REPORT TO MAYOR AND COUNCIL

NO: 09-158

Council Meeting: August 11, 2009

SUBJECT: Automatic Gas Shut-Off Devices in New or Significant Building Construction (Study Issue)

REPORT IN BRIEF

The purpose of this report is to review and evaluate the feasibility of changing the Municipal Code to require Automatic Gas Shut-off Devices on new construction and significant remodel projects within the City. This report also examines the cost, maintenance and practicality of existing gas shut-off devices.

Staff recommends that Council select Alternative #1 and not require the installation of Automatic Gas Shut-off devices.

BACKGROUND

During Council's review of the Draft Seismic Safety and Safety Sub-element, Council requested a Study Issue, asking staff to evaluate the feasibility of changing the Municipal Code to require Automatic Gas Shut-off Devices on new construction and significant remodel projects within the City (Attachment A, Study Issue Paper DPS-01). Staff was asked to prepare a report that provided the following information:

- Technology available that automatically controls the flow of natural gas to structures and to gas appliances within a structure.
- A description of how Automatic Gas Shut-off technology controls the flow of natural gas in the event of an earthquake to prevent fires.
- A description of PG&E's ability to shut off gas to particular geographical areas within the City.
- Costs related to installation and maintenance of the devices.
- An evaluation of the potential enhancement to life safety should such an ordinance change be implemented.

EXISTING POLICY

Fire Services Sub-Element

Goal 4.2C: Reduce the demand for fire suppression and Hazardous Materials response, reduce the severity of the incidents and provide protection for the lives, welfare and the environment of people within the community.

Goal 4.2C.1a: Revise and adopt appropriate codes, ordinances, and policies significant to fire and life safety.

DISCUSSION

Staff gathered information from several sources including a study from the State of California Community Development Department that evaluated the performance of the devices under Senate Bill 1992 (Perata). The Bill has since been Chaptered, adding Section 19205 to the California Health and Safety Code. That section simply required the Department of Housing and Community Development, in consultation with the State Architect, to consider whether or not to propose building standards mandating the installation of the devices in dwelling units, motels, and hotels throughout the state. That consideration was made in 2003, and the Department concluded that there was insufficient evidence to support such a requirement.

The 2003 State Report examined statistics related to fires and deaths caused by unrestricted gas flow during day to day conditions, as well as seismic events. The study took data from the National Fire Protection Agency (NFPA), the California State Fire Marshall's Office, and the California Commission on Seismic Safety. The study then extrapolated the data to produce the findings that, if installation of the devices were to be mandated in the State of California: L*ess than 26 residential fires would be prevented annually; less than 22 fires would be prevented in California after a major earthquake; 1-2 fire related injuries would be prevented each year, and one death would be prevented every four years. And, the cost to new housing in California would range from $43 to $73 million dollars annually.*

The State of California Study found that while these devices are effective in their function, the incidence of fires, injuries, and deaths related to unrestricted gas flow is so low that the costs under a state mandate would far outweigh the benefit. The State of California's actions did not preclude local municipalities from enacting a local code to mandate the installation of the devices.

Evaluation of Risks

There are two primary risks to public safety from damage to a natural gas system sufficient to cause release of natural gas. If the leakage is sufficient to create a flammable air-gas mixture and an ignition source is present, there is a risk of fire, or, in rare cases, explosion. The life safety risks from a gas-related fire are greatest if a fire is initiated in a damaged or collapsed building that has not been evacuated.

Another potential life safety risk can result if gas service is restored improperly in the presence of gas leaks that are not first detected and repaired. Improper service restoration may also fail to correct inadequate venting conditions that might lead to the accumulation of carbon monoxide in a structure.

It is important to understand that the risk of a gas-related fire in residential structures following earthquakes is generally very low because of the numerous conditions necessary for gas ignition. Natural gas is lighter than air and tends to disperse in most building environments other than a confined space such as a basement.

Life Safety

Life safety consequences from post-earthquake fires depend on the ability of individuals to evacuate buildings following earthquakes. Building layouts differ as to whether occupants must use shared paths of emergency egress or by a direct, unshared route. In multi-unit occupancies (R-1 occupancies), common paths of egress and limited means of escape make it more likely that persons can be trapped after earthquakes.

The greater the number of occupants in a building, the greater is the likelihood they will be trapped in an emergency. Damage to exterior doors of apartment and condominium units often prevent occupants from exiting safely. In buildings of more than two or three stories, the escape paths usually include enclosed stairways whose doors can be jammed by the racking deflections of the doorframes caused by the earthquake. Frequently, the elevators in these buildings are also unusable.

Single-family residential units (R-3 occupancies), on the other hand, cannot, by code, be more than three stories high, and their windows are usually constructed in such a way that they can serve as secondary exits. More and easier pathways exist for escape in R-3 occupancies than in R-1 occupancies. In addition, if the R-3 structure is properly tied to its foundation, it is less likely to lose its means of escape than the larger and more complex R-1 structures.

Restoration of Gas Services

Qualified individuals with the necessary knowledge and experience should restore gas service. As defined by ASCE 25-97, a "Qualified Person" is "Any individual, firm, corporation, or company that is experienced in such work and is familiar with all precautions required based on manufacturer's instructions, local codes, and the authority having jurisdiction." The process of restoring gas service to customers following earthquakes is the same regardless of whether conditions existed to warrant shutting off the service in the first place.

A qualified person should check gas house lines, appliance connectors and appliances for leaks, and inspect gas equipment, vents and flues to identify damage or obstructions that could lead to fires or the accumulation of dangerous carbon monoxide fumes. These inspections by a qualified gas utility service technician or certified plumber require access to the customer's building or facility. Note that PG&E will not repair or reset any device beyond the company

owned meter. They will simply advise of the repairs needed and not restore service until the reset and or repair is made.

Post-earthquake restoration of gas service by non-qualified personnel increases the potential risk of injury or death from the accumulation and ignition of unidentified gas leaks and carbon monoxide in damaged gas appliance vents. Lengthy service interruptions may lead to nonqualified personnel re-establishing service without taking the necessary precautions.

Available Gas Shutoff Devices
The following sections summarize the methods available for limiting the flow of natural gas to buildings or appliances, thereby reducing the likelihood of a gas-fueled fire following earthquakes. These methods do not address elimination of non-gas-related ignition and fuel sources. These methods apply to the customer owned portion of the natural gas supply system. Many of the actions that can be taken to limit the flow of natural gas require adding hardware components to the customer's gas piping system. Some require special expertise to assure that installations are performed in compliance with existing codes and regulations, while others can be done by the homeowner or property owner.

Manual Valve
Manually turning off gas service to a building or facility is the most common method used and can be highly effective if someone is present to smell or hear escaping gas. Gas service shutoff valves are installed by the gas utility at all gas meter locations or "curb" locations if the meter is not accessible from the outside. To be most effective, customers should maintain access to the shutoff valve and keep an adjustable pipe or crescent wrench nearby or a wrench designed for this purpose. To shut off the gas, the tang on the valve is rotated a quarter turn in either direction so that the tang is crosswise to the pipe. To minimize the possibility of unauthorized operation of the valve, wrenches should be located near, but not at, the gas meter location.

During the Loma Prieta earthquake of 1989, DPS responded to many properties and manually shut off gas service to homes and businesses. This was done as an "automatic" precaution and in vast majority of cases unnecessary. It turned out to be a lesson learned. There was widespread media safety messages delivered immediately after the earthquake causing approximately 160,000 buildings in the Bay Area and Santa Cruz area to shutoff their gas service. DPS, or the owner, can shut off the service, but PG&E is required to restore the service, which they only do after checking the system and attached appliances. Although 156,000 customers had their service restored within nine days, the shear number of disconnects caused some customers to wait for over a month to have PG&E restore gas service.

The Sunnyvale Department of Public Safety, Office of Emergency Services currently advises during emergency preparedness presentations and Sunnyvale

Neighborhoods Actively Prepare (SNAP) classes against shutting off the gas service unless there is a known problem. We also discuss and demonstrate the other two types of automatic shutoff devices described above, including the pros and cons of installation.

Seismically Actuated Gas Valve

A seismically actuated gas valve is a sensing mechanism that detects vibration and shuts off the flow of gas in response to that motion. Seismically actuated gas valves are not typically sensitive to changes in gas flow or pressure and are normally installed on the customer's natural gas houseline piping downstream of the utility point of delivery near the gas meter.

Installation of this device downstream of the gas meter requires special expertise and should not be done by homeowners. Installation should be done only by a certified plumber, specialty contractor, or other qualified person who can correctly size the valve for the particular installation for present and future appliance loads. Similarly, qualified personnel should re-establish gas service following device actuation to ensure that the gas system is safe. In the past, many earthquake-activated gas valves were activated from vibrations unrelated to earthquakes, such as heavy truck traffic or accidental bumping of the device. Seismically actuated gas valves on the market today that comply with current standards are not as prone to this problem, but these types of false shut-offs can still occur.

Gas service may be shut off when the valve senses motions that exceed trigger levels, regardless of whether the gas system is damaged. Seismically actuated gas valves can also reactivate during aftershocks and increase the demand for multiple service restorations. Since a seismically actuated gas valve is normally installed near the gas meter, extensive structural damage (e.g., a structure falling off its foundation onto the gas meter) may damage the device itself or cause damage upstream of the device.

In California, seismically actuated gas valves marketed for consumers for earthquake safety applications require certification by the Division of the State Architect. California has adopted the American Society of Civil Engineers standard ASCE 25-97, Earthquake Actuated Automatic Gas Shutoff Devices, in Title 21, Division 1, Chapter 1, Sub 5 of the CA Code of Regulations as the basis for certification (www.calregs.com).

ASCE 25-97 provides specifications for the motions at which the devices should actuate and installation requirements to assure that devices respond to the earthquake ground motion.

Once a seismically actuated gas valve is activated, the pilot light would be extinguished after the gas remaining in the houseline dissipates, eliminating the possibility of the pilot light igniting flammable or spilled materials such as

gasoline or paint thinner. Shutting off the gas based on ground shaking may also protect against hazards resulting from damage to other portions of the gas combustion systems (e.g., vents, flues). Restoration of gas service by qualified persons should include the inspection and repair of these systems.

Unfortunately, the level of ground shaking associated with such damage cannot presently be estimated accurately because of the large variations in building construction and appliance installation techniques. The inability to reliably predict damage means that current standards for seismically actuated devices are intentionally biased toward actuation at lower levels of ground motion. The potential benefit of these devices should be considered along with the drawbacks of shutting off gas service when no damage has occurred.

For residential customers, this drawback could result in delays to re-establish service and the unavailability of fuel for heating and cooking. Prolonged delays in service restoration may prompt some homeowners to attempt to restore service themselves.

Potential benefits to the City residents from such actions need to be weighed against the potential drawbacks associated with delays in service restoration. A large number of seismically actuated gas valve installations that are triggered closed could significantly delay service restoration, especially since qualified personnel are needed to inspect the installations. Additional risks are a factor if unqualified persons try to reestablish gas service themselves without first ensuring that gas leaks, venting and other related hazards are corrected.

Excess Flow Valves
Excess flow valves may be installed in the two manners described below:

1) In a houseline piping system.

2) At each appliance with an appliance connector to automatically shut off the source of gas if a gas piping break or major leak occurs downstream of the device.

A combination of the two can also be utilized. The excess flow valve is not sensitive to ground motion but is actuated by the pressure differential created when the gas flow exceeds the design limit for the valve. Although several types of excess flow valves are used in natural gas service, the basic principle of operation is the same.

In California, excess flow valves marketed for consumer earthquake safety applications are required to be certified by the State in compliance with the CSA Requirements for Excess Flow Valves Number 3-92. These requirements are adopted in Title 21, Division 1, Chapter 1, Sub 6 of the California Code of Regulations as the basis for certification (www.calregs.com).

All excess flow valves have an internal mechanism that allows gas to flow as long as the pressure difference between the upstream and downstream side of the excess flow valve is below a specific design level. The design pressure difference is directly related to the design flow capacity of the valve. A break in the piping downstream of the excess flow valve produces a pressure drop, which increases the pressure between the upstream and downstream sides of the valve. If the pressure difference is greater than the design level, a device inside the valve closes it.

This occurs when a major leak occurs in household piping. Once qualified personnel make repairs to the service line, houseline or appliance connector, a bypass feature in the valve can be set to open automatically and allow the gas system to operate normally once the leak has been repaired.

The benefit of excess flow valves is that they are activated when a gas leak is detected, whether or not the leak is a result of an earthquake. For example, if a connection at a gas line or a piece of gas piping is faulty and causes a leak, an excess flow device will automatically shut off the supply to the faulty area until a repair has been made. Another benefit is that the number of false shut-offs is potentially less than with the seismically activated shut-off devices. This is because the seismically activated device will shut off the gas supply in the event of an earthquake, even if there is not damage to the gas lines.

1) On the Customer's Piping Near the Gas Meter
Excess flow valves installed on the customer's piping system near the gas meter are intended to shut off gas flow in case of a break or major leak in the customer's gas piping or equipment. Because each customer can have different gas demands, sizing the valve for the correct appliance load is crucial.

Excess flow valves at the meter are installed with a shutoff flow-rate sized normally at a level above the total gas load of all gas appliances connected downstream of the device, to prevent unintentional shutoff when many gas appliances are in use. If a break in the customer piping or equipment results in a leak below the designed shutoff flow-rate, the excess flow valve will not actuate to stop the flow of gas.

The design flow rate needs to be reviewed by a qualified person and the valve may need to be replaced with a properly sized valve when gas appliances are changed, installed or removed. Installation of any device immediately downstream of the gas meter requires special expertise and should not be performed by a homeowner, but by a certified plumber or specialty contractor who is trained to correctly size the valve for the particular installation in consideration of present and future appliance loads.

Similarly, qualified personnel should reestablish gas service following device actuation to ensure the gas system is safe. Since excess flow valves installed near the gas meter are typically exposed, extensive structural damage (e.g., a structure falling off the foundation onto the gas meter) may render an excess flow valve ineffective from damage to the device itself, or cause damage upstream of the device. In a complete houseline break, excess flow valves installed downstream of the meter can improve natural gas safety if significant damage occurs. Such damage might be related to building collapse or movement of a structure off its foundation.

2) On Houseline Connection to Gas Appliances
Excess flow valves with a lower design shutoff flow-rate are installed on a gas houseline as close as possible to the gas source at individual appliances and sized according to the gas load of an individual appliance. The size of the leak that will cause a shutoff is lower compared to the installation of an excess flow valve installed near the gas meter, which must be sized for the total connected load of all gas appliances.

Excess flow valves are most effective if they are installed near all gas appliances and located on the customers' gas piping just upstream of the flexible houseline connection. Excess flow valves installed on the houseline connection typically have a bypass mechanism that allows the device to automatically reset and the appliance to operate only when the leak has been corrected. The bypass flow-rate is determined by the standards for excess flow valves. A professional or a homeowner can install these types of excess flow valves.

Earthquake damage to gas service piping within buildings (not including piping attached to appliances) primarily results from poor structural response. In cases where there is no serious structural damage (near collapse), data from past earthquakes show that natural gas leaks in customer interior house lines are not a significant cause of post-earthquake fires.

Improved Structural Performance Through Currently Adopted Codes
For the building occupants, improving seismic structural performance has the added benefits of maintaining escape paths, reducing their risk of injury, reducing financial costs associated with post earthquake repairs, and decreasing the likelihood of having to relocate following an earthquake. From a community perspective, reduced building damage can lessen the demand on emergency services such as search and rescue and temporary shelters, and keeps community businesses open.

Newer construction in compliance with current building codes and construction in compliance with modern (post-1984) building codes are generally the least vulnerable to earthquake effects. Nevertheless, if the potential consequences of earthquake damage are viewed as exceptionally serious, the City may impose

additional requirements on new construction that are more restrictive than those of current building codes.

PG&E

Gas supply systems generally have little direct impact on safety. One reason is that pipelines are often located beneath city streets, where the potential consequences to the public are low, even if leaking gas were to ignite. Benefits to gas customers and the community from pipeline improvement projects include greater overall reliability of service and reduced interruption in gas service to business and manufacturing sectors of the community following earthquakes.

PG&E operates in a region where major earthquakes are likely and recognizes the vulnerabilities of the natural gas transmission and distribution system. The most significant risk for earthquake damage exists in older distribution systems not constructed of welded steel or medium- and high-density polyethylene pipeline materials. Pipelines in older distribution systems may have been constructed of bare steel pipe, cast iron, or copper, and their complete replacement is very costly. The installation of a large distribution main in a dense urban area using typical construction methods can cost $1 million to $3 million per mile.

PG&E requires excess flow valves to be installed on new gas lines installed between the main line and the meter. These devices will shut-off the gas supply when a leak is detected before the meter.

PG&E also has a manual shutoff system within the City of Sunnyvale. This system is actuated if there is an uncontrollable release of gas in a particular area of the City. The activation of this manual system would involve areas of numerous City blocks. This is generally why PG&E will elect to manually crimp gas piping in most situations, nearest the point of the break, as it affects fewer customers. If it affects fewer customers, that means less work in restoring gas service and less inconvenience to those affected customers

Costs related to Automatic Gas Shutoff Devices

Some general considerations are presented here to assist Council in evaluating the potential costs and benefits of various measures. This section focuses on one- or two-family dwellings; additional considerations are provided for multi-family construction since those structures are more complex.

The approximate costs of installing various devices are provided in Attachment B. The range in hardware cost is primarily related to variation among manufacturers and the size (diameter and required flow capacity) of the gas service line to the building. Installation includes the cost of modifying the customer's gas piping and. Additional costs such as fees for building permits or inspections may also apply, depending how the City approaches the permit process if installation is mandated. Costs incurred after installation may be for inspection, maintenance and gas service restoration. The benefits of installing devices to stop the flow of

natural gas can be evaluated from the standpoint of an individual customer and the community at large.

Generally the maintenance cost should be minimal unless the system is physically damaged by accident, or on purpose. Written into the code for the acceptance by the State is the requirement that the device work properly for a period of 30 years without routine maintenance.

Costs generally run less expensive on new construction as it is planned from the beginning and incorporated into the building. If a requirement were to be issued for remodeling the cost generally runs in the higher range because existing piping must be modified.

Data shown in Attachment C can be used to develop a rough estimate of the possible benefits gained by preventing natural gas ignitions. The bounds on total fire ignitions are approximate and are based on a visual examination of the range of data. The reduced ignition bounds assume that natural gas ignitions account for 14% to 50% of the total ignitions; that 100% can be eliminated with gas shutoff; and that 100% of the building inventory has natural gas service. The reduction in fire ignitions would be less if natural gas service were provided only to a portion of the total building inventory.

As Attachment C illustrates, the number of fire ignitions in past earthquakes has been highly variable. The data used in developing the relationship plotted in Attachment C has not been segregated to account for the type, age, or condition of building construction or the presence of restraints on natural gas appliances. Attachment C can be used to estimate the number of fire ignitions in a large population of buildings and is most appropriate when the characteristics of the building population are similar to those from which data were obtained.

Loss of life from fires following earthquakes in one- or two-family dwellings has not been observed in recent (last 30 years) moderate California earthquakes. The reason for this is the relative ease in evacuating such structures, even when they are heavily damaged. This is not the case for other types of buildings, particularly older high-rise structures prone to significant earthquake damage and not equipped with automatic fire sprinklers. Egress from these structures often relies on interior or exterior stairways that can be damaged or inaccessible because of jammed doors or impassable from fallen debris. A post-earthquake fire in these structures can lead to a significant loss of life, justifying far more investment to prevent earthquake fires than a one- or two-family dwelling.

Property Owner Perspective

Justifying a community's investment in natural gas-related fire prevention requires consideration of several factors: the life safety risks of buildings vulnerable to earthquake damage, the overall impact of potential fire damage on a community, and the objectives the community is trying to attain (e.g., reduce all fire damage, reduce earthquake fire damage, and improve life safety). Of particular importance is understanding the relationship between post earthquake fire losses and losses related to ground shaking or other, non-earthquake causes. Some of the considerations that should be assessed are:

1. The likelihood of an earthquake generating ground motions sufficient to cause multiple simultaneous fires in conjunction with conditions that would rapidly spread post earthquake fires (time of day, high winds, low humidity).
2. Potential reductions in the number of fatalities or injuries achieved by reducing the rate of post-earthquake natural gas ignitions.
3. The ability of the community to respond to multiple simultaneous ignitions following an earthquake, including water supply reliability, delays in response time, quantity of fire fighting resources, availability of mutual aid, and non-directed responses by citizens.
4. Existing codes and ordinances (e.g., water heater restraint requirements, sprinkler systems) that may reduce the number of natural gas ignitions.
5. Costs incurred by the community in reducing natural gas ignitions—the costs to restore service, the costs associated with business interruption, the costs of providing assistance during service restoration, and the costs of enforcing regulations.
6. Potential losses unrelated to post-earthquake fires (e.g., severe storms, flooding, non earthquake fires).
7. The time value of the monetary investment made by the community and the possibility that the benefits from an action may not be realized for decades, or at all, considering the remaining life of some buildings.

If a City ordinance is not mandated, the decision to install either of the automatic gas shutoff devices is left up to the individual. If an individual decides to install an automatic device, it must be one that is approved by the State of California, as outlined by City of Sunnyvale's adoption of the 2007 Plumbing Code.

An individual homeowner's decision to reduce earthquake fire risk depends on the individual's perception of risk and the affordability of specific actions. Given the level of costs involved, more affluent homeowners who perceive the risk of post-earthquake fire to be high or have a low tolerance for risk may view the costs presented in Attachment B as insignificant. The same is likely not true for lower income homeowners. Other financial factors that may enter into the decision include home equity, intentions to remain in the home for a long period of time, and insurance coverage.

Homeowners can also be influenced by their capability to act following an earthquake (i.e., shut off gas or extinguish small fires), how likely they are to be at home at the time, and whether or not they can rely on neighbors to detect leaking gas and shut off gas service while they are away.

The consequences of post-earthquake fires for residential gas customers are largely financial. A fire ignition only becomes a life safety concern when inhabitants are unable to exit the building following an earthquake. Experience in past earthquakes indicates that egress from an earthquake-damaged single-family home (R-3 occupancy in the California Building Code) is generally possible because of the limited structure height, low number of occupants, and multiple direct escape paths via doors and windows. For these reasons, property protection is the primary concern of a typical homeowner. Fire insurance coverage, generally a requirement for obtaining a building loan, typically covers earthquake-related fire damage and is an important factor in determining actual financial losses.

MUNICIPAL CODE ORDINANCE CONSIDERATIONS

Pursuant to Health and Safety Code Section 17958.5, city and county local ordinances may make reasonably necessary modifications to state residential building standards based on local topographical, geological, or climatic conditions. To Staff's knowledge, a number of jurisdictions in California have local ordinances mandating the installation of seismic gas shutoff valves or excess flow gas shutoff devices. It should be noted that in Santa Clara County the City of Milpitas is the only jurisdiction that requires automatic gas shutoff devices. Attachment D gives an overview of the local jurisdiction and their current related requirements. Mandating installation of one of the types of shutoff devices may be accomplished through enactment of a local ordinance to amend the California Building Standards Code based on local topographical, geological, or climatic conditions. The local jurisdiction is required to make an express finding that such modifications or changes to the state building standards are reasonably necessary because local topographical, geological, or climatic conditions so warrant. Such findings may be difficult to make as the State of California did not make such findings from their 2003 report.

FISCAL IMPACT

Should Council choose to select the recommended Alternative 1 there will be no fiscal impact to the City. Should Council choose one of the other proposed Alternatives; the fiscal impact would have to be determined in further study by the Community Development Department. The on-going costs associated with the enactment of an ordinance would be inspection time required and whether or not the additional cost of the permit would cover the costs of the inspection process.

PUBLIC CONTACT

Public contact was made by posting the Council agenda on the City's official-notice bulletin board outside City Hall, in the Council Chambers lobby, in the

Office of the City Clerk, at the Library, Senior Center, Community Center, and Department of Public Safety; posting the agenda and report on the City's Web site; and making the report available at the Library and the Office of the City Clerk.

Copies of the final report were also mailed to the International Association of Plumbing and Mechanical Plumbing Officials and to the National Fire Protection Association.

ALTERNATIVES

1. Do not require the installation of Automatic Gas Shutoff Devices.
2. Adopt an ordinance that requires Excess Flow Gas Shutoff Devices.
3. Adopt an ordinance that requires Seismic Actuated Gas Devices.
4. Adopt an ordinance that requires either approved devices.

RECOMMENDATION

Staff recommends Alternative #1; do not require the installation of Automatic Gas Shutoff Devices. This recommendation is made based on results of the 2003 State of California study that additional fire and life safety provided by automatic gas shutoff devices (seismically activated or excess flow) is not justified based on the additional costs. Based on reports from major earthquakes and our experience in Sunnyvale after the Loma Prieta earthquake, the fires ignited by gas leaks are very minimal and resulting loss of life is almost non-existent. Additionally, there is an increased risk from improperly restored gas line that may lead to the increased risk of carbon monoxide accumulation in a structure.

Should Council choose Alternatives #2, #3, or #4, Staff recommends that further study and formalization of an appropriate ordinance be conducted by the Community Development Department who would be responsible for the implementation, enforcement, issuing of permits and inspection of the installation process.

Reviewed by:

Don Johnson, Director, Public Safety
Prepared by: Kelly Fitzgerald, Deputy Chief

Reviewed by:

Hanson Hom, Director, Community Development

Approved by:

Gary M. Luebbers
City Manager

Attachments

A. Study Issue Paper 2008, DPS-01
B. Approximate Cost for Actions to Limit Natural Gas Flow After Earthquakes
C. Summary of Building Fire Ignitions for Recent Earthquakes
D. Ordinances Related to Automatic Gas Shutoff Valves

Proposed 2009 Council Study Issue

DPS-01 Municipal Code Ordinance to Require Automatic Gas Shut-Off Appliances in New or Significant Building Construction

Lead Department	Public Safety
Element or Sub-element	Seismic Safety and Safety Sub-Element
New or Previous	New
Status Above the line	**History** **1 year ago** None **2 years ago** None

1. What are the key elements of the issue? What precipitated it?

During Council's review of the Draft Seismic Safety and Safety Sub-element in a Study Session, Council Member Howe sponsored a Study Issue asking staff to evaluate the feasibility of changing the Municipal Code to require Automatic Gas Shut-off appliances on new construction and significant remodel projects within the city. The issue arose from Council Member Howe's awareness of technology that is available that automatically controls the flow of natural gas to structures and to gas powered appliances within a structure. The technology causes the flow of natural gas to automatically shut off in the event of an earthquake to prevent fires.

As part of the Study Issue, Council Member Howe asked that staff also determine whether or not PG & E has the ability to shut gas down to particular geographical areas within the City.

This Study Issue would examine the costs for installation and maintenance of the devices, and would evaluate the potential enhancement to life safety should such an ordinance change be made.

2. How does this relate to the General Plan or existing City Policy?

Fire Services Sub-Element

Goal 4.2C: Reduce the demand for fire suppression and Hazardous Materials response, reduce the severity of the incidents and provide protection for the lives, welfare, and environment of people within the community.

4.2C.1a: Revise and adopt appropriate codes, ordinances, and policies significant to fire and life safety issues.

3. Origin of issue

Council Member(s) Council Member John Howe
General Plan
City Staff
Public
Board or Commission none

4. **Multiple Year Project?** No **Planned Completion Year** 2009

5. **Expected participation involved in the study issue process?**

Does Council need to approve a work plan? No

Does this issue require review by a Board/Commission? No

If so, which?
none

Is a Council Study Session anticipated? No

What is the public participation process?
A public hearing conducted by Council. Public contact will be made by posting the Council agenda on the City's official-notice bulletin board outside City Hall, in the Council Chambers lobby, in the Office of the City Clerk, at the Library, Senior Center, Community Center, and Department of Public Safety; posting the agenda and report on the City's Web site; and making the report available at the Library and the Office of the City Clerk.

6. **Cost of Study**

Operating Budget Program covering costs
Program 483 Community Safety Services

Project Budget covering costs

Budget modification $ amount needed for study

Explain below what the additional funding will be used for

7. **Potential fiscal impact to implement recommendations in the Study approved by Council**

Capital expenditure range None

Operating expenditure range None

New revenues/savings range None

Explain impact briefly

8. **Staff Recommendation**

Staff Recommendation None

If 'For Study' or 'Against Study', explain

9. **Estimated consultant hours for completion of the study issue**

Managers

Role	Manager				Hours
Lead	Fitzgerald, Kelly	Mgr CY1:	5	Mgr CY2:	0
		Staff CY1:	0	Staff CY2:	0
Support	Moretto, Douglas	Mgr CY1:	5	Mgr CY2:	0

		Staff CY1:	20	Staff CY2:	0
Interdep	Fatapour, Ali	Mgr CY1:	5	Mgr CY2:	0
		Staff CY1:	15	Staff CY2:	0

Total Hours CY1: 50
Total Hours CY2: 0

Note: If staff's recommendation is 'For Study' or 'Against Study', the Director should note the relative importance of this Study to other major projects that the Department is currently working on or that are soon to begin, and the impact on existing services/priorities.

Reviewed by

Department Director **Date**

Approved by

City Manager **Date**

Addendum

A. Board / Commission Recommendation

☐ **Issue Created Too Late for B/C Ranking**

Board or Commission	Rank	Rank 1 year ago	Rank 2 years ago
Arts Commission			
Bicycle and Pedestrian Advisory Committee			
Board of Building Code Appeals			
Board of Library Trustees			
Child Care Advisory Board			
Heritage Preservation Commission			
Housing and Human Services Commission			
Parks and Recreation Commission			
Personnel Board			
Planning Commission			

Board or Commission ranking comments

B. Council

Council Rank	1
Start Date	3/2/2009
Work Plan Review Date	(blank)
Study Session Date	(blank)
RTC Date	6/23/2009
Actual Complete Date	(blank)
Staff Contact	

ATTACHMENT B. APPROXIMATE COSTS FOR ACTIONS TO LIMIT NAUTRAL GAS FLOW AFTER EARTHQUAKES

Device	Hardware Cost	Installation Cost[1]
Restrain Individual Gas Appliance	$15-$50	$0 - $100
Manual Shutoff Valve and Wrench	$5-$20[2]	$0
Earthquake Shutoff Valve	$100 - $300	$100 - over $300[3,4]
Excess Flow Valve at Meter	$20 - $100	$100 - over $300[3,5]
Excess Flow Valve at Appliance	$5 - $15	$0 - $100

NOTES:

1. All costs are approximate and do not include permit and inspection fees that in other jurisdictions have ranged from $25 to more than $100. Installations that can be performed by the building owner are assumed to have no cost.

2. Cost of a suitable wrench.

3. Installation costs do not include cost of a gas system survey, which can cost more than $200.

4. Higher installation costs may occur if substantial modifications of plumbing and valve support are necessary.

5. Higher installation costs may occur if substantial plumbing modifications are necessary.

ATTACHMENT C. SUMMARY OF BUILDING FIRE IGNITION FOR RECENT EARTHQUAKES

Earthquake	Magnitude	Earthquake Fire Ignition	Gas-related Fire Ignition
1964 Alaska	9.2	4-7	0
1965 Puget Sound	6.7	1	?
1971 San Fernando	6.6	109	15
1983 Coalinga	6.2	1-4	1
1984 Morgan Hill	6.2	3-6	1
1986 Palm Springs	6.2	3	0
1987 Whittier	5.9	6	3
1989 Loma Prieta	7.2	67	16
1994 Northridge	6.7	97	54
1995 Kobe	6.9	205	36

ATTACHMENT D. AUTOMATIC GAS SHUTOFF VALVES

SANTA CLARA COUNTY & INCLUDED CITIES	
Jurisdiction	**Requirement of Seismic or Excess Flow**
City of Campbell	No
City of Cupertino	No
City of East Palo Alto	No
City of Gilroy	No
City of Los Altos	No
City of Los Gatos	No
City of Milpitas	Either
City of Morgan Hill	No
City of Mountain View	No
City of Palo Alto	No
City of San Jose	No
City of Santa Clara	No
City of Saratoga	No
Santa Clara County (Unincorporated)	No

JURISDICTIONS OUTSIDE SANTA CLARA COUNTY	
Jurisdiction	**Requirement of Seismic or Excess Flow**
Contra Costa County (Unincorporated)	Either
City of Brentwood	Either
Marin County (Unincorporated)	Either
Alameda County (Unincorporated)	Excess Flow Only
Los Angeles City	Seismic Only
West Hollywood	Seismic Only