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DENTON,H.R. Office of Nuclear Reactor Regulation, Director

SUBJECT: Forwards add info re reactor coolant pump lubricating oil collection sys exemption request. Existing configuration provides adequate protection. Installation of oil collection sys would pose unnecessary burdens.

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CP&L
Carolina Power & Light Company

July 30, 1982

Mr. Harold R. Denton, Director
Office of Nuclear Reactor Regulation
United States Nuclear Regulatory Commission
Washington, DC 20555

H. B. ROBINSON STEAM ELECTRIC PLANT, UNIT NO. 2
DOCKET NO. 50-261
LICENSE NO. DPR-23
APPENDIX R, SECTION III.O, REQUEST FOR EXEMPTION
REACTOR COOLANT PUMP LUBRICATING OIL COLLECTION SYSTEM

Dear Mr. Denton:

On January 19, 1981, Carolina Power & Light Company (CP&L) requested an exemption from the specific requirements of Appendix R, Section III.O, with regard to the requirement for a reactor coolant pump lubricating oil collection system. This request was renewed in our letter of March 11, 1981. Subsequently, during discussions and meetings with the NRC Staff, additional information was requested concerning our request for exemption. Carolina Power & Light Company is submitting herewith additional analysis and additional information concerning the reactor coolant pump lubricating oil collection system exemption request in response to the Staff's request.

The attached analysis demonstrates that the existing configuration provides protection of the public health and safety equivalent to that which would be provided by meeting the specific requirements of Section III.O. Furthermore, the installation of an oil collection system would pose unnecessary radiological and financial burdens.

The attached analysis demonstrates that in the event that a fire burned unextinguished within a reactor coolant pump bay (assuming that 100 percent of the oil burned to extinguishment), the plant could sustain the loss of all combustible materials in a reactor coolant pump bay and still be able to shut down safely. Given this, and the other information contained

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within this analysis, including cost-benefit information, CP&L believes that an exemption should be granted from the requirements of Section III.0 of Appendix R to 10 CFR 50.

If you have any questions concerning this material, please contact our staff.

Yours very truly,

S. R. Zimmerman
Manager
Licensing & Permits

PWH/DLB/mf (933C2T4)
Enclosure

cc: Mr. J. P. O'Reilly (NRC-RII)
Mr. G. Requa (NRC)
Mr. Steve Weise (NRC-HBR)

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H. B. ROBINSON STEAM ELECTRIC PLANT
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SUMMARY AND EXEMPTION REQUEST

The reactor coolant pump bays at H. B. Robinson Steam Electric Plant do not meet the specific provisions of 10 CFR 50 Appendix R Section III.0 in that an oil collection system does not exist for each pump. Carolina Power & Light Company has requested an exemption from the requirements of Section III.0. The basis of the request for exemption is that the existing configuration provides protection of the public health and safety equivalent to that which would be provided by meeting the specific provisions of Section III.0. In view of the excessive man-rem exposure necessary to install and maintain an oil collection system and that such a system would not enhance the protection of the public health and safety, this exemption should be granted under the provisions of 10 CFR 50.12 and 10 CFR 50.48.

Objective Statement

The objective of this analysis is to present the anticipated effects of a single reactor coolant pump lubricating oil fire on the ability to achieve and maintain safe shutdown conditions.

Area Description

The Containment Area at Robinson Steam Electric Plant Unit 2 is designed to maintain the capability to isolate the reactor and control the release of fission products in the event of a design basis accident. Equipment located within the containment includes the reactor vessel, control rod drive mechanisms, three reactor coolant pumps, three steam generators, safety injection accumulators, the pressurizer, a 155-ton crane, piping for each reactor coolant loop, air recirculation units and various electrical cables, instruments, valves and lighting. Equipment is generally separated by reinforced concrete walls.

CONTAINMENT AREA

AREA DESCRIPTION

1. Construction:

   Base: 10' concrete + 1/2" steel liner + 2' concrete

   Sidewalls: 3'6" thick, 130' diameter

   Dome: 2'6" thick, 65' diameter

2. Elevations:

   Floor Elev.: 228'

   Ceiling Elev.: 425'

3. Room Volume:

   1,950,000 cu. ft. free volume

4. Congestion:

   High density of steel components in pump bays

   Very low density above Elev. 275'

Access into the Containment Area is provided by a personnel air lock. The open and closed status of the personnel air lock is indicated in the control room. There is also an equipment access hatch with a double gasketed cover.

The major combustibles in the Containment Area include reactor coolant pump lubricating oil at 200 gallons per pump, cable insulation, and carbon filters.

Background

Subsequent to the Browns Ferry fire in 1975, licensees began to review their fire protection programs. These reviews began in the summer of 1976. The standard used in these reviews was presented in Branch Technical Position (BTP) APCSB 9.5-1 Appendix A and in amplifying instructions provided by the Commission. This criteria implemented the near-term recommendations of the Browns Ferry report for individual plant reviews while recognizing the impacts of unique plant features. In terms of fire protection systems, either in place or proposed, the objective was to provide defense-in-depth relying upon a proper balance in the following aspects:

1. Preventing fires from starting,

2. Detecting fires quickly, suppressing those fires that occur, putting them out quickly, and limiting their damage, and

3. Designing plant safety systems so that a fire that starts in spite of the fire prevention program and burns for a considerable time in spite of fire protection activities will not prevent essential plant safety functions from being performed.

BTP APCSB 9.5-1 provided licensees with fire protection guidelines and criteria for analysis. Protection against reactor coolant pump lubricating oil fires in particular was specified in several sections including Control of Combustibles [Section D.2(a)], and Primary and Secondary Containment [Section F.11(a)]. Additional guidance concerning the single failure criterion was provided in Section A.4 which stated that postulated fires or fire protection system failures need not be considered concurrent with other plant accidents or the most severe natural phenomena.

Carolina Power and Light Company issued its "Fire Protection Program Review" in response to BTP 9.5.1 on December 29, 1976 which was subsequently turned over to the Staff's consultants at Brookhaven National Laboratory for review. The consultants at Brookhaven had been previously retained by the Commission to assist in reviewing the fire analysis submitted by the licensees

in response to BTP 9.5.1, to draft fire protection safety evaluation reports (FPSERs), and to develop the state of knowledge in general on the hazards associated with fires in nuclear power plants. In support of the latter objective, Brookhaven published a series of informal reports over the period of 1977 through 1979 on individual fire protection issues. Among the earlier reports was one written by I.B. Asp, E.A. MacDougall and R.E. Hall 1/ which included an evaluation of a reactor coolant pump lubricating oil fire.

The fires assumed in the Brookhaven report were defined as having the most severe characteristics and effect on the seven areas considered. The authors expressed a view that the information derived from the analyses would be useful as a guide in the evaluation of fire hazards in nuclear power stations. The seven areas examined were:

1. Cable Spreading Room
2. Control Room Complex
3. Battery Rooms
4. Emergency Diesel Generator Room
5. Switchgear Rooms
6. Containment (PWR)
7. Safety Related Water Tanks

Focusing on the containment analysis, Asp et al. considered the combustion of the entire lubricating oil inventory in a reactor coolant pump (190 gallons) within a containment with a free volume of 1.8×10^6 cubic feet. The fire duration was assumed to be twenty minutes with a constant heat release rate of the 2.8×10^7 BTUs contained within the oil (1 gallon was considered to have a potential energy release of 1.5×10^5 BTUs). The analysts had as an objective the determination of uniform containment temperatures and pressures as a result of this admittedly conservative treatment.

Asp et al. allowed the postulated fire to burn unmitigated to self-extinguishment and employed fairly constraining assumptions to emphasize the effects of the fire on containment parameters. Without considering operability of plant systems or addressing any nuclear safety aspects of the resulting conditions, recommendations were made from the narrow perspective of fire protection engineering. Among those recommendations appears the concept of providing shields to prevent the spray of lubricating oil from a broken line from impinging on hot surfaces. In cases where such shields were impractical, it was recommended that water suppression be provided wherever oil may accumulate.

1/ "Design Base (sic) Fires in Nuclear Power Plants," BNL-NUREG-23392 (Revised), Informal Report, Brookhaven National Laboratory, Upton New York, October 1977.

This analysis, published in October 1977, appears to present the initial concept for reactor coolant pump lubricating oil fire protection using shields and suppression. Although it is not clear whether the concern and the recommended protection have a common origin in this report, subsequent to its publication, many licensees encountered this position being taken by the Staff and their consultants in the review of the BTP 9.5.1 fire hazards analysis. It should be emphasized that such protection was not specified in the BTP 9.5.1 criteria.

A second report in the Brookhaven series, published at the same time as the Asp report, reviewed the experience with fire at nuclear power plants through the Browns Ferry event. This report, written by J.K. Kelvan, E. MacDougall and R. Hall 2/, identified a limited number of lubricating oil fires involving reactor coolant pumps. Of these fires, only two were severe enough to result in reactor shutdown. Of these two events, only one was reported as being more than a minor leak. This event ultimately burned approximately 30 gallons of oil and caused some localized damage in the vicinity of the pump itself. Perhaps as a result of a growing concern over this experience and considering the Asp report, Staff reviews of licensee submittals, including that for H.B. Robinson Steam Electric Plant, led to the requirement for protection for reactor coolant pump lubricating oil systems beyond that suggested in the Branch Technical Position.

In response to the growing Staff requirements in 1977, Carolina Power and Light Company (CP&L) initially proposed to install an oil collection system and an automatic detection system. On February 23, 1978, the Commission accepted CP&L's proposal in an an FPSER and amended the license for H.B. Robinson as a result of the BTP 9.5.1 process. Based on comments presented in the consultant's report attached to the SER with regards to the reactor coolant pump lubricating oil fire, it appears the protection afforded by the CP&L proposed modifications and agreed to by the Staff were directed towards mitigating the potential effects of leaking RCP oil.

Following the issuance of the Robinson SER, the previously established dialog between the Staff and CP&L was maintained concerning fire protection matters in general, and, in particular, the resolution of those items left open by the FPSER. During this period, CP&L had contracted with Westinghouse Electric Corporation to design an oil collection system in accordance with

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2/ "Fire Damage Data Analysis as Related to Current Testing Practices for Nuclear Power Application," BNL-NUREG-23364, Informal Report, Brookhaven National Laboratory, Upton New York, October 1977.

the provisions of the license amendment. Upon receiving and reviewing the design, however, CP&L concluded that the size, weight, and configuration of the proposed system could potentially cause more harm than good in terms of maintenance and operation of the reactor coolant pump. At the same time, the Staff was pressing for CP&L to make another containment penetration to bring a fixed suppression system inside the containment at the points where electrical cable penetrations are located. When CP&L ultimately acceded to the Staff's request for fixed suppression, the feasibility of suppression protection against reactor coolant pump lubricating oil fires also appeared promising. In April 1979, CP&L notified the Staff of this change who gave their concurrence and by February 1980 had commenced work.

On July 17, 1979, Mr. R. Ferguson, Section Leader, Plant Systems Branch, Division of Operating Reactor (DOR), forwarded a memorandum to Mr. B.K. Grimes, then Acting Assistant Director for Systems Engineering, DOR, identifying staff criteria to be used to expedite the completion of the BTP 9.5.1 reviews. Although most FPSERs had been issued prior to that date, this memorandum appears to offer the first set of Staff guidelines for use in reviewing BTP 9.5.1 analysis. Seven areas in all were identified in that memorandum which included one on reactor coolant pump (RCP) lubricating oil fires. The criteria for this issue was later developed and forwarded to Mr. Grimes on November 9, 1979, along with the first written criteria for associated circuits.

The Staff position on RCP lubricating oil fires was ultimately transmitted to licensees including those for whom this issue had already been resolved in the FPSER and a licensing amendment. The concerns identified in this position paper were twofold. The first highlighted the importance of ensuring that oil collection systems adequately collect oil from all potential leakage points and maintain sufficient storage capacity for the quantity that may leak. To most licensees, this was not a new issue. The second concern, however, introduced an entirely new requirement for the qualification of such systems to survive a safe shutdown earthquake (SSE). The apparent area of concern was whether an SSE could initiate a RCP lubricating oil fire.

In reviewing the Ferguson memorandum of November 1979, it appears that the details of the Staff position assumed aspects of a regulatory guide whereby two methods were identified as meeting the protection objectives. The first called for an elaborate system consisting of multiple collection points leading to a closed container of sufficient size to contain the entire RCP lubricating oil system inventory, qualified to an SSE. Alternatively, an automatic suppression system was called for which was also to be qualified to an SSE. Many licensees, including CP&L, did not know what to do with the position papers since FPSERs had already been issued and their licenses had already been amended.

For CP&L, in particular, fire protection engineering and procurement activities associated with Amendment 31 to the Robinson operating license were in progress during this period to meet the schedule for installation during the June 1980 refueling outage. Commission requirements contained within a license amendment clearly takes precedence over an internal Staff position paper. The work continued unabated.

As events turned out, however, the contents of staff positions outlined over the latter half of 1979 ultimately formed the basis for the drafting of Appendix R in early 1980. As CP&L entered its refueling outage on May 29, 1980, the Commission published a notice of proposed rulemaking for Appendix R which incorporated, essentially intact, the two alternatives outlined in the Ferguson memorandum of November 19, 1979. Since the proposed rule allowed for a suppression system in addition to an oil collection system CP&L continued the installation of the previously-approved suppression system at H.B. Robinson on schedule while commenting on the proposed rule. System installation was completed in September 1980. In November 1980, three days after completing the system test, the final rule of the fire protection was published. CP&L was notified that its suppression system was no longer acceptable.

Review of the Issues

The issue of protection against reactor coolant pump lubricating oil fires needs to be separated into the individual concerns. These concerns appear to include the following elements:

1. Protection against small oil fires resulting from minor oil leaks; and,

2. Protection against larger fires which may originate from the catastrophic failure of the oil system and impingement onto hot metal surfaces.

In reviewing these concerns, it is important not to lose sight of the primary focus of backfitting protection: the protection of the public health and safety. With respect to Appendix R, this translates to protection of the safe shutdown capability.

A fire in any one reactor coolant bay may only be expected to affect the components and equipment in that bay itself given the significant amount of isolation present. The components potentially affected by such fire would be primary plant instrumentation including steam generator and reactor coolant pressure and temperature instruments. While the loss of an entire loop's instrumentation as a result of a reactor coolant pump fire would be an off-normal event sufficient redundancies exist in the

instrumentation in the other bays so as not to impair the ability to achieve and maintain safe shutdown conditions.

Further, the approximately 1000 reactor-years of operation to date indicates a limited experience with reactor coolant pump lubricating oil fires in general. These fires have been small in number involving minor quantities oil with inconsequential effects on the safe shutdown capability. Given the nature of such fires and the bay isolation afforded by concrete barriers, it is clear that such fires have little effect on the safe shutdown capability and that implementation of Section III.0 modifications would not enhance the protection of the public health and safety.

Further, the remaining concern is that associated with postulated fires involving larger quantities of oil. Although there is no experience with such fires against which to measure the hazard, an evaluation of the issue is nevertheless possible and is addressed in the following section. This review encompasses the following aspects:

1. A review of the relationship of the seismic requirements of Section III.0 of Appendix R on the ability to achieve and maintain safe shutdown conditions; and,

2. An analysis of the effects of a large oil fire in a reactor coolant pump bay on the survivability of primary plant instrumentation in adjacent bays.

The objective of this review is to determine whether the implementation of Section III.0 requirements would enhance the protection of the public health and safety. As a result of this review, it is CP&L's belief that the existing configuration provides protection of the public health and safety equivalent to Section III.0. Meeting Section III.0, therefore, would not enhance that protection at H. G. Robinson. Indeed, given the excessive man-rem exposure necessary to install and maintain a collection system, such a system would be considered detrimental to overall health and safety considerations.

Section III.0 and Safe Shutdown

This analysis presents a brief background to the issue of reactor coolant pump lubricating oil fires. That background indicates that, although such fires were considered in the branch technical position, an evolution in the requirements occurred in 1978 and 1979 as the Staff reviewed licensee submittals. Whereas licensees may have had the occasion in dialogs with the Staff to glimpse that evolutionary process, most dropped out of the system when the Commission amended the licenses and specified the

requirements and the schedule to be met. The licensees' precipitation out of the ill-defined system for specifying new requirements eventually caught up with the utilities with the promulgation of Appendix R which uprooted previous Commission license amendments, demanded new modifications on other plant systems without considering the effects of those modifications and invited licensees to, if they wished, challenge the imposed modifications via the exemption process.

Focusing on the larger fires, it is apparent that the first indication for the Staff's insistence on oil collection systems or automatic suppression appears in the recommendations in October 1977 by Asp et. al. 3/, which is derived from their analysis of the distribution of hot gases inside containment from a RCP lubricating oil fire. While the authors admit that their analysis is conservative, they suggest that the effects are within the realm of possibility and infer the need for additional protection. Given the severe thermal and pressure response reported for the containment as a result of such a fire and the possible contribution of this analysis to establishing regulatory requirements affecting structures, systems, and components essential to safety, it is reasonable to apply the quality assurance process and attempt to independently reproduce the results of the Brookhaven calculations.

The problem outlined by Asp is a somewhat simplified representation of conditions within containment in the use of single thermal and pressure parameters to characterize the effects of a fire. The unrealistic nature of this approach is further enhanced in the total burnout of all the oil in a reactor coolant pump. While this technique does simplify the problem, from the analyst's point of view, a number of difficulties remain and are immediately encountered in the review. First and foremost of these difficulties is that the precise mathematical relationship used in the model is not presented. Fortunately, enough information is presented so as to infer a model whose features are outlined below.

The process considered by Asp involves a constant heat generation over a twenty minute period associated with the oil burn. This energy is contributed to the containment and uniformly mixed with the free volume of air. Twenty percent of the heat is removed through radiation to a concrete slab representative of the containment walls while no credit is taken for heat losses to the other objects within containment. Asp also claims to take credit for containment cooling in the analysis.

3/ Op. cit.

Finally, free convection is defined by the Uchida heat transfer coefficients. The governing equation is therefore given by:

$$\frac{\partial \text{ Tair}}{\partial t} = \frac{\dot{Q} \text{ burn} - \dot{Q} \text{ removed}}{\rho C_p V}$$

Where: $$C_p = \frac{27.43 + 6.18 \times 10^{-3} \text{ Tair} - 0.8987 \times 10^{-6} T^2}{\text{Mair}}$$

("Thermodynamics", Third Edition, K. Wark, McGraw Hill Book Company, New York, 1977)

Solving this expression by Euler's method on a VAX 11/780 yields a uniform containment temperature and pressure that does not exceed 320°F and 6.5 psig. Brookhaven's hand calculations and extrapolated solution using the same assumptions indicate peak temperatures of 700°F and pressures of 16 psig which is seriously at odds with the results presented in the review.

In attempting to understand the reasons for the differences between the two calculations, several items were identified. The most significant of these items seems to be that although Asp claims in his analysis to include the effects of containment cooling, such credit does not appear to be taken. Since Asp only allows 20% of the energy in the oil to be transmitted directly to concrete through flame radiation and adds the remaining 80% directly to an uncooled containment atmosphere, it should not be surprising that severe conditions are anticipated.

A second comment which should be noted is that this analysis reports corrected results of the problem which Brookhaven's analysts set up. Several deficiencies still remain and should be highlighted. Although containment cooling does not appear to be considered, the Asp analysis for example, provides a relationship between heat removal rate and containment temperature which is valid up to 280°F. While the relationship appears to be monotonically increasing and Asp reports peak containment temperatures in excess of 700°F, no guidance is provided on how to treat the containment heat removal capability above 280°F. Lacking such information, the review calculation truncated the value at the 280°F point recognizing the conservatisms taken in the approach.

Clearly, however, whatever may be said concerning the validity of the Brookhaven analysis, an initial assumption presented in that analysis may not be appropriate, i.e., the assumption of perfect mixing within the entire containment volume. In certain

areas within containment, localized conditions may develop whereby the temperatures suggested by a perfect mixing model may be exceeded. Similarly, other areas within containment may be exposed to a less severe environment as a result of a RCP lubricating oil fire. Thus, while the Brookhaven model does provide information in one sense concerning the limits of general ambient conditions with conservative assumptions, greater resolution may be appropriate. The conclusion to be derived from this analysis is that the containment conditions suggested by Asp et. al. in the Brookhaven report cannot be supported by independent third party review and that the recommendations provided in that report have yet to be substantiated by Staff analysis.

A fire in a RCP bay as a result of a large scale oil system failure may be expected to yield severe localized conditions. These conditions may be so severe as to lead to a loss of all instrumentation in that bay. However, given the significant compartmentation associated with each bay and the high congestion of piping and components, such a fire is not expected to adversely affect the instrumentation in other bays which may be necessary to achieve and maintain safe shutdown conditions. Analysis using hydrothermal fluid dynamics computer simulation is currently in progress on behalf of CP&L in support of this assertion. On this basis, it may be concluded that protection against an RCP lubricating oil fire may not enhance the protection of the public health and safety, a conclusion previously reached by the Staff.

On April 6, 1979, three months prior to the Ferguson memorandum identifying the need for Staff positions for BTP 9.5.1 reviews and seven months prior to the transmittal of the RCP lubricating oil position, the Commission issued Supplement No. 1 to the FPSER for another CP&L facility, Brunswick Steam Electric Plant 4/. In that report, the Staff took action on a number of open fire protection items. Additionally, the Staff commented on Brookhaven's analysis of the Brunswick fire hazards analysis and provided the basis for rejecting certain recommendations. In particular, Brookhaven had expressed a concern for seismically induced RCP lubricating oil fires. Brookhaven's comment and the Staff's basis for rejecting the recommendation to design RCP lubricating oil fire protection features to seismic standards is reproduced below:

4/ "Supplement No. 1 to the Fire Protection Safety Evaluation Report by the Office of Nuclear Reactor Regulation in the Matter of Carolina Power and Light Company, Brunswick Steam Electric Plant Unit Nos. 1 and 2 Docket Nos. 50-325 and 50-324", US Nuclear Regulatory Commission, Washington DC, April 6, 1979.

Consultant's Comment:

Seismic Damage

The SER does not consider the effect of seismic damage on primary and backup fire protection systems, although Branch Technical Position 9.5-1 addresses this item for new plants. It is recommended that the potential that a seismic event could cause both a fire and damage to the protective features provided to cope with the fire be further evaluated. This should include fires started in non-seismically qualified systems or areas that spread to safety-related systems because protective systems are damaged. This item requires a policy decision by the NRC staff to remove it as a generic concern.

Staff Response

The guidelines of Appendix A to BTP 9.5-1 do not require fire protection systems at operating plants to be seismically designed. In developing the guidelines of Appendix A to BTP 9.5-1, the staff performed a study of the likelihood of a fire being caused by a seismic event concurrent with failure of fire suppression water systems as a result of a seismic event (sic). The staff found that the contribution to overall risk from potential seismically induced fires is low and would not be significantly affected whether the fire protection system is designed to Category I requirements or not. Seismic qualification of the fire protection system was not a part of the evaluation of the Brunswick fire protection program.

[Page 31, op. cit. (emphasis added)]

Approximately one year following the publication of this supplement, the Commission promulgated Appendix R requiring the imposition of seismic requirements on RCP lubricating oil fire protection features. During the intervening period, no new information became available which might invalidate the previous analysis or conclusion nor has any new information became available to date on this subject. Thus, although the Commission's requirements in Section III.O are clear, the standard for exemption in 10 CFR 50.48 appears to be met for H. B. Robinson Steam Electric Plant. It may be concluded that the Staff's assessment in April 1979 is still correct and that the application of seismic requirements to fire protection features would

not enhance protection of the public health and safety at H. B. Robinson Steam Electric Plant.

Health Physics Concerns'

The decision to implement an oil collection system in order to meet the requirements of Section III.O of Appendix R implies the acceptance of a cost against an expected value of protection. Previous discussions highlighted the fact that additional protection of the public health and safety is not achievable through the implementation of such a system and that this issue had been independently addressed in an earlier Staff analysis. The validity of the Staff's previous judgement concerning this subject was affirmed by the Commission in its licensing amendment to the Brunswick Steam Electric Plant. Against this anticipated value this section addresses the anticipated costs of implementing a seismic oil collection system.

In order to make a proper evaluation of the desirability of a plant modification, it is given that substantial, additional protection of the public health and safety must result. If the cost in terms of safety is comparable to the value received, clearly, such modifications are inappropriate. The cost of implementing an oil collection system at H.B. Robinson must be measured in terms of the radiation dose to be incurred by those personnel who would install and maintain the apparatus. An analysis of this dose is possible given realistic estimates of the necessary tasks derived from actual experience and a knowledge of the radiation levels in the affected areas. This analysis indicates a total exposure of 337 man-rem for installation and an average annual exposure of 6 man-rem for maintenance. Assuming approximately 30 years of maintenance and no change in the background levels, a total cost for an oil collection system is projected at 517 man-rem of exposure.

It must be emphasized that this estimate is a realistic one and may actually be slightly low. It is based upon actual experience and a knowledge of the difficulties associated with work in the reactor coolant pump bays. It may be slightly low in that it is based upon 1982 radiation levels which could drift upward over time. However argued, the costs are directly measurable.

It has been previously demonstrated that the experience with reactor coolant pump lubricating oil fires is extremely limited in terms of frequency and consequences. The Commission has previously concluded that the risk of larger fires is low. Even in the event of such a fire, the effects are expected to be localized and not to adversely affect the safe shutdown capability or pose a threat to the public health and safety. The costs of implementing an oil collection system to meet the requirements of Section III.O are expected to be high, however, and outweigh whatever benefits installation may be perceived to offer. In

view of the excessive man-rem exposure necessary to maintain an oil collection system and that such a system would not enhance the protection of the public health and safety, this exemption from the provisions of Section III.O of Appendix R should be granted under the provisions of 10 CFR 50.12 and 10 CFR 50.48.