

Attachment to AEP:NRC:0692CL

Donald C. Cook Nuclear Plant Units 1 and 2
Technical Specifications

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PLANT SYSTEMS

3/4.7.9 FIRE SUPPRESSION SYSTEMS

FIRE SUPPRESSION WATER SYSTEM

LIMITING CONDITION FOR OPERATION

3.7.9.1 The fire suppression water system shall be considered to be OPERABLE with:

- a. Three fire suppression system pumps, * each with a capacity of 2500 gpm, with their discharge aligned to the fire suppression header,
- b. Two fire water tanks, * each with a minimum usable volume of 565,000 gallons (34.0 feet level indication).
- c. An OPERABLE flow path capable of taking suction from either one of the fire water tanks and transferring the water through distribution piping (with OPERABLE sectionalizing valves) up to the yard hydrant curb control valves, to the hose station valve(s) and water suppression system controlling valve(s). The hose station valve(s) and the water suppression system controlling valve(s) that are required to be in the flow path are given in Specifications 3.7.9.5 and 3.7.9.2, respectively.

APPLICABILITY: At all times.

ACTION:

- a. With one pump inoperable, restore the inoperable pump to OPERABLE status within 7 days or provide an alternate backup pump.
- b. With one fire water tank inoperable, restore the inoperable tank to OPERABLE status within 30 days or establish a backup water system supply.
- c. With the fire suppression water system otherwise inoperable:
 1. Restore the fire suppression water distribution system to OPERABLE status within 24 hours, or
 2. Establish a backup fire suppression water system within 24 hours.
- d. The provisions of Specifications 3.0.3 and 3.0.4 are not applicable.

* These pumps and tanks are shared between Units 1 and 2.

PLANT SYSTEMS

SURVEILLANCE REQUIREMENTS

4.7.9.1.1 The fire suppression water system shall be demonstrated OPERABLE:

- a. At least once per 7 days by verifying the water supply contained in the fire water tanks.
- b. At least once per 31 days on a STAGGERED TEST BASIS by starting each pump and operating it for at least 15 minutes on recirculation flow.
- c. At least once per 31 days by verifying that each valve (manual, power operated, or automatic) in the flow path that is not locked, sealed, or otherwise secured in position, is in its correct position.
- d. At least once per 6 months by performance of a system flush of above ground internal distribution headers and fire hydrants.
- e. At least once per 12 months by cycling each testable valve in the flow path through at least one complete cycle of full travel.
- f. At least once per 18 months by performing a system functional test which includes simulated automatic actuation of the system throughout its operating sequence, and:
 1. Verifying that each automatic valve in the flow path actuates to its correct position,
 2. Verifying that each pump develops a flow of at least 2500 gpm at a system head of at least 300 feet of water by observing three points (minimum, rated, and peak) on the pump's performance curve,
 3. Cycling each valve in the flow path that is not testable during plant operation through at least one complete cycle of full travel, and
 4. Verifying that each pump starts in its preplanned sequence to maintain the fire suppression water system pressure greater than or equal to 100 psig.
- g. At least once per 3 years by performing a series of flow tests so that every fire main segment (excluding individual system supplies) has been verified to be clear of obstruction by a full flow test.

PLANT SYSTEMS

SURVEILLANCE REQUIREMENTS (Continued)

4.7.9.1.2 The fire pump diesel engines shall be demonstrated OPERABLE:

- a. At least once per 31 days by verifying:
 - 1. The fuel storage tanks contain at least 160 gallons of fuel, and
 - 2. The diesels start from ambient conditions and operate for at least 30 minutes.
- b. At least once per 92 days by verifying that a sample of diesel fuel from the fuel storage tanks obtained in accordance with ASTM-D4057-81 is within the acceptable limits specified in Table 1 of ASTM-D975-81 when checked for viscosity, water and sediment.
- c. At least once per 18 months by subjecting the diesels to an inspection in accordance with procedures prepared in conjunction with the manufacturer's recommendations for this class of standby service.

4.7.9.1.3 The fire pump diesel starting battery banks and chargers shall be demonstrated OPERABLE:

- a. At least once per 7 days by verifying that:
 - 1. The electrolyte level of each battery is above the plates, and
 - 2. The output battery voltage of each bank is greater than 24 volts.
- b. At least once per 92 days by verifying that the specific gravity is appropriate for continued service of each battery.
- c. At least once per 18 months by verifying that:
 - 1. The batteries, cell plates and battery packs show no visual indication of physical damage or abnormal deterioration, and
 - 2. The battery-to-battery and terminal connections are clean, tight, free of corrosion, and coated with anti-corrosion material.

1. The first part of the document is a letter from the President of the United States to the Congress, dated January 3, 1863. It is a very important document, as it contains the President's message to the Congress, and is one of the most important documents in the history of the United States.

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BASES

3/4.7.9 FIRE SUPPRESSION SYSTEMS

The OPERABILITY of the fire suppression systems ensures that adequate fire suppression capability is available to confine and extinguish fires occurring in any portion of the facility where safety related equipment is located. The fire suppression systems consist of the water system, spray and/or sprinklers, CO₂, Halon and fire hose stations. The collective capability of the fire suppression systems is adequate to minimize potential damage to safety-related equipment and is a major element in the facility fire protection program.

In the event that one or more CO₂ suppression systems requiring automatic actuation must be isolated for personal protection to permit entry for routine tours, maintenance, construction, or surveillance testing in the protected area, the fire detection system(s) required to be OPERABLE by Specification 3.3.3.7 shall be verified to be OPERABLE. Isolation of an automatic CO₂ suppression system temporarily puts this system in a manual actuation mode.

Reliance on the fire detection system, in conjunction with the ability to manually discharge the CO₂ suppression system will provide adequate fire protection for periods when personnel are required to work in these areas.

In the event that portions of the fire suppression systems are inoperable, alternate backup fire fighting equipment is required to be made available in the affected areas until the inoperable equipment is restored to service. When the inoperable fire fighting equipment is intended for use as a backup means of fire suppression, a longer period of time is allowed to provide an alternate means of fire fighting than if the inoperable equipment is the primary means of fire suppression. Backup fire protection equipment will normally take the form of permanently mounted fire extinguishers and/or fire hose stations in or near the area, or fire hoses routed to the affected area. In the event that the fire water tanks become inoperable, Lake Michigan may serve as their backup. Two manual, diesel-engine driven, vertical-turbine fire pumps rated at 2000 gpm, which take suction off of Lake Michigan and provide water to the fire suppression header, are administratively controlled. One of these pumps may serve as a backup to one of the fire suppression pumps that take suction off of the tanks. However, it is not our intent to rely on backup systems or other compensatory measures for an extended period of time and action will be taken to restore the inoperable portions of the fire suppression system to OPERABLE status within a reasonable period.

The surveillance requirements provide assurance that the minimum OPERABILITY requirements of the fire suppression systems are met. While performing the surveillances specified in 4.7.9.1 the fire suppression water system is still capable of performing its intended function. Consequently, it is not necessary to enter the ACTION STATEMENT specified in 3.7.9.1 while the SURVEILLANCES specified in 4.7.9.1.1 are being performed, unless the tested equipment fails the SURVEILLANCE. In addition, an allowance is made for ensuring a sufficient volume of Halon and CO₂ in the Halon and CO₂ storage tanks by verifying either the weight, level, or pressure of the tanks.

100

Figure 1. The effect of the concentration of the *Agrobacterium* suspension on the transformation efficiency of *Agrobacterium* strains. The *Agrobacterium* strains were grown in YEA medium for 24 h at 28 °C. The cell concentration was adjusted to 10⁸ cells/ml. The cells were then mixed with the plant tissue and the transformation efficiency was determined. The results are shown as the mean ± SD of three independent experiments. The asterisk indicates a significant difference (p < 0.05) between the control and the treated groups.

1. The first step in the process is to identify the problem. This involves gathering information about the situation and understanding the needs of the stakeholders involved.

2. Once the problem is identified, the next step is to develop a plan. This involves setting goals, identifying resources, and determining the steps that need to be taken to address the problem.

3. The third step is to implement the plan. This involves putting the plan into action and monitoring progress to ensure that the goals are being met.

4. Finally, the fourth step is to evaluate the results. This involves assessing the effectiveness of the plan and making adjustments as needed to improve the outcome.

Figure 1. The effect of the number of trials on the number of correct responses. The number of correct responses was significantly higher than the number of incorrect responses in all cases. The number of correct responses was significantly higher than the number of incorrect responses in all cases. The number of correct responses was significantly higher than the number of incorrect responses in all cases.

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Figure 1. The effect of the concentration of the *Agrobacterium* suspension on the transformation efficiency of *Agrobacterium* strains. The number of transformed cells was determined by the number of colonies obtained on the selective medium. The results are the mean of three independent experiments. Error bars represent the standard deviation.

Итого: 100%

BASES

3/4.4.7.9 (Continued)

The fire suppression water system has three fire pumps common to both units which discharge into underground ring headers. There is one motor-driven horizontal centrifugal fire pump rated at 2500 gpm that takes suction from the fire water storage tanks; and two diesel-engine-driven horizontal centrifugal fire pumps rated at 2500 gpm that take suction from the fire water storage tanks. Having a combination of diesel-driven and electric motor-driven pumps in the system design is consistent with NRC Branch Technical Position APSCB 9.5-1.

The flow paths capable of taking suction from Lake Michigan are normally isolated to preclude zebra mussel infestation of the system.

The purpose of the charcoal filter fire suppression T/S is to account for detection and suppression of fires in the charcoal filters. Manual operation of these systems is allowed because two-point heat detection with control room and local annunciation of trouble conditions is provided for the charcoal filters. The OPERABILITY of the fire suppression system protecting the charcoal filters is only required when there is charcoal in the filters. Actuation of spray water onto the charcoal filters requires both the manual opening of the system isolation valve and reaching the high temperature alarm setpoint for the automatic opening of the system deluge valve.

Because of the inaccessibility of the lower containment to personnel during operation due to ALARA radiation exposure concerns, the use of one or more CCTVs in the lower containment, to monitor for fire and smoke, is an acceptable substitute to an hourly fire watch, if the fire suppression system becomes inoperable.

All hourly fire watch patrols are performed at intervals of sixty minutes with a margin of fifteen minutes.

A continuous fire watch requires that a trained individual be in the specified area at all times and that each fire zone within the specified area be patrolled at least once every fifteen minutes with a margin of five minutes.

BASES

3/4.7.9 (Continued)

A control valve is defined as a valve that when closed does not leave an alternate open flow path to a system. A sectionalizing valve is defined as a valve that when closed does not prevent an alternate open flow path to a system and hence does not make the fire suppression water system inoperable. Under certain situations, the closure of a sectionalizing valve followed by the closure of a second valve will not leave an open flow path to one of the specified systems. In this instance, Action Statement c of Specification 3.7.9.1 is applicable.

Manual actuation of CO₂ fire suppression systems provides adequate fire protection for the protected areas based on OPERABLE fire detection in the area, low combustible loadings, and prompt fire brigade response to alarms.

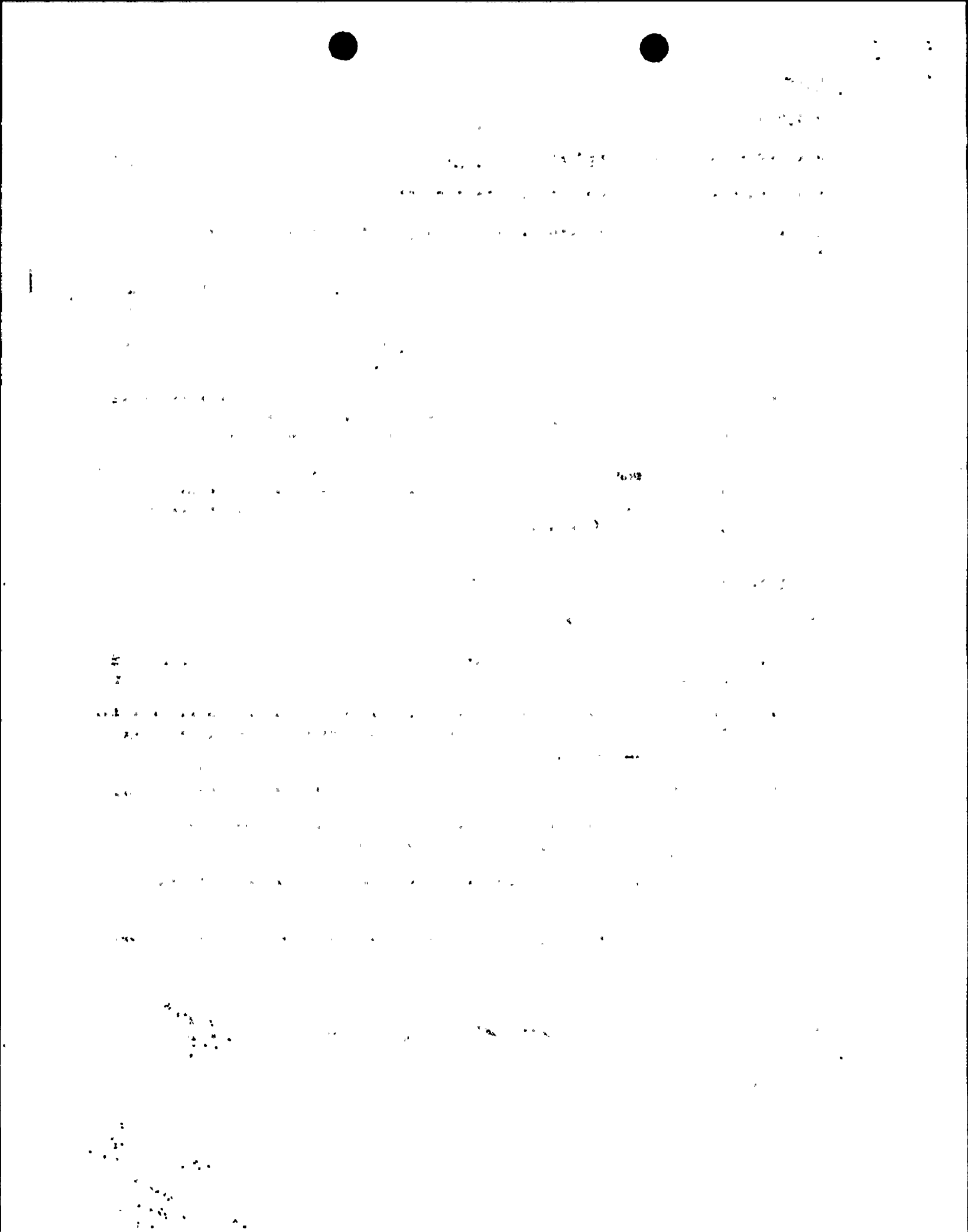
Many of the Action Statements take credit for OPERABLE fire detection in lieu of a fire watch when a fire protection system is inoperable. OPERABLE fire detection provides sufficient early warning capability of a fire to the appropriate Control Room.

During Surveillance Testing of a Low Pressure CO₂ System with the system inoperable, the requirement for a continuous fire watch may be suspended during portions of the test which result or may result in a discharge into the CO₂ protected area. Similarly, if a CO₂ actuation occurs which results in the need to have the Low Pressure CO₂ System made inoperable, the requirement for a continuous fire watch may be suspended. In either case, the area affected shall be restored to habitability as soon as practicable, after which the continuous fire watch is to be re-established if the system is still inoperable.

3/4.7.10 FIRE RATED ASSEMBLIES

The OPERABILITY of the fire barriers and barrier penetrations ensure that fire damage will be limited. These design features minimize the possibility of a single fire involving more than one fire area prior to detection and extinguishment. The fire barriers and fire barrier penetration sealing devices are periodically inspected to verify their OPERABILITY. The functional testing of the fire dampers is provided to ensure that the dampers remain functional. The ventilation seals area seals around ventilation duct work penetrating fire barriers. It is not our intent to rely on backup systems or other compensatory measures for an extended period of time and action will be taken to restore the inoperable portions of the fire rated assembly to OPERABLE status within a reasonable period.

For the purpose of determining OPERABILITY, an OPERABLE fire rated assembly and/or sealing device is one that is capable of performing its intended safety function.



PLANT SYSTEMS

3/4.7.9 FIRE SUPPRESSION SYSTEMS

FIRE SUPPRESSION WATER SYSTEM

LIMITING CONDITION FOR OPERATION

3.7.9.1 The fire suppression water system shall be considered to be OPERABLE with:

- a. Three fire suppression system pumps, * each with a capacity of 2500 gpm, with their discharge aligned to the fire suppression header,
- b. Two fire water tanks,* each with a minimum usable volume of 565,000 gallons. (34.0 feet level indication)
- c. An OPERABLE flow path capable of taking suction from either one of the fire water tanks and transferring the water through distribution piping (with OPERABLE sectionalizing valves) up to the yard hydrant curb control valves, to the hose station valve(s) and water suppression system controlling valve(s). The hose station valve(s) and the water suppression system controlling valve(s) that are required to be in the flow path are given in Specifications 3.7.9.5 and 3.7.9.2, respectively.

APPLICABILITY: At all times.

ACTION:

- a. With one pump inoperable, restore the inoperable pump to OPERABLE status within 7 days or provide an alternate backup pump.
- b. With one fire water tank inoperable, restore the inoperable tank to OPERABLE status within 30 days or establish a backup water system supply.
- c. With the fire suppression water system otherwise inoperable:
 1. Restore the fire suppression water distribution system to OPERABLE status within 24 hours, or
 2. Establish a backup fire suppression water system within 24 hours.
- d. The provisions of Specifications 3.0.3 and 3.0.4 are not applicable.

* These pumps and tanks are shared between Units 1 and 2.

1. The first part of the document is a list of names and addresses of the members of the committee.

2. The second part of the document is a list of names and addresses of the members of the committee.

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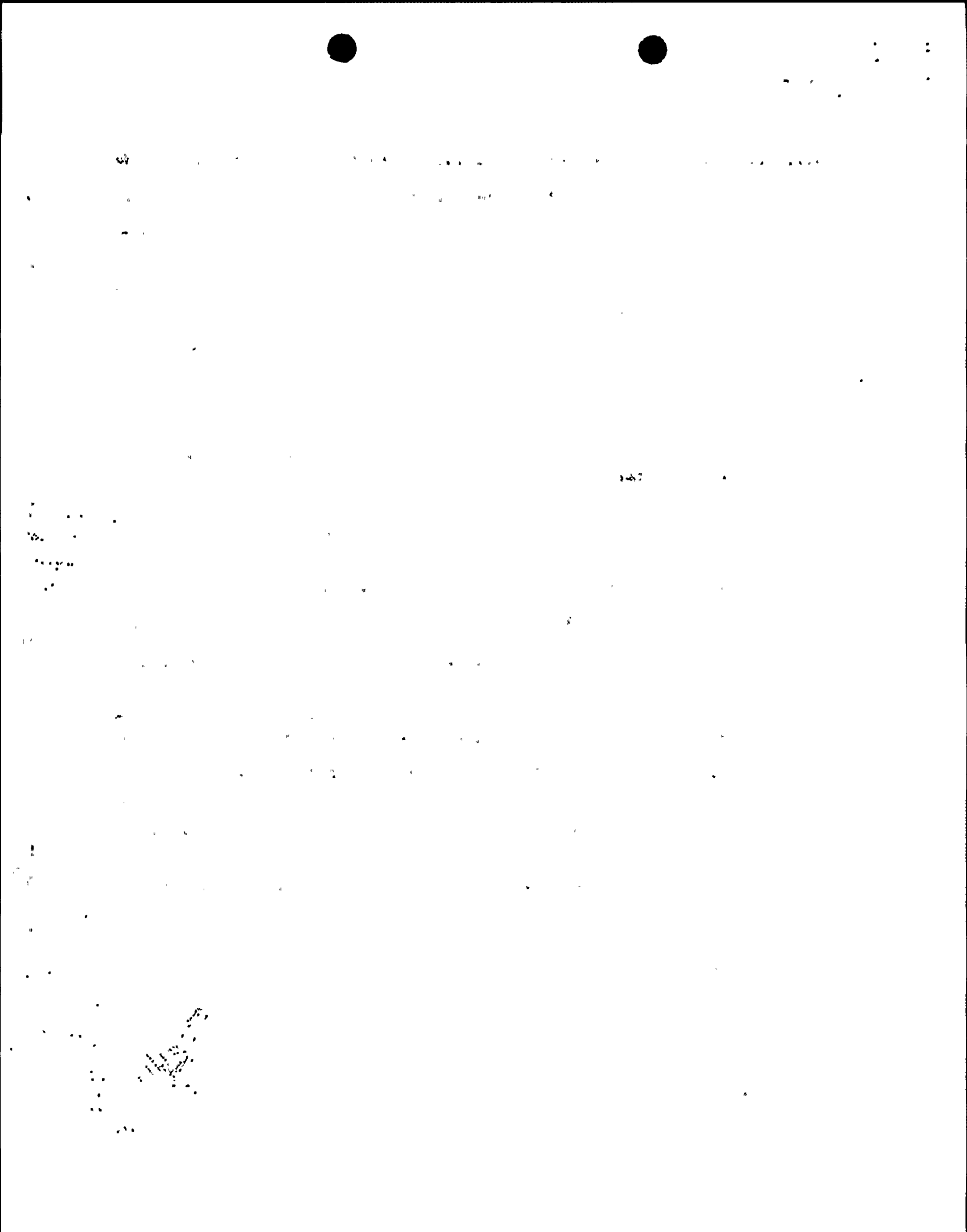
18. The eighteenth part of the document is a list of names and addresses of the members of the committee.

PLANT SYSTEMS

SURVEILLANCE REQUIREMENTS

4.7.9.1.1 The fire suppression water system shall be demonstrated OPERABLE:

- a. At least once per 7 days by verifying the water supply contained in the fire water tanks.
- b. At least once per 31 days on a STAGGERED TEST BASIS by starting each pump and operating it for at least 15 minutes on recirculation flow.
- c. At least once per 31 days by verifying that each valve (manual, power operated, or automatic) in the flow path that is not locked, sealed, or otherwise secured in position, is in its correct position.
- d. At least once per 6 months by performance of a system flush of above ground internal distribution headers and fire hydrants.
- e. At least once per 12 months by cycling each testable valve in the flow path through at least one complete cycle of full travel.
- f. At least once per 18 months by performing a system functional test which includes simulated automatic actuation of the system throughout its operating sequence, and:
 1. Verifying that each automatic valve in the flow path actuates to its correct position,
 2. Verifying that each pump develops a flow of at least 2500 gpm at a system head of at least 300 feet of water by observing three points (minimum, rated, and peak) on the pump's performance curve,
 3. Cycling each valve in the flow path that is not testable during plant operation through at least one complete cycle of full travel, and
 4. Verifying that each pump starts in its preplanned sequence to maintain the fire suppression water system pressure greater than or equal to 100 psig.
- g. At least once per 3 years by performing a series of flow tests so that every fire main segment (excluding individual system supplies) has been verified to be clear of obstruction by a full flow test.



PLANT SYSTEMS

SURVEILLANCE REQUIREMENTS (Continued)

4.7.9.1.2 The fire pump diesel engines shall be demonstrated OPERABLE:

- a. At least once per 31 days by verifying:
 1. The fuel storage tanks contain at least 160 gallons of fuel, and
 2. The diesels start from ambient conditions and operate for at least 30 minutes.
- b. At least once per 92 days by verifying that a sample of diesel fuel from the fuel storage tanks obtained in accordance with ASTM-D4057-81 is within the acceptable limits specified in Table 1 of ASTM-D975-81 when checked for viscosity, water and sediment.
- c. At least once per 18 months by subjecting the diesels to an inspection in accordance with procedures prepared in conjunction with the manufacturer's recommendations for this class of standby service.

4.7.9.1.3 The fire pump diesel starting battery banks and chargers shall be demonstrated OPERABLE:

- a. At least once per 7 days by verifying that:
 1. The electrolyte level of each battery is above the plates, and
 2. The output battery voltage of each bank is greater than 24 volts.
- b. At least once per 92 days by verifying that the specific gravity is appropriate for continued service of each battery.
- c. At least once per 18 months by verifying that:
 1. The batteries, cell plates and battery packs show no visual indication of physical damage or abnormal deterioration, and
 2. The battery-to-battery and terminal connections are clean, tight, free of corrosion, and coated with anti-corrosion material.

PLANT SYSTEMS

BASES

The service life of a snubber is evaluated via manufacturer's input and information through consideration of the snubber service conditions and associated installation and maintenance records (newly installed snubber, seal replaced, spring replaced, in high radiation area, in high temperature area, etc...). The requirement to monitor the snubber service life is included to ensure that the snubbers periodically undergo a performance evaluation in view of their age and operating conditions. These records will provide statistical bases for future consideration of snubber service life. The requirements for the maintenance of records and the snubber service life review are not intended to affect plant operation.

The number of snubbers to be functionally tested during each surveillance is based on calculations performed to allow extension of the surveillance interval from 18 months to 24 months, and therefore, the number of snubbers functionally tested deviates from the number required by the Westinghouse Standard Technical Specifications (NUREG-0452, Revision 4).

3/4.7.8 SEALED SOURCE CONTAMINATION

The limitations on removable contamination for sources requiring leak testing, including alpha emitters, is based on 10 CFR 70.39(c) limits for plutonium. This limitation will ensure that leakage from byproduct, source, and special nuclear material sources will not exceed allowable intake values.

3/4.7.9 FIRE SUPPRESSION SYSTEMS

The OPERABILITY of the fire suppression systems ensures that adequate fire suppression capability is available to confine and extinguish fires occurring in any portion of the facility where safety-related equipment is located. The fire suppression system consists of the water system, spray and/or sprinklers, CO₂, halon and fire hose stations. The collective capability of the fire suppression systems is adequate to minimize potential damage to safety-related equipment and is a major element in the facility fire protection program.

In the event that one or more CO₂ suppression systems requiring automatic actuation must be isolated for personal protection to permit entry for routine tours, maintenance, construction, or surveillance testing in the protected area, the fire detection system(s) required to be OPERABLE by Specification 3.3.3.7 shall be verified to be OPERABLE. Isolation of an automatic CO₂ suppression system temporarily puts this system in a manual actuation mode. Reliance on the fire detection system, in conjunction with the ability to manually discharge the CO₂ suppression system, will provide adequate fire protection for periods when personnel are required to work in these areas.

PLANT SYSTEMS

BASES

3/4.7.9 (Continued)

In the event that portions of the fire suppression systems are inoperable, alternate backup fire fighting equipment is required to be made available in the affected areas until the inoperable equipment is restored to service. When the inoperable fire-fighting equipment is intended for use as a backup means of fire suppression, a longer period of time is allowed to provide an alternate means of fire fighting than if the inoperable equipment is the primary means of fire suppression. Backup fire protection equipment will normally take the form of permanently mounted fire extinguishers and/or fire hose stations in or near the area, or fire hoses routed to the affected area. In the event that the fire water tanks become inoperable, Lake Michigan may serve as their backup. Two manual, diesel-engine driven, vertical-turbine fire pumps rated at 2000 gpm, which take suction off of Lake Michigan and provide water to the fire suppression header, are administratively controlled. One of these pumps may serve as a backup to one of the fire suppression pumps that take suction off of the tanks. However, it is not our intent to rely on backup systems or other compensatory measures for an extended period of time and action will be taken to restore the inoperable portions of the fire suppression system to OPERABLE status within a reasonable period.

The surveillance requirements provide assurance that the minimum OPERABILITY requirements of the fire suppression systems are met. While performing the surveillances specified in 4.7.9.1.1 the fire suppression water system is still capable of performing its intended function. Consequently, it is not necessary to enter the ACTION STATEMENT specified in 3.7.9.1 while the SURVEILLANCES specified in 4.7.9.1.1 are being performed, unless the tested equipment fails the SURVEILLANCE. In addition, an allowance is made for ensuring a sufficient volume of Halon and CO₂ in the Halon and CO₂ storage tanks by verifying either the weight, level, or pressure of the tanks.

The fire suppression water system has three fire pumps common to both units which discharge into underground ring headers. There is one motor-driven horizontal centrifugal fire pump rated at 2500 gpm that takes suction from the fire water storage tanks; and two diesel-engine-driven horizontal centrifugal fire pumps rated at 2500 gpm that take suction from the fire water storage tanks. Having a combination of diesel-driven and electric-motor-driven pumps in the system design is consistent with NRC Branch Technical Position APSCB 9.5-1.

The flow paths capable of taking suction from Lake Michigan are normally isolated to preclude zebra mussel infestation of the system.

BASES

3/4.7.9 (Continued)

The purpose of the charcoal filter fire suppression T/S is to account for detection and suppression of fires in the charcoal filters. Manual operation of these systems is allowed because two-point heat detection with control room and local annunciation of trouble conditions is provided for the charcoal filters. The OPERABILITY of the fire suppression system protecting the charcoal filters is only required when there is charcoal in the filters. Actuation of spray water onto the charcoal filters requires both the manual opening of the system isolation valve and reaching the high temperature alarm setpoint for the automatic opening of the system deluge valve.

Because of the inaccessibility of the lower containment to personnel during operation due to ALARA radiation exposure concerns, the use of one or more CCTVs in the lower containment, to monitor for fire and smoke, is an acceptable substitute to a continuous fire watch, if the fire suppression system becomes inoperable.

All hourly fire watch patrols are performed at intervals of sixty minutes with a margin of fifteen minutes.

A continuous fire watch requires that a trained individual be in the specified area at all times and that each fire zone within the specified area be patrolled at least once every fifteen minutes with a margin of five minutes.

A control valve is defined as a valve that when closed does not leave an alternate open flow path to a system. A sectionalizing valve is defined as a valve that when closed does not prevent an alternate open flow path to a system and hence does not make the fire suppression water system inoperable. Under certain situations, the closure of a sectionalizing valve followed by the closure of a second valve will not leave an open flow path to one of the specified systems. In this instance, Action Statement c of Specification 3.7.9.1 is applicable.

Manual actuation of CO₂ fire suppression systems provides adequate fire protection for the protected areas based on operable fire detection in the area, low combustible loadings, and prompt fire brigade response to alarms.

BASES

3/4.7.9 (Continued)

Many of the Action Statements take credit for OPERABLE fire detection in lieu of a fire watch when a fire protection system is inoperable. OPERABLE fire detection provides sufficient early warning capability of a fire to the appropriate Control Room.

During Surveillance Testing of a Low Pressure CO₂ System with the system inoperable, the requirement for a continuous fire watch may be suspended during portions of the test which result or may result in a discharge into the CO₂ protected area. Similarly, if a CO₂ actuation occurs which results in the need to have the Low Pressure CO₂ System made inoperable, the requirement for a continuous fire watch may be suspended. In either case, the area affected shall be restored to habitability as soon as practicable, after which the continuous fire watch is to be re-established if the system is still inoperable.

3/4.7.10 FIRE RATED ASSEMBLIES

The OPERABILITY of the fire barriers and barrier penetrations ensures that fire damage will be limited. These design features minimize the possibility of a single fire involving more than one fire area prior to detection and extinguishment. The fire barriers and fire barrier penetration sealing devices are periodically inspected to verify their OPERABILITY. The functional testing of the fire dampers is provided to ensure that the dampers remain functional. The ventilation seals are seals around ventilation duct work penetrating fire barriers. It is not our intent to rely on backup systems or other compensatory measures for an extended period of time and ACTION will be taken to restore the inoperable portions of the fire rated assembly to OPERABLE status within a reasonable period.

For the purpose of determining OPERABILITY, an OPERABLE fire rated assembly/sealing device is one that is capable of performing its intended safety function.