



PUBLIC SERVICE COMPANY OF COLORADO

FORT ST. VRAIN NUCLEAR GENERATING STATION

NRC #9
Eisenhut
BOOK 2

1/21/83

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RADIOLOGICAL EMERGENCY RESPONSE PLAN - STATION

NO.	SUBJECT	ISSUE NUMBER	EFFECTIVE DATE
RERP-ECP	Executive Command Post Procedure	6	01-03-83
RERP-EXP	Emergency Exposure Guidelines	1	08-02-82
RERP-FCP	Forward Command Post Procedure	8	01-03-83
RERP-FIELD	Field Monitoring Procedure	2	09-01-82
RERP-HOME	Home Packet for Off-Shift Notifications	3	01-21-83
RERP-ORG	FSV Emergency Organization and Responsibilities	3	01-03-83
RERP-PAG	Protective Action Guideline Recommendations	1	08-02-82
RERP-PCC	Personnel Control Center Procedure	8	12-20-82
RERP-SEOC	State Emergency Operations Center Procedure	5	01-03-83
RERP-SURVEY	Inplant/Onsite Radiological Monitoring	1	09-09-82
RERP-THYROID	Thyroid Blocking Agent Administration	2	12-03-82



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TITLE: HOME PACKET FOR OFF-SHIFT NOTIFICATIONS

ISSUANCE
AUTHORIZED
BY

1-18-83
Don Wessmberg

PJRC
REVIEW

FORC 500 JAN 17 1983

EFFECTIVE
DATE

1-21-83

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General

This procedure is provided for use, at home, by plant management contacts, RERP facility directors and alternates, and by the first individual on each facility director's call list. The purpose of this procedure is: (1) To assist plant management in determining the severity of an occurrence when contacted at home by the FSV duty Shift Supervisor; (2) To provide plant management contacts with copies of notification forms to assist the the duty Shift Supervisor in their completion; (3) To provide required telephone numbers for facility activation if required; and, (4) To assure that individuals who may potentially be required to call-in individuals for off-shift emergency facility activation are clearly identified.

1.0 Criteria for Implementation

This procedure may be utilized under virtually any off-normal off-shift situation where consultation regarding reportability or activation requirements must be addressed.

2.0 Procedure

2.1 ANI Notifications

Notification to American Nuclear Insurers (ANI) is required under five (5) general categories listed below:

- Losses believed to be near, or above, the deductible (\$50,000);
- Incidents where fixed fire protection systems have operated under other than test conditions;
- Incidents where prompt assistance could help prevent further loss or expense, or where assistance is otherwise desirable;
- Incidents where incendiarism or malicious mischief is suspected; or
- Emergency impairments to fire protection equipment.

Whenever the on-duty Shift Supervisor believes an occurrence matches one of these circumstances, he will contact a plant management contact for consultation (where possible). The Shift Supervisor and plant management contact will jointly complete Attachment 1 to this procedure. Additional plant management contacts may be made utilizing Table 1 for reference.



2.2 "Significant Event" Notifications

Notification to the NRC operations center within one (1) hour is required for events which fall under the general descriptions shown in Table 2. When these events transpire, or when the on-duty Shift Supervisor believes an event may require such reporting, he shall contact one of the plant management contacts listed in Table 1. Together, where possible, they shall jointly complete the "Significant Event Notification" form, Attachment 2 of this procedure. Additional management contacts may be made as necessary, utilizing the list in Table 1.

2.3 Radiological Emergency or RERP (RERP) Notifications

Notification to both the state authorities and the NRC within fifteen (15) minutes of event classification is required when a situation has arisen that meets classification criteria set forth in Tables 3-6 of this procedure. Events classified as a NOTIFICATION OF UNUSUAL EVENT are reported to the state utilizing the notification format of Attachment 3. The plant management contact shall assist the completion of this form. If the event is an ALERT, or higher, RERP event, Attachment 4 shall be jointly completed.

2.3.1 NOTIFICATION OF UNUSUAL EVENT

For a NOTIFICATION OF UNUSUAL EVENT, the initial management contact shall notify other contacts per Checklist 1 and forward the completed form to the Technical Services Department.

2.3.2 ALERT or Higher RERP Event

For an ALERT or higher RERP event, the notification fanout shown in Figure 1 of this procedure shall occur to assure prompt facility activation and staffing. Under these conditions, Facility Directors will be contacted by the PSCo Telephone Operator. The Facility Director will in turn contact his alternate. The alternate, or the next person contacted, is then responsible for performing the additional notifications specified herein. Each facility's call list is reproduced as Attachments 5-9, herein. The Facility Director primary and alternates are shown on Attachment 10.



3.0 Responsibilities

3.1 Duty Shift Supervisor

Contact a plant management contact in accordance with existing Operations Orders, Notification Procedures, or RERP-Implementing Procedures, where possible.

3.2 Plant Management Contacts

Assist the Shift Supervisor, as required, and perform additional notifications, as appropriate to a given situation.

4.0 References

4.1 FSV Radiological Emergency Response Plan

4.2 PT-80-177, Subject: Fire/All-Risk Emergency Notification to the NRC; March 26, 1980

4.3 PT-80-177, Subject: Fire/All-Risk Emergency Notification to the NRC; October 13, 1980

5.0 Referenced or Supporting Procedures

5.1 RERP PHONE LISTS

5.2 CR-UE, Control Room UNUSUAL EVENT Procedure

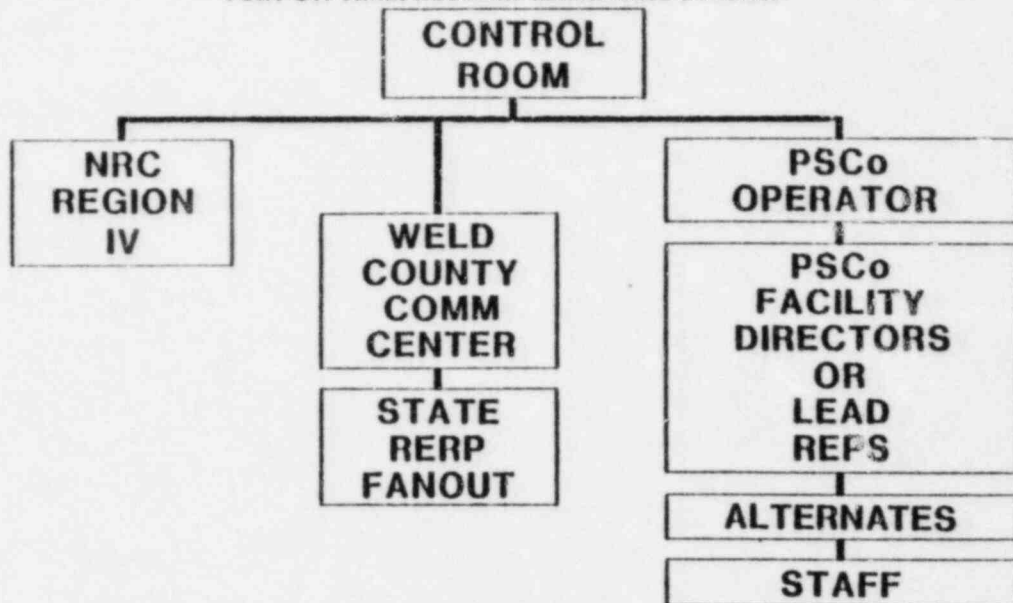
5.3 CR-ALERT, Control Room ALERT, SITE EMERGENCY, GENERAL EMERGENCY Procedure.



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NOTIFICATION FANOUT
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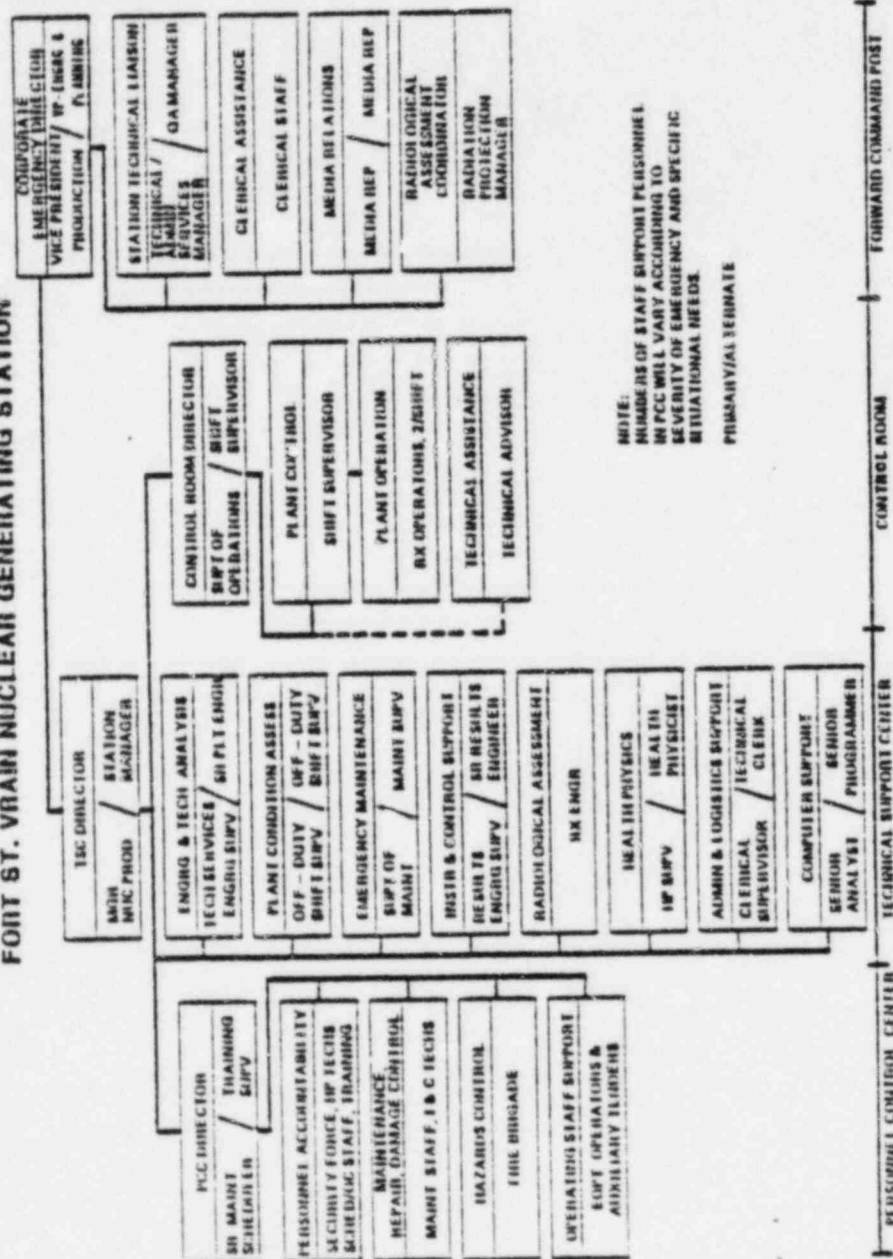




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FIGURE 5.2-2
EMERGENCY ORGANIZATION (ALERT, SITE EMERGENCY, GENERAL EMERGENCY)
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MANAGEMENT CONTACT NOTIFICATION LIST FOR AN UNUSUAL EVENT

The first management contact will make the following notifications, and forward the completed form to the Technical Services Department.

Subsequent Contacts	Date/ Time	Remarks
Plant Management (Contact 1) Supt. of Oper.		
Station Manager		
Administrative/ Tech. Serv. Mgr.		
Manager, Nuclear Production		
Radiation Pro- tection Manager		
Vice President, Production		
Media Relations Rob Burns		
or Gary Reeves		
or Marilyn McAdams		
NRC Bill Dickerson		
or G.L. Plumlee, III		

*Calls to PSC phones from outside of the PSC telephone system may require use of a different telephone exchange. In these cases, utilize the exchange in parentheses.



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TABLE 1

PLANT MANAGEMENT CONTACTS*

	<u>Page Phone</u>	<u>Plant Ext.</u>	<u>Home Phone</u>
Supt. of Operations			
Station Manger			
Admin./Tech.			
Serv. Manager			
Mgr. Nuclear Prod.			
Rad. Protection			
Manager			
Vice Pres., Prod.			

* Listed in order of preferred contact sequence.



TABLE 2

SIGNIFICANT EVENT TABLE ¹

<u>Event (NRC Description)</u>	<u>Typical Initiating Events ²</u>
1. Any event requiring initiation of the licensee's emergency plan or any section of that plan.	<div>1. a) Initiation of the Radiological Emergency Response Plan (RERP) as described in Tables 4.1-1 through 4.1-4 of the Plant RERP.</div> <div>b) Abnormal coolant temperature and/or pressure or abnormal fuel temperatures.</div> <div>c) Loss of engineered safety feature or fire protection system function requiring shutdown by Technical Specifications (e.g., because of malfunction, personnel error, or procedural inadequacy).</div>
2. The exceeding of any Technical Specification Safety Limit	<div>2. a) Exceeding limits of SL 3.1, Reactor Core Safety Limit.</div> <div>b) Exceeding limits of SL 3.2, Reactor Vessel Pressure Safety Limit</div> <div>NOTE: Action to be taken specified in AC 7.2.</div>
3. Any event that results in the nuclear power plant not being in a controlled or expected condition while operating or shutdown.	<div>3. a) Reactor pressure exceeds limiting safety system setting (LSSS 3.3) without automatic trip.</div> <div>b) Inability to trip and insert sufficient rods to achieve Technical Specification shutdown margin.</div>



TABLE 2

SIGNIFICANT EVENT TABLE ¹

<u>Event (NRC Description)</u>	<u>Typical Initiating Events ²</u>
3. (Cont.)	<ul style="list-style-type: none">c) Failure of the PPS to complete a required protective action once initiated.d) Failure of a system other than the systems subject to limiting safety system settings to actuate, or actuation of a limiting safety system at a monitored parameter value less conservative than listed in the system's Technical Specifications.e) Operation with unacceptable PCRV penetration interspace leak rate test results.f) Reactivity anomalies involving disagreement with the predicted value of reactivity balance under steady state conditions power operation $\geq 0.01\Delta K/K$; a calculated shutdown margin less conservative than Technical Specifications; short term reactivity increases that correspond to a reactor period of less than 5 seconds, or if subcritical, an unplanned reactivity insertion of $> 0.005\Delta K/K$; or any unplanned criticality.g) Upsets resulting in reactor pressure and flux transients that peak at values higher than analyzed.



TABLE 2

SIGNIFICANT EVENT TABLE ¹

<u>Event (NRC Description)</u>	<u>Typical Initiating Events ²</u>
3. (Cont.)	h) Failure of a PCRV safety/relief valve to close after pressure has reduced below the required reseal value.
4. Any act that threatens the safety of the nuclear power plant or site personnel, or the security of special nuclear material (SNM) including instances of sabotage or attempted sabotage.	4. a) Threatened civil disturbances that result in initiation of the Security Contingency Plan. b) Evidence of unauthorized access to Fuel Storage Building or Fuel Storage Wells. c) Notification by fuel shipping carrier of theft or attempted theft of fuel. d) Actual incidents of sabotage or threatened sabotage.
5. Any event requiring initiation of shutdown of the nuclear power plant in accordance with Technical Specification Conditions for operation.	5. a) ACM generator breaker tripped after 20 minutes during test; tripped unit found to be defective, declared inoperable. b) One of two centrifugal turbine water removal pumps inoperable due to faulty bearing; redundant pump inoperable.

NOTE: In the two examples listed above, repair(s) cannot be implemented within LCO time limits.



TABLE 2

SIGNIFICANT EVENT TABLE ¹

<u>Event (NRC Description)</u>	<u>Typical Initiating Events ²</u>
6. Personnel error or procedural inadequacy which, during normal operations, anticipated operational occurrences, or accident conditions, prevents, or could prevent by itself, the fulfillment of the safety function of those structures, systems, and components that are needed to	6. a) During refueling operations, a $.01\Delta p$ shutdown margin is not maintained due to incorrect rod removal sequence. b) Incorrect valve lineup which results in shut off of secondary system decay heat removal sequence. c) Error in analysis of waste tank results in release which exceeds acceptable limits. d) Liquid waste monitor setpoints raised for liquid waste release completed. Reactor Building sump pumps taken out of pull-to-lock. Setpoints not reset.
i) shutdown the reactor safely and maintain it in a safe condition; or, ii) remove residual heat following reactor shutdown; or, iii) limit the release of radioactive material to acceptable levels or reduce the potential for such release.	
7. Any event resulting in manual or automatic actuation of Engineered Safety Features, including the Reactor Protection System (scrams and loop shutdown only).	7. <u>EXCEPTIONS:</u> a) Manual scram initiated at $\leq 2\%$ during a normal shutdown.



TABLE 2

SIGNIFICANT EVENT TABLE ¹

<u>Event (NRC Description)</u>	<u>Typical Initiating Events ²</u>
7. (Cont.)	b) Only one of three channels tripped manually or automatically, but no final protective action takes place, nor is required. c) Actuation of the forementioned systems which result from, and are a part of, the planned sequence during surveillance testing.
8. Any accidental, unplanned or uncontrolled radioactive release. (Normal or expected releases from maintenance or other operational activities are not included).	8. a) Initiation of EP H-3, "High Activity in the Plant." b) Burst of gas waste tank rupture disk.
9. Any fatality or serious injury occurring on-site and requiring off-site medical facility for treatment.	9. A serious injury is considered to be an injury which in the judgment of the licensee representative will require hospitalization for an extended period of time (greater than 48 hours).
10. Any serious personnel radioactive contamination requiring on-site or off-site decontamination.	10. Decontamination process requiring use of agents other than soap and water.



TABLE 2

SIGNIFICANT EVENT TABLE ¹

<u>Event (NRC Description)</u>	<u>Typical Initiating Events ²</u>
11. Any event meeting the criteria of 10CFR20.403 for one hour notification.	11. a) Exposure of the whole body of any individual to 25 rem or more of radiation; exposure of the skin of the whole body of any individual to 150 rem or more of radiation; or exposure of the feet, hands, or forearms of any individual to 375 rem or more of radiation. b) A loss of one working week or more of the operation of any facilities affected. c) The release of radioactive material in concentrations which, averaged, over a period of 24 hours, would exceed 5000 times the limits specified for such materials in 10CFR20, Appendix B, Table II. d) Damage to property in excess of \$200,000.
12. Strikes of operating employees or for security guards, or honoring of picket lines by these employees.	12. Situation evident.

NOTE 1: Many of the events contained in this table are duplicated in the RERP, Tables 4.1-1 through 4.1-4. For those cases it is imperative that RERP actions are carried out in addition to reporting requirements contained in this section. RERP actions take precedence whenever doubt or time is a factor. Tables in Section 2 will classify operating events at their highest level of response wherever duplication of events exists.

NOTE 2: This table lists only typical initiating events that fit the Nuclear Regulatory Commission event descriptions. This column does not list all initiating events that are conceivable for a particular Nuclear Regulatory Commission event description.



TABLE 3

NOTIFICATION OF UNUSUAL EVENT

<u>Event</u>	<u>Indication</u>
1. Any unplanned radiological release to the Reactor Building or its ventilation system.	1. Alarms on: RT 7312 CAM(s) RT 7324-1 RT 7324-2 RT 7325-1 RT 7325-2 RT 4801 RT 4802 RT 4803 RT 73437-1, 2
2. Any liquid waste release resulting in offsite effluent in excess of Technical Specification limits.	2. a) RT 6212 or 6213 alarm with inability to prevent discharge offsite. b) As determined by station personnel.
3. Indication of minor fuel damage detected in primary coolant.	3. a) 25% increase in circulating activity from previous equilibrium conditions at the same power level. RT 9301 (RR 93256). b) SR 5.2.11 results.
4. Serious fire at the plant lasting more than 10 minutes which could lead to substantial degradation of plant safety systems, or which could result in the release of radiological or toxic materials.	4. a) any of various alarms on Fire Control Alarm Panel; b) Fire Pump 1A auto start; c) verbal reports.



TABLE 3

NOTIFICATION OF UNUSUAL EVENT

<u>Event</u>	<u>Indication</u>
5. Abnormal coolant temperatures or core region temperature rises to the extent requiring shutdown in accordance with Technical Specifications.	5. Violations of LCO 4.1.7 or LCO 4.1.9 for region outlet mismatch, or region ΔT , respectively, to the extent that shutdown per Station Technical Specifications is required (SOP 12-04).
6. Natural phenomenon that may be experienced or threatened that represent risks beyond normal levels: a) earthquake b) floods c) tornadoes d) extremely high winds	6. a) Seismic Recorder Operate; b)-d) as visually observed by, or reported to, station personnel.
7. Unusual Hazards Experienced: a) Aircraft crash on site or near the site that is subject to public concern because of possible detrimental effect on the plant; b) Onsite explosions or near site explosions that may be subject to public concern because of possible detrimental effect on the plant; or,	7. As visually observed by, or reported to, station personnel.



TABLE 3

NOTIFICATION OF UNUSUAL EVENT

<u>Event</u>	<u>Indication</u>
7. c) Onsite or near site plant related accidents that could result in the release of toxic material or spills of flammable materials.	
8. Any serious radiological exposure of plant personnel or the transportation to offsite facilities of contaminated personnel who may have been injured. (Probably cannot be determined within two hours- call to be made in a timely fashion.)	8. As occurring.
9. Accidents within the state that may involve plant spent fuel shipments or plant radio-active waste shipments.	9. As occurring, or reported by shipper.
10. Loss of Engineered Safety Feature or Fire Protection System to the extent requiring Shutdown in accordance with station Technical Specifications.	10. Shutdown required in accordance with applicable LCOs: a) Engineered Safeguards 1) Plant ventilation- LCO 4.5.1 2) Steam/Water Dump System - LCO 4.3.3



TABLE 3

NOTIFICATION OF UNUSUAL EVENT

<u>Event</u>	<u>Indication</u>
10. (Cont).	<ul style="list-style-type: none">3) PCRV penetration flow restriction devices - LCO 4.2.7 and LCO 4.2.94) PCRV penetration secondary closures - LCO 4.2.7 and LCO 4.2.95) PCRV Safety Valves - LCO 4.2.8 SL 3.2 LSSS 3.3.2.cb) Fire Protection System - LCO 4.2.6, LCO 4.10.1- LCO 4.10.5
11. Indication or alarms on radiological effluent monitors not functional.	<ul style="list-style-type: none">11. Data Logger Alarm/Alarm Summary indication of non-operational alarm or indication on:<ul style="list-style-type: none">a) RT 7324-1, 2 <u>and</u> RT 4803; orb) RT 7325-1, 2, RT 4802, <u>and</u> RT 73437-1; orc) RT 73437-2 <u>and</u> RT 4801; ord) RT 6212 <u>and</u> RT 6213.

NOTE: Use LCO 4.8.1 Technical Specification Limits as basis.



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TABLE 4

ALERT

<u>Event</u>	<u>Indication</u>
1. Rapid, severe fuel particle coating failure.	1. Coolant Inventory of a) >2.4 (CI) (Mev) Beta-Gamma 1b b) circulating I-131 activity equivalent $>24\text{Ci}$ c) plate out I-131 $>1 \times 10^4$ Ci d) SR 5.2.6 or SR 5.2.11 results.
2. Rapid, gross failure of one steam generator reheat section with loss of offsite power.	2. Loop 1 Hot Reheat Header (HRH) activity high (5mrem/hr); or, Loop 2 HRH activity high (5mrem/hr) accompanied by 230 Kv OCB trips and RAT undervoltage/loss of power alarm.
3. Primary coolant pressure decay (to a value greater than 100 psi less than normal pressure, accompanied by area and stack radiation monitor alarms).	3. PAL 9335 PAL 9347 PAL 9359 and area monitor or stack monitor alarm
4. High radiation levels or high airborne contamination which indicates severe degradation in control of radioactive materials. (Increase by factor of 1,000 over normal.) e.g. lifting PCRV relief valve or abnormal release to cooling tower blowdown.	4. RT 7312 CAM(s) alarm RT 6212 RT 6213 RT 93252-12 Area Monitors Alarms with corresponding meter readings on area or process monitors.



TABLE 4

ALERT

<u>Event</u>	<u>Indication</u>
5. Loss of offsite power <u>and</u> vital onsite AC power for up to 30 minutes.	5. 230 KV OCB trips <u>and</u> RAT undervoltage/loss of power alarm accompanied by 4 KV bus undervoltage 480V bus undervoltage, <u>and</u> Diesel Trouble alarms.
6. Loss of all vital DC power for up to 30 minutes.	6. DC bus 1 < 10 volts and DC bus 2 < 10 volts
7. Loss of primary coolant forced circulation for between 2 and 5 hours.*	7. All He flow indicators read zero.
8. Loss of secondary coolant functions needed for removing residual heat.	8. All secondary coolant flow indicators read zero.
9. Loss of normal ability to place the reactor in a subcritical condition by scram of the control rods.	9. a) Indication of insufficient rods inserted; or, b) neutron count rate not decreasing.
10. Serious fire which could lead to substantial degradation of plant safety systems.	10. a) any of various alarms on Fire Control Alarm Panel b) Fire Pump 1A auto start c) verbal reports

* These times are LOFC from 100% power. Times may be correspondingly longer for lower power levels (CMG-4).



TABLE 4

ALERT

<u>Event</u>	<u>Indication</u>
11. Radiological effluents exceed 10 times technical specifications instantaneous limits.	<p>11. a) RT 7324-1 indicating $\geq 2.5 \times 10^{-2}$ $\mu\text{Ci/cc}$</p> <p>b) RT 7324-2 indicating $\geq 2.5 \times 10^{-2}$ $\mu\text{Ci/cc}$</p> <p>c) RT 7325-1 indicating $\geq 7.0 \times 10^{-8}$ $\mu\text{Ci/cc}$</p> <p>d) RT 7325-2 indicating $\geq 7.0 \times 10^{-8}$ $\mu\text{Ci/cc}$</p> <p>e) RT 73437-1 indicating $\geq 7.0 \times 10^{-8}$ $\mu\text{Ci/cc}$ I-131.</p> <p>f) RT 4802 indicating $\geq 7.0 \times 10^{-8}$ $\mu\text{Ci/cc}$ I-131.</p> <p>g) RT 4803 indicating $\geq 2.5 \times 10^{-2}$ $\mu\text{Ci/cc}$</p> <p>Utilize reading from above instruments and calculate dose rate per procedures</p>
12. Ongoing security compromise.	<p>12. a) As observed or reported;</p> <p>b) Guard Station Trouble alarm; or,</p> <p>c) Guard Station Acknowledge alarm.</p>



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TABLE 4

ALERT

<u>Event</u>	<u>Indication</u>
13. Severe natural phenomenon being experienced or projected, such as:	13. a) Seismic recorder operate (≥ 0.05 g)
a) earthquake exceeding Operating Basis Earthquake levels;	b) As Reported
b) flood near design level; or,	c) As Reported
c) tornado striking facility.	
14. Other hazards being experienced or projected such as:	14. As reported by, or to, station personnel.
a) aircraft crash on facility;	
b) missile impact on facility;	
c) explosion damage affecting plant operation; or,	
d) entry into facility environs of toxic or flammable gas.	
(Some effect on facility experienced or anticipated)	
15. Evacuation of control room anticipated or required, with control of shutdown systems established from local stations. (Control room integrity breached).	15. As deemed necessary by Shift Supervisor



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TABLE 4

ALERT

<u>Event</u>	<u>Indication</u>
16. All alarms (annunciators) lost for more than 15 minutes and reactor is not shutdown; or, plant transient experienced while all alarms lost. (Parameter indication still functional.)	16. Control room observation.
17. Other plant conditions warranting precautionary activation of the PCC, TSC, and FCP.	17. As deemed necessary by Shift Supervisor.



TABLE 5

SITE AREA EMERGENCY

<u>Event</u>	<u>Indication</u>
1. Loss of primary coolant forced circulation for over 5 hr. from 100% power. (Lower power levels preceeding LOFC extends time available before core damage is incurred. See CMG-4.)	1. All He flow indicators read zero.
2. Non-isolable primary coolant leakage through a steam generator reheat section.	2. Loop 1 or 2 HRH activity alarm-high with Shift Supervisor determination that leakage is non-isolable.
3. PCRV relief valve remains open.	3. RF 93252-12 alarm and rapidly decreasing Reactor pressure.
4. Determination of inability to restore onsite AC power.	4. 230 KV OCB trips and RAT undervoltage/loss of power alarm accompanied by 4Kv bus undervoltage, 480v bus undervoltage, and Diesel Trouble alarms. Standby Diesel Fail to Start.
5. Loss of functions needed for plant hot shutdown.	5. Inability to insert sufficient control rods accompanied by failure of emergency reserve shutdown system - resulting in inability to maintain - .01 Δ p at 220°F.
6. Major damage to spent fuel due to severe cask damage resulting in release of radioactivity to plant environs.	6. a) Visual observation. b) area radiation monitor alarms.



TABLE 5
SITE AREA EMERGENCY

<u>Event</u>	<u>Indication</u>
7. Fire adversely affecting safety systems.	7. a) Fire pump 1A start; b) Fire Control Alarm Panel c) Various alarms according to affected safety system. d) Shift Supervisor determines fire beyond capability of station staff.
8. a) Effluent monitors detect levels corresponding to greater than 50 mrem/hr, or greater than 500 mrem/hr whole body for two minutes at the site boundary under adverse meteorology (or levels 5 times the above for thyroid dose rate).	8. Stack monitor alarm with corresponding stack concentration indications on: a) RT 73437-1, RT 4802, and RT 7325-1, 2 $\geq 6.7 \times 10^{-5} \mu\text{Ci/cc}$ I-131; or, b) RT 7324-1, 2, and RT 4803 $> 6.6 \times 10^{-2} \mu\text{Ci/cc}$ mixed noble gasses.
b) These dose rates are projected based on other plant parameters or are measured in the environs.	
9. Imminent loss of physical control of the plant due to security breach. (Response detailed in Station Security Plan.)	9. Situation evident.



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TABLE 5

SITE AREA EMERGENCY

<u>Event</u>	<u>Indication</u>
10. Severe natural phenomenon being experienced or projected (with plant not in cold shutdown), such as;	10.
a) earthquake greater than Safe Shutdown Earthquake	a) Seismic Recorder Operate alarm with indication of ground motion greater than 0.10g horizontal or greater than 0.067g vertical.
b) flood greater than design levels	b) As reported or observed.
c) winds in excess of design levels	c) average wind velocity greater than 90 mph or 10 second gusts exceeding 99 mph.
d) tornado in excess of design levels	d) horizontal wind velocity greater than 202 mph.
11. Other hazards being experienced or projected with reactor not shutdown, such as;	11. As observed by or reported to, station personnel.
a) aircraft crash affecting vital structures;	
b) severe damage to safe shutdown equipment;	
c) entry of toxic/flammable gas into vital areas.	
12. Reactor building louvers open due to building being overpressurized by primary coolant. (DBA #2)	12. a) Louvers Open Alarm (3 inches water) b) Reactor building radiation alarms.



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TABLE 5

SITE AREA EMERGENCY

<u>Event</u>	<u>Indication</u>
13. Evacuation of control room, accompanied by inability to locally control shutdown systems within 15 minutes.	13. Remote shutdown instrumentation indications (panel I-49).
14. Other plant conditions warranting activation of FCP/EOCs, monitoring teams, and precautionary public notification.	14. As determined by Shift Supervisor.



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TABLE 6
GENERAL EMERGENCY

<u>Event</u>	<u>Indication</u>
1. a) Effluent monitors detect levels corresponding to 1 rem/hr. whole body (or 5 rem/hr thyroid) at the exclusion area boundary under <u>actual</u> meteorological conditions.	1. Stack monitor RT-7324-1, 2 alarm, or Corresponding dose rates determined with E-500 or cutie-pie detector per procedure HPP-56 and associated graphs.
b) These dose rates are projected based on other plant parameters, or are measured in the environs.	
2. Loss of physical control of the facility. (due to security breach).	2. Situation evident.
3. Other plant conditions exist that make release of large amounts of radioactivity possible.	3. As determined by Shift Supervisor.



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ATTACHMENT I
IMPAIRED FIRE PROTECTION NOTICE

Report No. _____ - _____
Year Sequence No.

ATTACHMENT I
IMPAIRED FIRE PROTECTION NOTICE

NOTE: It is important that the time of all calls and names of people contacted be logged. Any further followup calls received or made should be logged as to time and identity of persons involved and the information transmitted or received shall also be logged.

GIVE THIS INFORMATION AS SHOWN

1. Facility Name: Public Service Company of Colorado Unit No. One
2. Location: Fort St. Vrain, Platteville, Colorado

Below is the Information Which Will Be Requested Of The Caller

3. Caller's Name: _____ Phone: _____
4. Date and time of occurrence: _____
5. Details and extent of impairment:

6. Did impairment result from a loss? ☐ *Yes ☐ No If yes, details: _____

*Loss would be a fire, accidental system operation, windstorm damage, etc.



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7. Restoration (of system) begun? ☐ Yes ☐ No

Restoration work to be continuous? ☐ Yes ☐ No

8. Impaired area or equipment operable? ☐ Yes ☐ No

Estimated restoration time: _____

9. Precautions: ☐ Valves tagged out

☐ Discontinued welding, cutting, and hot work

☐ Discontinued smoking

☐ Notify Control Room (Shift) Supervisor, or
other applicable management.

☐ Notify Fire Department/Fire Brigade

☐ Increased watchman service to _____ hourly

☐ Extra extinguishers/firehose in area

Other: _____

10. Contacts made by Shift Supervisor:

a) Name of ANI contact: _____

b) Time of ANI contact: _____

Management Contact:

a) Name of management contact: _____

b) Time of management contact: _____

11. Additional contacts made/received:

a) Per attached call sheet log.



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12. RESTORED

- a) Repeat Steps 1 and 2 above
- b) Caller's Name: _____
- c) Date and time of restoration: _____
- d) Name of ANI contact: _____
- e) Time of ANI contact: _____

13. The Shift Supervisor shall send the completed copies of the completed forms directly to Technical Services.

14. If Notification was a Fire/All-Risk Emergency, Technical Services will:

- a) Determine if a Reportable Occurrence is required, and prepare a facsimile copy if a 14 day report is indicated.
- b) Assign a sequential number and send a copy to the Superintendent, Operations and a copy to PORC.



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Initial Notification, Significant Event Notification

Report No. _____ - _____
Year Sequence No.

IMPORTANT:

It is important that the time of all calls and names of people contacted be logged. Any further follow-up calls received or made should be logged as to time and identity of persons involved and the information transmitted or received shall also be logged.

1. Name and Identity of Caller: _____
2. Date of Event: _____ Time of Event: _____
3. This notification appears to be required pursuant to 10CFR 50.72, Item number _____ (1-12).
4. Description of Event: _____

5. Actions Taken: _____
- _____
- _____
- _____
- _____
- _____

6. Status:
- _____ Under control by on-site staff, no off-site assistance anticipated. Final report.
- _____ Under control by on-site staff. Will keep NRC advised.
- _____ Off-site assistance may be required. Will advise.
(See Item #7)



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_____ Off-site assistance required. (See Item #7)

7. If off-site assistance is anticipated or required, describe assistance that has been or may be requested:

8. Does the event involve off-site releases of the potential for off-site release that would affect the general health and safety of the public as the result of Fort St. Vrain conditions?

_____ Yes _____ No

9. If yes, provide a good description: _____

10. Contacts made by Shift Supervisor:

a) Name of NRC contact: _____

b) Time of NRC contact: _____

Management Contact

a) Name of management contact: _____

b) Time of management contact: _____

11. Contacts made by management:

a) Per attached call sheet log.



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12. The Shift Supervisor and Management Contact shall send their copies of the completed forms directly to Technical Services who will:
- a) Determine if a reportable occurrence is required and prepare a facsimile copy if a 14 day report is indicated.
 - b) Send a copy to the Superintendent, Operations.
 - c) Send a copy to PORC.



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NOTIFICATION OF UNUSUAL EVENT

A. The Emergency Coordinator and first management contact will complete the following information jointly:

1. Name and identity of caller _____

2. Date of Event _____ Time of Event _____

3. General Category of Event

_____ Unplanned Radiological Release to Reactor Building

_____ Fuel Failure

_____ Fire

_____ Natural Phenomenon (circle one)

Earthquake Flood Tornado Winds

_____ Unusual Hazards (circle one)

Aircraft Explosion Toxic Material

Other (Specify) _____

_____ Spent Fuel Incident

4. Description of Event _____

5. Actions taken _____

6. Status:

_____ Under control by onsite staff, no offsite assistance anticipated.

_____ Under control by onsite staff. Will keep State and NRC advised.

7. At the present time, the event does not involve offsite release or the potential for offsite releases that would affect the general health and safety of the public.



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B. The Emergency Coordinator will make notifications as follows:

Contact with State EOC _____, and Governor's Office _____
or Mansion _____

1. READ the following statement verbatim:

"THIS IS A NOTIFICATION OF AN UNUSUAL EVENT AT THE FORT ST. VRAIN NUCLEAR GENERATING STATION. THIS NOTIFICATION DOES NOT REQUIRE ACTIVATION OF EMERGENCY RESPONSE CENTERS. THIS NOTIFICATION REQUIRES VERIFICATION OF RECEIPT BY THE STATE. VERIFY BY CALLING _____"

2. READ all the information recorded in Step A (Page 1 of this ATTACHMENT).

3. RECORD the following information:

Name of State EOC contact _____ Date/Time _____

Name of Governor's Office/Mansion Contact _____

Date/Time _____

Call back verification from State EOC, Date/Time _____

Call back verification from Governor's Office/Mansion

Date/Time _____

Contact with NRC Operations Center (Hot Line or _____)

(If NRC Hot Line and Land Line are inoperative, use HP Network line.)

1. READ the following statement verbatim:

"THIS IS NOTIFICATION OF A SIGNIFICANT EVENT AT THE FORT ST. VRAIN NUCLEAR GENERATING STATION AT PLATTEVILLE, COLORADO. THIS NOTIFICATION APPEARS TO BE REQUIRED PURSUANT TO 10CFR50.72, ITEM NUMBER 1. THIS NOTIFICATION DOES NOT REQUIRE ACTIVATION OF FEDERAL OR STATE EMERGENCY RESPONSE ORGANIZATIONS."



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2. READ the NRC Operations Center all of the information recorded in Step A (Page 1 of this Attachment).

3. RECORD the following information:

Name of NRC Contact _____ Date/Time _____



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NOTIFICATION TO ACTIVATE STATE EMERGENCY RESPONSE CENTERS

- A. The Emergency Coordinator will complete Pages 1 and 2 of this attachment with the assistance of the first management contact.

Required Information

1. This is _____ (Name) _____, Shift Supervisor at the Fort St. Vrain Station.
2. At _____ (Time) _____ we experienced an (ALERT, SITE AREA EMERGENCY, GENERAL EMERGENCY) Class incident.
3. a) There is NO, repeat NO, radioactive release taking place, and no special protective actions are recommended at this time.

OR

b) A radioactive release IS, repeat IS, taking place, and we recommend that people in areas _____ remain indoors with windows and doors closed.

OR

c) A radioactive release IS, repeat IS, taking place, and we recommend that evacuation of areas _____ be considered.
4. Further information on incident conditions will be provided in followup messages.



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SUPPLEMENTAL INFORMATION

NOTE: This information is to be supplied to the NRC and the Colorado Department of Health when requested. The radiological data can be determined as specified in Section 2.2.1.2 of this procedure.

1. Date and Time of Incident _____
2. Class of emergency (ALERT)(SITE AREA EMERGENCY)
(GENERAL EMERGENCY)
3. Type of release (airborne, waterborne, surface) _____
4. Current release rate:
Noble Gas _____ Ci/sec Iodine _____ Ci/sec
5. Estimated curies Released Noble Gas _____ Ci Iodine _____ Ci
6. Wind Velocity _____ MPH, from _____ degrees. Air Temp. _____ ° F.
7. Stability Category _____, Form of Precip. _____
8. Dose rate at EAB - WB _____ rem/hr Thyroid _____ rem/hr
9. Projected dose at EAB - WB _____ rem Thyroid _____ rem
10. Estimated accumulated dose at EAB-WB _____ rem Thyroid _____ rem
11. Estimate of any surface radioactive contamination _____

12. On-site response actions under way _____



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13. Recommended Protective Action based on the projected dose at the EAB (NOTE: Refer to RERP-PAG):

Circle Appropriate Protective Actions
and Read Aloud

Projected Dose (rem)	Recommended Protective Action
Whole Body <1 Thyroid <5	No planned protective actions. State may issue advisory to seek shelter and await instructions. Monitor radiation levels.
Whole Body 1 to 5 Thyroid 5 to 25	Take shelter and consider selective evacuation. Monitor radiation levels. Establish Controlled Area and limit access.
Whole Body 5 and above Thyroid 25 and above	Conduct mandatory evacuation. Monitor radiation levels and adjust area for mandatory evacuation based on these levels Control Access.

14. Prognosis for worsening of event _____

15. Date and time of report _____

B. The Emergency Coordinator will make notifications in sequence as follows:

| _____ |
| PSC Company Operator |
| or |
| _____ |

- 1) INSTRUCT the Operator to initiate the "Fort St. Vrain Radiological Emergency Call List."
- 2) READ verbatim the information recorded in Part A (Page 1 of this attachment).
- 3) RECORD the following information:

Time PSC Operator Notified _____

Time Operator Callback Received _____



PUBLIC SERVICE COMPANY OF COLORADO

FORT ST. VRAIN NUCLEAR GENERATING STATION

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Weld County (911 Using Greeley Line)

- 1) READ verbatim the information recorded in Part A (Page 1 of this attachment).

- 2) RECORD the following information:

Time Weld County Notified _____

Time Weld County Callback Received _____

NRC OPERATIONS CENTER (HOT LINE OR (202) 951-0550)

(Use HP Network Line if NRC Hot Line and Land Line are inoperable.)

- 1) READ Items 1) through 4) from Part A.
- 2) READ the following sentences verbatim. "THIS EVENT IS BEING REPORTED PURSUANT TO 10-CFR50.72, ITEM NUMBER 1. WE ARE PRESENTLY ACTIVATING STATE AND LOCAL EMERGENCY RESPONSE CENTERS."
- 3) READ the supplemental information (Page 2 of this attachment).
- 4) RECORD the following information:

NAME of NRC Contact _____

TIME of NRC Contact _____



ECP DIRECTOR'S CALL LIST INSTRUCTIONS

In the event that you are notified by the PSC operator that a Radiological ALERT or higher classification event has occurred at Fort St. Vrain, complete the following telephone calls:

1. If you are the response center/post Director:
 - a. Call your response center/post Alternate Director (the alternate will complete the calls on the attached list).
 - b. If you cannot contact your Alternate Director, call the first person on the attached list and inform him to complete the call list.
2. If you are the response center/post Alternate Director and are contacted by the Director:
 - a. Complete the attached call list.
3. If you are the response center/post Alternate Director and are contacted by the PSC Operator:
 - a. Call the first person on the attached list and inform him to complete the call list.



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ECP DIRECTOR'S CALL LIST

First call all primaries, then call all alternates.

<u>PSC</u>		
<u>Extension</u>	<u>Home</u>	<u>Time</u>

Manager - Technical Support

Primary - J. R. Reesy
Alternate - Mike Holmes

Manager - Media Relations

Primary - R. T. Person, Jr.
Alt. - W. D. Fitzmaurice

Manager - Resources

Primary - D. D. Hock
Alternate - J. Bumpus

Manager - Security

Primary - E. O'Neal
Alternate - Leonard Johnson

*To call these numbers from other than a PSC telephone, the correct prefix is



CORPORATE EMERGENCY DIRECTOR'S CALL LIST INSTRUCTIONS

In the event that you are notified by the PSC operator that a Radiological ALERT or higher classification event has occurred at Fort St. Vrain, complete the following telephone calls:

1. If you are the response center/post Director:
 - a. Call your response center/post Alternate Director (the alternate will complete the calls on the attached list).
 - b. If you cannot contact your Alternate Director, call the first person on the attached list and inform him to complete the call list.
2. If you are the response center/post Alternate Director and are contacted by the Director:
 - a. Complete the attached list.
3. If you are the response center/post Alternate Director and are contacted by the PSC Operator:
 - a. Call the first person on the attached list and inform him to complete the call list.



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CORPORATE EMERGENCY DIRECTOR'S CALL LIST (FCP)

First contact all primaries, then call all alternates.

	<u>Extension</u>	<u>Home</u>	<u>Time</u>
<u>Station Technical Liaison</u>			
Primary - L. M. McBride			
Alternate - J. W. Gahm			
<u>Radiological Assessment</u>			
Primary - T. Borst			
<u>Clerical Assistance</u>			
Primary - C. Stroh			
Alternate - Sue Katcher			
2nd Alt. - Laurie Banagas			
<u>Media Relations</u>			
Primary - M. McAdams			
Alternate - S. Volsted			



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PCC DIRECTOR'S CALL LIST INSTRUCTIONS

In the event that you are notified by the PSC operator that a Radiological ALERT or higher classification event has occurred at Fort St. Vrain, complete the following telephone calls:

1. If you are the response center/post Director:
 - a. Call your response center/post Alternate Director (the alternate will complete the calls on the attached list).
 - b. If you cannot contact your Alternate Director, call the first person on the attached list and inform him to complete the call list.
2. If you are the response center/post Alternate Director and are contacted by the Director:
 - a. Complete the attached call list.
3. If you are the response center/post Alternate Director and are contacted by the PSC Operator:
 - a. Call the first person on the attached list and inform him to complete the call list.

PCC DIRECTOR'S CALL LIST

	<u>Plant Extension</u>	<u>Home</u>	<u>Time</u>
<u>Personnel Accountability and I & C Technicians</u>			
T. Bashline			_____
P. Bearly			_____
M. Benedict			_____
M. Blossom			_____
P. Bollig			_____
S. Caines			_____
R. Erwin			_____
G. Fisher			_____
M. Gale			_____
C. Harding			_____
K. Hays			_____
W. Holcomb			_____
T. McElwaine			_____
G. Murphy			_____
M. Murphy			_____
D. Nelson			_____
G. Powers			_____
G. Redmond			_____
R. Rivera			_____
C. Stieff			_____
J. Switzer			_____
L. Walker			_____
S. Willford			_____

Maintenance, Repair, and Damage Control

As Required - See RERP Phone Roster at end of procedure.

Hazards Control Team

D. Brown	_____
C. Schmidt	_____



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Attachment 7
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Monitoring Teams - Health Physics

R. Hooper
K. Latimer
P. Morris
E. J. O'Donoghue
S. Rima
D. Rozell
S. Scruggs
E. Stroud

Radiochemistry

V. McGaffic (P)
D. Miller(A)
S. Poet(A)
M. Prochownik (A)

Operating Staff Support

As Required - See RERP Phone Roster

Telephone Console Operators

D. Edwards (P)
S. Rozell (A)

Maintenance (Electrical, Mechanical)

As required at the discretion of the PCC Director - Refer to
RERP Phone Lists.



STATE EOC CALL LIST INSTRUCTIONS
(For Contacts by PSC)

In the event you are notified by the PSC operator that a Radiological ALERT or higher classification event has occurred at Fort St. Vrain, complete the following telephone calls:

1. If you are the PSC primary contact:
 - a. Call the PSC alternate contact and instruct him to complete the call list.
 - b. If you cannot reach the PSC alternate contact, call the first person on the attached list and inform him to complete the call list.
2. If you are the PSC alternate contact and are notified by the PSC primary contact:
 - a. Complete the attached call list.
3. If you are the PSC alternate contact and are notified by the PSC operator:
 - a. Call the first person on the attached list and inform him to complete the call list.



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STATE EOC CALL LIST
(For Contacts by PSC)

	<u>Extension</u>	<u>Home</u>	<u>Time</u>
<u>Radiological Consultant</u>			
K. Schiager			_____
<u>Media Relations</u>			
R. A. Burns (Primary)			_____
G. Reeves (Alt.)			_____



TSC DIRECTOR'S CALL LIST INSTRUCTIONS

In the event that you are notified by the PSC operator that a Radiological ALERT or higher classification event has occurred at Fort St. Vrain, complete the following telephone calls:

1. If you are the response center/post Director:
 - a. Call your response center/post Alternate Director (the alternate will complete the calls on the attached list).
 - b. If you cannot contact you Alternate Director, call the first person on the attached list and inform him to complete the call list.
2. If you are the response center/post Alternate Director and are contacted by the Director:
 - a. Complete the attached call list.
3. If you are the response center/post Alternate Director and are contacted by the PSC Operator:
 - a. Call the first person on the attached list and inform him to complete the call list.

TSC DIRECTOR'S CALL LIST

First call all primaries, then call all alternates.

<u>Reactor Physics</u>	<u>Plant Extension</u>	<u>Home</u>	<u>Time</u>
Primary - C. Fuller			_____
Alternate - R. Heller			_____
Alternate - F. Novachek			_____
<u>Radiological Assessment</u>			
Primary - J. Sills			_____
<u>Plant Condition Assessment</u>			
Call two off-duty Shift Supervisors			
M. Deniston			_____
D. Evans			_____
W. Franklin			_____
J. Hak			_____
D. Hood			_____
H. O'Hagan			_____
G. Reigel			_____
J. VanDyke			_____
<u>Emergency Maintenance</u>			
Primary - W. Craine			_____
Alternate - J. Liebelt			_____
<u>Instrument and Control</u>			
Primary - B. Burchfield			_____
Alternate - J. Weller			_____
<u>Health Physics/Health Physicist</u>			
Primary - T. Schleiger			_____
Alternate - B. Woodard			_____
<u>Administration/Logistics</u>			
Primary - A. Kitzman			_____
Alternate - P. Collins			_____
Alternate - D. Merritt			_____



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FGRT ST. VRAIN NUCLEAR GENERATING STATION

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Computer Support

Primary - D. Klaus
Alternate - D. Bilstein

ATTACHMENT 10
Facility Directors/Alternates

	Extension	City	Home	Time
<u>Technical Support Center</u>				
a. Primary: D. W. Warembourg Alternate: E. D. Hill		Frederick Johnstown		
<u>Control Room Director</u>				
b. Primary: M. L. Block Alternate: None		Longmont		
<u>Personnel Control Center</u>				
c. Primary: J. Glass Alternate: R. E. Wadas		Brighton Johnstown		
<u>Forward Command Post</u>				
d. Primary: L. M. McBride Alternate: J. W. Gahn		Boulder Northglenn		
<u>Corporate Emergency Director</u>				
e. Primary: O. R. Lee Alternate: J. K. Fuller		Brighton Denver		
<u>Executive Command Post</u>				
f. Primary: R. F. Walker Alternate: B. O'Donnell		Denver Denver		
<u>State Emergency Operations Center</u>				
g. Primary: D. McNellis Alternate: H. L. Brey		Denver Broomfield		



PUBLIC SERVICE COMPANY OF COLORADO

FORT ST. VRAIN NUCLEAR GENERATING STATION

BOOK 3

1/21/83

NRC # 9
Eisenhut

NON-CONTROLLED COPY

RADIOLOGICAL EMERGENCY RESPONSE PLAN - STATION

NO.	SUBJECT	ISSUE NUMBER	EFFECTIVE DATE
RERP-TSC	Technical Support Center Procedure	11	01-03-83
RERP CR-UE	Control Room Unusual Event Procedure	17	01-21-83
RERP-VC	Visitors Center Procedure	2	01-21-83
RERP-PHONE LISTS		14	10-26-82



PUBLIC SERVICE COMPANY OF COLORADO
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RERP-VC
Issue 2
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TITLE: VISITOR'S CENTER PROCEDURE

ISSUANCE AUTHORIZED BY	<i>1-11-83</i> <i>Don Waresburg</i>		
PORC REVIEW	PORC 500 JAN 17 1983	EFFECTIVE DATE	1-21-83

<u>Sections</u>	<u>Description</u>	<u>Page</u>
1.0	<u>Criteria for Implementation</u>	1
2.0	<u>Procedure</u>	1
3.0	<u>Responsibilities</u>	3
4.0	<u>References</u>	3
5.0	<u>Referenced or Supporting Procedures</u>	3
Figure 1	Visitor's Center Evacuation Routes	1



1.0 Criteria for Implementation

The purpose of this procedure is to provide guidance to the PSC Visitor's Center representative in the event of a radiological emergency at Fort St. Vrain requiring activation of the FSV Radiological Emergency Response Plan (RERP). The RERP is generally activated for an ALERT, or higher, emergency classification.

2.0 Procedure

This procedure will be initiated by notification via the plant public address system or by telephone call to the PSC representative at the Visitor's Center.

2.1 When notified that the Radiological Emergency Response Plan (RERP) is being activated, instruct all non-station occupants to proceed to the Fort Lupton Fire Station using the route specified. The Personnel Control Center (PCC) will inform the Fort Lupton Fire Station to anticipate persons arriving.

2.1.1 Load occupants into buses and cars, and transport to the fire station in caravan style.

- Route #1 - through Platteville to U.S. 85 to Fort Lupton, 1 on attached map (Figure 1).
- Route #2 - South to Colorado 66 West to I-25 east, Colorado 52 to Fort Lupton, 2 on attached map (Figure 1).
- Route #3 - North to Johnstown to Colorado 60 east to U.S. 85 south to Fort Lupton, 3 on attached map (Figure 1).

2.1.2 Do not attempt to detain any visitors who will not cooperate in the evacuation of the Visitor's Center. If a visitor will not cooperate in the evacuation, obtain whatever identifying information that is possible (name, description, vehicle license plate, etc.), and notify the Central Alarm Station (Extension 300 or page) of the situation.

2.1.3 Attempt to obtain names and applicable information from visitors prior to their departure to the Evacuation Center. This information should be available from the guest log.

2.1.4 Take the Visitor's Center Log Book and any applicable notes when leaving.



2.2 When the evacuation of visitors from the Visitor's Center has been completed, the PSC Visitor's Center representative shall contact either the Shift Supervisor (Extension or page) or the Central Alarm Station (Extension or page).

2.3 Upon arrival at the Fort Lupton Fire Station, personnel will be monitored and sent home.

2.3.1 Account for occupants of Visitor's Center by checking names against the Log Book or name list.

2.3.2 Call the Personnel Control Center, and report accountability for Fort St. Vrain employees only (if required).

2.3.3 Notify the State Health Department of any visitors who did not cooperate in the evacuation, and furnish any applicable information available regarding their identity.

3.0 Responsibilities

The PSC representative at the Visitor's Center is responsible to notify visitors and building occupants of the situation and any instructions received from the Lead Security Officer or Shift Supervisor. The PSC representative shall attempt to evacuate the building, as directed, but is not responsible for the actions of uncooperative visitors. In the event of an uncooperative visitor, the PSC representative shall notify FSV security of the situation. Upon completion of the Visitor's Center evacuation of visitors, the PSC representative shall notify the Shift Supervisor or Central Alarm Station of evacuation completion.

4.0 References

4.1 FSV Radiological Emergency Response Plan (RERP)

5.0 Referenced or Supporting Procedures

5.1 RERP-PCC, Personnel Control Center Procedure

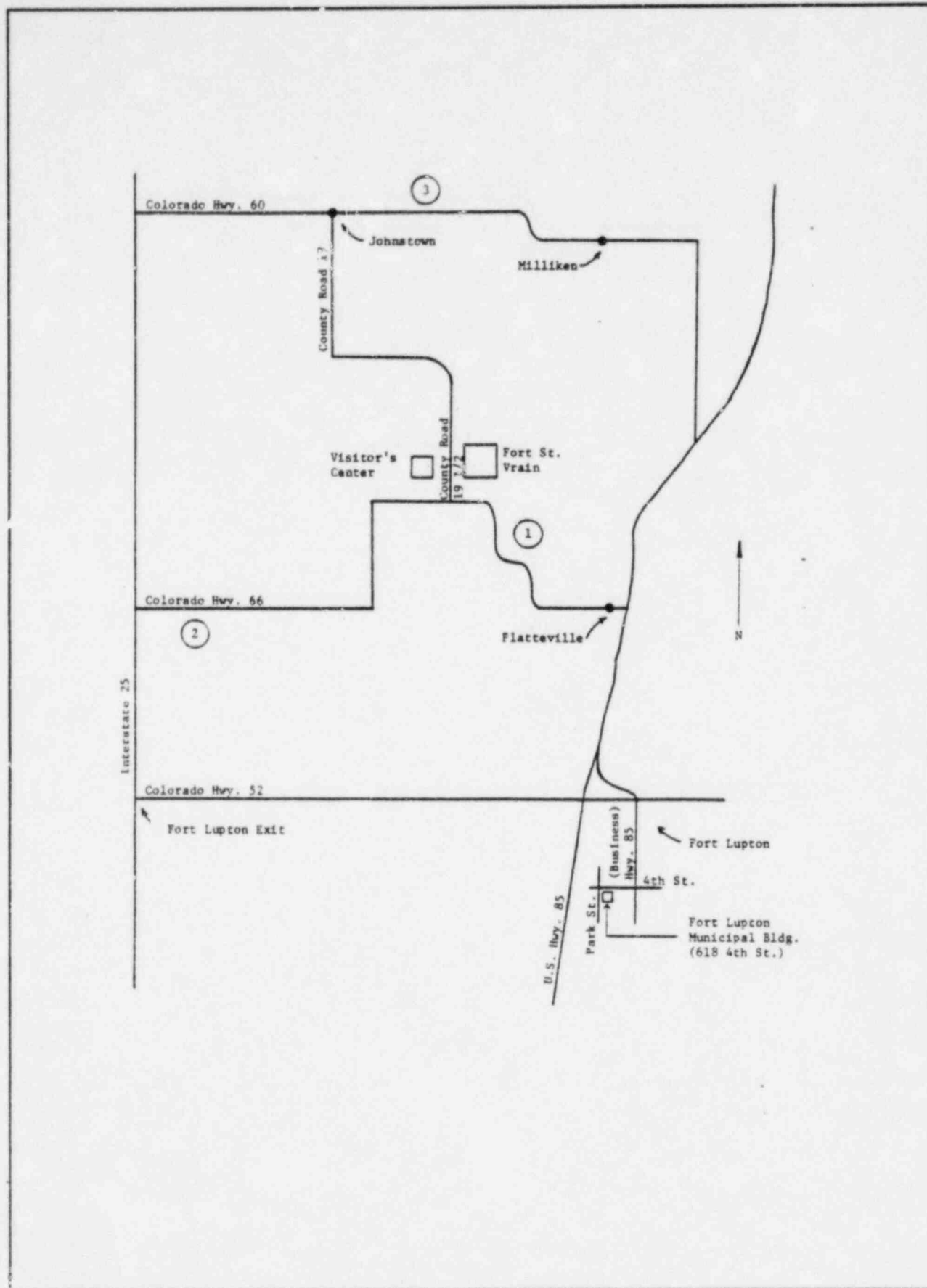
5.2 AFM G-5, Personnel Emergency Response



PUBLIC SERVICE COMPANY OF COLORADO

FORT ST. VRAIN NUCLEAR GENERATING STATION

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CR-UE

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TITLE: CONTROL ROOM UNUSUAL EVENT PROCEDURE

ISSUANCE
AUTHORIZED
BY

1-1883
De Warrington

PORC
REVIEW

PORC 500 JAN 17 1983

EFFECTIVE
DATE

1-21-83

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* ANYTIME A WORKSHEET, DATASHEET, OR CHECKLIST HAS BEEN WRITTEN ON, COMPLETE THE REPORTING SHEET ATTACHED IN THE TABBED WORKSHEET SECTION AND FORWARD IT TO THE TECHNICAL CLERK AND RECORDER, FORT ST. VRAIN. DO NOT WRITE ON ANY WORKSHEETS, DATASHEETS, CHECKLISTS, OR REPORTING SHEETS IN THE PROCEDURE ITSELF. ALL WORKSHEETS/DATASHEETS/CHECKLISTS ARE TO BE TAKEN FROM THE TABBED SECTION FOLLOWING EACH PROCEDURE.



1.0 Criteria for Implementation

This procedure is provided for use by Control Room personnel in the event of an occurrence which is classified as a NOTIFICATION OF UNUSUAL EVENT, as specified in the FSV Radiological Emergency Response Plan (RERP). A summary of initiating event categories and respective Emergency Action Levels (EALs) are summarized for the four levels of emergency classification in Tables 1-4 of this procedure. In addition, the classification process is described in greater detail in Emergency Procedure EP-CLASS, Event and Emergency Classification Overview. Initial event classification is the responsibility of the Shift Supervisor.

2.0 Procedure

2.1 General Responses

- 2.1.1 Under any emergency condition, the Shift Supervisor and onsite personnel will immediately initiate those actions required to limit the consequences of the event and return the plant to a safe and stable condition.
- 2.1.2 Implementation of the RERP is required whenever any of the Initiating Events of Tables 1 through 4 of this procedure occurs. Additional guidance on accident classification is contained in Emergency Procedure EP-CLASS, as well as in each individual Emergency Procedure. Initial accident classification is the responsibility of the Shift Supervisor.
- 2.1.3 Checklist 1 is for use by the CR Director and/or the Emergency Coordinator. This check list is a brief summary of actions, and is to be used for guidance purposes to assist in verifying execution of required responses.



2.1.4 During non-working hours, PSC personnel required to man the response centers (Figure 1) are notified by telephone. It is the responsibility of the individual response center Alternate Directors (or, the first individual contacted by the director) to ensure these notifications are made (see RERP-HOME). Refer to the RERP PHONE LIST for instructions and personnel names and numbers. Under most circumstances, an occurrence classified as a NOTIFICATION OF UNUSUAL EVENT does not warrant activation of the FSV Emergency Response Organization and Facilities. A precautionary activation of FSV Emergency Response Organization and Facilities would constitute an ALERT emergency classification.

2.1 Initial Required Responses For Unusual Event

In the event of an occurrence believed to be defined by any of the events listed in Table 4.1-1 of the RERP (included as Table 1 of this procedure), the following actions shall be taken:

2.2.1 On-Shift Control Room Personnel:

2.2.1.1 Implement Emergency Procedure actions required to limit the consequences of the event and return the plant to a safe and stable condition.

2.2.1.2 If a radiological release is involved, make a preliminary assessment of the release. Actions to perform offsite dose calculations are described in implementing procedure RERP-DOSE. RERP-DOSE should be utilized as a reference in any cases where questions as to the specifics of dose calculation procedures arise. Worksheets, Datasheets, and a Checklist for dose calculations are contained herein, as summarized below:

Worksheet 1 Monitored Release - Manual
Worksheet 2 Monitored Release - TI-59
Worksheet 3 Unmonitored Release - Manual
Worksheet 4 Unmonitored Release - TI-59
Datasheet 1 Monitored Release - Datalogger
Datasheet 2 Unmonitored Release - Datalogger
Checklist 2 Monitored Datalogger

Datalogger calculation is the most rapid means of assessing offsite consequences,



provided that the user is familiar with proper program utilization. It is the Shift Supervisor's responsibility to assure that offsite consequence assessments are performed, as required. This activity will become the responsibility of the Technical Support Center after full emergency facility activation.

2.2.1.3 As soon as possible, inform the Emergency Coordinator of the results of the preliminary radiological assessment.

2.2.2 Shift Supervisor (Emergency Coordinator Checklist 1)

2.2.2.1 Assume the position of the Emergency Coordinator until relieved by the Superintendent of Operations.

2.2.2.2 As Emergency Coordinator, direct onsite emergency response and initiate any required corrective actions.

2.2.2.3 Notify the on-duty Technical Advisor

<u>Page</u> <u>Phone</u>	<u>Plant</u> <u>Ext.</u>	<u>Home</u> <u>Phone</u>
-----------------------------	-----------------------------	-----------------------------

|
|
|
F. Novachek
J. Sills
J. Eggebroten

2.2.2.4 If a radiological release or potential radiological release is involved, delegate the preliminary assessment of the release to a Reactor Operator and obtain assessment results.

2.2.2.5 Initiate radiological protective actions for station-personnel.

2.2.2.6 Contact one member of plant management listed below in order of preference (see Checklist 3):



Supt. of Operations
Station Manager
Admin./Tech.
Services Mgr.
Mgr. Nuclear Prod
Radiation Protection
Manager
Vice Pres, Prod.

Page
Phone

Plant
Ext.

Home
Phone

2.2.2.7 Based on preliminary plant and radiological assessments, the Shift Supervisor (Emergency Coordinator) shall confirm the classification of the emergency as a NOTIFICATION OF UNUSUAL EVENT with the first management contact. If the classification of the emergency is deemed an ALERT, SITE AREA EMERGENCY, or GENERAL EMERGENCY, go to section 2.7 of "Control Room ALERT, SITE EMERGENCY, GENERAL EMERGENCY Procedure (CR-ALERT)."

NOTE: In the event that no management person listed above can be contacted, it is the responsibility of the Shift Supervisor to classify the emergency and make the appropriate notifications of 2.2.2.8 below.

2.2.2.8 NOTIFICATION OF UNUSUAL EVENT

- a) The Shift Supervisor (Emergency Coordinator) and the first management contact shall jointly complete the "NOTIFICATION OF UNUSUAL EVENT" Form (Attachment 1). Both the management contact and the Shift Supervisor (Emergency Coordinator) shall fill out the Notification Form to ensure both have the same information.



- b) The Shift Supervisor (Emergency Coordinator) shall then notify the State of Colorado and the NRC Operations Center by making the following telephone calls as per Attachment 1, Page 2.

State Emergency Operations Center
Governor's Office or
Governor's Mansion
NRC Operations Center "Hot Line" or
Shift Technical Advisor (as required)

- * Back-up Emergency Numbers For NRC Notification:

OR on HPN system (located in H.P. Supervisor's office and the Technical Support Center)

The information on the "Notification of Unusual Event" Form will be read to the above contacts.

- c) The management contact will contact the remainder of the management personnel listed in 2.2.2.6 above, and one of the Resident NRC Inspectors (Checklist 3):

Plant		
Ext.	Office	Home

B. Dickerson
G. L. Plumlee, III

- d) No further action is required unless the event escalates to a higher RERP emergency classification as shown in Tables 2-4 of this procedure.



3.0 Responsibilities

3.1 Emergency Coordinator

The Emergency Coordinator is the on-duty Shift Supervisor. The title of Emergency Coordinator is retained by the duty Shift Supervisor until he is relieved by either the Control Room Director or the Technical Support Center Director, upon activation of the FSV Emergency Organization (see Figure 1). The Emergency Coordinator is responsible for:

- Initial accident classification;
- Recommending protective actions;
- Initiating emergency actions to mitigate the accident;
- Notifying offsite authorities;
- Diagnosing accident conditions;
- Estimating radiological exposures; and
- Establishing communications with the TSC.

Responsibility for the decision for offsite notification and protective action recommendation may not be delegated.

3.2 Technical Advisor

The Technical Advisor is responsible to provide technical analysis and advice as requested, and to provide recommendations of corrective actions necessary to restore the plant to a safe and stable condition.

3.3 Plant Control and Plant Operations

Plant Control and Plant Operations responsibilities are handled by personnel already on-shift and assigned those responsibilities.

4.0 References

- 4.1 FSV Radiological Emergency Response Plan
- 4.2 State Radiological Emergency Response Plan



5.0 Referenced or Supporting Procedure

- 5.1 CR-ALERT; Control Room ALERT, SITE EMERGENCY, GENERAL EMERGENCY Procedure
- 5.2 RERP-DOSE, Offsite Dose Calculations
- 5.3 EP-CLASS, Event and Emergency Classification Overview
- 5.4 RERP-ORG, FSV Emergency Organization and Responsibilities
- 5.5 RERP-PAG, Protective Action Guideline Recommendations
- 5.6 RERP-Phone List
- 5.7 RERP-HOME, Home Packet for Off-Shift Notifications

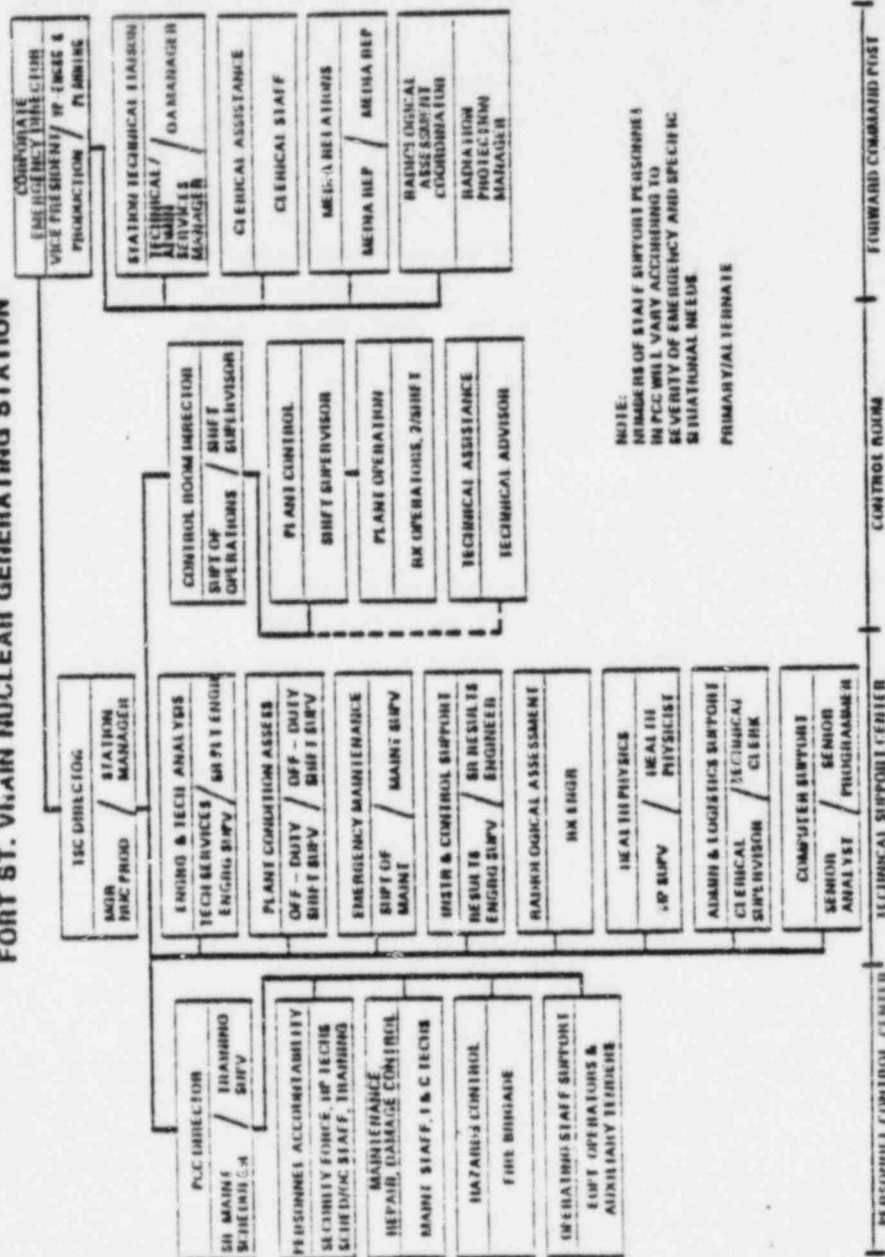


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FIGURE 5.2-2
EMERGENCY ORGANIZATION (ALERT, SITE EMERGENCY, GENERAL EMERGENCY)
FORT ST. VRAIN NUCLEAR GENERATING STATION





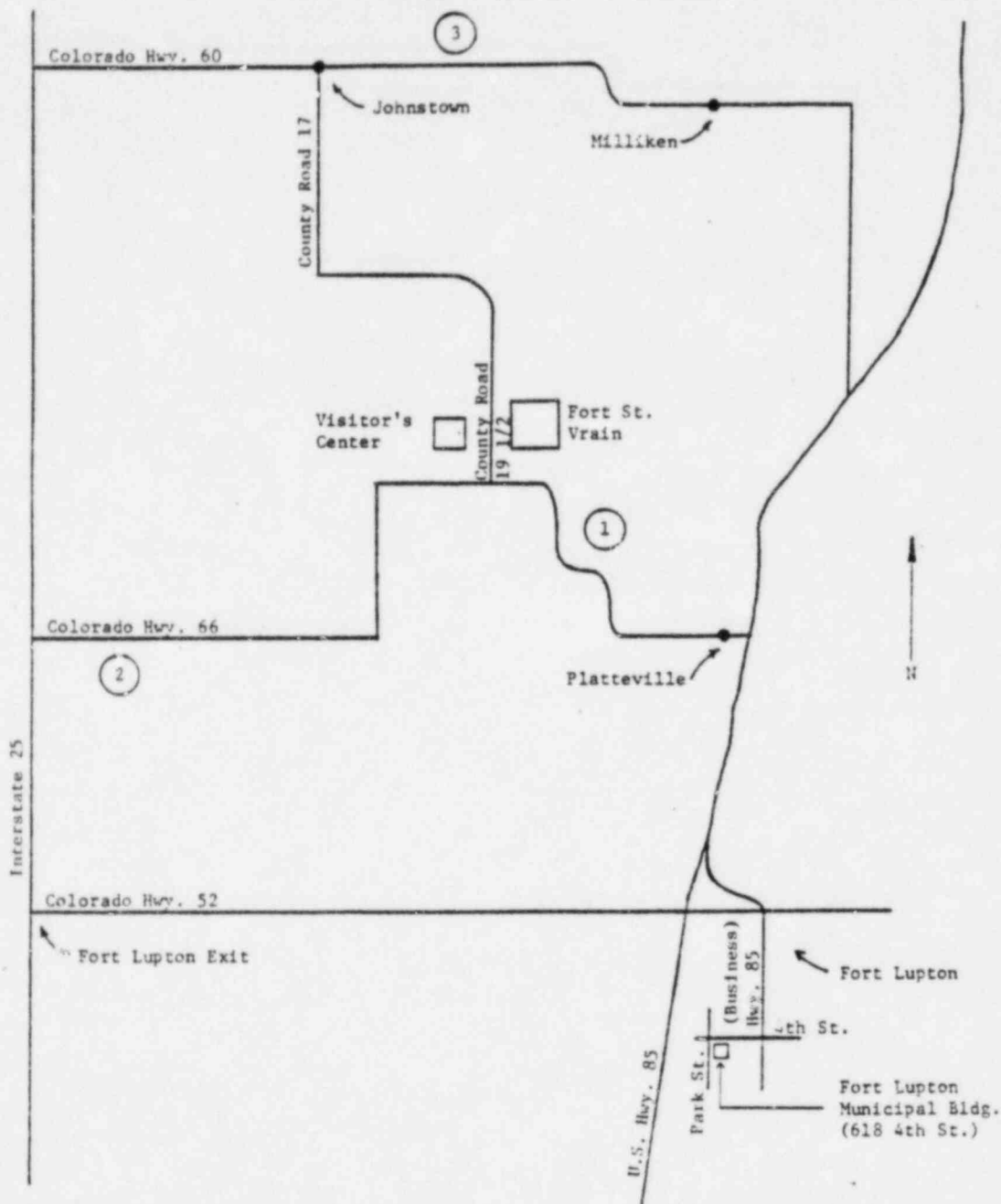
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FIGURE 2

VISITORS CENTER EVACUATION ROUTES





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FIGURE 3

SITE SECTOR MAP

GEOGRAPHICAL AREA IDENTIFICATION DESIGNATIONS

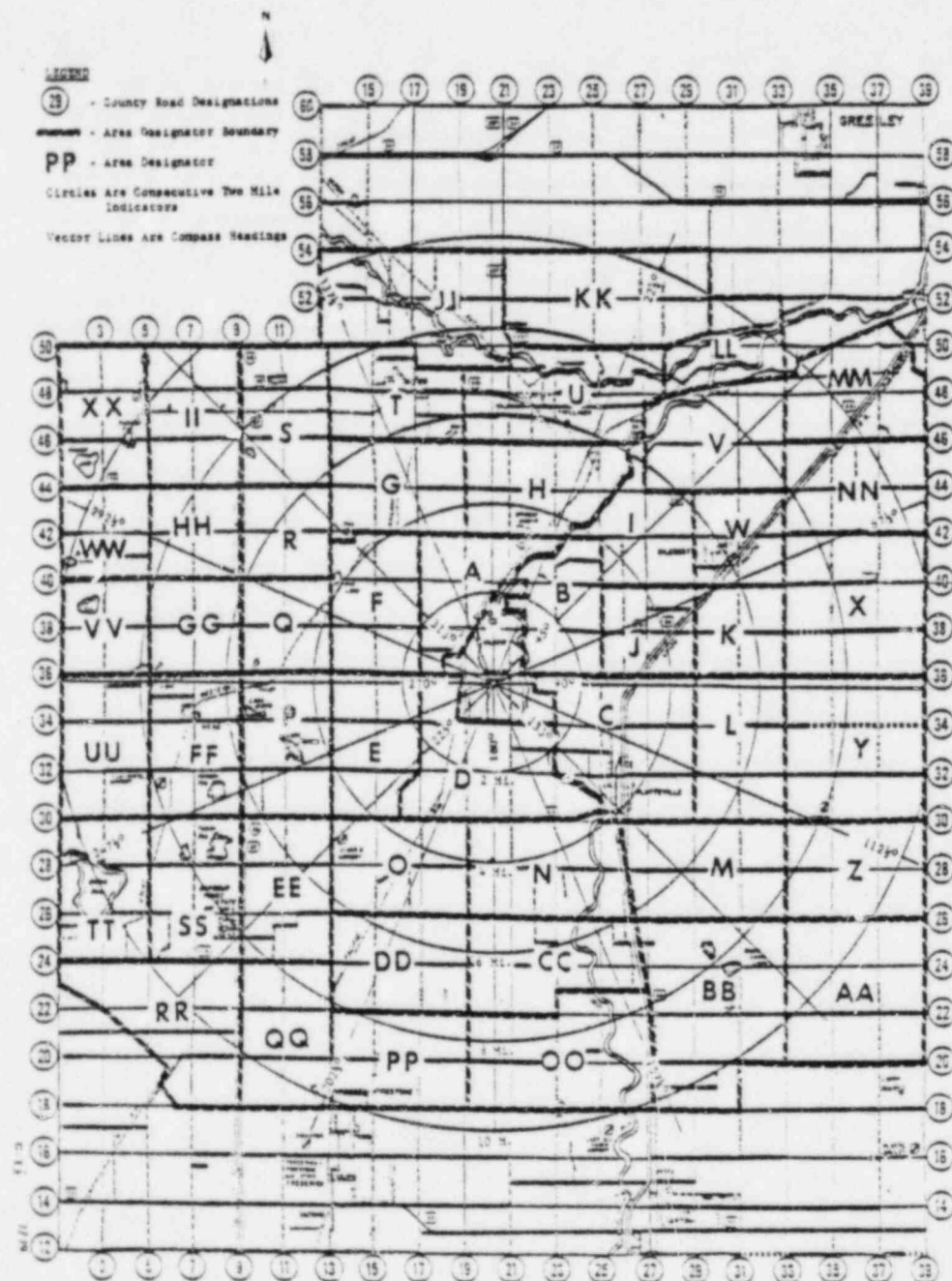




TABLE 1

NOTIFICATION OF UNUSUAL EVENT

<u>Event</u>	<u>Indication</u>
1. Any unplanned radiological release to the Reactor Building or its ventilation system.	1. Alarms on: RT 7312 CAM(s) RT 7324-1 RT 7324-2 RT 7325-1 RT 7325-2 RT 4801 RT 4802 RT 4803 RT 73437-1, 2
2. Any liquid waste release resulting in offsite effluent in excess of Technical Specification limits.	2. a) RT 6212 or 6213 alarm with inability to prevent discharge offsite. b) As determined by station personnel.
3. Indication of minor fuel damage detected in primary coolant.	3. a) 25% increase in circulating activity from previous equilibrium conditions at the same power level. RT 9301 (RR 93256). b) SR 5.2.11 results.
4. Serious fire at the plant lasting more than 10 minutes which could lead to substantial degradation of plant safety systems, or which could result in the release of radiological or toxic materials.	4. a) any of various alarms on Fire Control Alarm Panel; b) Fire Pump 1A auto start; c) verbal reports.



TABLE 1

NOTIFICATION OF UNUSUAL EVENT

<u>Event</u>	<u>Indication</u>
5. Abnormal coolant temperatures or core region temperature rises to the extent requiring shutdown in accordance with Technical Specifications.	5. Violations of LCO 4.1.7 or LCO 4.1.9 for region outlet mismatch, or region ΔT , respectively, to the extent that shutdown per Station Technical Specifications is required (SOP 12-04).
6. Natural phenomenon that may be experienced or threatened that represent risks beyond normal levels: a) earthquake b) floods c) tornadoes d) extremely high winds	6. a) Seismic Recorder Operate; b)-d) as visually observed by, or reported to, station personnel.
7. Unusual Hazards Experienced: a) Aircraft crash on site or near the site that is subject to public concern because of possible detrimental effect on the plant; b) Onsite explosions or near site explosions that may be subject to public concern because of possible detrimental effect on the plant; or,	7. As visually observed by, or reported to, station personnel.



TABLE 1

NOTIFICATION OF UNUSUAL EVENT

<u>Event</u>	<u>Indication</u>
7. c) Onsite or near site plant related accidents that could result in the release of toxic material or spills of flammable materials.	
8. Any serious radio-logical exposure of plant personnel or the transportation to offsite facilities of contaminated personnel who may have been injured. (Probably cannot be determined within two hours- call to be made in a timely fashion.)	8. As occurring.
9. Accidents within the state that may involve plant spent fuel shipments or plant radio-active waste shipments.	9. As occurring or reported by shipper.
10. Loss of Engineered Safety Feature or Fire Protection System to the extent requiring Shutdown in accordance with station Technical Specifications.	10. Shutdown required in accordance with applicable LCOs: a) Engineered Safeguards 1) Plant ventilation- LCO 4.5.1 2) Steam/Water Dump System - LCO 4.3.3

TABLE 1
NOTIFICATION OF UNUSUAL EVENT

<u>Event</u>	<u>Indication</u>
10. (Cont).	<ul style="list-style-type: none">3) PCRV penetration flow restriction devices - LCO 4.2.7 and LCO 4.2.94) PCRV penetration secondary closures - LCO 4.2.7 and LCO 4.2.95) PCRV Safety Valves - LCO 4.2.8 SL 3.2 LSSS 3.3.2.cb) Fire Protection System - LCO 4.2.6, LCO 4.10.1- LCO 4.10.5
11. Indication or alarms on radiological effluent monitors not functional.	<ul style="list-style-type: none">11. Data Logger Alarm/Alarm Summary indication of non-operational alarm or indication on:<ul style="list-style-type: none">a) RT 7324-1, 2 <u>and</u> RT 4803; orb) RT 7325-1, 2, RT 4802, <u>and</u> RT 73437-1; orc) RT 73437-2 <u>and</u> RT 4801; ord) RT 6212 <u>and</u> RT 6213. <p>NOTE: Use LCO 4.8.1 Technical Specification Limits as basis.</p>



TABLE 2

ALERT

<u>Event</u>	<u>Indication</u>
1. Rapid, severe fuel particle coating failure.	1. Coolant Inventory of a) >2.4 (CI) (Mev) Beta-Gamma 1b b) circulating I-131 activity equivalent $>24\text{Ci}$ c) plate out I-131 $>1 \times 10^4$ Ci d) SR 5.2.6 or SR 5.2.11 results.
2. Rapid, gross failure of one steam generator reheat section with loss of offsite power.	2. Loop 1 Hot Reheat Header (HRH) activity high (5mrem/hr); or, Loop 2 HRH activity high (5mrem/hr) accompanied by 230 Kv OCB trips and RAT undervoltage/loss of power alarm.
3. Primary coolant pressure decay (to a value greater than 100 psi less than normal pressure, accompanied by area and stack radiation monitor alarms).	3. PAL 9335 PAL 9347 PAL 9359 and area monitor or stack monitor alarm
4. High radiation levels or high airborne contamination which indicates severe degradation in control of radioactive materials. (Increase by factor of 1,000 over normal.) e.g. lifting PCRV relief valve or abnormal release to cooling tower blowdown.	4. RT 7312 CAM(s) alarm RT 6212 RT 6213 RT 93252-12 Area Monitors Alarms with corresponding meter readings on area or process monitors.



TABLE 2

ALERT

<u>Event</u>	<u>Indication</u>
5. Loss of offsite power <u>and</u> vital onsite AC power for up to 30 minutes.	5. 230 KV OCB trips <u>and</u> RAT undervoltage/loss of power alarm accompanied by 4 KV bus undervoltage 480V bus undervoltage, <u>and</u> Diesel Trouble alarms.
6. Loss of all vital DC power for up to 30 minutes.	6. DC bus 1 < 10 volts and DC bus 2 < 10 volts
7. Loss of primary coolant forced circulation for between 2 and 5 hours.*	7. All He flow indicators read zero.
8. Loss of secondary coolant functions needed for removing residual heat.	8. All secondary coolant flow indicators read zero.
9. Loss of normal ability to place the reactor in a subcritical condition by scram of the control rods.	9. a) Indication of insufficient rods inserted; or, b) neutron count rate not decreasing.
10. Serious fire which could lead to substantial degradation of plant safety systems.	10. a) any of various alarms on Fire Control Alarm Panel b) Fire Pump 1A auto start c) verbal reports

* These times are LOFC from 100% power. Times may be corresponding longer for lower power levels (CMG-4).



TABLE 2

ALERT

<u>Event</u>	<u>Indication</u>
11. Radiological effluents exceed 10 times technical specifications instantaneous limits.	<p>11. a) RT 7324-1 indicating $\geq 2.5 \times 10^{-2}$ $\mu\text{Ci/cc}$</p> <p>b) RT 7324-2 indicating $\geq 2.5 \times 10^{-2}$ $\mu\text{Ci/cc}$</p> <p>c) RT 7325-1 indicating $\geq 7.0 \times 10^{-8}$ $\mu\text{Ci/cc}$</p> <p>d) RT 7325-2 indicating $\geq 7.0 \times 10^{-8}$ $\mu\text{Ci/cc}$</p> <p>e) RT 73437-1 indicating $\geq 7.0 \times 10^{-8}$ $\mu\text{Ci/cc}$ I-131.</p> <p>f) RT 4802 indicating $\geq 7.0 \times 10^{-8}$ $\mu\text{Ci/cc}$ I-131.</p> <p>g) RT 4803 indicating $\geq 2.5 \times 10^{-2}$ $\mu\text{Ci/cc}$</p> <p>Utilize reading from above instruments and calculate dose rate per procedures</p>
12. Ongoing security compromise.	<p>12. a) As observed or reported;</p> <p>b) Guard Station Trouble alarm; or,</p> <p>c) Guard Station Acknowledge alarm.</p>
13. Severe natural phenomenon being experienced or projected, such as:	<p>13. a) Seismic recorder operate ($\geq .05$ g)</p> <p>b) As Reported</p> <p>c) As Reported</p>
a) earthquake exceeding Operating Basis Earthquake levels;	
b) flood near design level; or,	
c) tornado striking facility.	



TABLE 2

ALERT

<u>Event</u>	<u>Indication</u>
14. Other hazards being experienced or projected such as: a) aircraft crash on facility; b) missile impact on facility; c) explosion damage affecting plant operation; or, d) entry into facility environs of toxic or flammable gas. (Some effect on facility experienced or anticipated)	14. As reported by, or to, station personnel.
15. Evacuation of control room anticipated or required, with control of shutdown systems established from local stations. (Control room integrity breached).	15. As deemed necessary by Shift Supervisor
16. All alarms (annunciators) lost for more than 15 minutes and reactor is not shutdown; or, plant transient experienced while all alarms lost. (Parameter indication still functional.)	16. Control room observation.
17. Other plant conditions warranting precautionary activation of the PCC, TSC, and FCP.	17. As deemed necessary by Shift Supervisor.



TABLE 3

SITE AREA EMERGENCY

<u>Event</u>	<u>Indication</u>
1. Loss of primary coolant forced circulation for over 5 hr. from 100% power. (Lower power levels preceeding LOFC extends time available before core damage is incurred. See CMG-4.)	1. All He flow indicators read zero.
2. Non-isolable primary coolant leakage through a steam generator reheat section.	2. Loop 1 or 2 HRH activity alarm-high with Shift Supervisor determination that leakage is non-isolable.
3. PCRVR relief valve remains open.	3. RT 93252-12 alarm and rapidly decreasing Reactor pressure.
4. Determination of inability to restore onsite AC power.	4. 230 KV OCB trips <u>and</u> RAT undervoltage/loss of power alarm accompanied by 4Kv bus undervoltage, 480v bus undervoltage, and Diesel Trouble alarms. Standby Diesel Fail to Start.
5. Loss of functions needed for plant hot shutdown.	5. Inability to insert sufficient control rods accompanied by failure of emergency reserve shutdown system - resulting in inability to maintain - .01Δp at 220°F.
6. Major damage to spent fuel due to severe cask damage resulting in release of radioactivity to plant environs.	6. a) Visual observation. b) area radiation monitor alarms.



TABLE 3

SITE AREA EMERGENCY

<u>Event</u>	<u>Indication</u>
7. Fire adversely affecting safety systems.	7. a) Fire pump 1A start; b) Fire Control Alarm Panel c) Various alarms according to affected safety system. d) Shift Supervisor determines fire beyond capability of station staff.
8. a) Effluent monitors detect levels corresponding to greater than 50 mrem/hr, or greater than 500 mrem/hr whole body for two minutes at the site boundary under adverse meteorology (or levels 5 times the above for thyroid dose range). b) These dose rates are projected based on other plant parameters or are measured in the environs.	8. Stack monitor alarm with corresponding stack concentration indications on: a) RT 73437-1, RT 4802, and RT 7325-1, 2 $\geq 6.7 \times 10^{-5} \mu\text{Ci/cc}$ I-131; or, b) RT 7324-1, 2, and RT 4803 $> 6.6 \times 10^{-2} \mu\text{Ci/cc}$ mixed noble gasses.
9. Imminent loss of physical control of the plant due to security breach. (Response detailed in Station Security Plan.)	9. Situation evident.



TABLE 3

SITE AREA EMERGENCY

<u>Event</u>	<u>Indication</u>
10. Severe natural phenomenon being experienced or projected (with plant not in cold shutdown), such as;	10.
a) earthquake greater than Safe Shutdown Earthquake	a) Seismic Recorder Operate alarm with indication of ground motion greater than 0.10g horizontal or greater than 0.067g vertical.
b) flood greater than design levels	b) As reported or observed.
c) winds in excess of design levels	c) average wind velocity greater than 90 mph or 10 second gusts exceeding 99 mph.
d) tornado in excess of design levels	d) horizontal wind velocity greater than 202 mph.
11. Other hazards being experienced or projected with reactor not shutdown, such as;	11. As observed by or reported to, station personnel.
a) aircraft crash affecting vital structures;	
b) severe damage to safe shutdown equipment;	
c) entry of toxic/flammable gas into vital areas.	
12. Reactor building louvers open due to building being overpressurized by primary coolant. (DBA #2)	12. a) Louvers Open Alarm (3 inches water) b) Reactor building radiation alarms.



TABLE 3

SITE AREA EMERGENCY

<u>Event</u>	<u>Indication</u>
13. Evacuation of control room accompanied by inability to locally control shutdown systems within 15 minutes.	13. Remote shutdown instrumentation indications (panel I-49).
14. Other plant conditions warranting activation of FCP/EOCs, monitoring teams, and precautionary public notification.	14. As determined by Shift Supervisor.



TABLE 4

GENERAL EMERGENCY

<u>Event</u>	<u>Indication</u>
1. a) Effluent monitors detect levels corresponding to 1 rem/hr. whole body (or 5 rem/hr thyroid) at the exclusion area boundary under actual meteorological conditions.	1. Stack monitor RT-7324-1, 2 alarm, or Corresponding dose rates determined with E-500 or cutie-pie detector per procedure HPP-56 and associated graphs.
b) These dose rates are projected based on other plant parameters or are in the environs.	
2. Loss of physical control of the facility. (due to security breach).	2. Situation evident.
3. Other plant conditions exist that make release of large amounts of radioactivity possible.	3. As determined by Shift Supervisor.

TABLE 5
FORT ST. VRAIN ATMOSPHERIC STABILITY CATEGORIES*

ΔT ($^{\circ}F$) from 60m tower	ΔT ($^{\circ}F$) from Reactor Building	Pasquill Categories	Stability Classification	σ_B^{**} (Degrees)
≤ -1.7	≤ -1.5	A	Extremely Unstable	≥ 22.5
> -1.7 to ≤ -1.5	> -1.5 to ≤ -1.3	B	Moderately Unstable	< 22.5 to ≥ 17.5
> -1.5 to ≤ -1.3	> -1.3 to ≤ -1.2	C	Slightly Unstable	< 17.5 to ≥ 12.5
> -1.3 to ≤ -0.4	> -1.2 to ≤ -0.4	D	Neutral	< 12.5 to ≥ 7.5
> -0.4 to $\leq +1.3$	> -0.4 to $\leq +1.2$	E	Slightly Stable	< 7.5 to ≥ 3.8
$> +1.3$ to $\leq +3.5$	$> +1.2$ to $\leq +3.1$	F	Moderately Stable	< 3.8 to ≥ 2.1
$> +3.5$	$> +3.1$	G	Extremely Stable	< 2.1

* per Proposed Revision 1 to Regulatory Guide 1.23, September 1980. For utilizing other than Reactor Building Instruments (ΔT), utilize NRC Regulatory Guide 1.23, proposed Revision, as a reference for stability classification.

** Standard deviation of horizontal wind direction fluctuation (plume meander) over a period of 15 minutes to 1 hour.



TABLE 6

DOSE CONVERSION FACTORS (DCF'S)

Radionuclide	$\frac{\text{rem/hr}}{\text{DCF}(\text{Ci/m}^3)*}$
Kr-83m	2.7E-1
Kr-85m	1.3E+2
Kr-85	1.7E+0
Kr-87	6.5E+2
Kr-88	1.7E+3
Kr-89	1.5E+3
Kr-90	1.0E+3
Xe-131m	9.9E+0
Xe-133m	2.7E+1
Xe-133	3.3E+1
Xe-135m	3.5E+2
Xe-135	2.0E+2
Xe-137	1.5E+2
Xe-138	6.8E+2
Noble gas weighted average total body DCF (based on 879 Mw(t) design inventory)	7.5E+2
I-131	1.2E+6
I-132	1.7E+4
I-133	2.3E+5
I-134	5.6E+3
I-135	5.7E+4
Radioiodine weighted average thyroid DCF (based on 879 Mw(t) design inventory)	5.3E+4

*DCF's for noble gases from "The EXREM III Computer Code for Estimating External Radiation Doses to Populations from Environmental Releases," ORNL-TM-4332, with the exception of DCF's for Kr-89 and Kr-90, which are from "Final Environmental Statement, Light Water Breeder Reactor Program," Volume 3 of 5, "Commercial Application of LWBR Technology," ERDA-1541.

DCF's for radioiodines from "INREM II: A. Computer Implementation of Recent Models for Estimating the Dose Equivalent to Organs of Man from an Inhaled or Ingested Radionuclide," ORNL/NUREG/TM-84



NOTIFICATION OF UNUSUAL EVENT

A. The Emergency Coordinator and first management contact will complete the following information jointly:

1. Name and identity of caller _____

2. Date of Event _____ Time of Event _____

3. General Category of Event

_____ Unplanned Radiological Release to Reactor Building

_____ Fuel Failure

_____ Fire

_____ Natural Phenomenon (circle one)

Earthquake Flood Tornado Winds

_____ Unusual Hazards (circle one)

Aircraft Explosion Toxic Material

Other (Specify) _____

_____ Spent Fuel Incident

4. Description of Event _____

5. Actions Taken _____

6. Status: -

_____ Under control by onsite staff, no offsite assistance anticipated.

_____ Under control by onsite staff. Will keep State and NRC advised.

7. At the present time, the event does not involve offsite release or the potential for offsite releases that would affect the general health and safety of the public.



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B. The Emergency Coordinator will make notifications as follows:

Contact with State EOC _____ and Governor's Office
or Mansion _____

1. READ the following statement verbatim:

"THIS IS A NOTIFICATION OF AN UNUSUAL EVENT AT THE
FORT ST. VRAIN NUCLEAR GENERATING STATION. THIS
NOTIFICATION DOES NOT REQUIRE ACTIVATION OF
EMERGENCY RESPONSE CENTERS. THIS NOTIFICATION
REQUIRES VERIFICATION OF RECEIPT BY THE STATE.
VERIFY BY CALLING

2. READ all the information recorded in Step A (Page 1 of
this ATTACHMENT).

3. RECORD the following information:

Name of State EOC contact _____ Date/Time _____

Name of Governor's Office/Mansion Contact _____

Date/Time _____

Call back verification from State EOC, Date/Time _____

Call back verification from Governor's Office/Mansion

Date/Time _____

Contact with NRC Operations Center (Hot Line or

(If NRC Hot Line and Land Line are inoperative, use HP Network line.)

1. READ the following statement verbatim:

"THIS IS NOTIFICATION OF A SIGNIFICANT EVENT AT THE
FORT ST. VRAIN NUCLEAR GENERATING STATION AT
PLATTEVILLE, COLORADO. THIS NOTIFICATION APPEARS TO
BE REQUIRED PURSUANT TO 10CFR50.72, ITEM NUMBER 1.
THIS NOTIFICATION DOES NOT REQUIRE ACTIVATION OF
FEDERAL OR STATE EMERGENCY RESPONSE ORGANIZATIONS."



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2. READ the NRC Operations Center all of the information recorded in Step A (Page 1 of this Attachement).

3. RECORD the following information:

Name of NRC Contact _____ Date/Time _____



LOCAL DETERMINATION OF STACK CONCENTRATION

This procedure should be performed by a person familiar with the instrumentation used to make a local determination of the stack concentration.

Dosimeter will be worn when performing this procedure. Exposure time will be kept to a minimum.

1. Proceed to the survey area at the exhaust stack on level 10, Turbine Building.
2. Insert instrument probe in shielded box at the exhaust stack and note reading (mR/hr).
3. Leave area immediately. Report the instrument used and reading (mR/hr) to the Control Room via the Gai-tronics.
4. Return to Control Room and verify proper instrument reading (mR/hr) conversion to concentration ($\mu\text{Ci/cc}$) via conversion graph posted in Control Room.

NOTE: Utilize HPP-56, "Manual Release Rate Determination" as a reference, if required.

TABLE 1A
 X/Q VALUES ($\times 10^{-5}$ sec/m³) AT THE EXCLUSION AREA BOUNDARY (590m)
 FOR AN ANEMOMETER LOCATED AT A HEIGHT OF 10 METERS
 ACCORDING TO THE EQUATIONS OF NRC REG GUIDE 1.145
 WINDSPEED AT 10 METERS (MPH)

Stability Class	1.0	2.0	3.0	5.0	7.0	9.0	12.0	15.0	20.0	30.0	50.0
A	3.469	1.735	1.156	0.694	0.496	0.386	0.289	0.231	0.174	0.116	0.069
B	11.490	5.746	3.830	2.298	1.642	1.277	0.958	0.766	0.575	0.383	0.230
C	23.250	11.630	7.751	4.650	3.22	2.584	1.938	1.550	1.163	0.775	0.465
D	36.56	18.28	12.19	7.844	6.928	5.988	4.491	3.593	2.695	1.796	1.078
E	48.46	24.23	16.15	10.83	10.83	9.449	7.089	5.670	4.252	2.835	1.701
F	88.42	44.21	29.47	20.35	18.54	14.42	10.81	8.650	6.488	4.325	2.595
G	140.20	70.11	46.74	33.62	40.06	31.16	23.37	18.70	14.02	9.348	5.609

FIGURE 1.A.
DISPERSION FACTOR (X/Q) vs. WINDSPEED FOR THE EXCLUSION
AREA BOUNDARY (590 METERS), ACCORDING TO THE EQUATIONS
OF NRC REG. GUIDE 1.145. WINDSPEEDS SHOWN ARE THE INDICATIONS
FOR AN ANEMOMETER LOCATED AT A HEIGHT OF 10 METERS.

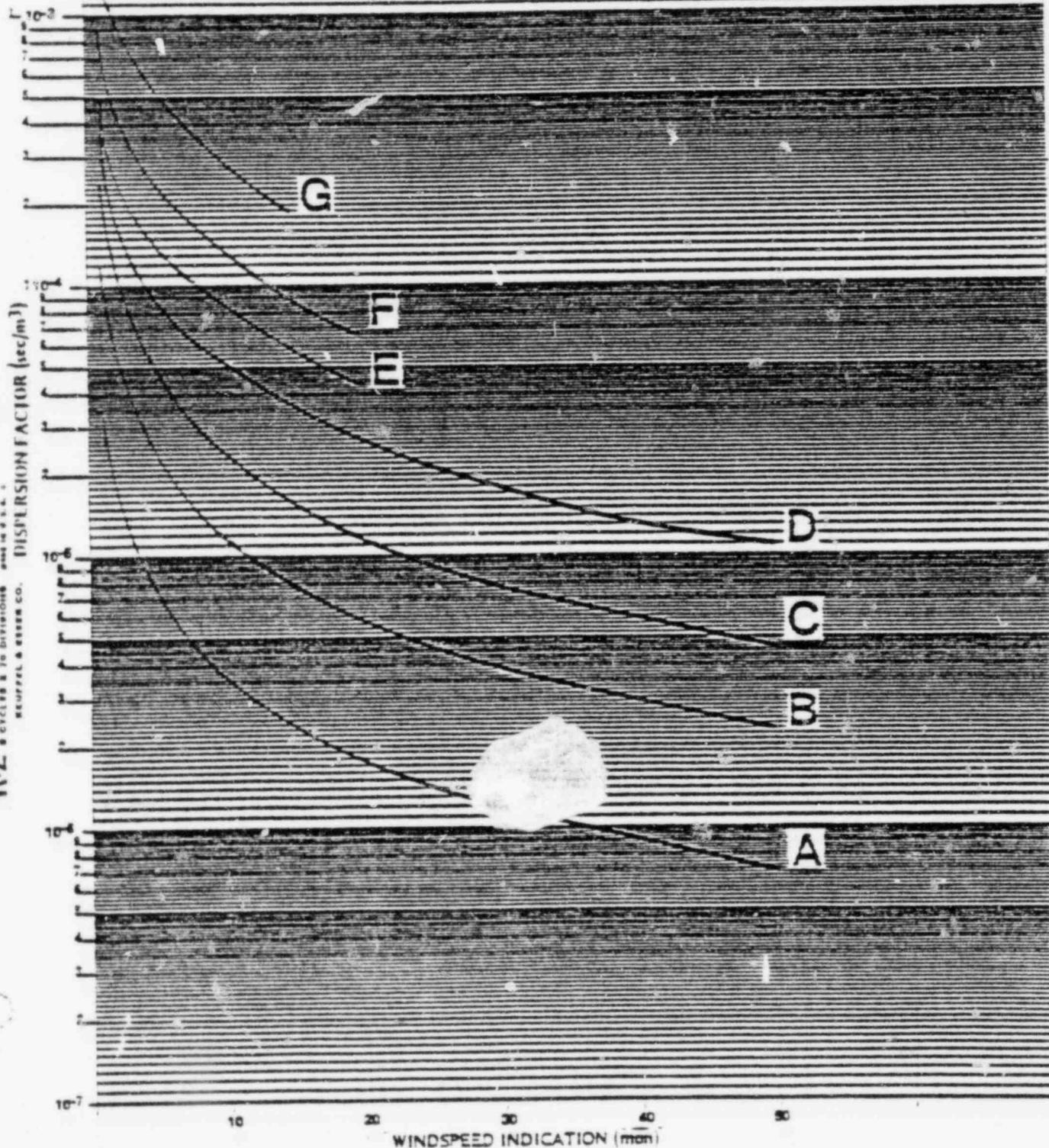


TABLE 2A
 X/Q VALUES ($\times 10^{-6}$ sec/m³) AT A DOWNWIND DISTANCE OF 2 MILES
 FOR AN ANEMOMETER LOCATED AT A HEIGHT OF 10 METERS
 ACCORDING TO THE EQUATIONS OF NRC REG GUIDE 1.145
 WINDSPEED AT 10 METERS (MPH)

Stability Class	1.0	2.0	3.0	5.0	7.0	9.0	12.0	15.0	20.0	30.0	50.0
A	0.124	0.062	0.041	0.025	0.018	0.014	0.010	0.008	0.006	0.004	0.002
B	1.751	0.876	0.584	0.350	0.250	0.195	0.146	0.117	0.088	0.058	0.035
C	12.97	6.483	4.322	2.593	1.852	1.441	1.081	0.865	0.648	0.432	0.259
D	38.13	19.07	12.71	7.859	6.104	5.019	3.972	3.177	2.383	1.589	0.953
E	64.89	32.44	21.63	13.74	11.46	9.821	7.961	6.369	4.776	3.184	1.911
F	130.4	65.18	43.45	28.33	25.27	22.53	17.91	14.33	10.74	7.163	4.293
G	250.1	125.0	83.35	56.60	56.14	51.2	38.79	31.03	23.28	15.52	9.310

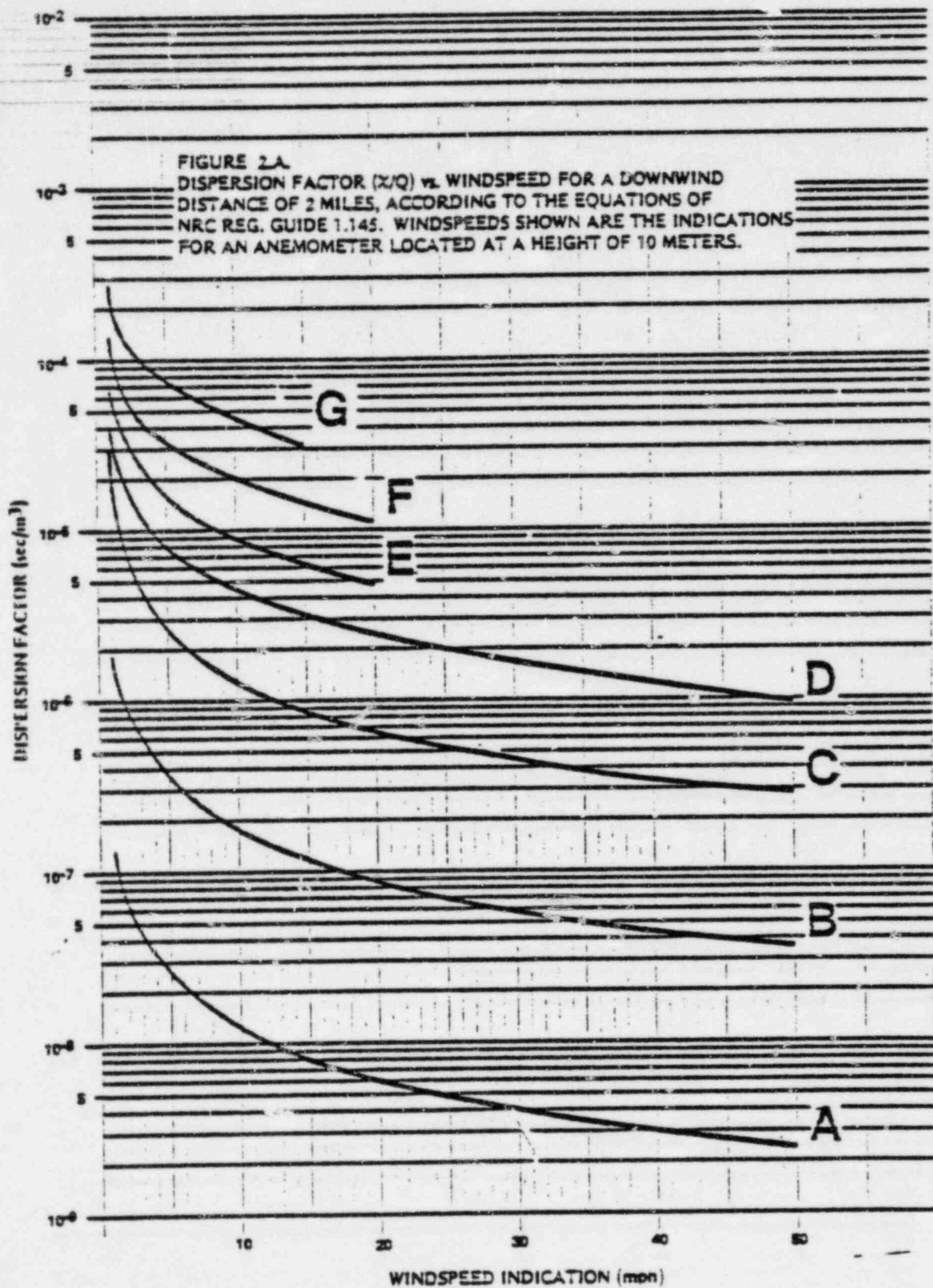


TABLE 3A
 X/Q VALUES ($\times 10^{-6}$ sec/m³) AT A DOWNWIND DISTANCE OF 4 MILES
 FOR AN ANEMOMETER LOCATED AT A HEIGHT OF 10 METERS
 ACCORDING TO THE EQUATIONS OF NRC REG GUIDE 1.145
 WIND SPEED AT 10 METERS (MPH)

Stability Class	1.0	2.0	3.0	5.0	7.0	9.0	12.0	15.0	20.0	30.0	50.0
A	0.069	0.034	0.023	0.014	0.010	0.008	0.006	0.005	0.003	0.002	0.001
B	0.155	0.078	0.052	0.031	0.022	0.017	0.013	0.010	0.078	0.005	0.003
C	3.963	1.982	1.321	0.793	0.566	0.440	0.330	0.264	0.198	0.132	0.079
D	14.87	7.434	4.956	3.028	2.271	1.823	1.411	1.132	0.849	0.566	0.340
E	29.17	14.59	9.725	6.053	4.757	3.918	3.095	2.476	1.857	1.238	0.743
F	15.46	32.73	21.82	13.85	11.40	9.626	7.585	6.068	4.551	3.034	1.820
G	132.81	66.42	44.28	29.04	25.85	22.67	19.37	13.90	10.42	6.948	4.169

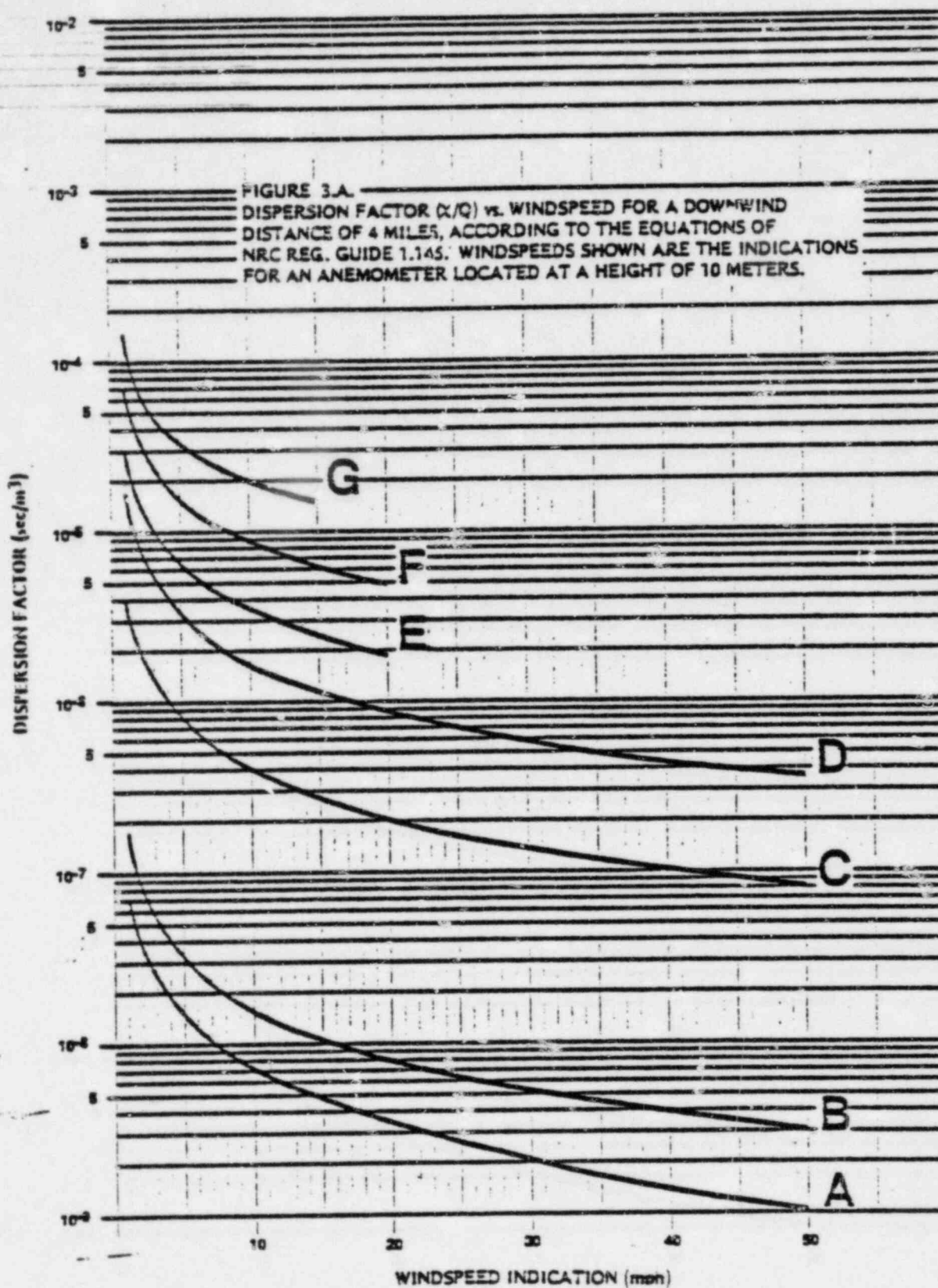


TABLE 4A
 X/Q VALUES ($\times 10^{-6}$ sec/m³) AT A DOWNWIND DISTANCE OF 5 MILES
 FOR AN ANEMOMETER LOCATED AT A HEIGHT OF 10 METERS
 ACCORDING TO THE EQUATIONS OF NRC REG GUIDE 1.145
 WINDSPEED AT 10 METERS (MPH)

Stability Class	1.0	2.0	3.0	5.0	7.0	9.0	12.0	15.0	20.0	30.0	50.0
A	0.057	0.028	0.019	0.011	0.008	0.006	0.005	0.004	0.003	0.002	0.001
B	0.072	0.036	0.024	0.014	0.010	0.008	0.006	0.005	0.004	0.002	0.001
C	2.704	1.352	0.902	0.541	0.386	0.301	0.225	0.180	0.135	0.090	0.054
D	10.96	5.478	3.652	2.224	1.655	1.322	1.017	0.816	0.612	0.408	0.245
E	22.43	11.21	7.476	4.630	3.586	2.927	2.294	1.837	1.377	0.918	0.551
F	52.07	26.03	17.36	10.93	8.819	7.347	5.759	4.608	3.456	2.304	1.382
G	107.7	53.86	35.91	23.30	20.14	17.34	13.34	10.67	8.005	5.336	3.202

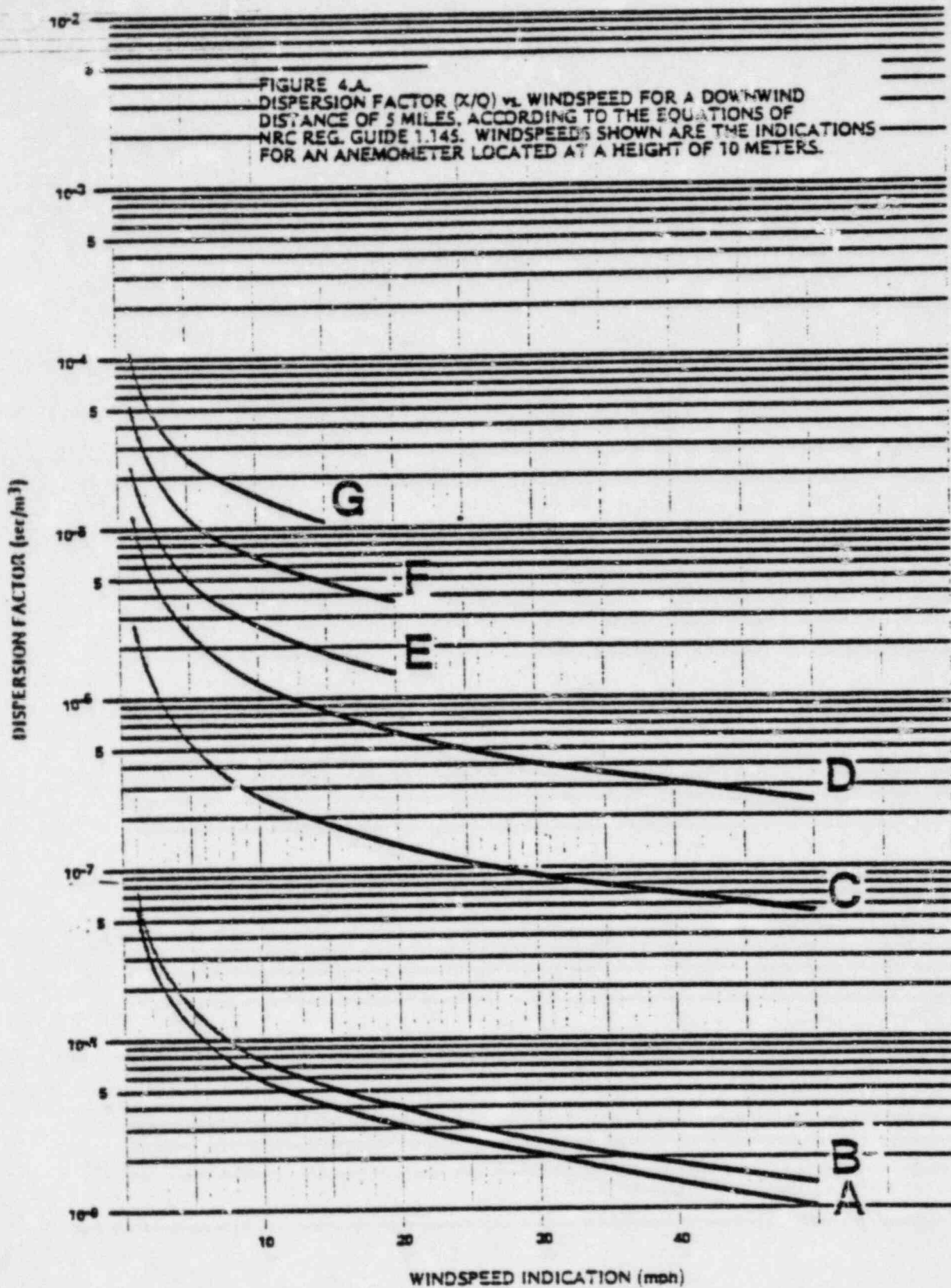


TABLE 5A
 X/Q VALUES ($\times 10^{-7}$ sec/m³) AT A DOWNWIND DISTANCE OF 6 MILES
 FOR AN ANEMOMETER LOCATED AT A HEIGHT OF 10 METERS
 ACCORDING TO THE EQUATIONS OF NRC REG GUIDE 1.145
 WINDSPEED AT 10 METERS (MPH)

Stability Class	1.0	2.0	3.0	5.0	7.0	9.0	12.0	15.0	20.0	30.0	50.0
A	0.485	0.243	0.162	0.097	0.069	0.054	0.040	0.032	0.024	0.016	0.010
B	0.616	0.308	0.206	0.123	0.088	0.068	0.051	0.041	0.031	0.021	0.012
C	19.72	9.859	6.573	3.944	2.817	2.191	1.643	1.315	0.986	0.657	0.394
D	85.61	42.81	28.54	17.35	12.84	10.21	7.830	6.284	4.713	3.142	1.885
E	179.6	89.81	59.87	36.93	28.31	22.96	17.88	14.33	10.75	7.166	4.299
F	431.9	215.9	144.0	90.18	71.65	59.15	46.17	36.93	27.70	18.47	11.08
G	909.7	454.9	303.2	195.3	165.2	140.4	108.1	86.45	64.84	43.23	25.94

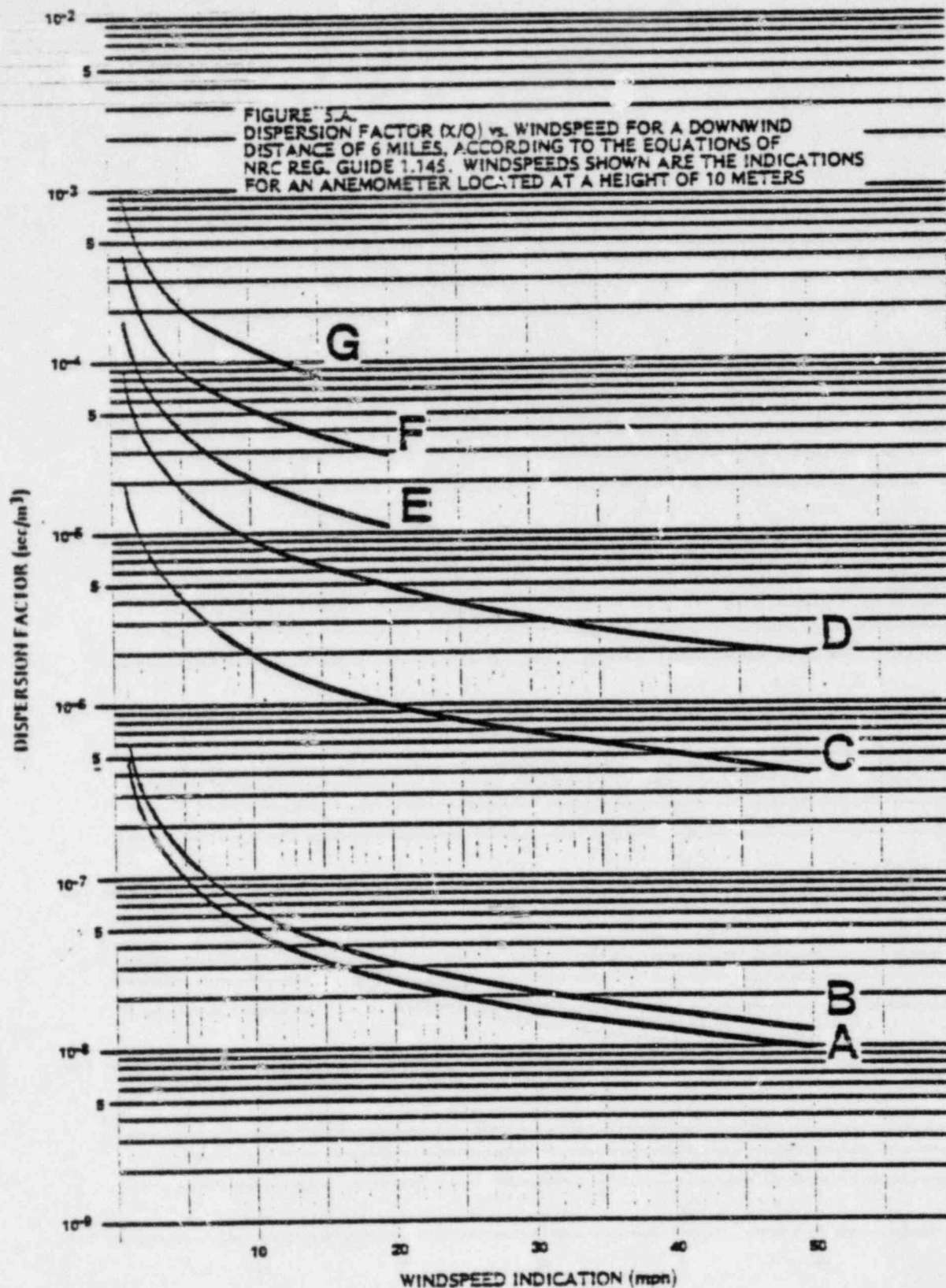


TABLE 6A
 X/Q VALUES ($\times 10^{-7}$ sec/m³) AT A DOWNWIND DISTANCE OF 8 MILES
 FOR AN ANEMOMETER LOCATED AT A HEIGHT OF 10 METERS
 ACCORDING TO THE EQUATIONS OF ARC REG GUIDE 1.145

WINDSPEED AT 10 METERS (MPH)

Stability Class	1.0	2.0	3.0	5.0	7.0	9.0	12.0	15.0	20.0	30.0	50.0
A	0.379	0.190	0.126	0.076	0.054	0.042	0.032	0.025	0.019	0.013	0.008
B	0.484	0.242	0.161	0.097	0.069	0.054	0.040	0.032	0.024	0.016	0.010
C	12.66	6.329	4.219	2.531	1.808	1.406	1.055	0.844	0.633	0.422	0.253
D	57.94	28.97	19.31	11.71	8.599	6.808	5.195	4.169	3.126	2.084	1.251
E	126.3	63.15	42.10	25.84	19.54	15.71	12.14	9.735	7.301	4.867	2.920
F	322.7	161.4	107.6	66.87	52.07	42.47	32.93	26.35	19.76	13.17	7.904
G	698.4	349.2	232.8	148.2	121.7	101.6	78.19	62.55	46.91	31.28	18.77

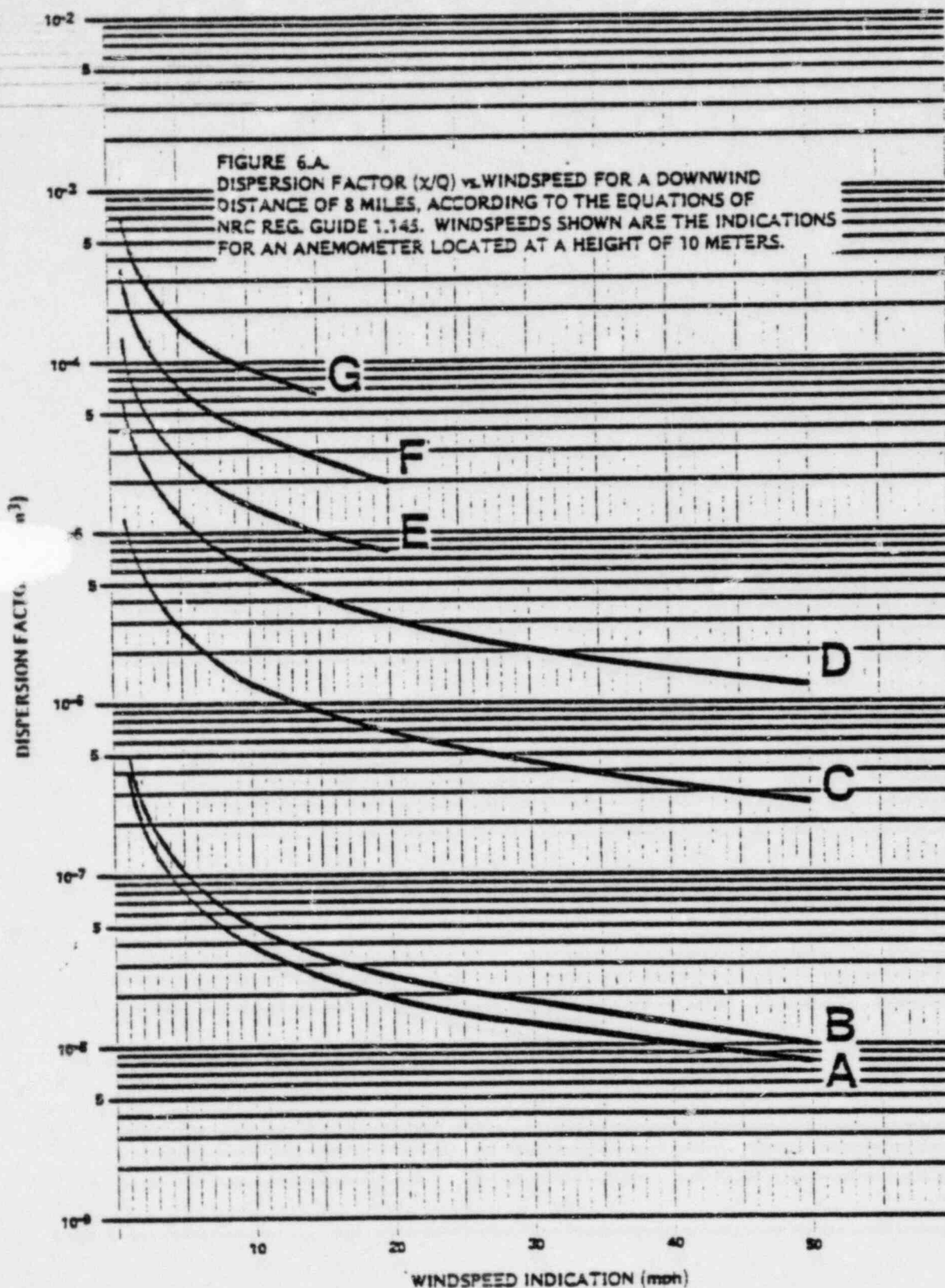
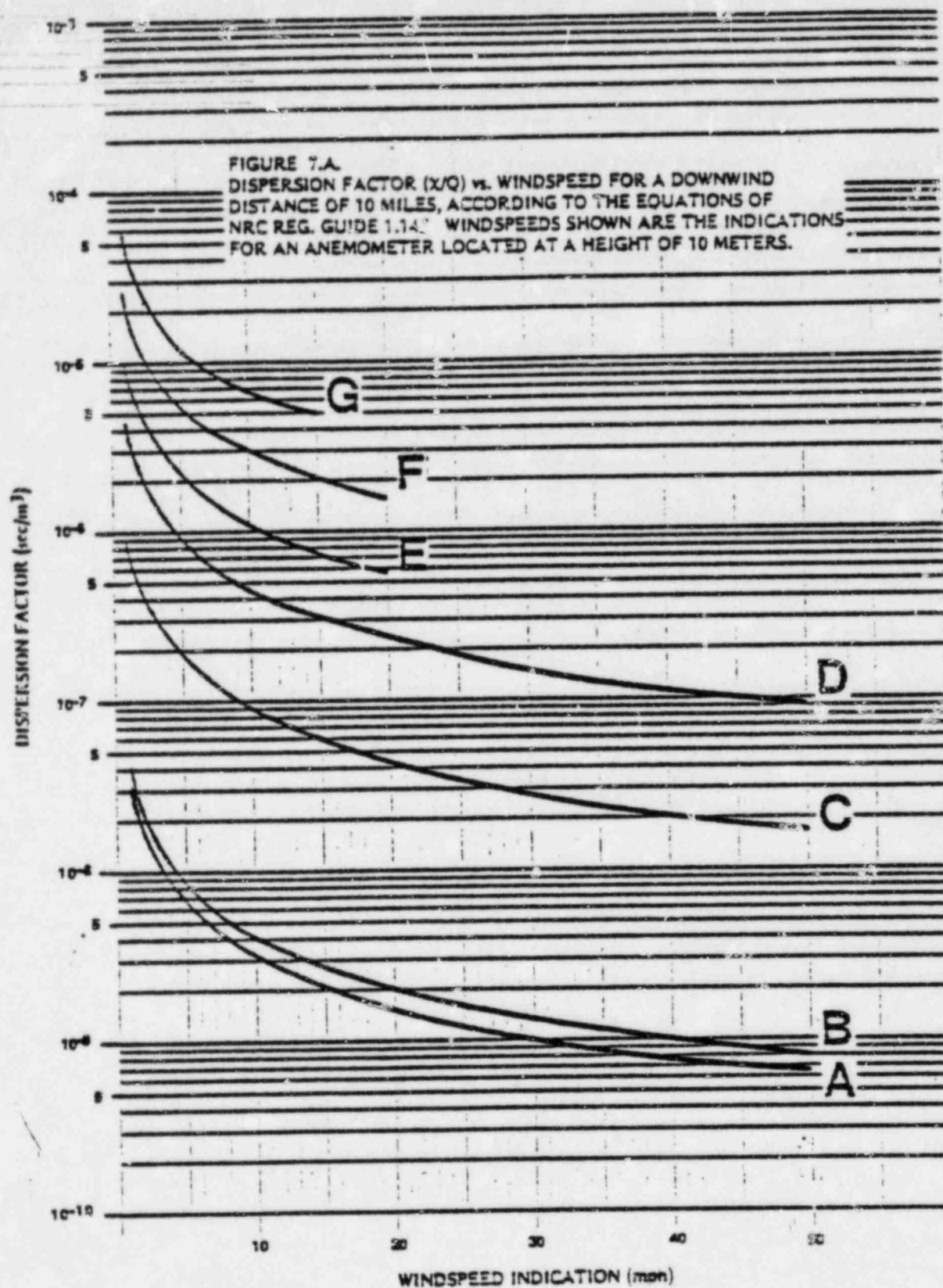


TABLE 7A
 X/Q VALUES ($\times 10^{-7}$ sec/m³) AT A DOWNWIND DISTANCE OF 10 MILES
 FOR AN ANEMOMETER LOCATED AT A HEIGHT OF 10 METERS
 ACCORDING TO THE EQUATIONS OF NRC REG GUIDE 1.145
 WINDSPEED AT 10 METERS (MPH)

Stability Class	1.0	2.0	3.0	5.0	7.0	9.0	12.0	15.0	20.0	30.0	50.0
A	0.313	0.156	0.104	0.063	0.045	0.035	0.026	0.021	0.016	0.010	0.006
B	0.402	0.201	0.134	0.080	0.057	0.045	0.033	0.027	0.020	0.013	0.008
C	8.833	4.416	2.944	1.767	1.262	0.981	0.736	0.589	0.442	0.294	0.177
D	43.02	21.51	14.34	8.678	6.345	5.008	3.810	3.057	2.293	1.528	0.917
E	99.81	49.90	33.27	20.35	15.26	12.20	9.384	7.527	5.645	3.763	2.258
F	256.9	128.5	85.64	52.96	40.71	32.95	25.44	20.35	15.26	10.18	6.105
G	568.7	284.3	189.6	119.8	96.40	79.62	61.16	48.93	36.70	24.46	14.68





Datasheet 1 - Data Logger (or IBM) Monitored Release

A. Projection - Option 2

1. Current and release start date and time:

a) ___/___/___

b) ___: ___

2. Projected end of release date and time:

a) ___/___/___

b) ___: ___

3. Radiation Monitor Values, Noble Gas

a) RT-7324, 1 _____ cpm

b) RT-7324, 2 _____ cpm

If one of the above is offscale or inoperative:

a) E-500 or Cutie Pie? _____

b) Instrument Reading _____ mR/hr

4. Exhaust Stack Flow Rate _____ cfm

5. Radioiodine Monitor Values; RT-73437, 1

a) Initial Reading from chart _____ cpm

b) Intermediate Reading from chart _____ cpm

c) Peak or Current Reading from chart _____ cpm

d) Time between a and b _____ minutes

e) Time between b and c _____ minutes

6. Wind Direction (preferred sampling point is 10 meter instrument on 60 meter meteorological tower)

_____ °



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7. Wind Speed (Preferred sampling point is 10 meter instrument on 60 meter meteorological tower)

_____ mph

8. Distance between upper and lower temperature instruments

_____ meters

9. Delta Temperature between temperature instruments

_____ °F

10. Standard Deviation (Sigma Theta) of Wind Direction - 15 min. average

B. Puff - Option 2

1. Current and release start date and time:

a) ____/____/____

b) ____: ____

2. End of Puff date and time (not to exceed 15 minutes after B.1)

a) ____/____/____

b) ____: ____

C. Total for All Puffs - Option 3

Change option and execute DF 41-0-0.



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Datasheet 2 - Data Logger (or IBM) Unmonitored Release)

1. Date and Time of beginning of release

a) ___/___/___

b) ___:___

2. Time of Louvers closed

3. Maximum CPM, RIS-9301

___ cpm

4. a) Primary coolant I-131 equivalent
circulating inventory

___ Ci

b) Primary coolant I-131 equivalent
plateout inventory

___ Ci

5. Primary Coolant Volume

___ scc

6. a) PCRV Pressure Before Release

___ psig

b) PCRV Pressure After Release

___ psig

7. Wind Direction (preferred sampling point
is 10 meter instrumentation on 60 meter
meteorological tower)

___ °

8. Wind speed (preferred sampling point is 10
meter instrumentation on 60 meter
meteorological tower)

___ mph



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9. Distance between upper and lower
temperature instruments

_____ meters

10. Delta Temperature between temperature
instruments

_____ °F

11. Standard Deviation (Sigma Theta) of wind
Direction - 15 min. average



PRELIMINARY ASSESSMENT OF PLANT CONDITIONS
TECHNICAL ADVISOR

1. Brief description of event _____

2. Date/Time of event _____

3. Date/Time of assessment _____
4. If the data logger is operating, obtain the Demand Function Printout (or print specified displays):

NOTE: All screens accessible on Display 900

Helium Inventory _____

DF 69-0-0 _____

DF 76-0-0 _____

DF 77-1-0 _____

Post Trip Review _____

PRIMARY SYSTEM

5. Current Reactor Power _____
6. Rod Runback Occur (Y/N) _____
If yes, record positions 2B _____ 4A _____
7. If shutdown, are all rods fully inserted (Y/N) _____
8. Circulators Operating A B C D MODE: Steam Feedwater Cond. Firewater
9. Purification Train A B To: Storage, FCRV, or Ventilation
10. Is heat removal capability adequate at this time (Y/N) _____



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SECONDARY SYSTEM

11. Loops Operating I II
12. Feed to S/G's: Norm FW____ Emer. FW____ Emer. Cond.____
Firewater____
13. Status of Aux. Boilers _____

Remarks

Time

Description



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EMERGENCY COORDINATOR'S CHECKLIST

1. Initiate Emergency Procedure actions. _____
2. Technical Advisor notified. _____
3. Obtain preliminary assessment of release. _____
4. Obtain meteorological data. _____
5. Initiate protective actions for station personnel. _____
6. Contact management and confirm classification.
(Checklist 3) _____
7. Complete Notifications Form. _____

NOTIFICATION OF UNUSUAL EVENT - Attachment 1 _____

8. Make Notifications (Attachment 1, Page 2)

NOTIFICATION OF UNUSUAL EVENT

State EOC _____

Governor's Office or Mansion _____

NRC's Operations Center _____



Checklist 2 - Data Logger Monitored Release

NOTE:

Initialize the summing screen by entering option 4 and running DF 41-0-0. This should be done for the first calculation only.

1. "DEMAND FUNCTION OVERVIEW" key, located cursor on DF 41-0-0 and "XMIT CURSOR." _____
2. Step 1 brings up display 941. Follow steps on this display. They lead the user from screen to screen through the basic program steps. Always utilize program "OPTION 2" when performing calculations for record keeping or dose reporting purposes. This "OPTION" reverts to a "1" after the Demand Function is run and must be reset to a "2" each time. _____
3. Perform a "duration of release" calculation utilizing the projected or estimated end of release time. Utilize 2 hours from current as a default value whenever this value isn't known. * _____
4. Print displays from this calculation. _____
5. Display results and print _____

*NOTE: Be certain to reset option to "2" after performance of a calculation.



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6. Perform a "puff" calculation utilizing a projected ending time 15 minutes from the current time shown on step 3 of this checklist. Release start time should be the same as current time.

_____*

7. Print displays from step 6.

8. Display results and print

9. Set "OPTION" to "3" and rerun DF 41-0-0

10. Print Display 951 which tabulates the results

SUMMARY OF DISPLAYS TO PRINT

<u>Step No.</u>	<u>Displays</u>	<u>Verification</u>
4.	944, 942, 948, 951	_____
5.	945, 947	_____
7.	944, 942	_____
8.	945, 947	_____
10.	949	_____

MANAGEMENT CONTACT NOTIFICATION LIST

The first management contact will make the following notification:

NOTE: Any change to this notification list requires a change be made to RERP-HOME, Checklist #1.

Subsequent Contacts	Date/ Time	Remarks
Plant Management (Contact 1) Supt. of Oper.		
Station Manager		
Administrative/ Tech. Serv. Mgr.		
Mgr., Nuc. Prod.		
Radiation Pro- tection Manager		
Vice President, Production		
Media Relations Rob Burns		
or Gary Reeves		
or Marilyn McAdams		
NRC Bill Dickerson		
or G.L. Plumlee, III		

*Calls to PSC phones from outside of the PSC telephone system may require use of a different telephone exchange. In these cases, utilize the exchange in parentheses.



WORKSHEET 1

ASSESSMENT OF RELEASE-MONITORED RELEASE

This attachment is to be used only if the TI-59 calculator program is not used. If the TI-59 is used, Worksheet 2 is to be used.

This attachment is used to determine the following:

- a) Estimated noble gas and iodine release and release rate;
 - b) The estimated whole body and thyroid gamma dose and dose rate at the EAB;
 - c) Classification of the release;
 - d) Projected whole body and thyroid gamma dose at the EAB; and
 - e) Recommended protective action for the general population.
1. Date/Time of beginning of release. _____
 2. Date/Time of ending of release. If release is still occurring, enter the Date/Time of the calculation. _____
 3. Hours between 1. and 2. _____
 4. Collect the following data:
 - a) Maximum CPM, RIS-7324-1:
(RR-93539, red pen) _____ cpm
 - b) Sensitivity, RIS-7324-1:
(I-14, 403-P7) _____ $\mu\text{Ci/cc/cpm}$
 - c) Maximum CPM, RIS-7324-2:
(RR-93539, blue pen) _____ cpm
 - d) Sensitivity, RIS-7324-2:
(I-14, 203-P7) _____ $\mu\text{Ci/cc/cpm}$
 - e) Maximum CPM/Min, RIS-73437-1: _____ cpm/min

NOTE: Maximum CPM/Min must be calculated as:

$$\left(\frac{\text{Maximum CPM} - \text{Initial or Intermediate CPM}}{\text{Elapsed Time (min)}} \right)$$

from strip chart.



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f) Sensitivity, RIS-73437-1: _____ $\mu\text{Ci/cc/cpm/min}$

g) Site Area Emergency Limit (as posted):

1) 6.6E-2 $\mu\text{Ci/cc}$ noble gas

2) 6.7E-5 $\mu\text{Ci/cc}^{131}\text{I}$

h) Ten Times Technical Specification Limits (as posted):

1) 2.5E-2 $\mu\text{Ci/cc}$ noble gas

2) 7.0E-8 $\mu\text{Ci/cc}^{131}\text{I}$

i) Exhaust Stack Flow (cfm):
(I-15, FI-7320) _____ cfm

j) Exhaust Stack Flow (cc/sec):
(Step 4i x 4.72E + 2) _____ cc/sec

k) Average Wind Speed
at 10 meters: _____ mph

l) Wind Direction
at 10 meters: From _____ Degrees

NOTE: North = 0° increasing
degrees - c.w.

m) Differential Temperature: _____ °F
Circle appropriate instrument

60m tower Reactor Building

5. Determine sectors affected using Site Sector Map.

(Figure 3) Sector(s) _____

6. Determine Stability Category using Table 5,
Step 4k), and 4m).

Stability Category _____

NOTE: Use proper column based on
whether 60m tower or reactor building
 ΔT instruments used.



Noble Gas Concentration

7. Calculate the exhaust stack noble gas concentration.

a) RIS-7324-1 concentration = (step 4a) x (step 4b)

$$= (\quad) \times (\quad)$$
$$= \quad \mu\text{Ci/cc}$$

b) RIS-7324-2 concentration = (step 4c) x (step 4d)

$$= (\quad) \times (\quad)$$
$$= \quad \mu\text{Ci/cc}$$

c) If either RIS-7324-1 or RIS-7324-2 is off-scale high, record the stack concentration as obtained by local, portable instrument (refer to HPP-56 or Attachment 2 for instructions).

Local Indicated Concentration = $\quad \mu\text{Ci/cc}$

d) Enter the highest of 7a), 7b), or 7c) $\quad \mu\text{Ci/cc}$

Noble Gas Release Rate

8. Calculate the Source Term, Q (i.e., Noble Gas Release Rate).

$$Q = (\text{step 7d}) \times (\text{step 4j}) \times (1 \text{ E } -6 \text{ Ci}/\mu\text{Ci})$$
$$= (\quad) \times (\quad) \times (1 \text{ E } -6)$$
$$= \quad \text{Ci/sec}$$



Classification of Event

9. Determine weighted noble gas dose conversion factor from Table 2. $7.5E+2$ $\frac{\text{Rem/hour}}{\text{Ci/m}^3}$

10. Determine the EAB dilution factor from Attachment 1 using the Stability Category (Step 6) and wind speed (Step 4k).

Dilution Factor = _____ sec/m^3

General Emergency Determination

11. Determine whole body dose rate at the EAB.

Dose Rate = (step 8) x (step 9) x (step 10)

= () x () x ()

= _____ Rem/hour

If the resulting dose rate at the EAB is ≥ 1 Rem/hour , the classification of the event is GENERAL EMERGENCY. Inform the Shift Supervisor of the General Emergency condition. Then go directly to Step 14 of this attachment.

Site Area Emergency Determination

12. Criteria for Site Emergency: If Step 7d) is greater than or equal to $6.0E-2$ $\mu\text{Ci/cc}$, the classification of the event is SITE AREA EMERGENCY. Inform the Shift Supervisor of the Site Emergency Condition. Then go directly to Step 14 of this attachment.

Radiological Alert Determination

13. Criteria for Radiological Alert: If Step 7d) is greater than or equal to ten times the Technical Specification limit $2.5E-2$ $\mu\text{Ci/cc}$ *, the classification of the event is RADIOLOGICAL ALERT. Inform the Shift Supervisor of the Radiological Alert Condition. Then proceed with Step 14.

*NOTE: Technical specification limit = $2.5E-3$ $\mu\text{Ci/cc}$
 $10 \times$ Technical Specification limit = $2.5E-2$ $\mu\text{Ci/cc}$,
as stated above.



Curies of Noble Gas Released

14. Calculate the curies of noble gas released to present time.

$$\begin{aligned}\text{Curies released} &= (\text{step 8}) \times (\text{step 3}) \times (3.6 \text{ E } +3 \text{ s/hr}) \\ &= (\quad) \times (\quad) \times (3.6 \text{ E } +3) \\ &= \underline{\hspace{2cm}} \text{ Curies}\end{aligned}$$

Accumulated Whole Body Gamma Dose at EAB

15. Calculate the dose received at the EAB.

$$\begin{aligned}\text{Dose} &= (\text{step 11}) \times (\text{step 3}) \\ &= (\quad) \times (\quad) \\ &= \underline{\hspace{2cm}} \text{ Rem}\end{aligned}$$

NOTE: This calculation assumes the recipient was at the EAB for the entire duration of the release.

Projections

16. If the release is continuing, consult with the Shift Supervisor and estimate the total number of hours the release will continue (i.e., from beginning to end). If the release has terminated, enter value from step 3.

Preliminary estimate of release hours hours.



17. Project the total whole body gamma dose at the EAB.

Projected dose at EAB = (step 11) x (step 16)

= () x ()

= _____ Rem

131 I Concentration

18. Calculate the exhaust stack ^{131}I concentration.

RIS-73437-1 concentration = (step 4e) x (step 4f)

= () x ()

= _____ $\mu\text{Ci/cc}$

131I and Total Radioiodine Release Rate

19. Calculate the source term Q (^{131}I release rate).

$Q = (\text{step 18}) \times (\text{step 4j}) \times (1 \text{ E } -6)$

= () x () x (1 E -6)

= _____ Ci/sec

20. Calculate Q_T for total radioiodine release.

$Q_T = (\text{step 19}) \times (1.05 \text{ E } + 2)^*$

= () x (1.05 E + 2)*

= _____ Ci/sec

* Ratio of total radioiodines to ^{131}I in design inventory.



Classification of Event

21. Determine weighted radiiodine dose conversion factor from Attachment 8. $\frac{5.3E+4 \text{ Rem/hour}}{\text{Ci/m}^3}$

General Emergency Determination

22. Determine the thyroid dose rate at the EAB.

$$\begin{aligned} \text{Dose Rate} &= (\text{step 20}) \times (\text{step 21}) \times (\text{step 10}) \\ &= (\quad) \times (\quad) \times (\quad) \\ &= \quad \text{Rem/hour} \end{aligned}$$

If the resulting dose rate at the EAB is ≥ 5 Rem/hour, the classification of the event is GENERAL EMERGENCY. Inform the Shift Supervisor of the General Emergency Condition. Then go directly to Step 25 of this attachment.

Site Area Emergency Determination

23. Criteria for Site Area Emergency: If Step 18 is great than or equal to $6.7E-5 \mu\text{Ci/cc}$, the classification of the event is SITE EMERGENCY. Inform the Shift Supervisor of the Site Emergency Condition. Then go directly to Step 25 of this attachment.

Radiological Alert Determination

24. Criteria for Radiological Alert: If Step 18 is greater than or equal to ten times the Technical Specification limit $7.0E-8 \mu\text{Ci/cc}^*$, the classification of the event is RADIOLOGICAL ALERT. Inform the Shift Supervisor of the Radiological Alert Condition. Then proceed with Step 25.

NOTE: Technical Specification Limit = $7.0E-9 \mu\text{Ci/cc}$
10x Technical Specification Limit = $7.0E-8 \mu\text{Ci/cc}$,
as stated above.



Curies of Radioiodine Released

25. Calculate the curies of radioiodine released to present time.

$$\begin{aligned}\text{Curies Released} &= (\text{step 20}) \times (\text{step 3}) \times (3.6 \text{ E } +3) \\ &= (\quad) \times (\quad) \times (3.6 \text{ E } +3) \\ &= \underline{\hspace{2cm}} \text{ curies}\end{aligned}$$

Accumulated Thyroid Dose at EAB

26. Calculate the dose received at the EAB.

$$\begin{aligned}\text{Dose} &= (\text{step 22}) \times (\text{step 3}) \\ &= (\quad) \times (\quad) \\ &= \underline{\hspace{2cm}} \text{ Rem}\end{aligned}$$

NOTE: This calculation assumes the recipient was at the EAB for the entire duration of the release.

Projections

27. If the release is continuing, consult with the Shift Supervisor and estimate the total number of hours the release will continue (i.e., from beginning to end). If the release has terminated, enter value from step 3.

Preliminary estimate of release hours hours.

28. Project the total thyroid dose at the EAB.

$$\begin{aligned}\text{Projected Dose at EAB} &= (\text{step 22}) \times (\text{step 27}) \\ &= (\quad) \times (\quad) \\ &= \underline{\hspace{2cm}} \text{ Rem}\end{aligned}$$



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29. Determine the recommended protective action for the general population based on the results of steps 17 and 28, refer to PERP-PAG.

30. The whole body gamma dose rate at the EAB is _____ Rem/hour
(step 11):

31. The classification of the event based on noble gases is (step 11 or step 12 or step 13): _____

32. The noble gas release rate is (step 8): _____ Ci/sec

33. The accumulated whole body gamma dose at the EAB is (step 15): _____ Rem

34. The total number of curies of noble gas release to the present time is (step 14): _____ Curies

35. The projected whole body gamma dose at the EAB is (step 17): _____ Rem

Based on projected release duration of (step 16): _____ hours

36. The thyroid dose rate at the EAB is (step 22): _____ Rem/hour

37. *The classification of the event based on radioiodines is (step 22 or step 23 or step 24): _____

38. The radioiodine release rate is (step 20): _____ Ci/sec

39. The accumulated thyroid dose at the EAB is (step 26): _____ Rem

40. The total number of curies of radioiodine released to the present time is (step 25): _____ Curies

41. The projected thyroid dose at the EAB is (step 28): _____ Rem

Based on projected release duration of (step 27): _____ hours

*If this classification differs from the classification in step 31, the higher (i.e., more severe) classification is to be used to determine recommended protective action.



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WORKSHEET 2

ASSESSMENT OF RELEASE USING TI-59 CALCULATOR PROGRAM-MONITORED RELEASE

This attachment is only to be used if the TI-59 calculator program is used. If the program is not used, use Worksheet 1.

This attachment is used to determine the following:

- a) Estimated noble gas and radioiodine release and release rate;
- b) Estimated whole body and thyroid gamma dose and dose rate at the EAB;
- c) Classification of the release;
- d) Projected whole body and thyroid gamma dose at the EAB; and
- e) Recommended protective action for the general population.

1. Collect the following data:

- a) Date/Time of beginning of release: _____
- b) Date/Time of ending of release. If release is still occurring, enter the Date/Time of the calculation: _____
- c) Hours between 1a) and 1b): _____ hours
(STO 11)
- d) Maximum CPM, RIS-7324-1:
(RR-93539, red pen) _____ cpm
(STO 03)
- e) Sensitivity RIS-7324-1:
(I-14, 403-P7) _____ $\mu\text{Ci/cc/cpm}$
(STO 04)
- f) Maximum CPM, RIS-7324-2:
(RR-93539, blue pen) _____ cpm
(STO 05)
- g) Sensitivity, RIS-7324-2:
(I-14, 203-P7) _____ $\mu\text{Ci/cc/cpm}$
(STO 06)

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*h) Maximum mR/hr, Cutie Pie-2520 Probe: _____ mR/hr
(STO 01)

*i) Maximum mR/hr, E-500-GM Probe _____ mR/hr
(STO 02)

j) Maximum CPM/MIN, RIS-73437-1: _____ cpm/min
(STO 07)

NOTE: Maximum CPM/Min must be calculated as:

(Maximum CPM - Initial or Intermediate CPM)
(_____ Elapsed Time (min) _____)

from strip chart.

k) Sensitivity, RIS-73437-1: _____ $\mu\text{Ci/cc/cpm/min}$
(STO 08)

l) Site Emergency Limit
(as posted): 1) 6.6E-2 $\mu\text{Ci/cc noble gas}$

2) 6.7E-5 $\mu\text{Ci/cc }^{131}\text{I}$

m) Ten Times Technical Specification
Limits (as posted): 1) 2.5E-2 $\mu\text{Ci/cc noble gas}$

2) 7.0E-8 $\mu\text{Ci/cc }^{131}\text{I}$

n) Exhaust Stack Flow (cfm):
(I-15, FI-7320) _____ cfm
(STO 09)

o) Average Wind Speed
at 10 meters: _____ mph

p) Wind Direction
at 10 meters:

NOTE: North = 0° increasing degrees-c.w. From _____ Degrees

q) Differential Temperature _____ °F
Circle appropriate instrument

60m Tower Reactor Building

* Steps 1h) and 1i) used only if RIS-7324-1 or RIS-7324-2
off-scale high.



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2. Determine sectors affected using Site Sector Map (Figure 3):

Sector(s) _____

3. Determine Stability Category using Table 5 and Steps 1o) and 1q).

Stability Category _____

NOTE: Use proper column based on whether
60m tower or reactor building
ΔT instruments used.

4. Determine the EAB dilution factor from Attachment 1 using the Stability Category (Step 3) and wind speed (Step 1o).

Dilution Factor _____

$\frac{\text{sec}}{\text{m}^3}$
(STO 10)

5. If the release is continuing, consult with the Shift Supervisor and estimate the total number of hours the release will continue (i.e., from beginning to end). If the release has terminated, enter value from step 1c).

Preliminary estimate of release hours _____ hours. (STO 12)



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6. Prepare the TI-59 for data entry.
 - a) Place TI-59 in printer/security cradle.
 - b) Plug in printer/security cradle.
 - c) Turn on printer/security cradle and TI-59.
 - d) Depress "TRACE" button on printer.
 - e) Obtain the magnetic card labeled "FSV Off-Site Dose Calculation (RERP) - Monitored Release."
 - f) Read magnetic card into TI-59.
 - 1) Depress |1| , |INV| , |2nd| , |WRITE| keys.
 - 2) Insert magnetic card into right side of TI-59. Card should be right side up with the "1" in the upper left-hand corner.
 - 3) "1" will be displayed if the card was read properly -continue with Step 7. If a flashing number is displayed, the card was not read properly. Obtain the other magnetic card with the same title and repeat Step 6f).



7. Input the necessary data into the indicated TI-59 storage registers.

a) Step 1c) = |STO| 11

b) Step 1d) = |STO| 03

c) Step 1e) = |STO| 04

d) Step 1f) = |STO| 05

e) Step 1g) = |STO| 06

f) Step 1h) = |STO| 01

g) Step 1i) = |STO| 02

h) Step 1j) = |STO| 07

i) Step 1k) = |STO| 08

j) Step 1n) = |STO| 09

k) Step 4) = |STO| 10

l) Step 5) = |STO| 12

8. Run Dose Assessment Program

a) Depress |R/S| key.

b) Wait until a number is displayed. A flashing number indicates improper execution of the program. Depress |CLR| and |RST| keys and repeat Steps 7 and 8.



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SUMMARY

9. a) The whole body gamma dose rate at the EAB is (RCL 19): _____ Rem/hour
- b) The classification of the event based on noble gases is: _____
- 1) If Step 10.a) ≥ 1 Rem/hour, GENERAL EMERGENCY.
- 2) If RCL 17 $\geq 6.6E-2$ $\mu\text{Ci/cc}$ (Step 1.1)1), SITE AREA EMERGENCY.
- 3) If RCL 17 $\geq 2.5E-2$ $\mu\text{Ci/cc}$ (Step 1.m)1) and $\leq 6.6E-2$ $\mu\text{Ci/cc}$, RADIOLOGICAL ALERT.
- c) The noble gas release rate is (RCL 18): _____ Ci/sec
- d) The accumulated whole body gamma dose at the EAB is (RCL 21): _____ Rem
- e) The total number of curies of noble gas released to the present time is (RCL 20): _____ Ci
- f) The projected whole body gamma dose at the EAB is (RCL 22): _____ Rem
- g) The thyroid dose rate at the EAB is (RCL 27): _____ Rem/hour



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*h) The classification of the event
based on radioiodines is: _____

- 1) If Step 10.g) ≥ 5 Rem/hour,
GENERAL EMERGENCY.
- 2) If RCL 23 $\geq 6.7E-5$ $\mu\text{Ci/cc}$
(Step 1.i)2),
SITE AREA EMERGENCY.
- 3) If RCL 23 $\geq 7.0E-8$ $\mu\text{Ci/cc}$
(Step 1.m)2) and
 $< 6.7E-5$ $\mu\text{Ci/cc}$,
RADIOLOGICAL ALERT.

i) The radioiodine release rate
is (RCL 26): _____ Ci/sec

j) The accumulated thyroid dose at
the EAB is (RCL 29): _____ Rem

k) The total number of curies of
radioiodine released to the
present time is (RCL 28): _____ Ci

l) The projected thyroid dose at
the EAB is (RCL 30): _____ Rem

Based on projected release duration
of (RCL 12): _____ hours

10. Determine the recommended protective action for the general
population based on RERP-PAG.

*If this classification differs from the classification in Step 10b),
the higher (i.e., more severe) classification is to be used to
determine recommended protective actions.



WORKSHEET 3

ASSESSMENT OF RELEASE-UNMONITORED RELEASE

This attachment is to be used only if the TI-59 calculator program is not used. If the TI-59 program is used, Worksheet 4 is to be used.

This attachment is used to determine the following due to an unmonitored release via the Reactor Building Louvers or the PCRV Relief Valves:

- a) Estimated whole body and thyroid gamma dose and dose rate at the EAB;
 - b) Classification of the release;
 - c) Projected whole body and thyroid gamma dose at the EAB; and
 - d) Recommended protective action for the general population.
1. Date/Time of beginning of release _____
 2. Date/Time of ending of release. If release is still occurring, enter the Date/Time of the calculation. _____
 3. Hours between 1. and 2. _____ hours
 4. Collect the following data:
 - a) Maximum CPM, RIS-9301:
(RR-93256, Pt. 10) _____ cpm
 - b) Sensitivity RIS-9301: _____ $\mu\text{Ci/cc/cpm}$
 - c) Primary coolant ^{131}I equivalent circulating inventory: _____ Ci
 - d) Primary coolant ^{131}I equivalent plateout inventory: _____ Ci
 - e) Primary Coolant Volume: _____ scc
 - f) Site Emergency Limit (as posted):
 - 1) $6.6\text{E-}2$ $\mu\text{Ci/cc}$ noble gas
 - 2) $6.7\text{E-}5$ $\mu\text{Ci/cc}^{131}\text{I}$
 - g) Ten times Technical Specification Limits (as posted):
 - 1) $2.5\text{E-}2$ $\mu\text{Ci/cc}$ noble gas



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2) 7.0E-8 $\mu\text{Ci/cc } ^{131}\text{I}$

h) Average Wind Speed
at 10 meters: _____ mph

i) Wind Direction
at 10 meters: From _____ Degrees

NOTE: North = 0° increasing degrees - c.w.

j) Differential Temperature _____ °F
Circle instrument used:

60m tower Reactor Building

5. Determine sectors affected using Site Sector Map
(Figure 3):

Sector(s) _____

6. Determine Stability Category using Table 5,
Step 4i and Step 4j:

Stability Category _____

NOTE: Use proper column based on whether
60m tower or reactor building
 ΔT instruments used.

7. Calculate the release noble gas concentration:

$$\begin{aligned}\text{RIS-9301 concentration} &= (\text{step 4a}) \times (\text{step 4b}) \\ &= (\quad) \times (\quad) \\ &= \text{_____} \mu\text{Ci/cc}\end{aligned}$$

8. Calculate the source term, Q_{ng} (noble gas release rate):

a) Reactor Building Louvers

$$\begin{aligned}Q_{ng} &= (\text{step 7}) \times (5.8 \text{ E } +7)^* \times (1 \text{ E } -6 \text{ Ci/pci}) \\ &= (\quad) \times (5.8 \text{ E } +7)^* \times (1 \text{ E } -6) \\ &= \text{_____} \text{ Ci/sec}\end{aligned}$$

*Release rate (cc/sec) from louvers (FSAR, Section 14.11.2.6).



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b) PCR Safety Valves

$$\begin{aligned} Q_{ng} &= (\text{step 7}) \times (1.9 \text{ E } +7)^{**} \times (1 \text{ E } -6) \\ &= (\quad) \times (1.9 \text{ E } +7)^{**} \times (1 \text{ E } -6) \\ &= \text{_____ Ci/sec} \end{aligned}$$

**Release rate (cc/sec) from both PCR safety valves (FSAR, Section 6.8).

Classification of Event

9. Determine weighted noble gas dose conversion factor from Table 2:

$$\frac{7.5\text{E}+2 \text{ Rem/hour}}{\text{Ci/m}^3}$$

10. Determine the EAB atmospheric dilution factor from Attachment 1 using Steps 6 and 4h:

$$\text{Dilution Factor} \text{ _____ sec/m}^3$$

General Emergency Determination

11. Determine the whole body dose rate at the EAB:

a) Reactor Building Louvers

$$\begin{aligned} \text{Dose Rate} &= (\text{step 8a}) \times (\text{step 9}) \times (\text{step 10}) \\ &= (\quad) \times (\quad) \times (\quad) \\ &= \text{_____ Rem/hour} \end{aligned}$$

b) PCR Safety Valves

$$\begin{aligned} \text{Dose Rate} &= (\text{step 8b}) \times (\text{step 9}) \times (\text{step 10}) \\ &= (\quad) \times (\quad) \times (\quad) \\ &= \text{_____ Rem/hour} \end{aligned}$$

12. If the resulting dose rate at the EAB is ≥ 1 Rem/hour, the classification of the event is GENERAL EMERGENCY. Inform the Shift Supervisor of the General Emergency Condition. Then go directly to Step 15.



Site Area Emergency Determination

13. If Step 8a. or 8b. is greater than or equal to $9.6E-1$ Ci/sec, the classification of event is SITE AREA EMERGENCY. Inform the Shift Supervisor of the Site Area Emergency Condition. Then go directly to Step 15.

Radiological Alert Determination

14. If Step 8a. or 8b. is greater than or equal to ten times the Technical Specification limit $3.7E-1$ Ci/sec, the classification of the event is RADIOLOGICAL ALERT. Inform the Shift Supervisor of the Radiological Alert Condition. Then proceed with Step 15.

NOTE: Technical Specification Limit = $3.7E-2$ Ci/sec.
10x Technical Specification Limit = $3.7E-1$ Ci/cc,
as stated above

Curies of Noble Gas Released

15. Calculate the curies of noble gas released to present time.

- a) Reactor Building Louvers

$$\begin{aligned}\text{Curies Released} &= (\text{step 8a}) \times (\text{step 3}) \times (3.6 E +3) \\ &= (\quad) \times (\quad) \times (3.6 E +3) \\ &= \underline{\hspace{2cm}} \text{Curies}\end{aligned}$$

- b) PCRV Safety Valves

$$\begin{aligned}\text{Curies Released} &= (\text{step 8b}) \times (\text{step 3}) \times (3.6 E +3) \\ &= (\quad) \times (\quad) \times (3.6 E +3) \\ &= \underline{\hspace{2cm}} \text{Curies}\end{aligned}$$



Accumulated Whole Body Gamma Dose at EAB

16. Calculate the dose received at the EAB.

a) Reactor Building Louvers

$$\text{Dose} = (\text{step 11a}) \times (\text{step 3})$$

$$= (\quad) \times (\quad)$$

$$= \quad \text{Rem}$$

b) PCRV Safety Valves

$$\text{Dose} = (\text{step 11b}) \times (\text{step 3})$$

$$= (\quad) \times (\quad)$$

$$= \quad \text{Rem}$$

NOTE: This calculation assumes the recipient was at the EAB for the entire duration of the release.

Projections

17. If the release is continuing, consult with the Shift Supervisor and estimate the total number of hours the release will continue (i.e., from beginning to end). If the release has terminated, enter value from step 3.

Preliminary estimate of release hours hour(s).

18. Project the total whole body gamma dose at the EAB.

a) Reactor Building Louvers

$$\text{Projected Dose at EAB} = (\text{step 11a}) \times (\text{step 17})$$

$$= (\quad) \times (\quad)$$

$$= \quad \text{Rem}$$



b) PCRV Safety Valves

Projected Dose at EAB = (step 11b) x (step 17)

= () x ()

= _____ Rem

19. Calculate the release ^{131}I equivalent concentration (Reactor Building Louvers or PCRV Safety Valves).

 ^{131}I Equivalent Concentration =(step 4c) + (step 4d) x (5.7 E -3) ^{***} + (step 4e)= () + () x (5.7 E -3) ^{***} + ()

= _____ Ci/cc

***Amount of plateout ^{131}I equivalent released (FSAR, Section 14.11.2.7-1).

20. Calculate the source term, Q (^{131}I equivalent release rate).

a) Reactor Building Louvers

Q = (step 19) x (5.8 E +7)

= () x (5.8 E +7)

= _____ Ci/sec

b) PCRV Safety Valves

Q = (step 19) x (1.9 E + 7)

= () x (1.9 E +7)

= _____ Ci/sec

Classification of Event

21. Determine ^{131}I dose conversion factor from Attachment 8.

 $\frac{1.2\text{E}+6 \text{ Rem/hour}}{\text{Ci/m}^3}$



22. Determine the thyroid dose rate at the EAB.

a) Reactor Building Louvers

$$\text{Dose Rate} = (\text{step 20a}) \times (\text{step 21}) \times (\text{step 10})$$

$$= (\quad) \times (\quad) \times (\quad)$$

$$= \underline{\hspace{2cm}} \text{ Rem/hour}$$

b) PCRV Safety Valves

$$\text{Dose Rate} = (\text{step 20b}) \times (\text{step 21}) \times (\text{step 10})$$

$$= (\quad) \times (\quad) \times (\quad)$$

$$\underline{\hspace{2cm}} \text{ Rem/hour}$$

General Emergency Determination

23. If the resulting dose rate at the EAB is ≥ 5 Rem/hour, the classification of the event is GENERAL EMERGENCY. Inform the Shift Supervisor of the General Emergency Condition. Then go directly to Step 26 of this attachment.

Site Area Emergency Determination

24. If Step 20a. or 20b. is greater than or equal to $9.8\text{E-}4$ Ci/sec, the classification of the event is SITE AREA EMERGENCY. Inform the Shift Supervisor of the Site Area Emergency Condition. Then go directly to Step 26 of this attachment.

Radiological Alert Determination

25. If Step 19 is greater than or equal to ten times the Technical Specification limit $1.0\text{E-}7$ Ci/sec, the classification of the event is RADIOLOGICAL ALERT. Inform the Shift Supervisor of the Radiological Alert Condition. Then proceed with Step 26.

NOTE: Technical Specification Limit = $1.0\text{E-}8$ Ci/cc
 $10 \times$ Technical Specification Limit = $1.0\text{E-}7$ Ci/cc,
as stated above.



Curies of ^{131}I Equivalent Released

26. Calculate the curies of ^{131}I equivalent released to present time.

a) Reactor Building Louvers

$$\begin{aligned}\text{Curies Released} &= (\text{step 20a}) \times (\text{step 3}) \times (3.6 \text{ E } +3 \text{ s/hr}) \\ &= (\quad) \times (\quad) \times (3.6 \text{ E } +3) \\ &= \underline{\hspace{2cm}} \text{ Curies}\end{aligned}$$

b) PCRV Safety Valves

$$\begin{aligned}\text{Curies Released} &= (\text{step 20b}) \times (\text{step 3}) \times (3.6 \text{ E } +3) \\ &= (\quad) \times (\quad) \times (3.6 \text{ E } +3) \\ &= \underline{\hspace{2cm}} \text{ Curies}\end{aligned}$$

Accumulated Thyroid Dose at EAB

27. Calculate the dose received at the EAB.

a) Reactor Building Louvers

$$\begin{aligned}\text{Dose} &= \\ &= (\text{step 22a}) \times (\text{step 3}) \\ &= \underline{\hspace{2cm}} \text{ Rem}\end{aligned}$$

b) PCRV Safety Valves

$$\begin{aligned}\text{Dose} &= (\text{step 22b}) \times (\text{step 3}) \\ &= (\quad) \times (\quad) \\ &= \underline{\hspace{2cm}} \text{ Rem}\end{aligned}$$

NOTE: This calculation assumes the recipient was at the EAB for the entire duration of the release.



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Projections

28. If the release is continuing, consult with the Shift Supervisor and estimate the total number of hours the release will continue (i.e., from beginning to end). If the release has terminated, enter value from step 3.

Preliminary estimate of release hours _____ hour(s).

29. Project the total thyroid dose at the EAB.

a) Reactor Building Louvers

Projected Dose at EAB = (step 22a) x (step 28)

= () x ()

= _____ Rem

b) PCRV Safety Valves

Projected Dose at EAB = (step 22b) x (step 28)

= () x ()

= _____ Rem

30. Determine the recommended protective action for the general population based on the results of Steps 18 and 29. Refer to RERP-PAG.

Summary

31. The whole body gamma dose rate at the EAB is (Step 11a or 11b): _____ Rem/hr
32. The classification of the event based on noble gases is (Step 12 or Step 13 or Step 14): _____
33. The noble gas release rate is (Step 8a or 8b): _____ Ci/sec



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34. The accumulated whole body gamma dose at the EAB is (Step 16a or 16b): _____ Rem
35. The total number of curies of noble gas released to the present time is (Step 15a or 15b): _____ Curies
36. The projected whole body gamma dose at the EAB is (Step 18a or 18b): _____ Rem
37. Based on projected release duration of (Step 17): _____ hours
38. The thyroid dose rate at the EAB is (Step 22a or 22b): _____ Rem/hour
39. *The classification of the event based on ^{131}I equivalent is (Step 23 or Step 24 or Step 25): _____
40. The ^{131}I equivalent release rate is (Step 20a or 20b): _____ Ci/sec
41. The accumulated thyroid dose at the EAB is (Step 27a or 27b): _____ Rem
42. The total number of curies of ^{131}I equivalent released to the present time is (Step 26a or 26b): _____ Curies
43. The projected thyroid dose at the EAB is (Step 29a or 29b): _____ Rem
- Based on projected release duration of (Step 28): _____ hours

*If this classification differs from the classification in Step 31, the higher (i.e., more severe) classification is to be used to determine recommended protective action.



WORKSHEET 4

ASSESSMENT OF RELEASE USING TI-59 CALCULATOR PROGRAM-UNMONITORED RELEASE

This attachment is only to be used if the TI-59 calculator program is used. If the program is not used, use Worksheet 3.

This attachment is used to determine the following due to an unmonitored release via the Reactor Building Louvers or the PCRV Relief Valves:

- a) Estimated whole body and thyroid gamma dose and dose rates at the EAB;
- b) Classification of the release;
- c) Projected whole body and thyroid gamma dose at the EAB; and
- d) Recommended protective action for the general population.

1. Collect the following data:

- a) Date/Time of beginning of release: _____
- b) Date/Time of ending of release. If release is still occurring, enter the Date/Time of the calculation: _____
- c) Hours between 1a) and 1b): _____ hours
(STO 07)
- d) Maximum CPM, PIS-9301:
(RR-93256, Pt. 10) _____ cpm
(STO 01)
- e) Sensitivity RIS-9301: _____ $\mu\text{Ci/cc/cpm}$
(STO 02)
- f) Primary Coolant ^{131}I equivalent circulating inventory: (posted) _____ Ci
(STO 03)
- g) Primary Coolant ^{131}I equivalent plateout inventory: (posted) _____ Ci
(STO 04)
- h) Primary Coolant Volume: (posted) _____ cc
(STO 05)



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i) Site Emergency Limit: (posted) 1) 6.6E-2 $\mu\text{Ci/cc}$ noble gas

2) 6.7E-5 $\mu\text{Ci/cc}$ ^{131}I

j) Ten Times Technical Specification Limits (posted):

1) 2.5E-2 $\mu\text{Ci/cc}$ noble gas

2) 7.0E-8 $\mu\text{Ci/cc}$ ^{131}I

k) Average Wind Speed at 10 meters:

_____ mph

l) Wind Direction at 10 meters:

NOTE: North = 0° increasing degrees-c.w. From _____ Degrees

m) Differential Temperature Circle instrument used

_____ $^\circ\text{F}$

60m Tower Reactor Building

2. Determine sectors affected using Site Sector Map (Figure 3):

Sector(s) _____

3. Determine Stability Category using Table 5 and Steps 1.1) and 1.m).

Stability Category _____

NOTE: Use proper column based on whether 60m tower or reactor building ΔT instruments used.

4. Determine the EAB dilution factor from Attachment 1 using the Stability Category (Step 3) and wind speed (Step 1k).

Dilution Factor _____

sec/m^3
(STO 06)



5. If the release is continuing, consult with the Shift Supervisor and estimate the total number of hours the release will continue (i.e., from beginning to end). If the release has terminated, enter value from step 1.c).

Preliminary estimate of release hours _____ hours. (STO 08)

6. Prepare the TI-59 for data entry.
- a) Place TI-59 in printer/security cradle.
 - b) Plug in printer/security cradle.
 - c) Turn on printer/security cradle and TI-59.
 - d) Depress "TRACE" button on printer.
 - e) Obtain the magnetic card labeled "FSV Off-Site Dose Calculation (RERP) - Unmonitored Release."
 - f) Read magnetic card into TI-59.
 - 1) Depress |1| , |INV| , |2nd| , |WRITE| keys.
 - 2) Insert magnetic card into right side of TI-59. Card should be right side up with the "1" in the upper left-hand corner.
 - 3) "1" will be displayed if the card was read properly - continue with Step 6f)4). If a flashing number is displayed, the card was not read properly. Obtain the other magnetic card with the same title and repeat Step 6f).
 - 4) Depress |2| , |INV| , |2nd| , |WRITE| keys.
 - 5) Insert card into right side of TI-59. Card should be upside down with the "2" in the lower left-hand corner.
 - 6) "2" will be displayed if the card was read properly - continue with Step 7. If a flashing number is displayed, the card was not read properly. Obtain the other magnetic card with the same title and repeat Step 6f).



7. Input the necessary data into the indicated TI-59 storage registers.

a) Step 1c) = |STO| 07

b) Step 1d) = |STO| 01

c) Step 1e) = |STO| 02

d) Step 1f) = |STO| 03

e) Step 1g) = |STO| 04

f) Step 1h) = |STO| 05

g) Step 4 = |STO| 06

h) Step 5 = |STO| 08

8. Run Dose Assessment Program.

a) Depress |R/S| key.

b) Wait until a number is displayed. A flashing number indicates improper execution of the program. Depress |CLR| and |RST| keys and repeat Steps 7 and 8.



SUMMARY

9. a) The release path is: _____
- 1) Reactor Building Louvers
- 2) PCRV Reliefs
- b) The whole body gamma dose at the EAB is (RCL 12 for louvers, RCL 13 for reliefs). _____ rem/hour
- c) The classification of the event based on noble gases is: _____
- 1) If Step 10b) ≥ 1 Rem/hour, GENERAL EMERGENCY.
- 2) If Step 10c) $\geq 9.6E-1$ Ci/sec SITE AREA EMERGENCY.
- 3) If Step 10c) $\geq 3.7E-1$ Ci/sec and $\leq 9.6E-1$ Ci/sec, RADIOLOGICAL ALERT.
- 4) If RCL 11 $\geq 9.6E-1$ Ci/sec, SITE AREA EMERGENCY.
- 5) If RCL 11 $> 3.7E-1$ Ci/sec and $< 9.6E-1$ Ci/sec, RADIOLOGICAL ALERT.
- e) The accumulated whole body gamma dose at the EAB is (RCL 16 for louvers, RCL 17 for reliefs): _____ Rem
- f) The total number of curies of noble gas released to the present time is (RCL 14 for louvers, RCL 15 for reliefs): _____ Ci
- g) The projected whole body gamma dose at the EAB is (RCL 18 for louvers, RCL 19 for reliefs): _____ Rem
- Based on a projected release duration of (RCL 08): _____ hours



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h) The thyroid dose rate at the EAB
is (RCL 24 for louvers, RCL 25
for reliefs): _____ Rem/hour

i) The ^{131}I equivalent release rate is
(RCL 22 for louvers, RCL 23
for reliefs): _____ Ci/sec

*j) The classification of the event
based on ^{131}I equivalent is: _____

- 1) If Step 10h) ≥ 5 Rem/hour,
GENERAL EMERGENCY.
- 2) If Step 10i) $\geq 9.8\text{E-}4$ Ci/sec
SITE AREA EMERGENCY
- 3) If Step 10i) $\geq 1.0\text{E-}7$ Ci/sec
and $< 9.8\text{E-}4$ Ci/sec
RADIOLOGICAL ALERT.

k) The accumulated thyroid dose at the EAB
is (RCL 28 for louvers, RCL 29 for
reliefs): _____ Rem

l) The total number of curies of ^{131}I
equivalent released to the present
time is (RCL 26 for louvers,
RCL 27 for reliefs): _____ Ci

m) The projected thyroid dose at the EAB
is (RCL 30 for louvers, RCL 31
for reliefs): _____ Rem

Based on projected release duration
of (RCL 08): _____ hours

10. Determine the recommended protective action for the general
population. Refer to RERP-PAG.

*If this classification differs from the classification in Step 10b),
the higher (i.e., more severe) classification is to be used to
determine recommended protective actions.

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Work/Datasheet/Checklist Control List

<u>Worksheet No.</u>	<u>Title</u>	<u>Number Copies</u>
----------------------	--------------	----------------------

1	Monitored Release Calculations (Manual)	5
2	Monitored Release Calculations (TI-59)	5
3	Unmonitored Release Calculations (Manual)	2
4	Unmonitored Release Calculations (TI-59)	2

<u>Datasheet No.</u>		
----------------------	--	--

1	Datalogger Monitored Release	5
2	Datalogger Unmonitored Release	2
3	Preliminary Assessment of Plant Conditions	2

<u>Checklist No.</u>		
----------------------	--	--

1	Emergency Coordinator/Control Room Director Checklist	2
2	Datalogger Monitored Release	5
3	Plant Management Contact List	2

<u>Attachment No.</u>		
-----------------------	--	--

1	Notification of Unusual Event	2
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FORMS USE REPORTING SHEET

Technical Clerk and Recorder:

This sheet is being transmitted to report use of forms from a controlled copy of the Radiological Emergency Response Plan Implementing Procedures, BOOK NO. _____, located at _____ . The following forms have been utilized from this copy:

Worksheet Numbers

Copies Used

Datasheet Numbers

Copies Used

Checklist Numbers

Copies Used

The procedure affected by this sheet is shown in the header to this page, unless otherwise noted below in the comments to this reporting form. When this form is received, it will be necessary to replace the noted number of forms, as well as this "Forms Use Reporting Sheet" for the affected procedure in the affected book.



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FORMS USE REPORTING SHEET(Continued)

COMMENTS

Reported By: _____

Date: _____

Technical Clerk and Recorder _____ *

Date Received _____

Date Replaced _____

* Technical Clerk and Recorder will transmit this form to the originating individual/department upon completion of this form to notify users that the procedure has been updated and that all worksheets, checklists, and datasheets are present in the required number of copies.



WORKSHEET 1

ASSESSMENT OF RELEASE-MONITORED RELEASE

This attachment is to be used only if the TI-59 calculator program is not used. If the TI-59 is used, Worksheet 2 is to be used.

This attachment is used to determine the following:

- a) Estimated noble gas and iodine release and release rate;
 - b) The estimated whole body and thyroid gamma dose and dose rate at the EAB;
 - c) Classification of the release;
 - d) Projected whole body and thyroid gamma dose at the EAB; and
 - e) Recommended protective action for the general population.
1. Date/Time of beginning of release. _____
 2. Date/Time of ending of release. If release is still occurring, enter the Date/Time of the calculation. _____
 3. Hours between 1. and 2. _____
 4. Collect the following data:
 - a) Maximum CPM, RIS-7324-1: (RR-93539, red pen) _____ cpm
 - b) Sensitivity, RIS-7324-1: (I-14, 403-P7) _____ $\mu\text{Ci/cc/cpm}$
 - c) Maximum CPM, RIS-7324-2: (RR-93539, blue pen) _____ cpm
 - d) Sensitivity, RIS-7324-2: (I-14, 203-P7) _____ $\mu\text{Ci/cc/cpm}$
 - e) Maximum CPM/Min, RIS-73437-1: _____ cpm/min

NOTE: Maximum CPM/Min must be calculated as:

$$\frac{(\text{Maximum CPM} - \text{Initial or Intermediate CPM})}{(\text{Elapsed Time (min)})}$$

from strip chart.



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f) Sensitivity, RIS-73437-1: _____ $\mu\text{Ci/cc/cpm/min}$

g) Site Area Emergency Limit (as posted):

1) 6.6E-2 $\mu\text{Ci/cc}$ noble gas

2) 6.7E-5 $\mu\text{Ci/cc}^{131}\text{I}$

h) Ten Times Technical Specification Limits (as posted):

1) 2.5E-2 $\mu\text{Ci/cc}$ noble gas

2) 7.0E-8 $\mu\text{Ci/cc}^{131}\text{I}$

i) Exhaust Stack Flow (cfm):
(I-15, FI-7320) _____ cfm

j) Exhaust Stack Flow (cc/sec):
(Step 4i x 4.72E + 2) _____ cc/sec

k) Average Wind Speed
at 10 meters: _____ mph

l) Wind Direction
at 10 meters: From _____ Degrees

NOTE: North = 0° increasing
degrees - c.w.

m) Differential Temperature: _____ °F
Circle appropriate instrument

60m tower Reactor Building

5. Determine sectors affected using Site Sector Map.

(Figure 3) Sector(s) _____

6. Determine Stability Category using Table 5,
Step 4k), and 4m).

Stability Category _____

NOTE: Use proper column based on
whether 60m tower or reactor building
 ΔT instruments used.



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Noble Gas Concentration

7. Calculate the exhaust stack noble gas concentration.

a) RIS-7324-1 concentration = (step 4a) x (step 4b)
= () x ()
= _____ $\mu\text{Ci/cc}$

b) RIS-7324-2 concentration = (step 4c) x (step 4d)
= () x ()
= _____ $\mu\text{Ci/cc}$

c) If either RIS-7324-1 or RIS-7324-2 is off-scale high, record the stack concentration as obtained by local, portable instrument (refer to HPP-56 or Attachment 2 for instructions).

Local Indicated Concentration = _____ $\mu\text{Ci/cc}$

d) Enter the highest of 7a), 7b), or 7c) _____ $\mu\text{Ci/cc}$

Noble Gas Release Rate

8. Calculate the Source Term, Q (i.e., Noble Gas Release Rate).

$$\begin{aligned} Q &= (\text{step 7d}) \times (\text{step 4j}) \times (1 \text{ E } -6 \text{ Ci}/\mu\text{Ci}) \\ &= () \times () \times (1 \text{ E } -6) \\ &= _____ \text{ Ci/sec} \end{aligned}$$



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Classification of Event

9. Determine weighted noble gas dose conversion factor from Table 2. $\frac{7.5E+2 \text{ Rem/hour}}{\text{Ci/m}^3}$
10. Determine the EAB dilution factor from Attachment 1 using the Stability Category (Step 6) and wind speed (Step 4k). Dilution Factor = _____ sec/m^3

General Emergency Determination

11. Determine whole body dose rate at the EAB.

$$\begin{aligned} \text{Dose Rate} &= (\text{step 8}) \times (\text{step 9}) \times (\text{step 10}) \\ &= (\quad) \times (\quad) \times (\quad) \\ &= \text{_____ Rem/hour} \end{aligned}$$

If the resulting dose rate at the EAB is ≥ 1 Rem/hour, the classification of the event is GENERAL EMERGENCY. Inform the Shift Supervisor of the General Emergency condition. Then go directly to Step 14 of this attachment.

Site Area Emergency Determination

12. Criteria for Site Emergency: If Step 7d) is greater than or equal to $6.6E-2 \mu\text{Ci/cc}$, the classification of the event is SITE AREA EMERGENCY. Inform the Shift Supervisor of the Site Emergency Condition. Then go directly to Step 14 of this attachment.

Radiological Alert Determination

13. Criteria for Radiological Alert: If Step 7d) is greater than or equal to ten times the Technical Specification limit $2.5E-2 \mu\text{Ci/cc}^*$, the classification of the event is RADIOLOGICAL ALERT. Inform the Shift Supervisor of the Radiological Alert Condition. Then proceed with Step 14.

*NOTE: Technical specification limit = $2.5E-3 \mu\text{Ci/cc}$
 $10 \times$ Technical Specification limit = $2.5E-2 \mu\text{Ci/cc}$,
as stated above.



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Curies of Noble Gas Released

14. Calculate the curies of noble gas released to present time.

$$\begin{aligned}\text{Curies released} &= (\text{step 8}) \times (\text{step 3}) \times (3.6 \text{ E } +3 \text{ s/hr}) \\ &= (\quad) \times (\quad) \times (3.6 \text{ E } +3) \\ &= \underline{\hspace{2cm}} \text{ Curies}\end{aligned}$$

Accumulated Whole Body Gamma Dose at EAB

15. Calculate the dose received at the EAB.

$$\begin{aligned}\text{Dose} &= (\text{step 11}) \times (\text{step 3}) \\ &= (\quad) \times (\quad) \\ &= \underline{\hspace{2cm}} \text{ Rem}\end{aligned}$$

NOTE: This calculation assumes the recipient was at the EAB for the entire duration of the release.

Projections

16. If the release is continuing, consult with the Shift Supervisor and estimate the total number of hours the release will continue (i.e., from beginning to end). If the release has terminated, enter value from step 3.

Preliminary estimate of release hours hours.



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17. Project the total whole body gamma dose at the EAB.

$$\begin{aligned}\text{Projected dose at EAB} &= (\text{step 11}) \times (\text{step 16}) \\ &= (\quad) \times (\quad) \\ &= \text{_____ Rem}\end{aligned}$$

131 I Concentration

18. Calculate the exhaust stack ^{131}I concentration.

$$\begin{aligned}\text{RIS-73437-1 concentration} &= (\text{step 4e}) \times (\text{step 4f}) \\ &= (\quad) \times (\quad) \\ &= \text{_____ } \mu\text{Ci/cc}\end{aligned}$$

131I and Total Radioiodine Release Rate

19. Calculate the source term Q (^{131}I release rate).

$$\begin{aligned}Q &= (\text{step 18}) \times (\text{step 4j}) \times (1 \text{ E } -6) \\ &= (\quad) \times (\quad) \times (1 \text{ E } -6) \\ &= \text{_____ Ci/sec}\end{aligned}$$

20. Calculate Q_T for total radioiodine release.

$$\begin{aligned}Q_T &= (\text{step 19}) \times (1.05 \text{ E } + 2)^* \\ &= (\quad) \times (1.05 \text{ E } + 2)^* \\ &= \text{_____ Ci/sec}\end{aligned}$$

* Ratio of total radioiodines to ^{131}I in design inventory.



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Classification of Event

21. Determine weighted radioiodine dose conversion factor from Attachment 8. $5.3E+4$ $\frac{\text{Rem/hour}}{\text{Ci/m}^3}$

General Emergency Determination

22. Determine the thyroid dose rate at the EAB.

$$\begin{aligned}\text{Dose Rate} &= (\text{step 20}) \times (\text{step 21}) \times (\text{step 10}) \\ &= (\quad) \times (\quad) \times (\quad) \\ &= \quad \text{Rem/hour}\end{aligned}$$

If the resulting dose rate at the EAB is ≥ 5 Rem/hour, the classification of the event is GENERAL EMERGENCY. Inform the Shift Supervisor of the General Emergency Condition. Then go directly to Step 25 of this attachment.

Site Area Emergency Determination

23. Criteria for Site Area Emergency: If Step 18 is great than or equal to $6.7E-5$ $\mu\text{Ci/cc}$, the classification of the event is SITE EMERGENCY. Inform the Shift Supervisor of the Site Emergency Condition. Then go directly to Step 25 of this attachment.

Radiological Alert Determination

24. Criteria for Radiological Alert: If Step 18 is greater than or equal to ten times the Technical Specification limit $7.0E-8$ $\mu\text{Ci/cc}^*$, the classification of the event is RADIOLOGICAL ALERT. Inform the Shift Supervisor of the Radiological Alert Condition. Then proceed with Step 25.

NOTE: Technical Specification Limit = $7.0E-9\mu\text{Ci/cc}$
 $10 \times$ Technical Specification Limit = $7.0E-8\mu\text{Ci/cc}$,
as stated above.