07-~~219~~65-91

NIAGARA MOHAWK POWER CORPORATION

NINE MILE POINT NUCLEAR STATION

UNIT II OPERATIONS

02-REQ-008-361-2-01 Revision 0

TITLE: OVERVIEW OF TITLE 10 OF THE CODE OF FEDERAL REGULATIONS (10-CFR)

	SIGNATURE	DATE
PREPARER		5/30/91
TRAINING AREA SUPERVISOR		5/31/91
TRAINING SUPPORT SUPERVISOR		5-31-91
PLANT SUPERVISOR/ USER GROUP SUPERVISOR		5/31/91

Summary of Pages

(Effective Date: 5/31/91)

Number of Pages: 27

Date	Pages
May 1991	1 - 27

TRAINING DEPARTMENT RECORDS ADMINISTRATION ONLY

VERIFICATION:

DATA ENTRY:

RECORDS:

I. TRAINING DESCRIPTION

A. Title of Lesson: Overview of Title 10 of the Code of Federal Regulations (10-CFR).

B. Lesson Description: This lesson contains information that will provide overview knowledge of Title 10 of the Code of Federal Regulations.

C. Estimate of the Duration of the Lesson: 2 hours.

D. Method of Evaluation, Grade Format, and Standard of Evaluation: A written exam will be given with a minimum grade of 80% required for satisfactory performance.

E. Method and Setting of Instruction: Lecture conducted in the classroom.

F. Prerequisites:

1. Instructor:

a. Certified in accordance with NTP-16.

2. Trainee:

a. In accordance with eligibility requirements of NTP-11.

G. References:

1. 10-CFR

II. REQUIREMENTS

A. AP-9, Administration of Training

B. NTP-11, Licensed Operator Requalification Training

III. TRAINING MATERIALS

A. Instructor Materials:

1. Training Record (TR)
2. Instructor's working copy of Lesson Plan
3. Whiteboard and Markers
4. Overhead Projector
5. Transparencies as needed
6. Flipchart
7. Copy of Trainee Handouts
8. Trainee Course Evaluation Forms

B. Trainee Materials:

1. Handouts
2. Paper or notebook
3. Pen or pencil

IV. EXAMS AND MASTER ANSWER KEYS

A. Exam and master answer keys will be on permanent file with the designated clerk.

V. LEARNING OBJECTIVES

Upon completion of this lesson the trainee will have gained the knowledge related to Title 10 of the Code of Federal Regulations to:

A. Terminal Objectives:

TO-1.0 Direct Actions to Ensure Compliance with Local, State, and Federal Environmental Regulations. (3410340303)

TO-2.0 Apply Tech Spec Directions for Safety Limits, LCOs, and Limiting Safety System Settings. (3410180303)

TO-3.0 Maintain a valid Senior Reactor Operator License. (3410370303)

TO-4.0 Write and Review Operational Reports (LERs). (3430160303)

TO-5.0 Authorize the Deviation from Tech Specs./Procedures during Emergency Conditions in Accordance with 10-CFR-50.54 x and y. (3440480303)

B. Enabling Objectives:

EO-1.0 Describe the Tech Spec terms:

a. Safety Limit
b. Limiting Safety System Setting
c. Limiting Conditions for Operation

EO-2.0 Describe the rights given to a licensed operator as defined on the NRC license document.

EO-3.0 Describe eight of the ten conditions of licenses other than restrictions which you shall observe.

EO-4.0 State whether conditions of the license are stated on the NRC operating license document.

EO-5.0 State whether a civil penalty may be levied upon a holder of an operating license.

EO-6.0 Describe the requirements for manipulating the controls of a reactor which may affect its reactivity or power level and include the TWO exceptions to these requirements.

EO-7.0 State who shall be present during core alternations of the core of a nuclear power plant.

EO-8.0 Describe the two conditions which must be met in order to "take reasonable action that departs from a license condition or a technical specification" during an emergency (include approval requirements and reportability time frames).

EO-9.0 State the time frame in which a disability must be reported to the NRC and the person responsible for making sure this notification is made.

EO-10.0 Describe the consequences to "any person who willfully violates any provision of the act or any regulation or order issued there under".

VI. LESSON CONTENT

LESSON CONTENT	DELIVERY NOTES	OBJECTIVES/ NOTES
I. INTRODUCTION		
A. Introduce yourself to the class.		
B. Distribute TR for completion.		
C. Distribute Course Evaluation forms and describe how it should be utilized.		
D. Explain that the evaluation will be conducted as part of a written exam at the end of the week.	Passing the weekly exam with ≥80% is satisfactory for this lesson.	
E. Review the learning objectives with the class.		
II. PURPOSE		
A. Code of Federal Regulations delineates federal regulations for a wide variety of areas.		
B. Code is composed of over 50 titles generally bearing the name of the federal issuing agency.		
C. Title 10 deals with energy.		
1. Volume I deals with NRC regulations in Part 0-199.	We will look briefly at Parts 19, 20 and 100.	
	A more detailed look at Parts 50 and 55 will be conducted.	
III. DETAILED DESCRIPTION		
A. 10-CFR-19 Notices, Instructions, and Reports to Workers: Inspections		
1. Specifies the notices and documents which must be made available to individuals at a licensed facility.		

2. Describes the conduct of regulatory inspectors at a licensed facility.
3. States the rights of workers to report instances of regulatory non-compliance by a licensee (utility, carrier of radioactive material, etc.) to the NRC.

B. 10-CFR-20 Standards for Protection against Radiation.

10-CFR-20 will be totally revised over the next few years. All plants will comply by 1993. Changes will be very significant.

1. Specifies Radiation Exposure limits for workers, non-workers, minors and pregnant women.
2. Specifies requirements for radiation limits, contamination limits and airborne radiation levels.
   a. Specifies posting and entry requirements for these areas.
3. Defines maximum permissible concentration for isotopes in air and water.
4. Defines reportable events and time frames for radiological emergencies.

C. 10-CFR-50 Domestic Licensing of Production and Utilization Facilities.

1. Defines the requirements to be met in obtaining and maintaining a license for the facility from construction to decommissioning.

2. Definitions 10-CFR-50.2

a. Controls-apparatus and mechanisms, the manipulation of which directly affects the reactivity or power level of the reactor.

Operators should be familiar with this definition.

EO-6.0

b. Also defines many other terms such as:

1) Reactor Coolant Pressure Boundary
2) Safe Shutdown (non-DBA)
3) Design bases
4) Station blackout

Safe shutdown and station blackout are covered in 50.2 page 528.

3. Written Communications 10-CFR-50.4

a. Describes required filings and applications along with submittals for construction permit and license application.

4. Licensing Requirements 10-CFR-50.10

a. Details activities requiring a license.

Paragraph (c) details Construction Permit requirements.

b. Details authorization for granting a license.

5. License Applications 10-CFR-50.30-35
   a. Details the information and documentation required to submit a license application including General and Technical information.
6. Technical Specifications 10-CFR-50.36
   a. Technical Specifications will be derived from the analyses and evaluation included in the safety analyses.
   b. License applications must include Technical Specifications.
   c. A summary statement of the bases or reasons for such specifications is required but shall not become part of the specification.
   d. Tech. Specs. will include items in the following areas:
      1) Safety Limit-limits upon important process variables that are found to be necessary to reasonably protect the integrity of certain physical barriers that guard against the uncontrolled release of radioactivity.

EO-1.0a

a) Safety limit violation requires plant shutdown, NRC notification, complete review and documentation of the situation, and corrective action.

b) Operation may not be resumed without NRC authorization.

c) Unit 2 has four Safety Limits

2) Limiting Safety System Settings- Settings for automatic protective devices related to those variables having significant safety functions.

EO-1.0b

3) Limiting Condition for Operation- The Lowest functional capability or performance levels of equipment required for safe operation of the facility.

EO-1.0c

4) Surveillance Requirements- Requirements relating to test, calibration, or inspection to assure that the necessary quality of systems and components is maintained.

5) Design Features - Those features such as materials of construction and geometric arrangements, which, if altered or modified, would have a significant effect on safety.
   a) Section 5 of Tech. Specs.
6) Administrative Controls - Provisions relating to organization and management, procedures, recordkeeping, review and audit, and reporting necessary to assure safe operation of the facility.
   a) Section 6 of Tech. Specs.

7. ECCS Acceptance Criteria 10-CFR-50.46
   a. Each BWR fueled with uranium oxide pellets and zircaloy cladding must be provided with an ECCS designed such that its calculated cooling performance on a postulated LOCA conforms to the following criteria:
      1) Maximum PCT $\leq$ 2200°F.
      2) Maximum clad oxidation $\leq$ 17% original clad thickness.

Design criteria required by Appendix K. Not the same as Design Bases.

3) Maximum hydrogen generation $\leq$ 1% hypothetical maximum if all cladding surrounding pellets excluding clad surrounding plenum region underwent chemical reaction.

4) Coolable core geometry must be maintained.

5) Long term cooling must be provided to maintain acceptably low temperature and remove decay heat following initial successful ECCS initiation.

8. Emergency Plans 10-CFR-50.47

a. NRC needs reasonable assurance that adequate protective measures can and will be taken in the event of a radiological emergency.

b. Describes the standards that the plan must meet.

9. Fire Protection 10-CFR-50.48

a. Requires fire protection plan that meets criteria set forth in Design Features (Appendix A to 10-CFR-50).

b. Appendix R to 10-CFR-50 details more stringent fire protection for those systems associated with achieving and maintaining safe shutdown conditions.

10. Duration of Licenses 10-CFR-50-51

    a. Licenses issued for specific period not to exceed 40 years.

Plants presently looking at license extensions now that the first plants are approaching 40 years.

11. Conditions of Licenses 10-CFR-50.54

    Conditions which apply to the license whether stated or not:

    a. 50.54 i-the licensee may not permit the manipulation of the controls of the facility by anyone who is not a licensed operator or senior operator.

    b. 50.54 i-1-within three months after issuance of a license the licensee must have an operator requalification program in effect.

    c. 50.54 j-Apparatus and mechanisms other than controls, the operation of which may affect the reactivity of the reactor shall be manipulated only with the knowledge and consent of a licensed operator or senior operator.

    d. 50.54 k - an operator or senior operator must be present at the controls at all times during the operation of the facility.

EO-4.0

e. 50.54 l- licensee shall designate individuals to be responsible for directing the licensed activities of licensed operators. These individuals shall be licensed at Senior Operators.

f. 50.54 m- details the requirements for shift manning under various plant conditions and circumstances.

   1) Includes requirement for Senior Operator or Senior Operator limited to fuel handling responsible to directly supervise the activities on the refuel floor. EO-7.0

g. 50.54 x- A licensee may take reasonable action that departs from a license condition or a technical specification in an emergency when this action is immediately needed to protect the public health and safety and no action consistent with license conditions and technical specifications that can provide adequate or equivalent protection is immediately apparent.

   SRO's need to be very familiar with 50.54x and y. EO-8.0

   1) Use of 50.54x is a non emergency one hour report.

h. 50.54 y- Licensee action permitted by paragraph x of this section shall be approved, as a minimum, by a licensed senior operator prior to taking the action.

12. Requirements for reduction of risk from ATWS 10-CFR-50.62
    a. Defines ATWS
    b. Describes requirements that plants are required to have to combat ATWS
        1) ARI
        2) SLCS automatic injection.
        3) Equipment to automatically trip the Recirculation pumps.
13. Loss of all Alternating Current Power 10-CFR-50.63
    a. Describe plant design required to deal with a station blackout.
14. Immediate notification requirements 10-CFR-50.72
    a. Requires the use of the Emergency Notification System (ENS)
    b. Describe immediate reports (1 hour).
    c. Describes 4 hour reports.

Red Phone in Control Room: direct hookup to the NRC Operations Center.

d. Describes requirements for followup reports.

15. Licensee event report system 10-CFR-50.73
    a. Describes requirements for submitting Licensee Event Report including:
        1) Event
        2) Time frame to report (30 days)

16. Notification of change in operator or senior operator status 10-CFR-50.74
    a. Each licensee shall notify the commission within 30 days of the following in regard to a licensed operator or senior operator:
        1) Permanent reassignment from the position for which the licensee has certified the need for a licensed operator or senior operator.
        2) Termination of any operator or senior operator.
        3) Disability or illness as described in 55.25 of this chapter.

EO-9.0

17. Remainder of 10-CFR-50
    a. The remainder of Part 50 deals with such issues as:
        1) Decommissioning
        2) License Amendment
        3) Revoking, Suspending or Modifying a License
        4) Backfitting Systems
        5) Enforcement of Violations
18. 10-CFR-50 Appendices of Interest
    a. Appendix A General Design Criteria
    b. Appendix B Quality Assurance Design Criteria
    c. Appendix C Emergency Planning and Preparedness
    d. Appendix K ECCS Evaluation Model
    e. Appendix R Fire Protection Program

Appendix from which Appendix R valves get their requirements. Refers to "smart fire" criteria.

D. 10-CFR-55 Operator's Licenses
1. Purpose 10-CFR-55.1
    a. Establish procedures and criteria for issuing licenses to operators and senior operators of utilization facilities.

b. Provide terms and conditions to issue and modify licenses.

c. Provide terms and conditions to maintain and renew these licenses.

2. Scope 10-CFR-55.2

a. Regulations apply to:

1) Any individual who manipulates the controls of any utilization facility, and

2) Any individual designated by the facility licensee to be responsible for directing any licensed activity of a licensed operator.

3. Definitions 10-CFR-55.4

a. Actively performing the functions of an operator or senior operator - an individual has a position on the shift crew that requires the individual to be licensed as defined in Technical Specification, and that the individual carries out and is responsible for the duties covered by that position.

b. Operator - any individual licensed under this part to manipulate a control of a facility. EO-2.0 EO-6.0

c. Senior Operator - any individual. licensed under this part to manipulate the controls of a facility and to direct the licensed activities of licensed operators.

4. General Exemptions 10-CFR-55-13

a. The regulations in this part do not require a license for an individual who: EO-6.0

1) Under the direction and in presence of a licensed operator or senior operator, manipulates the controls of a facility as part of the individual's training in a facility licensee's training program.

2) Under the direction and in the presence of a licensed senior operator, manipulates the controls of a facility to load or unload the fuel into, out of or within the reactor vessel.

5. Medical Examination 10-CFR-55.21
   a. Applicants must have medical examination every two years.
6. Incapacitation because of disability or illness 10-CFR-55.25
   a. Failure to meet medical requirements of license at any time during the term of the license requires NRC notification within 30 days.
7. Conditions of Licenses 10-CFR-55.53
   a. Each license contains and is subject to the following conditions whether stated or not: EO-4.0
      1) Neither the license nor any right under the license may be assigned or otherwise transferred. EO-3.0
      2) The license is limited to the facility for which it is issued.
      3) The license is limited to those controls of the facility specified in the license.
      4) The license is subject to and the licensee shall observe, all applicable rules, regulation, and Orders of the Commission.

5) If a licensee has not been actively performing the functions of an operator or senior operator, the licensee may not resume activities authorized by this part except as permitted below.

   To maintain active status, the licensee shall actively perform the functions of an operator or senior operator on a minimum of seven 8 hour or five 12 hour shifts per calendar quarter.

EO-3.0

6) If the paragraph above is not met, before resumption of functions authorized by a license issued under this part, an authorized representative of the facility licensee shall certify the following:

   a) The qualifications and status of the licensee are current and valid.

b) The licensee has completed a minimum of 40 hours of shift functions under the direction of an operator or senior operator as appropriate and in the position to which the individual will be assigned. The 40 hours must have included a complete tour of the plant and all required shift turnover procedures.

Requalification requirements in 10-CFR-55.59.

For senior operators limited to fuel handling, one shift must have been completed.

7) The licensee shall notify the Commission within 30 days of conviction of a felony.
8) The licensee shall complete a requalification program.
9) The licensee shall have a biennial medical examination.

10) The licensee shall comply with any other conditions that the Commission may impose to protect health or danger to life or property.

8. Expiration 10-CFR-55.55
   a. License expires:
      1) Six years after date of issue.
      2) Termination of employment by facility.
      3) Facility determines that licensed individual no longer needs to maintain a license.
   b. If application for renewal is filed 30 days prior to expiration, then license won't expire until disposition of the application.
9. Renewal of License 10-CFR-55.55
   a. Applicant's license will be renewed if:
      1) Medical health of the licensee continues to be such as not to cause operational errors that endanger the public health and safety.

2) The licensee:
   a) Is capable of continuing to competently and safely assume license duties;
   b) Has successfully completed a requalification program approved by the NRC.
   c) Has passed the requalification exams and annual operating exams.
   d) Has passed a comprehensive requalification written examination and operating test administered by the NRC during the six year license.
3) There is a continued need for a licensee to operate or for a senior operator to direction operators at a facility designated in the application.
4) The past performance of the licensee has been satisfactory to the Commission.

Commission will include Notices of Violation or letters of reprimand in the licensee's docket to make this evaluation.

10. Requalification 10-CFR-55.59

a. Requalification requirements-each licensee shall:

1) Successfully complete a requalification program developed by the facility and approved by the Commission.

a) The program shall be conducted for a continuous period not to exceed 24 months.

2) Pass a comprehensive requalification written examination and an annual operating test.

b. Additional Training

1) If the training requirements above are not met the Commission may require the Licensee to complete additional training and submit evidence to the Commission of successful completion before returning to licensed duties.

c. Requalification requirements
   1) Details requirements for
      a) Schedule
      b) Lectures
      c) OJT-lists annual and biannual manipulations.
      d) Evaluation
      e) Records

11. Modification and Revocation of Licenses 10-CFR-55.61
   a. Terms and Conditions of all licenses are subject to amendment, revision, or modification by reason of rules, regulations, or orders issued in accordance with the Act or any amendments thereto.
   b. Any license may be revoked, suspended, or modified, in whole or in part:
      1) For any material false statement in the application or in any statement of fact required.

2) Because of conditions revealed by the application or statement of fact or any report, record, inspection or other means that can warrant the NRC to refuse to grant a license on an original application.

3) Willful violation of, or failure to observe any of the terms and conditions of the Act, or the license, or of any rule, regulation, or order of the Commission. EO-10.0

4) Any conduct determined to be a hazard to safe operation of the facility.

12. Violations 10-CFR-55.71

a. An injunction or court order may be obtained prohibiting any violation of Federal rules as listed.

b. A court order may be obtained for the payment of a civil penalty for violations as listed. EO-5.0

c. Any person who willfully violates any provision of the Atomic Energy Act or any regulation issued under the Act, may be guilty of a crime and upon conviction, may be punished by fine or imprisonment.

E. 10-CFR-100 Reactor Site Criteria

1. Purpose: To describe criteria to guide the NRC in evaluating sites for stationary power reactors.

2. Defines terms such as Exclusion Area and Low Population Zone and describes how they are determined.

3. Appendix A to 10-CFR-100 deals with Seismic and Geological Sitting Criteria.

a. Defines Safe Shutdown Earthquake and Operating Basis Earthquake.

IV. WRAP-UP

A. Review Student Learning Objectives.

1. Spot check learning objectives by asking questions of the students directly.

B. Request student's fill out TR.

C. Request student's fill out Trainee Evaluation Form.

07-66-91

ADS MALFUNCTIONS

AD01	ADS FAILS TO INITIATE
AD02	RELIEF VALVE FAILURE (1-18 OR ANY OR ALL)
AD03	ADS/RELIEF VALVE FAILURE - STUCK (1-18 OR ANY OR ALL)
AD04	ADS/RELIEF VALVE(S) FAILURE - LEAKS (1-18 OR ANY OR ALL)
AD05	ADS/RELIEF VALVE(S) FAILURE - OPEN (1-18 OR ANY OR ALL)
AD06	TMI ACCIDENT - BWR EQUIVALENT
AD07	ADS VALVE TAIL PIPE RUPTURE (A-G OR ANY)
AD08	ADS VALVE N2 SUPPLY SEVERED (A-G OR ANY)

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CORE SPRAY MALFUNCTIONS

CS01	HIGH PRESSURE CORE SPRAY - INADVERTENT INITIATION
CS02	HIGH PRESSURE CORE SPRAY FAILS TO AUTO START
CS03	HIGH PRESSURE CORE SPRAY DIESEL ENGINE FAILURE
CS04	HIGH PRESSURE CORE SPRAY INJECTION VALVE FAILS TO OPEN
CS05	HIGH PRESSURE CORE SPRAY PUMP TRIP
CS06	LOW PRESSURE CORE SPRAY PUMP TRIP
CS07	LOW PRESSURE CORE SPRAY INJECTION VALVE FAILS TO OPEN

R.W.C.U. MALFUNCTIONS

CU01	REACTOR WATER CLEAN-UP PUMP TRIP (A,B OR BOTH)
CU02	REACTOR WATER CLEANUP DRAIN FLOW CONTROL VALVE FAILURE - OPEN
CU03	REACTOR WATER CLEANUP DRAIN FLOW CONTROL VALVE FAILURE - CLOSED
CU04	REACTOR WATER CLEANUP DRAIN FLOW CONTROL VALVE FAILURE - AS IS
CU05	REACTOR WATER CLEANUP FILTER DEMINERALIZER RESIN DEPLETION (A,B,C,D OR ALL)
CU06	REACTOR WATER CLEANUP NON-REGENERATIVE HEAT EXCHANGER TUBE LEAK
CU07	COOLANT LEAKAGE OUTSIDE PRIMARY CONTAINMENT
CU08	REACTOR WATER CLEANUP ISOLATION FAILURE

AUX WATER MALFUNCTIONS

CW01	SERVICE WATER PUMP TRIP (A,B,C,D,E,F OR ANY)
CW02	REACTOR BUILDING CLOSED LOOP COOLING WATER PUMP TRIP (A,B,C, OR ANY)
CW03	TURBINE BUILDING CLOSED LOOP COOLING WATER PUMP TRIP (A,B,C OR ANY)
CW04	CIRCULATING WATER PUMP TRIP (A,B,C,D,E,F OR ANY)
CW05	CIRCULATING WATER EXPANSION JOINT LEAKAGE
CW06	RBCLC BREAK TO DRYWELL UNIT COOLERS

DIESEL GENERATORS MALFUNCTIONS

DG01	DIESEL GENERATOR FAILURE TO START (1,3 OR BOTH)
DG02	DIESEL GENERATOR TRIP (1,3 OR BOTH)
DG03	DIESEL GENERATOR LOAD SEQUENCER TIMER FAILURE (DIV I, DIV II OR BOTH)

ELECTRICAL DISTRIBUTION MALFUNCTIONS

ED01	MAIN TRANSFORMER LOSS OF COOLING
ED02	LOSS OF OFF-SITE 115KV POWER SOURCES (LINE 5, LINE 6, BOTH)
ED03	13.8KV BUS FAULT (SWG 001,002,003 OR ANY)
ED04	4.16KV NORMAL BUS FAULT (SWG 11-18, OR ANY)
ED05	4.16KV EMERGENCY BUS FAULT (101,102,103 OR ANY)
ED06	600V NORMAL BUS FAULT 2NJS-US1--US10 OR ANY, A,B,C AS APPROPRIATE
ED07	600V EMERGENCY BUS FAULT (US1,US3 OR BOTH)
ED08	125VDC NORMAL BUS FAULT (SWG 001A,B,C OR ANY)
ED09	125VDC EMERGENCY BUS FAULT (2BYS*SWG002A,B,C OR ANY)
ED11	24 VOLT DC NORMAL BATTERY BUS FAILURE (3A,3B OR BOTH)

MAIN GENERATORS MALFUNCTIONS

EG01	MAIN GENERATOR TRIP
EG02	MAIN GENERATOR AUTOMATIC VOLTAGE REGULATOR FAILURE - INCREASE
EG03	MAIN GENERATOR AUTOMATIC VOLTAGE REGULATOR FAILURE - DECREASE
EG04	MAIN GENERATOR CORE INTERNAL HEATING
EG05	MAIN GENERATOR HYDROGEN COOLING SYSTEM LEAKAGE
EG06	MAIN GENERATOR STATOR COOLING PUMP TRIP (A,B OR BOTH)
EG07	MAIN GENERATOR STATOR COOLING DEMINERALIZER - RESIN DEPLETION
EG08	MAIN GENERATOR MAIN AND EMERGENCY HYDROGEN SEAL OIL PUMP FAILURE
EG09	TURNING GEAR OIL PUMP FAILURE
EG10	POWER GRID NETWORK LOAD TRANSIENT - INCREASE
EG11	POWER GRID NETWORK LOAD TRANSIENT - DECREASE
EG12	MAIN GENERATOR ISOPHASE BUS DUCT FAN TRIP (A,B OR BOTH)
EG13	MAIN GENERATOR LOSS OF LOAD
EG14	MAIN GENERATOR AVR FAILURE - OSCILLATIONS
EG15	NO TRANSFER TO RESERVE PWR - SWG 001/003

FIRE PROTECTION MALFUNCTIONS

FP01	TURBINE ISLAND FIRE DETECTOR FAILURE
FP02 - FP06	FIRE DETECTION FAILURE
FP07	ENGINE DRIVEN FIRE PUMP FAILURE
FP08	ELECTRIC FIRE PUMP FAILURE
FP09	AUXILIARY FIRE PUMP FAILURE (A,B OR BOTH)
FP11	LOSS OF CO2 FROM STORAGE TANK (TK1,TK2 OR BOTH)
FP12	FIXED SYSTEM FOAM CONCENTRATE PUMP FAILURE (1A,1B OR BOTH)
FP13	HOSE REEL FOAM CONCENTRATE PUMP FAILURE (1A,1B OR BOTH)
FP14	HALON BANK FAILURE
FP15	FIRE IN NORMAL STATION SERVICE TRANSFORMER (2STX-XNS1)
FP16	FIRE AT TURB BEARING #8
FP17	FIRE IN DIV II DIESEL ROOM
FP18	FIRE IN DIV I BATT. ROOM
FP19	FIRE IN RELAY ROOM

CONDENSATE & FEEDWATER MALFUNCTION

FW01	CONDENSATE PUMP TRIP (A,B,C OR ANY)
FW02	CONDENSATE BOOSTER PUMP TRIP (A,B,C OR ANY)
FW03	FEEDWATER PUMP TRIP (A,B,C OR ANY)
FW04	FEEDWATER LOW PRESSURE LOW FLOW VALVE FAILURE - OPEN
FW05	FEEDWATER LOW PRESSURE LOW FLOW VALVE FAILURE - CLOSED
FW06	FEEDWATER LOW PRESSURE LOW FLOW VALVE FAILURE - AS-IS
FW07	FEEDWATER HIGH PRESSURE LOW FLOW VALVE(S) FAILURE - OPEN (A,B OR BOTH)
FW08	FEEDWATER HIGH PRESSURE LOW FLOW VALVE FAILURE - CLOSED
FW09	FEEDWATER HIGH PRESSURE LOW FLOW VALVE FAILURE - AS-IS (A,B OR BOTH)
FW10	FEEDWATER HIGH PRESSURE HIGH FLOW VALVE FAILURE - OPEN (A,B,C OR ANY)
FW11	FEEDWATER HIGH PRESSURE HIGH FLOW VALVE FAILURE - CLOSED (A,B,C OR ANY)
FW12	FEEDWATER HIGH PRESSURE HIGH FLOW VALVE FAILURE - AS-IS (A,B,C OR ANY)
FW13	FEEDWATER MASTER CONTROLLER FAILURE - HIGH
FW14	FEEDWATER MASTER CONTROLLER FAILURE - LOW
FW15	FEEDWATER MASTER CONTROLLER FAILURE - AS-IS
FW16	FEEDWATER PUMP RECIRCULATION VALVE FAILURE - OPEN
FW20	CONDENSATE DEMINERALIZER RESIN DEPLETION (1A THRU 1J, OR ALL)
FW22	FEEDWATER HEATER TUBE LEAK - FEEDWATER HEATER (A1,B1,C1)
FW23	CONDENSATE DEMINERALIZER HIGH DIFFERENTIAL PRESSURE
FW24	CONDENSATE RECIRCULATION VALVE FAILURE - OPEN
FW25	CONDENSATE RECIRCULATION VALVE FAILURE - CLOSED
FW26	CONDENSATE RECIRCULATION VALVE FAILURE - AS-IS
FW27	FEEDWATER HEATER DRAIN PUMP TRIP (A,B,C OR ANY)
FW28	REACTOR VESSEL LEVEL NARROW RANGE TRANSMITTER FAIL - UPSCALE (A,B,C OR ANY)

FW29	REACTOR VESSEL LVL NARROW RANGE TRANSMITTER FAIL - DOWNSCALE (A,B,C OR ANY)
FW30	REACTOR VESSEL LVL NARROW RANGE TRANSMITTER FAIL - AS-IS (A,B,C OR ANY)
FW31	FEEDWATER LINE BREAK INSIDE DRYWELL
FW32	FEEDWATER LINE BREAK INSIDE STEAM TUNNEL
FW33	FEEDWATER CHECK VALVES FAIL OPEN
FW34	FEEDWATER INPUT FAILS TO FW CONTROL SYSTEM
FW35	STEAM FLOW INPUT FAILS TO FW CONTROL SYSTEM

INSTRUMENT AIR MALFUNCTIONS

IA01 LOSS OF INSTRUMENT AIR

CONDENSER MALFUNCTIONS

MC01	MAIN CONDENSER AIR INLEAKAGE
MC02	MAIN CONDENSER TUBE LEAK
MC03	HOTWELL LEVEL CONTROLLER FAILURE - HIGH
MC04	HOTWELL LEVEL CONTROLLER FAILURE - LOW
MC05	2CNS-AOV104 HOTWELL REFLOOD VALVE FAILURE - OPEN
MC06	EXPLOSION IN AIR EJECTOR DISCHARGE PIPING

MAIN STEAM MALFUNCTIONS

MS01	STEAM LEAKAGE OUTSIDE PRIMARY CONTAINMENT
MS02	STEAM LINE RUPTURE OUTSIDE PRIMARY CONTAINMENT (DBA)
MS03	STEAM LEAKAGE INSIDE THE PRIMARY CONTAINMENT
MS04	STEAM LINE RUPTURE INSIDE PRIMARY CONTAINMENT
MS05	MAIN STEAM LINE ISOLATION VALVE FAILURE - OPEN (INBOARD - A,B,C,D; OUTBOARD - E,F,G,H; OR ANY)
MS06	MAIN STEAM LINE ISOLATION VALVE FAILURE - CLOSED
MS07	TURBINE STEAM SEAL REGULATOR FAILS CLOSED
MS08	STEAM JET AIR EJECTOR STEAM SUPPLY VALVE FAILURE - CLOSED
MS09	MOISTURE SEPARATOR REHEATER HIGH LEVEL (A,B OR BOTH)
MS10	LOSS OF EXTRACTION STEAM TO FEEDWATER HEATER (E6A,B,C)
MS11	LOSS OF STEAM TO MOISTURE SEPARATOR REHEATER (A,B OR BOTH)
MS12	REACTOR VESSEL ISOLATION
MS13	MSIV ISOLATION FAILURE

NEUTRON MONITORING SYSTEM MALFUNCTIONS

NM01	SOURCE RANGE MONITOR CHANNEL FAILURE - UPSCALE (A,B,C,D OR ANY)
NM02	SOURCE RANGE MONITOR CHANNEL FAILURE - DOWNSCALE (A,B,C,D OR ANY)
NM03	SRM RECORDER FAILURE (RED, BLACK OR BOTH PENS)
NM04	SRM CHANNEL INOPERATIVE (A,B,C,D OR ANY)
NM05	SOURCE RANGE MONITOR CHANNEL DETECTOR STUCK (A,B,C,D OR ANY)
NM06	INTERMEDIATE RANGE MONITOR CHANNEL FAILURE - UPSCALE (A,B,C,D,E,F,G,H OR ANY)
NM07	INTERMEDIATE RANGE MONITOR CHANNEL FAILURE - DOWNSCALE (A,B,C,D,E,F,G,H OR ANY)
NM08	IRM RECORDER/APRM RECORDER CHANNEL FAILURE - INOPERATIVE (A,B,C,D OR ANY, RED PEN OR BLACK PEN)
NM09	INTERMEDIATE RANGE MONITOR CHANNEL FAILURE - INOP (A,B,C,D,E,F,G,H OR ANY)
NM10	INTERMEDIATE RANGE MONITOR CHANNEL DETECTOR STUCK (A,B,C,D,E,F,G,H OR ANY)
NM11	AVERAGE POWER RANGE MONITOR CHANNEL FAILURE UPSCALE (A,B,C,D,E,F OR ANY)
NM12	AVERAGE POWER RANGE MONITOR CHANNEL FAILURE DOWNSCALE (A,B,C,D,E,F OR ANY)
NM14	LOCAL POWER RANGE MONITOR FAILURE (X-Y-J) UPSCALE
NM15	LOCAL POWER RANGE MONITOR FAILURE - DOWNSCALE (X-Y-J)
NM16	ROD BLOCK MONITOR CHANNEL FAILURE - UPSCALE (A,B OR ANY)
NM17	ROD BLOCK MONITOR CHANNEL FAILURE - DOWNSCALE (A,B OR ANY)
NM19	ROD BLOCK MONITOR FAILURE (A,B OR BOTH)
NM20	AVERAGE POWER RANGE MONITOR CHANNEL FAILURE
NM21	TRAVERSING IN-CORE PROBE FAILURE - STUCK IN CORE

NEUTRON MONITORING SYSTEM MALFUNCTIONS

NM22	LPRM FAILURE - DRIFT + OR - 25% (X-Y-J, ANY)
NM23	APRM UPSCALE NEUTRON TRIP (A,B,C,D,E,F OR ANY)

OFFGAS MALFUNCTIONS

OG01	EXPLOSION IN AIR EJECTOR DISCHARGE PIPING
OG02	OG RECOMBINER PREHEATER STM SUPPLY VALVE FAILURE - CLOSED (A,B OR BOTH)
OG03	OFFGAS DISCHARGE ISOLATION VALVE FAILURE - CLOSED

CONTAINMENT MALFUNCTIONS

PC01	LOSS OF DRYWELL COOLING
PC02	PRIMARY CONTAINMENT LEAKAGE
PC03	PRIMARY CONTAINMENT ISOLATION
PC04	STANDBY GAS TREATMENT TRAIN EXHAUST FAN TRIP (A,B OR BOTH)
PC05	DBA HYDROGEN RECOMBINER BLOWER FAILURE (A,B OR BOTH)
PC06	SECONDARY CONTAINMENT ISOLATION FAILURE
PC07	HYDROGEN GENERATION IN DRYWELL
PC08	OXYGEN GENERATION IN DRYWELL
PC09	H_2-O_2 BURN/DEFLAGRATION IN DRYWELL
PC10	DRYWELL/WETWELL VACUUM BREAKER PAIR FAILED OPEN (A-D OR ANY)
PC11	DRYWELL/WETWELL VACUUM BREAKER PAIR FAILED CLOSED (A-D OR ANY)
PC12	SUPPRESSION POOL TO RX BLDG LEAK
PC13	FIRE IN THE REACTOR BUILDING (A,B OR BOTH)
PC14	DW UC1A-D ELECTRICAL FAULT (DRS-UC1A,B,C,D OR ANY)
PC15	DW UC2A-D ELECTRICAL FAULT (DRS-UC2A,B,C,D OR ANY)
PC16	DW UC3A-D ELECTRICAL FAULT (DRS-UC3A,B OR ANY)
PC17	GROUP 8 & 9 DIV I/II ISOLATION FAILURE (A,B, OR BOTH)
PC18	GROUP 8 & 9 DIV I/II ISOLATION OCCURS (A,B, OR BOTH)

RCIC SYSTEM MALFUNCTION

RC01	REACTOR CORE ISOLATION COOLING AUTO START FAILURE
RC02	REACTOR CORE ISOL COOLING FAILURE - ISOLATION OF RCIC SYSTEM
RC03	RCIC TURBINE SPEED CONTROLLER FAILURE - HIGH
RC04	RCIC TURBINE SPEED CONTROLLER FAILURE - LOW
RC05	RCIC SYSTEM TURBINE SPEED CONTROLLER FAILURE - AS IS
RC06	REACTOR CORE ISOLATION COOLING TURBINE TRIP
RC07	RCIC FLOW TRANSMITTER FAILURE - HIGH
RC08	RCIC FLOW TRANSMITTER FAILURE - LOW
RC09	RCIC FLOW TRANSMITTER FAILURE - AS IS
RC10	RCIC SYSTEM - SPURIOUS INITIATION
RC11	RCIC ISOLATION FAILURE
RC12	RCIC STEAM LEAK IN REACTOR BUILDING ELEVATION 215

CONTROL RODS SYSTEM MALFUNCTIONS

RD01	ROD POSITION INFORMATION SYSTEM FAILURE - INOP
RD02	ROD DRIVE CONTROL SYSTEM FAILURE - TIMER MALFUNCTION
RD03	ROD DRIVE CONTROL SYSTEM FAILS TO INSERT
RD04	CONTROL ROD FAILURE (XX-YY) DRIFT IN
RD05	CONTROL ROD FAILURE (XX-YY) DRIFT OUT
RD06	CONTROL ROD FAILURE (XX-YY) - ACCUMULATOR TROUBLE
RD07	CONTROL ROD FAILURE (XX-YY) - STUCK
RD08	CONTROL ROD (XX-YY) FAILURE-UNCOUPLED
RD09	CONTROL ROD FAILURE (XX-YY) - SCRAMMED
RD10	CONTROL ROD FAILURE (XX-YY) - SLOW SCRAM TIME
RD11	CONTROL ROD (XX-YY) FAILURE - RPIS
RD12	CRD FEED PUMP TRIP (A,B OR BOTH)
RD13	CONTROL ROD DRIVE FLOW CONTROL VALVE FAILURE - OPENED (A,B OR BOTH)
RD14	CRD FLOW CONTROL VALVE FAILURE - CLOSED (A,B OR BOTH)
RD15	LOSS OF INSTRUMENT AIR PRESSURE
RD16	SCRAM DISCHARGE VOLUME RUPTURE
RD17	PARTIAL INSERTION OF ONE BANK OF CONTROL RODS UNDER SCRAM CONDITIONS
RD18	ONLINE CRD SUCTION FILTER CLOGGED

RESIDUAL HEAT REMOVAL SYSTEM MALFUNCTIONS

RH01	RESIDUAL HEAT REMOVAL PUMP TRIP (A,B,C OR ANY)
RH02	RESIDUAL HEAT REMOVAL LOW PRESSURE COOLANT INJ VLVS FAIL TO OPEN (A,B,C OR ANY)
RH03	RESIDUAL HEAT REMOVAL STEAM DUMP VALVE FAILURE - CLOSED (A,B OR BOTH)
RH04	RESIDUAL HEAT REMOVAL HEAT EXCHANGER TUBE LEAK (A,B OR BOTH)
RH05	RH REMOVAL HEAT EXCHANGER LVL CONTROLLER FAILURE - UPSCALE (A,B OR BOTH)
RH06	RH REMOVAL HEAT EXCHANGER LVL CONTROLLER FAILURE - DOWNSCALE (A,B OR BOTH)
RH07	RHR PUMP SUCTION LINE RUPTURE (A,B, OR BOTH)
RH08	GROUP 5 ISOLATION FAILURE (RHS*MOV122/113)
RH09	RHS*MOV215A/B JAMMED (A,B OR BOTH)
RH10	RHS*MOV24A/B JAMMED (A,B OR BOTH)
RH11	RHS*MOV33A/B JAMMED (A,B OR BOTH)
RH12	RHS*MOV38A/B JAMMED (A,B OR BOTH)
RH13	DIV I/II ECCS INADVERTENTLY INITIATES (A,B, OR BOTH)
RH14	DIV I/II ECCS FAILS TO INITIATE (A,B, OR BOTH)

REACTOR RECIRCULATION MALFUNCTIONS

RR01	RECIRC MASTER CONTROLLER FAILURE HIGH
RR02	REACTOR RECIRC MASTER FLOW CONTROLLER FAILURE-LOW
RR03	REACTOR RECIRC MASTER FLOW CONTROLLER FAILURE - AS IS
RR04	REACTOR RECIRC LOOP FLOW CONTROLLER FAILURE - HIGH (A,B OR BOTH)
RR05	REACTOR RECIRC LOOP FLOW CONTROLLER FAILURE - LOW (A,B OR BOTH)
RR06	REACTOR RECIRC LOOP FLOW CONTROLLER FAILURE - AS IS (A,B OR ANY)
RR07	REACTOR RECIRCULATION FLOW UNIT FAILURE - UPSCALE (A,B,C,D OR ANY)
RR08	REACTOR RECIRCULATION FLOW UNIT FAILURE - DOWNSCALE (A,B,C,D OR ANY)
RR09	REACTOR RECIRCULATION FLOW UNIT FAILURE - AS IS (A,B,C,D OR ANY)
RR10	REACTOR RECIRCULATION PUMP BKR TRIP (BKR 4A, B OR BOTH)
RR11	REACTOR RECIRCULATION PUMP SEIZURE (A,B OR BOTH)
RR12	RR LOW FREQ MOT GEN SET DRIVE MOT BREAKER TRIP (A,B OR BOTH)
RR13	RR PUMP HIGH SPEED TO LOW SPEED AUTO TRANS INCOMPLETE (A,B OR BOTH)
RR14	RR LOW FREQ M.G. SET VOLTAGE REG FAILS - LOW (A,B OR BOTH)
RR15	FAILURE OF REACTOR RECIRC PUMP INNER SEAL (A,B OR BOTH)
RR16	RECIRCULATION PUMP UPPER SEAL FAILURE (A,B OR BOTH)
RR17	REACTOR RECIRC PUMP A(B) DISCHARGE VALVE FAILURE
RR18	JET PUMP FAILURE ('A' LOOP)
RR19	COOLANT LEAKAGE INSIDE PRIMARY CONTAINMENT
RR20	REACTOR RECIRCULATION LOOP RUPTURE - DBA LOCA
RR21	REACTOR VESSEL PRESSURE RECORDER FAILURE - UPSCALE (A,B

REACTOR RECIRCULATION MALFUNCTIONS

RR22	REACTOR VESSEL PRESSURE RECORDER FAILURE - DOWNSCALE (A,B OR BOTH)
RR23	REACTOR VESSEL PRESSURE RECORDER FAILURE - AS IS (A,B OR BOTH)
RR24	REACTOR VESSEL PRESSURE INDICATOR FAILURE - UPSCALE
RR25	REACTOR VESSEL PRESSURE INDICATOR FAILURE - DOWNSCALE
RR26	REACTOR VESSEL PRESSURE INDICATOR FAILURE - AS IS
RR27	RPV LEVEL INSTRUMENTS ALL FAIL UPSCALE
RR28	HPU A PMP NUMBER 1 FAILURE
RR29	HPU A PMP NUMBER 2 FAILURE
RR30	HPU B PMP NUMBER 1 FAILURE
RR31	HPU B PMP NUMBER 2 FAILURE
RR32	HPU A OIL TEMP FAIL HIGH
RR33	HPU B OIL TEMP FAIL HIGH

REACTOR PROTECTION SYSTEM MALFUNCTIONS

RP01	SPURIOUS REACTOR SCRAM
RP02	REACTOR PROTECTION SYSTEM FAILURE TO SCRAM - AUTOMATIC
RP03	REACTOR PROTECTION SYSTEM FAILURE TO SCRAM
RP04	ANTICIPATED TRANSIENT WITHOUT SCRAM
RP05	LOSS OF NORMAL POWER TO RPS CHANNEL (A OR B)
RP06	LOSS OF MOTOR GENERATOR (MG01A,B OR BOTH)
RP07	RRCS 25 SECOND TIMER FAILURE (A - DIV I, B - DIV II)
RP08	RRCS 98 SECOND TIMER FAILURE (A - DIV I, B - DIV II)
RP09	RRCS SPURIOUS INITIATION (A - DIV I, B - DIV II)
RP10	RRCS FAILURE OF FWC RUNBACK (A - DIV I, B - DIV II)
RP11	RRCS FAILURE OF RECIRC PUMP TRIP/DOWNSHIFT
RP12	RRCS DIVISIONAL FAILURE (A - DIV I, B - DIV II)
RP13	RRCS INADVERTENT ARI (A - DIV I, B - DIV II)
RP14	RRCS ARI FAILURE/DEFEATED

RSCS/RWM MALFUNCTIONS

RW01	ROD WORTH MINIMIZER FAILURE
RW02	ROD SEQ CONTROL SYS FAILURE - DOES NOT ENFORCE NOTCH LOGIC
RW03	ROD SEQUENCE CONTROL SYSTEM TOTAL FAILURE

RX CORE SYSTEM MALFUNCTIONS

RX01	FUEL CLADDING FAILURE
RX02	INCREASED ROD WORTH FOR ANY CONTROL ROD (XX-YY)
RX03	CHANGE IN CORE REACTIVITY
RX04	CORE POWER INSTABILITY WHEN OPERATING IN THE RESTRICTED ZONE.

STANDBY LIQUID CONTROL MALFUNCTIONS

SL01	STANDBY LIQUID CONTROL PUMP TRIP (A,B OR BOTH)
SL02	2SLS-VEX 3A, B OR BOTH FAIL TO FIRE WHEN SLC PMP IS TURNED ON
SL03	SLC PUMP SUCTION VALVE FAILS TO OPEN (A,B OR BOTH)

TURBINE CONTROL MALFUNCTIONS

TC01	EHC SYSTEM PRESSURE REGULATOR FAILURE - HIGH (A,B OR BOTH)
TC02	EHC SYSTEM PRESSURE REGULATOR FAILURE - LOW (A,B OR BOTH)
TC03	EHC SYS STEAM PRESSURE REGULATOR FAILURE - OSCILLATION (A,B OR BOTH)
TC04	MAIN TURBINE ACCELERATION CONTROL FAILURE
TC05	ALL TURBINE BYPASS VALVES FAIL - OPEN
TC06	ALL TURBINE BYPASS VALVES FAIL - CLOSED
TC07	MAIN TURBINE BYPASS VALVE FAILURE - OPEN (#1)
TC08	MAIN TURBINE BYPASS VALVES FAILURE - CLOSED (#1)
TC09	NO. ONE TURBINE BYPASS VALVE FAILURE - STICKS OPEN
TC10	MAIN TURBINE GOVERNOR FAILURE - HIGH
TC11	MAIN TURBINE GOVERNOR FAILURE - LOW
TC12	MAIN TURBINE CONTROL VALVE FAILURE - CLOSED (A,B,C,D OR ANY)
TC13	MAIN TURBINE CONTROL VALVE FAILURE - AS-IS (A,B,C,D OR ANY)

MAIN TURBINE MALFUNCTIONS

TU01	MAIN TURBINE BEARING HIGH TEMPERATURE
TU02	MAIN TURBINE BEARING HIGH VIBRATION
TU03	MAIN TURBINE HIGH ECCENTRICITY
TU04	EXHAUST HOOD SPRAY VALVE FAILURE - CLOSED
TU05	MAIN TURBINE BEARING OIL PRESSURE LOW
TU06	MAIN TURBINE THRUST BEARING WEAR
TU07	SPURIOUS MAIN TURBINE TRIP