

NRC INSPECTION MANUAL

IIPB

TEMPORARY INSTRUCTION 2515/146

HYDROGEN STORAGE LOCATIONS

PROGRAM APPLICABILITY: Power Reactors Listed Below

2515/146-01 OBJECTIVE

01.01 To verify certain licensees are complying with applicable codes and commitments regarding hydrogen storage locations at nuclear power plants to ensure unrecognized risk-significant conditions do not exist. The plants in question either did not respond to or provided incomplete or indeterminate responses to a survey performed by Division of Licensing Project Management (DLPM). The plants are: 50-237, 50-244, 50-247, 50-249, 50-255, 50-261, 50-271, 50-275, 50-277, 50-278, 50-282, 50-286, 50-293, 50-305, 50-306, 50-313, 50-315, 50-316, 50-323, 50-327, 50-328, 50-338, 50-339, 50-346, 50-352, 50-353, 50-354, 50-368, 50-390, 50-458.

01.02 To verify that licensees are providing:

- a. Greater than 50 feet of separation between hydrogen storage and ventilation intakes.
- b. Greater than 50 feet distance between hydrogen storage and risk significant tanks or Structures, Systems, or Components (SSCs).

2515/146-02 BACKGROUND

A survey of all operating plants was performed in May 1999, by DLPM following a hydrogen fire at the James A. FitzPatrick nuclear power plant on January 14, 1999. The reason for the survey was to update information concerning hydrogen storage at nuclear power plants. One response from the survey indicated that one plant was not in compliance with its commitments with regard to having required spacing between ventilation intakes and bulk hydrogen storage based on National Fire Protection Association (NFPA) 50A, Standard for Gaseous Hydrogen Systems at Consumer Sites. Nine plants responded to the survey with information. From the information provided it was not possible to determine if code compliance and commitment compliance were achieved. A number of other plants failed to respond to this survey. Unrecognized risk significant conditions can exist from possible hydrogen intrusion into ventilation systems and from fire or explosion hazards to risk-significant equipment.

2515/146-03 INSPECTION REQUIREMENTS

During the routine baseline inspection using Fire Protection inspection procedure 71111.05 inspectors shall:

03.01 Confirm that distances between any hydrogen storage capacity and ventilation intakes are greater than 50 feet or are in accordance with licensee's commitments.

03.02 Confirm that distances between hydrogen storage and risk significant tanks and SSCs are greater than 50 feet or are in accordance with licensee's commitments.

2515/146-04 INSPECTION GUIDANCE

04.01 Most¹ licensees have committed to NFPA 50A, "Gaseous Hydrogen Systems," as part of their licensing basis. For pre-1979 plants this would have been through Appendix A to Branch Technical Position APCS 9.5-1 (Appendix A), and for post-1979 plants this would have been through the fire protection portions of NUREG-0800 CMEB 9.5-1 (NUREG-0800). Both Appendix A and NUREG-0800 contain statements relating to NFPA 50A. NFPA 50A requires 50 feet of separation between ventilation intakes and hydrogen storage. Such a lack of separation distance should be evaluated in the licensee's fire hazard analysis (FHA).

04.02 Appendix A, to which many pre-1979 plants have committed, includes a 50 foot separation criteria for spacing between combustibles and safety related tanks. Later plants (post-1979) are usually committed to NUREG-0800, which includes the statement, "Combustible materials should not be stored next to outdoor tanks." A distance of 50 ft. or greater would not be considered 'next to.' Distances less than 50 ft. should have an evaluation included in the plants fire hazards analysis (FHA). If the tanks identified are risk-significant, but not safety-related, any licensee commitments to Appendix A may not apply.

Some licensees may have less than 50 feet between hydrogen storage and risk significant or safety-related SSCs (other than tanks). Storage of hydrogen for both pre-1979 and post-1979 plants should be located such that a fire or explosion will not adversely affect any safety related SSCs (Appendix A, D.2(b), NUREG-0800, 5.d(1)(2)). Such storage of hydrogen should be evaluated in the station's fire hazards analysis.

2515/146-05 REPORTING REQUIREMENTS

05.01 This inspection should be performed as part of inspection procedure 71111.05. Inspection findings should be documented in routine inspection reports under 1RO5 of IMC 0612 (formerly 0610*) Fire Protection.

¹ Licensees are permitted to change such commitments, by performing evaluations, deviations, exemptions, etc. If a licensee does not have proper spacing they may have an evaluation. Any such evaluation should be reviewed.

05.02 Within 90 calendar days of the expiration of this temporary instruction (TI), each region shall send to the Office of Nuclear Reactor Regulation (NRR/DSSA), Chief of Fire Protection Engineering and Special Projects Section, a list of licensee names and docket numbers of all facilities that have been inspected by this TI and responses to the below requested information. The requested information may be formatted in a manner that is most effective and efficient from the standpoint of regional staff effort.

- a. Distance to ventilation intake from hydrogen storage, if less than 50 feet.
- b. Distance to safety related water tanks from hydrogen storage, if less than 50 feet.
- c. Distance to safety related or risk significant SSC's other than those from b., if less than 50 feet.
- d. If any of the above distances are less than 50, provide NRR any technical evaluation or justification which the licensee has developed justifying this deviation from NFPA codes or licensee's commitments.
- e. If the response to any of the above questions is greater than 50 feet, then the response may be "greater than 50 feet".

Upon receipt of all responses to this TI, NRR/DSSA will determine if any inspection findings were identified, and if so, their significance.

2515/146-06 COMPLETION SCHEDULE

No change in inspection scheduling will be required to use this TI except to perform these inspection requirements in conjunction with the conduct of IP 71111.05.

2515/146-07 EXPIRATION

This TI shall remain in effect until March 30, 2002.

2515/146-08 CONTACT

Questions about this TI should be addressed to D. Frumkin at 301-415-2280 or E-mail at DXF1@NRC.GOV. The 5.02 report should also be copied to D. Frumkin, M/S O-11A11, Washington, DC 20555-001.

2515/146-09 STATISTICAL DATA REPORTING

All direct inspection effort expended as a result of this TI should be charged against 2515/146.

2515/146-10 ORIGINATING ORGANIZATION INFORMATION

10.01 NRR/DSSA/SPLB initiated this TI.

10.02 The estimated average onsite inspection time necessary to complete this TI should be 2 hours. Actual inspections at a specific site may require more or less time, depending on the circumstances.

10.03 There is no specialized training that is required to perform the inspection requirements defined in this TI.

END