

GSEP ENVIRONS GROUP
EMERGENCY PLAN IMPLEMENTING PROCEDURES

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EG-3
Revision 3
June, 1982

GSEP ENVIRONS GROUP
EMERGENCY PLAN IMPLEMENTING PROCEDURE

EG-3

FIELD TEAM EQUIPMENT AND SURVEY TECHNIQUES

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A. PURPOSE

This procedure describes the equipment and field survey techniques to be used by the field teams in measuring radiation releases.

B. REFERENCES

1. FEMA REP 2 (Sept. '80) Guidance on Offsite Emergency Radiation Measurement Systems
2. EG-1 Coordination of Environs Groups Activities
3. EG-2 Onsite and Offsite Monitoring Locations
4. EG-4 Protective Equipment and Personnel Dosimetry
5. EG-5 Use of KI by Field Teams
6. EG-19 Operation of Eberline SAM-2 Iodine Counter

C. PREREQUISITES

1. Activation of Environs Group Teams.
2. Each team should be equipped with or have access to necessary sampling equipment as described in Appendix A.
3. Each team member should be properly trained in the use of the sampling equipment and be familiar with all the applicable procedures.
4. The Environs Groups under the supervision of the Rad/Chem or Environs Director will consist of personnel from CECO and contractors designated to assist the groups.

D. PRECAUTIONS

1. When entering an area where unknown types and concentrations of airborne radioactive material exist, the Environs Director shall direct what type of respiratory protection is needed and if protective clothing shall be worn, as the situation warrants (per EG-4).
2. Only calibrated instruments and air sampling equipment shall be used. Equipment should be tested before use, and if it responds incorrectly, the Environs Director should be notified and the instrument replaced with a working model.
3. Each sample shall be properly labeled as applicable with the date, time, location, flow rate, flow time, sample taker's name and/or any other information pertinent to sample analysis included.
4. When noble gases are suspected to be present, completely bag and seal the C.P. in a plastic bag.
5. When taking Window Open (WO) and Window Closed (WC) readings with the C.P. at heights of 6 inches (hold end window towards ground) and 6 feet above the ground:

D. PRECAUTIONS (Continued...)

5. a. If the beta/gamma readings at 6 inches and 6 feet above the ground indicate no beta radiation is present (ie. WO and WC readings are the same), then the team is not submerged in the plume and is measuring predominately gamma radiation from the nearby plume, not ground contamination. Therefore, the gamma radiation measurement at 6 feet is appropriate to use when determining the wholebody exposure rate.
 - b. If the beta readings at 6 feet are significantly less than the 6 inch readings, then it is probable that the team is not submerged in the plume and is measuring contamination from the ground. Under these conditions, the gamma radiation measurement at 6 inches may be higher than the 6 feet gamma measurement and the larger value should be used to determine the wholebody exposure rate.
 - c. If the beta readings at 6 feet and 6 inches above the ground indicate positive beta radiation is present (i.e. Window open minus window closed is positive), then it is probable that the team is submerged in the plume and is measuring predominately beta/gamma radiation from the plume. However, these C.P. readings are not representative of the beta/gamma dose rate from the plume unless the C.P. is completely sealed from the entry of noble gases into the chamber.
6. The following ALARA considerations apply.
- a. The Environs Director will exercise ALARA considerations for the environs teams by keeping them away from the plume centerline as much as possible, especially close to the station where exposure rates may be very high.
 - b. While the environs teams are running their air sampling equipment they should effectively use their time by collecting other samples as requested by the Environs Director (e.g. soil, water, vegetation samples). In high radiation fields the environs team should as practical, leave the area and after 5-10 minutes come back and retrieve their air sampling equipment.
 - c. The environs team will immediately inform the Environs Director when radiation levels exceed 100 mR/hr.

E. LIMITATIONS AND ACTIONS

1. An inventory and inspection will be performed on a quarterly basis and after each use as required by each Station's procedures to ensure the operational readiness of the Environs Sampling Kits.
2. Verify that the equipment and supplies listed in Attachment A are present and/or operable. If items are missing, not in adequate supply or inoperable ensure corrective action is taken to clear the deficiency.
3. Calibrate all instruments in the Environs Sampling Kit at least every six months.
4. Film badges or TLD's will be individually sealed in plastic with a desiccant and replaced semi-annually.
5. Ensure all dosimeters are quality control tested every six months in accordance with each station's procedures.
6. Replace all spare batteries in the Environs Sampling Kit annually.
7. The Environs Sampling Kit inventory should be reviewed by a member of the Stations' health physics staff after it has been completed.
8. Initiation of environmental sampling activities and direction of the Environs Groups will be performed by the Rad/Chem Director until the Environs Director has been notified and assumes his duties.
9. If the radiation levels at the site boundary are significantly elevated, initial emphasis should be placed on determination of offsite radiation levels and identification of areas that require controlled access and or evacuation.
10. If the areas have a significantly elevated radiation level, entry shall be at the discretion of the Environs Director. Appropriate clothing and respiratory protection shall then be issued. (Ref. EG-4)

F. PROCEDURE

1. Determination of Ground Contamination
The following method can be used to quickly determine if there is significant ground contamination. Using a GM instrument, (eg. Eberline GM with an HP210 probe or equivalent) take a background reading at approximately 3 ft. above the ground. Take a second reading at 6 inches above the ground, being careful not to damage or contaminate the probe face by hitting the ground. If the 6 inch reading is significantly higher than the background reading taken at 3 feet, ground contamination is present. Record both results in the sampling log and note the location(s) of ground contamination. Contact the Environs Director with this information.

2. Verifying Exposure Rate Patterns

The well defined plume under stable conditions represents the greatest hazard at the farthest distance from the site. Additionally, under extremely stable conditions, elevated and continuous releases will have such little dispersion that ground level measurements may not be in the plume even at distances of a mile or more from the point of release. The sampling locations should therefore be adjusted according to plume stability. The more stable the plume, the farther out they will need to be.

a. Use the following methods to verify the patterns of the estimated exposure rates from an airborne release:

- (1) At each measurement location take readings in both the open and closed window positions.
- (2) Measure radiation levels along the plume periphery at two or more distances downwind of the station, following the guidance of the Environs Director. The Environs Director will use these measurements to determine the center-line exposure rate and extrapolate downwind, taking Pasquill conditions into account.
- (3) Measure at points in a pre-planned grid pattern that is centered over the downwind line relative to the station.
- (4) For a release of long duration, a projected pattern may need to be revised whenever there are significant changes in the meteorological conditions, release rates or release composites.

b. Instrumentation Requirements

- (1) Use the instrumentation package to verify plume projected dose by taking both direct gamma measurements of the plume and a five minute air sample.
- (2) Average the gamma reading obtained over a 30 second time span at approximately 6 feet above the ground and also approximately 6 in. above the ground at the same location. Record readings.
- (3) If the 6 in. reading is equal to or less than the 6 ft. reading assume the predominate gamma source is the airborne plume. If the opposite occurs, i.e. the 6 ft. reading is lower than the 6 in. reading, assume most of the gamma source is deposited on the ground.

3. Air Sampling

- a. Set up the air sampling equipment at approximately 1 meter above the ground. Run the air sampler for 5 minutes or until 30 ft.³ is reached. Analyze the air samples in a low background area (< 200 cpm). Remove the particulate filter from the canister and measure the filter with a GM equipped with an HP210 probe or equivalent. Subtract the background count data (measured at 1m) from the particulate filter measurements. The iodine canister should be measured with a SAM-II or equivalent. Refer to EG-19 for the proper operating procedures of portable monitoring equipment.
- b. Obtain and replace particulate and iodine samples from the Fixed Environmental Monitoring Stations. Work initially in downwind areas. Forward samples to a laboratory designated by the Environs Director for analytical counting or to the station itself.

G. APPENDIX

1. Field Team Equipment List.
2. Guide for the use of equipment.

H. TECHNICAL SPECIFICATION REFERENCES

1. None.

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ATTACHMENT A
FIELD TEAM EQUIPMENT LIST*

A. Instrument Kit

1.	High Range CP (RO-3 Special) 0-100 R/HR Range	1
2.	Count Rate Meter (PRM 5-3)	1
3.	H.P. 210 Probe w/cable adaptable to PRM5-3	1
4.	Alpha AC-3B-7 Probe w/cable, adaptable to PRM5-3 w/check source	1
5.	Cs-137 Check source (8uCi)	1
6.	Sam-2 Stablized Assay Meter w/battery pak	1
7.	Fuses: Sam-2 (1.5 amp, 1/4 S.B.) Spare fuses for air sampler used in kit	5 ea. 5 ea.
8.	Dosimeter charger w/batteries	1
9.	200mr self reading dosimeter	4
10.	One R self reading dosimeter	4
11.	≥ 50R self reading dosimeter	4
12.	Film badges	12
13.	Stop watch	1
14.	Compass	1
15.	Environs box key	1

B. Sample Taking Kit

1.	500 ml Disposable Marinelli Containers	30
2.	Plastic bags (small)	30
3.	Plastic bags (large)	30
4.	Tweezers	1
5.	Labels	70
6.	Permanent markers	2
7.	Surgeons gloves	50
8.	Garden spade	1
9.	Petrislide dishes for particulate filters	25
10.	37% Formaldehyde solution, 10% bisulfite solution, and iodide carrier or dry ice preservative	**

C. Air Sampling Equipment and Supplies

1.	D.C. or A.C. Air Sampler (Model H809V, B2 or C)	1
2.	Power Supply for Air Sampler	1
3.	Particulate/Cartridge holder assembly for air sampler	2
4.	47 mm Silver Zeolite cartridges	20
5.	47 mm Particulate filters (Box of 50)	1
6.	Air Sample labels	25
7.	Tripod (or equivalent) for air sampler	1

* Equivalent equipment may be used when necessary. Each station shall maintain equipment (type A-F) for two field teams.

** Acquire as necessary for preserving milk samples.

ATTACHMENT A
(Continued...)

D. Protective Clothing

1. Coveralls (Various sizes)*	4
2. Hoods*	4
3. Rubbers*	4
4. Booties*	4
5. Boots*	4
6. Cotton glove liners*	4
7. Latex gloves*	4
8. Rain suit*	4
9. Full face mask	3
10. Particulate/charcoal cartridge	6

* These items should be grouped together as four sets of clothes in bags for ease of distribution.

E. Tool Kit

1. Pliers, needle nose w/side cutter capability	1
2. Screw Driver, standard (small)	1
3. Screw driver, standard (large)	1
4. Screw driver, phillips (small)	1
5. Screw driver, phillips (large)	1
6. Adjustable wrench (med.)	1
7. Vice grips (med.)	1
8. Bolt cutters (med.)	1
9. Sledge hammer (small-short handle)	1

F. Information and Record Keeping Items

1. Environmental Emergency Procedures (EG series)	1
2. Instrument Manuals	1/instrument
3. Note book for Record Keeping	1
4. Time Keeping sheets	3
5. Pens (permanent marker type)	2
6. GSEP Radio	1
7. Sample Collection forms	10

ATTACHMENT A
(Continued...)

G. Miscellaneous Supplies

1. Pocket knife	1
2. Flashlight w/batteries (high intensity)	3
3. Scissors	1
4. Masking Tape (2" Rolls)	3
5. Rad Ribbon or rope (50 yd. roll)	1
6. Rad Signs	various
7. Teri Towels (75/pak)	2
8. "D" size batteries (spare)	12
9. "AA" size batteries (spare)	2
10. "9 Volt" batteries (spare)	5
11. Highway flares	12
12. First Aid Kit (#36 Unit)	1
13. Smear pads (box)	1
14. Ladder (5' or 6')	1
15. Potassium Iodide Tablets	10 tablets per team member.

Appendix B
GUIDE FOR THE USE OF EQUIPMENT

Type of Surveillance	"Cutie Pie" Range		Geiger Counter	Air Sampler		Collection Bottles: 500 ml Marinelli beaker
	Hi	Low		Portable (Hi-Vol)	Fixed (Low-Vol)	
Ground Contamination			X			
Plume Survey		X		X	X	
Radiation Level	X	X				
Environmental Samples						X