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ACCESSION NBR:8206040349 DOC.DATE: 82/05/25 NOTARIZED: NO DOCKET #
FACIL:50-269 Oconee Nuclear Station, Unit 1, Duke Power Co. 05000269
50-270 Oconee Nuclear Station, Unit 2, Duke Power Co. 05000270
50-287 Oconee Nuclear Station, Unit 3, Duke Power Co. 05000287

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PARKER,W.O.	Duke Power Co.

RECIP.NAME	RECIPIENT AFFILIATION
DENTON,H.R.	Office of Nuclear Reactor Regulation, Director
STOLZ,J.F.	Operating Reactors Branch 4

SUBJECT: Forwards addl info re upgraded senior reactor operator & reactor operator training & training for mitigating core damage,in response to 820406 request.

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WILLIAM O. PARKER, JR.
VICE PRESIDENT
STEAM PRODUCTION

TELEPHONE: AREA 704
373-4083

May 25, 1982

Mr. Harold R. Denton, Director
Office of Nuclear Reactor Regulation
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

Attention: Mr. J. F. Stolz, Chief
Operating Reactors Branch No. 4

Subject: Oconee Nuclear Station
Docket Nos. 50-269, -270, -287

Dear Sir:

By letter dated April 26, 1982, the NRC requested additional information regarding upgraded SRO and RO training and training for mitigating core damage. Attached please find our response to this request. By copy of this letter, the NRC contractor, Science Applications, Inc. is provided a copy of the response directly.

Very truly yours,

William O. Parker, Jr.

RLG/php
Attachment

cc: Dr. R. T. Line
Science Applications, Inc.
1710 Goodridge Drive
McLean, Virginia 22102

Mr. James P. O'Reilly
Regional Administrator
U. S. Nuclear Regulatory Commission
Region II
101 Marietta Street, Suite 3100
Atlanta, Georgia 30303

Mr. W. T. Orders
NRC Resident Inspector
Oconee Nuclear Station

Mr. Philip C. Wagner
Office of Nuclear Reactor Regulation
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

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P PDR

UPGRADED SRO AND RO TRAINING AND TRAINING FOR
MITIGATING CORE DAMAGE - REQUEST FOR ADDITIONAL INFORMATION

Question 1. The operator training program has lectures and quizzes which cover the subjects of heat transfer, fluid flow, thermodynamics, and accident mitigation. Is the material covered in these lectures as extensive as that identified in enclosures 2 and 3 of the Denton March 28, 1980, letter? Do the lectures and quizzes involve 80 contact hours? (A contact hour is a one-hour period in which the course instructor is present or available for instructing or assisting students; lectures, seminars, discussions, problem-solving sessions, and examinations are considered contact periods under this definition.)

Response 1. The material presented in the Oconee Nuclear Station License Preparatory Program is at least as extensive as that identified in enclosures 2 and 3 of the Denton March 28, 1980, letter. (See attachment A for an outline of the Thermodynamics, Fluid Flow and Heat Transfer course and attachment B for an outline of the Core Accident Mitigation lesson plan.)

During the License Preparatory Program, approximately ten (10) days or eighty (80) hours are devoted to the above subjects.

Question 2. Are the lectures and quizzes on the subject of accident mitigation given to shift technical advisors and operating personnel from the plant manager through the operations chain to the licensed operators? If they are, would you please provide the titles of the people who are trained and an organization chart which illustrates their position in the operations chain?

Response 2. Accident Mitigation is covered in all License Preparatory programs and, as such, is applicable for coverage in the Requalification program. It was presented at the SRO/STA level to all licensed Oconee operators. (See attachment C for an organizational chart depicting those individuals by title who were presented the program as outlined in attachment B.)

Question 3. Does the training program have an increased emphasis on reactor and plant transients as called for in enclosure 1 of Denton's March 28, 1980, letter? If there is, does the program address both normal and abnormal (accident) transients?

Response 3. An increase in emphasis on both normal and abnormal transients has been incorporated into the training program. (See attachment D for objectives of the applicable lesson plans. NOTE: the SRO level objectives are provided but the material is also covered in RO license prep.)

Question 4. The requalification program includes lectures on the subjects of heat transfer, fluid flow, thermodynamics, and accident mitigation. Do these lectures cover the subject at the level of depth called out in enclosures 2 and 3 of Denton's March 28, 1980, letter? Do these lectures and their associated testing involve 80 contact hours?

Response 4. The material presented in the Oconee Nuclear Station Requalification Program is at least as extensive as that identified in enclosures 2 and 3 of the Denton March 28, 1980 letter. (See attachment A for an outline of the Thermodynamics, Fluid Flow, and Heat Transfer course and attachment B for an outline of the Core Accident Mitigation lesson plan.)

During the initial coverage in the Requalification Program approximately ten (10) days or eighty (80) hours were devoted to the above subjects. As a future area of coverage for requalification training an appropriate amount of time will be spent commensurate with maintaining the licensed operator's knowledge in these areas.

Question 5. The requalification program section 2.1 defines certain reactivity changes which are essentially the same as those listed in enclosure 4 of Denton's letter of March 28, 1980. Are items a, c, e, f, i and o performed or simulated on an annual basis with all other items performed on a two-year cycle as specified in enclosure 4? If they are not, will you please explain your justification?

Response 5. Items a, c, e, f, i and o of enclosure 4 of Denton's, March 28, 1980 letter are not performed or simulated on an annual basis with all other items performed on a two year cycle. Current usage of the B&W simulator in Lynchburg, Va. precludes performing all of the stated reactivity changes in Denton's letter enclosure 4 because of scheduling difficulties and the lack of direct applicability to training effectiveness because of simulator-to-plant differences. The reactivity changes are administered according to the Oconee Nuclear Station Requalification Program for NRC Licensed Personnel, Revised July 14, 1980 section 2.1, 4.2, 4.3 and 4.4. In addition to those requirements STA's have been attending simulator training on an annual basis.

A site specific simulator is being constructed by Electronic Associates, Inc. for delivery in mid-1982. Upon implementation of simulator training on our site specific simulator, the reactivity changes will be administered in accordance with the annual and two-year cycle requirements as specified in enclosure 4 of Denton's letter of March 28, 1980.

Question 6. Are instructors enrolled in a requalification program which addresses current operating history, problems, and changes in procedures and administrative limits?

Response 6. Instructors at the Oconee Training Center are enrolled in the appropriate portions of the requalification program as stated in section 2.4 of the Oconee Nuclear Station Requalification Program for NRC Licensed Personnel, Revised July 14, 1980. This program for Instructors includes, but is not limited to, a review of:

A. procedure changes

B. station modifications

C. Technical Specification changes

D. Emergency Procedures, selected Operating Procedures, Technical Specifications, selected Performance Test Procedures, and selected Station Directives according to a formalized schedule

E. Operating Experience Evaluation Program reports that have impact on operator training - Sources for materials in this area include, but are not limited to:

   1. INPO Significant Event Reports

   2. NSAC Reports

   3. TAP (B&W)

   4. D.P.C. nuclear units off-normal events

F. Oconee Nuclear Station incident reports

G. Applicable I&E Bulletins

H. Current operating history and problems

I. All NRC committments for training of licensed operators, such as,

   1. Small Break LOCA

   2. Pressurized Thermal Shock

   3. Core Accident Mitigation

   4. TMI Accident

   5. ETC.

ATTACHMENT "A"
THERMODYNAMICS, HEAT TRANSFER, FLUID FLOW
COURSE OUTLINE

1.A THERMODYNAMICS

Introduction
Units and Conversion Factors
The Conversion Relationship
Thermodynamic Properties and States
Pressure
Temperature and Temperature Scales
Temperature Change
Specific Volume and Density
Internal Energy

1.B STEAM AND VAPOR PROPERTIES

Steam Tables
Saturation Temperature and Pressure
Specific Volume
Quality
Pressure - Specific Volume Diagram
Wet-Steam
Enthalpy
Enthalpy of High Pressure Water
Entropy
Summary of Wet-Steam Formulas
Superheated Steam Tables
The Ts Diagram
Mollier Enthalpy - Entropy Chart for Steam
Gas Relationships
Boyle's Law
Charles' Law

2.A WORK AND HEAT

General Energy Equation
Work and A System Boundary
Heat and Heat Units
Heat of Fusion and Heat of Vaporization
Specific Heat
Energy and Power Equivalences
Vapor Pressure

2.B FIRST LAW OF THERMODYNAMICS

The First Law of Thermodynamics
Flow Energy
General Energy Equation
Applications of the General Energy Equation
Nuclear Boilers/Steam Generators
The Steam Turbine
Feed Pump, Condensate Pump
Friction
Reactor Heat Input
Throttles

2.C SECOND LAW OF THERMODYNAMICS

Thermodynamics of a Basic Cycle
Pressure - Specific Volume Diagram
Thermal Efficiency
Cycle Efficiency

2.D ENTROPY

The Second Law of Thermodynamics
Cycle Diagrams
Thermodynamic Cycles
Turbine Work
Condenser Heat Removal
Pump Work
Reactor Heat Input
Thermal Efficiency
Feedwater Heating
Cycle Analysis
Effects of Feedwater Heaters

2.E FLUID FLOW

Basic Fluid Flow Relationships
Units of Flow
Laminar and Turbulent Flow
Continuity of Flow

Bernoulli's Equation
Fluid Friction
Evaluating Head Loss Due To Fluid Friction
Evaluating Head Added By Pumps
Measuring Fluid Flow Rate
Two - Phase Fluid Flow
Characteristics of Centrifugal Pumps
Discharge Head
Total Developed Head, TDH

3 HEAT TRANSFER

Conduction
Convection
Radiation
Heat Transfer in Heat Exchangers
Performance of Power Plant Heat Exchangers
Calculations of Reactor Power
Heat Balances as Done at Oconee Nuclear Station
Heat Transfer From The Reactor Core
Boiling Heat Transfer
Convection Heat Transfer
Natural Circulation in the Reactor Coolant System
Nucleate Boiling
Departure From Nucleate Boiling
Film Boiling
The Boiling Water Curve

ATTACHMENT "B"
ACCIDENT MITIGATION

LESSON OUTLINE:

1.0 CORE COOLING MECHANICS 8.0 hrs

1.1 Natural Circulation
1.2 HPI Forced Cooling
1.3 Inadequate Core Cooling
1.4 Boron Precipitation Concerns Following a LOCA

2.0 POTENTIALLY DAMAGING OPERATING CONDITIONS 3.0 hrs

2.1 Equipment Failure Sequences
2.2 Refueling Shutdown Operation
2.3 Damage Thresholds for Core Components

3.0 RECOGNIZING CORE DAMAGE 5.0 hrs

3.1 Use of Self Powered Neutron Detectors
3.2 Use of Incore Thermocouples
3.3 Use of Source Range Nuclear Instrumentation
3.4 Use of Radiation Monitor Systems
3.5 Use of Isotopic Analysis

4.0 GAS/STEAM BINDING 1.5 hrs

4.1 Situations That Might Result in Gas Accumulation in RCS
4.2 Potential Gas Sources
4.3 Potential Detrimental Effects of Gases in RCS
4.4 Symptoms of Gases in RCS
4.5 Removing or Otherwise Coping With Gases in RCS

5.0 HYDROGEN HAZARDS DURING SEVERE ACCIDENTS 1.5 hrs

5.1 Hydrogen/Oxygen Sources
5.2 Post Accident Hydrogen Control
5.3 Post LOCA Hydrogen Hazards

6.0 CRITICAL PARAMETERS 1.5 hrs

6.1 Hostile Envoronment
6.2 Instrumentation
6.3 Use of Plant Computer

7.0 RADIATION HAZARDS 1.0 hrs

7.1 Reactor Building Radiation Monitor
7.2 Accident Source Term

8.0 CRITERIA FOR OPERATION AND COOLING MODE SELECTION 1.5 hrs

8.1 Core Flow
8.2 Core Cooling Modes
8.3 Containment Isolation
8.4 Chemical and Transport Characteristics of Fission Products
8.5 Fission Product Release Pathways

LPSO - TRAINING OBJECTIVES

OBJECTIVES:

1. Be able to explain orally and in writing the four requirements for natural circulation.

2. Be able to explain orally and in writing the concept of thermal centers as it applies to the core and the OTSG.

3. Be able to explain orally and in writing the four factors that affect the flow rate of natural circulation.

4. Be able to explain orally and in writing two ways in which the operator can increase the strength of the heat sink.

5. Be able to explain orally and in writing two ways in which the operator can increase the difference in elevation between the OTSG and the core.

6. Be able to list two primary indications the operator should verify when RCP's are tripped.

7. Discuss the role of feedwater following loss of RCP's and the establishment of natural circulation.

8. Be able to describe orally and in writing indications to assure adequate coupling upon loss of RCP's with two OTSG's operable.

9. Be able to describe orally and in writing indications to assure adequate coupling upon loss of RCP's with only one OTSG operable.

10. Be able to describe orally and in writing the Reflux boiling means of natural circulation.

11. Be able to describe orally and in writing the operator actions required to ensure core cooling upon loss of all feedwater.

12. Be able to describe orally and in writing the advantages and disadvantages of HPI operation in the Forced Cooling Mode.

13. Be able to discuss under what plant conditions elevated core temperatures might result.

14. Be able to discuss under what plant conditions the operator is required to secure all RCP's.

15. Be able to describe orally and in writing for what reasons the operator secures RCP's on a LOCA.

LPSO - TRAINING OBJECTIVES (Cont'd.)

OBJECTIVES:

16. Be able to describe orally and in writing required operator actions and the reasons for these actions when incore thermocouples indicate:

    the core is superheated.
    clad temperature ° 1400°F.
    clad temperature ° 1800°F.

17. Be able to describe orally and in writing the probable state of the core when:

    clad temperature ° 1400°F.
    clad temperature ° 1800°F.

18. Be able to describe orally and in writing the effects of quenching a degraded core.

19. Be able to list three conditions where the operator would elect to leave RCP's running following a LOCA.

20. Be able to describe orally and in writing mechanisms that can produce high boron concentrations in the core.

21. Be able to describe orally and in writing two severe consequences of boron precipitation.

22. Be able to describe in writing NRC restrictions on boron concentration in the core.

23. Be able to describe orally and in writing the operator actions required to achieve minimum dilution flowrate thru the core.

24. Be able to describe orally several scenarios that could lead to a degraded core condition from full power operation.

25. Be able to describe orally the basic refueling states in which the core can become degraded.

26. Be able to describe orally and in writing the major causes of a degraded core while in refueling conditions.

27. Be able to describe orally and in writing the consequences of core uncovery as it applies to the following:

    clad rupture.
    clad oxidation/hydrogen generation.
    fuel/cladding eutectic formation.

LPSO - TRAINING OBJECTIVES (Cont'd.)

OBJECTIVES:

28. Be able to list four major system consequences of core uncovery.

29. Be able to describe orally and in writing the basic mechanisms of damage that occurred at TMI-2.

30. Be able to describe orally and in writing the response of SPND's to elevated core temperatures as far as:

    Thermionic Emission.
    Space Charge Release.

31. Be able to discuss orally the available informaiton from SPND's following a LOCA.

32. Be able to locate the cabinets in the cable room where local SPND current can be measured.

33. Be able to describe orally and in writing the response of the SPND's in the event of a recriticality accident following a LOCA.

34. Be able to describe orally and in writing how encore thermocouple temperatures can be obtained and how these readings can be used to verify adequate core cooling.

35. Be able to locate the cabinet in the cable room where incore thermocouple readings may be obtained upon loss of computer.

36. Be able to describe orally and in writing the sources of neutrons that make up the flux generation term.

37. Be able to describe orally and in writing how a change in coolant density affects the flux transmission term.

38. Be able to describe in detail SRM response for core uncovery.

39. Be able to explain orally and in writing how each of the following events will affect SRM response:

    recriticality
    LOCA
    core boiling
    core damage

40. Be able to describe in writing a typical SRM response following a reactor trip.

LPSO - TRAINING OBJECTIVES (Cont'd.)

OBJECTIVES:

41. Be able to draw and explain a source range trace while the RCS is in a two phase condition and all RCP's are secured.

42. Be able to draw and explain a source range trace showing the effects of HPI reflood following core uncovery.

43. Be able to draw and explain a source range trace in which RCS voiding begins shortly after the transient.

44. Be able to describe orally and in writing the usefulness of RIA-36 to detect a degraded core condition.

45. Be able to discuss the validity of information presented to the operator from area and process monitors following a LOCA.

46. Be able to describe orally and in writing the relationship of fuel pin activity versus gap activity.

47. Be able to discuss how fission product nuclides are distributed within the RCS.

48. Be able to describe orally and in writing how certain key ratios can determine the type of accident that has occurred.

49. Be able to describe orally and in writing several situations that may result in gas accumulation in the RCS.

50. Be able to list several types of gas and their source in the RCS following an accident.

51. Be able to describe orally and in writing means of dealing with gas accumulation within the RCS.

52. Be able to describe orally and in writing how gas accumulation within the RCS could block Reflux boiling.

53. Be able to describe orally and in writing symptoms of gas binding within the RCS.

54. Be able to describe orally and in writing how the use of RCP bumps minimizes the affect of gas accumulation within the RCS.

55. Be able to describe orally and in writing the mechanism by which radiolysis produces hydrogen and oxygen.

LPSO - TRAINING OBJECTIVES (Cont'd.)

OBJECTIVES:

56. Be able to describe orally and in writing how the following mechanisms produce hydrogen:

    Zirconium water reaction
    Zinc-boric acid reaction
    Stainless-steel steam reaction

57. Be able to describe orally and in writing how to basically sample the containment for hydrogen concentration.

58. Be able to discuss the reasons why the hydrogen purge unit is not put into operation until 3.5 volume % hydrogen.

59. Be able to describe orally and in writing the basic operation of the hydrogen purge system.

60. Be able to describe orally and in writing the flammability limits of hydrogen.

61. Be able to discuss the characteristics of hydrogen combustion for values up to 19% and for values above 19%.

62. Be able to list hostile conditions expected to exist in containment following a LOCA.

63. Be able to determine which of the following instrumentation is qualified in a hostile environment:

    RCS pressure-wide range
    Pressurizer level
    RCS hot leg wide range temperature
    RCS hot leg narrow range temperature
    Reactor building narrow range pressure
    Reactor building wide range pressure
    Reactor building temperature
    Emergency sump level
    Nuclear Instrumentation
    Emergency steam generator level

64. Be able to describe instrumentation whose function is non-safety but is used in emergency procedures to mitigate an accident.

65. Be able to discuss three major plant computer programs which will provide the operator with information to mitigate an accident.

66. Be able to describe orally and in writing the response of RIA-4 to a design break accident.

LPSO - TRAINING OBJECTIVES (Cont'd.)

OBJECTIVES:

67. Be able to discuss alternate means of signal measurement from RIA-4 if the remote readout module should fail.

68. Be able to describe orally and in writing how to determine the accident source term with RIA-4 out of service.

69. Be able to discuss the means by which adequate core flow can be verified following a LOCA.

70. Be able to describe orally and in writing the factors which affect core flow versus loop flow.

71. Be able to explain in writing why all incore Thermocouples are not expected to read the same following an accident.

72. Be able to basically explain in writing the long term emergency cooling flowpath.

73. Be able to describe orally and in writing the disadvantages of the HPI/LPI piggyback cooling mode.

74. Be able to discuss when the LPI/HPI piggyback cooling would be the preferred mode of cooling.

75. Be able to describe orally and in writing when the operator would elect to unisolate the containment following a LOCA.

76. Be able to describe orally and in writing the consequences of the operator not swapping suction to the emergency sump when the BWST reaches lo-lo level following a major LOCA.

77. Be able to describe orally and in writing the transport characteristics of the following key nuclides:

    Noble gases
    Cesium
    Iodine

78. Be able to describe orally and in writing post-LOCA methods for mitigating the effects of the following nuclides:

    Xenon
    Iodine's
    Cesium's
    Particulates

LPSO - TRAINING OBJECTIVES (Cont'd.)

OBJECTIVES:

79. Be able to discuss several release pathways from the containment to the environment.

80. Be able to discuss major release pathways identified at TMI-2.

LPRO - TRAINING OBJECTIVES

OBJECTIVES:

1. Be able to explain orally and in writing the four requirements for natural circulation.
2. Be able to explain orally and in writing the concept of thermal centers as it applies to the core and the OTSG.
3. Be able to explain orally and in writing the four factors that affect the flow rate of natural circulation.
4. Be able to explain orally and in writing two ways in which the operator can increase the strength of the heat sink.
5. Be able to explain orally and in writing two ways in which the operator can increase the difference in elevation between the OTSG and the core.
6. Be able to list two primary indications the operator should verify when RCP's are tripped.
7. Discuss the role of feedwater following loss of RCP's and the establishment of natural circulation.
8. Be able to describe orally and in writing indications to assure adequate coupling upon loss of RCP's with two OTSG's operable.
9. Be able to describe orally and in writing indications to assure adequate coupling upon loss of RCP's with only one OTSG operable.
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11. Be able to describe orally and in writing the operator actions required to ensure core cooling upon loss of all feedwater.
12. Be able to describe orally and in writing the advantages and disadvantages of HPI operation in the Forced Cooling Mode.
13. Be able to discuss under what plant conditions elevated core temperatures might result.
14. Be able to discuss under what plant conditions the operator is required to secure all RCP's.
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LPRO - TRAINING OBJECTIVES (Cont'd.)

OBJECTIVES:

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    clad temperature ° $1400^{o}F$.
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26. Be able to describe orally and in writing the major causes of a degraded core while in refueling conditions.

27. Be able to describe orally and in writing the consequences of core uncovery as it applies to the following:

    clad rupture.
    clad oxidation/hydrogen generation.
    fuel/cladding eutectic formation.

LPRO - TRAINING OBJECTIVES (Cont'd.)

OBJECTIVES:

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29. Be able to describe orally and in writing the basic mechanisms of damage that occurred at TMI-2.

30. Be able to describe orally and in writing the response of SPND's to elevated core temperatures as far as:

    Thermionic Emission.
    Space Charge Release.

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32. Be able to locate the cabinets in the cable room where local SPND current can be measured.

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34. Be able to describe orally and in writing how incore thermocouple temperatures can be obtained and how these readings can be used to verify adequate core cooling.

35. Be able to locate the cabinet in the cable room where incore thermocouple readings may be obtained upon loss of computer.

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    core damage

40. Be able to describe in writing a typical SRM response following a reactor trip.

LPRO - TRAINING OBJECTIVES (Cont'd.)

OBJECTIVES:

41. Be able to draw and explain a source range trace while the RCS in in a two phase condition and all the RCP's are secured.

42. Be able to draw and explain a source range trace showing the effects of HPI reflood following core uncovery.

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46. Be able to describe orally and in writing several situations that may result in gas accumulation in the RCS.

47. Be able to list several types of gas and their source in the RCS following an accident.

48. Be able to describe orally and in writing means of dealing with gas accumulation within the RCS.

49. Be able to describe orally and in writing how gas accumulation within the RCS could block Reflux boiling.

50. Be able to describe orally and in writing symptoms of gas binding within the RCS.

51. Be able to describe orally and in writing how the use of RCP bumps minimizes the affect of gas accumulation within the RCS.

52. Be able to describe orally and in writing the mechanism by which radiolysis produces hydrogen and oxygen.

53. Be able to describe orally and in writing how the following mechanisms produce hydrogen:

    Zirconium water reaction
    Zinc-boric acid reaction
    Stainless-steel steam reaction

54. Be able to describe orally and in writing how to basically sample the containment for hydrogen concentration.

LPRO - TRAINING OBJECTIVES (Cont'd.)

OBJECTIVES:

55. Be able to discuss the reasons why the hydrogen purge unit is not put into operation until 3.5 volume % hydrogen.

56. Be able to describe orally and in writing the basic operation of the hydrogen purge system.

57. Be able to describe orally and in writing the flammability limits of hydrogen.

58. Be able to discuss the characteristics of hydrogen combustion for values up to 19% and for values above 19%.

59. Be able to list hostile conditions expected to exist in containment following a LOCA.

60. Be able to determine which of the following instrumentation is qualified in a hostile environment:

    RCS pressure-wide range
    Pressurizer level
    RCS hot leg wide range temperature
    RCS hot leg narrow range temperature
    Reactor building narrow range pressure
    Reactor building wide range pressure
    Reactor building temperature
    Emergency sump level
    Nuclear Instrumentation
    Emergency steam generator level

61. Be able to describe instrumentation whose function is non-safety but is used in emergency procedures to mitigate an accident.

62. Be able to discuss three major plant computer programs which will provide the operator with information to mitigate an accident.

63. Be able to describe orally and in writing the response of RIA-4 to a design break accident.

64. Be able to discuss alternate means of signal measurement from RIA-4 if the remote readout module should fail.

65. Be able to describe orally and in writing how to determine the accident source term with RIA-4 out of service.

LPRO - TRAINING OBJECTIVES (Cont'd.)

OBJECTIVES:

66. Be able to discuss the means by which adequate core flow can be verified following a LOCA.

67. Be able to describe orally and in writing the factors which affect core flow versus loop flow.

68. Be able to explain in writing why all incore Thermocouples are not expected to read the same following an accident.

69. Be able to basically explain in writing the long term emergency cooling flowpath.

70. Be able to describe orally and in writing the disadvantages of the HPI/LPI piggyback cooling mode.

71. Be able to discuss when the LPI/HPI piggyback cooling would be the preferred mode of cooling.

72. Be able to describe orally and in writing when the operator would elect to unisolate the containment following a LOCA.

73. Be able to describe orally and writing the consequences of the operator not swapping suction to the emergency sump when the BWST reaches lo-lo level following a major LOCA.

74. Be able to discuss several release pathways from the containment to the environment.

75. Be able to discuss major release pathways identified at TMI-2.

ATTACHMENT "C"
OPERATIONS ORGANIZATION CHART (by title of those individuals trained as outlined in attachment "B")

Superintendent of Operations
(SRO Licensed)

Operating Engineers
(SRO Licensed)

Shift Technical Advisors
(SRO Licensed)

Shift Supervisors
(SRO Licensed)

Assistant Operating Engineers
(SRO Licensed)

Assistant Shift Supervisors
(SRO Licensed)

Nuclear Control Operators
(RO Licensed)

Assistant Nuclear Control Operators
(RO Licensed)

NOTE: The Assistant Station Manager also received the training outlined in Attachment "B" and is currently RO Licensed and SRO Certified

ATTACHMENT "D"

NORMAL TRANSIENTS
PROG. OP-OC-SPS-PTR-NT

LPSO - TRAINING OBJECTIVES

OBJECTIVES:

1. Be able to describe the overall plant response for an increase or decrease in generator frequency.

2. Be able to describe the overall plant response for an increase or decrease in header pressure.

3. Be able to describe the overall plant response for a failed open Turbine Bypass Valve at various power levels.

4. Be able to describe the overall plant response to a load rejection from 100% power and from 50% power.

5. Be able to describe the overall plant response to a loss of condenser vacuum.

6. Be able to describe the overall plant response for a turbine trip.

7. Be able to describe the overall plant response to a loss of feed flow indication.

8. Be able to describe the overall plant response to a loss of one feedwater pump.

9. Be able to describe the overall plant response to a loss of both feedwater pumps.

10. Be able to describe the overall plant response to a main feedwater valve failing shut at 100% power.

11. Be able to describe the overall plant response to a main feedwater valve failing full open at 50% power.

12. Be able to describe the overall plant response when an OTSG operating level instrument fails high.

13. Be able to describe the overall plant response when an OTSG startup level instrument fails low.

14. Be able to describe the overall plant response when OTSG tube fouling occurs.

15. Be able to describe the overall plant response when feedwater pump Δp fails low.

16. Be able to describe the overall plant response when the bypass valve bias of 125 psi fails during a reactor trip.

OBJECTIVES (cont'd):

17. Be able to describe the overall plant response when the R.C. flow signal is lost.

18. Be able to describe the overall plant response when ΔT_c fails high.

19. Be able to describe the overall plant response when T_h fails high.

20. Be able to describe the overall plant response when T_h fails low.

21. Be able to describe the overall plant response when T_c fails high.

22. Be able to describe the overall plant response when T_c fails low.

23. Be able to describe the overall plant response when NI-5 fails.

24. Be able to describe the overall plant response when CRD fails to respond to neutron error.

25. Be able to describe the overall plant response when an asymmetric rod occurs.

26. Be able to describe the overall plant response for any of the above events during conditions which might involve some ICS stations in manual.

LPSO - TRAINING OBJECTIVES

OBJECTIVES:

1. Be able to describe the overall plant response as described in the plant Safety Analysis for "uncompensated operating reactivity changes".
2. Be able to describe the overall plant response as described in the plant Safety Analysis for "startup accident".
3. Be able to describe the overall plant response as described in the plant Safety Analysis for "rod withdrawal accident at rated power operation".
4. Be able to describe the overall plant response as described in the plant Safety Analysis for "moderator dilution accident".
5. Be able to describe the overall plant response as described in the plant Safety Analysis for "cold-water accident".
6. Be able to describe the overall plant response as described in the plant Safety Analysis for "loss-of-coolant flow".
7. Be able to describe the overall plant response as described in the plant Safety Analysis for "stuck-out, stuck-in, or dropped-in control rod accident".
8. Be able to describe the overall plant response as described in the plant Safety Analysis for "loss of electric power".
9. Be able to describe the overall plant response as described in the plant Safety Analysis for "steam line failure".
10. Be able to describe the overall plant response as described in the plant Safety Analysis for "steam generator tube failures".
11. Be able to describe the overall plant response as described in the plant Safety Analysis for "fuel handling accidents".
12. Be able to describe the overall plant response as described in the plant Safety Analysis for "rod ejection accident".
13. Be able to describe the overall plant response as described in the plant Safety Analysis for "loss-of-coolant accident".
14. Be able to describe the overall plant response as described in the plant Safety Analysis for "maximum hypothetical accident".
15. Be able to describe the overall plant response as described in the plant Safety Analysis for "waste gas tank rupture".

LPSO - TRAINING OBJECTIVES

OBJECTIVES:

1. Be able to discuss incidents at your facility which have occurred within six months prior to license examination. Must be able to provide basic description, cause, corrective action and lessons learned.

2. Be able to discuss major incidents at your facility which have occurred greater than six months prior to license examination. Must be able to provide some information as above.

3. Be able to discuss major industry wide incidents which have occurred. Must be able to relate incident to your plant and how lessons learned will prevent occurrence at your facility. (LER's and I&E Bulletins from NRC will be source of information.)

4. Be able to discuss the incident of TMI-2.

5. Must be able to discuss any other incident related material such as operating experiences, etc. presented during this module.

LPSO - TRAINING OBJECTIVES

OBJECTIVES:

1. Be able to discuss small break analysis for B&W lowered loop plants.
2. Be able to discuss turbine building flood scenario for ONS.
3. Be able to discuss inadequate core cooling and the effects and actions required.
4. Be able to discuss the effects of degraded non-nuclear instrumentation due to loss of various portions of the power supplies.
5. Be able to discuss the potential effects of a Steam Generator Overfill accident.