

HOUSTON LIGHTING AND POWER COMPANY
SOUTH TEXAS PROJECT
ELECTRIC GENERATING STATION
PLANT PROCEDURES MANUAL

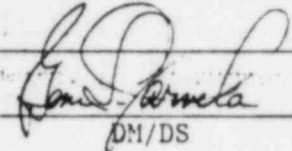
FOR INFORMATION ONLY

NON SAFETY-RELATED

Radiological Control-
Posting and Warning Devices

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APPROVED:


DM/DS

X/A
DATE APPROVED

3/21/84
DATE EFFECTIVE

This procedure is not described in the FSAR.
Field changes to this procedure must be approved by Radiological Services.

1.0 Purpose and Scope

- 1.1 This procedure provides instructions for posting radiologically controlled areas with devices such as warning rope, tape, signs, and stickers.
- 1.2 Area postings and access controls are required by federal and state regulations and are implemented as specified by HL&P policy. Posting and access control guide values are specified in the HL&P Health Physics Policy Manual and in Procedure PRP2-ZB-04 (Radioactive Contamination and Airborne Radioactivity Guides and Limits).

2.0 Definitions

- 2.1 AIRBORNE RADIOACTIVITY AREA: a) An area in which airborne materials exist in concentrations in excess of the limits of 10 CFR20, Appendix B, Table I, Column I, or b) An area where airborne materials exist in concentrations, which, if averaged over the number of hours in any week during which individuals are in the area, exceed 25 percent of the amounts specified in 10 CFR20, Appendix B, Table I, Column I.
- 2.2 HIGH RADIATION AREA: Any area, accessible to personnel, in which there exists radiation originating in whole or in part within licensed material at such levels that a major portion of the body could receive in any one hour a dose in excess of 100 millirem.
- 2.3 RADIATION AREA: Any area, accessible to personnel, in which there exists radiation, originating in whole or in part within licensed material, at such levels that a major portion of the body could receive in any one hour a dose in excess of 5 millirem, or in any 5 consecutive days a dose in excess of 100 millirem.

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- 2.4 CONTAMINATED AREA - An area where radioactive material is deposited where it is not desired.

3.0 Procedure

- 3.1 Radiation Protection surveys shall be used to identify the areas where posting and radiological controls are required.

NOTE: TEMPORARY AREA CONTROLS SHOULD BE ESTABLISHED WHEN RADIOLOGICAL HAZARDS ARE NOT PRESENT BUT THE POTENTIAL FOR RADIOLOGICAL HAZARDS EXISTS IN THE AREA.

- 3.2 Provisions should be made to attach signs securely and in a manner such that postings are clearly visible from all locations where access to the area is possible.
- 3.3 Postings should reflect existing radiological conditions and clearly indicate general area conditions and extremes that could be encountered. When a change in conditions is found which requires a change in controls or posting, it is the responsibility of the Radiological Protection representative who discovers or is advised of the change to ensure that postings and controls are updated.
- 3.4 If more than one type of radiological hazard exists, the posting should clearly indicate each hazard type.
- 3.5 All areas controlled for radiological safety reasons must be posted and, when necessary, barricaded using approved radiation warning devices.

NOTE: NON-RADIOLOGICAL WARNING DEVICES SHALL NOT BE USED TO SUBSTITUTE FOR THE PROPER YELLOW AND MAGENTA DEVICES. CONVERSELY, IT IS UNACCEPTABLE TO USE YELLOW AND MAGENTA DEVICES FOR PURPOSES OTHER THAN RADIOLOGICAL WARNING AND HAZARD CONTROL. AS A TEMPORARY MEASURE WHEN PROPER DEVICES ARE NOT AVAILABLE, THE CONTROLLED AREA WILL BE ATTENDED BY A RESPONSIBLE INDIVIDUAL.

- 3.6 General Instructions - to determine the extent of the area to be posted and establish special access controls.
- 3.6.1 Determine the extent of the area to be posted and boundary locations using the following considerations:
- 3.6.1.1 If the area to be controlled is a room with narrow entry points (such as a door, gate, wall opening, etc. or multiple thereof), the entire

area may be posted, if practical, by placing signs and access controls at the entrance(s) in such a manner that their visibility will not be obscured by routine use of the entrance.

- 3.6.1.2 If only a portion of the room is to be posted, the boundaries of the area should be clearly defined by a rope and stanchion barricade or using clearly visible radiological warning tape. A sufficient number of signs should be present to ensure identification of the purpose of the boundary from all possible approaches.
- 3.6.1.3 The size of the controlled area will often be chosen for convenience; however, the boundaries must be set such that areas outside the boundary perimeters do not exceed posting requirements.
- 3.6.1.4 If controls for more than one type of radiological hazard are required in an area (e.g., radioactive area, contaminated area and airborne radioactivity area), the entire area may be posted and controlled for all hazards, or special areas may be established within the major area if more convenient. Concentric areas are allowed if each area boundary is clearly delineated and postings indicate the reason for additional restrictions in that area. If boundaries between two areas intersect, postings should be set up to assure that the more limiting restrictions for each area will be applied.
- 3.6.1.5 Areas established to confine existing loose contamination should have clearly marked controlled access/egress locations with a step-off pad at each control point.

3.6.2 In an area where a major portion of the body could receive a dose rate greater than 5 mrem per hour or 100 mrem in the normal work week (40 hours), the area shall be posted with appropriate signs as a Radiation Area.

- 3.6.2.1 Determine the boundaries of an area where the 5 mr/hr limit is not exceeded, as per PRP4-ZS-02 (Radiation Survey Methods). In cases where an individual could be expected to be present in an area for 40 hours a week, determine where the 2.5 mrem/hr limit is not exceeded.

- 3.6.2.2 When the area is open, place radiation rope or radiation barrier tape at the boundary determined in Section 3.6.2.1. Place "Radiation Area" signs on the rope, with at least one sign per side.
- 3.6.2.3 When the area comprises a room that has a doorway(s), the doorway(s) shall be marked or roped off with radiation rope or tape and a sign. The "Radiation Area" sign should be placed on the door or on the barricade so that it is easily visible. The sign should include the radiation level at the boundary, the general radiation level in the area, and specific major levels, as appropriate.
- 3.6.2.4 For other areas insure that access to such an area requires the individual to physically pass over a boundary rope/tape exhibiting the required posting(s).
- 3.6.3 In an area where a major portion of the body could receive a dose rate greater than 100 mrem per hour the area shall be conspicuously posted as a "High Radiation Area."
 - 3.6.3.1 Determine the boundary of the area where the dose rate does not exceed 100 mrem/hr.
 - 3.6.3.2 When the area is open, place radiation rope (or radiation barrier tape) at the boundary as determined in step 3.6.3.1.
 - 3.6.3.3 Place appropriate signs on the rope in a sufficient number of places so that all individuals that will be entering the area are aware of the conditions that exist. The sign shall have a statement indicating what requirements must be met prior to entry.
 - 3.6.3.4 Post doorways as per Section 3.6.2.3, but use "High Radiation Area" signs.
 - 3.6.3.5 For other areas post signs as per Section 3.6.2.4, but use "High Radiation Area" signs.
 - 3.6.3.6 Post on each sign all entry requirements.
- 3.6.4 In areas where a major portion of the body could receive a dose rate greater than 1000 mrem per hour, the area shall be locked and posted as a "High Radiation Area" in

accordance with Section 3.6.3. When locking an area is not possible, an individual shall be assigned to control access to such an area on a continuous basis until the area is secured or the radiation level reduced below 1000 mrem/hr.

NOTE: LOCKS MUST NOT BE AFFIXED SO AS TO
PREVENT EGRESS FROM THAT AREA.

- 3.6.5 Areas where airborne radioactivity concentrations are in excess of limits listed in PRP2-ZB-04 (Radioactive Contamination and Airborne Radioactivity Guides and Limits) shall be posted as "Airborne Radioactivity Area", using the appropriate signs.
- 3.6.5.1 Establish the area or room that has airborne radioactivity concentrations in excess of limits by obtaining airborne radioactivity surveys of the area, as per PRP4-ZS-04 (Airborne Radioactive Material Survey Methods).
 - 3.6.5.2 Verify the boundary of the airborne radioactivity area by taking surveys in adjacent rooms/areas.
 - 3.6.5.3 Isolate the area, if required.
 - 3.6.5.4 Place the appropriate "Airborne Radioactivity Area" signs on the rope/tape. Also affix signs indicating special instructions, such as: "Respiratory Equipment Required," "RWP Required," etc.
 - 3.6.5.5 These signs must be placed in a sufficient number of places so that it is obvious to all personnel that the room or area contains airborne radioactivity.
- 3.6.6 Areas having loose surface contamination greater than levels specified in PRP2-ZB-04 (Radioactive Contamination and Airborne Radioactivity Guides and Limits) shall be posted as "Contamination Area" with appropriate signs.
- 3.6.6.1 Determine the loose contamination levels and boundary, as per PRP4-ZS-03 (Contamination Survey Methods).
 - 3.6.6.2 When the area is an open area, place radiation rope/tape around the contaminated section, ensuring the contaminated area is well within the boundary of the rope/tape barricade.

- 3.6.6.3 Place appropriate signs on the rope in a sufficient number of places so that all individuals entering the area are aware of the conditions that exist. The signs should have a statement indicating what requirements must be met prior to entry.
- 3.6.6.4 Ensure that step-off pads and containers for disposal of protective equipment are set up, if necessary.
- 3.6.7 Any building, room or area containing licensed radioactive material in amounts equal to or greater than quantities specified in Appendix C of 10 CFR, Part 20 shall be posted with appropriate signs as a "Radioactive Materials Area."
 - 3.6.7.1 The presence of radioactive material in excess quantities or limits shall be ascertained by Radiological Protection personnel.
 - 3.6.7.2 Place the sign(s) around or on the building, room, area, or container. The sign(s) shall include the Radiation symbol and the phrase "Caution, Radioactive Material."
- 3.6.8 Other signs, labels and stickers are available to aid in identifying the area, room or materials. They may be used as follows:
 - 3.6.8.1 These signs and labels shall not be used by themselves, unless they contain the radiation symbol. They shall be used in conjunction with the signs indicated in Section 3.6.2 through 3.6.7.
 - 3.6.8.2 Contamination signs or stickers shall be used on bags of waste to reflect that contamination is present in the bags.
 - 3.6.8.3 Radiation tape may be used to indicate a boundary along floors or walls.
 - 3.6.8.4 The "Hot Spot" sign is to be used to identify areas/materials where the radiation level is much higher than the surrounding area and is usually greater than 100 mrem/hr on contact. The "Hot Spot" sign is to be placed on contact with the area/material of concern and the contact reading is to be written on the sign.

- 3.6.8.5 A "Contaminated Clothing" sign shall be used to indicate that the clothing contained inside a bag, hamper or drum is contaminated.

3.7 Specification of Posting and Control Requirements

- 3.7.1 Postings and controls shall comply with the guidelines outlined in Addendum 1 of this procedure unless the following conditions are met:
- 3.7.1.1 Posting and controls not in compliance with Addendum 1 shall be specified on a case-by-case basis and shall have written approval of the Radiological Protection Supervisor or his designee.
 - 3.7.1.2 Personnel whose normal work activities are affected by the postings and controls are given an explanation of the deviation from normal control. The Lead Radiological Protection Technician should also notify appropriate supervision and make entries in the shift log.
 - 3.7.1.3 Postings and controls are in compliance with applicable state and federal regulations.
- 3.7.2 Entrances to specially posted and controlled areas should have at least one of the following:
- a) A posted annotated map or copy of the most recent survey of the area or,
 - b) The radiological control sign nearest the entrance should be dated to indicate the most recent survey, be initialed by Radiological Protection personnel, and have general area ranges for radiation and contamination levels listed.
- 3.7.3 If an area does not have a specific entrance or entrances, an adequate number of posted signs must list the hazard level range and be initialed and dated by a Radiological Protection representative. Information posted is to be based on latest survey results. Signs shall be posted such that individuals using possible approach routes should reasonably encounter a posted sign that contains the above information.
- 3.7.4 "Hot Spot" signs and stickers, when used, shall be firmly attached to the surface of the radiation source as near as practical to the location of maximum source strength.

4.0 References

- 4.1 Code of Federal Regulations, Title 10, Part 20, "Standards for Protection Against Radiation"
- 4.2 Texas Regulations for Control of Radiation, Part 21, "Standards for Protection Against Radiation"
- 4.3 PRP2-ZB-04 (Radioactive Contamination and Airborne Radioactivity Guides and Limits)
- 4.4 PRP4-ZS-02 (Radiation Survey Methods)
- 4.5 PRP4-ZS-03 (Contamination Survey Methods)
- 4.6 PRP4-ZS-04 (Airborne Radioactive Material Survey Methods)

5.0 Support Documents

- 5.1 Addendum 1 - Radiological Hazard Posting and Area Control Guidelines

ADDENDUM 1
RADIOLOGICAL HAZARD POSTING AND AREA CONTROL GUIDELINES

Hazard Designation	Range	Posting-Sign	Accessible Boundary Control Device(s) (Minimum)	Entrance Control(s) (Minimum)
Radiation Level	2.5-99 mrem/hr	Caution Radiation Area	Warning Tape ¹ or Warning Rope ¹	Plainly Visible Warning Sign(s)
	100-999 mrem/hr	High Radiation Area	Warning Rope ¹ (Double Rope Preferred)	Rope ² with Sign Across Entrance Causing Entering Personnel To Take Positive Action
	1000 mrem/hr or above	High Radiation Area (preferred) or Caution-High Radiation Area	Fencing or other Permanent Barrier Designed to Eliminate Accessibility at other than Designated Entry Points	Entry Point to be Locked or have Access Surveillance when Unlocked
	100mrem/hr	Hot Spot	No Additional Requirements	No Additional Requirements
Contamination (Loose or Removable)	100-999 d/m/100cm ²	Caution Contaminated Area	Warning Tape	Single Step Off Pad (SOP) or Instruction Sign to Change or Dispose of Shoe Covers
	1000-9999 d/m/100cm ²	Caution Contaminated Area	Warning Rope ¹	Sign and Single SOP
	10K-99K d/m/100cm ²	Caution Contamination Area	Warning Rope (Double Rope Preferred)	Sign and Single SOP
	100K d/m/100cm ² or above	Caution High Contamination	Warning Rope (Double Rope Preferred)	Sign and Double SOP

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ADDENDUM 1 (CONT.)
RADIOLOGICAL HAZARD POSTING AND AREA CONTROL GUIDELINES

Hazard Designation	Range	Posting-Sign	Accessible Boundary Control Device(s) (Minimum)	Entrance Control(s) (Minimum)
Airborne Radioactive Material	Equal to or Exceeding 25% of applicable 10CFR20 Appendix "B" values	Caution ³ Airborne Radioactivity Area	Warning Rope ¹	Rope with Sign Across Entrance Causing Entering Personnel to Take Some Positive Action
Storage of Non-Exempt Quantities of Source Material	Material Present Exceeds 10x Applicable 10CFR20 Appendix "C" Values	Caution ³ Radioactive Material	None-Sign and Label on Inner and Outer Container	Posted Sign at Room or Area Entrance
Use of Unsealed Radioactive Sources, Non-Exempt Quantities	Any Quantity of Radioactive Material	Caution Radioactive Material	Warning Tape, Rope or Stickers to Clearly Identify Scope of Work Area	Posted Sign at Room or Area Entrance

1. Warning Rope may also refer to non-adhesive flat plastic ribbon. Rope may be attached to available fixtures; attachment point should be approximately 30 to 48 inches from floor and placed at a distance from fixed ladders, open gratings, etc., so as not to create a safety hazard.
2. Rope must be placed so that person coming upon unguarded entrance cannot walk unimpeded into the area. Entrances which are positively controlled (e.g., reactor containment entrance) need not be roped off.
3. Optional sign wording must contain words: CAUTION, AIRBORNE RADIOACTIVITY, and/or RADIOACTIVE.