



National Transportation Safety Board  
Washington, D.C. 20594

**Emergency Response Group Chairman's Factual Report**

**A. Accident Identification**

Description: Explosion and fire at private residence  
Product: Natural Gas  
Location: 10708 Paiute Way, Rancho Cordova, California  
Date/Time: December 24, 2008, 1:35 p.m. PST  
NTSB No.: DCA09FP003

**B. Operations Group Members**

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**C. Accident Summary**

At approximately 1:35 p.m. (PST)<sup>1</sup> on December 24, 2008, an explosion and fire caused by a natural gas leak destroyed a residence at 10708 Paiute Way in Rancho Cordova, CA. One elderly person suffered fatal injuries and five other people, including one utility

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<sup>1</sup> All times in report are in Pacific Standard Time.

employee and one firefighter were hospitalized as a result of the explosion. Two adjacent residences had severe damage and several homes suffered minor damage.

**D. 2006 Gas Leak Repair**

On September 15, 2006, PG&E had a gas odor complaint from 10708 Paiute Way. The Company responded with a crew who went to evaluate the complaint at about 4:00 p.m. Pacific Gas and Electric (PG&E) provided gas service to Paiute Way. The source of the odor was found to be a leak from the gas main in front of the residence. Specifically, the leak was found in a 2-inch Aldyl-A plastic pipe main that had been installed in 1977. The leak in the gas main was found in the yard of 10708 off the South side of the Street. The work was completely repaired on September 21, 2006 after 20 feet of 1 ¼ plastic PE (polyethylene) pipe was inserted inside the older 2-inch pipe and across the leak.

(Attachments 1 & 2)

**E. Pre-Explosion Odor Complaint**

On December 24, 2008 at about 9:16 a.m. (all response times are from PG&E timeline), the PG&E customer contact center received a gas odor complaint from a resident at 10716 Paiute Way. The caller reported a gas odor outside her house. The customer contact center prepared a case ticket<sup>2</sup> and contacted PG&E dispatch. As part of normal procedure, PG&E dispatch prepared a field order from the case ticket. A field order is the action of dispatching personnel to work on a case ticket. This field order was to have a gas service representative (GSR) respond to 10716 Paiute Way.

(See Attachments 3 & 4)

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<sup>2</sup> The customer contact center must create a case number in reference to the customer's call. The case number leads to the creation of a case ticket package or case ticket being prepared. The case ticket is put into the company's information system. The case ticket consists of the printed request from dispatch, information from the customer's call, and sometimes a map of the pipeline(s) at the location to be investigated. The case ticket is to be used as a reference for all response personnel responding, including GSRs and the maintenance & construction personnel.

**F. Initial PG&E Response to the Odor Complaint**

On December 24, 2008, Christmas Eve, it rained in the early morning hours and continued to sprinkle, on and off through the morning.<sup>3</sup> At about 9:21 a.m. on December 24, 2008, PG&E dispatched a GSR to respond to 10716 Paiute Way with a field order. The field order was to investigate an outside gas leak at a meter, and was prioritized as “zero”.<sup>4</sup> According to a PG&E field service supervisor, a zero priority rating called for an immediate response. A supervisor stated that, in some cases, personnel would drop whatever they were doing to respond to this type of field order.

At about 9:30 a.m. the GSR entered a code into PG&E’s field automation system (FAS) using her laptop. The code confirmed that she had received the field order. At about 9:55 a.m. she entered another code in to the system indicating that she was en route to 10716 Paiute Way.

(Attachments 3 & 5)

The GSR arrived at the scene at about 10:14 a.m. with a combustible gas indicator. Although a combustible gas indicator could best handle an inside leak; the GSR picked up natural gas readings in a box outside the house<sup>5</sup> as she carried the combustible gas indicator toward the door of 10716 Paiute Way,

When the GSR arrived outside 10716 Paiute Way she met the resident outside the single-story<sup>6</sup> home. The GSR interviewed the resident and learned that she no longer smelled gas outside her house as she had when she called in the leak earlier that morning. The GSR tested the outside meter (clock test<sup>7</sup>) and inside of 10716 and found no gas. The

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<sup>3</sup> NTSB Weather Report

<sup>4</sup> The PG&E manager stated: “We have priority jobs and priority zero is your next job.”

<sup>5</sup> A water box is a box put on the water line by the water company. It allows a junction of water lines, a location for a meter or a way of dispensing water without a hose or a faucet.

<sup>6</sup> All homes on the street were single story homes on concrete slabs.

<sup>7</sup> This test checks the meter for excess flow across it, indicating gas is going through the line into the house at a fast rate. The test is done by taking a reading at two different times to determine the change over time. The GSR often started a clock test and finished it later by returning to the residence after visiting another house. This report does not

resident informed the GSR that she did however smell gas outside her next-door neighbor's house at 10712 Paiute Way. The resident pointed out the neighbor's house. At about 10:24 a.m. the GSR then proceeded toward 10712 Paiute Way.

Knowing the gas was probably in a yard outside of a building, the GSR called PG&E's customer contact center. The call, made at 10:25 a.m., was to a phone number that connected directly to the dispatch center (PBX Line). This call was made according to the PG&E Gas Leak and Odor Response of August, 2008 (S6434), and the PG&E Gas Leak Investigation Procedure of September, 2008 (WP6434-01). In the call, the GSR requested that the 10716 Paiute Way case be forwarded to the maintenance & construction (M&C) department. She wanted an M&C crew dispatched to the scene to assist with the leak investigation in the yards. The M&C crew would be equipped with a flame ionization device (FID) or "flame pack." The FID could allow it's operator to determine the exact leak location outside. The operator would also be able to learn the gas migration path.

The PG&E customer contact center created the case ticket for 10716 Paiute Way at 10:28 a.m. The Gas Distribution Supervisor (from the M&C department), on duty later, acknowledged the case ticket for 10716 Paiute Way at about 10:41 a.m.

Arriving at 10712 Paiute Way, the GSR knocked on the door, and entered the house at the invitation of the female resident. The resident informed the GSR that she had smelled a gas odor outside her house. Upon learning of this, the GSR asked the resident of 10712 Paiute Way to call PG&E's customer contact center to report a leak in her yard. The GSR knew that the call from the resident at 10712 Paiute Way would lead to the creation of a new field order for that address.

(Attachments 3, 4, 6, 7, 8 & 9)

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indicate the exact times for beginning and finishing each test. During the GSR travels between houses, she was always trying to analyze the underground migration path of the natural gas.

The GSR tested inside of 10712 Paiute Way and first, found a small “fuzz leak” at the water heater. This leak was eliminated by tightening a fitting on the unit. Next the GSR proceeded to the garage where she detected “a little whiff” of natural gas with her nose. She then went back into the kitchen to investigate further and met the male resident. He indicated that the source of the leak was in his next door neighbor’s yard at 10708. A clock test was performed on the meter at 10712 and no problems were found.

The customer contact center received a call from the resident of 10712 Paiute Way at about 10:29 a.m. The customer indicated that there was a strong gas odor coming from outside her house in the area of the garage.

The GSR called the concord dispatch at about 10:32 a.m. Like the call at 10:25 for 10716, the GSR was requesting that an M&C crew respond to 10712 Paiute Way. At about 10:35 a.m., the GSR made another phone call, this time directly to the customer contact center to request the a M&C crew be dispatched to 10712 Paiute Way.

The male resident of 10712 led the GSR outside and into the yard of 10708 Paiute Way. Once in the yard, the GSR detected some natural gas in the yard with her nose. The 10712 Paiute Way resident told the GSR that he had smelled gas at that location for about a year and had called the gas company about it.. He also informed the GSR that a repair had been completed at that location roughly a year ago.

The GSR suspected the leak was probably at the location the 10712 resident indicated. She made this decision based on a patch of dead grass located in the 10708 yard. (The dead grass was in the middle of the yard about five feet west of the driveway, and roughly 45 feet from the residence.)

The GSR’s combustible gas indicator had a more limited range than a FID.<sup>8</sup> However, the combustible gas indicator allowed the GSR to detect natural gas near the dead grass.

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<sup>8</sup> Most combustible gas indicators read from 0 (0% gas-in-air) to 1(100% of the lower-explosive-limit or 4% gas-in-air).

Specifically, the GSR's combustible gas indicator got a reading of 63% of the lower explosive limit (LEL). The LEL is approximately 4% gas-to-air, therefore the gas to air ratio was roughly 2.5%.

However, the GSR was not certain this was the exact location because of her limited equipment. The GSR called concord dispatch again at 11:01. Two minutes later the GSR called an M&C clerk. Another call, at 11:06, was made to the leak investigator who was responding to the site.

(Attachments 3, 4 & 9)

The GSR went to the door of 10708 Paiute Way and she was unable to gain entry because no one was home at that time.

At about 11:11 a.m. the GSR called dispatch to request a field order for 10708 Paiute Way. The field order documented the leak in the front yard and that there was no flow on the gas meter at 10708. At about 11:17 a.m. the GSR made another call directly to the PG&E customer contact center. The call was to request that the 10708 Paiute Way case be forwarded to the M&C department so a crew could be dispatched to the scene and assist with the leak investigation. The GSR was still hoping an FID and operator would arrive.

After completing the field orders, the GSR made several calls to co-workers in an effort to determine the status of the responders and help them with directions to the site. An M&C department supervisor spoke with the GSR, and the supervisor advised the GSR to stay on site until being relieved by the M&C department.

(Attachments 3, 4, 9, 11 & 12)

Before the M&C personnel arrived, the GSR waited in her vehicle across the street in front of 10716 and 10712 Paiute Way. The GSR was unaware that a family had entered

10708 Paiute Way while she was waiting for the M&C crew. According to postaccident interviews of the family members, they had returned to 10708 Paiute Way at approximately 12:00 p.m. The gas service representative did not see the family arrive and they did not notice the PG&E vehicle parked nearby.

(Attachments 3, 4, 10, 11 & 13)

**G. PG&E Management Response to the Field Investigation**

While the PG&E GSR was making calls and investigating for leaks. The customer contact center created the case ticket for 10716 Paiute Way at 10:28 a.m. The gas distribution supervisor on duty acknowledged the case ticket for 10716 Paiute Way at about 10:41 a.m. He then proceeded to telephone for a leak investigator<sup>9</sup> at 10:42.

The first fieldman called was unable to respond because of his location, so a second fieldman (the fieldman) was called out at about 10:42.

The customer contact center created the case ticket for 10712 Paiute Way at 10:42 a.m. The M&C department acknowledged the case ticket for 10712 at 11:11

The customer contact center created a case ticket for 10708 Paiute Way at about 11:22 a.m. (40 minutes after 10712), the M&C department acknowledged it at 11:26 a.m.

Responding to further calls from the GSR, a second M&C supervisor telephoned and dispatched a gas crew foreman to the site at 12:30 p.m. The fieldman was dispatched in a separate truck.

(Attachments 3, 4, 9, 10, 11 & 12)

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<sup>9</sup> The official PG&E title for this position was “equipment operator. Other titles used included “leak investigator,” “leak locator” and “leak surveyor.”

## **H. PG&E Personnel Arrival in the Field**

The leak investigator was delayed by traffic and he arrived at the PG&E service center to pick up the FID at about 11:30 a.m. The leak investigator had problems with his truck brakes, which forced him to acquire another truck and delayed his departure to Paiute Way. He called the GSR 3 times, but never notified his supervisor of his delays. The leak investigator departed the PG&E service center at about 12:42 p.m., over an hour after his arrival at the facility. The leak investigator had not notified the dispatch of the two delays he experienced.

The foreman arrived on site at about 1:14 p.m. and the leak investigator arrived at about 1:19 p.m. The fieldman was the last of the crew to arrive at the site at approximately 1:22.

(Attachments 3, 4, 9, 10, 11 & 12)

## **I. PG&E Personnel Actions On-Site**

The foreman who arrived first was briefed by the GSR who told him that there was a probable leak in front of 10708 Paiute Way where there was dead grass. She also told the foreman that she had obtained gas readings in the water boxes. Finally, she told the foreman that the 10708 residence has not been checked for gas since no one had been home when she tried to make contact with the residents. The foreman then relieved her and she left the scene. The other two crewmen arrived soon after and the foreman and fieldman began marking and locating the main and services in front of 10712 and 10708 Paiute Way. The leak investigator briefly met with the crew foreman to share the plat showing the location of the gas line and the crew foreman told the leak investigator that the service representative found a gas reading in the water boxes but a stronger reading in front of 10708 Paiute Way where the dead grass was located. The leak investigator knocked on the door of 10708 Paiute Way and met the granddaughter at the front door. The granddaughter introduced the leak investigator to her grandfather. The grandfather



and leak investigator had a brief discussion about the gas line at the family's door. The leak investigator had not smelled any gas at the residence door. No one from the residence reported any odor of gas in the home. The leak investigator did not ask to check the residence for gas.

Once the leak investigator finished his discussion with the resident he acquired his FID and began surveying along the main in front of 10712 Paiute Way and then toward 10708 Paiute Way when he discovered signs of a leak over the gas main in a dead patch of grass. He proceeded to survey along the service line up to the riser near the foundation of the home at 10708 Paiute Way, but he did not find any signs of a leak near the structure. As he turned around to survey back to the dead patch of grass the house exploded.

(Attachments 3, 4, 9, 12 & 13)

#### **J. Police and Fire Department Responses**

On December 24, 2008 at approximately 1:35 p.m. two Rancho Cordova Police officers heard a very loud noise that sounded like an explosion and immediately notified their dispatch. The Sacramento Metropolitan Fire Department was also dispatched, and first responders arrived on scene at approximately 1:43 p.m. As the fire department worked to extinguish the fire, paramedics prepared all the victims for transport. There were a total of six victims, all of whom were transported to the hospital by 2:00 p.m. PG&E personnel and the fire department verified that there was an active gas leak near the explosion site and as a result an evacuation was enforced for 10 houses away from the explosion site in both directions. The evacuation started at 2:04 and concluded at about 5:03 p.m. on December 25, the day following the explosion.

A Sacramento Metropolitan Fire Department investigator interviewed the 17 year old granddaughter of the homeowner at Shriners Hospital for Children on Monday December 29, 2008. She told the investigator that there had been a problem a couple of years ago with a natural gas leak that was strong inside the house. The leak had killed the sod in

front of the house. She stated that PG&E responded, found, and repaired the leak. She also stated that her grandfather had warned her of a gas odor in the house before arriving home at approximately 12:00 p.m. on December 24, 2008 and that she had smelled a strong odor of gas both outside and inside the house. She indicated that a leak investigator for PG&E had knocked on the front door and that her grandfather and the technician went outside. She returned to the bathroom and shortly thereafter she heard a whoosh, two explosions and immediately escaped to the street. On January 15, 2009, the family's lawyer responded to additional questions from Safety Board investigators on behalf of the homeowner's daughter. The response indicated that she arrived at the residence shortly before noon. She did not see any PG&E vehicles or personnel, nor did she see any kind of notice on the door directing her not to enter before PG&E could check the premises. She also stated that she did not inform the leak investigator that she smelled gas inside the house because she did not smell any at the time. She indicated that the PG&E leak investigator did not request entry into the residence to check for gas.

(Attachment 2 & 13)

Emergency Response Group Chairman

Charles Koval

**K. Factual Report List of Attachments**

Attachment 1 – Pacific Gas and Electric work order for 10708 Paiute Way (2006)

Attachment 2 - PG&E Installer Interview (December 31, 2008)

Attachment 3 – Rancho Cordova PG&E Timeline (redacted by PG&E)

Attachment 4 – PG&E Gas Service Representative Interview (December 31, 2008)

Attachment 5 – PG&E Field Service Supervisor Interview (February 5, 2009)

Attachment 6 – M & C and Field Services New Gas Leak Follow-up Process

Attachment 7 – PG&E Gas Leak and Odor Response Process of August, 2008. (S6434)

Attachment 8 - PG&E Gas Leak Investigation Procedure of September, 2008 (WP6434-01)

Attachment 9 – PG&E Gas Distribution Supervisor Interview (with Gas Compliance Supervisor)

Attachment 10 – PG&E Fieldman Interview (December 31, 2008 )

Attachment 11 – PG&E Leak Investigator Interview (December 31, 2008)

Attachment 12 – PG&E Gas Crew Foreman Interview (February 5, 2009)

Attachment 13 – Sacramento County Sheriff's Department Report