



U. S. Chemical Safety and Hazard Investigation Board

RECOMMENDATIONS STATUS CHANGE

SUMMARY

Report:	Kleen Energy Natural Gas Explosion
Recommendation Number:	2010-7-I-CT-UR5
Date Issued:	June 28, 2010
Recipient:	Siemens
New Status:	Closed- Acceptable Action
Date of Status Change:	September 30, 2013

Recommendation Text:

Provide to your customers:

- *Comprehensive technical guidance on inherently safer methods for cleaning fuel gas piping, such as the use of air or pigging with air.*
- *Comprehensive Cleaning Force Ratio (CFR) guidelines, specifying both the upper and lower limits required to obtain satisfactory cleaning for the fuel gas piping for purposes of the warranties of the turbines.*
- *Warnings against the use of fuel gas to clean pipes.*

Board Status Change Decision:

A. Rationale for Recommendation

This recommendation was issued pursuant to the CSB's investigation of the February 7, 2010 explosion at Kleen Energy, a combined-cycle, natural gas-fueled power plant then under construction in Middletown, Connecticut. A catastrophic natural gas explosion occurred during the planned cleaning of fuel gas piping using natural gas. The CSB found that this practice is inherently unsafe and that safer, non-flammable cleaning methodologies are available.

B. Response to the Recommendation

Siemens reported to the CSB that it provides turbine customers with cleaning and commissioning guidelines for its Siemens Gas Turbine Auxiliaries Package (SGT-PAC).¹ This document prohibits the use of flammable gas for cleaning for SGT-PAC piping and provides guidelines, including CFR requirements, for cleaning the piping using air. The document also warns against the use of flammable gas to clean Balance of Plant (BOP) piping.²

Siemens also reported to the CSB that where Siemens is responsible for conducting pipe cleaning operations or selecting the contractor for these operations, it prohibits cleaning of both SGT-PAC piping and Balance of Plant (BOP) piping using flammable gas. Where Siemens does not have control over the methodology used, the company removes its

¹ The SGT-PAC consists of the fuel gas supply piping that runs from the filter separator to the gas turbine.

² The Balance of Plant (BOP) piping extends from the plant boundary to the inlet flange of the filter separator. Contractors at Kleen Energy were cleaning BOP piping when the incident occurred.

personnel from the site if a gas blow operation is to be conducted against its recommendation.

C. Board Analysis and Decision

Because Siemens reported actions that are consistent with the intent of this recommendation, the Board changed the status of this recommendation to “Closed-Acceptable Action.”