Consumers Power Company

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April 5, 1982

Harold R Denton, Director
Office of Nuclear Reactor Regulation
Division of Licensing
US Nuclear Regulatory Commission
Washington, DC 20555

MIDLAND PROJECT
DOCKET NOS 50-329, 50-330
RESOLUTION OF NRC CONCERNS RELATED TO
THE STAFFS SAFETY EVALUATION REVIEW
OF THE MIDLAND FIRE PROTECTION PROGRAM
FILE B9.5.1, 0485.11 SERIAL 16795

REFERENCE: OCTOBER 7, 1981 MEETING SUMMARY
FORWARDED BY NRC CORRESPONDENCE
OF OCTOBER 27, 1981

ENCLOSURE: RESOLUTION OF NRC STAFF CONCERNS
ON THE MIDLAND FIRE PROTECTION PROGRAM

On October 7, 1981, a meeting was held with the NRC Staff to discuss several aspects of the Midland Fire Protection Program. During the discussion at this meeting, several NRC concerns were identified by the Staff and were documented by the NRC's meeting summary transmitted by the referenced NRC correspondence. Subsequent to this meeting additional Staff concerns were identified for us resulting from the NRC's safety evaluation review effort.

In response to these Staff concerns we are forwarding the enclosed document which addresses these items and provides information to clarify the Midland FSAR Subsection 9.5.1 and Appendix 9A description of certain Midland fire protection features. The information enclosed represents: (1) a distillation of information already contained in the Midland FSAR or transmitted by separate correspondence; (2) additional details which supplements that in the FSAR; and (3) commitments to design changes which have been made but which are not yet reflected in the FSAR. Design changes identified in the enclosed document will be incorporated into a subsequent revision of the Midland FSAR. We believe that the enclosed information should resolve each item of concern.

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The present plant construction schedule will allow a plant fire protection confirmatory walkdown by the NRC to be performed anytime after June 1, 1981. On June 1, 1982 the milestone of 90% overall cable installation will be reached and we continue to believe that an early walkdown would be beneficial to the licensing process.

Consumers Power believes that the enclosed responses to NRC concerns, combined with the forthcoming meeting with the Staff on the afternoon of April 5, 1982, should serve to resolve all remaining concerns identified by the Staff during their safety evaluation review of the Midland Fire Protection Program.

JA Mooney

J A Mooney
Executive Manager

For: J W Cook

JWC/JAM/RLT/RAP/jlh

CC RJCook, Midland Resident Inspector (w/o att)
RWHuston, Washington (w/att)
RWHernan, NRC (w/att) (2)
REberly, NRC (w/att)

RESOLUTION OF NRC STAFF CONCERNS OF THE MIDLAND FIRE PROTECTION PROGRAM

MIDLAND UNITS 1 AND 2
DOCKET NO 50-329 AND 50-330
CONSUMERS POWER COMPANY

APRIL 2, 1982

RESOLUTION OF NRC STAFF CONCERNS
ON THE MIDLAND FIRE PROTECTION PROGRAM

MIDLAND UNITS 1 AND 2

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MIDLAND PLANT UNITS 1 & 2

Resolution of NRC Staff Concerns On The Midland Fire Protection Program

The information contained within the following text is being provided to clarify the Midland FSAR Subsection 9.5.1 and Appendix 9A description of certain Midland fire protection features to resolve NRC Staff concerns on the Midland fire protection program. In addition, commitments to several design changes are described in this position paper to meet Appendix R guidelines and resolve NRC concerns. These design changes will be incorporated in a subsequent issue of the Midland FSAR. The issues discussed herein are as follows:

1. Supervision of sectional and control valves and the isolation of fire hydrants.

2. Providing additional manual fire hose stations to ensure coverage of areas containing safety-related equipment.

3. Use of CO_2 hose reel stations.

4. Layout of automatic fire detection for areas containing safety-related equipment.

5. Upgrade of fire barriers in certain fire areas.

6. Providing protection of cable tray supports.

7. Separation of the main control room from peripheral rooms by one-hour fire-rated barriers.

8. Request for a total flooding Halon system in the concealed ceiling of the control room.

9. Flow restriction valve in the hydrogen supply system.

10. Fire protection features for the main control instrument rack room.

11. Fire protection features for the auxiliary shutdown panel room.

12. Commitment to meet the technical requirements of Appendix R to 10 CFR 50 or provide equivalent protection.

The information in this discussion is provided with at least a level of detail equivalent to that required in an FSAR and represents a distillation of information already contained in the Midland FSAR or transmitted by separate docketed correspondence and additional details to supplement that in the FSAR. The only exceptions to this are recent design changes, initiated to resolve

NRC concerns, which have not yet been incorporated into the Midland FSAR as commitments.

Supervision of Sectional and Control Valves and Hydrant Isolation

A. NRC Staff Concern

1. The staff will require all sectional and control valves in the fire protection water supply system to be electrically supervised with alarms in the control room or locked open and under a management supervisory program with start key control and periodic visual checks of the valves.

2. Isolation of outside hydrants should not interrupt the water supply to automatic and/or manual fire suppression for any area containing safety-related equipment and/or cable.

B. Midland Plant FSAR Commitment

1. All fire protection system valves and maintenance are controlled administratively. Periodic inspection and checking will be performed and documented on a check list.

2. Approved visual indicating sectional control valves (PIV) are provided to isolate portions of the fire main for maintenance or repair. Any portion of the underground yard fire main can be isolated and primary or secondary fire protection water can be provided to each area containing shutdown and other safety-related equipment.

C. References

1. Midland Plant FSAR Appendix 9A References:

   a. Subsection 9A.1.9, entitled "Fire Protection System Description."

   b. Subsection 9.A.3.E, Part 2a, entitled "Fire Protection Water Supply Systems."

   c. Subsection 9A.3.E, Part 3b, entitled "Water Sprinklers and Hose Standpipe Systems."

   d. FSAR Figure 9A-29, "Yardwork - Plant Area, Fire Protection System."

   e. FSAR Figure 9A-30, Sheets 1, 2, 3 and 4, "Fire Protection P&ID."

2. Letter from J W Cook to H R Denton, dated December 14, 1981, Consumers Power Company Serial 15105, transmitting "Appendix R Comparison - Midland Units 1 and 2." See Section III.B, "Sectional Isolation Valves," and Section III.C, "Hydrant Isolation Valves."

D. Discussion

1. Description of Valve Supervision

Valves that have electrical supervision will alarm into the control room. Supervision is provided by limit switches installed on the valve stems. When the valve position is moved, the limit switch contacts close sending a signal to the control room. Electrical circuitry is Class B. The signals are sent via the plant's security/fire protection system circuitry.

All other control valves to safety-related equipment are locked in the open position and administratively controlled.

2. Description of Hydrant Isolation

Any hydrant may be isolated from the fire protection water system without impairing the fire protection water supply protecting safety-related systems. An adequate number of sectional control valves have been installed to allow this.

To isolate a hydrant, the two closest sectional control valves will be closed. This may also isolate either the hose standpipe or sprinkler system protecting safety-related equipment. It will not isolate both these water systems. Sprinklers and/or hose streams will always be available to protect safety-related systems.

Primary and secondary fire protection water systems entering plant areas, come from different sections of the underground water header. Any two successive sectional control valves can be closed without interrupting both the primary and the secondary water systems entering the plant.

During the October 7, 1981 meeting, the NRC Staff identified that manual fire suppression was isolated to the Diesel Generator Building and Service Water Building occured when certain hydrants were isolated. To resolve the problem with the Diesel Generator Building a hose station outside the Turbine Building (Column Line 5 and Column Line Q) has been added. For the service water structure, a new PIV was added to isolate the hydrant outside the service water structure (see FSAR Figure 9A-30, Sht 2). In addition a hose reel was added inside the service water structure. The water supply for this new hose reel is upstream of the new PIV, thus manual fire suppression to the service water structure cannot be isolated.

Manual Fire Suppression Hose Stations

A. NRC Staff Concern

Manual hose stations are not located throughout the plant to ensure that an effective hose stream can be directed to safety-related areas in the plant. For proper coverage of all areas containing safety-related equipment, the Staff will require additional hose stations in the following areas:

1. Auxiliary Building

   a. Elevation 574' to 614'
      Pipeway - Fire Area 7
      Pipeway - Fire Area 9
      Pipeway - Fire Area 10

   b. Elevation 659'
      Emergency fuel pool air handling unit room.

   c. Elevation 685'
      Control room air handling unit room.

2. Diesel Generator Building
   Elevation 634' and 664'
   Floor Area - Fire Area 87
   Floor Area - Fire Area 88

3. Service Water Pump Structure
   Elevation 634' - 6"
   Floor Area - Fire Area 95
   Floor Area - Fire Area 95A
   Floor Area - Fire Area 95B
   Floor Area - Fire Area 95C

B. Midland Plant FSAR Commitment

Interior manual hose installations are capable of reaching any location in the plant, for which access is provided, with at least one effective hose stream. To accomplish this, each hose standpipe is equipped with either 75 feet or 100 feet of 1-1/2 inch woven jacket lined fire hose with adjustable spray nozzles.

C. References

1. Midland Plant FSAR Appendix 9A References:

   a. Section 9A.2, entitled "Fire Area Analysis", description of Fire Area 9, Unit 1 Pipeway, and description of Fire Area 10, Unit 2 Pipeway.

b. Subsection 9A.3.E, Part 3(d), entitled "Water Sprinklers and Hose Standpipe Systems."

c. FSAR Figure 9A-4, "Fire Protection - Reactor and Auxiliary Buildings Plan at Elevation 568'-0"."

d. FSAR Figure 9A-5, "Fire Protection - Reactor and Auxiliary Buildings Plan at Elevation 584'-0"."

e. FSAR Figure 9A-6, "Fire Protection - Reactor and Auxiliary Building Plan at Elevation 599'-0"."

2. Figure 1, Auxiliary Building Unit 2 Pipeway Sections, Fire Area 10.

D. Discussion

The Midland Plant FSAR commitment states that interior manual hose installations are capable of reaching any location in the plant for which access is provided with at least one effective hose steam.

During the October 7, 1981 meeting between the NRC Staff and Consumers Power representatives, certain areas of the plant were discussed which could not be easily reached with a manual hose reel. As a result, we initiated a review of all fire areas related to the effectiveness of using manual hoses within the Midland Plant.

To meet the commitments made in the FSAR, it was decided that additional hose reels would have to be added to the plant. These were added in the following locations:

A. Service Water Structure
B. Outside the Turbine Building near the Diesel Generators
C. Within the Control Room Complex on Elevation 659'-0"

In addition, in several other areas of the plant the existing 75-foot long hoses will be changed to 100-foot hose lengths.

Even after these changes had been made, it was evident that certain portions of Fire Areas 9, 10 and 12 could not be easily reached with an effective manual hose stream. The draft FSAR Figure 9A-5 is a plan view at elevation 584'-0" of the Auxiliary Building. Fire Area 9 is located west of Column Line 5.4, between Column Lines F and G. Fire Area 10 is located east of Column Line 7.4, between Column Lines F and G. Fire Area 12 is located between Column Lines 5.6 and 7.4 and between Column Lines A and B.

1. Fire Areas 9 and 10

Fire Areas 9 and 10 are the Unit 1 and Unit 2 pipe gallery. As can be seen in the draft FSAR Figure 9A-5, each of these fire areas are divided by a wall into a north and south portion. Figure 1 of this

report is an elevation view of Fire Areas 8, 10, and 10A. Fire Areas 7, 9 and 9A are a mirrored image of this figure. Fire Areas 9 and 10 extend from elevation 574'-0" to elevation 634'-0". The nearest hose reel to Fire Areas 9 and 10 is located 12' north of Column Line H and 12' east of Column Line 7.4, and is labeled "Hose Reel No 2."

a. Access to Fire Area 10

Access to the south portion of Fire Area 10 for manual fire fighting is through Fire Area 10A. Hose Reel No 2 has sufficient length to be used in the southern portion of Fire Area 10 and provide an effective manual hose stream. Due to the verticle wall in the center of the pipe gallery, the northern portion of Fire Area 10 cannot be accessed through this area.

To provide a manual hose stream to Fire Area 10-north, access must be obtained from elevation 614'-0" through Fire Area 8. Draft FSAR Figure 9A-7, plan view of Auxiliary Building at elevation 614'-0", shows Hose Reel No 21 located on Column Line 6.9 and Column Line C. Using this hose reel Fire Area 10-north can be reached through Fire Area 8. The floor separating Fire Area 8 from Fire Area 10 is a grating floor and can be removed to provide access. Therefore, manual fire suppression can be provided for Fire Area 10 even though this area is not readily accessible.

As discussed in the Midland FSAR discription of Fire Area 10, no exposed combustibles exist in Fire Area 10. Also, an area smoke detector system is provided in the unlikely event a fire should occur. As can be seen in Part E of this section (Safety-Related Equipment in Fire Area 9 and 10), the effect of a fire in this area would not prevent safe shutdown of the plant. The safety-related equipment within this area is redundant to equipment located in othe fire areas. Based on this information, we believe that no additional fire protection is needed for Fire Area 10.

b. Access to Fire Area 9

Fire Area 9 is a mirror image of Fire Area 10. The difference is in the location of the fire hoses. Using Hose Reel No 2, access to Fire Area 9-south is through Fire Area 9A. As measured in the plant, it is approximately 98' to the opening in the wall between Fire Area 9A and 9 south. Therefore, manual fire suppression can be provided for Fire Area 9, even though this area is not readily accessible.

Access to Fire Area 9-north is provided through Fire Area 7 at elevation 614'-0". Using Hose Reel No 21, as shown on draft FSAR Figure 9A-7, Fire Area 9-north is reached through the grating in Fire Area 7 at elevation 614'-0". Therefore, manual fire suppression can be provided for Fire Area 10, even though this area is not readily accessible.

As discussed in the Midland FSAR description of Fire Area 9, no exposed combustibles exist in Fire Area 9. Also, an area smoke detection system is provided in the unlikely event a fire should occur. As can be seen in Part E below, the effect of a fire in this area would not prevent the safe shutdown of the plant. The safety-related equipment within this area is redundant to equipment located in other fire areas. Based on this information, we believe that no additional fire protection is needed in Fire Area 9.

2. Fire Area 12

One portion of Fire Area 12 cannot be easily reached by a manual hose. As can be seen in draft FSAR Figure 9A-6, Fire Area 12 (located on the north end of the plant) is separated into three sections. Routed through both the east and west sections is Channel A safety-related cables. Located in the central section are only nonsafety-related cables and equipment. Due to the method of access to these tank rooms, the center tank room cannot be reached with a 100 foot manual fire hose. Since this area contains no safety-related components, additional fire suppression was unnecessary.

Due to the features of these fire areas, we believe that the intent of the Midland FSAR commitment to providing an effective manual hose stream to all areas of the plant has been met.

E. Safety-related Equipment in Fire Areas 9 and 10

1. The following is a list of safety-related equipment in Fire Area 9:

   a. Channel A, Isolation Valve 1MO-3870A for the Auxiliary Feedwater System to feed Steam Generator 1E-51B.

   b. Channel B, Isolation Valve 1MO-3865B for the Auxiliary Feedwater System to feed Steam Generator 1E-51B.

   c. Valve 1MO-3126 turbine gland seal feed valve to Channel B turbine driven auxiliary feedwater pump.

2. The following is a list of safety-related cables in Fire Area 9:

   a. Channel A, Safety-Related Cables for Steam Generator Auxiliary Feedwater Isolation Valve 1MO-3870A.

   b. Channel B, Safety-Related Cables

      1. Cable for Makeup Pump 1P-58B.

      2. Cables for High Pressure Injection Valve 1MO-0341C.

      3. Cables for High Pressure Injection Valve 1MO-0341D.

4. Cables for Steam Generator Auxiliary Feedwater Isolation Valve 1MO-3870B.

5. Cables for Steam Generator Auxiliary Feedwater Isolation Valve 1MO-3865B.

6. Cables for Auxiliary Feedwater Turbine 2G05 Governor Valve 2SCV-3831.

7. Cables for CCW Header Pressure Instrument 2PT-71612B.

3. The following is a list of safety-related equipment in Fire Area 10:

a. Channel A, Isolation Valve 2MO-3970A for the Auxiliary Feedwater System to feed Steam Generator 2E-51B.

b. Channel B Isolation Valve 2MO-3965B for the Auxiliary Feedwater System to feed Steam Generator 2E-51B.

c. Valve 2MO-3226 to provide steam flow to Channel B turbine driven auxiliary feedwater pump.

4. The following is a list of safety-related cables in Fire Area 10:

a. Channel A Safety-Related Cables for Steam Generator Auxiliary Feedwater Isolation Valve 2MO-3970A.

b. Channel B Safety-Related Cables

1. Cable for Makeup Pump 2P-58B.

2. Cables for High Pressure Injection Valve 2MO-0441C.

3. Cables for High Pressure Injection Valve 2MO-0441D.

4. Cables for Steam Generator Auxiliary Feedwater Isolation Valve 2MO-3970B.

5. Cables for Steam Generator Auxiliary Feedwater Isolation Valve 2MO-3965B.

6. Cables for Auxiliary Feedwater Turbine 2G05 Governor Valve 2SCV-3931.

7. Cables for CCW Header Pressure Instrument 2PT-1712B.

Use of CO_2 Hose Reels

A. Discussion

A number of references have been made concerning the use of CO_2 hose reels. The Midland Plant does not have any CO_2 hose reels.

Additional Automatic Fire Detection For Safety-related Equipment Areas

A. NRC Staff Concern

The applicant has provided automatic fire detection only in certain areas containing safety-related equipment. To meet the guidelines of Section E.1 of Appendix A to BTP ASB 9.5-1, the staff requires the applicant to provide automatic fire detection in all areas containing safety-related equipment.

B. Midland Plant FSAR Commitment

The selection and placement of fire detection alarm devices is based on the configuration and occupancy of the area together with air-flow patterns due to natural or mechanical ventilation. In addition, each area was analysed to determine whether safety-related components exist within the area. Based on the results of such studies, the detector layout at Midland is shown on the fire area drawings and discussed in FSAR Section 9A-2.

C. References

1. Midland Plant FSAR Appendix 9A References:

   a. Subsection 9A.1.9.2 entitled, "Component Description."

   b. Section 9A.2, entitled "Fire Area Analysis."

   c. FSAR Figures attached to Appendix 9A showing location of detectors which include all fire protection drawings of the Reactor and Auxiliary Building plans, Turbine Building plans, Service Water Structure plans and Diesel Generator Building plans.

   d. Subsection 9A.3.E, Part 1, entitled "Fire Detection."

2. NRC letter to Consumers Power transmitting the October 7, 1981 meeting summary between the NRC Staff and Consumers Power representatives.

3. Table 1, Detectors Added to Safety-Related Equipment Areas.

4. Draft FSAR figures providing the position and location of detectors in the Midland Plant.

D. Discussion

During the October 7, 1981 meeting between the NRC Staff and Consumers Power representatives, the NRC advised that fire detection is required in all areas containing at least one channel of safety-related systems or components. We were also advised at this time that cabling was considered to be "safety-related equipment" by the NRC. Due to the clarification of this point, a re-evaluation of the placement of detectors in the Midland Plant was performed. The re-evaluation resulted in the addition of 64 new detectors. A list of the fire areas and location of new detectors is contained in Table 1 of this report. In addition, the plan view drawings of the plant showing the location of fire areas has been marked to indicate the location of all detectors in the Midland Plant. The new fire detection system will meet the guidelines of Section E.1 of Appendix A to BTP ASB 9.5-1 and other NRC guidance provided on the location of automatic fire detectors. These new detectors will be added to the appropriate FSAR figures in a subsequent revision.

Fire Barriers and Fire Barrier Penetrations

A. NRC Staff Concern

For fire areas that do not have a three-hour fire-rated assembly, each individual area was evaluated with respect to its fuel load, fire suppression and detection systems and proximity to safe shutdown equipment to determine if fire-rated assemblies provided are adequate for the areas affected and meet the guidelines of Section D.1.j of Appendix A to BTP ASB 9.5-1. Based on this evaluation, the Staff found a 1-1/2-hour fire barrier for these areas with two exceptions are acceptable. The Staff will require a three-hour fire-rated barrier be provided for the following areas due to the in-situ combustibles installed in these areas.

1. Pipe and cable chase Units 1 & 2 of the Auxiliary Building - Fire Areas 24 and 25, Elevation 593' to 634'-6".

2. Floor Area and Corridor of the Auxiliary Building - Fire Area 63,Elevation 646'-0".

B. Midland Plant FSAR Commitment

Midland has been evaluated for design basis fires as defined in FSAR Subsection 9A.1.2. This evaluation assumes that the postulated fire will involve the total heat energy which can be released due to combustion of all flammable material determined to be available within a fire area. A potential fire is considered to be of a maximum severity with the assumption that manual, automatic, and other fire fighting measures have not been initiated. The potential fire is also considered for fire intensity, effectiveness of fire protection, duration of fire, and effect on adjacent areas.

The type and quantity of in-situ combustible materials within a fire area were determined as follows. The total heat released (in BTU's) was taken from the heat of combustion for the number of pounds of combustibles. Cable in conduit was not considered for fire loading. The fire loading was determined by dividing the heat released, by the floor area of the fire area. The fire loading, in BTU/ft^2, is achieved through complete combustion of all combustible material within each fire area. The estimated fire severity was determined using Table 9A-1 of the Midland FSAR. Based on the fire severity, fire barrier ratings were determined.

C. References

1. Midland Plant FSAR Appendix 9A References:

   a. Subsection 9A.1.2, Part i, entitled "Evaluation Criteria."

   b. Subsection 9A.1.3, entitled "Fire Hazards Analysis."

   c. Section 9A.2, entitled "Fire Area Analyses," description of Fire Areas 24, 25 and 63.

   d. FSAR Figure 9A-6, "Fire Protection - Reactor and Auxiliary Buildings Plan at Elevation 599'-0"."

   e. FSAR Figure 9A-7, "Fire Protection - Reactor and Auxiliary Buildings Plan at Elevation 614'-0"."

   f. FSAR Figure 9A-9, "Fire Protection - Reactor and Auxiliary Buildings Plan at Elevation 646'-0"."

   g. FSAR Figure 9A-16, "Fire Protection - Auxiliary Building Section F-F."

   h. FSAR Figure 9A-24, "Fire Protection - Miscellaneous Plans and Details."

2. Figure 2, Auxiliary Building Floor Plan, Elevation 646'-0".

3. Figure 3, Auxiliary Building Unit 1 Tray Plan Elevation 645'-0".

4. Figure 4, Auxiliary Building Unit 2 Tray Plan Elevation 645'-0" Unit 2.

5. Figure 5, Pipe and Cable Chase Sprinkler Systems, Fire Areas 24 and 25.

D. Discussion on Fire Areas 24 and 25

1. Description

Fire Areas 24 and 25 are the pipe and cable chases for Unit 1 and 2, respectively. Each cable chase is located on the north end of the Auxiliary Building between Column Lines A and B. Fire Area 24 is located just east of Column Line 5.1 and Fire Area 25 is located just west of Column Line 7.9. Each cable chase is approximately 27'-6" long and 8'-6" wide. They extend from elevation 593'-0" to just below floor elevation 634'-6". Each of the pipe chases opens up onto floor elevation 624'-0". Further details on the layout and location of these pipe chases can be obtained from the figures referenced above which are attached to this report.

2. Safety-Related Equipment

The only safety-related equipment contained in Fire Area 24 are Channel A cables for Unit 1. The only safety-related equipment contained in Fire Area 25 are Channel A cables for Unit 2.

3. Fire Protection Features

Fire Areas 24 and 25 are surrounded by a two-hour rated fire barrier at all elevations, except 624'-0". An area smoke detection system is provided at the top of each of the cable chases. Also, a smoke detector is supplied in the return air duct from each of these fire areas. Fire suppression in these areas consists of automatic wet pipe sprinklers, portable extinguishers, and manual hoses with adjustable nozzles. For automatic wet pipe sprinklers in Fire Areas 24 and 25, refer to Figure 5 attached. In Fire Area 25, the total fire severity is two hours 56 minutes. For Fire Area 24, the total fire severity is one hour 51 minutes.

4. Dicusssion

For Fire Area 24 the total severity, assuming all combustibles are consumed, is approximately equal to the rating of the surrounding fire barrier. For Fire Area 25 the fire severity, should all combustibles be consumed, is approximately one hour in excess of the rating of that fire barrier. This assumes in both cases that no fire suppression occurs and that no manual action is taken. It also must be assumed that the automatic protection placed within these piping cable chases is not activated by the fire, otherwise, this fire severity would be much less than that assumed in FSAR Appendix 9A.

The walls of Fire Area 24 and 25 are constructed of concrete block and poured concrete below elevation 624'-0". All cable tray and conduit penetrations through the two-hour fire barrier will be sealed with three-hour rated penetration seals. Penetrations through the two-hour fire barrier by HVAC ductwork will have a fire damper with a three-

hour fire rating. Based upon the design already incorporated into the Fire Areas 24 and 25, and the fire loadings, all fire barriers below elevation 624'-0" will be upgraded to three-hour barriers.

The floor elevation 624'-0", onto which the cable chases of Fire Area 24 and 25 open, contains nonsafety equipment and the safety-related cables routed from the cable chases. All fire areas exterior to Fire Areas 24 and 25 between elevations 624'-0" and 634'-0" contain only nonsafety-related equipment. The floors at elevation 624'-0" and 634'-6" are two-hour rated fire barriers. The layout of this portion of the Auxiliary Building eliminates the necessity of fire rating the walls of these fire areas above 624'-0".

Due to the upgraded fire barriers in Fire Areas 24 and 25 below elevation 624'-0" and the equipment layout above elevation 624'-0" the guidelines of BTP APCSB 9.5-1 are met.

E. Fire Area 63

1. Description

Fire Area 63 is located in the Auxiliary Building on elevation 646'-0". The area shown in the dark outline on Figure 3 of this report is the boundary of Fire Area 63. It can be seen from this figure that this fire area encompasses most of elevation 646'-0" of the Auxiliary Building. Due to the location of walls within this fire area, it can be treated as two separate areas linked by a common corridor. The area to the east of the center line of the Auxiliary Building contains equipment and cabling for the A train chillers. The area to the west of the center line of the Auxiliary Building contains cabling and equipment for B train chillers. The corridor that links the two areas identified by cross-hatching on figure contains only nonsafety-related cabling and equipment. At each end of the corridor at Column Lines 5.6 and 7.4 are hollow metal steel doors. Approximately 100 feet separate the A train equipment from the B train equipment.

2. Safety-Related Equipment.

a. Channel A

Safeguard Chillers 1VM-59A and 2VM-59A

Safeguard Chiller Pumps 1VP-02A and 2VP-02A

Service Water to Safeguard Chiller Unit Control

Valves 1PV-1975A and 2PV-1975A

b. Channel B

Safeguard Chillers 1VM-59B and 2VM-59B

Safeguard Chiller Pumps 1VP-02B and 2VP-02B

Service Water to Safeguard Chiller Unit

Control Valve 1PV-1975B and 2PV-1975B

3. Fire Protection and Prevention

At the present time no fire barriers exist within this area separating the A train and B train equipment. Area fire detection is provided along the safety-related cable trays and above the chillers. One additional feature is a fire stop placed in the nonsafety-related cable trays running along the corridor linking the two fire areas. The purpose of this fire stop is to prevent a fire from transversing from the A train chiller area to the B train chiller area. For further details of the fire protection and prevention provided for this fire area refer to FSAR Appendix 9A, Fire Area 63, in the fire analysis section.

4. Discussion

In Fire Area 63 all A train equipment and cabling are separated from B train equipment and cabling by approximately 100 feet. On Figure 3 of this report the area that is cross-hatched represents nonsafety-related cable that runs along the corridor connecting the west half of Fire Area 63 to the east half. Figure 4 and Figure 5 of this report show cable tray layout of the nonsafety-related cable in Fire Area 63. For a fire to affect both trains of the safety-related chillers, all of the cables within this corridor would have to be consumed and the fire would have to spread to additional cabling outside of the corridor. To prevent this from happening, a fire stop placed in the location shown in Figure 3 would prevent a fire from affecting both A train and B train chillers. Approximately five feet of all cable trays penetrating the wall at Column Line 5.6 will be equipped with a one-hour fire stop. This will prevent the spread of the fire from A train to B train equipment. Should a fire occur in the region of the A train safety-related chillers, it would still be possible to achieve safe shutdown in the plant using the B train safety-related chillers. Based on the discussion above, we believe we meet the intent of providing proper separation between redundant of trains of safety-related equipment.

Providing Protection of Cable Tray Supports

A. NRC Staff Concern

The NRC Staff is concerned that the structural supports for trays protected from the effects of fire may collapse prior to the one-hour fire rating of the cable trays. The applicant has verbally agreed and will document in a future FSAR amendment that the cable tray supports will be protected to achieve the same fire rating as the cable tray or conduit itself.

B. Midland FSAR Commitment

The Midland FSAR currently makes no mention of the protection of cable tray or conduit supports.

C. References

None

D. Discussion

Cable and conduit supports will be protected to the same fire resistance rating as the protected cable, cable trays, and conduits.

This commitment will be incorporated into a subsequent revision to the Midland FSAR.

Separation of Control Room From Peripheral Rooms

A. NRC Staff Concern

The control room complex peripheral rooms are not fire rated. This is not consistent with staff guidelines. The Staff will require that all peripheral rooms be separated from the main control room by a one-hour fire rated construction. The staff will also require that smoke detectors with alarm annunciation in the control room be provided for these rooms.

B. Midland Plant Position

The control room complex at the Midland Plant is protected from fire damage and is separated from other fire areas of the plant by three-hour rated fire barriers. Within the control room complex the control room is separated from the Unit 1 and 2 main control instrument rack rooms by concrete walls and Class A fire doors. The only penetrations through this wall are for HVAC. We believe that these walls meet the intent of BTP APCSB 9.5.1, Part C.6.b in preventing a fire in peripheral rooms causing damage to the control room. Additional protection in the Unit 1 and 2 main control instrument rack rooms include separate automatic Halon suppression systems.

C. References

1. Midland Plant FSAR Appendix 9A References:

   a. Section 9A.3, Part E.2, entitled "Control Room."

   b. FSAR Figure 6.4-3, "Control Room Equipment Arrangement."

   c. FSAR Figure 9A-10, "Fire Protection - Reactor and Auxiliary Buildings Plan at Elevation 556'-0"."

2. NRC Letter to Consumers Power Company concerning Midland Units 1 and 2, Summary of October 7, 1981 meeting on Midland Fire Protection Plan Review (See discussion on Control Room Complex).

D. Discussion

The control room complex at the Midland Plant is protected from fire damage and separated from other fire areas of the plant by three-hour rated fire barriers. Within the control room complex the control room is separated from the Unit 1 and 2 main control instrument rack rooms by concrete walls and Class A fire doors. The only other peripheral room to the control room is the Unit 1 and 2 safety-related equipment room. This area requires periodic use by the operators for control and monitoring of the plant. Separation of this area from the main control room is not practical due to the need for operator access.

As discussed in the Midland Plant position, Unit 1 and 2 main control instrument rack rooms are separated from the main control room by a boundary wall with Class A rated fire doors. There are presently only HVAC pentrations between these areas and the main control room. Due to the addition of Halon systems in both the Unit 1 and Unit 2 main control instrument rack rooms, automatic, motor-operated dampers are being installed in all HVAC ducts penetrating these areas. With the fire protection features, such as, automatic area fire detection and an automatic Halon gas suppression system, we believe the additional fire protection of a one-hour fire barrier is not necessary.

Total Flooding Halon System in Control Room Ceiling

A. NRC Staff Position

Cables from the upper cable spreading room penetrate the ceiling and are run on open-ladder cable trays in the concealed ceiling space. To meet the guidelines of Section F.2 of Appendix A, to BTP ASB 9.5-1 the Staff will require an automatic total flooding Halon system be provided for protection of these concealed cable trays.

B. Midland Plant FSAR Commitment

Fire protection of the main control room currently consists of an automatic fire detection system both above and below the suspended ceiling line in the main control room. Fire suppression can be performed using either portable extinguishers or manual hoses.

A fire in the concealed ceiling space in the main control room would only affect B train cabling. Due to the safe shutdown analysis performed on the Midland Plant for fire protection, loss of B train components in the main control room will not affect safe shutdown. Alternate means of achieving safe shutdown have been provided outside of the main control room using A train equipment only. Thus, the fire in B training cabling inside the main control room would have no effect on the capabilities of achieving safe shutdown.

C. References

1. Midland Plant FSAR Appendix 9A References:

   a. Section 9A.3, Part F.2, entitled "Control Room."

   b. FSAR Figure 9A-10, entitled "Fire Protection - Reactor and Auxiliary Buildings Plant at elevation 656'-0"."

2. Figure 6, entitled "Conduit and Tray Plan Unit 1 Control Room Elevation 659'-0"."

3. Figure 7, entitled "Conduit and Tray Plan Unit 2 Control Room Elevation 659'-0"."

4. Figure 8, entitled "Conduit and Tray Plans Control Room Detailed in Section Elevation 659'-0"."

5. Table 2, Open-Ladder Trays Located within Main Control Room.

D. Discussion

Within the main control room a limited number of cables are routed from the upper cable spreading room to certain panels within the control room via open-ladder type trays in the concealed ceiling space. A list of these cable trays and their sizes are given in Table 2 of this report. Provided with this list is the current percentage fill of each cable tray in the main control room. When all cable is pulled the final tray fill will be less than 40% for each tray. The percentage of cable tray fill is the percentage of the cable tray cross-sectional area that is occuppied by cables. It is expected that very few cables will be added to the existing cable trays within the main control room. Figures 6, 7 and 8 of the conduit tray plans show the location of each of these cable trays within the control room.

Only B train cables are routed to the control room from the upper cable spreading room in open-ladder cable trays. All cables entering the main control room terminate there. In reviewing the drawings showing the tray routings in the control room (Figures 6 and 7), it can be seen that the cable trays are well distributed. Thus, the limited amount of combustible material, i.e., cables, is evenly distributed within the control room. This accounts for the low fire loading and low severity level stated in FSAR Appendix 9A, Section 9A.3 "Fire Area 65, of the Fire Hazards Analyses."

The fire protection and prevention features within the main control room include an automatic smoke detection system located above and below the suspended ceiling. Primary fire suppression is supplied using portable extinguishers, and secondary fire suppression is supplied using manual hoses with adjustable nozzles. In addition, this is a continually manned space.

B train cabling is the only cable located in the open-ladder type cable trays within the main control room. In the safe shutdown analysis, an evaluation was performed to determine the effect of a fire in the B train control cables. As a result of the safe shutdown analysis, it was determined that a fire in these cables would not prevent safe shutdown of the plant.

Halon addition to the concealed ceiling space is not accepted industry pratice because technically it is doubtful that the concealed ceiling space can be sealed to maintain the required concentrations. It would seem more prudent to investigate the source of the fire, use portable extinguishers to suppress the fire, and rely on operation of the units from either the control room or auxiliary shutdown panel as conditions dictate. In addition the discharge of Halon, whether intential or accidental, will result in the evacuation of the control room.

Based on the discussion presented above we believe that the addition of a Halon system in the concealed ceiling space of the main control room would not provide a safe and effective means to augment fire protection in this area. Since the control room is a continually manned space and the detectors in the main control room are alarmed, sufficient time would be provided to extinguish a fire should it occur. In addition, we have provided alternative means of achieving safe shutdown of the plant outside of the main control room.

Flow Restriction Valve In The Hydrogen Supply System

A. NRC Staff Concern

The applicant has not provided adequate information for the Staff to review the hazards posed by the routing of hydrogen piping through safety-related areas. To meet the guidelines of Sections D.2.b of Appendix A to BTP ASB 9.5-1, the staff will require hydrogen piping to be sleeved or to restrict hydrogen flow in case of a line break.

B. Midland Plant FSAR Position

The existing hydrogen system has an excess flow valve located in the main header supply line which is designed to shutdown the flow in the case where flow exceeds 25 SCFM. This excess flow valve is identified as valve QCKMGH 070 on the attached Figure 14, which is the draft FSAR Figure 9.3-41, Sheet 1, and the P&ID for the hydrogen supply system. Calculations show that in the case of a circumferential line break, the hydrogen flow would be about 730 SCFM. In addition a second excess flow valve, such as that indicated on Figure 14, or equivalent protection will be installed to shutdown the flow from the reserve bottled hydrogen source. Normal operating pressure of this system is 90 psig. A low pressure hydrogen alarm located downstream of the excess flow valve will notify the operators. Based on installation of the two excess flow valves indicated on Figure 14, the flow of hydrogen from either the main or reserve source will be cut off in the event of a line break in the auxiliary building.

Fire Protection Features For The Main Control Instrument Rack Rooms

A. NRC Staff Concern

Panels 1C-166, for Unit 1, and 2C-166, for Unit 2 are located in the main control instrument rack rooms. Each contain all four trains of safety-related logic instrumentation. Each channel of safety-related logic is contained in a separate bay of these panels and is separated from other bays by a sheet metal barrier. The Staff's position is that the sheet metal partitions do not constitute fire barriers and therefore, the panels are considered to be all one cabinet. The Staff's concern relates to an exposure fire external to the cabinet that may affect more than one instrument section within the cabinet. One possible remedy for this problem which was discussed in the October 7, 1981 meeting would be to erect a one-hour fire barrier around the cabinet and install an automatic Halon suppression system.

B. Midland Plant Position

1. Unit 1 Main Control Instrument Rack Room

To provide protection of the 1C-166 cabinet from an exposure fire due to transient combustibles, a one-hour fire barrier will be installed as shown in Figure 9 of this report. The intent of the barrier is to isolate the 1C-166 cabinet from a normal access route from the main control room and the auxiliary shutdown panel. To provide additional protection for this area, a total flooding Halon system will be installed. The Halon system will be automatically actuated from a smoke detection system located within this area.

2. Unit 2 Main Control Instrument Rack Room

Due to three factors: (1) the size of the main control instrument rack room for Unit 2; (2) the location of the 2C-166 cabinet within

this area; and (3) the small amount of combustibles, it is not necessary or practical to install a one-hour fire barrier. As an alternative, all cabling in open cable trays will be wrapped to provide a one-hour fire barrier for them. In addition, a total flooding Halon system will be installed in this main control instrument rack room. The Halon system will be automatically actuated from fire detectors located in this area.

C. References

1. Midland Plant FSAR Appendix 9A References;

   a. Section 9A.2 entitled "Fire Area Analysis" description of Fire Area 65 Main Control Room.

   b. Section 9A.3 entitled "Midland Comparison To Appendix A Of Branch Technican Position 9.5-1, Part E For Halon Suppression Systems."

   c. FSAR Figure 9A-10, "Fire Protection - Reactor and Auxiliary Buildings Plan at Elevation 656'-0".

2. Figure 9, Plan View of Main Control Instrument Rack Room Unit 1.

3. Figure 10, Plan View of Main Control Instrument Rack Room and Auxiliary Shutdown Panel Area for Unit 2.

4. Figure 11, Elevation View of One-Hour Fire Barrier in Main Control Instrument Rack Room Unit 1.

5. Figure 12, showing partial construction of one-hour fire barrier.

6. NRC Letter to Consumers Power Company transmitting the meeting summary from the October 7, 1981 meeting.

D. Discussion

1. Unit 1 Main Control Instrument Rack Area

   A one-hour fire barrier has been designed and will be installed to protect the 1C-166 cabinet from an exposure fire in this main control instrument rack area. Figures 9 and 11 show the configuration and location of this fire barrier. Figure 12 shows a typical cross section for the proposed construction for the one-hour barrier.

   A certain amount of cabling is routed in the open cable trays above the 1C-166 cabinet. All exposed cabling inside of the one-hour fire barrier will be wrapped with a one-hour fire retardant material. Only safety-related Channels B and D cabling would be exposed to the effects of a fire in this main control instrument rack room. If damage were to occur to the safety-related cables, safe shutdown of

the plant could still be achieved using Channels A and C cabling located in other areas.

In addition to the one-hour fire barrier, a total flooding Halon system will be installed to protect the entire main control instrument rack area. Actuation of the Halon system will be by detectors located within this area. Secondary fire suppression within this area is accomplished using portable fire extinguishers or manual hoses with adjustable nozzles.

2. Unit 2 Main Control Instrument Rack Room

The Unit 2 main control instrument rack room (MCIRR) contains only two cabinets, the Unit 2 annunciator termination cabinet (2C-34) and the Unit 2 safety-related instrument cabinet (2C-166). The only combustible material within the area are cables in open cable trays. All walls with the exception of the west wall of the Unit 2 MCIRR are three-hour rated fire barriers. Currently fire suppression includes an automatic actuated total flooding Halon system for the entire room, portable extinguishers and manual hoses with adjustable nozzles.

With reference to Figure 10, it can be seen that the Unit 2 MCIRR does not have sufficient excess space to add additional fire barriers directly around the cabinets. There is only two feet of clear space between the south wall and the logic cabinets. Since this space is an access way to tne auxiliary shutdown panel area, reducing the size of this space is not practical. A one-hour fire rated barrier would reduce the width of this access way to 19" which is below accepted aisleway requirements.

As an alternative to the one-hour barrier arrangement as shown on Figure 9 for the Unit 1 MCIRR, the Unit 2 MCIR room will become the enclosure itself. As in the Unit 1 MCIRR, all safety-related cables routed in conduit or cable trays are Channel B or D. To reduce the exposure fire effects on the 2C-166 cabinets, all safety-related and nonsafety-related cable trays will be wrapped with a one-hour fire retardant material. An automatic total flooding Halon system, is provided. Due to the limited amount of combustible material in this area, the size of the MCIRR and the room geometry, we believe that these fire protection features in combination with those discussed in the FSAR Section 9A.2 for Fire Area 65 sufficiently reduce the exposure fire hazard to the 1C-166 cabinet to an acceptably low level.

3. Halon System for Main Control Instrument Rack Room

Refer to the description of the design and operation of the Halon system in Attachment 1.

Fire Protection Features For The Auxiliary Shutdown Panel Rooms

A. NRC Staff Concern

18 feet separate the Auxiliary Shutdown Panel (1 and 2C-114) from the Channel A Auxiliary Feedwater Control Racks (1 and 2C-445A). The Staff indicated that an acceptable solution would be to erect an 8 foot high, one-hour fire barrier and an automatic Halon suppression system in the auxiliary shutdown panel room.

B. Midland Plant Position

A one-hour fire barrier and an automatic Halon suppression system will be provided in the Auxiliary Shutdown Panel Rooms. In addition all cable trays between the new one-hour barrier and the west wall (east wall for Unit 1) will be wrapped with a one-hour fire retardant material. This will prevent an exposure fire from affecting both the Channel A Auxiliary Feedwater Level Control Rack (2C-445A) and either the Auxiliary Shutdown Panels (1 and 2C-114) or the Channel B Auxiliary Feedwater Level Control Racks (1 and 2C-445B).

C. References

1. Midland Plant FSAR Appendix 9A References:

   a. Section 9A1.8, entitled "Shutdown Analysis."

   b. Section 9A.2, Fire Area 64, "Auxiliary Shutdown Panel Room, Elevation 659'-0", Unit 1."

   c. Section 9A.2, Fire Area 65, "Auxiliary Shutdown Panel Room Elevation 659'-0", Unit 2"

   d. Section 9A.3, Section E, "Halon Suppression Systems"

   e. FSAR Figure 9A-10,"Fire Protection Reactor and Auxiliary Buildings Plan at Elevation 659'-0"

2. Figure 10, "Plan view of Unit 2 Main Control Instrument Rack Room and Auxiliary Shutdown Panel room, Elevation 659'-0".

3. Figure 12, "Typical Construction for a One-Hour Fire Resistant Partition."

4. Figure 13, "Section B-B of Auxiliary Shutdown Panel Area."

D. Discussion

1. Auxiliary Shutdown Panel Areas

The Channel A Auxiliary Feedwater Level Control Racks (1&2C-445A) are redundant to certain Channel B safety-related components in the Auxiliary Shutdown Panels (1&2C-114) and the Channel B Auxiliary Feedwater Level Control Racks (1&2C-445B). As can be seen in Figure 10 for Unit 2, these cabinets are 18 feet from each other. The Unit 1 configuration for Fire Area 64 is a mirrored image of Fire Area 66 shown on Figure 10. To prevent damage to redundant trains of safety-related equipment due to an exposure fire, a one-hour fire barrier will be installed as shown in Figures 10 and 13. A mirror image one-hour barrier will be installed in Fire Area 64. In addition, all Channel B conduits and cable trays routed in the locality of the 1&2C-445A racks will be wrapped with a one-hour fire retardant material. Fire suppression will be provided by an automatic Halon suppression system actuated by area smoke detectors. These fire protection provisions are sufficient to alleviate the effects of an exposure fire in the auxiliary shutdown panel areas.

2. Halon System for Auxiliary Shutdown Panel Areas

Refer to the description of the design and operation of the Halon system in Attachment 1.

Commitment to Appendix R or Provide Equivalent Protection

A. NRC Staff Concern

The requirements set forth in Appendix R are being used as guidelines by the Staff in the licensing of plants to operate after January 1, 1979. On April 27, 1981, the Commission required that operating licenses issued after January 1, 1979 contain a condition requiring compliance with commitments made by the applicant and agreed to by the Staff after differences between the applicant's program and the guidelines set forth in Appendix A to BTP ASB 9.5-1 and Appendix R have been identified and evaluated.

The applicant has not commited to meet the technical requirements of Appendix R to 10 CFR 50 or provide equivalent protection. The Staff will condition the operating license to require the applicant to meet the technical requirements of Appendix R to 10 CFR 50 or provide equivalent protection.

B. References

1. Midland FSAR Section 9A.3, entitled "Midland Comparison to Appe... of Branch Technical Position APCSB 9.5-1."

2. Letter to J W Cook from R L Tedesco, dated June 29, 1981, concerning the Staff's interim position on Appendix R to 10 CFR 50.

3. Letter to H R Denton from J W Cook, Serial 15105 dated December 14, 1981, transmitting the Midland comparison to Appendix R, entitled "Appendix R Comparison" dated December 1, 1981.

4. NRC meeting summary dated October 27, 1981, transmitting meeting notes for the October 7, 1981 meeting on the Midland Fire Protection Program.

C. Discussion

The Staff's interim position, concerning the use of the technical requirements from Appendix R and the criteria from Branch Technical Position (BTP) ASB 9.5-1 for use as Staff guidelines for plants licensed to operate after January 1, 1979, was transmitted in the NRC's correspondence dated June 29, 1981.

In response to this Staff interim position we forwarded a detailed point-by-point tabular comparison of the Midland fire protection program with Appendix R in our correspondence, Serial 15105, dated December 14, 1981. A detailed comparison of the Midland fire protection program with BTP ASB 9.5-1 is contained in the Midland FSAR Section 9A.3 as completely updated for Revision 35 dated July 1981.

Revisions to update the Midland FSAR to accommodate addressing the technical guidance of Appendix R, combined with the separate comparisons of the Midland Fire Protection Program with Appendix R and BTP ASB 9.5-1, document the substantial effort which has been completed to evaluate the Midland Plant design against the current NRC guidance on fire protection. As a result, we believe that the Midland Fire Protection Program complies with the NRC fire protection guidelines which are contained in BTP ASB 9.5-1 and Appendix R, with the exceptions and alternate provisions which are identified in the above referenced Midland comparisons with Appendix R and BTP ASB 9.5-1, as modified by the additional commitments and justifications contained in this postion paper. In those instances where the specific requirements of Appendix R or BTP ASB 9.5-1 could not be met in a practical manner, alternate provisions have been incorporated into the Midland Fire Protection Program which meet the intent of NRC guidance and are documented in the Midland FSAR, as supplemented by those additional commitments to design changes included in this position paper.

ATTACHMENT 1

DESCRIPTION OF TOTAL FLOODING HALON
SYSTEMS USED IN FIRE AREAS 64, 65, AND 66

The control room wings, which contain safety-related equipment and the auxiliary shutdown panels, will be protected by total flooding Halon systems. Two systems will protect the Unit 1 side (Fire Area 64 and part of Fire Area 65) and two systems will protect the Unit 2 side (Fire Area 66 and a portion of Fire Area 65).

The wings are cut off from the main control room by a wall and door and the two rooms in each wing from each other by three-hour barriers and doors.

The systems will be designed and installed according to NFPA 12A. All four Halon systems will operate in the same manner. A cross-zoned smoke detection system will be used to initiate the Halon release. Upon the first alarm the HVAC will be turned off to the effected area, and dampers (where installed) will close. A signal will be sent to the control room indicating that an alarm has occured. The second detector to alarm will initiate another alarm and start a timer. After no more than 30 seconds the Halon will be released. Halon concentration in the rooms will be in a minimum of 5%. Electrical circuitry for the Halon systems will be Class B.

TABLE 1

DETECTORS ADDED TO SAFETY-RELATED
EQUIPMENT AREAS

Fire Area	Elevation of Detector	Number of Detectors	Reason for Addition
FA-1	568'-0"	4	Safety-Related Cables
FA-2	584'-0"	1	DHR Heat Exchanger & Valves
FA-3	584'-0"	1	DHR Heat Exchanger & Valves
FA-6	568'-0"	2	Safety-Related Cables
FA-9	599'-0"	2	Safety-Related Valves
FA-10	599'-0"	2	Safety-Related Valves
FA-11	584'-0"	1	Safety-Related Cables & Equipment
FA-12	599'-0"	2	Safety-Related Cables
FA-14	584'-0"	1	DHR Heat Exchanger & Valves
FA-15	584'-0"	1	DHR Heat Exchanger & Valves
FA-23	599'-0"	1	Safety-Related Cables & Equipment
FA-24	624'-0"	2	Safety-Related Cables
FA-25	624'-0"	2	Safety-Related Cables
FA-33	599'-0"	2	Make-up Pressure Transmitters
FA-36	614'-0"	2	Battery & Charger A-Train
FA-37	614'-0"	2	Battery & Charger B-Train
FA-38	614'-0"	2	Battery & Charger B-Train
FA-39	614'-0"	2	Battery & Charger A-Train
FA-42	614'-0"	2	Safety-Related Cables & Equipment
FA-43	614'-0"	2	Safety-Related Cables & Equipment
FA-50	634'-0"	5*	Safety-Related Cables
FA-51	634'-0"	7	Safety-Related Cables

FA-52	646'-0"	1	Aux Bldg Exhaust HVAC
FA-63	646'-0"	3	Safety-Related Cables
FA-64	673'-0"	1	Aux Shutdown Panel
FA-66	673'-0"	1	Aux Shutdown Panel
FA-71A	659'-0"	1	Spent Fuel Pool Filters
FA-71B	659'-0"	1	Spent Fuel Pool Filters
FA-72	673'-0"	1	Aux Bldg Exhaust HVAC
FA-73	673'-6"	2	Area Fire Detection
FA-73C	673'-6"	1	CCW Surge Tank
FA-73D	673'-6"	1	CCW Surge Tank
FA-76	673'-6"	1	HVAC Equipment Room
FA-82	685'-0"	1	Aux Bldg HVAC Equipment
FA-83	685'-0"	1	Aux Bldg HVAC Equipment

* Note: These will be placed above the ceiling

Total Number of Additional Detectors 64

TABLE 2

CABLE TRAYS OF OPEN-LADDER TYPE
MAIN CONTROL ROOM

Cable Tray	Size (inches)	% Fill*
1BFF01	9x4	23%
1BFF02	3x4	1%
1BGD01	6x4	11%
1BFF03	3x4	31%
1BFD03	6x4	11%
1BFF04	9x4	16%
1BFF05	18x4	25%
1BFF06	18x4	28%
1BFF07	12x4	32%
1BFF08	6x4	25%
1BGD04	3x4	15%
1BFF09	9x4	12%
1BFF10	15x4	22%
1BGD05	3x4	13%
1BFF11	18x4	24%
1BFF12	9x4	15%
1BGD02	9x4	15%
2BFL01	18x4	20%
2BFL02	15x4	31%
2BGF01	3x4	7%
2BFL04	18x4	22%
2BFL05	15x4	20%
2BGF02	3x4	13%
2BFL06	9x4	31%
2BFL07	12x4	25%
2BGF04	6x4	6%
2BFL08	15x4	14%
2BGF05	3x4	0%

2BFL09	6x4	16%
2BGF06	6x4	14%
2BFL10	3x4	1%
2BGF07	6x4	11%
2BFL11	18x4	22%
2BFL12	12x4	18%
2BFL13	9x4	31%
2BGF09	3x4	3%
2BFN01	12x4	34%
2BGF03	9x4	5%
2BGF08	9x4	17%
2NFL10	12x4	1%
2NFT04	12x4	11%

*Note: Percentage fill represents the percentage of a cable tray cross-sectional area that is occupied by cable.

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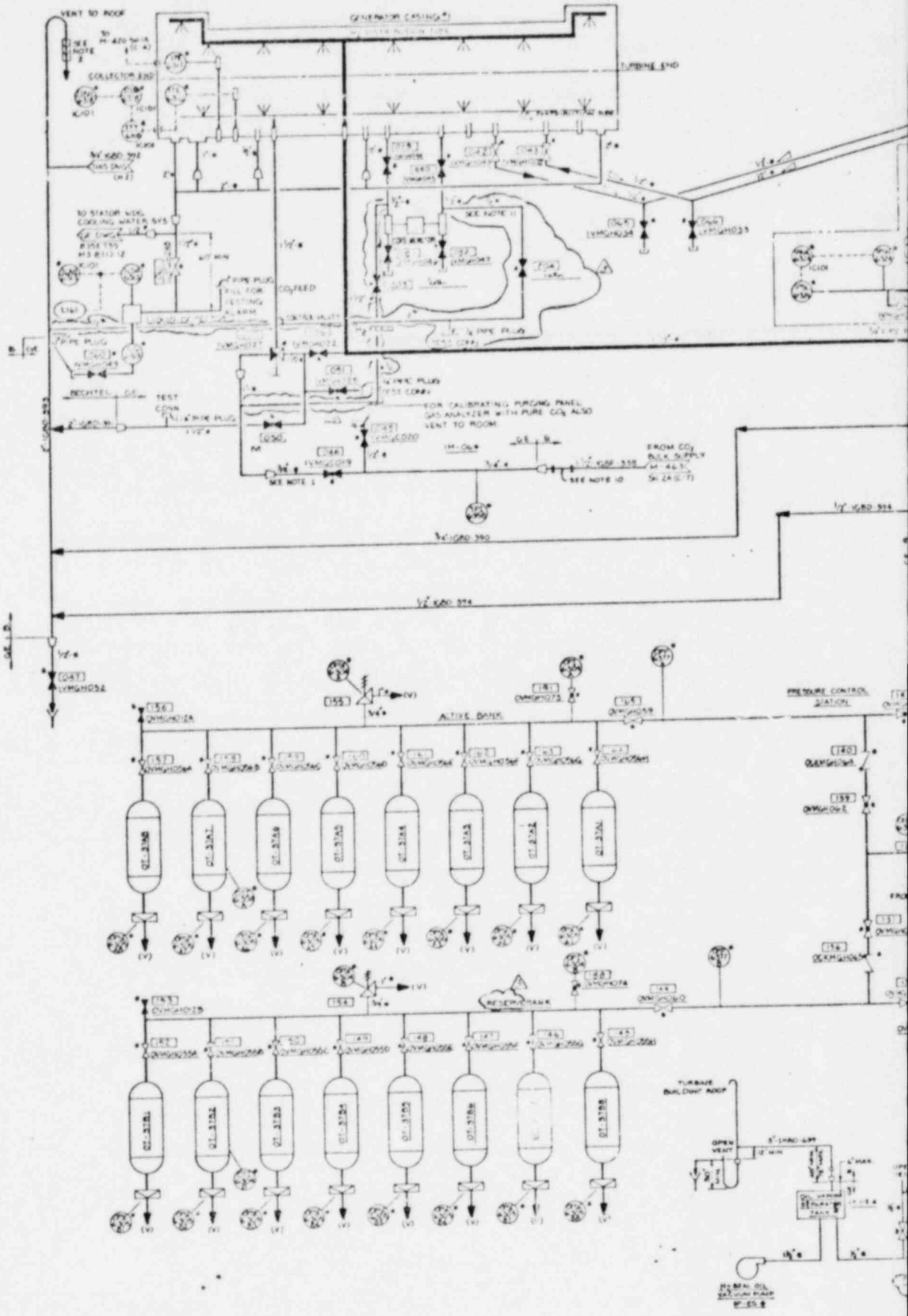
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TEST CONN
FOR CALIBRATING PURGING PANEL GAS ANALYZER WITH PURE CO2 ALSO VENT TO ROOM
FROM CO2 BULK SUPPLY
SEE NOTE 10
SEE NOTE 1
ACTIVE BANK
RESERVE BANK
PRESSURE CONTROL STATION
TURBINE BUILDING ROOF
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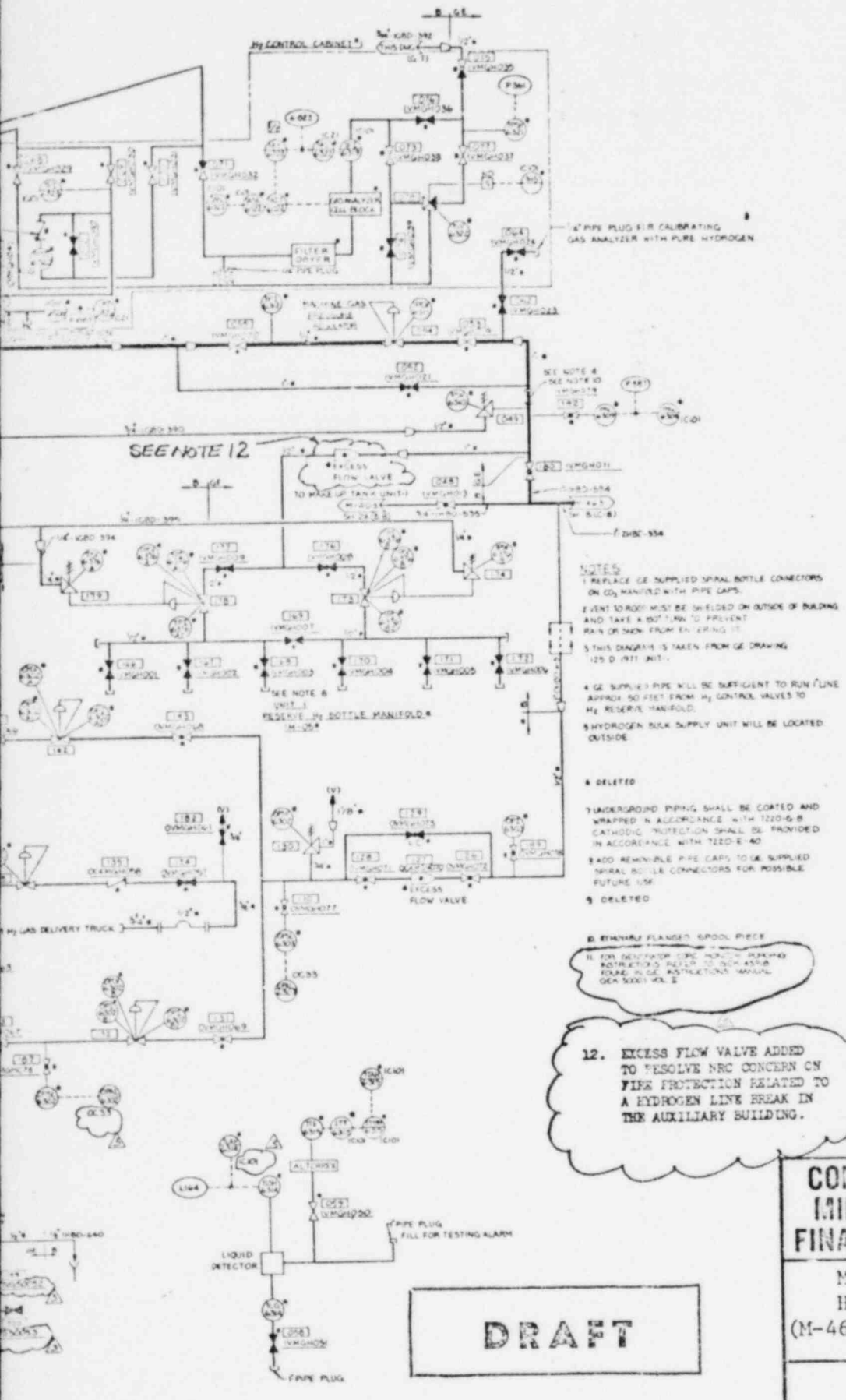

FIGURE 14

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CONSUMERS POWER COMPANY
MIDLAND PLANT UNITS 1 & 2
FINAL SAFETY ANALYSIS REPORT

Miscellaneous Gas System
Hydrogen Supply
(M-463 sh 1A, Rev 3)

FSAR Figure 9.3-41, sh. 1