Nebraska Public Power District
Nebraska's Energy Leader

NLS2001102
October 25, 2001

U.S. Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, D.C. 20555-0001

Gentlemen:

Subject: Emergency Plan Implementing Procedure
Cooper Nuclear Station, NRC Docket 50-298, DPR-46

Pursuant to the requirements of 10 CFR 50, Appendix E, Section V, "Implementing Procedures," Nebraska Public Power District is transmitting the following Emergency Plan Implementing Procedure (EPIP):

EPIP 5.7.18 Revision 18 "Off-Site and Site Boundary Monitoring"

Should you have any questions concerning this matter, please contact me.

Sincerely,

P. A. Hays
Acting Emergency Preparedness Manager

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Rec'd 01/23/02

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The following table identifies those actions committed to by the District in this document. Any other actions discussed in the submittal represent intended or planned actions by the District. They are described for information only and are not regulatory commitments. Please notify the NL&S Manager at Cooper Nuclear Station of any questions regarding this document or any associated regulatory commitments.

COMMITMENT	COMMITTED DATE OR OUTAGE
None	

CNS OPERATIONS MANUAL EPIP 5.7.18 OFF-SITE AND SITE BOUNDARY MONITORING	USE: REFERENCE EFFECTIVE: 10/11/01 APPROVAL: SORC OWNER: S.C. REZAB DEPARTMENT: EP

1. PURPOSE

This procedure describes the emergency off-site and site boundary monitoring and sampling activities to be undertaken in the event of a release of radioactive material from CNS.

2. PRECAUTIONS AND LIMITATIONS

2.1 Be aware that air samples or retrieved filter-cartridge assemblies may be highly radioactive. Exercise ALARA techniques when handling.

2.2 Vehicle air cleaners may become a significant radiation source when driving in airborne radioactivity areas. Consideration should be given to removing the air cleaner cartridge prior to traversing a radioactive plume.

2.3 Clearly label all radioactive material (samples) with the dose rate, time taken, location taken, and person sampling-at a minimum.

3. REQUIREMENTS

3.1 A release of radioactive material has occurred or has the potential to occur.

3.2 Operationally check all instruments prior to departure and leave instruments on.

3.3 Ensure communications between Survey Teams and Field Team Coordinator (FTC) has been established prior to leaving the site.

3.4 Check with the FTC to see if thyroid blocking has been authorized by the Emergency Director (ED).

3.5 Obtain survey vehicle(s) keys from Access Control or Emergency Preparedness.

3.6 Ensure vehicles to be used are properly fueled.

3.7 Ensure the following equipment and materials are available, as needed:

[ ] 3.7.1 Survey vehicles (Primary - AWD window vans; Alternate - Radio equipped station vehicles).

[ ] 3.7.2 Thermoluminescent Dosimeter (TLD).

[ ] 3.7.3 Equipment and materials as per Procedure 5.7.21, Emergency Equipment Inventory.

4. GENERAL INSTRUCTIONS FOR SURVEY TEAMS

4.1 Off-Site Radiological Survey Team(s) are under the direction of the Radiological Assessment Supervisor (RAS) and will communicate through the FTC. The RAS will be reviewing meteorological information to estimate the plume location. The RAS should dispatch the available survey teams to sample the following locations in order:

[ ] 4.1.1 ELEVATED RELEASE

[ ] 4.1.1.1 ~ 2 miles downwind.

[ ] 4.1.1.2 ~ 5 miles downwind.

[ ] 4.1.2 GROUND LEVEL RELEASE

[ ] 4.1.2.1 Site Boundary.

[ ] 4.1.2.2 2 miles downwind.

4.2 A minimum of two persons shall be on each survey team. Teams will be formed from personnel assembled at the OSC, EOF, or AEOF. All teams shall receive an initial briefing on current plant status and radiological conditions prior to being dispatched. A team leader shall be designated for each team.

[ ] NOTE - KI use may only be authorized by the ED per Procedure 5.7.14. KI use will be discussed and appropriate attachment(s) of Procedure 5.7.14 will be completed.

4.3 KI will be taken voluntarily at the direction of the Radiological Control Manager or Chemistry/RP Coordinator.

4.4 Once the plume is located, a team shall traverse it (travel across it at right angles to the wind direction). Dose rates will increase as the centerline is reached, peak at the centerline, and decrease as the opposite edge is reached.

5. BOUNDARY SURVEYS

[ ] NOTE - Steps 5.1.1 through 5.1.8 may be performed by one survey team or several survey teams, depending on the plume location(s).

5.1 BOUNDARY MONITORING

[ ] 5.1.1 Leave survey instruments on while traveling to survey starting point. Relay any increased readings to the FTC. Observation of the meter during transit will also establish a background reading.

[ ] 5.1.2 Survey the site area boundary as directed by the FTC. The extent of the boundary survey may be affected by conditions such as weather, river water level, and radio contact.

[ ] 5.1.3 At the monitoring location(s), perform Beta-Gamma dose rate measurement(s) at 3' and at 3" above the ground. Record the results on Attachment 1.

[ ] 5.1.3.1 High Gamma to Beta ratio indicates the plume is overhead.

[ ] 5.1.3.2 High Beta contribution indicates the plume is at ground level.

[ ] 5.1.3.3 A high 3" Beta reading compared to the 3' Beta reading indicates there is ground deposition.

[ ] 5.1.4 While traversing the plume, the centerline is determined as the location where dose rates peak. Air sampling should be performed at centerline per Step 6.2, when Beta readings indicate the plume is at ground level or there has been a ground deposition. A silver zeolite cartridge shall be used to obtain a gross iodine air sample.

[ ] 5.1.5 Attempt to approximate locations indicated on the survey map (Attachment 4 of this procedure) and take readings at each point. Record the results on Attachment 1.

[ ] 5.1.6 Record dosimetry readings on Attachment 1 periodically and whenever plume affected areas are exited.

[ ] 5.1.7 Exit plume and determine the iodine and particulate concentrations using Section 7.

[ ] 5.1.8 Relay survey results to the FTC.

[ ] 5.1.9 Teams shall be provided further sampling instructions by the RAS via the FTC.

5.2 DOWNWIND MONITORING

[ ] 5.2.1 Conduct surveys at distances of ~ 2 and 5 miles downwind. Pre-determined monitoring locations at or near these distances may not correlate well with highways or roads. Approximations will need to be made. Communicate clearly when relaying location information to and from downwind survey teams.

[ ] NOTE - Steps 5.2.2 through 5.2.6 may be performed by one survey team or several survey teams, depending on the plume location(s).

[ ] 5.2.2 At monitoring location(s), teams shall traverse the plume and perform Beta/Gamma dose rate measurement(s) at 3' and at 3" above the ground. Record the results on Attachment 1.

[ ] 5.2.2.1 High Gamma to Beta ratio indicates the plume is overhead.

[ ] 5.2.2.2 High Beta contribution indicates the plume is at ground level.

[ ] 5.2.2.3 A high 3" Beta reading compared to the 3' Beta reading indicates there is ground deposition.

[ ] 5.2.3 While traversing the plume the centerline is determined as the location where dose rates peak. Air sampling should be performed at centerline per Step 6.2, when Beta readings indicate the plume is at ground level or there has been a ground deposition. A silver zeolite cartridge shall be used to obtain a gross iodine air sample.

[ ] 5.2.4 Record dosimetry readings on Attachment 1 periodically and whenever plume affected areas are exited.

[ ] 5.2.5 Having exited the plume, the team shall determine iodine and particulate concentrations using Section 7.

[ ] 5.2.6 Relay survey results to the FTC.

[ ] 5.2.7 Teams shall be provided further sampling instructions by the RAS via the FTC.

6. FIXED ENVIRONMENTAL AIR STATION FILTER RETRIEVAL/CHANGEOUT

6.1 If requested by the RAS, retrieve/changeout the filter/cartridge assemblies at fixed environmental air sampling stations.

[ ] 6.1.1 Assemble the filter and appropriate cartridge(s) in their holders as directed by the RAS prior to approaching the station.

[ ] **CAUTION** - The retrieved filter-cartridge assemblies may be highly radioactive. Exercise ALARA techniques when handling.

[ ] **NOTE** - Key (J423) for sampling station gates is available on the vehicle key rings for the primary survey vehicles.

[ ] 6.1.2 Bag (separately) and label the retrieved filter and cartridge(s). Shield as required.

6.2 PORTABLE AIR SAMPLING

[ ] **NOTE 1** - Assemble the filter and appropriate cartridge(s) in their holders and attach to the air sampler prior to entering the affected area. Use silver zeolite cartridges for radioiodines. Use charcoal cartridges for gross activity (iodines and noble gases). An estimate of noble gas activity may be obtained by subtracting the activity on a silver zeolite cartridge from the activity on a charcoal cartridge collected at the same place and time.

[ ] **NOTE 2** - Always install a particulate filter upstream of any cartridge(s).

[ ] **NOTE 3** - Ensure proper orientation (flow direction) of cartridge(s) if marked, or mark the cartridge if not marked.

[ ] 6.2.1 At the sampling location(s) draw air sample(s) as directed by the FTC.

[ ] 6.2.2 Record location(s) and results on Attachment 1.

[ ] 6.2.3 Separate, bag, and label the filter and cartridge(s).

[ ] 6.2.4 Leave the area of airborne radioactivity.

[ ] 6.2.5 Notify the FTC that the sample has been collected.

[ ] 6.2.6 For radioiodine and particulate concentration determinations, proceed to Section 7.

7. IN-FIELD AIR SAMPLE CONCENTRATION DETERMINATION

7.1 GROSS IODINE

[ ] 7.1.1 Take a contact reading (through the bag) on the up stream face of the silver zeolite cartridge.

[ ] 7.1.2 On the appropriate figure of Attachment 2 (**Figure 1** for E-140 with pancake probe, **Figure 2** for ion chamber), find the reading obtained in Step 7.1.1 along the horizontal axis. Go up the chart until the appropriate sample volume line is reached, then left to a point on the vertical axis.

[ ] 7.1.3 If results cannot be obtained, proceed to Step 7.3.

7.2 GROSS PARTICULATE

[ ] 7.2.1 Take a contact reading (through the bag) on the up stream face of the particulate filter.

[ ] 7.2.2 On the appropriate figure of Attachment 3 (**Figure 3** for E-140 with pancake probe, **Figure 4** for ion chamber), find the reading obtained in Step 7.2.1 along the horizontal axis of the graph. Go up the chart until the appropriate sample volume line is reached, then left to a point on the vertical axis of the graph. Record the gross particulate concentration in Attachment 1.

[ ] 7.2.3 If results cannot be obtained, proceed to Step 7.3.

7.3 CONCENTRATION HAND-CALCULATION (ATTACHMENT 5)

[ ] 7.3.1 Take a contact reading (through the bag) on the upstream face of a sample.

[ ] 7.3.2 Use Attachment 5 to hand calculate the concentration of the air sampled. Be sure to use the correct correction factor for the sample media, instrument, and probe used to read the sample.

8. SOIL SAMPLING

8.1 At the sampling location(s) collect one square meter of surface (< 1/4") soil and place in a bag.

8.2 Double bag and label the sample.

9. WATER SAMPLING

9.1 At the sampling location(s) select a standing body of water of sufficient depth to submerse the sample bottle. If a body of water is not sufficiently deep enough in the area to be sampled, scoop water using one bottle and deposit it into a second, until the second bottle is filled.

9.2 Vertically submerse the sample bottle until the mouth of the bottle is just below the surface of the water. If the size of the body of water permits, move the bottle around carefully to skim as much surface water as possible.

9.3 Cap the bottle, dry it, double bag, and label.

10. VEGETATION SAMPLING

10.1 At the sampling location(s), select an area of vegetation of uniform height.

10.2 Carefully collect one square meter of vegetation, cutting to within an inch of the ground.

10.3 Double bag and label the sample.

11. SNOW SAMPLING

11.1 At the sampling location(s), select an area which is undisturbed.

11.2 Collect one square meter of surface (< 1/4") snow and place in bag.

11.3 Double bag and label the sample.

12. SHIFT TURNOVER/TERMINATION

12.1 SHIFT TURNOVER

[ ] 12.1.1 Contact the FTC to determine the desired location for delivery of the sample media and turnover location.

[ ] 12.1.2 Inform the FTC of supplies/equipment needed to continue monitoring. The relieving survey team should bring these items with them to the turnover location.

[ ] 12.1.3 Deliver sample media to the designated location.

[ ] 12.1.4 Meet the relieving survey team at the turnover location.

[ ] 12.1.5 Fully brief the relieving survey team on radiological conditions, samples taken, problems encountered, etc.

[ ] 12.1.6 Report to the RAS for a final debrief.

12.2 TERMINATION

[ ] 12.2.1 Contact the FTC to determine the desired location for delivery of the sample media.

[ ] 12.2.2 Deliver sample media to the designated location.

[ ] 12.2.3 Report to the RAS for a final debrief.

[ ] 12.2.4 Return equipment/supplies to emergency lockers or other storage locations.

[ ] 12.2.5 Perform inventory of equipment using Procedure 5.7.21 and replace, as necessary.

[ ] 12.2.6 Return the survey vehicles to their designated parking areas or to a decon facility and return the keys to Access Control or Emergency Preparedness.

ATTACHMENT 1 FIELD MONITORING DATA

DATE: _____

TEAM DESIGNATION: _____

TEAM LEADER: _____ TEAM MEMBER: _____

MONITORING LOCATION	SURVEY TIME	NET DOSE RATE (mrem/hr) AT 3' GAMMA SHIELD CLOSED	NET DOSE RATE (mrem/hr) AT 3' BETA/ GAMMA SHIELD OPEN	NET DOSE RATE (mrem/hr) AT 3" GAMMA SHIELD CLOSED	NET DOSE RATE (mrem/hr) AT 3" BETA/ GAMMA SHIELD OPEN	AIR SAMPLE DATA SAMPLE VOLUME FT^3	AIR SAMPLE DATA GROSS IODINE µCi/cc	AIR SAMPLE DATA GROSS PART. µCi/cc	INTEGRATED DOSE NAME DOSIMETER READING	INTEGRATED DOSE NAME DOSIMETER READING

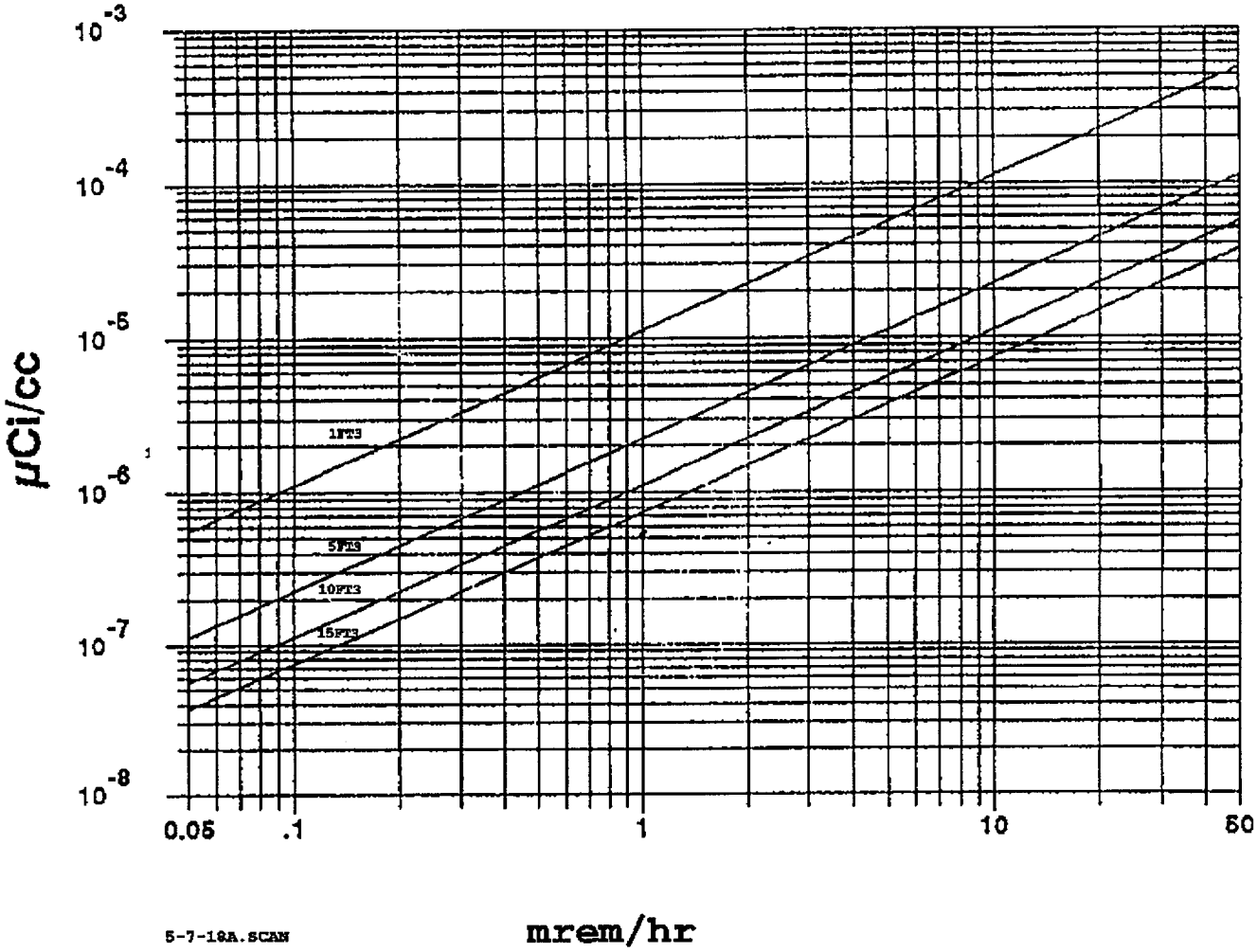

Figure 1 - E-140, PANCAKE PROBE; SILVER ZEOLITE CARTRIDGE

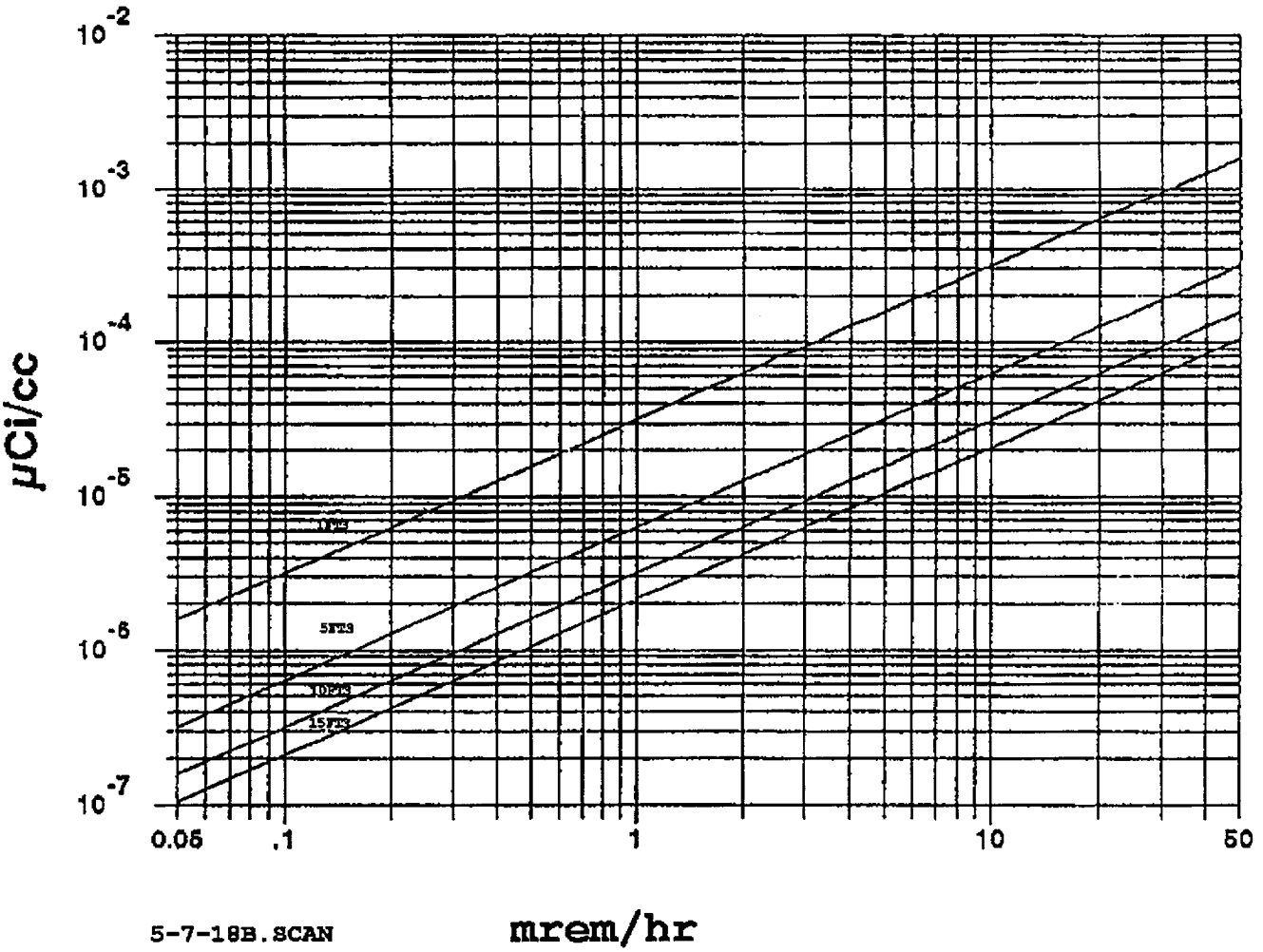

Figure 2 - ION CHAMBER; WINDOW OPEN SILVER ZEOLITE CARTRIDGE

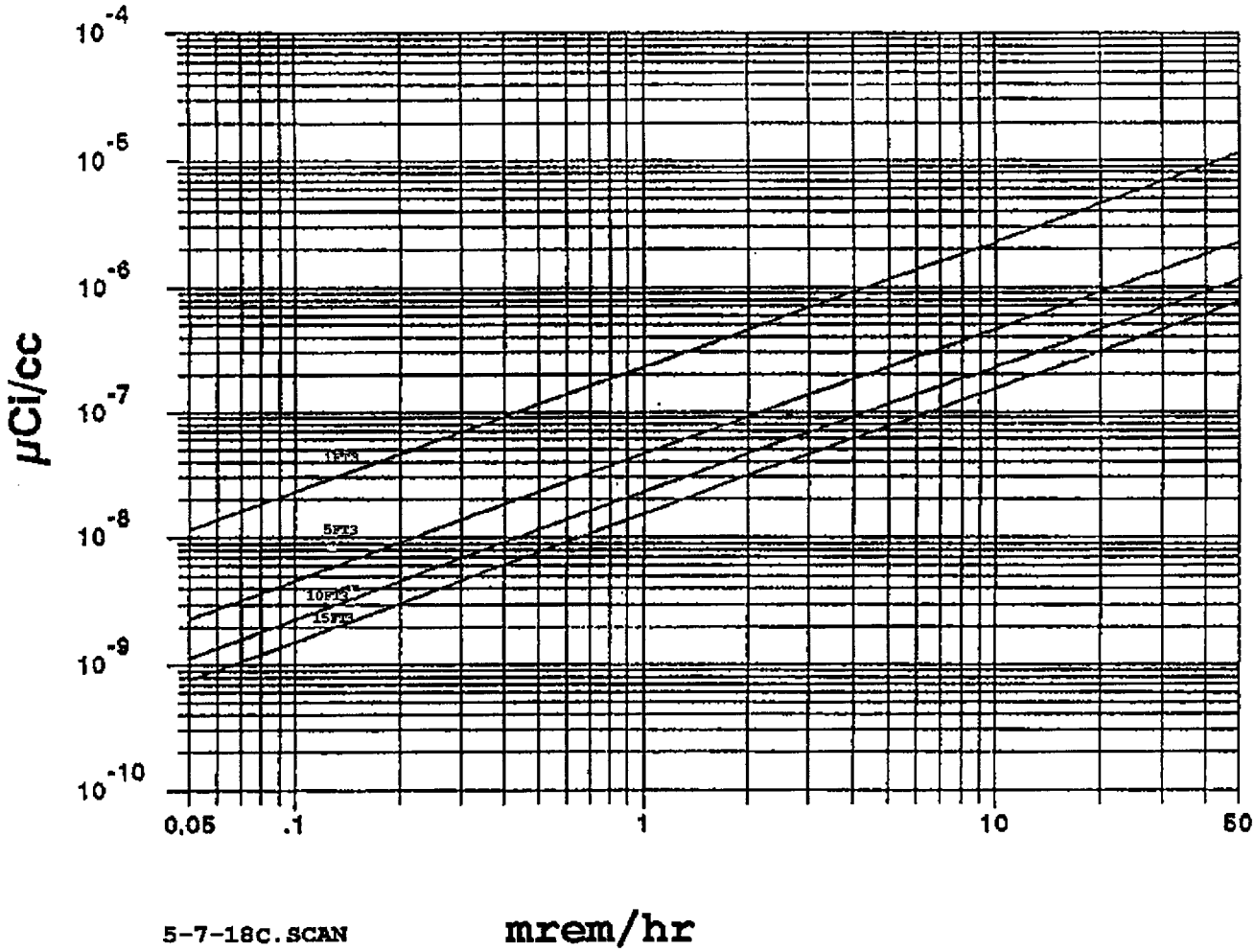

Figure 3 - E-140, PANCAKE PROBE; PARTICULATE FILTER

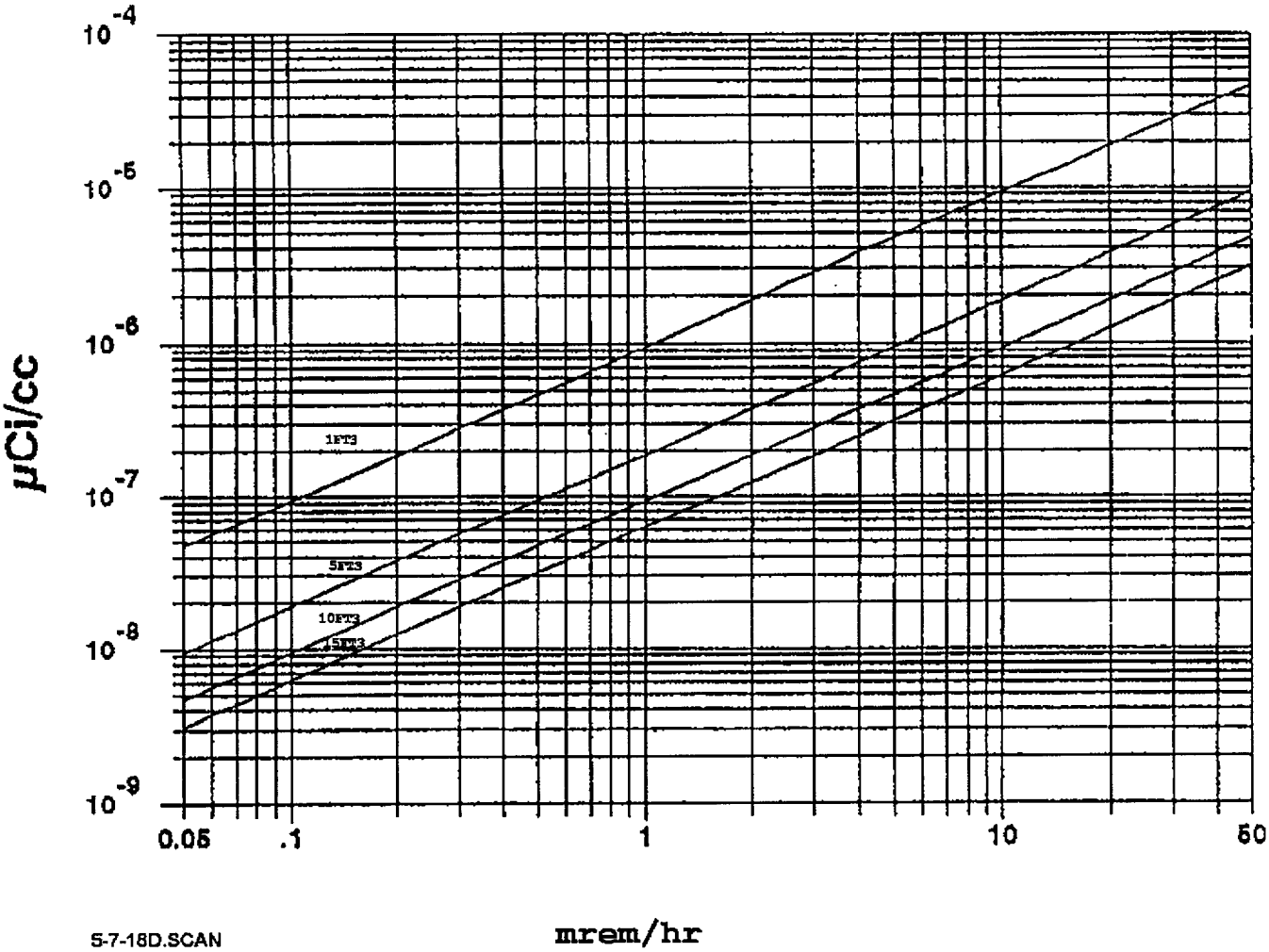

Figure 4 - ION CHAMBER; WINDOW OPEN PARTICULATE FILTER

STATION	DIRECTION	STATION	DIRECTION	STATION	DIRECTION	STATION	DIRECTION
1	N	5	E	9	S	13	W
2	NNE	6	ESE	10	SSW	14	WNW
3	NE	7	SE	11	SW	15	NW
4	ENE	8	SSE	12	WSW	16	NNW

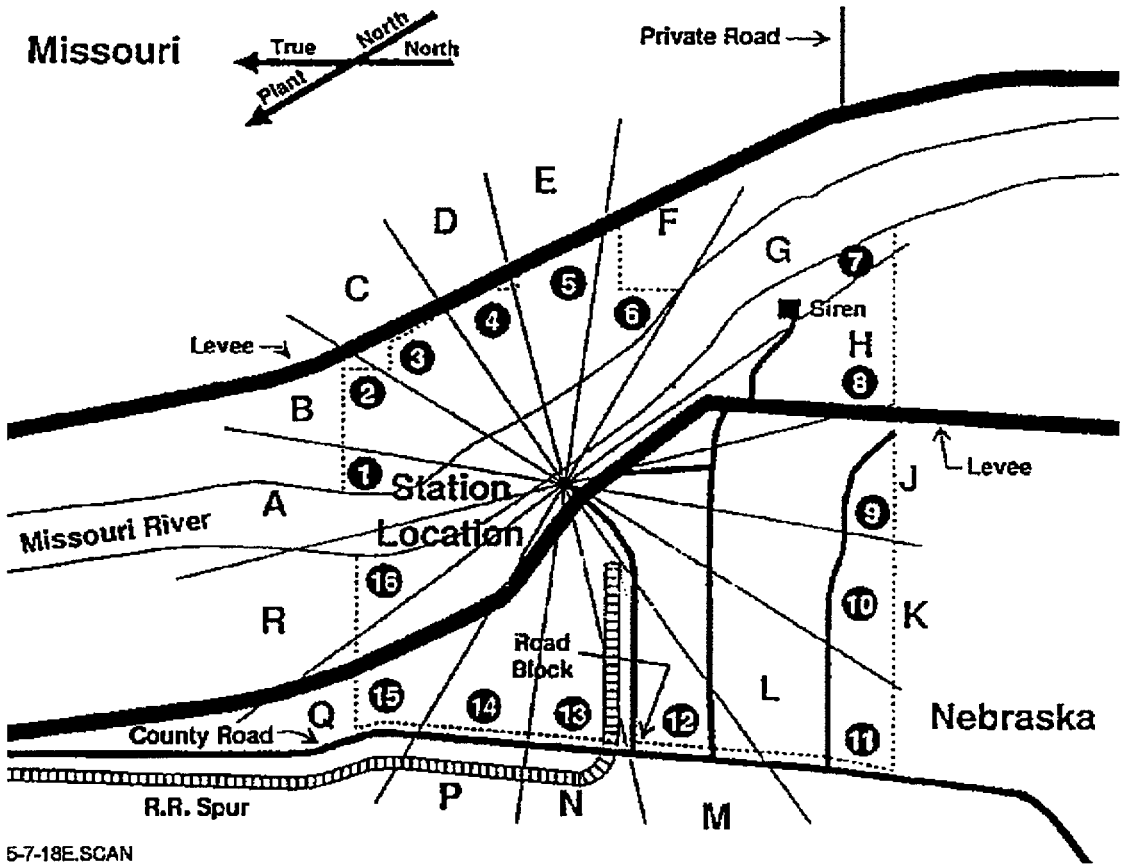

Figure 5

Concentrations of radioisotopes may be determined using the following formula:

Concentration of Radioisotopes (μCi/cc)

$$= \frac{(3.53 \times 10^{-5}) \times (\text{mrem/hr contact reading})}{(\text{Cf}) \times (\text{sample volume in cubic ft})}$$

$$= \frac{(3.53 \times 10^{-5}) \times (\quad)}{(\quad) \times (\quad)}$$

= _____ μCi/cc

where:

Cf is a correction factor dependant on:

1. Instrument type
2. Probe type
3. Sample collection media (particulate filter or cartridge).
4. Isotope/form of interest

Cf values for the instruments and probe types used at CNS for particulates and Iodides are listed below.

Instrument/Probe/Media	Cf	
Ion Chamber, Silver Zeolite	1.12	Iodides
E-140, Pancake probe, Silver Zeolite	3.16	
Ion Chamber, Particulate filter	37.7	Particulate
E-140, Pancake probe, Particulate filter	154.2	

The above Cf values were determined experimentally in the laboratory using I-131 for iodides and Cs-137 for particulate.

1. DISCUSSION

1.1 In the event of a radiological release, data obtained from off-site surveys shall be used to verify projected release rates, concentrations, and doses. This data also provides a basis for making or modifying Protective Action Recommendations (PARs) per Procedure 5.7.20.

1.2 Once a release is in progress, downwind survey teams shall be used to make gross iodine determinations based upon air sample results. These gross iodine determinations will be correlated against projected iodine concentrations to verify the adequacy of Protective Action Recommendations (PARs). Correlations between actual field sample readings and projected concentrations should be made periodically as long as a release is in progress.

1.3 Once the release is terminated, additional field sampling results (i.e., soil, vegetation, water) shall be taken to determine the radiological impact and aid in re-entry decision making. These determinations and decisions will involve State and Federal agencies.

2. REFERENCES

2.1 CODE AND STANDARDS

2.1.1 Environmental Protection Agency (EPA) 400-R-92-001, Manual of Protective Action Guides and Protective Actions for Nuclear Incidents, May 1992.

2.1.2 FEMA-REP-2, Guidance on Off-site Emergency Radiation Measurement Systems.

2.1.3 NPPD Emergency Plan for CNS.

2.1.4 NUREG 0654/FEMA-REP-1, Revision 1, Criteria for Preparation and Evaluation of Radiological Emergency Response Plans and Preparedness in Support of Nuclear Power Plants.

2.2 PROCEDURES

2.2.1 Emergency Plan Implementing Procedure 5.7.14, Stable Iodine Thyroid Blocking (KI).

2.2.2 Emergency Plan Implementing Procedure 5.7.20, Protective Action Recommendations.

2.2.3 Emergency Plan Implementing Procedure 5.7.21, Emergency Equipment Inventory.

2.3 MISCELLANEOUS

2.3.1 NRC Inspection Report 91-12, Emergency Preparedness Annual Inspection Report.

2.3.2 QA Audit QA-86-06.

2.3.3 QA Audit QA-89-03.