PMComanchePeakPEm Resource

From: Monarque, Stephen
Sent: Tuesday, September 01, 2009 3:08 PM
To: ComanchePeakCOL Resource
Subject: FW: Response to Remaining Four FEMA RAIs
Attachments: TXNB-09024 FEMA RAIs.pdf

From: John.Conly@luminant.com [mailto:John.Conly@luminant.com]
Sent: Wednesday, July 15, 2009 9:31 AM
To: Monarque, Stephen; sfrantz@morganlewis.com; tmatthews@morganlewis.com; James.Hill2@luminant.com
Cc: Donald.Woodlan@luminant.com; Robert.Reible@luminant.com; David.Fuller@luminant.com
Subject: Response to Remaining Four FEMA RAIs

This is the complete letter submitted to FEMA today. If there are any questions regarding the submittal, please contact me or contact Bob Reible (254-897-0449, Robert.Reible@luminant.com).

Thanks,

John Conly
COLA Project Manager NuBuild
Luminant Power
(254) 897-5256

Hearing Identifier: ComanchePeak_COL_Public
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From: Monarque, Stephen

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CP-200901005
Log # TXNB-09024

Ref # 10 CFR 52

July 14, 2009

Federal Emergency Management Agency
U.S. Department of Homeland Security
1800 S. Bell Street
Arlington, VA 20598-3025
ATTN: Vanessa Quinn
Chief, Radiological Emergency Preparedness Branch

SUBJECT: COMANCHE PEAK NUCLEAR POWER PLANT, UNITS 3 AND 4
RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

REFERENCES:
1. Letter, R. Flores to V. Quinn, "Response to Request for Additional Information," TXNB-09015 dated June 9, 2009
2. Letter, V. Quinn to D. Woodlan, "Final Request for Additional Information (RAI) for the Luminant Generation Company, Comanche Peak Nuclear Power Plant (CPNPP) Unit 3 Combined License (COL) Application," dated April 10, 2009

Dear Madam:

Reference 1 submitted responses to eleven of the fifteen questions asked in Reference 2 and requested an extension for submitting responses to the remaining four questions. Luminant Generation Company LLC (Luminant) hereby submits the attached responses to the remaining four questions. These questions and responses support the Federal Emergency Management Agency reasonable assurance review of Luminant's Combined License Application for Comanche Peak Nuclear Power Plant Units 3 and 4.

If there are any questions regarding these responses, please contact me or contact Bob Reible (254-897-0449, Robert.Reible@luminant.com).

I state under penalty of perjury that the foregoing is true and correct.

Executed on July 14, 2009.

Sincerely,

Luminant Generation Company LLC

Rafael Flores

Rafael Flores

Attachment - Responses to Request for Additional Information

c- Stephen Monarque w/attachment
Dan Barss, NRC w/attachment
Nan Calhoun, FEMA Region VI w/attachment

Lisa Hammond, FEMA Region VI w/o attachment
The Honorable Walter Maynard w/o attachment
The Honorable Andy Rush w/o attachment

Email Distribution: w/o attachment

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ATTACHMENT

Responses to Request for Additional Information

Response to Question CP-015 (2 pages)

Attachment: State of Texas Emergency Management Plan, Annex D: Radiological Emergency Management, Tab 1: Fixed Nuclear Facility Accident Response, Chapter 1: Comanche Peak Nuclear Power Plant, Approved 061909. (33 pages)

Response to Question CP-018 (2 pages)

Attachments: Texas Department of State Health Services, Procedure 10, "Monitoring and Sampling Airborne Gamma Releases," Approved 061909. (53 pages)

Texas Department of State Health Services, Procedure 11, "Monitoring and Sampling Airborne Alpha Releases," Approved 101907. (50 pages)

Response to Question CP-019 (1 page)

Response to Question CP-022 (2 pages)

RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

Comanche Peak, Units 3 and 4

Luminant Generation Company LLC

Docket Nos. 52-034 and 52-035

SRP SECTION: PART 5 – Emergency Preparedness Plan

APPLICATION SECTION:

DATE OF RAI ISSUE: 04/10/2009

QUESTION NO.: CP-015

Subject: Public Education and Information
Basis: NUREG 0654, Criterion G.3.a
SRP Acceptance Criterion: Requirement H

State of Texas Emergency Management Plan: The draft copy of Tab 1, Chapter 1 to Annex D addresses the location of the JIC, telephone numbers for use by the media, and describes the work area and equipment available in the JIC, but a final copy is needed to resolve this issue. Provide a final copy of Tab 1 Chapter 1 of the plan to address this criterion.

ANSWER:

Final approved version of the "**State of Texas Emergency Management Plan**" **Annex D**: Radiological Emergency Management, **Tab 1**: Fixed Nuclear Facility Accident Response, **Chapter 1**: Comanche Peak Nuclear Power Plant (Approved 061909) is attached.

This approved version of the State plan has been updated to reflect the current location of JIC (Annex D, Tab 1 Chapter 1 Section III.B.2). In addition, the NUREG 0654 Crosswalk has been updated to reflect the cross-references for implementation of the G.3.a. criteria in the state, site and county plans and is attached to response RAI CP-023.

Impact on R-COLA

CPNPP COLA Part 5, Emergency Plan, Revision 0, in the folder for "State_EP" replace the Draft Tab1, Chapter 1 to Annex D with the approved version of Tab 1, Chapter 1 to Annex D (04-04_Tab1Chapter1_r01.pdf)

In the Comanche Peak Unit 3 & 4 Emergency Plan, file 03_CPNPP_EPlan.pdf, Replace Appendix 8 Table A8-2 pages A8-2 to A8-19 with new Table A8-2 (pages A8-2 to A8-25). The information contained in Tables A8-3 and A8-4 did not change but the tables are now presented on pages A8-26 to A8-34.

Attachments:

- **State of Texas Emergency Management Plan, Annex D**: Radiological Emergency Management, **Tab 1**: Fixed Nuclear Facility Accident Response, **Chapter 1**: Comanche Peak Nuclear Power Plant, Approved 061909. (File: 04-04_Tab1Chapter1_r01.pdf)

- **Revision to NUREG 0654 Crosswalk, (See response to RAI CP- 023)**

TEXAS

EMERGENCY MANAGEMENT

PLAN

Annex D: RADIOLOGICAL EMERGENCY MANAGEMENT

Tab 1: FIXED NUCLEAR FACILITY ACCIDENT RESPONSE

Chapter 1: COMANCHE PEAK NUCLEAR POWER PLANT

CHAPTER 1 OF

TAB 1 TO ANNEX D

FIXED NUCLEAR FACILITY ACCIDENT RESPONSE

CPNPP NUCLEAR POWER PLANT

APPROVAL AND IMPLEMENTATION

This chapter is hereby approved for implementation and supersedes all previous editions.

6/19/09
Date

Kathryn C. Perkins
Radiation Program Officer
Radiation Control Program
Department of State Health Services

CHANGE NUMBER	DATE OF CHANGE	INITIALS AND DATE ENTERED
Change 5	3/2/2000	Revised entire document
Change 6	04/2007	Revised entire document
Change 7	07/2007	Revised entire document
Change 8	01/2008	Revised entire document
Change 9	01/2009	Revised entire document

TABLE OF CONTENTS

CHAPTER ONE

CPNPP STEAM ELECTRIC STATION

I. FACILITY SUMMARY

A. LOCATION:

CPNPP Nuclear Power Plant (CPNPP) is located in Somervell County, Texas. The plant site is approximately five miles north-northwest of Glen Rose, 10 miles south of Granbury, and 40 miles southwest of downtown Fort Worth. (See attachments (7) and (8))

B. REACTOR SIZE AND TYPE:

CPNPP includes two 1250 MW pressurized water reactor electrical generating units. Since the units are of identical type and size, no differentiation between Unit 1 and Unit 2 will be made in this plan. Department of State Health Services (DSHS) Radiation Control Program (RCP) response activities, and the locations at which those activities are conducted, will be the same for both units.

C. MANAGEMENT:

The Utility operating CPNPP is Luminant Power. Emergency coordination and corporate support will be provided by Luminant Power. CPNPP is wholly owned by Luminant Power. The emergency preparedness program at CPNPP is concerned with hypothetical accidents that may occur and that could potentially have an impact on the health and safety of the general public, CPNPP employees, vendors, and visitors and /or protection of the environment. The emergency preparedness program at CPNPP is designed in accordance with Code of Federal Regulations, Title 10, Part 50.47 and the guidelines of the U.S. Nuclear Regulatory Commission (NRC) as established in NUREG-0654/Department of Homeland Security (DHS) Report-1, Rev.1.

D. OPERATING HISTORY:

1. CPNPP Unit 1 received its operating license from the Nuclear Regulatory Commission (NRC) on April 17, 1990. Unit 1 commenced operations on August 13, 1990.

2. CPNPP Unit 2 received its operating license from the NRC on April 6, 1993. Unit 2 commenced operations on August 3, 1993.

II. LOCAL GOVERNMENT SUMMARY

A. PLUME EXPOSURE PATHWAY EMERGENCY PLANNING ZONE (10-MILE EPZ):

1. COUNTIES:

The plume exposure pathway EPZ for CPNPP includes portions of Hood and Somervell counties. (See attachment (1))

2. CITIES:

The incorporated communities of Granbury and Tolar are in the Hood County portion of the 10-mile EPZ. While some parts of both Granbury and Tolar are more than 10 miles from CPNPP, the boundary of the EPZ has been adjusted to include everyone living within the city limits of these two communities.

Glen Rose, the only incorporated city in Somervell County, is inside that portion of the 10-mile EPZ that lies in Somervell County.

3. HOST JURISDICTIONS:

If portions of the 10-mile EPZ are evacuated because of an accident involving CPNPP, the city of Stephenville in Erath County and the City of Cleburne in Johnson County will be the primary host jurisdictions. These cities would establish reception centers for evacuees from the 10-mile EPZ, perform monitoring and decontamination of evacuees as required, and provide lodging and other essential welfare services. Annually CPNPP releases information to the public in the local phone book. It tells the public how they will be alerted and what they should do in the event of a nuclear emergency at CPNPP.

In the event that additional host jurisdictions are required, guidance incorporated in the Texas Disaster Act of 1975 will provide a basis for such activity. Those communities most likely to be involved as additional host jurisdictions are Meridian, Weatherford and Mineral Wells.

B. INGESTION EXPOSURE PATHWAY EPZ (50-MILE EPZ):

1. COUNTIES:

The Ingestion Exposure Pathway or 50-mile EPZ includes all of: Bosque, Johnson, Erath, Parker, Hood and Somervell Counties. Minor Portions of: Coryell, Dallas and McLennan Counties. Major Portions of: Comanche, Hamilton, Tarrant, Eastland, Hill, Ellis and Palo Pinto Counties. (See attachment 2)

2. CITIES:

Since agricultural production is the primary area of concern in the 50-mile EPZ, the identity of specific local city governments is not significant to the purposes of this plan. The identity of cities may be obtained from the 50-mile EPZ map if desired, or from the Texas Almanac listings for the appropriate counties.

III. EMERGENCY SUPPORT FACILITIES:

A. LOCAL GOVERNMENT

1. EMERGENCY OPERATION CENTER (EOC)

In the event of a nuclear accident involving CPNPP, all jurisdictions within the plume exposure pathway EPZ will coordinate their operations from their respective county EOC's in accordance with the National Response Framework (NRF) and National Incident Management System (NIMS). Those EOC's for Hood and Somervell County are in the County Law Enforcement Centers in Granbury and Glen Rose.

The Hood County EOC is in the Hood County Law Enforcement Center, 400 Deputy Larry Miller Drive, Granbury TX 76048 (See attachment (9)).

The Somervell County EOC is in the Somervell County Law Enforcement Center, 750 E. Gibbs Blvd., Glen Rose TX 76043 (See attachment (10)).

Ingestion Exposure Pathway EPZ activities will only peripherally involve those local government's that are beyond the 10-mile EPZ but still within the 50-mile EPZ. The Hood and Somervell County Judge or the Mayors of Granbury or Glen Rose may declare a local state of disaster for their jurisdictions. The Emergency Management Director, City Mayors, County Commissioners, Emergency Management Coordinator and the Sheriff acting as the key members of the Direction and Control Group, will exercise direction and control from the county or respective city EOC.

2. RECEPTION CENTERS AND CONGREGATE CARE FACILITES

The primary relocation centers for persons evacuating from the CPNPP 10-mile Exposure Pathway EPZ are located in Stephenville at the Parks and Recreation Center 378 W. Long, Stephenville, Texas 76401, in Cleburne at the Senior Center 1212 Glenwood Dr., Cleburne, TX 76033, and in Benbrook at the YMCA 1899 Winscott Road, Benbrook, TX 76126. Maps to each facility can be found within local telephone directories published in Hood and Somervell County (maps are provided as attachments (12) and (13).

The Reception Centers are jointly operated and managed by the Chisholm Trail and Heart of Texas chapters of the American Red Cross (ARC).

The American Red Cross has agreements with the school systems and churches to use designated facilities for Emergency Reception Centers and Congregate Care Facilities during emergencies.

3. HOSPITAL AND MEDICAL SERVICES

Hospitals capable of handling contaminated injured persons are Lake Granbury Medical Center and, Texas Health - Harris Methodist Hospital in Cleburne. For offsite cases involving accidental radiation overexposure and/or injuries with actual or potential radioactive contamination, Texas Health – Harris Methodist Hospital in Cleburne, or Lake Granbury Medical Center in Granbury would provide emergency medical care. Care for persons injured onsite at CPNPP would be provided by Lake Granbury Medical Center in Granbury under the provisions of a letter of agreement between that hospital and Luminant Power.

The offsite response organizations responsible for transportation of contaminated injured patients are Granbury/Hood County Emergency Medical Services (EMS) and Somervell Counties Fire Department EMS.

B. CPNPP:

1. EMERGENCY OPERATIONS FACILITY (EOF):

The onsite Emergency Operations Facility (EOF) for CPNPP is a protected facility attached to the Nuclear Operations Support Facility, which is located 1.2 miles west of the plant's two reactor units. The EOF serves as the primary location for coordination between the Radiation Control Program (RCP) and CPNPP. The EOF provides sufficient radiological protection and monitoring equipment to assure that radiation exposure to any person working in the EOF will not exceed five (5) rem TEDE or twenty-five (25) rem thyroid CEDE during the duration of a declared emergency. Should the EOF become uninhabitable, necessary personnel will move to the Alternate Emergency Operations Facility located in Granbury at 1314 Weatherford Hwy (FM 51) North. Granbury is approximately 15 miles north of CPNPP.

2. JOINT INFORMATION CENTER (JIC):

The JIC for CPNPP is located approximately 10 miles north of CPNPP at the Granbury City Hall, 116 West Bridge Street, Granbury, Texas. JIC will be established by CPNPP at the declaration of an Emergency Classification at the Alert level. CPNPP, State, County, and Federal Public Information personnel will coordinate information, issue news bulletins and participate jointly in news briefings.

C. STATE AGENCIES:

1. STATE OPERATIONS CENTER (SOC):

The Governor's Division of Emergency Management (GDEM) SOC is used for overall coordination of activities at the state level. The SOC is located in the Department of Public Safety Headquarters, 5805 North Lamar Blvd, Austin, Texas. All involved members of the Texas Emergency Management Council will send representatives to the SOC or maintain telephone and/or live video contact. The Federal liaison to the State Council may also be present at the SOC. The State EOC is approximately 165 highway miles from CPNPP and is operational 24 hours a day.

2. DISASTER DISTRICT 1A, GARLAND:

The EOC for Disaster District 1A is located in Department of Public Safety Region 1 Headquarters at 350 West I-30, Garland, TX, 75043 in Garland. This EOC will serve as the coordinating location for area support activities provided to affected local governments by State agencies on the Texas Emergency Management Council. The Disaster District 1A EOC is approximately 100 highway miles from CPNPP.

3. DSHS/RCP STAGING AREA, GRANBURY:

During radiological emergencies at CPNPP, the RCP will be the lead state agency in the assessment of radiological impact and damage to the environment. The RCP staging area will be established in the Hood County Courthouse Annex 1 at 200 Deputy Larry Miller Dr. in Granbury. If that building is not available, the Staging Area Coordinator in consultation with the Chief of Field Operations (Incident Commander) will select an alternate site. The staging area will provide telephones for communications with the Chief of Field Operations (Incident Commander) at the CPNPP EOF, Decontamination Assistance personnel, as well as for contact with off-duty personnel; and radio capabilities for communication with field teams and with RCP personnel in the CPNPP EOF.

Physical space availability in the staging area is sufficient to permit the assembly of stand-by team members and/or persons requiring briefing or debriefing prior to going on or off duty. Space availability will also permit Logistics Support and Instrument Maintenance and Calibration team activities to be conducted from that site. Adequate parking space is available for response team vehicles as well as the DSHS mobile laboratory.

If an alternate staging area site is required, selection criteria should ensure at least approximately 800 to 1,000 square feet of useable space, adequate vehicle parking, and the availability to rapidly install two outside telephone lines.

A letter of agreement between the state and utility is kept on file at the RCP headquarters in Austin.

D. FEDERAL AGENCIES:

1. JOINT FIELD OFFICE (JFO):

A JFO may be established and managed by DHS. It will be a temporary Federal facility established locally to provide a central point for all non-technical federal, state, and local representatives with responsibility for accident support and coordination. The location of the JFO may be pre-determined or may be selected by DHS upon implementation of the National Response Framework (NRF) following the declaration of an incident at CPNPP.

2. FEDERAL RADIOLOGICAL MONITORING & ASSESSMENT CENTER (FRMAC):

When a major radiological emergency is anticipated, suspected, or has occurred, a National Coordinating Agency or state can request activation of the FRMAC to provide support. The FRMAC is an interagency organization with representatives from various federal, state, and local radiological response organizations. A declaration to respond to a major radiological emergency will be made by the U. S. Department of Energy (DOE) Headquarters. The location of the FRMAC may be predetermined by DOE or may be selected upon implementation of the NRP.

IV. ACCIDENT CLASSIFICATION SYSTEM

The following system will be used to denote various accident classes according to their severity in terms of threat to the general public around CPNPP. This system has been coordinated with CPNPP Emergency Plans and is categorized into the following four emergency classifications, based on the recommendations of NUMARC/NESP-007, Methodology for Development of Emergency Action Levels, January 1992, Rev. 2. Following each classification is an indication of the associated threat to the general public, and a description of the probable RCP response.

Accident Category	Public Threat	RCP Response
UNUSUAL EVENT	NONE	NONE
ALERT	POTENTIAL	ADVISORY
SITE AREA EMERGENCY	MINIMAL	PRECAUTIONARY
GENERAL EMERGENCY	SIGNIFICANT.	OPERATIONAL

V. RCP RESPONSE LEVELS

RCP response to any notification from CPNPP will be related to, but not limited by, the utility's estimate of severity. The RCP will consider such other factors as the degree of uncertainty and the lead-time required to position RCP response personnel should something more serious develop. For any class of accident, actions appropriate to the situation may be initiated at the discretion of the Radiation Program Officer or his/her assigned designee. Upon activation, at least two forms of communications will be established for the response team.

Briefly, the types of RCP response indicated for various classes of accident are:

UNUSUAL EVENT: NONE - No action will be taken by the RCP except to log the receipt of notification in order to preserve a record of such events. The process of receiving notifications of Unusual Events will serve as a test of notification methods and procedures.

ALERT: ADVISORY - One of the individuals assigned to Accident Assessment will establish contact with CPNPP, obtain data to evaluate the event, and either keep an open line to the plant or arrange for periodic updates until the situation is resolved. The Radiation Program Officer, the Chief of Field Operations (Incident Commander), and the Accident Assessment Team will be advised that the plant has issued an ALERT, and will be given sufficient information to permit independent evaluation.

SITE AREA EMERGENCY: PRECAUTIONARY - The Accident Assessment Team will establish contact with CPNPP, obtain data to evaluate the event, and maintain contact until the incident is resolved. The Radiation Program Officer, the Chief of Field Operations (Incident Commander) and the Accident Assessment Team will be kept informed of significant events and Utility response. At least one shift of response team personnel will be notified, and either placed on stand-by or deployed at the discretion of the Radiation Program Officer.

GENERAL EMERGENCY: OPERATIONAL - Response team personnel will be activated and will maintain 24-hour operational capability until the event is resolved, or until it is downgraded to a lesser classification.

VI. TEAM DEPLOYMENT, PLUME EXPOSURE PHASE:

Deployment of the first full shift to field duty stations is estimated to require from four to five hours. This deployment time is not considered to be critical because, while the remainder of the response team is traveling to their duty stations, one shift of the Accident Assessment Team will assemble at the Exchange Building in Room N-110. By telephone contact with CPNPP, the Assessment Team will obtain necessary information. Recommendations are passed to Hood and Somervell County officials and to other agencies as necessary. They will also keep the Radiation Program Officer and Chief of Field Operations (Incident Commander) informed of the event. During this initial deployment period, site personnel from CPNPP will conduct any necessary offsite monitoring.

When the first shift of the response team is in position, the group in Austin will turn their function over to their counterparts located in the CPNPP Emergency Operations Facility (EOF) and proceed to the site for further duty.

VII. RCP RESPONSE TEAMS

A. IDENTITY:

The RCP will activate any or all of the following response teams and personnel in support of emergency response operations involving the CPNPP 10-mile and 50-mile EPZ's.

1. Chief of Field Operations (Incident Commander)
2. Licensee Liaison
3. Field Monitoring Teams
4. Sample Preparation & Coordination
5. Field Sample Analysis
6. Accident Assessment (Planning Section)
7. Contamination Control
8. Decontamination Assistance
9. Public Information Coordination
10. Instrumentation Maintenance and Calibration
11. Logistics Support
12. State Operations Center (SOC) Liaison
13. Disaster District Sub 1A-Garland Liaison
14. Hood and Somervell County EOC Liaison
15. Staging Area Support and Coordination
16. Administrative Support
17. Courier Service
18. Medical Facility Liaison

B. COMPOSITION

Response teams will normally be comprised entirely of DSHS personnel with the following exceptions:

1. Field Monitoring Teams

During the Plume Exposure Pathway phase of response, RCP personnel will be paired with Department of Public Safety (DPS) officers to form two-person field monitoring teams.

DPS personnel have received training in radiological monitoring procedures. Transportation and communications will be provided via DPS vehicles that are equipped to both transmit and receive on DSHS and DPS law enforcement frequencies.

2. Field Sample Analysis

Individuals from the DSHS Laboratories Services Section will staff the mobile laboratory to operate on-board analysis systems. Texas A&M University and the University of Texas also have an agreement with the RCP for backup environmental sample analyses if needed.

C. CAPABILITY

Response teams will have the following specific capabilities for response to accidents or incidents involving CPNPP. This listing is not complete. Rather, it is selective; showing only those non-routine capabilities that could be essential in response to a fixed nuclear facility accident.

1. Chief of Field Operations (Incident Commander):

The Chief of Field Operations (Incident Commander), a designated senior manager deployed from Austin, will direct the RCP response. Response teams will have the following specific capabilities for response to accidents or incidents involving CPNPP. A shift schedule will be written to support 24-hour operations. This listing is not complete. Rather, it is selective, showing only those non-routine capabilities that could be essential in response to a facility accident.

2. Licensee Liaison:

The Licensee Liaison team will staff two one-person shifts in the CPNPP EOF. These individuals will generally observe CPNPP activities in the EOF, relaying to appropriate RCP response team elements any items or issues which could affect RCP activities, but which might not routinely be reported to the RCP through other channels. Normally information will be gathered by attending the Utility's briefings within the main area of the EOF. The Licensee Liaison may also provide updates to the Utility on the RCP's response during these briefings.

3. Field Monitoring Team Leaders (Operations Section Chief):

The Field Monitoring Team Leaders will staff two one-person shifts in the CPNPP EOF, providing direction and control of RCP field monitoring activities. They will have radio and/or phone contact with the monitoring teams, and will serve as interface between the monitoring teams and other portions of the RCP's response team. The Field Monitoring Team Leader will also serve as coordinators of Contamination Control team activities, using either radio or telephone for communications with those individuals.

The Field Monitoring Team Leader is also responsible for ensuring that, prior to deployment, all field team members have been briefed concerning the accident, including current and anticipated weather conditions and protective response activities. The Field Monitoring Team Leader may be assisted by the Staging Area Coordinator (Logistics Section Chief) in accomplishing these briefings.

4. Field Monitoring Teams:

During the plume exposure response phase, Field Monitoring Teams will have maps of the 10-mile EPZ, transportation via the vehicles assigned to their DPS team member, and supplies and equipment as shown in Procedure 10. All teams may be active at one time, or the teams may be split into two or more shifts as conditions warrant. Teams will be capable of locating and monitoring the plume boundaries; taking air and direct radiation samples; and taking such other confirmatory readings as are necessary to determine the extent and levels of contamination within the 10-mile EPZ. Pre-selected monitoring points for initial sampling are included in attachment (3).

During the Ingestion Exposure Pathway phase of emergency operations, field monitoring teams will be responsible for collecting samples of air, soil, water, milk, and vegetation including grass, animal feeds and fruits and vegetables intended for human consumption. In some instances, teams may also be required to collect meat and poultry samples.

During the Ingestion Exposure Pathway phase, field monitoring teams may be augmented by reassigning personnel from other Radiation Control Program emergency response team elements. Team members may not be paired with DPS Troopers. Instead, during this phase, team members may be paired with personnel from other DSHS programs or with personnel from other federal, state or local organizations. Transportation will be via DSHS or other agency vehicles.

During the Ingestion Exposure pathway phase, field monitoring teams will have maps of the 50-mile Ingestion Exposure Pathway EPZ and monitoring instruments and sample collection tools and containers as are detailed in Procedure 10.

Radio communications will not be required during the Ingestion Exposure Pathway phase. In most instances, protective clothing worn during this phase will be limited to gloves and shoe covers.

A third phase of emergency response in which field monitoring teams will be used is the recovery phase. Activities to be conducted during this phase will consist primarily of area monitoring, supervision of decontamination efforts and collection of air, soil, water and some vegetation samples. Tasks to be accomplished during this phase are generally described in Procedure 22.

5. Sample Preparation & Coordination Team:

The individuals assigned to the Sample Preparation & Coordination Team will be prepared to receive all samples collected by the Field Monitoring Teams, other RCP programs, and other agencies active in the 50-mile EPZ. The team will record the source and nature of the samples, and route samples to the DSHS mobile laboratory, DSHS's main laboratory in Austin, laboratories of the University of Texas or Texas A&M University, or other laboratories, which have agreed to provide backup analysis support. The team will receive reports of analyses from those various labs and relay all pertinent data to the Accident Assessment Team or enter it in the mobile laboratory's computer.

Additionally, the Sample Preparation Team will have access to all personnel exposure records for emergency workers in the 10-mile EPZ. The team will develop and maintain an exposure history for each emergency worker, and will provide guidance concerning duty assignment modifications necessary to avoid excessive exposure risks.

Sample Coordinators will work in the RCP Emergency Response Vehicle (ERV), which will be located adjacent to the mobile laboratory at the RCP staging area or some other central location as designated by the Chief of Field Operations. They will have communications with other team elements via departmental radio, commercial telephone, or courier.

6. Field Sample Analysis Team:

The RCP mobile analysis laboratory is contained within a 32-foot gooseneck trailer. Using power supplied from available distribution, samples can be rapidly processed. A computer associated with the analysis systems will be used to coordinate sample counting, analyze results, and to archive data for future use.

The Field Sample Analysis Team will have communications capabilities consisting of commercial telephone, departmental radio, and runner.

The RCP shall provide a driver for the vehicle transporting the mobile laboratory.

It shall be the responsibility of the Field Sample Analysis Team to prepare the mobile laboratory, including the computer, for transport prior to departure for any location, and for operations upon arrival at any location during an emergency response or exercise.

Unless conditions dictate otherwise, the mobile laboratory will be positioned on a prepared site adjacent to the DSHS staging area in Granbury. The staging area is located in the Hood County Courthouse Annex 1 at 200 Deputy Larry Miller Dr., near the Hood County Law Enforcement Center. At the discretion of the Chief of Field Operations, some other mobile laboratory location may be selected.

7. Accident Assessment (Planning Section):

The Accident Assessment Team will consist of up to four persons per shift. The team will initially be located in the CPNPP EOF where they will be able to exchange information with the assessment teams of CPNPP and the Nuclear Regulatory Commission (NRC).

The Accident Assessment team will perform real-time dose estimates and project future trends using any of the various assessment programs and procedures available within the RCP.

Procedure 1, Accident Assessment: Plume Exposure Pathway provides basic guidance for team activities during the plume phase of response when attention is primarily focused on the 10-mile EPZ.

Procedure 2, Accident Assessment: Ingestion Pathway identifies action levels and provides guidance for dealing with potential or actual food contamination problems associated with the 50-mile EPZ.

Procedure 22, Recovery, provides guidance for decisions concerning survey, decontamination and release for general use of areas affected by deposited radioactive materials, and for the long-term relocation of persons previously residing in areas which cannot reasonably be decontaminated to a level where they are safe for general occupancy.

When possible, one the Accident Assessment team members will always be available to receive information from the Licensee Liaison, the Field Monitoring teams, other agencies, and the Sample Preparation team. Two team members will be able to concentrate on evaluating and correlating information provided, using either manual assessment processes referenced in procedures 1, 2 and 22 or various computer or programmable calculator models.

The fourth member of the team will relay the team's findings to the Chief of Field Operations, Public Information Team, CPNPP, the NRC, and Liaisons to each of the following: State Operations Center (SOC), Disaster District 6A in Waco, Local Government EOCs, and other agencies performing assessments of the event.

If operations with less than four Accident Assessment team members per shift are required, individual duties may be redefined as appropriate to the situation. In those instances, some outside communication duties of the team may be assumed by the Chief of Field Operations, or may be delegated to Administrative Support personnel assisting the Accident Assessment Team.

Accident Assessment team communications will include local and long distance service and a facsimile machine to permit contact with the RCP office in Austin, SOC in Austin, Hood and Somervell County EOCs, Disaster District 1A EOC in Garland, the RCP staging area at Hood County Annex 1 and the RCP Public Information Coordinator in the Joint Information Center (JIC). Contact with all other team elements will either be via telephone or departmental radio.

While CPNPP procedures task its personnel with setting up the RCP's onsite operating area prior to the arrival of RCP personnel, it remains the responsibility of the Accident Assessment team to make final adjustments in furniture arrangement and to set up any computer hardware to be used by the team.

If federal radiological monitoring and assessment assistance is requested, the Accident Assessment team may relocate to the Federal Radiological Monitoring and Assessment Center (FRMAC) once that facility is activated. Any such relocation shall be at the discretion of the Chief of Field Operations.

8. Contamination Control:

In order to alert persons that they may be entering a hazardous area, to reduce unnecessary exposures, and to prevent the further spread of particulate contamination, RCP will identify an exclusion area which includes that off-site portion of the CPNPP Plume Exposure Pathway EPZ which has been affected by an airborne release of radioactivity.

Enforcement of access control for the identified area shall be the responsibility of Hood and Somervell County Officials, aided as necessary by other city, county or state law enforcement personnel.

The role of DSHS Contamination Control teams at access control points shall be as outlined in procedure 24.

In the event of a waterborne release from CPNPP, contamination will most probably be contained within Squaw Creek Reservoir a 3,300 surface acre lake that is inside the owner controlled area adjacent to the plant. In this event, Luminant Power will establish access control points, ensure that persons entering the area have necessary personal dosimetry and protective equipment, and maintain exposure records for all persons working on or near the water. Monitoring and decontamination or impounding of equipment will also be the responsibility of Luminant Power, with assistance provided by state or federal agencies if required.

9. Public Information Coordination:

The Public Information Coordination team will operate in the News Center, which is to be established by CPNPP at the Granbury City Hall, 116 West Bridge Street, Granbury, Texas. Typically, this team will consist of one public information specialist and one technical spokesperson per shift; assisted by one administrative assistant. The function of the RCP Public Information Coordination team will be to provide information concerning the impact of the radiological aspects of the emergency on the health and safety of the public, and concerning the RCP emergency response activities. The team will have contact with RCP personnel in the CPNPP EOF, the RCP staging area and SOC in Austin via telephone and fax. Contact with RCP personnel at other locations will be via telephone.

10. Courier Service:

RCP personnel in a radio-equipped Texas Department of State Health Services vehicle will pick up samples from Field Monitoring teams for delivery to the Sample Preparation & Coordination team, and will perform such other transportation-related logistics support services as are required.

11. Decontamination Assistance:

The primary relocation centers for persons evacuating from the CPNPP 10-mile Exposure Pathway EPZ will be at the Cleburne Reception Center located at the Cleburne Senior Center, 1212 Glenwood Dr. in Cleburne TX 76033, at the Stephenville Reception Center located at the Parks and Recreation Center within the city park at 378 W. Long Street in Stephenville, and at the Benbrook Reception Center located at the YMCA 1899 Winscott Road Benbrook, TX 76126. Based on wind direction at the time of the event, one or the other of these locations will be selected as the primary reception center and the public will be advised of its identity via an EAS broadcast. For maps of these areas see attachments 12 and 13. Monitoring and decontamination of the general public and their vehicles will be the responsibility of local officials in those jurisdictions, as will the provision of lodging, food and other welfare services.

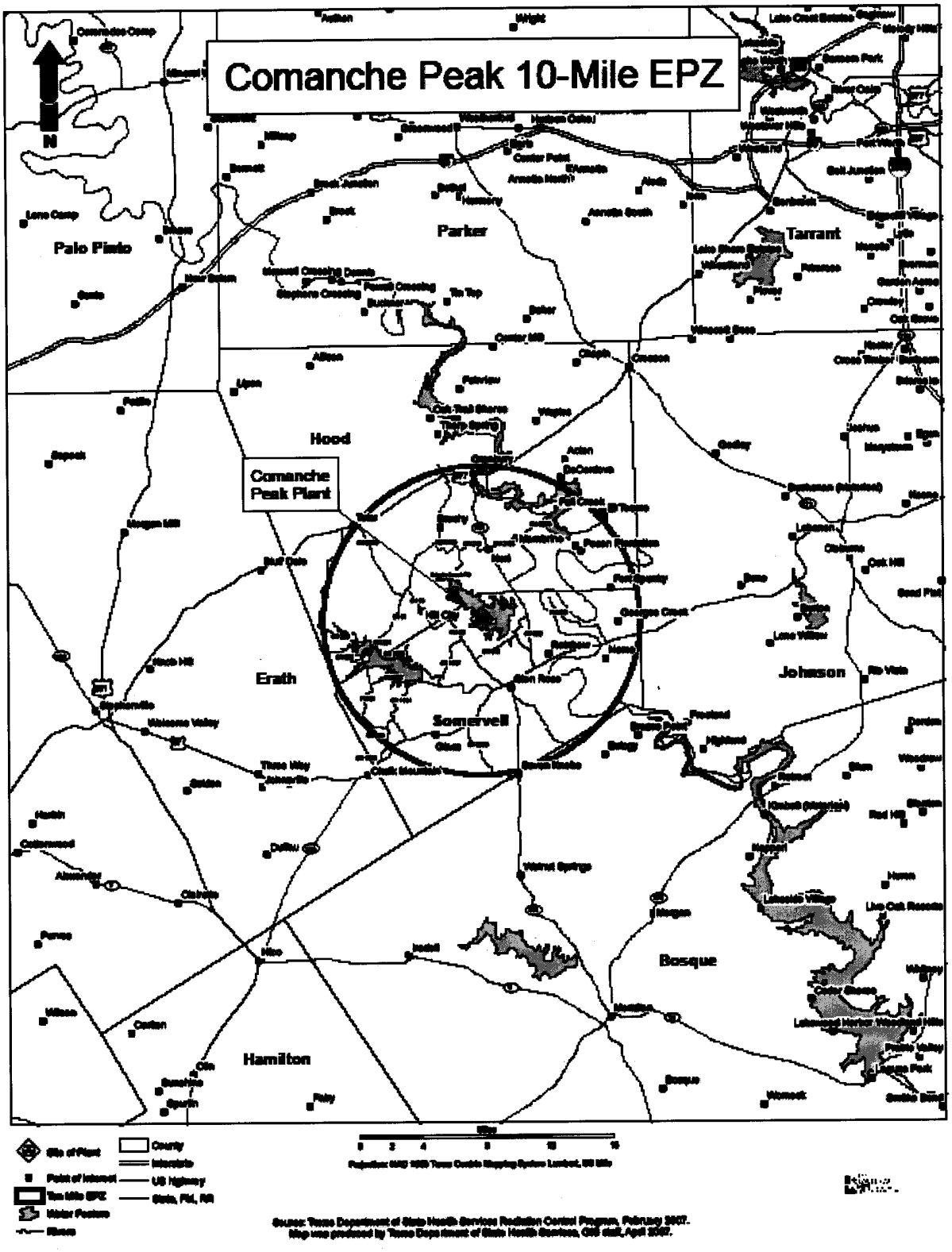
The RCP has agreed to provide advisory teams to each jurisdiction in which a significant evacuee monitoring effort is necessary as the result of an accident at CPNPP.

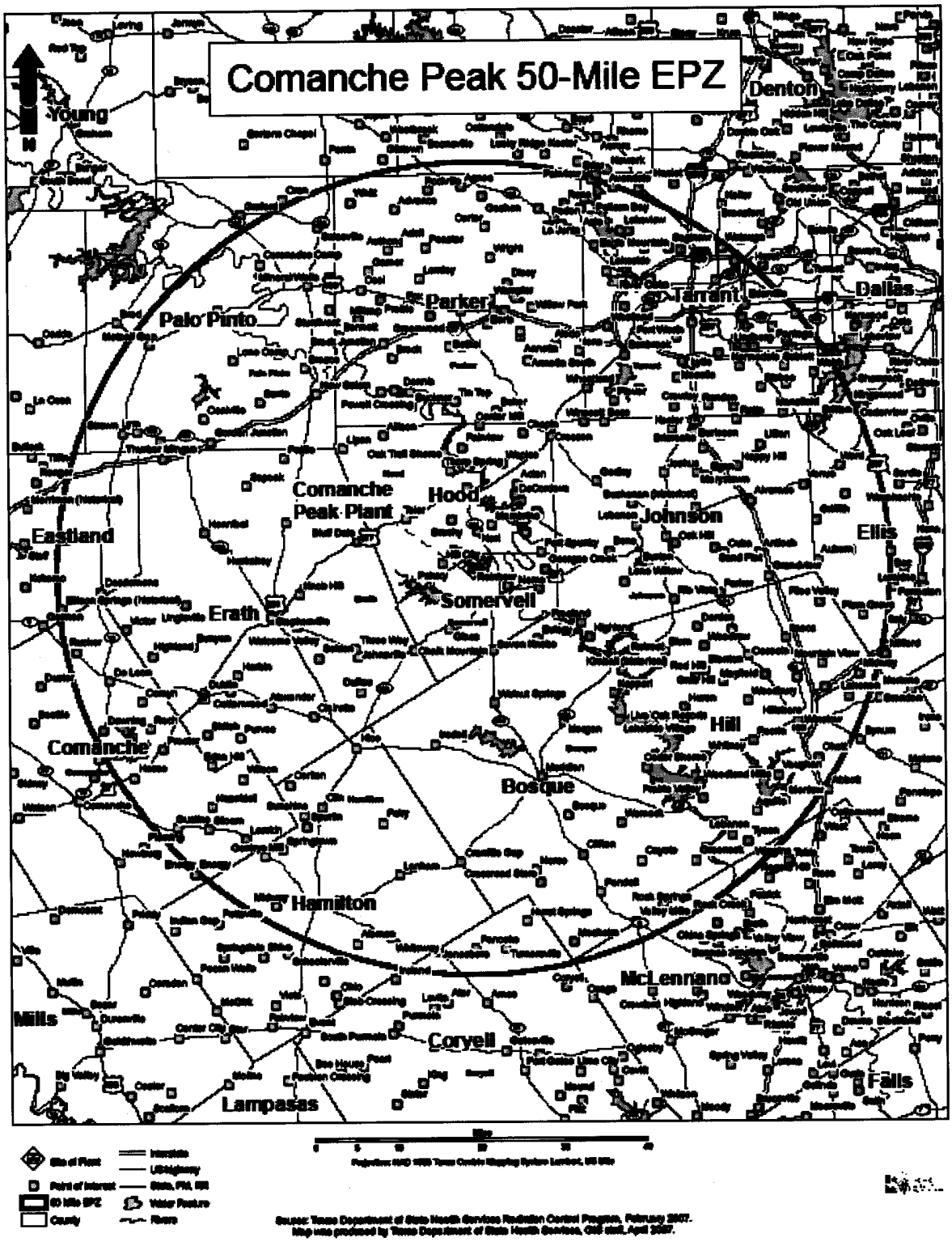
Decontamination Assistance team communications will be via telephone. Backup communications will be via relay through the radio capabilities of other agencies present at the relocation center.

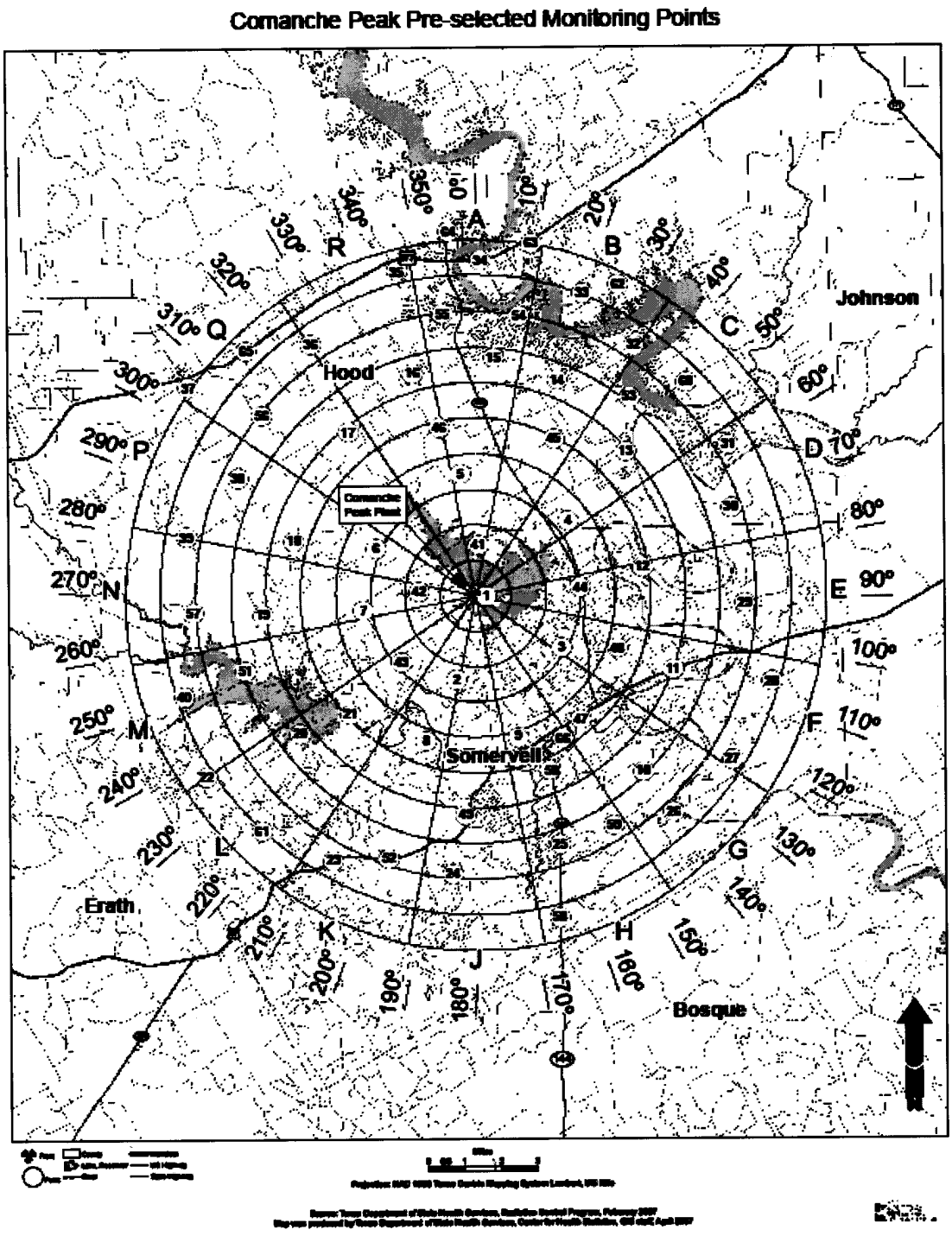
Procedure 25, Decontamination Assistance, provides basic guidance for RCP Decontamination Assistance Team activities during their assistance at reception centers

12. Other Radiation Control Program Teams

Other Radiation Control Program teams will function in accordance with guidance incorporated within these plans and procedures or as specifically directed by the Chief of Field Operations. Aside from their specific duty stations, there will be no difference between their activities in response to an accident at the CPNPP and their activities in response to any other major radiological emergency.

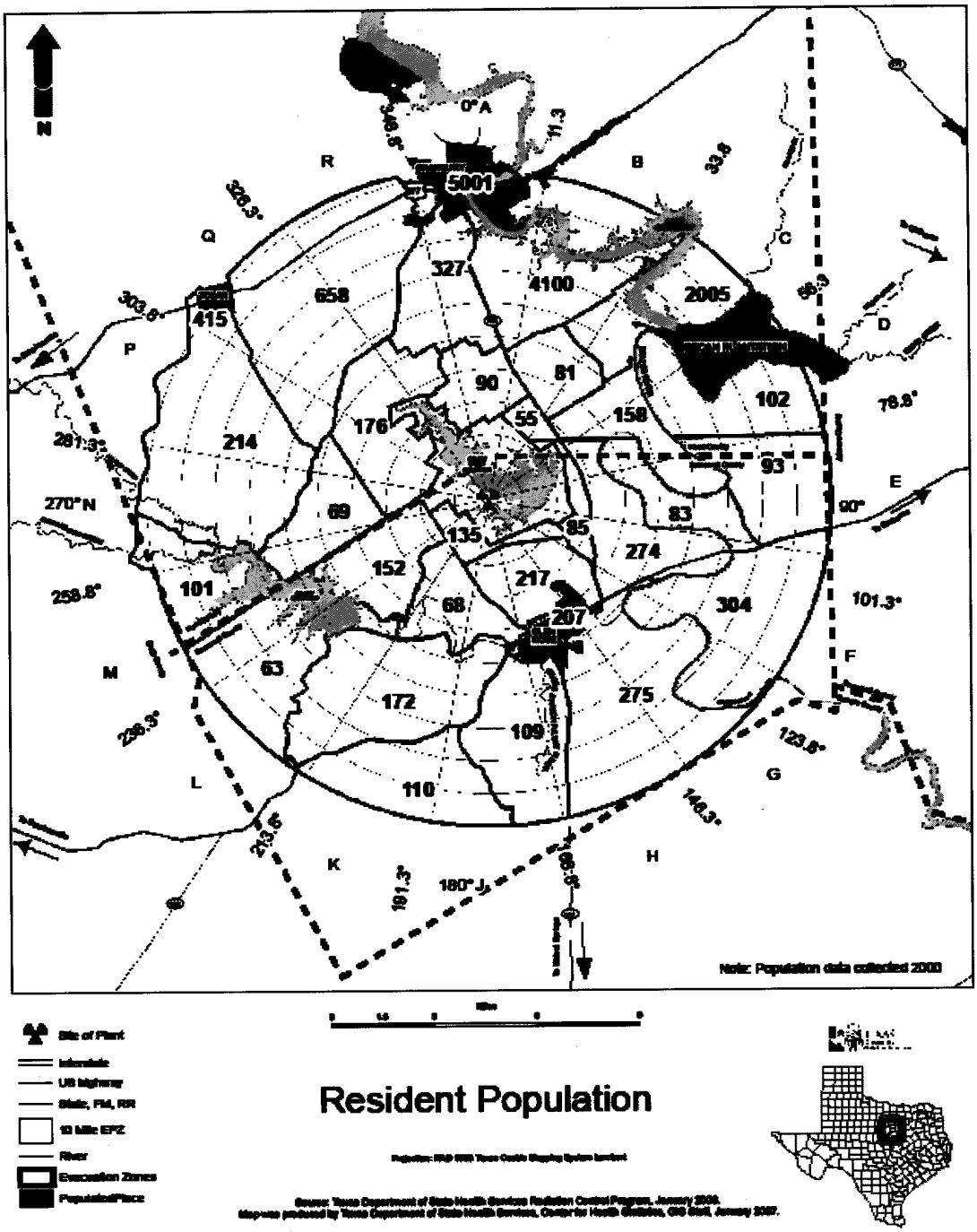

Comanche Peak 10-Mile EPZ
N
Palo Pinto
Parker
Tarrant
Hood
Comanche Peak Plant
Erath
Somervell
Johnson
Bosque
Hamilton
City of Plant
Point of Interest
Ten Mile EPZ
Water Feature
River
County
Interstate
US Highway
State, FM, RR


Comanche Peak 50-Mile EPZ
N
Young
Denton
Palo Pinto
Parker
Tarrant
Dallas
Comanche Peak Plant
Hood
Johnson
Ellis
Eastland
Somervell
Erath
Hill
Comanche
Bosque
Hamilton
McLennan
Mills
Coryell
Falls
Lampasas
County



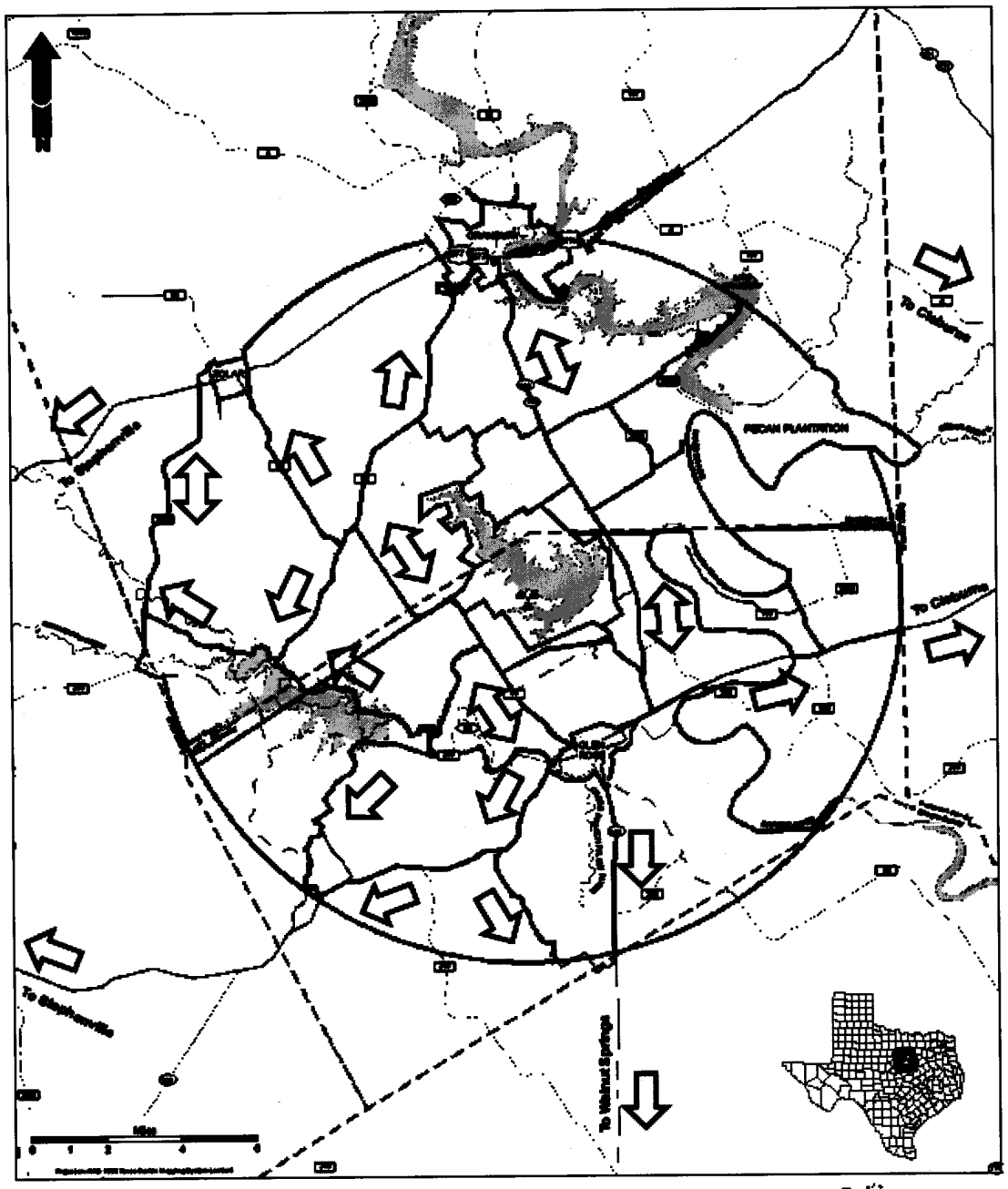
CPNPP Pre-selected Monitoring Points

Note: Monitoring points are indicated by circled number. More detailed maps with a detailed list of monitoring points are available for emergency response team use



Resident Population Distribution

Note: Population is indicated by Emergency Response Zone. Map of Emergency Response Zones is included as Attachment (14). More detailed map is available for emergency response team use.



CPNPP Evacuation Routes

Note: Evacuation routes are indicated by bold lines with arrows. More detailed map is available for emergency response team use.

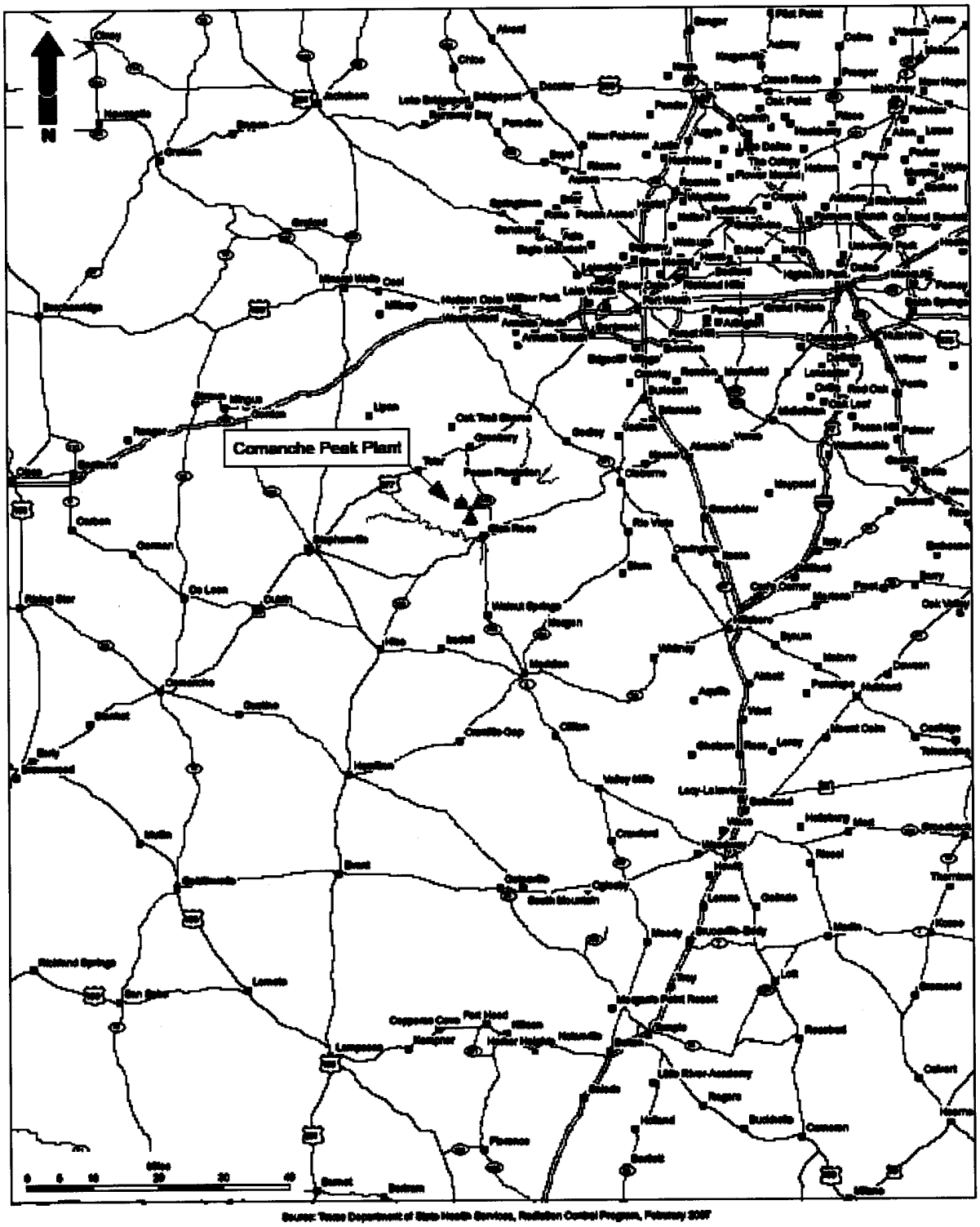
COMANCHE PEAK NUCLEAR POWER PLANT
NOTIFICATION MESSAGE FORM

Roll call: _____ DPS _____ Somervell County _____ Hood County _____ Time

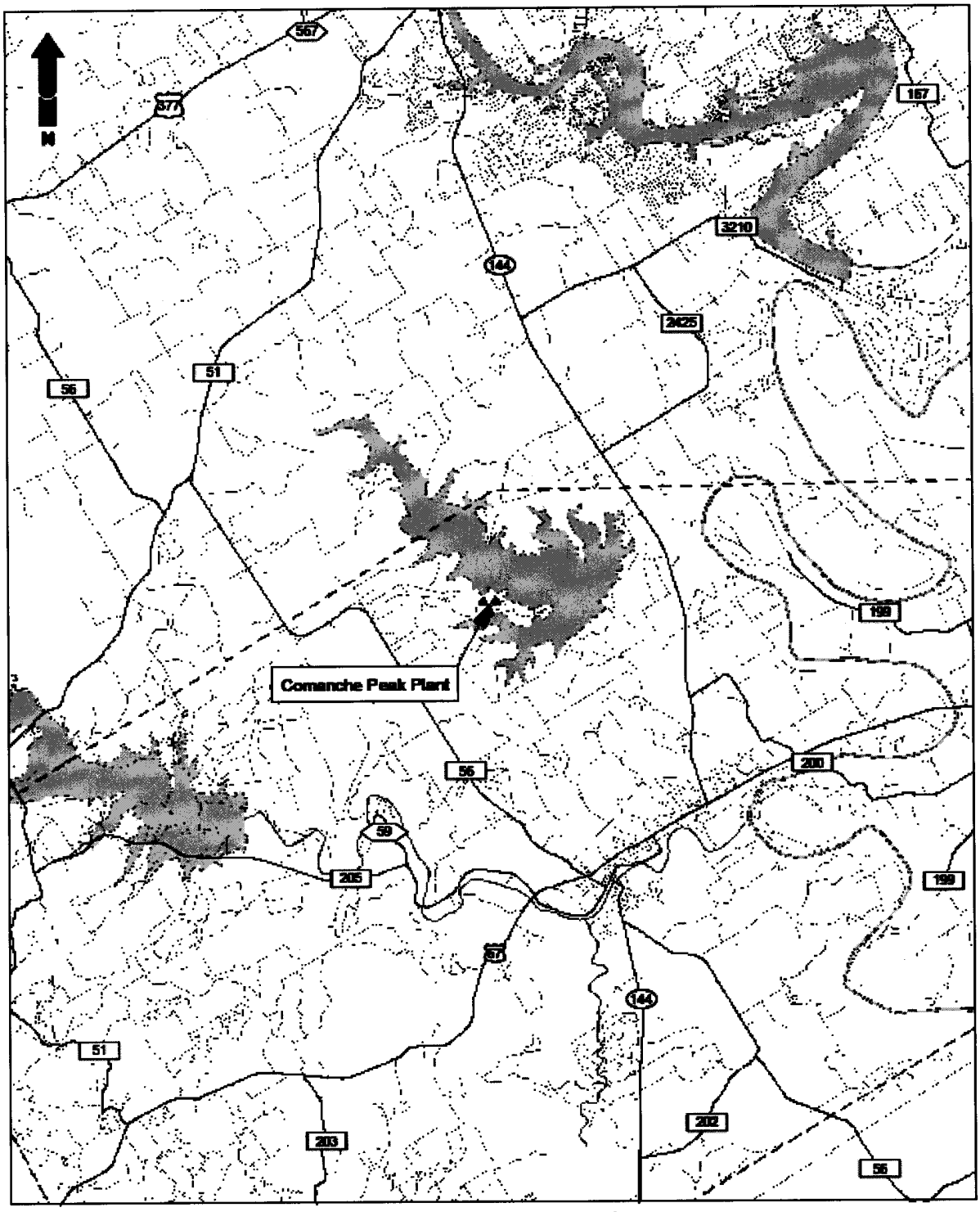
1. **Communicator:** (name)
2. ☐ **This is a drill** ☐ **This is NOT a drill**
3. **Message Number** , **Originating From:** ☐ CR ☐ TSC ☐ EOF
4. **Emergency Classification:** ☐ New ☐ Unchanged
   Declared at: Date: Time:
   ☐ Unusual Event ☐ Alert ☐ Site Area Emergency ☐ General Emergency ☐ Terminated
5. **Event Description:** ☐ New ☐ Unchanged
   Classification Path/EAL No.
   Explain:
6. **Radiological Data:** ☐ New ☐ Unchanged
   Radiological release in progress: ☐ Yes ☐ No
   A. If Yes: Expected Duration: hrs. Started: Date: Time:
   B. ☐ Radiological release has ended: Duration: hrs. Terminated: Date: Time:
7. **Recommended Protective Actions:** ☐ New ☐ Unchanged
   A. ☐ No recommended protective actions at this time
   B. ☐ Recommended protective actions are:
      1. Evacuate from zones:
      2. Shelter in zones:
      3. Sectors affected:
8. **DSHS - Radiation Control concurs with Recommendations in 7 above:**
   ☐ Yes ☐ DSHS Not Contacted ☐ No
9. **Meteorological Data:** ☐ New ☐ Unchanged
   A. Wind Speed MPH; Wind direction From Degrees
   B. Stability Class (Check One): ☐ A ☐ B ☐ C ☐ D ☐ E ☐ F ☐ G
   C. Precipitation (Check One): ☐ None ☐ Rain ☐ Sleet ☐ Snow ☐ Hail ☐ Fog
10. **Remarks:**
11. **Approved:** (Emergency Coordinator) Date: Time:
    Print / Sign

EPP 203-8 Rev. 12

Geographic Orientation - CPSES

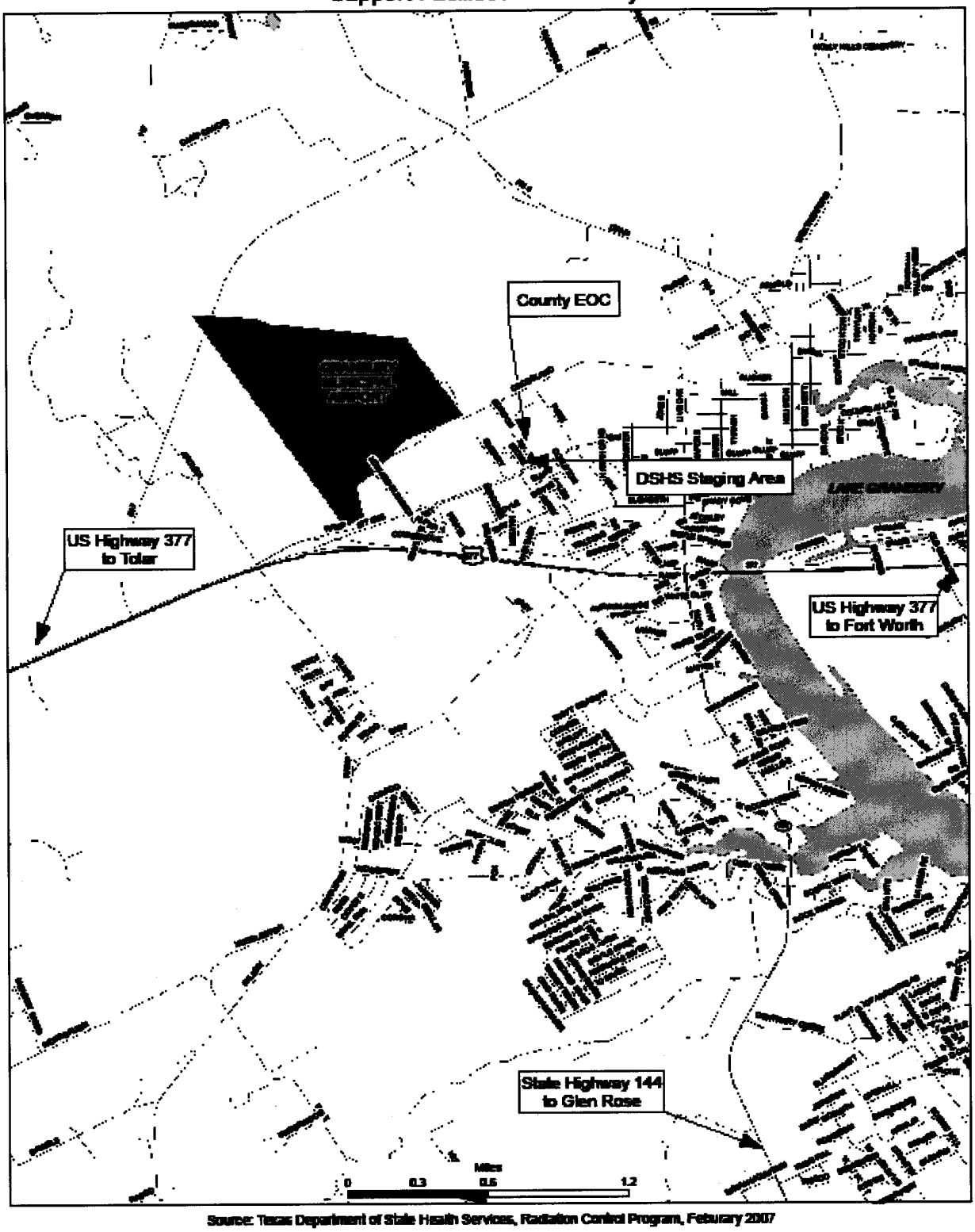


Detail to Comanche Peak



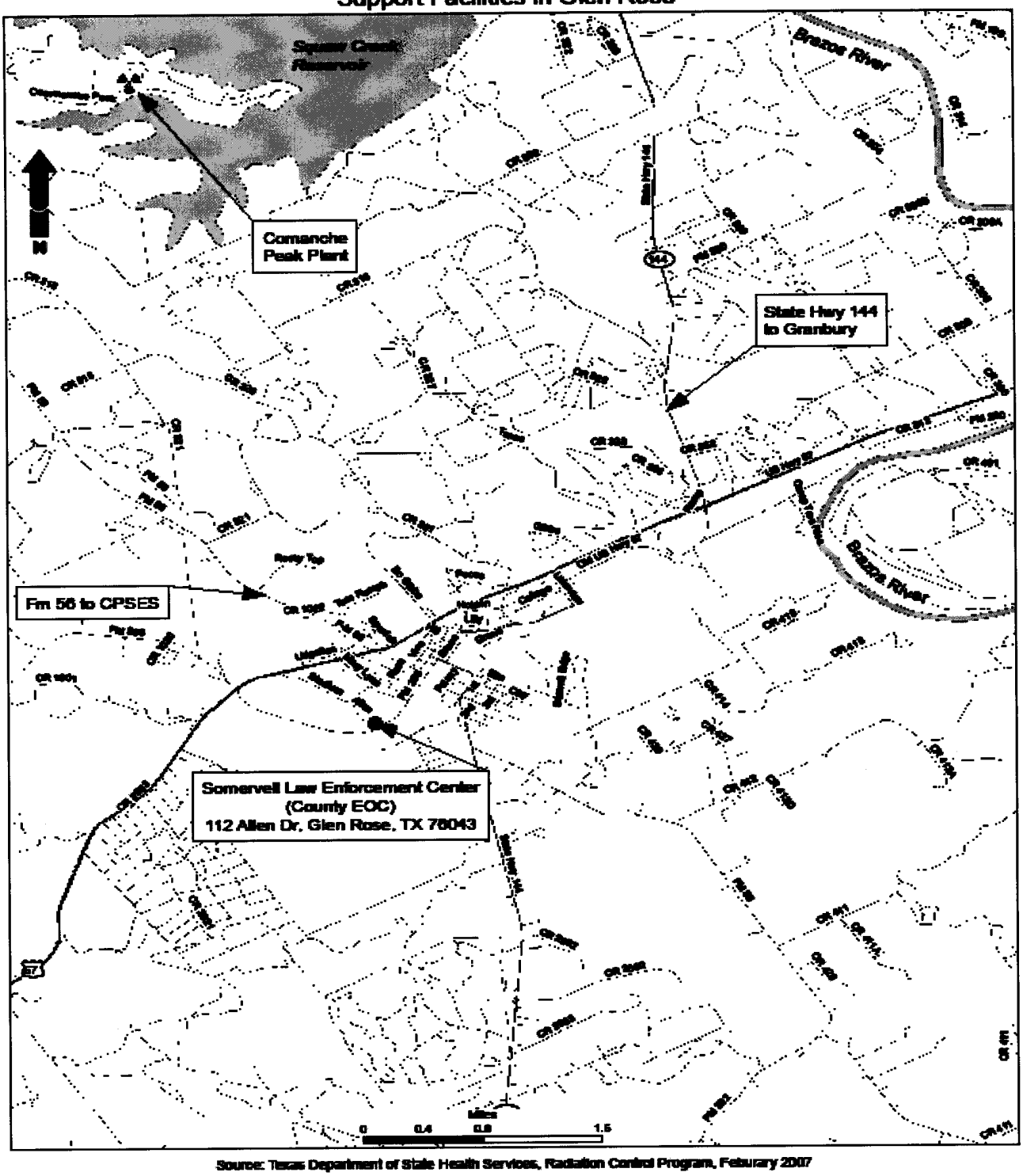
Source: Texas Department of State Health Services, Radiation Control Program, February 2007

Support Facilities in Granbury



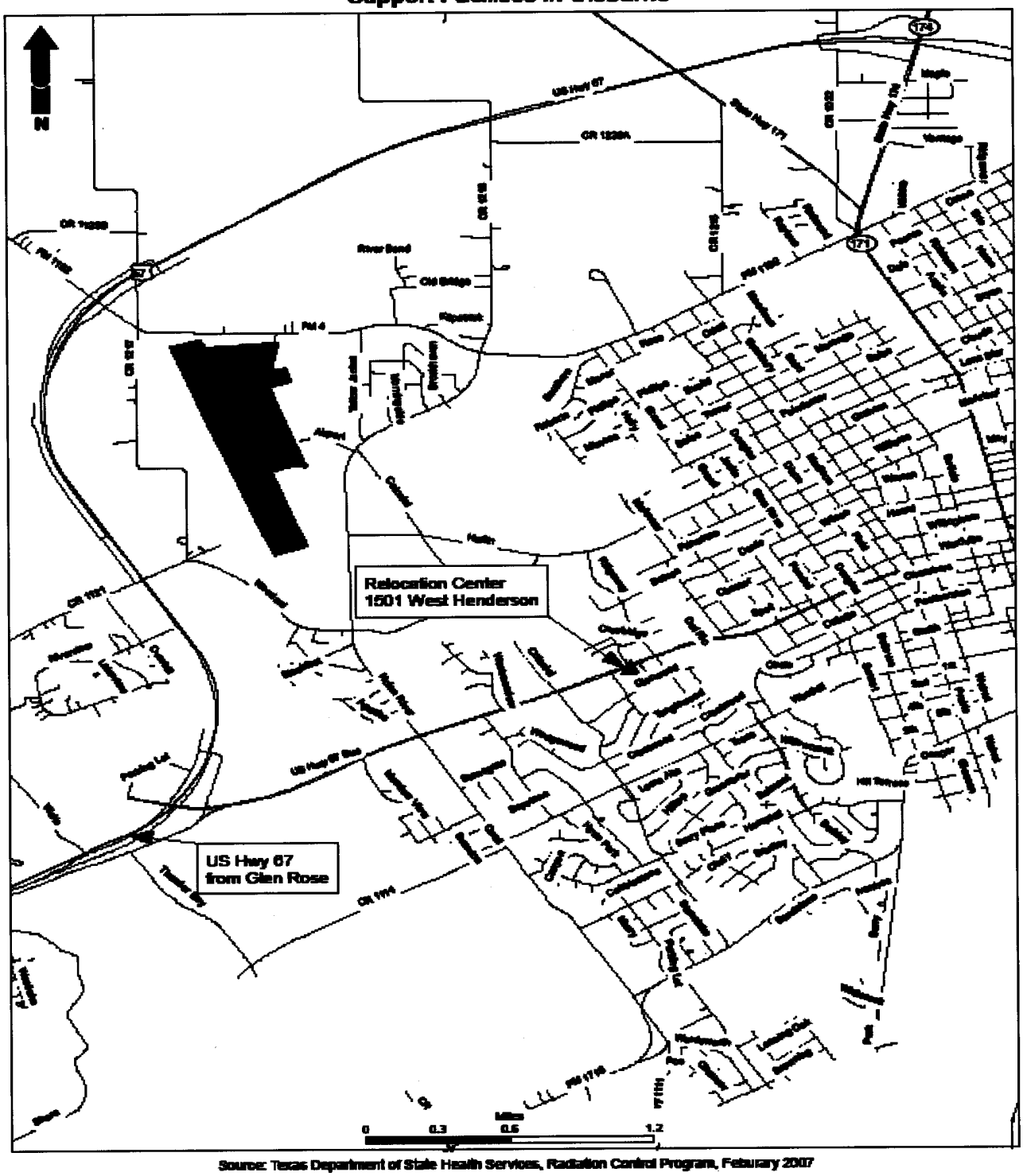
Source: Texas Department of State Health Services, Radiation Control Program, February 2007

Support Facilities in Glen Rose



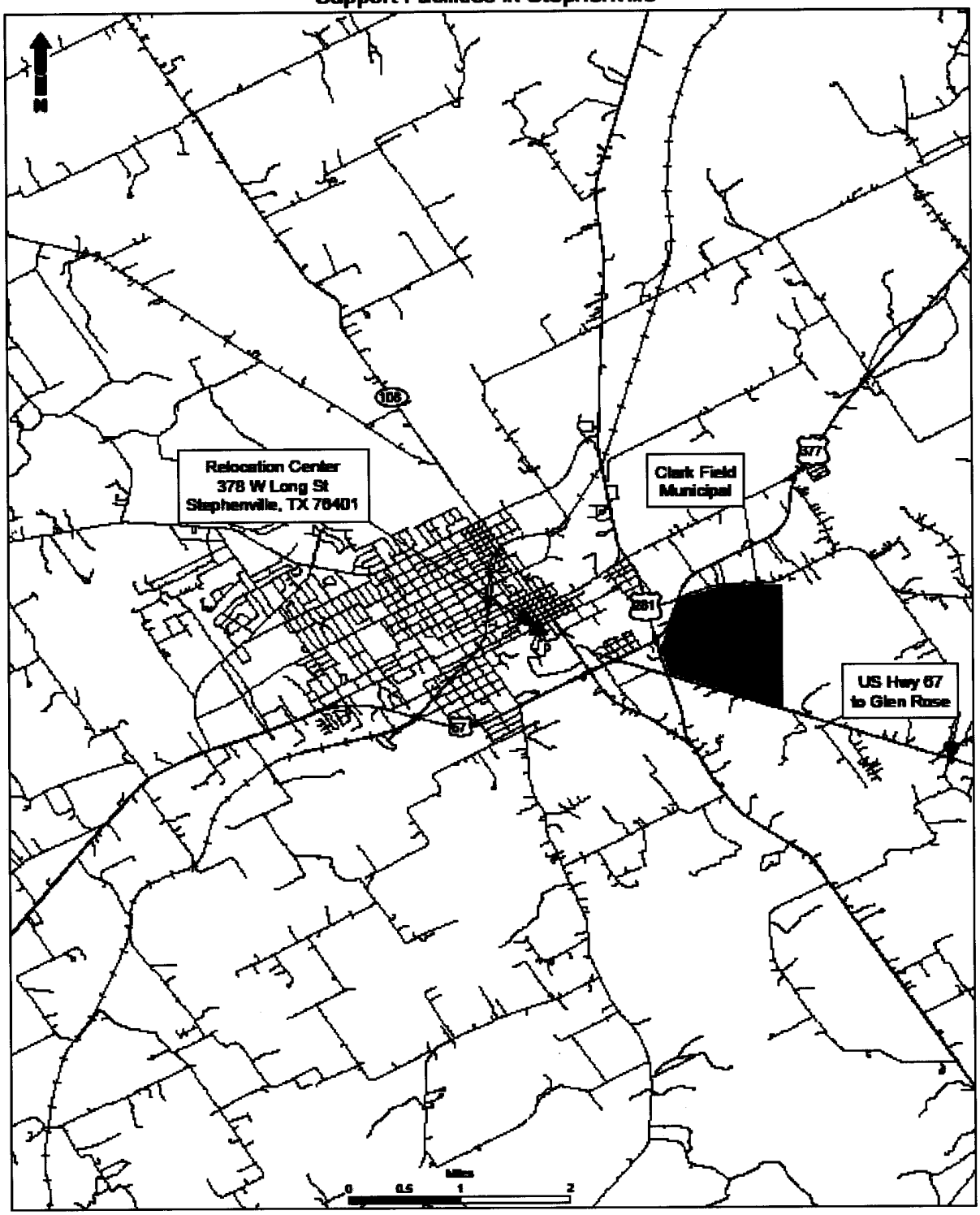
Source: Texas Department of State Health Services, Radiation Control Program, February 2007

Support Facilities in Cleburne



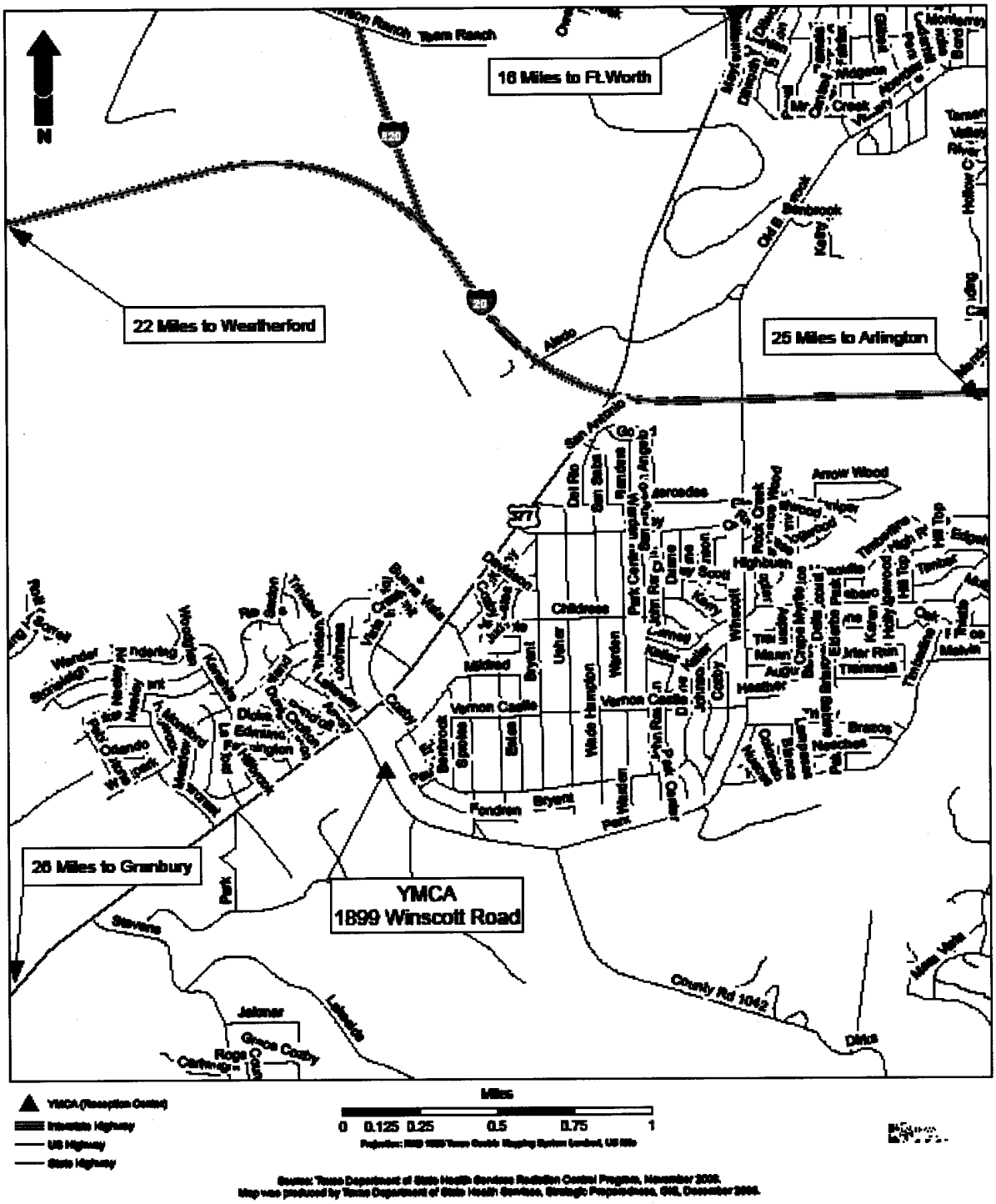
Source: Texas Department of State Health Services, Radiation Control Program, February 2007

Support Facilities in Stephenville

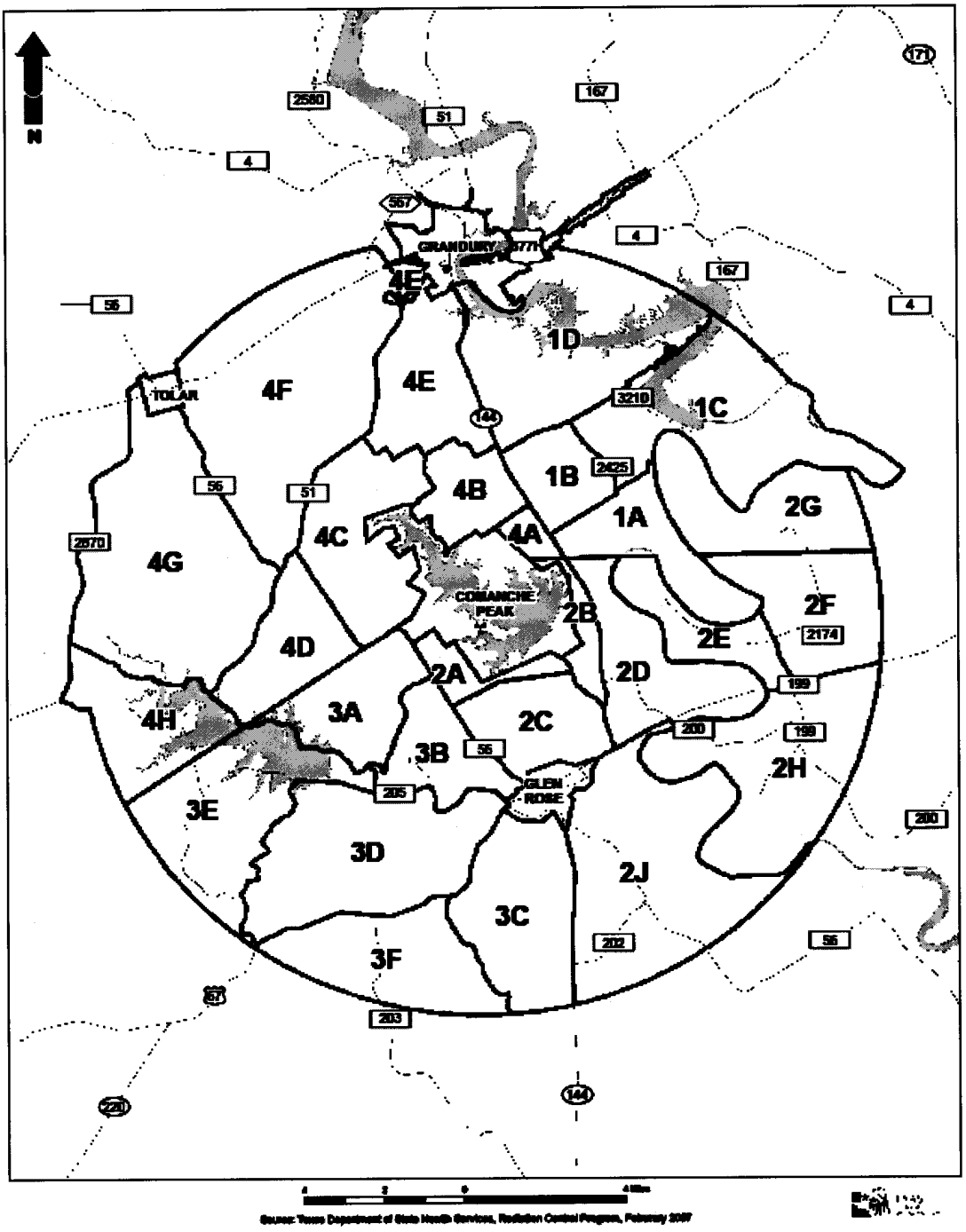


Source: Texas Department of State Health Services, Radiation Control Program, February 2007

Benbrook Reception Center



Comanche Peak Emergency Response Zones



CPNPP Emergency Response Zones

Note: Emergency Response Zones correspond with population distribution shown in Attachment (4). More detailed map is available for emergency response team use.

RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

Comanche Peak, Units 3 and 4

Luminant Generation Company LLC

Docket Nos. 52-034 and 52-035

SRP SECTION: PART 5 – Emergency Preparedness Plan

APPLICATION SECTION:

DATE OF RAI ISSUE: 04/10/2009

QUESTION NO.: CP-018

Subject: Emergency Facilities and Equipment
Basis: NUREG 0654, H.3
SRP Acceptance Criterion: Requirement H

State of Texas Emergency Management Plan: Draft plans describe facility layouts, list facility equipment, back-up capabilities, and access to facilities for directing responses. A final copy of Tab 1, Chapter 1 is necessary to resolve this issue. In addition, it will be necessary to update NUREG 0654 cross-reference to indicate appropriate portions of Procedures 10 and 11 that fully address this criterion.

ANSWER:

As referenced in CP-015, Final approved version of the "**State of Texas Emergency Management Plan**" **Annex D**: Radiological Emergency Management, **Tab 1**: Fixed Nuclear Facility Accident Response, **Chapter 1**: Comanche Peak Nuclear Power Plant (Approved 061909) is attached to the response for RAI CP-015.

The Texas Department of State Health Services (DSHS) Procedure 10, "Monitoring and Sampling Airborne Gamma Releases" has been updated to address criterion H.3 and is attached to this response along with referenced DSHS Procedure 11, "Monitoring and Sampling Airborne Alpha Releases."

In addition, the NUREG 0654 Crosswalk has been updated to reflect the cross-references for implementation of the H.3 criteria in the state, site and county plans and is attached to the response to CP-023.

Impact on R-COLA

See attachments to CP-015 for approved version of the State Plan and CP-023 for an update to the crosswalk.

Add to the State_EP folder under the Supplemental folder for the DSHS Approved Procedures:

Procedure 10 (file: Texas DSHS Procedure 10_061909.pdf) and

Procedure 11 (file: Texas DSHS Procedure 11_101907.pdf)

Impact on S-COLA

None.

Impact on DCD

None.

Attachments:

- **Texas Department of State Health Services, Procedure 10,** "Monitoring and Sampling Airborne Gamma Releases", Approved 061909.

- **Texas Department of State Health Services, Procedure 11,** "Monitoring and Sampling Airborne Alpha Releases", Approved 101907.

- **See Also – Attachment to RAI Response CP-015 for approved State Plan and RAI Response CP-023 for an update to the NUREG 0654 Crosswalk.**

TEXAS

EMERGENCY MANAGEMENT

PROCEDURES

PROCEDURE 10

MONITORING AND SAMPLING AIRBORNE GAMMA RELEASES

Radiological Emergency Procedures of the Radiation Program
Texas Department of State Health Services

PROCEDURE 10

MONITORING AND SAMPLING AIRBORNE GAMMA RELEASES

APPROVAL AND IMPLEMENTATION

This procedure is hereby approved for implementation and supersedes all previous editions.

6/19/09
Date

Kathryn C. Perkins
Radiation Program Officer
Radiation Control Program
Texas Department of State Health Services

PROCEDURE 10

MONITORING AND SAMPLING AIRBORNE GAMMA RELEASES

APPROVAL AND IMPLEMENTATION

This procedure is hereby approved for implementation and supersedes all previous editions.

June 19, 2009
Date

/s/ Kathryn C. Perkins
Radiation Program Officer
Radiation Control Program
Texas Department of State Health Services

DATE OF CHANGE	CHANGE	INITIALS AND DATE ENTERED
05/27/2004	Revised entire document	KV 5/2004
12/29/2005	Administrative changes	KV 12/2005
5/21/2008	Document revision	RW 5/2008
06/19/2009	Revised Section VIII.C.4	RW 06/2009
06/19/2009	Revised Section VIII.F.3	RW 06/2009
06/19/2009	Addition of Section IX.D.1.c	RW 06/2009
06/19/2009	Updated 10.5 Milk Collection	RW 06/2009
06/19/2009	Added sentence to 10.1.IV.K	RW 06/2009

TABLE OF CONTENTS

Section Page

Procedure 10 – Monitoring and Sampling Airborne Gamma Releases

MONITORING AND SAMPLING AIRBORNE GAMMA RELEASES

I. Purpose

This procedure provides uniform guidelines for Field Monitoring Team personnel responsible for collecting data concerning radiological conditions in areas affected by airborne releases of gamma-emitting radioactive materials.

II. Discussion

In order to evaluate the short and long term consequences of an accidental release of radioactive materials, it is first necessary to identify the geographic area affected and the radioisotope(s) involved. Systematic performance of exposure rate measurements, along with the collection and analysis of environmental samples from monitoring locations will serve to validate or refute protective action recommendations in effect or under consideration. These activities will provide a basis for the development of population dose estimates, and will identify measures necessary for the recovery and restoration of the contaminated area. Standardization of radiological survey and sampling techniques is an essential first step in this interpretative process.

III. Definitions

A. In this procedure, all references to radioactive materials, radiation, contamination, exposure, exposure rate, count rate, counts per minute, disintegrations per minute and related terms and values are used in the context of gamma emitting radiation except where another usage is clearly identified.

IV. References

A. Procedure 3, Contamination Survey Techniques: Area & Equipment

B. Procedure 4, Tool & Equipment Decontamination

C. Procedure 5, Personnel Monitoring & Decontamination

D. Procedure 7, Personnel Dosimetry & Exposure Records

E. Procedure 9, Radioprotective Drugs

F. Procedure 17, Radio Communications

G. Procedure 26, Selection & Use of Protective Clothing

H. The appropriate Tab and Chapter to Annex D for the type of accident involved.

V. Equipment Required

A list of Field Monitoring Team equipment and supplies is included as Attachment 1 to this procedure. With the exception of items that are specifically identified as available from Logistics Support or from Instrument Maintenance & Calibration, Field Monitoring Team members are responsible for obtaining and transporting their own equipment and initial supplies in the designated Field Team Boxes.

VI. Precautions and Limitations

A. Persons performing Field Monitoring Team duties will maintain their individual exposures As Low As Reasonably Achievable (ALARA) under prevailing conditions. Personnel entering a radioactive plume shall not proceed beyond the 100 mR/hour (closed window) boundary unless prior approval has been obtained from the Chief of Field Operations (Incident Commander) or their appointed designee when acting in support of life saving or other urgent emergency operations.

B. Air samples will normally be obtained from a location within the plume at which radiation exposure rates are between 2 and 10 mR/hr closed window. After obtaining an air sample, place a plastic bag on the sample head. The radiation reading of the sample filter and cartridge should be completed in a low background area before sending to Sample Prep.

C. Precautions and limitations concerning use of protective clothing, personnel dosimetry and radioprotective drugs shall be implemented in accordance with the procedures covering those subjects. The information provided in this procedure is to serve only as a reminder, not to replace reference to and use of the specific guidelines in the other procedures.

VII. Prerequisites

Prior to entering a suspected radiation field, Field Monitoring Team members must attempt to determine the anticipated radiation exposure rates and potential contamination hazards. The Field Monitoring Team Leader (Operations Section Chief) will normally provide this information. Information may also be obtained from the shippers, carriers, or from other emergency personnel responding to the incident.

VIII. Team Activation

A. Notification, Mobilization or Standby

1. Following the declaration of an Alert, Site Area Emergency, or General Emergency at a fixed nuclear facility, or the occurrence of an accidental release of radioactive materials at another location, selected Field Monitoring Team personnel will either be activated or placed on standby.

2. Unless otherwise instructed, activated team members will assemble necessary supplies and equipment, and travel by personal vehicle to the Radiation Control Program (RCP) staging area or other specified location for a briefing on emergency conditions and monitoring objectives.

3. Unless otherwise instructed, team members placed on standby will assemble supplies and equipment, wrap instrument probes with a thin plastic material provided at the Staging Area and make other preparations for response; keeping the Staging Area Coordinator (Logistics Section Chief) informed of their location and means of contact at all times.

B. Assembly and Briefing

1. Team members, along with members of other emergency response teams, will assemble at the staging area or other designated location for a briefing conducted by the Field Monitoring Team Leader (Operations Section Chief) or the Chief of Field Operations (Incident Commander) prior to deployment to duty assignments.

2. The briefing shall include the following:

A summary of the event(s) causing the emergency;

A description of current conditions, including:

- anticipated radiation exposure rates and potential contamination hazards,
- known or anticipated nonradiological hazards, and
- potential for improvement or worsening of the situation;

An explanation of specific response objectives including special types of monitoring or sampling to be performed and an identification of any special equipment or supplies ("Special Response Items") needed by the teams;

An identification of other agencies involved in the response, including their roles, points of contact and operating locations.

Note: Information concerning other agencies will normally focus on those agencies who are responding to the radiological aspects of the emergency or who are otherwise active in the EPZ.

C. Equipment Issuance, Inventorying, and Checking

1. Following the team briefing, each Field Monitoring Team shall inventory their Support and Instrument Maintenance and Calibration, as well as other necessary items listed in Attachment 1 to this procedure. A copy of the Field Monitoring Team equipment and supplies list is included in each Field Monitoring Team kit to use as a checklist while performing the inventory. Wrap instrument probes with clear plastic material provided at the Staging Area before entering a plume.

   Note: The inventory process may be initiated prior to the team briefing, but cannot be completed until any "Special Response Items" to be included have been identified. "Special Response Items" are listed separately on the equipment checklist and will be issued by Logistics Support when identified as necessary for a specific response.

2. Requirements for "Special Response Items" will be identified during team briefings on emergency conditions and monitoring objectives. Primarily, these items consist of additional supplies needed for non-routine tasks, but in some instances they will merely be substitutes for normal team equipment.

3. Performance of the inventory shall be noted on form CI-13, Response and Recovery Activities Record Sheet, Attachment 3 to this procedure.

4. Except for radios, each team shall perform operability checks as appropriate on all equipment. At this time, background readings and calibration dates of all types appropriate to the incident involved should be recorded on form CI-15, Radiological Monitoring Data Record Sheet, Attachment 5 to this procedure. The performance of operability checks should be noted on form CI-13.

   DSHS maintains an inventory of instruments which are calibrated annually or as recommended by supplier. These instruments are placed back into service immediately following calibration and are always made available to emergency response team members during an emergency response. Additional calibrated emergency response instruments are held in stock and maintained to replace any malfunctioning instruments in the field. No team member is issued an instrument that is out of calibration.

5. Following completion of all pre-deployment activities, each Field Monitoring Team shall deploy to monitoring locations when and as directed by the Field Monitoring Team Leader (Operations Section Chief).

6. As a final communications check upon deployment, each Field Monitoring Team shall establish radio contact with the Field Monitoring Team Leader

(Operations Section Chief). This check is to be performed in accordance with the guidelines in Procedure 17, Radio Communications. Performance of this communications check should also be noted on form CI-13.

D. Maps

1. The 360 degree areas surrounding Pantex Plant, the Comanche Peak Nuclear Power Plant and the South Texas Project Electric Generating Station (STP) have been divided into sixteen (16) 22.5 degree sectors which are identified by the alphabetical descriptors "A" through "R" ("I" and "O" omitted) as shown on attachments to their Annex D chapters of Tab 1 or Tab 2. These are located in the State Plan.

2. Pre-selected offsite monitoring locations within a 10-mile radius of each of those facilities are designated on maps included as attachments to those chapters. Pre-selected monitoring locations are sequentially numbered and are usually located on hard surface roads at intersections or other easily identifiable landmarks.

3. Logistics support will develop and distribute maps showing pre-selected monitoring locations and sectors "A" through "R" to all team members for sustained operations at sites other than those named above. Unless and until such maps are available, directions will be given, and locations will be identified using the following improvised system on any map that can be obtained.

   The accident site will be assumed to be the center point on the map provided. Mark the site with a small "x".

   Using a straightedge and pen or pencil, draw a line through the accident site parallel to the north arrow on the map. The line should extend at least ten miles to both the north and the south; using the same scale for distance as shown on the map.

   Label the segment of the line north of the accident site "0 degrees." (This segment corresponds to the centerline of sector "A" on sector maps.)

   Label the segment of the line south of the accident site "180 degrees." (This segment corresponds to the centerline of sector "J" on sector maps.)

   Identify all subsequent locations in terms of approximate compass direction and distance from the accident site, using degrees clockwise from 0 degrees and/or a narrative description such as "next to private airport" when such additional information would be helpful in differentiating between otherwise similar points on the map.

   As surveys are reported or samples collected, mark the locations on your copy of the map using a numerical sequence so that the Sample

Coordinator and/or the Accident Assessment Team can later correlate analysis and assessments with the proper location.

E. Communications

1. Field Monitoring Team radios shall be turned on prior to departure from the staging area and shall remain on until relieved or advised by the Field Monitoring Team Leader (Operations Section Chief) that radio contact is no longer required.

2. In the event of a communications failure affecting radio frequencies, urgent communications may be transmitted via Department of Public Safety (DPS) or other law enforcement frequency relay. Communications that are less urgent may be conducted by periodic use of telephones. During operations that do not include DPS team personnel, all communications will be via periodic telephone contact with the Field Monitoring Team Leader (Operations Section Chief) or another party designated by the Team Leader.

3. All departmental radios shall be returned to Instrument Maintenance & Calibration at the end of each shift, unless other instructions are given.

4. Additional provisions as contained in Procedure 17 shall apply.

F. Exposure Control

1. At the beginning of each shift, each Field Monitoring Team member shall obtain their dosimetry and fill out initial information on form CI-1, Emergency Worker Radiation Exposure Record in Procedure 7, Personnel Dosimetry and Exposure Records.

2. In order to hold personnel exposure ALARA, unnecessary time should not be spent within, or in proximity to the plume or affected area where exposure rate readings exceed normal background.

3. Individual whole body exposure shall be monitored by checking dosimetry approximately every 30 minutes or as instructed by the Field Team Leader (Operations Section Chief). Note each time dosimetry is checked on form CI-13. The total effective dose equivalent (internal plus external) for a person in an active beta-gamma plume without a respirator will be estimated using the deep dose equivalent indicated on the individual's dosimeter, and a factor of 5 multiplier. For example, if a person has been in an active plume and has 10 mrem indicated on their dosimeter, the total effective dose equivalent (TEDE) is 50 mrem (10 mrem x 5).

4. Individual exposures exceeding 200 mrem TEDE shall be immediately reported to the Field Monitoring Team Leader (Operations Section Chief).

(200 mrem TEDE should serve as a flag to evaluate an individual's need to remain in a radiation field.)

5. Unless prior authorization has been received from the Chief of Field Operations (Incident Commander) or the appointed designee, no assignment shall be made or accepted that would cause daily individual exposure to exceed 1 rem.

6. Field Monitoring Team members shall present their dosimetry and form CI-1 to the person performing exit monitoring at the end of each shift. (See Section XIII of this procedure.)

7. The person performing exit monitoring shall enter dosimetry exit reading and indicated dose on form CI-1. A copy of the form shall be returned to the Field Monitoring Team member as a temporary record of exposure received.

IX. Plume Locating and Tracking

A. While traveling to the affected area, and while engaged in locating the plume and tracking its movement, a member of each Field Monitoring Team shall continuously observe the meter scale of the monitoring instrument or keep the instrument speaker turned on in order to identify plume boundaries and to detect changes in radiation intensity within the area affected by the plume. If the instrument probe is not already wrapped with plastic, do so before entering the plume.

1. Readings while in motion shall be taken with the detector of the instrument held inside the vehicle and above the lap of the individual taking measurements. If survey meter reads 2 mR/hr or more and there is a difference between closed and open window readings, you have reached the edge of the plume.

2. Readings taken while in motion should not be interpreted as actual measurements of intensity at any given location, because of the time lag between detection and meter response. Readings while in motion shall be used only as indicators of trends in radiation intensity changes. Their primary utility lies in initial detection of the plume, and as an early warning of areas in which exposure rates may exceed guidelines for monitoring team activities.

3. Field Monitoring Team personnel that are separated or are operating alone should always keep the instrument speaker turned on while driving or while performing other tasks that require visual attention to be directed away from the monitoring instrument.

B. For initially locating the plume, either the Ludlum Model 44-2 High Energy Gamma Scintillation probe (1" x 1"), SSPA-8 probe or the Ludlum Model 44-6 Thin Wall Gamma probe (side window Geiger-Mueller) may be used.

1. The 44-2 and SSPA-8 are the most sensitive probes and will permit earlier detection of the plume. Readings obtained using the 44-2 and SSPA-8 probes are in counts per minute (cpm). Maximum readings on the Ludlum 14-C are on the X100 range multiplier for the external probe. The X1000 range is for the internal Geiger-Mueller probe, even when attached to the model 44-2 probe. The cpm reading will rapidly increase as you reach the edge of the plume. Once the cpm reading is greater than two times background, the 44-2 probe should be replaced with the 44-6 probe (SSPA-8 probe replaced with the SHP 270 probe) to allow for plume edge measurements in mR/hr. If survey meter reads 2 mR/hr or more and there is a difference between closed and open window readings, you have reached the edge of the plume.

C. Upon initial detection of the plume, each team shall stop its vehicle and perform exposure rate measurements with a monitoring instrument. (See Section X of this procedure.)

D. Upon completion of the initial exposure rate measurements, each team shall report its location and survey results to the Field Team Monitoring Leader (Operations Section Chief) and record the data on form CI-14, Exposure Rate Measurements Data Sheet, Attachment 4 to this procedure, and then proceed as directed by the Field Monitoring Team Leader (Operations Section Chief).

1. Any of the following instruments with the indicated probe may be used for subsequent readings while in motion.

- Ludlum 14-C with Ludlum 44-6 probe
- Eberline E-600 with SHP-270 probe
- Any Equivalent Instrument

As directed, drive from point to point in the affected area while observing trends in instrument meter readings.

a. Lateral plume boundaries may be located by driving along available roads running perpendicular to the path of the plume.

b. The leading edge of the plume may be located by driving downwind along roads parallel to the path of the plume. Whenever possible, the leading edge should be approached from a downwind direction in advance of the plume.

Note: In locating the plume, it will be necessary to determine whether you are in direct contact with the plume or whether you are getting readings that result from "sky-shine" (when the plume is either overhead or off to one side) or from ground deposition once the trailing edge of the plume has passed. (See the Note in Section X.A.)

c. Centerline measurements will be taken by the utility.

E. The Accident Assessment Team should always have a fairly accurate computer projection of the plume location during operations involving fixed nuclear facilities. While physical confirmation of this data will be required, this projection can be of some value during the plume locating and tracking process.

X. Survey Measurements

Note: The survey measurements that are to be recorded and transmitted should be selected, where possible, for ease in communicating the measurement location; e.g., pre-selected monitoring points, other road intersections, etc. Sector designations (or approximate compass direction from the accident site) and estimated distance should be recorded; along with the pre-selected monitoring location number, if applicable.

A. Exposure Rate Measurements

1. For these surveys, use the Ludlum 44-6 (Thin Wall Geiger-Mueller) probe or the Ludlum 14-C's internal GM probe, or Eberline SHP-270.

Take exposure rate measurements with the detector held about three (3) feet above the ground (waist level) and about 3 inches above the ground (ground level), obtaining both open and closed readings.

Take the readings in this order: waist level open window, ground level open window, waist level closed window, and ground level closed window.

Note: Direct contact with the plume is indicated by a significant beta reading; i.e., the "window open" (beta-gamma) reading is higher than the "window closed" (gamma) reading. The absence of a significant beta reading may mean that the gamma radiation is coming from a plume that is overhead (but not in contact with the ground), or that the plume has already passed and the radiation is coming from materials that have been deposited on the ground.

2. Record the exposure rate measurements on the appropriate form; i.e.

If only an exposure rate measurement is performed at the location, enter data on form CI-14, Attachment 4 to this procedure.

If samples are collected at this location enter all data for the exposure rate measurement on form EP-6, Attachment 7 to this procedure.

An exposure rate measurement shall be performed each time the Field Monitoring Team collects an air, soil, liquid or vegetation sample. The exposure rate measurement should be performed prior to other activities at each location.

B. Deposition Surveys

Ground deposition may be surveyed by the direct scan method or the wipe evaluation method. The direct scan method should not be used while in direct contact with the plume. Judgments requiring accurate data as their basis must be delayed until laboratory analysis of collected samples can be performed.

XI. Sample Collection and Field Evaluation

Note: Some of the steps in 10.1 thru 10.5 to Procedure 10 are designed to keep the samples from being contaminated. These steps should be followed in addition to personnel anti-contamination procedures. Disposable gloves should always be worn when handling any sample collection medium or sample container because of the concentration of contaminants that can occur during some collection processes. All used gloves and shoe covers may be stored in a single plastic bag until proper disposal can be arranged at the end of the shift.

Procedure 10 has been divided into 5 parts to describe types of environmental surveys taken by Field Monitoring Teams. For collection and evaluation discussion, see the appropriate part. They are as listed:

1. Air Sampling
2. Soil Sampling
3. Vegetation Sampling
4. Water Sampling
5. Milk Sampling

XII. Reporting Data

A. Reports from the field

1. Report each significant change in status: e.g.

   a. Except for readings taken while in motion, the time, location and reading for any exposure rate measurement which is ten times background or greater;

   b. Departure en route to next location (identify destination);

   c. Arrival at designated location;

d. Sample collected (or completion of any assigned task);

e. Inability to collect a sample (or to complete any assigned task);

f. Any planned action that will result in loss of radio contact for more than 15 minutes;

g. Resumption of radio contact following "f", above;

h. Termination of radio contact at end of day;

i. Personnel meeting or exceeding any established dose-limit; and

j. Other reports specifically requested by the Team Leader.

2. Report instrument readings in requested units on each form. Do not convert to other units of measurement and do not use scientific notation unless your instrument reports data in that format.

B. Document submission at end of duty

At the end of each day or other tour of duty, forward all written documentation prepared that day to the Field Monitoring Team Leader (Operations Section Chief). This documentation should include copies of forms CI-13, CI-14 and CI-15, as well as any Site Area maps on which sampling or monitoring locations have been marked.

Note: Forms CI-1 and EP-6 are not covered by this instruction. Specific instructions for submission of those documents are provided in another section in this procedure and other procedures.

XIII. Contamination Control

A. During field monitoring activities, personnel exposure can be reduced by effective use of the limited protection afforded by the team vehicle.

1. While inside the plume, or in areas where re-suspension could be a factor, keep the vehicle closed as much as possible. Keep windows closed at all times and use only air conditioner or heater settings that re-circulate inside air.

2. Upon exiting the plume, switch heater or air conditioner settings to "vent" and, weather permitting, open vehicle windows for at least a few minutes to purge any contaminated air that may have been trapped in the vehicle.

B. During the performance of plume monitoring and sampling activities, each Field Team shall monitor itself, its vehicle and its equipment for possible contamination.

1. Each time a team member gets out of the vehicle in an area affected by the release, their hands and shoe soles shall be monitored when they have exited the plume.

   Note: As a special purpose definition to be used in this context only, "area affected by the release" is defined as "any location where exposure rate or counts per minute readings are ten times normal background or higher."

2. Sample collecting tools and equipment shall be cleaned and monitored after each use.

3. Instruments and probes shall be monitored each time they come in contact with a suspected contaminated surface. Probes shall also be monitored at any time that persistent high readings are noted which is not readily attributable to another source.

4. Team members shall monitor themselves each time they exit the affected area.

C. At the end of each shift or other duty period, each Field Monitoring Team, its vehicle, instruments, probes and equipment shall be monitored by a Contamination Control team member or by RCP personnel at an alternate location specified by the Field Monitoring Team Leader (Operations Section Chief).

   Note: While they are the responsibility of the persons performing exit monitoring, the following actions are of significance to the Field Monitoring Team members. For your own protection, ensure that each of these steps is completed by the person(s) performing the survey.

1. Enter dosimetry "Reading at Exit" and "Indicated Dose" on the individual's CI-1 form. Route form as indicated on the document.

2. Return dosimetry to the Field Team Member.

3. Perform, or supervise performance of decontamination that may be required before individual can leave the area. Repeat survey and decontamination process as appropriate, subject to limitations imposed by decontamination capabilities available at the monitoring location, giving thought to the potential for harm to the individual and/or the potential for contaminating other persons or equipment if decontamination is not completed at this time.

4. Inform the individual of any remaining contamination and of any additional decontamination actions which should be performed by the individual at his or her place of lodging or other appropriate location.

5. Collect any used gloves, shoe covers and/or other potentially contaminated waste for appropriate disposal.

D. Decontamination of Field Monitoring Team personnel, vehicles and equipment shall be performed in accordance with RCP procedures and as directed by the Contamination Control Team or Field Monitoring Team Leader (Operations Section Chief).

TEXAS

EMERGENCY MANAGEMENT

PROCEDURES

PROCEDURE 10.1

MONITORING AND SAMPLING AIRBORNE GAMMA RELEASES

Air Sampling

Radiological Emergency Procedures of the Radiation Control Program
Texas Department of State Health Services

Air Samples

I. Purpose

Air samples are collected and evaluated for the purpose of identifying and quantifying airborne radioactive contaminants, which could contribute to population exposures either through inhalation, direct external exposure, or uptake in plants or animals produced for human consumption.

II. Discussion

A. Evaluation of an air-sample cartridge can yield an early approximation of radioiodine concentrations present in the plume. (This value is only likely to be significant in the case of nuclear power generating plant accidents where large quantities of iodine are involved.)

B. Evaluation of the particulate filter can yield an early approximation of gross particulate activity, allowing differentiation between exposure rates from noble gases, which are likely to continue dissipating, and other contaminants that are likely to be deposited and remain a problem until removed or until they decay to non-radioactive forms.

C. Following plume passage, air sample collection and evaluation can provide an indication of the extent to which re-suspension of deposited materials poses a continuing threat to respiration or could result in contamination of additional downwind areas.

III. Equipment

In addition to a power supply (normally provided by the battery of the team vehicle), collection and field evaluation of an air sample requires the following Field Monitoring Team equipment and supplies:

- RADeCO low volume air sampler and sample head
- Power Inverter, if needed (12VDC to 115VAC)
- Power cables, if needed
- Silver zeolite (or charcoal) cartridges
- 47mm particulate filter discs
- Ludlum Model 14C, Eberline E600 or equivalent survey meter with GM probe (Ludlum 44-6, Eberline SHP-360 or equivalent)
- 2 1/8" X 2 1/8" glassine envelope marked to show upstream side of particulate filter discs

- Small sealable bags
- Large sealable bags
- Large plastic bags
- Adhesive sample labels
- Roll of tape
- Tweezers
- Pen, pencil or permanent marker
- Absorbent towels
- Site Area map
- Form EP-6, Radionuclide Analysis Report
- Form CI-1, Emergency Worker Radiation Exposure Record
- Form CI-13, Response and Recovery Activity Record Sheet
- Form CI-14, Exposure Rate Measurements Data Sheet
- Form CI-15, Radiological Monitoring Data Record Sheet
- Form CI-17, Field Analysis Work Sheet
- Personal Protection Equipment (PPE)

IV. Collection

Note: Air samples will normally be collected in an area between 2 and 10 mR/hr with a difference in the open (beta + gamma) and closed (gamma) window readings. If the exposure rate at the location exceeds 10 mR/hour or is less than 2 mR/hour, notify the Field Monitoring Team Leader (Operations Section Chief) before collecting an air sample. Exposure rates that are considerably less than 2 mR/hour may require a longer than normal collection time. Exposure rates that are significantly greater than 10 mR/hour may permit a shorter than normal collection time, or warrant skipping sample collection at this location in order to avoid excessive personnel exposure. Before collecting air sample, record open window and closed window dose rates at waist and ground level. Continue to monitor dose rates during and upon completion of sampling. This will verify contact with the plume was maintained throughout the sample period.

A. Place the particulate filter in the recessed area just ahead of the metal screen in the chamber of the sample head with the fuzzy side facing out. Screw the filter holder cap down carefully and examine assembly to verify that the filter disc remains centered.

B. Place the silver zeolite or charcoal cartridge in the rear chamber of the sample head with the printed arrow on the cartridge pointing in the direction of airflow. Re-assemble the sample head.

C. Connect the sample head to the sampler.

D. Air samplers and inverters should be turned off while being connected to a running vehicle.

E. If the vehicle has a fixed inverter, plug in the air sampler power cord.

F. If an inverter is needed, plug the air sampler power cord into the inverter and attach the inverter jumper cables to the vehicle battery as follows: Connect the positive cable to the positive (larger) battery post. Connect the negative cable to a grounded portion of the vehicle.

G. With the vehicle's engine running, turn on the sampler and inverter (if used). The sampler should be started at a flow rate less than 4 cubic feet per minute (CFM) to ensure it starts due to high starting current. (Note: Place the sampler on the vehicle hood, on top of the vehicle, or on a tripod stand in a stable position. Placing the sampler on the ground or in an area where dirt or dust is present may result in re-suspension, which will result in inaccurate results of the sample.)

H. Adjust the sampler flow rate to 2-4 CFM.

I. Record the sampling start time and actual flow rate on form EP-6, Radionuclide Analysis Report.

J. Allow the sampler to run until the desired volume of air has been sampled. The digital sampler can be programmed to stop at a desired volume. (The preferred volume is 10 ft^3; however, the actual volume desired will depend upon the time available and may vary if the exposure rate level experienced at the monitoring location exceeds 10 mR/hour or falls below 2 mR/hour. The Field Monitoring Team Leader (Operations Section Chief) will specify the volume of air to be sampled in instances when it is to be a volume other than the standard 10 ft^3.)

K. Turn off the sampler (Note: sampler may turn off automatically), turn off the inverter, and record sample time and volume on form EP-6. Place a plastic bag over sample head. Take dose rate readings and document on EP-6. Store removed protective clothing in a plastic bag until it can be properly disposed. Potentially contaminated protective clothing should never be reused.

Return to an area that has background radiation readings and find a safe place to park.

Note: The following steps will require a clean, uncontaminated surface upon which to place the bags and sampling head parts. A clean sheet of notepaper, a paper towel, or even an inside page from a newspaper carried in the team vehicle is sufficient. **Wear gloves during this process.**

L. Remove plastic bag from air sample head. Remove the sample head from the air sampler. While holding the sample head upright, unscrew the filter holder cap and lay it aside on the clean paper.

M. Using tweezers carefully lift the particulate filter disc out of the sample head.

Note: The filter disc should be handled only by the outer lip, which was covered by the filter holder cap during sampling. The filter disc will probably be stuck to the sampling head and must be removed carefully to avoid shaking off particulates that have been collected on the surface, or tearing it.

N. Lay the sample head aside on the clean paper and carefully slide the particulate filter disc into a glassine envelope with the upstream side (fuzzy side) of the disc corresponding to the marked side of the envelope. Tuck in the envelope flap.

O. Place the glassine envelope in a small sealable bag.

P. Holding the remaining portion of the sample head upright, unscrew the upper section and lay it aside on the clean paper.

Q. Place the silver zeolite or charcoal cartridge in separate small sealable bag.

R. Reassemble the sample head, disconnect the air sampler, inverter and power cables and store these items.

S. Mark the sample location on the Site Area map.

T. If requested to do so, evaluate the cartridge *(silver zeolite cartridges only)* and particulate filter in accordance with instructions found in Section 6 below. Document results on form CI- 17, Field Analysis Work Sheet.

Note: Leave the cartridge and filter inside the sealable bags for the evaluations. This practice will yield field results of acceptable accuracy while ensuring that the probe is not contaminated during the evaluation process.

V. Sample Submission

All air samples shall be labeled and submitted to the Sample Preparation and Coordination Team. Labels and form EP-6 must show the total volume of air sampled in cubic feet.

A. Enter required data on an adhesive sample label and form EP-6. Place sample label on one of the small bags.

B. Place the two bags containing the cartridge and filter disc in a large sealable bag with the sample label facing outward so others can read it.

C. Close the large bag and seal it by folding a piece of tape over the bag opening.

D. Note sample collection activity on form CI-13, Response and Recovery Activities Record Sheet.

E. Submit the sample and form EP-6 to the Sample Preparation and Coordination Team.

Note: Chain of sample custody shall be certified by each person, including couriers, having temporary or ultimate custody of a specific sample.

VI. Field Evaluation

Perform field evaluation only when directed by the Field Monitoring Team Leader (Operations Section Chief).

Note: To limit time spent in the affected area, and to minimize any error resulting from incorrectly reading the background count rate, team members should move to a low background area prior to evaluating samples.

A. Determination of Gross Iodine Activity

1. Take a background count rate measurement using the Ludlum 14-C or equivalent with the Ludlum 44-9 probe or equivalent. Record the value.

2. Place the probe directly above the upstream side of the cartridge and measure the count rate. Record the value.

3. Determine the net count rate by subtracting the background count rate from the gross count rate.

4. Do not report count rate results to Field Monitoring Team Leader (Operations Section Chief) until analysis of both filters are complete.

5. Accident Assessment will calculate the gross iodine concentration as follows:

$$uCi/cc = \frac{(1.59 \times 10^{-11})\ (\text{corrected count rate})}{(E_1)\ (E_C)\ (\text{sample volume, ft}^3)}$$

$$= \frac{(1.59 \times 10^{-11})\ (\text{corrected count rate})}{(.081)\ (\text{sample volume, ft}^3)}$$

where:

E_1 = Counting efficiency factor for probe = 0.09 counts/disintegration

E_C = Collection efficiency for iodine cartridge = 0.9

B. Field Determination of Gross Particulate Activity

1. Take a background count rate measurement using the Ludlum 14-C or equivalent instrument with the Ludlum 44-9 probe or equivalent. Record the value.

2. Place the probe directly above the upstream side of the particulate filter and measure the count rate. Record the value.

3. Determine the corrected count rate by subtracting the background count rate from the gross count rate.

4. Report both net count rates to the Field Monitoring Team Leader (Operations Section Chief).

5. Accident Assessment will calculate the gross particulate concentration as follows:

$$uCi/cc = \frac{(1.59 \times 10^{-11})\ (\text{corrected count rate})}{(E_2)\ (E_F)\ (\text{sample volume, ft}^3)}$$

$$= \frac{(1.59 \times 10^{-1}1)\ (\text{corrected count rate})}{(.186)\ (\text{sample volume, ft}^3)}$$

where:

E_2 = Counting efficiency for probe = 0.19 counts/disintegration

E_F = Collection efficiency for particulate filter = 0.98

TEXAS

EMERGENCY MANAGEMENT

PROCEDURES

PROCEDURE 10.2

MONITORING AND SAMPLING AIRBORNE GAMMA RELEASES

Soil Sampling

Radiological Emergency Procedures of the Radiation Control Program
Texas Department of State Health Services

Soil Samples

I. Purpose

Soil samples are collected and evaluated to identify and quantify radioactive contaminants that have been deposited on the ground surface as a result of an airborne release.

II. Discussion

A. Contaminants deposited on the soil are significant because they could potentially affect persons in one or more of the following manners:

1. Direct radiation resulting in whole body exposure;

2. Re-suspension resulting in either whole body exposure, inhalation, or re-deposition in previously unaffected areas;

3. Adsorption or absorption resulting from direct skin contact; and/or

4. Plant uptake and subsequent entry into the food chain.

B. Following completion of the deposition process, soil sample collection and evaluation may be necessary to determine the extent to which land usage must be restricted, or the extent to which decontamination may be required.

C. Prior to land tillage or precipitation, most contaminants will remain in a very thin top layer of soil.

1. In most instances, a sample that contains the top quarter inch (1/4") of soil will be sufficient to collect all contaminants deposited from an airborne release.

2. In instances where the soil is very uneven due to clods or cracking, a greater sampling depth will be required.

D. During later stages of response operations, or after contaminants have been mixed into the soil, the Field Monitoring Team Leader (Operations Section Chief) will provide guidance concerning soil-sampling techniques to be used.

E. The size of the area from which a soil sample is collected is as important as the sampling depth and must be accurately determined because the intent in gathering the sample is to determine the deposition per unit area.

III. Equipment

The following equipment will be required each time a soil sample is collected:

- Ruler (1 foot minimum)
- Trowel
- Sample container with lid (16 oz. plastic tub)
- Roll of Tape
- Adhesive sample labels
- Pen, pencil or permanent marker
- Site Area map
- Large sealable bags
- Large plastic bags
- Spray bottle with water
- Absorbent towels
- Personal Protection Equipment (PPE)
- Form EP-6 (Radionuclide Analysis Report)
- Form CI-1 (Emergency Worker Radiation Exposure Record)
- Form CI-13 (Response and Recovery Activity Record Sheet)
- Form CI-14 (Exposure Rate Measurements Data Sheet)
- Form CI-15 (Radiological Monitoring Data Record Sheet)

IV. Collection

A. When selecting a soil collection site, apply the following criteria in descending order of priority.

1. Soil samples must be taken from an area undisturbed since the release.

a. This criterion must be met. If no site in the vicinity of the desired sample location meets this criterion, advise the

Field Monitoring Team Leader (Operations Section Chief) and await further instructions.

2. Do not sample next to or under vehicles, buildings, trees, structures and other objects that would tend to shield the area from the wind. If no site is found to meet all the sampling criteria below, choose a site that comes closest to meeting the criteria.

   a. If the potential collection site is downwind of an intervening object, the distance of separation must be equal to twice the height of the object.

   b. If the potential collection site is upwind or to one side of an object, the distance of separation should be at least great enough to escape any noticeable wind swirl caused by the object.

   If no potential site meets criterion number two based on these guidelines, further consideration should be given those sites on which deposition appears to have occurred in patterns which are representative of the area.

3. Ideally, the site should be free of vegetation; but since that is an unlikely condition in most undisturbed and unsheltered locations, some vegetation will probably be present on all sites.

B. Mark off a 12" X 12" area within the selected site, being careful not to touch the ground inside the marked area.

C. Remove the soil from inside the marked area to a uniform depth of 1/4" and place it in the sample container.

   1. When it is necessary to collect a sample that is covered with vegetation, clip grass closely and treat it as a vegetation sample. Bag it separately.

   2. Sampling depth may be increased slightly if doing so will result in a more representative sampling of clods or cracked soil.

   3. If the area is free of vegetation, cracks and clods, the sample will fill the container, leaving just enough space for the lid.

D. Snap the lid on the container and tape it in place by running a piece of masking tape completely around the rim of the container, folding the upper edge of the tape down onto the lid. The tape must make adequate contact with both the container and the lid to hold the lid securely in place.

E. Enter required data on the adhesive sample label and on form EP-6. Attach the label to the container.

F. Submit the sample and form EP-6 to the Sample Preparation and Coordination Team.

G. Mark the sampling location on the Site Area map.

H. Enter requested data on form CI-14 and note sample collection activity on form CI-13.

I. Wash the trowel with clean water before using it to collect another sample.

J. Store used gloves and/or shoe covers in a plastic bag until they can be properly disposed. Gloves and shoe covers should never be reused. Any used absorbent towels may also be stored in the bag with the discarded gloves and shoe covers.

V. Field Evaluation

A. Field Monitoring Teams will not perform field evaluations of soil samples collected during response to accidents involving airborne gamma releases. Field information concerning ground deposition can be more easily and accurately obtained from exposure rate measurements or through performance of deposition surveys by direct scan or by wipe evaluation. (See Section X of this procedure.)

B. All soil samples collected along with form EP-6 shall be forwarded to the Sample Preparation and Coordination Team for routing to a laboratory facility for evaluation.

TEXAS

EMERGENCY MANAGEMENT

PROCEDURES

PROCEDURE 10.3

MONITORING AND SAMPLING AIRBORNE GAMMA RELEASES

Vegetation Sampling

Radiological Emergency Procedures of the Radiation Control Program
Texas Department of State Health Services

Vegetation Samples

I. Purpose

Vegetation samples are collected and evaluated for estimating ingestion exposure pathway hazards resulting from an airborne release of radioactive materials.

II. Discussion

A. Contaminants deposited on vegetation are significant because they could potentially affect persons in one or more of the following manners:

1. Direct ingestion on the surface of vegetables, grain, nuts or fruits, or in the edible portion of the plant following uptake;

2. Indirect ingestion through consumption of meat, milk or other foods from animals that have eaten vegetation on or in which contaminants were present.

B. Following completion of the deposition process, vegetation sample collection and evaluation may be necessary to determine whether agricultural products are safe for human or animal consumption; and whether grains and vegetation can safely be grazed by, or harvested and fed to animals whose flesh or byproducts are to be used for human foods.

1. Of the processes mentioned above, the hazard from grazing by food-producing animals should be evaluated as soon as possible after deposition has terminated. Early evaluation avoids allowing contaminants to enter the animal before the effects are evaluated.

2. In the case of grains that are harvested for animal feed, sample collection and evaluation should be deferred until just prior to harvest. Sampling at this time will automatically correct the evaluation to account for weathering and decay.

3. In the case of fruits, vegetables and grains that are harvested for human consumption, evaluation should be performed at a later stage, after the item has been processed for consumption.

4. In the case of nuts, all of which have a protective outer shell that is removed prior to consumption, contaminants present in the meat will almost exclusively be the result of plant uptake through the root system. Evaluation of this phenomenon must be delayed until after such uptake has occurred.

5. In all cases, barring some urgent need to do otherwise, sampling and evaluation should only be performed at the stage of growth where grazing or harvesting would normally occur.

C. The size of the area from which vegetation samples are collected is of little significance because the intent in evaluating the sample is to determine the quantity of radionuclides that would be ingested during plant consumption. Assessments will be based on the quantity of contaminants per unit weight or volume of vegetation.

III. Equipment

For collecting grass samples, or samples of other plants that can be cut with grass clippers, the following equipment will be required:

- Grass clippers
- Large sealable bags
- Adhesive sample labels
- Pen, pencil or permanent marker
- Roll of tape
- Site Area map
- Spray bottle with distilled or potable water
- Absorbent towels
- Large (1 gallon) sealable bags
- Large plastic bags
- Personal Protection Equipment (PPE)
- Form EP-6 (Radionuclide Analysis Report)
- Form CI-1 (Emergency Worker Radiation Exposure Record)
- Form CI-13 (Response and Recovery Activity Record Sheet)
- Form CI-14 (Exposure Rate Measurements Data Sheet)
- Form CI-15 (Radiological Monitoring Data Record Sheet)

A. For collecting hay samples, wire cutters may be required.

B. For collecting grain samples, a knife may be required for cutting the seed head from the plant.

C. In instances where a ladder would be required for obtaining samples of fruits or nuts, sample collection activities should be coordinated with the producer, or with the County Agricultural Extension Agent.

IV. Collection

A. Unless otherwise specified, each sample should consist of at least a 1-gallon sealable bag of vegetation. Excess air should be squeezed out of the bag before it is closed

The 1-gallon sealable bag will.contain the desired quantity if it is filled with tightly packed cured hay or dry grass, or if it is filled with moderately packed green grass.

1. For samples other than grass samples, specific instructions will be provided by the Field Monitoring Team Leader (Operations Section Chief) if a different sample volume is desired.

B. For samples taken from pastures, fields or orchards prior to harvest, the selection of vegetation to be included in a given sample should be based on the following considerations:

1. If the sample is to represent vegetation that an animal would consume during grazing, the sample should include only plants that the animal would normally eat and be limited to the portion of the plant normally consumed by the animal.

2. If the sample is to consist of items for human consumption, include the part of the plant that is normally eaten, plus any husks, shucks, rinds, pods, peelings, skins, hulls or shells not routinely removed prior to retail marketing.

3. If the sample is to represent nuts or grain that would be harvested for human or animal consumption, include the hulls, shells or seed heads.

4. If the sample is to represent plants that would be harvested as hay or ensilage, include the entire above ground portion of the plant.

C. Close the 1-gallon sealable bag and seal it by folding a piece of tape over the bag opening.

D. Enter required data on the adhesive sample label and form EP-6. Attach label to the bag.

E. Submit sample and form EP-6 to the Sample Preparation and Coordination Team.

F. Mark the sampling location on the Site Area map.

G. Enter requested data on form CI-14 and note sample collection activity on form CI-13.

H. Store used gloves and/or shoe covers in a plastic bag until they can be properly disposed. Gloves and shoe covers should never be reused. Any used absorbent towels may also be stored in the bag with the discarded gloves and shoe covers.

I. Wash the grass clippers (or other collection tools) with clean water before using them to collect another sample or storing in field team box.

V. Field Evaluation

Field Monitoring Teams will not perform field evaluations of vegetation samples collected during response to accidents involving airborne gamma releases. Field information concerning ground deposition can be more accurately obtained from exposure rate measurements or through performance of deposition surveys by direct scan or by wipe evaluation. (See Section X of this procedure.)

A. All vegetation samples along with form EP-6 shall be forwarded to the Sample Preparation and Coordination team for routing to a laboratory facility for evaluation.

Note: Chain of sample custody shall be certified by each person, including couriers, having temporary or ultimate custody of a specific sample.

TEXAS

EMERGENCY MANAGEMENT

PROCEDURES

PROCEDURE 10.4

MONITORING AND SAMPLING AIRBORNE GAMMA RELEASES

Water Sampling

Radiological Emergency Procedures of the Radiation Control Program
Texas Department of State Health Services

Water Samples

I. Purpose

Surface and well water samples are collected and evaluated for calculating ingestion exposure pathway hazards resulting from an airborne release of radioactive materials. As a secondary benefit, evaluation of surface water samples can also identify any potential for whole body exposure associated with swimming or other recreational water use.

II. Discussion

A. Most events involving an airborne release of radioactive materials, water contamination should be negligible, but the possibility of contamination cannot be completely ignored. Some degree of water sample collection and analysis will be required in response to almost every incident involving an airborne release of radioactive materials; especially if radioiodines or any gamma-emitting particulate is involved.

1. Public concerns demand that public water supplies be sampled.

2. Food producers and/or harvesters may require assurance that products grown or processed using area water supplies will be marketable.

3. DSHS' responsibility for protecting the public health and safety will not permit ignoring the potential of exposure through this medium.

B. Contaminants may not appear in water supplies until long after deposition has terminated.

1. Contaminants in surface water supplies may result from run-off that has washed adjacent land areas and vegetation.

2. Contaminants in ground water supplies may take years to appear because of the extremely slow movement of water through some aquifers.

III. Equipment

The following equipment will be required for collection of water samples:

- One-gallon cubitainer with cap and transport box
- Roll of tape
- Adhesive sample labels
- Pen, pencil or permanent marker

- Site Area map
- Absorbent towels
- Bucket or dipper
- Large plastic bags
- Personal Protective Equipment (PPE)
- Form EP-6 (Radionuclide Analysis Report)
- Form CI-1 (Emergency Worker Radiation Exposure Record)
- Form CI-13 (Response and Recovery Activity Record Sheet)
- Form CI-14 (Exposure Rate Measurements Data Sheet)
- Form CI-15 (Radiological Monitoring Data Record Sheet)

IV. Collection

A. Unless modifying instructions are issued at the time of the event, sites for collection of water samples should be selected based on the following guidelines:

1. To sample drinking water, samples from municipal water supplies should be collected after the water has passed through the treatment plant; either from a tap at the plant, or from a tap supplying potable water at some point in the distribution system.

2. Samples from private wells should be collected from a tap inside the residence, or from the tap that is nearest to the point where water from that well would be used. Run water a few minutes to clear line before sampling. This will ensure that the sample is representative of the actual water used, including the effects of any treatment such as water softening or demineralization normally occurring between the well and the tap in question.

3. If the purpose in sampling is also to determine whether the supply itself is contaminated, a second sample of raw water should be collected upstream of any municipal or private treatment mechanism.

4. Samples of untreated surface water should be collected from bodies of standing water unless a sample from a flowing stream is specifically desired.

5. The Sample Preparation and Coordination Team will perform any necessary filtration and/or acidification of samples, and appropriate notation of such on form EP-6.

B. Cubitainers should be capped prior to entry into the affected area, and should remain capped at all times except while they are being filled.

C. Always rinse the cubitainer immediately before use. Rinse the cubitainer by filling it approximately half full, shaking it to wash all inside surfaces, and emptying it before filling it with the sample intended for analysis. (Water from the source intended to be sampled may be used to rinse the cubitainer.)

D. Each water sample should consist of 1-gallon of water.

E. When collecting a water sample from an outside tap, or from any other tap where contamination may have been deposited on the tap itself, rinse the outside of the tap and allow water to run a few seconds before a sample is collected.

F. Surface water samples should be collected by pouring the sample into the cubitainer from a bucket or dipper.

G. When collecting samples from shallow sources, care must be exercised to avoid stirring up silt that would ruin the sample.

H. After filling, dry the outside of the cubitainer, cap tightly and run a piece of masking tape across the top of the cap with the ends of the tape extending down at least one inch (1") onto the cubitainer on each side of the cap.

I. Enter required data on the adhesive sample label and on form EP-6.

J. Assemble the cubitainer transport box.

K. Attach the label to the cubitainer.

L. Place the cubitainer and the completed copy of form EP-6 in the cubitainer transport box and close box cover.

M. Mark the sample location on the Site Area map.

N. Enter requested data on form CI-14 and note sample collection activity on form CI-13.

O. Wash any buckets, dippers or funnels in clean water before using them to collect another sample.

P. Store used gloves and/or shoe covers in a plastic bag until they can be properly disposed. Gloves and shoe covers should never be reused. Any used absorbent towels may also be stored in the bag with the discarded gloves and shoe covers.

V. Field Evaluation

Field Monitoring Teams will not perform field evaluations of water samples collected during response to accidents involving airborne gamma releases. Field information concerning surface deposition can be estimated from exposure rate measurements of adjacent land areas, or from depositions surveys performed in those adjacent areas.

(1) All water samples and EP-6 forms shall be forwarded to the Sample Preparation and Coordination team for routing to a laboratory facility for evaluation.

Note: Chain of sample custody shall be certified by each person, including couriers, having temporary or ultimate custody of a specific sample.

TEXAS

EMERGENCY MANAGEMENT

PROCEDURES

PROCEDURE 10.5

MONITORING AND SAMPLING AIRBORNE GAMMA RELEASES

Milk Sampling

Radiological Emergency Procedures of the Radiation Control Program
Texas Department of State Health Services

Milk Samples

I. Purpose

Milk samples are collected and evaluated to quantify exposure hazards resulting from ingestion of milk produced in areas affected by the airborne release of radionuclides.

II. Discussion

A. Contaminants in milk are significant because milk and dairy products constitute one of the main groups in the food pyramid considered to be an essential part of the diet.

B. Nuclides associated with the calcium in milk may be incorporated in bone tissue; presenting very long term potential for internal exposure.

C. Radioiodines, which are readily incorporated in milk if present in the dairy animal's food or water, tend to concentrate in the human thyroid; posing a particular threat to that gland as well as to surrounding parts of the body.

D. Sampling of milk is of particular concern because it constitutes a major food item for infants and growing children; the very segment of the population, which would be most vulnerable to the phenomena described in "b" and "c", above.

E. Collection of milk samples shall always be performed in the presence of, or at least with the knowledge and permission of the dairy operator.

F. Milk samples will be collected by personnel from the Texas Department of State Health Services (DSHS) Inspection Unit Food and Drug Branch Milk Group.

G. This procedure addresses only the collection of raw milk samples. If samples of pasteurized milk or other dairy products are required, they should be collected in the containers in which they are marketed or in accordance with the procedures of the DSHS Inspection Unit Food and Drug Branch Milk Group.

III. Equipment

The following Field Monitoring Team equipment and supplies may be required for collection of raw milk samples:

- One-gallon cubitainer with cap and transport box
- Roll of tape
- Adhesive sample labels

- Pen, pencil or permanent marker
- Site Area map
- Large plastic bags
- Absorbent towels
- Personal Protective Equipment (PPE)
- Form EP-6 (Radionuclide Analysis Report)
- Form CI-1 (Emergency Worker Radiation Exposure Record)
- Form CI-13 (Response and Recovery Activity Record Sheet)
- Form CI-14 (Exposure Rate Measurements Data Sheet)
- Form CI-15 (Radiological Monitoring Data Record Sheet)

A. The Inspection Unit Food and Drug Branch Milk Group will provide any additional supplies that may be required for collection of raw milk samples.

B. A supply of clean water will also be required for sanitizing equipment prior to use. If, for any reason, the water at the dairy is believed to be contaminated, the team will need one gallon of clean water from some other source.

C. Any addition of formaldehyde or other preservatives, and appropriate notation of such on form EP-6, will be performed by the Sample Preparation and Coordination Team as instructed by DSHS Inspection Unit Food and Drug Branch Milk Group.

IV. Collection

A. The DSHS Inspection Unit Food and Drug Branch Milk Group Inspector/Sanitarian will collect the milk sample in accordance to their procedures.

B. An RCP Field Monitoring Team Member will accompany the Milk Group Inspector/Sanitarian to continually measure and record radiation readings and to perform the following steps once the milk sample has been collected:

1. Enter required data on adhesive sample label and on form EP-6.
2. Assemble the cubitainer transport box.
3. Attach the label to the cubitainer.

4. Place the cubitainer and the completed copy of form EP-6 in the transport box and close the box cover.

5. Mark the sampling location on the Site Area Map.

6. Enter requested data on form CI-14 and note sample collection activity on form CI-13.

7. Store used gloves and/or shoe covers in a plastic bag until they can be properly disposed. Gloves and shoe covers should never be reused. Any used absorbent towels may also be stored in the bag with the discarded gloves and shoe covers.

V. Field Evaluation

A. Field Monitoring Teams will not perform field evaluations of milk samples collected during response to accidents involving airborne gamma releases. Preliminary data concerning radioactive contaminants in milk can be obtained from a gross gamma scan of the milk sample by the mobile laboratory.

B. All milk samples and EP-6 forms shall be forwarded to the Sample Preparation and Coordination team for routing to a laboratory facility for evaluation.

Note: Chain of sample custody shall be certified by each person, including couriers, having temporary or ultimate custody of a specific sample.

TEXAS

EMERGENCY MANAGEMENT

PROCEDURES

PROCEDURE 10 ATTACHMENTS

MONITORING AND SAMPLING AIRBORNE GAMMA RELEASES

Radiological Emergency Procedures of the Radiation Program
Texas Department of State Health Services

FIELD MONITORING TEAM EQUIPMENT AND SUPPLIES

In addition to personnel dosimetry and such other equipment and supplies as are required by other applicable procedures, each two-person Field Monitoring Team shall have the following items in their possession prior to commencing field operations:

1 - Ludlum Model 14-C or Eberline E600 portable survey meter or equivalent with batteries
1 - Ludlum Model 44-6 Thin Wall Gamma or Eberline SHP-270 probe or equivalent
1 - Ludlum Model 44-9 or Eberline SHP-360 Pancake probe or equivalent
1 - Ludlum Model 44-2 High Energy Gamma Scintillation or Eberline SSPA-8 probe (1" x 1")
1 - RADeCO/SAIC air sampler and 2 sample heads (filter holder)
1 - Power inverter
1 - Set of jumper cables
1 - Package of 47mm particulate filter discs (or at least 10 discs)
4 - Silver zeolite air sampler cartridges
10 - Charcoal air sampler cartridges (2" diameter)
25 - Wipes/smears (approximately 2" diameter)
25 - Glassine envelopes (2 1/8" x 2 1/8")
1 - Roll of masking tape
1 - Pair of tweezers
1 - Site Area map series
2 - Pen, pencil or permanent marker
1 - Box of disposable gloves (or at least 50 gloves)
5 - Pair of disposable shoe covers
1 - Pad of pre-printed adhesive sample labels
1 - Roll or package of absorbent towels
10 - Copies of form EP-6 (Radionuclide Analysis Report)
10 - Copies of form CI-13 (Response and Recovery Activity Record Sheet)
5 - Copies of form CI-14 (Exposure rate Measurements Data Sheet)
5 - Copies of form CI-15 (Radiological Monitoring Data Record Sheet)
5 - Copies of form CI-17 (Field Analysis Work Sheet)
5 - Copies of form CI-1 (Emergency Worker Radiation Exposure Record)
1 - Box of large sealable bags
1 - Box of small sealable bags
5 - Trash Bags
1 - Scientific Calculator (solar powered)
1 - Spray bottle with water

Items to be available at the staging area are listed in Attachment 2.

SUPPLIES TO BE MAINTAINED BY LOGISTICS SUPPORT

Logistics Support will ensure the following items are available at the staging area to restock the two-person Field Monitoring Team box or to support post plume sampling of soil, vegetation or water:

10 - Rolls of masking tape
5 - Boxes of trash bags
5 - Boxes of large sealable bags
5 - Boxes of small sealable bags
5 - Boxes of large (1-gallon) sealable bags
10 - Sets of Site Area map series
25 - Copies of form EP-6 (Radionuclide Analysis Report)
50 - Copies of form CI-13 (Response and Recovery Activity Record Sheet)
25 - Copies of form CI-14 (Exposure rate Measurements Data Sheet)
25 - Copies of form CI-15 (Radiological Monitoring Data Record Sheet)
25 - Copies of form CI-17(Field Analysis Work Sheet)
25 - Copies of form CI-1 (Emergency Worker Radiation Exposure Record)
4 - Pair of grass clippers
4 - Trowels
24 - Soil sample containers (16 oz. plastic tubs) with lids
12 - One gallon cubitainers with caps and transport boxes
10 - 12" rulers
10 - D cell flashlight with batteries
1 - Instrument check source set
2 - Boxes of Anti-Contamination Coveralls

Note: Logistics Support must maintain the capability to replace/restock the above items as necessary to support continuous operations.

SPECIAL RESPONSE ITEMS

The following items will be obtained and issued by Logistics Support when necessary to meet specific conditions or to perform special tasks:

For collection of milk samples: (Coordination with Inspection Unit Food and Drug Branch Milk Group will be required.)

1 - Seamless, stainless steel dipper
5 - Chlorine test strips
1 - Funnel
1 - Vial containing 100 ml of concentrated chlorine liquid
1 - One-gallon empty plastic jug with split neck and with opening cut in top to allow insertion of dipper
1 - Set of maps showing locations of dairies in the affected area

TEXAS DEPARTMENT OF STATE HEALTH SERVICES
RADIATION CONTROL PROGRAM
RESPONSE AND RECOVERY ACTIVITIES RECORD SHEET

Name: _____ Date: _____

Entered by (Initials): _____ Page _____ of _____

Time	Summary of Activity Performed

CI-13 (2/05)

TEXAS DEPARTMENT OF STATE HEALTH SERVICES
RADIATION CONTROL PROGRAM
EXPOSURE RATE MEASUREMENTS DATA SHEET

Date: _____ Page _____ of _____

Team No. _____

Team Member (1) _____ & (2) _____

Instrument Model (1) _____

Instrument Serial No. (1) _____

Calibration Date. (1) _____

For each location where only an exposure rate measurement is performed, enter data on this form. Use additional pages if necessary.
Forward this form to the Field Monitoring Team Leader (Operations Section Chief) at the end of this shift.

Time	Sector	Monitoring Point # or Other Location	Meter Reading (mR/hr)		Gross - gamma = beta
			Open Window waist / OW ground (gross)	Closed Window waist / CW ground (gamma)	

CI-14 (2/05)

TEXAS DEPARTMENT OF STATE HEALTH SERVICES

RADIATION CONTROL PROGRAM

RADIOLOGICAL MONITORING DATA RECORD SHEET

Complete all applicable sections of this form at the beginning of each shift and at any time when changes are required due to change of equipment or relief of team members.

Detailed instructions for performing the various activities necessary to acquiring requested data are contained in Procedure 10, "Monitoring and Sampling Airborne Gamma Releases."

Submit all completed copies of this form to the Field Monitoring Team Leader (Operations Section Chief) at the end of this shift.

Team: _____ Date: _____ Time: _____ Page ___ of ___

Team Data

	(RCP Member)	(DPS Member)
Team Member's Name:	_____	_____
Ludlum 14-C Serial #:	_____	Date Last Calibrated: _____
Eberline E-600 Serial #:	_____	Date Last Calibrated: SHP-270_____ SHP-360 _____ SSPA-8 _____
44-2 Probe Serial #:	_____	background _____ cpm
SSPA-8 Probe Serial #:	_____	background _____ cpm
44-6 Probe Serial #_____		background _____ mR/hr
SHP-270 Probe Serial #:	_____	background _____ µR/hr
44-9 Probe Serial #:	_____	background _____ cpm
SHP-360 Probe Serial #:	_____	background _____ cpm
Air Sampler Serial #:	_____	Date Last Calibrated: _____

Notes:

CI-15 (2/05)

TEXAS DEPARTMENT OF STATE HEALTH SERVICES

RADIATION CONTROL PROGRAM

FIELD ANALYSIS WORK SHEET

(FOR SILVER ZEOLITE CARTRIDGE WITH PARTICULATE FILTER ONLY)

Sample Location: _____ Name: _____
(Complete new form for each sample) (Person filling out form)

Sample start time: _____ Stop time: _____

Duration _____ (min.) x Flow rate (CFM) = Sample vol. _____ FT^3

(NO FURTHER ANALYSIS NECESSARY UNLESS REQUESTED BY FIELD MONITORING TEAM LEADER (OPERATIONS SECTION CHIEF).)

Field Determination of Gross Iodine Activity

Instrument serial number: _____

_____ - _____ = _____
Gross cpm - Background cpm* = Net cpm

$\frac{(2.0\ E^{-10})\ (\text{\_\_\_\_\_ Net cpm})}{(\text{\_\_\_\_\_ ft}^3)}$ = _____ uCi/cc gross iodines

*Use actual background reading at counting location

Field Determination of Gross Particulate Activity

Instrument serial number: _____

_____ - _____ = _____
Gross cpm - Background cpm* = Net cpm

$\frac{(1.0\ E^{-10})\ (\text{\_\_\_\_\_ Net cpm})}{(\text{\_\_\_\_\_ ft}^3)}$ = _____ uCi/cc gross iodines

*Use actual background reading at counting location

CI-17(2/05)

TEXAS DEPARTMENT OF STATE HEALTH SERVICES

RADIATION CONTROL PROGRAM

RADIONUCLIDE ANALYSIS REPORT

Handling Instructions:

Authorized By _____

Team No. _____ Initials: _____

Sample Type:

☐ Soil ☐ Vegetation ☐ Milk

☐ Air Sample volume: _____ cu. Ft.

(Sample start time: _____ @ _____ CFM)

(Sample stop time: _____ @ _____ CFM)

☐ Water ☐ Wipe

☐ Other _____

Container reading on contact (mR/hr): _____

Sampling Location Exposure Rate 1 meter above ground:

Window open _____mR/hr Window closed _____mR/hr

Sampling location _____

Licensee/Facility _____

I certify this sample was collected by me at _____:_____.m. on _____/_____/_____and remained in my custody until transferred to _____

at _____:_____.m. on _____/_____/_____

Signed _____

I certify that this sample was continuously in my custody from the time of receipt listed above until transferred to:

_____

at _____:_____.m. on _____/_____/_____

Signed _____

I certify that this sample was continuously in my custody from the time of receipt listed above until transferred to

_____

at _____:_____.m. on _____/_____/_____

Signed _____

I certify that this sample was continuously in my custody from the time of receipt listed above until transferred to

_____

at _____:_____.m. on _____/_____/_____

Signed _____

FOR USE BY THE LABORATORY ONLY

Laboratory Sample Number: _____

Condition of Seals:

☐ Satisfactory ☐ (Specify) _____

Wet (as received) Weight _____

Notes _____

I certify this sample was continuously in my custody from the time of receipt until the completion of laboratory analysis on ____/____/____.

Signed: _____

Am-241	____	____ ±	____	uCi/____
Ba-140	____	____ ±	____	uCi/____
Ce-144	____	____ ±	____	uCi/____
Co-58	____	____ ±	____	uCi/____
Co-60	____	____ ±	____	uCi/____
Cs-134	____	____ ±	____	uCi/____
Cs-137	____	____ ±	____	uCi/____
Cs-138	____	____ ±	____	uCi/____
Fe-59	____	____ ±	____	uCi/____
I-131	____	____ ±	____	uCi/____
I-132	____	____ ±	____	uCi/____
I-133	____	____ ±	____	uCi/____
I-134	____	____ ±	____	uCi/____
I-135	____	____ ±	____	uCi/____
K-40	____	____ ±	____	uCi/____
Kr-85	____	____ ±	____	uCi/____
Kr-85m	____	____ ±	____	uCi/____
Kr-87	____	____ ±	____	uCi/____
Kr-88	____	____ ±	____	uCi/____
Na-22	____	____ ±	____	uCi/____
La-140	____	____ ±	____	uCi/____
Mn-54	____	____ ±	____	uCi/____
Nb-95	____	____ ±	____	uCi/____
Rb-88	____	____ ±	____	uCi/____
Ru-106	____	____ ±	____	uCi/____
Te-132	____	____ ±	____	uCi/____
Xe-133	____	____ ±	____	uCi/____
Xe-133m	____	____ ±	____	uCi/____
Xe-135	____	____ ±	____	uCi/____
Xe-135m	____	____ ±	____	uCi/____
Xe-138	____	____ ±	____	uCi/____
Zn-65	____	____ ±	____	uCi/____
Zr-95	____	____ ±	____	uCi/____

ALPHA COUNT

Gross Alpha _____ ± _____ uCi/_____

BETA COUNT

Gross Beta _____ ± _____ uCi/_____

Results reported at ___:___ __.m. on ____/____/___

EP-6 (12/05)

TEXAS

EMERGENCY MANAGEMENT

PROCEDURES

PROCEDURE 11

MONITORING AND SAMPLING AIRBORNE ALPHA RELEASES

Radiological Emergency Procedures of the Radiation Control Program
Texas Department of State Health Services

PROCEDURE 11

MONITORING AND SAMPLING AIRBORNE ALPHA RELEASES

APPROVAL AND IMPLEMENTATION

This procedure is hereby approved for implementation and supersedes all previous editions.

10/19/07
Date

Richard Ratliff
Radiation Program Officer
Radiation Control Program
Texas Department of State Health Services

DATE OF CHANGE	INITIALS AND DATE ENTERED
03/24/2004	Revised entire document
06/02/2005	Administrative changes
10/03/2007	Revised entire document

TABLE OF CONTENTS

MONITORING AND SAMPLING AIRBORNE ALPHA RELEASES

I. Purpose

This procedure provides uniform guidelines for Field Monitoring Team personnel charged with collecting data concerning radiological conditions in areas affected by airborne releases of alpha-emitting radioactive materials.

II. Discussion

In order to evaluate the consequences of an accidental release of radioactive material, it is first necessary to identify the geographic area affected. Systematic performance of survey measurements, along with the collection and analysis of environmental samples from monitoring points will serve to validate or challenge protective action recommendations in effect or under consideration. These activities will provide a basis for the development of population dose estimates, and will identify measures necessary for the recovery and restoration of the contaminated area. Due to the design and age of nuclear weapons, a Pantex accident may result in beta and gamma (low and high energy) radiation along with alpha radiation. Since the detection range for alpha is so short and the alpha probe Mylar windows are susceptible to damage in the field, initial search of contamination will focus on gamma radiation, x-rays, and beta particles, that are present.

III. Definitions

References in this procedure are to the E-600 with SHP-380AB (alpha/beta) probe, PG-2 (low energy) probe, SHP-360 (GM Pancake) probes, and E-600 with the Field Instrument for the Detection of Low Energy Radiation (FIDLER) during responses to incidents involving the Pantex Plant or other accidents where low energy gamma and/or alpha radiation will be the major concern.

IV. References

A. Procedure 3, Area Survey and Decontamination

B. Procedure 4, Tool & Equipment Decontamination

C. Procedure 5, Personnel Monitoring & Decontamination

D. Procedure 7, Personnel Dosimetry & Exposure Records

E. Procedure 8, Respiratory Protection

F. Procedure 17, Radio Communications

G. Procedure 26, Selection & Use of Protective Clothing.

H. The appropriate Tab and Chapter (if any) to Annex D for the type of accident involved.

V. Equipment Required

A list of Field Monitoring Team equipment and supplies is included as Attachment 1 and 2 to this procedure. Each team member shall possess a copy of this procedure and of each document referenced in Section IV above.

VI. Precautions and Limitations

A. Individuals will maintain their exposures as low as reasonably achievable (ALARA) under prevailing conditions. Personnel entering a radioactive plume shall not proceed beyond the 100 mR/hour (closed window) boundary unless prior approval has been obtained from the the Incident Commander (Chief of Field Operations) or their appointed designee or when acting in support of life saving or other urgent emergency operations.

B. Except when acting in support of life saving or other urgent emergency operations, persons entering a radioactive area shall not proceed into an area that requires respiratory protection (greater than 6 $\mu Ci/m^2$ (133,200 dpm/100 cm^2)) unless prior approval has been obtained from the Incident Commander (Chief of Field Operations) or their designee.

C. Precautions and limitations concerning use of protective clothing, personnel dosimetry, and respiratory protection will apply, and shall be implemented in accordance with guidance contained in the respective procedures covering those subjects unless specifically waived or modified by the Incident Commander (Chief of Field Operations) or their designee. Information provided in this procedure concerning those topics is presented as a reminder only, and is not intended to replace, reference to, and use of the specific guidance in those procedures.

VII. Prerequisites

Each individual must attempt to ascertain anticipated radiation exposure rates and potential contamination hazards. This information will normally be available from the Operations Section Chief (Field Monitoring Team Leader) if it has not already been provided to team members in a briefing conducted by the Incident Commander (Chief of Filed Operations). In addition to, or in lieu of, information obtained from the above sources, where applicable, bills of lading, shipping papers, or waste manifests; contact with shippers, carriers, or consignees; or information obtained from other emergency

personnel such as police or firemen responding to the incident may provide data concerning the quantity, physical condition, and chemical form of the radioisotope(s) involved.

VIII. Team Activation

A. Notification and Mobilization or Standby

1. Following the declaration of a Site Area Emergency or a General Emergency at Pantex, or the occurrence of an accidental release of radioactive materials at any other location, selected personnel will either be activated or placed on standby.

2. Unless otherwise instructed at the time of notification, activated team members will assemble necessary supplies and equipment, and travel to the Radiation Control Program (RCP) staging area or other specified location for a briefing on emergency conditions and monitoring objectives.

3. Unless otherwise instructed at the time of notification, team members who are placed on standby will assemble necessary supplies and equipment, and make other preliminary preparations for response; but will then resume normal activities, keeping the Logistics Sections Chief (Staging Area Coordinator) appraised of their location and means of contact at all times.

B. Assembly and Briefing

1. All RCP response team members, will assemble at the staging area or other designated location for a briefing prior to deployment to duty assignments.

2. This briefing, which is to be conducted by the Operations Sections Chief (Field Monitoring Team Leader) or the Incident Commander (Chief of Field Operations) shall include the following:

a. A summary of the event(s) causing the emergency.

b. A description of current conditions, including;

(1) anticipated radiation exposure rates and potential contamination hazards;

(2) known or anticipated non-radiological hazards;

(3) the potential for improvement or worsening of the situation; and

(4) current meteorological conditions and weather predictions for the duration of the team assignment.

c. An explanation of specific response objectives including any special types of monitoring or sampling to be performed and an identification of any special equipment or supplies ("Special Response Items") needed by the teams.

d. An identification of other agencies involved in the response, including their roles, points of contact, and operating locations.

Note: Information concerning other agencies will normally focus on those agencies who are responding to the radiological aspects of the emergency or who are otherwise active in the Emergency Planning Zone (EPZ) but should also provide an overview of actions being conducted outside the EPZ in response to the emergency.

C. Equipment Issuance, Inventory Preparing, and Operability Checks

1. Following the team briefing, each Field Monitoring Team shall inventory their equipment and supplies. A copy of the Field Monitoring Team equipment and supplies list is to be included in each Field Monitoring Team kit for use as a checklist while performing this inventory. Items identified as missing or requiring replacement can be obtained from Logistics Support.

Note: This inventory process may be initiated prior to the team briefing, but cannot be completed until any "Special Response Items" to be included have been identified. "Special Response Items" are listed separately on the equipment checklist, and are to be issued by Logistics Support only when identified as necessary for a specific response.

2. Requirements for "Special Response Items" will be identified during team briefings on emergency conditions and monitoring objectives. Primarily, these items consist of additional supplies needed for non-routine tasks, but in some instances they will merely be substitutes for standard team equipment.

3. Performance of the equipment inventory shall be noted on each team member's copy of form CI-13, Response and Recovery Activities Record Sheet.

4. The E-600 Kit contains the following equipment:

   a. survey meter;

   b. SHP-380AB scintillation probe;

   c. SHP-270 Geiger Muller probe;

   d. PG-2 low energy probe;

   e. SHP-360 Geiger Muller pancake probe;

   f. flat head screwdriver; and

   g. two cables.

5. The Field Team shall complete E600 operability checks, background readings, and instrument response checks in accordance with procedures included in the instrument kit. Determine both the alpha and beta cpm background using the SHP-380AB (alpha/beta zinc-sulfide scintillator) probe. Determine the beta and gamma dose rate (mr/hr) background (open window) using the E600 with SHP-270 (sliding-window GM) probe. Determine the cpm background using the SHP-360 (pancake GM). Determine the low energy gamma and x-ray cpm background with the PG-2 probe. Background readings should be recorded on form CI-15A, Alpha Radiological Monitoring Data Sheet (Attachment 5). The Performance of Operability checks should be noted on form CI-13 (Attachment 7).

6. A communications check shall be conducted upon deployment with the Operations Section Chief (Field Monitoring Team Leader). This check is to be performed in accordance with guidelines in Procedure 17. For operations near Pantex, an additional communications check must be completed as the field team vehicle approaches the Amarillo International Airport. At this point, communications will be shifted to the repeater channel.

7. Following completion of all pre-deployment activities, each Field Monitoring Team shall travel to monitoring locations when and as directed by the Operations Section Chief (Field Monitoring Team Leader).

D. Maps

1. Pantex

a. The 360 degree area surrounding the Pantex Plant has been divided into sixteen (16) 22.5 degree sectors which are identified by the alphabetized descriptors "A" through "R" ("I" and "O" omitted), and twelve (12) 30 degree sectors which are labeled "1A" to "12A" from 0-5 miles and "1B" to "12B" from 5-10 miles as shown on attachments to Tab 2, Chapter 1 of Annex D.

b. Pre-selected offsite monitoring locations within a 10-mile radius of the Pantex Plant are designated on attachments to Tab 2, Chapter 1. Pre-selected monitoring locations are sequentially numbered and are usually located at road intersections or at other easily identifiable landmarks. Waypoints for all pre-planned sample locations are stored in the Field Team GPS units. Field Team maps provide additional information on each sample location.

2. Other

For sustained operations at sites other than the Pantex Plant, maps showing pre-selected monitoring locations and sectors "A" through "R" in 22.5 degree increments in a clockwise direction will be developed by Logistics Support or GIS support staff and distributed to all response team members. Until the maps are available, directions will be given, and locations will be identified using the following improvised system on whatever maps can be obtained.

a. The accident site will be assumed to be the center point on whatever map is provided. Mark the site with a small "x."

b. Using a straightedge and pen or pencil, draw a line through the accident site parallel to the north arrow on the map. This line should extend at least ten miles to both the north and the south, using the same scale for distance as is shown on the map; or to the edges of the map if it covers a smaller area.

c. Label the segment of the line north of the accident site "0 degrees." (This segment corresponds to the centerline of sector "A" on sector maps.)

d. Label the segment of the line south of the accident site "180 degrees." (This segment corresponds to the centerline of sector "J" on sector maps.)

Identify all subsequent locations in terms of approximate direction and distance from the accident site, using degrees clockwise from 0 degrees and/or a narrative description such as "next to private airport" when such additional information would be helpful in differentiating between otherwise similar points on the map.

e. As surveys are reported or samples collected, mark those locations on your copy of the map using a numerical sequence so that the Sample Coordinator and/or the Accident Assessment Team can later correlate analyses and assessments with the proper location.

E. Communications

1. In order to ensure a constant communications capability, Field Monitoring Team radios shall be turned on prior to departure from the staging area, and shall remain on at all times until the team is back at the staging area, or has been advised by the Operations Section Chief (Field Monitoring Team Leader) that radio contact is no longer required.

2. All radios are programmed in accordance with the Texas Interoperability Plan. Fire and Law channels are available for use for Field Monitoring Teams to contact the Department of Public Safety or the local Fire Department, however, the normal protocol is for teams to contact the Operations Section Chief (Field Monitoring Team Leader) using RCP channels.

3. In the event of radio failure or loss of radio contact, alternate provisions as contained in Procedure 17, Radio Communications shall apply. A communications list with all required phone numbers and means of communicating is distributed to all field teams.

F. Exposure Control

1. Alpha radiation will not be detected by the dosimetry issued during an event. The dosimeters are required should there be a presence of gamma radiation. At the beginning of each shift, each member shall zero his or her electronic or self reading pocket dosimeter and fill out initial information on a RCP Form CI-1, Emergency Worker Radiation Exposure Record. (See Procedure 7, Personnel Dosimetry and Exposure Records.)

2. In order to hold personnel exposure ALARA, unnecessary time should not be spent within, or in proximity to any affected area where radiation readings exceed normal background without respiratory protection.

   Individual whole body gamma exposure shall be monitored by periodically checking dosimetry. Each time dosimetry is checked, this action should be noted on the "Response and Recovery Activities Record Sheet, CI-13."

3. Individual exposures exceeding 200 mRem shall be immediately reported to the Field Monitoring Team Leader. (As the upper limit of exposure, which can be measured on low-range team dosimetry, 200 mRem should serve as a flag requiring reassessment of an individual's need to remain in a radiation field.)

4. At the end of each shift, members shall present their dosimetry and Emergency Worker Radiation Exposure Records to the person performing exit monitoring. (See Section XIII of this procedure.)

5. Dosimetry "Reading at Exit" and "Indicated Dose" shall be entered on the Emergency Worker Radiation Exposure Record by the person performing exit monitoring and one copy of that form shall be returned to the Field Monitoring Team member as a temporary record of exposure received.

IX. Protective Clothing

A. During the pre-deployment briefing at the staging area, personnel will be provided with the RCP's best estimates of suspended and deposited nuclides in the restricted area. This information will generally be in the form of dose assessment projections generated by the HOTSPOT code or by actual field measurement data if available. Protective clothing and equipment will be recommended in accordance with the following:

   - If there is detectable contamination and the anticipated contamination levels are less than 6 $\mu Ci/m^2$ (133,200 dpm/cm^2), shoe covers and gloves will be required for entry into the restricted area. A respirator may be recommended if work involving dust-generating operations will be performed.

   - If the anticipated contamination levels are greater than 6 $\mu Ci/m^2$ (133,200 dpm/cm^2), but less than 60 $\mu Ci/m^2$ (1,332,000 dpm/cm^2), anti-contamination clothing, shoe covers, gloves, cap, and limited entry up to 4 hours will be authorized without respiratory protection.

- If the anticipated contamination levels are greater than 60 $\mu Ci/m^2$ (1,332,000 dpm/cm^2) , but less than 300 $\mu Ci/m^2$ (6,660,000 dpm/cm^2), anti-contamination clothing, shoe covers, gloves, cap, and the use of an approved air purifying respirator (APR) respiratory protection system will be required to enter the restricted area. Only essential operations will be authorized at levels greater than 60 $\mu Ci/m^2$.

- If the anticipated contamination levels are greater than 300 $\mu Ci/m^2$ (6,660,000 dpm/cm^2), anti-contamination clothing, shoe covers, gloves, cap, and pressure demand SCBAs are required for entry into the restricted area.

X. Field Monitoring

Due to the potential for contamination, periodic contamination checks of personnel and their vehicle and equipment are required. These checks can be obtained at an access control point that is staffed with trained monitors, or you can do it yourself in a "clean" area. If you perform the check, use the preliminary monitoring in accordance with Procedure 24 for checking yourself and other members or your team. Carefully monitor the head (including face around nose and mouth), hands, knees, and shoes. If alpha contamination in excess of 30 cpm above background or beta contamination in excess of 300 cpm above background are found on skin surfaces, decontamination is warranted.

Vehicles are monitored for alpha contamination by direct frisk or using large area wipes. The wipes can be RCP provided 2"or 47 mm disks, paper towels, or other available dry cloth or paper. Areas that should be monitored include:

- front grill;
- door handles;
- wheel covers/wheel wells;
- steering wheel; and
- control pedals.

Monitoring teams, vehicles, and equipment will be monitored for contamination at access control/hot line locations when departing the restricted area. The outside of sample packages being transported out of the area will also be checked for contamination. If a person, vehicle, or equipment is found to be contaminated, the team will be referred for decontamination to the reception center while in operation or staging area if reception center is closed. Samples having contaminated outer coverings will be decontaminated or repackaged, as appropriate.

A wipe survey is done by gently wiping a 100 cm^2 area with a porous paper disc and measuring the amount of contamination on the disc with an E-600 survey meter and SHP-380AB probe. The wipes can be evaluated in the field and/or returned to the counting facility for analysis. Analysis in the field is accomplished by placing the wipes on a flat, clean surface and measuring the count rate of the wipe. Contamination limits are 30 cpm for alpha contamination and 300 cpm for beta/gamma contamination.

Field monitoring teams, vehicles, and equipment will be monitored for contamination at access control locations when departing the restricted area. The outside of sample packages being transported out of the area will also be checked for contamination. If a person, vehicle, or equipment is contaminated, the team will be sent for decontamination at the RCP's staging area or other designated location. Samples having contaminated outer coverings will be decontaminated or repackaged, as appropriate.

Collected samples and completed documentation will be taken by Couriers to the Sample Preparation and Coordination Team for processing and subsequent analysis after being cleared by monitors at the access control point. When the samples are transferred to another person or team, complete the chain of custody documentation in accordance with the requirements in this procedure.

Note: During operations involving the Pantex Plant, the Accident Assessment Team should always have a fairly accurate computer projection of the affected area. While physical confirmation of this data will be required, this projection can be of some value during the locating and tracking process.

XI. Survey Measurements

A. Initial search for contamination from a Pantex Accident

1. Search for contamination/deposition from an accident at Pantex is conducted with the PG-2 (low energy gamma/x-ray) probe and a SHP-360 (pancake GM) probe. The PG-2 probe will permit detection of an affected area by utilizing the 60 KeV decay peak of 241-Am from Plutonium.

2. Use both instruments to localize areas of contamination in the field. Once a reading of twice background is detected on either probe, inform the Operations Section Chief (Field Monitoring Team Leader). These results are not intended to be quantitative results. They are necessary in order to find and localize areas of alpha contamination.

3. PG-2 (low energy gamma/x-ray) and SHP-360 (pancake GM) readings will be logged on the Alpha Monitoring Data Sheet (Attachment 6) and reported to the Operations Section Chief (Field Monitoring Team Leader).

4. If time permits, the E-600 survey meter connected to a FIDLER probe can be used to initially establish the area of deposition. The FIDLER is a larger, more sensitive low energy instrument used to search for the 60 KeV decay peak of 241-Am from Plutonium.

5. All of these results are used to locate the boundaries and severity of the contamination and deposition.

B. Deposition surveys

1. Monitoring for alpha contamination is generally much slower than monitoring for either beta or gamma radiation. This is due to the alpha particle's short range in air and large mass. As a general rule, the detector must be within about one quarter inch (1/4) of an alpha source in order to detect it, whereas beta radiation can be detected a meter or so away from a beta particle source, and gamma rays can be detected from much longer distances. The surface area being monitored must be dry. A water film (such as dew) is sufficient to prevent the alpha particle from entering the detector. Ground deposition may be surveyed by either of two methods; "direct scan" or "wipe evaluation detector."

CAUTION

Use of the SHP-380AB probe should only be used on smooth and flat surfaces. The probe should not be used directly on the ground due to the high risk of damaging the probe. Rough terrain, vegetation, and rocks will puncture the thin Mylar window. A 100 cm^2 wipe will be conducted and read with the SHP-380AB probe when alpha measurements are required.

When monitoring for alpha particles, use the SHP-380AB (alpha/beta) scintillation probe. The alpha/beta channel will provide a total cpm of the alpha and beta activity. The Channel Selector Switch (Chnl) can be switched to alpha only or beta only readings.

Note: The formulas that are given in the following sections for conversion of cpm to uci/m^2 ground deposition and dpm/100 cm^2 smear contamination results provide field approximations only. These conversions may be useful to Emergency Response Team personnel, but judgments requiring accurate data as their basis must be deferred until laboratory analysis of collected samples can be performed.

2. Deposition Survey by Direct Scan

   a. For this survey, use the Eberline E-600 instrument with the Eberline SHP-380AB scintillation probe attached.

   b. Enter data on the Alpha Monitoring Data Sheet (Attachment 5).

   c. Take a gross count rate measurement with the probe held not more than one-quarter (1/4) inch above the surface. Scan at a speed of one inch per second. When activity is located, allow the detector to remain stationary over the area being monitored for one minute. Record the reading. Use the cpm value from the alpha channel on the E600.

   d. Calculate deposition as follows:

$$uci/m^2 = \frac{gross\ cpm}{(Eff)(2.22E6)(.01)}$$

   Where:

   Eff = counting efficiency 2 pi factor for probe (.36)
   2.22E6 = to convert to µci
   .01 = to convert from 100 cm^2 to m^2

   e. Mark location on Site Area Map and/or on the GPS unit.

3. Deposition Survey by Wipe Evaluation

   a. This survey requires the following equipment and supplies.

      (1) Eberline Model E-600;

      (2) Eberline SHP-380AB probe;

      (3) one inch wipe paper;

      (4) one two-inch plastic petri dish with cover;

      (5) small (one pint capacity) zip-lock bag;

      (6) one inch piece of sample sealing tape;

      (7) adhesive sample label;

(8) large (one gallon capacity) zip-lock bag;

(9) Site Area map;

(10) form EP-6, Radionuclide Analysis Report (Attachment 2);

(11) form CI-18, Alpha Monitoring Data Sheet (Attachment 6); and

(12) pen.

b. Record all data in the Alpha Monitoring Data Sheet for this location (Attachment 5).

c. Take a 100 cm^2 swipe of a flat, exposed, horizontal area such as the hood of a car that has remained parked outside since the beginning of the release.

d. Being careful not to contaminate the outside of the petri dish or to shake collected material off of the wipe paper, place the wipe in the petri dish, contaminated side up. Always attempt to maintain the contaminated side of the wipe up while handling the sample.

e. Hold the Eberline SHP-380AB probe 1/4" above the wipe for one minute. Record this value as the gross count rate. Do not bring the probe in contact with the wipe.

f. Calculate the smearable contamination as follows:

$$dpm/100\ cm^2 = \frac{gross\ cpm}{(Eff)}$$

Where:

Eff = Counting efficiency factor (2 pi) for probe
= 36 percent for the SHP-380AB (Alpha Channel)

g. Enter required data on an adhesive sample label, peel off the backing paper and attach the label to the backside of a one pint zip-lock bag. (The back side is the side opposite the contact side of the wipe.)

h. Put lid on the petri dish. Place the petri dish containing the wipe in the zip-lock bag and seal it by folding a 1" piece of sample sealing tape over the bag opening.

i. Fill out form EP-6, Radionuclide Analysis Report (Attachment 4) and place it and the bag containing the wipe inside a one-gallon zip-lock bag.

j. Mark the survey location on the Site Area map and/or in the GPS unit.

k. Submit the sample to the Sample Preparation and Coordination Team through the courier or in person as directed by Operations Section Chief (Field Team Leader).

Note: Chain of sample custody shall be certified by each person, including couriers, having temporary custody of a specific sample. When necessary, additional blank sets of form number EP-6 shall be used to continue Chain of Custody certification. Such additional sets shall each bear in the "notes" space on the left of the form the statement "Chain of Custody continuation for sample number ____." (Since each change in sample custody must be noted on form EP-6, the outer bag should be closed by its zip-lock closure, but should not be sealed in any way that would prevent access to that form.)

XII. Sample Collection and Field Evaluation

Note: Some of the steps in the following processes are designed to keep the samples from being contaminated. Because of the concentration of contaminants that can occur during some collection processes, disposable rubber gloves should always be worn when handling any unbagged sample collection medium or sample container. All gloves, and any shoe covers used by a team may be stored in a single plastic bag until proper disposal can be arranged at the end of the shift.

A. Air Samples

1. Purpose

Air samples are collected and evaluated for the purpose of identifying airborne radioactive contaminants that could contribute to exposures through inhalation, direct external exposure, or uptake in plants or animals.

2. Discussion

   a. The field evaluation of the particulate filter can yield an early approximation of gross particulate activity.

   b. Air sample collection and evaluation can provide an indication of the extent to which re-suspension of deposited materials poses a continuing threat to respiration or could result in contamination of additional downwind areas.

   c. The method used for air sampling is also the same as that described in Procedure 10, Tab 1. Removal of the filter and its packaging are described in paragraphs XII.A.4.l. through m. of this procedure. In order to determine the amount of alpha and beta contamination on a surface, a direct scan using the E-600 survey meter and SHP-380AB probe can be accomplished by holding it about one quarter inch (1/4) above the surface of the air filter for one minute. Record the alpha and the beta channel reading in CPM. The amount of alpha deposition on the filter is an indication of airborne alpha activity requiring the consideration of the use of respiratory protection. The active surface area of the SHP-380AB probe is 100 cm^2.

3. Equipment

   In addition to a power supply (normally provided by the battery of the survey team vehicle), collection and field evaluation of one air sample requires use of the following Field Monitoring Team equipment:

   a. RADeCO/SAI low volume air sampler and sampling head (filter holder);

   b. power inverter;

   c. roll of sample sealing tape;

   d. 47mm filter & backing pad;

   e. Eberline E-600 portable survey meter;

   f. Eberline SHP-380AB probe;

   g. 2" plastic petri dish with cover;

h. two small (one pint capacity) zip-lock bags;

i. one large (one gallon capacity) zip-lock bag;

j. two adhesive sample labels;

k. pair of tweezers;

l. pen;

m. Form EP-6, Radionuclide Analysis Report; and

n. Form CI-18, Alpha Monitoring Data Record Sheet.

4. Collection

a. Unscrew the outer ring of the sampler head and place the filter on the screen. Replace outer ring.

b. Screw the sampling head into the sampler.

c. Plug the air sampler to the inverter, which is connected to the vehicle's battery.

d. Collect a 40 cubic feet air sample in accordance with the Air Sampler procedure provided in the E600 instrument kit. Adjust flow rate to 2-4 cubic feet per minute (CFM). Ensure the vehicle's engine is running prior to turning on the sampler.

e. Record the sampling start time and actual flow rate in form CI-18.

f. Allow the sampler to run until the desired volume of air has been sampled.

Note: The preferred volume is 40 ft^3. The actual volume desired will depend upon the time available. The Operations Section Chief (Field Monitoring Team Leader) will specify the volume of air to be sampled in instances when it is to be any volume other than the standard 40 ft^3. If a high volume air sampler is to be used, techniques on its use will be demonstrated and procedures will be supplied.

g. Once the sample is completed record volume of air sampled on form EP-6.

The following steps will require a clean, uncontaminated surface on which to lay bags and sampling head parts. A clean sheet of notepaper, a paper towel, or even an inside page from a newspaper carried in the team vehicle should suffice.

h. Remove the sampling head from the air sampler and, holding the sampling head upright, unscrew the filter holder cap and lay it aside.

i. Using tweezers carefully lift the particulate filter disc out of the sampling head.

Note: The filter disc should be handled only by the outer lip, which was covered by the filter holder cap during sampling. The filter disc will probably be stuck to the sampling head and must be removed carefully to avoid tearing it or shaking off particles, which have been collected on the surface.

j. Lay the sampling head aside and place the particulate filter disc into a plastic petri dish with the upstream side of the disc corresponding to the marked side of the dish. Use care when transporting the sample to keep the marked side upright at all times.

k. Place the petri dish in a small zip-lock bag, close the bag and seal it by folding a 1" piece of sample sealing tape over the bag opening.

l. Survey the sample head for signs of contamination and decontaminate if necessary. Reassemble the sampling head, disconnect the air sampler, inverter, and power cables and store these items.

m. Mark the sampling location on the Site Area and/or in the GPS unit.

5. Field Evaluation

Preliminary evaluation of alpha activity may be performed if requested with the E600 and the SHP-380AB probe. Normally the evaluation will be performed at the Mobile Laboratory.

6. Sample Submission

All particulate filter discs shall be labeled and submitted to the Sample Preparation and Coordination Team. Labels and form EP-6 must show the volume of air sampled in cubic feet.

a. Enter required data on adhesive sample label and form EP-6, Radionuclide Analysis Report (Attachment 4).

b. Attach label to the top of the bag containing the particulate filter.

c. Place form EP-6 and the bag containing the filter disc in a one-gallon zip-lock bag. Use care when handling the filter to keep the marked side up at all times.

d. Note sample collection activity on form CI-13, Response and Recovery Activities Record Sheet.

e. Submit the sample to the Sample Preparation and Coordination Team.

Note: Chain of sample custody shall be certified by each person, including couriers, having temporary or ultimate custody of the specific sample. When necessary, additional blank sets of form EP-6 shall be used to continue Chain of Custody certification. Such additional sets shall each bear in the "notes" space on the left of the form the statement "Chain of Custody continuation for sample number ___." (Since each change in sample custody must be noted on form EP-6, the outer bag should be closed by its zip-lock closure, but should not be sealed in any way that would prevent access to that form.)

B. Soil Samples

1. Purpose

Soil samples are collected and evaluated for the purpose of identifying and quantifying radioactive contaminants that have been deposited on the ground surface as a result of an airborne release.

2. Discussion

a. Contaminants deposited on the soil are significant because they could potentially affect persons in the following manner:

(1) re-suspension resulting in either whole body exposure, inhalation, or re-deposition in previously unaffected areas;

(2) adsorption or absorption resulting from direct skin contact; and/or

(3) plant uptake and subsequent entry into the food chain.

b. Following completion of the initial deposition process, soil sample collection and evaluation may be necessary to determine the extent to which routine land usage must be restricted, or the extent to which decontamination may be required.

c. Prior to the time when land tillage or precipitation causes deposited materials to be mixed into the soil, most contaminants will remain in a very thin surface layer of soil.

(1) In most instances, a sample that contains the top quarter inch of soil will be representative of contaminants deposited from an airborne release.

(2) In instances where the soil is very uneven due to clotting or cracking, a greater sampling depth will be required.

(3) Samples for soil depth profiles will not routinely be collected during response to accidental airborne releases. When such samples are desired, they will be specifically requested by the Operations Section Chief (Field Monitoring Team Leader).

d. During later stages of response operations, after contaminants have been mixed into the soil through tillage or percolation, the Operations Section Chief (Field Monitoring Team Leader) will provide guidance concerning soil sampling techniques to be utilized.

Because the intent in gathering the sample is to determine the deposition per unit area, the size of the area from which a soil sample is collected is as important as the sampling depth and must be accurately determined.

3. Equipment

The following equipment will be required each time a soil sample is to be collected. Additional quantities of some items will be required if the area to be sampled is clotted or cracked and a greater than normal volume of soil must be collected.

(1) disposable gloves and shoe covers;

(2) ruler (one-foot minimum);

(3) trowel;

(4) sample container (16oz. plastic tub) and lid;

(5) masking tape;

(6) adhesive sample label;

(7) pen;

(8) water for rinsing equipment;

(9) sample sealing tape;

(10) Form EP-6, Radionuclide Analysis Report;

(11) Site Area map and

(12) two one-gallon zip-lock bags (A 22" X 28" sample collection bag shall be substituted if soil sample is in multiple containers.)

4. Collection

a. In selecting a site from which to collect a soil sample, apply the following criteria in descending order of priority. So long as even one site meets a given criterion, other sites that fail to do so should be eliminated from further consideration.

Note: Except as noted below, if the strict application of a particular standard would result in the elimination of all remaining sites, the two or three sites more nearly meeting the criterion should be evaluated on the basis of subsequent criteria.

(1) The soil surface must not have been disturbed since the beginning of the release.

Note: This criterion must be met. If no site in the vicinity of the desired sampling location meets this criterion, advise the Operations Section Chief (Field Monitoring Team Leader) and await further instructions.

(2) The site must be away from vehicles, building, trees, structures and other objects, which would shield it from the wind or otherwise influence deposition patterns.

Note: Since the term "away from" requires a subjective judgment on the part of the sample collector, the following guidelines should be applied.

(a) Assume that all deposition has resulted from materials that were carried on winds blowing in a straight line from the point of release to the sampling location.

(b) If the potential collection site is downwind of any intervening object, the distance of separation must be at least equal to twice the height of the object.

(c) If the potential collection site is upwind or to one side of an object, the distance of separation should be at least great enough to escape any noticeable wind swirl caused by the object.

(d) If no potential site meets criterion number two based on these guidelines, further consideration should be given to those sites on which deposition appears to have occurred in patterns which are representative of the area.

(3) Ideally, the site should be free of vegetation; but, since that is an unlikely condition in most undisturbed and unsheltered locations, some vegetation is acceptable.

(4) If more than one site remains eligible at this point, select the one site free of clods, rocks, ground cracks, debris and other features that would complicate the process of collecting a sample of uniform soil depth.

b. Mark off a 12" X 12" area within the selected site, being careful not to touch the ground inside the marked area.

c. Remove the soil from inside the marked area to a uniform depth of one quarter of an inch and place it in the sample container.

(1) Include any vegetation from the area in the sample.

(2) Sampling depth may be increased slightly if doing so will result in a more accurate sample of clotted or cracked soil.

(3) If the area is free of vegetation, cracks, and clods, the sample will almost fill the container, leaving just enough space for the lid.

(4) If the sample volume exceeds the capacity of a single container, use as many containers as necessary, and indicate on their labels that they are part of the same sample.

d. Snap the lid on the container and tape it in place by running a piece of masking tape completely around the rim of the container, folding the upper edge of the tape down onto the lid. The tape must make adequate contact with both the container and the lid to hold the lid securely in place.

e. Seal the container with a (3" minimum) piece of sample sealing tape. Starting at a point on the container approximately 2" below the exposed outer end of the masking tape, run the sample sealing tape up the side of the container, down over the rim and onto the lid.

f. Enter data on the adhesive sample label, peel off the backing paper and attach the label on the side of the container below the masking tape.

g. Fill out a set of form EP-6 and place it and the sample container inside a one-gallon zip-lock bag.

h. If multiple containers were required to hold this sample, repeat steps "d" through "f", above; for each container indicate number of containers used on form EP-6, and place all containers, along with form EP-6, in one of the 22" X 28" sample collection bags.

Note: Since each change in sample custody must be noted on form EP-6, the outer bag should be closed, either by its zip-lock closure or with a twist tie, but should not be sealed in any way that would prevent access to that form.

i. Mark the sampling location on the Site Area map and/or in the GPS unit.

j. Enter requested data on a copy of form EP-6 for this location and note sample collection activity on form CI-13, Response and Recovery Activities Record Sheet.

k. Wash trowel with clean water and dry it with a paper towel from the kit, before using it to collect another sample. Monitor for contamination.

l. Store any gloves and/or shoe covers plus other disposable items in a plastic bag until they can be properly disposed of. Gloves and/or shoe covers should never be reused.

5. Evaluation

a. Field Monitoring Teams will not perform field evaluation of soil samples collected during response to accidents involving airborne alpha releases. Field information concerning ground deposition can be more easily and accurately obtained through performance of deposition surveys by direct scan or by wipe evaluation. (See Section XI.)

b. All soil samples collected shall be forwarded to the Sample Preparation and Coordination team for routing to a laboratory facility for evaluation.

c. Chain of sample custody shall be certified by each person, including couriers, having temporary or ultimate custody of a specific sample. (When necessary, a second set of form EP-6 shall be used to continue Chain of Custody certification. Such second set, and any additional sets, shall bear in the "notes" space on the left of the form the statement "Chain of Custody continuation for sample number ___.")

C. Vegetation Samples

1. Purpose

Vegetation samples are collected and evaluated for the purpose of estimating ingestion exposure pathway hazards resulting from an airborne release of radioactive materials.

2. Discussion

a. Contaminants deposited on vegetation are significant because they could potentially affect persons by:

(1) direct ingestion on the surface of vegetables, grain, nuts or fruits, or in the edible portion of the plant following uptake; and/or

(2) indirect ingestion through consumption of meat, milk, or other foods from animals that have eaten vegetation on or in which contaminants were present.

b. Following completion of the initial deposition process, vegetation sample collection, and evaluation may be necessary to determine whether fruits, grains, and vegetables are safe for human consumption; and whether grains and vegetation can safely be grazed by, or harvested and fed to animals whose flesh or byproducts are to be used for human foods.

(1) Of the processes mentioned above, the hazard from grazing by food-producing animals should be evaluated as soon as possible after deposition has terminated, because such early evaluation avoids the irreversible action of allowing contaminants to enter the animal before the effects are evaluated.

(2) In the case of grains which are harvested for animal feed, sample collection and evaluation should more properly be deferred until harvesting, thereby automatically correcting the evaluation to account for weathering and for any decontamination which normally occurs during the harvesting process.

(3) In the case of fruits, vegetables, and grains that are harvested for human consumption, any evaluation should more properly be performed at a later stage, after the item has been processed.

(4) In the case of nuts, all of which have a protective outer shell which is removed prior to consumption contaminants present in the meat will almost exclusively be the result of plant uptake through the root system. Evaluation of this phenomenon must be delayed until after such uptake has occurred.

(5) In all cases, barring some urgent need to do otherwise, sampling and evaluation should only be performed at the stage of growth where grazing or harvesting would normally occur.

c. Because the intent in evaluating the sample is to determine the quantity of radionuclides that would be ingested during plant consumption, the size of the area from which vegetation samples are collected is of little significance. Assessments will be based on the quantity of contaminants per unit weight or volume of vegetation.

3. Equipment

a. For collecting grass samples, or samples of other plants that can be cut with grass clippers, the following equipment will be required.

(1) disposable gloves and shoe covers;

(2) grass clippers;

(3) one (two gallon) zip-lock plastic bag;

(4) one (one gallon) zip-lock plastic bag;

(5) adhesive sample label;

(6) pen;

(7) sample sealing tape;

(8) Form EP-6, Radionuclide Analysis Report; and

(9) Site Area map.

b. For collecting hay samples, wire cutters may also be required.

c. For collecting grain samples, a knife may be required for cutting the seed head from the plant.

d. In instances where a ladder would be required for obtaining samples of fruits or nuts, sample collection activities should be coordinated with the producer, or with the County Agricultural Extension Agent.

4. Collection

a. Unless otherwise specified, each sample should consist of a one-gallon zip-lock bag of vegetation. Place vegetation inside bag gently as to prevent loss/scattering of contamination. Excess air should be squeezed out of the bag before it is closed.

(1) The one-gallon zip-lock bag will contain the desired quantity if it is filled with tightly packed, cured hay or dry grass, or if it is filled with moderately packed green grass.

(2) For samples other than grass samples, specific instructions will be provided by the Operations Section Chief (Field Monitoring Team Leader) if a sample volume other than one gallon is desired.

b. For samples taken from pastures, fields, or orchards prior to harvest, the selection of vegetation to be included in a given sample should be based on the following considerations.

(1) If the sample is to represent vegetation that an animal would consume during grazing, the sample should include only plants that the animal would normally eat, and of those plants, should be limited to that portion of the plant normally consumed by the animal.

(2) If the sample is to consist of items for human consumption, include only the part of the plant which is normally eaten, plus any husks, shucks, rinds, pods, peelings, skins, hulls, or shells not routinely removed prior to retail marketing.

(3) If the sample is to represent nuts or grain that would be harvested for human or animal consumption, include the hulls, shells, or seed heads.

(4) If the sample is to represent plants that would be harvested as hay or ensilage, include the entire above-ground portion of the plant.

c. Seal zip lock bag with one inch sealing tape.

d. Enter required data on the adhesive sample label, peel off the backing paper and attach the label on the side of the bag.

e. Fill out a set of form EP-6 and place it, and the bag containing the sample inside a second sample collection bag.

Note: Since each change in sample custody must be noted on form EP-6, the outer bag should be closed, but should not be sealed in any way that would prevent access to that form.

f. Mark the sampling location on the Site Area map and/or in the GPS unit.

g. Enter requested data on a copy of form CI-18 for this location and note sample collection activity on form CI-13, Response and Recovery Activities Record Sheet.

h. Wash grass clippers (or other collection tools) with clean water before using them to collect another sample. Monitor for contamination.

i. Store any gloves and/or shoe covers in a plastic bag until they can be properly disposed of.

5. Evaluation

a. Field Monitoring Teams will not perform field evaluations of vegetation samples collected during response to accidents involving airborne alpha releases.

b. All vegetation samples collected shall be forwarded to the Sample Preparation and Coordination team for routing to a laboratory facility for evaluation.

c. Chain of sample custody shall be certified by each person, including couriers, having temporary or ultimate custody of a specific sample. (When necessary, a second set of form EP-6 shall be used to continue Chain of Custody certification. Such second set, and any additional sets shall bear in the "notes" space on the left of the form the statement "Chain of Custody continuation for sample number ___.")

D. Water Samples

1. Purpose

Water samples are collected for the purpose of estimating ingestion exposure pathway hazards from an airborne release of radioactive materials.

2. Discussion

a. Contaminants deposited in water are significant because they could potentially affect persons in any of the following ways:

(1) Direct ingestion of contaminated drinking water or water used in food preparation.

(2) Contamination resulting from washing, bathing or swimming in contaminated water.

(3) Ingestion of milk or other products from animals whose water supply was contaminated.

(4) Ingestion of foods grown on plants that were irrigated from contaminated water supplies.

(5) Ingestion of fish or other marine products harvested from contaminated bodies of water.

b. In almost any conceivable event involving an airborne release of radioactive materials, water contamination will be negligible, but the possibility of significant contamination cannot be completely ignored. Some degree of water sample collection and analysis will be required in response to almost every incident involving an airborne release of radioactive materials.

(1) Public concern will almost certainly demand that public water supplies be sampled.

(2) Food producers and/or harvesters may require assurance that products grown or processed using area water supplies will be marketable.

(3) RCP's responsibility for protecting the public health and safety will not permit ignoring the potential of exposure through this medium.

c. Contaminants may not appear in water supplies until long after deposition has terminated.

(1) Contaminants in surface water supplies may result from run-off that has washed adjacent land areas and vegetation.

(2) Contaminants in ground water supplies may take years to appear because of the extremely slow movement of water through some aquifers.

3. Equipment

a. The following equipment will be required for collection of water samples:

(1) disposable gloves and shoe covers;

(2) one-gallon cubitainer with cap and transport box;

(3) sample sealing tape;

(4) two adhesive sample labels;

(5) pen;

(6) Form EP-6, Radionuclide Analysis Report;

(7) Site Area map;

(8) paper towels; and

(9) bucket or dipper.

Note: A clean soil sample container will serve as an improvised dipper if no other bucket or dipper is readily available.

4. Collection

a. Unless modifying instructions are issued at the time of the event, sites for collection of water samples should be selected on the basis of the following guidelines.

(1) To sample drinking water, samples from municipal water supplies should be collected after the water has passed through the treatment plant; either from a tap at the plant, or from a tap supplying potable water at some point in the distribution system.

(2) Samples from private wells should be collected from a tap inside the residence, or from the tap, which is nearest to the point where water from that well would be used. This practice will ensure that the sample is representative of the actual water used, including the effects of any treatment such as water softening or demineralization normally occurring between the well and the tap in question.

(3) If the purpose in sampling is also to determine whether the supply itself is contaminated, a second sample of raw water should be collected upstream of any municipal or private treatment mechanism.

(4) Samples of untreated surface water should be collected from bodies of standing water unless a sample from a flowing stream is specifically desired.

(5) The Sample Preparation and Coordination Team will perform any necessary filtration and/or acidification of samples, and appropriate notation of such on form EP-6.

b. Cubitainers should be capped prior to entry into the affected area, and should remain capped at all times except while they are being filled.

c. Always rinse the cubitainer immediately before use. Water from the source intended to be sampled should be used to rinse the cubitainer. Rinse the cubitainer by filling it approximately half full, shaking it to wash all inside surfaces, and emptying it before filling it with the sample intended for analyses.

d. Each water sample should consist of one gallon of water.

e. When collecting a water sample from an outside tap, or from any other tap where contamination may have been deposited on the tap itself, the outside of the tap should be rinsed and water allowed to run from the tap for a few seconds before a sample is collected.

f. Surface water samples should be collected by pouring the sample into the cubitainer from a bucket or dipper. Rinse the bucket or dipper with the water to be sampled prior to use.

g. When collecting samples from shallow sources, care must be exercised to avoid stirring up silt, which would adulterate the sample.

h. After filling, dry the cubitainer if necessary, cap tightly and seal by running a piece of sample sealing tape across the top of the cap with the ends of the tape extending down at least one inch (1") onto the cubitainer on each side of the cap.

i. Enter required data on two copies of the adhesive sample label and one set of form EP-6, Radionuclide Analysis Report.

j. Assemble the cubitainer transport box.

k. Peel off label backing papers and attach one copy of the label to the front of the cubitainer and one copy to the side of the cubitainer transport box opposite the carrying slot.

l. Place the cubitainer in the cubitainer transport box.

m. Mark the sampling location on the Site Area map and/or in the GPS unit.

n. Enter requested data on a copy of form CI-18 for this location and note sample collection activity on form CI-13, Response and Recovery Activities Record Sheet.

o. Wash any buckets, dippers or funnels in clean water before using them to collect another sample. After allowing the utensils to air dry, survey them for the presence of residual contamination. Bag the utensils to prevent contamination prior to use.

p. Store any gloves and/or shoe covers in a plastic bag until they can be properly disposed of; either as low-level radioactive waste if necessary, or as ordinary garbage. Gloves and/or shoe covers should never be reused.

q. Store any used paper towels in the bag with the discarded gloves and/or shoe covers.

5. Evaluation

a. Field Monitoring Teams will not perform field evaluations of water samples collected during response to accidents involving airborne alpha releases.

b. All water samples and Radionuclide Analysis Report forms shall be forwarded to the Sample Preparation and Coordination Team for routing to a laboratory facility for evaluation.

c. Chain of sample custody shall be certified by each person including couriers, having temporary or ultimate custody of a specific sample. (When necessary, a second set of form EP-6 shall be used to continue Chain of Custody certification. Such second set, and any additional sets shall bear in the "notes" space on the left of the form the statement "Chain of Custody continuation for sample number___.")

E. Milk samples

1. Purpose

Milk samples are collected and evaluated for the purpose of quantifying exposure hazards resulting from ingestion of milk produced in areas affected by the airborne release of radionuclides.

2. Discussion

a. Contaminants incorporated in milk are significant because milk and dairy products constitute one of the basic food groups that are considered to be an essential part of the human diet.

b. Nuclides in milk, which mimic calcium transport and deposition in the body, may be incorporated in bone tissue; presenting very long term potential for internal exposure.

c. Collection of milk samples shall always be performed in the presence of, or at least with the knowledge and permission of, the dairy operator.

d. Milk samples will normally be collected RCP personnel accompanied by Sanitarians from the Division of Milk and Dairy Products.

e. This procedure addresses only the collection of raw milk samples. If samples of pasteurized milk or other dairy products are required, they would be collected in the containers in which they are marketed; or by Sanitarians in accordance with the procedures of that division.

3. Equipment

a. The following Field monitoring Team equipment and supplies will be required for collection of raw milk samples:

(1) disposable gloves and shoe covers;

(2) one-gallon container with cap and transport box;

(3) sample sealing tape;

(4) two adhesive sample labels;

(5) pen;

(6) Form EP-6, Radionuclide Analysis Report; and

(7) Site Area map.

b. The following equipment and supplies will also be required. Since they are not part of the Field Monitoring Team's routine inventory, these items are to be provided by the Division of Milk and Dairy Products Sanitarian, or obtained through Logistics Support from that division whenever collection of milk samples is to be undertaken without an accompanying Sanitarian:

(1) seamless, stainless steel dipper;

(2) chlorine test strip;

(3) one-gallon of DI or uncontaminated water

(4) one-gallon empty plastic jug with split neck and opening cut in top for dipper;

(5) funnel;

(6) 100 ml concentrated chlorine liquid; and

(7) map showing dairy locations in the affected area.

Note: Since almost every dairy will have chlorine available, this 100 ml supply is essentially a spare to prevent an additional trip in the unlikely event that a dairy is temporarily out of chlorine or refuses to provide any.

c. A supply of clean water will also be required for sanitizing the dipper prior to use.

d. Any addition of formaldehyde or other preservatives, and appropriate notation of such on form EP-6 will be performed by the Sample Preparation and Coordination Team.

4. Collection

   a. Turn on the bulk tank agitator and allow it to stir milk for at least five minutes.

   b. While the agitator is running, sterilize the dipper in a solution of at least 100ppm hypochlorite solution.

      (1) While strength will vary based on strength of chlorine available, 100 ml of chlorine per gallon of water will provide at least the required strength solution.

      (2) Solution strength can be tested with the chlorine test strip, following instructions accompanying the strip.

      (3) The dipper must be submersed in the sterilizing solution beyond the depth that will enter the milk.

      (4) The dipper must be submersed in the sterilizing solution for a minimum of 30 seconds.

   c. Dip milk from opening in the top of the bulk tank and pour through funnel into cubitainer.

   d. Tightly cap cubitainer and seal by running a piece of sample sealing tape across the top of the cap with the ends of the tape extending down at least one inch (1") onto the cubitainer on each side of the cap.

   e. Turn off bulk tank agitator.

   f. Enter required data on two copies of the adhesive sample label and one set of form EP-6, Radionuclide Analysis Report.

   g. Assemble the cubitainer transport box.

   h. Peel off label backing papers and attach one copy of the label to the side of the cubitainer and one copy to the side of the cubitainer transport box opposite the carrying slot.

   i. Place the cubitainer and Form EP-6 in the transport box and close box cover.

j. Mark the sampling location on the Sample Area map and/or in the GPS unit.

k. Enter requested data on a copy of form EP-6 for this location and note sample collection activity on form CI-13.

l. Discard the used chlorine solution and wash the dipper, funnel, and plastic jug in clean water. After allowing the utensils to air dry, survey them for the presence of residual contamination. Bag utensils to prevent contamination prior to use.

m. Store any gloves and/or shoe covers in a plastic bag until they can be properly disposed of; either as low-level radioactive waste, if necessary, or as ordinary garbage. Gloves and/or shoe covers should never be reused.

5. Evaluation

a. Field Monitoring Teams will not perform field evaluations of milk samples collected during response to accidents involving airborne alpha releases.

b. All milk samples and Radionuclide Analysis Report forms shall be forwarded to the Sample Preparation and Coordination Team for routing to a laboratory facility for evaluation.

c. Each person, including couriers, having temporary or ultimate custody of a specific sample, shall certify chain of sample custody. (When necessary, a second set of form EP-6 shall be used to continue Chain of Custody certification. Such second set, and any additional sets shall bear in the "notes" space on the left of the form the statement "Chain of Custody continuation for sample number ___.")

XIII. Reporting Data

A. Reports from the field

1. Report each significant change in status; e.g.,

a. report the time, location and reading for any measurement which are two times normal background read or greater;

b. departure en route to next location (identify destination);

c. arrival at designated location;

d. sample collected (or completion of any assigned task);

e. inability to collect a sample (or to complete any assigned task);

f. any planned action in which will result in loss of radio contact for more than 15 minutes;

g. resumption of radio contact following "f", above;

h. termination of radio contact at end of day; and

i. other reports specifically requested by the Operations Section Chief (Field Monitoring Team Leader).

2. Report type of instrument and readings in the units in which they are measured.

B. Document submission at end of duty

At the end of each day or other tour of duty, forward all written documentation prepared that day to the Operations Section Chief (Field Monitoring Team Leader). This documentation should include copies of forms CI-13, and CI-18, as well as any Site Area maps on which sampling or monitoring locations have been marked.

Note: Emergency Worker Radiation Exposure Records and Radionuclide Analysis Reports are not covered by this instruction. Specific instructions for submission of those documents are provided elsewhere in this and other procedures.

XIV. Contamination Control

A. During field monitoring activities, personnel exposure can be reduced by effective use of the protection provided by the team vehicle.

1. While inside the plume, or in areas where re-suspension could be a factor, keep the vehicle closed as much as possible. Keep windows closed at all times and use only air conditioner or heater setting, which re-circulates inside air.

2. Upon exiting the plume, weather permitting, open vehicle windows for at least a few minutes to purge any contaminated air that may have been trapped in the vehicle.

B. Periodically, during the performance of plume monitoring and sampling activities, each Field Monitoring Team shall monitor itself, its vehicle, and its equipment for possible contamination.

1. Each time a team member gets out of the vehicle in an area affected by the release, at least his or her hands and shoe soles shall be monitored before he or she reenters the vehicle. If contaminated, remove items before entering vehicle to keep contamination inside vehicle as low as possible.

Note: As a special purpose definition to be used in this context only, "area affected by the release" is defined as "any location where exposure rate or counts per minute readings are twice background."

2. Sample collecting tools and equipment shall be monitored after each use.

3. Instruments and probes shall be monitored each time they come in contact with a suspected contaminated surface. Probes shall also be monitored at any time persistent high readings are noted that are not readily attributable to another source.

4. Except when merely driving out of the affected area in order to reenter it at another nearby point, team members shall monitor themselves, their vehicle, and equipment each time they exit the affected area.

C. At the end of each shift or other duty period, each Field Monitoring Team, its vehicle, instruments, probes, and equipment shall be monitored by a Contamination Control Team or by other RCP personnel at an alternate location specified by the Field Monitoring Team Leader.

Note: While they are the responsibility of the persons performing exit monitoring, the following actions are of significance to the Field Monitoring Team members. For your own protection, ensure that each of these steps is completed by the person(s) performing this survey.

1. Enter personal dosimetry "Reading at Exit" and "Indicated Dose" on the individual's Emergency Worker Radiation Exposure Record form. Route copies of this form as indicated on the document.

2. Return dosimetry to the individual.

3. Perform, or supervise performance of such decontamination as may be required before individual can leave the area. Repeat survey and decontamination process as appropriate; subject to limitations imposed by decontamination capabilities available at the monitoring location.

4. Inform the individual of any remaining contamination and of any additional decontamination actions which should be performed by the individual at his or her place of lodging or other appropriate location.

5. Collect any used gloves, shoe covers, respirator cartridges, and other potentially contaminated waste for appropriate disposal.

D. Decontamination of Field Monitoring Team personnel, vehicles, and equipment shall be performed in accordance with RCP procedures and as directed by the Contamination Control Team or Operations Section Chief (Field Monitoring Team Leader).

FIELD MONITORING TEAM EQUIPMENT AND SUPPLIES

In addition to personnel dosimetry and such other equipment and supplies as are required by other applicable procedures, each Field Monitoring team shall have the following items in their possession prior to commencing field operations.

Team members are responsible for conducting an inventory of the following supplies including the field team box prior to deploying in the field.

1	E-600 Survey Kit containing: • E-600 survey meter with batteries • SHP-380AB scintillation probe • SHP-270 Geiger-Mueller probe • PG-2 Low Energy probe • SHP-360 Pancake probe • 2 cables, flat head screwdriver, and check sources
1	RADeCO/SAI low volume air sampler and sampling head (filter holder)
1	GPS Unit
1	Power Inverter
1	Package of air filter discs and backing pads
25	adhesive sample labels
25	1" wipes
25	Plastic petri dishes
12	Soil sample containers (16 oz. plastic tubs) with lids
12	One gallon container with caps and transport boxes
1	Roll of sample sealing tape
1	Roll of 1" masking tape
1	Pair of tweezers
1	Pair of grass clippers
1	Trowel
1	12" ruler
1	Flashlight with batteries
4	AAA Batteries
3	C Batteries
1	Site Area map
1	Pen
1	Gallon of water

Logistics Support will issue the following items to each two-person team at the staging area:

1	Roll of sample sealing tape
36	Zip-lock plastic bags (two gallon capacity)
24	Zip-lock plastic bags (one gallon capacity)
36	Zip-lock plastic bags (one pint capacity)
1	Pad of pre-printed adhesive sample labels
1	Roll or package of paper towels
1	Box of disposable gloves (or at least 50 gloves)
2	Each, pair of appropriate sized protective coveralls
30	Pair of tyvek disposable shoe covers
12	Copies of EP-6, Radionuclide Analysis Report
10	Copies of form CI-13, Response and Recovery Activity Record Sheet
10	Copies of form CI-18, Alpha Monitoring Data Sheet
6	Extra C cell flashlight batteries for survey meters (6 per meter)
1	Full face air purifying respirator (if directed by the Incident Commander)

SPECIAL RESPONSE ITEMS

The following items will be issued by Logistics Support when necessary to meet specific conditions or to perform special tasks:

1	Seamless, stainless steel dipper
5	Chlorine test strips
1	Funnel
1	Vial containing 100 ml of concentrated chlorine liquid
1	One-gallon empty plastic jug with split neck and with opening cut in top to allow insertion of dipper
1	Set of maps showing locations of dairies in the affected area

TEXAS DEPARTMENT OF STATE HEALTH SERVICES
RADIATION CONTROL PROGRAM
RADIONUCLIDE ANALYSIS REPORT

Handling Instructions _____

_____

Authorized By _____

Sample Type:
☐ Soil ☐ Vegetation ☐ Milk

☐ Air (Sample volume: _____ FT^3) ☐ Water ☐ Wipe

☐ Other _____

Container reading on contact (mR/hr): _____

Sampling Location Exposure Rate 1 meter above ground:

Window open _____mR/hr Window closed _____mR/hr

Sampling location _____

Licensee/Facility_____

I certify this sample was collected by me at

____:____.m. on ____/____/____ and remained in my

custody until I transferred to _____

at ____:____.m. on ____/____/____.

Signed_____

I certify that this sample was continuously in my custody from the time of receipt listed above until transferred to:

_____

at ____:____.m. on ____/____/____.

Signed_____

I certify that this sample was continuously in my custody from the time of receipt listed above until transferred to:

_____

at ____:____.m. on ____/____/____.

Signed_____

I certify that this sample was continuously in my custody from the time of receipt listed above until transferred to:

_____

at ____:____.m. on ____/____/____.

Signed_____

FOR USE BY THE LABORATORY ONLY

Laboratory Sample Number: _____

Condition of Seals:
☐Satisfactory ☐ (Specify) _____

Wet (as received) Weight _____

Notes _____

I certify this sample was continuously in my custody from the time of receipt until the completion of laboratory analysis on ____/____/____.

Signed: _____

Am-241	____	_____	±	_____	uCi/_____
Ba-140	____	_____	±	_____	uCi/_____
Ce-144	____	_____	±	_____	uCi/_____
Co-58	____	_____	±	_____	uCi/_____
Co-60	____	_____	±	_____	uCi/_____
Cs-134	____	_____	±	_____	uCi/_____
Cs-137	____	_____	±	_____	uCi/_____
Cs-138	____	_____	±	_____	uCi/_____
Fe-59	____	_____	±	_____	uCi/_____
I-131	____	_____	±	_____	uCi/_____
I-132	____	_____	±	_____	uCi/_____
I-133	____	_____	±	_____	uCi/_____
I-134	____	_____	±	_____	uCi/_____
I-135	____	_____	±	_____	uCi/_____
K-40	____	_____	±	_____	uCi/_____
Kr-85	____	_____	±	_____	uCi/_____
Kr-85m	____	_____	±	_____	uCi/_____
Kr-87	____	_____	±	_____	uCi/_____
Kr-88	____	_____	±	_____	uCi/_____
Na-22	____	_____	±	_____	uCi/_____
La-140	____	_____	±	_____	uCi/_____
Mn-54	____	_____	±	_____	uCi/_____
Nb-95	____	_____	±	_____	uCi/_____
Rb-88	____	_____	±	_____	uCi/_____
Ru-106	____	_____	±	_____	uCi/_____
Te-132	____	_____	±	_____	uCi/_____
Xe-133	____	_____	±	_____	uCi/_____
Xe-133m	____	_____	±	_____	uCi/_____
Xe-135	____	_____	±	_____	uCi/_____
Xe-135m	____	_____	±	_____	uCi/_____
Xe-138	____	_____	±	_____	uCi/_____
Zn-65	____	_____	±	_____	uCi/_____
Zr-95	____	_____	±	_____	uCi/_____

ALPHA COUNT

Gross Alpha _____±_____ uCi/_____

BETA COUNT

Gross Beta _____±_____ uCi/_____

Results reported at ____:____ __.m. on ____/____/____

TEXAS DEPARTMENT OF STATE HEALTH SERVICES

RADIATION CONTROL PROGRAM

ALPHA RADIOLOGICAL MONITORING DATA RECORD SHEET

Complete all applicable sections of this form at the beginning of each shift and at any time when changes are required due to change of equipment or relief of team members.

Submit all completed copies of this form to the Operations Section Chief (Field Monitoring Team Leader) at the end of this shift.

Team: _____ Date: _____ Time: _____ Page ___ of ___

Team Data

	(RCP Member)	(RCP Member)
Team Member's Name:	_____	_____
Eberline E-600 Serial #s:	_____	_____
SHP-270 Probe Serial #:	_____	background _____ ur/hr (OW)
Date Last Calibrated:	_____	
SHP-380AB Probe Serial #:	_____	background _____ cpm (alpha)
Date Last Calibrated:	_____	background _____ cpm (beta)
SHP-360 Probe Serial #:	_____	background _____ cpm
Date Last Calibrated:	_____	
PG-2 Probe Serial #:	_____	background _____ cpm
Date Last Calibrated:	_____	
Air Sampler Serial #:	_____	Date Last Calibrated: _____

Notes:

CI-15A (8/06)

TEXAS DEPARTMENT OF STATE HEALTH SERVICES
RADIATION CONTROL PROGRAM

ALPHA MONITORING DATA SHEET

Date: _____ Time: _____ Page _____ of _____

Team No._____

Team Members (1)_____ & (2)_____

Instrument Model _____ Serial No._____

Instrument Model _____ Serial No._____

GPS Model No. _____ Serial No. _____

In each location where a measurement is made, enter data on this form. All probe readings may not be required at each location. Use additional pages if necessary. Forward this form to the Operations Section Chief (Field Monitoring Team Leader) at the end of this shift.

TIME 24 HR CLOCK	GPS POSITION	MONITORING POINT DESCRIPTION	PG-2 CPM READING	SHP-360 PANCAKE CPM READING	SHP-270 (OW) UR/HR OR MR/HR READING	SHP-380AB ALPHA/BETA CPM READING
Example 1815	N 32.12345 W097.12345	Corner of Line and 5th St for Contamination Search	1500 cpm PHA	120 cpm	25 ur/hr	20 cpm Alpha 120 cpm Beta

CI-18

TEXAS DEPARTMENT OF STATE HEALTH SERVICES
RADIATION CONTROL PROGRAM
RESPONSE AND RECOVERY ACTIVITIES RECORD SHEET

Name: _____ Date: _____

Entered by (Initials): _____ Page _____of _____

Time	Summary of Activity Performed

RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

Comanche Peak, Units 3 and 4

Luminant Generation Company LLC

Docket Nos. 52-034 and 52-035

SRP SECTION: PART 5 – Emergency Preparedness Plan

APPLICATION SECTION:

DATE OF RAI ISSUE: 04/10/2009

QUESTION NO.: CP-019

Subject: Emergency Facilities and Equipment
Basis: NUREG 0654, H.4
SRP Acceptance Criterion: Requirement H

State of Texas Emergency Management Plan: Provide information in the plan that addresses the criterion for declaring a facility operational and procedures for activation and staffing facilities.

ANSWER:

As referenced in CP-015, Final approved version of the "**State of Texas Emergency Management Plan**" **Annex D**: Radiological Emergency Management, **Tab 1**: Fixed Nuclear Facility Accident Response, **Chapter 1**: Comanche Peak Nuclear Power Plant (Approved 061909) is attached to the response for RAI CP-015.

In addition, the NUREG 0654 Crosswalk has been updated to reflect the cross-references for implementation of the H.3 criteria in the state, site and county plans and is attached to the response to RAI CP-023.

Impact on R-COLA

See attachments to CP-015 for approved version of the State Plan and CP-023 for an update to the crosswalk

Attachments:

- **See Also – Attachment to RAI Response CP-015 for approved State Plan and RAI Response CP-023 for an update to the NUREG 0654 Crosswalk.**

RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

Comanche Peak, Units 3 and 4

Luminant Generation Company LLC

Docket Nos. 52-034 and 52-035

SRP SECTION: PART 5 – Emergency Preparedness Plan

APPLICATION SECTION:

DATE OF RAI ISSUE: 04/10/2009

QUESTION NO.: CP-022

Subject: Protective Response
Basis: NUREG 0654, J.2
SRP Acceptance Criterion: Requirement H

State of Texas Emergency Management Plan: Provide information or a reference to information in the plan that addresses arrangements with offsite organizations to assist with the evacuation of onsite personnel. Identify alternate routes for use in the event of an impediment to the identified evacuation routes.

ANSWER:

As referenced in CP-015, Final approved version of the "**State of Texas Emergency Management Plan**" **Annex D**: Radiological Emergency Management, **Tab 1**: Fixed Nuclear Facility Accident Response, **Chapter 1**: Comanche Peak Nuclear Power Plant (Approved 061909) is attached to the response for RAI CP-015.

In addition, the NUREG 0654 Crosswalk has been updated to reflect the cross-references for implementation of the H.3 criteria in the state, site and county plans and is attached to the response to CP-023.

The CPNPP 2008 Evacuation Time Estimates consider employee evacuation and impediments, such as, construction delays. Assistance to employees evacuating the site/EPZ may be obtained from Traffic/Access Control Points (T/ACPs) established by both the Hood and Somervell counties Sheriff's Departments.

Impact on R-COLA

See attachments to CP-015 for approved version of the State Plan and CP-023 for an update to the crosswalk.

Attachments:

- **NONE – See Attachment to RAI Response CP-015 for approved State Plan and RAI Response CP-023 for an update to the NUREG 0654 Crosswalk.**