

**PUBLIC SERVICE COMPANY OF COLORADO**

FORT ST. VRAIN NUCLEAR GENERATING STATION

BOOK 2

2/1/83

NRC#9
Esenhut**NON-CONTROLLED COPY**RADIOLOGICAL EMERGENCY RESPONSE PLAN - STATION

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



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FORT ST. VRAIN NUCLEAR GENERATING STATION

RERP-FIELD
Issue 3
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TITLE: FIELD MONITORING PROCEDURE

ISSUANCE
AUTHORIZED
BY

1-24-83

De Warrington

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REVIEW

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EFFECTIVE
DATE

2-1-83

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



General

Emergency offsite radiological monitoring, in the event of a radiological emergency at Fort St. Vrain, will be performed by FSV monitoring teams until field monitoring teams from the Colorado Department of Health (CDH) respond to the scene. The data collected by these field teams will be relayed directly to the Technical Support Center to aid in the assessment of offsite radiological consequences. The TSC will transmit field measurement data to the Forward Command Post for use by PSC and state radiological assessment personnel.

The PSC Field Monitoring Teams are deployed from the Personnel Control Center. The teams are in radio communication with the senior Health Physics representative at the TSC and report directly to him with all data. In addition, the field teams are directed by the senior Health Physics representative after initial deployment.

1.0 Criteria For Implementation

The Field Monitoring Teams are assembled at the Personnel Control Center anytime that the full FSV emergency organization is activated. The initial deployment of these teams is at the direction of the TSC Director.

2.0 Procedure

The Field Monitoring Teams shall be composed of a driver and an HP Technician. There is provision for the deployment of two field teams, one with survey responsibilities near site, primarily out to the site Exclusion Area Boundary (EAB), and the other from the EAB to the outer perimeter of the plume exposure Emergency Planning Zone (EPZ), approximately a five (5) mile radius.

2.1 The decision to deploy Field Monitoring Teams is the responsibility of the TSC Director. He shall make this decision, based upon projected offsite doses, as advised by the TSC Radiological Assessment individual, and the consideration of the ability to effectively assess these dose rates in the field (lower level of detection, weather conditions, etc.) as advised by the senior Health Physics representative at the Technical Support Center.



2.2 The monitoring teams shall assure that all required instruments, equipment, and supplies are present in the survey vehicle prior to departure. This equipment shall include:

- RM-14 or RM-15
- PIC-6A, or equivalent
- SA 2 scaler
- 5 piece SAM-2 shield and detector
- Air sampler with Silver Zeolite cartridges and pre-filters
- Portable Electric Generator with gasoline
- Field Use Maps
- Wipes
- Pencil
- Field Radio
- Copy of RERP-FIELD
- Spare Batteries

2.3 The Personnel Control Center Director shall ascertain that the field monitoring teams have been provided protective clothing, protective equipment, and dosimetry as directed by the senior Health Physics representative at the TSC.

2.4 Field Monitoring teams act under the direction of the senior Health Physics representative after their initial deployment from the PCC. The Health Physics Technician assigned to each team shall ensure that good health physics practices are employed while in the field. This is to include:

- Keeping RM-14/15 or PIC-6A (as appropriate to radiation levels) operating at all times to evaluate ambient radiation conditions and plume location;
- Wearing all protective clothing and equipment prescribed by the senior Health Physics representative at the TSC;
- Spending as little time as necessary in elevated radiation exposure areas; and,



- Travelling outside of predicted plume trajectory whenever possible, to minimize exposure and spread of contamination.
- 2.5 The senior Health Physics representative shall communicate the sampling location designations by utilizing easily recognizable landmarks, in particular, the intersections of county roadways (e.g., Weld County Roads 19 and 38, the confluence, meteorological monitoring towers, etc.).
- 2.6 The Field Monitoring Teams, in the interest of dose reduction and facilitating rapid data transmission, may transmit raw field monitoring data directly to the senior Health Physics representative at the TSC, where calculations may be performed. Worksheet 1 is provided for both data collection and calculations.
- 2.7 The Field Monitoring teams shall collect the following data at each sampling location:
- Ambient Radiation Level (mrem/hr)
 - I-131 Air Concentration ($\mu\text{Ci/cc}$)
 - Gross Particulate Concentration (cpm/cc)
- 2.8 The senior Health Physics representative at the Technical Support Center shall accumulate data on Worksheet 1 and complete all required calculations. After calculations are completed, data should be recorded on Datasheet 1, a partial scale survey map of the plume exposure EPZ. This map should be utilized in concert with dose projection results to keep the TSC Director and FCP personnel abreast of current data dose assessment results.
- 2.9 Operation of Eberline SAM-2 counters is outlined below.
- Install Detector in 5 piece shield.
 - Plug Scaler into 110 V AC receptacle of portable electric generator.
 - Verify switch settings on front of instrument as matching those posted on the top of the instrument.
 - Turn on SAM-2 and allow two minutes for the instrument to warm up.
 - Take a one minute background count and record on Worksheet 1 (or transmit to TSC via radio communication).



- Collect Air Sample on Silver Zeolite Cartridge (HPP-12) and determine sample volume.
- Load cartridge in detector shield and close shield door.
- Take a one minute count of air sample cartridge and record on worksheet 1 (or transmit to TSC via radio communication).
- I-131 concentration ($\mu\text{Ci/cc}$ or Ci/m^3) =

$$\frac{\mu\text{Ci I-131}}{\text{cc}} = \frac{(\text{CPM}_S - \text{CPM}_B) \times 1.0\text{E-}10 \times 15}{V}$$

Where:

CPM_S = Gross counts per minute of sample

CPM_B = Counts per minute of background

1.0E-10 - Unit Conversion Factor

V = Sample Volume in ft^3

- 2.10 At the conclusion of FSV field monitoring activities, the driver shall return the vehicle, passengers, and contents to the Personnel Control Center, inform the PCC Director of the team's arrival, and request a contamination survey of the vehicle, its passengers, and its contents. Decontamination shall be handled in accordance with FSV Health Physics Procedures (HPP-10 and HPP-11) with area posting and control as required in accordance with HPP-9.

3.0 Responsibilities

3.1 Health Physics Technician (Field)

Perform surveys as directed by the senior Health Physics representative at the TSC. Ensure that good health physics practices are employed throughout the course of field monitoring efforts.

3.2 Health Physics Technician (PCC)

Perform contamination surveys as required on returning field monitoring personnel and equipment.

3.3 Senior Health Physics Representative (TSC)

Assume overall responsibility for the conduct of field monitoring activities. Direct field teams to appropriate sampling locations utilizing TSC dose projections and current meteorological conditions as a basis.



3.4 TSC Director

Assume ultimate responsibility for all activities centered from site, including the initial dispatch of field monitoring teams.

3.5 PCC Director

Ensure adequate contamination survey (and decontamination) of returning field monitoring personnel and equipment.

4.0 References

4.1 Instruction manuals for Eberline SAM-2 counting equipment.

5.0 Referenced or Supporting Procedures

5.1 RERP-EXP, Emergency Exposure Guidelines.

5.2 RERP-DOSE, Offsite Dose Calculation Methodology.

5.3 RERP-ORG, FSV Emergency Organization and Responsibility.

5.4 TSC, Technical Support Center Procedure.

5.5 PCC, Personnel Control Center Procedure.

5.6 HPP-9, Establishing and Posting Controlled Areas.

5.7 HPP-10, Area and Equipment Decontamination

5.8 HPP-11, Personnel Decontamination.

5.9 HPP-12, Portable Air Sample Collection and Analysis.

WORKSHEET 1, IN-FIELD SAMPLING DATA

1) Date: / /

2) Time: _____:

3) Field Team: () EAB () EPZ (Check One)

4) Sample Number: _____

5) Sample Location (describe): _____

6) Ambient Radiation Level: mrem/hr

7) Air Sample Data:

a) Flow Rate _____ ft^3/min

b) Collection Time		minutes
1	2	3
4	5	6
7	8	9
10	11	12
13	14	15
16	17	18
19	20	21
22	23	24
25	26	27
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34	35	36
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358	359	360
361	362	363
364	365	366
367		

c) Volume Collected

7a) _____ ft^3/min x 7b) _____ min = _____ ft^3

d) Volume Correction Factor (VCF):

15.0 ft³ =

7c) ft^3

8) Particulate Activity Concentration:

a) Particulate Filter Count Rate = _____ cpm

b) Background Count Rate = _____ cpm

| c) Net Count Rate

8a) _____ cpm - 8b) _____ cpm = _____ cpm

d) Gross Beta Activity

[8c) _____ cpm x 7d) _____] = _____ $\mu\text{Ci/cc}$

2.36E+11



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RERP-FIELD
Worksheet 1
Issue 3
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| 9) ^{131}I Activity:

| a) Cartridge Count Rate = _____ cpm

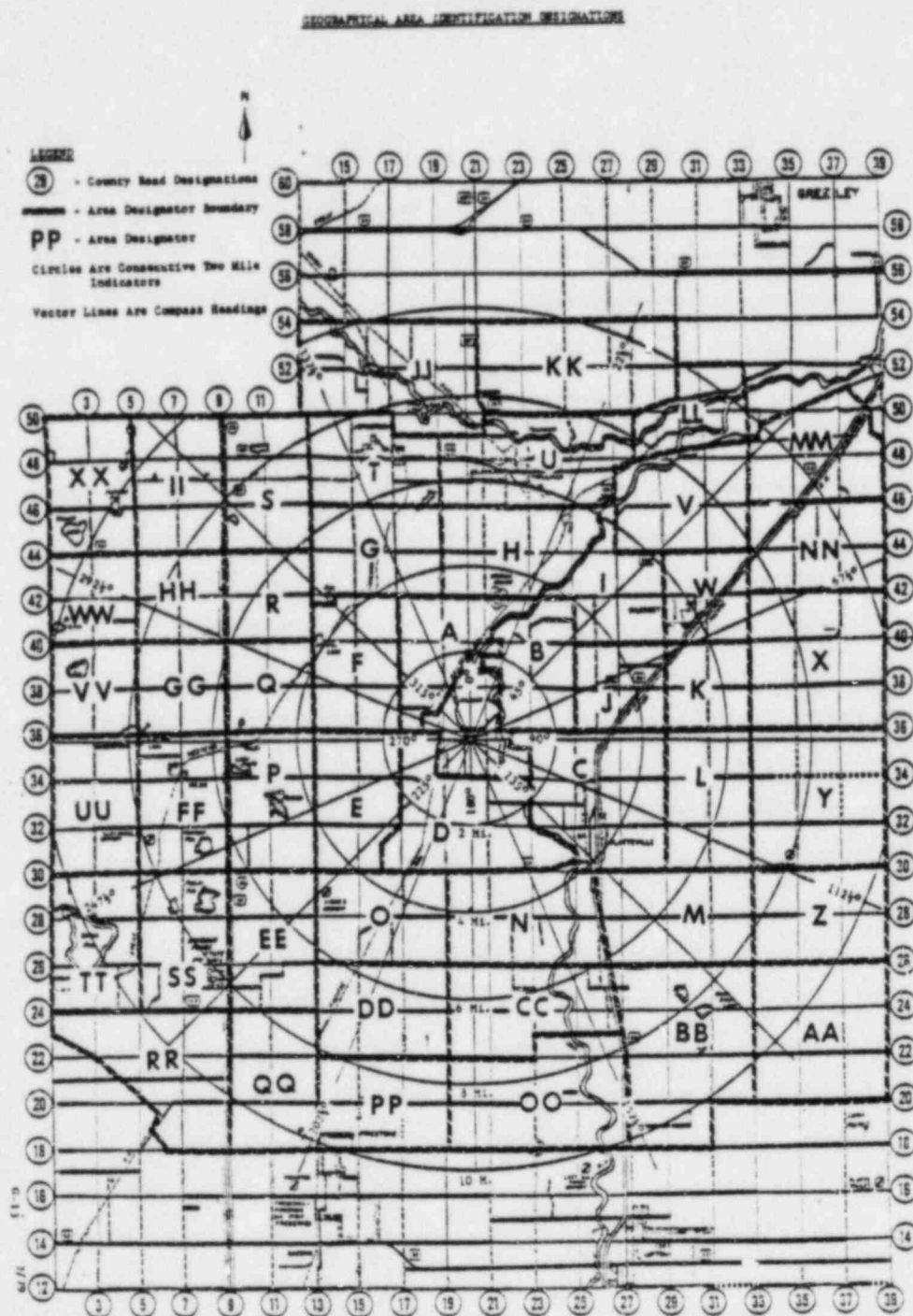
| b) Background Count Rate = _____ cpm

| c) Net Count Rate

| 9a) _____ cpm - 9b) _____ cpm = _____ cpm

| d) ^{131}I Activity

| 9c) _____ cpm $\times 1.0\text{E-}10 \times 7\text{d)}$ _____ = _____ $\mu\text{Ci/cc}$



Datasheet 1 - In-field Sampling Results

[illegible]



Work/Datasheet/Checklist Control List

<u>Worksheet No.</u>	<u>Title</u>	<u>Number Copies</u>
1	In-Field Sampling Data	15

<u>Datasheet No.</u>		
1	In-Field Sampling Results	3

<u>Checklist No.</u>		
None	N/A	N/A



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FORMS USE REPORTING SHEET

Technical Clerk and Recorder:

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

Worksheet Numbers

Copies Used

Datasheet Numbers

Copies Used

Checklist Numbers

Copies Used

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



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FORMS USE REPORTING SHEET(Continued)

COMMENTS

Reported By: _____

Date: _____

Technical Clerk and Recorder _____ *

Date Received _____

Date Replaced _____

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



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WORKSHEET 1, IN-FIELD SAMPLING DATA

- 1) Date: ____/____/____
- 2) Time: ____:____
- 3) Field Team: () EAB () EPZ (Check One)
- 4) Sample Number: _____
- 5) Sample Location (describe): _____
- 6) Ambient Radiation Level: _____ mrem/hr
- 7) Air Sample Data:
- a) Flow Rate _____ ft³/min
- b) Collection Time _____ minutes
- c) Volume Collected
- 7a) _____ ft³/min x 7b) _____ min = _____ ft³
- d) Volume Correction Factor (VCF):
- 15.0 ft³ = _____
- 7c) _____ ft³
- 8) Particulate Activity Concentration:
- a) Particulate Filter Count Rate = _____ cpm
- b) Background Count Rate = _____ cpm
- c) Net Count Rate
- 8a) _____ cpm - 8b) _____ cpm = _____ cpm
- d) Gross Beta Activity
- [8c) _____ cpm x 7d) _____] = _____ μ Ci/cc
- 2.36E+11



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| 9) 131I Activity:

| a) Cartridge Count Rate = _____ cpm

| b) Background Count Rate = _____ cpm

| c) Net Count Rate

| 9a) _____ cpm - 9b) _____ cpm = _____ cpm

| d) 131I Activity

| 9c) _____ cpm x 1.0E-10 x 7d) _____ = _____ $\mu\text{Ci/cc}$



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WORKSHEET 1. IN-FIELD SAMPLING DATA

- 1) Date: ____/____/____
- 2) Time: ____:____
- 3) Field Team: () EAB () EPZ (Check One)
- 4) Sample Number: _____
- 5) Sample Location (describe): _____
- 6) Ambient Radiation Level: _____ mrem/hr
- 7) Air Sample Data:
- a) Flow Rate _____ ft^3/min
- b) Collection Time _____ minutes
- c) Volume Collected
- 7a) _____ ft^3/min x 7b) _____ min = _____ ft^3
- d) Volume Correction Factor (VCF):
- 15.0 ft^3 _____ = _____
- 7c) _____ ft^3
- 8) Particulate Activity Concentration:
- a) Particulate Filter Count Rate = _____ cpm
- b) Background Count Rate = _____ cpm
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| 9) 131I Activity:

| a) Cartridge Count Rate = _____ cpm

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| 9a) _____ cpm - 9b) _____ cpm = _____ cpm

| d) 131I Activity

| 9c) _____ cpm x 1.0E-10 x 7d) _____ = _____ $\mu\text{Ci/cc}$



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7) Air Sample Data:

a) Flow Rate _____ ft³/min

b) Collection Time _____ minutes

c) Volume Collected

7a) _____ ft³/min x 7b) _____ min = _____ ft³

d) Volume Correction Factor (VCF):

15.0 ft³
_____ = _____

7c) _____ ft³

8) Particulate Activity Concentration:

a) Particulate Filter Count Rate = _____ cpm

b) Background Count Rate = _____ cpm

c) Net Count Rate

8a) _____ cpm - 8b) _____ cpm = _____ cpm

d) Gross Beta Activity

[8c) _____ cpm x 7d) _____]
_____ = _____ μ Ci/cc

2.36E+11



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| 9) ^{131}I Activity:

| a) Cartridge Count Rate = _____ cpm

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| 9a) _____ cpm - 9b) _____ cpm = _____ cpm

| d) ^{131}I Activity

| 9c) _____ cpm $\times 1.0\text{E-}10 \times 7\text{d)$ _____ = _____ $\mu\text{Ci/cc}$



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| d) 131I Activity

| 9c) _____ cpm x 1.0E-10 x 7d) _____ = _____ $\mu\text{Ci/cc}$



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- = _____ μ Ci/cc
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| 9) 131I Activity:

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| c) Net Count Rate

| 9a) _____ cpm - 9b) _____ cpm = _____ cpm

| d) 131I Activity

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| 9) 131I Activity:

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- 7) Air Sample Data:
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- 7a) _____ ft^3/min x 7b) _____ min = _____ ft^3
- d) Volume Correction Factor (VCF):
- 15.0 ft^3
- _____ = _____
- 7c) _____ ft^3
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- _____ = _____ $\mu\text{Ci/cc}$
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| d) ^{131}I Activity

| 9c) _____ cpm $\times 1.0\text{E}-10 \times 7\text{d}$) _____ = _____ $\mu\text{Ci/cc}$



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- a) Flow Rate _____ ft³/min
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- d) Volume Correction Factor (VCF):
- 15.0 ft³
- _____ = _____
- 7c) _____ ft³
- 8) Particulate Activity Concentration:
- a) Particulate Filter Count Rate = _____ cpm
- b) Background Count Rate = _____ cpm
- c) Net Count Rate
- 8a) _____ cpm - 8b) _____ cpm = _____ cpm
- d) Gross Beta Activity
- [8c) _____ cpm x 7d) _____]
- _____ = _____ μ Ci/cc
- 2.36E+11



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| 9) ¹³¹I Activity:

| a) Cartridge Count Rate = _____ cpm

| b) Background Count Rate = _____ cpm

| c) Net Count Rate

| 9a) _____ cpm - 9b) _____ cpm = _____ cpm

| d) ¹³¹I Activity

| 9c) _____ cpm x 1.0E-10 x 7d) _____ = _____ μ Ci/cc



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WORKSHEET 1, IN-FIELD SAMPLING DATA

- 1) Date: ____/____/____
- 2) Time: ____:____
- 3) Field Team: () EAB () EPZ (Check One)
- 4) Sample Number: _____
- 5) Sample Location (describe): _____

- 6) Ambient Radiation Level: _____ mrem/hr
- 7) Air Sample Data:
- a) Flow Rate _____ ft³/min
- b) Collection Time _____ minutes
- c) Volume Collected
- 7a) _____ ft³/min x 7b) _____ min = _____ ft³
- d) Volume Correction Factor (VCF):
- 15.0 ft³
_____ = _____
- 7c) _____ ft³
- 8) Particulate Activity Concentration:
- a) Particulate Filter Count Rate = _____ cpm
- b) Background Count Rate = _____ cpm
- c) Net Count Rate
- 8a) _____ cpm - 8b) _____ cpm = _____ cpm
- d) Gross Beta Activity
- [8c) _____ cpm x 7d) _____]
_____ = _____ μ Ci/cc
- 2.36E+11



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| 9) ^{131}I Activity:

| a) Cartridge Count Rate = _____ cpm

| b) Background Count Rate = _____ cpm

| c) Net Count Rate

| 9a) _____ cpm - 9b) _____ cpm = _____ cpm

| d) ^{131}I Activity

| 9c) _____ cpm $\times 1.0\text{E}-10 \times 7\text{d)$ _____ = _____ $\mu\text{Ci/cc}$



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- a) Flow Rate _____ ft³/min
- b) Collection Time _____ minutes
- c) Volume Collected
- 7a) _____ ft³/min x 7b) _____ min = _____ ft³
- d) Volume Correction Factor (VCF):
- _____ 15.0 ft³ = _____
- 7c) _____ ft³
- 8) Particulate Activity Concentration:
- a) Particulate Filter Count Rate = _____ cpm
- b) Background Count Rate = _____ cpm
- c) Net Count Rate
- 8a) _____ cpm - 8b) _____ cpm = _____ cpm
- d) Gross Beta Activity
- [8c) _____ cpm x 7d) _____] = _____ μ Ci/cc
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| a) Cartridge Count Rate = _____ cpm

| b) Background Count Rate = _____ cpm

| c) Net Count Rate

| 9a) _____ cpm - 9b) _____ cpm = _____ cpm

| d) ^{131}I Activity

| 9c) _____ cpm $\times 1.0\text{E}-10 \times 7\text{d}$) _____ = _____ $\mu\text{Ci/cc}$



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- 7a) _____ ft³/min x 7b) _____ min = _____ ft³
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- 7c) _____ ft³
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- 8a) _____ cpm - 8b) _____ cpm = _____ cpm
- d) Gross Beta Activity
- [8c) _____ cpm x 7d) _____]
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| 9) ^{131}I Activity:

| a) Cartridge Count Rate = _____ cpm

| b) Background Count Rate = _____ cpm

| c) Net Count Rate

| 9a) _____ cpm - 9b) _____ cpm = _____ cpm

| d) ^{131}I Activity

| 9c) _____ cpm $\times 1.0\text{E}-10 \times 7\text{d)$ _____ = _____ $\mu\text{Ci/cc}$



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- 2) Time: ____:____
- 3) Field Team: () EAB () EPZ (Check One)
- 4) Sample Number: _____
- 5) Sample Location (describe): _____
- 6) Ambient Radiation Level: _____ mrem/hr
- 7) Air Sample Data:
- a) Flow Rate _____ ft^3/min
- b) Collection Time _____ minutes
- c) Volume Collected
- 7a) _____ ft^3/min x 7b) _____ min = _____ ft^3
- d) Volume Correction Factor (VCF):
- 15.0 ft^3 = _____
- 7c) _____ ft^3
- 8) Particulate Activity Concentration:
- a) Particulate Filter Count Rate = _____ cpm
- b) Background Count Rate = _____ cpm
- c) Net Count Rate
- 8a) _____ cpm - 8b) _____ cpm = _____ cpm
- d) Gross Beta Activity
- [8c) _____ cpm x 7d) _____] = _____ $\mu\text{Ci/cc}$
- 2.36E+11



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9) ¹³¹I Activity:

a) Cartridge Count Rate = _____ cpm

b) Background Count Rate = _____ cpm

c) Net Count Rate

9a) _____ cpm - 9b) _____ cpm = _____ cpm

d) ¹³¹I Activity

9c) _____ cpm x 1.0E-10 x 7d) _____ = _____ μ Ci/cc



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- a) Flow Rate _____ ft³/min
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- d) Volume Correction Factor (VCF):
- 15.0 ft³ _____ = _____
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| 9) 131I Activity:

| a) Cartridge Count Rate = _____ cpm

| b) Background Count Rate = _____ cpm

| c) Net Count Rate

| 9a) _____ cpm - 9b) _____ cpm = _____ cpm

| d) 131I Activity

| 9c) _____ cpm x 1.0×10^{-10} x 7d) _____ = _____ $\mu\text{Ci/cc}$



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- d) Volume Correction Factor (VCF):
- 15.0 ft³
- = _____
- 7c) _____ ft³
- 8) Particulate Activity Concentration:
- a) Particulate Filter Count Rate = _____ cpm
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- c) Net Count Rate
- 8a) _____ cpm - 8b) _____ cpm = _____ cpm
- d) Gross Beta Activity
- [8c) _____ cpm x 7d) _____]
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| 9) 131I Activity:

| a) Cartridge Count Rate = _____ cpm

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| c) Net Count Rate

| 9a) _____ cpm - 9b) _____ cpm = _____ cpm

| d) 131I Activity

| 9c) _____ cpm x $1.0E-10$ x 7d) _____ = _____ $\mu\text{Ci/cc}$



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a) Flow Rate _____ ft³/min

b) Collection Time _____ minutes

c) Volume Collected

7a) _____ ft³/min x 7b) _____ min = _____ ft³

d) Volume Correction Factor (VCF):

15.0 ft³
_____ = _____

7c) _____ ft³

8) Particulate Activity Concentration:

a) Particulate Filter Count Rate = _____ cpm

b) Background Count Rate = _____ cpm

c) Net Count Rate

8a) _____ cpm - 8b) _____ cpm = _____ cpm

d) Gross Beta Activity

[8c) _____ cpm x 7d) _____]
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| a) Cartridge Count Rate = _____ cpm

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| c) Net Count Rate

| 9a) _____ cpm - 9b) _____ cpm = _____ cpm

| d) 131I Activity

| 9c) _____ cpm x $1.0E-10$ x 7d) _____ = _____ $\mu\text{Ci/cc}$

Datasheet 1 - In-field Sampling Results

[illegible]

Datasheet 1 - In-field Sampling Results

[illegible]