

# THOMAS COMMISSION EXECUTIVE REPORT

September 21, 2010

## GOVERNOR'S COMMISSION KLEEN ENERGY EXPLOSION

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The February 7, 2010 explosion at the Kleen Energy construction site in Middletown caused the tragic deaths of six men and injured more than thirty other people. First and foremost, the members of this commission extend their sympathy to the families and friends of those killed in this incident. It is our hope that the work of this commission and the adoption of the recommendations in this report will ensure that such a tragedy does not happen again in Connecticut or elsewhere.

Governor M. Jodi Rell acted immediately in response to this incident by appointing two separate commissions. The Nevas Commission, whose executive report is attached as an exhibit, was charged with identifying the cause and origin of the explosion as well as any contributing factors.

This commission was charged with recommending specific steps, including legislative and regulatory changes that might be taken to ensure that such a tragedy does not occur again.

On February 23, 2010, a judge of the Connecticut Superior Court signed a search and seizure warrant applicable to the site of the explosion. The Nevas Commission did an admirable job of completing its assignment without compromising that ongoing criminal investigation.

The Nevas Commission found that the explosion resulted from a process known as "cleaning" or "blowing" a natural gas pipeline for the purpose of removing small bits of matter from the pipeline. In this case, the "blowing" was done through the use of large quantities of natural gas, propelled outside the Kleen Energy power block under very high pressure, where it accumulated and ignited from a source near or in the Kleen Energy power block.

The Nevas Commission also found that, although the construction of the Kleen Energy plant was heavily regulated and supervised by a variety of agencies, including federal Occupational Safety and Health Administration (OSHA), the local building inspector, the local fire marshal (supported by the Office of the State Building Inspector and the Office of the State Fire Marshal, respectively), the Department of Public Utility Control, the Department of Environmental Protection, the Connecticut Department of Labor, the Connecticut Department of Consumer Protection, and the Connecticut Siting Council, no agency had oversight with regard to the element of the construction process known as "cleaning" or "blowing" the natural gas pipeline.

Noting that it was for its successor, the Thomas Commission to determine what regulatory changes should be recommended, the Nevas Commission made a number of suggestions as to areas of inquiry. At its first meeting on August 10, 2010, the Thomas Commission heard a Presentation and Overview of the Nevas Panel Report. Department of Public Utility Control Chairman Kevin DelGobbo stated that the members of the Nevas Panel made the following three (3) determinations:

1. The Panel finds that the February 7, 2010, explosion was the product of a process used to clean a natural gas pipeline using large quantities of natural gas that came into contact with an ignition source known in the industry as a "gas blow;"
2. The Panel finds that, although the Kleen Energy construction project was heavily regulated by a variety of agencies, no agency regulated the process used - or any process that might be used such as gas purging - to clean the natural gas pipeline that was the source of the explosion;
3. The Panel finds, and recommends to the Thomas Panel, that there are significant regulatory steps that should be taken to ensure that the events of February 7, 2010 are not repeated.

Manuel R. Gomez, Director of Recommendations from the United States Chemical Safety Board attended the next meeting of this commission on August 24<sup>th</sup> and made a presentation, a copy of which is attached to this report as an exhibit. The United States Chemical Safety Board is an investigatory rather than a regulatory board. Although representatives of OSHA were invited to attend the August 24 meeting, they felt it necessary to decline the invitation. On August 5, 2010, OSHA cited 14 contractors. As with the criminal investigation, this OSHA process will be ongoing as at least some of the citations are being contested. In view of the pending litigation, it was necessary for OSHA to decline the invitation to meet with this commission.

The testimony of Mr. Gomez of the United States Chemical Safety Board was particularly enlightening in putting on the record for the first time to this commission that safer alternatives to flammable gas blows are available. There are alternative gas pipe cleaning methods such as; air and nitrogen blows, pigging, steam blows, water or chemical cleaning. Mr. Gomez testified that there have been no known instances where an alternative to the gas blow process could not be used. There are no standards and extremely limited guidance regarding safely cleaning fuel gas piping. National Fire Protection Association (NFPA) codes provide no guidance on fuel gas pipe cleaning and OSHA does not regulate natural gas usage.

At the September 14<sup>th</sup> meeting this commission heard a presentation from representatives of the Connecticut Siting Council. Siting Council Member, James J. Murphy made a presentation that is attached to this report as an exhibit. Mr. Murphy indicated that it is the Siting Council's intention to also incorporate and implement any recommendations this commission makes as conditions to future permits to ensure public safety and to ensure that the future is free of such tragedies.

One important issue addressed in the presentation was The Nevas Commission's recommendation that the Siting Council address concerns relative to gas-fired base-load power plant facilities that have already been permitted and the records of which are now closed. Mr. Murphy noted that the Council has the authority, on its own motion, to modify certificates at any time if they find "changed conditions" as defined under Section 4-181a (b) of the Administrative Procedures Act. Due process requires that they hold a hearing when re-opening the records and possibly modifying the final decisions which allowed the plants to be constructed in the first place.

To date, the Council has acted to re-open on its own motion the final decision in two matters where the certificate holder of the power plant had filed with the Council a request for an extension of time for construction. These matters were Kleen Energy and Meriden Gas Turbines.

As to statutory recommendations, Mr. Murphy noted that pursuant to Conn. Gen. Stat. Section 16-50j (h), prior to commencing any hearing, the Council must consult with and solicit written comments from certain state agencies. Those agency comments are made part of the record in the proceeding. The Siting Council has taken the initiative to include the Department of Emergency Management and Homeland Security. The Siting Council suggested that the following state agencies also be made a part of the list contained in that statute:

- Department of Emergency Management and Homeland Security
- Department of Public Safety
- Department of Labor
- Department of Consumer Protection
- Department of Public Works
- Any other state agencies which this Commission may recommend, as having cognizance of or concern for matters involving the power plant construction at any time during the building process.

A presentation was also made at the September 14 meeting by Department of Public Safety – Division of Fire, Emergency and Building Services, a copy of which is attached as an exhibit to this report as to what regulatory changes are appropriate. Since most of their recommendations are included herein in the executive report as specific recommendations of this commission, it is not necessary to further detail them here.

Prior to setting forth our final recommendations, the Thomas Commission notes that the safety issues involved are really national issues. While there are specific actions that can and should be taken in Connecticut, national codes and federal legislation should also be addressing the issues herein involved.

As to Connecticut in particular, some of the recommendations below can be accomplished by executive order, state legislation or adoption of regulations. State legislation and in particular adoption of regulations is a time consuming process, however, it is important to note that the regulatory review process is currently in process

for the Connecticut State Fire Safety Code, Connecticut State Building Code and Connecticut Fire Prevention Code. Recommendations of this Thomas Commission can be incorporated into the ongoing regulatory update process in an expedited manner. It is critically important that the Siting Council follow through on its promise to consider incorporation of the Thomas Commission's recommendations as conditions to permits.

#### **FINAL RECOMMENDATIONS:**

**1. The use of flammable gases to conduct "gas blows" should be banned in Connecticut; at least until such time as there are accepted national standards published and in place.**

This is perhaps the most obvious and effective recommendation this commission can make. Testimony from the United States Chemical Safety Board and others has indicated that cleaning of the interior of fuel piping is possible by alternate safe methods. No one has come forward with information indicating that use of flammable gas for this purpose is necessary. In view of testimony that cleaning by compressed air that is not flammable is possible and the loss of life that has occurred, an outright ban is appropriate, at least until such time as safe national standards have been published. Consideration should be given for these possible procedures:

- By executive order of Governor until such time as this can be addressed by regulation.
- By regulation that is not subject to modification process unless an appropriate national standard has been published.
- By condition of licensing or siting.
- By statute at least until NFPA, American Society of Mechanical Engineers (ASME) or some other national code/standard writing organization publishes appropriate standards.

**2. Recommendation of requirement of special inspectors, development of safety plans and payment of cost by power plant applicant**

Where application is made for the construction of an electric generating facility which requires Siting Council approval or a building permit, the applicant should be required to pay the cost of one or more special inspectors to assist the municipal fire marshal and building inspector, (acting in consultation with the Office of the State Fire Marshal and the Office of the State Building Inspector) in providing plan review and, conducting inspections during construction in order to ensure compliance with the standards recommended by this committee. The special inspector must be either a Connecticut Registered Engineer with specific knowledge and experience regarding electric generating facilities; or a person holding a Commission from the National Board of

Boiler and Pressure Vessel Inspectors or equivalent experience and approved by the local fire marshal and building inspector.

The special inspector shall be responsible for assisting the local fire marshal and building inspector in reviewing and accepting the methods for cleaning the interior of the gas piping, including but not limited to approval of an appropriate safety plan for any non flammable gas blows conducted and the observation of the actual cleaning procedure in order to assure compliance with the previously approved method. Although adoption of the recommendations of this commission will result in the banning of the use of flammable gasses for gas blows, the use of alternatives such as nitrogen or compressed air carry their own safety risks and until such time as national standards or OSHA requirements are in place, every non flammable gas blow that is carried out should be done so based upon a safety plan developed by the permit holder and approved and carried out under the supervision of the local fire marshal, local building inspector and the special inspector.

The safety plan shall include an accountability system that identifies what personnel are on site at all times and that requires evacuation of all non-essential personnel during gas blow procedures.

It is recommended that the General Assembly pass enabling legislation providing clear statutory authority to require a power plant applicant to pay all the cost of the special inspector as outlined above. The legislation should provide clear authority to require payment and enable adoption of regulations that will contain specifics as to procedure.

### **3. Recommendation of Clearing House for future power plant applications.**

The Nevas Commission found that the construction of the Kleen Energy plant was heavily regulated and supervised by a variety of agencies, including federal OSHA, the local building inspector, the local fire marshal (supported by the Office of the State Building Inspector and the Office of the State Fire Marshal, respectively), the Department of Public Utility Control, the Department of Environmental Protection, the Connecticut Department of Labor, the Connecticut Department of Consumer Protection, and the Connecticut Siting Council. Although the Nevas Commission found that no agency had oversight with regard to the element of the construction process known as "cleaning" or "blowing", that void will be addressed if flammable gas blows are banned and safety plans as to non flammable gas blows are developed, approved and overseen in accordance with recommendation 2. For purposes of future plants, the Nevas Commission suggested that a "coordinating council" consisting of pertinent state agencies be assembled to share information during the course of construction of a large power facility. The Siting Council recommended a revision to CGS 16-50j (h), which provides that, prior to commencing any hearing, the Council must consult with and solicit written comments from certain state agencies. Those agency comments are made part of the record in the proceeding. The Siting Council has taken the initiative to include the Department of Emergency Management and Homeland Security. The Siting Council

suggested that the following state agencies also be made a part of the list contained in that statute:

- Department of Emergency Management and Homeland Security
- Department of Public Safety
- Department of Labor
- Department of Consumer Protection
- Department of Public Works

This commission concurs with this recommendation and urges the General Assembly to revise CGS 16-50j(h) accordingly.

The commission also recommends that new statutory language be adopted that provides for representatives of all of the agencies above to be assembled as a coordinating council to serve during construction of any power plant facility that meets the jurisdictional requirements of the Siting Council. Since the Siting Council is already soliciting comment from the agencies involved, consideration should be given to having the Siting Council serve as a "clearinghouse" to track the efforts of every regulatory agency with responsibilities associated with the construction of a power plant.

#### **4. Recommendation of Conditions to Licensing to be made to the Siting Council.**

Following sections will address possible code adoption by the state and what codes may be appropriate. Adoption of regulations is a time consuming process that will address safety issues in regard to all future power plants. In the meantime, the current permit for the Middletown Kleen Energy facility expires on November 30, 2010 and a renewal or extension of that permit will be necessary. The Nevas report recommended that the Siting Council attach recommendations of the Thomas Commission as conditions to any renewal or extension if available by that time. Those conditions should include a ban on flammable gas blows as discussed above as well as compliance with code recommendations that follow.

#### **5. Recommendation as to existing power plants.**

The Nevas Commission recommended that the Siting Council should review its report and ultimately the Thomas Commission report to determine whether its "changed conditions" authority would enable it to review all power plants within its jurisdiction to determine whether such plants warrant further attention. The Siting Council testified to this commission that it has the authority, on its own motion, to modify certificates at any time if they find "changed conditions" as defined under Section 4-181a (b) of the Administrative Procedures Act. Due process requires that they hold a hearing when re-opening the records and possibly modifying the final decisions which allowed the plants to be constructed in the first place. To date, the Council has acted to re-open on its own motion the final decision in two matters where the certificate holder of the power plant

had filed with the Council a request for an extension of time for construction. These matters were Kleen Energy and Meriden Gas Turbines.

This commission applauds these efforts of the Siting Council and urges it to continue to use its authority, within the due process requirements of the Uniform Administrative Procedures Act, to make the recommendations of this commission applicable to existing power plants where necessary.

#### **6. Recommendation as to adoption of codes.**

Adoption of codes by regulation by the Department of Public Safety is already authorized by statute. Since the process for adoption of regulations takes at least one year, consideration should be given to the possible use of the emergency regulation process to expedite this process. The procedures for updating the Connecticut Fire Safety Code, Connecticut State Building Code and the Connecticut Fire Prevention Code are currently in process and should be expedited to include where possible the adoption of these regulatory recommendations.

The Department of Public Safety is urged to take all necessary steps to adopt the following regulations:

- Amend the current Flammable & Combustible Liquids Code adopted pursuant to CGS 29-320 to adopt the 2010 edition of NFPA (National Fire Protection Association) 37 Standard for the Installation and Use of Stationary Combustion Engines and Gas Turbines. The current Flammable & Combustible Liquids Code RSA 29-320-1a through 29-320-4a inclusive adopts the 1994 edition of NFPA 37. The NFPA has made some significant changes to this document from 1994 to 2010 editions, some of the more substantial are: a) the removal of the 7500 hp (approx 5.6 MW) limitation in the scope of the standard, b) the adoption of ASME B31.3 for gas system in excess of 125 psi gas pressure, and c) inclusion of guidance for the installation of gas trains for gaseous fueled engines.
- Amend the Gas Equipment and Piping Code adopted pursuant to CGS 29-329 to:
  - A) Adopt the 2009 edition of NFPA 54 *National Fuel Gas Code* including TIA (Tentative Interim Amendment) 09-3, and by CT Amendment remove the exception regarding fuel gas piping at electric utility power plants. The current Gas Equipment and Piping Code RSA 29-329-1 through 29-329-4 inclusive, adopts the 1996 edition of NFPA 54. This would allow the most current technology to be utilized in the installation of gas piping.
  - B) Adopt ASME (American Society of Mechanical Engineers) Standard B31, *Code for Pressure Piping*; including making appendices IV and V of ASME B31.1 mandatory for newly constructed electric utility power plants. This would address all piping of fuel gas whose pressure is outside the scope of NFPA 54, this is 125 psig. ASME B31 is a series, with the various aspects of piping systems being broken down; for example B31.1 is *Power Piping*;

B31.3 is *Process Piping*; B31.8 is *Gas Transmission and Distribution Systems*.

- Amend the Connecticut Fire Prevention Code adopted pursuant to CGS 29-291a ADD section 60.6 in the Hazardous Materials Chapter:  
60.6 Gas piping cleaning operations

60.6.1 Definitions:

60.6.1.1 Authority Having Jurisdiction (AHJ) – As used in this chapter the Authority Having Jurisdiction shall be the State Fire Marshal.

60.6.1.2 Purge / Purging – To free a gas conduit of air or gas, or a mixture of gas and air. [NFPA 54 – 3.3.84]

60.6.1.3 Gas Blow - The process of cleaning the interior of a gas conduit of debris by using large volumes of gas at elevated pressures. The use of flammable gas for these purposes is prohibited in accordance with Section 60.6.2 and shall not be allowed through modification procedure

60.6.1.4 Blowdown - The release of gas pressure in a pipeline through an engineered vent to atmosphere.

60.6.2 The use of flammable gas as a medium to 'clean' the inside of fuel gas piping is prohibited.

- Amend the Fire Prevention Code adopted pursuant to CGS 29-291a DELETE sections 29-291a-2 (a) and (b) as shown by the strike-out below:

**(NEW) Sec. 29-291a-2.**

**Relationship to State Fire Safety and Building Codes**

~~(a) The requirements of the Connecticut State Fire Prevention Code shall not supersede the requirements of either the Connecticut State Fire Safety Code (CSFSC) or the State Building Code (SBC).~~

~~(b) Where any provision of this code conflicts with or duplicates any provision of either the CSFSC or SBC, the CSFSC or the SBC shall prevail.~~

(a) Where the CSFSC or SBC do not address an issue or have deleted a provision, the provisions of this code shall apply.

(b) No person shall remove or modify any fire protection system installed or maintained under the provisions of the CSFSC or the SBC, unless otherwise permitted by those codes. Buildings and structures, and parts thereof, shall be maintained in a safe condition. Devices or safeguards which are required by the CSFSC or the SBC shall be maintained in conformance with the code edition under which installed.

- Adopt the requirements of the 2010 Edition of NFPA 850 “Fire Protection for Electric Generating Plants and High Voltage Current Converter Stations” and any tentative interim amendments to such standard. Since this standard provides recommendations and not mandatory requirements, the scope section of this document will have to be amended to clearly indicate the standard is mandatory and will apply to all future electric generating plants

## **7. Training for regulatory personnel**

Although the recommendation for hiring of special inspectors will provide critical and necessary assistance to the local fire marshal and building inspector, there should also be some provision for the power plant applicant to bear responsibility for the cost of training, available to all local fire marshals and building inspectors on the complex issues involved. There is an existing statutorily dedicated fund and code training process with a statutory board of control established pursuant to CGS 29-251c. The General Assembly should adopt legislation providing for some payment into this code training fund by any power plant applicant who is required to obtain Siting Council approval. Any entity requiring a building permit will already be paying into fund, but additional payment by a power plant applicant meeting jurisdictional requirements of Siting Council is appropriate.