

TENNESSEE VALLEY AUTHORITY

CHATTANOOGA, TENNESSEE 37401

400 Chestnut Street Tower II

34 AUG 28 P 3: 33  
August 27, 1984

U.S. Nuclear Regulatory Commission  
Region II

Attn: Mr. James P. O'Reilly, Regional Administrator  
101 Marietta Street, NW, Suite 2900  
Atlanta, Georgia 30323

Dear Mr. O'Reilly:

WATTS BAR NUCLEAR PLANT UNITS 1 AND 2 - NRC REGION II INSPECTION REPORT  
50-390/84-22, 50-391/84-17

The subject report dated June 1, 1984, provided the results of the NRC's  
Emergency Preparedness Inspection of March 27 - April 6, 1984 at Watts Bar  
Nuclear Plant (WBN). These results were grouped into the following  
categories:

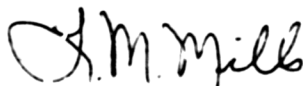
- A. Emergency Preparedness Deficiencies
- B. Emergency Preparedness Improvement Items
- C. Incomplete Emergency Preparedness Items

Enclosed are TVA responses to all items listed in these categories. Please  
note that, where possible, specific schedules have been given for required  
changes. In no case are activities scheduled beyond fuel load. In view of  
this, TVA does not intend to provide written notification when these items  
are complete.

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

Enclosure

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

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ENCLOSURE  
WATTS BAR NUCLEAR PLANT UNITS 1 AND 2  
WBN RADIOLOGICAL EMERGENCY PLANT APPRAISAL REPORT RESPONSE

A. DEFICIENCIES

1. Items 390/84-22-08 and 391/84-17-08

The following deficiency must be corrected prior to receipt of a license authorizing fuel load and low power operations:

The applicant has not developed an adequate OSC organization; only operations personnel are included; there is no certain method of assembling supporting HP or maintenance personnel, if required; OSC management is not required to assemble teams to be deployed into the plant at a common location for designation of team leader and pre-deployment plant status and HP briefings; the common ASE is tasked to brief the OSC on plant status, yet the position of common ASE is not staffed nor is there any documented requirement for it to be staffed in the future; plant procedures do not include a requirement for periodic communications between the OSC and teams deployed into potentially hazardous environments to ensure their safety through updates on the plant status per 10 CFR 50.47(b)(8); 10 CFR 50, Appendix E, Paragraph IV.E; and the criteria of NUREG-0654 and NUREG-0578.

RESPONSE

The Operations Support Center procedures have been revised to incorporate the concepts outlined in items 390/84-22-08 and 391/84-17-08.

2. Items 390/84-22-10 and 391/84-17-10

The following deficiency must be corrected prior to exceeding 5% reactor power:

The applicant has not made provisions for evacuation routes and transportation for onsite individuals to some suitable offsite location, including alternatives for inclement weather, high traffic density, and specific radiological conditions as per 10 CFR 50.47(b)(10) and as per the criteria in NUREG-0654, Section II.J.2.

RESPONSE

Procedures will be revised by September 1, 1984 to include the Spring City Substation and the Ten Mile Substation as alternate assembly areas. These areas are on opposite sides of the river and are perpendicular to the prevailing winds.

3. Items 390/84-22-17 and 391/84-17-17

The following deficiency must be corrected prior to exceeding 5% reactor power:

The applicant has not established procedures to obtain meteorological conditions from the National Weather Service as per NUREG-0737, Supplement 1, Section 6.1.b.

## RESPONSE

Provisions for contacting the National Weather Service, for forecast meteorological information, have been included in the Meteorological Support section of the Radiological Emergency Notification Directory.

### 4. Item 390/84-22-23 and 391/84-17-23

The following deficiencies must be corrected prior to exceeding 5% reactor power:

The applicant has not made adequate provision in each procedure to identify the individual or organizational element having the authority and responsibility for performing tasks covered by the procedure; an appendix to the REP, listing, by title, procedures required to implement the plan, is not provided; the applicant has not dated the revised pages to the REP as per 10 CFR 50, Appendix E, Paragraph IV.A and NUREG-0654, Section II.P.

## RESPONSE

Individual and/or organization authorities and responsibilities are clearly defined in each Watts Bar Implementing Procedure. A listing, by title, of the procedures required at the site to implement the REP is maintained in section 6.2 of the REP. Procedures, by title, are also listed for TVA's offsite centers in Appendix A, Section 5.0; Appendix B, Section 5.0; Appendix C, Section 5.0; and in Appendix D, Section 5.0. The same document control system used for other TVA controlled documents is used for the REP. This system requires the use of a revision level and a dated list of effective pages instead of dates on the revised pages.

### 5. Items 390/84-22-27 and 391/84-17-27

The following deficiency must be corrected prior to obtaining an operating license authorizing low-power operations:

The applicant's emergency plan, implementing instructions, and implementing procedures must provide an adequate emergency classification and action level scheme based upon facility parameters as required by 10 CFR 50.47(t)(4), 10 CFR 50.47(d), 10 CFR 50, Appendix E, Paragraph IV.B as defined by the criteria in NUREG-0654, Appendix 1.

## RESPONSE

The Watts Bar REP, EAL's were revised on April 30, 1984. The Watts Bar Implementing Procedures will be revised by September 1, 1984 to reflect changes made in the EAL's.

### 6. Items 290/84-22-29 and 391/84-17-29

The following deficiency must be corrected prior to exceeding 5% reactor power.

The applicant has not established, for the use of the Site Emergency Director or CECC Director, a range of protective action recommendations consistent with Federal guidance as per 10 CFR 50.47(b)(10).

RESPONSE

WBN-IP-5 has been revised to give the Site Emergency Director guidance on recommending protective actions. IP-3 for the CECC has also been revised to furnish guidance to the CECC Director.

7. Items 390/84-22-32 and 391/84-17-32

The following deficiency must be corrected prior to exceeding 5% reactor power.

The applicant has not identified or referenced, in the WBN-REP, or the WBN-IPD, the methods and equipment to be used for onsite (out-of-plant) and in-plant radiological surveys during emergencies as per 10 CFR-50.47(b)(9).

RESPONSE

Watts Bar IP-14 will be revised to reference TSIL-18 as the procedure to be used for onsite (out-of-plant) and in-plant surveys by September 1, 1984.

8.a. Items 390/84-22-34 and 391/84-17-34

The following deficiency must be corrected prior to exceeding 5% reactor power.

The applicant has not described the classification of release modes (i.e., ground vent or elevated) based on meteorological conditions, nor has the applicant adequately described which primary meteorological measurements (temperature, wind speed, and direction by elevation) are considered for each release mode as per 10 CFR 50.47(b)(9). Justification should be provided for the selection of meteorological measurements applicable to each release mode.

RESPONSE

The items addressed in this response are (1) procedures to classify the height of release point, (2) procedures to identify the data to be used for each release mode, (3) justification of the data used, (4) procedures for incorporating meteorological data into the manual dose projection scheme, and (5) discussion of possible aerodynamic effects of natural draft cooling towers on local airflow and dispersion conditions.

- (1) The release mode classification scheme used by TVA is summarized in the following table:

<u>Height of release point (H)</u>	<u>Degree of entrainment</u>	<u>Release Mode</u>
$H > 2 \text{ MBH}^a$	Not applicable	Elevated
$\text{MBH} \leq H \leq 2 \text{ MBH}$	$w/ub \geq 5.0$	Elevated
$\text{MBH} \leq H \leq 2 \text{ MBH}$	$w/u \leq 5.0$	Ground-level
$H < \text{MBH}$	Not applicable	Ground-level

a. MBH is the maximum adjacent building height.

b. w is the effluent exit velocity and u is the ambient wind speed.

This methodology is based on Regulatory Guide (R.G.) 1.111, sections 2.a and b., guidance for routine releases. However, to be conservative when  $w/u < 5.0$ , a ground-level release is assumed instead of a mixed mode as in R.G. 1.111. When  $w/u \geq 5.0$ , the assumption is made that a release will escape the building wake and will behave as an elevated release. All of the monitored release points at Watts Bar are less than the MBH (40.8m) except for the shield building vents. This exit velocity (W) of the shield building vents is approximately 9.5 m/s.

Therefore, considering the  $w/u$  ratio, an elevated release is assumed only for a shield building release when the 46-m wind speed is  $\leq 1.9$  m/s. The release height for elevated releases is determined by adding non-buoyant plume rise to the release height.

2. The measurement level used for each release mode is summarized in the following table.

<u>Release Mode</u>	<u>Transport Wind Direction<sup>b</sup></u>	<u>Transport Wind Speed</u>	<u>Dispersion Wind Speed</u>	<u>Stability Layer</u>
Ground	I	I	I	I-L
Elevated <sup>a</sup>	U or I	U or I	U or I	U-I

- a. When an elevated release is assumed, the tower wind level nearest the effective plume height (including nonbuoyant plume rise) will be used.
- b. U, I, and L represent the upper, intermediate, and lower tower measurement levels, respectively.

The attached instruction sheet and plume rise calculations sheet are used to determine the appropriate release mode, plume rise, and measurement levels, and layers. The plant name and release point are needed to apply the instruction sheet. The acronym used for Watts Bar Nuclear Plant is WBN.

3. The 46-m, or intermediate, wind speed and direction level is used for ground-level releases to avoid local influences, which affect measurements more at the 10-m level (especially during stable, light wind conditions) and to better represent air flow in the area. The stability of the I-L layer is expected to be the most representative for dispersion of a ground-level release. For elevated releases, the wind speed and direction level nearest the effective plume height (i.e., release height plus plume rise) should be indicative of the mean plume transport, especially for the emergency planning zone. The stability of the U-I layer is expected to be more representative for dispersion of an elevated plume than the I-L layer because strong surface heating and cooling affect measurements at the 10-m level more than at higher levels and use of the I-L layer would lead to overestimation and underestimation, respectively, of diffusion of the elevated release.
4. The release mode and measurement level and layer selection procedures are followed whether automated or manual dose assessment schemes are being used. The information is entered on attachment 3 of MSEC IP-7 and then the appropriate level and layer are copied on attachment 4 of the MSEC IP-7. The dose assessor receives the meteorological data on attachment 4 and enters it into the dose projection schemes that are in use.

**INSTRUCTION SHEET FOR DETERMINING RELEASE MODE AND MEASUREMENT  
LEVELS AND LAYERS**

<u>Plant</u>	<u>Release Point</u>	<u>ff Level for pr</u>	<u>Critical ff</u>	<u>Stability Layer for pr</u>	<u>Release Mode</u>	<u>ff and dd levels</u>	<u>Stability Layer</u>
BFN	Stack	U	N/A	U-I	ST	U	U-I
BFN	Reactor Bldg. Vents	I	<2.5 m/s >2.5 m/s	U-I N/A	EV GV	U or I I	U-I I-L
BFN	All Other Vents	N/A	N/A	N/A	GV	I	I-L
SQN	Shield Bldg.	I	<1.9 m/s >1.9 m/s	U-I N/A	EV GV	U or I I	U-I I-L
SQN	All Other Vents	N/A	N/A	N/A	GV	I	I-L
WBN	Shield Bldg.	I	<1.9 m/s >1.9 m/s	U-I N/A	EV GV	U or I I	U-I I-L
WBN	All Other Vents	N/A	N/A	N/A	GV	I	I-L

ff denotes wind speed

dd denotes wind direction

pr denotes plume rise

ST denotes Stack

EV denotes Elevated Vent

GV denotes Ground Vent

**PLUME RISE CALCULATIONS FOR  
RADIOLOGICAL EMERGENCY PLAN SUPPORT**

Plant	Vent Hgt. (m)	Exit Vel. (m/s)	Vent Diam. (m)	Stab. Class	WIND SPEED (m/s)											
					0.4	0.6	0.8	1.0	1.2	1.5	2.0	2.5	3.0	5.0	7.0	10
BFN (Stack)	175	17.7	0.9	ABCD	*	80	60	48	40	32	24	19	16	10	7	5
				E	*	27	24	23	21	20	18	17	16	10	7	5
				F	*	23	21	19	18	17	15	14	13	10	7	5
				G	*	21	19	17	16	15	14	13	12	10	7	5
BFN (Reactor Bldg. - Radwaste Zone)	40	12.1	1.2	ABCD	109	73	54	44	36	29	22	17	*	*	*	*
				E	29	25	23	21	20	19	17	16	*	*	*	*
				F	24	21	19	18	17	16	14	13	*	*	*	*
				G	22	19	18	16	15	14	13	12	*	*	*	*
BFN (Reactor Bldg. - Refuel Zone)	41	12.9	1.5	ABCD	145	97	73	58	48	39	29	23	*	*	*	*
				E	35	31	28	26	24	23	20	19	*	*	*	*
				F	30	26	24	22	21	19	17	16	*	*	*	*
				G	27	23	21	20	19	17	16	15	*	*	*	*
BFN (Reactor Bldg. - Reactor Zone)	42	12.5	2.1	ABCD	197	131	98	79	66	53	39	32	*	*	*	*
				E	43	37	34	32	30	28	25	23	*	*	*	*
				F	36	32	29	27	25	23	21	20	*	*	*	*
				G	33	29	26	24	23	21	19	18	*	*	*	*
BFN (Reactor Bldg. - Turbine Zone)	43	12.6	2.4	ABCD	227	151	113	91	76	60	45	36	*	*	*	*
				E	47	41	37	35	33	30	28	26	*	*	*	*
				F	40	35	32	29	28	26	23	22	*	*	*	*
				G	36	31	29	27	25	23	21	20	*	*	*	*
SQN, WBN (Shield Bldg)	40	9.5	0.7	ABCD	50	33	25	20	17	13	10	*	*	*	*	*
				E	17	15	14	13	12	11	10	*	*	*	*	*
				F	15	13	12	11	10	9	9	*	*	*	*	*
				G	13	11	10	10	9	8	8	*	*	*	*	*

\* Denotes that the value is not needed.

If the wind speed falls between indicated values, use the smaller plume rise value.  
Do not interpolate.

For plume rise values above the dashed lines, the upper level wind speed and direction should be used in dispersion and transport estimations. For plume rise values below the dashed line the intermediate level wind speed and direction should be used.

5. The Watts Bar cooling towers are located about 180m east and east-southeast of the shield building. Winds from the west-southwest, west, and west-northwest could cause a release to pass near the cooling towers. The combined frequency of these directions for 46-m winds is about 11 percent. The frequency of these directions for winds less than 2.4 m/s is about 5 percent. Shield building releases are considered as elevated when wind speeds are  $\leq 1.9$  m/s. Such a release would be assigned on effective plume height between 40 and 90 meters. It would be expected to be diverted around the cooling towers. Some of the plume would probably return to the initial transport direction (but outside of the wake) after passing the cooling towers and the rest of the plume would likely be affected by the aerodynamic wake. The net effect would likely be to enhance the dispersion of the plume, causing it to reach the ground sooner and to decrease offsite imports over those predicted by the dose projection scheme.

Ground-level releases that pass near the cooling towers would also experience enhanced dispersion, but less noticeably.

East-northeast, east, and east-southeast winds could result in a wake from the cooling towers that would encompass the shield building vents. However, the shape of the cooling towers and their distance from the shield building would be expected to result in only a limited wake effect at the point of release. Winds from these directions occur about 11 percent of the time. Of these winds, about 9 percent are below 2.4 m/s.

8.b. Items 390/84-22-35 and 391/84-17-35

The following deficiency must be corrected prior to exceeding 5% reactor power.

The applicant has not adequately described the procedures for replacing unavailable primary meteorological data when needed for dose assessment calculations.

RESPONSE

TVA has prepared objective backup procedures to provide estimates for missing or garbled meteorological data needed to perform dose calculations and to determine transport estimates. A copy of the procedures, titled the Watts Bar Nuclear Plant Nowcast Manual, is attached. The procedures accommodate both partial and total primary system outages or invalid data. Reference parameters (i.e., some piece or pieces of available information) are used to establish estimated values. Reference parameters include earlier values of the variables to be estimated, other primary data, offsite data from the Sequoyah Nuclear Plant or nearby National Weather Service stations, and conditional climatology. Each procedure has an associated confidence level based on historical data.

The attached form 2c is used to determine and record nowcast values and to record the associated confidence level. The appropriate information is then recorded on attachment 4 of MSEC IP-7 and distributed to dose assessment staff. Whenever backup procedures are being used in lieu of primary data, the dose assessment staff is informed of this and is advised about the reliability of the nowcast values.



WORKSHEET FOR NOWCASTING  
OF METEOROLOGICAL DATA

Date \_\_\_\_\_ Nuclear Plant \_\_\_\_\_ Initials \_\_\_\_\_

Parameters and Measurement Levels or Layers Needed a:

1. \_\_\_\_\_ 2. \_\_\_\_\_ 3. \_\_\_\_\_ 4. \_\_\_\_\_

Observation Time \_\_\_\_\_

Nowcast Information

Work Space

1. Missing Parameter a:  
Table/Column No. Used:  
Nowcast Value:  
Confidence Level:
2. Missing Parameter a:  
Table/Column No. Used:  
Nowcast Value:  
Confidence Level:
3. Missing Parameter a:  
Table/Column No. Used:  
Nowcast Value:  
Confidence Level:
4. Missing Parameter a:  
Table/Column No. Used:  
Nowcast Value:  
Confidence Level:

Comments: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

a. Use WT for stability layer, ff for wind speed, dd for wind direction, and U, I, and L for upper, intermediate, and lower, respectively.

**9.a. Items 390/84-22-40 and 391/84-17-40**

The following deficiency must be corrected prior to exceeding 5% reactor power.

The applicant's procedures do not comprehensively describe methods and priorities for radiological surveillance activities in support of onsite emergency response functions as per 10 CFR 50.47(b)(8).

**RESPONSE**

Watts Bar IP-14 will be revised by September 1, 1984 to include priority for radiological surveillance support and to reference applicable procedures.

**9.b. Items 390/84-22-41 and 391/84-17-41**

The following deficiency must be corrected prior to exceeding 5% reactor power.

The applicant has not established adequate means for controlling radiological exposures of all emergency workers remaining onsite after an evacuation of nonessential personnel as per 10 CFR 50.47(b)(11).

**RESPONSE**

Watts Bar IP-14 will be revised by September 1, 1984 to include the issuance of dosimetry devices to those personnel remaining inside the site fence.

**B. IMPROVEMENTS**

The following items should be considered for program improvement:

1. Items 390/84-22-02 and 391/84-17-02

Completing contractual agreements with local fire companies for support of the applicant's fire protection program.

RESPONSE

It is anticipated that a local fire department will provide backup fire protection services for the site. A contract proposal has been published in the Commerce Business Daily as required by Federal statute and should be in place by September 1, 1984.

2. Items 390/84-22-03 and 391/84-17-03

Demonstrating compliance with the time requirements for the augmentation criteria in NUREG-0654, Section II.B, Table B-1, by conducting a study, drill, or exercise.

RESPONSE

TVA has concluded that the staff augmentation criteria specified in NUREG-0654 can be met. A drill will be conducted prior to the fuel loading to verify the augmentation capability.

3. Items 390/84-22-04 and 391/84-17-04

Modify Chapter 6 of the Tech Specs to require minimum staffing levels that are compatible with Table B-1 for all modes.

RESPONSE

Watts Bar complies with the NRC requirements in 10 CFR 50 pertaining to minimum staffing levels for plant operation. In addition to the minimum Technical Specification required staffing levels, the normal shift complement has sufficient personnel to meet the requirements of NUREG-0654, Table B-1.

4. Items 390/84-22-09 and 391/84-17-09

Indicating in the WBN-REP and IPD the alternate laboratory facilities and their names and locations.

RESPONSE

IP-14, IP-20, and TSIL-18 will be revised by August 15, 1984, to list Sequoyah Nuclear Plant and the Power Operations Training Center as alternate counting labs for sample analysis.

5. Items 390/84-22-11 and 391/84-17-11

Completing the equipping of the onsite ambulance.

RESPONSE

The ambulance is complete and in service.

6. Items 390/84-22-18 and 391/84-17-18

Determining that the technique for measuring vertical temperature difference meets the accuracy specification contained in Regulatory Guide 1.23 for this parameter over the complete range of temperature expected and for time averaging periods as short as 15 minutes.

RESPONSE

The root sum square error (RSS) for temperature differences has been calculated for all components of this temperature system from the sensor to the recording of the value. The RSS is estimated to be ' 0.18~F. This represents the error of an instantaneous temperature difference except that a rounding error ('0.005~F) has been included to account for the averaging of instantaneous temperature values. Although 15-minute and 60-minute time-averaged temperature differences are calculated, the diminishing effect time-averaging has on the instantaneous error estimate (because of the parts of the error that are random in nature) has not been included. Also, this error estimate is for the extremes of the temperature range, which have the largest errors. Therefore, the time-averaged error of the temperature difference is below the Regulatory Guide 1.23 guidance of 0.18~F.

7. Items 390/84-22-19 and 391/84-17-19

Improving the strip chart displays in the control room to facilitate the determination of time-averaged meteorological conditions.

RESPONSE

The meteorological strip chart recorders in the control room are set at the slowest speed possible to enable the operator to easily average the meteorological conditions. Therefore no further action will be taken on this item.

8. Items 390/84-22-24 and 391/84-17-24

Update the REP listings of the Emergency Response facilities' IPs.

RESPONSE

The REP listing of Emergency Response facilities IP's will be updated by September 1, 1984.

9. Items 390/84-22-25 and 391/84-17-25

Provide an appendix to the IPD, listing, by title, all referenced procedures.

RESPONSE

TVA has reviewed the Watts Bar Implementing Procedures and determined that referenced procedures are listed in a separate section of the procedure where necessary. No further action will be taken by TVA.

10. Items 390/84-22-26 and 391/84-17-26

Revising AOI-27 to refer the operator to IP-1 to ensure the event is properly classified.

RESPONSE

Step IV.F.1 of AOI-27 requires the Shift Engineer to activate the REP. No further action will be taken.

11. Items 390/84-22-28 and 391/84-17-28

Reviewing and revising the REND to ensure that necessary telephone numbers are included (IE Notice 82-15) and that the numbers contained are valid; reviewing the process by which the required quarterly verification of the REND is accomplished to determine why errors persist over long periods in spite of quarterly verifications.

RESPONSE

The required quarterly verification of the REND has been completed.

In order to improve the verification process, the quarterly review is tracked by the REP staff, as well as being printed on the REP tracking system.

A formal letter is sent, quarterly, to organizations outside the division. An informal memorandum is given to those inside the division. These additional steps should reduce problems which have occurred in the past.

12. Items 390/84-22-31 and 391/84-17-31

Modifying MSEC IP-9 to include the following provisions:

1. Verifying presence in the plume before attempting to collect an air sample.
2. Reading the inlet face of the air-sample cartridge.
3. Purging the cartridge after sampling to remove the some of the noble gases.
4. Including on survey-data sheets a space for recording serial number of the instrument used.

## RESPONSE

1. It is assumed that it is recommended that teams have a method of detecting extremely small airborne concentrations of noble gases and that a positive indication be prerequisite to air sampling. This is not compatible with TVA's approach to managing field teams. Each team receives instructions via radio from the Health Physics supervisor in the Technical Support Center or later from the Field Coordinator at the Radiological Monitoring Control Center. Those instructions are not subject to interpretation by the field team nor are there prerequisites externally imposed on the individual responsible for managing the emergency environmental monitoring. These supervisors are free to assign field monitoring tasks based on their judgement and knowledge of plant and environmental conditions and the teams do not have any options when following them except for protective actions, if necessary.

A team will take direct survey readings using instruments capable of measuring 0.01 mR/h upon arrival at an assigned location and will immediately radio the results to the appropriate center. It is at this time that the supervisor can verify whether or not the team is in the plume and alter the team's instructions if he believes that would be beneficial. Therefore, no further action will be taken on this item.

2. This will be incorporated into MSEC-IP-9 by September 1, 1984.
3. The use of silver zeolite with <0.01% noble gas retention and the use of NaI detectors with single channel analyzers for counting virtually eliminates the need for purging cartridges. Exceptional counting needs will be met using the screening van or alternate counting facilities. Therefore, no further action will be taken on this item.
4. This will be incorporated into MSEC-IP-9 by September 1, 1984.

### 13. Items 390/84-22-33 and 391/84-17-33

Modifying HP-TSIL-18 to include the following provisions:

1. For out-of-plant surveys, verifying presence in the plume before attempting to collect an air sample.
2. Reading the inlet face of the air-sample cartridge.
3. Purging the cartridge after sampling to remove some of the noble gases.
4. Using in-plant maps to document radiological conditions.
5. Using in-plant maps showing the radiological conditions projected in the FSAR to aid in determining dose-saving routes.

## RESPONSE

1. It is assumed that it is recommended that teams have a method of detecting extremely small airborne concentrations of noble gases and that a positive indication be prerequisite to air sampling. This is not compatible with TVA's approach to managing field teams. Each team receives instructions via radio from the Health Physics supervisor in the Technical Support Center or later from the Field Coordinator at the Radiological Monitoring Control Center. Those instructions are not subject to interpretation by the field team nor are there prerequisites externally imposed on the individual responsible for managing the emergency environmental monitoring. These supervisors are free to assign field monitoring tasks based on their judgement and knowledge of plant and environmental conditions and the teams do not have any options when following them except for protective actions, if necessary.

A team will take direct survey readings using instruments capable of measuring 0.01 mr/h upon arrival at an assigned location and will immediately radio the results to the appropriate center. It is at this time that the supervisor can verify whether or not the team is in the plume and alter the team's instructions if he believes that would be beneficial. Therefore no further action will be taken on this item.

2. This will be incorporated into procedure HPTSIL-18 by September 1, 1984.
  3. The use of silver zeolite with 90.01% noble gas retention and the use of NaI detectors with single channel analyzers for counting virtually eliminates the need for purging cartridges. Exceptional counting needs will be met using the screening van or alternate counting facilities. Therefore, no further action will be taken on this item.
  4. HPTSIL-3 requires the use of implant maps to document plant radiological conditions. No further action will be taken.
  5. Maps in the Watts Bar FSAR do not project accident dose rates nor does the FSAR give projected dose rates in areas which would aid in planning low dose routes during an accident. Therefore, no further action will be taken.
14. Items 390/84-22-36 and 391/84-17-36

Indicating in the dose assessment procedures uncertainties associated with the assumption of a straight-line trajectory in complex terrain, particularly for cross-valley directions.

## RESPONSE

Dose assessment staff in the Muscle Shoals Emergency Center (MSEC) are supported by an Air Quality Branch meteorologist. This individual provides both meteorological data support and advice to the dose assessment staff during an exercise or accident.

Section 5.2.2 of MSEC IP-7 states that the MSEC meteorologist responsibilities include, '(3) Providing expert advice on current dispersion and transport characteristics,' and '(4) Performing trajectory analysis of effluent transport.' A terrain map is used in conjunction with current meteorological conditions and knowledge of plume transport in complex terrain so that advice can be provided to the dose assessment staff on uncertainties in the assumption of a straight-line trajectory. The advice includes possible flow alteration or channeling if terrain effects are deemed likely. The dose assessment staff can then adjust protective action recommendations to account for any added uncertainty expected from terrain.



15. Items 390/84-22-39 and 391/84-17-37

Expanding the area of possible plume location from one 22.5 sector to at least 3 sectors (67.5 ).

RESPONSE

The Radiation Accident Code (RAC) estimates impacts into one 22.5 sector. The sector is selected from meteorological tower data and the data is assumed to be applicable for the 10-mile emergency planning zone. We understand that this is not an appropriate assumption in determining protective action recommendations, especially for complex terrain. Evaluation of current dispersion and transport characteristics is utilized in formulating an assessment. Expanding the area of possible plume location to three sectors (67.5 ) is not a suitable solution for complex terrain. Rather, uncertainty in the plume location will be appropriately factored into protective action recommendation decisionmaking. No further action will be taken on this item.

16. Items 390/84-22-38 and 391/84-17-38

Including provisions in the procedures to incorporate information from offsite radiation surveys to improve atmospheric transport and diffusion estimates.

RESPONSE

RAC calculates offsite dose rates and iodine-131 air concentrations. These correspond to data collected by monitoring teams. Field data are currently compared to model estimates in order to verify the appropriateness of recommendations. Many factors are involved in comparing a calculated value to a measured value (calculated versus actual; release rate, wind speed, stability class, terrain effects, etc.). We believe adjustments to a straight-line model would be inappropriate except when field data are consistently higher than the RAC model.

Caution must be used in interpreting field measurements due also to the fact that the measurements may not be on the plume centerline and thus may be nonconservative. However, where field data are consistently higher than data from the RAC model, the field information would be used to back calculate release rates and adjust exposure rates and airborne activity calculations. Likewise, where field data shows a different plume location than calculated, this information would be used in the assessment process. No further action will be taken on this item.

17. Items 390/84-22-39 and 391/84-17-39

Including consideration of real-time precipitation conditions in the dose assessment for radioiodines.

RESPONSE

We do not believe that incorporation of real time precipitation conditions (i.e., wet washout) explicitly into a dose model is appropriate. Variability in rainfall patterns at a site (e.g., localized heavy rainfall) would introduce significant uncertainties into projected deposition and doses due to wet washout. Model results would be highly questionable.

Available site and regional meteorological information will be used to identify areas where wet washout is most likely. Field teams will then be deployed to assess the levels of ground contamination due to washout. Population doses from ground concentrations of iodines and/or particulates would be assessed based on the field data.

Because doses from ground contamination would be delivered over a long period of time as compared with doses received via submersion and inhalation, there should be sufficient time to take timely protective actions which may be necessary due to washout of radioactivity. No further action will be taken on this item.

18. Items 390/84-22-42 and 391/84-17-42

Clarifying the decisionmaking process for issuance of KI to onsite personnel.

RESPONSE

The Site Emergency Director is responsible for recommending plant personnel consider taking KI when the projected thyroid dose exceeds 24 rem. Watts Bar procedures will be changed to indicate this responsibility by September 1, 1984.

19. Items 390/84-22-43 and 391/84-17-43

Establishing candidate locations for an alternate Health Physics laboratory.

RESPONSE

Watts Bar IP-14 and HPTSIL-18 will be revised by September 1, 1984 to list an alternate HP lab.

20. Items 390/84-22-44 and 391/84-17-44

Establishing primary and secondary evacuation routes which are clearly marked with arrows, signs, floor markings, or other readily visible means.

RESPONSE

Watts Bar utilizes different assembly areas for the various groups of employees. To mark primary and secondary evacuation routes to these assembly areas would be extremely confusing. Each Watts Bar employee is aware of their assembly area location and is familiar enough with the plant to find it. However, each assembly area itself will be clearly marked by September 1, 1984.

21. Items 390/84-22-47 and 391/84-17-47

Stating or referencing in IP-8 the methods and procedures to be employed for decontamination of all personnel and their vehicles prior to release from the site.

RESPONSE

Watts Bar IP-8 and HPTSIL-5 will be revised by September 1, 1984.

22. Items 390/84-22-51 and 391/84-17-51

Determining whether all WBN-REP changes should be subjected to safety review (the Tech Specs require only those initiated by the PORC to be reviewed), as applicable; and submitting a change to Chapter 6 of the Technical Specification requirements for safety review of the changes to the REP.

RESPONSE

The Watts Bar REP requires that all revisions to the REP be reviewed by PORC, therefore, no revision to the Tech Specs is necessary.

23. Items 390/84-22-52 and 391/84-17-52

Reviewing guidance and determining whether the CECC, DNPEC, KEC, and MSEC IPs should be subjected to a safety review, as appropriate; and submitting a change to Chapter 6 of the Tech Spec requirements for a safety review of applicable CECC, DNPEC, KEC, and MSEC IPs.

RESPONSE

TVA has reviewed its policy on whether the CECC, DNPEC, KEC, and MSEC IPs should be subjected to a safety review and has determined that no material that would impact the safety of Watts Bar is contained in these documents. The documents contain information related to the staffing and operation of the offsite TVA centers and are generic to all TVA nuclear plants. Prior to implementing any change in these procedures the change is reviewed by the corporate REP staff to determine if the change effects any other entity of the emergency organization. If it does, the affected organization will review the change and approve. If no other organization is affected and it complies with the REP and TVA policy the change is approved. Therefore, TVA has determined that no further review or change to Tech Specs is necessary.

24. Items 390/84-22-53 and 391/84-17-53

Providing a procedure for Quality Assurance auditors to observe emergency drills as part of their audit program.

RESPONSE

The Operations Quality Assurance Branch (OQAB) conducts annual audits of the REPs for licensed plants. These audits include a review of documentation to verify that drills are conducted and critiqued as required by the REP. In addition, when possible during the audits, the audit teams observe drills as part of the audit. For example, the 1984 audit of SQN and BFN REPs included observing the CECC and DNPEC during a SQN-TSC drill. Also, the TVA Operational Audit organization has participated in the last two exercises at both BFN and SQN. OQAM is currently scheduled to observe portions of the 1984 SQN exercise. OQAM believes its coverage of Radiological Emergency Planning is adequate and does not plan to incorporate a requirement to audit REP drills into its operating procedures.

25. Items 390/84-22-54 and 391/84-17-54

Revising the brochure to include a section on the classification of radiological emergencies.

RESPONSE

A separate insert defining the emergency classes was included in the latest mailing of the Watts Bar brochure to residents within the 10 mile emergency planning zone. These definitions will be included on all future mailings.

26. Items 390/84-22-56 and 391/84-17-56

Revising WBN IPs 2-5 to define those Site Emergency Director responsibilities which may not be delegated per NUREG-0654, Section II.B.4.

RESPONSE

The Watts Bar REP has been revised to clarify these responsibilities. Watts Bar IP-6 will also be revised by September 1, 1984.

27. Items 390/84-22-57 and 391/84-17-57

Revising IP-1, page 29, to define chemistry verification of failed-fuel-detector values and to indicate time sensitivity (30 minutes) as per NUREG-0654, Appendix 1.

RESPONSE

IP-1 will be revised by September 1, 1984.

28. Items 390/84-22-58 and 391/84-17-58

Revising the 'protective action' section of IP-5 to:

- a. Review the human-factors presentation of notes in the logic diagram to achieve a high probability that procedure users will take note of them.
- b. Review the selection of instrumentation in note 2 in the determination of containment fission-product inventory, the present instruments are valved off service at phase A isolation.

RESPONSE

The IP-5 protective action logic diagram notes have been reviewed and IP-5 will be revised by September 1, 1984.

C. STATUS OF INCOMPLETE ITEMS

1. Items 390/84-22-01 and 391/84-17-01

Due to the fact that a site EPC has not been appointed, this portion of the applicant's program was found to be incomplete.

STATUS

An REP Coordinator has been assigned to the site.

2. Items 390/84-22-05 and 391/84-17-05

Completion of REP training required by REP section 9.1 and IP-19.

STATUS

A formalized training program has been developed and implemented. Training of all personnel will be completed prior to fuel loading.

3. Items 390/84-22-06 and 391/84-17-06

Training for HP, Chemistry, TSC Staff, and OSC Staff is incomplete as required by the REP and IP's.

STATUS

Training of all personnel will be completed prior to fuel loading.

4. Items 390/84-22-07 and 391/84-17-07

The TSC is incomplete and IP-6 does not address physical layout, telephone layout and restrictions, and radio systems.

STATUS

The TSC is complete except for TSC Data System (not required until first Unit 1 refueling outage) and IP-6 has been revised.

5. Items 390/84-22-12 and 391/84-17-12

Complete and stock the permanent decontamination facility.

STATUS

Facility is complete except for ventilation tie-in. Decon materials and supplies are on hand and ready to be stocked. Supplies will be stocked by fuel load.

6. Items 390/84-22-13 and 391/84-17-13

Emergency kits other than the vans are incomplete.

STATUS

Supplies are available or on order. Kits will be stocked upon completion of construction activities prior to fuel load.

7a. Items 390/84-22-14 and 391/84-17-14

Completing the installation, calibration, and testing of all ARMs and PMs.

STATUS

All ARMs and PMs have been installed. Calibration and testing is in progress and will be completed by fuel load.

7b. Items 390/84-22-15 and 391/84-17-15

Establish ARM setpoints.

STATUS

Alarm setpoints are set at 10 mR/hr on initial calibration and preop. Actual setpoints will have to be determined during initial operations. Final adjustments will be made during the first six months of power operation.

7c. Items 390/84-22-16 and 391/84-17-16

Issue TI-30, 'Radiological Gaseous Effluent Evaluation,' for determining the classification of an accident requiring radiological emergency plan activation.

STATUS

TI-30 was issued on May 22, 1984.

8. Items 390/84-22-20 and 391/84-17-20

Deployment of SCBA devices and extra air bottles as specified in WBN IP-17.

STATUS

SCBA devices and air bottles are not installed due to construction activity in the areas. SCBAs and bottles will be placed in required locations prior to fuel loading.

9. Items 390/84-22-21 and 391/84-17-21

No supplies of protective clothing are in place in the emergency cabinets.

STATUS

Items not installed due to construction activities in the areas. Protective clothing will be installed in required locations prior to fuel load.

10. Items 390/84-22-22 and 391/84-17-22

Some emergency lockers remain to be established and/or equipped.

STATUS

Items not installed due to construction activities in areas. Lockers will be placed in proper location prior to fuel-load.

11. Items 390/84-22-30 and 391/84-17-30

Development of an appendix (analogous to Appendices 2 and 3) to MSEC IP-9 site-specific for the Watts Bar plant, providing descriptions (and indicating availability) of site area maps with preselected sampling points, and listing the locations of environmental monitoring stations.

STATUS

MSEC-IP-9 has been revised to add Appendix 4, Watts Bar Maps and Environmental Monitoring Locations.

12a. Items 390/84-22-45 and 391/84-17-45

The applicant has not demonstrated the capability for completing a full personnel accountability, including identification of missing personnel within 30 minutes.

STATUS

Watts Bar has demonstrated the capability of completing a personnel accountability in several recent drills.

12b. Items 390/84-22-46 and 391/84-17-46

The Security Key Card System (for use in vital areas) is incomplete.

STATUS

The card key system will be complete by September 11, 1984.

13. Items 390/84-22-48 and 391/84-17-48

Public Safety Service post orders covering radiological emergencies are to be developed.

STATUS

Public Safety Service post orders have been completed and will be implemented by September 11, 1984.

14. Items 390/84-22-49 and 391/84-17-49

All emergency preparedness drills have not been completed.

STATUS

All required REP drills will be completed by September 11, 1984.

15. Items 390/84-22-50 and 391/84-17-50

Implementing the procedure for updating quarterly the telephone number of the WBN emergency organization.

STATUS

A method for updating the WBN emergency organization telephone numbers quarterly has been implemented.

16. Items 390/84-22-55 and 391/84-17-55

The required communications drills, radiological monitoring drills, and health physics drills have not been performed.

STATUS

All required drills will be complete by September 11, 1984.