7/25/80

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of	§	
	§	
HOUSTON LIGHTING & POWER	§	
COMPANY	§	Docket No. 50-466
	§	
(Allens Creek Nuclear	§	
Generating Station, Unit	§	
No. 1)	§	

APPLICANT'S RESPONSE TO TEXPIRG'S SET OF INTERROGATORIES AND REQUEST FOR PRODUCTION OF DOCUMENTS TO HOUSTON LIGHTING & POWER COMPANY DATED JULY 9, 1980

In response to the interrogatories propounded by Texas Public Interest Research Group, Inc., Houston Lighting & Power (Applicant) answers as follows:

NO. 8--NATURAL GAS ALTERNATIVE

INTERROGATORY NO. 1:

Provide the factual basis and a summary of the testimony each witness is expected to provide to the following issues or questions.

(a) What are the reasons that natural gas can not be used as a fuel to replace the need for ACNGS?

(b) What sections of what laws prevent the use of natural gas for utility fuel after 1990?

(c) Is natural gas an environmentally safer fuel than nuclear power?

(f) Have any new laws either been passed or proposed in the U.S. Congress that would amend the Industrial Fuel Use Act of 1976 to allow utilities to continue to burn natural gas past 1990?

(g) Do the present laws allow utilities in the Non-attainment areas for oxidants and sulfur dioxide to be exempted from the required conversions away from the use of natural gas?

(h) How do the present and future costs of electricity compare when generated by natural gas versus nuc.ear?

ANSWER:

a. See the Power Plant and Industrial Fuel Use Act of 1978, Public Law 95-620 (November 9, 1978).

b. See answer to Interrogatory No. 1(a).

c. Applicant previously answered this question in response to Interrogatory No. 13 of TexPirg's Seventh Set of Interrogatories to Applicant.

d. HL&P will reach the limits of existing natural gas contracts in 1982 and will begin burning considerable quantities of fuel oil. For example, it is anticipated that HL&P will burn approximately 17 million barrels of oil in 1988 in units that could use natural gas.

e. HL&P anticipates that during the next two decades, natural gas will become the most expensive of the three alternative fuel types. As shown in the table below, natural gas is expected to cost approximately eight times as much as nuclear fuel in early 1980's, and four to six times as much during the remainder of the period. The cost of gas is also expected to become approximately 60% higher than that of coal.

Year	Gas/Coal*	Gas/Nuc.*
1985	1.5	7.9
1990	1.6	4.0
1995	1.6	5.7
2000	1.6	5.2

*Based on $ per Million BTU

f. No, however, the U. S. Senate passed the Power Plant Fuels Conservation Act of 1980 (S. 2470) on June 24, 1980. This legislation will go to the House of Representatives for consideration.

g. Applicant previously answered this question in response to Interrogatory No. 16 of TexFirg's Seventh Set of Interrogatories to Applicant.

h. Cost comparisons between natural gas and nuclear fuel have not been made due to the reasons stated in the answer to Question 1(a) and (b) above.

INTERROGATORY NO. 2:

Identify any studies or documents which show that a new natural gas plant will [sic] not produce electricity more economically than a nuclear plant?

ANSWER:

As a result of the Power Plant and Industrial Fuel Use Act, Applicant has not done any such studies.

NO. 12--CONSERVATION AND INTERCONNECT

INTERROGATORY NO. 1:

What conclusions reached by Taylor in his book, Energy: the Easy Path, do you disagree with?

ANSWER:

Applicant objects to this interrogatory as being overly broad. Applicant cannot answer the question without knowing specifically which of Mr. Taylor's conclusions are being referred to in this interrogatory.

INTERROGATORY NO. 2:

What steps have you taken to promote conservation within the last 10 years, and what effect have they had to date?

ANSWER:

See Chapter 1 of the Allens Creek Environmental Report and Environmental Report Supplement. Applicant has updated this description in Exhibit A hereto and has described the effects of those programs.

INTERROGATORY NO. 3:

If the Applicant undertook a major effort (spending at least 2 billion dollars within next 10 years) to promote the conservation of energy of its customers, what % of the energy now wasted could be saved?

ANSWER:

Applicant is in the process of doing studies of this nature but they are not complete.

INTERROGATORY NO. 4:

If you doubt that more than 30% of energy could be conserved then give the basis of your conclusion. Please cite all studies or reports that you rely on for this conclusion.

ANSWER:

This interrogatory is too vague to answer. If, as it appears, the interrogatory is referring back to Interrogatory No. 3, Applicant has answered that it is in the process of conducting studies of the potential for further energy conservation measures beyond those described in the ER and in Exhibit A hereto.

INTERROGATORY NO. 5:

How much more generating capacity than necessary to supply peak demand do each of the utilities within 500 miles of Houston, Texas have at the present time? (Answer at least as to those utilities taking part in the ongoing [sic] "Federal Interconnect" proceedings.)

ANSWER:

Applicant has not consulted with each of the utilities within 500 miles of Houston, Texas with respect to the specific information requested. To the extent that each

utility within the Electric Reliability Council of Texas and within the Southwest Power Pool report such information with respect to demand and capacity projections it is reported in FPC Form 12 E-2. Applicant believes that these reports are available for inspection at the Fort Worth regional office of the Federal Energy Regulatory Commission.

INTERROGATORY NO. 6:

What effect on necessary reserve margins (now about 15%), will the proposed "DC Interconnect" proposed by HL&P and CSW have on the Applicant?

ANSWER:

The proposed DC interconnection is expected to have little or no effect on the reserve margin criteria which is now about 15%.

INTERROGATORY NO. 7:

What studies or reports do you have to indicate that the demand for electricity within the Applicants [sic] service area will not be less than that projected in the ER and FES because of Harris County and Galveston County being designated as "non-attainment" areas by EPA and thus restricting the growth of pollution causing (and electricity using) industries. Summarize your position on this issue.

ANSWER:

Applicant previously answered this question in response to Interrogatory No. 17 of TexPirg's Seventh Set of Interrogatories to Applicant.

INTERROGATORY NO. 8:

Identify and summarize the results of any studies which show that it would not be economically feasible for Applicant to reduce its reserve margin through "interconnection of grids".

ANSWER:

Applicant has already offered to produce these studies in response to Interrogatory No. 12 of TexPirg's Fifth Set of Interrogatories.

NO. 26--ERROR IN COMPUTER PROGRAM

INTERROGATORY NO. 1:

What assurance do you have that the computer program(s) used by the Applicant to calculate forces and stresses on the reactor, associated piping, and containment do not have errors involving the substraction [sic] of forces that should be added?

ANSWER:

As to work done by Ebasco, the Ebasco pipe stress analysis computer program, PIPESTRESS 2010 develops dynamic loads for piping by summing the loads properly. In addition, the PIPESTRESS 2010 computer program has, in turn, been compared with solutions to sample programs generated by similar, independently written, programs in the public domain (i.e. ANSYS and PIPESD). This comparison shows that PIPESTRESS 2010 results are virtually identical to results generated by the above programs and hand calculations.

As stated in PSAR Appendix E, Item No. E.3.33, the computer programs used in the design analysis of the containment and all other safety-related structures are either recognized programs in the public domain or have all been qualified by one or more of the following methods, in which two benchmark problems solutions are compared to results of: (1) physical tests, (2) hand calculations, or (3) generally accepted program in the public domain.

As to work within the GE scope, the methods of adding forces and stresses are delineated in PSAR Sections 3.2, 3.7, 3.8 and 3.9. Applicant's commitment to NRC Regulatory Guide 1.92 is delineated in PSAR Appendix C. Further models used by GE are design verified changes to the models are design verified and inputs to the programs are design verified. Based on the preceding, there is adequate assurance that the programs are correctly performing the calculations.

NO. 31--TECHNICAL QUALIFICATIONS

INTERROGATORY NO 1:

Specify in what ways the quality assurance program of the Applicant for ACNGS differs from that proposed by the Applicant for the South Texas Project.

ANSWER:

Applicant's quality assurance program for ACNGS will be essentially the same as for STP including modifications which are now being made to the latter.

INTERROGATORY NO. 2:

Do you maintain that Ebasco would carry out a better quality assurance program that Brown and Root? Why or why not.[sic]

ANSWER:

Applicant expects both contractors to have satisfactory quality assurance programs.

INTERROGATORY NO. 3:

Do you deny that the Applicant underestimates the amount of construction materials to be used in the S. Texas project in the amounts specified in (b) of the contention? Why?

ANSWER:

Applicant itself made no such estimates. Brown & Root did make some estimates that proved to be in error.

INTERROGATORY NO. 4:

Is the design of the ACNGS plant further along than the S. Texas plants were at the time of their Construction permit hearings? What percent complete were the design plans of S. Texas at the time of its CP hearings, and what % complete are the design plans of ACNGS at the present time?

ANSWER:

It appears ACNGS is further along. It was estimated that STP had about 60% of the engineering done at the time of the CP but this estimate was later determined to be in error. ACNGS is now approximately 60% complete.

INTERROGATORY NO. 5:

What amounts of steel, concrete, rebar, piping, wire and cable, terminations, cable trays, and conduit are now expected to be used in ACNGS? What is the total projected cost of each of these items such as concrete?

ANSWER:

Item	Quantity	Cost*
Steel	12 000 Tons	$ 34,400,000
Concrete	325,000 CY	168,000,000 (1)
Rebar	70,000,000 LB	Included w/Concrete
Piping	400,000 LF	133,600,000 (2)
Wire & Cable	6,000,000 LF	22,600,000
Terminations	300,000 EA	Included w/Wire & Cable
Cable & Trays	95,000 LF	14,600,000 (3)
Conduit	500,000 LF	16,300,000

*Includes escalated material and installation cost, based on 5/1/81 CP. Does not include Sales Tax and fringe benefits for craft labor.

(1) Includes forms, rebar and embeds
(2) Includes valves and supports
(3) Includes tray covers and supports

INTERROGATORY NO. 6:

How many of the applicants [sic] direct employees have a Ph. D. degree in either a science or engineering field? For each give their name, position with applicant, years experience since receiving Ph. D., summary of present duties, university degree (PhD) received from, and undergraduate grade point average. Which have degrees in nuclear physics or nuclear engineering?

ANSWER:

Applicant objects to this interrogatory on the grounds that it is overly broad and that it is not reasonably related to any issue in this proceeding, and is thus unduly burdensome to answer.

INTERROGATORY NO. 7:

Do you feel that the NRC was jusitifed in fining the applicant $100,000 dollars [sic] so far in 1980 for violations of the NRC regulations? Why or why not?

ANSWER:

Applicant provided an answer to the NRC's notice of violation on April 30, 1980. In that letter it addresses each of the items in the notice of violation.

INTERROGATORY NO. 8:

List the violations charged against the applicant that resulted in the 100K fine over problems at the S. Texas project.

ANSWER:

Each alleged violation is listed and described in the attachment to the letter of Mr. Victor Stello to Mr. George Oprea dated April 28, 1980. A copy of this document is available for inspection at the offices of Baker & Botts, 3000 One Shell Plaza, Houston, Texas.

INTERROGATORY NO. 9:

What effect in the way of increased cost of construction at the S. Texas plant has the quality assurance program there had? What % increase has that been?

ANSWER:

The changes in the South Texas Quality Assurance Program are to be described in Applicant's answer to the NRC's April 30, 1980 order to show cause. This answer is due to be filed on July 29, 1980.

INTERROGATORY NO. 10:

What % of the increased cost of the S. Texas project, do you think was caused by (a) intervenors, (b) increased costs of NRC regulations changes, (c) miscalculation of original estimates, (d) technical incompetence of applicant, and other causes? Please detail the basis of each part of the answer. For example in (b), list each of the regulation changes, the date of change, and increased cost to S. Texas from such change.

ANSWER:

Applicant has not made the specific comparison requested.

INTERROGATORY NO. 11:

What specific changes has the applicant made to increase its technical competence as a result of

a. Three Mile Island lessons learned,

b. new NRC regulations,

c. NRC report and fine concerning quality control at S. Texas?

ANSWER:

a. Applicant will make all necessary changes in its staff which are required to comply with any changes which have or will result from the NRC's investigation of the Three Mile Island accident.

b. Applicant does not know what new NRC regulations are being referred to here.

c. See answer to Interrogatory No. 10(a).

INTERROGATORY NO. 12:

What % of total cost of S. Texas and ACNGS has and is expected to result from

a. technical costs such as design and technical employees,

b. cost of materials such as concrete and steel,

c. interest, and

d. overhead such as attorneys and bookkeepers, and office space.

ANSWER:

Applicant objects to this question on the grounds that it bears no relationship to the issue of technical qualifications.

NO. 21--RADIATION EXPOSURE OF WORKERS

INTERROGATORY NO. 1:

How many employees are planned to be on each crew (shift) for the operation of ACNGS? How many man-rems of exposure are expected each year of operation (1st through 40th)? What positions, such as operator or electrical repair, etc. are expected to average the highest exposure/ year? How much?

ANSWER:

Approximately 150 personnel will be involved in the operation of ACNGS. The number of personnel on a given shift will vary from approximately 100 during the day to approximately 20 during the night. The major source of exposure at BWRs appears to be the buildup of cobalt-60. The annual station dose at early BWRs, when viewed as a function of years of operation, approximates a cobalt-60 build up to an equilibrium value of 300 man rem (Ref: Preliminary Draft of Technology Planning Study of Occupational Radiation Exposure in LWR Nuclear Power Plants). Thus it could be expected that the annual station dose at ACNGS will also follow this type of behavior, although the equilibrium value cannot be determined. As an approximation, a value of 500 man-rem/year could be used. On this basis the yearly annual station expsoures could be calculated.

The normal operation of the reactor and various systems handling radioactive fluids should not incur significant exposure since operator control stations and panels have been located in low radiation zones to preclude unnecessary radiation exposure. Routine and special maintenance have been found to contribute approximately 70% of the annual station exposure at BWRs.

INTERROGATORY NO. 2:

What has been the total occupational exposure from each of the BWR's that started operation during the last 10 years for each of those years of operation? Restrict to

those in U.S. For example, Brown Ferry #1 was 267 man-rem in 1978 and 345 man-rem in 1979.

ANSWER:

Applicant objects to this interrogatory on the grounds that it is unduly burdensome. It appears from the interrogatory that Intervenor has access to the requested information and is capable of extracting the requested data therefrom.

INTERROGATORY NO. 3:

What changes have been made in ACNGS as compared to older BWR's that would reduce the expected occupational exposure of ACNGS? Detail expected reductions to be expected from each change whether design (thicker concrete) or operational (new rules).

ANSWER:

The greater part of exposure in a plant is due to maintenance on equipment in radioactive areas. One of the major objectives of the design effort for ACNGS is to factor into the design the access requirements for equipment and valves. This involves numerous decisions made on a daily basis by engineers and designers in the course of the design development. Although it is difficult to assess the effect of each design modification, the overall impact should be a plant design that has incorporated maintenance access requirements to a much greater extent than in earlier plants at which time this problem was not fully appreciated.

A specific example of this approach is the Radwaste Building in which large passive components, such as tanks, are isolated from active components, such as valves and pumps. A further separation of valve galleries and pump rooms has also been incorporated into the layout. Radioactive pipe is run within shielded pipe chases. This design should ensure a minimum of cross exposure from other sources while maintenance is being performed on a specific piece of equipment.

INTERROGATORY NO. 4:

Detail any reasons that you believe that it is not "reasonably achievable" for Allens Creek to keep its total

occupational exposure equal to or less than that of the average exposure of the exposure experienced by the BWR in 2 above that has kept its exposure the lowest.

ANSWER:

Applicant's only requirement is to comply with NRC regulations, which it intends to do.

INTERROGATORY NO. 5:

What has the mean, median, and range of exposures to workers been at the plants listed in 2 above, i.e. that to individual workers such as in 1977, Browns Ferry mean was 0.89 rem, median was 1.0 rem, min was 0.07 rem, and max was 15.9 rem.

ANSWER:

See answer to No. 21-2.

INTERROGATORY NO. 6:

For each of the plants in 2 above, and for each of the years since 1970, show the number of workers that received more radiation than that now allowed by the NRC regulations.

ANSWER:

See answer to No. 21-2.

NO. 28--CONTROL ROOM DESIGN

INTERROGATORY NO. 1:

Detail the major ways that the control room layout and design differs from that of TMI. Explain why these differences made it easier for the operators to control the plant under all accident conditions.

ANSWER:

The Allens Creek control room design is shown in PSAR Section 7.5. The Allens Creek design (Nuclenet 1000) is a human engineered control room and due to the fact that it is an advanced design for a BWR, it differs significantly

from an older design for a PWR. Intervenor is welcome to compare the control room design given in Section 7.5 with the TMI design.

INTERROGATORY NO. 2:

What is the maximum distance between instruments that might need to be read by one operator? What are those instruments and where are they placed in the control room. [sic]

ANSWER:

The maximum walking distance between panels in the horseshoe area is 30 walking feet. Obviously, all instruments are within this area. Which specific instruments are the two furthest apart is a function of where the operator is standing and is meaningless anyway.

INTERROGATORY NO. 3:

What are the maximum number of (a) visual and (b) noise alarms that might be activated at the same time (not start at same time, but still be in the alarm state while other alarms are active).

ANSWER:

There are two noise alarms in the control room. There are approximately 1500 annunciators in the control room. It is conceivable that (depending on the sequence of events postulated) that a significant portion of the 1500 might be activated.

INTERROGATORY NO. 4:

During the worst accident conditions planned for at ACNGS, how many people would be allowed in the control room, and what are each of their positions (job not physical), and duties. [sic]

ANSWER:

Per the recommendation of NUREG-0578 Item 2.2.2a, the number of personnel allowed access to the control room will be limited. The On-Site Technical Support Center will be the central location for coordinating plant emergency

operations. As detailed in PSAR Section 6.4.1, the Control Room Habitability Systems are designed to support ten average males for seven days in complete isolation.

INTERROGATORY NO. 5:

Detail the features of the ACNGS control room design that make it impossible for an operator to make an error that would make an accident happen or make an accident worse than was in progress.

ANSWER:

It is not impossible for an operator to make an error. During the design phase, every effort is made to minimize the possibility that an operator error might occur.

NO. 36--WATER SPRAY FOR CHARCOAL

INTERROGATORY NO. 1:

In what ways would the use of water sprays increase the danger of the ACNGS?

ANSWER:

The use of waters sprays to extinguish a fire in the Off-Gas Charcoal Beds is undesirable since the use of water would not accelerate the extinguishing of a fire over and above the present isolation/blanketing concept and it would greatly extend the time period for system recovery and eventual restart of the plant.

INTERROGATORY NO. 2:

Explain why the method proposed by the applicant would prevent the release of radioactive iodine into the environment in the case of a fire in the charcoal beds.

ANSWER:

Iodine is absorbed by the charcoal bed in the off gas system. A hydrogen-oxygen ignition in the off gas system could result in subsequent ignition in isolated regions of the charcoal beds that contain carbon fines, thereby creating elevated temperatures in the charcoal beds which could lead to desorption of iodine from the bed. In

the unlikely event of a charcoal ignition in an adsorber tank the ACNGS design provides the capability of bed isolation and nitrogen purge/blanketing. This will eliminate the air flow needed to sustain combustion thereby extinguishing the fire and minimizing iodine releases.

The utilization of this approach requires the eventual isolation of the affected adsorber tank(s) thereby confining the contents. Consequently, releases (including iodine) will be minimized.

The ACNGS Off-Gas System design, in adopting the above approach, is consistent with the following statement found on page 20 of NUREG-0442:

> "Charcoal bed ignition will not cause a continuous burning of the charcoal beds if the airflow from the Offgas System is not sustained, i e., the available oxygen will only consume a small fraction of the charcoal."

INTERROGATORY NO. 3:

What is the ignition temperature of charcoal? What is the normal operating temperature of the charcoal? What temperatures can be expected during the type of accident that can cause the maximum temperatures in the charcoal? What type accident would that be? Describe the accident sequence.

ANSWER:

a. The ignition temperature of the charcoal is 400°C.

b. The normal operating temperature of the charcoal is 40°F.

c. As stated in the report entitled "Investigation of Carbon Adsorber Temperature Excursions Browns Ferry Nuclear Plant July 17, 1980" prepared by Dan L. Paul, the charcoal bed reached 964°F. The report goes on to say that the beds were isolated from the offgas flow and purged with nitrogen to stifle combustion and restore temperatures. There was no notable increase in stack gas activity at any time during or following the incident.

d. The Browns Ferry scenario developed as follows:

1. A blockage in the preheater drain line developed causing some condensation of the dilution steam flow.

2. The recombiner ceased functioning because of moisture laden catalyst.

3. A combustible mixture of hydrogen and oxygen had accumulated throughout the off-gas system when the recombiner stopped functioning.

4. The presence of the combustible mixture and a source of ignition produced a deflagration wave which apparently caused isolated regions of the charcoal adsorber beds to burn.

5. The beds were subsequently isolated from the off-gas flow and purged with nitrogen to stifle combustion and restore temperatures. As stated in NUREG-0442 "Technical Report on Operating Experience With Boiling Water Reactor Off-Gas Systems" only a small fraction of the charcoal was consumed.

INTERROGATORY NO. 4:

Which other nuclear plants now in operation [sic] or design do not use water spray for the charcoal beds?

ANSWER:

Some of the nuclear BWR plants now in operation or design which do not use water spray for the charcoal beds are: (1) Nine Mile Point 2; (2) Susquehanna Units 1 and 2; and (3) Laguna Verde Units 1 and 2.

INTERROGATORY NO. 5:

List the studies and reports that have addressed this issue.

ANSWER:

a. NUREG-0442 "Technical Report on Operating Experience With Boiling Water Reactor Off Gas Systems".

b. "Investigation of Carbon Adsorber Temperature Excursions Browns Ferry Nuclear Plant July 17, 1977", Dan L. Paul.

NO. 38--CONTROL ROD DRIVE SYSTEM

INTERROGATORY NO. 1:

Detail how the ACNGS control drive system is different from all the other BWR's that recently were ordered to shut down to check their systems because of the failure of one plant's system to operate properly.

ANSWER:

Allens Creek has significantly larger discharge volumes than Browns Ferry; the discharge volumes dump into two separate instrument volumes (versus 1) and Allens Creek uses a water level transmitter versus a float switch.

INTERROGATORY NO. 2:

Explain how you can assure that the float switches in the scram discharge volume tanks will float in all cases.

ANSWER:

Transmitters are not float switches and measure water level by changes in pressure.

NO. 39--REACTOR VESSEL

INTERROGATORY NO. 1:

What is your understanding of the purpose and status of Task A-11?

ANSWER:

To the best of Applicant's knowledge, Task A-11 is a program to evaluate material degradation due to neutron irradiation for approximately 20 operatig PWRs with beltline materials that have marginal toughness relative to the requirement of Appendices G and H.

INTERROGATORY NO. 2:

Why were PWR's allowed to use less safe reactor vessel materials than BWR's? Explain.

ANSWER:

This question is more appropriately addressed to the NRC since it is their determination.

INTERROGATORY NO. 3:

What is the basis for the concern expressed in Task A-11?

ANSWER:

See answer to No. 39-2.

INTERROGATORY NO. 4:

What is the measure of reactor fracture toughness, i.e. pounds/square inch. [sic] How is it measured with small samples and in reactors?

ANSWER:

See PSAR Section 5.2.4 and ASTM-E-185-73.

INTERROGATORY NO. 5:

How does reactor fracture toughness vary with

(a) the material used,

(b) the temperature of the material,

(c) the past radition exposure of the material,

(d) the thickness of the material,

(e) the shape of the material, and

(f) its past history of temperature cycles, extremes, radiation, welding, atmosphere of ambient air, etc.

ANSWER:

See NEDO-21708.

INTERROGATORY NO. 6:

What is the accuracy of these measurements when applied to large operating reactor vessels, i.e. % error? What has been the range of values measured for past reactor vessels? What is the "safety factor" required for ACNGS? Are there requirements or plans to test the pressure capacity of the ACNGS by actually applying overpression to the actual reactor vessel at various times during its operating life?

ANSWER:

The question is too vague to answer; Applicant cannot provide a meaningful answer without specification of the exact measurements and the exact range of values that Intervenor has in mind.

NO. 41--OVER-PRESSURE IN VESSEL

INTERROGATORY NO. 1:

What is the ASME Boiler and Pressure Vessel Code upper pressure limit for the ACNGS reactor vessel? What values are the applicants [sic] relief valves set at for the reactor vessel?

ANSWER:

See PSAR Section 5.2.2.2.4.

INTERROGATORY NO. 2:

What basis is used to justify that the closure of the main steam isolation valves is the most severe test of the relief valve system for the reactor?

ANSWER:

The main steam isolation valve closure transient is the most severe in terms of vessel pressure increase. Accordingly, it is the most severe in requiring pressure relief.

INTERROGATORY NO. 3:

Specify why it would be impossible to have a common mode failure of the relief valves such that less than half would operate in the relief mode at the pressure-relief set point.

ANSWER:

Comm. . mode failure is so remote that it is not a consideration in meeting ASME or NRC requirements for over-pressure protection.

INTERROGATORY NO. 4:

What is the time delay of the ACNGS pressure sensing system? Valve Assembly? What is the accuracy of these times? What is the range of times associated with the slowest to fastest valves? Slowest to fastest sensing system?

ANSWER:

See Section 5.2.2 and specifically Figure 5.2-7 of the PSAR. Since maximum times are used in the overpressure protection analysis, the portion of this question dealing with ranges, etc. is meaningless.

INTERROGATORY NO. 5:

In the pressure analysis performed by applicant of this problem, what was the shape of the pressure v. time curve from beginning through the end of the transit in pressure? What is the rate of change of pressure with time near the 1300 psi level of the transit under the conditions assumed? What would the resulting pressure be if it is assumed that all relief valves were delayed by (a) 0.1 sec and (b) 1.0 second in opening past the times assumed in the analysis?

ANSWER:

See Figure 5.2-1. Delays beyond those delineated in Section 5.2.2 are not considered as they do not exist.

INTERROGATORY NO. 6:

What basis does applicant supply to justify their [sic] claim that the safety/relief valve opening set points are assumed at a conservatively high level?

ANSWER:

Applicant claims that the safety/relief valve set points accommodate the ASME code requirements for over-pressure protection.

INTERROGATORY NO. 7:

What is the basis for allowing the ACNGS overpressure capacity to be greater than the reactor coolant pressure boundary design pressure? Where is the large safety factor here?

ANSWER:

The ASME code allowable pressure for this upset condition is 1375 psig. The analysis performed in accordance with ASME code requirements shows that the vessel pressure is held below this limit. "Safety factors" are inherent in the ASME code.

NOS. 40 AND 53--HYDROGEN EXPLOSION

INTERROGATORY NO. 1:

State all the ways that the ACNGS hydrogen gas detection systems differ from those of TMI? (both for containment and vessel).

ANSWER:

The post accident hydrogen monitoring at TMI was accomplished by the Reactor Building Sampling System. Samples were retrieved from the top of the dome and lower elevation points using a sample bomb and then analyzed using photospectometry methods.

The Hydrogen Analyzer system designed for ACNGS does not resemble the system supplied at TMI. As described in PSAR Sections 6.2, 7.3 and 7.5, the Allens Creek NGS Unit has two (2) dedicated redundant Hydrogen Monitoring Systems. Redundant sampling points (at seven locations) are located both in the Containment and Drywell. Containment atmospheric samples are pumped from the sample locations to the hydrogen analyzers located in the Reactor Auxiliary Building. The redundant analyzers are located approximately 180° apart in the RAB. When sampling is completed at one point and the value is recorded in the Control Room the next point is sampled. In addition, high hydrogen concentration and system malfunctions are annunciated in the Control Room. The Hydrogen Monitoring Subsystem including the sample lines are Safety Class 2 and Seismic Category I.

INTERROGATORY NO. 2:

Do you believe that it would be impossible for a hydrogen explosion to take place in the vessel or containment of ACNGS? Why?

ANSWER:

Systems have been designed to mitigate the potential for a hydrogen explosion in the containment, so it is irrelevant whether Applicant considers it impossible for such an event to occur. Redundant Hydrogen Recombiners are provided to recombine hydrogen in the containment with air to form water and thus maintain hydrogen concentration below the flammability limit. ACNGS also includes provisions for containment hydrogen purge. As detailed in PSAR Appendix C, ACNGS meets the intent of Regulatory Guide 1.7.

INTERROGATORY NO. 3:

What is the minimum explosive force or pressure within the (a) vessel and (b) containment that it would take to cause a crack? Explain? What pressure would it take to also cause the concrete shell to shatter?

ANSWER:

Hydrogen explosion in the vessel is not an event requiring evaluation and, therefore, has not been evaluated.

INTERROGATORY NO. 4:

What is the range of the pressure detection systems used in ACNGS? Their accuracy? manufacture? Model?

ANSWER:

There are no hydrogen pressure detection systems related to the RPV. Vessel pressure transmitters have not been purchased for Allens Creek. Transmitters, when purchased will probably be Rosemont Model 1152GP adjustable up to approximately 3000 psi. Pressure set points, etc. have not been established for Allens Creek.

INTERROGATORY NO. 5:

What do you think was [sic] the results of the hydrogen gas explosion (pressure transit) at TMI? What was the maximum pressure measured during that transit? What was the concentration of hydrogen gas just before the explosion? just after?

ANSWER:

The Applicant can provide no additional information on the TMI pressure spike beyond what appears in the Kemeny Commission Report (e.g., pages 30, 107 and 123), and the Rogovin Report (e.g., Rogovin Volume 1, ch. 9).

INTERROGATORY NO. 6:

If a condition existed for a hydrogen explosion of sufficient force to crack the vessel, containment and concrete wall, would you recommend that the operating crew stay in the control room or leave fast?

ANSWER:

The Control Room is habitable during any accident.

NO. 50--LATCHING

INTERROGATORY NO. 1:

Do you deny that the radiation from a nuclear plant can cause the phenomenon of "latching"? Do you agree that "latching" can cause an electronic malfunction?

ANSWER:

Applicant does not know of any such phenomenon.

INTERROGATORY NO. 2:

Provide your basis, if any, for taking the position that the radiation form ACNGS could not increase the probability that aircraft near it would be more likely to fall into it than if no radiation was [sic] emitted into the air.

ANSWER:

The basis is that to the best of Applicant's knowledge no such phenomenon has ever caused an airplane crash.

NO. 55--INADEQUATE SCRAM

INTERROGATORY NO. 1:

What basis do you have for believing that the rapid depressurization of the ACNGS reactor vessel resulting from a complete steam line break would not lead to a reactivity increase too rapid to be oversome [sic] by the scram system? What studies or reports do you rely on for this basis?

ANSWER:

The increase of voids in the core reduces the amount of thermalization of neutrons and increases the neutron leakage rate. As a result the fissioning rate (and hence power production) is reduced, not increased, by the formation of voids which would be formed as a result of the rapid depressurization. The effect of voids can be found in numerous basic nuclear physics textbooks.

Respectfully submitted,

J. Gregory Copeland

J. Gregory Copeland
C. Thomas Biddle, Jr.
Darrell Hancock
Charles G. Thrash, Jr.
3000 One Shell Plaza
Houston, Texas 77002

OF COUNSEL:

BAKER & BOTTS
3000 One Shell Plaza
Houston, Texas 77002

LOWENSTEIN, NEWMAN, REIS,
AXELRAD & TOLL
1025 Connecticut Avenue, N.W.
Washington, D.C. 20036

Jack R. Newman
Robert H. Culp
1025 Connecticut Avenue, N.W.
Washington, D.C.

ATTORNEYS FOR APPLICANT
HOUSTON LIGHTING & POWER
COMPANY

Exhibit A

Time-of-Day Rates: Experimental rate introduced in new tariff available to 50 voluntary residential customers. Customers must provide a permanently installed alternative energy source such as wind, geothermal, etc. Substantial charge is levied for electric service used during on-peak periods.

Industrial Conservation: Main effort is directed towards peak shaving through computerized demand controllers, improvement of plant power factors, efficient lighting sources, shifting production to off-peak periods. We promote Energy Management Teams consisting of customer engineering personnel and HL&P power consultant to identify, monitor and evaluate conservation measures.

Commercial Energy Audits: HL&P provides free energy audits for commercial establishments, consisting of a visit to the facility and an on-site consultation. These audits encompass a variety of low cost/no cost energy conservation techniques applicable to each situation. Maintenance procedures for lighting and HVAC systems are also outlined. Commercial customers have realized substantial savings as a result of this service.

Commercial Seminars and Presentations: The Company has sponsored or co-sponsored numerous programs to professional groups and to groups of customers from various SIC categories. Since April, 1978, a total of 4,336 people have attended these presentations, representing 10,488 metered facilities.

Energy Checked Home Program: A voluntary program under which builders are encouraged to construct energy efficient homes, this program was introduced in 1975. The Company physically inspects every home signed up to insure compliance. Homes in the program must have R-19/R-11 insulation, weatherstripping, caulking including base-plate seal, and properly sized high efficiency A/C or heat pumps.

Project Conservation: In 1979, the Company initiated this program to compare consumption patterns of three types of homes. The three categories of homes are: control homes built in a conventional manner, energy conservation design with heat pump plus other conservation features, and energy

conservation design with central air and electric heat plus other conservation features. Results of the tests show that both sets of conservation homes ran significantly below the standard homes. The heating and cooling KWH consumption in the two categories of energy efficient designed homes was considerably less than that of the standard homes. Research findings will be released in the near future and builders will be encouraged to adopt these measures.

Conservation in Existing Homes: Retrofit measures analyzed on an individual basis as well as giving presentations discussing these measures for interested groups. During 1978-1979, the Company reached 33,900 customers through presentations to groups and has counseled 17,084 customers on an individual basis.

High EER Program: This program was initiated in the early 1970's, the purpose being to encourage customers to purchase more efficient air conditioners. This is an annual program.

Heat Pump Program: The Heat Pump Program was begun in 1964. The objective of this program is to educate the public that heat pumps are energy efficient and that energy savings can be realized. This is an annual program.

Award Programs: Presently, HL&P is participating in the N.E.W. and the Energy Conservation Design Award programs. The Edison Electric Institute's Commercial/Industrial National Energy Watch Program (N.E.W.) is designed to recognize and award commercial and industrial customers who have achieved significant reductions in KWH and KVA consumption through energy conservation methods in retrofit and new construction design. The Energy Conservation Design Award is being sponsored with cooperation from the American Institute of Architects. One award will be given to the new building design category and one winner will be in the retorfit category.

We estimate that the combined effect of these programs has been a 31,230 KW reduction in peak demand. The impact of these programs is taken into account in Company load forecasts and is contributing to the projected slower growth in peak demand compared to earlier periods.

STATE OF TEXAS §
§
COUNTY OF HARRIS §

BEFORE ME, THE UNDERSIGNED AUTHORITY, on this day personally appeared J. D. Guy, who upon his oath stated that he has answered each interrogatory with respect to Contentions 8 and 12 of Applicant's Response to TexPirg's Set of Interrogatories and Request for Production of Documents to Houston Lighting & Power Company dated July 9, 1980 in his capacity as Manager of Corporate Planning for Houston Lighting & Power Company, and all statements contained therein are true and correct to the best of his knowledge and belief.

J. D. Guy

SUBSCRIBED AND SWORN TO BEFORE ME by the said J. D. Guy, on this 25th day of July, 1980.

Joanne Blechner
Notary Public in and for
Harris County, Texas

STATE OF TEXAS §
§
COUNTY OF HARRIS §

BEFORE ME, THE UNDERSIGNED AUTHORITY, on this day personally appeared L. D. Richards, who upon his oath stated that he has answered each of the foregoing interrogatories, except those related to Contentions 8 and 12, of Applicant's Response to TexPirg's Set of Interrogatories and Request for Production of Documents to Houston Lighting & Power Company dated July 9, 1980 in his capacity as Lead Engineer for Houston Lighting & Power Company, and all statements contained therein are true and correct to the best of his knowledge and belief.

Lonnie D. Richards
L. D. Richards

SUBSCRIBED AND SWORN TO BEFORE ME by the said L. D. Richards, on this 25th day of July, 1980.

Jeanne Bleckman
Notary Public in and for
Harris County, Texas

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of	§	
	§	
HOUSTON LIGHTING & POWER COMPANY	§	Docket No. 50-466
	§	
(Allens Creek Nuclear Generating	§	
Station, Unit 1)	§	

CERTIFICATE OF SERVICE

I hereby certify that copies of the foregoing Applicant's Response to TexPirg's Set of Interrogatories and Request for Production of Documents to Houston Lighting & Power Company Dated July 9, 1980 in the above-captioned proceeding were served on the following by deposit in the United States mail, postage prepaid, or by hand-delivery this 25th day of July, 1980.

Sheldon J. Wolfe, Esq., Chairman
Atomic Safety and Licensing
Board Panel
U.S. Nuclear Regulatory Commission
Washington, D. C. 20555

Dr. E. Leonard Cheatum
Route 3, Box 350A
Watkinsville, Georgia 30677

Mr. Gustave A. Linenberger
Atomic Safety and Licensing
Board Panel
U.S. Nuclear Regulatory Commission
Washington, D. C. 20555

Mr. Chase R. Stephens
Docketing and Service Section
Office of the Secretary
of the Commission
U.S. Nuclear Regulatory Commission
Washington, D. C. 20555

Richard Lowerre, Esq.
Assistant Attorney General
for the State of Texas
P. O. Box 12548
Capitol Station
Austin, Texas 78711

Hon. Charles J. Dusek
Mayor, City of Wallis
P. O. Box 312
Wallis, Texas 77485

Hon. Leroy H. Grebe
County Judge, Austin County
P. O. Box 99
Bellville, Texas 77418

Atomic Safety and Licensing
Appeal Board
U.S. Nuclear Regulatory Commissi
Washington, D. C. 20555

Atomic Safety and Licensing
Appeal Board
U.S. Nuclear Regulatory Commissi
Washington, D. C. 20555

Steve Sohinki, Esq.
Staff Counsel
U.S. Nuclear Regulatory Commissi
Washington, D. C. 20555

Mr. Bryan L. Baker
1118 Montrose
Houston, Texas 77019

J. Morgan Bishop
11418 Oak Spring
Houston, Texas 77043

Stephen A. Doggett
P. O. Box 592
Rosenberg, Texas 77471

John F. Doherty
4327 Alconbury
Houston, Texas 77021

Robert S. Framson
Madeline Bass Framson
4822 Waynesboro
Houston, Texas 77035

Carro Hinderstein
609 Fannin, Suite 521
Houston, Texas 77002

D. Marrack
420 Mulberry Lane
Bellaire, Texas 77401

Brenda McCorkle
6140 Darnell
Houston, Texas 77074

W. Matthew Perrenod
4070 Merrick
Houston, Texas 77025

F. H. Potthoff
7200 Shady Villa, No. 110
Houston, Texas 77055

Wayne E. Rentfro
P. O. Box 1335
Rosenberg, Texas 77471

James M. Scott
13935 Ivy Mount
Sugar Land, Texas 77478

J. Gregory Copeland

J. Gregory Copeland