

# Proposal for Additional Amendments to the Palo Alto Municipal Fire Code

## Summary

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The update to the Municipal Fire Code provides the City Council with an opportunity to strengthen the Fire Department oversight over the use of hazardous materials covered by Section 6.95 of the Health and Safety Code and Title 19 regulations. These regulations require those sites where accidents involving large quantities extremely hazardous materials could lead to offsite consequences to identify themselves and inform the public. Because of the risks associated with such sites, it makes sense that additional safety measures and oversight of these hazardous materials should be required. This is especially important when such sites are located near residents and other businesses. In addition to the risks from the materials themselves, the reactive nature of some of these materials can lead to the emission of highly toxic fumes. The additional amendments proposed here would require a higher level of supervision and monitoring of the hazardous materials by the facilities where they are used and stored.

## Rationale for Additional Amendments

There is a gap in our Municipal Code that regulates the usage of hazardous material. On one hand, state regulations require companies that have substantial amounts of regulated substances, which include flammable and toxic hazardous materials listed on the Federal Regulated Substances for Accidental Release Prevention and listed on the State of California Regulated Substances list, to register and to inform emergency response officials and the public. These are sites where an accidental release of those substances can potentially pose the greatest risk of immediate harm to the public and the environment beyond the storage or usage site itself. The **HEALTH AND SAFETY CODE, Chapter 6.95, Sections 25531** state the following in regard to manufacturing and processing facilities that use hazardous materials: "because of the nature and volume of chemicals handled at these facilities, some of those operations may represent a threat to public health and safety if chemicals are accidentally released." The directives of the Legislature were formalized in the California Code of Regulations, Title 19, Division 2, Chapter 4.5, Sections 2735-2785, issued in June 2004. The program is also called the California Accidental Release Prevention Program, or CalARP.

On the other hand, our Municipal Code, which empowers the local Fire Department to issue permits, monitor, control, and inspect hazardous materials, makes no reference to a category of regulated substances, those that are above the threshold quantities listed in the Title 19 regulations. As a result, it ignores the fact that facilities subject to the CalARP program should be subjected to additional automated control and monitoring that would, in the case of an accidental release, immediately alert the site's emergency personnel and first responders and other potentially affected individuals as soon as possible.

The Title 19 regulations themselves cannot fill this gap. The CalARP program, administered locally by the Santa Clara County Department of Environmental Health (DEH), requires businesses to have planning activities that are intended to minimize the

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possibility of an accidental release by encouraging engineering and administrative controls, but cannot require them. Owners or operators of facilities subject to CalARP program must develop and implement an accident prevention program and write a Risk Management Plan (RMP). The County DEH reviews all applicable components of RMPs to ensure completeness and adequacy, and inspects these high-risk facilities for compliance with applicable state and federal requirements.

When it comes to jurisdiction over the usage, control, handling and inventory monitoring of these extremely hazardous materials, however, the Palo Alto Fire Department has the primary role.

The **HEALTH AND SAFETY CODE, Chapter 6.95, Sections 25531** goes on to say that "programs designed to prevent these accidents are the most effective way to protect the community health and safety and the environment. These programs should anticipate the circumstances that could result in their occurrence and require the taking of necessary precautionary and preemptive actions, consistent with the nature of the hazardous materials handled by the facility and the surrounding environment."

These words support including amendments to the Municipal Fire Code requiring additional engineering controls and monitoring of the extremely hazardous substances at sites subject to the Title 19 regulations.

## Reactive properties of Toxic and Highly Toxic Used and Stored in Quantities above Title 19 Thresholds

The Palo Alto Municipal ordinance should also take into account that chemically reactive materials present additional hazards, beyond those from the materials themselves, arising from improper use or mixing with incompatible materials. As stated in the US Chemical Hazard and Safety Board Report, *Improving Reactive Hazard Management*, "changes in chemical structure from the mixture of two incompatible materials has the potential to generate gaseous byproducts beyond that which can be safely absorbed by the immediate surroundings, resulting in toxic emissions that can cause serious harm to people, property, or the environment."<sup>1</sup>

The potential for the release of toxic gaseous emissions from the reactive materials at CPI poses a significant risk to the health and safety of nearby residents. Potassium cyanide, one of the extremely hazardous materials used and stored in amounts above Title 19 thresholds at CPI, is an example of a highly toxic and also a reactive material. The Hazardous Material Inventory Statements list potassium cyanide as "highly toxic" and an "irritant." However, it is also a highly reactive material, and a highly toxic gas byproduct can result from its reaction with incompatible materials.

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<sup>1</sup> "Improving Reactive Hazard Management", US Chemical Hazard and Safety Board, Report No. 2001-01-H, October 2002.

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The NFPA 704 instability rating of hazardous materials, which is used in the California Fire Code, was developed as a tool for identification and evaluation of potential hazards during emergency response. It deals primarily with a material's explosive potential and its response to elevated temperature and pressure<sup>2</sup> and not its incompatibility with other chemicals.<sup>3</sup> The NFPA 704 reactivity (called 'instability') rating of potassium cyanide is 2 on a scale of 0 to 4.

The Material Safety Data Sheets (MSDS) sheets for potassium cyanide give a clear picture of the hazard from its reactivity. The MSDS state that potassium cyanide reacts strongly with acids to liberate toxic and flammable hydrogen cyanide gas. In CPI's production processes, large amounts of potassium cyanide are in solution in a number of open tanks of liquids in the same room with a number of open tanks of acids. Significant quantities of highly toxic hydrogen cyanide could be produced and released following an accident or natural disaster.

Potassium cyanide is stored as a solid in a storage building at CPI that is within several feet of residential property. The MSDS sheets also state that, while potassium cyanide is stable when dry, water or weak alkaline solutions can produce dangerous amounts of hydrogen cyanide in confined areas. Moisture will cause slow decomposition, releasing poisonous hydrogen cyanide gas. Potassium cyanide reacts with carbon dioxide in ordinary air to form hydrogen cyanide gas. In addition, the material emits toxic fumes of cyanide and oxides of nitrogen when heated to decomposition.

Nitric acid, the other material at CPI in amounts above Title 19 thresholds, can generate toxic fumes through reactions with other materials even though it has a NFPA instability rating of 0. According to the Fire Department's investigation report, the release of toxic fumes in February 2<sup>nd</sup> was the result of a reaction of nitric acid with water. The incident began when undiluted nitric acid was dumped into a waste acid tank in which there was some water, causing the acid temperature to rise and the fumes to be generated.

## Conclusion and Recommendation

Despite the existence of the large amounts of reactive chemicals and the recent history of the release of toxic fumes from CPI, the supervision and monitoring of these materials currently is insufficient. Despite its proximity to residents, who whose health and safety could be severely compromised by a future incident, CPI is not required to have monitors of cyanide fumes or acid fumes in the areas where the production work is done, where these materials are stored, or at the exit points of emissions from their facility. The Toxic Gas Ordinance, which refers to compressed toxic gases, including hydrogen cyanide,

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<sup>2</sup> California Fire Code, Chapter 43, 2007.

<sup>3</sup> Reference 1, page 49.

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requires sites using or storing toxic gases to have a complex set of monitoring and control measures, yet none are required at CPI even though the very same toxic hazardous emissions may be present. In fact, because the alarms and monitors are not present, the emissions could arise insidiously, without warning or alarm or even the knowledge of those working with the materials that highly toxic emissions could be generated. So the risk to the health and safety is even greater.

To deal with this issue, the Fire Department needs stronger regulatory tools. When the Fire Department was asked by residents, following the toxic gas release in February 2006, to require CPI to install continuous toxic gas monitors and sensors and automatic alarms, such as the systems required in semiconductor plants or in facilities using compressed toxic gases, the Fire Department response was that they did not have the authority to impose that requirement on CPI.

The City Council can fill the gap in hazardous material regulations by strengthening Chapter 15 of the Palo Alto Municipal Code. Please give your consideration to including the proposed amendments. They would provide the regulatory tools the Fire Department needs to adequately protect and insure our health and safety.

## Proposed Amendments - Summary

The amendments we propose would empower the Fire Department to impose monitoring and alarm systems over sites with amounts of extremely hazardous materials above threshold quantities listed in Title 19, Chapter 4.5 of the California Code of Regulations. These amendments would:

- 1) Require sites that have filed a Risk Management Plan (RMP) to submit their current plan together with their filing of their Hazardous Materials Management Plan;
- 2) Require sites that have filed a Risk Management Plan (RMP) to submit a quarterly summary inventory of those hazardous materials that are used or stored in amounts above the Title 19 program reporting thresholds,
- 3) Require sites that have filed a Risk Management Plan (RMP) to have continuous gas monitoring, alarms, and emergency control stations (similar to those required for compressed toxic gases). This would apply to the materials above Title 19 program reporting thresholds and which may react to produce highly toxic vapors and cover indoor use and storage and the outdoor storage.
- 4) Require the location of outdoor storage of toxic and highly toxic materials to be at least 300' from property line for sites that have this material above Title 19 reporting thresholds.

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## Local Amendments to the Fire Code. – additions are in bold

### Chapter 27 Hazardous Materials - General Provisions

Addition of definition: Section 2702.1

**RISK MANAGEMENT PLAN (RMP)** A risk management plan is the document that sites must provide, as specified in the California Code of Regulations, Title 19, Division 2, Chapter 4.5, if they use or store any hazardous material in above the threshold quantities listed in Table 1, 2 or 3 of Section 2770.5 of that section of the regulations.

Addition of amendment

**2701.5.1.1** All sites subject to the provisions of the California Code of Regulations, Title 19, Division 2, Chapter 4.5 shall include a copy of the site's current Risk Management Plan with the submission of their Hazardous Materials Management Plan.

Addition of amendment

**2701.5.2.2** All sites subject to the provisions of the California Code of Regulations, Title 19, Division 2, Chapter 4.5 shall submit a quarterly inventory of the hazardous materials on their site that are above the threshold quantities listed in Table 1, 2 or 3 of Section 2770.5 of those regulations.

### Chapter 37 Highly Toxic and Toxic Materials

Addition of amendment

**3703.1.2.1 Gas Detection System.** Continuous monitoring by a gas detection system as defined in Section 3704.2.2.10 shall be employed for each of the materials used or stored in amounts above the threshold quantities listed in Table 1, 2 or 3 of Section 2770.5 of the California Code of Regulations, Title 19, Division 2, Chapter 4.5, and for toxic or highly toxic fumes if one or more of these materials can produce them under conditions of shock, pressure, temperature, light, or contact with another material. The gas detection system shall initiate a local alarm as defined in Section 3704.2.2.10.1

Addition of amendment

**3703.1.3.1 Treatment system - toxic and highly toxic liquids.** Exhaust scrubbers or other systems for processing vapors of highly toxic and toxic liquids shall be provided if these materials are used or stored in amounts above the threshold quantities listed in Table 1, 2 or 3 of Section 2770.5 of the California Code of Regulations, Title 19, Division 2, Chapter 4.5 and if one or more of these materials can produce toxic or highly toxic fumes under conditions of shock, pressure, temperature, light, or contact with another material. Treatment systems and other processing systems shall be installed in accordance with the *California Mechanical Code*. The exhaust shall be continuously monitored by a gas detection system, as defined in Section

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3704.2.2.10, whose sensing port shall be at the point of exhaust of these treatment systems to the atmosphere, and whose signals shall initiate a local alarm as defined in Section 3704.2.2.10.1

Modification of amendment

3703.1.5.2 Exhaust ventilation for open systems. Mechanical exhaust ventilation shall be provided for highly toxic and toxic fumes, mists or vapors. Continuous monitoring by a Gas detection systems as defined in Section 3704.2.2.10 shall be employed for each of the materials used or stored in amounts above the threshold quantities listed in Table 1, 2 or 3 of Section 2770.5 of the California Code of Regulations, Title 19, Division 2, Chapter 4.5, and if one or more of these materials can produce toxic or highly toxic fumes under conditions of shock, pressure, temperature, light, or contact with another material. The gas detection system shall initiate a local alarm as defined in Section 3704.2.2.10.1

Modification of amendment

3703.2.2 Quantities exceeding the maximum allowable quantity per control area. The outdoor storage or use of highly toxic and toxic solids or liquids in amounts exceeding the maximum allowable quantity per control area set forth in Table 2703.1.1(4) shall be in accordance with Sections 3701 and 3703.2 and Chapter 27 Continuous monitoring by a gas detection systems as defined in Section 3704.2.2.10 shall be employed for each of the materials used or stored in amounts above the threshold quantities listed in Table 1, 2 or 3 of Section 2770.5 of the California Code of Regulations, Title 19, Division 2, Chapter 4.5, and if one or more of these materials can produce toxic or highly toxic fumes under conditions of shock, pressure, temperature, light, or contact with another material. The gas detection system shall initiate a local alarm as defined in Section 3704.2.2.10.1

Modification of amendment

3703.2.3.1 Location. Outdoor storage or use of highly toxic or toxic solids and liquids shall not be located within 20 feet(6096 mm) of lot lines, public streets, public alleys, public ways, exit discharges or exterior wall openings. If these materials are stored in amounts above threshold quantities listed in Table 1, 2 or 3 of Section 2770.5 of the California Code of Regulations, Title 19, Division 2, Chapter 4.5, the outdoor storage shall not be located within 300 feet of lot lines, public streets, public alleys, public ways, exit discharges or exterior wall openings.

Modification of amendment

3703.2.3.2 Treatment system-highly toxic liquids and solids. Exhaust scrubbers or other systems for processing vapors of highly toxic and toxic liquids shall be provided if these materials are used or stored in amounts above the threshold quantities listed in Table 1, 2 or 3 of Section 2770.5 of the California Code of Regulations, Title 19,

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Division 2, Chapter 4.5 and if one or more of these materials can produce toxic or highly toxic fumes under conditions of shock, pressure, temperature, light, or contact with another material. Treatment systems and other processing systems shall be installed in accordance with the *California Mechanical Code*. The exhaust shall be continuously monitored by a gas detection system, as defined in Section 3704.2.2.10, whose sensing port shall be at the point of exhaust of these treatment systems to the atmosphere, and whose signals shall initiate a local alarm as defined in Section 3704.2.2.10.1