U.S. NUCLEAR REGULATORY COMMISSION REGION I
OPERATOR LICENSING EXAMINATION REPORT

EXAMINATION REPORT NO. 50-309/88-02(OL)

FACILITY DOCKET NO. 50-309

FACILITY LICENSE NO. DPR-36

LICENSEE: Maine Yankee Atomic Power Company
83 Edison Drive
Augusta, Maine 04336

FACILITY: Maine Yankee

EXAMINATION DATES: February 11, 1988

CHIEF EXAMINER: _____ 23 Mar 88
Barry S. Norris Date
Senior Operations Engineer

APPROVED BY: _____ 3-24-88
Peter W. Eselgroth, Chief Date
PWR Section, Operations Branch
Division of Reactor Safety, Region I

SUMMARY: A written re-examination was administered to a Senior Reactor Operator (SRO) candidate. He passed the examination.

DETAILS

TYPE OF EXAMINATIONS: Replacement

EXAMINATION RESULTS:

	SRO Pass/Fail
Written	1/0
Operating	waived
Overall	1/0

CHIEF EXAMINER AT SITE: B. S. Norris, USNRC

OTHER EXAMINERS: D. T. Wallace, USNRC

No exit meeting was held since only a single written examination was administered. The facility was provided a copy of the examination questions and answer key for review. The facility comments (Attachment 2) and the NRC resolution of the comments (Attachment 3) are enclosed.

Attachments:
1. SRO Written Examination and Answer Key
2. Facility Comments on Written Examination
3. NRC Resolution to Facility Comments

ATTACHMENT 1

U. S. NUCLEAR REGULATORY COMMISSION
SENIOR REACTOR OPERATOR LICENSE EXAMINATION

FACILITY: MAINE YANKEE

REACTOR TYPE: PWR-CE

DATE ADMINISTERED: 88/02/09

EXAMINER: GRUEL, R.

CANDIDATE: ANSWER KEY

INSTRUCTIONS TO CANDIDATE:

Use separate paper for the answers. Write answers on one side only. Staple question sheet on top of the answer sheets. Points for each question are indicated in parentheses after the question. The passing grade requires at least 70% in each category and a final grade of at least 80%. Examination papers will be picked up six (6) hours after the examination starts.

CATEGORY VALUE	% OF TOTAL	CANDIDATE'S SCORE	% OF CATEGORY VALUE		CATEGORY
25.00	25.00			5.	THEORY OF NUCLEAR POWER PLANT OPERATION, FLUIDS, AND THERMODYNAMICS
25.00	25.00			6.	PLANT SYSTEMS DESIGN, CONTROL, AND INSTRUMENTATION
25.00	25.00			7.	PROCEDURES - NORMAL, ABNORMAL, EMERGENCY AND RADIOLOGICAL CONTROL
25.00	25.00			8.	ADMINISTRATIVE PROCEDURES, CONDITIONS, AND LIMITATIONS
100.00		Final Grade	%		Totals

All work done on this examination is my own. I have neither given nor received aid.

Candidate's Signature

NRC RULES AND GUIDELINES FOR LICENSE EXAMINATIONS

During the administration of this examination the following rules apply:

1. Cheating on the examination means an automatic denial of your application and could result in more severe penalties.

2. Restroom trips are to be limited and only one candidate at a time may leave. You must avoid all contacts with anyone outside the examination room to avoid even the appearance or possibility of cheating.

3. Use black ink or dark pencil only to facilitate legible reproductions.

4. Print your name in the blank provided on the cover sheet of the examination.

5. Fill in the date on the cover sheet of the examination (if necessary).

6. Use only the paper provided for answers.

7. Print your name in the upper right-hand corner of the first page of each section of the answer sheet.

8. Consecutively number each answer sheet, write "End of Category __" as appropriate, start each category on a new page, write only on one side of the paper, and write "Last Page" on the last answer sheet.

9. Number each answer as to category and number, for example, 1.4, 6.3.

10. Skip at least three lines between each answer.

11. Separate answer sheets from pad and place finished answer sheets face down on your desk or table.

12. Use abbreviations only if they are commonly used in facility literature.

13. The point value for each question is indicated in parentheses after the question and can be used as a guide for the depth of answer required.

14. Show all calculations, methods, or assumptions used to obtain an answer to mathematical problems whether indicated in the question or not.

15. Partial credit may be given. Therefore, ANSWER ALL PARTS OF THE QUESTION AND DO NOT LEAVE ANY ANSWER BLANK.

16. If parts of the examination are not clear as to intent, ask questions of the examiner only.

17. You must sign the statement on the cover sheet that indicates that the work is your own and you have not received or been given assistance in completing the examination. This must be done after the examination has been completed.

18. When you complete your examination, you shall:

a. Assemble your examination as follows:

(1) Exam questions on top.

(2) Exam aids - figures, tables, etc.

(3) Answer pages including figures which are part of the answer.

b. Turn in your copy of the examination and all pages used to answer the examination questions.

c. Turn in all scrap paper and the balance of the paper that you did not use for answering the questions.

d. Leave the examination area, as defined by the examiner. If after leaving, you are found in this area while the examination is still in progress, your license may be denied or revoked.

QUESTION 5.01 (2.50)

A reactor startup is in progress. Given the following information:

shutdown and regulating groups fully withdrawn

RCS is at no load temperature and pressure

Keff = 0.95

countrate = 60 cps

a. HOW MUCH negative reactivity is in the core? SHOW all calculations. (1.0)

The control room operator begins RCS dilution. Later the operator notices that the countrate has increased to 110 cps.

b. HOW MUCH negative reactivity is present in the core? SHOW all calculations. (1.5)

QUESTION 5.02 (3.00)

The reactor has a startup rate (SUR) of 0.7 decades per minute (DPM) at BOC.

a. HOW long will it take after passing 100 watts to reach 5 megawatts? (1.0)

b. If the same amount of reactivity as was added in part a. is added to the reactor at EOC, WHAT would be the resultant SUR? STATE assumptions and SHOW calculations. (2.0)

QUESTION 5.03 (1.00)

The Maine Yankee nuclear reactor core produces plutonium-239. HOW does the fuel temperature coefficient (FTC) respond to increases in Pu-239 and WHY? (1.0)

(***** CATEGORY 05 CONTINUED ON NEXT PAGE *****)

QUESTION 5.04 (2.00)

ANSWER the following questions on the production of xenon and its affects on core reactivity.

a. HOW is xenon produced in the core? (0.5)

b. HOW is xenon removed from the core? (0.5)

c. STATE the relationship between equilibrium xenon reactivity and reactor power level. WHAT is the main reason for this relationship? (1.0)

QUESTION 5.05 (1.50)

After a spent fuel assembly had been in the spent-fuel pool for two years, it was surveyed and it was determined that the dose rate at one foot was 70,000 R/hr. One and one-half years later (after 3-1/2 years in the pool), the dose rate at the same location was found to be 7000 R/hr. CALCULATE the effective half-life, t-1/2 of the fuel assembly. SHOW calculations. (1.5)

QUESTION 5.06 (1.00)

Following a reactor trip from sustained operation at 100% power, the power (neutron flux) level drops immediately to about (SELECT the correct answer) (1.0)

(a.) 6% because about 94% of the neutrons are prompt neutrons.

(b.) 6% because about 0.4 to 0.5% of the neutrons are delayed neutrons.

(c.) 99.5 to 99.6% because about 0.4 to 0.5% of the neutrons are delayed neutrons.

(d.) 99.5 to 99.6% because 99.5 to 99.6% of the neutrons are prompt neutrons.

(***** CATEGORY 05 CONTINUED ON NEXT PAGE *****)

QUESTION 5.07 (3.50)

The reactor is at 3[illegible]% power, Group 5 rods at 100 steps, equilibrium xenon and samarium, boron concentration is 1200 ppm and BOC. Using the attached figures from the Maine Yankee Technical Data book determine WHAT the final boron concentration will be if power is raised to 80%, ARO, equilibrium xenon and samarium? STATE all assumptions, SHOW all work, and IDENTIFY any figures used. (3.5)

QUESTION 5.08 (3.00)

The reactor is operating at 100% power. STATE the INITIAL effect that each of the following will have (INCREASE, DECREASE, NO EFFECT) on fuel center-line temperature and BRIEFLY JUSTIFY your answer.

a. Decrease in reactor coolant flow (0.75)

b. Increase in steam flow (0.75)

c. Increase in RCS pressure (0.75)

d. Decreasing fuel/cladding gap thickness (0.75)

QUESTION 5.09 (2.50)

The Maine Yankee reactor has tripped due to loss of offsite power.

a. LIST four (4) indications which verify establishment of natural circulation flow. INCLUDE the parameter AND its expected value or trend. (2.0)

b. WHAT should SG pressure be to bring initial core temperature to 532 degrees F? (0.5)

(***** CATEGORY 05 CONTINUED ON NEXT PAGE *****)

QUESTION 5.10 (1.50)

For each of the following concerning centrifugal pump operation, STATE whether available NPSH INCREASES, DECREASES or REMAINS THE SAME. Consider each item separately.

a. Suction temperature is reduced. (0.5)

b. Discharge valve is closed slightly. (0.5)

c. Suction valve is closed slightly. (0.5)

QUESTION 5.11 (1.00)

STATE WHY an MDFP (P2A or P2B) must be isolated and depressurized before its associated recirc valve can be stroke tested. (1.0)

QUESTION 5.12 (2.50)

The plant is at 100% power. The regenerative heat exchanger E-67 is operating with a letdown temperature of 316 degrees F. The charging flow enters the regenerative heat exchanger at 120 degrees F and is heated before entering the RCS. ASSUMING that the specific heat of water is constant at 1 BTU/lb-F, ANSWER the following heat transfer questions regarding this component. CLEARLY state ALL assumptions used in your calculations.

a. CALCULATE the nominal heat transfer rate (Q) for this heat exchanger in BTU/hr. (1.0)

b. CALCULATE the temperature of the RCS charging flow as it exits the regenerative heat exchanger. (1.0)

c. WHAT is the pressure corresponding to 20 degrees F sub-cooled at the outlet of the letdown side of the regenerative heat exchanger. (0.5)

(***** END OF CATEGORY 05 *****)

QUESTION 6.01 (1.00)

ANSWER TRUE or FALSE to the following statements about the CEA Control System.

a. Regulating Group 5 is divided into two subgroups, 5A and 5B. Group 5B CEAs are trippable while Group 5A CEAs are not. (0.5)

b. The Shutdown CEAs move at 27 steps per minute (20 inches/minute) while the Regulating CEAs move at 40 steps per minute (30 inches/minute). (0.5)

QUESTION 6.02 (1.50)

LIST the three (3) CEA withdrawal prohibit (CWP) signals generated by the RPS AND the conditions under which EACH can be disabled. (1.5)

QUESTION 6.03 (3.00)

ANSWER the following regarding the reactor power level (variable overpower) portion of the reactor protection system.

a. STATE HOW reactor power is determined by this system. INCLUDE input parameters as well as those inputs used for compensation. (2.0)

b. Briefly DESCRIBE WHAT operator actions (if any) related to this system are necessary during:

1. power increases (0.5)

2. power decreases (0.5)

(***** CATEGORY 06 CONTINUED ON NEXT PAGE *****)

QUESTION 6.04 (3.25)

ANSWER the following regarding the Emergency Diesel generators.

a. After the 11.5-minute cooldown period, diesel engine RPM increases unexpectedly to 700 RPM, and spurious engine alarms including Low Oil Pressure, Hot Engine, and Low Lube Oil level are generated. The engine remains unloaded. Briefly EXPLAIN WHAT prompt action is necessary to shutdown the engine. (0.75)

b. During the diesel AUTO START loading sequence, the diesel generator comes up to rated speed quickly. EXPLAIN HOW an engine overspeed condition is avoided. (1.0)

c. EXPLAIN the sequence of operation of BUS 7 breakers P-29A and P-29C (service water pump breakers) during a diesel auto loading sequence, AND the reason(s) for that operation. (1.5)

QUESTION 6.05 (1.75)

ANSWER the following regarding the Main Steam System.

a. WHAT is the primary purpose of the EFCVs? (0.75)

b. EXPLAIN how the NRV vacuum assist system operates. INCLUDE the conditions under which it would be used AND why it is used at that time. (1.0)

(***** CATEGORY 06 CONTINUED ON NEXT PAGE *****)

QUESTION 6.06 (2.50)

ANSWER the following regarding the Service Water and the Primary and Secondary Component Cooling Water Systems (PCC and SCC).

a. Normally two service water pumps are operating. WHAT are the two (2) temperature setpoint conditions requiring the start of an additional pump? (0.5)

b. The PCC and SCC contain in-line process type radiation monitors (RM-3401 for PCC, and RM-1701 for SCC). DESCRIBE HOW these monitors interlock with other PCC and SCC components. (1.5)

c. WHAT steps must be taken if either the PCC or SCC system is inoperative? (0.5)

QUESTION 6.07 (.50)

STATE WHY Maine Yankee uses a pressurizer level program that varies with reactor power. (0.5)

QUESTION 6.08 (1.50)

The letdown pressure control valve LD-F-16 closes automatically on a high differential pressure signal.

a. Across WHICH component(s) is the differential pressure measured? (0.5)

b. WHAT valve opens upon closure of LD-F-16 and WHERE is the letdown flow redirected? (1.0)

(***** CATEGORY 06 CONTINUED ON NEXT PAGE *****)

QUESTION 6.09 (2.80)

ANSWER the following regarding the RHR/LPSI system.

a. Briefly EXPLAIN HOW the RCS coolant can be purified when the RHR system is in operation. (1.0)

b. LIST the RHR pressure setpoint interlocks on both increasing AND decreasing RCS pressure. (0.8)

c. HOW is full LPSI flow capability through LSI-F-59, RHR control valve, ensured during at power conditions? (1.0)

QUESTION 6.10 (2.70)

ANSWER the following regarding the HPSI system.

a. LIST three (3) operational attributes of the P-14S HPSI pump which make it different from the other two HPSI pumps. (1.2)

b. LIST the functions (or valve numbers) of three (3) HPSI/CVCS valves which close on an SIAS and reopen when the SIAS signal is RESET. (1.5)

QUESTION 6.11 (1.50)

Maine Yankee Procedure 3.1.2, ECCS Routine Testing, states that the LPSI pump breaker should not be racked down when P-61S is being used as a spray pump in the same train.

a. LIST the two (2) consequences of not observing this guidance. (1.0)

b. STATE the condition under which these consequences would occur. (0.5)

(***** CATEGORY 06 CONTINUED ON NEXT PAGE *****)

QUESTION 6.12 (3.00)

For each of the following conditions (a., b., and c.) LIST those actuation signals and trips (1. through 5.) that should have automatically occurred. CONSIDER each condition separately. Each condition may have for its answer none, one, or several actuation signals or trips. (3.0)

1. SIAS
2. CSAS
3. RAS
4. CIS
5. Main Feedwater System Trip

a. A steam line break has occurred in containment and

containment pressure = 7 psig
containment radiation = normal background
S/G levels = 60%, 60%, 30%
Pzr pressure = 1800 psia
S/G pressures = 700 psia, 700 psia, 550 psia
RWST level = 250,000 gallons

b. A LOCA has occurred and

containment pressure = 25 psig
containment radiation = 6 R/hr
S/G levels = 38%, 38%, 38%
Pzr pressure = 1300 psia
S/G pressures = 380 psia, 450 psia, 450 psia
RWST level = 85,000 gallons

c. A feedwater problem has occurred

containment pressure = 1 psig
containment radiation = normal background
S/G levels = 63%, 63%, 31%
Pzr pressure = 2180 psia
S/G pressures = 730 psia, 730 psia, 640 psia
RWST level = 300,000 gallons

(***** END OF CATEGORY 06 *****)

QUESTION 7.01 (1.50)

LIST two (2) reasons why an isolated loop is maintained in an overpressure condition per procedure 1-10-5, "Cooldown of an Isolated Loop." ASSUME the isolated loop has insignificant coolant loss. (1.5)

QUESTION 7.02 (1.50)

Procedure 1-10-7, "RCP Operation," allows deviations from "normal" parameters under very specific conditions. ANSWER the following regarding RCP operation during off-normal conditions.

a. By procedure, RCP operation with excess seal leakoff (i.e., > 5 gpm) is allowed, provided that the lower seal cavity temperature is maintained at approx. 150 degrees F. HOW does one maintain this seal temperature specification? (0.5)

b. A sudden reduction in RCP seal leakoff flow to below its normal value is considered more serious than a sudden increase. EXPLAIN WHY a sudden reduction in RCP seal leakage flow is serious to RCP operation, AND IDENTIFY the expected result should the condition go unaltered. (1.0)

QUESTION 7.03 (1.00)

Procedure 1-11-6, "CVCS Operation," CAUTIONS that "Only one HPSI Pump Control Switch shall be out of the PULL-TO-LOCK position when the RCS temperature is less than 430 degrees F." EXPLAIN the reason for this CAUTION statement. (1.0)

(***** CATEGORY 07 CONTINUED ON NEXT PAGE *****)

QUESTION 7.04 (1.50)

Procedure 1-22-2, "Battery and Vital Bus Operation," identifies three (3) major inadvertent plant responses which could occur as a result of a "voltage spike" generated during the cross connection of vital buses (necessitated by either inverter failure or required maintenance) during power operation. LIST the three (3) major inadvertent plant responses which could occur. (1.5)

QUESTION 7.05 (1.50)

In accordance with Operations Memo 9-D-11, turbine backpressure should be reduced when unit load is less than 30% power.

a. WHAT value of turbine backpressure should be maintained? (0.5)

b. WHAT is the reason for avoiding high backpressure during low power operation AND WHAT would result from such operation? (1.0)

QUESTION 7.06 (1.25)

ANSWER the following regarding containment operations during abnormal plant conditions.

a. If an automatic containment isolation valve is not operable, WHAT action is required to maintain containment integrity? (0.5)

b. WHAT post-LOCA containment condition can lead to a containment pressure spike? IDENTIFY limits in your answer. (0.75)

(***** CATEGORY 07 CONTINUED ON NEXT PAGE *****)

QUESTION 7.07 (2.00)

ANSWER the following which address operator actions to be taken during abnormal plant conditions.

a. WHAT two (2) operator actions MUST be taken immediately after a loss of control air? (1.0)

b. WHAT operator action MUST be initiated no later than 10 minutes following the discovery of a Main Control Room Fire to protect the RCS? (0.5)

c. WHAT alternate source of water MAY be aligned to the SGs "as a last resort" during the performance of an RCS cool-down from the Auxiliary Shutdown Panel (ASP)? (0.5)

QUESTION 7.08 (4.50)

E-0 "Emergency Shutdown from Power or Safety Injection" provides entry into the Maine Yankee EOPs. ANSWER the following regarding E-0.

a. NAME the five (5) "criteria" provided on the E-0 foldout page. Specific setpoints or values do NOT need to be included. (1.5)

b. A reactor trip has occurred and two (2) rod bottom lights are not lit. LIST the immediate actions that are to be conducted. ASSUME the two rod bottom lights remain unlit and reactor power remains greater than 2%. (2.0)

c. ASSUME the Containment Purge Isolation valves cannot be manually closed. WHAT action should you take? INDICATE specific plant locations in your response. (1.0)

(***** CATEGORY 07 CONTINUED ON NEXT PAGE *****)

QUESTION 7.09 (1.50)

ANSWER the following regarding ES-0.2, "Natural Circulation Cooldown."

a. The Step 5 CAUTION states: "DO NOT run more than two CEDM cooling fans at one time." EXPLAIN the reason for this caution statement. (0.75)

b. WHAT is the primary function of the CEDM cooling fan operation during ES-0.2? (0.75)

QUESTION 7.10 (3.25)

Once an SGTR event has been properly diagnosed, entry into the Emergency Procedures for recovery from an SGTR is made (i.e., E-3, ES-3.1, ES-3.3). ANSWER the following regarding this set of SGTR procedures.

a. E-3, "Steam Generator Tube Rupture," requires the isolation of the faulted steam generator, which includes stopping the faulted loop's RCP. Under WHAT condition(s) MUST the faulted loop's RCP continue to be operated? (0.5)

b. Three main objectives of E-3 are to isolate the faulted SG, cooldown the RCS, and depressurize the RCS. For the cooldown and depressurization initiated in E-3,

   1. WHAT is the basis for establishing the RCS target pressure? (0.75)

   2. WHAT is the basis for establishing the RCS target temperature? (0.75)

c. Both ES-3.1, "Post-SGTR Cooldown Using Backfill," and ES-3.3, "Post-SGTR Cooldown Using Steam Dump," are entered via Step 42 of E-3, at the discretion "of the plant staff."

   1. WHICH is the preferred procedure? (0.5)

   2. Under WHAT conditions should the alternate procedure be used? (0.75)

(***** CATEGORY 07 CONTINUED ON NEXT PAGE *****)

QUESTION 7.11 (2.00)

If an emergency boration of the RCS becomes necessary during normal core reloading operations,

a. WHAT source of borated water would be used? (0.5)

b. WHICH pump(s) would be used to inject the borated water? (0.5)

c. WHAT flow path would be used for injection of the borated water into the RCS? (1.0)

QUESTION 7.12 (1.50)

During refueling operations, Maine Yankee operating procedures describe a method for manipulator crane position indication alignment WITHOUT the TV camera.

a. HOW is this alignment performed? (0.75)

b. WHAT is the major disadvantage of this alternate alignment procedure? (0.75)

QUESTION 7.13 (2.00)

A contaminated tank located 15 feet from a work area in the RCS has resulted in a gamma radiation dose rate of 100 mrem/hr in the work area. One layer of lead bricks will reduce the radiation level to 50 mrem/hr. The work area radiation level is to be lowered to below 4 mrem/hr.

a. HOW MANY layers of lead bricks are necessary to accomplish the radiation level reduction? SHOW WORK. (1.0)

b. SHOULD the resultant area (about 4 mrem/hr) be posted as a Radiation Area? WHY or WHY NOT? (1.0)

(***** END OF CATEGORY 07 *****)

QUESTION 8.01 (2.00)

ANSWER the following regarding the DEFINITIONS section of the Maine Yankee Technical Specifications.

a. WHAT single operating condition change defines the transition from Condition 3 to Condition 4? (0.5)

b. WHAT single operating condition change defines the transition from Condition 5 to Condition 6? (0.5)

c. WHEN is the reactor considered critical (for purposes of administrative control)? (0.5)

d. WHY does the cold shutdown Boron concentration differ from the hot shutdown Boron concentration? (0.5)

QUESTION 8.02 (4.50)

ANSWER the following regarding the Plant Shift Superintendent (PSS), the Shift Operating Supervisor (SOS), and the Control Room Operator (CRO).

a. WHAT is the minimum license requirement per Maine Yankee Technical Specifications for the SOS? (0.5)

b. LIST five (5) actions the oncoming PSS shall take prior to assuming the shift. (1.5)

c. ARE the following actions of shift staff proper? JUSTIFY your answer. (1.5)

The SOS and a CRO are alone in the control room. The SOS enters the bathroom. During this time the CRO sits at the SOS desk while he updates his logs. The SOS returns to his desk and the CRO gets his lunch from the kitchen area.

d. Under WHAT conditions may the PSS briefly leave the control room during accident situations? (1.0)

(***** CATEGORY 08 CONTINUED ON NEXT PAGE *****)

QUESTION 8.03 (2.00)

You are the on-duty PSS. ANSWER each question separately.

a. An AO calls and informs you that a normally locked shut ECCS valve has been tampered with. WHAT action should you immediately take? (1.0)

b. You are conducting an approved procedure when the SOS informs you that an entry in the Night Orders pertains to the next step of the procedure. The procedures and Night Orders do not agree. WHICH do you follow? (0.5)

c. You are on shift, out in the plant and a fire alarm occurs. WHAT should you do? (0.5)

QUESTION 8.04 (3.00)

Regarding the use of "White Tags,"

a. 1. Under WHAT conditions is independent verification of proper tagging required? (0.75)

2. WHAT exception exists to this practice? (0.75)

b. HOW can a White Tag be cleared if the "person to whom apparatus is tagged" is unavailable? (1.0)

c. HOW often are outstanding White Tags reviewed for their continued applicability? (0.5)

QUESTION 8.05 (1.00)

The PSS must get authorization from WHAT two (2) individuals, by title, to allow a loop entry at power? (1.0)

(***** CATEGORY 08 CONTINUED ON NEXT PAGE *****)

QUESTION 8.06 (3.00)

For EACH of the following conditions, STATE WHAT action(s) (if any) are to be performed per the Maine Yankee Technical Specifications. INCLUDE any associated time requirements. ASSUME all other plant conditions are normal and the reactor is in Condition 7. Actions required beyond a four-hour period are NOT required.

a. SIA-M-21 (safety injection tank isolation valve) is closed for testing. (0.75)

b. LPSI pump P-12A is taken out of service for maintenance. (0.75)

c. The auxiliary feedwater pump is out of service for maintenance and a common problem is found that renders both emergency feedwater pumps INOPERABLE. (0.75)

d. CEA subgroups 5A and 5B differ by 12 steps. (0.75)

QUESTION 8.07 (3.00)

Containment pressure and temperature must be maintained in order to support various FSAR analyses.

a. STATE the allowable containment pressure for Condition 7 operations AND its basis. (1.5)

b. STATE the allowable containment temperature AND LIST four (4) actions that can be taken if containment temperature is too high. (1.5)

QUESTION 8.08 (2.50)

ANSWER the following regarding CEA operational and shutdown margin limits during Condition 7 operation.

a. WHEN is a CEA considered to be fully withdrawn? (0.5)

b. TRUE or FALSE. Operation of CEAs in the automatic mode is prohibited in the Maine Yankee Technical Specifications. (0.5)

c. Under WHAT conditions is continued operation with inoperable CEA(s) permitted? (1.5)

(***** CATEGORY 08 CONTINUED ON NEXT PAGE *****)

QUESTION 8.09 (4.00)

ANSWER the following regarding the Maine Yankee Emergency Plan.

a. WHO on back shift serves as the Emergency Coordinator during an emergency? (0.4)

b. WHO (by title) are authorized to act as Emergency Coordinator upon their arrival on site? (1.2)

c. WHAT duties of the Emergency Coordinator cannot be delegated? (1.6)

d. WHAT offsite organization is first notified of an emergency and WHEN must this notification be made? (0.8)

(***** END OF CATEGORY 08 *****)
(********** END OF EXAMINATION **********)

ANSWERS -- MAINE YANKEE -88/02/09-GRUEL, R.

ANSWER 5.01 (2.50)

a. rho = (Keff - 1)/Keff = (0.95 - 1)/0.95
rho = -5.26% delta k/k [+1.0]

b. CR2/CR1 = (1 - K1/1 - K2) = K2 = 1 - CR1/CR2 (1 - K1)
K2 = 1 - 60/110 (1 - 0.95) = 0.973 [+0.5]
rho = (Keff - 1)/Keff = (0.971 - 1)/0.973 = -2.80% delta k/k
[+1.0]
[Δk = k-1 allowed for full credit]

REFERENCE

1. Maine Yankee: ELO #CRC-0101-58.
192008K104 ...(KA'S)

ANSWER 5.02 (3.00)

a. P = Po 10**(SUR)(T)
5 x 10**6 = (100)(10**(0.7)T)
T = (1/0.7)log (5 x 10**4)
T = 6.7 min [+1.0]

b. assume beta(eff) = 0.006 at BOC
= 0.005 at EOC
(full credit for reasonable values)

t = 26/SUR = 26/0.7 = 37 sec
rho = beta(eff)/(1 + lambda t) =
0.006% delta k/k/(1 + (0.08)(37))
rho = 0.152% delta k/k [+1.0]

EOC: T = (beta - rho)/(lambda*rho) = (0.005 - 0.00152)/
(0.08)(0.00152) sec
T = 28.6 sec
SUR = 26/28.6 = 0.909 dpm [+1.0]

REFERENCE

1. Maine Yankee: RO Rx Theory LP No. RO-L-1.10 and ELO #CRC-101-63.
192003K106 ...(KA'S)

ANSWERS -- MAINE YANKEE -88/02/09-GRUEL, R.

ANSWER 5.03 (1.00)

FTC increases due to Pu-239 buildup [+0.5]. This is because of the increased resonant capture in Pu-239 compared to U-235 [+0.5].

REFERENCE

1. Maine Yankee: ELO #CRC-0101-42.
192004K107 ...(KA'S)

ANSWER 5.04 (2.00)

a. from fission fragments decay [+0.4] and directly from fission [+0.1]

b. burnout [+0.25] and decay [+0.25]

c. At higher reactor power, equilibrium xenon reactivity changes less with a change of power than at lower reactor power [+0.5]. As power increases, the burnout and production terms become dominant, so at high power, production and removal terms become more linear [+0.5].

REFERENCE

1. Maine Yankee: RO Rx Theory LP No. RO-L-1.12 and ELO #CRC-101-90.
192006K103 192006K104 192006K111 ...(KA'S)

ANSWER 5.05 (1.50)

A2 = A1 e**-(0.693 t/(t-1/2)) [+0.5]

ln A2/A1 = -0.693 t/(t-1/2)

t-1/2 = 0.693 (1.5) yr/ln (70,000/7,000)

t-1/2 = 0.45 yrs [+1.0]

REFERENCE

1. Maine Yankee: ELO #CRC-0101-11.
033000A102 ...(KA'S)

ANSWERS -- MAINE YANKEE -88/02/09-GRUEL, R.

ANSWER 5.06 (1.00)

(b.) [+1.0]

REFERENCE

1. Maine Yankee: ELO #CRC-0101-54.
192008K123 ...(KA'S)

ANSWER 5.07 (3.50)

reactivity due to FTD: (Figure 2.1.2.1)
-0.81 -(-0.38) = -0.43% drho [+0.4]

reactivity due to MTD: (Figure 2.2.2.1)
+0.02 - (+0.035) = -0.015% drho [+0.4]

reactivity due to xenon: (Figure 2.3.1.5 or Figure 2.3.1.2)
-2.4 - (-1.7) = -0.7% drho [+0.4]

reactivity due to samarium: (Figure 2.3.2.1) at power equilibrium is constant [+0.4]

reactivity due to rods: (Figure 2.6.2)
1.49 - 1.08 = 0.41% drho [+0.4]

total reactivity change: sum of above: -0.74% drho [+0.4]

boron worth at 1200 ppm: (Figure 2.7.2.1 or Figure 2.7.1.2)
-11.2% drho/1200 ppm = -0.0093% drho/ppm [+0.4]

new boron concentration:
(Cb - 1200 ppm)(-0.0093% drho/ppm) = +0.74% drho [+0.3]
Cb = (-0.74/0.0093 + 1200)ppm = 1120 ppm [+0.4]

REFERENCE

1. Maine Yankee: RO Rx Theory LP No. RO-L-1.13.

2. Maine Yankee: TLO #CRC-101.C.

3. Maine Yankee: Procedure No. 1-4, "Operations at Power," Section 5.

4. Maine Yankee: Technical Data Book, Figures 2.1.1.2, 2.1.2.1, 2.2.1.1, 2.2.1.3, 2.2.2.1, 2.2.2.2, 2.2.2.3, 2.3.1.2, 2.3.1.5, 2.3.2.1, 2.6.1, 2.6.2, 2.7.1.2, and 2.7.2.1.
192008K117 ...(KA'S)

ANSWERS -- MAINE YANKEE -88/02/09-GRUEL, R.

ANSWER 5.08 (3.00)

a. Increase [+0.25]. Q is proportional to the mass flowrate, so as flow decreases moderator and therefore fuel must heat up [+0.5].

b. Decrease [+0.25]. Increase in steam flow will decrease RCS Tavg [+0.5] (which will tend to decrease fuel center-line temperature). Also accept "Increase" [+0.25] if reason addresses increased power due to MTC effects [+0.5].

c. No effect [+0.25]. Subcooled heat transfer is not affected by pressure changes [+0.5].

d. Decrease [+0.25]. Q is proportional to delta-T/L (gap width) --> delta-T is proportional to QL, so as L decreases, delta-T (and fuel center-line temperature) decreases [+0.5].

REFERENCE

1. Maine Yankee: RO-L-7.3, PPM-109, PPM-102, ELO #PPM-103-4.

193008K116 ...(KA'S)

ANSWER 5.09 (2.50)

a. 1. core delta-T less than full power delta-T, but greater than zero
2. T-cold constant or decreasing, but greater than SG T-sat
3. T-hot constant or decreasing
4. core exit TCs trending with T-hot
5. core subcooling greater than 12 degrees F
6. heat removal via steam flow
7. SG pressures constant or decreasing

Any four (4) [+0.5] each, +2.0 maximum.

b. SG pressure should be about 900 psig [+0.5] (slightly lower values are acceptable due to core delta-T)

REFERENCE

1. Maine Yankee: Heat Transfer RO-L-7.5, pp. 5 and 6 of 10, Rev. 1.
2. Maine Yankee: ES-0.1, Reactor Trip Response, Step 12, Rev. 2
3. Steam Tables.

000017EA12 002000K515 193008K122 ...(KA'S)

ANSWERS -- MAINE YANKEE -88/02/09-GRUEL, R.

ANSWER 5.10 (1.50)

a. increases [+0.5]
b. increases [+0.5]
c. decreases [+0.5]

REFERENCE

1. Maine Yankee: Lesson RO-L-7.4, ELO #PPM-104-5.
191004K106 ...(KA'S)

ANSWER 5.11 (1.00)

To limit the potential for and consequences of waterhammer [+1.0].

REFERENCE

1. Maine Yankee: OPS Memo 9-D-3, Rev. 1.
059000G001 ...(KA'S)

ANSWER 5.12 (2.50)

a. assume normal letdown flow = 80 gpm [+0.25]
assume RCS T-cold at 100% = inlet temp to regen Hx = ~~550~~ 552 F [+0.25]
Q = (80 gpm)(1 BTU/lb-F)(60 min/hr)(1 ft**3/7.48 gal)
(~~62.4~~ 51 lb/ft**3)(550 F - 316 F)
Q = ~~9.4~~ 6 E 6 BTU/hr [+0.5]

b. assume normal charging flow = 65 gpm [+0.5]
Tin = 120 F
Tout = 120 F + (9.4 E 6 BTU/hr)/((65 gpm)(60 min/hr)
(1 ft**3/7.48 gal)(~~62.4~~ 61 lb/ft**3)(1 BTU/lb-F))
Tout = 409 F [+0.5]

(can be alternatively determined by flow/delta-T comparison)

c. T = 316 F = 20 F subcooled --> T-sat = 336 F [+0.25]
P-sat (336 F) = 112 psia (approx.) [+0.25]

REFERENCE

1. Maine Yankee: NS-4, p. 101, Rev. 5A.
004020K502 ...(KA'S)

ANSWERS -- MAINE YANKEE -88/02/09-GRUEL, R.

ANSWER 6.01 (1.00)

a. False (5B NOT trippable) [+0.5]
b. True [+0.5]

REFERENCE

1. Maine Yankee: CEACS, NS-9, pp. 3 and 5, Rev. 5.
001000K403 001~~000~~010K404 ...(KA'S)

ANSWER 6.02 (1.50)

1. high neutron flux power pre-trip [+0.3] - cannot be disabled [+0.2] (but does not drop below 20% power)

2. high rate of change neutron flux pre-trip [+0.3] - automatically disabled below 10-4% power [+0.2] and above 15% power

3. thermal margin/low pressure pre-trip [+0.3] - disabled automatically below 10-4% power [+0.2]; can be manually bypassed below 2% power

REFERENCE

1. Maine Yankee: CEACS, NS-9, p. 15, Rev. 5; RPS, NS-12, pp. 9, 13, 22, Rev. 5
001000K402 001000K403 ...(KA'S)

ANSWER 6.03 (3.00)

a. Reactor power is the higher [+0.5] of: the associated nuclear power safety channel [+0.5], OR the power determined from the (auctioneered high) RCS delta-T [+0.5]. (Auctioneered high) T-cold is used for compensation [+0.5].

b. 1. periodic reset is necessary to raise the setpoint [+0.5]
2. none [+0.5]

REFERENCE

1. Maine Yankee: RPS, NS-12, Section 2.1.1, pp. 9 through 14, Rev. 5.
012000A101 012000K402 ...(KA'S)

ANSWER 6.04 (3.25)

a. Engine can be immediately shutdown by moving the injection control lever to "no fuel" position. [+0.75]
Also accept: Depress engine stop push buttons AND operate emergency fuel cutoff valve [+0.75]

b. Overspeed is minimized by starting the governor booster pumps [+0.5] and by starting the diesel with some electrical loads on its bus [+0.5].

c. On an autostart, both P-29A and P-29C breakers shut [+0.3]. The circuit is designed such that if the "A" service water pump breaker (P-29A) shuts, the "C" service water breaker (P-29C) will automatically trip back open [+0.3]. If the "A" service water pump breaker (P-29A) fails to shut, then the "C" service water pump breaker (P-29C) will NOT trip open [+0.4]. The logic is designed to minimize diesel loading [+0.5].

REFERENCE

1. Maine Yankee: Diesel Generators, AS-12, pp. 53, 56, and 57, Rev. 3.

064000G007 064000G009 064000K401 ...(KA'S)

ANSWER 6.05 (1.75)

a. The EFCVs are installed to isolate the SGs and protect the RCS against rapid cooldown following a major downstream steam line rupture. [+0.75]

b. During cooldown, a vacuum can be maintained on the upper portion of the valves' internals which holds the valve up preventing valve flutter and allowing steam flow at very low pressures and flow rates [+0.75]. The system allows an additional means of decay heat removal [+0.25].

REFERENCE

1. Maine Yankee: Main & Reheat Steam System, PGS-2, pp. 3, 9, and 10, Rev. 5.

039000G004 ...(KA'S)

ANSWERS -- MAINE YANKEE -88/02/09-GRUEL, R.

ANSWER 6.06 (2.50)

a. 1. when PCC heat exchanger outlet temperature > 85 degrees F
2. when SCC heat exchanger outlet temperature > 89 degrees F

[+0.25] each

b. Radiation monitors RM-3401 and RM-1701 cause closure of the respective systems' surge tank vent valve [+~~0.75~~ 1.5] (and ~~redirection~~ Continuance of the gland leakoff tank overflow to the PAB sump) ~~[+0.75]~~.

c. loss of either system requires immediate plant shutdown [+0.5]

REFERENCE

1. Maine Yankee: Service Water, PGS-10, p. 21, Rev. 3.

2. Maine Yankee: Component Cooling System, AS-1, p. 18, Rev. 5.
008000A204 008000G001 076000A404 ...(KA'S)

ANSWER 6.07 (.50)

To minimize the need to change letdown and charging flowrates as reactor power (and consequently Tavg) varies. [+0.5]

REFERENCE

1. Maine Yankee: CVCS, NS-4, p. 2, Rev. 5A.
011000G004 ...(KA'S)

ANSWER 6.08 (1.50)

a. either the letdown pre-filter or letdown post-filter [+0.5]

(Full credit for letdown filter.)

b. When LD-F-16 closes, relief valve (LD-S-14) lifts [+0.5], redirecting letdown flow to the volume control tank (VCT) [+0.5].

REFERENCE

1. Maine Yankee: CVCS, NS-4, p. 26, Rev. 5A.
004020K404 004020K405 ...(KA'S)

ANSWERS -- MAINE YANKEE -88/02/09-GRUEL, R.

ANSWER 6.09 (2.80)

a. RHR flow can discharge to the CVCS purification loop [+0.5] or the spent pool purification loop [+0.5] for reactor coolant purification.

b. 600 psig autoisolation on increasing RCS pressure [+0.4]; 400 psig open enable setpoint on decreasing RCS pressure [+0.4].

c. The LPSI flow control override switch is placed in the LOCKED OPEN position [+0.5]. LSI-F-59 is also mechanically blocked in the open position [+0.5].

REFERENCE

1. Maine Yankee: RHR, NS-6, pp. 2, 8, and 13, Rev. 3.

005000K402 005000K407 006000K409 ...(KA'S)

ANSWER 6.10 (2.70)

a. 1. ~~(must be valved in locally) is~~ may be aligned to either train

2. receives power from either emergency Bus 5 or Bus 6

3. may be aligned to SCC or PCC cooling

[+0.4] each

b. charging isolation valve (CH-A-32), charging isolation valve (CH-A-33), charging flow control valve (CH-F-38), fill header stop valve (CH-F-70), seal water to RCPs (SL-P-3)

[+0.5] each, +1.5 maximum.

REFERENCE

1. Maine Yankee: ECCS, NS-5, pp. 16, 17, and 18; and Table NS-5-IV, pp. 39 and 40, Rev. 5.

006000K201 006020K601 006030K405 ...(KA'S)

ANSWERS -- MAINE YANKEE -88/02/09-GRUEL, R.

ANSWER 6.11 (1.50)

a. 1. loss of one spray train (for 10 seconds) [+0.5]
2. loss of suction to one HPSI pump (for 10 seconds) [+0.5]

b. during RAS switchover [+0.5]

REFERENCE

1. Maine Yankee: Procedure 3.1.2, Section 4.7, p. 3 of 110, Rev. 41.

2. Maine Yankee: OP Memo 9-E-11, May 1, 1987.

005000K402 194001A102 ...(KA'S)

ANSWER 6.12 (3.00)

a. CIS (on containment press > 5 psig) [+0.25]
SIAS (on containment press > 5 psig) [+0.25]

b. SIAS (on containment press > 5 psig or Pzr press < 1585 psig) [+0.25]
CSAS (on containment press > 20 psig and SIAS) [+0.5]
RAS (on RWST level < 100,000 gallons) [+0.5]
CIS (on containment press > 5 psig) [+0.25]
MFW trip (on SIAS and SG press < 400 psig) [+0.5]

c. none [+0.5]

REFERENCE

1. Maine Yankee: ECCS, NS-5, Rev. 5, p. 36 (SIAS), p. 48 (CSAS), p. 43 (CIS).

2. Maine Yankee: Containment Spray, NS-7, Rev. 3, p. 25 (RAS).

3. Maine Yankee: Main Feedwater, PGS-12, Rev. 4, p. 65 (MFW Trip).

013000K101 ...(KA'S)

ANSWERS -- MAINE YANKEE -88/02/09-GRUEL, R.

ANSWER 7.01 (1.50)

1. to ensure uniform heat transfer in the steam generator [+0.75]
2. to ensure the loop remains subcooled [+0.75]

REFERENCE

1. Maine Yankee: Procedure No. 1-10-5, Section 2, p. 1 of 5, Rev. 7.

002000K409 ...(KA'S)

ANSWER 7.02 (1.50)

a. by increasing the seal injection flow as seal leakage flow increases [+0.5]

b. RCP seals may not receive adequate lubrication [+0.5] which could result in seal stage wear and damage [+0.5]

REFERENCE

1. Maine Yankee: Procedure No. 1-10-7, Section 6.5, p. 7 of 16, Rev. 23.

003000A201 003000A401 ...(KA'S)

ANSWER 7.03 (1.00)

to eliminate a means of pressurizing the RCS at low temperature [+1.0]

REFERENCE

1. Maine Yankee: Procedure No. 1-11-6, Section 3.0, pp. 1 and 4 of 32, Rev. 22.

2. Maine Yankee: TS 3.4.

004020A103 ...(KA'S)

ANSWERS -- MAINE YANKEE -88/02/09-GRUEL, R.

ANSWER 7.04 (1.50)

1. SIAS [+0.5]
2. PORV actuation [+0.5]
3. RPS trip [+0.5]

REFERENCE

1. Maine Yankee: Procedure No. 1-22-2, Section 5.3, p. 5 of 10, Rev. 7.

062000A208 ...(KA'S)

ANSWER 7.05 (1.50)

a. at 3.5 in Hg or less [+0.5]

b. To prevent harmful vibrating stress levels [+0.5] which could lead to turbine damage (cracking of blades or disc attachment areas) [+0.5].

REFERENCE

1. Maine Yankee: Operations Memo 9-D-11.

045000G001 ...(KA'S)

ANSWER 7.06 (1.25)

a. the valve must be tagged shut [+0.5]

b. hydrogen [+0.5] concentration exceeding 4% [+0.25]

REFERENCE

1. Maine Yankee: AOP 2-30, Section 2.0(d), p. 1, Rev. 12.

2. Maine Yankee: AOP 2-17, Section 1.0, p. 1, Rev. 8.

103000K406 ...(KA'S)

ANSWERS -- MAINE YANKEE -88/02/09-GRUEL, R.

ANSWER 7.07 (2.00)

a. 1. trip the reactor and turbine [+0.5]
2. trip the RCPs (within 45 seconds) [+0.5]

b. an operator must be dispatched to remove power from the PORVs [+0.5]

c. SGs may be fed from the fire system [+0.5]

REFERENCE

1. Maine Yankee: AOP 2-28, Steps 5.1 and 5.2, Rev. 12.

2. Maine Yankee: AOP 2-90-1, Step 5.3, Rev. 5.

3. Maine Yankee: AOP 2-90-8, Section 1.0, Rev. 5.

000065EA20 039000G013 194001K116 ...(KA'S)

ANSWERS -- MAINE YANKEE -88/02/09-GRUEL, R.

ANSWER 7.08 (4.50)

a. 1. RCP Trip Criteria [+0.3]
2. SIAS Initiation Criteria [+0.3]
3. SI Throttling Criteria [+0.3]
4. EFW Supply Switchover Criteria [+0.3]
5. Minimum FW Flow for Decay Heat Removal [+0.3]

b. 1. Manually trip CEDM Gen. set output breakers (MG-1A, MG-1B) [+0.4]

2. Manually OPEN and reclose 480V supply breakers to BUS 9 and BUS 12 [+0.4]

3. (Go to FR-S.1 and) ensure turbine trip [+0.4]

4. Ensure minimum FW flow for decay heat removal [+0.4]

5. (Ensure reactor is subcritical and) initiate emergency boration [+0.4]

c. Send an operator to locally close the valves [+0.5]. They are located in the EFW pump room and equipment hatch area [+0.5].

REFERENCE

1. Maine Yankee: E-0; Step 2, Step 11, Rev. 1; Foldout Page, Rev. 3.

2. Maine Yankee: FR-S.1, Steps 1-6, Rev. 0.
000007G011 000029G010 000069G006 ...(KA'S)

ANSWER 7.09 (1.50)

a. To prevent overpressurization of the CEDM duct work (if three fans were running). [+0.75]

b. To cool the stagnant upper head fluid (so that loss of subcooling margin does not occur.) [+0.75]

REFERENCE

1. Maine Yankee: ES-0.2, Step 5 Caution Basis, Rev. 2.
000007G007 ...(KA'S)

ANSWERS -- MAINE YANKEE -88/02/09-GRUEL, R.

ANSWER 7.10 (3.25)

a. If it is the ONLY RCP available to provide pressurizer spray. [+0.5]

b. 1. RCS target pressure is set to (the equilibrium pressure of ruptured SG to) minimize/eliminate RCS leakage [+0.75].

2. RCS target temperature is set to maintain required subcooling margin at the RCS target pressure [+0.75].

c. 1. ES-3.1 [+0.5]

2. When a more rapid cooldown and depressurization is required. [+0.75]

REFERENCE

1. Maine Yankee: E-3, Step 3 Caution, Steps 17-20, Step 42 Basis, Rev. 2.

000009EA20 000009G012 003000G001 ...(KA'S)

ANSWER 7.11 (2.00)

a. the boric acid storage tank [+0.5]

b. the boric acid transfer pump [+0.5]

c. through an idle charging pump through the HPSI lines (by operating BA-M-36 or 37 and opening HSI-M-40, 41, 42 and 43) [+1.0]

REFERENCE

1. Maine Yankee: Procedure No. 10-1, Appendix D, Sections 1.0 and 5.0, p. 27 of 65, Rev. 11.

000024G010 ...(KA'S)

ANSWERS -- MAINE YANKEE -88/02/09-GRUEL, R.

ANSWER 7.12 (1.50)

a. Alternate alignment is possible using a "plumb-bob" suspended from the hoist box. [+0.75]

b. The major disadvantage is higher personnel exposure. [+0.75]

REFERENCE

1. Maine Yankee: Procedure No. 13-6A, p. 1, Rev. 4.
034000G009 034000G302 ...(KA'S)

ANSWER 7.13 (2.00)

a. 1 layer = 1 HVL
I/Io = 2**x
x = ln 25/ln 2 = 4.64 Therefore 5 layers are required [+1.0]

(Full credit given for any correct method.)

b. Yes [+0.5]. The resultant radiation level results in a dose rate (125 mrem) in excess of 100 mrem in 5 days [+0.5].

REFERENCE

1. Maine Yankee: Protection Manual, Section 1.0, p. 1-1 and Section 3.4.1, p. 3-2.
19401K104 ...(KA'S)

ANSWERS -- MAINE YANKEE -88/02/09-GRUEL, R.

ANSWER 8.01 (2.00)

a. RCS ~~Tavg~~ Temp. [+0.25] increases to 210 degrees F [+0.25]

b. control rod withdrawal [+0.5]

c. (Neutron flux log range channel instrumentation ~~[+0.25]~~ indicates) greater than 10**-4% rated power ~~[+0.25].~~ [+0.5]

d. They differ because of the change (decrease) in boron concentration necessary to counteract a Tavg change (increase) of at least ~~190~~ 210 degrees F (500 degrees F - ~~120~~ 210 degrees F) [+0.5].

REFERENCE

1. Maine Yankee: Technical Specifications, pp. 1 and 2 of definitions.

001000G005 001000K529 001010A101 015000G005 ...(KA'S)

ANSWERS -- MAINE YANKEE -88/02/09-GRUEL, R.

ANSWER 8.02 (4.50)

a. RO [+0.5] per Tech Spec Figure 5.2-2. (Maine Yankee Procedure 1-26-4, Section 4.2.12, states that the SOS shall possess an SRO license.)

b. 1. review and initial the Crew Document Review Book

2. review and initial the Shift Information Book

3. review and initial the Yellow Tag Book

4. review and initial the Night Order Book

5. review the Operations Turnover with the off-going PSS

6. review the Control Room Log over the past 24 hours-or-back to his last working shift

7. discuss reasons for annunciator alarms, abnormal system line-ups, status of safety related systems, equipment tagged

8. review initial conditions and precautions of procedures in progress, which he may be involved with

Any five (5) [+0.3] each, +1.5 maximum.

c. No [+0.5]. The CRO left the controls ~~[+0.5]~~ on two occasions [+0.5] ~~[+0.5]~~.

d. Only when an SOS [+0.5] and STA [+0.5] remain in the Control Room.

REFERENCE

1. Maine Yankee: Technical Specification, Figure 5.2-12.

2. Maine Yankee: Procedure 1-26-3, Section 3.1.3, Rev. 6.

3. Maine Yankee: Procedure 1-26-5, Section 4.1, Rev. 1.

194001A103 ...(KA'S)

ANSWERS -- MAINE YANKEE -88/02/09-GRUEL, R.

ANSWER 8.03 (2.00)

a. Direct alignment checks of the affected system [+1.0] (using approved plant procedures).

b. the procedure [+0.5]

c. (immediately) return to the Control Room [+0.5]

REFERENCE

1. Maine Yankee OP Memo 9-L-20, Rev. 4.

2. Maine Yankee Procedures 1-300-10, Rev. 0.

3. Maine Yankee Procedures 1-200-10, Section 5.6(d), p. 4 of 38, Rev. 2.

194001A102 194001K101 194001K116 ...(KA'S)

ANSWER 8.04 (3.00)

a. 1. when the component or equipment is Safety Class [+0.75]

2. when the independent verification results in a significant amount of radiation exposure (as determined by the PSS/SOS) [+0.75]

b. A white tag can be cleared by two authorized individuals; the supervisor or "coworker" of the "tagger" [+0.5 for either] and the PSS/SOS [+0.5].

c. monthly [+0.5]

REFERENCE

1. Maine Yankee: Procedure O-14-1, Sections 5.1.15, 5.6.4, 5.9.1, Rev. 0.

194001K102 194001K103 ...(KA'S)

ANSWERS -- MAINE YANKEE -88/02/09-GRUEL, R.

ANSWER 8.05 (1.00)

1. Plant Manager (or designated alternate) [1.0]
2. Radiological Controls Section Head (or designated alternate) [This item no longer true; however, it was allowed for full credit ~~[+0.5] each~~

REFERENCE

1. Maine Yankee: OPS memo 9-L-13, Rev. 2.

103000G001 ...(KA'S)

ANSWER 8.06 (3.00)

a. The valve must be reopened [+0.25] within one hour [+0.5].

b. LPSI pump P-12B must be tested [+0.5] within two hours [+0.25]; or swing pump lined up as Train A pump [+0.75].

c. Immediate action [+0.5] must be taken to restore at least one pump to operable status [+0.25].

d. No action is required [+0.75].

REFERENCE

1. Maine Yankee: Technical Specifications, 3.6.C.1, Exception and 3.6.C.2, Remedial Action 1, p. 3.6-2, Amend 97; 3.8.E, Remedial Action d, p. 3.8-2, Amend 88; 3.10.A.3, p. 3.10-1, Amend 68.

001050A204 006000G005 006000K419 061000A204 ...(KA'S)

ANSWERS -- MAINE YANKEE -88/02/09-GRUEL, R.

ANSWER 8.07 (3.00)

a. 3 psig [+0.5]. Maintains peak accident pressure below 55 psig [+0.5] and (permits a positive containment pressure which) allows for successful operation of the continuous leakage monitoring system [+0.5].

b. 112 degrees F [+0.5]

1. shift HXs ~~6. Verify Substitute PCC #14 Alone~~
2. add HXs
3. add SW pumps
4. add PCC pump (verify slow, increase slow acceptable)
5. reduce power

Any four (4) [+0.25] each, +1.0 maximum.

REFERENCE

1. Maine Yankee: Technical Specifications, 3.11.C, p. 3.11-2, Rev. 89 and p. 3.11-6, Rev. 80.

2. Maine Yankee: Operations Memo 9-B-3, Rev. 0.

022000A101 022000A102 022000G010 ...(KA'S)

ANSWER 8.08 (2.50)

a. when it is within 4 steps of its upper electrical limit of 181 steps [+0.5]

b. True [+0.5]

c. Operation may continue provided:

1. the shutdown margin requirements are demonstrated as satisfied [+0.5] without including the reactivity associated with the inoperable CEA [+0.25] within 2 hours [+0.25].

2. only one CEA is inoperable [+0.5].

REFERENCE

1. Maine Yankee Technical Specifications 3.10; Sections A.2, A.5, B.2; pp. 3.10 - 1,2; Rev. 68,98.

001000G005 001000K401 ...(KA'S)

ANSWERS -- MAINE YANKEE -88/02/09-GRUEL, R.

ANSWER 8.09 (4.00)

a. the on-duty PSS [+0.4]

b. plant manager
assistant plant manager
operation department manager
technical support department manager

[+0.3] each

c. declaring and categorizing the emergency condition

notifing offsite authorities

advising offsite authorities with respect to protection actions

coordinating emergency operation of Maine Yankee and governmental agencies

[+0.4] each

d. Maine State Police [+0.4] within 15 minutes of declaration of an emergency (or within 30 minutes of discovery that an ~~EAL~~ EAL has been reached) [+0.4].

REFERENCE

1. Maine Yankee: Emergency Plan, Volume II, Section 5.1, pp. 5.1 and 5.2; Section 5.2, pp. 5.5 and 5.6; Section 6.2, p. 6.7; Volume 1, 2.50.1 Section 4.0.

194001A116 ...(KA S)

EQUATION SHEET

Where $\dot{m}_1 = \dot{m}_2$

$(\text{density})_1(\text{velocity})_1(\text{area})_1 = (\text{density})_2(\text{velocity})_2(\text{area})_2$

$KE = \frac{mv^2}{2}$ $\quad PE = mgh$ $\quad PE_1 + KE_1 + P_1V_1 = PE_2 + KE_2 + P_2V_2$ where V = specific volume, P = Pressure

$Q = \dot{m}c_p(T_{out} - T_{in})$ $\quad Q = UA\,(T_{ave} - T_{stm})$ $\quad Q = \dot{m}(h_1 - h_2)$

$P = P_0 10^{(SUR)(t)}$ $\quad P = P_0 e^{t/T}$ $\quad SUR = \frac{26.06}{T}$ $\quad T = \frac{(B-p)t}{p}$

$\text{delta } K = (K_{eff} - 1)$ $\quad CR_1(1-K_{eff1}) = CR_2(1-K_{eff2})$ $\quad CR = S/(1-K_{eff})$

$M = \frac{(1-K_{eff1})}{(1-K_{eff2})}$ $\quad SDM = \frac{(1-K_{eff}) \times 100\%}{K_{eff}}$

$\text{decay constant} = \frac{\ln(2)}{t_{1/2}} = \frac{0.693}{t_{1/2}}$ $\quad A_1 = A_0 e^{-(\text{decay constant})x(t)}$

Water Parameters

1 gallon = 8.345 lbs
1 gallon = 3.78 liters

1 ft^3 = 7.48 gallons

Density = 62.4 lbm/ft^3
Density = 1 gm/cm^3

Heat of Vaporization = 970 Btu/lbm
Heat of Fusion = 144 Btu/lbm
1 Atm = 14.7 psia = 29.9 in Hg

Miscellaneous Conversions

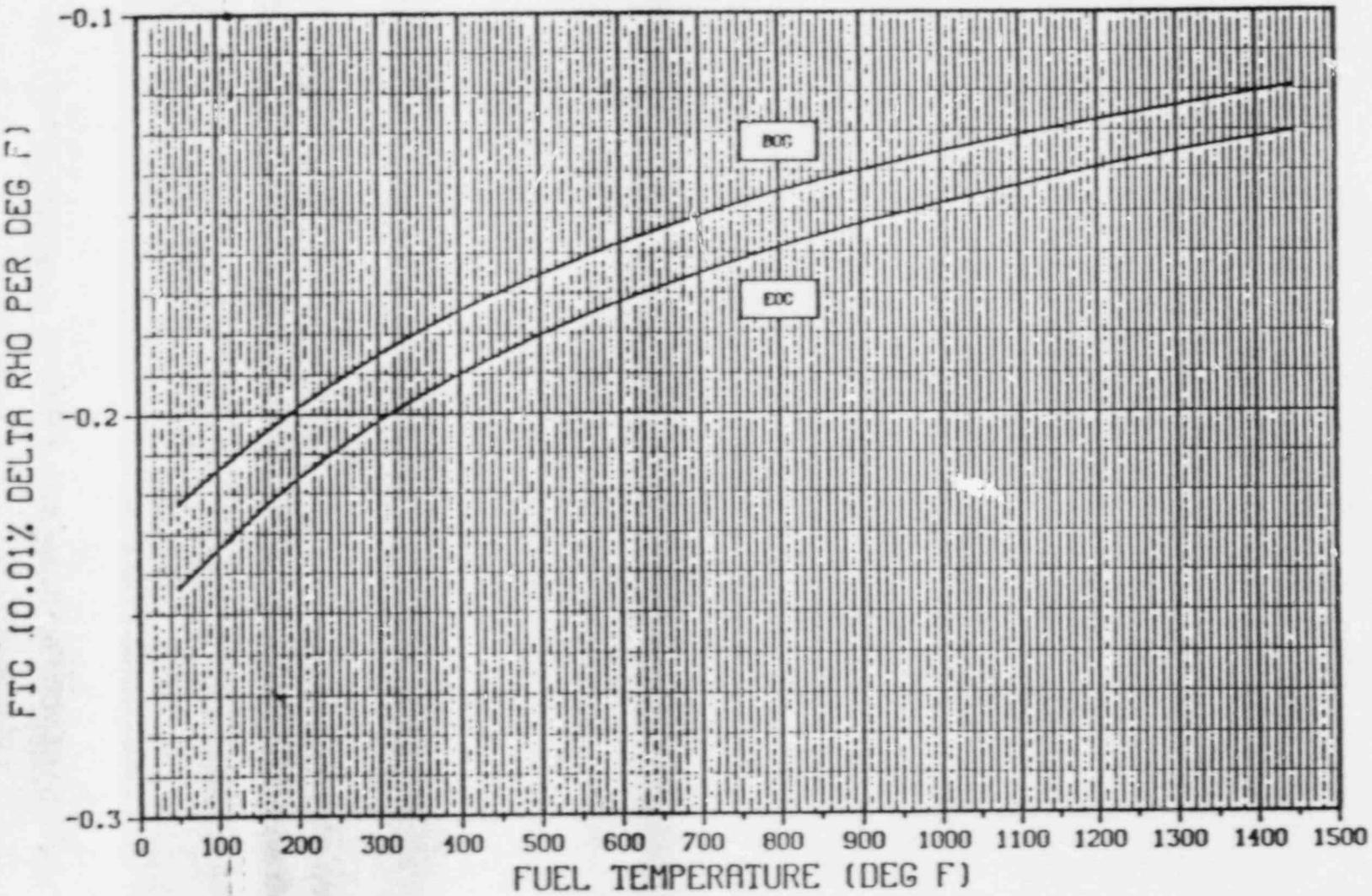
1 Curie = 3.7×10^{10} dps
1 kg = 2.21 lbs

1 hp = 2.54×10^3 Btu/hr

1 MW = 3.41×10^6 Btu/hr
1 Btu = 778 ft-lbf

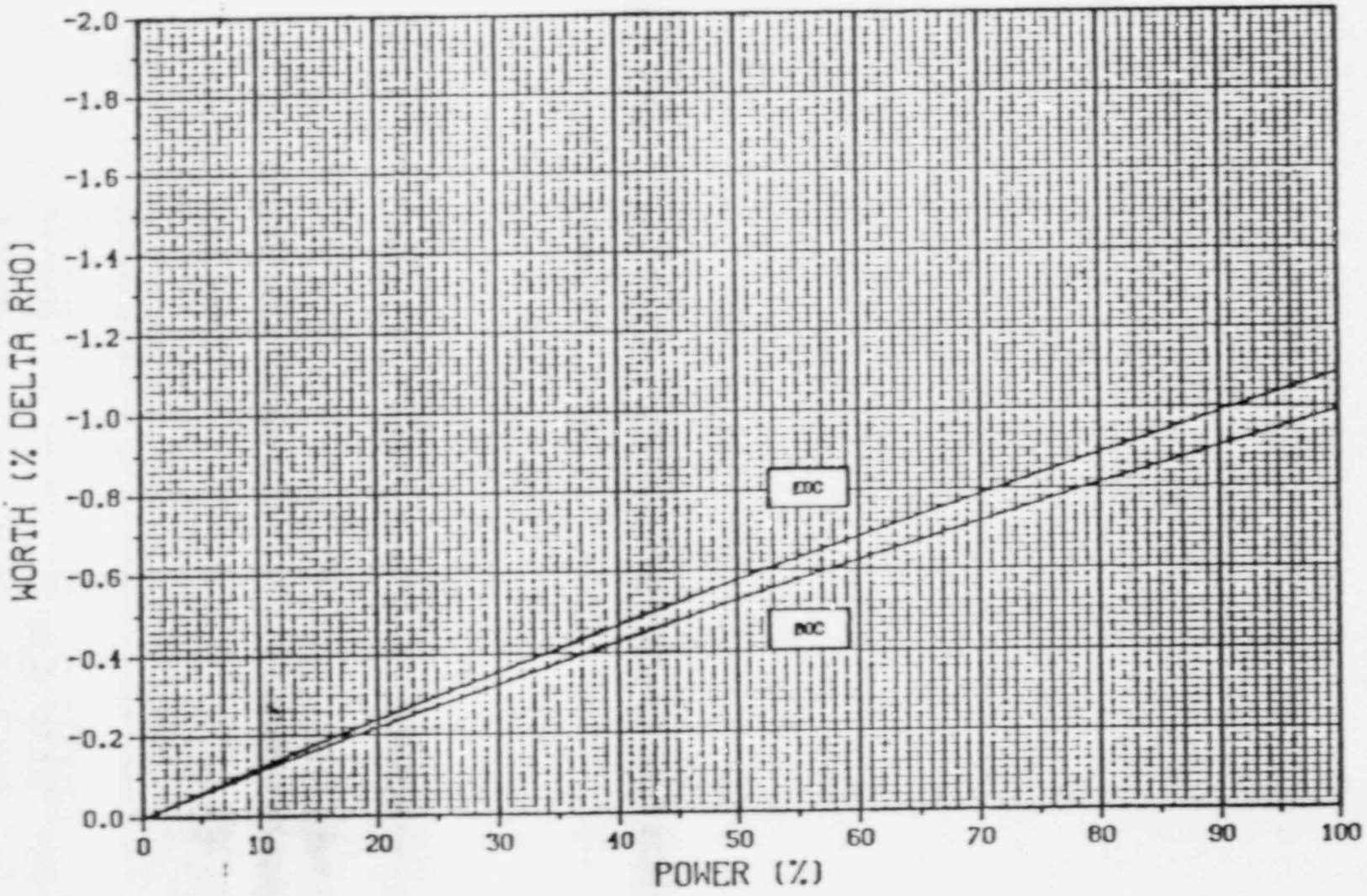
Degrees F = (1.8 x Degrees C) + 32
1 inch = 2.54 centimeters
g = 32.174 $ft\text{-}lbm/lbf\text{-}sec^2$

FTC VS. FUEL TEMPERATURE
CONDITIONS: CORE 10



PORC REVIEW [illegible] DATE 5/28/82 FIGURE 2.1.1-2
REVIEWED BY [illegible] DATE 4/15/82 PREPARED BY [illegible]

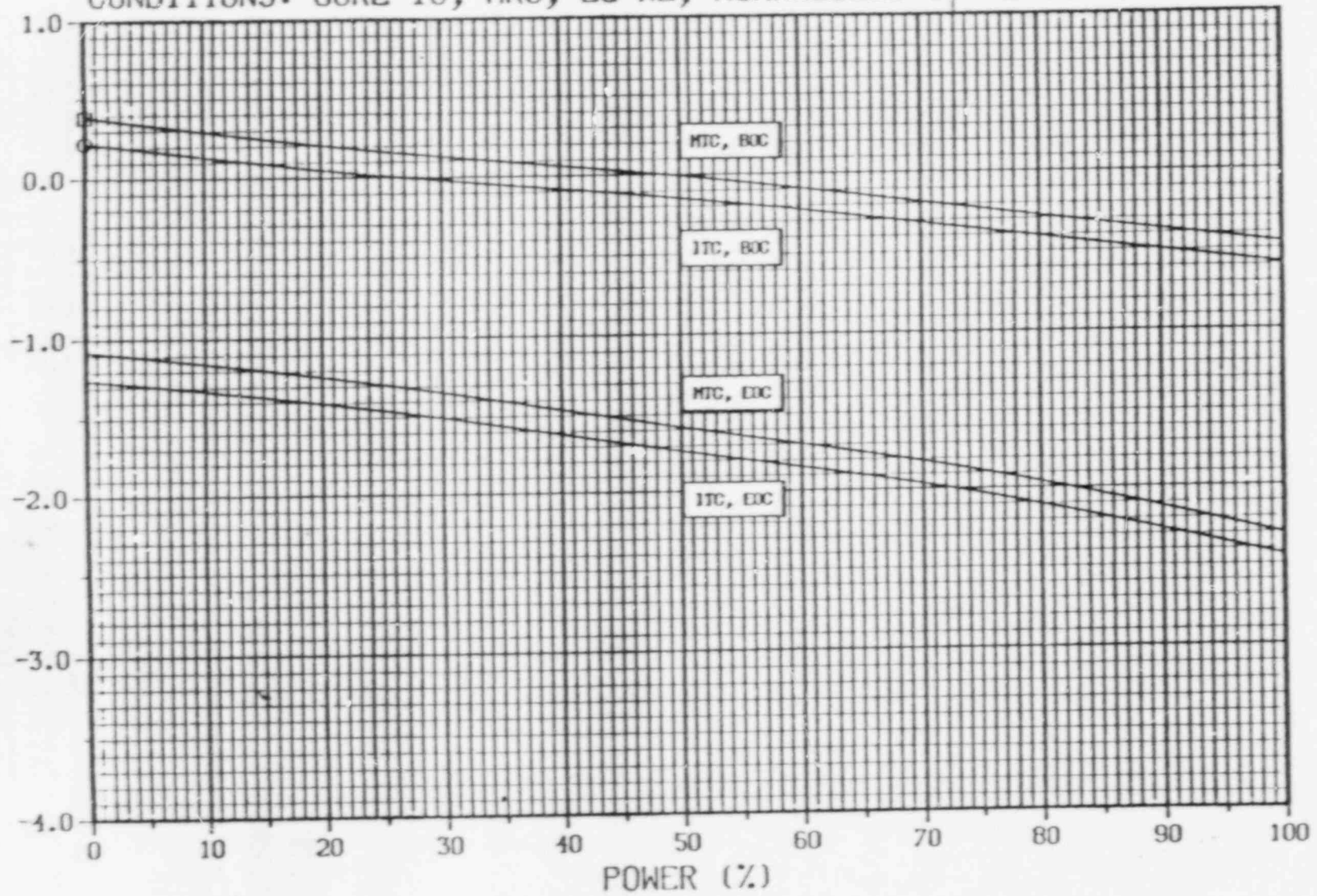
FUEL TEMPERATURE DEFECT VS POWER
CONDITIONS: CORE 10



FORC REVIEW [illegible] DATE 5/28/82 FIGURE 2.1.2.1
REVIEWED BY [illegible] DATE 6/1/82 PREPARED BY [illegible]

MTC/ITC VS. POWER

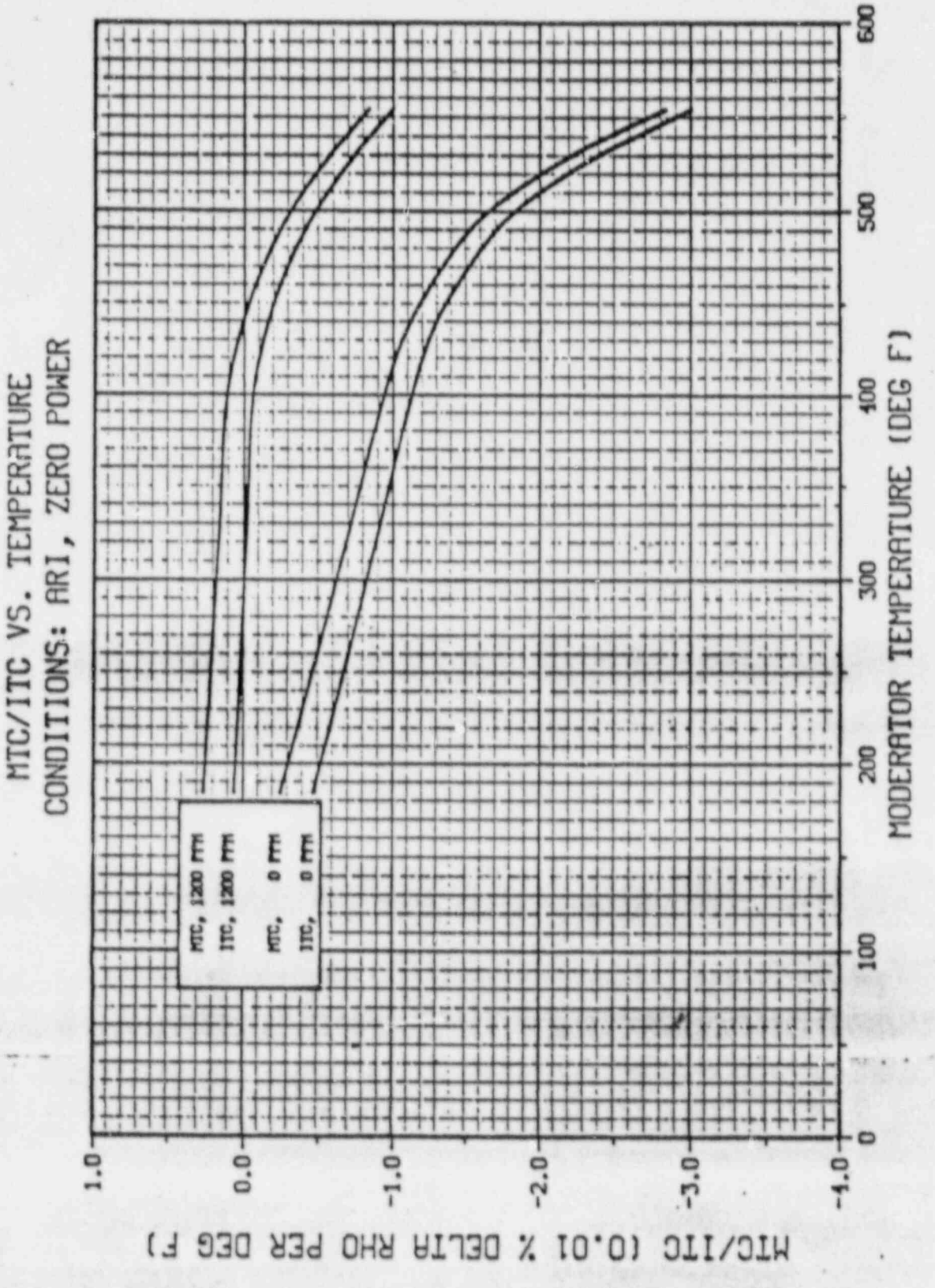
CONDITIONS: CORE 10, ARO, EQ XE, NORMALIZED TO MEASURED VALUES



PORC REVIEW [signature] DATE 11-3-82 FIGURE 2.2.1-1

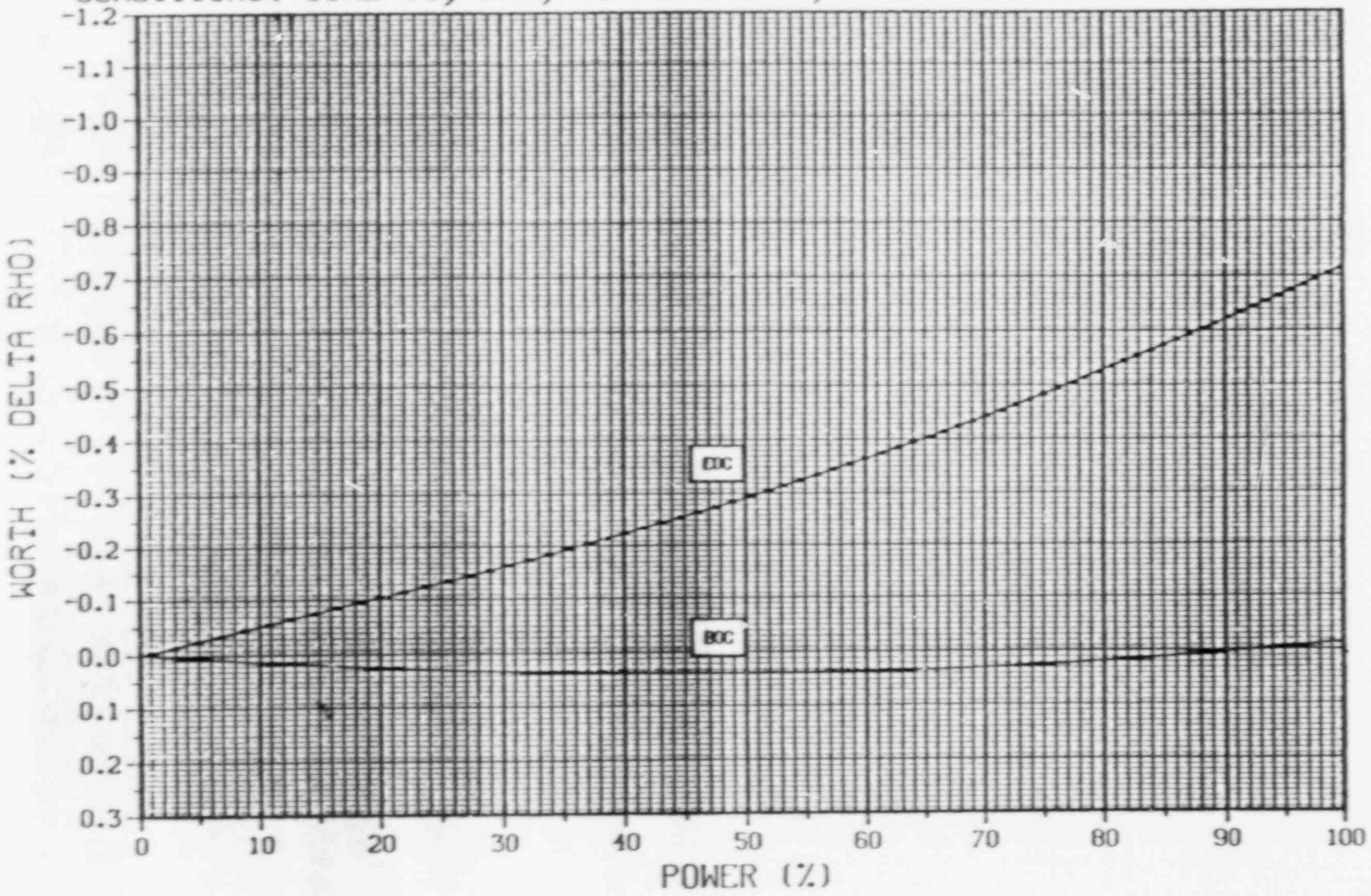
REVIEWED BY [signature] DATE 10/19/82 PREPARED BY [signature]

PORC REVIEW 36	DATE 5/18/82	FIGURE 2.2.1.3
REVIEWED BY [illegible]	DATE 4/19/82	PREPARED BY [illegible]



MODERATOR TEMPERATURE DEFECT VS. POWER

CONDITIONS: CORE 10, ARO, EQ XE AND SM, NORMALIZED TO MEASURED VALUES

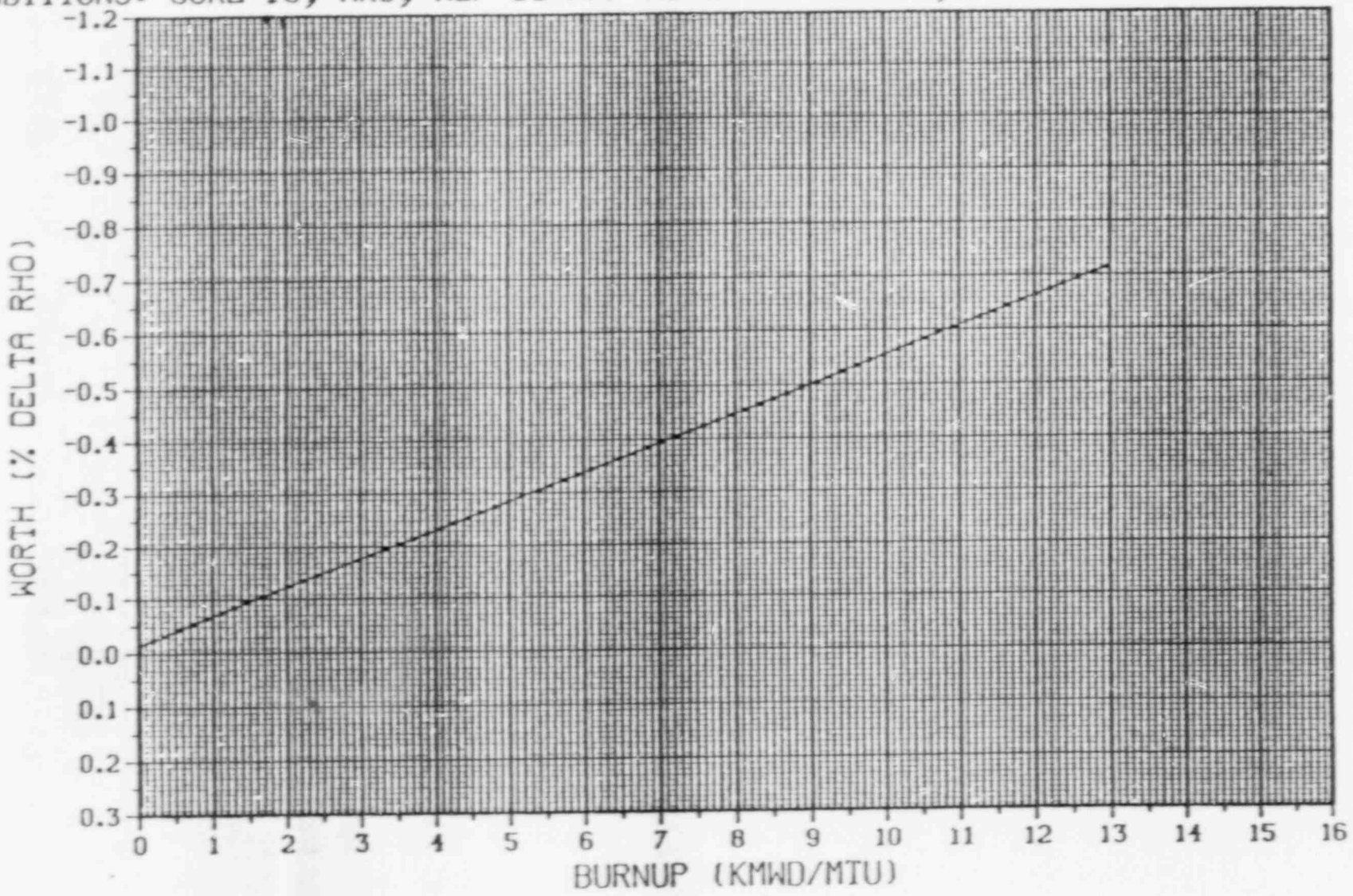


PORC REVIEW SKS DATE 11-5-82 FIGURE 2.2.2-1

REVIEWED BY [signature] DATE 10/18/82 PREPARED BY [signature]

MODERATOR TEMPERATURE DEFECT VS. BURNUP

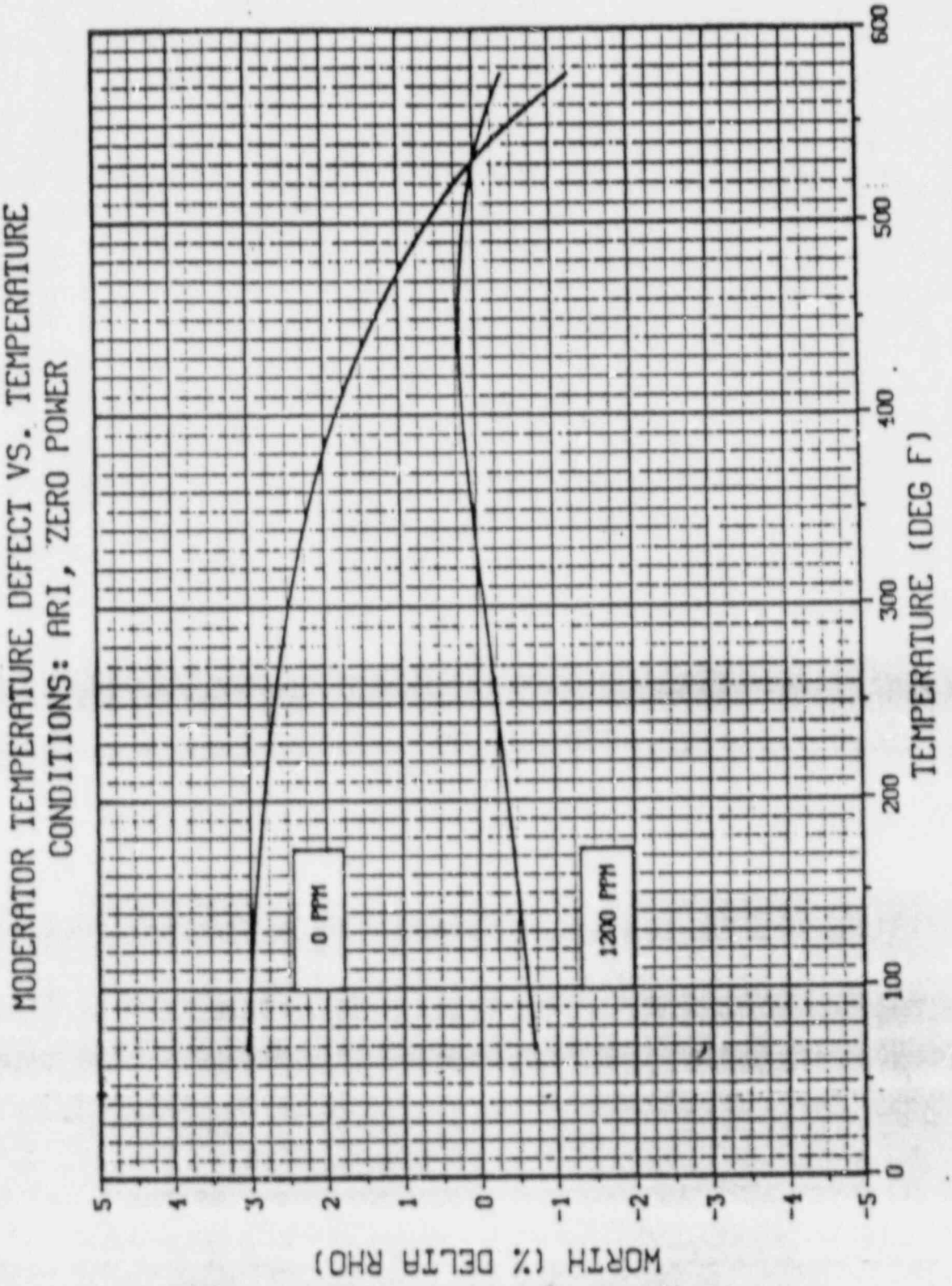
CONDITIONS: CORE 10, ARO, HZP TO HFP AT EQ XE AND SM, NORMALIZED TO MEASURED VALUES



PORC REVIEW [illegible] DATE 11-5-82 FIGURE 2.2.2.2

REVIEWED BY [illegible] DATE 10/18/82 PREPARED BY [illegible]

PORC REVIEW 36	DATE 4/28/87	FIGURE	2.2.2.3
REVIEWED BY [signature]	DATE 4/15/87	PREPARED BY [signature]	

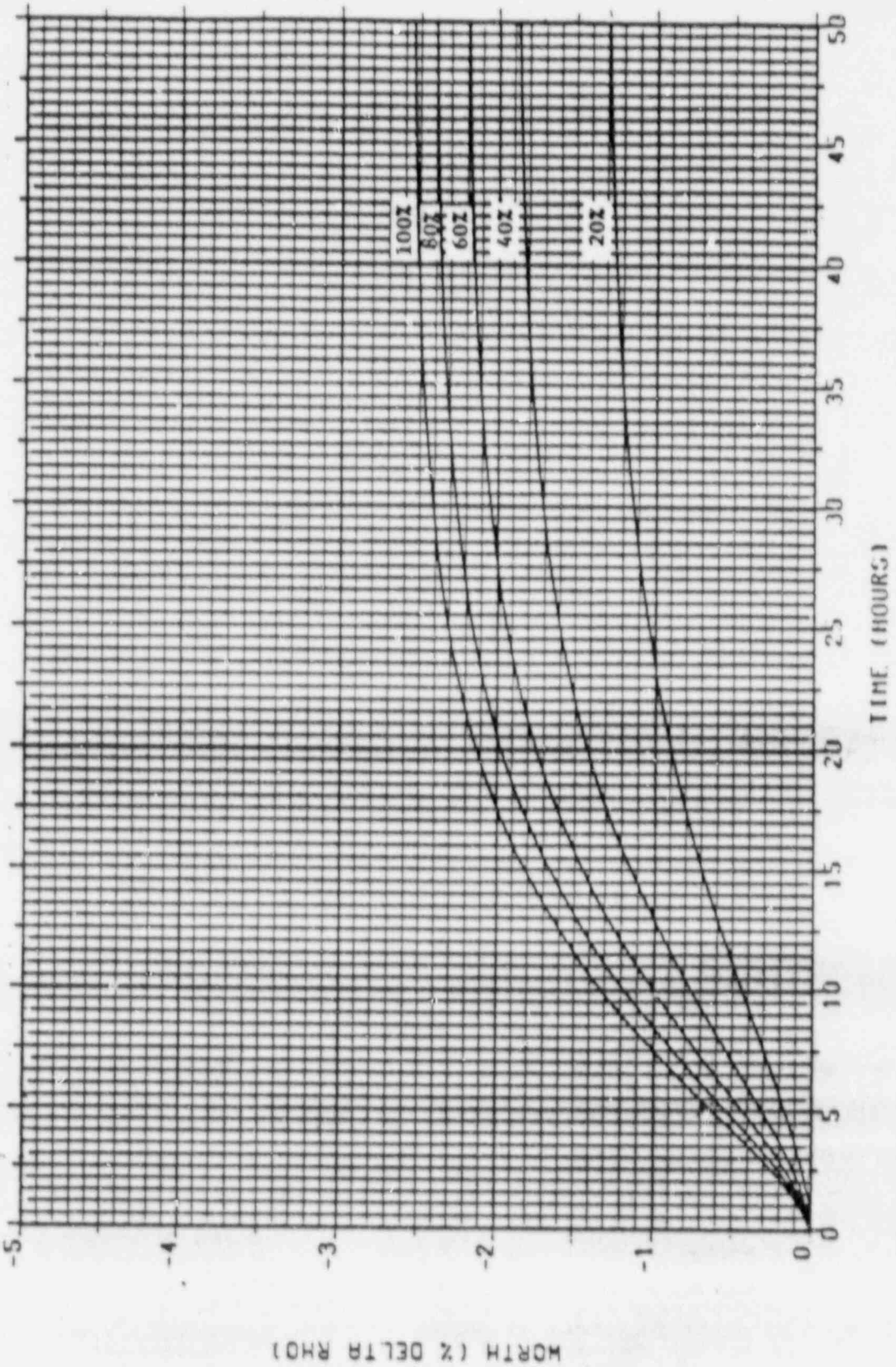


PORC REVIEW [illegible] DATE 7/14/82 FIGURE 2.3.2.2

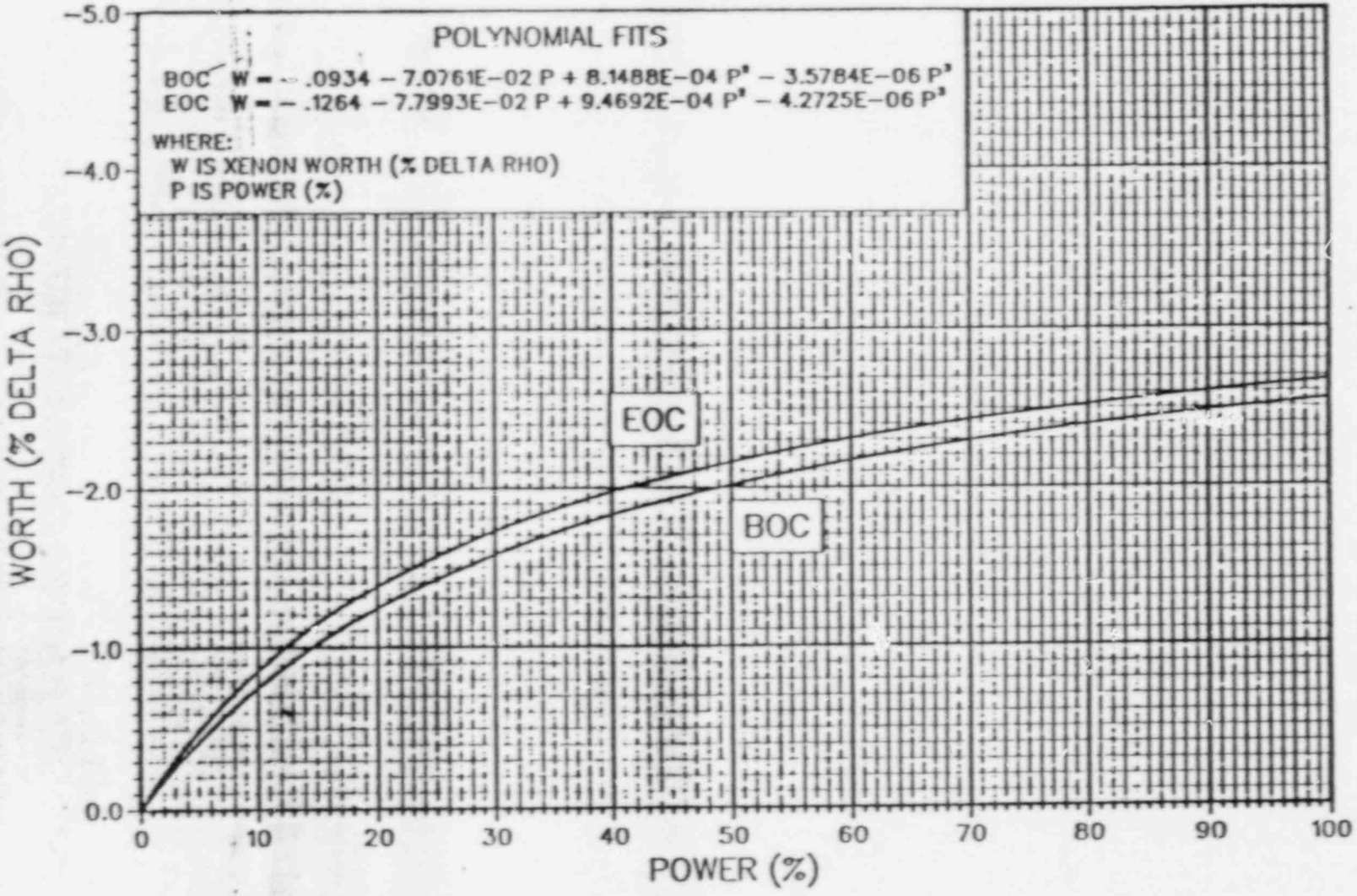
REVIEWED BY [illegible] DATE 6/1/82 PREPARED BY [illegible]

XE BEHAVIOR DURING POWER INCREASE VS. FINAL POWER

CONDITIONS: INSTANTANEOUS POWER INCREASE TO GIVEN POWER FROM NO XE AT 0% POWER



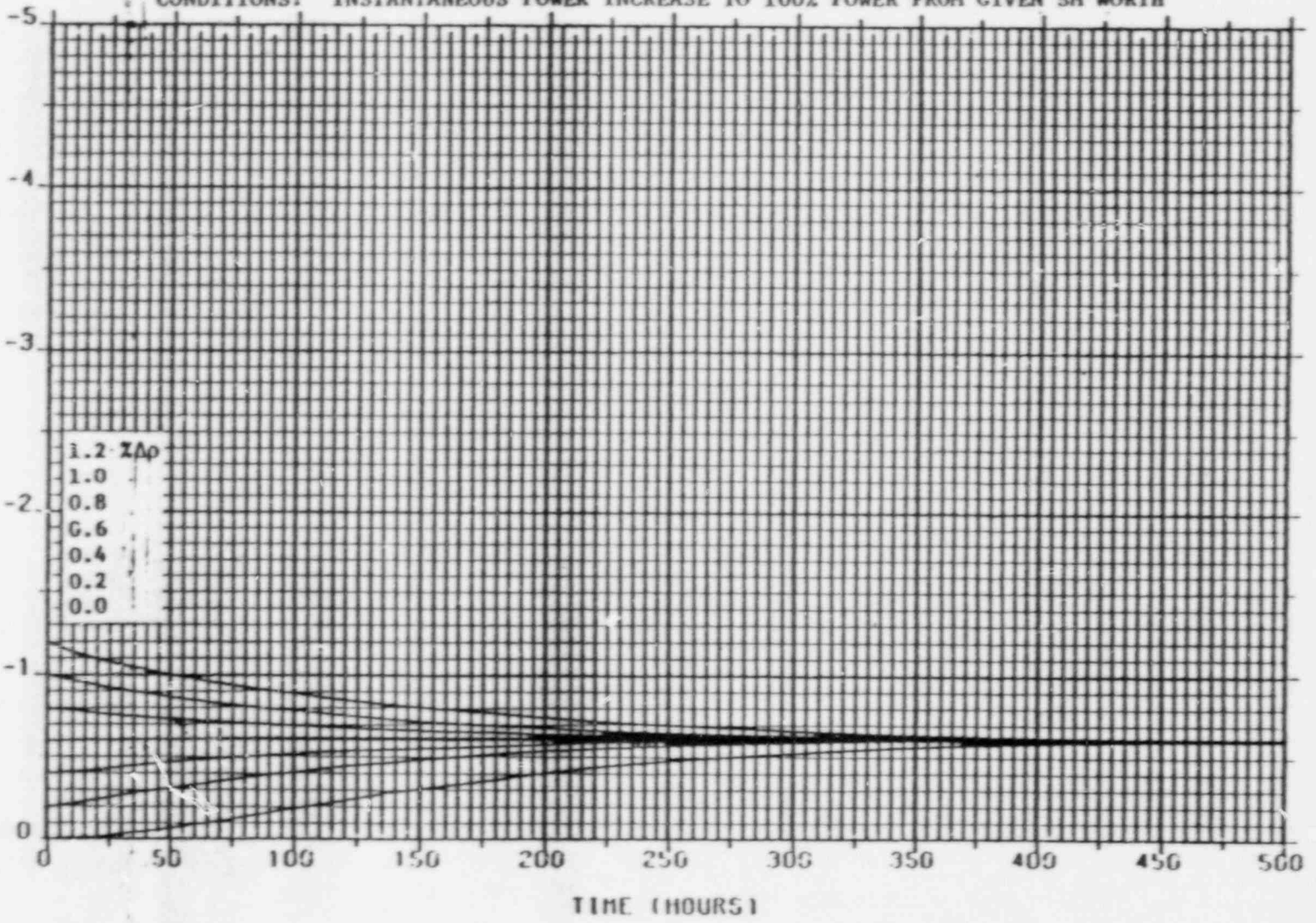
EQUILIBRIUM XENON WORTH VS. POWER
CONDITIONS: CORE 10



PORC REVIEW 16 DATE 5/26/82 FIGURE 2.3.15
REVIEWED BY [signature] DATE 4/16/82 PREPARED BY [signature]

SM BEHAVIOR DURING POWER INCREASE VS. INITIAL WORTH

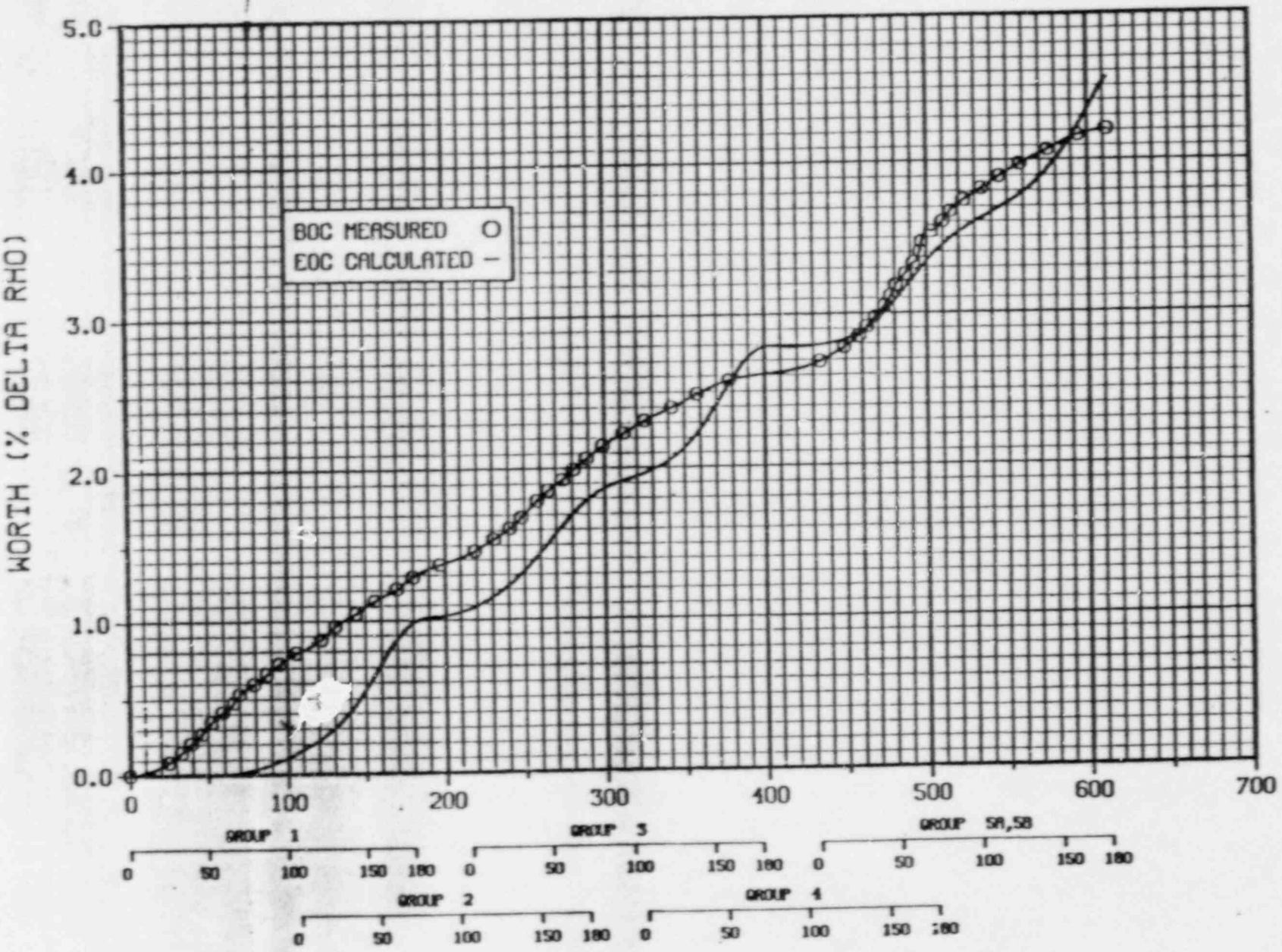
CONDITIONS: INSTANTANEOUS POWER INCREASE TO 100% POWER FROM GIVEN SM WORTH



PORC REVIEW DATE 7/16/82 FIGURE 2.3.2-1

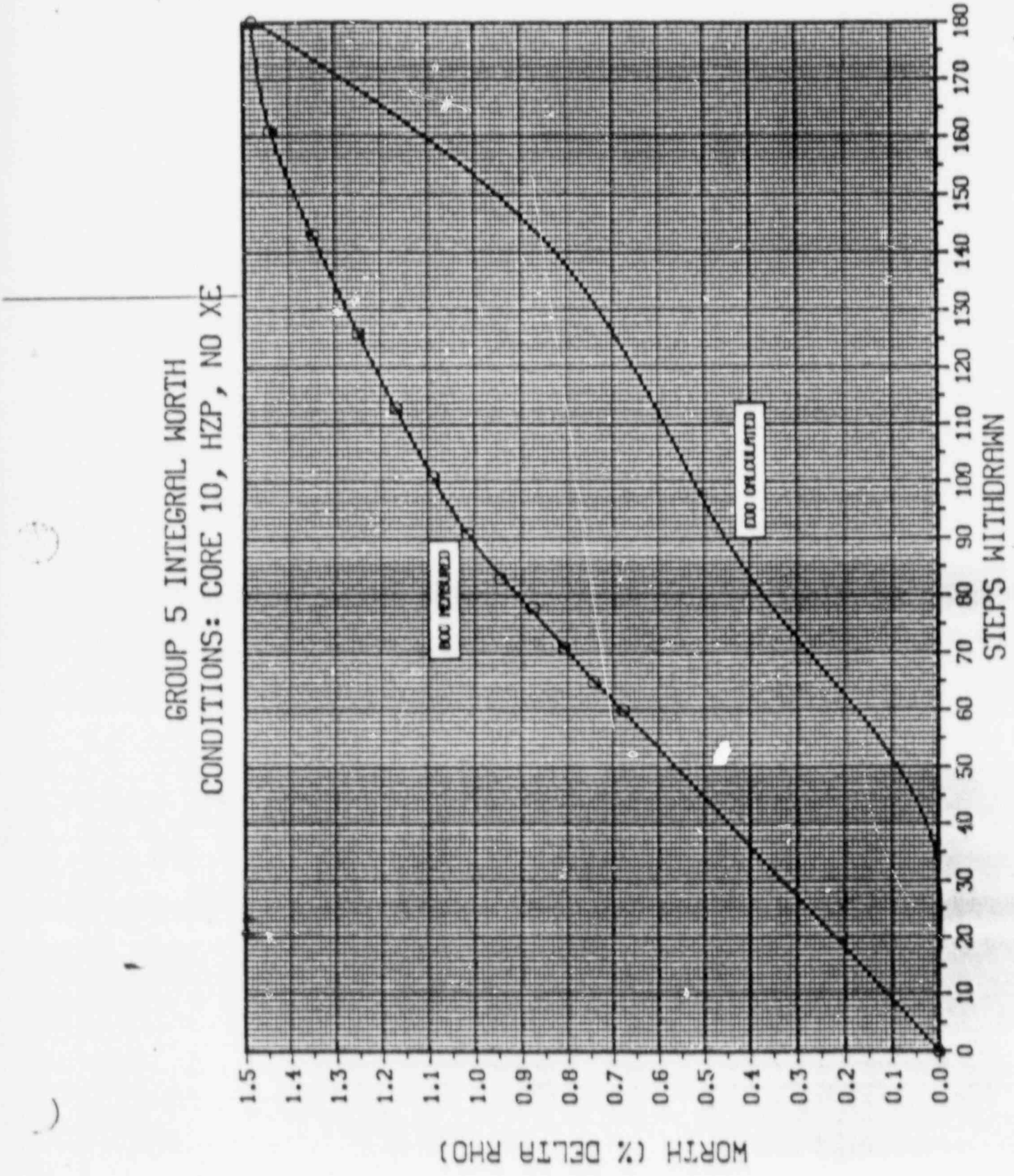
REVIEWED BY [illegible] DATE 6/15/82 PREPARED BY [illegible]

REGULATING GROUP INTEGRAL WORTH WITH OVERLAP
CONDITIONS: CORE 10, HZP

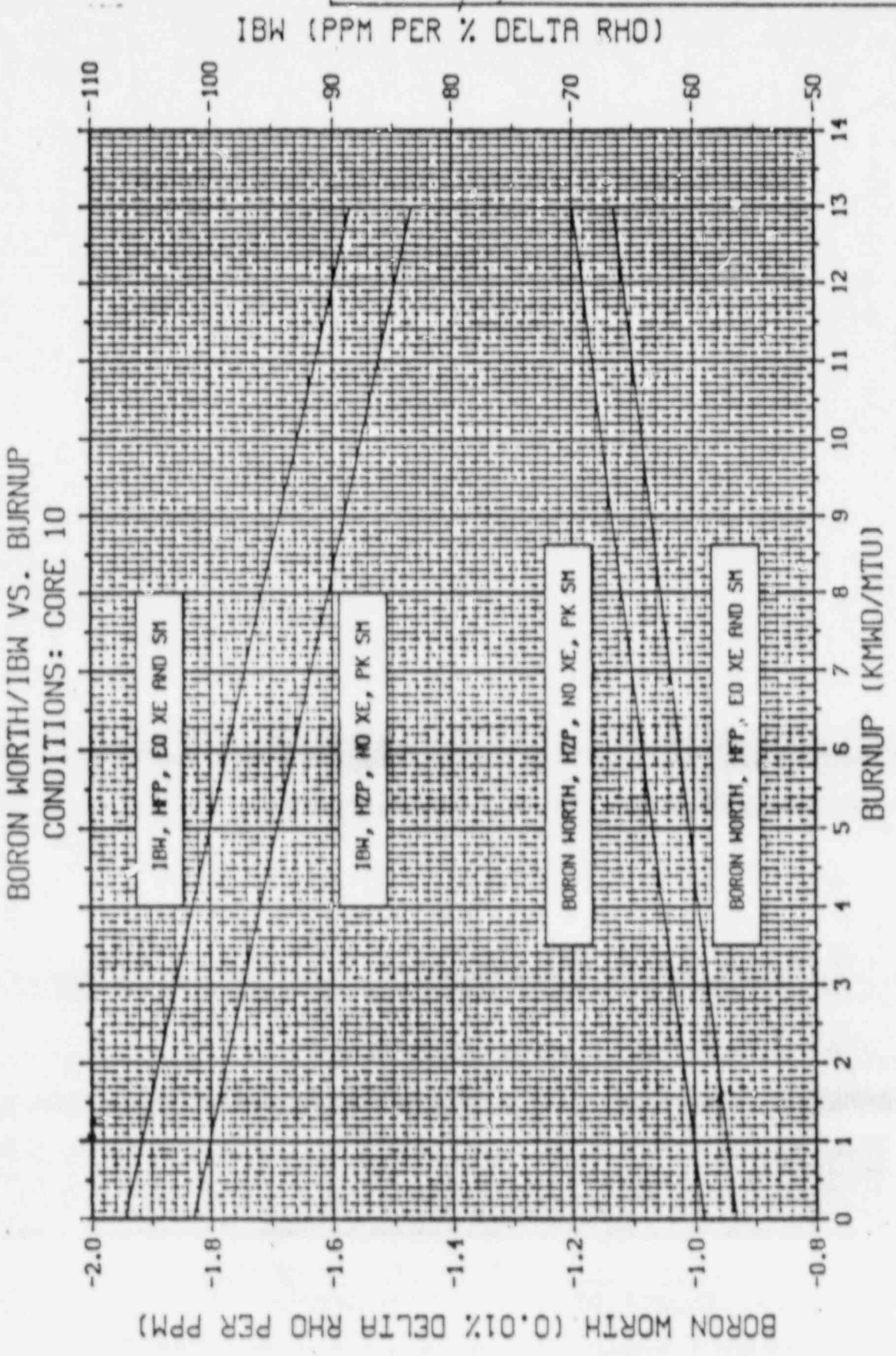


PORC REVIEW [illegible] DATE 11-5-87 FIGURE 2.6.1
REVIEWED BY [illegible] DATE 10/19/87 PREPARED BY [illegible]

PORC REVIEW	PHD	DATE	11-5-87	FIGURE	2.6.2
REVIEWED BY	S.M. Lee	DATE	10/16/87	PREPARED BY	

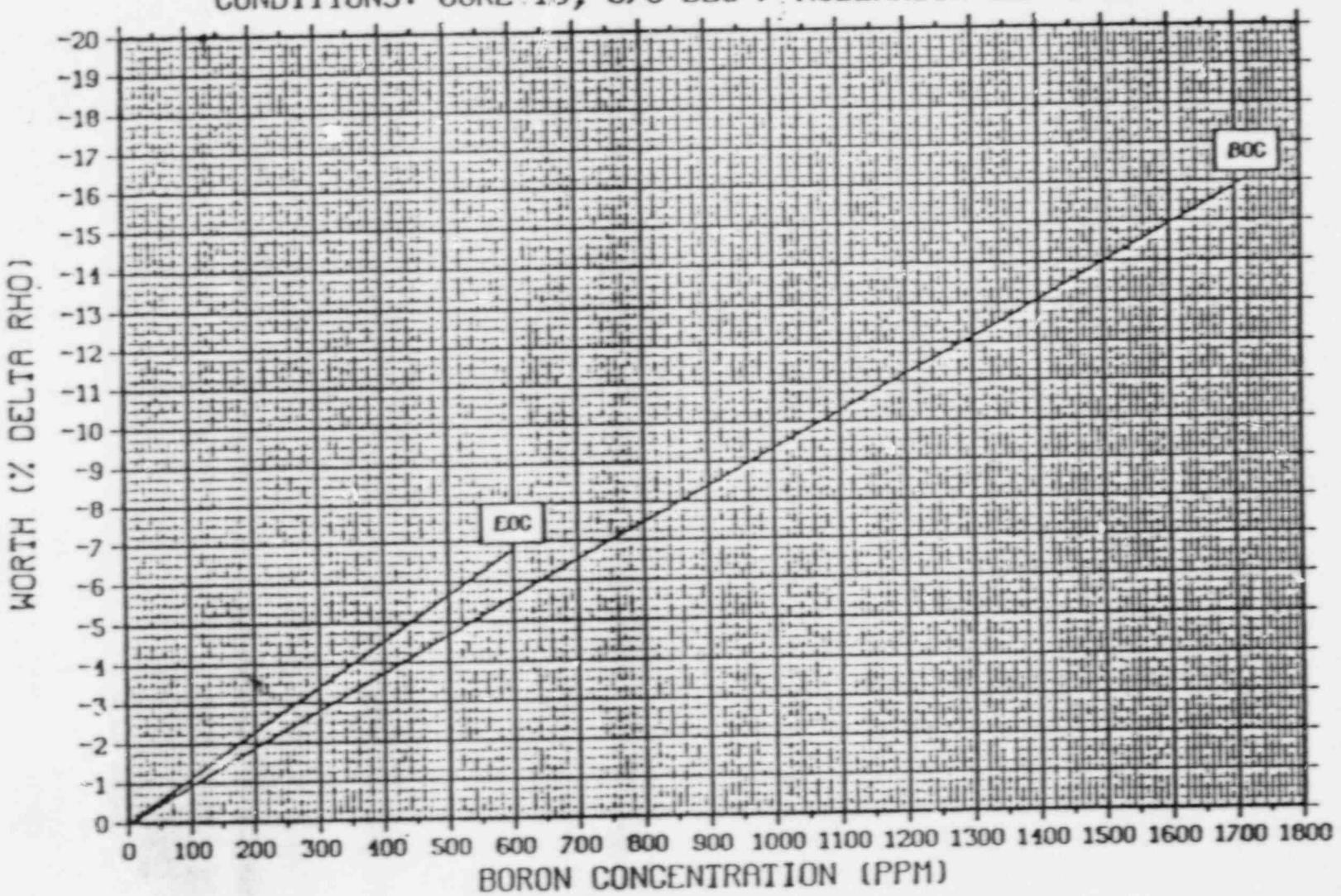


PORC REVIEW 56 DATE 5/28/87 FIGURE 2.7.1.2
REVIEWED BY [illegible] DATE 5/10/87 APPROVED BY [illegible]



BORON DEFECT VS. BORON CONCENTRATION

CONDITIONS: CORE 10, 576 DEG F MODERATOR TEMPERATURE



PORC REVIEW NO. 10 DATE 4/28/92 FIGURE 2.7.2-1

REVIEWED BY [signature] DATE 4/30/92 PREPARED BY [signature]

ATTACHMENT 2

SECTION 5.0

5.01 The use of Keff as a given piece of information decreases the operational orientation of this question. This question should not be added to the NRC's Maine Yankee exam bank unless modified to reflect installed instrumentation capabilities.

a. Using the equation supplied on the Equation Sheet (delta K = (Keff -1)) the answer to this question is:

delta K = .95 - 1
= -.05
= -5% delta K

Is is recognized that this equation provides only an approximation for reactivity that increases in accuracy as Keff approaches 1, but the inclusion of this equation on the Equation Sheet must be taken into account when grading the question.

b. Using the equation supplied on the Equation Sheet (delta K = (Keff - 1)) the answer to this question is:

$K_2 = 1 - 60/110 (1-0.95) = 0.973$

delta K = .973 - 1
= -.027
= -2.7% delta K

Again it is recognized that use of this equation provides only an approximation whose accuracy increases as the reactor approaches criticality. Use of this equation is justified both operationally when conducting a reactor startup and by its inclusion on the Equation Sheet.

5.02 No technical problem exists with this question, however the use of watts and megawatts as an indication of power level decreases the operational orientation of this question and can create confusion, this question should not be added to the NRC's Maine Yankee exam bank unless modified to reflect installed instrumentation.

5.03 No comment

5.04 No comment

5.05 No comment

5.06 No comment

5.07 Answering this question requires reading multiple T.D.B. curves accurately. The answer key should reflect a range of acceptable answers based on a reasonable expectation of accuracy when reading these curves.

5.08 a. No comment

b. The answer to this question depends on how the candidate judges "INITIAL." An increase in steam flow will also cause an increase in power, it is difficult to predict the "Initial" effect on fuel center line temperature. Either INCREASE or DECREASE should be accepted depending on the brief justification.

c. No Comment

d. No Comment

5.09 a. Other indications exist which can be used to verify natural circulation flow. See Procedure ES 0.1 step 12 attached.

5.10 No comment

5.11 No comment

5.12 Answer could be slightly different due to our 100% power Tc now being allowed to be 552°F vice 550°F as is assumed in the answer key. See T.D.B figure attached.

Section 6.0

6.01 a. No comment

b. This question involves memorization of facts which are not required by our learning objectives, not included in the KSA catalog and not important to the operation of the facility. The question should be deleted.

6.02 No comment

6.03 No comment

6.04 a. A second available method to perform an emergency shutdown of the Emergency Diesel Generator is:

1. Depress the engine stop pushbuttons (stops motor driven fuel pump).

2. Operate the emergency fuel cutoff valve (shuts off fuel to the engine driven fuel pump).

Reference Lesson RO-L-5.4 page 16 (Reactor Operator Lesson plan on EDG's) - attached.

Either answer should be accepted.

c. The question states that service water pumps (A and C) are powered from bus 5. These pumps are powered from bus 7 which is powered from bus 5. This question should be modified prior to being added to the NRC Maine Yankee exam bank.

6.05 No comment

6.06 b. The gland leadoff tank overflow is maintained disabled to flow continuously to the PAB sump and therefore should not be included in the answer.

Reference: Procedures 1-15-1 (step 4.11.3) attached.
1-15-2 (step 4.10.4) attached.

c. This question is extremely open ended.

* Answer will be affected by plant condition (cold shutdown or at power).

* Answer could include actions of AOP's, Technical Specifications, Emergency Plan and many others.

Grading of this question should not be limited to the responses listed in the answer key. Full credit should be given where correct responses are provided.

6.07 No comment

6.08 No comment

b. Valve number (LD-S-14) should not be required. Full credit should be given for reference to letdown system relief to the VCT.

6.09 No comment

6.10 a. The first listed answer is incorrect since all three HPSI pumps must be valved in locally. P-14S may be valved in as either an "A" or "B" train HPSI pump.

b. No comment

6.11 No comment

6.12 No comment

Section 7.0

General Comment -

This exam section contains many questions/answers that require memorization of normal operating procedures beyond the level required by our learning objectives and beyond the examination construction guidance contained in NUREG - 1021, ES-402.

Paragraph A.3 - Category 7 - Procedures: Normal, Abnormal, Emergency and Radiological Control, clearly indicates that complete knowledge and understanding of the symptoms, automatic actions and immediate action steps specified by off normal or emergency procedures is within the scope of this section. This paragraph goes on to state that the candidate should be able to describe generally the objectives and methods used in the normal, off normal and emergency operating procedures.

Although Maine Yankee feels that the high number of questions/answers not conforming to this guidance generally invalidates this exam section, the following comments are provided.

7.01 1. General comment applies

2. KSA reference supplied does not match requested knowledge.

3. Other acceptable answers:

- to maintain the pressure within the bounds of the MPT curve (step 3.1).

- to ensure no backflow from the steam generator to the loop (step 5.3).

7.02 No comment

7.03 No comment

7.04 1. General comment applies

Other inadvertant plant responses are possible and "could" occur. In order to receive full credit on this question per the answer key the candidate must memorize the discussion section of this (and thus every) normal operating procedure.

7.05 a. 1. General comment applies

Memorization of Operations Memos (especially setpoints in Operations Memos) is not and should not be considered required.

7.06 No comment

7.07 a. The question indicates there are only two (2) initial actions which must be taken after a loss of control air. AOP 2-28 - Loss of Control Air lists eight (8) initial actions. Any two (2) of these eight (8) should be accepted for full credit. AOP-2-28, Section 5.0 attached.

b. No comment

c. General comment applies

7.08 a. General comment applies - memorization of the fold-out pages in the EOP's is not required by Maine Yankee and does not meet the criteria of ES-402 with respect to examination scope of EOPs.

b. Your question specifically refers to answering the question with regards to E-0. The answer key requires responses from FR-S.1. The correct answer should be that listed in #1 and #2 of the answer key plus transition to FR-S.1.

c. No comment

7.09 No comment

7.10 a. General comment applies - memorization of caution statements is not required by Maine Yankee and does not meet the criteria of ES-402 with respect to examination scope of EOP's.

b. No comment

c. No comment

7.11 No comment

7.12 General comment applies

This is a good example of choosing an extremely obscure and very infrequently used procedure and asking detailed (and also open ended) questions.

This question should be deleted from the exam as being clearly beyond the required scope.

7.13 This question requires knowledge which is not within the job responsibilities of an SRO at Maine Yankee. This question should be deleted from the exam.

Section 8.0

General Comment - when referring to operating conditions with respect to Maine Yankee Technical Specifications, the use of condition name (i.e., cold shutdown, transthermal, etc.) is generally used vice condition numbers. Questions in this exam referring to Technical Specification operating conditions should be modified to reflect this fact prior to being entered into NRC's Maine Yankee exam bank.

8.01 a. The answer key indicates that "RCS Tavg" is necessary for half credit. This is an unreasonable assignment since in fact we use Th when less than 210°F. The answer "RCS temp" should be accepted for half credit.

c. The answer key indicates that "Neutron flux log range channel instrumentation" is required for half credit. This is an unreasonable assignment since this instrumentation is the only means available for power indication in the range of 10^{-4}% power, 10^{-4}% power should be acceptable for full credit.

d) The lead in clearly specifies that this question is to be answered regarding the DEFINITIONS section of the Maine Yankee Technical Specifications. This question makes the statement that cold shutdown Boron concentration (DEFINITION) differs from the hot shutdown Boron concentration (DEFINITION). In fact the DEFINITIONS are exactly the same. Full credit should be given if the candidate responds accordingly.

The explanation in the answer key should read "of at least 290°F (500 degress F-210 degrees F).

8.02 a. The examiner seems to be attempting to trick the candidate into stating "SRO" which is in fact the way the plant is operated, by using "per Maine Technical Specifications." Since we are required by Technical Specifications to adhere to our plant procedures, "SRO" is an acceptable answer.

b. No comment

c. The answer requires the candidate to state that the CRO left the controls "on two occasions" for one-third credit. This is an unreasonable assignment due to the subjective nature of the requirements to "justify your answer."

d. No comment

8.03 a. The question indicates potential sabotage and the candidate may respond accordingly by contacting security and initiating an investigation which should be accepted for full credit. (Reference is in Safeguarded Security procedures.)

b. No comment

c. No comment

8.04 No comment

8.05 1. The reference (OP Memo 9-L-13) has been deleted.

2. Only one person may now allow a loop entry at power - the Plant Manager

Reference OP-1-200-10 Section 11 and Section 11.3 (attached).

"Plant Manager" should be accepted for full credit.

8.06 General - this question requires memorization of actions to be taken beyond the one-hour time frame normally considered within the scope of Section 8 examining procedures.

a. No comment

b. 1. General comment applies
2. Another acceptable action would be to valve in P-61s as an "A" train LPSI pump and test run.

In all cases the requirements of Tech. Spec. 3.0 will apply and may be mentioned.

8.07 General comment - this question requires memorization of details and numbers contained in Administrative procedures. This practice is not in conformance with the guidance provided in ES-402 Section A.4 - Category 8 - Administrative Procedures, Conditions, and Limitations, which states that the candidate is not expected to memorize the exact details, numbers and surveillance requirements contained therein.

The answer for question 8.07a should be granted full credit if the basis is correct.

The answer for question 8.07b should be granted full credit if four (4) valid actions are listed.

b. Other acceptable actions should be:

- Verify satisfactory PCC flow to recirc fan coolers.

- Increase PCC flow to recirc fan coolers.

8.08 a. Since the UEL is 181 steps, an answer of greater than 177 steps should be accepted for full credit.

b. No comment

c. No comment

8.09 a. No comment

b. Question is incorrectly worded.

Anyone qualified to be an Emergency Coordinator is authorized to act as Emergency Coordinator upon their arrival on site. These personnel are designated on the Emergency Plan Roster by name and not title.

c. No comment

d. The answer "Maine State Police within 15 minutes" should be accepted for full credit. Once an EAL (see typo in answer key) is reached, we are required to declare the appropriate event within 15 minutes. The fact that the event has already been classified can be inferred from the question.

STEP	ACTION/EXPECTED RESPONSE	RESPONSE NOT OBTAINED

NOTE

RCP-1 or RCP-2 provide Pzr. spray.

12	Check RCP Status - AT LEAST ONE RUNNING	Try to start one RCP: a. Establish conditions for starting an RCP per ATTACHMENT A. b. Start one RCP. IF an RCP CAN NOT be started, THEN verify natural circulation flow: o Core region subcooling greater than 12°F. o SG pressures constant or decreasing. o WR T-HOTs constant or decreasing. o Core region Temp. constant or decreasing. o WR T-COLDs at saturation Temp. for SG pressure. (Use MPT Curve or Steam Tables) IF natural circulation flow NOT verified, THEN increase dumping steam from SGs.

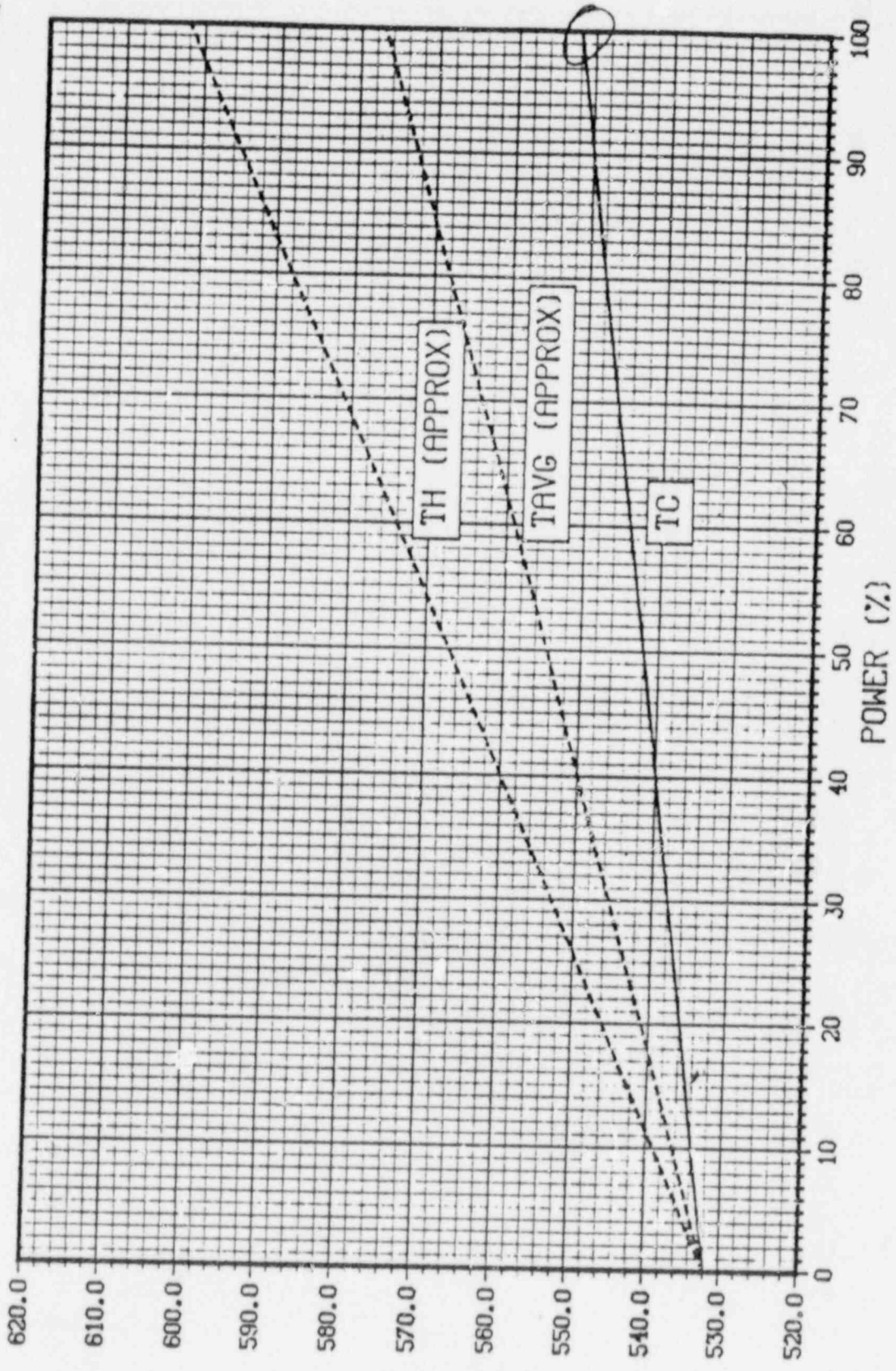
TRAINING USE ONLY

TRAINING USE ONLY

PORC REVIEW	PLM	DATE	9/26/85	FIGURE	1.2.2
REVIEWED BY	MWS	DATE	8/29/85	PREPARED BY	TJL

RCS TEMPERATURE PROGRAM

CONDITIONS: NONE



ELO	OUTLINE OF INSTRUCTION	INSTRUCTOR ACTIVITY	REFERENCE
	B. Engine shutdowns	Use Maine Yankee valve location book to illustrate operating requirement location	Surveillance 3.1.4
	1. Unload DG and trip DG output breaker		
	a. CR or excitation panel		
	2. Depress engine stop pushbuttons		
	a. Two buttons		
	3. Governor automatically reduce speed to idle		
	4. Idles for 11.5 minute cooldown		
DG-102-7	a. If auto start signal		
	o Engine will restart		
	o Will not manual restart		
	5. Automatically to "no fuel"		
	a. Engine secured		
	6. Emergency shutdown		
	a. Place injector control lever in no fuel position		
	b. Shut emergency F.O. shutoff valve and push both stop buttons		

Training Use Only

4.11 The PCC system is being chemically treated with potassium chromate and the following precautions must be followed.

4.11.1 Report all leakage, spills, or drainings of the PCC system to Chemistry.

4.11.2 Any water vented or drained from the system must be directed to and processed by the waste disposal system or directed to a suitable container.

4.11.3 Chromates are toxic. Avoid contact and wipe up all spills immediately.

4.11.4 Maintain collection tank overflow aligned to PAB sump (solenoid tripped).

4.11.5 Floor drains in pump pit area are directed to the PAB sump. Floor drains in the Heat Exchanger area are directed to the Turbine Hall Sump. If the shell side of any HX must be drained, these drains must be directed to the pump pit area or to a suitable container.

4.12 Verify only PCC is aligned to P-14S oil coolers if it is an "A" pump or only SCC is aligned if it is a "B" pump. It is possible to cross connect the PCC and SCC systems through misvalving.

4.13 Whenever a PCC pump is placed in standby, after maintenance has been done, it shall be tested for a minimum of 15 minutes. This will ensure all interlocks are cleared and the pump is reliable.

4.14 Many valves in this system are required to be aligned as per ECCS, CIS, and containment integrity procedures. Before changing a valve's position ensure the valves intended function is not defeated. When returning these valves to service, fill out proper documentation as required (re; the white tag system and portions of surveillance procedures).

4.15 If the PCC surge tank level begins to change, a leak may have developed in the system. The rate of change in the sight glass is approximately 18 gals/inch. Refer to AOP 2-25.

NOTE: If the reclaiming filter plugs up, water will be lost due to overflow to the sump.

4.16 PCC must be supplied to every operating RCP. Normal PCC D/P is 5.5 to 7.0 psid.

4.17 In order to prevent any possibility of freezing or non-condensible accumulation in the PCC lines supplying cooling to DG-1A, a positive flow must be maintained in these lines. Normally a bypass around the DG-1A cooler does this. If for any reason this cooler is isolated, the bypass valves located on the inlet and outlet PCC lines in the diesel generator room must be opened after the jumper connection located at the valves is in place.

4.18 Operation of valves designated by an asterisk (*) may result in a breach of Containment Integrity. Refer to Procedure 1-12-5, Technical Specification 4.11 and Technical Specification definition of Containment Integrity.

4.0 PRECAUTIONS

4.1 Maintain the pH between 7.0 - 8.5.

4.2 Maintain the potassium chromate concentration between 700 and 1200 ppm.

4.3 The design component cooling flow through the RHR heat exchanger is 4000 gpm with a maximum limit of 5000 gpm. MCB annunciator alarms at 4800 gpm.

4.4 Verify the radiation actuated trip coil at the surge tank is energized and operative in the open position. The trip valve at the reclaiming tank overflow will be left in the tripped position.

4.5 The full load amperage is 46.2 amps.

4.6 Maintain the proper pump oil levels.

4.7 The permissible starts per hour for SCC pump motors are:

4.7.1 Motor at ambient temperature - 5 consecutive starts.

4.7.2 Motor at full load temperature - 4 starts with motor running between starts and 3 starts with motor shut down between starts.

4.7.3 Motor at rated total temperature - 2 consecutive starts.

4.8 Component Cooling Heat Exchanger limitations:

Service Water	CC Water
pressure - 75 psig	150 psig
flow - 10,000 gpm	6500 gpm
temp. - 150°F	200°F

4.9 If excessive pump gland leakage is noted, a Discrepancy Report should be filled out.

4.10 The SCC system is now being chemically treated with potassium chromate and the following precautions must be followed:

4.10.1 Report all leakage, spills or draining of the SCC system to a Chemistry Supervisor and the Hazardous Waste Coordinator.

4.10.2 Any water vented or drained from the system must be directed to and processed by the Waste Disposal Evaporator or directed to a suitable container. Duratek cannot process chromated water.

4.10.3 Chromates are toxic and any spills should be wiped up immediately.

4.10.4 Maintain collection tank overflow aligned to PAB sump (solenoid tripped).

FOR TRAINING ONLY

5.0 INITIAL ACTION

5.1 Trip the reactor and turbine.

5.2 Trip the reactor coolant pumps within 45 seconds and initiate Procedure EOP E-0, Emergency Shutdown from Power or Safety Injection.

5.3 Stop all of the main feed pumps and the heater drain pumps.

5.4 Dispatch an operator to lower level PAB to take manual control of seal water supply regulating bypass valves and charging header supply isolation valve (CH-A-32 or CH-A-33 depending on operating charging pump). This will provide seal water flow control to RCP's.

R 5.5 Start and stop an auxiliary or emergency feed pump (steam driven preferred) to maintain steam generator levels as necessary until an operator can be dispatched to the Emergency Feedpump Room to manually control feed flow to S/G's using valves EFW-103, 203 and 303, EFW Flow Control Bypasses. (CRS-2)

5.6 Shut the letdown isolation valve, LD-H-2.

5.7 RCP seal water supply may be sufficient to maintain pressurizer level. Additional makeup may be acquired by taking a suction from the RWST with a charging pump and discharging through the fill header bypass valve. (CH-85)

5.8 RCS temperature control is accomplished by using atmospheric dump valve (MS-A-162)

6.0 SUBSEQUENT ACTION

6.1 Reference Emergency Plan Section 2.50.0 to determine Emergency Action Levels.

6.2 In secondary plant perform the following:

6.2.1 Open the condensate pump seal water bypass valve. (SSL-84)

6.2.2 Open the exhaust hood spray valve bypasses. (CD-49, CD-45)

6.2.3 Shut the normal condenser makeup isolation valve. (CD-92)

6.2.4 Open the manual bypass for SCC to the H_2 coolers, turbine oil coolers and EHC coolers. (SCC-230, SCC-261, SCC-319)

6.2.5 Assume manual control of SCC heat exchanger outlet/bypass controller. (SCC-T-23)

TRAINING Use ONLY

10.12.3 All procedure changes will be independently reviewed in accordance with Procedure 1-200-9.

11.0 RADIOLOGICAL CONTROLS AND INDUSTRIAL SAFETY

11.1 The use of proper radiological practices and procedures is the responsibility of all members of the plant staff. All personnel must be continuously alert to the radiological aspects of the work/evolution they are involved in and take appropriate actions to preclude industrial accidents.

11.2 The PSS/SOS are responsible for frequently inspecting their job sites and areas of responsibility in the plant to ensure that appropriate and effective radiological and safety procedures and controls are being utilized and that deficiencies are identified and reported to appropriate supervision.

11.3 Loop entries are defined as any entry within the "biological shield" as specified by the HP Section Head. Loop entries may be conducted only with approval of the Plant Manager. The PSS is responsible for controlling each of the operator entries to remain within the man-rem budget specified in the Radiation Work Permit.

11.4 The PSS is responsible for monitoring the exposure of each operator and to insure that job assignments are being made with due consideration for ALARA principles.

11.5 Whenever an RMS process monitor becomes inoperable and Tech Specs require that a grab sample be taken, the following shall be performed.

11.5.1 DR issued.

11.5.2 Log entry made that includes:

- Time out of service.
- Time Chemistry is notified of grab sampling requirement.
- Entry into remedial action, if applicable.

11.5.3 If the sample is required to be taken once per 24 hours, inform Chemistry to get a sample once per 24 hours until further notice.

11.5.4 Enter on shift turnover and keep it on the turnover until the monitor is back in service.

11.6 When the monitor becomes operational again, log it back in service in the Control Room Log and notify Chemistry that samples are no longer required.

ATTACHMENT 3

MAINE YANKEE FACILITY COMMENTS/RESOLUTIONS

These comments were prepared in accordance with ES-201-1, Enclosure 3. Facility comments without a concise recommendation were not addressed. Paragraph 2 of ES-201-1, Enclosure 3 states that the facility comments will be submitted to the NRC by the highest level of corporate management for plant operations, e.g., the Vice President for Nuclear Operations. The facility comments were in fact submitted by the Operations Training Section Head.

5.01 The approximation $\Delta K = K-1$ was accepted for full credit.

5.08b "Increase" was accepted for full credit as long as appropriate justification was provided.

5.09 Additional indications of natural circulation noted in ES-0.1 were accepted for full credit.

5.12 New Tc allowance was accepted for full credit.

6.01b K/A reference was corrected. Question was not deleted (SRO K/A of 2.8).

6.04a Alternate EDG shutdown method was accepted for full credit. Facility comment reference to RO-L-5.4, page 16 should be page 62.

6.04c Requested change was incorporated into question for exam bank use.

6.06b Response regarding gland leakoff tank overflow was not required for full credit. Facility comment reference to procedure 1-15-1, step 4.11.3 should be step 4.11.4.

6.60c Any correct answers were accepted for credit.

6.08b Valve number was not required for full credit.

6.10a Alignment to either ESF train was accepted for credit.

7.01 2. The noted K/A (operation of loop isolation valves) was used as it provided the closest reference to the conditions under which an isolated loop is maintained.

3. The additional answers were not accepted. The first is applicable only if the loop is pressurized: it does not define why it is overpressurized. The second answer is precluded by the question structure which implies no loop leakage.

7.07a No changes were made. The ordering of steps and the time associated with the second step implies that only the first two steps are of immediate concern.

7.08b No change was made. The facility comment is based purely on semantics. The operator was asked to state the immediate action steps for a given situation.

7.13 No change was made. Knowledge of shielding uses and radiation level requirements for radiation areas are ALARA concerns and are supported by ES-402 and the referenced K/A.

8.01a Use of "temperature" instead of "Tavg" was accepted for credit.

8.01c Reference to neutron flux log range channel instrumentation was not required for full credit.

8.01d The noted temperatures were corrected. No other changes were made. The facility comment is based purely on semantics as the conditions are different; the question did not ask if they are different, but why they are different.

8.02a No change was made. The facility comment implies that the correct minimum license requirement is either an RO or SRO license. Technical specifications state the minimum requirement.

8.02c Stating that the CRO left the controls was accepted for full credit.

8.03a No change was made. Security and other valid concerns were allowed.

8.05 Plant manager was accepted for full credit. Reference to the Radiological Controls Section Head was allowed.

8.06b Lining up swing pump was accepted for full credit.

8.07b Alternatives to "add PCC pump" were accepted for credit.

8.08a 177 steps was accepted for full credit.

8.09b No changes were made. No supporting information was provided so designations in the Emergency Plan were used.

8.09d No changes were made. Information within parenthesis is not required for full credit.