

**Statement to the NFPA Standards Council on Behalf of the US CSB
Manuel R. Gomez, CSB Director of Recommendations
San Antonio, Texas
October 20, 2010**

Good morning.

On behalf of the U.S. Chemical Safety Board I would like to thank you for the opportunity to speak to you today about the NFPA's plans to form a new gas processing safety standard that would consolidate and expand the applicable safety guidance and requirements for conducting a wide range of gas activities (e.g., cleaning piping, charging piping, purging and possibly others). Mr. Shannon's letter of August 19, 2010 to our Chair, Dr. Rafael Moure-Eraso, as well as a subsequent meeting in which our two principals had an excellent exchange of views, described why this new committee would be the best approach for NFPA to address the CSB recommendation and contribute to the prevention of the very serious risks of "gas blowing" activities during the construction of power plants.

At the outset, let me remind you that my statement is crafted to faithfully reflect the views of the Board, and I am confident that it does. In a number of key issues, I will actually describe official Board decisions. Ultimately, however, it is the Board alone that will make any future decisions regarding recommendations and whether or not they have been adequately implemented.

Our Board believes that the NFPA rationale for a new consolidated committee and standard is sound, and they support it as a reasonable vehicle with which the implementation of its recommendation can be achieved. The Board recently voted unanimously to designate the NFPA response as an "Open Acceptable Response." This rather bureaucratic phrase simply means that the Board considers that the actions described in Mr. Shannon's letter demonstrate important steps towards implementation of the CSB recommendation. The Board is also very pleased with the substantive content and promptness of your response, and particularly with your commitment to pursue an expedited process. We believe this is entirely appropriate in light of the very serious risks that may face the estimated 125 power plants to be built in the near future. The CSB commits to providing as much relevant information to the committee during its deliberations as we have available.

The Board also understands that the NFPA itself will not determine the technical content of the eventual new standard; the experts on the committee will do that. It is therefore important for me to convey that the eventual successful closure of the recommendation still depends on the degree to which the standard addresses the main thrust of the recommendation, which is to ensure that the standard "require[s] the use of inherently safer alternatives such as air blows or pigging with air in lieu of flammable gas" for pipe cleaning purposes.

In the remainder of my statement, I will briefly summarize the incident, our major conclusions, and then close with some remarks about some recent developments, a suggestion about the composition of the committee, and the importance of NFPA's actions on this matter.

I will try to be brief, but it is important that I summarize for those of you who may not be well acquainted with the issues, and for the record, the basic facts and the rationale for the CSB recommendation and its urgency. The CSB conducted an investigation of the February 7, 2010, natural gas explosion at a combined-cycle natural gas-fueled power plant under construction in Middletown, Connecticut. Immediately prior to the explosion, workers were conducting a "gas blow," a procedure that forced natural gas through the piping at a high volume and pressure to remove debris which may have accumulated during construction. The natural gas and debris were vented to the atmosphere near the facility's power generation building. The gas accumulated, found an ignition source, and exploded, killing six contract workers and injuring approximately fifty others.

The CSB concluded, and other experts concur, that using natural gas or other flammable gases to clean fuel gas piping is inherently unsafe and should be replaced with safer methods. On June 28, 2010, the Board issued urgent recommendations to the NFPA, the ASME, and OSHA to this effect. Incidentally, while we did not issue a recommendation to the International Code Council, they have advised the CSB that they intend to address our concerns with code changes nonetheless.

There are powerful and very compelling reasons for our recommendations. I will cover there of the most salient.

First, **explosions resulting from flammable gas blows can, and have, resulted in loss of human life, serious injuries, and costly property damage.** At the Kleen Energy site, non-essential personnel were restricted from the area where the gas blow was being conducted, but more than 50 people remained at work in the adjacent building. The six individuals fatally injured were all within the building at the time of the explosion; five were involved with the natural gas blow activities and one was not. In addition to this tragic loss of life, many other individuals sustained injuries, and the Kleen Energy facility sustained millions of dollars in damage as well as several months delay in startup. It has been argued that the gas blow at Kleen Energy was not conducted properly to ensure the dispersion of the released natural gas and to prevent the gas from encountering ignition sources. This point overlooks the simple fact that cleaning piping with flammable gases presents an inherent explosion hazard.

My second point is that **cleaning piping with flammable gases presents an explosion hazard that is extremely difficult to manage, because it is cumbersome and technically difficult if not impossible in some ways to do so.** Quite frankly, it doesn't make sense to try to "control" this hazard when perfectly feasible and far safer alternatives are available to meet the same ends.

Where flammable gas is to be used to clean fuel gas piping, a highly complex technical evaluation is necessary to minimize the extent of the flammable atmosphere that will inevitably occur downstream of the venting outlet. The evaluation must consider the height, location and orientation of the vent pipe discharge, and the velocity and density of the gas being discharged. It must evaluate factors impacting the dispersion of the gas, including atmospheric conditions and natural topography. The analysis and control of all of these factors can be difficult and full of uncertainty and potential mishaps. To complicate matters further, any efforts to control ignition sources is, at best, fraught with uncertainty. For this kind of operation, the classical steps of eliminating ignition sources such as welding torches,

heaters, and internal combustion engines of electric generators and compressors, and similar steps, cannot eliminate the ignition hazard. This is because the CSB found that a gas blow *itself* can provide a source of ignition from potential static charge accumulation created as the gas flows through the piping at high velocity, as was reported in an investigation of a Fairfield, California incident in 2003, or by ignition through sparks generated when metal debris particles struck nearby surfaces, as was reportedly the case in a power generation station under construction in Lorain, Ohio in 2001.

These findings illustrate that attempts to “control” or “manage” the inherent risks of these natural gas blows with long lists of elaborate requirements that are prone to failure are not a prudent approach to increased safety, and may well prove to be excessively costly as well because of their complexity.

My third and final point in support of CSB’s urgent recommendation to prohibit this unsafe practice is probably the most important. The CSB found that **alternative, technically-feasible and cost-effective cleaning methods are available and able to perform the same cleaning function as natural gas blows.**

Although natural gas blows remain a common practice, the CSB found in its investigation that safer pipe cleaning methods, such as pigging or blowing with air, are available and constitute cost-efficient, effective alternatives to cleaning with flammable gases.

Indeed, major gas turbine manufacturers have already acknowledged that these alternatives are available for cleaning new piping to remove the debris that would otherwise damage the turbine. In the wake of the Kleen Energy tragedy, for example, GE Energy revised its policies to, in the words of a Senior Professional Engineer at the CSB public meeting, “make gas blows something that will not happen again under GE’s watch.” GE also expressly prohibits its own employees from being on site if one of its customers chooses to conduct a blow with flammable gas. GE is reportedly the largest provider of gas turbines in the US.

Although some recent statements have suggested that there may be technical or economic feasibility obstacles to the use of alternative pipe cleaning technologies, the CSB investigation found that their use is widespread. Indeed, another witness at the CSB hearing, a former expert of natural gas blows, reported that he now conducts blows with nitrogen, and at a lower cost. The CSB would welcome scientifically reliable information that would help to clarify any technical or other obstacles to the use of alternative methods, but, so far, we have not found any.

An additional and important observation is that the CSB generally supports the active participation of all the potentially affected parties in the development of voluntary consensus standards. In this case, we strongly urge NFPA to aggressively try to ensure the participation of organized labor with an interest in these matters.

In closing, the February 2010 explosion at Kleen Energy demonstrated that using flammable gases to clean piping is highly dangerous. The possibility of catastrophic consequences, the complex evaluation required to prevent the accumulation of gas, the extreme difficulty in eliminating and controlling ignition sources, and the availability of safe, effective alternatives, are all compelling reasons to prohibit the use of flammable gases for

purposes of cleaning fuel gas piping. We are confident, therefore, that the new NFPA committee, after considering the available evidence, will enact requirements on pipe cleaning methods that will prohibit the use of natural gas.

In closing, I would also like to emphasize another point which Mr. Shannon's letter to our Chair indicated, and with which we agree. The actions of voluntary standards organizations on this matter are likely to play a significant role in how the Occupational Safety and Health Organization (OSHA) responds to the CSB's recommendation. We believe that your new committee can play a leadership role in prevention by incorporating the main thrust of our recommendation and beyond, by strongly encouraging other standards bodies to follow suit with harmonized standards and codes, and eventually by calling on OSHA to adopt a standard that forbids the inherently unsafe and unnecessary use of natural gas to clean gas piping in power plants and any similar situations.