ACRS-1644

MINUTES OF THE ACRS THREE MILE ISLAND SUBCOMMITTEE MEETING
Student Center, Pennsylvania State University Campus
Middletown, PA
June 6-7, 1979

The ACRS Three Mile Island Subcommittee met in Middletown, Pa. to discuss details of the Three Mile Island accident with the operators of the plant, Metropolitan Edison and its parent company, General Public Utilities, and with the NRC Staff. The notice of the meeting, containing the proposed agenda, appeared in the Federal Register, p. 29765, Vol. 44 No. 100 Tuesday, May 22, 1979. (Attachment A). The Tentative Detailed Schedule is attached (Attachment B), as well as a list of attendees (Attachment C). Copies of presentation slides and supporting documents are attached as noted below. There were no requests to make oral statements and no written statements received although the Committee had been informed that a Mr. Bar n of Boston, Mass. would submit a statement.

Executive Session (OPEN)

Mr. Harold Etherington, the Chairman, introduced the Committee members and consultants present:

Dr. M. Bender, Member
Dr. M. W. Carbon, Member
Dr. S. Lawroski, Member
Dr. M. S. Plesset, Member
Dr. P. G. Shewmon, Member
Mr. W. M. Mathis, Member
Dr. H. W. Lewis, Member
Mr. C. Michelson, Consultant
Dr. W. C. Lipinski, Consultant
Dr. I. Catton, Consultant
Mr. R. Muller, Designated Federal Employee, ACRS Staff
Mr. H. Alderman, ACRS Staff

Then he polled the Committee to see if any members desired changes or abridgements of the schedule.

NRC Staff Report - Plant Modifications

1. Mr. Richard Vollmer, USNRC, Director of TMI-2 Support described the current plant status and the status of plant modifications. The core was being cooled by natural circulation through the A loop, steaming on the A steam generator to the condenser. Core delta T was 10^{o}, $T_H = 161^{o}$, $T_C = 151^{o}$. Flow velocity through the core was 1 foot/min. B loop is isolated with $T_h = 163^{o}$, and $T_c = 104^{o}$. In response to Dr. Plesset's question, Mr. Vollmer stated that maximum thermocouple temperature was 282^{o} with a decreasing trend. System pressure was 340 pounds. Leakage from the primary system was 0.5 to 0.7 gpm. Containment pressure had been slowly increasing and was now about atmospheric (0.1 lb positive with a temperature of 102^{o} F) Water in the containment was about 7-1/2 feet above the top of the sump level. ~ 500,000 gallons). Containment activity was 10^{-3} µCi/cc of Iodine, and 10^{-1} µCi/cc of Krypton 85 and Xenon 133.

Normal pressurizer level measuring instrumentation was no longer functional because of flooding or radiation damage. The pressurizer was being kept solid and its level monitored by alternate means.

Radiation readings at the equipment hatch ranged from 50-150 mr/hr, with a T-1/2 of 8 days. Containment atmosphere samples are collected once per week from two locations. Water samples had not yet been measured. Calculations, assuming the origin of the water, indicate it might have 50 µCi/ml of Cesium (the dominant isotope).

Water was being added to the containment at a rate of 0.5-0.7 gpm (700gpd)., volume displacement is about 70,000 gallons per foot.

Next, Mr. Vollmer discussed the modifications made to the plant since the accident. A filter system was put on the auxiliary building roof. Both the auxiliary building and the fuel handling building are ve'.ed into redundant trains of filter systems, HEPA and charcoal, which are then combined. A four train system was flown in from Hanford. Any three of the four systems, with fan operating, is capable of carrying the full capacity of the auxiliary and fuel handling buildings' ventilation system. The effluents from these systems emit about 10^{-12} 2 µCi/cc of Iodine which is about 1% of the Maximum Permissible Concentration.

In addition to the installation of these redundant filter systems, the filters in the existing systems were replaced.

The liquid wastes in the auxiliary building contained 30-40 uCi/ml Cesium-137. A system for removing the radioactivity from the water has been constructed. It is called Epicore 2. It is undergoing preoperational testing. Legal processes, however, would delay operation of the system even though the operator has agreed that no individual would receive more than 3 millirem from the water released. If th director of NRR determined that Epicore 2 was needed in an emergency situation, the Commission could be so informed and it is is expected it could proceed. But, the water could not be disposed of.

In response to Mr. Bender, Mr. John Collins, NRC, indicated that the gaseous activity released by the water is less than 1% of the MPC for noble gases, and about 1% for iodines. (Noble gases amount to 30-50 curies/day, principally xenon-133. They are vented to a vent header and then collected.)

In response to Dr. Lawroski's question re the containment pressure, Mr. Vollmer explained that with swings in atmospheric pressure, occasionally the pressure was positive with respect to at ospheric, but only about 1/10-pound/in^2 and the leakage resulting therefrom did not result in the escape of measurable radioactivity.

Mr. Vollmer explained that if something happened to the A steam generator, the B steam generator could be used to cool the core in solid operation. A closed cooling system with a heat exchanger has been installed in the basement of the turbine building for this purpose. Two demineralizers are installed in the B generator secondary loop to clean up the secondary side activity, which is not very high.

The A and B decay heat removal systems that existed in the plant have been upgraded. They are available if needed, but the preferred way is to keep the primary activity within the primary loop to the extent possible. An alternate heat removable system, on skids, is available on about 24 hour notice if needed to cool the core. Two diesel generators of 2.5 MW capacity each have been installed, so that the decay heat removal systems could be used with on-site power only.

To keep absolute water level control in the system, a passive pressure volume control system was fabricated in one of the two fuel pools in the fuel handling building. With it, a steady positive head can be kept on the system and the pressurizer would not be required.

Mr. Bender inquired how long the system would be safe if all off-site power was lost. Mr. Vollmer replied that it would be all right for many many days.

He added that the operators have an emergency check list and know exactly what to do in case of any failures.

NRC - Metropolitan Edison Interface

The licensing side of NRR has 14 professionals on site, half of these full-time. I&E has 15 people on site covering all three shifts. Seven of these are involved in operations, the remainder in environmental measurements. The NRR contingent has the ability to perform a "Bethesda-type" review at the site. The TMI-2 support staff can call on Bethesda for whatever support may be required.

Emergency Equipment

Mr. Bender asked if the Staff had compiled a list of emergency equipment which should be kept available for future emergencies. Mr. Vollmer indicated that that was a function of the "lessons learned" people. He identified instrumentation to follow the course of an accident as a definite need. The difficulty of compiling a list adequate either for a LOCA or TMI-2 accident was mentioned. Certainly, available mobile power sources would help, as could the possibility to hook up a recombiner. The capability to draw samples from the containment seemed important.

Emergency Communications

Phones have been installed in all operating plants that provide around the clock communications with USNRC Region Offices. Mr. Arnold, of GPU, explained that there are two phones in each control room. One, when it is lifted off the hook, rings in both the Region Office and in Bethesda. The other requires a two number dial and rings only in the Region Office. It is for environmental release information. Mr. Arnold indicted no decision

to put in similar hard lines to the reactor vendor had been made. Mr. Bender wondered if communication with the Region Office is adequate. Dr. Lewis pointed out that phone lines can be jammed.

Reliability of Technical Data

In response to Mr. Michelson's question, Mr. Vollmer stated that from the onset of TMI's troubles the FSAR was the principal source of NRC information on the plant. This was found not to be up to date. Mr. Michelson reported that his FSAR showed the pressurizer in Unit 2 to be in the B loop when, in fact, it was in the A loop. Also, the site plan disagreed with the plot plan.

Mr. Michelson asked when transcripts of the operator interviews would be available. Mr. Vollmer agreed to report on that the following day.

Mr. Michelson had a question on GPU's chronology on block valve operation between four and five hours, where four operations were omitted that had previously been reported. Again, Mr. Vollmer agreed to comment on that the following day.

GPU Presentation

Mr. R. C. Arnold, Vice Pres. of Generation Environmental Affairs, GPU Service Corporation, Mr. Jack Herbein, V.P. of Generation for Metropolitan Edison, and Bob Keaten, Manager of Systems Engineering for GPU Service Corporation.

Mr. Arnold thanked the Committee for delaying the Subcommittee meeting until key personnel had taken care of the site emergency.

He explained that Mr. Keaten would cover the chronology covering those items not previously given to the Committee. The shift supervisor, the shift foreman and the control room operators who were in the control room at the time of the accident were available to answer questions.

Dr. Lawroski commented that he would have liked more explanatory prose with Attachment D - Evaluation of Hydrogen Bubble Volume in Reactor Coolant System. Mr. Keaten explained that it was meant to show maximum errors possible rather than statistical errors. He agreed to cover it in greater detail at a later time.

Mr. Keaten next indicated that some items on the chronology labelled "Preliminary Annotated Sequence of Events", dated May 10, were now believed wrong. A new version is about to appear containing substantial additional information . Mr. Keaten explained that the initiating event was not, as reported earlier, the trip of the condensate pump, but the fact that the station operator was trying to clear a plug in the transfer line from the condensate polisher to the regeneration tank. He introduced water and air simultaneously in an attempt to pressurize the line. A check valve in the air line was frozen open so that water could back up into the instrument air system. Water got into the controllers for the valve positions for the condensate outlet valves causing the valves to close. A test will be performed to verify this explanation.

Mr. Keaten explained that there were two problems with the system:

(a) Emergency feedwater was blocked.

(b) The PORV on the pressurizer failed to close.

The feedwater block valves were opened at about eight minutes into the transient.

Mr. Keaten referred to Slide E-1 (attached) and explained that the Reactor Coolant System pressure had changed between two and six minutes from the earlier (May 10) version. The pressure did not level off but continued to decrease later because of the valve that was stuck open.

Mr. Keaten discussed Slides E-2 and E-3 and explained the nodalization for the RETRAN code (Slide E-4). In response to Mr. Etherington, he explained that GPU had an independent calculational capability with the aid of Energy, Inc.

After about 20-30 minutes into the accident, there was no more discernible impact of the closed feedwater valves. The short term impact was between six and nine minutes when the operators got an indication that pressure was increasing which would not have happened if only the PORV was stuck open, but which served to confuse the operators.

Using Slide E-5, Mr. Keaten showed a comparison of a cooldown transient using the RETRAN code and an actual transient that occurred the previous spring in TMI-2. RETRAN was developed from the RELAP code.

Next, Mr. Keaten reviewed with Slides E-9, E-11, E-12, E-13, E-14, what would happen with Normal Loss of Feedwater and Slides E-15, 16, 17 of what would happen without auxiliary feedwater. The steam generator would boil dry in one to two minutes. The hot leg temperature would go off scale in nine min-

utes and the system pressure would trigger the pressurizer relief valves in fifteen minutes.

Mr. Keaten noted that the code used in the actual transient overcools the secondary side. He believed this was due to incorrect treatment of the hood in the downcomer of the steam generator.

The code also predicted a more rapid drop in pressure on the primary side than actually occurred. The code is very sensitive to where cold flashing first occurs, whether it be in the upper vessel head, or the hot leg, or even the cold leg.

Mr. Bender asked if any GPU findings to date would contradict instructions received from the NRC Staff. Mr. Keaton stated that, while his calculations were still very preliminary, so far no such problems had been noted.

Mr. Keaten next discussed the inventory of water in the reactor coolant system (RCS) with Slide E-20. The three scenarios represent three bounding sets of assumptions with Scenario 2 the "best guess" of actual conditions. This would indicate a loss of 2000 cubic feet from a total of 10,500 cubic feet initially present within the first 100 minutes (Slide E-1) Shortly after 100 minutes, the last coolant pump was turned off. Prior to the time the coolant pumps were turned off, the system was operating on saturated water and steam with some quality in the hot leg.

Because of pump oscillation the coolant pumps in the B loop were turned off at 72 minutes, and an analysis indicates no natural circulation was set up. Mr. Keaten discussed the resultant steam generator pressures and levels with the aid of Slide E-22.

On common feedwater, with the B steam generator pressure declining, the A steam generator suffered starvation of feedwater and boiled dry. So with the B-loop not removing any heat and the A steam generator depleted, the reactor heat sink was lost. At this point, the core void fraction increased and solid water level in the core dropped so that neutron detectors gave an increased signal.

Mr. Michelson observed that at that point the decay heat was such that a steam generator was not needed for a heat sink. Mr. Keaten concurred and explained that he did not feel any core damage resulted during this period. The quality of fluid forced through the A loop was still adequate to cool the core.

Dr. Plesset inquired how long the reactor coolant pumps (RCPs) could pump such quality fluid without damage. B&W agreed to supply this information at the full Committee meeting the next week.

At 101 minutes the A RCPs were turned off. At two hours fifteen minutes, alarms in the reactor building began to increase, leading to the conclusion that core damage had occurred.

System pressure was restored early in the evening and the RCP's were put back in operation.

Mr. Keaten was not sure how radioactivity was transported from the reactor building to the auxiliary building. He noted that, as Mr. Michelson had said, the reactor containment building sump pumps had operated for thirty minutes but were then turned off and not restarted as far as could be determined.

Gaseous activity may ha been released from the gaseous rad waste system. A correlation between operation of the makeup tank and the puff releases in in the auxiliary building was observed. Three or four known releases were associated with the installation of the temporary transfer line installed from the waste gas decay tank to the reactor containment building.

As a result of the uncertainty of the origin of the liquid and gaseous releases, GPU was not certain of the properties of the released material.

Mr. Keaten summed up as follows:

1. The blockage of feedwater initially had no long term impact on the transient. It did add to operator confusion.
2. The root cause of the accident was the failure of the PORV to reseat.
3. Core damage did not start until all four RCPs were turned off.
4. The operators took appropriate action on loss of feedwater but they did not recognize that the PORV was stuck open, and they did not use the HPI system correctly.

Dr. Shewmon asked when there was first a significant steam bubble in the system. Mr. Keaten replied that his analysis indicated that may have occurred as early as two minutes after the turbine trip.

Discussion With Operators

Gary Miller, Station Manager
Bill Zewe, Shift Supervisor
Fred Scheiman, Shift Foreman
Craig Faust, Control Room Operator
Ed Frederick, Control Room Operator
Lex Tsuggaris, (Not on watch)

In response to Dr. Carbon's question, Mr. Miller explained that the Shift Supervisor had responsibility for both units, the Shift Foreman, who was senior licensed, was responsible for only one unit.

Mr. Miller stated it was not recognized the PORV was stuck open. On turbine trip it was expected to [illegible]en. Some leakage had been known to occur from the relief valves in the pressurizer. It was within the allowable and typically could cause the 180°-190° temperature range seen (from a normal 130°). Leakage from one valve will cause all three tail pipe temperatures to rise. Mr. Miller explained that when Mr. Zewe asked for these temperatures and he got 228°,232° some time after trip, he assumed the pipe was cooling down. When the valve was open, temperatures of around 350° have been recorded. The thermocouple is strapped to the outside of the pipe for all three relief valves.

In response to Mr. Bender's question, Mr. Miller stated that he was not aware of PORV problems at Oconee or other plants. Mr. Miller added that valve leakage did not contribute to the operators' lack of recognition that the valve was stuck open.

In response to Dr. Lipinski's question, Mr. Miller stated that the emergency procedure on pressurizer system failure was not called into play. The operator did not see drain tank pressure above normal. It was not looked at until after sixteen minutes, by which time the rupture disk had ruptured.

Drain tank pressure data came from the reactimeter and was not available in the control room.

In response to Dr. Plesset's question, Mr. Zewe stated that the highest temperature he had ever seen on the relief valve tailpipe was 392° on Unit 1. Dr. Plesset observed that that was a very high temperature for steam expanding out through a small opening.

In response to Dr. Carbon's question, Mr. Zewe confirmed that the only instrumentation available to signal an open PORV is the downstream thermocouple and the pressure reading in the drain tank. Mr. Miller added that a light on the control panel would indicate that the valve had a command to open. This was on for only a short time. It goes on at 2255 pounds and goes off again when the pressure relieves to 2205 pounds.

Mr. Michelson noted that sump pump A in the containment came on at 7-1/2 minutes, sump pump B came on ten minutes, the sump was overfilling and a high level alarm came on at eleven minutes. Where did Mr. Zewe think the water was coming from?

Mr. Zewe said at that time he had no knowledge that the sump pumps were running. His first indication was when Mr. Frederick received a call from the auxiliary operator monitoring the radwaste panel that there was a high level in the reactor building sump. He agreed at that time that the sump pumps should be secured. In response to Mr. Michelson's question Mr. Zewe said that, because of computer back-up, he did not have the high level alarm in the sump at that time.

Mr. Zewe stated that difficulty in starting the A makeup pump was probably due to failure of the operator to hold the control switch for the required 2-1/2 seconds to allow the oil pumps to come on.

In response to Mr. Etherington's question about the reliability of the make-up pumps, Mr. Faust explained that reliability was not a problem, that he had deliberately cut them on and off to adjust for apparent demand for water. He was trying to normalize seals to the RCPs.

Mr. Arnold added that there were some points in the chronology, four hours seventeen minutes for example, where the makeup pumps stopped. At the moment, there is no explanation therefor.

Mr. Miller explained to Mr. Etherington that failure of the auxiliary boiler was unexpected.

Dr. Lawroski asked about the attempt to regenerate the resin. Mr. Miller explained that the resin was slurried using air and water. There was blockage in the transfer line. A leaky check valve permitted water to back through the instrument and service air cross-connector, allowing water into the instrument air. Dr. Lawroski asked how often that had occurred in the past. Mr. Miller replied that it had happened a number of times. Mr. Arnold added that a controlled experiment was being done to check the response.

Mr. Arnold replied to Dr. Carbon that it was correct that the operators (individuals who were not present) had stated to the President's Commission that they had opened the AFW block valves upon completion of the test procedure some forty-two hours before the incident. As yet, there was no explanation for their being closed.

Auxiliary operators are always under the control of a licensed control room operator. The lowest grade of auxiliary operator is C. After a year's

experience he can take an exam for B, and after another year an exam for A. Only an A operator can work on primary plant. 60-70% of the operators at TMI came from the naval program All those present had naval experience.

Dr. Lewis asked about the probability that the operator might have noticed that the AFW block valves were closed. The operators agreed that if the system had not been worked on, with the array of red and green lights on the panel, even though the operator might have looked at the panel often enough, he might not have detected the red lights.

Dr. Plesset asked about operator training for natural circulation. Mr. Miller replied that it was covered for station blackout or loss of coolant pumps. Hot and cold leg temperatures would be monitored. The bubble is kept in the pressurizer. Mr. Michelson asked if the training considered saturated steam in the primary loop. Mr. Arnold answered that the training program is clearly deficient in terms of thermodynamics and heat transfer.

Dr. Lewis asked when the operators recognized there was a void. Mr. Miller responded that within the first hour after his arrival (7 A.M.), he recognized there were steam bubbles in the hot legs.

Dr. Lipinski asked what the operators' response was when they saw a decade increase in neutron flux two hours into the event when the pumps were turned off. Mr. Zewe said he did not know why the reactor was apparently increasing in power with HPI on and emergency boration. He thought perhaps somehow demineralized water was being added to the system, so a search for some potential dilution source was begun.

Dr. Lipinski asked if any effort had been made to correlate the loss of neutron attenuation with the increased reading. Mr. Keaten said GPU had not but he thought B&W might have.

Mr. Bender asked about the use of written procedures and whether they could be compared to those used by airline pilots.

Mr. Zewe felt that the system employed, where a specific alarm requires going to specific procedures, is a valid one. Mr. Herbein felt that there may not be an adequate procedure for every conceivable event.

Dr. Lewis pointed out that in an emergency an airplane pilot is in complete charge and can break any rule he wishes, only he must justify his action later. Mr. Zewe replied that there was no question that he was in charge, however, he discussed all actions in detail with his operators.

Dr. Plesset asked if any attempt had been made to go to natural cooling following becoming aware of voids. Mr. Miller said he attempted to use the A steam generator: B was isolated because of a suspected leak. He checked the steam generator downcomer temperature. He had recommended that the HPI be kept on.

In response to Dr. Catton's question, Mr. Miller replied that neither he nor Mr. Zewe had a good explanation for not recognizing pressure in the RCS being low and voiding in the RCS. Things between 4 and 7 A.M. seemed to have a logical explanation without considering that the PORV was stuck open. When the block valve was shut at two hours twenty minutes, it was more "on feel" than on analysis. No information received pointed to leakage in the primary system. He pointed out that once sump level gets to the top of the sump, there is no further indication of events in the reactor building. There is no rad-

iation alarm. Entry into the reactor building was even considered between 6 and 7 A. M.

Mr. Miller's prime concern after arrival was to implement emergency planning. He did ask for temperature readings, but in the press of other work he never got back to them. Two weeks later, he found what could have been very useful data had been written on a computer sheet.

Mr. Michelson asked about T_H and T_C. Mr. Miller reported T_H was around 720°. Mr. Zewe added Tc was just under 200°.

In response to Mr. Michelson's point, Mr. Zewe stated that the alarms for the most part also alarm on the computer and, in addition, a lot of other information is available on the computer. Sump level, for example, is available only on the printer.

In response to Dr. Lipinski's question, Mr. Zewe stated that about 5 A. M. problems were experienced with the computer, and alarms were more than an hour behind in time. When it was put back into operation, it was erased and restarted. Shortly thereafter, the same thing happened again and the computer again began to backlog.

Mr. Etherington inquired as to the role of B&W. Mr. Miller said when he came aboard he enlisted the help of the B&W representative present to participate in his think team. They had no disagreements. The B&W man had trouble communicating with his home office because the phones were tied up with emergency plans.

In response to Dr. Carbon's question, Mr. Miller explained that the AFW block valves were not on the check list because they were not designated safeguards components. The check lists were compiled by Met. Ed., not mandated by Tech. Specs.

Dr. Lawroski inquired what indication of reactor level was available. Mr. Miller responded that pressurizer level was considered the prime indicator. The operators were drilled not to let pressurizer level go out the bottom, and when it fills there are precautions not to go solid. There was no awareness or training re possible bubble formation. Mr. Zewe concurred. Mr. Herbein added that operators were trained to always keep the core covered, not necessarily covered and pressurized.

Mr. Arnold concurred that the core was probably at least partially uncovered three different times. Mr. Miller did not know what three times the core was considered uncovered, but he admitted he did not have hard data to show it was covered.

Mr. Bender asked if temperature indications would help determine if the core was uncovered. Mr. Miller pointed out that the temperature guage on the hot leg is high on the candy cane. It was off scale above 700°. T_c was low but T_H was high as the reactor pressure was lowered. When the core flood tanks were pressurized above the reactor coolant, they dropped in level, giving reason to believe there was core coverage. Mr. Miller stated that later in the day he was told that 400 gpm was required. Later the pressure was brought back up and the RCP's started, ensuring core coverage.

Dr. Plesset asked when Mr. Miller was aware that hydrogen was being released. Mr. Miller replied that it was not until the following day. He said he thought there may have been some fuel failure, but without the in-core temperature readings he was unaware of the extent of fuel damage, though there was evidence of large radiation releases into the containment.

In response to Mr. Michelson's question, Mr. Miller stated he was unaware of the pressure pulses in the reactor coolant drain tank in the 3-4 hour period, and the spike at ten to two occurred so rapidly it was not recognized as a hydrogen burn.

Mr. Zewe described the spike he observed just as he had Mr. Scheimann open the block valve to reduce pressure further from 2-1/2 lbs. The spike went to 20 or 25 psi. The building spray pumps actuated simultaneously.

Mr. Michelson wondered why the spike did not show up elsewhere such as on the drain tank. He noted that the chronology showed the block valve was opened at 7 1/2 hours and not reclosed until 13-1/2 hours. Mr. Arnold stated that they had not yet been able to complete a review of all this information.

Mr. Michelson noted the depressurization curves were smooth and did not show valve manipulation. Mr. Arnold asked Mr. Keaton to look into the matter.

Mr. Miller stated that there was no instruction not to close the block valve and no reason not to.

In response to Dr. Carbon's question, Mr. Miller admitted it was probably a violation of Tech. Specs. not to have an AFW system available since the valves were closed. He added that the operators were not aware of a similar

situation at Davis Besse in 1977. Despite attendance at a B&W users meeting, that transient was never discussed.

Mr. Herbein explained that the operators on Unit 1 read the LERs on Unit 2 and vice versa but they do not routinely read LERs from other B&W reactors.

In response to Dr. Lawroski's question, Mr. Herbein explained that the candy cane arrangement required initial pressurization with 30 lbs. of nitrogen, which was unique to this plant configuration, but soon became routine.

(Several members and consultants departed at this point for their plant tour. The meeting continued with Dr. Carbon acting as chairman.)

Dr. Carbon asked how the hydrogen bubble was dissipated. Mr. Keaten explained two mechanisms:

(1) Discharge of RCS water to the make up tank through the letdown line as system is depressurized. This caused hydrogen in solution to come out in the make up tank, from where it was subsequently transferred via the waste gas header to the temporary line connected to the containment building.

(2) Pressurizer coolant spray released hydrogen which was relieved by venting the pressurizer, and since the reactor coolant drain tank rupture disc had ruptured, venting the pressurizer, transferred the gas to the containment building.

Mr. Keaten noted one error in the chronology. It omitted the fact that just prior to turning off the RCP's, the operators turned on the HPI.

He explained that the operators detected no flow in the AFW lines by observing

steam generator behavior - pressure drop, water level low. Dr. Carbon asked if the closed block valves could have been detected by high discharge pressure from the AFW pumps. Mr. Keaten felt it could not.

Dr. Lewis asked if the control valves had opened automatically. Mr. Keaten said he would check. He believed the tags on the valves indicated they were partially open.

Incore Thermocouple Data

Mr. Keaten discussed thermocouple data with the aid of slides in Attachment F. He pointed out that temperatures over 700° were printed out as question marks by the computer, so a technician had to measure millivolts across the thermocouple terminals. Although some thermocouples had relatively low readings, some were over 1800°. The higher readings were generally near the center of the core. On March 30, all the thermocouples read 700° or less. The ones on the outside read higher than on the 28th, and the ones in the center very much lower.

Mr. Keaten replied to Dr. Carbon's question that Gary Miller had asked for these readings, and he was told that some were high and some low and they were probably not reliable. He never received the complete set.

The hot six thermocouples were monitored during the cooldown process. Mr. Keaten pointed on Slide F-5 to the points in the curve where the turbine was put on line, the turbine tripped, and where natural circulation began. In the natural circulation case, the system cooled because of the reduction of the coolant pump heat load.

In response to Dr. Lewis' question, Mr. Arnold stated that the make up can enter either cold leg, the let down comes out the A cold leg. Mr. Keaten explained that the vendors analysis indicated the hydraulic resistance of the core was a factor of 200-300 higher than it should have been.

Mr. Keaten stated that the sump pumps came on at ten minutes and were turned off at forty minutes into the transient. There was no evidence that they had ever been turned on again.

In response to Dr. Carbon's question, Mr. Herbein reported that prior to the accident, there was no formal requirement by either NRC or Met. Ed. for a watch-change checklist, although the plant review committee normally got into this amount of detail on other matters.

Next, the hydrogen spike was discussed. It was of relatively short duration (1/2 - 2 seconds). There were no longer duriation pressure pulses.

At 6:35 P.M., the meeting was adjourned until the following day. The meeting resumed at 8:30 A.M., June 7th with Mr. Etherington as Chairman.

Plant Organization and Operation (J. Herbein)

Mr. Herbein discussed the organization using the Slides in Attachment G. There are 31 licensed Senior Reactor Operators (Slide G-3). There are 173 maintenance employees in four shift sections; they report to a foreman who typically heads a staff of nine, (three instrument and control, three mechanical, three electrical). The maintenance foreman reports to the shift supervisor. Thirty-four personnel have engineering degrees, twenty of these are assigned to the technical support function.

Mr. Herbein explained to Mr. Bender the system of Work Permits. Maintenance personnel must clear their work through the operators. The constraints on operating certain valves and equipment are contained in the Tech. Specs. Mr. Bender inquired if maintenance personnel had followed these procedures in working on the AFW block valves. Mr. Herbein pointed out that no maintenance was done on the block valves but they were subjected to a surveillance test two days before the accident. There is a sign-off procedure. This information is transferred to another sheet, in summary form, and the original sign-off sheet is then disposed of. It is not now available.

In response to Dr. Lipinski's question, Mr. Herbein stated the supervisors of operations for Units 1 & 2, Jim Floyd and Joe Logan were licensed Senior Reactor Operators (SRO). Gary Miller formerly held a SRO license for Unit 1, but his current duties did not require it. Dr. Lipinski asked if Mr. Miller gave an order to a licensed operator, would he be free to ignore it. Mr. Herbein said he would not, but he would be duty bound to question it if he felt it was incorrect.

In response to Mr. Bender's question, Mr. Herbein explained that the operators write maintenance work requests. The operations shift foreman helps decide the priorities of maintenance work. Repetitive failures surface in various management reviews. The demineralizer chain was thus identified, although Mr. Herbein and Mr. Miller did not recall specifically if the resin solution problem was identified.

Mr. Bender wondered if there was any systematic way of controlling the interaction between non-safety grade equipment and safety grade. Mr. Herbein

said he knew of no system-wide way except that economic incentive would motivate one to take care of particularly troublesome equipment.

Mr. Herbein discussed GPU's Technical Functions Group (Slide G-5). The Met. Ed. Corporate Staff is in Reading, Pa. The GPU Group is in Parsippany, New Jersey. Its director is Dick Wilson. Mr. Keaten reports to Mr. Wilson. He is the Manager of Systems Engineering. He has four sections under him. In reply to Dr. Lawroski, he stated that system interaction would come under him.

In response to Mr. Michelson's question, Mr. Keaten agreed that the systems engineering group does not review operating procedures.

Mr. Herbein covered review committees (Slide 7-6).

Dr. Carbon asked if the Plant Operations Review Committee (PORC) had discussed the PORV maintenance problem. Mr. Herbein indicated that there was not a record of formal review of the matter, but the members were aware of the valve leakage and were staying on top of the matter so that if leakage increased they could order the required (by Tech. Specs.) safety evaluation.

In response to various members' questions, Mr. Herbein discussed the frequency and duration of the meetings of the review committees (example - PORC;:1978; half-a-day, every day; 1979 - two days a week).

Mr. Herbein indicated there was no procedure to guarantee that LERs from other B&W plants would be reviewed. However, there was an on-site support team of B&W engineers. The lead B&W engineer is in contact with Lynchburg where there is a review group examining all B&W reactors. Generic concerns are flagged

to the onsite B&W team. The leader documents these concerns in letters to the unit superintendents or the station manager. Assisting Met. Ed., not reporting to B&W, is the primary function of the B&W team.

Mr. Herbein explained to Dr. Lipinski that there was a separate procedure for Loss of Offsite Power with diesels and without diesels. Dr. Lipinski asked for a list of all procedures and Mr. Herbein agreed to supply it.

Dr. Lawroski asked which review committee would have decided that different parameters would effect containment isolation on Unit 1 and Unit 2. He noted that Unit 2 did not isolate on high radiation. Mr. Herbein replied that differences stemmed from differences in architect/engineer requirements between the two units. This would only have been cursorily reviewed by any of the committees but would have been amply examined during the detailed NRC review.

Procedures (J. Herbein)

Mr. Herbein next covered procedure preparation with the aid of Slide G-7. Administrative Procedure 1001 covers control over procedures required by Tech. Specs. After comments are resolved, the PORC recommends safety related procedures for unit superintendent approval. The applicable department heads recommends non-safety related procedures for unit superintendent approval.

The Unit 2 test program underwent a field verification process including a review by a shift supervisor or a shift foreman. Controlled copies of the procedures are located in the control room. Operators are trained on each procedure section including symptoms, immediate automatic actions, immediate manual actions and follow up actions. Operators are required to remember

symptoms and each of the automatic and manual procedure steps.

Mr. Michelson asked to what extent procedures were reviewed by the architect/engineer. Mr. Herbein indicated this had been done for Unit 1 but not for Unit 2, because it was felt they were so similar. Mr. Thorpe added that although the procedures were copies for Unit 2, the architect engineer did have a chance to review the final product. But, Mr. Herbein added, this was not done on a formal basis. Mr. Arnold stated that this was done under contract and in that respect was quite formal.

Dr. Lipinski noted that the current procedure for test of TMI-2 auxiliary feedwater calls for disabling all of the redundant AFW supplies simultaneously. This is a revision of an earlier procedure which did not disable either auxiliary feedwater system. Mr. Herbein said B&W was not involved in the revision nor did he believe that NRC was, although the records of the procedure change were available for NRC to review. Mr. Arnold conceded that it was an error in preparation of the procedure to call for taking both feed trains out of service for testing simultaneously.

Training

Mr. Herbein used Attachment H to outline his discussion of training. The Training Department is responsible for all operator training. It is also responsible for administering the progression of auxiliary operators from C to B to A. Replacement control room operators are selected from senior qualified A auxiliary operators. The training also conducts general training and radiation protection training for employees, vendors, and contractors, as needed.

Dr. Carbon asked what the minimum education requirements were for a shift supervisor. Mr. Herbein stated he must be at least a high school graduate. Most, like Bill Zewe have Navy nuclear experience. In response to Mr. Mathis, Mr. Herbein explained that the supervisor of training attended Penn. State for four years and has held a Senior Reactor Operator's (SRO) License at Penn. State. At the time of the accident, he was in training for a SRO license.

Dr. Catton asked how LERs at other B&W plants are factored into the training program. Mr. Herbein admitted they were not formally, but a mechanism is set up. The station manager attends B&W users group meetings, Mr. Herbein attends EEI prime movers meetings and, as a result, they funnel information back to the Training Department. In addition, the department subscribes to and scrutinizes the Atomic Clearinghouse Letter which contains reports on LERs. They missed the one on the Davis-Besse incident.

Met. Ed. does not receive LERs from other B&W plants formally from NRC. Formal transmissions from NRC are reviewed by the Met. Ed. licensing staff in Reading.

Emergency Plan (Alexis Tsaggaris)

Mr. Tsaggaris covered emergency planning with the help of slides in Attachment I.

Emergencies are handled by the on-shift operating crew. The emergency director on March 28 was Gary Miller. The organization is shown on Slide I-6. Required off-site notifications are shown on Slide I-10.

Unit 1 was in a start-up mode at the time of the emergency. It was decided then to place it in a shutdown mode.

Dr. Plesset inquired about the radiation in the Unit 1 control room and its impact on operations. Mr. Dubiel, supervisor of radiation protection and chemistry, indicated that he felt he may have evacuated nonessential personnel and required respiratory protection for those remaining in the Unit 1 control room (when the noble gas cloud was pulled back into the unit's air intake, and daughter product Rubidium 88 indicated high particulate activity) unnecessarily. The action was taken because the instrumentation was inadequate to ascertain that the activity, Rubidium 88, was short-lived.

Dr. Plesset expressed concern that the activity could enter the Unit 1 control room. Mr. Dubiel pointed out that once activity is detected, the ventilation system switches automatically to a recirculation mode when levels reach MPC levels. Krypton 88 has high MPC levels, however its daughter, Rubidium, started building up.

The radiation monitors in the auxiliary building and the reactor building were on very early in the event. The isolation of the control room occurred two hours later, because of a wind shift. Dr. Plesset reiterated his concern that the Unit 1 control room could become uninhabitable. Mr. Arnold agreed to discuss this at the full committee meeting. Mr. Michelson requested that this discussion also include the difficulty of communicating while wearing respiratory protection.

The timing of the sequence of events was covered with Slides I-11 and I-12. At nine o'clock on March 28, the emergency control station became uninhabitable due to airborne radiation at the control point, and it was moved to the Unit 2 control room rather than prescribing use of respirators. Slide I-15

showed the organization available to the off-site coordinator at the observation center on the east shore.

Mr. Bender asked what triggered the decision to declare an emergency. Mr. Tsaggaris said it was the reactor building dome monitor reaching its alert setpoint.

Mr. Bender asked what, other than radiation, can trigger an emergency. Mr. Tsaggaris answered: loss of coolant pressure coupled with a high sump level or containment building pressure. Also, an emergency would be declared if, after a transient or reactor trip, the plant does not assume the expected condition after fifteen or twenty minutes.

In a discussion of the remaining agenda, Mr. Arnold agreed to supply a copy of the surveillance procedures that apply to auxiliary feedwater system.

Post Accident Support (R. C. Arnold, V.P., GPU)

For the first five or six hours, the plant staff was on its own. Later NRC, the State, and some contractor people were called in, and by early evening GPU Service Corporation had personnel on site.

By Sunday evening, a large group of technical talent was assembled from other utilities, architect/engineering firms, all the NSSS vendors, constructors, consulting firms, EPRI, government and national laboratories. The group assisted in gathering data, and performing analyses to determine what had occurred. Equipment was brought in Friday and Saturday for monitoring and analyses and also for the mitigation of off-normal conditions in the plant - such things as tanks for storing liquids, etc.

Mr. Arnold pointed out that this precedent-setting assemblage of talent called attention to the need for an emergency call list probably on a regional basis, so that such talent could be brought to bear on any emergency. A file of plant procedures, drawings, and technical manuals should be available to such a team. A list of emergency equipment should be developed. Mr. Arnold felt that rethinking of the roles and responsibilities of some of the involved agencies was called for.

Timeliness of information furnished to the public must be improved.

Mr. Bender asked if the support should come from the private or the public sector. Mr. Arnold replied that his preliminary feeling is that it should come from both.

Waste Management, Ron Williams and Ben Rusche

Mr. Williams opened the discussion by enumerating the wastes to be handled. (See Slide J-1, attached). He discussed Epicor I (Slide J-2), a filtration demineralization system brought in early in the accident to process wastes that were currently in the Unit 1 auxiliary building in order to provide room for possible excesses at Unit 2. After processing of 150,000 gallons through this system, Unit 1 is reasonably dry. Some low activity water from Unit 2 has also been processed through this system.

Currently, Epicor II is being constructed (Slide J-3). It is located inside a building that has ventilation and filtration protection so that higher activity fluids can be processed through it. (1-100 μCi/ml of Iodine compared to 1 μCi/ml for Epicor I.)

Two systems are being examined for disposal of higher activity level fluids - submerged demineralizer in the B fuel pool and an evaporator system. Both systems may be used. Ben Rusche has been engaged as a consultant.

A supplementary system for gas filtration has been installed on the Auxiliary building.

Any discharges will conform with Tech. Specs. No plans have yet been developed for the recovery of the reactor building. A Bechtel team under GPU Service Corporation management is working on it.

In response to Dr. Lawroski's question, Mr. Williams stated that while he personally did not have estimates of the radioactivity on surfaces of the reactor building, he was certain that others had some - but based solely on analyses, not measurements.

In response to Mr. Etherington's question about loss of unrecirculated borated water, Mr. Herbein explained that a tank truck was brought in on March 21, and boric acid solution was mixed in the station yard and transferred to the borated water storage tank. The boric acid was provided by the contractor who mixed the solution and transferred it to the tank. Mr. Gary Miller explained that there was time to do that.

Mr. Rusche commented on the desirability of having NRC Staff personnel on-site to conduct rapid reviews of proposed actions. He distinguished between separating the wastes from the large volume of water containing them, and disposing of the water and of the wastes. He noted that the only available site for disposal was in Washington State and observed that this focussed on

a need for regional sites. He stated that most utilities do not have experience in dealing with highly contaminated water, although there is such experience in the federal establishment. A review group of SRL and CRNL personnel has been formed. Dr. Clark Ice has been engaged as a consultant. Proposals are being received for a final clean-up system, and it is expected a contractor will be selected in a few weeks.

Mr. Rusche replied to Mr. Bender that the resulting water would definitely be suitable for release under all existing federal regulations. Selection of a final disposal method, however, depends on matters other than health and safety.

After a luncheon break, Mr. Arnold corrected a previous statement to inform the Committee that the architect/engineer had not reviewed the final balance of plant procedures, although the A/E had seen earlier drafts.

Mr. Herbein replied to Mr. Michelson that the procedures for Unit 1 had been reviewed by B&W, but because of the similarity of the units the same degree of formality for review of Unit 2 had not been carried out. Mr. Arnold explained to Mr. Bender that the comments received on the Unit 1 procedures were of a very minor nature.

Mr. Herbein also corrected two previous statements:

(1) Met. Ed. does receive all LERs through a subscription service.

(2) There is no check list of safety related valve positions that is passed from shift to shift. There are shift and daily check procedures.

Mr. Herbein commented that he had provided the Subcommittee with:

(1) Administrative Procedure 1012, Shift Relief and Log Entries, (Attachment K) and,

(2) Unit 2 Surveillance Procedure 2301, -S1, Shift and Daily Checks (Attachment L)

Dr. Lawroski recalled an LER on Unit 1 involving emergency feed valves left closed. Mr. Herbein reported that the event, which preceded the TMI-2 accident occurred because, part way through the valve line-up check list, some maintenance had to be done and when the check list was resumed, the steam inlet valve to the turbine was omitted.

Mr. Herbein confirmed for Dr. Lipinski that on Unit 1, the steam driven pump starts automatically and electrically driven pumps must be manually started.

Mr. Herbein explained that Bill Zewe's recollection was that 1000 gpm was injected for about an hour after trip of the RCP in the A loop. This was reduced an hour after the second set of pumps was tripped because a pressure increase in the system was noted. Mr. Arnold added that this was while the computer data was unavailable.

Mr. Michelson asked when the injection was begun. Mr. Herbein replied that the operators recollection was that it was immediately prior to the trip of the RCP's in the A loop. To get 1000 gpm two pumps were running.

Transfer of Radioactivity to the Auxiliary Building

Mr. Arnold stated that he does not feel he knows yet the actual pathways for the transfer of the radioactive material out of the containment into the auxiliary building. Neither Unit 1 nor Unit 2 containments isolate on high

radiation level. Mr. Herbein explained that transport from the reactor building sump over into the auxiliary building is isolated by radiation in Unit 1 but not in Unit 2.

The building isolates only on four pounds of pressure. The purge valves associated with ventilation supply and exhaust from the reactor building isolate on radiation signal which comes off the stack.

Mr. Herbein believed the letdown system isolates on high containment pressure but not on radiation, and not on ECCS signal alone.

Mr. Bender recalled a principle that required lines that fed gas to the environment to be closed on radiation signal. Mr. Miller indicated that only the purge valves were in that category.

Water Hammer

Mr. Keaten reviewed the initiating event:

Mistaken closure of the valves from the condensate polisher, which resulted in loss of suction at the booster pumps and pump trip at 12 psig. The pump, even though tripped, continued to rotate and sucked further water from the line, causing water hammer in the line and separation of the fluid and subsequent collapse. An operator reported that the line moved three feet. This was immediately after the initial trip.

Dr. Shewmon asked if any damage was noted resulting from that movement. Mr. Keaten mentioned a leaking flange and an instrument air line which was disconnected as a consequence of the motion, but he was unaware of any permanent deformation of the pipe.

Possible Improvement in Instrumentation and Diagnostic Capability (R. Keaten)

Mr. Keaten used Slides M-1 and M-2 to discuss possible improvements in instrumentation and diagnostic capability. On thermocouple readings he thought a response time of several minutes would be acceptable. He pointed out that actual valve position indication was desirable not just what the command to the valve was.

Mr. Keaten indicated he was not yet convinced of the practicality of reactor liquid level indication, though it was on his list.

He felt hydrogen concentration at the entry to the recombiner would be very useful information, and if present could have avoided worry over propagation of flame back into the containment building.

Mr. Keaten said GPU was working on some of these things prior to the accident but their priority was not high at that time.

In response to Mr. Etherington's question, he indicated that if all the information from the quench tank (temperature, etc.) were available, the operator could have easily inferred the valves were open.

Mr. Keaten indicated it was not clear to him why the core thermocouples were connected to the computer in such a way that they went off scale at 700°F.

He felt there should be an expanded list of instruments required to withstand accident conditions. He cited the pressurizer level guages which failed successively as the water level rose in the reactor building. A guage of water level in the containment would have been useful in predicting which instrumentation would fail next.

Remote TV monitors in a few more locations would have been a great help.

Mr. Keaten felt high speed computer monitoring and recording of all plant parameters would have been the most useful diagnostic tool that could have been added.

Mr. Keaten and Mr. Herbein both indicated that they had not been influenced by Reg. Guide 1.97 on instrumentation to follow the course of an accident.

Mr. Bender noted that although Mr. Rusche had indicated there was uncertainty about the nuclides inside the containment, Mr. Keaten's list contained no instruments for their determination. Mr. Keaten said this was only because the list was a first pass and was by no means intended to be complete.

Mr. Nicholson asked about the location of the containment pressure sensor. Mr. Herbein agreed to supply that later.

Dr. Lahey asked about continuous on-line measurement of boron concentration.

Mr. Keaten said, with regard to B&W design, his group had not yet determined what variations in design might have been helpful. He felt that perhaps the setpoint for the level in the steam generators under post-drift conditions might be set higher. Dr. Lahey reminded him of the possible desirability of being able to bleed off the top of the candy cane and also of being able to vent from the top of the reactor vessel. Mr. Keaten pointed out that for the former, under natural circulation, such an event may be saturating.

Mr. Bender asked Mr. Keaten to investigate the desirability of having enough

pressure relief capacity in these systems to deal with an ATWS event, so that one would never be unable to depressurize low enough to use the low pressure heat removal system.

Mr. Keaten indicated that a system for partial containment isolation may be desirable.

He said some thought had been given to requiring larger pressurizers. Analysis will be done on that.

Dr. Lipinski pointed out the need for high reliability in the control that turns off the pressurizer heater when the pressurizer level gets low. Mr. Etherington added that not only was there danger of burning out the heaters, there was danger of overheating the pressurizer.

Control Room Layout, Diagnostic Capability, and Human Engineering (R. Keaten)

Mr Keaten stated that the industry could learn much from the aerospace industry in the field of human engineering. Control panels are not organized in such a way that instruments and controls are grouped so that priorities are apparent. He felt the nuclear industry did not make sufficient use of computers. GPU has better computers on non-nuclear plants.

Mr. Etherington asked if this would require additional shutdowns when the computer is out. Mr. Keaten said GPU is thinking about redundant computers for TMI-1 to cover this eventuality.

With only one computer and it out of commission, certain maneuvers may have to be restricted.

Training, Organization, Health Physics (J. Herbein)

Mr. Herbein used the slides in Attachment for his presentation. He indicated training had been deficient in thermodynamics heat transfer and core cooling demands. Simulated failures were not carried far enough. On-shift training was inadequate. He felt six shifts are required to provide adequate training. The procedures were inadequate in that they provided "cookbook" steps but did not list the objectives of each procedure.

In response to Dr. Carbon's question, Mr. Herbein explained that typically B&W runs their operators through the simulator one week per year. Consideration is being given to extending this to two weeks.

The training consists of twenty hours on the machine and twenty classroom hours going through such transients as rod drop, reactor coolant pump trip, reactor trip, small break, etc.

Some operators have had an expanded eight week program including such things as NSSS design, etc.

In response to Dr. Carbon's question, Mr. Herbein explained that B&W prepares the training program and Met. Ed. buys it with selected options.

Mr. Herbein felt the organization expects too much of the shift supervisors. More technical capability on shift is desirable. He felt a degreed engineer was needed on shift. This engineer could relieve the shift supervisor of such functions as health physics and maintenance operations.

Dr. Shewmon asked if the shift supervisor and the degreed engineer could be one and the same person. Mr. Herbein replied that that was being looked at,

and, if enacted, pay scales would conform.

Dr. Carbon wondered if shift supervisor on a billion dollar nuclear plant was not comparable to aircraft commander on a large plane such as a DC-10. Mr. Arnold said all these things have been thought of and nuclear shift supervisors were paid more than fossil shift supervisors, but he disclaimed any expertise in training and compensation received by airline pilots. Preparation for examinations requires extensive study of shielding, some heat transfer, radiation protection, nuclear engineering, etc.

Mr. Carbon commented that the ANSI-Standard training requirements were somewhat [illegible] twelve weeks for [illegible] and felt that [illegible] almost zero. Mr. Arnold felt that experience made up for this paucity, but Dr. Carbon pointed out that experience in handling accidents was not generally obtained.

Mr. Herbein next discussed the difficulty of transmitting information from shift to shift. He also explained the burden of administrative requirements and how they tied up a significant number of technical personnel.

At this point, several committee members had to leave. Dr. Carbon assumed chairmanship of the Subcommittee.

Mr. Herbein continued with a discussion of health physics. The large required influx of health physics personnel was almost overwhelming. A lot of breathing apparatus was used. There was a shortage of air compressors, hoses, manifolds, and other devices. It was difficult to cycle respirator face masks through the decontamination process. Dosimetry was a problem.

Mr. Arnold indicated that NRC response was very good and, at this time, he

had no comments on any recommended changes in the manner in which NRC interfaced with his organization.

Mr. Arnold reviewed those things he would recommend be available for emergencies.

Dr. Lawroski asked about the benefits of standardization, referencing certain differences between Units 1 & 2.

Mr. Arnold commented that the non-standardization required more people, more training, more procedures etc. that constituted a distinct disadvantage. He did not feel that non-standardization contributed to the accident.

Dr. Lawroski asked about the disadvantage of a two unit station, referring to the interference with Unit 1 operation that could be caused by radioactivity sucked into the ventilation from Unit 2 releases. Mr. Arnold pointed out that there was no real interference with Unit 1 operation.

Returning to differences between the units, Mr. Arnold pointed out even if fossil plants that were replicate there were inevitable differences between early and later plants.

Dr. Lawroski pointed out that standardization carried to an extrere would not be desirable. He explained that if all aircraft were DC-10s (which were currently grounded), it would be a serious matter.

NRC Staff Discussion of Communications (Mr. Ebe C. McCabe)

Since, after the TMI-2 Accident, NRC decided to have dedicated phone lines installed in all power reactor control rooms, direct communication with the Operations Center in Bethesda has been established with 68-70 licensees.

This "OPX" system is manifested at TMI-2 by an automatically ringing red phone in the control room and in the shift supervisor's office. One more will be installed in the visitor's center, the alternate emergency response center.

There is a regional duty officer and a headquarters duty officer on call at all times.

System 2, the "SSS" system is a regional system for transmitting radiological information to the regional office.

NRC is still developing the criteria for the use of these systems. Basically, when certain parameters are exceeded NRC is to be notified.

Hydrogen Bubble Calculations

Dr. Plesset asked that these calculations be discussed briefly before the full Committee. He asked if the partial pressure of the steam was accounted for, how the results correlated with the perfect gas law, and was the temperature known at all times. Mr. Arnold said he would attempt to answer the next week.

Base Plan for Transition to Natural Circulation (R. Keaten)

Mr. Keaten used the Slides in Attachment O. The Sunday following the accident, plans were formulated for arriving at a final cooldown state. The plan underwent extensive revision, but the basic system is the same as originally planned.

The start is represented by point A on Slide O-1 (just below 300°F, slightly below 1000 psi). The plan was to cool down and then to depressurize and transition to natural circulation.

The first steps to depart from A came after the calculated hydrogen bubble volume had been reduced to zero. At this time, awareness developed that gas spaces in the control rod drive mechanisms could have trapped up to eighty cubic feet of gas. This amount when expanded to the hoped-for pressure was enough to block natural circulation.

This gas was removed by progressively lowering the pressure while maintaining the temperature constant expanding the gas and sweeping it out of the vessel head. Then the pressure was brought back up to start the temperature reduction, which was done by opening up additional steam flowpaths from the steam generator to the condenser.

Because reliable pressurizer level indication was lost, the transition to natural circulation was made earlier than planned, at which time the pump was tripped, reducing the heat load on the system.

The design and installation of various backup systems was completed, then the pressure was reduced gradually to 300 psi, and will be reduced further. Pressure must be controlled to be sure gas does not block natural circulation. Lower pressure, however, reduces potential leakage.

Slide O-2 shows the temperature changes in the hot and cold legs during the transition to natural circulation. Slide O-3 shows average thermocouple readings during the transition. Variations from average are shown in Slides O-4 and O-5. Mr. Keaten could not explain why one thermocouple jumped up 20^{0}.

Key Decisions

Mr. Arnold enumerated key decisions made by his organization:

1. Decision to degassify the reactor coolant system.

2. Decision not to use decay heat system if avoidable.
3. Decision not to pump water out of the containment building. (Required alternate methods of measuring plant parameters whose instrumentation was subject to flooding.)
4. Decision to install hydrogen recombiner and back-up equipment.
5. Decision to degas through the makeup tank.
6. Decision to remain as long as possible at stable temperature and pressure rather than decreasing temperature as rapidly as possible.
7. Decision to install long term backup cooling, pressure and volume control systems.
8. Decision to prepare three alternate methods of decay heat removal.
9. Decision to rely on natural circulation.
10. Decision to maintain plant at 300-350 psi solid in the pressurizer.

All decisions were cleared with NRC. NRC input came via a technical working group.

Representatives from GPU (Wilson), Met. Ed. (Herbein), waste management (currently Rusche) Burns & Roe, B&W (MacMillan), NRR, and an industry advisory group constituted the group.

It met twice a day until May 6, once a day until May 25th, and twice weekly since then. (The industry advisory group disbanded on May 6.)

Dr. Carbon noted the committee had received a diagram of a Simplified TMI-2 Emergency Feedwater System (Attachment P), and a chart of Reactimeter readings (Attachment O)

A compilation of TMI-2 procedures is attached (Attachment 7).

Dr. Carbon reviewed the items to be covered at the full committee meeting. A list of questions (Attachment 8) would be provided to summarize items desired by the Committee.

The meeting was adjourned at 3:30 P.M.

Additional detail is available in the Transcript of the meeting available at the NRC Public Document Room at 1717 H St., N.W., Washington, D. C., or can be obtained from ACE Federal Reporters, Inc., 444 N. Capitol St., Washington, D. C.

Subcommittee on Electrical Sciences and Analysis of the Advisory Committee for Engineering Meeting

Please Note.—This Meeting was originally scheduled for February 20-21, 1979, and appeared in the Federal Register on February 2, Page 6818. Due to inclement weather, the meeting was postponed to May 21-22, 1979. We are republishing the meeting notice in its entirety.

In accordance with the Federal Advisory Committee Act, Pub. L. 92-463, as amended, the National Science Foundation announces the following meeting:

Name: Subcommittee on Electrical Sciences and Analysis of the Advisory Committee for Engineering.

Date and time: May 21 and 22, 1979—9 a.m. to 5 p.m. each day.

Place: Room 1232, National Science Foundation, 1800 G Street, NW., Washington, D.C. 20550.

Type of meeting: Part Open—Open—5/21-9 a.m. to 12:30 p.m.; 5/22-9 a.m. to 5 p.m. Closed—5/21-1:30 p.m. to 5 p.m.

Contact person: Dr. Yoh-Han Pao, Section Head, Electrical Sciences and Analysis Section Room 1110, National Science Foundation, Washington, D.C. 20550. Telephone: (202) 632-5201.

Summary minutes: May be obtained from the Committee Management Coordinator, Division of Financial and Administrative Management, Room 248, National Science Foundation, Washington, D.C. 20550.

Purpose of subcommittee: To provide advice and recommendations concerning support for research in the area of Electrical Sciences and Analysis.

Agenda:

Tuesday, May 21, 1979—9 a.m. to 12 Noon—Open

9:00 a.m.—Overview of Schedule, Yoh-Han Pao.

9:30 a.m.—Briefing by Division Director, Engineering, H. C. Torrens, Jr.

10:00 a.m.—Briefing by Program Directors: I. Harris, W. L. Brogan, E. Schuttman, and N. Caplan.

Tuesday, May 21, 1979—1 p.m. to 5 p.m.—Closed

1:00 p.m.—Subpanel reviews of individual programs, including examination of proposal jackets, reviewer comments and other privileged material.

5:00 p.m.—Adjourn.

Wednesday, May 22, 1979—9 a.m. to 5 p.m.—Open

9:00 a.m.—Briefing by Section Heads and Program Directors of Related Research Areas (Computer Sciences, Materials, Research Applications).

10:00 a.m.—Presentation of Electrical Sciences and Analysis Long Range Plans—Yoh-Han Pao.

11:30 a.m.—Subpanel Reports.

12:30 p.m.—Lunch.

1:30 p.m.—Discussion of Long Range Plans.

5:00 p.m.—Adjourn.

Reason for closing: The Subcommittee will be reviewing grants and declinations jackets which contain the names of applicant institutions and principal investigators and privileged information contained in declined proposals. This session will also include a review of the peer review documentation pertaining to applicants. These matters are within exemption (4) and (6) of 5 U.S.C. 552b(c), Government in the Sunshine Act.

Authority to close meeting: This determination was made by the Director, NSF, pursuant to provisions of Section 10(d) of Pub. L. 92-463.

M. Rebecca Winkler,
Committee Management Coordinator.

May 17, 1979.

[FR Doc. 79-15792 Filed 5-21-79; 8:45 am]

BILLING CODE 7555-01-M

NUCLEAR REGULATORY COMMISSION

Advisory Committee on Reactor Safeguards; Three Mile Island Nuclear Station, Unit 2 Subcommittee; Meeting

The ACRS Subcommittee on the Three Mile Island Nuclear Station, Unit 2 will hold a meeting on June 6-7, 1979 in the Pennsylvania State University Capitol campus Auditorium, Middletown, PA 17057 to discuss technical details of the March 28, 1979 incident at this Station.

In accordance with the procedures outlined in the Federal Register on October 4, 1978 (43 FR 45926), oral or written statements may be presented by members of the public, recordings will be permitted only during those portions of the meeting when a transcript is being kept, and questions may be asked only by members of the Subcommittee, its consultants, and Staff. Persons desiring to make oral statements should notify the Designated Federal Employee as far in advance as practicable so that appropriate arrangements can be made to allow the necessary time during the meeting for such statements.

The agenda for subject meeting shall be as follows:

Wednesday, June 6, 1979: 1:00 p.m. until conclusion of business that day.

Thursday, June 7, 1979: 8:30 a.m. until conclusion of business that day.

The Subcommittee may meet in Executive Session, with any of its consultants who may be present, to explore and exchange their preliminary opinions regarding matters which should be considered during the meeting and to formulate a report and recommendation to the full Committee.

At the conclusion of the Executive Session, the Subcommittee will discuss with representatives of the NRC Staff and representatives of the Metropolitan Edison Company, et al., matters identified in the initial session.

In addition, it may be necessary for the Subcommittee to hold one or more closed sessions for the purpose of exploring matters involving proprietary information. I have determined, in accordance with Subsection 10(d) of Public Law 92-463, that, should such sessions be required, it is necessary to close these sessions to protect proprietary information (5 U.S.C. 552b(c)(4)).

Further information regarding topics to be discussed whether the meeting has been cancelled or rescheduled, the Chairman's ruling on requests for the opportunity to present oral statements and the time allotted therefor can be obtained by a prepaid telephone call to the Designated Federal Employee for this meeting, Mr. Raghwald Muller, (telephone 202/634-1413) between 8:15 a.m. and 5:00 p.m., EDT.

Background information concerning this nuclear station can be found in documents on file and available for public inspection at the NRC Public Document Room, 1717 H Street, N.W., Washington, D.C. 20555 and at the Government Publications Section, State Library of Pennsylvania, Education Building, Commonwealth and Walnut Street, Harrisburg, PA 17126.

Dated: May 17, 1979.

John C. Hoyle,
Advisory Committee Management Officer.

[FR Doc. 79-15800 Filed 5-21-79; 8:45 am]

BILLING CODE 7590-01-M

[Docket No. 50-302]

Florida Power Corp., et al., Crystal River Unit No. 3, Nuclear Generating Plant

Order

I. Florida Power Corporation (FPC or the licensee) and eleven other co-owners are the holders of Facility Operating License No. DPR-72 which authorizes the operation of the nuclear power reactor known as Crystal River Unit No. 3 Nuclear Generating Plant (the facility or Crystal River Unit 3), at steady state power levels not in excess of 2452 megawatts thermal (rated power). The facility is a Babcock & Wilcox (B&W) designed pressurized water reactor (PWR) located at the licensees' site in Citrus County, Florida.

II. In the course of its evaluation to date of the accident at the Three Mile Island Unit No. 2 facility, which utilizes a B&W designed PWR, the Nuclear Regulatory Commission staff has

REVISION 1
June 1, 1979

Attachment B

TENTATIVE DETAILED SCHEDULE
ACRS THREE MILE ISLAND SUBCOMMITTEE MEETING
PENNSYLVANIA STATE UNIVERSITY (CAPITOL CAMPUS
AUDITORIUM
MIDDLETOWN, PENNSYLVANIA
June 6 and 7, 1979

Times are
Approximate

1:30 P. M. I. Opening Statement
Mr. Harold Etherington, Subcommittee Chairman

1:35 II. Executive Session (OPEN)

1:50 III. Meeting with NRC Staff
(R. H. Vollmer et al)
1. Current plant status
2. NRC - Metropolitan Edison interface
3. Emergency Equipment which should be available where, in whose custody.
4. Manner of establishing communications in emergencies

2:50 P.M. IV. Meeting with Metropolitan Edison and General Public Utilities
(Mr. Robert C. Arnold, V.P., GPU
Mr. Ed Wallace, GPU, et al)

1. Introduction

3:00 P.M. 2. Incident chronology summary

(a) Transient - Primary and Secondary

(b) Operator's Response

(c) Review of special conditions

(i) hydrogen bubble (extent, how was volume calculated)
(ii) operations of block valve between 4 hours 6 min. and 4 hours 54 min.
(iii) make-up pump 1C - trips and restarts
(iv) method of determining no flow in aux feed water lines
(v) in core thermocouple data
(vi) time of turning off sump pumps
(vii) transition to natural circulation

5:15 P.M. ADJOURNMENT - RESUME AT 8:30 A.M., June 7

3. Plant organization and operation

(a) Overall plant organization

(i) operations
(ii) engineering support
(iii) procedure preparation and approval including:

Use of Emerg. Proc. 2202-1.5
(Pressurizer System Failure)

(iv) training

4. Emergency plan

(a) Content
(b) Implementation (including communications)

10:30-10:45 P.M. **** BREAK ****

5. Post accident support

Description and observations

6. Radioactive waste management

(a) Volumes and activity levels
(b) Clean-up plan

12:00-12:45 P.M. LUNCH

12:45-1:15 P.M. V. Public Statements

RESUME ITEM IV ABOVE

1:15 P.M. 7. Special Questions

(a) Organization and function of B&W Owners' and Users' Groups

(b) Emergency feedwater system

(i) surveillance and operations
(ii) test procedure for valves

(c) Transport of Radioactivity from reactor bldg. to auxiliary bldg. — containment isolation design criteria

(d) Water hammer and effect, including:

(i) systems interaction
(ii) valves affected
(iii) leaks caused

(e) Possible improvements in instrumentation and diagnostic capability

(f) Recommended change to:

(i) NSSS design
(ii) Control room layout, diagnostic capability, human engineering

(iii) Operator training and requalification
(iv) Plant organization structure incl.

A. Interface between operations and engineering

(v) Health physics job requirements, background, etc.
(vi) NRC ability to respond to emergencies
(vii) Emergency communications facilities and procedures

(g) Key decisions made, reason therefor

(h) "BASE PLAN" for operations leading to long-term cooling

2:30 P.M. VI. Executive Session - Discussion of Subcommittee Report to Full Committee

5:00 P. M. ADJOURN

Attachment C

ACRS THREE MILE ISLAND SUBCOMMITTEE MEETING

Student Center, Pennsylvania State University Campus

Middletown, PA
June 6-7, 1979

Attendees:

ACRS

H. Etherington, Chairman
M. W. Carbon
S. Lawroski
M. Bender
M. S. Plesset
P. G. Shewmon
W. M. Mathis
H. W. Lewis
C. Michelson, Consultant
I. Catton, Consultant
R. Muller, ACRS
H. Alderman

NRC

Richard H. Vollmer
J. T. Collins
F. Williams
J. T. Collins
Ebe C. McCabe, Jr.
Al Ignatonis

Metropolitan Edison

A. Tsaggaris
G. P. Miller
B. Zewe
E. R. Frederick
C. C. Faust
J. F. Hilbish
J. B. Logan
J. G. Herbein
Paul G. Christman
Richard W. Dubiel
Richard Zechman
Dennis Baltz
J. B. Logan
Ronald Williams

Babcock & Wilcox

E. G. Ward
D. W. Renner
Ron Davis
Roy Strauss

Toledo Edison Co.

Stuart A. Hall
George J. Reed

Ace Federal Reporters

Madelon Z. Bloom
James R. Burns, Jr.
D. Parker

GPUSC

R. W. Keaton
T. G. Broughton
J. P. Moore, Jr.
R. C. Arnold
Ronald Williams
Donald H. Reppert
J. R. Thorpe
E. G. Wallace
Dick Heward
W. N. Moreau

Others

F. J. Scheimann, TMJ
S. W. Porter, Jr., Porter-Gertz Consult.
W. W. Love, R. Love & Gamece
E. G. Herron, USGAO
Bobby L. Day, Babcock-Brown Reaktor Bmbtd. Mannheim, Germany
Wendy Hawthorne, Student Capitol Campus PA State U.
Susan Ringedary " " "
Raymond Marten, Middletown resident
Jane G. Foster, Resident/Camp Hill, PA
Jeane J. Cundey, Beech Island citizen
Joan Bretz, Middletown resident
Edward G. Lessod, US-GAO
Joseph P. Dole "
Lynn B. Myers, Gilbert/Commonwealth
R. Sanacore, American Nuclear Insurers
Frances Costanzi, PA U. student

Others:

Daryl Bielski
Karl V. Layer, BBR
W. R. Cobean, Jr., Burns & Reg. Inc.
Scott Markod, U.Press Int'l.
Ricis Roberts, Satsiot-News Co.
W. R. Cobean, Jr., Burns & Roe Inc.
Scott Mast--, U. Press Intl.
Jan Matthew, WHP-TV Harrisburg
Dough Neilson, WHP-TV
Ricis Roberts, Partriot News Co.
Joseph F. Daly, U.S. Gen. Account
T. Raney, EBASCO
Karl Layer, BBR, FRG
Ben C. Rusche, GPU-SCERI
Clark Ice, SCERI
R. Sanacore, ANI
T. G. Brousnton, GPU SL
C. H. Bitting, Gilbert Assoc. Inc.
J. F. Scott, Public Service Electric & Gas
S. Eklund, NSS
Susan Evans, WFEC News

Attachment D

EVALUATION OF HYDROGEN BUBBLE VOLUME

IN REACTOR COOLANT SYSTEM

SUMMARY OF RCS BUBBLE CALCULATION METHODS

$$P_1 V_1 = P_2 V_2$$

WHERE P_i = RCS PRESSURE AT TIME i
V_i = RCS GAS BUBBLE VOLUME AT TIME i

$$V_2 = V_1 + \Delta V$$

WHERE ΔV = CHANGE IN GAS BUBBLE VOLUME FROM TIME 1 TO TIME 2

COMBINING THESE EQUATIONS:

$$V_1 = \frac{P_2 \Delta V}{P_1 - P_2}$$

DETERMINATION OF VOLUME CHANGE

V = CHANGE IN VOLUME OF WATER IN THE PRESSURIZER AND MAKE UP TANK CORRECTED FOR THE DIFFERENCE IN SPECIFIC VOLUME FROM THAT IN THE REACTOR COOLANT SYSTEM.

THUS, $\Delta V = \Delta V_P + \Delta V_{MUT} + \Delta V_{H_2}$ SOLUBILITY*

WHERE, ΔV_P = CHANGE IN VOLUME OF WATER IN PRESSURIZER EXPRESSED IN FT^3 OF WATER AT THE TEMPERATURE OF THE REACTOR COOLANT SYSTEM

ΔV_{MUT} = CHANGE IN VOLUME OF WATER IN THE MAKEUP TANK EXPRESSED IN FT^3 OF WATER AT THE TEMPERATURE OF THE REACTOR COOLANT SYSTEM.

*NOT CONSIDERED IN GPU FORMULATION

ERROR ANALYSIS

$$V_1 = fn\ (P_1,\ P_2,\ \Delta L^{mut},\ \Delta L\ Pzr)$$

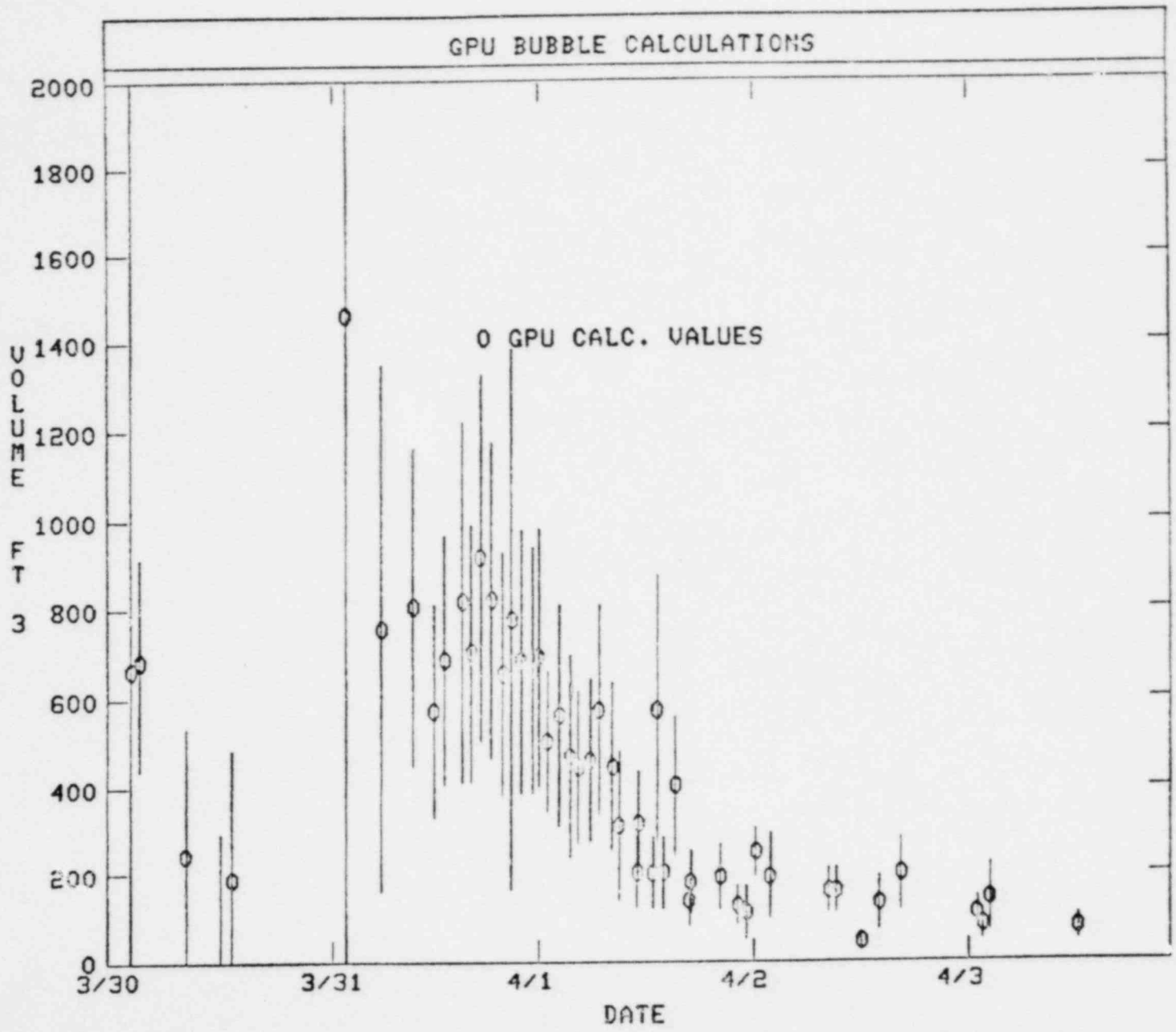
$$\sigma^2_{vi} = \sum_{i=1}^{4} \sigma^2_{x\,i} \left(\frac{\partial\ Vi}{\partial\ Xi} \right)^2$$

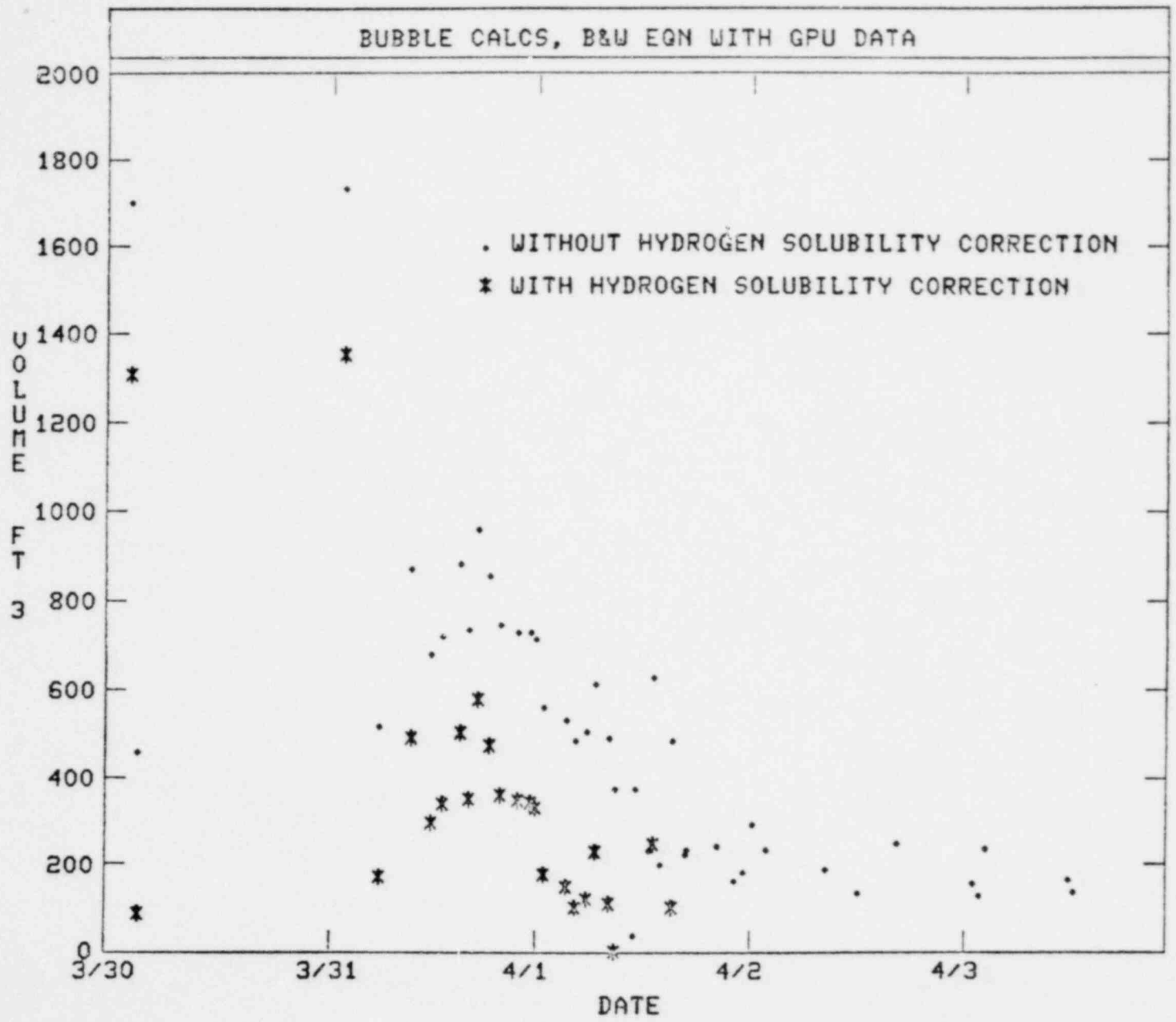
- Errors of instruments

Pressure Readings	± 0.3%
MUT Level readings	± 0.3%
PZR Level Readings	± 0.6%

- Temperature correction of specific volume of RCS was neglected due to small ΔT during readings (max. $1^{o}F$).

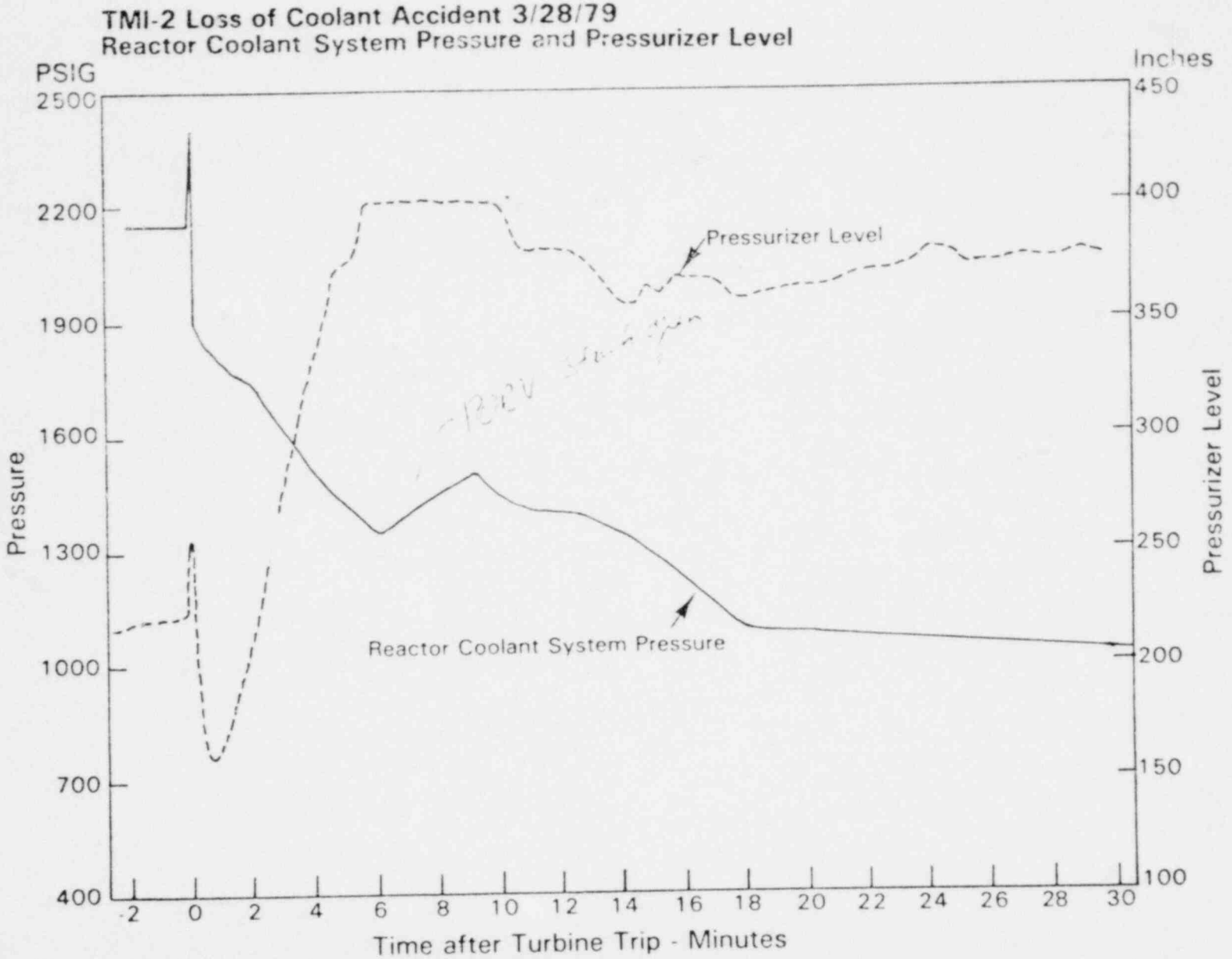
- No correction for H_2 solubility change as function of Pressure was made in GPU analysis.


GPU BUBBLE CALCULATIONS
0 GPU CALC. VALUES
VOLUME FT 3
2000
1800
1600
1400
1200
1000
800
600
400
200
0
3/30
3/31
4/1
4/2
4/3
DATE


BUBBLE CALCS, B&W EQN WITH GPU DATA
. WITHOUT HYDROGEN SOLUBILITY CORRECTION
* WITH HYDROGEN SOLUBILITY CORRECTION
VOLUME FT 3
2000
1800
1600
1400
1200
1000
800
600
400
200
0
3/30
3/31
4/1
4/2
4/3
DATE

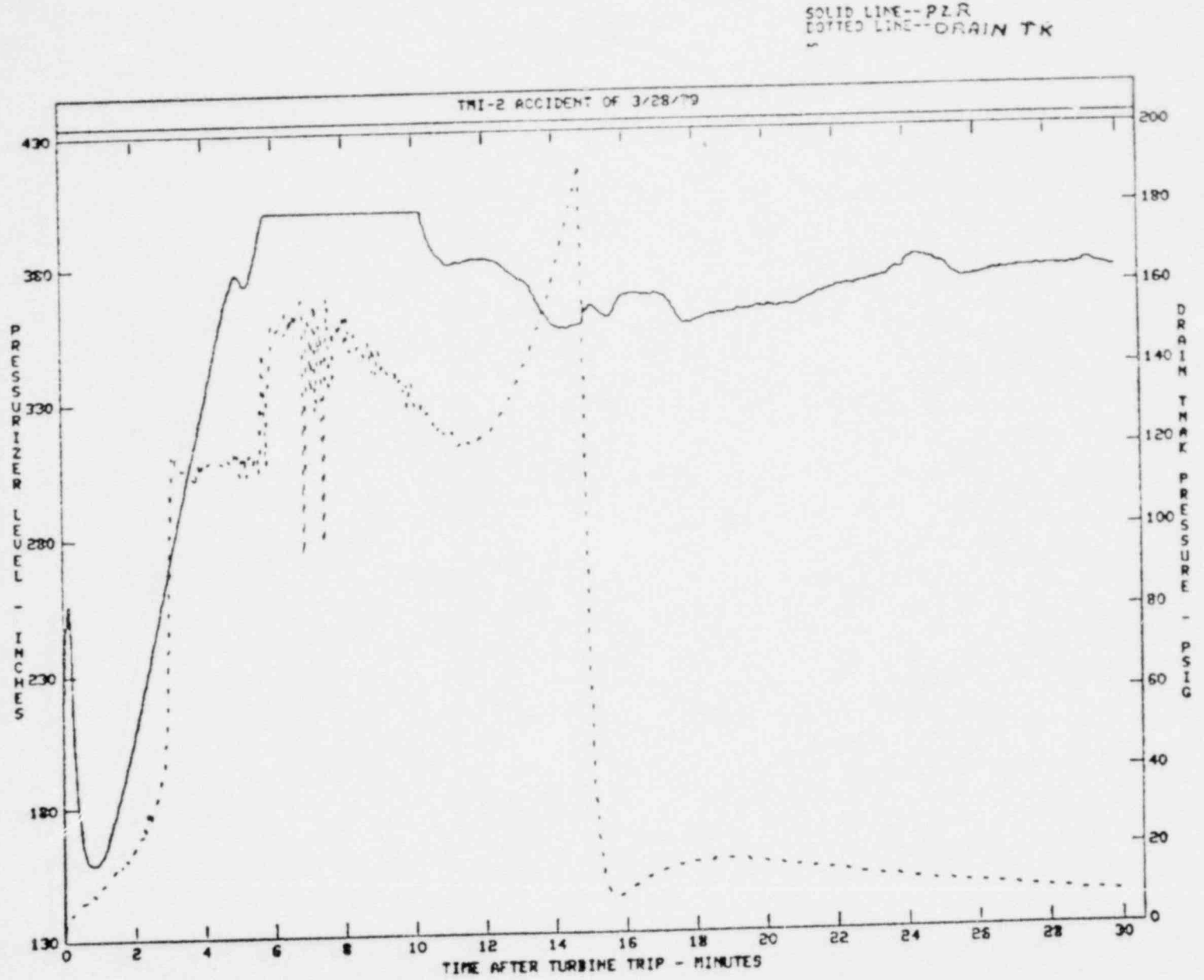
Keaten
June 6, 1979
Attachment E

TRANSIENT - PRIMARY AND SECONDARY



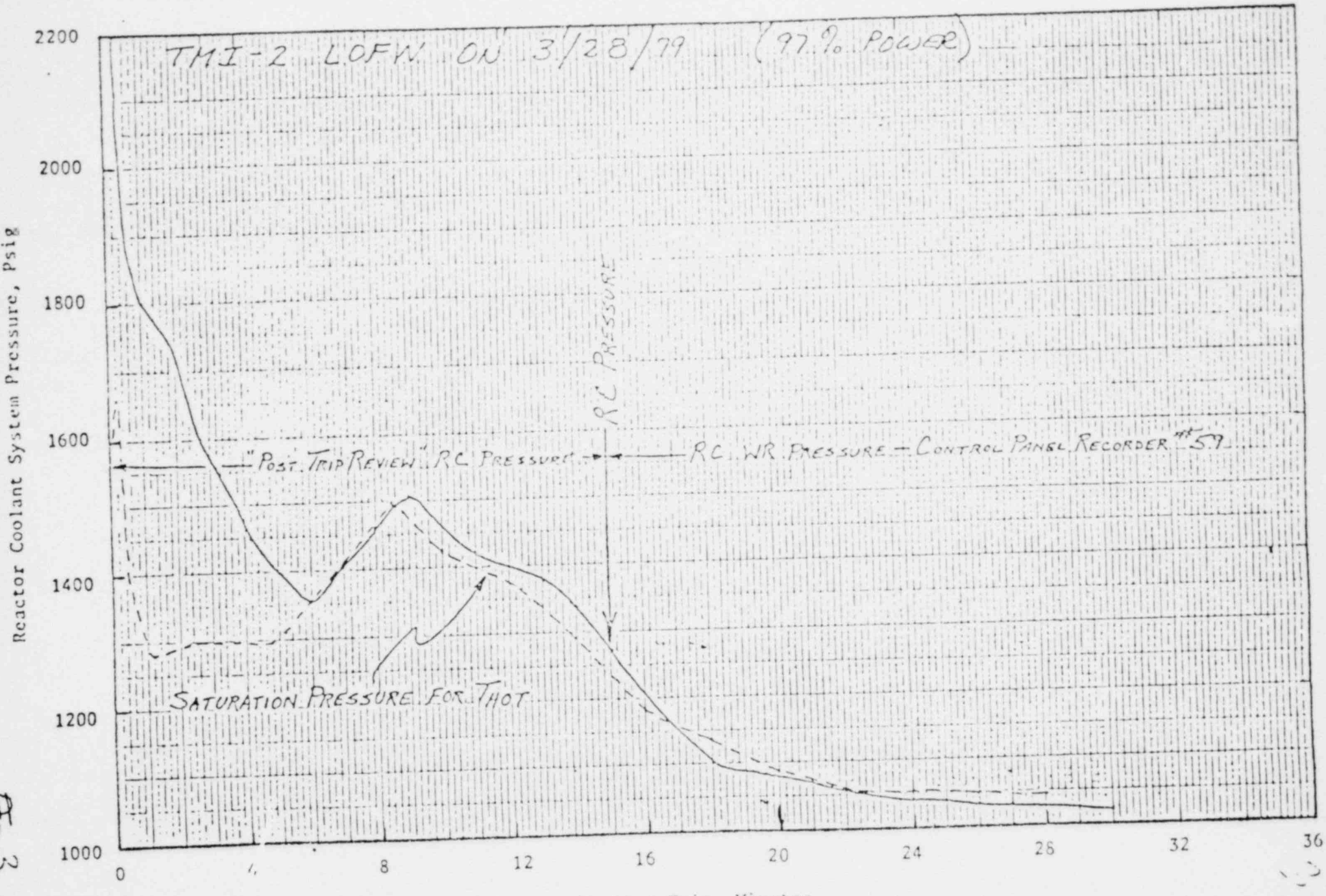
Rev to Fig 3
in Key 10 document

DRAIN TANK PRESSURE & PRESSURIZER LEVEL - 0 to 30 MINUTES

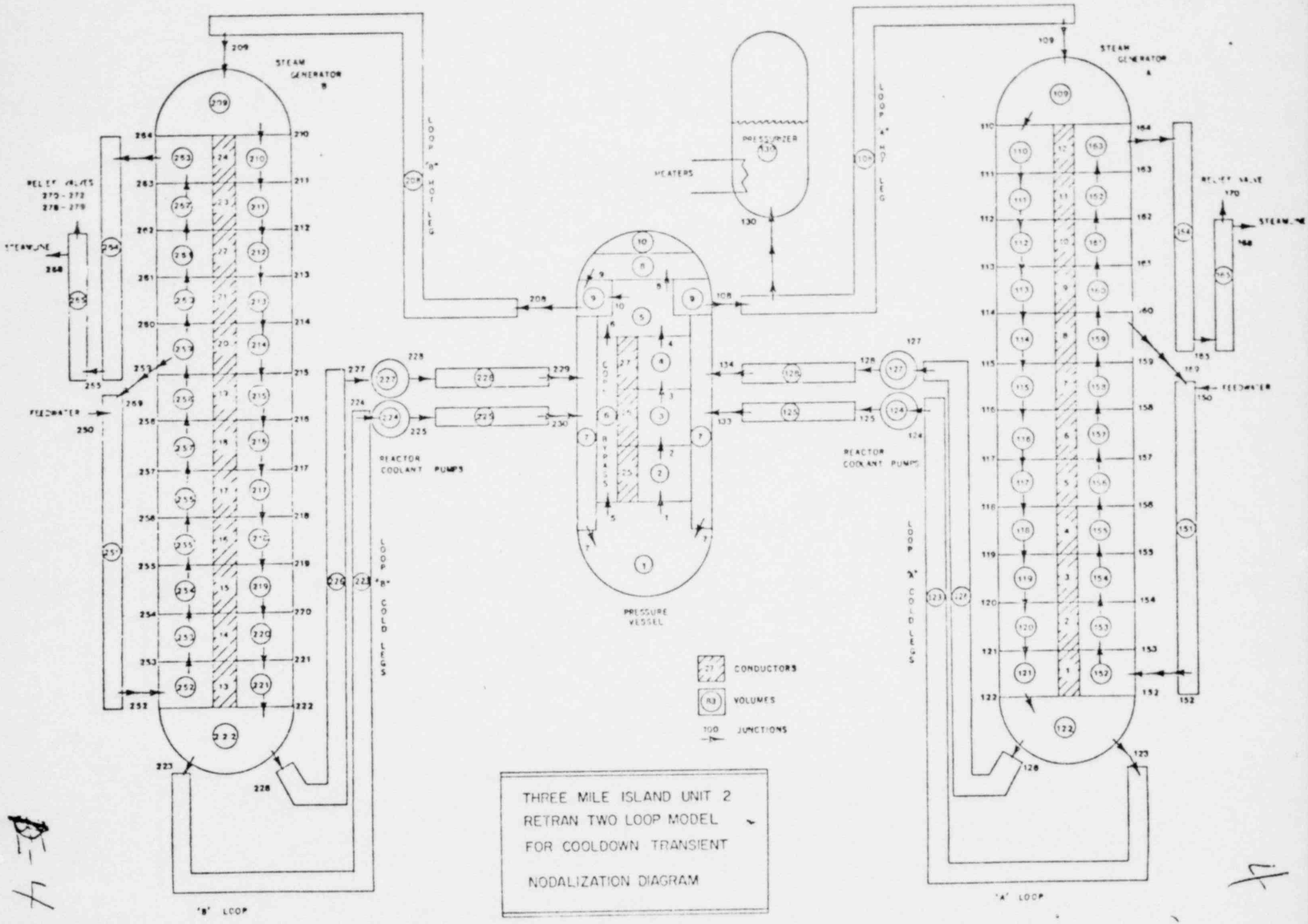


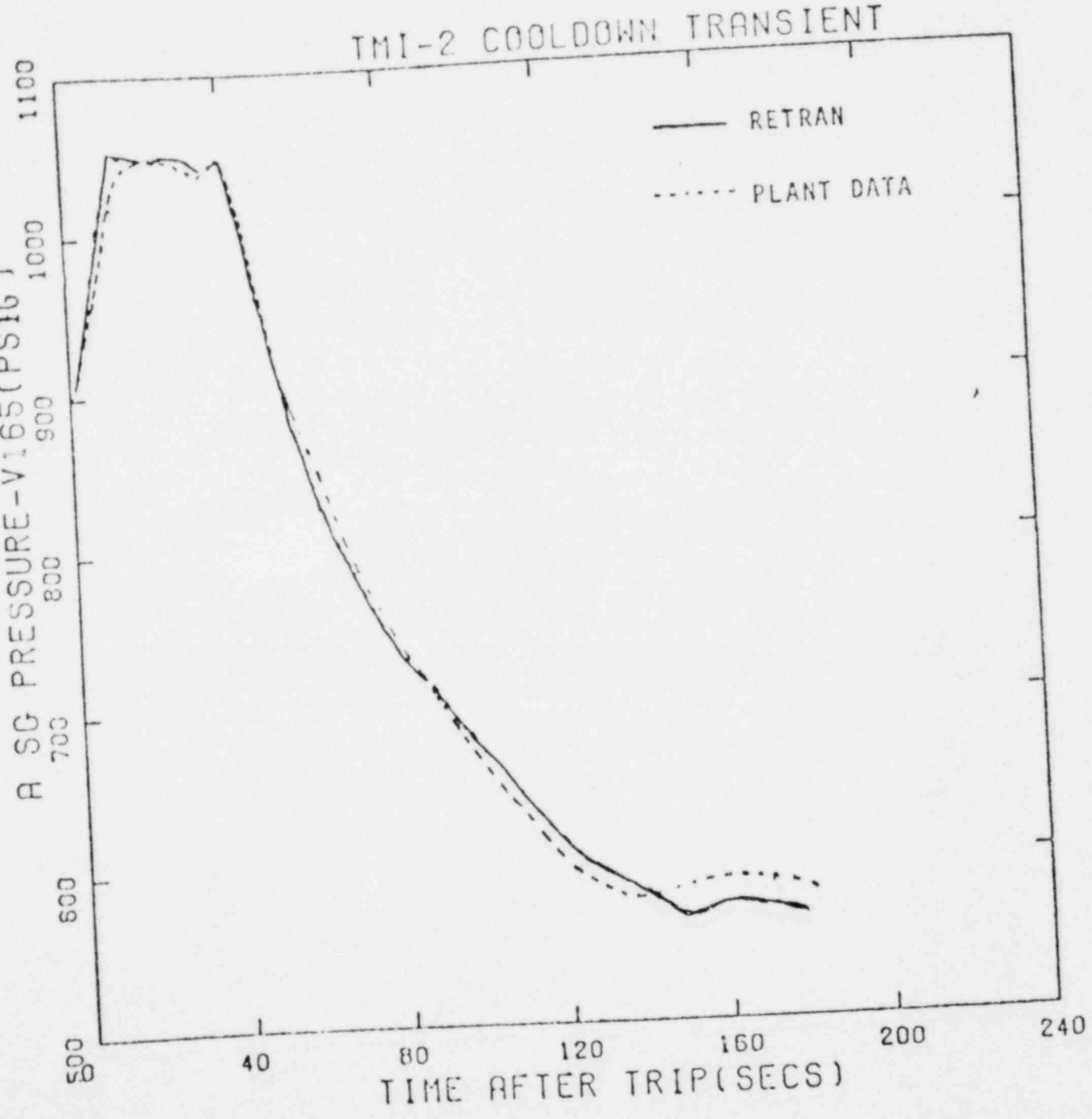
E-2

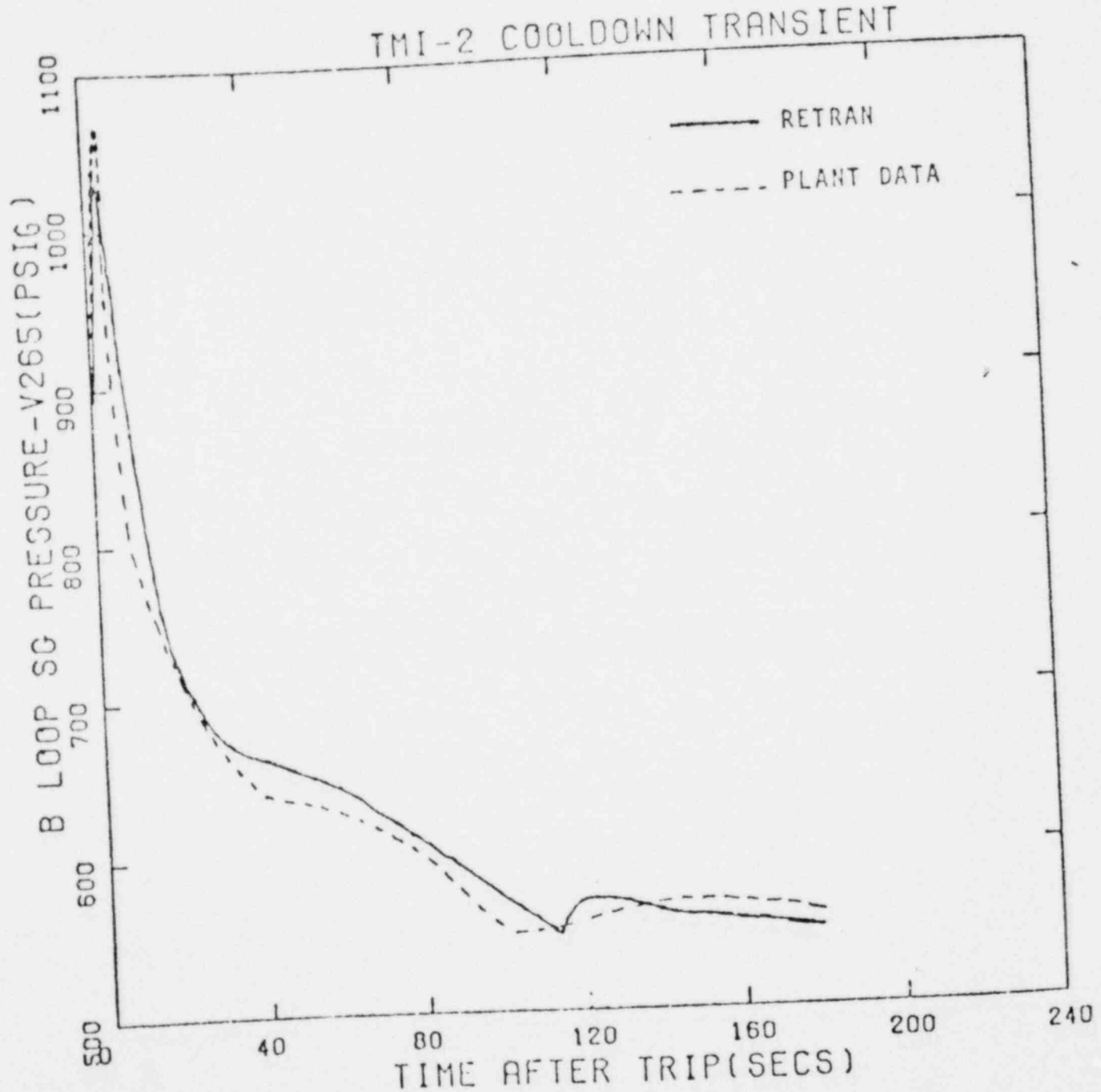
Reactor Coolant System Pressure And Saturation Pressure For T (HOT)
Versus Time After Turbine Trip

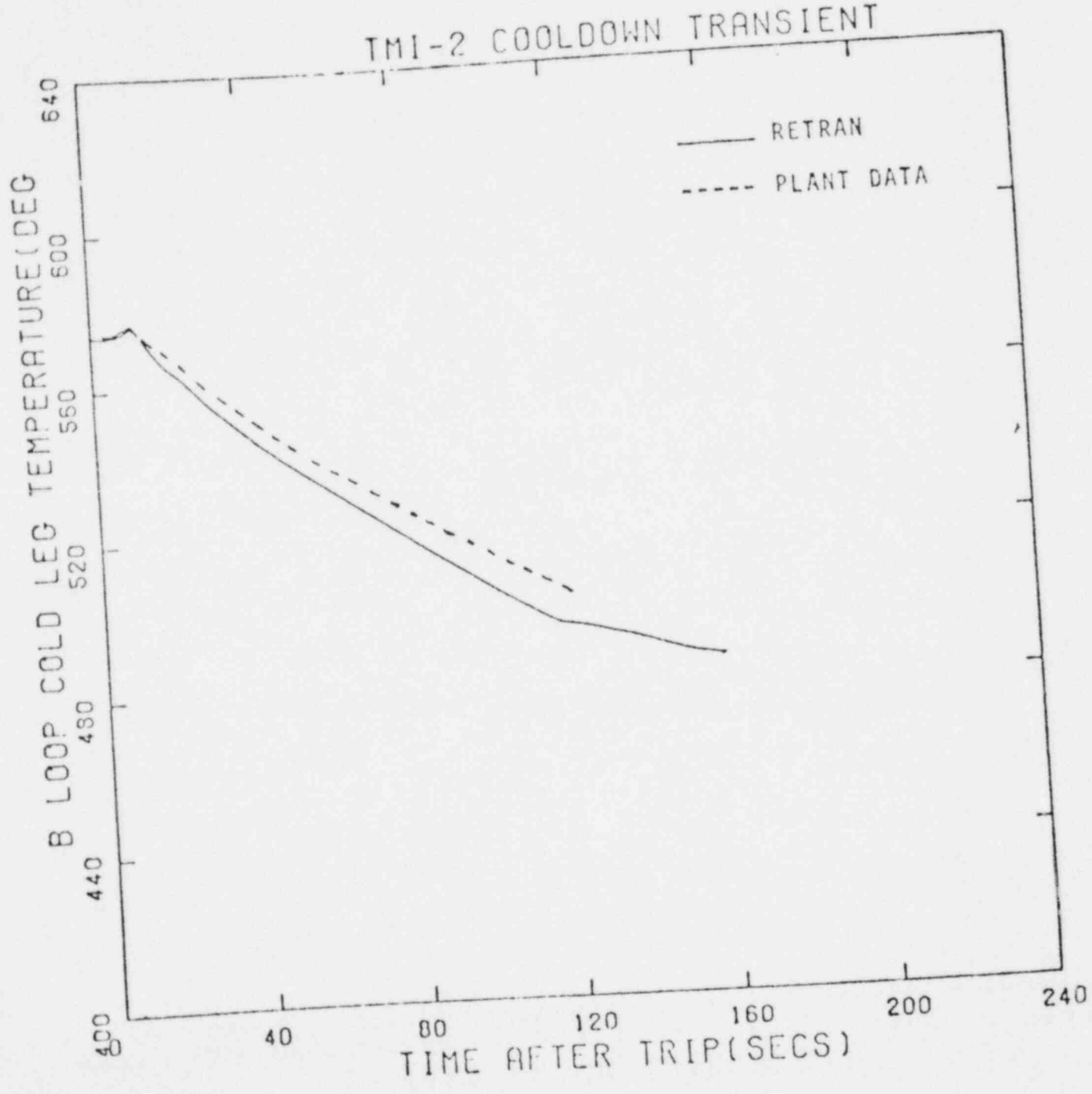


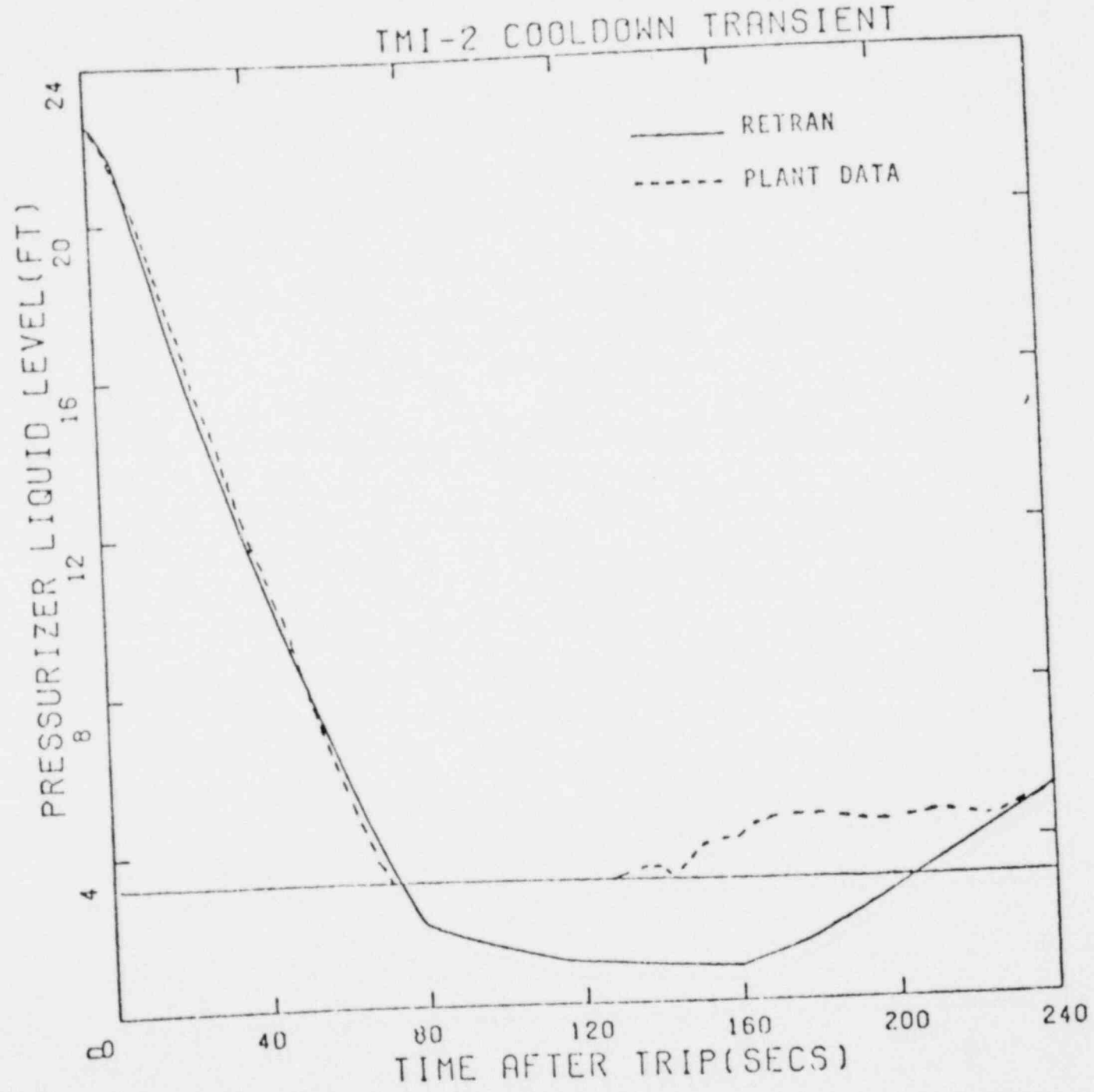
E-3


STEAM GENERATOR B
STEAM GENERATOR A
PRESSURIZER
HEATERS
LOOP "B" HOT LEG
LOOP "A" HOT LEG
RELIEF VALVES
270 - 272
278 - 279
STEAMLINE
FEEDWATER
REACTOR COOLANT PUMPS
REACTOR COOLANT PUMPS
PRESSURE VESSEL
LOOP "B" COLD LEGS
LOOP "A" COLD LEGS
CONDUCTORS
VOLUMES
JUNCTIONS
THREE MILE ISLAND UNIT 2
RETRAN TWO LOOP MODEL
FOR COOLDOWN TRANSIENT
NODALIZATION DIAGRAM
"B" LOOP
"A" LOOP

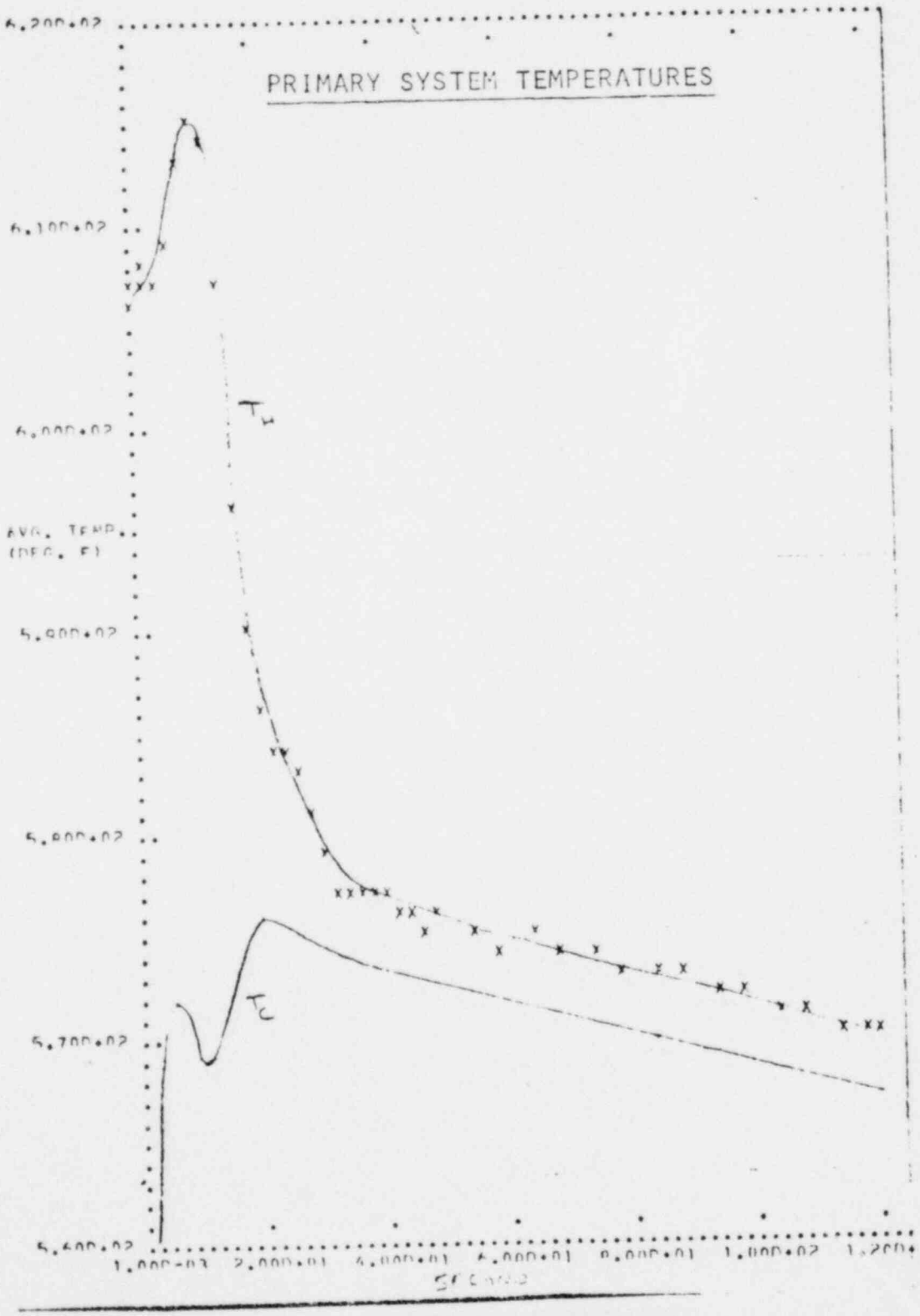

TMI-2 COOLDOWN TRANSIENT
RETRAN
PLANT DATA
A SG PRESSURE-V165(PSIG)
1100
1000
900
800
700
600
500
40
80
120
160
200
240
TIME AFTER TRIP(SECS)

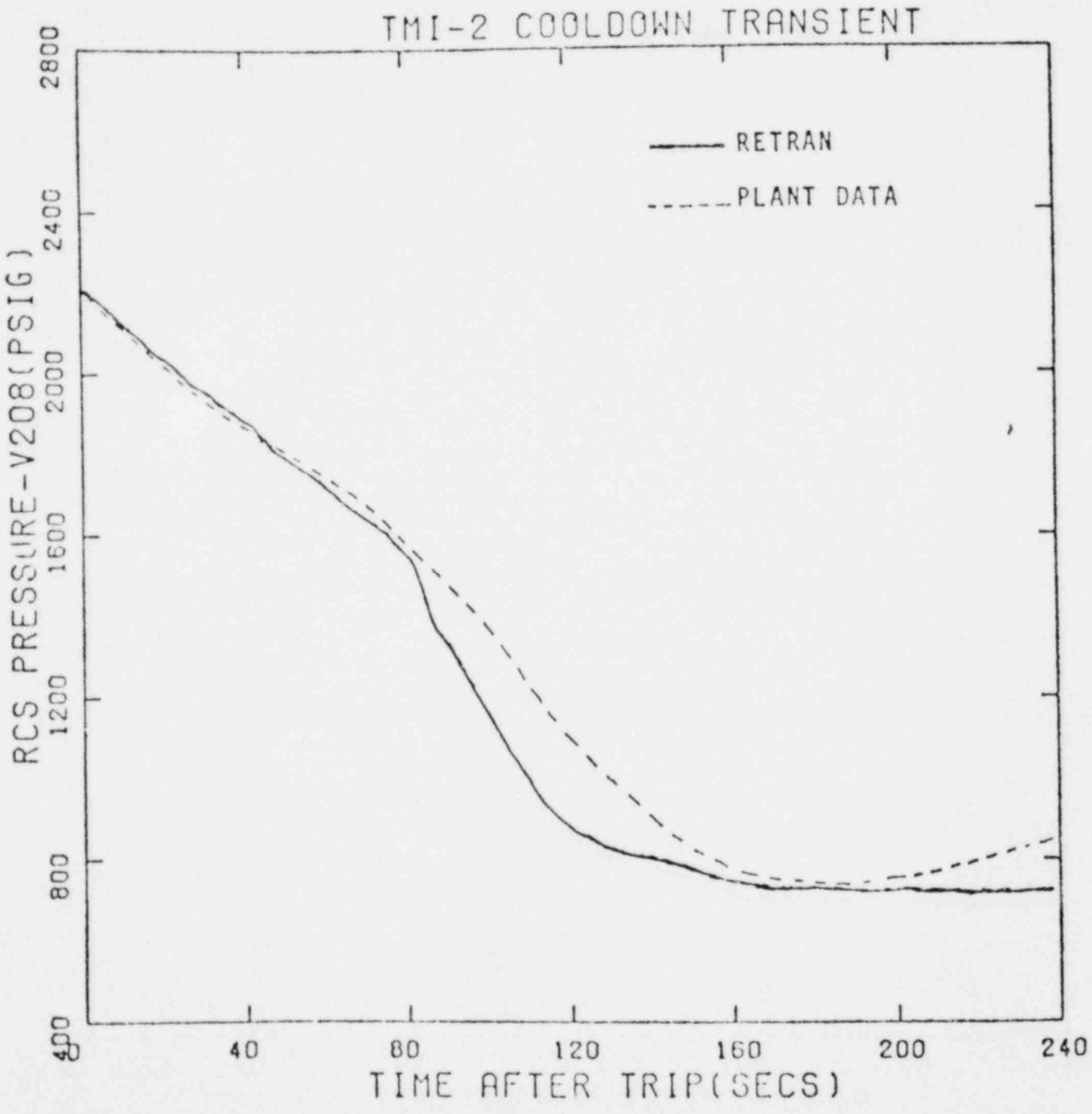

TMI-2 COOLDOWN TRANSIENT
RETRAN
PLANT DATA
B LOOP SG PRESSURE-V265(PSIG)
1100
1000
900
800
700
600
500
40
80
120
160
200
240
TIME AFTER TRIP(SECS)


TMI-2 COOLDOWN TRANSIENT
RETRAN
PLANT DATA
B LOOP COLD LEG TEMPERATURE(DEG
640
600
560
520
480
440
400
0
40
80
120
160
200
240
TIME AFTER TRIP(SECS)

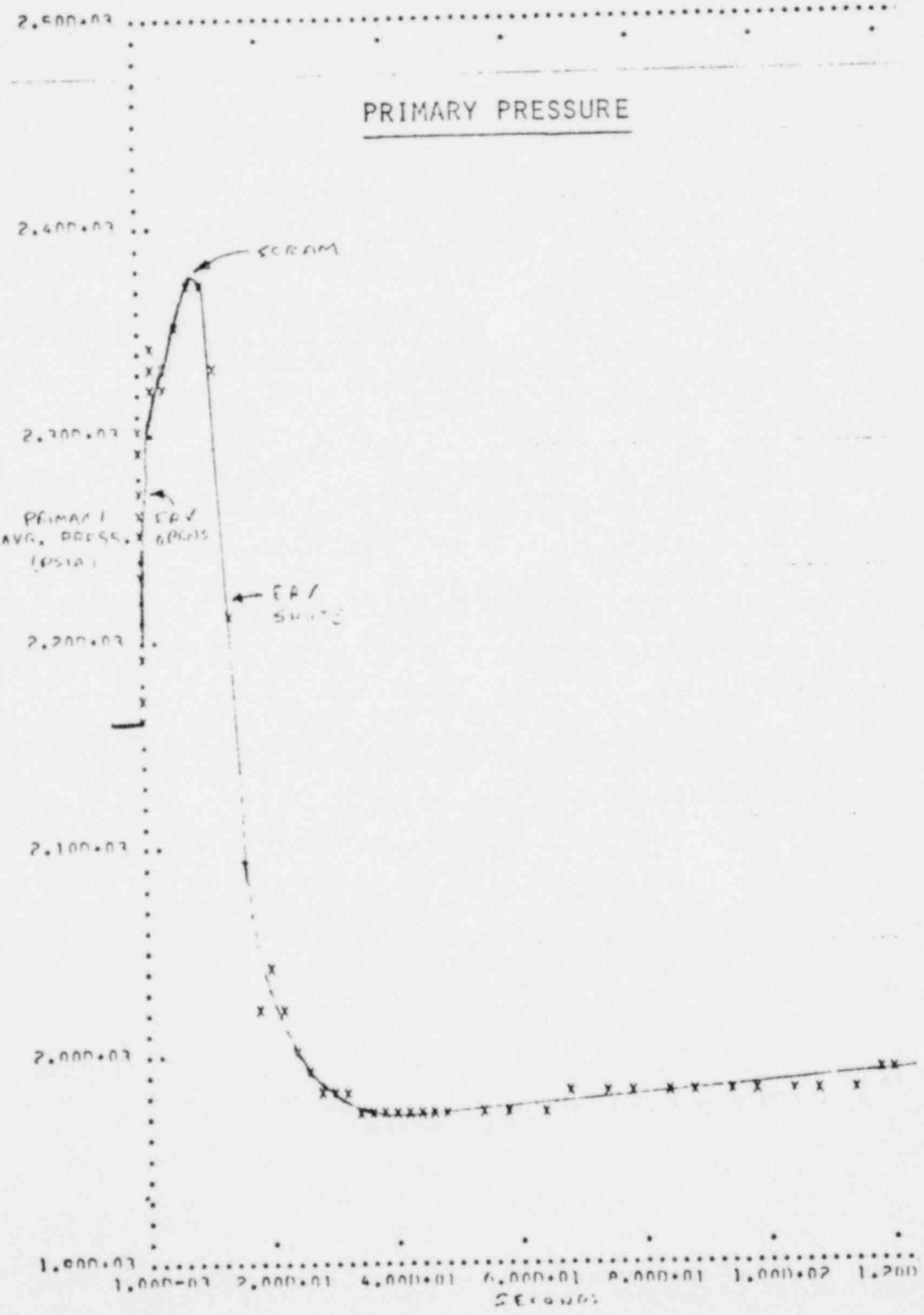

TMI-2 COOLDOWN TRANSIENT
RETRAN
PLANT DATA
PRESSURIZER LIQUID LEVEL(FT)
0
4
8
12
16
20
24
0
40
80
120
160
200
240
TIME AFTER TRIP(SECS)

NORMAL LOSS OF FEEDWATER FLOW

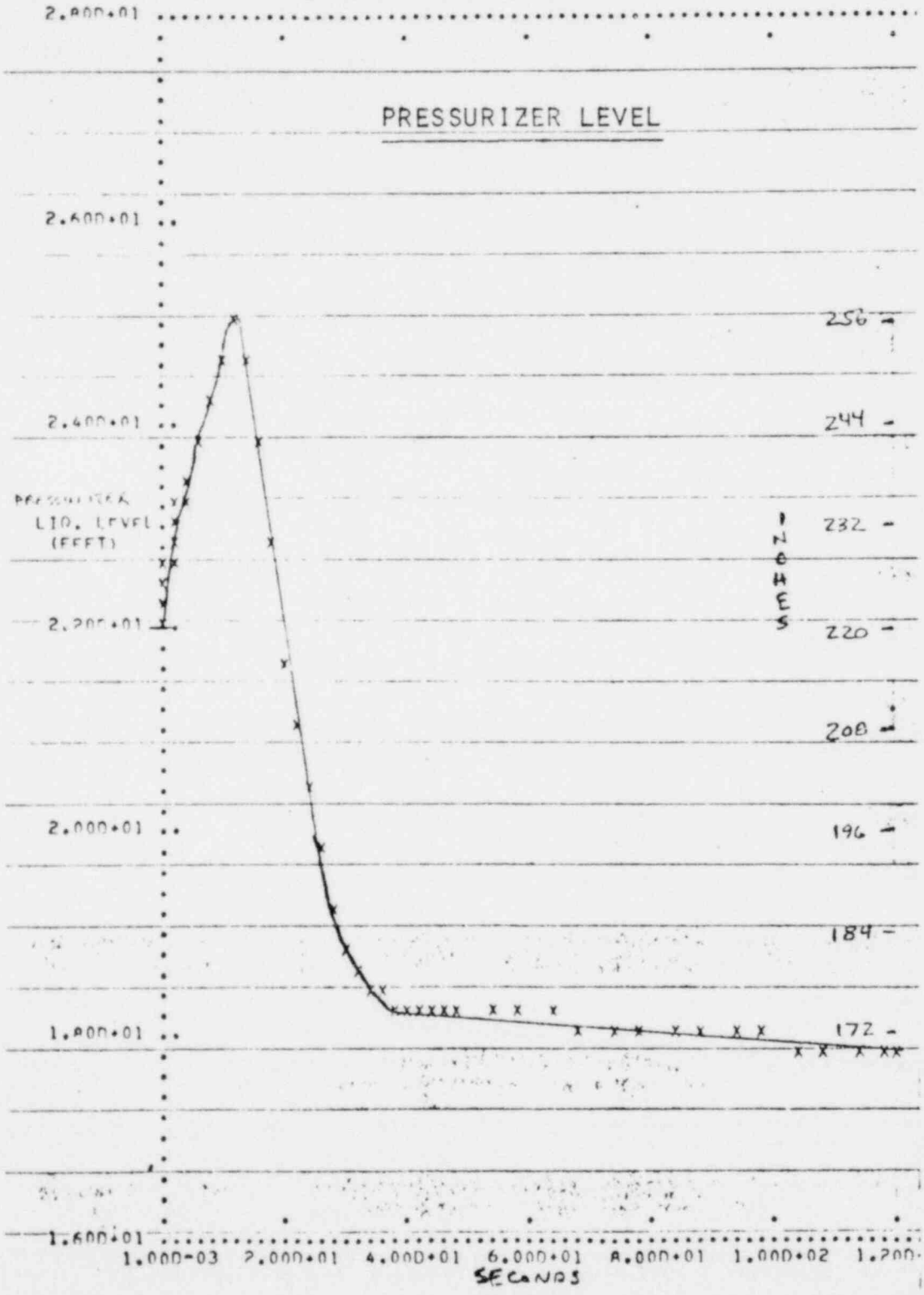



TMI-2 COOLDOWN TRANSIENT
RETRAN
PLANT DATA
RCS PRESSURE-V208(PSIG)
2800
2400
2000
1600
1200
800
400
0
40
80
120
160
200
240
TIME AFTER TRIP(SECS)

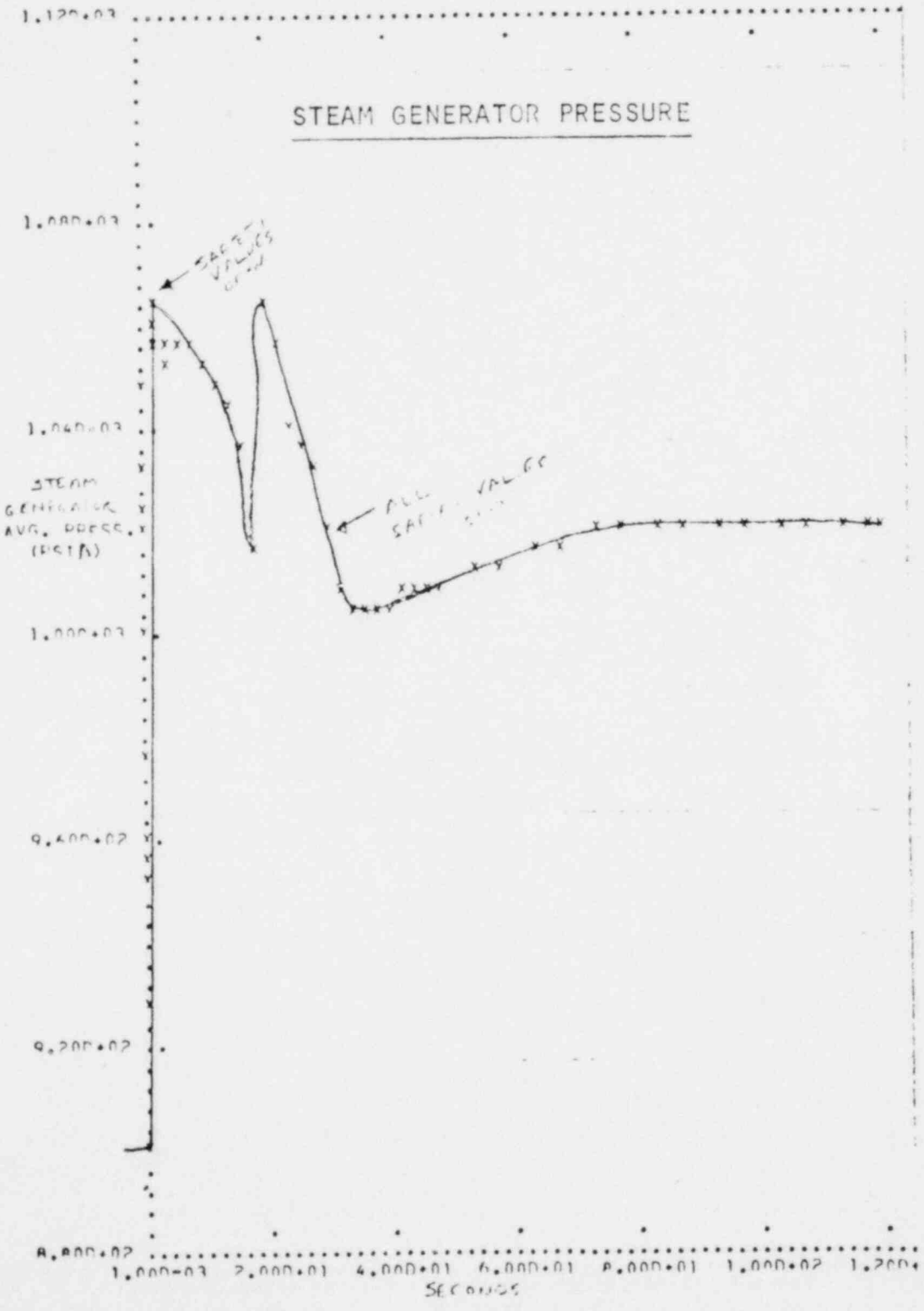
NORMAL LOSS OF FEEDWATER FLOW



NORMAL LOSS OF FEEDWATER FLOW

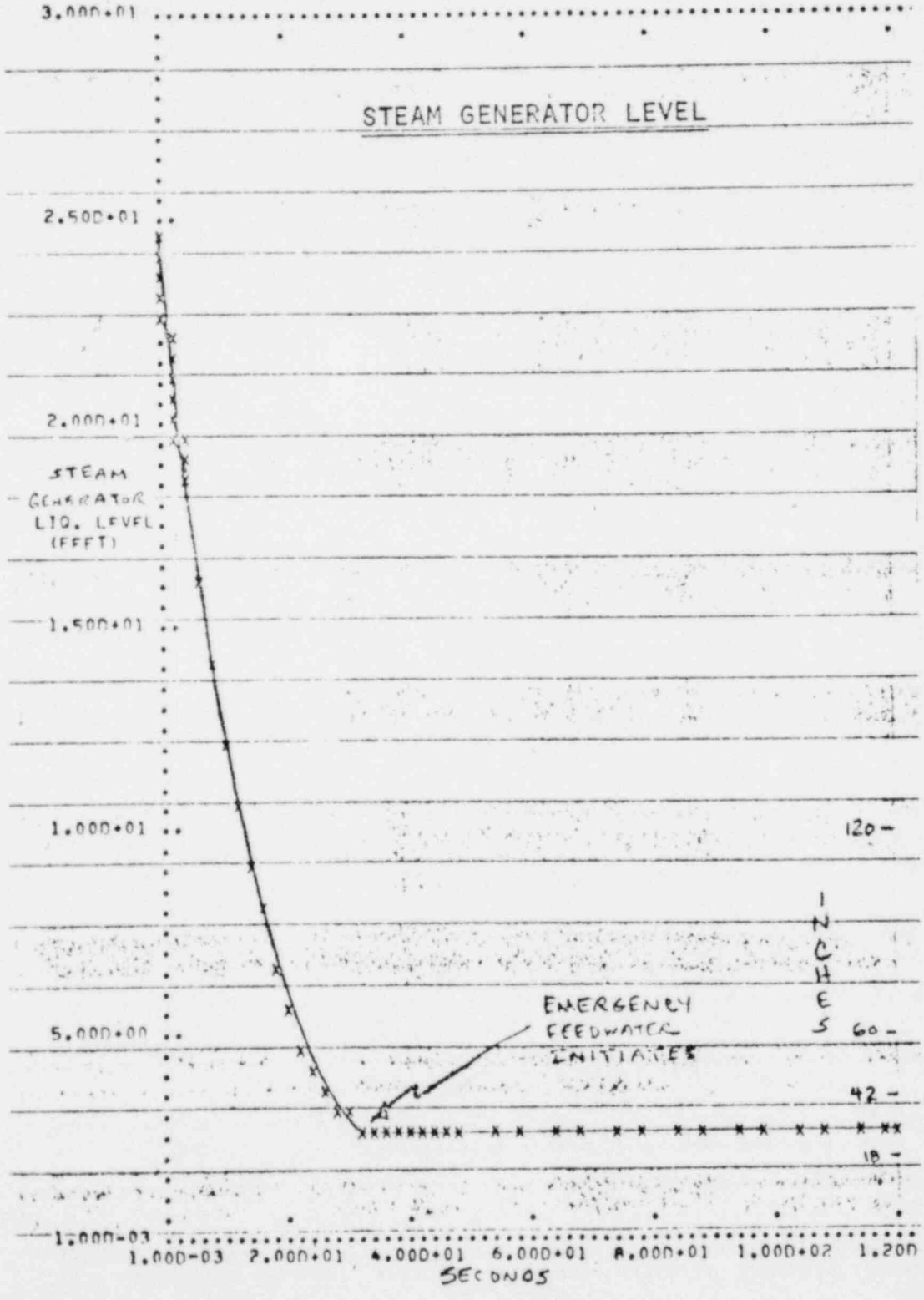


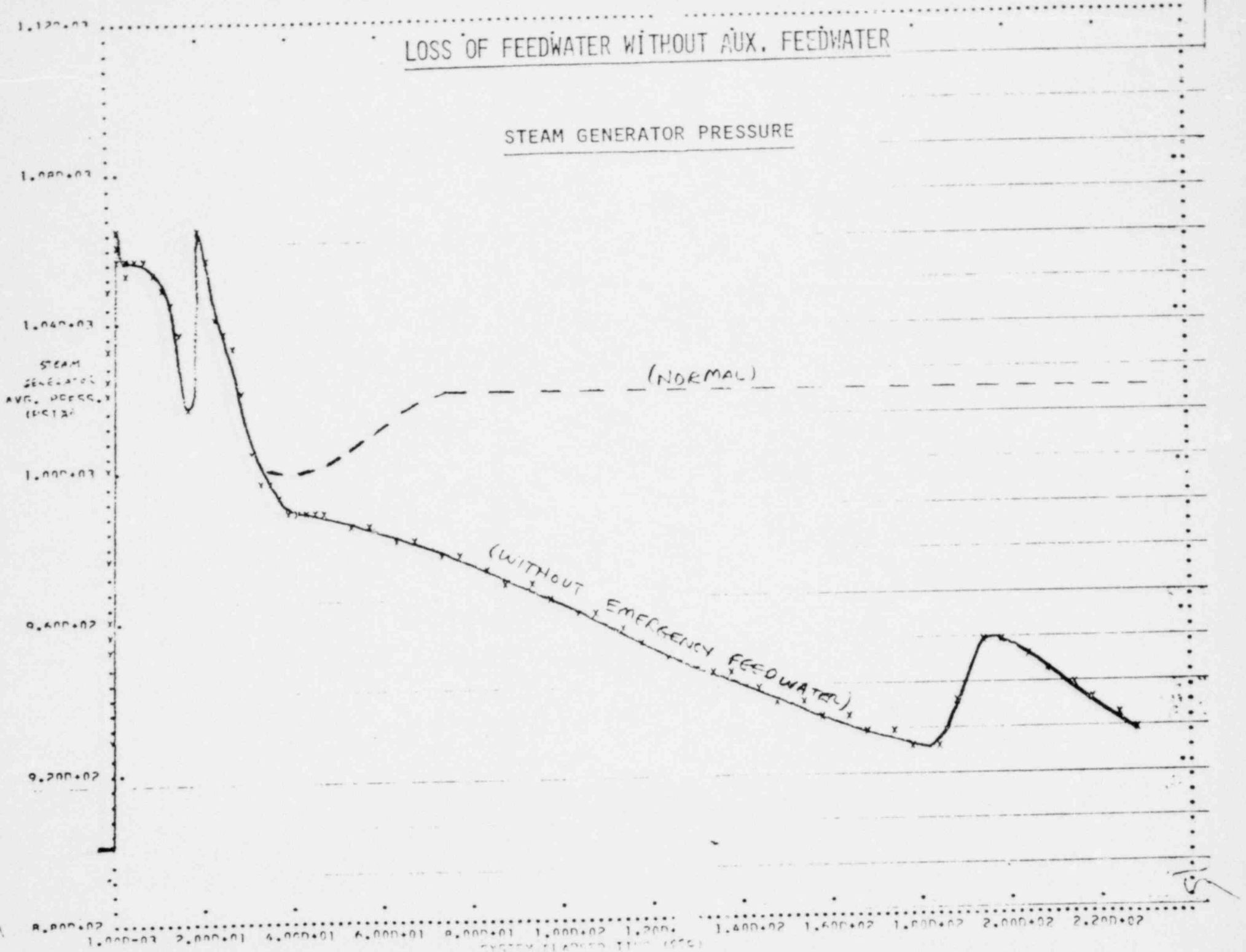
NORMAL LOSS OF FEEDWATER FLOW

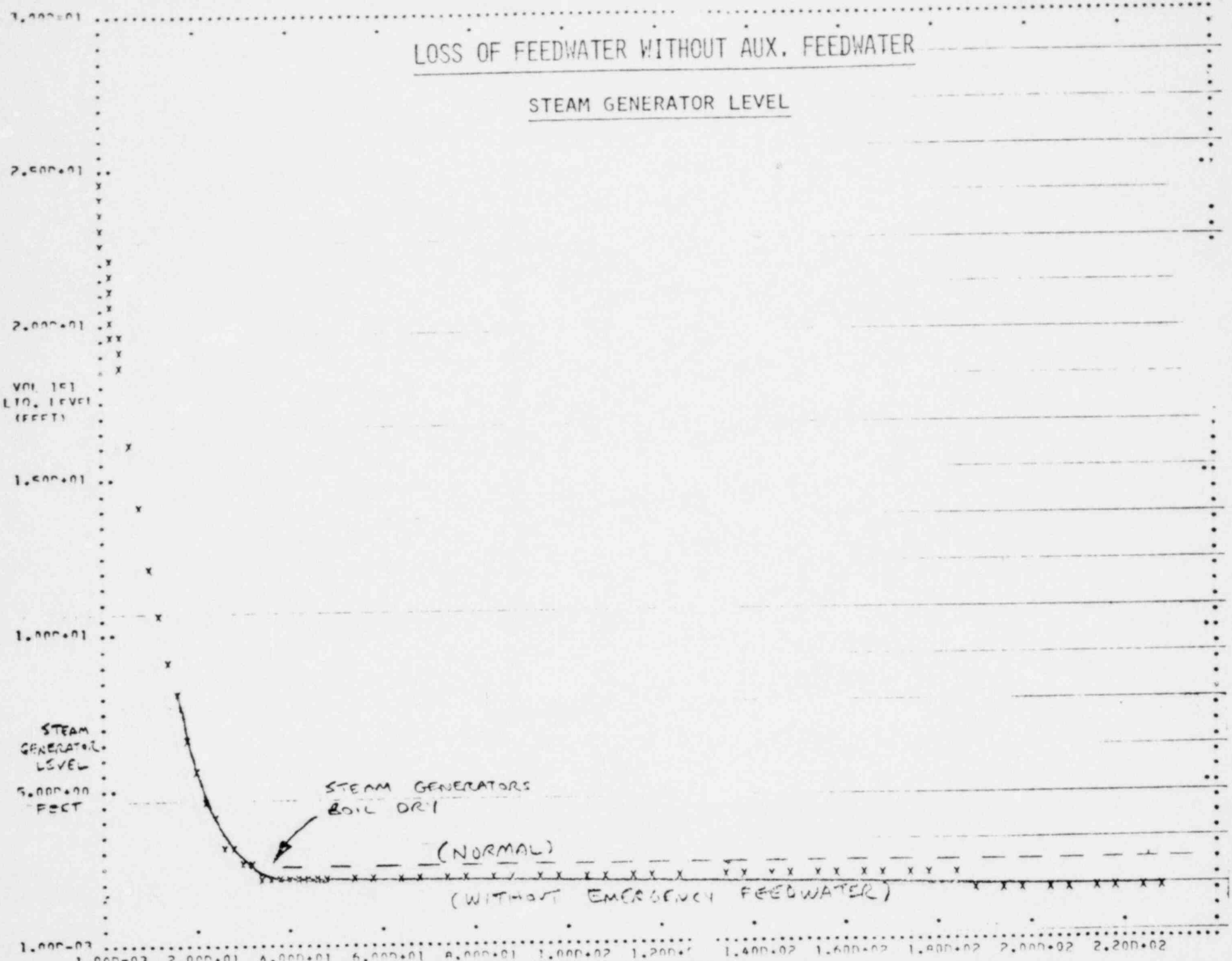


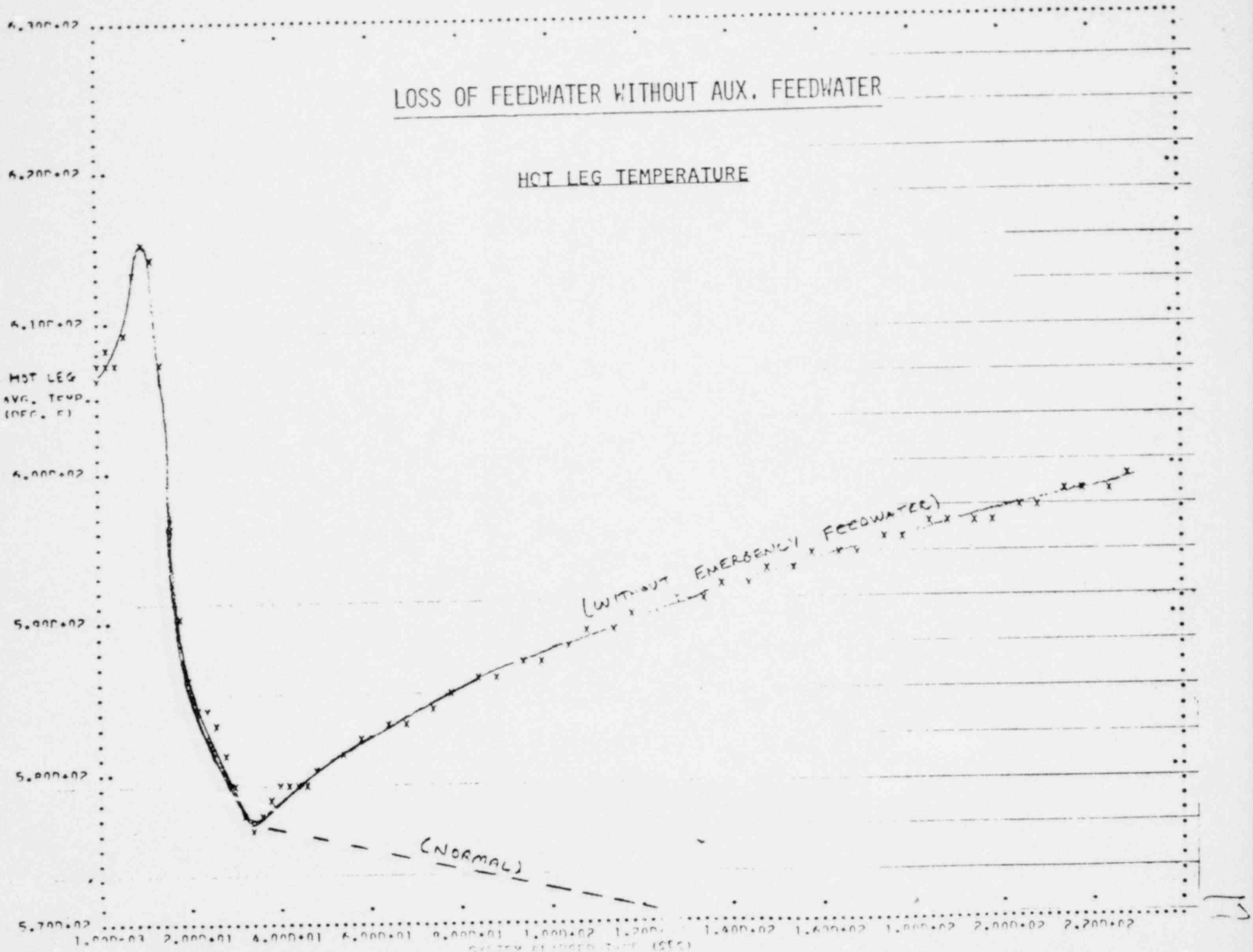
H

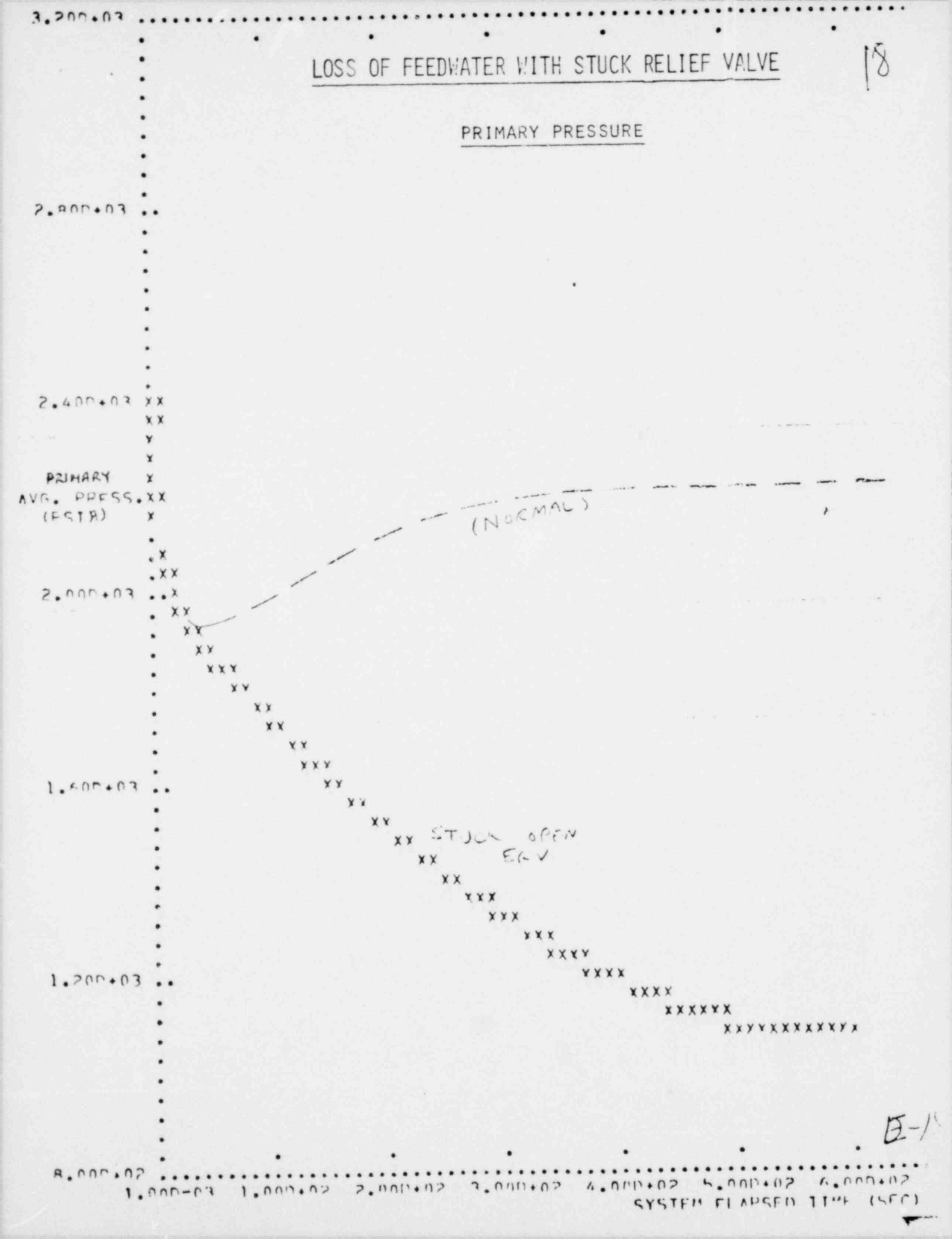
NORMAL LOSS OF FEEDWATER FLOW




LOSS OF FEEDWATER WITHOUT AUX. FEEDWATER
STEAM GENERATOR PRESSURE
(NORMAL)
(WITHOUT EMERGENCY FEEDWATER)

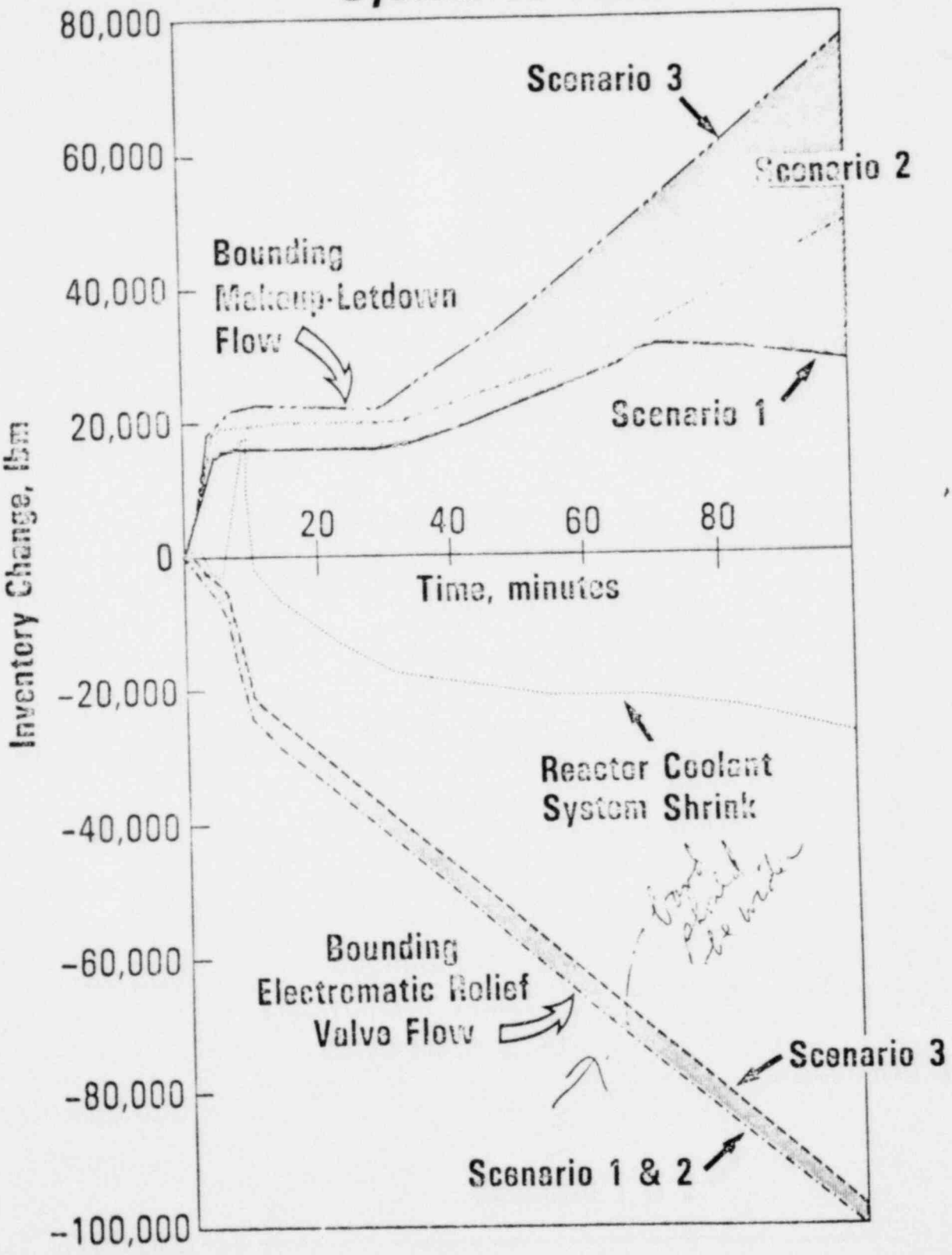

LOSS OF FEEDWATER WITHOUT AUX. FEEDWATER
STEAM GENERATOR LEVEL
2.500+01
2.000+01
VOL 151
LTD. LEVEL
(FEET)
1.500+01
1.000+01
STEAM
GENERATOR
LEVEL
5.000+00
FEET
STEAM GENERATORS
BOIL DRY
(NORMAL)
(WITHOUT EMERGENCY FEEDWATER)
1.000-03
1.000-03 2.000+01 4.000+01 6.000+01 8.000+01 1.000+02 1.200+02 1.400+02 1.600+02 1.800+02 2.000+02 2.200+02


LOSS OF FEEDWATER WITHOUT AUX. FEEDWATER
HOT LEG TEMPERATURE
HOT LEG
AVG. TEMP.
(DEG. F)
(WITHOUT EMERGENCY FEEDWATER)
(NORMAL)
5.700+02
5.800+02
5.900+02
6.000+02
6.100+02
6.200+02
6.300+02
1.000+03
2.000+01
4.000+01
6.000+01
8.000+01
1.000+02
1.400+02
1.600+02
1.800+02
2.000+02
2.200+02


LOSS OF FEEDWATER WITH STUCK RELIEF VALVE
PRIMARY PRESSURE
3.200+03
2.800+03
2.400+03
2.000+03
1.600+03
1.200+03
8.000+02
PRIMARY AVG. PRESS. (ESTR)
(NORMAL)
STUCK OPEN ERV
1.000-03
1.000+02
2.000+02
3.000+02
4.000+02
5.000+02
6.000+02
SYSTEM ELAPSED TIME (SEC)


LOSS OF FEEDWATER WITH STUCK RELIEF VALVE
HOT LEG TEMPERATURE
6.400+02
6.200+02
HOT LEG
AVG. TEMP.
(DEG. F)
6.000+02
5.800+02
5.600+02
5.400+02
1.000-03
1.000+02
2.000+02
4.000+02
5.000+02
SYSTEM ELAPSED TIME

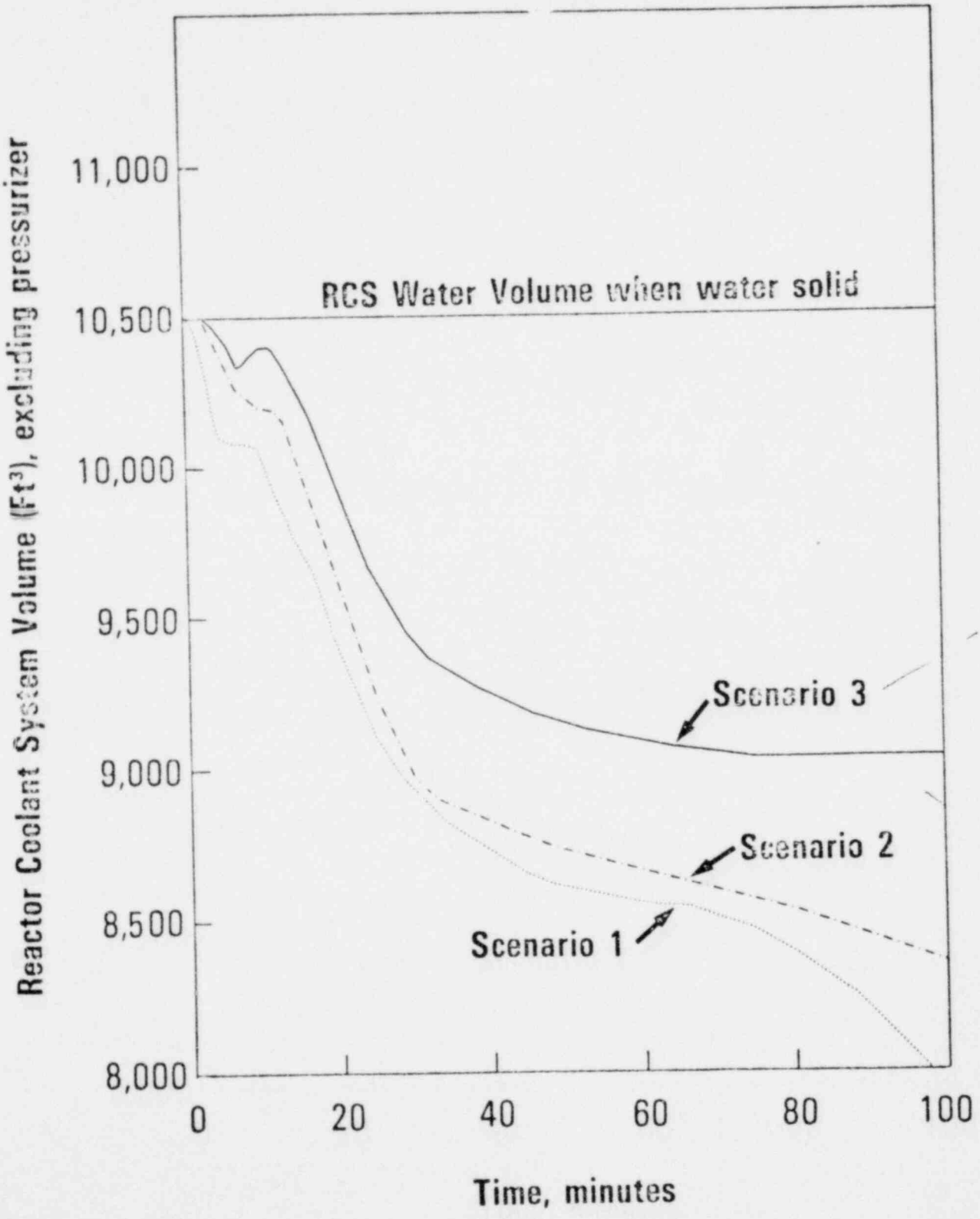
Inventory Changes in Reactor Coolant System vs Time



20

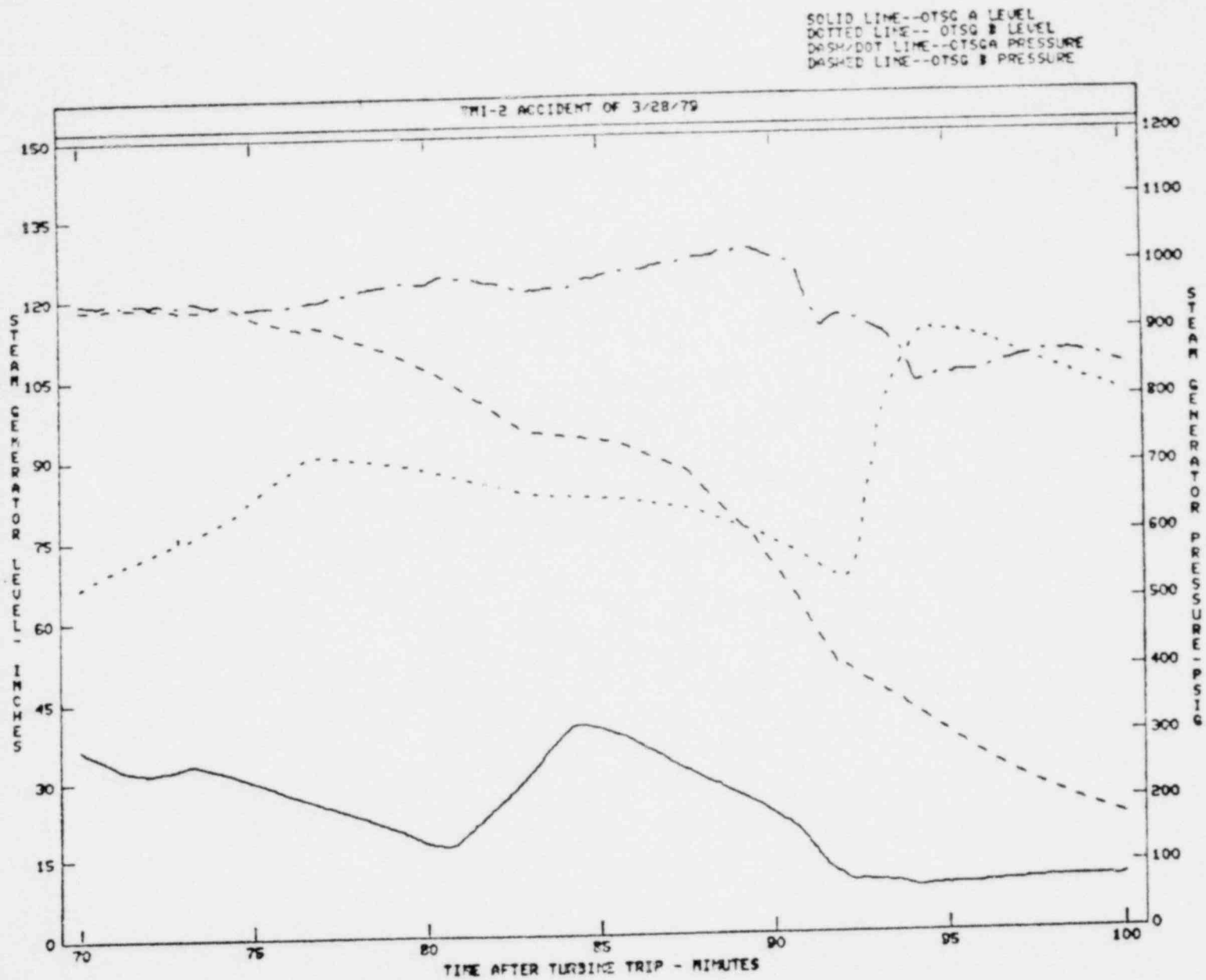
E-21

Reactor Coolant System Volume vs Time



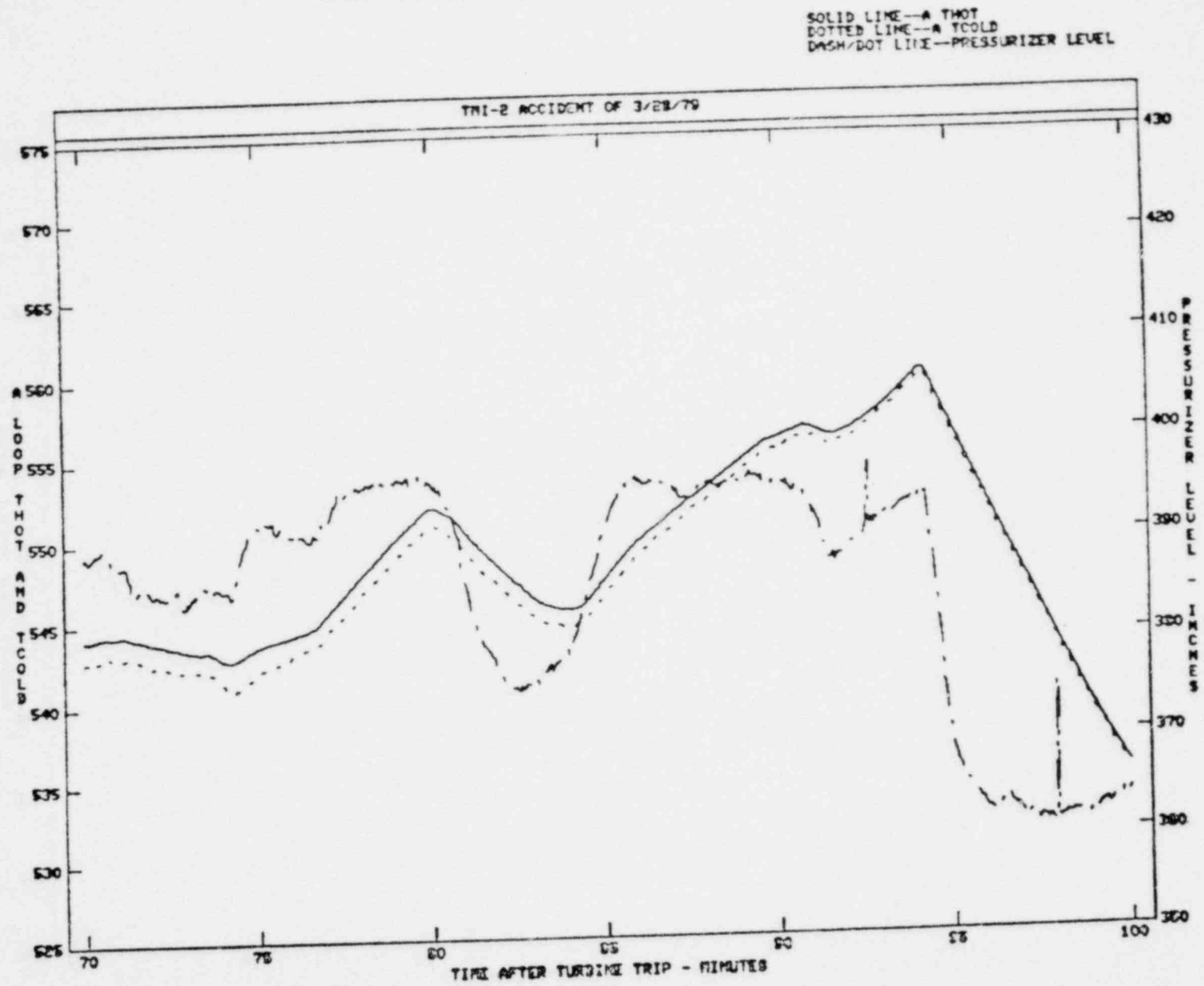
E-21

STEAM GENERATOR PRESSURES & LEVELS - 70 to 100 MINUTES



D-27

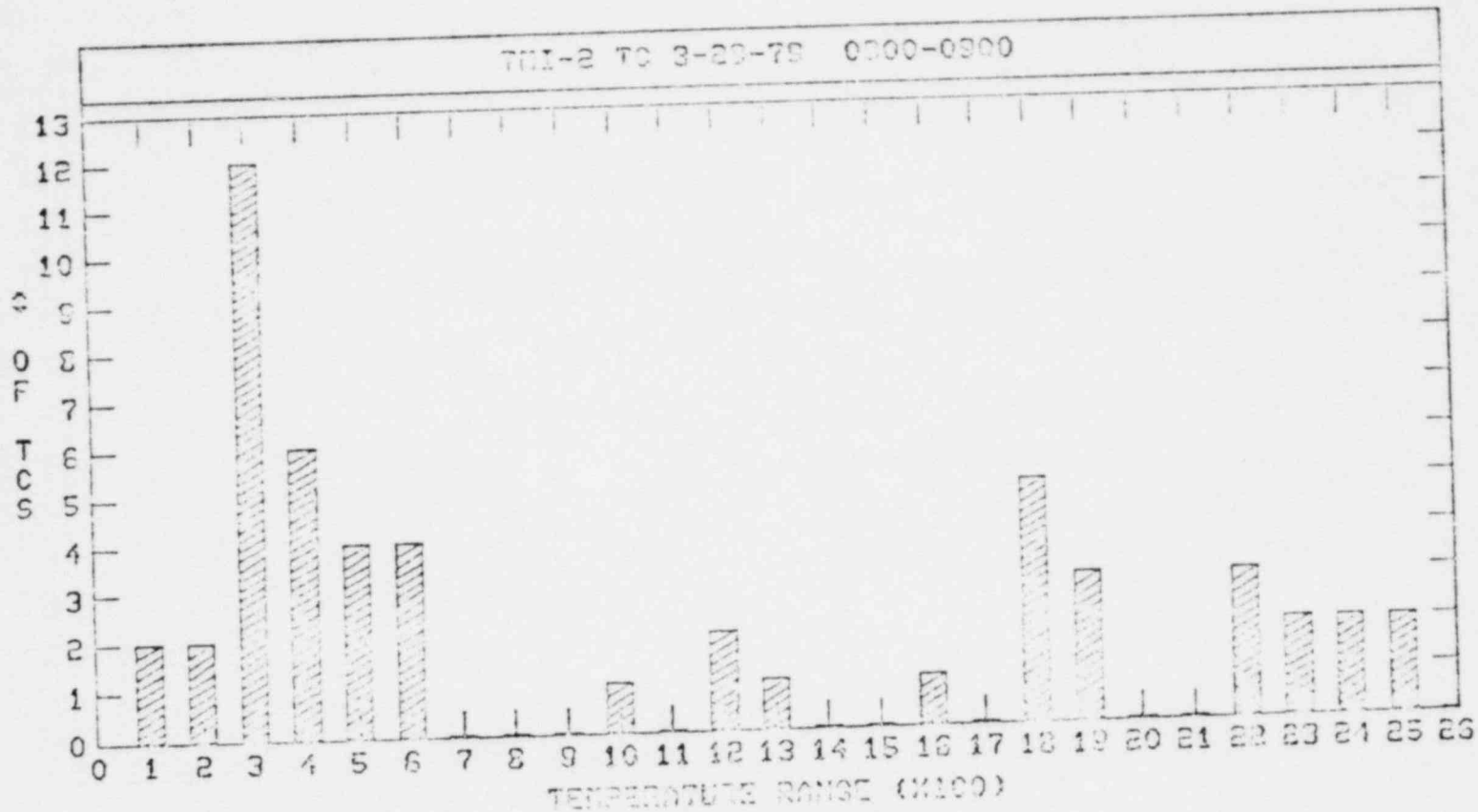
PRIMARY TEMPERATURE AND PRESSURIZER LEVEL - 70 to 100 MINUTES



Keaten

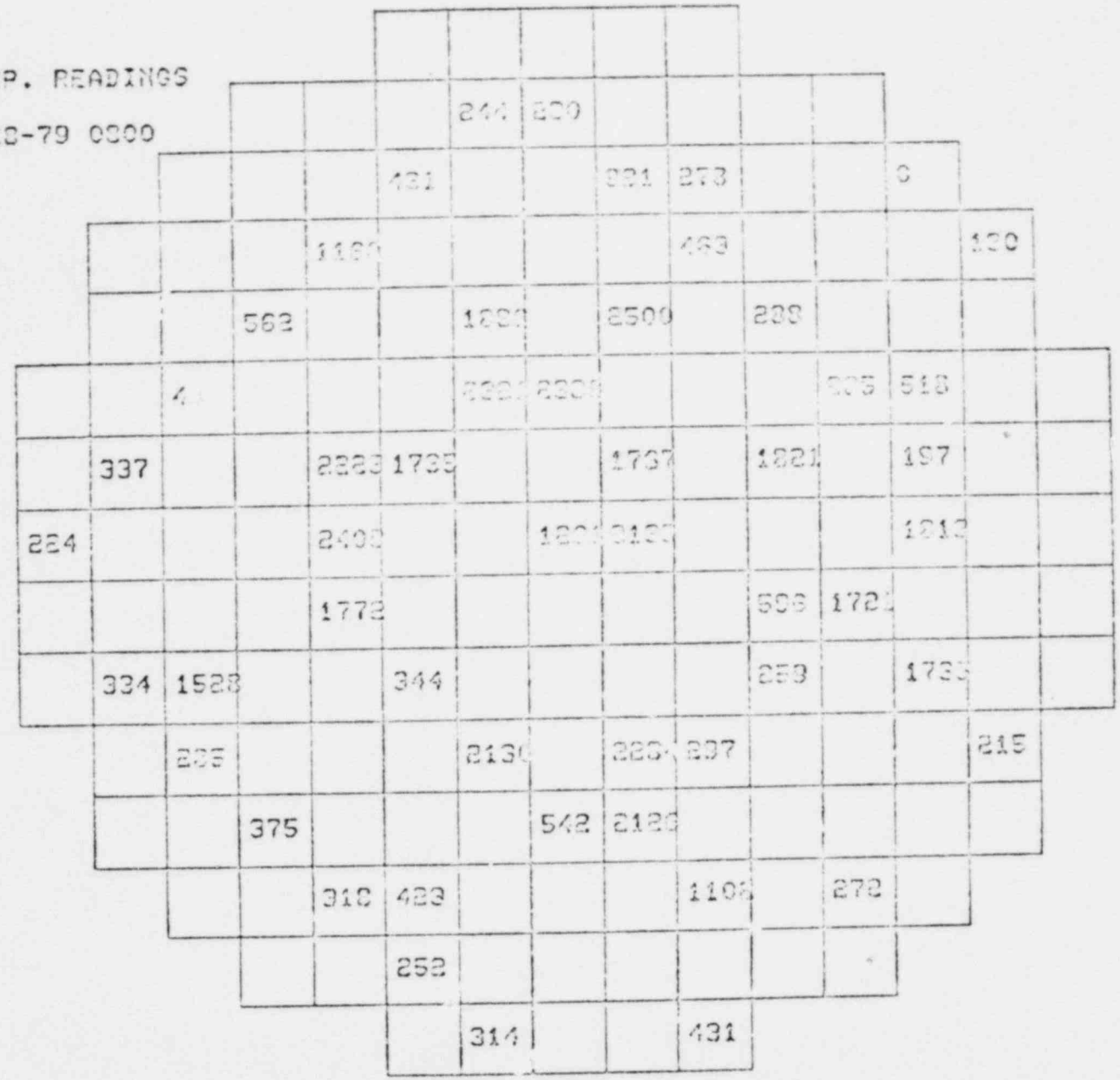
Attachment 5

INCORE THERMOCOUPLES

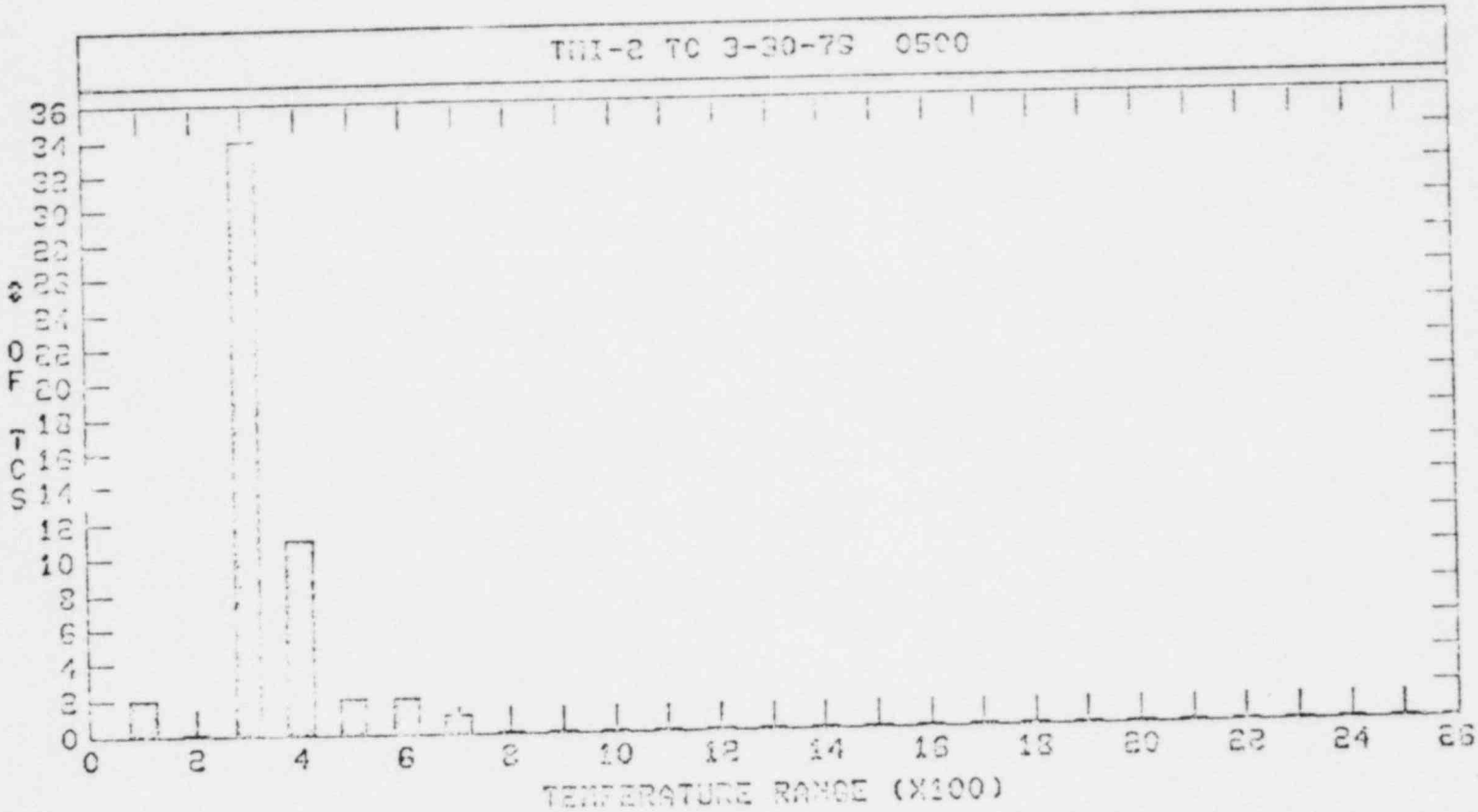

TMI-2 TC 3-28-79 0300-0900
OF TCS
0 1 2 3 4 5 6 7 8 9 10 11 12 13
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26
TEMPERATURE RANGE (X100)

TEMP. READINGS

3-28-79 0000



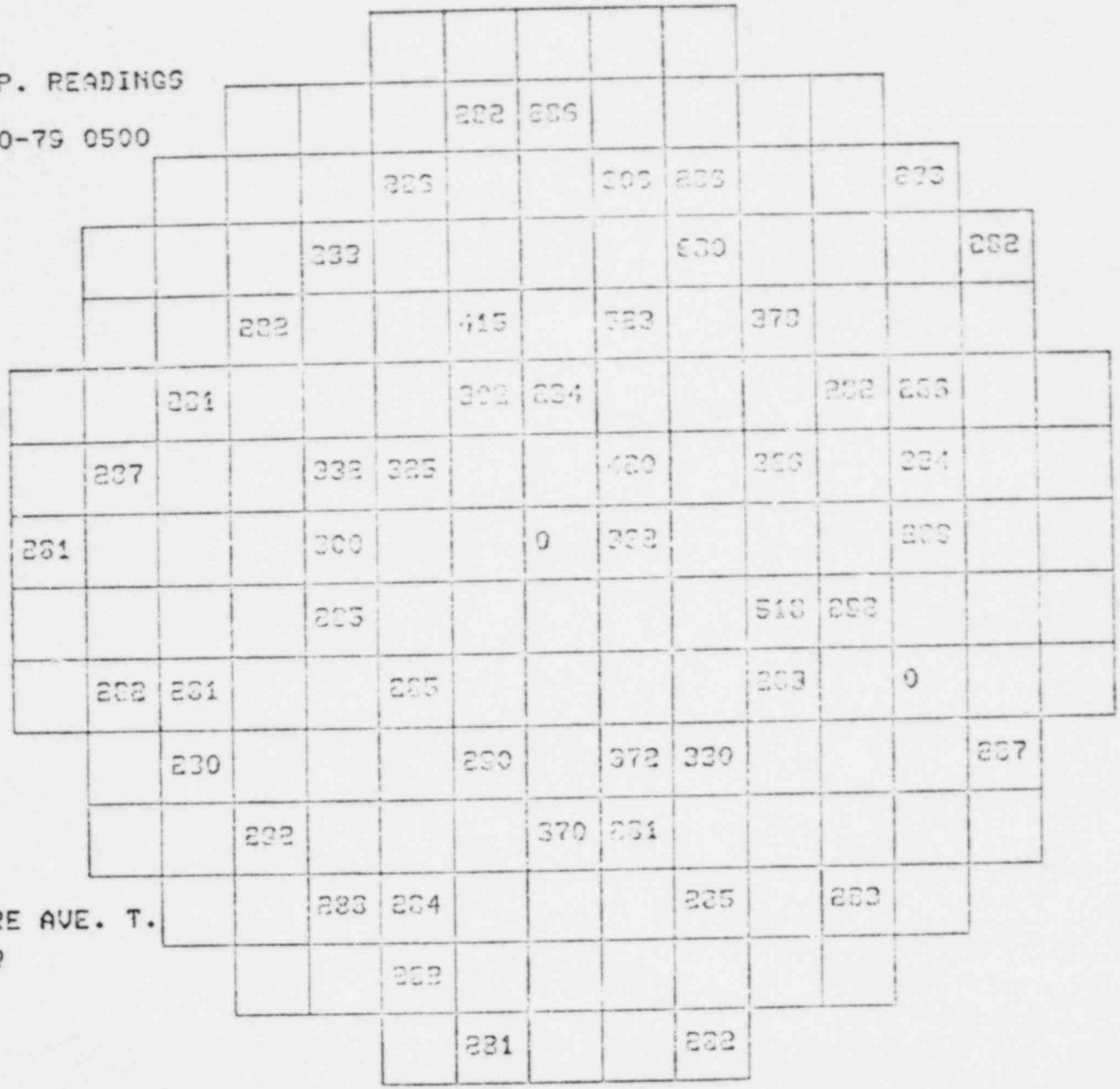
F-2


TMI-2 TC 3-30-79 0500
NO OF TCS
0
2
4
6
8
10
12
14
16
18
20
22
24
26
TEMPERATURE RANGE (X100)

F-3

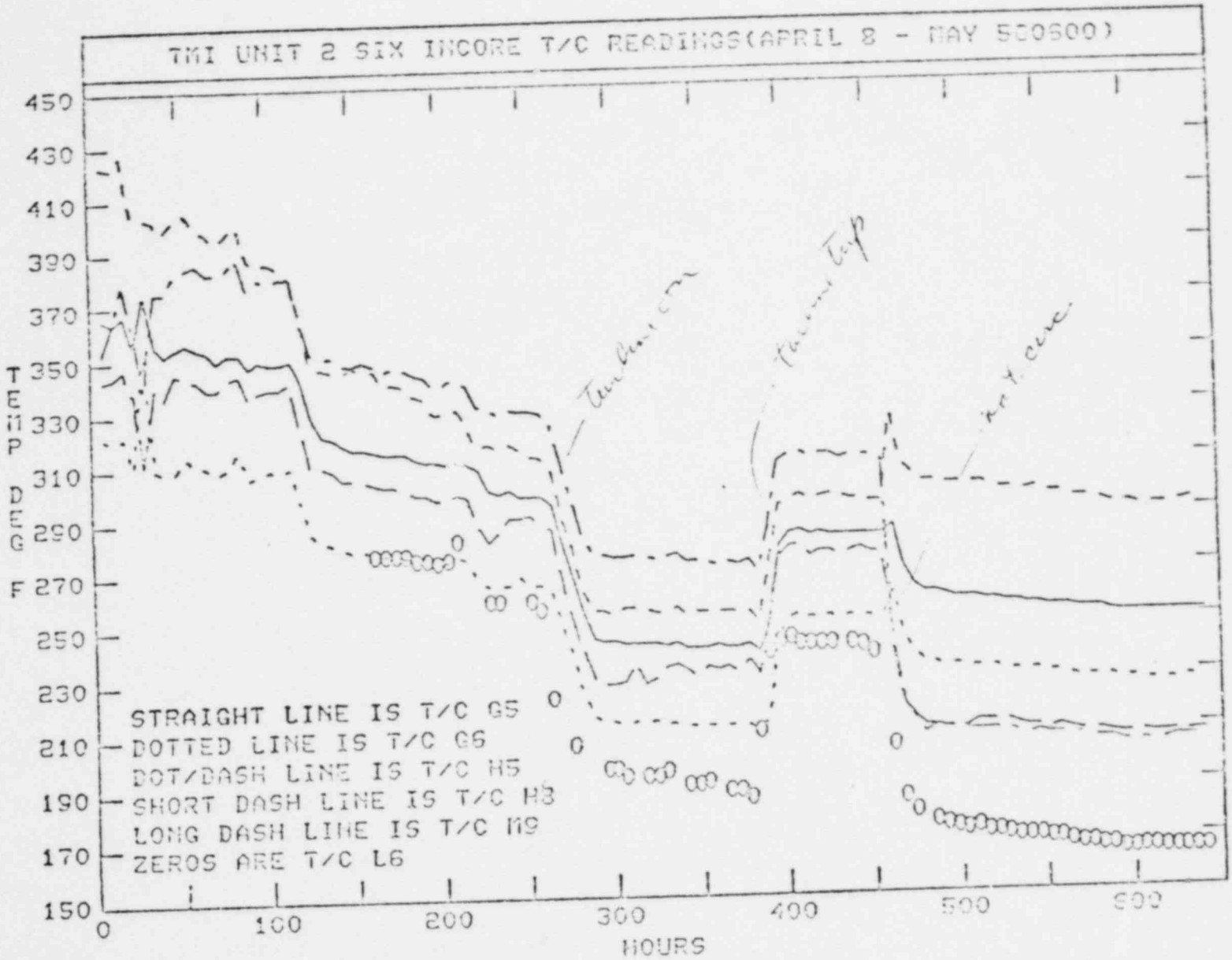
TEMP. READINGS

3-30-79 0500

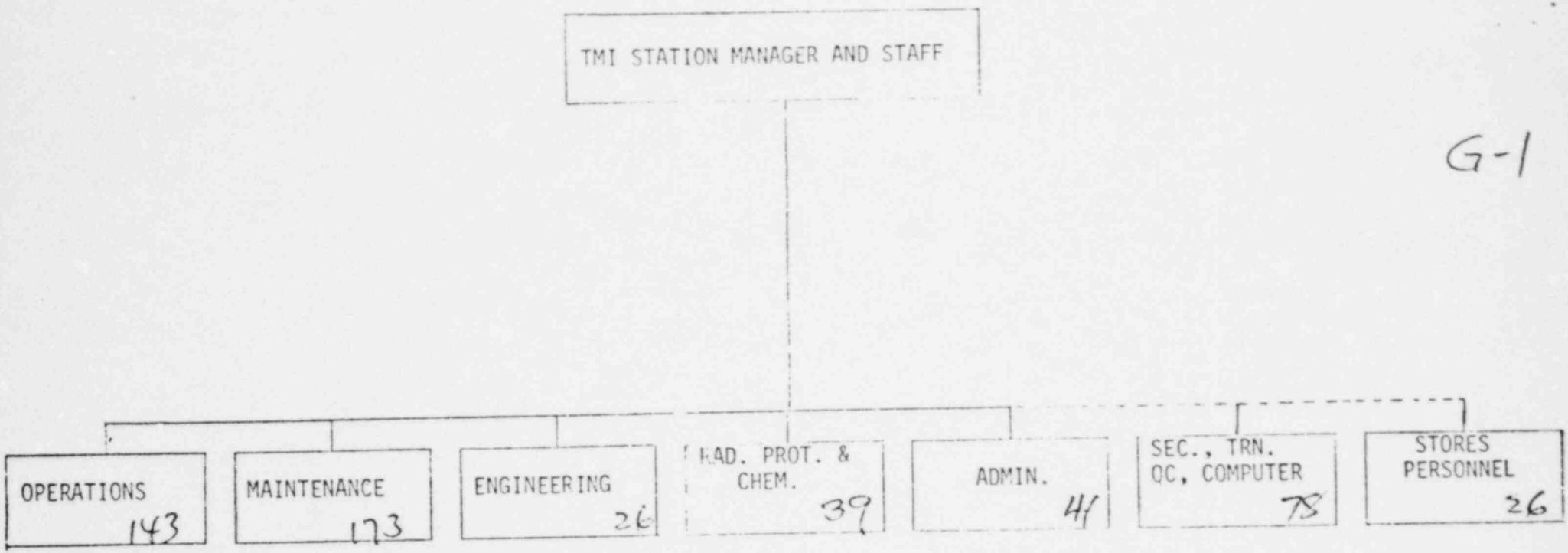


CORE AVE. T.
319

F-4

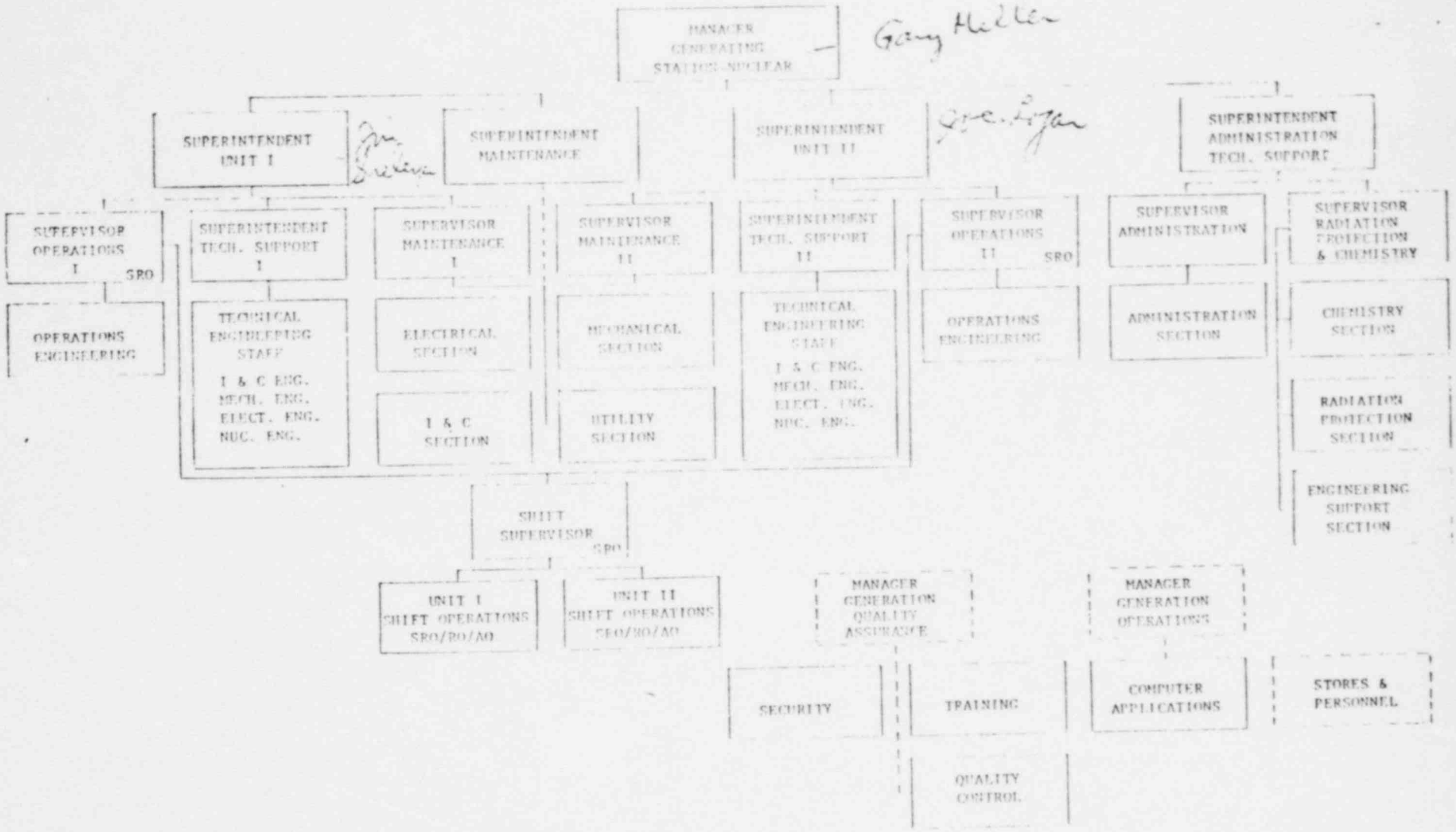

TMI UNIT 2 SIX INCORE T/C READINGS(APRIL 8 - MAY 500600)
TEMP DEG F
450
430
410
390
370
350
330
310
290
270
250
230
210
190
170
150
0
100
200
300
400
500
600
HOURS
STRAIGHT LINE IS T/C G5
DOTTED LINE IS T/C G6
DOT/DASH LINE IS T/C H5
SHORT DASH LINE IS T/C H8
LONG DASH LINE IS T/C H9
ZEROS ARE T/C L6

GRAPH 4


TMI STATION MANAGER AND STAFF
OPERATIONS
143
MAINTENANCE
173
ENGINEERING
26
RAD. PROT. &
CHEM.
39
ADMIN.
41
SEC., TRN.
QC, COMPUTER
78
STORES
PERSONNEL
26

G-1

THREE MILE ISLAND NUCLEAR STATION - ONSITE STAFF



G-2

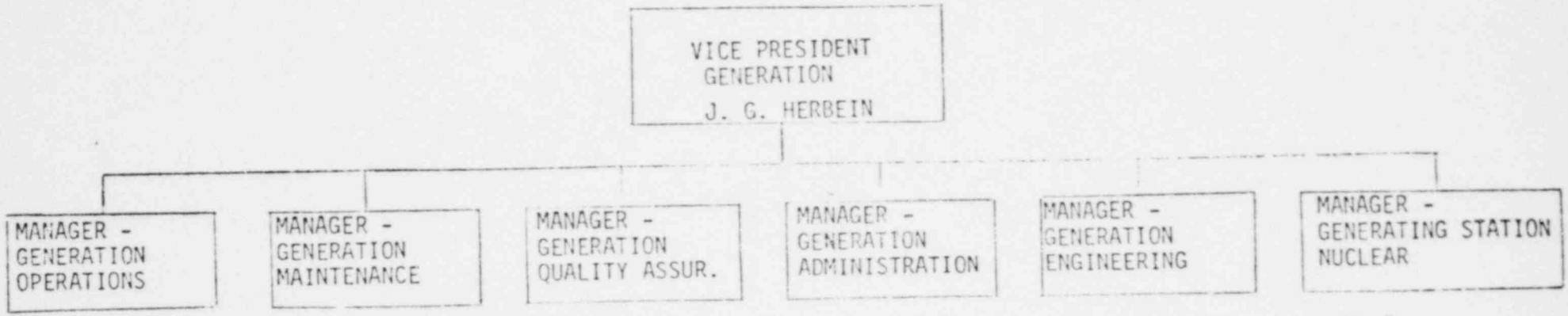
G-3

SRO/RO LICENSE SUMMARY

	Unit I	Unit I & Unit II	Unit II
SRO	12	12	7
RO	11		12
Total	23	12	19

Unit Supt's	2
Operations Dept.	46
Tech Support	2
Training	4
Total	54

GENERATION DIVISION



- Nuclear Fuel
- Plant Computer Programming
- Station Economy & Thermal Performance
- Fossil Generating Stations
- Fossil Fuel and Ash

- Turbine Overhaul Scheduling
- Review of Contractor Maintenance Capability
- Welding Program
- Fossil Station - Maintenance Scheduling & Planning

- Quality Assur. and Quality Control
- Licensing
- Training
- Security

- Office Administration
- Personnel
- Budgets & Reports
- COMEC

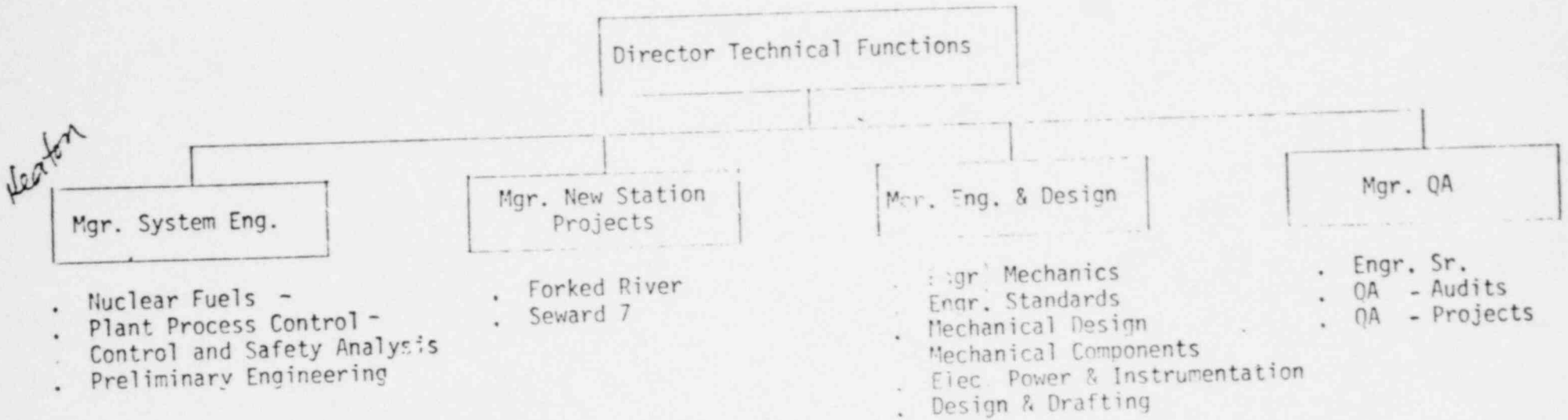
- Projects
- Mechanical & Systems Engrg.
- Radiation Safety & Environmental Engineering
- Electrical & Controls Engr.

- Nuclear Generating Station (TMI)

G-4

1

GPUSC TECHNICAL FUNCTIONS GROUP



G-5

G-6

REVIEW COMMITTEES

The Plant Operation Review Committee (PORC)

1-5 x/wk

before Mar 28 2 full days/wk

The Generation Review Committee (GRC) 1-2 days

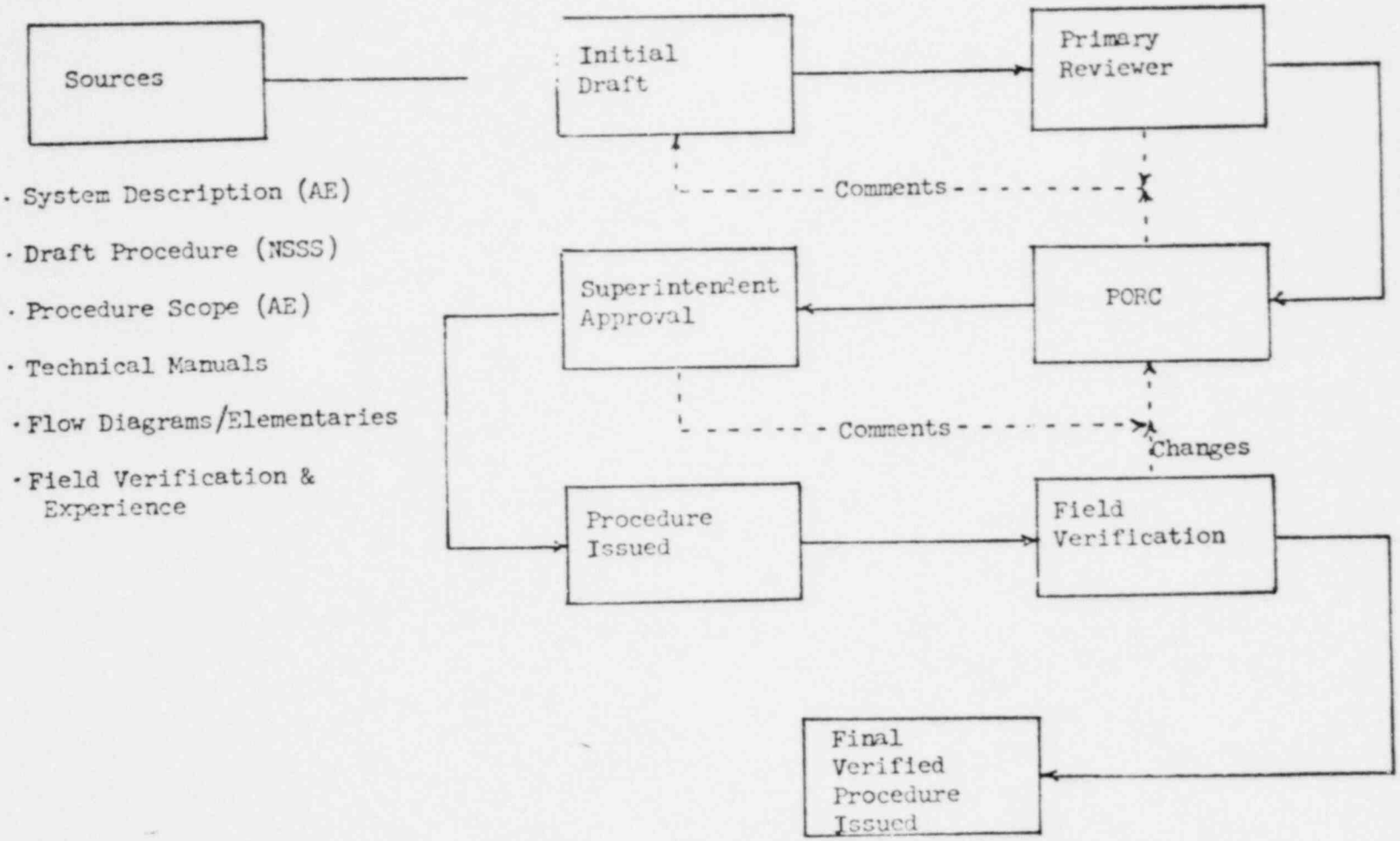
2-3 mtg/wk

The General Office Review Board (GORB) 2 days

The Nuclear Plant Management Review Group 1 day

LERS from other B&W plants do not routinely come to these committees

IN[illegible]AL PROCEDURE PREPARATION

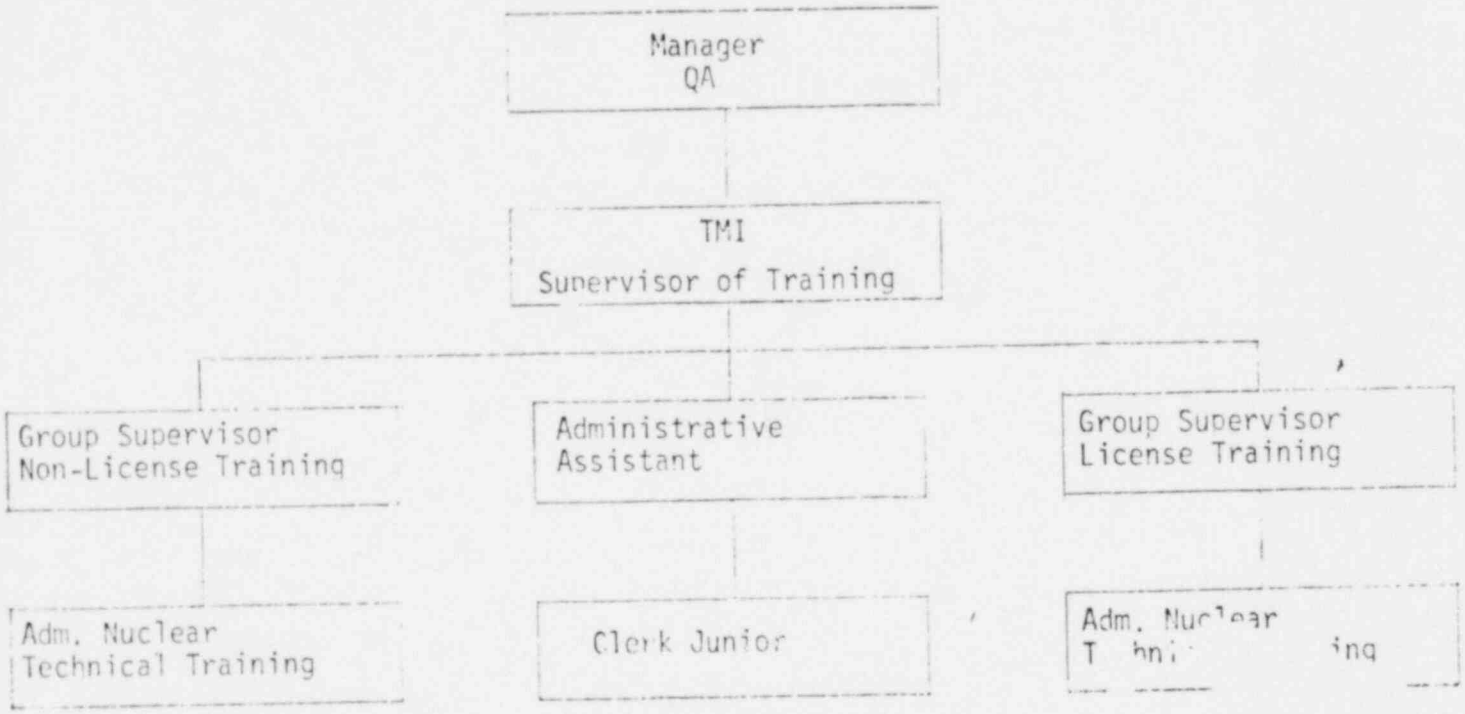


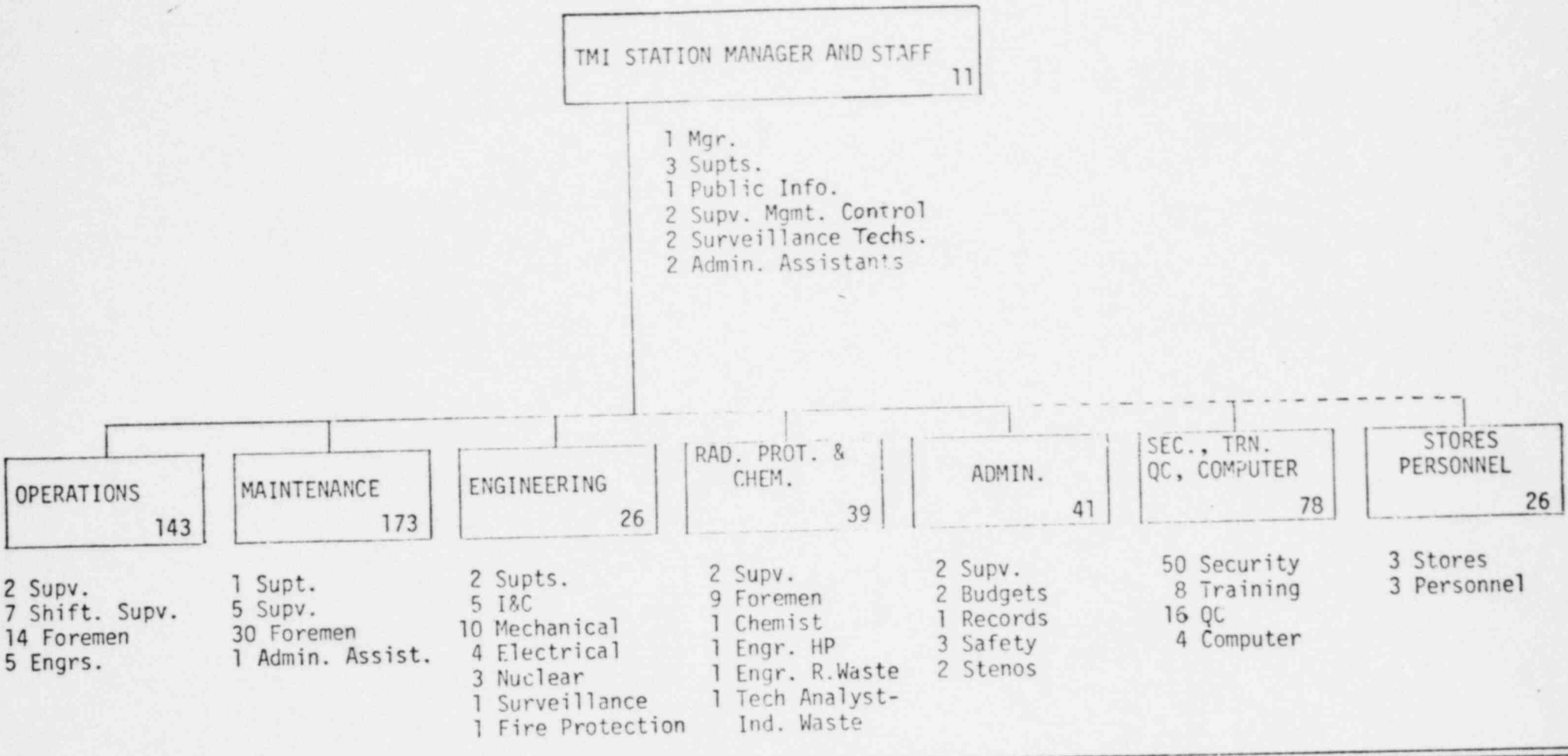
- System Description (AE)
- Draft Procedure (NSSS)
- Procedure Scope (AE)
- Technical Manuals
- Flow Diagrams/Elementaries
- Field Verification & Experience

G-7

3(A)(iii)

TMI Training Department Organization




TMI STATION MANAGER AND STAFF
11
1 Mgr.
3 Supts.
1 Public Info.
2 Supv. Mgmt. Control
2 Surveillance Techs.
2 Admin. Assistants
OPERATIONS
143
MAINTENANCE
173
ENGINEERING
26
RAD. PROT. & CHEM.
39
ADMIN.
41
SEC., TRN. QC, COMPUTER
78
STORES PERSONNEL
26
2 Supv.
7 Shift. Supv.
14 Foremen
5 Engrs.
1 Supt.
5 Supv.
30 Foremen
1 Admin. Assist.
2 Supts.
5 I&C
10 Mechanical
4 Electrical
3 Nuclear
1 Surveillance
1 Fire Protection
2 Supv.
9 Foremen
1 Chemist
1 Engr. HP
1 Engr. R.Waste
1 Tech Analyst-Ind. Waste
2 Supv.
2 Budgets
1 Records
3 Safety
2 Stenos
50 Security
8 Training
16 QC
4 Computer
3 Stores
3 Personnel
34 CRO's
81 AO's
32 I&C
33 Mechanical
22 Electrical
49 Utility
24 Rad/Chem. Techs.
31 Clerks
20 Stockkeepers

G-10

MET-ED NUCLEAR EXPERIENCE

	No. of Employees with Experience	Years Experience	Average (Yrs/Emp.)
TMI			
Station Manager and Staff	4	62	15.5
Operations	142	877	6.2
Technical Support	26	150	5.8
Rad. Protection & Chemistry	39	262	6.7
Maintenance	112	692	6.2
Quality Control and Administration	17	186	10.9
Training	6	80	13.3
Subtotal	346	2309	6.7
Other Than TMI			
Corp. Tech. Support Staff	13	95	7.3
Fossil Generating Stations	3	28	9.3
Subtotal	16	123	7.7
TOTAL	362	2432	6.7

NOTES

GPU NUCLEAR EXPERIENCE

	No. of Employees with Experience	Years Experience	Avg. Years Nuc. Exp
TECHNICAL FUNCTIONS	128	1835.5	14
PRODUCTIVITY	3	46	15
CORP. PLANNING	10	115	11.5
GENERATION OPERATIONS	6	93	15.5
PROJECTS GROUP	19	449	24
ENVIRONMENTAL AFFAIRS GROUP	5	75.5	15
TOTALS	171	2614	15

Herbein

June 7, 1979

1350

Attachment H

H-1

TRAINING

- Training audit
- Thermodynamics, heat transfer and core cooling demands
- Simulated failures didn't follow through to ultimate consequences
- On-shift training drills
- Procedure format

ORGANIZATION

(Not Previously Identified)

- Too much is expected of the Shift Supervisor - needs to be de-centralized.

- More technical capability available on shift is desirable.

- More direct coupling between the plant staff and the Service Company technical capabilities is desirable.

- Difficulty with transmitting information from shift to shift.

H-3

ORGANIZATION

(Previously Identified)

- Tendency toward a complex organization.

- Diversion of line management's energy to the maintenance of support functions, i.e., tremendous increase in "paperwork"

- Complexity of Admin. Controls.

HEALTH PHYSICS

- Training and Supervision
- Post Accident Administration
- Breathing Apparatus
- Dosimetry
- Organization Complexity

Alexis Isabella

I-1

THREE MILE ISLAND

EMERGENCY PLAN

I. CONTENT

II. IMPLEMENTATION

EMERGENCY PLAN

- PLAN IN EFFECT SINCE 1974
- EMERGENCY DRILLS CONDUCTED EACH YEAR SINCE 1974
  - AUDITED BY NRC
  - OBSERVED BY STATE AUTHORITIES
- EMERGENCY DRILL PERFORMED AS PREREQUISITE FOR UNIT 2 LICENSE
- TRAINING CONDUCTED EACH YEAR
  - STATION STAFF
  - OFF-SITE AGENCIES
- EMERGENCY EQUIPMENT AVAILABLE FOR USE
- REDUNDANT COMMUNICATIONS AVAILABLE FOR USE
- OFF-SITE DOSE ASSESSMENT CAPABILITY EXISTED
- EMERGENCY PLAN REVIEWED AND UPDATED EACH YEAR

PURPOSE

TO DESCRIBE THE ACTIONS TO BE TAKEN TO ASSURE ADEQUATE PROTECTION OF BOTH ON-SITE AND OFF-SITE PERSONNEL WHO COULD BE AFFECTED BY ANY INCIDENT INVOLVING ABNORMAL RADIATION LEVELS OR RELEASES OF RADIOACTIVE MATERIAL.

MET-ED'S ROLE

- ASSESS NATURE AND MAGNITUDE OF ACCIDENT
- ATTEMPT TO ISOLATE, TERMINATE OR MITIGATE IMPACT OF CONSEQUENCES TO ON-SITE PERSONNEL AND PUBLIC
- EVALUATE AND CONSTANTLY RE-EVALUATE IMPACT ON OFF-SITE AREAS.
- COMMUNICATE ASSESSMENTS TO OFF-SITE AUTHORITIES
- MAKE RECOMMENDATIONS ON PROTECTIVE MEASURES TO BE TAKEN OFF-SITE

EMERGENCY CLASSIFICATIONS

LOCAL

- AFFECTS PERSONNEL OR EQUIPMENT SAFETY
- OFF-SITE HAZARD UNLIKELY

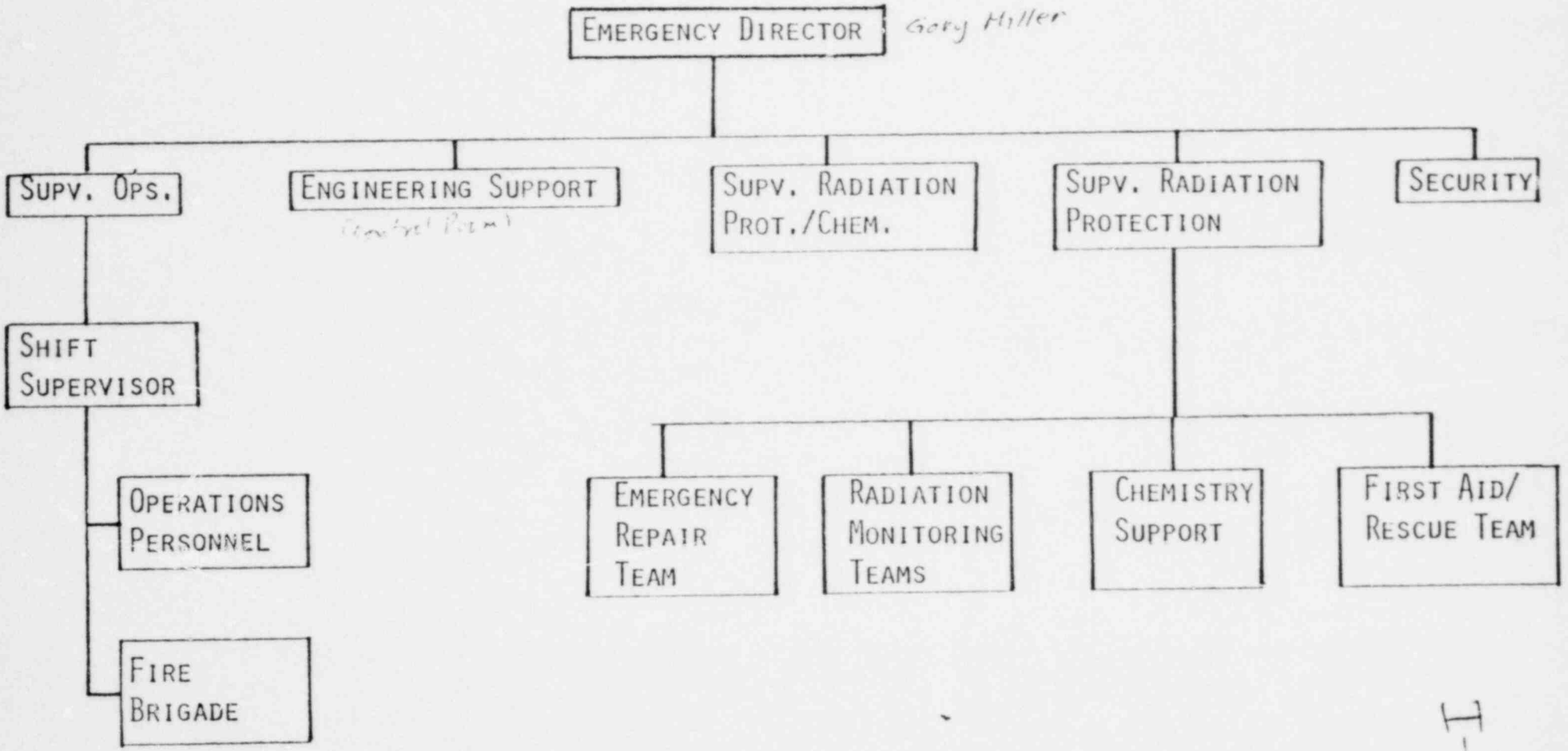
SITE

- MAJOR ACCIDENT
- POSSIBLE UNCONTROLLED RELEASE TO IMMEDIATE ENVIRONMENT
- POTENTIAL OFF-SITE RADIOLOGICAL DOSE CONSEQUENCES

GENERAL

- MAJOR ACCIDENT
- OFF-SITE PROTECTIVE ACTIONS NECESSARY TO MINIMIZE RADIOLOGICAL DOSE
- OFF-SITE AGENCIES INVOLVED FOR ASSESSMENT AND PROTECTIVE ACTIONS
- POSSIBLE EVACUATION OF OFF-SITE PERSONNEL

EMERGENCY ORGANIZATION



SITE EMERGENCY

REQUIRED ACTIONS

- ASSESS CONDITIONS AND DIRECT PROTECTIVE AND CORRECTIVE ACTIONS
- ANNOUNCE EMERGENCY TO PLANT PERSONNEL
- NOTIFY OFF-SITE AGENCIES (PEMA AS SOON AS POSSIBLE) Pa. Emerg Mgmt. Agency
- ESTABLISH COMMUNICATIONS WITH OFF-SITE GROUPS AND BEGIN TRANSMITTING DATA
- ASSEMBLE AND ACCOUNT FOR ON-SITE PERSONNEL
- EVALUATE IN-PLANT RMS AND METEOROLOGICAL DATA
- DISPATCH ON AND OFF-SITE RADIATION MONITORING TEAMS

SITE EMERGENCY (CONTINUED)

REQUIRED ACTIONS

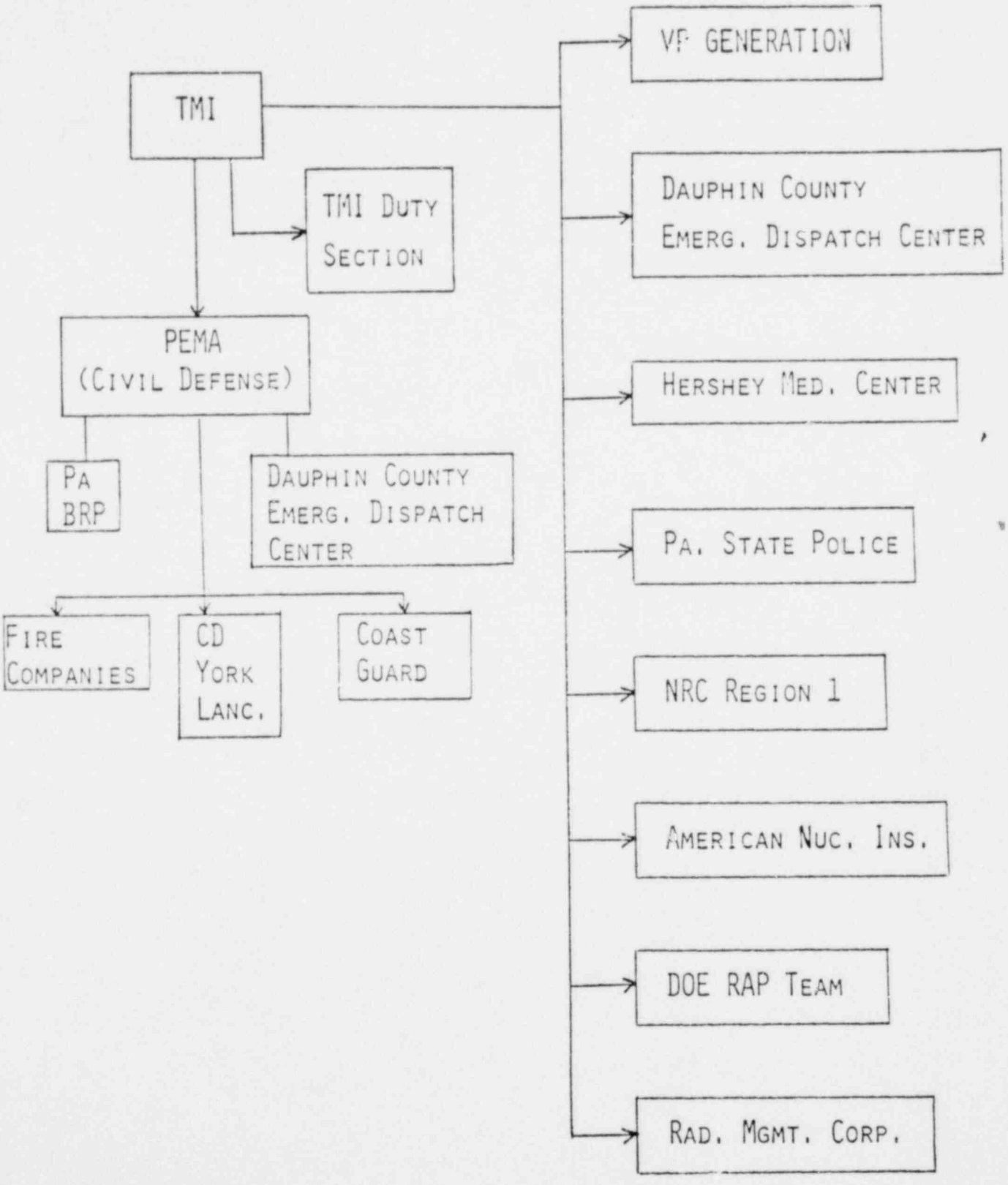
- RECALL STANDBY TMI PERSONNEL
- PROJECT OFF-SITE DOSE CONSEQUENCES AND RE-EVALUATE AS ACTUAL MONITORING RESULTS ARE RECEIVED
- EVALUATE EMERGENCY'S IMPACT ON UNAFFECTED UNIT
- EVACUATE ON-SITE NON-ESSENTIAL PERSONNEL IF NECESSARY

GENERAL EMERGENCY

REQUIRED ACTIONS

- ANNOUNCE EMERGENCY TO PLANT PERSONNEL
- NOTIFY OFF-SITE AGENCIES
- TAKE INITIAL ACTIONS AS DESCRIBED IN SITE EMERGENCY
- MAKE RECOMMENDATION TO PA. BUREAU OF RADIATION PROTECTION BASED ON PROJECTED AND MEASURED OFF-SITE DOSES
- IF SITUATION REQUIRES IMMEDIATE PROTECTIVE ACTION AND BRP CANNOT BE CONTACTED, RECOMMEND TO COUNTY CD TO EVACUATE AFFECTED AREA

OFF-SITE NOTIFICATIONS



EMERGENCY PLAN IMPLEMENTATION

SEQUENCE OF EVENTS

TIME	
0400	TURBINE/RX TRIP. SENIOR STATION PERSONNEL CALLED AND BEGIN REPORTING TO THE SITE.
0655	SITE EMERGENCY DECLARED
0702	PEMA DUTY OFFICER NOTIFIED
0704	NRC REGION I NOTIFIED
0709 (APPROX.)	STATION SUPERINTENDENT RELIEVES SHIFT SUPERVISOR AS EMERGENCY DIRECTOR
0720	OFF-SITE NOTIFICATIONS COMPLETE (ANI NO ANSWER)
0724	GENERAL EMERGENCY DECLARED
0725	PA. BRP CALLS TMI-2 CONTROL ROOM. OPEN LINE ESTABLISHED.
	ON-SITE MONITORING TEAM DISPATCHED.

SEQUENCE OF EVENTS (CONT'D)

TIME	
0746	ON-SITE TEAM - < 1 MR/HR AT WESTERN SITE BOUNDARY
0750	NRC REGION 1 CALLS UNIT 2 CONTROL ROOM. OPEN LINE ESTABLISHED.
	OFF-SITE NOTIFICATIONS COMPLETE
0755	OFF-SITE TEAM - < 1MR/HR AT OBSERVATION CENTER
0800	MET-ED REQUEST REMP INCREASED TO MAXIMUM REGIME
0815	ON-SITE ACCOUNTABILITY COMPLETE
	STATE POLICE HELICOPTER REQUESTED
0835	HELICOPTER PICKS UP WEST-SHORE MONITORING TEAM
0842	HELICOPTER TEAM REPORTS < 1MR/HR AT GOLDSBORO
0900 (APPROX)	ECS MOVED TO UNIT 2 CONTROL ROOM

Unintelligible due to airborne

STATUS OF EMERGENCY PLAN

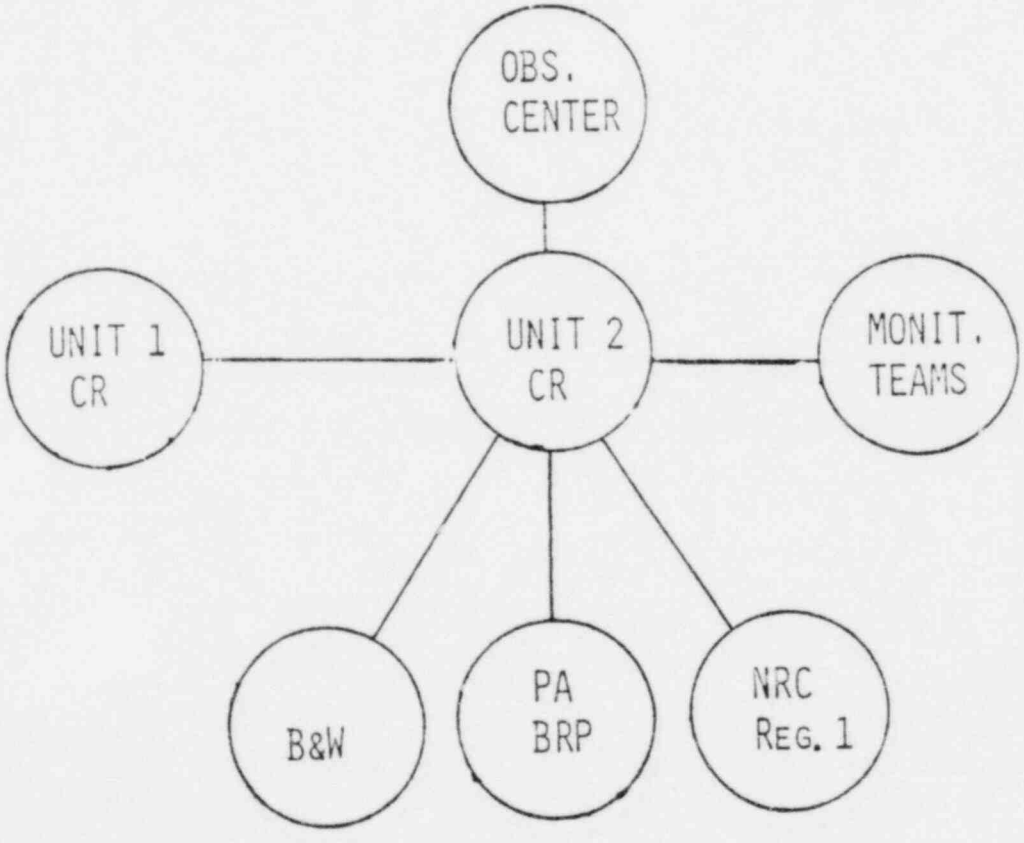
IMPLEMENTATION

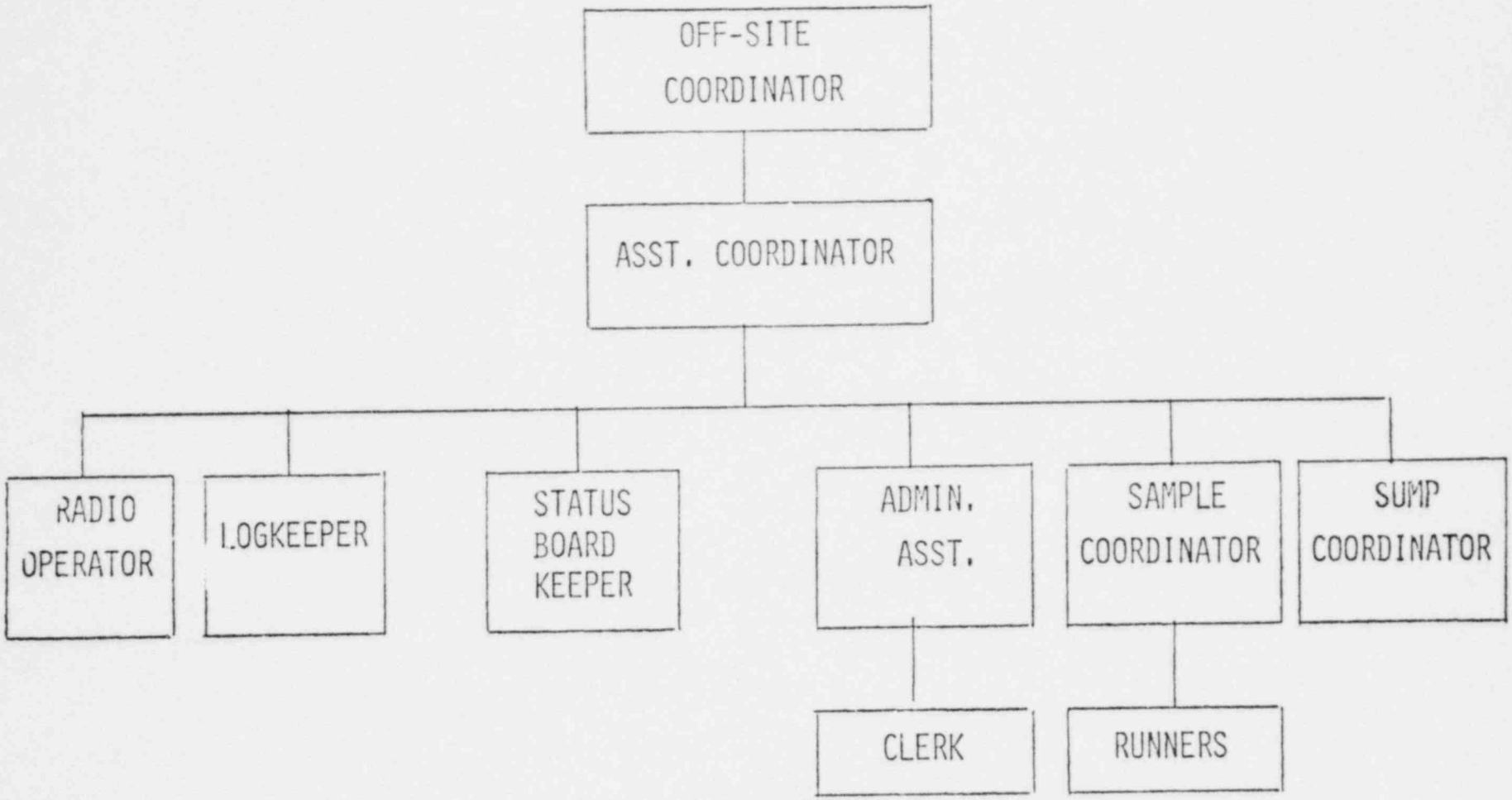
- FULLY INITIATED
- PROCEDURAL STEPS CARRIED OUT
- OFF-SITE COMMUNICATIONS ESTABLISHED WITH PA. BRP AND NRC
- MONITORING TEAM RESULTS BEING PASSED TO PA. BRP
- ON-SITE ACCOUNTABILITY COMPLETE

SEQUENCE OF EVENTS (CONT'D)

TIME	
1005	5 NRC REGION 1 PERSONNEL ARRIVE (HP & MONITORING EQUIPMENT)

COMMUNICATIONS




OFF-SITE COORDINATOR
ASST. COORDINATOR
RADIO OPERATOR
LOGKEEPER
STATUS BOARD KEEPER
ADMIN. ASST.
SAMPLE COORDINATOR
SUMP COORDINATOR
CLERK
RUNNERS

RON WILLIAMS
GPU

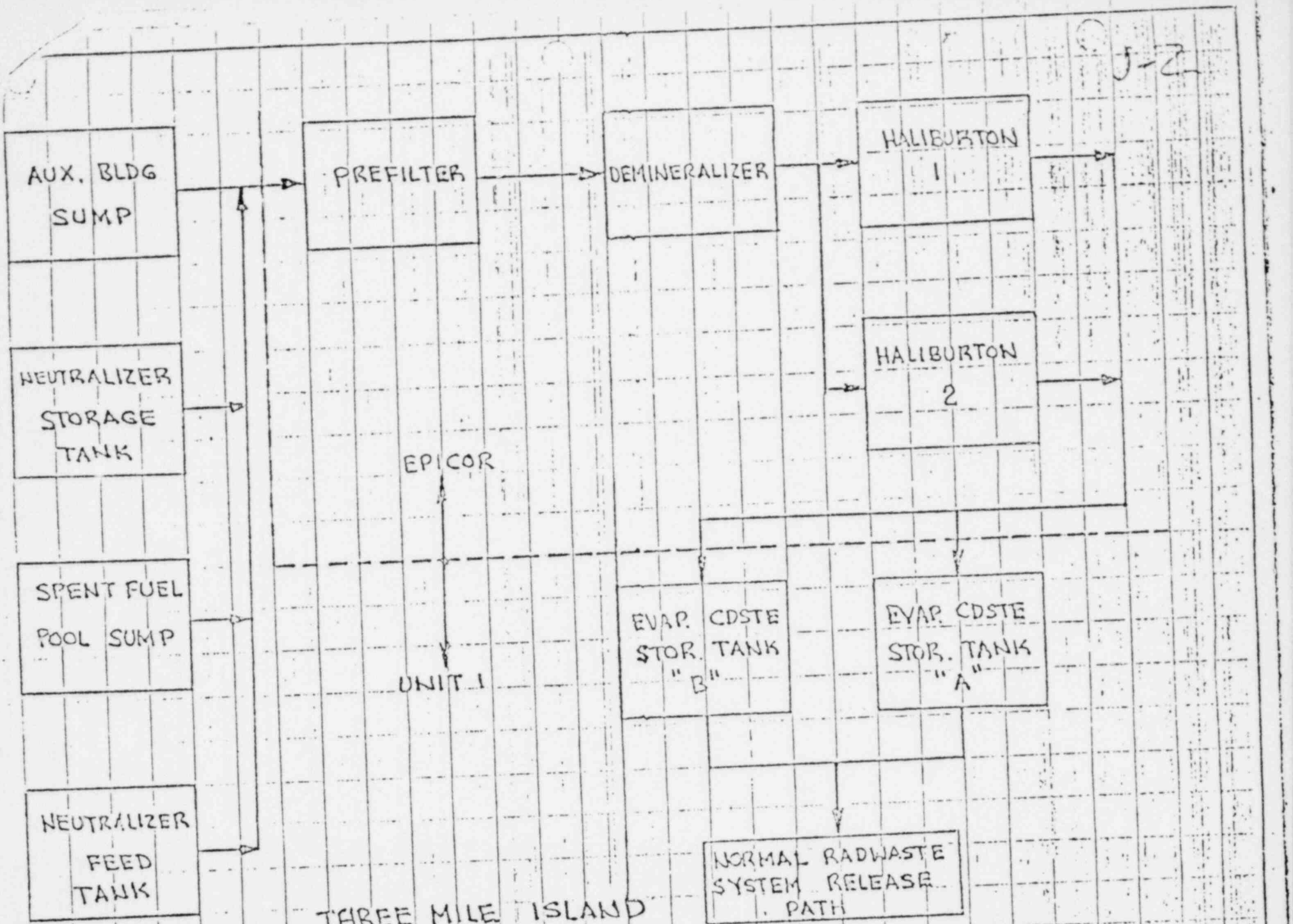
VOLUME AND ACTIVITY LEVELS

WASTE CATEGORIES

(Attachment J
J-1

N JUNE 1

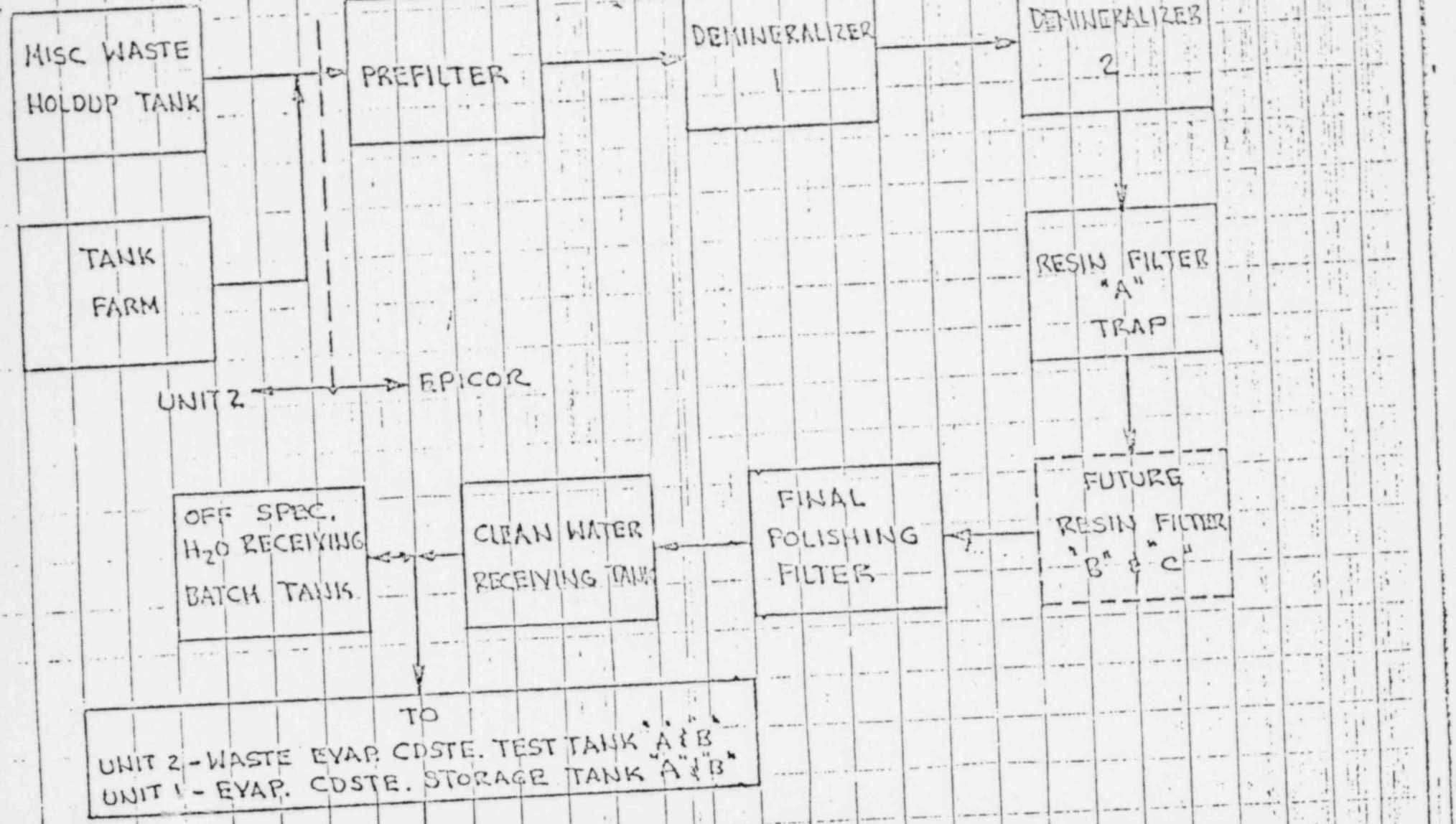
ACTIVITIES (μCi/ml)	AUXILIARY BUILDING TANKS	REACTOR COOLANT BLEED TANKS	REACTOR BUILDING BASEMENT	REACTOR COOLANT SYSTEM
I_{131}	10	65	300	210
$Cs\ 134$	0.7	7.7	100	42
$Cs\ 136$	0.2	1.4	30	7
$Cs\ 137$	3	35	300	190
$Ba\ 140$	0.4	1.2	70	25
$Sr\ 89/90$	2.7	6	400	650
VOLUME (GALLONS)	115,000	250,000	450,000	100,000



THREE MILE ISLAND

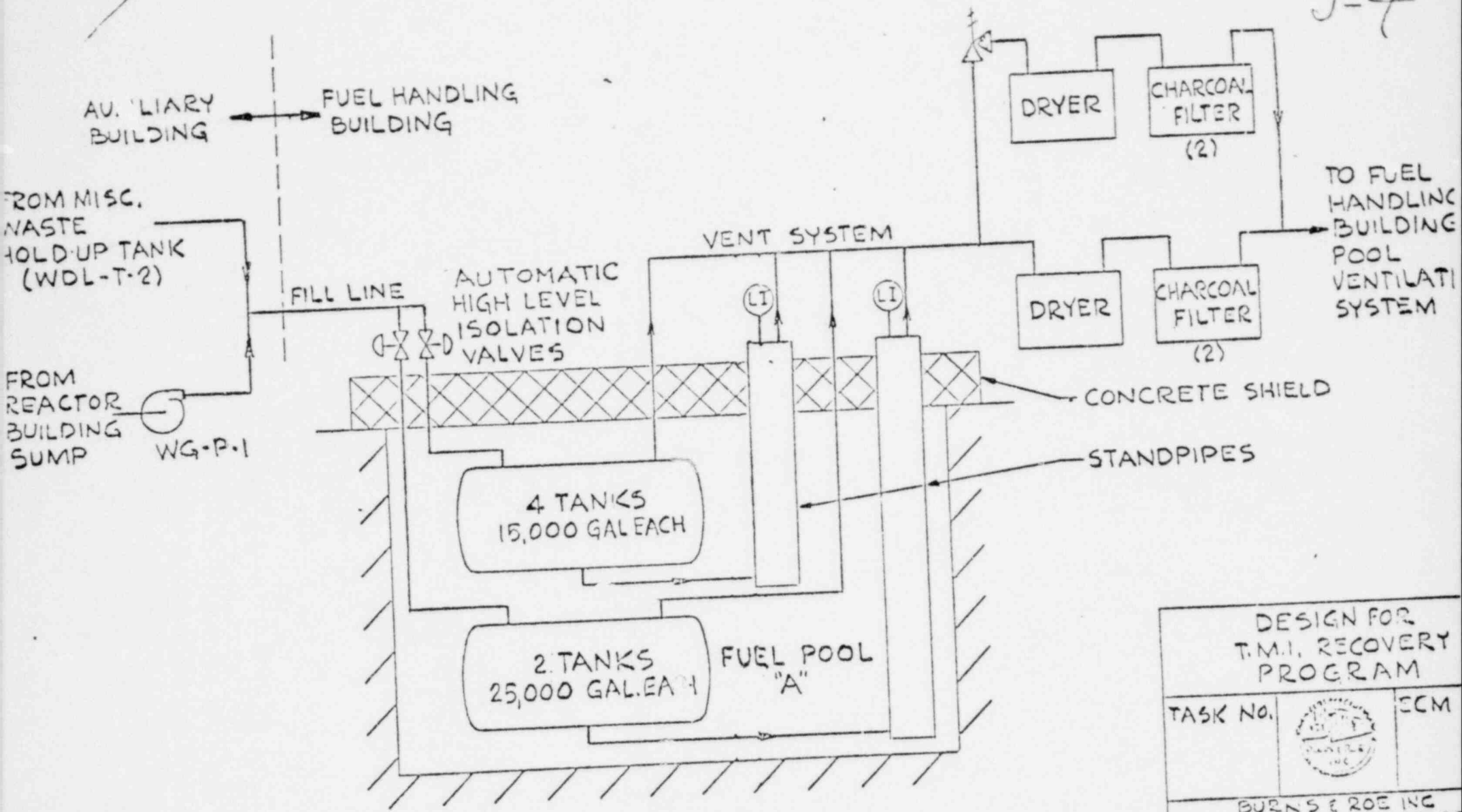
LIQUID RELEASE FLOWPATH (b)

EPICOR I



THREE MILE ISLAND
LIQUID RELEASE FLOWPATH (C)
EPICOR II

J-4



DESIGN FOR T.M.I. RECOVERY PROGRAM

TASK NO. ECM

BURNS & ROE INC
ENGINEERS AND CONSTRUCTO
ORADELL NJ HEMPSTEAD NY LOS ANGELE

SIMPLIFIED FLOW DIAGRA
FUEL POOL WASTE STORAGE

JERSEY CENTRAL POWER & LIGHT
THREE MILE ISLAND STATION-UN

W.O. B

STATUS 5-2 9:00 AM

1012
Revision 8
11/04/77

THREE MILE ISLAND NUCLEAR STATION
STATION ADMINISTRATIVE PROCEDURE 1012
SHIFT RELIEF AND LOG ENTRIES

MASTER COPY
DO NOT REMOVE
CONTROLLED COPY

Table of Effective Pages

Page	Date	Revision	Page	Date	Revision	Page	Date	Revision
1.0	08/11/75	3						
2.0	11/04/77	8						
2.1	11/04/77	8						
3.0	01/12/77	6						
4.0	08/11/75	3						
5.0	08/11/75	3						
6.0	08/11/75	3						
7.0	08/11/75	3						
8.0	08/11/75	3						
9.0	11/16/76	5						
10.0	06/20/77	7						
11.0	06/20/77	7						

Unit 1 Staff Recommends Approval

Approval NA Date —
Cognizant Dept. Head

Unit 2 Staff Recommends Approval

Approval NA Date —
Cognizant Dept. Head

Unit 1 PORC Recommends Approval

C E Hartman Date 10/21/77
V- Chairman of PORC

PORC comments of — included
(date)

By — Date —

Unit 2 PORC Recommends Approval

A J Hilbish Date 10/18/77
V. Chairman of PORC

PORC comments of — included
(date)

By — Date —

Approval J H Taylor Date 11/4/77
Mgr., Gen. Quality Assurance

Approval J. L. Seelinger Date 10/19/77
Station Superintendent
Unit Superintendent
G P. Gallon 10/21/77

TMI-58-A 11-74

THREE MILE ISLAND NUCLEAR STATION

ADMINISTRATIVE PROCEDURE #1012

SHIFT RELIEF AND LOG ENTRIES

Table of Contents

1.0 GENERAL

1.1 Purpose

This procedure establishes the requirements for shift relief and for recording station operating activities in logs or other controlled documents on a shift basis.

1.2 Scope

This procedure outlines the responsibilities of the on-duty and the on-coming shift personnel during shift relief. It also describes the various shift records and logs involved and the instructions required to maintain these records to conform to Technical Specifications and to assure the adherence to the requirements of FSAR.

1.3 References

a. Metropolitan Edison Technical Specification Section 6.5.

b. Appendix A, N.R.C. Safety Guide 33, Section A.

c. F.S.A.R. Volume 4 - 12 - 10 (Unit), 11, 12, 13 (Unit 2)

d. Hourly Log (Form 3042379)

e. Control Room Log

f. Shift Foreman Log

g. Radio Log - Form OD:4-ME

h. Met-Ed Co.'s Operating Instructions & Procedures applying to the use of the Mobile Radio System.

2.0 RESPONSIBILITIES

2.1 The Station/Unit Superintendent shall be responsible for the implementation of the recording of all data relative to the testing and operational status of the TMI Nuclear Station.

2.2 The Supervisor of Operations shall be responsible for the review, approval and storage of the logs and records. The supervisor of Operations (or his designee) shall review the

Control Room Log and the Shift Foreman's Log a minimum of once per week and document the review by initials or signature. The Supervisor of Operations shall institute action where necessary to correct any deficiencies in the recording techniques or significant operating abnormalities adverse to quality and determine the cause of such significant operating abnormalities which have occurred since his last review of the shift foreman's log. Significant abnormalities are defined as plant conditions which have potential for affecting the health and safety of the public.

2.3 The Shift Foreman shall be responsible for the review and sign off of the Shift Foreman's Log at the completion of each shift. He shall also make all the detailed entries in the Shift Foreman's Log.

2.4 The Control Room Operator shall be responsible for maintaining and signing off the Control Room Log. The control room operator shall be responsible for maintaining the Radio Log. (per par. 3.6).

2.5 The Supervisor-Quality Control shall be responsible for the surveillance and audit of all the subject documents.

3.0 REQUIREMENTS

3.1 General

3.1.1 Shift records are defined as Hourly Log, Control Room Log, Shift Foreman Log, Check off Lists, Recorder Charts and Computer Printouts that describe or record operating information and events. These records comprise the information that is necessary for evaluating operations or for analysis of previous operations.

3.1.2 All log entries, reports, chart notations, etc., must be legible, accurate, understandable and written in ink.

3.1.3 Upon assuming the duty, the operator(s) will record the time and date and make the appropriate notation indicating his knowledge of the plant status, e.g.

a. Hot Shutdown - as before

b. Cold Shutdown - as before

c. At Power - as before

d. Hot Standby - as before

3.1.4 All log entries shall be prefaced (in the left hand margin) with the time of entry in (24) twenty-four hour notation (e.g.-0800, 1300, 2400, etc.).

3.1.5 The individual responsible for maintaining logs must sign and date the portion or portions of the log which cover their shift assignment.

3.1.6 Upon completion of the duty, the operator will sign the log.

3.1.7 Each recording instrument shall be checked on the 11 to 7 shift for correct timing and legibility of marking.

3.1.8 Each chart shall be marked with the date, time, and instrument recorder name when replacing the chart paper. In addition, the variable speed recorder charts shall be marked to indicate any change in the chart speed.

3.1.9 If it becomes necessary to make any corrections whatsoever in the various logs, erasing is prohibited. A single line will be drawn through the incorrect information and the corrected information shall be recorded adjacent to or in a space available with reference to the deleted information. The individual making the entry shall initial the lined out information.

3.2 Hourly Log

3.2.1 This log will reflect plant parameters on an hourly basis. It will normally be prepared by the plant computer but can be manually prepared by the control room operator in the event that the computer is not functioning. If manual preparation is necessary it will be performed by the control room operators and auxiliary operators.

3.3 Control Room Log

3.3.1 This log will contain the following types of information:

a. Information concerning reactivity.

b. Alarms pertaining to reactor core conditions with detailed explanation.

c. Any abnormal condition of operation.

d. Releases of radioactive waste, gaseous or liquid.

This log is an official document required by F.S.A.R. and cannot be removed from the Control Room unless authorized by the Supervisor of Operations.

3.3.2 The 11 to 7 shift shall initiate their Control Room Operator's Log on a new page. It shall be prefaced with a brief description of the plant status, e.g.

a. At (80) Eighty Percent Power - MWT-/MWE

b. Rod Positions

c. Statements regarding unusual evolutions or alignments.

d. The following equipment is out of service (list).

3.3.3 All alarms that involve reactor core conditions shall be recorded by the operator along with an explanation or reason for the alarm e.g. T_{ave}, Reactor Coolant System, pressure, flow, or power.

3.3.4 All reactor startups - record time, T_{ave}, rod positions, primary pressure and boron concentrations (all normally taken at 10^{-8} amps on the Intermediate Range).

3.3.5 Reactor Shutdown - Record rod position, T_{ave}, time, Boron Concentration and reactor power prior to inserting rods for shutdown.

3.3.6 Plant Startup - Record the major events and time of occurrence, e.g., starting RCP's, starting turbine warmup, etc.

3.3.7 Plant Shutdown - Record the major steps in shutdown and the associated times.

3.3.8 Each system startup, significant status changes, and shutdowns shall be recorded. Also, record major

unit status changes such as opening of primary system, flooding of fuel transfer canal, etc. and the time of the event.

3.3.9 Equipment Malfunction - List the equipment and problem and any restriction placed on the plant.

3.3.10 Abnormal operation - Record any condition that causes principle primary or secondary parameters variation from normal.

3.3.11 Reactivity Changes - Record the addition or dilution of RCS Boron Concentration, assignment of rods to different groups, power changes, etc.

3.3.12 Reactor Trip & Turbine Trip - Record the conditions prior to the trip, cause of trip (if determined), corrective action taken and time of the events.

3.3.13 All significant power level changes in the power range shall be recorded.

3.3.14 Start and stop of any radioactive gaseous or liquid releases shall be recorded in the Control Room Log along with the release permit number.

3.3.15 Any abnormal valve line ups and equipment out of service, or returned to service shall be recorded.

3.3.16 Changes of position of any "defeat", or "by-pass" switches shall be recorded.

3.3.17 Accomplishment of testing - Record title and number of the test performed, and the start and completion times or time of suspension of the test. The performance of all periodic tests and inspections required by the Technical Specifications shall be recorded.

3.3.18 The above sections are not meant to be all inclusive but merely indicates the type of entries that should be made. When doubt exists, enter it in the log.

3.4 Control Room Log Prior to Initial Criticality

The following operations shall be recorded by the control room operator.

3.4.1 Execution of switching orders - Record order number and time as indicated on the switching order.

3.4.2 Placing equipment out of service or returning equipment to service Log the name and alphanumeric designator of the equipment, time of shutdown or return to service and reasons for shutdown or nature of work completed.

3.4.3 Accomplishing Test Function - Record the test number, title and time the test was started and completed.

3.4.4 Operating systems under direction of startup - List the system with a brief description, e.g., Jogging S.R. valves SR-V-2 and SR-V-6 for position indication checks.

3.4.5 Major Plant Status Changes - e.g., Filled C.W. Basin for Tower 1A, Filled Borated Water Storage Tank, De-Energized D.E.S. 4160 Bus, etc., also record the time of the event.

3.4.6 Completion and Turnover of Systems - e.g., Acceptance of a system by Met-Ed - Record the date with a description of the System and Systems' Boundaries.

3.5 Shift Foreman Log

3.5.1 This log will contain a summary of the station operation and major events that occur on each shift. Significant abnormalities which occur will be explained in greater detail than would be expected in the control room log.

3.5.2 The left hand side of the log should be reserved for changes in status of E.S. components, and major plant status changes at the discretion of the Shift Foreman.

3.5.3 When equipment covered by Tech Specs. is taken out of service, the reason, time, Tech. Spec. requirements and sample results (if applicable) will be noted on the left hand page of the Shift Foreman's Log. Additionally, all requirements for running, sampling and/or testing will also be noted, delineating times, when above must be accomplished.

(i.e.)

7/31/75 1100. Ran SP #1303-4.16 on 1B Diesel generator to prove its operability, removed 1A DG from service for oil ring inspection and repair. 1B DG must be tested daily until 1A DG is returned to service.

8/1/75 1100. Tested 1A DG in accordance with SP #1303-4.16. Test satisfactory.

When the equipment is returned to service the time/date shall also be noted on the left hand page of the S.F. Log.

3.5.4 Upon assuming the duty the Shift Foreman shall record in his log the plant conditions which exist.

a. Temperature (RCS)

b. Pressure (RCS)

c. Boron Concentration (RCS)

d. MWe Net

e. Rx Power

f. Control Rod Positions

3.5.5 Upon being releived the Shift Foreman will note that fact along with the time and sign his section of the log.

3.6 Radio Log

3.6.1 This log will contain the data which must be recorded to meet the requirements of the (FCC) Federal Communications Commissions' Rules and Regulations, such as (1) Log any contact with another base station and (2) Log entry made and signed by technician performing maintenance on the radio unit.

3.7 Shift Relief

3.7.1 All shift operations personnel shall be responsible for maintaining their duty station until properly relieved. The Shift Supervisor, Shift Foreman, Control Room Operators and Auxiliary Operators shall be relieved by qualified personnel only, e.g. those personnel who are properly licensed and properly informed of the plant status, operations in progress, and any special instructions which may be applicable. The relieving individual will discuss the plant status, operations in progress and special instructions with on-duty personnel so that he is adequately informed prior to assuming his shift duties.

3.7.2 The Control Room Operator will acknowledge his understanding and awareness of the changes in the plant status since his own last entry by signing the Control Room Log prior to assuming the shift duty.

3.7.3 During his shift the relieving individual shall insure adquate review of station logs, records, special instructions, etc., which have been generated since his last shift. The logs and records to be reviewed should include:

1. Shift Foreman Log
2. Control Room Log
3. Hourly Computer Log
4. Tagging Application Book
5. Equipment and Fuel Status Boards
6. TCN and SOP Books
7. Standing Order Book
8. Operations Memo Book
9. Preventative Maintenance Schedule Books
10. Revision Review Book

THREE MILE ISLAND NUCLEAR STATION
UNIT #2 SURVEILLANCE PROCEDURE 2301-S1
SHIFT AND DAILY CHECKS

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23.0	12/22/77	2						
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Unit 1 Staff Recommends Approval

Approval N/A Date —

Cognizant Dept. Head

Unit 2 Staff Recommends Approval

Approval N/A Date —

Cognizant Dept. Head

Unit 1 PORC Recommends Approval

N/A Date —

Chairman of PORC

Unit 2 PORC Recommends Approval

[signature] Date 3/10/79

Chairman of PORC

Unit 1 Superintendent Approval

N/A Date —

Unit 2 Superintendent Approval

[signature] Date 3/14/79

Manager Generation Quality Assurance Approval N/A Date —

THREE MILE ISLAND NUCLEAR STATION

UNIT #2 SURVEILLANCE PROCEDURE 2301-S1

SHIFT AND DAILY CHECKS

1.0 PURPOSE

1.1 To perform the required Shift and Daily Checks in compliance with the TMI Unit 2 Technical Specifications.

1.2 To review and implement Event Related Surveillance Requirements in compliance with the TMI Unit 2 Technical Specifications.

2.0 MODE/FREQUENCY REQUIREMENTS:

2.1 Refer to applicable attachments, Mode and frequency requirements of a given surveillance item.

3.0 LIMITS AND PRECAUTIONS

3.1 Each hourly log entry shall be recorded within one hour and 5 minutes of the previous entry.

3.2 Each bi-hourly log entry shall be recorded within 2 hours and 10 minutes ofthe previous entry.

3.3 Each shiftly log entry shall be recorded within 13 hours of the previous entry.

3.4 Each daily log entry shall be recorded within 26 hours of the previous entry.

3.5 Refer to the MODE applicability on each enclosure/appendix data sheet when recording data and implementing Tech Spec ACTION requirements.

4.0 LOCATION

PARAMETER		INST. NO.	READOUT DESIGNATOR	LOCATION
RC Outlet Temp.	Loop A	RC-4ATT1	Loop A Th - (TT1)	Panel 4
		RC-4ATT4	Loop A Th - (TT4)	Panel 4
	Loop B	RC-4BTT1	Loop B Th - (TT1)	Panel 4
		RC-4BTT1	Loop B Th - (TT4)	Panel 4
RC Unit Outlet Temp.	Loop A	Selected Loop "A" TH	Loop A Th	RC-4TR Pnl. 4
	Loop B	Selected Loop "B" Th	Loop B Th	RC-4TR Pnl. 4
	Unit	Average Sel. Loop A & Loop B Th	Unit Th	RC-4TR-Pnl. 4
R. C. Press	Wide Range	RC-3A PR2	RC Press. W.R.	Panel 4
	Narrow Range A	RC-3A PR1	RC Press NR-A	Panel 4
	Narrow Range B	RC-3B PR1	RC Press NR-B	Panel 4
R.C. Press	SFAS Ch. 1	RC-3A PT3	RCS Press.	SFAS Cab. 124
	SFAS Ch. 2	RC-3A PT4	RCS Prsss.	SFAS B/X Cab. 125
	SFAS Ch. 3	RC-3B PT3	RCS Press.	SFAS B/S Cab. 126
R.C. Flow	Loop A	RC-14A-FI	R.C. Flow Loop A	Panel 4
	Loop B	RC-14B-FI	R.C. Flow Loop B	Panel 4
	Total	RC-14A + RC-14B FT	R.C. Flow Total	Panel 4
R.B. Press (Remote)	Wide Range	BS-PT43882	R.B. WR Prsss	BS-PR4338 Pnl 3
		BS-PT1412-2	R.B. WR Press	BS-PR1412 Pnl 3
	Narrow Range	BS-PT1412-1	R.B. NR Press	BS-PR1412 Pnl 3
		BS-PT4338-1	R.B. NR Press	BS-PR4338 Pnl 3
R.B. Pressure (Local Ind)	ESFAS	BS-PS-3260	R.B. Press Ch. A	Rack 455
	ESFAS	BS-PS-3988	R.B. Press Ch. A	Rack 455
	RPS	BS-PS-3571	R.B. Press Ch. A	Rack 455
	ESFAS	BS-PS-3987	R.B. Press Ch. B	Rack 472
	ESFAS	BS-PS-3259	R.B. Press Ch. B	Rack 472
	RPS	BS-PS-3570	R.B. Press Ch. B	Rack 472
	RPS	BS-PS-3572	R.B. Press Ch. C	Rack 467
	ESFAS	BS-PS-3261	R.B. Press Ch. C	Rack 467
	ESFAS	BS-PS-3989	R.B. Press Ch. C	Rack 467
	RPS	BS-PS-3573	R.B. Press Ch. D	Rack 452
BUS 2-1E U.V.		Relay 27XA/27XB	White Ind. Light	Panel 6A
BUS 2-2E U.V.		Relay 27XA/27XB	White Ind. Light	Panel 6B
BUS 2-3E U.V.		Relay 27X	White Ind. Light	BUS 2-3E ( )
BUS 2-4E U.V.		Relay 27X	White Ind. Light	BUS 2-4E ( )

PARAMETER	INST. NO	READOUT DESIGNATOR	LOCATION
Chlorine Monitor	AH-CIS-5484	Chl. Monitor - Air Intake Tunnel	281' Elev. of Serv. Bldg.
	AH-CIS-5188	Chl.Monitor-Control Room Supply Air	351' Elev. of Cont. Bldg.
ECCS Valves	NA	BS-V3A	MCC 2-11EA
		BS-V3B	MCC 2-21EA
		CF-V1A	MCC 2-11EB
		CF-V1B	MCC 2-21EB
		CF-V3A	MCC 2-32B
		CF-V3B	MCC 2-42B
Condensate Storage Tanks	CO-LI-072	CST 1A Level	Panel 5
	CO-LI-072	Local LI	At "A" CST
	Comp Pt. #93	CST 1A Level	Computer
	CO-LI-073	CST 1B Level	Panel 5
	CO-LI-073	Local LI	At "B" CST
	Comp Pt. #94	CST 1B Level	Computer
C.R. Air Temp.	AH-YMTR-5193	CR Air Temp.	Panel 25
BWST Temp.	DH-4TI	BWST Temp.	Panel 8
River Water Temp.	SR-TE1083	River Water Temp.	Comp Pt. #1031
	NR-TI2017	River Water Temp.	Riverwater Pump House
	NR-TI2018		
River Water Level	NA	NA	Unit 1 Screen House
Outside Air Temp.	AH-YMTR-1923	Air Temp.	Panel 10
Wind Speed & Direction	Recorder	W.S. W.D.	Panel 10
Control Rod Position	Absolute	API	Panel 14
	Relative	API	Panel 14
	Group Avg.	Gp. Avg. PI	Panel 4
Axial Power Imbalance	NI-5	Δ Flux NI-5	Panel 4
	NI-6	Δ Flux NI-6	
	NI-7	Δ Flux NI-7	
	NI-8	Δ Flux NI-8	
Core Flood Tank Level	CF-2 LI1	CFT "A1" Level	Panel 8
	CF-2 LI2	A2 Level	
	CF-2 LI3	B1 Level	
	CF-2 LI4	B2 Level	

PARAMETER	INST. NO	READOUT DESIGNATOR	LOCATION
Core Flood Tank Pressure	CF-PI1	A1 Press	Panel 8
	CF-PI2	A2 Press	
	CF-PI3	B1 Press	
	CF-PI4	B2 Press	
Pressurizer Level	RC-1 LT1	LT1 (RC-1LR)	Panel 4
	RC-1 LT2	LT2 (RC-1LR)	
	RC-1 LT3	LT3 (RC-1LR)	
OTSG Level (Operating Range)	SP-1A LT2	SP-1A LR	Panel 4
	SP-1A LT3	SP-1A LR	
	SP-1B LT2	SP-1B LR	
	SP-1B LT3	SP-1B LR	
RB Temp.	AH-YMTR-5017	Recorder Pt. 11 Recorder Pt. 12 Recorder Pt. 13 Recorder Pt. 14 Recorder Pt. 15 Recorder Pt. 16	Panel 25
Reactor Power	NI-5	Total Flux	RPS Cab A
	NI-6	Total Flux	RPS Cab B
	NI-7	Total Flux	RPS Cab C
	NI-8	Total Flux	RPS Cab D
Delta Flux	NI-5	Buffered Delta Flux	RPS Cab A
	NI-6	Buffered Delta Flux	RPS Cab B
	NI-7	Buffered Delta Flux	RPS Cab C
	NI-8	Buffered Delta Flux	RPS Cab D
RCS Flow	RC-14 DPT 1,2,3 & 4	Total Flow	RPS Cab A, B C & D
RCS Press	RC-3A PT1 & 2 RC-3B PT1 & 2	Pressure	RPS Cab A, B, C & D
RC Pumps		Pump/Flux Contact Monitor	RPS Cab A, B, C & D
Intermediate Range Power	NI-3 & 4	IR Flux	RPS Cab C & D
Intermediate Range Rate	NI-3 & 4	IR Rate	RPS Cab C & D
Source Range Flux	NI-1 & 2	SR Flux	RPS Cab A & B
Source Range Rate	NI-1 & 2	SR Rate	RPS Cab A & B
RB Sump Level	WDL-LI1316	RB Sump Level	Rad Waste Pnl. 301A

OTSG "A" Outlet Press	SP-6A-PT1	OTSG "A: Press	Panel 4
	SP-6A-PT2	OTSG "A" Press	Panel 4
OTSB "B" Outlet Press	SP-6B-PT1	OTSG "B" Press	Panel 4
	SP-6B-PT2	OTSB "B" Press	Panel 4
Radiation Monitoring System	HP-R-215	Fuel Handling Bride Area	Panel 12
	HP-R-221B P	Fuel Handling Bldg Exh.	Panel 12
	HP-R-221B G	Duct-Downstream of Filter	
	HP-R-227 P and G	R.B. Air Sample Line	Panel 12
	HP-R-229 P and G	R.B. Hydrogen Purge Duct	Panel 12
	HP-R-225 P, I and G	R.B. Purge Exhaust Duct "A"	Panel 12
	HP-R-226 P, I and G	R.B. Purge Exhaust Duct "B"	Panel 12
	HP-R-219 P, I and G	Station Vent Monitor	Panel 12

5.0 ATTACHMENTS

5.1 Enclosures:

1. Miscellaneous Surveillance Items.
2. Rod Position Instrumentation.
3. RPS Instrumentation Channel Checks.
4. RMS Instrumentation Channel Checks.
5. Event Related Surveillance Requirements.

5.2 Appendix: (Event Related Data Sheets).

A. OTSG Press/Temp Limitations.
B. Flood Protection.
C. Asymmetric Rod Monitor Inoperable.
D. Regulating Rod Insertion Limits/Sequence.
E. Axial Power Imbalance Monitor Inoperable.
F. NSRW Source to Aux FW Pumps.
G. Quadrant Power Tilt Monitor Inoperable.
H. Boron Reduction in RCS.

5.3 Figures:

1. Control Rod Position Index vs Power Level.
2. Axial Power Imbalance Envelope.

6.0 PROCEDURE:

Data Sheets in this procedure are separated into ENCLOSURES and APPENDICES:

a. "Enclosure" data sheets are to be completed each shift as specified by MODE applicability identified on each individual data sheet.

b. "Appendix" data sheets are EVENT RELATED and shall only be completed whenever an EVENT-RELATED-SURVEILLANCE-REQUIREMENT exists per Enclosure 5 (Event Related Surveillance Requirements).

c. Enclosure 5 - Event Related Surveillance Requirements - shall be used to determine if an EVENT-RELATED condition exists by reviewing unit conditions as described under "EVENT DESCRIPTION" column. Parameter data is NOT to be logged on this data sheet. However all parameters shall be monitored throughout shift and nc entries made on this sheet until the end of the shift or until the event has occured.

Surveillance requirements are listed with the appropriate items on data sheet attachments to this procedure. Follow up each item NOT meeting requirements per applicable TECH SPEC ACTION Number.

6.1 Record appropriate data per Enclosure 1, MISCELLANEOUS SURVEILLANCE ITEMS, per MODE applicability identified on each data sheet. Follow up per applicable Tech Spec ACTION Number if required data is not within acceptance criteria.

6.2 Record control rod positions per Enclosure 2, ROD POSITION INSTRUMENTATION, and refer to Figure 1, as necessary, to ensure that required rod positions are satisfied. Follow up per applicable Tech Spec ACTION Number if required data is not within acceptance criteria.

6.3 Record appropriate data per Enclosure 3, RPS INSTRUMENTATION CHANNEL CHECKS, and determine channel OPERABILITY by comparison of the channel indication and/or status derived from independent instrument channels measuring the same parameter (i.e. Tech Spec definition of CHANNEL CHECK). Follow up per applicable Tech Spec ACTION Number if any channel is determined INOPERABLE.

6.4 Record appropriate data per Enclosure 4, RMS INSTRUMENTATION CHANNEL CHECKS, and determine channel OPERABILITY by satisfactory performance of a CHANNEL CHECK. Follow up per applicable Tech Spec ACTION Number if any channel is determined INOPERABLE.

6.5 Complete Enclosure 5, EVENT RELATED SURVEILLANCE REQUIREMENTS, each shift, by reviewing Unit status in relation to ~~the "EVENT~~ DESCRIPTION" column of the data sheet and determine if an event requiring further surveillance exists:

a. If an event, as listed, does not exist, no followup action is required.

b. If an event, as listed, does exist, follow up per noted Tech Spec ACTION statement and/or appropriate Surveillance Procedure.

c. Log time and conditions of existing events requiring further surveillance in the Control Room Operators Log.

d. Notify Shift Supervisor/Foreman upon determination of an event related requirement.

e. Each subsequent shift shall document the initiation/continuation of all EVENT-RELATED surveillance activities in the Control Room Operators Log at the beginning of each shift.

NOTE: Event related surveillance requirements are to be implemented upon each event occurrance. Enclosure 5 should be referred to a[s] often as necessary each shift to ensure that proper Tech Spec surveillance is being maintained.

7.0 ACCEPTANCE CRITERIA

7.1 Readings are acceptable if within normal expected range for various plant conditions.

7.2 Appropriate Tech Spec ACTION paragraphs are implemented for items not meeting surveillance requirements.

7.3 Entries are made in the Control Room Operators Log of all implemented Event Releated surveillance requirements and all out-of-spec items identifying subsequent followup action.

7.4 All data sheets are completed, as applicable, by the data taken and approved by the Shift Supervisor/Foreman each shift.

7.5 Log entries are recorded within the time limits specified in section 3, Limits and Precautions.

ENCLOSURE 1
SHIFT AND DAILY SURVEILLANCE CHECKS
MISCELLANEOUS SURVEILLANCE ITEMS

2301-S1
Revision 2
12/22/77

APPLICABLE MODES: 1,2,3,4,5,6 | PRESENT MODE | | | | DATE

TECH SPEC ACTION No.	DATA DESCRIPTION	ACTUAL 3	ACTUAL 1	ACTUAL 2	REQUIRED
3.3.3.4	100 Ft Wind Speed Recorder				Sufficient Paper & Ink (✓)
3.3.3.4	100 Ft Wind Direction Recorder (From Unit 1)				
3.3.3.4	33-150 Ft Air Temp Delta T Recorder				
3.1.2.8 3.1.3.9 3.5.4	BWST Temp				>40°F
3.7.6.1	River Water Level				<301 Ft.

SURVEILLANCE CHECKS ARE AS REQUIRED? (YES/NO) | | | | YES-No Followup NO-Followup per T

	3	Time	1	Time	2	Time
Performed by:						
Approved by:						

ENCLOSURE 1
SHIFT AND DAILY SURVEILLANCE CHECKS
MISCELLANEOUS SURVEILLANCE ITEMS

APPLICABLE MODES: 1, 2, 3, 4 Sh 1 of 2 PRESENT MODE DATE

TECH SPEC ACTION NO.	DATA DESCRIPTION	ACTUAL 3	1	2	REQUIRED
3.3.3.6	Chlorine Det - Air Intake Tunnel, Conc.				In Green or Yellow Band
3.3.3.6	Chlorine Det - Control Room Supply, Conc.				In Green or Yellow Band
3.4.5	OTSG (A) Startup Level (In.)				OTSG water level is less than 390 i on the full range, less than 99% on the operating ranc and greater than 18 inches on the Startup Range.
3.4.5	OTSG (B) Startup Level (In.)				
3.4.5	OTSG Level (A) Full Range (In.)				
3.4.5	OTSG Level (B) Full Range (In.)				
3.4.5	OTSG Level (A) LT-3 Oper. Range (%)				
3.4.5	OTSG Level (B) LT-3 Oper. Range (%)				
3.4.5	OTSG Level (B) LT-2 Oper. Range (%)				
3.4.5	OTSG Level (A) LT-2 Oper. Range (%)				
3.6.1.4	RB Press WR (Red)				RB Internal Pressure is between -2 and +3 PSIG
3.6.1.4	RB Press NR (Green)				
3.6.1.4	RB Press WR (Red)				
3.6.1.4	RB Press NR (Green)				
3.6.1.5	RB Average Air Temp.				The arithmetical average RB air temperature shall not exceed 130°F.
3.6.1.5	Location a. EL 353-1 AMB Rec. Pt. 11 Panel 25				
3.6.1.5	Location b. EL 353-2 AMB Rec. Pt. 12 Panel 25				
3.6.1.5	Location c. EL 330-1 AMB Rec. Pt. 13 anel 25				
3.6.1.5	Location d. EL 330-2 AMB Rec. Pt. 14 Panel 25				
3.6.1.5	Location e. EL 310-1 AMB Rec. Pt. 15 Panel 25				
3.6.1.5	Location f. EL 310-2 AMP Rec. Pt. 16 Panel 25				
3.6.1.5	AVERAGE = $\frac{a+b+c+d+e+f}{6}$ =				

SURVEILLANCE CHECKS ARE AS REQUIRED? (YES/NO) YES-NO FOLLOW UP NO-FOLLOW UP PER

	3	Time	1	Time	2	Time
Performed By:						
Approved By:						

APPLICABLE MODES: 1,2,3,4 Sh 2of2 PRESENT MODE ___ DATE ___

TECH SPEC ACTION NO.	DATA DESCRIPTION		ACTUAL 3	ACTUAL 1	ACTUAL 2	REQUIRED
3.7.5.1	River Water Level					>271 ft.
3.7.5.1	River Water Temp					≤90°F
3.7.7.1	Control Room Air Temp					<100°F
3.5.2 3.5.3	DHR "A" Pump Suct. Vlv (DHV-102A)	OPEN				Valve and breakers are positioned as indicated (✓). NOTE: In Mode 4, only one ECCS Subsystem is required
3.5.2 3.5.3	Valve DHV-102A Breaker (MCC2-11EA)	OPEN				
3.5.2 3.5.3	DHR "B" Pump Suct. Vlv (DHV-102B)	OPEN				
3.5.2 3.5.3	Valve DHV-102B Breaker (MCC2-21EA)	OPEN				
3.5.2 3.5.3	BWST to S.F. Valve (DHV-157)	CLOSED				
3.5.2 3.5.3	Valve DHV-157 Breaker (MCC2-32B)	OPEN				
3.4.6.2	RB Sump Level					Within Operational Leakage Limits of T.S. 3.4.6.2
3.4.6.2	RB Sump Level Change Since Last Shift					
3.4.6.2	*No. of RB Sump Pump Starts Since Last Reading					
3.4.6.2	RB Sump Discharge. (Gals) GAls = (28 ft^3 x 7.48 gal/ft^3 x #Sump Pump Starts)					
	*No. of RB Sump Pump Starts since last reading. If computer is O.O.S, Place Control Switches for R.B. Sump Pumps in OFF. Monitor R.B. Sump Level every 4 hrs.(Log level in CRO Log every time reading is taken) If level gets to 4ft,start a R.B. Sump Pump and reduce level by 16". (Record starts and use formula as if R.B. Sump Pumps started in AUTO) - in AUTO sump level varies by 16" - (16"=209 gal.)					
3.6.1.7	Accumulated RB Purge time while in Modes 1-4					≤ 90 hrs. in proceeding 365 day
3.6.5	AH-E-52A in operation (MCC-2-35) Yes/No					At least one Reactor vessel skirt fan shall be in operation
3.6.5	AH-E-52B in operation (MCC-2-47) Yes/No					
	*Ref. Computer Alarm Printout (pts. 2726 and 2727)					
SURVEILLANCE CHECKS ARE AS REQUIRED? (Yes/NO)						YES NO FOLLOWUP NO-FOLLOWUP PER

PERFORMED BY:	3	TIME	1	TIME	2	TIME	
APPROVED BY:							

APPLICABLE MODES: 1.2.3	PRESENT MODE				DATE
TECH SPEC ACTION NO.	DATA DESCRIPTION	ACTUAL 3	ACTUAL 1	ACTUAL 2	REQUIRED
3.4.4	Pressurizer Level LT-1				PZR Level is between 45 and 385 in.
3.4.4	Pressurizer Level LT-2				
3.4.4	Pressurizer Level LT-3				
3.5.1	Core Flood Tank "A" Level LT-1A1				CF Tank Level is between 12.55' and 13.45'
3.5.1	Core Flood Tank "B" Level LT-1B1				
3.5.1	Core Flood Tank "A" Level LT-2A2				
3.5.1	Core Flood Tank "B" Level LT-2B2				
3.5.1	Core Flood Tank "A" Pressure PT-1A1				CF Tank Nitrogen Pressure is between 575 and 625 (PSIG)
3.5.1	Core Flood Tank "B" Pressure PT -1B1				
3.5.1	Core Flood Tank "A" Pressure PT - 1A2				
3.5.1	Core Flood Tank "B" Pressure PT-2B2				
3.5.1	CF Tk "A" Isol Vlv (CF-V1A) OPEN				Valves are Positioned as indicated (✓). NOTE: Required when RCS Pressure is >750 PSIG
3.5.1	CF Tk "B" Isol Vlv (CF-V1B) OPEN				
3.7.1.3	Condensate STorage Tank Level:				Combined Level ≥27.5 ft required whenever CSTS are source to the Aux FW Pumps
3.7.1.3	LT A Console Level Indicator				
3.7.1.3	LT A Local Level Indicator				
3.7.1.3	LT B Console Level Indicator				
3.7.1.3	LT B Local Level Indicator				
3.3.2.1	4KV Emerg Bus 2-1E Under Voltage				White Ind. Light (27xA/27xB)Lit
3.3.2.1	4KV Emerg Bus 2-2E Under Voltage				
3.3.2.1	4KV Emerg Bus 2-3E Under Voltage				White Ind. Light (27x) Lit
3.3.2.1	4KV Emerg Bus 2-4E Under Voltage				
SURVEILLANCE CHECKS ARE AS REQUIRED? (YES/NO)					YES-NO FOLLOWUP NO-FOLLOWUP PER TS
Performed By:		3 TIME	1 TIME	2 TIME	
Approved By:					

ENCLSOURE 1
SHIFT AND DAILY SURVEILLANCE CHECKS
MISCELLANEOUS SURVEILLANCE ITEMS

03/09/78
2301-S1
Revision 4

APPLICABLE MODES: 1,2,3 //// PRESENT MODE | | | | DATE

TECH SPEC ACTION NO.	DATA DESCRIPTION	ACTUAL 3	1	2	REQUIRED
3.3.2.1	RCS Press Chan 1. (ES Cab No. 124)				Channel check satisfactory by comparison of Readings. log indicated value.
3.3.2.1	RCS Press Chan. 2 (ES Cab No. 125)				
3.3.2.1	RCS Press Chan. 3 (ES Cab No. 126)				
3.3.2.1	RB Press (BS-PS-3261) Instrument Rack 467				Each Channel Reading is to be compared with other channels indicating the same parameter and any deviations evaluated for malfunction of instrument or sensors. In general, deviations >10% warrent further investigation and/or corrective action.
3.3.2.1	RB Press (BS-PS-3989) Instrument Rack 467				
3.3.2.1	RB Press (BS-PS-3987) Instrument Rack 472				
3.3.2.1	RB Press (BS-PS-3259) Instrument Rack 472				
3.3.2.1	RB Press (BS-PS-3260) Instrument Rack 455				
3.3.2.1	RB Press (BS-PS-3988) Instrument Rack 455				
SURVEILLANCE CHECKS ARE AS REQUIRED? (YES/NO)					YES-NO FOLLOWUP NO-FOLLOWUP PER T
Performed By:	3		1		2 TIME
Approved By:					

ENCLOSURE 1
SHIFT AND DAILY SURVEILLANCE CHECKS
MISCELLANEOUS SURVEILLANCE ITEMS

2301-S1
Revision 15
03/14/79

APPLICABLE MODES: 1 | //// | PRESENT MODE

TECH SPEC ACTION NO.	DATA DESCRIPTION	ACTUAL 1	ACTUAL 2	ACTUAL 3	REQUIRED
3.2.5	DNB PARAMETERS:				RCP's OPERATING 4 | 3 | 2
3.2.5	RC Pressure NR Loop "A" (PSIG)				≥ 2062 PSIG | ≥ 2058 PSIG | ≥ 2092 PSIG
3.2.5	RC Pressure NR Loop "B" (PSIG)				
3.2.5	RC Pressure WR Loop "A" (PSIG)				
3.2.5	RC Outlet Temp (^{o}F) Loop "A" TT1				≤ 609^{o}F | ≤ 609^{o}F | ≤ 609^{o}F
3.2.5	RC Outlet Temp (^{o}F) Loop "A" TT4				
3.2.5	RC Outlet Temp (^{o}F) Loop "B" - TT1				
3.2.5	RC Outlet Temp (^{o}F) Loop "B" - TT4				
3.2.5	RCS Total Flow (%) (100% = 144.1E6 #/HR) See Appendix I				See Appendix I ≥ 95% | ≥ 70.1% | ≥ 43.1%
____	Number of RC Pumps Operating				Rev. for above TS 3.2.5 Req 'Mt.
3.2.1 *	Axial Pwr Imb Within Limits?				Per Compt Gp. 55 YES/NO
	NI Calibration				
3.3.1.1	Perform Heat Balance Calibration				Rx ≥ 15% F.P.
	per 2302-S1				
	NOTE: Attach completed Data Sheet(s) for NI				
	calibration.				
	* Required when > 20% RTP				
SURVEILLANCE CHECKS ARE AS REQUIRED? (YES/NO)					YES-NO FOLLOWUP NO-FOLLOWUP PER T

	3	TIME 1	TIME 2	TIME
Performed By:				
Approved By:				

ENCLOSURE 1
SHIFT AND DAILY SURVEILLANCE CHECKS
MISCELLANEOUS SURVEILLANCE ITEMS

APPLICABLE MODES: //// PRESENT MODE					
TECH SPEC ACTION NO.	DATA DESCRIPTION	ACTUAL 3	ACTUAL 1	ACTUAL 2	REQUIRED
Applicable Modes: 3,4, 5 //// Present Mode					Complete 2311-F3 sd margin must be ≥ 1% Δ k/k
Tech Spec. Action Nb.		ACTUAL 3	ACTUAL 1	ACTUAL 2	
3.1.1.1	Determine SD Margin to be ≥ 1% Δk/k per S.P. 2311-F3	////		////	
SURVEILLANCE CHECKS ARE AS REQUIRED? (YES/NO)					YES-NO FOLLOWUP NO-FOLLOWUP PER
Performed By:		3 TIME	1 TIME	2 TIME	
Approved By:			14.1		

ENCLOSURE 2

SHIFT AND DAILY SURVEILLANCE CHECKS

2301-S1 11/09/78
Revision 12

APPLICABLE MODES: 1,2 //// PRESENT MODE - [3] [1] [2] DATE

Gp-Rd		1-1	1-2	1-3	1-4	2-1	2-2	2-3	2-4	2-5	2-6	2-7	2-8	3-1	3-2	3-3	3-4	3-5	3-6	3-
3	API																			
	RPI																			
1	API																			
	RPI																			
2	API																			
	RPI																			

Gp-Rd		3-8	4-1	4-2	4-3	4-4	4-5	4-6	4-7	4-8	5-1	5-2	5-3	5-4	5-5	5-6	5-7	5-8	5-9	5-1
3	API																			
	RPI																			
1	API																			
	RPI																			
2	API																			
	RPI																			

Gp-Rd		5-1	5-12	6-1	6-2	6-3	6-4	6-5	6-6	6-7	6-8	6-9	6-10	6-11	6-12	7-1	7-2	7-3	7-4	7-5
3	API																			
	RPI																			
1	API																			
	RPI																			
2	API																			
	RPI																			

Gp-Rd		7-6	7-7	7-8	7-9	8-1	8-2	8-3	8-4	8-5	8-6	8-7	8-8
3	API												
	RPI												
1	API												
	RPI												
2	API												
	RPI												

//// Performed By: Approved By:

		TIME
3		
1		TIME
2		TIME

GROUP		1	2	3	4	5	6	7	8
PI AVG	3								
	1								
	2								

COMMENTS:

TECH SPEC ACTION NO.	TS REQUIREMENT: 'YES' answer - No Further Action Req'd. 'NO' answer - Followup per T.S. Action No.	YES/NO 3	1	2
3.1.1.1 **	S/D Margin ≥ 2 Δk/k (Reg Rods within limits of Fig. 1)? (Applicable when Keff ≥1.0)			
3.1.3.1	All Safety & Reg Rods agree within ± 6.5% of Gp AVG?			
3.1.3.2	All APSR AGREE within ± 6.5% of Group AVG?			
3.1.3.3	Each Rod API & RPI agrees within ± 6.5%			
3.1.3.6 *	All Safety Rods Fully Withdrawn?			
3.1.3.7 *	Reg Rod Groups Positioned Per Fig 1 with 25±5% Gp Overlap?			
	(** NOTE: Attach completed Data Sheet from Shutdown Calculations)			

*Keff ≥1.0

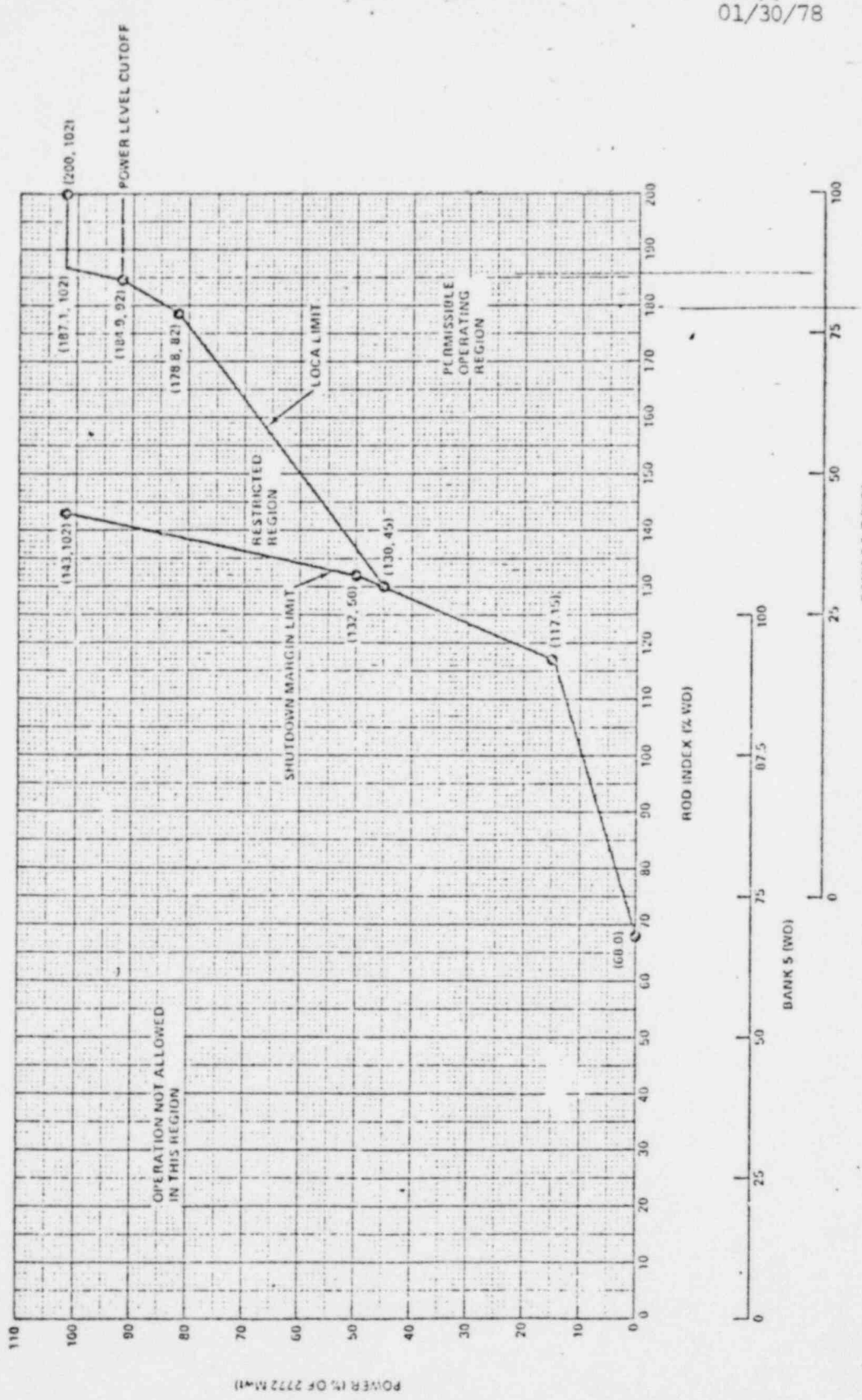


Figure 1a Regulating Rod Group Insertion Limits
(0–200 ± 10 EFPD's) 4 Pump Operation

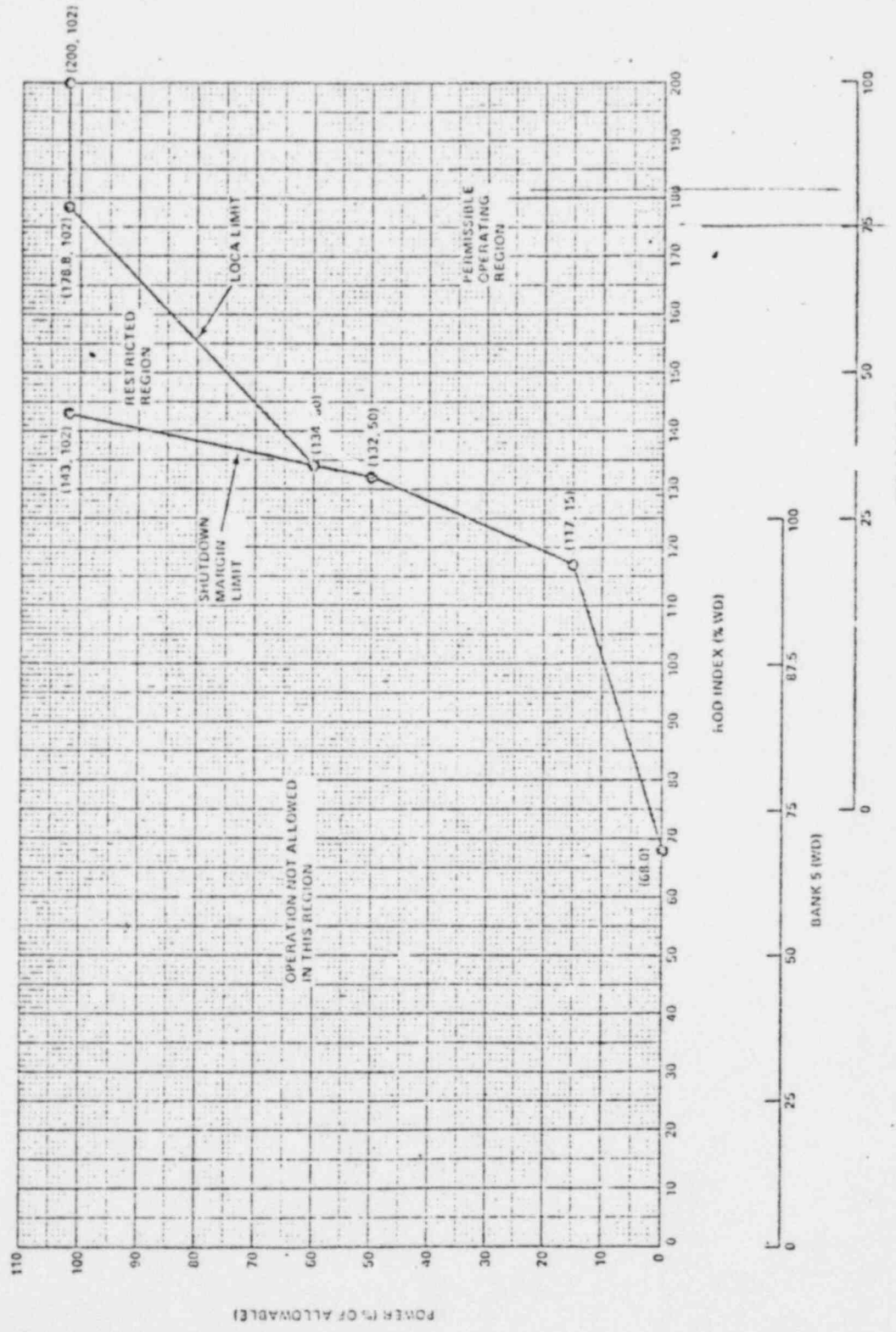


Figure 1-b Regulating Rod Group Insertion Limits
(0–200 ± 10 EFPD's) 3 Pump Operation

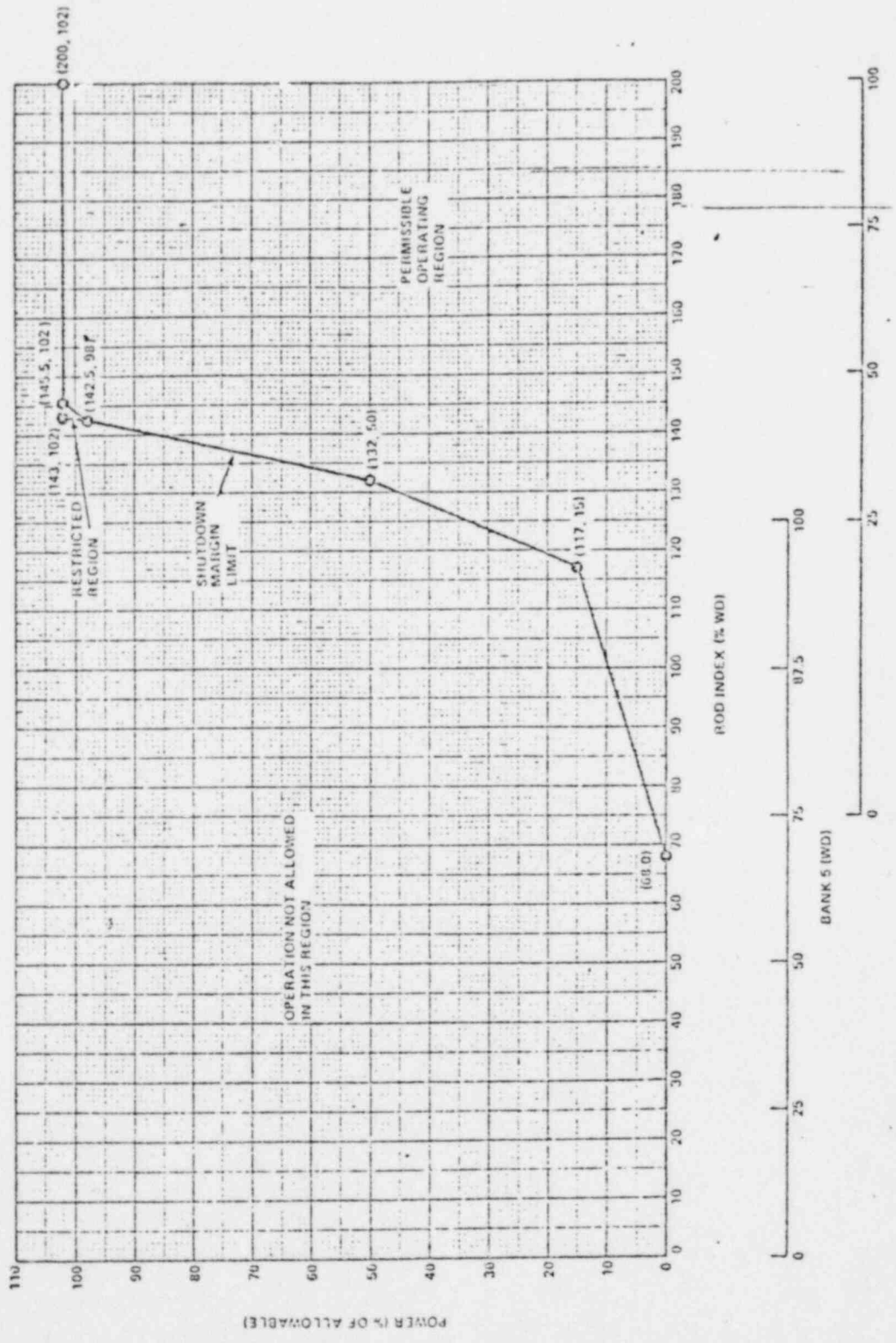


Figure 1c Regulating Rod Group Insertion Limits
(0–200 ± 10 EFPD's) 2 Pump Operation

ENCLOSURE 3

SHIFT AND DAILY SURVEILLANCE CHECKS
RPS INSTRUMENTATION CHANNEL CHECKS

APPLICABLE MODES: 1, 2 — PRESENT MODE: [3] [1] [2]

PARAMETER	RPS Cab.	A			B			C			D		
	Shift	3	1	2	3	1	2	3	1	2	3	1	2
TOTAL N Flux (% Power)													
Buffered Delta Flux (% Power)													
TOTAL RC Flow (Lbs/Hr x 10^6)													
RC Pressure (PSIG)													
Reactor Coolant Pressure/Temperature Comparitor	Temp (^oF)												
	Press (PSIG)												
RB Press-Local Ind. (Ref. Sect. 4.D)													
Pump/Flux Contact Monitor: (Circle the number corresponding to the bright lights)		1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4	1 2 3 4
Required whenever the CRD Bkrs are CLOSED	IR Flux (Amps)												
	IR Rate (DPM)												
MODES 3,4, & 5													
Shutdown Bypass (N - Normal) (B - Bypass)													
MODES 2,3,4, & 5													
Source Range Flux (CPS)													
Source Range Rate (DPM)													

COMMENTS: _____

TECH SPEC. ACTION NO.	TECH SPEC REQUIREMENT: 'YES' - No further action req'd. 'NO' - Followup per T.S. Action No.	3	1	2
3.3.1.1	RPS Channels OPERABLE* per CHANNEL CHECK (yes/no)			

*Each Channel Reading is to be compared with other channels indicating the same parameter and any deviations evaluated for malfunction of instrument or sensors. In general, deviations >10% warrant further investigation and/or corrective action.

DATE: _____

SHIFT:	- 3 -	TIME	- 1 -	TIME	- 2 -	TIME
Performed By:						
Approved By:						

Applicable Modes	Instrument	Source Check Sat 1st Shift	2nd Shift	3rd Shift	T/S Action	Comments
All	HP-R-219 (P) Stat. Vent				2.3.2(ETS) 3.3.3.1	
	HP-R-219 Stat. Vent (I)				3.4.6.1 3.4.6.2	
	HP-R-219 Stat. Vent (G)				3.4.6.1 3.4.6.2	
	HP-R-225 R.B. Purge (P)				3.4.6.1 3.4.6.2	
	HP-R-225 R.B. Purge (I)				3.4.6.1 3.4.6.2	
	HP-R-225 R.B. Purge (G)				3.4.6.1 3.4.6.2	
	HP-R-226 R.B. Purge (P)				3.4.6.1 3.4.6.2	
	HP-R-226 R.B. Purge (I)				3.4.6.1 3.4.6.2	
	HP-R-226 R.B. Purge (G)				3.4.6.1 3.4.6.2	
1,2,3,4	HP-R-227 RCS Leakage (P)				3.3.3.1 3.4.6.1	
	HP-R-227 RCS Leakage (G)					
Note (1)	HP-R-221B F.H. Bldg Vent (P)				3.3.3.1	
Note (2)	HP-R-215 Crit. Monit.					

The above radiation monitoring instrumentation is operable except as noted.

NOTE 1: Required whenever irradiated fuel is in spent fuel pool.

NOTE 2: Required whenever fuel is in S.F. Pool or in Fuel Handling Building.

	1st Shift	2nd Shfit	3rd Shift
PERFORMED BY:			
APPROVED BY:			
	Date Time	Date Time	Date Time

ENCLOSURE 5

EVENT RELATED SURVEILLANCE REQUIREMENTS Page 1 of 3

2301-S1
DATE Revision 8
~~06/12/78~~

MODE						EVENT DESCRIPTION	EVENT EXISTS? YES/NO			PERFORM S.P. No.	RELATED T.S. ACTION No.	SURVEILLANCE REQUIREMENT
6	5	4	3	2	1		3	1	2			
✓	✓	✓	✓	✓	✓	Boron Reduction in RCS				2301-S1 App H	3.1.1.2	RCS Flow ≥ 2800 GPM
✓	✓	✓	✓	✓	✓	Outside Air Temp < 40°F				2301-S1 Encl. 1	3.1.2.8 3.1.2.9 3.5.4	BWST Temp ≥ 40°F
✓	✓	✓	✓	✓	✓	OTSG Press >237 psig, T-Ave <200°F				2301-S1 App. A	3.7.2.1	OTSG Temp >110°F
✓	✓	✓	✓	✓	✓	River Water Level >301' MSL				2301-S1 App. B	3.7.6.1	Monitor Level ea. 2 hours
✓	✓	✓	✓	✓	✓	PZR Aux Spray in Operation				2311-7	3.4.9.2	Ck PZR/Spray ΔT <410°F ea. 2 hours
✓	✓	✓	✓	✓	✓	Irradiated fuel in Fuel Stg. Pool				2315-R4	3.9.11	Water ≥23' over fuel
✓	✓	✓	✓	✓	✓	Irradiated fuel in Fuel Stg Pool and (1) HEPA/CHARCOAL Housing Maint. or (2) following painting, fire or chemical release in the FH Bldg ventilation area				2303-R28	3.9.12	Verify cleanup performance
✓		✓	✓	✓	✓	RMS CHANNEL INOPERATIVE				--	3.3.3.1	Refer to T.S. 3.3.3.1 ACTION STATEMENTS
	✓	✓	✓	✓	✓	Inoperable Control Rod				2311-1	3.1.1.1.1	Verify S/D Margin within one hour & each 12 hrs per T.S. Req'mt 4.1.1.1.1
	✓	✓	✓	✓	✓	RPS Channel Inoperative				--	3.3.1.1	Refer to T.S. 3.3.1.1 ACTION STATEMENTS
	✓	✓	✓	✓	✓	Pri Spec Act. >1.0 μCi/gm Dose Equiv I-131 or 100/$\bar{E}$ μCi/gm				2304-3D2	3.4.8	Isotopic Anal for Iodine each 4 hours
		✓	✓	✓	✓	Establishing containment Integrity				2311-5	3.5.2	Visual Inspection of RB
		✓	✓	✓	✓	Person. Airlock entry Equip Hatch Airlock entry (Seals broken) yes/no				2311-5	3.6.1.1 3.6.1.3	Flow test door seal > 10 psig after each use, INSP.
		✓	✓	✓	✓	ESFAS Channel Inoperative				--	3.3.2.1.1	Refer to T.S. 3.3.2.1. ACTION Statements
		✓	✓	✓	✓	R. B. Isol Valve Maintenance Repair or Replacement				2303-M17	3.6.3.1.1	Check valve for cycling and closure time

MODE						EVENT DESCRIPTION	EVENT EXISTS ?			PERFORM S.P NO.	RELATED TS ACTION NO.	SURVEILLANCE REQUIREMENTS
6	5	4	3	2	1		3	2	1			
		✓	✓	✓	✓	Control Rm HEPA/CHARCOAL housing Maint., or after painting, fire or chemical release in vent area				2302-R25	3.7.7.1	Verify cleanup performance
		✓	✓	✓	✓	Sec. Sys. Gross Iodine Activity is ▶ 10% of Limit				2304-3D2	3.7.1.4	Do Primary Isotopic Analysis for I-131 DOSE EQUIV ea 31 d
			✓	✓	✓	NRSW Source to Aux FW Pumps				2301-S-1 App. F	3.7.1.3	Verify for one (10 NSRW Sys. OPERABLE each 8 hours
			✓	✓	✓	CSTS Source to Aux FW Pumps				2301-S1 Encl. 1	3.7.1.3	Verify level > ft ea 8 hrs.
			✓	✓	✓	Following a thermal power change exceeding 15% of the RTP within a 1hr period.				2304-3D2	3.4.8	Do Primary Isotopic analysis for Iodine between 2 & 6 Hrs.
			NOTE 2	✓	✓	CF TK VOL INC >1% of Capacity				2304-M1	3.5.1	Verify Boron Conc within 6 hours.
					✓	RCS T-AVE $\leq 535^{o}F$				2311-2	3.1.1.4	Verify T-ave $>525^{o}F$ as 1/2 hr
				✓	✓	RC Pump Combination Change				2311-6	3.4.1	Reset RPS Setpoint vs. RC Pump Comb within 4 hours
				✓	✓	CRD Maintenance/Modification				2303-R1	3.1.3.5	Verify CRD DROP time
				✓	✓	CRD Patch Panel Testing/Maint				2311-3	3.1.3.8	Verify CRD Programming
				✓	✓	RB HEPA/CHARCOAL housing maint., or after painting, fire or chemical release in ventilation area				2303-R15	3.6.4.3	H^2 Purge and Exhaust Performance evalulation
				✓	✓	Asym Rod Monitor INOPERATIVE				2301-S1 APP. C	3.1.3.1 3.1.3.2 3.1.3.3	Verify idnividual and group Rod Positions ea. 4 hours
				✓	✓	Reg Rod INSERT Limit alarm INOP				2301-S1 App. D	3.1.3.7	Verify reg groups within insert limits each 4 hours
				✓	✓	GRD Sequence Alarm INOP				2301-S1 App. D	3.1.3.7	Verify SEQ adn OVERLAP in limits each 4 hours.

MODE 6	5	4	3	2	1	EVENT DESCRIPTION	EVENT EXISTS? YES/NO 3	1	2	PERFORM S.P. No.	RELATED TS ACTION No.	SURVEILLANCE REQUIREMENT
				✓	✓	Asym. Rod Monitor Inoperative				2311-F2	3.1.3.1 (C.2.C)	Determine Power Distribution with 72 hours
				✓	✓	At RTP Equil. Boron Conc of 300 PPM				2311-F4	3.1.1.3	Determine Mod. Temp. Coeff Within 7 days
				✓	✓	Init. OP>5% RTP after fuel load				2311-F4	3.1.1.3	Determine Mod Temp Coeff.
					Note 4	Axial Pwr IMB Moniotr INOP				2301-S1 App. E	3.2.1	Calc Axial Pwr IMB ea 1 hr.
					Note 3	Quad Pwr Tilt Monitor INOP				2301-S1 App. G	3.2.4	Calc Quad Pwr Tilt ea. 1 hr.
					✓	Inc Therm Pwr > Pwr Level Cutoff				2311-4	3.1.3.9	Determine Xenon Reactivity Equilibrium
					Note 5	Initial OPER > 75% RTP After each Fuel Loading				2311-2	3.2.2 3.2.3	Determine Nuclear Heat Flux-Hot Channel Factor
					✓	Incore Det. Sys. Used for Surv. Axial Pwr IMB or Quad Pwr Tilt				2302-R4	3.3.3.2	Calib Incore Detector Chan within 7 days prior to use.
					✓	After Ea. 31 EFPD accumulated				2311-F1	3.1.1.1	Reactivity Anomally Check

MODES: 1,2,3,4,5,6 (As Indicated) PRESENT MODE

	-3-	TIME	-1-	TIME	-2-	TIME
PERFORMED BY:						
APPROVED BY:						

DATE:
COMMENTS:

NOTES:

1. With Keff ≥ 1.0
2. RC Press >800 PSIG.
3. When >15% of RTP
4. Wher >40% of RTP
5. When >20% but <75% of RTP

APPENDIX A
OTSG PRESSURE/TEMPERATURE LIMITATION

SURVEILLANCE REQUIREMENT: Data in this appendix is required at least once per hour when OTSG secondary pressure is >237 psig and T-ave is <200°F

PARAMETER \ TIME																								
OTSG A TT1, °F																								
OTSG A TT2, °F																								
OTSG B TT1, °F																								
OTSG B TT2, °F																								
OTSG A PT1, PSIG																								
OTSG A PT2, PSIG																								
OTSG B PT1, PSIG																								
OTSG B PT2, PSIG																								
RC Tave, °F																								

REQUIRED TECH SPEC ACTION:

Implement T.S. ACTION Paragraph 3.7.2.1 if OTSG Temperature ≤110°F whenever OTSG Pressure >237 PSIG.

COMMENTS: _____

_____

MODES 1, 2, 3, 4, 5, 6

	PERFORMED BY:	APPROVED BY:
3		
1		
2		

DATE: _____

APPENDIX B

FLOOD PROTECTION

SURVEILLANCE REQUIREMENT:

Data in this appendix is required at least once per two (2) hours when River Water level is $\geq$ 301 feet Mean Sea Level.

TIME	RIVER WATER LEVEL (ft)	PERFORMED BY:	APPROVED BY:

MODE 1, 2, 3, 4, 5, 6 DATE: _____

TECH SPEC REQUIREMENT:

See T.S. ACTION No. 3.7.6.1 if the River Water level exceeds 302 ft MSL.

APPENDIX C

ASYM ROD MONITOR INOP

SURVEILLANCE REQUIREMENT:

Data in this appendix is required at least once per four (4) hours if the ASYM Rod Monitor is INOPERATIVE.

TIME:												
Gp-Rd:	API	RPI	API	RPI	API	RPI	API	RPI	API	RPI	API	RPI
1-1												
1-2												
1-3												
1-4												
2-1												
2-2												
2-3												
2-4												
2-5												
2-6												
2-7												
2-8												
3-1												
3-2												
3-3												
3-4												
3-5												
3-6												
3-7												
3-8												
4-1												
4-2												
4-3												
4-4												
4-5												
4-6												
4-7												
4-8												
5-1												
5-2												
5-3												
5-4												
5-5												
5-6												
5-7												
5-8												
5-9												
5-10												
5-11												
5-12												
6-1												

TIME Gp-Rd	API	RPI	API	RPI	API	RPI	API	RPI	API	RPI	API	RPI
6-2												
6-3												
6-4												
6-5												
6-6												
6-7												
6-8												
6-9												
6-10												
6-11												
6-12												
7-1												
7-2												
7-3												
7-4												
7-5												
7-6												
7-7												
7-8												
7-9												
8-1												
8-2												
8-3												
8-4												
8-5												
8-6												
8-7												
8-8												

TIME Gp.	AVG	AVG	AVG	AVG	AVG	AVG
1						
2						
3						
4						
5						
6						
7						
8						

COMMENTS: _____

DATE: _____

MODES 1 and 2

TECH SPEC ACTION No.	T.S. REQUIREMENT	TIME	YES/NO					
3.1.3.1	All Control Rods ±6.5% of Gp?							
3.1.3.2	All APSR ±6.5% of Gp?							
3.1.3.3	All Rods API ±4% of RPI ?							
"YES"-No Further Action "NO"-Followup per T.S. Action No.	PERFORMED BY:							
	APPROVED BY:							

APPENDIX D

REGULATING RODS INSERTION LIMITS/SEQUENCE

SURVEILLANCE REQUIREMENT: Data in this appendix is required at least once per four (4) hours if:

☐ Reg. Rod Insertion Limit Alarm is INOPERABLE.

☐ CRD Sequence Alarm is INOPERABLE.
(Check applicable EVENT)

_____Date of EVENT.

_____Time of EVENT

DATE:							
TIME:							
Regulating Rod Group Positions: (% W/D)	5						
	6						
	7						
T.S. ACTION No.	TECH SPEC REQUIREMENT:						
3.1.3.7	Reg Rods within Limits of Figure 1? YES/NO						
3.1.3.7	25 ± 5% OVERLAP of Gp 5 and Gp 6/7? YES/NO						
"YES" ANSWER: No Further Action Required. "NO" ANSWER: Followup per T.S. ACTION No.							
MODES 1 and 2	PERFORMED BY:						
	APPROVED BY:						

COMMENTS: _____

APPENDIX E

AXIAL POWER IMBALANCE MONITOR INOP

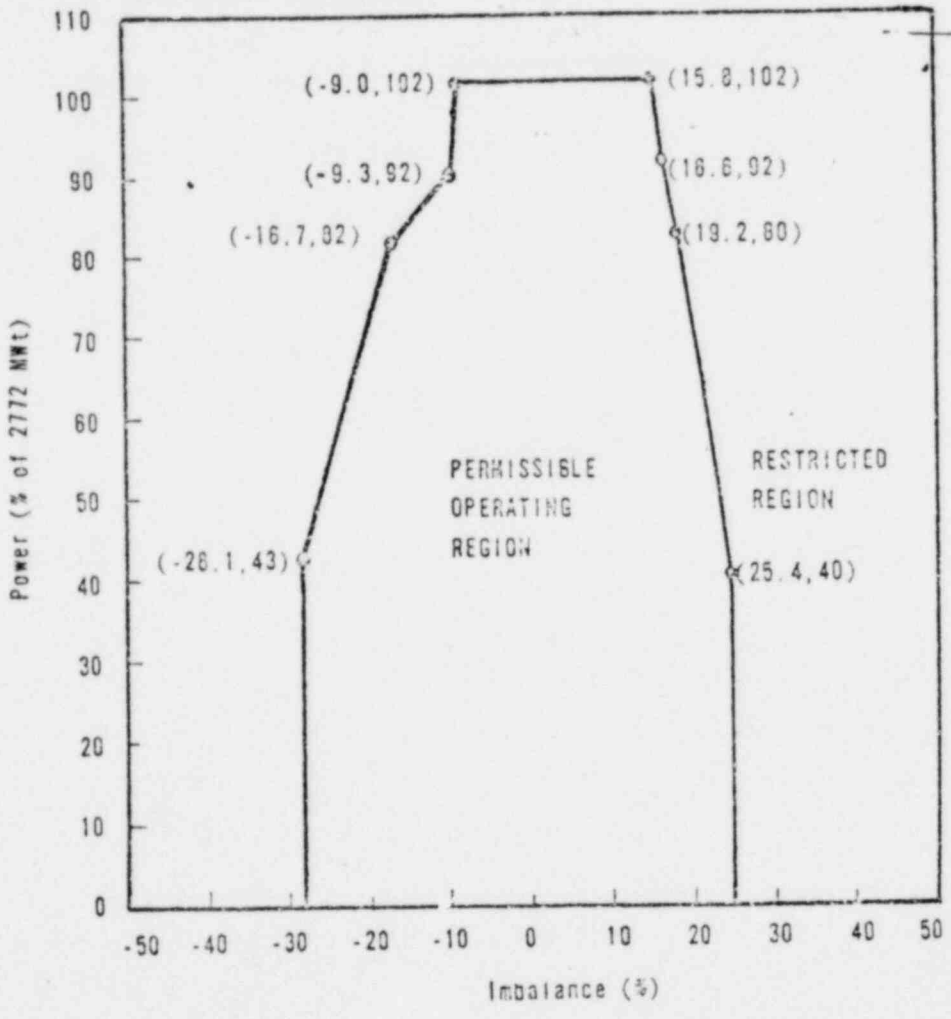
SURVEILLANCE REQUIREMENT: Data in this appendix is required at least once per hour if the Axial Power Imblance Monitor is INOPERABLE.

APPROVED BY: SHIFT -3- -1- -2- MODE: 1 (>40% RTP) DATE:

TECH SPEC ACTION No.	TECH SPEC REQUIREMENT: "YES" - No Further Action Required "NO" - Followup per T.S. ACTION No.
3.2.1	IS AXIAL POWER IMBALANCE WITHIN LIMITS OF FIGURE 2

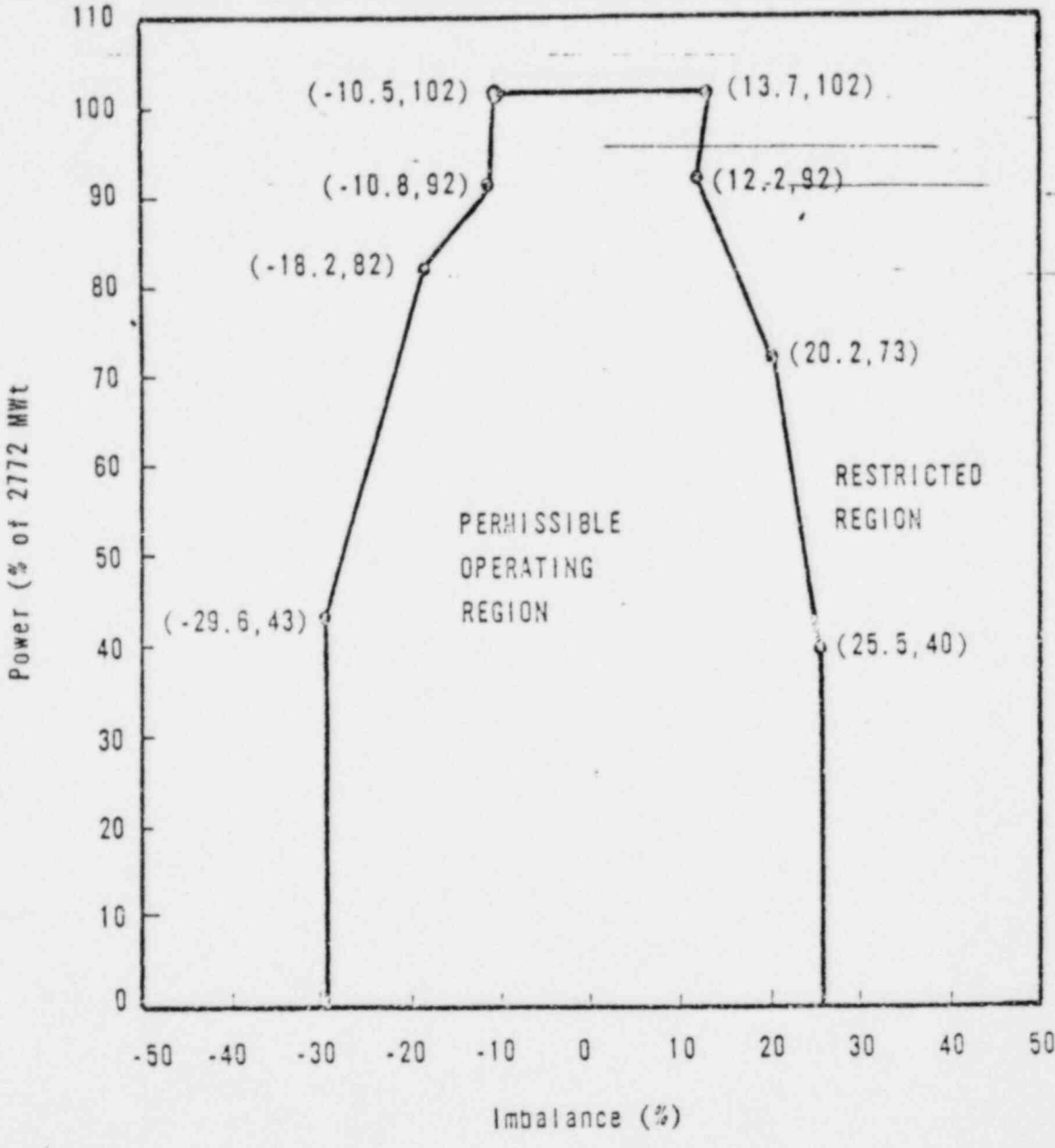
TIME	CONTROL CONSOLE INDICATORS								YES NO	PERFORMED BY:	TIME	CONTROL CONSOLE INDICATORS								YES NO	PERFORMED BY:
	NI-5		NI-6		NI-7		NI-8					NI-5		NI-6		NI-7		NI-8			
	Ø	IMB	Ø	IMB	Ø	IMB	Ø	IMB													

CALCULATION: (1) Determine average Power (Ø) = (NI-5 + NI-6 + NI-7 + NI-8) ÷ 4
(2) Using IMB reading and average Ø, refer to Figure 2 and verify that axial power imbalance is within allowable limits.
(3) Answer YES or NO in appropriate space.



CORE IMBALANCE VS POWER LEVEL
(0-200 ± 10 EFPD'S)

Figure 2



CORE IMBALANCE VS POWER LEVEL
(200-421 ± 10 EFPD'S)

Figure 2

APPENDIX F

NSRW SOURCE TO AUX FW PUMPS

SURVEILLANCE REQUIREMENT: Data in this appendix is required at least once per shift whenever the Nuclear Services River Water System is the supply source for the auxiliary feedwater pumps.

			(✓)					(✓)		
			3	1	2			3	1	2
1.a	IS NR Loop A Operating	YES				1.b	IS NR Loop B Operating	YES			
		NO						NO			
2.a	If YES - Verify that tne following valves are positioned as shown:					2.b	If YES - Verify that the following valves are positioned as shown:				
			INITIALS					INITIALS		
			3	1	2			3	1	2
	NR-V25A	OPEN					NR-V25B	OPEN			
	NR-V26A	OPEN					NR-V26B	OPEN			
	NR-V28A	CLOSED					NR-V28B	CLOSED			
	NR-V27A	CLOSED					NR-V27B	CLOSED			
3.a	Verify "A" Loop Operability by cycling NR-V27A OPEN then CLOSED		INITIALS			3.b	Verify "B" Loop Operability by cycling NR-V27B OPEN then CLOSED		INITIALS		
			3	1	2				3	1	2

TECH SPEC ACTION No.	TECH SPEC REQUIREMENT: "YES" - No Further Action Req'd. "NO" - Followup per T.S. ACTION No.	3	1	2
3.7.1.3	NR Loop "A" or "B" is OPERABLE YES/NO			
	TIME:			

MODES: 1, 2, 3

Date: _____

SHIFT:	-3-	-1-	-2-
APPROVED BY:			

APPENDIX G

QUADRANT POWER TILT MONITOR INOP

SURVEILLANCE REQUIREMENT: Data in this appendix is required at least once per eight (8) hours if the Quadrant Power Tilt Monitor is INOPERATIVE.

DATE: _____

TECH SPEC ACTION No.	T.S REQUIREMENT: "YES" - No Further Action Required. "NO" - Followup per T.S. ACTION No.
3.2.4	Quadrant Power Tilt is within limits of Table G.

		SHIFT	-3-	-1-	-2-	
		TIME				
1	Calculate Quadrant Power Tilt per 2103-1.11 (enter results and attach Data Sheets)					
2	Is Quadrant Power Tilt within limits per Table G? (YES/NO)					
3	PERFORMED BY:					
4	APPROVED BY:					

TABLE G

QUADRANT POWER TILT LIMITS

	STEADY STATE LIMIT	TRANSIENT LIMIT	MAXIMUM LIMIT
Measurement Independent QUADRANT POWER TILT	3.69	9.74	20.0
QUADRANT POWER TILT as Measured by:			
Symmetrical Incore Detector System	2.30	[illegible]	20.0
Power Range Channels	0.96	[illegible]	20.0
Minimum Incore Detector System	1.72	3.71	20.0

BORON REDUCTION IN RCS

SURVEILLANCE REQUIREMENT: Data in this appendix is required at least once per hour whenever a boron reduction in the RC System is being made.

Reduction in RCS boron concentration began _____ (TIME/DATE), completed _____ (TIME/DATE).

TECH SPEC ACTION No.	DESCRIPTION	ACTUAL												
3.1.1.2	TIME: (HOURLY ± 7 min)													
	≥2800 gpm (✓)													
	TIME: (HOURLY ± 7 min)													
	≥2800 gpm (✓)													

REQUIRED TECH SPEC ACTION

With RCS flow <2800 gpm, immediately suspend all operations involving a boron reduction of the RCS per Tech Spec ACTION No. 3.1.1.2

	- 3 -	- 1 -	- 2 -
PERFORMED BY:			
APPROVED BY:			

COMMENTS: _____

APPENDIX I

RCS TOTAL FLOW

1. Obtain a current reading of computer points 1715 and 1716 (Average RC Flow A and B, respectively).

   NOTE: If computer is unavailable obtain flow rate from RC Total Flow Recorder on Panel 4 and use as X below in formula.

2. Add computer point values 1715 and 1716.

   X = 1715 + 1716 (Average RC Flow A + Avg. RC Flow B)

   X = R.C. Total Flow

3. Determine value for specific volume of RCS from Table I, its notation is in formula.

4. Substitute values in formula below to determine RC flowrate in GPM.

   $$(X \frac{\text{lbs.}}{\text{hr.}}) \left(\frac{7.4805 \text{ gal/ft}^3}{60 \text{ min/hr}}\right) \left(\upsilon \frac{\text{ft}^3}{16}\right) = \text{RC Flow (GPM)}$$

5. RC Flow must be greater or equal to ($\geq$)

   382,655 GPM for 4 RC Pump Operation

   284,606 GPM for 3 RC Pump Operation

   185,542 GPM for 2 RC Pump Operation

   per Tech Spec 3.2.5

   NOTE: This includes 1.5% instrument error.

Table I: Specific Volume

PSIG / °F	2100	2110	2120	2130	2140	2150	2160	2170	2180
530	.02082	.02082	.02081	.02081	.02081	.02081	.02080	.02080	.0208
540	.02009	.02009	.02008	.02008	.02008	.02007	.02007	.02007	.0200
550	.02137	.02137	.02137	.02136	.02136	.02136	.02135	.02135	.0213
560	.02168	.02167	.02167	.02167	.02166	.02166	.02166	.02165	.0216
570	.02201	.02201	.02201	.02200	.02200	.02199	.02199	.02199	.0219
580	.02238	.02237	.02237	.02237	.02236	.02236	.02236	.02235	.0223
590	.02278	.02278	.02277	.02277	.02276	.02276	.02275	.02275	.0227
600	.02223	.02222	.02222	.02221	.02221	.02220	.02220	.02219	.0221
610	.02274	.02273	.02272	.02272	.02271	.02270	.02269	.02269	.0226

Keaten
6/7/79
1:20 pm

Attachment M.

POSSIBLE IMPROVEMENTS IN INSTRUMENTATION AND DIAGNOSTIC CAPABILITY

POSSIBLE ADDED INSTRUMENTATION

IN-CORE THERMOCOUPLES

ADDED THERMOCOUPLES ON REACTOR COOLANT SYSTEM COMPONENTS

ACTUAL VALVE POSITION INDICATORS ON CRITICAL VALVES

POSITION INDICATORS ON RELIEF AND SAFETY VALVES

FLOW INDICATION DOWNSTREAM OF RELIEF AND SAFETY VALVES

SATURATION PRESSURE MONITOR AND ALARM

REACTOR VESSEL AND STEAM GENERATOR (PRIMARY SIDE) LEVEL (TO BE EVALUATED)

ON LINE BORON MONITOR

RADIATION MONITORS FOR CONTAINMENT ISOLATION

HYDROGEN CONCENTRATION AT RECOMBINER INLET

POSSIBLE ADDITIONAL DIAGNOSTIC EQUIPMENT

EXPANDED RANGE READOUTS ON PRIMARY INSTRUMENTATION

PROTECTION OF INSTRUMENTATION AGAINST POTENTIAL ACCIDENT ENVIRONMENTS

EXPANDED RANGES ON AREA RADIATION MONITORS

REMOTE TV MONITORS FOR CRITICAL PLANT LOCATIONS

HIGH SPEED COMPUTER MONITORING AND RECORDING OF ALL SIGNIFICANT PLANT PARAMETERS

J. Herbein
7 June 1979

Attachment N

TRAINING

- Training audit
- Thermodynamics, heat transfer and core cooling demands
- Simulated failures didn't follow through to ultimate consequences
- On-shift training drills
- Procedure format

ORGANIZATION

(Not Previously Identified)

. Too much is expected of the Shift Supervisor - needs to be de-centralized.

. More technical capability available on shift is desirable.

. More direct coupling between the plant staff and the Service Company technical capabilities is desirable.

. Difficulty with transmitting information from shift to shift.

ORGANIZATION

(Previously Identified)

- Tendency toward a complex organization.

- Diversion of line management's energy to the maintenance of support functions, i.e., tremendous increase in "paperwork".

- Complexity of Admin. Controls.

HEALTH PHYSICS

- Training and Supervision
- Post Accident Administration
- Breathing Apparatus
- Dosimetry
- Organization Complexity

Koaten

1440 7 June 79

Attachment O

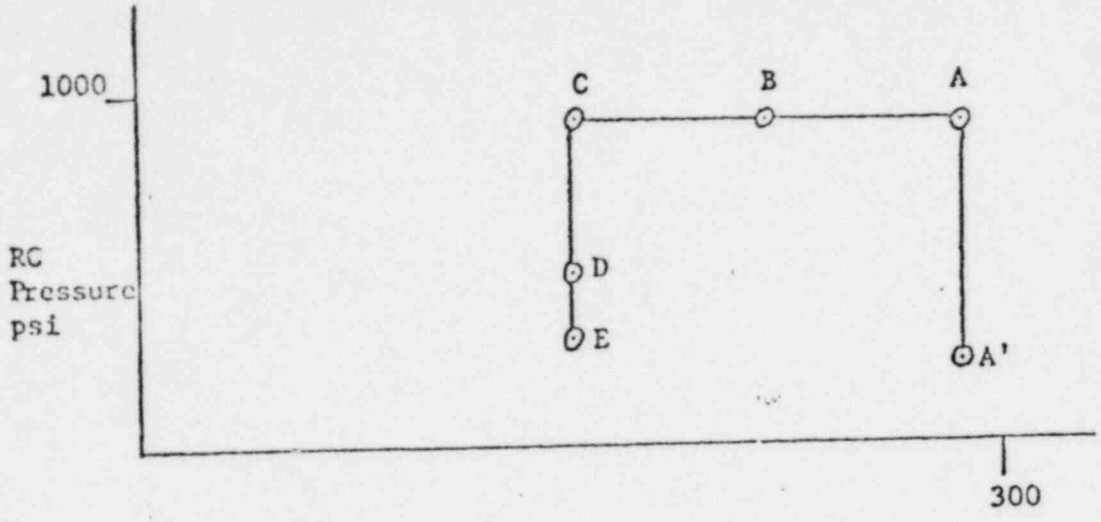
TRANSITION TO NATURAL CIRCULATION

BASE PLAN

TMI-2 RECOVERY

BASE CASE SUMMARY (REVISION 3)

0-1



1. Degas at A. Lower pressure (A⟶A') while degassing, then return to A. (Completed 4/12/79)

2. Reduce temperature (A⟶B) by steaming on "A" OTSG. (Completed 4/24/79)

3. At B, trip RC Pump and establish natural circulation. (Completed 4/27/79)

4. Continue temperature coastdown (B⟶C) on natural circulation; with "A" OTSG steaming.

5. Complete design/installation/testing of the following reactor plant systems.
   - Closed Cooling System, B Loop
   - P/V Control System
   - Decay Heat Removal System Enhancements (Testing in progress)
   - Backup S/G Level Instrumentation
   - Air Ejector Filter System (Complete)

6. Reduce RC pressure (C⟶D) to 500± 50 psig.

7. At D, identify and establish optimum PZR operational mode (Solid or Bubble) and identify optimum RC pressure.

8. Adjust (D⟶E) RC pressure as appropriate.

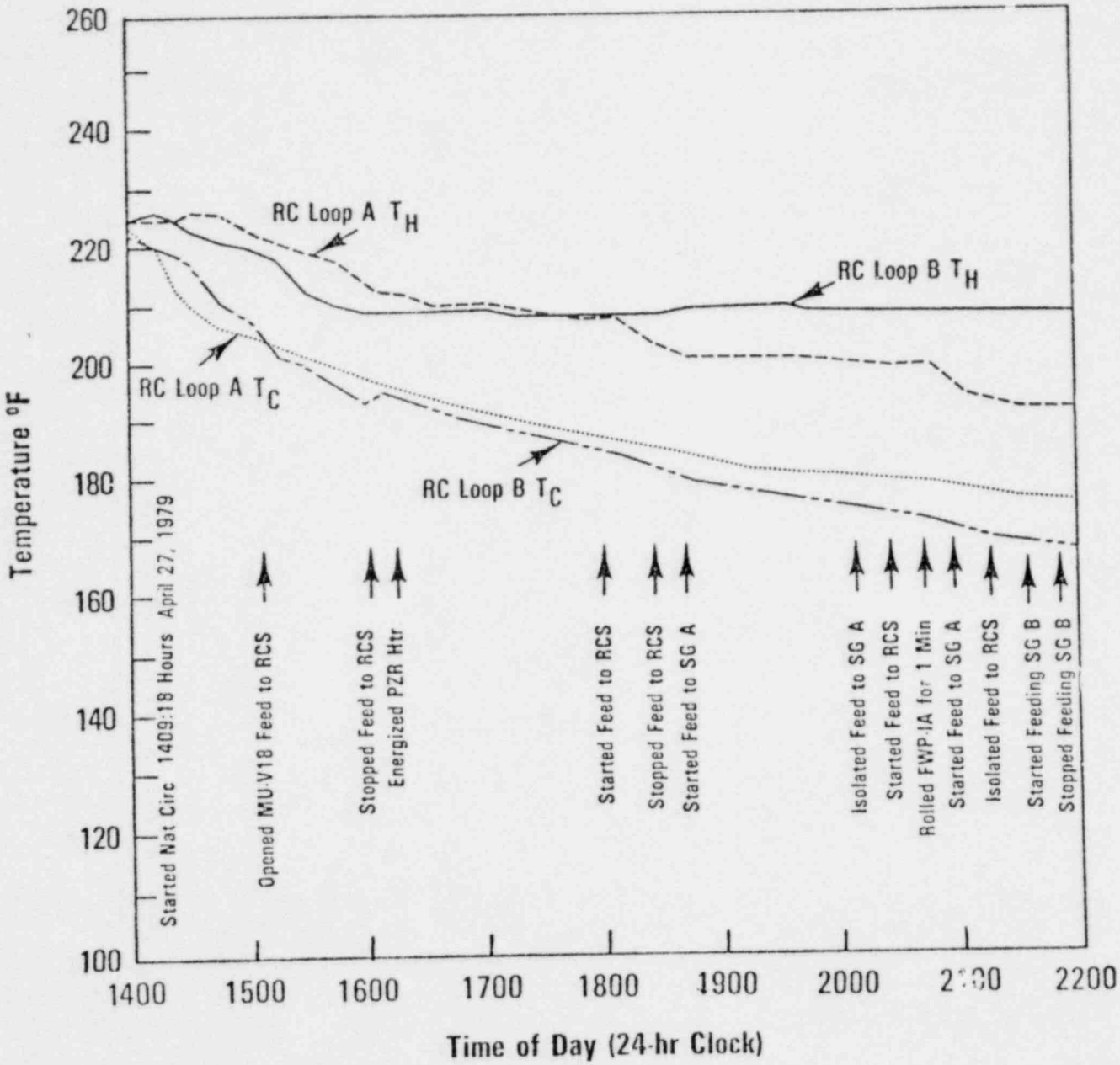
9. Operate new RC P/V control system when available.

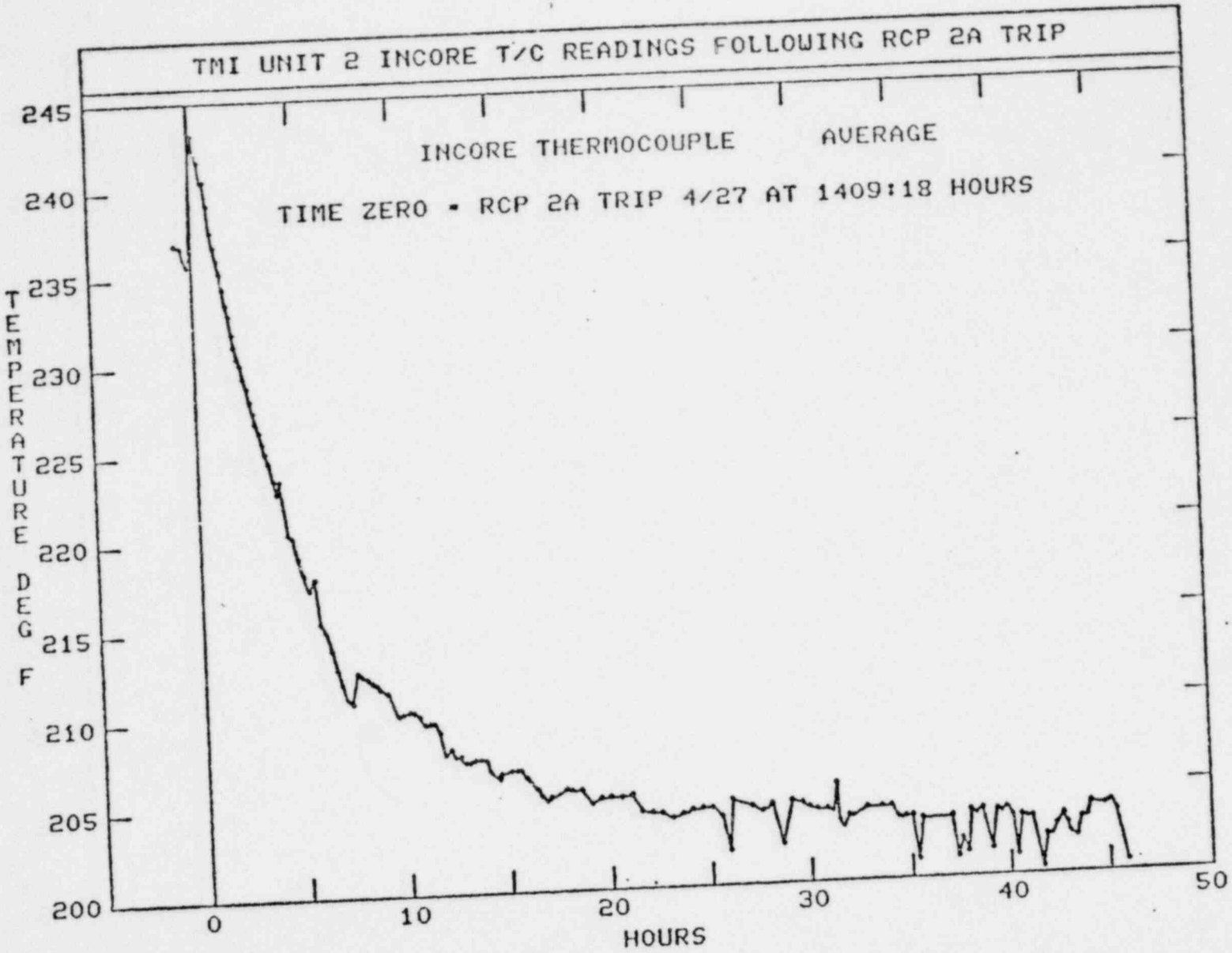
End Point - Primary: Natural Circulation, long term pressure/volume control
Secondary: Steaming on "A", B in standby for steaming or for solid secondary mode of operation.

Approved for Issue

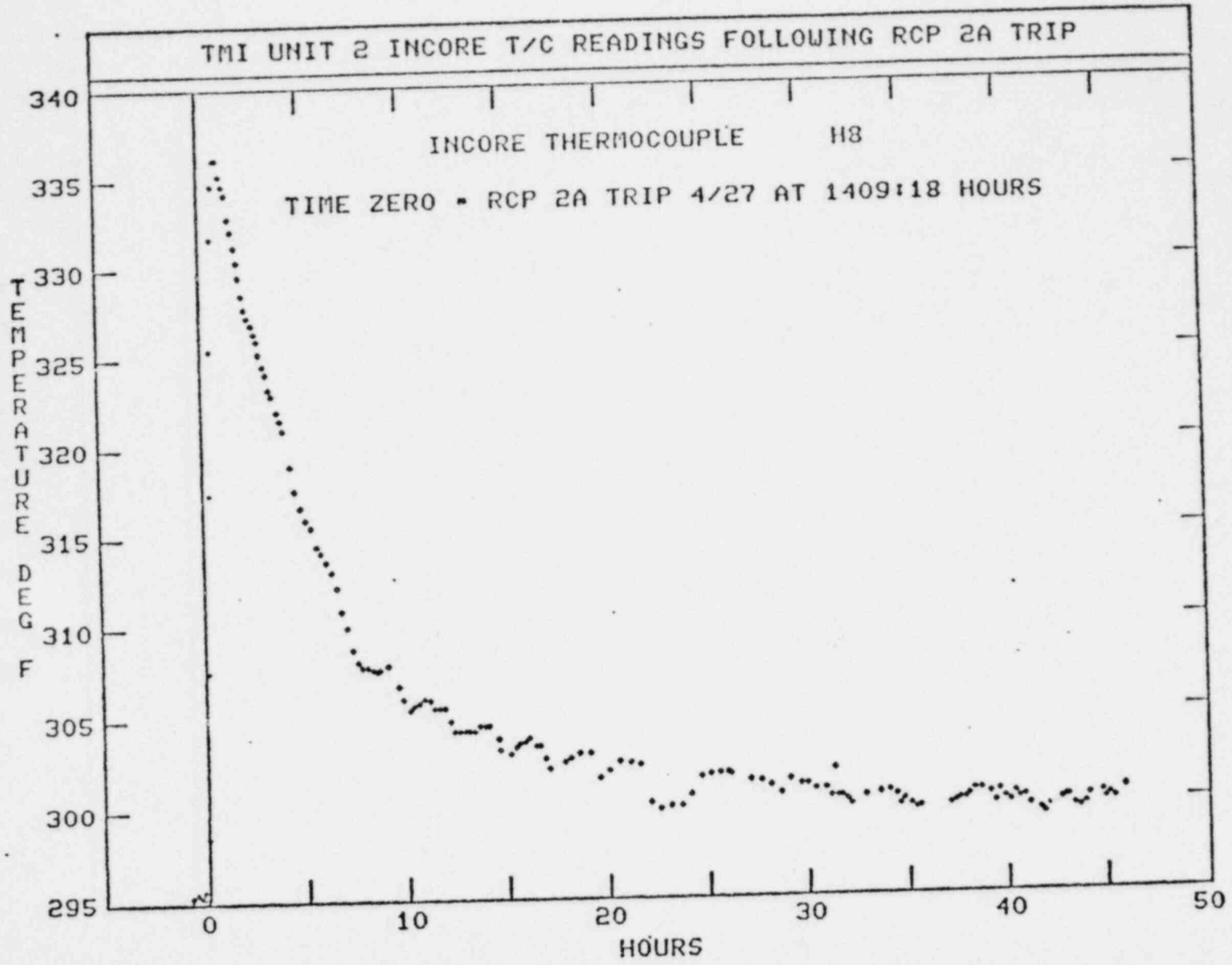
R. C. ARNOLD
General Operations Manager
GPU

Coolant Temperature vs Time during the Transition to Natural Circulation

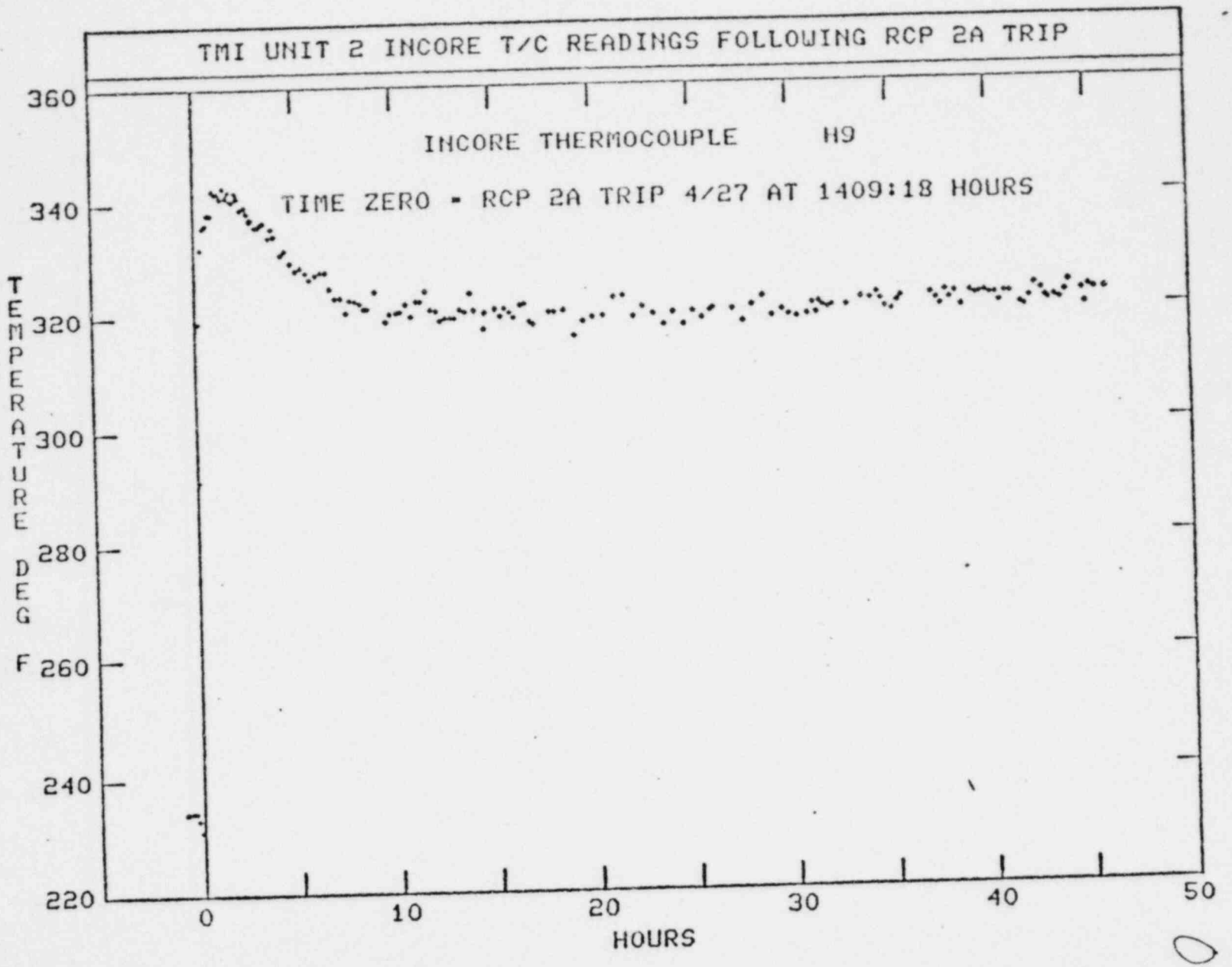



TMI UNIT 2 INCORE T/C READINGS FOLLOWING RCP 2A TRIP
INCORE THERMOCOUPLE AVERAGE
TIME ZERO - RCP 2A TRIP 4/27 AT 1409:18 HOURS
TEMPERATURE DEG F
245
240
235
230
225
220
215
210
205
200
0
10
20
30
40
50
HOURS

C-3


TMI UNIT 2 INCORE T/C READINGS FOLLOWING RCP 2A TRIP
INCORE THERMOCOUPLE H8
TIME ZERO = RCP 2A TRIP 4/27 AT 1409:18 HOURS
TEMPERATURE DEG F
340
335
330
325
320
315
310
305
300
295
0
10
20
30
40
50
HOURS

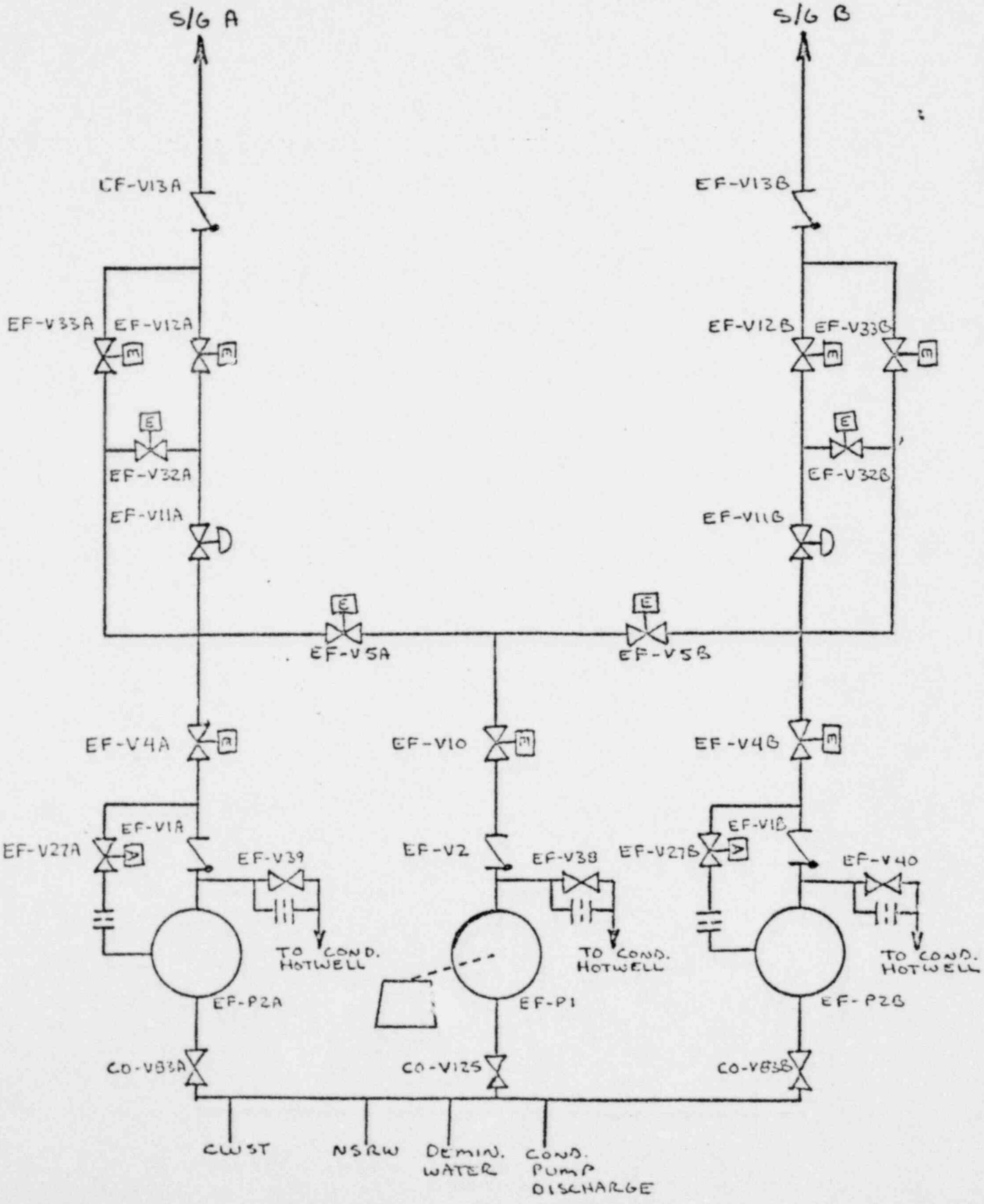
4-0


TMI UNIT 2 INCORE T/C READINGS FOLLOWING RCP 2A TRIP
INCORE THERMOCOUPLE H9
TIME ZERO - RCP 2A TRIP 4/27 AT 1409:18 HOURS
TEMPERATURE DEG F
360
340
320
300
280
260
240
220
0
10
20
30
40
50
HOURS

5-0

Attachment P

SIMPLIFIED TMI-2 EMERGANCY FEEDWATER SYSTEM



REACTIMETER PATCH

Attachment Q

Mux Channel	Patchboard Number	DELOG	Logged Variable	Pre Amp Gain	Logged Variable Range If Different Than DASEY Range	Sign-Off Initial)
1	14	-0125 +0125	NI-5 POWER RANGE	1	0/+10V 0/125 %	
2	28	+0520 +0620	T HOT LPA NR	1	-10/+10V 520/620 °F	
3	29	+0520 +0620	T HOT LP B NR	1	-10/+10V 520/620 °F	
4	31	+0050 +0650	T COLD LP A WR	1	-10/+10V 50/650 °F	
5	34	+0050 +0650	T COLD LP B WR	1	-10/+10V 50/650 °F	
6	45	+0000 +0090	RC FLOW LP A TEMP. COMP.	1	-10/+10V 0/90 MPPH	
7	22	-0400 +0000	PZR LVL TEMP. COMP.	1	+10/-10V 0/400 IN.	
8	96	+0000 +0100	MUT LVL	1	-10/+10V 0/100 IN	
9	19	-9999 +9999	PZR SPRAY VLV POS.	1	CLOSED - CC	
10	65	-0250 +0250	DRAIN TANK PRESS.	1	0/+10V 0/250 PSIG	
11	27	+0900 +2500	RC PRESS. LP B NR	1	0/+10V 1700/2500 PSIG	
12	1	-9999 +9999	REACTOR TRIP	1	TRIP - CC	
13	47	+0000 +0090	RC FLOW LP B TEMP. Cor	1	-10/+10V 0/90MPPH	
14	57	-0500 +0000	FEEDWATER TEMP.	1	+10/-10V 0/500 °F	
15	110	-0305 +1203	TURBINE HDR. PRESS. LP f	1	+2/+10 600/1200 PSIG	
16	49	+0000 +0100	OTSG A OP LVL TEMP. COMP.	1	-10/+10V 0/100 %	
17	50	+0000 +0250	OTSG A SU LVL	1	-10/+10V 0/250 IN.	
18	62	+0000 +6500	FEEDWATER FLOW LP A	1	-10/+10V 0/6500 KPPH	
19	63	+0000 +6500	FEEDWATER FLOW LP B	1	-10/+10V 0/6500 KPPH	
20	85	-9999 +9999	TURBINE TRIP	1	TRIP - CC	
21	112	-1833 +1222	OTSG A STM. PRESS.	1	+2/+10V 0/1200 FSI	
22	113	-1796 +1197	OTSG B STM. PRESS.	1	+2/+10V 0/1200 PSI	
23	51	+0000 +0100	OTSG B OP LVL TEMP. COMP.	1	-10/+10V 0/100 %	
24	52	+0000 +0250	OTSG B SU LVL	1	-10/+10V 0/250 IN.	

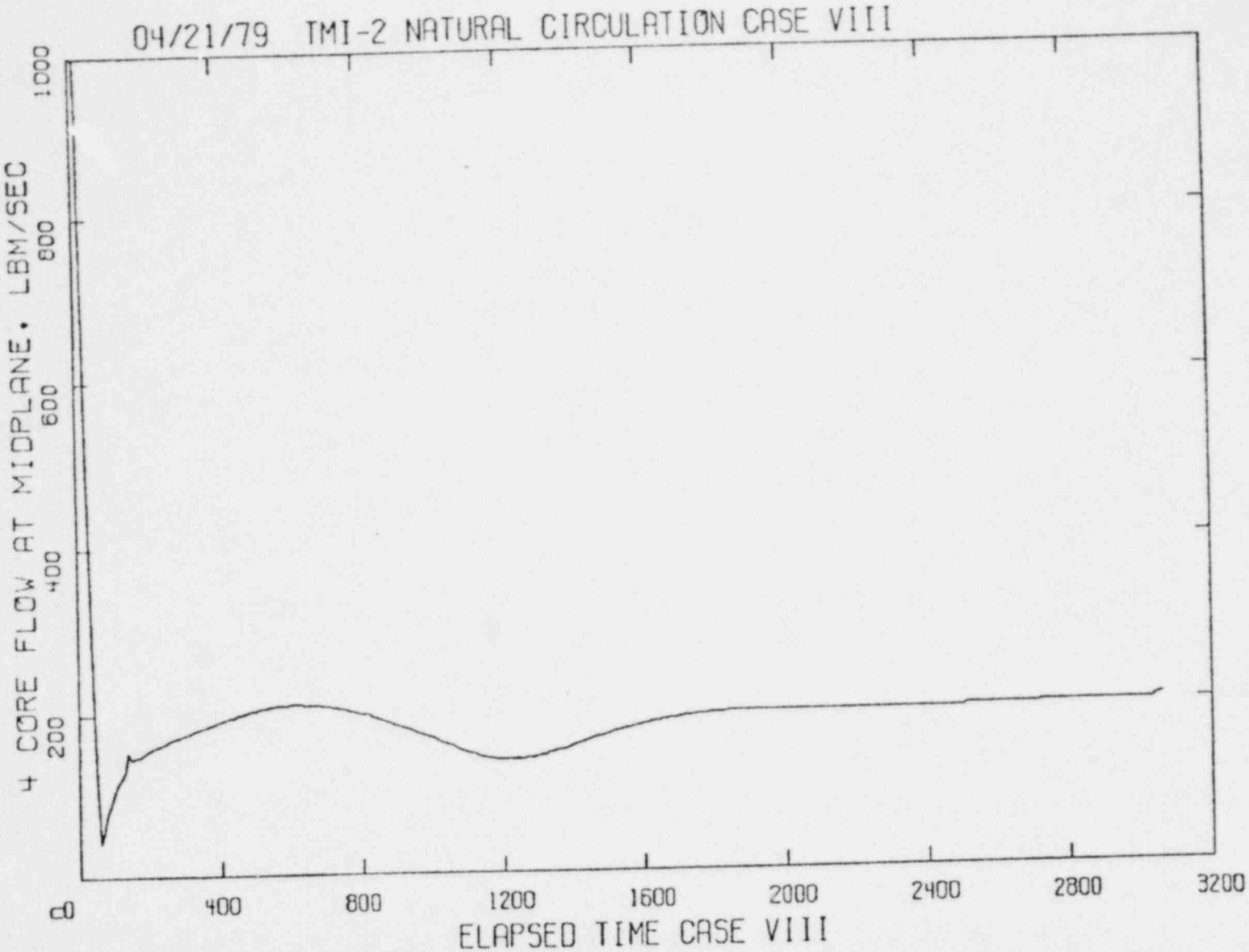
CONDITIONS FOR LOSS OF NATURAL CIRCULATION

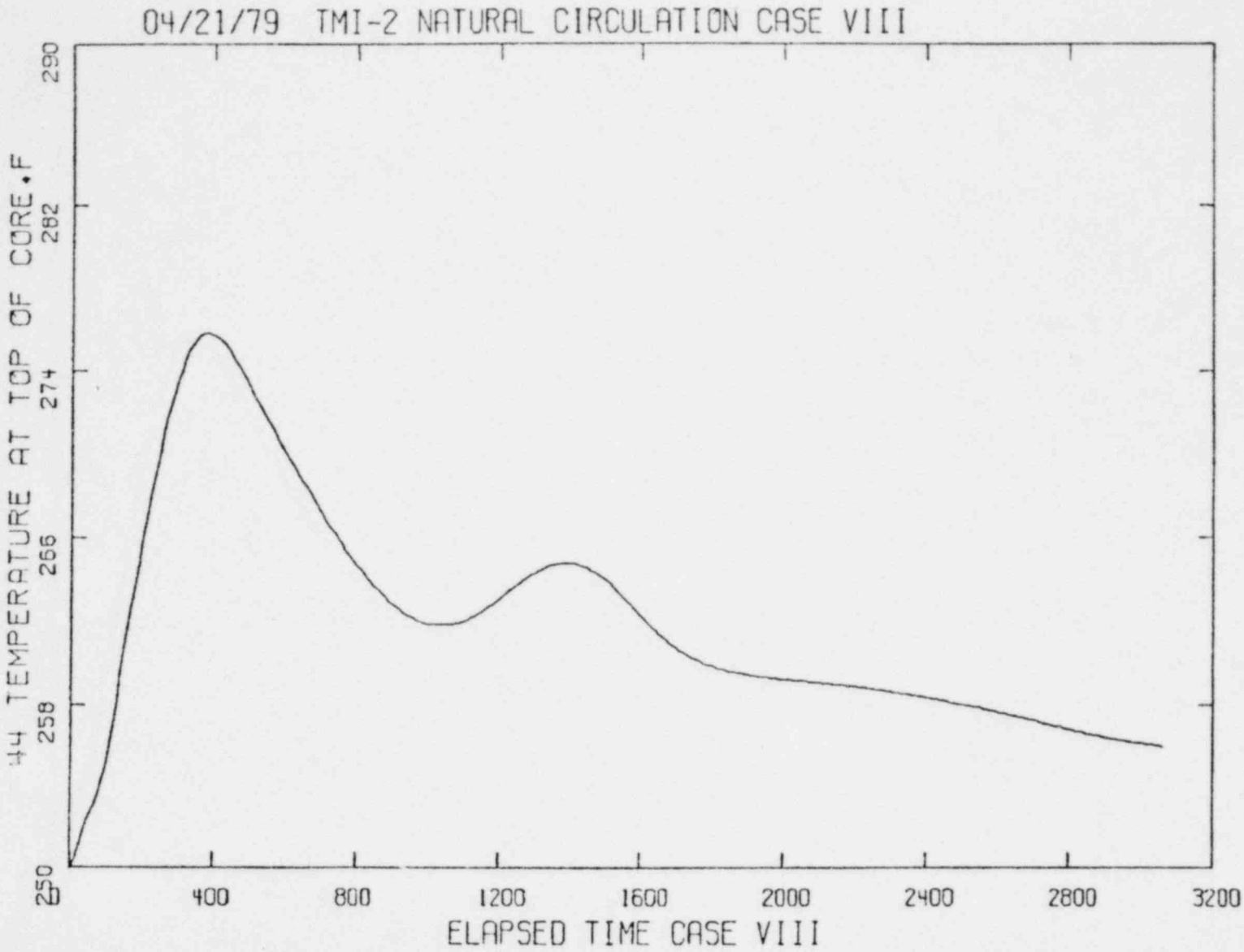
GAS AT HIGH POINT OF LOOPS

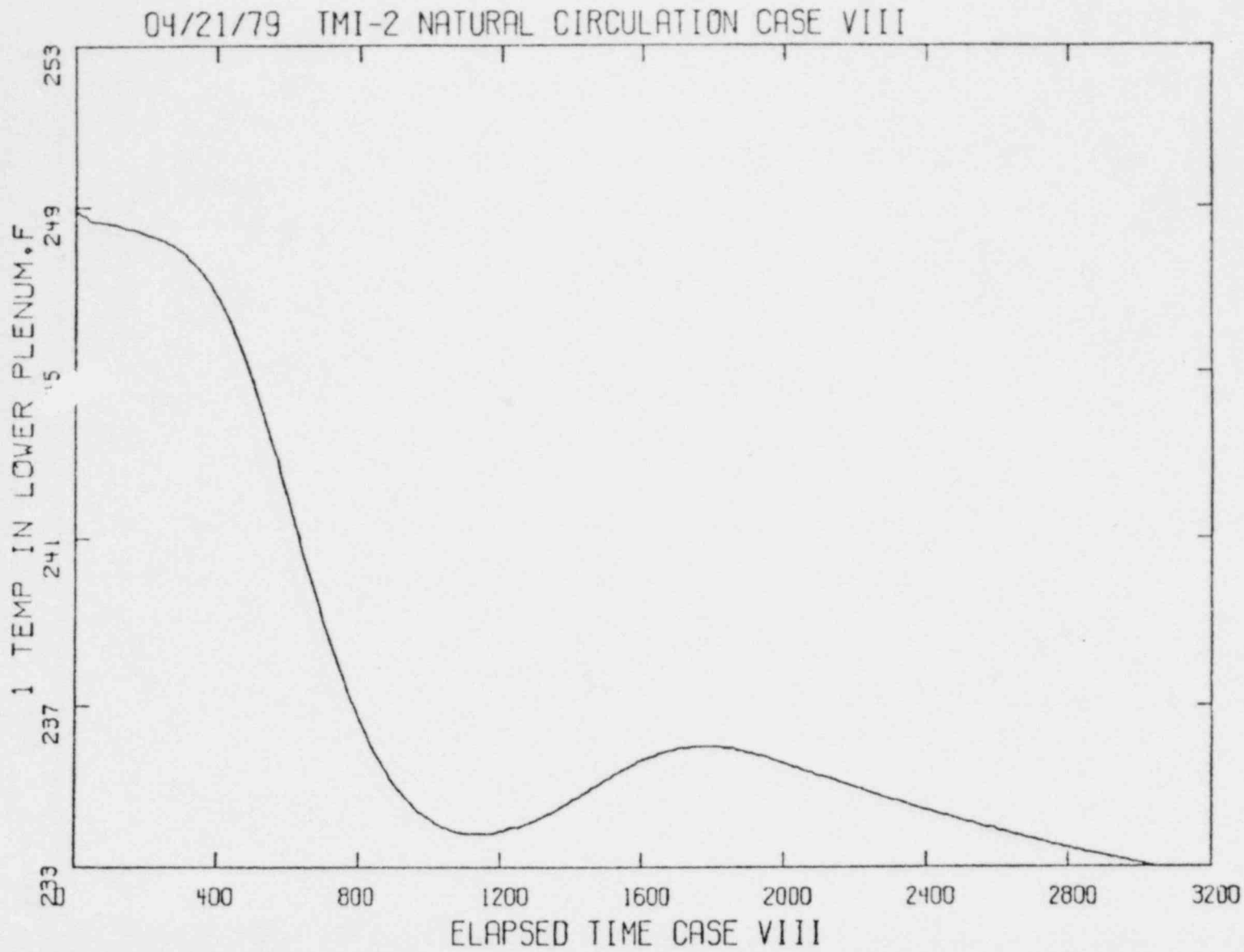
- NONCONDENSIBLE BUBBLE
- STEAM FORMATION AND COLLECTION

STEAM GENERATOR OPERATION

- TOO LOW WATER LEVEL IF STEAMING
- TOO LOW FLOW IF SOLID


04/21/79 TMI-2 NATURAL CIRCULATION CASE VIII
4 CORE FLOW AT MIDPLANE, LBM/SEC
0
200
400
600
800
1000
0
400
800
1200
1600
2000
2400
2800
3200
ELAPSED TIME CASE VIII


04/21/79 TMI-2 NATURAL CIRCULATION CASE VIII
44 TEMPERATURE AT TOP OF CORE,F
290
282
274
266
258
250
400
800
1200
1600
2000
2400
2800
3200
ELAPSED TIME CASE VIII


04/21/79 TMI-2 NATURAL CIRCULATION CASE VIII
1 TEMP IN LOWER PLENUM.F
253
249
245
241
237
233
400
800
1200
1600
2000
2400
2800
3200
ELAPSED TIME CASE VIII

STATUS AS OF 05-24-79

ADMINISTRATIVE PROCEDURES (STATION)

1001		DOCUMENT CONTROL	18	02-21-79
1002		"RULES FOR THE PROTECTION OF MEN WORKING ON ELECTRICAL AND MECHANICAL APPARATUS"	15	04-24-79
1003		RADIATION PROTECTION MANUAL	12	12-13-77
1004		EMERGENCY PLAN AND PROCEDURES VOLUME I	12	04-21-79
1004		VOLUME I TABLE OF CONTENTS	1	01-16-78
1004	SECT. 1	TMI EMERG PLAN (UNCONTROLLED)		
1004		SECTION II TABLE OF CONTENTS	2	02-15-78
1004	SECT. 2	TMI EMERG PLAN	1	01-16-78
1004	SECT. 3	LETTERS OF AGREEMENT	0	01-16-78
1004	SECT. 4	SITE DESCRIPTION-STATE SUPPLIED (UNCONTROLLED)		
1670.1		LOCAL EMERGENCY PROC.	6	02-13-78
1670.2		SITE EMERGENCY PROC.	9	11-22-78
1670.3		EMERG PLAN VOL 1 EMERG PROC - GEN EMERG PROC	6	02-13-78
1670.4		RADIOLOGICAL DOSE CALCULATIONS	4	11-22-78
1670.5		VOL I EMER PLANS & PROC - ON-SITE RADIO. MONITORING	0	01-16-78
1670.6		VOL I EMER PLANS & PROC - OFF-SITE RADIO. MONITORING	2	01-16-78
1670.7		VOL 1 EMERG PLANS + PROC EMERG ASSEMBLY. ACCOUNTABILITY AND EVACUATION	3	02-15-78
1670.8		EMERGENCY RE-ENTRY FOR REPAIR OR RESCUE	0	01-16-78
1670.9		VOL 1 EMERG PLANS + PROC EMERG TRNG + EMERG EXERCISE	6	02-03-79
1670.10		VOL I EMERG PLANS + PROC - THE MILTON S. HERSHEY MEDICAL CENTER EMERGENCY PROCEDURES FOR MEDICAL EMERGENCIES INVOLVING RADIATION OR RADIOACTIVE MAT.	0	01-16-78
1670.11		VOL I EMER PLANS + PROC - ON-SITE MEDICAL EMERGENCY (INJURED AND CONTAMINATED)	0	01-16-78
1670.12		VOL 1 EMERG. PLANS & PROC. EMERG. READINESS CHECKLIST	5	01-16-78
1670.13		RELEASE OF INFORMATION TO THE PUBLIC	1	06-23-77
1670.14		VOL I EMERG PLANS + PROC EMERG CONTACT LIST	8	11-22-78
1670.15		VOL I EMERG PLANS + PROC POST ACCIDENT RE-ENTRY AND RECOVERY PLAN	0	01-16-78
1004		EMERGENCY PLAN AND PROCEDURES VOLUME II	12	04-21-79
1004		VOLUME II TABLE OF CONTENTS	9	02-15-78
1004	SECT. 7	CHECKLIST	1	06-20-77
		1014	3	06-21-77
		1105-12	3	11-16-78
		2105-1.11	2	06-23-78
		ADDITIONAL INFORMATION (UNCONTROLLED)		
1004	SECT. 8	FIRE EMERGENCY PLAN	7	08-17-78
1004	SECT. 9	FLOOD EMERGENCY PLAN	2	01-10-78
1004	SECT. 10	EARTHQUAKE EMERGENCY PLAN	2	06-20-77
1004	SECT. 12	TORNADO EMERGENCY PLAN	1	06-20-77
1004	SECT. 13	TOXIC RELEASE	1	06-20-77
1004	SECT. 14	OIL SPILLS	0	02-15-78
1006		TMI RETRAINING PROGRAM	2	04-11-77
1007		CONTROL OF RECORDS	4	07-14-78
1008		GOOD HOUSEKEEPING	4	09-26-78
1009		STATION ORGANIZATION AND CHAIN OF COMMAND	3	10-28-77
1010		TECHNICAL SPECIFICATION SURVEILLANCE PROGRAM	13	01-09-79
1011		CONTROLLED KEY LOCKER CONTROL	16	05-01-78
1012		SHIFT RELIEF AND LOG ENTRIES	8	11-04-77
1013		BYPASS OF SAFETY FUNCTIONS AND JUMPER CONTROL	7	02-21-78

1014	CALL OF STANDBY PERSONNEL TO PLANT	3	06-21-77
1016	OPERATIONS SURVEILLANCE PROGRAM	12	07-22-77
1018	QUALITY CONTROL WAREHOUSING	2	04-11-75
1019	QUALIFICATION OF PERSONNEL PERFORMING SPECIAL PROCEDURES	2	12-22-75
1020	CLEANLINESS REQUIREMENTS	6	11-17-78
1021	PLANT MODIFICATIONS	4	03-26-79
1022	CONTROL OF MEASURING TEST EQUIPMENT	9	11-13-78
1023	TEST EQUIPMENT RECALL	4	11-02-77
1024	CONTROL OF TMI Q. C. RECORDS	1	12-16-77
1025	SPECIAL NUCLEAR MATERIAL ACCOUNTABILITY	7	11-22-78
1026	CORRECTIVE MAINTENANCE AND MACHINE HISTORY	9	05-17-79
1027	PREVENTIVE MAINTENANCE	6	11-29-78
1028	OPERATOR AT THE CONTROLS	0	05-05-77
1030	CONTROL OF ACCESS TO PRIMARY SYSTEM OPENINGS	2	11-07-78
1032	DISSEMATION OF INFORMATION	0	08-29-77
1033	OPERATING MEMO'S AND STANDING ORDERS	0	09-27-77
1034	CONTROL OF COMBUSTIBLE MATERIALS (UNIT 2 ONLY)	1	02-07-79
1035	CONTROL OF TRANSIENT COMBUSTIBLE MATERIALS	1	02-28-79
1036	INSTRUMENT OUT-OF-SERVICE CONTROL	1	08-23-78
1037	CONTROL OF CAUTION AND ONO TAGS	1	08-23-78
1038	ADMINISTRATIVE CONTROLS - FIRE PROT. PROG. PLAN	1	03-26-79
1041	ISI SYSTEMS LIST AND RETEST REQUIREMENTS	0	05-02-78
1042	UNIT II ISI SYSTEMS LIST AND RETEST REQ. UNIT 2 ONLY	0	05-04-78

CHEMISTRY PROCEDURES(STATION)

1800.2	SAMPLING SCHEDULE (UNIT 1)	4	11-29-76
1800.3	WATER CHEMISTRY MANUAL (UNIT 2 ONLY)	0	12-13-77
1800.4	CHEMISTRY INVENTORY	0	09-17-75
1810.1	NPDES PERMIT - CHEMISTRY REQUIREMENTS	1	06-28-78
1810.2	NPDES-OPERATIONS RESPONSIBILITY	2	06-23-78
1810.3	NPDES - PERMIT - REPORTING REQ.	0	11-12-75
1900	DETERMINATION OF PH	1	06-03-75
1901	DETERMINATION OF CONDUCTIVITY	1	06-08-77
1902	HARDNESS CALCIUM AND MAGNESIUM	2	10-30-78
1903	HARDNESS SHORT METHOD. TOTAL	1	06-23-75
1904	DETERMINATION OF AMMONIA	3	06-08-77
1905	DETERMINATION OF HYDRAZINE	3	06-08-77
1906	DETERMINATION OF SILICA	4	06-08-77
1907	CHLORIDES	1	06-08-77
1908	DETERMINATION OF CHLORIDES	3	01-19-76
1908.1	DETER. OF CHLORIDES IN WATER CONTAINING NALCO 41	0	11-13-78
1909	DETERMINATION OF FLUORIDES	3	01-19-76
1910	DISSOLVED OXYGEN	1	01-19-76
1910.1	DISSOLVED OXYGEN MODIFICATION FOR BORIC ACID	1	01-22-76
1911	DISSOLVED OXYGEN MODIFIED WINKLER METHOD	1	01-22-76
1912	DETERMINATION OF BORON (NORMAL USE)	3	05-31-77
1912.1	DETERMINATION OF HIGH BORIC ACID CONCENTRATIONS	1	01-22-76
1913	DETERMINATION OF BORON (LESS THAN 20 PPM)	1	01-28-76
1914	OIL & GREASE FREON EXTRACTION PROCEDURE	0	05-12-76
1915	DETERMINATION OF COPPER	1	03-02-76
1916	COPPER	4	11-07-78
1917	DETERMINATION OF IRON	2	03-02-76
1918	DETERMINATION OF IRON (AA)	2	03-02-76
1918.1	IRON CONCENTRATION TECHNIQUE FOR AA	2	06-23-76
1919	DETERMINATION OF DISSOLVED OXYGEN USING YSI DISSOLVED OXYGEN METER	0	01-04-77

1920	DETERMINATION OF SODIUM	3	06-23-76
1921	DETERMINATION OF SODIUM (AA)	2	02-07-79
1924	DETERMINATION OF LITHIUM (AA)	2	03-02-76
1925	DETERMINATION OF LEAD	1	03-02-76
1926	DETERMINATION OF DREWGARD - 100	1	03-02-76
1927	DETERMINATION OF FREE CHLORINE	1	06-08-77
1928	DETERMINATION OF TOTAL SOLIDS	1	06-25-76
1929	DETERMINATION OF SOLIDS, SUSPENDED & DISSOLVED	1	06-25-76
1930	DETERMINATION OF ALKALINITY	1	06-25-76
1931	DETERMINATION OF SETTLED VOLUME	0	01-28-77
1932	DETERMINATION OF SODIUM SULFITE	1	06-25-76
1933	LITHIUM FUSION	1	06-23-76
1934	DETERMINATION OF SODIUM THIOSULFATE	2	07-07-76
1935	DETERMINATION OF LANGLIER INDEX	1	07-07-76
1936	DETERMINATION OF SODIUM HYDROZIDE	2	07-07-76
1937	PHOSPHATE DETERMINATION (COLORIMETRIC)	1	06-25-76
1938	DETERMINATION OF CALCIUM	2	06-08-77
1939	DETERMINATION OF AMMONIA	2	07-07-76
1940	DETERMINATION OF FREE & TOTAL CHLORINE	2	07-07-76
1941	PROCEDURE FOR AGAR POUR PLATE COUNTS	1	07-07-76
1942	DETERMINATION OF MORPHOLINE	1	06-08-77
1943	DETERMINATION OF NALCO LIQUID	0	09-26-78
1950	DETERMINATION OF GROSS BETA GAMMA	3	02-03-79
1950.1	DETERMINATION OF GROSS ALPHA	1	11-10-76
1950.2	DETERMINATION OF MINIMUM DETECTABLE ACTIVITY	1	11-12-76
1950.3	DETERMINATION OF GROSS BETA GAMMA REACTOR COOLANT	1	11-03-76
1951	DETERMINATION OF TRITIUM	3	11-03-76
1952	DETERMINATION OF IODINE (RADIOCHEMICAL SEPARATION)	1	11-12-76
1953	DETERMINATION OF UNDISSOLVED SOLIDS (CRUD)	2	10-16-78
1954	DETERMINATION OF IRON - 59	1	11-12-76
1955	STRONTIUM	2	11-12-76
1955.1	CALIBRATION OF RADIOSTRONTIUM	2	11-12-76
1956.1	CALIBRATION OF GAS CHROMATOGRAPH	2	11-07-78
1957	TOTAL GAS	6	12-11-78
1958	GAMMA SPECTROMETRY	1	06-20-74
1958.2	INSTRUMENT OPERATION OF HEWLETT PACKARD M. C. A.	1	10-29-77
1958.3	GAMMA SPECTRUM ANALYSIS USING THE B&W CRAM PROGRAM	2	06-13-77
1958.4	DOSE EQUIVALENT I-131 DETERMINATION	2	11-02-77
1959	DETERMINATION OF E BAR	2	01-14-77
1959.1	DETERMINATION OF E BAR (UNIT 2 ONLY)	0	07-18-77
1961	O2 DETECT. CAL.	1	02-03-77
1962	GROSS ALPHA ACTIVITY MEASUREMENT	1	10-21-75
1963	GAS ANALYSIS USING A. GAS CHROMATOGRAPH	1	02-03-77
1970	STANDARDIZATION OF ANALYTICAL METHODS	2	07-07-76
1971	SPIKED SAMPLE PROGRAM	1	11-05-75
1972	PREPARATION OF A MIXED CARRIER SOLUTION	1	10-21-77
1973	VERIFICATION OF SAMPLE REPRESENTATIVENESS AND ACCURACY EFFLUENTS	3	03-12-79

HEALTH PHYSICS PROCEDURES (STATION)

1602	RADIATION DOSE RATE SURVEYS	3	09-13-76
1603	NEUTRON SURVEYS	3	04-06-78
1604	ALPHA SURVEYS	6	04-06-77
1605	PORTABLE AIR SAMP FOR RADIOACTIVE PARTICULATES	4	04-19-77
1606	AIR SAMPLING FOR RADIOACTIVE IODINE	4	04-06-78
1607	AIR SAMPLING FOR RADIOACTIVE GAS	2	01-19-76
1608	AIR SAMPLING FOR TRITIUM	2	01-19-76

1609	SURFACE CONTAMINATION SURVEYS	3	04-11-77
1610	ESTABLISHING AND POSTING AREAS	7	09-30-77
1611	AREA AND EQUIPMENT DECONTAMINATION	5	04-11-77
1612	MONITORING FOR PERSONNEL CONTAMINATION	6	06-12-78
1613	RADIATION WORK PERMITS	8	09-27-77
1616	USE OF RESPIRATORY PROTECTION DEVICES	13	04-21-79
1617	RECEIPT OF RADIOACTIVE MATERIAL	3	06-28-77
1618	SHIPMENT OF RADIOACTIVE MATERIAL, DOT REGULATIONS	6	03-06-79
1620	RAD. CONTROLS FOR PROCESSING SOLID RAD. WASTE	4	02-09-79
1621	RELEASING RADIOACTIVE LIQUID WASTE (UNIT 1)	14	02-08-79
1621.2	RELEASING RADIOACTIVE LIQUID WASTE FROM UNIT 2	4	01-05-79
1622	RELEASING RADIOACTIVE GASEOUS WASTE	18	07-14-78
1622.2	RELEASING RADIOACTIVE GASEOUS WASTE FROM UNIT 2	5	03-26-79
1623	PERSONNEL CONTROL DURING INITIAL FUEL HANDLING	3	11-25-75
1623.2	PERSONNEL CONTROL DURING NEW FUEL RECEIPT AND HANDLING (UNIT 2 ONLY)	0	09-01-76
1624	RAD. CONT. PROC. DURING NEW FUEL HANDLING AND REFUEL.	4	06-13-77
1624.2	RADIATION CONTROL PROCEDURES DURING NEW FUEL HANDLING AND REFUELING (UNIT 2 ONLY)	2	06-08-77
1625	EMERGENCY PLAN DURING NEW FUEL HANDLING	1	11-19-75
1625.2	EMERGENCY PLAN DURING NEW FUEL HANDLING (UNIT 2 ONLY)	0	09-01-76
1626	BIOLOGICAL SHIELD SURVEY (UNIT 1)	1	06-17-76
1628	PROGRAM FOR MEDICAL AND BIOASSAY EXAMS.	3	09-30-77
1629	HEALTH PHYSICS PROCEDURE FOR LIQUID WASTE DISPOSAL	1	07-03-74
1629.2	LIQ WASTE DISPSL SYST SAMPLNG (PERTINENT TO 2104-4.1 SYSTEM OPERATION (UNIT 2 ONLY)	0	08-15-77
1630	REACTOR BUILDING ENTRANCE PROCEDURE	9	11-02-77
1630.2	REACTOR BUILDING ENTRY (UNIT 2 ONLY)	2	11-05-78
1631	SAMPLING OF WASTE GAS DECAY TANKS & R B	9	09-29-78
1631.2	SAMPLING WASTE GAS DECAY TANKS & R.B. (UNIT 2 ONLY)	3	11-06-78
1632	RADIATION SHUTDOWN SURVEY	2	02-24-77
1632.2	RADIATION SHUTDOWN SURVEY (UNIT 2 ONLY)	0	02-14-77
1633	HANDLING AM-BE NEUTRON SOURCE	1	01-19-76
1634	HANDLING 60CO GAMMA SOURCE	1	12-17-76
1635	HANDLING #602-50CI CS-137 INSTRUMENT CALIBRATOR	1	02-25-77
1636	HANDLING #64-764 VICTOREEN-100M CI CS-137 INSTRU. CALIBRATOR	2	11-07-78
1640	PERSONNEL DOSIMETRY, ISSUANCE, ADMIN & RECORD KEEPING	0	06-15-77
1641	SELF READER DOSIMETER USAGE AND RECORD KEEPING	1	06-17-77
1642	OPERATION AND CALIBRATION OF THE THERMOLUMINESCENT DOSIMETRY SYSTEM	1	09-28-77
1643	QUALITY ASSURANCE TESTS FOR TLD DOSIMETRY SYSTEM	0	04-11-77
1660	COLLECTION OF ENVIRONMENTAL AIR SAMPLES	7	10-16-78
1661	COLLECTION OF ENVIRONMENTAL SURFACE WATER SAMPLES	3	10-19-78
1662	COLLECTION OF ENVIRONMENTAL RAINWATER SAMPLES	2	12-05-77
1675	RADIOACTIVE RELEASE RECORDS	4	09-30-77
1676	RADIATION PROTECTION RESPONSIBILITIES FOR PLANNED AND UNPLANNED RELEASES	3	03-12-79
1681	CONTROL OF CONTAMINATED SPILLS	1	12-16-77
1682	CONTROL OF CONTAMINATED TOOLS, EQUIPMENT, AND MATERIAL	2	04-28-77
1683	HANDLING OF CONTAMINATED VAC CLEANERS	1	09-30-77
1684	HEALTH PHYSICS REQUIREMENTS FOR MAINTENANCE AND RADIOGRAPHY ON PRIMARY & SECONDARY SYSTEMS	2	09-30-77
1685	HEALTH PHYSICS INTERNAL AUDITS	5	09-19-77
1686	USE OF PROTECTIVE CLOTHING	1	05-18-77
1687	CHARCOAL SAMPLING PROCEDURE	0	01-28-76
1690	RADIATION PROTECTION TRAINING PROGRAM	6	03-22-78
1695	CANCELLED 01-04-79		

1701	BACKGROUND DETERMINATION FOR GM SCALERS	1	09-07-76
1702	BACKGROUND DETERMINATION FOR PCC-11T	1	09-07-76
1703	BACKGROUND DETERMINATION FOR BECKMAN WIDE BETA	1	09-08-76
1704	EFFICIENCY DETERMINATION FOR GM SCALERS	2	02-25-77
1705	EFFICIENCY DETERMINATION FOR PCC-11T	2	02-25-77
1706	EFFICIENCY DETERMINATION FOR BECKMAN WIDE BETA	2	02-25-77
1707	PLATEAU DETERMINATION FOR GM SCALERS	2	02-25-77
1708	PLATEAU DETERMINATION FOR PCC-11T	2	02-25-77
1709	PLATEAU DETERMINATION FOR BECKMAN WIDE BETA	2	02-25-77
1710	BACKGROUND DETERMINATION FOR PACKARD TRI-CARD	2	09-07-76
1711	EFFICIENCY DETERMINATION FOR PACKARD TRI-CARD	3	02-25-77
1712	BACKGROUND DETERMINATION FOR LUDLUM 2000 SCALER	1	09-07-76
1713	EFFICIENCY DETERMINATION FOR LUDLUM 2000 SCALER	2	02-25-77
1714	PLATEAU DETERMINATION FOR LUDLUM 2000 SCALER	2	06-25-76
1716	CHARGING FILTER OF RP-A2 - UNIT 1	3	08-15-77
1717	OPERATION OF RESPIRATORY TEST BOOTH	1	10-10-78
1720	HP/CHEM RESPONSE TO PRIMARY-TO-SECONDARY LEAK	0	02-27-78
1741	INSTRUMENT OPERATION OF PACKARD TRI-CARD	2	09-07-76
1748	OPERATING AND CALIBRATION OF THE EBERLINE PIC-6A	0	02-14-77
1749	PORTABLE/LAB INSTRUMENT CALIBRATION SCHEDULE	4	12-01-77
1750	OPER & CALIB OF GSI-5 SURVEY INSTRU.	1	06-14-76
1751	OPERATION & CALIBRATION OF EBERLINE E-520	1	06-23-76
1752	OPERATION & CALIBRATION OF EBERLINE PAC-4S	1	02-14-77
1753	OPERATION & CALIBRATION OF EBERLINE PNR-4	1	02-11-77
1754	OPERATION & CALIBRATION OF EBERLINE PNC-4	1	02-16-77
1756	OPERATION & CALIBRATION OF EBERLINE TELETECTOR 6112	1	06-23-76
1757	OPERATION & CALIBRATION OF EBERLINE RFM-3	1	02-14-77
1758	OPERATION & CALIBRATION OF AIR SAMPLERS	1	06-14-77
1759	OPERATION OF CONDENSER - K METER	1	02-14-77
1760	OPERATION & CALIBRATION OF EBERLINE RAD OWL	2	05-12-77
1761	OPERATION & CALIBRATION OF VICTOREEN VAMP	3	01-19-77
1762	OPERATION & CALIBRATION OF THE RO-2	1	12-18-75
1763	H.P. INSTRUMENT CALIBRATION/STATUS AND BATTERY CHECK	1	12-01-77
1764	OPERATION & CALIBRATION OF THE SAM-2 ANALYZER	1	11-30-78
1772	DOSIMETER CALIBRATION & LEAK TEST	3	11-22-77
1775	BIOLOGICAL AIR SAMPLING	1	03-04-76
1776	SAMP. OF UNMONITORED POTENTIAL RAD RELEASE PATHS	2	02-16-78
1778	EMERGENCY EQUIPMENT AND INVENTORY CONTROL	4	01-26-78
1780	PROTECTIVE CLOTHING LAUNDERING PROCEDURE	0	02-13-74
1799	RECEIPT INSPECTION OF TMI MAKE-UP PUMPS	0	04-29-76

MAINTENANCE PROCEDURES (STATION)

GENERAL MAINTENANCE PROCEDURES STATION

1406	CRANE OPERATOR QUALIFICATIONS	1	06-09-78

MECHANICAL GENERIC CORRECTIVE MAINT. (STATION) (42)

1407-1	STATION CORRECTIVE MAINTENANCE PROCEDURE	2	05-03-79
1410-C-1	HEAT EXCHANGERS INSPECTION & CLEANING	3	03-08-79
1410-F1	FILTER ELEMENTS REPLACEMENT	0	12-12-77
1410-F-3	CHANGING H.C. LETDOWN PREFILTER (HU-F-2A/B)	3	07-14-78
1410-P-1	REPACK PUMP	1	05-31-77
1410-P-2	ADD PACKING TO PUMPS & ADJUST PKNG GLANDS	1	05-31-77
1410-P-3	LUBE OIL CHANGE	1	05-31-77

1410-P-5	DISASSEMBLE & INSPECT LAPP POSITIVE DISPLACEMENT PUMPS	1	05-31-77
1410-P-7	ASSEMBLY & DISASSEMBLY OF CENTRIFUGAL PUMPS	1	06-29-78
1410-P-9	ADJUSTING MU PUMP MECHANICAL SEALS	1	05-10-77
1410-P-11	REPAIRING & INSTALLING MECH SEALS	1	10-13-78
1410-T-1	TANK INSPECTION	1	06-22-78
1410-V-3	TEST, REPAIR, INSPECT OR RESET RELIEF VALVES	1	08-28-78
1410-V-6	DISASSEMBLE, INSPECT & REPAIR DIAPHRAGM VALVES	2	08-23-78
1410-V-8	SEAT REPLACEMENT IN CAGE PLUG TYPE VALVES	2	05-31-77
1410-V-10	DISASSEMBLE, CLN, INSPT & REPAIR GATE & GLOBE VALVES	4	06-14-78
1410-V-13	ADD, REPACK OR ADJUST VALVE PACKING	1	05-09-78
1410-V-14	VALVE REPACKING PROCEDURE FOR BORATED WATER	3	11-08-78
1410-V-15	ADD PACKING FOR BORATED WATER	1	07-05-78
1410-V-16	VALVE PACKING DATA SHEET	1	02-13-78
1410-V-17	INSPECTION & REPAIRS OF PRESSURE SEAL CHECK VALVES	0	10-21-77
1410-V-18	DISASSEMBLE, INSP., CLEAN, REPAIR & ASSEMB. CK. VLV	0	08-10-77
1410-V-20	INSPECT AND REPAIR BUTTERFLY VALVES	0	03-27-78
1410-V-22	RESET FIRE SERVICE SYSTEM DELUGE VALVES	0	08-17-78
1410-V-23	INSPECT AND REPAIR BALL AND PLUG VALVES	0	03-27-78
1410-V-24	INSPECT AND REPAIR AUTOMATIC AIR VENT VALVES	0	04-04-78
1410-V-26	REPAIR OF REMOTE MANUAL VALVE OPERATORS	0	06-09-78
1410-V-27	LEAK TEST, ELECTROMATIC RELIEF VALVE RC-R2(UNIT 2 ONLY)	0	07-13-78
1410-V-28	REPLACE RUBBER SEAT RINGS IN PRATT VLVS (UNIT 2 ONLY)	0	08-14-78
1410-Y-1	GASKET INSTALLATION	1	05-31-77
1410-Y-2	PLUG REMOVAL & INSTALLATION	1	05-31-77
1410-Y-3	REMVL & INSTALLATION OF EQUIP GUARDS & SHROUDING	1	05-31-77
1410-Y-4	TIGHTENING &/OR INSTALLING TUBING & FITTINGS	1	04-14-78
1410-Y-5	STEAM TRAP REPAIR	1	11-27-78
1410-Y-6	CLEANING OF STRAINERS	0	11-14-76
1410-Y-7	REMOVAL OF MIRROR INSULATION	2	05-31-77
1410-Y-8	SIGHT GLASS REPLACEMENT ON WASTE EVAPORATORS	0	11-16-76
1410-Y-9	MELTING ICE BLOCKAGE OF LIQUID LINES	1	11-08-77
1410-Y-11	INSTALLATION, RMVL & RPLCMNT OF THRDED PIPING & FTNGS	1	05-31-77
1410-Y-14	CHANGE BEARING IN CONTAINMENT DOOR	1	05-31-77
1410-Y-16	REMOVAL AND REPLACEMENT OF LOW PRESSURE MANWAY OR HAND HOLE COVERS AND GASKETS	0	11-22-78
1410-Y-17	CLEANING OF CLOGGED LINES	1	10-25-77
1410-Y-18	MOTOR SHAFT CONNECTION (COUPLING)	1	09-07-78
1410-Y-22	FIRE DAMPER FUSIBLE LINK REPLACEMENT	2	05-31-77
1410-Y-24	ADJUSTMENT OF SPRING HANGERS	1	07-14-78
1410-Y-25	LOCKWIRING CHEM VENT CLOSURES	1	05-31-77
1410-Y-26	WELDING & CUTTING PROCEDURE FOR FIRE SAFETY	3	02-23-78
1410-Y-35	CLEANING AND REPAIR OF ROTARY STRAINERS	1	05-31-77
1410-Y-36	INSTALLATION OF EXPANSION JOINTS	0	12-16-77
1410-Y-37	BAR RACK BRAKE ADJUSTMENT SHEAR PIN REPLACEMENT	0	12-12-77
1410-Y-40	INSTALL COMPRESSED ASBESTOS OR RUBBER GASKETS ON FLANGES	0	04-28-78
1410-Y-41	RUPTURE DISC REPLACEMENT	0	06-13-78
1410-Y-42	ADJUST. OF "STONE" TORQUE LIMITING CLUTCH(UNIT 2 ONLY)	0	06-23-78
1410-Y-43	FIRE BARRIER PENE. FIRE SEAL REPAIRS (UNIT 2 ONLY)	4	01-29-79
1410-Y-44	USE OF FORMANITE	0	01-24-79
1410-Y-45	INSTALLATION AND REMOVAL OF SPOOL PIECES	0	10-19-78
1410-Y-46	CONCRETE CORE DRILLING OF CLASS I, II, III WALLS, FLOORS & CEILINGS	0	08-25-78
1410-Y-47	SHEAR PIN REPLACEMENT SW-S-2A,B,C (UNIT 2 ONLY)	0	02-02-79

ELECTRICAL GENERIC CORRECTIVE MAINT (STATION)

1420-AH-4	AIR HANDLNG EQUIP TROUBLESHOOTING! REPAIR OF BELTS, BEARINGS, EXCESSIVE VIBRATION	1	09-14-78

1420-BKR-2	TESTING MAGNETIC TRIP MOLDED CASE CIRCUIT BREAKER	2	10-16-78
1420-BKR-3	TEST. THERMAL MAG. MOLDED CASE BREAKER (UNIT 2 ONLY)	1	09-07-78
1420-CRD-4	TROUBLESHOOT CRD BREAKER	0	10-31-77
1420-CRD-5	CONTROL ROD DRIVE A.C. TRIP BKR CLOSURE (UNIT 2 ONLY)	0	02-03-78
1420-HT-3	TROUBLESHOOTING & REPAIRING AND REPLACING HEAT TRACE AND HEAT TRACE ALRMS	0	03-26-79
1420-INV-4	INVERTER, TROUBLESHOOT AND ALIGNMENT (UNIT 2 ONLY)	0	05-01-78
1420-LTG-1	REPLACE LIGHT BULBS	2	10-18-78
1420-LTG-2	FUEL POOL UNDERWATER LIGHTS) CHANGING OF BULBS, OR REPAIR OF LIGHT FIXTURE OR WIRING	1	08-23-78
1420-LTQ-1	TROUBLESHOOTING LIMITORQUE VALVE OPERATORS AND CONTROL CIRCUITS	1	03-19-77
1420-LTQ-2	LIMITORQUE OPERATOR LIMIT SWITCH ADJUSTMENT	1	06-05-77
1420-LTQ-3	LIMITORQUE TORQUE SWITCH ADJUSTMENT	1	05-13-77
1420-RCP-3	CHANGE OIL IN RC PUMPS	1	09-14-78
1420-RCP-4	RCP MOTOR WINDING INSULATION RESISTANCE	1	09-14-78
1420-RCP-5	REACTOR COOLANT PUMP VIBRA SWITCH ADJUSTMENT/REPLACE. (UNIT 2 ONLY)	0	07-24-78
1420-Y-1	USE OF CRIMPING TOOLS	0	05-09-78
1420-Y-3	TROUBLESHOOT CONTROL/INDICATING CIRCUIT FOR AIR OPERATED OR SOLENOID OPERATED VALVES	1	09-07-78
1420-Y-5	SUMP PUMP, TROUBLESHOOT AND REPAIR	1	09-07-78
1420-Y-9	TROUBLE SHOOT AND REPAIR ALARM CIRCUITS (UNIT 2 ONLY)	1	01-12-79
1420-Y-10	TROUBLESHOOT/REPAIR MOTOR OPERATED VLVS (UNIT 2 ONLY)	1	01-17-79
1420-Y-12	DRIVE BELT INSPECTION/REPLACEMENT	1	12-11-78
1420-Y-13	TROUBLESHOOT & REPAIR OF CONTROL CIRCUITS(UNIT 2 ONLY)	0	03-08-79

INSTRUMENT GENERIC CORRECTIVE MAINT (STATION)

1430-ANN-2	REPLACE OR REPAIR A FAULTY ANNUNCIATOR CIRCUIR(UNIT 2)	0	10-18-78
1430-CRD-3	INSPECTION & CLEANING THE CRD CONTROL SYSTEM	1	05-25-78
1430-CRD-16	REPAIR CALIBRATE A. POSITION INDICATOR AMPLIFIER	2	03-13-79
1430-CRD-17	CRD DIFFERENCE AMPLIFIER ADJ. (UNIT 2 ONLY)	0	06-16-78
1430-CRD-18	CHECK CRD POWER SUPPLIES FOR FAULTY SCR'S AND DIODES AND GATE DRIVE UNITS	0	08-04-78
1430-CRD-20	APPLY CRD 120 VAC CONTROL POWER (UNIT 2 ONLY)	0	09-15-78
1430-HYG-2	PURGING MAINT. AND/OR CALIB OF H2 GAS SYS(UNIT 2 ONLY)	0	08-11-78
1430-RMS-14	REPAIR/REPLACE, OF A LIQUID MONITOR FLOWSWITCH(UNIT 2)	0	06-22-78
1430-RMS-15	UNIT DOES NOT ALARM AT PROPER VALVE (UNIT 2 ONLY)	0	06-19-78
1430-RMS-17	DECON. OF LIQUID MONITORS RMS DECON PROC (UNIT 2 ONLY)	0	09-11-78
1430-RPS-3	REPAIR LINEAR AMPLIFIER RPS (UNIT 2 ONLY)	0	06-16-78
1430-RPS-4	REPAIR AN RPS MODULE (UNIT 2 ONLY)	0	06-16-78
1430-RTD-1	(RTD) TEMPERATURE LOOP REPAIR & CALIBRATION	1	03-23-78
1430-SPDN-4	INCORE CABLE CHECK (UNIT 2 ONLY)	0	02-27-78
1430-SPDN-5	INCORE INSTRUMENTATION TORQUING PROCEDURE (UNIT 2 ONLY)	0	08-21-78
1430-TC-1	CANCELLED 02-09-79		
1430-TC-2	THERMOCOUPLE (TC) TEMPERATURE LOOP REPAIR AND CALIB.	0	11-16-76
1430-Y-1	CALIBRATION OF TEST EQUIPMENT	1	08-01-77
1430-Y-3	REPAIR A PANEL METER/INDICATOR	1	05-25-78
1430-Y-4	PRESSURE SWITCH REPAIR AND CALIBRATION	2	06-13-78
1430-Y-5	REPAIR TO LIQUID LEVEL GAUGE GLASSES/SIGHT GLASSES	0	01-13-77
1430-Y-6	PRESSURE INDICATOR REPAIR AND//OR CALIBRATION	1	12-14-78
1430-Y-7	TEMP. INDICATOR REPAIR/CALIBRATION	0	01-13-77
1430-Y-8	TEMPERATURE SWITCH REPAIR/ CALIBRATION	0	01-12-77
1430-Y-9	AIR OPERATED CONTROL VALVE AND POSITIONER REPAIR & STROKING	0	01-13-77
1430-Y-10	CONTROLLER REPAIR,TUNING AND/CALIBRATION	0	01-14-77
1430-Y-11	REPAIR/CAL OF VARIOUS INSTRUMENTATION RECORDERS	1	05-25-78
1430-Y-12	INSP/REPAIR DAMAGED OR LEAKING INSTR LINES OR FITTINGS	2	11-17-78

1430-Y-13	FLOW INDICATOR REPAIR AND CALIBRATION	0	01-07-77
1430-Y-14	FLOW SWITCH REPAIR/CALIB	0	12-17-76
1430-Y-16	REPAIR FUSE HOLDER	1	05-24-78
1430-Y-17	DIFFERENTIAL PRESSURE TRANSMITTER/LOOP REPAIR & CALIB	2	08-31-78
1430-Y-19	PRESSURE REGULATOR REPAIR/ADJUSTMENT	1	05-25-78
1430-Y-21	G.C. MOUNTING PROCEDURE (UNIT II)	1	04-12-78
1430-Y-24	CLEARING INSTRUMENT LINES OF MOISTURE OR CLOGKAGE	0	03-24-78
1430-Y-25	REPAIR/CALIB OF VARIOUS INSTRUMENTATION LEVEL SWITCHES	0	03-23-78
1430-Y-26	SOURCE RANGE DETECTOR REMOVAL & REPLACEMENT	0	08-29-78
1430-Y-27	THERMOMETER CALIBRATION	0	07-14-78
1430-Y-28	CRIMPING TOOL CALIBRATION	0	06-23-78
1430-Y-29	SOLENOID OPERATED VLV REPAIR	0	07-19-78
1430-Y-30	BAILEY BY TRANSMITTER COVER SEAL GASKET LEAKAGE TEST (UNIT 2 ONLY)	0	08-30-78
	UTILITY GENERIC CORRECTIVE MAINT. PROC. (STATION)		
1440-D-1	CLOGGED DRAIN MAINTENANCE	1	06-29-78
1440-F-1	CHANGE OF AIR HANDLING FILTERS	1	07-14-78
1440-Y-1	RECHARGING SCOTT-AIR BREATHING CYLINDERS	0	01-25-79
1450-007	RLY FUNC TESTS FOR 4160 V BUS TIE BKR TIE-2E-2 (UNIT 2)	0	03-23-79
1450-008	RLY FUNC TESTS FOR 4160 V BUS TIE BKR T3E-4E2(UNIT 2)	0	03-26-79
1460-Y-2	REMOVAL OF CONTAMINATED CHARCOAL FILTERS FROM UNIT 2 AUX BLDG (UNIT 2 ONLY)	0	05-21-79
	PREVENTIVE MAINTENANCE (STATION)		
	ELECTRICAL PREVENTIVE MAINT. (STATION)		
E 1	SOUND ANALYSIS FOR ELEC MOTORS/& ROTATING EQUIP	1	11-27-78
E 2	DIELECTRIC CHECK OF INSULATION, MOTORS & CABLES	1	01-06-78
E 3	PREVENTATIVE MAINT INSP FOR AC INDUCTION MOTORS	2	12-04-78
E 4	SWITCHGEAR, BUS DUCT, MCC & TRANSFORMER INSP. & CLNG	4	02-02-79
E 9	DC MOTORS - PREVENTIVE MAINTTENANCE OF	3	12-26-78
E 10	RELAY CABINETS - INSPECTION	2	01-24-79
E 13	LIMITORQUE VALVES	2	03-07-77
E 18	BATTERY CHARGERS-ANNUAL INSPECTION	2	11-27-78
E 23	ELECTRIC MOTORS-LUBRICATION OF GREASED BEARINGS	2	11-27-78
E 25	OIL CHANGE OF ELECTRIC MOTORS	1	11-27-78
E 29	ELEC HEATERS-CLEAN, AMPERAGE CK, & TIGHTEN	1	05-12-78
E 30	STORED EQUIPMENT ELECTRICAL CHECK	2	07-21-78
E 36	ELECTRICAL GRD TRIP BREAKER CHECK	2	08-17-78
E 37	CALIBRATION CHECK OF BURNDY CRIMPING TOOLS	1	07-21-78
E 44	WESTINGHOUSE TYPE DHP CIRCUIT BREAKER INSPECTION AND TESTING (UNIT #II)	0	04-04-77
E 46	PREVENTATIVE MAINT, TROUBLE SHOOTING, AND REPAIR OF BRUSHLESS EXCITER FUSES (UNIT 2 ONLY)	0	08-15-77
E 48	UNIT 2 PRESSURIZER HEATERS RESIS. CHECK (UNIT 2 ONLY)	1	10-12-78
E 49	UNIT 2 LUB/OIL CHANGE OF ELEC MOTORS (UNIT 2 ONLY)	1	10-12-78
E 50	CALIB OF THE THOMAS & BETTS HYDRAULIC CRIMPING PUMP WITH COLOR CODED DIES	1	11-27-78
E 51	MEGGER/INSPECT POTHEADS, RCP MOTORS	1	11-27-78
E 52	TEMPERATURE TESTING OF ELECTRIC MOTORS	0	03-31-78

E 56	THERMAL OVERLOAD DEVICES INSP. & TESTING (UNIT 2 ONLY)	0	06-12-78
E 57	INSPECTION OF OVERHEAD CRANES (UNIT 2 ONLY)	0	07-26-78
E 100	CANCELLED 03-06-79		
E 101	TURBINE ROTOR GROUNDING DEVICE-WKLY MAINT (UNIT 2 ONLY)	1	01-12-79

INSTRUMENT PREVENTIVE MAINTENANCE (STATION)

IC 1	FLOW LOOP CALIBRATION	3	03-26-79
IC 2	PRESSURE LOOP CALIBRATION	4	03-12-79
IC 3	RTD TEMP. LOOP CALIBRATION	4	03-12-79
IC 4	T/C TEMP. LOOP CALIBRATION	2	03-12-79
IC 5	LEVEL LOOP CALIBRATION	2	03-26-79
IC 6	CONDUCTIVITY LOOP CALIBRATION	0	12-07-76
IC 7	PH LOOP CALIBRATION	1	08-15-78
IC 9	EVALUATION OF VIBRATION AND LOOSE PARTS LOOP	1	05-17-78
IC 10	FUNCTIONAL CHECK OF LEVEL SWITCHES	1	01-24-79
IC 11	FLOW SWITCHES CALIBRATION	1	12-20-78
IC 12	PRESSURE SWITCH CALIBRATION	1	12-28-78
IC 13	FUNCTIONAL CHECK TEMPERATURE INDICATORS AND SWITCHES	1	01-11-79
IC 14	DIFFERENTIAL PRESSURE LOOP CALIBRATION	1	03-26-79
IC [illegible]	DIFFERENTIAL PRESSURE SWITCH & INDICATOR CALIBRATION	1	11-27-78
IC 17	CALIBRATE PRESSURE GAUGE CALIBRATION	0	12-19-76
IC 25	SM A-3 BATTERY CHECK	1	05-30-78
IC 37	CAL OF F.H. BRIDGES SELSYN INDICATORS	2	11-27-78
IC 38	CAL OF F.H. BRIDGES DILLON LOAD CELLS	3	11-27-78
IC 40	FISHER LEVEL-TROL CONTROLLER 2502,WITH PROPORTIONAL BAND PLUS RESET	1	07-07-77
IC 55	TLD READER QUARTERLY CALIBRATION	1	04-19-78
IC 57	AIR ACTUATED VALVE STROKING	2	12-28-78
IC 58	FLOW INDICATOR/SIGHTGLASSES CALIBRATION PROCEDURE	1	12-20-78
IC 59	CALIBRATION OF ESERLINE HAND & FOOT MONITOR MODE HFM3	1	11-02-78
IC 60	CALIBRATION OF PORTAL MONITOR MODEL PMC-4B	1	11-02-78
IC 62	CLEAN RADIATION MONITOR PAPER DRIVE UNIT-UNIT 2 ONLY	0	08-15-77
IC 65	MONTHLY HAND TOOL MEGGERING & GROUND CHECK PREV. MAINT	0	12-23-77
IC 66	INSTRUMENTATION SYSTEM PREVENTIVE MAINTENANCE	1	05-17-78
IC 68	PORTABLE RADIATION MONITORING EQUIP MAINT & CALIB	0	06-13-78
IC 69	200 TON DILLON SERVO-INDICATOR OPER AND MAINT	0	05-26-78
IC 70	RCP VIBRATION PROBE CALIB. MODEL 15210 (UNIT 2 ONLY)	0	06-28-78
IC 71	CALIB. OF MOIST COMBINED AIR TEMP. INDICATOR AND RECORDER (UNIT 2 ONLY)	0	06-28-78
IC 72	CALIB. OF CIRC WATER CHLORINATION SYS INSTR. (UNIT 2)	0	06-28-78
IC 73	HYDROCARBON DETECTOR INFRARED ANALYZER CALIB (UNIT 2 ONLY)	0	08-08-78
IC 74	GENERATOR CONDITION MONITOR (HY-4-12) CHECKCALBI2-PKF3 UNIT 2 ONLY	0	11-06-78
IC 76	CALIBRATION OF DWYER MAGNEHELIC PRESSURE GAUGES	0	03-06-79
IC 701	BAILEY TYPE WR RECORDER MAINT (UNIT 2 ONLY)	0	08-08-78
IC 702	BECKMAN MODEL 2530 RECORDER MAINT (UNIT 2 ONLY)	0	08-11-78
IC 703	BECKMAN MODEL 2550 RECORDER MAINT (UNIT 2 ONLY)	0	08-16-78
IC 704	BECKMAN MODEL R05 RECORDER MAINT (UNIT 2 ONLY)	0	08-16-78
IC 705	BRISTOL 71A-550 RECORDER MAINTENANCE (UNIT 2 ONLY)	0	08-22-78
IC 706	ESTERLINE-ANGUS RECORDER MAINT (UNIT 2 ONLY)	0	08-11-78
IC 707	FOXBORO RAE-6 RECORDER MAINT (UNIT 2 ONLY)	0	08-11-78
IC 708	GENERAL ELECTRIC RECORDER MAINT (UNIT 2 ONLY)	0	08-11-78
IC 709	GOULD 110 RECORDER MAINT (UNIT 2 ONLY)	0	08-11-78
IC 710	HONEYWELL VUMATIK RECORDER MAINT (UNIT 2 ONLY)	0	08-16-78
IC 711	HONEYWELL ELECTRONIK 15 RECORDER MAINT (UNIT 2 ONLY)	0	08-11-78
IC 712	HONEYWELL ELECTRONIK 111 RECORDER MAINT (UNIT 2 ONLY)	0	08-16-78
IC 713	LEEDS AND NORTHRUP SPEEDOMAX H & W RECORDER MAINT		

	UNIT 2 ONLY	0	08-16-78
IC 714	L & N SPEEDOMAX "M" RECORDER MAINT (UNIT 2 ONLY)	0	08-16-78
IC 715	TAYLOR RECORDER MAINT (UNIT 2 ONLY)	0	08-16-78
IC 717	FOXBORO M/64, MODEL E-0 RECORDER MAINT (UNIT 2 ONLY)	0	08-11-78
IC 718	FOXBORO SPEC 200 RECORDER MAINT (UNIT 2 ONLY)	0	08-11-78

MECHANICAL PREVENTATIVE MAINTENANCE (STATION)

M 1	INSPECTION OF CENTRIFUGAL PUMPS	1	11-27-78
M 7	TRAVELING SCREENS - INSPECT SCREEN CONDITION, GEARS, ENSURE PROPER OPERATION	2	11-13-78
M 8	PORTABLE FIRE EXTINGUISHER INSPECTION	0	12-14-78
M 19	POSITIVE DISPLACE. PUMP INSPECTION/OVERHAUL	0	09-22-78
M 25	INSP. OF MAIN & AUXILIARY CONDENSER	1	06-09-78
M 27	VISUAL INSPECTION OF REFLECTIVE INSULATION	2	11-27-78
M 42	VISUAL INSPECTION OF EXTERIOR AND INTERIOR OF PRESSURE VESSELS	2	11-27-78
M 45	INSP. PROC. & CALIB. CK FOR INSIDE, OUTSIDE & DEPTH GAGE MICROMETERS	0	06-12-78
M 48	TORQUE WRENCH & TORQUE TESTER CALIBRATION	1	04-06-78
M 50	INSPECT. OF MECHANICAL DRAFT COOLING TOWER FANS	1	12-06-78
M 51	STORED EQUIPMENT CHECK	1	12-06-78
M 55	CHLORINE EVAPORATOR	0	10-21-77
M 73	STUD TENSIONER CYCLE CHECK	0	12-06-78
M 80	SETTING THE RELIEF VALVES ON THE FUEL HANDLING BRIDGE AND TRANSFER SYSTEM HYDRAULIC SYSTEMS	1	04-03-78
M 82	CANCELLED 06-28-78		
M 83	FUEL HANDLING BRIDGE HOIST MECHANICAL LOAD BRAKE ADJUSTMENT.	1	11-14-78
M 84	CLEAN/CHANGE RMS PUMP FILTERS & FLUSH RMS PUMPS (UNIT 2)	1	10-18-78
M 85	CLEAN MISC OR RC EVAPORATOR FEED TANK	2	10-27-78
M 88	INSPECTION FOR CLEANING OF D.F. FOOT VLV.(UNIT 2 ONLY)	1	10-12-78
M 89	WATER DRAINAGE FROM DIESEL FUEL TANKS (UNIT 2 ONLY)	1	10-12-78
M 90	INSPECTION/CLEANING/LUBRICATION OF AIR HANDLING VALVE SEATS (UNIT 2 ONLY)	0	06-23-78
M 91	RB ACCESS HATCH DOOR OPER MECHANISMS (UNIT 2 ONLY)	0	06-21-78
M 92	BAR BRAKES (UNIT 2 ONLY)	0	07-26-78
M 96	INSPECTION PROC AND CALIB. CHECK FOR INSIDE AND OUTSIDE DIAL INDICATORS	0	12-06-78

UTILITY PREVENTATIVE MAINTENANCE (STATION)

U 7	AIR HANDLING FILTER DIP CHECK (UNIT 2 ONLY)	0	06-21-78

SECURITY PROCEDURES (STATION)

1005.1	SECURITY PROCEDURE	9	02-28-79
1005.3	LEGAL POWERS OF SITE PROTECTION OFFICERS	4	05-24-77
1005.4	INSTRUCTIONS FOR SITE PROTECTION FORCE AT TMI NUC STA	18	05-03-79
1005.6	TESTING OF ALARMS & SURVEILLANCE SYSTEM	8	02-28-79
1005.7	SECURITY OF PROTECTED AREAS & VITAL AREAS	16	02-02-79
1005.8	FIREARMS - TRAINING - CONTROL - USE	8	08-25-78
1005.9	BOMB & OTHER OVERT THREATS	17	03-19-79
1005.10	ENTRY TO TMI	18	05-21-79
1005.11	ACCESS TO AND WITHIN TMI	15	04-19-79

1005.12	INTERFACE WITH VISITORS DURING A RADIATION EMERG.	5	08-29-77
1005.13	CONTROL ROOM INTERFACE WITH SITE PROTECTION FORCE	8	02-28-79
1005.14	CIVIL DISORDERS	7	04-19-79
1005.15	SEARCH OF INDIVIDUALS & VEHICLES ENTERING PROT AREAS	5	02-29-79
1005.18	GENERAL KEY LOCKER CONTROL	9	02-28-79

STORES PROCEDURES (STATION)

#1	PROCUREMENT	2	06-28-78
#2	EXPENDITURE AND SHIPMENT OF MATERIAL	2	01-24-78
#3	TURN IN OF MATERIAL	1	01-24-78
#4	MATERIAL STORAGE	1	01-24-78
#5	MATERIAL RECEIPT	1	01-24-78
#6	APPROVAL OF INVOICES & LOCAL PURCHASE ORDERS	2	01-24-78
#7	ULTRASONIC CALIBRATION STANDARDS CONTROL	2	07-19-78
#8	TRANSFER OF MATERIAL FROM UNIT 2 CONST. TO UNIT 1	0	01-24-78
#9	LETTERS OF JUSTIFICATION	1	01-24-78

SURVEILLANCE PROCEDURES (STATION)

3301-M1	FIRE SYSTEM VALVE LINEUP VERIFICATION	5	05-07-79
3301-M2	EMERGENCY PLANT RADIATION INSTRUMENTATION CHECK	0	04-19-78
3301-Q2	SPECIFIC GRAVITY CHECK - DIESEL FIRE PUMPS	2	06-21-78
3301-R1	FIRE SERVICE DIESEL ENGINE INSPECTION	0	02-02-78
3301-W1	FIRE SYSTEM WATER SOURCE LEVEL CHECK	1	03-06-79
3301-W2	FIRE SYSTEM DIESEL BATTERY CHECK	3	03-06-79
3302-R1	EMERG PLANT RAD INSTR CALIB REQD INTER-REFUELING INT	0	05-09-78
3303-A1	FIRE SYSTEM VALVE CYCLING	2	05-07-79
3303-A2	FIRE SYSTEM MAIN HEADER FLUSH AND LOOP TEST	2	05-21-79
3303-M1	FIRE PUMP PERIODIC OPERATION	3	01-31-79
3303-Q1	FIRE PUMP DIESEL FUEL	4	03-22-79
3303-R1	FIRE PUMP START CIRCUIT	0	01-24-78
3303-R2	FIRE PUMP CAPACITY TESTING	1	01-19-79
3303-3Y1	FIRE SYSTEM CAPABILITY TEST	1	01-31-79
3325-SA1	CHEMICAL RELEASE INVENTORY	0	03-21-78
3391-SA1	FIRE HYDRANT INSPECTION	2	11-07-78

FUELING PROCEDURES (STATION)

3501-1.1	MOVEMENT OF THE DUMMY FUEL ASSEMBLY BETWEEN UNIT 1 & 2	0	10-30-78

OPERATING PROCEDURES (STATION)

3106-1	UNIT #1 & UNIT #2 CONDENSATE CROSS-CONNECT	3	05-21-79

UNIT 1 OPERATING PROCEDURES IN UNIT 2 FILE
*APPLIES TO BOTH UNITS

1104-36	RIVER WATER CHLORINATION	10	09-14-78
1104-45	FIRE PROTECTION	24	02-21-79
1106-4	AUXILIARY BOILERS	10	01-26-78

2100 OPERATING PROCEDURES (114)

2101	LIMITS AND PRECAUTIONS		
2101-1	PLANT LIMITS AND PRECAUTIONS		
2101-1.1	NUC. PLANT LIMITS AND PRECAUTIONS	4	08-08-78
2101-1.2	TRANSIENT COMBUSTIBLE LIST	0	01-19-79
2101-2	PLANT SETPOINTS		
2101-2.1	NUC. PLANT SETPOINTS	4	11-06-78
2102	PLANT OPERATING PROCEDURES		
2102-1	PLANT STARTUP PROCEDURES		
2102-1.1	UNIT HEATUP	19	03-07-79
2102-1.2	APPROACH TO CRITICALITY	6	02-05-79
2102-1.3	UNIT START-UP	14	03-20-79
2102-2	POWER OPERATIONS		
2102-2.1	POWER OPERATIONS	11	03-20-79
2102-3	PLANT SHUTDOWN PROCEDURES		
2102-3.1	UNIT SHUTDOWN	8	03-07-79
2102-3.2	UNIT COOLDOWN	13	03-10-79
2102-3.3	DECAY HEAT REMOVAL VIA OTSG	6	04-17-78
2102-4	GENERAL PLANT PROCEDURES		
2102-4.1	REACTOR BUILDING PURGE AND PURIFICATION	3	04-18-78
2102-4.2	FILL AND DRAIN OF THE FUEL TRANSFER CANAL	5	07-19-78
2103	REACTOR COOLANT SYSTEM OPERATING PROCEDURES		
2103-1.1	FILLING AND VENTING THE R.C.SYS.	9	03-07-79
2103-1.2	SOLUBLE POISON CONCENTRATION	4	06-12-78
2103-1.3	PRESSURIZER OPERATION	3	07-19-78
2103-1.4	REACTOR COOLANT PUMP OPERATION	6	08-16-78
2103-1.5	H2 ADDITION AND DEGASIFICATION	3	10-06-78
2103-1.6	DRAINING AND NITROGEN BLANKETING OF THE R.C. SYS.	4	07-19-
2103-1.9	REACTIVITY BALANCE	3	09-22-
2103-1.10	HEAT BALANCE CALCULATIONS	3	04-05-78
2103-1.11	HAND CALCULATIONS OF QUADRANT POWER TILT & AXIAL POWER IMBALANCE	4	03-10-79
2104	AUXILIARY SYSTEMS OPERATING PROCEDURES		
2104-1	NUC. PLANT AUX SYS. OPERATING PROCEDURES		
2104-1.1	CORE FLOODING SYSTEM	8	09-29-78

2104-1.2	MAKE UP AND PURIFICATION SYSTEM	13	03-19-79
2104-1.3	DECAY HEAT REMOVAL SYSTEM	11	06-23-78
2104-1.4	REACTOR BUILDING SPRAY	3	04-18-78
2104-1.5	SPENT FUEL COOLING SYSTEM	6	09-22-78
2104-1.6	INTERMEDIATE CLOSED COOLING WATER SYSTEM	10	02-15-79
2104-1.7	PENETRATION COOLING	1	03-01-77
2104-1.8	ENVIRONMENTAL BARRIER SYSTEM	0	07-07-77
2104-1.10	NITROGEN FOR NUCLEAR & RADWASTE SYSTEMS	5	01-23-79
2104-1.11	NUCLEAR SAMPLING SYSTEM	1	04-18-78
2104-1.12	NUCLEAR PLANT CHEM. ADD.	8	11-06-78
2104-1.13	RECIRC OF BWST AND SODIUM HYDROXIDE TANK	1	11-15-77
2104-2	SEC. PLANT AUX. SYS. OPERATING PROCEDURES		
2104-2.1	CYCLE MAKEUP PRETREATMENT	3	03-07-78
2104-2.2	DEMINERALIZED SERVICE WATER	8	07-19-78
2104-2.3	INSTRUMENT AIR SYSTEM	6	08-22-78
2104-2.4	TURBINE LUBE OIL PURIFICATION & TRANSFER	6	09-28-78
2104-2.5	SUMP PUMP AND DRAINAGE SYSTEM	4	03-30-78
2104-2.6	MAIN GENERATOR HYDROGEN GAS SYSTEM	4	06-15-78
2104-2.7	DOMESTIC WATER SYSTEM	4	11-15-78
2104-2.8	SECONDARY PLANT SAMPLING	4	10-13-78
2104-2.9	DEMINERALIZING SYSTEM	4	10-05-77
2104-2.10	SERVICE AIR	6	04-17-78
2104-2.11	REGENERANT WASTE NEUTRALIZATION	2	03-21-78
2104-3	COOLING WATER SYSTEMS OPERATING PROCEDURES		
2104-3.1	NUCLEAR SERVICE RIVER WATER	7	04-26-78
2104-3.2	NUC. SERVICE CLOSED COOLING WATER SYSTEM	5	06-20-78
2104-3.3	DECAY HEAT CLOSED COOLING WATER SYSTEM	6	01-05-79
2104-3.4	SECONDARY SERVICES RIVER WATER	7	10-13-78
2104-3.5	SECONDARY SER. CLOSED COOLING WATER	8	04-26-78
2104-3.6	CIRCULATING WATER SYSTEM	8	11-15-78
2104-3.7	SCREEN HOUSE EQUIPMENT	6	03-10-79
2104-3.8	MECHANICAL DRAFT COOLING TOWER OPERATION	6	11-[illegible]-78
2104-3.9	RIVER WATER CHEM TREAT.	2	09-[illegible]-77
2104-3.10	CIRCULATING WATER CHEM. TREAT.	1	09-16-77
2104-4	RAD WASTE SYSTEMS OPERATING PROCEDURES		
2104-4.1	MISC. LIQUID RAD WASTE DISPOSAL	2	03-14-79
2104-4.2	REACTOR COOLANT LIQUID WASTE DISPOSAL	1	06-22-77
2104-4.3	WASTE GAS DISPOSAL SYSTEM	1	01-31-78
2104-4.4	SOLID WASTE DISPOSAL SYSTEM	2	09-16-77
2104-4.5	RAD WASTE PUMPS SEAL WATER SYS.	1	01-05-78
2104-4.6	REACTOR COOLANT LEAKAGE RECOVERY SYSTEM	1	10-11-77
2104-5	HVAC OPERATING PROCEDURES		
2104-5.1	RX BLDG. NORMAL AND EMERG. VENT. & COOLING	5	12-23-78
2104-5.2	FUEL HANDLING BUILDING H&V	3	09-22-78
2104-5.3	AUX. BUILDING H&V	2	05-10-78
2104-5.4	CONTROL BUILDING HVAC	3	03-14-79
2104-5.5	SERVICE BUILDING HVAC	2	10-25-78
2104-5.6	TURBINE BUILDING H&V	0	04-09-77
2104-5.7	DIESEL BUILDING H&V	2	09-22-78
2104-5.8	CHLORINATOR BUILDING H&V	0	08-20-75
2104-5.9	COAGULATOR BUILDING H&V	1	09-16-77
2104-5.10	CONTROL BUILDING AREA H&V	1	09-16-77

2104-5.11	CIRC. WATER PUMP HOUSE H&V	0	08-20-75
2104-5.12	AIR INTAKE TUNNEL H&V	1	06-28-78
2104-5.13	FIRE PUMP HOUSE HEATING AND VENTILATION	1	02-15-78
2104-5.14	MECH DRAFT CLG TOWER PUMP HOUSE H&V	1	09-16-77
2104-5.15	RIVER WATER PUMP HOUSE H&V	3	09-16-77
2104-6	EMERGENCY SYSTEMS OPERATING PROCEDURES		
2104-6.1	FIRE PROTECTION SYSTEM	5	03-10-79
2104-6.2	EMER. DIESELS & AUXILIARIES	9	03-14-79
2104-6.3	EMERGENCY FEED WATER	4	06-08-78
2104-6.4	HYDROGEN RECOMBINER OPERATION	2	07-07-78
2104-6.5	HYDROGEN CONTROL SYSTEM	1	08-08-78
2105	INST. & CONT. SYS. OPERATING PROCEDURES		
2105-1	INST. & CONT. SYS. OPERATING PROCEDURES		
2105-1.1	NUCLEAR INSTRUMENTATION	2	08-15-78
2105-1.2	REACTOR PROTECTION SYSTEM	4	09-12-78
2105-1.3	SAFETY FEATURES ACTUATION SYSTEM	2	10-25-78
2105-1.4	INTEGRATED CONTROL SYSTEM	3	09-01-78
2105-1.5	INCORE MONITORING	1	09-21-77
2105-1.6	RCS/N.N.I. OPERATION	3	10-06-78
2105-1.7	SECONDARY PLANT AUX. CONTROL SYS. INSTRUMENTATION	3	04-18-78
2105-1.8	RADIATION MONITORING	0	02-03-77
2105-1.9	CONTROL ROD DRIVES	5	09-28-78
2105-1.10	COMPUTER	0	02-14-77
2105-1.11	COMMUNICATIONS SYSTEM	2	06-23-78
2105-1.12	RADIATION MONITORING SYSTEM SETPOINTS	6	11-09-78
2105-1.13	VIBRATION AND LOOSE PARTS MONITOR SYSTEM	2	12-27-77
2105-1.14	MOVEABLE INCORE DETECTOR SYSTEM	0	04-19-78
2106	STEAM SYSTEM OPERATING PROCEDURES		
2106-1	MAIN STEAM		
2106-1.1	MAIN & REHEAT STEAM	5	12-23-78
2106-1.2	EXTRACTION STM & FEEDWATER HEATER VENTS & DRAINS	8	03-13-79
2106-1.3	AUXILIARY STEAM SYSTEM	6	09-28-78
2106-1.4	GLAND STEAM	5	09-28-78
2106-1.5	TURBINE BYPASS	2	06-12-78
2106-2	FEEDWATER AND CONDENSATE		
2106-2.1	CONDENSATE SYSTEM	11	02-05-79
2106-2.2	CONDENSATE POLISHING SYSTEM	9	03-21-79
2106-2.3	CONDENSER AIR REMOVAL SYSTEM	3	04-12-78
2106-2.4	FEEDWATER	6	03-14-79
2106-2.5	OTSG SEC. FILL, DRAIN & LAYUP	8	12-23-78
2106-2.6	FEEDWATER HEATER N2 BLANKETING SYSTEM	2	01-05-78
2106-2.7	S G CHEMICAL CLEANING		
2106-2.8	CONDENSATE CHEMICAL FEED	1	09-16-77
2106-3	TURBINE GENERATOR SYSTEMS		

2106-3.1	TURBINE GENERATOR	8	03-21-79
2106-3.2	TURBINE LUBE OIL SYSTEM	8	10-13-78
2106-3-3	MAIN GENERATOR HYDROGEN SEAL OIL SYSTEM	2	01-19-78
2106-3.4	ELECTRO HYDRAULIC CONTROL SYSTEM	7	03-21-79
2106-3.6	ISOL. PHASE BUS DUCT COOLING SYSTEM	1	03-30-78
2107	ELECTRICAL SYSTEMS OPERATING PROCEDURES		
2107-1	NORMAL AND EMERGENCY ELECTRICAL		
2107-1.1	BOP AUXILIARY ELECTRICAL	7	03-17-78
2107-1.2	CLASS 1E ELEC. SYS	6	01-25-79
2107-1.3	SUBSTATION (500KV)	2	03-30-78
2107-1.4	HEAT TRACING SYSTEM	5	03-10-79
2200	EMERGENCY & ABNORMAL PROCEDURES		
2202	PLANT EMERGENCY PROCEDURES (21)		
2202-1	REACTOR SYSTEMS EMERGENCY PROCEDURES		
2202-1.1	REACTOR TRIP	6	10-25-78
2202-1.2	UNANTICIPATED CRITICALITY	2	06-08-78
2202-1.3	LOSS OF R.C./R.C.S. PRESS.	11	10-06-78
2202-1.4	LOSS OF R.C. FLOW/RCP TRIP	8	02-08-79
2202-1.5	PRESSURIZER SYSTEM FAILURE	3	09-29-78
2202-1.6	HIGH ACTIVITY IN R.C.	2	11-15-77
2202-1.7	EXCESS RAD LVL IN AUTH. AUX BLDG. STA. VENT	2	11-15-77
2202-1.8	LOSS OF D.H. REMOVAL	2	01-05-78
2202-1.9	LOSS OF INTERMEDIATE CLOSED COOLING WATER	4	09-01-78
2202-1.10	SHUTDOWN FROM OUTSIDE THE CONTROL ROOM	8	12-23-78
2202-2	AUXILIARY SYSTEMS EMERGENCY PROCEDURES		
2202-2.1	STATION BLACKOUT	7	06-21-78
2202-2.2	LOSS OF S. G. FEED	3	10-13-78
2202-2.3	LOSS OF INSTRUMENT AIR AND SERVICE AIR	3	02-10-78
2202-2.5	STATION BLACKOUT WITH LOSS OF BOTH DIESEL GENERATORS	6	09-22-78
2202-2.6	OTSG TUBE RUPTURE	4	10-06-78
2202-2.7	HIGH CATION CONDUCTIVITY AND/OR SODIUM IN THE CONDENSATE AND/OR FEEDWATER SYSTEM	2	02-08-79
2202-2.8	LOSS OF ONE AUXILIARY TRANSFORMER	1	07-19-78
2202-2.9	PLANT RESPONSE TO PENETRATION OF THE PROTECTED AREA	0	05-19-78
2202-3	GENERAL EMERGENCY PROCEDURES		
2202-3.1	FIRE	4	10-06-78
2202-3.2	FLOOD	2	01-05-78
2202-3.3	EARTHQUAKE	2	09-12-78
2203	PLANT ABNORMAL PROCEDURES (14)		

2203-1	REACTOR SYSTEMS ABNORMAL PROCEDURES		
2203-1.1	LOSS OF BORON (MODERATOR DILUTION)	5	09-12-78
2203-1.2	CRD EQUIP. FAILURE	2	09-22-78
2203-1.3	CRD MALFUNCTION ACTIONS ASYMMETRIC ROD FAULT (6.5%)	1	03-20-79
2203-1.4	R.C. PUMP AND MOTOR EMER.	3	05-04-78
2203-1.5	LOSS OF R.C. MAKEUP	2	09-07-78
2203-1.6	NUC. SERVICES CLOSED COOLING WATER FAILURE	1	10-06-78
2203-1.7	NUCLEAR SERVICES RIVER WATER FAILURE	0	02-03-77
2203-1.8	VIBRATION AND LOOSE PARTS MONITORING SYSTEM	2	10-25-78
2203-2	AUXILIARY SYSTEMS ABNORMAL PROCEDURES		
2203-2.1	LOAD REJECTION	2	06-08-78
2203-2.2	TURBINE TRIP	7	10-25-78
2203-2.3	STEAM SUPPLY SYS. RUPTURE	5	10-06-78
2203-2.4	SECONDARY SER. CLOSED COOLING WATER FAILURE	1	06-20-77
2203-2.5	CONTROL ROOM HVAC FAILURE	2	02-24-77
2203-2.6	POST ACCIDENT HYDROGEN CONTROL	1	06-23-78
2204	RESPONSE TO ALARMS (1447)		
2204-7	FIRE PROTECTION SYSTEM		
2204-7A.A1	P 707 AUX BLDG FLTR DELUGE SYSTEMS TROUBLE	0	12-23-77
2204-7A.A2	P 708 AUX BLDG FLTR DELUGE SYSTEMS TROUBLE	0	12-23-77
2204-7A.A3	P 709 CONT RM BYPASS FILTER ASS'Y DEL SYS TROUBLE	0	12-23-77
2204-7A.A4	FIRE PROTECTION PUMP TROUBLE	0	12-23-77
2204-7A.A5	PANEL 710 RADWASTE FILTER DELUGE SYSTEM TROUBLE	0	12-23-77
2204-7A.A6	P 704 DIESEL GEN DELUGE SYSTEMS TROUBLE	0	12-23-77
2204-7A.B2	DIESEL FIRE PUMP ROOM FIRE		
2204-7A.B3	DIESEL FIRE PUMP START FAILURE		
2204-7A.B4	P 706 INTAKE TUNNEL DELUGE SYSTEM TROUBLE	0	12-23-77
2204-7A.B5	FIRE PUMP ROOM SPRINKLERS ACTUATED		
2204-7A.B6	FUEL HANDLING BLDG. EL 347' FIRE	0	12-23-77
2204-7A.C1	REACTOR BUILDING FIRE	0	01-31-78
2204-7A.C2	REACTOR BUILDING HYDROGEN PURGE EXHAUST FIRE	0	01-31-78
2204-7A.C3	REACTOR BUILDING PURGE UNIT A FIRE	0	01-31-78
2204-7A.C4	REACTOR BUILDING PURGE UNIT B FIRE	0	01-31-78
2204-7A.C5	FUEL HANDLING BUILDING EL. 280'-6" FIRE	0	12-23-77
2204-7A.C6	FUEL HANDLING BUILDING EL. 305' FIRE	0	12-23-77
2204-7A.D1	FUEL HANDLING BUILDING SUPPLY UNIT FIRE	0	12-23-77
2204-7A.D2	FUEL HANDLING BUILDING EXHAUST UNIT A FIRE	0	01-31-78
2204-7A.D3	FUEL HANDLING BUILDING EXHAUST UNIT B FIRE	0	01-31-78
2204-7A.D4	FUEL HANDLING BUILDING EXHAUST FIRE	0	12-23-77
2204-7A.D5	ALTITUDE TANK UNIT 1 WATER LEVEL LOW		
2204-7A.D6	ALTITUDE TANK UNIT 1 WATER TEMP. LOW		
2204-7A.E1	AUX. BUILDING SUPPLY UNIT FIRE	0	12-23-77
2204-7A.E2	AUX. BUILDING EXHAUST UNIT A FIRE	0	01-31-78
2204-7A.E3	AUX. BUILDING EXHAUST UNIT B FIRE	0	01-31-78

2204-7A.E4	AUX. BUILDING EXHAUST FIRE	0	12-23-77
2204-7A.E5	AUX. BUILDING EL. 280'-6" FIRE	0	12-23-77
2204-7A.E6	AUX. BUILDING EL. 305' FIRE	0	12-23-77
2204-7A.F1	EME[illegible]IESEL GENERATOR BLDG EAST SPRINKLERS ACTUATED	0	04-11-78
2204-7A.F2	EME[illegible].ESEL GENERATOR BLDG WEST SPRINKLERS ACTUATED	0	04-11-78
2204-7A.F3	CONTROL ROOM FILTER ASSEMBLY BYPASS FIRE	0	01-31-78
2204-7A.F4	AUX BUILDING RADWASTE GAS FILTER FIRE	0	01-31-78
2204-7A.F5	REACTOR BLDG SUPPLY UNITS FIRE	0	01-31-78
2204-7A.F6	AUX. BUILDING EL. 328' FIRE	0	12-23-77
2204-7A.G1	EMERG DIESEL GENERATOR BUILDING EL. 280'-6" FIRE	0	12-23-77
2204-7A.G2	EMERG DIESEL GENERATOR BUILDING EL. 305' FIRE	0	12-23-77
2204-7A.G3	DIESEL GENERATOR BLDG EAST FIRE		
2204-7A.G4	DIESEL GENERATOR BLDG WEST FIRE		
2204-7A.G5	EMERG DIESEL GENERATOR AIR INTAKE FIRE	0	01-31-78
2204-7A.G6	DIESEL GENERATOR OIL STORAGE TANKS FIRE	0	01-31-78
2204-7A.H1	SERVICE BUILDING EL. 280'-6" FIRE	0	12-23-77
2204-7A.H2	SERVICE BUILDING EL. 305' FIRE	0	12-23-77
2204-7A.H3	SERVICE BUILDING EL. 322' FIRE	0	12-23-77
2204-7A.H4	SERVICE BUILDING SOILED EXHAUST FIRE	0	12-23-77
2204-7A.H5	SERVICE BUILDING CLEAN RETURN/EXHAUST FIRE	0	12-23-77
2204-7A.I1	CONTROL BUILDING CONTROL ROOM FIRE	0	12-23-77
2204-7A.I2	CONTROL BUILDING CABLE ROOM FIRE	0	12-23-77
2204-7A.I3	CONTROL BUILDING MECHANICAL ROOM FIRE		
2204-7A.I4	SERVICE BLDG MULTIZONE UNIT FIRE	0	12-23-77
2204-7A.I5	SERVICE BLDG MECHANICAL EQUIP ROOM FIRE	0	12-23-77
2204-7A.J1	CONTROL BUILDING AREA WEST FIRE	0	12-23-77
2204-7A.J3	CONTROL BLDG BATTERY ROOM NO. 1 FIRE (NORTH)	0	01-31-78
2204-7A.J4	CONTROL BLDG BATTERY ROOM NO. 2 FIRE (SOUTH)	0	01-31-78
2204-7A.J5	RIVER WATER PUMP HOUSE FIRE	1	01-31-78
2204-7A.J6	CIRC. WATER PUMP HOUSE FIRE	1	01-31-78
2204-7A.K1	CONTROL BUILDING AREA EAST FIRE	0	12-23-77
2204-7A.K2	BATTERY, SWITCH GEAR/INVERTER ROOM #1 FIRE	0	01-31-78
2204-7A.K3	BATTERY, SWITCH GEAR/INVERTER ROOM #2 FIRE	0	01-31-78
2204-7A.K4	BATTERY ROOM MEZZANINE FIRE	0	01-31-78
2204-7A.K5	HALON 1301 CABLE ROOM SYSTEM ACTUATED	0	12-23-77
2204-7A.K6	HALON 1301 CABLE ROOM SYSTEM TROUBLE	0	12-23-77
2204-7A.L1	VALVE FS-V421B FUEL HAND BLDG EXH UNIT A DEL SYS ISOL	0	12-23-77
2204-7A.L2	VALVE FS-V420B FUEL HAND BLDG EXH UNIT B DEL SYS ISOL	0	12-23-77
2204-7A.L3	VALVE FS-V424B RB HYD PURGE UNIT DEL SYS ISOL	0	12-23-77
2204-7A.L4	VALVE FS-V423B RB PURGE EXH UNIT A DEL SYS ISOL	0	12-23-77
2204-7A.L5	VALVE FS-V422B RB PURGE EXH UNIT B DEL SYS ISOL	0	12-23-77
2204-7A.L6	VALVE FS-V433B RADWASTE GAS FILTER DEL SYS ISOL	0	12-23-77
2204-7A.M1	CONTROL BLDG VALVE FS-V507 BYPASS FLTR ASSY DEL SYS ISOL	0	12-23-77
2204-7A.M2	SERVICE BLDG VALVE FS-V508 HOSE CABINETS ISOLATED	0	12-23-77
2204-7A.M3	SER BLDG VALVE FS-V416 HOSE CAB. EL 280-6 ISOL	0	12-23-77
2204-7A.M4	SER BLDG VALVE FS-V414 HOSE CAB EL 305-0 ISOL	0	12-23-77
2204-7A.M5	AUX BLDG VALVE FS-V509 HOSE STATION ISOLATED	0	12-23-77
2204-7A.M6	AUX BLDG. VALVE FS-V510 HOSE STATION ISOLATED	0	12-23-77
2204-7A.N1	AUX BLDG VALVE FS-V511 CARBON FLTR DEL SYS ISOL	0	12-23-77
2204-7A.N2	AUX BLDG VALVE FS-V513 CARBON FLTR DEL SYS ISOL	0	12-23-77
2204-7A.N3	DIESEL GEN BLDG VALVE FS-V515 DEL SYS ISOL	0	12-23-77

2204-78.G3	INTAKE TUNNEL SOUTH OF DIVIDER FIRE	0	01-31-78
2204-78.G4	CW-C-1A VALVES FS-V-520/521 OPEN FIRE	0	01-31-78
2204-78.G5	CW-C-1B VALVES FS-V-526/527 OPEN FIRE	0	01-31-78
2204-78.G6	MD COOLING TOWER (A) FIRE	0	01-31-78
2204-78.H1	INTAKE TUNNEL COMBUSTIBLE HYDROCARBONS	0	01-31-78
2204-78.H2	INTAKE TUNNEL HALON DUMP (RATE OF PRESSURE)	0	01-31-78
2204-78.H3	INTAKE TUNNEL HALON DUMP (ULTRAVIOLET)	0	01-31-78
2204-78.H4	CW-C-1A VALVES FS-V-522/523 OPEN FIRE	0	01-31-78
2204-78.H5	CW-C-1B VALVES FS-V-528/529 OPEN FIRE	0	01-31-78
2204-78.H6	MECH. DRAFT COOLING TOWER (B) FIRE	0	01-31-78
2204-78.I1	CW-C-1A DELUGE SYS ISOL	0	12-23-77
2204-78.I2	INTAKE TUNNEL DELUGE SUMP PUMP RUN		
2204-78.I3	INTAKE TUNNEL FIRE DOOR (DAMPERS) MALFUNCTION	0	01-31-78
2204-78.I4	CW-C-1A VALVES FS-V-524/525 OPEN FIRE	0	01-31-78
2204-78.I5	CW-C-1B VALVES FS-V-530/531 OPEN FIRE	0	01-31-78
2204-78.I6	MECHANICAL DRAFT COOLING TOWER (C) FIRE	0	01-31-78
2204-78.J1	INTAKE TUNNEL HALON DUMP (MANUAL)	0	01-31-78
2204-78.J2	PNSL 723,724,725,726, INT TUN HALON SYSTEM TROUBLE	0	12-23-77
2204-78.J3	P 705 INTAKE TUNNEL DELUGE SYSTEM TROUBLE	0	12-23-77
2204-78.J4	CW-C-1A DELUGE SYSTEM TROUBLE	0	01-31-78
2204-78.J5	CW-C-1B DELUGE SYSTEM TROUBLE	0	01-31-78
2204-78.J6	MDCT DELUGE SYSTEM TROUBLE	0	01-31-78
2204-78.K1	ZONE DETECT P 711 AUX BLDG TROUBLE	0	12-23-77
2204-78.K2	ZONE DETECT P 713 CIRC WATER PUMP HSE TROUBLE	0	12-23-77
2204-78.K3	ZONE DETECT P 715 CONTROL BUILDING TROUBLE	0	12-23-77
2204-78.K4	ZONE DETECT P 717 DIESEL GEN. BLDG TROUBLE	0	12-23-77
2204-78.K5	ZONE DETECT P 719 FUEL HAND BLDG TROUBLE	0	12-23-77
2204-78.K6	ZONE DETECT P 721 SERVICE BLDG. TROUBLE	0	12-23-77
2204-78.L1	ZONE DETECT P 712 CHLORINATOR HOUSE TROUBLE	0	12-23-77
2204-78.L2	ZONE DETECT P 714 COAGULATOR BUILDING TROUBLE	0	12-23-77
2204-78.L3	ZONE DETECT P 716 CONT BLDG AREA TROUBLE	0	12-23-77
2204-78.L4	ZONE DETECT P 718 RIVER WATER PUMP HOUSE TROUBLE	0	12-23-77
2204-78.L5	ZONE DETECT P 720 REACTOR BLDG TROUBLE	0	12-23-77
2204-78.L6	ZONE DETECT P 722 TURB. BLDG. TROUBLE	0	12-23-77
2204-78.M1	TURB BLDG VALVE FS-V500 EAST RISER ISOLATED	0	12-23-77
2204-78.M2	TURB BLDG VALVE FS-V405B H2 SEAL OIL UNIT DEL SYS ISOL	0	12-23-77
2204-78.M3	TURB BLDG VALVE FS-V404B EAST WALL DEL. SYS ISOL	0	12-23-77
2204-78.M4	TURB BLDG VALVE FS-V403B MAIN TRANS 2A DEL SYS ISOL	0	12-23-77
2204-78.M5	TURB BLDG VALVE FS-V402B MAIN TRANS 2B DEL SYS ISOL	0	12-23-77
2204-78.M6	TURB BLDG VALVE FS-V401B AUX. TRANS. 2A DEL SYS ISOL	0	12-23-77
2204-78.N1	TURB BLDG VALVE FS-V400B AUX TRANS 2B DEL SYS ISOL	0	12-23-77
2204-78.N2	TURB BLDG VALVE FS-V502 EAST CENTRAL DEL SYS ISOL	0	12-23-77
2204-78.N3	TURB BLDG VALVE FS-V504 CENTRAL RISER HOSE STA ISOL	0	12-23-77
2204-78.N4	CW-C-1B DELUGE SYS ISOL	0	12-23-77
2204-78.N5	MECHANICAL DRAFT COOLING TOWER DEL SYS ISOL	0	12-23-77
2204-78.N6	TURB BLDG VALVE FS-V408B TURB OIL RES. DEL SYS ISOL	0	12-23-77
2204-78.O1	TURB BLDG VALVE FS-V409B SG OIL RES 1A DEL SYS ISOL	0	12-23-77
2204-78.O2	TURB BLDG VALVE FS-V410B SG OIL RES 1B DEL SYS ISOL	0	12-23-77
2204-78.O3	TURB BLDG VALVE FS-V411B SSFP BEAR PKE SYS ISOL	0	12-23-77
2204-78.O4	TURB BLDG VALVE FS-V412B TURB GEN BEAR PKE SYS ISOL	0	12-23-77
2204-78.O5	TURB BLDG VALVE FS-V506 WEST RISER HOSE STA ISOL	0	12-23-77
2204-78.O6	TURB BLDG VALVE FS-V505 WEST CENTRAL RISER ISOL	0	12-23-77

2204-7B.P1	MECH DRAFT COOL. TOWER PUMP HOUSE FIRE	0	01-31-78
2204-7B P2	MECH DRAFT COOL. TOWER PUMP HOUSE TROUBLE	0	01-31-78
2204-8	COOLANT SYSTEMS MONITORING PANEL		
2204-8.A1	REACTOR BUILDING PRESS HI	1	12-22-77
2204-8.A3	1A SSRW PUMP LUBE PRESS LO	3	09-22-78
2204-8.A4	1A/1B NUC. SER. RIVER WATER PUMP OVERLOAD	2	01-24-78
2204-8.A5	1A/1B NSRW PUMPS DISCHARGE HEADER PRESSURE LO	2	01-24-78
2204-8.A6	1A RB EM COOL BOOSTER PUMP SUC PRESS LO	1	01-24-78
2204-8.A8	SEC SERV CL COOL WTR PUMP SUC PRESS LO	0	09-14-76
2204-8.A9	R.B. PRESSURE HI	0	12-22-77
2204-8.A10	DECAY HEAT CL COOL SURGE TANK DC-T-1A LEVEL HI/LO	3	09-22-78
2204-8.A11	NS CL COOLING WATER SURG TANK LEVL HI/LO	0	09-14-76
2204-8.A12	1A MAKEUP PUMP MOTOR COOLANT FLOW LO	1	01-24-78
2204-8.A13	NUCLEAR SERV. COOLER OUTLET TEMP HI	0	09-14-76
2204-8.A14	INTERMEDIATE COOLING SURGE TANK LVL HI/LO	0	09-14-76
2204-8.A15	INTERMEDIATE COOLING TO CRD FLOW LO	1	12-22-77
2204-8.A16	POST LOCA HYDROGEN RECOMBINER SYS TROUBLE	0	12-22-77
2204-8.A17	1A/1B CORE FLOODING TANK PRESS HI/LO	2	10-25-78
2204-8.A18	FUEL STORAGE POOL LEVEL LO	0	09-14-76
2204-8.A19	SPENT FUEL COOLANT SUR TK LVL HI/LO	0	09-14-76
2204-8.A20	SPENT FUEL COOLING PUMP SUC PRESS LO	0	09-14-76
2204-8.A21	1A DH REMOVAL PUMP SUC PRESS LO	1	01-24-78
2204-8.A22	DECAY HEAT REMOVAL FLOW LO	0	09-14-76
2204-8.A23	NAOH TANK LEVEL HI/LO	0	09-14-76
2204-8.A24	RC PUMP MOTOR POWER MONITORING SYS TROUBLE	0	11-24-76
2204-8.A25	PRESSURIZER SCR MO FAILURE	0	09-14-76
2204-8.A26	PRESSURIZER HEATER GROUND FAULT	0	09-14-76
2204-8.A27	RCP TOTAL INJECTION LOOP FLOW HI/LO	1	09-22-78
2204-8.A28	RC STM GENERATOR (RC-M-1A) FLOW LO	1	03-13-78
2204-8.A29	1B R C P MOTOR OVERLOAD	0	11-24-76
2204-8.A30	1B R C P AUX OIL PUMP TRIP	0	11-24-76
2204-8.A31	R C P SEAL CONTROL BLEED OFF TEMP HI.	2	09-22-78
2204-8.A32	1B RCP LUBE SYSTEM TROUBLE	0	11-24-76
2204-8.A33	LETDOWN FLOW TEMP HI	0	09-14-76
2204-8.A35	MAKEUP TANK PRESS HI/LO	0	09-14-76
2204-8.A36	1A MAKEUP PUMP DISCHARGE PRESS LO	2	12-22-77
2204-8.A37	MAKEUP PUMP MOTOR OVERLOAD	0	09-14-76
2204-8.A38	MU PUMP MAIN BEARING LUBE PUMP TRIP	1	12-22-77
2204-8.A39	A DIESEL GEN RM SUMP LVL HI	1	04-04-77
2204-8.A40	1A DIESEL FUEL STORAGE TANK LVL HI/LO	1	01-24-78
2204-8.B1	1A RX BLDG SPRAY PUMP SUC. PRESS LO	1	12-22-77
2204-8.B3	1B SEC S P W PUMP LUBE PRESS LO	3	09-22-78
2204-8.B4	NS RW PUMP NR-P-1A/B TRIP	2	12-22-77
2204-8.B5	1A NS RW STRAINER DIFF PRESS HI	2	01-24-78
2204-8.B6	1B RB EMERG CLG BOOSTER PUMP SUCT PRESS LO	1	01-24-78
2204-8.B7	RC SYSTEM VIBRATION AND LOOSE PARTS TROUBLE	0	06-05-77
2204-8.B8	SEC SERV CL COOL WATER HEAD TK LVL HI/LO	0	09-14-76
2204-8.B9	UNIT 2 NON RAD LIQUID TO WASTE DISCHARGE	0	01-24-78
2204-8.B9	VALVE CLOSED		
2204-8.B10	1 DH CLOSED COOL SURGE TK DC-T-1B LVL HI/LO	3	09-22-78
2204-8.B11	1A NS CLOSED COOLING PUMP SUC PRESS LO	1	01-24-78
2204-8.B12	1B MU PUMP MOTOR COOLANT FLOW LO	1	01-24-78
2204-8.B13	N S CLOSED COOLING PUMP TRIP	0	01-14-77
2204-8.B14	1A IC PUMP SUCTION PRESS LO	1	01-24-78
2204-8.B15	INTERMEDIATE COOLING CRD FIL DIFF PRESS HI	0	09-14-76

2204-B.B16	SPARE		
2204-B.B18	FUEL STORAGE CASK POOL LEVEL LO	0	09-14-76
2204-B.B19	SPENT FUEL COOLANT FILTER DIFF PRESS HI	0	09-14-76
2204-B.B20	SPENT FUEL COOLING PUMP TRIP	0	09-14-76
2204-B.B21	1B D H REMOVAL PUMP SUC PRESS LO	1	01-24-78
2204-B.B22	LO PRESS INJ LOOP A FLOW HI/LO	0	09-14-76
2204-B.B23	NAOH TANK TEMP HI/LO	0	09-14-76
2204-B.B24	BORATED WATER RECIRC PUMP SUC PRESS LO	0	09-14-76
2204-B.B25	PRESSURIZER SCR #9 FAILURE	0	09-14-76
2204-B.B26	PRESSURIZER LEVEL HI/LO	0	09-14-76
2204-B.B27	RX COOLANT PUMP LOOP SEAL INJ FLOW LO	1	09-22-78
2204-B.B28	RX COOLANT TO S/G RC-M-1B FLOW LO	1	01-24-78
2204-B.B29	1A REACTOR COOLANT PUMP MTR OVERLOAD	0	11-24-76
2204-B.B30	1A RX COOLANT PUMP AUX OIL PUMP TRIP	0	11-24-76
2204-B.B31	RC PUMP BEARING INLET TEMP HI	1	03-13-78
2204-B.B32	1A RC PUMP LUBE SYS TROUBLE	0	11-24-76
2204-B.B33	PRESSURIZER MU FLOW HI	0	09-14-76
2204-B.B34	MU TANK LEVEL HI/LO	1	01-24-78
2204-B.B35	1B MU PUMP DISCHARGE PRESS LO	2	12-22-77
2204-B.B38	MU PUMP AUX BEARING LUBE PUMP TRIP	0	09-14-76
2204-B.B39	DIESEL GEN RM SUMP LEVEL HI	1	04-04-77
2204-B.B40	1B DIESEL FUEL STORAGE TANK LEVEL HI/LO	1	01-24-78
2204-B.C1	1B RX BLDG SPRAY PUMP SUC PRESS LO	1	12-22-77
2204-B.C2	RB SPRAY PUMP SUC HEADER VALVE CLOSED	1	12-22-77
2204-B.C3	1C SEC SERV R M PUMP LUBE PRESS LO	2	09-22-78
2204-B.C4	1C/1D NSRW PUMP OVERLOAD	2	01-24-78
2204-B.C5	1C/1D NSRW PUMPS DISCHARGE HEADER PRESSURE LO	2	12-22-77
2204-B.C6	1C RB EMERG. COOLING - BOOSTER PUMP SUC PRESS LO	1	01-24-78
2204-B.C7	MECHANICAL DRAFT COOLING TOWER TROUBLE	0	06-05-77
2204-B.C8	SSCC SYSTEM DIFF PRESS HI/LO	0	09-14-76
2204-B.C10	1A DH CLOSED COOL WATER PUMP SUC PRESS LO	1	12-22-77
2204-B.C11	1A NSCC PUMP SUCTION PRESS LO	1	12-22-77
2204-B.C12	1C RU PUMP MOTOR COOLANT FLOW LO	1	12-22-77
2204-B.C13	1A RB SPRAY MOTOR COOLING FLOW LO	0	09-14-76
2204-B.C14	1B INTERMEDIATE COOLING PUMP SUC PRESS LO	1	12-22-77
2204-B.C15	CONTROL ROD DRIVE TEMP HI	0	02-06-78
2204-B.C16	H2 SO # GAS TO MU SYS PRESS HI/LO	0	06-05-77
2204-B.C17	1A/1B CORE FLOODING TANK LEVEL HI/LO	1	12-22-77
2204-B.C19	SPENT FUEL DEMINERALIZER DIFF PRESS HI	0	09-14-76
2204-B.C20	DH LINE FROM RC SYSTEM TO DH REMOVAL PUMP PRESS HI	0	12-22-77
2204-B.C21	DH REMOVAL PUMP SUC TEMP HI	1	12-22-77
2204-B.C22	LO PRESS INJ LOOP B FLOW HI/LO	1	12-22-77
2204-B.C23	BORATED WATER STORAGE TNK LVL HI/LO	0	09-14-76
2204-B.C24	BORATED WATER STORAGE RECIRCULATION PUMPS TROUBLE	0	12-22-77
2204-B.C25	PRESSURIZER SCR #10 FAILURE	0	09-14-76
2204-B.C26	PRESSURIZER LEVEL HI-HI	0	09-14-76
2204-B.C27	RX COOLANT PUMP LOOP SEAL RETURN FLOW HI	1	09-22-78
2204-B.C28	REACTOR COOLANT TOTAL FLOW LO	0	06-05-77
2204-B.C29	2B RX COOLANT PUMP MOTOR OVERLOAD	0	11-24-76
2204-B.C30	2B RX COOLANT PUMP AUX OIL PUMP TRIP	0	11-24-76
2204-B.C31	RC PUMP SEAL CAVITY PRESS HI	0	11-24-76
2204-B.C32	2B RCP LUBE SYSTEM TROUBLE	0	11-24-76
2204-B.C33	HP INJ. LOOP B FLOW HI/LO	1	09-22-78
2204-B.C34	SPARE		
2204-B.C35	MU FILTERS DIFF PRESS HI	0	09-14-76
2204-B.C36	1C MU PUMP DISCHARGE PRESS LO	3	09-22-78
2204-B.C38	MU PUMP AUX GEAR LUBE PUMP TRIP	0	09-14-76
2204-B.C39	MU PUMP GEAR LUBE PRESS LO	1	04-05-78

2204-B.C40	DF TRANS PUMP DISC FIL DIFF PRESS HI	0	06-05-77
2204-B.D1	1A R B SPRAY PUMP FLOW HI/LO	3	04-05-78
2204-B.D2	MECH DRAFT COOLING TOWER FAN TRIP	0	09-14-76
2204-B.D3	SSRW PUMP STRAINER TROUBLE	0	09-14-76
2204-B.D4	1C/1D NSRW PUMP TRIP	2	12-22-77
2204-B.D5	1B NSRW STRAINER DIFF PRESS HI	2	01-24-78
2204-B.D6	1D RB EMERG. COOLING BOOSTER PUMP SUCTION PRESS LO	1	01-24-78
2204-B.D7	MECHANICAL DRAFT COOLING TOWER FAN REVERSE ROTATION	0	06-05-77
2204-B.D8	SEC SERVICE CLOSED COOLING PUMP TRIP	0	09-14-76
2204-B.D9	SPARE		
2204-B.D10	1B DHCC WATER PUMP SUCTION PRESS LO	1	12-22-77
2204-B.D11	1C NSCC PUMP SUCTION PRESS LO	1	12-22-77
2204-B.D12	RB EMER. CLG. BOOSTER PUMP MTR COOLING FLOW LO	0	12-22-77
2204-B.D13	1B RB SPRAY MOTOR COOLING FLOW LO	0	09-14-76
2204-B.D14	INTERMEDIATE COOLING PUMP TRIP	0	09-14-76
2204-B.D15	RADWASTE PANEL SYSTEM TROUBLE	0	12-22-77
2204-B.D16	H2 GAS MANIFOLD PRESS LO	0	06-05-77
2204-B.D17	CORE FLOODING VALVE ABNORMAL (CLOSED)	0	09-14-76
2204-B.D18	CORE FLOODING VALVE ABNORMAL (OPEN)	0	09-14-76
2204-B.D19	R.B. HI PRESS SW'S TEST ACTUATED	0	12-22-77
2204-B.D20	VALVE DH-V171 OPEN	0	06-05-77
2204-B.D21	DECAY HEAT REMOVAL PUMP OVERLOAD	0	12-22-77
2204-B.D23	BORATED WATER STORG TNK LVL LO/LO	1	01-24-78
2204-B.D24	BORATED WATER STORG TNK TEMP HI/LO	0	09-14-76
2204-B.D25	PRESSURIZER SCR#11 FAILURE	0	09-14-76
2204-B.D26	DO NOT START PUMP MC-P-1A WAIT 20 MINUTES	0	11-24-76
2204-B.D27	RCP SEAL INJ RETURN FILTER DIFF PRESS HI	0	11-24-76
2204-B.D28	RX COOLANT NARROW RANGE PRESS HI	0	06-05-77
2204-B.D29	2A RCP MOTOR OVERLOAD	0	11-24-76
2204-B.D30	2A RCP AUX OIL PUMP TRIP	0	11-24-76
2204-B.D31	DO NOT START PUMP MC-P-1B WAIT 20 MINUTES	0	11-24-76
2204-B.D32	2A RCP LUBE SYSTEM TROUBLE	0	11-24-76
2204-B.D33	MP INJECTION LOOP A FLOW HI/LO	1	09-22-78
2204-B.D34	MU & PURIF DEMINERALIZER DIFF PRESS HI	0	09-14-76
2204-B.D36	1A MU PUMP SUCTION PRESS LO	2	12-22-77
2204-B.D37	MU PUMP TRIP	2	12-22-77
2204-B.D38	MU PUMP MU-P-1A MAIN LUBE PRESS LO	2	09-22-78
2204-B.D39	TURB BLDG PASSENGER ELEVATOR TROUBLE	0	01-31-78
2204-B.D40	HEAT TRACING CIRCUIT "A" TROUBLE	0	06-05-77
2204-B.E1	1B RB SPRAY PUMP FLOW HI/LO	3	04-05-78
2204-B.E2	MECH DRAFT COOL TOWER PUMP OVERLOAD	1	12-22-77
2204-B.E3	TURBINE TRIP ON LOSS OF SSCC WATER	0	12-22-77
2204-B.E4	1A NS RW PUMP LUBE PRESS LO	2	01-24-78
2204-B.E5	1C NS RW PUMP LUBE PRESS LO	2	01-24-78
2204-B.E6	RB EMERG. COOLING BOOSTER PUMP TRIP	0	12-22-77
2204-B.E7	1A DIESEL GEN COOL WATER OUTLET FLOW LO	1	01-24-78
2204-B.E9	DHCC PUMP MOTOR FLOW LO	0	09-14-76
2204-B.E10	DHCC WATER PUMP TRIP	0	09-14-76
2204-B.E11	1B DH REMOVAL PUMP COOLING FLOW LO	1	01-24-78
2204-B.E12	SEISMIC RECORDER ON	0	06-05-77
2204-B.E13	SEISMIC TRIGGER ON	0	08-18-77
2204-B.E14	INTERMEDIATE COOLING WATER TEMP HI	0	09-14-76
2204-B.E15	REACTOR COOLANT EVAPORATOR TROUBLE	0	12-22-77
2204-B.E17	RED CHANNEL TRIP	2	09-01-78
2204-B.E18	RED CHANNEL SHUTDOWN BYPASS	0	09-14-76
2204-B.E19	GREEN CHANNEL TRIP	2	09-01-78
2204-B.E20	GREEN CHANNEL SHUTDOWN BYPASS	0	09-14-76
2204-B.E21	YELLOW CHANNEL TRIP	2	09-01-78

2204-8.E22	YELLOW CHANNEL SHUTDOWN BYPASS	0	09-14-76
2204-8.E23	BLUE CHANNEL TRIP	2	09-01-78
2204-8.E24	BLUE CHANNEL SHUTDOWN BYPASS	0	09-14-76
2204-8.E25	PRESSURIZER SCR #12 FAILURE	0	09-14-76
2204-8.E26	PRESSURIZER LEVEL LO-LO	0	09-14-76
2204-8.E27	PURIF. & DEMORATING FILT DIFF PRESS HI	1	12-22-77
2204-8.E28	RX COOLANT NARROW RANGE PRESS LO	0	06-05-77
2204-8.E29	REACTOR COOLANT PUMP TRIP	0	11-24-76
2204-8.E30	REACTOR COOLANT PUMP MOTOR STATOR TEMP HI	1	08-18-77
2204-8.E31	RC PUMP UP THRUST BEARING TEMP HI	0	11-24-76
2204-8.E32	REACTOR COOLANT PUMP VIBRATION HI	0	11-24-76
2204-8.E34	FEED & BLEED ENABLED BORATE-DEBORATE	1	08-18-77
2204-8.E36	1B MU PUMP SUCTION PRESS LO	2	12-22-77
2204-8.E38	MU PUMP MU-P-1B MAIN LUBE PRESS LO	2	09-22-78
2204-8.E39	AUX BLDG. PASSENGER ELEVATOR TROUBLE	0	01-31-78
2204-8.E40	HEAT TRACING CIRCUIT B TROUBLE	0	06-05-77
2204-8.F1	N B SPRAY PUMP OVERLOAD	1	12-22-77
2204-8.F2	MECH DRAFT CLG TR PUMP DISCH		
2204-8.F2	MUR PRESS LO	0	09-14-76
2204-8.F3	SEC SERVICE RIVER WATER PUMP TRIP	0	09-14-76
2204-8.F4	1B RS RX PUMP LUBE PRESS LO	2	01-24-78
2204-8.F5	1D RS RX PUMP LUBE PRESS LO	2	01-24-78
2204-8.F7	DIESEL GEN (DF-X-1B) COOLING WATER OUTLET FLOW LO	1	03-13-78
2204-8.F8	REACTOR BUILDING SPRAY PUMP TRIP	1	12-22-77
2204-8.F9	NSCC PUMP MOTOR COOLING FLOW LO	1	12-22-77
2204-8.F10	DC SYS FLOW CONTRL VALVE ABNORMAL POSITION	0	09-14-76
2204-8.F11	1A DH REMOVAL PUMP COOLING FLOW LO	1	01-24-78
2204-8.F14	INTERMEDIATE COOLING WATER FLOW LO	0	06-05-77
2204-8.F15	SHIELD DOOR OPEN	0	10-05-77
2204-8.F16	CBA FLOOD DOOR OPEN	0	03-13-78
2204-8.F17	RED CHANNEL BYPASSED	0	09-14-76
2204-8.F18	RED CHANNEL DETECTOR POWER SUPPLY FAULT	0	09-14-76
2204-8.F19	GREEN CHANNEL BYPASSED	0	09-14-76
2204-8.F20	GREEN CHANNEL DETECTOR POWER SUPPLY FAULTO	0	09-14-76
2204-8.F21	YELLOW CHANNEL BYPASSED	0	09-14-76
2204-8.F22	YELLOW CHANNEL DETECTOR POWER SUPPLY FAULT	0	09-14-76
2204-8.F23	BLUE CHANNEL BYPASSED	0	09-14-76
2204-8.F24	BLUE CHANNEL DETECTOR POWER SUPPLY FAULT	0	09-14-76
2204-8.F25	PRESSURIZER SCR #13 FAILURE	0	09-14-76
2204-8.F27	DO NOT START PUMP RC-P-2A WAIT 20 MINUTES	0	11-24-76
2204-8.F28	REACTOR COOLANT PRESS LO-LO	1	10-25-78
2204-8.F29	REACTOR COOLANT DELTA TC HI	0	06-05-77
2204-8.F30	REACTOR COOLANT OUTLET TEMP HI	0	06-05-77
2204-8.F31	RC PUMP DOWN THRUST BEARING TEMP HI	0	11-24-76
2204-8.F32	DO NOT START PUMP RC-P-2B WAIT 20 MINUTES	0	11-24-76
2204-8.F34	BLEED & FEED AUTO TERMINATE	1	10-25-78
2204-8.F36	1C MU PUMP SUCTION PRESS LO	2	12-22-77
2204-8.F38	MU PUMP MU-P-1C MAIN LUBE PRESS LO	2	09-22-78
2204-8.F39	RX BLDG ELEV TROUBLE ALARM	0	01-31-78
2204-8.F40	CORE FLOODING VALVES ABNORMAL (CLOSED)	0	09-14-76
2204-8A	RADWASTE DISPOSAL RC LIQUID LKG RECOVERY SYSTEM		
2204-8A.A1	RC PUMP SEAL LEAKAGE FLOW HIGH	1	09-22-78
2204-8A.A3	LEAKAGE TRANSFER PUMP TRIP	0	10-05-77
2204-8A.A5	RC DRAIN TANK LEVEL HI/LO	0	10-05-77
2204-8A.A6	RC DRAIN TANK PRESSURE HI/LO	0	10-05-77

2204-8A.B3	LEAKAGE CLOSED COOLING PUMP TRIP	0	10-05-77
2204-8A.B5	RC DRAIN TANK LEVEL LO/LO	0	10-05-77
2204-9	FEED AND BLEED PANEL		
2204-9.A3	WASTE TRANSFER PUMP SUCTION PRESS LO	0	05-05-77
2204-9.A4	RC BLEED HOLD-UP TANK PRESSURE HI	0	05-05-77
2204-9.A5	DEBORATING DEMINERALIZER DIFF PRESSURE HI	0	05-05-77
2204-9.B3	WASTE TRANSFER PUMP TRIP	0	05-05-77
2204-9.B4	RC BLEED HOLD-UP TANK LEVEL HI	0	05-05-77
2204-12	RADIATION MONITORING SYSTEM		
2204-12.A1	RMS TROUBLE	0	04-21-77
	ATMOSPHERIC MONITORS		
2204-12.HP-R-219	UNIT VENT MONITOR	1	11-09-78
2204-12.HP-R-220	CONTROL ROOM INTAKE DUCT	1	11-09-78
2204-12.HP-R-221A	FH BLDG EXHAUST DUCT UPSTREAM OF FILTER	1	11-09-78
2204-12.HP-R-221B	FH BLDG EXHAUST DUCT DOWNSTREAM OF FILTERS	1	11-09-78
2204-12.HP-R-222	AUX BLDG PURGE AIR EXHAUST UPSTREAM OF FILTERS	1	11-09-78
2204-12.HP-R-225	REACTOR BLDG PURGE EXHAUST DUCT "A"	1	11-09-78
2204-12.HP-R-226	REACTOR BLDG PURGE EXHAUST DUCT "B"	1	11-09-78
2204-12.HP-R-227	REACTOR BLDG	1	11-09-78
2204-12.HP-R-228	AUX BLDG EXHAUST DOWNSTREAM OF FILTERS	1	11-09-78
2204-12.HP-R-229	HYDROGEN PURGE DUCT	1	11-09-78
2204-12.WDG-R-1489	WASTE GAS DISCHARGE	1	11-09-78
2204-12.WDG-R-1485	WASTE DECAY TANK 1A DISCHARGE	1	11-09-78
2204-12.WDG-R-1486	WASTE DECAY TANK 1B DISCHARGE	1	11-09-78
2204-12.VA-R-7486	CONDENSER VACUUM PUMP EXHAUST	1	11-09-78
	LIQUID MONITORS		
2204-12.MU-R-720	PRIMARY COOLANT LETDOWN	1	11-09-78
2204-12.IC-R-1091	INTERMEDIATE COOLING WATER LETDOWN COOLER MU-C-1B	0	01-23-78
2204-12.IC-R-1092	INTERMEDIATE COOLING WATER LETDOWN COOLER MU-C-1A	0	01-23-78
2204-12.IC-R-1093	INTERMEDIATE COOLING WATER COOLER OUTLET	1	11-09-78
2204-12.WDL-R-1311	LIQUID EFFLUENT PLANT NO. 2	1	11-09-78
2204-12.DC-R-3399	DECAY HEAT CLOSED COOLING WATER LOOP A	0	01-23-78
2204-12.DC-R-3400	DECAY HEAT CLOSED COOLING WATER LOOP B	0	01-23-78
2204-12.NS-R-3401	NUCLEAR SERVICE CLOSED COOLING WATER	1	11-09-78
2204-12.SF-R-3402	SPENT FUEL COOLING WATER SYSTEM	1	11-09-78
2204-12.WT-R-3694	WATER TREATMENT AND CONDENSATE POLISHING	0	01-23-78
2204-12.WT-R-3695	WATER TREATMENT AND CONDENSATE POLISHING	1	11-09-78
	AREA MONITORS		
2204-12.HP-R-201	CONTROL ROOM	1	11-09-78
2204-12.HP-R-202	CABLE ROOM	1	11-09-78
2204-12.HP-R-204	REACTOR BLDG EMERG. COOLING BOOSTER PUMP AREA	1	11-09-78
2204-12.HP-R-205	REACTOR COOLANT EVAPORATOR CONTROL PANEL AREA	1	11-09-78
2204-12.HP-R-206	MAKEUP TANK AREA	1	11-09-78
2204-12.HP-R-207	INTERMEDIATE COOLING PUMP AREA	1	11-09-78
2204-12.HP-R-209	MAIN FUEL HANDLING BRIDGE-REACTOR BLDG	1	11-09-78

-12.HP-R-210	AUX FUEL HAND. BRIDGE-REACTOR BLDG	1	11-09-78
-12.HP-R-211	PERSONNEL ACCESS HATCH	1	11-09-78
-12.HP-R-212	EQUIPMENT ACCESS HATCH	1	11-09-78
2204-12.HP-R-213	INCORE INSTRUMENT PANEL AREA	1	11-09-78
2204-12.HP-R-214	REACTOR BLDG DOME	1	11-09-78
2204-12.HP-R-215	FUEL HAND. BLDG - FUEL HANDLING BRIDGE	1	11-09-78
2204-12.HP-R-218	WASTE DISPOSAL STORAGE AREA	1	11-09-78
2204-12.HP-R-231	AUX BLDG SUMP TANK FILTER ROOM	1	11-09-78
2204-12.HP-R-232	MEZZANINE AREA ABOVE REACTOR BLDG SUMP FILTERS	1	11-09-78
2204-12.HP-R-233	MEZZANINE AREA ABOVE SPENT FUEL COOLING FILTER	1	11-09-78
2204-12.HP-R-234	CONTAMINATED DRAIN TANK ROOM AREA	1	11-09-78
2204-12.HP-R-3236	REACTOR BLDG PURGE UNIT AREA	1	11-09-78
2204-12.HP-R-3238	AUX BLDG EXHAUST UNIT AREA	1	11-09-78
2204-12.HP-R-3240	FUEL HAND BLDG - EXHAUST UNIT AREA	1	11-09-78
2204-13	SAFETY FEATURES ACTUATION SYSTEM		
2204-13.A2	SFAS CHANNEL TRIP (ACTUATION A)	0	03-29-77
2204-13.A3	SAFETY INJECTION NOT BYPASSED (ACTUATION A)	0	03-29-77
2204-13.A4	SFAS RELAY CABINETS LOW AIR FLOW	0	03-29-77
2204-13.A5	BS-V146 NOT OPENED	0	03-29-77
2204-13.A6	BS-V148 NOT OPENED	0	03-29-77
2204-13.A8	SFAS CHANNEL TRIP	0	03-29-77
2204-13.A9	RC SAFETY INJECTION NO BYPASSED	0	03-29-77
2204-13.A10	SFAS RELAY CABINETS LOW AIR FLOW	0	05-03-77
2204-13.A12	ISOLATION VALVE BS-V149 CLOSED	0	03-29-77
2204-13.A11	ISOLATION VALVE BS-V147 CLOSED	0	03-29-77
2204-13.B1	SFAS ANALOG CABINET 124 TROUBLE	0	03-29-77
2204-13.B2	SFAS ANALOG CABINET 126 TROUBLE	0	03-29-77
2204-13.B7	SFAS ANALOG CABINET 125 TROUBLE	0	03-29-77
2204-14	CONTROL ROD DRIVE SYSTEM		
2204-14.A1	START-UP RATE ROD WITHDRAWAL INHIBIT	0	06-28-77
2204-14.A2	ASYMMETRIC ROD PATTERN	0	06-28-77
2204-14.A3	CRD MOTOR ROTATION FAULT	0	06-28-77
2204-14.B2	SEQUENCE FAULT	0	06-28-77
2204-14.B3	GROUP 6/7 MISALIGNMENT FAULT	0	06-28-77
2204-15	CONTAINMENT INTEGRITY PANEL (ICS ALARM RESPONSES)		
2204-15.A1	RC FLOW RUNBACK IN EFFECT	1	10-25-78
2204-15.A2	HIGH LOAD LIMIT IN EFFECT	1	10-25-78
2204-15.A3	LOW LOAD LIMIT IN EFFECT	0	01-05-78
2204-15.A4	LOSS OF FEEDWATER PUMP RUNBACK IN EFFECT	1	10-25-78
2204-15.A5	ASSYMETRIC ROD RUNBACK IN EFFECT	1	10-25-78
2204-15.A6	LOSS OF R.C. PUMP RUNBACK IN EFFECT	1	10-25-78
2204-15.A7	ICS COOLING - FAN FAILURE	1	10-25-78
2204-15.B1	FEEDWATER LIMITED BY REACTOR	1	10-25-78
2204-15.B2	STEAM GEN. A ON HTU LIMIT	0	01-05-78
2204-15	STEAM GEN. B ON HTU LIMIT	1	10-25-78
2204-15..	STEAM GEN. A ON LOW LEVEL LIMIT	1	02-10-78
2204-15.B5	STEAM GEN. B ON LOW LEVEL LIMIT	1	10-25-78
2204-15.B6	REACTOR LIMITED BY FEEDWATER	0	01-05-78
2204-16	TURBINE SUPERVISORY PANEL		

2204-16.A1	TURBINE ROTOR OFF POSITION GOVERNOR END	1	09-22-78
2204-16.A2	TURBINE ROTOR OFF POSITION GENERATOR END	0	09-22-78
2204-16.A3	TURB DIFF EXPANSION GOV. END	0	09-10-76
2204-16.A4	TURBINE DIFF EXPANSION GEN. END	0	09-10-76
2204-16.B3	TURB ROTOR HIGH VIBRATION	1	09-22-78
2204-16.B6	TURB ROTOR HIGH ECCENTR	0	09-10-76
2204-17	TURBINE AUXILIARIES MONITORING PANEL		
2204-17.A1	SERVICE AIR COMPRESSOR TROUBLE	1	01-10-78
2204-17.A2	DEMINERALIZED WATER PUMP DISCH PRESS LO	0	08-25-76
2204-17.A3	CONDENSATE POLISHING SYSTEM TROUBLE	3	03-18-77
2204-17.A4	CHLORINATOR HOUSE CL2 CONCENTRATION HI	6	08-25-76
2204-17.A5	MOTOR DRIVEN EMERG FEED PUMP TRIP	0	09-16-76
2204-17.A6	TURBINE BUILD SUMP LEVEL HI	0	08-25-76
2204-17.A7	COLD CONDENSER VAC LO	1	09-27-78
2204-17.A8	HOTWELL LEVEL HI	0	08-25-76
2204-17.A9	CONDENSATE PUMP SUC STRAINER DIFF PRESS HI	0	08-25-76
2204-17.A10	CONDENSATE BOOSTER PUMP BRG OIL PRESS LO	1	12-23-77
2204-17.A11	C B P SHAFT DRIVEN OIL PUMP FAILURE	1	12-23-77
2204-17.A13	2A FEED PUMP TURB OIL FILT DIFF PRESS HI	0	09-16-76
2204-17.A14	1A FEED PUMP TURB LUBE OIL PRESS LO	1	09-27-78
2204-17.A15	1A FEED PUMP TURBINE TRIP	2	09-27-78
2204-17.A16	1B FEED PUMP TURBINE TRIP	2	09-27-78
2204-17.A17	1A FEED PUMP TURB. BRG OIL INLET TEMP HI	2	09-27-78
2204-17.A18	1A FEED PUMP TURB EXHAUST HOOD TEMP HI	1	09-27-78
2204-17.A19	1A FEED PUMP TURB TURNING GEAR NOT ENGAGED	1	09-27-78
2204-17.A20	1A FEED PUMP OIL PURIFIER TROUBLE	2	09-27-78
2204-17.A22	HEATER DRAIN PUMP STRAINER DIFF PRESS HI	0	02-16-77
2204-17.A23	HEATER DRAIN TANK LEVEL HI/LO	0	02-16-77
2204-17.A24	ANY FW HEATER BLEED STM CHECK VALVE CLOSED	0	02-16-77
2204-17.A25	3RD STAGE FW HEATER LEVEL HI-HI	0	02-16-77
2204-17.A26	3RD STAGE FW HEATER LEVEL HI/LO	0	02-16-77
2204-17.A27	2B MOIST SEP & REHEATER HI PRESS COIL DRAIN LEVEL HI/LO	2	07-19-78
2204-17.A28	1B MOIST SEP & REHEATER HI PRESS COIL DRAIN LEVEL HI/LO	2	07-19-78
2204-17.A29	MSR M-T-1B BLEED STEAM DRAIN TANK LEVEL HI/HI	0	05-03-77
2204-17.A30	TURBINE GLAND SEAL STEAM PRESS LO	0	08-25-76
2204-17.A31	TURBINE EXHAUST HOOD TEMP HI	0	08-25-76
2204-17.A32	TURBINE THROTTLE PRESS HI/LO	0	08-25-76
2204-17.A33	TURBINE THRUST BEARING OIL PRESS HI TRIP	0	08-25-76
2204-17.A34	TURBINE THROTTLE VALVE CLOSED	0	08-25-76
2204-17.A35	TURB EH PUMP 1 OIL FILT DIFF PRESS HI	0	08-25-76
2204-17.A36	TURB EH SYSTEM MAIN PUMP TRIP	0	08-25-76
2204-17.A37	TURB OIL RESERV LEVEL HI/LO	1	06-05-77
2204-17.A38	REHEAT STEAM CROSS UNDER PIPING DRAIN TANK LEVEL HI/LO	0	11-02-76
2204-17.B1	INSTRUMENT AIR COMPRESSOR TROUBLE	0	12-23-77
2204-17.B2	DEMINERALIZED WATER PUMP SUCTION PRESS LO	0	08-25-76
2204-17.B3	WATER TREATMENT SYSTEM TROUBLE	0	08-25-76
2204-17.B4	CHLORINATION SYSTEM TROUBLE	0	02-16-77
2204-17.B5	CHLORINATION HOUSE SUMP LEVEL HI	0	08-25-76
2204-17.B6	CONTROL BUILD AREA SUMP LEVEL HI	0	08-25-76
2204-17.B7	HOT CONDENSER VAC LO	0	01-12-77
2204-17.B8	HOTWELL LEVEL LO	0	08-25-76
2204-17.B9	2A CONDENSATE PUMP DISCH PRESS LO	0	08-25-76
2204-17.B11	2B EMER FEED PUMP SUCTION PRESS LO	0	05-03-77
2204-17.B12	EMER FEED PUMP EF-P-1 SUCTION PRESS LO	0	05-03-77
2204-17.B13	2B FEED PUMP TURB OIL FILTER DIFF PRESS HI	0	09-16-76
2204-17.B14	1B FEED PUMP TURBINE LUBE OIL PRESS LO	1	09-27-78
2204-17.B15	1A FEED PUMP TURB SHAFT ECCENT HI	1	09-27-78

2204-17.H16	1A FEED PUMP TURB SHAFT ECCENT HI	1	09-27-78
2204-17.H17	1B FEED PUMP TURB BEARING OIL INLET TEMP HI	2	09-27-78
2204-17.H18	1B FEED PUMP TURBINE EXHAUST HOOD TEMP HI	1	09-27-78
2204-17.H19	2A EMER FEED PUMP SUCTION PRESS LO	0	05-03-77
2204-17.H19	1B FEED PUMP TURB TURNING GEAR NOT ENGAGED	1	09-27-78
2204-17.H20	1B FEED PUMP OIL PURIFIER TROUBLE	2	09-27-78
2204-17.H21	1B FEED PUMP TURB EXHAUST VACUUM LO	1	09-27-78
2204-17.H22	2A HEATER DRAIN PUMP SUCTION PRESS LO	0	02-16-77
2204-17.H23	HEATER DRAIN PUMP TRIP	0	02-16-77
2204-17.H24	AUX STEAM SUPPLY TO RC EVAP PRESS LO	0	08-25-76
2204-17.H25	8TH STAGE FW HEATER LEVEL HI-HI	0	02-16-77
2204-17.H25	8TH STAGE FW HEATER LEVEL HI/LO	0	02-16-77
2204-17.H27	2B MOIST SEP & REHEATER LO PRESS COIL DRAIN LEVEL HI/LO	2	07-19-78
2204-17.H28	1B MOIST SEP & REHEATER LO PRESS COIL DRAIN LEVEL HI/LO	2	07-19-78
2204-17.H29	MSR MO-1-2B BLEED STEAM DRAIN TANK LEVEL HI/HI	0	05-03-77
2204-17.H30	GLAND STEAM EXHAUSTER TRIP	0	08-25-76
2204-17.H31	TURB DC CONTROL SYSTEM FAILURE	0	08-25-76
2204-17.H32	TURBINE INLET TEMP HI	0	08-25-76
2204-17.H33	TURBINE BEARING OIL PRESS LO TRIP	1	09-27-78
2204-17.H34	TURBINE ZERO SPEED	0	08-25-76
2204-17.H35	TURB MAIN EH PUMP 2 OIL FILT DIFF PRESS HI	0	08-25-76
2204-17.H36	TURB TURNING GEAR OIL PUMP TRIP	0	08-25-76
2204-17.H37	TURB OIL RESERVOIR VAPOR EXTRACTOR TRIP	1	06-05-77
2204-17.H38	TURB IEOPS TESTING OR MALFUNCTION	0	04-05-78
2204-17.C1	VACUUM DEGASSIFIER SYSTEM TROUBLE	0	10-12-78
2204-17.C2	DEMINERALIZED WATER STORG. TANK LEVEL HI/LO	1	11-15-77
2204-17.C3	CIRC WATER COOLING TOWER LEVEL LO	1	06-05-77
2204-17.C4	CIRC WATER PUMP HOUSE SUMP LEVEL HI	0	08-25-76
2204-17.C5	MOTOR DRIVEN EMERG FEED PUMP OVERLOAD	0	09-16-76
2204-17.C6	TENDON GALLERY SUMP LEVEL HI	0	08-25-76
2204-17.C7	CONDENSER VACUUM BREAKER VALVE OPEN	0	01-12-77
2204-17.C8	2A CONDENSATE STORAGE TANK LEVEL HI/LO 0	0	08-25-76
2204-17.C9	2B CONDENSATE PUMP DISCH PRESS LO	0	08-25-76
2204-17.C10	STEAM GENERATOR FEEDWATER LINE RUPTURE	1	11-06-78
2204-17.C11	CONDENSATE BOOSTER PUMP AND AUX OIL PUMP NOT RUNNING	0	05-03-77
2204-17.C12	1A FEED PUMP TURBINE GOV OVERSPEED	1	09-27-78
2204-17.C13	1A FEED PUMP TURBINE EXHAUST VACUUM LO	1	09-27-78
2204-17.C14	1A FEED PUMP TURB LUBE & CONTROL OIL PRESS LO	1	09-27-78
2204-17.C15	FEED PUMP MAIN OIL PUMP TRIP	0	09-16-76
2204-17.C16	2A FEED PUMP TURB VIBRATION HI	0	09-16-76
2204-17.C17	1A FEED PUMP TURBINE BEARING OIL OUTLET TEMP HI	1	09-27-78
2204-17.C18	1A FEED PUMP DC EMERG OIL PUMP OPERATING	1	09-27-78
2204-17.C19	2A FEED PUMP SUC STRAINER DIFF PRESS HI	0	09-16-76
2204-17.C20	FEED PUMP TURB TURNING GEAR TRIP	0	09-16-76
2204-17.C22	2B HEATER DRAIN PUMP SUCTION PRESS LO	0	02-16-77
2204-17.C23	HEATER DRAIN PUMP OVERLOAD	0	02-16-77
2204-17.C24	AUX STEAM SUPPLY BLOCK VALVES BOTH OPEN	0	08-25-76
2204-17.C25	10TH STAGE FW HEATER LEVEL HI-HI	0	02-16-77
2204-17.C25	10TH STAGE FW HEATER LEVEL HI/LO	0	02-16-77
2204-17.C27	2B MOIST SEP & REHEATER DRAIN LEVEL HI/LO	1	05-03-77
2204-17.C28	1B MOISTURE SEPERATOR REHEATER DRAIN LEVEL HI/LO	1	05-03-77
2204-17.C30	EXHAUST HOOD WATER SPRAYS ON	0	01-12-77
2204-17.C31	ATMOSPHERIC DUMP VALVE AIR FAILURE	0	05-03-77
2204-17.C32	TURBINE BEARING OIL PRESS LO	1	09-27-78
2204-17.C33	TURBINE OVERSPEED TRIP	0	08-25-76
2204-17.C34	TURBINE TURNING GEAR ENGAGED	0	08-25-76
2204-17.C35	TURB EH FLUID RETURN PRESS HI	0	08-25-76
2204-17.C36	TURB SEAL OIL BACK UP PUMP TRIP	1	09-27-78
2204-17.C37	TURB VAPOR EXTRACTOR DEMISTER DIFF PRESS HI	1	06-05-77

2204-17.01	BATTERY RM 1 H2 CONTRATION HI	0	08-25-76
2204-17.02	DEMINERALIZED WATER PUMP TRIP	0	08-25-76
2204-17.03	CIRC WATER COOLING TOWER LEVEL HI	1	06-05-77
2204-17.04	CIRCULATING WATER PUMP OVERLOAD	1	06-05-77
2204-17.05	CIRC WATER CONDUCTIVITY CONTROL PANEL TROUBLE	0	05-03-77
2204-17.06	CONTROL & SERVICE BUILD SUMP LEVEL HI	0	08-25-7
2204-17.07	CONDENSER VACUUM PUMP AUX OIL PUMP TRIP	0	05-03-7
2204-17.08	2B CONDENSATE STOR TANK LEVEL HI/LO	0	08-25-76
2204-17.09	2C CONDENSATE PUMP DISCH PRESS LO	0	08-25-76
2204-17.010	2A COND BOOSTER PUMP OIL FILT DIFF PRESS HI	0	08-25-76
2204-17.011	CONDENSATE BOOSTER PUMP AUX OIL PUMP OVERLOAD TRIP	0	08-25-76
2204-17.013	1B FEEDPUMP TURB GOV OVERSPEED	1	09-27-78
2204-17.014	1B FEED PUMP TURBINE LUBE & CONTROL OIL PRESS LO	1	09-27-78
2204-17.015	FEED PUMP AUX OIL PUMP TRIP	0	09-16-76
2204-17.016	2B FEED PUMP TURBINE VIBRATION HI	0	09-16-76
2204-17.017	1B FEED PUMP TURB GRG OIL OUTLET TEMP HI	1	09-27-78
2204-17.018	1B FEED PUMP DC EMERG. OIL PUMP OPERATING	1	09-27-78
2204-17.019	2B FEED PUMP SUC STRAINER DIFF PRESS HI	0	09-16-76
2204-17.020	FEED PUMP TURB BRACKET LEAK OFF TNK LVL HI	0	09-16-76
2204-17.022	2C HEATER DRAIN PUMP SUC PRESS LO	0	02-16-77
2204-17.023	HEATER DRAIN PUMP AUX OIL PUMP TRIP	0	02-16-77
2204-17.024	AUX STEAM SUPPLY HEADER PRESS LO	0	08-25-76
2204-17.025	11TH STAGE FW HEATER LEVEL HI-HI	0	02-16-77
2204-17.026	11TH STAGE FW HEATER LEVEL HI/LO	0	02-16-77
2204-17.027	2A MOIST SEP & REHEATER LO PRESS COIL DRAIN LEVEL HI/LO	2	07-19-78
2204-17.028	1A MOIST SEP & REHEATER LO PRESS COIL DRAIN LEVEL HI/LO	2	07-19-78
2204-17.029	GLAND STEAM CONDENSER VAC LO	0	08-25-76
2204-17.031	TURB BY-PASS CONTROL VALVE AIR FAILURE	0	05-03-77
2204-17.032	TURB THRUST BEARING OIL PRESS HI	0	08-25-76
2204-17.033	TURB CONDENSER VAC LO TRIP	0	12-23-77
2204-17.034	TURBINE TURNING GEAR TRIP	0	08-25-76
2204-17.035	TURBINE EH FLUID LEVEL HI	0	08-25-76
2204-17.036	BEARING LIFT PUMP TRIP	0	08-25-76
2204-17.037	TURBINE OIL VAPOR EXTRACTOR VACUUM LO	2	12-23-77
2204-17.E1	BATTERY RM 2 H2 CONCENTRATION HI	0	08-25-76
2204-17.E2	CIRC WATER FLUME LEVEL LO-LO	0	06-05-77
2204-17.E3	SCREEN WASH SYSTEM PUMP-SCREEN TRIP	0	08-25-76
2204-17.E4	CIRCULATING WATER PUMP TRIP	1	06-05-77
2204-17.E5	CIRC WATER ACID PUMP CONTROL PANEL TROUBLE	0	05-03-77
2204-17.E6	SECONDARY SAMPLING SYSTEM TROUBLE	0	05-03-77
2204-17.E7	CONDENSER VACUUM PUMP TRIP	0	01-12-77
2204-17.E8	CONDENSATE PUMP TRIP	0	08-25-76
2204-17.E9	CONDENSATE BOOSTER PUMP TRIP	0	08-25-76
2204-17.E10	2B CONDENSATE BOOSTER PUMP OIL FILTER DIFF PRESS HI	0	08-25-76
2204-17.E11	GLAND STEAM CONDENSATE DRAIN TANK LEVEL HI	0	08-25-76
2204-17.E12	SG 2A/2B FW LATCHING SYSTEM BYPASSED	0	11-02-76
2204-17.E14	2A STM GENERATOR LEVEL HI/LO	1	09-29-77
2204-17.E17	2A FEED PUMP TURBINE CONTROL VALVES CLOSED	0	09-16-76
2204-17.E18	1A FEED PUMP TURBINE THRUST BEARING WEAR HI	1	09-27-78
2204-17.E19	2A FEED PUMP TURB OIL TANK LEVEL HI/LO	1	06-05-77
2204-17.E20	2A FEED PUMP TURBINE DRAIN TANK LEVEL HI	0	09-16-76
2204-17.E22	MTR DRAIN PUMP LUBE OIL FILT DIFF PRESS HI	0	02-16-77
2204-17.E23	HEATER DRAIN PUMP SEAL WATER DRAIN TANK LEVEL HI/LO	0	02-16-77
2204-17.E25	13TH STAGE FW HEATER LEVEL HI-HI	0	02-16-77
2204-17.E26	13TH STAGE FW HEATER LEVEL HI/LO	0	02-16-77
2204-17.E27	2A MOIST SEP & REHEATER HI PRESS COIL DRAIN LEVEL HI/LO	2	07-19-78
2204-17.E28	1A MOIST SEP & REHEATER HI PRESS COIL DRAIN LEVEL HI/LO	2	07-19-78
2204-17.E29	MSR MO-I-1A BLEED STEAM DRAIN TANK LEVEL HI/HI	0	05-03-77

2204-17.E30	GLAND STEAM CONDENSER LEVEL HI	0	08-25-76
2204-17.E31	TURBINE INTERCEPT VALVE CLOSED	0	08-25-76
2204-17.E32	CONDENSER VACUUM LO	0	01-12-77
2204-17.E33	TURBINE RESET SWITCH OFF NORMAL	0	08-25-76
2204-17.E34	EMERG DC BEARING OIL PUMP OPERATING	0	08-25-76
2204-17.E35	TURBINE EH FLUID LEVEL LO	0	08-25-76
2204-17.E36	TURB EH FLUID LO LEVEL TRIP	1	09-27-78
2204-17.E37	GENERATOR OIL VAPOR EXTRACTOR TRIP	.	06-05-77
2204-17.F1	DOMESTIC WATER SYSTEM PRESS LO	0	08-25-76
2204-17.F2	SCREEN WASH PUMPS LUBE PRESS LO	0	08-25-76
2204-17.F3	SCREEN WASH PUMP STRAINER TROUBLE	1	08-29-77
2204-17.F4	MECHANICAL TRASH RAKE TROUBLE	0	08-25-76
2204-17.F5	CHEMICAL ADDITION SYSTEM TROUBLE	0	02-16-77
2204-17.F6	COND/FW CHEMISTRY TROUBLE	0	01-10-78
2204-17.F7	COND DRAIN TANK VA-T-1 LEVEL LO	0	12-23-77
2204-17.F8	CONDENSATE PUMP OVERLOAD	0	08-25-76
2204-17.F9	CONDENSATE BOOSTER PUMP OVERLOAD	0	08-25-76
2204-17.F10	2C COND BOOSTER PUMP OIL FILT DIFF PRESS HI	0	08-25-76
2204-17.F11	GLAND STEAM CONDENSATE DRAIN TANK LEVEL LO	0	08-25-76
2204-17.F12	SG HC-H-1A STEAM LINE RUPTURE TROUBLE	1	09-27-78
2204-17.F13	SG HC-H-1B STEAM LINE RUPTURE TROUBLE	0	09-27-78
2204-17.F14	2B STM GENERATOR LEVEL HI/LO	1	09-29-77
2204-17.F15	ICS SYSTEM TROUBLE	0	01-12-77
2204-17.F17	2B FEED PUMP TURBINE CONTROL VALVE CLOSED	0	09-16-76
2204-17.F18	1B FEED PUMP TURB THRUST BEARING WEAR HI	1	09-27-78
2204-17.F19	2B FEED PUMP TURB OIL TANK LVL HI/LO	1	06-05-77
2204-17.F20	2 B FEED PUMP TURB DRAIN TNK LVL HI	0	09-16-76
2204-17.F22	HEATER DRAIN PUMP SHAFT DRIVEN OIL PUMP FAILURE	0	02-16-77
2204-17.F26	14TH STAGE FW HEATER LEVEL HI/LO	0	02-16-77
2204-17.F27	2A MOIST SEP & REHEATER DRAIN LVL HI/LO	1	05-03-77
2204-17.F28	1A MOIST SEP & REHEATER DRAIN LVL HI/LO	1	05-03-77
2204-17.F29	MSR MS-T-2A BLEED STEAM DRAIN TANK LEVEL HI/HI	0	05-03-77
2204-17.F31	TURB REHEAT STOP VALVE CLOSED	0	08-25-76
2204-17.F32	TURB VACUUM TRIP LATCH SWITCH OFF NORMAL	0	08-25-76
2204-17.F33	TURB TRIPPED	0	08-25-76
2204-17.F34	EMER. DC BEARING OIL PUMP OVERLOAD	0	08-25-76
2204-17.F35	TURBINE EH FLUID LEVEL LO-LO	0	08-25-76
2204-17.F36	TURBINE OIL TEMP HI	0	08-25-76
2204-17.F37	TURB OIL PURIFIER TROUBLE	1	06-05-77
2204-17.F38	TURB OIL TRANSFER PUMP TROUBLE	0	12-23-77

2204-18 UNIT ELECTRIC AUXILIARIES MONITORING PANEL

2204-18.A1	GENERATOR FIELD LOSS	0	01-23-78
2204-18.A2	H2 LEAK INTO ISOLATED PHASE BUS DUCT	0	06-03-77
2204-18.A3	ISOLATED PHASE BUS DUCT TEMP HI	0	06-03-77
2204-18.A4	ISOLATED PHASE BUS DUCT CLG WATR FLOW LO	0	06-03-77
2204-18.A5	2A MAIN TRANSFORMER TROUBLE	0	06-14-77
2204-18.A6	2A AUX TRANSFORMER TROUBLE	0	11-11-76
2204-18.A7	6900 V BUS 2-1/2-2 MAIN BREAKER TRIP	0	11-11-76
2204-18.A8	6900 V BUS 2-1/2-2 MAIN BREAKER POSITION SWITCH MISMATCH	0	11-11-76
2204-18.A9	CIRC WATER PUMP MSE 4KV BUS 2-5/2-6 BRKR TRIP	0	03-30-77
2204-18.A10	MECH DRAFT COOLING TOWER 4KV BUS 2-7/2-8 BREAKER TRIP	0	03-30-77
2204-18.A11	4KV BUS 2-3 MAIN OR MAIN FEEDER TO USS BREAKER TRIP	0	02-16-77
2204-18.A12	480V BUS 2-31/2-41 FEEDER BREAKER TRIP	0	03-30-77
2204-18.A13	480V BUS 2-32/2-42 DC LOSS	0	03-30-77
2204-18.A14	480V BUS 2-34/2-44 DC LOSS	0	03-30-77
2204-18.A15	480V BUS 2-36/2-46 DC LOSS	0	03-30-77
2204-18.A17	480V USS 2-51 TRANSFORMER TEMP HI	0	03-30-77

2204-18.A18	480V BUS 2-72/2-82 MAIN OR TIE BREAKER TRIP	0	03-30-77
2204-18.A19	4KV ES BUS 2-1E/2-2E VOLTAGE LOSS	0	11-11-76
2204-18.A20	4KV ES BUS 2-1E/2-2E LOAD SEQ TIMING RELAY DC LOSS	0	11-11-76
2204-18.A21	480V ES BUS 2-11E/2-21E MAIN OR TIE BREAKER TRIP	0	11-11-76
2204-18.A22	480V ES BUS 2-12E/2-22E MAIN OR TIE BREAKER TRIP	0	11-11-76
2204-18.A23	OVER EXCITATION VOLTS/HERTZ	0	01-23-78
2204-18.A24	GENERATOR CORE MONITOR CORE WINDING HOT	0	02-01-78
2204-18.B1	GENERATOR FIELD BREAKER TRIP	0	03-30-77
2204-18.B2	EXCITER LOSS OF PULSE/BLOWN FUSE/LOSS OF POWER	0	08-12-77
2204-18.B3	GENERATOR BREAKER B2-02 TRIP	0	06-14-77
2204-18.B4	GENERATOR BREAKER B2-2602 TRIP	0	06-14-77
2204-18.B5	2A MAIN TRANSFORMER SUDDEN PRESSURE	0	06-14-77
2204-18.B6	2A AUX TRANSFORMER SUDDEN PRESSURE	0	11-11-76
2204-18.B7	6900V BUS 2-1/2-2 VOLTAGE LOSS	0	11-11-76
2204-18.B8	6900 V BUS 2-1/2-2 DC LOSS	0	11-11-76
2204-18.B9	CIRC WTR PMP MOT 4KV BUS 2-5/2-6 VOLT LOSS	0	03-30-77
2204-18.B10	MECH DRAFTING COOLING TOWER SWITCH GEAR D C LOSS	0	03-30-77
2204-18.B11	4KV BUS 2-3/2-4 VOLTAGE LOSS	0	02-16-77
2204-18.B12	480V USS 2-31 THRU 2-37 TRANSFORMER TEMP HI	0	11-11-76
2204-18.B13	480V BUS 2-42/2-42 MAIN OR TIE BRKR TRIP	0	03-30-77
2204-18.B14	480V BUS 2-34/2-44 MAIN OR TIE BRKR TRIP	0	03-30-77
2204-18.B15	480V BUS 2-36/2-46 MAIN OR TIE BRKR TRIP	0	03-30-77
2204-18.B17	480V BUS 2-51/2-61 MAIN OR TIE BRKR TRIP	0	03-30-77
2204-18.B19	4KV ES BUS 2-1E MAIN OR TIE FEEFER TO USS BRKR TRIP	0	11-11-76
2204-18.B20	4KV ES BUS 2-1E/2E MAIN BREAKER POSITION SWITCH MISMATCH	0	11-11-76
2204-18.B21	480V ES BUS 2-11E/2-21E D C LOSS	0	11-11-76
2204-18.B22	480V ES BUS 2-12E/2-22E D C LOSS	0	11-11-76
2204-18.B24	GENERATOR STATOR WINDING GROUND FAULT	0	01-23-78
2204-18.C1	GENERATOR FIELD GROUND	0	03-30-77
2204-18.C2	EXCITATION SWITCH GEAR D C LOSS	0	03-30-77
2204-18.C3	GENERATOR BREAKER B2-02 STUCK		
2204-18.C5	2B MAIN TRANSFORMER TROUBLE	0	06-14-77
2204-18.C6	2A AUX TRANSFORMER VOLTAGE LOSS	0	11-11-76
2204-18.C7	6900V BUS 2-1/2-2 GROUND	0	11-11-76
2204-18.C8	BUS 2-1/2-2 MAIN BREAKER LOCKOUT RELAY DC LOSS	0	11-11-76
2204-18.C9	4KV BUS 2-5/2-6 TIE BREAKER POSITION SWITCH MISMATCH	0	03-30-77
2204-18.C10	OSCILLOGRAPH FAIL/FLOW CHART	0	01-23-78
2204-18.C11	4KV BUS 2-3/2-4 D C LOSS	0	11-11-76
2204-18.C12	480V BUS 2-31/2-41 D C LOSS	0	11-11-76
2204-18.C13	480V USS 2-33 FEEDER BRKR TRIP OR DC LOSS	0	11-11-76
2204-18.C14	480V BUS 2-35/2-45 DC LOSS	0	11-11-76
2204-18.C15	480V BUS 2-37/2-47 DC LOSS	0	11-11-76
2204-18.C16	480V BUS 2-37/2-47 D C LOSS		
2204-18.C17	480V USS 2-61 TRANSFORMER TEMP HI	0	11-11-76
2204-18.C19	4KV ES BUS 2-1E/2-2E DC LOSS	0	11-11-76
2204-18.C20	4KV ES BUS 2-1E/2-2E MAIN OR TIE BREAKER LOCKOUT RELAY DC LOSS	0	11-11-76
2204-18.C21	480V ES USS 2-11E/2-12E TRANSFORMER TEMP HI	0	11-11-76
2204-18.C22	480V ES USS 2-31 E TRANSFORMER TEMP HI	0	11-11-76
2204-18.C24	GENERATOR STATOR WINDING GROUND FAULT RELAY DC LOSS	0	01-23-78
2204-18.D1	GENERATOR FIELD FORCING	0	08-12-77
2204-18.D2	VOLTAGE REGULATOR TRIP	0	08-12-77
2204-18.D3	GENERATOR BREAKER B2-02 TROUBLE	0	06-14-77
2204-18.D4	GENERATOR BREAKER B2-2602 TROUBLE	0	06-14-77
2204-18.D5	2B MAIN TRANSFORMER SUDDEN PRESSURE	0	06-14-77
2204-18.D6	2B AUX TRANSFORMER TROUBLE	0	11-11-76
2204-18.D7	4 KV BUS 2-7/2 - 8 TIE BREAKER POSITION SWITCH MISMATCH	0	03-30-77

2204-18.D8	BREAKERS 2B-52/2A-62 TRIP	0	03-30-77
2204-18.D9	CIRC WATER PUMP HSE SWITCHGEAR DC LOSS	0	11-11-76
2204-19.D10	MECH. DRAFT COOLING TOWER 4KV BUS 2-7/2-8 VOLTAGE LOSS	0	11-11-76
2204-18.D11	4KV BUS 2-4 MAIN OR MAIN FEEDER TO USS BREAKER TRIP	0	02-16-77
2204-18.D12	480V BUS 2-31/2-41 MAIN OR TIE BREAKER TRIP	0	03-30-77
2204-18.D13	480V BUS 2-43 FEEDER BREAKER TRIP OR DC LOSS	0	11-11-76
2204-18.D14	480V BUS 2-35/2-45 MAIN OR TIE BRKR TRIP	0	03-30-77
2204-19.D15	480V BUS 2-37/2-47 MAIN OR TIE BRKR TRIP	0	03-30-77
2204-18.D17	480V USS 2-71/2-72 TRANSFORMER TEMP HI	0	11-11-76
2204-18.D19	BUS 2-1E UNDER VOLTAGE	0	01-23-78
2204-18.D20	BUS 2-2E UNDER VOLTAGE	0	01-23-78
2204-19.D21	480V ES BUS 2-11E/2-21E FEEDER BREAKER TRIP	0	11-11-76
2204-18.D22	480V ES BUS 2-31E/2-41E MAIN OR TIE BRKR TRIP	0	11-11-76
2204-18.E1	GENERATOR FAULT TRIP	0	01-23-78
2204-19.E2	GENERATOR MOTORING OR OUT OF STEP	0	01-23-78
2204-18.E5	GENERATOR/TRANF PROTECTION LOCKOUT RELAY TRIP	0	03-30-77
2204-18.E6	2B AUX TRANSFORMER SUDDEN PRESSURE	0	11-11-76
2204-18.E8	BREAKERS 2B-52/2A-62 D C LOSS	0	11-11-76
2204-18.E9	ISOLATED PHASE BUS DUCTS AIR FLOW LO		
2204-18.E10	4KV BUS 2-3/2-4 MAIN BREAKER POSITION SWITCH MISMATCH	0	02-16-77
2204-18.E11	4KV BUS 2-3/2-4 MAIN BREAKER LOCKOUT RELAYS D C LOSS	0	11-11-76
2204-18.E12	480V USS 2-41 THRU 2-47 TRANSFORMER TEMP HI	0	11-11-76
2204-18.E14	480V BUS 2-34/2-44 FEEDER BREAKER TRIP	0	03-30-77
2204-18.E15	480V BUS 2-46 FEEDER BRKR TRIP	0	03-30-77
2204-18.E17	480V BUS 2-71/2-81 MAIN OR TIE BRKR TRIP	0	03-30-77
2204-18.E18	DIESEL GENERATOR SWGR 2DG1/2DG2 DC LOSS	0	11-11-76
2204-18.E19	4KV ES BUS 2-2E MAIN OR TIE OR FEEDER TO USS BRKR TRIP	0	11-11-76
2204-18.E20	4KV ES BUS 2-3E/2-4E TIE OR FEEDER TO USS BREAKER TRIP	0	11-11-76
2204-18.E21	480V ES BUS 2-12E/2-22E FEEDER BRKR TRIP	0	11-11-76
2204-18.E22	480V ES USS 2-41E TRANSF TEMP HI	0	11-11-76
2204-18.F1	GENERATOR H2 PANEL TROUBLE	0	03-30-77
2204-19.F2	CONTROL ROOM PANEL ANNUNCIATORS DC FAILURE	0	03-30-77
2204-18.F3	GEN/TRANSFORMER PROT PANEL D C LOSS	0	01-23-78
2204-18.F4	GENERATOR POTENTIAL TRANSFORMER FUSE BLOWN	0	05-04-78
2204-18.F5	GEN/TRANSF PROTECTION LOCKOUT RELAY DC LOSS	2	05-04-78
2204-18.F6	2B AUX TRANSFORMER VOLTAGE LOSS	0	11-11-76
2204-18.F7	500KV SUBSTATION FAULT		
2204-18.F8	ENGR. SAFEGUARD BUS TIE BETWEEN UNIT 1 & 2 CABLE FAULT	0	11-11-76
2204-19.F9	ENGR. SAFEGUARD BUS TIE BETWEEN UNIT 1 & 2 OVERCURRENT	0	11-11-76
2204-18.F10	ENG. SAFEGUARD BUS TIE BETWEEN UNIT 1 & 2 LOSS OF VOLT.	0	11-11-76
2204-18.F11	230KV BUS 4/8 DIFFERENTIAL	0	11-11-76
2204-19.F12	480V BUS 2-32/2-42 FEEDER BRKR TRIP	0	03-30-77
2204-18.F17	480V USS 2-81/2-82 TRANSFORMER TEMP HI	0	11-11-76
2204-18.F21	480V ES USS 2-21E/2-22E TRANSF TEMP HI	0	11-11-76
2204-18.F22	RIVER PUMP HOUSE SWITCHGEAR DC LOSS	0	11-11-76
2204-18.F23	RIVER PUMP HOUSE BUS 2-3E/2-4E VOLTAGE LOSS	0	11-11-76

2204-19 VITAL POWER CONTROL PANEL

2204-19.A1	RECTIFIER 2-1A/1B/1C/1D A C FAILURE	0	11-02-76
2204-19.A2	RECTIFIER 2-2A/2B/2C/2D A C FAILURE	0	11-02-76
2204-19.A3	VITAL PWR SUPPLY 2-3V LOSS OF ALTERNATE SOURCE		
2204-19.A4	VITAL PWR SUPPLY 2-1V LOSS OF ALTERNATE SOURCE	0	11-02-76
2204-19.A5	VITAL POWER SUPPLY 2-2V LOSS OF ALTERNATE SOURCE	0	11-02-76
2204-19.A6	VITAL PWR SUPPLY 2-3V LOSS OF ALTERNATE SOURCE	0	11-02-76
2204-19.A7	VITAL PWR SPLY 2-1V INVERTER SELECTED	0	11-02-76

2204-19.A8	VITAL PWR SPLY 2-2V INVERTER SELECTED	0	11-02-76
2204-19.A9	VITAL PWR SUPPLY 2-3V INVERTER SELECTED	0	11-02-76
2204-19.A10	VITAL PWR SPLY 2-4V INVERTER SELECTED	0	11-02-76
2204-19.A11	VITAL PWR SPLY 2-5V INVERTER SELECTED	0	11-02-76
2204-19.A12	VITAL PWR SPLY 2-1V FUSE BLOWN	0	11-02-76
2204-19.B1	STATION BATTERY 2-1 DISCHARGING	1	04-09-77
2204-19.B2	CIRCUIT BREAKER 1DC-5B1 TRIPPED	1	04-09-77
2204-19.B4	CIRCUIT BREAKER 1DC-12E TRIPPED	1	04-09-77
2204-19.B5	CIRCUIT BREAKER 1DC-2DC TIE BRKR CLOSED	1	04-09-77
2204-19.B6	CIRCUIT BREAKER 1DC-2DC TRIPPED	1	04-09-77
2204-19.B7	STATION BATTERY 2-2 DISCHARGING	1	04-09-77
2204-19.B8	CIRCUIT BREAKER 2DC-5B2 TRIPPED	1	04-09-77
2204-19.B10	CIRCUIT BREAKER 2DC-22E TRIPPED	1	04-09-77
2204-19.B11	CIRCUIT BREAKER 2DC-1DC TRIPPED	1	04-09-77
2204-19.B12	VITAL PWR SPLY 2-2V FUSE BLOWN	0	11-02-76
2204-19.C1	D C BUS 2-1 DC VOLTAGE	1	04-09-77
2204-19.C2	D C BUS 2-1DC FEEDER BRK TRIPPED	1	04-09-77
2204-19.C3	D C BUS 2-1DC GROUND	1	04-09-77
2204-19.C4	D C BUS 2-1DC CONTROL POWER LOST	1	04-09-77
2204-19.C5	VITAL PWR SPLY 2-4V LOSS OF ALTERNATE SOURCE	0	11-02-76
2204-19.C6	VITAL PWR SPLY 2-5V LOSS OF ALTERNATE SOURCE	0	11-02-76
2204-19.C7	D C BUS 2-2DC VOLTAGE LO	1	04-09-77
2204-19.C8	D C BUS 2-2DC FEEDER BRKR TRIPPED	1	04-09-77
2204-19.C9	D C BUS 2-2DC GROUND	1	04-09-77
2204-19.C10	D C BUS 2-2DC CONTROL POWER LOST	1	04-09-77
2204-19.C12	VITAL PWR SPLY 2-3V FUSE BLOWN	0	11-02-76
2204-19.D1	VITAL POWER SUPPLY 2-1V MALFUNCTION	0	11-02-76
2204-19.D2	VITAL POWER BUS 2-1V REGULATED POWER SELECTED	0	11-02-76
2204-19.D3	VITAL POWER SUPPLY 2-3V MALFUNCTION	0	11-02-76
2204-19.D4	VITAL POWER BUS 2-3V REGULATED POWER SELECTED	0	11-02-76
2204-19.D5	VITAL POWER SUPPLY 2-5V MALFUNCTION	0	11-02-76
2204-19.D6	VITAL POWER BUS 2-5V REGULATED POWER SELECTED	0	11-02-76
2204-19.D8	VITAL POWER SUPPLY 2-2V MALFUNCTION	0	11-02-76
2204-19.D9	VITAL POWER BUS 2-2V REGULATED POWER SELECTED	0	11-02-76
2204-19.D10	VITAL POWER SUPPLY 2-4V MALFUNCTION	0	11-02-76
2204-19.D11	VITAL POWER BUS 2-4V REGULATED POWER SELECTED	0	11-02-76
2204-19.D12	VITAL POWER SUPPLY 2-4V FUSE BLOWN	0	11-02-76
2204-19.E1	VITAL POWER SUPPLY 2-1V L1 TO GROUND	0	11-02-76
2204-19.E2	VITAL POWER SUPPLY 2-1V L2 TO GROUND	0	11-02-76
2204-19.E3	VITAL POWER SUPPLY 2-3V L1 TO GROUND	0	11-02-76
2204-19.E4	VITAL POWER SUPPLY 2-3V L2 TO GROUND	0	11-02-76
2204-19.E5	VITAL POWER SUPPLY 2-5V L1 TO GROUND	0	11-02-76
2204-19.E6	VITAL POWER SUPPLY 2-5V L2 TO GROUND	0	11-02-76
2204-19.E7	VITAL PWR SPLY 2-2V L1 TO GROUND	0	11-02-76
2204-19.E8	VITAL PWR SPLY 2-2V L2 TO GROUND	0	11-02-76
2204-19.E9	VITAL PWR SPLY 2-4V L1 TO GROUND	0	11-02-76
2204-19.E10	VITAL PWR SPLY 2-4V L2 TO GROUND	0	11-02-76
2204-19.E12	VITAL PWR SUPPLY 2-5V FUSE BLOWN	0	11-02-76
2204-19.F1	500KV CONTROL CHANNEL TRANSFER DEVICE ON	0	11-02-76
2204-19.F2	500KV CONTROL LOSS OF CARRIER CHANNEL	0	11-02-76
2204-19.F3	500KV CONTROL MASTER/REMOTE STATION MALFUNCTION	0	11-02-76
2204-19.F4	500KV CONTROL LOSS OF MICROWAVE CHANNEL	0	11-02-76
2204-19.F5	500KV CONTROL GEN BKR DC SUPPLY LOW	0	11-02-76
2204-19.F7	VITAL PWR SPLY 2-1V LOW DC VOLT	0	11-02-76
2204-19.F8	VITAL PWR SPLY 2-2V LOW DC VOLT	0	11-02-76

2204-19.F9	VITAL PWR SPLY 2-3V LOW DC VOLT	0	11-02-76
2204-19.F10	VITAL PWR SPLY 2-4V LOW DC VOLT	0	11-02-76
2204-19.F11	VITAL PWR SPLY 2-5V LOW DC VOLT	0	11-02-76
2204-25.1	HVAC REACTOR BUILDING CR GROUP		
2204-25.1A1	REACTOR BLDG COOLING FANS TRIP	0	11-15-77
2204-25.1A2	R.B. COOLING FAN AH-E-11C POWER LOSS	0	11-15-77
2204-25.1A3	R.B. PENETRATION COOLING RETURN AIR HI TEMP	1	03-11-77
2204-25.1A4	R.B. PENETRATION COOLING FANS AH-E-4B A OR B TRIP	1	03-11-77
2204-25.1A5	R.B. COOLING FAN LOCAL SWITCH NOT IN AUTO POSITION	0	11-15-77
2204-25.1B1	A-RB FAN DRIP PAN LEVEL HI	0	11-15-77
2204-25.1B2	B-RB FAN DRIP PAN LEVEL HI	0	11-15-77
2204-25.1B3	C-RB FAN DRIP PAN LEVEL HI	0	11-15-77
2204-25.1B4	D-RB FAN DRIP PAN LEVEL HI	0	11-15-77
2204-25.1B5	E-RB FAN DRIP PAN LEVEL HI	0	11-15-77
2204-25.1B6	REACTOR BLDG PURGE SUPPLY FAN TRIP	0	11-15-77
2204-25.1B7	REACTOR BLDG PURGE EXHAUST FAN TRIP	0	11-15-77
2204-25.1C1	REACTOR BLDG A-PURGE SPLY FLTER LIMIT	0	11-15-77
2204-25.1C2	REACTOR BLDG B-PURGE SPLY FLTER LIMIT	0	11-15-77
2204-25.1C3	REACTOR BLDG A-PURGE EXHAUST FLTR LMT	0	11-15-77
2204-25.1C4	REACTOR BLDG B PURGE EXHAUST FLTR LMT	0	11-15-77
2204-25.1C5	REACTOR BLDG. H2 CONTROL EXHAUST FAN TRIP	0	11-15-77
2204-25.1C6	REACTOR BLDG H2PURGE FLTR D/P HI	0	11-15-77
2204-25.1C7	REACTOR BLDG TEMP HI	0	02-10-78
2204-25.1C8	REACTOR BLDG PRESSURE HI	0	11-15-77
2204-25.1D1	REACTOR BLDG PENETRATION COOLING PRESS HI/LO	0	01-06-77
2204-25.1D2	REACTOR BLDG PENETRATION COOLING FLOW LO	0	01-06-77
2204-25.1D3	NORMAL COOLING SURGE TANK LEVEL HI/LO	0	11-15-77
2204-25.1D4	EMERGENCY CLNG BOOSTER PUMP RR-P-1A LO PRESS AUTO-START	0	11-15-77
2204-25.1D5	EMERGENCY CLNG BOOSTER PUMP RR-P-1B LO PRESS AUTO-START	0	11-15-77
2204-25.1D6	EMERGENCY CLNG BOOSTER PUMP RR-P-1C LO PRESS AUTO-START	0	11-15-77
2204-25.1D7	EMERGENCY CLNG BOOSTER PUMP RR-P-1D LO PRESS AUTO-START	0	11-15-77
2204-25.2	HVAC CONTROL BUILDING CC GROUP		
2204-25.2A1	CONTROL RM FAN COIL UNIT AH-C-19A/19B TRIP	0	01-06-77
2204-25.2A2	CONTROL ROOM SUPPLY FAN BY-PASS AH-E-4A/B TRIP	0	01-06-77
2204-25.2A3	CONTROL ROOM EXHAUST FAN AH-E-3B TRIP	0	01-06-77
2204-25.2A4	MECHANICAL ROOM FAN COIL UNIT AH-C-16A/B TRIP	0	01-06-77
2204-25.2A5	MECHANICAL ROOM FRESH AIR SUPPLY FAN AH-E-40 TRIP	0	01-06-77
2204-25.2A6	MECHANICAL ROOM EXHAUST FAN AH-E-6 TRIP	0	01-06-77
2204-25.2A7	CABLE ROOM FAN COIL AH-C-17A/B TRIP	0	01-06-77
2204-25.2A8	CABLE ROOM EXHAUST FAN AH-E-20 TRIP	0	01-06-77
2204-25.2B1	CONTROL ROOM SUPPLY FILTER AH-F-2A LIMIT	0	01-06-77
2204-25.2B2	CONTROL ROOM SUPPLY FILTER AH-F-2B LIMIT	0	01-06-77
2204-25.2B3	CONTROL RM BY-PASS PRE-FILTER AH-F-3 LIMIT	0	01-06-77
2204-25.2B4	CONTROL RM EMERG. RECIRC FILTERS DELTA P HI	0	01-06-77
2204-25.2B5	MECHANICAL RM SUPPLY FILTER LIMIT	0	01-06-77
2204-25.2B6	MECHANICAL RM SUPPLY FILTER LIMIT	0	01-06-77
2204-25.2B7	CABLE RM A SUPPLY FILTER AH-F-23A LIMIT	0	01-06-77
2204-25.2B8	CABLE RM B SUPPLY FILTER AH-F-23B LIMIT	0	01-06-77
2204-25.2C1	MECHANICAL ROOM TEMP HI	0	01-06-77
2204-25.2C2	CABLE ROOM TEMP HI	0	01-06-77
2204-25.2C3	1-BATTERY ROOM TEMP HI	0	01-06-77

2204-25.2C4	2-BATTERY ROOM TEMP HI	0	01-06-77	
2204-25.2C5	CONTR BLDG AIR DUCT CL MONITOR AH-C1S-5188 INST FAULT	0	01-06-77	
2204-25.2C6	CONTROL BLDG FANS LOW FLOW	0	01-06-77	
2204-25.2C7	CONTR BLDG AIR DUCT CL MON. AH-C1S-5188 CHLO DANGER	0	01-06-77	
2204-25.2C8	AIR INTAKE TUNNEL CL2 MON AH-C1S-5484 CHLO DANGER	0	04-19-77	
2204-25.2D1	CONTROL BLDG CHILLER UNIT EXPANSION TANK LEVEL HI/LO	0	01-06-77	
2204-25.2D2	CONTROL BLDG LIQUID COOLER PUMP AH-P-1A/B TRIP	0	01-06-77	
2204-25.2D3	CONTROL BLDG CHILLER WATER EXIT TEMP HIGH	0	01-06-77	
2204-25.2D4	CONTROL BLDG RIVER WATER BOOSTER PUMP TRIP	1	06-03-77	
2204-25.2D5	CONTR BLDG FILTER CAB. SEAL WTR TNK AH-T/S HI/LO LVL	0	01-06-77	
2204-25.3	H & V AUXILIARY BLDG GROUP CA			
2204-25.3A1	AUXILIARY BLDG SUPPLY FANS TRIP	0	06-30-77	1
2204-25.3A2	AUXILIARY BLDG EXHAUST FANS TRIP	0	06-30-77	
2204-25.3A3	AUXILIARY BLDG SUPPLY FILTER LIMIT	0	06-30-77	
2204-25.3A4	AUXILIARY BLDG EMERGENCY (A) EXHAUST FILTER LIMIT	0	06-30-77	
2204-25.3A5	AUXILIARY BLDG EMERGENCY (B) EXHAUST FILTER LIMIT	0	06-30-77	
2204-25.3A6	AUXILIARY BLDG SUPPLY FILTER DIFFERENTIAL PRESSURE HI	0	06-30-77	
2204-25.3B1	AUXILIARY BLDG PRESSURE HI/LO	0	06-30-77	
2204-25.3B2	AUXILIARY BLDG A&B RH SPRAY PUMP ROOMS TEMP HI	0	06-30-77	
2204-25.3B3	AUXILIARY BLDG ELEVE 280'-6" TEMP HI	0	06-30-77	
2204-25.3B4	AUXILIARY BLDG ELEV 305' TEMP HI	0	06-30-77	
2204-25.3B5	AUXILIARY BLDG ELEV 328' TEMP HI	0	06-30-77	
2204-25.3B6	DECAY HEAT CLR & PUMP ROOM TEMP HI	0	06-30-77	1
2204-25.3C1	AUXILIARY BLDG EMERGENCY (A) EXHAUST FILTER DP HI	0	06-30-77	
2204-25.3C2	AUXILIARY BLDG EMERGENCY (B) EXHAUST FILTER DP HI	0	06-30-77	
2204-25.3C3	AUX. BLDG. FILTER SEAL TK AH-T-C LEVEL HI/LO	0	06-30-77	
2204-25.3C4	AUX BLDG SUPPLY FANS AH-E-7A/B LOW FLOW	0	06-30-77	
2204-25.3C5	AUX BLDG EXH.FANS AH-E-8A/B/C/D LOW FLOW	0	06-30-77	
2204-25.3D3	AUX BLDG. EXH FANS AH-E-8A/B START FAILURE	0	06-30-77	
2204-25.3D4	AUX BLDG EXH FANS AH-E-8C/D START FAILURE	0	06-30-77	
2204-25.4	H & V FUEL HANDLING BUILDING GROUP CF			
2204-25.4A1	FUEL BLDG SUPPLY FAN AH-E-9A/B TRIP	0	01-06-77	1
2204-25.4A2	FUEL BLDG EXHAUST FAN AH-E-10A/B/C/D TRIP	0	01-06-77	
2204-25.4A3	FUEL BLDG SUPPLY FILTER LIMIT	0	01-06-77	
2204-25.4A4	FUEL BLDG A-EXHAUST FILTER LIMIT	0	01-06-77	
2204-25.4A5	FUEL BLDG B-EXHAUST FILTER LIMIT	0	01-06-77	
2204-25.4B1	FUEL BLDG EXHAUST FILTERS DELTA P HI	0	01-06-77	
2204-25.4B2	FUEL BLDG SUPPLY FILTER DELTA P HI	0	01-06-77	
2204-25.4B3	FUEL BLDG/AUX BLDG DELTA P HI/LO	0	01-06-77	
2204-25.4C1	FUEL BLDG ELEV 280'-6" TEMP HI	0	01-06-77	
2204-25.4C2	FUEL BLDG ELEV 305' TEMP HI	0	01-06-77	
2204-25.4C3	FUEL BLDG NEW FUEL STORAGE ELEV 331 TEMP HI	0	01-06-77	1
2204-25.4C4	FUEL BLDG ELEV 333' TEMP HI	0	01-06-77	
2204-25.4C5	FUEL BLDG ELEV 347'-6" TEMP HI	0	01-06-77	
2204-25.4D1	FUEL HAND BLDG SUPPLY FANS AH-E-9A/9B LOW FLOW	0	12-22-77	
2204-25.4D2	FUEL HAND BLDG EXH FANS AH-E-10A/B/C/D LOW FLOW	0	12-22-77	
2204-25.4D3	FUEL HAND BLDG EXH FANS AH-E-10A/10B START FAILURE	0	12-22-77	
2204-25.4D4	FUEL HAND BLDG EXH FANS AH-E-10C/10D START FAILURE	0	12-22-77	

2204-25.5	H & V MISCELLANOUS BUILDINGS GROUP CD		
2204-25.5A1	EAST DIESEL GENERATOR BLDG FAN TRIP	1	08-29-77
2204-25.5A2	WEST DIESEL GENERATOR BLDG FAN TRIP	1	08-29-77
2204-25.5A3	WEST DIESEL GENERATOR ROOM TEMP HI	1	08-29-77
2204-25.5A4	DIESEL GENERATOR SWITCHGEAR RM TEMP HI	1	08-29-77
2204-25.5A5	EAST DIESEL GEN. RM. HI TEMP	0	08-29-77
2204-25.5A6	DIESEL GEN. BLDG ROOM TEMP LOW	0	08-29-77
2204-25.5B1	SERVICE BLDG PANEL 315 TROUBLE	0	01-06-77
2204-25.5B2	TURBINE BLDG PANEL 316 TROUBLE	0	01-06-77
2204-25.5B3	CONTROL BLDG AREA PANEL 317 TROUBLE	0	01-06-77
2204-25.5B4	EVAP COOLER PANEL 318 TROUBLE	0	04-19-77
2204-25.5B5	AIR INTAKE TUNNEL PANEL 319 TROUBLE	0	04-19-77
2204-25.5B6	RIVER WATER PUMP HOUSE PANEL 320 TRBL	0	01-06-77
2204-25.5C1	CIRCLING WATER PUMPHSE PNL 321 TRBL	0	01-06-77
2204-25.5C4	MECH DRAFT COOL TWR PUMP ROOM TEMP HI/LO	0	01-06-77
2204-25.5C5	MECH DRAFT COOL TWR PUMP RM VENT FAN AH-E-60 TRIP	0	01-06-77
2204-25.5C6	COAGULATOR BLDG FILTER AH-F-43 LIMIT	0	01-06-77
2204-25.5D1	FIRE PUMPHOUSE TEMP HI	0	01-06-77
2204-25.5D2	FIRE PUMPHOUSE FAN AH-E-32 TRIP	0	01-06-77
2204-25.5D3	CHLORINATOR HOUSE FAN AH-E-44,45,46,47 TRIP	0	01-06-77
2204-25.5D4	CHLORINATOR HOUSE TEMP HI	0	01-06-77
2204-25.5D5	COAGULATOR BLDG. FAN AH-E-42 TRIP	0	01-06-77
2204-25.5D6	COAGULATOR BLDG. TEMP HI	0	01-06-77
2204-26	PANEL 26 "A" DIESEL GENERATOR		
2204-26.A1	LOW JACKET WATER PRESSURE	1	01-23-79
2204-26.A2	LOW LUBE OIL PRESSURE	0	08-18-77
2204-26.A3	HIGH GENERATOR BEARING TEMPERATURE	0	08-18-77
2204-26.A4	OVERSPEED TRIP	0	08-18-77
2204-26.A5	FUEL OIL DAY TANK LEVEL HIGH/LOW	0	08-18-77
2204-26.A6	FAILURE TO START	0	08-18-77
2204-26.A7	LOW STARTING AIR PRESSURE	0	08-18-77
2204-26.A8	ANY SWITCH NOT IN AUTOMATIC POSITION	0	08-18-77
2204-26.B1	HIGH JACKET WATER TEMPERATURE	0	08-18-77
2204-26.B2	HIGH LUBE OIL TEMPERATURE	0	08-18-77
2204-26.B3	LOW FUEL OIL PRESSURE	0	08-18-77
2204-26.B4	DIESEL GENERATOR RUNNING	0	08-18-77
2204-26.B5	GENERATOR FIELD GROUND	0	08-18-77
2204-26.B6	LOW LUBE OIL TEMPERATURE	0	08-18-77
2204-26.B7	HIGH ENGINE EXHAUST TEMPERATURE	0	08-18-77
2204-26.B8	GENERATOR D.C. LOSS OF FIELD	0	08-18-77
2204-26.C1	OPERATION OF OUT OF STEP RELAY	0	08-18-77
2204-26.C2	GENERATOR OVER VOLTAGE	0	08-18-77
2204-26.C3	LOW LUBE OIL DAY TANK LEVEL	1	10-27-77
2204-26.C4	HIGH CRANKCASE PRESSURE	0	08-18-77
2204-26.C5	HIGH FUEL OIL STRAINER DIFFERENTIAL PRESSURE	0	08-18-77
2204-26.C6	REVERSE POWER, LOSS OF EXCIT. GEN. OVERCURRENT BYPASSED	0	02-10-78
2204-26.C7	STARTING AIR MANUAL VALVE NOT FULLY OPEN	0	08-18-77
2204-26.C8	OPERATE ENGINE ALARM RESET	0	12-26-77
2204-26.D1	HIGH STATOR TEMPERATURE	0	08-18-77
2204-26.D2	LOW RIVER WATER SUPPLY PRESSURE	0	08-18-77

2204-26.D3	LOW JACKET WATER TANK LEVEL	0	08-18-77
2204-26.D4	HIGH FUEL OIL FILTER DIFFERENTIAL PRESSURE	0	08-18-77
2204-26.D5	FUEL OIL TRANSFER PUMP OVERLOAD	0	08-18-77
2204-26.D6	GENERATOR NEGATIVE PHASE SEQUENCE	0	08-18-77
2204-26.D7	LOW JACKET WATER TEMPERATURE	0	08-18-77
2204-26.D8	GENERATOR TROUBLE	0	08-18-77

2204-29 PANEL 29 "B" DIESEL GENERATOR

2204-29.A1	LOW JACKET WATER PRESSURE	1	01-25-79
2204-29.A2	LOW LUBE OIL PRESSURE	0	08-23-77
2204-29.A3	HIGH GENERATOR BEARING TEMPERATURE	0	08-23-77
2204-29.A4	OVERSPEED TRIP	0	08-23-77
2204-29.A5	FUEL OIL DAY TANK LEVEL HIGH/LOW	0	08-23-77
2204-29.A6	FAILURE TO START	0	08-23-77
2204-29.A7	LOW STARTING AIR PRESSURE	0	08-23-77
2204-29.A8	ANY SWITCH NOT IN AUTOMATIC POSITION	0	08-23-77
2204-29.B1	HIGH JACKET WATER TEMPERATURE	0	08-23-77
2204-29.B2	HIGH LUBE OIL TEMPERATURE	0	08-23-77
2204-29.B3	LOW FUEL OIL PRESSURE	0	08-23-77
2204-29.B4	DIESEL GENERATOR RUNNING	0	08-23-77
2204-29.B5	GENERATOR FIELD GROUND	0	08-23-77
2204-29.B6	LOW LUBE OIL TEMPERATURE	0	08-23-77
2204-29.B7	HIGH ENGINE EXHAUST TEMPERATURE	0	08-23-77
2204-29.B8	GENERATOR DC LOSS OF FIELD	0	08-23-77
2204-29.C1	OPERATION OF OUT OF STEP RELAY	0	08-23-77
2204-29.C2	GENERATOR OVER VOLTAGE	0	08-23-77
2204-29.C3	LOW LUBE OIL LEVEL DAY TANK	1	10-27-77
2204-29.C4	HIGH CRANKCASE PRESSURE	0	08-23-77
2204-29.C5	HIGH FUEL OIL STRAINER DIFF PRESSURE	0	08-23-77
2204-29.C6	REVERSE POWER, LOSS OF EXCIT., GEN. OVERCURRENT BYPASS.	0	02-10-78
2204-29.C7	STRTNG AIR PRL VALVE NOT FULLY OPEN	0	08-23-77
2204-29.C8	OPERATE ENGINE ALARM RESET	0	12-14-77
2204-29.D1	HIGH STATOR TEMPERATURE	0	08-23-77
2204-29.D2	LOW RIVER WATER SUPPLY PRESSURE	0	08-23-77
2204-29.D3	LOW JACKET WATER TANK LEVEL	0	08-23-77
2204-29.D4	HIGH FUEL OIL FILTER DIF PRESSURE	0	08-23-77
2204-29.D5	FUEL OIL TRANSFER PUMP OVERLOAD	0	08-23-77
2204-29.D6	GENERATOR NEGATIVE PHASE SEQUENCE	0	08-23-77
2204-29.D7	LOW JACKET WATER TEMPERATURE	0	08-23-77
2204-29.D8	GENERATOR TROUBLE	0	08-23-77

2204-301A WDL - MISCELLANEOUS LIQUIDS

2204-301A.A2	REACTOR BUILDING SUMP LEVEL HI	0	02-24-77
2204-301A.A3	2A R.B. SPRAY PUMP ROOM SUMP LEVEL HI	0	02-24-77
2204-301A.A4	MISC. WASTE HOLD-UP TANK LEVEL HI	0	02-24-77
2204-301A.A5	CONTAMINATED DRAIN TANK LEVEL HI	0	02-24-77
2204-301A.A8	CONT. DRAIN PUMP TRIP	0	02-24-77
2204-301A.B2	CONTAMINATED DRAIN TANK RM SUMP LEVEL HI	0	02-24-77
2204-301A.B3	2B RB SPRAY PUMP RM SUMP LEVEL HI	0	02-24-77
2204-301A.B4	MISC WSTE HOLD-UP TANK INLET FILTER DELTA P HI	0	02-24-77
2204-301A.B5	CONT DRAIN TANK OUTLET FILTER DELTA P HI	0	02-24-77
2204-301A.B8	AUX BUILDING SUMP TANK PUMP TRIP	0	02-24-77
2204-301A.C2	AUX BUILDING SUMP LEVEL HI	0	02-24-77

2204-301A.C3	2B DH REMOVAL PUMP ROOM SUMP LEVEL HI	0	02-24-77
2204-301A.C4	NEUTRALIZER TANK LEVEL HI	0	02-24-77
2204-301A.C6	RADWASTE PUMP SEAL WATER UNIT TRIP	0	02-24-77
2204-301A.C8	MISC WASTE TANK PUMP TRIP	0	02-24-77
2204-301A.D1	AUX BUILDING SUMP PUMP DISCH FILTER DELTA P HI	0	02-24-77
2204-301A.D2	AUX BUILDING SUMP TANK LEVEL HI	0	02-24-77
2204-301A.D3	2B DH REMOVAL PUMP ROOM SUMP LEVEL HI	0	02-24-77
2204-301A.D4	NEUTRALIZR TANK OUTLET FILTER DELTA P HI	0	02-24-77
2204-301A.D6	RADWASTE PUMP SEAL WATER PRESSURE LO	0	02-24-77
2204-301A.D8	NEUTRALIZER TANK PUMP TRIP	0	02-24-77

2204-3018 WDL - REACTOR COOLANT LIQUID

2204-3018.A2	WASTE TRANSFER PUMP SUCTION PRESS LO	0	06-28-77
2204-3018.A3	EVAP CONDENSATE PUMP SUCTION PRESS LO	0	06-28-77
2204-3018.A4	EVAP COND DEMINERLZR DIFF PRESS HI	0	06-28-77
2204-3018.A5	2 RC EVAPORATOR FEED VALVE CLOSED	0	06-28-77
2204-3018.A6	CLEAN UP DEMIN RESIN TRANSFER IN COMPLETE	0	06-28-77
2204-3018.A7	CLEANUP DEMIN INLET FILTER DIFF. PRESS HI	0	06-28-77
2204-3018.A8	DEBORATING DEMIN END OF BACKWASH	0	06-28-77
2204-3018.B2	WASTE TRANSFER PUMP TRIP	0	06-28-77
2204-3018.B3	EVAP CONDENSATE TEST TNK LVL HI	0	06-28-77
2204-3018.B5	RC DRAIN TANK LEVEL HI/LO	0	06-28-77
2204-3018.B6	CLEANUP DEMIN RESIN TRANSFER OUT COMPLETE	0	06-28-77
2204-3018.B7	CLEANUP DEMIN AFTER FILTER D P HI	0	06-28-77
2204-3018.B8	DEBORATING DEMIN END OF CAUSTIC RINSE	0	06-28-77
2204-3018.C3	EVAP COND DEMIN OUTLET RESIN TRAP DIFF PRESS HI	0	06-28-77
2204-3018.C4	CLEANUP DEMINERLZR DIFF PRESS HI	0	06-28-77
2204-3018.C5	RC DRAIN TANK PRESS HI/LO	0	06-28-77
2204-3018.C6	EVAP COND DEMIN RESIN TRANSFER IN COMPLETE	0	06-28-77
2204-3018.C7	DEBORATING DEMIN RESIN TRANSFER IN COMPLETE	0	06-28-77
2204-3018.C8	DEBORATING DEMIN END OF FAST RINSE	0	06-28-77
2204-3018.D2	RC BLEED HOLD-UP TANK PRESS HI	0	06-28-77
2204-3018.D3	RC BLEED HOLD-UP TANK LEVEL HI	0	06-28-77
2204-3018.D4	DBORATNG DEMINERLZR DIFF PRESS HI	0	06-28-77
2204-3018.D6	EVAP COND DEMIN RESIN TRANSFER OUT COMPLET	0	06-28-77
2204-3018.D7	DEBORATING DEMIN RESIN TRANSFER OUTCOMPLETE	0	06-28-77
2204-3018.D8	PLANT EFFLUENT HIGH RADIATION	0	06-28-77

2204-3028 RADWASTE - GAS & SOLID

2204-3028.A1	N2 SUPPLY TO SPENT RESIN STORAGE TANKS PRESS HI	0	04-13-77
2204-3028.A2	N2 GAS 115# SUPPLY TO REACTOR BLDG PRESS HI/LO	0	04-13-77
2204-3028.A3	N2 GAS TO CORE FLDNG TNKS PRESS HI/LO	0	04-13-77
2204-3028.A5	VENT HEADR MANIFOLD PRESS HI	0	04-13-77
2204-3028.A6	WASTE GAS COMPRESSOR TRIP	0	04-13-77
2204-3028.A7	RECLMD BORIC ACID TNK TEMP HI/LO	0	10-26-77
2204-3028.A8	CONC LIQUID WSTE TNK TEMP HI/LO	0	10-26-77
2204-3028.B1	N2 GAS 50# SUPPLY TO AUX BLDG PRESS HI/LO	0	04-13-77
2204-3028.B2	N2 STORAGE TUBE OUTLET PRESS HI/LO	0	04-13-77
2204-3028.B3	N2 MAKE-UP CORE FLD TNKS PRESS LO	0	04-13-77
2204-3028.B4	WASTE GAS FILTER TEMP HI	0	04-13-77
2204-3028.B5	WASTE GAS COMPRESSOR INLET HEADER PRESS LO	0	04-13-77
2204-3028.B6	WASTE GAS COMPRESSOR MOIST SEPARATOR WATER LEVEL HI/LO	0	04-13-77

2204-302B.A7	RECLMD BORIC ACID TNK LVL HI/LO	0	10-26-77
2204-302B.A8	CONC LIQUID WSTE TNK LVL HI/LO	0	10-26-77
2204-302B.C2	N2 HEADER PRESS HI/LO	0	04-13-77
2204-302B.C3	N2 GAS HIGH SUPPLY TO RB PRESS HI	0	04-13-77
2204-302B.C4	WSTE GAS FLTR DIFF PRESS HI	0	04-13-77
2204-302B.C5	WSTE GAS DECAY TNK WTR LVL HI	0	04-13-77
2204-302B.C8	A SPENT RESIN STRAG TNK LVL HI	0	10-26-77
2204-302B.D1	ANALYZR GAS FLOW LO	1	07-11-77
2204-302B.D2	GAS VENT HDR O2 CONC HI	0	04-13-77
2204-302B.D3	REACT BLDG N2 HDR BELOW MN-V142 PRESS HI/LO	0	04-13-77
2204-302B.D4	GAS VENT HDR. N2 CONC HI	0	04-13-77
2204-302B.D5	WSTE GAS DECAY TNK PRESS HI	0	04-13-77
2204-302B.D8	B SPENT RESIN STRAGE TNK LVL HI	0	10-26-77

2204-303 PANEL 303 CHEMICAL ADDITION SYSTEM

2204-303.A1	BORIC ACID MIX TANK LOW TEMPERATURE	0	03-11-77
2204-303.A2	RECLAIMED TANK TEMP HI	0	03-11-77
2204-303.A3	RECLAIMED BORIC ACID TANK LEVEL HI	0	03-11-77
2204-303.A5	PUMPS OVERLOAD TRIP	0	03-11-77
2204-303.B1	MIX TANK LEVEL LO	0	03-11-77
2204-303.B2	RECLAIMED TANK TEMP. LO	0	03-11-77
2204-303.B3	RECLAIMED TANK LEVEL LO	0	03-11-77
2204-303.B4	BORIC ACID PUMP STRAINER DIFF. PRESS. HI	0	03-11-77

2204-304 CONDENSATE POLISHING SYSTEM

2204-304.A1	INFLUENT HIGH CONDUCTIVITY	0	03-18-77
2204-304.A2	POLISHER #1 HIGH CONDUCTIVITY	0	03-18-77
2204-304.A3	POLISHER #1 HIGH PRESSURE DROP RESIN TRAP	0	03-18-77
2204-304.A4	POLISHER #2 HIGH CONDUCTIVITY	0	03-18-77
2204-304.A5	POLISHER #2 HIGH PRESSURE DROP RESIN TRAP	0	03-18-77
2204-304.A6	POLISHER #3 HIGH CONDUCTIVITY	0	03-18-77
2204-304.A7	POLISHER #3 HIGH PRESSURE DROP RESIN TRAP	0	03-18-77
2204-304.A8	POLISHER #4 HIGH CONDUCTIVITY	0	03-18-77
2204-304.A9	POLISHER #4 HIGH PRESSURE DROP RESIN TRAP	0	03-18-77
2204-304.A10	RECEIVING TANK HIGH CONDUCTIVITY	0	03-18-77
2204-304.A11	ACID CONCENTRATION FAULT	0	03-18-77
2204-304.A12	POLISHER #5 HIGH CONDUCTIVITY	0	03-18-77
2204-304.A13	POLISHER #5 HIGH PRESSURE DROP RESIN TRAP	0	03-18-77
2204-304.A14	POLISHER #6 HIGH CONDUCTIVITY	0	03-18-77
2204-304.A15	POLISHER #6 HIGH PRESSURE DROP RESIN TRAP	0	03-18-77
2204-304.A16	POLISHER #7 HIGH CONDUCTIVITY	0	03-18-77
2204-304.A17	POLISHER #7 HIGH PRESSURE DROP RESIN TRAP	0	03-18-77
2204-304.A18	POLISHER #8 HIGH CONDUCTIVITY	0	03-18-77
2204-304.A19	POLISHER #8 HIGH PRESSURE DROP RESIN TRAP	0	03-18-77
2204-304.A20	EFFLUENT HIGH CONDUCTIVITY	0	03-18-77
2204-304.B1	HIGH DIFFERENTIAL PRESSURE	0	03-18-77
2204-304.B2	POLISHER #1 LOW FLOW	0	03-18-77
2204-304.B3	POLISHER #1 EHAUSTED	0	03-18-77
2204-304.B4	POLISHER #2 LOW FLOW	0	03-18-77
2204-304.B5	POLISHER #2 EHAUSTED	0	03-18-77
2204-304.B6	POLISHER #3 LOW FLOW	0	03-18-77
2204-304.B7	POLISHER #3 EHAUSTED	0	03-18-77
2204-304.B9	POLISHER #4 EHAUSTED	0	03-18-77
2204-304.B8	POLISHER #4 LOW FLOW	0	03-18-77

2204-304.B10	MIX & STORAGE TANK HIGH CONDUCTIVITY	0	03-18-77
2204-304.B11	CAUSTIC CONCENTRATION FAULT	0	03-18-77
2204-304.B12	POLISHER #5 LOW FLOW	0	03-18-77
2204-304.B13	POLISHER #5 EXHAUSTED	0	03-18-77
2204-304.B14	POLISHER #6 LOW FLOW	0	03-18-77
2204-304.B15	POLISHER #6 EXHAUSTED	0	03-18-77
2204-304.B16	POLISHER #7 LOW FLOW	0	03-18-77
2204-304.B17	POLISHER #7 EXHAUSTED	0	03-18-77
2204-304.B18	POLISHER #8 LOW FLOW	0	03-18-77
2204-304.B19	POLISHER #8 EXHAUSTED	0	03-18-77
2204-304.B20	POLISHER REGENERATION SUMP LEVEL HIGH	0	03-01-77
2204-305	CYCLE MAKE UP PRETREATMENT SYSTEM		
2204-305.A1	HYDRAZINE LOW LEVEL	1	02-15-77
2204-305.A2	CAUSTIC LOW LEVEL	1	02-15-77
2204-305.A3	ACID LOW LEVEL	1	02-15-77
2204-305.A4	NEUTRALIZING TANK HIGH LEVEL	1	02-15-77
2204-305.A5	CLEARWELL HIGH LEVEL	1	02-15-77
2204-305.A6	CLEARWELL LOW LEVEL	1	02-15-77
2204-305.A7	ACID CONCENTRATION FAULT	1	02-15-77
2204-305.A8	TWO BED TRAIN "A" EXHAUSTED	1	02-15-77
2204-305.A9	ANION A PH FAULT	1	02-15-77
2204-305.A10	ANION A CONDUCTIVITY FAULT	1	02-15-77
2204-305.A11	MIXED BED TRAIN A EXHAUSTED	1	02-15-77
2204-305.A12	MIXED BED TRAIN A CONDUCTIVITY FAULT	1	02-15-77
2204-305.B1	AMMONIA LOW LEVEL	1	02-15-77
2204-305.B2	PRETREAT CHEMICALS LOW	1	02-15-77
2204-305.B3	WATER TREATMENT SUMP LEVEL HIGH	1	02-15-77
2204-305.B4	SLUDGE COLLECTION SUMP LEVEL HIGH	1	02-15-77
2204-305.B5	DC FAILURE		
2204-305.B7	CAUSTIC CONCENTRATION FAULT	1	02-15-77
2204-305.B8	TWO BED TRAIN B EXHAUSTED	1	02-15-77
2204-305.B9	ANION B PH FAULT	1	02-15-77
2204-305.B10	ANION B CONDUCTIVITY FAULT	1	02-15-77
2204-305.B11	MIXED BED TRAIN B EXHAUSTED	1	02-15-77
2204-305.B12	MIXED BED TRAIN B CONDUCTIVITY FAULT	1	02-15-77
2204-306	HAYES GAS ANALIZER		
2204-306.A1	FLOW LO	0	02-02-77
2204-306.A2	HI O2	0	02-02-77
2204-306.A3	HI H2	0	02-02-77
2204-307	HYDROGEN SEAL OIL SYSTEM		
2204-307.A1	HYDROGEN PURITY HIGH	0	04-09-77
2204-307.A2	HYDROGEN PURITY LOW	0	04-09-77
2204-307.A3	HYDROGEN PRESSURE HIGH	0	04-09-77
2204-307.A4	HYDROGEN PRESSURE LOW	0	04-09-77
2204-307.A5	HYDROGEN SUPPLY PRESSURE LOW	0	04-09-77
2204-307.B1	WATER DETECTOR HIGH	0	04-09-77
2204-307.B2	HYDROGEN TEMPERATURE HIGH	0	04-09-77
2204-307.B3	DEFOAMING TANK LEVEL HIGH	0	04-09-77
2204-307.B4	AIR SIDE SEAL OIL PUMP OFF	0	04-09-77
2204-307.B5	SEAL OIL PRESSURE LOW	0	04-09-77

2204-307.C1	HYDROGEN SIDE LEVEL LOW	0	04-09-77
2204-307.C2	SEAL OIL TURBINE BACKUP PRESSURE LOW	1	09-29-77
2204-307.C3	HYDROGEN SIDE SEAL OIL PUMP OFF	0	04-09-77
2204-307.C4	AIR SIDE SEAL OIL BACKUP PUMP RUNNING	0	04-09-77
2204-307.C5	AIR SIDE SEAL OIL BACKUP PUMP OVERLOAD	0	04-09-77
2204-307.D3	HYDROGEN SIDE SEAL OIL PUMP OVERLOAD	0	04-09-77
2204-307.D4	AIR SIDE SEAL OIL PUMP OVERLOAD	0	04-09-77

2204-308 PANEL 308 "A" DIESEL GENERATOR LOCAL PANEL

2204-308.A1	LOW JACKET WATER PRESSURE	1	01-29-79
2204-308.A2	LOW LUBE OIL PRESSURE	0	08-18-77
2204-308.A3	HIGH GENERATOR BEARING TEMPERATURE	0	08-18-77
2204-308.A4	OVERSPEED TRIP	0	08-18-77
2204-308.A5	FUEL OIL DAY TANK LEVEL HIGH/LOW	0	08-18-77
2204-308.A6	FAILURE TO START	0	08-18-77
2204-308.A7	LOW STARTING AIR PRESSURE	0	08-18-77
2204-308.A8	ANY SWITCH NOT IN AUTOMATIC POSITION	0	08-18-77
2204-308.B1	HIGH JACKET WATER TEMPERATURE	0	08-18-77
2204-308.B2	HIGH LUBE OIL TEMPERATURE	0	08-18-77
2204-308.B3	LOW FUEL OIL PRESSURE	0	08-18-77
2204-308.B4	DIESEL GENERATOR RUNNING	0	08-18-77
2204-308.B5	GENERATOR FIELD GROUND	0	08-18-77
2204-308.B6	LOW LUBE OIL TEMPERATURE	0	08-18-77
2204-308.B7	HIGH ENGINE EXHAUST TEMPERATURE	0	08-18-77
2204-308.B8	GENERATOR D.C. LOSS OF FIELD	0	08-18-77
2204-308.C1	OPERATION OF OUT OF STEP RELAY	0	08-18-77
2204-308.C2	GENERATOR OVER VOLTAGE	0	08-18-77
2204-308.C3	LOW LUBE OIL DAY TANK LEVEL	1	10-27-77
2204-308.C4	HIGH CRANKCASE PRESSURE	0	08-18-77
2204-308.C5	HIGH FUEL OIL STRAINER DIFFERENTIAL PRESSURE	0	08-18-77
2204-308.C6	REVERSE POWER,LOSS OF EXCIT.,GEN. OVERCURRENT BYPASSED	0	02-10-78
2204-308.C7	STARTING AIR MANUAL VALVE NOT FULLY OPEN	0	08-18-77
2204-308.C8	OPERATE ENGINE ALARM RESET	0	12-14-77
2204-308.D1	HIGH STATOR TEMPERATURE	0	08-18-77
2204-308.D2	LOW RIVER WATER SUPPLY PRESSURE	0	08-18-77
2204-308.D3	LOW JACKET WATER TANK LEVEL	0	08-18-77
2204-308.D4	HIGH FUEL OIL FILTER DIFFERENTIAL PRESSURE	0	08-18-77
2204-308.D5	FUEL OIL TRANSFER PUMP OVERLOAD	0	08-18-77
2204-308.D6	GENERATOR NEGATIVE PHASE SEQUENCE	0	08-18-77
2204-308.D7	LOW JACKET WATER TEMPERATURE	0	08-18-77
2204-308.D8	GENERATOR TROUBLE	0	08-18-77

SAME AS 2204-26

2204-309 PANEL 309 "B" DIESEL GENERATOR LOCAL PANEL

2204-309.A1	LOW JACKET WATER PRESSURE	1	01-29-79
2204-309.A2	LOW LUBE OIL PRESSURE	0	08-18-77
2204-309.A3	HIGH GENERATOR BEARING TEMPERATURE	0	08-18-77
2204-309.A4	OVERSPEED TRIP	0	08-18-77
2204-309.A5	FUEL OIL DAY TANK LEVEL HIGH/LOW	0	08-18-77
2204-309.A6	FAILURE TO START	0	08-18-77
2204-309.A7	LOW STARTING AIR PRESSURE	0	08-18-77
2204-309.A8	ANY SWITCH NOT IN AUTOMATIC POSITION	0	08-18-77

2204-309.B1	HIGH JACKET-WATER TEMPERATURE	0	08-18-77
2204-309.B2	HIGH LUBE OIL TEMPERATURE	0	08-18-77
2204-309.B3	LOW FUEL OIL PRESSURE	0	08-18-77
2204-309.B4	DIESEL GENERATOR RUNNING	0	08-18-77
2204-309.B5	GENERATOR FIELD GROUND	0	08-18-77
2204-309.B6	LOW LUBE OIL TEMPERATURE	0	08-18-77
2204-309.B7	HIGH ENGINE EXHAUST TEMPERATURE	0	08-18-77
2204-309.B8	GENERATOR D.C. LOSS OF FIELD	0	08-18-77
2204-309.C1	OPERATION OF OUT OF STEP RELAY	0	08-18-77
2204-309.C2	GENERATOR OVER VOLTAGE	0	08-18-77
2204-309.C3	LOW LUBE OIL DAY TANK LEVEL	1	10-27-77
2204-309.C4	HIGH CRANKCASE PRESSURE	0	08-18-77
2204-309.C5	HIGH FUEL OIL STRAINER DIFFERENTIAL PRESSURE	0	08-18-77
2204-309.C6	REVERSE POWER•LOSS OF EXCIT.•GEN. OVERCURRENT BYPASSED	0	02-10-78
2204-309.C7	STARTING AIR MANUAL VALVE NOT FULLY OPEN	0	08-18-77
2204-309.C8	OPERATE ENGINE ALARM RESET	0	12-13-77
2204-309.D1	HIGH STATOR TEMPERATURE	0	08-18-77
2204-309.D2	LOW RIVER WATER SUPPLY PRESSURE	0	08-18-77
2204-309.D3	LOW JACKET WATER TANK LEVEL	0	08-18-77
2204-309.D4	HIGH FUEL OIL FILTER DIFFERENTIAL PRESSURE	0	08-18-77
2204-309.D5	FUEL OIL TRANSFER PUMP OVERLOAD	0	08-18-77
2204-309.D6	GENERATOR NEGATIVE PHASE SEQUENCE	0	08-18-77
2204-309.D7	LOW JACKET WATER TEMPERATURE	0	08-18-77
2204-309.D8	GENERATOR TROUBLE	0	08-18-77
	SAME AS 2204-29		

2204-310 SECONDARY PLANT SAMPLING

2204-310.A1	MAIN STEAM SODIUM HI	1	06-08-78
2204-310.A2	COLD CONDENSER SODIUM HI	1	06-08-78
2204-310.A3	HOT CONDENSER SODIUM HI	1	06-08-78
2204-310.A4	CONDENSATE HYDRAZINE HI/LO	0	06-28-77
2204-310.A5	1A STEAM GENERATOR FEEDWATER HYDRAZINE HI/LO	0	06-28-77
2204-310.A6	1B STEAM GENERATOR FEEDWATER HYDRAZINE HI/LO	0	06-28-77
2204-310.A7	CONDENSATE DISSOLVED OXYGEN HI	0	06-28-77
2204-310.A8	1A STEAM GENERATOR FEEDWATER DISSOLVED OXYGEN HI	0	06-28-77
2204-310.A9	1B STEAM GENERATOR FEEDWATER DISSOLVED OXYGEN HI	0	06-28-77
2204-310.A10	DISSOLVED OXYGEN HI	0	01-23-78
2204-310.A11	MAKEUP WATER PLANT SPECIFIC CONDUCTIVITY HI	0	06-28-77
2204-310.A12	CONDENSATE POLISHER EFFLUENT CATION CONDUCTIVITY HI	1	06-08-78
2204-310.A13	CONDENSATE SPECIFIC GRAVITY HI	1	06-08-78
2204-310.A14	CONDENSATE BOOSTER PUMP CATION CONDUCTIVITY HI	1	06-08-78
2204-310.A15	1A STEAM GENERATOR FEEDWATER CATION CONDUCTIVITY HI	2	06-08-78
2204-310.A16	1B STEAM GENERATOR FEEDWATER CATION CONDUCTIVITY HI	2	06-08-78
2204-310.A17	HEATER DRAIN TANK CONDUCTIVITY HI	0	06-28-77
2204-310.A18	COLD CONDENSER CATION CONDUCTIVITY HI	1	06-08-78
2204-310.A20	HOT CONDENSER CATION CONDUCTIVITY HI	1	06-08-78
2204-310.B5	DC FAILURE	0	06-28-77
2204-310.B6	CHILLER MALFUNCTION	0	06-28-77
2204-310.B12	CONDENSATE PUMP DISCHARGE CATION CONDUCTIVITY HI	1	06-08-78
2204-310.B13	MAKEUP WATER PLANT PH HI/LO	0	06-28-77
2204-310.B14	CONDENSATE PUMP DISCHARGE PH HI/LO	0	06-28-77
2204-310.B15	1A STEAM GENERATOR FEEDWATER PH HI/LO	1	06-08-78
2204-310.B16	1B STEAM GENERATOR FEEDWATER PH HI/LO	1	06-08-78
2204-310.B17	COND POLISHER EFFLUENT PH HI/LO	1	06-08-78

2204-310.H18	MAKEUP WATER PLANT SILICA HI	0	06-28-77
2204-310.H19	COND POLISHER EFFLUENT SILICA HI	1	06-08-78
2204-310.H20	MAIN STEAM SILICA HI	1	06-08-78
2204-311	R.C. EVAPORATOR		
2204-311.A1	FEED PUMP SHUTDOWN	0	10-26-77
2204-311.A2	DISTILLATE REJECT	0	10-26-77
2204-311.A3	HI LEVEL CONCENTRATOR	0	10-26-77
2204-311.A4	HI LEVEL FEED TANK	0	10-26-77
2204-311.A5	HI LEVEL DISTILLATE RESERVOIR	0	10-26-77
2204-311.A6	HI LEVEL GAS STRIPPER	0	10-26-77
2204-311.A7	LO TEMP FEED TANK	0	10-26-77
2204-311.A8	READY FOR AUTO DISCHARGE SYSTEM AT CONCENTRATION	0	10-26-77
2204-311.B1	LOW VACCUM CONCENTRATOR	0	10-26-77
2204-311.B2	LOW VACCUM GAS STRIPPER	0	10-26-77
2204-311.B3	LOW LEVEL CONCENTRATOR	0	10-26-77
2204-311.B4	LOW LEVEL FEED TANK	0	10-26-77
2204-311.B7	LOW CONCENTRATION FLOW	0	10-26-77
2204-315	SERVICE BUILDING HVAC		
2204-315.A1	MECH. ROOM FAN COIL UNIT, AH-C-24 TRIP	1	02-14-77
2204-315.A2	MULTI ZONE FAN COIL UNIT, AH-C-36 TRIP	1	02-14-77
2204-315.A3	WATER LAB HOOD SUPPLY FAN, AH-E-33 TRIP	1	02-14-77
2204-315.A4	SOILED EXHT. FILTER, ASS'Y AH-F-27/28 DELTA HI	1	02-14-77
2204-315.A5	CLEAN EXHAUST FAN, AH-E-28 TRIP	1	02-14-77
2204-315.A6	RETURN/EXHAUST FAN, AH-E-26 TRIP	1	02-14-77
2204-315.B1	SOILED EXHAUST FAN, AH-E-23A TRIP	1	02-14-77
2204-315.B2	SOILED EXHAUST FAN, AH-E-23B TRIP	1	02-14-77
2204-315.B3	SERVICE BUILDING LIQUID COOLER PUMP AH-P-3A TRIP	1	02-14-77
2204-315.B4	SERVICE BUILDING LIQUID COOLER PUMP AH-P-3B TRIP	1	02-14-77
2204-315.B5	SERVICE BUILDING R.W. BOOSTER PUMP, NR-P-3A TRIP	2	06-08-77
2204-315.B6	SERVICE BUILDING R.W. BOOSTER PUMP, NR-P-3B TRIP	2	06-08-77
2204-315.C1	MECH. EQUIP. ROOM TEMP. HI.	1	02-14-77
2204-315.C2	SAMPLING INSTRUMENT ROOM TEMP. HI	1	02-14-77
2204-315.C3	HOT INSTRUMENT REPAIR SHOP TEMP. HI	1	02-14-77
2204-315.C4	SERV BLDG CHILLER UNIT EXPANSION TANK LEVEL HI/LO	1	02-14-77
2204-315.C5	SERVICE BLDG WTR COOLER DISCHARGE TEMP HI	1	02-14-77
2204-315.C6	WATER CHILLERS AH-C-25A/. CHILLED WATER LOW FLOW	1	02-14-77
2204-315.D1	MECH. ROOM SUPPLY FILTER AH-C-24 LIMIT	1	02-14-77
2204-315.D2	MULTI ZONE FAN COIL FILTER AH-F-25 LIMIT	1	02-14-77
2204-315.D3	SOILED EXHAUST PREFILTER, AH-F-27 LIMIT	1	02-14-77
2204-315.D4	SOILED EXHAUST FILTER, AH-F-28 DP HI	1	02-14-77
2204-316	TURBINE BUILDING H &V		
2204-316.A1	TURBINE BUILDING SUPPLY FAN AH-E-1 TRIP	1	02-15-77
2204-316.A2	TURBINE BUILDING SUPPLY FANS AH-E-1-2-3 LOW FLOW	1	02-15-77
2204-316.A3	TURBINE BUILDING SUPPLY FAN AH-E-2 TRIP	1	02-15-77
2204-316.A5	TURBINE BUILDING SUPPLY FAN AH-E-3 TRIP	1	02-15-77
2204-316.A7	NEUTRALIZER TANK AREA EXHAUST FAN AH-E-39 TRIP	1	02-15-77
2204-316.B1	TURBINE BUILDING ELEVATION 331' -6" TEMP. HI	1	02-15-77
2204-316.B2	TURBINE BUILDING ELEVATION 305' TEMP HI	1	02-15-77

2204-316.B3	TURBINE BUILDING ELEVATION 281'-6" TEMP. HI		1	02-15-77
2204-316.B4	TURBINE BUILDING SUPPLY FILTER AH-F-40 LIMIT		1	02-15-77
2204-316.B5	TURBINE BUILDING SUPPLY FILTER AH-F-39 LIMIT		1	02-15-77
2204-316.B6	TURBINE BUILDING SUPPLY FILTER, AH-F-38 LIMIT		1	02-15-77
2204-317	CONTROL BUILDING AREA HVAC			
2204-317.A1	CBA FRESH AIR FAN, AH-C-51 TRIP		1	06-05-77
2204-317.A2	CBA FAN COIL UNIT, AH-C-50A TRIP		1	06-05-77
2204-317.A3	CBA FAN COIL UNIT, AH-C-50B TRIP		1	06-05-77
2204-317.A4	RXPH AIR SUPPLY NO FLOW		1	06-05-77
2204-317.A6	CBA FANS LOW FLOW		1	06-05-77
2204-317.B1	CBA UNIT COOLER AH-C-58A THRU J TRIP		1	06-05-77
2204-317.B2	FAN COILS AH/C-58A-J FILTERS HI DP		1	06-05-77
2204-317.B3	CONTROL BLDG. REST AREA TEMP HI 0 09-09-76		1	06-05-77
2204-317.B5	AH-F-22A/B LIMIT CBA FAN COIL UNIT FILTERS		1	06-05-77
2204-317.B6	RXPH H.C. FUMES DANGER		1	06-05-77
2204-318	EVAPORATIVE COOLERS			
2204-318.A1	EVAPORATIVE COOLER RB-Z-1A SPRAY PUMP PRES. LOW		0	06-13-77
2204-318.A2	EVAPORATIVE COOLER RB-Z-1B SPRAY PUMP PRES. LOW		0	06-13-77
2204-318.A3	EVAPORATIVE COOLER RB-Z-1A TEMP HI		0	06-13-77
2204-318.A4	EVAPORATIVE COOLER RB-Z-1A TEMP. LOW		0	06-13-77
2204-318.A5	EVAPORATIVE COOLER RB-Z-1B TEMP. HI		0	06-13-77
2204-318.A6	EVAPORATIVE COOLER RB-Z-1B TEMP LO		0	06-13-77
2204-318.B1	EVAPORATIVE COOLER RB-Z-1A SPRAY PUMP TRIP		0	06-13-77
2204-318.B2	EVAPORATIVE COOLER RB-Z-1B FAN MOTOR TRIP		0	06-13-77
2204-318.B3	EVAPORATIVE COOLER RB-Z-1B SPRAY PUMP TRIP		0	06-13-77
2204-318.B4	R. B. NORMAL COOLING WATER PUMPS RB-P-1A/B TRIP		0	06-13-77
2204-318.B5	EVAPORATIVE COOLER BLOW DOWN PUMPS RB-P-2A/B TRIP		0	06-13-77
2204-318.B6	EVAPORATIVE COOLER RB-Z-1A FAN MOTOR TRIP		0	06-13-77
2204-319	AIR INTAKE TUNNEL			
2204-319.A1	AIR INTAKE TUNNEL A-FIRE DOOR CLOSED		1	08-12-77
2204-319.A2	AIR INTAKE TUNNEL B-FIRE DOOR CLOSED		1	08-12-77
2204-319.A3	AIR INTAKE TUNNEL C-FIRE DOOR CLOSED		1	08-12-77
2204-319.A4	AIR INTAKE TUNNEL D-FIRE DOOR CLOSED		1	08-12-77
2204-319.A5	AIR INTAKE TUNNEL E - FIRE DOOR CLOSED		1	08-12-77
2204-319.A6	AIR INTAKE TUNNEL F-FIRE DOOR CLOSED		1	08-12-77
2204-319.B1	AIR INTAKE TUNNEL TEMP HI		0	04-04-77
2204-319.B2	AIR INTAKE TUNNEL NORMAL SUMP WATER LEVEL - HI		0	04-04-77
2204-319.B3	AIR INTAKE TUNNEL EMERGENCY SUMP WATER LEVEL-HI		0	04-04-77
2204-319.B4	AIR INTAKE TNL CHLO MONITOR AH-C15-5484 DANGER		0	04-04-77
2204-319.B5	AIR INTAKE TNL. CHL MONITOR AH-C15-5484 INSTR		0	04-04-77
2204-320	RIVER WATER PUMP HOUSE HVAC			
2204-320.A1	RXPH FAN COIL UNIT AH-C-20A/B TRIP		1	02-15-77
2204-320.A2	RXPH SUPPLY FILTER AH-F-24A LIMIT		1	02-15-77
2204-320.A3	RXPH SUPPLY FILTER AH-F-24B LIMIT		1	02-15-77
2204-320.A4	RXPH TEMPERATURE HIGH		1	02-15-77
2204-320.A5	RXPH SWITCH GEAR ROOM 2-4E TEMP. HIGH		1	02-15-77
2204-320.A6	RXPH AIR SUPPLY FUMES HIGH		1	02-15-77
2204-320.B3	FIRE PUMP HOUSE FAN TRIP		1	02-15-77

2204-320.B5	RWPH SWITCH GEAR 2-3E ROOM TEMP. HIGH	1	02-15-77
2204-320.B6	RWPH AIR SUPPLY LOW FLOW	1	02-15-77
2204-321	CIRC. WATER PUMP HOUSE H & V		
2204-321.A1	CWPH TEMPERATURE HI	0	09-01-76
2204-321.A2	CWPH ROD F VENTILATOR AH-E-22A TRIP	0	09-01-76
2204-321.A3	CWPH ROOF VENTILATOR AH-E-22B TRIP	0	09-01-76
2204-321.A4	CWPH ROOF VENTILATOR AH-E-22C TRIP	0	09-01-76
2204-321.A5	CWPH ROOF VENTILATOR AH-E-22D TRIP	0	09-01-76
2204-321.A6	CWPH ROOF VENTILATOR AH-E-22E TRIP	0	09-01-76
2204-321.B1	CWPH ROOF VENTILATOR AH-E-22F TRIP	0	09-01-76
2204-321.B2	CWPH ROOF VENTILATOR AH-E-29 TRIP	0	09-01-76
2204-331	MECHANICAL DRAFT COOLING TOWER		
2204-331.A1	WATER TEMP. AT LOWER LOUVERS LO	0	06-05-77
2204-331.A2	COOLING TOWER WATER INLET TEMPLO	0	06-05-77
2204-331.A3	1 FAN 1/2 SPEED CONTROL LOGIC TROUBLE	0	06-05-77
2204-331.B2	COOLING TOWER WATER OUTLET TEMP LO	0	06-05-77
2204-331.B3	2 FAN 1/2 SPEED CONTROL LOGIC TROUBLE	0	06-05-77
2204-331.C2	COOLING WATER OUTLET TEMP HI	0	06-05-77
2204-331.C3	3 FAN 1/2 SPEED CONTROL LOGIC TROUBLE	0	06-05-77
2204-331.D1	RIVER WATER DISCHARGE TEMP HI	0	06-05-77
2204-331.E1	RIVER WATER SUPPLY TEMP LO	0	06-05-77
2204-331.F3	INSTRUMENT POWER SUPPLY FAILURE	0	06-05-77
2204-333/334	CIRCULATING WATER CHEMICAL ADDITION		
2204-333.A1	PH LOW-CIRCULATING WATER	0	02-02-77
2204-333.A2	PH HIGH-CIRCULATING WATER	0	02-02-77
2204-333.A3	ACID STORAGE TANK LEVEL LO CW-CAH-3793	0	02-02-77
2204-334.A1	CONDUCTIVITY HIGH CIRCULATING WATER	0	02-02-77
2204-336	VACUUM DEGASIFIER		
2204-336.A1	DEGASIFIER CLEARWELL LEVEL LO	0	02-02-77
2204-336.A2	DEGASIFIER CLEARWELL LEVEL HI	0	02-02-77
2204-336.A3	FIRST STAGE VAC. DEGASIFIER VAC LO	0	02-02-77
2204-336.A4	SECOND STAGE VAC. DEGASIFIER VAC LO	0	02-02-77
2204-336.B1	BOTH TRANSFER PUMPS STOPPED	0	02-02-77
2204-336.B2	AT LEAST 2 OF 3 VAC. PUMPS STOPPED	0	02-02-77
2204-336.B3	TRANSFER PUMP SUCTION TEMP. HI	0	02-02-77
2204-337	HYDROGEN RECOMBINER SYSTEM		
2204-337.A1	HEAT EXCHANGER OFF	0	10-13-77
2204-337.A2	BLOWER OFF	0	10-13-77
2204-337.A3	HEATER OUTLET GAS TEMPERATURE HIGH	0	10-13-77
2204-337.A4	REACTION CHAMBER TEMPERATURE HIGH	0	10-13-77

2204-337.A5	GAS RETURN TEMPERATURE HIGH		0	10-13-77
2204-337.B1	CIRCUIT BREAKER TRIPPED		0	10-13-77
2204-337.B2	LOW FLOW		0	10-13-77
2204-337.B4	REACTION CHAMBER GAS TEMPERATURE LOW		0	10-13-77
2204-340	INSTRUMENT AIR COMPRESSOR			
2204-340.A1	INSTRUMENT AIR DRYER TROUBLE		1	05-27-77
2204-340.A2	"A" INSTRUMENT AIR COMPRESSOR OIL PRESS LO		1	05-27-77
2204-340.A3	"A" INSTRUMENT AIR COMPRESSOR DISCH. PRESS HI		1	05-27-77
2204-340.A4	"A" INSTRUMENT AIR COMPRESSOR RECEIVER PRESS LO		1	05-27-77
2204-340.A5	"A" INSTRU AIR COMPRESSOR AIR DISCH. TEMP HI		1	05-27-77
2204-340.A6	"A" INSTRU AIR COMPRES COOLING WATER TEMP HI		1	05-27-77
2204-340.B2	"B" INSTRUMENT AIR COMPRESSOR OIL PRESSURE LO		1	05-27-77
2204-340.B3	"B" INSTRUMENT AIR COMPRESSOR DISCH. PRESS HI		1	05-27-77
2204-340.B4	"B" INSTRUMENT AIR COMPRESSOR RECEIVER PRESS LO		1	05-27-77
2204-340.B5	"B" INSTRUMENT AIR COMPRESSOR AIR DISCH. TEMP HI		1	05-27-77
2204-340.B6	"B" INSTRU AIR COMPRES COOLING WATER TEMP HI		1	05-27-77
2204-341	SERVICE AIR COMPRESSORS			
2204-341.A1	"A" SERVICE AIR COMPRESSOR OIL PRESSURE LO		0	02-24-77
2204-341.A2	"A" SERVICE AIR COMPRESSOR DISCHARGE PRESSURE HI		0	02-24-77
2204-341.A3	"A" SERVICE AIR COMPRESSOR RECEIVER PRESSURE LO		0	02-24-77
2204-341.A4	"A" SERVICE AIR COMPRESSOR AIR DISCHARGE TEMP. HI		0	02-24-77
2204-341.A5	"A" SERVICE AIR COMPRESSOR COOLING WATER TEMP. HI		0	02-24-77
2204-341.B1	"B" SERVICE AIR COMPRESSOR OIL PRESSURE LO		0	02-24-77
2204-341.B2	"B" SERVICE AIR COMPRESSOR DISCHARGE PRESSURE HI		0	02-24-77
2204-341.B3	"B" SERVICE AIR COMPRESSOR RECEIVER PRESSURE LO		0	02-24-77
2204-341.B4	"B" SERVICE AIR COMPRESSOR AIR DISCHARGE TEMP HI		0	02-24-77
2204-341.B5	"B" SERVICE AIR COMPRESSOR COOLING WATER TEMP HI		0	02-24-77
2204-341.C1	"C" SERVICE AIR COMPRESSOR OIL PRESSURE LO		0	02-24-77
2204-341.C2	"C" SERVICE AIR COMPRESSOR DISCHARGE PRESSURE HI		0	02-24-77
2204-341.C4	"C" SERVICE AIR COMPRESSOR AIR DISCHARGE TEMP. HI		0	02-24-77
2204-341.C5	"C" SERVICE AIR COMPRESSOR COOLING WATER TEMP. HI		0	02-24-77
2300	SURVEILLANCE PROCEDURES (217)			
2301-S1	SHIFT AND DAILY CHECKS		15	03-14-79
2301-D1	RCS INVENTORY	4.4.6.2.D	3	02-05-79
2301-W1	WEEKLY SURVEILLANCE CHECKS		5	12-23-78
2301-W2	STATION STORAGE BATTERIES AND CHARGERS WEEKLY CHECK		2	01-28-78
2301-W2		4.8.2.3.2.A		
2301-M1	POST ACCIDENT MONITORING INST. CHANNEL CHECK	4.3.3.6	1	04-27-78
2301-M2	BORON INJECTION SYSTEM VALVE LINEUP VERIFICATION		2	06-08-78
2301-M2		4.1.2.1.B/4.1.2.2.B		
2301-M3	SEISMIC INSTRUMENTATION CHECK	4.3.3.3.1	0	02-16-77
2301-M4	REMOTE SHUTDOWN INSTRUMENTATION	4.3.3.5	3	08-22-78
2301-M5	RCP SEAL RETURN MEASUREMENT	4.4.6.2.C	2	01-11-79
2301-M6	CFT-ISOLATION VALVE BREAKER POSIT. VERIFICATION	4.5.1.C	2	04-11-78
2301-M7	ECCS SUBSYSTEM VALVE POSITION VERI	4.5.2.B/4.5.3.B	2	05-04-78
2301-M8	CONTAINMENT INTEGRITY VERIFICATION	4.6.1.1.A	7	02-05-79
2301-M9	BLDG. SPRAY VALVE LINEUP VERIFICATION	4.6.2.1.A/4.6.2.2.A	2	09-14-77

2301-M10	NSCCW VALVE LINEUP VERIFICATION	4.7.3.1.A	2	03-21-78
2301-M11	DHCCW VALVE LINEUP VERIFICATION	4.7.3.2.A	3	01-24-78
2301-M12	NSRW VALVE LINEUP VERIFICATION	4.7.4.1.A	4	03-14-79
2301-R1	STATION STORAGE BATTERIES	4.8.2.3.2B, 4.8.2.4.2.B	2	01-28-78
2302-S1	POWER RANGE AMPLIFIER CALIBRATION		3	12-23-78
2302-R1	GAS CHROMATOGRAPH CHANNEL CALIBRATION	4.6.4.1	0	01-23-78
2302-Q1	POWER RANGE INSTRUMENTATION	4.3.1.2.1/1.1.2 & 4.3.3.5	3	05-04-78
2302-SA1	METEOROLOGICAL INST. CALIBRATION	4.3.3.4	3	03-10-79
2302-M1.1	RPS HIGH & LOW RC PRESS. CHANNEL CALIB		2	08-15-78
2302-M1.1	4.3.1.11 TABLE 4.3-1 5,6,13			
2302-M1.2	RPS RC TEMP CHANNEL & PRESS/TEMP COMPARATOR CALIB		2	12-23-78
2302-M1.3	RPS RC FLOW CHANNEL CALIB. 4.3.1.11 TABLE 4.3-1 (4)		4	08-22-78
2302-M1.4	RPS PUMP/FLUX COMPARATOR CALIB		3	12-15-78
2302-M1.5	RPS HIGH REACTOR BUILDING PRESSURE CHANNEL		2	02-10-78
2302-M1.6	INTER. RANGE NEUTRON FLUX & RATE CALIB		0	11-15-77
2302-M1.7	SOURCE RANGE NEUTRON FLUX & RATE		1	02-27-78
2302-M2	R.B. SPRAY, R.B. PRESS HI-HI CHANNEL CALIB.	4.3.2.1.1	1	02-28-78
2302-M2		4.3.2.1.2		
2302-M3	RADIATION MONITORING SYSTEM	4.3.3.1	1	11-17-77
2302-M4	INCORE DETECTOR CHANNEL CALIBRATION	4.3.3.2.B	1	08-22-78
2302-M5	SEISMIC SYSTEM CALIBRATION	4.3.3.3.1/4.3.3.3.2	4	07-07-78
2302-M6	CONTROL ROD POSITIONS INDICATION FOR REMOTE SHUTDOWN		1	12-23-78
2302-M7	PRESSURIZER LEVEL AND TEMPERATURE CALIBRATION		3	07-19-78
2302-M8	REACTOR COOLANT SYSTEM FLOW-RNI 4.3-13.5		2	11-09-78
2302-M9	RX BLDG. SUMP LEVEL & RX BLDG. COOLER EXCESS CONDENSATE		3	04-18-78
2302-M9	LEVEL SWITCHES CALIBRATION	4.6.6.1.B.D		
2302-M10	SAFETY INJECT., RCS PRESS. LOW CHANNEL CALIB.		4	08-22-78
2302-M10		4.3.2.1.1/4.3.2.1.2		
2302-M11	REACTOR BLDG ISOL & COOLING CHANNEL CALIB		1	03-07-78
2302-M11		4.3.2.1.1/4.3.2.1.2		
2302-M12	FW LATCHING SYSTEM CHANNEL CALIB	4.3.2.1.1/4.3.2.1.2	2	09-12-78
2302-M13	H2 RECOMBINER CHANNEL CALIBRATION	4.6.4.2.B.1	1	05-19-78
2302-M14	4KV BUS 2-1E & 2-2E UNDERVOLTAGE RELAY CALIB.		2	04-17-78
2302-M14	4.3.2.1 TABLE 4.3-2 (6)			
2302-M16	EMERG. D.G. LOAD SEQUENCE RELAY CALIB.	4.8.1.1.2.C.6	1	05-10-78
2302-M17	STEAM GENERATOR WATER LEVEL 4.3-10,9		3	07-19-78
2302-M18	4 KV BUS 2-3E & 2-4E UNDERVOLTAGE RELAY CALIB.		2	04-17-78
2302-M18	4.3.2.1 TABLE 4.3-2 (7)			
2302-M19	BAST TEMP & LEVEL 4.3-10 (10)		4	01-31-79
2302-M20	REACTOR BUILDING AIR PRESSURE	4.3-10 (2)	1	02-01-78
2302-M21	MU STORAGE TANK LEVEL	4.3-(6) (5)	1	02-01-78
2302-M22	RB AUTO SUMP SUCTION CALIB.		0	09-29-77
2302-M23	FW LINE RUPTURE AUTO DETECTION CALIB.		1	04-26-78
2302-M24	CFT LEVEL & PRESS. CALIB.		3	07-12-78
2302-M25	LOW PRESS. INJ. FLOW CHANNEL CALIBRATION		1	02-06-78
2302-M26	HIGH PRESSURE INJ. FLOW		1	02-06-78
2302-M27	RCS AVERAGE TEMP		1	03-17-78
2302-M28	STEAM GENERATOR PRESSURE CALIB.		3	07-19-78
2302-M29	RB SPRAY PUMP FLOW		0	01-10-78
2303-M1	SOURCE RANGE CHANNEL FUNCTIONAL TEST 4.3.1.1.1-TABLE		6	05-10-78
2303-M1	4.3.1 ITEM 1, 4.9.2.A&B			
2303-M1A/B	MU PUMP & VALVE FUNCTIONAL TEST 4.1.2.3/4.1.2.4/4.5.2.F		5	09-22-78
2303-M2A/B	DHR PUMP FUNCT TEST AND VLV OP TEST 4.1.2.5 & 4.5.3.F		7	06-20-78
2303-M4	CONTROL ROD MOVEMENT	4.1.3.1.2/4.1.3.2.2	3	04-26-78
2303-M6	RPS FUNCTIONAL TESTS	4.3.1.1.1	3	10-13-78

2303-M6	TABLE 4.3-1 ITEMS 2-9,12,13			
2303-M7	R.B. PRESSURE HI HI CHANNEL & ACT.	4.3.2.1.1&4.3.2.1.2	7	03-20-79
2303-M7	LOGIC CHANNEL FUNCTIONAL TEST			
2303-M8	AREAS & PROCESS MONITOR-RMS CHANNEL FUNCT. TEST	4.3.3.1	1	08-08-78
2303-M9	CONTAINMENT MONI.-RMS CHANNEL FUNCT. TEST	4.3.3.1	4	11-28-78
2303-M9		4.4.6.1.A.C		
2303-M10	CHLORINE DETECTOR SYSTEM	4.3.3.6	2	05-05-78
2303-M12A/B	R.B. COOLING UNIT OPERATION	4.6.2.3.A	2	04-17-78
2303-M13	H2 PURGE CLEANUP SYSTEM	4.6.4.3.A	2	02-08-79
2303-M14A/B/C/D/E	E.F. SYS. VALVE LINEUP VERIFICATION AND OPERABILITY TEST1 AND TURBINE DRIVEN E. FEEDPUMP OPERABILITY TEST	4.7.1.2.A	8	11-21-78
2303-M15A/B	CONTROL ROOM EMERG. VENTILATION SYSTEM	4.7.7.1.B	3	10-06-78
2303-M16A/B/C/D	EMERGENCY DIESEL GENERATOR AND COOLING WATER VALVE OPERABILITY TEST 4.6.1.1.2.A, 4.8.1.2.2.A		8	10-13-78
2303-M18	FH BLDG. CLEANUP-REMOTE START & OPER. CHECK	4.9.12.A	0	08-31-77
2303-M20	SAFETY INJECTION - RCS PRESSURE LOW CHANNEL FUNCT. TEST		3	09-27-78
2303-M20		4.3.2.1.1, 4.3.2.1.2		
2303-M21	RB ISOLATION & CLG/SAFETY INJ.RB PRESS. HI CHANNEL		3	09-07-78
2303-M21	FUNCTIONAL TEST	4.3.2.1.1, 4.3.2.1.2		
2303-M23A/B	CONTROL BLDG. LIQUID COOLER PUMPS FUNCT. TEST AND VALVE OPERABILITY TEST	4.0.5	3	03-13-78
2303-M24A/B	RA BLDG. SPRAY PUMP FUNCTIONAL TEST AND VALVE OPERABILITY TEST	4.6.1.2.1.B	7	10-06-78
2303-M25A/B	DECAY HEAT CLOSED COOLING WATER PUMPS FUNCTIONAL AND VALVE OPERABILITY TEST		5	12-23-78
2303-M26A/B	BORIC ACID PUMP FUNCTIONAL TEST		4	03-10-79
2303-M27A/B	MOTOR DRIVEN EMERGENCY FEEDPUMP FUNCT. TEST AND VALVE OPERABILITY TEST	4.0.5	4	08-30-78
2303-M28A/B	NSRW PUMP FUNCT TEST & VALVE OPERABILITY TEST	4.0.5	5	09-01-78
2303-M29	CONTROL BLDG. R.W. BOOSTER PUMPS FUNCT. TEST AND VALVE OPERABILITY TEST	4.0.5	3	05-01-79
2303-M30A/B	NSCC PUMP FUNCT. TEST & VALVE OPERABILITY TEST	4.0.5	5	05-12-78
2303-M31A/B C/D	RA BLDG. EMERG. COOLING BOOSTER PUMPS FUNC. TEST AND NUCLEAR SERVICES RIVER WATER VALVE OPERABILITY TEST		6	08-24-78
2303-M32A/B	SPENT FUEL COOLING PUMP FUNCT. TEST	4.0.5	1	11-15-77
2303-M33	SCREEN WASH PUMP FUNCTIONAL TEST AND VALVE	4.0.5	4	03-07-79
2303-M33	OPERABILITY TEST			
2303-M34	SAFETY INJ. MANUAL ACTUATION & ACT. LOGIC FUNC. TEST		6	01-05-79
2303-M34	4.3.2.1.1			
2303-M35	R.B. ISO. & COOLING MANUAL INITIATION AND ACTUATION LOGIC FUNCTIONAL TEST		6	03-14-79
2303-M35	4.3.2.1.1 TABLE 4.3-2 (2A) (2E)			
2303-M36	4KV ESF BUS UNDERVOLTAGE RELAYS CHANNEL FUNC. TEST		0	09-12-77
2303-M36	4.3.2.1.1 TABLE 4.3-2			
2303-M37	H2 MIXING SYSTEM REMOTE START & OP TEST	4.6.4.4	0	09-12-77
2303-02A/B	MAIN STEAM ISOLATION VALVES A-POWER		3	03-19-79
2303-02A/B	OPERATION/H COLD SHUTDOWN	4.7.1.5		
2303-03	HYDROGEN RECOMBINER FUNC. TEST	4.6.4.2.A	2	10-06-78
2303-04	INSERVICE TESTING OF VALVES DURING NORMAL PLANT OPS		3	09-01-78
2303-05	INSERVICE TESTING OF HVAC VALVES		2	03-30-78
2303-06	VACUUM BREAKER FUNCTIONAL TEST		3	03-07-79
2303-07	VALVE OPERABILITY TEST DURING COLD SHUTDOWN AND REMOTE INDICATION FUNCTIONAL TEST		2	04-18-78
2303-S31	SEISMIC INSTRUMENTATION FUNCT.	4.3.3.3.1	1	09-14-77
2303-S32	RB MATCH LEAKRATE & INTERLOCK TEST	4.6.1.1.B	2	01-09-79
2303-S32		4.6.1.3.B,C		
2303-S34	INTAKE CHANNEL ELEVATION VERIFICATIONS	4.7.5.1.B	1	03-13-78
2303-R1	CONTROL ROD DROP TIMES	4.1.3.5.A,B,C	1	04-27-78
2303-R2	RPS RESPONSE TIMES	4.3.1.1.3	0	06-30-77

2303-R3	ESFAS RESPONSE TIME TESTING	4.3.2.1.3	2	05-04-78
2303-R4	RCS TOTAL FLOW	4.2.5.2	2	03-20-79
2303-R6	CF TANK ISOLATION VALVE ALARM	4.5.1.D	1	11-15-77
2303-R7	D.H. REMOVAL ISOLATION & INTERLOCK TEST AND VALVE OPERABILITY AND REMOTE INDICATION FUNCTIONAL TESTS	4.5.2.D/ 4.5.3	3	04-26-78
2303-R8	LP INJECTION SYSTEM LEAKAGE	4.5.2.D, 3A&B	2	04-12-78
2303-R14	HYDROGEN RECOMBINER OPERATIONAL TEST	4.6.4.2.B(1-5)	1	11-15-77
2303-R15	H2 PURGE SYSTEM-PERFORMANCE ANALYSIS	4.6.4.3.B/F	2	07-12-78
2303-R16	CLASS 1E DIST. SYS. SOURCE TRANSFER TEST	4.8.1.1.1.B/ 4.8.1.2.1.B	3	01-28-78
2303-R18	EMERGENCY FEEDWATER VALVE ACTUATION	4.7.1.2.B	2	11-04-77
2303-R20	ROD POSITION INDICATION FUNCT. TEST	4.1.3.4	1	02-01-78
2303-R21	CLASS 1E DIST. SYS. FUNCTIONAL TEST		2	03-19-79
2303-R21	4.8.1.1.2.C./4.8.1.1.2.C.5/4.8.1.1.2.C.2/4.8.1.2			
2303-R22	STATION STORAGE BATTERIES - SERVICE TEST	4.8.2.3.2.C,D 4.8.2.4.2.C,D	3	05-10-78
2303-R24	PRESSURIZER CODE SAFETY VALVE CHECK	4.4.2/4.4.3	2	01-04-78
2303-R25	CONTROL ROOM EMERGENCY VENTILATION PERFORMANCE ANALYSIS	4.7.7.1.C,D	1	03-30-78
2303-R26	BUILDING SPRAY SYSTEM LEAKAGE	4.6.2.1.D	3	07-19-78
2303-R27	MAIN STEAM SAFETY VALVES	4.7.1.1	2	09-01-78
2303-R28	FH BLDG AIR CLEANUP PERFORMANCE ANALYSIS	4.9.12.B-F	1	03-30-78
2303-R29	EMERGENCY DIESEL GENERATOR LOADING TEST	4.8.1.1.2.C4	0	08-03-77
2303-R30	CONTROL ROOM & FHB-RMS CHANNEL FUNC. TEST		1	05-16-78
2303-R31	INACCESSIBLE VALVE REMOTE INDICATION FUNCTIONAL TEST		0	01-10-78
2303-SY1	STATION STORAGE BATTERIES - PERFORMANCE DISCHARGE TEST	4.8.2.4.2.E	1	01-28-78
2303-SY2	RB SPRAY NOZZLE	4.6.2.1.E	1	05-25-77
2303-SY3	NAOH SOLUTION FLOW RATE CHECK	4.6.2.2.D	0	05-05-77
2304-301	RCS CHEMISTRY	4.4.7	2	02-05-79
2304-302	RCS SPECIFIC ACTIVITY	4.4.8	0	11-08-77
2304-303	SECONDARY COOLANT SPECIFIC ACTIVITY	4.7.1.4.1	0	12-16-76
2304-304	FUEL CANAL BORON CONCENTRATION	4.9.1.2	0	12-16-76
2304-A1	BORATED WATER SOURCE CONCENTRATION VERIF.	4.1.2.8.A.1	1	03-14-79
2304-A1		4.1.2.9.A.1 4.5.4.A.2		
2304-A1	CF TANK BORON CONCENTRATION	4.5.1.B	2	01-11-79
2304-D1	DIESEL FUEL TESTING	4.8.1.1.2.B 4.8.1.2.2.B	3	12-23-78
2304-SA1	BUILDING SPRAY NAOH TANK CONCENTRATION AND VOLUME	4.6.2.2.B.2	2	07-07-78
2304-SA2	SEALED SOURCE TESTING	4.7.10.1.2.3	1	02-06-78
2304-SA3	SECONDARY COOLANT SYSTEM SPECIFIC ACTIVITY	4.7.1.4.2	1	10-25-78
2305-SA1	DIKE INSPECTION	4.7.6.1.2.A.B	0	07-14-77
2305-R1	ECCS CONTAINMENT EMERG. SUMP INSPECT.	4.5.2.C 4.5.3.C	1	09-01-78
2305-R2	OTSG EDDY CURRENT TESTING	4.4.5.1 THRU 4.4.5.5	0	12-16-76
2305-R3	DIESEL GENERATOR INSPECTION	4.8.1.1.2.C.1	2	01-09-79
2305-R4	RV INTERNALS VENT VALVE INSPECTION	4.4.10.1.B	1	10-26-77
2305-R5	HYDRAULIC SNUBBER INSPECTION	4.7.8.1	1	02-06-78
2305-R6	RV MATERIAL SURV. SPECIMAN INSPECTION	4.4.9.1.2	0	08-29-77
2305-R7	REACTOR COOLANT PUMP FLYWHEEL INSPECTION	4.4.10.1.A	0	08-03-77
2305-R8	CHLORINE DETECTION SYSTEM INSPECTIONS & MAINTENANCE		0	01-23-78
2311-1	SHUTDOWN MARGIN WITH INOPERABLE CONTROL ROD(S)	4.1.1.1.A	1	02-01-78
2311-2	MINIMUM TEMPERATURE FOR CRITICALITY	4.1.1.4.A 1.B	0	07-18-77
2311-3	ROD PROGRAM SURVEILLANCE	4.1.3.8.A	3	12-23-78

2311-4	POWER LEVEL CUT-OFF XENON EQUILIBRIUM	4.1.3.9	1	02-01-78
2311-5	CONTAINMENT INTEGRITY	4.6.1.3.A	7	02-08-79
2311-6	RPS SETPOINTS VS RCP COMBINATIONS	4.4.1	1	10-25-78
2311-7	PRESSURIZER TEMP/SPRAY WATER DELTA T	4.4.9.2	1	02-10-78
2311-8	ACC. OPEN TIME FOR CONT. PURGE/EXH. & ISO VALVES			
2311-9	CR EMERG. VENT. PROT. ANALYSIS		0	10-27-77
2311-10	CR EMERG. VENT. CHARCOAL ANALYSIS		0	10-26-77
2311-11	H2 PURGE PERF. ANALYSIS		0	11-07-77
2311-12	H2 PURGE CHARCOAL ANALYSIS		0	10-14-77
2311-13	FH BLDG AIR CLEANUP SYS PERF. ANALYSIS		0	11-07-77
2311-14	FH BLDG AIR CLEANUP SYS. CHARCOAL ANALYSIS		0	10-26-77
2311-F1	REACTIVITY ANOMALY		1	09-22-78
2311-F2	POWER DISTRIBUTION		5	12-23-78
2311-F3	SHUTDOWN MARGIN DETERMINATION		0	06-03-77
2311-F4	MODERATOR TEMPERATURE COEFFICIENT		1	03-21-78
2313-R5	STRUCTURAL INTEGRITY TEST	4.6.1.6/4.6.1.7	1	01-24-78
2313-R6	CONTAINMENT INTEGRATED LEAKAGE TESTING	4.6.1.2(A-C)&H	2	04-26-78
2313-R7	REACTOR BLDG LOCAL LEAK RATE TESTING		2	01-05-79
2313-S02	INTERMEDIATE RANGE CHANNEL 4.3.1.1.1(TABLE 4.3-1-ITEM10)		3	01-31-79
2313-S03	MANUAL REACTOR TRIP CH. FUNCT. TEST	4.3.1.1.1	1	12-13-77
2313-S03	TABLE 4.3-1, ITEM 1			
2313-C01	CHECK VALVE OPERABILITY TEST DURING COLD SHUTDOWN		1	03-07-79
2313-C02	CORE FLOODING SYSTEM CHECK VALVE FUNCTIONAL TEST		1	03-07-79
2315-R2	FUEL HANDLING BRIDGE HOIST TEST	4.9.6	2	09-08-78
2315-R3	FUEL HANDLING BUILDING SERVICE CRANE INTERLOCKS	4.9.7	1	02-13-78
2322-Q1	WASTE GAS DECAY TANK EFFLUENT MONITORS		1	04-11-78
2322-Q2	LIQUID EFFLUENT RADIATION MONITORS		1	04-05-78
2322-A1	WASTE GAS AND UNIT VENT DISCHARGE FUNCTIONAL TEST		3	01-05-79
2322-R2	CALIBRATION OF STATION AND UNIT #2 DELTA T INSTRUMENT.		1	07-26-78
2322-R3	VENTILATION/PURGE EXHAUST RADIATION MONITORS		1	01-04-78
2324-W1	ENVIRONMENTAL CHLORINE MONITORING		0	09-15-77
2324-W2A/B	EVAPORATOR CONDENSATE TEST TANK/NEUTRALIZING TANK		2	07-26-78
2324-W3A/B	UNIT 2 UNIT VENT SAMPLING		2	01-05-79
2324-W1	UNIT 2 CONDENSER VACUUM PUMP RELEASE SAMPLING		0	01-28-78
2331-M1	FIRE SYSTEM HOSE STATION VISUAL INSPECTION	4.7.10.4.A	0	10-17-77
2331-SA1	AIR INTAKE TUNNEL HALON SYST INSPECT (P)	4.7.10.4.2.A	2	10-12-78
2331-SA2	FIRE SYSTEM HALON SYSTEM CHECK	4.7.10.3.1.A	4	10-25-78
		AND 4.7.10.3.2.A		
2331-R1	FIRE SYSTEM DELUGE/SPRINKLER SYS INSPECT.	4.7.10.2.B3&4	2	03-30-78
2331-R2	FIRE SYSTEM HOSE STATION INSPECTION	4.7.10.4.B	1	01-05-78
2331-R3	FIRE BARRIER PENETRATION FIRE SEAL INSPEC.	4.7.11	1	11-06-78
2333-R3	FIRE DETECTION CIRCUIT OPERATIONAL CHECK	4.3.3.8.3	0	01-06-78
2333-SA1	FIRE SYSTEM DETECT INSTRU FUNCTIONAL TEST	4.3.3.8.1	1	11-06-78
2333-SA2	FIRE DETECTION CIRCUIT OPERATIONAL TEST	4.3.3.8.2	0	01-05-78
2333-R2	FIRE SYSTEM DELUGE/SPRINKLER SYSTEM FUNCTIONAL TEST		1	04-05-78
2333-R3	CABLE ROOM AND TRANSFORMER ROOM HALON SYSTEM FUNCTIONAL TEST	4.7.10.3.1.B	1	03-30-78
2333-R5	FIRE SYSTEM VALVE FUNC TEST 4.7.10.1.1.E &	4.7.10.2.B.2	0	01-05-78
2333-R6	AIR INTAKE TUNNEL HALON SYSTEM FUNC TEST	4.7.10.3.2.B	1	03-21-78
2333-3Y1	FIRE SYSTEM DELUGE/SPRINKLER SYST FLOW TEST	4.7.10.2.C	1	03-30-78
2333-3Y2	FIRE SYSTEM HOSE STATION FUNCTIONAL TEST	4.7.10.4.C	0	01-10-78
2392-R1	SPARE H2 RECOMBINER CHANNEL CALIBRATION		0	06-28-78
2393-Q1	SPARE HYDROGEN RECOMBINER FUNCTIONAL TEST		1	09-22-78
2393-R1	SPARE HYDROGEN RECOMBINER OPERATIONAL TEST		0	06-28-78

2395-M1	RIVER WATER PUMPHOUSE SILT SURVEILLANCE		0	09-01-78
2601-M1	RECLAIMED BORIC ACID TANK TEMP	4.1.2.8, 4.1.2.9	0	08-11-77
2602-R1	INCORE BACKUP RECORDER CALIB.	3.2(1) (2) (3) (4)	1	03-07-79
2602-R4	BORIC ACID MIX TANK TEMP. & LEVEL	4.1.2.8.A. 2 & 3	1	01-31-78
2602-R4		4.1.2.9.A 2 & 3		
2602-R5	RECLAIMED BORIC ACID TANK LEVEL & TEMP	4.1.2.8.A 2 & 3	2	03-14-79
2602-R5	CALIBRATION	4.1.2.9.A 2 & 3		
2602-R9	DECAY HEAT REMOVAL TEMP.	4.4.9.2	1	11-15-77
2602-R10	CONTROL ROOM AIR TEMP.	4.7.7.1.A	3	05-11-78
2602-R14	CONTAINMENT AIR TEMP.	4.6.1.5	0	06-08-77
2602-R15	SODIUM HYDROXIDE TANK LEVEL CALIB	4.6.2.2	3	07-20-78
2602-R16	CONDENSATE STORAGE TANK LEVEL CALIB	4.7.1.3.1	1	01-28-78
2602-R17	DIESEL FUEL STORAGE TANK LEVEL	4.8.1.1.2	2	05-10-78
2602-R18	DIESEL FUEL DAY TANK LEVEL	4.8.1.1.2	1	01-28-78
2602-R19	SPENT FUEL STORAGE/FUEL STORAGE /SPENT FUEL SURGE TANK			
2602-R19	LEVEL CALIBRATION	4.9.11	0	08-09-77
2602-R22	REACTOR COOLANT SYSTEM LEAKAGE	4.4.6.2	1	11-05-78
2603-M1	DIESEL "DF-X-1A" (DF-X-1B) GENERATOR PROTECTIVE RELAYING		0	02-23-79
2612-M1	SODIUM HYDROXIDE STORAGE TANK TEMP CALIB		0	11-17-77
2612-R2	ATMOSPHERIC RADIATION MONITORS CALIB		1	05-18-79
2612-R3	LETDOWN FLOW CALIB		0	10-29-77
2612-R4	LIQ RADIATION MONITOR CALIBRATION		0	10-13-77
2612-R5	RADIATION MONITOR CALIBRATION G-M TUBE AREA MONITORS		0	07-19-78
2622-R1	RTD INPUT FUNCTIONAL CALIBRATION (COMPUTER)		0	11-17-77
2622-R2	THERMOCOUPLE INPUT FUNCTIONAL CALIBRATION (COMPUTER)		1	02-21-78
2630-R3	DIFFERENTIAL PRESSURE GAGE CALIBRATION	N/A	0	08-15-77
2632-M1	PRESSURE GAGE CALIBRATION	N/A	1	03-13-78
2632-R2	PRESSURE TRANSMITTER LOOP CALIBRATION	N/A	0	12-07-77

2400 MAINTENANCE PROCEDURES (31)

2401 R.C. SYSTEM MAINTENANCE

2401-1	REACTOR COOLANT PUMPS			
2401-1.1	R.C. PUMP SEAL INSPECTION AND REPAIR		1	08-23-77
2401-1.1	146-6			
2401-1.2	R.C. PUMP INTERNALS REMOVAL & INSTALLATION		0	05-03-77
2401-1.2	146-7			
2401-1.3	REMOVAL AND INST. OF RCP MOTOR		0	06-07-76
2401-1.3	146-8			
2401-1.4	R.C.P. AND MOTOR ALIGNMENT		0	07-09-76
2401-1.5	USE OF FREEZE SEALS		1	09-08-77
2401-2	PRESSURIZER MAINTENANCE			
2401-2.1	PRESSURIZER RELIEF VALVE REMOVAL AND/OR REPLACEMENT		0	04-13-77
2401-2.3	PRESSURIZER HEATER REMOVAL & REPLACEMENT		0	04-29-77
2401-2.4	PRESSURIZER MANWAY COVER REMOVAL AND/OR REPLACEMENT		0	04-13-77
2401-4	OTSG MAINTENANCE			
2401-4.1	OTSG TUBE PLUGGING		0	01-22-76

2401-4.2	OTSG FEED NOZZLE REMOVAL & REPLACEMENT	0	06-12-76
2401-4.3	OTSG FEEDWATER ORIFICE ADJUSTMENT	1	09-08-77
2401-4.4	OTSG MANWAY & INSPECTION COVERS REMOVAL & REPLACEMENT	0	03-29-77
2401-5	CROM MAINTENANCE		
2401-5.1	CROM STATOR REMOVAL & REPLACEMENT	0	07-18-76
2401-5.2	CROM REMOVAL AND REPLACEMENT	0	03-11-77
2401-5.3	CROM PI ASSEMBLY REMOVAL & REPLACEMENT	1	10-20-78
2401-5.4	CROM STATOR ROM LATCH AND DROP OUT ELECTRICAL TEST	0	02-15-77
2401-6	REACTOR INTERNALS VENT VALVE-RMVL/RPL.		
2401-6.1	REACTOR INTERNALS VENT VALVE-RMVL/RPL	0	02-06-76
2401-7	R.C. TEMP. DETECTOR		
2401-7.1	R C TEMP DETECTOR RM VL/RPR	0	10-18-75
2401-8	INCORE MONITOR PIPING REPAIR		
2401-8.1	INCORE MONITOR PIPING REPAIR	1	08-01-78
2402	AUXILIARY SYSTEM MAINTENANCE		
2402-1	MAKEUP AND PURIFICATION SYSTEM		
2402-1.1	M.U. & PURIFICATION FILTER RPL.	1	01-19-78
2402-2	R.B. CRANE ROUTINE MAINTENANCE		
2402-2.1	R.B. CRANE ROUTINE MAINTENANCE	0	03-11-75
2402-3.1	INTERMEDIATE COOLING FILTER REPLACEMENT	0	09-08-76
2403	INST. AND CONTROL SYSTEM MAINTENANCE		
2403-1	NUCLEAR DETECTOR REMOVAL & REPLACEMENT		
2403-1.1	NUCLEAR DETECTOR REMOVAL AND REPLACEMENT	2	08-04-78
2403-3	RMS DETECTOR		
2403-3.1	RMS DETECTOR (TOTAL/PARTIAL) REPLACEMENT	1	08-29-78
2404	MAIN STEAM SYSTEM MAINTENANCE		
2404-1.0	MAIN STEAM RELIEF VALVE-REMOVAL AND REPLACEMENT	0	09-10-76
2405	ELECTRICAL SYSTEM MAINTENANCE		
2405-1	4160 V CLASS IE MAINTENANCE		
2405-1.2	4160V CLASS 1E BREAKER MAINT	0	03-11-75
2405-2	480 V CLASS IE MAINTENANCE		
2405-2.2	480 V CLASS BREAKER MAINTENANCE	0	11-29-76
2405-3	DIESEL GENERATOR MAINTENANCE		
2405-3.1	DIESEL GEN. ROUTINE MAINTENANCE	0	02-06-76
2405-3.2	DIESEL ENGINE ROUTINE MAINTENANCE	0	12-13-77
2405-4	250V DC MAINTENANCE		
2405-4.1	STATION BATTERY CHARGING-EQUALIZE	0	06-30-77
2405-4.2	250V DC BREAKER MAINTENANCE	0	04-05-77

2500 FUEL HANDLING INSTRUCTIONS AND PROCEDURES (45)

2501 FUEL HANDLING PROCEDURES

2501-1.1	FUELING CONTROL DOCUMENT	5	01-05-79
2501-3.3	CRD LEADSCREW UNCOUPLING (SHIM SAFETY)	2	09-08-78
2501-3.4	CRD LEADSCREW UNCOUPLING (APSR)	2	09-08-78
2501-3.5	HEAD SERVICE LINE DISCONNECTING	2	09-08-78
2501-3.6	REMOVAL OF THERMAL INSULATION	1	10-11-77
2501-3.7	INSTALLATION OF TRANSFER CANAL SEAL PLATE AND FLOOD LINE COVER PLATE	1	09-13-78
2501-3.9	CLOSURE HEAD STUD DETENSIONING	2	02-10-78
2501-3.9	FLANGE HOLE PLUG AND ALIGNMENT STUD INSTALLATION	2	02-10-78
2501-3.11	CLOSURE HEAD REMOVAL	2	09-12-78
2501-3.12	REACTOR UPPER PLENUM REMOVAL	2	09-13-78
2501-3.13	REACTOR VESSEL O-RING INSTALL. & GROOVE INSPECT.	1	09-13-78
2501-3.14	INSPECTION OF STUDS, NUTS AND WASHERS	1	10-14-77
2501-3.15	REMOVAL & INSTALLATION OF FUEL TRANSFER TUBE BLANK FLANGES	2	06-23-78
2501-3.16	NEUTRON SHIELD TANK REMOVAL AND INSTALLATION	0	11-03-77
2501-3.17	CORE SUPPORT ASSEMBLY REMOVAL AND INSTALLATION	0	09-12-78
2501-4.01	CORE ASSEMBLY	6	05-17-78
2501-4.02	CORE DEFUELING	0	12-21-76
2501-5.1	REACTOR UPPER PLENUM INSTALLATION	2	09-08-78
2501-5.2	CLOSURE HEAD INSTALLATION	3	09-12-78
2501-5.3	GUIDE STUD REMOVAL AND CLOSURE HEAD STUD INSTALLATION	1	01-31-78
2501-5.4	CLOSURE HEAD STUD TENSIONING	2	09-12-78
2501-5.5	STORAGE OF TRANSFER CANAL SEAL PLATE AND FLOOD LINE COVER PLATE	2	09-12-78
2501-5.6	INSTALLATION OF THERMAL INSULATION	1	09-12-78
2501-5.7	HEAD SERVICE LINE CONNECTING	1	05-04-78
2501-5.8	CRD LEADSCREW COUPLING (SHIM SAFETY)	2	09-08-78
2501-5.9	CRD LEADSCREW COUPLING (APSR)	2	09-08-78
2501-6.1	RECEIPT, INSPECTION, FIT-UP AND STORAGE OF NEW FUEL AND CONTROL COMPONENTS (POOL DRY)	4	02-06-78
2501-6.2	DAMAGED NEW FUEL AND CONTROL CMPNTS	0	08-28-76
2501-6.3	SHIPMENT OF DAMAGED NEW FUEL	1	11-11-76
2501-6.4	NEW FUEL CLOSURE COVER INSTALLATION AND REMOVAL	0	11-24-76
2501-7.1	INCORE INSTRUMENTATION	2	09-12-78

2502 FUELING INSTRUCTIONS

2502-1.1	POLAR CRANE OPERATOR	1	10-14-77
2502-1.2	FUEL HANDLING BLDG CRANE OPERATION	5	02-13-78
2502-1.3	MAIN FUEL HANDLING BRIDGE	2	09-13-78
2502-1.4	AUX FUEL HANDLING BRIDGE	1	02-10-78
2502-1.5	SPENT FUEL HANDLING BRIDGE	2	09-12-78
2502-1.6	NEW FUEL ELEVATOR	1	01-31-78
2502-1.7	FUEL TRANSFER SYSTEM	1	01-31-78

2502-1.8	REFUELING SYSTEM INTERLOCKS	1	09-13-78
2502-1.11	MANUAL TOOLS FOR HANDLING FUEL AND CONTROL COMPONENTS	1	10-26-76
2502-1.12	AUX. NEUTRON DETECTOR SYSTEM	0	10-01-76
2502-1.14	REACTIVITY INSERTION COMPUTATION	0	11-02-76
2502-1.15	INSPECTION OF REACTOR AND VESSEL INTERNALS	0	10-19-77
2502-1.16	REACTOR INTERNALS HANDLING TOOLS	1	10-11-77
2502-1.17	USE OF VISUAL INSPECTION EQUIPMENT	0	09-08-77

PROD	GPU	CPU	MIN	0	SEC	00.60	END	PRINT	R07	JOB	659	GMD01400	14.47.07	MAY	24	79	INV	R07	13.22.52	MAY	24	79	GMD01400	GPU
PROD	GPU	CPU	MIN	0	SEC	00.60	END	PRINT	R07	JOB	659	GMD01400	14.47.07	MAY	24	79	INV	R07	13.22.52	MAY	24	79	GMD01400	GPU
PROD	GPU	CPU	MIN	0	SEC	00.60	END	PRINT	R07	JOB	659	GMD01400	14.47.07	MAY	24	79	INV	R07	13.22.52	MAY	24	79	GMD01400	GPU
PROD	GPU	CPU	MIN	0	SEC	00.60	END	PRINT	R07	JOB	659	GMD01400	14.47.07	MAY	24	79	INV	R07	13.22.52	MAY	24	79	GMD01400	GPU
PROD	GPU	CPU	MIN	0	SEC	00.60	END	PRINT	R07	JOB	659	GMD01400	14.47.07	MAY	24	79	INV	R07	13.22.52	MAY	24	79	GMD01400	GPU
PROD	GPU	CPU	MIN	0	SEC	00.60	END	PRINT	R07	JOB	659	GMD01400	14.47.07	MAY	24	79	INV	R07	13.22.52	MAY	24	79	GMD01400	GPU
PROD	GPU	CPU	MIN	0	SEC	00.60	END	PRINT	R07	JOB	659	GMD01400	14.47.07	MAY	24	79	INV	R07	13.22.52	MAY	24	79	GMD01400	GPU
PROD	GPU	CPU	MIN	0	SEC	00.60	END	PRINT	R07	JOB	659	GMD01400	14.47.07	MAY	24	79	INV	R07	13.22.52	MAY	24	79	GMD01400	GPU
PROD	GPU	CPU	MIN	0	SEC	00.60	END	PRINT	R07	JOB	659	GMD01400	14.47.07	MAY	24	79	INV	R07	13.22.52	MAY	24	79	GMD01400	GPU
PROD	GPU	CPU	MIN	0	SEC	00.60	END	PRINT	R07	JOB	659	GMD01400	14.47.07	MAY	24	79	INV	R07	13.22.52	MAY	24	79	GMD01400	GPU

EVALUATION OF HYDROGEN BUBBLE VOLUME

IN REACTOR COOLANT SYSTEM

SUMMARY OF RCS BUBBLE CALCULATION METHODS

$$P_1 V_1 = P_2 V_2$$

WHERE P_i = RCS PRESSURE AT TIME i
V_i = RCS GAS BUBBLE VOLUME AT TIME i

$$V_2 = V_1 + \Delta V$$

WHERE ΔV = CHANGE IN GAS BUBBLE VOLUME FROM TIME 1 TO TIME 2

COMBINING THESE EQUATIONS:

$$V_1 = \frac{P_2 \Delta V}{P_1 - P_2}$$

DETERMINATION OF VOLUME CHANGE

V = CHANGE IN VOLUME OF WATER IN THE PRESSURIZER AND MAKE UP TANK CORRECTED FOR THE DIFFERENCE IN SPECIFIC VOLUME FROM THAT IN THE REACTOR COOLANT SYSTEM.

THUS, $\Delta V = \Delta V_P + \Delta V_{MUT} + \Delta V_{H_2}$ SOLUBILITY*

WHERE, ΔV_P = CHANGE IN VOLUME OF WATER IN PRESSURIZER EXPRESSED IN FT^3 OF WATER AT THE TEMPERATURE OF THE REACTOR COOLANT SYSTEM

ΔV_{MUT} = CHANGE IN VOLUME OF WATER IN THE MAKEUP TANK EXPRESSED IN FT^3 OF WATER AT THE TEMPERATURE OF THE REACTOR COOLANT SYSTEM.

*NOT CONSIDERED IN GPU FORMULATION

ERROR ANALYSIS

$$V_1 = fn\ (P_1,\ P_2,\ \Delta L^{mut},\ \Delta L\ pzr)$$

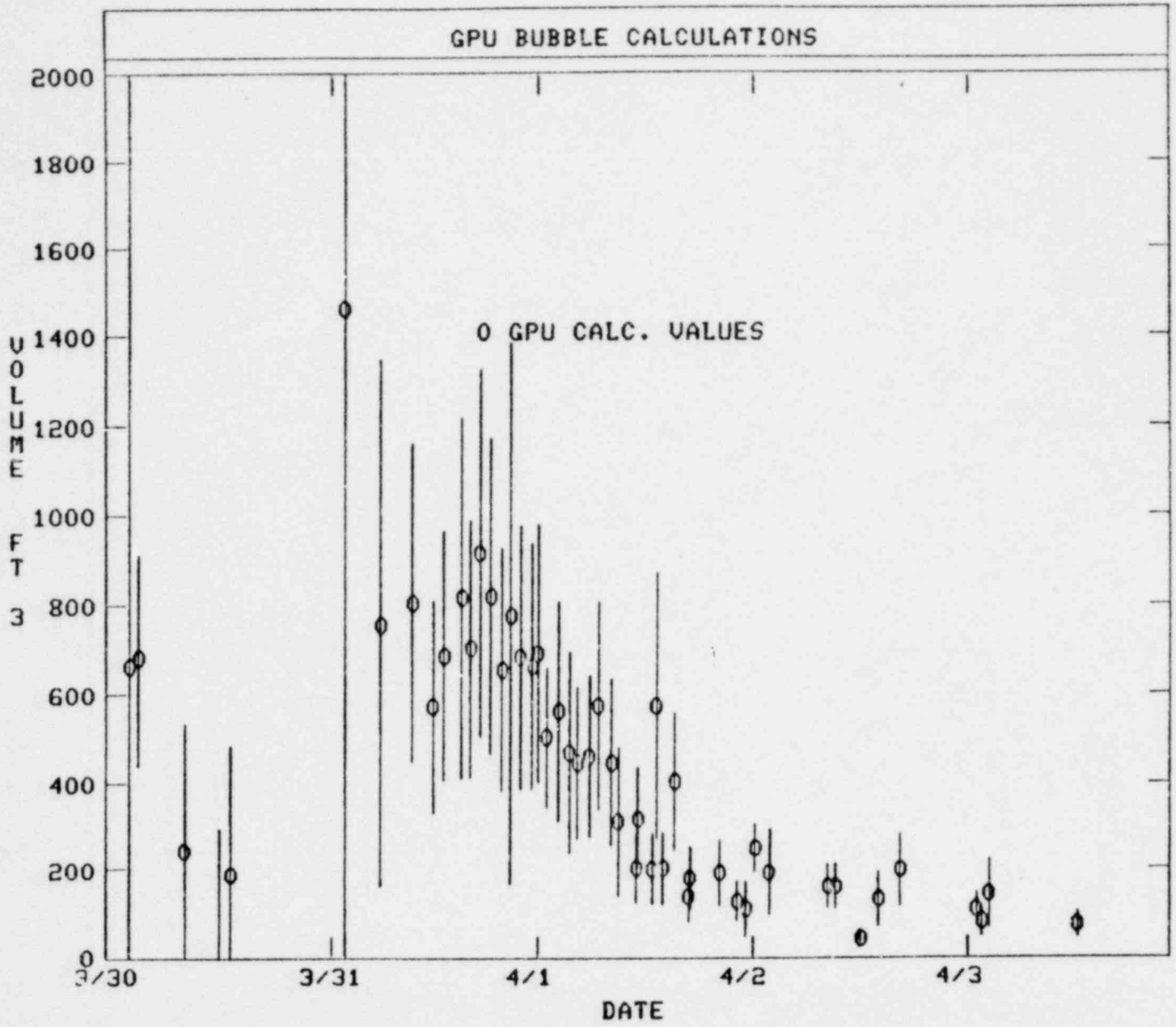
$$\sigma^2_{vi} = \sum_{i=1}^{4} \sigma^2_{x\,i} \left(\frac{\partial\ Vi}{\partial\ Xi} \right)^2$$

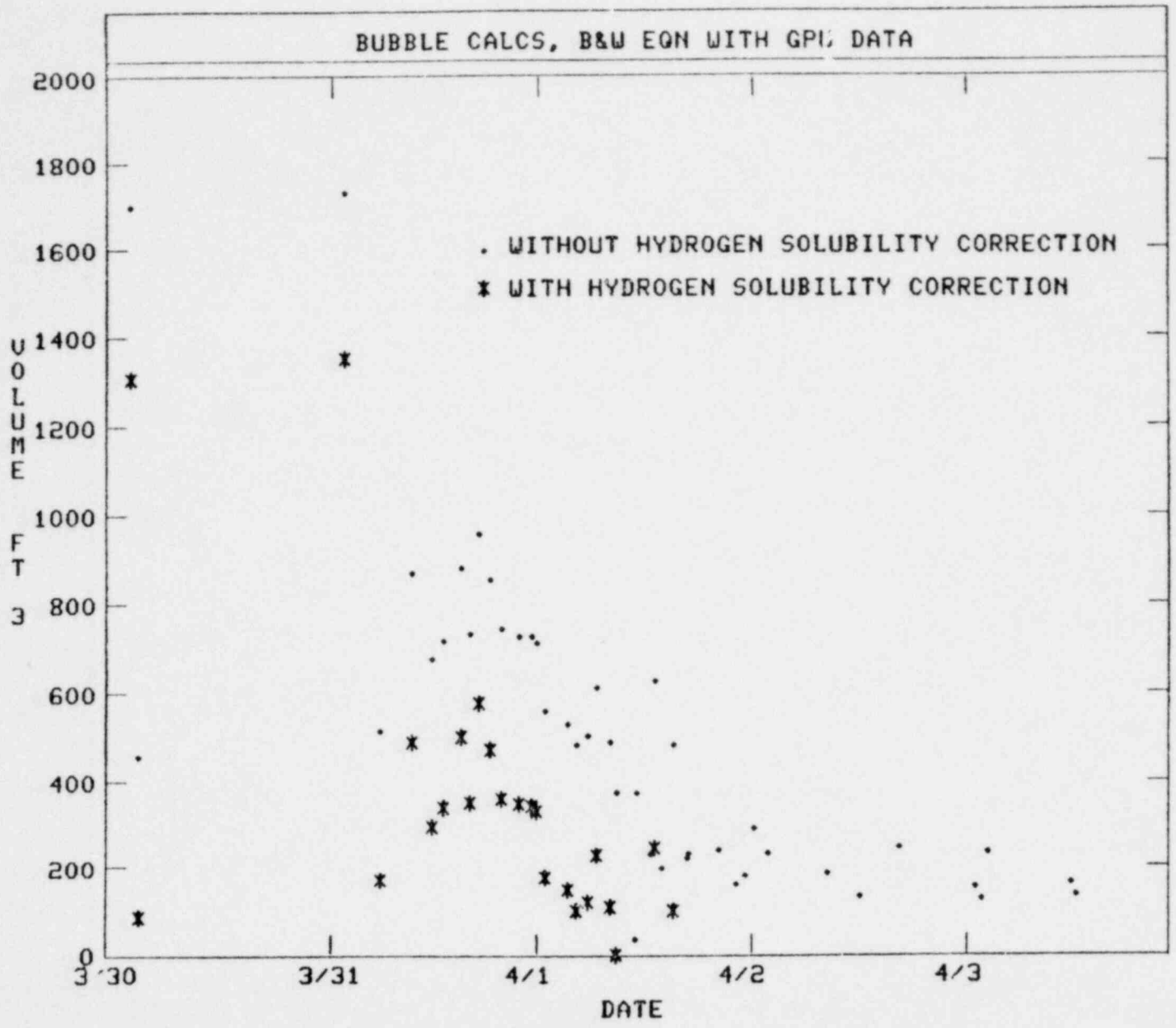
- Errors of instruments

Pressure Readings	$\pm$ 0.3%
MUT Level readings	$\pm$ 0.3%
PZR Level Readings	$\pm$ 0.6%

- Temperature correction of specific volume of RCS was neglected due to small ΔT during readings (max. $1^{o}F$).

- No correction for H_2 solubility change as function of Pressure was made in GPU analysis.


GPU BUBBLE CALCULATIONS
0 GPU CALC. VALUES
VOLUME FT 3
2000
1800
1600
1400
1200
1000
800
600
400
200
0
3/30
3/31
4/1
4/2
4/3
DATE


BUBBLE CALCS, B&W EQN WITH GPU DATA
. WITHOUT HYDROGEN SOLUBILITY CORRECTION
* WITH HYDROGEN SOLUBILITY CORRECTION
VOLUME FT 3
2000
1800
1600
1400
1200
1000
800
600
400
200
0
3/30
3/31
4/1
4/2
4/3
DATE

RCS BUBBLE CALCULATION

SUMMARY OF RCS BUBBLE CALCULATION METHODS

$$P_1 V_1 = P_2 V_2$$

WHERE P_i = RCS PRESSURE AT TIME i
V_i = RCS GAS BUBBLE VOLUME AT TIME i

$$V_2 = V_1 + \Delta V$$

WHERE ΔV = CHANGE IN GAS BUBBLE VOLUME FROM TIME 1 TO TIME 2

COMBINING THESE EQUATIONS:

$$V_1 = \frac{P_2 \Delta V}{P_1 - P_2}$$

DETERMINATION OF VOLUME CHANGE

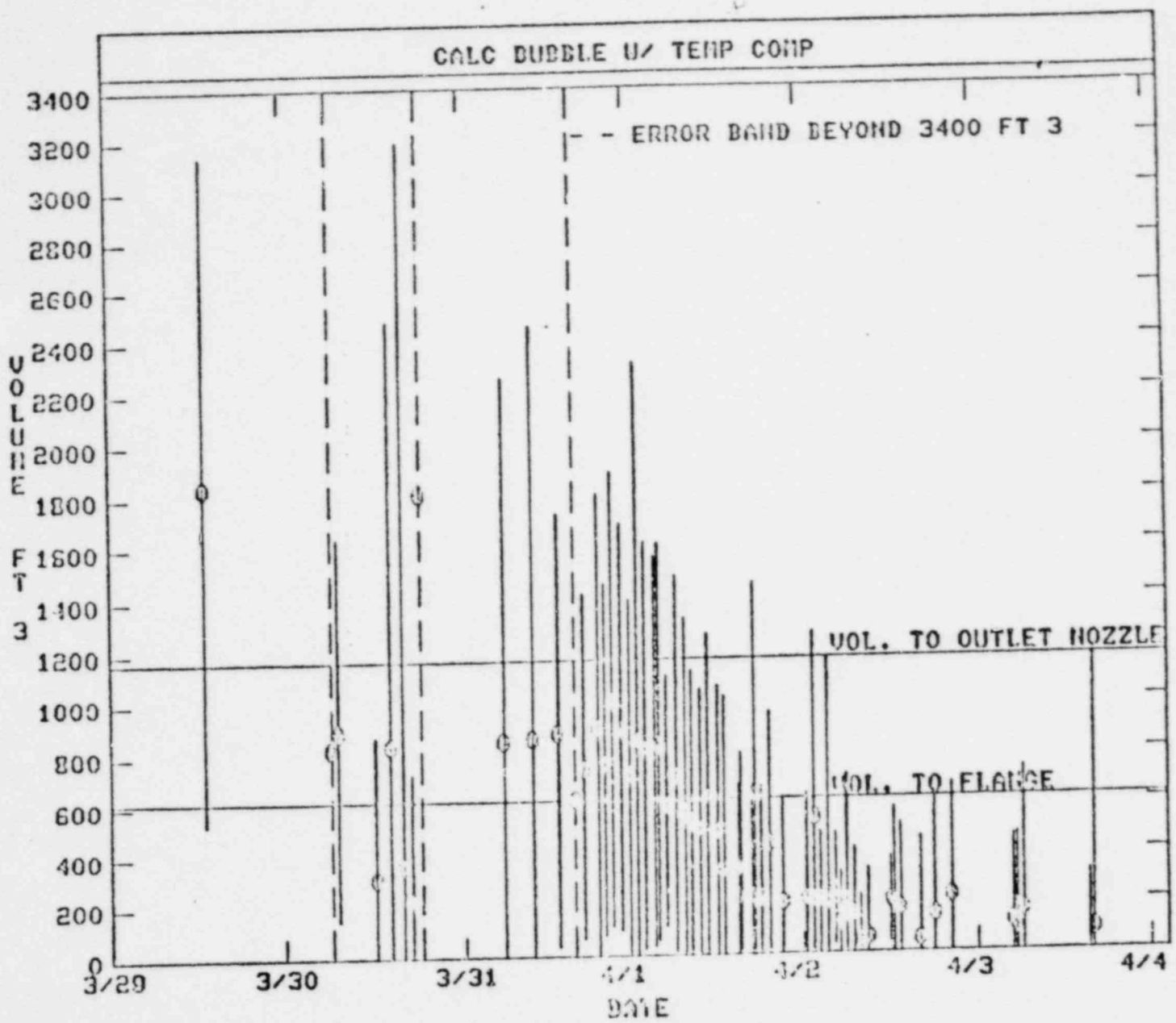
ΔV = CHANGE IN VOLUME OF WATER IN THE PRESSURIZER AND MAKE UP TANK CORRECTED FOR THE DIFFERENCE IN SPECIFIC VOLUME FROM THAT IN THE REACTOR COOLANT SYSTEM.

THUS, $\Delta V = \Delta V_P + \Delta V_{MUT}$

WHERE,

ΔV_P = VOLUME OF WATER IN PRESSURIZER EXPRESSED IN FT^3 OF WATER AT THE TEMPERATURE OF THE REACTOR COOLANT SYSTEM

ΔV_{MUT} = VOLUME OF WATER IN THE MAKEUP TANK EXPRESSED IN FT^3 OF WATER AT THE TEMPERATURE OF THE REACTOR COOLANT SYSTEM.


CALC BUBBLE U/ TEMP COMP
- - ERROR BAND BEYOND 3400 FT 3
VOL. TO OUTLET NOZZLE
VOL. TO FLANGE
VOLUME FT 3
3400
3200
3000
2800
2600
2400
2200
2000
1800
1600
1400
1200
1000
800
600
400
200
0
3/29
3/30
3/31
4/1
4/2
4/3
4/4
DATE

Attachment 5

TMI-2 QUESTIONS TO BE ADDRESSED AT
230TH ACRS MEETING

*1. Met.Ed/GPU indicated (June 7 Subcommittee Transcript, p. 337) they had never (prior to March 28) been influenced in their thinking and action by Regulatory Guide 1.97 or the NRC re instrumentation to follow the course of an accident. Why? (ACRS letter report of Oct. 22, 1976 on its review of TMI-2 stated "The Committee recommends that, prior to commercial power operation of Three Mile Island Unit 2, additional means for evaluating the cause and likely course of various accidents, including those of very low probability should be in hand in order to provide improved bases for timely decisions concerning possible off-site emergency measures. The Committee wishes to be kept informed.")

*2. Comment on education, training, and experience requirements for Shift Supervisors (those in actual charge when an accident occurs). Are they adequate? Are they on par with those required of airline pilots? Comment specifically on training in fundamentals (e.g. reactor physics, health physics, thermodynamics, electronics, etc.)

(B&W has been reported to have stated that minimum requirements are a H.S. education plus 12 weeks of lectures).

3. Confirm that the current procedure for the test of TMI-2 aux. FW calls for disabling all redundant aux FW supply simultaneously. Was this always so? If it is a revision, why was it revised and what was the review process? Did it involve NRC? B&W? Request B&W, NRC Staff comment.

4. Discuss speed of computer at TMI-2 (Requires 12 sec/line was continuously clogged). What should be done about reactimeter speed - 3 sec/signal?

5. Discuss use of existing instrumentation in a diagnostic mode. What upgrading will be necessary?

6. Discuss events starting with attempts to clear resin to loss of hot well and its recovery. Include cause of water hammer that resulted in loss of air lines.

7. Tail pipe temperature does not seem to relate to whether or not PORV is open. Assess and discuss. (If thermocouple is mounted outside of pipe then thermal lag may be intolerable).

8. Why should not non-safeguards equipment be on daily check lists especially that interfacing safeguards equipment or that which is equally important?

9. What will Met.Ed. do to insure that senior operators are aware of LER's from other B&W plants? How will System Engineering, Nuclear Safety be involved in these interpretations?

10. Discuss control room ventilation sequence. Why were respirators required? Do they interfere with ability to communicate? Include discussion of ability to maintain control room on closed-cycle cooling and positive pressure.

11. Discuss planned improvements in training program.

12. How does Met. Ed. assure that procedures are actually followed.

13. Discuss recommended changes in plant.

14. Discuss instrumentation to be used to identify dispersed radionuclides in accidents.

15. Discuss circumstances under which natural circulation might be lost in TMI type plants and conditions for restoration if any.

16. Did the hydrogen bubble calculation include partial pressure of steam in the bubble? Were the results correlated with the perfect gas law. (PV & RT).

17. How long can RCP's tolerate relatively high quality steam flow?

18. What was the source of radioactivity in the auxiliary building? What was let down pathway? Is gaseous leakage checked regularly?

19. Why was there no pressure spike in the drain tank at the time of the 28 lb. spike in the reactor building? Why does not the depressurization curve show an indication of valve operation?

20. What was the duration of the 28 lb. spike? What is the sensitivity of the instrument which recorded it?

21. Were the make-up pumps turned on before or after the last coolant pumps were turned off?

22. The block valves were closed. Did the automatic FW valves turn on at 30 inches pressure?

23. How many items on the watch-relief check list? Confirm that the PORC did not review the check list.

24. How many nuclear years of experience are represented by the technical functions group?

25. Provide a copy of surveillance procedures for the aux. FW system.

26. Estimate the activity on the reactor building inside surfaces.

27. Please provide copies of TMI Administrative Procedure 1012.

28. Was there any permanent deformation as a result of the water hammer?

29. Please assess the desirability of providing enough pressure relief capacity so that depressurizing low enough to use the low pressure heat removal system would never be a problem.

30. What does Met. Ed. think about the Staff document on B&W plants discussing the possibility of closing relief valves and block valves during power operation?