H Accident Assessment

This section of the Plan describes the techniques, methods and procedures for the initial and long-term assessment of the declared emergency classification at the Station. At the first indication of abnormal conditions, initial assessments are performed. Necessary actions are then taken by the onsite plant staff to classify the emergency, mitigate the conditions, recommend offsite protective actions, and initiate the appropriate emergency response action. When notified that an abnormal condition exists, the Shift Supervisor is responsible for making the immediate assessments, classifying the event, and initiating notifications. Offsite protective action recommendations are included on the notification form in accordance with Emergency Response Procedure 0ERP01-ZV-IN02, Notifications to Offsite Agencies.

An initial protective action recommendation is included in the Emergency Response Procedure 0ERP01-ZV-SH01, Shift Supervisor, and 0ERP01-ZV-IN07, Offsite Protective Action Recommendations.

If the situation dictates, the Shift Supervisor may activate the Station's Emergency Response Organization. When activated, the Station Emergency Response Organization personnel perform accident assessment activities and the Emergency Director determines appropriate offsite protective action recommendations.

The long-term or continuing accident assessment is performed by the Station Emergency Response Organization. The Station Emergency Response Organization formulates recommended protective actions and implements long-term offsite monitoring (radiological data gathered from the plume exposure pathway is analyzed and communicated to the Station). Monitoring teams systematically monitor the onsite and offsite environs using the functional plant instrumentation and portable instruments, as necessary. Assessment continues for the duration of the event and Recovery. Federal, State, and County emergency organizations will be notified for assistance as required. The radiological assessment procedures used by the Station Emergency Response Organization include 0ERP01-ZV-IN06, Radiological Exposure Guidelines, 0ERP01-ZV-TP01, Offsite Dose Calculations, and 0ERP01-ZV-IN07, Offsite Protective Action Recommendations.

The criteria for Emergency Action Levels used to classify an emergency are incorporated in Emergency response procedures for Emergency Classification to assist the Shift Supervisor in recognizing and declaring the appropriate emergency classification. The instrumentation available to the Shift Supervisor to perform this assessment is described in the Final Safety Analysis Reports for the Station.

H.1 Assessment Resources

The following resources are available for detection/assessment of events:

H.1.1 Fire Detection Systems

The fire detection equipment, alarms, and suppression equipment are described in Section 9.5 and 9.A of the Station Final Safety Analysis Reports and in the Station Fire Hazard Analysis Report. In general, standpipe and hose systems, together with

portable extinguishers, are provided in all buildings throughout the Station, except the demineralizer building for Units 1 and 2. Additionally, the following systems are provided in selected areas to enhance the total fire protection and detection program:

- *Automatic wet pipe sprinkler system*
- *Manual pre-action dry pipe system*
- *Manual pre-action sprinklers*
- *Water spray deluge system*
- *Foam-water sprinklers*
- *Hydrants*
- *Halon system*
- *Carbon Dioxide system*

H.1.2 Seismic Monitoring

The seismic monitoring system is described in Section 3.7 of the Station Final Safety Analysis Reports. The seismic instrumentation is a triaxial time history accelererometer unit with programmable alarm, trigger, memory, recording and data retrieval capabilities and computer interface. The appropriate trigger condition will be selected to start data capture for later analysis. Settings for the instrument's pre-event memory and length of time that data is recorded will be selected so that the significant ground motion associated with the earthquake is recorded. The recorded information can be analyzed and displayed using software supplied with the machine. This software will display the measured response spectrum to be compared with the Operating Basis Earthquake (OBE) and Safe Shutdown Earthquake (SSE) response spectrum. The seismic instrumentation locations are identified in the Station's Final Safety Analysis Reports.

H.1.3 Plant Process Instrumentation

The plant process instrumentation consists of various pressure, temperature, and level indicators of the Reactor Protection System and the Engineered Safety Feature System.

Instruments which provide information to the Plant Operations Staff for monitoring conditions in the reactor, reactor coolant system, and containment, and specific instrumentation designations and ranges are listed in the Unit Technical Specifications. These instruments provide information necessary for the rapid assessment of emergency conditions within the Station.

Additionally, the instrumentation provides data in the Control Room, Technical Support Center and the Emergency Operations Facility via the Emergency Response Facilities Data Acquisition and Display System or Plant Information and Control System.

H.1.4 Liquid Radiation Monitor

A liquid radiation monitor is provided for gross failed fuel detection. The monitor obtains a continuous sample from the reactor coolant system and activates an alarm on the Radiation Monitoring System if a predetermined activity level is reached. The monitor is described in Section 11.0 of the Station Final Safety Analysis Reports.

H.1.5 Radiation Monitoring System

The Station has a system for monitoring radioactivity throughout the Station. This system is called the Radiation Monitoring System and consists of area and process/effluent radiological monitoring instrumentation. More information on the Radiation Monitoring System can be found in Section J of this Plan and is described in detail in Section 12.3 of the Station Final Safety Analysis Reports.

H.1.6 Meteorological System

The Station has two permanent meteorological towers near site for the analysis of current Station area meteorological data. The primary tower is a 60-meter (196.9 feet) tower, instrumentation, and computerized data output. The primary tower instrumentation includes sensors to measure wind direction, wind speed, air temperature, dew point, solar radiation, precipitation, and calculated differential temperatures between elevations. Data from the primary tower is relayed to the Station. This data is displayed by the Integrated Computer System (ICS/ERFDADS/PICS) and the Control Room meteorological instruments Table H-1 provides details on instrumentation and elevations of primary meteorological instrumentation.

The backup system consists of a 10-meter (32.8 feet) tower with similar but fewer instruments to measure air temperature, wind speed, and wind direction.

Data from either tower can be fed by independent digital processors to the Control Rooms, Technical Support Centers, Emergency Operations Facility, the Nuclear Regulatory Commission and State and County offices through direct dial modem communications.

Weather forecasts are available from the National Weather Service by telephone. The Station has the option of using contracted commercial weather service or the National Weather Service.

H.1.7 Plant Liquid Systems

Analyses of plant liquid systems may be performed to help ascertain the nature of problems detected by other instrumentation (prior to an emergency). The samples will be collected and analyzed in accordance with Station Chemistry and Radiochemistry procedures.

H.1.8 Gaseous Effluent Radiation Monitoring System

The Gaseous Effluent Radiation Monitoring System is based on the Radiation Monitoring System multiple channel analysis. Each channel consists of a sampling

mechanism, one, two, or three chambers for particulate, iodine, and/or noble gas collection and detection, associated with auxiliary equipment and a local microprocessor. The system is capable of monitoring particulate activity and iodine and noble gas concentrations, in accident and normal ranges. Location of detectors for the process/effluent Radiation Monitoring System is provided in table form in Section 11.5 of the Station Final Safety Analysis Reports.

H.2 Objectives of Onsite and Offsite Monitoring

The primary objective of the Onsite and Offsite Emergency Response Teams is to rapidly survey areas in order to determine the extent and distribution of radioactive material following an incident. The initial onsite and offsite surveys are important in the decision process since the extent and type(s) of protective actions will be based upon data reported by the survey teams.

Data provided to the Radiological Director from the field monitoring teams shall be compared to information supplied to the dose projection and assessment area by any Department of State Health Services teams that may be dispatched into the area. Data collected before Texas Department of Health teams are in the field shall be provided to the Department of State Health Services by the Radiological Director as soon as possible.

The task of each Offsite Field Team is to collect air samples and survey data so as to transmit information and results to the appropriate response center (i.e., the Control Room, Technical Support Center, and Emergency Operations Facility). 0ERP01-ZV-TP02, Offsite Field Teams provide process and procedural requirements for Offsite Field Teams. Information obtained by the Offsite Field Team is transmitted to the Offsite Field Team Supervisor as appropriate to the phase of the response, via radio contact. After the initial urgency of the post-accident situation has relaxed, subsequent surveys will be performed to obtain more information.

The systems and equipment described in this section and the personnel resources described in Section B and C of this Plan allow for continuous monitoring and assessment of abnormal radiological conditions.

Within minutes of the declaration of an emergency, monitoring of the plant systems is established to assess potential releases or the extent of an actual release and to provide guidance for appropriate protective measures. This includes the capability to deploy an Offsite Field Team. Offsite Field Teams may be deployed after declaration of an Alert or higher emergency classification with an effluent monitor indication of a higher than normal release of radioactive materials or an unmonitored release. Field monitoring data and samples shall be collected and analyzed per normal Station Radiation Protection procedures and Radiological Environmental Monitoring procedures. Data from Federal, State, and County organizations are coordinated with the Station through their representatives at the Station Emergency Operations Facility with the Radiological Director.

The principal early concerns are thyroid dose commitment, due to inhalation of radioactive iodines, and exposure from immersion in a cloud of radioactive noble

gases. Criteria for taking protective actions such as evacuation are expressed in terms of these two variables. Following this, efforts will normally be directed toward the evaluation of possible long-term exposures from ground deposition and various food chain pathways. Monitoring will continue throughout the duration of the emergency classification to allow for offsite protective action recommendation escalation, recovery or termination (with concurrence of County, State, and NRC organizations) as dictated by environmental sampling results.

Offsite Field Teams may be deployed to take dose rate readings and iodine concentrations in accordance with 0ERP01-ZV-TP02, Offsite Field Team. The Radiological Director will provide direct input to the Emergency Director concerning the need to make protective action recommendations to offsite agencies.

Environmental radiological impact analysis is available using computerized dose assessment models or equivalent. This is more adequately detailed in Emergency Response Procedure 0ERP01-ZV-TP01, Offsite Dose Calculations.

Table H-1 Assessment Instrumentation
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Typical Onsite Assessment Equipment and Facilities

INSTRUMENT SYSTEM	DESCRIPTION & LOCATION	FUNCTIONAL APPLICABILITY
1. Meteorological Monitors		
Meteorological Wind Speed	Wind speed indicators located on primary (60m) and backup (10m) towers on northeastern portion of the site	Measures wind speed at 10m and 60m above ground level
Wind Direction	Wind direction indicators located on primary (60m) and backup (10m) towers on northeastern portion of the site	Measures wind direction at 10m and 60m above ground level
Temperature Differential	Temperature sensors located on primary (60m) tower and backup (10m) towers on northeastern portion of the site	Measures temperature at 10m and 60m above ground level for computation of differential temperature
Precipitation	Heated gage near ground level at the primary tower	Provides measurement of precipitation levels
Dewpoint	Sensed via a dewpoint probe dewpoint membrane (vapor window), dewpoint cell and a temperature probe sensor located at 3 meters on the Primary Meteorological Tower	Provides atmospheric dewpoint measurement for the site environs
Computer	Data acquisition computers at primary and back up towers tied to ICS/ERFDADS/PICS	Provides data link for meteorological information

Table H-1 Assessment Instrumentation
Page 2 of 4

Typical Onsite Assessment Equipment and Facilities

	INSTRUMENT SYSTEM	DESCRIPTION & LOCATION	FUNCTIONAL APPLICABILITY
2.	Seismic Monitor	A triaxial accelerometer unit with programmable alarm, trigger, memory, recording and data retrieval capabilities and computer interface	Record ground and peak orthogonal accelerations with respect to time
3.	Radiation Monitoring System		
	A. Area Radiation Monitoring System		
	B. Process/Effluent Radiation Monitoring System		
4.	Fire Protection System		
	A. Spot Thermal Detector		Detect fixed temperature or rate of temperature rise; activates an alarm
	B.Ionization Detector		Detect nonvisible smoke and combustible gases; activates
	C. Ultraviolet Flame Detector		Detect flame or spark; activates an alarm
	D. Photoelectric Detector		Detect visible smoke; activates an alarm

Table H-1 Assessment Instrumentation
Page 3 of 4

Typical Onsite Assessment Equipment and Facilities

INSTRUMENT SYSTEM	DESCRIPTION & LOCATION	FUNCTIONAL APPLICABILITY
E. Line Type Thermal Detector		Sufficient heat from source activates an alarm
F. Fire Protection System Display Unit 1 and 2 Main Control Room		A Cathode Ray Tube linked to the unit computers provides for appraisal of Fire Protection System incoming alarms and system actuation's in each Control Room
G. Fire Protection System Display Unit 3 and 4 Main Control Room		A video display Unit linked to the unit computer system provides for appraisal of Fire Protection System incoming alarms and system actuation's in each Control Room
5. Facilities		
A. Radiological Laboratory Equipment and Detectors	Chemical analysis count room of each unit	Equipped for radiological/ chemical analysis
B. Environmental Surveillance Program	Thermoluminescent dosimeter monitoring stations	Measures radiation dose
	Fixed air sampling stations outside security fence	Sample particulate and radioidines

Table H-1 Assessment Instrumentation
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Typical Onsite Assessment Equipment and Facilities

	INSTRUMENT SYSTEM	DESCRIPTION & LOCATION	FUNCTIONAL APPLICABILITY
6.	Seismic Monitoring	National Earthquake Information Center	Detect and quantify horizontal and vertical ground motion
	Meteorological	National Weather Service	Forecasting and routine weather observations
7.	Radiation Monitoring Ambient Levels (Station)	Permanent thermoluminescent dosimeter stations, both on and offsite	Estimation of background and integrated doses
	Airborne Monitoring (Station)	10 fixed air sampling stations located offsite	Monitor particulate and radioiodines in air
	Emergency Response Vehicle (ERF) [Department of State Health Services]	Portable radiation monitoring instruments	Emergency mobile lab with equipment for support of offsite field teams
	Department of State Health Services Mobil Laboratory	Multi-channel analyzer portable air sampler with silver zeolite cartridges in Staging Area	Emergency lab portable equipment for field assessment by field monitoring teams
8.	Radiological Laboratory	Onsite, each unit	Environmental monitoring sample analysis