

J. PROTECTIVE RESPONSE

This Plan Section describes the range of protective actions developed for plant workers and the general public within the plume exposure pathway, the 10-mile Emergency Planning Zone.

J.1 Onsite Notification

The Protected Area is the zone within the Owner-Controlled Area bounded by the Protected Area security fence. The plant itself is located within this zone. In the event of an emergency situation at Fermi 2, methods are established for notifying personnel within the Protected Area. These people include the following:

- Employees not having emergency assignments
- Visitors
- Contractor personnel

Methods are also established for notifying personnel outside the Protected Area yet still in facilities within the Owner-Controlled Area (site boundary). These facilities include the following:

- Fermi Information Center
- General Training and Orientation Center (GTOC)
- Technical Assistance Center (TAC)
- Nuclear Operations Center (NOC)
- Fermi 1

The primary means of notification within the Protected Area is the emergency alarm system. This system provides an audible signal that alerts personnel to the existence of an emergency event. The following emergency events have specific audible alarm signals:

- Fire - yelp
- Tornado - siren
- Plant area - steady

Following the alarm, personnel are advised of the nature of the emergency via the plant intercom (HiCom) system.

Activation of the emergency alarm system and the subsequent announcement is the responsibility of the Emergency Director. The activation and the appropriate announcement are performed immediately upon classification of an Alert, Site Area Emergency, or General Emergency. If an Unusual Event occurs, notification announcements are performed on a timely basis consistent with the nature of the event. Following activation of the emergency alarm system, all personnel within the Protected and Owner-Controlled Areas are notified and advised within 15 minutes of an emergency situation.

All personnel working within the Protected Area (including contractors, vendors, and visitors) are either trained in emergency procedures or escorted at all times by an authorized individual. Within the Protected Area, a visitor is anyone who has not been issued an unescorted access keycard for the Protected Area. Within the Owner-Controlled Area, a visitor is defined as anyone whose work location is not Fermi 2. The cognizant supervisor is responsible for visitors inside the Owner-Controlled Area but outside the Protected Area.

Authorized escorts are trained in emergency procedures and in the appropriate steps to be taken by visitors in an emergency. Visitors entering the Protected Area meet their assigned escorts at the Security Access Building and are promptly escorted back if an emergency event requiring accountability occurs.

The Fermi Information Center, GTOC, TAC, NOC, and Fermi 1 will be notified of an emergency by Hi-Com announcement.

J.2 Evacuation

A Plant Area Evacuation is defined as the supervised evacuation of all nonessential personnel from a specific area of the plant to another designated safe area. A Protected Area Evacuation is defined as the supervised evacuation of all nonessential personnel from the Protected Area. A Site Area Evacuation is defined as the supervised evacuation of all nonessential personnel from all Owner-Controlled Areas of the site, including but not limited to the Protected Area, the Fermi Information Center, GTOC, TAC, Fermi 1, and the NOC. Evacuated personnel will be directed to assemble at the Newport Service Center, Monroe Power Plant, Trenton Channel Power Plant or will be sent home.

Figure J-1 identifies the Owner-Controlled Area. The evacuation routes and the relocation and monitoring centers for persons leaving Fermi 2 are shown in Figure J-2. The directions of travel and the off-site assembly area(s) (Edison's Newport Service Center, Monroe Power Plant, and Trenton Channel Power Plant) are determined by the Emergency Director based on the current meteorological and emergency conditions. An announcement will be made over the HiCom system in the Protected Area, Fermi Information Center, GTOC, TAC, NOC, and Fermi 1. Nuclear Security is responsible for traffic direction and control of persons leaving Fermi 2, including special provisions for a coordinated evacuation under severe conditions such as inclement weather, large groups of personnel to be evacuated, or a high level radioactive release. Assembly, accountability, and evacuation are conducted in accordance with established procedures.

- J.2.1 **Monitoring and Decontamination** - In the event of a Site Area Evacuation, all nonessential personnel exiting the Protected Area are monitored for contamination by passing through passive portal radiation monitors. Personnel in the Fermi Information Center, GTOC, TAC, NOC, and Fermi 1 are directed to offsite assembly areas and monitored, if emergency conditions warrant, by individuals trained in the operation of personnel monitoring equipment. Vehicles are monitored, as necessary, depending on the amount and direction of the radioactivity released.

Facilities will be available at the offsite assembly areas should it be necessary to decontaminate individuals and/or vehicles. Decontamination equipment is listed in Radiation Protection Procedure 67.000.405. Personnel monitoring and decontamination is performed using techniques described in Radiation Protection Procedure 67.000.400. Vehicle monitoring and decontamination is performed in accordance with EP-220.

- J.2.2 **Accountability** - As individuals exit the Protected Area, they leave their identification badges with the Nuclear Security personnel. Nuclear Security will account for each person inside the Protected Area, using either the security computer system or by visual inspection using the badge exchange system.

Either method provides for accountability of all individuals within 30 minutes of the start of an assembly and accountability and continuously thereafter for all individuals remaining within the protected area.

The accountability of tour groups is the responsibility of the guides who are escorting each group. Persons leaving the NOC, TAC, and Fermi 1 are accounted for by their work supervisors. Assembled groups report to the senior person at each assembly area.

J.3 **Radiation Protection Equipment**

Adequate supplies of radiation protection equipment including protective clothing are maintained for persons remaining in or entering the Protected Area or the Emergency Response Facilities. This emergency equipment is listed, maintained, and inspected in accordance with Radiation Protection Procedure 67.000.405.

Onsite Medical maintains adequate amounts of potassium iodide (KI) to support the Onsite Emergency Response Organization for emergency situations at Fermi 2. The Emergency Director is responsible for authorizing the distribution and use of KI. Protective clothing and respiratory protection equipment are used as directed by the Emergency Director (or delegate).

J.4 Protective Actions

In a radiological emergency, an estimate must be made of the radiation dose that affected population groups may potentially receive. A protective action is taken to avoid or reduce the effects of this projected radiation dose. The Protective Action Guideline (PAG) is a predetermined level of projected dose to individuals in the population at which protective actions are warranted.

Procedures are in place to recommend plume exposure protective actions to State and local offsite emergency response agencies. Prompt notification of protective action recommendations is made to State and local agencies. The Nuclear Regulatory Commission is informed of these recommendations.

The implementation of protective actions taken offsite to protect the health and safety of the general public is the responsibility of the State of Michigan in conjunction with local emergency response agencies.

The Michigan Emergency Management Plan, Monroe County Emergency Management Plan, and Wayne County Emergency Operations Plan describe the provisions to implement measures for the plume exposure pathway EPZ for State and local emergency response personnel and the public. Provisions include the following:

- Maps showing evacuation routes, evacuation areas, congregate care centers, and shelter areas
- Maps showing the population distribution around the nuclear facility
- Methods for notifying all segments of the transient and resident population
- Means for protecting handicapped, institutionalized, or confined individuals whose mobility may be impaired
- Methods for registering and monitoring evacuees at reception centers
- Means of relocation, including reception centers, access control, and evacuation routes and methods
- Methods for protecting the public from consumption of contaminated foodstuffs

- J.4.1 **Basis for Recommending Protective Actions** - The Manual of Protective Action Guides and Protective Actions for Nuclear Incidents (EPA 400-R-92-001) and NUREG-0654 are used as the basis for recommendations for protective actions for the offsite public. Table J-1 summarizes possible protective actions to be implemented by State and local agencies during an emergency. As a further aid in determining appropriate protective actions, Table J-2 contains representative shielding factors provided by typical structures against direct exposure from the plume.
- J.4.2 **Evacuation Time Estimates** - When evacuation is being considered, the time required to implement the evacuation may be an important factor in reaching a protective action recommendation. Evacuation time estimates in the plume exposure EPZ are contained in a separate study "Evacuation Time Estimate Analyses for the Fermi 2 Nuclear Power Plant Emergency Planning Zone," revised March, 2003. Advent Engineering Services, Inc., Ann Arbor, Michigan, performed this study for Detroit Edison. The evacuation time estimate study includes considerations for periods of peak traffic congestion, adverse weather conditions, and the evacuation of institutionalized population.
- J.4.3 **Population Distribution** - The 10-mile and 50-mile EPZs are shown in Figures A-1 and A-2. The population distribution in the 10-mile EPZ is given in Table J-3. There are approximately 5.5 million people in the 50-mile EPZ.
- J.4.4 **Offsite Monitoring** - The locations of the offsite environmental monitoring stations are listed in the Offsite Dose Calculation Manual.

**TABLE J-1: EXPOSURE PATHWAYS, INCIDENT PHASES,
AND PROTECTIVE ACTIONS (a)**

POTENTIAL EXPOSURE PATHWAYS AND INCIDENT PHASES	PROTECTIVE ACTIONS
1. External radiation from facility	Sheltering Evacuation Control of access
2. External radiation from plume	Sheltering Evacuation Control of access
3. Inhalation of activity in plume	Sheltering Administration of stable iodine Evacuation Control of access
4. Contamination of skin and clothes	Sheltering Evacuation Decontamination of persons
5. External radiation from ground deposition of activity	Evacuation Relocation Decontamination of land and property
6. Ingestion of contaminated food and water	Food and water controls (e)
7. Inhalation of resuspended activity	Relocation Decontamination of land and property

- (a) Reference: U.S. Environmental Protection Agency, "Manual of Protective Action Guides and Protective Actions for Nuclear Incidents," EPA 400-R-92-001.
- (b) Period at the beginning of a nuclear incident when immediate decisions for effective protective actions are required and must therefore usually be based primarily on the status of the facility and the prognosis for worsening conditions.
- (c) Period beginning after the source and releases have been brought under control and reliable environmental measurements are available for use as a basis for decisions on additional protective actions.
- (d) Period beginning when recovery actions designed to reduce radiation levels in the environment to acceptable levels for unrestricted use are commenced.
- (e) The use of stored animal feed and uncontaminated water to limit the uptake of radionuclides by domestic animals in the food chain can be applicable in any of the phases.

TABLE J-2: REPRESENTATIVE SHIELDING FACTORS FROM GAMMA CLOUD SOURCE (a)

<i>Structure or Location</i>	<i>Representative Shielding Factor (b)</i>	<i>Representative Range</i>
Outside	1.0	---
Vehicles	1.0	---
Woodframe house (c) (no basement)	0.9	---
Basement of wood house	0.6	0.1 to 0.7 (d)
Masonry house (no basement)	0.6	0.4 to 0.7 (d)
Basement of masonry house	0.4	0.1 to 0.5 (d)
Large office or industrial building	0.2	0.1 to 0.3 (d, e)

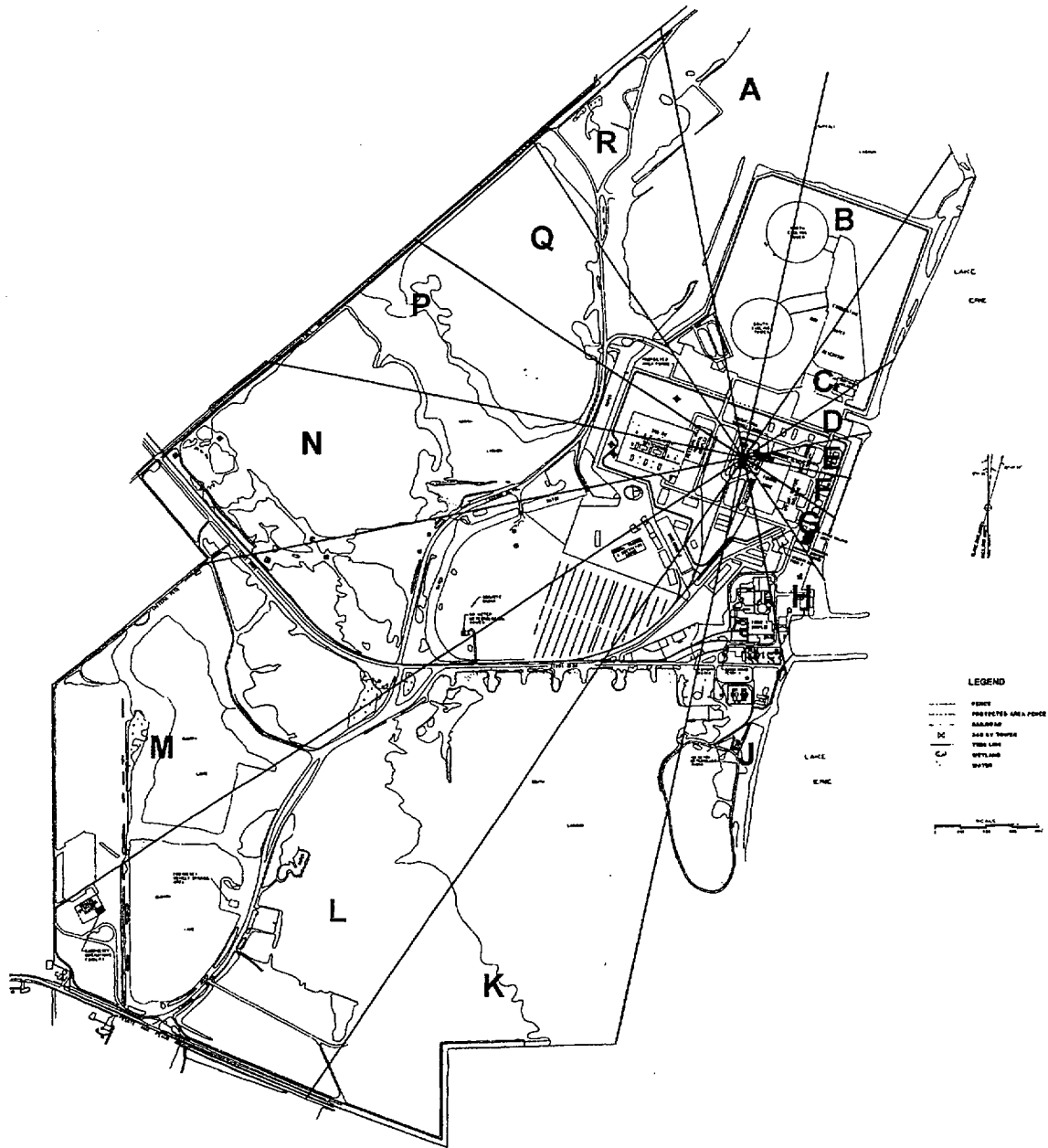
- (a) Taken from SAND 77-1725 (Unlimited Release)
- (b) The ratio of the dose received inside the structure to the dose that would be received outside the structure.
- (c) A wood-frame house with brick or stone veneer is approximately equivalent to a masonry house for shielding purposes.
- (d) This range is mainly due to different wall materials and different geometries.
- (e) The shielding factor depends on where the personnel are located within the building (for example, the basement or an inside room).

TABLE J-3: DISTRIBUTION OF 2000 POPULATION IN EMERGENCY PLANNING ZONE RINGS AND SECTORS, MONROE AND WAYNE COUNTIES, MICHIGAN

Sector	Ring (One-Mile)										Total
	1	2	3	4	5	6	7	8	9	10	
A	0	118	242	179	195	201	873	3656	4367	4658	14489
B	0	214	62	21	54	249	779	1002	835	3761	6977
C	0	191	98	0	0	1	5	0	0	0	295
D	0	0	0	0	0	0	0	0	0	0	0
E	0	0	0	0	0	0	0	0	0	0	0
F	0	0	0	0	0	0	0	0	0	0	0
G	0	0	0	0	0	0	0	0	0	0	0
H	0	0	8	0	0	0	0	0	0	0	8
J	3	782	103	0	0	0	0	0	0	0	888
K	4	621	0	0	0	0	0	0	0	0	625
L	3	245	44	144	876	144	17	560	406	2703	5142
M	3	76	807	2035	1355	1036	3353	10182	11075	7370	37292
N	5	73	105	219	358	776	1080	1131	781	685	5213
P	2	45	103	107	240	3334	601	499	490	590	6011
Q	1	165	467	340	707	265	1093	337	809	2862	7046
R	1	110	393	137	137	150	187	495	745	2556	4911
Total	22	2640	2432	3182	3922	6156	7988	17862	19508	25185	88897

* Includes 583 persons who live outside the ten mile EPZ boundary but are included for protective action decision implementation.

Figure J-1
OWNER-CONTROLLED AREA



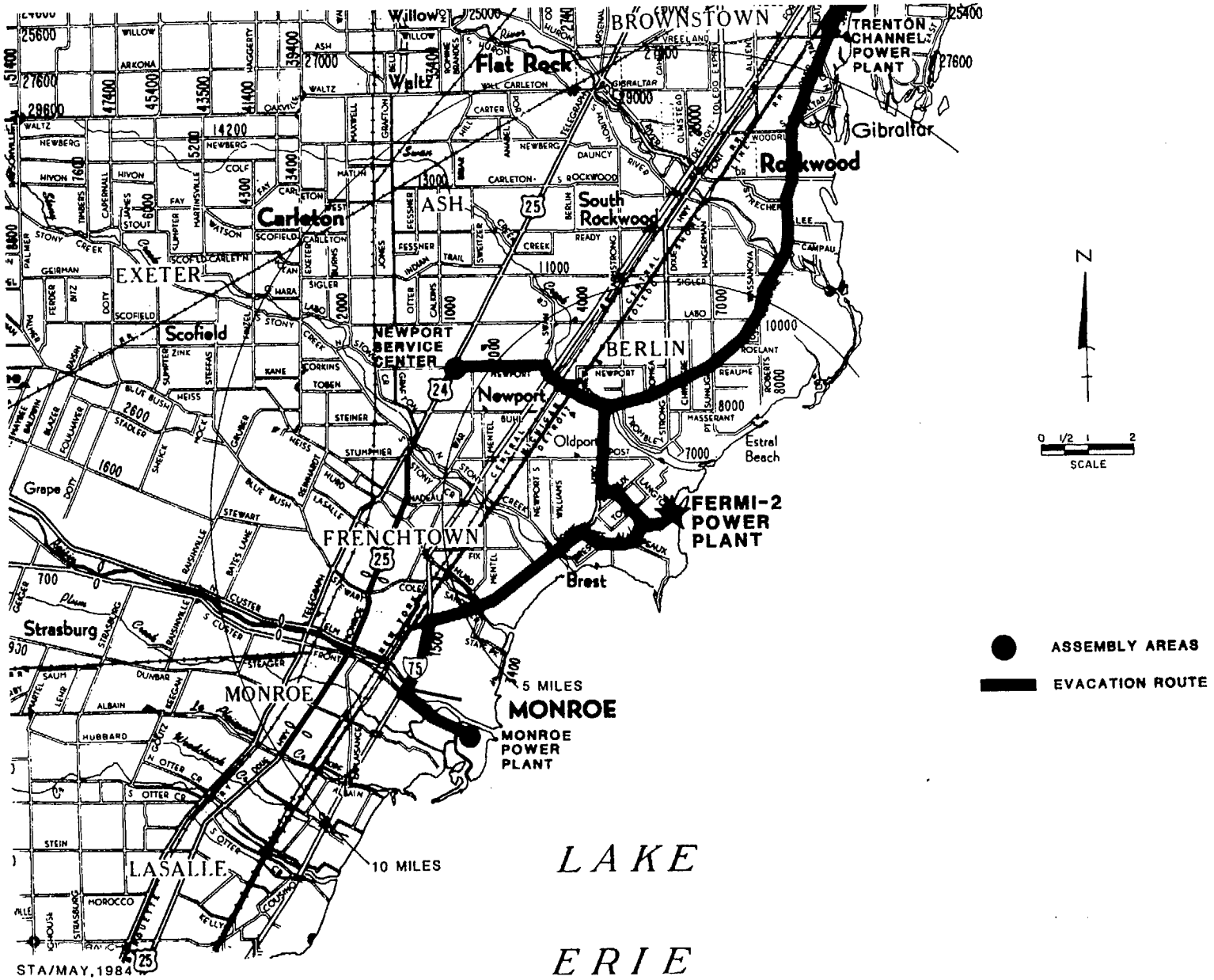


Figure J-2
 EVACUATION ROUTES AND ASSEMBLY AREAS

STA/MAY, 1984

PROTECTIVE ACTION RECOMMENDATIONS

Revision Summary

- 1) Changed 5 Rem to ≥ 5 Rem in Enclosure A.
- 2) Corrected Note numbers in Enclosure A.
- 3) Made editorial changes in Enclosure A. No revision bars used to mark these changes.

Implementation Plan

- 1) This procedure goes into effect upon issuance.

Attachments - None

CM

Enclosures

- A 121304 PAR Flowchart
- B 101204 Downwind Affected Sector to Area Conversion Table
- C 012798 Protective Action Areas
- D 032803 EF 2 10-Mile EPZ Evacuation Time Estimates Summary
- E 032803 EF 2 10-Mile EPZ Population Analysis
- F 050602 Representative Shielding Factors From a Gamma Cloud Source
- G 050602 Inhalation Shielding Factors for a Wood House, Snug Doors, Closed Windows (Thyroid)

<i>Information and Procedures</i>				
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1.0 PURPOSE

To provide guidelines for formulating and recommending appropriate protective actions for the general public in the event of a General Emergency.

2.0 USE REFERENCES

2.1 EP-290, Emergency Notifications

3.0 ENTRY CONDITIONS

3.1 A Site Area Emergency or General Emergency is declared.

4.0 GENERAL INFORMATION

4.1 Protective actions (evacuation and/or sheltering) are required for the affected areas of the general public at the General Emergency declaration and are recommended to local and/or state authorities as appropriate.

4.2 Protective Action Recommendation (PAR) formulation involves an assessment of risk to the general public. Appropriate recommendations are determined using Enclosure A, PAR Flowchart, which considers risk assessment based on two primary indicators.

4.2.1 Dose Projections

1. Dose projections are classified as "Actual" or "Potential."

- a. **Actual** doses are based on radioactivity actually being released from the plant. They are calculated using either effluent radiation monitor readings (normal), grab sample results, or actual field measurements.
- b. **Potential** doses are based on radioactivity in primary containment available for release. They are calculated using Containment High Range Radiation Monitors (CHRRMs) or containment atmosphere grab sample results.

2. PAR decision making may be based on an estimate of radiation exposure an individual might receive over a projected period in comparison to a Protective Action Guideline (PAG).
 - a. A PAG is a level of exposure that an individual might receive that warrants a specific protective action to be implemented.
 - b. PAG values are expressed in units of dose and represent the risk of health effects to the exposed population.
 - c. PAG values are as follows:

TEDE	1 rem
Adult Thyroid	5 rem
 - d. A projected dose greater than a PAG value is used to initiate PAR decision-making and **normally** requires an evacuation.
3. The risk associated with a projected dose that exceeds a PAG value is generally higher than the risk associated from an evacuation.
 - a. The risks associated with an evacuation during inclement weather or other competing disasters may be greater than that associated with a PAG value. In these cases, sheltering of the public may be appropriate.
 - b. For short, controlled releases, the risk of evacuation in comparison to dose that might be received may be too great. In these cases, sheltering of the public may be appropriate.
4. When projected doses exceed a PAG value at a distance greater than 10 miles, manual dose calculations may be used to determine the affected areas and distances. Protective actions would be determined by a joint assessment between state and facility decision-makers.

4.2.2 Plant Status

1. PAR decision-making also includes an assessment of plant conditions, specifically core damage estimates.

2. Normally a General Emergency declaration represents a significant risk to the general public and indicates a severe core damage accident is in progress **or** projected (> 20% gap release) with a potential for containment failure.
3. Severe core damage accidents reflect an amount of radioactivity that may be available and presents an unacceptable risk to the general health of the public. These accidents would require evacuation of those close to the plant and certain potentially affected downwind areas.
4. The risks due to the potential radiation exposure from a severe core damage accident are reduced by the implementation of protective actions.
5. PAR decision-making based on plant status represents the **desired proactive approach** to the protection of the public. It focuses the decision-maker on the likelihood of radiation exposure thereby offering the greatest reduction of risk.
6. Careful evaluation of plant conditions is needed to properly determine if a *fuel melt* accident is in progress or projected. This evaluation may include, but is not limited to:
 - a. Status of reactor water level and injection capabilities
 - b. Amount of time the fuel has been uncovered
 - c. CHRRMs
 - d. Core damage estimates such as EP-547, "Rapid Estimate of Core/Fuel Damage Based on Containment High Range Radiation Monitor," or dose assessment program
7. Fuel melt sequences represent the greatest risk to the health of the general public. Activity produced from these sequences, if released, can produce severe early health effects and necessitates immediate protection of the public.
8. Analysis of potential primary containment failure during a severe accident may prove to be extremely difficult or impossible to predict since plant conditions are outside of plant design. Therefore, status of primary containment is not considered for the initial PAR development.

4.2.3 PARs must be **continually** evaluated to assure the public's health and safety as conditions change or more information becomes available.

1. If dose calculations become available after an initial PAR has been made the impact on PAR effectiveness must be determined.
2. Meteorological data and the Offsite Radiological Emergency Team (RET) survey(s) provide useful information for PAR development. Each provides information on plume position.
3. Weather forecast data may provide insight on future plume positions. This information should be considered for incorporation into PAR development when available.
4. Current offsite hazards may also exist that might impact protective actions. The presence of physical or environmental hazards (e.g., tornadoes, ice storms, road hazards) should be identified as soon as possible. Presence of these conditions may lead to a shelter recommendation.
5. The current status of emergency response efforts can provide insight to future PARs. Successful (or failed) efforts can provide decision makers with data to help determine likelihood of further core damage.

4.3 Other considerations may be involved when evaluating the effectiveness of a PAR and are normally evaluated by **state** decision-makers.

4.3.1 Certain members of the general public may be at a greater risk from an evacuation or evacuation efforts may take much longer. These members may include, but are not limited to, schools, hospitals, nursing homes, parks, etc.

4.3.2 Evacuations are most effective if completed before plume arrival.

1. Enclosures D and E identify evacuation time estimates and total population which may be useful to evaluate evacuation effectiveness.
2. Enclosure F, Representative Shielding Factors From a Gamma Cloud Source, and Enclosure G, Inhalation Shielding Factors for a Wood House, Snug Doors, Closed Windows (Thyroid), may be used to evaluate sheltering effectiveness by multiplying projected Total Effective Dose Equivalent (TEDE) and adult thyroid dose respectively by the Enclosure's shielding factors.

- 4.3.3 Dose received before PAR implementation is not used for PAR effectiveness evaluations.
- 4.3.4 In cases where evacuations are **not** prudent, sheltering may be appropriate.
- 4.4 Protective actions for the early phase of a General Emergency are prescribed for the 10-Mile Emergency Planning Zone (EPZ) surrounding the site.
 - 4.4.1 For planning purposes, the EPZ is divided into concentric rings of 2, 5, and 10 miles.
 - 4.4.2 The EPZ is also divided into sixteen 22.5° sectors.
 - 4.4.3 The EPZ is further divided into five Protective Action Areas (PAAs) as shown in Enclosure C, Protective Action Areas.
 - 4.4.4 When making PARs, the minimum area considered is the PAAs located in the 2-mile radius, and the projected plume's centerline sector, and two adjacent sectors out to five miles.
 1. When developing PARs for "Security Event Resulting in Loss of Physical Control of the Plant" (HG1), the minimum area considered is located in the 2-mile radius (Area 1).
 2. If the projected dose exceeds a PAG value >10 miles away, adhoc protective actions would be developed in conjunction with offsite authorities.
 - 4.4.5 Once a PAR has been determined **and** communicated, less stringent recommendations are normally **not** considered or used.
 - 4.4.6 Other information such as better understood accident sequence, presence of significant particulate fission products or radioiodine, or the presence of an unmonitored or unfiltered release path may lead to more stringent Adhoc protective actions.
- 4.5 Responsibility for PARs
 - 4.5.1 Emergency Response Organization decision-makers only **recommend** protective actions. State decision-makers make the final decision on what protective action(s) to implement.

- 4.5.2 If the Technical Support Center (TSC) and Emergency Operations Facility (EOF) are **not** functional:
1. The Shift Technical Advisor evaluates available information and advises the Emergency Director in matters related to protective action recommendations.
 2. The Emergency Director is responsible for making the final recommendation(s) to local and/or state authorities as appropriate.
- 4.5.3 If the TSC is functional and the EOF is **not** functional:
1. The Radiation Protection Advisor and/or Technical Engineer, as appropriate, evaluate available information and advise the Emergency Director in matters related to protective action recommendations.
 2. The Emergency Director is responsible for making a final recommendation to local and/or state authorities as appropriate.
- 4.5.4 If the EOF is functional:
1. The Radiation Protection Coordinator evaluates available information and advises the Emergency Officer in matters related to protective action recommendations. The Nuclear Operations Advisor should assist as appropriate.
 2. The Emergency Officer is responsible for making a final recommendation to local and/or state authorities as appropriate.
- 4.5.5 PARs are made to the State Emergency Operations Center (SEOC) if the SEOC is functional.
1. Recommendations will be discussed with the State Emergency Director before issuance, when time permits.
 2. The State Emergency Director will consider recommendations and issue a Protective Action Order, when appropriate, acting with the delegated authority of the Governor.

4.5.6 PARs are made directly to Wayne and Monroe Counties when the SEOC is **not** functional.

1. Recommendations will be discussed with county officials before issuance, when time permits.
2. When deemed appropriate, recommendations will be passed on to the public by county officials.

5.0 IMMEDIATE ACTIONS

5.1 When a Site Area Emergency is declared:

NOTE: Do **not** make any PAR until a General Emergency has been declared.

5.1.1 Initiate formulation of PARs using Enclosures A and B when possible before declaration of a General Emergency.

5.2 When a General Emergency is declared:

NOTE: A PAR shall be made to appropriate offsite authorities concurrent with the initial notification of General Emergency declaration and documented using a Nuclear Plant Event Notification Form.

5.2.1 Formulate PARs using Section 6.0.

6.0 PROCEDURE

6.1 Initial PAR

6.1.1 Determine centerline sector using available resources.

6.1.2 Determine if dangerous travel conditions exist.

6.1.3 Determine if there is a radioactive release.

1. Determine the direction of the radioactive release.

6.1.4 Determine appropriate PAR using Enclosures A and B.

NOTE: Notifications of initial PARs **must** be completed within 15 minutes of the General Emergency declaration.

6.1.5 Immediately communicate the PAR to offsite authorities in accordance with EP-290, "Emergency Notifications."

6.1.6 GO TO step 6.2.

6.2 PAR Effectiveness

6.2.1 Evaluate the effectiveness of the existing PAR using the questions listed in Enclosure A, "Evaluation Considerations for PAR Effectiveness" block as a guide.

6.2.2 Modify the existing PAR using Enclosures A and B as necessary.

NOTE: Notifications of any change to PARs **must** be completed within 15 minutes upon indication(s) of conditions requiring a PAR change.

6.2.3 **Immediately** communicate the new PAR to offsite authorities in accordance with EP-290, "Emergency Notifications."

7.0 FOLLOW-UP ACTIONS

7.1 Continue to evaluate PAR effectiveness (step 6.2.1) as conditions require.

7.2 Keep offsite authorities informed of current dose projection results, plant status, response efforts, and other information which may potentially affect PARs in accordance with EP-290, "Emergency Notifications."

8.0 RECORDS

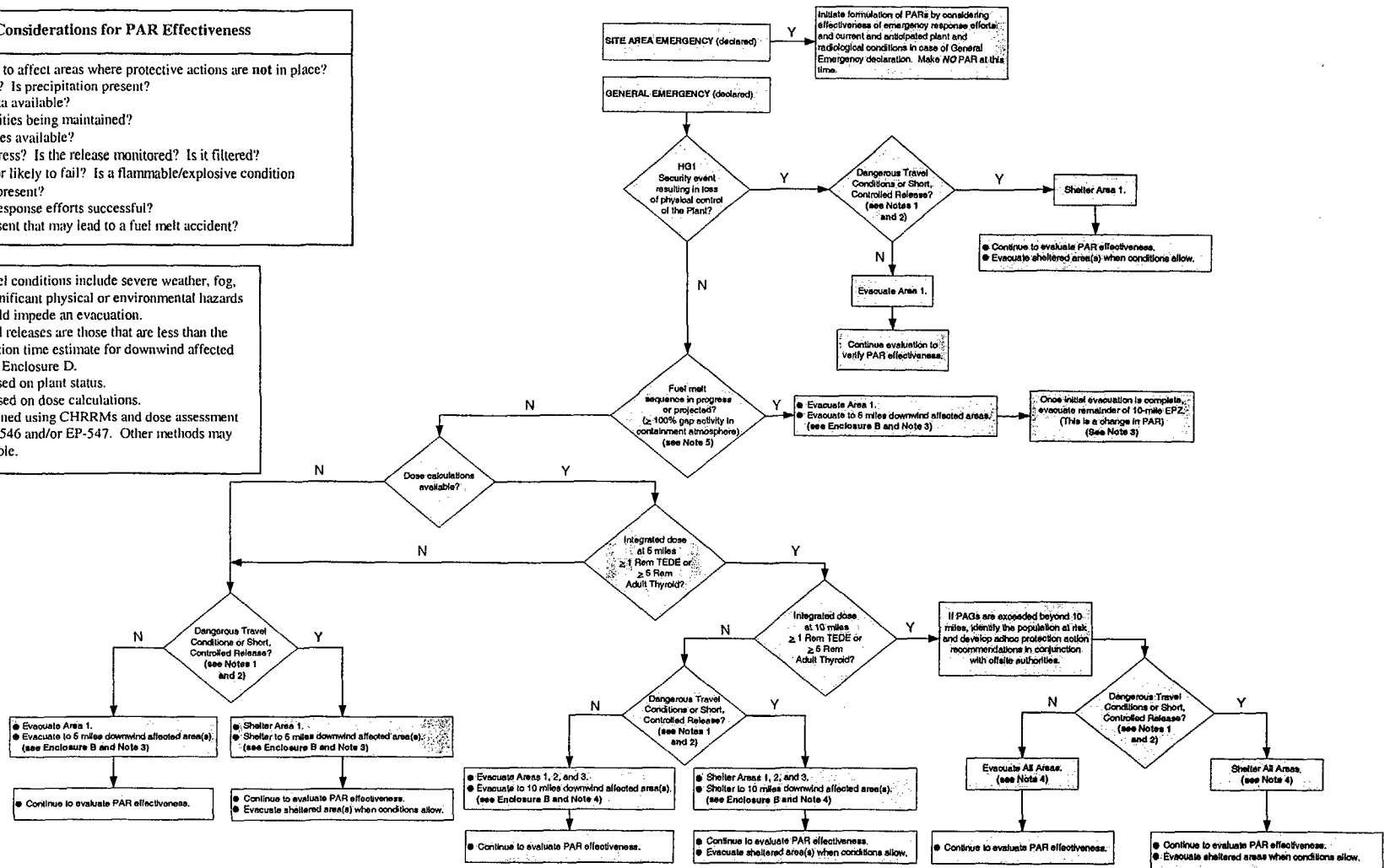
8.1 There are no required records generated through this procedure.

END OF TEXT

PAR FLOWCHART

Evaluation Considerations for PAR Effectiveness	
1.	Are wind shifts expected to affect areas where protective actions are not in place?
2.	Is a lake breeze in effect? Is precipitation present?
3.	Is offsite RET survey data available?
4.	Are core cooling capabilities being maintained?
5.	Are core damage estimates available?
6.	Is there a release in progress? Is the release monitored? Is it filtered?
7.	Has containment failed or likely to fail? Is a flammable/explosive condition ($H_2 \geq 6\%$ and $O_2 \geq 5\%$) present?
8.	Are current emergency response efforts successful?
9.	Are plant conditions present that may lead to a fuel melt accident?

- NOTE (1):** Dangerous travel conditions include severe weather, fog, ice, or other significant physical or environmental hazards offsite that would impede an evacuation.
- NOTE (2):** Short controlled releases are those that are less than the shortest evacuation time estimate for downwind affected area(s) listed in Enclosure D.
- NOTE (3):** This PAR is based on plant status.
- NOTE (4):** This PAR is based on dose calculations.
- NOTE (5):** May be determined using CHRRMs and dose assessment program or EP-546 and/or EP-547. Other methods may also be acceptable.



DOWNWIND AFFECTED SECTOR TO AREA CONVERSION TABLE

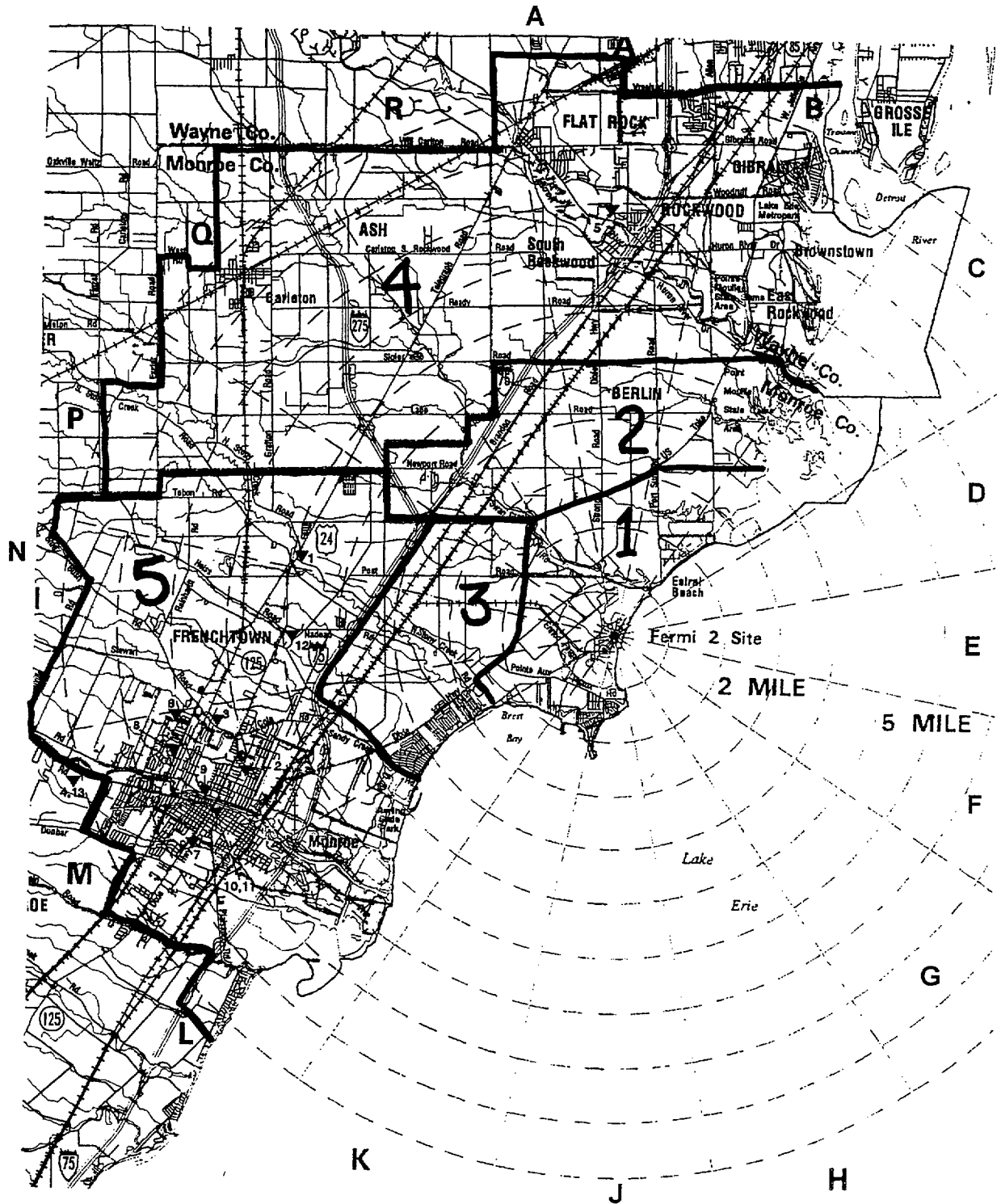
NOTE: The Centerline Sector can be identified on:

- the Integrated Plant Computer System (IPCS) “Straight Line” plume plot display
- dose reports indicating “Affected Sector”
- field team data

When evacuating to 5 miles “Downwind Affected Area(s)”	The “Downwind Affected Area(s)” are:
If Downwind Centerline Sector is E, F, G, H, or J or if wind direction “from” is ≥ 258.8 and ≤ 11.2 deg	Area 1
If Downwind Centerline Sector is A, B, C, or D or if wind direction “from” is ≥ 168.8 and ≤ 258.7 deg	Areas 1 and 2
If Downwind Centerline Sector is K, L, or M or wind direction “from” is ≥ 11.3 and ≤ 78.7 deg	Areas 1 and 3
If Downwind Centerline Sector is N, P, Q, or R or if wind direction “from” is ≥ 78.8 and ≤ 168.7 deg	Areas 1, 2, and 3

When evacuating to 10 miles “Downwind Affected Area(s)”	The “Downwind Affected Area(s)” are:
If Downwind Centerline Sector is R, A, B, C, or D or if wind direction “from” is ≥ 146.3 and ≤ 258.7 deg	Areas 1, 2, 3, and 4
If Downwind Centerline Sector is E, F, G, H, or J or if wind direction “from” is ≥ 258.8 and ≤ 11.2 deg	Areas 1, 2, and 3
If Downwind Centerline Sector is K, L, or M or if wind direction “from” is ≥ 11.3 and ≤ 78.7 deg	Areas 1, 2, 3, and 5
If Downwind Centerline Sector is N, P, or Q or if wind direction “from” is ≥ 78.8 and ≤ 146.2 deg	Areas 1, 2, 3, 4, and 5

PROTECTIVE ACTION AREAS



EF2 10-MILE EPZ EVACUATION TIME ESTIMATES SUMMARY*

Area	Description	Summer Day Normal	Summer Day Adverse ^b	Summer Night Normal	Summer Night Adverse ^b	Winter Day Normal	Winter Day Adverse ^b	Winter Night Normal	Winter Night Adverse ^b
1	All Sectors to 2 miles	2:40	3:10	1:15	1:15	2:40	3:10	1:15	1:15
1 & 2	All Sectors to 2 miles Northwest sectors to 5 miles	2:40	3:15	1:15	1:20	2:45	3:05	1:15	1:20
1 & 3	All Sectors to 2 miles Southwest sectors to 5 miles	4:45	5:05	1:55	2:05	4:00	4:50	1:35	1:25
1, 2, & 3	All sectors to 5 miles	4:45	5:05	1:55	2:05	4:00	4:50	1:35	1:25
1, 2, 3, & 4	All Sectors to 5 miles Northwest sectors to 10 miles	4:45	5:05	2:25	2:30	4:15	5:05	2:20	2:20
1, 2, 3, & 5 ^a	All Sectors to 5 miles Southwest sectors to 10 miles	4:55	5:40	4:55	5:10	5:40	5:50	4:30	4:55
1, 2, 3, 4, & 5 ^a	All sectors to 10 miles	5:12	5:53	5:03	5:21	5:51	6:06	4:40	5:09

* These are comparative times based on data drawn from the Evacuation Time Estimates Analyses for the Fermi 2 Nuclear Power Plant Emergency Planning Zone, March, 2003, prepared by Advent Engineering Services. **Times are given in hours : minutes.**

- a. When evaluating an evacuation PAR for distances greater than 5 miles, and including Area 5, consideration should be given to the special needs of Mercy Memorial Hospital and Mercy Memorial Nursing Center. These facilities are located approximately 7 miles from the site and require approximately 6 hours - 6 minutes to complete an evaluation.
- b. "Adverse" weather conditions are those which may impair visibility and/or traction, such as light snow, ice, rain, or fog.

EF2 10-MILE EPZ POPULATION ANALYSIS*

Area	Description	Summer Day	Summer Night	Winter Day	Winter Night
1	All Sectors to 2 miles	4271	3656	5156	3646
1 & 2	All Sectors to 2 miles Northwest sectors to 5 miles	6726	5876	7953	5866
1 & 3	All Sectors to 2 miles Southwest sectors to 5 miles	8810	7933	11431	7881
1, 2, & 3	All sectors to 5 miles	11265	10153	14227	10101
1, 2, 3, & 4	All sectors to 5 miles Northwest sectors to 10 miles	52603	48664	64554	45381
1, 2, 3, & 5	All sectors to 5 miles Southwest sectors to 10 miles	74526	65673	83703	63013
1, 2, 3, 4, & 5	All sectors to 10 miles	115864	104184	134030	98293

* EPZ population data extracted from the Evacuation Time Estimates Analyses for the Fermi 2 Nuclear Power Plant Emergency Planning Zone, March, 2003, prepared by Advent Engineering Services. Additional population data provided by local planning agencies using U.S. Census data.

REPRESENTATIVE SHIELDING FACTORS FROM GAMMA CLOUD SOURCE^(a)

Structure or Location	Representative Shielding Factor (b)	Representative Range
Outside	1.0	--
Vehicles	1.0	--
Wood frame house ^(c) (no basement)	0.9	0.9
Basement of wood house	0.6	0.1 to 0.7 ^(d)
Masonry house (no basement)	0.6	0.4 to 0.7 ^(d)
Basement of masonry house	0.4	0.1 to 0.5 ^(d)
Large office or industrial building	0.2	0.1 to 0.3 ^(d,e)

(a) Taken from SAND 77-1725 (Unlimited Release).

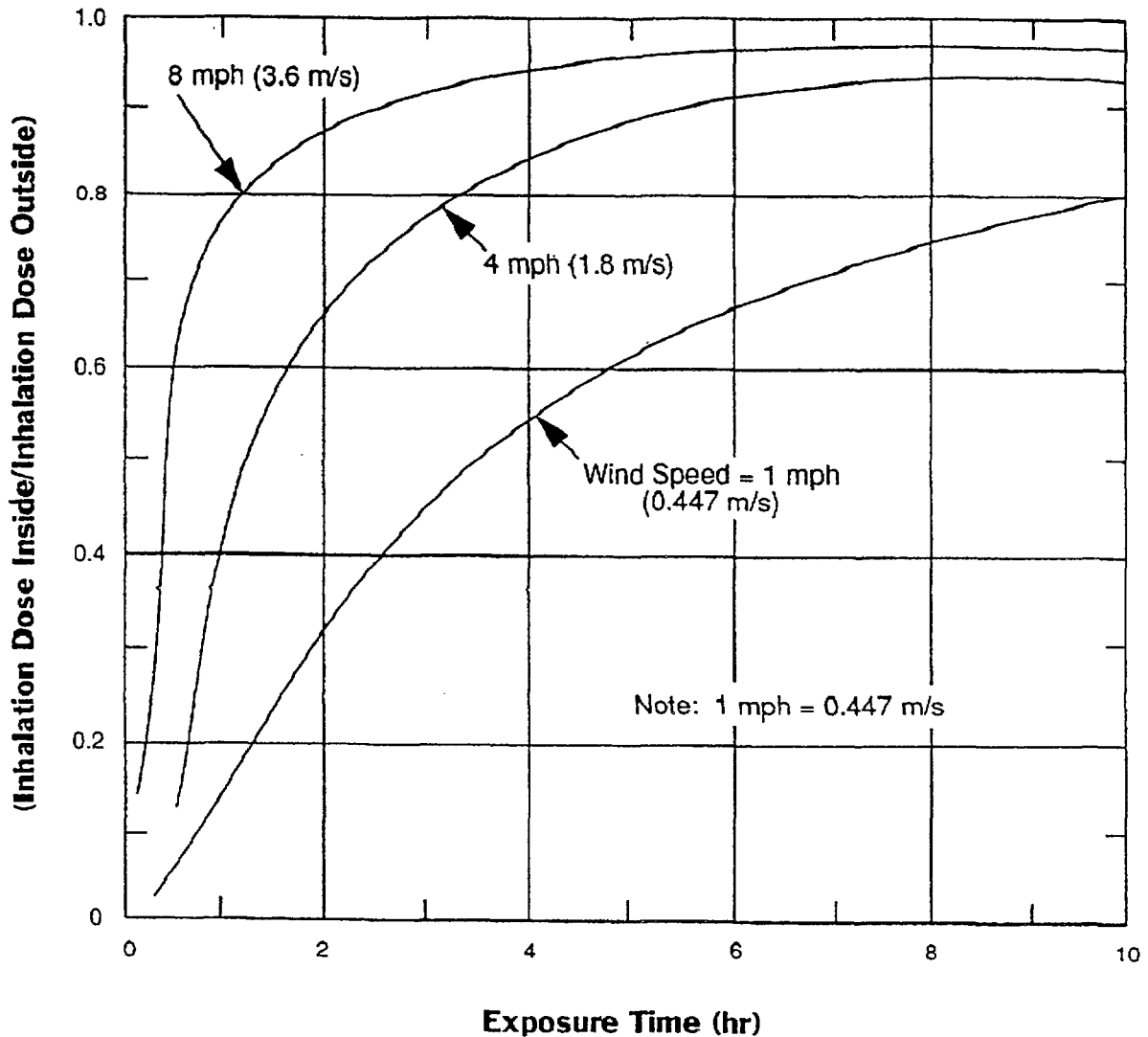
(b) The ratio of the dose received inside the structure to the dose that would be received outside the structure.

(c) A wood-frame house with brick or stone veneer is approximately equivalent to a masonry house for shielding purposes.

(d) This range is mainly due to different wall materials and different geometries.

(e) The shielding factor depends on where the personnel are located within the building (e.g., the basement or an inside room).

**INHALATION SHIELDING FACTORS FOR A WOOD HOUSE,
SNUG DOORS, CLOSED WINDOWS (THYROID)**



The above curve assumes the house remains closed up for the duration. Actually, the dose inside the house can be further reduced by opening the doors and windows after the cloud has passed and purging the house with fresh air.

"Reactor Safety Study," Appendix VI, Wash-1400, October 1975

END

ASSEMBLY AND ACCOUNTABILITY AND ONSITE PROTECTIVE ACTIONS
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Revision Summary

- 1) Added step 5.1.2 to reference new Enclosure B.
- 2) Revised Enclosure A to relocate security event protective actions to Enclosure B.
- 3) Added new Enclosure B.
- 4) Changed Enclosure B to C.
- 5) Changed Enclosure C to D.
- 6) Deleted former Enclosure D.
- 7) Revised wording announcement in Enclosure E.
- 8) Added NTC shelter areas to Enclosure F.
- 9) Made editorial changes throughout procedure. No revision bars used to mark these changes.

Implementation Plan

- 1) This revision goes into effect upon issuance.

Attachments

- 1 020305 OCA Assembly and Accountability Log

Enclosures

- A 080905 Onsite Protective Actions Flowchart
 B 080905 Security Event Onsite Protective Actions Flowchart
 C 080905 Announcement for Assembly and Accountability
 D 080905 Announcement for Unaccounted Personnel Within the Protected Area
 E 080905 Announcement for Onsite Evacuation Order
 F 080905 Safe Shelter Area

<i>Information and Procedures</i>				
DSN EP-530	Revision 18	DCR # 05-1313	DTC TPEPT	File # 1703.10
IP Code I	Date Approved 8-10-05	Released By P. Scott /s/	Date Issued 8-31-05	Recipient

1.0 PURPOSE

To describe the actions necessary to order assembly and accountability including guidance for ordering onsite protective actions.

2.0 USE REFERENCES - None

3.0 ENTRY CONDITIONS

3.1 Either or both of the following conditions exist:

- 3.1.1 An Alert, a Site Area Emergency, or a General Emergency has been declared.
- 3.1.2 An unexpected or uncontrolled hazard exists, or is anticipated in the plant or Owner Controlled Area.

4.0 GENERAL INFORMATION

4.1 When an Alert or higher emergency classification is declared, all personnel onsite shall be accounted for to ensure their location.

- 4.1.1 Assembly and Accountability starts when the order is given to assemble via Hi-Com announcement or by Nuclear Security.
- 4.1.2 Accountability of all personnel within the **Protected Area** shall be completed within 30 minutes. Protected Area Assembly and Accountability ends when the status of all personnel has been reported to the Emergency Director.
- 4.1.3 Assembly of the Owner Controlled Area (OCA) requires all other personnel and visitors to report to the NTC Auditorium.
 - 1. Personnel who report to the NTC Auditorium should log in using Attachment 1, OCA Assembly and Accountability Log.
 - 2. The most senior DTE Energy person present should assume control of personnel present.
 - 3. A brief will be provided to assembled personnel prior to release from the NTC Auditorium. The brief will be provided by senior EOF personnel.

- 4.2 Assembly and Accountability will precede, whenever possible, the order to evacuate. It is desirable in an emergency to establish accountability of personnel as soon as possible to facilitate location of any missing individuals.
- 4.3 For the purpose of Assembly and Accountability, all personnel report to the following facilities:
- 4.3.1 Control Room
- Emergency Response Organization (ERO) assigned to Control Room
- 4.3.2 Technical Support Center (TSC)
- Medical personnel trained in Radiological Medical Emergency Response
 - ERO assigned to TSC
 - NRC Inspectors (having unescorted access to Protected Area)
- 4.3.3 Operations Support Center (OSC)
- Operations Support personnel
 - Radiation Protection personnel assigned to OSC
 - Chemistry personnel assigned to OSC
 - Fire Brigade
 - ERO assigned to OSC
- 4.3.4 Alternate Operations Support Center (AOSC)
- I&C personnel
 - Electrical/Mechanical Maintenance personnel
 - Fire Protection personnel
 - Warehouse A personnel
 - ERO assigned to the AOSC

4.3.5 Emergency Operations Facility (EOF)

- ERO assigned to EOF
- Nuclear Information Personnel

4.3.6 Nuclear Training Center (NTC) Auditorium

- All other DECo personnel
- All non-ERO contractors and visitors

4.4 Normal means of OCA exit is through the main Security Gate on Fermi Drive.

4.4.1 An alternate means of OCA exit is located southeast of the Nuclear Operation Center (NOC) through a locked security gate at Quarry Lake and Pt. Aux Peaux Road.

4.5 Any media requests shall be directed to Corporate Communications.

5.0 PROCEDURE

5.1 Immediate Actions

<i>Who</i>	<i>Step</i>	<i>Action</i>
Emergency Director/ Shift Manager	5.1.1	If emergency conditions/events are occurring that require onsite protective actions, GO TO the Onsite Protective Actions Flowchart in Enclosure A.
	5.1.2	If there is a security event, GO TO the Security Event Onsite Protective Actions Flowchart in Enclosure B.

5.2 Assembly and Accountability Order

<i>Who</i>	<i>Step</i>	<i>Action</i>
Emergency Director/ Shift Manager	5.2.1	Order Assembly and Accountability in accordance with Enclosure C.
	5.2.2	Inform the Security Shift Supervisor that Assembly and Accountability has been ordered.

5.2.3 Protected Area

1. Verify personnel accountability by checking reports received from the Security Shift Supervisor.
2. If personnel are unaccounted for, make the announcement in Enclosure D over the plant Hi-Com, using the Hi-Com Override to locate missing persons.
3. If personnel are still unaccounted for after using Enclosure D, direct the OSC Coordinator to dispatch a Damage Control and Rescue Team to locate any unaccounted for personnel.
4. Provide frequent updates to Emergency Director until all personnel have been accounted for in the Protected Area.
5. When all personnel have been accounted for, notify the Emergency Director.

**Security
Personnel/
Damage Control
Rescue Team**

5.2.4 Owner Controlled Area

1. Perform facility (building or office) sweeps, during normal work hours, to ensure personnel assemble in the NTC Auditorium.
2. Announce the Assembly and Accountability order in accordance with EP-205-01, "Security Force," during off hours **or** when the Hi-Com Override is **not** functioning.
3. Ensure personnel assembling in the NTC Auditorium sign in on Attachment 1.
4. Brief assembled personnel on plant conditions and status of emergency response.

**OCA Building
Coordinators**

Security

**Building
Coordinator(s)/
Security**

**Emergency
Officer/delegate**

5.3 Onsite Sheltering

NOTE: Onsite sheltering is a protective action taken for tornado observations. Onsite sheltering for tornado warnings (normally received by way of Security or System Supervisor) is ordered in accordance with Abnormal Operating Procedures.

<i>Who</i>	<i>Step</i>	<i>Action</i>
Emergency Director/ Shift Manager	5.3.1	If tornado observations are reported: <ol style="list-style-type: none">1. Sound tornado alarm.
		NOTE: Safe shelter areas are identified in Enclosure F.
		<ol style="list-style-type: none">2. Make Hi-Com System/Override announcement ordering all onsite personnel to take shelter at the nearest Safe Shelter Area.3. If the Hi-Com System/Override is not functioning, instruct Nuclear Security to announce the sheltering order in accordance with EP-205-01, "Security Force."

NOTE: The Emergency Director should consult with the STA (Control Room) or Radiation Protection Advisor (RPA) before ordering onsite sheltering for abnormal effluent releases.

Emergency Director/ Shift Manager	5.3.2	If a short duration radiological effluent release occurs (< 2 hours), consider performing the following actions: <ol style="list-style-type: none">1. Make Hi-Com System/Override announcement ordering all onsite personnel to remain indoors with doors and windows closed until further notice.2. Inform Nuclear Security of sheltering order.3. If the Hi-Com System/Override is not functioning, instruct Nuclear Security to announce the sheltering order in accordance with EP-205-01.
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5.4 Onsite Evacuation

Who Step Action

NOTE: Assembly and Accountability should be complete prior to an evacuation order.

**Emergency
Director/
Shift Manager**

5.4.1 Before ordering an onsite evacuation:

1. Determine hazard location/plume direction (consult with Shift Technical Advisor/Radiation Protection Advisor/Dose Assessors).
2. Ensure the onsite protective action order does not conflict with any state protective action order in effect.
3. Determine, from Nuclear Security, if the normal (Fermi Drive Gate) or alternate (Pt. Aux Peaux gate) site exit from the OCA will be used.
4. Brief personnel assembled in NTC Auditorium on plant status.

**Emergency
Officer/Delegate**

5.4.2 **If no** radiological hazards are present at the time of the evacuation order:

1. Inform Nuclear Security of the evacuation order.
2. GO TO step 5.4.5.

5.4.3 **If** radiological hazards are present and/or personnel monitoring is required:

1. Select one of the following offsite Assembly Areas:
 - a. Newport Service Center (evacuating West)
 - b. Monroe Power Plant (evacuating South)
 - c. Trenton Channel Power Plant (evacuating North)
2. Inform Nuclear Security of the evacuation order and selected Offsite Assembly Area.

5.4.4 If personnel evacuate to an offsite assembly area, inform the Radiological Emergency Team (RET) Leader or Radiation Protection Coordinator (RPC) to dispatch the Personnel Monitoring Teams (PMTs).

- 5.4.5 Order onsite evacuation in accordance with Enclosure E.
- 5.4.6 If Hi-Com System/Override is not functioning, instruct Nuclear Security to announce the evacuation order in accordance with EP-205-01, "Security Force."

5.5 Follow-up Actions

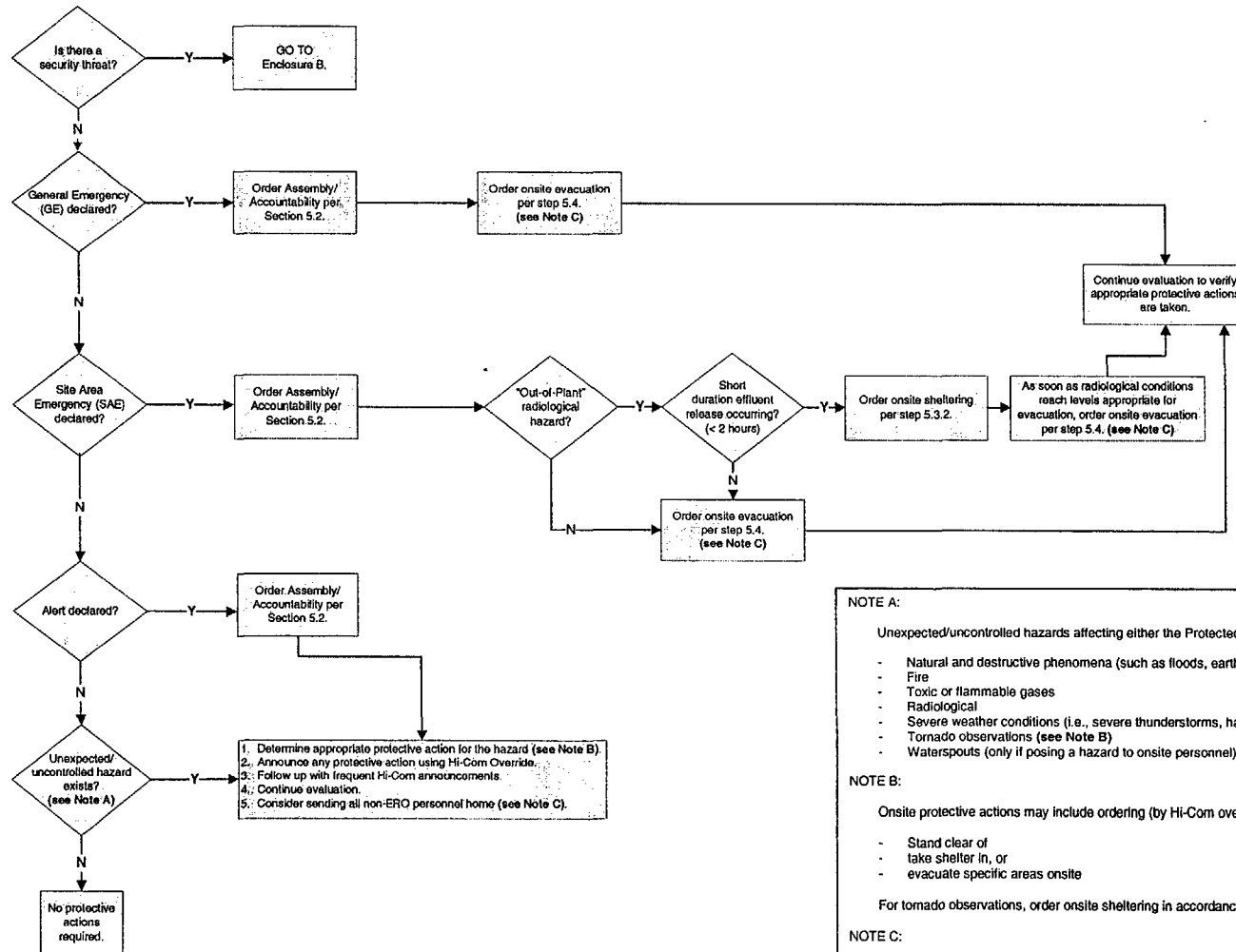
<i>Who</i>	<i>Step</i>	<i>Action</i>
Emergency Director/ Shift Manager	5.5.1	Follow-up onsite protection action orders as follows: <ol style="list-style-type: none">1. Continue to assess physical and radiological hazards onsite.2. Verify appropriate onsite protective actions have been taken to protect the health and safety of onsite personnel.

6.0 RECORDS

- 6.1 OCA Assembly and Accountability Log (Attachment 1) is a required record and shall be retained or dispositioned in accordance with established requirements.

END OF TEXT

ONSITE PROTECTIVE ACTIONS FLOWCHART



NOTE A:
 Unexpected/uncontrolled hazards affecting either the Protected Area or Owner Controlled Area include:

- Natural and destructive phenomena (such as floods, earthquakes, vehicle crashes, etc.)
- Fire
- Toxic or flammable gases
- Radiological
- Severe weather conditions (i.e., severe thunderstorms, hail, blizzards, etc.)
- Tornado observations (see Note B)
- Waterspouts (only if posing a hazard to onsite personnel)

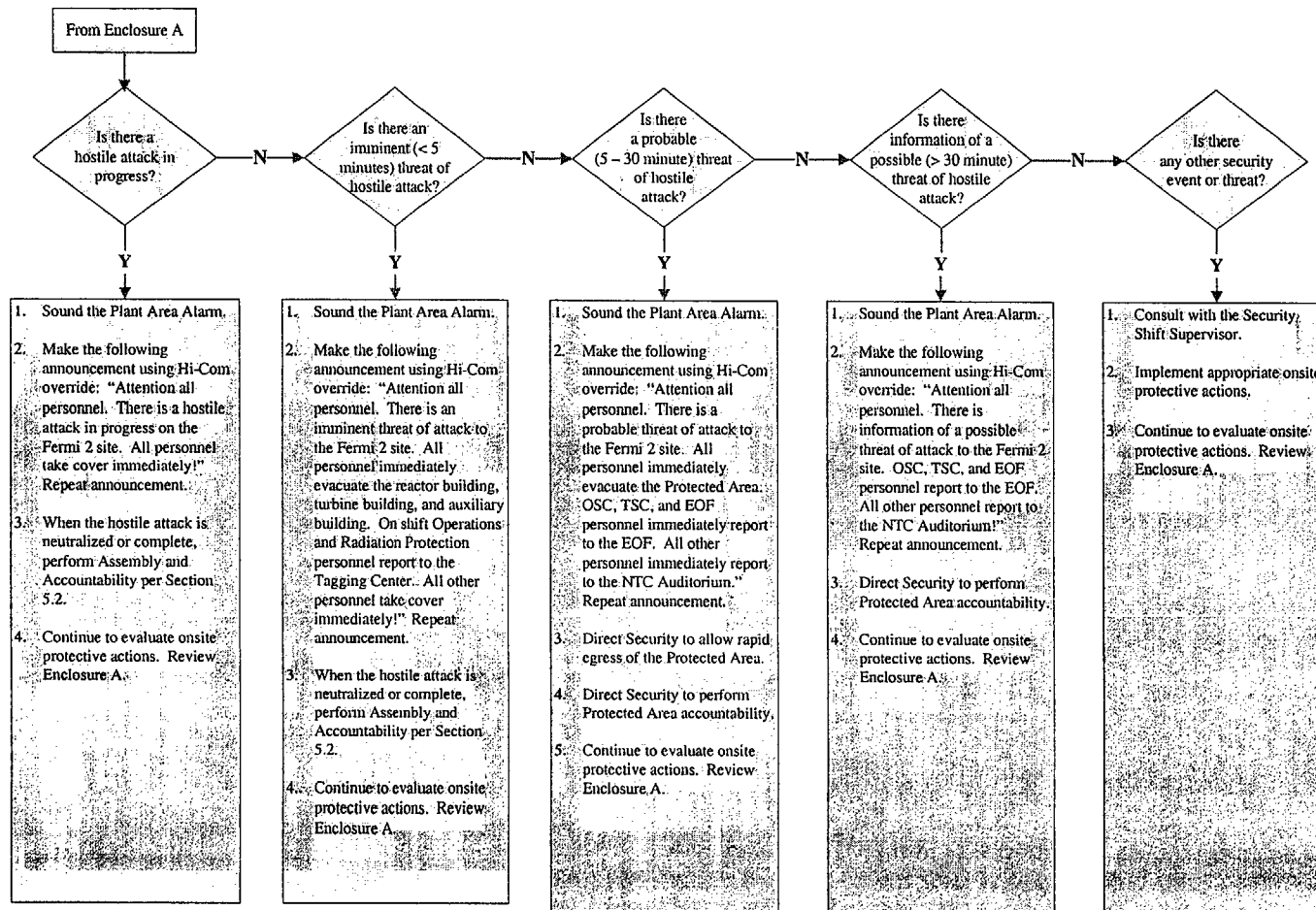
NOTE B:
 Onsite protective actions may include ordering (by Hi-Com override) personnel to:

- Stand clear of
- take shelter in, or
- evacuate specific areas onsite

For tornado observations, order onsite sheltering in accordance with step 5.3.1.

NOTE C:
 Personnel should be briefed on plant conditions prior to release from site.

SECURITY EVENT ONSITE PROTECTIVE ACTIONS FLOWCHART



ANNOUNCEMENT FOR ASSEMBLY AND ACCOUNTABILITY

NOTE (1): Considerations **before** Ordering Assembly and Accountability:

- If severe weather/tornado warning is in progress, the Emergency Director must verify outside conditions are safe before ordering Assembly and Accountability.
- If physical hazards are present (such as fire, flood, earthquake, toxic or flammable gases, etc.), the Assembly and Accountability message must be modified to include protective actions for the hazard.
- If emergency repair activities are in progress and need to be continued per the Emergency Director's discretion, the Emergency Director will notify Nuclear Security to have individuals accounted for.

NOTE (2): Enclosure B shall be used for security events that involve a threat to the facility.

When an ALERT (or higher class if applicable) is declared:

1. Sound the Plant Area alarm.
2. Make the following announcement on the plant Hi-Com system, using Hi-Com override:

"Attention all personnel. An Alert (or higher class if applicable) has been declared by the Emergency Director. **All** personnel are to report to their assigned assembly area **immediately!** **OSC, TSC, and EOF** personnel immediately report to your Emergency Response Facility. **All other** personnel immediately report to the Nuclear Training Center Auditorium!

REPEAT ANNOUNCEMENT

3. If Hi-Com override is not functioning, instruct Nuclear Security to announce Assembly and Accountability (in accordance with EP-205-01) using battery powered bull horns and vehicle public address speakers.
4. GO TO step 5.2.2.

**ANNOUNCEMENT FOR UNACCOUNTED PERSONNEL WITHIN THE
PROTECTED AREA**

1. Make the following announcement over the plant Hi-Com system, using Hi-Com override:

"Attention all personnel
Will the following personnel immediately report your location to the Control Room."
(Announce the name of each unaccounted for person.)
REPEAT ANNOUNCEMENT

2. GO TO step 5.2.3.3.

ANNOUNCEMENT FOR ONSITE EVACUATION ORDER

When an onsite evacuation is ordered:

1. Sound the Plant Area Alarm.
2. Make the appropriate announcement below on the plant Hi-Com System using the Hi-Com Override.

For non-radiological hazards:

"Attention all personnel. A site evacuation has been ordered by the Emergency Director. All non-Emergency Response Organization personnel evacuate the site and go home."

REPEAT ANNOUNCEMENT

For radiological hazards/personnel monitoring:

"Attention all personnel. A site evacuation has been ordered by the Emergency Director. All non-Emergency Response Organization personnel evacuate to (name one below):"

NEWPORT SERVICE CENTER (evacuating West)

or

MONROE POWER PLANT (evacuating South)

or

TRENTON CHANNEL POWER PLANT (evacuating North)

REPEAT ANNOUNCEMENT

3. GO TO step 5.4.6.

SAFE SHELTER AREAS

NOTE (1): The following locations are designated Safe Shelter Areas for all onsite personnel located both in the Protected Area and Owner Controlled Area. These locations are for safe sheltering for severe weather warnings (tornadoes). Onsite personnel must immediately report to the nearest Safe Shelter Area upon acknowledging a sheltering order due to a tornado warning announcement made by the Control Room (via Hi-Com Override) or Nuclear Security personnel.

NOTE (2): Signs are posted throughout the Fermi site to identify the nearest Safe Shelter Area.

Seven locations are identified as Safe Shelter Areas:

1. Turbine Building 1st Floor for personnel with RRA access
2. OSB hallway (next to RRA entrance) leading to the Turbine Building 1st Floor entrance for personnel without RRA access
3. Outage Building (DWEEB) 1st Floor
4. Technical Support Center (TSC) 1st Floor OBA
5. Inside identified Shelter Areas in Fermi 1
6. Nuclear Operations Center (NOC) in Room 146, 160, 162, and 164 (EOF)
7. Nuclear Training Center (NTC) first floor center area

NOTE: Nuclear Security personnel can remain in the Primary Access Portal (PAP) during severe weather events since the PAP is considered a Safe Shelter Area.

Personnel located throughout the OSB and Outer Buildings 41, 42, and 49 take shelter in the Turbine Building 1st Floor (RRA access) or hallway leading to TB-1 entrance (without RRA access).

Personnel located in the Availability Improvement Building (AIB), Buildings 24 (Warehouse D) 44A, 45, 45A, Warehouse C, and Alternate Access Portal (AAP) take shelter in the Drywell Entry/Exit Building (DWEEB).

Personnel located in Warehouse B, Communications Building, General Training & Orientation Center (GTOC), Technical Assistance Building (TAC), Fermi Information Center, and Buildings 20, 21, 22, 23, 26, 27, 37, 40, and 96 take shelter inside the posted Shelter Areas in Fermi 1.

Personnel located in the NOC take shelter in Rooms 146, 160, 162, and 164 (EOF).

Personnel located in the NTC take shelter in computer rooms, bathrooms, telephone/email rooms, and center classrooms.

END