2.2.2 Fire Sources

Once the critical locations were identified from the screening process, a more detailed evaluation was performed to assess the magnitudes of the fire sources in each critical location. The fire source ignition potential was identified to be either an exposure fire or self-ignition. Combustibles are designated as follows:

1. Cable insulation
2. Panel wire insulation
3. Cabinets (wire insulation)
4. Transient combustibles

Examination of the data base for fire frequency, section 2.3, indicated that cable insulation fire frequency contributed to about half the fire initiating frequency, while panels, cabinets and transient combustibles contributed the other half. The data is based on past operating experience and includes cable fires since 1972. Most cable fires were attributed to bad splicing and underrated cables. The BWR/6 has design features aimed at reducing the likelihood of such fires. These features include the elimination of cable splices in raceways, the use of overrated cables with overcurrent protection, and the extensive use of flame-retardant cables. The Limerick fire analysis used a five-fold reduction in the frequency of cable-raceway fires[5] to account for cable insulation improvements. Brookhaven National Laboratory estimated a reduction factor of 3[6] which has been used in this analysis. The location fire frequency determined from the data base was weighted by the fraction of combustible material in the critical area. This factor, P, is defined as the

area occupied by combustibles divided by the area of the room. The percentage of cross-sectional area occupied by the combustibles was assessed to be the probability that a fire starts in a critical location, that is, in safety related equipment or within a distance to ignite safety equipment.* While this method is approximate, it yields a higher factor than that which represents the actual critical location within the room since not all equipment is safety-related. In each case, the cross-sectional area used to calculate the P factor was selected conservatively to maximize the value of P.

While the amount of installed combustibles was conscientiously limited in the design, the possibility of human error must be considered. The term transient combustible introduces the concept of postulated unforeseen situations. this is especially important for access ways and corridors where oil cans, trash cans, or solvents may be left inadvertently. The quantification of transient combustible fires were derived from the statistical data of Light Water Reactor operation.

[redacted]

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* Fire frequency is given by the following equation:

$$\text{Probability Fire Starts} \times \frac{\text{Area of Combustibles}}{\text{Room Area}}$$

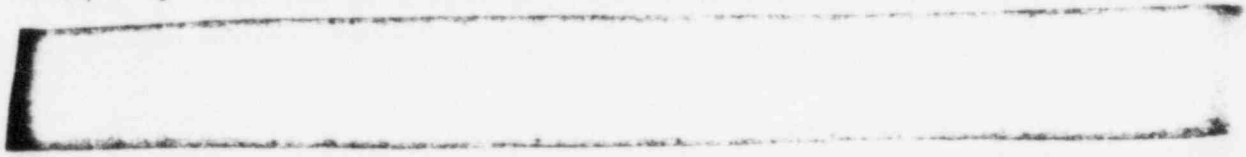
[redacted]

Transient combustible fires must be sustained long enough to ignite safety related equipment in order to contribute to core damage frequency. The distances beyond which a postulated amount of fuel can no longer ignite cable insulation are shown in Table 2-2. These distances were calculated in the Limerick and Zion PRAs by COMPBRN, a computer code which models fire propagation[5,7]. The analysis results show that the transient initiating combustible fire frequency is small compared to the initiating frequency for other fires considered in this analysis.

2.3 Fire Occurrence Frequency

Following identification of the critical fire locations in the fire hazard analysis, fire frequencies were assigned based on historical data by room (or corridor). Reference 8 provided fire frequencies for both PWRs and BWRs. Reference 9, which is current through 1981, yielded the total number of fires and operating experience time. It should be noted that the Browns Ferry fire was included in the calculation of fire frequency for the cable tunnel room. An upper bound on the probability that a fire ignites a safety-related component was obtained by weighting the room fire frequencies by the P factor defined in Section 2.2.2.

The fire initiating frequencies evaluated for each of the critical locations is provided in Table 2-3. The values are also provided in the first column of each of the event trees (Figures 2-7 through 2-12). The frequencies are defined in terms of room-year or building-year. The frequencies defined for the Zone 1 Corridor and the Auxiliary Building Electrical Equipment Area required some modification to the data provided in the literature. The fire frequency from the data base applicable to the Auxiliary Equipment Building



The frequencies from Table 2-3 were utilized as the initiators for the critical location event tres discussed in section 2.5. It should be noted that the resultant initiation frequencies are conservative relative to those defined in the Limerick evaluation[5]. Reference 5 performed a more detailed initiation evaluation in which the room fire frequency was defined by the fire frequency by component type contained in the room. Using this approach, separate event trees were constructed for each type of fire and fire initiation probabilities by room were established by summation on fire type.

2.4 Fire Propagation Suppression Analysis

This section describes the work to determine the probability that a fire propagates or is suppressed.

2.4.1 Assumptions and Procedures

In the analysis fires were conservatively assumed to be large enough to warrant consideration of the possibility of fire spreading beyond the cabinet or cable tray. It was also conservatively assumed that fires may damage entire divisions. This approach is conservative because fire damage would probably be limited to one system due to physical separation of cables for one division. Separation is maintained in the BWR/6 standard plant even in the case where one of the four bays in a panel contains electrical equipment of another division for optimization of the operator interface. Where this occurs, devices of a different division are enclosed in a metal can, and their cables are routed out of the bay in flexible metallic conduit[4]. However, it is conservatively assumed that all four bays are subject to fire damage, i.e., both divisions are subject to fire damage, despite the fact that the requirements of Reg. Guide 1.75 are met by providing the metallic barrier between divisions.

In this analysis, no credit was taken for the fact that some cables are in conduit which inhibits the spread of fire. Table 2-1 identifies those locations which contain cables in conduit instead of cable trays. The conditional frequency of fire spreading is given by:

$$fc = e^{(-tg/ts)}$$

Where fc = frequency of fire spreading, tg = fire growth time, and ts = suppression time. The suppression times were taken from a distribution of reported fires[9]. The growth times were obtained from experience, COMPBRN computer runs performed for Zion[7] and Limerick[5] PRAs, and engineering judgement.

Information on spread of fire to other divisions is limited. Therefore,

There are 3 types of suppression systems used in the GESSAR II plant. These systems are described in Table 2-4.

2.4.2 Fire Analysis by Location

The analysis for each room is briefly described below. The event trees in Section 2-5 illustrate the sequences described herein.

It should be noted that many of the computer results are taken from Limerick and Zion COMPBRN runs, which follow a conservative trend. The improved BWR/6 fire protection system should exhibit lower results, although no credit for design differences was taken in this analysis.

These improvements in the fire protection system include covered cable trays, and much of the cabling is in conduit and embedded in the concrete walls[5]. Probabilities of fire propagating to redundant divisions may not realistically model the divisional separation maintained in the BWR/6. The description of each room can be found in Appendix 9A[4].

2.4.2.1 Control Room

[redacted]

although paper is found in the computer room, COMPBRN calculations performed for the Limerick study revealed that paper fires are incapable of igniting cable insulation.

The result of a control room fire was assumed to be loss of capability to shut down from the control room. Therefore, control would be from the remote shutdown panel. Failure to safely shut down from the remote shutdown panel was [redacted]

2.4.2.2 Control Equipment Room

[redacted]

2.4.2.3 Electric Equipment Room (Control Building)

From the COMPBRN evaluation in the Limerick PRA[5], the failure probability to suppress fire in 10 minutes is 0.4; given this failure, the division was assumed to be lost. The probability of spread to the other division across 20 feet of space was assessed to be [redacted]

2.4.2.4 Cable Tunnel

2.4.2.5 Auxiliary Building

The auxiliary building includes both the electric equipment room and the zone 1 corridor.

The other 3 divisions are found in the remaining quadrants of the building. The manual suppression systems consist of a hose reel and extinguishers. Pull alarm stations are also located in the rooms. A transient combustible fire frequency, although significantly lower than that for panel fire, was included to account for the possibility of the maintainence crew transferring lube oil into this location.

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HAND DELIVERED
August 6, 1984

William Dircks
Executive Director for Operations
U.S. Nuclear Regulatory Commision
Washington, D.C. 20555

APPEAL OF INITIAL FOIA DECISION
84-A-66E(84-175)
Rec'd 8-9-84

SUBJECT: Appeal of Denial of FOIA-84-175

Dear Mr. Dircks:

On March 13, 1984, Steven Sholly of the Union of Concerned Scientists (UCS) submitted to NRC a Freedom of Information Act request for the Probabilistic Risk Assessment (PRA) performed by the General Electric Company for its GESSAR II standardized plant design, for any NRC-sponsored reviews of the PRA, and for identification of the reviewing organizations and contract details. A copy of that letter is attached.

When the NRC did not respond to Mr. Sholly's request in a timely manner, UCS appealed the failure to respond in a letter to you dated April 5, 1984. J. M. Felton of the Division of Rules and Records finally responded to Mr. Sholly's original request and to the April 5 appeal on June 25, 1984. Mr. Felton's response identified and denied four documents, and stated that the review of additional documents responsive to Mr. Sholly's request was "continuing." Mr. Sholly has received no further correspondence from Mr. Felton.

Having appealed the NRC's original failure to make a timely response to Mr. Sholly's FOIA request, UCS is entitled to bring this matter directly before a federal District Court. 5 U.S.C. § 552(a)(6)(C). However, we have chosen to take an additional administrative appeal of Mr. Felton's response letter, because we believe you will agree that he has not provided adequate or consistent justification for denial of these documents. We also appeal once more the Commission's failure to complete its response to this request within the statutory time frame required by the Freedom of Information Act, 5 U.S.C. § 552(a)(6)(A)(i).

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Mr. Felton's June 25 letter identifies and denies in their entirety four documents: the PRA and three reviews of the PRA by the Brookhaven National Laboratory. Although Mr. Felton's letter does not specifically identify the FOIA exemption claimed, he apparently invokes exemption 4 of the Act, which protects

> trade secrets and commercial or financial information obtained from a person and privileged or confidential.

5 U.S.C. § 552(b)(4). Mr. Felton does not claim that the documents constitute "trade secrets," and none of the documents fits the description of a trade secret given by the U.S. Court of Appeals for the District of Columbia:

> an unpatented, commercially valuable plan, appliance, formula, or process, which is used for the making, preparing, compounding, treating, or processing of articles or materials which are trade commodities.

Public Citizen Health Research Group v. FDA, 704 F.2d 1280, 1287 (D.C. Cir. 1983). Rather, Mr. Felton claims that disclosure of the materials could cause "substantial harm to the competitive position of the General Electric Company." Thus, he appears to invoke the second prong of exemption 4, for confidential commercial or financial information that is obtained from a person.

However, Mr. Felton has not satisfied the second prong of exemption 4 because he has not shown that the materials are actually confidential, i.e., that the release of the materials would cause substantial harm to GE's competitive position. Id. at 1290. A significant amount of the information being withheld is already available to the public, and thus disclosure of these documents would have little effect on the ability of competitors to obtain the information they contain. "Clearly, if the information is already available to competitors, then it does not qualify as confidential." United Technologies Corp. v. Marshall, 464 F. Supp. 845, 852 (D. Ct. 1979), citing Hughes Aircraft Company v. Schlesinger, 384 F. Supp. 292, 297 (C.D. Cal. 1974).

GE and the NRC have already released -- and thus made available to GE competitors -- a significant amount of information related to the GESSAR PRA. The NRC released one of

the Brookhaven review documents, virtually in its ertirety, to another FOIA requester*, and it has held at least one open meeting discussing the contents of the GESSAR PRA in detail. The Brookhaven document that has been released discusses the contents of the PRA in detail and demonstrates that GE's claim to a level of "detail, sophistication, and NRC acceptance which is not remotely approached with respect to BWR's by GE's present or potential competitors" is highly inflated. According to Brookhaven, GE used the MARCH, CORRAL, and CRAC codes as the bases for its source term and consequence analyses. All three of these codes were developed for NRC and are available in NRC publications and technical literature. The versions of these codes used by GE are not highly sophisticated, state-of-the-art codes, but have been used for many years. There is thus simply no basis to GE's claim that release of these materials will have a substantial detrimental effect on its competitive position in the marketplace.

Moreover, some of the methodologies that GE would like the NRC to protect as proprietary information were developed at government expense. Such government-generated information is not exempt from disclosure under the Freedom of Information Act. Consumers Union of United States, Inc. v. Veterans' Administration, 301 F. Supp. 796, 803 (S.D.N.Y. 1969). If anything, the NRC's refusal to disclose GE's use of PRA-related codes developed at government expense constitutes an illegal and unwarranted subsidy of GE.

The Brookhaven report also discusses some of the PRA's input assumptions in great detail. Many of these assumptions are not design-specific, but relate to standardized concepts regarding nuclear power plant accidents. Other assumptions, although somewhat design-dependent, do not involve the use of detailed design information which might be proprietary or confidential. Their disclosure would reveal little information that is not already widely known in the industry. Moreover,

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* "Review and Evaluation of the GESSAR-II Probabilistic Risk Assessment - Containment Failure Modes and Fission Product Release," Letter Report by Accident Analysis Group, Department of Nuclear Energy, Brookhaven National Laboratory (July 27, 1983). This is identified as document # 3 in Mr. Felton's June 25 response to Mr. Sholly. It was released to Susan Hiatt on January 3, 1984 in FOIA-83-460.

any design-specific assumptions should be available to the public, since GE has not claimed the plant design itself as proprietary information.

The Brookhaven report also contains a great deal of information on the results of the PRA. Although specific figures have been deleted from the tables, PRA results are described and discussed in the text. In any event, competitors could obtain approximately the same results by using the methodologies and assumptions as described in the Brookhaven study.

Inconsistent positions taken in the past by GE and NRC with regard to the confidentiality of the GESSAR PRA and related documents raise serious questions about the sincerity and veracity of GE's claim that release of the information will cause "substantial" harm to its competitive position. GE and NRC officials have orally stated to UCS that they are not interested in protecting the results of the PRA, but only the methodology. Yet, the Brookhaven Laboratory study released by the NRC discusses the methodology in great detail, but it omits many of the results. Although GE and NRC now claim complete confidentiality for the PRA, they participated in an open ACRS meeting on April 22, 1983, in which the methodology and assumptions used in the PRA were discussed in great detail. The transcript of that meeting is publicly available. Having permitted the release of so much of the PRA-related information in the past, GE and NRC are no longer in a position to claim that the requested materials are confidential.

As discussed above, Mr. Felton has failed to provide adequate justification for the denial of the requested documents under exemption 4 of the FOIA. Moreover, he has failed to satisfy the Act's requirement to release "reasonably segregable" portions of the documents. 5 U.S.C. § 552(b). Any changes that GE has made to publicly available assumptions and methodologies could easily be segregated from other parts of the PRA. Yet, the NRC has not made the slightest attempt to identify releasable portions of the documents.

In addition to the requirements of the Freedom of Information Act, strong policy reasons compel the release of

these documents to the public. The GESSAR PRA is being used to obtain a gener[illegible] license that will be valid over the next ten years. The c[illegible]ity of this license application will therefore be critical [illegible]e safety and reliability of any individual plants that are licensed pursuant to this standardized design. For this reason, it should be opened to the closest scrutiny possible. GE's sudden and inconsistent attempts to protect the confidentiality of its PRA and related review documents may demonstrate more of a wish to hide flaws in the GESSAR PRA from public scrutiny than a need to protect valuable business secrets. As a matter of policy, the NRC should make the GESSAR PRA and related review documents available to the public, with the exception of only those limited portions that GE can demonstrate are truly confidential. The NRC must not endorse and promote GE's blanket attempts to shield this vital safety information from the public eye.

Moreover, although no regulatory requirement for PRAs exists now, we understand that the NRC intends to use the GESSAR PRA to evaluate and perhaps require changes in the GESSAR standardized plant design. If this is true, then the PRA is a part of the design application that must be made available for public review and comment under the hearing requirement of the Atomic Energy Act, 42 U.S.C. § 2239(a)(1). The public's right to a hearing on the safety of the standardized plant design will effectively be denied if important supporting information is withheld from public scrutiny.

As far as we know, this is the first PRA that has been withheld by NRC as confidential commercial information. If, as recent NRC regulatory proposals indicate, the Commission intends to use PRAs to evaluate design adequacy in the future, it should be prepared to share that information with the public as required by the hearing provision of the Atomic Energy Act. If it intends to protect such information from public scrutiny, it should reconsider its intention to use PRAs as licensing documents.

We look forward to receiving your response within the 20 working days permitted by the statute. If UCS does not receive a full response, with either complete disclosure or substantial

justification for deletion of minor portions of the documents, we intend to pursue this matter in federal court.

Sincerely,

Diane Curran

William S. Jordan, III
Attorneys for Union of
Concerned Scientists

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

JUN 25 1984

Mr. Steven Sholly
Technical Research Associate
Union of Concerned Scientists
1346 Connecticut Avenue, NW
Washington, DC 20036

IN RESPONSE REFER
TO FOIA-84-175

Dear Mr. Sholly:

This is in further response to your letter dated March 13, 1984, and your April 5, 1984 appeal, requesting documents relating to GESSAR-II.

The four documents listed on Appendix A are being withheld in their entirety as release of this information could cause substantial harm to the competitive position of the General Electric Company in that GE maintains:

1. The GESSAR-II PRA is the only Level 3 PRA which has been performed by an NSSS vendor at its own cost. The GESSAR-II PRA will be the first Level 3 PRA approved for a Standard Nuclear Island Design. As such, its market value far exceeds the total cost. GE intends to utilize the information and analyses in the PRA as the major portion of plant-specific analyses for BWR/6 plants which are currently operating, are under construction, and for future plant sales. Total resources expended by GE in performing the PRA, preparing the required submittals, and supporting the PRA review amount to millions of dollars;

2. The performance of probabilistic risk assessments is a highly competitive market. The information in this PRA represents a level of expenditure, detail, sophistication, and NRC acceptance which is not remotely approached with respect to BWR's by GE's present or potential competitors. Accordingly, public disclosure of this information would permit competitors or potential customers to utilize this information at no cost and would thereby deprive GE not only to seek reimbursement of its expeditures but also an economic competitive advantage by allowing competitors to copy the design at little or no cost; and

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3. The three NRC contractor (Brookhaven National Laboratory) reports also contain GE proprietary information and are being withheld in their entirety for the same reasons stated above.

The NRC has reviewed General Electric's proprietary claim and agrees that the information involved is proprietary.

These documents are being withheld from public disclosure pursuant to Exemption (4) of the Freedom of Information Act (5 U.S.C. 552(b)(4)) and 10 CFR 9.5(a)(4) of the Commission's regulations. These documents do not contain any reasonably segregable factual portions.

Pursuant to 10 CFR 9.9 of the Commission's regulations, it has been determined that the information is exempt from production or disclosure, and that its production or disclosure is contrary to the public interest. The persons responsible for this denial are the undersigned and Mr. Harold R. Denton, Director, Office of Nuclear Reactor Regulation.

This denial may be appealed to the Commission's Executive Director for Operations within 30 days from the receipt of this letter. As provided in 10 CFR 9.11, any such appeal must be in writing, addressed to the Executive Director for Operations, U.S. Nuclear Regulatory Commission, Washington, DC 20555, and should clearly state on the envelope and in the letter that it is an "Appeal from an Initial FOIA Decision."

The review of additional documents related to your request is continuing. You will be notified at the completion of this review.

Sincerely,

J. M. Felton, Director
Division of Rules and Records
Office of Administration

Enclosure: Appendix A

APPENDIX A

1. GESSAR II Probabilistic Risk Assessment (PRA)

2. BNL Memo dated 5/5/83 "Status of GESSAR PRA Review."

3. BNL Letter Report "Review and Evaluation of the GESSAR II PRA - Containment Failure Modes and Fission Product Release," 7/27/83.

4. BNL Letter Report "Review of GESSAR II Probabilistic Risk Assessment," undated.

UNION OF CONCERNED SCIENTISTS 1346 Connecticut Avenue, N.W. • S. 1101 • Washington, DC 20036 • (202) 296-5600

13 March 1984

FREEDOM OF INFORMATION ACT REQUEST
FOIA-84-175
Rec'd 3-15-84

Mr. J. M. Felton, Director
Division of Rules and Records
Office of Administration
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

RE: Freedom of Information Act Request for the GESSAR-II Probabilistic Risk Assessment and Associated NRC and NRC-contractor Reviews of that Report (Sholly FOIA Request Number 84-07)

Dear Mr. Felton:

Pursuant to the Freedom of Information Act, please make available at the Commission's Public Document Room at 1717 H Street, N.W., Washington, D.C., copies of documents in the following categories:

A. A copy of the General Electric Probabilistic Risk Assessment for the GESSAR-II standard plant design (BWR/6 Mark III), and all updates, amendments, appendices, addenda, supplements, and all other changes thereto.

B. Copies of all NRC staff reviews of the documents described above in "A".

C. Copies of all NRC contractor reviews of the documents described above in "A".

D. For any review identified under "C" above, provide the name of the reviewing organization, the lead investigators, all other investigators, the NRC Contract and FIN numbers assigned to the review project, the funding provided for the review project, and the NRC Form 189 for each such project.

If there are any questions regarding this request, please contact me at 296-5600. It is my understanding that a proprietary claim has been made with respect to some or all of the documents identified in "A" above. This request specifically includes a request to review the bases for the priprietary claim and release all of the documents discussed in "A" above.

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The definition of "trade secret" is also relatively narrow. It has been defined as an "unpatented, secret, commercially valuable plan, appliance, formula or process which is used for the making, preparing, compounding, treating or processing of articles or materials which are trade commodities. Consumers Union, supra, 301 F.Supp. at 801.

It is impossible to believe that all of the Gessar PRA is legally exempt from disclosure under this standard. For one thing, the Gessar design is not "secret" since it is subject to NRC review and public scrutiny. In addition, it is my understanding that the codes being used are primarily publicly-available codes.

I would appreciate your response as soon as possible.

Sincerely,

Ellyn R. Weiss

Ellyn R. Weiss
General Counsel
Union of Concerned Scientists

Enclosure 1