



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

NOV 2 1982

MEMORANDUM FOR: R. Fraley, Executive Director
Advisory Committee on Reactor Safeguards

FROM: William V. Johnston, Assistant Director
Materials & Qualifications Engineering
Division of Engineering

SUBJECT: RESPONSE TO ACRS REGARDING FIRE PROTECTION
IN NUCLEAR PLANTS

During the April 2, 1982 ACRS meeting several fire protection issues were discussed regarding a memorandum dated March 24, 1982 from D. R. Bucci, Jr. to R. L. Ferguson. This memorandum presented fire items of interest to the ACRS. A copy of the staff's handout for that meeting is enclosed (Enclosure 1). Related questions were discussed at a May 14, 1982 ACRS Subcommittee meeting on Control Room Habitability. A copy of the staff's handout for that meeting is also enclosed (Enclosure 2).

Subsequently, you indicated that you would like a written reply to several items that were discussed but not fully answered. Your memorandum dated June 9, 1982 to W. Johnston set forth the specific questions to be answered. Our response to these questions is enclosed (Enclosure 3). We asked the Nuclear Utility Fire Protection Group to comment on the committee's questions. Their informal responses are provided as enclosure 4.

William V Johnston
William V. Johnston, Assistant Director
Materials & Qualifications Engineering
Division of Engineering

Enclosures:
As stated

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ENCLOSURE 1

NRC Fire Protection Program for Nuclear Power Facilities ACRS Full Committee Meeting, April 2, 1982

Introduction:

Paragraph 50.48 Fire Protection of 10 CFR 50 requires that each operating nuclear power plant have a fire protection plan that satisfies Criterion 3 of Appendix A to 10 CFR 50. During discussion of fire protection issues in the ACRS Full Committee meeting of October 1981, the staff was requested to provide information on certain issues concerning NRC Fire Protection requirements, Exemptions to NRC Fire Protection Requirements, Fires for critical areas, Fire Barriers, and the effects of fire suppressants.

NRC Fire Protection Requirements

On April 27, 1981, the Commission required that operating licenses issued after January 1, 1979 contain a condition requiring compliance with commitments made by an applicant and agreed to by the staff (SECY-80-546/SECY-81-114).

The guidelines for fire protection programs being used for the current reviews (i.e. after January 1, 1982) are set forth in NUREG-0800 Section 9.5.1 Fire Protection Program, July 1981. The guidelines contained in this document are the most recent consolidation of NRC fire protection guidance. They include the technical requirements set forth in Appendix R to 10 CFR 50.

For plants reviewed prior to January 1, 1982, the guidelines used for the review are set forth in the earlier issues of the Standard Review Plan, Supplementary guidance documents, and Appendix R to 10 CFR 50. These guidelines are in accordance with the Commission's Memorandum and Order in the matter of Petition for Emergency and Remedial Action, May 23, 1980 (CLI-80-21). The Commission's Order indicated that on April 23, 1980, the Commission approved a proposed rule concerning fire protection and that the combination of guidance contained in Appendix A to BTP 9.5-1 and the requirements set forth in the proposed rule define the essential elements for an acceptable fire protection program at nuclear power plants docketed for Construction Permit prior to July 1, 1976, for demonstration of compliance with General Design Criterion 3 of Appendix A to 10 CFR 50.

Exemptions to NRC Fire Protection Requirements

The majority of the exemption requests received to date have been concerned with the following categories:

1. Fixed fire barriers with less than 3-hour rating defining fire areas.

2. Fire barriers protecting shutdown cables without an automatic fire suppression system.
3. Less than 20 feet separation of cables with fire propagation retardants (e.g., coatings, blankets, covered trays) and an automatic suppression system.
4. For large open areas with few components to be protected and few in-situ combustibles, no automatic suppression system with separation less than 20 feet.
5. No fixed suppression in the control room.
6. No fixed suppression in areas without a large concentration of cables for which alternative shutdown capability has been provided.

Fires In Critical Areas

For the purposes of this discussion, critical areas are those areas where redundant systems necessary for plant shutdown are in close proximity and therefore a fire and/or fire suppressant system may threaten both systems (e.g. Control Room, Cable Spreading Room, Relay Rooms, Switchgear Rooms).

For critical areas our guidelines accept three methods of fire protection. A passive 3-hour fire barrier should be used where possible. Where a fixed barrier cannot be installed, an automatic suppression system in combination with a fire barrier or a separation distance free of combustibles is used if the configurations of systems to be protected and in-situ combustibles are such that there is reasonable assurance that the protected systems will survive. If this latter condition is not met, alternative shutdown capability is required and a fixed suppression system installed in the fire area of concern, if it contains a large concentration of cables. It is essential to remember that these alternative requirements are not deemed to be equivalent. However, they provide adequate protection for those configurations in which they are accepted. In addition, we accept other alternative configurations, if they are justified by a fire hazards analysis. Where alternative shutdown capability is provided it must meet the minimum criteria set forth in Section III.L of Appendix R. The alternative must assure that one train of equipment necessary to achieve hot shutdown from either the control room or emergency control stations is free of fire damage. In addition, the alternative must assure that fire damage to at least one train of equipment necessary to achieve cold shutdown is limited such that it can be repaired within a reasonable time (i.e., minor repairs with components stored on-site).

Fire Barriers

Fire areas are usually defined by wall, ceiling and floors which act as fire barriers to confine the effects of a fire. These

assemblies may be penetrated by piping, conduit, ventilation ducts, doorway, and access hatches. Normally, these openings are closed by penetration seals, fire doors, or fire dampers. Fire dampers are usually open and should close when a fire occurs. Some fire doors operate in a similar manner, however, in most cases fire doors are normally closed. Penetration seals and access hatches are usually in place; however, during repair or maintenance procedures they may be open.

Because any of these openings may be open at the time of a fire, part of the fire fighting strategy should be to assure that these openings are closed or that compensating measures are taken to contain the fire.

Effects of Fire Suppressants

The effects of fire suppressants on components and equipment should be taken into account in all fire areas (GDC 3). For example, the zone of influence of a fire hose is as great or sometimes greater than the fire itself.

ENCLOSURE 2

ACRS SUB-COMMITTEE MEETING
CONTROL ROOM HABITABILITY
MAY 14, 1982 - PREPARED BY R. EBERLY

1. (a) How reliable are fire dampers?

To our knowledge, there have been no studies conducted to date, which have specifically addressed the question of fire damper reliability. However, our experience with the design and installation of fire dampers permits us to make some relevant observations. In general, fire damper operation is caused by the melting of a eutectic alloy fusible link which releases the damper. The damper is then free to close either from the force of gravity or due to the force of a spring. On a relative scale, we are of the opinion that the reliability of a fusible link operator on a fire damper should be roughly equivalent to the reliability of a fusible link on an automatic sprinkler head. Additionally, fire dampers which are listed by Underwriters Laboratories must pass a reliability test to be approved. The Underwriter's reliability test requires a damper to be subjected to a cycling test, a salt spray corrosion test, and a dust loading test to ensure that it can function as intended after actual installation.

(b) Can you stop air flow within a control room for fire control?

The operation of control room ventilation systems has been previously described by Mr. Wermeil. I will, therefore, only address this question in regard to fire dampers. Fire dampers are normally installed to close in the direction of air flow. If the damper has been correctly installed, it should be capable of closing while the ventilation system is operating. If this occurs, the majority

of air flow will be stopped by the fire damper. Because a fire damper is designed to prevent the spread of fire, not smoke, a small amount of heated air, and smoke can still pass through a fully closed fire damper. Depending on the nature and location of a fire, it is possible that an amount of smoke could leak into the control room, even if all fire dampers have functioned properly.

2. (a) If dampers automatically close during a fire, can you over-ride this action?

The answer to this question depends on the type of dampers installed in the control room ventilation system. There are several types of dampers and releasing or operating mechanisms available. One manufacturer has developed a motor operated damper with a re-opening capability that can be operated from a remote location. Other manufacturers provide a manual operator on the damper itself for local control. NRC fire protection guidelines, however, do not require that any type of damper over-ride mechanisms be installed.

3. How reliable are fire or smoke detection systems for control rooms?

To our knowledge, this issue has never been specifically investigated. Control room fire and smoke detection equipment is state-of-the-art equipment recommended by fire protection engineers for installation in typical industrial applications. We have no reason to believe that any aspect of a nuclear power plant control room warrants specialized detection equipment.

We have not reviewed the LERs to determine the performance record of control room detection systems.

4. Has anyone done a Probabilistic Risk Analysis of potential failures in the ventilation systems for NPP control rooms?

To our knowledge, no one has yet done such an analysis. The Indian Point and Zion PRA studies did not address the question of a fire in or adjacent to the control room or in the control room ventilation systems.

ENCLOSURE 3

STAFF RESPONSE TO ACRS RE: FIRE PROTECTION
QUESTIONS AS SET FORTH IN R. FRALEY'S
MEMORANDUM TO W. JOHNSTON DATED
JUNE 9, 1982

Question 1a

How rapidly must a control room fire be quenched such that remote shutdown remains operable?

Response

The control room is continuously manned and is equipped with portable fire extinguishers. In the event of a fire in the control room, there would be a time delay between the advent of the fire and release of the fire protection agent from the installed fire protection system. This time delay would depend on the location of the fire, its propagation rate, ventilation, discharge time associated with the suppression system and operator and fire brigade reaction time. Based on this variance, it is not possible to predict the damage that would be sustained by the redundant trains of equipment in the control room. Therefore, licensees of current operating and recent licensed facilities have been required to install an auxiliary shutdown system which is independent of the control room and which has this capability of achieving and maintaining hot shutdown conditions independent of the fire damage that occurred.

Except for Fermi 2, alternate or dedicated (remote) shutdown capability which meets NRC requirements is separated from the control room and is expected to remain operable regardless of how long it takes to suppress the fire and whether or not the entire control room burns. Under severe transient conditions produced by adverse valve or circuit breaker actions, manual operator actions are required to reestablish circuit breaker, valve and pump "line ups" and to isolate the undamaged portions of the remote shutdown systems external to the control room from the damaged portions of the systems within the control room.

For Fermi 2, redundant systems are in separate cabinets in the control room. A separate remote shutdown panel is provided for each redundant train. A fire in the control room cabinet would disable the remote shutdown panel for that train also. If the control room fire affects adjacent shutdown cabinets, then control switches at the redundant remote station also become inoperable. However, the licensee was required to develop emergency procedures such that if this happens, the affected equipment could be operated from its motor control center.

Question 1b

If the control room burned completely, is remote shutdown still operable?

Response

As described in 1.a. above, licensees are required to install an auxiliary shutdown system which is independent of the control room. The design of this auxiliary system and related power sources must be such that they will be available and have the capability to maintain this facility at hot shutdown conditions for a 72-hour period immediately following a fire, independent of the fire damage that may occur in the control room. Licensees must also have approved procedures and the necessary dedicated spare components, such as replacement lengths of cables with connectors attached, readily available for repair of required cold shutdown systems such that cold shutdown operations can be completed within the 72-hour period.

Question 2

What is the reliability/integrity of fire dampers juxtaposed with other fire fighting capability and safety related equipment in nuclear power plants?

Response

Fire dampers are installed in ventilation openings in fire barriers to reduce the amount of combustion products (hot gases, and particles) that are transferred from the fire area to other areas.

At the present time we do not have reliability data regarding fire dampers. However, we have made several attempts to obtain such data. The INPO and EPRI data acquisition programs do not include fire dampers at this time. The early NRC reliability data program did not include fire dampers. The American Nuclear Insurers and the Underwriters' Laboratory were also contacted without success. The Zion and Indian Point 2/3 PRA's did not include such data. We have concluded that a data base for the reliability of fire protection features is not available. We are considering a program to develop such a data base.

Question 3

What is the impact of fire protection equipment on critical areas and components particularly with regard to the impact of water hoses and water sprays on equipment reliability.

Response

The occurrence of a fire and the subsequent discharge of suppressants in the fire area generate an environment of hot gases, conducting particles, CO₂, Halon, Water. Electrical components are the most sensitive to such an environment and usually have not been specially designed to withstand the environment. All such components are not equally sensitive. There are three levels of sensitivity, e.g., (1) cables, (2) electrical equipment, and (3) electronic equipment.

Our requirements recognize the vulnerability of equipment to the fire and fire suppressants, e.g. GDC 3 requires that fire fighting systems be designed to assure that their rupture or inadvertent operation does not significantly impair the safety capability of structures, systems or components important to safety. Section III.G.3 of Appendix R to 10 CFR 50 requires that alternate shutdown capability be provided independent of fire areas where redundant systems required for hot shutdown may be subject to damage from fire suppression activities or from the rupture or inadvertant operation of fire suppression systems.

In addition, functional requirements for water and gaseous systems are included in BTP CMEB 9.5-1.

Question 4

What were the staff's conclusions/recommendations regarding their fire protection inspection of the D.C. Cook Nuclear Stations?

Response

Region III issued a report of the D.C. Cook inspection findings on September 22, 1982. A copy of the report (Enclosure 5) is attached for your information.

Question 5

If a fire damper stops the supply of ventilation to a room(s) as part of its fire-protection function, what is the effect on the operating equipment in the rooms (e.g., will isolation which occurs in the HVAC system cause or exacerbate failure of redundant safety related equipment by cutting off the air supply, for example, to multiple locations)?

Response

When the ventilation to a room(s) containing operating equipment is shutdown, the air in that room would start heating up at some rate. In some cases, the equipment's temperature will stabilize at some higher acceptable temperature determined by the natural circulation and heat load in the room. In other cases, the temperature may approach unacceptable levels such that operator actions would be required to protect the equipment. These operator actions could involve opening doors to provide additional natural circulation or providing portable blowers to ventilate the room. In some cases, licensees have installed auxiliary fans to cool critical areas where time was not available for such operator actions.

Any equipment, necessary to maintain hot shutdown conditions following a fire in a specific fire area should have adequate cooling for its operation; however, equipment not required for hot shutdown operations may be shutdown. Individual space coolers are provided

for certain safety related equipment. The criteria for compliance with Appendix R requirements includes verification that for a fire in any area of the plant, adequate safe shutdown equipment and related support equipment (such as ventilation) is available to assure safe shutdown.

Question 6a

If fire and hot gases are transmitted through HVAC ducts, what is the effect on electrical cabinets, switchgear, and other safety related equipment in the plant?

Response

If fire is transmitted through HVAC ducts via the burning of fuel which leaves the fire area involved in a fire prior to ignition or from dust within the duct, there is a potential of igniting a secondary fire in another fire area served by the duct.

If hot gases containing conducting particulate matter is transmitted through the HVAC ducts it would heat up other rooms and the particulate matter would deposit out on equipment.

No analysis has been made of the heat up rate in the fire area served by the duct. Such an analysis would be area dependent, it would have to consider design details beyond our review scope, and therefore is not included within our audit.

Of additional concern are those bus ducts that cross connect redundant switchgear. As a result, combustion products from a fire within one set of switchgear may be transmitted through the common bus duct to the redundant switchgear.

Question 6b

If fire dampers operate as designed, will they isolate rapidly enough to preclude damage to sensitive equipment?

Response

The sensitivity of electrical equipment to heat and combustion products is not established. The time required to fail such equipment would depend upon the configuration of the ventilation system. If the ventilation system is ducted directly into cabinets containing sensitive equipment, fire dampers would probably not act quickly enough to protect the equipment. If the ventilation system serviced a large room containing small cabinets of heat tolerant equipment damage would probably be precluded by fire damper operation.

Nuclear Utility Fire Protection Group's
Informal Responses to ACRS Questions

Question 1

How rapidly must a control room fire be quenched such that remote shutdown remains operable? If the control room burns completely, is remote shutdown still operable?

Response

The rapidity of quenching a control room fire is generally not an issue for plants having remote shutdown systems designed to respond to fire protection issues. Such systems generally allow the operator at the remote shutdown locations to isolate the damaged portion of the circuit and take control via a transfer switch. Theoretically such a remote shutdown system's performance would be independent of the magnitude or location of a control room fire.

Complete control room burnout is not considered a credible event. Power plants are designed and operated to provide sufficient time for the detection and suppression of control room fires in order to protect safe shutdown capability. Factors contributing to this situation, discussed below, include the presence of multiple fire protection systems and the low probability of such fires.

Nuclear power plant control rooms are equipped with multiple fire protection systems. In addition to the continuous fire watch provided by the operators, detectors are installed in locations where it has been determined that a potential fire hazard may exist. Plant specific detection system design and layout ensures rapid identification of smoldering fires prior to their development into large scale fires. Response to any such occurrence would be rapid given the multiple portable extinguishers located in the control room and the continual presence of the operating staff.

It should be emphasized that irrespective of the continued presence in the control room of an operating staff who are trained to serve with the fire brigade, and the multiple fire protection systems, the potential for fires in the control room is exceedingly low. Electrical systems in the control room are of low voltage and are designed and installed to high standards thereby reducing the likelihood of a fault which may lead to a fire. Should an electrical fault nevertheless develop, the low

voltage of these circuits inherently limits the amount of energy available to heat combustible materials to their ignition temperatures.

With regard to transient combustibles, once again the presence of the operating staff and the lack of maintenance activities within the control room tends to limit the introduction and accumulation of such materials thereby minimizing the potential for fires. Breakdown of administrative controls limiting such combustibles in the control room would be unlikely given the physical security system's limitation on general access to the control room and the presence in the control room of the operating staff.

All of these factors, while difficult to quantify, nevertheless suggest that the potential for the occurrence of a control room fire which may threaten system operability is very remote. Moreover, even if such a fire should slowly develop, detection by visual observation, the sense of a suspicious odor, or fire detection system alarm would bring an immediate fire fighting response by the trained operating staff. This consideration has been borne out through experience, i.e., significant control room fires have not occurred.

In view of the foregoing, we submit that control room fires are not a significant safety issue. Notwithstanding this view, it is still possible in an academic sense to postulate a control room fire of undetermined magnitude and origin which may propagate in a non-mechanistic manner. Lacking details concerning the scenario for such a fire, it is difficult to respond to the question in a generic sense. Some key concepts, however, may be highlighted in order to demonstrate the additional protection provided by the inherent flexibility available in the interface between the plant and the operator.

Assuming that an unspecified fire develops in the control room and begins to propagate in a manner which may tend to threaten the availability of important system panels, it may be safely assumed that a reactor trip will be effected either by operator action or as a result of the fire due to direct damage or related plant transient. During this period, early fire fighting activities by personnel in the control room would be rapidly complemented by the arrival of other plant management personnel and the fire brigade. While these activities are in progress, hot shutdown conditions would have been established requiring a minimum of safety functions. These functions would primarily involve the removal of decay heat to the heat sink, reactor pressure control and the maintenance of water inventory. For most units, procedures would dictate

that such functions be provided by normal balance-of-plant systems with other redundant safety-related systems available as backup. Control would initially be maintained in the control room.

Postulating that propagation of the fire to other panels occurs despite the combined efforts of the fire brigade and the virtual non-existence of fixed or transient combustible materials inside the control room to support such propagation on a large scale, transfer of safe shutdown functions to remote locations may occur. Depending on the nature and extent of the damage incurred as well as the particular features of individual plant designs, such transfers might include component operation at remote shutdown panels or the motor control centers and even manual control of important system valves. The important point to be emphasized is that there is flexibility designed into the individual units to allow for remote operation of essential safe shutdown systems.

A potential remote shutdown concern related to postulated control room fires is that of plant stability through the transfer process. This concern is resolvable when due consideration is given to the fact that once hot shutdown and system integrity is established, situations leading to a short duration loss of power or control to the components maintaining these conditions may be sustained without adverse consequences. If such conditions occurred in the course of the transfer of component control to remote stations, the operators would be capable of resetting affected breakers or establishing local control in an expeditious manner.

In sum, the risk associated with potential control room fires is extremely low due to the multiple layers of protection which reduce the likelihood of a significant fire and provides system flexibility to mitigate the effects should a fire occur.

Question 2

What is the reliability/integrity of fire dampers juxtaposed with other fire fighting capability and safety-related equipment in nuclear plants?

Response

In the context of the reliability of other fire fighting and safety-related equipment, fire dampers are considered to be reliable.

Section III.G.2 of Appendix R to 10 C.F.R. Part 50, requires that redundant safe shutdown systems and their associated circuits be separated, (e.g., a three-hour rated fire barrier). In situations where such a barrier is penetrated by an HVAC duct, a three-hour-rated fire damper should also be installed in the duct at the barrier penetration. Licensees may submit plans and schedules for installing these dampers or request an exemption based on an analysis justifying the use of alternative measures.¹

Fire dampers are usually designed to function based upon activation of a single heat-sensitive fusible link. Once positioned closed, these dampers typically require manual reset. Given the simplicity of the design and the high reliability of the fusible links, inadvertent operation of such dampers do not appear to be a concern. Potential safety issues involving fire dampers are addressed in the 10 C.F.R. §50.59 reviews. These reviews are performed by licensees for all proposed plant changes in order to determine whether the change would result in an unreviewed safety question or a modification to the technical specification. The installation of fire dampers cannot proceed absent satisfactory results of such a review. On this basis, it is concluded that existing regulations provide assurance that damper reliability issues are being properly addressed by licensees.

Question 3

What is the impact of fire protection equipment on critical areas and components particularly with regard to the impact of water hoses and water sprays on equipment reliability?

Response

The impact of water sprays on individual pieces of electrical equipment (such as switchgear motors and MCCs) could be adverse, resulting in equipment failure and additional adverse secondary effects. The extent of the impacts is dependent upon the devices' specific designs. Licensees are required by 10 C.F.R. §50.59 and Appendix R to evaluate their plants to ensure that these effects will

¹ Prior to the promulgation of Appendix R, Staff guidance concerning ventilation systems was provided in BTP APCS 9.5-1 and Appendix A. This guidance addressed the capability to isolate the ventilation for specific plant areas such as the cable spreading room and the control room as a means of controlling the distribution of combustion products. For operating plants, manual systems were considered to be acceptable.

not be experienced by redundant, required pieces of safe shutdown equipment during either an inadvertent actuation or during the course of firefighting.

As is the case of all proposed design changes, licensees are required to perform a review in accordance with 10 C.F.R. §50.59 of the design of the automatic suppression systems. In the course of designing such systems, licensees consider the potential impacts on plant equipment as a result of the initiation of suppression. This assessment includes the effects of inadvertent operation. The results of this evaluation dictate the design characteristics of suppression system coverage affecting decisions as to the appropriate extent of the coverage itself.²

It should be emphasized that the review process may result in the exploration of other alternatives. Under some circumstances, for example, the need for an exemption due to potential equipment damage may be precluded through the use of a different suppressant such CO₂ or halon or different coverage patterns. In these situations, the objectives of early suppression may be achieved absent the potential hazards associated with system operation.

The design and installation of manual hose stations may also be subject to a 10 C.F.R. §50.59 review. It should be recognized, however, that the potential for inadvertent actuation of manual systems is somewhat less than for automatic systems.

The provisions of Appendix R to 10 C.F.R. Part 50 provide detailed guidance concerning fire brigade manning and the training requirements. These requirements include the specification that the fire brigade leader and at least two brigade members be competent to assess the potential consequences of a fire and the effects of fire suppressants on safe shutdown capability. This competence is further reinforced through frequent drills and training sessions. Such training emphasizes the use of fog instead of solid water stream, for example, so as to limit the potential for system damage.

² If the results of the licensee's review indicate the potential for equipment damage due to inadvertent suppression system actuation and an alternative design is not feasible, licensees may seek an exemption to the regulation based on the assertion that system modification would degrade overall facility safety.

The conclusion which must be recognized is that, as in the case of automatic suppression, the safety issues related to manual suppression are addressed by existing regulatory standards and licensee processes. Where such issues suggest the potential for a compromise in safety, alternative designs or methods may be used.

Question 4

What were the Staff's conclusions/recommendations regarding their fire protection inspection of D.C. Cook Nuclear Station?

Response

No response provided.

Question 5

If a fire damper stops the supply of ventilation to a room(s) as part of its fire protection function, what is the effect on the operating equipment in the rooms (e.g., will isolation which occurs in the HVAC system cause of exacerbate failure of redundant safety-related equipment by cutting off the air supply, for example, to multiple locations)?

Response

Depending upon the design of the system, damper actuation does have the potential for isolation of cooling to safety-related equipment. However, under the heat loads expected to develop inside these rooms, it would take an extended period of time in room heatup before temperatures reach a level for concern. Before this occurs, the postulated fire would be expected to be extinguished and adequate time would exist for damper reset.

It must be emphasized that this question highlights the plant specific nature of the potential hazard associated with this scenario (e.g., HVAC system design characteristics). As in the previous responses the common element towards dispositioning this issue is the 10 C.F.R. §50.59 review process.

Question 6

If fire and hot gasses are transmitted through HVAC ducts, what is the effect on electrical cabinets, switchgear, and other safety-related equipment in the plant? If fire dampers operate as designed, will they isolate rapidly enough to preclude damage to sensitive equipment?

Response

Fire dampers are designed and installed in accordance with fire protection standards to protect adjacent compartments from the effects of the free circulation between compartments of hot combustion gases. As such, they utilize a highly reliable single fusible link rated according to the application. Typical setpoints of dampers are in the 165°F to 250°F range, air temperatures well below the ignition temperatures of combustible materials contained within safe shutdown equipment. Moreover, since combustion gases potentially discharged in adjacent compartments from an HVAC duct would undergo significant mixing and diffusion, prior to damper actuation duct air temperatures may actually be expected to be higher than the air in the compartment collecting the gases. On this basis, it may be concluded that damper operation as designed would preclude fire induced damage to equipment in adjacent compartments.



ENCLOSURE 5
UNITED STATES
NUCLEAR REGULATORY COMMISSION
REGION III
799 ROOSEVELT ROAD
GLEN ELLYN, ILLINOIS 60137

SEP 22 1982

Docket No. 50-315

Docket No. 50-316

Indiana and Michigan Electric Company
ATTN: Mr. John E. Dolan, Vice President
Post Office Box 18
Bowling Green Station
New York, New York, 10004

Gentlemen:

This refers to the special team inspection conducted by Mr. J. A. Grobe of this office, Messrs. J. C. Stone and C. J. Haughney of the Office of Inspection and Enforcement, and Messrs. T. L. Chan and R. Eberly of the Office of Nuclear Reactor Regulation on April 12 through 16, May 14 and June 10, 1982 of the activities at Donald C. Cook Nuclear Plant, Units 1 and 2, authorized by NRC Operating Licenses No. DPR-58 and No. DPR-74 and to the discussion of our findings with Mr. W. G. Smith, Jr. at the conclusion of the inspection. The report setting forth the results of this inspection is enclosed.

This inspection resulted in the identification of many deficiencies in your implementation of the requirements of 10 CFR 50.48 and Appendix R to 10 CFR 50. In addition, this inspection disclosed certain inaccurate statements made by you concerning compliance with those requirements. This matter has been referred to our Office of Investigation for review and an investigation of the circumstances surrounding these statements is in progress. Appropriate enforcement action for these inspection findings and the findings of the ongoing investigation will be taken at the conclusion of the investigation. Correspondence relating to this matter will be provided to you at a later date and no response from you concerning this report is required at this time.

In accordance with 10 CFR 2.790 of the Commission's regulations, a copy of this letter and the enclosed inspection report will be placed in the NRC's Public Document Room. If this report contains any information that you (or your contractors) believe to be exempt from disclosure under 10 CFR 9.5(a)(4), it is necessary that you (a) notify this office by telephone within ten (10) days from the date of this letter of your intention to file a request for withholding; and (b) submit within twenty-five (25) days from the date of this letter a written application to this office to withhold such information. If your receipt of this letter has been delayed such that less than seven (7) days are available for your review;

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please notify this office promptly so that a new due date may be established. Consistent with Section 2.790(b)(1), any such application must be accompanied by an affidavit executed by the owner of the information which identifies the document or part sought to be withheld, and which contains a full statement of the reasons which are the bases for the claim that the information should be withheld from public disclosure. This section further requires the statement to address with specificity the considerations listed in 10 CFR 2.790(b)(4). The information sought to be withheld shall be incorporated as far as possible into a separate part of the affidavit. If we do not hear from you in this regard within the specified periods noted above, a copy of this letter and the enclosed inspection report will be placed in the Public Document Room.

We will gladly discuss any questions you have concerning this inspection.

Sincerely,

C. E. Norelius

C. E. Norelius, Director
Division of Engineering and
Technical Programs

Enclosure: Inspection
Report No. 50-315/82-08(DETP)
and No. 50-316/82-08(DETP)

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DMB/Document Control Desk (RIDS)
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