Cathy Moore
(202) 224-0448

United States Senate

SEP 0 9 1983

Respectfully referred to:

Congressional Liaison
Nuclear Regulatory Commission
1717 H Street, N.W.
Washingotn, DC 20555

Because of the desire of this office to be responsive to all inquiries and communications, your consideration of the attached is requested. Your findings and views, in duplicate form, along with return of the enclosure, will be appreciated by

U.S.S.

Arlen Specter

Form #2

Susquehanna Environmental Advocates
P.O. Box 1560 Wilkes-Barre, Pa. 18703 (717) 825-4304

Gerald R. Schultz, Coordinator
(717) 675-1093

Honorable Arlen Specter
331 Hart Senate Office Building
Washington, DC 20510

August 15, 1983

Dear Senator Specter:

SEA recently released the results of a study of Licensee Event Reports filed by Pennsylvania Power and Light Company with the Nuclear Regulatory Commission under terms of the operating license of the Susquehanna Steam Electric Station at Berwick, Pennsylvania. This study raises some serious questions concerning the utility's handling of equipment malfunctions of the reactor's safety systems. Additionally, concerns are raised for the adequacy of the NRC's documentation of the resolution of these malfunctions, and possibly in the NRC's oversight of the corrective actions themselves.

Enclosed is a copy of our study for your review. We request that you initiate action to further investigate the findings of this study. We believe that the health and well-being of the communities surrounding this reactor is dependent upon diligent adhearance to the letter and the spirit of the Technical Specifications of this reactor as delineated in the operating license.

Sincerely,

Gerald R. Schultz

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Coordinator

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NEWS RELEASE

For Immediate Release

June , 1983

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SEA has released the results of a study analyzing equipment failures, malfunctions, and operational errors occuring at PP&L's Susquehanna Nuclear Power Plant. The study summarizes four categories of events and evaluates the utility's handling of the events and proposed corrective actions. The SEA study raises questions about the quality and timeliness of the information presently available to the NRC and the public to assess the safe operation of the reactor. In certain instances the utility exercised wide discretion in liberally interpreting the terms of its operating license and reporting requirements.

One of the issues illustrated is the questionable or non-existent corrective actions taken in response to failure of reactor safety components. The report concludes with recommendations for independent analysis of reactor safety issues by local governments and close regulatory oversight by the NRC.

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AN ANALYSIS OF SELECTED LICENSE EVENT REPORTS FOR SUSQUEHANNA STEAM ELECTRIC STATION, LUZERNE COUNTY, PA.

NOVEMBER 22- 1982 - MARCH 24, 1983

Susquehanna Environmental Advocates
P.O. Box 1560 Wilkes-Barre, Pa. 18703 (717) 825-4304

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OVERVIEW:

An analysis of significant License Event Reports and certain events reported by the utility to the news media was completed for the period beginning November 22, 1982 to March 24, 1983. During this period fifteen License Events reports were analyzed and these were correlated with two news media reports and one event related by the Nuclear Regulatory Commission. The fifteen analyzed Event Reports comprise about half of those reported by the utility to the NRC during this period.

Events separated by four general types. The analysis attempts to examine the significance of the event, the utility response to the event, and the appropriateness and effectiveness of proposed corrective and preventive actions.

Following, separated by types of events, is a chronology analysis and comentary on the selected events.

Standby Gas Treatment System and Containment Related Events

December 23, 1983: During a test of the reactor's ability to respond to an incident involving the loss of offsite power (the loss of electric service to the grid from which the reactor components receive electric power) both radioactive gas treatment systems failed to properly operate. The first system was disabled as the result of an incorrect high radiation signal resulting from instrumentation error caused by the loss of power (this type of problem was reported in at least one other Event Report). The second treatment system was started but became inoperative when air entering the system was not adequately raised in temperature to a prescribed minimum by charcoal bed heaters.

A modification to correct the instrumentation error was reportedly accomplished. No immediate corrective action was proposed to correct the problem with charcoal bed heaters for the heated inlet air. However, an investigation was reported ongoing to preclude future problems. No written report of such an investigation could be located.

February 25, 1983: During a startup of the reactor both channels of the Primary Containment Atmosphere Gaseous Radioactivity monitoring were inoperable. The "A" channel meter was stuck in a low position. The problem was corrected by a "mechanical shock". The "B" channel appeared to suffer from a blockage in the line flow. No further investigation of the cause of the "A" meter sticking in a low positon was provided nor did the Event Report suggest how future occurrences of the same type could be prevented.

March 1, 1983: The utility notified the NRC that the plant was operated at 100% of full power without either standby gas treatment system operable. This was the result of a maintenance error which disabled both systems while testing the charcoal bed heaters on one of the systems. The systems were inoperative for 25 hours and this failure was discovered only when maintenance on the second unit revealed that it was also inoperative. Although warning alarms in the control room were activated they were not adequately investigated. As a result, the NRC proposed a $60,000 penalty for operating the plant with both systems disabled.

March 10, 1983: While performing a test of the Standby Gas Treatment Systems (while in "cold shutdown"), it was discovered that two blank flanges were missing from ductwork connecting the refueling floor of unit 1 to the unit 2 side of the reactor building. These flanges were important to maintain a negative air pressure within the unit 1 building, helping to prevent release of radioactive gases to unit 2 and the atmosphere during plant operations.

This error comprises a breech of the secondary containment. The event report states that "the missing blanks did not affect the operability of the SGTS (Standby Gas Treatment System) because the indicated flow rate was within the limits of the SGTS". However, the report later admits that "the last time the SGTS was run to check the secondary containment flow rate (18 month surveillance) was in October, 1982. It is therefore possible that higher than allowed flow rates for secondary containment integrity existed while in an applicable operating condition". What the report does not go on to acknowledge is that the SGTS itself was completely disabled for 25 hours and the plant operated at 100% full power as reported in the March 1, Event Report. A radioactive release on the unit 1 refueling floor during this period could have resulted in an immediate impact on public health and safety by a release of radioactive gases and its escape from the comprimised secondary containment.

Commentary on Standby Gas Treatment System and Containment Related Events

The NRC's proposed penalty seems inconsistent in view of the number and seriousness of other event reports filed by the utility since the start of the reactor test program in September, 1982. According to the NRC's Reactor Safety Study, 35% of the incidents involving safety system nonavailability are the result of testing and maintenance such as that which was caused by the March 1 incident (and such as that which resulted in the accident at Three Mile Island). The utility may have also been negligent in failing to document and follow through on the investigation promised after the December incident. It is difficult to identify a pattern of consistent reasoning in NRC's reaction to this incident. Without NRC publicly correlating this event with other related events or with PP&L's performance to date, it is difficult to consider the proposed penalty as representing the expression of any firm or consistent policy towards reactor safety systems at the Susquehanna facility. The plant personnel's failure to take corrective action in response to the warning alarms points out the inherent complexity of the reactor controls and the on-going problem of keeping all operations and maintenance staff fully trained for all possibilities.

Reactor Coolant System Recirculation Pumps and Related Events

November 28, 1982: During the reactor Start up Testing Program, a voltage transient occurred caused by "flash-over of the auxiliary boilers". Flash-over of the auxiliary boilers can occur as a result of high water conductivity. As a result of this change in voltage, various pieces of plant equipment failed, including the reactor coolant recirculation pumps. The pumps were restored to operation after an unspecified period of time. The Event Report stated that the ineffectiveness of installed water conductivity meters was "well known". As a result, the utility issued a memorandum stressing the importance of testing water conductivity independently (presumably with different instruments than those installed). Corrective

measures offered involved installation of isolation transformers on the auxiliary boilers and "the investigation of acquisition of more accurate conductivity meters".

January 19, 1983: While the reactor was operating at 75% of full power, (787,000 kilowatts), a motor-generator for the reactor coolant water recirculation pump shut off. The pump was returned to operation after an unspecified period of time. The report stated that an investigation would be performed to establish necessary corrections. An investigation committee convened "within an hour" after this equipment failure, to formulate an action plan to resolve the problem. The committee recommended that data be collected on five voltage, current and speed conditions associated with the motor-generator and associated exciter. The committee reported no electrical or mechanical corrective action, but instead recommended that the plant be returned to operation so that a "data history" of these five factors could be established so that future occurrences may be investigated.

January 24 (?), 1983: While at 85% of full power operation, the conductivity of the coolant water increased rapidly. Power was reduced slightly (2%) and then increased to 85%, thereafter the water conductivity rose above the maximum allowed under the operating license. The problem was found to be caused by contamination during a maintenance procedure with an organic cleaning solution. Temporary administrative actions were proposed, however, final administrative procedures were reported under development and would not be implemented until June 1, 1983, (four months after the incident). On November 28, high water conductivity had led to a failure within the collant recirculation pumps.

February 8, 1983: While the reactor was operating at 96% full power (1 million kilowatts) the flow of water from the reactor feedwater pumps exceeded that specified by the reactor operating license. An excess of water flow from these pumps could cause a too rapid change of temperature within the reactor. This event was reportedly caused by an incorrect

setting on the pump controls. The problem was corrected by changing step settings.

February 16, 1983: During a period when the reactor was shutdown, the Residual Heat Removal System* shut down twice within an hour as a result of "....spurious tripping of the alternate power supply breakers....". This occurred while a preventive maintenance was being performed on a related motor. An engineering modification was scheduled for completion on July 1, to help prevent future recurrences.

February 18, 1983: While the plant was in a shutdown condition, an operator in the process of "making rounds" discovered a valve in the Residual Heat Removal System to be broken. The valve was severly vibrating, had lost packing (seals), the valve position indicator had vibrated to an extent that it fell off the valve (and thus correct valve position was difficult to determine), and the welds on the bracket securing the valve had broken. The Event Report stated that the damage was caused by excess flow through the valve. The report noted that the weld failures were the result of operating the system outside of the optimum range. An inspection of the alternate Residual Heat System also revealed cracks in the pipe hangers but repairs were not made until the first system was again operable. The operating procedures for the Residual Heat Removal System were revised, but no mention was made of more frequent inspection of system components by maintenance or operating personnel.

Commentary on Reactor Coolant System Recirculative Pumps and Related Events

The utility's rather casual approach toward equipment failures as evidenced by their inclination to "(investigate the acqusition of more accurate conductivity meters") extends to

*The residual heat removal system removes heat generated by radioactive material in the reactor fuel core. This heat is generated even with the control rods in the full-in position, thus, the term "cold shutdown" though widely used in the industry, is actually a misnomer. Even when the fision process is stopped enough radioactive waste material is contained in the fuel cells to generate core damaging heat.

even critical safety components. The investigation team that so hurriedly convened ("within an hour") to determine the cause of the recirculation pumps failure (Jan. 19), concluded their work without determination of what caused the outage of a very critical reactor safety component. The description of the failure of the valve in the Residual Heat Removal System indicated that the vibration damage to the valve packing position indicator and bracket was such that it seems likely that the problem had gone unnoticed for some period of time. Yet the corrective action for this failure did not include more frequent checks of these valves. Furthermore, the welding failures that occurred in the valve support bracket could have resulted from nonconformance to American Welding Society Code. The problem of defective welds in reactor components and structure was the object of an investigation report completed in conjunction with the Bechtel Company early at the start of the reactor test program (around September, 1982). The correlation between this investigation and the bracket weld failures was not made in the Event Report.

Coolant Leakages and Coolant Leak Detection Failures

November 24, 1982: On this date the reactor was operated with only two coolant leak detectors available to quantify coolant leakage in the drywell of the reactor. The technical specifications approved under the reactor's operating license requires at least three leak detection systems to be operable at any time. Instead the operator continued reactor operation in violation of the technical specifications based upon a presumptive misinterpretation of the license requirements. Two weeks after the utility proposed corrective action, a spill of "5,000 to 10,000" gallons of radioactive water was reported by a plant spokesperson to the news media. Two weeks after that spill, another smaller spill was again reported to the media. Event reports apparently were not filed with the NRC as a result of these spills, nor from a 270 gallon "premature release" that occurred December 21, 1982.

Commentary on Coolant Leaks and/or Leak Detection Events'

Based upon the small amounts of information provided in the Event Report, it is difficult to assess as to whether a leak detection deficiency could have contributed to the reported leak of radioactive water in the two later leak incidents. Although the radioactive water was reported contained within the plant, cleanup of the leakage involved exposure of workers to radioactive material. Further, although the radioactive water was reportedly "treated", under terms of the operating license the plant is allowed to release quantities of radioactive water into the river. This was confirmed by the NRC in a letter to the office of the City Clerk in Wilkes-Barre. Responding to an early February resolution by the City Council, Ronald Haynes, NRC Regional Administrator stated that "our review indicated that the liquid was disposed of in accordance with plant design, and that corrective actions were taken to prevent recurrence". Plant design allows the water to be released into the Susquehanna river as long as the radioactivity is within prescribed limits. SEA could find no written record of corrective action. Further, while release of radioactive water into the Susquehanna may be allowable under NRC or EPA regulations, responsible public health officials believe that the most prudent public health policy is to reduce exposure to carcinogens (such as radioactive water) to the lowest level possible. This is especially important for downstream communities, such as Danville, Pa., that obtain drinking water from the river.

The spills reinforce the utility's poor judgement in operating the plant with less than the required number of leak detection systems available. The NRC's March 11, letter in response to the concern expressed by the Wilkes-Barre City Council's resolution, demonstrates a lack of willingness to provide specific information in how plant incidents occurred, exactly how the problem was resolved, and what specific steps were taken to prevent re-occurrences. The NRC decision to fine the utility for a operational error that occurred ten days before this letter was signed could perhaps be viewed as a correlated attempt to

demonstrate to the city council that the NRC is performing a role as stern watchdog of the utility. On the contrary, the record shows that for this specific event the NRC appears to have exercised little regulatory discretion (over the numerous other events.)

Control Rod Mechanism Failures

On November 22, 1982, plant personnel reported the loss of instrumentation indication that a control rod was in the "full-in" position. In order to ascertain that the indicator itself was faulty, it was necessary to withdraw the rod a notch again insert it to the "full-in" position. When repair crews were summoned to correct the condition, the problem did not reappear. The report noted a similar event occurring at an earlier unspecified date. The report indicates that no corrective action was proposed to prevent this instrumentation failure from reoccurring but that corrective action "will occur after the next occurrence".

December 21, 1982: During a start up of the reactor, one control rod had become jammed and could not be withdrawn to allow reactor start up. It was necessary to increase water pressure beneath the rods to withdraw the rod.

January 26, 1983: A rod withdrawal sequence indicator generated spurious signals, stopping the rod withdrawals. A faulty sensor in one of the control rods caused incorrect signals to stop the control rods. The report noted that this same system (the Rod Position Indicator System) was repaired during the last outage.

February 22, 1983: During a review of the plant technical Specifications it was discovered that testing for the operation of the Rod Block Monitor was omitted from the plant start up procedure.

Commentary on Control Rod Related Events

Although none of the events related to control rod functioning involved operational problems in inserting the control rods to a full-in position (bringing the reactor to "cold shutdown"), the unreliability of the rod position and sequence indication systems raises questions about the quality of important reactor control information available to control room

operators. The utility's omission of a pre-operational test of the Rod Block Monitors and willingness to wait until after the next occurance for corrective action points up the apparent lack of concern for the reliable operation of rod control indicator mechanisms.

Conclusion and Recommendations

This report is limited by the amount and quality of information available for analysis under the NRC system for disclosing information on the operation of nuclear power plants. The utility has thirty days to report in writing to the NRC when deviations from the plants technical specifications, occur. P.P. & L. 'S License Event Reports are almost always completed on the 30th or 31st day after the event. PP&L has no obligation to release these reports to the public. Instead, the public has acess to them through NRC's local Public Document Room after they are mailed by the NRC. Most of the reports are very brief and in themselves seem to represent a very limited written record of the events, especially for use by the NRC, which is responsible for analyzing the technical and policy implications of specific failures and failure trends. The utility appears to have considerable latitude in determining which events are reportable. For example, no License Event Reports were found for the September fire reported by the news media, nor the spills of radioactive water similarly reported. The public is essentially almost totally reliant on PP&L for information as to the safe operation of the plant just as the public is totally reliant on the skill and good judgement of the reactor staff and the reliability of the reactor equipment for its very health and well being.

The incidents analyzed in the study point up questions concerning the skill, and judgement of the reactor staff and the reliability of reactor safety systems. These events and PP&L's response to them illustrate the inherent complexity of the nuclear station and inevitable failures of electrical and mechanical devices upon which safe operation depends.

In view of the predictable continuation of events similar to those analyzed here, and the NRC's historically consistent failure to provide close regulatory control over individual reactor safety operations, it is important that nearby communities have a reliable source of objective information on the on-going safe operation of the reactor. For this reason, Luzerne and Columbia counties should consider acquiring independent technical expertise to monitor the performance of the PP&L and NRC staff in safely operating the reactor. Closer scrutiny of Event Reports and vigorous follow up action by the NRC are urgently needed. A flurry of single incidence fines at this and other reactors in nearby states (Salem I and Vermont Yankee) is not a substitute for on-going close regulatory control.