TENNESSEE VALLEY AUTHORITY
CHATTANOOGA, TENNESSEE 37401
400 Chestnut Street Tower II

February 15, 1984

Director of Nuclear Reactor Regulation
Attention: Ms. E. Adensam, Chief
Licensing Branch No. 4
Division of Licensing
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555

Dear Ms. Adensam:

In the Matter of the Application of) Docket Nos. 50-390
Tennessee Valley Authority) 50-391

By your letter dated December 16, 1983 to H. G. Parris, TVA was requested to provide additional information concerning the Watts Bar Nuclear Plant (WBN) Radiological Emergency Plan (REP) Emergency Action Levels (EAL). Enclosure 1 provides TVA's responses.

Also enclosed are draft REP revisions resulting from TVA's EAL review and NRC concerns related to missing figures, a shift manning table, and agreement letter with the near-site media center. TVA expects to formalize these revisions in the REP before the NRC REP appraisal for WBN.

If you have any questions concerning this matter, please get in touch with D. P. Ormsby at FTS 858-2682.

Very truly yours,

TENNESSEE VALLEY AUTHORITY

L. M. Mills, Manager
Nuclear Licensing

Sworn to and subscribed before me
this 15th day of Feb. 1984
Paulette H. White
Notary Public
My Commission Expires 9-5-84

Enclosures (2)
cc: U.S. Nuclear Regulatory Commission (Enclosures)
Region II
Attn: Mr. James P. O'Reilly, Regional Administrator
101 Marietta Street, NW, Suite 2900
Atlanta, Georgia 30303

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ENCLOSURE 1

REVIEW OF EMERGENCY ACTION LEVELS FOR
THE WATTS BAR NUCLEAR PLANT, UNITS 1 AND 2

I. UNUSUAL EVENT

Comment

Initiating Condition 2. (Radiological effluents). The licensee should consider listing radiation monitors such that a valid alarm mode will indicate that liquid or gaseous radiological effluents have exceeded technical specification limits.

Response

Radiation monitors at Watts Bar Nuclear Plant (WBN) are set to alarm before reaching technical specification limits. The alarm setpoints are also verified frequently and may be changed because of changing detector and equipment characteristics. Therefore, sampling is the only valid method for determining whether effluents have exceeded technical specification limits.

No revision to the WBN Radiological Emergency Plan (REP) is necessary.

Comment

Initiating Condition 11. (Alarms on process or effluent parameters). The licensee's EAL requirement that an Unusual Event will be declared after an evaluation by the shift engineer is acceptable if the evaluation can be made promptly (within 15 minutes).

Response

A prompt evaluation can be made by the shift engineer after detection of a malfunction as described in the EAL item 1.

Comment

Initiating Condition 17. (Rapid depressurization of PWR secondary side). The licensee should consider listing other EALs that will indicate depressurization of the secondary side, inside and outside of containment. These could include a "steam line differential safety injection signal and high reactor building pressure" or "high steam flow and Lo-Lo TAVG" or "a steam pressure safety injection signal."

Response

These suggested conditions are addressed in other EALs. While they do indicate secondary side depressurization, they have greater significance and are more readily recognized in the other EALs (such as ECCS initiation - Unusual Event EAL 1). Therefore, the shift engineer will classify the event accordingly and these items will not be included in this EAL.

II. ALERT

Comment

Initiating Condition 2. (Failure of one steam generator tube with LOOP). We interpret this initiating condition to include a nonguillotine failure of one steam generator tube (that is, the rate of primary to secondary leakage may be relatively small). With smaller leaks, the water level in the affected steam generator might not increase because the steam generator level control system might be able to compensate for the leak by reducing feedwater flow. Therefore, the licensee's EAL for estimating leakage by considering the amount of rise in the faulted steam generator level may not always apply but is acceptable. Other EALs the licensee should consider for indicating steam generator tube failure are radiation monitor alarms on the steam generator blowdown and condenser exhaust.

Response

Any primary-to-secondary system leakage greater than technical specification limits is covered by Unusual Event EAL, item 5. Should the system leakage be greater than 50 gpm, the event would be covered by Alert EAL, item 5. The lag time for an increased indication on the steam generator blowdown or condenser exhaust radiation monitors would be significant at the smaller leak rates. While we agree that an increase in steam generator blowdown and condenser exhaust radiation monitor readings would indicate a primary-to-secondary leakage, the decrease in the reactor coolant system pressurizer level will be immediate. TVA will revise the EAL before the emergency plan implementation appraisal to clearly indicate the more evident decrease in reactor coolant system level.

Comment

Initiating Condition 3. (Failure of steam generator tubes). The licensee should consider using the NUREG-0654 initiating condition version rather than "Rapid failure of more than 10 steam generator tubes." To help indicate large primary to secondary leak rates from failure of steam generator tubes, the licensee should consider listing EALs that indicate a reactor trip on low pressure or reactor pressure decreasing uncontrollably, and radiation monitor alarms on the steam generator blowdown or condenser exhaust. In addition, EALs that indicate no significant increase in reactor building pressure, sump level, or radiation will be helpful for indicating failure of steam generator tubes as opposed to a steam line break.

Response

TVA will revise the WBN REP before the emergency plan implementation appraisal to utilize the EAL as written in NUREG-0654. It is TVA's policy to concentrate on what the problem is, not what the problem is not. Therefore, reactor building pressure, sump level, or radiation will not be included in the change. Additionally, a reactor trip on low pressure or reactor pressure decreasing uncontrollably will be

obvious from the safety injection actuation, while the radiation-monitor alarms on the steam generator blowdown or condenser exhaust may be significantly delayed.

Comment

Initiating Condition 4. (Steam line break with primary to secondary leakage). The licensee should consider changing their initiating condition which is a misinterpretation of the intent of the NUREG-0654. It should read "steam line break with significant (e.g., greater than 10 gpm) primary to secondary leak rate." The use of MSIV malfunction in the initiating condition is intended for BWRs. Thus, the licensee's EALs for indicating failure of the MSIVs to close are not applicable. The licensee's EAL for indicating a steam line break is "by use of EOI-0 and EOI-2." The Staff does not have access to these EOIs, in order to evaluate their EAL adequacy. Thus, the licensee may consider using the following EAL set for indicating a steam line break: "steam line differential safety injection signal and high reactor building pressure and radiation alarms", (these EALs indicate a steam line break with steam exhausting to containment and contamination of containment) or "high steam flow and Lo-Lo TAVG or steam pressure safety injection signal" (these three EALs indicate a steam line break outside containment). The licensee's EALs for indicating steam generator primary or secondary leakage greater than 10 gpm is "as determined by surveillance instruction 4.5 or chemical analysis." These EALs may result in delaying the declaration of an Alert. Another EAL to consider for indicating this primary to secondary leak rate is the steam generator blowdown liquid monitor alarm.

Response

TVA will revise the WBN REP before the emergency plan implementation appraisal to reflect the intent of the EAL as written in NUREG-0654. It is TVA's policy to diagnose a plant problem or malfunction using the Emergency Operating Instructions (EOIs). It is not intended that the REP be used for that purpose. The purpose of the REP is to classify the problem into one of the four emergency classifications. Therefore, use of EOI-0 and EOI-2 to determine that a steam-line break has occurred is appropriate. Should a primary to secondary leak occur before the steam line break, it would already have been known and classified as an Unusual Event (item 5), Alert (item 5) or Site Area Emergency (item 1). If primary-to-secondary leakage occurs coincident or subsequent to a steam line break, the only methods to determine the amount of leakage will be by SI-4.5 or chemical analysis, because the resulting safety injection signal will isolate other indications such as a steam generator blowdown.

Comment

Initiating Condition 9. (Coolant pump seizure leading to fuel failure). The licensee should consider using a "Failed fuel or letdown radiation monitor" EAL in place of using chemical analysis to determine an increase in specific activity in the primary system.

Response

A fuel failure resulting in a high coolant activity would be classified as an Alert by Alert EAL, item 1. Therefore, no change will be made to the WBN REP.

Comment

Initiating Condition 10. (Complete loss of any function needed for plant cold shutdown). The licensee should consider listing EALs that indicate the failure of the systems needed to maintain the primary system temperature less than 200°F, or other EALs that indicate the complete loss of any function needed for plant cold shutdown.

Response

TVA will revise the WBN REP before the emergency plan implementation appraisal to include a statement on maintaining an adequate shutdown margin. Maintenance of an adequate shutdown margin and a temperature less than 200°F will ensure the plant remains in cold shutdown.

Comment

Initiating Condition 11. (Failure of the reactor protection system). The licensee's EAL set is confusing (too wordy). All that is required is a valid scram signal (i.e., trip status lights) and a neutron count rate that indicates the reactor has not been brought subcritical.

Response

TVA will revise the WBN REP before the emergency plan implementation appraisal to simplify the wording of the EAL.

Comment

Initiating Condition 12. (Fuel handling accident). The licensee's EALs for release to containment and for release to the Auxiliary Building should be "ORed."

Response

TVA will revise the WBN REP before the emergency plan implementation appraisal to incorporate this comment.

Comment

Initiating Condition 14. (Alarms lost). The EAL requirement that the unit not be in a shutdown condition is unnecessary.

Response

The phrase in the TVA EAL, "with unit not in a stable condition," is used to clarify the EAL and prevent a declaration of an Alert for a temporary loss of power to the annunciator system as has occurred several times in the past. Therefore, no revision will be made to the REP.

Comment

Initiating Condition 15. (Radiological effluents). The licensee should consider listing the appropriate radiation monitors that will help indicate radiological effluents greater than 10 times technical specifications.

Response

Radiation monitors are set to alarm before reaching the technical specification values and are changed frequently because of changes in background and other instrument characteristics.

Consequently, readings for specific radiation monitors denoting 10 times the technical specification limits would be impossible to maintain. Therefore, the WBN REP will not be revised to include this suggestion.

Comment

Initiating Condition 20. (Evacuation of Control Room). The licensee's EAL will be acceptable if the words "anticipated or" are inserted before the word "required."

Response

TVA will revise the WBN REP before the emergency plan implementation appraisal to incorporate this comment.

III. SITE AREA EMERGENCY

Comment

Initiating Condition 1. (Known LOCA). The licensee should consider adding a "steam pressure not lower in one steam generator than the others" EAL which eliminates all events except a LOCA.

Response

It is TVA's position that we will determine what the problem is, not what the problem is not. However, we agree with the basis for the comment and will revise the WBN REP accordingly before the emergency plan implementation appraisal.

Comment

Initiating Condition 2. (Degraded core with possible loss of coolable geometry). The licensee should consider adding to their EAL set possible conditions for evaluating loss of coolable geometry such as "temperature drop across the core increasing or no temperature drop across the core."

Response

TVA EAL, item 2. "Incore thermocouples offscale more than the 700°F" implies an increasing temperature difference; therefore, no revision is necessary to the WBN REP.

Comment

Initiating Condition 3. (Failure of steam generator tubes with LOOP). All of the review comments for Alert Initiating Condition No. 3, "rapid failure of steam generator tubes," apply to the EAL set. The licensee's EAL set for indicating loss of offsite power is adequate.

Response

See the response to Alert Initiating Condition 3 above.

Comment

Initiating Condition 5. (PWR steam line break with primary to secondary leak and fuel damage). The licensee's EALs for indicating primary to secondary leakage (EAL 4.) may result in delaying the declaration of a Site Area Emergency. The licensee should consider using, for example, steam generator blowdown radiation monitor alarms for indicating this leakage. The licensee's EAL 5 indicates fuel damage and is acceptable. EAL 3 indicates steam line breaks outside containment. EAL 2 which concerns steam line differentials would be acceptable for indicating a steam line break inside containment if supplemented with a "high reactor building pressure alarm" EAL. EAL 1 which references EOI-0 and EOI-2 cannot be evaluated.

Response

During a steam line break, the steam generator blowdown monitor will isolate and be unavailable. The only method available for determining primary-to-secondary leakage is by chemical analysis, water inventory balance, or surveillance instructions. Additionally, depending on the size of the steam line break, it could take several hours to reach the "high reactor building pressure alarm," thus delaying the initiation of the Site Area Emergency. Therefore, no revision will be made to the WBN REP.

Comment

Initiating Condition 8. (Complete loss of any function needed for plant hot shutdown). The licensee should consider using the NUREG-0654 initiating condition version. The licensee's EALs do not consider all of the systems required for a plant hot shutdown. Consideration should be given to a "loss of the condenser and steam generator safety valves not operable" EAL.

Response

TVA will revise the WBN REP before the emergency plan implementation appraisal to add an EAL on loss of secondary heat sink.

Comment

Initiating Condition 10. (Major damage to spent fuel). The licensee should consider listing EALs that use the containment and fuel handling building radiation monitors as well as a "Shift Supervisor's opinion" EAL which will take into account the possibility of false alarms or other accidents causing trips of the radiation alarms.

Response

TVA has a senior reactor operator supervising all fuel handling operations. The supervisor is capable of determining whether major damage to a spent-fuel assembly has occurred. As stated in the comment, false alarms and other types of accidents could cause the alarms to trip. No one will be in a better position to verify this condition than the supervisor; therefore, no change will be made to the REP.

Comment

Initiating Condition 12. (Alarms lost and plant transient in progress). The phrase "plant is not in cold shutdown or" should be deleted from the licensee's initiating condition. The phrase "unit not in a stable condition" should be deleted from the licensee's EAL set, and a "Shift Supervisor's opinion that a transient has occurred or is in progress" EAL should be added to take into account the large number of possible transients.

Response

TVA will revise the WBN REP before the emergency plan implementation appraisal to include these comments.

IV. GENERAL EMERGENCY

Comment

Initiating Condition 1. (Effluent monitors detect radiation levels). The licensee should change "adverse meteorological conditions" in their initiating condition to "actual meteorological conditions" to be consistent with NUREG-0654.

Response

It is TVA's decision to be more conservative than NUREG-0654 suggests; therefore, no change will be made to the emergency plan.

Comment

Initiating Condition 2. (Loss of 2 of 3 fission product barriers). The licensee's EAL set is incomplete. The suggestions of NUREG-0818 should be used in developing acceptable EALs. This initiating condition and corresponding EALs were not addressed separately by the licensee, but were listed as EAL (f) under initiating condition No. 3.

Response

TVA has reviewed the suggestions of NUREG-0818 and maintains that all suggestions are contained in TVA's EAL set. No change will be made.

Comment

Initiating Condition 4. (Other plant conditions). The licensee responded to this initiating condition by listing the example PWR sequences of NUREG-0654, Appendix 1, and some corresponding EALs. An appropriate EAL for this initiating condition is "Shift Supervisor's opinion."

Response

TVA will revise the WBN REP before the emergency plan implementation appraisal to reflect this comment.

Comment

Initiating Condition 5a. (Small and large LOCAs). The licensee should consider EALs concerning decreasing reactor coolant system pressure and steam generator pressures using the suggestions of NURGE-0818 as guidelines.

Response

TVA has reviewed NUREG-0818 and maintains that all suggestions contained in the NUREG are contained in the TVA EAL set except the two specific items listed in the comment. As stated in response to Site Area Emergency Initiating Condition 1, TVA attempts to refrain from determining what the problem is not and concentrate on what the problem is. Therefore, the comment on steam generator pressures will not be included. Additionally, it is uncertain whether the reactor coolant system pressure will be increasing or decreasing under this initiating condition without specific status on other plant equipment. Since this item could cause operator confusion, it will not be included as a TVA EAL.

Comment

Initiating Condition 5b. (Transient initiated by loss of feedwater). The licensee's EAL set is incomplete in indicating the sequences of this initiating condition. The licensee should consider using the suggestions of NUREG-0818 in developing an acceptable EAL set.

Response

TVA has reviewed NUREG-0818 and complies with each item except loss of ECCS heat sink. Therefore, TVA will revise the WBN REP before the emergency plan implementation appraisal to include an EAL on loss of ECCS heat sink.

Comment

Initiating Condition 5d. (Failure of offsite and onsite power with loss of feedwater capability). If the licensee's reactor has steam-driven emergency feedwater pumps, failure of such pumps is a requirement for this initiating condition.

Response

The phrase "No auxiliary feedwater flow" in the TVA EAL set includes flow from the steam-driven auxiliary feedwater pump. No change will be made to the emergency plan.

Comment

The licensee's scheme for addressing protective actions does not include all of the conditions for making protective action decisions and taking the recommended actions as stated in NUREG-0654, Appendix 1.

Response

Making protective action decisions and the methodology for making those decisions are actions covered in the REP implementing procedure documents. The WBN REP only covers the protective actions that may be recommended and categories of information that will be used to arrive at these recommendations. In response to IE Information Notice No. 83-28, TVA is preparing logic diagrams for inclusion in the implementing procedures, which will take into account the information in the notes to General Emergency initiating condition 4 of NUREG-0654, Appendix 1. A revision will also be made to the REP to establish the methodology of recommending these protective actions. This revision will be completed before the emergency plan implementation appraisal.

Comment

The following initiating conditions were not addressed by the licensee:

Site Area Emergency 9

General Emergency 7

Response

TVA will revise the WBN REP before the emergency plan implementation appraisal to include these items.

Comment

It appears that initiating conditions Nos. 4 and 5 and the corresponding EALs are repeated from initiating conditions Nos. 8 and 9 of the Site Area Emergency EAL Section, and should be deleted.

Response

TVA will revise the WBN REP before the emergency plan implementation appraisal to correct this mistake.

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ENCLOSURE 2

The following is a list of examples of initiating conditions and specific instrument parameters, if necessary, for those conditions for the various accident classifications.

5.2.1 Initiating Conditions and Emergency Action Levels for Notification of Unusual Event

Initiating Conditions	Emergency Action Levels
1. ECCS initiated and discharge to vessel	1. ~~SI~~ ECCS initiated by valid SI signals as listed in Technical Specifications 3.3-3 and 3.3-4. ~~2. "SI Actuated" alarm on alarm panel XA-55-4A.~~ ~~3. Reactor trip first out alarm due to SI actuation.~~
2. Radiological effluent specification limits exceeded.	1. Liquid effluent release greater than technical specification limit 3.11.1.1 as verified by analysis. 2. Instantaneous gas release rate $\geq$ .20 Ci/sec as determined by plant computer release rate program or WBN Gaseous Release Surveillance Instructions.
3. Fuel damage indication.	Reactor coolant specific activity exceeds limits of Technical Specification 3.4.8 by analysis.
(a) High-coolant activity sample.	1. Gross failed-fuel detector increased greater than 2×10^4 cpm and verified by lab analysis.
(b) Failed-fuel monitor indicated increase greater than 0.1 percent equivalent fuel failures within 30 minutes.	

5.2.1 Initiating Conditions and Emergency Action Levels for Notification of Unusual Event (Cont'd)

Initiating Conditions	Emergency Action Levels
4. Abnormal coolant temperature and/or pressure or abnormal fuel temperatures outside of technical specification limits.	1. RCS pressure indicating ≥2735 psig. 2. RCS ~~temperature~~ parameters exceeding the limits of technical specification figure 2.1-1. ~~3. Abnormal fuel temperatures as inferred from coolant temperature as well as power distribution measurements based on ex-core and incore nuclear instrumentation and incore thermocouples.~~
5. Exceeding either primary/secondary leak rate technical specification or system leak rate technical specification.	1. Primary to secondary leak rate ≥1 gpm through all steam generators and/or 500 gal/day through any one S/G as verified by SI-4.5. 2. RCS leak rate >1 gpm unidentified or >10 gpm identified as verified by SI-2 and SI-4.5. 3. Controlled leakage >40 gpm as verified by SI-4.20.
6. Failure of safety or relief valve to close. following reduction in applicable pressure.	1. Primary System (a) PORV or safety valve relief line high temperature alarm and indication on temperature indicators. (b) Acoustic monitor and indication of flow. (c) PRT temperature, level, and pressure increasing with one of above symptoms. (d) PORV position switch. (e) Decreasing RCS pressure. 2. Secondary System (a) Increased steam/feed flow in conjunction with decreasing RCS temperature. (b) EOI-0 and EOI-2 indications.

5.2.1 Initiating Conditions and Emergency Action Levels for Notification of Unusual Event (Cont'd)

Initiating Conditions	Emergency Action Levels
7. Loss of offsite power or loss of onsite ac power capability	1. Offsite Power Shutdown boards supplied from diesel generators only. 2. Onsite Power Both unit-related diesel generators inoperable simultaneously as determined by the shift supervisor or failure to meet acceptance criteria of SI-8.1.
8. Loss of containment integrity requiring shutdown by technical specifications	1. Loss of containment integrity requiring shutdown as defined in technical specifications ~~(a) Notification of an open~~ and inoperable isolation valve or open penetration. (b) Failure ~~to~~ meet the acceptance criteria ~~of SI-6.33, SI-6.1, SI-6.2, or SI-6.3.~~
9. Loss of engineered safety features or fire protection system function requiring shutdown by technical specifications.	~~1.~~ Unit is placed in modes 3, 4, or 5 as a result of exceeding technical specification LCO where the associated action statement requires a unit shutdown. ~~2. Shutdown required by GOI-6.~~
10. Fire within the plant lasting more than 10 minutes.	Fire brigade leader report of fire lasting >10 minutes in the protected areas or perimeter.
11. Indications or alarms on process or effluent parameters not functioning in control room to an extent requiring plant shutdown or other significant loss of assessment or communication capability.	1. Loss of indications in the control room will be visually apparent. In addition, routine instrumentation checks are made on each shift to monitor instrument conditions.

5.2.1 Initiating Conditions and Emergency Action Levels for Notification of Unusual Event (Cont'd)

Initiating Conditions		Emergency Action Levels
		1. (Con't) Communications with remote instruments are also checked. All alarms are verified during testing as part of the plant surveillance program required by technical specifications. 2. This event will be declared after an evaluation by the Shift Engineer.
12.	Security threat or attempted entry or attempted sabotage.	Shift Engineer's judgement, based upon advice of the Public Safety Supervisor on duty - based upon the WBNP Contingency Plan.
13.	Natural phenomena being experienced or projected beyond usual levels.	
	(a) Any earthquake ~~felt in plant or detected on station seismic instrumentation.~~	Any earthquake felt in plant or detected ~~as indicated on~~ on station ~~by alarm (½ SSE has occurred) on panel M-15B, of the~~ seismic instrumentation ~~event as in AOI-9~~.
	(b) Flood or low water.	1. River elev. >718 but <726. 2. River elev. ≥680 but ≤683. 3. River elevation is provided to the shift engineer by the Division of Water Resources or the TVA load dispatcher.
	(c) Any tornado near site.	Tornado near site indicated by actual sighting of tornado by plant personnel, or tornado "warning" issued for Rhea or Meigs Counties.
	(d) Any hurricane.	Hurricane near site with wind speed >70 mph but <85 mph as measured at the meteorological tower and recorded on O-M-25 in MCR.

5.2.1 Initiating Conditions and Emergency Action Levels for Notification of Unusual Event (Cont'd)

Initiating Conditions	Emergency Action Levels
14. Other hazards being experienced or projected.	
(a) Aircraft crash on site or unusual aircraft activity over facility.	(a) Report of aircraft crash within the exclusion area or judgment of the Shift Engineer that unusual aircraft activity has occurred over the facility.
(b) Train derailment onsite.	(b) Report of train derailment within the exclusion area.
(c) Near or onsite explosition.	(c) Report or detection of an unplanned explosion within the exclusion area.
(d) Near or onsite toxic or flammable gas release.	(d) 1. Report or detection of the release of toxic or flammable gases in such quantities that, in the judgment of the Shift Engineer, the potential exists for impaired station operability. ~~2. Automatic control building isolation due to chlorine detection.~~
(e) Turbine failure.	(e) ~~Major turbine mechanical damage as indicated by turbine supervisory instrumentation on M-1 in MCR and verified by local inspection.~~ Turbine rotating component failure causing rapid plant shutdown
15. Other plant conditions exist that warrant increased awareness on the part of State and/or local offsite authorities or require plant shutdown under other than normal controlled shutdown.	Any abnormal plant condition as determined by the Shift Engineer or plant management such as: (a) Any condition which has the potential for escalating into a Notification of Unusual Event. (b) Unit shutdown is other than a normal controlled shutdown.

5.2.1 Initiating Conditions and Emergency Action Levels for Notification of Unusual Event (Cont'd)

Initiating Conditions	Emergency Action Levels
16. Transportation of contaminated injured individual from site to offsite hospital.	Contaminated injured individual is transported to offsite hospital.
17. Rapid depressurization of secondary side.	~~Observation or detection of steam dump, relief, or steam generator safety valve opening inadvertently, or steam line break by:~~ ~~(a)~~ Uncontrolled ~~steam generator steam~~ pressure ~~indicator~~ decreasing ~~and main steam header pressure indicator decreasing as indicated on M-4.~~ on any steam generator.

5.2.2 Initiating Conditions and Emergency Action Levels for Alert

Initiating Conditions	Emergency Action Levels
1. Severe loss of fuel cladding.	
(a) Verify high coolant activity sample.	a) Reactor coolant activity $\geq$300µCi/gm dose equivalent I-131 as determined by sample analysis.
(b) Failed fuel monitor indicates increase greater than 1 percent fuel failures within 30 minutes or 5 percent total fuel failures.	b) Gross failed fuel detector increase $>1 \times 10^5$ cpm, AND laboratory analysis indicates >1 percent failed fuel OR laboratory analysis indicates >5 percent failed fuel.
2. Rapid gross failure one steam generator tube with loss of offsite power	Safety injection actuation followed by diagnosis from EOI-0.

5.2.2 Initiating Conditions and Emergency Action Levels for Alert (Cont'd)

Initiating Conditions		Emergency Action Levels
2.	(Con't)	Leakage rate will be estimated by the SRO considering ~~safety injection~~ RCS makeup flow required to maintain or recover pressurizer level ~~and the amount of rise in the faulted steam generator level~~ AND loss of offsite power as indicated by shutdown boards supplied from diesel generators only.
3.	Rapid failure of ~~more than 10~~ steam generator tubes.	Safety injection actuation followed by diagnosis from EOI-0. Leakage rate will be estimated by the SRO considering ~~safety injection~~ RCS makeup flow required to maintain or recover pressurizer level ~~and the amount of rise in the faulted steam generator~~ level.
4.	Steam line break with significant primary to secondary leak rate ~~or MSIV malfunction~~.	1. Steam line break indicated by use of EOI-0 and EOI-2 and steam generator primary to secondary leakage >10 gpm as determined by SI-4.5 or chemical analysis. ~~2. Failure of one or more MSIVs to close when signaled by hi-hi containment pressure or the high steam flow safety injection signals.~~

5.2.2 Initiating Conditions and Emergency Action Levels for Alert (Cont'd)

Initiating Conditions	Emergency Action Levels
5. Primary coolant leak rate greater than 50 gpm.	This level of primary system leakage will cause pressurizer level to decrease below 25 percent with one charging pump operating; therefore, a second pump must be started to maintain pressurizer level. The leak will be diagnosed and handled per AOI-6. Leak rate will be estimated based on charging vs. letdown flows and the change in pressurizer level.
6. High radiation levels or high airborne contamination which indicate a severe degradation in the control of radioactive materials.	1. An increase of a factor of 1000 from normal in the readings from area monitors throughout the plant including, but not limited to, the following: a. Spent fuel pit area monitor b. Solid waste packaging area monitor c. Hot sample room area monitor d. Control room area monitor
7. Loss of offsite power and loss of all onsite ac power.	Shutdown boards ~~supplied from diesel generators only~~ A-A and B-B deenergized ~~AND failure of diesel generators A-A and B-B to energize associated 6.9kV shutdown boards.~~
8. Loss of all onsite dc power.	Undervoltage alarm on 125V dc vital battery boards I, II, III, and IV, along with personnel verification.

5.2.2 Initiating Conditions and Emergency Action Levels for Alert (Cont'd)

Initiating Conditions	Emergency Action Levels
9. Coolant pump seizure leading to fuel failure.	Abrupt loss of one loop of reactor coolant system flow with possible pump trip. Rapid increase in primary system temperature and an unexplained increase in the specific activity in the primary system as determined by chemical analysis.
10. Loss of functions needed for plant cold shutdown.	Failure to maintain the primary system temperature <200°F. or maintain adequate shutdown margin.
11. Fuel handling accident with release of radioactivity to containment or fuel handling building.	(a) Notification by fuel handling SRO of dropped or damaged fuel assembly as indicated by use of AOI-29. (b) Release to Containment 1. The readings on the containment upper compartment monitor increase above 300,000 cpm after fuel handling accident. 2. Containment vent isolation occurring. 3. Analysis of containment atmosphere indicates fission product release. OR (c) Release to Auxiliary Building 1. Spent fuel pit area monitor increase above 10 MR/hr after accident. 2. Auxiliary building isolation occurring. 3. Analysis of auxiliary building atmosphere indicates fission product release.

5.2.2 Initiating Conditions and Emergency Action Levels for Alert (Cont'd)

Initiating Conditions	Emergency Action Levels
12. Fire potentially affecting safety systems.	Fire potentially affecting safety systems as reported by the fire brigade leader.
13. All alarms (annunciators) lost.	Annunciators lost on panels M-1 through M-6 for more than 5 minutes with unit not in a stable condition.
14. Radiological effluents greater than 10 times technical specification instantaneous limits.	1. Liquid effluent release 10 times greater than technical specification 3.11.1.1 limits. 2. Gaseous instantaneous release rate > 2.0 Ci/second. 3. Environmental measurements at the site boundary of 0.5 mr/hr
15. Ongoing security compromise.	Based on advice of Public Safety Shift Supervisor.
16. Severe natural phenomena being experienced or projected.	
(a) Earthquake greater than OBE levels.	Earthquake ≥ .09G horizontal and > .06G vertical (1/2 SSE) but < .18G horizontal and < .12G vertical as indicated by alarm on panel M-15B, of the seismic event as in AOI-9.
(b) Flood, low water.	1. Flood near design levels a. October 1 to April 15 - River elevation > 714 but < 738. b. April 16 to September 30 - river elevation > 726 but < 738. 2. Low river level elevation < 680 but > 675.
(c) Any tornado striking facilty.	Visual observation of tornado striking plant site.
(d) ~~High~~ Hurricane winds.	Winds > 85 mph but < 95 mph as measured at the met tower and indicated on panel 0-M-25 in the MCR.

5.2.3 Initiating Conditions and Emergency Action Levels for Site Area Emergency

Initiating Conditions	Emergency Action Levels
1. Known loss of coolant accident greater than makeup pump capacity.	1. Valid safety injection initiated by high containment pressure or low pressurizer pressure. with increasing containment radiation.
2. Degraded core with possible loss of coolable geometry.	Shift supervisor's judgment based on evaluation of the following possible conditions: a. Large (100X) increase in letdown radiation level. b. Large increase in containment radiation levels. c. Containment hydrogen concentration increase. d. Incore thermocouples offscale >700°F.
3. Rapid failures of more than 10 steam generator tubes with loss of offsite power.	Safety Injection actuation followed by diagnosis from EOI-0. Leakage rate will be estimated by the SRO considering ~~safety injection~~ RCS makeup flow required to maintain or recover pressurizer level, ~~and the amount of rise in the faulted steam generator level~~ AND Loss of offsite power as indicated by shutdown boards supplied from diesel generators only.

5.2.3 Initiating Conditions and Emergency Action Levels for Site Area Emergency (Cont'd)

Initiating Conditions	Emergency Action Levels
4. Steam line break with greater than 50 gpm primary to secondary leakage and indication of fuel damage.	1. Steam line break determined by EOI-0 and EOI-2 as indicated by a valid safety injection signal. 2. One steam generator ≥100 psi less than the others. 3. High steam line flow with either lo-lo T_{avg} of 550°F or low steam line pressure of 675 psig. 4. >50 gpm primary to secondary leakage as determined by chemical analysis or by surveillance instructions or water inventory balance determination AND 5. Indication of fuel failure by gross failed fuel detector indicating >1 x 10^5 cpm or by radiochemical analysis for failed fuel.
5. Loss of offsite power and loss of onsite ac power for more than 15 minutes.	1. Shutdown boards A-A and B-B deenergized for >15 minutes AND 2. Failure of diesel generators A-A and B-B to energize their associated 6.9kV shutdown boards for >15 minutes.
6. Loss of all vital onsite dc power for more than 15 minutes.	Undervoltage alarm on 125V dc vital battery boards I, II, III, and IV along with personnel verification for >15 minutes.
7. Loss of any functions needed for plant hot shutdown.	Loss of either of the following systems when it is the only method of RCS heat removal: a. Main and auxiliary feedwater (secondary heat removal) a. Secondary heat sink (feedwater and steam release path)

5.2.3 Initiating Conditions and Emergency Action Levels for Site Area Emergency (Cont'd)

Initiating Conditions	Emergency Action Levels
7. (Con't)	b. Loss of RHR system (shutdown cooling)
8. ~~Transient requiring operation of shutdown systems with failure to trip.~~ Continued power generation following trip	
9 8. Major damage to spent fuel in containment or fuel handling building.	Notification by fuel handling SRO of dropped or damaged fuel assembly as indicated by use of AOI-29.
10 9. Fire affecting safety system.	Fire affecting required safety equipment as reported by fire brigade leader.
11 10. All alarms (annunciators) lost for more than 15 minutes and ~~plant is not in cold shutdown or~~ plant transient initiated while all alarms lost.	Annunciators lost on panels M-1 through M-6 for >15 minutes ~~with unit not in a stable condition~~ and transient initiated based on SRO judgement.
12 11. Effluent monitors detect levels corresponding to greater than 50 mR/hr for 1/2 hour or greater than 500 mR/hr W. B. for 2 minutes (or 5 times these levels to the thyroid) at the site boundary for adverse meteorology. These dose rates are projected based on other plant parameters or are measured in the environs.	1. Verified total plant noble gas release rate >8×10^5 µCi/sec or ^{131}I release rate of 110µCi/sec for 1/2 hour or > 8×10^6 µCi/sec Noble gas or 1100 µCi/sec I-131 for 2 minutes as determined by plant computer release rate program or WBN Gaseous Release Surveillance Instructions. 2. Environmental measurements of 50 mR/hr for ½ hour or greater than 500 mR/hr total body for minutes (or 5 times these levels to the thyroid)
13 12. Imminent loss of physical control of the plant.	Based on advice from the Public Safety Shift Supervisor.

5.2.3 Initiating Conditions and Emergency Action Levels for Site Area Emergency (Cont'd)

Initiating Conditions	Emergency Action Levels
14 13. Severe natural phenomena experienced or projected with plant not in cold shutdown.	
(a) Earthquake greater than SSE levels.	(a) Earthquake $\geq$.18G horizontal or $\geq$.12G vertical as indicated by alarm on panel M-15B of the seimic event as in AOI-9.
(b) Flood, low water, failure of protection of vital equipment at lower levels.	(b) 1. River level > elev. 738.1 or failure of a flood barrier that protects vital equipment. 2. Low water < elev. 675.
(c) Winds in excess of design levels.	(c) Winds >95 mph as measured at the meteorological tower and indicated on panel O-M-25 in the MCR.
15 14. Other hazards being experienced or projected with plant not in cold shutdown.	
(a) Aircraft crash affecting vital structures by impact or fire.	(a) Aircraft crash which affects structures required for safe shutdown by impact or subsequent fire.
(b) Severe damage to safe shutdown equipment from missiles or explosion.	(b) Severe damage to equipment required for safe shutdown from explosion or missile impingement.
(c) Entry of toxic or flammable gases into vital areas.	(c) Entry of toxic or flammable gases into area affecting plant safe operation.

5.2.3 Initiating Conditions and Emergency Action Levels for Site Area Emergency (Cont'd)

Initiating Conditions	Emergency Action Levels
16 15. Other plant conditions exist that warrant activation of emergency centers and monitoring teams and a precautionary public notification.	Any condition warranting "site emergency" status in which the shift supervisor deems it necessary to activate the emergency center, monitoring teams, and/or precautionary public notification.
17 16. Evacuation of control room and control of shutdown not established from local stations in 15 minutes.	Conditions warranting control room evacuation per AOI-27 with plant control not established from auxiliary control room and required local stations within 15 minutes.

5.2.4 Initiating Conditions and Emergency Action Levels for General Emergency

Initiating Conditions	Emergency Action Levels
1. Effluent monitor detects levels corresponding to 1 rem/hr whole body or 5 rem/hr thyroid at the site boundary under adverse meteorological conditions. These dose rates are projected based on other plant parameters or are measured in the environs.	1. Effluent monitors on O-M-12 detect levels corresponding to: 1 R/hr whole body or 5 R/hr thyroid Setpoints: 2. Either of the above dose rates is measured by a health physics monitoring team. ~~3. All effluent monitors indicate and record on O-M-12 in the MCR and alarm on high level.~~
3 2. Loss of physical control of the facility.	Declared by the Shift Engineer or senior plant management representative on shift based on the advice of the Public Safety Shift Supervisor.
4 3. Other. Plant conditions exist that may result in a core melt situation.	(a) Small and large LOCAs with failure of ECCS to perform leading to severe core degradation or melt. Ultimate failure of containment possible for meltdown sequences. (Several hours available for response.) The Site Emergency Director will consider the following: 1. ~~Radioisotopic~~ analysis of reactor coolant indicating >5 percent fuel failures. 2. Accident radiation monitor reading. 3. Containment pressure ~~high~~ above 15 psid ~~indication~~. 4. ECCS pumps not running or flow paths obstructed. 5. Core exit thermocouples reading ≥1200°F. ~~6. Incore thermocouples above 700°F with computer not working.~~

5.2.4 Initiating Conditions and Emergency Action Levels for General Emergency (Cont'd)

Initiating Conditions	Emergency Action Levels
5 3. (Con't)	move to previous page 6. The RCS T-hot RTDs pegged high.
b) ←	(b) Transient initiated by loss of feedwater and condensate systems followed by failure of emergency feedwater system for extended period. Core melting possible in several hours. Ultimate failure of containment likely ~~possible~~ if core melts. The Site Emergency Director will consider the following: 1. ~~Loss~~ steam generator ~~water level alarms and~~ wide range ~~level indicators showing~~ levels decreasing toward zero. 2. No auxiliary feedwater ~~pump running or zero~~ flow to the steam generators for >30 minutes. 3. Containment pressure ~~indication~~ >15 psid. 4. RHR system not available for heat removal.
c) ←	(c) Transient requiring operation of shutdown systems with failure to trip, which results in core damage ~~possible.~~ or Additional failure of core cooling and makeup systems (which would could) start ~~lead to core melt~~. The Site Emergency Director will consider the following: 1. Reactor fails to trip ~~control rods still withdrawn.~~ 2. Safety injection signal isolates main feedwater. 3. No flow to reactor coolant system via ECCS pumps.

5.2.4 Initiating Conditions and Emergency Action Levels for General Emergency (Cont'd)

Initiating Conditions	Emergency Action Levels
5 β. (Con't) d)	(d) Failure of offsite and onsite power along with total loss of emergency feedwater makeup capability for several hours. ~~Could~~ would lead to eventual core melt and ~~possible~~ likely failure of ~~the~~ containment. The Site Emergency Director will consider the following. 1. Shutdown boards A-A and B-B ~~supplied from diesel generators only and diesel generators A-A and B-B inoperable~~ de-energized. 2. No auxiliary feedwater flow ~~on auxiliary feedwater flow indicators~~ to steam generators. 3. Steam generator ~~levels decreasing toward zero on~~ wide range level indicators decreasing toward zero.
e)	(e) Small LOCA and initially ~~un~~successful ECCS. Subsequent failure of ~~residual~~ containment heat removal system over several hours could lead to core melt and ~~possible~~ likely failure of ~~the~~ containment. The Site Emergency Director will consider the following: ~~1. Reactor trip~~ ~~2. Reactor coolant system pressure low.~~

5.2.4 Initiating Conditions and Emergency Action Levels for General Emergency (Cont'd)

Initiating Conditions	Emergency Action Levels
5. (Continued)	1. ECCS requirements ~~3. Safety injection.~~ ~~4. Residual heat removal system flow indicators show zero flow.~~ 2. Reactor coolant system temperature increasing. 3. Containment spray operability
	(f) Loss of two of three fission product barriers with a potential loss of the third barrier (e.g., loss of ~~fuel~~ integrity and primary coolant boundary, and high potential for ~~radio-~~ loss of activity release from containment). The Site Emergency Director will consider the following: stat
	1. Containment ~~hi-hi~~ pressure indication >15 psid ~~and alarm.~~
	2. LOCA identified by EOI-0
	3. Accident radiation monitor high level verified by analysis.
	4. Incore thermocouples > 1200° F.
	~~5. Incore thermocouples above 700° F with computer not working.~~
	6. The RCS T-hot RTDs pegged high.
4. Major damage to spent fuel in containment or fuel handling building.	Notification by fuel handling SRO of dropped or damaged fuel assembly as indicated by use of AOI-29.
5. Fire affecting safety system.	Fire affecting required safety equipment as reported by fire brigade leader.

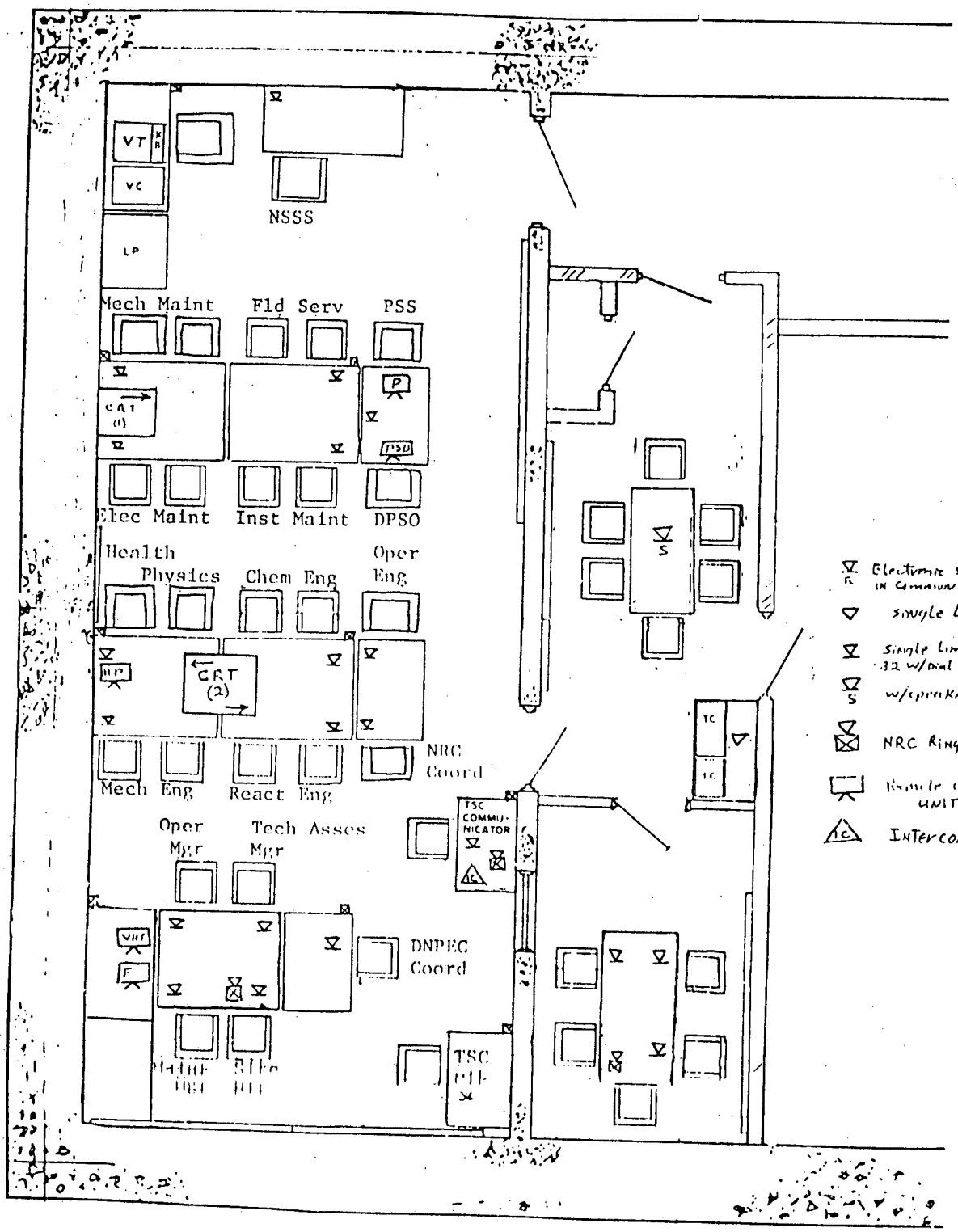

VT
VC
LP
NSSS
Mech Maint
Fld Serv
PSS
CRT (1)
P
PSO
Elec Maint
Inst Maint
DPSO
Health Physics
Chem Eng
Oper Eng
HP
CRT (2)
NRC Coord
Mech Eng
React Eng
Oper Mgr
Tech Asses Mgr
TSC COMMUNICATOR
TC
DNPEC Coord
TSC
S
Electronic set w/numbers in common on all sets
single Line
single Line Ringdown
w/speaker phone
NRC Ring-down
Remote control UNIT
Intercom

Figure 10

MEDICAL, HEALTH PHYSICS, & DECONTAMINATION FACILITIES
WATTS BAR NUCLEAR PLANT

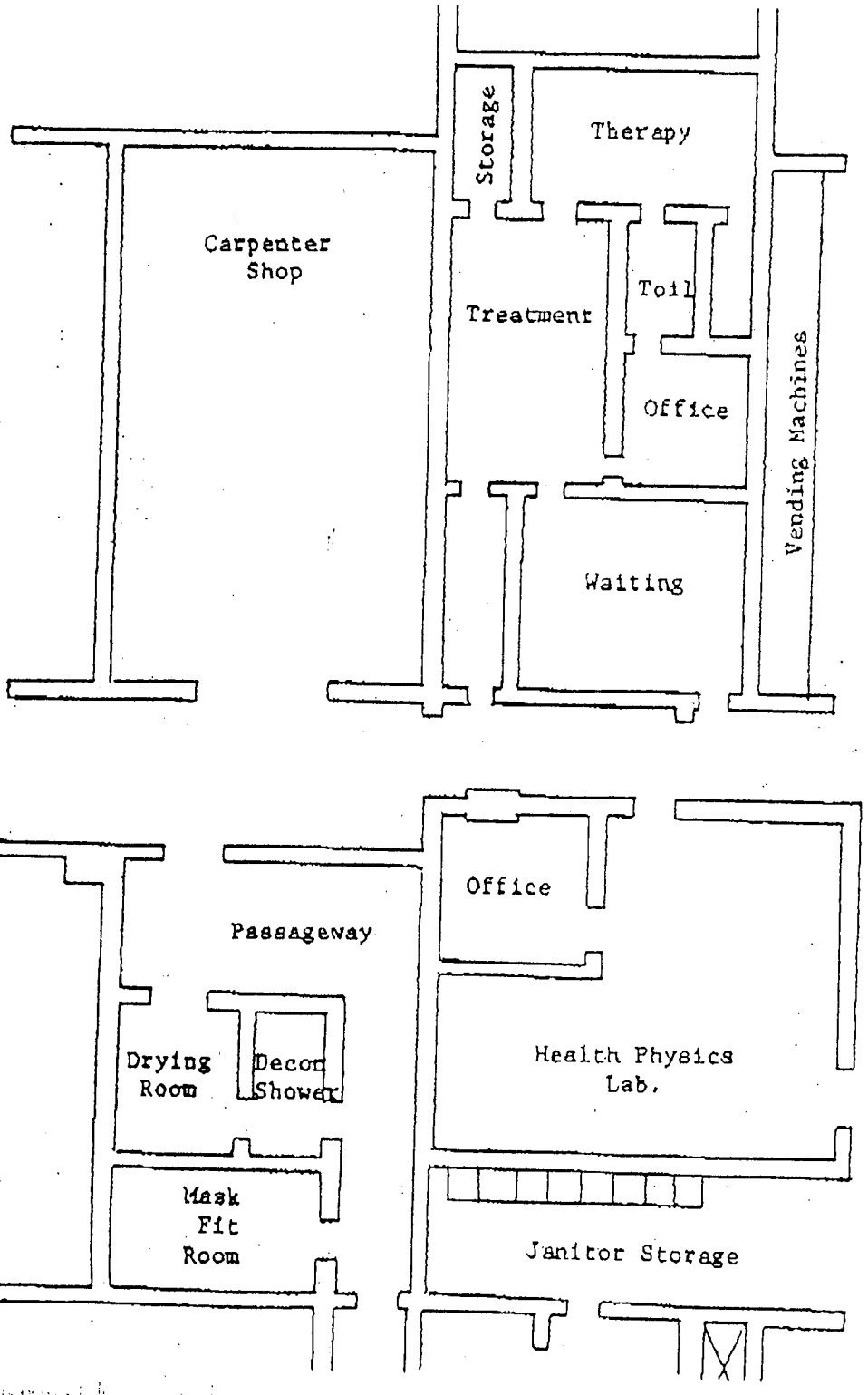
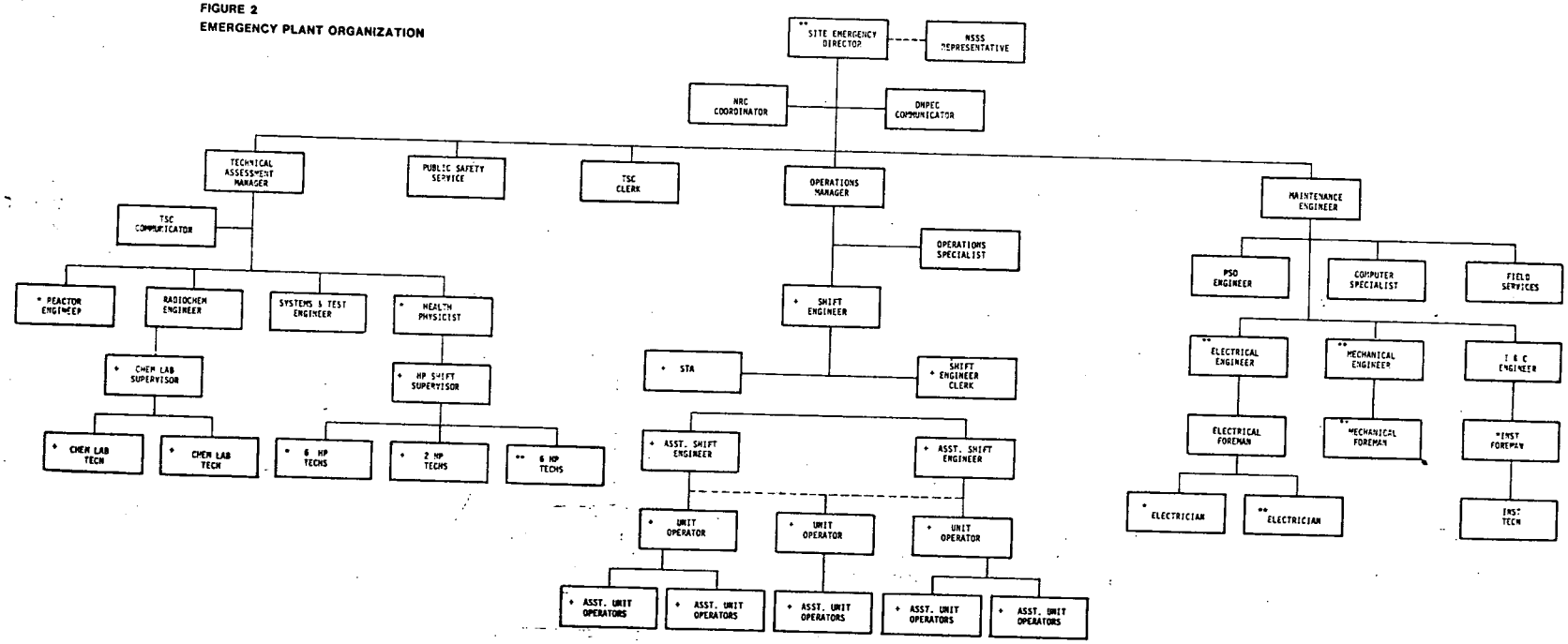


FIGURE 2
EMERGENCY PLANT ORGANIZATION



\+ On Shift
* Will arrive within approximately 30 minutes
** Will arrive within approximately 60 minutes
All others will arrive as soon as possible after notification.

CONTRACT NO. TV-60562A
ACCOUNT NO. 984-19-740
OFFICE OF POWER,
INFORMATION STAFF

AGREEMENT
Between
QUALITY INN, SWEETWATER, TENNESSEE
And
TENNESSEE VALLEY AUTHORITY
For
USE OF MEETING FACILITIES
At
SWEETWATER, TENNESSEE

THIS AGREEMENT, made and entered into as of the 1st day of May, 1983, between Quality Inn, Sweetwater, Tennessee (hereinafter designated as "Quality Inn"), and TENNESSEE VALLEY AUTHORITY, with a mailing address of 200 Lupton Building, Chattanooga, Tennessee 37401 (hereinafter designated as "TVA"),

W I T N E S S E T H:

WHEREAS, TVA desires to use certain meeting facilities situated in the Quality Inn, Sweetwater, Tennessee, to establish a Near Site Media Center in the event of a major incident at TVA's Watts Bar Nuclear Plant and for 72-hour drills for preparation of any such event at a minimum of once a year.

NOW, THEREFORE, in consideration of the sums to be paid by TVA to Quality Inn as hereinafter provided, and the mutual covenants and agreements as herein contained, it is agreed between Quality Inn and TVA as follows:

1. TVA is hereby permitted and authorized to use the facilities described below at any time in an emergency; provided, however, that TVA will give Quality Inn two (2) hours' notice prior to any such use:

Andrew Johnson Room, Conference Room, James K. Polk Room, Suite A, Suite B, Suite C, Suite D, and Suite E as required.

For scheduled drills, arrangements will be made with Quality Inn Forty-Five (45) days in advance by TVA's Power Information Staff.

2. In addition to the use of the above described facilities, Quality Inn will provide and set up tables and chairs as required.

3. TVA shall have the right to post information signs outside the building and in the lobby area indicating directions to the media center; and install additional telephone jacks in the occupied space as required.

4. In the event large crowds of reporters make the use of the Andrew Johnson Room impractical, Quality Inn shall make the indoor courtyard available to TVA for press briefings. This area will not be used during drills.

5. TVA shall have the right to store up to ten (10) telephone sets and two (2) typewriters permanently in closets provided by Quality Inn.

6. If guest rooms are available during an emergency, TVA employees shall have first call for reservations. Guest rooms to be used in connection with scheduled drills will be reserved thirty ( ) days in advance by TVA's Power Information Staff. Any charges for use of guest rooms by TVA employees shall be billed separately and shall not be payable under this agreement.

7. TVA will reimburse Quality Inn for loss, damage, or injury to the Quality Inn facilities caused by TVA's employees, agents, invitees, or licensees. TVA will protect and save harmless Quality Inn from any claims for personal injury or property damage arising out of TVA's use of the Quality Inn facilities unless such injury or damage is caused by the negligence of Quality Inn.

8. TVA is to pay to Quality Inn for the facilities and services provided hereunder as follows:

a. Andrew Johnson Room - Two Hundred Fifty-Seven and 50/100 Dollars ($257.50) a day.

b. James K. Polk Room - One Hundred Eighty and 25/100 Dollars ($180.25) a day.

c. Conference Room - One Hundred Three Dollars ($103.00) a day.

d. Indoor Courtyard - Two Hundred Fifty-Seven and 50/100 Dollars ($257.50) a day.

e. Suites A - D - Forty-Three and 78/100 Dollars ($43.78) a day for each suite.

f. Suite E - Fifty-One and 50/100 Dollars ($51.50) a day.

The term "day" is defined as a 24-hour period beginning at 6:00 a.m. and ending at 6:00 a.m., or any part thereof.

Quality Inn shall submit itemized invoices at the end of each month for any of the above facilities used by TVA and services provided by Quality Inn. Invoices should be submitted to Tennessee Valley Authority, Power Information Staff, 670 Chestnut Street Tower II, Chattanooga, Tennessee 37401.

9. This agreement shall be effective as of May 1, 1983, for an initial firm term of one (1) year, and shall be automatically renewed for an additional term of one year on each anniversary date thereafter, subject to termination by either party at any time during the extended term on six (6) months' written notice to the other party.

10. Lessor agrees to comply with the provisions of Executive Order No. 11246 and the Facilities Nondiscrimination clause contained therein which is made a part of this agreement by reference.

11. No member of or delegate to Congress or Resident Commissioner, or any officer, employee, special Government employee, or agent of TVA shall be admitted to any share or part of this agreement or to any benefit that may arise therefrom unless the agreement be made with a corporation for its general benefit, nor shall the contractor offer or give, directly or indirectly, to any officer, employee, special Government employee, or agent of TVA, any gift, gratuity, favor, entertainment, loan, or any other thing of monetary value, except as provided in 18 C.F.R. § 1300.735-12 or -34. Breach of this provision shall consitiute a material breach of this agreement.

IN WITNESS WHEREOF, the parties hereto have hereunto subscribed their names as of the day and year first above written.

Attest:

_____

QUALITY INN, SWEETWATER, TENNESSEE

By Ted Pat

Title Gen.

TENNESSEE VALLEY AUTHORITY

By _____

Chief, Office Service Branch

Law