verification Checklist (Fire Zone 79)	0	12/90
2	0120-164-001B	ABB Impell Calculation NFPA 10, 1984 Code Compliance Walkdown Verification Checklist (Fire Zone 80)	0	12/90
3	0120-164-001C	ABB Impell Calculation NFPA 10, 1984 Code Compliance Walkdown Verification Checklist (Fire Zone 84)	0	12/90
4	0120-164-001D	ABB Impell Calculation NFPA 10, 1984 Code Compliance Walkdown Verification Checklist (Fire Zone 85)	0	12/90
5	0120-164-001E	ABB Impell Calculation NFPA 10, 1984 Code Compliance Walkdown Verification Checklist (Fire Zone 28)	0	12/90

WALKDOWN VERIFICATION CHECKLISTS (Continued)

6	0120-164-001F	ABB Impell Calculation NFPA 10, 1984 Code Compliance Walkdown Verification Checklist (Fire Zone 30)	0	12/90
7	0120-164-001G	ABB Impell Calculation NFPA 10, 1984 Code Compliance Walkdown Verification Checklist (Fire Zone 90)	0	12/90
8	0120-164-001H	ABB Impell Calculation NFPA 10, 1984 Code Compliance Walkdown Verification Checklist (Fire Zone 91)	0	12/90
9	0120-164-001I	ABB Impell Calculation NFPA 10, 1984 Code Compliance Walkdown Verification Checklist (Fire Zone 96)	0	12/90
10	0120-164-001J	ABB Impell Calculation NFPA 10, 1984 Code Compliance Walkdown Verification Checklist (Fire Zone 97)	0	12/90
11	0120-164-001K	ABB Impell Calculation NFPA 10, 1984 Code Compliance Walkdown Verification Checklist (Fire Zone 129)	0	12/90
12	0120-164-001L	ABB Impell Calculation NFPA 10, 1984 Code Compliance Walkdown Verification Checklist (Fire Zone 130)	0	12/90

REF. NO.	DOCUMENT NUMBER	TITLE	REV. NO.	DATE
		PROCEDURES		
13	12SHP2270 FIRE.001	Portable Fire Extinguisher Inspection	1	06/03/88
		TECHNICAL DATA		
		Catalog **DRAWINGS**		
14	F-8486	Ansul Fire Protection	-	1984
15	12-5267-6	Fire Facilities Basement Plan El. 591'-0" & El. 587'-0" Units 1 & 2	6	01/29/90
16	12-5268-5	Fire Facilities Mezzanine Floor El. 609'-0" Units 1 & 2	5	01/29/90
17	12-5269-5	Fire Facilities Turbine Bldg. Main Floor El. 633'-0" Units 1 & 2	5	01/29/90
		LICENSING DOCUMENTS		
18	50-315 50-316	Safety Evaluation Document of IMPC D.C. Cook Plant Units 1 & 2	-	04/26/90

TABLE 3.1-1

DEVIATION AND RECOMMENDATIONS/JUSTIFICATIONS
NFPA 10 - Portable Fire Extinguishers

CODE SECTION	DEVIATION/OPEN ITEM	RECOMMENDATION/JUSTIFICATION
1-6.2	Deviation a. Extinguishers are obstructed from direct access. These Include:	Recommendation: Relocate to an accessible location and revise facilities drawing accordingly.

Fire Zone	Exting. No.
79	FES 591T-78BC
	FES 591T-77CO_2
	FES 591T-79BC
80	FES 591T-72BC
	FES 591T-73CO_2
	FES 591T-66BC
84	FES 591T-96BC
	FES 591T-96CO_2
85	FES 591T-51BC
91	FES 609T-42CO_2
96	FES 633T-27BC

b. Extinguishers were not in their designated places or of the type of extinguisher designated.

Recommendation:
Relocate extinguisher or revise facilities drawing accordingly.

FZ#1/Exting No.	Deficiency
66/Unknown	Improper type indicated on dwg.
79/FES 591T-78BC	Wrong location on
FES 591T-77CO_2	on drawing.
80/FES 591T-68BC	Wrong type
FES 591T-66BC	Wrong location
84/FES 591T-61BC	Wrong type
91/FES 609T-50CO_2	Wrong location
129/FES 633T-27BC	Wrong location

TABLE 3.1-1 (Continued)

DEVIATION AND RECOMMENDATIONS/JUSTIFICATIONS
NFPA 10 - Portable Fire Extinguishers

CODE SECTION	DEVIATION/OPEN ITEM	RECOMMENDATION/JUSTIFICATION
1-6.2 (Cont'd)	Extinguisher locations were not properly marked. They include: Fire Zone #/Exting. No. 80/FES 591T-75CO_2 96/FES 591T-35BC	Recommendation: The proper markings (i.e., painted location) should be provided.
3-1.2 & 3-2.1	Deviation: Class A rated extinguisher is not available within 75' travel distances for first aid use. These include Fire Zones 28, 30, 84, 85, 91, 96, 97, 129 & 130 and Fire Areas AAA & CCC (Unit 1 & 2 Containments).	Recommendation: Provide extinguisher within travel distance for fire zones 28, 30, 84, 85, 91, 96, 97, 129 & 130 accordingly. Justification: Based on the review of the SER for BTP APSCB 9.5-1, Appendix A, Table 1, the portable extinguishers provided within the containment structures (Fire Areas AAA & CCC) meet the requirements of the commitment made and are therefore, considered acceptable.
3-3.1 & 3-3.3	Deviation: Class B rated extinguisher is not available within 50' travel distances for the following: Fire Zones 96, 129 & 130 and Fire Areas AAA & CCC (Unit 1 & 2 Containments).	Recommendation: Provide extinguisher within travel distance for fire zones 96, 129 & 130 accordingly. Justification: Based on the review of SER for BTP APSCB 9.5-1 Appendix A, Table 1, the portable extinguishers provided within the containment structures meet (Fire Areas AAA & CCC) the requirement of the commitment made and are therefore, considered acceptable.

TABLE 3.1-1 (Continued)

DEVIATION AND RECOMMENDATIONS/JUSTIFICATIONS
NFPA 10 - Portable Fire Extinguishers

CODE SECTION	DEVIATION/OPEN ITEM	RECOMMENDATION/JUSTIFICATION
4-3.2	Deviation: Procedure 12-SHP 2270 FIRE 001 does not contain surveillance criteria to verify that the extinguisher is unobstructed, the operating instructions are facing out, or that the unit is checked for inspection.	Recommendation: Revise procedure to ensure that extinguisher is accessible and unobstructed, the instructions are facing out, and fullness is verified by lifting the extinguisher.
4-3.4.2 & 4-4.3	Deviation: Extinguisher tanks do not indicate person providing service and when service was performed.	Justification: Plant procedure No. 12 SHP 2270 Fire.001 properly documents the personnel performing the service and when it was performed. Therefore, the intent of this code section is being met.

3.2 NFPA 13-1971 Sprinkler Systems

3.2.1 Scope of Evaluation

The sprinkler systems of D.C. Cook were originally designed under the jurisdiction of the 1971 Edition of NFPA 13. Over the course of time, modifications to the sprinkler systems were performed. The most recent modifications were completed under the jurisdiction of the 1983 Edition of NFPA-13. However, for the purpose of this evaluation, only the original (1971) Edition of NFPA 13 was utilized since no modifications after the initial design were performed on the systems being evaluated. The following systems were evaluated under the requirements of NFPA 13, 1971 Edition:

System	Fire Zone	Area
Wet Pipe	79, 80, 84, 85, 90, 91, 96, 97	The fire zones will be verified for all portions of the fire zone within 40 feet of column line H, and auxiliary feed water pump rooms or safety related trays. The portions of the fire zones reviewed included the area bounded by column coordinates: Fire Zones #79-80 (Col. Lines H-23, H-14, G-26, G-18, GA-23, GA-26, E-18 and E-14); Fire Zones #84-85 (Col. Lines H-13, H-4, G-9, G-1, GA-4, GA-1, E-13 and E-9); Fire Zones #90-91 (Col. Lines H-14, H-23, E-14, E-18, G-18, G-26 and GA-26); Fire Zones #96-97 (Col. Lines H-13, H-4, G-13, G-1, GA-4 and GA-1).
Wet Pipe	28, 30	Units 1 & 2 Diesel Fire Pump Room Sprinkler Systems

3.2.2 Assumptions

The following assumptions have been made for the evaluation of NFPA 13.

1. The above noted fire protection systems at the D.C. Cook Plant are not subject to earthquake support criteria as it pertains to NFPA codes.

3.2.3 Deviations and Recommendations/Justifications

The sprinkler systems evaluated are in compliance with NFPA 13 - 1971 except as identified by the open items and deviations in Table 3.2-1. The table also provides recommendations and/or justifications for these items.

3.2.4 References

REF. NO.	DOCUMENT NUMBER	TITLE	REV. NO.	DATE
		WALKDOWN VERIFICATION CHECKLISTS		
1	0120-164-002A	ABB Impell Calculation NFPA 13, 1971 Code Compliance Walkdown Verification Checklist (Turbine Bldg., Zone 79)	0	12/90
2	0120-164-002B	ABB Impell Calculation NFPA 13, 1971 Code Compliance Walkdown Verification Checklist (Turbine Bldg., Zone 80)	0	12/90
3	0120-164-002C	ABB Impell Calculation NFPA 13, 1971 Code Compliance Walkdown Verification Checklist (Turbine Bldg., Zone 90)	0	12/90
4	0120-164-002D	ABB Impell Calculation NFPA 13, 1971 Code Compliance Walkdown Verification Checklist (Turbine Bldg., Zone 91)	0	12/90
5	0120-164-002A	ABB Impell Calculation NFPA 13, 1971 Code Compli[illegible]e Walkdown Verification Checklist (Cable Trays, Zone 79)	0	12/90
6	0120-164-002F	ABB Impell Calculation NFPA 13, 1971 Code Compliance Walkdown Verification Checklist (Cable Trays, Zone 80)	0	12/90

REF. NO.	DOCUMENT NUMBER	TITLE	REV. NO.	DATE
7	0120-164-002G	ABB Impell Calculation NFPA 13, 1971 Code Compliance Walkdown Verification Checklist (Cable Trays, Zone 90)	0	12/90
8	0120-164-002H	ABB Impell Calculation NFPA 13, 1971 Code Compliance Walkdown Verification Checklist (Cable Trays, Zone 91)	0	12/90
9	0120-164-002I	ABB Impell Calculation NFPA 13, 1971 Code Compliance Walkdown Verification Checklist (Area & Tray, Zone 84)	0	12/90
10	0120-164-002J	ABB Impell Calculation NFPA 13, 1971 Code Compliance Walkdown Verification Checklist (Area & Tray, Zone 85)	0	12/90
11	0120-164-002K	ABB Impell Calculation NFPA 13, 1971 Code Compliance Walkdown Verification Checklist (Area & Tray, Zone 96)	0	12/90
12	0120-164-002L	ABB Impell Calculation NFPA 13, 1971 Code Compliance Walkdown Verification Checklist (Area & Tray, Zone 97)	0	12/90
13	0120-164-002M	ABB Impell Calculation NFPA 13, 1971 Code Compliance Walkdown Verification Checklist (Diesel Fire Pump Rooms, Zones 28, 30)	0	12/90

REF. NO.	DOCUMENT NUMBER	TITLE	REV. NO.	DATE
		PROCEDURES		
20	PO-050-508	Fire Protection - Water Preoperational Test Procedure	0	07/03/74
21	12-OHP-4030-STP-120VC	Fire Protection Yearly Valve Cycle and Lineup Verification	1	07/19/90
22	12-OHP-4030-STP-120VV	Fire Protection Valve Lineup Verification	0	11/17/88
23	12-OHP-4030-STP-120SF	Fire Protection Unobstructed Flow Test and Sprinkling Alarm Test	1	07/19/90
24	12-OHP-4030-STP-124	Fire Protection System Flush and Loop Flow Test	0	10/05/89
25	12-OHP-4030-STP-223	Fire Protection Water System Test	8	07/27/89
26	12-OHP-4030-STP-125NS	Non-Tech Spec Required Sprinkler Tests	1	10/12/89
		TECHNICAL DATA		
30	-	Letter From: R.J. Daley To: R.W. Jurgensen Instruction Book, "Grinnel and Star Fire Systems Equipment"	-	07/15/74
31	SD-DCC-FP101	System Description, Fire Protection System - Water	2	12/26/89
32	-	Specification for Fire Protection Systems of D.C. Cook Nuclear Plant	0	04/02/71
33	DCCPM104QCS	Piping Specification	4	11/09/72
34	DCCPM102QCS	Shop and Field Fabrication and Erection	4	05/24/73

REF. NO.	DOCUMENT NUMBER	TITLE	REV. NO.	DATE
35	ROC from D. Kipley to B. Gerwe	Ambient Temperature Conditions	-	08/06/90
36	0120-164-005	ABB Impell Calc., NFPA 72D, Code Compliance Verification Checklist	O	12/90
37	0120-164-006	ABB Impell Calc., NFPA 72E, Code Compliance Verification Checklist	O	12/90
38	-	Grinnel Hydraulic Calcs for Zone 79	-	02/18/72
39	-	Grinnel Hydraulic Calcs for Zone 80	-	03/13/72
40	-	Grinnel Hydraulic Calcs for Zone 90	-	03/30/72
41	-	Grinnel Hydraulic Calcs for Zone 91	-	03/30/72
42	-	Grinnel Hydraulic Calcs for Zone 79 Cable Trays	-	05/26/72
43	-	Grinnel Hydraulic Calcs for Zone 80 Cable Trays	-	07/05/72
44	-	Grinnel Hydraulic Calcs for Zone 90 Cable Trays	-	09/22/72
45	-	Grinnel Hydraulic Calcs for Zone 91 Cable Trays	-	11/09/72
46	-	Hodgeman Hydraulic Calcs for Zone 84	-	10/18/74
47	-	Hodgeman Hydraulic Calcs for Zone 85	-	12/27/72
48	-	Hodgeman Hydraulic Calcs for Zone 96	-	12/11/74

REF. NO.	DOCUMENT NUMBER	TITLE	REV. NO.	DATE
49	-	Hodgeman Hydraulic Calcs for Zone 97	-	05/19/75
50	ROC from D. Kipley to B. Gerwe	D.C. Cook Code Compliance Review	-	08/21/90
51	0120-164-007	ABB Impell Calc. Deviation Evaluation	0	12/90
		LICENSING DOCUMENTS		
60	Docket No. 50-315, 50-316	Safety Evaluation Document of Donald C. Cook Plant, Units 1 & 2	1	01/30/87
		DRAWINGS		
70	DWG 46-032-71M-20	Sprinkler Piping, Unit 1 Generator End Basement	2	12/18/71
71	DWG 46-032-71M-24	Sprinkler Piping, Unit 1 Turbine End Basement Zone 80	3	10/30/71
72	DWG 46-032-71M-29	Sprinkler Piping, Unit 1 Generator End, Mezz Floor Zone 90	0	12/10/71
73	DWG 46-032-71M-32	Sprinkler Piping, Unit 1 Turbine End Mezz Floor Zone 91	0	11/03/71
74	DWG 46-032-71M-22	Sprinkler Piping, Unit 1 Generator End Basement Cable Racks Zone 79	1	05/26/72
75	DWG 46-032-71M-26	Sprinkler Piping, Unit 1 Turbine End Basement Cable Racks Zone 80	0	05/26/72

REF. NO.	DOCUMENT NUMBER	TITLE	REV. NO.	DATE
76	DWG 46-032-71M-31	Sprinkler Piping, Unit 1 Generator End, Mezz Floor Cable Racks Zone 90	0	09/22/72
77	DWG 46-032-71M-35	Sprinkler Piping, Unit 1 Turbine End, Mezz Floor Cable Racks Zone 91	0	07/29/72
78	DWG 121-8	Sprinkler Piping, Unit 2 Turbine End, Mezz Floor Floor Zone 84	1	10/21/74
79	DWG 121-22	Sprinkler Piping, Unit 2 Turbine End Basement Cable Racks Zone 84	0	08/16/76
80	DWG 121-10	Sprinkler Piping, Unit 2 Generator End Basement Floor Zone 85	2	12/30/74
81	DWG 121-24	Sprinkler Piping, Unit 2 Generator End Basement Cable Trays Zone 85	0	09/23/76
82	DWG 121-12	Sprinkler Piping, Unit 2 Turbine End Mezz Floor Zone 96	1	11/27/74
83	DWG 121-31	Sprinkler Piping, Unit 2 Turbine End Mezz Floor Cable Racks, Zone 96	0	11/17/76
84	DWG 121-14	Sprinkler Piping, Unit 2 Generator End Mezz Floor Zone 97	1	05/19/75
85	DWG 121-28	Sprinkler Piping, Unit 2 General End Mezz Floor Cable Racks Zone 97	0	10/15/76
86	DWG 1-5152J-1	Flow Diagram, Unit 1 Details - Turbine Bldg. and Screen House	1	06/21/88

REF. NO.	DOCUMENT NUMBER	TITLE	REV. NO.	DATE
87	DWG 2-5152K-2	Flow Diagram, Unit 2 Details - Turbine Bldg. and Screen House	2	06/21/88
88	DWG 2-5152C-2	Flow Diagram, Unit 2 Turbine Bldg. and Screen House	2	08/04/88
89	DWG 1-5152B-1	Flow Diagram, Unit 1 Turbine Bldg. and Screen House	4	04/07/89
90	RDR-12-253	Sprinkler Piping Diesel Fire Pump Rooms	1	04/20/79

TABLE 3.2-1

DEVIATION AND RECOMMENDATIONS/JUSTIFICATION
NFPA 13 - Installation of Sprinkler Systems (1971)

CODE SECTION	DEVIATION/OPEN ITEM	RECOMMENDATION/JUSTIFICATION
1041	Deviation: a. Fire Zones 79, 80, 90 & 91 had misaligned sprinklers for the cable tray systems. b. Protective guards were missing for hatchway sprinklers in Fire Zone 80. c. Sectionalizing valve No. 1-FP-196 does not have a valve operator.	a. Recommendation: Realign sprinkler nozzles as originally designed. b. Justification: ABB Impell Calc. No. 0120-164-007, Section 4.1-1 verified that the protective guards for the sprinklers at the hatchway are not required. Recommendation: Provide valve operator for valve 1-FP-196.
1046	Open Item: The instructions charts or care maintenance pamphlets (NFPA 13A) provided for the Unit 2 sprinkler systems.	Justification: Although maintenance instructions are not provided, the surveillance not procedures currently being implemented meet the intent of this code section.
1141	Open Item: Documentation could not be found to verify if the flooring is watertight.	Justification: Based on ABB Impell Calc. No. 0120-164-007, Section 4.1-2 the location of the system headers and floor drain facilities were verified for not having an impact on the safety related components installed in the area of system headers.

DEVIATION AND RECOMMENDATIONS/JUSTIFICATION
NFPA 13 - Installation of Sprinkler Systems (1971)

CODE SECTION	DEVIATION/OPEN ITEM	RECOMMENDATION/JUSTIFICATION
1412	Open Item: No documents stating that all materials and devices installed for the sprinkler systems were new or considered satisfactory for reuse.	Justification: The materials and devices specified in the 1971 piping and installation specification are in accordance with the NFPA standard and are therefore acceptable. In addition, walkdowns of the systems performed in July, 1990, verified the system components were well maintained.
	Deviation: Jamesbury butterfly isolation valves for wet pipe systems are not approved for fire service use.	Justification: The Jamesbury butterfly valve, although not listed, is adequate for the intended service. Valve positions is indicated by an arrow on the valve body and is cast of the appropriate materials for the class of service.
1511 1631 1632 1700	Open Item: There are no documents stating that the installation and testing of the Unit 2 sprinkler systems have been completed.	Justification: The review of Procedure 2-PO-050-508 verified that preoperational testing was performed as required. In addition, surveillance procedures performed verify the operability of these systems.
1611	Open Item: There are no certificates of acceptance for all systems.	Justification: The review of procedure PO-050-508 verified that preoperational testing was performed and were found to be acceptable.
1620	Deviation: Installation specifications do not require lead-in connections to be flushed.	Justification: Test procedure (12 OHP 4030.STP.124) requires periodic flushing of all systems.

CODE SECTION	DEVIATION/OPEN ITEM	RECOMMENDATION/JUSTIFICATION
2822	Deviation: a. Non-approved gauges were provided for the sprinkler system riser in Fire Zone 96, 84, 85, 97, 28 & 30. b. Gauge by-pass lines at fire zone 28 alarm valve are not freeze protected. c. Fire Zones 28 & 30 gauges read 210 PSI on a 300 psi scale.	Justification: a. The intent of this code requirement is to establish gauge accuracy on systems subject to large fluctuations in pressure. The water system at D.C. Cook is not subject to large pressure surges and therefore the gauges are acceptable. b. The alarm valve for Fire Zone 28 is heat traced and has not experienced freezing problems. c. The intent of this code requirement is to establish gauge accuracy on systems subject to large fluctuations in pressure. The water system at D.C. Cook is not subject to large pressure surges and therefore the gauges are acceptable.
3091 3092 3093 3094 3095	Open Item: There are no documents to verify proper installation of piping fittings and joints.	Justification: See response to code sections 1511, 1631, 1632 & 1700.
3241 & 3783	The main drain facilities for the sprinkler system headers for Unit 1 are not piped to flushing header. The retard chamber drains for Unit 2 sprinkler systems drain to floor.	Justification: Based on ABB Impell Calc. No. 0120-164-007, Section 4.1.2, adequate precautions are utilized for facilitating drainage.
3562	Deviation: a. Hangers were missing on sprinkler piping in Fire Zones 80, 84, 91 & 96. Deviation: b. Hangers were obstructing sprinklers in Fire Zones 28, 79, 84, 96 & 97.	Recommendation: a. Install hangers in Fire Zones 80, 84, 91 & 96 as required by code and original design drawings. Justification: b. Based on ABB Impell Calc. No. 0120-164-007, Section 4.1.3 the hanger rods will not adversely impact the nozzle spray patterns.

CODE SECTION	DEVIATION/OPEN ITEM	RECOMMENDATION/JUSTIFICATION
3612	Deviation: a. The Cable Tray and Area Systems installed in Fire Zones 79, 80, 90 & 91 use 1/4" orifice nozzles which are less than the 1/2" orifices specified by the NFPA code.	Justification: a. Based on ABB Impell Calc. No. 0120-164-007, Section 4.1.4 the cable tray sprinklers were determined to be adequate protection for these areas. Recommendation: b. The (2) small orifice sprinklers installed in the area system for Fire Zone 91 should be replaced with 1/2" orifice sprinklers.
3653	Deviation: Unit 1 & 2 cable tray and Unit 1 Turbine Building area protection sprinkler systems use 250°F sprinklers which exceed the temperature requirements of the Code Table 3651.	Justification: Code Section 3654 allows using high temperature rated sprinklers for special hazards which are normally associated with the turbine building.
3691 3682 3683	Deviation: a.Sprinklers in Fire Zones 79, 80, 84, 91 & 96 were painted or covered.	Recommendation: All sprinklers which have been painted or covered should be replaced. Although sprinklers are painted or covered with a plastic bag, they are typically isolated to one or two sprinklers in an area. Since the painting is typically a light spraying, only the response time of the sprinkler is affected. Considering the overlap from adjacent sprinklers, this is not considered a significant problem.

CODE SECTION	DEVIATION/OPEN ITEM	RECOMMENDATION/JUSTIFICATION
4143	Deviation: a. Sprinklers were found to be missing in Fire Zones 79, 80, 90, 91, 84, 85, 96 & 97. b. Improper installation of sprinklers were provided for several Fire Zones 80, 91, 96 & 97.	Justification: a. Based on ABB Impell Calc. No. 0120-164-007, Section 4.1.5, several missing sprinklers were found to be justified based on the lack of combustible materials present and the control of a postulated fire by adjacent sprinklers. These Fire Zones include No. 80, 84, 85, 90 & 97. b. ABB Impell Calc. No. 0120-164-007, Section 4.1.5, verified the adequacy of the current type of sprinklers installed to protect the areas. The sprinklers are located in the hatchways in Fire Zones 80 & 91. Recommendation: a. Sprinklers missing in the following fire zones should be installed as required to provide protection. They include Fire Zones 79, 80, 84, 91 & 96. b. Replace improperly installed sprinklers in Fire Zones 80, 96 & 97.
4156 4316 4319	Deviation: Sprinklers were found to be obstructed in Fire Zones 79, 80, 90, 91, 84, 85, 96 & 97.	Justification: ABB Impell Calc. No. 0120-164-007, Section 4.1.6 verified that the sprinkler obstructions do not adversely affect the ability of the sprinklers to provide adequate protection. This justification includes sprinkler obstructions detailed in the calculation for Fire Zones 79, 80, 84, 85, 90, 91, 96 & 97. Recommendation: Sprinklers should be installed to provide adequate protection under obstructions in Fire Zones 91, 96 & 97.

CODE SECTION	DEVIATION/OPTION ITEM	RECOMMENDATION/JUSTIFICATION
4211 4231	Deviation: Sprinklers are installed greater than 12 inches below the deck in Fire Zones 90, 91, 96 & 97.	Justification: ABB Impell Calc. No. 0120-164-007, Section 4.1.7 verified that sprinklers located less than 16" below the deck will not have an adverse affect on the operation of the sprinkler system or its ability to provide adequate coverage for the underside of the deck. This is based on the combustibles present and adjacent sprinklers providing adequate protection. This includes Fire Zone No. 97. Recommendation: Deflectors should be located within 16 inches of the deck for sprinklers located in Fire Zone 90, 91, 96 & 97.

3.3 NFPA 14 - Installation of Standpipe and Hose Systems

3.3.1 Scope of Evaluation

The standpipe and hose systems were reviewed under the edition that was in effect at the time the original system was specified on April 2, 1971.

The following areas were evaluated under the requirements of NFPA 14, 1971 Edition:

- These fire zones will be verified for all portions of the fire zone within 40 feet of column line H, and auxiliary feed water pump rooms or safety related trays. The portions of the fire zones reviewed included the area bounded by column coordinates: Fire Zones #79-80 (Col. Lines H-23, H-14, G-26, G-18, GA-23, GA-26, E-18 and E-14); Fire Zones #84-85 (Col. Lines H-13, H-4, G-9, G-1, GA-4, GA-1, E-13 and E-9); Fire Zones #90-91 (Col. Lines H-14, H-23, E-14, E-18, G-18, G-26 and GA-26); Fire Zones #96-97 (Col. Lines H-13, H-4, G-13, G-1, GA-4 and GA-1) Fire Zones 129 & 130 (Col. Lines H-8, H-19, G-8 and G-19). ⚠1

- Unit 1 & 2 Containment Fire Areas AAA & CCC (Fire Zone 66-68, 74-76, 101 through 104)

- Unit 1 & 2 Diesel Fire Pump Room Sprinkler Systems (Fire Zone 28 & 30)

- Hose Stations located in Fire Zone 142 were used to verify adequate coverage of hazards within Fire Zone 28 & 30.

3.3.2 Assumptions

The following assumption has been made for the evaluation of NFPA 14.

1. The intent of the standpipe service at the plant was to provide Class II service for those stations which have a single 1-1/2 inch hose valve and Class III service at those stations which have both 2-1/2 inch and 1-1/2 inch hose valves.

3.3.3 Deviations and Recommendations/Justifications

The standpipe and hose systems at the plant are in compliance with NFPA 14 except as identified by the open items and deviations in Table 3.3-1. The table also provides recommendations and/or justifications for these items.

3.3.4 References

WALKDOWN VERIFICATION CHECKLISTS

1	0120-164-003A	ABB Impell Calc., NFPA 14, 1971 Code Compliance Walkdown Verification Checklist (Fire Zone - 79)	0	12/90
2	0120-164-003B	ABB Impell Calc., NFPA 14, 1971 Code Compliance Walkdown Verification Checklist (Fire Zone - 80)	0	12/90
3	0120-164-003C	ABB Impell Calc., NFPA 14, 1971 Code Compliance Walkdown Verification Checklist (Fire Zone - 84)	0	12/90
4	0120-164-003D	ABB Impell Calc., NFPA 14, 1971 Code Compliance Walkdown Verification Checklist (Fire Zone - 85)	0	12/90
5	0120-164-003E	ABB Impell Calc., NFPA 14, 1971 Code Compliance Walkdown Verification Checklist (Fire Zone - 28)	0	12/90
6	0120-164-003F	ABB Impell Calc., NFPA 14, 1971 Code Compliance Walkdown Verification Checklist (Fire Zone - 30)	0	12/90
7	0120-164-003G	ABB Impell Calc., NFPA 14, 1971 Code Compliance Walkdown Verification Checklist (Fire Zone - 90)	0	12/90
8	0120-164-003H	ABB Impell Calc., NFPA 14, 1971 Code Compliance Walkdown Verification Checklist (Fire Zone - 91)	0	12/90
9	0120-164-003I	ABB Impell Calc., NFPA 14, 1971 Code Compliance Walkdown Verification Checklist (Fire Zone - 96)	0	12/90

REF NO.	DOCUMENT NUMBER	TITLE	REV. NO.	DATE
10	0120-164-003J	ABB Impell Calc., NFPA 14, 1971 Code Compliance Walkdown Verification Checklist (Fire Zone - 97)	0	12/90
11	0120-164-003K	ABB Impell Calc., NFPA 14, 1971 Code Compliance Walkdown Verification Checklist (Fire Zone - 129)	0	12/90
12	0120-164-003L	ABB Impell Calc., NFPA 14, 1971 Code Compliance Walkdown Verification Checklist (Fire Zone 130)	0	12/90
		PROCEDURES		
13	12-SHP2270 FIRE.004	Tests and Inspections of the Plant Fire Hose Standpipe Stations	0	2/12/88
14	12-OHP4030.STP.120VV	Fire Protection Valve Lineup Verification	0	4/14/88
14A	12-OHP4030.STP.124	Fire Protection System Flush and Loop Flow Test	0	9/10/87
		TECHNICAL DATA		
15	09-0120-0123	Impell Report	0	5/88
15A	0120-164-007	ABB Impell Calc. for Deviation Evaluations	0	12/90
16	SD-DCC-FP101	Fire Protection System-Water (Pg. 12)	2	12/26/89
17	Catalog (Page 25 + 78)	Fire End	-	-
18	P125-670	Jamesbury Catalog	-	6/70
19	Catalog-T (Ref 57)	Elkhart	-	-
20	NFPA 14	NFPA 14: 4-2.2	-	1987
21		ROC Kipley to Russell	-	8/7/90

REF NO.	DOCUMENT NUMBER	TITLE	REV. NO.	DATE
		DRAWINGS		
22	0120-164	ROC Kipley to Basset	-	8/7/90
23	1-5152B-5	Flow Diagram Fire Protection Fire Protection - Water Turbine Bldg & Screen House Unit 1	5	4/7/89
24	2-5152C-2	Flow Diagram Fire Protection Fire Protection - Water Turbine Bldg & Screen House Unit 2	2	8/4/88
25	2-5152A-3	Flow Diagram Fire Protection Fire Protection - Water Piping at Pumps Units 1 & 2	3	3/23/88
26	12-5267-6	Fire Facilities Basement Plan El. 591'-0" and 587'-0" Units 1 & 2	6	1/29/90
27	12-5268-5	Fire Facilities Mezzanine Floor El. 609'-0" Units 1 & 2	5	1/29/90
28	12-5269-5	Fire Facilities Turbine Bldg. Main Floor El. 633'-0" Units 1 & 2	5	1/29/90
29	1-FP-4	Turbine Room Fire Protection Piping Isometric	8	7/23/87
30	1-FP-5	Turbine Room Fire Protection Piping Isometric	3	8/31/71
31	1-FP-12	Turbine Room Fire Protection Piping Isometric	7	1/16/89
32	1-FP-13	Turbine Room Fire Protection Piping Isometric	6	4/20/73
33	1-FP-27	Turbine Room Fire Protection Piping Isometric	4	4/20/73
34	1-FP-28	Turbine Room Fire Protection Piping Isometric	3	8/31/71

REF NO.	DOCUMENT NUMBER	TITLE	REV. NO.	DATE
35	1-FP-29	Turbine Room Fire Protection Piping Isometric	5	3/11/87
36	1-FP-30	Turbine Room Fire Protection Piping Isometric	6	7/27/87
37	2-FP-37	Turbine Room Fire Protection Piping Isometric	5	3/23/87
38	2-FP-38	Turbine Room Fire Protection Piping Isometric	7	3/23/87
39	2-FP-39	Turbine Room Fire Protection Piping Isometric	6	2/1/88
40	2-FP-40	Turbine Room Fire Protection Piping Isometric	10	3/23/87
41	2-FP-41	Turbine Room Fire Protection Piping Isometric	7	4/10/85
42	2-FP-42	Turbine Room Fire Protection Piping Isometric	5	1/30/78
43	2-FP-60, sht. 1 of 2	Turbine Room Fire Protection Piping Isometric	6	5/22/85
44	2-FP-60, sht. 2 of 2	Turbine Room Fire Protection Piping Isometric	1	2/1/72
45	2-FP-78	Turbine Room Fire Protection Piping Isometric	4	1/20/88
46	2-FP-86, sht. 1 of 2	Turbine Room Fire Protection Piping Isometric	5	1/30/88
47	2-FP-86, sht. 2 of 2	Turbine Room Fire Protection Piping Isometric	2	2/20/73
48	2-FP-90	Turbine Room Fire Protection Piping Isometric	0	6/28/72
49	1-FP-119	Turbine Room Fire Protection Piping Isometric	1	1/4/90

REF NO.	DOCUMENT NUMBER	TITLE	REV. NO.	DATE
		LICENSING DOCUMENTS		
50	50-315 50-316	Safety Evaluation Report for BTP.APCSB 9.5-1, Appendix A	-	07/31/79
51	50-315 50-316	10CFR50, Appendix R Safety Evaluation Document of IMPC D.C. Cook Plant, Units 1 & 2	-	04/26/90

TABLE 3.3-1

DEVIATION AND RECOMMENDATIONS/JUSTIFICATIONS
NFPA 14 - Standpipe and Hose System

CODE SECTION	DEVIATION/OPEN ITEM	RECOMMENDATION/JUSTIFICATION
171	Open Item: Plan and specification Documentation was not available to confirm that the authority having jurisdiction reviewed them for approval.	Justification: Although these documents could not be verified for approval, AEP (A/E) has plans and specifications for these systems in their files. These diagrams and specs are controlled documents and are maintained by AEP.
212, 212a, 511, 524, 525, 531 & 671	Open Item: Hydraulic calcs. will be required in order to determine compliance.	Recommendation: AEP to provide further evaluation in conjunction with new water supply and pumping facilities to determine compliance.
432, 442	Deviation: Pressure reducers are not provided at hose stations and signs are not installed at hose stations to warn personnel of high pressures.	Justification: The hose stations are for use by the fire brigade only. The fire brigade is trained in the use of high pressure hose.
622, 413	Deviation: Isolation valves are not provided for the Turbine Building hose systems risers and supplies.	Justification: The review of drawings 1-5152B & 2-5152C verified that adequate isolation valves were provided for a majority of the of the hose risers without adversely impacting the operation of sprinklers protecting safety related components. Also reference ABB Impell Calc., 0120-164-007, Section 4.2.1 for the justification for the lack of isolation valves for specific hose risers in Fire Zones 80, 84 & 142.

DEVIATION AND RECOMMENDATIONS/JUSTIFICATIONS
NFPA 14 - Standpipe and Hose System

CODE SECTION	DEVIATION/OPEN ITEM	RECOMMENDATION/JUSTIFICATION
651	Open Item: Drawings were not available to verify compliance with the requirements for providing proper system piping supports.	Justification: Based on the review of the turbine room fire protection drawings (Ref. 29 through 49), the seismic class III support system provided verifies that the requirements for this section are being met. Also based on discussions with AEPSC staff, pipe support failures have not been a significant issue.
681	Deviation: Water flow alarms are not provided at base of risers.	Justification: This code section is a recommendation to preclude the use of hose stations by building occupants without the notification of others as to the fire location. Since the hose stations are for the fire brigade's use only, waterflow signaling will not provide a significant increase in the level of fire protection.

DEVIATION AND RECOMMENDATIONS/JUSTIFICATIONS
NFPA 14 - Standpipe and Hose System

CODE SECTION	DEVIATION/OPEN ITEM	RECOMMENDATION/JUSTIFICATION
724	Deviation: New gaskets are not installed during annual testing.	Justification: Fire hoses are inspected monthly for verification of equipment present and identification of any damage. If damage is noted, the hose is replaced. At 18 month intervals, all hoses are removed; inspected for damage and degradation of gaskets; corrections made, if necessary, and reracked. This dual checking of hoses at one and 18 month frequencies satisfies the intent of this code to identify and correct damaged equipment.
321	Deviation: Hose reach for all portions of Unit 1 & 2 of containments are not achieved with maximum hose length of 100 feet.	Justification: Based on the review of AEP Calc. No. DCC-FP010-HS16-F & DCC-FP02-HS32-F, adequate protection would be provided by the hose stations located outside the containment access portals when using hose lengths in excess of 100 feet.

3.4 NFPA 15-1973 Water Spray Systems

3.4.1 Scope of Evaluation

The water spray systems evaluated for the D.C. Cook Nuclear Plant are limited to the following:

The following systems were evaluated under the requirements of NFPA 15, 1973 Edition:

- Unit 1 & 2 Containment Charcoal Filter Unit and Reactor Coolant Pump Suppression Systems, (Fire Zone 66-68, 74-76,)
- Unit 1 & 2 Transformer and Turbine Wall Water Spray Systems (Yard)

3.4.2 Assumptions

The following assumptions have been made for the evaluation of NFPA 15.

1. Due to ALARA (high radiation) concerns, the charcoal filter units were inaccessible during the walkdowns. Therefore, the water spray nozzle arrangements within the filtration units are assumed similar to the previous walkdown sketch as documented in the AEPSC evaluation document of June 17, 1988 for all units.

2. The above noted fire protection systems at the D.C. Cook Plant are not subject to earthquake support criteria as it pertains to NFPA codes.

3. The water spray systems were installed per April 2, 1971 specifications.

4. It is assumed that the spray system arrangement for the charcoal filter units are typical with the exception of the number of charcoal filter beds.

3.4.3 Deviations and Recommendations/Justifications

The water spray systems are in compliance with NFPA 15 with the exception of the open items and deficiencies identified in Table 3.6-1. The table also provides recommendations and/or justifications for these items.

REF NO.	DOCUMENT NUMBER	TITLE	REV. NO.	DATE

3.4.4 References

WALKDOWN VERIFICATION CHECKLISTS

1	0120-164-004A	ABB Impell Calc., NFPA 15, 1973 Code Compliance Walkdown Verification Checklist (Start-Up XFRM 101 AB)	0	12/90
2	0120-164-004B	ABB Impell Calc., NFPA 15, 1973 Code Compliance Walkdown Verification Checklist (Start-Up XFRM 101 CD)	0	12/90
3	0120-164-004C	ABB Impell Calc., NFPA 15, 1973 Code Compliance Walkdown Verification Checklist (Aux XFRM 1 CD)	0	12/90
4	0120-164-004D	ABB Impell Calc., NFPA 15, 1973 Code Compliance Walkdown Verification Checklist (Aux XFRM 1 AB)	0	12/90
5	0120-164-004E	ABB Impell Calc., NFPA 15, 1973 Code Compliance Walkdown Verification Checklist (345KV Main XFRM)	0	12/90
6	0120-164-004F	ABB Impell Calc., NFPA 15, 1973 Code Compliance Walkdown Verification Checklist (Unit 1 Exposure Prot)	0	12/90
7	0120-164-004G	ABB Impell Calc., NFPA 15, 1973 Code Compliance Walkdown Verification Checklist (Aux XFRM 2 AB)	0	12/90
8	0120-164-004H	ABB Impell Calc., NFPA 15, 1973 Code Compliance Walkdown Verification Checklist (Aux XFRM 2 CD)	0	12/90

REF NO.	DOCUMENT NUMBER	TITLE	REV. NO.	DATE
9	0120-164-004I	ABB Impell Calc., NFPA 15, 1973 Code Compliance Walkdown Verification Checklist (Unit 2 Main XFRM's 01,02,03)	0	12/90
10	0120-164-004J	ABB Impell Calc., NFPA 15, 1973 Code Compliance Walkdown Verification Checklist (Start-Up XFRM's 201 AB, 201 CD)	0	12/90
11	0120-164-004K	ABB Impell Calc., NFPA 15, 1973 Code Compliance Walkdown Verification Checklist (Unit 2 Exposure Prot)	0	12/90
12	0120-164-004L	ABB Impell Calc., NFPA 15, 1973 Code Compliance Walkdown Verification Checklist (Charcoal Filter Units)	0	12/90
13	0120-164-004M	ABB Impell Calc., NFPA 15, 1973 Code Compliance Walkdown Verification Checklist (RCP Pump Systems)	0	12/90
		PROCEDURES		
20	P0-050-508	Fire Protection - Water Preoperational Test Procedure	0	07/03/74
21	12-0HP-4030-STP120VC	Fire Protection Yearly Valve Cycle and Lineup Verification	1	07/19/90
22	12-0HP-4030-STP120VV	Fire Protection Valve Lineup Verification	0	11/17/88
23	12-0HP-4030-STP120SF	Fire Protection Unobstructed Flow Test and Sprinkling Alarm Test	1	07/19/90
24	12-0HP-4030-STP.124	Fire Protection System Flush and Loop Flow Test	0	10/05/89
25	12-0HP-4030-STP.223	Fire Protection Water System Test	8	07/27/89
26	12-0HP-4030-STP.125NS	Non-Tech Spec Required Sprinkler Tests	1	10/12/89

REF NO.	DOCUMENT NUMBER	TITLE	REV. NO.	DATE
27	1-0HP-4030-STP.123	Transformer Water Spray Test	2	07/25/88
28	2-0HP-4070-STP.123	Transformer Water Spray Test	2	12/29/88
29	1-0HP-4030 STP.125CV	Unit 1 Yearly Charcoal Filter Valve Cycle	0	09/21/89
30	2-0HP-4030-STP.125CV	Unit 2 Yearly Charcoal Filter Valve Cycle	0	05/19/89
31	12-0HP-4030-STP.125CF	Inside Containment Charcoal Filter F.P. Valve Cycling	0	02/23/89
32	1-MPH-4030-STP.032	Inspection of Preaction Spray Headers Inside Unit 1 Containment	1	03/13/86
33	2-MPH-4030-STP.032	Inspection of Preaction Spray Headers Inside Unit 2 Containment	1	02/27/86
34	12THP-4030-STP.239	RCP Fire Det. and Water System Test	7	07/06/90
35	120HP-4030-STP.120PS	RCP F.P. Strainer Blowdown and Isolation Valve Cycling	2	01/09/89
		TECHNICAL DATA		
40	-	Letter From: R. J. Daley To: R.W. Jurgensen Instruction Book, "Grinneland Star Fire Systems Equipment"	-	07/15/74
41	SD-DCC-FP101	System Description, Fire Protection System - Water	2	12/26/89
42	-	Specification for Fire Protection Systems of D.C. Cook Nuclear Plant	0	04/02/71
43	DCCPM104ECS	Shop and Field Fabrication and Erection	4	05/24/7[illegible]
45	ROC from D. Kipley to B. Gerwe	Ambient Temperature Conditions		08/06/90

REF NO.	DOCUMENT NUMBER	TITLE	REV. NO.	DATE
46	0120-164-005	ABB Impell Calc. NFPA 72D, Code Compliance Verification Checklist	0	12/90
47	0120-164-006	ABB Impell Calc. NFPA 72E, Code Compliance Verification Checklist	0	12/90
48	-	Grinnel Hydraulic Calcs. for Unit 1 Main XFRM	0	01/06/72
49	-	Grinnel Hydraulic Calcs. for Unit 1 Start-Up XFRM	0	09/20/71
50	-	Grinnel Hydraulic Calcs. for Unit 1 Aux XFRM	0	09/20/71
51	-	Grinnel Hydraulic Calcs. for Unit 1 Spare Main XFRM	1	07/31/72
52	-	Hodgeman Hydraulic Calcs. for Unit 1 Spare Main XFRM	0	09/15/76
53	-	Hodgeman Hydraulic Calcs. for Unit 1 Exposure Prot	0	02/12/76
54	-	Hodgeman Hydraulic Calcs. for Start-Up XFRMs 201 AB & 201 CD	0	11/08/74
55	-	Hodgeman Hydraulic Calcs. for Unit 2 Main XFRMs 01, 02, 03	0	07/08/74
56	-	Hodgeman Hydraulic Calcs. for Unit 2 Exposure Protection	0	06/02/76
57	DCCFP01HS02-F	AEPSC Hydraulic Calc. for Unit 1 HVAC Equip Vestibule	0	02/24/88
58	DCCFP02HS25-F	AEPSC Hydraulic Calc. for Unit 2 HVAC Equip	0	02/24/88
59	-	Grinnel and Hodgeman Sprinkler Head Spec Sheets	-	-

REF NO.	DOCUMENT NUMBER	TITLE	REV. NO.	DATE
60	-	Phoenix Hydraulic Calcs. & FC 12-2231 (RCP & Diesel Pump Room)	0	04/26/79
61	RFCDC-12-2231	Phoenix Contractors Hydraulic Calcs. (RCP & Diesel F.P Rooms)	0	03/27/87
62	-	AEPSC Evaluation Document	0	06/17/88
63	0120-164-007	ABB Impell Calc. Deviation Evaluation	0	12/ 0
		LICENSING DOCUMENTS		
70	DRP No. 74	Donald C. Cook, FHA Docket No. 50-316	4	01/31/87
		DRAWINGS		
80	Dwg. 46-032-71M-11	Plot Plan and Header Details, Unit 1 Trans.	4	09/30/71
81	Dwg. 121-25	Unit 1 Main XFRM Bottom Ring	0	09/15/76
82	Dwg. 121-26	Unit 1 Main XFRM Top Ring	0	09/15/76
83	Dwg. 46-032-71M-7	Unit 1 Start-Up XFRM 101 AB & 101 CD	3	09/20/71
84	Dwg. 46-032-71M-8	Unit 1 Aux XFRM 1 AB & 1 CD	2	09/24/71
85	Dwg. 46-032-71M-10	Unit 1 345 KV Main XFRM	2	01/12/72
86	Dwg. 121-18 121-17	Unit No. 1 Exposure Protection	0	02/12/76
87	Dwg. 46-032-71M-43	Unit 2 Aux XFRMs	0	12/15/72
88	Dwg. 121-15	Unit No. 2 Aux XFRMs	-	-
89	Dwg. 121-6	Unit No. 2 Start-Up Transformers 201 AB, 201 CD	1	11/08/74

REF NO.	DOCUMENT NUMBER	TITLE	REV. NO.	DATE
90	Dwg. 121-2	Unit 2 Plot Plan and Header Details	5	06/13/74
91	Dwg. 46-032-71M-42	Unit 2 Plot Plan and Header Details	0	12/15/72
92	Dwg. 121-3	Unit 2 Main XFRMs 01, 02, 03	2	06/14/74
93	Dwg. 46-032-71M-44	Unit 2 Main XFRMs 01, 02, 03	0	12/14/72
94	Dwg. 121-19 & 121-20	Unit No. 2 Exposure Protection	1	05/12/76
95	RFC No. 12-2231	RCP Spray Piping Plans (Phoenix sheets 3, 4, 5, 14, 15 & 16)	0	09/17/79
96	Dwg. 12-5152-4	Flow Diagram Fire Prot - Water Yard Piping Unit 1 & 2	4	07/23/89
97	Dwg. 1-5152B-5	Flow Diagram Fire Prot - Water Turb. Bldg. and Screen House Unit 1	5	04/07/89
98	Dwg. 2-5152C-2	Flow Diagram Fire Prot - Water Turb. Bldg. and Screen House Unit 2	2	08/04/88
99	Dwg. 12-5152D-7	Flow Diagram Fire Prot - Water Aux & Containment Unit 1 and 2	0	12/04/89
100	Dwg. 12-5152E-3	Flow Diagram Fire Prot - Water Charcoal Filters Units 1 and 2	3	01/08/90
101	Dwg. 1-5152J-1	Flow Diagram Fire Prot - Water Details - Turbine Bldg. and Screen House Unit 1	1	06/21/88
102	Dwg. 1-5152K-1	Flow Diagram Fire Prot - Water Details - Turbine Bldg. and Screen House Unit 2	2	06/21/88

REF NO.	DOCUMENT NUMBER	TITLE	REV. NO.	DATE
103	Dwg. 12-5152L-7	Flow Diagram Fire Prot - Water Sys. Details Turb. Bldg. and Service Bldg. Unit 1 & 2	7	01/08/90
104	Dwg. 12-5152M-4	Flow Diagram Fire Prot - Water Details - RCP's Units 1 & 2	4	09/29/89
105	Dwg. 12-5152N-3	Flow Diagram Fire Prot - Water Sys. Details - Yard Piping & Aux Bldg. Units 1 & 2	3	09/18/89

TABLE 3.4-1

DEVIATION AND RECOMMENDATIONS/JUSTIFICATIONS
NFPA 15 - Water Spray Fixed Systems

CODE SECTION	DEVIATION/OPEN ITEM	RECOMMENDATION/JUSTIFICATION
1061	Open Item: Document verifying the certifications of all water spray systems involved is not provided.	Justification: It is assumed that all materials and devices installed for the water spray systems are in accordance with standard installation practices under the guidance of the 1971 piping and installation specifications. The review of pre-operational test procedure PO-050-508 has also verified that the systems were properly tested by AEPSC and were found to be satisfactory prior to start-up.
2012	Open Item: a. Documents not available for verifying that materials were new at the time of procurement. b. Unit 1 & 2 spray system isolation valves are not approved for application. c. Unit 1 & 2 charcoal filter unit automatic valves are not approved for the application.	Justification: a. See response to code section 1061. b. The Jamesbury butterfly valve, Unit 1 & 2 charcoal filter unit although not listed, is adequate for the intended service. Valve position is indicated by an arrow on the valve body and is rated for the class of service. c. ABB Impell Calc. No. 0120-164-007, Section 4.3.1 verified the valves used for the filter unit spray systems are adequate for use in these systems.

CODE SECTION	DEVIATION/OPEN ITEM	RECOMMENDATION/JUSTIFICATION
2031 4072	Deviation: Inadequate spray protection is provided for the following: a. Unit 1 exposure protection does not consider (4) unprotected openings. b. Unit 2 main transformer nozzle obstructions. c. Unit 1 RCP #3 nozzle obstruction.	Justification: a. ABB Impell Calc. No.0120-164-007, Section 4.3.2 verified that the one opening in the turbine building wall and the three openings in the service building wall are provided adequate protection based on spacial separation, fire rated construction and/or transformer water spray system. b. The review of Hodgeman Calc. No. 121-1 & 121-2 verified that the original design included a significantly higher spray density for the transformer (0.7GPM/FT^2) than is required by NFPA 15-1987, Section 4-4.3.4 (0.25 GPM/FT^2). This increased density compensates for any minor obstructions encountered due to the physical restraints of the installation. c. The review of AEPSC Drawings No. 2-5695 & 2-5699, Phoenix Dwg. No. 14 & 15 and Grinnell nozzle data for EA-1, has verified that the (1) Nozzle obstructed by a 24" x 81" HVAC duct is being supported by overlapping spray from adjacent nozzles.
2082	Deviation: Non-approved solenoid valve for charcoal filter unit spray systems.	Justification: Based on ABB Impell Report No. 09-0120-0123, NFPA 72D Section 2032, the solenoid valves are considered acceptable.
2111	Deviation: Strainers are not provided for the Unit 1 & 2 transformer and exposure protection spray systems.	Justification: Based on ABB Impell Calc. No. 0120-164-007, Section 4.3.3, strainers are not considered to be necessary.

CODE SECTION	DEVIATION/OPEN ITEM	RECOMMENDATION/JUSTIFICATION
4081	Deviation: 3/8" pipe installed within the charcoal filter units is less than the 1" pipe required by the code.	Justification: Based on the review of the evaluation performed in AEP Evaluation Document dated 6/17/88, this piping arrangement is acceptable.
4082	Deviation: Test gauge connections are not provided for the Unit 2 RCP pumps, charcoal filter units, main transformers, startup transformers, and exposure protection spray systems.	Justification: The intent of this code is to verify design pressures during initial system tests. Hydraulic calcs verify the ability of the system to supply adequate pressure at the most remote nozzle, and system flow tests are performed every 18 months via plant procedures.
4121	Deviation: System gauges are not provided for the Unit 1 & 2 charcoal filter units and non-approved gauges are used in the Unit 2 transformer and exposure protection systems.	Justification: Based on ABB Impell Calc. No. 0120-164-007, Section 4.3.4, the system gauges provided are considered acceptable for surveillance and testing purposes and the provision of gauges for the filter units is not considered significant fire protection enhancement.
5011 5021 5031	Open Item: Documentation verifying the certification of all water spray systems involved is not provided.	Justification: See response to Code Section 1061.
5023	Open Item: There are no test results for the discharge pressure at the most remote nozzle of each system.	Justification: See response to Code Section 4082.

DEVIATION AND RECOMMENDATIONS/JUSTIFICATIONS
NFPA 15 - Water Spray Fixed Systems

CODE SECTION	DEVIATION/OPEN ITEM	RECOMMENDATION/JUSTIFICATION
7000	Open Item: Design documents are not available for the Unit 1 & 2 charcoal filter units.	Justification: Although original design documents are not available, AEPSC has prepared system piping/support configuration sketches and hydraulic calcs to verify the adequacy of the water spray systems installed within the charcoal filter units.
7010	Open Item: Water supply graphs are not available for review to verify that the water supply is adequate for the systems reviewed.	Recommendation: AEPSC to evaluate water supply adequacy during future fire pump modification.
8051	Open Item: The activation of the Unit 1 & 2 detectors for the spray systems within the required time frame of 40 seconds could not be verified for compliance during testing.	Justification: Based on ABB Impell Calc. No. 0120-164-007, Section 4.3.5, the detection systems response time is considered adequate.

3.5 NFPA 72D - Proprietary Signaling Systems

3.5.1 Scope of Evaluation

The evaluation of the proprietary signaling system was based on the edition that was in effect at the time the system was specified on April 2, 1971. The edition that was applicable was 1967. The portions of the systems addressed under the 1967 edition, are as follows:

REVIEW INCLUDES THE FOLLOWING SYSTEMS:	INITIAL SYSTEM INSTALLATION DATE
Alison Controls detection panels which include:	
a. Charcoal Filter Units:	2/72
° 1 & 2-HV-CFT-1 (Detection Only)*	
° 1 & 2-HV-CFT-2 (Detection Only)*	
b. Reactor Coolant Pumps	4/79
° Units 1 & 2 RCP Pump #1-4 (Detection Only)*	
c. Containment Alarm System Unit 1 & 2 (Detection Only)*	6/71
d. Transformers	
° Unit 1 Main	9/86
° Unit 2 Main, Phases 1-3	2/72
° Transformer 1AB & 2AB	2/72
° Transformer 1CD & 2CD	2/72
° Transformer 101AB	2/72
° Transformer 101CD & 201CD	2/72
° Transformer 201AB	9/86
e. Unit 1 & 2 Turbine Building Wall Spray Systems.	7/72
The "EF" annunciator panel signaling line circuits only for the associated detection and sprinkler waterflow/supervisory systems were reviewed in items a through e above.	2/72
The waterflow and manual alarm and supervisory devices for suppression systems installed in Fire Zones 28, 30, 79, 80, 84, 85, 90, 91, 96 & 97, yard transformers and Turbine Bldg. walls. *	2/72

*NOTE: The control panels, waterflow, manual alarm and supervisory devices for suppression systems were previously reviewed for compliance in ABB Impell Report No. 09-0120-0123.

Certain scope limitations are identified in the report which are not verified due to their non-applicability. The limitations are as follows:

a. The proprietary signaling system has not been designed to perform Manual Fire Signaling Services as outlined in NFPA 72D, Article 310. This is based on code section 3010 which states that the signaling services may be applied individually or in any combination of different types of systems. Since manual stations have not been provided throughout the areas reviewed, only those areas where manual stations have been provided for the suppression system actuation have been reviewed. The intent of the suppression system manual station devices installed was not to provide a manual fire alarm signaling service. Therefore, code section 3113 which details the distribution requirements for providing a manual fire alarm signaling service are not applicable. However, code sections 3321 and 3421 requires that supplemental manual fire station be provided for detection systems and that they be located where designated by the authority having jurisdiction. These devices have been provided as required.

b. The intent in the design of proprietary signaling system at D.C. Cook was to be a "Class B" (two wire) system in accordance with the requirements of code section 4011. Therefore, the requirements of code sections 4012, and 4080 which address "Class A" systems are not applicable.

3.5.2 Assumptions

The following assumption has been made for the evaluation of NFPA 72D.

1. For the purpose of this report, it is assumed that under most conditions the authority having jurisdiction was the architect/engineer (A/E) for the plant who is American Electric Power Service Corporation (AEPSC) unless otherwise indicated.

2. AEPSC will ensure that any modifications required for compliance with the Factory Mutual approval criteria will be performed for the A888-M664/A panels installed.

3. The new Alison control panels model number A888-M664/A recently installed for the Unit 1 transformer and the Unit 2 start-up transformer, were reviewed for compliance with the requirements of NFPA 72D-1967 edition. Although these panels were installed after 1986, the intent of the code section requirements reviewed as part of this evaluation for the 1967 Edition, did not significantly change under the 1986 Edition. Therefore, to provide consistency, these panels were reviewed to the 1967 Edition.

3.5.3 Deviations and Recommendations/Justifications

The plant proprietary signaling system is in compliance with NFPA 72D except as identified by the open items and deviations in Table 3.5-1. The table also provides recommendations and/or justifications for these items.

3.5.4 References

		WALKDOWN VERIFICATION CHECKLISTS		
1	0120-164-005A	Fire Zone 79 - Unit 1	0	12/90
2	0120-164-005B	Fire Zone 80 - Unit 1	0	12/90
3	0120-164-005C	Fire Zone 84 - Unit 2	0	12/90
4	0120-164-005D	Fire Zone 85 - Unit 2	0	12/90
5	0120-164-005E	Fire Zone 90 - Unit 1	0	12/90
6	0120-164-005F	Fire Zone 97 - Unit 2	0	12/90
7	0120-164-005G	Yard - Unit 1	0	12/90
8	0120-164-005H	Yard - Unit 2	0	12/90
9	0120-164-005I	Fire Zone 28 - Unit 1	0	12/90
10	0120-164-005J	Fire Zone 30 - Unit 2	0	12/90
		TECHNICAL DATA		
11	0120-108-007.1	NFPA 72D Document Verification Checklist	0	5/11/88
12	09-0120-0123	ABB Impell Code Compliance Compliance Report	0	5/88
13	-	AEP NFPA Code Justification Evaluations	-	6/17/88
14	-	Alison Controls Inc. Manual for A888-M664/A	-	9/15/86
15	-	Record of Conversation Between D. Kipley and B. Gerwe	-	7/27/90
16	PM 683	Plant Modification Project for the Installation of ACI A888-M664/A Panels	1	01/07/87

REF NO.	DOCUMENT NUMBER	TITLE	REV. NO.	DATE
16A	--	ABB Impell Memo No.M-007 on Alarm Circuit Supervision	-	7/6/90
		PROCEDURES		
17	1-0HP-4030-STP-123	Transformer Water Spray Test	2	07/25/88
18	2-0HP-4030-STP-123	Transformer Water Spray Test	2	12/29/88
19	PMI-2270	Fire Protection Program	16	02/09/87
20	12-0HP-4030-STP-125NS	Non-Tech Spec. Required Sprinkler Tests	1	10/12/89
21	12-THP-6030-IMP-142	Fire Det. & CO_2 System Surv. Testing (6 Mo.)	10	07/16/87
22	12-THP-4030-STP-239	RCP Fire Det. & Water System Test	7	07/06/90
23	12-0HP-4030-STP-125CF	Inside Containment Charcoal Filter Fire Prot. Valve Cycle	0	02/23/89
24	12-THP-4030-STP.223	Fire Protection Water System Test	8	07/27/89
25	1-MPH-4030-STP-032	Inspection of the Fire Prot. System Preaction Spray Headers in Unit 1 Containment Bldg.	1	03/13/86
26	2-MPH-4030-STP-032	Inspection of the Fire Prot. System Preaction Spray Headers in Unit 2 Containment Bldg.	1	02/22/86
27	12-0HP-4030-STP-120VC	Fire Prot. Yearly Valve Cycle and Lineup Verification	1	07/19/90
28	1-IHP-6030-IMP-190	Thermistor String Fire Det. System Operability and Calibration	3	04/05/90
29	2-IHP-6030-IMP-290	Thermistor String Fire Det. System Operability and Calibration	2	07/19/90
30	1-THP-6030-IMP-151	Containment Cable Tray Fire Det. System	4	07/19/90

REF NO.	DOCUMENT NUMBER	TITLE	REV. NO.	DATE
31	2-THP-6030-IMP-251	Containment Cable Tray Fire Det. System	5	01/25/90
32	12-0HP-4030-STP-120VV	Fire Prot. Valve Lineup Verification	0	11/17/88
33	1-0HP-4024-101-001-100	Annun #1: Plant Fire System	2	03/10/86
34	2-0HP-4024-201-001-100	Annun #1: Plant Fire System	2	12/30/86
35	1-0HP-4024-102-001-050	Annun #2: Misc. Area Fire System	3	01/22/87
36	2-0HP-4024-202-001-050	Annun #2: Misc. Area Fire System	1	11/06/86
		LICENSING DOCUMENTS		
37	Docket No. 50-315 50-316	Safety Evaluation Document of IMPC D.C. Cook Plant, Units 1 & 2	-	04/26/90
37A	50-315 50-316	Safety Evaluation Report for BTP.APCSB 9.5-1, Appendix A	-	07/31/79
		DRAWINGS		
38	1-95907	Fire Prot. Transformer & Sprinkler Fire Systems Turb. & Aux. Bldgs.	16	04/01/87
39	2-95907	Fire Prot. Transformer & Sprinkler Fire Systems Turb. & Aux. Bldgs.	13	10/86
40	12-5152E	Flow Diagram Fire Prot. Water	3	01/03/90
41	12-5152J	Flow Diagram Fire Prot. Water	1	06/21/88
42	12-5152K	Flow Diagram Fire Prot. Water	2	06/21/88
43	12-5152L	Flow Diagram Fire Prot. Water	7	01/09/90
44	12-5152M	Flow Diagram Fire Prot. Water	4	09/29/89

	DOCUMENT NUMBER	TITLE	REV. NO.	DATE
45	12-5152N	Flow Diagram Fire Prot. Water	3	09/13/89
46	1-98972	Fire Prot. Water Systems Elementary Diagram	9	11/05/86
47	2-98972	Fire Prot. Water Systems Elementary Diagram	9	10/24/86
48	12-5152A	Flow Diagram Fire Prot. Water	3	03/23/88
49	12-5152B	Flow Diagram Fire Prot. Water	5	04/07/89
50	12-5152C	Flow Diagram Fire Prot. Water	2	08/04/88
51	12-5152D	Flow Diagram Fire Prot. Water	7	12/04/89
52	1-98612	Plant Fire System Annun. Elementary Diagram	12	07/01/86
53	2-98612	Plant Fire System Annun. Elementary Diagram	16	08/14/87
54	1-98613	Misc. Fire Area System & Vent Elementary Diagram	19	10/30/87
55	2-98613	Misc. Fire Area System & Vent Elementary Diagram	17	10/30/87
56	1-98969	FP Systems Annun. Elementary Diagram	7	06/08/87
57	1-12060	DC Aux. One-Line 250V DC Bus	2	02/26/87
58	2-12060	DC Aux. One-Line 250V DC Bus	0	10/06/86

TABLE 3.5-1

DEVIATION AND RECOMMENDATIONS/JUSTIFICATIONS
NFPA 72D - Proprietary Protective Signaling System

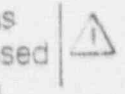
CODE SECTION	DEVIATION/OPEN ITEM	RECOMMENDATION/JUSTIFICATION
2032, 2212, & 3111	Deviation: a. The ACI A888-M664/A panel is not approved for the application. b. The pushbutton manual stations for transformer and exposure protection systems are not approved for the application. c. Automatic control valves for charcoal filter units are not approved for the application.	Justification: a. The ACI A888-M664/A panel is currently undergoing Factory Mutual's review. It is assumed that any deviations/non compliances found during FM's review will be adequately addressed and resolved by AEP. Alison Control Inc. has committed to AEP for any necessary modifications. b. Although these devices are not approved and do not latch into an alarm condition. The new Alison Control panels (A888-M664/A) will monitor these devices via properly supervised circuits as installed under PM Nos. 683, 1045 and MM-083, and will provide adequate verification of their operation by latching into an alarm condition at the panel and initiating all auxiliary functions. c. Based on the radiation conditions under which the valves are exposed due to their location being within containment, the installation of the system in accordance with the 1971 installation specification, and the operability verification of the valves under Procedure No. 12-OHP-4030-STP-125CF, these valves are considered acceptable. 
2033	Open Item: Data was not available for the acceptance testing of ACI A909 panels and the sprinkler alarm devices.	Justification: The NRC regulatory requirements dictate that surveillance tests be performed to confirm the operability of the signaling system. The performance of these surveillances during the required frequencies incorporate the test

TABLE 3.5-1

DEVIATION AND RECOMMENDATIONS/JUSTIFICATIONS
NFPA 72D - Proprietary Protective Signaling System

CODE SECTION	DEVIATION/OPEN ITEM	RECOMMENDATION/JUSTIFICATION
		requirements of NFPA 72D the manufacturer's recommendations. Pre-operational test documentation is also available to verify that the systems were tested for their operability prior to the turnover to PSC. Therefore, this condition is acceptable.
2034 4052	Deviation: Charcoal filter unit spray systems are not verified by flowing water during testing.	Justification: Although a water flow device is not provided for the CFT Unit spray systems, a detection system has been. The detection system is required to activate prior to the operation of the automatic valve therefore, the detection system provides the annunciation to the control room to alert the operators of a fire condition. Recommendation: The intent of this code section is to verify the operability of the system piping and alarm signaling devices as a whole. Air flow testing is performed on all filter systems in procedure 12 THP 4030 STP.223 except the CFT filter units. This testing should be incorporated into the procedure for the Unit 1 and 2 CFT Units. accordingly to verify the piping system.
2047	Deviation: Valve tamper switches are not verified operable during testing for all wet type transformer and exposure protection systems.	Justification: Procedure 12 OHP 4030.STP120VV verifies monthly the position of the sprinkler system riser control valves which satisfies the intent of the valve tamper switches.
2251 2331 2341	Open Item: Data was not available to determine power supply compliance with the requirements.	Justification: Based on the review of the data collected under AEPSC Evaluation dated 6/17/88 for panel No. A909 and the compliance with FM approval criteria for the A888-

TABLE 3.5-1

DEVIATION AND RECOMMENDATIONS/JUSTIFICATIONS
NFPA 72D - Proprietary Protective Signaling System

CODE SECTION	DEVIATION/OPEN ITEM	RECOMMENDATION/JUSTIFICATION
		M664/A panels the requirements for these code sections are satisfied.
2411 2422 3424 4011	Deviation: a. ACI A909 panels supervise all functions with the exception of the manual station and release circuits which do not verify the circuits for open or ground fault conditions. b. All sprinkler supervisory and alarm devices are not supervised for open circuit conditions from the "EF" panel.	Justification: The NRC regulatory requirements dictate that surveillance tests be performed to confirm the operability of the signaling system. The performance of these surveillances during 18 month frequencies incorporate the test requirements of NFPA 72D and manufacturers recommendations and provide an equivalency for this requirement. In addition, procedure 1-OHP 4030.001.001 requires the control room operators to visually examine the annunciator panels once per shift to verify their status.
2631 3423 4041	Deviation: a. RCP pump & charcoal filter unit panel alarm & trouble signals are transmitted as a non-distinct signal to "EF" panel. b. Containment detection does not provide distinctive alarm location.	Justification: The "EF" annunciators indicate a sprinkler system "abnormal" condition. The annunciator response procedures (1&2 OHP 4030.100 & 200 Series) indicate the potential problems and direct the operators to take the appropriate corrective action.
3112	Deviation: The pushbutton manual stations were mounted 4' or 4'-3" AFF, which is lower than the 4'-6" AFF requirement.	Justification: The mounting location of the manual stations does not deviate drastically from the minimum 4-1/2 ft mounting height required or mounted such that the device cannot be properly operated. In addition, NFPA 72D, 1979 Edition lower the minimum criteria to 3-1/2 ft. Therefore, this condition is acceptable.

CODE SECTION	DEVIATION/OPEN ITEM	RECOMMENDATION/JUSTIFICATION
3431	Deviation: Waterflow devices are not provided for hose station risers, transformer, exposure protection and charcoal filter spray systems.	Justification: The charcoal filter unit risers are provided with individual alarm annunciation to the "EF" panels via the ACI A924 panels. Temperature monitoring within the filter units is also furnished and will provide a high temperature signal in the control room which would be redundant to the fire alarm signal from the ACI A924 panel. Upon the actuation of the suppression system, a timing cycle will time down to deactivate the system, thus limiting the amount of water being discharged into the associated filter unit. The transformer and exposure protection spray system risers are provided with individual alarm annunciation to the "EF" panels via the ACI A909 & A888-M664/A panels. In addition to the detection system operation, the fire pumps will operate simultaneously thus providing additional confirmation on the "EF" panel of a fire for this area. Therefore, waterflow signaling does not provide significant increase in the level of fire protection features. For justification of the hose station risers refer to the discussion on Section 681, NFPA 14, 1971 Edition.
3441 3442 3443	Deviation: a. The "EF" annunciator panel does not provide a restoration signal. b. The RCP low air signal is transmitted to "EF" panel as non-distinctive signal.	Justification: The "EF" annunciators indicate a sprinkler system "abnormal" condition. The annunciator response procedures (1&2 OHP 4024.100 & .200 series) indicate the potential problems and directs the operators to take the appropriate corrective actions. In addition, AEP has committed to providing a "reflash" capability on the annunciator panel.
	Open Item: Transmission of tamper off-normal signal could not be verified.	Justification: See response to Code Section 2047.

CODE SECTION	DEVIATION/OPEN ITEM	RECOMMENDATION/JUSTIFICATION
3542	Deviation: The RCP pump detector loop resistance value is not verified.	Recommendation: Incorporate RCP pump detection loop resistance testing into the plant procedures.
3543	Deviation: The fire detection panels are not inspected monthly as required.	Justification: The systems controls are verified for operability typically semi-annually. Since the D.C. Cook plant specifically indicated that the testing frequencies required by NFPA 72D will not be met in their response to Appendix A to BTP/APSCB 9.5-1, this monthly surveillance is not required.
4091	Deviation: a. The "EF" panel signaling line circuits are not supervised for open circuit fault conditions. b. ACI A909 manual station and release circuits are not supervised for open and ground fault conditions.	Justification: See response to Code Sections 2411, 2422, 3424 & 4011.
4101 4111	Deviation: Supervisory or trouble reports are not generated.	Justification: Based on the review of the AEPSC response to Appendix A to BTP/APCSB 9.5-1 Section II.B.1 and clarification statements in the NRC 53 Questions (Questions 16 and 48), AEP clearly does not commit to providing a printer and is therefore not required. Also reference the response to Code Section 3423.

3.6 NFPA 72E - Automatic Fire Detectors

3.6.1 Scope of Evaluation

The evaluation of the installation and maintenance of the automatic fire detectors was based on the edition that was in effect at the time alarm system was specified on April 2, 1971. Since NFPA 72E was not adopted until 1974, this edition was used as the basis for the initial installation of the devices. The following systems/areas were reviewed under the requirements of NFPA 72E, 1974 Edition:

- Unit 1 & 2 Containment Charcoal Filter Unit and Reactor Coolant Pump Detection Systems, Unit 1 & 2 Containment Cable Tray Detection Circuits (Fire Zone 66-68, 74-76, 101 through 104)

- Unit 1 & 2 Transformer and Turbine Wall Water Spray Systems (Yard)

3.6.2 Assumptions

The following assumptions have been made for the evaluation of NFPA 72E.

1. Due to ALARA (high radiation) concerns, the charcoal filter units were inaccessible during the walkdowns. Therefore, the detection arrangements within the filtration units are assumed similar to the previous walkdown sketch as documented in the AEPSC evaluation document of June 17, 1988 for all units.

2. It is assumed that the detection arrangement for the charcoal filter units are typical with exception of change in the number of charcoal filter beds.

3.6.3 Deviations and Recommendations/Justifications

The plant fire alarm system is in compliance with NFPA 72E with the exception of the open items and deviations identified in Table 3.6-1. The table also provides recommendations/justifications for these items

WALKDOWN VERIFICATION CHECKLISTS

1	0120-164-006A	XFRM 101AB	0	12/90
2	0120-164-006B	Start Up XFRM 101CD	0	12/90
3	0120-164-006C	Aux. XFRM 1CD	0	12/90
4	0120-164-006D	Aux. XFRM 1AB	0	12/90
5	0120-164-006E	345KV Main XFRM	0	12/90
6	0120-164-006F	Unit 2 Aux. XFRM 2AB	0	12/90
7	0120-164-006G	Unit 2 Aux. XFRM 2CD	0	12/90
8	0120-164-006H	Unit 2 Main XFRM	0	12/90
9	0120-164-006I	Unit 2 Start Up XFRMS	0	12/90
10	0120-164-006J	Charcoal Filter Units	0	12/90
11	0120-164-006K	RCP Pumps	0	12/90

TECHNICAL DATA

12	0120-164-005	NFPA 72D Code Compliance Verification Checklist	0	12/90
13	09-0120-0123	ABB Impell Code Compliance Report	0	05/88
14	-	AEP Evaluation Document	-	06/17/88
15	-	Alison Controls Inc. Manual for A888-M664/A	-	09/15/86
16	-	Record of Conversation Between D. Kipley and B. Gerwe	-	07/27/90
17	PM 683	Plant Modification Project for the Installation of ACI A888-M664/A Panels	1	01/07/87

REF NO.	DOCUMENT NUMBER	TITLE	REV. NO.	DATE
		PROCEDURES		
18	1-0HP-4030-STP-123	Transformer Water Spray Test	2	07/25/88
19	2-0HP-4030-STP-123	Transformer Water Spray Test	2	12/29/88
20	PMI-2270	Fire Protection Program	16	02/09/87
21	12-0HP-4030-STP-125NS	Non-Tech Spec. Required Sprinkler Tests	1	10/12/89
22	12-THP-6030-IMP-142	Fire Det. & CO_2 System Surv. Testing (6 Mo.)	10	07/16/87
23	12-THP-4030-STP-239	RCP Fire Det. & Water System Test	7	07/06/90
24	12-0HP-4030-STP-125CF	Inside Containment Charcoal Filter Fire Prot. Valve Cycle	0	02/23/89
25	12-0HP-4030-STP-125CV	Inside Containment Charcoal Filter Fire Prot. Valve Cycle	0	02/23/89
26	1-MPH-4030-STP-032	Inspection of the Fire Prot. System Preaction Spray Headers in Unit 1 Containment Bldg.	1	03/13/86
27	2-MPH-4030-STP-032	Inspection of the Fire Prot. System Preaction Spray Headers in Unit 2 Containment Bldg.	1	02/22/86
28	12-0HP-4030-STP-120VC	Fire Prot. Yearly Valve Cycle and Lineup Verification	1	07/19/90
29	1-IHP-6030-IMP-190	Thermistor String Fire Det. System Operability and Calibration	3	04/05/90
30	2-IHP-6030-IMP-290	Thermistor String Fire Det. System Operability and Calibration	2	07/19/90
31	1-THP-6030-IMP-151	Containment Cable Tray Fire Det. System	4	07/19/90
32	2-THP-6030-IMP-251	Containment Cable Tray Fire Det. System	5	01/25/90

REF NO.	DOCUMENT NUMBER	TITLE	REV. NO.	DATE
33	12-0HP-4030-STP-120VV	Fire Prot. Valve Lineup Verification	0	11/17/88
34	1-0HP-4024-101-001-100	Annun #1: Plant Fire System	2	03/10/86
35	2-0HP-4024-201-001-100	Annun #1: Plant Fire System	2	12/30/86
36	1-0HP-4024-102-001-050	Annun #2: Misc. Area Fire System	3	01/22/87
37	2-0HP-4024-202-001-050	Annun #2: Misc. Area Fire System	1	11/06/86
38	RFC#12-2521	Fire Detection Design Packet	-	08/14/85
39	RFC#12-2741	Fire Detection Design Packet	0	02/13/87
40	RFC#12-1843	Fire Detection Design Packet	3	10/23/87
41	RFC#01-2679	Fire Detection Design Packet	0&1	01/31/86
42	RFC#02-2694	Fire Detection Design Packet	0&1	05/02/86
43	RFC#12-2678	Fire Detection Design Packet	0&1	12/18/87
44	RFC#12-2231	RCP Pump Fire Detection Supp. Protection Modification Packet	0	03/27/87
		LICENSING DOCUMENTS		
50	Docket No. 50-315 50-316	Safety Evaluation Document of IMPC D.C. Cook Plant, Units 1 & 2	-	04/26/90
		DRAWINGS		
60	1-95907	Fire Prot. Transformer & Sprinkler Fire Systems Turb. & Aux. Bldgs.	16	04/01/87

REF NO.	DOCUMENT NUMBER	TITLE	REV. NO.	DATE
61	2-95907	Fire Prot. Transformer & Sprinkler Fire Systems Turb. & Aux. Bldgs.	13	10/86
62	12-5152E	Flow Diagram Fire Prot. Water	3	01/03/90
63	12-5152J	Flow Diagram Fire Prot. Water	1	06/21/88
64	12-5152K	Flow Diagram Fire Prot. Water	2	06/21/88
65	12-5152L	Flow Diagram Fire Prot. Water	7	01/09/90
66	12-5152M	Flow Diagram Fire Prot. Water	4	09/29/89
67	12-5152N	Flow Diagram Fire Prot. Water	3	09/13/89
68	1-98972	Fire Prot. Water Systems Elementary Diagram	9	11/05/86
69	2-98972	Fire Prot. Water Systems Elementary Diagram	9	10/24/86
70	12-5152A	Flow Diagram Fire Prot. Water	3	03/23/88
71	12-5152B	Flow Diagram Fire Prot. Water	5	04/07/89
72	12-5152C	Flow Diagram Fire Prot. Water	2	08/04/88
73	12-5152D	Flow Diagram Fire Prot. Water	7	12/04/89
74	1-98612	Plant Fire System Annun. Elementary Diagram	12	07/01/86
75	2-98612	Plant Fire System Annun. Elementary Diagram	16	08/14/87
76	1-98613	Misc. Fire Area System & Vent Elementary Diagram	19	10/30/87
77	2-98613	Misc. Fire Area System & Vent Elementary Diagram	17	10/30/87
78	1-98969	FP Systems Annun. Elementary Diagram	7	06/08/87

REF NO.	DOCUMENT NUMBER	TITLE	REV. NO.	DATE
79	1-12060	DC Aux. One-Line 250V DC Bus	2	02/26/87
80	2-12060	DC Aux. One-Line 250V DC Bus	0	10/06/86

TABLE 3.6-1

DEVIATION AND RECOMMENDATIONS/JUSTIFICATIONS
NFPA 72E - Automatic Fire Detectors

CODE SECTION	DEVIATION/OPEN ITEM	RECOMMENDATION/JUSTIFICATION
2-5.2.1	Open Item: Documentation was not available to verify initial acceptance testing was performed.	Justification: The NRC regulatory requirements dictated that surveillance tests be performed to confirm the operability of the detection systems. The performance of these surveillances incorporate the test requirements of NFPA 72D and the manufacturer's recommendations and confirms that the detection devices perform their required function.
7-3.1.4	Deviation: Loop resistance testing is not performed for Unit 1 & 2 RCP pump detection systems.	Recommendation: Incorporate loop resistance testing of the Unit 1 & 2 RCP pump detection systems into plant procedures.

APPENDIX A1

CODE COMPLIANCE VERIFICATION CHECKLIST

NFPA 10 - 1984 EDITION

CALCULATION / PROBLEM COVER SHEET

Calculation / Problem No: 0120-164-001

Title: NFPA 10 CODE COMPLIANCE CCVC

Client: AEPSC Job No: 0120-164

Project: D.C. COOK EXTENDED COPE REVIEW

Design Input / References:

SEE SECTION 3.0

Assumptions:

SEE SECTION 2.0

Method:

SEE SECTION 3.0

Remarks:

SEE SECTIONS 1.0 & 4.0

REV. NO.	REVISION	APPROVED	DATE
0	ORIGINAL ISSUE		12-14-90
1	REVISED FOR CLARIFICATION ON PG. 6		1/14/91

1.0 PURPOSE

1.1 The purpose of this calculation is to identify the applicable sections of the NFPA Code addressed determine a method of verification for each applicable code section and confirm compliance for the plant fire protection systems within our review.

2.0 ASSUMPTIONS

Activities performed by the fire extinguisher service company are performed in accordance with the appropriate sections of the code.

3.0 METHODOLOGY

Reference Section 2.1.1 of ABB Impell Project Instruction PI-0120-164-01 Revision 0.

The evaluation of the portable fire extinguisher system was reviewed under the 1984 edition of the code. Although the system was installed under different edition years from 1970 to 1994, the difference in the edition requirements were minimal and the 1984 edition year was deemed to be more applicable to the system installed.

Justifications for deviations and open items identified in the CCVC's are detailed in ABB Impell Technical Report Number 09-0120-0381.

4.0 RESULTS

Reference the Code Compliance Verification Checklist.

References

WALKDOWN VERIFICATION CHECKLISTS

REF. NO.	DOCUMENT NUMBER	TITLE	REV. NO.	DATE
1	0120-164-001A	ABB Impell Calculation NFPA 10, 1984 Code Compliance Walkdown Verification Checklist (Fire Zone 79)	0	12/90
2	0120-164-001B	ABB Impell Calculation NFPA 10, 1984 Code Compliance Walkdown Verification Checklist (Fire Zone 80)	0	12/90
3	0120-164-001C	ABB Impell Calculation NFPA 10, 1984 Code Compliance Walkdown Verification Checklist (Fire Zone 84)	0	12/90
4	0120-164-001D	ABB Impell Calculation NFPA 10, 1984 Code Compliance Walkdown Verification Checklist (Fire Zone 85)	0	12/90
5	0120-164-001E	ABB Impell Calculation NFPA 10, 1984 Code Compliance Walkdown Verification Checklist (Fire Zone 28)	0	12/90

REF. NO.	DOCUMENT NUMBER	TITLE	REV. NO.	DATE
6	0120-164-001F	ABB Impell Calculation NFPA 10, 1984 Code Compliance Walkdown Verification Checklist (Fire Zone 30)	0	12/90
7	0120-164-001G	ABB Impell Calculation NFPA 10, 1984 Code Compliance Walkdown Verification Checklist (Fire Zone 90)	0	12/90
8	0120-164-001H	ABB Impell Calculation NFPA 10, 1984 Code Compliance Walkdown Verification Checklist (Fire Zone 91)	0	12/90
9	0120-164-001I	ABB Impell Calculation NFPA 10, 1984 Code Compliance Walkdown Verification Checklist (Fire Zone 96)	0	12/90
10	0120-164-001J	ABB Impell Calculation NFPA 10, 1984 Code Compliance Walkdown Verification Checklist (Fire Zone 97)	0	12/90
11	0120-164-001K	ABB Impell Calculation NFPA 10, 1984 Code Compliance Walkdown Verification Checklist (Fire Zone 129)	0	12/90
12	0120-164-001L	ABB Impell Calculation NFPA 10, 1984 Code Compliance Walkdown Verification Checklist (Fire Zone 130)	0	12/90

REF. NO.	DOCUMENT NUMBER	TITLE	REV. NO.	DATE
		PROCEDURES		
13	12SHP2270 FIRE.001	Portable Fire Extinguisher Inspection	1	06/03/88
		TECHNICAL DATA		
		Catalog **DRAWINGS**		
14	F-8486	Ansul Fire Protection	-	1984
15	12-5267-6	Fire Facilities Basement Plan El. 591'-0" & El. 587'-0" Units 1 & 2	6	01/29/90
16	12-5268-5	Fire Facilities Mezzanine Floor El. 609'-0" Units 1 & 2	5	01/29/90
17	12-5269-5	Fire Facilities Turbine Bldg. Main Floor El. 633'-0" Units 1 & 2	5	01/29/90
		LICENSING DOCUMENTS		
18	50-315 50-316	Safety Evaluation Document of IMPC D.C. Cook Plant Units 1 & 2	-	04/26/90

NFPA 10 - 1984 EDITION

PORTABLE FIRE EXTINGUISHERS

This Review includes the following areas:

- These fire zones will be verified for all portions of the fire zone within 40 feet of column line H, and auxiliary feed water pump rooms or safety related trays. The portions of the fire zones reviewed included the area bounded by column coordinates: Fire Zones #79-80 (Col. Lines H-23, H-14, G-26, G-18, GA-23, GA-26, E-18 and E-14); Fire Zones #84-85 (Col. Lines H-13, H-4, G-9, G-1, GA-4, GA-1, E-13 and E-9), Fire Zones #90-91 (Col. Lines H-14, H-23, E-14, E-18, G-18, G-26, and GA-26); Fire Zones #96-97 (Col. Lines H-13, H-4, G-13, G-1, GA-4 and GA-1) Fire Zones 129 &130 (Col. Lines H-8, H-19, G-8 and G-19).

- Unit 1 & 2 Diesel Fire Pump Room
  Fire Zones 28 & 30

- Unit 1 & 2 Containment Building
  Fire Areas AAA & CCC

- Extinguishers located in Fire Zone 142 were used to verify adequate coverage of hazards within Fire Zones 28 & 30.

The evaluation of the portable fire extinguisher system was reviewed under the 1984 edition of the code. Although the system was installed under different edition years from 1970 to 1984, the difference in the edition requirements were minimal and the 1984 edition year was deemed to be more applicable to the installed system.

The evaluation of the portable fire extinguisher system verified the following features:

1. Proper types of fire extinguishers have been provided based upon the characteristics of the anticipated fires.

2. Fire extinguishers have been properly distributed throughout the plant.

3. Procedures for the Inspection, Maintenance and Recharging of fire extinguishers are satisfactory.

CODE COMPLIANCE VERIFICATION CHECKLIST
NFPA 10-1984
PORTABLE FIRE EXTINGUISHERS

Code Section No.	Code Section	Information Required Verification Method W = Walkdown D = Document Search	Summary of Results (List results and reference details in calculations, sketches, etc., as required)
	CHAPTER 1. INTRODUCTION		
1-6.2	Portable extinguishers shall be maintained in a fully charged and operable condition, and kept in their designated places at all times when they are not being used.	W, D	**Complies:** Fire Zones 28, 30, 90,97, 130 **Ref:** #5-7, 10, 12, 13, 15-17. **Does Not Comply:** Fire Zone-79, FES 591T-78BC, FES 591T-77 CO_2 are not readily accessible and are shown in wrong location on drawing #12-5267-6. FES 591T-79BC access is obstructed. **Ref:** #1, 13, 15. **Does Not Comply:** Fire Zone-80, FES 591T-75 CO_2 not clearly marked, FES 591T-72BC and FES 591T-73 CO_2 access is obstructed. FES 591T-68BC is designated on drawing #12-5267-6 as Foray dry Chemical, actual extinguisher agent is "Purple K" (BC). FES 591T-66BC is shown on drawing in wrong location and access is obstructed. **Ref:** #2, 13, 15. **Does Not Comply:** Fire Zone-84, FES 591T-26BC and CO_2 access obstructed. FES 591T-61BC has wrong designation on drawing #12-5267-6, extinguisher agent is shown as Foray Dry Chemical, actual agent is "Purple K" (BC). **Ref:** #4, 13, 15. **Does Not Comply:** Fire Zone-85, FES 591T-51BC is obstructed. **Ref:** #4, 13, 15. **Does Not Comply:** Fire Zone-91, FES 609T-42 CO_2, access obstructed, FES 609T-50 CO_2 shown in wrong location on drawing #12-5268-5. **Ref:** #8, 13, 16.

REV	BY	DATE	CHECKED	DATE
D	WEL	12/4/89	SPD	12/14/89

NFPA 10-CODE COMPLIANCE VERIFICATION CHECKLIST
DONALD C. COOK UNITS 1 AND 2

ABB Impell Corporation

JOB NO 0120-164
CALC NO 0120-164-001

REV	BY	DATE	CHECKED	DATE
0	[illegible]	12/4/90	S.E.D.	12/14/90

NFPA 10-CODE COMPLIANCE VERIFICATION CHECKLIST

DONALD C. COOK UNITS 1 AND 2

ABB Impell Corporation

JOB NO 0120-164

CALC NO 0120-164-001

PAGE 5 OF 17

CODE COMPLIANCE VERIFICATION CHECKLIST
NFPA 10-1984
PORTABLE FIRE EXTINGUISHERS

Code Section No.	Code Section	Information Required Verification Method W = Walkdown D = Document Search	Summary of Results (List results and reference details in calculations, sketches, etc., as required)
			Does Not Comply: Fire Zone-96, FES 609T-358C, not properly marked. **Ref:** #9, 13, 16
			Does Not Comply: Fire Zone-129, drawing #12-5269-5 indicates extinguisher on column G-17. No extinguisher found at this location. FES 633T-278C found on column G-18 is not indicated on drawing #12-5269-5 and is obstructed from access. **Ref:** #11, 13, 17
3-1.2	Fire extinguishers shall be provided for the protection of both the building structure, extinguishers provided for hazards within if combustible, and the occupancy hazards contained therein.	W	**Complies:** Fire Zones-79, 80, 90. **Ref:** #1, 2, 7
			Does Not Comply: Fire Zones-28, 30, 84, 85, 91, 96, 97, 129, 130. No extinguisher provided for protection of Class A - ordinary combustibles. **Ref:** #3-6, 8-12
3-1.2.2	Occupancy hazard protection shall be provided by fire extinguishers suitable for such Class A, B, C, or D fire potentials as may be present.	W	See results of Code Section 3-1.2
3-2.1	Minimal sizes of fire extinguishers for the listed grades of hazards shall be provided on the basis of Table 3-1.1 except a modified by 3-2.3. Extinguishers shall be located so that the maximum travel distances shall not exceed those specified in Table 3-2.1, except as modified by 3-2.3.	W, D	**Complies:** Fire Zones-28, 30, 79, 80, 90. **Ref:** #12, 5-7, 14-16.
			Does Not Comply: Fire Zones-84, 85, 91, 97. Travel distences for Class A extinguishers, Table 3-2.1 are exceeded. **Ref:** #3, 4, 8, 10, 14, 16.
			Does Not Comply: Fire Zones-96, 129, 130. Travel distances for Class A extinguishers, Table 3-2.1, and Class B extinguishers, Table 3-3.1 are exceeded. **Ref:** #9, 11, 12, 14, 16, 17.

REV	BY	DATE	CHECKED	DATE
D	[illegible]	12/14/89	[illegible]	[illegible]

ABB Impell Corporation

NFPA 10-CODE COMPLIANCE VERIFICATION CHECKLIST
DONALD C. COOK UNITS 1 AND 2

JOB NO 0120-164
CALC NO 0120-164-001

CODE COMPLIANCE VERIFICATION CHECKLIST
NFPA 10-1984
PORTABLE FIRE EXTINGUISHERS

Code Section No.	Code Section	Information Required Verification Method W = Walkdown D = Document	Summary of Results (List results and reference details in calculations, sketches, etc., as required)
			Does Not Comply: Fire Areas-AAA, CCC. Travel distances for Class A extinguishers, Table 3-2.1, and Class B extinguishers, Table 3-3.1 are exceeded. **Ref:** #18
3-3.1	Minimal sizes of fire extinguishers for the listed grades of hazard shall be provided on the basis of Table 3-3.1. Extinguishers shall be located so that the maximum travel distances shall not exceed those specified in the table used. EXCEPTION: EXTINGUISHERS OF LESSER RATING, DESIRED FOR SMALL SPECIFIC HAZARDS WITHIN THE GENERAL HAZARD AREA, MAY BE USED, BUT SHALL NOT BE CONSIDERED AS FULFILLING ANY PART OF THE REQUIREMENTS OF TABLE 3-3.1.	W, D	See results of code section 3-2.1
3-3.3	The protection requirements may be fulfilled with extinguishers of higher ratings provided the travel distance to such larger extinguishers shall not exceed 50 ft (15.25 m).	W, D	**Does Not Comply:** Fire Zones-A11. Extinguishers with higher ratings are provided and a travel distance of 50 feet was verified for in determining compliance to Section 3-3.1. See results of Code Section 3-2.1 for deficiencies. **Ref:** #1-12, 14-17.
4-3.2	Procedure. Periodic inspection of extinguishers shall include a check of at least the following items: (a) Located in designated place. (b) No obstruction to access or visibility. (c) Operating instructions on nameplate legible and facing outward. (d) Seals and tamper indicators not broken or missing. (e) Determine fullness by weighing or hefting. (f) Examine for obvious physical damage corrosion, leakage, or clogged nozzle. (g) Pressure gage reading or indicator in the operable range or position.	D	**Does Not Comply:** Fire Zones-A11. Item (B), (C) and (E) are not included in the inspection procedure #12-SHP2270 FIRE.001. Item (G) is not applicable. The extinguishers provided are cartridge operated Dry Chemical or CO_2 and need not to be equipped with a pressure gage. **Ref:** #13

REV	BY	DATE	CHECKED	DATE
D	[illegible]	7/11/89	SEE	12/1/90

NFPA 10-CODE COMPLIANCE VERIFICATION CHECKLIST
DONALD C. COOK UNITS 1 AND 2

ABB Impell Corporation

JOB NO 0120-164
CALC NO 0120-164-001

PAGE 13 OF 40

CODE COMPLIANCE VERIFICATION CHECKLIST
NFPA 10-1984
PORTABLE FIRE EXTINGUISHERS

Code Section No.	Code Section	Information Required Verification Meth.: W = Walkdown D = Document Search	Summary of Results (List results and reference details in calculations, sketches, etc., as required)
4-3.4.2	At least monthly, the date the inspection was performed and the initials of the person performing the inspection shall be recorded.	W, D	Does Not Comply: Fire Zones-All. Date of inspection and initials of person who performed it, do not appear on tag. Ref: #1-13.
*4-4.3	RECORDKEEPING. Each extinguisher shall have a tag or label securely attached that indicates the month and year the maintenance was performed and shall identify the person performing the service.[1] The same record tag or label shall indicate if recharging was also performed.	W, D	Does Not Comply: Fire Zones-All. No tag or label is attached to the unit indicating the month and year maintenance was performed, who performed the service and if recharging was required. Ref. #1-13.

APPENDIX A2

CODE COMPLIANCE VERIFICATION CHECKLIST

NFPA 13 - 1971 EDITION

CALCULATION / PROBLEM COVER SHEET

Calculation / Problem No: 0120-164-002

Title: NFPA 13 - CODE COMPLIANCE CALC

Client: AEPSC Job No: 0120-164

Project: D.C. COOK EXTENDED CODE REVIEW

Design Input / References:

SEE SECTION 5.0

Assumptions:

SEE SECTION 2.0

Method:

SEE SECTION 3.0

Remarks:

SEE SECTIONS 1.0 & 4.0

REV. NO.	REVISION	APPROVED	DATE
0	ORIGINAL ISSUE	[signature]	12-14-90
1	REVISED FOR CLARIFICATION OF PAGES 2 & 10	[signature]	1/14/91

1.0 PURPOSE

1.1 The purpose of this calculation is to identify the applicable sections of the NFPA Code addressed, determine a method of verification for each applicable code section and confirm compliance for the plant fire protection systems within our review.

2.0 ASSUMPTIONS

For the purpose of this report, it is assumed that under most conditions the authority having jurisdiction was the architect/engineer (A/E) for the plant who is American Electric Power Service Corporation (AEPSC) unless other wise indicated.

3.0 METHODOLOGY

3.1 Reference Section 2.1.1 of ABB Impell Project Instruction PI-0120-164-01, Revision 0.

Justifications for deviations and open items identified in the CCVC's are detailed in ABB Impell Technical Report Number 09-0120-0381. △1

4.0 RESULTS

Reference the Code Compliance Verification Checklist.

5.0 REFERENCES

References

REF. NO.	DOCUMENT NUMBER	TITLE	REV. NO.	DATE
		WALKDOWN VERIFICATION CHECKLISTS		
1	0120-164-002A	ABB Impell Calculation NFPA 13, 1971 Code Compliance Walkdown Verification Checklist (Turbine Bldg., Zone 79)	0	12/90
2	0120-164-002B	ABB Impell Calculation NFPA 13, 1971 Code Compliance Walkdown Verification Checklist (Turbine Bldg., Zone 0)	0	12/90
3	0120-164-002C	ABB Impell Calculation NFPA 13, 1971 Code Compliance Walkdown Verification Checklist (Turbine Bldg., Zone 90)	0	12/90
4	0120-164-002D	ABB Impell Calculation NFPA 13, 1971 Code Compliance Walkdown Verification Checklist (Turbine Bldg., Zone 91)	0	12/90
5	0120-164-002A	ABB Impell Calculation NFPA 13, 1971 Code Compliance Walkdown Verification Checklist (Cable Trays, Zone 79)	0	12/90
6	0120-164-002F	ABB Impell Calculation NFPA 13, 1971 Code Compliance Walkdown Verification Checklist (Cable Trays, Zone 80)	0	12/90

REF. NO.	DOCUMENT NUMBER	TITLE	REV. NO.	DATE
7	0120-164-002G	ABB Impell Calculation NFPA 13, 1971 Code Compliance Walkdown Verification Checklist (Cable Trays, Zone 90)	0	12/90
8	0120-164-002H	ABB Impell Calculation NFPA 13, 1971 Code Compliance Walkdown Verification Checklist (Cable Trays, Zone 91)	0	12/90
9	0120-164-002I	ABB Impell Calculation NFPA 13, 1971 Code Compliance Walkdown Verification Checklist (Area & Tray, Zone 84)	0	12/90
10	0120-164-002J	ABB Impell Calculation NFPA 13, 1971 Code Compliance Walkdown Verification Checklist (Area & Tray, Zone 85)	0	12/90
11	0120-164-002K	ABB Impell Calculation NFPA 13, 1971 Code Compliance Walkdown Verification Checklist (Area & Tray, Zone 96)	0	12/90
12	0120-164-002L	ABB Impell Calculation NFPA 13, 1971 Code Compliance Walkdown Verification Checklist (Area & Tray, Zone 97)	0	12/90
13	0120-164-002M	ABB Impell Calculation NFPA 13, 1971 Code Compliance Walkdown Verification Checklist (Diesel Fire Pump Rooms, Zones 28, 30)	0	12/90

REF. NO.	DOCUMENT NUMBER	TITLE	REV. NO.	DATE
		PROCEDURES		
20	PO-050-508	Fire Protection - Water Preoperational Test Procedure	0	07/03/74
21	12-OHP-4030-STP-120VC	Fire Protection Yearly Valve Cycle and Lineup Verification	1	07/19/90
22	12-OHP-4030-STP-120VV	Fire Protection Valve Lineup Verification	0	11/17/88
23	12-OHP-4030-STP-120SF	Fire Protection Unobstructed Flow Test and Sprinkling Alarm Test	1	07/19/90
24	12-OHP-4030-STP-124	Fire Protection System Flush and Loop Flow Test	0	10/05/89
25	12-OHP-4030-STP-223	Fire Protection Water System Test	8	07/27/89
26	12-OHP-4030-STP-125NS	Non-Tech Spec Required Sprinkler Tests	1	10/12/89
		TECHNICAL DATA		
30	-	Letter From: R.J. Daley To: R.W. Jurgensen Instruction Book, "Grinnel and Star Fire Systems Equipment"	-	07/15/74
31	SD-DCC-FP101	System Description, Fire Protection System - Water	2	12/26/89
32	-	Specification for Fire Protection Systems of D.C. Cook Nuclear Plant	0	04/02/71
33	DCCPM104QCS	Piping Specification	4	11/09/72
34	DCCPM102QCS	Shop and Field Fabrication and Erection	4	05/24/73

REF. NO.	DOCUMENT NUMBER	TITLE	REV. NO.	DATE
35	ROC from D. Kipley to B. Gerwe	Ambient Temperature Conditions	-	08/06/90
36	0120-164-005	ABB Impell Calc., NFPA 72D, Code Compliance Verification Checklist	O	12/90
37	0120-164-006	ABB Impell Calc., NFPA 72E, Code Compliance Verification Checklist	O	12/90
38	-	Grinnel Hydraulic Calcs for Zone 79	-	02/18/72
39	-	Grinnel Hydraulic Calcs for Zone 80	-	03/13/72
40	-	Grinnel Hydraulic Calcs for Zone 90	-	03/30/72
41	-	Grinnel Hydraulic Calcs for Zone 91	-	03/30/72
42	-	Grinnel Hydraulic Calcs for Zone 79 Cable Trays	-	05/26/72
43	-	Grinnel Hydraulic Calcs for Zone 80 Cable Trays	-	07/05/72
44	-	Grinnel Hydraulic Calcs for Zone 90 Cable Trays	-	09/22/72
45	-	Grinnel Hydraulic Calcs for Zone 91 Cable Trays	-	11/09/72
46	-	Hodgeman Hydraulic Calcs for Zone 84	-	10/18/74
47	-	Hodgeman Hydraulic Calcs for Zone 85	-	12/27/72
48	-	Hodgeman Hydraulic Calcs for Zone 96	-	12/11/74

REF. NO.	DOCUMENT NUMBER	TITLE	REV. NO.	DATE
49	-	Hodgeman Hydraulic Calcs for Zone 97	-	05/19/75
50	ROC from D. Kipley to B. Gerwe	D.C. Cook Code Compliance Review	-	08/21/90
51	0120-164-007	ABB Impell Calc. Deviation Evaluation	0	12/90

LICENSING DOCUMENTS

60	Docket No. 50-315, 50-316	Safety Evaluation Document of Donald C. Cook Plant, Units 1 & 2	1	01/30/87

DRAWINGS

70	DWG 46-032-71M-20	Sprinkler Piping, Unit 1 Generator End Basement	2	12/18/71
71	DWG 46-032-71M-24	Sprinkler Piping, Unit 1 Turbine End Basement Zone 80	3	10/30/71
72	DWG 46-032 71M-29	Sprinkler Piping, Unit 1 Generator End, Mezz Floor Zone 90	0	12/10/71
73	DWG 46-032-71M-32	Sprinkler Piping, Unit 1 Turbine End Mezz Floor Zone 91	0	11/03/71
74	DWG 46-032-71M-22	Sprinkler Piping, Unit 1 Generator End Basement Cable Racks Zone 79	1	05/26/72
75	DWG 46-032-71M-26	Sprinkler Piping, Unit 1 Turbine End Basement Cable Racks Zone 80	0	05/26/72

REF. NO.	DOCUMENT NUMBER	TITLE	REV. NO.	DATE
76	DWG 46-032-71M-31	Sprinkler Piping, Unit 1 Generator End, Mezz Floor Cable Racks Zone 90	0	09/22/72
77	DWG 46-032-71M-35	Sprinkler Piping, Unit 1 Turbine End, Mezz Floor Cable Racks Zone 91	0	07/29/72
78	DWG 121-8	Sprinkler Piping, Unit 2 Turbine End, Mezz Floor Floor Zone 84	1	10/21/74
79	DWG 121-22	Sprinkler Piping, Unit 2 Turbine End Basement Cable Racks Zone 84	0	08/16/76
80	DWG 121-10	Sprinkler Piping, Unit 2 Generator End Basement Floor Zone 85	2	12/30/74
81	DWG 121-24	Sprinkler Piping, Unit 2 Generator End Basement Cable Trays Zone 85	0	09/23/76
82	DWG 121-12	Sprinkler Piping, Unit 2 Turbine End Mezz Floor Zone 96	1	11/27/74
83	DWG 121-31	Sprinkler Piping, Unit 2 Turbine End Mezz Floor Cable Racks, Zone 96	0	11/17/76
84	DWG 121-14	Sprinkler Piping, Unit 2 Generator End Mezz Floor Zone 97	1	05/19/75
85	DWG 121-28	Sprinkler Piping, Unit 2 General End Mezz Floor Cable Racks Zone 97	0	10/15/76
86	DWG 1-5152J-1	Flow Diagram, Unit 1 Details - Turbine Bldg. and Screen House	1	06/21/88

REF. NO.	DOCUMENT NUMBER	TITLE	REV. NO.	DATE
87	DWG 2-5152K-2	Flow Diagram, Unit 2 Details - Turbine Bldg. and Screen House	2	06/21/88
88	DWG 2-5152C-2	Flow Diagram, Unit 2 Turbine Bldg. and Screen House	2	08/04/88
89	DWG 1-5152B-1	Flow Diagram, Unit 1 Turbine Bldg. and Screen House	4	04/07/89
90	RDR-12-253	Sprinkler Piping Diesel Fire Pump Rooms	1	04/20/79

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ABB Impell Corporation

NFPA 13-CODE COMPLIANCE VERIFICATION CHECKLIST
DONALD C. COOK UNITS 1 AND 2

CALC NO 0120-164-002 | JOB NO 0120-164 | PAGE 17 OF 25

CODE COMPLIANCE VERIFICATION CHECKLIST
NFPA 13-1971
STANDARD FOR THE INSTALLATION OF SPRINKLER SYSTEMS

Code Section No.	Code Section	Information Required Verification Method W = Walkdown D = Document Search	Summary of Results (List results and reference details in calculations, sketches, etc., as required)

The Sprinkler Systems of D.C. Cook were originally designed under the jurisdiction of the 1971 Edition of NFPA 13. Over the course of D.C. Cooks history, modifications to the Sprinkler Systems were performed. The last of these modifications were completed under the jurisdiction of the 1983 Edition of NFPA 13. However, for the purpose of this evaluation, only the original (1971) Edition of NFPA 13 was utilized since no modifications after the initial design were performed on the systems being reviewed.

The following systems were evaluated under the requirements of NFPA 13, 1971 Ed.

System	Fire Zone*	Area
Wet Pipe	79, 80, 84, 85, 90, 91, 96, 97	Unit 1 & 2 Turbine Building (Aux. Building Exposure Only)
Wet Pipe	28, 30	Unit 1 & 2 Diesel Fire Pump Room Sprinkler Systems

*NOTE: These fire zones will be verified for all portions of the fire zone within 40 foot of column line H, and auxiliary feed water pump rooms or safety related trays. The portions of the fire zones reviewed included the area bounded by column coordinates: Fire zones #79-80 (Col. Lines H-23, H-14, G-25, G-18, GA-23, GA-26, E-18 and E-14); Fire Zones #84-85 (Col. Lines H-13, H-4, G-9, G-1, GA-4, GA-1, E-13 and E-9), Fire Zones #90-91 (Col. Lines H-14, H-23, , 14, E-18, G-18, G-26, and GA-26); Fire Zones #96-97 (Col. Lines H-13, H-4, G-13, G-1, GA-4 and GA-1).

CHAPTER 1, GENERAL INFORMATION

1041	A sprinkler system installed under this Standard must be properly maintained for efficient service. The owner is responsible for the condition of his sprinkler and must use due diligence in keeping the system in good operating condition.	W, D	Comply: All systems reviewed in Zones 79, 80, 90, 91 are maintained and tested via plant procedures. Ref: 1-13, 21-24. Does Not Comply: For the system protecting Zone 80, the guards have been removed from the open bay sidewall sprinklers. Also, valve 1-FP-196 has no operator. Ref: 2, 21-24 Does Not Comply: For the system protecting the cable trays in Zone 80 several nozzles are misaligned. Ref: 6, 21-24

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NFPA 13-CODE COMPLIANCE VERIFICATION CHECKLIST
DONALD C. COOK UNITS 1 AND 2

ABB Impell Corporation

JOB NO 0120-164
CALC NO 0120-164-002
PAGE 11 OF 25

CODE COMPLIANCE VERIFICATION CHECKLIST
NFPA 13-1971
STANDARD FOR THE INSTALLATION OF SPRINKLER SYSTEMS

Code Section No.	Code Section	Information Required Verification Method W = Walkdown D = Document Search	Summary of Results (List results and reference details in calculations, sketches, etc., as required)
1042	The installing contractor shall provide the owner with: (a) Instruction charts describing operation and proper maintenance of sprinkler devices. (b) Published pamphlet on Care Maintenance of Sprinkler Systems. (NFPA No. 13A.)	D	**Comply:** Systems in Unit 1 consisting of Grinnel and Star fire protection equipment are provided with documentation. **Ref:** 30 **Open Item:** Systems in Unit 2 installed by Hodgeman are not provided with documentation for review.
1141	Flooring should preferably be made tight and waterproof.	D	**Open Item:** Documentation could not be found which would verify that the floors have been waterproofed.
1412	Normally, only new materials and devices shall be employed in the installation of sprinkler systems. Second-hand sprinklers shall not be used. When special conditions warrant, listed devices shall as alarm valves, retarding chambers, circuit closers, water motor devices, dry pipe valves, and quick opening devices, etc., may be re-used, but if re-used they shall be reconditioned by the original manufacturer. On request of the authority having jurisdiction, the original manufacturer shall furnish a certificate, stating that such specified devices have been reconditioned and tested and are considered satisfactory for re-use.	D	**Open Item:** No documentation provided for verification of this code section. **Does Not Comply:** Non-approved isolation valves are installed at the Unit 1 sprinkler system risers. **Ref:** 32

Code Section No.	Code Section	Information Required Verification Method W = Walkdown D = Document Search	Summary of Results (List results and reference details in calculations, sketches, etc., as required)
1511	Before asking final approval of an automatic sprinkler equipment by the authority having jurisdiction the installation company should furnish a written statement to the effect that the work covered by its contract has been completed and tested in accordance with the approved specifications and plans. (See Section 1700).)(Sic)	D	**Open Item:** No documentation provided for verification of this code section.
1611	All tests should be made by contractor in presence of inspector of the authority having jurisdiction. When inspector is not available and permission is granted by the authority having jurisdiction, tests may be witnessed by owner or his representative and test certificate signed by same.	D	**Open Item:** Although the specifications require the presence of ANI (NEL-PIA) during all tests for approval, final test certificates are not provided for review. **Ref:** 32, Sect 1:03.
1620	Flushing of Underground Connections Underground mains and lead-in connections to system risers shall be flushed thoroughly before connection is made to sprinkler piping in order to remove foreign materials which may have entered the underground during the course of the installation. Underground mains supplying wet pipe, dry pipe or pre-action sprinkler systems should be flushed at a rate of flow of not less than 750 gallons per minute for 6-inch pipe, 1,000 gallons per minute for 8-inch pipe, 1,500 gallons per minute for 10-inch pipe and 2,000 gallons per minute for 12-inch pipe. The minimum rate of flow for flushing underground connections to open sprinkler, deluge, and hydraulically designed systems should not be less than the water demand rate of the system which is determined by system design. For all systems, the flushing operations should be continued for a sufficient time to insure thorough cleaning. When planning the flushing operations, consideration shall be given	D	**Does Not Comply:** The installation specifications do not require the lead in connections to be flushed. However, specification 12 DHP 4030.STP 124 requires regular system flushing with flushing connections provided at all automatic valve manifolds. Also, strainers are provided at the pumps. **Ref:** 24, 3 Sect. 1:07.3.

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2	DBH	7/4/90	SAO	7-9-90

NFPA 13-CODE COMPLIANCE VERIFICATION CHECKLIST
DONALD C. COOK UNITS 1 AND 2

ABB Impell Corporation

JOB NO 0120-164
CALC NO 0120-164-002
PAGE 12 OF 25

CODE COMPLIANCE VERIFICATION CHECKLIST
NFPA 13-1971
STANDARD FOR THE INSTALLATION OF SPRINKLER SYSTEMS

Code Section No.	Code Section	Information Required Verification Method W = Walkdown D = Document Search	Summary of Results (List results and reference details in calculations, sketches, etc., as required)
	to disposal of the water issuing from the test outlets. If the water supply will not produce the stipulated flow rate, the maximum flow rate available should be obtained by employing adequate discharge means.		
1631	Test Pressure. All new systems including yard piping shall be tested hydrostatically at not less than 200 pounds per square inch pressure for two hours, or at 50 pounds per square inch in excess of the maximum static pressure when the maximum static pressure is in excess of 150 pounds.	D	**Open Item:** The piping specifications require hydrostatic testing of 1-1/2 times the design pressure, however test certificates are not provided for review. **Ref:** 34, Sect. 3.4.3
1632	Permissible Leakage. The inside sprinkler piping should be installed in such a manner that there will be no visible leakage when the system is subjected to the hydrostatic pressure test. Refer to Outside Protection Standard (NFPA No. 24) for permissible leakage in underground mains and lead-ins. The amount of leakage may be measured by pumping from a calibrated container.	W, D	**Open Item:** Piping specifications require repair of any leaks during hydrostatic testing and no visible leaks were found, however, test certificates were not provided for review. **Ref:** 1-13, 34 Sect. 3.4.1
1700	Contractor's Material and Test Criteria Sprinkler Systems - Water Spray Systems (Certificates and requirements appear on pages 24 - 2. of the code.)	D	**Open Item:** Documentation not provided for review.
	CHAPTER 2. WATER SUPPLIES		
2822	The required pressure gauges shall be of approved type and shall have a maximum limit not less than twice the normal working pressure at the point where installed. They shall be so installed as to permit easy removal, and shall be located where they will not be subject to freezing.	W, D	Comply: Pressure gauges are acceptable for Zones 79, 80, 90, 91. **Ref:** 1-8, 66 Does Not Comply: Walkdown and drawings indicate 300 psi gauges for fire zones 44, 85, 97. Working pressure is 162 psi. **Ref:** 9, 10, 12, 87

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2	DKK	7/14/89	SEO	7/14/89

ABB Impell Corporation

NFPA 13-CODE COMPLIANCE VERIFICATION CHECKLIST
DONALD C. COOK UNITS 1 AND 2

JOB NO 0120-164
CALC NO 0120-.54-002

PAGE 12 OF 25

CODE COMPLIANCE VERIFICATION CHECKLIST
NFPA 13-1971
STANDARD FOR THE INSTALLATION OF SPRINKLER SYSTEMS

Code Section No.	Code Section	Information Required Verification Method W = Walkdown D = Document Search	Summary of Results (List results and reference details in calculations, sketches, etc., as required)
			Does Not Comply: The gauge below the alarm valve protecting zone 96 is an Ashcroft (non U.L.) gauge. Ref. 11, 87
			Does Not Comply: The gauges below the alarm valves protecting the Diesel Fire Pump Rooms are Ashcroft (non-U.L.). Gauges reading 200 psi on a scale of 300 psi. The Unit 1 Diesel Fire Pump gauge and bypass line are not freeze protected. Ref: 12, 86, 87
	CHAPTER 3. SYSTEM COMPONENTS		
3051	Branch lines should not exceed 6 sprinklers on either side of cross main. The following pipe schedules are given only as a guide for installations having no unusual features.	W,D	Not Applicable: Documentation shows that all systems reviewed have been hydraulically designed with the exception of the Diesel Fire Pump Room systems which are sized based on an ordinary hazard pipe schedule. Ref: 1-13, 38-49, 70-85, 90, 50

Steel

1 in. pipe	1 sprinkler
1-1/4 in. pipe	2 sprinklers
1-1/2 in. pipe	5 sprinklers
2 in. pipe	8 sprinklers
2-1/2 in. pipe	15 sprinklers
3 in. pipe	27 sprinklers
3-1/2 in. pipe	40 sprinklers
4 in. pipe	55 sprinklers
5 in. pipe	90 sprinklers
6 in. pipe	150 sprinklers
8 in. pipe	See Paragraph 3032

Copper

1 in. pipe	1 sprinkler
1-1/4 in. pipe	2 sprinklers
1-1/2 in. pipe	5 sprinklers
2 in. pipe	8 sprinklers

CODE COMPLIANCE VERIFICATION CHECKLIST
NFPA 13-1987
STANDARD FOR THE INSTALLATION OF SPRINKLER SYSTEMS

Code Section No.	Code Section	Information Required Verification Method W = Walkdown D = Document Search	Summary of Results (List results and reference details in calculations, sketches, etc., as required)
	2-1/2 in. pipe — 20 sprinklers 3 in. pipe — 30 sprinklers 3-1/2 in. pipe — 45 sprinklers 4 in. pipe — 65 sprinklers 5 in. pipe — 100 sprinklers 6 in. pipe — 170 sprinklers 8 in. pipe — See Paragraph 3032 The area protected by any one system on any one floor of one fire section shall not exceed 25,000 square feet. This permits exceeding the number of sprinklers specified above the 8-inch pipe.		
3091	All threaded fittings and pipe shall have threads cut to ANSI Standard B2.1. Care should be taken that the pipe does not extend into the fitting sufficiently to reduce the waterway.	D	Open Item: Documentation (Procedures of Specifications) not provided for review.
3092	Pipe shall be properly reamed after cutting to remove all burns and fins.	D	Open Item: See response to Code Section 3091.
3093	Joint compound shall be applied to the threads of the pipe end not in the fitting.	W, D	Open Item: See response to Code Section 3091. Ref: 1-13
3094	Other types of joints must be made or installed in accordance with the requirements of the listing thereof by a nationally recognized testing and inspection agency.	D	Open Item: See response to Code Section 3091.
3095	Brazed joints for the connection of pipe or tube and fittings may be used. The fire hazard of the process shall be suitably safeguarded.	W, D	Open Item: See response to Code Section 3091. Ref: 1-13

CODE COMPLIANCE VERIFICATION CHECKLIST
NFPA 13-1971
STANDARD FOR THE INSTALLATION OF SPRINKLER SYSTEMS

Code Section No.	Code Section	Information Required Verification Method W = Walkdown D = Document Search	Summary of Results (List results and reference details in calculations, sketches, etc., as required)
3211	All sprinkler pipe and fittings shall be so installed that the system may be thoroughly drained. Where practicable, all piping should be arranged to drain to the main drain valve.	W, D	**Comply:** Walkdown and documentation verified acceptable drainage with aux. drains provided for trapped sections as required by the drawing. **Ref:** 1-13, 70-85, 90
3212	Pipe shall be straightened before installation to prevent pockets which would interfere with proper drainage.	W	**Comply:** Plant walkdowns verified the existence of straight pipe. See response to Code Section 3211. **Ref:** 1-13
3213	On wet pipe systems sprinkler pipes shall be pitched not less than 1/4 inch to 10 feet.	W	**Comply:** Plant walkdown verified acceptable drainage see response to Code Section 3211. **Ref:** 1-13
3241	Each drain pipe should preferably discharge outside the building at a point visible from the drain valve # d free from the possibility of causing water damage. Where it is not possible to discharge outside the building wall, the drain should be piped to a sump, which in turn should discharge by gravity or be pumped to a waste water drain or sewer. Direct interconnections should not be made between sewers and sprinkler drains of systems supplied with public water. The drain discharge should be in conformity with any local health or water department regulations, or sanitary code. The drain connection should be of a size to carry off water from open drains while two, are discharging under normal water pressures.	W	**Does Not Comply:** The Unit 1 systems reviewed (Zones 79, 80, 90, 91) are equipped with drain lines that are gauged and have hose couplings to facilitate draining. One hose goes to a bucket with a portable sump pump. **Ref:** 1-8 **Does Not Comply:** The Unit 2 systems reviewed (Zones 84, 85, 96, 97) are equipped with main drain lines that are connected to the flushing header which goes to a sump. The drain line from the retard chamber, however, discharges to the floor. **Ref:** 9-12 **Does Not Comply:** The drain lines for the Unit 2 Diesel Fire Pump Room system are piped to a sump. However, the Unit 1 Diesel Fire Pump Room drains discharge to the floor. **Ref:** 13

Page 7

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NFPA 13-CODE COMPLIANCE VERIFICATION CHECKLIST
DONALD C. COOK UNITS 1 AND 2

ABB Impell Corporation

JOB NO 0120-154
CALC NO 0120-164-002

PAGE 14 OF 25

REV	BY	DATE	CHECKED	DATE
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NFPA 13-CODE COMPLIANCE VERIFICATION CHECKLIST
DONALD C. COOK UNITS 1 AND 2

ABB Impell Corporation

JOB NO 0120-164
CALC NO 0120-164-002

PAGE 7 OF 15

CODE COMPLIANCE VERIFICATION CHECKLIST
NFPA 13-1971
STANDARD FOR THE INSTALLATION OF SPRINKLER SYSTEMS

Code Section No.	Code Section	Information Required Verification Method W - Walkdown D - Document Search	Summary of Results (List results and reference details in calculations, sketches, etc., as required)
3562	The minimum distance between hangers and upright sprinklers should be in accordance with Table 3562.	W, D	**Comply:** Walkdown and documentation verified compliance for Zones 30, 90, 85, and 97 systems. **Ref:** 3, 7, 10, 12, 72, 76, 80, 81, 84, 85 **Does Not Comply:** Walkdown showed that hangers were too close to upright sprinklers in the Unit 1 Diesel Fire Pump Room (Zone 29) and on line #206 in Zone 79. **Ref:** 1, 5, 13, 70, 74, 90 **Does Not Comply:** Walkdown showed that hangers were missing in Fire Zone 84 (numerous), Zone 80 (missing on main "C1" and "L2"), and Zone 91 (no dead weight support on 5" riser, one hanger missing). **Ref:** 2, 6, 4, 8, 9, 71, 73, 75, 77, 78, 79 **Does Not Comply:** Walkdown showed that hangers were broke in Fire Zone 96. **Ref:** 11, 82, 83
3612	Automatic sprinklers with nominal 1/2-inch discharge orifice and of the ordinary degree temperature ratings will usually be required.	W	**Comply:** Walkdown verified compliance with all area systems in Fire Zones 80, 79, 90, 84, 85, 96 & 97. **Ref:** 1 thru 4 and 9 thru 13 **Does Not Comply:** Walkdown shows that Unit 1 & 2 cable tray systems (Zones 80, 79, 85, 90, 91, 96 & 97) used 1/4" orifice heads and small orifice heads were noted in Fire Zone 91. **Ref:** 5, 6, 7, 8

CODE COMPLIANCE VERIFICATION CHECKLIST
NFPA 13-1971
STANDARD FOR THE INSTALLATION OF SPRINKLER SYSTEMS

Code Section No.	Code Section	Information Required Verification Method W = Walkdown D = Document Search	Summary of Results (List results and reference details in calculations, sketches, etc., as required)
3653	The use of sprinklers with temperature ratings higher than ordinary shall be in accordance with the maximum ceiling temperatures given in Table 3651, except as provided in Paragraph 3654.	W, D	**Comply:** Drawings and walkdowns show that the sprinklers used in the Unit 2 area protection systems (Zones 24, 95, 96, 97) are in accordance with the temperture given in Tabel 3651. **Ref:** 9-12, 78-85 **Does Not Comply:** Drawings and walkdowns show that the sprinklers used in the Unit 1 area and cable tray systems, Unit 2 cable tray systems, and in the Diesel Fire Pump Rooms are 250°F rate heads rather than 175°F to 225°F called out in Tabel 3651. **Ref:** 1-13, 70-85, 90
3681	When the sprinkler piping is given any kind of coating, such as whitewash or paint, care must be exercised to see that no portion of the automatic sprinklers is coated. When painting sprinkler piping or painting in areas near sprinklers, the sprinklers may be protected by covering with a paper bag which shall be removed immediately after the painting has been finished.	W	**Comply:** Walkdown verified compliance for Zones 28, 30, 85, (Area Sys. only) and 90 (area system only). **Ref:** 1,3, 10, 13 **Does Not Comply:** Walkdowns showed painted heads in Zone 79, 80 91 & 96 and covers left in place after painting in Zones 79, 84 & 91. **Ref:** 9, 11

REV	BY	DATE	CHECKED	DATE

NFPA 13-CODE COMPLIANCE VERIFICATION CHECKLIST
DONALD C. COOK UNITS 1 AND 2

ABB Impell Corporation

JOB NO 0120-164
CALC NO 0120-164-002

PAGE 4 OF 25

CODE COMPLIANCE VERIFICATION CHECKLIST
NFPA 13-1971
STANDARD FOR THE INSTALLATION OF SPRINKLER SYSTEMS

Code Section No.	Code Section	Information Required Verification Method W = Walkdown D = Document Search	Summary of Results (List results and reference details in calculations, sketches, etc., as required)
3682	Sprinkler frames may be factory painted or enameled for the purpose of identifying sprinklers of different temperature ratings in accordance with Paragraph 3651. Otherwise, sprinklers shall not be painted and any sprinklers which have been painted, except for factory applied coatings applied for identification of temperature ratings shall be replaced with new approved sprinklers. Paintings of sprinklers may retard the thermal response of the fusible element, may interfere with the free movement of parts and may render the sprinkler inoperative. Moreover, painting may invite the application of subsequent coatings, thus increasing the possibility of a malfunction of the sprinkler.	W	**Comply:** Walkdowns verified compliance for this code section in Zones 28, 30 (Diesel Fire Pump Rooms), Zone 90, Zone 85, and Zone 97. **Ref:** 3, 7, 10, 12, 13 **Does Not Comply:** Walkdowns showed several heads which were painted or covered by plastic bags in Zone 79 (painted heat in cable tray sys, covers left on area sys, line #504), Zone 8, (several painted heads on area sys), Zone 91 (painted and covered heads with plastic bags on area sys), Zone 84 (covers left in place), and Zone 96 (painted heads). **Ref:** 1, 2, 4-9, 11
3683	Ornamental finishes shall not be applied to sprinklers by anyone other than the manufacturer of the sprinklers and only sprinklers approved with such finishes shall be used.	W	**Comply:** See response to Code Section 3682. **Does Not Comply:** See the response to code section 3682.
3691	Arrangements should be made to keep at least 18 inches clearance below sprinkler deflectors to reduce possible obstruction to the distribution of water. For high piled combustible stock increased clearance of 36 inches or more should be provided.	W	**Comply:** Walkdowns verified that this code section is being met. **Ref:** 1-13

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NFPA 13-CODE COMPLIANCE VERIFICATION CHECKLIST
DONALD C. COOK UNITS 1 AND 2

ABB Impell Corporation

JOB NO 0120-164
CALC NO 0120-164-002
PAGE 10 OF 55

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ABB Impell Corporation

NFPA 13-CODE COMPLIANCE VERIFICATION CHECKLIST

DONALD C. COOK UNITS 1 AND 2

JOB NO 0120-164

CALC NO 0120-164-002

PAGE 20 OF 25

CODE COMPLIANCE VERIFICATION CHECKLIST
NFPA 13-1971
STANDARD FOR THE INSTALLATION OF SPRINKLER SYSTEMS

Code Section No.	Code Section	Information Required Verification Method W = Walkdown D = Document Search	Summary of Results (List results and reference details in calculations, sketches, etc., as required)
3761	(a) Electrically operated alarm attachments forming part of an auxiliary, central station, proprietary or remote station signaling system shall be installed in accordance with the following applicable NFPA standards. 1. Central Station Protective Signaling Systems (NFPA No. 71). 2. Auxiliary Protective Signaling Systems (No. 72B). 3. Remote Station Protective Signaling Systems (NFPA No. 72C). 4. Proprietary Protective Signaling Systems (NFPA No. 72D). (b) Electrically operated alarm attachments forming part of a local sprinkler water flow alarm system shall be installed in accordance with the local alarm system provisions of NFPA No. 72A and in accordance with the provisions of the following Paragraphs 3762, 3763 and 3764. These standards permit local electrical waterflow alarms to be of open circuit type.	D	Comply: All devices are properly installed, and tested based on the review of the evaluations performed for NFPA 72D-1967 edition in Report No. 09-0120-0123. REF: 21, 22, 23 & 51.
3762	Waterflow devices, controlling electric alarm circuits, should be provided with means for testing the electrical supply, circuits, connection and devices. An actual waterflow, through the use of a test connection, shall be the method employed for testing the operation of the sprinkler alarm unit as a whole.	D	Comply: Test devices are provide for each system. Ref: 1-13, 23
3783	Drain from retarding chamber and electric alarm switch should preferably discharge through an open cone and be run separate from main system drains to a safe and visible point of free discharge or to sewer or ground drain. Drain from water-motor-	W, D	Comply: Walkdown and documentation verifies that retard chambers are provided and separate from main drain. Ref: 1-13, 09-84

ABB Impell Corporation

NFPA 13-CODE COMPLIANCE VERIFICATION CHECKLIST
DONALD C. COOK UNITS 1 AND 2

JOB NO 0120-164
CALC NO 0120-164-002

CODE COMPLIANCE VERIFICATION CHECKLIST
NFPA 13-1971
STANDARD FOR THE INSTALLATION OF SPRINKLER SYSTEMS

Code Section No.	Code Section	Information Required Verification Method W = Walkdown D = Document Search	Summary of Results (List results and reference details in calculations, sketches, etc., as required)
	operated alarm device may run separately to sewer or ground drain or may be connected to drain from retarding chamber at a point between such sewer and a check valve on this drain, a union or plug being inserted in the drain from the alarm device to permit inspection.		**Does Not Comply:** Walkdown and documentation showed retard chambers discharge to floor. **Ref:** 1-13, 86-89
	CHAPTER 4, SPACING, LOCATION AND POSITION OF SPRINKLERS		
4011	The authority having jurisdiction shall be consulted in every case as to location and spacing of sprinklers for the protection of buildings and contents.	D	**Comply:** The specifications require that the plans and final installation are subject to the approval of the authority having jurisdiction. **Ref:** 32 Sec 1:04.1
4032	Where such partial sprinkler installations are installed, the standards of this pamphlet should be used insofar as they are applicable. The authority having jurisdiction should be consulted in each case.	D	**Not Applicable:** The Fire Zones evaluated (79, 80, 84, 85, 90, 91, 96, 97, 28, 29) have full area coverage. Flow test are performed every 18 months for water supply. **Ref:** 1-13, 25, 38-49, 70-85, 90
4133	... a Hazard Occupancy. The protection area per sprinkler shall not exceed 90 square feet for any type of building construction.	D	**Comply:** Walkdown and documentation verify compliance with this code section for Zones 79, 80, 84, 85, 90, 91, 96, and 97. **Ref:** 1-13, 70-85 **Not Applicable:** The Diesel Fire Pump Room systems are sized based on an ordinary hazard. **Ref:** 13, 90, 80
4143	The arrangement of branch lines depends upon such construction features as the distance between girders or trusses, columns of mushroom type reinforced concrete, and beams of standard mill construction. Each space or bay should usually be treated as a unit, installing the same number of branch lines uniformly in each space. Where simple branch lines will suffice, they should be	W	**Comply:** Walkdowns showed compliance for this Code Section in Zone 85. **Ref:** 10 **Does Not Comply:** Walkdowns showed numerous sprinklers missing from bays in Zone 79 (3 bays with no sprinklers), 80 (one branch line and numerous heads missing), 90 (missing heads), 91

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ABB Impell Corporation

NFPA 13-CODE COMPLIANCE VERIFICATION CHECKLIST
DONALD C. COOK UNITS 1 AND 2

JOB NO 0120-164
CALC NO 0120-164-002

PAGE 11 OF 13

CODE COMPLIANCE VERIFICATION CHECKLIST
NFPA 13-1971
STANDARD FOR THE INSTALLATION OF SPRINKLER SYSTEMS

Code Section No.	Code Section	Information Required Verification Method W = Walkdown D = Document Search	Summary of Results (List results and reference details to calculations, sketches, etc., as required)
	placed midway in each bay or space. The arrangement of branch lines also depends upon the structural members available and suitable for the attachment of hangers and upon the need for properly locating sprinkle. deflectors in accordance with Sections 4150 and 4200.		(several uprotected rooms, missing branch lines), 84 (missing heads), 85 (missing heads), 96 (one branch line missing) and 97 (branch lines missing). **Ref:** 1-9, 11, 12 **Does Not Comply:** Walkdowns showed improper installation of sprinkler heads for Zone 80 (area svs., upright in pendent position and standard heads installed in bays where sidewalls are preferred), Zone 97 (upright in pendent position), Zone 96 (upright at angle), and Zone 91 standard heads installed in bays where sidewalls are preferred). **Ref:** 2, 12, 11, 4 **Not Applicable:** The Diesel Fire Pump Room have no bays. **Ref:** 13
4156	Beams. It is essential that if deflectors of sprinkler. in bays are above the bottom of the beam, they be at sufficient distances from the beams, as shown in Table 4156 and Fig. 4156 to avoid obstruction to the sprinkler discharge pattern.	W, D	**Does Not Apply:** Walkdowns identified numerous obstructions to discharge patterns in Zone 79 (obstructions due to cable trays and misc. piping, no suppression for storeow areal, Zone 80 (obstructions due to cable trav or 3/4" dia. guards), Zone 90 (obstructions due to cable trav, bus duct and misc 4" obs.), Zone 91 (obstruction due to steam piping and beams or 3/4" dia. guards), Zone 84 (piping obstructions, misc.), Zone 85 (sprinklers too close to each other, misc. obstructions from piping), Zone 86 (misc. obstructions), Zone 97 (obstructions from cable trays, piping, and baffle plates). **Ref:** 1-12, 70-85 **Comply:** The Diesel Fire Pump Rooms meet this code section. **Ref:** 13, 90

CODE COMPLIANCE VERIFICATION CHECKLIST
NFPA 13-1971
STANDARD FOR THE INSTALLATION OF SPRINKLER SYSTEMS

Code Section No.	Code Section	Information Required Verification Method W = Walkdown D = Document Search	Summary of Results (List results and reference details in calculations, sketches, etc., as required)
4211	Where branch lines run across the beams, the deflectors of sprinklers located in the bays should preferably be located above the bottom of the beam and in no case more than 4 inches below the bottom level of the beams.	W	**Comply:** Walkdowns verified compliance for Zones 79, 84, 85. **Ref:** 1, 9, 10 **Does Not Comply:** Walkdowns showed deflectors too low or too high for Zone 90 (heads 24"-30" below deck), Zone 91 (head 6" from beam, pendent 2" from deck), Zone 96 (branch of heads > 12" below deck), Zone 97 (branch lines and heads > 12" below deck). **Ref:** 2-8, 11-12
4221	Deflectors of sprinklers under beams should be located 1 inch to 4 inches below beams, and not more than 14 inches below combustible ceilings or not more than 16 inches below noncombustible ceilings.	W	**Not Applicable:** No smooth ceiling construction for Zones 79, 80, 84, 85, 90, 91, 96, 97. **Ref:** 1-12 **Comply:** The Diesel Fire Pump Room walkdown verified compliance. **Ref:** 13
4231	Deflectors of sprinklers in bays should be located not less than 3 inches below and not more than 16 inches below combustible or noncombustible roof or floor decks.	W	**Comply:** See response to Code Section 4211. **Does Not Comply:** See response to Code Section 4211.
4316	Obstructions. Timbers, uprights, hangers, piping, lighting fixtures, duct, etc., are likely to interfere with the proper distribution of water from sprinklers. Therefore, sprinklers should be so located or spaced that any interference is held to a minimum. The required clearance between such members and sprinklers is dependent upon the size of the obstruction to water distribution. The clearances should not be less than those specified between sprinklers and truss members in Paragraph 4161 and 4166. (See Also Paragraph 4166.)	W	**Does Not Comply:** See response to Code Section 4156. **Comply:** See response to Code Section 4156.

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ABB Impell Corporation

NFPA 13-CODE COMPLIANCE VERIFICATION CHECKLIST
DONALD C. COOK UNITS 1 AND 2

JOB NO 0120-164
CALC NO 0120-164-002

PAGE OF

CODE COMPLIANCE VERIFICATION CHECKLIST
NFPA 13-1971
STANDARD FOR THE INSTALLATION OF SPRINKLER SYSTEMS

Code Section No.	Code Section	Information Required Verification Method W = Walkdown D = Document Search	Summary of Results (List results and reference details in calculations, sketches, etc., as required)
4319	Lighting Fixtures (a) Lighting fixtures of the pendent- or surface-mounted type may offer obstruction to discharge from sprinklers unless specified clearances are provided. (b) Branch sprinkler lines should be run parallel to and between lines of fixtures and should be sufficient in number to provide proper floor and ceiling coverage. Pendent fixtures located below the level of the sprinkler deflectors and also surface mounted fixtures may necessitate additional branch lines.	W	Does Not Comply: See response to Code Section 4156. Comply: See response to Code Section 4156.
	CHAPTER 5. TYPES OF SYSTEMS		
5341	Spacing of heat-responsive devices shall be in accordance with their listing by nationally recognized testing laboratories, unless conditions indicate the need for a closer spacing.	W, D	Not Applicable: Only wet pipe systems reviewed. Ref: 1-13
5343	Ceiling Heights. Where ceiling heights exceed 35 feet the heat-responsive devices should be so spaced that the area covered by each device will not exceed 75 percent of the area normally covered.	W, D	Not Applicable: Only wet pipe systems reviewed. Ref: 1-13
5352	Supervision. The sprinkler piping and heat-responsive devices shall be automatically supervised unless otherwise approved by the authority having jurisdiction.	W, D	Not Applicable: Only wet pipe systems reviewed. Ref: 1-13

REV	BY	DATE	CHECKED	DATE

NFPA 13-CODE COMPLIANCE VERIFICATION CHECKLIST
DONALD C. COOK UNITS 1 AND 2

ABB Impell Corporation

JOB NO 0120-164
CALC NO 0120-164-002

PAGE 1 OF 25

CODE COMPLIANCE VERIFICATION CHECKLIST
NFPA 13-1971
STANDARD FOR THE INSTALLATION OF SPRINKLER SYSTEMS

Code Section No.	Code Section	Information Required Verification Method W = Walkdown D = Document Search	Summary of Results (List results and reference details in calculations, sketches, etc., as required)
5193	Pressure Gauges. Approved pressure gauges conforming to Paragraph 2822 shall be installed as follows: (a) Above and below pre-action valve and below deluge valve. (b) On air supply to pre-action and deluge valves.	W,D	Not Applicable: Only wet pipe systems reviewed. Ref: 1-13

NFPA 13-CODE COMPLIANCE VERIFICATION CHECKLIST
DONALD C. COOK UNITS 1 AND 2
ABB Impell Corporation
JOB NO 0120-164
CALC NO 0120-164-002
PAGE 15 OF 19

REV	BY	DATE	CHECKED	DATE
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APPENDIX A3

CODE COMPLIANCE VERIFICATION CHECKLIST

NFPA 14 - 1971 EDITION

CALCULATION / PROBLEM COVER SHEET

Calculation / Problem No: 0120-164-003

Title: NFPA-14 CODE COMPLIANCE EVAL

Client: AEPSC Job No: 0120-164

Project: D.C. COOK EXTENDED CODE REVIEW

Design Input / References:

SEE SECTION 5.0

Assumptions:

SEE SECTION 2.0

Method:

SEE SECTION 3.0

Remarks:

SEE SECTIONS 1.0 & 4.0

REV. NO.	REVISION	APPROVED	DATE
0	ORIGINAL ISSUE	[illegible]	12-14-90
1	REVISED PER CLARIFICATION ON PAGES 2 & 3	[illegible]	1/14/91

Sheet 1 of 13

1.0 PURPOSE

1.1 The purpose of this calculation is to identify the applicable sections of the NFPA Code addressed, determine a method of verification for each applicable code section and confirm compliance for the plant fire protection systems within our review.

2.0 ASSUMPTIONS

The intent of the standpipe service at the plant was to provide Class II service for those stations which have a single 1-1/2 inch hose valve and Class III service at those stations which have both 2-1/2 inch and 1-1/2 inch hose valves.

3.0 METHODOLOGY

Reference Section 2.1.1 of Impell Project Instruction PI-0120-164-01, Revision 0.

The basis for the review of the fire protection systems against a specific code edition was determined by reviewing the systems against the code edition in effect during the time of the original system installation.

The hose stations reviewed were based on the hose stations required for use in the fire zones within our scope of the evaluation. These hose stations are detailed in the Fire Hazards Analysis, Revision 4.

Justifications for deviations and open items identified in the CCVC's are detailed in ABB Impell Technical Report Number 09-0120-0381.

4.0 RESULTS

Reference the Code Compliance Verification Checklist.

References

REF NO.	DOCUMENT NUMBER	TITLE	REV. NO.	DATE
		WALKDOWN VERIFICATION CHECKLISTS		
1	0120-164-003A	ABB Impell Calc., NFPA 14, 1971 Code Compliance Walkdown Verification Checklist (Fire Zone - 79)	0	12/90
2	0120-164-003B	ABB Impell Calc., NFPA 14, 1971 Code Compliance Walkdown Verification Checklist (Fire Zone - 8[illegible])	0	12/90
3	0120 164-003C	ABB Impell Calc., NFPA 14, 1971 Code Compliance Walkdown Verification Checklist (Fire Zone - 84)	0	12/90
4	0120-164-003D	ABB Impell Calc., NFPA 14, 1971 Code Compliance Walkdown Verification Checklist (Fire Zone - 85)	0	12/90
5	0120-164-003E	ABB Impell Calc., NFPA 14, 1971 Code Compliance Walkdown Verification Checklist (Fire Zone - 28)	0	12/90
6	0120-164-003F	ABB Impell Calc., NFPA 14, 1971 Code Compliance Walkdown Verification Checklist (Fire Zone - 30)	0	12/90
7	0120-164-003G	ABB Impell Calc., NFPA 14, 1971 Code Compliance Walkdown Verification Checklist (Fire Zone - 90)	0	12/90
8	0120-164-003H	ABB Impell Calc., NFPA 14, 1971 Code Compliance Walkdown Verification Checklist (Fire Zone - 91)	0	12/90
9	0120-164-003I	ABB Impell Calc., NFPA 14, 1971 Code Compliance Walkdown Verification Checklist (Fire Zone - 96)	0	12/90

REF NO.	DOCUMENT NUMBER	TITLE	REV. NO.	DATE
10	0120-164-003J	ABB Impell Calc., NFPA 14, 1971 Code Compliance Walkdown Verification Checklist (Fire Zone - 97)	0	12/90
11	0120-164-003K	ABB Impell Calc., NFPA 14, 1971 Code Compliance Walkdown Verification Checklist (Fire Zone - 129)	0	12/90
12	0120-164-003L	ABB Impell Calc., NFPA 14, 1971 Code Compliance Walkdown Verification Checklist (Fire Zone 130)	0	12/90
		PROCEDURES		
13	12-SHP2270 FIRE.004	Tests and Inspections of the Plant Fire Hose Standpipe Stations	0	2/12/88
14	12-OHP4030.STP.120VV	Fire Protection Valve Lineup Verification	0	4/14/88
14A	12-OHP4030.STP.124	Fire Protection System Flush and Loop Flow Test	0	9/10/87
		TECHNICAL DATA		
15	09-0120-0123	Impell Report	0	5/88
15A	0120-164-007	ABB Impell Calc. for Deviation Evaluations	0	12/90
16	SD-DCC-FP101	Fire Protection System-Water (Pg. 12)	2	12/26/89
17	Catalog (Page 25 + 78)	Fire End	-	-
18	P125-670	Jamesbury Catalog	-	6/70
19	Catalog-T (Ref 57)	Elkhart	-	-
20	NFPA 14	NFPA 14: 4-2.2	-	1987
21		ROC Kipley to Russell	-	8/7/90

	DOCUMENT NUMBER	TITLE	REV. NO.	DATE
		DRAWINGS		
2	[illegible]	ROC Kipley to Basset	-	8/7/90
	1-5152B-5	Flow Diagram Fire Protection Fire Protection - Water Turbine Bldg & Screen House Unit 1	5	4/7/89
	[illegible]	[illegible]w Diagram Fire Protection Fire Protection - Water Turbine Bldg & Screen House Unit 2	2	8/4/88
	1-5152A-3	Flow Diagram Fire Protection Fire Protection - Water Piping at Pumps Units 1 & 2	3	3/23/88
26	12-5267-6	Fire Facilities Basement Plan El. 591'-0" and 597'-0" Units 1 & 2	6	1/29/90
27	12-5268-5	Fire Facilities Mezzanine Floor El. 6[illegible]'-0" Units 1 & 2	5	1/29/90
28	12-5269-5	Fire Facilities Turbine Bldg. Main Floor El. 633'-0" Units 1 & 2	5	1/29/90
29	1-FP-4	Turbine Room Fire Protection Piping Isometric	8	7/22/87
30	1-FP-5	Turbine Room Fire Protection Piping Isometric	3	8/31/71
31	1-FP-12	Turbine Room Fire Protection Piping Isometric	7	1/16/89
32	1-FP-13	Turbine Room Fire Protection Piping Isometric	6	4/20/73
33	1-FP-27	Turbine Room Fire Protection Piping Isometric	4	4/20/73
34	1-FP-28	Turbine Room Fire Protection Piping Isometric	3	8/31/71

REF NO	DOCUMENT NUMBER	TITLE	REV. NO.	DATE
35	1-FP-29	Turbine Room Fire Protection Piping Isometric	5	3/11/87
36	1-FP-30	Turbine Room Fire Protection Piping Isometric	6	7/27/87
37	2-FP-37	Turbine Room Fire Protection Piping Isometric	5	3/23/87
38	2-FP-38	Turbine Room Fire Protection Piping Isometric	7	3/23/87
39	2-FP-39	Turbine Room Fire Protection Piping Isometric	8	2/1/88
40	FP-40	Turbine Room Fire Protection Isometric	10	3/23/87
41	2-FP-41	Turbine Room Fire Protection Piping Isometric	7	4/10/85
42	2-FP-42	Turbine Room Fire Protection Piping Isometric	5	1/30/78
43	2-FP-60, sht. 1 of 2	Turbine Room Fire Protection Piping Isometric	6	5/22/85
44	2-FP-60, sht. 2 of 2	Turbine Room Fire Protection Piping Isometric	1	2/1/72
45	2-FP-78	Turbine Room Fire Protection Piping Isometric	4	1/20/88
46	2-FP-86, sht. 1 of 2	Turbine Room Fire Protection Piping Isometric	5	1/30/88
47	2-FP-86, sht. 2 of 2	Turbine Room Fire Protection Piping Isometric	2	2/20/73
48	2-FP-90	Turbine Room Fire Protection Piping Isometric	0	6/28/72
49	1-FP-119	Turbine Room Fire Protection Piping Isometric	1	1/4/90

REF NO.	DOCUMENT NUMBER	TITLE	REV. NO.	DATE
		LICENSING DOCUMENTS		
50	50-315 50-316	Safety Evaluation Report for BTP.APCSB 9.5-1, Appendix A	-	07/31/79
51	50-315 50-316	10CFR50, Appendix R Safety Evaluation Document of IMPC D.C. Cook Plant, Units 1 & 2	-	04/26/90

NFPA 14 - 1971 EDITION

STANDPIPE & HOSE SYSTEMS

This review includes the majority of all hose stations which make up the following areas:

- Unit 1 & 2 Turbine Building
  Fire Zones 79-80, 84-85, 90-91, 96-97, 129-130

- Unit 1 & 2 Diesel Fire Pump Room
  Fire Zones 28 & 30

- Unit 1 & 2 Containment Buildings
  Fire Areas AAA & CCC

- Hose stations located in Fire Zone 142 were used to verify adequate coverage of hazards within Fire Zones 28 & 30.

NOTE: These fire zones will be verified for all portions of the fire zone within 40 feet of column line H, and auxiliary feed water pump rooms or safety related trays. The portions of the fire zones reviewed included the area bounded by column coordinates: Fire Zones #79-80 (Col. Lines H-23, H-14, G-26, G-18, GA-23, GA-26, E-13 and E-14); Fire Zones #84-85 (Col. Lines H-13, H-4, G-9, G-1, GA-4, GA-1, E-13 and E-9); Fire Zones #90-91 (Col. Lines H-14, H-23, E-14, E-18, G-18, G-26 and GA-26); Fire Zones #96-97 (Col. Lines H-13, H-4, G-13, G-1, GA-4 and GA-1); Fire Zones 129 & 130 (Col. Lines H-8, H-19, G-8, and G-19). 1

The evaluation of the standpipe and hose systems included the review of these systems under the 1971 Edition. The edition year selected was based on the edition that was in effect at the time the original system was specified in April, 1971.

The following hose stations were used to determine compliance within the Unit 1 & 2 Containment Buildings. Since the hose stations located in Fire Zones 69, 33A & 34A were previously reviewed in Report No. 09-0120-0123, these hose stations were only reviewed for compliance with hose reach requirements within the containment areas.

FIRE ZONE	HOSE STATION	ELEVATION	ORIGINAL INSTALLATION	MODIFICATION NO.
69	209	650'	-	12-2229
	209A	650'	-	12-2229
	210	650'	-	12-2229
	210A	650'	-	12-2229
33A	203	612'	-	12-2229
	203A	612'	-	12-2229
34A	207	612'	-	12-2229
	207A	612'	-	12-2229

The evaluation of the standpipe and hose systems verified the following features:

1. Size and arrangement of standpipes and hose outlets.

2. Number and location of standpipes.

3. Adequate support of piping.

4. Adequate water supplies.

5. Arrangement of piping, valves and fittings.

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NFPA 14-CODE COMPLIANCE VERIFICATION CHECKLIST

DONALD C. COOK UNITS 1 AND 2

ABB Impell Corporation

JOB NO 0120-154

CALC NO 0120-164-GJ3

PAGE 17 OF [illegible]

CODE COMPLIANCE VERIFICATION CHECKLIST
NFPA 14-1971
STANDPIPE AND HOSE SYSTEMS

Code Section No.	Code Section	Information Required Verification Method W = Walkdown D = Document Search	Summary of Results (List results and reference details in calculations, sketches, etc., as required)
	CHAPTER 1, GENERAL INFORMATION		
151.	All devices and materials used in standpipe systems shall be of approved type.	W, D	Complies: Fire Zones - All. Ref: # 1-12, 15, 17, 18.
171.	Plans showing the location, sizes and connections of the fixed portion of the standpipe system shall be furnished to the authority having jurisdiction. The plans shall be drawn to scale, and shall include the details necessary to indicate clearly all of the equipment and its arrangements. The plans shall be accompanied by specifications covering the character of the material and the features relating to the installation in det-	D	Open Item: Documentation is not available to determine compliance.
	CHAPTER 2, SIZE AND ARRANGEMENT OF STANDPIPES		
212.	In standpipe systems for Class I and Class III services, each standpipe shall be sized for a minimum flow of 500 gallons per minute. Where only one standpipe is required, its supply piping shall be sized for a minimum flow of 500 gallons per minute. Where more than one standpipe is required, all common supply piping shall be sized for a minimum flow of 500 gallons per minute for the first standpipe plus 250 gallons per minute for each additional standpipe, the total not to exceed 2500 gallons per minute. (a) Standpipes not exceeding 100 feet in height shall be at least 4 inches in size.	W, D	Open Item: Will require hydraulic calculations to confirm compliance with 500 gpm minimum flow requirement. a) Supply does not exceed 100' in height, however, piping is not all 4 inch. It appears the intent of the code section is being met, however further evaluation is required. The calculations should verify the adequacy of the water supply for the following: Hose No. 77, 78 & 80 for Unit 1 and Hose No. 66, 68 & 81 for Unit 2.

CODE COMPLIANCE VERIFICATION CHECKLIST
NFPA 14-1971
STANDPIPE AND HOSE SYSTEMS

Code Section No.	Code Section	Information Required Verification Method W = Walkdown D = Document Search	Summary of Results (List results and reference details in calculations, sketches, etc., as required)
216.	An approved means of maintaining a pressure on all zones of standpipe systems shall be provided.	D	Complies: Fire Zones - All. Ref: # 16, 25.
217.	In standpipe systems for Class II service each standpipe shall be sized for a minimum flow of 100 gallons per minute (379 l/min). Where one or more standpipes are required, all common supply piping shall be sized for a minimum flow of 100 gallons per minute (379 l/min).	W, D	Not Applicable: Fire Zones - All. No Class 2 service hose stations provided. Ref: #1-12, 23, 24
	CHAPTER 3, NUMBER AND LOCATION OF STANDPIPE AND HOSE CONNECTIONS		
321.	The number of hose stations for Class I and Class III services in each building and in each section of a building divided by fire walls shall be such that all portions of each story of the building are within 30 feet of a nozzle attached to not more than 100 feet of hose. Equipment should be so arranged as to permit directing the discharge from the nozzle into all portions of important enclosures such as closets and like enclosures.	W, D	Does Not Comply: Portions of Fire Area - AAA, CCC, Elevations 598', 609 are not protected within 30 feet of a nozzle attached to 100 feet of hose maximum. All other fire zones comply. Ref: # 1-12, 26-29 Does Not Comply: The following hose station exceeds 100 feet of hose; Fire Zone 129 - Hose Station #80 - 125 feet of hose. Ref: # 11, 28
322.	The number of hose stations for Class II service in each building and each section of a building divided by fire walls shall be such that all portions of each story of the building are within 20 feet of a nozzle when attached to not more than 75 feet of hose. Equipment should be so arranged as to permit directing the discharge from the nozzle into all portions of important enclosures such as closets and like enclosures.	W, D	Not Applicable: Fire Zones - All. No Class 2 service hose stations provided. Ref: #1-12, 23, 24

NFPA 14-CODE COMPLIANCE VERIFICATION CHECKLIST
DONALD C. COOK UNITS 1 AND 2
ABB Impell Corporation
JOB NO 0120-164
CALC NO 0120-164-003
PAGE 11 OF 13

REV	BY	DATE	CHECKED	DA.
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CODE COMPLIANCE VERIFICAT' CHECKLIST
NFPA 14-1971
STANDPIPE AND HOSE SYSTEMS

Code Section No.	Code Section	Information Required Verification Method W = Walkdown D = Document Search	Summary of Results (List results and reference details in calculations, sketches, etc., as required)
	NOTE: The standpipes supplying the 2-1/2 inch hose streams may also be used to supply the small hose streams. When the area of the building is large, separate standpipes or branches for the small hose streams may be necessary. Small hose streams may sometimes be supplied from an automatic sprinkler system. (See Standard for the Installation of Sprinkler Systems, NFPA No. 13.)		
334.	In buildings divided by numerous partitions, standpipes shall be so located that the streams can be brought to bear in any room.	W, D	**Does Not Comply:** Fire Area - AAA, CCC. See Section 321 of this Code.
	CHAPTER 4. HOSE OUTLETS		
413.	Valves of approved type should be provided at the main riser for controlling branch lines to hose station outlets so that in the event that the branch is broken during the fire, the fire department may shut off this branch, conserving the water for their use.	W, D	**Does Not Comply:** Fire Zones - All. Turbine building hose system is not properly sectionalized. **Ref:** # 1-12, 24
421.	Each hose outlet provided for the use of building occupants (Class II and III services) shall be equipped with not more than 75 feet and preferably not more then 50 feet of approved small fire hose attached and ready for use. NOTE: Long lengths of hose should be avoided as they are difficult to handle likely to kink and interfere with the effectiveness of the streams and cause loss of time when it is most valuable. For information on the selection of hose, see Care of Fire Hose, NFPA No. 198.	W, D	**Not Applicable:** Fire Zones - All. Per Section 321 of this Code, 100 feet of hose is allowed.

NFPA 14-CODE COMPLIANCE VERIFICATION CHECKLIST
DONALD C. COOK UNITS 1 AND 2
ABB Impell Corporation
JOB NO 0120-164
CALC NO 0120-164-003
PAGE 12 OF 18

REV	BY	DATE	CHECKED	DATE
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NFPA 14-CODE COMPLIANCE VERIFICATION CHECKLIST

DONALD C. COOK UNITS 1 AND 2

ABB Impell Corporation

JOB NO 0120-164

CALC NO 0120-164-003

PAGE 13 OF 18

CODE COMPLIANCE VERIFICATION CHECKLIST
NFPA 14-1971
STANDPIPE AND HOSE SYSTEMS

Code Section No.	Code Section	Information Required Verification Method W = Walkdown D = Document Search	Summary of Results (List results and reference details in calculations, sketches, etc., as required)
431.	Each station provided with small hose shall be equipped with an approved rack securely fastened in position. NOTE: With hose racks of the "semi-automatic" or "one-man" type, the hose valve should first be opened wide. The nozzle should then be grasped firmly and the hose lines drawn toward the fire. The water is automatically restored as the last few feed of hose are pulled form the rack.	W, D	**Does Not Comply:** Fire Zones - All. No signs provided at hose stations. **Ref:** # 1-12, 17
432.	Each rack for small hose should be provided with a sign reading "Fire Hose for Use By Occupants of Building". Signs shall be securely fastened in position.	W	
442.	Where the static pressure at any standpipe outlet for small hose exceeds 100 pounds per square inch, an approved device shall be installed at the outlet to reduce the pressure so that the nozzle pressure will be approximately 80 pounds per square inch. NOTE: Pressure reducers are not required on standpipe outlets for 2-1/2 inch hose because it is assumed 2-1/2 inch hose will be attached only when the person likely to use it are trained in handling large streams.	W, D	**Does Not Comply:** Fire Zones - All. Static pressures exceed 100 psi and are not provided with reducers. **Ref:** # 1-12
443.	Each hose valve on a wet system should be provided with a suitable open or automatic drip connection so installed that any slight leakage past the valve seat will be carried off and prevented from entering the fire hose.	W, D	**Complies:** Fire Zones - All. Although no drip connection is provided, Code Section is in compliance due to use of lined fire hose per NFPA 14, 1993. **Ref:** # 1-12, 15, 19, 20

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ABB Impell Corporation

NFPA 14-CODE COMPLIANCE VERIFICATION CHECKLIST

DONALD C. COOK UNITS 1 AND 2

JOB NO 0120-164

CALC NO 0120-164-003

PAGE 14 OF 19

CODE COMPLIANCE VERIFICATION CHECKLIST
NFPA 14-1971
STANDPIPE AND HOSE SYSTEMS

Code Section No.	Code Section	Information Required Verification Method W = Walkdown D = Document Search	Summary of Results (List results and reference details in calculations, sketches, etc., as required)
	CHAPTER 5, WATER SUPPLIES		
511.	The water supply requirements for standpipe systems are dependent upon the size and number of fire streams likely to be needed at any fire, and the length of time such streams will have to be used. Both of these factors are largely influenced by the conditions at the building or plant to be equipped and it is necessary that the probable number of standard streams for the protection of both interior and exterior of the building be carefully ascertained before the water supply is decided upon. The selection of water supplies for each installation shall be determined in cooperation with the authority having jurisdiction.	D	Open Item: Hydraulic calculations are required to confirm compliance.
524.	Supply for Class I and Class III services should be capable of furnishing the number of streams required for full protection for long periods.	D	Comply: (5) fire pumps are available to support the hose demands. Ref: 16, 23-25.
525.	Where the system will supply sprinklers in addition to standpipes, the water supply requirements of both shall be considered. NOTE: See also Standard for the Installation of Sprinkler Systems, NFPA No. 13.	D	Open Item: Hydraulic calculations are required to confirm compliance.
531.	The minimum supply for Class I service shall be sufficient to provide 500 gallons per minute for a period of at least thirty (30) minutes. Where more than one standpipe is required by Chapter 3, the minimum supply shall be 500 gallons per minute for the first standpipe and 250 gallons per minute for each additional standpipe, the total supply not to exceed	D Verify that the requirements for this section are met for Class III service. Ref: Code Section 551. Not applicable for Class I service, not provided at this unit.	Not Applicable: Fire Zones - All. No Class 1 service hose stations are provided. Ref: # 23, 24 Open Item: Will require hydraulic calculations to confirm compliance.

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ABB Impell Corporation

NFPA 14-CODE COMPLIANCE VERIFICATION CHECKLIST
DONALD C. COOK UNITS 1 AND 2

JOB NO 0120-164
CALC NO 0120-164-003

CODE COMPLIANCE VERIFICATION CHECKLIST
NFPA 14-1971
STANDPIPE AND HOSE SYSTEMS

Code Section No.	Code Section	Information Required Verification Method W = Walkdown D = Document Search	Summary of Results (List results and reference details in calculations, sketches, etc., as required)
	2500 gallons per minute for a period of at least thirty (30) minutes. The supply shall be sufficient to maintain a residual pressure of 65 pounds per square inch at the topmost outlet of each standpipe with 500 gallons per minute flowing from the topmost outlet of the most remote standpipe and 250 gallons per minute flowing from the topmost outlet of each of the other standpipes up to a maximum of 2500 gallons per minute flowing. The supply shall be sufficient to maintain a residual pressure of 65 pounds per square inch at the topmost outlet of each standpipe (including the roof outlet) with 500 gallons per minute flowing.		
541.	The minimum supply of Class II service shall be sufficient to provide 100 gallons per minute for a period of at least thirty (30) minutes. The supply shall be sufficient to maintain a residual pressure of 65 pounds per square inch at the topmost outlet of each standpipe (including the roof outlet) with 100 gallons per minute flowing.	D	**Not Applicable:** Fire Zones - All. No Class 2 service hose stations are provided. **Ref:** # 23, 24
551.	The minimum supply for Class III service shall be the same as for Class I service.	D	**Open Item:** See response to Section 531.
	CHAPTER 6. PIPING AND VALVES AND FITTINGS		
622.	Sufficient stop valves or check valves should be provided to permit cutting off a standpipe riser without interrupting the supply to other risers from the same source of supply.	W, D	**Complies:** Fire Zones - All. sectionalizing valves are not provided for individual risers. **Ref:** # 1-12, 24

CODE COMPLIANCE VERIFICATION CHECKLIST
NFPA 14-1971
STANDPIPE AND HOSE SYSTEMS

Code Section No.	Code Section	Information Required Verification Method W = Walkdown D = Document Search		Summary of Results (List results and reference details in calculations, sketches, etc., as required)
624.	Where the standpipes are supplied from a yard main or header in another building, the connection shall be provided with an approved outside indicator post gate valve at a safe distance from the building or an approved indicator valve at the header.	W, D		Complies: Fire Zones - All. Valves are provided but not approved. Reference Code Section 151. Ref: # 1-12, 15, 17-19, 24
651.	The pipe hangers shall be of approved type, so arranged that they will sustain the loads and retain the piping securely in position. They shall be used in sufficient number to prevent vibration in the piping when the standpipe is in use.	W, D	Verify for non-seismically qualified systems identified by AEPSC only.	Open Item: Will require additional documentation to confirm compliance.
671.	An approved 3-1/2 inch dial spring pressure gage shall be connected with each discharge pipe from fire pump and public water works, at the pressure tank, at the air pump supplying pressure tank and at the top of each standpipe. Gages shall be located in a suitable place where water will not freeze. Each gage will be controlled by a valve having arrangement for draining. NOTE: Where several standpipes are interconnected at the top, a single gage properly located may be substituted for the gages at the top of each standpipe. Additional pressure gages at the base of the standpipes may be desirable in some equipments, particularly in large plants and high buildings.	W, D		Does Not Comply: Fire Zones - All. No gage provided at top of risers. Ref: # 1-12 Complies: Fire Zones - All. Gage is provided at pump discharge and gages are controlled by a drain valve. Ref: # 1-12, 21, 25 Not Applicable: No gage required for water works and no pressure tank or air pump provided. Ref: # 1-12, 21, 25
681.	Water flow alarms should be provided on all standpipe risers, where required by the authority having jurisdiction.	W, D		Does Not Comply: Fire Zones - All. Waterflow alarms are required by the authority having jurisdiction and are not provided. Ref: # 1-12, 23-25

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NFPA 14-CODE COMPLIANCE VERIFICATION CHECKLIST
DONALD C. COOK UNITS 1 AND 2

ABB Impell Corporation

JOB NO 0120-164
CALC NO 0120-164-002

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0	[illegible]	12/4/90	[illegible]	12/5/90

NFPA 14-CODE COMPLIANCE VERIFICATION CHECKLIST

DONALD C. COOK UNITS 1 AND 2

ABB Impell Corporation

JOB NO 0120-164

CALC NO 0120-164-003

PAGE 1-1

OF 1-8

CODE COMPLIANCE VERIFICATION CHECKLIST
NFPA 14-1971
STANDPIPE AND HOSE SYSTEMS

Code Section No.	Code Section	Information Required Verification Method W = Walkdown D = Document Search	Summary of Results (List results and reference details in calculations, sketches, etc., as required)
	CHAPTER 7. TESTS AND MAINTENANCE		
711.	All new systems including yard piping shall be tested hydrostatically at no less than 200 pounds per square inch pressure for two house, or at 50 pounds per square inch in excess of the normal pressure when the normal pressure is in excess of 150 pounds per square inch. NOTE: Where standpipe connections are built in the walls or partitions the above tests should be made before they are covered in or permanently concealed.	D	Complies: Fire Zones - All. Systems are existing, no new systems installed since original installations. Ref: # 13
712.	The amount of leakage in underground piping shall be measured at the specified test pressure by pumping from a calibrated container.	D	Complies: Fire Zones - All. Based on reference, hose standpipes and underground piping are verified for their operability. Also, since these systems have remained operable since their original installation, the intent of these sections are met. Ref: # 13, 14A
713.	(a) New pipe laid with gasketed joints should, if the workmanship is satisfactory, have no leakage at the joints. Unsatisfactory amounts of leakage usually result from twisted, pinched, or cut gaskets. However, some leakage might result from small amounts of grit or small imperfections. The amount of leakage at the joints should not exceed 2 quarts per hour per 100 joints irrespective of pipe diameter. The leakage should be distributed over all joints. If such leakage occurs at a few joints the installation should be considered unsatisfactory and necessary repairs made.	D	Complies: Fire Zones - All Based on reference, hose standpipes and underground piping are verified for their operability. Also, since these systems have remained operable since their original installation, the intent of these sections are met. Ref: # 13, 14A

REV	BY	DATE	CHECKED	DATE
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ABB Impell Corporation

NFPA 14-CODE COMPLIANCE VERIFICATION CHECKLIST

DONALD C. COOK UNITS 1 AND 2

JOB NO 0120-164

CALC NO 0120-164-003

PAGE [illegible] OF [illegible]

CODE COMPLIANCE VERIFICATION CHECKLIST
NFPA 14-1971
STANDPIPE AND HOSE SYSTEMS

Code Section No.	Code Section	Information Required Verification Method W = Walkdown D = Document Search	Summary of Results (List results and reference details in calculations, sketches, etc., as required)
723.	The valves in the main connection to the automatic sources of water supply shall be open at all times. The hose valves shall be frequently examined to see that they are tight. NOTE: Leakage at the hose valves may be detected by inspection of the drips at the valves, and care should be taken to see that these are not clogged with dirt or sediment.	D	Complies: Fire Zones - All. Valves in the main connection to the automatic sources of water supply are open at all times. Valves are examined to insure they are tight. Ref: # 13, 14
724.	Inspections shall be made frequently to assure that the hose is in proper position on the racks, and that all of the equipment is in place and in good condition. The hose should be removed and re-racked at intervals at least annually and new gaskets installed in the couplings, both at the hose valves and at the nozzles. When couplings are polished, care should be taken to see that polish used does not touch fabric of hose. NOTE: For further details, see Care of Fire Hose, NFPA No. 198.	D	Does Not Comply: Fire Zones - All. New gaskets are not installed in the couplings annually. All other items comply. Ref: # 13, 22

APPENDIX A4

CODE COMPLIANCE VERIFICATION CHECKLIST

NFPA 15 - 1973 EDITION

CALCULATION / PROBLEM COVER SHEET

Calculation / Problem No: 0120-1164-004

Title: NFPA 15 - CODE COMPLIANCE CCVL

Client: AEPSC Job No: 0120-1164

Project: D.C. CODE EXTENDED CODE REVIEW

Design Input / References:

SEE SECTION 5.0

Assumptions:

SEE SECTION 2.0

Method:

SEE SECTION 3.0

Remarks:

SEE SECTIONS 1.0 & 4.0

REV. NO.	REVISION	APPROVED	DATE
0	ORIGINAL ISSUE	[signature]	12-14-90
1	REVISED PAGES 2 & 10 FOR CLARIFICATION	[signature]	1/14/91

1.0 PURPOSE

1.1 The purpose of this calculation is to identify the applicable sections of the NFPA Code addressed, determine a method of verification for each applicable code section and confirm compliance for the plant fire protection systems within our review.

2.0 ASSUMPTIONS

Due to ALARA (high radiation) concerns, the charcoal filter units were inaccessible during the walkdowns. Therefore, the water spray nozzle arrangements within the filtration units are assumed similar to the previous walkdown sketch as documented in the AEPSC evaluation document of June 17, 1988 for all units.

The fire protection systems at the D.C. Cook Plant are not "subject to earthquake" as it pertains to NFPA codes.

The water spray systems were installed per April 2, 1971 specifications.

It is assumed that the spray nozzle arrangement for the charcoal filter units are typical with exception of change in the number of charcoal filter beds.

3.0 METHODOLOGY

Reference Section 2.1.1 of ABB Impell Project Instruction PI-0120-164-01, Revision 0.

The basis for the review of the fire protection systems against a specific code edition was determined by reviewing the systems against the code edition in effect during the time of the original system installation.

Justifications for deviations and open items identified in the CCVC's are detailed in ABB Impell Technical Report Number 09-0120-0381. △1

4.0 RESULTS

Reference the Code Compliance Verification Checklist.

References

REF NO.	DOCUMENT NUMBER	TITLE	REV. NO.	DATE
		WALKDOWN VERIFICATION CHECKLISTS		
1	0120-164-004A	ABB Impell Calc., NFPA 15, 1973 Code Compliance Walkdown Verification Checklist (Start-Up XFRM 101 AB)	0	12/90
2	0120-164-004B	ABB Impell Calc., NFPA 15, 1973 Code Compliance Walkdown Verification Checklist (Start-Up XFRM 101 CD)	0	12/90
3	0120-164-004C	ABB Impell Calc., NFPA 15, 1973 Code Compliance Walkdown Verification Checklist (Aux XFRM 1 CD)	0	12/90
4	0120-164-004D	ABB Impell Calc., NFPA 15, 1973 Code Compliance Walkdown Verification Checklist (Aux XFRM 1 AB)	0	12/90
5	0120-161-004E	ABB Impell Calc., NFPA 15, 1973 Code Compliance Walkdown Verification Checklist (345KV Main XFRM)	0	12/90
6	0120-164-004F	ABB Impell Calc., NFPA 15, 1973 Code Compliance Walkdown Verification Checklist (Unit 1 Exposure Prot)	0	12/90
7	0120-164-004G	ABB Impell Calc., NFPA 15, 1973 Code Compliance Walkdown Verification Checklist (Aux XFRM 2 AB)	0	12/90
8	0120-164-004H	ABB Impell Calc., NFPA 15, 1973 Code Compliance Walkdown Verification Checklist (Aux XFRM 2 CD)	0	12/90

REF NO.	DOCUMENT NUMBER	TITLE	REV. NO.	DATE
9	0120-164-004I	ABB Impell Calc., NFPA 15, 1973 Code Compliance Walkdown Verification Checklist (Unit 2 Main XFRM's 01,02,03)	0	12/90
10	0120-164-004J	ABB Impell Calc., NFPA 15, 1973 Code Compliance Walkdown Verification Checklist (Start-Up XFRM's 201 AB, 201 CD)	0	12/90
11	0120-164-004K	ABB Impell Calc., NFPA 15, 1973 Code Compliance Walkdown Verification Checklist (Unit 2 Exposure Prot)	0	12/90
12	0120-164-004L	ABB Impell Calc., NFPA 15, 1973 Code Compliance Walkdown Verification Checklist (Charcoal Filter Units)	0	12/90
13	0120-164-004M	ABB Impell Calc., NFPA 15, 1973 Code Compliance Walkdown Verification Checklist (RCP Pump Systems)	0	12/90
		PROCEDURES		
20	P0-050-508	Fire Protection - Water Preoperational Test Procedure	0	07/03/74
21	12-0HP-4030-STP120VC	Fire Protection Yearly Valve Cycle and Lineup Verification	1	07/19/90
22	12-0HP-4030-STP120VV	Fire Protection Valve Lineup Verification	0	11/17/88
23	12-0HP-4030-STP120SF	Fire Protection Unobstructed Flow Test and Sprinkling Alarm Test	1	07/19/90
24	12-0HP-4030-STP.124	Fire Protection System Flush and Loop Flow Test	0	10/05/89
25	12-0HP-4030-STP.223	Fire Protection Water System Test	8	07/27/89
26	12-0HP-4030-STP.125NS	Non-Tech Spec Required Sprinkler Tests	1	10/12/89

REF NO	DOCUMENT NUMBER	TITLE	REV. NO.	DATE
27	1-0HP-4030-STP.123	Transformer Water Spray Test	2	07/25/88
28	2-0HP-4030-STP.123	Transformer Water Spray Test	2	12/29/88
29	1-0HP-4030-STP.125CV	Unit 1 Yearly Charcoal Filter Valve Cycle	0	09/21/89
30	2-0HP-4030-STP.125CV	Unit 2 Yearly Charcoal Filter Valve Cycle	0	05/19/88
31	12-0HP-4030-STP.125CF	Inside Containment Charcoal Filter F.P. Valve Cycling	0	02/22/89
32	1-MPH-4030-STP.032	Inspection of Preaction Spray Headers Inside Unit 1 Containment	1	03/13/86
33	2-MPH-4030-STP.032	Inspection of Preaction Spray Headers Inside Unit 2 Containment	1	02/27/86
34	12THP-4030-STP.239	RCP Fire Det. and Water System Test	7	07/06/90
35	120HP-4030-STP.120PS	RCP F.P. Strainer Blowdown and Isolation Valve Cycling	2	01/09/89
		TECHNICAL DATA		
	-	Letter From: R.J. Daley To: R.W. Jurgensen Instruction Book, "Grinneland Star Fire Systems Equipment"	-	07/15/74
41	SD-DCC-FP101	System Description, Fire Protection System - Water	2	12/26/89
42	-	Specification for Fire Protection Systems of D.C. Cook Nuclear Plant	0	04/02/71
43	DCCPM104ECS	Shop and Field Fabrication and Erection	4	05/24/73
45	ROC from D. Kipley to B. Gerwe	Ambient Temperature Conditions		08/06/90

REF NO	DOCUMENT NUMBER	TITLE	REV. NO.	DATE
46	0120-164-005	ABB Impell Calc. NFPA 72D, Code Compliance Verification Checklist	0	12/90
47	0120-164-006	ABB Impell Calc. NFPA 72E, Code Compliance Verification Checklist	0	12/90
48	-	Grinnel Hydraulic Calcs. for Unit 1 Main XFRM	0	01/06/72
49	-	Grinnel Hydraulic Calcs. for Unit 1 Start-Up XFRM	0	09/20/71
50	-	Grinnel Hydraulic Calcs. for Unit 1 Aux XFR	0	09/20/71
51	-	Grinnel Hydraulic Calcs. for Unit 1 Spare Main XFRM	1	07/31/72
52	-	Hodgeman Hydraulic Calcs. for Unit 1 Spare Main XFRM	0	09/15/76
53	-	Hodgeman Hydraulic Calcs. for Unit 1 Exposure Prot	0	02/12/76
54	-	Hodgeman Hydraulic Calcs. for Start-Up XFRMs 201 AB & 201 CD	0	11/08/74
55	-	Hodgeman Hydraulic Calcs. for Unit 2 Main XFRMs 01, 02, 03	0	07/08/74
56	-	Hodgeman Hydraulic Calcs. for Unit 2 Exposure Protection	0	06/02/76
57	DCCFP01HS02-F	AEPSC Hydraulic Calc. for Unit 1 HVAC Equip Vestibule	0	02/24/88
58	DCCFP02HS25-F	AEPSC Hydraulic Calc. for Unit 2 HVAC Equip	0	02/24/88
59	-	Grinnel and Hodgeman Sprinkler Head Spec Sheets	-	-

REF NO.	DOCUMENT NUMBER	TITLE	REV. NO.	DATE
80	-	Phoenix Hydraulic Calcs. & FC 12-2231 (RCP & Diesel Pump Room)	0	04/26/79
61	RFCDC-12-2231	Phoenix Contractors Hydraulic Calcs. (RCP & Diesel F.P Rooms)	0	03/27/87
62	-	AEPSC Evaluation Document	0	06/17/
63	0120-164-007	ABB Impell Calc. Deviation Evaluation	0	12/90
		LICENSING DOCUMENTS		
70	DRP No. 74	Donald C. Cook, FHA Docket No. 50-316	4	01/31/87
		DRAWINGS		
80	Dwg. 46-032-71M-11	Plot Plan and Header Details, Unit 1 Trans.	4	09/30-71
81	Dwg. 121-25	Unit 1 Main XFRM bottom Ring	0	09/15/76
82	Dwg. 121-26	Unit 1 Main XFRM Top Ring	0	09/15/76
83	Dwg. 46-032-71M-7	Unit 1 Start-Up XFRM 101 AB & 101 CD	3	03/23/71
84	Dwg. 46-032-71M-8	Unit 1 Aux XFRM 1 AB & 1 CD	2	09/24/71
85	Dwg. 46-032-71M-10	Unit 1 345 KV Main XFRM	2	01/12/72
86	Dwg. 121-18 121-17	Unit No. 1 Exposure Protection	0	02/12/76
87	Dwg. 46-032-71M-43	Unit 2 Aux XFRMs	0	12/15/72
88	Dwg. 121-15	Unit No. 2 Aux XFRMs	-	-
89	Dwg. 121-6	Unit No. 2 Start-Up Transformers 201 AB, 201 CD	1	11/08/74

REF NO.	DOCUMENT NUMBER	TITLE	REV. NO.	DATE
90	Dwg. 121-2	Unit 2 Plot Plan and Header Details	5	06/13/74
91	Dwg. 46-032-71M-42	Unit 2 Plot Plan and Header Details	0	12/15/72
92	Dwg. 121-3	Unit 2 Main XFRMs 01, 02, 03	2	06/14/74
93	Dwg. 46-032-71M-44	Unit 2 Main XFRMs 01, 02, 03	0	12/14/72
94	Dwg. 121-19 & 121-20	Unit No. 2 Exposure Protection	1	05/12/76
95	RFC No. 12-2231	RCP Spray Piping Plans (Phoenix sheets 3, 4, 5, 14, 15 & 16)	0	09/17/79
96	Dwg. 12-5152-4	Flow Diagram Fire Prot - Water Yard Piping Unit 1 & 2	4	07/25/89
97	Dwg. 1-5152B-5	Flow Diagram Fire Prot - Water Turb. Bldg. and Screen House Unit 1	5	04/07/89
98	Dwg. 2-5152C-2	Flow Diagram Fire Prot - Water Turb. Bldg. and Screen House Unit 2	2	08/04/88
99	Dwg. 12-5152D-7	Flow Diagram Fire Prot - Water Aux & Containment Unit 1 and 2	0	12/04/89
100	Dwg. 12-5152E-3	Flow Diagram Fire Prot - Water Charcoal Filters Units 1 and 2	3	01/08/90
101	Dwg. 1-5152J-1	Flow Diagram Fire Prot - Water Details - Turbine Bldg. and Screen House Unit 1	1	06/21/88
102	Dwg. 1-5152K-1	Flow Diagram Fire Prot - Water Details - Turbine Bldg. and Screen House Unit 2	2	06/21/88

REF NO.	DOCUMENT NUMBER	TITLE	REV. NO.	DATE
103	Dwg. 12-5152L-7	Flow Diagram Fire Prot - Water Sys. Details Turb. Bldg. and Service Bldg. Unit 1 & 2	7	01/08/90
104	Dwg. 12-5152M-4	Flow Diagram Fire Prot - Water Details - RCP's Units 1 & 2	4	09/29/89
105	Dwg. 12-5152N-3	Flow Diagram Fire Prot - Water Sys. Details - Yard Piping & Aux Bldg. Units 1 & 2	3	09/18/89

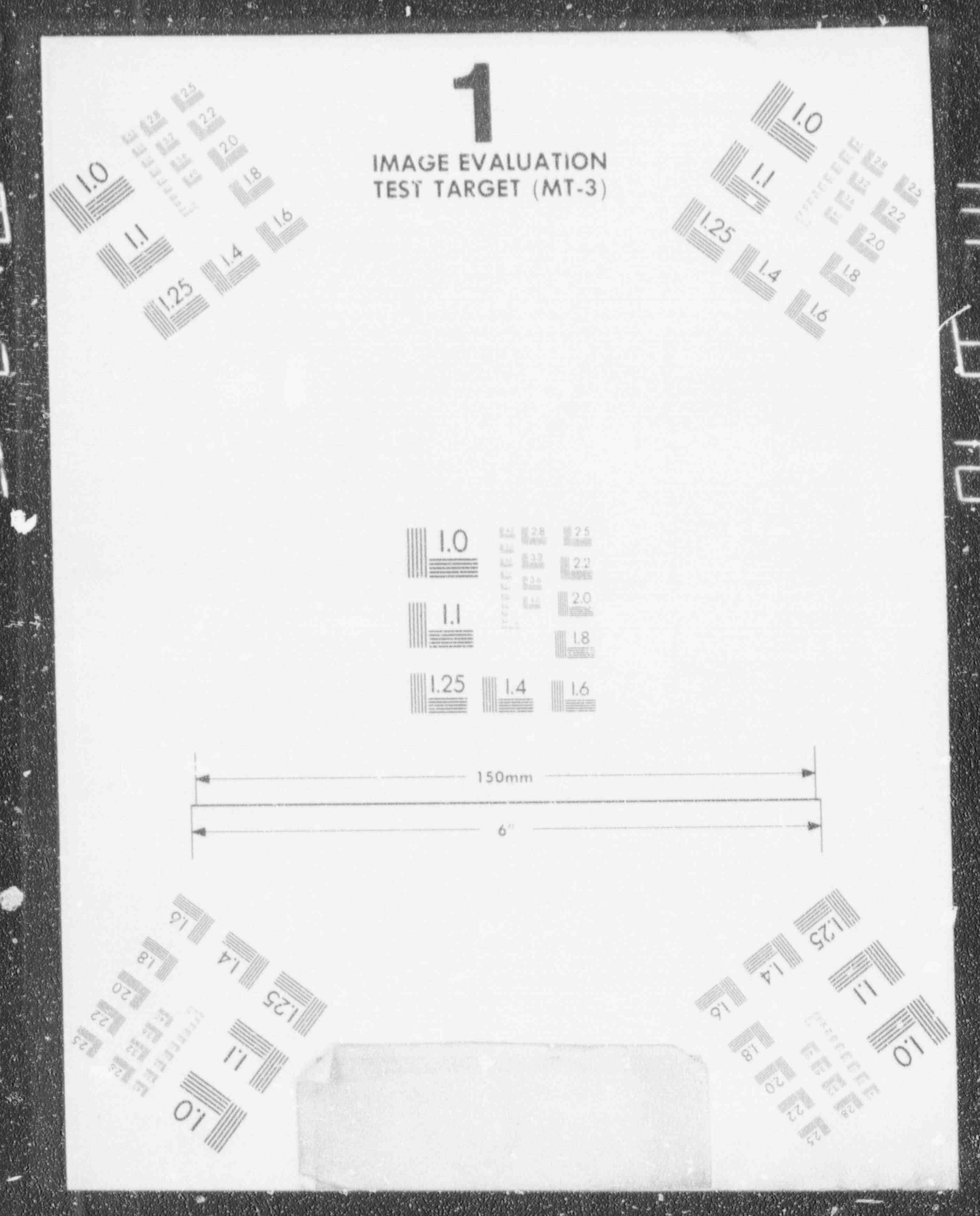
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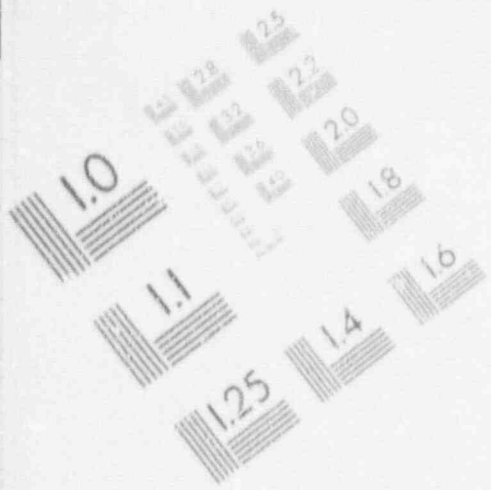
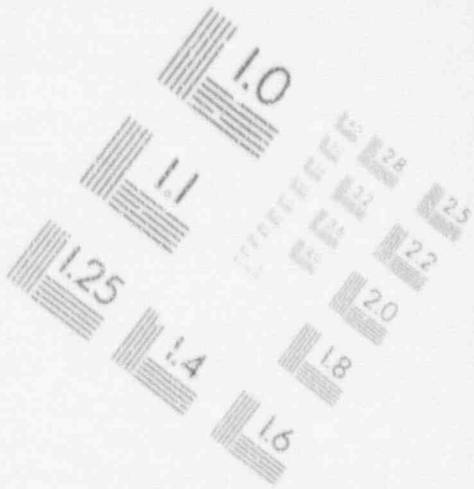
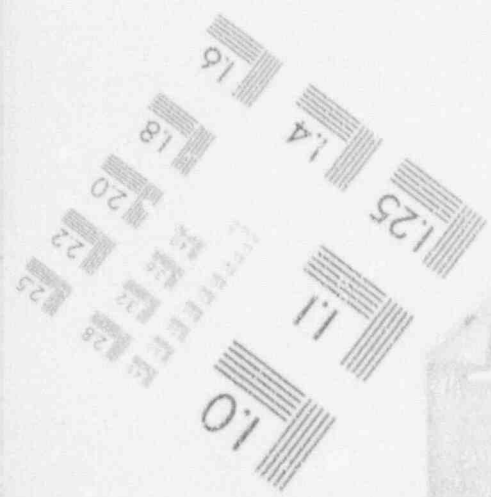
IMAGE EVALUATION
TEST TARGET (MT-3)
1.0
1.1
1.25
1.4
1.6
1.8
2.0
2.2
2.5
2.8
3.2
3.6
4.0
150mm
6"

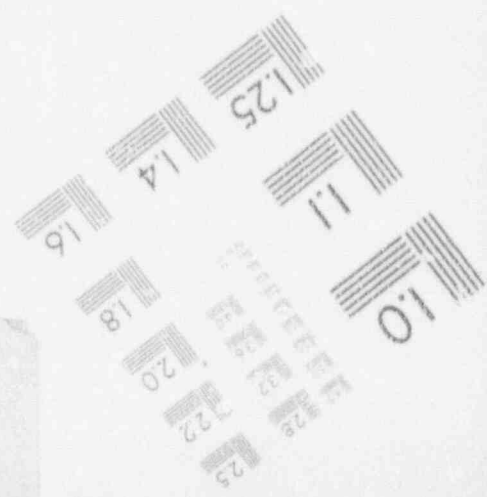
1

IMAGE EVALUATION TEST TARGET (MT-3)



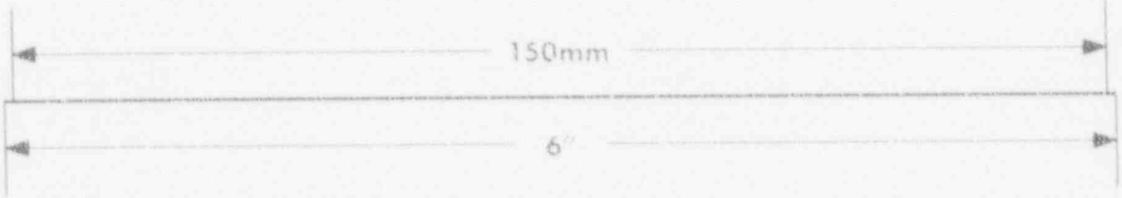


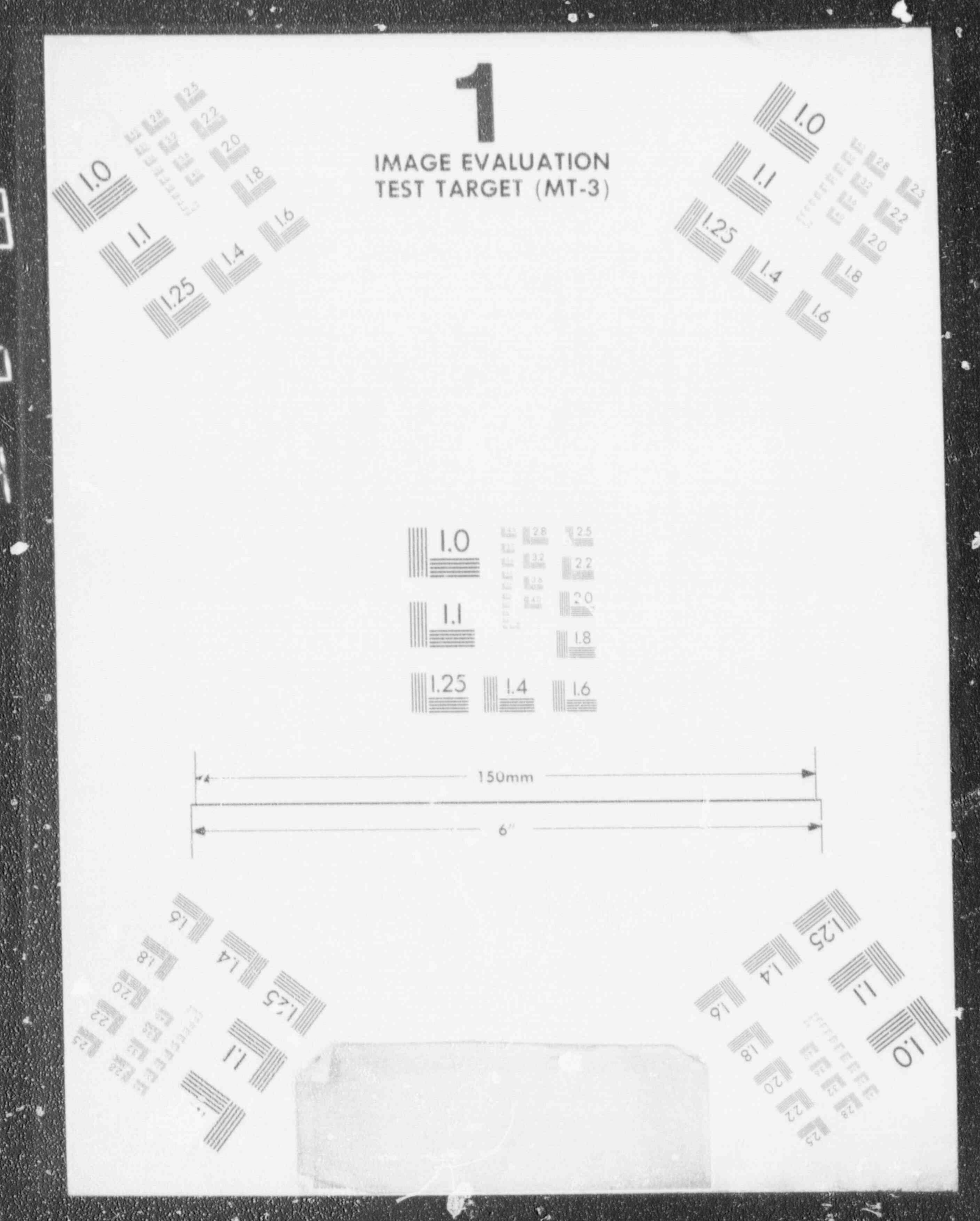




1

IMAGE EVALUATION TEST TARGET (MT-3)




1
IMAGE EVALUATION
TEST TARGET (MT-3)
1.0
1.1
1.25
1.4
1.6
1.8
2.0
2.2
2.5
2.8
3.2
3.5
4.0
4.5
150mm
6"

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NFPA 15-CODE COMPLIANCE VERIFICATION CHECKLIST

DONALD C. COOK UNITS 1 AND 2

ABB Impell Corporation

JOB NO 0120-164

CALC NO 0120-164-004

PAGE 10 OF 19

CODE COMPLIANCE VERIFICATION CHECKLIST
NFPA 15-1973
STANDARD FOR WATER SPRAY FIXED SYSTEMS FOR FIRE PROTECTION

Code Section No.	Code Section	Information Required Verification Method W = Walkdown D = Document Search	Summary of Results (List results and reference details in calculations, sketches, etc., as required)

The water spray systems evaluated for the D.C. Cook Nuclear Plant were evaluated using the requirements of the 1973 edition of NFPA 15 which was the code of record during system installation. The following systems were evaluated.

System	Zone
Unit 1 & 2 Containment Charcoal Filter Units and Reactor Coolant Pumps Suppression Systems.	66, 67, 68, 74, 75, 76, 101, 102, 103, 104
Unit 1 & 2 Transformers and Turbine Bldg. Wall Exposure Water Spray Systems	Yard

CHAPTER 1, GENERAL PROVISIONS

1061	The contractor shall prepare and submit a description and diagram of the system and its purpose, maintenance and instruction bulletins, and the applicable parts of the Sprinkler Contractors Certificate covering material and tests (see "Standard for the Installation of Sprinkler Systems", NFPA 13, 1973) certifying that the work has been completed and tested in accordance with plans and specifications; before requesting final approval of the water spray system.	D	Open Item: No documentation was found providing verification to this code section.
2012	Only listed new materials and devices shall be employed in the installation of systems except that, where age and condition permit, listed devices such as special system water control valves and their accessories, circuit closers, water motor alarm devices, nonautomatic pattern spray nozzles, etc., may be reused. But if reused they shall be reconditioned by the original manufacturer. The original manufacturer shall furnish a certificate, stating that such specified devices have been reconditioned and tested and are considered satisfactory for reuse.	D	Open Item: Although visual inspection found components to be approved, no documentation was available indicating new procurement. Ref: 41-43 Does Not Comply: The system isolation valves and automatic valves for the spray systems are not approved for their application. Ref: 42

CODE COMPLIANCE VERIFICATION CHECKLIST
NFPA 15-1973
STANDARD FOR WATER SPRAY FIXED SYSTEMS FOR FIRE PROTECTION

Code Section No.	Code Section	Information Required Verification Method W = Walkdown D = Document Search	Summary of Results (List results and reference details in calculations, sketches, etc., as required)
2031	CHAPTER 2. SYSTEM COMPONENTS Care shall be taken in the application of nozzle types. Distance of "throw" or location of nozzle from surface shall be limited by the nozzle's discharge characteristics (see 4078). Care shall also be taken in the selection of nozzles to obtain waterways which are not easily obstructed by debris, sediment, sand, etc., in the water. Requirements for strainers and their replacement are described in 2110 and 4110.	W, D	**Does Not Comply:** a) Unit 1 exposure prot.: field survey reflects 4 unprotected openings: (1) at top of elevator shaft & (3) at service building wall. b) Unit 2 main. trans. No. 2 to main 3: nozzle obstructions c) Unit 2 RCP: nozzle obstruction (HVAC ductwork) **Ref:** 1-7, 41, 84, 88, 90, 92 94, 95 101
2082	Control of automatic valves shall be by means of approved accessories for special systems.	D	**Does Not Comply:** Charcoal filter units do not have approved type solenoid valves all others comply. **Ref:** 41
2111	Pipeline strainer shall be specifically approved for use in water supply connections. Strainers shall be capable of removing from the water all solids of sufficient size to obstruct the spray nozzles (normally 1/8 in. perforations are suitable). In addition, the strainer shall be capable of continued operation without serious increase in head loss, for a period estimated to be ample when considering the type of protection provided, the condition of the water, and similar local circumstances (see 4113).	W, D	**Does Not Comply:** With exception of charcoal filter units. Provisions for strainers between the water supply and controlling valve have not been provided for all other spray systems. **Ref:** 1-13, 41, 101

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NFPA 15-CODE COMPLIANCE VERIFICATION CHECKLIST
DONALD C. COOK UNITS 1 AND 2

ABB Impell Corporation

JOB NO 0120-164
CALC NO 0120-164-004

PAGE 11 OF 19

CODE COMPLIANCE VERIFICATION CHECKLIST
NFPA 15-1973
STANDARD FOR WATER SPRAY FIXED SYSTEMS FOR FIRE PROTECTION

Code Section No.	Code Section	Information Required Verification Method W = Walkdown D = Document Search	Summary of Results (List results and reference details in calculations, sketches, etc., as required)
	CHAPTER 4. SYSTEM DESIGN AND INSTALLATION		
4011	Before a water spray system is installed or existing equipment remodeled, complete working plans, specifications and hydraulic calculations shall be prepared and made available to interested parties. For details concerning plans, specifications and hydraulic calculations, see Chapter 7.	D	Comply: Systems were designed by experienced firms (i.e., Grinnell, Hodgeman, Phoenix) submitted for owners review. Ref: 83, 84, 86, 88, 104
4032	Control of Burning		
	(b) Nozzles shall be installed to impinge on the areas of the source of fire, and where spills may travel or accumulate. The water application rate on the probable surface of the spill shall be at the rate of not less than 0.1 gpm per sq. ft.	W, D	Comply: All systems were designed considering duration of water supply capabilities with specific location and arrangement of hazard being protected. Ref: 1-13, 27, 101, 41
4052	Area Drainage		
	(a) Adequate provisions shall be made to promptly and effectively dispose of all liquids from the fire area during operation of all systems in the fire area. Such provisions shall be adequate for:		
	(1) Water discharged from fixed fire protection systems at maximum flow conditions.	D	Comply: Considerations for drainage and or storage of run-off was found. Ref: 27, 41, 101
	(2) Water likely to be discharged by hose streams.		
	(3) Surface water.		
	(4) Cooling water normally discharged to the system.		

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ABB Impell Corporation

NFPA 15-CODE COMPLIANCE VERIFICATION CHECKLIST
DONALD C. COOK UNITS 1 AND 2

JOB NO 0120-164
CALC NO 0120-164-004

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REV	BY	DATE	CHECKED	DATE

ABB Impell Corporation

NFPA 15-CODE COMPLIANCE VERIFICATION CHECKLIST
DONALD C. COOK UNITS 1 AND 2

JOB NO 0120-164
CALC NO 0120-164-004

PAGE 13 OF 89

CODE COMPLIANCE VERIFICATION CHECKLIST
NFPA 15-1973
STANDARD FOR WATER SPRAY FIXED SYSTEMS FOR FIRE PROTECTION

Code Section No.	Code Section	Information Required Verification Method W = Walkdown D = Document Search	Summary of Results (List results and reference details in calculations, sketches, etc., as required)
4063	Drain Valves. Readily accessible drains shall be provided for low points in underground and aboveground piping.	W, D	**Comply:** Adequate provisions for piping drainage was found via low point plugged drains and or as applicable open nozzles. **Ref:** 80-105, 1-13, 41
4072	Position. Spray nozzles may be placed in any position necessary to obtain proper coverage of the protected area. Positioning of nozzles with respect to surface to be protected, or to fires to be controlled or extinguished, shall be guided by the particular nozzles design and the character of water spray produced. The effect of wind and fire draft on very small drop sizes or on larger drop sizes with little initial nozzle velocity shall be considered, since these factors will limit the distance between nozzle and surface, and will limit the effectiveness of exposure protection, fire control or extinguishment. Care shall be taken in positioning nozzles that water spray does not miss the target surface and reduce the efficiency or calculated discharge rate (gpm/ft^2). Care shall also be exercised in placement of spray nozzles protecting pipe lines handling flammable liquids under pressure, where such protection is intended to extinguish or control fires resulting from leaks or ruptures.	W, D	**Does Not Comply:** Referance the results of code section 2031.
4081	Size. As effective protection is dependent on having adequate pressure and quantity of water available at all spray nozzles, each system requires individual consideration as to the size of the piping. This requires that the size of the piping be based upon hydraulic computations (see Chapter 7). However, piping shall not be less than one-inch nominal diameter.	D	**Comply:** With the exception of the Charcoal Filter Units, all systems were properly designed and meet this code section. **Ref:** 41, 81-84, 88 **Does Not Comply:** The Charcoal Filter Units utilize 3/8" pipe. **Ref:** 41, 81-84, 88
4082	INSTALLATION (d) Provision shall be made for test gages at or near the highest or most remote nozzle on	D	**Does Not Comply:** Test gauge connections or provisions not provided for Unit 2

CODE COMPLIANCE VERIFICATION CHECKLIST
NFPA 15-1973
STANDARD FOR WATER SPRAY FIXED SYSTEMS FOR FIRE PROTECTION

Code Section No.	Code Section	Information Required Verification Method W = Walkdown D = Document Search	Summary of Results (List results and reference details in calculations, sketches, etc., as required)
	each major separate section of the system. At least one gage, connection shall be provided at or near the nozzle calculated as having the least pressure under normal flow conditions.		RCP pumps, charcoal filter units, Unit 2 main transformers (01, 02, 03), Unit 2 start up transformers, and Unit 2 exposure protection. **Ref:** 80, 89-95
4101	System piping shall be adequately supported. All supports in the fire area should be protected by the system. In any area where possibility of explosion may be recognized, special care shall be taken to support the piping from portions of the structure least liable to disruption.	W, D	**Comply:** Physical inspection reflected hangers which were properly installed and which imposed no adverse impairments to the existing steel members. **Ref:** 1-13, 80-95
4102	Tapping or drilling of load-bearing structural members is not permitted unless the design of the structural members contemplates this feature or their design is such that the additional load can be safely tolerated, and no other arrangement is feasible. Attachments may be made to existing steel or concrete structures and in some cases to equipment and its supports. Where welding of supports directly to vessels or equipment is necessary, it shall be done in a safe manner in conformation with the provisions of all safety, structural, and fire codes and standards.	W, D	**Comply:** See response to code section 4101.
4103	Where the usual methods of supporting piping for the fire protection purposes cannot be used, the piping shall be supported in such a manner as to produce the strength equivalent to that afforded by such usual means of support. In such cases, piping arrangements which are essentially self-supporting may be employed together with such hangers as are necessary.	W, D	**Comply:** See response to code section 4101.

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NFPA 15-CODE COMPLIANCE VERIFICATION CHECKLIST
DONALD C. COOK UNITS 1 AND 2

ABB Impell Corporation

JOB NO 0120-164
CALC NO 0120-164-004

REV	BY	DATE	CHECKED	DATE

ABB Impell Corporation

NFPA 15-CODE COMPLIANCE VERIFICATION CHECKLIST
DONALD C. COOK UNITS 1 AND 2

JOB NO 0120-164
CALC NO 0120-164-004

PAGE 15 OF 19

CODE COMPLIANCE VERIFICATION CHECKLIST
NFPA 15-1973
STANDARD FOR WATER SPRAY FIXED SYSTEMS FOR FIRE PROTECTION

Code Section No.	Code Section	Information Required Verification Method W = Walkdown D = Document Search	Summary of Results (List results and reference details in calculations, sketches, etc., as required)
4121	Gages shall be installed as follows: (a) Below the seat of the automatic valve and arranged so as to indicate the residual pressure in the riser with the test pipe valve wide open. (b) At each independent pipe from an air supply to an automatic valve. (c) On the water supply connection to hydraulically controlled automatic valves. (d) At the air pump supplying an air receiver. (e) At an air receiver.	W, D	**Does Not Comply:** Gauges are not provided for the charcoal filter units and the gauges provided for the unit 2 systems are unapproved/listed reading 165 psi on a scale of 300 psi. **Ref:** 1-13, 99-105
5011	Hydrostatic Tests. All new system piping shall be hydrostatically tested in accordance with the provisions of the Standard for Installation of Sprinkler Systems, NFPA No. 13, 1973.	D	**Open Item:** Piping and installation spec requires hydrostatic testing at 1-1/2 times design pressure. However, no test certificates are provided for review. Water spray tests are performed every eighteen months. **Ref:** 20, 27, 28, 34, 41, 42
5021	When practicable, full flow tests with water shall be made of system piping as a means of checking the nozzle layout, discharge pattern, any obstructions and determination of relation between design criteria and actual performance, and to insure against clogging of the smaller piping and the discharge devices by foreign matter carried by the water	D	**Open Item:** See response to code section 5011.
5023	The discharge pressure at the highest, most remote nozzle, shall be at least that for which the system was designed.	D	**Open Item:** See response to code section 5011.
5031	All operating parts of the system shall be fully tested to assure they are in operating condition.	D	**Open Item:** See response to code section 5011.

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ABB Impell Corporation

NFPA 15-CODE COMPLIANCE VERIFICATION CHECKLIST
DONALD C. COOK UNITS 1 AND 2

JOB NO 0120-164
CALC NO 0120-164-004

PAGE 1 OF 19

CODE COMPLIANCE VERIFICATION CHECKLIST
NFPA 15-1973
STANDARD FOR WATER SPRAY FIXED SYSTEMS FOR FIRE PROTECTION

Code Section No.	Code Section	Information Required Verification Method W = Walkdown D = Document Search	Summary of Results (List results and reference details in calculations, sketches, etc., as required)
	CHAPTER 6. PERIODIC TESTING AND MAINTENANCE		
6001	Water spray systems require competent and effective care and maintenance to assure that they will perform their purpose effectively at the time of fire. Systems shall be serviced and tested periodically by men trained in this work. An inspection contract with a qualified agency for service, test, and operation at regular intervals is recommended and may be required.	D	**Comply:** All systems are tested and maintained as required per this code section, instruction booklets provided for Grinnel and Star equipment. (Unit 2 systems use star equip.). **Ref:** 21-35, 40, 41
6002	Operating and maintenance instructions and layouts shall be available or can be posted at control equipment and at the plant fire headquarters. Selected plant personnel shall be trained and assigned to the task of operating and maintaining the equipment.	D	**Comply:** See results of code section 6001.
6003	At weekly, or other frequent regularly scheduled plant inspections, equipment shall be checked visually for obvious defects, such as broken or missing parts, nozzle loading, or other evidence of impaired protection.	D	**Comply:** See results of code section 6001.
6013	Piping. All piping shall be examined at regular intervals to determine condition and proper drainage. Frequency of inspections will be dependent upon local conditions and shall be at intervals of not more than one year.	D	**Comply:** All systems are inspected and tested via plant procedures. Water spray or air flow tests are performed, valve cycle and lineup verification is performed. **Ref:** 21-35, 41
6014	Flow tests of open head spray systems shall be made at least every five years or more frequently, as determined from experience.	D	**Comply:** See results of code section 6013.
6015	Control Valves & Devices. Control valves and automatic detection equipment shall be tested at least annually, by qualified personnel.	D	**Comply:** See results of code section 6013.

CODE COMPLIANCE VERIFICATION CHECKLIST
NFPA 15-1973
STANDARD FOR WATER SPRAY FIXED SYSTEMS FOR FIRE PROTECTION

Code Section No.	Code Section	Information Required Verification Method W = Walkdown D = Document Search	Summary of Results (List results and reference details in calculations, sketches, etc., as required)
6016	Manual tripping devices and valves, including O. S. & Y. gate and post indicator valves, shall be operated at least annually.	D	Comply: See results of code section 6013.
6017	Where normally opened valves are closed following system operation or test, suitable procedures shall be instituted to insure that they are reopened and that the system is promptly and properly restored to full normal operating condition. Main drain flow tests shall be made after valves are reopened (see Recommended Practice for the Care and Maintenance of Sprinkler Systems, NFPA No. 13A, 1971 - Flow Tests).	D	Comply: See results of code section 6013.
6018	Spray Nozzles. All spray nozzles shall be inspected for proper positioning, external loading, and corrosion, and cleaned if necessary at intervals of not more than twelve months or more frequently if necessary, based on experience. Local conditions may require such inspections and cleaning more frequently and may require interna inspection. After each operation open spray nozzles equipped with individual screens shall be removed and the spray nozzle and screen cleaned, unless observation under flow conditions indicates this is not necessary.	D	Comply: See results of code section 6013.
	CHAPTER 7. PLANS, SPECIFICATIONS & HYDRAULIC CALCULATIONS		
7000	Plans and Specifications Working plans, including elevations, shall be drawn to an indicated scale, show all essential details, and the following data: Date Name of owner and occupant Location, including street address Point of compass Structural features	D	Does Not Comply: No design drawings exist to show the configuration of the nozzles within the charcoal filter units. However, a sketch was made during the 4/4/88 walkdown to justify the original noncompliance. Ref: 80-105

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NFPA 15-CODE COMPLIANCE VERIFICATION CHECKLIST
DONALD C. COOK UNITS 1 AND 2

ABB Impell Corporation

JOB NO 0120-164
CALC NO 0120-164-004

PAGE 17 OF 19

CODE COMPLIANCE VERIFICATION CHECKLIST
NFPA 15-1973
STANDARD FOR WATER SPRAY FIXED SYSTEMS FOR FIRE PROTECTION

Code Section No.	Code Section	Information Required Verification Method W = Walkdown D = Document Search	Summary of Results (List results and reference details in calculations, sketches, etc., as required)
	Relative elevations of nozzles, junction points and supply or reference points Full information concerning water supplies, including pumps, underground mains, etc., and flow test results. Make, type, size, location, position, and direction of spray nozzles. Make, type model, and size of special system valve. Types of alarms to be provided. Number of each size and type of spray nozzles on each system. Lengths of pipe and whether center to center or cutting lengths are shown. Size of all pipe and fittings. Heat responsive equipment, including type, arrangement and location. Hydraulic reference points. Design purpose of system. Make and type of hangers and inserts. All control and check valves, strainers, drain pipes, and test pipes. Small hand hose and hose equipment. The weight or class, lining and size of underground pipe and the depth that the top of the pipe is to be laid below grade. Provisions for flushing underground pipe.		
7010	Hydraulic Calculations General. Hydraulic calculations shall be prepared on forms that include a summary sheet, detailed work sheets, and a graph sheet.	D	Open Item: Although hydraulic calculations were performed for all systems, a graph sheet showing the available supply is not provided. Ref: 48-61

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NFPA 15-CODE COMPLIANCE VERIFICATION CHECKLIST
DONALD C. COOK UNITS 1 AND 2

ABB Impell Corporation

JOB NO 0120-164
CALC NO 0120-164-004

CODE COMPLIANCE VERIFICATION CHECKLIST
NFPA 15-1973
STANDARD FOR WATER SPRAY FIXED SYSTEMS FOR FIRE PROTECTION

Code Section No.	Code Section	Information Required Verification Method W = Walkdown D = Document Search	Summary of Results (List results and reference details in calculations, sketches, etc., as required)
	CHAPTER 8. AUTOMATIC DETECTION EQUIPMENT		
8051	The heat detection system shall be designed to cause actuation of the special system water control valve within 20 seconds under expected fire conditions. Under test conditions when exposed to a standard heat source, the system shall operate within 40 seconds. These are to be considered maximum response times subject to the considerations described in 8011 and 8031.	D	Open Item: Procedures indicate that activation of the control valve be within a reasonable amount of time. Further evaluation is needed to determine what that time is.

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NFPA 15-CODE COMPLIANCE VERIFICATION CHECKLIST
DONALD C. COOK UNITS 1 AND 2

ABB Impell Corporation

JOB NO 0120-164
CALC NO 0120-164-004

APPENDIX A5

CODE COMPLIANCE VERIFICATION CHECKLIST

NFPA 72D - 1967 EDITION

CALCULATION / PROBLEM COVER SHEET

Calculation / Problem No: 0120-164-005

Title: NFPA 72D - CODE COMPLIANCE CALC

Client: AEPSC Job No: 0120-164

Project: D.C. COOK EXTENDED CORE REVIEW

Design Input / References:

SEE SECTION 5.0

Assumptions:

SEE SECTION 2.0

Method:

SEE SECTION 3.0

Remarks:

SEE SECTIONS 1.0 & 4.0

REV. NO.	REVISION	APPROVED	DATE
0	ORIGINAL ISSUE	[signature]	12-14-90

1.0 PURPOSE

1.1 The purpose of this calculation is to identify the applicable sections of the NFPA Code addressed, determine a method of verification for each applicable code section and confirm compliance for the plant fire protection systems within our review.

2.0 ASSUMPTIONS

For the purpose of this report, it is assumed that under most conditions the authority having jurisdiction was the architect/engineer (A/E) for the plant who is American Electric Power Service Corporation (AEPSC) unless otherwise indicated.

3.0 METHODOLOGY

Reference Section 2.1.1 of ABB Impell Project Instruction PI-0120-164-01 Revision 0.

Justifications for deviations and open items identified in CCVC's, are detailed in Impell Technical Report No. 09-0120-0381. The basis for the review of the fire protection systems against a specific code edition was determined by reviewing the systems against the code edition in effect during the time of the original system installation.

4.0 RESULTS

Reference the Code Compliance Verification Checklist.

References

REF NO.	DOCUMENT NUMBER	TITLE	REV. NO.	DATE
		WALKDOWN VERIFICATION CHECKLISTS		
1	0120-164-005A	Fire Zone 79 - Unit 1	0	12/90
2	0120-164-005B	Fire Zone 80 - Unit 1	0	12/90
3	0120-164-005C	Fire Zone 84 - Unit 2	0	12/90
4	0120-164-005D	Fire Zone 85 - Unit 2	0	12/90
5	0120-164-005E	Fire Zone 90 - Unit 1	0	12/90
6	0120-164-005F	Fire Zone 97 - Unit 2	0	12/90
7	0120-164-005G	Yard - Unit 1	0	12/90
8	0120-164-005H	Yard - Unit 2	0	12/90
9	0120-164-005I	Fire Zone 28 - Unit 1	0	12/90
10	0120-164-005J	Fire Zone 30 - Unit 2	0	12/90
		TECHNICAL DATA		
11	0120-108-007.1	NFPA 72D Document Verification Checklist	0	5/11/88
12	09-0120-0123	ABB Impell Code Compliance Compliance Report	0	5/88
13	-	AEP NFPA Code Justification Evaluations	-	6/17/88
14	-	Alison Controls Inc. Manual for A888-M664/A	-	9/15/86
15	-	Record of Conversation Between D. Kipley and B. Gerwe	-	7/27/90
16	PM 683	Plant Modification Project for the Installation of ACI A888-M664/A Panels	1	01/07/87

REF NO.	DOCUMENT NUMBER	TITLE	REV. NO.	DATE
16A	--	ABB Impell Memo No.M-007 on Alarm Circuit Supervision	-	7/6/90
		PROCEDURES		
17	1-0HP-4030-STP-123	Transformer Water Spray Test	2	07/25/88
18	2-0HP-4030-STP-123	Transformer Water Spray Test	2	12/29/88
19	PMI-2270	Fire Protection Program	16	02/09/87
20	12-0HP-4030-STP-125NS	Non-Tech Spec. Required Sprinkler Tests	1	10/12/89
21	12-THP-6030-IMP-142	Fire Det. & CO_2 System Surv. Testing (6 Mo.)	10	07/16/87
22	12-THP-4030-STP-239	RCP Fire Det. & Water System Test	7	07/06/90
23	12-0HP-4030-STP-125CF	Inside Containment Charcoal Filter Fire Prot. Valve Cycle	0	02/23/89
24	12-THP-4030-STP.223	Fire Protection Water System Test	8	07/27/89
25	1-MPH-4030-STP-032	Inspection of the Fire Prot. System Preaction Spray Headers in Unit 1 Containment Bldg.	1	03/13/86
26	2-MPH-4030-STP-032	Inspection of the Fire Prot. System Preaction Spray Headers in Unit 2 Containment Bldg.	1	02/22/86
27	12-0HP-4030-STP-120VC	Fire Prot. Yearly Valve Cycle and Lineup Verification	1	07/19/90
28	1-IHP-6030-IMP-190	Thermistor String Fire Det. System Operability and Calibration	3	04/05/90
29	2-IHP-6030-IMP-290	Thermistor String Fire Det. System Operability and Calibration	2	07/19/90
30	1-THP-6030-IMP-151	Containment Cable Tray Fire Det. System	4	07/19/90

REF NO.	DOCUMENT NUMBER	TITLE	REV. NO.	DATE
31	2-THP-6030-IMP-251	Containment Cable Tray Fire Det. System	5	01/25/90
32	12-0HP-4030-STP-120VV	Fire Prot. Valve Lineup Verification	0	11/17/88
33	1-0HP-4024-101-001-100	Annun #1: Plant Fire System	2	03/10/86
34	2-0HP-4024-201-001-100	Annun #1: Plant Fire System	2	12/30/86
35	1-0HP-4024-102-001-050	Annun #2: Misc. Area Fire System	3	01/22/87
36	2-0HP-4024-202-001-050	Annun #2: Misc. Area Fire System	1	11/06/86
		LICENSING DOCUMENTS		
37	Docket No. 50-315 50-316	Safety Evaluation Document of IMPC D.C. Cook Plant, Units 1 & 2	-	04/26/90
37A	50-315 50-316	Safety Evaluation Report for BTP.APCSB 9.5-1, Appendix A	-	07/31/79
		DRAWINGS		
38	1-95907	Fire Prot. Transformer & Sprinkler Fire Systems Turb. & Aux. Bldgs.	16	04/01/87
39	2-95907	Fire Prot. Transformer & Sprinkler Fire Systems Turb. & Aux. Bldgs.	13	10/86
40	12-5152E	Flow Diagram Fire Prot. Water	3	01/03/90
41	12-5152J	Flow Diagram Fire Prot. Water	1	06/21/88
42	12-5152K	Flow Diagram Fire Prot. Water	2	06/21/88
43	12-5152L	Flow Diagram Fire Prot. Water	7	01/09/90
44	12-5152M	Flow Diagram Fire Prot. Water	4	09/29/89

REF NO.	DOCUMENT NUMBER	TITLE	REV. NO.	DATE
45	12-5152N	Flow Diagram Fire Prot. Water	3	09/13/89
46	1-96972	Fire Prot. Water Systems Elementary Diagram	9	11/05/86
47	2-96972	Fire Prot. Water Systems Elementary Diagram	9	10/24/86
48	12-5152A	Flow Diagram Fire Prot. Water	3	03/23/88
49	12-5152B	Flow Diagram Fire Prot. Water	5	04/07/89
50	12-5152C	Flow Diagram Fire Prot. Water	2	08/04/88
51	12-5152D	Flow Diagram Fire Prot. Water	7	12/04/89
52	1-98612	Plant Fire System Annun. Elementary Diagram	12	07/01/86
53	2-96612	Plant Fire System Annun. Elementary Diagram	16	08/14/87
54	1-98613	Misc. Fire Area System & Vent Elementary Diagram	19	10/30/87
55	2-98613	Misc. Fire Area System & Vent Elementary Diagram	17	10/30/87
56	1-98969	FP Systems Annun. Elementary Diagram	7	06/08/87
57	1-12060	DC Aux. One-Line 250V DC Bus	2	02/26/87
58	2-12060	DC Aux. One-Line 250V DC Bus	0	10/06/86

NFPA 72D - 1967 EDITION

PROPRIETARY PROTECTIVE SIGNALING SYSTEMS

Review includes the following systems:	INITIAL SYSTEM INSTALLATION DATE
Alison Controls Detection Panels which include:	
*a. Charcoal Filter Units:	2/72
° 1&2-HV-CFT-1 (Detection Only)	
° 1&2-HV-CFT-2 (Detection Only)	
*b. Reactor Coolant Pumps	
° Units 1&2 Rcp Pump # 1-4 (Detection only)	4/79
*c. Containment Alarm System Unit 1&2 (Detection Only)	6/71
d. Transformers	
° Unit 1 Main	9/86
° Unit 2 Main, Phases 1-3	2/72
° Transformer 1AB & 2AB	2/72
° Transformer 1CD & 2CD	2/72
° Transformer 101AB	2/72
° Transformer 101CD & 201CD	2/72
° Transformer 201AB	9/86
e. Unit 1 & 2 Turbine Building Wall Spray Systems	7/72
The "EF" Annunciator Panel Signaling Line Circuits only for the Associated Detection and Sprinkler Waterflow/Supervisory Systems were Reviewed in Items a through e above	2/72
The Waterflow, Manual Alarm and Supervisory Devices for Suppression Systems installed in Fire Zones 79, 80, 84, 85, 90, 91, 96, 97, Yard Transformers and Turbine Bldg. Walls*	2/72

*NOTE: The control panels for these detection, waterflow, manual alarm and supervisory circuits and devices for suppression systems were reviewed for compliance with NFPA 72D standard in ABB Impell Report No. 09-0120-0123.

CODE COMPLIANCE VERIFICATION CHECKLIST
NFPA 72D-1967
PROPRIETARY PROTECTIVE SIGNALING SYSTEMS

Code Section No.	Code Section	Information Required Verification Method W = Walkdown D = Document Search	Summary of Results (List results and reference details in calculations, sketches, etc., as required)
2032.	Equipment. All devices, combinations of devices, and equipment constructed and installed in conformity with this standard shall be approved for the purposes for which they are intended.	W, D	**Comply:** All sprinkler Alarm and supervisory devices and ACI A909 Panels are considered approved based on the evaluation performed in Report No. 09-0120-J123 **Ref:** # 1, 12, 15 **Does Not Comply:** All push button manual stations and ACI A888-H664/A Panels are not approved. **Ref:** # 11, 12, 15
2033.	Acceptance Tests. Upon completion of a system, a satisfactory test of the entire installation shall be made in the presence of a representative of the authority having jurisdiction.	D	**Open Item:** Data was not available for review of ACI A909 panels and sprinkler alarm devices. **Ref:** # 1 **Comply:** The review of plant modification (PM) package No. 883 indicated that acceptance testing was performed with project managers present (I&MPC). **Ref:** 16
2034.	Maintenance Agreement. Where required by the authority having jurisdiction, a satisfactory agreement on the maintenance, operation, and efficiency of the system shall be provided. All systems shall be under the supervision of qualified persons satisfactory to the authority having jurisdiction. These persons shall cause proper tests and inspections to be made to prescribed intervals and shall have general charge of all alterations and additions to the systems under their supervision. For sprinkler waterflow alarm tests, an actual water flow, through the use of a test connection, shall be the method employed for testing the reliability of the sprinkler alarm unit as a whole. For a wet pipe system, the test connection at the extremity of the system shall be used.	D	**Comply:** With the exception of charcoal filter units, all systems are maintained and tested by qualified personnel. **Ref:** # 11, 17-26 **Does Not Comply:** Charcoal filter unit spray systems are not verified by flowing water during testing. **Ref:** # 11, 17-26

REV	BY	DATE	CHECKED	DATE
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NFPA 72D-CODE COMPLIANCE VERIFICATION CHECKLIST

DONALD C. COOK UNITS 1 AND 2

ABB Impell Corporation

JOB NO 0120-164

CALC NO 0120-164-005

PAGE 13 OF 13

CODE COMPLIANCE VERIFICATION CHECKLIST
NFPA 72D-1967
PROPRIETARY PROTECTIVE SIGNALING SYSTEMS

Code Section No.	Code Section	Information Required Verification Method W = Walkdown D = Document Search	Summary of Results (list results and reference details in calculations, sketches, etc., as required)
2046.	Voltage Variation. A system shall be so designed and installed that it shall be capable of performing its intended function at 85 percent and at 110 percent of the rated voltage.	D	**Comply:** Panels are connected to the 250 VDC plant emergency power system which is a regulated system such that voltage fluctuations are unlikely. **Ref:** # 12, 14, 38, 39
2047.	Rewinding or Resetting. All apparatus requiring rewinding or resetting to maintain normal operation shall be restored to normal as promptly as possible after each test or alarm, and kept in normal condition for operation.	D	**Comply:** With the exception of the wet systems, transformer systems, and exposure protection systems isolation valve tamper switches, the alarm system is promptly reset to normal after each alarm or test. **Ref:** # 11,17,18,20,22-24,27 **Does Not Comply:** Valve tamper switches for all wet, transformer, and exposure protection systems are not verified for operability during testing. **Ref:** 11, 17, 18, 20, 22, 23, 24, 27
2122.	Wiring cables, and terminal and junction facilities, unless adequately protected, shall be located where they are not exposed to hazardous or corrosive atmospheres, stored combustible materials, or to other potential hazards which might cause disruption of service.	W	**Not Applicable:** The areas reviewed are not corrosive or hazardous to the equipment installed. **Ref:** # 1-10
2154.	Limited Energy Applications. Approved cable meeting the requirements of Paragraphs 2155 and 2156 may be used in circuits having energy limiting characteristics as follows: a. Circuit voltages not to exceed those shown in Column 1 of Table 1. b. Maximum fault currents designed into the circuit not to exceed those shown in Column 2 of Table 1.	D	**Comply:** Based on the former AEP evaluation for NFPA 72D Section 2154, in Report No. 09-0120-0123, this code section is considered acceptable. **Ref:** 13

REV	BY	DATE	CHECKED	DATE
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NFPA 72D-CODE COMPLIANCE VERIFICATION CHECKLIST
DONALD C. COOK UNITS 1 AND 2
ABB Impell Corporation
JOB NO 0120-164
CALC NO 0120-164-005
PAGE 9 OF 23

CODE COMPLIANCE VERIFICATION CHECKLIST
NFPA 72D-1967
PROPRIETARY PROTECTIVE SIGNALING SYSTEMS

Code Section No.	Code Section	Information Required Verification Method W = Walkdown D = Document Search	Summary of Results (List results and reference details in calculations, sketches, etc., as required)
	c. Noninterchangeable overcurrent protection not to exceed that shown in Column 3 of Table 1.		
	d. Energy limitations not to exceed those shown in Column 4 of Table 1.		
2212.	Equipment. The equipment shall be approved for the particular application.	W, D	Comply: See response to Code Section 2032. Does Not Comply: See response to Code Section 2032.
2220.	Light and Power Services.		
2221.	General. A reliable electrical light or power service may be used as a source of supply for fire-protective signaling systems under the following conditions:	D	Comply: All ACI A909 and A888-M664/A panels are supplied VIA a two wire conduit for the main supply only. Based on the justification made in Ref. 12 for 72D Section 2221, this condition is considered equivalent. Ref: # 12, 14
	a. Two-Wire Supplies. A two-wire supply circuit may be used for either the main operating power supply or the trouble signal power supply of the signaling system.		
	b. Three-Wire Supplies. A three-wire a-c and d-c supply circuit having a continuous unfused neutral conductor, or a polyphase a-c supply circuit having a continuous unfused neutral conductor where interruption or one phase does not prevent operation by the other phase may be used with one side or phase for the trouble signal power supply of the signaling system.		

REV	BY	DATE	CHECKED	DATE
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NFPA 72D-CODE COMPLIANCE VERIFICATION CHECKLIST
DONALD C. COOK UNITS 1 AND 2
ABB Impell Corporation
JOB NO 0120-164
CALC NO 0120-164-005
PAGE 10 OF 13

REV	BY	DATE	CHECKED	DATE
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NFPA 72D-CODE COMPLIANCE VERIFICATION CHECKLIST

DONALD C. COOK UNITS 1 AND 2

ABB Impell Corporation

JOB NO 0120-164

CALC NO 0120-164-005

PAGE 11 OF 23

CODE COMPLIANCE VERIFICATION CHECKLIST
NFPA 72D-1967
PROPRIETARY PROTECTIVE SIGNALING SYSTEMS

Code Section No.	Code Section	Information Required Verification Method W = Walkdown D = Document Search	Summary of Results (List results and reference details in calculations, sketches, etc., as required)
2223.	An overcurrent protective device of suitable current-carrying capacity and capable of interrupting the maximum short-circuit current to which it may be subjected shall be provided in each ungrounded conductor. The overcurrent protective device shall be enclosed in a locked or sealed cabinet located immediately adjacent to the point of connection to the light and power conductors.	W, D	**Comply:** A review of wiring diagrams indicates that all breakers are properly labeled. All transformer detection panels are connected to one dedicated circuit for Unit 1&2 accordingly. **Ref.** # 46,47,57,58
2251.	A rectifier power supply, employed as a direct source of supply for a signalling system, shall be approved for the purpose and of adequate capacity to maintain voltage regulation between 130 percent of rated voltage at no load and 100 percent of rated voltage at maximum rated load.	D	**Open Item:** Documentation was not available to verify compliance for this code section.
2331.	A system control unit shall be protected on the supply side by overcurrent devices having a rating not greater than 150 percent of the rating of the control unit.	W, D	**Comply:** Based on the review of the engineering evaluation performed on 6/17/88 for Sections 2251 and 2331 deficiencies, the intent of this code section is being met. **Ref:** # 46,47,13 **Open Item:** ACI data on the A888-M664/A power supply was not available to verify compliance for this code section.
2341.	A transformer shall be protected on either the primary or secondary side by overcurrent devices having a rating not greater than the continuous duty rating of the transformer unless the current is limited to the same value by other approved means.	D	**Open Item:** Documentation was not available to verify compliance for this code section.

REV	BY	DATE	CHECKED	DATE
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ABB Impell Corporation

NFPA 72D-CODE COMPLIANCE VERIFICATION CHECKLIST

DONALD C. COOK UNITS 1 AND 2

JOB NO 0120-164

CALC NO 0120-164-005

PAGE 12 OF 23

CODE COMPLIANCE VERIFICATION CHECKLIST
NFPA 72D-1967
PROPRIETARY PROTECTIVE SIGNALING SYSTEMS

Code Section No.	Code Section	Information Required Verification Method W = Walkdown D = Document Search	Summary of Results (List results and reference details in calculations, sketches, etc., as required)
2411.	Except as otherwise permitted in this standard, a system shall be electrically supervised so that the occurrence of a break or a ground fault condition of its installation-wiring circuits which prevents the required operation of the system, or failure of the main power supply source, will be indicated by a distinctive trouble signal.	D	Comply: All ACI A888-M664/A panels properly supervise all required functions. Ref: # 11,14,45,47 Does not comply: All Sprinkler "Alarm/supervisory devices" are not supervised by the "EF" panel. All ACI A909 panels properly supervise all functions except manual station and release circuits. Ref: # 11,14,46,47
2422.	Signal Initiating Circuits. All circuits for signals initiated by the operation of fire alarm boxes, fire detectors, automatically operated transmitters, or other appliances or devices which initiate or transmit signals either manually or automatically, except: a) A noninterfering shunt circuit, provided that a fault condition of the shunt circuit wiring results only in the loss of the noninterfering feature of operation. b) The circuits of a supplementary signal annunciator, provided that the fault condition of this circuit wiring results only in the loss of annunciation. c) The circuits within initiating devices where wiring terminals of such devices are connected in multiple across electrically supervised circuits.	D	Does Not Comply: See response to Code Section 2411.

CODE COMPLIANCE VERIFICATION CHECKLIST
NFPA 72D-1967
PROPRIETARY PROTECTIVE SIGNALING SYSTEMS

Code Section No.	Code Section	Information Required Verification Method W = Walkdown D = Document Search	Summary of Results (List results and reference details in calculations, sketches, etc., as required)
2431.	Distinctive Trouble Signals. Trouble signals shall be distinctive from both alarm and supervisory signals and shall be indicated by the continuous operation of a sounding appliance or where there is supervisory attendance at all times, a suitable coded signal. An audible trouble signal may be common to several supervised circuits.	D	**Not Applicable:** Since all ACI panels are in remote locations from the hazards, audible devices are not provided. All signals are sent to the control room. **Ref:** # 11,14,46,47
2432.	Silencing Switch. A switch for silencing the trouble signal sounding appliance shall be permitted only if it transfers the trouble indication to a lamp or other acceptable visible indicator adjacent to the switch. The visual indication shall remain operated until the silencing switch is restored to its normal position unless the audible trouble signal will be obtained when a fault occurs without restoring the switch to normal, or unless the audible trouble signal is again energized upon correction of the fault.	D	**Not Applicable:** See response to Code Section 2431.
2631.	When both sprinkler supervisory signals and fire or waterflow alarm signals are transmitted over the same signaling line circuit, provision shall be made to either obtain alarm signal precedence or sufficient repetition of the alarm signal to prevent the loss of any alarm signal transmittal devices. The trouble signal of a combined alarm and supervisory signal circuit shall not be used for the supervisory signal feature, except as indicated in Paragraph 3422.	W, D	**Comply:** ACI A909 and A886-M664/A panels transmit alarm/trouble signals over separate circuits and all sprinkler alarm and supervisory signals are transmitted separately to the "EF" panel. **Ref:** # 22, 46, 47 **Does Not Comply:** RCP Pump and Charcoal filter unit alarm and trouble signals are transmitted as a non-distinctive signal to the "EF" panel. **Ref:** # 22, 46, 47

REV	BY	DATE	CHECKED	DATE
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NFPA 72D-CODE COMPLIANCE VERIFICATION CHECKLIST
DONALD C. COOK UNITS 1 AND 2
ABB Impell Corporation
JOB NO 0120-164
CALC NO 0120-164-005
PAGE 13 OF 23

CODE COMPLIANCE VERIFICATION CHECKLIST
NFPA 72D-1967
PROPRIETARY PROTECTIVE SIGNALING SYSTEMS

Code Section No.	Code Section	Information Required Verification Method W = Walkdown D = Document Search	Summary of Results (List results and reference details in calculations, sketches, etc., as required)
	ARTICLE 310. MANUAL FIRE ALARM SERVICE.		
3111	General. Manual fire alarm boxes shall be approved for the particular application and shall be used only for fire protective signaling purposes. Combined fire alarm and watchmen's signalling boxes are acceptable.	D	**Does Not Comply:** Based on the review of Ref. 12, Section 3111.4(a., the XFRM Push Buttons cannot be considered equivalent to approved devices since they are typical of the Hose Systee Manual Stations Ref: # 11, 5, 6
3112.	Mounting. Each box shall be securely mounted. It is recommended that the bottom of the box be not less than 4-1/2 feet and not more than 6 feet above the floor level.	W	**Does Not Comply:** The push button manual stations were mounted 4' or 4'-3" above the finished floor which is lower than the 4' - 6" AFF requirement. Ref: 1-10
	ARTICLE 340. SPRINKLER ALARM & SUPERVISORY SERVICE.		
3423.	Signal Identification. The signals received shall indicate the particular element of the sprinkler property which is abnormal and when it has been restored.	D	**Comply:** See response to code section 2631 **Does Not Comply:** Distinctive signals are not provided for the waterflow and supervisory devices for the RCP pump spray systems.
3424.	Tampering. A signal attachment and its circuits shall be so designed and installed that they cannot be readily tampered with or removed without causing a signal to be produced.	W, D	**Comply:** See response to Code Section 2411 **Does Not Comply.** See response to Code Section 2411

NFPA 72D-CODE COMPLIANCE VERIFICATION CHECKLIST
DONALD C. COOK UNITS 1 AND 2
ABB Impell Corporation
JOB NO 0120-164
CALC NO 0120-164-005
PAGE 2 OF 13

REV	BY	DATE	CHECKED	DATE
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CODE COMPLIANCE VERIFICATION CHECKLIST
NFPA 72D-1967
PROPRIETARY PROTECTIVE SIGNALING SYSTEMS

Code Section No.	Code Section	Information Required Verification Method W = Walkdown D = Document Search	Summary of Results (List results and reference details in calculations, sketches, etc., as required)
3431.	General. Provision shall be made to indicate the flow of water in a sprinkler system, except movement of water due to waste, surges, or variable pressure, by an alarm signal. The waterflow signaling attachment shall operate to indicate any loss of low of water occurring at a rate of ten or more gallons per minute.	W, D	Comply: Waterflow switches are provided for all wet type systems reviewed. Ref: 1-10, 40-45 Does Not Comply: Waterflow devices are not provided for hose station risers, Transformer, exposure protection and charcoal filter spray systems. Ref: 1-10, 40-45
3441.	General. Provisions shall be made for supervising the required conditions, which are essential for the proper operation of sprinkler systems, except those related to water mains, tanks, cisterns, reservoirs, and other containers of water controlled by a municipality or a public utility.	D	Does Not Comply: See the response to code Sections 3442 and 3443.
3442.	Gate Valve Position Supervision. A gate valve shall be supervised to obtain two separate and distinctive signals, one indicating movement of the valve to the normal position and the other indicating restoration of the valve to its normal position. The off-normal signal shall be obtained either during the first two revolutions of a hand wheel or when the stem of the valve has moved one fifth of the distance from its normal position. a) Where the signaling attachments of two or more valves utilize a common circuit, a restoration signal shall be obtained only when all of the valves of the group are in their normal positions. b) An attachment for supervising the position of a gate valve shall not interfere with the operation of the valve nor obstruct the view of its indicator nor prevent access to its stuffing box.	W, D	Comply: The tamper switch devices do not obstruct the operation or servicing of valves and are wired such that all tampers are required to be restored to "normal" prior to restoration of the circuit. Ref: 1-11, 52-56 Does Not Comply: The "EF" panels do not provide restoration signals. Ref: 1-11, 52-56 Open Item: Transmission of tamper off-normal signal could not be verified. Ref: 1-11, 52-56

REV	BY	DATE	CHECKED	DATE
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NFPA 72D-CODE COMPLIANCE VERIFICATION CHECKLIST

DONALD C. COOK UNITS 1 AND 2

ABB Impell Corporation

JOB NO 0120-164

CALC NO 0120-164-005

CODE COMPLIANCE VERIFICATION CHECKLIST
NFPA 72D-1967
PROPRIETARY PROTECTIVE SIGNALING SYSTEMS

Code Section No.	Code Section	Information Required Verification Method W = Walkdown D = Document Search	Summary of Results (List results and reference details in calculations, sketches, etc., as required)
3443.	Pressure Supervision. Pressure sources shall be supervised to obtain two separate and distinctive signals, one indicating that the required pressure has been decreased or increased and the other indicating restoration of the pressure to its normal value. a) A pressure supervisory signal attachment for a pressure tank shall indicate both high and low pressure conditions. A signal shall be obtained when the pressure is increased or decreased ten pounds from the required pressure valve. b) A pressure supervisory signal attachment for a dry pipe sprinkler system shall indicate both high and low pressure conditions. A signal shall be obtained when the required pressure is increased or decreased in accordance with the requirements of the authority having jurisdiction. c) A steam pressure supervisory attachment shall indicate a low pressure condition. A signal shall be obtained when the normal pressure is reduced to a value which is not less than 110 percent of the minimum operating pressure of the steam-operated equipment supplied. d) An attachment for supervising the pressure of other sources than those specified above shall be capable of being applied and operated as required by the authority having jurisdiction.	W, D	**Not Applicable:** There are no pressure tanks dry pipe systems, or steam pumps in the areas reviewed. **Comply:** RCP pump sprinkler piping is supervised. **Ref:** 22, 33, 34, 48-51 **Does Not Comply:** RCP pump piping supervision to A7 panel not to "EF" panel, it is non-distinctive. **Ref:** 22, 33, 34, 48-51

REV	BY	DATE	CHECKED	DATE
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ABB Impell Corporation

NFPA 72D-CODE COMPLIANCE VERIFICATION CHECKLIST

DONALD C. COOK UNITS 1 AND 2

JOB NO 0120-164

CALC NO 0120-164-005

CODE COMPLIANCE VERIFICATION CHECKLIST
NFPA 72D-1967
PROPRIETARY PROTECTIVE SIGNALING SYSTEMS

Code Section No.	Code Section	Information Required Verification Method W = Walkdown D = Document Search	Summary of Results (List results and reference details in calculations, sketches, etc., as required)
	ARTICLE 350. AUTOMATIC SM[illegible] ALARM SERVICE.		
3541.	All equipment requiring servicing shall be readily accessible and shall provide practical means of [illegible]ing parts which accumulate dust, replacement [illegible]uminating lamps, etc.	W	**Comply:** All pressure, valve tamper, actuators and alarm panels are accessible for maintenance. **Ref:** 1-10
3542.	Suitable and practical facilities shall be provided to permit periodic testing for sensitivity.	W, D	**Does Not Comply:** Line type heat detectors are verified for their loop resistance value under the referenced procedures with a Fluke Model #8050 digital multimeter. This is true for all detectors except the RCP pump detection circuit since these circuits are not verified for their loop resistance value. **Ref:** 21-23, 28-31
3543.	Th[illegible]ent shall be inspected monthly and ma[illegible] in proper operating condition.	D	**Does Not Comply:** ACI A700-9 and 6007 panels are inspected every 18 months. ACI A909 and A888-M664/A panels inspected at 6 months and 12 months respectively. **Ref:** 19 **Com[illegible]:** Sprinkler system piping and valve verification is inspected monthly. Waterflow testing is done at 5 month and 18 month intervals. Hose racks are inspected monthly and hoses hydro tested every 12 months. **Ref:** 19

NFPA 72D-CODE COMPLIANCE VERIFICATION CHECKLIST

DONALD C. COOK UNITS 1 AND 2

ABB Impell Corporation

JOB NO 0120-164

CALC NO 0120-164-005

PAGE 17 OF 23

REV	BY	DATE	CHECKED	DATE
2	[illegible]	1/14/92	[illegible]	[illegible]

CODE COMPLIANCE VERIFICATION CHECKLIST
NFPA 72D-1967
PROPRIETARY PROTECTIVE SIGNALING S..

Code Section No.	Code Section	Information required Verification Method W = Walkdown D = Document Search	Summary of Results (Test results and reference details in calculations, sketches, etc., as required)
	CHAPTER 4. PROPRIETARY SYSTEMS.		
4011.	The provisions of this article shall apply to a system supervised by competent and experience personnel in a central supervising station at the property protected. The system is to include equipment and other facilities required to permit the operators to test and operate the system and, upon receipt of signal, to take such action a shall be required under the rules established for their guidance by the authority having jurisdiction. The system shall be maintained and tested by owner personnel or an organization satisfactory to the authority having jurisdiction. These systems are designated "Class A" and "Class B", except as indicated in Paragraphs 4012, below. Class A system provides emergency operation for fire alarm, waterflow alarm, and guard's tour signals during a single break or a single ground fault of the signaling line circuit. A Class B system does not include this emergency operating feature.	D	**Comply:** The ACI AW09 detection and A888-M664/A circuits are Class A circuits. **Ref:** 11, 14, 46, 47 **Does Not Comply:** The "EF" panel and ACI A909 manu[illegible]r ion and release circuits are in[illegible]'o be Class B. However, the cl[illegible]. for the "EF" panel do not super[illegible]ut an open circuit and the ACI manual station release circuits [illegible]re not supervised for open or ground fault conditions. **Ref:** 11, 14, 46, 47

REV	BY	DATE	CHECKED	DATE
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NFPA 72D-CODE COMPLIANCE VERIFICATION CHECKLIST
DONALD C. COOK UNITS 1 AND 2
ABB Impell Corporation
JOB NO 0120-164
CALC NO 0120-164-005
PAGE 1 OF [illegible]

CODE COMPLIANCE VERIFICATION CHECKLIST
NFPA 72D-1967
PROPRIETARY PROTECTIVE SIGNALING SYSTEMS

Code Section No.	Code Section	Information Required Verification Method W = Walkdown D = Document Search	Summary of Results (List results and reference details in calculations, sketches, etc., as required)
4031.	General. The central supervisory station shall have reliable means for transmitting fire alarms to the fire department over wires electrically supervised and under the control of the plant owner or occupant. a. Where permissible and deemed necessary the means shall consist of a direct electrically-supervised line to the fire department, with suitable code-sending device and register, or a municipal fire alarm box, either of ordinary or auxiliary type, within fifty feet of the central supervising station. b. It is recommended that there be a telephone line from the central supervising station to the fire department, such line to available at all times and independent of the plant telephone switchboard.	D	Comply: Although a "reliable" means of transmitting fire alarm signals to off site fire departments is not provided, the justification provided for 72D Section 4031 in Ref. 12 still applies. Ref: 12, 19

REV	BY	DATE	CHECKED	DATE
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NFPA 72D-CODE COMPLIANCE VERIFICATION CHECKLIST

DONALD C. COOK UNITS 1 AND 2

ABB Impell Corporation

JOB NO 0120-164

CALC NO 0120-164-005

PAGE 19 OF 23

CODE COMPLIANCE VERIFICATION CHECKLIST
NFPA 72D-1967
PROPRIETARY PROTECTIVE SIGNALING SYSTEMS

Code Section No.	Code Section	Information Required Verification Method W = Walkdown D = Document Search	Summary of Results (List results and reference details in calculations, sketches, etc., as required)
4041.	The proprietary system shall be arranged to receive and record all signals received at its central supervisory station and transmit to the fire department, indication of the buildings or group of buildings from which an alarm has been received.	W, D	**Comply:** Although the "EF" panel is not provided with an automatic printer for signals received, the justification for section 4041 and 4042 of NFPA 72D in Ref. 12 still applies. **Ref:** 1-12 **Does Not Comply:** Containment area detection does not provide adequate data on location of fire (i.e. elevation or section of containment) **Ref:** #33,34
4042.	Recording Devices. Recording devices shall be designed and arranged to provide a permanent record. The time of receipt of all recorded signals shall be marked adjacent to the signal preferably by automatic means.	W, D	**Comply:** Reference the results of code Section 4041.
4051.	Circuits. Facilities shall be provided at the central supervising station on all circuits extending from the central supervisory station and on all legal current sources at the central supervisory station for making the following daily tests: a. Current strength on each circuit. b. Voltage across terminals of each circuit at the inside terminals of protective devices. c. Voltage between ground and each side of each circuit.	D	**Comply:** Although daily alarm circuit tests are not performed, the NFPA 72D section 4051 justification in Ref. 12 still applies. **Ref:** 12
4052.	Devices. Except as otherwise permitted by the authority having jurisdiction and as otherwise indicated in Paragraph 3335 complete and satisfactory tests of all coded and non-coded signaling devices shall be made quarterly	D	**Comply:** See response to code section 2024. **Does NLT Comply:** See response to code section 2024.

NFPA 72D-CODE COMPLIANCE VERIFICATION CHECKLIST
DONALD C. COOK UNITS 1 AND 2
ABB Impell Corporation
JOB NO 0120-164
CALC NO 0120-164-005
PAGE 20 OF 23

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NFPA 72D-CODE COMPLIANCE VERIFICATION CHECKLIST

DONALD C. COOK UNITS 1 AND 2

ABB Impell Corporation

JOB NO C120-164

CALC NO 0120-164-005

CODE COMPLIANCE VERIFICATION CHECKLIST
NFPA 72D-1967
PROPRIETARY PROTECTIVE SIGNALING SYSTEMS

Code Section No.	Code Section	Information Required Verification Method W = Walkdown D = Document Search	Summary of Results (List results and reference details in calculations, sketches, etc., as required)
4053.	Records. A complete record shall be kept of the tests and operations of each system. The record shall be available for examination and, where required, reported to the authority having jurisdiction.	D	**Comply:** All tests are properly documented however, valve tamper devices are not verified for operability. The justification for NFPA 72D Section 2034 in Ref. 12 is still valid. **Ref:** 11, 12, 14, 32, 46, 47
4061.	General. The devices and circuits shall be designed and installed so as to meet successfully the most severe conditions liable to be met in practice. No change or alteration shall be made without approval by the authority having jurisdiction.	W, D	**Comply:** The flexible conduit for all waterflow and supervisory alarm devices except for the Unit 2 201AB & 201CD transformer spray systems, were not "seal tight" type conduit. However, based on the 72D Section 2122 justification in Ref. 12, this code section is being met. **Ref:** 1-12
4091.	General. Circuits shall be so arranged that a single break or a single ground shall not cause a false alarm signal. A break or a ground which prevents the normal functioning of any circuit shall be automatically indicated at the central supervisory station by a trouble signal which will compel the attention of attendants. The trouble signal shall be distinguishable from other signals, except where such other signals denote an abnormal condition of supervised parts of a fire-extinguishing system.	D	**Comply:** ACI 6007, A730-9, AS24 and A888-M664 panels supervise all circuits properly. **Ref:** 11, 14, 46, 47 **Does Not Comply:** The "EF" panel will indicate a ground fault but not an open circuit as a trouble condition. ACI A909 detection circuits are properly supervised but the manual station and release circuits are not supervised for open and ground fault conditions. **Ref:** 11, 14, 46, 47
4101.	General. Arrangements shall be made to furnish such reports of signals that may be received and in such form as may be required by the authority having jurisdiction. Daily reports may be required.	D	**Does Not Comply:** Fire reports are generated with the exception of supervisory or trouble results which are not generated. **Ref:** 49

CODE COMPLIANCE VERIFICATION CHECKLIST
NFPA 72D-1967
PROPRIETARY PROTECTIVE SIGNALING SYSTEMS

Code Section No.	Code Section	Information Required Verification Method W = Walkdown D = Document Search	Summary of Results (List results and reference details in calculations, sketches, etc., as required)
4111.	Upon receipt of trouble signals or other signals referring to matters of purely equipment maintenance of the signaling system, the station operator shall immediately send a runner to investigate and, if possible, see that the trouble is remedied at once. Written notice shall be given the authority having jurisdiction and the property owner in all cases where service of the signaling system is interrupted and is not immediately corrected.	D	**Comply:** The operators are required to take corrective action upon receipt of a trouble condition. **Ref:** 19, 33-36 **Does Not Comply:** A written notice of system impairment is not required to be documented by operator procedure. **Ref:** 19, 33-36
4121.	Two alternate main power supply sources shall be provided within the supervisory central station. The secondary source shall be independent of other sources and a high degree of reliability. The secondary source shall be arranged as follows: a. It shall not operate through or be dependent upon the same motor-generator, convertor, or other device having moving parts which supplies the primary or normal supply, except that no additional source of power is required when a storage battery floating on a rectifier or generator is capable of carrying the load without the battery. The same regulation shall be provided as required in Paragraph 2251. b. It shall be of such capacity and reliability as to assure system operation, in case of interruption of the normal supply, for a period of 24 hours, and shall have, in addition, at the conclusion of this 24 hour period, a residual capacity sufficient to operate the system through at least one complete cycle of alarm initiation, transmission, and registration.	D	**Comply:** Secondary power is provided and in compliance with this code section. **Ref:** 11, 12, 46, 47

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NFPA 72D-CODE COMPLIANCE VERIFICATION CHECKLIST
DONALD C. COOK UNITS 1 AND 2

ABB Impell Corporation

JOB NO 0120-164
CALC NO 0120-164-005

CODE COMPLIANCE VERIFICATION ON
NFPA 72D 1967
PROPRIETARY PROTECTIVE SIGNALING SYSTEMS

Code Section No.	Code Section	Information Required Verification Method W = Walkdown D = Document Search	Summary of Results (List results and reference details in calculations, sketches, etc., as required)
	c. It shall automatically supply the circuit or circuits upon loss of the normal source within 60 seconds; this automatic feature may be omitted if suitable provisions are made for manually transferring to the secondary source within 30 seconds.		
	d. The secondary source may be used for (double signal power supply		

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NFPA 72D-CODE COMPLIANCE VERIFICATION CHECKLIST
DONALD C. COOK UNITS 1 AND 2

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ABB Impell Corporation

JOB NO 0120-164
CALC NO 0120-164-005

APPENDIX A6

CODE COMPLIANCE VERIFICATION CHECKLIST

NFPA 72E - 1974 EDITION

CALCULATION / PROBLEM COVER SHEET

Calculation / Problem No: 0120-164-00C

Title: NFPA 72E - CODE COMPLIANCE CIVIL

Client: AEPSC Job No: 0120-164

Project: D.C. COOK EXTENDED CODE REVIEW

Design Input / References:

SEE SECTION 5.0

Assumptions:

SEE SECTION 2.0

Method:

SEE SECTION 3.0

Remarks:

SEE SECTIONS 1.0 & 4.0

REV. NO.	REVISION	APPROVED	DATE
0	ORIGINAL ISSUE	[signature]	12-14-00

Sheet 1 of 12

1.0 PURPOSE

1.1 The purpose of this calculation is to identify the applicable sections of the NFPA Code addressed, determine a method of verification for each applicable code section and confirm compliance for the plant fire protection systems within our review.

2.0 ASSUMPTIONS

It is assumed that the detection arrangement for the charcoal filter units are typical with exception of change in the number of charcoal filter beds.

3.0 METHODOLOGY

Reference Section 2.1.1 of ABB Impell Project Instruction PI-0120-164-01, Revision 0.

The basis for the review of the fire protection systems against a specific code edition was determined by reviewing the systems against the code edition in effect during the time of the original system installation.

4.0 RESULTS

Reference the Code Compliance Verification Checklist.

5.0 REFERENCES

References

REF NO	DOCUMENT NUMBER	TITLE	REV. NO.	DATE
		WALKDOWN VERIFICATION CHECKLISTS		
1	0120-164-006A	XFRM 101AB	0	12/90
2	120-164-006B	Start Up XFRM 101CD	0	12/90
3	0120-164-006C	Aux. XFRM 1CD	0	12/90
4	0120-164-006D	Aux. XFRM 1AB	0	12/90
5	0120-164-006E	345KV Main XFRM	0	12/90
6	0120-164-006F	Unit 2 Aux. XFRM 2AB	0	12/90
7	0120-164-006G	Unit 2 Aux. XFRM 2CD	0	12/90
8	0120-164-006H	Unit 2 Main XFRM	0	12/90
9	0120-164-006I	Unit 2 Start Up XFRMS	0	12/90
10	0120-164-006J	Charcoal Filter Units	0	12/90
11	0120-164-006K	RCP Pumps	0	12/90
		TECHNICAL DATA		
12	0120-164-005	NFPA 72D Code Compliance Verification Checklist	0	12/90
13	09-0120-0123	ABB Impell Code Compliance Report	0	05/88
14	-	AEP Evaluation Document	-	06/17/88
15	-	Alison Controls Inc. Manual for A888-M664/A	-	09/15/86
16	-	Record of Conversation Between D. Kipley and B. Gerwe	-	07/27/90
17	PM 683	Plant Modification Project for the Installation of ACI A888-M664/A Panels	1	01/07/87

REF NO.	DOCUMENT NUMBER	TITLE	REV. NO.	DATE
		PROCEDURES		
18	1-0HP-4030-STP-123	Transformer Water Spray Test	2	07/25/88
19	2-0HP-4030-STP-123	Transformer Water Spray Test	2	12/29/88
20	PMI-2270	Fire Protection Program	16	02/09/87
21	12-0HP-4030-STP-125NS	Non-Tech Spec. Required Sprinkler Tests	1	10/12/89
22	12-THP-6030-IMP-142	Fire Det. & CO_2 System Surv. Testing (6 Mo.)	10	07/16/87
23	12-THP-4030-STP-239	RCP Fire Det. & Water System Test	7	07/06/90
24	12-0HP-4030-STP-125CF	Inside Containment Charcoal Filter Fire Prot. Valve Cycle	0	02/23/89
25	12-0HP-4030-STP-125CV	Inside Containment Charcoal Filter Fire Prot. Valve Cycle	0	02/23/89
26	1-MPH-4030-STP-032	Inspection of the Fire Prot. System Preaction Spray Headers in Unit 1 Containment Bldg.	1	03/13/86
27	2-MPH-4030-STP-032	Inspection of the Fire Prot. System Preaction Spray Headers in Unit 2 Containment Bldg.	1	02/22/88
28	12-0HP-4030-STP-120VC	Fire Prot. Yearly Valve Cycle and Lineup Verification	1	07/19/90
29	1-IHP-6030-IMP-190	Thermistor String Fire Det. System Operability and Calibration	3	04/05/90
30	2-IHP-6030-IMP-290	Thermistor String Fire Det. System Operability and Calibration	2	07/19/90
31	1-THP-6030-IMP-151	Containment Cable Tray Fire Det. System	4	07/19/90
32	2-THP-6030-IMP-251	Containment Cable Tray Fire Det. System	5	01/25/90

REF NO.	DOCUMENT NUMBER	TITLE	REV. NO.	DATE
33	12-0HP-4030-STP-120VV	Fire Prot. Valve Lineup Verification	0	11/17/88
34	1-0HP-4024-101-001-100	Annun #1: Plant Fire System	2	03/10/86
35	2-0HP-4024-201-001-100	Annun #1: Plant Fire System	2	12/30/86
36	1-0HP-4024-102-001-050	Annun #2: Misc. Area Fire System	3	01/22/87
37	2-0HP-4024-202-001-050	Annun #2: Misc. Area Fire System	1	11/06/86
38	RFC#12-2521	Fire Detection Design Packet	-	08/14/85
39	RFC#12-2741	Fire Detection Design Packet	0	02/13/87
40	RFC#12-1843	Fire Detection Design Packet	3	10/23/87
41	RFC#01-2679	Fire Detection Design Packet	0&1	01/31/86
42	RFC#02-2694	Fire Detection Design Packet	0&1	05/02/86
43	RFC#12-2678	Fire Detection Design Packet	0&1	12/18/87
44	RFC#12-2231	RCP Pump Fire Detection Supp. Protection Modification Packet	0	03/27/87
		LICENSING DOCUMENTS		
50	Docket No. 50-315 50-316	Safety Evaluation Document of IMPC D.C. Cook Plant, Units 1 & 2	-	04/26/90
		DRAWINGS		
60	1-95907	Fire Prot. Transformer & Sprinkler Fire Systems Turb. & Aux. Bldgs.	16	04/01/87

REF NO	DOCUMENT NUMBER	TITLE	REV. NO.	DATE
61	2-95907	Fire Prot. Transformer & Sprinkler Fire Systems Turb. & Aux. Bldgs.	13	10/86
62	12-5152E	Flow Diagram Fire Prot. Water	3	01/03/90
63	12-5152J	Flow Diagram Fire Prot. Water	1	06/21/88
64	12-5152K	Flow Diagram Fire Prot. Water	2	06/21/88
65	12-5152L	Flow Diagram Fire Prot. Water	7	01/09/90
66	12-5152M	Flow Diagram Fire Prot. Water	4	09/29/89
67	12-5152N	Flow Diagram Fire Prot. Water	3	09/13/89
68	1-98972	Fire Prot. Water Systems Elementary Diagram	9	11/05/86
69	2-98972	Fire Prot. Water Systems Elementary Diagram	9	10/24/86
70	12-5152A	Flow Diagram Fire Prot. Water	3	03/23/88
71	12-5152B	Flow Diagram Fire Prot. Water	5	04/07/89
72	12-5152C	Flow Diagram Fire Prot. Water	2	08/04/88
73	12-5152D	Flow Diagram Fire Prot. Water	7	12/04/89
74	1-98612	Plant Fire System Annun. Elementary Diagram	12	07/01/86
75	2-98612	Plant Fire System Annun. Elementary Diagram	16	08/14/87
76	1-98613	Misc. Fire Area System & Vent Elementary Diagram	19	10/30/87
77	2-98613	Misc. Fire Area System & Vent Elementary Diagram	17	10/30/87
78	1-98969	FP Systems Annun. Elementary Diagram	7	06/08/87

REF NO.	DOCUMENT NUMBER	TITLE	REV. NO.	DATE
79	1-12060	DC Aux. One-Line 250V DC Bus	2	02/25/87
80	2-12060	DC Aux. One-Line 250V DC Bus	0	10/06/86

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NFPA 72E-CODE COMPLIANCE VERIFICATION CHECKLIST
DONALD C. COOK UNITS 1 AND 2

ABB Impell Corporation

JOB NO 0120-164
CALC NO 0120-164-006

PAGE 3 OF 4

CODE COMPLIANCE VERIFICATION CHECKLIST
NFPA 72E 1974
AUTOMATIC FIRE DETECTORS

Code Section No.	Code Section	Information Required Verification Method W = Walkdown D = Document Search	Summary of Results (List results and reference details in calculations, sketches, etc., as required)

The evaluation of the installation and maintenance of the automatic fire detectors was based on the edition that was in effect at the time the alarm system was specified on April 2, 1971. Since NFPA 72E was not adopted until 1974, this edition was used as the basis for the initial installation of the devices.

The following systems/areas were evaluated under the requirements of NFPA 72E, 1974 Edition:

Area	Fire Zone
Unit 1 & 2 Turbine Building Wall	Yard
Unit 1 & 2 Containment Charcoal Filter Unit and Reactor Coolant Pump Suppression Systems, Unit 1 & 2 Containment Cable Tray Detection Circuits	66-68, 74-76, 101-104
Unit 1 & 2 Transformer and Turbine Wall Water Spray Systems	Yard

2-5.2	ACCEPTANCE TEST		
2-5.2.1	Upon completion of the installation, a satisfactory test of the fire detectors shall be made in the presence of a representative of the authority having jurisdiction.	D	Open Item: Documentation was not provided to verify the presence of the A/E (AEPSC) during testing. Ref: 38-44
2-6	INSTALLATION		
2-6.1	Where subject to mechanical damage, detectors shall be protected.	W	Comply: All detectors reviewed were installed such that the potential for mechanical damage was negligible. Ref: 1-11
2-6.5	Detectors shall be installed in all areas where required by appropriate NFPA Standard or the authority having jurisdiction. Where total coverage is required this shall include all rooms, halls, storage areas, basements, attics, lofts, spaces above suspended ceilings, and other sub-	W, D	Not Applicable: The systems reviewed utilized line type Thermistor wire to monitor specific hazards such as transformers. Ref: 1-11

Code Section No.	Code Section	Information Required Verification Method W = Walkdown D = Document Search	Summary of Results (List results and reference details in calculations, sketches, etc., as required)
	divisions and accessible spaces, and inside all closets, elevator shafts, enclosed stairways, dumbwaiter shafts and chutes. Ineccessible areas which contain combustible material shall be made accessible and protected by detector(s). EXCEPTION NO. 1: DETECTORS MAY BE OMITTED FROM COMBUSTIBLE BLIND SPACES WHEN ANY OF THE FOLLOWING CONDITIONS PREVAIL: a) When the ceiling is attached directly to the underside of the supporting beams of a combustible roof or floor deck. b) When the concealed space is entirely filled with a noncombustible insulation. In solid joisted construction the insulation need fill only the space from the ceiling to the bottom edge of the joist of the roof or floor deck. c) When there are small concealed spaces in question, each not exceed 50 square feet in area. d) In spaces formed by sets of facing studs or solid joists in walls, floors or ceilings where the distance between the facing studs or solid joists is less than 6 inches.		
2-6.7	Where codes, standards, laws, or authorities having jurisdiction require the protection of selected areas only, the specified areas shall be protected in accordance with this standard.	W, D	Not Applicable: See response to code section 2.6.5.
3-5.3	BEAM CONSTRUCTION. If shall be treated as a smooth ceiling if the beams project no more than 4 inches below the ceiling. If the beams project more than 4 inches below the ceiling, detectors shall be located at no more than two-thirds the spacing schedule in the direction at right angles to the direction of beam travel. If the beam projects more than 18 inches below the ceiling,	W, D	Not Applicable: Construction of this type is not applicable to the systems reviewed. Ref: 1-11

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ABB Impell Corporation

NFPA 72E-CODE COMPLIANCE VERIFICATION CHECKLIST
DONALD C. COOK UNITS 1 AND 2

JOB NO 0120-154
CALC NO 0120-164-006
PAGE 9 OF 14

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ABB Impell Corporation

NFPA 72E-CODE COMPLIANCE VERIFICATION CHECKLIST
DONALD C. COOK UNITS 1 AND 2

JOB NO 0120-164
CALC NO 0120-164-006

PAGE 1 OF 17

CODE COMPLIANCE VERIFICATION CHECKLIST
NFPA 72E 1974
AUTOMATIC FIRE DETECTORS

Code Section No.	Code Section	Information Required Verification Method W = Walkdown D = Document Search	Summary of Results (List results and reference details in calculations, sketches, etc., as required)
	each bay formed by the beams shall be treated as a separate area.		
4-1	GENERAL		
*4-1.2	Smoke detectors shall be installed in all areas where required either by the appropriate NFPA Standard, or by the authority having jurisdiction.	W, D	Not Applicable: No smoke detection systems were reviewed. Only line-type fixed temperature detectors (thermistor wire) were evaluated.
4-3	LOCATION		
4-3.1	Spot-type smoke detectors shall be located on the ceiling not less than 4 inches from a sidewall, or if on the sidewall, between 6 to 12 inches from the ceiling.		
4-3.2	Line-type smoke detectors shall be located on the ceiling or on the sidewalls not more than 20 inches from the ceiling Exception: See paragraph 4-4.5.	W	Not Applicable: See response to code section 4-1.2.
4-4	SPACING		
4-4.1	General. Spacing of smoke detectors shall result from an evaluation based upon engineering judgement supplemented, if feasible, by field tests. Ceiling shape and surfaces, ceiling height, configuration of contents, burning characteristics of the stored combustible, and ventilation are some of the parameters that shall be considered.	W, D	Not Applicable: See response to code section 4-1.2.
4-4.2	Smooth Ceilings. On smooth ceilings, with no forced air flow, spacing of 30 feet may be used as a guide. In all cases, the manufacturer's recommendations shall be followed. Other spacing may be used depending on ceiling height, different conditions for response requirements.	W, D	Not Applicable: See response to code section 3-5.3.

CODE COMPLIANCE VERIFICATION CHECKLIST
NFPA 72E 1974
AUTOMATIC FIRE DETECTOR

Code Section No.	Code Section	Information Required Verification Method W = Walkdown D = Document Search	Summary of Results (List results and reference details in calculations, sketches, etc., as required)
4-4.5	HIGH CEILINGS.		
4-4.5.2	For proper protection for buildings with high ceilings, detectors shall be installed alternately at two levels; one half at ceiling level, and the other half at least three feet below the ceiling.	W, D	Not Applicable: See response to code section 3-5.3.
4-4.6	Beam Construction. Beams 8 inches or less in depth can be considered equivalent to a smooth ceiling in view of the "spill over" effect of smoke. In beam construction over 8 inches in depth, movement of heated air and smoke may be slowed by the pocket or bay formed by the beams. In this case, spacing shall be reduced. If the beams exceed 18 inches in depth and are more than 8 feet on centers, each bay shall be treated as a separate area requiring at least one detector.	W	Not Applicable: See response to code section 3-5.3.

REV	BY	DATE	CHECKED	DATE

NFPA 72E-CODE COMPLIANCE VERIFICATION CHECKLIST
DONALD C. COOK UNITS 1 AND 2

ABB Impell Corporation

JOB NO 0120-164
CALC NO 0120-164-006
PAGE 1 OF 4

CODE COMPLIANCE VERIFICATION CHECKLIST
NFPA 72E 1974
AUTOMATIC FIRE DETECTORS

Code Section No.	Code Section	Information Required Verification Method W : Walkdown D : Document Search	Summary of Results (List results and reference details in calculations, sketches, etc., as required)
4-5	SPECIAL CONSIDERATIONS		
4-5.1	The selection and installation of smoke detectors shall take into consideration both the design characteristics of the detector and the areas into which the detectors will be installed so as to prevent false operation or nonoperation after installation. Some of the considerations are as follows:	W, D	**Not Applicable:** See response to code section 4-1.2.
4-5.1.5	Air Conditioned Facilities. In air conditioned facilities and others, where forced ventilation or open windows are present, detectors shall not be mounted near fresh air inlets. Detectors located shall favor air flow toward air outlet openings. The manufacturer shall be consulted before installation of detectors	W	**Not Applicable:** See response to code section 3-5.3.
5-2.2	The detector(s) shall be exposed to the radiation from the area of fire that is to be detected This usually involves expert application engineering. The time in which a fire must be detected and the area or intensity thereof may have to be related to the capabilities of associated extinguishing media and equipment.	W, D	**Not Applicable:** See response to code section 4-1.2.
5-4.1	Except as otherwise permitted herein, flame detectors shall not be spaced beyond their listed or approved maximums. Closer spacing shall be utilized where the structural and other characteristics of the protected hazard would otherwise impair the effectiveness of the detection.	W, D	**Not Applicable:** See response to code section 4-1.2.
5-4.2	Flame detector shall be so designed and installed that their field of vision will be sufficient to assure detection of a specified area of fire.	W	**Not Applicable:** See response to code section 4-1.2.

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NFPA 72E-CODE COMPLIANCE VERIFICATION CHECKLIST
DONALD C. COOK UNITS 1 AND 2

ABB Impell Corporation

JOB NO 0120-164
CALC NO 0120-164-006

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NFPA 72E-CODE COMPLIANCE VERIFICATION CHECKLIST
DONALD C. COOK UNITS 1 AND 2

JOB NO 0120-164
CALC NO 0120-164-006

PAGE 13 OF 42

CODE COMPLIANCE VERIFICATION CHECKLIST
NFPA 72E 1974
AUTOMATIC FIRE DETECTORS

Code Section No.	Code Section	Information Required Verification Method W = Walkdown D = Document Search	Summary of Results (List results and reference details in calculations, sketches, etc., as required)
5-5.1	Since flame detectors are essentially line-of-sight devices, special care shall be taken in applying them to assure that their ability to respond to the required area of fire in the zone which is to be protected will not be unduly compromised by the presence of intervening structural members or other opaque objects or materials.	W	**Not Applicable:** See response to code section 4-1.2.
5-5.2	The overall situation shall be reviewed frequently to assure that changes in structural or usage conditions could interfere with fire detection capabilities are remedied promptly.	D	**Not Applicable:** See response to code section 4-1.2.
7-3	PERIODIC TESTS		
7-3.1.2	For restorable spot-type heat detectors, at least one detector on each signal initiating circuit shall be tested semiannually and different detectors shall be selected for each test.	D	**Not Applicable:** See response to code section 4-1.2.
7-3.1.4	Line-type fixed-temperature detectors shall have their loop resistance measured and recorded in the control cabinet at least semiannually.	D	**Comply:** Loop resistance testing is performed for the transformer systems, charcoal filter units, and cable tray systems. **Ref:** 22, 23, 29-32 **Does Not Comply:** Loop resistance testing is not performed for the RCP pump detection systems. **Ref:** 23, 29-32
8-1.1	GENERAL		
8-1.1.1	The function of air duct smoke detectors is to detect smoke for the primary purpose of controlling blowers and dampers of air conditioning and ventilating systems in an attempt to prevent possible panic and damage from	D	**Not Applicable:** See response to code section 4-1.2.

CODE COMPLIANCE VERIFICATION CHECKLIST
NFPA 72E 1974
AUTOMATIC FIRE DETECTORS

Code Section No.	Code Section	Information Required Verification Method W : Walkdown D : Document Search	Summary of Results (test results and reference details in calculations, sketches, etc., as required)
	distribution of smoke and gaseous products.		
8-1.2	APPLICATION OF DUCT DETECTORS		
8-1.2.1	Air duct smoke detectors shall be provided as required by the Standard on Air Conditioning and Ventilation Systems, NFPA No. 90A.	W, D	Not Applicable: See response to code section 4-1.2.

REV	BY	DATE	CHECKED	DATE
0	[illegible]	12/4/90	SKD	12/14/90

ABB Impell Corporation

NFPA 72E-CODE COMPLIANCE VERIFICATION CHECKLIST
DONALD C. COOK UNITS 1 AND 2

JOB NO 0120-164
CALC NO 0120-164-006

PAGE 1 OF 14

APPENDIX B1

DEVIATION EVALUATION

CALCULATION NO. 0120-164-007

CALCULATION/PROBLEM COVER SHEET

Calculation/Problem No: 0120-164-007

Title: NFPA CODE DEVIATION EVALUATION

Client: AEPSC Project: D.C. COOK EXTENDED CODE REVIEW

Job No: 0120-164

Design Input/References:

SEE SECTION 5.0

Assumptions:

SEE SECTION 2.0

Method:

SEE SECTION 3.0

Remarks:

SEE SECTION 1.0 & 4.0

REV. NO.	REVISION	APPROVED	DATE
0	ORIGINAL ISSUE	M.A. Sanlitro	12/14/90
1	REVISED FOR CLARIFICATIONS	M.A. Sanlitro	1/14/91

1.0 PURPOSE

The purpose of this calculation is to provide technical evaluations for the code deficiencies that are listed in ABB Impell Technical Report No. 09-0120-0381, Revision 1 which are identified by a reference to this calculation in the "Recommendation/Justification" section of Tables 3.2-1, 3.3-1, and 3.4-1. The techincal evaluations will determine if the deficient conditions compromise an equivalent level of protection as specified by the codes in consideration of other existing fire protection features or the installation of new features.

2.0 ASSUMPTIONS

2.1 NFPA 13

2.1.1 Floor drains in the area of the suppression headers are of adequate size to drain water being discharged from a 2" drain line from one system in operation.

2.1.2 Only one system is assumed to be in operation at any one moment based on BTP APCSB 9.5-1, Appendix A single failure criteria. The hose systems reviewed for compliance with NFPA 14, Section 651 (sectionalizing valves), were also verified for the potential of degrading an associated suppression system in both the Auxiliary and Turbine Buildings

3.0 METHODOLOGY

Code deviations identified in ABB Impell Technical Report No. 09-0120-0381 which require further evaluation are identified in the following matrix. The basis for the evaluations was the performance of a combination of one or several of the following methods including; a walkdown of the area where the deficient portion of the fire protection system is located to document the current physical conditions(e.g., combustible materials present, nozzle obstructions, other compensating protection features, etc.), review of existing plant documents (e.g., HVAC drawings, hydraulic calculations, etc.) and a review of NFPA Standards which provide exceptions to the requirements of the earlier code editions based on recent technological advancements within the industry.

The physical aspects in each of the deficient areas were then evaluated to determine if the code deviations were adequately compensated for by equivalent fire protection

features [i.e., adjacent unobstructed nozzle(s)], lack of combustible materials present (i.e., transient and fixed loads), NFPA Standard exceptions and good engineering practices.

Where an equivalent level of protection could not be justified, recommendations for correcting the deficient condition was provided.

The evaluations performed include the following:

NFPA CODE	CODE EDITION	CODE SECTION	EVALUATION NUMBER	STATUS
13	1971	1041	13A	Justification and Recommendation
13	1971	1141,3441 & 3783	13B	Justified
13	1971	3562	13C	Justification and Recommendation
13	1971	3612	13D	Justified
13	1971	4143	13E	Justification and Recommendation
13	1971	4156,4316 & 4319	13F	Justification and Recommendation
13	1971	4211&4231	13G	Justification and Recommendation
14	1971	651	14A	Justified
15	1973	2012	15A	Justified
15	1973	2031&4072	15B	Justified
15	1973	2111	15C	Justified
15	1973	4121	15D	Justified
15	1973	8051	15E	Justified

4.0 RESULTS

See the technical evaluations listed above in subsections 4.1 through 4.3 of this calculation for the detailed results of the evaluations.

5.0 REFERENCES

The references are listed as part of the evaluations detailed in subsections 4.1 through 4.3.

4.1 Technical Evaluations for NFPA 13-1971

4.1.1 Evaluation No.13A-NFPA 13 Code Section 1041

Deviation: (a) Protective guards were not installed for three spinklers located within the hatchway near column G-16 at elevation 591'-0" in Fire Zone 80. (b) Misaligned sprinklers were identified in several areas of the plant. (c) A water supply header valve was identified as not having a manual actuator installed for operating the valve.

Justification: (a) A review of the area during the walkdown performed on 10/9/90 concluded that the purpose of the protective guards currently installed was to prevent damage to the sprinklers during the periods when the hatchway was removed and equipment was being transported through the opening. It is ABB Impell's belief that the intent of the guards was not to protect the sprinklers from equipment passing underneath in the isleway below, since the sprinklers are located up in the hatchway and are approximately 16 feet above the finished floor. Based on discussions with plant personnel, it was stated that this hatchway is infrequently used and that during the times when the hatchway might be open, safety procedures are implemented to ensure that adequate precautions are taken to prevent damage during lifting operations.

Recommended Action: (b)&(c) Items which require additional corrective action have been detailed below with the action recommended to provide compliance with the code.

Fire Zone	Column	Floor Elevation	Corrective Action
79	G-22,H-22 & H-20A	591'-0"	Realign (4) Cable Tray Nozzles and heat collectors
80	Near G-16	591'-0"	Install hand wheel on Valve No. 1-FP-196
80	GC-19&G-18	591'-0"	Realign (1) sprinkler near GC-19 and (2) sprinklers near G-18
80	GC-18,GC-18A	591'-0"	Realign (1) Cable

	& G-19		Tray Nozzle at each location
80	GC-18 & G-15	591'-0"	Realign (1) Cable Tray Heat collector at each location
84	FB-12	591'-0"	Realign Sidewall Nozzle deflector and adjust so as to ensure it remains in place
84	GC-9	591'-0"	Realign (1) Cable Tray Nozzle
84	G-10	591'-0"	Realign (1) Cable Tray Nozzle away from VCC 2-TBV
85	Near GC-7	591'-0"	Realign branch line with (2) sprinklers
91	H-14 to G-14	609'-0"	Realign (5) Cable Tray nozzles
91	H-17	609'-0"	Realign (1) Cable Tray nozzle

Based on the discussion above and the implementation of the recommended corrective actions, it is ABB Impell's conclusion that the deficient conditions are considered acceptable.

References: -ABB Impell walkdown notes of 9/13 to 10/11/90
-ROC between D.Kipley(ABB Impell) and P.Jaques(IMPC) dated 11/28/90

4.1.2 Evaluation No.13B-NFPA 13 Code Section 1141, 3241 & 3783

Deviation: (a) The drain lines for the retard chambers and alarm switch test lines drain directly to the floor for the suppression headers located near columns A-21, A-9, A-2, AB-18, AB-9, G-2, H-11 and H-7 at elevation 591'-0", and G-25 at elevation 609'-0".

Also, (b) PVC type piping was used for the main drain line at several suppression headers installed along Column line H at elevation 591'-0" of the Turbine Building. Also, the header at Column H-20 had the PVC type drain pipe discharge into a bucket containing a small sump pump.

Justification: (a) A review of the ABB Impell walkdown notes of 10/8/90 and AEPSC Drawing No.s 1-5152J,

2-5152K, 12-5267 and 12-5268 verified that the alarm switch drain lines discharge directly onto the floor. However, the area in which the majority of the suppression headers are installed are essentially located at the lowest level of the Turbine Building, with the exception of the Basement at elevation 570'-6"(Fire Zone 2). Safety related components and cables are not exposed to an inadvertant spray of water from the floor above due to lack of openings in the ceiling. In addition, it was noted that floor drains are typically provided in the area of the suppression headers and would drain the water discharged from the 1-1/2" or 2" drain line of the system. A review of the Fire Hazards Analysis for Fire Zone 2 indicated that safety related components or cables are not present in this zone thus eliminating the concern for water damage to safety related components.

The suppression header located at column G-25 on elevation 609'-0" was verified to have a solid concrete floor in the area of the header with penetrations being sleeved approximately 1" to 2" above the finished floor line and a floor drain located in the immediate area of the header location. Therefore, the exposure of safety related cables which may be located in Fire Zone 79 below the system header, from water accumulation on the floor above is mitigated by the raised sleeves and floor drain. 1

Justification: (b) The review of ABB Impell walkdown notes of 9/13 to 10/11/90 verified that the PVC drain pipe installation was only temporary since all the PVC pipe had been removed and replaced with steel pipe.

Based on the dicussion above, it is ABB Impell's conclusion that adequate drainage is provided to handle the discharge of water from the suppression headers and is considered an acceptable condition.

References: -AEPSC Drawing No.
a. 1-5152J-1, 6/21
b. 2-5152K-2, 6/21, 3
c. 12-5267-6, 1/29/90
d. 12-5268-5, 1/29/90
-AEPSC FHA Rev.4, 1/31/90
-ABB Impell walkdown notes of 9/13 thru 10/11/90

4.1.3 Evaluation No.13C-NFPA 13 Code Section 3562

Deficiency: (a) Hangers were found to be missing from sprinkler piping in several fire zones and (b) hangers were found to be obstructing sprinkler spray patterns.

Justification:(a) A review of ABB Impell walkdown notes of 9/13 to 10/11/90 identified a hanger installation which did not meet the intent of code requirements. However, due to the provision of adequate supports on either side of the missing support this condition is considered acceptable. This area includes Fire Zone 80 near V-20 on the feed main piping where a pipe support required by the system drawings has not been installed.

Justification:(b) A review of the ABB Impell walkdown notes of 9/13 to 10/11/90 verified that several hangers were installed within 3" of the associated sprinkler deflector which obstructs the sprinkler spray pattern. The walkdown performed however, identified that the component obstructing the spray typically was a 1/2" or less diameter all threaded rod. Based on the review of NFPA 13-1989, Section 4-2.4.5 components of 1/2" in diameter should be located a minimum of 3 inches from the sprinkler deflector. For Components less than 1/2" in diameter there should be no adverse affects on the spray pattern of the adjacent sprinkler. Since the threaded rod is typically 3/8" in diameter, sprinklers could be located within 3" of the rod and this would not have an adverse affect on the performance on the spray pattern. The Fire Zones in which this deficiency occured includes; No.28 near A-18, No.79 at GC-21, No.84 at GD-11, No.96 at H-9 and 97 at GC-6.

Recommended Action: (a) Hangers which were noted with either portions missing, never installed or are being recommended for installation include the following;

Fire Zone	Column*	Floor Elevation	Corrective Action
80	V-21	591'-0"	Install (2) new
	GC-18	591'-0"	hangers.Replace (1) hanger
84	GC-9B	591'-0"	Reinstall (6) hangers
	H-9	591'-0"	Reinstall (1) hanger
	GC-9	591'-0"	Reinstall (3) hangers
90	H-21	609'-0"	Reinstall (1) hanger (Cable Tray)
	GD-14	609'-0"	Reinstall (1) hanger
	H-17	609'-0"	Install (1) new 6" Dia. dead weight support at floor
	H-20	609'-0"	Install (1) new 6" Dia. dead weight support at floor
96	G-9	609'-0"	Replace (1) hanger

*Note: Column Line "V" is located by the Condenser area of the asssociated turbine building.

					NFPA CODE DEVIATION EVALUATION	
					DONALD C. COOK UNITS 1 AND 2	
1	[illegible]	1/11/91	JPC	1-11-91	ABB Impell Corporation	JOB NO 0120-164
REV	BY	DATE	CHECKED	DATE		CALC NO 0120-164-007

Based on the review of the discussion above and the impementation of the recommended corrective action, this condition is considered acceptable.

4.1.4 Evaluation No.13D-NFPA 13 Code Sections 3612

Deviation: (a) Sprinklers protecting the Cable Tray systems in Fire Zones 79,80&90 use 1/4" orifice sprinklers which are less than the 1/2" orifices required. (b) Small orifice sprinklers have been installed in the area coverage system in Fire Zone 91.

Justification: (a) Although Code Section 3612 clearly states that 1/2" orifices for sprinklers are required, the review of Code Sections 3616 and 3617 provide an exception for the use of smaller orifice sprinklers based on special applications where larger amounts of water normally required by 1/2" orifices are not necessary.

Recommended Action: The two small orifice sprinklers located near the Consdensor area near column V-22 in Fire Zone 91 at elevation 609'-0", should be replaced with a 1/2" orifice sprinkler as required for Ordinary Hazard Occupancies.

Based on the review of the discussion above and the implementation of the recommended corrective action, this condition is considered acceptable.

References: -NFPA 13-1971

4.1.5 Evaluation No.13E-NFPA 13 Code Sections 4143

Deviation: Sprinklers were found to be (a) missing or (b) improperly installed in Fire Zones 79,80,84,85,90,91,96 & 97.

Justification: (a) Sprinklers which are missing and can be justified based on the lack of fixed combustible loads in the area (i.e., non combustible piping insulation, cable in conduit, and steel pipe and components present), the provision of adjacent unobstructed sprinklers to control a postulated fire, or are located over frequently used access/egress pathways which do not present a fire exposure from below the obstruction. The basis for the sprinkler coverage adequacy has been determined by walkdown performed in the associated area between 9/13 and 10/8/90.

Fire Zone	Column	Floor Elevation	No. Missing
80	GC-19A	591'-0"	2
84	H-11	591'-0"	1
84	G-11 to G-9B	591'-0"	7(Spray Impingement Concern)*
85	H-4	591'-0"	1
90	GA-23	609'-0"	2
90	H-22	609'-0"	1
97	GC-6	609'-0"	3
97	G-5	609'-0"	1

*NOTE: Equipment exposed includes MCC Units 2-TBC-B, 2-TBC-CS & 2-TBV.

The review of the walkdown notes of 10/11/90 also verified that the following areas were not protected by sprinklers. However, due to the limited amount of combustible materials present,the addition of sprinklers in these areas would not significantly increase the fire protection features. These areas include:

Fire Zone	Column*	Elevation	Deficiency
91	H-18	609'-0"	Sprinklers are not installed at the top of the Main Steam piping shaft which is open to Fire Zone 91.
91	FB-16 to CC-16	609'-0"	Sprinklers are not installed over the Main Steam Stop Valves.

Recommended Action: The areas where corrective action is being recommended includes;

Fire Zone	Column*	Floor Elevation	Corrective Action
79	GC-20A	591'-0"	Install (1) Upright
79	GC-21	591'-0"	Install (1) Upright
79	G-22	591'-0"	Install nipple on (1) cable tray nozzle
80	V-21	591'-0"	Install (1) Upright
84	V-52	591'-0"	Install (1) Upright & (1)Pendent
91	H-15 to H-17	609'-0"	Install sprinklers to protect (2)

91	H-17 to H-18	609'-0"	Radiation Protection offices Install sprinklers to protect (1) womens bathroom
91	G-17	609'-0"	Install (1)Cable Tray Nozzle
96	GC-7A	609'-0"	Install (1) Upright
96	G-11	609'-0"	Install (1) Cable Tray Nozzle
96	G-13	609'-0"	Install (1) Cable Tray Nozzle

*Note: Column Line "V" is located near the Condenser area of the associated turbine building.

Based on the review of the discussion above and the provision of the sprinklers recommended for installation, these conditions are considered acceptable.

Justification: (b) The improper installation of sprinklers identified during the compliance review include upright sprinklers which have been installed in the pendent position and standard sprinklers installed in applications where sidewall type sprinklers are prefered. Those sprinklers which have been justified based on engineering judgement are detailed below:

Fire Zone	Justification
80&91	Standard type sprinklers have been installed near column G-16 in two hatchways where sidewall type sprinklers would be preferred. The review of ABB Impell walkdown notes dated 10/9 to 10/11/90 verfied that the standard sprinklers are typically not installed within 4" of the edge of the beams surrounding the hatchway openings. A review of NFPA 13, 1989 Edition Code Section 4-2.1.5 requires that sprinklers not be installed closer than 4" from any wall. Since the sprinkler deflectors are typically greater than 4" from the edge of the beam flange and not less than 7" from the beam web, the amount of spray disturbance produced by water deflection from the beam web is not considered to be significant. Also, a walkdown of the area verified that the floor area being protected is an aisleway and does not contain fixed combustible loads which would expose the hatchway areas. All areas surrounding the hatchway areas are properly protected with sprinklers. Therefore, this condition is considered acceptable.

Recommendation Action: The sprinklers recommended for replacement include the following:

Fire Zone	Column	Floor Elevation	Corrective Action
80	G-20A	591'-0"	Replace (2) Upright Sprinklers with Pendent type
96	GC-7	609'-0"	Reinstall (1) sprinkler currently at right angle to upright position
97	GC-6	609'-0"	Replace (1) Upright Sprinkler with Pendent type

References: -ABB Impell walkdown notes of 9/1. thru 10/11/90.
-AEP FHA Document, Rev.4, 1/31/90

4.1.6 Evaluation No.13F-NFPA 13 Code Sections 4156,4316 & 4319

Deficiency: Sprinklers were found to be obstructed by structural members or system components (i.e., large piping, cable trays, etc.).

Justification: A walkdown of the protected areas performed between 9/13 to 10/11/90 verified the type of obstruction, the amount of combustible materials present including fixed and transient, and other available fire protection features. Based on the negligible combustibles in the areas, the operation of adjacent sprinklers to control a postulated fire under the area, the provision of hose stations in the immediate area to extinguish the fire and the fact that minimal combustible materials are located below the obstructed area, ABB Impell concludes that additional sprinklers are not required to provide protection under the obstruction. The areas that are considered to be acceptable based on these conditions include:

Fire Zone	Column*	Elevation	Area of Obstruction
79	H-22	591'-0"	(2) sprinklers are obstructed by expanded metal type cable tray and steam piping with aisleway located below
79	GA-23 to GA-24	591'-0"	(9) sprinklers are obstructed by solid type cable tray and large diameter piping with aisleway and small storage room located

			directly below.
79	GC-22	591'-0"	(2) sprinklers are within 3" of beam and are obstructed on south side of beam. They are located over Condensate Heater Unit 1-HE-3B.
80 & 91	G-16	591'-0" and 609'-0"	Hatchway sprinklers are obstructed by 3/4" Dia. guard rod. The area below the hatchway is an aisleway and does contain any fixed or transient combustibles. Adjacent sprinklers around the hatchway are unobstructed.
80	GC-16	591'-0"	(1) sprinkler is within 2" of beam and is obstructed. The sprinkler is located over the aisleway near the passenger elevator. Adjacent sprinklers are unobstructed.
80	GC-17A to GC-20A	591'-0"	Obstruction of several area sprinklers by (4) expanded metal type cable trays located over Condensate Heater 1-HE-3A.
84	GC-10	591'-0"	(1) sprinkler is obstructed by 12" dia. pipe within 2" of the deflector. The sprinkler is located between Condensate Heaters 2-HE-2A & 2-HE-5A. Adjacent sprinklers are unobstructed.
84	GD-11	591'-0"	(1) sprinkler is within 2" of solid type cable tray and is obstructed. The sprinkler is located adjacent to the aisleway. Adjacent sprinklers are unobstructed.
84	V-78	591'-0"	(1) sprinkler is within 6" of angle iron and is obstructed. The sprinkler is located over Main Feed Pump Seal Water Pump. Minimal lube oil hazard is present and adjacent sprinklers are unobstructed.

84	H-11 to H-9	591'-0"	Several area sprinklers are obstructed by (8) steam pipes near the ceiling. The obstructed area below includes the aisleway and the area directly adjacent to the aisleway.
85	H-5	591'-0"	(2) sprinklers are obstructed by (3) 4'x4'solid type cable tray platforms. The obstruction is located adjacent to the aisleway. Adjacent sprinklers will assist in protecting fire dampers # 2-HV-TS-1 & 2-HV-TX-FD-1, approximately (7) conduit penetration seals and (1) 3 hour rated fire door #314.
85	H-5 to H-6	591'-0"	Area sprinklers are obstructed by (3) steam pipes and (1) 4'x4' solid type cable junction box. The obstruction is located directly over the aisleway and will not present an exposure hazard.
90	H-22	609'-0"	Several area sprinklers are obstructed by (3) 4'x4' solid type cable platforms. The obstructions are located primarily over the aisleway. Adjacent sprinklers are unobstructed and will adequately protect the 3 hour fire door to Fire Zone 42A.
91	H-15	609'-0"	(1) sprinkler is within 2" of beam and is obstructed. Unprotected area is a stairwell and adjacent sprinklers are unobstructed.
91	G-14 to GC-17	609'-0"	Several sprinklers are obstructed by solid type cable trays and steam piping. The obstruction is located directly over the aisleway. Cable trays are

			protected by cable tray sprinklers.
91	V-20	609'-0"	(1) sprinkler is obstructed by solid type cable tray and a beam. Adjacent sprinklers are unobstructed.
91	G-17 to V-20	609'-0"	Several area sprinklers are obstructed by a 5' dia. steam pipe. Transient and fixed combustible loading does not exist under the obstruction.
91	H-20 to H-18	609'-0"	Several sprinklers are obstructed by approximately (5) steam pipes. The obstruction is located directly over aisleway with minimal exposure from below.
91	V-22 to GC-18 & G-19A to GC-19A	609'-0"	Numerous steam pipes obstruct the area sprinklers located above. The area below the obstruction contain Heater Units 1-HE-2A & 1-HE-5A and Drain Tank 1-TK-90. All adjacent area sprinklers are unobstructed.
96	G-7 to G-10, GC-8 to GC-10 & H-10 to H-7	609'-0"	Numerous steam pipes obstruct area sprinklers above. The area below the obstruction contains Heater Units 2-HE-2A & 2-HE-5A. This is normally an unocuppied space and contains minimal fixed or transient combustible loads.
96	GD-10	609'-0"	(1) sprinkler is within 6" of a beam and is obstructed. The obstruction is located over the Reheater Condensate Drain Tank 2-K-95. Adjacent sprinklers are unobstructed and will provide protection.
97	G-5	609'-0"	Preseparator 2-QT-416-LS obstructs area sprinklers located above. Minimal fixed or transient

combustible loads exist. Adjacent sprinklers are unobstructed.

*Note: Column line "V" is located near the Condenser area of the associated turbine building.

Recommended Action: The areas where corrective action is being recommended includes;

Fire Zone	Column	Corrective Action
91	GC-17 to V-20 & 11'North of G-16 to FB-16	Provide area sprinklers below the solid type cable tray and steam piping that are located in this area. The cable tray in this area are exposed by the transient load staging area located directly below.
91	G-16	(2) cable tray system sprinklers are obstructed by numerous cable transitioning between two different cable trays. Relocate the sprinklers above and away from cables.
96	GD-12	Relocate (1) upright sprinkler from between two beams which are located within 3" on either side of the sprinkler deflector. The area below contains a lube oil hazard for the air compressor units.
97	G-2	The heat collector plates for the sprinklers located over the overhead door are misaligned and obstruct the spray pattern of the sprinklers. Adjust the collector plates accordingly.

Based on the implementation of the recommendations listed and the justification discussions above, the deficiencies identified are considered acceptable.

References: -ABB Impell Walkdown Notes dated 9/13 to 10/11/90
-ROC between D.Kipley (ABB Impell) and P.Jaques (IMPC) Dated 11/28/90.

4.1.7 Evaluation No.13G-NFPA 13-1971, Section 4211, 4231

Deficiency: Sprinklers are located greater than 12 inches below the ceiling deck.

Justification: Per the review of the ABB Impell walkdown notes dated 10/8/90, a branch line of sprinklers in Fire Zone 97 between Column GA-4 to G-4 & GA-2 to G-2 are located approximately 16 inches from the deck. Based on the review of NFPA 13-1989, Section 4-3.2.1, the 16" distance from the deck is acceptable.

Recommended Action: Corrective action required to comply with as a minimum, NFPA 13-1989, Section 4-3.2.1 for installing sprinkler deflectors within 16" of the ceiling deck should be applied to the following:

Fire Zone	Column	Corrective Action
90	G-22	Reinstall (4) sprinklers currently located approximately 30" below the deck to within 16".
90	GC-21	Reinstall (1) sprinkler currently located approximately 24" below the deck to within 16". This is being required due to presence of other system deficiencies in the immediate area.
91	H-19	Reinstall (3) branch lines with (3) sprinklers each currently located approximately 24" below the deck to within 16".
96	GD-12 to GD-13	Reinstall (4) sprinklers currently located approximately 24" below the deck to within 16".
97	H-6	Reinstall (4) sprinklers currently located approximately 24" below the deck to within 16".

Based on the review of the justification discussions and the implementation of the recommendations listed above, these conditions are considered acceptable.

References:-ABB Impell walkdown notes dated 9/13 to 10/11/90
-NFPA 13-1989 Edition

4.2 Technical Evaluations for NFPA 14-1971 Edition

4.2.1 Evaluation No. 14A-NFPA 14 Section 413 & 622

Deficiency: Sectionalizing valves have not been provided for isolating hose station risers from the fire main loop contained within the Turbine and Screen House Buildings. The areas affected include, Fire Zone No. 80 for Hose No. 32A, 33A 59B,79B & 60, 245, TSC Sprinkler system (Col. H-17 & H-16), Fire Zone No. 84 for Hose No.7A, 10A, 44A & 67A (Col. H-8) and Fire Zone No. 142 for Hose No.19B, 20B, 23B, 24B and Unit 1&2 diesel fire pump room sprinkler systems (Col. A-13).

Justification: The review of AEPSC Drawing No. 12-5152, 1-5152B, 2-5152C and 12-5152D has verified that should the hose station risers fail at the identified locations adequate back-up protection features would be available. These protection features may include adjacent hose systems or yard fire hydrants. The justified conditions include:

Fire Zone	Col.	Problem Condition	Justification
80	H-17 & H-16	A failure of these hose risers would require the closure of Valve No.s 1-FP188, 12-FP193 & 1-FP195. This will isolate 12-ZMO-20, the sprinklers for the Unit 1 Aux. Feedpump rooms, Turb. Bldg. and the hose stations for Fire Zones 7-12, 33-33B, 55 & 105.	Hose stations will still be available in the"T"-shaped section of the Aux. Bldg. via 12-ZMO-10 connection for Fire Zones 33-33B ,55 & 105. Hose is also available at hose Sta.No 36 near the Aux. Feedpump rms.(17A-G) and hose from adjacent hose stations will be provided for the Turb. Bldg. areas. Yard Hydrant No.8 is also located outside Fire Zone 33 and would provide additional manual hose capability for Fire Zones 33-33B, 55 & 105. Hose for Fire Zones 7-12 is available from Hose Sta.No.32 in the Turb. Bldg.
84	H-8	A failure of this hose riser would require the closure of Valves 2-FP188 &	Hose stations for the "T"-shaped section of the Aux. Bldg. are available for Fire

		2-FP195. This will isolate the sprinkler systems for Unit 1&2 Aux. Bldg."T"-shaped area, U2 Aux. Feed-pump Rms, U2 Cable Vault,U2 Turb.Bldg. and hose sta.s for Fire Zones 22-27, 34-34B & 60.	Zones 34-34B, 60 & Cable Vault(58). Hose Sta. No.8 is available for Aux. Feedpump Rms (17A-G). Hose sta.s are also available for the U2 Turb. Bldg. areas. Yard Hydrant No.8 is also available for manual hose capabilities for Fire Zones 34-34B. Fire Zones 22-27 are afforded protection from Hose Sta.No.7 in the Turb. Bldg.
142	A-13	A failure of the 12" fire main loop would require the closure of Valves 1 & 2-FP253. This will isolate Unit 1&2 Diesel fire pump room sprinkler systems and the Screen House hose stations.	Additional hose may be supplied from Yard Hydrant No. 1&14 and from Hose Stations No. 21 (Unit 2) & 22 (Unit 1) to protect Fire Zones 28, 30 & 142.

Based on the review of the discussions above, this condition is considered acceptable.

Reference: -AEPSC Drawing No.s
12-5152-4, 7/25/89
1-5152B-5, 4/7/89
2-5152C-2, 8/4/88
12-5152D-7,10/4/89

4.3 Technical Evaluations for NFPA 15-1973 Edition

4.3.1 Evaluation No.15A-NFPA 15 Section 2012

Deficiency: Non-approved automatic valves are provided for the Unit 1&2 charcoal filter units.

Justification: The review of the original installation specifications dated 4/2/71 and 1/21/71 (DCCPM104QCS), the Pre-operational test procedure PO-050-508

and current surviellance test procedures, The Hammel-Dahl Model 830 automatic valve installed responds to an alarm condition within the required timeframe (i.e., 40 seconds) and is constructed to operate under the high radiation conditions within containment.

Reference:-AEPSC Spec. Dated 4/1/71
-AEPSC Spec.No. DCCPM104QCS, Dated 1/21/71
-AEPSC Pre-op Test Procedure P)-050-508, Dated 1/31/78
-AEPSC Surviellance Procedure 12-OHP-4030-STP.125CF, Rev. 0

4.3.2 Evaluation No.15B-NFPA 15, Section 2031

Deficiency: Four unrated openings are exposed to a postulated fire from the Unit 1 Main transformer.

Justification: The review of AEPSC Drawing No. 12-5979, Grinnell Drawing No. 121-26, AEPSC FHA for Fire Zone 129 and ABB Impell Walkdown Notes of 9/13/90 verified that an opening of approximately 2.5'x 1' is located in the three hour fire rated barrier at Column line Ga of the Turbine Building approximately 13' above the top of the Unit 1 Main transformer. Three other openings are located in the south wall near Col. H-26 of the Service building approximately 35' from the Main transformer.

The three openings in the Service building are afforded protection from the water spray system installed on the transformer and the spacial separation of the opening to the transformer hazard.

The one opening in the Turbine building wall has an actual linear distance of 19' from the top of the transformer. This opening penetrates through the 3 hour fire rated barrier and into the freight elevator shaft located near column Ga-24 at elevation 648'-0". The review of AEPSC FHA discussion for Fire Zone 129 indicates that the elevator shaft is constructed primarily of 6" and 8" concrete block, with all structural steel members supporting the shaft enclosed in 4" face brick. Based on the review of NFPA Fire Protection Handbook, Section 7, Figure 7-8H, Item A, verifies that the shaft construction has a minimum fire rating of one hour. Since a water spray system has been provided at the transformer to protect all exposures, the opening has a spacial separation of approximately 19' and the opening enters into a minimum one hour fire rated shaft, this condition is considered acceptable based on the fire protection features present.

Reference:-AEPSC FHA Rev.4
-AEPSC Drawing No.12-5979, Rev.3
-Grinnell Drawing No. 121-26
-ABB Impell Walkdown Notes of 9/13/90 to 10/11/90
-NFPA Fire Protection Handbook, Sixteenth Edition, Page 7-99

4.3.3 Evaluation No.15C-NFPA 15, Section 2111

Deficiency: Strainers have not been provided for either the 1/4" orifice Cable Sprinklers (NFPA 13) or the Exposure protection and Transformer spray systems.

Justification: Based on the review of System Description No. SDDCCFP101 AEPSC code compliance review for NFPA 20-1969 and IMPC surveillance program for fire main flush and flow testing, and deluge system flow testing, adequate facilities are provided to ensure the operabilty of the small orifice nozzles and prevent their clogging.

Reference:-AEPSC Description No. SDDCCFP101, Rev.2
-AEPSC NFPA 20 Code Review, Dated 8/14/90
-IMPC test procedure series OHP-4030-STP.120
-ROC Between P.Jaques(IMPC) and D.Kipley (ABB Impell), Dated 11/28/90

4.3.4 Evaluation No.15D-NFPA 15, Section 4121

Deficiency: (a) Non-approved gauges are installed at the suppression system headers for the Unit 2 Transformer and Exposure protection systems. (b) Gauges have also not been provided for the Unit 1 & 2 CFT Charcoal Filter unit water spray systems.

Justification: (a) Based on the review of the Ashcroft gauge Bulletin No. DU-1, this equipment is adequate for the normal operating pressure of the fire protection systems (175 psi) and is considered acceptable for the application.

Justification: (b) The review of AEPSC System Desription No. SDDCCHV102 has verified that a total flow of 160 GPM is being supplied to the upper containment cooling

components through a 3" pipe. Based on ANI's criteria for protecting charcoal filter beds a density of .25 GPM/FT2 is required to protect each filter bed. Since the area of each filter bed is 5 FT2, and one nozzle is required to protect each bed, each nozzle must deliver 1.25 GPM. The total flow for each filter unit, assuming the filter arrangement is typical of filter units 1&2-HV-ACFR-1, would be 23 GPM with a minimum pressure requirement at the base of the filter unit supply connection of 25 PSI (assuming a minimum nozzle pressure requirement of 5 PSI per Spraying System Co. data sheet No. 29A). The actual flow for the spray nozzle at 5 PSI is 1.4 GPM with a total for each filter unit of 25 GPM. The 2" feed main supplied from the 3" pipe should be an adequate supply for each filter unit. This is based on NFPA 13-1989, Section 8-3.2 and Grinnell Duraspeed sprinkler data sheet which indicate that a 3" pipe will flow 400 GPM with (40) sprinklers flowing a minimum of 10 GPM each. A 2" pipe will flow a minimum of 100 GPM with (10) sprinklers flowing a minimum of 10 GPM each. These pipe sizes are more than adequate for flowing the total flows of 185 GPM (3"pipe) and 25 GPM (2"pipe) required. Therefore, the lack of pressure gauges installed at each filter unit's automatic valve location is considered acceptable.

Reference:
- -Ashcroft Bulletin No. DU-1, Dated 4/86
- -AEPSC System Description No. SDDCCHV102, Rev.4, 4/25/89
- -Spraying System Co. "Unijet" nozzle Model 3/8 TT9540, Catalog No. 29A, pages 22-23, 1973 Edition
- -AEPSC Evaluation Document Dated 6/17/88
- -NFPA 13-1989 Edition
- -Grinnell "Duraspeed" data sheet N-2, 7/1/69
- -ANI Recommendations for Charcoal Filters, dated 9/77
- -ROC between B.Gerwe(AEPSC) and D. Kipley(ABB Impell), dated 12/10/90

4.3.5 Evaluation No.15E-NFPA 15, Section 8051

Deficiency: Data was not available to verify if the response time for the Unit 1 & 2 Transformer and Exposure protection systems were within the 40 second time limit required by the code.

Justification: Based on the review of the ROC between P. Jaques (IMPC) and D. Kipley (ABB Impell) dated

11/28/90, the response time for these detection systems is typically between 60 and 90 seconds. The intent of this code section is to provide a detection system which will respond rapidly to a fire where an unstable combustible liquid is stored in large quantities and presents a significant exposure hazard. Based on the review of the plant FHA text and Drawing No.12-5979, a spacial separation of not less than 13' is provided from any one building structure, building structures (i.e., Auxiliary and Turbine) are primarily provided with fire barriers of three hour construction, and openings through the fire rated barriers are typically protected with three hour fire rated protective devices or the openings are approximately 19' from the top of the transformer. Fixed water spray systems have been provided for most of the unrated openings located near Unit Main Transformer (Unit 2 Turbine wall adjacent to the Main transformer does not contain unprotected openings). Manual electric actuation switches have been provided to furnish a manual means of actuating the affected water spray system should the automatic detection system fail to operate.

Based on the review of the discussion above, this response time and detection system condition are considered acceptable.

Reference: -AEPSC FHA Rev.4, Dated 1/31/90
-AEPSC Drawing 12-5979 Rev.3
-Grinnell Drawing 121-26
-ROC between P.Jaques (IMPC) and D.Kipley (ABB Impell) Dtaed 11/28/90

Appendix B2

Supplemental Justifications

Appendix B2 of the Extended NFPA Code Compliance Evaluation Report 09-0120-0381 has been added by AEPSC. The report was originally prepared by ABB Impell. This section was added by AEPSC in order to keep the entire report and its final justifications and recommendations together as a complete package. These supplemental justifications have been prepared to remove prior recommendations from the "Deviation and Recommendations/Justifications" Tables found in Sections 3.1-1 to 3.6-1 of the report.

AMERICAN ELECTRIC POWER

Date November 20, 1991

Subject Cook Nuclear Plant
NFPA 10 Code Compliance Review
Impell Report 09-0120-0381

From B.J. Gerwe

To Extended NFPA Code Compliance Report 09-0120-0381, Appendix B2

ABB Impell code compliance review for NFPA 10 identified the following code deviation.

NFPA 10, 1984 Edition, Section 1-6.2

Deviation: Several fire extinguishers were found to be obstructed from direct access. Several fire extinguishers were not in their designated places or of the type of extinguisher designated. Two fire extinguisher locations were not properly marked.

Resolution: The plant has advised that these deviations have been corrected. Revision 2 of Procedure 12 SHP 2270 FIRE.001 included the requirement that all fire extinguisher locations be checked each month to ensure that the area is clear of obstructions. In addition, the fire extinguishers have undergone numerous surveillance inspections since the original findings and since Revision 2 of the procedure in March of 1991. These inspections have ensured that these deviations have been corrected. Due to normal work activities around the plant, fire extinguishers are sometimes moved to a new location on a temporary basis. Should a workman forget to restore the fire extinguisher to its normal location after completion of the work, the monthly inspection would discover the problem and correct it.

References: Conversation on 11-14-91 with P.H. Jacques - Plant Fire Protection Coordinator.
Procedure 12 SHP 2270 FIRE.001, Revision 2.

B.J. Gerwe

cc: J.D. Crier/B.J. Gerwe
P.H. Jacques - Bridgman
MF: Yes

Intra-System

INDIANA MICHIGAN POWER

Date November 18, 1991

Subject Fire Protection Code Compliance Review

From P.H. Jacques

To B.J. Gerwe

Per your request I have reviewed the status of Plant implementation of maintenance items and procedure revisions as outlined in the Code Compliance Review, Expanded Code Compliance Review, NFPA 30 Compliance Review and ESW Pump Room Area Extinguishers. With the exception of the items listed below all maintenance items and procedure revisions have been completed.

NFPA 30 Code Compliance

P.J. Russell memo dated June 29, 1990

Status

Complete

P.J. Russell memo dated July 2, 1990

Status

To be completed by Operations Department per your discussion with A. Puplis.

P.J. Russell memo dated July 10, 1990

Status

In some fire zones there are more than three flammable liquid cabinets. In these areas flammable liquid cabinets are used to store Class A combustibles such as cleaning materials, aerosols, grease, etc. We consider this to be an acceptable practice and monitor the additional cabinets on a regular basis.

Code Compliance Review - Impell Report No. 09-0120-0123

NFPA ~~13~~ 12A, Paragraph 1-9.5.6

BJG 11-20-91

Status

Signs will be made for the Unit 1 and Unit 2 Halon systems by December 31, 1991.

NFPA 72D, Paragraph 2034, 4052

Status

Plant procedures will be revised or new procedures developed to verify that alarms are received in the Control Room from those Auxiliary Building standpipes that are fed from piping equipped with a flow alarm or are controlled by ZMO-10 and ZMO-20 by June 1, 1992.

NFPA 12, Paragraph 1625

Status

The vent lines referred to in this item were not part of the original installation and will not be reinstalled for safety reasons. In the event of a blockage in any part of the vent line pressure can back up through the back side of the pilot valves opening the valves and allowing an uncontrolled discharge of CO2 into all of the areas connected to the vent line.

NFPA 13, Paragraphs 3-16.2.2, 3-16.3.5, 3-16.9.2

Status

This item will be completed with the Expanded Code Compliance review items.

NFPA 72D, Paragraph 2042 Item b.

Status

Relocation of fire detectors or installation of protective guards will require a design change.

FOR JUSTIFICATION OF THIS ITEM SEE 11-14-91 MEMO BY B.J. GERWE. BJG 11-20-91

Expanded Code Compliance Review
Impell Report No. 09-0120-0381

NFPA 10, Paragraph 4-3.2

Status

Procedure 12 SHP 2270 FIRE.001 has been revised to verify that fire extinguishers are clear. On fire extinguishers the operating instructions are applied by the manufacturer as is the hanging bracket. Since the extinguisher can only be hung one way we will not change the procedure. The monthly inspection is the document that verifies that the extinguisher has been inspected. The inspection procedures meet NFPA criteria.

NFPA 13, Paragraph 1041

Status

A walk down of the sprinklers will be completed and the sprinklers realigned as needed by December 31, 1992.

Valve 1-FP-196 was installed without a hand wheel. A determination will have to be made on whether one can be added without a design change.

Paragraph 3612

Status

A field walk down will be conducted and sprinkler heads changed as required by December 31, 1992.

Paragraphs 3681, 3682, 3683

Status

This item will be completed in 1992 or 1993 depending on budget allocation.

Paragraph 4143

Status

A walk down will be completed and sprinklers installed per applicable drawings by December 31, 1992.

NFPA 72D, Paragraphs 2034, 4052

Status

Procedures for the testing of the CFT Charcoal Filter Units will be completed by the start of the 1992 refueling outages for each unit.

ESW Extinguishers

Status

Per your request we have verified that the fire extinguishers in the ESW Pump Room area are all ABC Dry Chemical extinguishers.

P.N. Jacques Jr

P.H. Jacques

c: P.F. Carteaux
File

AMERICAN ELECTRIC POWER

Date November 18, 1991

Subject Cook Nuclear Plant
NFPA Code Compliance
Procedure Revisions

From B.J. Gerwe

To P. Carteaux - Bridgman
J. Sampson - Bridgman
T. Beilman - Bridgman

The NFPA Code Compliance reviews performed by ABB Impell, Report No. 09-0120-0123 and 09-0120-0381, identified procedures which required revision to incorporate surveillance and testing issues. A review of these plant procedures shows that several of the previously identified changes under Report No. 09-0120-0123 have not been incorporated as previously requested. The required changes are given below. Please direct this listing to the appropriate personnel for incorporation of these surveillance requirements.

These procedural changes are being committed to the NRC and require completion by the end of 1992. In reviewing the changes with the various departments, the end of 1992 date has been agreed to due to the two unit refueling outages occurring in 1992, and the additional procedural burden associated with the outages. Each department also indicated that they should be able to better this date. Please advise the writer in writing when the procedures have been revised.

NFPA Code	Edition	Code Section	Procedure	Deviation/Requirement
15	1973	5011 5021 5031 6001-6003 6013-6018	12MHP4030.STP.020 Series	Deviation: Charcoal filter unit 12-HV-SATFU is not included in any of the procedures. Requirement: The charcoal filter unit 12-HV-SATFU fire protection system is to be tested. Nozzle operability should be confirmed. NOTE: The 12-HV-SATFU water spray system is supplied water through Hose Station No. 4. Hose Station No. 4 angle valve operability, ZMO-10 and ZMO-20 operability and connecting fire hose operability are already being performed under separate procedures which can be used to satisfy the first part of this requirement.

NFPA Code	Edition	Code Section	Procedure	Deviation/Requirement
72D	1967	2034 4052 2047	12SHP2270.FIRE.004 1&2OHP4030.STP.121 Series	Deviation: The procedures do not perform surveillance tests or verify the receipt of alarm or supervisory signals at the control room from fire pump supervisory signals and hose system manual stations alarm initiating devices to confirm their operability. Requirement: The procedures should be enhanced to verify the receipt of all required signals at the control room. Each hose station device should also be activated to verify operability of the device and its circuit. Deviation: The procedures do not verify the reset of signals received by the control room from the fire pumps. Requirement: The surveillance test should be revised to verify the reset of each signal prior to continuing the test. Deviation: Air flow testing is not performed for the Unit 1 and 2 containment CFT charcoal filter units. Requirement: Incorporate the air flow testing of the Unit 1 and 2 CFT charcoal filter units into the plant procedures.
72D 72E	1967 1974	3542 7-3.1.4	12THP4030.STP.239	Deviation: Loop resistance testing for the Unit 1 and 2 reactor coolant pumps (RCP) thermistor line type detectors is not performed. Requirement: Incorporate loop resistance testing of the Unit 1 and 2 RCP detection systems into the plant procedures.

NFPA Code	Edition	Code Section	Procedure	Deviation/Requirement
72E	1974	5-5.2	12THP6030.IMP.153	Deviation: The procedures do not confirm the changes in the alignment of the infrared flame detectors. Requirement: The procedures should be revised to verify the alignment of the flame detectors. Deviation: The line type heat detectors for the RCP pumps are not verified for their operability by loop resistance testing. Requirement: The procedures should be revised to verify the operability of the line type heat detectors as required.

Please call if you have any questions.

B.J. Gerwe

BJG/gh

cc: E.E. Fitzpatrick
A.A. Blind - Bridgman
P.H. Jacques - Bridgman
A. Arent - Bridgman
T. Walsh - Bridgman
C. Miles - Bridgman
R.L. Shoberg
J.D. Grier/B.J. Gerwe
File: NFPA Code Compliance Report 09-0120-0123
NFPA Code Compliance Report 09-0120-0381
MF: N

AEP INDIANA MICHIGAN POWER

Form 6324

DONALD C. COOK NUCLEAR PLANT

PROCEDURE COVER SHEET

CLOSEOUT FOR NFPA 10, SECTION 4-3.2 CONCERNING OBSTRUCTION OF FIRE EXTINGUISHERS.

Procedure No.	12 SHP 2270 FIRE.001
Revision No.	2

TITLE PORTABLE FIRE EXTINGUISHER INSPECTIONS

SCOPE OF REVISION

Revision 2: Minor revision. Marginal markings used. Updated references. Added references to Halon extinguishers, requirements for verifying clear access to extinguishers and updated Attachments 3, 4, 5 and 6 to reflect current extinguisher locations. Reworded body paragraph 8.1.3 to require verification that access to fire extinguishers is clear during monthly inspection and verification that extinguishers have not passed there hydrostatic test date on semiannual inspections. Updated hydrostatic test frequencies for pressurized dry chemical extinguishers in Attachment No. 2.
QA/NSDRC Audit No. QA-90-27/NSDRC 176.

SIGNATURES	REVISION NUMBER			
• • • • • •	REVISION 2			
PREPARED BY	Pat Jones			
DEPARTMENT HEAD APPROVAL				
INTERFACING DEPARTMENT HEAD CONCURRENCE				
QUALITY ASSURANCE SUPERVISOR APPROVAL				
PLANT NUCLEAR SAFETY COMMITTEE	Meeting #2490			
PLANT MANAGER APPROVAL				
APPROVAL DATE	3/14/91			
EFFECTIVE DATE	3/3/91			

INDIANA MICHIGAN POWER COMPANY
DONALD C. COOK NUCLEAR PLANT

1.0 TITLE: Portable Fire Extinguisher Inspections

2.0 OBJECTIVE

2.1 To establish the criteria by which the Safety and Assessment Department will perform inspections of the portable fire extinguishers (excluding the new Training Facility).

2.2 To assure that all the portable fire extinguishers are in operable condition and are in their proper locations.

3.0 REFERENCES

3.1 PMI-2270, Fire Protection.

3.2 12 PMP 6010 RAD.001 and .002 Radiation Protection Manual.

3.3 Fire Facilities Plan - Drawing Numbers 12-5265, 12-5266, 12-5267, 12-5268, 12-5268A, 12-5269, 12-5270 and 12-5271. Service Building extension 12-4510, 12-4511, 12-4512 and 12-4513. Security Control Center - 12-4507.

3.4 NFPA-10.

3.5 QA Audit 86-21-4A - Requires inspection of all Fire Extinguishers that are assigned to the Fire Watches.

3.6 QA Audit/NSDRC Audit No. QA-90-27/NSDRC 176.

4.0 PREREQUISITES/PRECAUTIONS/INITIAL CONDITIONS

4.1 The following equipment and supplies are necessary:

4.1.1 Paper Punch

4.1.2 Fire Extinguisher Cards

4.1.3 Plastic Seals

4.1.4 50# Spring Scale

8.1.3 Attachment Nos. 3, 4, 5 and 6 are used to document the monthly inspection of the plant portable fire extinguishers. Following completion of the Attachments, the data sheets (Attachments) are submitted for Supervisor Review.

Monthly Inspection - To assure that all portable extinguisher locations have an operable fire extinguisher and that access to the fire extinguisher is clear.

Semiannual Inspection - To assure that all portable extinguishers are properly charged and that the extinguisher has not passed its hydrostatic test date.

8.1.4 Extinguishers found with no Inspection tag may be inspected and retagged to indicate the extinguisher is acceptable for use. The Inspection Tag will be punched to be in agreement with the last monthly extinguisher inspection. This will insure that the extinguisher is inspected during the next completion of this procedure. No procedure data entry is necessary for re-inspection/ re-tagging of extinguishers.

8.2 The fire extinguishers located on 598 and 609 in the Containments shall only be inspected on a monthly basis during refueling or extended non-refueling outages. The first inspection of the outage duration will be performed within seven (7) days after Containment integrity is broken. The monthly inspections shall continue until Containment integrity is restored.

8.3 Outage support fire extinguishers designated for containment use are normally stored on the 633' elevation of the Auxiliary Building.

9.0 RESTORATION

9.1 Replace deficient Fire Extinguishers with an operable unit.

9.2 Provide arrangements for a contractor to come in and service unacceptable fire extinguishers.

CO2 PORTABLE FIRE EXTINGUISHER
Monthly Inspection Detailed Procedure

1. Check that the correct type of fire extinguisher is in the designated location. Replace any missing/inoperable fire extinguishers.

2. Check that the pin is in its proper position and that the seal is intact. The seal should be around the handle and through the eye of the pin. If the seal is broken, weigh the fire extinguisher using the 50# spring scale. The weight of a fully charged fire extinguisher is stamped on the side of the valve body. If the difference in weight is more than 1½ pounds under the weight stamped on the side of a valve body, the fire extinguisher shall be replaced. Reseal fire extinguisher if the difference in weight is acceptable.

3. Check the fire extinguisher visually for signs of damage. Damaged fire extinguishers shall be replaced.

4. Punch card for the applicable month and replace any missing cards.

5. Verify that access to the fire extinguisher is clear.

DRY CHEMICAL PORTABLE FIRE EXTINGUISHERS
Monthly Inspection Detail & Procedure

1. Check that the correct type of fire extinguisher is in the designated location. Replace any missing/inoperable fire extinguishers.

2. Check that the seal is intact. If the seal is broken and the plunger, if applicable, is in the down position, check the charge bottle to see if it has been fired. To do this, squeeze the nozzle to find out if the fire extinguisher is charged or under pressure. Check hose for packed chemical by flexing hose. If there is no pressure then proceed and remove charge bottle. If the seal on the charge bottle is still intact, reassemble extinguisher and put on the new seal. If the seal on the charge bottle is broken, take the whole extinguisher out of service and replace it with a spare.

3. Check those extinguishers with a red plunger to assure that the plunger is down. A charged or pressurized fire extinguisher plunger would be in the up or visible position. If the plunger is up but the seal is not broken, follow the above procedure for checking the charge bottle. If the charge bottle is still intact and the fire extinguisher has not been pressurized, remove the top of the fire extinguisher and pull the plunger down. Reassemble and reseal the acceptable fire extinguisher. Replace fired or charged fire extinguishers.

4. Check fire extinguisher for signs of damage. Damaged extinguishers shall be replaced.

5. Punch card for the applicable month and replace any missing cards.

6. Verify that access to the fire extinguisher is clear.

HALON AND PRESSURIZED DRY CHEMICAL EXTINGUISHERS
Monthly Inspection

1. Check gauge indication and ensure tank pressure is in green band.

2. Check hose and valve for damage and ensure extinguisher has a seal.

3. Punch card for monthly inspection and record inspection on data sheet.

4. Verify that access to the fire extinguisher is clear.

WHEELED N_2 CHARGED DRY CHEMICAL FIRE EXTINGUISHER
Monthly Inspection Detailed Procedure

1. Check that the fire extinguisher is in its proper location. Relocate misplaced units.

2. Check the pressure gauge on the N_2 bottle. The pressure reading should be in the black portion of the gauge. This pressure is greater than 1500 PSI. Tanks which read in the red or under 1500 PSI shall be replaced.

3. Check that the pin is properly located in the hand wheel on the N_2 bottle valve and that the seal is intact. If the seal is broken or the pin has been removed, check further to verify if unit may have been fired. Replace pin and seal if unit has not been fired. Fired units shall be taken out for servicing even if the N_2 bottle pressure gauge still shows a pressure of more than 1500 PSI.

4. If it appears that the unit may have been fired remove the hose and thoroughly inspect it. If the hose is packed with dry chemical clean the hose prior to re-racking.

5. Check the unit visually for signs of damage. Damaged units should be replaced.

6. Punch card for the applicable month and replace any missing cards.

7. Verify that access to the fire extinguisher is clear.

SEMI-ANNUAL INSPECTION OF 150 LB. AND 350 LB. WHEEL UNITS

1. Check for proper location and ensure area is clear of obstructions.

2. Remove cover and check wheel operation.

3. Check nitrogen tank pressure. Remove from service if nitrogen tank pressure is unacceptable.

4. Check nozzle for operation and presence of powder. If powder is present, replace unit. Ensure hose is wrapped neatly (has not been pulled and put back incorrectly).

5. Invert unit to mix powder and return to upright position.

6. Remove cap and check powder. If powder balls exist, they should crumble if dropped from 6 inches. (If powder balls do not crumble, replace unit.) Replace cap.

7. Check high and low pressure primary lines for cuts, cracks and distortion.

8. Dust cylinder and check cylinders for:

   a. Dents.
   b. Corrosion.
   c. Labels - Manufacturer.
      - Picturesque fire identification labels.
   d. Hydrostatically tested in last:
      - 12 years for chemical cylinder.
      - 5 years for nitrogen cylinder.
   e. Arc welds or flashes.

9. Update inspection card for monthly and semiannual inspections. Record inspection on data sheet.

NOTE If the extinguisher does not meet the above acceptance criteria, replace the extinguisher and note the deficiency/replacement under comments.

SEMIANNUAL INSPECTION OF 5 LB. CARTRIDGE EXTINGUISHERS

1. Check cylinder for:

   a. Dents.
   b. Corrosion.
   c. Hydrostatically tested in last 12 years.
   d. Labels - Manufacturer.
      - Picturesque fire identification labels.
   e. Arc welds or flashes.

2. Check hose for:

   a. Cracks.
   b. Cuts.
   c. Distortion.
   d. Nozzle operation.

3. Remove cap and cartridge.

4. Weigh cartridge and inspect cartridge for corrosion and damage to frangible disc. Replace cartridge if disc is damaged or cartridge is below minimum weight listed on cartridge.

5. Check lever operation and install cartridge.

6. Insure chemical is powdery and not caked. Replace cap and reseal. Update inspection card for monthly and semiannual inspections. Record inspection on data sheet.

NOTE If the extinguisher does not meet the above acceptance criteria, replace the extinguisher and note the deficiency/ replacement under comments.

SEMIANNUAL INSPECTION OF CO2 FIRE EXTINGUISHERS

1. If applicable, check extinguisher location. The hanger must be attached solidly and the area be free of obstructions.

2. Check hose for:

   a. Conductivity.
   b. Cracks.
   c. Cuts.
   d. Distortion.
   e. Coupling attachment.

3. Check horn for:

   a. Cracks.
   b. Distortion.

4. Clean cylinder (dust) and inspect for:

   a. Dents.
   b. Corrosion.
   c. Arc welds or flashes.
   d. Hydrostatically tested in last 5 years.
   e. Labels - Manufacturer.
      - Picturesque fire inspection labels.

5. Check band and clamp for:

   a. Proper horn fit (wrong fit will damage horn).
   b. Corrosion.
   c. Missing screws.

   Correct deficiencies or replace extinguisher.

6. Check valve for:

   a. Hose connection at valve is straight and hose is properly attached (damaged connection could make a rocket out of unit when discharged).
   b. Pin should be straight and moveable.
   c. Handle rivets intact.

7. Weigh extinguisher, weight usually stamped on valve. If extinguisher has lost more than 1½ pounds of weight stamped on the valve, replace it.

8. Seal unit and update inspection card for monthly and semiannual inspections. Record inspection on data sheet.

NOTE If the extinguisher does not meet the above acceptance criteria, replace the extinguisher and note the deficiency/replacement under comments.

SEMIANNUAL INSPECTION OF CARTRIDGE OPERATED EXTINGUISHERS
(Other Than 5 Lb. Extinguishers)

1. If applicable, check extinguisher location. The hanger must be attached solidly and the area be clear of obstructions.

2. Invert unit and remove cartridge cover and cartridge.

3. Weigh cartridge and inspect cartridge for corrosion and damage to frangible disc. Replace cartridge if disc is damaged or cartridge is below minimum weight listed on cartridge.

4. Clean cylinder (dust) and inspect the cylinder for:

   a. Dents.
   b. Corrosion.
   c. Hydrostatically tested in last 12 years.
   d. Arc welds or flashes.
   e. Missing screws from nozzle bracket.
   f. Labels - Manufacturer
              - Picturesque fire identification labels.

   Replace the fire extinguisher if any deficiencies exist.

6. Inspect hose for cuts, cracks and correct nozzle operation. Replace the fire extinguisher if any deficiency exists.

7. Set cylinder upright and remove cap. Blow in nozzle and check for disturbance in chemical. If nozzle is plugged replace extinguisher.

8. Replace cap, cartridge and cartridge cover. Seal unit and update inspection card for monthly and semiannual inspections. Record inspection on data sheet.

NOTE If the extinguisher does not meet the above acceptance criteria, replace the extinguisher and note the deficiency/ replacement under comments.

SEMI-ANNUAL INSPECTION OF HALON AND PRESSURIZED DRY CHEMICAL EXTINGUISHERS

1. Dust and inspect cylinder for:

   a. Dents
   b. Corrosion
   c. Hydrostatically tested in last 12 years.
   d. Labels - Manufacturer
      - Picturesque Fire Identification Labels
   e. Arc Welds or Flashes

2. Check hose for:

   a. Cuts
   b. Cracks
   c. Distortion
   d. Connection at Tank

3. Weigh extinguisher, weight and tolerances are on label.

4. Check gauge indication and ensure tank pressure is in green band.

NOTE If the extinguisher does not meet the above acceptance criteria, replace the extinguisher and note the deficiency/ replacement under comments.

5. Update the inspection card and data sheet for the monthly and Semi-Annual Inspections.