NUCLEAR FUEL DIVISION
PLANT PROCEDURE

COLUMBIA SITE EMERGENCY PROCEDURE

SUBJECT: PREPARATION AND REVISION OF EMERGENCY PROCEDURES

PROCEDURE: CSEP-0001

RESPONSIBLE DEPARTMENT: REGULATORY COMPLIANCE

REVISION: 0

EFFECTIVE DATE:

WP #0291E

PURPOSE

To define the mechanism and responsibilities for the preparation and periodic review and updating of emergency procedures and documents which implement the policy set forth in the Columbia Site Emergency Plan.

SCOPE

Due to general nature of the plan, more specific procedures must be supplied in the form of implementing procedures to all concerned personnel. This procedure is intended to provide specific information for:

1) Identification of required procedures

2) Review and approval of procedures

3) Maintenance of existing procedures including distibution and updating

4) Periodic review of all procedures.

PROCEDURE

1. Identification of Required Procedures

   All personnel involved in emergency planning and response have a responsibility to aid in identification of procedural deficiencies in the emergency plan and preparation of new procedures.

2. Review and Approval of Procedures

   The Manager of Regulatory Compliance is responsible to designate those persons who should review and approve each implementing procedure whether new or revised.

3. Maintenance of Procedures

   Manager of Radiological Environmental Engineering is responsible for listing all persons having a controlled set of procedures, and for issuing new or revised procedures including a "Listing of Procedures."

4. Periodic Procedure Review

   All emergency procedures are to be reviewed annually to assure they are still valid and up-to-date.

COLUMBIA SITE EMERGENCY PROCEDURE

SUBJECT: PREPARATION AND REVISION OF EMERGENCY PROCEDURES

PROCEDURE: CSEP-0001

RESPONSIBLE DEPARTMENT: REGULATORY COMPLIANCE

REVISION: 0

EFFECTIVE DATE:

WP #0291E

5. Emergency Evacuation Log Book

The senior Conversion Area supervisor will maintain the emergency evacuation log book. The Regulatory Compliance group will review the log to assure the record is maintained.

NUCLEAR FUEL DIVISION	subject: COLUMBIA SITE EMERGENCY PROCEDURE RELEASE OF TOXIC FUMES OR VAPOR	procedure: 0002
PLANT PROCEDURE	effective date	responsible department: SAFETY DEPARTMENT	revision: 0
		page: 1 of 1

1.0 PURPOSE

This procedure defines the necessary steps to be taken in the event of a release of toxic fumes or vapors.

2.0 SCOPE

In the event that toxic fumes or vapors are released, certain measures will be taken to protect plant personnel. Evacuation of an area or the entire plant may be necessary depending on the severity of the release. After the area has been properly cleared of toxic fumes or vapors, personnel may be allowed to return to work.

3.0 PROCEDURE

3.1 When a release of toxic fumes or vapors is evident, supervisory personnel shall notify all personnel to evacuate this area. If a general evacuation is deemed necessary, proper management will be notified of this action.

3.2 Exhaust ventilation systems which do not recyle the air, can be used to reduce toxic vapors or fumes if this would not endanger the environment; e.g., explosive atmosphere.

3.3 Only the persons who are essential to evaluating and controlling the release of material will be permitted into the area.

3.4 Persons who are evaluating the problem or who are to shut off equipment in the area must wear self-contained breathing apparatus. These persons must be trained in the use of such equipment.

4.0 RECORDS

A history of what happened, cause or probable cause, employes exposed to amounts greater than the Threshold Limit Value (TLV) of the chemical, and remedial actions taken shall be compiled by the area supervisor(s) and forwarded to the Safety Department

5.0 TERMINATION OF HAZARD

Upon evaluation of the situation and after the area has been determined to be cleared of the toxic fumes or vapors, the Safety Section, or their designee, will authorize reentry and return to work. If there is a concurrent radioactive material release, the Health Physics Department must also release the area.

NUCLEAR FUEL DIVISION
PLANT PROCEDURE

COLUMBIA SITE EMERGENCY PROCEDURE

SUBJECT: COLUMBIA SITE EMERGENCY PROCEDURE FIRE CONTROL

PROCEDURE: CSEP-0003

RESPONSIBLE DEPARTMENT: SAFETY DEPARTMENT

REVISION: 0

EFFECTIVE DATE:
WP #0306E:3

PURPOSE

This procedure defines methods of seeking help, fire control measures, and a means of alerting personnel to the situation.

SCOPE

In the event of a fire, various means would be used to alert the fire brigade and plant personnel that a fire was occurring. Alarms would be sounded over the entire site and firefighting equipment within the facility could be activated. Additionally, the site emergency brigade would respond; and if necessary, offsite firefighting support would be requested. Evacuation of the plant may be necessary.

FIRE CALL BOXES AND FIRE ALARMS

Fire call boxes are located throughout the plant. These call boxes will be used to send an alarm signal in the event of a fire. In the event that a fire should occur at some distance from a call box, then the Security Guard would be called to summon help.

Fire alarm buzzers would alert personnel in the immediate area that a fire had been reported in this area. At the same time, a coded signal would sound throughout the plant alerting the fire brigade members of the location of the fire.

The fire brigade will respond to the alarm and take steps necessary to protect life and property.

EVACUATION

All personnel in the controlled area shall immediately evacuate at a fast pace upon hearing the Zone 1 alarm. Other personnel shall assume an alert condition and stay clear of the fire area and fire brigade. If necessary, or when directed by supervision or the fire brigade, they should evacuate the area or building.

Evacuation shall be rapid but in an orderly manner. Area supervision shall direct and control the exiting.

Employes evacuating shall use established plant evacuation routes and report to assembly areas.

Employes shall stay at the assembly areas until notified that they can leave or return to work. No employe may reenter unless he is authorized to do so by management.

While at the assembly areas, an attempt will be made to ascertain that all employes are accounted for. Supervision, managers, etc., shall initiate a roll call or other means to try and account for employes.

SUBJECT: COLUMBIA SITE EMERGENCY PROCEDURE FIRE CONTROL

PROCEDURE: CSEP-0003

RESPONSIBLE DEPARTMENT: SAFETY DEPARTMENT

REVISION: 0

EFFECTIVE DATE:
WP #0306E:3

EVACUATION (Cont.)

If an employe(s) is known to have been in the work areas prior to the evacuation, it shall be brought to the immediate attention of the emergency brigade chief, or person in charge so that a search may be initiated.

EMERGENCY BRIGADE

The site emergency brigade is advised of a fire by a coded fire alarm system over the entire site. The brigade will respond to the scene of the reported fire; and under the direction of the brigade chief, fire marshal, or emergency director will initiate action to put out the fire.

If it becomes necessary, outside firefighting support from the Columbia Fire Department (779-0430) can be requested by the emergency director or emergency coordinator.

If additional help is needed from surrounding communities, their help would be requested by the Columbia Fire Department.

FIRE CONTROL

All personnel are instructed to first sound the fire alarm, then using equipment available (hand-type fire extinguishers, glove box extinguishers, etc.), attempt to extinguish the fire if possible. Sprinklers will be automatically activated in certain areas of the plant where criticality codes permit.

The following general firefighting rules should be followed:

1. Always turn in alarm promptly.

2. Fire marshal will advise the brigade members concerning protective clothing and respiratory protection requirements.

3. Do not use water to fight a fire unless it has been specifically authorized. (Water can inadvertently cause criticality in moderation control uranium storage areas.)

4. CO_2 or A, B, C type dry powder fire extinguishers should be used for small fires not involving pyrophoric material. If there are powdered radioactive materials in the vicinity, use care not to disturb or disperse them.

5. MET-L-X powder or extinguishers should be used for small fires with pyrophoric materials such as uranium or zirconium turnings or chips. Small contained fires with these material should be allowed to burn out.

SUBJECT: COLUMBIA SITE EMERGENCY PROCEDURE FIRE CONTROL

PROCEDURE: CSEP-0003

RESPONSIBLE DEPARTMENT: SAFETY DEPARTMENT

REVISION: 0

EFFECTIVE DATE:
WP #0306E:3

TESTING FIRE ALARMS

The fire alarm alert, a coded ringing buzzer, is used to alert personnel to assume an emergency condition. The current code is listed in Table 0003-1.

Under the direction of the fire marshal, fire alarms will be tested on a scheduled basis.

TERMINATION OF THE EMERGENCY

After the fire emergency is over, the building(s) will be assessed for integrity and to assure that they are safe to return to work. The fire marshal, or his designee, will authorize return to normal operations after evaluation of the structure.

TABLE 0003-1

FIRE ALARM SIGNAL CODE

Buzzes	Zone	Area
1 Long - Pause - 1 Short	1	Controlled Area
1 Long - Pause - 2 Short	2	Expansion Area
1 Long - Pause - 3 Short	3	Mechanical Manufacturing and Expansion Office Area
1 Long - Pause - 4 Short	4	Second Floor Mezzanine
1 Long - Pause - 5 Short	5	First Floor Mezzanine
1 Long - Pause - 6 Short	6	Main Office Area
1 Long - Pause - 7 Short	7	Roof
1 Long - Pause - 8 Short	8	Outside Main Plant
1 Long - Pause - 10 Short	10	Sprinkler Discharge or Malfunction Initiated

NUCLEAR FUEL DIVISION	subject THE RETRIEVAL AND DISPOSITION OF NUCLEAR CRITICALITY ACCIDENT BADGES FOLLOWING A NUCLEAR CRITICALITY ACCIDENT	procedure CSEP-0004
PLANT PROCEDURE	effective date	responsible department: Regulatory Compliance	revision 0
		page 1 of 1

PURPOSE

This procedure provides instructions for the retrieval and disposition of nuclear criticality accident badges following a nuclear criticality accident.

SCOPE

All nuclear criticality accident badges, which include a neutron energy spectrum badge and a radiation dosimeter, at the Columbia Plant.

RESPONSIBILITIES

If a nuclear criticality accident should occur, Health Physics Operations personnel shall be responsible for the retrieval of all criticality badges. Radiological and Environmental Engineering personnel will be responsible for the disposition of the badges and data analysis following the retrieval.

PROCEDURE

Retrievel of Badges

1. The retrieval of criticality badges from the exclusion area surrounding the point of the criticality accident cannot be accomplished until the area has been cleared for reentry. Badges located outside of the exclusion area may be retrieved sooner, as approved by the Manager of Regulatory Compliance.

2. Prior to reentry, technicans assigned to the badge retrieval operation shall each receive a copy of the Criticality Badge Location Map (Figure 1), and be given responsibility for the retrieval of specific badges.

3. All badges shall be returned to Radiological and Environmental Engineering personnel for further disposition.

Disposition of Badges

The criticality badge is divided into two portions, the neutron spectrum badge and the criticality dosimeter. The spectrum badge will contain several activation foils (gold, copper, indium), a sulfur tablet, and LiF chip or rod. The criticality dosimeter portion of the badge is a film-type dosimeter. Beta, gamma, thermal and fast neutron doses can be determined by processing the dosimeter through the vendor.

1. Upon receipt of the criticality badges, R & E Engineering personnel shall immediately remove the criticality dosimeter films from the criticality badges.
2. Assure that all film labels are readable so that no mistake in badge identification can be made. The film dosimeter number corresponds with the criticality badge number.
3. The criticality dosimeter vendor shall be contacted in advance and be informed of the accident situation. Arrange for all dosimeter films to be processed on an emergency basis.
4. R & E Engineering is responsible for processing the spectrum badges following a nuclear criticality accident.

NUCLEAR FUEL DIVISION
PLANT PROCEDURE

COLUMBIA SITE EMERGENCY PROCEDURE

SUBJECT: NUCLEAR CRITICALITY EVALUATION PROCEDURE, ASSEMBLY AREAS, ACCOUNTABILITY RESCUE OPERATIONS

PROCEDURE: CSEP-0005

RESPONSIBLE DEPARTMENT: REGULATORY COMPLIANCE

REVISION: 0

EFFECTIVE DATE:
WP #0302E:3

PURPOSE

The purpose of this section is to establish a procedure for evacuation, accountability and rescue of personnel from plant areas if a nuclear criticality incident should occur.

SCOPE

In the event of a criticality accident in the plant, the criticality alarm sirens will be automatically activated, and personnel will be evacuated to and accounted for at predesignated assembly points. Rescue operations may be attempted if the potential radiation dose does not indicate too high a risk.

1. At the sound of the criticality alarm siren all personnel shall evacuate at a fast pace to designated assembly points (See Figure 0005-1) via the nearest exit. Use an alternate exit if there is evidence the incident occurred between you and the exit.

2. Assist visitors and/or injured personnel but do not delay evacuation.

3. At the assembly point evacuating personnel will notify their supervisor or the Emergency Coordinator that they are present and accounted for. Each supervisor and manager will immediately notify the Emergency Coordinator concerning missing persons and the status of his personnel using Figure 0005-4. Other supervisors shall standby to assist the Emergency Coordinator as is necessary.

4. At the assembly point, personnel will be monitored for radiation and contamination. All personnel will remain at the assembly points until directed otherwise. Figures CSEP-0005-2 and 0005-3 will be used to document exposure and contamination survey data.

5. An immediate decision will be made if a search and rescue mission is necessary. Reentry to recover unaccounted for personnel is the responsibility of the Emergency Director. The Radiation Protection Component will advise the Emergency Director concerning external radiation levels and airborne concentration levels. Appropriate health physics emergency instrumentation consisting of 1) a GM Beta-Gamma Survey Instrument, 2) a portable ion chamber survey instrument, 3) pocket dosimeter, 4) respiratory protection will be used to verify the incident conditions. Noting a radiation field in excess of 25 mR/hr constitutes verification. A maximum whole body dose of 3 rems is allowed for incident verification. Refer to Table 0005-3. Reentry for rescue missions should only be attempted after the following have been considered.

   a) the degree of hazard
   b) the time of stay
   c) the approved route
   d) unrestricted retreat route
   e) respiratory protection and protective clothing requirements

Reentry for other than rescue missions is prohibited until a complete evaluation can be performed.

6. All evacuated personnel will immediately notify the radiation protection component if nausea is experienced.

7. The preliminary location of the affected plant area may be determined by observation of the gamma alarm panel in the Health Physics Laboratory.

8. The Regulatory Protection Component will assure that the dose levels are acceptable at the assembly points; i.e., normally less than 5 mR/hr. If the dose levels are elevated, the assembly points will be moved to acceptable areas.

9. Potential false alarms will be investigated by the Regulatory Protection Component at the request of the Emergency Director. A survey team, consisting of two radiation monitors, will approach the facility as per step four and validate the alarm level. If no unusual radiation levels (> 25 mR/hr.) are encountered, the Emergency Director shall initiate action to determine the cause of the false alarm and terminate the emergency.

10. The Radiation Protection Component shall approve all entries where suspected problem exists with external exposure. Whole body emergency exposure criteria of Westinghouse employes will be limited to:

    a) 25 rem exposure - to eliminate a source or potential source that represents a hazard.
    b) 75 rem exposure - lifesaving operations such as rescue and search for known missing persons.

11. Exposure to hospital and ambulance personnel shall be limited to:

    a) 3 Rem - (If there is an adequate number of attendants such that rotation may be accomplished without endangering the patients.)

    b) 5 Rem - (If the number of attendants is limited such that personnel cannot be rotated.)

    c) 25 Rem - (For lifesaving mission.)

12. Radiation Monitors shall:

    a) Determine the extent of personnel radiation exposure by 1) indium foil counting, 2) the "quick sort" method using a Eberline E-120 survey instrument.

b) Survey all personnel for contamination.

c) Provide decontamination assistance.

d) Determine additional action requirements based on the following radiation exposure limits:

1. 0-5 Rads: No additional action required.
2. 0-25 Rads: Medical attention required.
3. Over 25 Rads: Immediate medical attention required.

13. External exposure doses shall be determined using Table 0005.1 and Table 0005.2. Doses shall be noted on form CSEP-0005.2.

14. All plant and staff emergency organizations will immediately form. If the incident occurs during minimum shift coverage the alternate Emergency Director will immediately notify the Emergency Director, Emergency Staff Team Members, and the Regulatory Compliance Manager at their home telephones listed in Table I, CSEP-0013. Immediate offsite notification will be given to South Carolina Department of Health and Environmental Control, Bureau of Radiological Health and the Nuclear Regulatory Commission at telephone numbers listed in CSEP-013.

15. The Regulatory Protection Component will utilize site boundary air samplers to perform environmental monitoring in determining if offsite action is considered necessary.

16. If offsite evacuation is required the Richland County Civil Defense Director and the State Disaster Preparedness Agency will be notified.

TABLE 0005-1

RADIATION DOSE DETERMINED BY "INDIUM FOIL COUNTING"

METHOD VERSUS INSTRUMENT READING AND ELAPSED TIME

INSTRUMENT E-120 READING, CPM	RADIATION DOSE IN RADS VERSUS ELAPSED TIME IN MINUTES											
	15 MIN.	30 MIN.	45 MIN.	60 MIN.	75 MIN.	90 MIN.	105 MIN.	120 MIN.	135 MIN.	150 MIN.	165 MIN.	180 MIN.
0-500	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	< 1	1	1
501-1,000	< 1	< 1	< 1	< 1	< 1	< 1	1	1	1	1	2	2
1,001-2,000	< 1	< 1	< 1	1	1	1	1	2	2	2	3	3
2,001-3,000	< 1	< 1	1	1	1	2	2	2	3	3	4	5
3,001-5,000	1	1	2	2	2	3	3	4	5	5	6	8
5,001-7,000	1	2	2	2	3	3	4	5	6	7	9	11
7,001-10,000	2	2	3	3	4	5	6	7	9	11	13	16
10,001-20,000	4	5	5	6	8	10	12	15	18	22	26	30
20,001-30,000	5	7	8	10	12	15	18	22	26	31	37	47
30,001-50,000	9	11	14	17	20	25	30	35	46	52	60	78
50,001-70,000	13	16	20	23	28	33	41	51	60	71	90	120
70,001-100,000	18	22	27	33	40	50	57	70	85	105	120	160

TABLE 0005-2

INSTRUMENT READING VERSUS RADIATION DOSE

DETERMINED BY "QUICK-SORT" METHOD

INSTRUMENT E-120 READING, CPM	RADIATION DOSE IN RADS FOR VARIOUS BODY WEIGHTS				
	51-100 LB.	101-150 LB.	151-200 LB.	201-250 LB.	OVER 250 LB.
0-500	26	14	9	7	5
501-1,000	54	27	18	14	11
1,001-1,500	80	41	26	20	16
1,501-2,000	107	54	35	27	22
2,001-2,500	134	67	45	34	27
2,501-3,000	162	80	54	40	32
3,001-4,000	OVER 200	107	71	53	43
4,001-5,000	OVER 200	133	89	66	54
5,001-7,500	OVER 200	200	134	100	80
7,501-10,000	OVER 200	OVER 200	178	132	107
10,001-12,500	OVER 200	OVER 200	OVER 200	166	134
12,501-15,000	OVER 200	OVER 200	OVER 200	200	161
15,001-20,000	OVER 200	OVER 200	OVER 200	OVER 200	OVER 200

TABLE 0005-3

DOSE VS. EXPOSURE TIME (MINUTES)

CUMULATIVE WHOLE-BODY DOSE, REMS	ALLOWABLE EXPOSURE TIME, MINUTES, TO RECEIVE THE WHOLE-BODY DOSES AT THE FOLLOWING RESPECTIVE				
	100 R/HR	200 R/HR	300 R/HR	1,000 R/HR	5,000 R/HR
3	1.8	0.9	0.6	0.2	.04
25	15	7.5	5.0	1.5	0.3
75	45	22.5	15.0	4.5	0.9

Under extreme conditions for lifesaving operation. Acute whole-body doses above 200 Rems may cause death. Acute whole-body doses above 1,000 Rems are usually fatal.

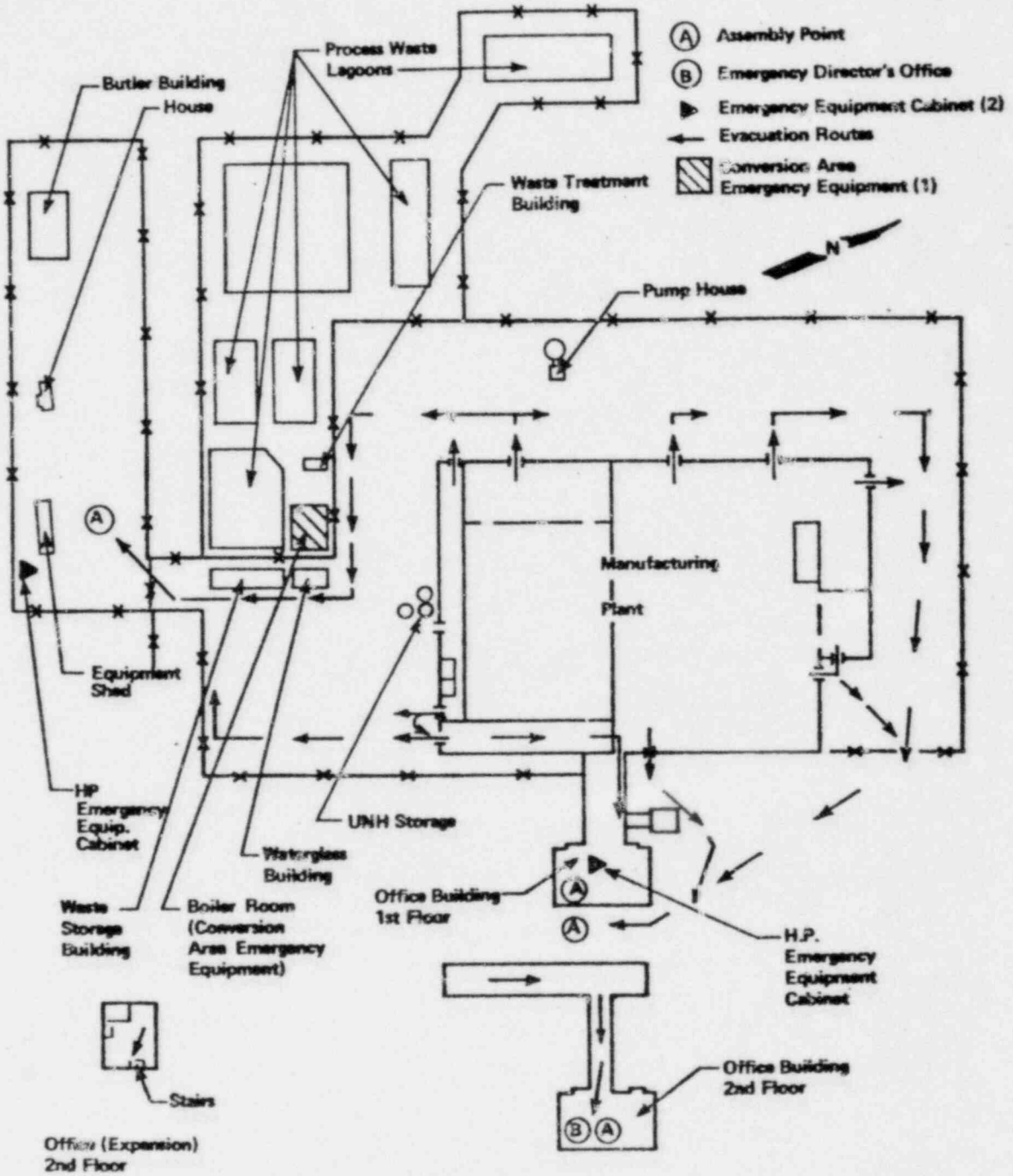


FIGURE CSEP-0005-1 Plant Evacuation Routes and Assembly Points, Columbia Site.

FIGURE CSEP 0005-2

PERSONNEL EXPOSURE DATA

Radiation Monitor: _____ Date: _____

Approximate Time of Incident: _____

Type Instrument Used: _____ Model No.: _____

Check Source Reading: _____ Background Reading: _____

NAME	TIME	INDIUM FOIL DATA				QUICK-SORT DATA				ACTION REQUIRED
		CR, CPM	BKG, CPM	CR-BKG CPM	DOSE RADS	CR, CPM	BKG, CPM	CR-BKG CPM	DOSE RADS	

FIGURE CSEP 0005-3

PERSONNEL CONTAMINATION DATA

Radiation Monitor: ______________________________ Date: ______________________

Approximate Time of Incident: ______________________________

Type Instrument Used: ____________________________ Model No.: __________________

Check Source Reading: ____________________________ Background Reading: __________

NAME	PERSONAL CONTAMINATION DATA			ACTION REQUIRED
	CR, CPM	BKG, CPM	CR-BKG, CPM	

NUCLEAR FUEL DIVISION
PLANT PROCEDURE

FIGURE CSEP 0005-4

EMERGENCY EVACUATION ABSENTEE LOG

Name of Supervisor: _____ Department: _____

NAME	STATUS

Are all of your personnel account for? _____ If not,explain.

_____

_____

_____

_____

_____

Signed: _____

Supervision of: _____

Date: _____

NUCLEAR FUEL DIVISION	subject: CIVIL DISTURBANCE		procedure: CSEP-0006
PLANT PROCEDURE	effective date	responsible department: SECURITY	revision: 0
			page: 1 OF 1

PURPOSE

To establish a program to deal with incidents of civil disturbance.

SCOPE

This procedure will cover security requirements, anticipated civil disturbance, and coordination with outside groups.

PROCEDURE

1. The Emergency Director and the Security Manager will convene with the Emergency Staff and initiate action as required to protect life and property.

2. The Security Manager shall take appropriate steps to assure sufficient security guards are available for anticipated civil disturbances.

3. In the event of civil disturbance, the Security Manager or the Emergency Director shall summon the Richland County Sheriff's Office (779-6100) or other outside agencies, if assistance is needed. During minimum staffing, the on-duty senior guard will act as an alternate for this function to immediately assess the situation and determine if outside assistance is required.

4. The on-duty senior guard will stop all vehicles other than Westinghouse employees from proceeding into the plant, and insure that the main roadway is kept clear. All access doors and gates leading into the plant shall be secured. A site map shall be maintained in the main guard station to determine vulnerable entry points and facilities.

5. The Fire Marshal or his alternate shall assemble the Emergency Brigade in an alert condition.

6. Supervision will shut down equipment and secure respective facilities in an orderly manner as is necessary.

7. The Emergency Director will advise concerning a general employee evacuation.

8. The site will return to normal operation when the "all clear" signal is given by the Security Manager.

9. All contacts with the media shall be handled by the Personnel Relations Department through the Communicator.

NUCLEAR FUEL DIVISION	subject: BOMB THREAT		procedure: CSEP-0007
			revision: 0
PLANT PROCEDURE	effective date	responsible department: Security	page: 1 of 2

PURPOSE

To establish a program of preparedness that will safely handle bomb threats and minimize lost time.

SCOPE

This comprehensive procedure will cover the receipt of the call, search, and possible evacuation.

RESPONSIBILITIES

1. The Security Manager (or in his absence, the Personnel Relations Manager) shall engage in conversation the person making a bomb threat; will notify Emergency Director of facts relating to bomb threat; will, with the Search Coordinator and Search Group, conduct search of premises when bomb threat is received; will notify the Emergency Director of the findings of an actual bomb or a foreign object which could possibly be a bomb. Manager of Security or the Personnel Relations Manager will contact the State Law Enforcement Division (758-2461) or Richland County Sheriff's Department (779-6100) by telephone for assistance.

2. Search Coordinator is responsible for the designating and training of a Search Group; in the event of a bomb threat will organize the Search Group to conduct a search, stressing public type areas and key utility installations. If a bomb or foreign object appearing to be a bomb is discovered, the Security Manager will utilize the Search Group to assist in isolating area where object is located, until evacuation and/or removal of object is accomplished.

3. Search Group will consist of management personnel: The Security Manager, the Manager of Maintenance and Construction, and the Manager of affected area.

4. Switchboard Operator, upon receipt of bomb threat, will endeavor to transfer the telephone call to the Security Manager or in his absence the Personnel Relations Manager, or act as an alternate.

PROCEDURE

If a bomb threat is received, the call will be transferred to the Security Manager (Extension 203) or the Personnel Relations Manager (Extension 202, 205) or their respective alternates. The following minimum information will be recorded:

1. Location of the bomb
2. Time the bomb is set to detonate
3. Sex of the caller
4. Type of voice, accent, mannerisms, or other identifying peculiarities
5. Background noises
6. Time and duration of the call

PROCEDURE (Cont.)

7. Record exact language used

This information will be transmitted to the Emergency Director (Extension 301) or his alternate, and a decision will be made if an immediate evacuation is warranted.

The Manager of Maintenance and Construction (Extension 294) is designated the Search Coordinator. He will search the premises in coordination with the Security Manager, and immediately advise the Emergency Director if a bomb is found. Outside help will be summoned from the South Carolina Law Enforcement Division (758-2461) if a bomb is located. The on-duty guard will stop all vehicles from proceeding into the plant and insure that the main roadway is kept clear until the "all clear" signal is given.

The Emergency Director will immediately decide which areas need to be evacuated. The Fire Alarm buzzer signal in combination with notification by immediate supervisor will be used to evacuate personnel. Supervision shall perform accountability operations to ensure the safety of their responsible units. Work shall be resumed when the "all clear" signal is given.

NUCLEAR FUEL DIVISION	subject: LOSS OF POWER/WATER		procedure: CSEP-0008
			revision: 0
PLANT PROCEDURE	effective date: 9/78	responsible department: PROCESS ENGINEERING	page: 1 OF 2

PURPOSE

To establish which procedures must be followed in the event of a loss of power/water incident.

SCOPE

Immediate response items are required in the Controlled Area to protect personnel and equipment in the event of such an occurrence. This procedure is general in nature. Specific area operating procedures will describe detailed shut down operations.

PROCEDURE

The following procedures will be instituted in the event of a loss of power/water incident.

A. Power

(1) Shut down processes and turn off critical equipment when operation must be immediately ceased to avoid damage or severe accidents.

(2) The Emergency Coordinator will assure proper operation of the emergency diesel generator for emergency power.

(3) Activate emergency warning light system.

(4) Evacuate all other personnel from the controlled areas. Supervisors will ensure accountability for their individual units. Emergency squad members or operations personnel remaining in the area will wear appropriate respiratory protection.

(5) When power returns, all equipment shall be checked by maintenance and supervisors to ensure normal operations.

(6) All ventilation equipment and hoods must be operating before reentry and initiation of work.

(7) Health Physics will release controlled areas after performing airborne particulate analyses and assuring limits are below maximum permissible concentration.

(8) The general reentry will be effected by turning off the emergency warning light system and by Supervisors notifying their units at the assembly points. The emergency is then terminated.

B. Water

(1) Shut down processes and turn off critical equipment where operation must be ceased to avoid damage or severe accidents.

A. Water (Cont.)

(2) When water supply is restored, check all affected equipment to ensure normal operations. The emergency is then terminated.

	NUCLEAR FUEL DIVISION	subject RELEASE OF RADIOACTIVE MATERIAL POWDER AND LIQUID SPILLS		procedure CSEP-0009
	PLANT PROCEDURE	effective date	responsible department REGULATORY COMPLIANCE	revision 0
				page 1 OF 2

PURPOSE

To establish a procedure at the Columbia Plant which will enable plant personnel to handle major releases of radioactive material, other than UF_6, and to return the plant to normal operations. Principal concerns listed in degree of importance are: (1) health and safety of personnel, (2) product and equipment damage, and (3) spread of contamination.

SCOPE

This procedure deals with various phases of action to be taken during powder and liquid spills including immediate actions, hazard assessment, control of reentry, personnel protection and notification. It is general in nature and may require changes for specific emergencies.

PROCEDURE

A. Immediate Action

1. Area supervision shall evacuate the areas affected and potentially affected. Judgement must be exercised whether or not to terminate the spill prior to evacuation. Normally, immediate evacuation is recommended. However, if an employee can terminate a spill without significantly increasing his intake of hazardous material he may do so.

2. Area supervision shall activate appropriate alarms and warning systems.

3. Area supervision shall notify Health Physics Operations/ R & E Engineering.

4. Area supervision shall notify the Medical Department/Emergency Brigade as appropriate.

5. The Emergency Coordinator will rope off the affected area to control access for small spills when the entire area is not evacuated.

6. The Emergency Brigade will be activated if the Emergency Coordinator deems it necessary. If the incident warrants the Emergency Staff will meet and determine a course of action.

B. Correction Actions

1. Liquid Spills

a. Right the container or shut off source, using proper protective clothing including liquid resistant gloves, respiratory protection, and other safety equipment as determinedby R & E Engineering/H.P. A self contained fresh air breathing apparatus may be required if toxic gases accompany the radioactive material released.

b. If the clothing is contaminated, discard the clothing immediately.

PROCEDURE (Cont.)

c. If the spill has contaminated the skin, flush it thoroughly.

d. For wet spills damp mops, absorbent material, and cloths should be utilized for decontamination and product recovery.

2. For Dry Release

a. Eliminate the source, using protective clothing and proper respiratory protection. A full face respirator may be used for airborne radioactive concentrations below 50 times MPC.

b. Immediately discard protective clothing if excessively contaminated by the spill.

c. Wash contaminated parts of the body as soon as possible.

d. For dry spills criticality safe vacuum cleaners, damp mops, and wet rags can be used for product recovery and decontamination.

C. Storage of Recovered Material

Store all recovered uranium liquid or powder in critically safe containers, 5 gallon maximum capacity, spaced 17 inches apart. Store all recovered pellets or slugs of uranium in polypaks, molybdenum boats, pellet trays, or other critically safe containers. Do not stack containers.

D. Control of Reentry

1. H.P. Operations shall maintain a control point at an area where airborne concentrations are less than MPC.

2. After the incident is deemed under control, H.P. Operations/R & E Engineering shall establish when general reentry can be effected. Airborne uranium concentration must be less than 1 MPC.

3. H.P. Operations/R & E Engineering shall evaluate the situation and determine which individuals must submit bioassay samples and be restricted from the area according to Health Physics Operating Procedure 04-01, 02, 03.

4. H. P. Operations shall check the linear velocities on hoods in the area of release to assure license requirements are met.

E. Termination of Emergency

1. The area will be released for normal operations when acceptable airborne activity levels have been achieved (less than 1 MPC), and when contamination control limits have been achieved. All barricade ropes will be removed and the Emergency Warning Light system will be deactivated.

2. The all clear signal will be given to evacuated personnel by their immediate supervisor.

3. Process Engineering/Operations shall submit an incident report to R & E Engineering.

NUCLEAR FUEL DIVISION	subject: EXPLOSIONS	procedure: CSEP-0010
		revision: 0
PLANT PROCEDURE	effective date: 9/78 / responsible department: SAFETY/SECURITY	page: 1 OF 1

PURPOSE

To develop a plan to respond to explosions.

SCOPE

This procedure will describe response to explosions, immediate actions, operation of equipment, and clearance of the area.

PROCEDURE

General procedures to be followed in case of an explosion are as follows:

(1) Turn off all equipment as the situation warrants. Obtain Safety and Radiological & Environmental Engineering approval before initiating operation of severely damaged equipment.

(2) Determine if there is a possibility for sequential type explosions.

(3) Supervision shall notify all personnel in the area to evacuate as is necessary.

(4) If necessary, the entire plant will be evacuated by sounding the fire alarm which is manuallyactivated from the guard station of by local pull boxes, and through notification of personnel by their local supervisor.

(5) Notify the Safety Manager and Security Manager so they can evaluate the situation and provide further instructions.

(6) Permit only those persons into the area who are essential to evaluation and controlling the release of material.

(7) The Emergency Brigade may be activated as per CSEP 0016-A should the Emergency Coordinator deem it necessary.

(8) Work shall be resumed when the "all clear" signal is given by the Emergency Director.

NUCLEAR FUEL DIVISION	subject: UF_6 RELEASE		procedure: CSEP-0011
			revision: 0
PLANT PROCEDURE	effective date	responsible department: Regulatory Compliance	page: 1 of 2

PURPOSE

This procedure defines the actions required following an accidental release of uranium hexafluoride, UF_6.

SCOPE

In the event of a UF_6 release, certain response and corrective actions will be required to protect the plant population and to terminate the incident.

PROCEDURE

A UF_6 release is defined as a condition which results in a substantial accidential discharge of uranium hexafluoride gas from a contained system to the ambient atmosphere. The gas immediately hydrolyzes to form uranyl fluoride. During the hydrolysis reaction substantial quantities of hydrogen fluoride gas, a toxic vapor, are released. Responding personnel will perform the following corrective actions in the event of a UF_6 release.

(1) Activate the Zone 1 Fire Alarm and the Emergency Warning Light System.

(2) Assure all personnel evacuate the affected area immediately. Limit reentry to emergency brigade members or responding operations personnel. Do not take unnecessary risks.

(3) Adjust the ventilation system to control the incident.

(4) Close all doors to the UF_6 Bay including boiler room and air compressor room.

(5) Evaluation of the situation by appropriate Emergency Staff members. The Emergency Coordinator will supervise response actions in the event of their absence.

(6) Emergency brigade members and responding operations personnel will don fresh air breathing apparatus in the pressure demand mode for immediate evaluation of the situation. Supervision or the Emergency Coordinator will determine if additional protective clothing is needed by the magnitude of the release.

(7) Isolate the problem.

(8) Close the UF_6 cylinder valve.

(9) If the release situation cannot be immediately controlled and terminated, the brigade members will evacuate, make a reentry plan in pairs of two dressed in acid protective suits. These individuals will be connected by lifeline to the outside. Communications are to be maintained by response team members in the Controlled Area with those stationed near the entrance point. The Safety Manager and the Regulatory Compliance Manager will approve the reentry plan.

(10) If the release cannot be contained immediately, regroup and advise Emergency Director.

PROCEDURE (Cont.)

(11) Hose down the acid suits on return to the outside being careful of HF acid contamination. NOTE: HF can cause severe skin burns.

(12) Give medical attention to all personnel exposed to hazardous vapors.

(13) All personnel exposed to UF_6/HF will shower thoroughly and dress in clean overalls.

(14) The Radiation protection group will restrict entry into affected areas until UO_2F_2 has settled. When air samples indicate acceptable airborne activity levels have been achieved (less than 1 MPC), general reentry can be made. Then surface contamination surveys will be performed as per the Contamination Control procedure.

(15) Radiological Environmental Engineering will perform personnel evaluation surveys to determine the degree of exposure of affected personnel. Following decontaminations, additional surveys will be performed until the respective areas and equipment can be released.

(16) Point source stack samples and environmental air samples will be analyzed immediately, if it is deemed necessary by Radiological and Environmental Engineering. Appropriate notification of the NRC will be made if the release exceed 10CFR20 limits.

(17) The respective supervisor or emergency coordinator will oversee and direct decontamination efforts with proper regard for materials balance. Normal operations will be returned once the incident is deemed under control.

(18) The Chemical Operations Department will prepare an engineering report of the incident within seven days.

NUCLEAR FUEL DIVISION	subject: COLUMBIA PLANT EMERGENCY MEDICAL PROCEDURE CONTAMINATION DETECTION AND TREATMENT		procedure: CSEP-0012A
			revision: 0
PLANT PROCEDURE	effective date	responsible department: MEDICAL	page: 1 of 5

1.0 PURPOSE

This procedure defines the methods used for detecting radioactive contamination on personnel and decontamination treatments.

2.0 SCOPE

In case of an accident or emergency, detection of radioactive contamination of personnel is the responsibility of Health Physics.

Health Physics personnel will survey all individuals from the incident area to determine those individuals who are contaminated. These individuals will be segregated and treated as conditions warrant.

The Medical Department will rely on evaluation made by Health Physics who will advise on decontamination procedures and injuries or skin breaks which are contaminated.

3.0 PROCEDURES

3.1 Notification

3.1.1 Immediately notify Health Physics to determine extent of contamination.

3.2 Skin Contamination

3.2.1 A beta-gamma and alpha survey is done with appropriate survey instruments over the entire body with the clothes on. If radioactive contamination is found, the clothing is removed and a resurvey is done. If radioactivity is found, the areas are marked and covered with plastic to prevent the spread of contamination.

3.2.2 Special care should be taken to survey areas under the fingernails, earlobes, and between skin folds (i.e., armpits, between fingers and toes, buttocks).

In the case of suspected alpha or beta contamination, filter paper smears should be taken of representative areas even if the portable survey detector shows no activity. The filter paper smears are labeled, placed in individual envelopes, and sent for counting. Health Physics personnel shall survey, collect, and count the smears.

NOTE: The skin is considered to be contaminated if any detectable radioactivity is found.

3.0 PROCEDURES (Cont.)

3.3 Wound Contamination

3.3.1 Personnel who are in a contaminated or suspected contaminated area and have any wound (i.e., skin break or injury) will be evaluated for radioactive contamination. Gross external contamination will be removed immediately in the controlled area. The injured person will be transported to the Medical Facility. Then the wound area will be surveyed with end window Geiger-Mueller and alpha detecting survey meters. If the surrounding area is contaminated, then the wound is considered to be contaminated.

3.3.2 If contamination is not found by survey meter, then a sterile moistened cotton tipped application is wiped over the wound prior to treatment and placed in an individually labeled envelope and retained for counting.

The labeled envelope should be marked with the patient's name, date, time, and wound description.

3.3.3 A wound is considered as contaminated if any radioactive material is detected within the wound or on adjacent skin.

The area of the skin around the wound is smeared or wiped lightly with one or more filter papers then placed in individually labeled envelopes for counting.

3.3.4 Personnel having contaminated wounds will initiate leaving urine bioassay samples at the request of Radiological and Environmental Engineering.

3.4 Detection of Ingested Radioactive Material

"Potential ingestion cases" will be any of the following:

Any person who has eaten contaminated food or eats in a contaminated or airborne area.

A sterile cotton tipped applicator smeared within the mouth which gives positive results.

A positive beta-gamma, alpha survey or smear about the mouth.

3.0 PROCEDURES (Cont.)

3.5 Whole Body Counting and Sampling

The Manager of Radiological Environmental Engineering will make arrangements for whole body counting of selected personnel.

3.6 Treatment of Whole Body Contamination

3.6.1 Priority for decontamination will be determined by the seriousness of nonradiation injury, the levels of radiation dose being received from the skin or outer clothing contamination, or by personnel increasing their internal body burden through contaminated wounds.

3.6.2 Contaminated clothing will be removed; areas of high level radioactivity on the body will be localized and marked. Open wounds are sealed with plastic and/or waterproof tape to prevent contaminating the wound(s).

Shower or wash with warm water and a mild soap the affected areas of the body. Use care so that contamination from high level areas is washed off rather than spread over clean areas of the body.

3.6.3 Contaminated wounds shall be decontaminated before concentrating on other contaminated body areas. The wound shall be protected so as not to recontaminate it while decontaminating other parts of the body. After all contamination has been completed, the wound shall be properly treated.

3.7 Treatment of Contaminated Wounds

3.7.1 Contaminated wounds shall be treated so as to encourage bleeding thereby helping to flush out contamination, irrigate with copious amounts of water, do not wash skin contamination into the wound. Resurvey at periodic intervals.

3.7.2 Decontaminate skin around the wound and seal the wound with plastic or waterproof tape. If wound cannot be decontaminated by the above procedures, refer patient to a physician for possible excision of contamination.

Urine samples will be collected from all casualties having had a contaminated wound.

3.0 PROCEDURES (Cont.)

3.8 Treatment of Eye, Eyelid, Nose, Mouth and Ear Contamination

3.8.1 The only treatment for corneal contamination is copious irrigation. Initially, it may be necessary to start irrigation with tap water; but as soon as possible, shift to sterile saline solution to prevent corneal edema.

If the corneal contamination acts as a foreign body and produces eyelid spasm and pain, the nurse or physician may instill 0.5% tetracaine or pontocaine as a corneal anesthetic.

3.8.2 Irrigation should continue for at least 15 minutes. After decontamination, the nurse or physician instills neosporin ophtalmic ointment into the conjunctival sac. Contaminated foreign bodies imbedded in the cornea will be removed by an opthalmologist.

3.8.3 Treatment of eyelid contamination is accomplished by having the patient close eye and irrigate lid with water for 5 minutes.

Survey with appropriate counter or moistened cotton tipped applicator. Repeat both steps if contamination persists.

If contamination still persists, apply ZnO2 or A&D ointment and wipe off gently with a gauze. Repeat as necessary to remove contamination.

3.8.4 No decontamination of the nose will be attempted, and the individual will be referred to a physician.

Generally, the nose will clear itself of foreign material in 24 to 48 hours and the material will be swallowed. Expectoration should be encouraged. The patient will be treated as a potential ingestion case, and urine and feces will be collected.

3.8.5 Treatment of mouth contamination is accomplished by having the patient gargle with tap water or saline solution at least 15 times. Survey the mouth using a cotton tipped applicator. The applicator and the expectorated gargle solution are then counted for radioactivity.

Repeat as necessary until no activity is found. Patient is considered as a potential ingestion case. Therefore, urine and feces will be collected.

3.0 PROCEDURES (Cont.)

3.8.6 Treatment of ear contamination is accomplished by gentle irrigation of the ear canal with tepid water. Persistent contamination of the ear canal will be with 3% hydrogen peroxide solution. Survey of the ear canal will be with cotton tipped applicator. Don't injure the canal mucosa (lining).

Further attempts at decontamination will be undertaken by a physician with the ear canal under direct visualization.

The ear lobe is treated as skin contamination (see 3.2).

NUCLEAR FUEL DIVISION	subject: COLUMBIA PLANT EMERGENCY PROCEDURES CASUALTY TRANSFER		procedure: CSEP-0012 B
PLANT PROCEDURE	effective date	responsible department: MEDICAL	revision: 0 page: 1 OF 3

PURPOSE

To define the requirements and procedures for transfer of contaminated casualties.

SCOPE

The requirements and procedures for transfer of contaminated casualties to the hospital and the transport procedures are listed here.

The Richland Memorial Hospital will be used for receiving casualties; the hospital emergency evacuation route is depicted on the enclosed sketch.

All information obtained at the hospital will be forwarded to the Manager of Radiological and Environmental Engineering.

PROCEDURES

1.0 Hospital Transfer

1.1 The Plant Nurse, or alternate must notify Richland Memorial Hospital Emergency Services - phone 765-7561 - the number of casualties, ETA, and that the casualties are contaminated. The transportation time from the Columbia Plant site to the hospital is 30 minutes.

1.2 Prepare the casualties for transportation by removal of clothes if applicable and decontaminate the patient as may be practical. Contaminated areas of the body will be localized and numbered using lipstick, marking pencil, or Merthiolate, etc.

1.3 Survey contaminated areas quantitatively using appropriate survey meters; established the dose rates at both the skin and one foot from the skin.

1.4 If practical, the patient will be placed between a plastic sheet and covered with a blanket. The plastic sheet will be placed on the stretcher so that it will lay under the patient and then pulled up over the person. Sides may be taped as necessary.

2.0 Medical Treatment Slip

A medical treatment slip will be taped to the plastic cover and will contain pertinent information:

Patient's Name
Date
Patient's home address and telephone number
Brief description of medical injury
Date and time of previous medical treatment
List any overriding condition of concern, explain
Date and time of any drug administered

3.0 Radiation Evaluation Slip

A radiation evaluation slip will be taped to the plastic cover and will contain pertinent information:

Patient's name
Date
List of contaminating radionuclides
Estimate of contamination levels of patient
Time of localized skin contamination
Site of contamination
Brief description of previous decontamination procedures
Estimate of whole body or local area dose to the patient at time of hospital admission

4.0 Casualty Transport

4.1 The patient will be transferred by medical vehicle or ambulance; the driver of the ambulance will be instructed to drive to the emergency entrance of Richland Memorial Hospital. See attached sketch.

4.2 Health Physics Operations personnel will determine if the ambulance driver requires shielding; e.g. lead sheeting or apron, and will supply the driver with TLD or pocket dosimeter to be worn on the back.

4.3 If radiation levels are significant, one or more pocket dosimeters or TLD body badges enclosed in plastic (to prevent contamination of the radiation monitors) will be placed on the patient for continuous monitoring.

4.4 The security guard and the Plant Nurse or alternates will accompany the patient to the hospital. A Health Physics technician will assist with contaminated casualty transfers and ensure the following:

Gross contaminated areas of patient are enshrouded in plastic.
The patient has medical and radiation slips.
That vehicle driver is wearing dosimetry as required on his back.

4.5 The medical vehicle or ambulance will drive to appropriate entrance and wait until hospital radiation protection personnel permit admission to the reception area.

Westinghouse Health Physics Operations personnel will assure that the reception area is prepared before allowing disembarkment.

4.6 Medical vehicle or ambulance drivers will await permission to leave; Health Physics personnel will survey the vehicle and driver.

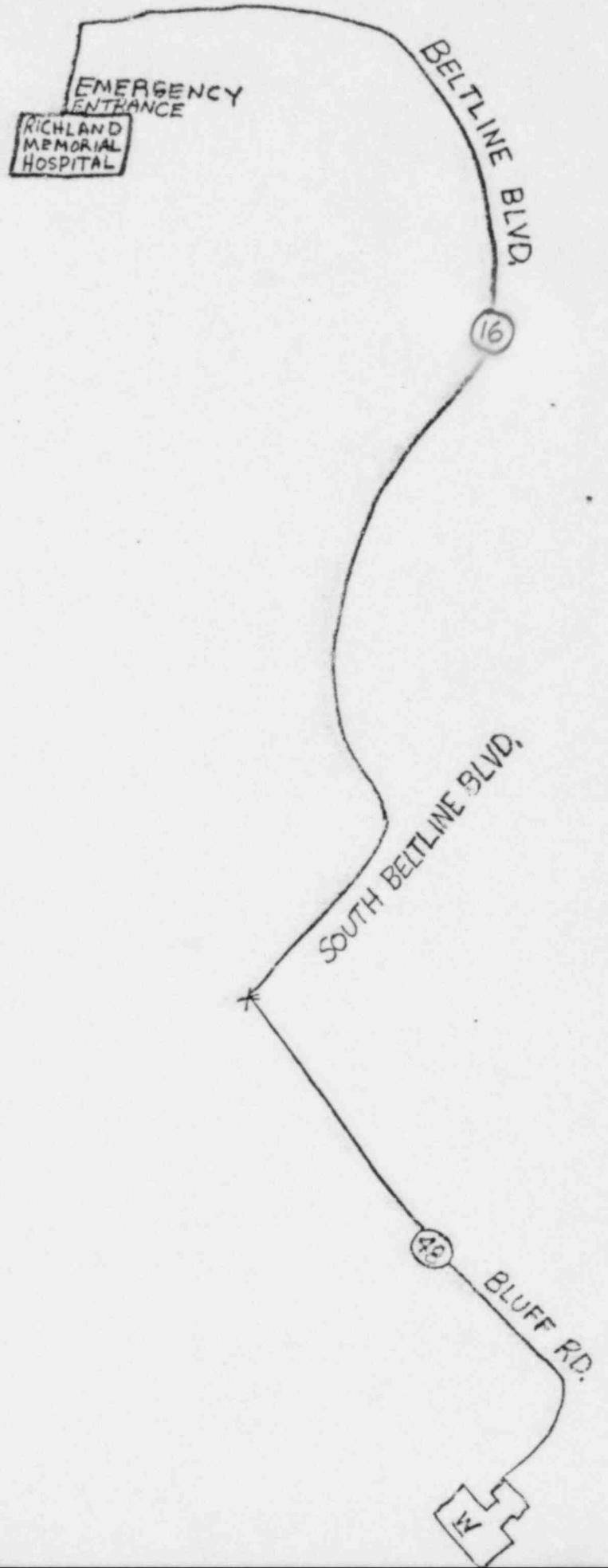
5.0 Hospital Release

5.1 Health Physics personnel shall survey areas of the hospital in which the patient had access during treatment. All hospital staff who came in contact with the patient shall also be surveyed. Appropriate decontamination of areas and contaminated staff shall be accomplished.

5.2 All contaminated equipment, clothing, etc., shall be enclosed in plastic, tagged with proper radiation tags, and returned to the Columbia Plant for disposition. Health Physics personnel are responsible for the above.

6.0 Records

A complete history of casualty transfer, hospital surveys, and release shall be completed and retained by Radiological & Environmental Engineering.


EMERGENCY ENTRANCE
RICHLAND MEMORIAL HOSPITAL
BELTLINE BLVD.
16
SOUTH BELTLINE BLVD.
48
BLUFF RD.
W

1.0 PURPOSE

This procedure provides the necessary information for the notification of both on-site and off-site organizations of an emergency situation.

2.0 SCOPE

Prompt notification of responsible personnel is necessary in dealing with any emergency situation. In addition, various local, state, and federal authorities must be notified if the situation requires assistance or has already or threatens to involve off-site persons. Adequate information is presented in this procedure along with assigned responsibilities to permit notification of all necessary persons or organizations. Guidelines are also presented to define the circumstances under which outside authorities are to be notified.

3.0 RESPONSIBILITIES

3.1 Notification of On-Site Personnel

The Emergency Coordinator is responsible to assure that all necessay on-site personnel have been notified. Table I presents the necessary names, titles, and telephone numbers.

3.2 Notification of Off-Site Organizations

Notification of off-site emergency organizations is the responsibility of the Site Emergency Director or his designee in respective areas: the Regulatory Compliance Manager, the Safety Manager, and the Security Manager. The Acting Emergency Director may initiate such notification upon incident verification and consultation with the Site Emergency Director or Emergency Staff member.

3.3 Notification of W NES Emergency Committee

The Emergency Director is responsible to establish under what conditions that W NES Committee should be notified. This staff will augment the site emergency staff and provide corporate level assistance to fulfill the company's obligations under state and federal regulations. This Committee can request personnel, equipment, materials, and funds be made available to the Columbia Site.

4.0 ON-SITE WESTINGHOUSE PERSONNEL

The on-site emergency personnel are listed in Table I. There personnel will be notified of incidents involving their facility which could cause harm to an employee or to the general public.

5.0 OFF-SITE ORGANIZATIONS

Various other organizations may have to be notified for reasons such as:

a) Request assistance to supplement on-site personnel.

b) Request assistance in dealing with off-site incidents.

c) Provide notification as required under state or federal regulations.

Table II presents a listing of other organizations which may have to be contacted along with the assigned responsibility for initiating the contact. The following sections provide guidance as to when such contacts should be made.

5.1 Immediate Notification - NRC

The NRC Directorate of Regulations, Region I, will be notified by telephone and telegraph in the event of the following:

A. Loss or theft of licensed material in quantities that may result in a substantial hazard to persons in unrestricted areas.

B. Exposure of any individual equal to or exceeding whole body 25 rems; skin of the whole body 150 rems; feet, ankles, hands, or forearms 375 rems.

C. Release of radioactive material which, if averaged over 24 hours, would exceed 5,000 times the limits specified in Appendix B, Table II, 10 CFR 20.

D. A loss of one working week or more of the operation of any facilities affected.

E. Damage to property in excess of $ 200,000.

F. Any incident where off-site effects may cause exposure of the public to radiation. See Tables 6-4 and 6-5.

G. Any incident requiring off-site treatment of either employees or the general public.

5.2 Twenty-Four Hour Notification - NRC

The NRC Directorate of Regulations will be notified within twenty-four hours of any incident causing the following:

A. Exposure of any individual equal to or exceeding whole body 5 rems; skin of the whole body 30 rems; feet, ankles, hands, or forearms 75 rems.

5.2 Twenty-Four Hour Notification - NRC (Cont.)

B. Release of radioactive material which, if averaged over 24 hours, would exceed 500 times the limits specified in Appendix B, Table II, 10 CFR 20.

C. A loss of one day or more of operation of any facilities affected.

D. Damage to property in excess of $2,000.

E. An incident which may not result in exposure but create serious public relations problems.

5.3 Thirty-Day Notification and Reports - NRC

A report will be submitted in written form within 30 days for the following:

A. Each exposure of an individual to radiation or concentrations in excess of any applicable limit in 10 CFR 20 or in the NRC facility license conditions.

B. Any incident requiring immediate or 24-hour notification.

C. Levels of radiation or concentration of radioactive material (not involving excessive exposure of any individual) in an unrestricted area in excess of 10 times any applicable limit set forth in 10 CFR 20 or in the conditions specified in the NRC facility license.

5.4 State of South Carolina

The State of South Carolina will be notified by telephone under the following incident conditions:

A. Situations where off-site effects may occur as a result of fires, criticality, explosion, or natural occurrences.

B. Incidents where off-site medical treatment is necessary, whether due to occupational or general public exposure to radiation.

C. Any discharge of materials to the environment which are above applicable limits and may lead to public relations problems.

D. Incidents which are reportable to the NRC, including abnormal security occurrences.

E. Incidents where discharge of radioactive materials may lead to radiation exposure above limits given in Tables 6-4 and 6-5 of the Emergency Manual.

5.5 American Nuclear Insurers (Mutual Atomic Energy Liability Underwriters)

The ANI-MAELU will be notified under the following conditions:

A. Emergency conditions requiring immediate notification of federal or state agencies.

B. Conditions which result in a request for the assistance of off-site emergency support groups such as medical, local, or state agencies, either to care for the injured or to protect the public.

5.6 Richland Memorial Hospital

The radiation emergency response staff will be alerted immediately in the event of serious injury or exposure of anyone as a result of radiation.

5.7 Richland County Sheriff's Office

The Richland County Sheriff will be notified immediately if assistance is necessary in controlling access or egress to an area involved in an incident. This may include assisting in evacuating the population areas.

TABLE III

EMERGENCY NOTIFICATION TELEPHONE NUMBERS
W NES EMERGENCY COMMITTEE

Department	
Emergency Coordinator	
Alternate Emergency Coordinator (Logistics)	
Public Relations	
Public Relations	(ALL CONTACTS WILL BE MADE BY W NES GUARDS)
Manpower Resources	
Financial Resources	
Medical and Health Physics	
Medical and Health Physics	
Legal	
Security	

Monroeville Nuclear Center Guardhouse Telephone Numbers: (412) 373-4112
(412) 373-4019
(412) 373-4020

EMERGENCY INFORMATION CHECKLIST

I. RECORD OF CONTACTS MADE

Date	Time	Name	Telephone No.	Affiliation	Initials

II. INFORMATION SUPPLIED

1.0 Description of Occurrence: _____

_____

_____

_____

_____

_____

_____

_____

Date _____ Time _____ Location _____

2.0 Persons Involved (Off-Site/On-Site): _____

_____

_____

_____

		Off-Site	On-Site
2.1	Evacuation		
	If so, to what places?		
2.2	Fatalities		
2.3	Injuries		
2.4	Contamination		
2.5	Radiation Exposures		
2.6	Hospitalization		

3.0 Property Damage _____

3.1 On-Site _____ Off-Site _____

3.2 Access Restrictions _____

4.0 Radiation Released _____

_____

_____

_____

4.1 On-Site _____ Off-Site _____

4.2 Concentrations _____

4.3 Total Activity _____

4.4 Projected Doses to Individuals (Off-Site/On-Site) _____

_____

_____

5.0 Action Initiated to Confine the Material and Decontaminate the Area and Results _____

_____

_____

_____

_____

6.0 Further Action Necessary to Keep Injury to Persons and Contamination of Property to a Minimum _____

_____

_____

_____

_____

_____

7.0 General Comments _____

_____

_____

_____

_____

_____

_____

TRANSPORTATION INCIDENT REPORT

On duty guard: _____

Person reporting incident: Name _____ Title _____

Location: _____

Nearest telephone _____

Description of incident: * _____

_____

Time incident occurred: _____

_____

Location of incident (including type of surroundings): _____

_____

Location of nearest airport: _____

_____

Fire or explosion involved: Yes ( ) No ( )

Injuries (if any) _____

Persons involved in accident _____

Responsible local officials advised: (Names) _____

_____

Date and time call received _____

_____

Other information furnished: _____

_____

* Including as much information as possible: kind, amount, and form of material involved; present physical condition of material; name of carrier, shipper, and recipient.

NUCLEAR FUEL DIVISION
PLANT PROCEDURE

COLUMBIA SITE EMERGENCY PROCEDURE

SUBJECT: HAZARDOUS WEATHER WARNING

PROCEDURE: CSEP-0014

RESPONSIBLE DEPARTMENT: SAFETY DEPARTMENT

REVISION: 0

EFFECTIVE DATE:

PAGE: 1 of 1

WP #0295E

1.0 PURPOSE

This procedure defines the actions to be taken when advised of strong winds or impending severe weather.

2.0 PROCEDURE

The Security Guard Station maintains an NOAA weather alert radio to advise of strong winds or impending severe weather.

The following actions are to be taken in the event of hazardous weather.

The guard will notify the following persons:

1. All Supervisors
2. Emergency Brigade Captains (who will, in turn, notify all Emergency Brigade members)

Each person notified will take appropriate action to insure protection of life and property.

NUCLEAR FUEL DIVISION
PLANT PROCEDURE

COLUMBIA SITE EMERGENCY PROCEDURE

SUBJECT: EMERGENCY BRIGADE ORGANIATION

PROCEDURE: CSEP-0015

RESPONSIBLE DEPARMENT: SAFETY DEPARTMENT

REVISION: 0

EFFECTIVE DATE:

WP #0292E

1.0 PURPOSE

This policy defines the structure, duties and training of the Emergency Brigade.

2.0 SCOPE

2.1 The Emergency Brigade is to act as a voluntary unit for prompt and intelligent action in an emergency: fire, explosion, hazardous weather warning, trapped, or severely injured personnel, etc.

2.2 Each Emergency Brigade shall consist of a minimum of six employes, excluding the nurse and guard.

2.3 Each shift schedule shall have a minimum of four employes on the Brigade.

3.0 EMERGENCY BRIGADE STAFFING FOR PLANT SHUTDOWN

3.1 The Emergency Brigade shall be staffed according to conditions relative to operations in process during weekend or holiday shutdowns. This staff's primary purpose is to identify fires and notify the appropriate personnel for instructions.

3.2 The Mechanical Manufacturing Areas shall be monitored by the security guard force.

3.3 The Controlled Area shall be monitored with the use of a checklist composed of the Pellet, WRD, Conversion and Maintenance areas. The monitoring shall be performed by the assigned personnel relative to the following conditions.

3.3.1 Idled Conditions -- (Weekends and Holiday Shutdown)
Monitoring shall be performed by two employes and supervised by an onsite Brigade Chief.

3.3.2 Cold Shutdown -- (Extended Shutdown)
Monitoring shall be performed by two employes. Concerns of the monitors will be addressed to an on-call Brigade Chief.

COLUMBIA SITE EMERGENCY PROCEDURE

SUBJECT: EMERGENCY BRIGADE ORGANIATION

PROCEDURE: CSEP-0015

RESPONSIBLE DEPARMENT: SAFETY DEPARTMENT

REVISION: 0

EFFECTIVE DATE:

WP #0292E

4.0 DUTIES AND RESPONSIBILITIES

4.1 The Safety Manager

The Safety Manager shall be responsible for organizing, assigning responsibility, training and equipping each Brigade so that it can function as an efficient unit for fire control, rescue work, first aid treatment, or other duties for which a Brigade may be called during an emergency (he acts only in an advisory capacity during an emergency).

4.2 Emergency Coordinator

The Emergency Coordinator shall be responsible for coordinating all emergency efforts; such as evacuation of personnel from the affected area, when required, and for securing production equipment, including shutting down the equipment or for altering operations to confine the area in which the emergency exists. He shall be responsible for coordinating the efforts of the Brigade Chiefs and the Brigade members during an emergency and training sessions.

4.3 Brigade Chief

The Brigade Chief shall be responsible for directing the activities of the Brigade members in fire control, rescue operations, and first aid to the injured during emergency operations. He shall assume the responsibilities of the Brigade Coordinator in the event of his absence and other activities as directed by the Emergency Coordinator.

4.4 Hoseman (2)

The hoseman shall remove hoses from hose houses, or hose racks, make necessary hose connection and operate nozzles.

4.5 Hydrant Man (1)

The hydrant man shall be responsible for coupling the hose at the hydrant and turning the water on and off. He shall remain at the hydrant during an emergency unless specified otherwise by the Brigade Chief.

4.6 Vehicle Driver (1)

The vehicle driver shall be in charge of the emergency vehicle and shall be able to utilize all equipment thereon. In the event this vehicle is not required, the vehicle driver shall perform other duties as specified by the Brigade Chief.

4.7 Utility Man (1)

The utility man shall attend to all electrical circuits that may be affected and handle all matters of an electrical nature, including the assurance that the site fire pump is functioning, then he shall assist the other Brigade members.

4.8 Backup Brigade

Items 4.3 through 4.7 identify minimum manpower requirements to combat a fire. Additional members of the Brigade shall be trained as a second hose team to be used if needed. In addition, they shall secure and provide ladders and protect as much equipment and material from water damage as possible.

4.9 Nurses and Female Members

Nurses and female members shall assist the Brigade Coordinator and Chiefs and be prepared to administer first aid to all employes.

4.10 Guard

One member of the guard force shall answer all emergency alarms unless only one guard is on duty. He is to bring the emergency truck, radio and master keys as directed. In addition, he shall provide crowd control, communications with the guardhouse, and locate the fire for the City Fire Department as directed by the Brigade Coordinator.

5.0 REQUIREMENTS FOR MEMBERSHIP

5.1 Assignment of personnel to the Emergency Brigade shall be the responsibility of the Manager of the respective departments with the approval of the Manager of Safety and the Manager of Regulatory Compliance and after a successful physical examination by the plant physician.

5.2 Successful completion of the Rock Hill Fire Academy or its equivalent is required before actual fire fighting participation is allowed.

COLUMBIA SITE EMERGENCY PROCEDURE

SUBJECT: EMERGENCY BRIGADE ORGANIATION

PROCEDURE: CSEP-0015

RESPONSIBLE DEPARMENT: SAFETY DEPARTMENT

REVISION: 0

EFFECTIVE DATE:

WP #0292E

6.0 BRIGADE TRAINING

6.1 Safety Section

The Safety Section will provide Emergency Brigade training each month. Training attendance records will be maintained by the Safety Section.

6.2 Brigade Members

Brigade members are required to attend a minimum of nine training sessions each calendar year.

NUCLEAR FUEL DIVISION
PLANT PROCEDURE

COLUMBIA SITE EMERGENCY PROCEDURE

SUBJECT: ACTIVATION OF EMERGENCY BRIGADE

PROCEDURE: CSEP-0016-A

RESPONSIBLE DEPARTMENT: SAFETY DEPARTMENT

REVISION: 0

EFFECTIVE DATE:

WP #0293E

1.0 PURPOSE

This procedure will give direction to the Emergency Brigade members at the sound of the alarms.

2.0 SCOPE

In the event of a fire, various means would be used to alert the Emergency Brigade and plant personnel that a fire was occurring. Alarms would be sounded over the entire site and firefighting equipment within the facility could be activated. Additionally, the Site Emergency Brigade would respond and if necessary, offsite firefighting support would be requested. Evacuation of the plant may be necessary.

3.0 RESPONSE PROCEDURES -- FIRE ALARM

The Emergency Brigade members assigned to the Mechanical Area will be identified as Unit 1 and members assigned to the Controlled Area will be identified as Unit 2.

3.1 Emergency Brigade Members

3.1.1 On 1st and 2nd Shift, Monday through Friday

Unit 1 has the primary responsibility in all areas except Zone One and Zone Two.

Unit 2 responds to all zone alarms by assembling in the Control Room unless specified otherwise.

Zone One (Controlled Area)

Unit 1 assembles outside at Dock 5 and assumes backup status. Unit 2 looks for emergency and acts accordingly. If the emergency is a UF_6 gas release, both units maintain a backup status to the Health Physics Operations outside at Dock 5.

Zone Two (Solvent Extraction)

Unit 1 assembles outside at Dock 3 and assumes backup status. Unit 2 looks for emergency and acts accordingly. If the emergency is a gas release, both units maintain a backup status to the Health Physics Operations outside at Dock 3.

COLUMBIA SITE EMERGENCY PROCEDURE

SUBJECT: ACTIVATION OF EMERGENCY BRIGADE

PROCEDURE: CSEP-0016-A

RESPONSIBLE DEPARTMENT: SAFETY DEPARTMENT

REVISION: 0

EFFECTIVE DATE:

WP #0293E

Zone Three Alarm (Mechanical Area and Expansion Office Area)

Unit 1 has primary responsibility and assembles at Dock 1, locates the emergency and acts accordingly. The first member there waits for another member so that accountability is maintained.

Zone Four or Five Alarm (First and Second Floor Mezzanine)

Unit 1 has primary responsibility and assembles at the Medical Department. The first member there waits for another member so that accountability is maintained.

Zone Six Alarm (Office Area)

Unit 1 has primary responsibility and assembles at the Safety Department. The first member there waits for another member so that accountability is maintained.

Zone Seven Alarm (Roof)

Unit 1 has primary responsibility and assembles at the fire pump house, locates the emergency and acts accordingly. The first member there waits for another member so that accountability is maintained. Unit 2 assumes backup status and assembles at Dock 3.

Zone Eight Alarm (Outside Area)

Unit 1 has primary responsibility and assembles at the fire pump house, locates the emergency and acts accordingly. The first member there waits for another member so that accountability is maintained. Unit 2 assumes backup status and assembles at Dock 3.

Zone Ten Alarm (Sprinklers)

Unit 1 has primary responsibility and assembles outside the Mechanical Development Lab. The guard drives the emergency vehicle to the exit next to the Mechanical Development Lab. Enroute he will listen for the manual rotoalarm outside the fire riser and identify the alarming riser to the Brigade. In the event none of these risers are alarming the Brigade will proceed to the Butler Building to investigate the emergency. Once the emergency is located the Brigade shall act accordingly.

Criticality Siren

Unit 1 assembles in th Staff parking lot (at the emergency truck) and awaits instruction. Unit 2 assembles at the UF_6 Recertification Building.

3.1.2 On Weekends and Holidays and 3rd Shift

Unit 2 has primary responsibility for all emergencies except for a UF_6 release or criticality. Therefore, they should respond to the same assembly points as Unit 1 does during regular hours.

3.1.3 After Reaching the Scene of the Emergency:

A. Insure that no employe is trapped in the emergency area.
B. Send a Brigade member to locate the emergency truck.
C. Isolate the area.
D. Set up communications system.
E. Analyze the situation and react accordingly.

3.2 Security Guard Force

3.2.1 Pick Up Required Equipment

A guard must be stationed at the guardhouse. The closest one to the emergency truck picks up the master set of keys and the communication equipment. If an Emergency Brigade member reaches the truck first, he/she gets the equipment. He is to remain at the truck and under the control of the Brigade Coordinator.

3.2.2 Taking the Emergency Truck to the Control Points:

Zone One Alarm

South side of the plant at Dock 5 area.

Zone Two Alarm

West side of the plant at Dock 3 area.

Zone Three Alarm

North side of the plant at Dock 1 area.

COLUMBIA SITE EMERGENCY PROCEDURE

SUBJECT: ACTIVATION OF EMERGENCY BRIGADE

PROCEDURE: CSEP-0016-A

RESPONSIBLE DEPARTMENT: SAFETY DEPARTMENT

REVISION: 0

EFFECTIVE DATE:

WP #0293E

Zone Four and Five Alarm

Southeast corner of the plant next to the hydrant house or the outside door to the Chem Lab.

Zone Six Alarm

Main guardhouse.

Zone Seven and Eight Alarm

Fire pump house.

Zone Ten Alarm

West side of plant to the exit next to the Mechanical Development Lab.

Criticality Siren

Staff parking lot.

NUCLEAR FUEL DIVISION
PLANT PROCEDURE

COLUMBIA SITE EMERGENCY PROCEDURE

SUBJECT: COLUMBIA SITE EMERGENCY PROCEDURE ACTIVATION OF HEALTH PHYSICS RESPONSE TEAM
RESPONSIBLE DEPARTMENT: SAFETY DEPARTMENT

PROCEDURE: CSEP-0016-B
REVISION: 0
PAGE: 1 of 2

EFFECTIVE DATE:
WP #0307E:3

PURPOSE

This procedure will define the actions of the Health Physics emergency response team and their basic duties.

SCOPE

In the event of an emergency incident involving release of radioactive material or a high radiation area, the Health Physics Operations group will respond to assure all personnel have evacuated the area and monitor personnel suspected of radiation contamination or exposure.

PROCEDURE

1. The Manager of Health Physics Operations or lead technician, shall form technician emergency teams to respond to unusual incident situations as indicated in the implementing procedures.

2. A "safe" control point will be established following the evacuation alarm. External dose readings will be less than 5 mR/hr. at this control point. Airborne concentrations shall be less than MPC. Health Physics Operations personnel or their alternates shall function as Radiation Monitors during criticality evacuations as specified in CSEP-0005.

3. All Health Physics personnel will act to limit exposure of general personnel to external whole body radiation to "As Low As Reasonably Achievable" (ALARA) or less than 3 Rem/quarter. Special emergency dose authorization may be given as outlined in CSEP-0005.

4. The Emergency Team will establish that all personnel have evacuated the area and monitor personnel suspected or radiation contamination and exposure.

5. General entry into the affected area will be restricted until the Emergency Brigade has the incident under control.

6. Bioassay shall be required of exposed personnel as per Health Physics Operating Procedure 04-01, 02, 03, or as deemed necessary by R&E Engineering. An unusual incident form will be completed by the area supervision following the incident.

7. The Health Physics Emergency Team will perform contamination surveys until the respective areas and equipment can be released per the Contamination Control Procedure.

COLUMBIA SITE EMERGENCY PROCEDURE

SUBJECT: COLUMBIA SITE EMERGENCY PROCEDURE ACTIVATION OF HEALTH PHYSICS RESPONSE TEAM
RESPONSIBLE DEPARTMENT: SAFETY DEPARTMENT

PROCEDURE: CSEP-0016-B
REVISION: 0
PAGE: 2 of 2

EFFECTIVE DATE:
WP #03078:3

8. The area will be released for normal operations when acceptable airborne activity levels have been achieved (less than 1 MPC), and when contamination control limits have been achieved.

9. Environmental sampling shall be initiated as deemed necessary by the Manager of R&E Engineering according to CSEP-0017-C.

NUCLEAR FUEL DIVISION
PLANT PROCEDURE

SUBJECT: ESTABLISHING DOWNWIND CONCENTRATIONS UTILIZING GROUND LEVEL RELEASE DIFFUSION FACTOR

PROCEDURE: CSEP-0017A

RESPONSIBLE DEPARTMENT: REGULATORY COMPLIANCE

REVISION: 0

EFFECTIVE DATE:
WP #0125E:3

PAGE: 1 of 1

PURPOSE

To provide a rapid method for estimating downwind concentrations following the accidental release of radioactive material.

SCOPE

Under certain conditions the meteorological parameters may be unavailable. It may become necessary to make a rapid assessment of the situation using conservative calculations. The ground level diffusion equation will be employed for this purpose. The graphs are based on the diffusion model conditions listed in Table B.1. This procedure will cover such situations.

PROCEDURE

1. Count stack sample immediately following the accident as per Health Physics Operating Procedure 06-02. Discount contribution from short lived alpha emitters if desired. Calculate source term by multiplying concentration times volume discharged factor in weekly computer program CAHP0070.

   Sample Calculation: $\frac{\text{uCi X ml X 1 hour X 1 minute X 1 Ci}}{\text{ml X hr X 60 min. X 60 seconds X } 10^6} = \text{Source Term, Ci/second}$

2. Determine the distance to the downwind sampling point where the concentration is desired by using the distances supplied in Emergency Procedure 17-C or estimating them in meters. Refer to Figure 1 and 2, 8-24 hour lines.

3. From Figures 1 and 2 determine the atmospheric diffusion factor X/Q, sec/m^3.

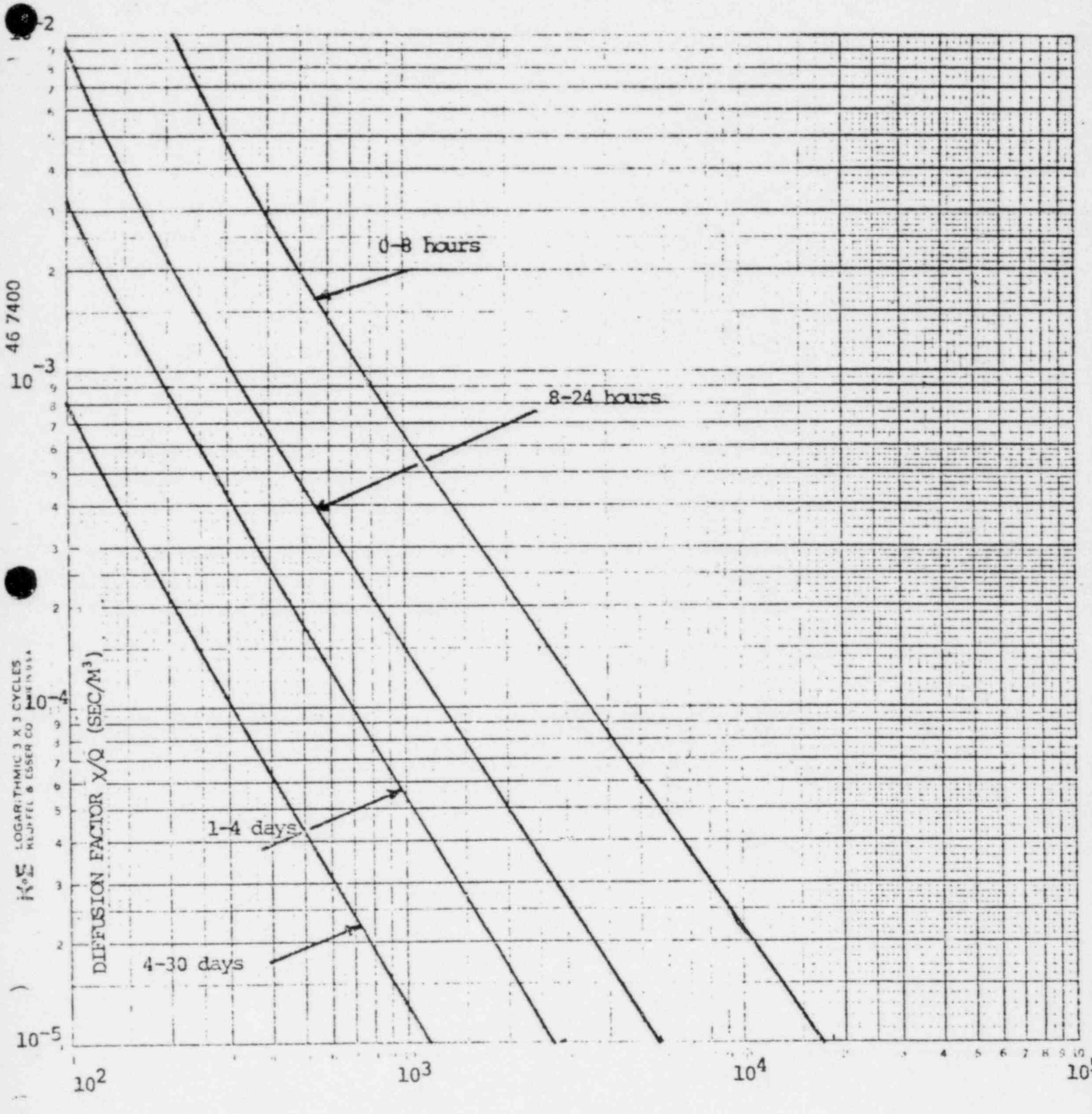
4. Estimate the downwind concentration using the diffusion factor from the above step and the following calculation:

Downwind Concentration at Distance "x" from the Structure (Ci/m^3)	=	Source Term, (Ci/sec)	X	Diffusion Factor (X/Q) from Figures 1 and 2 for Distance "x" ($second/m^3$)

GROUND LEVEL RELEASE - ATMOSPHERIC

DIFFUSION FACTORS FOR VARIOUS TIMES

FOLLOWING ACCIDENT



Distance from Structure (Meters)

FIGURE 1

GROUND LEVEL RELEASE - ATMOSPHERIC
DIFFUSION FACTORS FOR VARIOUS TIMES
FOLLOWING ACCIDENT

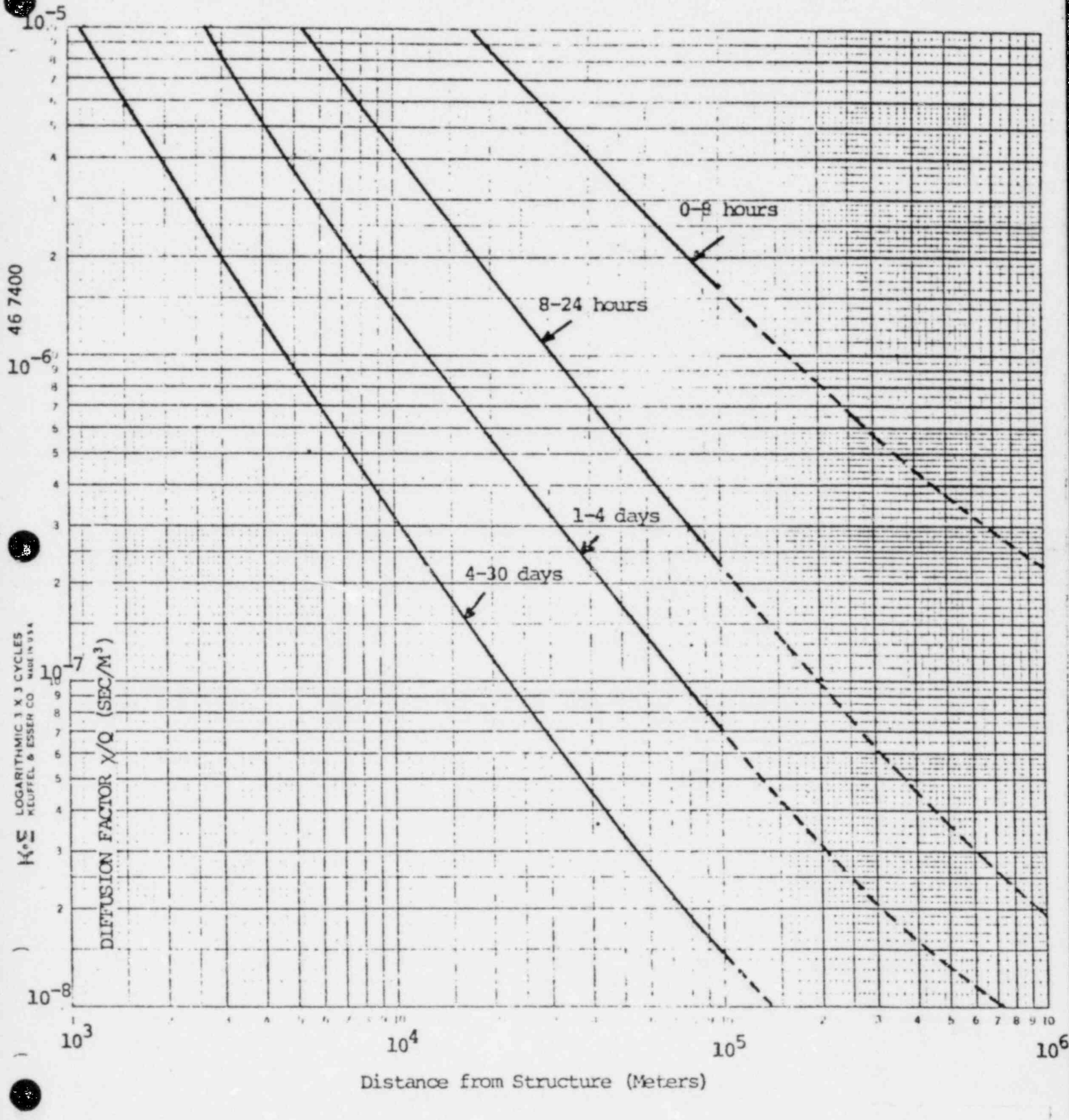


FIGURE 2

NUCLEAR FUEL DIVISION	subject ESTABLISHING METEOROLOGICAL CONDITIONS AND CALCULATING DOWNWIND CONCENTRATIONS USING UNIFORM DIRECTION WIND MODEL	procedure 0017-B
		revision 0
PLANT PROCEDURE	effective date / responsible department: Regulatory Compliance	page 1 of 2

PURPOSE

To establish the meteorological conditions which exist during an accidental release of airborne radioactive materials.

SCOPE

This procedure will cover the information necessary to calculate the atmospheric dispension factor for radioactive particulate material. This factor in combination with the source term can be utilized to determine the dose commitment for both employees and the general public under emergency conditions.

PROCEDURE

1. Establishing Windspeed

   A. By measurement establish wind speed and direction at 10 meters, approximately the top of the building, or estimate from ground level measurement using R. M. Young, Field Recording Wind Set:

$$\frac{U_1}{U_2} = \frac{Z^1}{Z^2} \quad (0.2)$$

U_1 = Windspeed at altitude Z^1, in meters
U_2 = Windspeed at altitude Z^2, in meters

Note conversion factor:

Windspeed, m/s = mph x 0.447

The wind direction recorded is the direction the wind is coming from. The path that the released material will take is therefore 180^0 different.

   B. By estimation

Estimate by use of the following:

1 to 3 mph - Smoke drifts lazily
4 to 7 mph - Trees leaves rustle
8 to 12 mph - Small flags fly
13 to 18 mph - Trees toss, dust flies
19 to 24 mph - Trees sway

2. Estimating Stability Class

There are six stability classes A - F which can be categorized according to solar insolation, amount of cloud cover, and windspeed:

Key to Stability Categories:

Surface Wind Speed at 10 m (m/s)	Day			Night	
	Incoming Solar Radiation			Cloud Cover	
	Strong	Moderate	Slight	Mostly Overcast	Mostly Clear
Class	(1)	(2)	(3)	(4)	(5)
< 2	A	A-B	B	E	F
2-3	A-B	B	C	E	F
3-5	B	B-C	C	D	E
5-6	C	C-D	D	D	D
> 6	C	D	D	D	D

1. Clear skies, solar altitude greater than 60 degrees above the horizontal, typical, of a sunny summer afternoon. Very convective atmosphere.

2. Summer day with a few broken clouds.

3. Typical of a sunny fall afternoon, summer day with broken low clouds, or summer day with clear skies and solar altitude from only 15 to 35 degrees above horizontal.

4. Can also be used for a winter day.

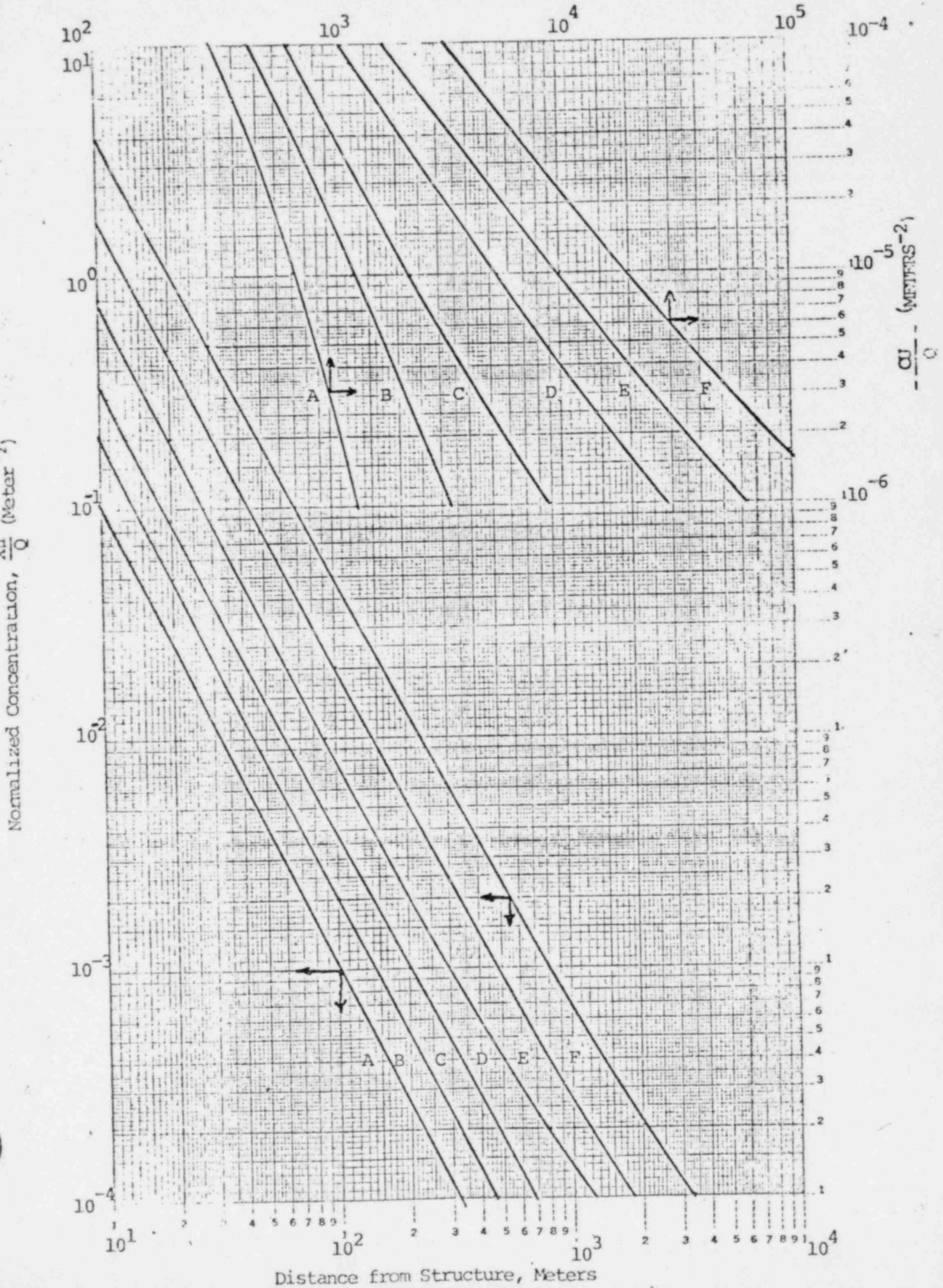
Normally select the most conservative stability class to overestimate the effects of the incident.

Calculation: For an incident which occurs over a relatively short time period, it is appropriate to assume that the wind direction remains uniform over a narrow band.

$$\text{Downwind Concentration At Distance "x" from The Facility, Ci/m}^3 = \frac{\text{Source Term, Ci/m}^3 \times \text{Normalized Concentration Factor from Figure 1 at Distance x and for Existing Stability Class, m-2}}{\text{Average Windspeed, m/Second}}$$

FIGURE 1

CSEP-0017-P



	NUCLEAR FUEL DIVISION	subject ESTABLISHING THE SOURCE TERM FOR RELEASED MATERIAL		procedure CSEP-0017C
	PLANT PROCEDURE	effective date	responsible department Regulatory Compliance	revision 0
				page 1 of 3

PURPOSE

To provide the necessary information to calculate the source term on the amount of radioactive material released per unit of time.

SCOPE

In order to evaluate the degree of hazard encountered, the source term must be established. This procedure describes the methods of measuring and estimating the source term depending on the available information. This data will determine what protective actions, if any, are desirable or necessary to protect both employes and the general public.

PROCEDURE

A. Determination by Stack Monitoring

Whenever the release route is through the normal ventilation stacks, the most accurate source is the stack air sample. Under certain conditions, it may be impossible or unfeasible to retrieve the sample or the release may occur at some unsampled opening. Section B will cover such situations.

1. Count the air sample as per normal procedure with an appropriate instrument to detect alpha activity. If desired the sample count can be corrected for the presence of long lived alpha emitters.

2. Use the appropriate sampling flow rate listed on the daily effluent air sampling sheet. Use the stack exhaust volume flow rate as listed on the weekly effluent air sampling report.

3. Calculate the source term:

$$\left[\text{Source Term}\right], \mu\text{Ci/second} = \frac{\left(\text{Sample Count Rate, cpm}\right) \times \left(\text{Stack Exhaust Flow Rate, ml/hr.}\right)}{\left(\text{Stack Sampling Rate, cfm}\right)\left(\text{Sample Collection Time}\right)} \; 1.86 \times 10^{-16*}$$

$$\text{Ci/second} = \frac{\left(\text{Sample Count Rate, cpm}\right) \times \left(\text{Stack Exhaust Flow Rate, ml/hr}\right)}{\left(\text{Stack Sampling Rate, cfm}\right)\left(\text{Sample Collection Time}\right)} \; 1.86 \times 10^{-22*}$$

* Assuming 50% efficiency

PROCEDURE (Cont.)

B. Determination Based on Environmental Monitoring

Under certain conditions, the stack samples may not be accessible or it may be desirable to establish the source term by a second method. This calculation is based on using the diffusion equations to back calculate the source term given a know air concentration at a known distance and direction from the point of release.

The air sample collected may be either from one of the fixed location environmental monitoring stations or a portable air monitoring pump. In either case, it is necessary to know the distance and direction of the sampling point from the point of release. The most desirable collection point would be a location directly in the path of the wind from the point of release. The distance and direction of the environmental monitoring stations from the plant are given below.

ENVIRONMENTAL AIR SAMPLER	DIRECTION	DISTANCE, m
No. 1	NE	915
No. 2	NNE	595
No. 3	NE	198
No. 4	WNW	595
No. 5*	NE	4668

C. Calculation of Air Concentration

For fixed air samplers sampling at 2.0 cfm the air concentration is determined as follows:

1. Alpha Air Concentration

$$\left(\frac{\text{uCi}}{\text{ml}} \text{ or } \frac{\text{Ci}}{\text{m}^3}\right) = \frac{\left(\text{Corrected Sample Count Rate, cpm}\right) \times 3.34\times10^{-13} *}{\left(\text{Sample Time, in hours}\right)}$$

* Assuming 50% efficiency

The collection time is assumed to be the time period from the start of the accident to the time when the release was terminated or the sample was collected. The sample count can be corrected for the presence of long-lived alpha emitters (radon and thoron), if necessary.

PROCEDURE (Cont.)

2. Other portable air samplers may be used with a correction factor for the exact volume sampled X, cfm/2.0 cfm

3. Source Term

$$(\text{Ci/second}) = \frac{\left(\text{Downwind Concentration at Distance "x" from plant } (\text{Ci/m}^3)\right)}{(\text{Diffusion Factor X/Q for Distance "x"})(\text{Seconds/m}^3)^*}$$

* Determined by meteorological conditions at distance "x"

NUCLEAR FUEL DIVISION	subject CALCULATION OF THE DOSE COMMITMENT DUE TO EXPOSURE TO AIRBORNE RADIOACTIVE MATERIAL		procedure CSEP-0017 D
			revision 0
PLANT PROCEDURE	effective date	responsible department Regulatory Compliance	page 1 of 2

PURPOSE

This procedure provides the steps necessary to determine the dose commitment that a person would receive if exposed to a certain concentration of airborne radioactive material for a specific period of time.

SCOPE

In the event of an accidental airborne release of radioactive material, it will be necessary to make estimates of the radiation exposure that might be received by persons exposed to the radioactive material. Other procedures in this series are used to establish the basic information necessary to estimate the dose commitment. Required information includes (1) the source term, (2) meteorological parameters, (3) determination of airborne concentrations.

Once all of the preliminary information has been compiled, this procedure is used to make estimates of the dose at various locations and under varying assumptions. Comparison of the anticipated dose commitment to the established protective action guides will establish what actions are necessary to provide adequate protection of the exposed persons.

RESPONSIBILITIES

The Manager of Radiological and Environmental Engineering or his designated alternate is responsible for the performance of these calculations, for the evaluation of the results and the determination of recommended protective actions, and for the collection and filing of all calculations and evaluations for future reference.

INTRODUCTION

Exposure to low level enriched uranium involves two basic hazards: (1) chemically a toxic element to the kidneys in the transportable (soluble) form and (2) a potential radiation hazard to the lung in the nontransportable (insoluble) form. The dose to the kidney can be controlled by limiting internal exposure to less than 2.5 mg transportable uranium per day. Dose to the lung can be controlled by limiting the incident exposure to less than 15 Rems. All nontransportable material will conservatively be assumed to be Class Y material for the first estimate.

PROCEDURE

1. Determine the air concentration at the site boundary (or the desired location) by environmental sampling or by using stack samples and applying the source term, diffusion factor, and meteorological parameters.

2. Determine if the release is soluble (UF_6, UO_2F_2, UNH, or ADU) or insoluble (U_3O_8 or UO_2) type material. If the material is soluble determine the U_{235} enrichment.

PROCEDURE (Cont.)

3. Estimate the duration of the incident. If possible estimate the duration of the exposure time at the downwind location.

4. Refer to Figure I for exposure times to insoluble material. Refer to Figure 2 for maximum exposure time to soluble material. Estimate dose in Rems and determine if exposure would be greater than 15 Rems. Determine if exposure to soluble materials is greater than 2.5 mgU.

5. If either of the above limits are exceeded, estimate the projected time limit it would take to initiate protective actions.

6. Initiate appropriate protective action sequences required by Tables 6.3, 6.4, 6.5 including notification of appropriate state agencies and the Nuclear Regulatory Commission.

TABLE 6.3

PROTECTIVE AND RESTORATIVE ACTIONS FOR NUCLEAR INCIDENTS RESULTING IN AIRBORNE RELEASES

Nuclear Incident	Protection Phase (See Numbered Legend Below)			Restoration Phase (c) (See Legend)
	Approximate Time of Initiation			
	0-4 Hr.	4-8 Hr.	> 8 Hr.	
Puff Release[a] – Gaseous or Gaseous and Particulate	1, 2, 3, 4	3, 4	3, 4, 5, 6, 7	8, 9, 10
Continuous Release[b] – Gaseous or Gaseous and Particulate	1, 2, 3, 4	1, 2, 3, 4	1, 2, 3, 4, 5, 6, 7	8, 9, 10

1 Evacuation
2 Shelter
3 Access Control
4 Respiratory Protection for Emergency Workers
5 Pasture Control
6 Milk Control
7 Food and Water Control
8 Lift Protection Controls
9 Reentry
10 Decontamination

a. Puff Release – less than 2 hours
b. Continuous Release – 2 hours or more
c. Restoration Phase may begin at any time as appropriate

TABLE 6.5

RECOMMENDED PROTECTIVE ACTIONS TO AVOID WHOLE BODY AND THYROID DOSE FROM EXPOSURE TO A GASEOUS PLUME

Projected Dose (rem) to the Population	Recommended Actions[a]	Comments
Whole Body < 0.5 Lung < 1.5 Bone < 3.0 Uranium (soluble) < 2.5 mg/day	No protective action required Monitor environmental radiation.	Previously recommended protective actions may be reconsidered or terminated.
Whole Body 0.5 to < 25 Lung 1.5 to < 75 Bone 3.0 to < 150 Uranium (soluble) 2.5 mg/day	State may issue an advisory to: Seek shelter and wait further instructions. Consider evacuation particularly for children and pregnant women. Consider access control.	Strong consideraton should be given to evacuation at levels above 5 rem whole body, 15 rem lung, and 5.0 rems bone. (marrow)
Whole Body 25 and above Lung 75 Bone 150 Uranium (soluble) > 2.5 mg/day	Conduct mandatory evacuation of populations in the predetermined area. Monitor environmental radiation levels and adjust area for mandatory evacuation based on these levels.	Seeking shelter would be an alternative if evacuation were not immediately possible.
Projected Dose (rem) to Emergency Team Workers		
Whole Body 25 Lung 75 Bone 150 Uranium (soluble) 10 mg/day Whole Body 75	Control exposure of emergency team members to these levels except for lifesaving missions. (Appropriate controls for emergency workers, include time limitations and respirators. Control exposure of emergency team members performing lifesaving missions to this level. (Control of time of exposure will be most effective.)	Respirators should be used where effective to control dose to emergency team workers.

a. These actions are recommended for planning purposes. Protective action decisions at the time of the incident must take into consideration the impact of existing constraints.

TABLE 6.4
INITIATION TIMES FOR PROTECTIVE ACTIONS

Approximate Initiation Time	Exposure Pathway	Action to be Initiated
0-4 Hours	Inhalation of Gases or Particulates	Evacuation, shelter, access control, respiratory protection
	Direct Radiation	Evacuation, shelter, access control
4-48 Hours	Milk	Take cows off pasture, prevent cows from drinking surface water, quarantine contaminated milk
	Harvested Fruits and Vegetables	Wash all produce, or impound produce
	Drinking Water	Cut off contaminated supplies, substitute from other sources.
	Unharvested Produce	Delay harvest until approved.
2-14 Days	Harvested Produce	Substitute uncontaminated produce.
	Milk	Discard or divert to stored products, such as cheese.
	Drinking Water	Filter, demineralize

FIGURE 1

PROJECTED LUNG DOSE, 4.0% ENRICHMENT (CLASS Y) MATERIAL

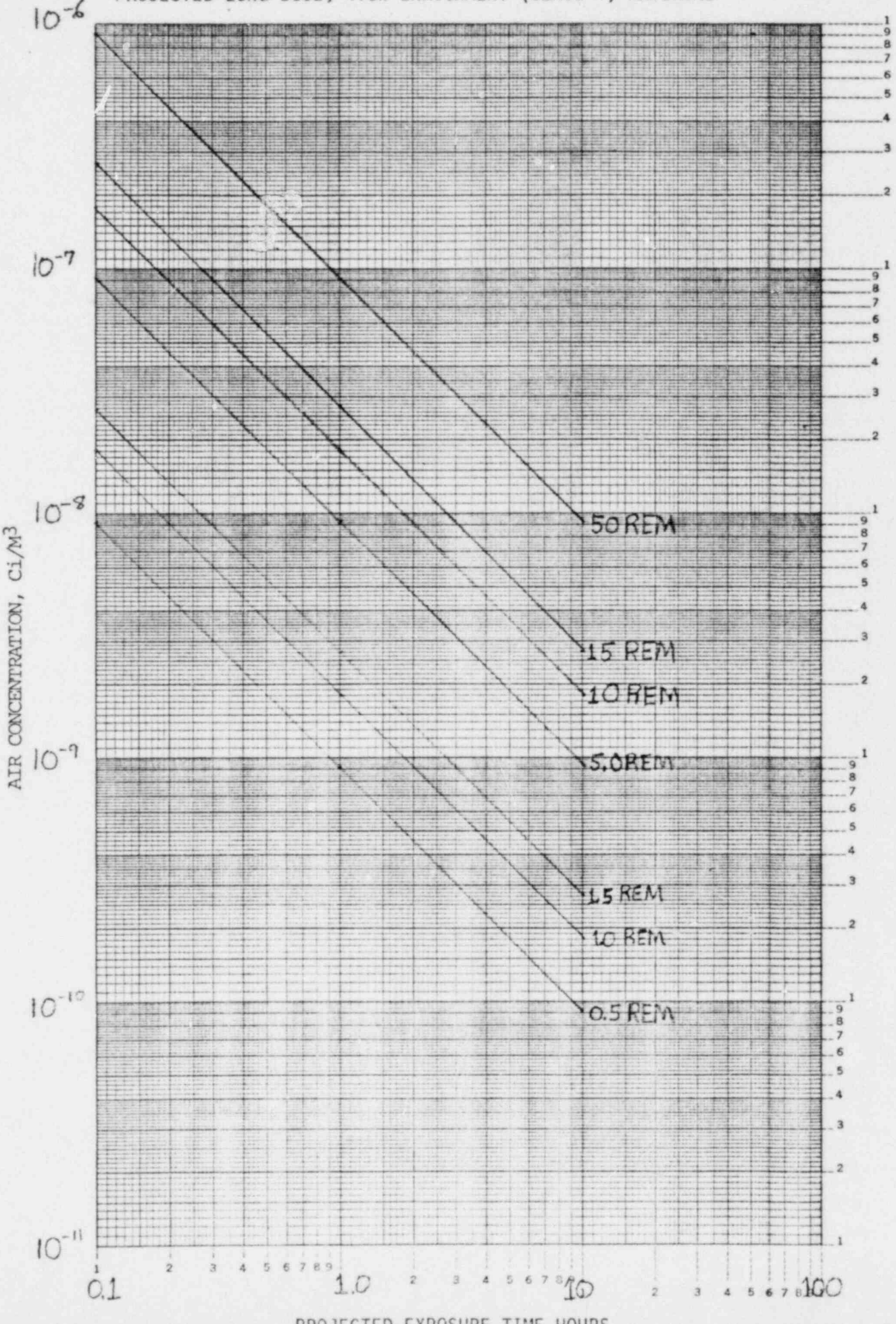
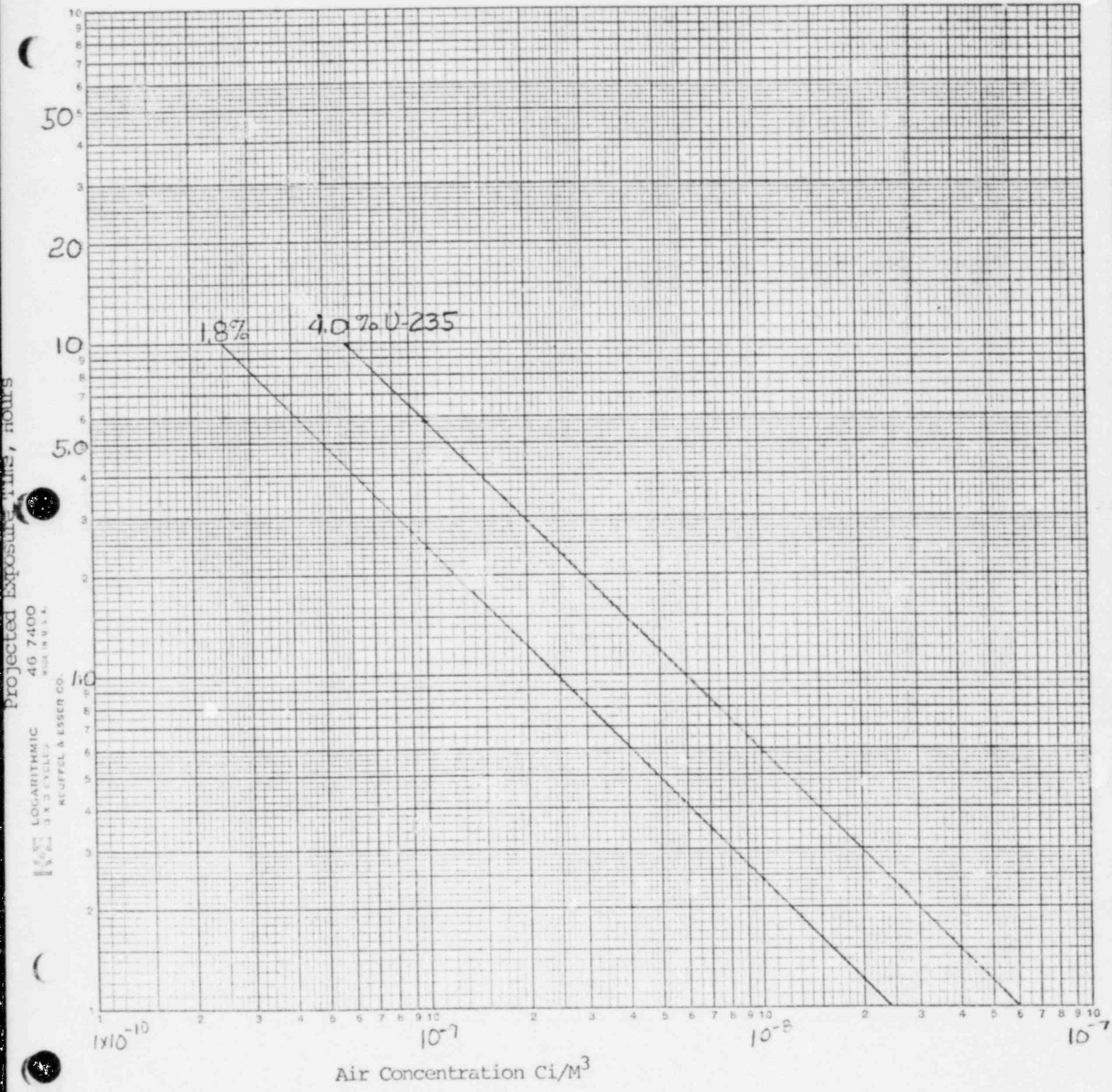


FIGURE 2

Air Concentration As Function Of Exposure Time For 1.8 and 4.0%

U235 Which Gives An Inhalation Dose Of 2.5 mg Soluble Uranium (Class D)



NUCLEAR FUEL DIVISION
PLANT PROCEDURE

COLUMBIA SITE EMERGENCY PROCEDURE

SUBJECT: EMERGENCY COMMUNICATIONS (TWO-WAY RADIOS)

PROCEDURE: CSEP-0018

RESPONSIBLE DEPARTMENT: REGULATORY COMPLIANCE

REVISION: 0

EFFECTIVE DATE:

WP #02908

1.0 PURPOSE

This procedure provides communication guidelines during emergency onsite and offsite situations.

2.0 SCOPE

In the event of a plant emergency, radios are available to direct and control activities. Typical emergencies may include hazardous fires; chemical or radiological accident; medical treatment or evacuation; or radiological, criticality or environmental monitoring and surveillance. Preassigned radio frequency channels are recommended. Radios shall be issued in the emergency by the security department.

3.0 RESPONSIBILITY

3.1 Security department shall issue radios to responsible personnel during plant emergencies. A log shall be kept by security listing time in and out, date and personnel receiving radio. Security department shall be responsible for storage, battery charge, maintenance, and servicing of radios. A functional check will be performed monthly on all radios.

3.2 Per Columbia plant emergency plan, the Plant Manager is the emergency director with preassigned designates.

3.3 Emergency Brigade shall be issued special voice actuated radios for personnel directly involved in hazardous activities. Channel "2" will be the primary emergency brigade frequency.

3.4 Personnel directly involved in emergency will be issued radios as required. Typical assignments of emergency portable radios:

Responsible Person	Quantity	Number of Channels
Emergency Director	1	8
Emergency Coordinator	1	4
Operations Engineering Manager	1	4
Maintenance Manager	1	4
R&E Engineering Manager	1	4
Health Physics	2	4
Emergency Brigade	3	4 voice actuated
Security, Safety, and Medical Personnel (available as required)	-	1 & 2

3.5 All personnel are responsible to make a radio functional check at the time radios are issued. Person assigned radio is responsible for keeping equipment in good working order while in his possession.

4.0 PROCEDURE

4.1 Personnel using radios shall report in to Base on Channel "I." Notify the Base station that continued emergency communication will be on designated primary preassigned channel. The following chart specifies preassigned channels with associate CALL SIGNS.

CHANNEL		DESCRIPTION
CALL SIGN "KSS 717"	CALL SIGN "KE 7409"	
1		Base communication & security
	2	Emergency Brigade for hazardous operations.
	3	Emergency evacuation personnel accountability; radiation, criticality, or environmental surveillance.
	4	Open-available for special communications.
5		Medical and safety ON and OFF site.

4.2 All personnel should closely follow FCC rules. Station identification must be strictly observed, CALL SIGN must be given at the end of each transmission and at least every 15 minutes of continuous transmission. Use the following format:

Channels 1 and 5 use "KSS 717" plus individual mobile or portable call sign.

Channels 2, 3, or 4 use "KE 7409" plus individual mobile or portable call sign.

Signify end of conversion with CALL SIGN and "CLEAR."

Examples:

"KSS 717 Base"
"KSS 717 this is (Mobile 1)"
"KSS 717 this is (W1)"
or
"KE 7409 this is (W1)"

4.3 Return radios to security for recharging or repair as required. Normal full-charged portable radios will function 24 hours maximum. Full recharge requires 16 hours minimum.

INVENTORY OF TWO-WAY RADIOS

TYPE	CALL	CHANNEL (QTY)	DESCRIPTION (WITH PRIMARY FUNCTION)
I	KSS 717	1, 5 (2)	Base station located at main guardhouse
II	Mobile-1	1, 5 (2)	Mobile security vehicle (range 10 miles)
	Mobile-2	1, 5 (2)	Mobile ambulance (range 10 miles)
III	Mobile-3	1 (1)	Mobile maintenance (range 10 miles)
	Mobile-4	1 (1)	Mobile receiving (range 10 miles)
IV	W-1	1,2,3,4,5...(8)	Portable for Plant Manager
V	W-2	1,2,3,4 (4)	Portable Emergency
	W-3	1,2,3,4 (4)	Portable Emergency
	W-4	1,2,3,4 (4)	Portable Emergency
	W-5	1,2,3,4 (4)	Portable Emergency
	W-6	1,2,3,4 (4)	Portable Emergency
	W-7	1,2,3,4 (4)	Portable Emergency
VI	W-8	1,2,3,4 (4)	Portable Emergency Brigade ONLY
	W-9	1,2,3,4 (4)	Portable Emergency Brigade ONLY
	W-10	1,2,3,4 (4)	Portable Emergency Brigade ONLY
VII	W-11	1 (1)	Portable Security
	W-12	1 (1)	Portable Security
	W-13	1 (1)	Portable Security
	W-14	1 (1)	Portable Security
VIII	W-15	1, 5 (2)	Portable Security
	W-16	1, 5 (2)	Portable Security
	W-17	1, 5 (2)	Portable Security
	W-18	1, 5 (2)	Portable Security

NOTE: For channels 1 or 5 use call sign "KSS 717"
For channels 2, 3, or 4 use call sign "KE 7409"