1.2 DEFINITIONS

The following definitions apply to the terms used in the Safety Analysis Report.

1. Radioactive Material Barrier - A radioactive material barrier includes the systems, structures, or equipment that, together, physically prevent the uncontrolled release of radioactive materials. The four barriers are identified as follows:

   a. Reactor Fuel Barrier - The uranium dioxide fuel is sealed in a zirconium cladding tube.

   b. Nuclear System Process Barrier - The nuclear system process barrier includes the systems of vessels, pipes, pumps, tubes, and similar process equipment that contain the steam, water, gases, and radioactive materials coming from, going to, or in communication with the reactor core. The actual boundaries of the nuclear system process barrier depend upon the status of plant operation.

      For example, process system isolation valves, when closed, form part of the barrier. The steam-jet ejector offgas path forms a planned process opening in the barrier during power operation.

      Because the nuclear system process barrier is designed to be divided by isolation valve action into two major sections under certain conditions, this barrier is considered in two parts as follows:

      (1) Nuclear system primary barrier - This barrier includes the reactor vessel and attached piping out to and including the second isolation valve in each attached pipe. In various codes and standards used in the industry, this barrier is sometimes referred to as the "primary system pressure boundary,"

      (2) Nuclear system secondary barrier - This barrier is that portion of the nuclear system process barrier not included in the nuclear system primary barrier.

   c. Primary Containment - The primary containment is defined as the drywell in which the reactor vessel is located, the pressure suppression chamber, and process line reinforcements out to the outermost containment isolation valve outside valve outside the containment wall. Portions of the nuclear system process barrier may become part of the primary containment, depending upon the location of a postulated failure. For example, a closed main steam isolation valve is part of the

primary containment barrier when the postulated failure of the main steam line is inside the primary containment.

d. Secondary Containment - The secondary containment is the reactor building, which completely encloses the primary containment. The reactor building ventilation system and the standby gas treatment system constitute controlled process openings in this barrier.

2. Radioactive Material Barrier Damage - Radioactive material barrier damage is defined as an unplanned, undesirable breach in a barrier, except that the operation of a main steam relief valve does not constitute barrier damage.

3. Nuclear System - The nuclear system generally includes those systems most closely associated with the reactor vessel which are designed to contain or be in communication with the water and steam coming from or going to the reactor core. The nuclear system includes the following:

Reactor vessel
Reactor vessel internals
Main steam lines from reactor vessel to the isolation
valves outside the primary containment
Neutron monitoring system
Reactor recirculation system
Control rod drive system
Residual heat removal system
Reactor core isolation cooling system
Core standby cooling systems
Reactor water cleanup system
Feedwater system piping between the reactor vessel and the first valve
outside the primary containment.

4. Safety - The word "safety," when used to modify such words as objective, design basis, action, and system, indicates that the objective, design basis, action, or system is related to concerns considered to be of primary safety significance, as opposed to the plant mission to generate electrical power. Thus, the word "safety" is used to identify aspects of the plant which are considered to be of primary importance with respect to safety.

5. Power Generation - The phrase "power generation," when used to modify such words as objective, design basis, action, and system, indicates that the objective, design basis, action, or system is related to the mission of the plant - to generate electrical power - as opposed to concerns considered to be of primary safety importance. Thus, the phrase "power generation" is used to identify aspects of the plant which are not considered to be primary importance with respect to safety.

6. Operational - The adjective "operational," along with its noun and verb forms, is used in reference to the working or functioning of the plant, in contrast to the design of the plant.

7. Scram - Scram refers to the rapid insertion of control rods. A scram is initiated either automatically in response to the detection of undesirable conditions or manually by the control room operator.

8. Limiting Safety System Setting (LSSS) - The limiting safety system setting is a setting on instrumentation which initiates the automatic protective action at a level such that the safety limits will not be exceeded. The region between the safety limit and these settings represent margin with normal operation lying below these settings. The margin has been established so that with proper operation of the instrumentation the safety limits will never be exceeded.

9. Limiting Conditions for Operation (LCO) - The limiting conditions for operation specify the minimum acceptable levels of system performance necessary to assure safe startup and operation of the facility. When these conditions are met, the plant can be operated safely and abnormal situations can be safely controlled.

10. Safety Limit - The safety limits are limits below which the reasonable maintenance of the cladding and primary systems are assured. Exceeding such a limit requires unit shutdown and review by the Nuclear Regulatory Commission before resumption of the unit operation. Operation beyond such a limit may not in itself result in serious consequences but it indicates an operational deficiency subject to regulatory review.

11. Normal Operation - Normal operation is normal plant operation under planned conditions in absence of significant abnormalities. Operations subsequent to an incident (transient, accident, or special event) are not considered planned operations until the actions taken in the plant are identical to those which would be used had the incident not occurred. The established planned operations can be considered as a chronological sequence: refueling outage, achieving criticality, heatup, power operation, achieving shutdown, cooldown, and refueling outage.

    The following planned operations are identified:

    a. Refueling Outage - Refueling outage is the period of time between the shutdown of the unit prior to a refueling and the startup of the unit after that refueling. For the purpose of designating frequency of testing and surveillance, a refueling outage shall mean a regularly scheduled refueling outage.

b. Achieving Criticality - Achieving criticality includes all the plant actions which are normally accomplished in bringing the plant from a condition in which all control rods are fully inserted to a condition in which nuclear criticality is achieved and maintained.

c. Heatup - Heatup begins where achieving criticality ends and includes all plant actions which are normally accomplished in approaching nuclear system rated temperature and pressure by using nuclear power (reactor critical). Heatup extends through warmup and synchronization of the turbine generator.

d. Power Operation - Power operation begins where heatup ends and includes continued operation of the plant at power levels in excess of heatup power.

e. Achieving Shutdown - Achieving shutdown begins where power operation ends and includes all plant actions normally accomplished in achieving nuclear shutdown (more than one rod subcritical) following power operation.

f. Cooldown - Cooldown begins where achieving shutdown ends and includes all plant actions normally accomplished in the continued removal of decay heat and the reduction of nuclear system temperature and pressure.

12. Incident - An incident is any event--abnormal operational transient, accident, special event, or other event, not considered as part of planned operation.

13. Abnormal Operational Transient - An abnormal operational transient includes the events following a single equipment malfunction or a single operator error that is reasonably expected during the course of plant operations. Power failures, pump trips, and rod withdrawal errors are typical of the single malfunctions or errors initiating the events in this category.

14. Abnormal Occurrence - Abnormal occurrence refers to the occurrence of any plant condition that:

a. Causes any abnormal operational transient, or

b. Violates a limiting condition for operation as established in the technical specifications, or

c. Exceeds a limiting safety system setting as established in the technical specifications, or

d. Causes any uncontrolled or unplanned release of radioactive material from the site.

15. Accident - An accident is a single event, not reasonably expected during the course of plant operations, that has been hypothesized for analysis purposes or postulated from unlikely but possible situations, and that causes or threatens a rupture of a radioactive material barrier. A pipe rupture qualifies as an accident; a fuel cladding defect does not.

16. Design Basis Accident - A design basis accident is a hypothesized accident the characteristics and consequences of which are utilized in the design of those systems and components pertinent to the preservation of radioactive material barriers and the restriction of radioactive material release from the barriers. The potential radiation exposures resulting from a design basis accident are greater than any similar accident postulated from the same general accident assumptions. For example, the consequences of a complete severance of a recirculation loop line are more severe than those resulting from any other single pipeline failure inside the primary containment.

17. Special Event - A special event that neither qualifies as an abnormal operational transient nor an accident but that is postulated to demonstrate some special capability of the plant or its systems.

18. Safety Action - A safety action is an ultimate action in the plant that is essential to the avoidance of specified conditions considered to be of primary safety significance. The specified conditions are those that are most directly related to the ultimate limits on the integrity of the radioactive material barriers or the release of radioactive material. There are safety actions associated with planned operation, abnormal operational transients, accidents, and special events. Safety actions include such actions as the indication to the operator of the values of certain process variables, reactor scram, core standby cooling, and reactor shutdown from outside the control room. See Figures 1.2-1 and 1.2-3 and Tables 1.4-2A and 1.4-2B.

19. Power Generation Action - A power generation action is an action in the plant that is essential to the avoidance of specified conditions considered to be of primary significance to the plant mission--the generation of electrical power. The specified conditions are those that are directly related to the following:

    a. The ability to carry out the plant mission--the generation of electrical power--through planned operation,

    b. The avoidance of conditions that would limit the ability of the plant to generate electrical power, and

c. The avoidance of conditions that would prevent or hinder the return to conditions permitting the use of the plant to generate electrical power following an abnormal operational transient, accident, or special event. There are power generation actions associated with planned operation, abnormal operational transients, accidents, and special events. See Figure 1.2-3.

20. Protective Action - An action initiated by the protection system when a limit is reached. A protective action can be at a channel or system level.

21. Protective Function - A system protective action which results from the protective action of the channels monitoring a particular plant condition.

22. Safety System - A safety system is any system, group of systems, component, or group of components the actions of which are essential to accomplishing a safety action. See Figure 1.2-3 and Table 1.4-2A and 1.4-2B.

23. Process Safety System - A process safety system is a safety system the actions of which are essential to a safety action required during planned operation. See Figure 1.2-3 and Table 1.4-2A and 1.4-2B.

24. Nuclear Safety System - A nuclear safety system is a safety system the actions of which are essential to a safety action required in response to an abnormal operational transient. See Figure 1.2-3 and Table 1.4-2A and 1.4-2B.

25. Engineered Safeguard - An engineered safeguard is a safety system the actions of which are essential to a safety action required in response to accidents. See Figure 1.2-3 and Table 1.4-2A and 1.4-2B.

26. Protection System - Protection system is a generic term that may be applied to nuclear safety systems and engineered safeguards. See Figure 1.2-3 and Table 1.4-2A and 1.4-2B.

27. Special Safety System - A special safety system is a safety system the actions of which are essential to a safety action required in response to a special event. See Figure 1.2-3 and Table 1.4-2A and 1.4-2B.

28. Power Generation System - A power generation system is any system the actions of which are not essential to a safety action, but which are essential to a power generation action. Power generation systems are provided for any of the following purposes:

    a. To carry out the mission of the plant--generate electrical power--through planned operation,

b. To avoid conditions which would limit the ability of the plant to generate electrical power, and

c. To facilitate and expedite the return to conditions permitting the use of the plant to generate electrical power following an abnormal operational transient, accident, or special event.

See Figure 1.2-3 and Table 1.4-2A and 1.4-2B.

29. Safety Objective - A safety objective describes in functional terms the purpose of a system or component as it relates to conditions considered to be of primary significance to the protection of the public. This relationship is stated in terms of radioactive material barriers or radioactive material release. The only systems that have objectives are safety systems. See Figure 1.2-3.

30. Power Generation Objective - A power generation objective describes in functional terms the purpose of a system or component as it relates to the mission of the plant. This includes objectives that are specifically established so the plant can fulfill the following purposes:

a. The generation of electrical power through planned operation,

b. The avoidance of conditions that would limit the ability of the plant to generate electrical power, and

c. The avoidance of conditions that would prevent or hinder the return to conditions permitting the use of the plant to generate electrical power following an abnormal operational transient, accident, or special event. See Figure 1.2-3.

A system or piece of equipment has a power generation objective if it is a power generation system. A safety system can have a power generation objective, in addition to a safety objective, if parts of the system are intended to function for power generation purposes.

31. Analytical Objective - An analytical objective describes the purpose or intent of a portion of the Safety Analysis Report presenting an analysis.

32. Safety Design Basis - The safety design basis for a safety system states in functional terms the unique design requirements which establish the limits within which the safety objective shall be met. A power generation system may have a safety design basis which states in functional terms the unique design requirements that ensure that neither planned operation nor operational failure by the system results in conditions for which plant safety actions would be inadequate.

33. Power Generation Design Basis - The power generation design basis for a power generation system states in functional terms the unique design requirements that establish the limits within the power generation objective shall be met. A safety system may have a power generation design basis which states in functional terms the unique design requirements which establish the limits within which the power generation objective for the system shall be met.

34. Safety Evaluation - A safety evaluation is an evaluation that shows how the system satisfies the safety design basis. A safety evaluation is performed for those systems having a safety design basis. Safety evaluations form the bases for the technical specifications and establish why specific safety limitations are imposed.

35. Power Generation Evaluation - A power generation evaluation is an evaluation that shows how the system satisfies some or all of the power generation design bases. Because power generation evaluations are not directly pertinent to public safety, they are generally not included. However, where a system or component has both safety and power generation objectives, a power generation evaluation can be used to clarify the safety versus power generation capabilities.

36. Operational Nuclear Safety Requirements - An operational nuclear safety requirement is a limitation or restriction on either the value of a process variable or the operability of a plant system. Such operational nuclear safety requirements must be observed in the operation (not necessarily at power) of the plant to satisfy specified operational nuclear safety criteria. The aggregate of all operational nuclear safety requirements defines an operational framework within which actual plant operations must remain.

37. Rated Power - For the pre-uprated unit(s), equivalent to Rated Thermal Power (RTP) which corresponds to a total reactor core heat transfer rate to the reactor coolant of 3293 MWt. For the uprated unit(s), rated power refers to operation at a reactor thermal power of 3458 MWt. Rated power is also termed 100 percent power and is the maximum power level authorized by the operating license. Rated steam flow, rated coolant flow, rated neutron flux, and rated nuclear system pressure refer to the values of these parameters when the reactor is at rated power.

38. Design Power - Design power refers to the power level used in safety and licensing analyses which support operation at rated power. Design power corresponds to 3,440 MWt for the pre-uprated unit(s). For the uprated unit(s), there is no distinction between “design power” and rated power. For the uprated unit(s), design power is also equal to 3458 MWt. For radiological

dose analyses provided in Section 14.6, design power has been assumed to be 3952 MWt.

39. Single Failure - A single failure is a failure that can be ascribed to a single causal event. Single failures are considered in the design of certain systems and are presumed in the evaluations of incidents to investigate the ability of the plant to respond in the required manner under degraded conditions. The nature of single causal event to be presumed depends on the risk of the event being evaluated. Reasonably expected single failures are presumed as the cause of abnormal operational transients. Single failures of passive equipment are assumed sometimes to be the causes of accidents. Safety actions essential in response to abnormal operational transients and accidents must be carried out in spite of single failures in active equipment. In any case, a single failure includes the multiple effects resulting from the single causal event.

40. Operable - Operability - A system, subsystem, division, component, or device shall be Operable or have operability when it is capable of performing its specified safety function(s) and when all necessary attendant instrumentation, controls, normal or emergency electrical power, cooling and seal water, lubrication and other auxiliary equipment that are required for the system, subsystem, division, component, or device to perform its specified safety function(s) are also capable of performing their related support function(s).

41. Operating - A system or component is operating when it is performing its intended functions in its required manner.

42. Operating Cycle - Interval between the end of one refueling outage for a particular unit and the end of the next subsequent refueling outage for the same unit.

43. Deleted.

44. Mode - A Mode shall correspond to any one inclusive combination of mode switch position, average reactor coolant temperature, and reactor vessel head closure bolt tensioning, specified as follows, with fuel in the reactor vessel.

MODE	TITLE	REACTOR MODE SWITCH POSITION	AVERAGE REACTOR COOLANT TEMPERATURE (°F)
1	Power Operation	Run	NA
2	Startup	Refuel[(a)] or Startup/Hot Standby	NA
3	Hot Shutdown[(a)]	Shutdown	$>$ 212
4	Cold Shutdown[(a)]	Shutdown	$\leq$ 212
5	Refueling[(b)]	Shutdown or Refuel	NA

(a) All reactor vessel head closure bolts fully tensioned.

(b) One or more reactor vessel head closure bolts less than fully tensioned.

45. Deleted.

46. Deleted.

47. Deleted.

48. Deleted.

49. Deleted.

50. Deleted.

51. Place in Isolated Condition - Place in isolated condition means conduct an uninterrupted normal isolation of the reactor from the main (turbine) condenser including the closure of the main steam isolation valves.

52. Deleted.

53. Deleted.

54. Deleted.

55. Refueling Outage - Refueling outage is a period of time between the shutdown of the unit prior to a refueling and the startup of the unit after that refueling. For the purpose of designating frequency of testing and

surveillance, a refueling outage shall mean a regular scheduled refueling outage.

56. Core Alteration - Core Alteration shall be the movement of any fuel, sources, or reactivity control components within the reactor vessel with the vessel head removed and fuel in the vessel. The following exceptions are not considered to be Core Alterations:

    a. Movement of source range monitors, local power range monitors, intermediate range monitors, traversing incore probes, or special movable detectors (including undervessel replacement); and

    b. Control rod movement, provided there are no fuel assemblies in the associated core cell.

    Suspension of Core Alterations shall not preclude completion of movement of a component to a safe position.

57. Risk - Risk is the product of the probability of an event and the adverse consequences of the event.

58. Reliability - Reliability is the probability that an item will perform its specified function without failure for a specified time period in a specified environment.

59. Unreliability - Unreliability is the probability that a component or system will fail to perform its specified action for a specified time period in a specified environment. (The sum of reliability and unreliability equals unity.)

60. Availability - Availability is the probability that a system will be functional at any randomly selected instant.

61. Unavailability - Unavailability is the probability that component or system will not be functional at any randomly selected instant. (The sum of availability and unavailability equals unity.)

62. Repair Rate - The repair rate is the number of repairs completed per unit time.

63. Failure Rate - The failure rate is the number of failures per unit time.

64. Test Duration - The test duration is the elapsed time between test initiation and test termination.

65. Test Interval - The test interval is the elapsed time between the initiation of identical tests.

66. Active Component - A device characterized by an expected significant change of state or discernible mechanical motion in response to an imposed design basis load demand upon the system. Examples are: switch, relay, valve not remaining in a stationary position, pressure switch, turbine, transistor, motor, damper, pump, and analog meter.

67. Passive Component - A device characterized by an expected negligible change of state or negligible mechanical motion in response to an imposed design basis load demand upon the system. Examples are: cable, piping, valve in stationary position, resistor, capacitor, fluid filter, indicator lamp, cabinet, and case.

68. Operating Basis Earthquake - That earthquake which produces the vibratory ground motion for which those features of the nuclear power plant necessary for continued operation without undue risk to the health and safety of the public are designed to remain functional.

69. Design Basis Earthquake - That earthquake which produces the vibratory ground motion for which those features of the nuclear power plant necessary to shut down the reactor and maintain the plant in a safe condition without undue risk to the health and safety of the public are designed to remain functional.

70. Deleted.

71. Deleted.

72. Probable Maximum Flood - The Probable Maximum Flood (PMF) is the hypothetical flood (peak discharge, volume, and hydrograph shape) that is considered to be the most severe reasonable possible, based on comprehensive hydrometerological application of probable maximum precipitation, and other hydrologic factors favorable for maximum flood runoff, such as sequential storms and snowmelt. The PMF design level at the Browns Ferry site is 572.5 feet.

    The term Maximum Possible Flood (MPF) has also been used in Browns Ferry design documents, however the preferred term for all Browns Ferry design is PMF. (See also Appendix 2.4.A, Probable Maximum Flood).

73. Emergency Core Cooling Systems (ECCS) are defined as:

    a. High Pressure Coolant Injection System (HPCI),

    b. Automatic Depressurization System,

    c. Core Spray System, and

d. Low Pressure Coolant Injection System (LPCI) (an operating mode of the Residual Heat Removal System).

The term Core Standby Cooling Systems (CSCS) has also been used in the FSAR, design documents, and plant procedures to describe the same systems. The terms ECCS and CSCS may be used interchangeably.