

NRC INSPECTION MANUAL

IIPB

TEMPORARY INSTRUCTION 2515/146, Revision 1

HYDROGEN STORAGE LOCATIONS

PROGRAM APPLICABILITY: Power Reactors Listed Below

2515/146-01 OBJECTIVE

01.01 To alert the users of this TI as a postscript, that specific information gathered resulting from this TI should be treated as Safeguards Information (SGI). See section.05 Reporting Requirements, and to update background information concerning hydrogen storage facilities.

01.02 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.

01.03 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. About 10% of the surveyed plants responded to the survey with information that was not sufficient to enable the NRC to determine if code compliance and commitment compliance was achieved. About 15% of the 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

¹Licensees 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.

05.01 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. Plant-specific information concerning the location and or capacity of hydrogen storage facilities should not be included in the inspection report, rather it should be treated as Safeguards Information (SGI) and transmitted separately (see 05.03 below).

Note: Any plant-specific information that inspectors have already developed, during implementation of TI 2515/146, should be treated as Safeguards Information. Questions regarding (1) threshold for SGI classification, (2) information that has already been made public, (3) information already transmitted to NRR, (4) results from TI 2515/146 that should be redacted or classified as SGI should be addressed to IRSB, A. Tardiff (301) 415-3814, A. Madison (301) 415-1490. or Doug Coe (301) 415-2040.

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".

05.03 A reasonable effort should be made to ensure that the specific locations of safety related or risk significant structures, systems, or components located within 50 feet of hydrogen storage facilities, the specific location of hydrogen onsite, or the specific quantity of hydrogen which, if released or ignited, would result in a vulnerability is not transmitted unless it is believed that this information will be useful in the NRR/DSSA evaluation. If the above information is necessary to be transmitted, it shall be subject to Safeguards Information (SGI) controls in accordance with management directive (MD) 12.6, "NRC Sensitive Unclassified Information Security Program". Contact Dan Frumkin DXF1@NRC.GOV (301) 415-2280 if assistance is required in determining if the information would be useful in the evaluation.

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 September 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