NORTHEAST UTILITIES

THE CONNECTICUT LIGHT AND POWER COMPANY
WESTERN MASSACHUSETTS ELECTRIC COMPANY
HOLYOKE WATER POWER COMPANY
NORTHEAST UTILITIES SERVICE COMPANY
NORTHEAST NUCLEAR ENERGY COMPANY

General Offices • Selden Street, Berlin, Connecticut

P.O. BOX 270
HARTFORD, CONNECTICUT 06141-0270
(203) 666-6911

March 23, 1984

Docket No. 50-423
B11090

Director of Nuclear Reactor Regulation
Mr. B. J. Youngblood, Chief
Licensing Branch No. 1
Division of Licensing
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Reference: (1) B. J. Youngblood to W. G. Counsil, Draft SER for Millstone Nuclear Power Station, Unit 3, dated December 30, 1983.

Dear Mr. Youngblood:

Millstone Nuclear Power Station, Unit 3
NRC Chemical Engineering Branch (Fire Protection)
Review Meeting, March 7, 1984

A meeting was held between the NRC-CMEB (fire protection section) and Northeast Nuclear Energy Company (NNECO) in Bethesda, Maryland on March 7, 1984 to discuss eight (8) Draft SER items contained in Reference (1). Six of these were open items and two were confirmatory items from the February 16, 1984 meeting. A status of each open item was noted as defined by one of the following three categories:

Closed - No further NNECO input or action is needed to resolve the NRC concern.

Confirmatory - NNECO must provide the requested information on the Millstone 3 docket, either by a letter or FSAR amendment.

Open - No resolution possible at this time, NNECO to address.

Attachment I provides the status of those Draft SER Open Items. It was agreed that NNECO will transmit a letter to the NRC providing a written response on each of those Draft SER open items by March 28, 1984. NNECO also agreed to provide all additional information as committed to in confirmatory items as the information becomes available. The attached responses to the open items (Attachment II) formalize the above commitment given orally at the meeting. The responses will be incorporated into the FSAR in a future amendment.

B002
1/40

If you have any concerns related to the information contained herein or any questions related to our responses, please contact our Licensing representative directly.

Very truly yours,

NORTHEAST NUCLEAR ENERGY COMPANY ET AL

By Northeast Nuclear Energy Company, their Agent

W. G. Counsil
Senior Vice President

STATE OF CONNECTICUT)
) ss. Berlin
COUNTY OF HARTFORD)

Then personally appeared before me W. G. Counsil, who being duly sworn, did state that he is Senior Vice President of Northeast Nuclear Energy Company, Applicant herein, that he is authorized to execute and file the foregoing information in the name and on behalf of the Applicants herein and that the statements contained in said information are true and correct to the best of his knowledge and belief.

Lorraine J. D'Amico
Notary Public

My Commission Expires March 31, 1988

ATTACHMENT I

Status of the NRC-CMEB (Fire Protection)
Draft SER Open Items Discussed at the Meeting
with the NRC-CMEB March 7, 1984

Item No.	Description	Status
FP-2	Potential Systems Interactions	Closed
FP-3	Qualification of Fire Barriers	Closed
FP-12	Installation of Fire Detectors	Closed
FP-17	Hose Station Standpipe Diameters	Open
FP-18	Control Room Console Smoke Detectors	Open
FP-19	Cable Spreading Room Protection	Open
FP-20	Switchgear Room Floor Drains	Closed
FP-21	Emergency Diesel Generator Day Tanks	Closed

ATTACHMENT II

Responses to the Draft SER Open Items

Item No.

FP-2
FP-3
FP-12
FP-17
FP-18
FP-19
FP-20
FP-21

Open Items

Chemical Engineering Branch - Fire Protection

FP-2 Potential Systems Interaction (Draft SER Section 9.5.1.1)

We are concerned whether the mechanisms by which fire and fire fighting systems may cause the simultaneous failure of redundant or diverse trains have been adequately considered in the design. We will require the applicant to identify the mechanisms that were considered in the fire hazards analysis and the measures taken to preclude the fire or fire-suppressant-induced failure of redundant or diverse safety trains and to document the procedures. This is an open item.

Response (2/84)

Section C5.b.1 of the Standard Review Plan CMEB 9.5.1 states:

> "Fire Protection features should be provided for structures, systems, and components important to safe shutdown. These features should be capable of limiting fire damage so that:
>
> a. One train of systems necessary to achieve and maintain hot shutdown conditions from either the control room or emergency control station(s) is free of fire damage, and
>
> b. Systems necessary to achieve and maintain cold shutdown from either the control room or emergency control station(s) can be repaired within 72 hours."

To meet the guidelines of Position C5.b.1, one of the following means of ensuring that one of the redundant trains is free from fire damage is suggested.

a. Separation of cables and equipment and associated circuits of redundant trains by a fire barrier having a 3 hour rating.

b. Separation of cables and equipment and associated circuits of redundant trains by a horizontal distance of more than 20 feet with no intervening combustibles or fire hazards. In addition, fire detectors and an automatic fire suppression system should be installed in the fire area, or

c. Enclosure of cables and equipment and associated circuits of one redundant train in a fire barrier having a 1 hour rating. In addition, fire detectors and an automatic fire suppression system should be installed in the fire area.

If the guidelines listed above cannot be met, then alternative or dedicated shutdown methods should be provided.

Millstone 3 Fire Protection Evaluation Report Section 6.2 lists the function required and equipment available to achieve and maintain safe shutdown. From this list, each fire area was evaluated to assure that redundant components/systems required for safe shutdown are separated by fire barriers having a fire resistance rating of 3 hours. Some isolated cases exist where the 3 hour barrier option was not used, and in this area one of the two options was utilized or a deviation was/will be requested.

FP-2 Cont.

This approach provides assurance that a fire in any one fire area does not effect the abiilty to achieve and maintain safe shutdown at Millstone 3.

In addition to the redundant train/fire analysis noted above, NNECO evaluated the effect of fire suppression activities. This evaluation was conducted to assure that at least one method of achieving and maintaining safe shutdown was free from the effects of the firefighting system activities. Further, additional safeguards were incorporated into the design to reduce the possibility/effects of inadvertent operation.

As an example, the CO_2 system, which provides protection for the Cable Spreading Room, East and West Switchgear Rooms, North and South Tunnels, Normal Switchgear Room, and East and West MCC Rod Drive Areas, have cross-zoned detection incorporated into their design. This detection scheme eliminates the possibility of a failure in one detector causing the CO_2 system to inadvertently operate. In addition, each discharge nozzle was or will be field checked to assure that discharging CO_2 would not directly impinge on sensitive electrical equipment.

The combination of field verification, proper system design, and separation of redundant safe shutdown components by rated fire barriers, assures that at least one method of achieving and maintaining safe shutdown would be free from the effects of fire or fire suppression activities.

Status (2/84)

Confirmatory.

Revised Response (3/84)

Section C5.b.1 of the Standard Review Plan CMEB 9.5.1 states:

> "Fire Protection features should be provided for structures, systems, and components important to safe shutdown. These features should be capable of limiting fire damage so that:
>
> a. One train of systems necessary to achieve and maintain hot shutdown conditions from either the control room or emergency control station(s) is free of fire damage, and
>
> b. Systems necessary to achieve and maintain cold shutdown from either the control room or emergency control station(s) can be repaired within 72 hours".

To meet the guidelines of Position C5.b.1, one of the following means of ensuring that one of the redundant trains is free from fire damage is suggested.

FP-2 Cont.

a. Separation of cables and equipment and associated circuits of redundant trains by a fire barrier having a 3 hour rating.

b. Separation of cables and equipment and associated circuits of redundant trains by a horizontal distance of more than 20 feet with no intervening combustibles or fire hazards. In addition, fire detectors and an automatic fire suppression system should be installed in the fire area, or

c. Enclosure of cables and equipment and associated circuits of one redundant train in a fire barrier having a 1 hour rating. In addition, fire detectors and an automatic fire suppression system should be installed in the fire area.

If the guidelines listed above cannot be met, then alternative or dedicated shutdown methods should be provided.

Millstone 3 Fire Protection Evaluation Report Section 6.2 lists the function required and equipment available to achieve and maintain safe shutdown. From this list, NNECO evaluated each fire area to assure that redundant components/systems required for safe shutdown are separated by fire barriers having a fire resistance rating of 3 hours. Some isolated cases were identified where safe shutdown equipment is not separated by 3 hour fire barriers. These areas either have alternative shutdown provided, or a deviation was/will be requested.

This approach provides assurance that a fire in any one fire area does not effect the ability to achieve and maintain safe shutdown at Millstone 3.

In addition to the redundant train/fire analysis noted above, NNECO evaluated the effect of fire suppression activities. This evaluation was conducted to assure that at least one method of achieving and maintaining safe shutdown was free from the effects of the firefighting system activities. Further, additional safeguards were incorporated into the design to reduce the possibility/effects or inadvertent operation.

As an example, the CO_2 system, which provides protection of the Cable Spreading Room, East and West Switchgear Rooms, North and South Tunnels, Normal Switchgear Room, and East and West MCC Rod Drive Areas, have cross-zoned detection incorporated into their design. This detection scheme eliminates the possibility of a failure in one detector causing the CO_2 system to inadvertently operate. In addition, each discharge nozzle was or will be field checked to assure that discharging CO_2 would not directly impinge on sensitive electrical equipment.

It should be noted that CO_2 was chosen for this installation because of its uniqueness. CO_2 provides superior fire protection coverage without subjecting sensitive electrical components to water discharge from sprinkler systems.

FP-2 Cont.

The combination of field verification, proper system design, and separation of redundant safe shutdown components by rated fire barriers, assures that at least one method of achieving and maintaining safe shutdown would be free from the effects of fire or fire suppression activities.

Status (3/84)

Closed.

Open Items

Chemical Engineering Branch - Fire Protection

FP-3 Qualification of Fire Barriers (Draft SER Section 9.5.1.4)

The walls that separate buildings and walls and floor/ceiling assemblies used to enclose rooms containing safe shutdown systems are 3-hour-fire-rated. However, the applicant has not indicated all fire rated assemblies are tested in accordance with ASTM E-119, "Fire Tests of Building Construction and Materials." To assure that all fire rated assemblies will perform as indicated under fire conditions, we will require the applicant to verify that all assemblies have been tested in accordance with ASTM E-119. This is an open item.

Response (3/84)

NNECO has reviewed NRC's concern with regard to the qualification of fire barriers as providing three hour fire rated separation between:

(a) safe shutdown systems/equipment from any potential fires in non-safe shutdown areas; and,

(b) redundant divisions or trains of safe shutdown systems/equipment, such that they are not subject to damage from a common fire.

As a result of this review, NNECO has verified that those three hour fire rated barriers provided to assure compliance with the above criteria have been constructed in accordance with designs qualified per the requirements of ASTM E-119, Fire Tests of Building Construction and Materials" (NFPA-251).

It should be noted that only those fire barriers constructed to provide the necessary separation to assure safe shutdown, as highlighted on the fire boundary drawings (S&W Nos. 12179-EM-60A-2 through 60D-2) contained in Attachment A, have been included in NNECO's review. Additional types of fire resistant construction have been utilized throughout the plant, as indicated on the fire boundary drawings, in order to subdivide the larger fire areas into fire zones. These fire barrier assemblies have not been specifically designed to meet the stated criteria and as such have not been considered in this review.

Three hour rated fire barriers at Millstone Unit No. 3 have been constructed in accordance with one of the following designs qualified per ASTM E-119.

Floor Slab Assemblies

Rated floor slab assemblies have been constructed as illustrated in Attachment B. These assemblies consist of a composite concrete floor slab, consisting of a 1 " corrugated steel decking covered with a minimum 6" of reinforced concrete, which is supported by a fire coated restrained structural steel frame. This fire coating on the structural steel frame has been applied to a minimum thickness of 2" and is qualified to provide the required three hour fire rating (see Attachment C for technical data). This floor slab assembly is similar to Underwriters Laboratories (UL) approved floor slab design No. 902, as listed in their Fire Resistance Directory. Also, the individual components (structural steel and

FP-3 Cont.

composite floor slab) are referenced as being approved for use in three hour fire rated construction in Section 6, Chapter 7, of the 14th Edition of the Fire Protection Handbook, published by the National Fire Protection Association (NFPA).

Reinforced Concrete and Solid Concrete Block Walls

Rated wall assemblies have been constructed utilizing either reinforced concrete (minimum thickness of 7") or solid concrete block (minimum thickness of 8"). Both of these designs are referenced in the NFPA Fire Protection Handbook as being approved assemblies for use in three hour fire rated construction.

Based on the above information, NNECO has determined that those fire barriers constructed to provide separation will perform as required under fire conditions.

Status (3/84)

Closed.

ATTACHMENT A

FIRE BOUNDARY DRAWINGS

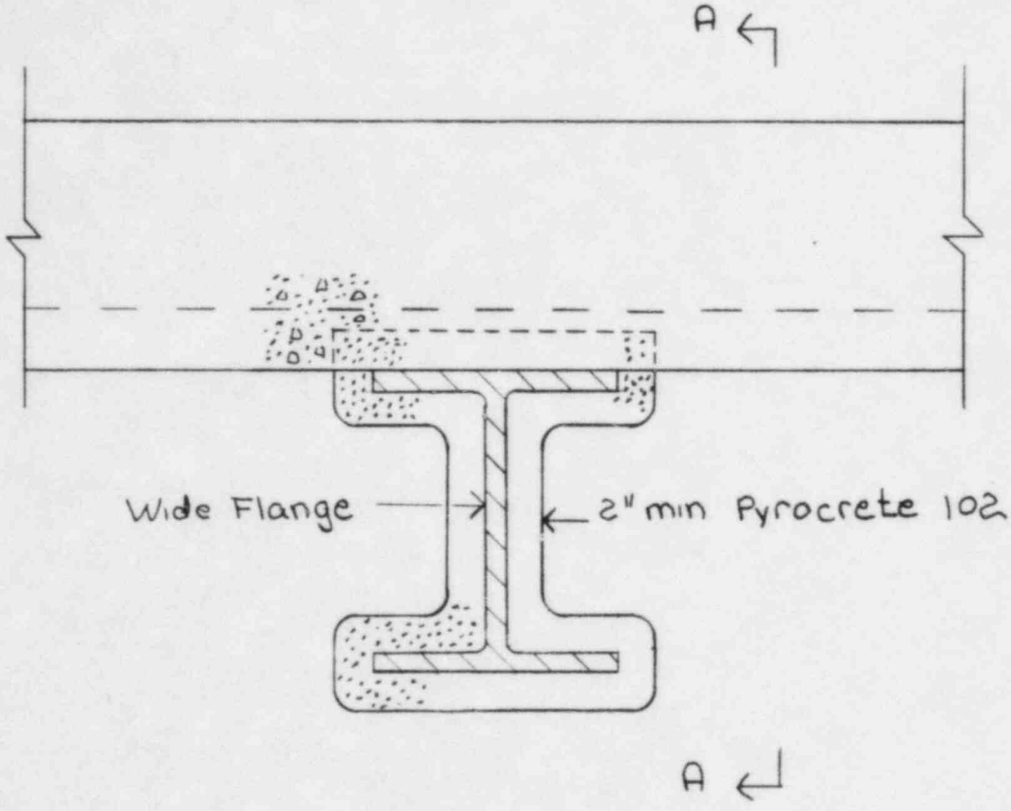
The following Drawings were provided to the NRC Staff at the Fire Protection Meeting (3/7/84)

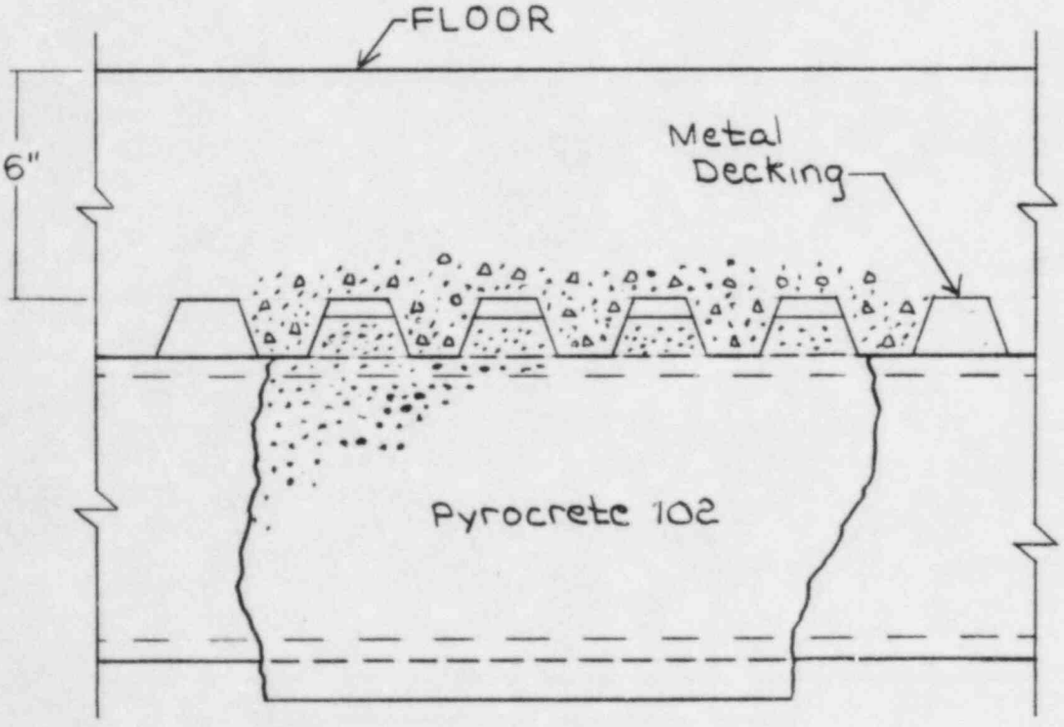
1. SW Drawing No. 12179-EM-60A-1
2. SW Drawing No. 12179-EM-60B-1
3. SW Drawing No. 12179-EM-60C-1
4. SW Drawing No. 12179-EM-60D-1

ATTACHMENT B

TYPICAL FLOOR SLAB ASSEMBLY

TYPICAL 3 HR. FIRE RATED FLOOR/CEILING ASSEMBLY





SECTION A-A

ATTACHMENT C

TECHNICAL DATA

PYROCRETE 102 STRUCTURAL STEEL FIREPROOFING

carboline®
FIREPROOFING PRODUCTS DIV

PYROCRETE® 102

SELECTION DATA

GENERIC TYPE: Catalyzed magnesium oxychloride formulation. Crystal and powder component mixed prior to application.

GENERAL PROPERTIES: A lightweight reinforced, fire resistive material for protection of structural steel on exterior or heavy duty use locations and/or to provide a thermal barrier for protection of urethane foam insulation. Its lower density and ease of application make it preferred over poured in place concrete. Its high compressive strength, impact resistance, and hardness make it suitable for installations where softer materials cannot be used.

RECOMMENDED USES: Currently used in refineries, pulp and paper mills, offshore installations, conventional power plants, petrochemical plants, nuclear power plants, architectural designs or where a hard durable fireproofing is required.

NOT RECOMMENDED FOR: Use over stainless steel and nonferrous metals. Pyrocrete 102 should not be used as a refractory cement (ambient temperatures exceeding 200°F).

PHYSICAL DATA (Typical Properties)

Dry Density	**60-70 lbs/ft^3**
Hardness (Shore D)	**65-70**
Compressive Strength	**2000 psi**
Coefficient of Thermal Expansion	**3.9 x 10^{-6} inch/inch/°F (7x10^{-6} cm/cm/°C)**
Impact Resistance	**20 foot pounds**
Average Flexural Strength	**1000 psi**
Maximum Strain	**.0028 inches/inch**
Insulation "K" factor	**9.6 BTU inches/hour ft^2°F at 75°F**
ASTM E-84 Results	
Flamespread	**5**
Smoke Development	**0**
Fuel contribution	**0**
Shrinkage	**0.5%**
Coverage (100 lb. Kit)*	**56 sq. ft. @ 1/4"**

***NOTE:** Material losses during mixing and application will vary and must be taken into consideration.

SUBSTRATES: Apply over properly primed steel or tiecoated urethane foam insulation.

PRIMER REQUIRED:

	Interior	Exterior
Foam	Pyroprime Tie-cote 775WB	Pyroprime Tie-cote 775WB
Steel (SSPC 6-63)	Carbo Zinc® 11/ Carboline 190HB	Carbo Zinc 11/Carboline 190HB
Steel (SSPC 3-63)	a) Carboline 193 Primer b) Carbomastic® 15 c) Pyroprime 772	a) Carboline 193 Primer b) Carbomastic 15
Galvanizing	Pyroprep 773 and Carboline 190HB	NA

TOPCOAT REQUIRED: For exterior applications, or for interior applications where excessive humidity or chemical fume exposure is present, the following topcoats should be used, unless otherwise specified:

a) Pyrocote 787 or,
b) Carboline 1340 Clear and Pyrocote 788 Elastomer or
c) Carboline 188 HB

Other topcoats may be used as recommended. When topcoats are applied directly to Pyrocrete 102, a seal coat, thinned 50%, should be applied followed by a full body coat.

COMPATIBILITY OF OTHER COATINGS: Consult Carboline Technical Service for suitable use of other coating systems.

APPROVALS: Pyrocrete 102 has been tested in accordance with ASTM E-119 by Factory Mutual, Underwriters Laboratories, and other qualified independent testing organizations. Pyrocrete 102 has also been approved under: BOCA No. RR-73-42; New York City MEA-20-75M; and numerous other jurisdictions. Pyrocrete 102 also meets EPA guidelines for spray-on fireproofing.

SPECIFICATION DATA

RECOMMENDED THICKNESS: Depends on desired rating and assembly fireproofed. (Consult attached design detail). At no time shall Pyrocrete 102 be applied at a thickness of less than 1/4 inches.

SHELF LIFE: One year minimum.

COLORS: Non-uniform off-white to tan.

ORDERING INFORMATION

Prices may be obtained from Carboline Sales Representative or Main Office. Terms – Net 30 days.

SHIPPING WEIGHT:

Crystal Component	35 lbs/bag
Powder Component	65 lbs/bag
	100 lbs/kit

Shipped on pallets of 40 bags/pallet.

Dec. 80 Replaces July 77

APPLICATION INSTRUCTIONS

These instructions are not intended to show product recommendations for specific service. They are issued as an aid in determining correct surface preparation, mixing instructions, and application procedure. It is assumed that the proper product recommendations have been made. These instructions should be followed closely to obtain the maximum service from the materials.

The following information is to be used as a guide. For a more detailed description, see specific Application Instructions on separate sheet.

SURFACE PREPARATION: Steel preparation prior to priming should be done in accordance to the SSPC methods listed under the "Primer Required" section and the primers' respective Product Data Sheets.

Prior to applying Pyrocrete 102, the substrate coating should be free of oil, grease, dirt, condensation or other contamination.

LATHING: 3.4 lbs/sq yard galvanized or painted metal lath shall be installed per design detail on last page of these instructions. Lath may be secured by bending around flange and securing through the use of stud welding, beam furring clips, or tie wire. Corner beads or screeds may be used for aesthetics as well as for application aids.

MIXING: Add seven to eight gallons of cool potable water to a mortar mixer with rubber tipped blades. With mixer running dissolve crystal component for three minutes. Powder component is then added slowly and mixed 5-10 minutes until a homogeneous mortar-like consistency is achieved. Total water MUST NOT exceed eight gallons per 100 lbs. kit.

MULTIPLE COATS: If multiple coats are necessary to achieve desired thickness, apply all coats within eight hours.

POT LIFE: Two hours at 75°F (24°C) and less at higher temperatures. Pot life ends when coating thickens and becomes unusable.

APPLICATION TEMPERATURES:

	Surface or Ambient Temp. MIN	MAX	Relative Humidity MIN	MAX
Interior or Sheltered	20°F (-7°C)	95°F (35°C)	0%	90%
Exterior	35°F (2°C)	95°F (35°C)	0%	90%

SPRAY EQUIPMENT:

Mfg & Model	Glover Stallion or "Pyrocreter"	Essick FM-9 or FM-5E	Spee-Flo Commander II
Pump	Screw/Moyno (2L3-2L4)	Screw Moyno (2L3-2L4)	Piston
Power	Gas or Electric	Gas or Electric	Air

Other manufacturers include Muller (AG-4), Goldblatt Supertex, and Mr. Parts moyno pumps.

For hose size, gun recommendations, tips, spraying, etc., see specific Application Instructions (separate sheet).

TROWEL: Pyrocrete 102 may be trowel applied using a standard plasterers hawk and trowel.

CURE TIMES: In low humidity, high temperature, or direct sun or wind, keep Pyrocrete surface damp for at least six hours after application. Apply a fine water mist spray as needed or wrap in polyethylene sheets.

Fresh Pyrocrete must be protected from rain, condensation or running water for 24 hours at 70°F (21°C) after application to prevent leaching of catalyst.

Normal dry times before topcoating Pyrocrete 102 of thicknesses of one inch or less at 70°F is five days. This time is dependent on thickness, humidity, and temperature. Pyrocrete 102 must be dry and exhibit a minimum shore of "55" prior to topcoating.

If Pyrocrete 102 is to be left untopcoated for a period longer than the normal dry times, it should be protected from rain by polyethylene sheeting, until topcoating can be completed.

CLEAN UP: Wet Pyrocrete 102 overspray or dripping must always be cleaned up with soapy or fresh water before it sets. Cured overspray may require chipping and/or scraping to remove, which should be followed by a water washdown.

Non-ferrous metals should be cleaned immediately with soap and water.

STORAGE CONDITIONS:
Temperature: –20 to 150°F (–29 to 66°C) Humidity: 0-90%.

For more detailed information please consult specific Carboline Application Instructions.

carboline
FIREPROOFING PRODUCTS DIV
350 HANLEY INDUSTRIAL CT. ST LOUIS, MO 63144

carboline
FIREPROOFING PRODUCTS DIV

PYROCRETE® 102

SELECTION DATA

GENERIC TYPE: Catalyzed magnesium oxychloride formulation. Crystal and powder component mixed prior to application.

GENERAL PROPERTIES: A lightweight reinforced, fire resistive material for protection of structural steel on exterior or heavy duty use locations and/or to provide a thermal barrier for protection of urethane foam insulation. Its lower density and ease of application make it preferred over poured in place concrete. Its high compressive strength, impact resistance, and hardness make it suitable for installations where softer materials cannot be used.

RECOMMENDED USES: Currently used in refineries, pulp and paper mills, offshore installations, conventional power plants, petrochemical plants, nuclear power plants, architectural designs or where a hard durable fireproofing is required.

NOT RECOMMENDED FOR: Use over stainless steel and nonferrous metals. Pyrocrete 102 should not be used as a refractory cement (ambient temperatures exceeding 200°F).

PHYSICAL DATA (Typical Properties)

Dry Density	**60-70 lbs/ft^3**
Hardness (Shore D)	**65-70**
Compressive Strength	**2000 psi**
Coefficient of Thermal Expansion	**3.9 x 10^{-6} inch/inch/°F (7x10^{-6} cm/cm/°C)**
Impact Resistance	**20 foot pounds**
Average Flexural Strength	**1000 psi**
Maximum Strain	**.0028 inches/inch**
Insulation "K" factor	**9.6 BTU inches/hour ft^2°F at 75°F**
ASTM E-84 Results	
Flamespread	**5**
Smoke Development	**0**
Fuel contribution	**0**
Shrinkage	**0.5%**
Coverage (100 lb. Kit)*	**96 sq. ft. @ 1/4"**

***NOTE:** Material losses during mixing and application will vary and must be taken into consideration.

SUBSTRATES: Apply over properly primed steel or tiecoated urethane foam insulation.

PRIMER REQUIRED:

	Interior	Exterior
Foam	Pyroprime Tie-cote 775WB	Pyroprime Tie-cote 775WB
Steel (SSPC 6-63)	Carbo Zinc® 11/ Carboline 190HB	Carbo Zinc 11/Carboline 190HB
Steel (SSPC 3-63)	a) Carboline 193 Primer b) Carbomastic® 15 c) Pyroprime 772	a) Carboline 193 Primer b) Carbomastic 15
Galvanizing	Pyroprep 773 and Carboline 190HB	NA

TOPCOAT REQUIRED: For exterior applications, or for interior applications where excessive humidity or chemical fume exposure is present, the following topcoats should be used, unless otherwise specified:

a) Pyrocote 787 or,
b) Carboline 1340 Clear and Pyrocote 788 Elastomer or
c) Carboline 188 HB

Other topcoats may be used as recommended. When topcoats are applied directly to Pyrocrete 102, a seal coat, thinned 50%, should be applied followed by a full body coat.

COMPATIBILITY OF OTHER COATINGS: Consult Carboline Technical Service for suitable use of other coating systems.

APPROVALS: Pyrocrete 102 has been tested in accordance with ASTM E-119 by Factory Mutual, Underwriters Laboratories, and other qualified independent testing organizations. Pyrocrete 102 has also been approved under: BOCA No. RR-73-42; New York City MEA-20-75M; and numerous other jurisdictions. Pyrocrete 102 also meets EPA guidelines for spray-on fireproofing.

SPECIFICATION DATA

RECOMMENDED THICKNESS: Depends on desired rating and assembly fireproofed. (Consult attached design detail). At no time shall Pyrocrete 102 be applied at a thickness of less than 1/4 inches.

SHELF LIFE: One year minimum.

COLORS: Non-uniform off-white to tan.

ORDERING INFORMATION

Prices may be obtained from Carboline Sales Representative or Main Office. Terms – Net 30 days.

SHIPPING WEIGHT:

Crystal Component	35 lbs/bag
Powder Component	65 lbs/bag
	100 lbs/kit

Shipped on pallets of 40 bags/pallet.

Dec. 80 Replaces July 77

APPLICATION INSTRUCTIONS

These instructions are not intended to show product recommendations for specific service. They are issued as an aid in determining correct surface preparation, mixing instructions, and application procedure. It is assumed that the proper product recommendations have been made. These instructions should be followed closely to obtain the maximum service from the materials.

The following information is to be used as a guide. For a more detailed description, see specific Application Instructions on separate sheet.

SURFACE PREPARATION: Steel preparation prior to priming should be done in accordance to the SSPC methods listed under the "Primer Required" section and the primers' respective Product Data Sheets.

Prior to applying Pyrocrete 102, the substrate coating should be free of oil, grease, dirt, condensation or other contamination.

LATHING: 3.4 lbs/sq yard galvanized or painted metal lath shall be installed per design detail on last page of these instructions. Lath may be secured by bending around flange and securing through the use of stud welding, beam furring clips, or tie wire. Corner beads or screeds may be used for aesthetics as well as for application aids.

MIXING: Add seven to eight gallons of cool potable water to a mortar mixer with rubber tipped blades. With mixer running dissolve crystal component for three minutes. Powder component is then added slowly and mixed 5-10 minutes until a homogeneous mortar-like consistency is achieved. Total water MUST NOT exceed eight gallons per 100 lbs. kit.

MULTIPLE COATS: If multiple coats are necessary to achieve desired thickness, apply all coats within eight hours.

POT LIFE: Two hours at 75°F (24°C) and less at higher temperatures. Pot life ends when coating thickens and becomes unusable.

APPLICATION TEMPERATURES:

	Surface or Ambient Temp.		Relative Humidity	
	MIN	MAX	MIN	MAX
Interior or Sheltered	20°F (-7°C)	95°F (35°C)	0%	90%
Exterior	35°F (2°C)	95°F (35°C)	0%	90%

SPRAY EQUIPMENT:

Mfg & Model	Glover Stallion or "Pyrocreter"	Essick FM-9 or FM-5E	Spee-Flo Commander II
Pump	Screw/Moyno (2L3-2L4)	Screw Moyno (2L3-2L4)	Piston
Power	Gas or Electric	Gas or Electric	Air

Other manufacturers include Muller (AG-4), Goldblatt Supertex, and Mr. Parts moyno pumps.

For hose size, gun recommendations, tips, spraying, etc., see specific Application Instructions (separate sheet).

TROWEL: Pyrocrete 102 may be trowel applied using a standard plasterers hawk and trowel.

CURE TIMES: In low humidity, high temperature, or direct sun or wind, keep Pyrocrete surface damp for at least six hours after application. Apply a fine water mist spray as needed or wrap in polyethylene sheets.

Fresh Pyrocrete must be protected from rain, condensation or running water for 24 hours at 70°F (21°C) after application to prevent leaching of catalyst.

Normal dry times before topcoating Pyrocrete 102 of thicknesses of one inch or less at 70°F is five days. This time is dependent on thickness, humidity, and temperature. Pyrocrete 102 must be dry and exhibit a minimum shore of "55" prior to topcoating.

If Pyrocrete 102 is to be left untopcoated for a period longer than the normal dry times, it should be protected from rain by polyethylene sheeting, until topcoating can be completed.

CLEAN UP: Wet Pyrocrete 102 overspray or dripping must always be cleaned up with soapy or fresh water before it sets. Cured overspray may require chipping and/or scraping to remove, which should be followed by a water washdown.

Non-ferrous metals should be cleaned immediately with soap and water.

STORAGE CONDITIONS:
Temperature: –20 to 150°F (–29 to 66°C) Humidity: 0-90%.

For more detailed information please consult specific Carboline Application Instructions.

carboline
FIREPROOFING PRODUCTS DIV
350 HANLEY INDUSTRIAL CT. ST LOUIS, MO 63144

Open Items

Chemical Engineering Branch - Fire Protection

FP-12 Installation of Fire Detectors (Draft SER Section 9.5.1.5)

The applicant's Fire Protection Evaluation Report does not indicate that fire detectors have been selected and installed in accordance with NFPA 72E. We will require the applicant to select and install early warning fire detectors as a minimum in accordance with NFPA 72E. This is an open item.

Response (2/84)

Millstone 3 Specifications for Fire Detectors (smoke, heat and ultra-violet types) requires that the supplier/vendor provide UL listed and/or FM approved equipment. Furthermore, the specification also requires that the detectors provided are suitable for the environment to which they (detectors) will be installed.

Selection of the type of detectors to be installed in the plant was based on the burning characteristics of materials within the protected areas. In areas, where high concentrations of cable are present, a combination of photoelectric and ionization type smoke detectors are installed. In areas where oil represents the major fire hazard, either smoke heat, UV detectors or a combination of fire detectors and systems are installed. Each detecton system provides an early warning signal to the main fire control panel. In some cases, the detection system also activates the area's suppression system as well.

With regards to the detection system's design and installation, the applicable guidelines of both NFPA 72E and the manufacturers technical recommendations have been considered when developing the design criteria. In accordance with NFPA 72E codes requirements, Engineering judgement was employed in developing design criteria and determining actual installation locations. Installation locations were determined using the following considerations in order to establish consistent Engineering judgement.

Types of Postulated Fires:

Selection as to the type of detector to be used was based on the type of postulated fire (smoldering, large free burning, etc.) for in each area.

Ceiling Construction/Shape:

Ceiling configuration and types (smooth, girder and beam construction) were considered when determining detector locations.

Ceiling Height:

Ceiling heights varied throughout the plant. Reduced spacing of detectors was considered on a case by case basis depending on ceiling height.

Ventilation Effects:

FP-12 Cont.

The direction of air movement throughout each area was considered when determining detector locations. In addition, the possible effects of stratification were also considered.

Locations of Hazards:

The amount of combustible material, burning characteristics and the projected fire plume and resultant smoke distribution paths were considered when evaluating detector locations. In areas, where no or limited combustible loading was present, and no heat or smoke was anticipated, no detectors were deemed necessary for that immediate area.

Considering the applicable guidelines of NFPA 72E, the manufacturers recommendations and sound engineering judgement, it is NNECO's position that Millstone 3 fire detection system design will provide a reliable early warning of a fire condition. The above referenced information satisfies the intent of BTP 9.5.1 Section C.6.a requirements.

Status (2/84)

Confirmatory.

Additional Response (3/84)

The fire detectors location drawing (SW Drawing No. 12179-EE-51P-2A) was provided to the NRC Staff at the Fire Protection Meeting.

Status (3/84)

Closed.

Open Items

Chemical Engineering Branch - Fire Protection

FP-17 Hose Station Standpipe Diameters (Draft SER Section 9.5.1.5)

BTP CMEB 9.5-1, Section C.G.c, recommends standpipes to be sized four inches in diameter for multiple hose station supplies and two and one-half inches in diameter for single hose station supplies. The applicant has provided standpipe of a smaller size. We will require that applicant to either verify that the smaller sized standpipe is capable of providing the 500 gpm hose streams at adequate pressure for manual fire fighting operations, or increase the size of the piping in the standpipe system. This is an open item.

Response (3/84)

NNECO has evaluated BTP CMEB 9.5-1, Section 6.c.4 guidelines which address standpipe and hose station recommendations. In response to the referenced guidelines, NNECO is offering the following comments/clarification for your review.

Millstone Unit No. 3's standpipe system is designed as a Class 3 service which provides both 2½" and 1½" hose connections. The piping utilized for Millstone Unit No. 3's standpipe supply system is four inches (4") in diameter and is capable of providing a minimum flow of 500 gallons per minute with a residual pressure of 65 pounds per square inch at the top-most outlet.

In buildings having large areas which required additional hose stations throughout the building, multiple hose station connections (2½ and 1½ inches) have been provided, in accordance with the guidelines of NFPA 14 "Standpipe and Hose Systems". NNECO trusts that the above information will satisfy any concerns with regard to Draft SER Question FP-17.

Status (3/84)

Open.

Open Items

Chemical Engineering Branch - Fire Protection

FP-18 Control Room Console Smoke Detectors (Draft SER Section 9.5.1.6)

Smoke detectors are not provided inside control room cabinets and consoles. We will require the applicant to install such detectors in accordance with our guidelines in BTP CMEB 9.5-1, Section C.7.b. This is an open item.

Response (2/84)

NNECO has evaluated the guidelines of BTP CMEB 9.5-1, Section C.7.b to Millstone 3's control panel design with regards to smoke detection within the control cabinets. As a result of this evaluation, it is NNECO's position that an equivalent level of fire detection/protection for the control cabinets has been provided and therefore, NNECO is requesting that a deviation to BTP CMEB 9.5-1, Section C.7.b guidelines be granted based on the following information:

Control Room Fire Protection Features

Millstone 3's Control Room has been provided with a general area smoke detection system. This detection system utilizes a combination of photoelectric and ionization type smoke detectors in order to provide an early warning of a smoke/fire condition (refer to the attached drawing for the detector layout). Since the major fire loading within the control cabinets is cable insulation, which represents a smoldering type fire, detectors are located at the ceiling level of the room utilizing the applicable sections of NFPA 72E as guidance. In addition, cable tray arrangements and ventilation paths, both in the room and control cabinets were considered when determining the appropriate detector location. Alarm annunciation of a detector will occur at both the main control board and the fire control panel. Both locations are provided with an audible/visual alarm to alert personnel of a smoke/fire condition.

Portable fire extinguishers have been provided throughout the control room area in accordance with the guidelines of NFPA 10 (Portable Fire Extinguishers). Selection of the type of extinguishers provided was based on the postulated fire within the immediate area. In addition, hose stations and fire extinguishers have been provided in the adjacent area (Service Building) to support manual firefighting efforts.

The control room is manned on a continuous basis by NNECO's Operation Department. On each shift, selected operations personnel, who are fully trained fire brigade members, are assigned the responsibility of supporting Millstone 3's fire brigade assignment for that shift. It can be expected, that any fire within a control cabinet will quickly be detected, controlled and extinguished by these qualified fire brigade personnel.

Control Cabinet Design Features

Millstone 3's control cabinets are constructed of metal and therefore are rated as non-combustible. The major fire loading within the cabinets is cable insulation which conforms to IEEE 383 requirements. Since the chemical

FP-18 Cont.

composition of the cable insulation offers an inherent fire retardent characteristics, a postulated fire within the cabinets is expected to result in either self-extinguishing or of a slow burning, smoldering type.

Class 1E circuits providing instrumentation and control functions are separated from their redundant class 1E circuits as well as from non-class 1E circuits in accordance with Regulatory Guide 1.75. Separation of redundant circuits has been achieved by either distance or the employment of metal barriers/enclosures. The electrical loads for the control cabinet wiring are of the low voltage type. Considering the characteristics of the cable insulation and the low voltage currents within the circuits, the potential for sufficient heat to be generated from an electrical fault to ignite adjacent cabling is remote.

Natural ventilation paths within the control cabinets move in the upward direction toward the ceiling area. Louvers located in the bottom sections of the cabinets provide the means for air intake. Air exhaust and the removing of any heat build-up within the cabinet is achieved by openings provided for cable routing at the top of the cabinet. This upward ventilation path will not only remove any heat generated but will also carry any products of combustion upward to the room ceiling area which is provided with smoke detectors, thus resulting in the detection and early warning of a smoke/fire condition.

Control Cabinet Fire Scenario

As previously discussed, NNECO has postulated that the only fire that is likely to occur is a smoldering, slow-burning type fire. When evaluating the possible damage that could result from such a fire, it was established that there are several means of detecting a fire at its early stages. Since the control room is manned on a continuous basis, NNECO believes that credit for operations personnel's sense of sight and smell should be considered as part of means for detecting a fire. Whether by the sight of smoke or smell of burning material, prompt operator action to control and extinguish the fire will occur. Considering the human factor and the installed early warning smoke detection system, it is NNECO's belief that an equivalent level of fire detection has been provided for the control cabinet in lieu of installing smoke detectors within the cabinet themselves. It should be noted that even postulating the worst case fire, one which is not detected and is allowed to develop into a fire which causes major damage within the control cabinet, safe shutdown capability would not be affected. Millstone 3's design for achieving safe shutdown has provided alternate safe shutdown capability from dedicated control cabinets located in the switchgear rooms of the Control Building (elevation 4'6"). Therefore, a loss of the Control Room's main control cabinets would not affect the ability of the plant to achieve safe shutdown.

Status 2/84

Open.

FP-18 Cont.

Revised Response (3/84)

Smoke detection for the control room cabinets and consoles was discussed with the NRC at a meeting on February 16, 1984. Based on the type of combustibles and continuous manning of the control room, it was agreed that the main control board was the only cabinet/enclosure of concern. It should be noted that even with a total loss of the main control board, safe shutdown capability would still exist. Sketch 1 illustrates a layout of the control room and the detection system concept.

The following information is presented for clarification and consideration.

- The ventilation path within the main control board moves in an upward direction towards the ceiling area. Fixed open louvers located in the bottom of the control board provide the means for air intake. Air exhaust and the removal of any smoke/heat buildup is achieved by two 1890 cfm exhaust ducts located at the top (ceiling) of the main control board (refer to Sketch #2). The upward ventilation path will not only remove any smoke/heat generated but will also carry any products of combustion to the duct above.

- The cable within the main control board is qualified to the requirements of IEEE 383 and therefore has inherent fire retardant characteristics.

- The Class 1E circuits which provide instrumentation and control functions are separated from their redundant Class 1E circuits as well as from non-class 1E circuits in accordance with Regulation Guide 1.75. Separation of redundant circuits is achieved by either distance or use of metal barriers/enclosures.

- Wiring and cabling within the main control board are of low voltage.

- The type of fire postulated for this area is a slow burning/smoldering type fire, in which a large quantity of smoke would be generated with very little heat damage incurred.

- A general area detection system provides for both photoelectric and ionization smoke detectors within the control room (refer to Sketch #1).

- The control room is continuously manned by operations personnel. It must be recognized that the senses of sight and smell can realistically detect a smoke/fire condition. On each shift, selected operations personnel, who are fully trained fire brigade members, will be assigned the responsibility

FP-18 Cont.

of supporting Millstone Unit No. 3's fire brigade assignment for that shift. It can be expected that any fire within the main control board will be quickly detected, controlled, and extinguished by qualified fire brigade personnel.

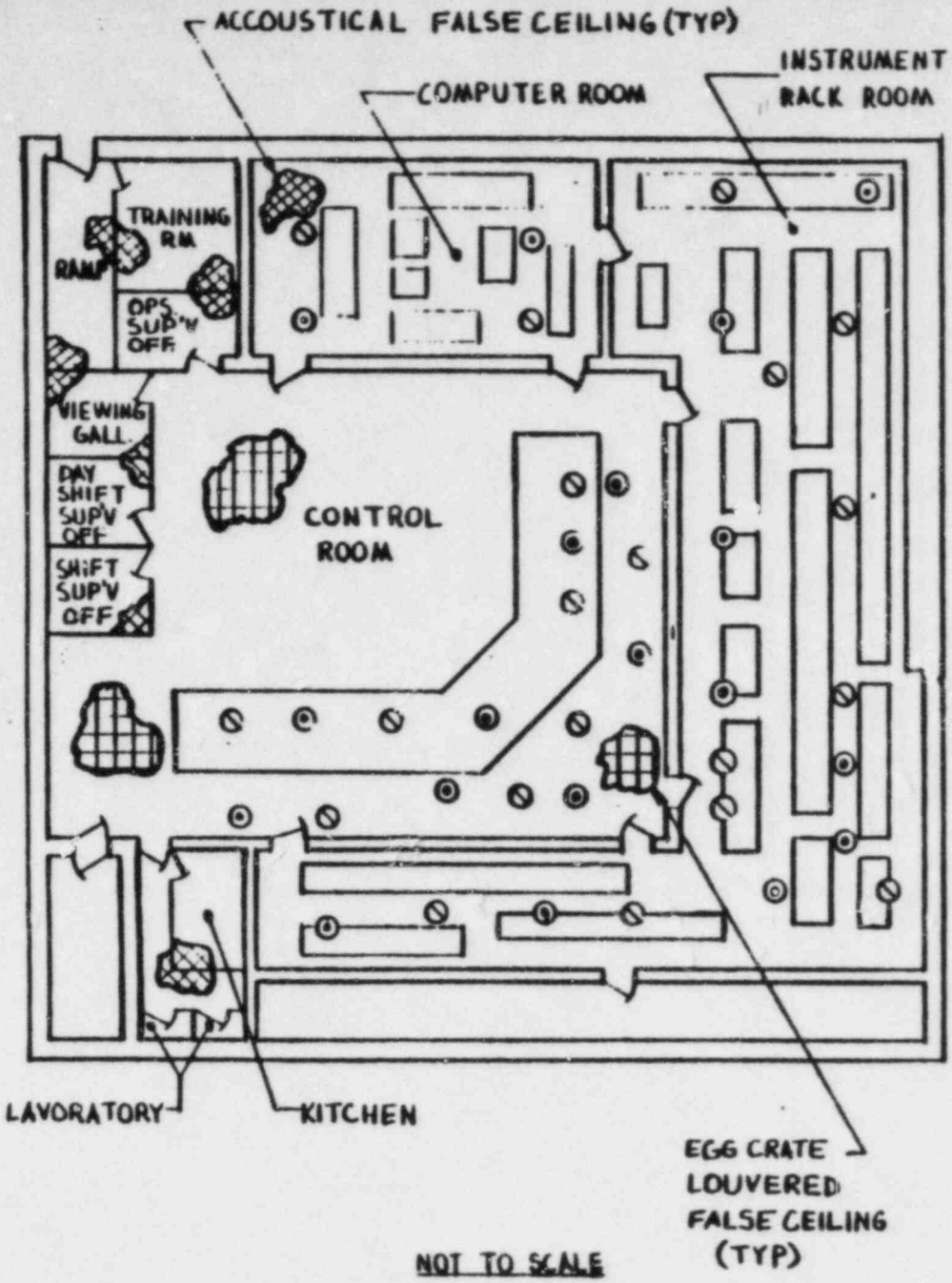
NNECO concludes that sufficient justification exists that the possibility of having an undetected fire within the main control board is extremely remote. Even with this, NNECO will commit to the installation of a detection scheme for the main control board to increase the level of protection. Because the main control board is of enclosed metal design, one detection technique to be considered will be a duct detection system. NNECO concludes that this justification and position will completely satisfy the NRC's concerns.

Status 3/84

Open.

STONE & WEBSTER ENGINEERING CORPORATION

SKETCH 1



NOT TO SCALE

GENERAL NOTES

1. UNDER FLOOR AREAS OF INSTR. RK. RM. AND COMP. RM. NOT SHOWN
2. ⊙ - DEPICTS PHOTOELECTRIC TYPE SMOKE DETECTOR
3. ⊘ - DEPICTS IONIZATION TYPE SMOKE DETECTOR
4. THERE IS A FALSE CEILING INSTALLED IN THE CONTROL ROOM. SMOKE DETECTORS ARE INSTALLED ABOVE THIS FALSE CEILING. NO SMOKE DETECTORS ARE INSTALLED IN THE CABINETS OR CONSOLES OF THIS AREA.
5. THERE IS A FALSE CEILING INSTALLED IN THE COMP. RM. SMOKE DETECTORS ARE INSTALLED BELOW THIS FALSE CEILING. NO SMOKE DETECTORS ARE INSTALLED IN THE CABINETS OR CONSOLES OF THIS AREA.
6. THERE IS NO FALSE CEILING IN THE INST. RK. RM. AND ALSO THERE ARE NO SMOKE DETECTORS INSTALLED IN THE CABINETS OR CONSOLES OF THIS AREA.

REF: 12179-EE-51Q-3

SKETCH SK-Q280.24 1 OF 1

TITLE: CONTROL ROOM COMPLEX - SMOKE DETECTOR LAYOUT

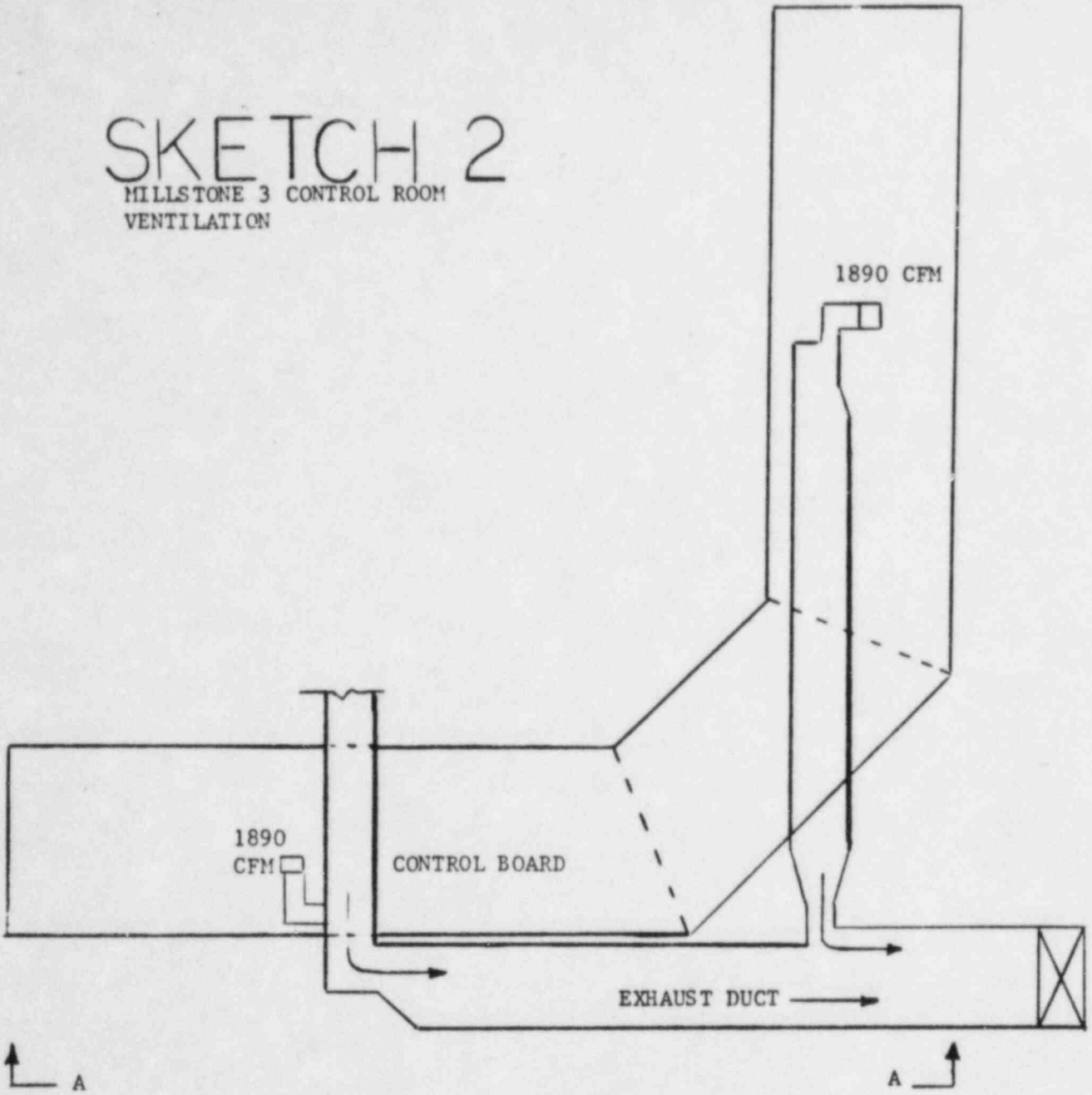
	1	2	3	4	5
DATE					
PREP.					
CHECK					
APPR.					

▲ 5219.9

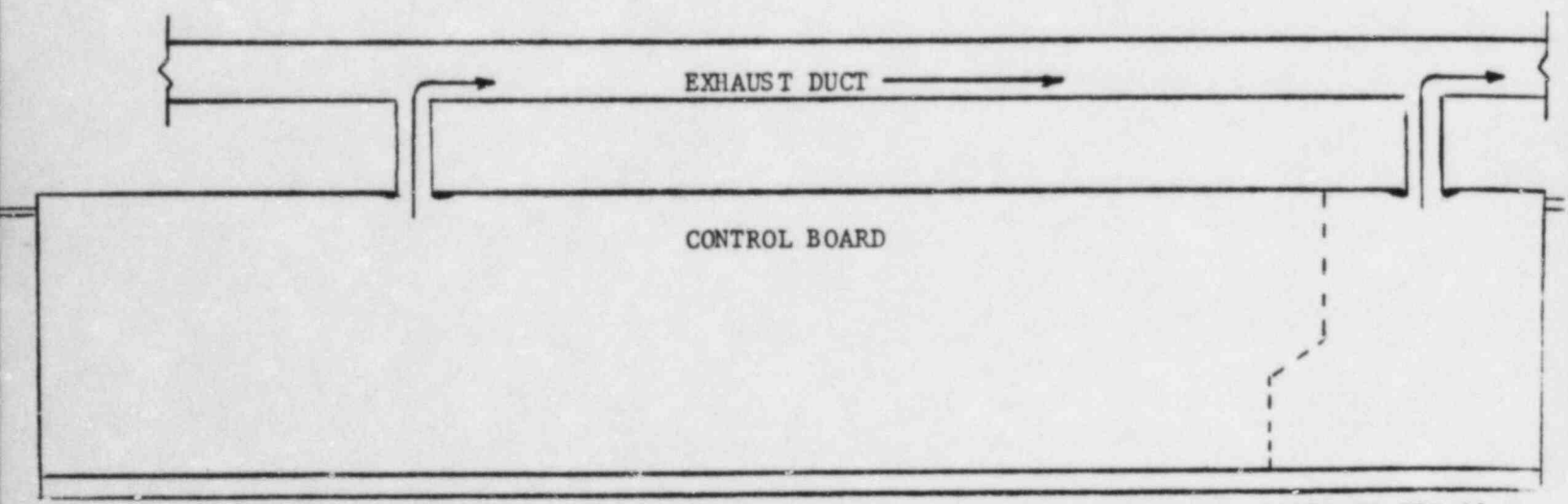
FP18-5

SKETCH 2

MILLSTONE 3 CONTROL ROOM
VENTILATION



Ref. S&W Dwg. No. 12179-EB-39C-12



FP18-6 (Section A-A) Ref. S&W Dwg. No. 12179-EB-39F-11

Open Items

Chemical Engineering Branch - Fire Protection

FP-19 Cable Spreading Room Protection (Draft SER Section 9.5.1.6)

The primary fire suppresion in the cable spreading room is a total flooding automatic carbon dioxide system. We will require the applicant to provide an automatic fixed water suppression system as the primary fire suppression means in the cable spreading room with the carbon dioxide system as a backup to meet the guidelines of BTP CMEB 9.5-1, Section C.7.c. This is an open item.

Response (2/84)

A discussion of cable spreading room fire protection was presented in the NRC-CMEB (Fire Protection) meeting. The discussion included a description of the design features of carbon dioxide system and compliance with the BTP Guidelines. The NRC requested that NNECO provide information on disarming the carbon dioxide system and the water suppression system as a backup to meet the BTP Guidelines.

Status (2/84)

Open.

Revised Response (3/84)

An additional discussion of cable spreading room fire protection was presented in the NRC-CMEB (Fire Protection) meeting on March 7, 1984. The discussion included a description of the design features of carbon dioxide system and compliance with the BTP Guidelines. The NRC requested that NNECO provide the following information on the carbon dioxide system:

1. Reliability
2. Training of operators
3. Disarming of carbon dioxide system
4. Carbon dioxide leakage into the control room

The NRC Staff disagreed with the NNECO position on the cable spreading room protection.

Status (3/84)

Open.

Open Items

Chemical Engineering Branch - Fire Protection

FP-20 Switchgear Room Floor Drains (Draft SER Section 9.5.1.6)

Floor drains have not been provided in the switchgear rooms to prevent damage to equipment from fire fighting water. We will require the applicant to provide floor drains to meet the guidelines of BTP CMEB 9.5-1, Section C.7.e. This is an open item.

Response (3/84)

NNECO has reviewed the guidelines of Branch Technical Position CMEB 9.5-1 and determined that the absence of floor drains in the switchgear areas, on elevation 4'6" of the Millstone Unit No. 3 control building will not:

- cause unacceptable damage to safety-related equipment due to the utilization of fire fighting hand hose lines (BTP CMEB 9.5-1, Section C.5.a.14); or,

- adversely affect the ability of the plant to achieve safe shutdown (BTP CMEB 9.5-1, Section C.5.a.15).

Thus, NNECO is requesting that a deviation be granted from the guidelines stipulated in Section C.7.e of BTP CMEB 9.5-1.

NNECO's justification for the deviation request is based on the following.

- The switchgear areas are separated from each other and surrounding areas by three-hour rated fire barriers. Penetrations through these barriers have been provided with three-hour fire rated penetration seals, doors, and dampers.

- Primary fire suppression capability in both the switchgear areas and cable tunnels is provided by an automatic total flooding carbon dioxide system. These CO_2 systems are supplied from a low pressure carbon dioxide storage tank with sufficient capacity, approximately 45 tons, for multiple discharges. Carbon dioxide was chosen as the primary suppression agent over water, due to its superior penetration characteristics into covered cable trays and enclosed electrical equipment. Also carbon dioxide will extinguish a fire without damaging adjacent equipment which commonly occurs with sprinkler systems.

- Due to the extensive use of flame retardant cables (IEEE 383 qualified) and separation between the switchgear equipment, the postulated fire for this area is a smoldering electrical type fire. Sufficient portable fire extinguishers have been provided in the switchgear areas of adjacent areas to control and extinguish the fire.

- Should a fire develop of such magnitude that 1½" hand hose lines are needed to control and extinguish the fire, 4" curbs have been provided to confine the flooding. These curbs have been provided between the

FP-20 Cont.

switchgear areas and surrounding adjacent areas, as illustrated in the sketches contained in Attachment A. This curbing is sufficiently sized to contain the discharge from two 1½" hand hose lines (60 gpm per hose line) for approximately 129 minutes within either switchgear area; see Attachment B for calculations. This will provide an additional 30 minutes of water discharge beyond the assumed maximum fire duration of 99 minutes for these areas as calculated in the "Fire Protection Evaluation Report" (Attachment C). Also any minor water accumulation (less than 2") in the redundant switchgear area would not affect the operation of the switchgear equipment. This is based upon a minimum three inch clearance that is maintained within the switchgear cabinets between the floor and any switchgear equipment/cabling.

- The design of the control building is such that water piping has been limited to domestic water for the control room kitchen/bathroom and the 1,000 gallons in the HVAC system. Thus the effects of a pipe break relative to possible flooding in the switchgear area is insignificant compared to the utilization of hand hose lines for manual fire fighting.

It is therefore NNECO's position that the absence of floor drains in the control building's switchgear areas will not affect the plant's safety and sufficient justification exists to grant the requested deviation from Section C.7.e of BTP CMEB 9.5-1.

Status (3/84)

Closed.

ATTACHMENT A

SKETCHES OF

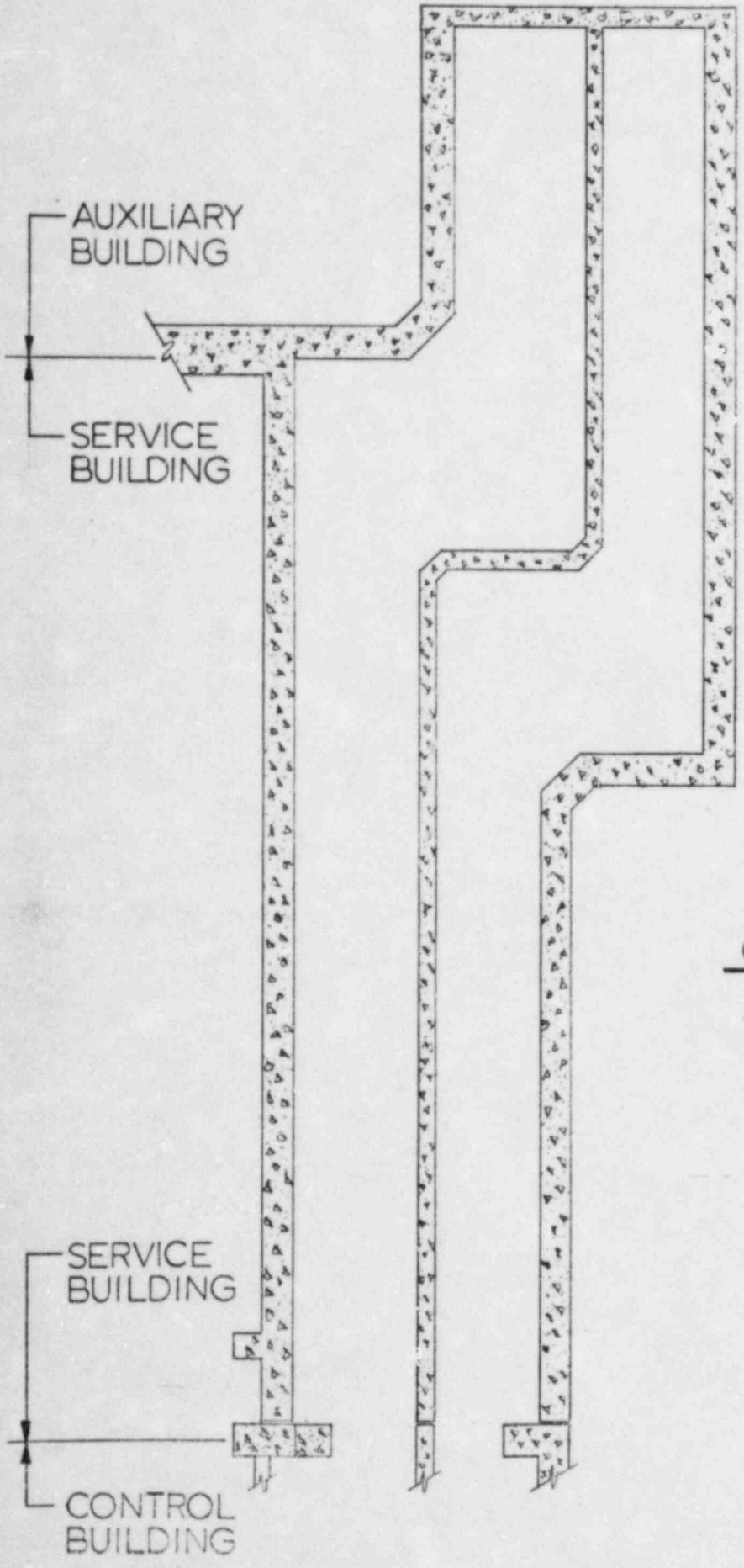
SWITCHGEAR AREAS, TUNNELS, AND CURBING

RAMP DETAIL

EAST SWITCHGEAR ROOM

CONTROL BLDG.
EL. 4'-6"
RAMPS

WEST SWITCHGEAR ROOM



CABLE TUNNELS
EL. 4'-6"

ATTACHMENT B

CALCULATION OF

WATER CONTAINMENT VOLUME AND DISCHARGE CAPACITY

A. EAST SWITCHGEAR AREA A & TUNNEL

1. Total area = 5925 Total water volume = 1973 ft^3

2. Switchgear = 89.5' x 58' 5191 ft^2

   Tunnel = 128.25' x 9.5' 1218 ft^2

   Subtotal = 6409 ft^2

3. Deductions:

   Walls = [.833' x 36'] + [112 x 1.0'] 142 ft^2

   Ramp Up = [9.71 x 3.333] x [.5] 16 ft^2

   Ramp Down = [4 x 11.2] + [(11.2 x 3.333)(.5)] 63.5 ft^2

   3 BYS * PNL [8.5 x 15.83]

   3 EHS * MCC1A [13.33 x 1.75]

   3 BYS * PNL-1 [(4.83 x 8.54) + (3.17 x 4.83) + (3.33 x 8.00)] 83 ft^2

   3 BYS * PNL-5 [(2.83 x 19.67) + (23.9 x 3.67) 143.4 ft^2

   3 RPS * JBRC [2.5 x 14.56] 36.4 ft^2

   Subtotal = 484.3

4. Total area = (2) - (3) = 6409 - 484 = 5925.0 ft^2

5. Total volume = (4) (Height Curb)
   (5925) (.333') = 1973.0 ft^3

   Note: Curb height is 4" above floor.

6. Total volume gallons = (1973)(7.84 gal/ft^3) 15468 gal.

7. Duration of water discharge:
   Assumption: Two 1½" hose lines, flowing 60 gpm per nozzle

   15468 ÷ [2(60)] = 129 minutes

   2 hours, 9 minutes

B. WEST SWITCHGEAR AREA B & TUNNEL

1. Total area = 6672.36 ft^2 Total volume = 2222 ft^3

2. Area: Switchgear [100 x 55.5] 5550 ft^2

   Tunnel [195 x 9.5] 1852.5 ft^2

   Subtotal = 7402.5 ft^2

3. Deductions:

   Stairway [9.66 x 23] 222 ft^2

   Walls [40.0 x 1.0] 40 ft^2

   Ramp Up [4.0 x 9.71] + [(3.33 x 9.71)(0.5)] 55 ft^2

   3 EHS * MCC1B2 (13.33 x 1.75) 23.3 ft^2

   3 PYS * PNL-1 [(8.58 x 7.75) + (4.75 x 6.25) + (1.42 x 3.33)] 101 ft^2

   Elec. Equip. Room [26.67 x 10.83] 288.84 ft

   Subtotal = 730.14

4. Total area = (2) - (3) = 7402.5 - 730.14 6672.36 ft^2

5. Total volume = (4) (Curb Height)
   (6672.36) x (.333) 2222 ft^3

   Note: Curb height is 4" above floor.

6. Total volume gallons = (2222)(7.84 gal/ft^3) 17420 gal

7. Duration of water discharge:

   Assumption: Two 1½" hose lines flowing 60 gpm per nozzle

   17420 ÷ [(2)(60)] = 145 minutes

   2 hours, 25 minutes

ATTACHMENT C

Control Building
Switchgear, West Floor Area

El. 4 ft-6 in.
Fire Area CB-1

Major Equipment

4.16 kV Switchgear (SR, NSR)(SS)
480 V Switchgear (SR)(SS)
Battery Chargers, Inverters, Panels (SR)(SS)
Cable (SR, NSR)(SS)
Auxiliary Shutdown Panel (SR)(SS)

Fire Protection

The west floor area at El. 4 ft-6 in. is equipped with both detection and suppression capability. Detection is by smoke detectors and heat detectors. Suppression is by total flooding CO_2. Dry chemical portable extinguishers provide backup protection from the adjacent areas.

Accessible extinguishing equipment outside this area consists of fire hose stations from the Tech Support Center El. 11 ft-6 in.

Design Features

Figure 77A gives a physical description of this fire area.

Combustible Material

Combustible Material	Quantity	Btu/ft²
Cable Insulation	53,000 lb	103,755
MCC 480 kV	8 sect	145
4.16 kV Switchgear	41 sect	21,700
480 V Switchgear	11 sect	1,435
Shutdown Panel	7 ft-6 in.	90

Assumed Fire Duration

1 hr, 35 min

Postulated Fire

The postulated fire is a cable insulation fire resulting from a transient ignition source or an electrical fault.

Consequences of Postulated Fire

The smoke detection system will detect any fire. The heat detection system will actuate a total flooding low pressure CO_2 extinguishing system. Extinguishing the fire by automatic means will limit the extent of damage.

In the event of no operator action or failure of the CO_2 system, any fire initiated in a cabinet or panel will be contained therein because it is all metal enclosed; thus the fire would affect only the components served by cabinet or the panel. Any cable insulation fire initiated outside a cabinet or panel will be limited and slow to spread because of design layout and the fire retardant characteristics of the cable itself.

A fire in this area could possibly affect equipment related to safe shutdown, but would not inhibit safe shutdown because of complete redundancy in a separate fire area.

Control Building
Switchgear, East Floor Area

El. 4 ft-6 in.
Fire Area CB-2

Major Equipment

4.16 kV Switchgear (NSR, SR)(SS)
480 V Switchgear (SR)(SS)
Battery Chargers, Inverters, Panels (SR, NSR)(SS)
Cable (SR, NSR)(SS)

Fire Protection

The east switchgear floor area at El. 4 ft-6 in. is equipped with both detection and suppression capability. Detection is by smoke detectors and heat detectors. Suppression is by total flooding CO_2. Dry chemical portable extinguishers provide backup protection in the immediate area.

Accessible extinguishing equipment outside this area consists of fire hose stations from the service building El. 24 ft-6 in.

Design Features

Figure 77A gives a physical description of this fire area.

Combustible Material

Combustible Material	Quantity	Btu/ft²
Cable Insulation	44,230 lb	101,360
Motor Control Center 480 V	8 sect	170
4.16 kV Switchgear	45 sect	29,890
480 V Switchgear	6 sect	2,285

Assumed Fire Duration

1 hr, 39 min

Postulated Fire

The postulated fire is a cable insulation fire resulting from a transient ignition source or an electrical fault.

Consequences of Postulated Fire

The smoke detection system will detect any fire. The heat detection system will actuate a total flooding low pressure CO_2 extinguishing system. Extinguishing the fire by automatic means will limit the extent of damage.

In the event of no operator action or failure of the CO_2 system, any fire initiated in a cabinet or panel will be contained therein because it is all metal enclosed; thus the fire would affect only the components served by the cabinet or panel. Any cable insulation fire initiated outside a cabinet or panel will be limited and slow to spread because of design layout and the fire retardant characteristics of the cable itself.

A fire in this area could possibly affect equipment related to safe shutdown, but would not inhibit safe shutdown because of complete redundancy in a separate fire area.

Open Items

Chemical Engineering Branch - Fire Protection

FP-21 Emergency Diesel Generator Day Tanks (Draft SER Section 9.5.1.6)

The day tanks are not separately enclosed from the diesel generators, nor are they in a diked enclosure. We will require the applicant to meet the guidelines of BTP CMEB 9.5-1, Section C.7.i. This is an open item.

Response (3/84)

BTP CMEB 9.5-1, Section C.7.i permits day tanks with a total capabity up to 1,100 gallons within the diesel generator area under the following conditions:

1. The day tank is located in a separate enclosure with a minimum fire resistance rating of three hours, including door penetrations. These enclosures should be capable of containing the entire contents of the day tanks and should be protected by an automatic fire suppression system, or

2. The day tank is located inside the generator room in a diked enclosure that has sufficient capacity to hold 110% of the contents of the tank or is drained to a safe location.

Present design includes a day tank with a capacity of 550 gallons, located within each diesel generator area.

Both diesel generator/day tank areas are completely redundant and physically separated from each other and from other areas of the plant by fire barriers having a minimum fire resistance rating of three hours. A dip pan design capable of holding 160 gallons of fuel for each day tank is provided for both areas. A preaction sprinkler system, activated by heat detectors, is also provided for each area. In addition, ultra violet (UV) fire detectors are installed to provide both a local alarm and annunciation in the control room. Fire hose stations, portable fire extinguishers, and a yard hydrant fire protection system are all available for backup manual protection. Floor drains connected to an oil separator located outside of the area allow for adequate drainage in both areas (See existing design attachment I, sketch I).

An evaluation was conducted to determine the effects of fire involving the diesel generator only, day tank only and combination diesel generator and day tank. It was concluded for all three fire scenarios that the end result would be the same. The fire would render the specific diesel generator inoperative. It should be noted that this conclusion is based on no operator action or failure of the installed preaction sprinkler system. Even if this occurred, there would be no safe shutdown consequences since the system (diesel generator/day tank) is completely redundant and physically separated by a three hour fire barrier. Because of this redundancy, the unaffected generator/day tank would be capable of providing on-site power.

FP-21 Cont.

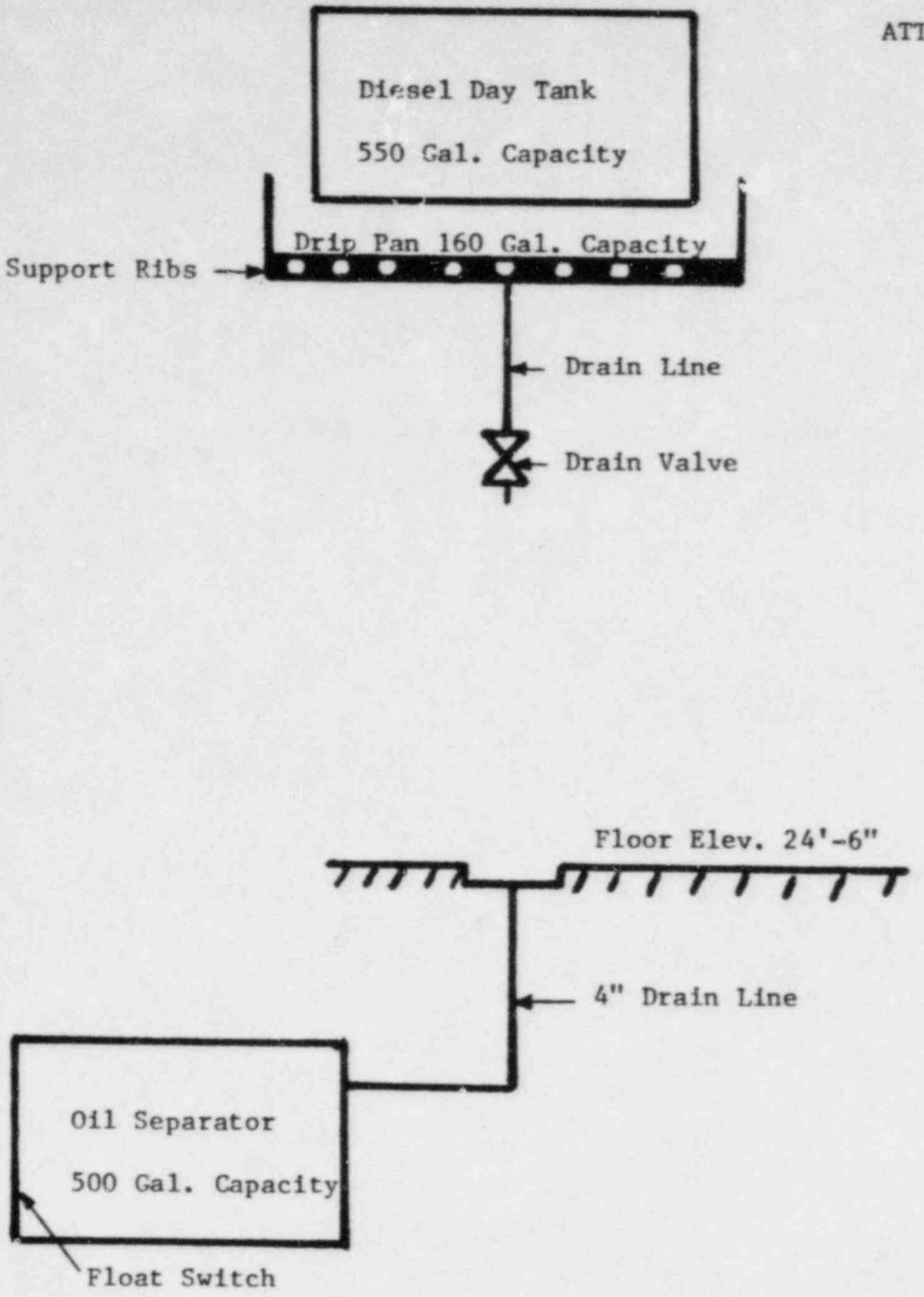
Although sufficient justification exists to assure that safe shutdown can be achieved, NNECO proposes to modify the existing (Attachment I, Sketch I) fuel collection system to provide a positive means of collecting/ drainage/fuel oil (See Attachment I, Sketch II). The proposed collection system will be hard piped to an underground storage oil separator tank and the total capacity of this collection/drainage system will contain 110% of the day tank capacity. NNECO trusts that this proposed collection/drainage system concept will satisfy the fire protection concerns for the Diesel Generator Rooms.

Status (3/84)

Closed.

ATTACHMENT 1

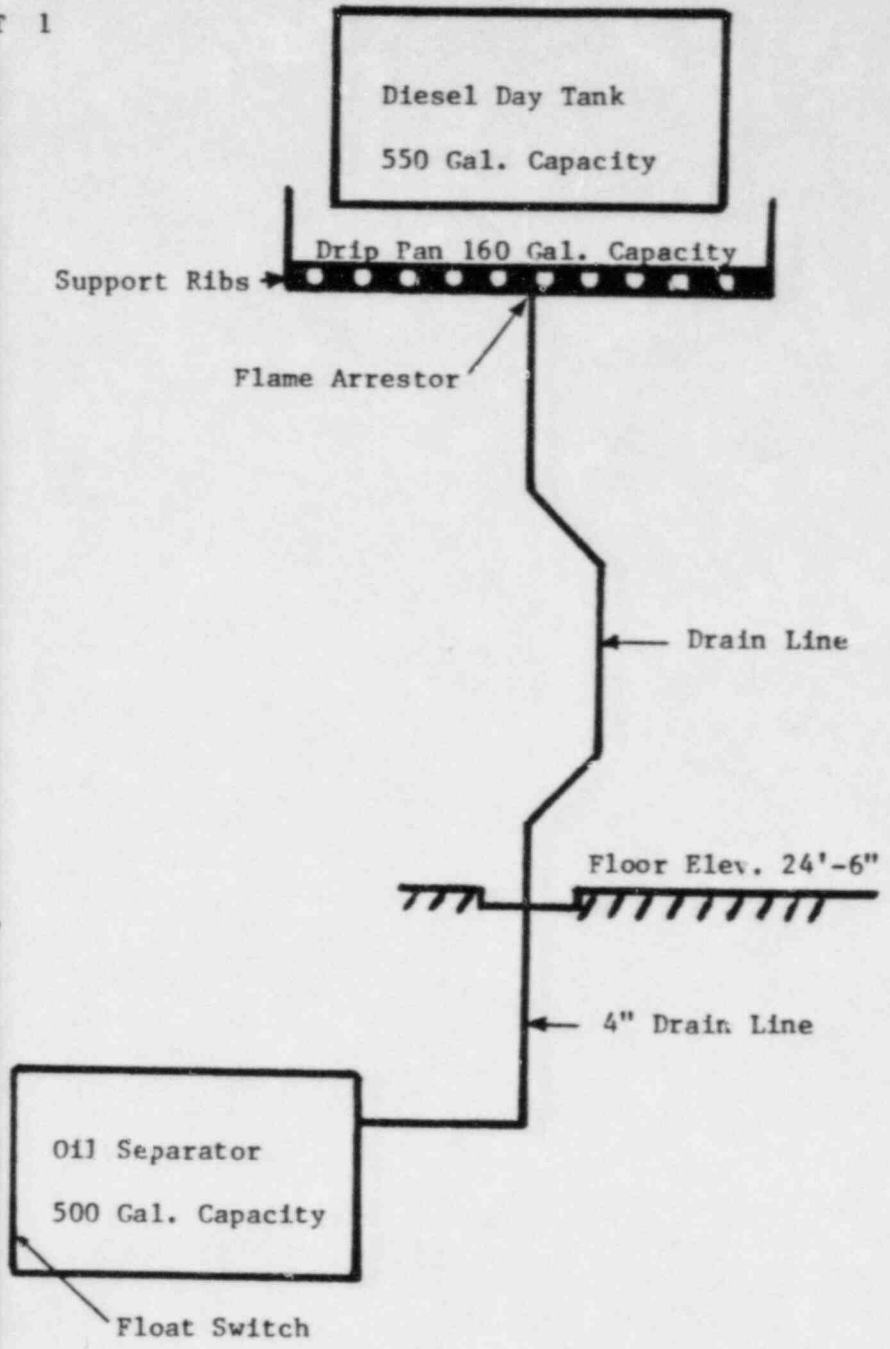
Sketch 1



EXISTING DESIGN

(SECTIONAL VIEW)

Sketch 2



PROPOSED DESIGN CONCEPT

(SECTIONAL VIEW)

Ref. S&W Dwg. No. 12179-BS-485

FP21-3