CP&L
A Progress Energy Company

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SERIAL: HNP-01-086
10 CFR 50, Appendix E

United States Nuclear Regulatory Commission
ATTENTION: Document Control Desk
Washington, DC 20555

SHEARON HARRIS NUCLEAR POWER PLANT
DOCKET NO. 50-400/LICENSE NO. NPF-63
CHANGE TO EMERGENCY PLAN IMPLEMENTING PROCEDURES

Dear Sir or Madam:

In accordance with 10 CFR 50, Appendix E, Carolina Power & Light Company is transmitting one copy each of recently revised Harris Nuclear Plant Emergency Plan implementing procedures. The enclosure to this letter identifies the emergency plan implementing procedures revised and the effective date.

Questions regarding this submittal may be referred to Mr. E. A. McCartney at (919) 362-2661

Sincerely,

R. J. Field
Manager, Regulatory Affairs
Harris Nuclear Plant

MGW

Enclosures

c: Mr. J. B. Brady (NRC Senior Resident Inspector, HNP)
Mr. Rich Laufer (NRR Project Manager, HNP)
Mr. L. A. Reyes (NRC Regional Administrator, Region II) with two copies of procedure

Harris Nuclear Plant
5413 Shearon Harris Road
New Hill, NC 27562

A045

CHANGE TO EMERGENCY PLAN IMPLEMENTING PROCEDURES

PROCEDURE NUMBER	TITLE	EFFECTIVE DATE
PEP-110, Revision 7	Emergency Classification and Protective Action Recommendations	05/29/01
PEP-340, Revision 7	Dose Assessment	05/29/01

I

INFORMATION USE

CAROLINA POWER & LIGHT COMPANY

SHEARON HARRIS NUCLEAR POWER PLANT

PLANT OPERATING MANUAL

VOLUME 2

PART 5

PROCEDURE TYPE: Plant Emergency Procedure

NUMBER: PEP-110

TITLE: Emergency Classification and Protective Action Recommendations

Table of Contents

Section Page

1.0 PURPOSE

1. The purpose of this procedure is to provide guidance on the use of Emergency Action Levels (EALs) for classifying an emergency. This implements Section 4.1 of PLP-201.

2. This procedure provides guidelines for determining Protective Action Recommendations (PARs) to be made to offsite authorities during a General Emergency. This implements Section 4.5 of PLP-201.

3. This procedure provides guidance for summarizing events and actions taken during an event for use during facility turnover and facility briefings. This implements Section 2.3 of PLP-201.

4. This procedure provides guidance for event termination and entry into Recovery. This implements Section 6.7 of PLP-201.

2.0 INITIATING CONDITIONS

1. Conditions exist which, in the judgment of the Superintendent-Shift Operations (S-SO), could be classified as an emergency.

2. Entry into the Emergency Action Level network has been directed by any of the Emergency Operating Procedures, Fire Protection Procedures, Abnormal Operating Procedures, or any other procedure.

3. A Critical Safety Function Status Tree (CSFST) on the Safety Parameter Display System has produced a valid red or magenta output and monitoring of the CSFSTs has been authorized in accordance with an approved procedure.

4. Notification has been received from the senior member of the Security Organization, or his designee, that a "Security Alert" or "Security Emergency" has been initiated.

5. Entry into the Emergency Action Level (EAL) Flowpath has been made at the discretion of the Site Emergency Coordinator for the purposes of reclassification.

6. A General Emergency has been declared.

7. Conditions have been stabilized and the Site Emergency Coordinator is preparing to terminated the emergency and enter into Recovery as per PEP-500.

3.0 PROCEDURE STEPS

3.1 Emergency Classification

NOTE: • Implementation of this Section does not constitute an emergency.

• This section serves as a guideline to assist in comparison of plant conditions with Emergency Action Levels to evaluate whether an emergency should be declared.

1. Once implemented, this section shall remain in effect until either:

   a. The determination has been made by the Superintendent-Shift Operations or his designated alternate, that an Emergency Action Level has not been exceeded.

   b. Conditions which resulted in declaration of an emergency have been resolved and the emergency has been terminated.

2. Enter the Emergency Action Level (EAL) Flowpath at Entry Point X, unless directed to another entry point.

3. The Flowpath may be entered at any time at the discretion of the Site Emergency Coordinator (SEC-CR) or Superintendent-Shift Operations or designee. The Flowpath can be reentered as appropriate in order to check the classification or to reclassify an event in progress.

CAUTION

The highest emergency class for which an Emergency Action Level was exceeded shall be declared.

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4. Complete the Flowpath, and if an emergency is declared, perform notifications in accordance with the highest level condition indicated on the EAL STATUS BOARD.

5. Implement PEP-230 and/or PEP-240 as appropriate.

3.2 Plant Based Protective Action Recommendations (PARs)

1. Use Attachment 3, "Protective Action Recommendation Process" as an aid in determining the proper PAR.

2. At a minimum, evacuation of a 2 mile radius and 5 miles downwind (with sheltering of all other Subzones) will be recommended for a General Emergency declaration.

3.2 Plant Based Protective Action Recommendations (PARs) (continued)

3. Evacuation of a 5 mile radius and 10 miles downwind (with sheltering of all other Subzones) will be recommended for plant conditions in which:

   a. Substantial core damage is imminent or has occurred. Indications that substantial core damage is imminent or has occurred include:

      (1) Core damage estimations >1% Melt.

      (2) Core Exit Thermocouple readings ≥ 2300° F.

      (3) Core uncovered > 30 minutes.

   b. A significant loss of reactor coolant is imminent or has occurred. Indications that a significant loss of reactor coolant is imminent or has occurred include:

      (1) Containment Radiation Monitors reading:

         - >10,000 R/Hr with no containment spray.
         - >4,000 R/Hr with containment spray on.

      (2) Containment hydrogen gas concentration >1%.

      (3) Rapid vessel depressurization.

      (4) A large break loss of coolant accident.

   c. Containment failure (primary or S/G) is imminent or has occurred. Indications that containment failure (primary or S/G) is imminent or has occurred include:

      (1) A release of radioactivity can not be maintained below the General Emergency EAL criteria.

      (2) Primary containment pressure can not be maintained below design basis pressure which is 45 psig.

      (3) Primary containment H_2 gas concentration can not be maintained below combustible limits which is 4% by volume.

      (4) Faulted/Ruptured S/G with a relief valve open.

4. Containment monitors can provide indication of both core damage and RCS breach. Monitor values used to determine a specific amount of core damage are dependent on plant conditions, power history, and time after shutdown. Monitor readings used to quantify an amount of damage or coolant leakage should be complimented by other indications and engineering judgment.

3.2 Plant Based Protective Action Recommendations (PARs) (continued)

5. If a release is in progress:

   a. Perform dose assessment as soon as possible to determine if PAGs are exceeded and if additional Subzones require evacuation.

   b. Add any Subzones requiring evacuation as determined by dose assessment to the plant based PARs.

6. If no release is in progress:

   a. Perform dose projections on possible conditions as time permits to determine if PAGs could be exceeded.

   b. Consider adding any Subzones requiring evacuation as determined by dose projection to the plant based PARs.

3.3 Dose Assessment Based Protective Action Recommendations (PARs)

NOTE: Dose projections are not required to support the decision process in Attachment 3, "Protective Action Recommendation Process."

1. In the event dose assessment results indicate the need to recommend actions beyond the outer EPZ boundaries, that is past 10 miles:

   a. Dispatch Environmental Teams to downwind areas to verify the calculated exposure rates prior to issuing PARs outside the EPZ.

   b. Many assumptions exist in dose assessment calculations, involving both source term and meteorological factors, which make computer predictions over long distances highly questionable.

2. From the Control Room: If a release is in progress and time permits, perform offsite dose assessment in accordance with PEP-340 to determine whether the plant based protective actions of Attachment 3 are adequate.

3. From the Emergency Operations Facility: Conduct offsite dose assessment in accordance with PEP-340 to determine whether the plant based protective actions of Attachment 3 are adequate using the following methods as applicable:

   a. Monitored Release:

      (1) If a release is in progress, assess the calculated impact to determine whether the plant based PARs of Attachment 3 are adequate.

3.3. Dose Assessment Based Protective Action Recommendations (PARs) continued)

(2) If a release is not in progress, use current meteorological and core damage data to project effluent monitor threshold values which would require 2, 5, and 10 mile evacuations (Attachment 3). Reestablish threshold values whenever meteorological conditions or core damage assessment values change.

b. Containment Leakage/Failure:

(1) If a release is in progress, assess the calculated impact to determine whether the plant based PARs of Attachment 3 are adequate.

(2) If a release is not in progress, use current meteorological and core damage data on various scenarios (design leakage, failure to isolate, catastrophic failure) to project the dose consequences.

- Determine whether the plant based PARs of Attachment 3 are adequate.

- Reestablish scenario values whenever meteorological conditions or core damage assessment values change.

c. Field Survey Analysis: Actual field readings from Environmental Teams should be compared to dose assessment results and used as a dose projection method to validate calculated PARs and to determine whether the plant or release based protective actions of Attachment 3 are adequate.

d. Release Point Analysis: Actual sample data from monitored or unmonitored release points should be utilized in conjunction with other dose assessment and projection methods to validate calculated PARs and to determine whether the plant based protective actions of Attachment 3 are adequate.

4. The Emergency Response Manager and the Radiological Control Manager shall discuss dose assessment and projection analysis results and evaluate their applicability prior to issuing PARs to the State if possible.

3.4 Downgrading the Emergency Classification Level

1. If the action level currently has abated to a lower declaration or the situation has been resolved prior to completion of off-site reporting:

a. Declare the highest classification for which an Emergency Action Level was exceeded, if not already done, and

3.4 Downgrading the Emergency Classification Level (continued)

b. Downgrade immediately to the emergency classification appropriate for the present conditions.

2. Downgrading of an emergency is performed by issuing a notification to a lower emergency classification level whenever plant conditions improve to satisfy the affected Emergency Action Levels. However, the following guidelines apply:

a. If the Emergency Response Manager (ERM) position is activated, he shall be consulted before downgrading occurs.

b. If the NRC Director of Site Operations position is activated, he should be consulted before downgrading occurs.

c. If offsite Protective Action Recommendations have been made, the SEC-TSC shall consult with the ERM and with State and County authorities, prior to downgrading. It is recommended that any off-site Protective Action Recommendations be completed prior to downgrading of a General Emergency.

d. Where lasting damage has occurred to the fission product barriers or to safety systems, the ERM should transition to PEP-500 rather than a simple downgrade of the emergency.

e. For Alert or higher classifications, unless the conditions causing emergency action levels are very quickly resolved (less than approximately 30 minutes), downgrading should not occur until after the TSC and EOF are activated.

3.5 Emergency Termination and Transition to Recovery

1. If entering Recovery from an Unusual Event, determine the need for a Recovery Plan and support organization.

a. Generally, the activities following an Unusual Event will not require the formation of a Recovery Organization or a transition period prior to event termination and entry into Recovery.

b. Refer to PEP-500 for further guidance if recovery efforts following an Unusual Event extend beyond offsite notification and the generation of required reports.

2. Complete the Termination Checklist (Attachment 5).

a. If conditions will allow for the termination of the emergency and entry into Recovery, exit this procedure and enter PEP-500, "Recovery."

3.5 Emergency Termination and Transition to Recovery (continued)

b. If conditions do no support termination of the emergency and entry into Recovery, continue following the guidance provided in Section 3.1.

4.0 GENERAL

4.1 Guidelines for Use of the EAL Flowpath

1. Equivalent parameters or redundant instrumentation, should be utilized whenever possible to confirm the validity of instrumentation response when evaluating Emergency Action Levels.

2. If, at any time, a General Emergency declaration is warranted, the SEC is to note the EAL Reference Number on the EAL status board. Immediately declare a General Emergency and carry out the appropriate actions.

3. If an event other than a General Emergency is warranted, the SEC is to circle the indicated level, note the EAL Reference Number on the EAL STATUS BOARD and continue through the Flowpath. Upon completion of the Flowpath the highest indicated level shall be declared.

4. The Flowpath can be entered or reevaluated at the discretion of the SEC.

5. The highest emergency class for which an Emergency Action Level was exceeded shall be declared.

4.2 Specific Rules for Use of the EAL Flowpath

1. Entry into the EAL Flowpath will be via Entry Point X unless otherwise specifically directed by an approved plant procedure or by the EAL Flowpath itself.

2. The MOST RECENT information is to be utilized, when answering the questions asked in the EAL Flowpath. The information available may precede the event that is in progress, but it should be used until superseded by new information. As an example, the Flowpath asks if RCS activity is greater than 300 uCi/cc. The SEC is to use the last sample results (for example 10 uCi/cc) until the on-duty chemist reports otherwise.

3. When new data is available, the SEC is to reenter the EAL Flowpath at entry point X, unless directed by an approved procedure to enter at Point T, U, V, or Y.

4. When the Fission Product Barrier Analysis states to "Indicate a Fission Product Barrier (FPB) to be Breached, Jeopardized, or Intact," the SEC is to indicate (for example, with an X or check mark) the status on the FPB Status Board, before continuing with the Flowpath.

4.2 Specific Rules for Use of the EAL Flowpath (continued)

5. If any item on the EAL Flowpath cannot be answered, it is to be circled and assumed to be satisfactory until proven otherwise and evaluation of the remainder of the Flowpath is continued without delay. Samples/analysis are to be requested, if the information is unavailable or suspect. This is acceptable because sufficient backup instrumentation is available, and utilized, so that declaration of the proper EAL should not be impeded.

NOTE: The term "functional" should not be confused with the term "operable" (that is, if a component is declared inoperable per Technical Specifications, it may still be functional if it can fulfill its desired task under current conditions).

6. The "Functions Required For Shutdown" Table (EAL Table 3) list those items required for the plant to achieve and maintain shutdown and cooldown conditions.

   a. If the plant is in Modes 1, 2, or 3, then both the Mode 3 and the Modes 4-5 columns apply.

   b. If the plant is in Mode 4 or 5, then only the Mode 4-5 column applies.

7. If the plant is in Mode 5 and no charging pumps are available, an Alert should be declared only if other means of charging (that is, RHR from the RWST) are unavailable.

8. When a "Continuing Action" is encountered, record on the EAL Status Board:

   a. The time that the event began.

   b. The time that the time limit expires.

   c. The required time duration.

   d. The current EAL that will be affected when the time expires.

4.3 Protective Action Recommendations (PARs) General Guidance

1. PARs are made by HNP personnel whenever a General Emergency is declared. Additionally, if in the opinion of the Emergency Response Manager, or the SEC-CR if the EOF is not yet activated, conditions warrant the issuance of PARs, a General Emergency will be declared (HNP will not issue PARs for any accident classified below a General Emergency).

2. PARs provided in response to a radioactive release include evacuation and taking shelter.

4.3 Protective Action Recommendations (PARs) General Guidance (continued)

a. Evacuation is the preferred action unless external conditions impose a greater risk from the evacuation than from the dose received.

b. HNP personnel do not have the necessary information to determine whether offsite conditions would require sheltering instead of an evacuation. Therefore, an effort to base PARs on external factors (such as road conditions, traffic/traffic control, weather or offsite emergency worker response) should not be attempted.

3. At a minimum, a plant condition driven PAR to evacuate a 2 mile radius and 5 miles downwind, and shelter all other Subzones, is issued at the declaration of a General Emergency. Depending on plant conditions, a 5 mile radius and 10 miles downwind, and shelter all other Subzones, may be issued instead of the minimum PAR.

a. PARs are included with the initial and follow-up notifications issued at a General Emergency.

b. The PAR must be provided to the State within 15 minutes of (1) the classification of the General Emergency or (2) any change in recommended actions.

c. The PAR must be provided to the NRC as soon as possible and within 60 minutes of (1) the classification of the General Emergency or (2) any change in recommended actions.

4. The Emergency Response Manager, or the SEC-CR if the EOF is not yet activated, may elect to specify PARs for any combinations of Subzones or the entire EPZ (or beyond) regardless of plant and dose based guidance.

5. PARs should not be extended based on the results of dose projections unless the postulated release is likely to occur within a short period of time. Plant based PARs are inherently conservative such that expanding the evacuation zone as an added precaution would result in a greater risk from the evacuation than from the radiological consequences of a release. It also would dilute the effectiveness of the offsite resources used to accommodate the evacuation.

6. Protective actions taken in areas affected by plume deposition following the release are determined and controlled by offsite governmental agencies.

a. HNP is not expected to develop offsite recommendations involving ingestion or relocation issues following plume passage.

b. HNP may be requested to provide resources to support the determination of post plume protective actions.

4.3 Protective Action Recommendations (PARs) General Guidance (continued)

7. Throughout the duration of a General Emergency, assess plant conditions and effluent release status to ensure the established PARs are adequate.

5.0 REFERENCES

5.1 PLP-201, "Emergency Plan"

1. Section 4.1, "Emergency Classification"
2. Section 4.5.1, "Protective Action Guides"

5.2 Referenced Plant Emergency Procedures

1. PEP-230, "Control Room Operations"
2. PEP-240, "Activation and Operation of the Technical Support Center"
3. PEP-270, "Activation and Operation of the Emergency Operations Facility"
4. PEP-310, "Notifications and Communications"
5. PEP-500, "Recovery"

5.3 Other References

1. North Carolina Emergency Response Plan in Support of the Shearon Harris Nuclear Power Plant"

2. EPA 400-R-92-001, "Manual of Protective Action Guides and Protective Actions for Nuclear Incidents"

3. NUREG-0654 Supplement 3, "Criteria for Protective Action Recommendations for Severe Accidents"

4. NUREG/BR-0150, Vol. 4, Rev.4, US NRC, RTM-96 Response Technical Manual

5. Regulatory Guide 1.101 "Emergency Planning and Preparedness for Nuclear Power Plants"

6. EPPOS No.1 "Emergency Preparedness Position (EPPOS) on Acceptable Deviations to Appendix 1 to NUREG-0654/FEMA-REP-1"

6.0 SPECIAL TOOLS AND EQUIPMENT

1. EAL Flow Paths: Mounted EAL Flow Paths are maintained in the Main Control Room, TSC and EOF.

2. PAR Boards: Mounted PAR boards, based on Attachment 3, are maintained in the Main Control Room, TSC and EOF.

7.0 DIAGRAMS AND ATTACHMENTS

See Table of Contents

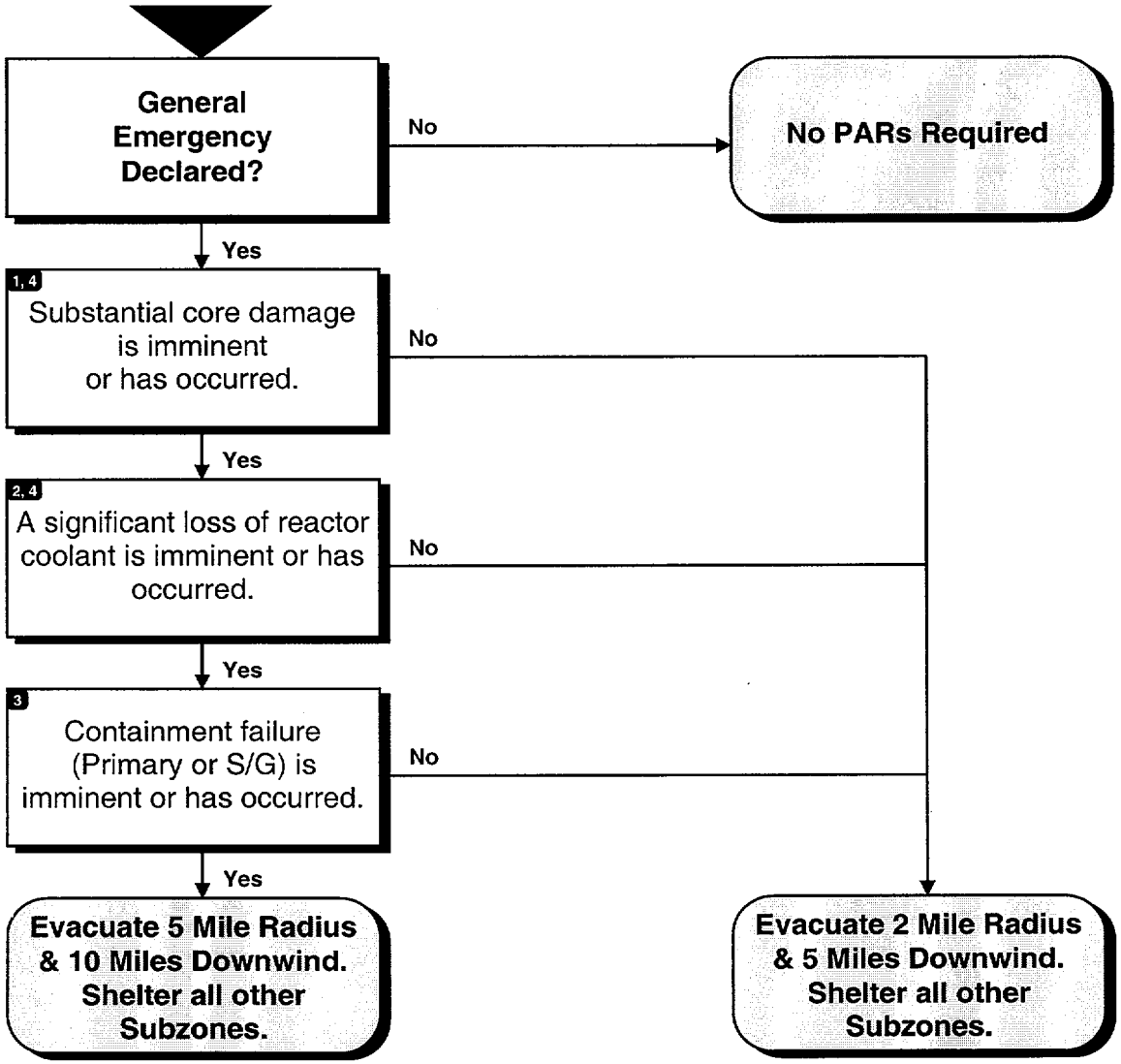
EAL FLOWPATH SIDE 1

A Folded Copy of the Emergency Action Level
Flowpath (Rev. 00-1) is contained in the
Plastic Sleeve Following This Hardcopy Page

EAL FLOWPATH SIDE 2

A Folded Copy of the Emergency Action Level
Flowpath (Rev. 00-1) is contained in the
Plastic Sleeve Following This Hardcopy Page

PROTECTIVE ACTION RECOMMENDATION PROCESS



5 Mile Radius, 10 Miles Downwind

Wind Direction (From °)	Evacuate Subzones	Shelter Subzones
348º - 010º	A,B,C,D,H,I,K,L	E,F,G,J,M,N
011º - 034º	A,B,C,D,H,I,J,K,L	E,F,G,M,N
035º - 079º	A,B,C,D,I,J,K,L,M	E,F,G,H,N
080º - 101º	A,B,C,D,J,K,L,M	E,F,G,H,I,N
102º - 124º	A,B,C,D,J,K,L,M,N	E,F,G,H,I
125º - 146º	A,B,C,D,K,L,M,N	E,F,G,H,I,J
147º - 191º	A,B,C,D,E,K,L,M,N	F,G,H,I,J
192º - 214º	A,B,C,D,E,K,L,N	F,G,H,I,J,M
215º - 236º	A,B,C,D,E,F,K,L	G,H,I,J,M,N
237º - 259º	A,B,C,D,E,F,G,K,L	H,I,J,M,N
260º - 326º	A,B,C,D,F,G,H,K,L	E,I,J,M,N
327º - 347º	A,B,C,D,G,H,I,K,L	E,F,J,M,N

2 Mile Radius 5 Miles Downwind

Wind Direction (From °)	Evacuate Subzones	Shelter Subzones
327º - 010º	A,D,K	B,C,E,F,G,H,I,J,L,M,N
011º - 056º	A,K	B,C,D,E,F,G,H,I,J,L,M,N
057º - 124º	A,K,L	B,C,D,E,F,G,H,I,J,M,N
125º - 191º	A,B,L	C,D,E,F,G,H,I,J,K,M,N
192º - 214º	A,B	C,D,E,F,G,H,I,J,K,L,M,N
215º - 259º	A,B,C	D,E,F,G,H,I,J,K,L,M,N
260º - 281º	A,B,C,D	E,F,G,H,I,J,K,L,M,N
282º - 304º	A,C,D	B,E,F,G,H,I,J,K,L,M,N
305º - 326º	A,C,D,K	B,E,F,G,H,I,J,L,M,N

PROTECTIVE ACTION RECOMMENDATION PROCESS

1. Indications that substantial core damage is imminent or has occurred include:
   a) Core damage > 1% Melt.
   b) Core Exit Thermocouple readings ≥ 2300º F.
   c) Core uncovered > 30 minutes.
2. Indications that a significant loss of reactor coolant is imminent or has occurred include:
   a) Containment radiation reading > 10,000 R/Hr without spray or > 4,000 R/Hr with spray.
   b) Containment hydrogen gas concentration > 1%.
   c) Rapid vessel depressurization.
   d) A large break loss of coolant accident.
3. Indications that containment failure (primary or S/G) is imminent or has occurred include:
   a) A release of radioactivity can not be maintained below the General Emergency EAL criteria.
   b) Primary containment pressure can not be maintained below design basis pressure which is 45 psig.
   c) Primary containment H_2 gas concentration can not be maintained below combustible limits which is 4% by volume.
   d) Faulted/Ruptured S/G with a relief valve open.
4. Accidents which result in a direct release pathway to the environment (for example, a faulted and ruptured S/G with water level below the tube bundles and a relief valve open would provide such a pathway) will most likely be thyroid dose limiting. For circumstances involving this type of accident sequence:
   a) Consider **any** Fuel Breach sufficient to warrant the determination that substantial core damage has occurred.
   b) Consider **any** RCS Breach sufficient to warrant the determination that a significant loss of reactor coolant has occurred.

Containment monitors can provide indication of both core damage and RCS breach. Monitor values used to determine a specific amount of core damage are dependent on plant conditions, power history and time after shutdown. Monitor readings used to quantify an amount of damage or coolant leakage should be complimented by other indications and engineering judgment.

<u>If a release is in progress:</u>

- Perform dose assessment as soon as possible to determine if PAGs are exceeded and if additional Subzones require evacuation.
- Add any Subzones requiring evacuation as determined by dose assessment to the plant based PARs.

<u>If no release is in progress:</u>

- Perform dose projection on possible conditions as time permits to determine if PAGs could be exceeded.
- Consider adding any Subzones requiring evacuation as determined by dose projection to the plant based PARs.

Date/Time:

EVENT INFORMATION WORKSHEET

A) Emergency Classification

Time Declared: _____ am/pm

❑ Unusual Event ❑ Alert

❑ Site Area ❑ General

Provide a brief summary of the event and mitigating actions in progress:

EAL: _____

B) Fission Product Barrier Status

	Fuel	RCS	Cnmt
Intact:	❑	❑	❑
Jeopardy:	❑	❑	❑
Breached:	❑	❑	❑

C) Plant Conditions

❑ On-Line ❑ At Power: _____%

❑ Off-Line ❑ Cooling Down

❑ Cold Shutdown

Time of Rx Shutdown: _____ am/pm

❑ Stable ❑ Improving

❑ Unstable ❑ Same

❑ Deteriorating

Describe equipment, instrument, or other problems: _____

D) Radiological Release

❑ None ❑ Controlled

❑ Imminent ❑ Uncontrolled

❑ In Progress ❑ Below PAGs

❑ Above PAGs

Time Started: _____ am/pm

Noble Gas: _____ Ci/sec

Iodines: _____ Ci/sec

Projected Duration: _____ hours

E) Personnel Status

Missions in plant:	❑ No	❑ Yes
Injuries (No._____):	❑ No	❑ Yes
Contamination(s):	❑ No	❑ Yes
Over Exposure(s):	❑ No	❑ Yes
	❑ Minor	❑ Major

Details (names of injured, status of family notification):

F) CP&L Facility Activation Status

❑ TSC: _____ am/pm

❑ OSC: _____ am/pm

❑ EOF: _____ am/pm

❑ JIC: _____ am/pm

G) Offsite Assistance Requested

❑ None

❑ Medical _____ am/pm

❍ Ambulance ❍ Helicopter

❑ Fire Department _____ am/pm

❍ Holly Springs ❍ Apex

❑ Law Enforcement _____ am/pm

❍ Local ❍ State

EVENT INFORMATION WORKSHEET

H) Onsite Protective Actions

- ❑ None
- ❑ Assembly/Accountability
- ❑ Local Area(s) Evacuated
- ❑ Protected Area Evacuated
- ❑ Exclusion Area Evacuated
- ❑ Potassium Iodide Issued
- ❑ Employee Info Phone #: _____

I) Offsite Notifications (last issued)

State/County	Time: _____ am/pm
NRC	Time: _____ am/pm
News Release	Time: _____ am/pm
Hospital	Time: _____ am/pm
INPO	Time: _____ am/pm
ANI	Time: _____ am/pm

J) CP&L PARs

- ❑ None Issued, or
  - ❍ Evac: A B C D E F G H I J K L M N
  - ❍ Shelter: A B C D E F G H I J K L M N

(circle the affected subzones)

K) Offsite Facility Activation Status

- ❑ Chatham County EOC: _____ am/pm
- ❑ Harnett County EOC: _____ am/pm
- ❑ Lee County EOC: _____ am/pm
- ❑ Wake County EOC: _____ am/pm
- ❑ State EOC: _____ am/pm
- ❑ NRC Incident Response Center: _____ am/pm

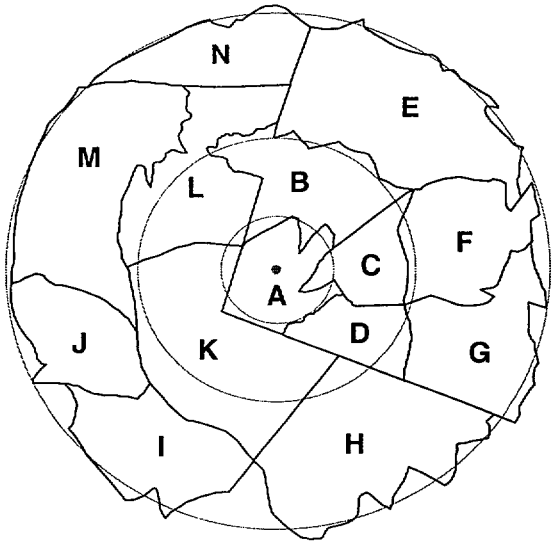
L) Offsite Actions/Response

- ❑ None Issued, or
  - ❍ Schools ❍ Daycare
  - ❍ Hospitals ❍ Rest Homes
  - ❍ Lake Evacuations
  - ❍ Other: _____

  _____
  - ❍ Evac: A B C D E F G H I J K L M N
  - ❍ Shelter: A B C D E F G H I J K L M N

(circle the affected subzones)

- ❑ Sirens Activated: _____ am/pm
- ❑ Tone Alerts Activated: _____ am/pm
- ❑ EAS Activated: _____ am/pm



Notes: _____

_____

_____

_____

_____

_____

_____

_____

_____

TERMINATION CHECKLIST

		True	False
1.	Conditions no longer meet an Emergency Action Level and it appears unlikely that conditions will deteriorate. List any EAL(s) which is/are still exceeded and a justification as to why a state of emergency is no longer applicable: _____ _____ _____ _____ _____ _____	❑	❑
2.	Plant releases of radioactive materials to the environment are under control (within Tech Specs) or have ceased and the potential for a uncontrolled radioactive release is acceptably low.	❑	❑
3.	The radioactive plume has dissipated and plume tracking is no longer required. The only environmental assessment activities in progress are those necessary to determine the extent of deposition resulting from passage of the plume.	❑	❑
4.	In-plant radiation levels are stable or decreasing, and acceptable given the plant conditions.	❑	❑
5.	The reactor is in a stable shutdown condition and long-term core cooling is available.	❑	❑
6.	The integrity of the Reactor Containment Building is within Technical Specification limits.	❑	❑
7.	The operability and integrity of radioactive waste systems, decontamination facilities, power supplies, electrical equipment and plant instrumentation including radiation monitoring equipment is acceptable.	❑	❑
8.	Any fire, flood, earthquake or similar emergency condition or threat to security no longer exists.	❑	❑

TERMINATION CHECKLIST

		True	False
9.	Any contaminated injured person has been treated and/or transported to a medical care facility.	☐	☐
10.	All required notifications have been made.	☐	☐
11.	Offsite conditions do not unreasonably limit access of outside support to the station and qualified personnel and support services are available.	☐	☐
12.	Discussions have been held with Federal, State and County agencies and agreement has been reached and coordination established to terminate the emergency.	☐	☐

It is not necessary that all responses listed above be 'TRUE'; however, all items must be considered prior to event termination and entry into Recovery. For example, it is possible that some conditions remain which exceed an Emergency Action Level following a severe accident but entry into Recovery is appropriate. Additionally, other significant items not included on this list may warrant consideration such as severe weather.

Comments:

_____

_____

_____

_____

_____

_____

_____

_____

Approved: _____ Date/Time: _____
Site Emergency Coordinator

Form PEP-110-5-1

Revision Summary for PEP-110 Rev.7

The changes to the procedure are related to A/R 21599. The ETE study and PEP-110 were compared and PEP-110 is being revised to reflect the investigation findings. The guidance with EAL interpretations was found to be inconsistent with the EPPOS #4 guidance and was removed.

Section	Revision
Page 10 4.2.9.	The following guidance on EAL interpretations was deleted NOTE: No interpretations are currently applicable to the EALs. Interpretations of certain Emergency Action Levels may be provided for use in determining the applicability of the particular Emergency Action Level wording to the existing conditions if: The interpretation does not change the intent of the EAL. The interpretation has been reviewed and approved by the Plant Nuclear Safety Committee. The interpretation is included as an attachment to this procedure. Emergency Action Level Flowpaths shall be annotated by a "#" sign followed by a number to key the user to any applicable EAL interpretations.
Att 3	5-mile radius 10-mile downwind changed from 237 - 281 to 237 - 259 and 282 - 326 to 260 -326.
Att 4	Date and time were added to the Event Information Worksheet

INFORMATION
USE

CAROLINA POWER & LIGHT COMPANY

SHEARON HARRIS NUCLEAR POWER PLANT

PLANT OPERATING MANUAL

VOLUME 2

PART 5

PROCEDURE TYPE: Plant Emergency Procedure

NUMBER: PEP-340

TITLE: Dose Assessment

Table of Contents

1.0 PURPOSE

The purpose of this procedure is to provide guidance for performing offsite radiological dose assessments during an emergency at the HNP. The HNP Dose Assessment and Protective Action Recommendation (DAPAR) program is designed to be used in conjunction with this procedure.

2.0 INITIATING CONDITIONS

1. An emergency has been declared.

2. Events require the projection of offsite doses due to an actual or potential release of radioactive materials near or beyond the site boundary.

3.0 PROCEDURE STEPS

CAUTION

Use of DAPAR to project doses based on normal plant readings would indicate offsite doses many magnitudes higher than actual offsite doses. Care should be taken in making a Protective Action Recommendation based on program output if there are no indications of Core Damage.

3.1 Start Up

1. Start the computer.

2. Ensure no other programs are running.

3. Start DAPAR program – A shortcut Icon labeled DAPAR v2.0 should be located on the desktop, if not locate the program on the Y:\ Access Databases, Shared, Dose Assessment.

4. If the assigned Dose Assessment Computer does not operate or the DAPAR program will not run, use another Dose Assessment Computer if available or install the program on any computer from CDs or Disks located in Emergency Communicator's Desk in the Control Room or the Dose Projection Cabinet in the EOF.

3.2 ERFIS Data

1. Obtain monitored release path information by accessing ERFIS Group Display 3DOSE.

3.3 Basic Program Flow Diagram

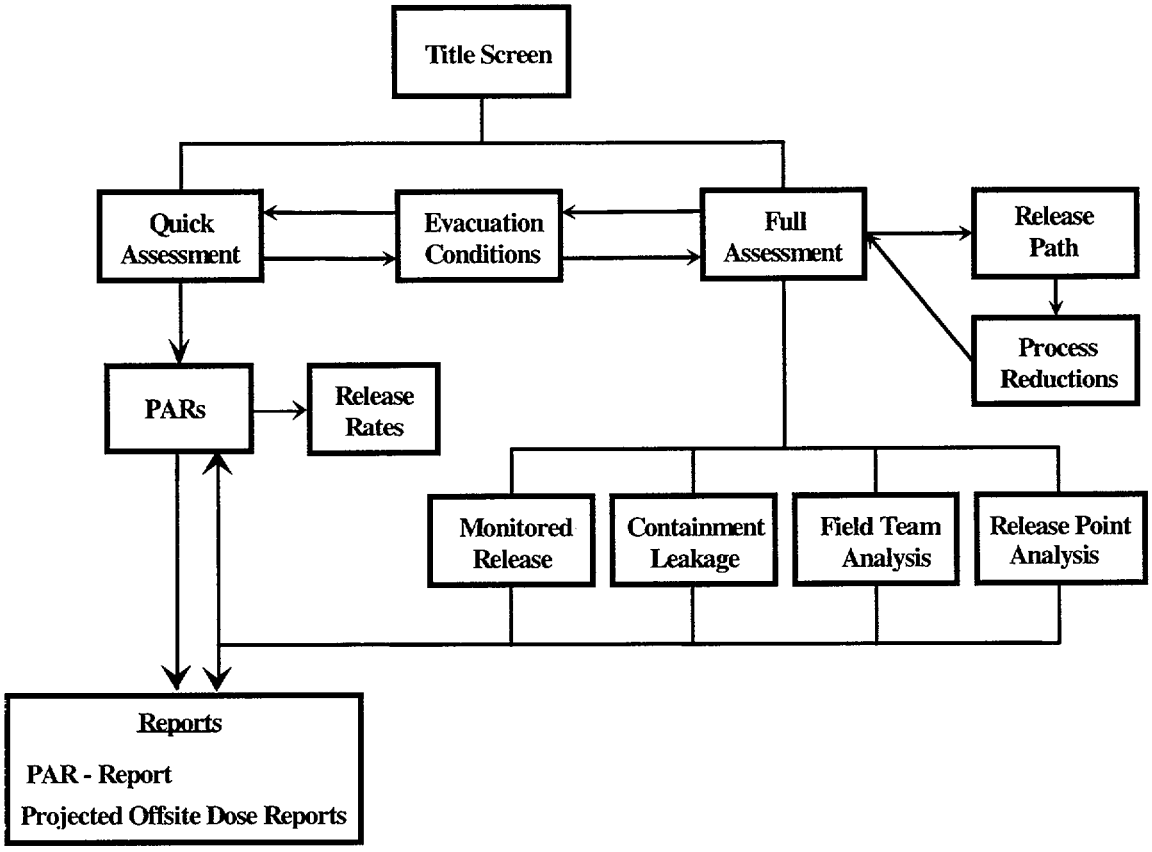


Diagram shows basic tasks which can be performed by the program and how user would maneuver between them.

3.4 Title Screen

The title screen shows the application version and offers the user three options to direct program flow

1. **Quick Assessment**
   This option is designed to be used by the Control Room. It performs assessments based on design basis default source terms.

2. **Full Assessment**
   This option is designed to be used by the Dose Assessment Staff in the EOF. It allows user more options in performing calculations

3. **Quit**
   Exits the Program.

3.4 Title Screen (continued)

NOTE: Once the User selects "Quick Assessment" or "Full Assessment" returning to the Title screen will reset all program values.

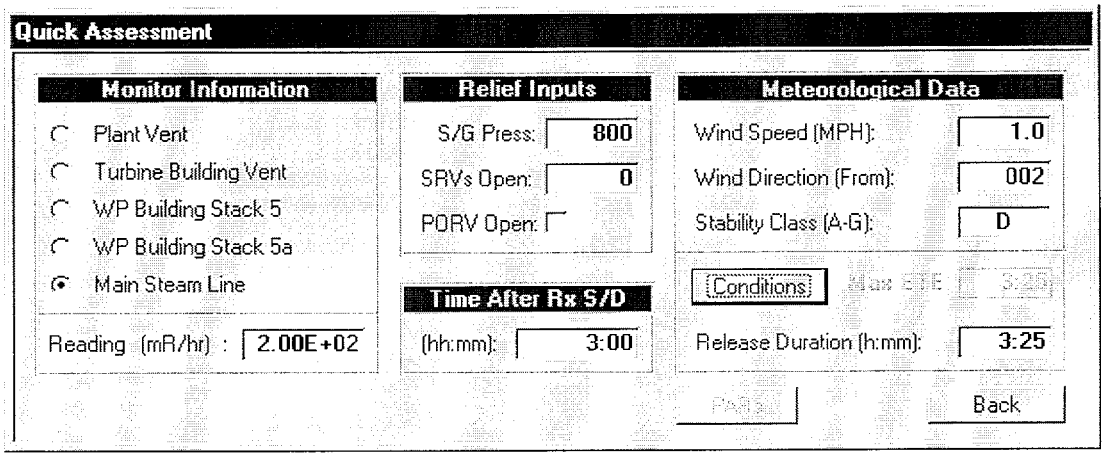
4. User should now go to:

   a. Section 3.5 for Quick Assessment.

   b. Section 3.7 for Full Assessment.

3.5 Quick Assessment

The Quick Assessment operations and calculations are identical to the Full Assessment method for a monitored release, but utilizes default release path and core damage assumptions for the determination of offsite doses. This allows for a rapid assessment from the Main Control Room.



1. Select **Monitor Information** – User chooses the appropriate monitor from the listed Monitors.

   a. Plant Vent – this is stack #1, the value for the reading of this monitor is provided at computer point RAV3509H. It reads out in μCi/sec.

   b. Turbine Building Vent – this is stack #3, the value for the reading of this monitor is provided at computer point RTV3536D. It reads out in μCi/sec.

   c. WP Building Vent 5 – the value for the reading of this monitor is provided at computer point RWV3546H. It reads out in μCi/sec.

   d. WPB Building Vent 5A – the value for the reading of this monitor is provided at computer point RWV3547H. It reads out in μCi/sec.

3.5 Quick Assessment (continued)

e. Main Steam Line – The Main Steam Line radiation monitors are used for this release point. The computer points for these monitors are RMS3591A, RMS3592A, and RMS3593A. Since these monitors read out in mR/hr a flow has to be determined to calculate the μC/sec release rate. This is accomplished by entering the steam pressure and the number of relief valves that are open in the section labeled "Relief Inputs".

2. Input **Reading** Information – Enter the appropriate monitor reading in μCi/sec or mRr/hr.

3. Input **Time After Rx Shutdown (S/D)** Information – Enter the time since the reactor was shutdown in hours and minutes (hh:mm).

NOTE: If Met Tower data is unavailable, another source of meteorological data may be used such as the National Weather Service or a local TV or Radio broadcast stations and the stability class can be estimated.

4. Input **Meteorological Data** – Enter the appropriate data from plant instruments as follows:

a. Wind Speed (MPH) – Obtain the Wind Speed from the ERFIS computer or the Control Room.

b. Wind Direction (From) – Obtain the Wind Direction from the ERFIS computer or the Control Room.

c. Stability Class (A-G AND 1-7) – Obtain the stability class from the ERFIS computer or the Control Room. Stability Classes:

A	1	Extremely unstable conditions
B	2	Moderately unstable conditions
C	3	Slightly unstable conditions
D	4	Neutral conditions
E	5	Slightly stable conditions
F	6	Moderately stable conditions
G	7	Extremely stable conditions

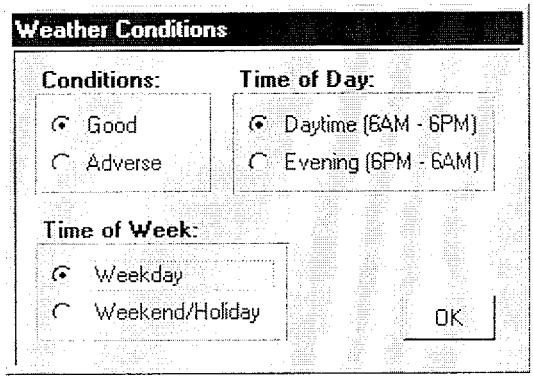
3.5 Quick Assessment (continued)

d. If the stability class is not available use the following table to choose appropriated value:

Surface Wind Speed (mph)	Daytime Solar Radiation (For moderate cloud cover move one column to the right)			Nighttime Conditions		Day or Night
	Summer/ Clear Sky	Spring &Fall Clear Sky	Winter	Thin overcast (>1/2 cloud cover)	<3/8 cloud cover	Heavy Overcast or Rain
	A	A-B	B			D
0.0 to 9.0	A-B	B	C	E	F	D
9.0 to 13.5	B	B-C	C	D	E	D
> 13.5	C	C-D	D	D	D	D

NOTE: The conditions Good or Adverse in the following step are in relation to the weather. Adverse is heavy rain or any other condition which would hinder the flow of traffic.

5. **Set Evacuation Conditions**
Click on the "Conditions" button to select the appropriate conditions for the program to calculate the Maximum Evacuation Time Estimate (ETE). Once the user sets the evacuation conditions the program will place the Max ETE value in the "Release Duration" and "Max ETE" text boxes.

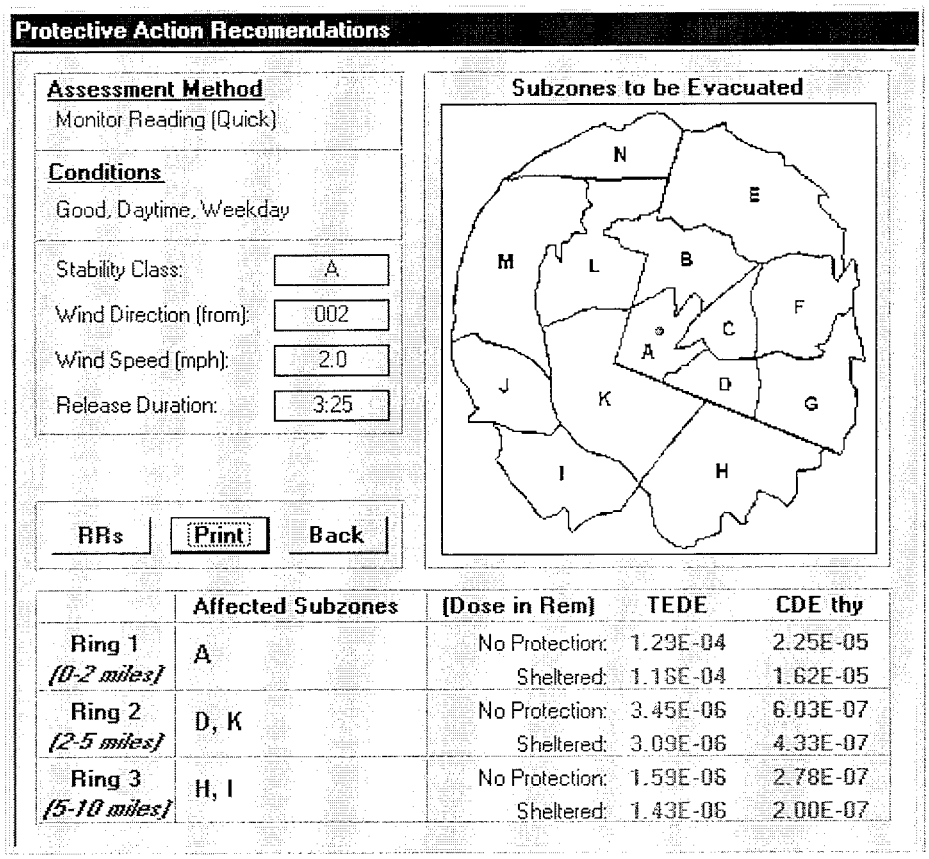


6. If the **Release Duration** is known change the displayed time to the known release duration. If a good estimate of the release duration can not be determined use the default value entered by the program.

7. Click the **PARs** button – The program will calculate the downwind doses based on user inputs and display Protective Action Recommendation form.

3.6 Protective Action Recommendations

1. The Protective Action Recommendation (PAR) form displays a summary of the downwind dose projections with a map showing which Subzones (grayed areas) the Protective Actions Guidance (PAG) is exceeded. Additional evaluation of the affected subzones would be made using PEP-110 Attachment 3.



	Affected Subzones	(Dose in Rem)	TEDE	CDE thy
Ring 1 *(0-2 miles)*	A	No Protection:	1.29E-04	2.25E-05
		Sheltered:	1.18E-04	1.62E-05
Ring 2 *(2-5 miles)*	D, K	No Protection:	3.45E-06	6.03E-07
		Sheltered:	3.09E-06	4.33E-07
Ring 3 *(5-10 miles)*	H, I	No Protection:	1.59E-06	2.78E-07
		Sheltered:	1.43E-06	2.00E-07

2. Explanation of displayed data:

   a. Assessment Method – Method used to calculate downwind doses.

   b. Evacuation Scenario – Entered evacuation conditions and meteorological data, along with Release Duration.

   c. Form displays the meteorological data used to determine PAR.

   d. Form displays an EPZ map, Subzones in which the population may receive doses exceeding a PAG will be shaded.

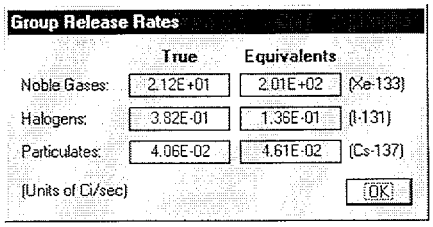
   e. Affected Areas – This is the downwind Subzones which are affected by the release.

3.6 Protective Action Recommendations (continued)

NOTE: The State/County Notification Form uses the units of mRem for reporting. Convert Rem to mRem.

f. TEDE and CDE Thyroid (thy)– Shows the highest doses (no protection and sheltered) in Rem for each Ring.

3. The **RRs** button will display the total release rates for isotopic groups in Ci/sec.



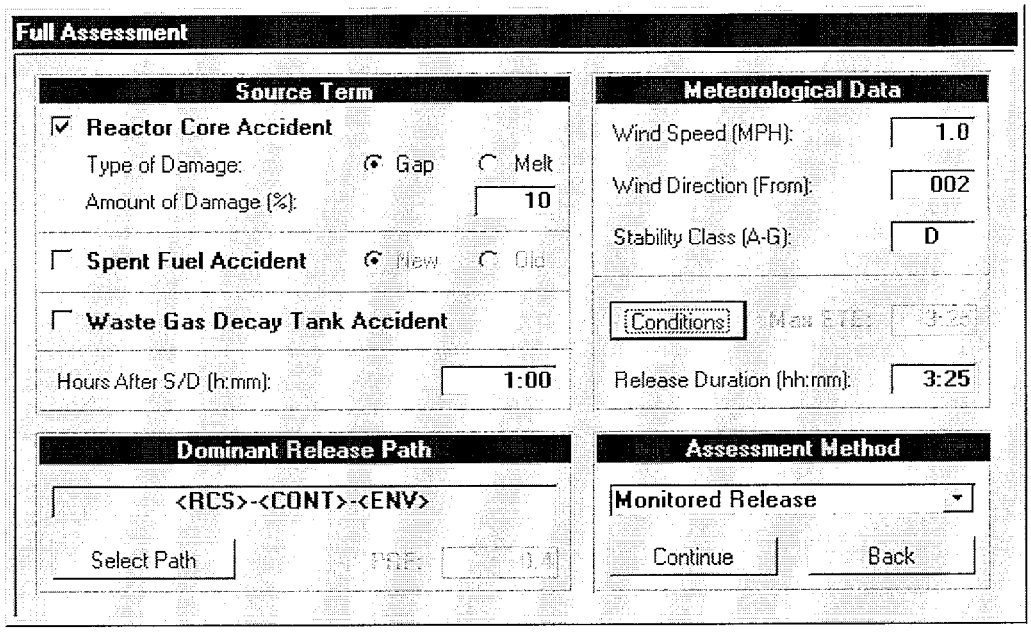
4. User can now **Print** the PARs or

5. Go **Back** and modify inputs. This will return user to either Quick Assessment Form or one of the Assessment Method forms available in Full Assessment.

3.7 Full Assessment

1. The Full Assessment operations and calculations are identical to the Quick Assessment method for a monitored release, but it allows the user to make more choices in performing dose projection calculations.

2. Choosing the Full Assessment option directs the program to a baseline data entry window. The window is divided into four input areas.



3.7 Full Assessment (continued)

3. Choose **Source Term** – This allows user to choose the appropriate source term depending on plant conditions and the type of accident that has occurred.

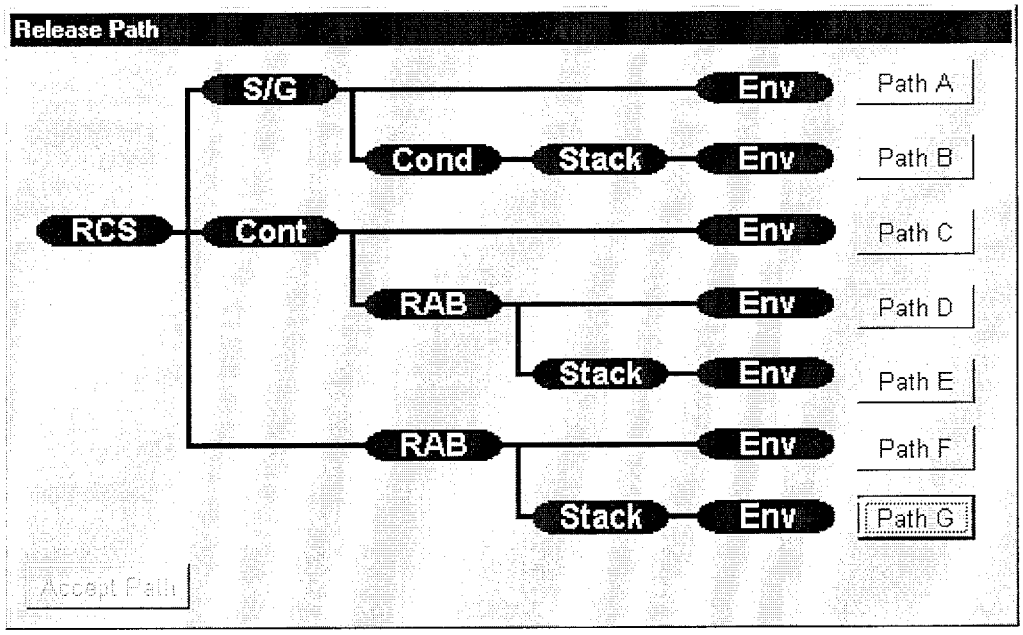
   a. Select Reactor Core Accident if the source of the release is from the reactor core. Select Gap or Melt and the % Damage based on core damage estimates or known conditions in the plant.

   b. Select Spent Fuel if the release is caused by damage to the spent fuel. User chooses between New Fuel or Old Fuel based on the type of fuel that has been damaged. Program uses a gap release scenario and defaults to a reactor Time After Shutdown based on this choice.

   c. Select Waste Gas Decay Tank Accident if the release is caused by damage/failure of a waste gas decay tank. Program sets source to one failed Waste Gas Decay Tank inventory.

   d. Enter Time after S/D in hours and minutes.

4. Select the **Dominant Release Path** – choose the most appropriate release path:



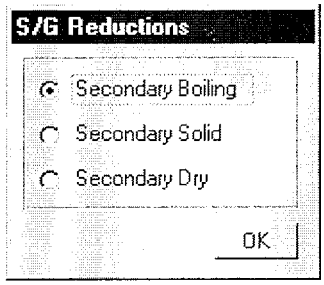
3.7 Full Assessment (continued)

5. Depending on the path chosen the user will be presented with more choices to pick the appropriate Process Reductions for the release.

Process Reduction Factors

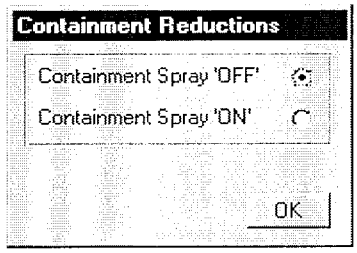
Removal Mechanism	PRF
Maximum (all systems)	0.001
S/G Tube Rupture Secondary Boiling	0.02
S/G Tube Rupture Secondary (Solid) No Boiling	0.50
S/G Tube Rupture Secondary Dry S/G	1.00
Bypass (failure into low-pressure system)	0.40
0.5 Hr Hold-Up Containment Spray	0.03
2-12 Hr Hold-Up Containment Spray	0.02
24 Hr Hold-Up Containment Spray	0.002
0.5 Hr Hold-Up No Containment Spray	0.4
2-12 Hr Hold-Up No Containment Spray	0.04
24 Hr Hold-Up No Containment Spray	0.01
Condenser Releases (no non-noble releases)	0.00
Building Holdup 0.5 Hr	0.40
Building Holdup 2-12 Hr	0.04
Building Holdup 24 Hr	0.01
Small Releases through Bldg Filters	0.01

a. If a release through the Steam Generators is chosen. Determine the status of the secondary side of the steam generator and select the appropriate condition.



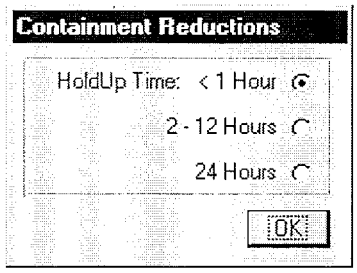
b. If a release through containment is chosen:

- First determine if containment sprays are on or off.

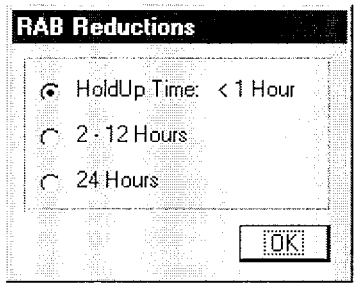


3.7 Full Assessment (continued)

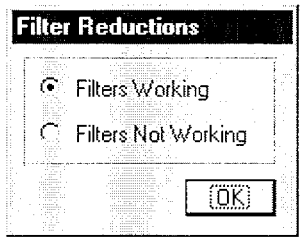
- Then determine if containment holdup time.



c. If a release through the RAB is chosen, determine the RAB holdup time.



d. If a release through a filtered Vent is chosen select if the filters are working or not. If the release has been ongoing for a long time or contains a large amount of liquids filters may not be working.



NOTE: If Met Tower data is unavailable, another source of meteorological data may be used such as the National Weather Service or a local TV or Radio broadcast stations and the stability class can be estimated.

6. Input **Meteorological Data** – Enter the appropriate data from plant instruments as follows:

   a. Wind Speed (MPH) – Obtain the Wind Speed from the ERFIS computer or the Control Room.

   b. Wind Direction (From) – Obtain the Wind Direction from the ERFIS computer or the Control Room.

3.7 Full Assessment (continued)

c. Stability Class (A-G) – Obtain the stability class from the ERFIS computer or the Control Room. Stability Classes:

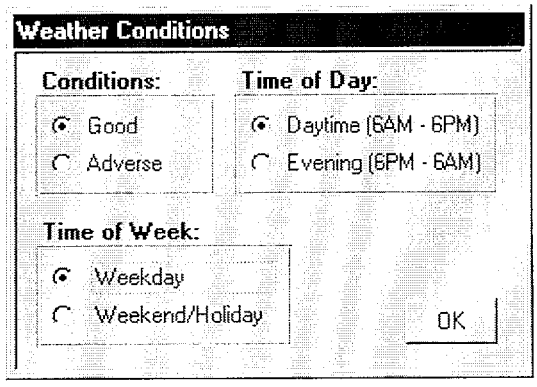
A	1	Extremely unstable conditions
B	2	Moderately unstable conditions
C	3	Slightly unstable conditions
D	4	Neutral conditions
E	5	Slightly stable conditions
F	6	Moderately stable conditions
G	7	Extremely stable conditions

d. If the stability class is not available use the following table to choose appropriated value:

Surface Wind Speed (mph)	Daytime Solar Radiation (For moderate cloud cover move one column to the right)			Nighttime Conditions		Day or Night
	Summer\ Clear Sky	Spring &Fall Clear Sky	Winter	Thin overcast (>1/2 cloud cover)	<3/8 cloud cover	Heavy Overcast or Rain
	A	A-B	B			D
0.0 to 9.0	A-B	B	C	E	F	D
9.0 to 13.5	B	B-C	C	D	E	D
> 13.5	C	C-D	D	D	D	D

NOTE: The conditions Good or Adverse in the following step are in relation to the weather. Adverse is heavy rain or any other condition which would hinder the flow of traffic.

7. **Set Evacuation Conditions** – Click on the "Conditions" button to select the appropriate conditions for the program to calculate the Maximum Evacuation Time Estimate (ETE). Once the user sets the evacuation conditions the program will place the Max ETE value in the "Release Duration" and "Max ETE" text boxes.



3.7 Full Assessment (continued)

8. If the **Release Duration** is known change the displayed times to the known release duration. If a good estimate of the release duration can not be determined use the default value entered by the program.

NOTE: User may switch back an forth between assessment methods as more information becomes available or conditions change. With the exception of the Hours After Shutdown, which updates each time user returns to main form, the data on the Full Assessment form will not change unless user changes it.

9. Choose the **Assessment Method** – Choose the appropriate assessment method based on available inputs. Assessment methods:

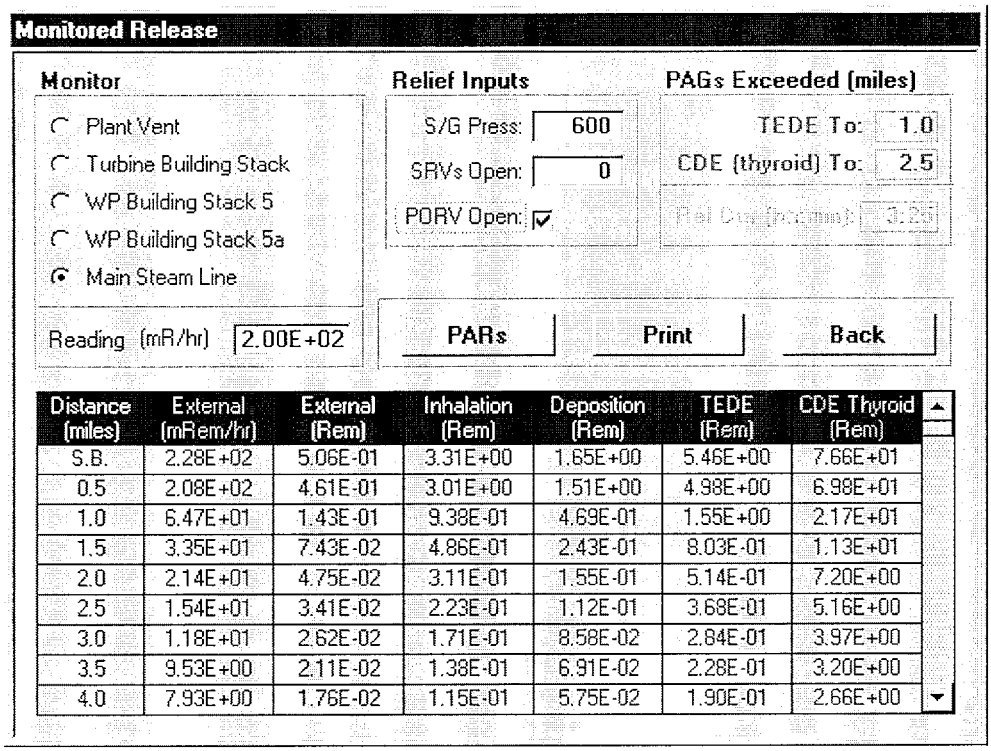
   a. Monitored Release – Choose this method for a release through a plant vent or through the Main Steam Relief Valves. Go to Section 3.8.

   b. Containment Leakage/Failure – Choose this method for containment failure scenarios. Go to Section 3.9.

   c. Field Team Analysis – Choose this method if field team survey or sample data is available. Go to Section 3.10.

   d. Release Point Analysis – Choose this method for a sample of a release has been obtained and a release flow rate can be estimated. Go to Section 3.11.

3.8 Monitored Release



Distance (miles)	External (mRem/hr)	External (Rem)	Inhalation (Rem)	Deposition (Rem)	TEDE (Rem)	CDE Thyroid (Rem)
S.B.	2.28E+02	5.06E-01	3.31E+00	1.65E+00	5.46E+00	7.66E+01
0.5	2.08E+02	4.61E-01	3.01E+00	1.51E+00	4.98E+00	6.98E+01
1.0	6.47E+01	1.43E-01	9.38E-01	4.69E-01	1.55E+00	2.17E+01
1.5	3.35E+01	7.43E-02	4.86E-01	2.43E-01	8.03E-01	1.13E+01
2.0	2.14E+01	4.75E-02	3.11E-01	1.55E-01	5.14E-01	7.20E+00
2.5	1.54E+01	3.41E-02	2.23E-01	1.12E-01	3.68E-01	5.16E+00
3.0	1.18E+01	2.62E-02	1.71E-01	8.58E-02	2.84E-01	3.97E+00
3.5	9.53E+00	2.11E-02	1.38E-01	6.91E-02	2.28E-01	3.20E+00
4.0	7.93E+00	1.76E-02	1.15E-01	5.75E-02	1.90E-01	2.66E+00

1. Choose the appropriate monitor:

   a. Plant Vent – this is stack #1, the monitor reading from computer point RAV3509H is used for this release point. It reads out in μCi/sec for this monitor.

   b. Turbine Building Vent – this is stack #3, the monitor reading from computer point RTV3536D is used for this release point. It reads out in μCi/sec for this monitor.

   c. WP Building Vent 5 – computer point RWV3546H is used for this release point. It reads out in μCi/sec for this monitor.

   d. WPB Building Vent 5A – computer point RWV3547H is used for this release point. It reads out in μCi/sec for this monitor.

   e. Main Steam Line – The Main Steam Line radiation monitors are used for this release point. The computer points for these monitors are RMS3591A, RMS3592A, and RMS3593A. Since these monitors read out in mR/hr a flow has to be determined to calculate the μCi/sec release rate. This is accomplished by entering the steam pressure and the number of relief valves that are open.

2. Input **Reading** Information – User enters the appropriate monitor reading in μCi/sec or mR/hr.

3.8 Monitored Release (continued)

3. After User enters data the program calculates offsite doses. The user can now perform one of the following items:

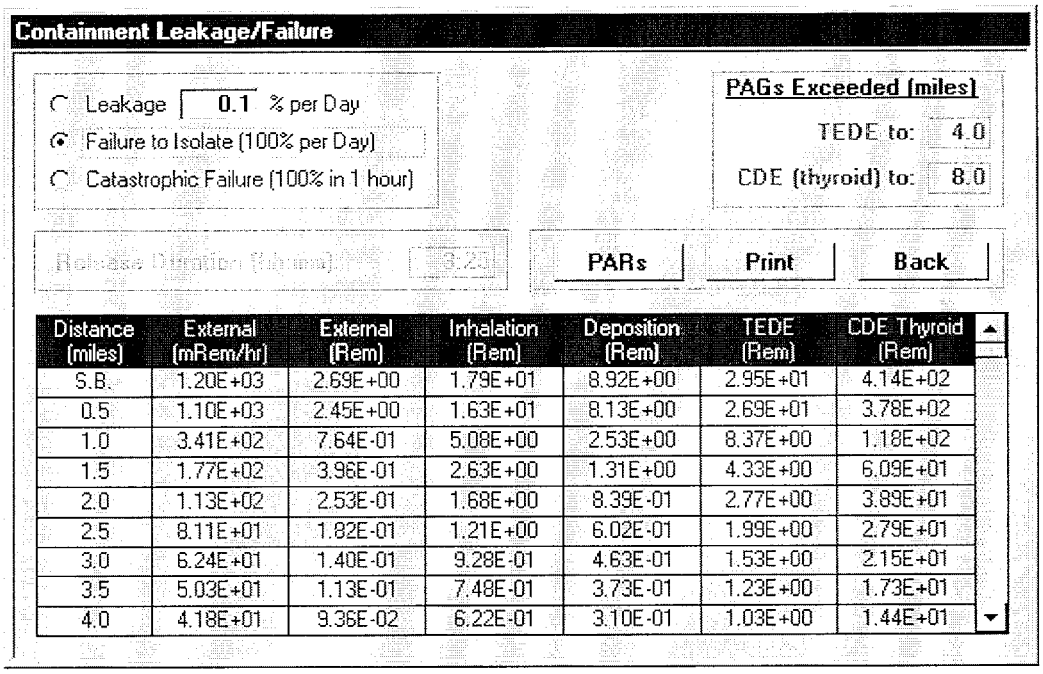
   a. Press Print button– Prints offsite dose projections based on monitor release.

   b. Press Back button to Change input data on the Full Assessment Form.

   c. Press PARs button to view PAR form – Go to section 3.6.

   d. Select a different monitor and/or change readings to recalculate doses and update PAR.

3.9 Containment Leakage/Failure



Distance (miles)	External (mRem/hr)	External (Rem)	Inhalation (Rem)	Deposition (Rem)	TEDE (Rem)	CDE Thyroid (Rem)
S.B.	1.20E+03	2.69E+00	1.79E+01	8.92E+00	2.95E+01	4.14E+02
0.5	1.10E+03	2.45E+00	1.63E+01	8.13E+00	2.69E+01	3.78E+02
1.0	3.41E+02	7.64E-01	5.08E+00	2.53E+00	8.37E+00	1.18E+02
1.5	1.77E+02	3.96E-01	2.63E+00	1.31E+00	4.33E+00	6.09E+01
2.0	1.13E+02	2.53E-01	1.68E+00	8.39E-01	2.77E+00	3.89E+01
2.5	8.11E+01	1.82E-01	1.21E+00	6.02E-01	1.99E+00	2.79E+01
3.0	6.24E+01	1.40E-01	9.28E-01	4.63E-01	1.53E+00	2.15E+01
3.5	5.03E+01	1.13E-01	7.48E-01	3.73E-01	1.23E+00	1.73E+01
4.0	4.18E+01	9.36E-02	6.22E-01	3.10E-01	1.03E+00	1.44E+01

1. Select the appropriate containment release mode:

   a. Leakage – Program defaults to 0.1% per day which is the Design Leakage rate per the FSAR. If a different percentage of leak rate has been calculated by TSC engineers enter that value in the % per day text box.

   b. Failure to Isolate – Assumes 100% of the isotopes available for release are released in a 24 hour time period.

   c. Catastrophic Failure – Assumes 100% of the isotopes available for release are released in a 1 hour time period.

3.9 Containment Leakage/Failure (continued)

2. After User enters data the program calculates offsite doses. The user can now have the program perform the following items:

   a. Press Print button to prints offsite dose projections based on containment failure.

   b. Press Back button to change input data on the Full Assessment Form.

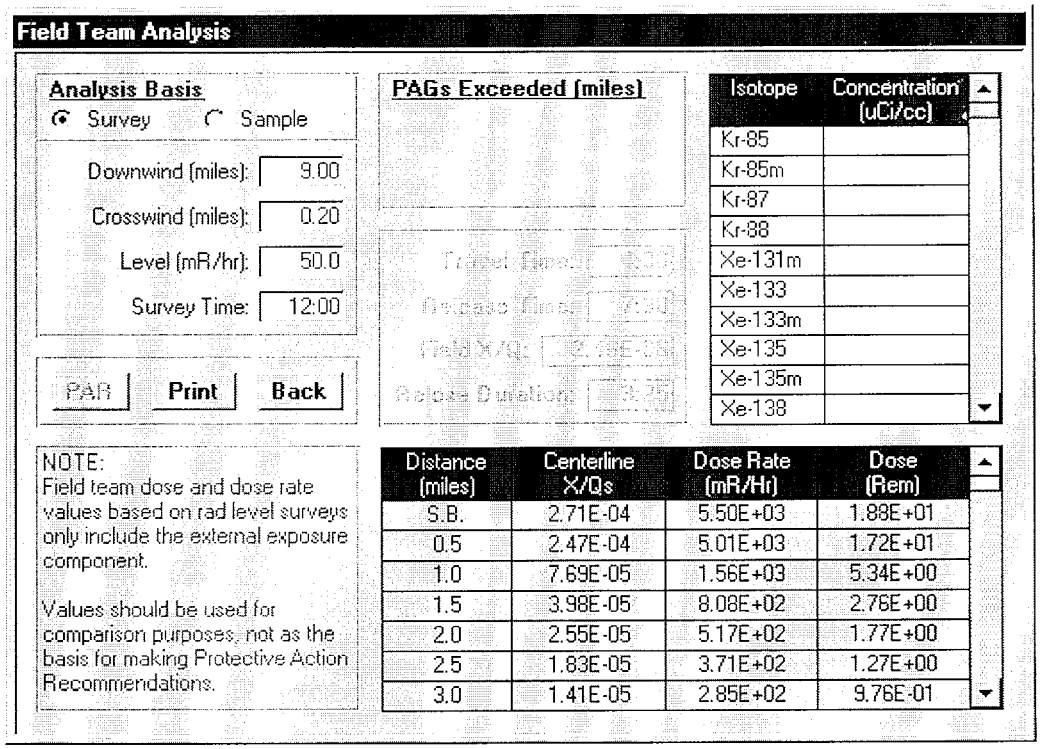
   c. Change containment failure mode – either by selecting different type of containment failure or % of daily leakage.

   d. Press PARs button to view PAR form – Go to section 3.6.

3.10 Field Team Analysis

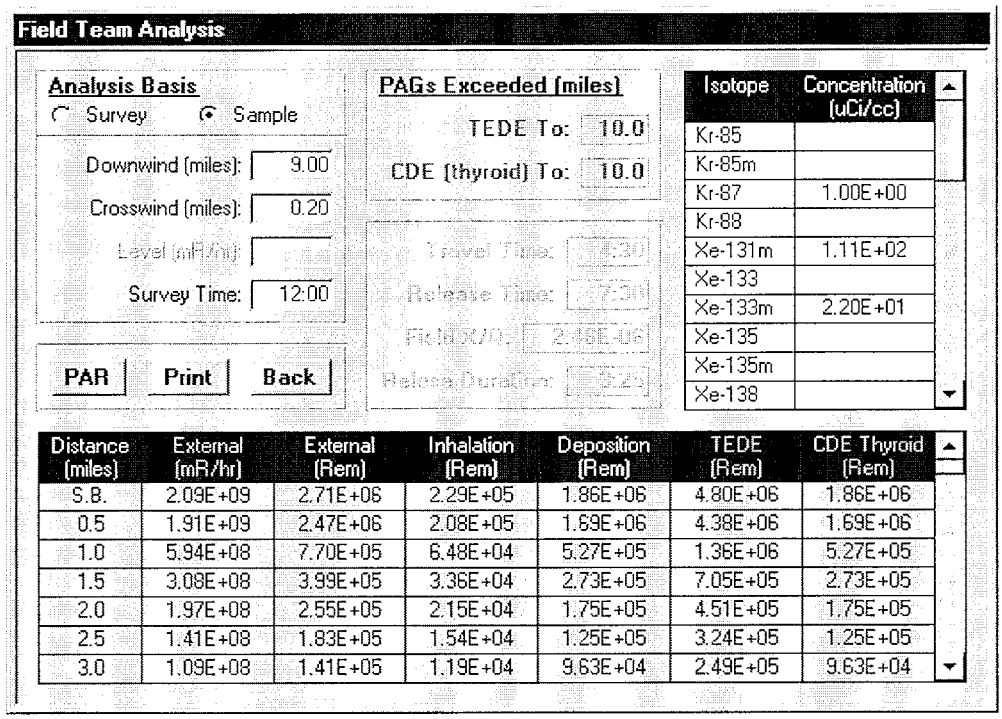
NOTE: The program calculates the plume Travel Time and Release Time to allow Dose Assessment personnel to compare previous dose assessment reports with data measured in the field.

1. Analysis Method –**Survey** – Select this method if Field Team Dose Rate Survey Data is available.



3.10 Field Team Analysis (continued)

2. Analysis Method **Sample** – Select this method if Field Team Air Sample Data is available.



3. Enter Location of Field Team Sample, Reading(s) and time sample was taken. Program will not allow mR/hr readings for sample data or isotopic results for survey data.

   a. Downwind (miles) – straight line distance from release point to sample location.

   b. Crosswind (miles) – the distance the team was away from the centerline when the sample was taken. The program will warn user if reported sample location is wider than expected plume width. The maximum width of any plume for the most unstable stability class is 2.96 miles, 10 miles downwind.

   c. If Analysis Method is Dose Rate Survey – Enter the Field Team Survey reading. in the box labeled "Level".

   d. If Analysis Method is Air Sample Results enter the μCi/cc values for each known isotope in the table at the upper right section of the form.

   e. Survey Time – Enter the time the survey or sample was taken.

3.10 Field Team Analysis (continued)

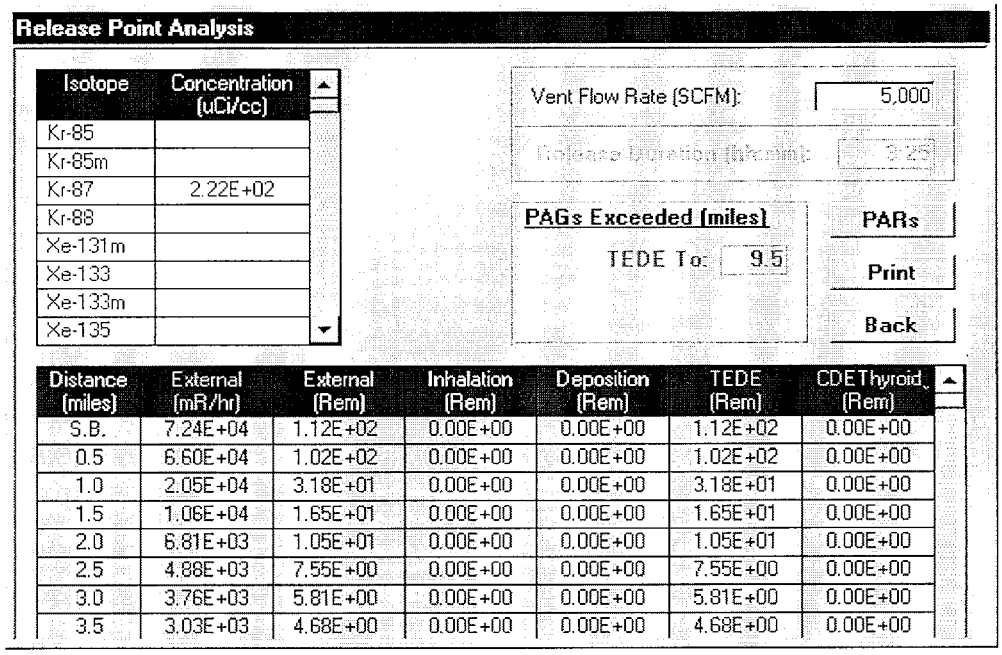
4. After User enters data the program calculates offsite doses. The user can now have the program perform the following items:

   a. Press Print button to prints offsite dose projections based on Field Team Survey/Sample data.

   b. Press Back button to Change input data on the Full Assessment Form.

   c. Press PARs button to view PAR form – Go to section 3.6.

3.11 Release Point Analysis



1. Enter the isotopic known concentration for each isotope (if unknown leave blank).

2. Enter vent flow rate (or estimate flow rate for other releases) in SCFM.

3. After User enters data the program calculates offsite doses. The user can now have the program perform the following items:

   a. Press Print button to print offsite dose projections based on release point data.

   b. Press Back button to Change input data on the Full Assessment Form.

   c. Press PARs button to view PAR form – Go to section 3.6

4.0 General

4.1 Overview

1. As a Microsoft Windows based application designed in MS Access, HNP-DAPAR uses many standard user interfaces. Instructions are not provided in basic computer operations in the Windows® environment. The user must be familiar with these to efficiently operated the program.

2. It is also assumed the user is somewhat familiar with health physics fundamentals. Emergency Response Organization training provides an overview of dose assessment methodologies.

4.2 DAPAR Program Use

The program is to be used to estimate the offsite consequences of a release or potential release of radioactive materials from the HNP during an emergency. The primary purpose of these dose projections is to arrive at a Protective Action Recommendation given by HNP management to offsite authorities. These PARs will be used by those authorities in their decision making process to take actions to protect the general public.

4.3 Limitations of DAPAR Program Use

The program should not be used to calculate the actual dose received by populations exposed to radioactive materials from HNP. Results from it may be used as part of the post accident investigations but a much more in depth analysis is needed to actually assign doses receives to members of the public.

4.4 Pre-Conditions for use DAPAR

An Emergency has been declared at the HNP. The program makes many conservative assumptions to ensure proper actions are taken offsite prior to exposing the general public to any release of radioactive materials. Use of the program to project doses based on normal plant readings would indicate offsite doses many magnitudes higher than actual offsite doses.

4.5 Definitions, Acronyms and Abbreviations

The following is a list of the Definitions, Acronyms and Abbreviations which a user of the HNP Dose Assessment and Protective Action Recommendations (DAPAR) computer program should be familiar with:

1. ***Centerline (plume)*** An imaginary line drawn in the middle of the plume along its downwind travel direction. The plume concentrations and deposition are assumed to be the highest along the centerline.

2. ***Cloud Shine*** Gamma radiation from radioactive materials in the air (plume)

4.5 Definitions, Acronyms and Abbreviations (continued)

3. ***Committed Dose Equivalent (CDE)*** The dose equivalent to parts of the body that will be received from an intake of radioactive material by an individual over a 50-year period of time.

4. ***Committed Effective Dose Equivalent (CEDE)*** The sum of the dose equivalent for 50 years following intake (inhalation or ingestion) of a radionuclide to each organ multiplied by a weighting factor

5. ***Core Damage*** Damage to the components which comprise the reactor core. Core damage typically refers to the failure of fuel cladding and/or fuel melting as a result of overheating.

6. ***Curie (Ci)*** A unit of radioactivity equal to 3.7E+10 disintegrations per second.

7. ***Delta T*** As used in dose projections it is the difference in temperature from the 10 meter temperature sensor and the 60 meter temperature sensor on the HNP meteorological tower.

8. ***Deposition*** The contamination found on the surface of the ground.

9. ***Dose Commitment*** The dose that will be accumulated by a specific organ over a specified period following uptake.

10. ***Dose Conversion Factor (DCF)*** The dose equivalent per unit intake of a radionuclide (mRem/μCi) or the effects of exposure to a given concentration of an isotope in a plume. R/hr per μCi/cc.

11. ***Dose Projection*** The calculation of individual radiation exposure at a given location at some time in the future. Dose projections are performed in response to an actual or anticipated release of radioactive material to the environment.

12. ***Effective Dose Equivalent (EDE)*** The sum of the dose equivalent from external exposure to each organ multiplied by a weighting factor. EDE is used to estimate the risk of delayed health effects.

13. ***Emergency Planning Zone (EPZ)*** An area around a nuclear power plant in which plans are in place for an emergency at the plant. Plans are in place to take immediate protective actions for individuals located within 10 miles of the Harris Nuclear Plant. This area is called the Plume Exposure Emergency Planning Zone. In addition, longer term plans are in place for the Ingestion Pathway Emergency Planning Zone which is within 50 miles of the plant.

14. ***Evacuation Exposure Period*** The period during which those being evacuated are exposed to the radioactive plume.

4.5 Definitions, Acronyms and Abbreviations (continued)

15. ***Millirem (mR)*** One one-thousandth of a Rem. The Rem is a unit of measure which defines the extent of biological injury that results to the body when it is exposed to radiation.

16. ***Offsite*** The area out side the site boundary, approximately 2500 feet from the center of Containment

17. ***Pilot Operated Relief Valve (PORV)*** A valve which serves to reduce pressure in the reactor coolant system or main steam system by allowing steam to escape from the pressurizer or the steam generators. The PORVs can be operated remotely by Plant Operators or automatically by high pressure.

18. ***Protective Action Guidelines (PAGs)*** Radiation exposure guidelines established by the Environmental Protection Agency which are used to determine the appropriate protective actions to be taken on the part of emergency workers and the general public. These actions include sheltering and evacuation.

19. ***Protective Action Recommendations (PARs)*** A recommendation made by HNP personnel to the offsite authorities on the appropriate protective actions to be taken on the part of the general public. The PARs are based on plant conditions or dose projections using the PAGs for guidance. These actions include sheltering and evacuation.

20. ***Safety Relief Valve*** A valve which serves to reduce pressure in a fluid system should the pressure become to high. Both the reactor coolant system (located on the pressurizer) and the main steam system (located on the steam generators) have safety and relief valves to protect them from being damaged by excessive pressure.

21. ***Site Boundary*** Defined as a circle with a radius of 2500 feet and the containment building as it's center.

22. ***Station Vent*** That part of the plant's ventilation system through which the containment building and auxiliary building air may be processed to the outside atmosphere. The discharge of the station vent is continuously monitored for abnormal amounts of radiation and would be isolated long before radiation levels approach federal limits

23. ***Subzones*** Pre-designated areas offsite in which Protective Actions such as evacuation of sheltering will be performed.

24. ***Total Effective Dose Equivalent (TEDE)*** A method of converting exposure to radiation to the biological effects that it will cause to the human body. It combines the external and internal ionizing radiation exposure.

5.0 References

1. HNP DAPAR Program Manual

6.0 Diagrams / Attachments

None

Revision Summary for PEP-340 Rev.7

Section	Changes
Page 3, Section 3.1	Changed C Drive, Program Files Folder to Y:\ Access Databases, Shared, Dose Assessment. Also updated DAPAR v1.0 to v2.0
Page 3, Section 3.2	Added ERFIS Data 1. Obtain monitored release path information by accessing ERFIS Group Display 3DOSE.
Page 5, Section 3.4.4	Corrected section for Quick assessment to 3.5 and 3.7 for full assessment.
Page 6 and 15, Section 3.5 and 3.7	Plant Vent Stack changed RAV3509D to RAV3509H Turbine Building Vent Changed RAV3526D to RTV3536D. WP Building Vent 5 Changed RAV3546H to RWV3546H. WPB Building Vent 5A Changed RAV3547H to RWV3547H
Page 12, Section 3.7.5	Added a table of the process reduction factors
Page 13, Section 3.7.6.c	Added numeric designations 1-7 to the stability class chart
Attachment 1	Removed the PAR printouts
Various	Corrected Section references due to renumbering of sections.