OUTAGE SCHEDULING

1.0 PURPOSE

1.1 The purpose of this procedure is to identify the various outage schedules and the relations between these schedules (i.e., Planned Outage, Maintenance Outage, Forced Outage, and Long-Range Schedules).

1.2 This procedure identifies the sources of data, tools and methodologies to be used, and the core reporting requirements for various schedules.

1.3 This procedure identifies the organizations, relationships, and responsibilities associated with Outage Scheduling.

NOTE

This procedure does not address the efforts required to support rapid-recovery trips.

2.0 DEFINITIONS

2.1 SCHEDULE DATABASE

A computer resident accumulation of data for use in the calculation and analysis of various schedules.

2.2 FRAGNET

A graphic representation of activities and relationships associated with the components of a job.

2.3 OUTAGE WORK PACKAGE

A work order package which requires an outage to perform.

2.4 REFUELING OUTAGE SCOPE

The scope of a refueling outage is the list of all major activities that are to be performed during the associated outage. This list includes the planned work on all major components, programs, and significant inspections/surveillances. The list will also identify the number of approved design changes and anticipated corrective maintenance MWO's, preventative maintenance MWO's, and technical specification surveillances.

2.5 REFUELING OUTAGE BUDGET

The "refueling outage budget" is the estimated cost of the outage scope activities for inclusion in the O & M Budget. The estimate is prepared by the Manager Outages and Planning and submitted to Financial Services for inclusion in the budgeting process.

2.6 NON-OUTAGE WORK PERIOD

The spring or fall of a year when no refueling outage is scheduled.

3.0 RESPONSIBILITIES

3.1 VICE-PRESIDENT NUCLEAR - VOGTLE PROJECT

The scope of refueling outages and changes thereto are approved by the Vice-President Nuclear - Vogtle Project. Typically, this approval is granted 12 months prior to the affected unit being shut down for the outage. Approvals may be granted by telephone, but should be followed up by written correspondence to enhance communication accuracy.

3.2 GENERAL MANAGER - NUCLEAR PLANT (GMNP)

The GMNP, or designee, has responsibility for:

3.2.1 Overall responsibility for all outage management, planning, and scheduling.

3.2.2 Approval of the scope of planned maintenance outages.

3.2.3 Approval of refueling and planned outage schedules.

3.2.4 Development of refueling outage scope.

3.3 ASSISTANT GENERAL MANAGER - PLANT OPERATIONS (AGMPO)

The AGM has responsibility for:

3.3.1 Providing direction and setting policy to ensure effective outage management, planning, and scheduling.

3.3.2 Approval of the scope of planned maintenance outages.

3.3.3 Approval of refueling and planned maintenance outage schedules.

3.3.4 Development of the refueling outage scope.

3.4 MANAGER OUTAGES AND PLANNING (MOP)

The MOP has responsibility for:

3.4.1 Establishing guidelines for developing the scope of all planned outages as well as approval authority for outage scope.

3.4.2 Approval authority for all Planned Outage, Maintenance Outage, and Forced Outage Schedules.

3.4.3 Establishing goals for development and implementation of outage schedules.

3.4.4 Ensuring that all departments support the goals established for the development and implementation of outage schedules.

3.4.5 Obtaining approval for significant scope changes for refueling outages.

3.5 OUTAGE SCHEDULING SUPERVISOR (OSS)

The OSS has responsibility for:

3.5.1 Ensuring development and implementation of schedules for all outages other than those related to rapid-recovery trips.

3.5.2 Determining the scope of the five-year plan and coordinating efforts required to meet the goals set forth in the five-year plan.

3.5.3 The OSS and the Supervisor Work Planning & Controls determine the specific scope of an outage.

3.5.4 Reviewing Outage Schedule Change Requests (Figure 1) for impact on outage schedules and identifying potential scope changes to the MOP.

3.5.5 Supervising data assembly and conversion activities required to develop a schedule.

3.5.6 Development and issuance of schedules and reports designed to support the pre-outage and outage requirements of all cognizant departments and management.

3.5.7 Preparation of post-outage reports.

3.6 SUPERVISOR WORK PLANNING & CONTROLS (SWPC)

The SWPC has responsibility for:

3.6.1 Issuing and packaging technical specification task sheets.

3.6.2 Issuing and packing outage preventive maintenance MWOs.

3.6.3 Classifying and packaging outage corrective maintenance MWOs.

3.6.4 Prepare fragnets for the implementation of design change packages.

3.6.5 Issuing and packaging MWOs to implement approved design change packages.

3.6.6 Prepare clearances to support refueling outage work.

3.6.7 Processing Outage Schedule Change Requests (Figur. to identify needed resources, materials, clearance and assessing the risk of delaying the work to futu.e system or refueling outages.

4.0 OUTAGE SCHEDULING

4.1 GENERAL

There are four principal categories of schedules covered by the term "Outage Scheduling": Long-Range, Maintenance, Planned Outage, and Forced Outage. The Maintenance, Planned, and Forced-Outage Schedules are comprised of details at the working level and can be used by supervisors and foremen for identifying and assessing daily work requirements. The long-range schedules are summary-level schedules used for coordination of Engineering, Procurement, and other preparatory activities required to support the plant's outages and non-outage work periods.

All of the schedules addressed in this procedure are compilations of data provided to the Outage Scheduling Supervisor in the form of fragnets or reports. Development of these fragnets is the responsibility of various departments. Upon receipt of fragnets, Outage Scheduling integrates them into the appropriate schedule database with the appropriate relationships. The resulting database is then used in producing the schedules and analyses required to support all users from foremen to senior management.

4.1.1 Schedules are structured in a hierarchical manner both within a particular schedule and between the various schedules. The hierarchical position (level) of any schedule is governed by the amount of detail included in the schedule. There are four levels of schedules:

4.1.1.1 A Level I Schedule is a Milestone Schedule which establishes targets for plant-wide activities (i.e., Start Planned Outage) and is used principally at the management level for external coordination.

4.1.1.2 A Level II Schedule is a System-Level Summary Schedule which identifies the general time frame in which work is being accomplished on any particular system but does not provide any detail about what work is being accomplished or of the intensity of the work. This level of schedule is targeted at Supervision/Management and provides a broad view of the progress of an outage.

4.1.1.3 A Level III Schedule is a Job-Order-Level Summary Schedule which identifies all work authorizing documents to be accomplished during the outage and the time frame in which work is to be performed but does not provide information about the detailed steps required to accomplish the task. This level of schedule is targeted at department-level supervision and contractor organizations, and provides a comprehensive picture of the scope and progress of an outage without the intricate details of each task.

4.1.1.4 A Level IV Schedule is the Base Schedule and represents all of the detail included in the schedule database. This schedule is the basis for all of the above and is the source of analyses related to critical path, manpower requirements, etc. This schedule is intended for use at the foreman level of supervision and is issued only as window working schedules because of the extensive work detail included in this level of schedule.

4.1.1.5 All four levels of schedule apply to Planned, Maintenance, and Forced-Outage Schedules, but only Levels I & II apply to long-range schedules because of their underlying summary nature.

4.1.2 Long-Range and Outage Scheduling involve the identification, analysis, and planning of major non-operating activities related to unit outages. They also involve the compilation of information on tasks from numerous sources.
The principal sources of tasks which are included in these schedules are:

a. Nuclear fuels analysis which governs the time between refuelings,

b. Inservice inspection plan which identifies major inspection and testing requirements,

c. Design Change Requests Log which identifies approved and prospective modifications to the design of the plant,

d. Surveillance testing program which identifies testing commitments defined in the plant technical specifications,

e. Commitment tracking which identifies external commitments,

f. Nuclear Plant Maintenance Information System (NPMIS) which identifies preventive maintenance and corrective maintenance tasks which must be accomplished to ensure plant reliability.

g. Operational activities such as startup and shutdown logic.

As data is accumulated from these various sources, it is input to the schedule database where it is used to generate both long-range and outage schedules.

4.2 FORCED OUTAGE SCHEDULE

4.2.1 During the course of normal plant operations, certain tasks must be deferred while the plant is operating at power; some of these can be accomplished in relatively short periods of time or would preclude the unit from returning to power in the event of a unit trip. The forced-outage schedule is a vehicle for the contingency plans required to accomplish this work and is intended to maximize the use of any unplanned unit down time.

4.2.2 Work Planning and Controls has responsibility for identifying those Maintenance Work Orders (MWO's) which require an outage to perform. Once an MWO has been identified as "Outage", it is preplanned and a work order package is developed which includes all of the information required to perform the work (example: drawings, material staging location, procedures). For complex work, a detailed fragnet is also provided by Work Planning which delineates the steps required to complete the tasks, the duration and manpower required by each step, and any support requirements.

The information provided on the fragnet, along with information on material requisitions, clearances, radiological work permit requirements, and other associated data are added to the scheduling database by the Outage Planning Department.

4.2.3 Use of the schedule database allows a routine analysis of the available outage work and results in the issue of a forced-outage schedule on a weekly basis. This schedule identifies all outage MWO's which could be performed during an unscheduled outage based on the plant-mode requirements (e.g., all work which would be performed if the plant were brought to mode 4). The work included in the schedule is reviewed and prioritized weekly by an Operations Superintendent.

A Level III Schedule is approved by the Outage Scheduling Supervisor, after review and concurrence by the Operations Unit Superintendent, and issued each week taking into consideration any additional work which is identified.

4.2.4 When a forced-outage begins, a determination is made on the expected duration and what plant conditions will be maintained during the outage. This information is then used by the MOP to decide upon limitations to be placed on the outage work scope. Once the limitations have been set, a revision of pre-planned Schedule is issued.

During the course of the outage, Outage Planning maintains the status of work via information obtained during shift turnover meetings between key individuals identified by appropriate departments. The information gathered in these turnover meetings is compiled and input to the schedule database which in turn is used to recalculate the schedule to provide current forecasts and analyses of progress against the original targets.

4.2.5 At the conclusion of the outage, a post-outage report is compiled by the appropriate Unit Scheduling Coordinator which identifies:

a. Reason for the outage,

b. Scope of the outage as defined when it commenced (the initial scope includes the work associated with the repairs required as a result of the unit's forced outage and any MWO's pulled from the contingency schedule),

c. Scope growth during the course of the outage,

NOTE

Scope growth for forced outages means the additional MWO's that were worked which were neither on the original schedule, nor contained in the contingency schedule, nor part of the repair work orders required to affect repairs required as a result of the outage.

d. Description/analysis of events which extended/altered the expected critical path,

e. Lessons learned during the outage.

4.3 MAINTENANCE OUTAGES

4.3.1 When the requirements for a maintenance outage are identified, Outages and Planning begins the planning process required to prepare for it. This planning phase consists of a review of the tasks precipitating the requirement for an outage and all pending outage work. This review is done by the Outages & Planning and Operations Departments. The results of this review are used to establish the primary scope, preliminary duration, and start of the outage.

After the preliminary analysis is completed, a Work Planning effort similar to that described in 4.2.2 is performed. As the planning progresses, MWO's currently included in the forced-outage schedule are identified for deferral to the Maintenance Outage and transferred into the Maintenance Outage Database. In addition to MWO's, a review of surveillance tracking and Design Change Request Logs are conducted by the departments responsible for maintenance of the logs to identify any tasks which, by addition to the outage, may enhance future plant availability. The review is triggered by a request from Outage Planning, when required.

4.3.2 The designated outage leader may conduct meetings during the planning phase to refine the scope of the outage and ensure coordination of the preparatory tasks associated with the outage being planned. These preparatory tasks include identification, scheduling, and tracking of pre-outage work activities. The commencement and frequency of these meetings, along with the various scope cutoff limits, are designated by the MOP.

4.3.3 Development of the schedule is an iterative process based on pre-established milestones (e.g., open generator circuit breakers & close generator circuit breakers), where preliminary information is used until a greater level of detail becomes available through the planning process. As the start of the Maintenance Outage approaches, the level of detail found in the schedule increases and a more clear representation of the key areas and resource requirements becomes available.

4.3.4 At the conclusion of the outage, a post-outage report is compiled by the Outage Scheduling Supervisor which identifies the same items addressed in 4.2.5.

4.4 PLANNED OUTAGES

4.4.1 Maintenance Outages, as discussed in 4.3, are generally of short to moderate length with limited time available for pre-outage planning. Planned outages are cyclic and can be reliably scheduled. The ability to schedule an outage for a particular time frame with a moderate to long duration allows for an outage with extensive scope and the use of manpower not normally available for short lead time outages. An extensive planning and scheduling effort is employed to maximize the amount and diversity of work which can be accomplished during the outage and minimize exposure to degraded safety system capability.

4.4.2 The process of developing a planned outage schedule begins with establishing a core schedule with those activities which must be accomplished during every planned outage and decisions on the methodology to be used for certain tasks. Outage risk management concepts are employed to ensure maximizing availability of fission product barriers, minimizing exposure to degraded safety system capability, maximizing availability of safety system support functions, minimizing or eliminating the duration that the equipment hatch is required to be opened during mid-loop operations, maximizing the electrical power sources for the class 1E busses, and providing temporary modifications to make available alternate means of providing support functions when required. The following items are examples of those contained in the core schedule:

a. Fuel Shuffle Incore or in Fuel Pool

b. Generic System Clearance Scheme

c. RCS Cleanup Method

d. Long-Cycle PM's and Surveillance Tests

e. Inservice Inspection Requirements

f. Shutdown, Layup, and Restart Scheme

g. Mid-loop windows

h. Defueled windows

The planning/scheduling of a Planned Outage starts well in advance of the outage to allow an appropriate lead time for engineering and procurement of materials and services for the major tasks, such as Design Changes and Major Maintenance.

4.4.3 Development of the schedule is an iterative process where preliminary information is used until a greater level of detail becomes available through the planning process. As the start of the outage approaches, the level of detail found in the schedule increases and a better representation of the key areas and resource requirements becomes available.

A preliminary schedule is issued approximately six months prior to the start of the outage or at the direction of the MOP. This is a Level III Schedule identifying the expected scope of the outage and allows concerned parties to perform a preliminary evaluation of the viability and expected scope of the outage. At this point, the schedule should include all Preventative Maintenance Tasks, Surveillance Tasks, Design Change Packages, and Outage Corrective Maintenance Tasks identified to date in preliminary form.

As new work is added to the schedule and schedule iterations occur, outage risk management concepts are used to evaluate the overall impact of any reduction of safety system capability. The hierarchy in the development and review process is to ensure compliance to plant technical specification, avoid limiting conditions for operations (LCO's), identify for information any mode constraint LCO's, and consider outage risk management concepts over and above technical specifications to enhance radiological safety.

In keeping with the principles of outage risk management and to enhance nuclear safety, Plant Management has directed that three of the four electrical sources used to power the class 1-E, 4160 volt emergency busses will be available at all times when fuel is in the reactor vessel.

The schedule should also provide for a drain down during the defueled window. Unless directed otherwise, all routine RCS valve work will be scheduled during the drain down period in the defueled window. If work must be scheduled during periods of reduced RCS inventory with irradiated fuel in the vessel, the time at reduced inventory should be minimized.

With irradiated fuel in the reactor vessel and the RCS water level at mid-loop, scheduling should minimize or, if practical, elim[illegible] the time the equipment hatch is opened. Planning sho[illegible]ivs maintain at least two fission product barriers intact when the RCS water level is at mid-loop with irradiated fuel in the reactor vessel. Contingencies should be considered for increasing the number of pathways through which water can be added to the RCS, i.e. maintain both trains of RHR operable, alternate gravity feed pathways, installing temporary makeup systems, etc.

At the time the preliminary schedule is issued, the scope of the outage should be well defined and more detailed planning of the identified work becomes the key focus. Common work is collected and logically tied in the schedule. The system windows are used as a guide to add work to the schedule to ensure a system is only tagged out of service one time. Refinements are made to durations, manpower requirements, support needs, temporary facilities, etc. as maintenance completes walkdowns of the work. Reviews are conducted to ensure temporary modifications needed are identified, ALARA concepts are incorporated, operability issues are addressed, technical specification compliance can be demonstrated, work areas are not congested, and special consideration is given to plant configurations resulting in reduced RCS coolant inventory. The schedule is resource constrained to levelize the demand on critical resources such as operators, polar crane, certain crafts, and supervision.

Prior to the scheduled start of a planned outage, Outage Planning, and Work Planning and Controls, jointly conduct a review of the jobs which are pending in the forced-outage schedule. All jobs which are selected during this review are then added to the Planned Outage database and included in the schedule. At this time, the schedule is issued for review and the detailed work scope of the outage is frozen. Approximately two weeks are allowed for review and comment, after which the schedule is revised for approval by the MOP and department managers prior to final approval by the GMNP.

4.4.4 The Outage Scheduling Supervisor will conduct meetings during the planning phase to define the detailed work scope of the outage and ensure coordination of the preparatory tasks associated with the outage being planned. These preparatory tasks include identification, scheduling, and tracking of pre-outage work activities. The commencement and frequency of these meetings, along with the various scope cutoff limits, are designated by the MOP.

4.4.5 At the conclusion of the outage, a post-outage report is compiled by the Outage Scheduling Supervisor which identifies the same items addressed in 4.2.5.

4.5 LONG-RANGE SCHEDULES

4.5.1 Unlike the outage schedules discussed above, the Long-Range Schedule is not a detailed schedule. The main purpose of the Long-Range Schedule is to coordinate design change package work and to ensure that preparations for significant outages are properly coordinated.

4.5.2 The Level I Long-Range Schedule consists of milestones for each refueling and other plant-wide evolutions. This document is issued semiannually and is used principally for coordination of outages by GPC.

4.5.3 The Level II Long-Range Schedule consists of summary activities for: major items which must be completed during a refueling, major capital budget activities which will be performed during normal plant operation, engineering required to support capital or outage activities, and coordination events such as emergency preparedness drills. Level II Long-Range Schedules are issued at the request of management.

4.6 SCOPE CONTROL

4.6.1 Scope Control for Forced-Outage Schedules consists of two separate phases.

4.6.1.1 The first phase of scope control associated with Forced Outage Schedules is performed by Operations Department and Work Planning and Controls during the work order preplanning process. This control is a determination of the workability of the task based upon the availability of materials, engineering, and other support requirements. The available tasks are then reviewed by all Departments. Once the review is completed and a work list of tasks are available Outage Scheduling will then develop a Level III schedule.

4.6.1.2 The second phase is performed after the outage has commenced based upon the plant conditions to be maintained and the expected duration of the outage. Recommendations on scope limitations in the second phase are made to the MOP by Operations, Maintenance, Work Planning and Controls, Engineering, and Outage Planning.

4.6.1.3 Once the scope has been approved by the MOP, all requests for additions to the scope of the outage must be submitted to the MOP via Work Planning & Controls, and Outage Scheduling, on an Outage Schedule Change Request (OSCR) (Figure 1). Design Change Package (DCP) scope is controlled by corporate using a "Worklist Revision Form" similar to the one shown in figure 2. The MWOs used to implement DCP scope changes should still be routed through he OSCR program to maintain proper site documentation. Work Planning & Controls will review the job to determine if it can be accomplished from a technical standpoint and is of significant importance to warrant addition to the work scope of the outage. Work Planning & Controls determines the resources and materials needed and assesses the risk of delaying the work to a future system or refueling outage. The Supervisor Work Planning & Controls either disapproves the schedule change request and returns it to the originator or recommends approval and forwards the request to Outage Scheduling Supervisor for schedule analysis. Outage Scheduling Supervisor reviews the request for relation to the critical path and impact on resource requirements. After analysis, the Outage Scheduling Supervisor ensures appropriate analyses are noted on the form, recommends either approval or disapproval, and forwards the form to the MOP. If Supervisor Work Planning & Controls and the Outage Scheduling Supervisor concur, the OSCR does not require MOP approval. All disapprovals will be concurred with by the Operations Unit Superintendent.

4.6.2 Scope control for Maintenance and Planned Outages follows the same process as for Forced Outages except Phase 2 is implemented prior to the start of the outage at the direction of the MOP. Although the scope control for refueling outages is the same as described above, the refueling outage scope and major changes thereto are approved by the Vice-President, Nuclear-Vogtle Project.

4.6.3 Scope control as defined in 4.6.1 does not apply to Long-Range Schedules. The only limitations on scope control in Long-Range Schedules are in the general guidelines established for inclusion in the Long-Range Schedule.

4.7 SCHEDULE STATUS

4.7.1 After an outage commences, the schedule is statused on a daily basis and reports are issued to supervision and management. A shift turnover status meeting will be conducted in the outage war room at each shift turnover. This meeting will be chaired by the Outage Shift Manager or the Duty Outage Supervisor. Representatives of each department/discipline are required to attend and be prepared to report the status of all activities which are in-progress, scheduled to start/finish but not yet started/finished, and problems encountered/expected. This status should consist of a start/finish time and remaining time required to complete the task for each detailed activity within their respective responsibilities.

4.7.2 Daily, or at the direction of the MOP, Outage Scheduling will prepare status reports with an analysis of the progress made against the original targets established for the outage, identify problem areas which have arisen or been resolved since the previous report, and generate a summary of the scope growth which takes place.

4.7.3 After an outage has been completed, Outage Scheduling will compile a Post-Outage Report to address schedule performance (target vs actual), scope growth, and lessons learned based upon input from all concerned parties.

4.7.4 Long-Range Schedules are updated as events occur or on a semi-annual basis at a minimum.

5.0 <u>REFERENCES</u>

5.1 PROCEDURES

5.1.1 00350-C, "Work Request Program"

5.1.2 00400-C, "Plant Design Control"

5.1.3 00404-C, "Surveillance Test Program"

5.1.4 29402-C, "WPG Work Request Processing"

5.1.5 29536-C, "Outage Management Program"

5.1.6 29539-C, "Long-Range Planning"

END OF PROCEDURE TEXT

OSCR #

OUTAGE SCHEDULE CHANGE REQUEST

TO BE COMPLETED BY ORIGINATOR

DATE / /	ORIGINATOR	ASSOCIATED DOCUMENTS
ADD JOB	NAME	MWO
DELETE JOB	PHONE	SURV
CHANGE DETAIL		DCP

SYSTEM - COMPONENT .....

DESCRIPTION OF WORK .....

.....

.....

.....

REASON FOR CHANGE TO SCHEDULE .....

.....

WORK PLANNING

WORK PLANNER _____ DATE ____ / ____ / ____

RESOURCES REQUIRED .....

.....

RISK CONSIDERATION .....

.....

CLEARANCE REQUIRED Y/N ____ CLEARANCE NUMBER _____

TO BE COMPLETED BY OUTAGE SCHEDULING

SCHEDULER _____ DATE ____ / ____ / ____

IMPACT TO SCHEDULE .....

.....

.....

MAJOR SCOPE ADDITION	Y	N	REQUIRES VICE-PRESIDENT APPROVAL

TITLE	SIGNATURE	APPROVAL		DATE	COMMENTS
WK PLN SUPV		Y	N	/ /	ALL REJECTED WORK REQUIRES CONCURRENCE OF OPERATIONS UNIT SUPERINTENDENT
SCHED SUPV		Y	N	/ /	
O&P MGR		Y	N	/ /	

OPERATIONS UNIT SUPERINTENDENT/
SCHEDULE CHANGE COMPLETED BY: DATE:

FIGURE 1

WORKLIST REVISION FORM (REV 1) WLRF NUMBER ____/____
YEAR SEQ NUM

REQUESTED ACTION: **********

DCR TITLE: _____

SCOPE INCREASE/ADD DCR # _____ TO THE _____ WORKLIST
(CIRCLE ONE)

BUDGET CATEGORY: O&M OR CAPITAL PRIORITY _____

ESTIMATED COST: (X 1000 $)

ENGINEERING	_____
MATERIAL	_____
IMPLEMENTATION	_____
OVERHEADS (AT 50%)	_____
TOTAL	_____

JUSTIFY ADDITION:

_____

_____

_____

SAMPLE

DELETION ACTION: **********

DCR # _____ DCR TITLE _____

WORKLIST PRIORITY: _____

ESTIMATED COST: (X 1000 $)

ENGINEERING	_____
MATERIAL	_____
IMPLEMENTATION	_____
OVERHEADS (AT 50%)	_____ (CAPITAL ONLY)
TOTAL	_____

JUSTIFY DELETION:

_____

_____

_____

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SITE APPROVALS

M - ESD _____/_____

AQM - OPS _____/_____

AQM - SPPT _____/_____

GM - NP _____/_____

CORP APPROVALS

M - NEL _____/_____

GM - VNS _____/_____

VP - VNP _____/_____

FIGURE 2