Date: Wed, 26 May 1999 10:24:07 -0600
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Subject: Yellow Alert: Flashback During Cutting Operations

Hanford Environmental Restoration Contractor Lessons Learned
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Title: Flashback Event During Cutting Operations

Date: May 25, 1999 Identifier: ERC-99-004

Lessons Learned Statement: To be determined.

Discussion of Event: On May 19, 1999, at approximately 11:40 am, a Bechtel Hanford, Inc. (BHI) Decontamination and Decommissioning (D&D) worker was performing cutting operations on a section of pipe as part of remediation activities at 107KE. The pipe is 6 feet in diameter and has a wall thickness of 5/8". The welder was using an oxygen/gasoline torch, which was previously used as a technology demonstration conducted by BHI at the 105C Interim Safe Storage Project. The torch model is Oxy-Gasoline Safety Torch, manufactured by PETROGEN. The oxy-gas torch system consists of a three-gallon fuel tank equipped with an automatic flow cut-off valve and pressure release valve, a gasoline supply hose, an oxygen supply hose, and a conventional oxygen bottle. The design of the cutting torch allows gasoline delivery to the tip of the torch in the form of a confined liquid. The expansion of gasoline from a liquid to vapor, and the mixing with oxygen, occurs in the tip. This is designed to eliminate backflash down the fuel line and keep the torch head cool. The entire system has been approved by the Underwriters Laboratory (UL).

The D&D worker performing the cutting operation at 107KE was working for approximately 5 seconds when a second D&D worker, standing on the opposite side and away from the pipe, observed the oxygen hose burst and emit a "road flare" size flame. The second D&D worker quickly notified the D&D worker doing the cutting and the operation was immediately shut down. There were no injuries and only the oxygen hose was damaged.

Per the manufacturer's requirements, the oxy-gas torch in use at 107KE has a flashback arrester installed at the oxygen tank regulator. The manufacturer recognized a flashback might be possible under certain circumstances, and recommended a second flashback arrester be installed at the torch. This second flashback arrester was not installed at the torch at the time of the incident. The line burst approximately 10-12' from the D&D worker and approximately 50' from the tank. There were no workers near the line when it burst.

Analysis: While further analysis is underway, the manufacturer recommends the oxygen line be purged prior to ignition, to help prevent flashbacks. Initial interviews with the workers indicate the oxygen line purge was completed prior to ignition. Further investigation is underway to determine cause and an updated lessons learned will be issued in the near future.

Recommended Actions: To be determined.

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Priority Descriptor: Yellow/Caution
DOE Functional Category(s): Worker Protection
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