
INSPECTION PROCEDURE 88142

UNDERGROUND FIRE WATER LOOP AND EQUIPMENT INSTALLATION

PROGRAM APPLICABILITY: 2630

88142-01 INSPECTION OBJECTIVES

01.01 Ascertain whether field activities pertaining to the installation or modification of the fire loop piping are being accomplished in accordance with applicable codes, standards, and licensee commitments.

88142-02 INSPECTION REQUIREMENTS

02.01 Quality Assurance Program. For each onsite organization with quality assurance (QA) and/or quality control (QC) responsibilities, regarding the installation and testing of fire loop piping and associated items, refer to the applicable inspection requirements of Inspection Procedures (IPs) 88106 - 88110.

02.02 Review of Procedures. Conduct inspections to ascertain whether specifications, drawings, work instructions and IPs have been established that will assure the technical adequacy of the following activities pertaining to the outside fire loop. Ascertain whether these documents comply with licensee commitments.

- a. Procurement. Review the design and purchase specifications and drawings to assure that specific technical requirements and commitments contained in the Construction Authorization Request (CAR) and the Safety Evaluation Report (SER) have been translated into vendor purchase documents. Verify the following:
 1. Fire protection equipment associated with the fire-suppression systems specified in the CAR (as noted below) have been identified and specified in procurement documents:
 - (a) Water-based suppression systems (pre-action, wet-pipe, dry-pipe, water-spray, and deluge systems);
 - (b) Carbon-dioxide systems;
 - (c) Standpipe systems; and
 - (d) Portable fire extinguishers.
 2. Materials, such as pipes, pipe joints, mains, anchors, valves, and clamps

meet specifications.

3. Fire pump(s) and associated controls and wiring conform to National Fire Protection Association (NFPA) 20 standards.
 4. Appropriate design and fabrication codes and standards [NFPA; American Water Works Association (AWWA); American National Standards Institute; American Society for Mechanical Engineers] requirements been identified or specified in procurement documents.
 5. Critical dimensions are specified. (Size and location of water supplies, size and location of all piping, and the depth to which they are to be buried, etc.)
 6. Fire hydrants comply with NFPA or AWWA criteria.
- b. Receipt Inspection. Verify that receiving-inspection instructions require: (a) inspections for damage; (b) conformance to purchase specifications (including any special requirements); (c) proper identification and tagging; and (d) receipt of proper supplier/vendor documentation.
- c. Storage. Verify that site storage procedures provide for proper identification, handling, cleanliness preservation, protection from adverse weather, and other physical damage and QC.
- d. Installation. Verify that the fire suppression systems, as specified in Chapter 7 of the CAR have been properly installed and that installation work procedures provide adequate instructions for the following (if applicable):
1. Installation work is to be done by fully experienced responsible persons.
 2. There are procedural controls of rigging and handling activities, to prevent damage to pipes, fittings, valves, and other equipment.
 3. Proper locations of valves, hydrants, mains, etc., are clearly identified.
 4. Fire-pump installation complies with NFPA-20. Separation and protection are in accordance with CAR commitments and Regulatory Guide 3.16.
 5. Dimensional checks are specified for levelness, alignment, clearances, etc.
 6. Proper restraints are provided for all tees, plugs, caps, bends, and hydrant branches.
 7. Installation of hydrants is in compliance with NFPA 24.
 8. Proper backfill methods are specified.
 9. Water-tank installation is in accordance with NFPA 22 standards.

10. Proper flushing and hydrostatic testing of the fire-loop water piping are specified.

02.03 Observation of Work and Work Activities.

- a. Visually examine pipe, fittings, valves, and hydrants before -- installation. (Sample sizes: at least two lengths of pipe and one unit of each type component.) Plain ends shall be inspected with special attention, since these ends are most susceptible to damage. Verify that commitments in the CAR are being met in the following areas:
 1. Cleanliness;
 2. Configuration of loop and appurtenances, relative to drawings;
 3. Obvious defects, such as cracks and dents, are identified and evaluated for suitability for use; and
 4. There are provisions for proper identification of components.
- b. Observe work activities or completed work during the installation of the fire loop. (Sample sizes: observe at least 25 percent of installation work and visually examine at least 50 percent of the completed work before backfill.) Verify the following items:
 1. Components are installed with proper location and orientation.
 2. All specified anchors are in proper places.
 3. No apparent damage was done to fire-loop components during installation.
 4. Ongoing work is being performed in accordance with approved procedures.
 5. There is adequate QC inspection coverage.
- c. If possible, observe portions of construction-completion testing (hydrostatic testing and fire-pump performance testing). If testing cannot be observed, examine records of completed tests.

02.04 Review of Records. Verify that the following QA records indicate that applicable commitments have been met:

- a. Receiving inspection records. (Sample size: at least two);
- b. Shop fabrication records. (Sample size: at least two, if applicable);
- c. Installation records. (Sample size one each, if applicable);
 1. Leveling, alignment, clearances;

2. Anchoring installation;
 3. Backfill and soil composition;
 4. Cleanliness;
 5. Flushing;
 6. Hydrostatic test; and
 7. Fire pump full load operational and automatic starting tests.
- d. Nonconformance Reports, if any; and
 - e. QA Audits.

88142-03 INSPECTION GUIDANCE

03.01 Definition. A “Fire Loop” is a main water-piping loop for fire protection, usually feeding hydrants, standpipes, and other fire-protection systems and components. Fire loops are provided to permit feeding hydrants and other components and systems, from at least two directions, for redundancy.

03.02 Applicable portions of the CAR and the Office of Nuclear Material Safety and Safeguards SER should be reviewed to determine licensee commitments relative to construction and inspection requirements, before review in this area. Inspectors should determine which versions of the industry codes and standards the licensee has committed to, in the CAR or other docketed correspondence, to follow. They should obtain copies of those documents and become familiar with those industry codes and standards during inspection preparation. Inspectors should select a sample size of sufficient quantity of items (a) to (d) to ensure that the licensee’s procedures incorporate the appropriate commitments.

03.03 Inspectors should interact with the licensee to enable them to learn his construction schedule, so as to be on the location when work is in progress. These observations are best performed by observing portions of work over a number of days. It is desirable to examine as much completed work as finished, before it is covered by backfill. Observation of the final construction testing (hydrostatic testing and fire-pump-performance testing) is important because it is the final verification that work was done correctly.

03.04 Inspectors should try to select record samples, for review, from work that U.S. Nuclear Regulatory Commission personnel did not observe, to help confirm that all work was done correctly.

88142-04 RESOURCE ESTIMATES

This IP is expected to take, on the average, 60 hours for review of licensee/contractor

activities. It should be conducted once, during construction, over a 3 month period, as needed, to observe licensee and contractor personnel competency.

88142-05 REFERENCES

Duke, Cogema, Stone and Webster, "Mixed-Oxide Fuel Fabrication Facility Construction Authorization Request (CAR)," latest revision accepted by NRC, Chapter 7, including pertinent codes and standards referenced in the CAR.

U.S. Nuclear Regulatory Commission, Regulatory Guide 3.16, "General Fire Protection Guide for Plutonium Processing and Fuel Fabrication Plants," January 1,1974.

National Fire Protection Association, (NFPA), NFPA 13-1996, 14-1996, 22-1998, and 25-1995, and other applicable referenced NFPA, American Water Works Association, American National Standards Institute and American Society for Testing and Materials codes.

END

ATTACHMENT 1

Revision History for IP 88142

Commitment Tracking Number	Issue Date	Description of Change	Training Needed	Training Completion Date	Comment Resolution Accession Number
N/A	08/08/07 CN 07-024	IP 88142 is a newly issued procedure. Issued for MOX inspection program to improve effectiveness and efficiency by incorporating and consolidating underground fire water loop and equipment inspection requirements.	None	N/A	ML072040092