



## U. S. Chemical Safety and Hazard Investigation Board RECOMMENDATIONS STATUS CHANGE SUMMARY

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| <b>Report:</b>                | Xcel Energy Company Hydroelectric Tunnel Fire        |
| <b>Recommendation Number:</b> | 2008-01-I-CO-R1                                      |
| <b>Date Issued:</b>           | August 25, 2010                                      |
| <b>Recipient:</b>             | Occupational Safety and Health Administration (OSHA) |
| <b>New Status:</b>            | Closed – Reconsidered/Superseded                     |
| <b>Date of Status Change:</b> | July 5, 2017   |

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### Recommendation Text:

*Amend the OSHA Permit-Required Confined Spaces Rule for general industry (29 CFR 1910.146) to establish a maximum permissible percentage substantially below the lower explosive limit (LEL) for safe entry and occupancy in permit-required confined spaces.*

### Board Status Change Decision:

#### A. Rationale for Recommendation

On October 2, 2007, five contract workers were killed and three others were injured when a flash fire erupted inside a drained penstock at the Xcel Energy, Inc. Cabin Creek hydroelectric power plant in Georgetown, Colorado. The fire, which trapped the workers deep underground, resulted from the ignition of methyl ethyl ketone (MEK); a flammable solvent being used by the workers to clean spraying equipment. The spraying equipment was unsuccessfully employed by the workers to apply a protective epoxy coating to the interior walls of the penstock.

The flash fire occurred and spread rapidly as a result of the ignition of flammable MEK vapors in the atmosphere inside the penstock. Neither RPI's (the contractor working inside the penstock) nor Xcel Energy's (the owner of the penstock) policies and permits established safe limits that prohibited entry or occupancy of a confined space with a hazardous flammable atmosphere, even though both companies claimed to have developed their respective policies and permits in accordance with OSHA's general industry permit-required confined space (PRCS) standard (29 CFR 1910.146).

As a part of its investigation, the U.S. Chemical Safety and Hazard Investigation Board (CSB) reviewed OSHA regulations and agency policies pertaining to the use of flammable materials inside PRCSs. The CSB concluded<sup>1</sup> that the PRCS standard does not prohibit entry or occupancy above a maximum permissible level of the lower flammable limit (LFL). CSB also noted in the Xcel report<sup>2</sup> that in 1996, OSHA issued a letter of interpretation<sup>3</sup> that allows work to be performed in atmospheres in excess of 10 percent of the LEL, provided all requirements of the rule are met and the employer has implemented control measures based on a hazard analysis of the means, procedures, and practices necessary for safe permit operations. As a

<sup>1</sup> See analysis in CSB report beginning on page 103

<sup>2</sup> See CSB Report, page 104

<sup>3</sup> OSHA Standard Interpretation Letter issued to Jones dated September 4, 2006 entitled: "Entry into a Confined Space When Lower Flammable Limit Is Greater Than 10 Percent"

result, CSB issued two recommendations to OSHA. This status change summary only addresses the recommendation to amend OSHA's general industry PRCS Rule (e.g., 2008-01-I-CO-R1).

B. Response to the Recommendation

- In April 2011, OSHA advised the CSB that the general industry PRCS standard already prohibits entry into atmospheres greater than 10% of the Lower Flammable Limit (LFL), unless the flammable/ explosive hazard has been controlled through inerting of the space to reduce the oxygen content below that needed to support combustion.
- In December of 2011, RPI entered into a criminal plea agreement with the U.S. Attorney for the District of Colorado which upheld all the OSHA citations issued against RPI, required RPI to pay a fine of \$2.5 million dollars, and placed them on probation for five years.
- In May of 2013, Xcel entered into a formal settlement agreement with OSHA to resolve all the OSHA violations that resulted from the penstock fire. In January of 2016, OSHA closed its case file with Xcel
- OSHA has archived the 1996 Letter of Interpretation with a note that states: "**NOTICE:** This is an OSHA Archive Document, and may no longer represent OSHA Policy. It is presented here as historical content, for research and review purposes only."

C. Board Analysis and Decision

Based on OSHA's response that the general industry PRCS standard already prohibited the entry into atmospheres greater than 10% of the LFL and successful settlements of the Xcel and RPI citations specific to that standard, the Board voted to change the status of CSB Recommendation No. 2008-01-I-CO-R1 to: "**Closed – Reconsidered/Superseded**"