NORTHEAST UTILITIES

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July 31, 1979

Docket Nos. 50-213
50-245
50-336

Director of Nuclear Reactor Regulation
Attn: Mr. D. L. Ziemann, Chief
Operating Reactors Branch #2
Mr. R. Reid, Chief
Operating Reactors Branch #4
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

References: (1) D. L. Ziemann letter to W. G. Counsil dated October 3, 1978.
(2) D. L. Ziemann letter to W. G. Counsil dated September 26, 1978.
(3) R. Reid letter to W. G. Counsil dated September 19, 1978.
(4) W. G. Counsil letter to D. L. Ziemann and R. Reid dated July 19, 1979.

Gentlemen:

Haddam Neck Plant
Millstone Nuclear Power Station, Unit Nos. 1 and 2
Fire Protection

In References (1), (2), and (3), the NRC Staff issued License Amendments and associated Safety Evaluation Reports regarding Fire Protection for the Haddam Neck Plant, Millstone Unit No. 1, and Millstone Unit No. 2, respectively. In Section 3 of each of the above References, a schedule of license submittals on various aspects of fire protection modifications was provided. In the majority of cases, the scheduled submittal date was July 1, 1979.

In Reference (4), information previously provided verbally to the NRC Staff regarding revised submittal dates was formally documented. It was anticipated that one submittal, addressing the topics included in Table 3.2 of Reference (1), Table 3.1 of Reference (2), and Table 3.1 of Reference (3) would be provided on or about July 31, 1979. Accordingly, additional information with regard to the above topics is hereby provided in Attachments 1, 2, and 3 to this letter for the Haddam Neck Plant, Millstone Unit No. 1, and Millstone Unit No. 2.

306 051

As noted in Reference (4), the majority of the material being provided at this time has been the subject of telephone discussions between our respective Staffs. It is our current understanding that resolution has been achieved regarding these topics.

Connecticut Yankee Atomic Power Company (CYAPCO) and Northeast Nuclear Energy Company (NNECO) trust that this information fulfills the commitments of References (1), (2), and (3).

Very truly yours,

CONNECTICUT YANKEE ATOMIC POWER COMPANY
NORTHEAST NUCLEAR ENERGY COMPANY

W. G. Counsil
Vice President

Attachments

DOCKET NO. 50-213

ATTACHMENT 1

HADDAM NECK PLANT

ADDITIONAL INFORMATION

FIRE PROTECTION

506 053

JULY, 1979

NRC - SER ITEM 3.2.1

ALTERNATE SHUTDOWN CAPABILITY

NRC CONCERN

An alternate means of safe shutdown should be provided which is independent of systems which could be damaged by fires in the following areas: a) Control Room, b) Switchgear Room, c) Cable Spreading Area, d) PAB, e) Cable Vault, f) Containment.

RESPONSE

As noted in the W. G. Counsil letter to D. L. Ziemann dated August 29, 1978:

CYAPCO believes that most of the important design criteria and methods used for the alternate shutdown system will be agreed upon during the Systematic Evaluation Program (SEP). At that time, it was expected that the last of these areas of agreement will be finalized in late spring of 1980. The subsequent evaluation, its results, and modifications deemed necessary could take up to three years from that point. Thus, we would expect that any modifications would be implemented by late 1983. CYAPCO wishes to note that conceptual design of the system has commenced. The overall schedule for the system will be periodically reassessed at various points during the SEP so as to consider the progress in determination of design criteria.

NRC - SER ITEM 3.2.2

SMOKE DETECTION SYSTEM TESTS

NRC CONCERN

The licensee is evaluating a method to conduct in-situ tests with a suitable smoke generation device to verify that a fire would be promptly detected by installed smoke detectors and that ventilation air flow patterns in the area do not significantly reduce or prevent detection response. Bench tests will be conducted to verify that smoke detectors will provide prompt response and have adequate sensitivity to the products of combustion for the combustibles in the area where smoke detectors are installed. If any fire detection systems are found to be inadequate, appropriate modifications will be made to provide adequate performance (4.2).

RESPONSE

CYAPCO has been actively involved in researching and investigating a method of in-situ testing for the Haddam Neck Plant. Various concepts have been reviewed/analyzed and it appears that NUTECH has developed an in-situ testing technique which merits further investigation. NUTECH's concept of in-situ testing was demonstrated and discussed with the NRC Staff in a meeting in Bethesda on June 21, 1979.

CYAPCO has evaluated NUTECH's concept of in-situ testing and concludes that although NUTECH's concepts have advanced the state-of-the-art, more testing or qualification is appropriate to provide assurance of an acceptable test. Several utilities and NUTECH are now considering sponsoring a prototype test program to qualify NUTECH's technique. The results of this testing would be useful in determining the acceptability of NUTECH's concept/technique.

CYAPCO will continue to evaluate methods of conducting a useful, acceptable in-situ test of existing detection systems. In the interim, it remains CYAPCO's position that a demonstrated, reliable method of conducting in-situ tests of smoke detectors is not currently available. The completed or in-progress fire protection modifications including extensive fire detection and suppression provide adequate assurance that postulated fires would be dealt with promptly. This assurance is enhanced by the consideration given to fire loadings, products of combustion, and ventilation paths in the installation of fire detection equipment.

NRC - SER ITEM 3.2.3

CABLE FIRE BARRIER PENETRATIONS TEST DATA

NRC CONCERN

Test data will be provided to demonstrate the adequacy of electrical cable fire barrier penetrations.

RESPONSE

All cable penetrations sealed at the Haddam Neck Plant have been sealed using Dow Corning Q3-6548 medium density Silicone RTV Foam. The penetration seal installer, Insulation Consultant and Management Service, Incorporated (ICMS), certifies the materials used to the ASTM E119-73 Fire Endurance test. This test is described in the Dow Corning "New Product Information" which is included. Actual fill depths reflect raceway type, percent obstruction, and area served.

There have been several other subsequently completed ASTM E119 tests using the Dow Corning penetration seal material among which are the Dow Corning and Chemtrol test, Factory Mutual No. 26543 (4610) dated October 28, 1975 and the Dow Corning and ICMS test, Factory Mutual No. OROQ3 AM (4610) dated May 18, 1977.

506 056

DOW CORNING

new product information

DOW CORNING® Q3-6548 SILICONE RTV FOAM (MEDIUM DENSITY)

(Black, reversion resistant, non-corrosive, improved fire resistant, closed cell).

Dow Corning® Q3-6548 Silicone RTV Foam is a two-part product supplied as A and B liquid components. The A component is black and the B component is off white for easy identification and inspection for completeness of mix. When the A and B components are thoroughly mixed in a one to one ratio by either weight or volume the product will expand, and cure to a foamed elastomer at room temperature. Only a mild exotherm (20°C maximum internal temperature rise) is exhibited during the curing reaction.

CAUTION: During and shortly after the foam expansion period, a small quantity of hydrogen gas is evolved from the foam product, and appropriate caution should be exercised. Keep away from sparks and flame. Adequate ventilation should be provided to prevent localized build-up of gas. (See section on gas evolution).

Dow Corning® Q3-6548 Silicone RTV Foam is specially formulated to have improved fire resistant properties. As a result of these unique properties, this material has been used to prepare fire stops and penetration seals. The suitability of Dow Corning® Q3-6548 Silicone RTV Foam for applications of this type is evidenced by the results after testing according to the ASTM E 119-73 Fire Endurance Test, where five hours of fire exposure were successfully maintained according to the

506 057

severe parameters of this test. This test was conducted at the National Gypsum Company and witnessed by a representative of the Factory Mutual Research Corporation. A formal report is available by requesting the Factory Mutual Serial No. 24963. It should be specifically noted that not all silicone foams have improved fire resistant properties. The use of the generic term "Silicone Foam" should be avoided when referencing this product or data. This test data is valid only to this product by its specific name and number designation, namely, Dow Corning® Q3-6548 Silicone RTV Foam.

Dow Corning® Q3-6548 Silicone RTV Foam has demonstrated utility in a variety of other applications that require sealability, improved fire resistance (see test methods and data on Page 4), insulation against heat and cold, and low toxicity[1]. It is particularly useful where stability at higher and lower temperatures is required. The following is a list of application requirements and the related pertinent properties for which data is or will be available on Dow Corning® Q3-6548 Silicone RTV Foam.

Application Requirement	Related Property
*Sealability	Closed cell structure Expansion ratio during cure
*Insulation against hot and cold	Termal conductivity K Factor
*Higher temperature stability	Thermal aging Reversion resistance

[1] The hazardous decomposition products due to extreme heat or burning of this product are SiO_2, CO_2 and traces of incompletely burned carbon products.

506 058

*Lower temperature stability	Stiffening temperature
*Flame retardancy (cured foam)	Vertical Burn Limiting oxygen index
*Flammability of liquid components	Flash point Fire point
*Toxicity	Toxicity of by-products Toxicity of product
*Nuclear applications	Radiation resistance Halogen content

Testing of Dow Corning® Q3-6548 Silicone RTV Foam is continuing with respect to the above specific material properties and related applications. Toxicologic properties of this material have not been thoroughly studied. Toxicity data on similar silicone materials indicate this product should pose no hazard to health. Additional data will be supplied upon request as it becomes available.

TYPICAL PROPERTIES (Not intended for use in preparing specifications)

As Supplied

Part A

Dow Corning Corporation Test Method	ASTM	Property-Physical	
CTM 0176		Appearance	Black liquid
CTM 0044	D 70	Specific Gravity	1.05
CTM 0050	D 1084	Viscosity, poise (Brookfield Model HAF spindle No. 3 at 10 rpms)	50
		Shelf Life, Months	6

506 059

CTM 0006	D92	Flash Point, °F	470
CTM 0006	D92	Fire Point, °F	Greater than 650
CTM 0787		Sulfur	None detected, less than 2 ppm
		Chlorine	None detected, less than 4 ppm
		Bromine	None detected, less than 5 ppm
		Iodine	None detected, less than 6 ppm

Test Method	ASTM	Property-Electrical (50 mils Liquid)	
CTM 0114	D877	Dielectric Strength, volts/mil	680
CTM 0210	D924	Dielectric Constant, 100 Hz	3.08
CTM 0210	D924	Dissipation Factor, 100 Hz	0.00103
CTM 0272	D169	Volume Resistivity, 500 volts DC, ohm-cm	3.23×10^{12}

As Supplied

Part B

Dow Corning Corporation Test Method	ASTM	Property-Physical	
CTM 0176		Appearance	Off White Liquid
CTM 0044	D70	Specific Gravity	1.05
CTM 0050	D1084	Viscosity, poise (Brookfield Model HAF Spindle No. 3 at 10 rpms)	60
		Shelf Life, Months	6
CTM 0006	D92	Flash Point, °F	270
CTM 0006	D92	Fire Point, °F	390
CTM 0787		Sulfur	None detected, less than 2 ppm
		Chlorine	None detected, less than 4 ppm

506 060

Bromine	None detected, less than 5 ppm
Iodine	None detected, less than 6 ppm

Test Method	ASTM	Property-Electrical (50 mils Liquid)	
CTM 0114	D877	Dielectric Strength, volts/mil	900
CTM 0210	D924	Dielectric Constant, 100 Hz	3.29
CTM 0210	D924	Dissipation Factor, 100 Hz	0.0034
CTM 0272	D169	Volume Resistivity, 500 volts DC, ohm-cm	3.38×10^{12}

PROPERTIES OF CURED FOAM (THOROUGHLY MIXED ONE PART OF A WITH ONE PART OF B AND CURED AT 23°C FOR A MINIMUM OF 24 HOURS

Test Method	Property-Physical	
CTM 0176	Appearance	Dark Gray-Black Elastomeric Foam
CTM 0812	Density (power mixed for 30 seconds and cured in non-confined condition) lbs/ft^3	17
CTM 0826	Cell structure, percent closed cell (breathability method)	95
CTM 0224	Thermal conductivity (cenco fitch method) Cal cm/sec sq cm deg C	1.8×10^{-4}
CTM 092A	Snap Time (time to non-pour condition. Also time to begin foam rise), minutes	1.5
CTM 0316A	Flammability (vertical burn)	

Time in Flame	Average Time to Flame-& Glow-out	Average Percent Weight Loss
15 seconds	7.2 seconds	1.3
60 seconds	15.6 seconds	13.5

CTM 0780	Limiting Oxygen Index (L.O.I. Rating)	35

506 061

The above listed tests, claims, representations and descriptions regarding the flammability of the product described are based on standard small scale laboratory tests and as such are not reliable for determining, evaluating, predicting or describing the flammability or burning characteristics of this product under actual fire conditions, whether said product is used alone or in combination with other products.

Test Method	ASTM	Property-Electrical (cured foam sample thickness - 125 mils)	
CTM 0014	D877	Dielectric Strength, volts/mil	165
CTM 0112	D150	Dielectric Constant, 100 Hz	1.95
CTM 0112	D150	Dissipation Factor, 100 Hz	0.00505
CTM 0249	D257	Volume Resistivity, ohm-cm	2.24×10^{15}

Test Method	Property - Radiation Resistance	
CTM 0525	Exposure, megarads	Modulus at 10% compression, PSI
	0	0.628
	6	0.672
	22	0.92
	49	2.00
	124	2.32 Still Resilient

MIXING

On standing some filler may settle to the bottom of the A and B component containers. To ensure a uniform product mix, the material in the A and B containers should be thoroughly mixed just prior to use.

506 062

To properly catalyze Dow Corning® Q3-6548 Silicone RTV Foam add an equal quantity of Part A with an equal quantity of Part B by either weight or volume. For batch mixing by hand or power mix, vigorously and thorough mixing should be maintained for 30 to 60 seconds. The mixed product should then be quickly transferred and poured into the desired application site. For larger volume applications the use of suitable automatic mixing, metering, and dispensing equipment is recommended.

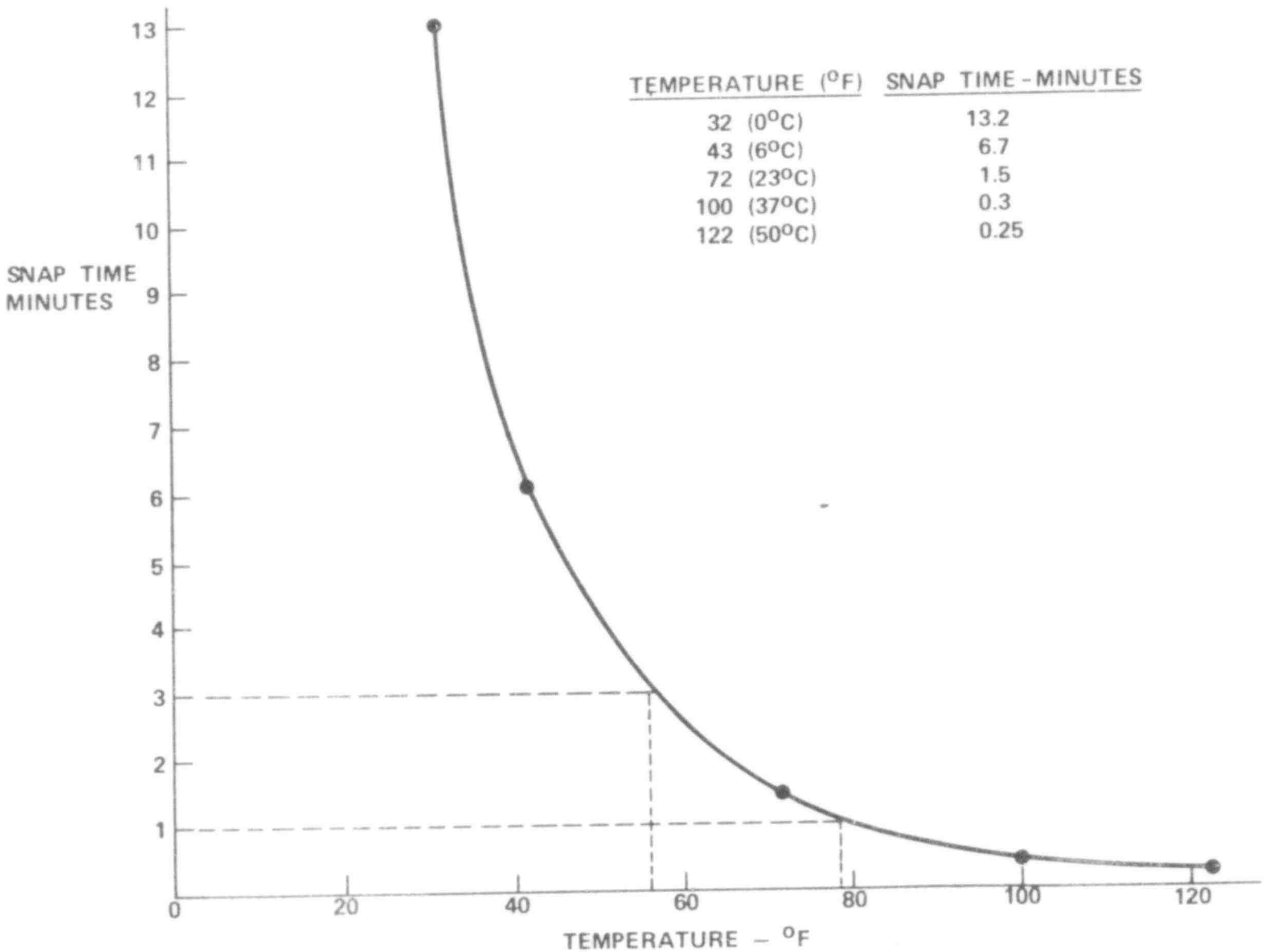
The type or degree of mixing can significantly affect the cell structure and density of the final foam product. The introduction of air during the mixing action is desirable to obtain a more uniform cell structure and maximum expansion ratio and volume efficiency. Typical batch hand mixing will generally result in a foam density of about 20 lbs/ft^3. Batch power mixing will generally result in a density of about 17 lbs/ft^3. Automatic mixing, metering and dispensing equipment with introduction of auxiliary air into the mix, can result in foam densities as low as 15 lbs/ft^3. Likewise, the expansion ratios of foam volume to liquid volume can vary from 2.5/1 to 4/1 depending on the type and degree of mixing. When cured under significant confinement and restriction, foam densities packed as high as 28 to 29 lbs/ft^3 can result.

CURE RATE

As supplied and properly mixed, Dow Corning® Q3-6548 Silicone RTV Foam has a snap time or working time of between 1 and 3 minutes at room temperature, where a typical snap time would be about 1.5 minutes. The cure rate or snap time is very dependant upon the temperature of the A and B components after they are mixed.

506 063

DOW CORNING® Q3-6548 SILICONE RTV FOAM SNAP TIME VS TEMPERATURE
AFTER MIXING PART A WITH PART B



506 064

As shown in the graph and table below, temperatures lower than 23°C (72°F) will result in significantly longer cure rates, while temperatures higher than 23°C (72°F) will result in significantly shorter cure rates. Snap times faster than 1 minute and longer than 3 minutes can result in a less uniform foam cell structure and a lower expansion ratio.

REPAIRABILITY

Once cured in place, Dow Corning® Q3-6548 Silicone RTV Foam can be removed with relative ease, repairs or changes made, and the repaired area re-foamed in place with additional product. Since this product develops good adhesion to itself, the repaired region will become an integral part of the original foam.

ADHESION

Upon curing, Dow Corning® Q3-6548 Silicone RTV Foam exhibits good adhesion to most common substrates. Substrates to which good adhesion is not normally obtained would include Teflon®, polyethylene, polypropylene and related materials. Adhesion to most substrates can be improved with the use of Dow Corning® 1200 Primer.(2) Good adhesion cannot be expected to substrates known to inhibit the cure of Dow Corning® Q3-6548 Silicone RTV Foam as listed in the following section.

(2) CAUTION: Dow Corning® 1200 primer is flammable. Keep away from heat and open flame. Use only with adequate ventilation.

INHIBITION OF CURE

Certain materials, chemicals, curing agents, and plasticizers can inhibit the cure of Dow Corning® Q3-6548 Silicone RTV Foam. Most notable of these are:

- *Organo-tin and other organo-metallic compounds
- *Silicone rubber containing organo-tin catalyst
- *Sulfur, polysulfides, polysulfones or other sulfur containing materials

506 065

*Amines, urethanes, or amine containing materials
*Unsaturated hydrocarbon plasticizers

If a substrate or material is questionable with respect to potentially causing inhibition of cure, it is recommended that a small scale compatibility test be run to ascertain suitability in a given application. The presence of liquid or uncured product at the interface between the questionable substrate and the cured Dow Corning® Q3-6548 Silicone RTV Foam would indicate incompatibility and inhibition of cure.

GAS EVOLUTION

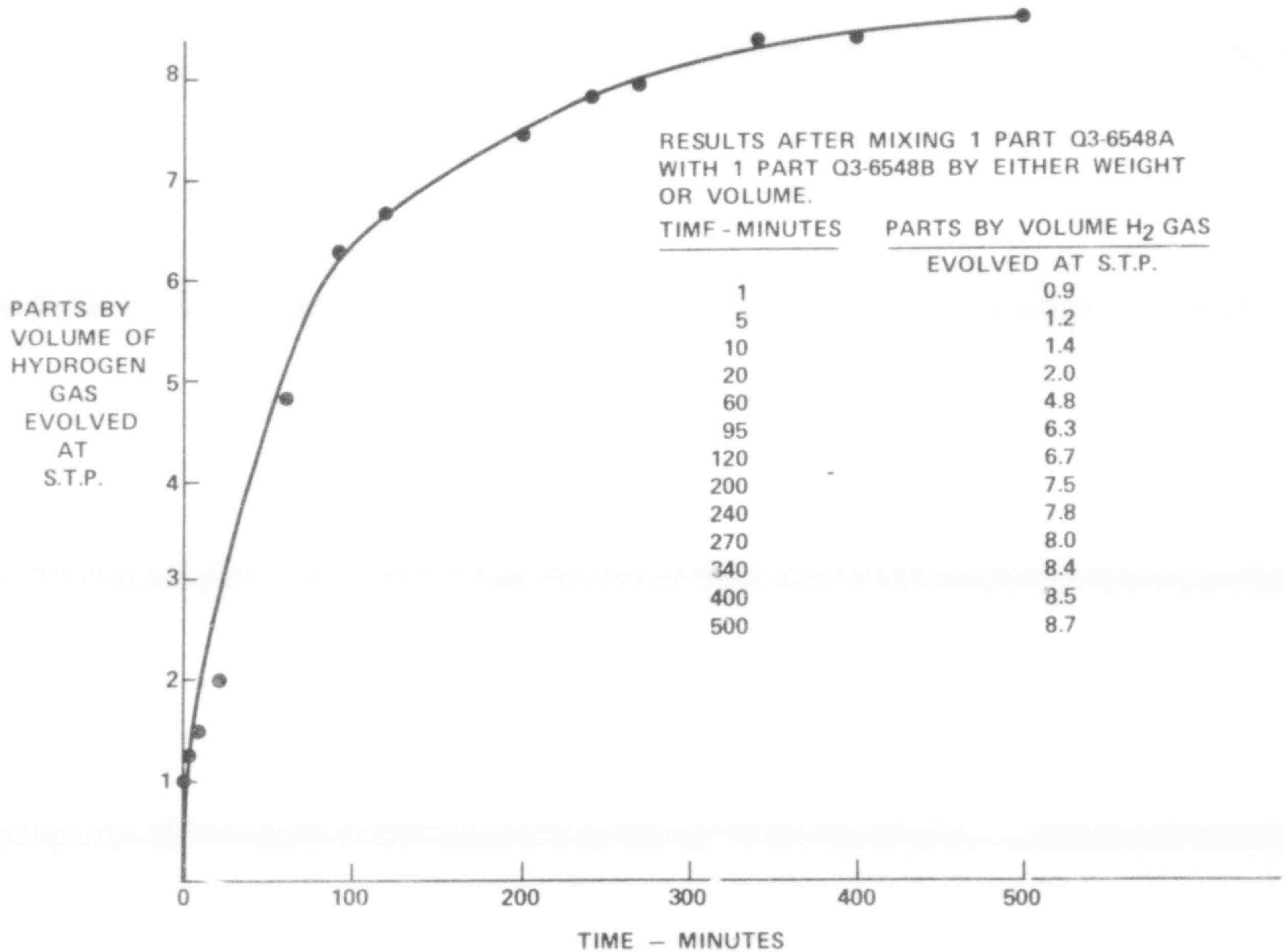
Immediately upon mixing the A and B components of Dow Corning® Q3-6548 Silicone RTV Foam, a cure reaction takes place that results in the evolution of hydrogen gas (see caution on page 1). The product then cures to an elastomer in the presence of the evolved gas resulting in a solid, flexible, elastomeric foam. Since the foam is greater than 90% closed cell, the gas is not immediately released to the surrounding atmosphere, but instead is released over a time period by diffusion. The total volume of gas is essentially generated during the first three minutes after the A and B components are mixed together. Since the foam has a closed cell structure, the gas is initially retained and then released as shown by the graph and table listed below. This data shows that one part by weight or volume of Part A mixed with one part by weight or volume of Part B will release 8.7 parts by volume of hydrogen gas at S.T.P. during the first 8 hours. More than one half of the total gas evolution is released from the foam during the first hour subsequent to mixing the A and B components.

AVAILABILITY

900 lb kits
100 lb kits

506 066

DOW CORNING® Q3-6548 SILICONE RTV FOAM HYDROGEN GAS VOLUME/RATE EVOLUTION AFTER MIXING PART A WITH PART B IN A 1 TO 1 RATIO BY EITHER WEIGHT OR VOLUME



RESULTS AFTER MIXING 1 PART Q3-6548A WITH 1 PART Q3-6548B BY EITHER WEIGHT OR VOLUME.

TIME - MINUTES	PARTS BY VOLUME H_2 GAS EVOLVED AT S.T.P.
1	0.9
5	1.2
10	1.4
20	2.0
60	4.8
95	6.3
120	6.7
200	7.5
240	7.8
270	8.0
340	8.4
400	8.5
500	8.7

DOCKET NO. 50-245

ATTACHMENT 2

MILLSTONE NUCLEAR POWER STATION, UNIT NO. 1

ADDITIONAL INFORMATION FIRE PROTECTION

506 068

JULY, 1979

NRC - SER ITEM 3.2.1

SMOKE DETECTION SYSTEM TESTS

NRC CONCERN

The licensee is evaluating a method to conduct in-situ tests with a suitable smoke generation device to verify that a fire would be promptly detected by installed smoke detectors and that ventilation air flow patterns in the area do not significantly reduce or prevent detection response. Bench tests will be conducted to verify that smoke detectors will provide prompt response and have adequate sensitivity to the products of combustion for the combustibles in the area where smoke detectors are installed. If any fire detection systems are found to be inadequate, appropriate modifications will be made to provide adequate performance (4.2).

RESPONSE

NNECO has been actively involved in researching and investigating a method of in-situ testing for the operating plants. Various concepts have been reviewed/analyzed and it appears that NUTECH has developed an in-situ testing technique which merits further investigation. NUTECH's concept of in-situ testing was demonstrated and discussed with the NRC Staff in a meeting in Bethesda on June 21, 1979.

NNECO has evaluated NUTECH's concept of in-situ testing and concludes that although some of NUTECH's concepts have advanced the state-of-the-art, more testing or qualification is appropriate to provide assurance of an acceptable test. Several utilities and NUTECH are now considering sponsoring a prototype test program to qualify NUTECH's technique. The results of this testing would be useful in determining the acceptability of NUTECH's concept/technique.

NNECO will continue to evaluate methods of conducting a useful, acceptable in-situ test of existing detection systems. In the interim, it remains NNECO's position that a demonstrated, reliable method of conducting in-situ tests of smoke detectors is not currently available. The completed or in-progress fire protection modifications including extensive fire detection and suppression provide adequate assurance that postulated fires would be dealt with promptly. This assurance is enhanced by the consideration given to fire loadings, products of combustion, and ventilation paths in the installation of fire detection equipment.

NRC - SER ITEM 3.2.2

FIRE HOSE STATION EVALUATION

NRC CONCERN

Hose stations will be verified to be capable of supp' ing a pressure of 65 psig at the nozzle under flowing conditions. Larger pipe sizes will be provided if required to provide a hose nozzle pressure to ensure adequate hose stream throw (4.3.1.d)(5.3).

RESPONSE

An evaluation of Millstone Unit No. 1 hose stations was conducted to determine if NRC Staff's minimum requirements of 65 psig is available at the hose station nozzle under flowing conditions.

The hose stations selected for this evaluation were H.S-44 and H.S-45 as shown on attached sketch. Please note that the location of the hose stations selected is the 108'6" level of the reactor building. The reason for this selection is that the 108' level represents the most sever conditions from a pressure consideration. Hose station #43 is also located at this level but was not pressure tested. This hose station is being relocated on the stairwell area for better coverage and, therefore, new pipe size and length will be provided to exceed the required pressure.

The actual pressure test performed for the noted hose stations was conducted as follows:

(1) The Millstone Unit No. 2 electric pump was manually started.

(2) Static pressure was recorded at both hose stations.

(3) Residual pressure was recorded with gage at hose station.

(4) Residual pressure was recorded with gage at nozzle outlet.

(5) Both hose stations contained 100' of 1-1/2" rubber-lined hose.

(6) Spray nozzles were adjustable fog spray nozzles as specified by NRC.

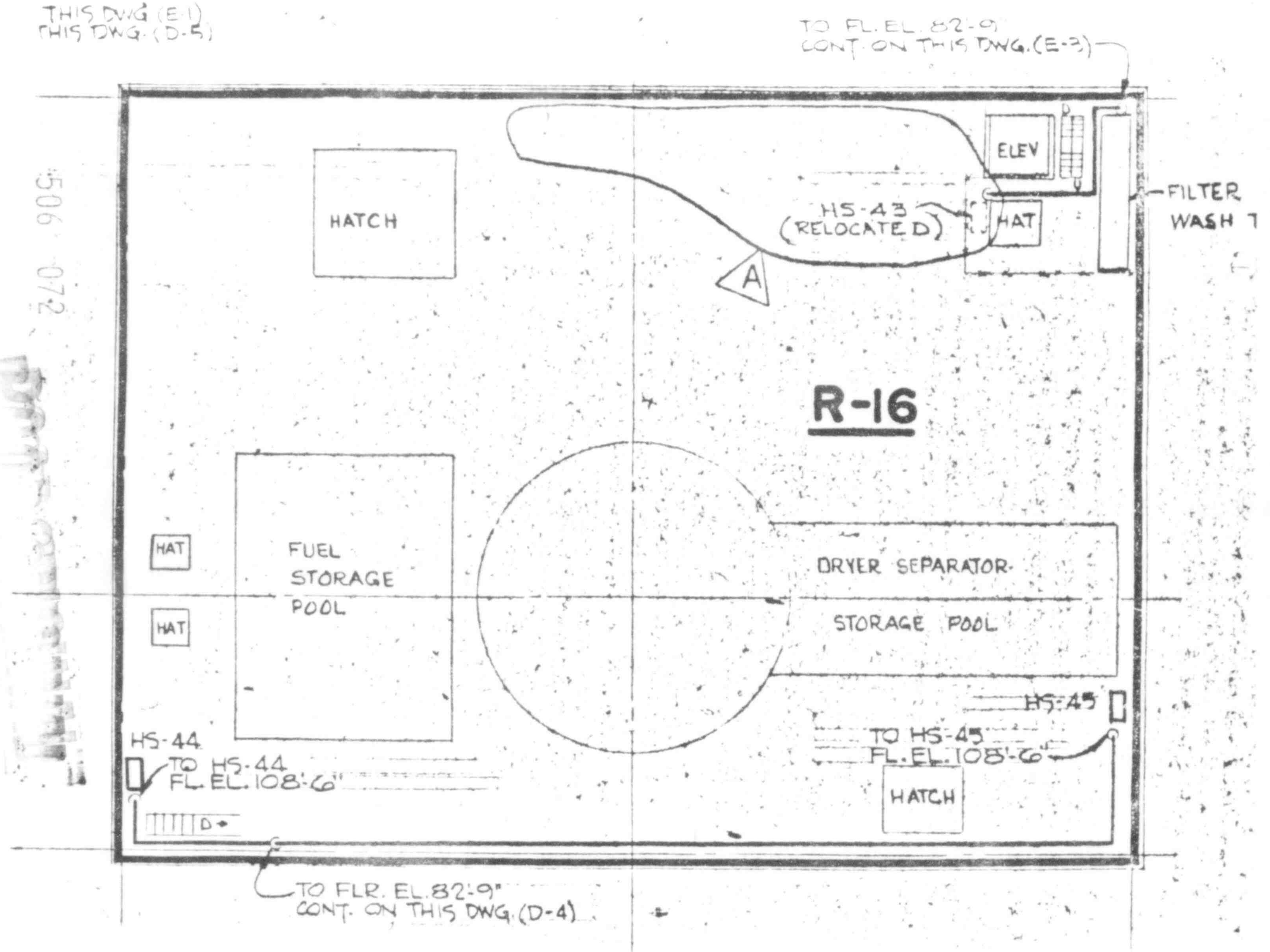
(7) Pipe lengths and number/type of fittings from stand pipe riser to hose station was recorded.

The results of the hose station pressure test were as follows.

506 070

	Static Pressure	Residual Pres. Gage at H.S.	Residual Pres. Gage at Nozzle	Pipe Length to Riser	No. of Fittings
H.S. #44	92 psig	78 psig	72 psig	32 ft.	7-90° elbows
H.S. #45	92 psig	70 psig	65 psig	132 ft.	7-90° elbows 1-45° elbow

Based on the actual test data documented above, Millstone Unit No. 1 concludes that their stand pipe hose station system complies with NRC's minimum requirements of 65 psig at hose station nozzle under flowing conditions.


THIS DWG (E-1)
THIS DWG. (D-5)
TO FL. EL. 82'-9
CONT. ON THIS DWG. (E-3)
ELEV
HATCH
HS-43
(RELOCATED)
HAT
FILTER
WASH T
A
R-16
HAT
HAT
FUEL
STORAGE
POOL
DRYER SEPARATOR
STORAGE POOL
HS-45
TO HS-45
FL. EL. 108'-6"
HS-44
TO HS-44
FL. EL. 108'-6"
HATCH
D
TO FLR. EL. 82'-9"
CONT. ON THIS DWG. (D-4)

DOCKET NO. 50-336

ATTACHMENT 3

MILLSTONE NUCLEAR POWER STATION, UNIT NO. 2

ADDITIONAL INFORMATION FIRE PROTECTION

506 073

JULY, 1979

NRC - SER ITEM 3.2.1

CABLE SPREADING AREA

NRC CONCERN

The licensee will conduct an evaluation to determine a suitable method to provide isolation, separation, or protection of redundant safety-related cables in the cable spreading area (4.1), (5.2).

RESPONSE

An evaluation of the Millstone Unit No. 2 cable spreading area has been completed and corrective action will be implemented as defined below. The intent of the evaluation was to:

(1) Determine the extent of existing physical separation between redundant cables of safety-related facilities.

(2) Determine the adequacy of existing safety-related cable separation based upon comparisons between all of the following:

   (a) Original plant design cable separation criteria.

   (b) The extent of accessibility into the various areas of the cable vault for manual fire fighting and personnel safety.

   (c) Existing methods of suppression and detection.

   (d) Cable raceway separation and density combinations known to be acceptable to NRC as a result of their recent fire protection inspections of the Millstone Unit No. 2 cable vault.

   (e) Cable type - IEEE 383, thermoset jacket, etc.

(3) Recommend corrective actions where necessary to assure that a fire would not involve redundant safety-related systems.

In order to accurately evaluate the Millstone Unit No. 2 cable spreading area, the area was sectionalized to account for varying degrees of cable raceway densities. The following represents our findings and recommendations on a section-by-section basis.

(1) Section: Column 15, 16/A, E5
Cable Vault, Turbine Area Elevation 25'

Design Features

This section contains the west entrance to the cable vault, risers to upper switchgear room cable vaults, and a 12" thick floor to ceiling reinforced block fire wall separating Z1 and Z2 facilities. Accessibility for manual fire fighting is adequate.

506 074

This area contains Z1 conduits Z17930-1 and Z17383-1 routed along colume E3 just above facility Z2 cable trays containing redundant HVAC cables.

Recommendation

Fire retardant barriers will be installed to separate the two facilities.

(2) Section: Column 15, 18.9/E5, F8
Cable Vault Area 6 and West Penetration Area Elevation 25'

Design Features

This section contains light to moderate cable raceway density and is accessible through the west cable vault entrance.

There are three locations where Z1 facility conduits or trays crossover Z2 cable trays. In each case, the degree of physical separation is in accordance with the original plant design separation criteria which is 4 ft. vertical, or enclosed raceway and 18" horizontal. In addition, all the cables within these trays have been inventoried and there are no redundant cables in the trays involved in the crossover.

Recommendation

None.

(3) Section: Column 15, 17.2/F8, L5
Cable Vault Area 7, Elevation 25'

Design Features

This section of the Millstone Unit No. 2 cable vault is located just beneath the main control panels and contains the plant's largest concentration of cable raceways. Approximately 94% of the 1,350 safety-related cables located in this area are control and instrument cables serving the vital plant equipment normally controlled from the control room. The remaining 6% is LV power cable that primarily supplies control room functions. Access into this area is via the east entrance to the cable vault.

There are extremely high cable concentrations combined with nearly total inaccessibility (stacks of cable trays obstructing east entrance to this area) thus requiring an absolute reliance on early detection and operation of the fixed manual deluge system to mitigate fire.

The location, quantity, and cable type involved in crossovers within this area is presently being researched.

Recommendation

A wet pipe automatic sprinkler system will be installed to protect this entire 90 ft. x 60 ft. area. (Represents 38% of cable vault.) The system design will have branch lines extending down from the ceiling and spray perpendicular to the tray edges. This new system should be independent of the existing cable vault deluge system header. Inherently, it will provide an additional measure of detection and alarm through fusible links and water flow alarm.

Fire retardant barriers will be installed if and where required to separate redundant facilities. This would be an additional measure used in conjunction with the proposed sprinkler system which in itself provides protection against loss of redundant cabling within this area.

(4) Section: Column 15.9, 18.9/L5, M7
Cable Vault Area 7 and East Penetration Area

Design Features

This section contains primarily Z1, Z3 and facility 1 raceways. There are no redundant facility crossovers in this area, and this area is readily accessible via the east entrance to the cable vault.

Recommendation

None.

NRC - SER ITEM 3.2.2

PROTECTION OF REDUNDANT CABLE TRAYS

NRC CONCERN

The consequences of fire damage to systems required for safe shutdown will be determined where the physical separation of cables in the auxiliary building may not preclude damage to redundant safety-related systems. Fire retardant coatings, automatic sprinkler, suitable fire barriers, or early warning detection will be provided to assure that fire damage does not result in a loss of shutdown capability where prompt action is not taken to suppress fires in these areas (5.2), (5.8).

RESPONSE

An evaluation of the Millstone Unit No. 2 auxiliary building has been completed and corrective action will be implemented as defined below. The intent of the evaluation was to:

(1) Determine the degree of existing physical separation between redundant cables of safety-related divisions.

(2) Determine the adequacy of existing cable separations (Paragraph 1 above) based upon original plant cable separation criteria and what is now known to be acceptable to NRC as a result of their recent fire protection inspection of Millstone Unit No. 2.

(3) Recommend corrective measures where necessary to assure that a fire would not involve redundant safety-related systems.

This evaluation was conducted in fire zones A-1A, A-1B, A-14, A-24, A-27B, and A-27D. The following represents our findings and recommendations on a zone-by-zone basis.

(1) Elevation 45', Zone 1A, Column F.8/H.2 and 16.6/17/2

Stack of three Z1 and three Z2 trays containing HPSI, LPSI, and other safety-related cables involved in crossover.

Recommendation

Ionization detectors placed just above the crossover as part of the general area detection system already proposed for this elevation plus the installation of an original plant design barrier to separate the two tray facilities.

(2) Elevation 45', Zone A-1A, Column F.8/H2 and 17.2/18.4

The same trays described in Paragraph 1 above running parallel to one another with three foot horizontal separation in accordance with IEEE-384.

506 077

Recommendation

Ionization detectors placed above tray stacks as part of the general area detection system already proposed for this elevation.

(3) Elevation 25', Zone A-9, Charging Pump Area

Stack of three Z1 trays containing charging pump cabling traversing entire zone.

Recommendation

Cable density is light, approximately five percent tray fill. The general area detection system recently proposed for this zone will provide adequate supervision.

(4) Elevation 5', Zone A-18, Column F.3/F.8 and 18.9/19.6, Pipe Penetration Room

HPSI, LPSI, and other safety-related Z2 facility conduits involved in crossover with Z1 facility trays.

Recommendation

Ionization detectors, possibly from Zone A25, will be installed above the Z1 trays at each of four Z2 conduit crossovers. In addition, original design barriers will be installed between Z1 tray and Z2 conduits at crossovers.

(5) Elevation 5', Zone A-14, Column F.8/H.2 and 18.1

Stack of three Z1 and four Z2 trays involved in crossover. Trays contain redundant containment spray stop MOV cables and other safety-related cables.

Recommendation

Ionization detectors, from proposed area detection system, will be installed at crossover plus original design barrier will be provided above Z14FK10.

(6) Elevation 5', Zone A-14, Column L.5/M.4 and 17.7

Stack of two Z1 and Z2 trays containing RWST cable and other safety-related cables involved in crossover.

Recommendation

Same as Paragraph 5 above. Barrier installed between Z14FL10 and Z26EE10 trays.

(7) Elevation 5', Zone A-14, Column M.4 and 17.8

Five Z1 conduits involved in crossover with two Z2 trays. Conduit Z1A488-1 and tray Z24FN10 contain redundant RWST cables.

Recommendation

Same as Paragraph 5. Barrier installed between upper tray and conduits.

(8) Elevation 14'6", Zone A-27D, Column M.7 and 18.9/20.0

Tray Z25BR20 crossing between trays Z14LB10 and Z15GA20 containing redundant enclosure building filtration cables and other safety-related cables.

Recommendation

Provide general area ionization detection system with additional detectors located at tray crossover. Also, barrier installed separating the Z2 tray from both Z1 trays similar to barrier detail in Paragraph 5.

(9) Elevation +14'6", Zone A-24, Column H.2/H.4 and 17.1/17.5

Stack of five trays (three Z1 and two facility) running parallel with and then crossing over a stack of facility Z2 trays containing redundant enclosure building and other vital area cooling fans.

Recommendation

Install general area detection system for Zone A-24 with detectors located at tray crossovers and where the two tray stacks run parallel with one another. Install original design barrier at crossovers.

(10) Elevation - 14'6", Zone A-24, Column F.8/H.2 and 17.4

Tray Z12PC10 containing diesel generator feed to bus 24C involved in crossover with stack of Z2 trays.

Recommendation

Same as Paragraph 9. Install barrier just below Z12PC10 and 11CA10 and above Z25BB20.

NRC - SER ITEM 3.2.3

SMOKE DETECTION SYSTEM TESTS

NRC CONCERN

The licensee is evaluating a method to conduct in-situ tests with a suitable smoke generation device to verify that a fire would be promptly detected by installed smoke detectors and that ventilation air flow patterns in the area do not significantly reduce or prevent detection response. Bench tests will be conducted to verify that smoke detectors will provide prompt response and have adequate sensitivity to the products of combustion for the combustibles in the area where smoke detectors are installed. If any fire detection systems are found to be inadequate, appropriate modifications will be made to provide adequate performance (4.2).

RESPONSE

NNECO has been actively involved in researching and investigating a method of in-situ testing for the operating plants. Various concepts have been reviewed/analyzed and it appears that NUTECH has developed an in-situ testing technique which merits further investigation. NUTECH's concept of in-situ testing was demonstrated and discussed with the NRC Staff in a meeting in Bethesda on June 21, 1979.

NNECO has evaluated NUTECH's concept of in-situ testing and concludes that although some of NUTECH's concepts have advanced the state-of-the-art, more testing or qualification is appropriate to provide assurance of an acceptable test. Several utilities and NUTECH are now considering sponsoring a prototype test program to qualify NUTECH's technique. The results of this testing would be useful in determining the acceptability of NUTECH's concept/technique.

NNECO will continue to evaluate methods of conducting a useful, acceptable in-situ test of existing detection systems. In the interim, it remains NNECO's position that a demonstrated, reliable method of conducting in-situ tests of smoke detectors is not currently available. The completed or in-progress fire protection modifications including extensive fire detection and suppression provide adequate assurance that postulated fires would be dealt with promptly. This assurance is enhanced by the consideration given to fire loadings, products of combustion, and ventilation paths in the installation of fire detection equipment.

NRC - SER ITEM 3.2.4

CABLE FIRE BARRIER PENETRATIONS TEST DATA

NRC CONCERN

Test data will be provided to demonstrate the adequacy of electrical cable fire barrier penetrations.

RESPONSE

All cable penetrations sealed at Millstone Unit No. 2 have been sealed using Dow Corning Q3-6548 medium density Silicone RTV Foam. The penetration and installer, Insulation Consultant & Management Services, Incorporated (ICMS), certifies the materials used to the ASTM E119-73 Fire Ensurance Test. This test is described in the Dow Corning "New Product Information" document transmitted in Attachment (1). Actual fill depths reflect raceway type, percent obstruction, and area served.

There have been several other subsequently completed ASTM E119 tests using the Dow Corning penetration seal material among which are the Dow Corning and Chemtrol test, Factory Mutual No. 26543 (4610) dated October 28, 1975 and the Dow Corning and ICMS test, Factory Mutual No. OROQ3 AM (4610) dated May 18, 1977.

NRC - SER ITEM 3.2.5

PRIMARY COOLANT PUMP LUBE OIL FIRE HAZARD

NRC CONCERN

The licensee is evaluating a method of oil collection or routing to prevent the spread of oil or the use of alternative types of lubricants to reduce the fire hazards associated with the reactor coolant pump lube oil systems (5.10).

RESPONSE

An evaluation was performed to determine a method of RCP lube oil collection and/or rerouting or the use of synthetic fire retardant oil to minimize fire exposure inside containment. The results of this evaluation indicated that the use of fire retardant lubricating oil is not considered practical at this time.

The type of oil collection and/or rerouting of RCP lube oil will consist of a main drip pan arrangement with a supplemental lift pump/oil cooler drip pan. The primary purpose of the drip pan system is to collect oil from all exterior leakage points (i.e., mechanical connections) around the RCP and route it to an acceptable tank storage area which will be located at the base of the RCP supports.

The RCP oil collection system will be handled as a field design and installation rather than a predesigned unit. The following general design/installation guidelines will be used:

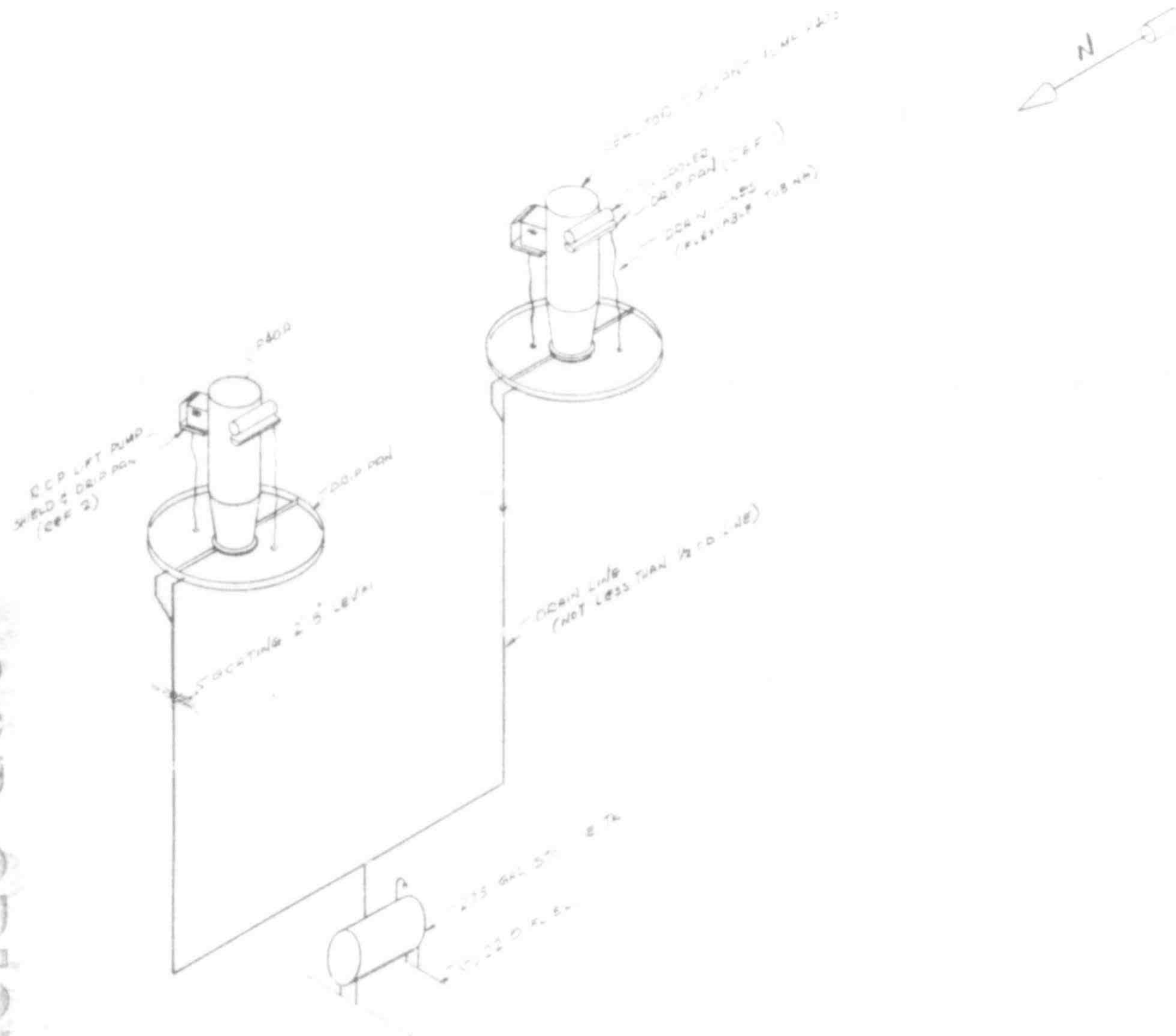
(1) A drip pan with a 3" lip (minimum) will be installed around the base of the RCP motor top hat area. The drip pan will extend radially to the exterior location of potential leakage points such as the upper oil cooler lower reservoir oil level transmitter, and the high pressure lube oil system.

(2) A deflection box/shield will be installed around the high pressure lube oil system to direct high pressure leakage to the drip pan.

(3) Two one-half inch holes will be provided at either the bottom of the lip or in the base plate at the lowest elevation of the drip pan. One-half inch tubing will be run from the drain holes to the storage tank.

(4) The one-half inch drain lines to the tank storage area will be tested after field installation to ensure that they are not clogged with debris.

An isometric sketch (SK-REB-531) is provided which illustrates the conceptual design for the system. This drawing is preliminary and final design will be established at time of installation. Installation is scheduled for the 1980 refueling outage.



REFERENCES
1. 25203-24070 SH 2 REACTOR COOLANT PUMP OIL SHIELD & DRIP PAN
2. 25203-24070 SH 1 REACTOR COOLANT PUMP OIL SHIELD & DRIP PAN

NOTE-1
C.C.P. P40C & D
SIMILAR BUT OPPOSITE HAND

NORTHEAST UTILITIES SERVICE CO
FOR MILLSTONE UNIT 2
TITLE REACTOR COOLANT PUMPS OIL COLLECTION SYSTEM
SCALE NONE
SK-REB-531

REVISIONS DURING CONSTRUCTION

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