U.S. NUCLEAR REGULATORY COMMISSION (NRC)

REGION II

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Report No:	50-348/97-06 and 50-364/97-06
Licensee:	Southern Nuclear Operating Company, Inc.
Facility:	Farley Nuclear Plant (FNP), Units 1 and 2
Location:	7388 North State Highway 95 Columbia, AL 36319
Dates:	May 11 through June 21, 1997
Inspectors:	T. Ross, Senior Resident Inspector J. Bartley, Resident Inspector R. Caldwell, Resident Inspector (In training) R. Carrion, Project Engineer B. Holbrook, Senior Resident Inspector - Hatch (Sections O1.1 and O2.1) W. Kleinsorge, Reactor Inspector (Sections M1.2, M2.1, M2.2 and M7.1) N. Merriweather, Reactor Inspector (Sections E6.1 and E7.1)
Approved by:	P. Skinner, Chief, Projects Branch 2 Division of Reactor Projects

Enclosure

EXECUTIVE SUMMARY

Farley Nuclear Power Plant, Units 1 and 2
NRC Inspection Report 50-348/97-06, 50-364/97-06

This integrated inspection included aspects of licensee operations, engineering, maintenance, and plant support. The report covers a six-week period of resident inspections.

Operations

- Operator attentiveness to annunciator alarms and response to changing plant conditions were prompt and purposeful. Except for one particular case, operating crews demonstrated that they were consistently aware of plant conditions and ongoing activities (Section O1.1).

- Operations control over the successful accomplishment of several major plant evolutions (midloop, refill, mode changes, initial criticality, and power ascension) was considered exemplary (Sections O1.2 through O1.6).

- Housekeeping and physical conditions continued to improve. Maintaining plant areas well lighted remained an ongoing challenge (Section O2.1).

- Unit 1 containment cleanup and restoration after the refueling outage were excellent (Section O2.2).

- General area tours verified that accessible portions of safety systems were maintained and operational (Sections O2.1 and O2.2).

- Efforts to identify, resolve, and prevent recurrence of problems remained effective (Sections O7.1 and M7.1).

- Operability determinations regarding the emergency core cooling system (ECCS) and containment spray (CS) system sumps in containment were based on comprehensive and detailed engineering evaluations (Section O8.1).

Maintenance

- Maintenance and surveillance testing activities were conducted in a competent manner by knowledgeable and experienced individuals in accordance with plant procedures and work instructions (Sections M1.1, M1.2, M1.4 and M1.5).

- One instance of insufficient work instructions and one instance of inadequate work planning were identified (Section M1.2).

- Post-fire cleanup efforts in the 1C steam generator (SG) hot leg channel head were extensive, thorough and carefully controlled (Section M1.3).

- The decision process used to select and replace heat damaged cables in Unit 1 containment was reasonable and reflected a conservative approach that addressed the safety significance of affected cables (Section M2.1).

- Several examples of poor housekeeping practices were observed related to maintenance activities (Section M2.2).

- Painting inside the Unit 2 penetration room boundary (PRB) with its resultant organic volatiles was adequately controlled using more restrictive limits (Section M8.1).

Engineering

- Onsite and offsite engineering organizations provided thorough, detailed and sound engineering evaluations to support operability, reportability, and decision making issues needed by Operations and Maintenance. Furthermore, engineering provided excellent technical support and direction during important evolutions (Section E1.1).

- The backlog of outstanding Requests for Engineering Review (REA) was at 188. Few were over two years old (Section E6.1).

- The licensee's Updated Final Safety Analysis Report (UFSAR) Reverification program identified numerous discrepancies between the UFSAR and the plant design, as-built condition, or operating procedures. A dedicated group in the corporate office was assigned to resolve these issues with a goal to close them all in 1997. Corrective actions taken for UFSAR discrepancies were adequate. The FSAR reverification program was considered a strength (Section E7.1).

Plant Support

- Health physics control over work activities within the the radiologically controlled area (RCA), and the RCA in general, were appropriate and adequately supported the plant staff (Section R2.1).

- Security personnel observed during the inspection period were attentive to their responsibilities. Site security systems were adequate to ensure physical protection of the plant (Section S1.1).

Report Details

Summary of Plant Status

Unit 1 was shutdown for its 14th refueling outage (U1RF14) during most of the inspection report period. The unit was returned to critical operation on June 3, and achieved full power on June 8. Unit 1 operated at full power for the remainder of the report period. U1RF14 lasted 82 days instead of the original 55 days due to increased scope of steam generator (SG) tube inspection and repair work, and delays caused by vendor difficulties.

Unit 2 operated continuously at 100% power for the entire report period.

I. Operations

O1 Conduct of Operations

O1.1 Routine Observations of Control Room Operations

a. Inspection Scope (71707)

Inspectors conducted inspections of ongoing plant operations in the Main Control Room (MCR) to verify proper staffing, operator attentiveness, adherence to approved operating procedures, communications, and command and control of operator activities. Inspectors reviewed operator logs and Technical Specifications (TS) Limiting Condition of Operation (LCO) tracking sheets, walked down the Main Control Boards (MCB), and interviewed members of the operating shift crews to verify operational safety and compliance with TSs. The inspectors attended morning plant status meetings and shift turnover meetings to maintain awareness of overall facility operations, maintenance activities, and recent incidents. Morning reports and Occurrence Reports (ORs) were reviewed on a routine basis to assure that the licensee properly reported and resolved potential safety concerns.

b. Observations, Findings and Conclusions

The Unit 1 and 2 MCBs and emergency power board (EPB) were nearly "blackboard" most of the inspection period, with only a few persistent annunciators in alarm for recognized deficiencies. By the end of the report period, MCB deficiencies on both units decreased significantly. Unit 1 had five and Unit 2 had eleven. Most of these involved nonsafety-related instrumentation or equipment. Management's continuing efforts to maintain MCB deficiencies at low levels were evident. Although neither has been "blackboard" for several months, management expressed a continuing commitment to the "blackboard" concept.

Overall operator control and awareness of plant conditions during the inspection period remained at a high level. The MCR was almost always quiet and clear of unessential personnel and distracting activities. Operators were attentive to MCB annunciators and promptly responded to all alarms and observed changes in plant conditions. Interviews with

members of the operating crew identified that they were consistently aware of existing plant conditions and ongoing activities. Pre-shift briefs of the operating crews by the shift supervisors (SS) were usually concise and informative. Operator logs generally contained sufficient detail and scope of activities.

However, during one control room and plant tour by a visiting senior resident inspector the following observations were made and communicated to the Assistant General Manger - Operations:

- Control room duty roster was not up to date for the currently assigned Emergency Director (ED). Discussions with the Unit 1 SS revealed that the SS was not aware that the assigned ED responsibilities had been changed. The SS immediately determined who was assigned ED duties and corrected the roster.

- Operating crew demeanor in one instance was casual and not attentive to MCB indications.

- Certain operators demonstrated a lack of detailed knowledge concerning operator work around items, both the definition and current status of work around items.

- One SS demonstrated a lack of knowledge concerning the procedures for disabled alarms and which MCB alarms were disabled. The SS was later able to locate the list of disabled alarms.

- When queried about the status of a deficiency tag on the EPB concerning the 2B battery charger, a Unit 1 operator indicated a lack of interest and responsibility. The Unit 2 SS indicated he was not aware of the details associated with the tag.

The above observations did not present an immediate concern regarding the ability of the operating crew to safely operate the plant and were not considered representative of the typical operating crew's performance. However, they could be indicative of decreased attentiveness to MCB indications and awareness of plant status by certain individuals.

O1.2 Unit 1 Midloop Operations (IP 71707)

The inspectors observed licensee preparations for establishing midloop conditions on Unit 1 in accordance with FNP-1-UOP-4.3, "Midloop Operations," Revision (Rev.) 4, including pre-job briefings and installation of a temporary Mansell reactor coolant system (RCS) level indicator. The inspector reviewed UOP-4.3 and Generic Letter 88-17, "Loss of Decay Heat Removal," and verified selected requirements of UOP-4.3, Section 2.0, Initial Conditions.

On-shift operators were interviewed to determine what training they had received on Mansell level indicating systems. Although the Mansell is a backup indication, the operators and two SSs were not sure where the sensing points were nor how to operate the system which uses a computer to perform the level calculations. Also, the vendor had not provided any instructions or operating procedure for system operation. Additionally, the operators had not received any training on the Mansell level indicating equipment.

The inspectors concluded that, although the Mansell level equipment was a backup level system to the normal level indications, it was a poor practice to provide operations with temporary indications without appropriate training.

The operators were questioned to determine their knowledge of available RCS level indications during a loss of off-site power (LOSP). The operators were not sure what level indicators would be available on a LOSP. After some discussion, the operating crew determined that only one MCR RCS level indicator would be functional during a LOSP and that it would be necessary to have a system operator (SO) establish communications at the temporary tygon hose in containment to determine level indication. However, the operating crew had not discussed or briefed the SO with respect to this LOSP contingency. The inspectors concluded that the failure to conduct a briefing was a minor deficiency due to the simple skills required to implement the contingency.

On May 23, an inspector observed completion of FNP-1-SOP-1.9, "Partial Reactor Coolant System Drain," Rev. 9, and the transition to FNP-1-UOP-4.3 via FNP-1-UOP-4.1, "Controlling Procedure for Refueling," Rev. 9. The pre-job brief to the SOs concerning maintaining RCS pressure with a nitrogen source was observed and considered concise and comprehensive. During the RCS draining, operators demonstrated proper vigilance and caution by continuously verifying RCS level was tracking properly by comparing independent level instruments. Control room demeanor was quiet and focused on the evolution in progress. The inspector concluded the approach to, and operation at, reduced inventory was conducted in a controlled and conservative manner. No deficiencies were identified.

O1.3 Unit 1 RCS Vacuum Refill

The inspectors observed completion of RCS vacuum refill per FNP-1-SOP-1.3, "RCS Filling and Venting," Rev. 35, Appendix 6. Operations were well controlled. Operator attention to control panels and plant parameters during the evolution was good. Operators were very knowledgeable of expected plant responses and approximate times to expect indications to come on scale.

O1.4 Unit 1 Preparation For Startup and Mode Changes

The inspectors observed portions of following evolutions in preparation for Unit 1 startup and mode changes:

- Two unsuccessful attempts to start the 1A reactor coolant pump (RCP), due to a bad handswitch. A successful start of the 1B RCP on May 27 in accordance with FNP-1-SOP-1.3.

- Partial RCS drain down per FNP-1-SOP-1.9, "Post Fill and Vent Reactor Coolant System Drain to Mid-pressurizer Level," Rev. 9, to repair a leaking Conoseal on the reactor vessel head.

- Solid plant operations and drawing a pressurizer bubble per FNP-1-UOP-1.1, "Heatup of the Unit From Cold Shutdown to Hot Standby," Rev. 54.

- Entry into Mode 4.

In addition to monitoring the above evolutions, the inspectors periodically reviewed FNP-0-SOP-103, "Return to Service Checklist," Rev. 9, and verified that Mode specific lists were up-to-date and complete prior to each mode change. The inspectors verified that each evolution was well-controlled by Operations and consistently conducted in accordance with approved plant procedures.

O1.5 Unit 1 Cycle 15 Initial Criticality

On June 2, 1997, an inspector attended the pre-evolution brief for Unit 1 Cycle 15 initial criticality and low power physics testing. Since this was an infrequently performed evolution, the Engineering Support (ES) manager and test coordinator (i.e., nuclear engineer) conducted the briefing per FNP-0-AP-92, "Infrequently Performed Tests And Evolutions," Rev. 3. The briefing was attended by all affected parties and was comprehensive.

Unit 1 entered Mode 2 at 00:17 a.m. CDT on June 3, when operators began to withdraw the control rod shutdown banks. These rods were fully withdrawn, and operators began to withdraw the control banks at about 00:34 a.m. CDT. An inspector monitored the approach to criticality during withdrawal of the control banks and subsequent RCS boron dilution in accordance with FNP-1-UOP-1.2, "Startup of Unit From Hot Standby To Minimum Load," Rev. 50; FNP-0-ETP-3601, "Zero Power Reactor Physics Test," Rev. 11; and contractor procedure LPPT-ALA/APR-01, "Low Power Physics Test Program With Dynamic Rod Worth Measurements," Rev. 1, which had been reviewed and approved for use by the ES manager. With control banks fully withdrawn, initial criticality of the reactor for Cycle 15 was achieved at 4:36 a.m. CDT by RCS boron dilution.

The approach to criticality was conducted in a slow, deliberate manner in strict compliance with procedural instructions. Criticality was achieved within expected bounds of the estimated critical concentration (ECC) and predicted quantity of makeup water needed to dilute the RCS. All reactivity alterations were precisely controlled and directly communicated to the SS prior to implementing any change. The inverse count rate ratio (ICRR) was plotted methodically during the entire evolution and reflected control over reactor reactivity conditions by Operations and ES personnel. Overall, the Cycle 15 approach to criticality was performed well.

01.6 Unit 1 Power Ascension

During June 4 through 6, an inspector observed portions of Unit 1 power ascension and operation as conducted by associated operating crews in accordance with FNP-1-UOP-3.1, "Power Operations," Rev. 46. The main generator was synchronized to the grid at 1:51 p.m. CDT on June 4 (which constituted the official end of U1RF14) and achieved full power on June 8. Unit 1 power ascension and power operations were well controlled and consistent with UOP-3.1 guidance. The unit achieved full power without a significant personnel incident or equipment problem.

02 Operational Status of Facilities and Equipment

02.1 General Tours of Specific Safety-Related Areas (IP 71707)

General tours of safety-related areas were performed by the inspectors to examine the physical condition of plant equipment and structures, and to verify that safety systems were properly aligned. These general walkdowns included the accessible portions of safety-related structures, systems, and components in the following areas:

- Unit 1 containment
- Low level radwaste building
- Motor-driven and diesel-driven fire pump house
- Unit 1 and 2 spent fuel pool (SFP), SFP heat exchangers (HXs), and SFP cooling pump rooms
- Central alarm station (CAS)
- Unit 1 piping penetration room (PPR) on 121 foot elevation
- Unit 2 penetration room filtration (PRF) system room
- Unit 2 auxiliary building and containment purge ventilation rooms
- Unit 1 and 2 motor-driven and turbine-driven auxiliary feedwater (AFW) pump rooms
- Unit 1 and 2 component cooling water (CCW) pump and HX rooms
- Turbine building
- Unit 1 and 2 vital 4160 volt alternating current (VAC) switchgear and vital 600 VAC load center rooms, train A
- Unit 1 containment tendon gallery
- Emergency diesel generator (EDG) building
- Unit 1 main steam valve room (MSVR)

- Unit 1 PPR on the 100 foot elevation
- Unit 1 and 2 vital 125 volt direct current (VDC) switchgear and battery rooms
- Unit 1 and 2 new fuel storage areas
- Unit 1 and 2 service and instrument air compressors, dryers and receivers
- Unit 2 containment spray (CS) pump rooms
- Unit 2 residual heat removal (RHR) HX rooms
- Unit 2 RHR pump rooms
- Unit 1 charging pump rooms and hallway

Overall material conditions and housekeeping for Units 1 and 2 were adequate. Plant areas were generally clear of trash and debris. Considerable efforts to improve physical appearances of plant areas and equipment continued, primarily in the form of extensive painting in the turbine, EDG and auxiliary buildings. These efforts improved the appearances of rooms, structures and equipment in targeted areas. Minor equipment and housekeeping problems identified by the inspectors during their routine tours were reported to the responsible SS and/or maintenance department for resolution. None of these problems represented any immediate equipment operability concerns. Licensee efforts at maintaining all critical areas of the auxiliary building well lighted were not fully successful and represented a continuing challenge.

02.2 Unit 1 Containment Tours

On May 30 and June 2, 1997, the inspectors performed tours of the Unit 1 containment just after entering Mode 4 and Mode 3, respectively. During the post-Mode 4 tour, an inspector collected approximately 0.25 cubic feet of trash (e.g., wire, red duct tape, tie wraps, screws, and 10 inch triangular file). Additionally, some trash could be seen in an inaccessible area behind the tool bin by the "A" Tri-Sodium Phosphate basket which was turned over to the Unit 1 SS. No component leaks were identified. During the post-Mode 3 tour, no appreciable trash or debris was discovered by the other inspector. However, a few transmitters with minor leaks were reported to the Unit 1 SS. A maintenance team corrected the leaks. Overall, the licensee had done an excellent job in cleaning and clearing out the containment. Conditions observed during the final close out tour were exemplary.

02.3 Biweekly Inspections of Safety Systems (IP 71707)

Inspectors used IP 71707 to verify the operability of the following selected safety systems and/or equipment:

- Unit 1 emergency core cooling system (ECCS) containment sumps
- Unit 1 trisodium phosphate baskets

Detailed walkdowns of the ECCS sumps and TSP baskets were conducted to verify that licensee actions had adequately corrected significant as-built problems discovered during U1RF14 as documented in inspection report (IR) 50-348, 364/97-05. Accessible portions of the engineered safety feature (ESF) system components listed above were verified to be properly in place and in good condition. The inspectors did not identify any problems that adversely affected system operability. The inspectors concluded that licensee repairs were effective (see also report section 08.1).

02.4 TS LCO Tracking (IP 71707)

The inspectors routinely reviewed the TS LCO tracking sheets filled out by the shift foremen. All tracking sheets for Unit 1 and 2 reviewed by the inspectors were consistent with plant conditions and TS requirements.

03 Operations Procedures and Documentation

03.1 NRC Form 3 Verification (IP 71707)

On May 27, 1997, a resident inspector verified the NRC Form 3, "Notice To Employees," Rev. 1-96 was posted in appropriate locations throughout the plant, in accordance with FNP-0-RCP-5, "Health Physics Group Forms," Rev. 5. The new NRC Form 3, "Notice To Employees," Rev. 9/96, was supplied during the report period. The resident inspector checked several locations and determined the new NRC Form 3's were properly posted.

07 Quality Assurance in Operations

07.1 Effectiveness of Licensee Control in Identifying, Resolving, and Preventing Problems (IP 71707 and 40500)

The inspectors reviewed all newly initiated Occurrence Reports (ORs) and completed ORs approved during the inspection period to ensure that plant incidents which affect or could potentially affect safety were properly documented and processed in accordance with Administrative Procedure (AP) FNP-0-AP-30, "Preparation and Processing of Incident Reports," Rev. 22. The inspectors concluded that the licensee's program for

identifying and resolving problems remained active and continued to be accomplished in accordance with FNP-0-AP-30. Plant personnel and management exhibited an appropriate threshold for identifying problems, initiating ORs, and assigning formal root cause determinations. Each new OR received prompt attention and was discussed in the next morning status/plan of the day meeting.

An inspector reviewed OR 1-97-198, "SG Reference Leg Insulation Missing," in detail and concluded the OR was accurate, complete, addressed reportability, and initiated appropriate corrective actions. A visiting inspector also reviewed a number of selected ORs related to welding problems as addressed in report Section M7.1.

O8 Miscellaneous Operations Issues (92901)

O8.1 (Open) IFI 50-348, 364/97-05-02: Foreign Material in Containment ECCS Sumps

An inspector reviewed Operability Determination (OD) 97-10, Rev. 1 and supporting documentation. Detailed operability and reportability evaluations were conducted regarding the as-found ECCS sump screen openings, including the foreign material discovered inside the sump screens and suction piping. All the excessively large openings found in Unit 1 and 2 ECCS sumps screens were repaired. The licensee concluded that these openings would not have posed a threat to associated ECCS systems. The licensee also concluded that even though the foreign material/debris found inside the Unit 1 sumps could have degraded ECCS and CS system performance, these systems would have still been able to perform their intended safety functions. Although the Unit 2 sump suction pipes were not examined, Operations management concluded that the Unit 1 evaluation was bounding for Unit 2. The inspector concluded that the licensee's actions and determinations appeared reasonable and appropriately conservative. Since the interior of the Unit 2 ECCS sumps and suction piping will not be examined until the next refueling outage (U2RF12), this inspector followup item will remain open pending the results of that examination.

O8.2 (Closed) EEI 50-348, 364/97-04-01: Inadequate Procedural Guidance for Penetration Room Filtration (PRF) System Operation and Testing - Multiple Examples
(Closed) EEI 50-364/97-04-02: Moving Fuel in a Condition Prohibited by TS
(Closed) EEI 50-364/97-04-03: Failure to Meet TS Surveillance Requirement 4.7.8.b.3 Acceptance Criteria
(Closed) EEI 50-348, 364/97-04-04: Penetration Room Boundary (PRB) In-leakage in Excess of the Updated Final Safety Analysis Report (UFSAR) Design
(Closed) EEI 50-348, 364/97-04-05: Failure to Perform TS Surveillance Requirements for Safety-Related Ventilation Systems - Multiple Examples

An Enforcement Conference (EA 97-130) was held in the Region II office on April 18, 1997, to discuss the above EEIs. As a result of the enforcement conference, these EEIs were closed and four violations (VIO) and a noncited violation (NCV) were identified:

- VIO 50-348, 364/97-130-01014, Inadequate Procedures For Operation of the PRF System
- VIO 50-348, 364/97-13, -02014, Failure to Comply With TS Surveillance Testing Requirements Related To ANSI N510-1980 For Ventilation Systems
- VIO 50-348, 364/97-130-03014, Failure to Identify And Correct Degraded PRB Conditions
- VIO 50-364/97-130-04014, Fuel Movement Within the Spent Fuel Pool Without Meeting PRF System TS Operability Requirements
- EEI 50-364/97-04-03 became NCV 50-364/97-06-02, Failure To Meet TS SR 4.7.8.b.3 Acceptance Criteria.

The Notice of Violation was issued as Enclosure 1 to the NRC letter of May 6, 1997, summarizing the proceedings of the meeting.

II. Maintenance

M1 Conduct of Maintenance

M1.1 General Comments

a. Inspection Scope (IP 61726 and 62707)

Inspectors observed and reviewed portions of various licensee corrective and preventive maintenance activities, and witnessed routine surveillance testing to determine conformance with plant procedures, work instructions, industry codes and standards, TSs, and regulatory requirements. The inspectors observed all or portions of the following maintenance and surveillance activities, as identified by their associated work order (WO), work authorization (WA), or surveillance test procedure (STP):

- FNP-2-STP-20.0: "PRF System Train B Quarterly Operability and Valve Inservice Test," Rev. 15
- WO# M97004386: Replacement of Bank D withdrawal interlock card per FNP-2-IMP-201.38A, Rev. 17
- FNP-1-STP-45.7: "Main Steam Isolation Valve and Bypass Valve Inservice Test," Rev. 3

- FNP-1-STP-21.1: "Main Steam Isolation Valve Inservice Test," Rev. 15
- FNP-1-STP-1.0: "Operations Daily and Shift Surveillance Requirements Modes 1-4," Rev. 60
- FNP-1-ETP-4432: "1A Motor-driven Auxiliary Feedwater Pump Test," Rev. 0
- FNP-2-STP-201.8: "Reactor Coolant System FT-415 Loop Calibration and Functional Test," Rev. 13
- FNP-2-STP-201.11: "Reactor Coolant System FT-425 Loop Calibration and Functional Test," Rev. 13
- FNP-2-STP-22.1: "2A Motor-driven Auxiliary Feedwater Pump Inservice Test," Rev. 10

b. Observations, Findings and Conclusions

All of the maintenance work and surveillance testing observed by the inspectors was performed in accordance with work instructions, procedures, and applicable clearance controls. No adverse findings were identified. Safety-related maintenance and surveillance testing evolutions were well planned and executed. Personnel demonstrated familiarity with administrative and radiological controls. Surveillance tests of safety-related equipment were consistently performed in a deliberate step-by-step manner by personnel in close communication with the Main Control Room (MCR). Overall, operators and technicians appeared knowledgeable, experienced, and well trained for the tasks they performed.

Problems caused by the extensive painting efforts were identified during these observations. The inspectors identified that the contractors painting the Unit 1 main feedwater pumps had painted some valve stems and some paint was on a high pressure stop valve piston where it entered the cylinder. These deficiencies were identified to the Unit 1 SS for corrective actions. The deficiencies did not cause the components to be inoperable.

M1.2 On-line Maintenance

a. Inspection Scope (IP 62700)

To evaluate the licensee's on-line maintenance activities, the inspectors reviewed procedures, observed work in progress and reviewed selected records. Observations were compared with applicable procedures and the UFSAR.

Specific areas examined included: procedure approval; post maintenance testing; inspection hold points; reference materials; fire protection; cleanliness and housekeeping; control of equipment; tag out process; functional testing; measuring and test equipment (M&TE) calibration and calibration control; and special process control. The inspectors observed all or portions of the following maintenance activities as identified by their associated WO or WA numbers.

- WA# 00 479776: 2C Service Water Pump Motor Inspect Clean and Megger
- WO# S96002924: Service Water Pump 2C Supply Breaker PM of Aux Contact Block
- WO# M00537477: MCC Aux Relay Cabinet 1C Clean Water Intrusion Damage
- WO# M97005093: 2A Accumulator Level H-L Main Control Board Annunciator Trouble Shoot Spurious Alarms

b. Observations and Findings

During the performance of WO#S96002924, the inspectors noted that the electricians were unable to obtain appropriate resistance measurements between terminals 13 and 15 with the breaker in the closed position as required by step 18 of the WO. The electricians consulted with other members of their maintenance team. After an hour and repeated attempts to obtain the desired measurement, the electricians determined that the breaker had to be in the closed and Not Charged condition to obtain the appropriate resistance measurement. This indicated that the work instruction did not contain sufficient detail for this specific activity.

The work plan for the Service Water B train system outage, identified maintenance of two breakers, with the maintenance on the Service Water Pump 2C (Train A) Supply Breaker to be conducted first. The licensee discovered during the maintenance of this breaker that the other breaker (Train B) was critical to return to service and should have been started first. Subsequently, the licensee dispatched a second team to conduct maintenance on the Train B breaker. This was a specific example of poor planning and scheduling.

The inspectors noted that the licensee did not have formal procedures for the calibration of the multi-meters used in the above maintenance activities. They indicated that they had a "technically correct" data sheet to conduct the calibration. The calibration personnel indicated that in 1995 they submitted 50 to 80 requests for calibration procedures for M&TE and instruments which are calibrated using data sheets. Calibration personnel stated that there are a number of tasks that are necessary for the calibration program, which are not proceduralized, and

are known only to one individual. At the conclusion of this report period, it could not be determined whether the licensee had adequate procedural coverage for calibration of M&TE. OR #97-251 was written to address this issue which is considered unresolved pending further review by the licensee and NRC to determine the necessity of procedures for M&TE activities. This issue is identified as Unresolved Item (URI) 50-348, 364/97-06-01: Lack of Test Equipment Calibration Procedures.

c. Conclusions

The on-line maintenance observed was conducted properly. Insufficient detail in a WO for the maintenance of a Service Water breaker caused an unnecessary delay. An instance of poor planning and scheduling of maintenance activities was demonstrated by working a less critical breaker before the breaker that was critical for return to service. An unresolved Item relating to a lack of test equipment calibration procedures was identified.

M1.3 Fire in 1C SG Hot Leg Channel Head

a. Scope

The inspectors reviewed the licensee's evaluations, corrective actions, and 10 CFR 50.59 screening package; interviewed technicians and supervisors; and monitored cleanup efforts. Licensee evaluations were documented in letter ENV-97-107, dated May 16, 1997 and ALA97-134, dated May 9, 1997.

b. Observations and Findings

On May 8, 1997, a fire occurred in the 1C SG hot leg channel head while conducting heat treatment operations on 1C SG. The fire was caused by the inadvertent retraction of a hot heat treatment probe that contacted the rubber drive wheels of the Remotely Operated Service Arm (ROSA). The burning rubber wheels disintegrated and ignited various combustible materials in the channel head. Technicians unsuccessfully attempted to extinguish the fire using a CO_2 extinguisher which was depressurized. Other personnel located a dry chemical fire extinguisher which was used to extinguish the fire. Approximately 4 pounds of dry chemical agent was discharged into the channel head.

Licensee efforts to remove the dry chemical agent from the 1C SG Hot leg channel head, tube sheet, and those tubes yet to be heat treated were extensive and thorough. The licensee:

- Thoroughly vacuumed the channel head and removed approximately 2.5 pounds of agent remotely using the ROSA and a vacuum connected to a hose;

- manually brushed (using a fox tail broom) and vacuumed areas unreachable by the ROSA or vacuum on a pole;
- performed a low pressure wash of the hot leg channel head using de-ionized water;
- with a vacuum at the tube hole, dry brushed each tube to be heat treated using the Wet Hone System with a soft nylon brush;
- performed a low pressure wash of the 1C SG cold leg channel head, and;
- conducted numerous chemical samples of tubes and channel head surfaces to characterize contamination levels and effectiveness of clean up efforts.

The licensee determined that approximately 0.8 pounds of dry chemical agent were unaccounted for after the cleanup efforts. This number was conservative based upon assuming a full fire extinguisher, and since the dry chemical removed during the low pressure washes was not collected.

The licensee performed two evaluations for determining the impact of the residual chemicals on: 1) the corrosion resistance of the tubes and sleeving; and 2) RCS chemistry during startup. The inspectors reviewed both evaluations and determined that they were adequate. The evaluations are summarized in the following paragraphs.

The licensee evaluation of the impact of the remaining dry chemical agent and contaminants from the burned materials on RCS chemistry identified that: 1) the presence of products of combustion from the fire damaged materials would have no significant effect on the reactor coolant chemistry, and 2) the residual dry chemical agent could cause suspended solid levels and sulfate levels significantly higher than those recommended in the Electric Power Research Institute (EPRI) Primary Water Chemistry Guidelines. However, after filling the RCS, there was no discernible effect on RCS chemistry as a result of the fire or the dry chemical agent.

The licensee identified that the elements of concern in the dry chemical agent for Alloy 600 and Alloy 690 degradation were lead and sulfur. Based on the concentrations of lead and sulfur in the dry chemical agent, the licensee's assumptions, and the corrosion mechanisms, the licensee determined that tube and sleeve corrosion effects from the residual dry chemical agent were not a concern.

c. Conclusions

Licensee post-fire cleanup efforts were extensive, thorough, and carefully controlled. Evaluations of chemical effects were conservative.

M1.4 Reactor Head Vent Operation from the Unit 1 Hot Shutdown Panel

On May 23, 1997, resident inspectors observed the Unit 1 reactor head vent valves stroked from the hot shutdown panel and the main control board under Work Order #M97003799 and FNP-1-STP-73.6, "Verification of Reactor Head Vent Valve Operation From the Hot Shutdown Panel," Rev. 0. Operators used communication repeat-backs and the STAR (Stop-Think-Act-Review) program during the test. No deficiencies were identified and the inspector concluded that the test was performed satisfactorily.

M1.5 Unit 1 Five Year Containment Tendon Surveillance Testing

a. Scope

An inspector observed portions of the Unit 1 containment tendon surveillance program prescribed by TS 4.6.1.6.1. This was the 20th year surveillance of a routine five year surveillance frequency.

b. Observations and Findings

On June 13, an inspector observed the removal of a tendon wire from one of the vertical containment tendon bundles to be shipped offsite for examination and analysis. A total of three wires were removed (one vertical, one hoop and one dome). On June 20 the inspector also observed the detensioning, retensioning, and shim adjustments of horizontal tendon 3BA. Tendon anchor lift-off and retension forces were verified to be within prescribed acceptance criteria. This tendon was one of nine tendons tested and examined (i.e., three vertical, three hoop and three dome) after the recent Unit 1 refueling outage. The lead onsite engineer later reported that all nine tendon pulls were found within the allowed TS acceptance criteria. The Unit 1 containment tendon testing and wire removal were conducted in accordance with FNP-1-STP-609, "Containment Tendon Surveillance Test," Rev. 16. Responsible contract mechanics, onsite engineers, corporate engineering and quality control support were experienced and knowledgeable. Surveillance testing was released by Operations as authorized by WA #W00475184.

c. Conclusions

All testing activities observed by the inspector were well controlled and accomplished in a manner consistent with STP-609 instructions and TS 4.6.1.6.1 requirements.

M2 Maintenance and Material Condition of Facilities and Equipment

M2.1 Overheated Cable Tray In Unit 1 Containment

On May 24, the licensee discovered a number of heat damaged cables in cable tray 1TNIB-03, inside Unit 1 containment. The heat damaged cables were found after two non-safety related cables had failed during U1RF14

associated with a reactor coolant pump (RCP) seal pressure transmitter and RCP upper thrust bearing temperature detector. OR #97-205 was written to document the problem, assess reportability and initiate corrective actions. The insulation of cables in the tray had been heat damaged due to the proximity of a main feedwater line that ran directly underneath two open sections of the cable tray. On May 28, inspectors walked down the cable tray in containment to examine the damaged cables and observe some of the ongoing cable replacement maintenance activities. The inspectors held detailed discussions with the responsible maintenance team leader and site management regarding planned cable replacements and the impact on equipment qualification (EQ) and operability.

Of the 142 cables in the tray, 15 were spare, and 20 were not affected due to being deleted or having been routed out of the cable tray before the open section. Of the 107 remaining cables potentially affected by the heat, management decided to replace the 21 most critical cables (i.e., EQ, Regulatory Guide 1.97, and important TS cables), in addition to the two failed cables, prior to Unit 1 restart. Heat shields were also installed to cover the cable tray gaps. The other 84 cables would not be replaced until the next Unit 1 refueling outage (U1RF15). The inspectors discussed this cable replacement scheme with the licensee and became convinced their approach was reasonable, except for certain of the safety-related cables that were excluded due to routing. After further review, the licensee replaced an additional cable (i.e., accumulator pressure) even though it was routed out of the cable tray before the open sections, its path came very close to one of the MFW lines. The licensee also conducted a detailed engineering evaluation to address the inspectors' reportability concern regarding whether the EQ of safety-related cables during Cycle 14 was maintained. This evaluation, documented in Bechtel letter AP-21579 dated June 25, 1997, concluded there was adequate assurance that the qualified life of the Unit 1 cables had not been exceeded and the existing life of comperable Unit 2 cables was at least 40 years.

M2.2 Housekeeping

a. Inspection Scope (62700)

The inspectors conducted a general walkdown inspection of the Service Water Intake Structure (SWIS), Auxiliary Building Room 478, and the Hot Machine Shop.

b. Observations and Findings

The inspectors noted the following deficiencies:

- Twelve electrical panel and control boxes in the SWIS were not properly secured. Some or all the closure devices were not properly tightened such that the weather stripping was not

compressed. The improper closure of electrical panel and control boxes could compromise environmental integrity of the components within these inclosures. Some examples were: QIH21E 513A, QSH21L502A-A and QSR42B515B-B. This condition was indicative of lack of attention to detail on the part of operations and/or maintenance, and was considered a poor work practice.

- An unmarked plastic sample bottle containing oil, a light bulb, and a pair of wire side cutters were found behind Panel NIH21NGVSS2618 in Auxiliary Building Room 478. This condition was indicative of a lack of attention to detail on the part of operations and/or maintenance, and was considered a poor work practice.

- Several wheeled portable pumps, two hand trucks and an instrument cart were stored with their wheels unsecured in Auxiliary Building Room 478, in proximity of electrical panels with safety related plant identification numbers and some Post Accident Sampling system equipment. A seismic event could cause the unsecured wheeled equipment to collide with and damage important plant equipment. This condition was indicative of a lack of attention to detail on the part of operations and/or maintenance, and was considered a poor work practice.

- A partial box of indicator replacement lamps was found in a safety related panel in the Unit 2 Cable Spreading Room. This was of concern for two reasons. First, the storage of combustibles in electrical panels is considered a poor practice. In addition, the pre-placement of indicator lamps invites replacement of lamps without verification of proper lamp type. This concern is referenced in NRC Information Notice 94-68: "SAFETY-RELATED EQUIPMENT FAILURES CAUSED BY FAULTED INDICATING LAMPS." This condition was indicative of lack of attention to detail on the part of operations and/or maintenance, and was considered a poor work practice.

c. Conclusions

In general the housekeeping was good in the areas examined; however, several examples of poor work practices relating to: improperly latched electrical enclosures; improper storage of wheeled equipment, tools and oil samples; and pre-placement of indicator lamps, were identified.

M7 Quality Assurance in Maintenance Activities

M7.1 Occurrence Reports (OR)- Welding

a. Inspection Scope (62700)

The inspectors reviewed the below indicated completed ORs to evaluate the licensee's corrective actions. Specific areas examined included: determination of the extent of the problem; corrective actions taken, and actions taken to prevent recurrence.

- OR# 1-97-071: Weld Procedure Violation at Q-I-P16V296B
- OR# 1-97-083: Welder Qualification Forms Not Completed Prior to Welding
- OR# 1-97-092: Welders Contacted for U1RF14 Uninformed Regarding FNP's Welding Manual and Compliance Requirements
- OR# 1-97-154: Butt Weld Members Joining Component Support Members Have Excessive Weld Reinforcement
- OR# 1-97-166: Carbon Steel Half Couple Welded Without Preheating

b. Observations, Findings and Conclusions

For the ORs examined, the licensee conducted adequate surveys to determine the extent of the problems and took appropriate actions to correct the problems and prevent their recurrence.

M8 Miscellaneous Maintenance Issues (IP 92902)

M8.1 (Closed) URI 50-364/97-05-05; Painting Effects on PRF Operability

The licensee determined that there was not an analysis to document the basis for the 1000 ft^2 painting limit in the penetration room boundary (PRB). Request for Engineering Assistance (REA) 97-1380 was issued to have Southern Company Services (SCS) perform an analysis to determine what limits needed to be placed on painting in the penetration room boundary to maintain PRF operability. On May 20, 1997, the licensee provided a copy of SCS's response to the REA to the inspectors. The inspectors reviewed the analysis and determined it was adequate. The analysis was based on an industry study which documented that charcoal could filter iodine at 99% efficiency with a 10% volatile organic compound (VOC) by weight loading. To provide an additional safety margin, SCS recommended a limit of 1% VOC by weight loading limit on painting. A 1% VOC by weight loading of the PRF charcoal filter equates to approximately 7.7 pounds of VOCs or 2.4 gallons of paint (for the

paint FNP uses). This limit is more restrictive than the previous limit of 1000 ft^2 which would take approximately 4 gallons of paint (~2% by weight) if applied per the coatings manual.

The inspectors reviewed the painting conducted in the Unit 2 PRB including approximate square footage painted per day and amount of paint issued for application. Independent measurements made by the inspectors supported the data provided by the licensee. The review indicated a maximum of 3 gallons of paint was used in any 24 hour period which equates to an approximate VOC loading of 1.5% by weight. Based on the review and licensee program changes, the inspectors determined that PRF was not inadvertently rendered inoperable by painting and enhanced procedural controls would adequately control future PRB painting. This URI is closed.

III. Engineering

E1 Conduct of Engineering (IP 37551)

E1.1 Onsite and Offsite Engineering Support

Onsite and offsite engineering organizations provided critical support for a number of complex, safety significant issues and/or evolutions during the report period. Among these issues were: 1) ECCS and CS system sump screen degradation and foreign material intrusion; 2) Fire, and subsequent contamination, in the 1C SG hot leg channel head; 3) Cycle 15 initial criticality and low power physics testing; 4) Containment tendon surveillance; 5) Heat-damaged cables in containment and associated EQ concerns; and 6) Effects of VOCs from painting in the PRB on safety-related ventilation system charcoal filters. Licensee engineers consistently provided thorough, detailed, and sound engineering evaluations in a timely manner to support operability, reportability, and decision-making issues needed by Operations and Maintenance. In addition, ES and corporate engineering provided excellent technical support and direction during important evolutions.

E6 Engineering Organization and Administration (IP 37550)

E6.1 Request for Engineering Assistance (REA) Backlog

a. Inspection Scope

The licensee corporate engineering organization utilized REAs as a method for authorizing the Architect/Engineer (AE) to conduct design or engineering work which may involve design changes, engineering studies, etc. The REAs were assigned a number for tracking by the corporate engineering group. The inspector reviewed the backlog of open REAs.

b. Observations and Findings

The REA performance indicators were as follows:

Total number of REAs opened in 1996 = 274
Total number of REAs opened in 1997 (through 6/4/97) = 102

Total number of open 1997 REAs = 92
Total number of open 1996 REAs = 85
Total number of open 1995 REAs = 10
Total number of open 1994 REAs = 1
Total number currently open = 188

Of the 188 open REAs, 56 were identified as requiring action by design engineering personnel.

c. Conclusion

The backlog of outstanding REAs was at 188, of these few were over two years old. The inspector concluded that further review would be required to determine if the REA backlog was being effectively managed.

E7 Quality Assurance in Engineering Activities (IP 37550)

E7.1 Review of Final Safety Analysis Report (FSAR) Accuracy Reverification Program

a. Inspection Scope

An inspection was conducted at the licensee's office in Birmingham, Alabama, to review the licensee's activities associated with the resolution of deficiencies identified during the FSAR Reverification Program to determine if these actions were consistent with the requirements of title 10 of the Code of Federal Regulations Parts 50.59, 50.72, 50.73, and Part 50 Appendix B, Criterion XVI.

b. Observations and Findings

The licensee conducted a review of the Updated Final Safety Analysis Report (UFSAR) to verify that it accurately reflected the plant design, as-built condition, and/or operating practices. The reviews were coordinated by the Corporate Nuclear Engineering and Licensing department and were performed by plant, corporate, architect engineer (both SCS and Bechtel), and nuclear steam supply system personnel. The reviews were conducted from July 1996 to December 1996. The review criteria was provided in the "Southern Nuclear UFSAR Verification Guidelines." The results were documented on "Verification Checklists." The checklists were transmitted to Corporate office in Birmingham where the open items were entered into a computer database for tracking. The licensee indicated that no operability/reportability issues had been

identified. This was based on the engineering judgement of the reviewers and not based on a formal evaluation for operability/ reportability. The inspector noted that the Verification Guidelines did not require a formal operability/reportability review to be performed. The licensee also indicated that no Occurrence Reports had been generated at the site from the items identified.

The inspector observed that 847 items had been entered into the computer database for tracking. The items had been categorized as editorial, historical, or problem related. The responsibility for resolution and closeout of the 847 items had been assigned to a recently formed group identified as the Configuration Management Project (CMP) which was managed by a former Engineering Manager. The CMP was still being staffed. The manager informed the inspector that one of the group's goals was to have all the UFSAR open items resolved by the end of 1997. He indicated that a site contact would be established to schedule PORC submittal for those problems that require PORC approval.

The inspector reviewed database printouts dated June 2 and 3, 1997, of open and closed items, respectively. The closed report contained 91 items. The inspector selected closed items 601A, 601B, 601C, 439B, 601D, 490, and 091A which involved issues with FSAR Sections 4.1, 4.2, 4.3, 4.3.1.5, 4.4, 9.3.2.2.1, and Appendix 9B, respectively, to review the licensee's corrective actions. The inspector found that the items had been adequately resolved with corrective actions completed. None of the issues involved reportability or operability concerns. For those items that required a 50.59 Safety Evaluation it was reviewed and found to be adequate with no unreviewed safety questions being identified. Markups of the UFSAR were also reviewed and found to be acceptable.

The inspector found that an additional 20 items were pending approval by the CMP Manager and submittal to the site for Plant Operations Review Committee (PORC) review. These items were expected to be submitted for site approval within the next two weeks. The licensee indicated that issues involving FSAR Sections 6.2, Chapter 17, and Appendix 9B were given first priority. Examples of other UFSAR issues that had been given priority by the licensee involved evaluating the effect of the integrated ECCS test and ECCS branch line flow verification on the reactor coolant system, evaluating the design basis for the 50 degrees per hour normal and 100 degrees per hour abnormal heatup and cooldown rate, and pre-plant cooldown boron concentration. These issues were also not considered to be reportable.

c. Conclusions

The licensee's UFSAR Reverification program identified numerous discrepancies between the UFSAR and the plant design, as-built condition, or operating procedures. These issues have been assigned to a dedicated group in the corporate office for resolution with a goal to have them all closed by the end of 1997. The dispositioning of these items by a dedicated group was considered a strength. The tracking and closeout of the items examined was found to be adequate.

IV. Plant Support

R2 Status of Radiological Protection Facilities and Equipment

R2.1 Tours of the Unit 1 and 2 Radiologically Controlled Areas (RCAs) (IP 71750)

During the course of the inspection period, the inspectors conducted tours of the Unit 1 and 2 auxiliary building RCAs. In general, health physics (HP) control over the RCA, and the work activities conducted within it, were appropriate and adequately supported the plant staff.

S1 Conduct of Security and Safeguards Activities

S1.1 Routine Observations of Plant Security Measures (IP 71750)

During routine inspection activities, inspectors verified that portions of site security program plans were being properly implemented. This was generally evidenced by: proper display of picture badges by plant personnel; appropriate key carding of vital area doors; adequate stationing/tours in the protected area by security personnel; and proper searching of packages/personnel at the primary access point and service water intake structure. Security personnel observed during the inspection period were attentive to their responsibilities. Site security systems seemed adequate to ensure physical protection of the plant. All cameras in the Central Alarm Station (CAS) appeared operational and capable of detecting unwanted intrusions.

V. Management Meetings and Other Areas

X1 Review of UFSAR Commitments

A recent discovery of a licensee operating its facility in a manner contrary to the UFSAR description highlighted the need for a special focused review that compares plant practices, procedures and/or parameters to the UFSAR descriptions. While performing the inspections discussed in this report, the inspectors reviewed the applicable portions of the UFSAR that related to the areas inspected. The inspectors verified that the UFSAR wording was consistent with the observed plant practices, procedures and/or parameters.

X2 Exit Meeting Summary

The inspectors presented the inspection results to members of licensee management on June 20, 1997. The licensee acknowledged the findings presented.

The inspectors asked the licensee whether any materials examined during the inspection should be considered proprietary. No proprietary information was identified.

PARTIAL LIST OF PERSONS CONTACTED

Licensee

M. Ajluni, SNC (Corporate) Licensing Manager - Farley Project
S. Casey, SG Service Engineer
R. Coleman, Maintenance Manager
J. Fitzgerald, Contracts Coordinator
S. Fulmer, Technical Manager
J. Garlington, Nuclear Support General Manager
D. Grissette, Operations Manager
R. Hill, General Manager
C. Hillman, Security Chief
R. Johnson, Maintenance Support Team Leader
D. Jones, Configuration Management Project Manager
R. Martin, Superintendent Operations Support
D. McKinney, Nuclear Engineering and Licensing Manager
M. Mitchell, Health Physics Superintendent
C. Nesbit, Assistant General Manager - Support
J. Odom, Superintendent Unit 1 Operations
J. Parrish, Maintenance Team Leader
J. Powell, Superintendent Unit 2 Operations
L. Stinson, Assistant General Manager - Plant Operations
J. Thomas, Engineering Support Manager

NRC

J. Zimmerman, Project Manager - Farley Nuclear Plant

INSPECTION PROCEDURES USED

IP 37550:	Engineering
IP 37551:	Onsite Engineering
IP 40500:	Effectiveness of Licensee Controls in Identifying, Resolving, and Preventing Problems
IP 61726:	Surveillance Observations
IP 62700:	Maintenance Implementation
IP 62707:	Maintenance Observations
IP 71707:	Plant Operations
IP 71750:	Plant Support Activities
IP 92901:	Followup - Operations
IP 92902:	Followup - Maintenance

ITEMS OPENED, CLOSED, AND DISCUSSED

Opened

Type	Item Number	Status	Description and Reference
URI	50-348,364/97-06-01	Open	Lack of Calibration Procedures (Section M1.2)
VIO	50-348, 364/97-130-1014	Open	Inadequate Procedures For Operation of the PRF System (Section O8.2)
VIO	50-348, 364/97-130-2014	Open	Failure to Comply With TS Surveillance Testing Requirements Related To ANSI N510-1980 For Ventilation Systems (Section O8.2)
VIO	50-348, 364/97-130-3014	Open	Failure to Identify And Correct Degraded PRB Conditions (Section O8.2)
VIO	50-364/97-130-4014	Open	Fuel Movement Within the Spent Fuel Pool Without Meeting PRF System TS Operability Requirements (Section O8.2)
NCV	50-364/97-06-02	Open	Failure To Meet TS SR 4.7.8.b.3 Acceptance Criteria (Section O8.2)

Closed

Type	Item Number	Status	Description and Reference
URI	50-364/97-05-05	Closed	Painting Effects on PRF Operability (Section M8.1)
EEI	50-348, 364/97-04-01	Closed	Inadequate Procedural Guidance for PRF System Operation and Testing - Multiple Examples (Section O8.2)
EEI	50-364/97-04-02	Closed	Moving Fuel in a Condition Prohibited by TS (Section O8.2)
EEI	50-364/97-04-03	Closed	Failure to Meet TS SR 4.7.8.b.3 Acceptance Criteria (Section O8.2)
EEI	50-348, 364/97-04-04	Closed	PRB In-leakage in Excess of the UFSAR Design (Section O8.2)

EEI	50-348, 364/97-04-05	Closed	Failure to Perform TS Surveillance Requirements for Safety-Related Ventilation Systems - Multiple Examples (Section 08.2)
NCV	50-364/97-06-02	Closed	Failure To Meet TS SR 4.7.8.b.3 Acceptance Criteria (Section 08.2)

Discussed

Type	Item Number	Status	Description and Reference
IFI	50-348, 364/97-05-02	Open	Foreign Material in Containment ECCS Sumps (Section 08.1)