PVNGS EMERGENCY PLAN IMPLEMENTING PROCEDURE	PROCEDURE NO. EPIP-02	
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PVNGS EMERGENCY PLAN IMPLEMENTING PROCEDURE	PROCEDURE NO. EPIP-02	
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REVISION HISTORY

Rev. No.	Date	Revised Pages	Comments

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1.0 OBJECTIVE

To provide a means of classifying off-normal events into one of the four emergency classifications described in the PVNGS Emergency Plan.

2.0 REFERENCES

2.1 Implementing References

2.1.1 EPIP-03, "Notification of Unusual Event Implementing Actions"

2.1.2 EPIP-04, "Alert Implementing Actions"

2.1.3 EPIP-05, "Site Area Emergency Implementing Actions"

2.1.4 EPIP-06, "General Emergency Implementing Actions"

2.1.5 EPIP-15, "Protective Action Guidelines".

2.1.6 EPIP-20, "Personnel Assembly and Accountability".

2.1.7 PVNGS Technical Specifications

2.1.8 41EP-1ZZ01, "Emergency Procedure"

2.1.9 71AC-0ZZ01, "Event Related Reporting"

2.1.10 41RO-1ZZ10, "Functional Recovery Procedure"

2.1.11 PVNGS Security Plan

2.2 Developmental References

2.2.1 NUREG-0654 Rev. 1 "Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants"

2.2.2 PVNGS Emergency Plan, Rev. 3

2.2.3 PVNGS Final Safety Analysis Report (FSAR), Amendment 11, April 1983

2.2.4 CEOG EOP Technical Guidelines, CEN-152, Rev. 02, April 1984

CONTROLLED DOCUMENT

2.2.5 EPA-520/1-75-00, "Manual of Protective Actions Guides and Protective Actions for Nuclear Incidents," Revised June 1980.

2.2.6 10 CFR 50, "Domestic Licensing of Production and Utilization Facilities," 1983.

2.2.7 CEOG Task 467, May 1983, "Guideline for Core Damage Assessment".

3.0 LIMITATIONS AND PRECAUTIONS

3.1 Surveillance and assessment of plant and containment conditions are necessary to ensure appropriate classification of an event and appropriate Protective Action Recommendations (PAR) made to offsite officials. These PARs are made to offsite officials even when no release is in progress.

3.2 Definitions and Abbreviations

3.2.1 Notification of Unusual Event - This classification applies to unusual events which are in progress or have occurred which indicate a potential degradation of the level of safety of the plant. No releases of radioactive material requiring offsite response or monitoring are expected unless further degradation of safety systems occur.

3.2.2 Alert - This classification consists of events which are in progress or have occurred which involve an actual or potential substantial degradation of the level of safety of the plant. Any releases are expected to be limited to small fractions of the Environmental Protection Agency Protective Action Guideline exposure levels.

3.2.3 Site Area Emergency - Consists of events which are in progress or have occurred which involve actual or likely major failures of plant functions needed for the protection of the public. Any releases are not expected to exceed Environmental Protection Agency Guideline exposure levels beyond the site boundary.

3.2.4 General Emergency - Consists of events which are in progress or have occurred which involve actual or imminent substantial core degradation or melting with potential for loss of containment integrity. Releases can be reasonably expected to exceed EPA Protective Action Guideline exposure levels offsite for more than the immediate site area.

3.2.5 ARM - Area Radiation Monitor

3.2.6 PRM - Process Radiation Monitor

3.2.7 PAG - Protective Action Guidelines: Guidelines used in establishing recommendations given to and acted upon by offsite authorities to ensure the safety of the public.

3.2.8 MSLB - Main Steam Line Break

3.2.9 MSSS - Main Steam Support Structure

3.2.10 SBCS - Steam Bypass Control System

3.2.11 ADV - Atmospheric Dump Valves

3.2.12 ESFAS - Engineered Safety Features Actuation System

3.2.13 PAR - Protective Action Recommendation

3.2.14 RPS - Reactor Protection System

3.2.15 RO - Recovery Operating Procedures

3.2.16 CHIC - Corporate Headquarters Information Center

3.2.17 CEC - Corporate Emergency Center

3.2.18 JENC - Joint Emergency News Center

3.2.19 SS - Shift Supervisor

3.2.20 EC - Emergency Coordinator

3.2.21 RMS - Radiation Monitoring System

3.2.22 WB - Whole Body

4.0 DETAILED PROCEDURE

4.1 Personnel Indoctrination/Responsibilities

CONTROLLED DOCUMENT

NOTE

The rationale and criteria used to derive Appendices A and B is given in Appendix C. Appendix C describes the criteria used in the development of the emergency classifications. It is intended for information only, not for event classification.

EPIP-02 is not implemented for the notification of significant events unless a situation degrades to the point of impacting on a fission product barrier and compromising a safety function. Notification of significant events is made per 71AC-0ZZ01, "Event Related Reporting".

4.1.1 If a conflict or uncertainty exists, the more conservative, higher numbered, Implementing Action EPIP should be initiated when classifying the event.

4.1.2 For Emergency Classifications of ALERT or higher, the Shift Supervisor of the designated unaffected unit shall relieve the Shift Supervisor of the affected unit as the Emergency Coordinator. For Notification of Unusual Events it will be the discretion of the Shift Supervisor of the affected unit, if he is to be relieved as Emergency Coordinator by the Shift Supervisor of the designated unaffected unit.

4.1.3 The normal assignments of designated unaffected unit Shift Supervisors are listed. If conditions exist which make the use of the listed Shift Supervisor undesirable, another qualified individual may relieve as the Emergency Coordinator at the discretion of the affected unit Shift Supervisor.

4.1.4 If an indication of barrier challenge or failure exists which is inconsistent with the recovery procedure in use, initiate the Emergency Classification indicated and rediagnose plant conditions to identify any additional procedure which may be necessary to address existing conditions.

4.1.5 The rationale used to develop the classification of events based on indications of barrier challenge or failure is provided in Appendix C. This information describes the relationship between safety function and barrier integrity.

4.1.6 Responsibilities of the affected unit shift supervisor are:

4.1.6.1 Initial classification of the event per this procedure.

NOTE

Designated Unaffected Unit Shift Supervisor to assume the role to the Emergency Coordinator in the Onshift Emergency Organization are:

Affected Unit SS	Unaffected Unit SS
Unit 1	Unit 2
Unit 2	Unit 1
Unit 3	Unit 2
Entire Site	Unit 1

4.1.6.2 Notification of the Shift Supervisor of the designated unaffected unit or other individual selected as Emergency Coordinator.

4.1.6.3 Organization of the onshift staff to place the plant in a safe condition.

4.1.6.4 Assumption of the Emergency Coordinator's position until relieved.

4.1.7 Responsibilities of the Emergency Coordinator are:

4.1.7.1 Overall responsibility for directing the onshift emergency response organization.

4.1.7.2 Implement EPIP's based on initial classification.

4.1.7.3 Verification/reclassification of the event after initial licensee actions are completed.

4.1.7.4 Monitoring plant conditions and reclassifying the event as necessary until the event is terminated.

4.1.7.5 Downgrade the event based on plant status with all safety functions satisfied and boundary status verified.

4.1.7.6 Terminate the event taking into account that the event has been downgraded and the anticipated plant response is such that there should be no challenge to any fission product barriers or radiation releases in excess of Tech Specs; and present plant conditions are such that there is no possibility of an adverse impact on the health or safety of the general public or plant personnel.

4.2 Prerequisites

4.2.1 A situation has occurred which requires the implementation of the PVNGS Emergency Plan to protect the health and safety of the public.

4.3 Instructions

4.3.1 When plant conditions are such that Emergency Plan implementation may be required, the Shift Supervisor/Emergency Coordinator shall perform the following:

4.3.2 Classify the event using the appropriate appendix:

Appendix A - If an event oriented Recovery Procedure or the functional Recovery Procedure is in use.

Appendix B - If a non-Rx trip event has occurred.

4.3.3 Record the date/time/events of initial classification. Upon verification/reclassification of the event, record the date and time and supporting information.

4.3.4 Initiate and complete the implementing actions given in the appropriate classified-event implementing procedure (ie-EPIP-03,04,05, or 06).

Offsite Dose and Barrier Challenge/Failure Event Classification

1.0 Determine the event classification as follows:

1.1 Evaluate any barrier challenges/failure per Appendix A, Table 1.

1.2 Evaluate any current offsite radioactive release per Appendix A, Table 2.

NOTE

Emergency classifications based on plant and containment conditions can be made to offsite officials even when no release is in progress.

2.0 Select the most restrictive, higher classification, from the Table 1 and Table 2 evaluations as the event classification.

Appendix A

Table 1 - Barrier Challenge/Failure Classification Criteria

1.0 Make Checks by any of the following conditions that currently exist.

RCS	CLAD	CONTAINMENT
___ RVLMS indicates voiding in upper plenum	___ ATWS	___ Physical breach of containment
	OR	
___ RCS pressure > 2750 psia	Excessive RCS Activity (> 300 uc/gm dose equivalent I-131)	OR
___ Uncontrolled loss of RCS inventory > 50 gpm	___ CET > 700 F	CIAS required but not completed (i.e. both automatic valves in a penetration fail to close)
		___ H_2 concentration > 3.5% by volume
		___ Containment pressure > 50 psig

Vital Auxiliaries/Radiation Release

___ Loss of offsite and onsite AC power

___ Loss of offsite and onsite AC power for longer than 60 minutes

___ Loss of all Class IE DC power.

___ Loss of all Class IE DC power for longer than 15 minutes.

___ Failure of ESF Safety Systems (both trains) to actuate when required

___ > 10gpm primary/secondary leakage concurrent with LOP

OR

> 10 gpm primary/secondary leakage concurrent with loss of secondary coolant outside containment

Appendix A

Table 1 - Barrier Challenge/Failure Classification Criteria (Cont'd.)

2.0 Determine the emergency classification level for barrier challenge/failure per the following guidelines:

Number of Checks made in 1.0	Barrier Status	Classification
0	No barriers lost or challenged	Unusual Event (EPIP-03)
1	One barrier lost or challenged	Alert (EPIP-04)
2	Two barriers lost or challenged	Site Area Emergency (EPIP-05)
3 or more	Three barriers lost or challenged	General Emergency (EPIP-06)

Appendix A

Table 2 - Offsite Dose Projection Classification Criteria

Based upon information provided by the Radiation Protection Group and/or RMS, determine the emergency classification level according to the following:

___ Notification of Unusual Event (EPIP-03)

Plant Vent Monitor	RU-143 Chn. 1	> 3.2 E-3 uci/cc
Fuel Bldg. Exh. Monitor	RU-145 Chn. 1	> 1.04 E-2 uci/cc
Condenser Exh. Monitor	RU-141	> 1.2 E-1 uci/cc

___ Alert (EPIP-04)

Plant Vent Monitor	RU-144 Chn. 1	> 3.45 E-3 uci/cc
Fuel Bldg Exh. Monitor	RU-146 Chn. 1	> 1.12 E-1 uci/cc
Condenser Exh. Monitor	RU-142 Chn. 1	> 1.3 E-1 uci/cc

___ Site Area Emergency (EPIP-05)

Plant Vent Monitor	RU-144 Chn. 1	30 min. @ > 3.45 E-1 uci/cc
	RU-144 Chn. 2	2 min. @ > 3.45 uci/cc
Fuel Bldg. Exh. Monitor	RU-146 Chn. 1	30 min. @ > 1.12 uci/cc
	RU-146 Chn. 2	2 min. @ > 1.12 E + 1 uci/cc
Condenser Exh. Monitor	RU-142 Chn. 1	30 min. @ > 1.3 E + 1 uci/cc
	RU-142 Chn. 2	2 min @ > 1.3 E + 2 uci/cc

___ General Emergency (EPIP-06)

Plant Vent Monitor	RU-144 Chn. 2	> 6.9 uci/cc
Fuel Bldg. Exh. Monitor	RU-146 Chn. 2	> 2.24 E + 1 uci/cc
Condenser Exh. Monitor	RU-142 Chn. 2	> 2.6 E + 2 uci/cc

Appendix B
Non Rx Trip Event Classification Criteria

1.0 Classify non Rx trip events as follows:

1.1 Based on existing plant conditions select the most appropriate event category from below:

Event Category	Tab
Increase in Radiation Levels or Radioactive Effluent Release Rate	1
Technical Specification LCO Nonconformance	2
Degraded Facility Control, Indication, or Alarm	3
Fire and/or Security Compromise	4
Natural Disaster/Physical Hazard to Facility	5

1.2 Refer to the indicated tab for the event category chosen and select the classification appropriate for existing conditions.

TAB 1

Increase in Radiation Levels or Radioactive Effluent Release Rate

Notification of Unusual Event (EPIP-03)

- RCS sample activity requires shutdown per Tech Spec 3.4.7
- Rad Protection and/or RMS confirms radioactive effluent releases exceed:

Plant Vent Monitor	RU-143 Chn. 1	> 3.2 E-1 uci/cc
Fuel Bldg. Exh. Monitor	RU-145 Chn. 1	> 1.04 E-2 uci/cc
Condenser Exh. Monitor	RU-141	> 1.2 E-1 uci/cc

- Transportation of internally or externally contaminated injured person to offsite hospital

Alert (EPIP-04)

- RCS sample activity > 300 uC/gm (DE I-131)
- Direct radiation readings within facility increase by 1000
- Rad Protection and/or RMS confirms radioactive effluent releases exceed:

Plant Vent Monitor	RU-144 Chn. 1	> 3.45 E-3 uci/cc
Fuel Bldg. Exh. Monitor	RU-146 Chn. 1	> 1.12 E-1 uci/cc
Condenser Exh. Monitor	RU-142 Chn. 1	> 1.3 E-1 uci/cc

- RCS leak rate > 50 gpm

Site Area Emergency (EPIP-05)

- Major damage to spent fuel

- Rad Protection and/or RMS confirms effluent radioactive releases exceed:

Plant Vent Monitor	RU-144 Chn. 1	30 min. @ > 3.45 E-1 uci/cc
	RU-144 Chn. 2	2 min. @ > 3.45 uci/cc
Fuel Bldg. Exh. Monitor	RU-146 Chn. 1	30 min. @ > 1.12 uci/cc
	RU-146 Chn. 2	2 min. @ > 1.12 E + 1 uci/cc
Condenser Exh. Monitor	RU-142 Chn. 1	30 min. @ > 1.3 E + 1 uci/cc
	RU-142 Chn. 2	2 min @ > 1.3 E + 2 uci/cc

- Radiation Protection measures > 50 MR/Hr at site boundary with portable instruments

General Emergency (EPIP-06)

- Rad Protection and/or RMS confirms effluent radioactive releases exceed:

Plant Vent Monitor	RU-144 Chn. 2	> 6.9 uci/cc
Fuel Bldg. Exh. Monitor	RU-146 Chn. 2	> 2.24 E + 1 uci/cc
Condenser Exh. Monitor	RU-142 Chn. 2	> 2.6 E + 2 uci/cc

- Radiation Protection measures > 1.0 R/Hr at site boundary with portable instruments

TAB 2

Technical Specification LCO Non-Conformance

Notification of Unusual Event (EPIP-03)

- Rad Protection and/or RMS confirms section 3/4.11 Tech Spec Radiological Effluent limits exceeded
- RCS activity sample requires shutdown per Tech Spec 3.4.7
- Tech Spec LCO action statement requires Rx shutdown, or prevents return to operation pending engineering evaluation

Alert (EPIP-04)

- RCS leakrate 50 gpm
- ATWS

Site Area Emergency (EPIP-05)

None

General Emergency (EPIP-06)

None

TAB 3

Degraded Facility Control, Indication and Alarm

Notification of Unusual Event (EPIP-03)

- Degraded control room indication or alarms on process parameters such that plant shutdown is required

Alert (EPIP-04)

- Loss of most or all annunciators
- Evacuation of control roon required or anticipated
- Complete loss of any function needed for plant cold shutdown, when in cold shutdown
- ATWS

Site Area Emergency (EPIP-05)

- Loss of most or all annunciators and plant transient indicated or in progress
- Imminent loss of physical control of the plant
- Complete loss of any function needed for plant hot shutdown, when in hot shutdown
- Control room evacuated and local control of shutdown systems not established within 15 minutes

General Emergency (EPIP-06)

- Loss of physical control of the facility

TAB 4

Fire and/or Security Compromise

Notification of Unusual Event (EPIP-03)

- Fire within the Unit lasting longer than 10 minutes
- Declared Security Emergency
- Declared Security Alert (with offsite authorities notified and immediately response requested)

Alert (EPIP-04)

- Required evacuation of control room
- SS/EC determines that the level of plant safety is substantially reduced due to fire or ongoing security compromise.

Site Area Emergency (EPIP-05)

- Imminent loss of physical control of the plant
- Control room evacuated and local control of shutdown systems not established within 15 minutes
- Fire compromising the operability of safety systems in both trains

General Emergency (EPIP-06)

- Loss of physical control of the plant
- Any major internal or external events which could cause massive damage to plant systems potentially leading to releases of large amounts of radioactivity

TAB 5

Natural Disaster/Physical Hazard to Facility

Notification of Unusual Event (EPIP-03)

- Natural phenomenon beyond usual level experienced or projected

  Earthquake greater than 0.1g ground shaking, flood, tornado onsite

- Other hazards experienced or projected

  Aircraft crash onsite or unusual aircraft activity over facility

  Train derailment onsite

  Explosion near or onsite

  Toxic or flammable gas release near on onsite

  Turbine rotating component failure resulting in rapid shutdown

Alert (EPIP-04)

- Severe natural phenomena experienced or projected with unit in modes 5-6

  Earthquake greater than design levels, 0.2g ground shaking,

  Tornado striking facility, or

  Severe flooding

- Other hazards experienced or projected

  Aircraft crash on facility

  Missile impacts on facility

  Explosion damage to facility affecting plant operation

  Toxic or flammable gas restricts entry to facility environs

Site Area Emergency (EPIP-05)

- Severe natural phenomena experienced or projected with unit in modes 1-4

  Earthquake greater than design levels, 0.2 ground shaking,

  Flood with failure of protection of vital equipment

  Sustained winds in excess of design levels

- Other hazard experienced or projected with unit in modes 1-4

  Aircraft crash affecting vital structures by impact

  Severe damage to safe shutdown equipment by missile or explosion

  Lack of entry into vital areas due to uncontrolled toxic or flammable gas

General Emergency (EPIP-06)

- Any major internal or external events which could cause massive damage to plant systems potentially leading to release of large amounts of radioactivity

CLASSIFICATION CRITERIA

1.0 CLASSIFICATION CRITERIA

The classification criteria for Notification of Unusual Event through a General Emergency are based on three main considerations:

1) The extent of fission product barrier challenge or failure

2) The projected/actual offsite dose rate associated with radioactivity releases.

3) Potential or actual reductions in the level of plant safety

Evaluation of these criteria allows the development of Emergency Action Levels (EALs) which are independent of event sequences and readily correlate with the symptom/function based Emergency Operating Procedure (EOP) Guidelines.

Using this system, most emergency classifications may be based on the failure of, or challenge to, the fission product barriers. "Failure" of barriers is defined in terms consistent with NUREG-0654, Appendix 1, Example Initiating Conditions - eg: primary coolant leaks of 50 gpm constitutes "failure" of the primary coolant boundary (based on charging pump capacity for 2 pumps minus minimum letdown); 300 uCi/cc dose equivalent I-131 constitutes "failure" of the clad (based on release of 1% equilibrium gas gap equivalent I-131); loss of containment integrity is defined per Technical Specification Section 1.7.

A "challenge" to a barrier is defined as one of the following conditions:

1) Loss of a critical safety function which protects that barrier.

2) An existing situation which will cause a barrier failure within a given time period unless successful corrective actions are implemented.

3) An initiating event which in all probability has damaged a fission product barrier but has yet to be verified.

The SS/EC has the authority to increase the classification above that determined by EPIP-02 when, in his judgement, plant conditions warrant increased response and awareness from offsite personnel and agencies.

Table 3.0 lists indications of barrier challenge/failure for RCS, Clad, Containment, and vital auxiliaries/radiation release.

The fission product barrier criteria is applied to event classification in increasing order of severity as follows:

NOTIFICATION OF UNUSUAL EVENT

1. No loss of and no challenge to a fission product barrier

ALERT

1. A challenge to one barrier, or

2. A verified failure of one barrier

SITE AREA EMERGENCY

1. Challenges to two barriers, or

2. Verified failure of one barrier and a challenge to another, or

3. Verified failure of two barriers

GENERAL EMERGENCY

1. Challenges to all three barriers, or

2. Verified failure of one barrier and challenges to the other two, or

3. Verified failure of two barriers and challenge to the other, or

4. Verified failure of all three barriers

Guidance for evaluation and classification of non Rx trip events is taken directly from NUREG 0654. The arrangement of example situations by event categories provides an efficient method for the operator to make a classification depending upon the severity of the condition.

2.0 EVENT CLASSIFICATION

Appendices A and B present potential plant conditions for consideration in determining event classification. SRO's and Emergency Coordinators responsible for implementing this procedure are required to be familiar with the specific conditions which constitute barrier challenge/failure and those non trip events requiring emergency classification.

Appendix A lists possible challenges/failures that might exist to the fission product barriers. A check by any of the indicated conditions constitutes one barrier challenge or failure. (Therefore, if two conditions under "RCS" are checked, that constitutes two barriers challenged or failed.) Event classification will be made after evaluating the number and extent of barrier challenge/failure along with the projected doses resulting from any offsite releases. The activity release levels associated with emergency classification levels are based on the following NUREG-0654 criteria:

Unusual Event -	Exceed Tech Spec 3/4.11 Radiological Effluent limits.
Alert -	Effluent release rate 10X Tech Spec limits or 1 mR WB @ site boundary for 2 hr release.
Site Area Emergency -	> 50 mR/hr WB @ site boundary for 30 min. release or > 500 mR/hr WB @ site boundary for 2 min release.
General Emergency -	> 1 rem/hr WB @ site boundary.

The Site Area Emergency classification is divided into activity concentrations that must be maintained for either two or thirty minutes in order for the offsite dose limits to be met or exceeded.

Appendix B provides guidance for evaluating conditions not resulting in a Rx trip that require emergency classification per NUREG-0654. Five event categories have been selected, under which, similar non trip events can be listed according to emergency classification. Most classification should be straightforward once the event category has been selected. Event classifications based upon degraded security conditions, however, can be somewhat more involved.

The PVNGS Security Department classifies security infractions nto two types:

1. Security Alert

2. Security Emergency

Any declared Security Emergency will be classified as a Notification of Unusual Event. Should any plant damage, loss of facility control, or loss of accessability result from a degraded security condition, the guidelines for upgrading the emergency classification are in Tab 3, Degraded Facility Control, and Tab 5, Physical Hazards to Facility. Should a security compromise further degrade such that a substantial reduction in the level of plant safety occurs, an alert classification is appropriate. The Shift Supervisor's/Emergency Coordinator's judgement will be required to determine the severity of the security intrusion and the likelihood that a fission product barrier might be challenged to warrant the upgraded emergency classification.

Security compromises resulting in a declared Security Alert with immediate response requested from offsite authorities is also classified Notification of Unusual Event. This will ensure notification of appropriate company management personnel to off-normal conditions serious enough to warrant immediate response from offsite authorities. Security Alerts of a less serious nature where offsite authority assistance is requested would not require classification. It should be understood that the key point to consider for classification of Security Alerts is whether offsite authorities are notified to provide immediate response or assistance.

Table 4.0 lists applicable licensee actions per event classification. These actions will be implemented per the direction of the appropriate EPIP.

TABLE 3.0

Indications of Barrier Challenge/Failure

RCS

___ RVLMS indicates voiding in upper plenum

___ RCS pressure > 2750 psia

___ Uncontrolled loss of RCS inventory > 50 gpm

CLAD

___ ATWS

OR

Excessive RCS Activity (> 300 uCi/gm dose equivalent I-131)

___ CET > 700 F

CONTAINMENT

___ Physical breach of containment

OR

CIAS required but not completed (i.e. both automatic valves in a penetration fail to close)

___ H_2 concentration > 3.5% by volume

___ Containment pressure > 50 psig

VITAL AUXILIARIES/RADIATION RELEASE

___ Loss of offsite and onsite AC power

___ Loss of offsite and onsite AC power for longer than 60 minutes

___ Loss of all Class IE DC power.

___ Loss of all Class IE DC power for longer than 15 minutes.

___ Failure of ESF safety systems (both trains) to actuate when required

___ > 10 gpm primary/secondary leakage concurrent with LOP

OR

> 10 gpm primary/secondary leakage concurrent with loss of secondary coolant outside containment

TABLE 4.0 LICENSEE ACTIONS

NOTE
Actions are for information only, to be carried out per applicable EPIP

Unusual Event (EPIP-03)	Alert (EPIP-04)	Site Area Emergency (EPIP-05)	General Emergency (EPIP-06)
o Inform NRC, State & County authorities of nature of unusual conditions; no release of radioactive material requiring offsite response or monitoring is expected unless further degradation of safety systems occur	o Inform NRC, State & County authorities of Alert status/cause; any releases are expected to be limited to small fractions of EPA/PAG exposure levels at the site boundary unless further degradation of safety systems occur	o Inform NRC, State & County authorities of site Area Emergency status/cause; any releases are not expected to exceed EPA/PAG exposure levels beyond the site boundary unless further degradation of safety systems occur	o Inform NRC, State & County authorities of General Emergency status/cause; any releases can be reasonable expected to exceed EPA/PAG exposure levels offsite for more than the immediate site area
o Based on the situation recommend that no protective action is necessary or to standby for update	o Recommend to the State that the Public be appraised of the situation and stay tuned to EBS/KTAR radio station	o Recommend to the State that consideration of appropriate protective actions based on actual or projected data is warranted per the appropriate EPIP	o Recommend to the State that consideration of appropriate protective actions based on actual or projected data is warranted per the appropriate EPIP
o Augment onshift resources	o Augment resources by activating STSC, TSC, OSC, EOF, JENC, CHIC and CEC	o Augment resources by ativtg. STSC, TSC, OSC, EOF, JENC, CHIC, and CEC	o Augment resources by ativtg. STSC, TSC, OSC, EOF, JENC, CHIC and CEC
o Activate STSC	o Dispatch (onsite/offsite) Monitoring Teams with associated communications equipment	o Dispatch (onsite/offsite) Field Monitoring Teams with associated communications equipment	o Dispatch (onsite/offsite) Field Monitoring with associated communications equipment
o Partially activate CHIC	o Provide meteorological assessments to offsite authorities and if releases are occurring, dose estimates for actual releases	o Provide a dedicated individual for plant status updates to offsite authorities	o Provide a dedicated individual for plant status updates of offsite authorities
o Terminate with verbal summary to offsite authorities followed by written report within 24 hours OR	o Terminate by verbal summary to offsite authorities followed by written summary within 8 hours OR	o Provide meteorological data and dose estimates (for actual releases) to offsite authorities	o Make senior technical and management staff available for periodic consultation with NRC and State
o Escalate to a higher classification	o Escalate to a higher classification	o Provide release and dose projections based on available plant condition information and foreseeable contingencies	o Provide meteorological data and dose estimates (for actual releases) to offsite authorities via a dedicated individual
		o Terminate (or reduction of) emergency class verbally at EOF followed by written summary within 8 hours OR	o Provide release and dose projections based upon available plant condition information and foreseeable contingencies
		o Escalate to GENERAL EMERGENCY	o Terminate (or reduction of) emergency

*Protective action recommendations are based on plant and containment conditions and these recommendations are made to offsite officials even when no release is in progress

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1.0 OBJECTIVE

1.1 This procedure provides a series of implementing actions to be taken upon declaration of a NOTIFICATION OF UNUSUAL EVENT.

2.0 REFERENCES

2.1 Implementing References

2.1.1 EPIP-02, "Emergency Classification"

2.1.2 EPIP-09, "Emergency Coordinator"

2.1.3 EPIP-11, "Technical Support Center/Satellite TSC Activation"

2.2 Developmental References

2.2.1 NUREG-0654, Rev. 1, "Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants".

2.2.2 PVNGS Emergency Plan, Rev. 3

2.2.3 ANSI N45.2.9-1974, "Requirements for Collection, Storage, and Maintenance of Quality Assurance Records for Nuclear Power Plants".

3.0 LIMITATIONS AND PRECAUTIONS

3.1 Continued surveillance and assessment of plant conditions are necessary to ensure that the emergency classification is appropriately revised as conditions change or more definitive information is obtained.

4.0 DETAILED PROCEDURE

4.1 Personnel Indoctrination/Responsibilities

4.1.1 In a NOTIFICATION OF UNUSUAL EVENT situation, time is available to take precautionary and constructive steps to prevent a more serious event and/or to mitigate any consequences that may occur. This event status places the plant in a readiness position for possible cessation of routine activities and/or augmentation of onshift resources. No releases of radioactive material requiring offsite response are expected. Appropriate notification of NRC and state/county authorities is made.

4.1.2 The Shift Supervisor shall be responsible for initiating this procedure. The Emergency Coordinator shall be responsible for completing the implementing actions of this procedure.

4.2 Prerequisites

4.2.1 The emergency has been classified per EPIP-02, "Emergency Classification."

4.3 Instructions

4.3.1 The affected unit Shift Supervisor shall perform the following:

NOTE

Designated Unaffected Unit Shift Supervisor to assume the role of the Emergency Coordinator in the Onshift Emergency Organization are:

Affected Unit	Unaffected Unit Shift Supervisor
Unit 1	Unit 2
Unit 2	Unit 1
Unit 3	Unit 2
Entire Site	Unit 1

4.3.1.1 Notify the Shift Supervisor of the designated unaffected unit (or Shift Supervisor of an unaffected unit) to report to the Control Room of the affected unit and assume the duties of the onshift Emergency Coordinator. For notification of unusual events, it will be at the discretion of the affected unit Shift Supervisor if he is to be relieved as Emergency Coordinator by the shift supervisor of an unaffected unit.

4.3.1.2 Announce the following over the public address system:

"ATTENTION ALL PERSONNEL - A NOTIFICATION OF UNUSUAL EVENT HAS BEEN DECLARED. SATELLITE TECHNICAL SUPPORT CENTER EMERGENCY PERSONNEL FOR UNIT _____, REPORT TO YOUR EMERGENCY STATION. OTHER PERSONNEL ASSIGNED TO THE EMERGENCY ORGANIZATION - STANDBY. ALL OTHER PERSONNEL CONTINUE WITH NORMAL ROUTINE UNTIL FURTHER NOTICE".

(Give a brief description of the event, if appropriate, and repeat the announcement).

NOTE

Protective Action recommendations (Appendix D) are based on plant and containment conditions and these recommendations are made to offsite officials even when no release is in progress.

4.3.1.3 Direct the Satellite TSC Communicator to fill out Appendix A, "Initial Emergency Message Form", in accordance with instructions provided in Appendix B.

4.3.1.4 Notify the Control Rooms of the unaffected units.

4.3.1.5 Ensure the actions of the appropriate Recovery procedures have been implemented.

4.3.2 The Emergency Coordinator/Shift Supervisor shall perform the following:

4.3.2.1 Ensure actuation of the Satellite TSC in accordance with EPIP-11, "Technical Support Center/Satellite TSC Activation".

4.3.2.2 Implement additional Emergency Plan Implementing Procedures according to the situation that resulted in the emergency being classified as a NOTIFICATION OF UNUSUAL EVENT. Procedures that shall be implemented and others which may be appropriate are identified in Appendix E.

4.3.2.3 Determine the need for any additional personnel. If needed, additional personnel should be requested by the existing on-shift organization.

4.3.2.4 Reevaluate the emergency classification and perform licensee actions as conditions change by implementing EPIP-02.

4.3.2.5 When the situation warrants downgrading/upgrading a NOTIFICATION OF UNUSUAL EVENT, proceed to appropriate implementing and notification procedures and direct the Shift Supervisor to announce the reclassification over the public address system and inform the other Control Rooms.

4.3.2.6 The Emergency Coordinator shall initiate and complete implementing actions of EPIP-09, "Emergency Coordinator".

4.3.3 Emergency Situation Terminated

4.3.3.1 The Shift Supervisor (or Emergency Coordinator) shall sound the "All Clear" signal for approximately (1) minute, Silence the signal, and Provide the following announcement over the plant wide telephone paging system:

"Attention all personnel, the emergency situation declared in Unit _____ has now been terminated." (Provide special instructions as necessary).

4.3.3.2 Repeat signal and announcement once.

4.3.4 Updating of the Emergency Notification Call List

4.3.4.1 The telephone numbers and responsible contacts listed in the Emergency Notification Call List shall be reviewed, verified and updated as required on a quarterly basis.

4.3.5 Record Retention

4.3.5.1 Appendix A shall be retained for the life of the plant.

INITIAL EMERGENCY MESSAGE FORM NOTIFICATION OF UNUSUAL EVENT, ALERT, SITE AREA EMERGENCY, OR GENERAL EMERGENCY

1. Verbatim text of Message: THIS IS (IS NOT) A DRILL!! (Circle One) THIS IS PALO VERDE NUCLEAR GENERATING STATION (NOTIFICATION OF UNUSUAL EVENT) (ALERT) (SITE AREA EMERGENCY) (GENERAL EMERGENCY)
(cross out notifications above not applicable)

declared at _____ (time) - _____ (date) - Wind is from _____ degrees - At _____ (speed) mph.

PALO VERDE AUTHENTICATOR _____ (authenticator letters)

2. This is _____ (name/title), at the Palo Verde Nuclear Generating Station

3. (Circle One)

(a) There is NO, repeat NO, radioactive release taking place and no special protective actions are recommended at this time.

OR

(b) There is NO, repeat NO, radioactive release taking place; however, the following protective actions are recommended at this time.

Sectors	Distance (Miles)
_____	_____
_____	_____
_____	_____

OR

(c) A radioactive release IS, repeat IS, taking place. We recommend that people in affected sectors remain indoors with windows and doors closed.

Sectors	Distance (Miles)
_____	_____
_____	_____
_____	_____

OR

(d) A radioactive release IS, repeat IS, taking place. We recommend that evacuation of affected sectors be considered.

Sectors	Distance (Miles)
_____	_____
_____	_____
_____	_____

FOLLOW-UP EMERGENCY MESSAGE FORM

1. Verbatim text of Message: THIS IS (IS NOT) A DRILL!! (Circle One) THIS IS A PALO VERDE NUCLEAR GENERATING STATION follow-up information message concerning the (NOTIFICATION OF UNUSUAL EVENT) (ALERT) (SITE AREA EMERGENCY) (GENERAL EMERGENCY)
   (cross out notifications above not applicable)

   declared at _____ - _____
   (time) (date)

   PALO VERDE AUTHENTICATOR _____
   (authenticator letters)

2. This is _____, at Palo Verde Nuclear Generating Station.
   (name/title)

3. Meteorological Data

   a. Wind direction from _____ (degrees) - at _____ miles per hour
      (direction) (speed)

      from _____ to _____
      (sector) (sector)

   b. Stability Class: A B C D E F G
      (Circle One)

   c. Precipitation Yes No
      (Circle One)

4. Radiological Data

   a. Radioactvity (check one)

      ( ) Has been released
      ( ) Has not been released

4. b. Release Time _____

c. Reactor Trip Time _____

d. Location/Source of Release _____

5. Current Release Rates

a. I-131 Equivalent _____ Ci/second
b. Noble Gas _____ Ci/second
c. Particulates _____ Ci/second

6. Two-hour plume centerline projected dose at:

Distance	Sector	Whole Body Dose (REM)	Child Thyroid Dose Commitment (REM)
Site Boundary			
2 miles			
5 miles			
10 miles			

7. Plume arrival time offsite:

_____ 2 mi
_____ 5 mi
_____ 10 mi
_____ Ruth Fisher School
_____ Arlington School

8. Estimated duration of release _____ minutes

9. The Following Emergency Measures Including Protective Actions are Recommended:

_____

_____

_____

10. The Following Emergency Reponse Actions are Underway:

_____

_____

_____

11. We Request the Following Onsite Support and Assistance from Offsite Sources:

_____

_____

_____

12. Our Prognosis of the Emergency is that Conditions:

_____Are Under Control
_____Can Be Expected to Terminate Within _____hours
_____Are Worsening

13. Other Information:

_____

_____

_____

14. THIS IS (IS NOT) A DRILL!! (Circle One)

EMERGENCY NOTIFICATION CALL LIST

EMERGENCY COORDINATOR/STSC COMMUNICATOR
(Sheet 1 of 2)

AGENCY OR INDIVIDUAL	PERSON CONTACTED	PRIMARY LINK	ALTERNATE LINK	ALTERNATE LINK	DATE/TIME	CALLER
Arizona Department of Public Safety	_____	MAN	Radio System Channel # Frequency		__/__	_____
Arizona Radiation Regulatory Agency	_____	MAN	Radio System Channel # Frequency		__/__	_____
Arizona Division of Emergency Services	_____	MAN	Radio System Channel # Frequency		__/__	_____
Maricopa County Department of Civil Defense and Emergency Services	_____	MAN	Radio System Channel # Frequency		__/__	_____
Maricopa County Sheriff's Office	_____	MAN	Radio System Channel # Frequency		__/__	_____
Director, Nuclear Operations					__/__	_____
Assistant Vice President, Nuclear					__/__	_____

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EMERGENCY NOTIFICATION CALL LIST (cont'D)

EMERGENCY COORDINATOR/STSC COMMUNICATOR (Sheet 2 of 2)

AGENCY OR INDIVIDUAL	PERSON CONTACTED	PRIMARY LINK	ALTERNATE LINK	ALTERNATE LINK	DATE/TIME	CALLER
Nuclear Admin. (Notify prior day shift only)	Telephone Operator	EMS	(None)	(None) FTS	__/__	
NRC Headquarters					__/__	
NRC Sr. Resident Inspector	Roy Zimerman			(None)	__/__	
Executive Vice President, Nuclear Operations	Tom Woods, Jr.			(None)	__/__	
APS Security	Security Guard			(None)	__/__	
Public Information	Duty Public Info			(None)	__/__	
APS Communications Department	Jane Brand (Primary)			(None)	__/__	
	Jack Swift (Alt.)			(None)	__/__	
PVNGS Visitors Center				(None)	__/__	
APS Site Construction				(None)	__/__	
Bechtel Emergency Control Center				(None)	__/__	
LLPO				(None)	__/__	
APS Dispatcher	Dispatch Telephone				__/__	

INSTRUCTIONS FOR COMPLETING APPENDIX A

1.0 INITIAL EMERGENCY MESSAGE FORM

1.1 Fill in data required by steps 1 and 2 of Appendix A, "Initial Emergency Message Form". Obtain authenticator from the confidential envelope marked on the outside with the appropriate month and drill sequence number (if it is a drill).

1.2 Obtain from the Radiation Protection Monitor (onshift) data required to complete step 3 of Appendix A.

1.3 Circle appropriate wording of step 4 of Appendix A.

1.4 Contact the NRC via the Emergency Notification System (ENS) dedicated telephone within 15 minutes of declaring an emergency. If the ENS phone fails, use commercial phone or FTS phone as an alternate line (see Appendix C).

1.5 When contact is made, the caller shall identify himself and read the completed Emergency Message Form verbatim (omit the Palo Verde Authenticator).

1.6 Offer to repeat information and reiterate as necessary.

1.7 Obtain the name of the person contacted and record in Appendix A, Emergency Notification Call List, Emergency Coordinator/STSC Communicator.

NOTE

When the NAN ring button is pushed and it appears that all the receiving stations are on line, or, the ring has stopped, the PVNGS originating station shall initiate a roll call in the order listed below. (Consider the time of day.)

1.8 By means of a single call on the Notification and Alert Net dedicated telephone, contact the following State/County agencies:

Duty Hours (8:00 a.m. to 5:00 p.m. Monday-Friday)

Maricopa County Sheriffs Office
Maricopa County Department of Civil Defense and Emergency Services
Arizona Department of Public Safety
Arizona Division of Emergency Services
Arizona Radiation Regulatory Agency

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NOTE

Subsequent notification of affected agencies during off-duty hours shall be made per internal agency procedures.

Off-Duty Hours (5:00 p.m. to 8: a.m., Monday-Friday, all day Saturday and Sunday)

Maricopa County Sheriff's Office
Department of Public Safety

1.9 When contact is made, the caller shall identify himself and request that the individuals obtain a copy of the Appropriate Emergency Message Form.

1.10 When each individual has obtained a copy, read the completed Emergency Message Form verbatim and request MCSO to read back verbatim.

1.11 Offer to repeat information and reiterate as necessary.

1.12 Obtain the name of each person contacted and record on Appendix A.

1.13 Notify additional personnel as listed in Appendix A as necessary, obtain the name of the person contacted, and inform them of the situation.

1.14 If an individual requests information not contained in the Emergency Message Form, make reasonable efforts to obtain and give the information only after all initial notification have been made.

2.0 FOLLOW-UP EMERGENCY MESSAGE FORM

2.1 Fill in data required by steps 1 and 2 of Appendix A, "Follow-up Emergency Message Form". Use the same authenticator code obtained for the "Initial Emergency Message Form".

2.2 Obtain from the Radiation Protection Monitor (onshift) data required to complete steps 3-9.

2.3 Obtain from the Emergency Coordinator (onshift) data required to complete steps 10-13.

2.4 Circle appropriate wording in step 14.

2.5 Notify NRC, state and county agencies per steps 1.4-1.14 of this Appendix.

NOTIFICATION SYSTEMS USER'S GUIDE

1. Emergency Notification System (ENS)

   Operation at plant end of circuit.

   A. ENS Characteristics

      1. Red color

      2. Used for notifications of NRC Headquarters. Region V NRC Office can be patched into this line.

      3. Commercial telephones and FTS backup the ENS.

   B. IDLE State - All lamps on all ENS phones are extinguished.

   C. Outgoing call to NRC Operations Center.

      1. Control Room (CR) or Shift Supervisor's Office (SSO) or Technical Support Center (TSC) initiates call.

         a. All phones in CR, SSO, and TSC have steady lamps.

         b. Ringing tone is heard in handset of initiating phone.

         c. Emergency Operations Facility (EOF) ENS phone lamp blinks.

         d. NRC Resident Inspector's office phone(s) rings and times out, lamp on phone(s) continues to blink until Resident Inspector answers, or call ends.

      2. EOF location initiates call.

         a. All phones in CR, SSO, TSC and EOF have a steady lamp.

         b. Initiating phone hears ringing tone in handset.

         c. Resident Inspector's office phone(s) rings and times out, lamp on phone(s) continues to blink until Resident Inspector answers or call ends.

      3. Resident Inspector's office initiates call.

         a. Resident Inspector's office phone(s) - steady lamp appears and ringing tone is heard in handset.

NOTIFICATION SYSTEMS USER'S GUIDE (CONT'D)

b. No indication at any plant location.

NOTE: The ENS circuit does not have privacy feature.

D. Incoming call to plant.

1. All ENS phones ring and lamps blink, until call is answered (except Resident Inspector's office).

2. Resident Inspector's office - not answered.

Ring times out after 30 (to 90) seconds but lamp continues to blink until Resident Inspector answers. A re-ring occurs if plant does not answer before time out.

3. ENS line answered at any plant location (except Resident Inspector).

a. All phones stop ringing and a steady lamp appears on all ENS phones in CR, SSO, and TSC. Also EOF if answering location.

b. EOF ENS phone lamp will continue to blink if not answering location.

c. Resident Inspector office phone(s) - lamp will continue to blink until answered, or call ends.

4. Line answered by Resident Inspector.

a. Phone(s) in Resident Inspector's office stop ringing and steady lamp appears on phone(s).

b. All plant ENS phones continue to ring and blink until answered then see item C-3 above.

E. Troubles: A circuit trouble lite has been installed and labeled in the Control Room area. Suggested label: "ENS Line Failure When Lit."

1. Normal condition: Lamp is extinguished.

2. Trouble condition: Lamp is illuminated. Notify NRCOC immediately by commercial line.

NOTIFICATION SYSTEMS USER'S GUIDE (CONT'D)

F. Site Package Configuration

Main Package	- Control Room (CR)
	- Shift Supervisor's Office (SSO)
	- Technical Support Center (TSC)
Emergency Package	- Emergency Operations Facility (EOF)
Resident Package	- Resident Inspector's Office (RI)

2. Notification and Alert Net

A. NAN Characteristics

1. Gold color

2. Group Ring-down Circuit which may bypass onsite and local offsite switches.

3. PVNGS onsite NAN locations:

a. STSCs

b. TSC

4. Offsite NAN locations

a. EOF

b. State EOC

c. ARRA

d. DPS

e. MSCO

f. County EOC

5. Battery backup is provided for all terminals and conference bridges.

B. Description

1. Phone terminal sets are equipped with "Push to Call" pushbutton and "Call Received" lamp as well as standard straight line ringer.

NOTIFICATION SYSTEMS USER'S GUIDE (CONT'D)

2. A loop-back function is provided to check both transmit and receive legs of each terminal from any point in the system.

3. The Interface/Controller contains a front panel meter and two green LEDs for battery capacity and battery charger status. Depress the pushbutton to check voltage level.

C. Operation

1. To originate a call, depress "Push to Call" button momentarily. This provides ringing to associated phones and turns on the "Call Received" lamp. Taking the phone off the hook cancels both bell and lamp.

2. A very low ringback signal is returned to the caller from all ringing phones to assure that the call is received by all parties. The signal is sufficiently low to allow conversation among all off-hook phones although others are still in the ringing mode.

3. Radio System

A. Characteristics

1. Eight channel system. Channel eight is backup for NAN.

2. System includes: two speaker amplifier, transmit VU meter; digital clock, microphone, amplifier for all transmit audio, interlocking channel select switches.

3. One speaker monitors all unselected channels, second speaker monitors the selected channel.

4. Selective and group call capabilities.

B. Operation

1. Depress eight channel button.

2. Depress TRANSMIT switch.

3. Utilize MONITOR, CALL, MUTE, BUSY and other functions as appropriate.

NOTIFICATION SYSTEMS USER'S GUIDE (CONT'D)

C. Locations

1. STSC

2. EOF

3. TSC

4. ARRA

5. ADES

4. Group Ring-Down Voice Circuits

A. Characteristics

1. Gold color

2. Used for transmission of technical information to office agencies, public affairs communications and communications of protective action recommendations to offsite agencies.

3. NAN is backup for communication of protective action recommendations.

4. Two independent circuits using Mountain Bell leased-lines and bypasing onsite and offsite switches - primary links.

5. Two independent circuits using APS microwave system - backup links.

6. Group call communications only.

7. Locations

Leased-Line Circuits #1	Leased-Line Circuits #2	APS Microwave Circuits #1	APS Microwave Circuits #2
TSC	TSC	TSC	TSC
EOF	EOF	EOF	EOF
STSCs		STSCs	
ADES	ADES	ADES	ADES
ARRA	ARRA	ARRA	ARRA

NOTIFICATION SYSTEMS USER'S GUIDE (CONT'D)

5. Ring-Down Facsimile Circuits

A. Characteristics

1. Two independant circuits used for transmission of technical drawing and data. Primary circuit uses Mountain Bell leased lines bypassing onsite and offsite switches. Backup circuit utilizes APS microwave system.

2. STSC telecopier can connect to either the primary or backup circuits. The STSC machines must be lined to the proper circuit to receive transmissions. Telecopier is auto-answer with phone in parallel for voice communications.

3. Capabilities include group or station-to-station transmission.

4. Locations (leased-line and APS microwave)

a. EOF

b. TSC

c. STSC (must be switched to proper circuit)

d. CEC

e. ADES

f. ARRA

6. Federal Telecommunications System (FTS)

A. FTS Characteristics

1. Brown color

2. Used for transmittal of radiological information by NRC personnel onsite to NRC personnel at Bethesda and Regional Offices.

3. Backup to ENS and commercial lines for NRC notifications.

4. PVNGS onsite locations

a. EOF - NRC Office

NOTIFICATION SYSTEMS USER'S GUIDE (CONT'D)

b. TSC - NRC Office and Data Display Room

c. EOF - Emergency Command Center Data Display Area

d. NRC Resident Inspector's Office

e. Radiation Protection Office

7. Mobile Radio Telephone System

A. Operation

1. Dial the designated seven digit number.

8. Paging System

A. Characteristics

1. Two systems operated from Phoenix Microwave Center and PVNGS. The PVNGS System can access the Phoenix System via microwave ties.

2. Activation of onsite pagers used in plant operation takes precedence over system-wide orders for pager activation.

B. Operation

1. Select appropriate six digit address. From PVNGS, use the 81 prefix prior to accessing the Phoenix terminal and dial the six digit number.

2. The first two digits of the six digit number access the paging terminal; 46 for Phoenix and 88 for PVNGS.

3. The third digit is a priority digit. Priority One (1) will activate two or more paging transmitters. Priority Two (2) will activate the transmitter nearest the paged individuals work area.

4. The last three digits are the specific address of individuals to receive the calls.

NOTIFICATION SYSTEMS USER'S GUIDE (CONT'D)

9. Call-Out System (Auto Dialer)

A. Characteristics

1. Used by the Security Director to call in PVNGS emergency response personnel.

2. Capability to contact by telephone, radio, or voice pocket pager.

3. After dialing, the System will speak the appropriate message and record acknowledgment. If acknowledgment does not occur (no answer or busy), the system will periodically retry the number.

B. Operations

1. Turn enable/disable switch to enable position.

2. Select operating instructions from display.

"P" Program Phone Lists
"S" Start Notification Sequence
"C" Compose Message
"T" Time Set
"N" Notification Repetition Programming
"A" Acknowledge Code Programming
"M" Message Repetition Programming

3. Select appropriate preprogrammed telephone number list (1 to 8) or "new" for lists not programmed.

4. If message and telephone number list are preprogrammed, selection of that list and message may be accomplished on the front panel or by depressing "S".

5. If a new message is required, type the message on the terminal keyboard and enter.

6. The printer records acknowledgment status and time.

7. The System continues dialing and message delivery attempts until either all numbers acknowledge or the programmed number of repetitions has been completed.

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THE PHONETIC ALPHABET

A	ALPHA	N	NOVEMBER
B	BRAVO	O	OSCAR
C	CHARLIE	P	PAPA
D	DELTA	Q	QUEBEC
E	ECHO	R	ROMEO
F	FOXTROT	S	SIERRA
G	GOLF	T	TANGO
H	HOTEL	U	UNIFORM
I	INDIA	V	VICTOR
J	JULIETT	W	WHISKEY
K	KILO	X	X-RAY
L	LIMA	Y	YANKEE
M	MIKE	Z	ZULU

CONTROLLED DOCUMENT

PROTECTIVE ACTION RECOMMENDATIONS

Classification Category	Protective Actions Recommendations
Notification of Unusual Event- events are in progress which indicate a potential degradation of the level of safety of the plant; however, no releases of radioactive material requiring offsite response/monitoring are expected unless further degradation of safety systems occur.	Inform state and county authorities of NUE status/ cause and based on the situation recommend that no protective action is necessary or to standby for an update due to potential degredation of plant safety.

NOTIFICATION OF UNUSUAL EVENT
IMPLEMENTING PROCEDURES

EPIP-02	*Emergency Classification
EPIP-09	*Emergency Coordinator
EPIP-11	*Technical Support Center/Satellite TSC Activation
EPIP-12	Operational Support Center Activation
EPIP-20	Personnel Assembly and Accountability
EPIP-23	Fire Fighting
EPIP-24	Security
EPIP-33	Offsite Assistance

* This procedure shall be implemented for a NOTIFICATION OF UNUSUAL EVENT classification.

PVNGS EMERGENCY PLAN IMPLEMENTING PROCEDURE	PROCEDURE NO. EPIP-04	
ALERT IMPLEMENTING ACTIONS	REVISION 9-21-87 4	Page 1 of 28

ASSIGNED COPY

PVNGS # 8-9B

DEPT. HEAD L. E. Brown DATE 8-15-84

PRB/PRG REVIEW O.R. Brunquell DATE 9/20/84

APPROVED BY O.R. Brunquell DATE 9/20/84

EFFECTIVE DATE 9/24/84

DN-1599A/0180A

PV216-000A (8/82)

TABLE OF CONTENTS

APPENDIX

1.0 OBJECTIVE

1.1 This procedure provides a series of implementing actions to be taken upon declaration of an ALERT.

2.0 REFERENCES

2.1 Implementing References

2.1.1 EPIP-02, "Emergency Classification"

2.1.2 EPIP-09, "Emergency Coordinator"

2.1.3 EPIP-11, "Technical Support Center/Satellite TSC Activation"

2.1.4 EPIP-12, "Operations Support Center Activation"

2.1.5 EPIP-13, "Emergency Operations Facility Activation"

2.1.6 EPIP-15, "Protective Action Guidelines"

2.1.7 EPIP-20, "Personnel Assembly and Accountability"

2.1.8 EPIP-33, "Offsite Assistance"

2.1.9 EPIP-39, "Emergency Operations Director (EOD)"

2.1.10 EPIP-40, "Adminstrative and Logistics Coordinator (ALC)"

2.1.11 EPIP-41, Radiological Assessment Coordinator (RAC)"

2.1.12 EPIP-42, "Technical Analysis Coordinator (TAC)"

2.1.13 EPIP-43, "Radiological Assessment Communicator (RACom)"

2.1.14 EPIP-44, "TSC Liaison Engineer (TLE)"

2.1.15 EPIP-45, "Government Liaison Engineer (GLE)"

2.1.16 EPIP-46, "EOF Contact"

2.1.17 EPIP-47, "Logistics Communicator"

2.1.18 EPIP-48, "Security Coordinator"

2.1.19 EPIP-49, "Dosimetry Clerk"

2.1.20 EPIP-50, "Status Board Keeper (SBK)"

2.1.21 EPIP-51, "Offsite Technical Representative (OTR)"

2.1.22 EPIP-52, "JENC Technical Advisor"

2.1.23 EPIP-55, "TSC/EOF Personnel Identification"

2.2 Developmental References

2.2.1 NUREG-0654, Rev. 1, "Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants"

2.2.2 PVNGS Emergency Plan, Rev. 3

2.2.3 78AC-0ZZ06, "Document And Record Turnover Control", Rev. 0.

3.0 LIMITATIONS AND PRECAUTIONS

3.1 Continued surveillance and assessment of plant conditions are necessary to ensure that the emergency classification is appropriately revised as conditions change or more definitive information is obtained.

4.0 DETAILED PROCEDURE

4.1 Personnel Indoctrination/Responsibilities

4.1.1 In an ALERT situation, limited releases of radioactive material may occur and radiological/meteorological information may have to be obtained for assessment of onsite and offsite consequences. The emergency response for an ALERT includes activation of onsite and offsite emergency centers. An ALERT calls for prompt initial and follow-up notification to offsite emergency management organizations. The ALERT status is maintained until the event is terminated or reclassified.

4.1.2 The Shift Supervisor or Emergency Coordinator shall be responsible for initiating and completing implementing actions of this procedure.

4.2 Prerequisites

4.2.1 The emergency has been classified per EPIP-02, "Emergency Classification".

4.3 Instructions

4.3.1 The affected unit Shift Supervisor shall perform the following:

NOTE

Designated Unaffected Unit Shift Supervisor to assume the role of the Emergency Coordinator in the Onshift Emergency Organization are:

Affected Unit	Unaffected Unit Shift Supervisor
Unit 1	Unit 2
Unit 2	Unit 1
Unit 3	Unit 2
Entire Site	Unit 1

4.3.1.1 Notify the Shift Supervisor of the designated unaffected unit (or Shift Supervisor of an unaffected unit) to report to the Control Room of the affected unit and assume the duties of the Emergency Coordinator.

NOTE

Initial notifications shall be made from the Satellite TSC by the Satellite TSC Communicator until activation of the EOF. At that time, all subsequent initial and follow up notifications shall be made by the government Liaison Engineer in the EOF.

NOTE

Protective action recommendations (Appendix D) are based on plant and containment conditions and these recommendations are made to offsite officials even when no release is in progress.

4.3.1.2 Direct the Satellite TSC Communicator to fill out Appendix A, "Initial Emergency Message Form," in accordance with instructions provided in Appendix B.

4.3.1.3 Sound the Unit Area Accountability Signal for 1 minute to alert personnel within the protected area. If the entire plant site requires notification, the Site Area Accountability Signal shall be activated.

4.3.1.4 Silence the signal and provide the following announcement over the plant wide telephone page:

"Attention all plant personnel, an emergency situation classified as an Alert exists in Unit _____. Assembly and Accountability for the Protected Area is now in progress. All affected Unit Emergency Response Personnel and alternates report to your emergency location. All other personnel in the Protected Area are ordered to leave the Protected Area and report to your assigned assembly area." (Provide instructions on route(s) or area(s) to avoid as appropriate).

4.3.1.5 Resound the Accountability signal and repeat the announcement.

4.3.1.6 Notify the Control Rooms of the unaffected units.

4.3.1.7 Ensure that the actions of the appropriate Recovery procedures have been implemented.

4.3.2 The Emergency Coordinator/Shift Supervisor shall perform the following:

4.3.2.1 Ensure activation of the Satellite TSC in accordance with EPIP-11, "Technical Support Center/Satellite TSC Activation".

4.3.2.2 Implement additional Emergency Plan Implementing Procedures according to the situation that resulted in the emergency being classified as an ALERT. Procedures that shall be implemented and those which may be appropriate are identified in Appendix E.

4.3.2.3 Direct the Security Director to call in the Onsite and Offsite Emergency Organization personnel by utilizing the appropriate call-out listing.

4.3.2.4 Determine the need for offsite assistance. If assistance is necessary, direct a Communicator to contact the required agency per EPIP-33, "Offsite Assistance".

4.3.2.5 Reevaluate the emergency classification as conditions change by implementing procedure EPIP-02.

4.3.2.6 When the situation warrants downgrading/upgrading an ALERT, proceed to appropriate implementing and notification procedures and direct the Shift Supervisor to announce the reclassification over the public address system and inform the other Control Rooms.

4.3.2.7 The Emergency Coordinator shall initiate and complete implementing actions of EPIP-09, "Emergency Coordinator".

4.3.3 Technical Support Center/Satellite Technical Support Center (TSC/STSC) Activation

4.3.3.1 The Emergency Coordinator shall implement EPIP-11, "Technical Support Center/Satellite TSC Activation".

4.3.4 Operations Support Center (OSC) Activation

4.3.4.1 The OSC Coordinator shall implement EPIP-12, "Operations Support Center Activation".

4.3.5 Emergency Operations Facility (EOF) Activation

4.3.5.1 The Emergency Operations Director shall implement EPIP-13, "Emergency Operations Facility Activation".

4.3.6 Emergency Situation Terminated

4.3.6.1 The Shift Supervisor (or Emergency Coordinator) shall Sound the "All Clear signal for approximately (1) minute, Silence the signal, and Provide the following announcement over the plant wide telephone paging system: "Attention all personnel. The emergency situation declared in Unit _____ has now been terminated". (Provide special instructions as necessary).

4.3.6.2 Repeat signal and announcement once.

4.3.7 Updating of the Emergency Notification Call List

4.3.7.1 The telephone numbers and responsible contacts listed in the Emergency Notification Call List shall be reviewed, verified, and updated as required on a quarterly basis.

4.3.8 Record Retention

4.3.8.1 Appendix A shall be retained for the life of the plant.

INITIAL EMERGENCY MESSAGE FORM
NOTIFICATION OF UNUSUAL EVENT,
ALERT, SITE AREA EMERGENCY, OR GENERAL EMERGENCY

1. Verbatim text of Message: THIS IS (IS NOT) A DRILL!! (Circle One) THIS IS PALO VERDE NUCLEAR GENERATING STATION (NOTIFICATION OF UNUSUAL EVENT) (ALERT) (SITE AREA EMERGENCY) (GENERAL EMERGENCY)
(cross out notifications above not applicable)

declared at _____ (time) - _____ (date) - Wind is from _____ degrees - At _____ (speed) mph.

PALO VERDE AUTHENTICATOR _____ (authenticator letters)

2. This is _____ (name/title), at the Palo Verde Nuclear Generating Station

3. (Circle One)

(a) There is NO, repeat NO, radioactive release taking place and no special protective actions are recommended at this time.

(b) There is NO, repeat NO, radioactive release taking place; however, the following protective actions are recommended at this time.

Sectors	Distance (Miles)
_____	_____
_____	_____

OR

(c) A radioactive release IS, repeat IS, taking place. We recommend that people in affected sectors remain indoors with windows and doors closed.

Sectors	Distance (Miles)
_____	_____
_____	_____

OR

(d) A radioactive release IS, repeat IS, taking place. We recommend that evacuation of affected sectors be considered.

Sectors	Distance (Miles)
_____	_____
_____	_____

4. THIS IS (IS NOT) A DRILL!! (Circle One)

FOLLOW-UP EMERGENCY MESSAGE FORM

1. Verbatim text of Message: THIS IS (IS NOT) A DRILL!! (Circle One)
   THIS IS A PALO VERDE NUCLEAR GENERATING STATION follow-up information message concerning the (NOTIFICATION OF UNUSUAL EVENT) (ALERT) (SITE AREA EMERGENCY) (GENERAL EMERGENCY)
   (cross out notifications above not applicable)

   declared at _____ - _____
   (time) (date)

   PALO VERDE AUTHENTICATOR _____
   (authenticator letters)

2. This is _____, at Palo Verde Nuclear Generating Station.
   (name/title)

3. Meteorological Data

   a. Wind direction from _____ (degrees) - at _____ miles per hour
   (direction) (speed)

   from _____ to _____
   (sector) (sector)

   b. Stability Class: A B C D E F G
   (Circle One)

   c. Precipitation Yes No
   (Circle One)

4. Radiological Data

   a. Radioactvity (check one)

   ( ) Has been released
   ( ) Has not been released

4. b. Release Time _____

   c. Reactor Trip Time _____

   d. Location/Source of Release _____

5. Current Release Rates

   a. I-131 Equivalent _____ Ci/second
   b. Noble Gas _____ Ci/second
   c. Particulates _____ Ci/second

6. Two-hour plume centerline projected dose at:

Distance	Sector	Whole Body Dose (REM)	Child Thyroid Dose Commitment (REM)
Site Boundary			
2 miles			
5 miles			
10 miles			

7. Plume arrival time offsite:

   _____ 2 mi
   _____ 5 mi
   _____ 10 mi
   _____ Ruth Fisher School
   _____ Arlington School

8. Estimated duration of release _____ minutes

PVNGS EMERGENCY PLAN IMPLEMENTING PROCEDURE	PROCEDURE NO. EPIP-04	APPENDIX A Page 4 of 6
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9. The Following Emergency Measures Including Protective Actions are Recommended:

_____

_____

_____

10. The Following Emergency Reponse Actions are Underway:

_____

_____

_____

11. We Request the Following Onsite Support and Assistance from Offsite Sources:

_____

_____

_____

12. Our Prognosis of the Emergency is that Conditions:

_____Are Under Control
_____Can Be Expected to Terminate Within _____hours
_____Are Worsening

13. Other Information:

_____

_____

_____

14. THIS IS (IS NOT) A DRILL!! (Circle One)

EMERGENCY NOTIFICATION CALL LIST

EMERGENCY COORDINATOR/STSC COMMUNICATOR
(Sheet 1 of 2)

AGENCY OR INDIVIDUAL	PERSON CONTACTED	PRIMARY LINK	ALTERNATE LINK	ALTERNATE LINK	DATE/TIME	CALLER
Arizona Department of Public Safety	________	NAN	Radio System Channel & Frequency	[redacted]	___/___	________
Arizona Radiation Regulatory Agency	________	NAN	Radio System Channel & Frequency	[redacted]	___/___	________
Arizona Division of Emergency Services	________	NAN	Radio System Channel & Frequency	[redacted]	___/___	________
Maricopa County Department of Civil Defense and Emergency Services	________	NAN	Radio System Channel & Frequency	[redacted]	___/___	________
Maricopa County Sheriff's Office	________	NAN	Radio System Channel & Frequency	[redacted]	___/___	________
Director, Nuclear Operations	[Joe Bynum]	[redacted]	[redacted]	[redacted]	___/___	________
	[O.J. Zeringue]	[redacted]	[redacted]	[redacted]	___/___	________
Assistant Vice President, Nuclear	[Don Karner]	[redacted]	[redacted]	[redacted]	___/___	________
	[John Allen]	[redacted]	[redacted]	[redacted]	___/___	________
	[John Vorees (Alt.)]	[redacted]	[redacted]	[redacted]	___/___	________

ENERGENCY NOTIFICATION CALL LIST (cont'D)

ENERGENCY COORDINATOR/STSC COMMUNICATOR (Sheet 2 of 2)

AGENCY OR INDIVIDUAL	PERSON CONTACTED	PRIMARY LINK	ALTERNATE LINK	ALTERNATE LINK	DATE/TIME	CALLER
Nuclear Admin. (Notify during day shift only)	Telephone Operator	ENS	(None)	(None)	__/__	_____
NRC Headquarters	_____	ENS		FTS	__/__	_____
NRC Sr. Resident Inspector	Ray Zimmerman			(None)	__/__	_____
Executive Vice President, Nuclear Operations	Tom Woods, Jr.			(None)	__/__	_____
All Security	Security Guard			(None)	__/__	_____
Public Information	Duty Public Info			(None)	__/__	_____
APS Communications Department	Jane Brand (Primary)			(None)	__/__	_____
	Jack Swift (Alt.)			(None)	__/__	_____
PVNGS Visitors Center	_____			(None)	__/__	_____
APS Site Construction	_____			(None)	__/__	_____
Technical Emergency Control Center	_____			(None)	__/__	_____
EPO	_____			(None)	__/__	_____
APS Dispatcher	_____					

PV216-000A (8/82)

INSTRUCTIONS FOR COMPLETING APPENDIX A

1.0 Initial Emergency Message Form

1.1 Fill in data required by Steps 1 and 2 of Appendix A, "Initial Emergency Message Form". Obtain Authenticator from the confidential envelope marked on the outside with the appropriate month and a drill sequence number (if it is a drill).

1.2 Obtain from the Radiation Protection Monitor (onshift) or the Radiological Assessment Coordinator (if EOF is activated) data required to complete Step 3 of Appendix A.

1.3 Circle appropriate wording of Step 4 of Appendix A.

1.4 Contact the NRC via the Emergency Notification System (ENS) dedicated telephone within 15 minutes of declaring an emergency. If the ENS fails, use the commercial telephone or FTS phone as an alternate link (see Appendix C).

1.5 When contact is made, the caller shall identify himself and read the completed Emergency Message Form verbatim (omit the Palo Verde Authenticator).

1.6 Offer to repeat information and reiterate as necessary.

1.7 Obtain the name of the person contacted and record in Appendix A, Emergency Notification Call List, Emergency Coordinator/STSC Communicator.

NOTE

When the NAN ring button is pushed and it appears that all the receiving stations are on line or the ring has stopped, the PVNGS originating station shall initiate a roll call in order listed below. (Consider the time of day.)

1.8 By means of a single call on the Notification and Alert Net dedicated telephone, contact the following State/County agencies:

Duty Hours (8:00 a.m. to 5:00 p.m. Monday-Friday)

Maricopa County Sheriff's Office
Maricopa County Department of Civil Defense and Emergency Services
Arizona Department of Public Safety
Arizona Division of Emergency Services
Arizona Radiation Regulatory Agency.

NOTE

Subsequent notification of affected agencies during off-duty hours shall be made per internal agency procedures.

Off-Duty Hours (5:00 p.m. to 8:00 a.m., Monday-Friday, all day Saturday and Sunday)

Maricopa County Sheriff's Office
Department of Public Safety

1.9 When contact is made, the caller shall identify himself and request that the individuals obtain a copy of the appropriate Emergency Message Form.

1.10 When each individial has obtained a copy, read the completed Emergency Message Form verbatim and request MCSO to read back verbatim.

1.11 Offer to repeat information and reiterate as necessary.

1.12 Obtain the name of each person contacted and record on Appendix A.

1.13 Notify additional personnel as listed in Appendix A as necessary, obtain the name of the person contacted, and inform them of the situation.

1.14 If an individual requests information not contained in the Emergency Message Form, make reasonable efforts to obtain and give the information only after all initial notifications have been made.

2.0 Follow-up Emergency Message Form

2.1 Fill in data required by Steps 1 and 2 of Appendix A, "Follow-up Emergency Message Form". Use the same Authenticator code obtained for the "Initial Emergency Message Form".

2.2 Obtain the Radiation Protection Monitor (Onshift) or the Radiological Assessment Coordinator (if EOF is activated) data required to complete Steps 3-9.

2.3 Obtain the Emergency Coordinator (Onshift) or the Technical Analysis Coordinator (if EOF is activated) data required to complete Steps 10-13.

2.4 Circle appropriate wording in Step 14.

2.5 Notify NRC, State and County Agencies per Steps 1.4, 1.14 of this Appendix.

CONTROLLED DOCUMENT

NOTIFICATION SYSTEMS USER'S GUIDE

1. Emergency Notification System (ENS)

Operation at plant end of circuit.

A. ENS Characteristics

1. Red color

2. Used for notifications of NRC Headquarters. Region V NRC Office can be patched into this line.
3. Commercial telephones and FTS backup the ENS.

B. IDLE State - All lamps on all ENS phones are extinguished.

C. Outgoing call to NRC Operations Center.

1. Control Room (CR) or Shift Supervisor's Office (SSO) or Technical Support Center (TSC) initiates call.

a. All phones in CR, SSO, and TSC have steady lamps.

b. Ringing tone is heard in handset of initiating phone.

c. Emergency Operations Facility (EOF) ENS phone lamp blinks.

d. NRC Resident Inspector's office phone(s) rings and times out, lamp on phone(s) continues to blink until Resident Inspector answers, or call ends.

2. EOF location initiates call.

a. All phones in CR, SSO, TSC and EOF have a steady lamp.

b. Initiating phone hears ringing tone in handset.

c. Resident Inspector's office phone(s) rings and times out, lamp on phone(s) continues to blink until Resident Inspector answers or call ends.

3. Resident Inspector's office initiates call.

a. Resident Inspector's office phone(s) - steady lamp appears and ringing tone is heard in handset.

NOTIFICATION SYSTEMS USER'S GUIDE (CONT'D)

b. No indication at any plant location.

NOTE: The ENS circuit does not have privacy feature.

D. Incoming call to plant.

1. All ENS phones ring and lamps blink, until call is answered (except Resident Inspector's office).

2. Resident Inspector's office - not answered.

Ring times out after 30 (to 90) seconds but lamp continues to blink until Resident Inspector answers. A re-ring occurs if plant does not answer before time out.

3. ENS line answered at any plant location (except Resident Inspector).

a. All phones stop ringing and a steady lamp appears on all ENS phones in CR, SSO, and TSC. Also EOF if answering location.

b. EOF ENS phone lamp will continue to blink if not answering location.

c. Resident Inspector office phone(s) - lamp will continue to blink until answered, or call ends.

4. Line answered by Resident Inspector.

a. Phone(s) in Resident Inspector's office stop ringing and steady lamp appears on phone(s).

b. All plant ENS phones continue to ring and blink until answered then see item C-3 above.

E. Troubles: A circuit trouble lite has been installed and labeled in the Control Room area. Suggested label: "ENS Line Failure When Lit."

1. Normal condition: Lamp is extinguished.

2. Trouble condition: Lamp is illuminated. Notify NRCOC immediately by commercial line.

NOTIFICATION SYSTEMS USER'S GUIDE (CONT'D)

F. Site Package Configuration

Main Package	- Control Room (CR) - Shift Supervisor's Office (SSO) - Technical Support Center (TSC)
Emergency Package	- Emergency Operations Facility (EOF)
Resident Package	- Resident Inspector's Office (RI)

2. Notification and Alert Net

A. NAN Characteristics

1. Gold color

2. Group Ring-down Circuit which may bypass onsite and local offsite switches.

3. PVNGS onsite NAN locations:

a. STSCs

b. TSC

4. Offsite NAN locations

a. EOF

b. State EOC

c. ARRA

d. DPS

e. MSCO

f. County EOC

5. Battery backup is provided for all terminals and conference bridges.

B. Description

1. Phone terminal sets are equipped with "Push to Call" pushbutton and "Call Received" lamp as well as standard straight line ringer.

NOTIFICATION SYSTEMS USER'S GUIDE (CONT'D)

2. A loop-back function is provided to check both transmit and receive legs of each terminal from any point in the system.

3. The Interface/Controller contains a front panel meter and two green LEDs for battery capacity and battery charger status. Depress the pushbutton to check voltage level.

C. Operation

1. To originate a call, depress "Push to Call" button momentarily. This provides ringing to associated phones and turns on the "Call Received" lamp. Taking the phone off the hook cancels both bell and lamp.

2. A very low ringback signal is returned to the caller from all ringing phones to assure that the call is received by all parties. The signal is sufficiently low to allow conversation among all off-hook phones although others are still in the ringing mode.

3. <u>Radio System</u>

A. Characteristics

1. Eight channel system. Channel eight is backup for NAN.

2. System includes: two speaker amplifier, transmit VU meter; digital clock, microphone, amplifier for all transmit audio, interlocking channel select switches.

3. One speaker monitors all unselected channels, second speaker monitors the selected channel.

4. Selective and group call capabilities.

B. Operation

1. Depress eight channel button.

2. Depress TRANSMIT switch.

3. Utilize MONITOR, CALL, MUTE, BUSY and other functions as appropriate.

CONTROLLED DOCUMENT

NOTIFICATION SYSTEMS USER'S GUIDE (CONT'D)

C. Locations

1. STSC
2. EOF
3. TSC
4. ARRA
5. ADES

4. Group Ring-Down Voice Circuits

A. Characteristics

1. Gold color
2. Used for transmission of technical information to office agencies, public affairs communications and communications of protective action recommendations to offsite agencies.
3. NAN is backup for communication of protective action recommendations.
4. Two independent circuits using Mountain Bell leased-lines and bypasing onsite and offsite switches - primary links.
5. Two independent circuits using APS microwave system - backup links.
6. Group call communications only.
7. Locations

Leased-Line Circuits	
#1	#2
TSC	TSC
EOF	EOF
STSCs	
ADES	ADES
ARRA	ARRA

APS Microwave Circuits	
#1	#2
TSC	TSC
EOF	EOF
STSCs	
ADES	ADES
ARRA	APRA

NOTIFICATION SYSTEMS USER'S GUIDE (CONT'D)

5. Ring-Down Facsimile Circuits

A. Characteristics

1. Two independant circuits used for transmission of technical drawing and data. Primary circuit uses Mountain Bell leased lines bypassing onsite and offsite switches. Backup circuit utilizes APS microwave system.

2. STSC telecopier can connect to either the primary or backup circuits. The STSC machines must be lined to the proper circuit to receive transmissions. Telecopier is auto-answer with phone in parallel for voice communications.

3. Capabilities include group or station-to-station transmission.

4. Locations (leased-line and APS microwave)

a. EOF

b. TSC

c. STSC (must be switched to proper circuit)

d. CEC

e. ADES

f. ARRA

6. Federal Telecommunications System (FTS)

A. FTS Characteristics

1. Brown color

2. Used for transmittal of radiological information by NRC personnel onsite to NRC personnel at Bethesda and Regional Offices.

3. Backup to ENS and commercial lines for NRC notifications.

4. PVNGS onsite locations

a. EOF - NRC Office

NOTIFICATION SYSTEMS USER'S GUIDE (CONT'D)

b. TSC - NRC Office and Data Display Room

c. EOF - Emergency Command Center Data Display Area

d. NRC Resident Inspector's Office

e. Radiation Protection Office

7. Mobile Radio Telephone System

A. Operation

1. Dial the designated seven digit number.

8. Paging System

A. Characteristics

1. Two systems operated from Phoenix Microwave Center and PVNGS. The PVNGS System can access the Phoenix System via microwave ties.

2. Activation of onsite pagers used in plant operation takes precedence over system-wide orders for pager activation.

B. Operation

1. Select appropriate six digit address. From PVNGS, use the 81 prefix prior to accessing the Phoenix terminal and dial the six digit number.

2. The first two digits of the six digit number access the paging terminal; 46 for Phoenix and 88 for PVNGS.

3. The third digit is a priority digit. Priority One (1) will activate two or more paging transmitters. Priority Two (2) will activate the transmitter nearest the paged individuals work area.

4. The last three digits are the specific address of individuals to receive the calls.

NOTIFICATION SYSTEMS USER'S GUIDE (CONT'D)

9. Call-Out System (Auto Dialer)

A. Characteristics

1. Used by the Security Director to call in PVNGS emergency response personnel.

2. Capability to contact by telephone, radio, or voice pocket pager.

3. After dialing, the System will speak the appropriate message and record acknowledgment. If acknowledgment does not occur (no answer or busy), the system will periodically retry the number.

B. Operations

1. Turn enable/disable switch to enable position.

2. Select operating instructions from display.

"P" Program Phone Lists
"S" Start Notification Sequence
"C" Compose Message
"T" Time Set
"N" Notification Repetition Programming
"A" Acknowledge Code Programming
"M" Message Repetition Programming

3. Select appropriate preprogrammed telephone number list (1 to 8) or "new" for lists not programmed.

4. If message and telephone number list are preprogrammed, selection of that list and message may be accomplished on the front panel or by depressing "S".

5. If a new message is required, type the message on the terminal keyboard and enter.

6. The printer records acknowledgment status and time.

7. The System continues dialing and message delivery attempts until either all numbers acknowledge or the programmed number of repetitions has been completed.

THE PHONETIC ALPHABET

A	ALPHA	N	NOVEMBER
B	BRAVO	O	OSCAR
C	CHARLIE	P	PAPA
D	DELTA	Q	QUEBEC
E	ECHO	R	ROMEO
F	FOXTROT	S	SIERRA
G	GOLF	T	TANGO
H	HOTEL	U	UNIFORM
I	INDIA	V	VICTOR
J	JULIETT	W	WHISKEY
K	KILO	X	X-RAY
L	LIMA	Y	YANKEE
M	MIKE	Z	ZULU

PROTECTIVE ACTION RECOMMENDATIONS

Classification Category	Protective Actions Recommendations
Alert- any releases are expected to be limited to a small fraction of the EPA/PAG exposure levels at the site boundary unless further degradation of safety systems occur.	Inform the state and county authorities of the ALERT status/cause and recommend that the public be appraised of the situation and stay tuned to EBS/KTAR radio station.

ALERT
IMPLEMENTING PROCEDURES LIST

EPIP-02 *Emergency Classification
EPIP-09 *Emergency Coordinator
EPIP-11 *Technical Support Center/Satellite TSC Activation
EPIP-12 *Operations Support Center Activation
EPIP-13 *Emergency Operations Facility Activation
EPIP-14A Release Rate Determination
EPIP-14B Dose Assessment
EPIP-15 Protective Action Guidelines
EPIP-16 Inplant Surveys and Sampling
EPIP-17 Onsite/Offsite Surveys and Sampling
EPIP-18 Emergency Exposure Guidelines
EPIP-19 Onsite Evacuation
EPIP-20 *Personnel Assembly and Accountability
EPIP-21 Search and Rescue
EPIP-22 Personnel Injury
EPIP-23 Fire Fighting
EPIP-24 Security
EPIP-25 Reentry for Emergency Operations
EPIP-26 Potassium Iodine (KI) Administration
EPIP-27 Sample Analysis at the Station
EPIP-27A Handling, Transfer and Shipment of Post Accident Grab Samples
EPIP-28 Personnel Monitoring and Decontamination
EPIP-29 Area/Equipment Monitoring and Decontamination
EPIP-30 Radiological Emergency Response Vehicle Operations
EPIP-31 Recovery
EPIP-33 Offsite Assistance
EPIP-39 *Emergency Operations Director (EOD)
EPIP-40 *Administrative and Logistics Coordinator (ALC)
EPIP-41 *Radiological Assessment Coordinator (RAC)"
EPIP-42 *Technical Analysis Coordinator (TAC)
EPIP-43 *Radiological Assessment Communicator (RACom)
EPIP-44 *TSC Liaison Engineer (TLE)
EPIP-45 *Government Liaison Engineer (GLE)
EPIP-46 *EOF Contact
EPIP-47 *Logistics Communicator
EPIP-48 *Security Coordinator
EPIP-49 *Dosimetry Clerk
EPIP-50 *Status Board Keeper (SBK)
EPIP-51 *Offsite Technical Representative (OTR)
EPIP-52 *JENC Technical Advisor
EPIP-53 Government Staffing at TSC
EPIP-54 Government Staffing at EOF
EPIP-55 *TSC/EOF Personnel Identification

* This procedure shall be implemented for an ALERT classification.

CONTROLLED DOCUMENT

PVNGS EMERGENCY PLAN IMPLEMENTING PROCEDURE	PROCEDURE NO. EPIP-05	
SITE AREA EMERGENCY IMPLEMENTING ACTIONS	REVISION 4 8/9/84	Page 1 of 28

ASSIGNED COPY

PVNGS # 8-9B

DEPT. HEAD O.R. Brunner DATE 9/20/84

PRB/PRG REVIEW O.R. Brunner DATE 9/20/84

APPROVED BY O.R. Brunner DATE 9/20/84

EFFECTIVE DATE 9/24/84

DN-1600A/0787A

PVNGS EMERGENCY PLAN IMPLEMENTING PROCEDURE	PROCEDURE NO. EPIP-05	
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APPENDICES

1.0 OBJECTIVE

1.1 This procedure provides a series of implementing actions to be taken upon declaration of a SITE AREA EMERGENCY.

2.0 REFERENCES

2.1 Implementing References

2.1.1 EPIP-02, "Emergency Classification"

2.1.2 EPIP-09, "Emergency Coordinator"

2.1.3 EPIP-11, "Technical Support Center/Satellite TSC Activation"

2.1.4 EPIP-12, "Operations Support Center Activation"

2.1.5 EPIP-13, "Emergency Operations Facility Activation"

2.1.6 EPIP-15, "Protective Action Guidelines"

2.1.7 EPIP-19, "Onsite Evacuation"

2.1.8 EPIP-20, "Personnel Assembly and Accountability"

2.1.9 EPIP-33, "Offsite Assistance"

2.1.10 EPIP-39, "Emergency Operations Director (EOD)"

2.1.11 EPIP-40, "Adminstrative and Logistics Coordinator (ALC)"

2.1.12 EPIP-41, Radiological Assessment Coordinator (RAC)"

2.1.13 EPIP-42, "Technical Analysis Coordinator (TAC)"

2.1.14 EPIP-43, "Radiological Assessment Communicator (RACom)"

2.1.15 EPIP-44, "TSC Liaison Engineer (TLE)"

2.1.16 EPIP-45, "Government Liaison Engineer (GLE)"

2.1.17 EPIP-46, "EOF Contact"

2.1.18 EPIP-47, "Logistics Communicator"

2.1.19 EPIP-48, "Security Coordinator"

CONTROLLED DOCUMENT

2.1.20 EPIP-49, "Dosimetry Clerk"

2.1.21 EPIP-50, "Status Board Keeper (SBK)"

2.1.22 EPIP-51, "Offsite Technical Representative (OTR)"

2.1.23 EPIP-52, "JENC Technical Advisor"

2.1.24 EPIP-55, "TSC/EOF Personnel Identification"

2.2 Developmental References

2.2.1 NUREG-0654, Rev. 1, "Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants"

2.2.2 PVNGS Emergency Plan, Rev. 3

2.2.3 78AC-0ZZ06, "Documentation and Record Turnover Control" Rev. 0

3.0 LIMITATIONS AND PRECAUTIONS

3.1 Continued surveillance and assessment of plant conditions are necessary to ensure that the emergency classification is appropriately revised as conditions change or more definitive information is obtained.

4.0 DETAILED PROCEDURE

4.1 Personnel Indoctrination/Responsibilities

4.1.1 In a SITE AREA EMERGENCY, substantial releases of radioactive material may occur. Any releases are not expected to exceed EPA Protective Action Guideline exposure levels beyond the site boundary. Consideration of appropriate protective actions, based on actual or projected data, is warranted. All onsite and offsite emergency centers are activated. Onsite evacuation will be initiated if appropriate. The station shall provide updated radiological/meteorological information to offsite emergency management organizations. The SITE AREA EMERGENCY status shall be maintained until the event is terminated or reclassification takes place.

4.1.2 The Shift Supervisor or Emergency Coordinator shall be responsible for initiating and completing the implementing actions of this procedure.

4.2 Prerequisites

4.2.1 The emergency has been classified per EPIP-02, "Emergency Classification."

4.3 Instructions

4.3.1 The affected unit Shift Supervisor shall perform the following:

NOTE

Designated Unaffected Unit Shift Supervisor to assume the role of the Emergency Coordinator in the Onshift Emergency Organization are:

Affected Unit	Unaffected Unit Shift Supervisor
Unit 1	Unit 2
Unit 2	Unit 1
Unit 3	Unit 2
Entire Site	Unit 1

4.3.1.1 Notify the Shift Supervisor of the designated unaffected unit (or Shift Supervisor of an unaffected unit) to report to the Control Room of the affected unit and assume the duties of the Emergency Coordinator.

CONTROLLED DOCUMENT

NOTE

Initial notifications shall be made from the satellite TSC by the Satellite TSC Communicator until activation of the EOF. At that time all subsequent initial and follow up notifications shall be made by the Government Liaison Engineer in the EOF.

NOTE

Protective Action recommendations (Appendix D) are based on plant and containment conditions and these recommendations are made to offsite officials even when no release is in progress.

4.3.1.2 Direct the Satellite TSC Communicator to fill out Appendix A, "Initial Emergency Message Form", in accordance with instructions provided in Appendix B.

4.3.1.3 Sound the Site Area Accountability signal for approximately one minute.

4.3.1.4 Silence the signal and provide the following announcement over the plant wide telephone page:

"Attention all plant Personnel, an emergency situation classified as a Site Area Emergency exists in Unit _____. Assembly and accountability for the Site Area is now in progress. All affected Unit Emergency Response Personnel and alternates report to your emergency location. All other personnel report to your original assembly area". (Provide instructions on routes or areas to avoid as appropriate).

4.3.1.5 Resound the Accountability Signal and repeat the announcement.

4.3.1.6 Notify the Control Rooms of the unaffected units.

4.3.1.7 Ensure that actions of the appropriate Recovery procedures have been implemented.

4.3.2 The Emergency Coordinator shall perform the following:

4.3.2.1 Ensure activation of the satellite TSC in accordance with EPIP-11, "Technical Support Center/Satellite TSC Activation."

4.3.2.2 Following accountability, and if conditions warrant per EPIP-15, "Protective Action Guidelines", initiate EPIP-19, "Onsite Evacuation".

4.3.2.3 Implement additional Emergency Plan Implementing Procedures according to the situation that resulted in the emergency being classified as a SITE AREA EMERGENCY. Procedures that shall be implemented and others which may be appropriate are identified in Appendix E.

4.3.2.4 Direct the Security Director to call in Onsite and Offsite Emergency Organization personnel by utilizing the appropriate computer call-out listing.

4.3.2.5 Determine the need for offsite assistance. If assistance is necessary, direct the STSC Communicator (onshift) or the Administrative and Logistics Coordinator to contact the required agency per EPIP-33, "Offsite Assistance".

4.3.2.6 Reevaluate the emergency classification and perform licensee actions as conditions change by implementing procedure EPIP-02.

4.3.2.7 When the situation warrants downgrading/upgrading the SITE AREA EMERGENCY, proceed to appropriate implementing and notification procedures and direct the Shift Supervisor to announce the reclassification over the public address system and inform the other Control Rooms.

4.3.2.8 The Emergency Coordinator shall initiate and complete implementing actions of EPIP-09 "Emergency Coordinator".

4.3.3 Technical Support Center/Satellite Technical Support Center (TSC/STSC) Activation

4.3.3.1 The Emergency Coordinator shall implement EPIP-11, "Technical Support Center/Satellite TSC Activation".

4.3.4 Operations Support Center (OSC) Activation

4.3.4.1 The OSC Coordinator shall implement EPIP-12, "Operations Support Center Activation".

4.3.5 Emergency Operations Facility (EOF) Activation

4.3.5.1 The Emergency Operations Director shall implement EPIP-13, "Emergency Operations Facility Activation".

4.3.6 Emergency Situation Terminated

4.3.6.1 The Shift Supervisor (or Emergency Coordinator) shall Sound the "All Clear" signal for approximately (1) minute, Silence the signal, and Provide the following announcement over the plant wide telephone paging system: "Attention all personnel. The emergency situation declared in Unit _____ has now been terminated". (Provide special instructions as necessary.)

4.3.6.2 Repeat signal and announcement once.

4.3.7 Updating of the Emergency Notification Call List

4.3.7.1 The telephone numbers and responsible contacts listed in the Emergency Notification Call List shall be reviewed, verified, and updates as required on a quarterly basis.

4.3.8 Record Retention

4.3.8.1 The forms of Appendix 'A' shall be turned into the Emergency Coordinator/Emergency Operations Director who shall ensure they are forwarded to DDC for proper storage.

INITIAL EMERGENCY MESSAGE FORM
NOTIFICATION OF UNUSUAL EVENT,
ALERT, SITE AREA EMERGENCY, OR GENERAL EMERGENCY

1. Verbatim text of Message: THIS IS (IS NOT) A DRILL!! (Circle One) THIS IS PALO VERDE NUCLEAR GENERATING STATION (NOTIFICATION OF UNUSUAL EVENT) (ALERT) (SITE AREA EMERGENCY) (GENERAL EMERGENCY)
(cross out notifications above not applicable)

declared at _____ (time) - _____ (date) - Wind is from _____ degrees - At _____ (speed) mph.

PALO VERDE AUTHENTICATOR ____________________ (authenticator letters)

2. This is ____________________ (name/title), at the Palo Verde Nuclear Generating Station

3. (Circle One)

(a) There is NO, repeat NO, radioactive release taking place and no special protective actions are recommended at this time.

(b) There is NO, repeat NO, radioactive release taking place. However, the following protective actions are recommended at this time.

Sectors	Distance (Miles)
______	______
______	______
______	______

OR

(c) A radioactive release IS, repeat IS, taking place. We recommend that people in affected sectors remain indoors with windows and doors closed.

Sectors	Distance (Miles)
______	______
______	______
______	______

OR

(d) A radioactive release IS, repeat IS, taking place. We recommend that evacuation of affected sectors be considered.

Sectors	Distance (Miles)
______	______
______	______
______	______

4. THIS IS (IS NOT) A DRILL!! (Circle One)

CONTROLLED DOCUMENT

FOLLOW-UP EMERGENCY MESSAGE FORM

1. Verbatim text of Message: THIS IS (IS NOT) A DRILL!! (Circle One)
   THIS IS A PALO VERDE NUCLEAR GENERATING STATION follow-up information message concerning the (NOTIFICATION OF UNUSUAL EVENT) (ALERT) (SITE AREA EMERGENCY) (GENERAL EMERGENCY)
   (cross out notifications above not applicable)

   declared at _____ - _____
   (time) (date)

   PALO VERDE AUTHENTICATOR _____
   (authenticator letters)

2. This is _____, at Palo Verde Nuclear Generating Station.
   (name/title)

3. Meteorological Data

   a. Wind direction from _____ (degrees) - at _____ miles per hour
   (direction) (speed)

   from _____ to _____
   (sector) (sector)

   b. Stability Class: A B C D E F G
   (Circle One)

   c. Precipitation Yes No
   (Circle One)

4. Radiological Data

   a. Radioactivity (check one)

   ( ) Has been released
   ( ) Has not been released

4. b. Release Time _____

   c. Reactor Trip Time _____

   d. Location/Source of Release _____

5. Current Release Rates

   a. I-131 Equivalent _____ Ci/second
   b. Noble Gas _____ Ci/second
   c. Particulates _____ Ci/second

6. Two-hour plume centerline projected dose at:

Distance	Sector	Whole Body Dose (REM)	Child Thyroid Dose Commitment (REM)
Site Boundary			
2 miles			
5 miles			
10 miles			

7. Plume arrival time offsite:

   _____ 2 mi
   _____ 5 mi
   _____ 10 mi
   _____ Ruth Fisher School
   _____ Arlington School

8. Estimated duration of release _____ minutes

9. The Following Emergency Measures Including Protective Actions are Recommended:

_____

_____

_____

10. The Following Emergency Reponse Actions are Underway:

_____

_____

_____

11. We Request the Following Onsite Support and Assistance from Offsite Sources:

_____

_____

_____

12. Our Prognosis of the Emergency is that Conditions:

_____Are Under Control
_____Can Be Expected to Terminate Within _____hours
_____Are Worsening

13. Other Information:

_____

_____

_____

14. THIS IS (IS NOT) A DRILL!! (Circle One)

EMERGENCY NOTIFICATION CALL LIST

EMERGENCY COORDINATOR/STSC COMMUNICATOR
(Sheet 1 of 2)

AGENCY OR INDIVIDUAL	PERSON CONTACTED	PRIMARY LINK	ALTERNATE LINK	ALTERNATE LINK	DATE/TIME	CALLER
Arizona Department of Public Safety	________	NAN	Radio System Channel 8 Frequency	[redacted]	__/__	________
Arizona Radiation Regulatory Agency	________	NAN	Radio System Channel 8 Frequency	[redacted]	__/__	________
Arizona Division of Emergency Services	________	NAN	Radio System Channel 8 Frequency	[redacted]	__/__	________
Maricopa County Department of Civil Defense and Emergency Services	________	NAN	Radio System Channel 8 Frequency	[redacted]	__/__	________
Maricopa County Sheriff's Office	________	NAN	Radio System Channel 8 Frequency	[redacted]	__/__	________
Director, Nuclear Operations	[Joe Bynum]	[redacted]	[redacted]	[redacted]	__/__	________
	[O.J. Zeringue]	[redacted]	[redacted]	[redacted]	__/__	________
Assistant Vice President, Nuclear	[Don Karner]	[redacted]	[redacted]	[redacted]	__/__	________
	[John Allen]	[redacted]	[redacted]	[redacted]	__/__	________
	[John Vorees (Alt.)]	[redacted]	[redacted]	[redacted]	__/__	________

EMERGENCY NOTIFICATION CALL LIST (cont'd)

EMERGENCY COORDINATOR/STSC COMMUNICATOR
(Sheet 2 of 2)

AGENCY OR INDIVIDUAL	PERSON CONTACTED	PRIMARY LINK	ALTERNATE LINK	DATE/TIME	CALLER
Nuclear Admin. (Notify during day shift only)	Telephone Operator	ENS	(None) FTS	__/__	
NRC Headquarters			(None)	__/__	
NRC Sr. Resident Inspector	Roy Zimmerman		(None)	__/__	
Executive Vice President, Nuclear Operations	Tom Woods, Jr.		(None)	__/__	
All Security	Security Guard		(None)	__/__	
Public Information	Duty Public Info		(None)	__/__	
APS Communications Department	Jane Brand (Primary)		(None)	__/__	
	Jack Swift (Alt.)		(None)	__/__	
PVNGS Visitors Center			(None)	__/__	
APS Site Construction			(None)	__/__	
Bechtel Emergency Control Center			(None)	__/__	
INPO			(None)	__/__	
APS Dispatcher				__/__	

[redacted]

INSTRUCTIONS FOR COMPLETING APPENDIX A

1.0 INITIAL EMERGENCY MESSAGE FORM

1.1 Fill in data required by steps 1 and 2 of Appendix A, "Initial Emergency Message Form". Obtain authenticator from the confidential envelope marked on the outside with the appropriate month and drill sequence number (if it is a drill).

1.2 Obtain from the Radiation Protection Monitor (onshift) data required to complete step 3 of Appendix A.

1.3 Circle appropriate wording of step 4 of Appendix A.

1.4 Contact the NRC via the Emergency Notification System (ENS) dedicated telephone within 15 minutes of declaring an emergency. If the ENS fails, use commercial phone or FTS phone as an alternate link (see Appendix C).

1.5 When contact is made, the caller shall identify himself and read the completed Emergency Message Form verbatim (omit the Palo Verde Authenticator).

1.6 Offer to repeat information and reiterate as necessary.

1.7 Obtain the name of the person contacted and record in Appendix A, Emergency Notification Call List, Emergency Coordinator/STSC Communicator.

NOTE

When the NAN ring button is pushed and it appears that all the receiving stations are on line, or, the ring has stopped, the PVNGS originating station shall initiate a roll call in the order listed below. (Consider the time of day.)

1.8 By means of a single call on the Notification and Alert Net dedicated telephone, contact the following State/County agencies:

Duty Hours (8:00 a.m. to 5:00 p.m. Monday-Friday)

Maricopa County Sheriffs Office
Maricopa County Department of Civil Defense and Emergency Services
Arizona Department of Public Safety
Arizona Division of Emergency Services
Arizona Radiation Regulatory Agency

NOTE

Subsequent notification of affected agencies during off-duty hours shall be made per internal agency procedures.

Off-Duty Hours (5:00 p.m. to 8: a.m., Monday-Friday, all day Saturday and Sunday)

Maricopa County Sheriff's Office
Department of Public Safety

1.9 When contact is made, the caller shall identify himself and request that the individuals obtain a copy of the Appropriate Emergency Message Form.

1.10 When each individual has obtained a copy, read the completed Emergency Message Form verbatim and request MCSO to read back verbatim.

1.11 Offer to repeat information and reiterate as necessary.

1.12 Obtain the name of each person contacted and record on Appendix A.

1.13 Notify additional personnel as listed in Appendix A as necessary, obtain the name of the person contacted, and inform them of the situation.

1.14 If an individual requests information not contained in the Emergency Message Form, make reasonable efforts to obtain and give the information only after all initial notification have been made.

2.0 FOLLOW-UP EMERGENCY MESSAGE FORM

2.1 Fill in data required by steps 1 and 2 of Appendix A, "Follow-up Emergency Message Form". Use the same authenticator code obtained for the "Initial Emergency Message Form".

2.2 Obtain from the Radiation Protection Monitor (onshift) data required to complete steps 3-9.

2.3 Obtain from the Emergency Coordinator (onshift) data required to complete steps 10-13.

2.4 Circle appropriate wording in step 14.

2.5 Notify NRC, state and county agencies per steps 1.4-1.14 of this Appendix.

NOTIFICATION SYSTEMS USER'S GUIDE

1. Emergency Notification System (ENS)

   Operation at plant end of circuit.

   A. ENS Characteristics

      1. Red color

      2. Used for notifications of NRC Headquarters. Region V NRC Office can be patched into this line.

      3. Commercial telephones and FTS backup the ENS.

   B. IDLE State - All lamps on all ENS phones are extinguished.

   C. Outgoing call to NRC Operations Center.

      1. Control Room (CR) or Shift Supervisor's Office (SSO) or Technical Support Center (TSC) initiates call.

         a. All phones in CR, SSO, and TSC have steady lamps.

         b. Ringing tone is heard in handset of initiating phone.

         c. Emergency Operations Facility (EOF) ENS phone lamp blinks.

         d. NRC Resident Inspector's office phone(s) rings and times out, lamp on phone(s) continues to blink until Resident Inspector answers, or call ends.

      2. EOF location initiates call.

         a. All phones in CR, SSO, TSC and EOF have a steady lamp.

         b. Initiating phone hears ringing tone in handset.

         c. Resident Inspector's office phone(s) rings and times out, lamp on phone(s) continues to blink until Resident Inspector answers or call ends.

      3. Resident Inspector's office initiates call.

         a. Resident Inspector's office phone(s) - steady lamp appears and ringing tone is heard in handset.

NOTIFICATION SYSTEMS USER'S GUIDE (CONT'D)

b. No indication at any plant location.

NOTE: The ENS circuit does not have privacy feature.

D. Incoming call to plant.

1. All ENS phones ring and lamps blink, until call is answered (except Resident Inspector's office).

2. Resident Inspector's office - not answered.

Ring times out after 30 (to 90) seconds but lamp continues to blink until Resident Inspector answers. A re-ring occurs if plant does not answer before time out.

3. ENS line answered at any plant location (except Resident Inspector).

a. All phones stop ringing and a steady lamp appears on all ENS phones in CR, SSO, and TSC. Also EOF if answering location.

b. EOF ENS phone lamp will continue to blink if not answering location.

c. Resident Inspector office phone(s) - lamp will continue to blink until answered, or call ends.

4. Line answered by Resident Inspector.

a. Phone(s) in Resident Inspector's office stop ringing and steady lamp appears on phone(s).

b. All plant ENS phones continue to ring and blink until answered then see item C-3 above.

E. Troubles: A circuit trouble lite has been installed and labeled in the Control Room area. Suggested label: "ENS Line Failure When Lit."

1. Normal condition: Lamp is extinguished.

2. Trouble condition: Lamp is illuminated. Notify NRCOC immediately by commercial line.

NOTIFICATION SYSTEMS USER'S GUIDE (CONT'D)

F. Site Package Configuration

Main Package	- Control Room (CR)
	- Shift Supervisor's Office (SSO)
	- Technical Support Center (TSC)
Emergency Package	- Emergency Operations Facility (EOF)
Resident Package	- Resident Inspector's Office (RI)

2. <u>Notification and Alert Net</u>

A. NAN Characteristics

1. Gold color

2. Group Ring-down Circuit which may bypass onsite and local offsite switches.

3. PVNGS onsite NAN locations:

a. STSCs

b. TSC

4. Offsite NAN locations

a. EOF

b. State EOC

c. ARRA

d. DPS

e. MSCO

f. County EOC

5. Battery backup is provided for all terminals and conference bridges.

B. Description

1. Phone terminal sets are equipped with "Push to Call" pushbutton and "Call Received" lamp as well as standard straight line ringer.

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NOTIFICATION SYSTEMS USER'S GUIDE (CONT'D)

2. A loop-back function is provided to check both transmit and receive legs of each terminal from any point in the system.

3. The Interface/Controller contains a front panel meter and two green LEDs for battery capacity and battery charger status. Depress the pushbutton to check voltage level.

C. Operation

1. To originate a call, depress "Push to Call" button momentarily. This provides ringing to associated phones and turns on the "Call Received" lamp. Taking the phone off the hook cancels both bell and lamp.

2. A very low ringback signal is returned to the caller from all ringing phones to assure that the call is received by all parties. The signal is sufficiently low to allow conversation among all off-hook phones although others are still in the ringing mode.

3. Radio System

A. Characteristics

1. Eight channel system. Channel eight is backup for NAN.

2. System includes: two speaker amplifier, transmit VU meter; digital clock, microphone, amplifier for all transmit audio, interlocking channel select switches.

3. One speaker monitors all unselected channels, second speaker monitors the selected channel.

4. Selective and group call capabilities.

B. Operation

1. Depress eight channel button.

2. Depress TRANSMIT switch.

3. Utilize MONITOR, CALL, MUTE, BUSY and other functions as appropriate.

NOTIFICATION SYSTEMS USER'S GUIDE (CONT'D)

C. Locations

1. STSC
2. EOF
3. TSC
4. ARRA
5. ADES

4. Group Ring-Down Voice Circuits

A. Characteristics

1. Gold color
2. Used for transmission of technical information to office agencies, public affairs communications and communications of protective action recommendations to offsite agencies.
3. NAN is backup for communication of protective action recommendations.
4. Two independant circuits using Mountain Bell leased-lines and bypasing onsite and offsite switches - primary links.
5. Two independant circuits using APS microwave system - backup links.
6. Group call communications only.
7. Locations

Leased-Line Circuits		APS Microwave Circuits	
#1	#2	#1	#2
TSC	TSC	TSC	TSC
EOF	EOF	EOF	EOF
STSCs		STSCs	
ADES	ADES	ADES	ADES
ARRA	ARRA	ARRA	ARRA

NOTIFICATION SYSTEMS USER'S GUIDE (CONT'D)

5. Ring-Down Facsimile Circuits

   A. Characteristics

      1. Two independant circuits used for transmission of technical drawing and data. Primary circuit uses Mountain Bell leased lines bypassing onsite and offsite switches. Backup circuit utilizes APS microwave system.

      2. STSC telecopier can connect to either the primary or backup circuits. The STSC machines must be lined to the proper circuit to receive transmissions. Telecopier is auto-answer with phone in parallel for voice communications.

      3. Capabilities include group or station-to-station transmission.

      4. Locations (leased-line and APS microwave)

         a. EOF

         b. TSC

         c. STSC (must be switched to proper circuit)

         d. CEC

         e. ADES

         f. ARRA

6. Federal Telecommunications System (FTS)

   A. FTS Characteristics

      1. Brown color

      2. Used for transmittal of radiological information by NRC personnel onsite to NRC personnel at Bethesda and Regional Offices.

      3. Backup to ENS and commercial lines for NRC notifications.

      4. PVNGS onsite locations

         a. EOF - NRC Office

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NOTIFICATION SYSTEMS USER'S GUIDE (CONT'D)

b. TSC - NRC Office and Data Display Room

c. EOF - Emergency Command Center Data Display Area

d. NRC Resident Inspector's Office

e. Radiation Protection Office

7. Mobile Radio Telephone System

A. Operation

1. Dial the designated seven digit number.

8. Paging System

A. Characteristics

1. Two systems operated from Phoenix Microwave Center and PVNGS. The PVNGS System can access the Phoenix System via microwave ties.

2. Activation of onsite pagers used in plant operation takes precedence over system-wide orders for pager activation.

B. Operation

1. Select appropriate six digit address. From PVNGS, use the 81 prefix prior to accessing the Phoenix terminal and dial the six digit number.

2. The first two digits of the six digit number access the paging terminal; 46 for Phoenix and 88 for PVNGS.

3. The third digit is a priority digit. Priority One (1) will activate two or more paging transmitters. Priority Two (2) will activate the transmitter nearest the paged individuals work area.

4. The last three digits are the specific address of individuals to receive the calls.

NOTIFICATION SYSTEMS USER'S GUIDE (CONT'D)

9. Call-Out System (Auto Dialer)

A. Characteristics

1. Used by the Security Director to call in PVNGS emergency response personnel.

2. Capability to contact by telephone, radio, or voice pocket pager.

3. After dialing, the System will speak the appropriate message and record acknowledgment. If acknowledgment does not occur (no answer or busy), the system will periodically retry the number.

B. Operations

1. Turn enable/disable switch to enable position.

2. Select operating instructions from display.

"P" Program Phone Lists
"S" Start Notification Sequence
"C" Compose Message
"T" Time Set
"N" Notification Repetition Programming
"A" Acknowledge Code Programming
"M" Message Repetition Programming

3. Select appropriate preprogrammed telephone number list (1 to 8) or "new" for lists not programmed.

4. If message and telephone number list are preprogrammed, selection of that list and message may be accomplished on the front panel or by depressing "S".

5. If a new message is required, type the message on the terminal keyboard and enter.

6. The printer records acknowledgment status and time.

7. The System continues dialing and message delivery attempts until either all numbers acknowledge or the programmed number of repetitions has been completed.

THE PHONETIC ALPHABET

A	ALPHA	N	NOVEMBER
B	BRAVO	O	OSCAR
C	CHARLIE	P	PAPA
D	DELTA	Q	QUEBEC
E	ECHO	R	ROMEO
F	FOXTROT	S	SIERRA
G	GOLF	T	TANGO
H	HOTEL	U	UNIFORM
I	INDIA	V	VICTOR
J	JULIETT	W	WHISKEY
K	KILO	X	X-RAY
L	LIMA	Y	YANKEE
M	MIKE	Z	ZULU

PROTECTIVE ACTION RECOMMENDATIONS

Classification Category	Protective Actions Recommendations
Site Area Emergency- any releases are not expected to exceed EPA/PAG exposures levels beyond the site boundary unless further degradation of safety systems occur.	Inform state and county authorities of Site Area Emergency status/cause and recommend seeking shelter within a 2 mile radius of the plant and within 10 miles in affected sectors as warranted based on plant/containment conditions and projected and/or actual releases.

SITE AREA EMERGENCY IMPLEMENTING PROCEDURES

EPIP-01*	Emergency Organization
EPIP-02*	Emergency Classification
EPIP-09*	Emergency Coordinator
EPIP-11*	Technical Support Center/Satellite TSC Activation
EPIP-12*	Operations Support Center Activation
EPIP-13*	Emergency Operations Facility Activation
EPIP-14A	Release Rate Determination
EPIP-14B	Dose Assessment
EPIP-15*	Protective Action Guidelines
EPIP-16	Inplant Surveys and Sampling
EPIP-17	Onsite/Offsite Surveys and Sampling
EPIP-18	Emergency Exposure Guidelines
EPIP-19	Onsite Evacuation
EPIP-20*	Personnel Assembly and Accountability
EPIP-21	Search and Rescue
EPIP-22	Personnel Injury
EPIP-23	Fire Fighting
EPIP-24	Security
EPIP-25	Reentry for Emergency Operations
EPIP-26	Potassium Iodine (KI) Administration
EPIP-27	Sample Analysis at the Station
EPIP-27A	Handling, Transfer and Shipments of Postaccident Grab Samples
EPIP-28	Personnel Monitoring and Decontamination
EPIP-29	Area/Equipment Monitoring and Decontamination
EPIP-30	Radiological Emergency Response Vehicle Operations
EPIP-31	Recovery
EPIP-33	Offsite Assistance
EPIP-39*	Emergency Operations Director (EOD)
EPIP-40*	Administrative and Logistics Coordinator (ALC)
EPIP-41*	Radiological Assessment Coordinator (RAC)"
EPIP-42*	Technical Analysis Coordinator (TAC)
EPIP-43*	Radiological Assessment Communicator (RACom)
EPIP-44*	TSC Liaison Engineer (TLE)
EPIP-45*	Government Liaison Engineer (GLE)
EPIP-46*	EOF Contact
EPIP-47*	Logistics Communicator
EPIP-48*	Security Coordinator
EPIP-49*	Dosimetry Clerk
EPIP-50*	Status Board Keeper (SBK)
EPIP-51*	Offsite Technical Representative (OTR)
EPIP-52*	JENC Technical Advisor
EPIP-53	Government Staffing at TSC
EPIP-54	Government Staffing at EOF
EPIP-55*	TSC/EOF Personnel Identification

* This procedure shall be implemented for a SITE AREA EMERGENCY classification.

CONTROLLED DOCUMENT

PVNGS EMERGENCY PLAN IMPLEMENTING PROCEDURE	PROCEDURE NO. EPIP-06	
GENERAL EMERGENCY IMPLEMENTING ACTIONS	REVISION 4 4/3/84	Page 1 of 29

ASSIGNED COPY

PVNGS # 8-9B

DEPT. HEAD O. D. Zimmerman DATE 9/20/84

PRB/PRG REVIEW O. D. Zimmerman DATE 9/20/84

APPROVED BY O. D. Zimmerman DATE 9/20/84

EFFECTIVE DATE 9/24/84

DN-1601A/0787A

TABLE OF CONTENTS

APPENDICES

1.0 OBJECTIVE

1.1 This procedure provides a series of implementing actions to be taken upon declaration of a GENERAL EMERGENCY.

2.0 REFERENCES

2.1 Implementing References

2.1.1 EPIP-02, "Emergency Classification"

2.1.2 EPIP-09, "Emergency Coordinator"

2.1.3 EPIP-11, "Technical Support Center/Satellite TSC Activation"

2.1.4 EPIP-12, "Operations Support Center Activation"

2.1.5 EPIP-13, "Emergency Operations Facility Activation"

2.1.6 EPIP-15, "Protective Action Guidelines"

2.1.7 EPIP-19, "Onsite Evacuation"

2.1.8 EPIP-20, "Personnel Assembly and Accountability"

2.1.9 EPIP-33, "Offsite Assistance"

2.1.10 EPIP-39, "Emergency Operations Director (EOD)"

2.1.11 EPIP-40, "Adminstrative and Logistics Coordinator (ALC)"

2.1.12 EPIP-41, Radiological Assessment Coordinator (RAC)"

2.1.13 EPIP-42, "Technical Analysis Coordinator (TAC)"

2.1.14 EPIP-43, "Radiological Assessment Communicator (RACom)"

2.1.15 EPIP-44, "TSC Liaison Engineer (TLE)"

2.1.16 EPIP-45, "Government Liaison Engineer (GLE)"

2.1.17 EPIP-46, "EOF Contact"

2.1.18 EPIP-47, "Logistics Communicator"

2.1.19 EPIP-48, "Security Coordinator"

2.1.20 EPIP-49, "Dosimetry Clerk"

2.1.21 EPIP-50, "Status Board Keeper (SBK)"

2.1.22 EPIP-51, "Offsite Technical Representative (OTR)"

2.1.23 EPIP-52, "JENC Technical Advisor"

2.1.24 EPIP-55, "TSC/EOF Personnel Identification"

2.2 Developmental References

2.2.1 NUREG-0654, Rev. 1, "Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants".

2.2.2 PVNGS Emergency Plan, Rev. 3

2.2.3 78AC-0ZZ06, "Document and Record Turnover Control", Rev. 0

3.0 LIMITATIONS AND PRECAUTIONS

3.1 Continued surveillance and assessment of plant conditions are necessary to ensure that the emergency classification is appropriately revised as conditions change, or more definitive information is obtained.

4.0 DETAILED PROCEDURE

4.1 Personnel Indoctrination

4.1.1 In a GENERAL EMERGENCY, events are in progress or have occurred which involve actual or imminent substantial core degradation or melting with potential for loss of containment integrity. Radioactive releases which may occur can be reasonably expected to exceed EPA Protective Action Guideline exposure levels offsite for more than the immediate site area. There is prompt notification of NRC and appropriate State and County authorities of the General Emergency status.

4.1.2 Accordingly, prompt consideration of appropriate protective actions, based on actual or projected data, is warranted. Consideration of predetermined protective action recommendations (in the event of potential loss of fission product barriers) may also be warranted. Onsite and offsite emergency centers are activated. Onsite evacuation shall be initiated if appropriate. The station shall provide updated radiological/meteorological information to offsite emergency management organizations as necessary. The GENERAL EMERGENCY status shall be maintained until the event is terminated or reclassification takes place.

4.1.3 The Shift Supervisor or the Emergency Coordinator shall be responsible for initiating and completing the implementing actions of this procedure.

4.2 Prerequisites

4.2.1 The emergency has been classified per EPIP-02, "Emergency Classification".

4.3 Instructions

4.3.1 The affected unit Shift Supervisor shall perform the following:

NOTE

Designated Unaffected Unit Shift Supervisor to assume the role of the Emergency Coordinator in the Onshift Emergency Organization are:

Affected Unit	Unaffected Unit Shift Supervisor
Unit 1	Unit 2
Unit 2	Unit 1
Unit 3	Unit 2
Entire Site	Unit 1

4.3.1.1 Notify the Shift Supervisor of the designated unaffected unit (or Shift Supervisor of an unaffected unit) to report to the Control Room of the affected unit and assume the duties of the Emergency Coordinator.

NOTE

Initial notifications shall be made from the Satellite TSC by the Satellite TSC Communicator until activation of the EOF. At that time all subsequent initial and follow up notifications shall be made by the Government Liaison Engineer in the EOF.

NOTE

Protective Action recommendations (Appendix D) are based on plant and containment conditions and these recommendations are made to offsite officials even when no release is in progress.

4.3.1.2 Direct the Satellite TSC Communicator to fill out Appendix A, "Initial Emergency Message Form", in accordance with instructions provided in Appendix B.

4.3.1.3 Sound the Site Area Accountability signal for approximately one minute.

4.3.1.4 Silence the signal and provide the following announcement over the plant wide telephone page:

"Attention all plant personnel, an emergency situation classified as a General Emergency exists in Unit _____. Assembly and accountability for the site area is now in progress. All affected Unit Emergency Response Personnel and alternates report to your emergency location. All other personnel report to your assigned assembly area". (Provide instructions on routes or areas to avoid as appropriate).

4.3.1.5 Resound the accountability signal and repeat the announcement.

4.3.1.6 Notify the Control Rooms of the unaffected units.

4.3.1.7 Ensure that actions of the appropriate recovery or casualty procedures have been implemented.

4.3.2 The Emergency Coordinator shall perform the following:

4.3.2.1 Ensure activation of the satellite TSC in accordance with EPIP-11, "Technical Support Center/Satellite TSC Activation."

4.3.2.2 Following accountability, and if conditions warrant per EPIP-15, "Protective Action Guidelines", initiate EPIP-19, "Onsite Evacuation".

4.3.2.3 Implement additional Emergency Plan Implementing Procedures according to the situation that resulted in the emergency being classified as a GENERAL EMERGENCY. Procedures that shall be implemented and others which may be appropriate are identified in Appendix E.

4.3.2.4 Direct the Security Director to call in Onsite and Offsite Emergency Organization personnel by utilizing the appropriate computer call-out listing.

4.3.2.5 Determine the need for offsite assistance. If assistance is necessary, direct the STSC Communicator (onshift) or Administrative and Logistics Coordinator to contact the required agency per EPIP-33, "Offsite Assistance".

4.3.2.6 Reevaluate the emergency classification and perform licensee actions as conditions change by implementing procedure EPIP-02.

4.3.2.7 When the situation warrants downgrading from a GENERAL EMERGENCY, proceed to appropriate implementing and notification procedures and direct the Shift Supervisor to announce the downgrading over the public address system and inform the other Control Rooms.

4.3.2.8 The Emergency Coordinator shall initiate and complete implementing actions of EPIP-09 "Emergency Coordinator".

4.3.3 Technical Support Center/Satellite Technical Support Center (TSC/STSC) Activation

4.3.3.1 The Emergency Coordinator shall implement procedure EPIP-11, "Technical Support Center/Satellite TSC Activation".

4.3.4 Operations Support Center (OSC) Activation

4.3.4.1 The OSC Coordinator shall implement procedure EPIP-12, "Operations Support Center Activation".

4.3.5 Emergency Operations Facility (EOF) Activation

4.3.5.1 The Emergency Operations Director shall implement procedure EPIP-13, "Emergency Operations Facility Activation".

4.3.6 Emergency Situation Terminated

4.3.6.1 The Shift Supervisor (or Emergency Coordinator) shall Sound the "All Clear" signal for approximately (1) minute, Silence the signal, and Provide the following announcements over the plant wide paging system: "Attention all personnel. The emergency situation declared in Unit _____ has now been terminated. (Provide special instructions as necessary.)

4.3.6.2 Repeat signal and announcement once.

4.3.7 Updating of the Emergency Notification Call List

4.3.7.1 The telephone numbers and responsible contacts listed in the Emergency Notification Call List shall be reviewed, verified, and updated as required on a quarterly basis.

4.3.8 Record Retention

4.3.8.1 The forms of Appendix A shall be turned into the Emergency Coordinator/Emergency Operations Director who shall ensure they are forwarded to DDC for proper storage.

PVNGS EMERGENCY PLAN IMPLEMENTING PROCEDURE	PROCEDURE NO. EPIP-06	APPENDIX A Page 1 of 6
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INITIAL EMERGENCY MESSAGE FORM
NOTIFICATION OF UNUSUAL EVENT,
ALERT, SITE AREA EMERGENCY, OR GENERAL EMERGENCY

1. Verbatim text of Message: THIS IS (IS NOT) A DRILL!! (Circle One)
THIS IS PALO VERDE NUCLEAR GENERATING STATION (NOTIFICATION OF UNUSUAL EVENT) (ALERT) (SITE AREA EMERGENCY) (GENERAL EMERGENCY)
(cross out notifications above not applicable)

declared at _____ (time) - _____ (date) - Wind is from _____ degrees - At _____ (speed) mph.

PALO VERDE AUTHENTICATOR ______________________ (authenticator letters)

2. This is ______________________ (name/title), at the Palo Verde Nuclear Generating Station

3. (Circle One)
   (a) There is NO, repeat NO, radioactive release taking place and no special protective actions are recommended at this time.

   OR

   (b) There is NO, repeat NO, radioactive release taking place, however, the following protective actions are recommended at this time.

Sectors	Distance (Miles)
________	________
________	________
________	________

   OR

   (c) A radioactive release IS, repeat IS, taking place. We recommend that people in affected sectors remain indoors with windows and doors closed.

Sectors	Distance (Miles)
________	________
________	________
________	________

   OR

   (d) A radioactive release IS, repeat IS, taking place. We recommend that evacuation of affected sectors be considered.

Sectors	Distance (Miles)
________	________
________	________
________	________

4. THIS IS (IS NOT) A DRILL!! (Circle One)

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FOLLOW-UP EMERGENCY MESSAGE FORM

1. Verbatim text of Message: THIS IS (IS NOT) A DRILL!! (Circle One) THIS IS A PALO VERDE NUCLEAR GENERATING STATION follow-up information message concerning the (NOTIFICATION OF UNUSUAL EVENT) (ALERT) (SITE AREA EMERGENCY) (GENERAL EMERGENCY)
   (cross out notifications above not applicable)

   declared at _____ - _____
   (time) (date)

   PALO VERDE AUTHENTICATOR _____
   (authenticator letters)

2. This is _____, at Palo Verde Nuclear Generating Station.
   (name/title)

3. Meteorological Data

   a. Wind direction from _____ (degrees) - at ____ miles per hour
   (direction) (speed)

   from _____ to _____
   (sector) (sector)

   b. Stability Class: A B C D E F G
   (Circle One)

   c. Precipitation Yes No
   (Circle One)

4. Radiological Data

   a. Radioactvity (check one)

   ( ) Has been released
   ( ) Has not been released

CONTROLLED DOCUMENT

4. b. Release Time _____

   c. Reactor Trip Time _____

   d. Location/Source of Release _____

5. Current Release Rates

   a. I-131 Equivalent _____ Ci/second
   b. Noble Gas _____ Ci/second
   c. Particulates _____ Ci/second

6. Two-hour plume centerline projected dose at:

Distance	Sector	Whole Body Dose (REM)	Child Thyroid Dose Commitment (REM)
Site Boundary			
2 miles			
5 miles			
10 miles			

7. Plume arrival time offsite:

   _____ 2 mi
   _____ 5 mi
   _____ 10 mi
   _____ Ruth Fisher School
   _____ Arlington School

8. Estimated duration of release _____ minutes

9. The Following Emergency Measures Including Protective Actions are Recommended:

_____

_____

_____

10. The Following Emergency Reponse Actions are Underway:

_____

_____

_____

11. We Request the Following Onsite Support and Assistance from Offsite Sources:

_____

_____

_____

12. Our Prognosis of the Emergency is that Conditions:

_____Are Under Control
_____Can Be Expected to Terminate Within _____hours
_____Are Worsening

13. Other Information:

_____

_____

_____

14. THIS IS (IS NOT) A DRILL!! (Circle One)

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EMERGENCY NOTIFICATION CALL LIST

EMERGENCY COORDINATOR/SISC COMMUNICATOR
(Sheet 1 of 2)

AGENCY OR INDIVIDUAL	PERSON CONTACTED	PRIMARY LINK	ALTERNATE LINK	ALTERNATE LINK	DATE/TIME	CALLER
Arizona Department of Public Safety	_____	MAN	Radio System Channel # Frequency		__/__	_____
Arizona Radiation Regulatory Agency	_____	MAN	Radio System Channel # Frequency		__/__	_____
Arizona Division of Emergency Services	_____	MAN	Radio System Channel # Frequency		__/__	_____
Maricopa County Department of Civil Defense and Emergency Services	_____	MAN	Radio System Channel # Frequency		__/__	_____
Maricopa County Sheriff's Office	_____	MAN	Radio System Channel # Frequency		__/__	_____
Director, Nuclear Operations	Joe Byron				__/__	_____
	G.J. Reinhart				__/__	_____
Assistant Vice President, Nuclear	Don Kartel				__/__	_____
	John Allen				__/__	_____
	John Verrez (Alt.)				__/__	_____

PVNGS EMERGENCY PLAN IMPLEMENTING PROCEDURE	PROCEDURE NO. EPIP-06	APPENDIX A Page 6 of 6
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EMERGENCY NOTIFICATION CALL LIST (cont'd)

EMERGENCY COORDINATOR/SPSC COMMUNICATOR (Sheet 2 of 2)

AGENCY OR INDIVIDUAL	PERSON CONTACTED	PRIMARY LINK	ALTERNATE LINK	DATE/TIME	CALLER
Nuclear Admin. (Notify during day shift only)	Telephone Operator	ENS	(None) FTS	__/__	
NRC Headquarters			(None)	__/__	
NRC Sr. Resident Inspector	Roy Zimmerman		(None)	__/__	
Executive Vice President, Nuclear Operations	Tom Woods, Jr.		(None)	__/__	
Ill Security	Security Court		(None)	__/__	
Public Information	Duty Public INFO		(None)	__/__	
APS Communications Department	Jane Brand (Primary)		(None)	__/__	
	Jack Sutfe (Alt.)		(None)	__/__	
APSCS Visitors Center			(None)	__/__	
APS Site Construction			(None)	__/__	
Technical Emergency Control Center			(None)	__/__	
EPO			(None)	__/__	
APS Dispatcher			(None)	__/__	

[redacted]

PV216-000A (8/82)

INSTRUCTIONS FOR COMPLETING APPENDIX A

1.0 INITIAL EMERGENCY MESSAGE FORM

1.1 Fill in data required by steps 1 and 2 of Appendix A, "Initial Emergency Message Form". Obtain authenticator from the confidential envelope marked on the outside with the appropriate month and drill sequence number (if it is a drill).

1.2 Obtain from the Radiation Protection Monitor (onshift) data required to complete step 3 of Appendix A.

1.3 Circle appropriate wording of step 4 of Appendix A.

1.4 Contact the NRC via the Emergency Notification System (ENS) dedicated telephone within 15 minutes of declaring an emergency. If the ENS fails, use commercial phone or FTS phone as an alternate link (see Appendix G).

1.5 When contact is made, the caller shall identify himself and read the completed Emergency Message Form verbatim (omit the Palo Verde Authenticator).

1.6 Offer to repeat information and reiterate as necessary.

1.7 Obtain the name of the person contacted and record in Appendix A, Emergency Notification Call List, Emergency Coordinator/STSC Communicator.

NOTE

When the NAN ring button is pushed and it appears that all the receiving stations are on line, or, the ring has stopped, the PVNGS originating station shall initiate a roll call in the order listed below. (Consider the time of day.)

1.8 By means of a single call on the Notification and Alert Net dedicated telephone, contact the following State/County agencies:

Duty Hours (8:00 a.m. to 5:00 p.m. Monday-Friday)

Maricopa County Sheriffs Office
Maricopa County Department of Civil Defense and Emergency Services
Arizona Department of Public Safety
Arizona Division of Emergency Services
Arizona Radiation Regulatory Agency

NOTE

Subsequent notification of affected agencies during off-duty hours shall be made per internal agency procedures.

Off-Duty Hours (5:00 p.m. to 8: a.m., Monday-Friday, all day Saturday and Sunday)

Maricopa County Sheriff's Office
Department of Public Safety

1.9 When contact is made, the caller shall identify himself and request that the individuals obtain a copy of the Appropriate Emergency Message Form.

1.10 When each individual has obtained a copy, read the completed Emergency Message Form verbatim and request MCSO to read back verbatim.

1.11 Offer to repeat information and reiterate as necessary.

1.12 Obtain the name of each person contacted and record on Appendix A.

1.13 Notify additional personnel as listed in Appendix A as necessary, obtain the name of the person contacted, and inform them of the situation.

1.14 If an individual requests information not contained in the Emergency Message Form, make reasonable efforts to obtain and give the information only after all initial notification have been made.

2.0 FOLLOW-UP EMERGENCY MESSAGE FORM

2.1 Fill in data required by steps 1 and 2 of Appendix A, "Follow-up Emergency Message Form". Use the same authenticator code obtained for the "Initial Emergency Message Form".

2.2 Obtain from the Radiation Protection Monitor (onshift) data required to complete steps 3-9.

2.3 Obtain from the Emergency Coordinator (onshift) data required to complete steps 10-13.

2.4 Circle appropriate wording in step 14.

2.5 Notify NRC, state and county agencies per steps 1.4-1.14 of this Appendix.

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NOTIFICATION SYSTEMS USER'S GUIDE

1. Emergency Notification System (ENS)

   Operation at plant end of circuit.

   A. ENS Characteristics

      1. Red color

      2. Used for notifications of NRC Headquarters. Region V NRC Office can be patched into this line.

      3. Commercial telephones and FTS backup the ENS.

   B. IDLE State - All lamps on all ENS phones are extinguished.

   C. Outgoing call to NRC Operations Center.

      1. Control Room (CR) or Shift Supervisor's Office (SSO) or Technical Support Center (TSC) initiates call.

         a. All phones in CR, SSO, and TSC have steady lamps.

         b. Ringing tone is heard in handset of initiating phone.

         c. Emergency Operations Facility (EOF) ENS phone lamp blinks.

         d. NRC Resident Inspector's office phone(s) rings and times out, lamp on phone(s) continues to blink until Resident Inspector answers, or call ends.

      2. EOF location initiates call.

         a. All phones in CR, SSO, TSC and EOF have a steady lamp.

         b. Initiating phone hears ringing tone in handset.

         c. Resident Inspector's office phone(s) rings and times out, lamp on phone(s) continues to blink until Resident Inspector answers or call ends.

      3. Resident Inspector's office initiates call.

         a. Resident Inspector's office phone(s) - steady lamp appears and ringing tone is heard in handset.

NOTIFICATION SYSTEMS USER'S GUIDE (CONT'D)

b. No indication at any plant location.

NOTE: The ENS circuit does not have privacy feature.

D. Incoming call to plant.

1. All ENS phones ring and lamps blink, until call is answered (except Resident Inspector's office).

2. Resident Inspector's office - not answered.

Ring times out after 30 (to 90) seconds but lamp continues to blink until Resident Inspector answers. A re-ring occurs if plant does not answer before time out.

3. ENS line answered at any plant location (except Resident Inspector).

a. All phones stop ringing and a steady lamp appears on all ENS phones in CR, SSO, and TSC. Also EOF if answering location.

b. EOF ENS phone lamp wil continue to blink if not answering location.

c. Resident Inspector office phone(s) - lamp will continue to blink until answered, or call ends.

4. Line answered by Resident Inspector.

a. Phone(s) in Resident Inspector's office stop ringing and steady lamp appears on phone(s).

b. All plant ENS phones continue to ring and blink until answered then see item C-3 above.

E. Troubles: A circuit trouble lite has been installed and labeled in the Control Room area. Suggested label: "ENS Line Failure When Lit."

1. Normal condition: Lamp is extinguished.

2. Trouble condition: Lamp is illuminated. Notify NRCOC immediately by commercial line.

NOTIFICATION SYSTEMS USER'S GUIDE (CONT'D)

F. Site Package Configuration

Main Package	- Control Room (CR) - Shift Supervisor's Office (SSO) - Technical Support Center (TSC)
Emergency Package	- Emergency Operations Facility (EOF)
Resident Package	- Resident Inspector's Office (RI)

2. Notification and Alert Net

A. NAN Characteristics

1. Gold color

2. Group Ring-down Circuit which may bypass onsite and local offsite switches.

3. PVNGS onsite NAN locations:

a. STSCs

b. TSC

4. Offsite NAN locations

a. EOF

b. State EOC

c. ARRA

d. DPS

e. MSCO

f. County EOC

5. Battery backup is provided for all terminals and conference bridges.

B. Description

1. Phone terminal sets are equipped with "Push to Call" pushbutton and "Call Received" lamp as well as standard straight line ringer.

NOTIFICATION SYSTEMS USER'S GUIDE (CONT'D)

2. A loop-back function is provided to check both transmit and receive legs of each terminal from any point in the system.

3. The Interface/Controller contains a front panel meter and two green LEDs for battery capacity and battery charger status. Depress the pushbutton to check voltage level.

C. Operation

1. To originate a call, depress "Push to Call" button momentarily. This provides ringing to associated phones and turns on the "Call Received" lamp. Taking the phone off the hook cancels both bell and lamp.

2. A very low ringback signal is returned to the caller from all ringing phones to assure that the call is received by all parties. The signal is sufficiently low to allow conversation among all off-hook phones although others are still in the ringing mode.

3. Radio System

A. Characteristics

1. Eight channel system. Channel eight is backup for NAN.

2. System includes: two speaker amplifier, transmit VU meter; digital clock, microphone, amplifier for all transmit audio, interlocking channel select switches.

3. One speaker monitors all unselected channels, second speaker monitors the selected channel.

4. Selective and group call capabilities.

B. Operation

1. Depress eight channel button.

2. Depress TRANSMIT switch.

3. Utilize MONITOR, CALL, MUTE, BUSY and other functions as appropriate.

NOTIFICATION SYSTEMS USER'S GUIDE (CONT'D)

C. Locations

1. STSC
2. EOF
3. TSC
4. ARRA
5. ADES

4. Group Ring-Down Voice Circuits

A. Characteristics

1. Gold color
2. Used for transmission of technical information to office agencies, public affairs communications and communications of protective action recommendations to offsite agencies.
3. NAN is backup for communication of protective action recommendations.
4. Two independant circuits using Mountain Bell leased-lines and bypasing onsite and offsite switches - primary links.
5. Two independant circuits using APS microwave system - backup links.
6. Group call communications only.
7. Locations

Leased-Line Circuits		APS Microwave Circuits	
#1	#2	#1	#2
TSC	TSC	TSC	TSC
EOF	EOF	EOF	EOF
STSCs		STSCs	
ADES	ADES	ADES	ADES
ARRA	ARRA	ARRA	ARRA

NOTIFICATION SYSTEMS USER'S GUIDE (CONT'D)

5. Ring-Down Facsimile Circuits

A. Characteristics

1. Two independant circuits used for transmission of technical drawing and data. Primary circuit uses Mountain Bell leased lines bypassing onsite and offsite switches. Backup circuit utilizes APS microwave system.

2. STSC telecopier can connect to either the primary or backup circuits. The STSC machines must be lined to the proper circuit to receive transmissions. Telecopier is auto-answer with phone in parallel for voice communications.

3. Capabilities include group or station-to-station transmission.

4. Locations (leased-line and APS microwave)

a. EOF

b. TSC

c. STSC (must be switched to proper circuit)

d. CEC

e. ADES

f. ARRA

6. Federal Telecommunications System (FTS)

A. FTS Characteristics

1. Brown color

2. Used for transmittal of radiological information by NRC personnel onsite to NRC personnel at Bethesda and Regional Offices.

3. Backup to ENS and commercial lines for NRC notifications.

4. PVNGS onsite locations

a. EOF - NRC Office

NOTIFICATION SYSTEMS USER'S GUIDE (CONT'D)

b. TSC - NRC Office and Data Display Room

c. EOF - Emergency Command Center Data Display Area

d. NRC Resident Inspector's Office

e. Radiation Protection Office

7. Mobile Radio Telephone System

A. Operation

1. Dial the designated seven digit number.

8. Paging System

A. Characteristics

1. Two systems operated from Phoenix Microwave Center and PVNGS. The PVNGS System can access the Phoenix System via microwave ties.

2. Activation of onsite pagers used in plant operation takes precedence over system-wide orders for pager activation.

B. Operation

1. Select appropriate six digit address. From PVNGS, use the 81 prefix prior to accessing the Phoenix terminal and dial the six digit number.

2. The first two digits of the six digit number access the paging terminal; 46 for Phoenix and 88 for PVNGS.

3. The third digit is a priority digit. Priority One (1) will activate two or more paging transmitters. Priority Two (2) will activate the transmitter nearest the paged individuals work area.

4. The last three digits are the specific address of individuals to receive the calls.

NOTIFICATION SYSTEMS USER'S GUIDE (CONT'D)

9. Call-Out System (Auto Dialer)

A. Characteristics

1. Used by the Security Director to call in PVNGS emergency response personnel.

2. Capability to contact by telephone, radio, or voice pocket pager.

3. After dialing, the System will speak the appropriate message and record acknowledgment. If acknowledgment does not occur (no answer or busy), the system will periodically retry the number.

B. Operations

1. Turn enable/disable switch to enable position.

2. Select operating instructions from display.

"P" Program Phone Lists
"S" Start Notification Sequence
"C" Compose Message
"T" Time Set
"N" Notification Repetition Programming
"A" Acknowledge Code Programming
"M" Message Repetition Programming

3. Select appropriate preprogrammed telephone number list (1 to 8) or "new" for lists not programmed.

4. If message and telephone number list are preprogrammed, selection of that list and message may be accomplished on the front panel or by depressing "S".

5. If a new message is required, type the message on the terminal keyboard and enter.

6. The printer records acknowledgment status and time.

7. The System continues dialing and message delivery attempts until either all numbers acknowledge or the programmed number of repetitions has been completed.

THE PHONETIC ALPHABET

A	ALPHA	N	NOVEMBER
B	BRAVO	O	OSCAR
C	CHARLIE	P	PAPA
D	DELTA	Q	QUEBEC
E	ECHO	R	ROMEO
F	FOXTROT	S	SIERRA
G	GOLF	T	TANGO
H	HOTEL	U	UNIFORM
I	INDIA	V	VICTOR
J	JULIETT	W	WHISKEY
K	KILO	X	X-RAY
L	LIMA	Y	YANKEE
M	MIKE	Z	ZULU

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PROTECTIVE ACTION RECOMMENDATIONS

	Classification Category	Protective Actions Recommendations
1.	A General Emergency has been declared if: (imminent/actual loss of physical control of the plant)	Consider a (2) mile precautionary evacuation.
2.	A General Emergency has been declared and large amounts of fission products are in the containment atmosphere. The projected dose using containment area monitor readings is calculated to be: a) whole body > 5 rem b) thyroid > 25 rem	In addition to considering a 2) mile evacuation, consider a 5 mile downwind evacuation of potentially affected sectors.*
3.	A General Emergency has been declared and containment failure leading to a direct atmospheric release is likely in the sequence but <u>not</u> imminent and large amounts of fission products in addition to noble gases are in the containment atmosphere. The projected does using containment area monitor readings is calculated to be: a) whole body > 5 rem b) thyroid > 25 rem	In addition to considering a two (2) mile 360° precautionary evacuation, consider a precautionary 360° evacuation to 5 miles and a downwind evacuation to 10 miles of potentially affected sectors. *
4.	A General Emergency has been declared and large amounts of fission products other than noble gases in the containment atmosphere and containment <u>failure</u> is <u>judged imminent</u>. The projected dose using containment area monitor readings is calculated to be: a) whole body > 5 rems b) thyroid > 25 rems	In addition to considering a two (2) mile 360° precautionary evacuation consider a precautionary 360° evacuation to 5 miles and a downwind evacuation to 10 miles of potentially affected sectors,* and consider shelter for areas where evacuation cannot be completed before the transport of activity to those areas.

* Plume width is equal to 3 sigma y (as a minimum, the downwind sectors and adjacent sectors).

PROTECTIVE ACTION RECOMMENDATIONS (CONT'D)

Classification Category	Protective Actions Recommendations
5. An actual release has occured and the projected does to individuals in the population is calculated to be: a) whole body $\geq$ 0.5 to $<$ 1 rem b) thyroid $\geq$ 1.0 to $<$ 5 rems	Recommend seeking shelter 360° for two (2) miles and in affected sectors out to 10 miles.
6. An actual release has occured and the projected does to individuals in the population is calculated to be: a) whole body $>$ 1 rem to $\leq$ 5 rems b) thyroid $>$ 5 rems to $<$ 25 rems	Recommend a 360° evacuation for two (2) miles and in affected sectors* out to 10 miles. Recommend seeking shelter 360° out to 10 miles.
7. An actual release has occured and the projected does to individuals in the population is calculated to be: a) whole body $>$ 5 rems b) thyroid $>$ 25 rems	Recommend a 360° evacuation for five (5) miles and in affected sectors* out to 10 miles. Recommend seeking shelter 360° out to 10 miles.

* Plume width is equal to 3 sigma y (as a minimum, the downwind sector(s) and adjacent sectors).

GENERAL EMERGENCY
IMPLEMENTING PROCEDURES

EPIP-02 *Emergency Classification
EPIP-09 *Emergency Coordinator
EPIP-11 *TSC/STSC Activation
EPIP-12 *Operations Support Center Activation
EPIP-13 *Emergency Operations Facility Activation
EPIP-14A Release Rate Determination
EPIP-14B Dose Assessment
EPIP-15 *Protective Action Guidelines
EPIP-16 Inplant Surveys and Sampling
EPIP-17 Onsite/Offsite Surveys and Sampling
EPIP-18 Emergency Exposure Guidelines
EPIP-19 Onsite Evacuation
EPIP-20 *Personnel Assembly and Accountability
EPIP-21 Search and Rescue
EPIP-22 Personnel Injury
EPIP-23 Fire Fighting
EPIP-24 Security
EPIP-25 Reentry for Emergency Operations
EPIP-26 Potassium Iodine (KI) Administration
EPIP-27 Sample Analysis at the Station
EPIP-27A Handling, Transfer and Shipment of Postaccident Grab Samples
EPIP-28 Personnel Monitoring and Decontamination
EPIP-29 Area/Equipment Monitoring and Decontamination
EPIP-30 Radiological Emergency Response Vehicle Operations
EPIP-31 Recovery
EPIP-33 Offsite Assistance
EPIP-39 *Emergency Operations Director (EOD)
EPIP-40 *Administrative and Logistics Coordinator (ALC)
EPIP-41 *Radiological Assessment Coordinator (RAC)"
EPIP-42 *Technical Analysis Coordinator (TAC)
EPIP-43 *Radiological Assessment Communicator (RACom)
EPIP-44 *TSC Liaison Engineer (TLE)
EPIP-45 *Government Liaison Engineer (GLE)
EPIP-46 *EOF Contact
EPIP-47 *Logistics Communicator
EPIP-48 *Security Coordinator
EPIP-49 *Dosimetry Clerk
EPIP-50 *Status Board Keeper (SBK)
EPIP-51 *Offsite Technical Representative (OTR)
EPIP-52 *JENC Technical Advisor
EPIP-53 Government Staffing at TSC
EPIP-54 Government Staffing at EOF
EPIP-55 *TSC/EOF Personnel Identification

* This procedure shall be implemented for a GENERAL EMERGENCY classification.

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PVNGS EMERGENCY PLAN IMPLEMENTING PROCEDURE	PROCEDURE NO. EPIP-14D	
DOSE ASSESSMENT SUMMATION	REVISION 0	Page 1 of 17

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PVNGS # 8-9B

DEPT. HEAD _____ DATE 9/12/84

PRB/PRG REVIEW _____ DATE 9/18/84

APPROVED BY _____ DATE 9/18/84

EFFECTIVE DATE 9/24/84

DN-9620A/0814A

PV216-00DA (8/82)

REVISION HISTORY

Rev. No.	Date	Revised Pages	Comments

CONTROLLED DOCUMENT

TABLE OF CONTENTS

1.0 OBJECTIVE

This procedure provides instructions and calculations necessary to determine actual offsite whole body gamma and thyroid inhalation dose commitments and other organ commitments based upon actual meterological data, noble gas, and I-131 release rates (Ci/sec) and particulate deposition. These calculations provide a basis for decision making concerning recommendations of appropriate protective actions to state or county authorities.

2.0 REFERENCES

2.1 Implementing References

2.1.1 EPIP-14A, "Release Rate Determination"

2.1.2 EPIP-14B, "Initial Dose Assessment"

2.1.3 EPIP-14C, "Continuing Dose Assessment"

2.1.4 EPIP-15, "Protective Action Guidelines"

2.1.5 The CRAC System User's Manual, Rev. 2, April 1983

2.2 Developmental References

2.2.1 PVNGS Emergency Plan, Rev. 3

2.2.2 NRC Reg Guide 1.145, August 1979; "Atmospheric Dispersion Models for Potential Accident Consequence Assessments at Nuclear Power Plants"

2.2.3 NRC Reg Guide 1.111, July 1, 1977, Rev 1; "Methods for Estimating Atmospheric Transport and Dispersion of Gaseous Effluent in Routine Releases from Light-Water-Cooled Reactors

2.2.4 Introduction to Nuclear Engineering, John R. LaMarsh, Addison Wesley Publishing Company, December 1977

2.2.5 Health Physics Journal, November 1981, Volume 41 No. 5, page 759

2.2.6 NRC Reg Guide 1.109 "Calculation of Annual Doses to Man from Routine Releases of Reactor Effluents for the Purpose of Evaluating Compliance with 10CFR50, Appendix I", October 1977.

CONTROLLED DOCUMENT

2.2.7 EPA "Manual of Protective Action Guides and Protective Actions for Nuclear Accidents" Appendix D, Revised June 1980

2.2.8 Desert dispersion parameters as referenced in NUREG/CR-2858, "PAVAN: An Atmospheric Dispersion Program for Evaluating Design Basis Accidental Releases of Radioactive Materials from Nuclear Power Stations", Nov. 82.

2.2.9 Meteorology and Atomic Energy, David A. Slade, Editor, 1968.

2.2.10 Journal of Applied Meteorology, Volume 3, p. 83-91, "A Diffusion Model for an Urban Area", D. B. Turner, 1964.

2.2.11 ANSI N45.2.9 "Requirements for Collection, Storage and Maintenance of Quality Assurance Records for Nuclear Power Plants, 1974.

2.1.12 EPIP-16, "Inplant Surveys and Sampling", Rev. 2

2.1.13 EPIP-17, "Onsite/Offsite Surveys and Sampling", Rev. 2

2.1.14 EPIP-33 "Offsite Assistance", Rev. 2

3.0 LIMITATIONS AND PRECAUTIONS

4.0 DETAILED PROCEDURE

4.1 Personnel Indoctrination/Responsibilities

4.1.1 The Radiological Protection Coordinator (at the TSC) shall be responsible for dose calculations and/or projections when the TSC become operational.

4.1.2 The Radiological Protection Coordinator will direct dose assessment summation as the incident progresses.

4.2 Prerequisites

4.2.1 An ALERT or more severe class emergency has been declared.

4.2.2 A release of airborne radioactive material has occurred.

4.2.3 Initial and continuing dose assessment has been performed.

4.2.4 Field data has been analyzed and offsite TLDs have been read.

4.3 Instructions

NOTE

Actual dose rates and integrated doses vary as a function of:

1) The duration of the release;

2) The release rates (dependent upon effective age);

3) The isotopic mixture of the release (dependent upon effective age);

4) Existing meterological conditions.

4.3.1 Once the initial offsite dose projections/assessments have been completed, determine/verify ground contamination based on isotopic analysis of soil samples.

4.3.1.1 Use the Appendix A work sheet and multiply surface contamination level by the given contamination dose rate conversion factor to obtain the corresponding dose rate.

4.3.1.2 Sum the dose rate per each isotope to determine total WB/skin dose rate.

4.3.1.3 Transfer data to appropriate column in Appendix D.

4.3.2 Determine inhalation dose assessment based on isotopic analysis of field particulate air samples.

NOTE

Inhalation dose commitment from particulates is comparatively small; however, based on amount of fuel damage and time of release after Rx trip, the influence of this dose commitment (calculated for WB, lung and critical organ) may be more significant.

4.3.2.1 Using Appendix B work sheet, multiply the concentration of each isotope by its corresponding inhalation dose factor to obtain the inhalation dose rate per WB, lung and/or critical organ.

4.3.2.1 Using Appendix B work sheet, multiply the concentration of each isotope by its corresponding inhalation dose factor to obtain the inhalation dose rate per WB, lung and/or critical organ.

4.3.2.2 Sum these values to determine total WB/lung/other organ dose rate; multiply the corresponding values by exposure time and conversion factor (1E-3 rem/mrem) to obtain inhalation dose commitment.

4.3.2.3 Complete calculations on page 1 of 2, Appendix B, for adult inhalation dose commitment and page 2 of 2, Appendix B, for child inhalation dose commitment.

4.3.2.4 Transfer data to appropriate column in Appendix D.

4.3.3 Determine ingestion dose assessment based on isotopic analysis of consumable products (milk, water, etc.).

NOTE

This assessment should be initiated if it has been determine that there has been ground deposition.

4.3.3.1 Use Appendix C work sheet and record the sample isotopic concentration.

4.3.3.2 Record the appropriate daily ingestion factor indicated in Appendix C.

4.3.3.3 Perform the indicated calculation on page 1 and 2.

4.3.3.4 Sum the isotopic commitment value per WB/GI/other organ for a given food item.

4.3.3.5 Complete the form and transfer data to the appropriate column in Appendix D.

4.3.4 Upon completing Appendices A through C and having obtained applicable information from EPIP 14C, use Appendix D to summarize the total integrated WB dose and child thyroid dose per affected sector(s) and downwind distance. Also summarize the total level of surface contamination, dose rates from surface contamination, inhalation dose commitment, and ingestion dose commitment.

NOTE

Critical organ is defined as that part of the body that is most susceptible to radiation damage per a given radioisotope (eg: strontium is a bone seeker).

NOTE

Critical population segment is defined as that group of individuals most susceptible physiologically to radiation injury.

4.3.4.1 Determine the highest accumulative whole body dose per each affected sector and given downwind distance. Record information on Appendix E.

4.3.4.2 Determine the highest accumulative child thyroid dose per each affected sector and given downwind distance. Record information on Appendix E.

4.3.4.3 Determine the population density per each affected sector and given downwind distance using page 1 and 2 of Appendix F and record information on Appendix E.

4.3.4.4 Multiply dose (WB/thyroid) vs population density to determine total population dose per affected sector and given downwind distance.

4.3.4.5 Compare these dose commitments to the EPA protective action guidelines in determining offsite protective action recommendations to the state - i.e. "population doses should be kept as low as practical as long as the effects of actions are not more hazardous than the projected dose".

Dose Rate From Ground Contamination

Receptor Location _____

Sample ID _____

ISOTOPE	SURFACE CONTAMINATION LEVEL (Ci/m^2)	X	CONTAMINATION DOSE RATE CONVERSION FACTOR ($mrem\text{-}m^2/hr\text{-}Ci$)	=	DOSE RATE FROM CONTAMINATED SURFACES (mrem/hr) (WB)	(SKIN)
Cr-51			2.60E02 (Skin)			
			2.20E02 (WB)			
Mn-54			6.80E03 (Skin)			
			5.80E03 (WB)			
Fe-59			9.40E03 (Skin)			
			8.00E03 (WB)			
Co-58			8.20E03 (Skin)			
			7.00E03 (WB)			
Co-50			2.00E04 (Skin)			
			1.70E04 (WB)			
Zn-65			4.60E03 (Skin)			
			4.00E03 (WB)			
Sr-89			6.50E-01 (Skin)			
			5.60E-01 (WB)			
Y-90			2.60 (Skin)			
			2.20 (WB)			
Zr-95			5.80E03 (Skin)			
			5.00E03 (WB)			
Nb-95			6.00E03 (Skin)			
			5.10E03 (WB)			
Mo-99			2.20E03 (Skin)			
			1.90E03 (WB)			
I-131			3.40E03 (Skin)			
			2.80E03 (WB)			
I-133			4.50E03 (Skin)			
			3.70E03 (WB)			
Cs-134			1.40E04 (Skin)			
			1.20E04 (WB)			
Cs-137			4.90E03 (Skin)			
			4.20E03 (WB)			
Ba-140			2.40E03 (Skin)			
			2.10E03 (WB)			
La-140			1.70E04 (Skin)			
			1.50E04 (WB)			
Ce-144			3.70E02 (Skin)			
			3.20E02 (WB)			
			(Skin)			
			(WB)			

Performed by _____ Date/Time _____

Reviewed by _____ Date/Time _____

CONTROLLED DOCUMENT

Inhalation Dose Commitment - Adult

Receptor Location _____

Sample ID _____

ISOTOPE	CONCENTRATION (uCi/cc)	X	INHALATION DOSE FACTOR (mrem-cc/uCi-hr)	=	INHALATION DOSE RATE (mrem/hr of exposure) (WB)	(LUNG)	(OTHER)
Cr-51			2.14E04 (WB)				
			1.64E06 (Lung)				
Mn-54			7.19E05 (WB)				
			1.60E08 (Lung)				
Fe-59			1.21E06 (WB)				
			1.16E08 (Lung)				
Co-58			2.37E05 (WB)				
			1.06E08 (Lung)				
Co-60			1.68E06 (WB)				
			6.81E08 (Lung)				
Zn-65			5.31E06 (WB)				
			9.86E07 (Lung)				
Sr-89			9.95E05 (WB)				
			1.60E08 (Lung)				
Sr-90			6.96E08 (WB)				
			1.10E09 (Lung)				
			1.13E10 (Bone)				(Bone)
Y-90			6.40E03 (WB)				
			1.94E07 (Lung)				
Zr-95			2.65E06 (WB)				
			2.02E08 (Lung)				
Nb-95			4.80E05 (WB)				
			5.76E07 (Lung)				
Mo-99			2.62E03 (WB)				
			1.04E07 (Lung)				
			2.83E07 (GI)				(GI)
Cs-134			8.31E07 (WB)				
			1.11E07 (Lung)				
			4.26E07 (Bone)				(Bone)
Cs-137			4.89E07 (WB)				
			8.58E06 (Lung)				
			7.09E07 (Liver)				(Liver)
Ba-140			2.93E05 (WB)				
			1.45E08 (Lung)				
La-140			5.23E03 (WB)				
			1.55E07 (Lung)				
			5.23E07 (GI)				(GI)
Ce-144			2.10E07 (WB)				
			8.88E08 (Lung)				

Performed by _____ Date/Time _____

Reviewed by _____ Date/Time _____

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Inhalation Dose Commitment - Child

Receptor Location _____

Sample ID _____

ISOTOPE	CONCENTRATION (uCi/cc)	X	INHALATION DOSE FACTOR (mrem-cc/uCi-hr)	=	INHALATION DOSE RATE (mrem/hr of exposure) (WB)	(LUNG)	(OTHER)
Cr-51			1.76E04 (WB)				
			1.94E06 (Lung)				
Mn-54			1.09E06 (WB)				
			1.80E08 (Lung)				
Fe-59			1.90E06 (WB)				
			1.45E08 (Lung)				
Co-58			3.61E05 (WB)				
			1.26E08 (Lung)				
Co-60			2.58E06 (WB)				
			8.07E08 (Lung)				
Zn-65			8.03E06 (WB)				
			1.14E08 (Lung)				
Sr-89			1.97E06 (WB)				
			2.46E08 (Lung)				
Sr-90			7.35E08 (WB)				
			1.69E09 (Lung)				
			1.15E10 (Bone)				(Bone)
Y-90			1.26E04 (WB)				
			2.99E07 (Lung)				(Bone)
Zr-95			4.22E06 (WB)				
			2.55E08 (Lung)				
Nb-95			7.48E05 (WB)				
			7.01E07 (Lung)				
Mo-99			4.86E03 (WB)				
			1.55E07 (Lung)				
			1.44E07 (GI)				(GI)
Cs-134			2.56E07 (WB)				
			1.38E07 (Lung)				
			7.43E07 (Bone)				(Bone)
Cs-137			1.47E07 (WB)				
			1.19E07 (Lung)				
			9.42E07 (Liver)				(Liver)
Ba-140			4.94E05 (WB)				
			1.99E08 (Lung)				
La-140			8.62E03 (WB)				
			2.09E07 (Lung)				
			2.58E07 (GI)				(GI)
Ce-144			4.13E07 (WB)				
			1.36E09 (Lung)				

Performed by _____ Date/Time _____

Reviewed by _____ Date/Time _____

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Ingestion Dose Assessment Worksheet - Adult

Receptor location _____

Sample ID _____

Sample Type: Milk _____

Water _____

Meat/Poultry ____

Fish _____

Vegetables/ Fruit _____

ISOTOPE	ISOTOPIC CONCENTRATION (uCi/unit*)	X	DAILY INGESTION FACTOR (unit/day)	=	INGESTION DOSE FACTOR (mrem/uCi)	X	CONVERSION FACTOR (1E-3 rem/mrem)	=	INGESTION DOSE COMMITMENT (rem)**
					8.84 (WB)				(WB)
					4.94E1 (GI)				(GI)
Sr-89					3.08E2 (BONE)				(BONE)
					1.86E3 (WB)				(WB)
					2.19E2 (GI)				(GI)
Sr-90					7.58E3 (BONE)				(BONE)
					3.41 (WB)				(WB)
					1.57 (GI)				(GI)
I-131					1.95E3 (THYROID)				(THYROID)
					7.51E-1 (WB)				(WB)
					2.22 (GI)				(GI)
I-133					3.63E2 (THYROID)				(THYROID)
					1.21E2 (WB)				(WB)
					2.59 (GI)				(GI)
Cs-134					1.48E2 (LIVER)				(LIVER)
					7.14E (WB)				(WB)
					2.11 (GI)				(GI)
Cs-137					1.09E2 (LIVER)				(LIVER)

* A unit equals 1 liter for milk and water an 1 lkg for all others
** rem/day of exposure

Daily Ingestion factor

	Child	Adult
Milk (l/d)	.9	.85
Water (l/d)	1.4	2.0
Meat/Poultry (kg/d)	.11	.30
Vegetables/ Fruits (kg/d)	1.4	1.4
Fish (kg/d)	.02	.06

Total Whole Body Ingestion Dose Commitment _____ rem
Total Thyroid Ingestion Dose Commitment _____ rem
Total GI Tract Ingestion Dose Commitment _____ rem
Total Bone Ingestion Dose Commitment _____ rem
Total Liver Ingestion Dose Commitment _____ rem

Performed by _____ Date/Time _____

Revieved by _____ Date/Time _____

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Ingestion Dose Assessment Worksheet - Child

Receptor Location _____

Sample ID _____

Sample Type: Milk _____

Water _____

Meat/Poultry _____

Fish _____

Vegetables/ Fruit _____

ISOTOPE	ISOTOPIC CONCENTRATION (uCi/unit*)	X	DAILY INGESTION FACTOR (unit/day)	X	INGESTION DOSE FACTOR (mrem/uCi)	X	CONVERSION FACTOR (1E-3 rem/mrem)	=	INGESTION DOSE COMMITMENT (rem)**
Sr-89					8.84 (WB)				(WB)
					4.94E1 (GI)				(GI)
					3.08E2 (BONE)				(BONE)
Sr-90					1.86E3 (WB)				(WB)
					2.19E2 (GI)				(GI)
					2.29E3 (BONE)				(BONE)
I-131					3.41 (WB)				(WB)
					1.57 (GI)				(GI)
					1.95E3 (THYROID)				(THYROID)
I-133					7.53E-1 (WB)				(WB)
					2.22 (GI)				(GI)
					3.63E2 (THYROID)				(THYROID)
Cs-134					2.82E2 (WB)				(WB)
					2.29 (GI)				(GI)
					1.48E2 (LIVER)				(LIVER)
Cs-137					7.14E1 (WB)				(WB)
					2.11 (GI)				(GI)
					1.09E2 (LIVER)				(LIVER)

* A unit equals 1 liter for milk and water an 1 kg for all others

** rem/day of exposure

Total Whole Body Ingestion Dose Commitment _____ rem

Total Thyroid Ingestion Dose Commitment _____ rem

Total GI Tract Ingestion Dose Commitment _____ rem

Total Bone Ingestion Dose Commitment _____ rem

Total Liver Ingestion Dose Commitment _____ rem

Performed by _____ Date/Time _____

Reviewed by _____ Date/Time _____

Daily Ingestion Factor

	Child	Adult
Milk (l/d)	.9	.85
Water (l/d)	1.4	2.0
Meat/Poultry (kg/d)	.11	.30
Vegetables/ Fruits (kg/d)	1.4	1.4
Fish (kg/d)	.02	.06

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Dose Assessment Summation

Downwind Distance from Plant (mi)	Affected Sector(s)	Wind Direction (from)°	Wind Speed (mph)	Stability Class	X/Q (sec/m³)	Release Rate (Ci/sec) NG, I-131, Particulate	Measured Dose Rates (rem/hr) WB	Measured Dose Rates (rem/hr) Thyroid	Measured Surface Contamination (Ci/m²)	Measured Dose Rates from Surface Contamination (rem/hr) WB	Measured Dose Rates from Surface Contamination (rem/hr) Skin	Measured Inhalation Dose Commitment (rem) Critical Organ	Measured Inhalation Dose Commitment (rem) Critical Population Segment	Measured Ingestion Dose Commitment Critical Organ	Measured Ingestion Dose Commitment Critical Population Segment
EAB															
1															
2															
3															
4															
5															
6															
7															
8															
9															
10															
11															
12															
13															
14															
15															
16															
17															
18															
19															
20															

Prepared by _____ Date/Time _____

Reviewed by _____ Date/Time _____

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Total Population Dose Commitment
Based on WB/Child Thyroid Dose

Downwind Distance From Plant (mi)	Affected Sector		Dose (rem)	Population X Density	Total Population Dose (rem) =
EAB		WB			
		Child Thyroid			
1		WB			
		Child Thyroid			
2		WB			
		Child Thyroid			
3		WB			
		Child Thyroid			
4		WB			
		Child Thyroid			
5		WB			
		Child Thyroid			
6		WB			
		Child Thyroid			
7		WB			
		Child Thyroid			
8		WB			
		Child Thyroid			
9		WB			
		Child Thyroid			
10		WB			
		Child Thyroid			
11		WB			
		Child Thyroid			
12		WB			
		Child Thyroid			
13		WB			
		Child Thyroid			
14		WB			
		Child Thyroid			
15		WB			
		Child Thyroid			
16		WB			
		Child Thyroid			
17		WB			
		Child Thyroid			
18		WB			
		Child Thyroid			
19		WB			
		Child Thyroid			
20		WB			
		Child Thyroid			

Prepared by: _____ Date/Time _____

Reviewed by: _____ Date/Time _____

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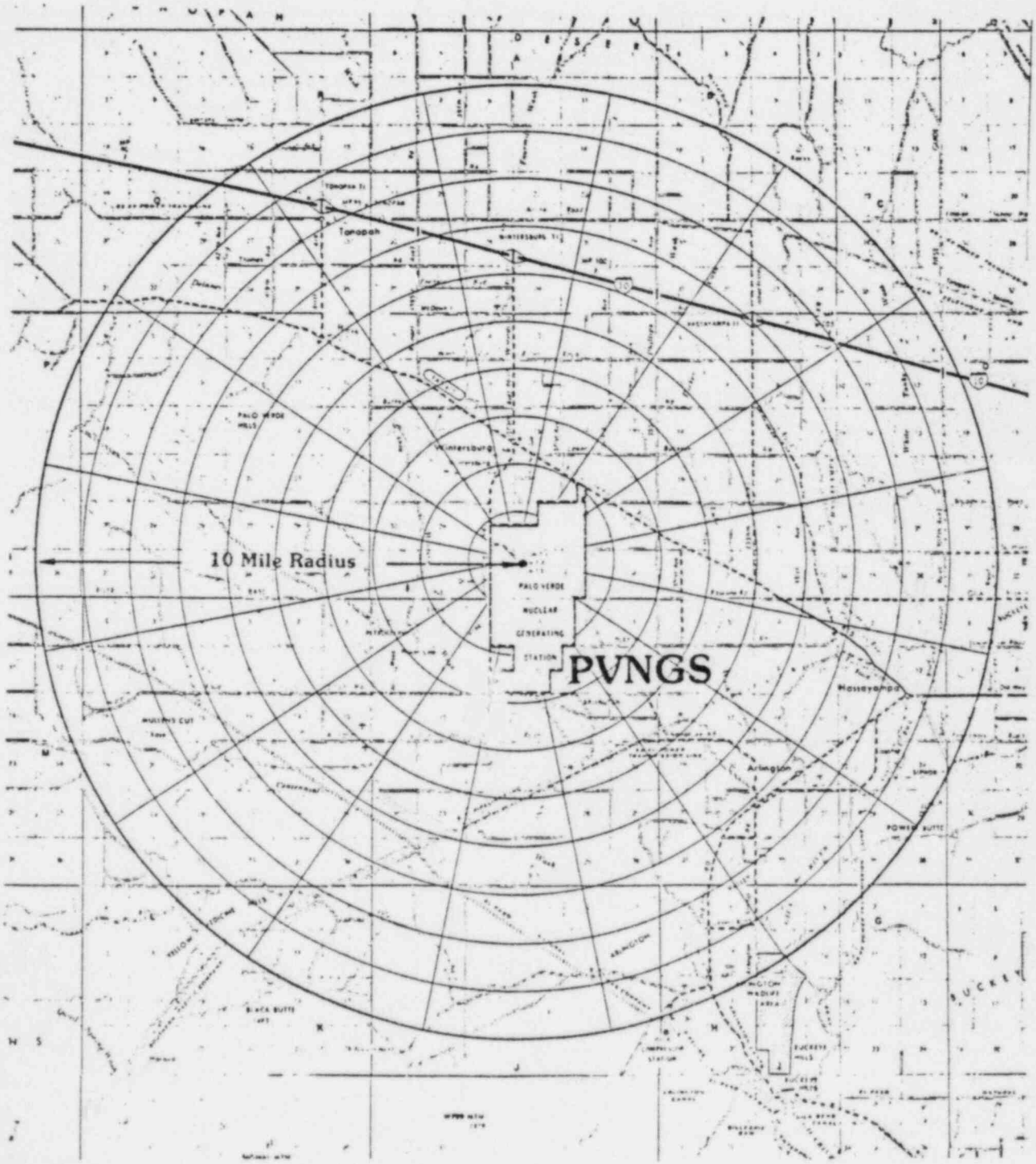

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CONTROLLED DOCUMENT

RADIUS

SECTOR

	A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q	R
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2	16	10	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	295	35	59	4	4	0	0	0	0	0	4	0	0	0	0	0
4	84	81	22	16	4	22	0	4	0	4	7	0	0	0	10	7
5	22	31	66	72	22	13	4	13	7	4	10	0	0	0	22	0
6	22	0	87	41	186	0	7	4	4	0	0	4	0	0	35	4
7	16	50	13	84	0	13	115	0	0	0	0	4	0	0	0	16
8	22	78	7	0	31	0	106	4	0	0	0	0	0	0	13	372
9	13	47	4	10	66	56	10	66	0	0	0	0	0	0	19	66
10	0	0	4	97	47	22	4	155	0	0	0	0	0	0	7	81

These data are for permanent residents only (no transients).
Source is MCDCD&ES, which will update data periodically.

PVNGS EMERGENCY PLAN IMPLEMENTING PROCEDURE	PROCEDURE NO. EPIP-56	
ULTIMATE HEAT SINK EMERGENCY WATER SUPPLY	REVISION 1	Page 1 of ~~13~~ 12

ASSIGNED COPY

PVNGS #8-9B

DEPT. HEAD _____ DATE 4/21/84

PRB/PRG REVIEW _____ DATE 4/21/84

APPROVED BY _____ DATE 4/21/84

EFFECTIVE DATE 4/24/84

DN-2050V/0470V

PV216-000A (8/82)

REVISION HISTORY

Rev. No.	Date	Revised Pages	Comments

CONTROLLED DOCUMENT

TABLE OF CONTENTS

APPENDICES

CONTROLLED DOCUMENT

1.0 OBJECTIVE

1.1 To provide guidance on the establishment of an Emergency alternate water supply to maintain sufficient water inventory in the unit spray ponds.

2.0 REFERENCES

2.1 Implementing References

2.1.1 Arizona Revised Statute 45-517

2.1.2 PVNGS Technical Specifications

2.2 Developmental References

2.2.1 Reg Guide 1.27, Rev. 2

2.2.2 PVNGS Emergency Plan Rev. 3

2.2.3 FSAR Sect. 9.2, Amm. 12

3.0 LIMITATIONS AND PRECAUTIONS

3.1 A reliable water supply capable of 225 gpm to each unit shall be operating within 27 days of a Safe Shutdown Earthquake.

3.2 The spray pond water level shall be maintained within operable levels per Technical Specifications to provide adequate heat removal capability and avoid reactor core damage.

3.3 If construction delays, redundant equipment failures or other unforeseen events threaten the availability and/or reliability of heat removal systems and/or water supply systems or water inventory the Emergency Coordinator, with the concurrence of Emergency Operation Director, shall take whatever action required to restore heat removal capability, including but not limited to;

3.3.1 Utilization of any available water supply and any resources available for delivery to the unit spray ponds.

3.3.2 Any resources available through APS Emergency Organization onsite or offsite.

3.4 Under Arizona Revised Statute 45-517, 1980, State Groundwater Code, evidence shall be submitted to the Director of Water Resources that an emergency exists as soon as reasonably practical after withdrawals of groundwater commence.

4.0 DETAILED PROCEDURE

4.1 Personnel Indoctrinatior/Responsibilities

4.1.1 Personnel within the Emergency Organization should be aware of the ramifications of a loss of water inventory and/or supply systems.

4.1.2 The Emergency Coordinator has overall responsibility for maintaining sufficient water inventory and deciding that an emergency well and piping system should be constructed. This decision should be made within 6 days of the emergency declaration.

4.1.3 The Emergency Maintenance Coordinator and the Technical Engineering Coordinator are responsible for providing the Emergency Coordinator with an accurate assessment of current water inventory, the status of normal water supply systems, time estimates for restoration of normal systems, alternate supplies and technically sound solutions to any outstanding water supply problems.

4.1.4 The Security Director is responsible for the movement, clearance and badging of personnel entering the station to provide support; i.e.; well drilling crews.

4.1.5 The Administrative and Logistics Coordinator is responsible for initiating actions and calling offsite resources required to support the effort to restore sufficient water supplies.

4.2 Prerequisites

4.2.1 A Safe Shutdown Earthquake (SSE), other seismic disturbance or redundant equipment failures has occurred to eliminate or restrict water supply to the unit spray ponds.

4.3 Instructions

NOTE

This procedure shall be implemented to secure a dependable water supply, capable of delivering 225 gpm to each unit within 27 days of a Safe Shutdown Earthquake or other accident which eliminates or restricts normal water supply to an unsafe level.

NOTE

This procedure shall be initiated within 6 days of a seismic event or SSE which results in irrepairable damage to the three onsite wells which supply makeup water to the Spray Ponds.

NOTE

See Appendix B for primary and Alternate Well Site Selection.

4.3.1 The Emergency Maintenance Coordinator shall initiate the action to determine the extent of damage to normal water supply systems, estimated time and resources required to make required repairs and restore normal systems. See Appendix E for available spare parts.

4.3.2 The Technical Engineering Coordinator shall initiate actions to determine the amount and availability of any alternate water reserves, i.e.: cooling tower basins, water reservoir and methods for delivery to spray ponds.

4.3.4 The Administrative and Logistics Coordinator shall take action to mobilize the following:

4.3.4.1 A well drilling company capable of sinking the required well within 15 days (27 days from time 0). See Appendix A for local companies.

4.3.4.2 An irrigation or other piping supply company capable of delivering temporary piping. See Appendix D for source of temporary piping.

4.3.4.3 Earth Technology Corp. may provide engineering support as needed, (Another suitable engineering firm may be used if Earth Technology Corp. is unavailable).

4.3.4.4 Bechtel Power Corporation shall provide engineering and/or field assistance as needed.

4.4 Routes to Palo Verde

4.4.1 Normal route to PVNGS for equipment from Phoenix would be Interstate 10 to Wintersburg Road and south to the site. (See Appendix C).

4.4.2 Alternate routes of travel should be established by the Administrative and Logistics Coordinator depending on resource availability, location and extent of any damage to offsite resources. (A suggested alternate route of travel is shown in Appendix C).

OFFSITE CONTACTS

WELL DRILLING COMPANIES

1. B C & M Drilling Inc., 1128 South Lewis Mesa, AZ 85202
   Anthony Ebouchard [redacted]

2. Morrow Drilling Co., 4302 East Superior, Phoenix, AZ 85040
   Bill Kingsbury [redacted]

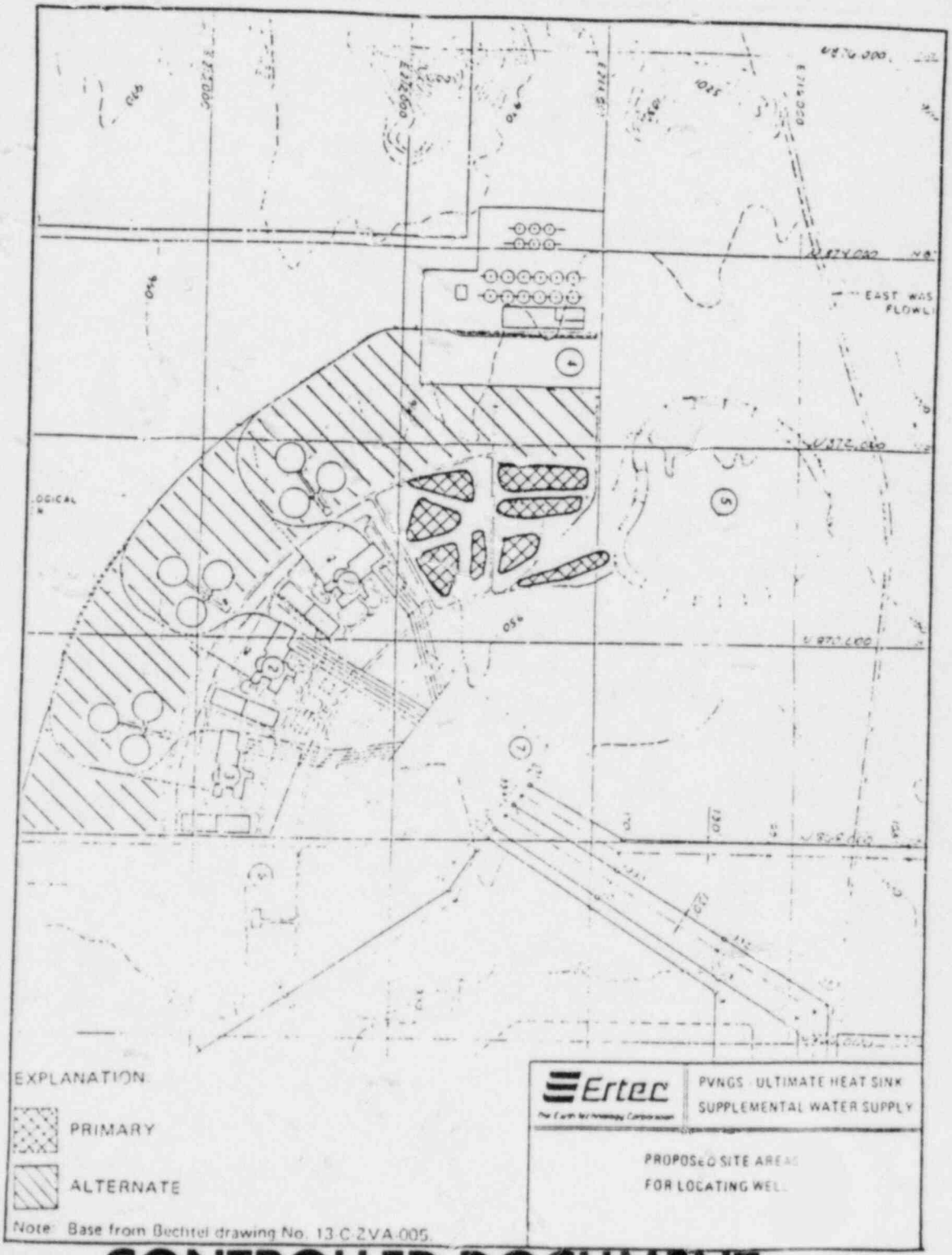
3. Bert Perry Drilling, 5338 East Apache Trail, Mesa, AZ 85205
   Bert Perry [redacted]

4. Campbell's Drilling, Inc., P.O. Box 833, Wickenburg, AZ 85358
   Dean Campbell [redacted]

5. EARTH TECHNOLOGY CORP.
   3116 West Thomas Road, Suite 601, P.O. Box 14570, Phoenix, AZ 85063
   [redacted]

6. Layne-Western Co., 9002 South Hardy Drive, Tempe, AZ 85284
   Dave Bowen [redacted]

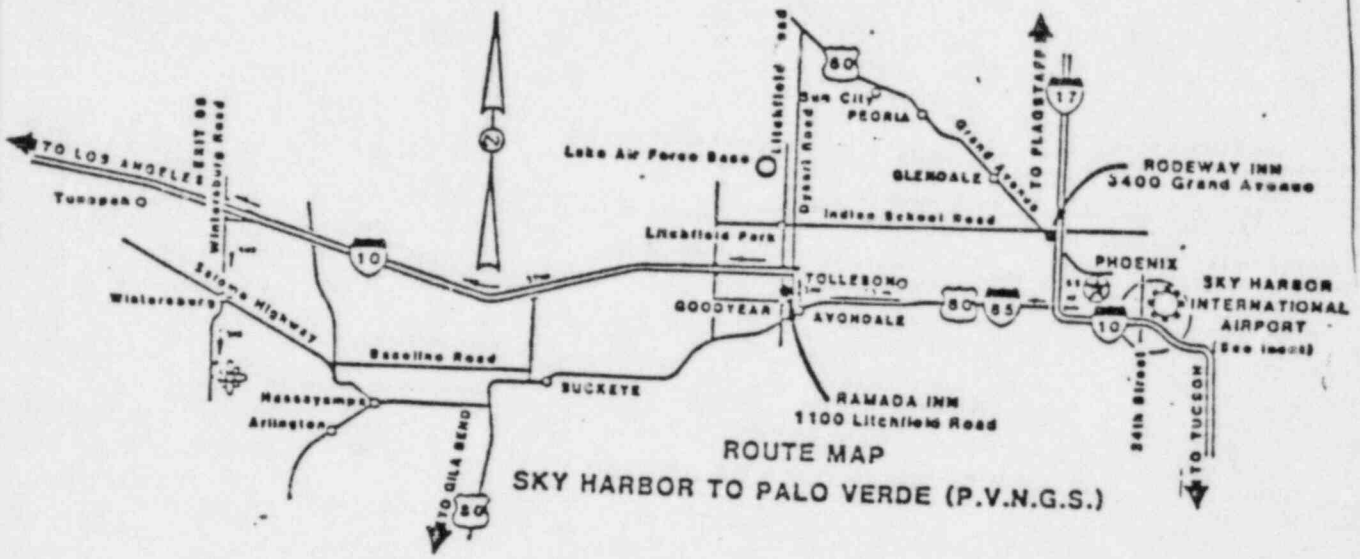
WELL SITE SELECTION



PV216-000A (8

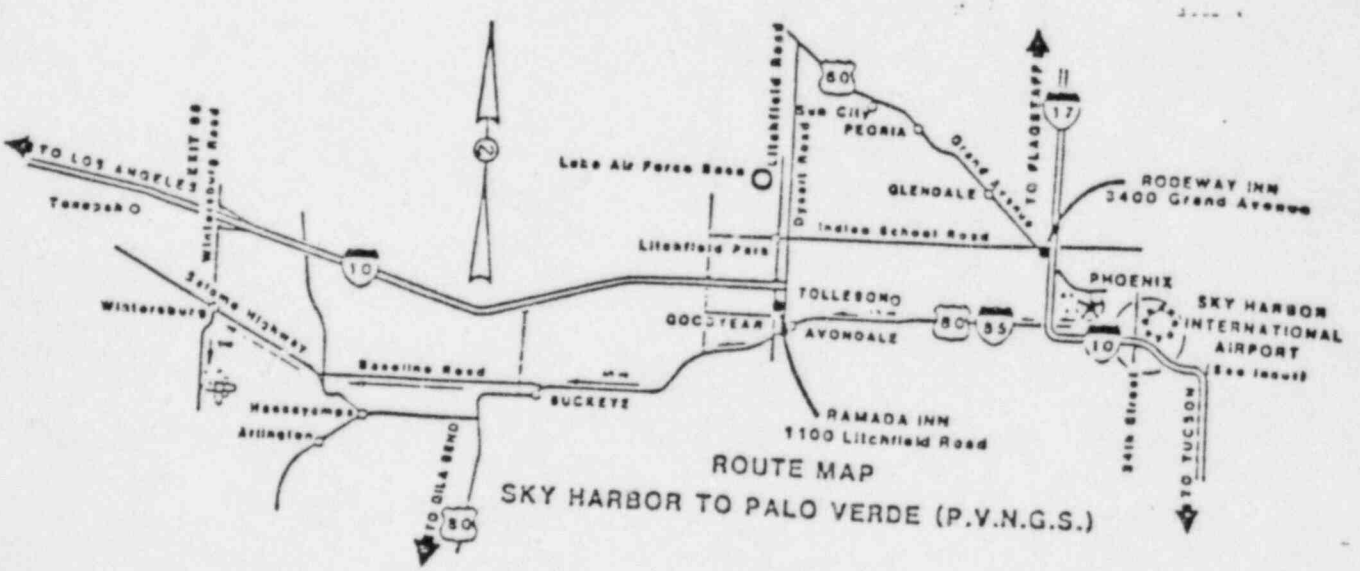
PRIMARY ROUTE FROM PHOENIX

TO PVNGS



ROUTE MAP

SKY HARBOR TO PALO VERDE (P.V.N.G.S.)



ROUTE MAP

SKY HARBOR TO PALO VERDE (P.V.N.G.S.)

ALTERNATE ROUTE FROM PHOENIX

TO PVNGS

TEMPORARY PIPING SUPPLIER

1. Rain for Rent Irrigation Systems, 26001 S. Arizona Hwy 93 Chandler, AZ
   Carl Teddy [redacted]

CONTROLLED DOCUMENT

DEEP WELL SPARE PARTS
PO # FC502, F15B394

	EQUIPMENT	QTY	BECHTEL MRR	APS MRR	LOCATION
1)	Pump Bowl Assembly	1	168063	952907	C19A9-10 C20A5-6
2)	Weld on Cone Galvanized Strainer 10"	1	167856	952907	C19A9
3)	Toe Pipe 10" x 10"	1	167856	952907	D21K
4)	200 Hp Electric Motor 3ϕ 1800 RPM	1	168063	952907	C4K
5)	Disc, Head (HD 16x10 NAT)	1	168063	952907	C19B9
6)	TPI Tube 20' Lengths	19	168063	952907	D21K
7)	Butt T & C Column Pipe 10" x 279" x 20'	19	168063	952907	D21K

EMERGENCY PLAN IMPLEMENTING PROCEDURE TRANSMITTAL
LIST I

EPIP NO. Change List-09/25/84, EPIP #14C Rev. 0 DATE 09/25/84

CANCELLATION-#07 Rev.2, CANCELLATION-#10 Rev. 0, #14A PCN 01 Rev. 3.

A	
J. Elish	6-8
G. Fiorelli	8-1
R. Selman	5-37
M. A. Cates	5-103
Compliance	5-17
Leon Brown	5-33
J. G. Sarver	5-102
V. Rhodes	1-1
John Schlag	5-15
T. Exum	5-40
DDC Library	1-2
M. W. Lantz	5-35
M. A. Hill	5-91
Harry Bieling	17-9
E. J. Hayes	5-34
J. Cederquist	5-20
T. Shriver	5-8
T. Barsuk	5-86
D. Best	5-88
R. Johnson	5-42
Sec Cpt	15-1
E. Cullen	5-41
EOF	17-1A
EOF	17-1B
EOF	17-1C
EOF	17-1D
EOF (Room 12)	17-1E
EOF	17-1F
Unit 2 Rad Protection	5-95
Jack Sims	17-2
Sharyn Eklund	17-3
Mike Crusa	17-4
Bob Page	17-5
Jerry Self	5-79
Mary Gerdes	13-12
Dennis Yows	5-36
Bill Knighton	15-2
Russ Papworth	5-7
Bruce Rash	13-18
Dan Phillips	13-16

B	
J. M. Allen	5-31
W. Fernow	5-14
C. Anderson	6-7
Sim Obs Rm	5-89
C. R. Dunaway	5-9
D. Nelson	5-18
M. Whitaker	5-38
J. Tench	5-19
. Poroutbka	6-6
. R. Bynum	5-22
B. Simmons	6-10
F. Hicks	6-9

C	
Unit 1 Control Room	5-2B
Kris Oberdorf	5-6
G. Olson	3-2
Unit 1 Radwaste	5-43
OSC Coordinator	3-15
A. Porter	3-3
T. Warren	5-21

D	
B. Rogers/TSC	5-94
John Cole	3-10
TSC	3-5
Les Barlow	3-8
Steve Grove	3-4
Greg Roettger	5-99
Maintenance Manager	3-11
TSC E Plan Anal	3-5A
John Kirby	2-4
Unit 2 Control Room	5-25

E	
D. Fasnacht	19-1
M. Zimmerman	20-1

F	
WRF/DDC	1-7

G	
Bob Adney/Unit II	5-39
John Scott	5-32

FOR NRC	
TAKE TO KARL GROSS ON R/A	
Jack Martin/Adm.	8-8
Document Cont. Desk	8-9A
Document Cont. Desk	8-9B
Ray Fish	8-5
Perry Robinson	8-6

PROCEDURE GROUP	
Dennis Yows	5-36A thru 5-36I
Emergency Kits coordinate w/ J. Sims	

010

CONTROLLED DOCUMENT

PALO VERDE NUCLEAR GENERATING STATION
EMERGENCY PLAN IMPLEMENTING PROCEDURES

CHANGE LIST DATE 09/25/84

Procedure Number	Procedure Title	Rev.	Date Effective
EPIP #14C	CONTINUING DOSE ASSESSMENT	0	09/25/84
EPIP #07	CANCELLATION..... NOTIFICATION PROCESS	2	09/17/84
EPIP #10	CANCELLATION..... SHIFT SUPERVISOR	0	09/24/84
(PCN) EPIP #14A-01	RELEASE RATE DETERMINATION	3	09/24/84

ASSIGNED COPY

PVNGS # 8-98

CONTROLLED DOCUMENT

EMERGENCY PLAN IMPLEMENTING PROCEDURE TRANSMITTAL

LIST I

EPIP NO. EPIP-07 (CANCELLATION) EPIP-10 (CANCELLATION) REVISION 2 0 DATE 09/25/84

A	
V. Elish	6-8
G. Fiorelli	8-1
R. Selman	5-37
M. A. Cates	5-103
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Leon Brown	5-33
J. G. Sarver	5-102
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M. A. Hill	5-91
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E. J. Hayes	5-34
J. Cederquist	5-20
T. Shriver	5-8
T. Barsuk	5-86
D. Best	5-88
R. Johnson	5-42
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E. Cullen	5-41
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EOF	17-1B
EOF	17-1C
EOF	17-1D
EOF (Room 12)	17-1E
EOF	17-1F
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Mike Crusa	17-4
Bob Page	17-5
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Mary Gerdes	13-12
Dennis Yows	5-36
Bill Knighton	15-2
Russ Papworth	5-7
Bruce Rash	13-18
Dan Phillips	13-16

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FOR NRC	
TAKE TO KARL GROSS ON R/A	
Jack Martin/Adm.	8-8
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PROCEDURE GROUP	
Dennis Yows	5-36A thru 5-36I
Emergency Kits coordinate w/ J. Sims	

Note: CANCELLATION - Remove entire Procedure

PVNGS EMERGENCY PLAN IMPLEMENTING PROCEDURE	PROCEDURE NO. EPIP-14C	
CONTINUING DOSE ASSESSMENT	REVISION 0	Page 1 of 67

ASSIGNED COPY

PVNGS #8-9B

DEPT. HEAD O.R. Zimmerman DATE 9/21/84

PRB/PRG/TRRG REVIEW O.R. Zimmerman DATE 9/21/84

APPROVED BY O.R. Zimmerman DATE 9/21/84

EFFECTIVE DATE 9-25-84

DN-9618A/0867A

PV216-00DA (8/82)

PVNGS EMERGENCY PLAN IMPLEMENTING PROCEDURE	PROCEDURE NO. EPIP-14C	
CONTINUING DOSE ASSESSMENT	REVISION 0	Page 2 of 67

REVISION HISTORY

Rev. No.	Date	Revised Pages	Comments

TABLE OF CONTENTS

APPENDICES

APPENDICES (CON'T)

CONTROLLED DOCUMENT

1.0 OBJECTIVE

This procedure provides instructions and calculations necessary to determine actual or projected offsite whole body gamma and thyroid inhalation dose commitments based upon actual meterological data and noble gas and I-131 release rates (Ci/sec). Actual or projected dose calculations provide a basis for decision making concerning recommendations of appropriate protective actions to state or county authorities.

2.0 REFERENCES

2.1 Implementing References

2.1.1 EPIP-14A, "Release Rate Determination"

2.1.2 EPIP-14B, "Initial Dose Assessment"

2.1.3 EPIP-14D, "Dose Assessment Summation"

2.1.4 EPIP-15, "Protective Action Guidelines"

2.1.5 EPIP-16, "Inplant Surveys and Sampling"

2.1.6 EPIP-17, "Onsite/Offsite Surveys and Sampling"

2.1.7 The CRAC System User's Manual, Rev. 2, April 1983

2.1.8 EPIP-33, "Offsite Assistance"

2.2 Developmental References

2.2.1 PVNGS Emergency Plan, Rev. 3.

2.2.2 NRC Reg Guide 1.145, August 1979; "Atmospheric Dispersion Models for Potential Accident Consequence Assessments at Nuclear Power Plants".

2.2.3 NRC Reg Guide 1.111, July 1, 1977, Rev 1; "Methods for Estimating Atmospheric Transport and Dispersion of Gaseous Effluent in Routine Releases from Light-Water-Cooled Reactors".

2.2.4 Introduction to Nuclear Engineering, John R. LaMarsh, Addison Wesley Publishing Company, December 1977.

2.2.5 Health Physics Journal, November 1981, Volume 41 No. 5, page 759.

2.2.6 NRC Reg Guide 1.109 "Calculation of Annual Doses to Man from Routine Releases of Reactor Effluents for the Purpose of Evaluating Compliance with 10CFR50, Appendix I", October 1977.

2.2.7 EPA "Manual of Protective Action Guides and Protective Actions for Nuclear Incidents" Appendix D, Revised June 1980.

2.2.8 Desert dispersion parameters as referenced in NUREG/CR-2858, "PAVAN: An Atmospheric Dispersion Program for Evaluating Design Basis Accidental Releases of Radioactive Materials from Nuclear Power Stations", Nov. 82.

2.2.9 Meteorology and Atomic Energy, David A. Slade, Editor, 1968.

2.2.10 Journal of Applied Meteorology, Volume 3, p 83-91, "A Diffusion Model for an Urban Area", D. B. Turner, 1964.

2.2.11 ANSI N45.2.9 "Requirements for Collection, Storage and Maintenance of Quality Assurance Records for Nuclear Power Plants, 1974.

3.0 LIMITATIONS AND PRECAUTIONS

3.1 Release rate determinations shall be conducted in accordance with EPIP-14A, "Release Rate Determination:.

3.2 Actual dose rates and integrated doses vary as a function of:

1) The duration of the release;

2) The release rates (dependent upon effective age);

3) The isotopic mixture of the release (dependent upon effective age);

4) Existing meterological conditions.

4.0 DETAILED PROCEDURE

4.1 Personnel Indoctrination/Responsibilities

4.1.1 The Radiation Protection Technician Radwaste (affected unit) shall be responsible for initial offsite dose calculcations and/or projections.

4.1.2 The Radiological Protection Coordinator (at the TSC) shall be responsible for dose calculations and/or projections when the TSC become operational.

4.2 Prerequisites

4.2.1 An ALERT or more severe class emergency has been declared.

4.2.2 A release of airborne radioactive material has occured or is imminent.

4.3 Instructions

4.3.1 Calculate doses and dose rates using the CRAC system, following instructions in the CRAC System User's Manual. If the emergency dose assessment capability of the CRAC system is unavailable, carry out the procedure for performing dose calculations using the IBM PC computer, as described in section 4.3.2.

4.3.2 Calculate doses and dose rates using the PVNGS Emergency Offsite Dose Projection computer program and the IBM PC computer, following the instructions included in Appendix J. If the program or the computer is not available, carry out the manual procedure described in sections 4.3.3 through 4.3.10. Upon completion of dose calculations (whether manual or computer-assisted), proceed with section 4.3.11.

4.3.3 Calculation of "plume arrival time" and "effective age" of noble gases at the receptor site (Appendix A).

4.3.3.1 Calculate "transit time" from the release point to the receptor location as follows:

1) Determine downwind distance (in miles) to the receptor site and record in column 1, Section A of Appendix A worksheet.

2) Obtain the 35 ft. level windspeed (mph) from the meteorological tower computer (ERFDADS in STSC) and record the value in column 2, Section A of the Appendix A worksheet.

3) Divide the downwind distance by the windspeed (as indicated on the Appendix A worksheet) and record the resulting "transit time" in column 3, Section A of the Appendix A worksheet.

4.3.3.2 Calculate the "effective age at the receptor site as follows:

1) Record the "effective age at release" (hr) in column 4, Section A of the Appendix A worksheet. The "effective age at release" is the number of hours after core shutdown that the release began.

2) Add the "transit time" (hr) in column 3 and the "effective age at release" (hr) in column 4 and record the resulting "effective age at receptor site" (hr) in column 5.

4.3.3.3 Add "transit time" (hr) to time at which the release began to calculate "plume arrival time" and record in column 6.

4.3.4 Obtain release rates (Ci/sec) of noble gases and I-131 from EPIP-14A and record in column 1 of Sections C and D respectively.

4.3.5 Determine the atmospheric stability category.

4.3.5.1 Obtain the delta F° (200ft-35ft) from the meteorological tower computer printout supplied by ERFDADS. Stability categories are defined as follows:

Stability Category	Delta F° (200ft-35ft)
A	< -1.72
B	-1.72 to -1.54
C	-1.54 to -1.36
D	-1.36 to -0.45
E	-0.45 to 1.34
F	1.34 to 3.62
G	> 3.62

NOTE

For alternate stability class determinations, use Appendix C.

4.3.6 Determine the X/Q values for key receptor sites (Appendix A, Section B).

NOTE

If additional plume centerline Xu/Q values are needed, calculate these values using the sigma Y/sigma Z data in Appendix C and the following formula:

$$Xu/Q = \frac{1}{TT\ \sigma Y\ \sigma Z}$$

NOTE

For off-centerline Xu/Q values use the following:

$$Xu/Q = (Xu/Q)_c \left[e^{\left[-1/2 \left(\frac{y}{\sigma Y} \right)^2 \right]} \right]$$

$(Xu/Q)_c$ = Centerline Xu/Q

y = Distance from the centerline in meters.

4.3.6.1 From the appropriate stability category in Appendix D, obtain Xu/Q values for site boundary, 2, 5 and 10 mile plume centerline locations and record in Appendix A, Section B. Only one sheet (Appendix A) should be used for a given date and time.

4.3.6.2 Obtain the wind speed (mph) at 35ft from the meteorological computer (ERFDADS) and record in Appendix A.

4.3.6.3 Complete calculations on Appendix A and record the resultant X/Q value in column 4, Section B.

4.3.7 Plot the path of the Dispersing Plume

4.3.7.1 Select the appropriate overlay that corresponds to the determined stability category and match the overlay with the release point on the map.

> CAUTION
>
> THE COMPASS HEADING ON THE 10 MILE EPZ MAP IS ROTATED 180°.

4.3.7.2 Rotate the overlay until the direct downwind plume centerline is oriented in the direction of the compass heading of the wind.

4.3.7.3 Identify key receptor locations in the path of the dispersing plume.

4.3.7.4 Verify that the appropriate $\bar{Xu}/Q$ for each specific receptor site is recorded on Appendix A, column 1, Section B per step 4.3.6.1.

NOTE

Plume width is 3 sigma Y unless wind is blowing toward sectors N, P, or Q; then the plume width is 6 sigma Y (ie 2 Sectors on either side of the affected Sector).

CAUTION

WHEN DEPLOYING FIELD TEAMS TO VERIFY PLUME CENTERLINE AND PLUME WIDTH, BE ADVISED THAT SIGMA Z VALUES IN APPENDIX E MAY BE TOO HIGH IN THE MORNING AND TOO LOW IN THE AFTERNOON CAUSING THEIR RESPECTIVE Xu/Q VALUES TO BE TOO LOW (AM) OR TOO HIGH (AFTERNOON). THEREFORE, IF TEAMS ARE DEPLOYED IN THE MORNING, USE THE PLUME WIDTH AS REFERENCE AND DIRECT THE TEAMS IN TOWARD THE CENTERLINE ≈ 1/4 MI. FROM EACH SIDE OF THE CURVE. IN THE AFTERNOON, DIRECT TEAMS OUTWARD ≈ 1/4 MI. ON EITHER SIDE OF THE PLUME WIDTH BOUNDARY.

4.3.7.5 Plot the path of the dispersing plume by tracing the overlay.

4.3.8 Calculate the Whole Body Gamma Dose Commitment from noble gases for each key receptor site, Appendix A, Section C. Only one receptor site should be used for calculation sheet (Appendix A).

NOTE

Appendix E provides data for two LOCA Signatures i.e. 1% failed fuel and total core inventory. If plant conditions indicate potential fuel failure, base projected/actual dose projections on data for 1% failed fuel. Should Conditions worsen prior to obtaining chemistry data, extrapolate data from Appendix E if sufficient plant parameters allow (i.e., letdown monitor indications, etc.; otherwise assume worst case/total core inventory).

4.3.8.1 Obtain the average gamma decay energy (MeV/dis) utilizing the effective age of the noble gas at the receptor site from Appendix E (table) and record on Appendix A, Sec. C.

4.3.8.2 Complete calculations to determine the dose rate.

4.3.8.3 Determine the exposure time based upon duration of the release and record in column 6.

4.3.8.4 Complete calculations in Section C to determine the dose.

4.3.9 Calculate the thyroid inhalation dose commitment from all radioiodines, Appendix A, Section D.

4.3.9.1 Complete calculations in Section D, columns 1 through 4.

NOTE

Appendix F provides data for two LOCA Signatures i.e. 1% failed fuel and total core inventory. If plant conditions indicate potential fuel failure, base projected/actual dose projections on data for 1% failed fuel. Should conditions worsen prior to obtaining chemistry data, extrapolate data from Appendix F if sufficient plant parameters allow (i.e. letdown monitor indications, etc.); otherwise assume worst case (total core inventory).

4.3.9.2 Obtain the ratio of integrated thyroid dose from all iodines to integrated dose from I-131 as a function of effective age at receptor site from Appendix F (table) and record in column 5 of Appendix A, Section D.

4.3.9.3 Determine the exposed time based upon duration of the release and record in Column 6, Section D.

4.3.9.4 Complete calculations of Section D of Appendix A.

4.3.10 Offsite contamination levels based on a particulate concentration must be determined by field measurements.

4.3.11 Update and refine dose calculations every hour and upon significant (as indicated below) changes in one or more of the following parameters using Appendix A, Sections C and D.

1) Release Rates (± 20% change)

2) Duration of the Release (± 20%)

3) Existing Meteorological Conditions
(WD ± 25° change Stability - ± 1 category)
(WS - ± 20% change)

4.3.12 Sum previous exposures using Appendix A, Sections C and D.

CONTROLLED DOCUMENT

4.3.13 Calculate doses based on field measurements reported by survey teams (EPIP 17, Onsite/Offsite Surveys and Sampling").

NOTE

Offsite samples may be analyzed in the RERV and/or onsite chemistry lab and data will be transmitted to the STSC/TSC for incorporation into offsite dose calculations. Compare these results with calculations done from data transmitted from the field and projected/actual release rates.

4.3.13.1 Sample teams shall report gross mR/hr at 3' above the ground. Each reading shall include the location and time of the measurement. Enter these data in columns 1, 2 and 3 of Appendix G. Determine an equivalent whole body dose for the same location and time using the procedure in section 4.3.8. Enter this value in column 4 of Appendix G. Divide the value in column 4 by the value in column 3 and enter the result in column 5 (Ratio of calculated whole body dose rate to measured dose rate).

4.3.13.2 Sample teams shall report iodine concentrations in terms of:

1) Location.

2) Time of measurement.

3) Net iodine count rate (CPM).

4) Sample duration (minutes).

5) Flow rate (cfm).

6) Counting efficiency of the meter (cpm/dpm).

4.3.13.3 Enter these data in the appropriate columns of Appendix H. Calculate the air concentration of iodine using the following formula:

$$A\ \frac{uCi}{cc} = \frac{\text{Net CPM} \times 1.66\ E\text{-}11\ \text{uCi-ft3/dpm - cc}}{\text{CFM (Sample Coll)} \times \text{Collection Time (min)} \times Ec\ (\text{cpm/dpm}) \times E_f}$$

where A = iodine activity uCi/cc;

Net CPM = net count rate;

Conversion factor = (4.7E-07 uCi/dpm)/2.83E+04 cc/ft^3 (For filter efficiency (E_f) see Appendix B);

CFM = sample collection volume; and

E_c = counting efficiency (cpm/dpm).

4.3.13.4 Enter the iodine concentration in column 7 of Appendix H. Calculate the iodine dose commitment using the following formula:

$$D\ (\text{mrem/hr}) = A\ \frac{uCi}{cc} \times B\ \frac{cc}{hr} \times DF\ \frac{mrem}{uCi} \times C^*$$

where D = thyroid dose commitment for an adult in mrem per hour of exposure to the iodine concentration A; multiply by 2 to obtain child thyroid dose commitment.

A = iodine concentration, uCi/cc;

B = breathing rate in cc/hr = 1.37E+6 cc/hr; and

DF = thyroid dose factor (50-year dose commitment)-

$$= 1.49E\text{-}3\ \frac{mrem}{pci}\ \frac{(1.0E+6\ pci)}{uci} = 1.49\ E+3\ \frac{mrem}{uci}$$

C* = TI/I-131 ratio in Appendix F used only if an iodine sample is counted on the SAM-2 for I-131 determination only.

4.3.13.5 Enter the iodine dose commitment in column 8 of Appendix H. Calculate an equivalent thyroid dose for the same location and time using the procedure in section 4.3.6 and enter the value in column 9. Divide the value in column 9 by the value in column 8 and enter in column 10 (Ratio of calculated thyroid dose to measured thyroid dose).

4.3.13.6 Sample teams will report particulate concentrations in terms of:

1) Location.

2) Time of measurement.

3) Net particulate count rate (cpm).

4) Sample duration (minutes).

5) Flow rate (cfm).

6) Counting efficiency of the meter (cpm/dpm).

Enter these data in the appropriate columns of Appendix I. Calculate the air concentration of particulates using the following formula:

$$A\ \frac{uCi}{cc} = \frac{\text{Net CPM} \times 1.66\ E\text{-}11\ \text{uCi-ft3/dpm - cc}}{\text{CFM (Sample Coll)} \times \text{Collection Time (min)} \times E_c\ \text{(cpm/dpm)} \times E_f}$$

where A = particulate activity uCi/cc;

Net CPM = net count rate;

Conversion factor = (4.7E-07 uCi/dpm)/2.83E+04 cc/ft^3 (For filter efficiency (E_f) see Appendix B);

CFM = sample collection volume; and

E_c = counting efficiency (cpm/dpm).

4.3.13.7 Enter the particulate concentration in column 7 of Appendix I.

Calculate the surface contamination level using the following formulas:

$A\ (Ci/sec) = uci/cc \times cfm \times 472\ min\text{-}cc/sec\text{-}ft^3 \times 1E\text{-}6\ Ci/uCi$

$C\ (Ci/m^2) = A\ (Ci/sec) \times X/Q\ (sec/m^3) \times CF \times D$

where $C\ (Ci/m^2)$ = Offsite surface contamination level,

A = Particulate release rate

CF = Conversion factor particulate deposition factor of 0.01 m/sec

D = Decay correction factor

4.3.13.8 Enter the surface contamination level in column 8 of Appendix I.

> CAUTION
>
> ANY ADJUSTMENT TO THE SOURCE TERM BASED ON THE FOLLOWING COMPARISONS SHOULD BE DONE ONLY AFTER CAREFUL SCRUTINY OF APPENDICES G, H and I. CHECK THE LOCATION OF THE MEASURED FIELD DATA IN RELATION TO THE PLOTTED PLUME.

4.3.14 Compare the calculated and measured dose rates in Appendices G and H and concentrations in Appendix I and attempt to reconcile any differences.

4.3.14.1 If values in column 5 of Appendix G and column 10 of Appendices H and I are consistently less than 1.0, indicating that field measurements are larger than calculated values, determine if any unmonitored release could be occurring. Unmonitored releases and/or uncertainty in the source terms used in calculations may indicate the need to adjust the source terms being used by dividing the source term values by the average value in column 5 of Appendix G for noble gases and by the average value in column 10 of Appendix H for iodines. The Radiological Protection Coordinator must authorize any adjustments.

4.3.14.2 If values in column 5 of Appendix G and column 10 of Appendices H and I are consistently greater than 1.0, indicating that field measurements are less than calculated values, determine if source terms being used may be too high. If source terms are determined by the Radiological Protection Coordinator to be too high, they can be adjusted by dividing the source terms by the average value in column 5 of Appendix G for noble gases and by the average value in column 10 of Appendix H for iodines.

4.3.14.3 Similar comparisons should be made between grab samples and field data.

4.3.15 Compare the dose commitments in Appendix A to the protective action guidelines (EPIP-15, "Protective Action Guidelines") to make offsite protective action recommendations to the State.

4.3.16 Once the initial offsite dose projections/assessments have been completed, determine/verify ground contamination based on isotopic analysis of soil samples per EPIP-14D, "Dose Assessment Summation".

CALCULATION OF PROJECTED WHOLE BODY AND THYROID DOSES

Receptor Site Location: _____

Reactor Shutdown Date: _____ Time: _____ Radioactive Release Date: _____ Time: _____

Section A: "Effective Age" Determination

Downwind Distance (mi)	/	Windspeed @ 35 ft. (mph)	=	Transit Time (hr)	+	Eff. Age @ Release (hr)	=	Eff. Age @ Receptor Site (hr)	Plume Arrival Time
_____	/	_____	=	_____	+	_____	=	_____	_____
_____	/	_____	=	_____	+	_____	=	_____	_____
_____	/	_____	=	_____	+	_____	=	_____	_____
_____	/	_____	=	_____	+	_____	=	_____	_____
_____	/	_____	=	_____	+	_____	=	_____	_____
_____	/	_____	=	_____	+	_____	=	_____	_____

Section B: X/Q Determination

Xu/Q (App C)	/	Windspeed @ 35 ft. (mph)	=	X/Q (sec/m3)
_____	/	1.447	=	_____
_____	/	1.447	=	_____
_____	/	1.447	=	_____
_____	/	1.447	=	_____
_____	/	1.447	=	_____
_____	/	1.447	=	_____

Section C: Whole Body Dose Projection

Noble Gas Release Rate (Ci/sec)	X	X/Q (sec/m3)	X	Mean Gamma Decay Energy (App D) (Mev/dis)	X	Dose factor (Rem-dis-m3) /hr-Mev-Ci)	=	Projected Whole Body Dose Rate (Rem/hr)	X	Estimated Exposure Time (hr)	=	Projected Whole Body Dose (Rem)
_____	X	_____	X	_____	X	9.42E+02	=	_____	X	_____	=	_____
_____	X	_____	X	_____	X	9.42E+02	=	_____	X	_____	=	_____
_____	X	_____	X	_____	X	9.42E+02	=	_____	X	_____	=	_____
_____	X	_____	X	_____	X	9.42E+02	=	_____	X	_____	=	_____

CONTROLLED DOCUMENT

CONTINUING DOSE ASSESSMENT Cont'd. Appendix A Pg. 2 of 2

Section D: Thyroid Inhalation Dose Projection

I-131 Release Rate (Ci-sec)		X/Q (sec/m3)		Dose Factor (Rem-m3 /hr-Ci)		I-131 Thyroid Dose Rate (Rem/hr)		Total Iodine Dose Ratio (App F)		Estimated Exposure Time (hr)		Projected Adult Thyroid Dose (Rem)		Projected Child Thyroid Dose (Rem)
_____	X	_____	X	1.86E+6	=	_____	X	_____	X	_____	=	_____	X 2 =	_____
_____	X	_____	X	1.86E+6	=	_____	X	_____	X	_____	=	_____	X 2 =	_____
_____	X	_____	X	1.86E+6	=	_____	X	_____	X	_____	=	_____	X 2 =	_____
_____	X	_____	X	1.86E+6	=	_____	X	_____	X	_____	=	_____	X 2 =	_____

Prepared by _____

Reviewed by _____

Date/Time _____

PV216-000A (8/82)

TYPICAL COLLECTION EFFICIENCIES FOR RADIOIODINE CARTRIDGES

TEDA IMPREGNATED CHARCOAL CARTRIDGE

FLOW RATE (Ft3/Min.)	PERCENT RETENTION (2 Hr. Purge)	(7 Da. Purge)	CARTRIDGE Δ p (mm Hg)
1.1	99.0	99.0	5
1.8	98.3	98.3	18
2.5	97.5	97.5	30
3.2	96.8	96.7	44
3.9	96.1	95.3	59
4.6	95.0	93.4	73
5.3	93.3	91.0	86

SILVER ZEOLITE CARTRIDGE

FLOW RATE (Ft3/Min.)	PERCENT RETENTION (2 Hr. Purge)	(7 Da. Purge)	CARTRIDGE Δ p (mm Hg)
1.1	96.0	96.0	10
1.8	94.0	93.0	15
2.5	92.0	89.0	20
3.2	88.0	85.0	25
3.9	85.0	80.0	33
4.6	82.0	75.0	38

PURGE DEFINITIONS:

2 Hr. Purge - After a sample is collected, air is drawn through the cartridge at the sampling rate for 2 hours to strip loosely held iodine.

7 Da. Purge - Before a cartridge is used, air is drawn through the cartridge (at the sampling rate) for 7 days to load the cartridge with natural gases and moisture.

NOTE

Cartridge calibration was performed using Methyl Iodine, which is the most difficult of the organic iodides to collect. Collection efficiencies for other iodides may be higher.

CONTROLLED DOCUMENT

APPENDIX C

ALTERNATE STABILITY CATEGORY DETERMINATION

1) If the ERFDADS terminal(s) is/are not operational, and time permits, obtain Δ °F from strip chart recorders in the met tower trailer. Obtain keys for the trailer from the Security office.

2) If the strip chart data is unobtainable, call the National Weather Service for cloud cover and ceiling height and visually estimate wind speed. Then find the appropriate Hour Table for the time of day and, knowing the extend of cloud cover and ceiling height, read Net Radiation (NR) Value under appropriate date. Then intersect NR value and wind speed on Class Table to determine Stability Class (Appendix C, Pages 2-6).

3) If cloud cover and ceiling height information is unavailable use default values on Page 7 of 8, Appendix C, and request National Weather Service support per EPIP-33, "Offsite Assistance".

STABILITY ESTIMATIONS
HOUR TABLES

HOURS 0 TO 5

Cloud Cover	Ceiling Height (ft)	Date 1/1 to 12/31
4/10	any height	NR = -2
4/10 - 10/10	any height	-1
10/10	7000	-1
10/10	7000	0

HOUR 6

Cloud Cover	Ceiling Height (ft)	Date 1/1-4/22	4/23-8/24	8/25-12/31
5/10	any height	NR=0	1	0
6/10 - 9/10	7000	1	1	1
6/10 - 9/10	7000 - 16000	1	1	1
6/10 - 9/10	7000	1	1	1
10/10	7000	1	1	1
10/10	7000	0	0	0

HOUR 7

Cloud Cover	Ceiling Height (ft)	Date 1/1 - 2/6	2/7 - 5/13	5/14 - 8/7	8/8 - 10/8	10/9 - 12/31
5/10	any height	NR=0	1	2	1	NR = 0
6/10 - 9/10	7000	1	1	1	1	1
6/10 - 9/10	7000 - 16000	1	1	1	1	1
6/10 - 9/10	16000	1	1	2	1	1
10/10	7000	1	1	1	1	1
10/10	7000	0	0	0	0	0

HOUR 8

Cloud Cover	Ceiling Height (ft)	Date 1/1 - 2/23	2/24 - 9/28	9/29 - 12/31
5/10	any height	NR=0	1	2
6/10 - 9/10	7000	1	1	1
6/10 - 9/10	7000 - 16000	1	1	1
6/10 - 9/10	16000	1	1	2
10/10	7000	1	1	1
10/10	7000	0	0	0

STABILITY ESTIMATIONS
HOUR TABLES (CONT'D)

HOUR 9

Cloud Cover	Ceiling Height (ft)	Date 1/1	1/2 - 4/8	4/9 - 9/2	9/3 - 11/16	11/17 - 12/31
5/10	any height	NR=1	NR = 2	NR = 3	2	1
6/10 - 9/10	7000	1	1	1	1	1
6/10 - 9/10	7000 - 16000	1	1	2	1	1
6/10 - 9/10	16000	1	2	3	2	1
10/10	7000	1	1	2	1	1
10/10	7000	0	0	0	0	0

HOUR 10

Cloud Cover	Ceiling Height (ft)	Date 1/1 - 2/20	2/21 - 10/7	10/8 - 12/31
5/10	any height	NR=2	NR=3	NR=2
6/10 - 9/10	7000	1	1	1
6/10 - 9/10	7000 - 16000	1	2	1
6/10 - 9/10	7000	2	3	2
10/10	7000	1	2	1
10/10	7000	0	0	0

HOUR 11

Cloud Cover	Ceiling Height (ft)	Date 1/1 - 1/27	1/28 - 4/22	4/23 - 8/23	8/24 - 11/3	11/4 - 12/31
5/10	any height	NR = 2	NR = 3	NR = 4	3	2
6/10 - 9/10	7000	1	1	2	1	1
6/10 - 9/10	7000 - 16000	1	2	3	2	1
6/10 - 9/10	16000	2	3	4	3	2
10/10	7000	1	2	3	2	1
10/10	7000	0	0	0	0	0

STABILITY ESTIMATIONS
HOUR TABLES (CONT'D)

HOUR 12

Cloud Cover	Ceiling Height (ft)	Date 1/1 - 1/4	1/15 - 3/28	3/29 - 9/10	9/11 - 11/24	11/25 - 12/31
5/10	any height	NR = 2	NR = 3	NR = 4	3	2
6/10 - 9/10	7000	1	1	2	1	1
6/10 - 9/10	7000 - 16000	1	2	3	2	1
6/10 - 9/10	16000	2	3	4	3	2
10/10	7000	1	2	3	2	1
10/10	7000	0	0	0	0	0

HOUR 13

Cloud Cover	Ceiling Height (ft)	Date 1/1 - 1/17	1/18 - 3/29	3/30 - 9/13	9/14 - 11/28	11/29 - 12/31
5/10	any height	NR = 2	NR = 3	NR = 4	3	2
6/10 - 9/10	7000	1	1	2	1	1
6/10 - 9/10	7000 - 16000	1	2	3	2	1
6/10 - 9/10	16000	2	3	4	3	2
10/10	7000	1	2	3	2	1
10/10	7000	0	0	0	0	0

HOUR 14

Cloud Cover	Ceiling Height (ft)	Date 1/1 - 2/5	2/6 - 4/19	4/20 - 8/22	8/23 - 11/16	11/17 - 12/31
5/10	any height	NR = 2	NR = 3	NR = 4	3	2
6/10 - 9/10	7000	1	1	2	1	1
6/10 - 9/10	7000 - 16000	1	2	3	2	1
6/10 - 9/10	16000	2	3	4	3	2
10/10	7000	1	2	3	2	1
10/10	7000	0	0	0	0	0

HOUR 15

Cloud Cover	Ceiling Height (ft)	Date 1/1 - 3/4	3/5 - 10/23	10/24 - 12/31 *
5/10	any height	NR=2	NR=3	NR=2
6/10 - 9/10	7000	1	1	1
6/10 - 9/10	7000 - 16000	1	2	1
6/10 - 9/10	7000	2	3	2
10/10	7000	1	2	1
10/10	7000	0	0	0

STABILITY ESTIMATIONS
HOUR TABLES (CONT'D)

HOUR 16

Cloud Cover	Ceiling Height (ft)	Date 1/1 - 1/19	1/20 - 4/8	4/8 - 9/6	9/7 - 12/18	12/19 - 12/31
5/10	any height	NR = 1	NR = 2	NR = 3	NR = 2	NR = 1
6/10 - 9/10	7000	1	1	1	1	1
6/10 - 9/10	7000 - 16000	1	1	2	1	1
6/10 - 9/10	16000	1	2	3	2	1
10/10	7000	1	1	2	1	1
10/10	7000	0	0	0	0	0

HOUR 17

Cloud Cover	Ceiling Height (ft)	Date 1/1 - 3/12	3/13 - 10/23	10/24 - 12/31
5/10	any height	NR=1	NR=2	NR=1
6/10 - 9/10	7000	1	1	1
6/10 - 9/10	7000 - 16000	1	1	1
6/10 - 9/10	7000	1	2	1
10/10	7000	1	1	1
10/10	7000	0	0	0

HOUR 18

Cloud Cover	Ceiling Height (ft)	Date 1/1 - 3/2	3/4 - 4/29	4/30 - 7/31	8/1 - 11/9	11/10 - 12/31
5/10	any height	NR = 0	NR = 1	NR = 2	NR = 1	NR = 0
6/10 - 9/10	7000	1	1	1	1	1
6/10 - 9/10	7000 - 16000	1	1	1	1	1
6/10 - 9/10	16000	1	1	2	1	1
10/10	7000	1	1	1	1	1
10/10	7000	0	0	0	0	0

HOUR 19

Cloud Cover	Ceiling Height (ft)	Date 1/1 - 4/17	4/18 - 8/22	8/23 - 12/13
5/10	any height	NR=0	NR=1	NR=0
6/10 - 9/10	7000	1	1	1
6/10 - 9/10	7000 - 16000	1	1	1
6/10 - 9/10	7000	1	1	1
10/10	7000	1	1	1
10/10	7000	0	0	0

STABILITY ESTIMATIONS
HOUR TABLES (CONT'D)

HOURS 20 TO 23

Cloud Cover	Ceiling Height (ft)	Date 1/1 to 12/31
4/10	any height	NR = -2
4/10 - 10/10	any height	-1
10/10	7000	-1
10/10	7000	0

CLASS TABLE

Wind Speed (knots)	Net Radiation (NR) 4	3	2	1	0	-1	-2
0 to 1.2 mph	A	A	B	C	D	F	G
1.3 to 3.5	A	B	B	C	D	F	G
3.6 to 5.8	A	B	C	D	D	E	F
5.9 to 6.9	B	B	C	D	D	E	F
7.0 to 8.1	B	B	C	D	D	D	E
8.2 to 10.4	B	C	C	D	D	D	E
10.5 to 11.5	C	C	D	D	D	D	E
11.6 to 12.7	C	C	D	D	D	D	D
12.8	C	D	D	D	D	D	D

STABILITY CLASS DEFAULT VALUES

Hour	JAN	FEB	MAR	APR	MAY	JUN
	Dir Cls mphs	Dir Cls mphs	Dir Cls mphs	Dir Cls mphs	Dir Cls mphs	Dir Cls mphs
1	N 4 G	N 5 G	NNE 6 G	NNE 6 G	SW 7 E	SW 6 G
2	NNE 4 G	NNE 5 G	NNE 5 G	NNE 5 G	SW 6 F	SW 5 G
3	NNE 4 G	N 4 G	NNE 5 G	NNE 5 G	SW 5 G	SW 5 G
4	N 4 G	NNE 4 G	NNE 5 G	NNE 5 G	SW 5 G	SW 5 G
5	NNE 4 G	NNE 4 G	NNE 5 G	NNE 5 G	NNE 4 G	NNE 5 G
6	NNE 4 G	NNE 4 G	NNE 5 G	NNE 5 G	NNE 4 G	NNE 4 G
7	NNE 4 G	NNE 4 G	N 4 G	N 4 G	NNE 4 G	NNE 4 F
8	NNE 4 G	N 4 G	NNE 4 E	NE 4 D	E 5 D	E 5 D
9	NNE 3 F	N 4 E	E 5 D	E 6 D	E 6 D	SE 6 D
10	E 4 D	E 5 D	E 6 D	ESE 7 C	SW 7 C	SW 6 D
11	E 5 D	E 6 D	E 7 D	SSW 7 C	SSW 8 A	SSW 7 A
12	E 6 D	E 7 D	E 8 D	SW 8 A	SW 8 A	SSW 8 A
13	E 6 D	E 7 D	SW 8 D	SW 9 A	SW 9 A	SW 9 A
14	E 6 D	E 7 D	SW 9 D	SW 9 A	SW 10 A	SW 10 A
15	E 7 D	E 7 D	SW 9 D	SW 10 A	SW 11 A	SW 10 A
16	E 6 D	SSW 7 D	SW 9 D	SW 11 A	SW 11 A	SW 11 A
17	E 6 D	SW 7 D	SW 9 D	SW 10 A	SW 11 C	SW 11 B
18	S 5 E	SE 6 D	SW 8 D	SW 10 D	SW 11 D	SW 12 D
19	SW 5 F	WSW 6 E	SW 8 E	WSW 9 E	SW 11 D	SW 11 D
20	NNW 5 F	NW 6 F	SW 7 F	SW 9 E	SW 10 E	SW 11 E
21	N 5 G	NNW 6 G	SW 7 F	SW 8 E	SW 10 E	WSW 10 F
22	NNE 5 G	N 6 G	N 7 G	SW 8 F	SW 9 E	WSW 9 F
23	N 5 G	NNE 6 G	NNE 7 G	SW 7 G	SW 9 E	SW 8 F
24	NNE 5 G	NNE 5 G	NNE 6 G	NE 7 G	SW 9 E	SW 8 F

STABILITY CLASS DEFAULT VALUES (CONT'D)

	JUL	AUG	SEP	OCT	NOV	DEC
Hour	Dir Mag Cls	Dir Mag Cls	Dir Mag Cls	Dir Mag Cls	Dir Mag Cls	Dir Mag Cls
1	SW 7 E	SW 7 E	ENE 5 G	NNE 4 G	NNE 4 G	NNE 4 G
2	SW 7 E	SW 6 E	SW 5 G	NNE 4 G	NNE 4 G	NNE 4 G
3	SW 6 E	SW 6 E	N 5 G	NNE 4 G	NNE 4 G	NE 4 G
4	SW 6 E	SW 5 G	NNE 5 G	N 4 G	NNE 4 G	NNE 4 G
5	SW 5 E	NNE 5 G	N 4 G	NNE 4 G	NNE 4 G	NNE 4 G
6	SW 5 E	NNE 5 G	N 4 G	NNE 4 G	N 4 G	NNE 4 G
7	SW 5 E	NNE 5 E	N 4 G	NNE 4 G	N 4 G	N 4 G
8	SW 5 D	E 5 D	NE 5 G	NNE 4 F	NNE 3 E	NNE 4 G
9	SW 7 D	E 6 D	E 6 D	E 5 D	E 3 D	NNE 3 F
10	SW 7 D	ESE 7 D	E 7 D	E 6 D	E 5 D	ENE 4 D
11	SW 7 A	ESE 7 D	E 8 D	E 7 D	E 6 D	ENE 5 D
12	SW 8 A	ESE 7 A	E 8 D	E 7 D	E 6 D	E 6 D
13	SSW 8 A	SW 8 A	E 8 A	E 7 D	E 7 D	E 6 D
14	SW 8 A	SW 8 A	SW 8 A	E 7 D	E 7 D	E 6 D
15	SW 9 A	SW 9 A	SW 8 D	E 7 D	E 6 D	E 6 D
16	SW 10 A	SW 9 A	SW 8 D	SW 7 D	E 6 D	E 6 D
17	WSW 10 A	SW 9 D	SW 8 D	SW 7 D	E 6 D	ESE 5 D
18	WSW 11 A	SW 10 D	SW 8 D	SW 6 E	SSW 6 E	SSE 5 E
19	SW 11 D	SW 10 D	SW 7 E	SW 6 F	NW 5 F	NW 5 G
20	SW 11 E	SW 9 D	SW 7 F	SW 6 G	NNW 5 G	N 5 G
21	SW 10 E	SW 9 E	WSW 6 F	N 6 G	N 6 G	N 5 G
22	SW 10 E	SW 9 F	WSW 6 F	NNE 6 G	NNE 6 G	NNE 5 G
23	SW 9 E	SW 8 E	SW 6 G	NNE 5 G	N 5 G	NNE 5 G
24	SW 8 E	SW 7 E	SW 6 G	N 5 G	NNE 5 G	NNE 4 G

SITE BOUNDARY DISTANCES

Wind Direction FROM (a)	Distance (mi)
S (168.75 - 191.25)	0.82
SSW (191.25 - 213.75)	0.83
SW (213.75 - 236.25)	1.58
WSW (236.75 - 258.75)	1.37
W (258.75 - 281.75)	1.34
WNW (281.75 - 303.75)	1.28
NW (303.75 - 326.25)	1.31
NNW (326.25 - 348.75)	1.88
N (348.75 - 11.25)	1.68
NNE (11.25 - 33.75)	1.14
NE (33.75 - 56.25)	0.75
ENE (56.25 - 78.75)	0.63
E (78.75 - 101.25)	0.62
ESE (101.25 - 123.75)	0.63
SE (123.75 - 146.25)	0.74
SSE (146.23 - 168.75)	0.83

(a) Based on 22 1/2° sectors.
(b) Distances are from Unit 2

Site Boundary Xu/Q Values

Stability Category A	B	C	D	E	F	G
4.0 E-6	1.0 E-5	1.9 E-5	6.8 E-5	1.3 E-4	2.0 E-4	3.1 E-4
3.9 E-6	1.0 E-5	1.8 E-5	6.7 E-5	1.2 E-4	2.0 E-5	3.1 E-4
8.2 E-7	2.2 E-6	4.6 E-6	2.5 E-5	5.1 E-5	9.0 E-5	1.5 E-4
1.2 E-6	3.1 E-6	6.2 E-6	3.1 E-5	6.2 E-5	1.1 E-4	1.8 E-4
1.2 E-6	3.3 E-6	6.5 E-6	3.2 E-5	6.4 E-5	1.1 E-4	1.8 E-4
1.4 E-6	3.6 E-6	7.2 E-6	3.4 E-5	6.8 E-5	1.2 E-4	1.9 E-4
1.3 E-6	3.4 E-6	6.8 E-6	3.3 E-5	6.6 E-5	1.1 E-4	1.9 E-4
5.4 E-7	1.5 E-6	3.1 E-6	1.9 E-5	4.0 E-5	7.3 E-5	1.3 E-4
7.1 E-7	1.9 E-6	4.0 E-6	2.2 E-5	4.6 E-5	8.3 E-5	1.4 E-4
1.8 E-6	4.8 E-6	9.3 E-6	4.1 E-5	8.0 E-5	1.3 E-4	2.2 E-4
5.0 E-6	1.3 E-5	2.0 E-5	7.9 E-5	1.4 E-4	2.2 E-4	3.5 E-4
7.5 E-6	1.9 E-5	3.3 E-5	1.0 E-4	1.8 E-4	2.8 E-4	4.2 E-4
7.8 E-6	2.0 E-5	3.4 E-5	1.1 E-4	1.8 E-4	2.8 E-4	4.2 E-4
7.5 E-6	1.9 E-5	3.3 E-5	1.0 E-4	1.8 E-4	2.8 E-4	4.2 E-4
5.2 E-6	1.3 E-5	2.3 E-5	8.0 E-5	1.4 E-4	2.3 E-4	3.5 E-4
3.9 E-6	1.0 E-5	1.8 E-5	6.7 E-5	1.3 E-4	2.0 E-4	3.1 E-4

Plume Centerline Xu/Q Values

Stability Category	Xu/Q Values 2 mi	5 mi	10 mi	15 mi	20 mi	25 mi
A	4.6 (E-7)	1.6 (E-7)	8.2 (E-8)	5.6 (E-8)	4.3 (E-8)	3.5 (E-8)
B	1.3 (E-6)	2.8 (E-7)	1.5 (E-7)	1.0 (E-7)	7.9 (E-8)	6.5 (E-8)
C	2.8 (E-6)	3.5 (E-7)	1.9 (E-7)	1.3 (E-7)	1.0 (E-7)	8.5 (E-8)
D	1.7 (E-5)	4.1 (E-6)	1.4 (E-6)	7.4 (E-7)	4.7 (E-7)	3.3 (E-7)
E	3.7 (E-5)	1.0 (E-5)	4.0 (E-6)	2.3 (E-6)	1.5 (E-6)	1.1 (E-6)
F	6.7 (E-5)	2.2 (E-5)	9.3 (E-6)	5.7 (E-6)	4.0 (E-6)	3.0 (E-6)
G	1.2 (E-4)	4.4 (E-5)	2.1 (E-5)	1.3 (E-5)	9.8 (E-6)	7.7 (E-6)

Stability Category	30 mi	35 mi	40 mi	45 mi	50 mi
A	3.2 (E-8)	3.2 (E-8)	3.2 (E-8)	3.2 (E-8)	3.2 (E-8)
B	6.7 (E-8)	4.8 (E-8)	4.3 (E-8)	3.8 (E-8)	3.5 (E-8)
C	7.2 (E-8)	6.3 (E-8)	5.6 (E-8)	5.0 (E-8)	4.6 (E-8)
D	2.7 (E-7)	2.4 (E-7)	2.2 (E-7)	2.0 (E-7)	4.3 (E-7)
E	8.7 (E-7)	7.0 (E-7)	5.8 (E-7)	5.0 (E-7)	4.3 (E-7)
F	2.4 (E-6)	2.0 (E-6)	1.7 (E-6)	1.5 (E-6)	1.3 (E-6)
G	7.1 (E-6)	6.9 (E-6)	6.8 (E-6)	6.8 (E-6)	6.6 (E-6)

For additional Xu/Q values, use the sigma y and sigma z values on the following page.

SITE BOUNDARY σ y, σ Z VALUES (METERS)

dis.	A		B		C		D		E		F		G	
(mi.)	y	Z	y	Z	y	Z	y	Z	y	Z	y	Z	y	Z
.62	300.1	135.4	175.3	92.8	139.6	66.3	69.9	43.2	109.6	15.7	164.2	6.8	254.4	2.9
.63	304.6	138.5	177.8	94.8	141.6	67.6	70.7	43.8	111.1	15.9	166.7	6.9	258.4	3.0
.74	353.2	174.3	205.6	118.0	163.4	82.4	79.6	50.0	127.7	17.2	193.1	7.2	302.3	3.0
.75	357.6	177.7	208.1	120.2	165.4	83.8	80.3	50.6	129.2	17.4	195.5	7.2	306.3	3.0
.82	388.3	202.6	225.5	136.3	179.1	93.8	85.8	54.4	139.6	18.2	212.2	7.4	334.1	3.0
.83	392.6	206.2	228.0	138.7	181.0	95.2	86.5	55.0	141.0	18.3	214.5	7.5	338.1	3.0
1.14	525.9	331.8	303.4	219.9	240.2	143.1	109.1	71.5	185.6	21.6	286.9	8.3	460.7	3.2
1.28	585.1	395.7	336.8	260.7	266.3	166.0	118.8	78.6	205.2	22.9	319.0	8.6	515.8	3.2
1.31	597.7	409.9	343.9	269.7	271.9	171.0	120.8	80.2	209.3	23.2	325.9	8.6	527.6	3.2
1.34	610.3	424.2	351.0	278.8	277.4	176.0	122.8	81.7	213.5	23.4	332.7	8.7	539.3	3.2
1.37	622.9	438.8	358.1	288.0	282.9	181.0	124.8	83.2	217.6	23.7	339.5	8.7	551.1	3.2
1.58	710.3	545.3	407.2	354.1	321.3	217.0	138.5	93.6	246.1	25.5	386.9	9.1	633.3	3.3
1.68	751.6	598.8	430.3	386.6	339.3	234.4	144.9	98.4	259.6	26.3	409.3	9.3	672.4	3.3
1.88	833.7	711.1	476.2	453.2	375.1	270.1	157.3	108.0	286.1	27.9	453.7	9.7	750.3	3.3

SITE BOUNDARY σ_y, σ_Z VALUES (METERS)

dis.	A		B		C		D		E		F		G	
	y	z	y	z	y	z		z	y	z	y	z	y	z
1	466.1,	272.3	269.6,	181.5	213.7,	120.9	99.2,	64.1	165.7,	20.1	254.5,	7.9	405.4,	3.1
2	882.6,	781.8	503.5,	494.0	396.4,	292.0	164.6,	113.7	301.8,	28.8	480.2,	9.9	796.9,	3.4
3	1282.1,	1000.0	725.5,	859.2	568.8,	500.6	221.4,	158.9	428.6,	35.6	696.1,	11.2	1183.4,	3.5
4	1671.1,	1000.0	940.2,	1000.0	735.1,	809.6	273.2,	201.5	549.7,	41.3	906.0,	12.2	1566.5,	3.6
5	2052.3,	1000.0	1149.6,	1000.0	896.7,	1000.0	321.6,	242.3	668.8,	46.3	1111.5,	13.1	1947.3,	3.7
6	2427.6,	1000.0	1354.8,	1000.0	1054.9,	1000.0	367.4,	281.7	780.7,	50.9	1313.5,	13.9	2326.1,	3.8
7	2797.9,	1000.0	1556.7,	1000.0	1210.2,	1000.0	411.2,	320.0	892.0,	55.1	1512.7,	14.6	2703.3,	3.9
8	3164.0,	1000.0	1755.7,	1000.0	1363.1,	1000.0	453.4,	357.3	1001.2,	59.0	1709.5,	15.2	3079.2,	3.9
9	3526.5,	1000.0	1952.3,	1000.0	1513.9,	1000.0	494.2,	393.8	1108.6,	62.7	1904.3,	15.8	3453.9,	4.0
10	3885.9,	1000.0	2146.7,	1000.0	1663.0,	1000.0	533.7,	429.6	1214.4,	66.3	2097.2,	16.3	3827.6,	4.0
11	4242.4,	1000.0	2339.2,	1000.0	1810.3,	1000.0	572.2,	464.8	1318.7,	69.6	2288.5,	16.8	4200.3,	4.0
12	4596.4,	1000.0	2530.0,	1000.0	1956.3,	1000.0	609.8,	499.4	1421.8,	72.8	2478.4,	17.3	4572.2,	4.1
13	4948.0,	1000.0	2719.2,	1000.0	2100.9,	1000.0	646.5,	533.5	1523.8,	75.9	2666.9,	17.7	4943.4,	4.1
14	5297.6,	1000.0	2906.9,	1000.0	2244.3,	1000.0	682.5,	567.2	1624.6,	78.8	2854.3,	18.1	5313.8,	4.2
15	5645.1,	1000.0	3093.4,	1000.0	2386.6,	1000.0	717.8,	600.5	1724.5,	81.7	3040.5,	18.5	5683.5,	4.2
16	5990.8,	1000.0	3278.6,	1000.0	2527.9,	1000.0	752.5.	633.4	1823.6,	84.5	3225.6,	18.9	6052.6,	4.2
17	6334.8,	1000.0	3462.6,	1000.0	2668.2,	1000.0	786.6,	665.9	1921.7,	87.2	3409.8,	19.3	6421.2,	4.2
18	6677.2,	1000.0	3645.6,	1000.0	2807.6,	1000.0	820.2,	698.1	2019.1,	89.8	3593.1,	19.6	6789.2,	4.3
19	7018.1,	1000.0	3827.6,	1000.0	2946.1,	1000.0	853.2,	730.0	2115.8,	92.3	3775.5,	20.0	7156.7,	4.3
20	7357.7,	1000.0	4008.7,	1000.0	3083.9,	1000.0	885.9,	761.8	2211.8,	94.8	3957.1,	20.3	7523.7,	4.3
21	7695.8,	1000.0	4189.8,	1000.0	3220.9,	1000.0	918.0,	792.9	2307.1,	97.2	4138.0,	20.6	7890.2,	4.3
22	8032.7,	1000.0	4368.1,	1000.0	3357.2,	1000.0	949.8,	823.9	2401.9,	99.6	4318.1,	20.9	8256.4,	4.4
23	8368.4,	1000.0	4546.6,	1000.0	3492.9,	1000.0	981.1,	854.8	2496.0,	101.9	4497.6,	21.2	8622.0,	4.4
24	8702.9.	1000.0	4724.3,	1000.0	3627.8,	1000.0	1012.1,	885.3	2589.6,	104.2	4676.4,	21.5	8987.4,	4.4
25	9036.4,	1000.0	4901.3,	1000.0	3762.2,	1000.0	1042.8,	915.7	2682.7,	106.4	4854.6,	21.8	9352.3,	4.4
26	9368.8,	1000.0	5077.6,	1000.0	3896.0,	1000.0	1073.1,	945.9	2775.3,	108.6	5032.2,	22.0	9716.8,	4.4
27	9700.1,	1000.0	5253.3,	1000.0	4029.3,	1000.0	1103.2,	975.8	2867.4,	110.7	5290.2,	22.3	10,000.0,	4.5

CONTROLLED DOCUMENT

Sigma 7, Sigma z Valued used to Calculate Xu/Q $9Xu/Q = \frac{1}{\Pi \sigma_y \sigma_z}$

dis.	A		B		C		D	E		F		G	
	y	z	y	z	y	z	z	y	z	y	z	y	z
28	10,000,	1000.0	5428.2,	1000.0	4162.0,	1000.0	1132.9, 1000.0	2959.0,	112.8	5385.6,	22.6	10,000,	4.5
29	10,000,	1000.0	5602.6,	1000.0	4292.4,	1000.0	1162.3, 1000.0	3050.2,	114.9	5561.5,	22.8	10,000,	4.5
30	10,000.	1000.0	4776.4,	1000.0	4425.8,	1000.0	1191.5, 1000.0	3141.0,	116.9	5737.0,	23.1	10,000,	4.5
31	10,000,	1000.0	5949.6,	1000.0	4557.0,	1000.0	1220.4, 1000.0	3231.3,	118.9	5911.9,	23.3	10,000,	4.5
32	10,000,	1000.0	6122.3,	1000.0	4687.8,	1000.0	1249.0, 1000.0	3321.3,	120.9	6086.4,	23.5	10,000,	4.6
33	10,000,	1000.0	6294.3,	1000.0	4818.1,	1000.0	1277.4, 1000.0	3410.9,	122.8	6260.3,	23.8	10,000,	4.6
34	10,000,	1000.0	6466.0,	1000.0	4948.0,	1000.0	1305.6, 1000.0	3500.1,	124.7	6433.9,	24.0	10,000,	4.6
35	10,000,	1000.0	6637.1,	1000.0	5077.5,	1000.0	1333.6, 1000.0	3589.0,	126.6	6607.0,	24.2	10,000,	4.6
36	10,000,	1000.0	6807.7,	1000.0	5206.5,	1000.0	1361.3, 1000.0	3677.5,	128.5	6779.7,	24.2	10,000,	4.6
37	10,000,	1000.0	6977.8,	1000.0	5335.2,	1000.0	1388.9, 1000.0	3765.7,	130.3	6952.0,	24.6	10,000,	4.6
38	10,000,	1000.0	7147.5,	1000.0	5463.5,	1000.0	1416.2, 1000.0	3853.6,	132.1	7123.9,	24.8	10,000,	4.6
39	10,000,	1000.0	7316.8,	1000.0	5591.4,	1000.0	1433.4, 1000.0	3941.2,	133.9	7295.5,	25.0	10,000,	4.7
40	10,000,	1000.0	7485.6,	1000.0	5718.9,	1000.0	1470.3, 1000.0	4028.4,	135.7	7466.6,	25.2	10,000,	4.7
41	10,000,	1000.0	7654.0,	1000.0	5846.2,	1000.0	1497.1, 1000.0	4155.4,	137.4	7637.4,	25.4	10,000,	4.7
42	10,000,	1000.0	7822.0,	1000.0	5973.7,	1000.0	1523.7, 1000.0	4202.1,	139.1	7807.9,	25.6	10,000,	4.7
43	10,000,	1000.0	7989.6,	1000.0	6099.6,	1000.0	1550.2. 1000.0	4288.5,	140.8	7978.0,	25.8	10,000,	4.7
44	10,000,	1000.0	8156.8,	1000.0	6225.8,	1000.0	1576.4, 1000.0	4374.6,	142.5	8147.8,	26.0	10,000,	4.7
45	10,000,	1000.0	8323.6,	1000.0	6351.7,	1000.0	1602.5, 1000.0	4460.5,	144.2	8317.3,	26.2	10,000,	4.7
46	10,000,	1000.0	8490.2,	1000.0	6477.4,	1000.0	1628.5, 1000.0	4546.1,	145.8	8486.5,	26.4	10,000,	4.7
47	10,000,	1000.0	8656.2,	1000.0	6602.7,	1000.0	1654.3, 1000.0	4631.5,	147.5	8655.2,	26.5	10,000,	4.7
48	10,000,	1000.0	8822.0,	1000.0	6727.7,	1000.0	1679.9, 1000.0	4716.6,	149.1	8823.8,	26.7	10,000,	4.8
49	10,000,	1000.0	8987.2,	1000.0	6852.5,	1000.0	1705.5, 1000.0	4801.5,	150.7	8992.1,	26.9	10,000,	4.8
50	10,000,	1000.0	9152.6,	1000.0	6976.9,	1000.0	1730.8, 1000.0	4886.1,	152.3	9160.0,	27.1	10,000,	4.8
51	10,000,	1000.0	9317.4,	1000.0	7101.1,	1000.0	1756.1, 1000.0	4970.6,	153.8	9327.7,	27.2	10,000,	4.8
52	10,000,	1000.0	9481.8,	1000.0	7225.0,	1000.0	1781.2, 1000.0	5054.7,	155.4	9495.0,	27.4	10,000,	4.8
53	10,000,	1000.0	9645.9,	1000.0	7348.7,	1000.0	1806.1, 1000.0	5138.7,	156.9	9662.2,	27.6	10,000,	4.8
54	10,000,	1000.0	9809.8,	1000.0	7472.1,	1000.0	1831.0, 1000.0	5222.5,	158.4	9829.1,	27.7	10,000,	4.8
55	10,000,	1000.0	9973.3,	1000.0	7595.3,	1000.0	1855.7, 1000.0	5306.0,	160.0	9995.7,	27.9	10,000,	4.8

CONTROLLED DOCUMENT

Average Gamma Decay Energy for Noble Gas Mixtures
vs "Effective Age"

Effective Age (hours)	1/% Failed Fuel (RCS Activity)	Total Core Inventory
0.00	0.207	0.555
0.01	0.207	0.554
0.02	0.206	0.553
0.03	0.206	0.551
0.04	0.206	0.550
0.05	0.205	0.549
0.06	0.205	0.548
0.07	0.204	0.547
0.08	0.204	0.546
0.09	0.204	0.545
0.10	0.203	0.544
0.20	0.200	0.534
0.30	0.196	0.524
0.40	0.192	0.515
0.50	0.189	0.505
0.60	0.186	0.496
0.70	0.182	0.486
0.80	0.179	0.477
0.90	0.176	0.468
1.00	0.173	0.459
2.00	0.147	0.380
2.00	0.126	0.315
4.00	0.110	0.262
5.00	0.098	0.220
6.00	0.087	0.186
7.00	0.079	0.158
8.00	0.072	0.136
9.00	0.067	0.118
10.00	0.067	0.104
20.00	0.062	0.047
30.00	0.035	0.036
40.00	0.032	0.033
50.00	0.031	0.031
60.00	0.030	0.030
70.00	0.030	0.030
80.00	0.030	0.030
90.00	0.030	0.030
100.00	0.030	0.030
200.00	0.030	0.029
300.00	0.030	0.029

Average Gamma Decay Energy for Noble Gas Mixtures
vs "Effective Age" (Cont'd)

Effective Age (hours)	1/% Failed Fuel (RCS Activity)	Total Core Inventory
400.00	0.029	0.029
500.00	0.029	0.028
600.00	0.029	0.026
700.00	0.028	0.024
800.00	0.027	0.021
900.00	0.026	0.018
1000.00	0.024	0.014

CONTROLLED DOCUMENT

Ratio of Integrated Thyroid Dose From All Iodines to Integrated Thyroid Dose From I-131 vs "Effective Age"

Effective Age (hours)	1/% Failed Fuel (RCS Activity)	Total Core Inventory
0.00	1.485	1.796
0.01	1.485	1.795
0.02	1.484	1.794
0.03	1.484	1.794
0.04	1.484	1.793
0.05	1.484	1.792
0.06	1.483	1.791
0.07	1.483	1.791
0.08	1.483	1.790
0.09	1.483	1.789
0.10	1.482	1.788
0.20	1.480	1.781
0.30	1.477	1.775
0.40	1.475	1.768
0.50	1.473	1.762
0.60	1.470	1.756
0.70	1.468	1.750
0.80	1.466	1.744
0.90	1.464	1.738
1.00	1.462	1.733
2.00	1.441	1.686
3.00	1.423	1.648
4.00	1.405	1.615
5.00	1.389	1.586
6.00	1.374	1.560
7.00	1.360	1.536
8.00	1.347	1.513
9.00	1.334	1.492
10.00	1.322	1.472
20.00	1.228	1.325
30.00	1.164	1.231
40.00	1.120	1.167
50.00	1.088	1.122
60.00	1.065	1.090
70.00	1.048	1.066
80.00	1.035	1.048
90.00	1.026	1.036
100.00	1.019	1.026
200.00	1.001	1.001
300.00	1.000	1.000

Ratio of Integrated Thyroid Dose From All Iodines to Integrated Thyroid Dose From I-131 vs "Effective Age" (Cont'd)

Effective Age (hours)	1/% Failed Fuel (RCS Activity)	Total Core Inventory
400.00	1.000	1.000
500.00	1.000	1.000
600.00	1.000	1.000
700.00	1.000	1.000
800.00	1.000	1.000
900.00	1.000	1.000
1000.00	1.000	1.000

APPENDIX G

WHOLE BODY DOSE RATES
COMPARISON OF FIELD DATA AND CALCULATIONS/GRAB SAMPLE DATA

Column 1	2	3	4	5
Location	Time	Measured(*) (mR/hr)	Calculated (mR/hr)	RATIO (Calculated/ Measured)

* Measured data will be transmitted from the onsite chemistry lab to the STSC/TSC.

APPENDIX H

THYROID DOSE COMMITMENTS - COMPARISON OF FIELD DATA AND CALCULATIONS/GRAB SAMPLE DATA

Column 1	2	3	4	5	6	7	8	9	10
Location	Time	Net Iodine (cpm)	Sample Duration (min)	Flow Rate (cfm)	Counting Efficiency (cpm/dpm)	Iodine Concntrtn (uCi/cc)	Measured Dose Commitment (mR/hr)	Calculated Dose Commitment (mR/hr)	Ratio

* $uCi/cc = \frac{\text{net Cpm} \times [1.66\ E{-}11]\ uci - [t]/dpm - cc}{\text{CFM} \times \text{collection time (min)} \times Ec\ (cpm/dpm)}$

* D(mrem/hr) = uci/cc x cc/hr x 1.49 E+3 mrem/uci.

APPENDIX I

PARTICULATE CONCENTRATIONS -
COMPARISON OF FIELD DATA AND CALCULATIONS/GRAB SAMPLE DATA

Location	Time	Net Particulate (cpm)	Sample Duration (min)	Flow Rate (cfm)	Counting Efficiency (cpm/dpm)	Measured Particulate Concentration (uCi/cc)	Calculated Particulate Concentration (uCi/cc) Ratio	Measured Surface Contamination (Ci/m2)	Ratio

uCi/cc = $\frac{\text{Net cpm X 1.66 E-11 uCi - ft /dpm - cc}}{\text{cfm X collection time (min) X E (cpm/dpm)}}$

Ci/m2 = A (Ci/sec) X X/Q (sec/m) X .01 m/sec X D (decay correction factor)

PALO VERDE NUCLEAR GENERATING STATION (PVNGS)

EMERGENCY OFFSITE DOSE CALCULATION COMPUTER PROGRAM INSTRUCTIONS

1.0 SOFTWARE DESCRIPTION

The PVNGS Emergency Dose Projection Computer Program has been designed for rapid assessment of emergency radioactive effluent releases based upon core inventory. The program is designed for use with the IBM personal computer (64K advanced basic) with one double sided/double density disk drive and an AST card, an Okidata 93 printer (preferably with a graphics chip to imitate an Epson printer). However, the program can operate without a printer.

The computer program calculates both noble gas dose and iodine 50 year dose commitment and dose rates at site boundary, 2 miles, 5 miles, and 10 miles based on a straight line Gaussian meterological model. Plume arrival and effective age at the above downwind distances are determined also. Based upon the site boundary dose rates, one of the four emergency classifications (or none) will be selected. Dose calculations are based on EPIP 14b and 14c and release rate calculations are based on EPIP 14a.

To aid in the tracking of plumes, the program is capable of variable trajectory plume plotting. The plume generated has only one constant plume width (or dispersion). It should be noted that the plume plot is only an aid and actual plume configuration and dose rates will be different to some extent.

2.0 OPERATION

2.1 Computer and Optional Printer Preparation

> CAUTION
>
> DO NOT TOUCH THE INNER PORTION OF THE DISKETTE.

2.2.1 Insert the "Emergency Offsite Dose Projection" diskette into disk drive "A" (left side) with the diskette label on the top. Close the disk drive "A" door.

> CAUTION
>
> NEVER REMOVE THE DISKETTE OR REBOOT WHILE THE RED DISK DRIVE LIGHT IS ON.

2.1.2 Turn the computer on. The switch is located on the right side near the rear. If the power is already on, press "Ctrl", "Alt" and "Del" all at the same time to reboot the disk. The program will automatically be loaded and run.

> NOTE
>
> Sections 2.1.4 through 2.1.6 are to set-up the Okidata printer.

2.1.3 Ensure the cable is connected between the printer and the computer.

2.1.4 Check the small dial on the front left side of the printer to make sure that is is set to "7".

2.1.5 Ensure that the perforation line of the paper is above print head then turn on the power. The switch is located on the back right side of the printer.

2.2 Program Operation

2.2.1 The program starts by allowing the operator to update the current date and time and the date and time of the reactor shutdown (see fig. 1). The current time is displayed as a running clock. Press the number associated with the item to be updated. Remember to include the "-" or ":" where shown.

2.2.1.1 The program will not allow a reactor shutdown date and time to surpass the present date and time or an error beep will occur when continuing. If this error beep occurs and will not allow continuation, change the reactor shutdown date and/or time.

2.2.1.2 If the reactor is still operating under power, leave the shutdown date and time unchanged (00-00-00 and 00:00).

2.2.1.3 Press "5" to continue with the program.

2.2.2 The main menu will now be displayed on the screen (see fig. 2). This is the menu which allows different calculations or operations to be performed.

2.2.3 Selection number 1, "Current Release Dose Determination". This selection should be chosen to reflect actual radioactive releases which are occurring and will perform the following:

a) Plot current plume position on the screen and will update each minute

b) Calculate two hour dose (in rem) and dose rates (in rem/hr.) for both noble gasses and total iodines. The total iodine doses are 50 year dose commitments. The screen will display the child iodine dose rate which is twice that of the adult.

c) Determine emergency classification based on the site boundary noble gas and total iodine dose rates.

Emergency Classification based on noble gas dose rate (rem/hr).

< 5.0 E-5	NONE
5.0 E-5 thru 4.9 E-4	UNUSUAL EVENT
5.0 E-4 thru 4.9 E-2	ALERT
5.0 E-2 thru 9.9 E-1	SITE AREA EMERGENCY
> 1.0	GENERAL EMERGENCY

Emergency Classification based on total iodine dose rate (rem/hr) is five times the above noble gas dose rates.

2.2.3.1 After pressing "1", fig. 3 will display on the screen. The following is a description of those items displayed on the screen:

a) At the top right of the screen is the viewing screen which displayed the plume. This screen is updated each minute.

b) At the top left of the screen is the current date and running clock which was entered in 2.2.1.

c) Below this is the screen description. This screen is "CURRENT RELEASE PROJECTIONS".

d) Below this is the emergency classification.

e) Below this is the indicator for whether the plume date is ready to be updated. If the words "PRESS SPACE BAR TO UPDATE" does not appear, then the plume is already being updated and the cursor is positioned at one of the seven input parameters.

f) Seven input parameters pertaining to each plume. These parameters will be discussed in more detail later.

g) Date and time of reactor trip which was entered in 2.2.1.

h) Plume number; two numbers are associated with this number. The number on the left indicates the number of plumes on the screen and the other indicates the total number of plumes generated and on file.

i) The bottom right of the screen displays dose rate information and operator messages.

NOTE

Obtain temperatures, wind speed and wind direction from meterological tower using ERFDADS.

NOTE

If the input parameter is to remain unchanged, just press "Return".

2.2.3.2 To create or update a plume, press the space bar. This will stop the clock and the space bar update prompt will erase. The cursor will move to input #1, "stability classification". Enter the proper classification of A-G and press "return". If the classification is unknown then enter a "U". The screen will prompt the operator for the meterological tower temperature difference of 200 feet - 35 feet. A stability classification will be determined.

2.2.3.3 Move the cursor to input #2, "Wind Speed". Enter the wind speed in mi/hr. Do not leave the speed at zero. Press 'Return' and the cursor will advance to input #3.

2.2.3.4 For input #3, "Wind From", enter the degrees from which the wind is blowing. This is a value from 0 to 360. Press "Return" and the degrees to which the wind is going will be displayed along with the effected downwind sector on the plume centerline. The cursor will advance to input #4.

2.2.3.5 For input #4, "Rel. Date", enter the date (mm-dd-yy) on the plume release or its update. This date can not surpass today's date. If the date is surpassed, an error beep will sound when the plume attempts to update and the date will need to be changed. The cursor will advance to input #5.

2.2.3.6 For input #5, "Rel. Time", enter the time (24 hour clock HH:MM) which the plume was released or the time which one of the input parameters changed. The release time can not surpass today's date and current time. If the time is surpassed, an error beep will sound when the plume attempts to update and the time will need to be changed. The cursor will advance to input #6.

2.2.3.7 For input #6, "Noble Gas", enter the noble gas release rate in curies per second. The number may be entered as decimal or scientific notation. If the value is unknown, press "U" and answer the questions relating to the release rate portion of the program. Release rate calculations are discussed in later sections and are performed using the method of EPIP-14A. The cursor will advance to input #7.

2.2.3.8 For input #7, "I-131", enter the iodine-131 release rate in curies per second. The number may be entered as decimal or scientific notation. If the value is unknown, press "U" and answer the questions relating to the release rate portion of the program. Release rate calculations are discussed in later sections and are performed using the method of EPIP-14A.

2.2.3.9 Upon answering #7 the prompt "PRESS SPACE BAR TO UPDATE" will reappear and the "CURRENT TIME" clock will restart.

2.2.3.10 At this point the operator has several options to choose from. The following are the choices:

> CAUTION
>
> IF THE LEADING EDGE OF A PLUME EXTENDS PAST THE TEN MILE RADIUS, THE PLUME WILL BE DELETED FROM THE SCREEN. THIS MUST BE TAKEN INTO CONSIDERATION IF THE PLUME OVERLAPS (REVERSES DIRECTION).

a) Wait until the clock reaches the minute mark and the current plume information will be used to construct a plume and perform dose calculations. Dose calculations will be performed only if a new plume is detected (change in parameter). The operator will be prompted to whether a printout is needed. Next the dose rates will be displayed, the plume will be drawn and the emergency classification will be updated along with the plume numbers. See fig. 4 for an example of a screen display of a plume and dose rate values. See fig. 5 for an example of a dose printout. Plume information and doses will be stored on disk for later retrieval.

b) Press the F1 key. This forces the plotting of the plume (and dose calculations if new plume). This performs the same items as 2.2.3.10.a above. Function keys will be discussed in more detail later.

c) Press F3 to delete the latest plume. Function keys will be discussed in more detail later.

d) Press other function keys (discussed later) to manipulate the viewing screen.

e) Press the space bar to correct or update plume information/parameters per sections 2.2.3.2 through 2.2.3.9.

f) Press "R" to return to the main menu in section 2.2.2.

2.2.4 Menu Selection number 2, "Projected Dose Determination". This selection should be chosen to project doses of radioactive releases which might occur (a what if situation). This selection is essentially the same as menu selection "1" with the following exceptions:

a) Plume plotting is not capable with this selection.

b) All function keys except F1 (dose calculations) are inoperable.

c) This selection will allow the operator to input a release date and time that surpasses the current date and time.

NOTE

Prior to starting dose projections, past entries should be reviewed and deleted if not needed. To delete all past entries, enter the word "KILL" for the plume number and press "Return".

2.2.5 Menu Selection number 3, "Review Past Entries". This selection is used to review plume and dose information stored on the diskette.

2.2.5.1 Plume data files are identified by two numbers (exp. 1-1230). The first being the plume number, which is a consecutive numbering system. It is possible to have two of these numbers the same if a plume has been deleted and another plume with a different time was entered.

2.2.5.2 The second number is the release time of the plume. All files will having the trailing ".dat" which indicates a data file.

2.2.5.3 Fig. 6 is an example of the past entry review screen. All files will be listed (if any) and the operator will be prompted for the file to review. Files may be deleted at this time by entering the word "KILL" for plume number.

2.2.5.4 Once the file numbers have been entered, the relevant information for the plume will be displayed on the screen (see fig. 7). A printout may be obtained by pressing both the "shift" and "PrtSc" keys (remember to form feed the paper and place back on-line).

2.2.5.5 Pressing the space bar will put the operator back in fig. 6; the operator may review another file or return to the main menu by entering an "R" for the plume number.

2.2.6 Menu Selection number 4, "FIELD DATA". This selection is used to calculate total iodine doses using iodine air samples taken by field monitoring teams.

2.2.6.1 The screen will list all the questions to be answered. See fig. 8 for an example of questions, answers and calculated doses.

2.2.6.2 The "location" is any name which will identify where the sample was taken. An "R" may be entered for location to return to the main menu.

2.2.6.3 Samples will be decay corrected from the time of reactor shutdown. If the reactor shutdown date shows that it is still operating, an effective age of zero (0) is used (plume travel is not considered).

2.2.7 Menu Selection number 5, "CHANGE REACTOR SHUTDOWN/TIME". This selection allows the operator to return and change or update the current date and time and also the reactor shutdown date and time in section 2.2.1.

2.3 FUNCTION KEYS

2.3.1 There are ten (10) function keys (F1-F10) located on the left side of the keyboard. Seven of these keys are used by the program. See fig. 9 for the template which is placed over the function keys to aid in screen manipulations.

> CAUTION
>
> WHEN PRESSING FUNCTION KEYS, ATTENTION SHOULD BE PAID TO THE RUNNING CLOCK. IF THE CLOCK HAS NOT APPEARED ON THE SCREEN OR THE CLOCK IS NOT RUNNING, THEN THE PROGRAM IS PERFORMING CALCULATIONS AND NO OTHER FUNCTION KEYS SHOULD BE PRESSED UNTIL IT STARTS TO RUN AGAIN.

2.3.1.1 Function key "F1" is used in both "Current Release Dose Determination" and "Projected Dose Determination". Pressing this key forces the program to draw and update the plume instead of waiting until the minute update. If the program detects a change in one or more of 5 input parameters, a dose projection will be calculated and the emergency classification based on site boundary dose rates will be displayed. No plume will be drawn in the "Projected Dose Determination" selection.

2.3.1.2 Function key "F2" is used in "Current Release Dose Determination" only. Pressing this key switches to a large screen for plotting of plumes. Pressing both the "shift" and "PrtSc" will print the plume. This will take approximately 2.5 minutes to complete. This screen will not update each minute. Press the screen bar to return to the plume parameter screen.

2.3.1.3 Function key "F3" is used in "Current Release Dose Determination" only. Pressing this key will delete the last plume plotted and will return all seven input parameters including plume number and emergency classification back to their previous values. Prior to deleting the plume the operator will be questioned as to if the plume is to be deleted in case the key was pressed inadvertently.

2.3.1.4 Function key "F7" is used in "Current Release Dose Determination" only. Pressing this key will make the plume screen zoom in (or increase in size). If the screen is increased too much, an error beep will occur.

2.3.1.5 Function key "F8" is used in "Current Release Dose Determination" only. Pressing this key will make the plume screen zoom out (or decrease in size). If the screen is decreased too much, an error beep will occur.

2.3.1.6 Function key "F9" is used in "Current Release Dose Determination" only. Pressing this key will draw in 2, 5, and 10 mile radiuses including the 16 sector marks.

2.3.1.7 Function key "F10" is used in "Current Release Dose Determination" only. Pressing this key will draw in major roads and highways.

2.3.2 A region of interest may be focused in on by using the four arrow keys on the number pad on the right side of the keyboard. These keys are "8" for looking up (moves map down), "2" for looking down, "4" for looking left (moves map right) and "6" for looking right. Moving too far in one direction will cause an error beep.

2.3.2.1 Fig. 10 shows a plume on large screen (F2) with radiuses (F9) and roads (F10). Fig. 11 shows the same plume but in addition, the map was zoomed in (F7 twice), moved down (up arrow, "8"), and moved to the left (right arrow, "6").

2.4 Release Rate Calculations

2.4.1 When a "U" is selected for either the noble gas or iodine release rate, release rate calculations will be performed and the screen will display five types of calculations that may be performed. Press the number for the calculation to be performed.

2.4.1.1 Selecting Plant Vent, Fuel Building Vent or Condenser Air Removal will display, for the most part, the same type of screen. The only difference will be the "fans running" if the Total flow is unknown. The following questions will be prompted:

a) Total Flow, the previous flow will be displayed in CFM. If the flow is to remain the same, then just press the return key. If the new flow is different, then enter the new number. If the flow is unknown then enter a "U". The screen will prompt the operator for which fans/pumps are running and the flow from each will be summed.

NOTE

For plant vent, if a no is the answer to if an effluent monitor is in use then the program defaults to prompting for containment area monitor readings or hand held instrument readings.

b) Enter the gross beta channel reading from the effluent monitor in uCi/cc. If there is an iodine channel, the operator will be prompted to enter its value in uCi/cc also. Fig. 12 is an example display of Plant Vent prompts.

c) The program will then calculate the noble gas, I-131 and total iodine release rates and will display them on the screen. If a mistake was made when inputting data, then press the "R" to redo calculations. Pressing the space bar will return to plume plotting and dose projections. Fig. 13 is an example display of calculated release rate values.

2.4.1.2 Main Steam Line:

a) Enter the monitor reading or average readings on the effected steam line(s) in mR/hr.

b) Enter the number of steam line monitors that are releasing steam. Enter the steam flow in thousands of pounds per hour and the monitor correction factor for each steam line.

c) The program will then calculate the noble gas, I-131 and total iodine release rates and will display them on the screen. If a mistake was made when inputting data, then press the "R" to redo calculations. Pressing the space bar will return to plume plotting and dose projections. Fig. 14 is an example display of Main Steam Line Release prompts.

2.4.1.3 Containment Curie Calculation

a) Enter the number of isotopes from the grab sample analysis.

b) Enter the isotope name, activity (uCi/cc), and half-life (hrs.). Each of these will be entered prior to pressing the return key but are separated by a comma.

c) Enter the containment temperature (deg. F) and pressure (psig).

d) The program will then calculate the total curies in the containment. This value could be taken and used in containment leak rate dose projections. Answer the prompt if another calculation is needed. Fig. 15 is an example of Containment Atmosphere prompts.

SELECT OPTION NUMBER TO UPDATE

1) TODAY'S DATE = 01-01-1980

2) CURRENT TIME = 00:02:42

3) REACTOR SHUTDOWN RATE (MM/DD/YY) = 00-00-00

4) REACTOR SHUTDOWN TIME (HH:MM 24 Hr. CLOCK) = 00:00

5) CONTINUE

Fig. 1

SELECT OPTION BY PRESSING APPROPRIATE NUMBER

1) CURRENT RELEASE DOSE DETERMINATION

2) PROJECTED DOSE DETERMINATION

3) REVIEW PAST ENTRIES

4) FIELD DATA

5) CHANGE REACTOR SHUTDOWN / TIME

Fig. 2

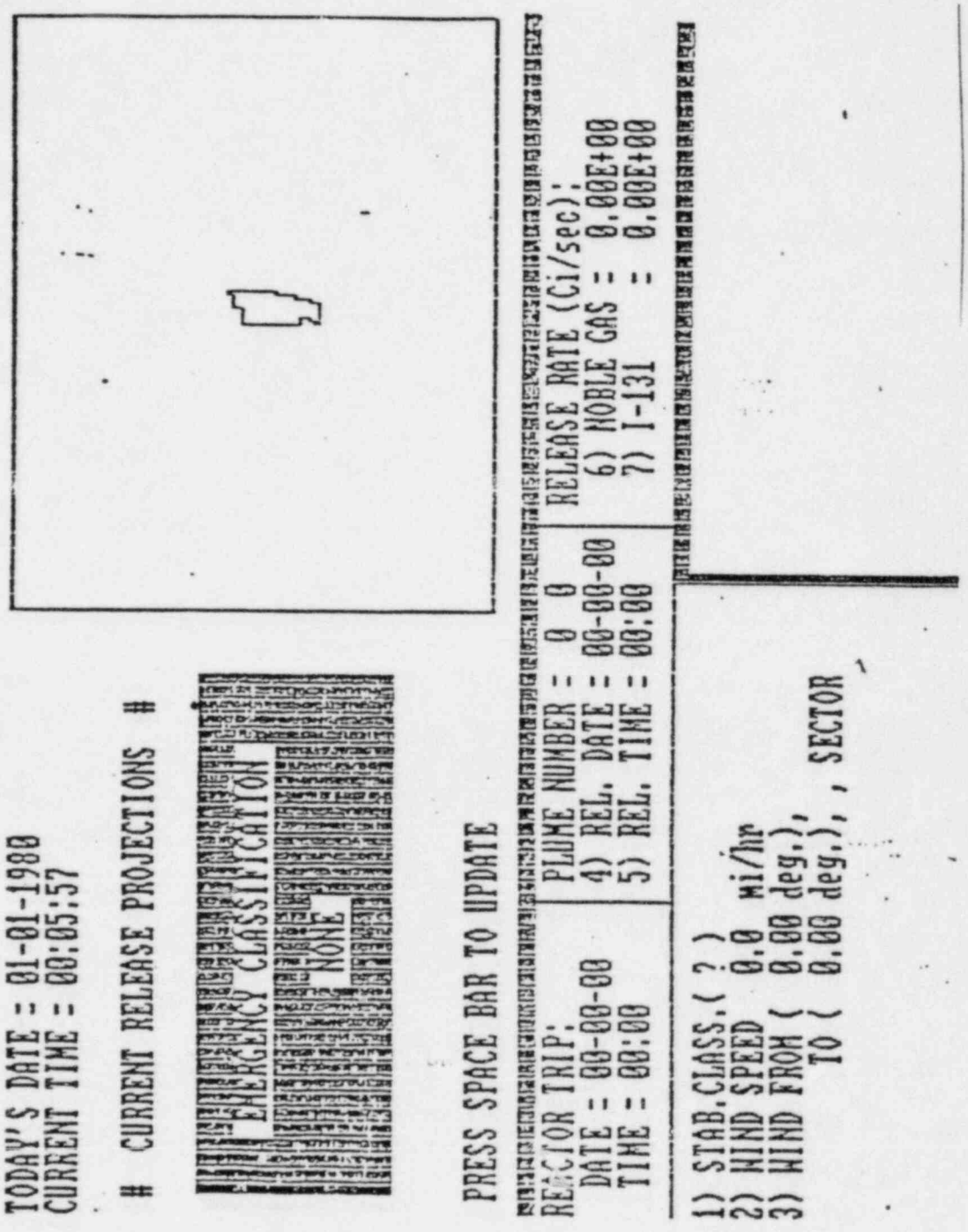
TODAY'S DATE = 01-01-1980
CURRENT TIME = 00:05:57
CURRENT RELEASE PROJECTIONS
EMERGENCY CLASSIFICATION
NONE
PRESS SPACE BAR TO UPDATE
REACTOR TRIP:
DATE = 00-00-00
TIME = 00:00
PLUME NUMBER = 0 0
4) REL. DATE = 00-00-00
5) REL. TIME = 00:00
RELEASE RATE (Ci/sec):
6) NOBLE GAS = 0.00E+00
7) I-131 = 0.00E+00
1) STAB.CLASS.(?)
2) WIND SPEED 0.0 mi/hr
3) WIND FROM (0.00 deg.), , SECTOR
TO (0.00 deg.), ,

Fig. 3

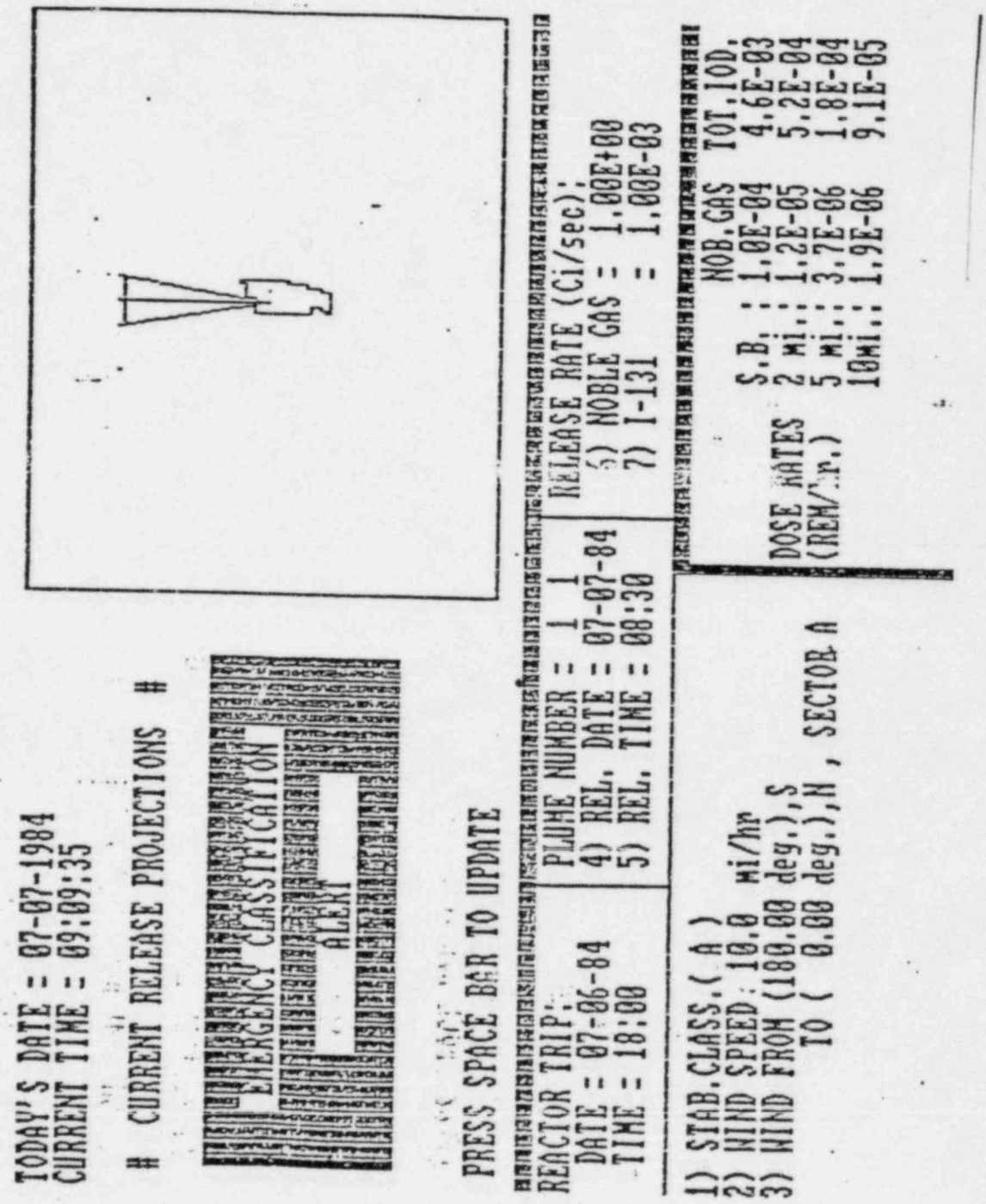
TODAY'S DATE = 07-07-1984
CURRENT TIME = 09:09:35
CURRENT RELEASE PROJECTIONS
EMERGENCY CLASSIFICATION
ALERT
PRESS SPACE BAR TO UPDATE
REACTOR TRIP:
DATE = 07-06-84
TIME = 18:00
PLUME NUMBER = 1 1
4) REL. DATE = 07-07-84
5) REL. TIME = 08:30
RELEASE RATE (Ci/sec):
6) NOBLE GAS = 1.00E+00
7) I-131 = 1.00E-03
1) STAB.CLASS.(A)
2) WIND SPEED: 10.0 mi/hr
3) WIND FROM (180.00 deg.),S
TO (0.00 deg.),N , SECTOR 0
DOSE RATES (REM/hr.)
NOB.GAS TOT.IOD.
S.B. : 1.0E-04 4.6E-03
2 mi.: 1.2E-05 5.2E-04
5 mi.: 3.7E-06 1.8E-04
10mi.: 1.9E-06 9.1E-05

Fig. 4

PV216-000A (8/82)

CURRENT RELEASE DATA

PLUME # 2

TODAY'S DATE = 07-19-1984

CURRENT TIME = 15:36

- REACTOR SHUTDOWN DATE & TIME = 07-19-84 AT 12:00 (hrs.)
- RELEASE DATE & TIME = 07-19-84 AT 15:10 (hrs.)

** METEROLOGICAL INFORMATION **

- WIND SPEED (mi/hr) = 10
- STABILITY CLASSIFICATION = F
- WIND DIRECTION FROM (W) AT (270) degs. TO THE (E) AT (90) degs.

** RELEASE RATE INFORMATION **

- NOBLE GAS (Ci/sec) = .1
- I-131 (Ci/sec) = .001

	DOWNWIND DISTANCE			
	SB	2	5	10
T/D	2.5E-05	1.5E-05	4.9E-06	2.1E-06
PLUME ARRIVAL (HRS.)	0.13	0.20	0.50	1.00
EFFECTIVE AGE (HRS.)	3.30	3.37	3.67	4.17
** DOSE RATES (rem/hr)**				
NOBLE GASES	3.0E-04	1.9E-04	6.1E-05	2.6E-05
ADULT I-131 INHALATION	4.6E-02	2.8E-02	9.2E-03	3.9E-03
ADULT TOT.IODINE INHALATION	7.4E-02	4.5E-02	1.5E-02	6.0E-03
** 2 hr.DOSE COMMITMENT (rem) **				
NOBLE GAS	6.1E-04	3.7E-04	1.2E-04	5.1E-05
ADULT THYROID INHALATION	1.6E-01	9.0E-02	2.9E-02	1.2E-02
CHILD THYROID INHALATION	2.9E-01	1.8E-01	7.3E-02	2.4E-02

Fig. 5

EMERGENCY CLASSIFICATION
ALERT

```
:\
-1430  .DAT        2-1445  .DAT        3-1459  .DAT        4-1503  .DAT
-1507  .DAT        6-1510  .DAT        7-1512  .DAT
203776 Bytes free
```

```
ENTER PLUME NUMBER ? 7

ENTER HOUR OF FILE TO REVIEW (EX 0900) ? 1512
```

Fig. 6

```
** PAST ENTRY REVIEW **                                   FILE # 7-1512

-  DAY TRIED = 00-00-00                    -  HOUR TRIED = 00:00
-  DATE RELEASED = 07-09-84                -  HOUR RELEASED = 15:12
-  N.G. RELEASE RATE =  2.00E+00
-  I-131 RELEASE RATE = 5.00E-02
-  WIND SPEED =  85  FROM  200             -  STABILITY CLASS = A

)OWNWIND DISTANCE              SB          2           5          10

(/Q                         3.9E-06     4.6E-07     1.6E-07    8.2E-0
)LUME ARRIVAL (HRS.)          0.01        0.02        0.06       0.12
:FFECTIVE AGE (HRS.)          0.01        0.02        0.06       0.12

 ** DOSE RATES (rem/hr)**

NOBLE GASES                 1.3E-04     1.4E-05     4.3E-06    1.8E-0
ADULT I-131 INHAILATION     9.5E-03     1.1E-03     3.9E-04    2.0E-0
ADULT TOT.IODINE INHALATION 1.7E-02     2.0E-03     7.0E-04    3.6E-0

                    PRESS SPACE BAR TO CONTINUE
```

Fig. 7

** FIELD IODINE DATA **

LOCATION = 355 & BECKEYE/SOLOME HWY.
SAMPLE TIME (HHMM) = 1500
SAMPLE DATE (MM/DD/YY) = 05/25/83
NET COUNTS = 1225
TOTAL VOLUME (CU.FT.) = 10
DETECTOR EFF. = .01

uC/cc = 1.95E-07

2 hr. ADULT THYROID DOSE (REM) = 1.16
2 hr. CHILD THYROID DOSE (REM) = 2.3

Fig. 8

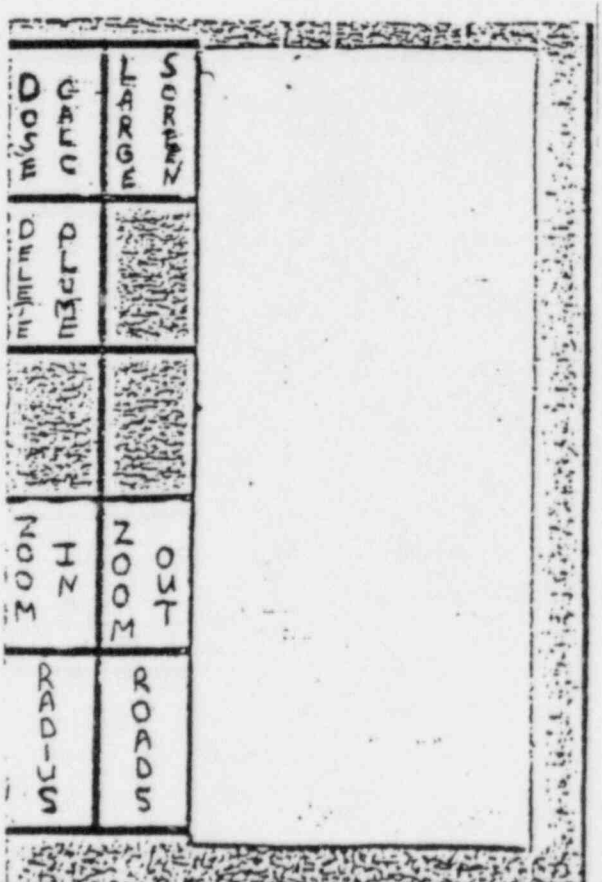

FIG. 9

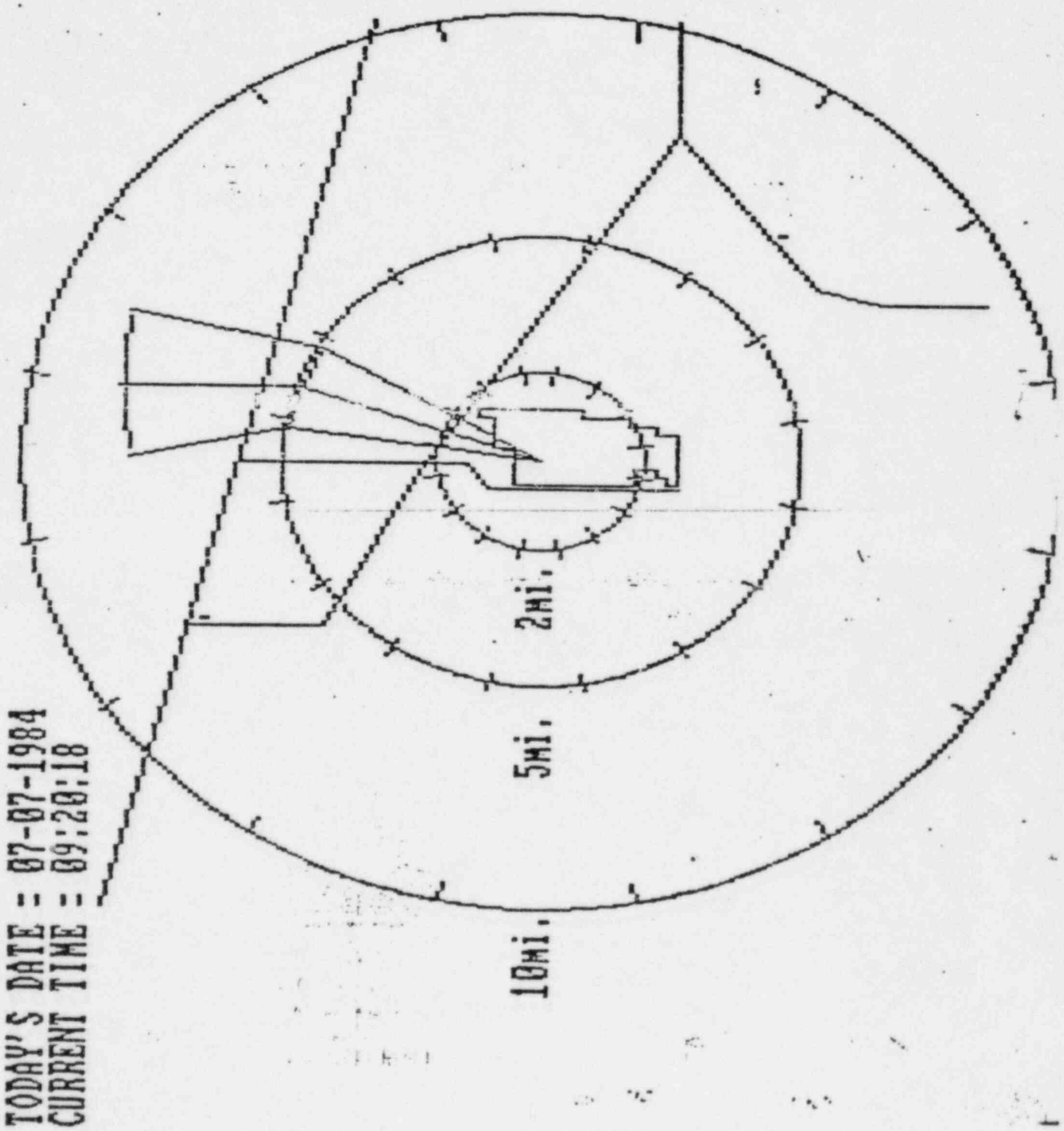

FIG 10

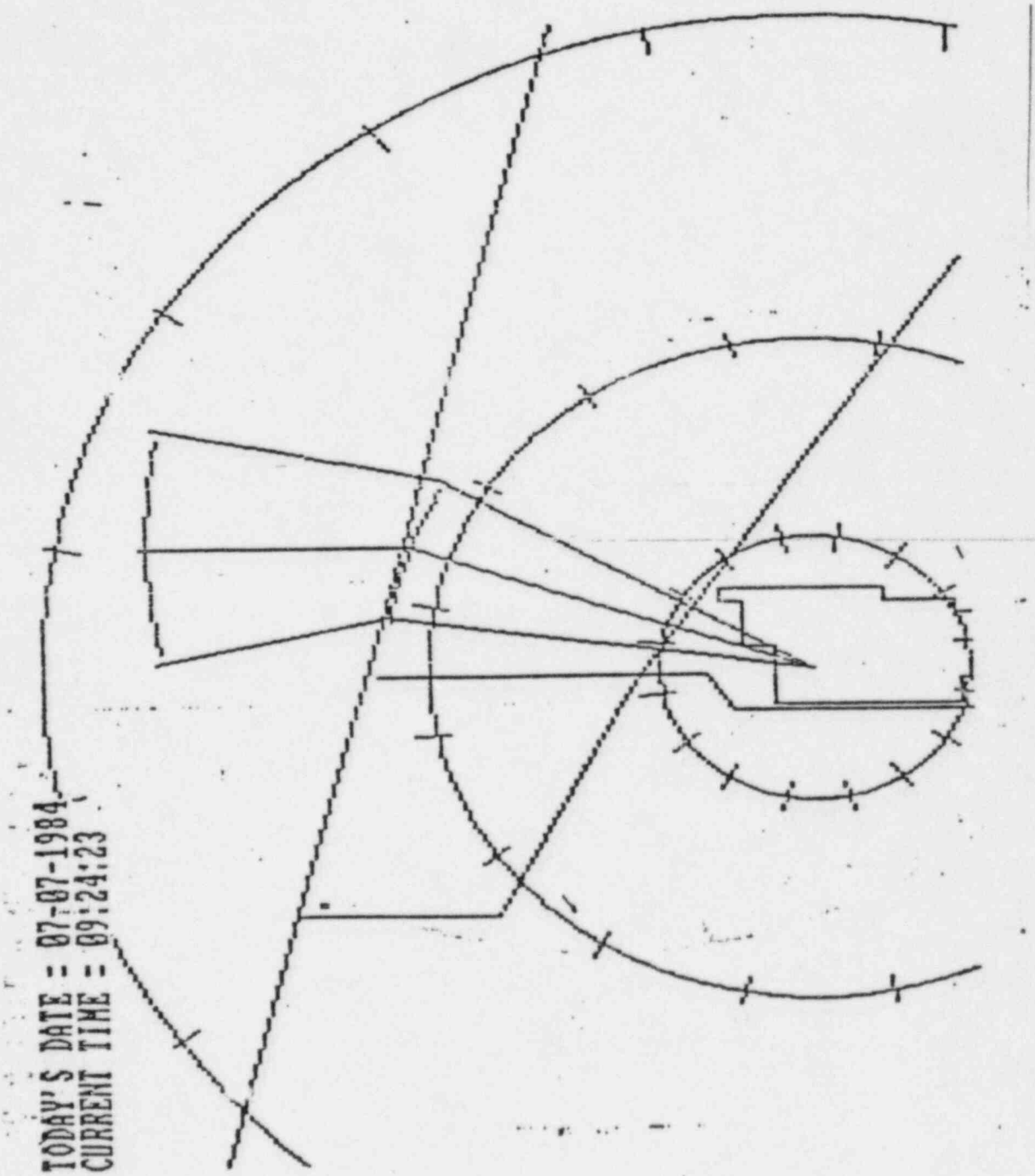

FIG II

1.) PLANT VENT

2.) FUEL BUILDING VENT

3.) CONDENSER AIR REMOVAL SYSTEM

4.) MAIN STEAM LINE

5.) CONTAINMENT CURIE CALC.

'LANT VENT RELEASE CALCULATION :

'OTAL FLOW (CFM) = ? 2200 ('U 'IF UNKNOWN)

S THE EFFLUENT MONITER IN USE?Y

[illegible]-143 OR Ru-144 READING FROM GROSS BETA CHANNEL "B IN uCi/cc:4E-

'S THE I-131 CHANNEL OPERABLE ?Y

-131 READING FROM Ru-143 or Ru-144 (uC/cc) :4E-6

Fig. 12

PLANT VENT RELEASE CALCULATION :

NOBLE GAS RELEASE RATE= 4.15E-03 Ci/sec

I-131 RELEASE RATE = 4.15E-06 Ci/sec

TOTAL IODINE RELEASE RATE = 4.62E-06 Ci/sec

PRESS SPACE BAR TO CONTINUE
('R ' TO REDO)

Fig. 13

MAIN STEAM LINE RELEASE CALCULATION :

READING FROM Ru-139A,B or Ru-140A,B (mr/hr):

HOW MANY STEAM FLOW MONITERS ARE YOU INPUTTING?

FLOW FROM MONITER # 1 (10^3 lbs/hr):?

ENTER CORRECTION FACTOR:

Fig. 14

CONTAINMENT ATMOSPHERIC TOTAL CURIE CALCULATION

ENTER TOTAL NUMBER OF NUCLIDES TO BE CONSIDERED:?

ENTER ISOTOPE 1 (NAME,ACT(uCi/cc),T1/2(HRS):?

ENTER CONTAINMENT TEMPERATURE (deg.F) ?

ENTER CONTAINMENT PRESSURE (PSIG)?

ENTER TIME IN HRS SINCE SAMPLE WAS TAKEN (hrs.):

Fig. 15

Exhibit 3

PROGRAM DESCRIPTION USED TO CALCULATE THE TOTAL ISOTOPIC CURIE CONTENT OF CONTAINMENT

The program "Containment Curie Content" is used to calculate the total isotopic curie content of containment for a given temperature and pressure. Utilizing manually inputted sample results, pressure, temperature and time since sampling, the program corrects the containment volume to STP and then calculates the total curie content per isotope and overall.

.The program uses 7.4191 X 10^{18} cc as the standard containment volume.

EQUATIONS USED

1) Temperature Correction

$$°K = ((°F - 32) \times 5/9) + 273$$

Where:

°K = Temperature absolute

°F = Temperature °F

2) STP Correction

$$\text{Corrected Volume} = \frac{14.7\ (\text{psia}) \times 7.42\ E{+}10(\text{cc})}{273\ (°K)} \quad \frac{T\ °K}{P\ (\text{psia})}$$

3) Correction to Ci calculation

Corrected Act (Ci) = (Act (uCi) x corrected Volume)/1 X E + 6 uCi/Ci)

Exhibit 3 (Continued)

EQUATION DERIVATIONS

Pressure/Temperature from Boyles Law:

$$V_2 = \frac{P\ V}{T_1} \quad \frac{(T_2)}{(P_2)}$$

At STP the total free volume of containment = 2.62 E + 6 Ft^3 which converts to:

$$\frac{2.62 \text{ X } 106 \text{ Ft3}}{3.5314 \text{ X } 10^{-5}\ \frac{Ft^3}{Cm^3}} = 7.42 \text{ E+10cc}$$

Therefore the volume at some other temperature and pressure is:

$$V = \frac{(14.7 \text{ (psia) X } 7.42\text{E } +10\text{(cc)}}{273\ (^{\circ}K)} \quad \frac{T\ (^{\circ}K)}{P\ (\text{psia})}$$

Exhibit 3 (Continued)

Manual Calculation:

Base Data

Date: 22 September 1983 Sample Date: 22 September 1983

Time: 0729 Sample Time: 0629

Containment Temperature: 110°F

Containment Pressure: 15.3 PSIA

Total free containment volume: 2.62×10^6 Ft^3
Isotopic Breakdown:

Isotope	Activity
1) I-131	3.5 E -6
2) I-132	4.7 E -7
3) I-133	6.2 E -5
4) I-134	8.7 E -6
5) I-135	1.3 E -6
6) Xe-135	2.4 E -4
7) Xe-133	8.7 E -4
8) Kr-87	6.3 E -5
9) Kr-85m	1.8 E -6
10) KR-88	2.5 E -3
11) Ar-41	1.7 E -3

Exhibit 3 (Continued)

TOTAL ACTIVITY CALCULATION

	Isotope	Activity uCi/cc	Total Activity uCi	Activity Ci
1)	I-131	3.5 E - 6	2.761 E + 5	2.761 E - 1
2)	I-132	4.7 E - 7	3.707 E + 4	3.707 E - 2
3)	I-133	6.2 E - 5	4.891 E + 6	4.891 E + 0
4)	I-134	8.7 E - 6	6.863 E + 5	6.863 E - 1
5)	I-135	1.3 E - 6	1.025 E + 5	1.025 E - 1
6)	Xe-135	0.4 E - 4	1.8932 E + 7	.893 E - 1
7)	Xe-133	8.7 E - 4	6.863 E + 7	6 863 E - 1
8)	Kr-87	6.3 E - 5	4.9696 E + 6	4.9696 E - 0
9)	Kr-85m	1.8 E - 6	1.42 E + 5	1.42 E - 1
10)	Kr-88	0.5 E - 3	1.972 E + 8	1.972 E + 2
11)	Ar-41	1.7 E - 3	1.341 E + 8	1.341 E + 2
			TOTAL	4.30 E +2

Exhibit 3 (Continued)

CONTAINMENT TOTAL CURIE CONTENT

Date: 9/22/83 UNIT: 1
Time: 729
Containment Temp: 110 F
Containment Press: 15.3 PSIA

	ISOTOPE	TOTAL ACTIVITY (Ci)
1)	I-131	0.761 E-1 Ci
2)	I-132	3.707 E-2 Ci
3)	I-133	4.891 E+0 Ci
4)	I-134	6.863 E-1 Ci
5)	XE-135	1.893 E+1 Ci
6)	XE-133	6.863 E+1 Ci
7)	KR-87	4.970 E+0 Ci
8)	KR-85M	1.420 E-1 Ci
9)	KR-88	1.972 E+2 Ci
10)	AR-41	1.341 E+2 Ci
TOTAL CURIES:		4.30 E+2 Ci

CONTROLLED DOCUMENT

PALO VERDE NUCLEAR GENERATING STATION

PROCEDURE CHANGE NOTICE

ASSIGNED COPY

PAGE 1 o

PVNGS #8-9B

☒ NON SCOPE/INTENT

SCOPE/INTENT

1. PROCEDURE TITLE Release Rate Determination
2. PROCEDURE NUMBER EPIP-14A REV. 3 PCN 001
3. REASON FOR PCN: Clarification of which procedures may be applicable
4. EXPIRATION: Incorporation into Revision 4
5. AFFECTED STEPS: 4.1.5
   CHANGE REQUIRED: Change to read "(EPIP-14A, 14B or 14C)." Vice "(EPIP-14A, 14C)."
6. PREPARED BY: [signature] SIGNATURE 9/14/84 DATE
   ENTERED IN PROCEDURE BY: SIGNATURE DA
7. TEMPORARY APPROVAL:
   SIGNATURE DATE
   SRO DATE
8. DEPT MANAGER: [signature] SIGNATURE 9/17/84 DATE
9. PRB/PRC/TRRC: [signature] SIGNATURE 9/17/84 DATE
10. APPROVED BY: J R Boynton SIGNATURE 9/17/84 DATE
11. DATE EFFECTIVE 9-24-84

PVNGS EMERGENCY PLAN IMPLEMENTING PROCEDURE	PROCEDURE NO. EPIP-14A	
RELEASE RATE DETERMINATION	REVISION 3	Page 1 of 21

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DEPT. HEAD [signature] DATE 9/19/84

PRB/PRG REVIEW [signature] DATE 9/19/84

APPROVED BY [signature] DATE 9/19/84

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PV216-00DA (8/82)

PVNGS EMERGENCY PLAN IMPLEMENTING PROCEDURE	PROCEDURE NO. EPIP-14A	
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REVISION HISTORY

Rev. No.	Date	Revised Pages	Comments

3

TABLE OF CONTENTS

APPENDICES

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1.0 OBJECTIVE

This procedure permits determination of radioactive release rates (Sections 4.3.1 and 4.3.2) or the projection of release rates using design basis containment leak rates (Sections 4.3.3 and 4.3.4).

2.0 REFERENCES

2.1 Implementing References

2.1.1 EPIP-14B, "Initial Dose Assessment"

2.1.2 78AC-0ZZ06, "Document and Record Turnover Control"

2.1.3 74CH-9ZZ47, "Core Damage Assessment"

2.2 Developmental References

2.2.1 PVNGS Emergency Plan, Rev. 3

2.2.2 FSAR, Chapter 11, "Process and Effluent Radiological Monitoring and Sampling Systems", Section 11.5, August 1981.

2.2.3 NUREG-0737, "Clarification of TMI Action Plan Requirements", October 1980.

3.0 LIMITATIONS AND PRECAUTIONS

3.1 The accuracy of plant vent monitors is 25% and the accuracy of containment area monitors is 20%. Therefore, release rate calculations may be limited to two significant figures.

4.0 DETAILED PROCEDURE

4.1 Personnel Indoctrination/Responsibilities

4.1.1 Monitor readings and monitor channel number should be obtained from the communication console in the Control Room or the console in the Radiation Protection office.

4.1.2 "Effective age" refers to the time between core shutdown and start of the release. Release rates will vary as a function of "effective age".

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4.1.3 When selecting values from the appendices, data corresponding to 1% failed fuel shall be used unless plant conditions indicates severe fuel cladding failure. When the effective age falls between two listed values, an effective age that yields the higher value shall be used.

4.1.4 The Radiation Protection Technician, Radwaste (affected unit) shall be responsible for the initial offsite dose calculations (EPIPs-14A, 14B).

See PCN #101

4.1.5 The Radiological Protection Coordinator shall be responsible for dose assessment when the TSC is activated (EPIPs-14A, 14B).

4.1.6 All release rate determination/projection documents shall be processed in accordance with 78AC-0ZZ06, "Document and Record Turnover Control".

4.2 Prerequisites

None

4.3 Instructions

NOTE

Use Section 4.3.1 for actual releases through the Plant Vent, Fuel Building Vent Exhaust and/or Condenser Air Removal System. If the release is through the main steam lines only, proceed to Section 4.3.2. If it is desired to predict release rates from containment, proceed to Section 4.3.3.

4.3.1 Determination of Activity Release Rate From an Effluent Release Point (Appendix A)

4.3.1.1 Complete Section A of Appendix A, "Release Rate Determination From an Effluent Release Point" and obtain RMS data and monitor channel number from RP office to determine the monitor correction factor from Appendix B.

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4.1.3 When selecting values from the appendices, data corresponding to 1% failed fuel shall be used unless plant conditions indicates severe fuel cladding failure. When the effective age falls between two listed values, an effective age that yields the higher value shall be used.

4.1.4 The Radiation Protection Technician, Radwaste (affected unit) shall be responsible for the initial offsite dose calculations (EPIPs-14A, 14B).

4.1.5 The Radiological Protection Coordinator shall be responsible for dose assessment when the TSC is activated (EPIPs-14A, 14B, 14C). See Rev 01

4.1.6 All release rate determination/projection documents shall be processed in accordance with 78AC-0ZZ06, "Document and Record Turnover Control".

4.2 Prerequisites

None

4.3 Instructions

NOTE

Use Section 4.3.1 for actual releases through the Plant Vent, Fuel Building Vent Exhaust and/or Condenser Air Removal System. If the release is through the main steam lines only, proceed to Section 4.3.2. If it is desired to predict release rates from containment, proceed to Section 4.3.3.

4.3.1 Determination of Activity Release Rate From an Effluent Release Point (Appendix A)

4.3.1.1 Complete Section A of Appendix A, "Release Rate Determination From an Effluent Release Point" and obtain RMS data and monitor channel number from RP office to determine the monitor correction factor from Appendix B.

4.3.1.2 From the Control Room, determine which fans are operating and complete Section B. If fan operating information is not available, assume that all fans are running. Total plant release rate is the sum of the individual pathway release rates.

4.3.1.3 Complete Section C using the Total Noble Gas Release Rate from Section B and the values listed in Appendix C.

4.3.1.4 If a release is in progress via the main steam lines, continue with Section 4.3.2; if not, perform offsite dose projections in accordance with EPIP-14B, "Initial Dose Assessment".

4.3.2 Determination of Activity Release Rate From the Main Steam Lines (Appendix D)

4.3.2.1 Complete Section A of Appendix D, "Release Rate Determination from Main Steam System".

4.3.2.2 Multiply monitor readings from RU-139 A&B and RU-140 A&B by the Correction Factor shown below to obtain Corrected Monitor Reading. Record in Section B both Correction Factor used and Corrected Monitor Reading.

Effective Age (Hours)	Correction Factor
0.0 - 0.49	2.55
0.5 - 23.9	3.07
24.0 - 719.9	3.74
> 720	3.33

#020 0

NOTE

Appendix D, page 2 and page 3 are default values based on hypothetical source terms. Projections based on the use of these numbers should be verified as soon as possible utilizing field measurements and/or lab analysis.

4.3.2.3 Using page 2 of Appendix D, Main Steam Line Data, select the nearest numbered line to the intersection of lines drawn through Effective Age and Corrected Monitor Reading.

4.3.2.4 Using page 3 of Appendix D, determine the Noble Gas

Concentration by traveling vertically from the Effective Age on the x-axis to the intersection of the numbered line selected in 4.3.2.3 and then horizontally to the y-axis.

4.3.2.5 Record Noble Gas Concentration for each monitor in Section B.

4.3.2.6 Obtain from the Control Room the Reactor Coolant System (RCS) temperature and steam line flow rates. Record flow rates in Section B.

4.3.2.7 Using RCS temperature and page 4 of Appendix D, select the appropriate Conversion Factor and record in Section B.

4.3.2.8 Complete Section B by multiplying Noble Gas Concentration by Conversion Factor and Steam Flow Rate.

4.3.2.9 Complete Section C using Total Noble Gas Release Rate from Section B and values listed in Appendix C.

4.3.2.10 Add noble gas and I-131 release rates to those determined in Section 4.3.1 and perform offsite dose projections in accordance with EPIP-14B.

CONTROLLED DOCUMENT

NOTE

This section is to be performed using information from area monitors (RU-148 or RU-149). Appendix E, pages 2 - 4 are default values based on hypothetical source terms. Projections based on the use of these numbers should be verified as soon as possible utilizing field measurements and/or lab analysis. If release rate projection is to be based on RU-1 (containment atmosphere monitor) proceed to Section 4.3.4.)

4.3.3 Release Rate Determination From an Isolated Containment Using Design Basis Leak Rates and Area Monitors or RU-1 (Appendix E)

4.3.3.1 Complete Section A of Appendix E, page 1. Appendix E provides data for 1% failed fuel and total core inventory. If plant conditions indicate potential fuel failure, base projected/actual dose projections on data for 1% failed fuel. Should conditions worsen prior to obtaining chemistry data, extrapolate data from Appendix E if sufficient plant parameters allow; otherwise, assume worst case/total core inventory.

4.3.3.2 Record the average monitor reading in Section B and using predicted values from Appendix E, pages 2 - 4, calculate Projected Noble Gas Release Rate.

4.3.3.3 Complete Section C using Projected Noble Gas Release Rate and values listed in Appendix C.

4.3.4 Release Rate Determination From an Isolated Containment Using Design Basis Leak Rates and RU-1

4.3.4.1 Complete Section A of Appendix E, page 1, disregarding area monitor readings.

4.3.4.2 Calculate Projected Noble Gas Release Rate in Section D of Appendix E using RU-1 Channel 1 monitor reading.

4.3.4.3 Calculate Projected I-131 Release Rate in Section E using Projected Noble Gas Release Rate from Section D and values listed in Appendix C.

4.3.5 To calculate release rate based on grab sample data use the IBM-PC in conjunction with information obtained per procedure 74CH-9ZZ47, "Core Damage Assessment".

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RELEASE RATE DETERMINATION FROM AN EFFLUENT RELEASE POINT

Section A: Release Data

RX SHUTDOWN: Date _____ Time _____ EFFECTIVE AGE _____

REL START: Date _____ Time _____

Section B: Noble Gas Release Rate Determination

Part 1. Plant Vent (Aux & Radwaste Bldg, Cntmt Refueling & Cntmt Power Access Purge)

		Effective Age Correction Factor (App B)	Noble Gas Conc (RU-143 or RU-144) (uCi/cc)	Conversion Constant (cc-Ci/cfm sec-uCi	Noble Gas Release Rate (Ci/sec)
HAN-J01A (30,000 cfm)	_____				
HAN-J01B (30,000 cfm)	_____				
HRN-J01A (25,500 cfm)	_____				
HRN-J01B (25,500 cfm)	_____				
CPN-J01A (16,500 cfm)	_____				
CPN-J01B (16,500 cfm)	_____				
CPN-J02 (2,200 cfm)	_____				

TOTAL FLOW RATE (cfm) _____ X _____ X _____ X 4.72E-04 = _____

Part 2. Condenser Air Removal System

		Effective Age Correction Factor (App B)	Noble Gas Conc (RU-141 or RU-142) (uCi/cc)	Conversion Constant (cc-Ci/cfm sec-uCi	Noble Gas Release Rate (Ci/sec)
Vacuum Pump A (60 cfm)	_____				
Vacuum Pump B (60 cfm)	_____				
Vacuum Pump C (60 cfm)	_____				
Vacuum Pump D (60 cfm)	_____				
Steam Packing Exhaust	_____				

TOTAL FLOW RATE (cfm) _____ X _____ X _____ X 4.72E-04 = _____

Part 3. Fuel Building Vent

		Effective Age Correction Factor (App B)	Noble Gas Conc (RU-145 or RU-146) (uCi/cc)	Conversion Constant (cc-Ci/cfm sec-uCi	Noble Gas Release Rate (Ci/sec)
HFN-J01A (21,750 cfm)	_____				
HFN-J01B (21,750 cfm)	_____				
HFA-J01 (6,000 cfm)	_____				
HFB-J01 (6,000 cfm)	_____				

TOTAL FLOW RATE (cfm) _____ X _____ X _____ X 4.72E-04 = _____

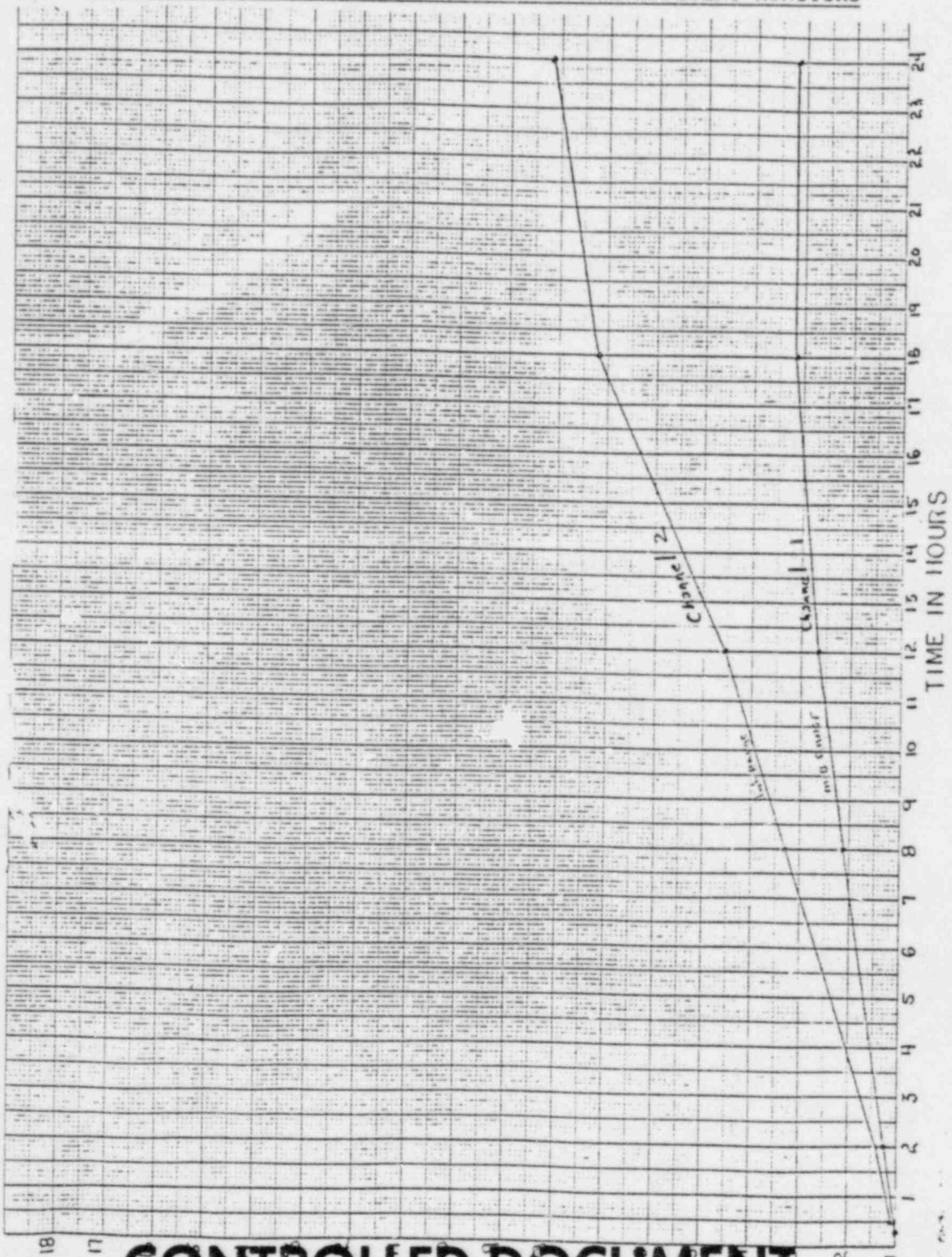
TOTAL PLANT VENT NOBLE GAS RELEASE RATE (Ci/sec) = _____

Section C: I-131 Release Rate Determination

Noble Gas Release Rate (Section B) (Ci/sec)		Total Iodine to Noble Gas Ratio (Appendix C)		Volatile Factor		I-131 to Total Iodine Ratio (Appendix C)		I-131 Release Rate (Ci/sec)
_____	X	_____	X	.25	X	_____	=	_____

CONTROLLED DOCUMENT

EFFECTIVE AGE CORRECTION FACTORS FOR THE EFFLUENT MONITORS



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NOBLE GAS AND IODINE RADIOLOGICAL DATA

Effective Age	1% FAILED FUEL Relative Release Rate Ratios of Tot I /NG	1% FAILED FUEL Relative Release Rate Ratios of I-131 /Tot I	Effective Age	TOTAL CORE INVENTORY Relative Release Rate Ratios of Tot I /NG	TOTAL CORE INVENTORY Relative Release Rate Ratios of I-131 /Tot I
0	0.291	0.264	0	0.894	0.121
0.1	0.291	0.267	0.1	1.188	0.124
0.2	0.290	0.269	0.2	1.371	0.128
0.3	0.290	0.272	0.3	1.481	0.131
0.4	0.289	0.274	0.4	1.553	0.134
0.5	0.288	0.276	0.5	1.603	0.137
0.6	0.287	0.279	0.6	1.640	0.141
0.7	0.286	0.281	0.7	1.668	0.144
0.8	0.285	0.283	0.8	1.688	0.147
0.9	0.284	0.285	0.9	1.701	0.150
1	0.283	0.287	1	1.710	0.153
2	0.275	0.306	2	1.680	0.180
3	0.269	0.323	3	1.623	0.202
4	0.263	0.338	4	1.580	0.221
5	0.258	0.352	5	1.547	0.237
6	0.253	0.366	6	1.517	0.252
7	0.248	0.378	7	1.488	0.266
8	0.244	0.391	8	1.459	0.279
9	0.240	0.403	9	1.430	0.292
10	0.235	0.415	10	1.401	0.305
20	0.203	0.521	20	1.149	0.420
30	0.181	0.612	30	0.977	0.521
40	0.166	0.688	40	0.865	0.609
50	0.155	0.753	50	0.789	0.685
60	0.148	0.807	60	0.737	0.750
70	0.143	0.851	70	0.700	0.805
80	0.140	0.886	80	0.677	0.848
90	0.139	0.913	90	0.663	0.884
100	0.138	0.934	100	0.655	0.911
200	0.156	0.997	200	0.719	0.995
300	0.187	1.000	300	0.853	1.000
400	0.225		400	1.009	
500	0.269		500	1.177	
600	0.320		600	1.344	
700	0.378		700	1.483	
800	0.440		800	1.561	
900	0.501		900	1.546	
1000	0.552		1000	1.460	

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RELEASE RATE DETERMINATION FROM MAIN STEAM SYSTEM

Section A: Release Data

REACTOR SHUTDOWN: Date _____ Time _____

RELEASE START: Date _____ Time _____

EFFECTIVE AGE: _____

Section B: Noble Gas Release Rate Determination

	RU-139A	RU-139B	RU-140A	RU-140B
Monitor Reading (mr/hr)				
Monitor Correction Factor (Step 4.3.2.2)				
Corrected Monitor Reading (mr/hr)				
Noble Gas Concentration (Appendix D) (uCi/cc)				
Conv Factor (App D) (cc-Ci-hr/lb-uCi-sec)				
Steam Flow Rate Control Rm (E+06 lbs/hr)				
Noble Gas Release Rate (Ci/sec)				

TOTAL STEAM LINE NOBLE GAS RELEASE RATE = _____

Section C: I-131 Release Rate Determination

Noble Gas Release Rate (Section B) (Ci/sec)		Total Iodine to Noble Gas Ratio (Appendix C)		Volatile Factor		I-131 to Total Iodine Ratio (Appendix C)		I-131 Release Rate (Ci/sec)
_____	X	_____	X	1.00	X	_____	=	_____

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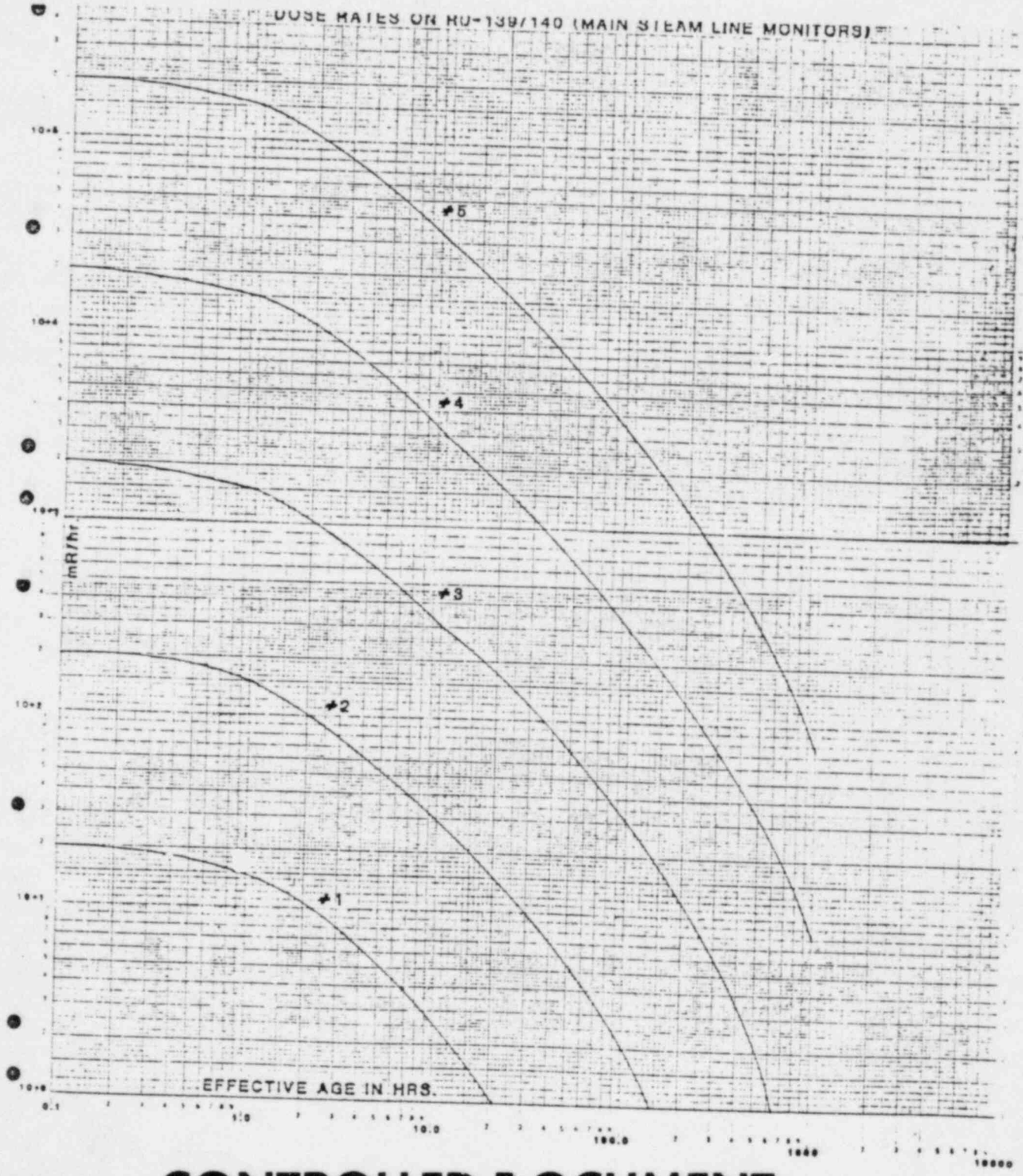

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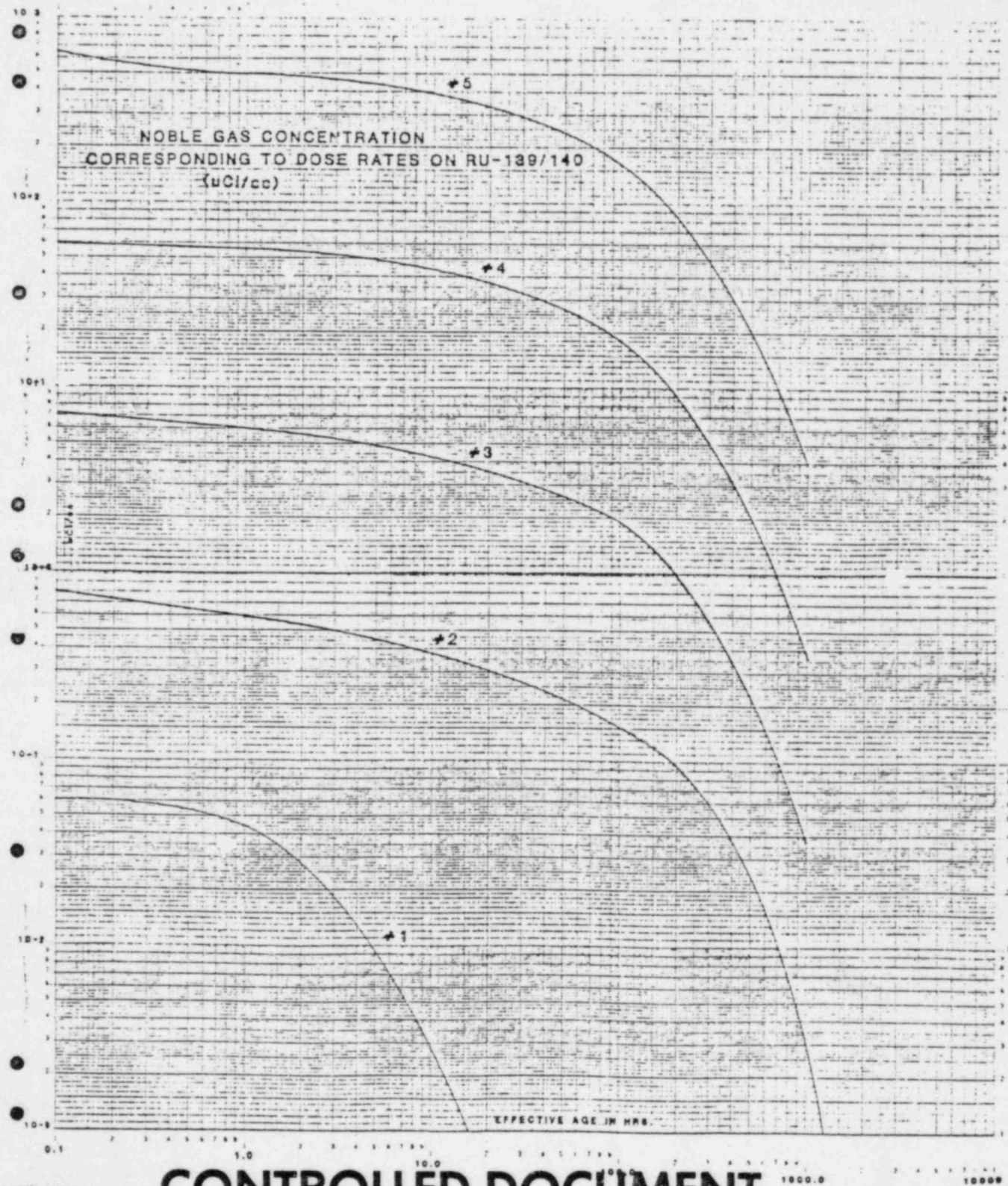

Reactor Coolant System Temperature	Converstion Factor (cc-Ci-hr/lb-uCi-sec)
200	2.65E-04
220	1.82E-04
240	1.28E-04
260	9.25E-05
280	6.81E-05
300	5.08E-05
320	3.86E-05
340	2.97E-05
360	2.33E-05
380	1.84E-05
400	1.47E-05
420	1.18E-05
440	9.58E-06
460	7.81E-06
480	6.42E-06
500	5.31E-06
520	4.39E-06
540	3.67E-06
560	3.06E-06
580	2.53E-06
600	2.10E-06
620	1.74E-06
640	1.42E-06
660	1.14E-06
680	8.75E-07

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RELEASE RATE DETERMINATION FROM AN ISOLATED CONTAINMENT USING DESIGN BASIS LEAK RATES AND AREA MONITORS OR RU-1

Section A: Plant Data

REACTOR SHUTDOWN: Date _____ Time _____

RELEASE START: Date _____ Time _____

EFFECTIVE AGE: _____

RU-148 reading: _____ RU-149 reading: _____

Section B: Noble Gas Release Rate Projection based on area monitors

Average of Monitor Readings (Section A) (mr/hr)		Expected Monitor Reading (Appendix E,p.2) (mr/hr)		Expected Nobel Gas Release Rate (Appendix E,p.3/4) (Ci/sec)		Projected Noble Gas Release Rate (Ci/sec)
_____	/	_____	X	_____	=	_____

Section C: I-131 Release Rate Projection based on area monitors

Projected Noble Gas Release Rate (Section B) (Ci/sec)		Total Iodine to Noble Gas Ratio (Appendix C)		I-131 to Total Iodine Ratio (Appendix C)		Projected I-131 Release Rate (Ci/sec)
_____	X	_____	X	_____	=	_____

Section D: Noble Gas Release Rate Projection based on RU-1

Noble Gas Concentration (RU-1, Ch 1) (uCi/cc)		Projected Leak Rate (Tech Specs) (cc/sec)		Conversion Constant (uCi to Ci)		Projected Noble Gas Release Rate (Ci/sec)
_____	X	8.52E+02	X	1E-06	=	_____

Section E: I-131 Release Rate Projection based on RU-1

Projected Noble Gas Release Rate (Section B) (Ci/sec)		Total Iodine to Noble Gas Ratio (Appendix C)		I-131 to Total Iodine Ratio (Appendix C)		Projected I-131 Release Rate (Ci/sec)
_____	X	_____	X	_____	=	_____

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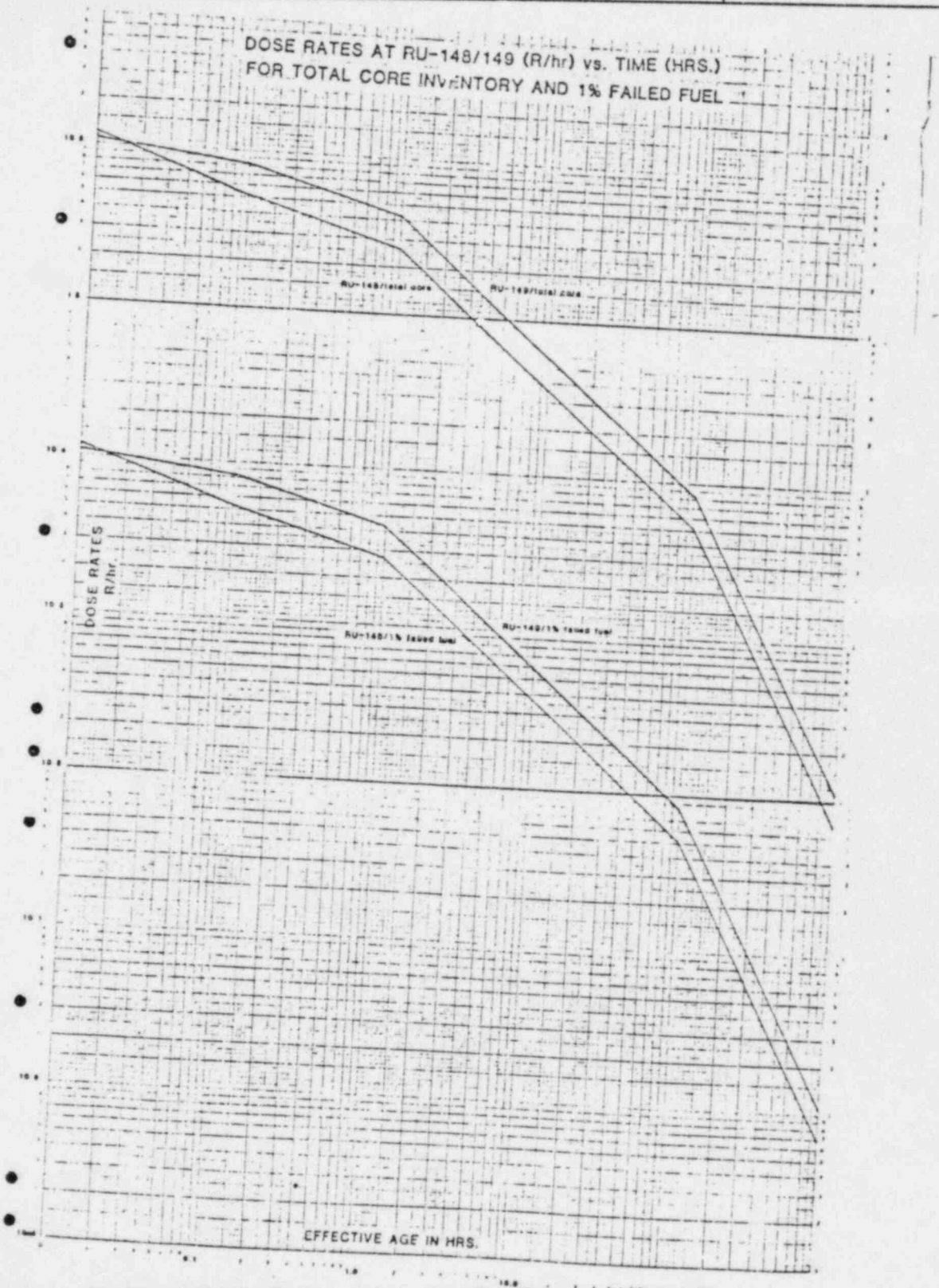

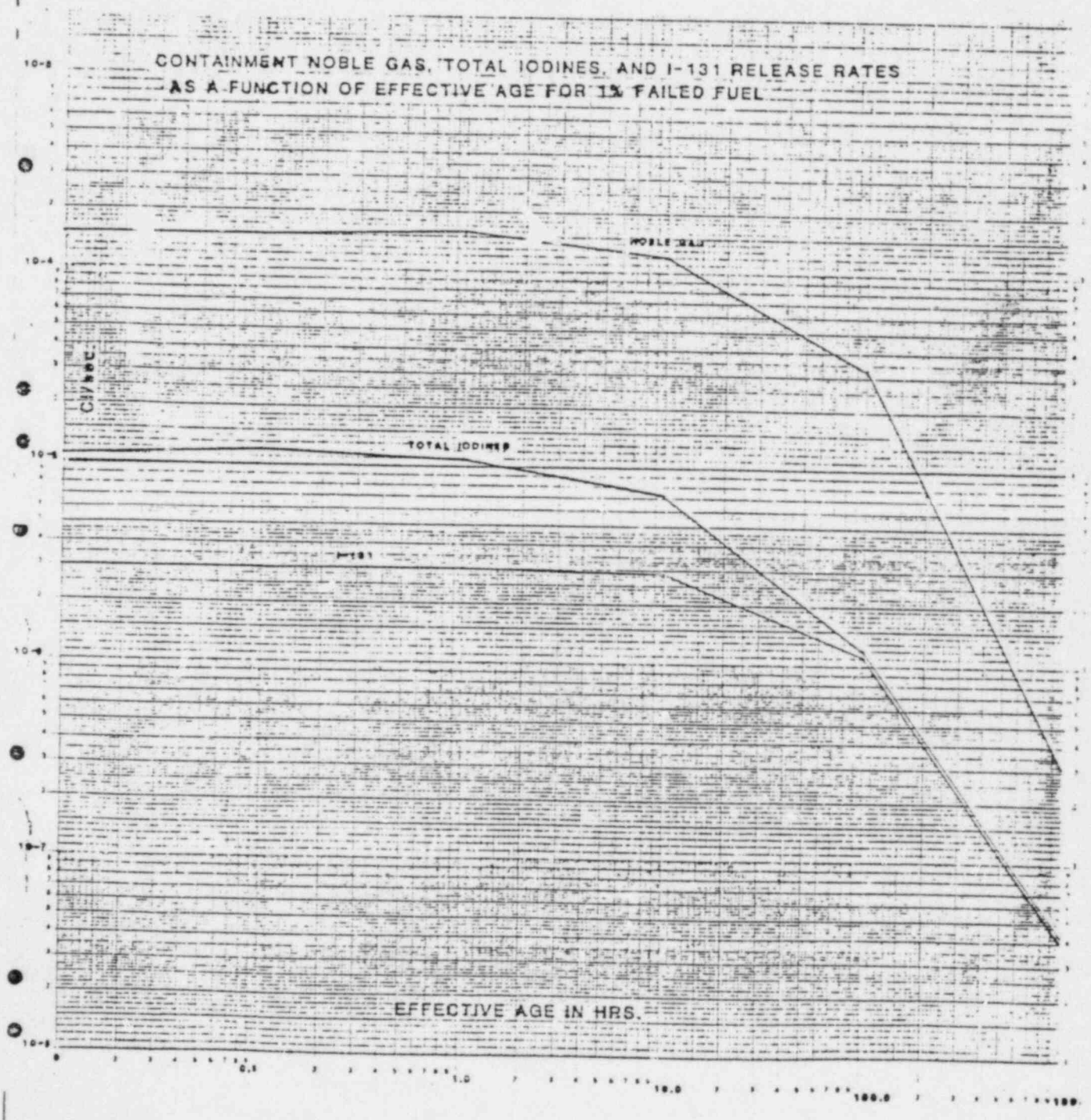

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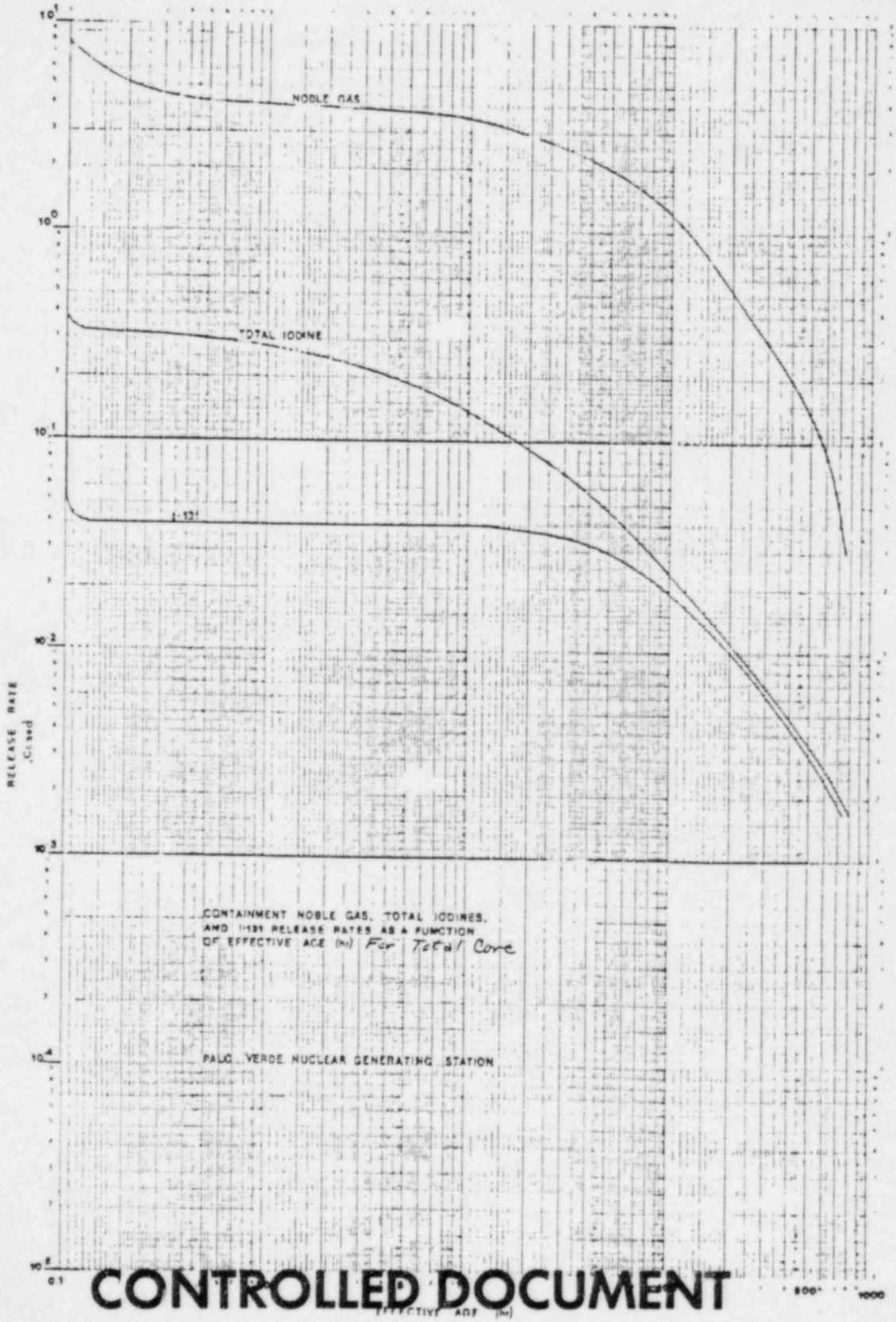

CONTAINMENT NOBLE GAS, TOTAL IODINES, AND I-131 RELEASE RATES AS A FUNCTION OF EFFECTIVE AGE (hr) For Total Core

PALO VERDE NUCLEAR GENERATING STATION

CONTROLLED DOCUMENT

UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D. C. 20555

December 6, 1984

50-528/529/530 Palo Verde

MEMORANDUM FOR: Chief, Document Management Branch, TIDC

FROM: Director, Division of Rules and Records, ADM

SUBJECT: REVIEW OF UTILITY EMERGENCY PLAN DOCUMENTATION

The Division of Rules and Records has reviewed the attached document and has determined that it may now be made publicly available.

J. M. Felton, Director
Division of Rules and Records
Office of Administration

Attachment: As stated