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**California Public Utilities Commission**

**UTILITIES SAFETY BRANCH  
NATURAL GAS AND PROPANE  
SAFETY REPORT FOR 1997**



*Enforcing safety regulations and promoting safety for the general public.*

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## MEMORANDUM

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This annual report of Natural Gas and Propane Safety presents an account of various activities carried out under the California Public Utilities Commission's (CPUC) natural gas and propane safety programs for the calendar year of 1997.

The CPUC has been entrusted with the safety jurisdiction over certain natural gas and propane facilities in the state by Legislative mandate. It is responsible for enforcing safety regulations, inspecting all work affected by the statutes and making necessary additions and changes to regulations for promoting the safety of the general public and the utility employees that work on the system. The natural gas and propane safety programs regulations are stated in General Orders (G.O.) 112-E . G.O. 112-E incorporates the Code of Federal Regulations (CFR) 49, parts 190-199 and part 40 that pertain to natural gas and/or propane safety). These regulations are supported by law as stated in the Public Utilities Code.

The State of California has two the nation's largest natural gas distribution companies. Therefore, it is important to maintain an adequate level of inspections and surveillance to ensure that these systems are designed, constructed, operated, and maintained properly in accordance with the regulations for safety of the general public. The CPUC's Utilities Safety Branch (USB) implements the safety program by carrying out accident investigations, follow up investigations, compliance inspections, review of utilities' reports and records, construction inspections, and special studies.

### ACKNOWLEDGMENT

*This report was prepared by Grayson Grove, Senior Utilities Engineer, under the general direction of Julian Ajello, Program and Project Manager, of the USB, of the Consumer Services Division. The staff also acknowledges the assistance provided by utilities and agencies in furnishing data necessary for this report and expresses its appreciation for their cooperation.*

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# INTRODUCTION

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## A. PURPOSE OF REPORT

The Annual Report's purpose is to provide general information about the Utilities Safety Branch's activities and summarize the progress of its safety programs during 1997. The California Public Utilities Commission (CPUC) monitors the pipeline safety of investor owned gas utilities mobile home parks and certain propane systems under General Order (GO) 112-E. The Utilities Safety Branch (USB) is charged with enforcing this order which adopts the federal Code (49 CFR Sections 190, 191, 192, 193, and 199). The mission of the USB is to regulate pipeline safety of utilities under Commission jurisdiction and assure an acceptable level of operational safety for the protection of the public and the utilities' employees.

## B. CPUC's RESPONSIBILITIES

### G.O. 112-E

GO 112-E requires the USB to conduct audits of the regulated utilities' natural gas facilities and jurisdictional propane systems. The large utilities are made up of a number of operational units, such as divisions, each of which is normally audited every two years; half the divisions in one year and the other half in the next. When a significant problem is found, the inspection interval is reduced to either one year or six months depending on the severity of the problem. Once the problem is remedied the unit returns to the two-year inspection cycle.

During these audits, the USB inspectors review the utilities' Emergency Plans and Operation and Maintenance (O&M) practices looking for deficiencies or oversights. The USB staff inspects leak survey records to see if the utility is meeting the standards for repairing leaks in a timely manner. They

review the utility's cathodic protection records and make field inspections to determine the effectiveness of corrosion control. They insure that the utility is properly certifying its welders and pipe joiners. Finally, they check records of random drug and alcohol tests.

The field inspection focuses on verifying the records kept by the utility by physically operating valves, checking regulator set points, requesting random testing of cathodic protection areas and verifying that repairs have actually been completed. Inspectors also observe the overall condition of the system and how the utility follows its published procedures. The USB inspectors will cite the utility for noncompliance and specify the time within which corrective action must be taken. The USB also implements programs it deems necessary to improve the utilities' performance. This report describes most of the programs administered by the USB and provides general statistical data that has been gathered as a result.

### **Mobile Home Park Program (MHP)**

The majority of natural gas customers in California receive gas directly from and are billed by the local gas utility. A portion of the gas rate covers the utility's cost of operating and maintaining the natural gas distribution system. Although this network of pipes and valves is under ground and therefore cannot be seen, there are prescribed maintenance activities and operating procedures that the utilities are required to follow to ensure that the system remains safe and in good operating condition.

Some customers in California do not receive gas direct from the local utility. In the case of many of the State's mobile home parks, a resident receives gas from and is billed by the park operator. In this case, the park is operating a master meter system. The park receives this gas at a slight discount since the local utility is not responsible for maintaining and operating the park's natural gas distribution system. The park, in turn bills its residents at the rates paid by other directly-served residential customers.

The difference between what the master meter operator pays for gas from the utility and what the operator charges its residents is not profit. Instead, these funds are to be used by the master meter operator to maintain and operate a safe natural gas system within the park. In fact, the master meter

operator must conform to the same rules concerning maintenance and operation as followed by the natural gas utilities.

The MHP program provides for periodic inspections of mobile home park operators who have master metered systems. These operators are expected to meet the requirements outlined in the federal "Guidance Manual for Operators of Small Gas Systems". USB inspectors are charged with carrying out this program and have the authority to cite operators who are in noncompliance with the law. In addition to inspections, the USB offers training seminars to master meter operators to reacquaint seasoned operators and introduce new operators to the requirements for operating a gas system.

The Utilities Safety Branch MHP Program was implemented in 1991 and is funded partially by the federal government with the remainder funded by a user fee of approximately 20¢ per month per space. The program is responsible for inspecting just under 3,000 master meter mobile home parks in California ranging in size from 10 to over 1,000 customers at least once every five-years. Many of the parks require special attention to meet state requirements. This requires USB to reinspect certain operators more than once during the five year period.

The program has been successful. Many potentially dangerous situations have been found by USB inspectors and corrected before an incident occurred. USB logs the results of the inspections, in a database, and uses the database to identify areas where inspections should be focused.

### **Propane Safety and Enforcement Program (PSEP)**

The Propane Safety and Enforcement Program (PSEP) is modeled on the MHP program. The same "Guidance Manual for Operators of Small Gas Systems" is used although, DOT is preparing a revised version specifically for propane. Operators are required to have a map of their system, an emergency plan and an operation and maintenance plan to assure safe operation of their system. USB Inspectors verify that the propane system operator is knowledgeable and performs adequate periodic maintenance on the system. USB engineers also perform a visual inspection of the system to determine if any apparent problems exist.

The PSEP was precipitated by a number of propane related incidents involving death and injury that occurred in the Sierras in 1992 and 1993. Investigation of these incidents revealed that operators of the propane systems had very little safety regulation. As a result, AB 766 (Hauser) became law on September 1, 1994 and was later amended by AB 2430 on September 19, 1996. The Public Utilities Code incorporates the law in sections 4451 through 4465. This program directs operators of jurisdictional propane distribution systems in California to comply with the federal pipeline safety standards, and permits the CPUC to adopt rules, at least as stringent as the federal law, to protect the health and safety of the operators, their employees and the customers they serve. The CPUC's responsibility covers all propane distribution systems serving 10 or more customers in a residential or commercial district, and 2 or more customers in a mobilehome park.

PSEP was patterned after the MHP program that requires the CPUC to inspect the natural gas systems of mobile home parks that serve two or more customers. In addition to implementing the program, AB 2430 requires the CPUC to collect a user fee from the propane operators under its jurisdiction. At present, the fee is set at twenty-five cents per unit per month or \$3.00 per customer per year. In accordance with the legislation enacted to implement this program, every operator of a propane system serving 10 or more units in a commercial or residential area or 2 or more mobilehomes must prepare and submit to the CPUC a completed Annual Report form.

Under existing law, the operator, depending on the size of the propane system, is subject to an inspection of the facility every two (for those systems that serve over 200 customers), three years (for those systems that serve at least 100 but less than 200 customers) or five years (for those systems that serve less than 100 customers). Any noncompliance with the law is subject to citation and potential fine if corrective action by the operator is not taken in a reasonable period of time.

Presently there are approximately 750 jurisdictional systems. Of these, 150 have been inspected by USB. As with any new program, USB's inspectors are finding that many operators, who are not suppliers, have little knowledge of their system. In these cases, the inspector becomes an instructor; working with the operator to list necessary actions to increase safety and bring the distribution system into compliance with federal regulations. The operator is then given a date by which to comply. Penalties for non compliance are outlined in the PU Code. Our inspectors are finding that many

operators are hiring consultants to inspect and leak survey their systems prior to our inspections. These operators are striving to comply with the law and as a result the propane systems in California are becoming safer.

USB works with the propane industry to improve the program. Many of the operators of these systems also supply the propane and because it is their main business, they are more knowledgeable of the federal regulations. USB listens to the concerns of these operators, and will seek necessary legislation to improve the program if warranted.

### **Description of a Typical Inspection**

The audit procedures are presently identical to the MHP inspection procedures. The auditor determines if the operator of the propane system has accurate maps of the system, a functional and complete emergency plan, an adequate Operation and Maintenance (O&M) plan (with documentation that the plan is being followed), periodic maintenance and timely surveys (cathodic protection, leak detection, odorant checks, etc.) of its system. If the operator needs to write an O&M or emergency plan, the auditor gives him a copy of our brief O&M and Emergency plan guide.

The auditor does some spot checks for gas leaks. If the operator has existing (permanent) bar holes, the auditor will randomly test them with a combustible gas indicator, commonly called a CGI (instrument that measures the amount of a combustible gas in an air sample usually drawn from bar hole with a long narrow probe). Otherwise, he/she will do a random above ground survey, concentrating on meter and tank connections as well as low lying areas where propane may collect.

As was necessary at the start of the MHP program, this program will be directed toward educating many operators and assisting them in developing Emergency plans, O&M plans, a schedule for doing the required tasks. as well as listing options if the system is in need of a lot of work to achieve compliance (e.g. Replacement, single tanks, alternate fuel, etc.). Without naming specific firms, the safety inspector can suggest the operator obtain the services of a consultant for performing leak surveys and repairs, cathodic protection evaluation and if necessary repair; or preparing an O&M/Emergency Plan. The inspector should inform the operator of possible options he may consider

as well as possible pitfalls in pursuing any course of action. The inspector is directed to just state facts and try to be helpful without recommending any specific type of action, brand names or specific consultants. Our goal will be to establish a reasonable inspection that will ensure the propane system is safe and the operator is following good maintenance procedures to minimize the occurrence of accidents.

Based on its early experience with this program, USB has noted several problems it will seek to solve. The first problem is capturing all jurisdictional systems in the database and keeping the database current (i.e. removing entities that become nonjurisdictional and adding new entities as they become jurisdictional). There is no existing reliable and comprehensive database of Propane master tank operators that contains the information necessary to determine whether they are subject to Commission jurisdiction. The USB database was assembled by using the Department of Housing and Community Development database to get a list of mobilehome parks and then just noting the presence of other possibly jurisdictional installations during inspection trips. One obvious source of information about propane distribution systems would be the propane vendors but they are not obligated to provide the Commission with information and generally decline to do so voluntarily.

Another problem is collecting the user fee intended to defer a portion of the program costs. Program costs are estimated to be \$300,000 to \$360,000 to inspect approximately 750 jurisdictional operators serving 30,000 customers. Assuming all operators pay the user fee, this program could generate up to \$90,000 annually. Unfortunately many operators are not paying the user fee. This is the only program for which USB is obligated to bill and collect a user fee. Consequently, the cost of billing and collection offsets most of the revenue collected.

### **Gas Incident Reports**

The USB monitors and Investigates gas incidents which occur in the service territory of utilities under Commission jurisdiction. The purpose is two-fold. First, to determine the cause and whether the utility was negligent or violated GO 112-E; and second, to determine if measures should be taken to

prevent similar incidents. By keeping a log of the incidents, the staff can track any trends that are occurring in gas incidents and initiate action to prevent them. Some past initiatives include the "Pipeline Replacement Program", "Meter Protection Program" and the "Above Ground Pipeline Inspection Program".

Each utility is required to report any incident to the United States Department of Transportation (DOT) which involves death, injury, \$50,000 or more of damage to property, including loss of gas, or in the operators judgment is significant. These incidents are to be reported to both the CPUC and the DOT within 2 hours (during working hours) and 4 hours (during non working hours) of the crew arriving on the scene. The USB has more stringent incident reporting requirements than the DOT. In addition to the requirements above, USB requires the utility to report any incident that involves significant media coverage. USB also requires the utility to file a quarterly report listing all reportable and non-reportable incidents that involve the escape of natural gas. This report includes all incidents that involve fire, explosion, or underground dig-ins regardless of the amount of property damage. This data is tabulated, analyzed and used to evaluate the need to develop other programs.

The USB staff investigates those incidents it believes are significant. This may be done by conducting a full scale investigation, visiting the site, making written data requests, conducting phone interviews with the operator and witnesses of the incident or a combination of these activities.

The major cause of gas incidents is dig-ins which account for more than half (59%) of the reportable gas incidents. Damage causing fire/explosion accounts for approximately 20 per cent of the total. The remaining 21 percent is made up of incidents caused by corrosion, construction, vehicles, material defects, suicide and miscellaneous origin (see Figure 1). Many incidents are caused by home owners and small contractors doing work on the customer's property. They are not reportable because they do not meet the criteria established by the CPUC.

On the other hand, leak repair statistics include all leaks requiring repair including the incidents listed above. Many of these leaks are detected by leak surveys rather than emergency statistics in are comprised of those caused by corrosion (37% for mains and 28% for services), third party (17% for mains and 31% for services), outside forces (3% for mains and 4% for services), construction defects

(10% for mains and 8% for services), material defects (8% for mains and 7% for services) and other (27% for mains and 22% for services) (see Figures 1 & 2). Over 68% of all the leaks found in 1997 were repaired in that year. Most of those that are not repaired (32%) are considered to be minor (grade two or three) and do not require immediate attention.

On average, about 500 to 600 natural gas incidents are reported to the USB every year. Of these only 1 to 5 percent are reported to DOT and half of those are questionable. The reason they are questionable is many incidents involve considerable damage and sometimes death or injury while the cause is unknown (e.g. a house fire caused by faulty wiring causes a wall to fall on the gas meter and it is not immediately obvious that the broken gas meter was not the initial cause. To be in Compliance with the federal rules, the utility tends to assume an incident to be DOT reportable if gas could have been the cause and rescinds its notification if gas was found not to be the cause.

During the last three years most of the DOT reportable incidents involved damage over \$50,000. There were very few fatalities or injuries related to natural gas incidents. Most of the reportable incidents that resulted in injury or fatality were caused by attempted suicides, leaks from faulty gas appliances within the home, or attempted relighting of gas appliances. Surprisingly, very few utility employees and those who dug into gas lines were injured, as a result of a gas incident. California has many more deaths and injuries caused by electrocution than natural gas.

### **Safety Related Condition Reports**

Safety-Related Condition Reports are required by the DOT to monitor situations that could affect public safety if not repaired in a timely manner. These reports are generally required in the event of a natural disaster, physical damage (e.g. dig-in), corrosion, material defect or operating error causing over pressurization of the pipe that results in the utility having to reduce pressure or shut down the line and not being able to repair it within five days. The complete definition is found in CFR 49 parts 191.23 and 191.25. The utilities appear to dislike monitoring this type of condition and prefer to

repair the occurrence as if it were an incident in less than five days. As a result, California utilities file a minimum number of "safety-related condition reports" during the year.

### **Drug and Alcohol Testing Program**

Utility Drug Testing Programs were required by DOT in 1990. Alcohol testing was incorporated in 1995. Each utility is now required to have a drug and alcohol testing program that conforms to the guidelines set forth by DOT in CFR 49 Parts 40 and 199. In essence, the utility is required to randomly test utility employees that perform "emergency response functions" in accordance with DOT's procedures. USB monitors the utility's performance by performing thorough audits at the utility's headquarters reviewing the plan that is in place, the MRO, the collection process and the chain of custody of the sample, including the drug testing laboratory. USB also devotes a section of its GO 112-E audits to ask questions of each gas unit it inspects.

### **Underground Service Alert (USA)**

USA was established in an effort to minimize the damage caused by dig-ins. USA is funded by its member utilities (gas, electric, water, telephone, cable, etc.) that are at risk of a dig-in and each utility is charged based on the number of calls that require USA's attention. The function of USA is to provide a single 800 number for excavators to call (One call system) 48 hours before they dig. USA notifies utilities that have facilities in the area to locate and mark them so the excavator will be aware of their location prior to digging.

Calls made to the 800 number are directed to one of two USA organizations in California; one serving northern California and the other serving southern California. Approximately 600,000 calls are made annually to the two locations. Of these Calls, less than one-half percent result in a contractor damaging a pipeline. Major Contractors tend to call before they dig. Some small Contractors and home owners appear to be unaware of the need to call before they dig and learn by an unfortunate experience. Even though violators are subject to fines, fines are rarely levied. The USB has endeavored to promote legislation to increase penalties for not calling USA, especially for repeat offenders and sends warning letters in particularly egregious cases. Presently, the State Contractor's

Licensing Board will revoke contractor licenses if it is determined that the contractor is ignoring the rules.

### **Pipeline Replacement Program (PRP)**

The PRP is of paramount importance to a gas utility. Its purpose is to replace old gas pipes which are technologically obsolete and prone to leakage or failure with new pipe. PG&E and So Cal Gas have implemented excellent programs which evaluate the numerous factors that must be considered in determining the priority of replacement. In general, the type of pipe, age, condition, location, proximity of known faults, population density and leak history are the major considerations in setting the priority.

As a result of the Loma Prieta earthquake in 1989, seismic effects were added as a major consideration in the formula. At this time, each pipeline segment has a seismic factor which is computed on four factors: (1) the probability of strong ground shaking, (2) the probability of surface faulting, (3) the susceptibility to soil liquefaction and (4) the susceptibility to slope failure or landslide.

PG&E and SoCal Gas presently use all these factors to develop a priority list for pipeline replacement. Both programs are well designed and appear to be an accurate method for planning and budgeting future replacements systematically. Each utility tracks the progress of its program detailing what has been accomplished and what remains to be completed. The priorities are subject to modification with substantial cause. For example when a utility learns of a planned repaving project, it may rearrange priorities so that scheduled pipe replacement can be accomplished at the same time as the paving project. Working closely with local public works departments is appreciated because it reduces disruption of traffic. As a result some pipeline replacement projects may be accelerated and others delayed.

Cast iron pipe replacement has always been at or near the top of SoCal Gas and PG&E's priority lists. SW Gas and SDG&E do not have cast iron pipe in their systems. SoCal Gas recently finished replacing all the cast iron pipe in its system. PG&E has approximately 500 miles of cast iron pipe (mainly in the San Francisco Bay area) left to replace. As shown by figure 3, PG&E is systematically

replacing this pipe as well as other high priority pipe. PG&E projects that it will complete Its cast iron replacement in approximately six years.

Pre-1931 steel distribution mains and steel transmission lines with joint configurations and girth welds not meeting current standards are a high priority on all utility pipeline replacement programs. These pipelines may be higher priority for replacement than cast iron if they operate at higher pressures, are located in highly corrosive areas, are subject to earth movement, are situated in a heavily populated area or have a leak history that logically places them at a greater risk of failure.

Leak surveys and evaluations regarding the cause of recently replaced pipe are used to judge the original pipeline replacement priorities. This coupled with unforeseen events, such as natural disasters, changes in operating conditions, city or county repaving programs, load shifts and funding all have an impact on the original set of priorities. With proper cause, replacement priorities can and should be modified. USB monitors these modifications and determines if they are in the best interest of public safety.

## **Meter Protection Program**

The meter protection program was initiated as a result of statistics indicating a high number of gas incidents were caused by vehicles hitting and rupturing gas pipelines. Upon further investigation of the statistics, it was determined that many of these incidents could have been avoided, if gas meters were either relocated or protected by steel posts. In the late 1980s, gas companies considered meter protection programs in order to minimize the vehicle caused incidents that occurred in their service territory. In 1990, the Commission ordered gas companies to develop a meter protection program and provide the Commission with annual status reports in order to monitor the utilities progress.

Initially, meter readers were to identify those meters that they felt were vulnerable to being struck by a vehicle. These meters were evaluated and many were slated to be protected. As a result of this program, the amount of incidents involving a vehicle has decrease substantially.

## **Pipe Lining Rather than Replacement Program**

PG&E requested a waiver from the federal regulations to use a liner in an existing pipeline rather than replacing the pipe. The new technology was less expensive and less disruptive to traffic than excavating a street and replacing the pipeline. In 1995, PG&E installed this liner in a large main in the San Francisco area. The pipe liner appears to be a cost effective solution to replacement for pipelines that are prone to leakage. USB is still monitoring the status of this new technology and how it performs over time. It is through the waiver process that new technologies are born and if proven to be effective are incorporated into the regulations.

## **Granting Of Waivers**

The process of granting waivers normally involves a regulated utility requesting to do something not covered by the existing regulations. In order to use a new product or technology the utility requests USB to evaluate the merit of the utility's proposal. If USB is convinced this request has merit, it will request a waiver from OPS/DOT. If the waiver is granted, the utility may proceed with the project for which the waiver was granted. It cannot use this technology elsewhere until DOT incorporates the new technology into the regulations or the utility requests and is granted a new waiver to use the

technology in another project. The use of larger diameter polyethylene pipe is a good example of how a request for a waiver eventually is incorporated into the regulations.

### **Above Ground Pipe Inspections**

Above ground pipeline inspections were initiated in 1990 after significant corrosion was observed on a major transmission line. Inspections revealed big differences in the surface condition of exposed piping in different districts within the same utility. In some districts above ground pipe was in excellent condition while in an adjacent district, there were frequent instances of surface rust and pitting.

As a result of these inspections, USB is directing some of the utilities to identify all above ground spans, state the general condition of each span, when it was last inspected, who conducted the inspection, and when work will be completed on the span, if needed. When this procedure is refined, USB will implement the program statewide. All utilities will be required to keep records of above ground facilities and these records will be reviewed during the course of normal GO 112-E inspections.

### **Seismic Safety Program**

As a result of the Loma Prieta earthquake the Seismic Safety Commission (SSC), which is charged with implementing an earthquake hazards reduction program for the state, set milestones for identifying and mitigating earthquake hazards. The CPUC was designated as the lead agency for utility systems providing critical services. In the process, the SSC set forth the following milestones:

- A. Establish, by August 1, 1989, the Channels of communications to all parties which have an interest in this sector.
  
- B. Establish, by January 1, 1990, appropriate seismic safety criteria and procedures for design, construction and operation of new facilities, hazard mitigation, and reliability improvement for existing facilities.

C. Establish, by July 1, 1990, suitable emergency response criteria and procedures to assure rapid restoration of services and to facilities repair or replacement of damaged or destroyed systems.

D. Determine, by January 1, 1991 if existing state authority is adequate to assure that seismic safety criteria and procedures will be met.

E. Provide, by July 1, 1991, for any additional state authority required to establish all seismic safety criteria and procedures.

USB staff met with the SSC after the Loma Prieta earthquake to inform it of the progress being made to restore service and to assess earthquake preparedness. In light of the significant amount of information gathered from the earthquake, the USB requested, and was granted, an extension of time from the SSC to respond to the milestones previously established by the SSC. The SSC agreed to accept a report from the Commission which would address the following five elements:

1. Policy Statement: A statement of policy that states goals, expectations, and deadlines, and explains the ranking of seismic safety in the agency's responsibilities.

2. Seismic Safety Program: A seismic safety program with a plan and process to identify earthquake hazards to people and to the organization's functions, to abate the unacceptable hazards, and to prudently manage the risks that cannot be eliminated.

3. Responsible Staff: A management level agency official having clear responsibility for meeting the goals in the policy statement, and an appropriately sized staff that has the administrative and technical knowledge and experience needed to carry out the program.

4. Adequate Funds: Funds adequate to carry out the program or a plan to raise the funds needed.

5. Accountability: A way to measure and report progress to the person or organization legally responsible for the agency, and to the Governor and the Legislature, and a way to ensure technical performance in carrying out the program.

Since 1990, the USB has worked with the utilities to insure that the above-mentioned five elements provided the foundation for the utilities' responses, and to determine various seismic considerations, parameters and lessons learned from the Loma Prieta (1989), Northridge (1994) and other earthquakes. It should be noted that many of the preventative measures suggested in this report are already being considered, or have been implemented, by the utilities; further, all utilities were found to be keenly aware of seismic issues. The USB is of the opinion that all the major utilities involved have, essentially, met the burden of developing and adopting a comprehensive and effective seismic safety program within the reasonable limits of adequate funding.

Based on the information gathered from the Loma Prieta and the Northridge earthquakes, it appears gas systems survive with relatively minor damage compared with other types of structures in the area. SoCal Gas is in the process of producing a report addressing what it learned from the Northridge quake and what can be done to mitigate problems that occur from seismic activity.

### **Other Programs**

The state is currently looking at new technology and pragmatic solutions to handle the current concerns in this state to improve gas safety. Paramount on this list is to determine the best method to control gas during and immediately after a seismic occurrence. If the interior house/building gas lines are damaged and leaking, it might be useful to have a device that would automatically shut off the gas at the meter. As yet seismic shut-off valves have not been perfected and are prone to cause false closures. The American Society of Civil Engineers is attempting to develop standards that would make these valves more effective. Other firms are working on a product that would sense the presence of gas in the air. The sensor would detect the amount of methane (CH<sub>4</sub>) in the environment and possibly carbon monoxide (CO), and at preset levels would shut off the gas supply to the building. The device would also sound an alarm much like a smoke detector notifying the occupants that the gas was shut off.

The state is also looking at better ways to measure the condition of pipelines. Manufacturers are currently developing devices that can be inserted into a gas line, travel through it and locate any areas of corrosion or damage. These devices are called "smart pigs". In time, they will be able to provide video of the interior of the pipe, measure wall thickness, determine where the pipe wrap may have been damaged, positively locate the area of concern and in some cases even repair certain conditions. These smart pigs combined with the improvement of other gas detection devices will improve the safety of the gas systems.

Other devices such as pipe liners capable of being inserted into existing pipes may greatly reduce the cost of pipeline replacement especially in highly populated areas. System Control And Data Acquisition (SCADA) systems are being used to remotely monitor critical pipeline facilities and in some cases, work as an early warning system to alert the utility to a potential problem such as overpressurization. Programs continue to be enacted as a result of information gathered following a natural disaster e.g. the water heater strapping program resulted from investigations of the causes of natural gas fires following an earthquake.

### **Other Duties Required by the Pipeline Safety Act**

The USB is required to log each of the regulated utilities' construction projects, uprates and hydro tests. During the process of logging the construction projects, USB staff also checks the utility's calculations to verify the pipe has adequate wall thickness to carry the pressure. It also performs random inspections of these activities. These inspections are usually conducted when time permits or a significant job warrants an inspection.

The USB is annually audited by the DOT to verify its ability to perform as an agent for the federal government. Federal funding is based on the results of this audit. The audit consists of reviewing USB's records of the previous year. Records regarding incident reports, inspections, citations for noncompliance and knowledge of the federal law are reviewed. Many days spent on auditing utilities and investigating gas incidents are weighted heavily. DOT also accompanies staff inspectors when they perform an audit of the utility. The DOT also requires the USB to account for its actions, to have

its inspectors fully trained by attending all the required courses at DOT's Transportation Safety Institute, to implement new rule changes in the federal regulations and to participate in certain annual meetings

The federal government is concerned about the condition of pipelines that are beyond the customer's meter. Because the responsibility of the utility normally ends at the customer's meter, DOT suggests that the utilities provide specific information to those consumers regarding the safety problems associated with customer owned service lines. The mandated use of excess flow valves (EFVs) which is opposed by many states is still being evaluated. California is opposed to mandating the use of such valves.

It is expected that a number of new provisions will be looked at during the next few years. Many of these concerns will deal with pipeline safety and effect on the environment. The Pipeline Safety Act of 1992 places the environment on an equal basis with safety in making regulatory decisions. It appears OPS is moving ahead with its risk-based planning approach. In its "work redesign" program, it identified the need for better analytical tools to assess the safety and environmental risks of pipeline transportation for long-range planning of activities. OPS is in the process of prioritizing the pipeline risks according to their probability of occurrence and consequences. In proposing solutions, it will consider the finite resources available and the relative costs and benefits to develop programs to address the risks. OPS intends to work with the industry, states and general public during this process.

### **C. Size of the California Gas System**

The California gas system (gas and propane) serves approximately 8 million gas customers with almost 88,000 miles of gas mains. Six gas companies serve California's customers. Table 1 illustrates the amount and type of transmission main and Table 2 illustrates the number and type of services each

company had in 1997. Table 3 lists the cause of leaks determined by each utility on their system in 1997. Figures 1 shows the type of gas leaks found on mains and Figure 2 shows the types of gas leaks found on service; the additional graphs show a breakdown by utility for gas mains only. The data is presented to give the reader a comparison of leaks caused by incidents as well as those detected by leak survey.

By observing the tables and graphs it is obvious that PG&E and SoCal are the two major gas Companies serving California These companies are two of the largest gas companies in the United States SDG&E while a large company in its own right is significantly smaller and is followed by SWG WWP and SCE. SCE, one of the largest electric companies in the United States has a small gas operation that serve the town of Avalon on Santa Catalina Island.

The gas that comes to California comes from the Southwest, Texas, New Mexico the Rocky Mountain Overthrust (Wyoming) and Canada. The gas pipelines serving California are capable of delivering up to 7 or 8 billion cubic feet per day if each were running full and the demand existed. California underground storage fields are capable of holding over 200 Bcf of natural gas. Of the eight storage fields in California, two are large (over 50 Bcf), three medium sized (10-50 Bcf) and the remainder could be considered small (under 10 Bcf) All are strategically located to aid gas flows in event of a curtailment on a major transmission line or severe demand during the winter.

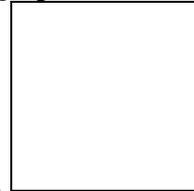
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## **Number of Leaks Detected on Mains and Services for the Major Gas Utilities in California**

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Below is a pie chart illustrating that “dig-ins” are the predominant cause of gas incidents comprising 59% of all gas incidents recorded in 1997. The second highest category involve fire and/or explosion at 20% with vehicles hitting facilities at 7%. Other incidents (14%) include corrosion leaks, construction defects, material defects and incidents that are unknown in origin such as faulty home appliances, poor gas connections, vandalism and attempted suicides. In essence this graph shows the need

for the “One-Call” (USA) system and the meter protection program.



**Figure 4**

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## UTILITY COMPANIES UNDER THE JURISDICTION OF THE CPUC

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The CPUC has been granted the authority by the Legislature to adopt and enforce requirements of G.O. 112-E on publicly owned utilities. There are six publicly owned natural gas utility companies within the state and three owned by municipalities with districts formed under the provisions of various laws of the State of California.

### A. NATURAL GAS COMPANIES



#### 1. Southern California Gas Company

Southern California Gas Company serves almost 4 million customers in Southern California. It has over 110 Bcf of underground storage capacity



#### 2. Pacific Gas and Electric

Pacific Gas and Electric (PG&E) provides electric service to about 4.4 million customers. Its service area spans 70,000 square miles, including all or portions of 48 of California's 58 counties.



### **3. San Diego Gas and Electric**

San Diego Gas and Electric (SDG&E) provides natural gas service to approximately 520,000 customers in San Diego and Orange county.



### **4. Southwest Gas Corporation**

Southwest Gas provides natural gas service to approximately 110,000 customers in Victorville, Big Bear and North Lake Tahoe within California. The company also serves much of Nevada and Arizona.



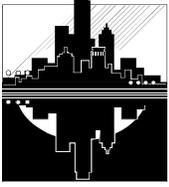
### **5. Washington Water Power Company**

This company serves approximately 15,000 customers at south end of Lake Tahoe.



### **6. Southern California Edison Company**

Edison operates a gas system (propane /butane air) system on Catalina Island. And also transports gas to one of its power plants. SCE is one of the nations' largest electric utilities, serving more than 11 million customers in a 50,000-square-mile area within Central and Southern California.



## **6. Municipalities**

These California municipalities provide natural gas service to their customers.

- Palo Alto
- Long Beach
- Coalinga

## **B. MOBILEHOME PARKS**

The Utilities Safety Branch approximately inspects 2800 mobilehome over a five year period.

## **C. JURISDICTIONAL PROPANE SYSTEMS**

There are approximately 750 jurisdictional propane systems under CPUC regulation at the present time.



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## USB'S GAS STATISTICS FOR 1997

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### **A. 112-E Inspection Areas**

In 1997, USB personnel were divided into four units where each unit was assigned specific counties to conduct G.O. 95 inspections in California. The following lists the counties each unit covered.

**Unit 1:** Alameda, Amador, Butte, Contra Costa, Del Norte, El Dorado, Humboldt, Lassen, Modoc, Nevada, Placer, Plumas, Sacramento, San Joaquin, Shasta, Sierra, Siskiyou, Solano, Sutter, Tehama, Trinity, and Yuba.

**Unit 2:** Alpine, Calaveras, Colusa, Glenn, Lake, Marin, Mendocino, Napa, San Benito, San Francisco, San Mateo, Santa Clara, Santa Cruz, Sonoma, Stanislaus, Yolo.

**Unit 3:** Fresno, Inyo, Kern, Kings, Madera, Mariposa, Merced, Monterey, Mono, San Bernardino, San Luis Obispo, Santa Barbara, Tuolumne, Tulare

**Unit 4:** Imperial, Los Angeles, Orange, Riverside, San Diego, Ventura

A file is kept on each area inspected for a period of at least 3 years. Major gas utilities are inspected periodically. Every unit of a major gas company and municipal utility is inspected every two years or more often if the condition of the unit is not in compliance with federal law. MHP and propane systems are inspected once every 5 years unless the audit warrants more frequent inspection. Records are kept in both Los Angeles and San Francisco. The federal government audits USB's records annually. Federal funding is based on the results of the federal audit.

## B. USB Inspection Data

### 1. Inspections

<b>For the 1997 Year</b>	<b>Total</b>
Number of Person-Days of Utility Inspections	279
Number of Person-Days of MHP Inspections	571
Number of Person-Days of Propane Inspections	202
Number of Person-Days Inspecting Incidents	154
Number of Person Days Performing Other Field Work	131

**Table 5. Summary of the G.O.112-E Inspections Conducted in 1997**

### 2. Incidents

<b>For the 1997 Year</b>	<b>Total</b>
Number of Incidents Reported	154
Number of Incidents Investigated	154
Number of Gas Complaints Received	200
Number of Weeks for On Call Engineer Duties	52
Number of USB Engineers* (not including management)	14

**Table 6. Summary of Incident Investigations & Customer Complaints for USB in 1997**

<b>For the 1997 Year</b>	<b>Total</b>
Number of Inspection Units Inspected (Major utilities)	74
Number of Inspection Units Inspected (Municipal utilities)	2
Number of Inspection Units Inspected (Master Meter - Gas)	553
Number of Inspection Units Inspected (Master Meter - LPG)	97
Number of Inspection Units Inspected (Major util. - Transmission)	37
Number of Inspection Violations Found	2918
Number of Inspection Violations Corrected	2471
Number of Compliance Actions Taken	689

**Table 7. Tabulation of Inspections Conducted and Probable Violations Found in 1997**

**3. Summary of Incident Causes**     •     •     •

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The following is a summary of leading causes of incidents in 1997 relating to gas pipelines.

<b>For the 1997 Year</b>	<b>Total</b>
Dig in	7,116
Corrosion	8,287
Material Defect	1,159
Construction Defect	2,215
Outside force	887
Miscellaneous other causes	6,290
<b>Grand Total</b>	<b>25,954</b>

**Table 8. Summary of Leading Causes of 1997 Incidents Relating to G.O. 112-E**  
**(includes reportable and non-reportable)**

## **C. GAS INCIDENTS & CUSTOMER COMPLAINTS**

The USB staff receives and investigates reportable gas and propane incidents from regulated utility companies or regulated systems (propane and MHP). GO 112-E states the reportable incidents are those which involve the release of gas and (a) result in fatality or personal injury rising to the level of in-patient hospitalization and attributable or allegedly attributable to utility owned facilities; (b) cause over \$50,000 in damage including the loss of gas; and (c) are the subject of significant public attention or media coverage and are attributable or allegedly attributable to utility facilities

The gas utility companies are required to provide notice to designated USB staff within 2 hours of a reportable incident. The notice shall identify the time and date of the incident, the time and date of notice to the Commission, the location of the incident, casualties which resulted from the incident, identification of casualties and property damage, and the name and telephone number of a utility contact person.

The designated USB staff is called the On-Call Engineer (OCE). The OCE is responsible for receiving reportable incidents from the utility companies and he or she is available to do so 24 hours per day. The OCE duties are shared amongst the USB staff. Each staff engineer assumes the OCE duties for an entire week (including weekends) several times per year. The OCE or a staff engineer may go out to investigate incidents at any hour, including weekends. If it is determined that a G.O. violation was involved, staff writes up a report and recommend action against the utility.

In addition, the staff maintains a data base of outages and accidents to note trends. If there is significant trending, the staff will investigate and work with utilities to correct the problem. The data base has been very useful in noting trends about dig-ins by excavators, manufacturer defects, corrosion areas, and need for meter protection. The Commission has initiated Order Instituting Investigations (OII) based on the supporting data and investigations of USB.

USB staff also handles customer complaints relating to safety issues per G.O. 112-E. Besides investigating incidents reported by the utility companies, USB may investigate customer

complaints involving alleged violations of the General Orders, sometimes on behalf of Consumers Affairs Branch or through direct referral.

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## ADDITIONAL INFORMATION

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### A. PUBLICATIONS

Copies of G.O. 112-E are available for the general public from the CPUC. Copies of federal regulations regarding pipeline safety must be obtained from the federal government. A form to obtain this information is on the last page of GO-112-E

#### 1. How to Order

Call or write to : Documents, California Public Utilities Commission  
505 Van Ness Avenue  
San Francisco, CA 94102  
(415) 703-1713

California Public Utilities Commission (most documents available)  
107 South Broadway, Room 5109  
Los Angeles, CA 90012  
(213) 897-2973

#### 2. G.O. 112-E

- Can be viewed on the internet at <http://www.cpuc.ca.gov/divisions/CSD/USB/usb.htm>
- Federal Regulations can be viewed on the internet at [http://www.access.gpo.gov/\\_docs/aces/aces140.html](http://www.access.gpo.gov/_docs/aces/aces140.html)

## B. USB ORGANIZATION CHART

Since 1997, the USB has been reorganized into three units instead of four. The following chart reflects the latest changes as of November 28, 1998.

