UNITED STATES OF AMERICA

NUCLEAR REGULATORY COMMISSION

BEFORE THE COMMISSION

Consolidated Edison Company of New York, Inc. (Indian Point, Unit No. 2)	:	Docket Nos. 50-3
	:	50-247
Power Authority of the State of New York (Indian Point Unit No. 3)	:	50-286

COMMENTS OF POWER AUTHORITY OF THE STATE OF NEW YORK

The Power Authority of the State of New York ("Authority") submits these comments in response to the Nuclear Regulatory Commission's ("Commission's") solicitation on February 15, 1980 of comments on the decision of the Director of the Office of Nuclear Reactor Regulation ("Director") issued on February 11, 1980 concerning the Union of Concerned Scientists' ("UCS") petition filed on September 19, 1979. The Authority respectfully submits that the Commission should decline to review the decision which, so far as affects Unit 3, (1) denied the UCS petition

and (2) made mandatory certain commitments by the Authority concerning the safety of Unit 3. In the event that the Commission determines that further consideration of the societal risk caused by the siting of nuclear power plants in high-density population areas is appropriate, such further consideration should be undertaken through a rulemaking proceeding.

POINT I

THE COMMISSION'S RULES AND PRACTICE AND THE MANDATE OF SOUND POLICY PROVIDE NO BASIS FOR REVIEW OF THE DIRECTOR'S DECISION

The February 11, 1980 decision of the Director to deny the UCS petition with respect to Unit 3 ("Director's Decision") was made pursuant to 10 CFR § 2.206 which states the Commission's procedure for instituting show cause proceedings. The Commission's regulations provide that the standard governing whether the Commission should review a Section 2.206 denial of a petition to institute a show cause proceeding is whether the denial results from an abuse of discretion. 10 CFR § 2.206(c)(1).

This standard for Commission review was explained in an earlier Commission decision concerning the Indian Point site, Consolidated Edison Company of New York, Inc. (Indian Point, Units 1, 2, & 3) CLI-75-8, 2 NRC 173 (1975). In that

proceeding the Commission refused to review a denial of a request to institute a show cause proceeding concerning the application of recently developed seismic data to the Indian Point units. The Commission stated that there is no requirement that the Commission review such a denial, even when requested to do so by a member of the public. Id. at 175. Rather, the Commission's review of a denial of a request to commence show cause proceedings should be based upon a determination by the Commission that there has been an abuse of discretion. In determining whether a denial of a request that a show cause proceeding be commenced constituted an abuse of discretion, the Commission established the following criteria: (1) whether the statement of reasons given in denying the request permits rational understanding of the basis for his decision; (2) whether the Director has correctly understood governing law, regulations and policy; (3) whether all necessary factors have been considered, and extraneous factors excluded, from the decision; (4) whether inquiry appropriate to the facts asserted has been made; and (5) whether the Director's decision is demonstrably untenable on the basis of all information available to him. Id. at 175.

These criteria for review of Staff action were recently reaffirmed by the Commission on June 8, 1979. Nuclear Engineering Company, Inc. (Sheffield Low-level Waste Disposal Site), CLI-79-6, 9 NRC 673 (1979). That proceeding involved a licensee's attempt to repudiate its license to operate a low-level radioactive waste disposal site. The Director ordered the licensee to show cause why it should not continue its responsibilities under its license and required the licensee to resume its responsibilities immediately. The licensee appealed to the Commission contending that the Director had abused his discretion in commencing the show cause proceeding. In rejecting this contention, the Commission stated:

> ...[W]e find that the Director's decision was not demonstrably untenable on the basis of all the information available to him. Consequently, we find that the Director acted well within his discretion in issuing an immediately effective show-cause order.

Id. at 678-79 (emphasis added).

While the Commission is not necessarily limited to reviewing whether there was an abuse of discretion, the Authority respectfully submits that it should, as a matter of good administrative practice, exercise care and restraint in undertaking to

review Staff action. The Commission's five criteria for review of Staff action provide a sound basis, independent of the abuse of discretion standard, for determining whether to review Staff action. The Staff has broad and deep knowledge of the relevant extraordinarily technical issues of nuclear safety. The decisions of the Staff, based on this knowledge and sophistication, should not be casually disregarded. This is particularly true when there is such high public concern over the continued use of nuclear power. It is essential that the Commission respond to true safety issues by using the considered and responsible judgment of the Staff concerning nuclear safety.

Examination of each of the five criteria for Commission review of Staff action, in light of the pertinent facts at issue in the case of the Indian Point plants, reveals that no basis for Commission review of the Director's Decision exists. The Decision permits a reasonable understanding of what factors were relied upon, that the inquiry leading to the Decision was sufficiently thorough and not based on extraneous issues, and that the Decision is not demonstrably untenable.

A. Stated Reasons Permit Rational Understanding of Basis for the Decision

The reasons for the Director's Decision were set forth

extensively, first, in the oral presentation made by the Director and other members of the Staff to the Commission on February 5 and 6, 1980; second, in the Director's Decision itself; and, third, in the materials annexed to the decision, particularly the Director's Confirmatory Orders, concerning certain interim measures, issued February 11, 1980. The Director's Decision addresses the points raised by the UCS petition and details the rationale and evaluations performed by the Staff in arriving at the conclusion that the UCS petition should be denied with respect to Indian Point Units 2 and 3. The thorough discussion of the issues in the Director's Decision and the Director's detailed presentation to the Commission on February 5, 1980, in which both his philosophy of the appropriate level of safety and his basis for assurance that the plants would meet that level were set forth, permit a rational understanding of the basis for the decision.

Review of the Director's Decision would necessarily involve more than merely delineating the reasons for the Staff action, as those reasons are detailed in the Decision. Rather, if the Decision is to be reviewed, it must be because the Commission disagrees with the conclusions reached by the Staff, either taken individually or the manner of balancing competing factors.

B. The Director Has Correctly Understood Governing Law, Regulations, and Policy

The UCS petition does not assert that continued operation of Unit 3 will constitute a violation of any Commission rule, regulation or policy. Rather, the essence of the petition is that the Commission should establish a new standard of safety for plants in high-density population areas. Thus, this criterion for review is not particularly pertinent in this instance. In any event, the Director's Decision, at page 30, indicates that since being licensed, Indian Point Units 2 and 3 have been significantly modified to meet Commission safety and security requirements. The Authority submits that it is clear that the Director has correctly understood governing law, regulations and policy.

C. All Necessary Factors Considered and Extraneous Factors Excluded

The Staff is conducting a thorough, ongoing investigation of all safety aspects of the operation of the Indian Point units as well as the two Commonwealth Edison Zion units. This study, for which a task force has been established, has gone well beyond the issues raised in the UCS petition. The thoroughness of this study and results that it has already produced, are ample proof that in the Director's Decision, while extraneous factors were given no weight, all necessary

factors were considered.

While the Staff's investigation, both prior and subsequent to the filing of the UCS petition, of the safety of Indian Point cannot be detailed briefly, several examples will indicate that the Staff's continuing investigation is appropriately considering the pertinent issues of nuclear safety. The fire protection claim raised anew by the UCS in its petition was previously the subject of Staff and Commission review during their consideration of the earlier and distinct UCS petition for rulemaking filed on November 4, 1977 and the UCS petition for reconsideration filed on May 3, 1978. As a result of that earlier review, extensive modifications to the fire protection system at Unit 3 have been completed and additional modifications are now under preparation. The material aspects of Staff's investigation of fire protection at Unit 3 and the Authority's response to Staff's directions for changes at Unit 3 is addressed on pages 20 and 21 of the Director's Decision.

The applicability to Indian Point of the unresolved safety problems listed in the Commission's Program for the Resolution of Generic Issues Related to Nuclear Power Plants, NUREG-0410 (January 1, 1978), has also been the subject of

intense investigation and review by Staff. As noted on page 21 of the Director's Decision, Staff has evaluated unresolved generic safety issues as they apply to Unit 3 and formulated a plan of action for their resolution. In addition, Staff has carefully examined Indian Point Unit 3 with respect to the lessons learned at Three Mile Island. The Staff's investigations and requirements of the Authority are detailed in the Director's Decision.

The issue of emergency planning, both generally and in high-density population areas, has recently been the subject of intensive examination by Staff as indicated on pages 7 through 12 of the Director's Decision. Concurrent with Staff's recommendations for generic improvements in emergency planning, the Authority commenced an extensive cooperative effort, together with the appropriate local officials, to prepare evacuation plans for an emergency planning zone surrounding Indian Point. The Authority is now providing extensive expert assistance to state and local governmental bodies to effect emergency plans. As part of this effort an analysis of the time required to evacuate the public from a 10 mile area surrounding Indian Point was submitted to the Commission on January 31, 1980. This extensive effort by the Authority is not the result of the rulemaking on emergency planning currently

in progress, but, in effect, anticipates the results of that proceeding.

In addition, the Director independently reexamined the level of safety at Unit 3 in light of the issues raised in the UCS petition. The Staff's task force, as a result of its examination of Indian Point and Zion, has obtained from the Authority a commitment to increase further the plant's operational safety margin by making substantial modifications in administrative areas and design features. In addition, the Authority has agreed to study the appropriateness of installing one or more substantial new engineered safety features - which study is well under way - that would prevent or significantly delay escape of radiation to the general public in the unlikely event of a major nuclear accident.

D. Appropriate Inquiry Has Been Made

The Staff's inquiry has explicitly examined the claims asserted in the petition and broadly examined the safety of the Indian Point plants. As indicated above in subsection C, there was extensive staff inquiry into the questions of fire protection adequacy, unresolved generic safety issues, emergency planning and the need for additional administrative and emergency safeguards at Indian Point.

E. Director's Decision Is Not Demonstrably Untenable

The Director's Decision reflects the considered judgment of the Staff. The experience, training and wisdom of the Staff should not be casually disregarded. The Commission should not, in the absence of a demonstrated instance of error, review the Director's Decision simply to repeat and reexamine the issues that have already been examined by the Staff and detailed in the Director's Decision.

The Commission cannot, as a practical matter, take up each particular technical issue regarding safety of operating nuclear plants. The Commission cannot as a matter of practice act as the technical reviewer of Staff action nor has it the time in its schedule to undertake the extensive investigation that would be required if it chose to do so. The Authority submits that Staff's technical expertise and efforts to date should be recognized and that additional review by the Commission will add nothing to Staff's technical resolution of the issues as presented by UCS.

The Authority respectfully submits, as detailed above, that a basis for a technically supportable challenge to the Director's Decision does not exist and that on the basis

of all available information the Director's Decision is not demonstrably untenable.

The Authority respectfully submits that none of the Commission's proposed criteria for review of the Director's Decision exists and that further consideration of the Director's Decision is thus unnecessary and unwarranted.

POINT II

APPROPRIATE QUESTIONS FOR COMMISSION CONSIDERATION DURING ITS REVIEW OF COMMENTS

Appropriate questions for Commission consideration during its review of comments are: (1) the present level of safety of the Indian Point units, and (2) the cost to society of shutting down the Indian Point plants, whether permanently or for a period during adjudication of the UCS petition. The Authority respectfully submits that after consideration of the comments, should the Commission decide that further review of the Director's Decision is warranted, an informal proceeding would be the most appropriate means to investigate the pertinent facts.

A. The Present Level of Safety of the Indian Point Units

On February 20, 1980 the Authority, together with Consolidated Edison and Commonwealth Edison, made a presentation to the Staff on the level of safety, both present and projected, of the Indian Point plants. In that presentation a number of

substantial differences in the safety features incorporated into the Indian Point units were contrasted with other operating nuclear power plants.

Indian Point was designed with a clear appreciation of the region's high-density population. The design for the plant, therefore, contains a number of safety features which distinguish it from the average pressurized water reactor. The following twelve items indicate the most important of the distinctive design features at Indian Point. A more detailed description of these twelve items is contained in Appendix 1.

(1) Containment Weld Channel and Weld Channel Pressurization System

(2) Penetration Pressurization System

(3) Isolation Valve Seal Water System

(4) Extra Fan Cooler Capacity

(5) Post LOCA Hydrogen Control

(6) Third Auxiliary Feedwater Pump

(7) Added Containment Radioactivity Removal

(8) Use of Confirmatory Actuation Signals to Assure Proper Valve Position

(9) In-containment Core Cooling Recirculating System

(10) Emergency Diesel Generators

(11) Gas Turbine Generators

(12) Additional Service Water Pumps

In addition to detailing for the Staff the differences in plant design, the Authority, together with Commonwealth Edison and Consolidated Edison, compared the probability of a severe accident at Indian Point to the probability of a similarly severe accident at an average plant. The Authority examined the dominant accident sequences presented in the Commission's Reactor Safety Study ("WASH-1400") for pressurized water reactors ("PWR") and identified system differences at Indian Point from the average PWR plant used in the WASH-1400 study that were particularly significant. For example, the Indian Point units' containment fan coolers are redundant to and independent of the containment spray system. This independent system materially reduced the calculation of risk as compared to that in WASH-1400.

The probability curves set forth on Appendix 2 demonstrate both the risk to society as presented by the Director to the Commission on February 5, 1980, and what the Authority considers to be a more accurate comparison of the Indian Point plant's risk to the standard WASH-1400 risk curve. The reference curve (labelled WASH-1400) is the risk curve developed in WASH-1400 based on an average risk of the WASH-1400 model PWR which was based on a study of the Surry reactor at a composite of sixty-eight sites. Appendix 2 also contains a risk

curve, developed by Staff and presented by the Director on February 5, which assumes the Surry reactor is located at the Zion and Indian Point sites. This curve modified the societal risk curve developed in WASH-1400 by adding the population and meteorology characteristics of the Indian Point and Zion sites.

Finally, new curves are shown on Appendix 2 which represent the societal risk of the actual Zion and Indian Point plants. These curves, which consider plant specific aspects, present a dramatically lower societal risk than the reference curve which the Staff apparently believes represents an acceptable level of risk.

The risk scale used in Appendix 2 is the same as used in the presentation on February 5, 1980. The curves are smoothed probability curves as used in WASH-1400 and represent a conservative assessment of risk.

It is important to recognize that the curves of Appendix 2, irrespective of any limitation in probabalistic risk analysis methodology as applied to single specific plant, demonstrate the relative safety of the Indian Point and Zion plants with respect to the risk of other PWRs to the surrounding population. When the Indian Point and Zion plants

are represented as they in actuality exist, that is, with their additional safety features which are not incorporated into the Surry plant, a clear gain in comparative safety results. In fact, the Indian Point and Zion plants are shown by the Appendix 2 curves to be safer than the reference plant curve, labelled WASH-1400, even considering that the population density is greater around the Indian Point and Zion sites than around the reference composite site.

Apart from the plant specific analysis discussed above, analysis following the publication of WASH-1400 and particularly following the accident at Three Mile Island, has altered the risk calculation in several important respects. First, the loss of auxiliary feedwater following shutdown, which was a major contribution to risk in WASH-1400, was found not to be a crucial contributor at Indian Point. Studies following the Three Mile Island accident have indicated that emergency cooling injection systems can provide the cooling necessary to avoid core melt provided the pressurized relief valves are open. For this reason certain accident sequences were deleted from the analysis of Indian Point.

Second, the two WASH-1400 accident sequences involving reactor transients followed by failure of the reactor trip system were deleted. These transients have been analyzed by the appropriate vendors and found not to result in core melting.

Third, the likelihood of one of the five containment failure modes identified in WASH-1400, -- an in-vessel steam explosion generating a missile with consequent containment failure -- has been reduced significantly compared to WASH-1400. Recent data suggests that in-vessel steam explosions are less likely and the probability of that event has consequently been reduced.

These changes in the calculation of the risk and consequences indicate that the comparison of risk of the Indian Point plants to the WASH-1400 standard plant, as presented by the Director to the Commission on February 5, 1980, over-emphasizes the risk to society from Indian Point.

In short, the Staff's estimate of the risk from Indian Point is substantially higher than it should be. The Indian Point plants do not represent an unusual risk, but in fact a lower than average risk. This is, in part, the result of the care taken in the initial design of the plants. The Authority submits that the basis for the Director's Decision is unduly conservative as it does not consider all relevant aspects of plant design.

In addition to the safeguards currently in place, measures are currently being undertaken to assure an even greater degree of safety at the Indian Points plants. These

measures, which are being undertaken jointly by the Authority, Consolidated Edison and Commonwealth Edison, include studies to develop methods of mitigating the effects of severe accidents and reducing the probability that such accidents will occur. These activities by the three utilities are being closely coordinated with the Staff.

B. The Cost of Shutting Down Indian Point

The Authority believes that the Commission, in deciding what level of safety is appropriate, should give consideration to the economic and social dislocations associated with a plant shutdown. Such consideration would be consonant with the declaration of the Atomic Energy Act of 1954, as amended, 42 U.S.C. 2011, which directs in Section 1 that atomic energy be developed to, among other things, improve the public welfare and increase the standard of living. The statement of national policy supporting the use of atomic energy for the generation of electricity for the public's use requires the Commission to consider the cost of shutting down Indian Point contrasted with the risk to society from continued operation of the plants.

That economic factors, as well as safety factors, must be considered by the Commission in its decision-making is also evidenced in its regulations. For example, 10 CFR §50.34a

requires specification by an applicant for a construction permit of how levels of radioactive material in effluents to unrestricted areas will be kept "as low as reasonably achievable." This term is defined in §50.33a as:

> ...as low as is reasonably achievable taking into account the state of technology, and the economics of improvements in relation to benefits to the public health and safety and other societal and socioeconomic considerations, and in relation to the utilization of atomic energy in the public interest.

The continued operation of the Indian Point plants provides a substantial public benefit to electric consumers in the metropolitan New York region. This region has come to depend on petroleum and nuclear fuels for generation of electricity; most of the nuclear power used in the region is generated at Indian Point.

It hardly needs explanation today that oil-fueled generation of electricity inevitably leads to sharply increased costs for electricity with consequent impacts on industrial, commercial and residential electricity consumers. In the metropolitan New York region this cause and effect relationship is exacerbated by the fact that almost all of the petroleum used to produce electricity is imported.

The calculation of the cost of shutting down Indian Point requires the resolution of a number of complex issues. In fact, the only simple fact in the economic consideration of continued operation of Indian Point is the inevitability of the rising cost of imported petroleum. The analysis set forth below does not resolve each question of cost, but presents what the Authority considers to be a realistic estimate of the costs to society of shutting down Indian Point.

It is estimated that operation of the Indian Point plants displaces approximately 20 million barrels of imported oil each year. The shutdown of Indian Point would deprive New York of more than 1,800 Mw of generating capacity which produces the cheapest electricity generated in the New York City-Westchester area.

The shutdown would thus be an economic calamity for New York City. It could cause, for the year 1980 alone, an

estimated increase in costs for the Authority's and Consolidated Edison's ratepayers of about $700 million, an amount that would escalate dramatically in subsequent years as the cost of imported oil rises.

About 45 percent of such an enormous cost increase would fall on the Authority's public customers, including the Metropolitan Transportation Authority ("MTA") and the City of New York, both of which are experiencing severe financial difficulties. Were the Indian Point plants shut down, the New York City subway system and commuter rail lines alone would suffer an annual increase of about $100 million in electricity costs. As the MTA already faces a deficit for 1980 of $200 million, such an increase would jeopardize New York's efforts to maintain the present transit fare and would lead to reduced use of mass transit and increased use of private vehicles.

The additional cost increases brought about by a shutdown of Indian Point would be paid directly by residential, industrial and commercial customers in New York City and Westchester County. These customers are now paying high rates for electricity and they should not be asked to assume new financial burdens caused by a shutdown since the analysis shows the Indian Point plants already meet the safety objective sought by the Director.

In addition to increases in the cost of electricity, the shutdown of Indian Point would lead to increased use of oil burning units with secondary impacts on other oil uses in the New York region, including increasingly scarce and expensive home heating oil. Shutting down the Indian Point plants would dash any real hope in New York City for any deceleration of energy cost increases and would inhibit the City's ability to attract new commercial enterprise.

Ironically, the increases will merely be used to pay for some 20 million barrels of oil which would have to be purchased overseas to replace nuclear-fueled generation, thus further increasing our debilitating dependence on foreign oil as an energy source. In the last analysis, these cost increases would simply be transmitted as new-found and additional tribute to the OPEC cartel, further impairing the nation's balance of trade payments and accelerating its inflationary spiral.

C. An Informal Proceeding Will Afford The Commission An Opportunity For Further Consideration If It Is Required

Should the Commission decide that the Director's Decision warrants further consideration, which the Authority believes it does not, an informal proceeding such as that described in Option No. 5 of the solicitation of comments is preferable to an adjudicatory hearing before a panel of hearing judges or examiner.

An informal presentation in which designated parties would present their views directly to the Commission without the rigidness and strictures of an adjudicatory hearing would be conducive to a full and free exchange of information between all parties. The Authority is confident that in the event the Commission believes that the Director may have abused his discretion, it can satisfactorily demonstrate to the Commission how the unprecedented and extraordinary safety measures at Indian Point will continue to provide operational safety and an acceptable measure of public risk.

In the event that informal proceedings are prescribed by the Commission, the three parties of principal interest, i.e., the Authority, Consolidated Edison, and UCS should be permitted to present their views in writing and orally before the Commission. Such a proceeding should be limited to the two questions previously described, namely (1) the present level of safety of the Indian Point units, and (2) the cost to society of shutting down the Indian Point plants, whether permanently or for a period during adjudication of the UCS petition.

POINT III

THE PUBLIC CAN MOST EFFECTIVELY PARTICIPATE IN REVIEWING THE SAFETY OF PLANTS IN HIGH-DENSITY POPULATION AREAS THROUGH A RULEMAKING

If after the informal proceedings the Commission is still not convinced that the Director's Decision was factually grounded

and well reasoned, a generic rulemaking proceeding should be considered rather than an adjudicatory hearing. An adjudicatory hearing is appropriate to resolve clearly defined issues of fact concerning a particular plant. The UCS petition, by contrast, raises broader issues of what constitutes an appropriate level of safety for plants operating near densely populated areas and how the costs of attaining specified safety levels are to be considered. These issues, while grounded in the facts concerning specific plants, are not limited to Indian Point. Moreover, the resolution of some of these issues will be governed by policy determinations that do not rest on the detailed factual questions at issue. These policy determinations will be founded on considerations of highly technical areas involving the disciplines of engineering, statistics, meteorology as well as others. This type of broad-based investigation, which is not limited to any particular site, is better suited to a rulemaking rather than an adjudicatory type hearing.

The rulemaking proceeding should be structured to address the two major factors comprising risk, i.e. the low probability of a release of radioactivity as a result of an accident and the societal consequences of such a release. The various components which comprise each factor should be identified, evaluated and

standards established. The objective of the proceeding should be to establish a level of acceptable societal risk resulting from operating plants in densely populated areas as compared to the risk imposed on society by plants in less populated areas. The WASH-1400 report could be used as an appropriate reference point for release probability comparison. Proposed administrative and engineering modifications could be analyzed and the resultant reduction in release probability quantified and compared to the same plant using WASH-1400.

Distinct from the determination of release probability yet equally important to the measure of societal risk are the consequences of a release. In this context it is important to note that Staff is currently conducting a rulemaking on improved emergency response planning by state and local agencies. The results of that rulemaking proceeding could also serve as an additional reference point to the licensee of a plant in a densely populated area.

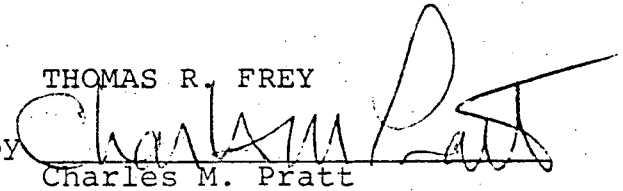
CONCLUSION

The Authority respectfully submits that the Commission, after examination of the Director's Decision and the comments submitted in response to the Commission's solicitation, should not review the Director's Decision. In the event that the Commission believes that further elucidation of the issues is necessary, it may institute an informal proceeding.

The Authority further submits that the issues raised by the petition are essentially not site-specific, but raise broad issues pertinent to a number of sites. Thus, an adjudicatory hearing concerning Indian Point would not provide an adequate procedural opportunity to resolve the issues; a rulemaking proceeding would be far preferable.

Respectfully submitted,

THOMAS R. FREY

By 
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Dated: March 10, 1980

APPENDIX 1

DISTINGUISHING SAFETY FEATURES INCORPORATED INTO INDIAN POINT UNIT NO. 3

(1) Containment Weld Channel and Weld Channel Pressurization System

All containment liner welds are enclosed by continuous linear channels welded to the liner to form a redundant seal at the joints of liner plates. Those channels which cover joints not buried in concrete are pressurized with air to a pressure exceeding calculated containment peak pressure. This eliminates leakage at liner plate joints.

(2) Penetration Pressurization System

In addition to the normal pressurization of electrical penetrations (with dry nitrogen), mechanical penetrations are pressurized with air to a pressure above calculated containment peak pressure. This eliminates leakage through penetration assemblies.

(3) Isolation Valve Seal Water System

Those double isolation valves, normally closed on a containment isolation signal, in water and small air systems have the area between valves filled (if needed) and maintained in a filled condition at a pressure exceeding calculated containment design pressure by this system. This eliminates any leakage of containment atmosphere via an open (or ruptured) line through the redundant isolation valves.

(4) Extra Fan Cooler Capacity

Each containment has 5 fan cooler units, 3 of which are required for post accident containment cooling. The added capacity provides assurance of system availability.

(5) Post LOCA Hydrogen Control

Each unit has both recombiner and post-LOCA containment purge capability. The recombiner capability was added to provide added conservatism.

(6) Third Auxiliary Feedwater Pump

Each unit has 3 auxiliary feedwater pumps per unit. Two of these are 100% capacity motor driven pumps and the third is a 200% capacity steam turbine driven pump. All three pumps are intertied through lines and valves designed for an active or passive failure. This extra capacity over a 2-100% capacity pump configuration provides added assurance of system availability.

(7) Added Containment Radioactivity Removal

Each fan cooler unit is equipped with HEPA and charcoal filters for post-accident particulate and iodine removal.

(8) Use of Confirmatory Actuation Signals to Assure Proper Valve Position

Confirmatory Emergency Safeguards Features (ESF) actuation signals are sent to power operated valves which are not required to change position. This ensures that, if a valve had inadvertently been placed in an incorrect position, it would restore to its proper position upon ESF actuation. This has been applied to critical safety systems valves.

(9) In-Containment Core Cooling Recirculating System

Two recirculating pumps located inside the containment provide for sump recirculation into the hot leg. These are in addition to the reactor heat removal.

(10) Emergency Diesel Generators

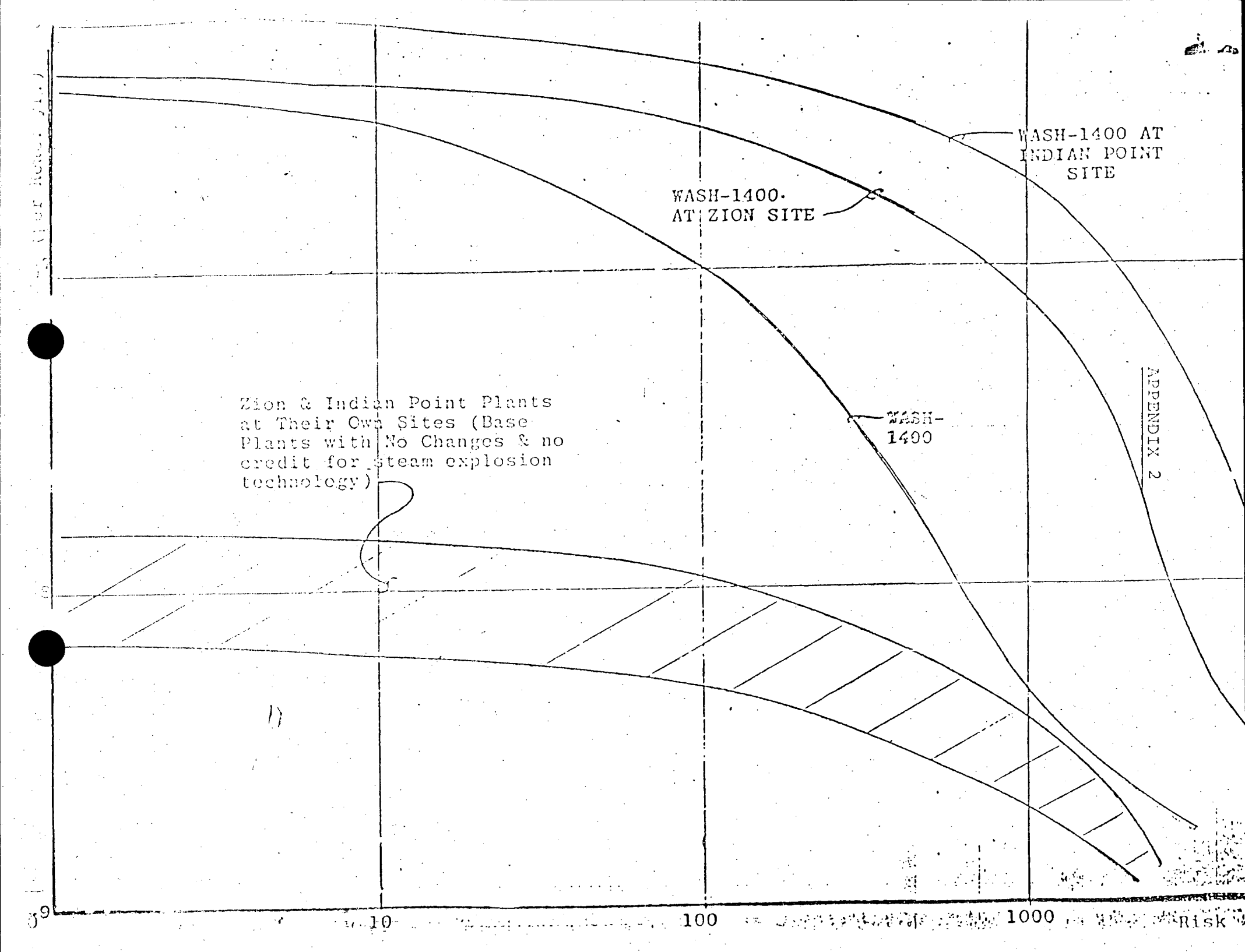
Three diesel generators are available for each unit. Two generators are adequate to meet engineered safeguards load.

(11) Gas Turbine Generators

One gas turbine located onsite and two others located in close proximity provide diverse energy sources. Interconnections exist for supplying power from these gas turbine units to both units.

(12) Additional Service Water Pumps

Three 100% capacity service water pumps are available per unit. In addition, three additional pumps provide balance of plant cooling requirements and these pumps can be used for safety systems.


WASH-1400 AT INDIAN POINT SITE
WASH-1400 AT ZION SITE
WASH-1400
Zion & Indian Point Plants at Their Own Sites (Base Plants with No Changes & no credit for steam explosion technology)
APPENDIX 2
10
100
1000
Risk