Nebraska Public Power District

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March 18, 1983

U. S. Nuclear Regulatory Commission
Operating Reactors Branch No. 2
Division of Licensing
Washington, D.C. 20555

Attention: Mr. Domenic B. Vassallo, Chief

Dear Mr. Vassallo:

Subject: Fire Protection Rule 10 CFR 50, Appendix R,
Preliminary Supplemental Response (Revised)
Cooper Nuclear Station
NRC Docket No. 50-298, DPR-46

Reference: Letter from D. B. Vassallo to J. M. Pilant dated December 14, 1982, "Draft SER on Appendix R Exemption Request"

On June 28, 1982, Nebraska Public Power District requested exemption from Section III.G of Appendix R for eight plant areas/categories. In Reference 1, the NRC Staff approved one and preliminarily recommended denial of seven of the eight exemption requests. After review of the Staff's preliminary recommendation, the District sought a meeting to provide a response and to bring each outstanding exemption request to a close. The Staff agreed to such a meeting at Cooper Nuclear Station.

It was mutually agreed that prior to the site meeting a working level meeting in Bethesda was appropriate to reach resolution on as many of the remaining exemptions as possible. Enclosures 1 and 2 to this letter document the presentation and commitments made by the District to the Nuclear Regulatory Commission's Staff at that March 3, 1983, meeting. Enclosure 2 documents the Fire Area Boundary exemption and Enclosure 1 documents the remaining six exemptions. Based upon the District's commitment to provide an alternative shutdown capability with control circuits for the required hot standby systems independent of the Control Room, Cable Spreading Room, Cable Expansion Room, and Auxiliary Relay Room, the exemption requests were substantially reduced in scope. On the basis of the information presented and the discussions held with the Staff at the meeting, it is the District's opinion that the Staff will be able to take favorable action on the exemption requests.

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We are confident that the attached information, in conjunction with that which was previously transmitted, demonstrates that the level of safety provided in each instance will be equivalent to the technical requirements of Appendix R, Section III.G.2. We believe that under existing NRC guidance, our proposed exemptions can be approved and, if they are, an appeal meeting (requested in Reference 1) will therefore be unnecessary.

Sincerely,

Jay M. Pilant
Division Manager of Licensing &
Quality Assurance

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Enclosure

Cable Spreading Room

As a preface to the Cable Spreading Room Exemption Request discussions, the District provided a commitment to the Staff to prepare a submittal describing an alternative shutdown capability, the control circuits of which would be independent of the Cable Spreading Room, Control Room, Cable Expansion Room, and Auxiliary Relay Room. On this basis, the Exemption Request for the Cable Spreading Room became limited to the southeast corner in the vicinity of the Division 2 125/250 Volt dc power feeds and the Division 2 4160 Volt ac feeds. The District provided a commitment to box in and protect (with a material such as the 3M fire barrier material) the 125/250 Volt dc power feeds up to an elevation where interferences precluded further boxing. The District also committed to protect the 4160 Volt ac Division 2 safe shutdown power feeds in a similar manner at the south wall of the Cable Spreading Room. Finally, the District committed to provide additional suppression beneath the path of the 125/250 Volt power feeds to their penetrations at the south wall of the Cable Spreading Room. This suppression coverage will be achieved by extending down the existing ceiling-based suppression. It is envisioned that four heads will be added, one each in the vicinity of the penetration areas (i.e., 125/250 Volt dc Division 2 into and out of the Cable Spreading Room, and two beneath the path of the dc power conduits). The coverage from the new heads is estimated at 0.25 gpm/ft^2 after installation of the new fire pump.

Cable Expansion Room

The District proposed a reduced Exemption Request for the Cable Expansion Room. Specifically, the exemption was from the requirement to enclose the Division 125/250 Volt dc power feeds for the HPCI and 4160 Volt ac safe shutdown power feeds in a rated one-hour fire barrier. The basis was the difficulty in enclosing or encapsulating the conduits of interest within the duct bank. The District committed to extend suppression above the conduits in the unsprinkled portion of the room and to provide a plume impingement shield beneath the Division 2 conduits. Conceptually, the plume impingement shield will be constructed of the 3M Composite Fire Barrier material attached to the unistrut frame.

Reactor Building 903' 6", Northeast Corner

The District's presentation reduced the scope of the previous Exemption Request at the northeast corner of the Reactor Building at 903' 6" elevation. Within that area, the District specifically requested exemptions, again, for the 4160 Volt ac safe shutdown system power feeds and the 125/250 Volt power feeds within the Division 2 conduit bank. The District noted that the conduit bank is approximately twenty feet above the ground and that the conduits of interest are well within the bank. The floor area in the northeast corner of the Reactor Building is covered by a floor-based water suppression system designed to NFPA-13 extra hazard requirements.

The conduits of interest are protected, in part, from the direct plume impingement affects of any floor-based exposure fire by the stairwell cover in the northeast corner. Only a limited area to the east and southeast of the RCIC starter racks is an area in which a floor-based exposure fire could occur directly beneath the Division 2 conduit bank. In that area, the wet pipe fire suppression system immediately above the floor level would act to mitigate the

effects of an exposure fire. It was noted that it is unlikely that a floor-based fire could cause damage to the conduits because of their height. It was also pointed out that there is an existing, installed ceiling-based wet pipe suppression system between the Division 1 and Division 2 Cable Trays at the north wall. This system would operate to quench any stratified hot-gas layer that could potentially impact the Division 2 conduits of interest.

On the basis of the existing configuration and the existing installed fixed-suppression system, no additional commitments for modifications were made by the District. Rather, the District requested that the exemption be granted on the basis of the existing configuration.

The previously submitted Exemption Request material identified additional circuits within the area as being required. The District indicated that on the basis of revised systems engineering it was concluded those circuits were not required.

The District also requested that for the 903' floor area elevation an exemption from total area suppression be granted. The District indicated that the area currently covered by floor-based suppression system was a fire loading of approximately 20,000 Btu/ft^2. Beyond the area of the suppression system coverage, the 1977 fire hazards analysis indicated a "negligible" combustible loading. Because of the extremely light combustible loading in the unsprinkled area, the District requested that an exemption be granted from the requirement for a suppression system throughout the 903' elevation.

Control Building Basement

The District indicated that in the Control Building Basement the number of circuits of interest had been reduced. The remaining safe shutdown circuits of interest were the 4160 Volt ac power feeds from the diesel generators and to the service water pumps and the 125 Volt dc power feeds to the diesel generator control circuitry. Appendix R would require enclosure of one division in a rated one-hour barrier, detection, and automatic fixed area suppression.

The District indicated that the area is very large, essentially void of exposed fixed combustibles, and is in a very noisy and out-of-the-way portion of the plant such that transient combustible material flow would logically be limited to those materials utilized for normal component maintenance.

As regards the 4160 Volt ac power feeds, the District committed to wrap one division up to the ceiling (where interferences preclude wrapping).

As regards the 125 Volt dc power feeds, after discussion with the Staff, the District was able to identify a spectrum of potentially acceptable alternatives. The District commits to protection of a single division with a one-hour fire barrier.

Upon review of the potential implementation problems associated with this approach, it becomes apparent that the existing conduit traversing the ceiling will become very difficult and expensive to wrap or enclose with a one-hour fire barrier. It may appear cost effective to install a new conduit whose improved accessibility would reduce the expense of enclosing same in a one-hour barrier. A course of action may be to replace the existing conduit and cable with a copper jacketed mineral insulated cable which has inherent protection essentially equivalent to a cable in conduit enclosed in a one-hour fire barrier.

The District commits to install a one-hour barrier in the Control Building Basement and thus we request the exemption for the complementary provision of Appendix R, Section III.G.2 be granted. Additionally, as part of the implementation of a one-hour rated enclosure of the 125 Volt dc circuit at the ceiling, the District respectfully requests the opportunity to submit test data to the Staff on the performance of mineral insulated cable for use in lieu of a wrapped conduit/cable configuration.

Auxiliary Relay Room

The District provided a presentation of the physical configuration of the Auxiliary Relay Room, noting the light combustible loading, the separation of the auxiliary relay cabinets, the proximity of the Control Room, and the spaciousness and the excellent access within the room for manual suppression, and that access to the room has an additional level of control beyond the keycard control typically found in that the room is locked and access to the key is controlled.

On the basis of the above and given the commitment to provide an alternative shutdown capability independent of the area, the District requested an exemption from the III.G.3 requirement for a fixed suppression system.

Control Room

The District requested, based upon the commitment to provide an alternative shutdown capability independent of the area and the continuous manning of the Control Room, an exemption from the III.G.3 requirement for a fixed suppression system.

Summary of Future District Activities

It is the District's understanding that if the foregoing commitments are submitted to the Staff within two weeks of the March 3, 1983, working level meeting, an SER could be issued which would not deny all remaining exemptions (thereby precluding the District from requesting exemptions per 10 CFR 50.12). The foregoing modifications (except alternate shutdown capability) not requiring plant shutdown will be completed nine months after the effective date of the Staff's SER (per 10 CFR 50.48.C.2). The foregoing modifications (except alternate shutdown capability) requiring plant shutdown will be completed per 10 CFR 50.48.C.3 during the first refueling outage at least 180 days after the effective date of the Staff's SER (i.e., Spring, 1984, refueling outage assuming no extended outage greater than 60 days beforehand).

As regards modifications for alternative shutdown capability, the District will submit a description of modifications per Reference 1 (December 14, 1982, draft SER letter) six months after the March 3, 1983, working level meeting (i.e., September 3, 1983). The level of detail required in this submittal was discussed with the Staff at the working level meeting. Per 10 CFR 50.48.C.4, the necessary modifications (which require plant shutdown) will be completed during the first refueling outage commencing 180 days after Staff approval of the September 3, 1983, submittal (assuming no extended outages greater than 60 days).

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FIRE AREA BOUNDARIES

The two previous Nebraska Public Power District Appendix R submittals dated June 28, 1982, and December 29, 1982, were very general in nature regarding fire barrier continuity and fire area boundaries. They relied heavily on the Appendix A review of Cooper Nuclear Station fire barriers and spatial separation between redundant safe shutdown equipment. This submittal on fire area boundaries will specifically address the areas needing an exemption and compare the separation of redundant equipment in these areas to the requirements of Appendix R, Section III.G.2. Other than the areas previously discussed in this submittal, the following areas have been identified as needing an exemption from Section III.G.2 of Appendix R.

1. Reactor Building 932' Elevation - Critical Switchgear Rooms 1F and 1G.

2. Reactor Building 931' Elevation.

3. Reactor Building 903' Elevation (excluding northeast corner).

4. Reactor Building 859' and 881' Elevations - quadrants and torus area.

In the previous submittals, Areas 1 through 4 were generally looked at in light of the requirements of Appendix R, Section III.G.2, i.e., redundant equipment being in separate fire areas or zones and separated by an equivalent three-hour fire barrier or equivalent spatial separation. This thinking led to the general request for exemption from a total three-hour-rated barrier as required in Section III.G.2.(a). A closer look at each area and the safe shutdown equipment in each has revealed that in some of the areas a more appropriate exemption request might refer to Section III.G.2.(b).

This analysis will provide in each of the four areas listed above a general description of each area; the mitigating features of the area; and finally conclude why an exemption request is needed and why one should be granted.

1. REACTOR BUILDING 932' ELEVATION - CRITICAL SWITCHGEAR ROOMS 1F AND 1G

The redundant Critical Switchgear Rooms 1F and 1G are located on the 932' Elevation of the Reactor Building. Room 1F is Division I and Room 1G is Division II. Access to the rooms is from the 932' Elevation of the Controlled Corridor (refer to Drawing 1 attached). Both rooms are enclosed within reinforced concrete walls, floors, and ceilings. Conduit and pipe penetrations are sealed with three-hour rated penetration seals. One electrical buss duct penetration through the east wall of Critical Switchgear Room 1G and through the common wall between the two switchgear rooms will be upgraded to three-hour. In the north wall of Room 1F is a set of metal, double doors which are not fire-rated. These doors are, however, kept closed and have alarms associated with the security system and are exposed by the 932' Elevation Controlled Corridor which contains negligible combustibles. In the wall between Rooms 1F and 1G is a set of double doors which are three-hour fire-rated. In the south wall of Room 1G is a metal man-door to the outside which is not rated. The only thing exposing this man-door to the south is two HVAC fan units on the roof. The two HVAC penetrations through the north wall of Room 1F, through the common wall between Rooms 1F and 1G, and through the south wall of Room 1G are not equipped with fire dampers at the wall penetrations. However, one and one-half hour-rated fire dampers are provided near the air supply grill of the air supply duct, east duct, within each room and near the air return grill of the air return duct west duct, within each room. Also, the ducts are covered with an insulating board similar to Class A acoustical suspended ceiling tile. This insulating material has been tested in roof and ceiling assembly fire tests and is estimated to be of one to two-hour fire resistance. Where the HVAC ducts penetrate the concrete walls there is sheet metal flashing around the exterior of the duct. NPPD proposes to upgrade the penetration around the duct to a three-hour-rated seal.

All cabling within the room is within conduit and the cable is equivalent to IEEE-383 qualified fire-resistive cable. The area within each room is kept very clean and is not an area of high maintenance where a transient fire load might exist. Access to the critical switchgear rooms requires key-card access. These rooms are not areas where quantities of hydrocarbons are needed or even pass through. Cooper Nuclear Station has in effect administrative procedures for the control of combustible materials and for the control of ignition sources. The automatic fire detection system within each room alarms to the control room which is just across the controlled corridor from these critical switchgear rooms. The control room is continuously manned by operators who have been well-trained in fire fighting procedures. As illustrated on the drawing, the fire fighting access to these rooms is very good. The fire brigade is also well-equipped with manual suppression equipment. Besides portable fire extinguishers in the area, there is also a CO_2 hose reel station within just a few feet of Critical Switchgear Room 1F. The hose is long enough to reach all areas of both rooms. This hose station is supplied by a five-ton low pressure CO_2 storage tank located in the basement of the Turbine Generator Building. If need be, one and one-half inch fire hose stations can also be brought to bear in the area of these rooms. All fire hose stations at Cooper Nuclear Station are equipped with ABC-type fire nozzles for fighting electrical fires. In

addition to the fire fighting equipment listed above there are also fixed fire lockers strategically located throughout the plant, one of which is located within just a few feet of the north doors to Room 1F. The fire lockers contain additional fire extinguishers, breathing apparatus, protective clothing, and additional fire fighting equipment. Also, two portable fire carts are provided at Cooper Nuclear Station which can be delivered to any area within the plant. These fire carts contain additional fire extinguishers, fire hose and nozzles, and other miscellaneous fire brigade equipment.

Since all cable is in conduit, each room contains negligible in situ combustibles. If one assumes a reasonable transient load of a five-gallon can of oil-based paint, which might be used to repaint the walls of either room, this would represent an average Btu loading of approximately 770 Btu/sq ft. This equates to approximately a one-minute fire on the ASTM E-119 time-temperature curve. Even if one assumes an unreasonable transient load of a 55-gallon drum of lube oil in either switchgear room, this would represent an average Btu loading of approximately 8,500 Btu/sq ft. This equates to approximately a seven-minute fire on the ASTM E-119 time-temperature curve.

The east and west walls, the floors, and the ceilings of the two Switchgear Rooms 1F and 1G are three-hour rated barriers with three-hour rated penetration seals. The common wall which separates the two rooms is a standard three-hour rated fire wall with three-hour rated penetration seals, except for the HVAC duct penetrations described above. A fire in one room would first have to penetrate the ductwork in that room, pass through the wall into the other room, and then exit through the HVAC duct and into the other room. A case can be made that this torturous path for fire to get from one room to the other is equivalent to three hours. Since the fire dampers are located near the air supply and return grills, a fire would first have to penetrate the one and one-half hour damper at the grill, pass through the wall inside the ductwork in which there is no continuity of combustibles, and then exit into the redundant room past the one and one-half hour fire damper at the air or supply grill in the adjacent room. One and one-half hour fire dampers in tandem are equivalent to three hours. Also, the fire resistive insulating board on the exterior of the ducts offers approximately three hours of fire resistance if one follows the torturous path to get from one room to the other through the HVAC ductwork. Therefore, the Section III.G.2.(a) requirement for redundant trains being separated by a fire barrier having a three-hour rating could be estimated to be met by the wall separating the Critical Switchgear Rooms 1F and 1G.

In conclusion, with the wall between the two redundant switchgear rooms being a three-hour wall except for the HVAC duct penetrations which are provided with equivalent protection; with the low combustible loading well below the rating of the barrier, even when considering an unreasonable transient combustible; and with the additional mitigating features described above; the Nebraska Public Power District requests that the staff grant an exemption from the literal three-hour barrier requirements of Appendix R, Section III.G.2.(a).

2. REACTOR BUILDING 931' ELEVATION

The general floor area of the Reactor Building 931' Elevation is shown on Drawing 1 attached. This area is bound by three-hour reinforced concrete walls, floor, and ceiling. However, there are open hatchways and unsealed pipe, conduit, cable tray, and HVAC penetrations in the floor and ceiling of this elevation. For this reason, the entire Reactor Building is essentially one fire area because of these minor unsealed penetrations and the open equipment hatchway. However, for purposes of simplifying the discussion regarding Appendix R exemption requests, we will address each level of the Reactor Building containing essential equipment necessary for safe shutdown an elevation at a time.

On the 931' Elevation of the Reactor Building are redundant Reactor Vessel Level and Pressure Instrument Racks A and B. Rack A is Division I and Rack B is Division II. Instrument Rack A, as shown on the drawing, is located near the northwest corner of the Reactor Building 931' Elevation and Instrument Rack B is located near the southeast corner of this elevation. The drawing illustrates the inherent partial fire barrier provided by the reactor vessel primary containment walls which do a good job of separating the two instrument racks. The racks are also separated by a minimum of 80 feet. The floor area between the instrument racks is of low combustible loading as the only combustible of any real significance on this elevation is the MG set heat exchangers located in the northwest corner of the 931' Elevation. The oil contained within the MG set heat exchangers located in the northwest corner is confined by a diked area around the heat exchangers along with an automatic wet pipe sprinkler system over the heat exchangers and the diked area.

The combustible loading for the area between the instrument racks has an average Btu loading of approximately 10,000 Btu's per square foot. This equates to approximately an eight-minute fire on the ASTM E-119 time-temperature curve. The light combustible loading in the area between the racks is represented by cable insulation. However, a large portion of the cable is in conduit with all power cable within conduit. The cable tray loadings on this elevation are generally light to moderate. Housekeeping on this elevation is very good.

From a transient fire standpoint, access to the Reactor Building requires key-card access. The area between the instrument racks is not an area of high maintenance or an area where large quantities of hydrocarbons are needed or even pass through. The cable trays in the area do not provide continuity of combustibles between the two instrument racks. Even if one were to assume a very large transient load represented by a 55-gallon drum of lube oil, this would only add an additional 1,000 Btu/sq ft to the average Btu loading. This would raise the total average loading to approximately 11,000 Btu/sq ft. This equates to approximately a nine-minute fire on the ASTM E-119 time-temperature curve. A fire of this slight severity poses no threat to redundant equipment separated by the large spatial separation which exists.

In addition to the low combustible loading and the lack of continuity of combustibles, Cooper Nuclear Station has in effect administrative procedures for the control of combustible materials and for the control of ignition sources. Spatial separation of redundant divisions is in accordance with IEEE-384 of three feet horizontal and five feet vertical separation. The sprinkler system over the MG set heat exchangers is equipped with a flow switch which alarms to the control room. Also alarming to the control room are automatic smoke detectors located throughout the 931' Elevation. The plant is equipped with a well-trained fire brigade which does have excellent fire fighting access to the 931' Elevation. This fire brigade has at its disposal adequate manual fire fighting equipment. This equipment consists of one and one-half inch fire hose stations located near each stairway and elevator landing. These hose stations can also be connected to portable foam carts which are especially effective in fighting flammable and combustible liquid fires. Portable fire extinguishers are distributed throughout the area. In addition to the equipment located within the area there are fixed fire lockers strategically located throughout the plant, one of which is located just outside the main Reactor Building entrance doors on the north side at the 903' Elevation. The fire lockers are equipped with additional portable fire extinguishers, breathing apparatus, protective clothing, and other miscellaneous fire fighting equipment. Also, portable fire carts can be brought to bear on any area in the plant. The portable carts are provided with fire extinguishers, fire hose, nozzles, wrenches, and additional fire brigade tools.

In conclusion, based on the automatic fire detection provided throughout the 931' Elevation; the large spatial separation between the redundant instrument racks, which is a minimum of 60' beyond the required 20' of separation with the additional 60' being equivalent to automatic suppression; the lack of continuity of combustibles between the two instrument racks; the low combustible loading in the area; and the additional defense-in-depth fire protection features discussed above; the Nebraska Public Power District requests that the Staff grant an exemption from the requirement for automatic suppression in Section III.G of Appendix R.

3. REACTOR BUILDING 903' ELEVATION (EXCLUDING NORTHEAST CORNER)

The general floor area of the 903' Elevation of the Reactor Building, excluding the northeast corner which has been previously addressed in this submittal, is bound by three-hour reinforced concrete walls, floor, and ceiling. However, there are unsealed HVAC, pipe, conduit, and cable tray penetrations in the floor and ceiling of this elevation, along with an open hatchway in the ceiling and hatchways in the floor which are covered with steel plating. As discussed in the 931' Elevation of the Reactor Building, the entire Reactor Building is essentially one fire area; however, for purposes of simplifying the discussion, each elevation will be analyzed with respect to the requirements of Appendix R, Section III.G.2. Refer to Drawing 2 attached.

The 903' level of the Reactor Building, exclusive of the northeast corner, contains redundant Division I and Division II safe shutdown equipment and cables in conduit. The Division I equipment and conduits of concern are located along the north wall of the Reactor Building and into the northwest corner where they run down the wall and through the 903' Elevation floor into the northwest quadrant of the Reactor Building. The Division II equipment and conduits of concern are located along the south wall of the Reactor Building and into the southwest corner, down along the wall, and through the floor of the 903' Elevation into the southwest quadrant. The redundant equipment and conduits are separated by a minimum of 75 feet of open, clear space without continuity of combustibles. The area does contain automatic smoke detection which alarms to the control room. The only combustible loading of any significance on this elevation is represented by cable insulation in cable trays. A large portion of the cable is in conduit. The average Btu loading on this elevation is approximately 20,000 Btu's per square foot. This equates to an approximate 15-minute fire on the ASTM E-119 time-temperature curve. All cable is equivalent to IEEE-383 qualified fire-resistive cable. A large portion of the cable in this area is in conduit with all power cable within conduit. The cable tray loadings are generally light. Housekeeping in the 903' Elevation area is very good.

From a transient fire load standpoint the area does require key-card access, and because the 903' Elevation is the ground floor elevation, the area tends to be a traffic area which precludes the area being blocked by large quantities of combustibles. Even if one assumes a very large transient represented by a 55-gallon drum of lube oil, this would only add an additional 800 Btu/sq ft to the average Btu loading. This would raise the total average loading to approximately 20,800 Btu/sq ft. This equates to approximately a 16-minute fire on the ASTM E-119 time-temperature curve. A fire of this slight severity poses no threat to redundant equipment separated by the large spatial separation which exists.

In addition to the low combustible loading and the lack of continuity of combustibles in this area, the plant has in effect administrative procedures for the control of combustible materials and a maintenance procedure for the control of ignition sources. There is an automatic wet pipe sprinkler system located in the northeast corner of the 903' Elevation which extends to near Column Line N. The smoke detection

system throughout the 903' Elevation does alarm to the control room. The well-trained fire brigade established at CNS has excellent fire fighting access to the 903' Elevation from several different directions. The brigade is equipped with a good supply of manual suppression equipment. This equipment consists of one and one-half inch fire hose stations located near all stairways in this area. Also, portable fire extinguishers are located throughout the elevation. In addition, there are also fixed fire lockers strategically located throughout the plant, one of which is located just outside the north main entrance to the Reactor Building at the 903' Elevation. The fire lockers are equipped with additional portable fire extinguishers, breathing apparatus, protective clothing, and other miscellaneous fire fighting equipment. There are also two portable fire carts which can be brought to this area. The carts are provided with fire extinguishers, fire hose, nozzles, wrenches, and additional fire brigade tools.

In conclusion, based upon the fire detection system provided, on this elevation and the large spatial separation of approximately 75 feet void of continuity of combustibles, the requirements of Section III.G.2.(b) are met except for the requirement for automatic suppression. The Nebraska Public Power District feels that the additional 55 feet of spatial separation above and beyond the required 20 feet of separation, along with the low combustible loading and the additional protective features described above, provide equivalent protection to an automatic suppression system. Therefore, we request the Staff to grant an exemption from the automatic suppression requirement of Appendix R, Section III.G.2.(b).

4. REACTOR BUILDING 859' AND 881' ELEVATIONS - QUADRANTS AND TORUS AREA

The Reactor Building quadrants and torus area are located on the 859' and 881' Elevations of the Reactor Building. The quadrants are divided into the northeast, northwest, southeast, and southwest corners of the building. This entire area is underground with all walls, floors, and ceilings being constructed of reinforced concrete (refer to Drawing 3 attached). As is shown by the drawing, the southwest quadrant also contains the HPCI pump room. The diagonal walls of each quadrant are waterproofed up from the 859' Elevation for approximately 10 to 20 feet. This is done by the use of rubber boot seals around the pipe penetrations. Above the waterproof seals, at approximately the 881' Elevation, there are several open pipe, conduit, and HVAC penetrations within these diagonal walls. Also, there are a few minor unsealed conduit and pipe penetrations in the ceilings of some quadrants along with hatchways for the northeast and southeast quadrants which are covered with steel plating. Hatchways for the northwest and southwest quadrants are sealed with concrete plugs. HVAC penetrations through the ceiling of each quadrant are not equipped with fire dampers and some of the HVAC penetrations through the ceiling are not sealed around the ductwork. Therefore, as in the discussions for the 931' Elevation and 903' Elevation of the Reactor Building, the entire Reactor Building can be considered one fire area. However, for purposes of simplifying the discussion, this elevation will be analyzed separately with respect to the requirements of Appendix R, Section III.G.2.

There are large spatial separations between the two redundant divisions at the 859' and 881' Elevations, similar to the spatial separations of redundant equipment on the 931' and 903' Elevations. The Division I equipment and cables in conduit are located along the north wall and within the northeast and northwest quadrants. The Division II equipment and conduits are located along the south wall and within the southeast and southwest quadrants. Therefore, there is a minimum of 75 feet of spatial separation between the redundant divisions. The open space between the quadrants is the torus area. The torus area contains negligible combustibles. Also, the torus itself and the drywell provide somewhat of a natural barrier between the redundant quadrants.

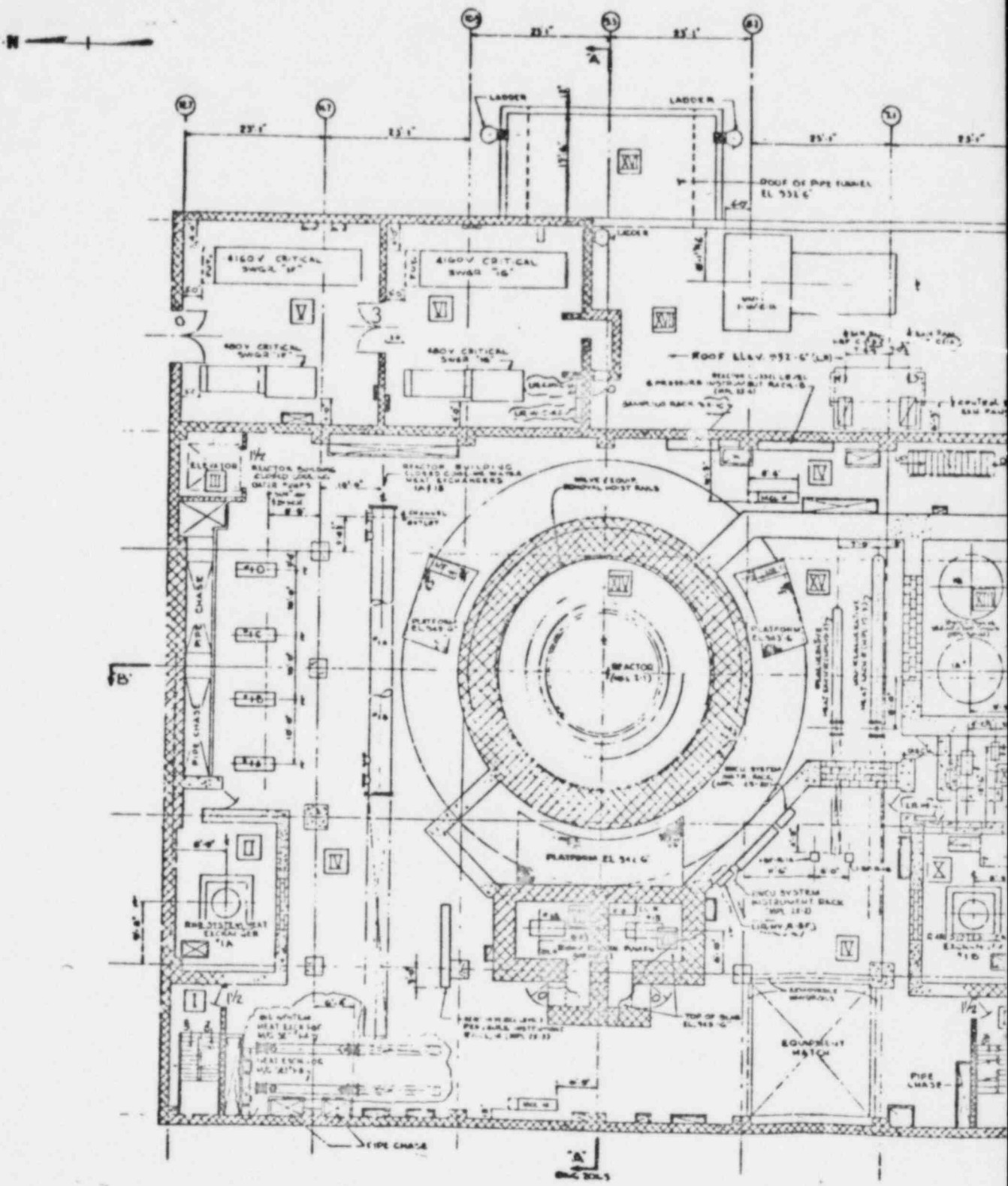
The combustible loading within each quadrant is limited to moderate to small quantities of lube oil. The largest average Btu loading is in the HPCI pump room located in the southwest quadrant. This area contains an average Btu loading of approximately 22,000 Btu's per square foot. This equates to approximately a 17-minute fire on the ASTM E-119 time-temperature curve. The cable in this area is all in conduit. The cable is equivalent to IEEE-383 qualified fire-resistive cable. The housekeeping within the quadrant areas is good.

From a transient fire load standpoint, the entire Reactor Building requires key-card access. These quadrant areas are not areas of high maintenance and the only reasonable transient load would be the lube oil necessary to change oil within the largest pump. If one assumes a transient load represented by three 55-gallon drums of lube oil necessary to change out the oil in the HPCI pump, this would only add an additional 22,800 Btu/sq ft to the average Btu loading. This would raise the total average loading to approximately 44,800 Btu/sq ft. This equates to

approximately a 34-minute fire on the ASTM E-119 time-temperature curve. A fire of this slight severity poses not threat to redundant equipment separated by the large spatial separation which exists.

In addition to the low combustible loading and the lack of continuity of combustibles in this area, Cooper Nuclear Station has in effect administrative procedures for the control of combustible materials and maintenance procedures for the control of ignition sources. All quadrants are equipped with automatic heat detectors, both at the 859' Elevation and the 881' Elevation. These detectors alarm to the control room. The CNS fire brigade has been well-trained and drilled in fighting fires in these quadrant areas. The fire brigade has at their access adequate manual fire fighting equipment. This equipment is in the form of one and one-half inch fire hose stations, portable fire extinguishers, and portable foam carts which can be brought to bear in these areas for the fighting of combustible liquid fires. In addition, fixed fire lockers are provided throughout the facility, one of which is located just outside the main north Reactor Building entrance at the 903' Elevation. These fire lockers are equipped with additional portable fire extinguishers, breathing apparatus, protective clothing, and other miscellaneous fire fighting equipment. The plant also has portable fire carts which are equipped with fire extinguishers, fire hose, nozzles, wrenches, and additional fire brigade tools.

Nebraska Public Power District seeks an exemption from the Section III.G.2.(b) requirement for automatic suppression. The quadrant areas are equipped with automatic heat detection and redundant divisions are separated by a minimum of 75 feet. This is 55 feet in excess of the required 20 feet separation. The 55 feet of clear space separation; the fire resistance provided by the diagonal quadrant walls, torus, and drywell; along with the mitigating defense-in-depth protective features described above, provide equivalent protection to the requirement for automatic suppression. For these reasons, the Nebraska Public Power District requests the Staff grant an exemption in this area from the Appendix R, Section III.G.2.(b), requirement for automatic suppression.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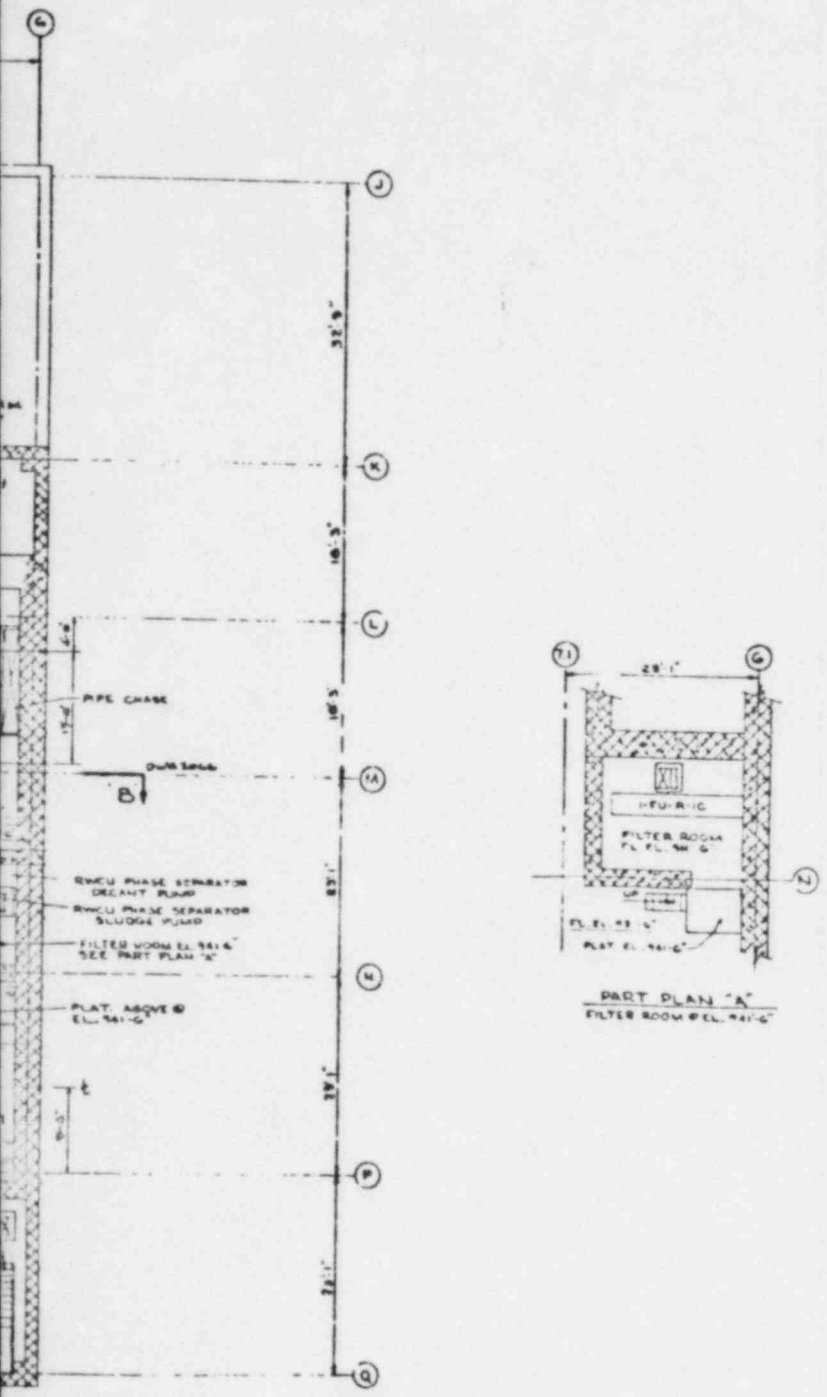
PIPE CHASE
PIPE CHASE
PIPE CHASE
PIPE CHASE
PLATFORM EL 943'-6"
PLATFORM EL 943'-6"
REACTOR
EQUIPMENT HATCH
PIPE CHASE
"A"
"B"



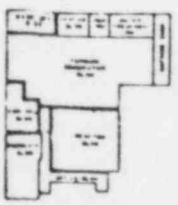
PART PLAN "A"
FILTER ROOM @ EL. 931'-6"

LEGEND: Fire Barrier

3 — NUMBER INDICATES HOURS OF FIRE RESISTANCE

DATE OF ISSUE: 12-7-76

FIRE AREAS

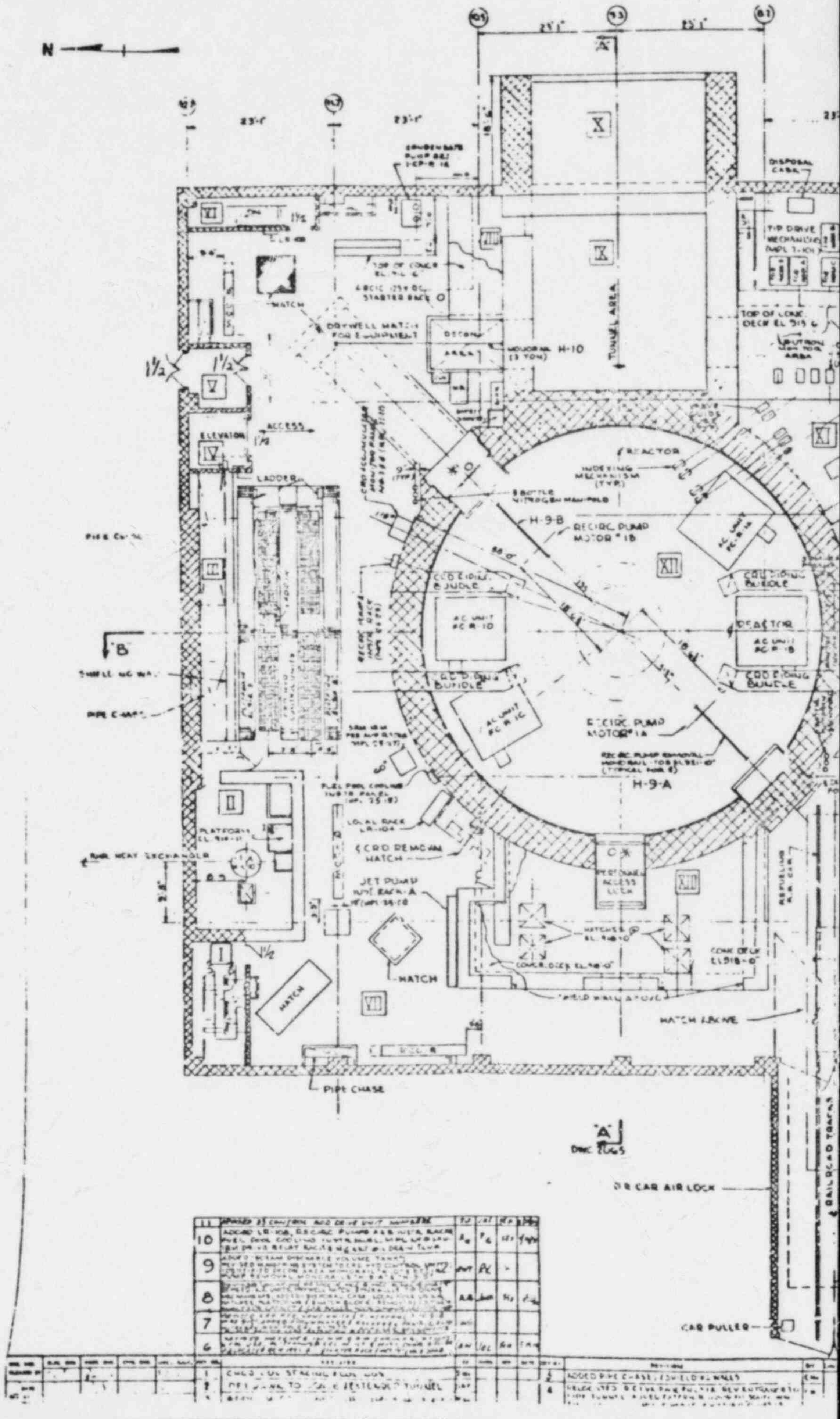


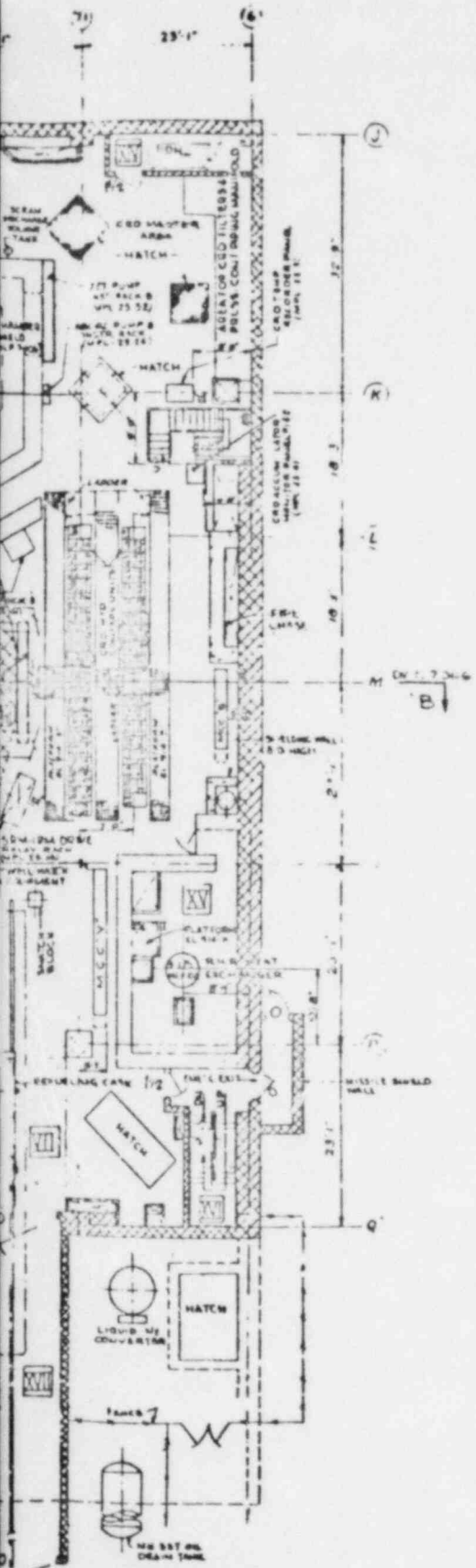
BURNS AND ROE, INC.
ENGINEERS AND CONSTRUCTORS
BRADELL N.J. MINEOLA N.Y. LOS ANGELES CALIF.

GENERAL ARRANGEMENT
REACTOR BUILDING
PLAN AT ELEV 931'-6"

CONSUMERS PUBLIC POWER DISTRICT
COOPER NUCLEAR STATION

Dwg. 1


N
23'-1"
X
IX
TUNNEL AREA
DISPOSAL CASK
TIP DRIVE MECHANISM
TOP OF CONC. DECK EL 313'-6
HATCH
DRYWELL HATCH FOR EQUIPMENT
DECON AREA
MONORAIL H-10 (3 TON)
H-10
VI
V
IV
III
II
I
VII
XI
XII
XIII
ELEVATOR
ACCESS
LADDER
PIPE CHASE
SHIELDING WALL
"B"
REACTOR
INDEXING MECHANISM (TYP.)
NITROGEN MANIFOLD
H-9-B
RECIRC PUMP MOTOR #1B
COOLING BUNDLE
AC UNIT FC-R-1D
AC UNIT FC-R-1B
AC UNIT FC-R-1C
REACTOR
RECIRC PUMP MOTOR #1A
H-9-A
PLATFORM
RHR HEAT EXCHANGER
LOCAL RACK
CRD REMOVAL HATCH
JET PUMP INST. RACK-A
PERSONNEL ACCESS LOCK
HATCHES
CONC. DECK
SHIELD WALL ABOVE
HATCH ABOVE
PIPE CHASE
"A"
DWG. 2065
RR CAR AIR LOCK
REFUELING R.R. CAR
RAILROAD TRACKS
CAR PULLER
10
9
8
7
6



LEGEND

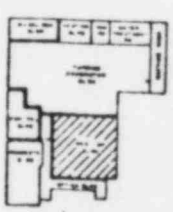
Fire Barrier

3 — NUMBER INDICATES HOURS OF FIRE RESISTANCE

* SPECIAL BUILDING CODE, NON COMBUSTIBLE CONSTRUCTION NOT RATED

DATE OF ISSUE: 12-7-76

FIRE AREAS

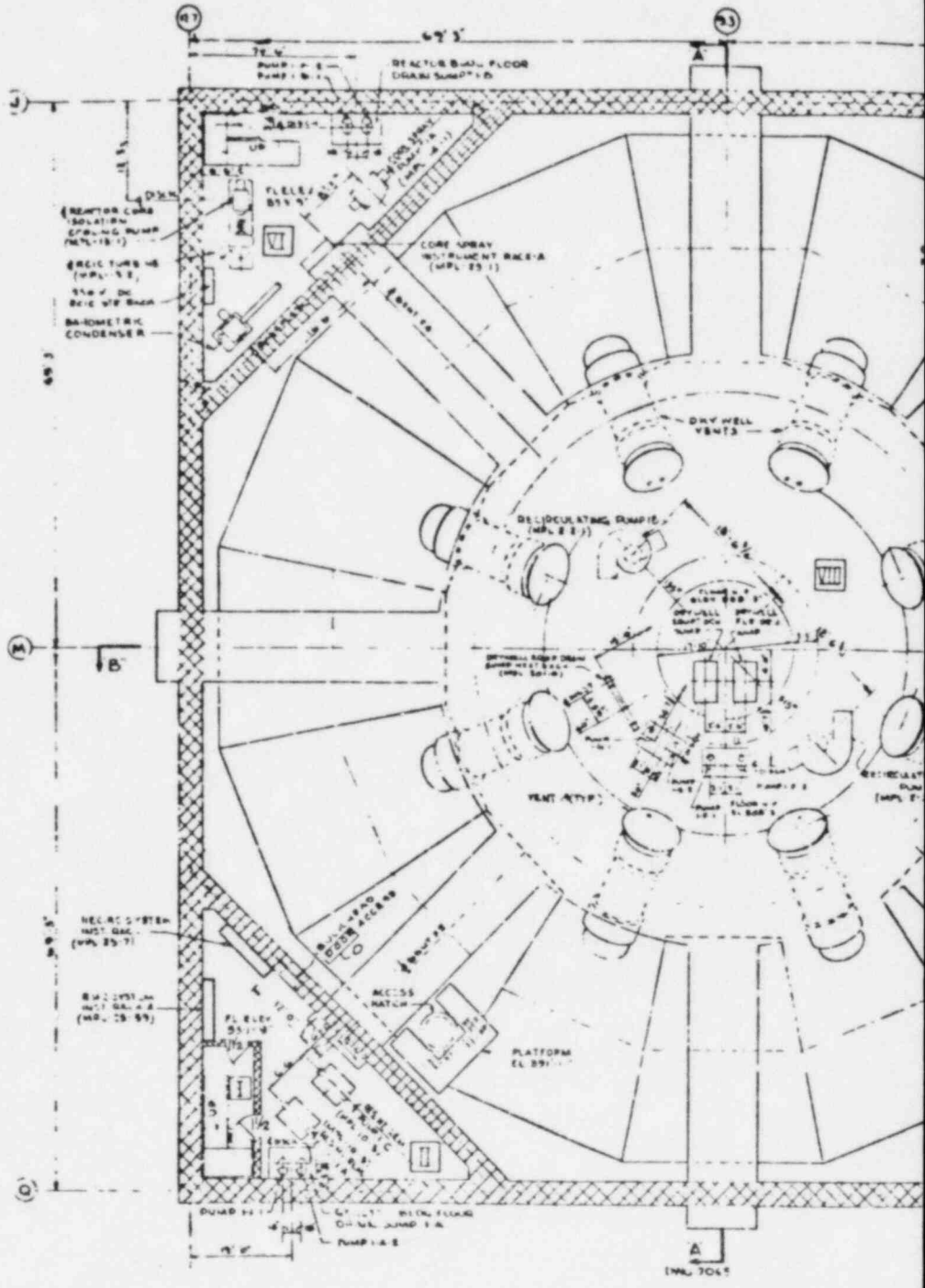


BURNS AND ROE, INC.
ENGINEERS AND CONSTRUCTORS
NEW YORK, N.Y.

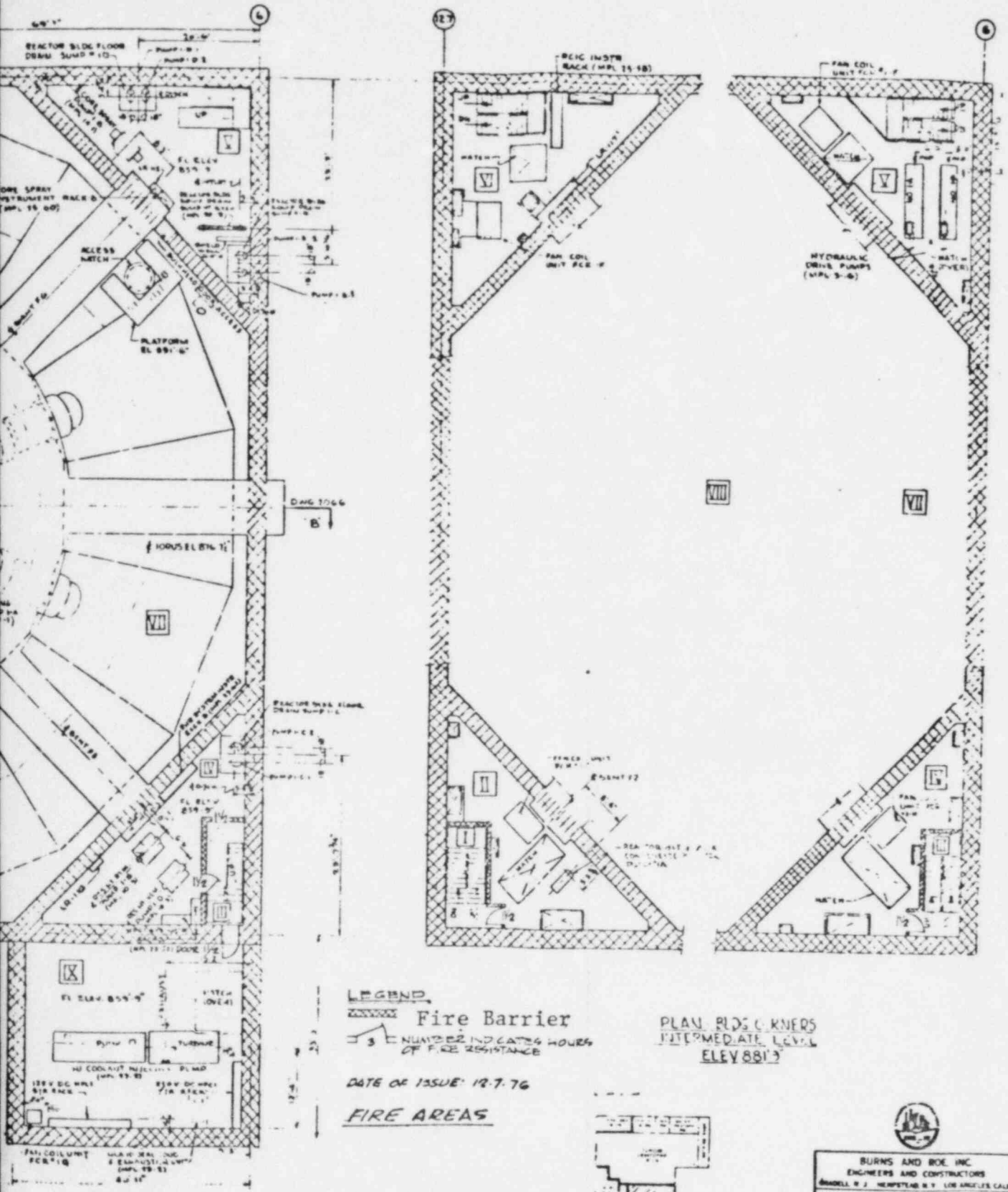
GENERAL ARRANGEMENT
REACTOR BUILDING
PLAN AT ELEV 903'-6"

CONSUMERS PUBLIC POWER DISTRICT
COOPER NUCLEAR STATION

Dwg. 2



PLAN BELOW GRADE
ELEV 899'
(EXCEPT AS NOTED OTHERWISE)



LEGEND

Fire Barrier

3 NUMBER INDICATES HOURS OF FIRE RESISTANCE

PLAN BLDG CONNERS
INTERMEDIATE LEVEL
ELEV 881'9"

DATE OF ISSUE: 12-7-76

FIRE AREAS

BURNS AND ROE, INC.
ENGINEERS AND CONSTRUCTORS
ORADELL N.J. HEMPSTEAD N.Y. LOS ANGELES CALIF.

GENERAL ARRANGEMENT
REACTOR BUILDING
PLAN BELOW GRADE

CONSUMERS PUBLIC POWER DISTRICT
COOPER NUCLEAR STATION

Dwg. 3