



**North
Atlantic**

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The Northeast Utilities System

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U. S. Nuclear Regulatory Commission
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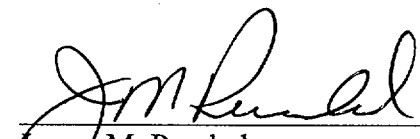
Seabrook Station
Emergency Response Manual ER5.3, Rev. 18, Chg. 01

Enclosed, please find ER5.3, Rev. 18, Chg. 01 to the Seabrook Station Emergency Response Manual (SSER). This revision constitutes a non-intent change to an implementing procedure in accordance with criteria in North Atlantic's administrative programs. The Seabrook Station Radiological Emergency Plan (SSREP) continues to meet the standards of 10 CFR 50.47(b) and 10 CFR 50, Appendix E. These changes are submitted per the requirements of 10 CFR 50, Appendix E, and 10 CFR 50.4. The Resident Inspector copies are provided directly through the North Atlantic records management system.

Should you have any questions regarding the enclosed revisions, please contact Ms. Susan H. Perkins-Grew, Manager – Emergency Preparedness at (603) 773-7278.

Very truly yours,

NORTH ATLANTIC ENERGY SERVICE CORP.



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A045

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3-10B/DDS WORK ORDER NO: 276979

**SEABROOK STATION
ADMINISTRATIVE PROCEDURE**

Operation of the METPAC System

ER 5.3

Rev. 18 Chg. 01

SORC Review: N/A (Non-intent) Date: N/A

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1.0 OBJECTIVES

This procedure provides instructions for the operation of METPAC, a software package developed to produce dispersion and offsite dose estimates during an accidental release of radioactive material.

2.0 RESPONSIBILITIES

2.1 METPAC Operator

Operates the METPAC system.

3.0 PRECAUTIONS

1. Periodically check on the quarter-hour for significant changes in meteorological conditions.
2. Do not terminate the program in the middle of a run; this may crash the program. Return to Screen One and select Q to terminate.
3. The dose rate projections produced by this procedure represent a best estimate. If projections from in-plant parameters are significantly different from those measured in the environment, it may be due to inaccuracies in meteorological modeling and/or release rate estimates. The results obtained from this procedure should be carefully analyzed since they may form the basis for protective action recommendations to the public.
4. The existence of a seabreeze can significantly affect plume transport and diffusion as predicted by METPAC. Seabreeze effects occur primarily from April through September during the daylight hours. Necessary conditions include sunny days when the sun warms the ground and the ground surface air temperatures rise significantly above the ocean and bay water temperatures.

A shift of onsite wind direction from offshore to onshore (onshore being defined as winds from 22E clockwise to 173E) occurring sometime during daylight hours can be indicative of a seabreeze front passing the site. Existence of a seabreeze front inland from the site can be confirmed by comparing onsite wind data with wind data from inland stations (e.g., Concord NWS).

If an inland seabreeze front exists, the plume will rise several hundred feet above ground upon reaching the front and be directed back towards the shoreline. As a result, there will be (i) little dose inland from the seabreeze front, and (ii) a low dose elsewhere between the seabreeze front and the shoreline where the plume passes several hundred feet overhead in the return flow.

5. When the containment failure model is executed in "batch execution" mode and produces a release duration of less than one hour, a thyroid shelter protection factor of 0.5 should be manually applied to the total thyroid dose. (Protected: Ref. 6.3)

6. If steam line pressure is indicated as less than 50 psig, enter 50 psig as the steam line pressure.
7. All times must be entered in 24-hour-clock notation.
8. All items must have proper values. No error checking is done until after the user has completed the input screen. If there are errors with the input, the terminal will beep, a message will appear above the input screen and the cursor will automatically move to the input location that is in error. The correction values must be inputted followed by a (CR). Once the value has been corrected, the program will continue error processing.
9. In the event that the Wide Range Gas Monitor (WRGM) is inoperable and the WRGM Backup Monitor has been activated, initiate Figure 4, WRGM Backup Monitor Data Calculation Sheet, and input the Effective WRGM Stack Concentration and Release Rate from this form as the STACK CONCENTRATION and STACK RELEASE RATE on the Radiological Data Screen.
10. Data entry limitations can be recognized by use of the "Prompt" selection.
11. Refer to the Technical Description of the SB METPAC System for isotopic breakdown of LOCA types.
12. The two-phase flow release pathway from a Main Steam Line (MSL) incorporates correction factors for the calculation of TEDE and thyroid CDE. (Protected: Ref. 6.12)
13. Monitor response entries will calculate offsite dose rate conditions based on an assumed mixture of noble gas and iodine concentrations. (Protected: Ref. 6.9)
14. METPAC assumes a default release duration of 4 hours.

4.0 PREREQUISITES

For purposes of requiring offsite dose assessment (i.e., a METPAC run), a release is defined as follows:

1. Wide Range Gas Monitor (WRGM) High Alarm (RM-6528-4),
2. Main Steam Line Monitor High Alarm with an OPEN ASDV or SRV on the affected main steam line,
3. The results of effluent analysis or site boundary monitoring indicate a dose rate greater than or equal to 0.06 mrem/hr.

5.0 ACTIONS

5.1 METPAC Operator

1. Turn on the METPAC Operator's computer and printer. Each piece of hardware can be turned on manually or all units can be powered through a master switch on the multiple outlet strip in which the units are plugged. The system should display a menu screen with 3 alternative programs:
 - METPAC
 - INGEST - (The METPAC Operator's computer will operate INGEST)
 - ODPS
2. Turn on the Dose Assessment Specialist's computer and printer. The Dose Assessment Specialist's METPAC system may be used either to review postulated worst case release scenarios or to provide a backup to the METPAC Operator's system.
3. At the prompts, type in METPAC on either system followed by a carriage return (CR). The system should begin executing the METPAC program and current analysis conditions will be outputted on the screen at this time. Refer to Figure 2 for information on special keys used by METPAC.
4. If the METPAC system does not execute, the user may reload the system with the backup diskettes which are available in the Dose Assessment Area, as follows:
 - a. Turn on the system.
 - b. After entry of date and time, load the METPAC reload disk 1 into drive A.
 - c. Type: A:Reload (CR).
 - d. Follow any further instructions as specified on the screen (usually for loading other disks).

This procedure should return METPAC to its original state. Any analysis previously performed will be lost.

5. Obtain a logger trend printout with data needed to run METPAC from the Technical Assistant. In the event that a logger trend printout is not available, obtain this information from the Technical Assistant or Health Physics Coordinator (in the TSC) as necessary, and record the data on the METPAC Input Data Log, Figure 7.
6. If the system is functioning properly, the Main Menu screen should appear. Select one of the following six options by moving the cursor key up or down to the option to be selected. For more information on METPAC Options refer to Figure 1, Options.

1 - START NEW ACCIDENT

2 - CONTINUE ACCIDENT

3 - ELIMINATE LAST 1/4 HOUR ANALYSIS

4 - OBTAIN OUTPUT

5 - BATCH EXECUTION

Q - QUIT

7. Upon selecting option 1 (START NEW ACCIDENT), the user will be prompted to keep previous data. The user should enter Y to initiate a new accident analysis. Entering N will return the user to the Main Menu screen to select another option.
8. Refer to specific screen entry instructions in Figure 8, METPAC Data Entry Screen Guidance. Enter the appropriate parameters for the various screens by using the information on the logger trend or Figure 7, METPAC Input Data Log. A listing of all METPAC function keys is presented in Figure 9, METPAC Function Key Listing.
9. Depress the EXIT function key (F10) to start the next quarter-hour analysis. This will clear the screen and display the first input screen.
10. After completing each dose projection run, obtain the "Tracking Report" printout. Verify the METEOROLOGY data on the Tracking Report against the Logger Trend or Figure 7 input data. Ensure that LOWER Wind Speed, Wind Direction and Delta Temperature values were used, except in the case of a Stack Release when UPPER Wind Speed, Wind Direction and Delta Temperature values must be used. Turn over results to the Dose Assessment Specialist (DAS) for review and validation. If the DAS is not available, report information to the EOF Coordinator. (Protected: Ref. 6.13)
11. If time permits, the METPAC Operator should try to generate a hardcopy of one projected map per fifteen-minute period and should not go beyond 30 minutes without a graphic printout. The map hardcopy is generated by depressing function key F9.
12. The Status Board Report should be used for status board updates. The Status Board Report is generated by depressing function key F1, followed by function key F4. If the system cannot access the Status Board Report (function keys F1, F4), fill out a Radiological Status Board Update Form, available in Procedure ER 3.3, Emergency Operations Facility Operations. Make necessary changes and direct the information to be posted on the status board by the Dose Assessment Personnel.
13. Ensure copies of the latest printouts are made and delivered, or are placed appropriately for pickup.
14. Maintain a file of printouts and logger trends. Maintain completed METPAC Input Data Logs (Figure 7) if used in place of logger trends.

15. Continue to obtain updates on plant radiological release and meteorological information using the logger trend printout, or Figure 7 if necessary. When possible, make time-advance projection(s) by advancing through the input screens. This assumes the meteorological and radiological data have not changed. Use Option 3 (eliminate last 1/4 hour of accident) when more than one projection has been made and current data becomes available. Option 2 (CONTINUE ACCIDENT) and the edit mode should be used to change the first projection time of analysis to that of the latest data. This procedure minimizes the amount of new data that must be input.
16. When appropriate, return to the main menu and select "QUIT" to exit METPAC program.
17. Turn in all data sheets and printouts from METPAC to the Dose Assessment Specialist.

6.0 REFERENCES

1. Technical Description of the SBMETPAC system
2. ER 5.7, Offsite Dose Projection System
3. YAEC memorandum SBP-89-273, dated 4/7/89, METPAC Software Problem.
4. ER 3.3, Emergency Operations Facility Operations
5. ER 2.0, Emergency Notification Documentation Forms Procedure
6. ER 5.4, Protective Action Recommendations
7. NRC Inspection Report No. 50-443/85-32-20
8. NRC Inspection Report No. 50-443/85-32-24
9. NRC Inspection Report No. 50-443/86-10-07
10. YAEC SBC-362 WRGM Input Correction Factors
11. YAEC Memorandum SBP-88-197, dated 3/22/88
12. Primary Technical Data Book
13. SEP#20000030, Response to A/R#00004326 from CR#007882

Figure 1
Options
(Sheet 1 of 2)

1- **Start New Accident**

The program will verify that the user wishes to choose this option. A "Y" should be typed. This will destroy the previous data base.

2- **Continue Accident**

Continues the analysis of the accident. This allows the user to update the release based on the next 15-minute radiological and meteorological data. The operator can also start up a new release pathway under this option.

3- **Eliminate Last 1/4 Hour Accident**

Selecting this option will result in a change in the "END TIME OF ANALYSIS" displayed on the Main Menu Screen (i.e., the end time of analysis is reduced by 15 minutes). This option will eliminate the last 15-minute data base record from the data base file.

4- **Obtain Output**

Selecting this option allows the user to view a plume plot or obtain a report generated for a previous time step. The user must enter the time period of interest. Valid times are between the start time of analysis and the end time of analysis. If the user does not wish to execute this option, press (CR). If valid times are entered, followed by a (CR), the program will display the plume plot for the time period of interest. After the plume plot is displayed, the user can obtain any desired METPAC report.

5- **Batch Execution**

The program clears the screen and asks the user to enter a batch option. The valid options are: (1) Project using current analysis with persistent meteorological and radiological data; (2) Project using current analysis with user-input meteorological and radiological data; (3) Project using new data; or (4) Perform containment failure/stack venting projection. The user has to enter in the option number, press (CR), then input appropriate data. The batch options allow the analysis of 1 through 32 quarter hours (8 hours total).

Q- **Quit**

To exit from METPAC, the user should type "Q" and (CR). The program will terminate without losing any data files.

Figure 1
Options
(Sheet 2 of 2)

EDITING DATA

To edit a mistake in a previous quarter hour data record, the user should proceed through the Main Menu screen as if continuing an accident. When the Date Screen is presented, the user should enter the quarter hour that the error occurred in the time of analysis input line. The user may change any previously entered value on the RAD and MET screens by moving the cursor to the error location and typing the corrected value. After all editing has been completed, move the cursor to "RUN" and press (CR). Since the program uses persistence when continuing an analysis, the program will assume that the error may have continued in future quarter hours. The program allows the user to proceed to the next quarter hour but will not change the field that was in error. If the user finds that the error did persist, it can be corrected at this time. The program will do this for all quarter hours from the time of the error to the last time analyzed. All quarter hours will be reanalyzed, but only the last quarter hour will be printed and plotted.

Figure 2

Special Keys

PrtSc	When the Print Screen key is pressed along with the Shift key, a copy of the information displayed is printed on the printer. If the information on the display is alpha/numeric characters, such as a program listing, Print Screen will duplicate this information on the printer. If the information is a graphic representation, it can only be reproduced on a printer that supports graphic printing.
Backspace	When pressed, the Backspace key erases the last character typed and moves the previously typed characters one position to the right.
CAPS LOCK	The Caps Lock key when pressed once, locks the characters A through Z in the uppercase position. You can get lowercase characters while Caps Lock is on by pressing the Shift key. Press the Caps Lock key again and uppercase mode for characters A through Z released.
Enter or Return	This is the Carriage Return key or the Enter key. Its use is defined by the programming language or application you are using.
CTRL C	If (CTRL) is depressed along with the C key, the METPAC program will come to a complete stop.

Figure 3
LOCA Type/Stability Classification

LOCA Type Classification Table:

RELEASE PATH	REACTOR TRIP TIME	
	LESS THAN 100 HOURS	GREATER THAN 100 HOURS
STACK	3	1
CONTAINMENT	3	3
UNMONITORED	3	3

Stability Classification Table:

Stability Classification	Pasquill Classes	Upper Delta-t	Lower Delta-t
Extremely Unstable	A=1	≤ -1.74	≤ -1.12
Moderately Unstable	B=2	≥ -1.73 to ≤ -1.55	≥ -1.11 to ≤ -1.0
Slightly Unstable	C=3	≥ -1.54 to ≤ -1.37	≥ -0.99 to ≤ -0.89
Neutral	D=4	≥ -1.36 to ≤ -0.46	≥ -0.88 to ≤ -0.30
Slightly Stable	E=5	≥ -0.45 to $\leq +1.36$	≥ -0.29 to $\leq +0.88$
Moderately Stable	F=6	$\geq +1.37$ to $\leq +3.64$	$\geq +0.89$ to $\leq +2.34$
Extremely Stable	G=7	$\geq +3.65$	$\geq +2.34$

NOTE

The Backup Met Tower displays the Pasquill Class (A-G) in numeric format (1-7) rather than the delta temperature in degrees F. To obtain the proper delta temperature, choose the appropriate upper or lower delta temperature value corresponding to the Pasquill Class letter (A-G).

Figure 4 WRGM Backup Monitor Data Calculation Sheet

This figure is to be used to calculate the "Effective" WRGM Stack Concentration and "Effective" WRGM Stack Release Rate from the output of the WRGM Backup Monitor (WBM).

1. Obtain the WBM reading from the Technical Support Center:

A = WBM reading = _____ mR/hr

2. Determine the Time After Shutdown (TAS) and obtain the WBM Correction Factor (WBMCF) from the table below:

<u>TAS in hours</u>	<u>WBMCF</u>
=1	0.175
2	0.183
5	0.223
7	0.252
10	0.294
20	0.437
50	1.10
70	1.71
100	2.13
200	2.26
500	2.27
700	2.25
1000	2.18

If TAS does not match listed TAS hours, round down
(e.g., if TAS = 8, use TAS 7 WBMCF 0.252)

B = WBM Correction Factor (WBMCF) = _____ $\frac{\mu\text{Ci/cc}}{\text{mR/hr}}$

3. Obtain the Stack Flow Rate from Logger Trend, Main Plant Computer Data Point RM-6528-4 "PF PLANT VENT DISCH FLOW" or Figure 5, Plant Vent Stack Flow Summarization, and convert to cc/sec as necessary:

C = Stack Flow Rate = _____ CFM x $472 \frac{\text{cc/Sec}}{\text{CFM}}$ = _____ cc/sec

4. Calculate the Effective WRGM Stack Concentration and Release Rate:

D = Effective WRGM Stack Concentration = A x B = _____ $\mu\text{Ci/cc}$

E = Effective WRGM Stack Release Rate = C x D = _____ $\mu\text{Ci/sec}$

Figure 5 Plant Vent Stack Flow Summarization

The following list represents the operating fans and respective flow rates for the various modes of plant operation. All flows are in CFM.

If a fan is shut down, assume a total stack flow reduction of 50% of the shutdown fan flow value. For example, if WAH-FN-13A is shut down, normal conditions stack flow would be $276,160 - (151,620/2) = 238,255$ CFM. Only the fans listed below should be considered when calculating flow reductions. Smaller support fans not listed below (e.g., WAH-FN-125) should not be considered in a flow reduction calculation.

NORMAL

CAP-FN-10	4,000
FAH-FN-124	34,000
PAH-FN-7A, B &/OR C	43,340
PAH-FN-8A OR B	43,200
WAH-FN-13A AND B	<u>151,620</u>
TOTAL CFM	276,160

"A" ISOLATION, EAH ON RECIRC

CAP-FN-10	4,000
FAH-FN-124	34,000
PAH-FN-7A, B &/OR C	43,340
PAH-FN-8A OR B	19,800
WAH-FN-13A AND B	151,620
EAH-FN-4A OR B	<u>4,000</u>
TOTAL CFM	256,760

PRE-ENTRY PURGE

CAP-FN-10	15,000
FAH-FN-124	34,000
PAH-FN-7A, B &/OR C	43,340
PAH-FN-8A OR B	43,200
WAH-FN-13A AND B	<u>151,620</u>
TOTAL CFM	287,160

REFUELING PURGE

CAP-FN-10	4,000
FAH-FN-124	34,000
PAH-FN-7A, B &/OR C	43,340
PAH-FN-8A OR B	3,200
WAH-FN-13A AND B	151,620
CAP-FN-35	<u>40,000</u>
TOTAL CFM	316,160

REFUELING

CAP-FN-10	4,000
FAH-FN-11A OR B	16,000
PAH-FN-7A, B &/OR C	43,340
PAH-FN-8A OR B	43,200
WAH-FN-13A AND B	<u>151,620</u>
TOTAL CFM	258,160

Assume a minimum default value (due to the stack chimney effect) of 57,568 CFM if

- 1) no fans are running, or
- 2) the total flowrate from a plant fan alignment is less than 57,568 CFM.

NOTE

The above information was taken from the Primary Technical Data Book, located in the Control Room.

Figure 6
METPAC Isotopic Sample Input Data Log

This input is for a ____ Stack (WRGM) ____ Containment Atmosphere sample.

The sample start time was ____ . The sample end time was ____ .
date/time date/time

ISOTOPIC SAMPLE RESULTS

I-131	_____ $\mu\text{Ci/cc}$	Cs-134	_____ $\mu\text{Ci/cc}$
I-132	_____ $\mu\text{Ci/cc}$	Cs-136	_____ $\mu\text{Ci/cc}$
I-133	_____ $\mu\text{Ci/cc}$	Cs-137	_____ $\mu\text{Ci/cc}$
I-134	_____ $\mu\text{Ci/cc}$	Ba-140	_____ $\mu\text{Ci/cc}$
I-135	_____ $\mu\text{Ci/cc}$	La-140	_____ $\mu\text{Ci/cc}$
Kr-83m	_____ $\mu\text{Ci/cc}$	Sr-91	_____ $\mu\text{Ci/cc}$
Kr-85m	_____ $\mu\text{Ci/cc}$	Sr-92	_____ $\mu\text{Ci/cc}$
Kr-85	_____ $\mu\text{Ci/cc}$	Y-91	_____ $\mu\text{Ci/cc}$
Kr-87	_____ $\mu\text{Ci/cc}$	Y-93	_____ $\mu\text{Ci/cc}$
Kr-88	_____ $\mu\text{Ci/cc}$	Zr-95	_____ $\mu\text{Ci/cc}$
Kr-89	_____ $\mu\text{Ci/cc}$	Nb-95	_____ $\mu\text{Ci/cc}$
Xe-131m	_____ $\mu\text{Ci/cc}$	Nb-97	_____ $\mu\text{Ci/cc}$
Xe-133m	_____ $\mu\text{Ci/cc}$	Ru-103	_____ $\mu\text{Ci/cc}$
Xe-133	_____ $\mu\text{Ci/cc}$	Ce-143	_____ $\mu\text{Ci/cc}$
Xe-135m	_____ $\mu\text{Ci/cc}$	Np-239	_____ $\mu\text{Ci/cc}$
Xe-135	_____ $\mu\text{Ci/cc}$	Ru-106	_____ $\mu\text{Ci/cc}$
Xe-137	_____ $\mu\text{Ci/cc}$	Te-132	_____ $\mu\text{Ci/cc}$
Xe-138	_____ $\mu\text{Ci/cc}$	Ce-144	_____ $\mu\text{Ci/cc}$

TIME: _____ DATE: _____ INITIALS: _____

Figure 7
METPAC Input Data Log
(Sheet 1 of 2)

COMPLETED BY _____

	MO/DA/YR	HR:MN
SHUTDOWN	_____	_____
UNMONITORED RELEASE	_____	_____
STEAM LINE	_____	_____
CONTAINMENT RELEASE	_____	_____
STACK RELEASE	_____	_____
ESTIMATED END OF RELEASE	_____	_____

15 MINUTE METEOROLOGICAL AVERAGES

Lower Wind Speed (mph): _____
Upper Wind Speed (mph): _____ (Stack release only)
Lower Wind Direction (deg from): _____
Upper Wind Direction (deg from): _____ (Stack release only)
Lower Delta Temperature (deg F): _____
Upper Delta Temperature (deg F): _____ (Stack release only)
Precipitation (in/qtr hr): _____
Solar Radiation (Ly/min): _____

UNMONITORED RELEASE

Field Team Dose Rate (mR/hr): _____
Iodine-131 Con (μ Ci/cc): _____
Field Team Location (mile): _____
Field Team Sector (1=N; 2=NNE; 3=NE, etc.): _____
Estimated Flow Rate (cc/Sec): _____

Figure 7
METPAC Input Data Log
(Sheet 2 of 2)

STEAM LINE RELEASE

Steamline Dose Rate (mr/hr): _____
Steamline Pathway : _____ SRV=1 _____ ASD=2 _____ 2-Phased
Steamline Pressure (psig): _____

CONTAINMENT RELEASE

Containment Dose Rate (R/hr): _____
Containment Pressure (psig): _____
Estimated Hole Diameter (ft): _____
Stack Venting (8" hole): _____ YES _____ NO

STACK RELEASE

WRGM Concentration ($\mu\text{Ci/cc}$): _____
WRGM Release Rate ($\mu\text{Ci/sec}$): _____

MISCELLANEOUS RELEASE INPUTS

Isotopics ($\mu\text{Ci/cc}$): _____ YES _____ NO
LOCA Type (1 or 3): _____
Monitored vs Isotopics (0-Mon/1-Thy/2-EDE): _____

All parameters are available on the Dose Assessment Status screen of the MPCCS.

Solar radiation measurements can be accessed through the logger trend printout. If instrumentation is **not** available, use default solar radiation values in Figure 10.

Figure 8 **METPAC Data Entry Screen Guidance** (Sheet 1 of 16)

CURRENT ACCIDENT CONDITION input

```

Metpac.bat
METPAC VERSION 5.4          SEABROOK STATION
CURRENT ACCIDENT CONDITION

      START OF          END OF
      MO/DA/YR  HR:MN    MO/DA/YR  HR:MN
SHUTDOWN      -1/-1/-1  -1:-1    -1/-1/-1  -1:-1
ANALYSIS      -1/-1/-1  -1:-1    -1/-1/-1  -1:-1

PLEASE ENTER DATE AND TIME OF SHUTDOWN AND DATE AND TIME OF RELEASE

      MO/DA/YR  HR:MN
SHUTDOWN      -1/-1/-1  -1:-1
UNMONITORED RELEASE  -1/-1/-1  -1:-1
STEAMLINE RELEASE  -1/-1/-1  -1:-1
CONTAINMENT RELEASE  -1/-1/-1  -1:-1
STACK RELEASE    -1/-1/-1  -1:-1

MAIN MENU    RAD SCREEN    MET SCREEN
  
```

Where:

SHUTDOWN = Enter date and time of the reactor trip.

UNMONITORED RELEASE = Enter date and time of release initiation. Use this analysis option if there is a loss of radiological monitoring capabilities with a suspected release in progress. This is assumed to be a ground level release.

STEAMLINE RELEASE = Enter date and time of release initiation. Use this analysis option if there is a main steam line radiation monitor high alarm with an open Atmospheric Steam Dump Valve or Safety Relief Valve on the affected steam line. This is assumed to be a ground level release.

CONTAINMENT RELEASE = Enter date and time of release initiation. Use this analysis option if containment enclosure is not at negative pressure, or if either of the containment enclosure/outside atmosphere differential pressure monitors (EAH-PDI-5782 or 5789) reads zero. This is assumed to be a ground level release.

STACK RELEASE = Enter date and time of release initiation. Use this analysis option if there is a Wide Range Gas Monitor high alarm (RM-6528-4).

Figure 8
METPAC Data Entry Screen Guidance
(Sheet 2 of 16)

RAD SCREEN input for UNMONITORED RELEASE pathway

The screenshot shows a terminal window titled "Metpac.bat". The screen displays the following text:

```
SHUTDOWN: DATE 10/10/00 TIME 10:00 UNMONITORED
ANALYSIS: DATE 10/10/00 TIME 10:30 METPAC VERSION 5.4 SEABROOK STATION

UNMONITORED:
METHOD: 0
MET <0-FIELD/1-COMBO/2-ISOTOPIC>
0- DOSE RATE: -1.000E+00 nR/hr
0- LOCATION: -1.00 mile
0- SECTOR: -1 <1=N/2=NNE/...>
0- I131 CONC: -1.000E+00 uCi/cc
0- LOCATION: -1.00 mile
0- SECTOR: -1 <1=N/2=NNE/...>

2- ISOTOPICS: N Y/N
2- EST FLOW RATE: -1.000E+00 cc/sec
```

At the bottom of the screen, there are three labels: "DATE SCREEN", "METPAC SCREEN" (which is highlighted with a box), and "PROMPT".

Where:

DOSE RATE = Enter a measured dose rate in the field.

LOCATION = Enter the estimated miles from the release point where the measured DOSE RATE was taken.

SECTOR = Enter the approximate direction of the DOSE RATE measurement LOCATION from the release point.

N - 1; NNE - 2; NE - 3; ENE - 4; E - 5; ESE - 6; SE - 7; SSE - 8; S - 9; SSW - 10; SW - 11;
WSW - 12; W - 13; WNW - 14; NW - 15; and NNW - 16

I131 CONC = Enter the measured I131 concentration in the field.

LOCATION = Enter the estimated miles from the release point where the measured I131 CONC was taken.

Figure 8
METPAC Data Entry Screen Guidance
(Sheet 3 of 16)

SECTOR = Enter the approximate direction of the I131 CONC measurement LOCATION from the release point.

N - 1; NNE - 2; NE - 3; ENE - 4; E - 5; ESE - 6; SE - 7; SSE - 8; S - 9; SSW - 10; SW - 11; WSW - 12; W - 13; WNW - 14; NW - 15; and NNW - 16

ISOTOPICS = Entering "N" will cause METPAC to use a predetermined radionuclide mix. Entering "Y" will take the user to another screen to input a known or estimated radionuclide mix.

NOTE

Obtain Dose Assessment Specialist guidance for which to use. If ISOTOPICS are used ("Y" is entered), enter estimated radionuclide mix from METPAC Isotopic Sample Input Data Log, Figure 6.

EST FLOW RATE = Enter the estimated flow rate at the release point. The following conversion may be useful.

$$\text{_____ ft}^3/\text{min} \times 471.9456 = \text{_____ cc/sec}$$

Figure 8
METPAC Data Entry Screen Guidance
(Sheet 4 of 16)

MET SCREEN input for UNMONITORED RELEASE pathway

```

c Metpac.bat
SHUTDOWN: DATE 10/10/00 TIME 10:00 UNMONITORED
ANALYSIS: DATE 10/10/00 TIME 10:30 METPAC VERSION 5.4 SEABROOK STATION
MET DATA

LOWER      : WIND SPEED      -1.00 MPH
            : WIND DIRECTION -1.00 DEG FROM
            : DELTA TEMPERATURE -100.00 DEG F

PRECIPITATION : -1.00 INCH/QTR HR
SOLAR RADIATION : -1.00 ly/min

RELEASE CONDITION <0=STOPPED/1=CONTINUING>
UNMONITORED : 1 ESTIMATED END OF RELEASE
MM/DD/YY HR:MM
10/10/00 14:30

LOCATYPE : 3 1 OR 3
DATE SCREEN RAD SCREEN RUN PROMPT
  
```

Where:

LOWER WIND SPEED = Enter the most recent 15 minute average value of lower wind speed.

LOWER WIND DIRECTION = Enter the most recent 15 minute average value of lower wind direction.

LOWER DELTA TEMPERATURE = Enter the most recent 15 minute average value of lower delta temperature.

PRECIPITATION = Enter the most recent 15 minute average value of precipitation.

SOLAR RADIATION = Enter the most recent 15 minute average value of solar radiation.

ESTIMATED END OF RELEASE = Enter the date and time when the release is expected to terminate, or has actually terminated. Note that this field is accessed by using the right arrow key from the SOLAR RADIATION field or the left arrow key from the RELEASE CONDITION field. Obtain entry values from the Dose Assessment Coordinator.

RELEASE CONDITION = Enter "0" if the release is stopped or "1" if it is continuing.

LOCA TYPE = Enter "3".

Position the cursor on the prompt "RUN" and press (CR). The program will begin execution of the dispersion and dose program. (Protected: Ref. 6.8)

Figure 8
METPAC Data Entry Screen Guidance
(Sheet 5 of 16)

RAD SCREEN input for STEAMLINE RELEASE pathway

The screenshot shows a terminal window titled "Metpac.bat". The screen displays the following text:

```
SHUTDOWN: DATE 10/10/00 TIME 10:00 STEAMLINE  
ANALYSIS: DATE 10/10/00 TIME 10:30 METPAC VERSION 5.4 SEABROOK STATION  
  
STEAMLINE:  
DOSE RATE: -1.000E+00 nR/hr  
PRESSURE: -1.00 psig  
PATHWAY: 1  
<1-SRV/2-ARV/3-TWO-PHASED>  
  
ISOTOPICS: N Y/N  
MON US ISO 0  
<0-MOM/1-INY/2-EDE>
```

At the bottom of the screen, there are three labels: "DATE SCREEN", "METPAC SCREEN", and "PROMPT". The "METPAC SCREEN" label is underlined.

Where:

DOSE RATE = Enter the value of the main steam line radiation monitor associated with the steam line having the open Atmospheric Steam Dump Valve or Safety Relief Valve.

PRESSURE = Enter the pressure in the ruptured generator. If the generator pressure is indicated less than 50 psig, enter 50 psig.

PATHWAY = Enter "1" if release is through a Safety Relief Valve, "2" if release is through an Atmospheric Steam Dump Valve, or "3" if both a steam AND liquid release is occurring through either valve.

ISOTOPICS = Entering "N" will cause METPAC to use a predetermined radionuclide mix. Entering "Y" will take the user to another screen to input a known or estimated radionuclide mix.

Figure 8
METPAC Data Entry Screen Guidance
(Sheet 6 of 16)

NOTE

Obtain Dose Assessment Specialist guidance for which to use. If ISOTOPICS are used ("Y" is entered), enter estimated radionuclide mix from METPAC Isotopic Sample Input Data Log, Figure 6.

MON VS ISO = Entering "0" will cause METPAC to use predetermined radionuclide mix for calculating TEDE and thyroid CDE, OR
 "1" will cause METPAC to use predetermined noble gas mixture for calculating TEDE and inputted known or estimated radionuclide mix (from above) for calculating thyroid CDE, OR
 "2" will cause METPAC to use inputted known or estimated radionuclide mix to calculate TEDE and thyroid CDE.

Figure 8
METPAC Data Entry Screen Guidance
(Sheet 7 of 16)

MET SCREEN input for STEAMLINE RELEASE pathway

```
Metpac.bat
SHUTDOWN: DATE 10/10/00 TIME 10:00 STEAMLINE
ANALYSIS: DATE 10/10/00 TIME 10:30 METPAC VERSION 5.4 SEABROOK STATION
MET DATA

LOWER      : WIND SPEED          -1.00 MPH
            : WIND DIRECTION      -1.00 DEG FROM
            : DELTA TEMPERATURE  -100.00 DEG F

PRECIPITATION : -1.00 INCH/QTZ HR
SOLAR RADIATION : -1.00 ly/min

RELEASE CONDITION <0=STOPPED/1=CONTINUING> ESTIMATED END OF RELEASE
MM/DD/YY HR:MM
10/10/ 0 14:30

STEAMLINE : 1

DATE SCREEN RAD SCREEN RUN PROMPT
```

Where:

LOWER WIND SPEED = Enter the most recent 15 minute average value of lower wind speed.

LOWER WIND DIRECTION = Enter the most recent 15 minute average value of lower wind direction.

LOWER DELTA TEMPERATURE = Enter the most recent 15 minute average value of lower delta temperature.

PRECIPITATION = Enter the most recent 15 minute average value of precipitation.

SOLAR RADIATION = Enter the most recent 15 minute average value of solar radiation.

ESTIMATED END OF RELEASE = Enter the date and time when the release is expected to terminate, or has actually terminated. Note that this field is accessed by using the right arrow key from the SOLAR RADIATION field or the left arrow key from the RELEASE CONDITION field. Obtain entry values from the Dose Assessment Specialist.

Figure 8
METPAC Data Entry Screen Guidance
(Sheet 8 of 16)

RELEASE CONDITION = Enter "0" if the release is stopped or "1" if it is continuing.

Position the cursor on the prompt "RUN" and press (CR). The program will begin execution of the dispersion and dose program. (Protected: Ref. 6.8)

Figure 8
METPAC Data Entry Screen Guidance
(Sheet 9 of 16)

RAD SCREEN input for CONTAINMENT RELEASE pathway



```
Metpac.bat
SHUTDOWN: DATE 10/10/00 TIME 10:00 CONTAINMENT
ANALYSIS: DATE 10/10/00 TIME 10:00 METPAC VERSION 5.4 SEABROOK STATION

CONTAINMENT:
DOSE RATE -1.000E+00 R/hr
PRESSURE: -1.00 psig
ISOTOPICS: N Y/N
MOM US ISO: 0
EST HOLE DIA.: -1.00 feet
PROMPT

DATE SCREEN METPAC SCREEN
```

Where:

DOSE RATE = Enter the measured or estimated value of the containment dose rate.

PRESSURE = Enter the containment pressure.

ISOTOPICS = Entering "N" will cause METPAC to use a predetermined radionuclide mix. Entering "Y" will take the user to another screen to input a known or estimated radionuclide mix.

NOTE

Obtain Dose Assessment Specialist guidance for which to use. If ISOTOPICS are used ("Y" is entered), enter estimated radionuclide mix from METPAC Isotopic Sample Input Data Log, Figure 6.

Figure 8
METPAC Data Entry Screen Guidance
(Sheet 10 of 16)

MON VS ISO = Entering "0" will cause METPAC to use predetermined radionuclide mix for calculating TEDE and thyroid CDE, OR
 "1" will cause METPAC to use predetermined noble gas mixture for calculating TEDE and inputted known or estimated radionuclide mix (from above) for calculating thyroid CDE, OR
 "2" will cause METPAC to use inputted known or estimated radionuclide mix to calculate TEDE and thyroid CDE.

EST HOLE DIAMETER = Enter the estimated diameter of the release point from containment.
Entering "-1" will cause METPAC to use the assumed design basis containment leak rate.

Figure 8
METPAC Data Entry Screen Guidance
(Sheet 11 of 16)

MET SCREEN input for CONTAINMENT RELEASE pathway

```
Metpac.bat
SHUTDOWN: DATE 10/10/00 TIME 10:00 CONTAINMENT
ANALYSIS: DATE 10/10/00 TIME 10:30 METPAC VERSION 5.4 SEABROOK STATION
MET DATA

LOWER      : WIND SPEED          -1.00 MPH
            : WIND DIRECTION     -1.00 DEG FROM
            : DELTA TEMPERATURE  -100.00 DEG F

PRECIPITATION : -1.00 INCH/QT/HR
SOLAR RADIATION : -1.00 ly/min

RELEASE CONDITION (&-STOPPED/1-CONTINUING) ESTIMATED END OF RELEASE
MM/DD/YY HR:MM
10/10/00 14:30

CONTAINMENT : 1

DATE SCREEN RAD SCREEN RUN PROMPT
```

Where:

LOWER WIND SPEED = Enter the most recent 15 minute average value of lower wind speed.

LOWER WIND DIRECTION = Enter the most recent 15 minute average value of lower wind direction.

LOWER DELTA TEMPERATURE = Enter the most recent 15 minute average value of lower delta temperature.

PRECIPITATION = Enter the most recent 15 minute average value of precipitation.

SOLAR RADIATION = Enter the most recent 15 minute average value of solar radiation.

ESTIMATED END OF RELEASE = Enter the date and time when the release is expected to terminate, or has actually terminated. Note that this field is accessed by using the right arrow key from the SOLAR RADIATION field or the left arrow key from the RELEASE CONDITION field. Obtain entry values from the Dose Assessment Coordinator.

Figure 8
METPAC Data Entry Screen Guidance
(Sheet 12 of 16)

RELEASE CONDITION = Enter "0" if the release is stopped or "1" if it is continuing.

Position the cursor on the prompt "RUN" and press (CR). The program will begin execution of the dispersion and dose program. (Protected: Ref. 6.8)

Figure 8
METPAC Data Entry Screen Guidance
(Sheet 13 of 16)

RAD SCREEN input for STACK RELEASE pathway

```
Metpac.bat
SHUTDOWN: DATE 10/10/00 TIME 10:00   STACK
ANALYSIS: DATE 10/10/00 TIME 10:30   METPAC VERSION 5.4   SEABROOK STATION

STACK:
CONCENTRATION:  -1.000E+00  uCi/cc
RELEASE RATE:   -1.000E+00  uCi/sec
ISOTOPICS:      N    Y/N
MON US ISO:     0
                <0-MON/1-THY/2-EDE>

DATE SCREEN  METPAC SCREEN  PROMPT
```

Where:

CONCENTRATION = Enter the indicated release concentration from the Wide Range Gas Monitor.

RELEASE RATE = Enter the indicated release rate from the Wide Range Gas Monitor.

ISOTOPICS = Entering "N" will cause METPAC to use a predetermined radionuclide mix. Entering "Y" will take the user to another screen to input a known or estimated radionuclide mix.

NOTE

Obtain Dose Assessment Specialist guidance for which to use. If ISOTOPICS are used ("Y" is entered), enter estimated radionuclide mix from METPAC Isotopic Sample Input Data Log, Figure 6.

Figure 8
METPAC Data Entry Screen Guidance
(Sheet 14 of 16)

MON VS ISO = Entering "0" will cause METPAC to use predetermined radionuclide mix for calculating TEDE and thyroid CDE, OR
 "1" will cause METPAC to use predetermined noble gas mixture for calculating TEDE and inputted known or estimated radionuclide mix (from above) for calculating thyroid CDE, OR
 "2" will cause METPAC to use inputted known or estimated radionuclide mix to calculate TEDE and thyroid CDE.

Figure 8
METPAC Data Entry Screen Guidance
(Sheet 15 of 16)

MET SCREEN input for STACK RELEASE pathway

```
Metpac.bat
SHUTDOWN: DATE 10/10/00 TIME 10:00 STACK
ANALYSIS: DATE 10/10/00 TIME 10:30 METPAC VERSION 5.4 SEABROOK STATION
MET DATA
UPPER      : WIND SPEED          -1.00 MPH
            : WIND DIRECTION      -1.00 DEG FROM
            : DELTA TEMPERATURE  -100.00 DEG F

PRECIPITATION : -1.00 INCH/QTR HR
SOLAR RADIATION : -1.00 ly/min

RELEASE CONDITION <0=STOPPED/1=CONTINUING> ESTIMATED END OF RELEASE
MM/DD/YY HR:MM
10/10/00 14:30

STACK      : 1
LOCATYPE   : 3 1 OR 3

DATE SCREEN  RAD SCREEN  RUN_  PROMPT
```

Where:

UPPER WIND SPEED = Enter the most recent 15 minute average value of upper wind speed.

UPPER WIND DIRECTION = Enter the most recent 15 minute average value of upper wind direction.

UPPER DELTA TEMPERATURE = Enter the most recent 15 minute average value of upper delta temperature.

PRECIPITATION = Enter the most recent 15 minute average value of precipitation.

SOLAR RADIATION = Enter the most recent 15 minute average value of solar radiation.

ESTIMATED END OF RELEASE = Enter the date and time when the release is expected to terminate, or has actually terminated. Note that this field is accessed by using the right arrow key from the SOLAR RADIATION field or the left arrow key from the RELEASE CONDITION field. Obtain entry values from the Dose Assessment Coordinator.

RELEASE CONDITION = Enter "0" if the release is stopped or "1" if it is continuing.

Figure 8
METPAC Data Entry Screen Guidance
(Sheet 16 of 16)

LOCA TYPE = Enter "3" if the reactor SHUTDOWN time occurred less than or equal to 100 hours from the current ANALYSIS time. Enter "1" if the reactor SHUTDOWN time occurred greater than 100 hours from the current ANALYSIS time.

NOTE

If the Wide Range Gas Monitor (WRGM) is inoperable and the WRGM Backup Monitor has been activated, enter LOCA 3 for all times after shutdown.

Position the cursor on the prompt "RUN" and press (CR). The program will begin execution of the dispersion and dose program. (Protected: Ref. 6.8)

Figure 9 **METPAC Function Key Listing** (Sheet 1 of 3)

As desired, select functions and capabilities as follows:

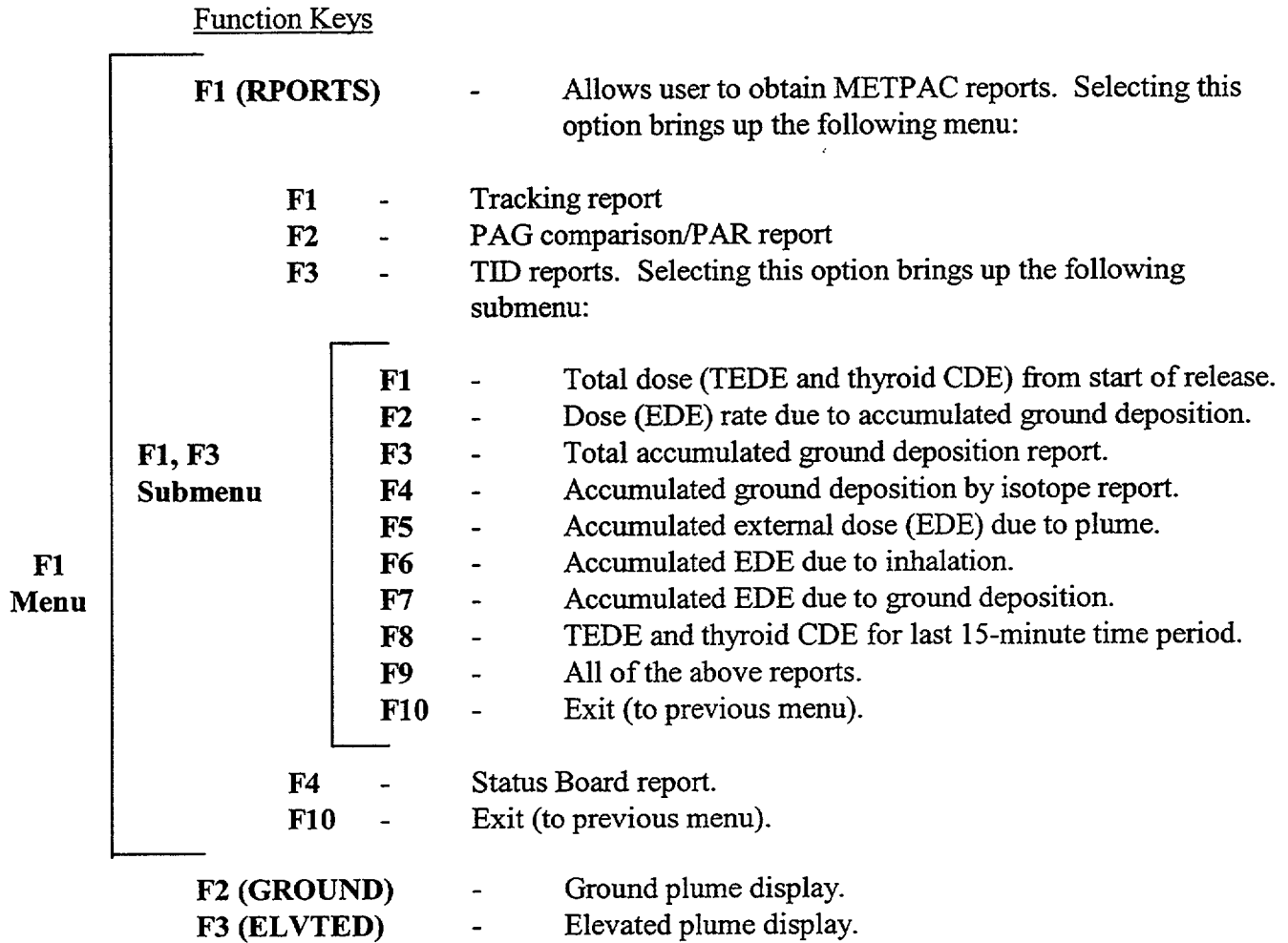


Figure 9
METPAC Function Key Listing
(Sheet 2 of 3)

F6 (MODIFY) - Modify plume plot. Selecting this option brings up the following menu:

F6 Menu

- | | | |
|-----------|---|---|
| F1 | - | Draws/removes 5 and 10 mile radius circles and 16 direction sectors. |
| F2 | - | Draws/removes evacuation roads. |
| F3 | - | Draws/removes points of interest; use keyboard letter corresponding with point of interest; to exit, press (CR). |
| F4 | - | Draws/removes town names. |
| F5 | - | Zooms in on an area of the map. To specify the area of interest, the user positions the cursor using the mouse in the upper left-hand corner of the area of interest, depresses the mouse key, and moves the cursor diagonally to the lower right-hand corner of the area of interest. The system will box the area of interest. The user then moves the cursor using the mouse to the accompanying menu and positions the cursor on either <u>A</u> CCEPT or <u>R</u> EJECT and depresses the mouse key. If ACCEPT, the map will be redrawn on the area of interest. |
| F6 | - | Changes legend. |
| F7 | - | Draws/removes TID plot. |
| F8 | - | Allows user to obtain a dose or dose rate for a location of interest on the map. To select the location of interest, the user positions the cursor using the mouse. To exit, position the cursor on the F10 (EXIT) display on the monitor. |

NOTE

This feature works for the plume plot (F6), TID plot (F7) and ground deposition plot (F9).

- | | | |
|------------|---|---|
| F9 | - | Draws/removes the ground deposition plot. |
| F10 | - | Exit (to previous menu). |

Figure 9
METPAC Function Key Listing
(Sheet 3 of 3)

F7 (SUMMARY)	-	Summary table for plume points. Selecting this feature brings up the following menu:															
F7 Menu		<table><tr><td>F1</td><td>-</td><td>Allows user to obtain METPAC reports (See F1 above).</td></tr><tr><td>F2</td><td>-</td><td>Summary table for ground level release.</td></tr><tr><td>F3</td><td>-</td><td>Summary table for elevated release.</td></tr><tr><td>F7</td><td>-</td><td>Returns user to previous plot.</td></tr><tr><td>F10</td><td>-</td><td>Exit (to Main Menu screen).</td></tr></table>	F1	-	Allows user to obtain METPAC reports (See F1 above).	F2	-	Summary table for ground level release.	F3	-	Summary table for elevated release.	F7	-	Returns user to previous plot.	F10	-	Exit (to Main Menu screen).
F1	-	Allows user to obtain METPAC reports (See F1 above).															
F2	-	Summary table for ground level release.															
F3	-	Summary table for elevated release.															
F7	-	Returns user to previous plot.															
F10	-	Exit (to Main Menu screen).															
F8 (DOSE)	-	Allows user to obtain a dose or dose rate for a location of interest on the map (see F8 above).															
F9 (PRINT)	-	Makes a hard copy of the graphic screen.															
F10 (EXIT)	-	Exit (to Main Menu screen).															
Spacebar	-	allows user to switch from plume display based on TEDE to a plume display based on thyroid CDE.															

Figure 10
Default Solar Radiation Values (Langley/Min)

Condition	Spring	Summer	Fall	Winter
Sunny	0.8 - 1.2	1.0 - 1.4	0.8 - 1.0	0.5 - 0.8
Overcast	0.05 - 0.1	0.05 - 0.2	0.05 - 0.2	0.05 - 0.1

Figure 11 Summary of Changes

Rev. 18:

Throughout the procedure changed Wide Range Gas Monitor (WRGM) high alarm from 1CC225 to RM-6528-4.

Rev. 18 Chg. 01:

In Figure 3 corrected the stability classification table delta-t value symbols to agree with Figure 2 of ER 5.7.

Rev. 17:

In §6.0 added reference 13.

In §5.1, step 10, added instructions for the METPAC Operator for verification of meteorology input data following each dose projection run. Protected the step.

Rev. 16:

Performed biennial review of the procedure.

In §3.0 revised step 11, added step protection to step 12, and added steps 13 and 14.

In §5.1, step 1, changed IPT to INGEST. In step 8, added references to Figures 8 and 9. Deleted Note and steps 9 through 12. Relocated the description of Function Keys to Figure 9.

In Figure 7 added reference to Figure 10.

Added Figure 8, METPAC Data Entry Screen Guidance. Renumbered old Figure 8.

Added Figure 10, Default Solar Radiation Values (Langley/Min).

Rev. 15:

In §3.0 and §6.0, deleted references to YAEC.

Added Figure 8, Summary of Changes, to comply with MNPR requirements.