7th Street Natural Gas Leak After Action Report

City of Grand Junction > September 16, 2013

Table of Contents

Executive Summary

Incident Information

On March 19, 2013, the City of Grand Junction responded to a significant incident involving multiple City departments, private companies, and outside agencies that had the potential to escalate beyond local capabilities. The incident began when utility workers using a boring machine, ruptured a 6 inch intermediate pressure natural gas line at a busy intersection. The pressurized gas was initially contained underground until it migrated into the sewer system. From the sewer system, gas ventilated from manholes and into surrounding structures resulting in explosion and fire and the evacuation of approximately 187 homes in an 8-10 block area. Eight victims (three with burn and soft tissue injuries and five uninjured) were displaced from two homes that were destroyed and a third home incurred exterior fire damage. The evacuation area also included 29 business/non-residential structures, three schools, one day care, and two churches. Xcel Energy estimated that 104 buildings were without power and gas, including the Colorado Mesa University campus. During the initial hours, the Grand Junction Regional Communications Center received 700-800 calls for service. The incident grew quickly and all personnel involved worked closely under the incident command system to bring the situation under control as quickly and safely as possible. After the initial 12 hour emergency phase, the incident transitioned into a recovery phase for additional three days. During this time, City departments, relief agencies and businesses assisted the evacuated residents with food, shelter and personal needs. Natural gas readings continued to be taken for weeks after the incident until readings were consistently negative and discontinued on May 9, 2013.

After Action Report Information

This After Action Report (AAR) is created by the City of Grand Junction and intended to be an educational tool for improving the overall management and mitigation of emergency incidents. The development of the AAR was suggested by City of Grand Junction Administration and created by a task force made up of City personnel from all involved departments. The general direction of the task force was to evaluate this incident and document successes and areas for improvement for future incidents of this magnitude.

The AAR process consisted of interviews of those involved, review of radio communications and any other information developed as part of this incident. An attempt was made to contact and interview every person that was involved in this incident. This included public safety employees from the Grand Junction Fire Department, Grand Junction Police Department, and Grand Junction Regional Communication Center. Interviews were also conducted with employees of the City of Grand Junction Public Works, Utilities, and Planning Department and City Administration. Outside interviews were conducted with Grand Valley Traffic Control, Mesa County Valley School District 51, the Western Colorado Chapter of the American Red Cross, and Xcel Energy (Xcel). Apeiron Utility Construction

(Apeiron) and Safe Site Utility Field Services (Safe Site) were contacted but declined to respond to the interviews. The information obtained from these interviews and the Post-Incident Analysis (PIA) conducted directly after the incident was used to develop this report.

Findings and Recommendations

During the interview process of those involved, common successes emerged that should be recognized and celebrated. Overall, the City and all employees worked very hard to provide the best service to the community and bring this incident to a close. There was excellent cooperation between all entities on scene, all working towards a common goal of supporting the City of Grand Junction residents. There were no fatalities to the public or any injuries to any workers on the scene.

Common themes also emerged for areas of improvement including; incident command, operations, incident communications, public communications, recovery, and prevention.

Full implementation of the Incident Management Team emerged as an area for improvement under command and operations. A unified command was established but there were no formal positions identified to support command. According to the Federal Emergency Management Agency (FEMA) and the United States Fire Administration (USFA) an Incident Management Team consists of an incident commander and the appropriate command and general staff personnel assigned to an incident. Both FEMA and the USFA define unified command as incidents involving multiple jurisdictions, a single jurisdiction with multi-agency involvement, or multiple jurisdictions with multi-agency involvement. Unified command allows agencies with different legal, geographic, and functional authorities and responsibilities to work together effectively without affecting individual agency authority, responsibility, or accountability. Had an Incident Management Team been assigned under the unified command there would have been better control of information and resources. For example, by appointing a Planning Section Chief, each operational period would have been identified and plans for subsequent days would have been outlined and needs addressed before they occurred. Other command and general staff positions would have also brought information together to fully support the incident. A Joint Information Center (JIC) was established but there was a breakdown in the flow of information out of the command post without sufficient support from command and general staff.

A number of recommendations to include education of key players within the City of Grand Junction and the implementation of incident command training are paramount in preparing for major incidents in the City of Grand Junction. The possibility of creating a Type 4 Incident Management Team should be explored to handle similar large or complicated incidents in the future.

Since the incident, both the City of Grand Junction and Xcel Energy have made procedural changes to prevent a similar incident in the future. Complete details of the findings and recommendations are contained in the report.

Background - Emergency Phase

Address:	North 7th Street and Orchard Avenue
Utility Locates Started:	March 14, 2013
Incident Date:	March 19, 2013
City Departments/Divisions Involved:	Administration, Fire, Police, Public Works, and Communications Center
Companies/Outside Agencies Involved:	Apeiron Utility Construction, Art Center, Colorado Public Utilities Commission, Grand Valley Traffic Control, Mesa County Sheriff's Office, Mesa County Valley School District, Safe Site Utility Field Services, Western Colorado Chapter of the American Red Cross, and Xcel Energy

Benchmarks:

Estimated Time of Gas Line Breech:	11:39 a.m.
911 Call for Gas Line Breech:	11:54 a.m.
Reverse 911 Call (shelter in place/evacuate area):	12:38 p.m.
First Evacuation Area Established:	12:41 p.m.
Tope Elementary School Shelter in Place:	12:44 p.m.
First Report of Explosion:	12:48 p.m.
Patient Transport:	1:09 p.m.
Structure Evacuation of Fire Crews:	1:29 p.m.
Main Gas Leak Controlled:	1:55 p.m.
Main Gas Leak Repaired:	5:40 p.m.
Gas Shut Off to Fire Damaged Structures:	8:48 p.m.
Fire Extinguished:	9:13 p.m.
Incident Command Terminated:	11:29 p.m.

Situation Description

Pre-Incident Description

1752 & 1742 North 7th Street

Pre-Incident

On March 14, 2013 utility locates began at the intersection of North 7th Street and Orchard Avenue and the surrounding area to prepare for routine upgrades and improvements to the traffic signal. City street division personnel were popping open manhole lids and measuring down to pipes for storm water and irrigation systems. These measurements were provided to Apeiron Utility Construction along with a hand written map showing the depths and locations of storm sewer and irrigation lines.

On March 15 all utilities at the intersection of North 7th Street and Orchard Avenue had been located. City street and traffic divisions were on site with Apeiron and Safe Site. Apeiron personnel were inquiring from Safe Site about the locations of two gas lines that were located and marked close together.

On March 18 City streets division personnel were at the intersection performing jack-hammering to remove concrete around pole bases. While working they observed Apeiron and Safe Site discussing the verification of gas lines that were exposed by potholing.

On March 19 at 11:00 a.m. a City traffic division supervisor arrived and spoke with Apeiron personnel. Apeiron indicated they had questions about the existing conduits in the traffic signal cabinet. At approximately 11:15 other City traffic personnel arrived to discuss a rattle Apeiron heard as they were boring from west to east under North 7th Street. At approximately 11:22 a City locator and street division employee was consulted about the possibility of there being an abandoned water line in the street. At 11:39 traffic division personnel opened the cabinet door and began to look at and expose the existing conduits in the cabinet. Shortly after opening the door they heard a gurgling sound and pressurized mud blew out of the

bore hole onto the traffic division employees. The estimated time of the gas line breech and subsequent gas release was 11:39. At this time the cabinet door was closed.

Incident Description

At 11:40 a.m. a City traffic department employee opened the cabinet again and put the intersection signal into "flash" mode. At 11:41 the signal was placed into "black" mode to eliminate any switch arcing that could be a potential ignition source and workers on scene could begin to manually control traffic. For the next several minutes scene operations included calling 911, blocking off the intersection, trying to control traffic and people, contacting supervisors, and making notifications regarding the incident that just occurred.

At 11:55 Grand Junction Fire Department Truck 3 was dispatched non-emergent to the intersection of North 7th Street and Orchard Avenue for a report of a punctured gas line. After the initial update from dispatch, Captain 3 requested dispatch notify Xcel to respond with an estimated time of arrival of 15 minutes. Upon arrival at 12:04 Captain 3 found construction crews around a bore hole in the intersection of North 7th Street and Orchard Avenue. Crews from the City and Apeiron were discussing the line break and Captain 3 could see natural gas vapors venting out of the bore hole with increasing volume. Truck 3 was pulled past the scene to the south of North 7th Street and Orchard Avenue to place them upwind of the incident. Firefighter 3 was assigned to walk the perimeter with the ITX gas monitor (ITX) to determine the lower explosive limit (LEL) in parts per million (PPM) of the air. Nothing significant outside of the immediate area of the bore hole was registered.

Captain 3 made contact with the City and Apeiron representatives in the area to determine needs from the fire department. Traffic control measures were moved back an additional block in each direction, contact was attempted with

residents/businesses in the three houses and the Art Center at the intersection of 7th and Orchard, and air continued to be monitored with the ITX.

At 12:13 p.m. the incident was moved to a tactical radio channel for the operation. At 12:14 Captain 3 requested Water and/or Persigo Wastewater division representatives respond due to visible natural gas venting from the manhole in the intersection. At 12:17 dispatch advised that they notified the water department who had a response time of 15 minutes and Persigo who had a response time of 20 minutes.

At 12:20 City utility division supervisors arrived on scene and responded to the intersection of North 6th Street and Orchard Avenue and contacted the City locator who was attempting to control traffic at that location. They assisted with traffic control, conducted an assessment, and began to remove manhole covers in an attempt to provide early ventilation.

At 12:27 Truck 3 pulled a hand line for protection of the workers that were preparing to dig up the street. At approximately 12:30 Captain 3 met with a representative from Persigo who stated they have no way to shut off the gas and suggested they pull the manhole covers in the immediate area and the City employees started to lift the covers.

At 12:30 a Persigo supervisor arrived on scene and consulted with Captain 3. Based on gas emitting from the manhole, his knowledge of the underground piping systems, and where this gas would go, he recommended to Captain 3 that they enlarge the initial scene area. At this time a Persigo truck and crew were northbound on North 7th Street and were nearly on scene. Upon their arrival they began to remove manhole lids as well.

At 12:38 Captain 3 requested a reverse 911 call to advise residents and businesses in a two-block radius to stay away or shelter in place, turn off HVAC units, and close windows and doors.

At 12:41 Captain 3 requested a second engine to respond to the area for additional personnel to begin an evacuation of the immediate area of 7th and Orchard (fire crews never completed this evacuation due to the explosion and fire. Grand Junction Police Officer's arrived on scene and completed the evacuation of both sides of 7th from Orchard to Elm). At 12:42 Truck 1 was dispatched, went enroute, and made contact with Truck 3 for an assignment. Truck 3 was noted to be "on air" while updating Truck 1. They were assigned to stage with Truck 3 and then to meet face-to-face once on scene. Two City utility division supervisors walked to North 7th Street and Orchard Avenue and within a couple of minutes heard a loud explosion. This turned out to be the house explosion at 1752 N. 7th Street. At 12:44 Tope Elementary School sheltered in place.

At 12:48 Firefighter 3 notified Captain 3 of an explosion to the south of the intersection. At the same time Engineer 3 notified dispatch on Fire Primary Channel that they needed two additional engines to the location of the gas leak for a house explosion with visible fire. Captain 3 then advised dispatch on Tac 1 that an ambulance and structure response was needed one block south of the intersection. Dispatch advised they would send a full structure assignment. Truck 1 upgraded their response to emergent from North 7th Street and North Avenue and Battalion 1 responded emergent from North 7th Street and Ouray Avenue. Ambulance 3 and Engine 2 were monitoring the radio and responded upon hearing the request for additional resources. Dispatch advised that Ambulance 2 should also go ahead and respond to the location.

At 12:50 Captain 3 stated that they have a fully involved house fire with an associated explosion at 1752 North 7th Street, he needed a second ambulance with the balance of the structure assignment, and he established 7th Street Command. Upon arrival, Ambulance 3 was assigned to staff the protection line for the workers digging in the intersection of North 7th Street and Orchard Ave.

At 12:51 Engine 4 was dispatched as the fourth engine in the structure assignment and Truck 1 and Battalion 1 both arrived on scene. When Captain 1 arrived he noted a pancake collapse of the structure at 1752 North 7th Street (Exposure 0 structure) with a small amount of fire in the interior. Firefighter 3 was providing exposure protection to the structure at 1742 North 7th Street (Delta 1 structure) and providing extinguishment of the exterior siding of 1806 North 7th Street (Bravo 1 structure). *See photo to the left showing the location and description of structures.* Captain 1 met face-to-face with Captain 3 who stated that the Exposure 0, Delta 1, Delta 2, and Bravo 1 structures were evacuated and clear (Bravo structures were north of 1742 North 7th Street and Delta structures were south of 1742 North 7th Street). Captain 3 assigned exposure protection of the Delta 1 structure to Truck 1. Upon arrival Battalion 1 contacted Captain 3 to assume command. Captain 3 stated that Truck 3 and Truck 1 were performing exposure protection to the Bravo 1 and Delta 1 structures along with extinguishment of the Exposure 0 structure and that there was gas in the sewer system. Captain 3 stated that the Bravo 1 and all Delta structures were evacuated and clear and the rest of the homes needed to be cleared. He also stated that there were two victims located with a PD unit at the church south of the incident. Battalion 1 copied and assumed 7th Street command and requested a Personal Accountability Report (PAR) of all crews on scene due to the initial explosion. Captain 3 stated that there was a full PAR on scene.

A Grand Junction Police Department Sergeant notified command stating that he had three burn victims at his vehicle located in the church parking lot south of the incident. Battalion 1 copied and assigned Ambulance 2 to respond to that location for patient treatment and transport.

At 12:55 Captain 1 notified command that the Delta 1 structure was now involved with fire and Battalion 1 assigned Engine 2 to assist with exposure protection on the Delta 1 structure upon their arrival. Battalion 1 also requested Engine 5 to respond for Rapid Intervention Team (RIT) and an additional ambulance to respond to the scene. Ambulance 6 stated that they were in the area and could respond if needed. They were assigned to respond to the church parking lot south of the incident to assist with patient care. Dispatch advised that they could send one Incident Dispatch Team (IDT) member to the scene if needed. Battalion 1 accepted the request and requested they respond to the command post in the Art Center parking lot just south of Orchard Avenue on North 7th Street.

At 12:59 Engine 4 arrived on scene and was assigned search of all the Bravo structures north of the incident. Upon their arrival they noted that the Exposure 0 structure had collapsed and that there was fire in the roof area of the Delta 1 structure. They also noted gas coming from the open manhole in the street ½ block south of Orchard Avenue on North 7th Street. Due to the visible gas, Engineer 4 moved their apparatus to the parking lot of the Art Center away from the incident. Ambulance 2 advised that Ambulance 6 would be transporting all patients to the hospital and were available for re-assignment. Battalion 1 assigned them to stage on scene as medical.

At 1:01 p.m. Captain 2 advised that there appeared to be fire on the interior of the Delta 1 structure and that they would be making an interior attack to extinguish the fire and save the house. Captain 1 established Delta Division to supervise the operations of the Delta 1 structure. Upon entering the Delta 1 structure, Captain 2 stated he had an all clear of the residence and they continued to search and extinguish fire in the attic area of that house.

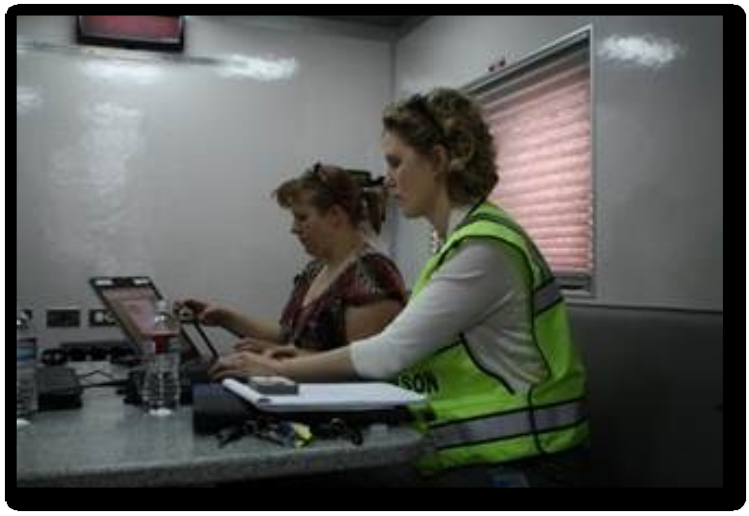
Captain 4 advised that the Bravo 1 structure was clear and that the eaves of the Delta 1 structure appeared to be on fire. Engine 5 arrived and was assigned to clear the remaining Bravo structures with Engine 4 and then stage as a Rapid Intervention Team (RIT).

Captain 1 advised that the smoke was building in the eaves on the bravo side of the Delta 1 structure. Captain 2 stated that they had extinguished the room and contents fire on the first floor, were going to the second floor and needed a second hose line brought to the first floor for protection. Once on the second floor they attempted to access the fire in the attic and extinguish. Efforts were hampered in accessing the attic due to multiple ceiling layers and the type of material used to cover the ceiling. The interior crew stated they had to use a chainsaw in order to access the attic area due to this ceiling material. Ambulance 1 advised crews on scene that there was fire on the roof line of the Charlie side of the Delta 1 structure. Captain 2 requested a Conditions–Actions–Needs (CAN) report from the Delta Division who stated that there was fire coming from the eaves on side Bravo with some light to moderate gray smoke pushing from the rest of the eaves on the second floor. Captain 1 advised that Truck 1 would be assisting with interior operations of the Delta 1 structure. The fire on the first floor started burning again and Truck 1 extinguished the remaining fire on the first floor. Once the fire was extinguished on the first floor, Truck 1 moved to the second floor to assist with extinguishment of the attic area. Battalion 1 reminded Captain 3 that since this was a gas fed fire it should not be completely extinguished in the Exposure 0 structure.

At 1:04 Tope Elementary School was evacuated and students transported to West Middle School by bus. At 1:06 evacuation area expanded north on both sides of 7th Street from Orchard to Bookcliff and south to include Grand Junction High School. Students evacuated to Sherwood Park. At 1:24 Battalion 1 established a unified command with the Grand Junction Police Chief at the north parking lot of the Grand Junction High School. This area also served as a staging area for incoming units. A PAR check was completed with a full PAR from all units on scene.

At 1:29 Captain 3 notified command that there was gas venting and burning from a vent pipe on top of the Delta 1 structure and he recommends they move to a defensive operation. Truck 1 notified command that they copied the traffic to evacuate from Captain 3 and stated that they were leaving the

structure. The Incident Safety Officer called for emergency evacuation horns to be sounded and Engineer 1 sounded the signal. Captain 1 hearing the emergency evacuation signal continued to quickly exit the Delta 1 structure. Upon Truck 1 exiting the Delta 1 structure they gave a full PAR. A PAR check was then completed for all units on scene giving a full PAR and this incident became a defensive operation at this point.



The Grand Junction Regional Communication Center (GJRCC) Mobile Communications vehicle was requested to respond to the command post at 1:36 p.m. with one supervisor and one driver. At 1:44 a Joint Information Center (JIC) was established with multiple Public Information Officers (PIOs) and the American Red Cross was notified to contact IDT 1. Five press conferences were held through the day (Appendix L).

Units on scene commented that the utilities to all of the homes on both sides of North 7th Street were secured and a tow truck was called to remove vehicles parked on the Charlie/delta corner of the Delta 1 structure to prevent any damage from the fires. Captain 3 advised that the area was safe to drive a tow truck as readings were negative on the ITX. Crews started to again remove manhole covers in the surrounding area of the original gas leak to allow for gas to vent out of the sewer system.

At 1:51 Battalion 1 passed command to Battalion 2 in the unified command post and Battalion 1 became the Operation Section Chief (Ops) and was mobile on the fire ground. The location of the unified command post was established in the parking lot of Grand Junction High School. Efforts began in the

command post to get key individuals with decision making capacity from the various businesses/entities/agencies that were assisting—including Xcel Energy, Apeiron, Persigo, and the City Streets division. Once back on scene Ops performed a face-to-face with all crews to determine the next phase of the operation of continuing to provide exposure protection to the Bravo 1 and Delta 2 structures. The fire in the Exposure 0 and Delta 1 structures would be monitored but allowed to burn so that the flowing gas in the area would not pose a greater problem. The gas to the main line had been shut off at 1:55 but residual gas in the lines was burning off through the fires. Firefighters in full personal protective equipment including self-contained breathing apparatus began opening manhole covers in a greater perimeter to facilitate the venting of gas out of the sewer. This included the area south of Bookcliff Avenue to Glenwood Avenue and from North 6th Street to North 8th Street.

Delta Division requested an engine to re-locate to the Charlie side of the Delta 1 structure to protect structures in that area from the changing winds and blowing the smoke column across the alley. Engine 4 was re-assigned to that location to assist the Delta Division with exposure protection.

At 2:27 p.m. a personnel rehab area with food and drink was established in the Grand Junction High School for all law enforcement units and at the Art Center for all fire units.

During the defensive operations, flames were kept from spreading to other exposures with hand lines from Truck 3, Truck 1, Engine 2, and Engine 4. Engine 5 maintained their position as RIT and Captain 5 continued to function as the Incident Safety Officer. Ambulance 1 and Ambulance 2 worked on their assignment to remove all of the manhole covers in the area. The situation was continually monitored and fires kept from spreading to additional homes. Xcel continued to try to isolate the gas lines feeding the Exposure 0 and Delta 1 structures so that they could be completely extinguished. Over the next four hours all fire crews were continually rotated through personnel rehab to allow the crews rest and hydration. At 2:45 the first press conference was conducted by the JIC.

At 2:58 Xcel began repair work on the original gas leak. A specialized Xcel crew was called in from out of the

area to handle the permanent repair. Fire crews again staffed a hand line for protection of the workers in the intersection of North 7th Street and Orchard Avenue. An intrinsically safe fan was placed over the manhole south of Orchard Avenue on North 7th Street to assist with the removal of gas from the sewer line.

At 3:07 p.m. the evacuation expanded to 6th to 9th and from North to Bookcliff. At 4:00 and 5:30 press conferences two and three were conducted by the JIC. At 5:40 the main gas leak had been repaired and efforts from Xcel were directed at shutting off the gas to the Exposure 0 and Delta 1 structures. At 6:29 p.m. the evacuation area retracted to 6th to 8th from Orchard to Walnut on the north and both sides of 7th from Orchard to Elm on the south. This remained the evacuation area over night.

At 7:30 press conference four was conducted by the JIC. At 8:30 p.m. Battalion 1 transitioned from Ops back into the unified command post and Captain 3 assumed Ops. Once it was determined that the area would remain evacuated, Ambulance 1 began to shuttle residents into the evacuation area so they could retrieve necessary items from their homes that they would need through the night. Ambulance 1 continued this shuttle until 11:00 p.m.

By 8:34 the fan placed over the sewer manhole had evacuated enough of the gas from the sewer line that Engine 5 was getting zero parts per million (PPM) of the Lower Explosive Limit (LEL) readings on their ITX monitor.

At 8:48 Xcel had shut off the gas to the Exposure 0 and Delta 1 structures and final mop up was initiated. All fire was extinguished at 9:13 p.m. with a final foam blanket placed over the two structures. At 9:14 Xcel had checked the two manholes where the fans were placed and they too had a zero PPM reading and the use of the fans to evacuate the sewer lines was discontinued.

At 9:45 fire units started to clear from the scene with a complete extinguishment of the fires. At 10:45 press conference five was conducted by the JIC. By 11:29 p.m. all units had cleared and command was terminated. Persigo crews stayed on scene all night continuing to monitor gas levels and to ventilate the sewer system and the Grand Junction Police Department provided scene security throughout the night as well.

Post-Incident Description

After midnight on March, 20 2013, Persigo crews worked through the night and into the next day ventilating and monitoring gas readings. These gas readings continued on an hourly basis for the next several days.

At 7:00 a.m. representatives from the City and Xcel discussed returning the evacuated citizens back into their homes. Xcel representatives stated they had utility technicians available to accompany residents in order to restore service to their home. City utility division supervisors were concerned that the gas level readings in the sewer were still too high to allow residents back into their homes. Residents were beginning to gather in the parking lot of the Grand Junction Seventh-Day Adventist Church at the corner of North 7th Street and Mesa Avenue while discussions between the City and Xcel continued, eventually settling on not allowing residents to return until readings were lower and sewer lines were flushed.

The power to the church had not been returned so two school buses were brought in as a place for residents to wait while a decision was made on when they could return to their homes. The City conducted informational meetings with the displaced citizens and media three times daily, usually at 8:00 a.m., 1:00 p.m., and 5:00 p.m. Once Xcel restored power and heat to the Grand Junction Seventh-Day Adventist Church, this building became the temporary evacuation center for the displaced residents and for meetings between representatives on scene. City staff began to assess what they could do to assist displaced residents once it was determined that they could not return to their homes in the affected area on both sides of North 7th Street south of Orchard Avenue and north of Elm Avenue. The gas levels were monitored throughout the morning and when it was determined that the evacuation area be retracted to this perimeter, residents were given vouchers for rooms at the Grand Vista Hotel by the City and the American Red Cross.

The American Red Cross and the Salvation Army took the lead in providing shelter to the displaced residents. They along with the Grand Junction Police Department Victim Advocates assessed individual and family needs and provided any necessary assistance. The City financially supported the American Red Cross and Salvation Army in this effort by funding approximately $3,400 for temporary lodging and $4,900 in Albertsons and Safeway gift cards to help residents meet their needs and help cover the cost of food that had to be discarded due to utilities being shut-off. All three agencies worked to identify the needs and issued the cards accordingly. During the incident and post incident, Pantuso's restaurant provided 287 meals (breakfast, lunch, dinner) over an eight day period at no cost, for residents that were displaced from their homes. Over 100 citizen contacts were made as a result of working with displaced individuals and families. Other ancillary costs involved $1,200 for the purchase of vented manhole covers and approximately $9,000 for traffic control.

At approximately 2:00 p.m. on March 21 the evacuation area was reduced to homes on both sides of North 7th Street south of Orchard Avenue and north of Mesa Avenue. Residents that were allowed back into their homes were escorted by Xcel and Grand Junction Fire Department employees to monitor the air in the homes and to restore services to the homes. The City continued citizen meetings on a regular basis in an effort to provide updated incident information. Xcel Energy began to drill bore holes through the asphalt to take gas readings in the soil below the street. This continued for the next couple of days. A "Hot Line" was set up in the evening to provide information to the public and was staffed by Grand Junction Police Department volunteers.

By the end of the day on March 22, all residents had been allowed back into their homes along North 7th Street with the exception of residents of the two structures involved in the fire. These residents continued to use the hotel vouchers until other accommodations could be made. City utility division workers continued to monitor the air for gas in the sewer and surrounding area.

On March 26, residence assistance transferred from City Administration to a Grand Junction Fire Department Captain who continued working with the American Red Cross to provide assistance to the remaining victims displaced by the fire in the two homes. All but two of the residents of the homes destroyed had made temporary housing arrangements and all were offered housing by Colorado Mesa University since they were students. The offer was declined and these two individuals used one

additional night of lodging at the Grand Vista Hotel as they had secured more permanent housing. Hilltop also offered a house for residents use but it was not needed.

By March 27 all displaced students had found housing and Grand Junction Police Department Victim Advocacy Coordinator and the American Red Cross filled the contact roles for any future requests regarding this incident.

Persigo crews continued monitoring area gas readings several times daily through May 9, 2013 at which time monitoring was discontinued as the gas PPM returned to a normal reading of zero.

Findings and Recommendations

Throughout this incident there were many successes. Overall, the City along with representatives from private companies and other agencies worked very hard to provide the best service to the community and bring this incident to a close. There was excellent cooperation between all entities on scene, all working towards a common goal of supporting the City of Grand Junction residents. During the interviews with everyone involved in this incident the following successes emerged and should be recognized.

- The community came together with emotional and financial support, food, clothing and housing for those in need.
- All City departments, their employees, and the private contractors worked well together to bring this incident under control.
- There were no deaths as a result of the explosion or ensuing fires.
- There were no injuries to any workers on the scene.
- The City working with the American Red Cross, provided resources to the displaced citizens in the form of meal vouchers and room vouchers.
- The spread of fire was limited to three structures.
- The volunteer staff worked hard to take care of the needs of the displaced citizens.
- The communications truck worked well as the command post and unified command was a good idea to institute with some changes needed in future incidents.
- Evacuations went well considering the continually changing perimeter.
- Having the ability to staff the tactical radio channel with two dispatchers to listen and document all of the traffic to make sure nothing was missed worked well.
- The staffing level of the communications center was at full staff and the ability of administration and IT staff to assist in the center was beneficial.
- The fire crews were disciplined in their assigned task when the emergency evacuation was ordered of the delta exposure structure.
- Ability to receive mutual aid from other county law enforcement agencies to assist with evacuations, scene security, and respond to additional calls for service worked well.
- Persigo crews were able to use their new gas monitors and they trusted the units. Each employee also had their own gas monitor which provided comfort for them while working in the hazard area.

Common themes also emerged for areas of improvement including: incident command, operations, incident communications, public communications, recovery, and prevention. These areas are outlined in the findings below along with recommendations for improvement.

Incident Command:

Finding:

Command and general Staff positions were not fully established, creating insufficient support of the initial incident and planning for subsequent operational periods. There was no designated lead agency in the unified command post which led to confusion in the structure of the Joint Information Center.

Recommendation:

Command Team and Call-Out Procedures

- Establish who the lead agency will be when involved in a unified command.
- Establish a "Command Team" concept at the City level to respond to expanding events.
    - Automatic dispatching fire department command officers to incidents
    - Automatic dispatching one Incident Dispatch Team member per agency to incidents
    - Develop notification procedure for City department heads
    - Assign a Battalion Aide position
    - Notification of the Mesa County Emergency Management Office

Incident Command Training

- Establish procedures for expanding the role of Incident Commanders. Training on development of Incident Action Plans and when to implement.
- Provide additional general Incident Command System (ICS) training to all other essential City departments.
    - General over view for GJRCC dispatchers
        - Include Grand Junction Rural Communication Center (GJRCC) personnel in department level training scenarios when ICS is utilized or established
    - General over view for department heads and essential supervisors
        - Include procedures to contact command units on emergency scenes

- Include procedures for on-scene interactions between supervisors and command units
- Provide training and exercises for public works employees on:
  - Scene awareness
  - Scene accountability
  - Reporting into the command post
  - Scene security

- Provide "Federal Emergency Management Agency (FEMA) ICS-300: Intermediate ICS for Expanding Incidents" and "FEMA ICS-400: Advanced ICS Command and General Staff – Complex Incidents" to all Grand Junction Fire Department Captains/Upgrade Captains and above, Grand Junction Police Department Sergeants and above, and City of Grand Junction Advisory and Implementation Management Team (mid-level managers) and above.
- Evaluate the need to form a Type 4 (Municipal Level) Incident Management Team that would receive advanced ICS training (ICS-300 and ICS-400) classes.

Operations:

Finding:

Limited response resources to cover the City and geographic isolation created the inability to provide additional resources during prolonged operations at large or multiple incidents.

Recommendation:

- Develop a reliable call-back system for critical staffing positions.
- Develop a standardized list of units/agencies/department to be called as a group.
- Improve ability to provide sufficient fire and EMS capability by building and staffing additional stations and apparatus.
- Use of mutual aid agreements and the development of automatic aid agreements with other agencies.

Incident Communications:

Finding:

Limited and conflicting information was passed along to personnel working on the incident. Difficulty in contacting personnel on scene due to limited number of portable

radios. Dispatch capabilities were not working in the communications vehicle when it responded to the incident.

Recommendation:

- Develop and distribute a "Command Team" phone list for department leaders, managers.
- Provide training to all personnel on emergency scene communications and proper procedures to ensure all orders are understood.
- Utilize one IDT member in the command post to fill the role of Communication Unit Leader under ICS.
- Provide a reliable system to replace or recharge cell phone batteries on incidents.
- Provide incident updates to all units upon dispatch regardless of when they are notified.
- Provide training on the use of cached 800 Megahertz (MHz) radios.
- Evaluate need for non-public safety departments to be on 800 MHz radio system.
- Place communication vehicle out of service whenever not available**.**

Public Communications:

Finding:

Information was immediately provided through multiple sources including social media and news media outlets as soon as it was released from the command post. However, notification of the citizens on how to access this information and how to receive emergency notifications was recognized as an area to improve upon.

Recommendation:

- Provide a designated location for public information such as an information booth or website.
- Differentiate between media briefings for command personnel vs. the media.
- Provide a "Hotline" earlier in the event. The ability to utilize a "211" information number in large events has already been coordinated for the future.
- Utilize the JIC website to distribute updated emergency information.
- The sheriff and police departments are working on coordinating posts to their Facebook pages so that immediate and consistent information can be posted.
- Continue to develop a monthly public awareness campaign to utilize the "Grand Junction Regional Communication Center Emergency and Community Notification System".

- Notices placed in City utility bills
- Perform public outreach
- Develop social media awareness campaigns

- School District 51 is working on a district wide text messaging system for students and parents to receive timely information.

Scene Security:

Finding:

Limited police personnel created an inability to control security at the scene. Bystanders and vehicles were able to enter the hazard area.

Recommendation:

- During large incidents consider the possibility of supplementing traffic control measures with private security companies or traffic control companies.

Recovery:

Finding:

As the incident transitioned from an emergency phase to a recovery phase there was no system to transfer command or maintain incident control.

Recommendation:

- Formalize the process to transfer command throughout the operational phases.
- Develop an Incident Command Chart that displays who is responsible for the recovery portion of different types of incidents.
- Recognition that large incidents may have continuing phases.
- Research feasibility of attending FEMA "E900 – IEMC: All Hazards Preparation and Response" Course.

Prevention:

Finding:

Need for stronger method to identify utilities and reduce the possibility of similar incidents.

Recommendation:

- Develop a checklist for notifications and assistance of all associated departments and contractors prior to beginning work.
- Provide mapping of utilities.

Adopted Prevention Methods:

The City of Grand Junction Public Works, Utilities, and Planning Department has established the following standard requirement on any street cut permit issued within the City or for any permit that may be issued for installations crossing parallel to Persigo Sewer System infrastructure.

- Any contractor installing utility conduits via a boring method, either crossing or longitudinal to Persigo Sewer System infrastructure, that may or may not be located in easement, tract, or street rights of way, shall provide Closed Circuit Television (CCTV) video documentation of the sewer main line and service line condition along the alignment of utility conduit installation. The CCTV documentation shall be conducted immediately after completing the new utility conduit installation. A video copy of the documentation with plan view schematic showing orientation of the sewer system and utility conduit alignment shall be provided to the City for review prior to approval of the work.

The following is the new Xcel process that must be adhered to when excavating around an Intermediate Pressure gas line. Xcel Energy has started this new policy in Mesa County and is trying to institute it statewide. ***Note: There is a difference between Safe Site and Site Wise. These are both utility locate companies.***

- Contractor/Excavator calls in a normal utility locate - 811
  - Xcel has created a Member Code for Intermediate Pressure (IP) gas lines. (The City has a Member Code because we do locates for our water and sewer lines; Xcel has a Member Code for their regular gas and electric lines, etc.) The current contractor for Xcel to respond to these locate requests is "Site Wise".
- Regular utility locater for gas and electric lines (currently "Safe Site") will do their locates. If an IP gas line is in the excavation area, Safe Site will mark the IP gas line and then will contact Site Wise.
- Site Wise will notify contractor/excavator that an IP gas line is in the vicinity of their excavation or bore.
- If excavation/bore is within 10 feet of the IP gas line then Site Wise will send out a person to watch while excavation/bore takes place.

Xcel has adopted an internal policy to treat all Intermediate Pressure lines in the same manner as they currently treat High Pressure lines. This policy can be referenced in Appendix L.

Appendix A

Critical Incident Factors

Scene Description:

The incident included the primary gas leak in the intersection of North 7th Street and Orchard Avenue. The exposure zero structure was located at 1752 North 7th Street and the delta one exposure was located at 1742 North 7th Street. The initial command post was located at the Art Center south of the intersection of North 7th Street and Orchard Avenue and it then moved to the north parking lot of the Grand Junction High School. Scene security was difficult with such a large perimeter, ultimately 6th Street to 9th Street and from North Avenue to Bookcliff. The evacuation area changed six times over three days as listed below.

Gas Line Description:

The gas line breach occurred during boring operations in the intersection of North 7th Street and Orchard Avenue. The gas line was a 6 inch intermediate pressure (150 psi) supplying Colorado Mesa University and owned by Xcel. Gas migrated through the sewer system and ground. Gas readings were present until May 9th.

Fire Description:

The first structure to become involved in fire was the exposure zero structure at 1752 North 7th Street. This home exploded and became involved in fire spreading to the delta one structure at 1742 North 7th Street. Both of these fires were gas fed fires originating in the sewer system. A third structure, Bravo 1 at 1806 North 7th Street, sustained minor damage from radiant heat.

Medical Concerns:

There were three parties injured that lived in the residence at 1752 North 7th Street. All three sustained burn and soft tissue injuries during the initial blast. All three victims were moved to the parking lot of the Grand Junction Seventh-Day Adventist Church at the corner of North 7th Street and Mesa Avenue. An ambulance treated and transported all three victims to St. Mary's Hospital for further treatment. There were no injuries to responders.

Evacuation Description

During the four day event approximately 187 homes were evacuated along with a number of businesses and other facilities.

The American Red Cross established an evacuation center at the Grand Junction High School but only a limited number of residents took advantage of this center. Most displaced residents found accommodations on their own. The American Red Cross and the City of Grand Junction assisted with hotel and food vouchers for displaced residents over four days event until they could either return to their home or find new housing. Pantuso's restaurant served 287 meals (breakfast, lunch, dinner) to displaced residents over an eight day period

The evacuation area changed six times as listed below:

March 19, 12:04 p.m. - Initial Gas Leak Area: Intersection of 7th and Orchard. Includes the three houses on the corners and the art center.

12:41 p.m. - Evacuation Area #1: Both sides of 7th from Orchard to Elm

1:06 p.m. - Evacuation Area #2: Both sides of 7th from Orchard to Bookcliff, including Tope Elementary and Grand Junction High School.

3:07 p.m. - Evacuation Area#3: 6th - 9th from North to Bookcliff

6:29 p.m. - Evacuation Area #4: 6th - 8th from Orchard to Walnut and south of Orchard both sides of 7th to Elm

March 20 - Evacuation Area #5: Both sides of 7th from Orchard to Elm

March 21 - Evacuation Area #6: Both sides of 7th from Orchard to Mesa (March 21)

Appendix B

Timeline

Pre-Incident Timeline

March 14, 2013	Utility locates began at the intersection North 7th Street and Orchard Avenue
March 15, 2013	All utilities had been located
March 18, 2013	Apeiron and Safe Site employees discussed the verification of the gas line exposed during potholing
March 19, 2013	
11:00 a.m.	City supervisors and Apeiron discussed conduits in the area
11:15 a.m.	City traffic personnel arrived to discuss a rattle heard during boring
11:22 a.m.	Discussion took place regarding abandoned water lines
11:39 a.m.	Estimated time of gas line breech

Incident Timeline

March 19, 2013

11:40 a.m.	Traffic signal put into “flash”
11:41 a.m.	Traffic signal put into “black”
11:54 a.m.	911 called for gas leak
11:55 a.m.	Dispatch Truck 3 for Gas Leak
11:57 a.m.	Request for Xcel to Respond
11:59 a.m.	Xcel has a 15 min ETA
12:04 p.m.	Truck 3 On Scene
12:13 p.m.	Crews Assigned Tactical Channel
12:14 p.m.	Request to Notify Water and Persigo of Gas in Sewer
12:27 p.m.	Protection Line Established for Excel

12:38 p.m.	Request for Reverse 911 Call to “Shelter in Place”
12:41 p.m.	Request for Manpower to assist with evacuations
12:42 p.m.	Dispatch Truck 1 for manpower to assist with evacuations
12:44 p.m.	Tope Elementary Shelter in Place
12:48 p.m.	First Report of Delta 0 Explosion
12:48 p.m.	Request for Full Structure Assignment
12:50 p.m.	Truck 1 Arrive on Scene
12:51 p.m.	Battalion 1 Arrives on Scene
12:52 p.m.	Battalion 1 Assumes Command
12:52 p.m.	JIC Notified
12:52 p.m.	GJPD on scene
12:55 p.m.	Delta 1 Exposure Exterior Involvement
12:58 p.m.	Ambulance 2, Ambulance 2, Engine 2 Arrive on Scene
12:57 p.m.	Request IDT at Command Post
1:01 p.m.	Delta 1 Interior Attack
1:04 p.m.	Evacuation Area #2 (includes Tope and GJHS)
1:06 p.m.	Engine 5 Arrives on Scene
1:09 p.m.	Patient Transport
1:13 p.m.	Confirmed Staging at Art Center
1:17 p.m.	RIT Established
1:21 p.m.	Engine 4 Arrives on Scene
1:24 p.m.	Battalion 1 Establishes Unified Command
1:29 p.m.	Recommendation for Defensive Ops
1:29 p.m.	Structure Evacuation with full PAR
1:36 p.m.	Request for Comm Van for ICP

1:44 p.m.	Joint Information Center Established
1:44 p.m.	Red Cross Requested
1:51 p.m.	Battalion 1 assumes Operations
1:55 p.m.	Main Gas Leak Control
2:32 p.m.	Firefighter Rehab at Art Center
2:35 p.m.	Police Officer Rehab at GJHS
3:07 p.m.	Evacuation Area #3
5:40 p.m.	Main Gas Leak Repaired
6:29 p.m.	Evacuation Area #4
8:00 p.m.	Evacuees Escorted to their Homes for Personal Items
8:30 p.m.	Battalion 1 Assumes Command
8:48 p.m.	Gas Shut Off to Delta 0 and Delta 1
9:13 p.m.	Fire Out
9:45 p.m.	Fire Mopped Up
11:29 p.m.	All Units Cleared / Command Terminate

March 20, 2013	Evacuation Area #5
	Crews from Persigo continued monitoring through the night
	Grand Junction Police Department provided security through the night
March 21, 2013	Evacuation Area #6
May 9, 2013	Gas monitoring was finally discontinued

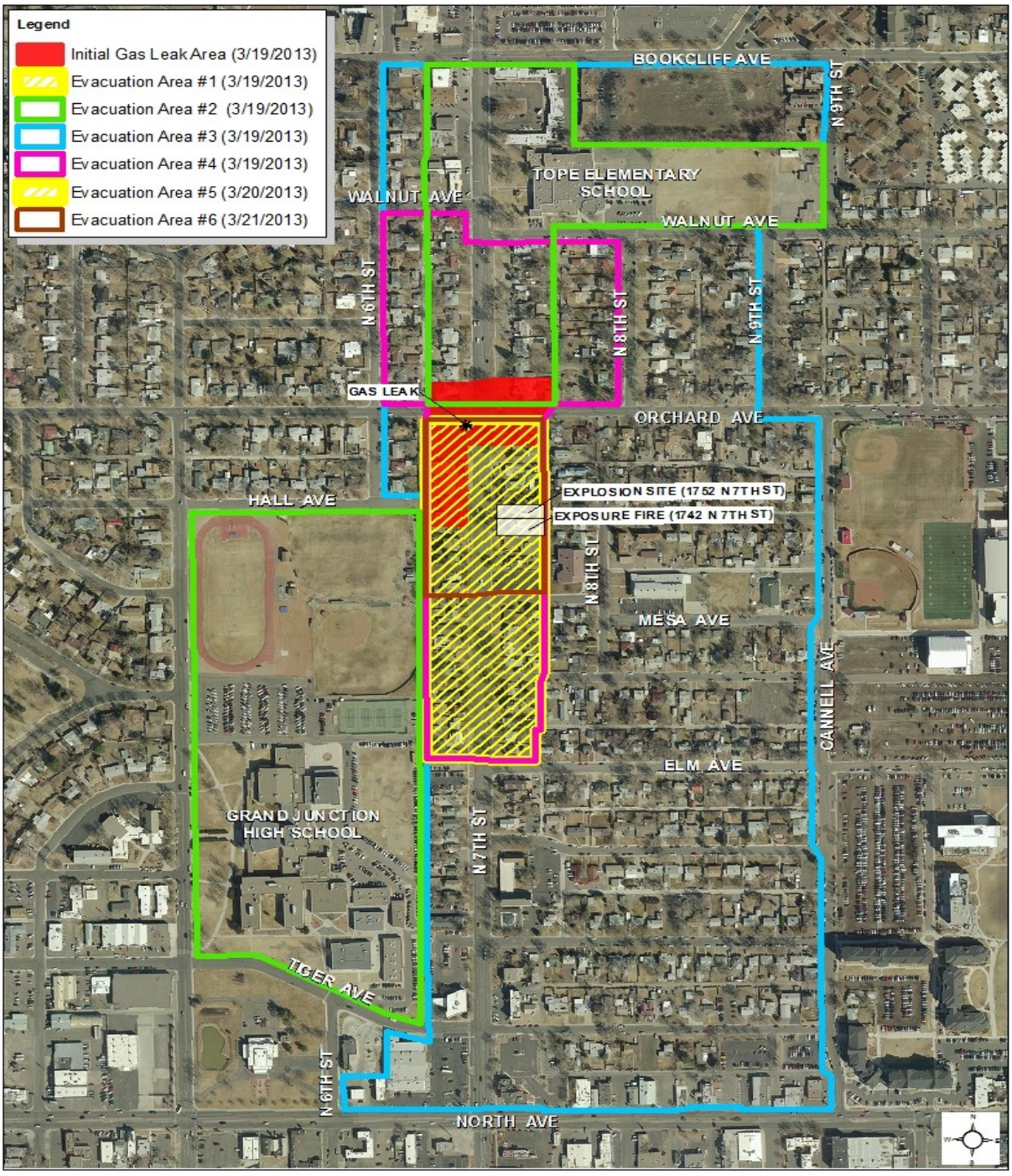
Appendix C

Diagrams of Incident

Area Involved:

Emergency Incident Location:

Evacuation Area:



Utility Area:

Appendix D

Press Releases (in ascending order)

Mesa County Communications Officers' Association

JOINT INFORMATION CENTER

Media Contacts:
Fred Eggleston- Xcel Energy, 970-216-1487
Sam Rainguet- City of Grand Junction, 970-244-1507

Gas Leak and Explosion on 7th St.
March 22, 2013 6:00pm

FOR IMMEDIATE RELEASE

MESA COUNTY, Colo – At approximately 3:00pm today, 7th St. and Orchard Ave. opened in all directions, and all lanes of traffic are open. Utility crews will continue to monitor the manhole at the intersection of 7th St. and Orchard Ave. where the initial gas line breach occurred to make sure the natural gas readings do not change. As a result, people driving in that area will occasionally see workers in that area taking readings for several more days.

Tope Elementary will be open Saturday, March 23 from 8 – 10 a.m. for parents to come by and collect any personal belongings that may have been left behind after Friday's evacuation.

There are representatives from multiple agencies doing simultaneous investigations, including the City of Grand Junction, Xcel Energy, and various insurance companies. A preliminary analysis of the emergency response to this incident shows the first 911 call came at 11:54am on March 19 from an employee of the company that was drilling at the intersection of 7th St. and Orchard Ave. The first fire truck arrived on scene at 12:04pm and Xcel Energy was also responding. During this time several citizens also called 911 to report the smell of gas in the area. Traffic was being diverted away from the area and firefighters set up hose lines near the source of the leak. At 12:38pm the firefighters advised dispatch they had a significant problem and requested additional fire units. At 12:48, as the second fire truck was arriving on scene, the house six properties away from the source of the gas leak exploded.

Timelines and information from the numerous parties involved with this incident are still being compiled and collected, as this extremely complicated investigation continues.

Previously released on March 22 at 9:45am
MESA COUNTY, Colo – All of the residents evacuated due to the gas leak and explosion are being allowed to return home this morning. Any residents returning home need to check in at the Seventh Day Adventist Church before going into their houses. Residents will be paired with an Xcel Energy employee who will go inside the home to turn on the gas and electricity, and to re-light pilot lights.

Xcel Energy and City of Grand Junction crews will remain in the area, including on streets that were not evacuated, continuing to test and evaluate the area to make sure it remains safe. This will be the case for several more days. Residents and workers in the area, including those in the nearby neighborhoods, should expect these workers, and should not be alarmed by their presence. They are simply there out of an abundance of caution.

For the next couple weeks, anyone who returns to their home needs to continue monitoring their toilets and drains, as part of the process for ventilating the gas out of the sewer system may have an effect on the sewer lines in the house. For example, if residents notice their toilets are not functioning properly, such as the water draining on its own or not refilling after being flushed, they should call 911 to report it. Also, if they smell any gas they should call 911 to report it.

7th St. will remain closed for now, to allow workers and their equipment access to the street, and to allow for any additional ventilating to occur. Residents needing to access their homes from 7th St. can do so by coming north from Elm Ave.

Previously Released on March 21 at 9:45am

MESA COUNTY, Colo – Tope Elementary School has been evacuated out of an abundance of caution after someone smelled natural gas coming from one of the manholes on the school property. All students are being bussed to West Middle School. Parents can meet at the commons area of the school starting at 10:00am to pick up their students.

Xcel Energy crews and City of Grand Junction crews have tested and evaluated the area around Tope Elementary. At this time there is no danger to the school or the surrounding neighborhood.

Previously released on March 21 at 2:30pm

MESA COUNTY, Colo – Some of the evacuees will be able to return to their homes today. The evacuation for homes south of Mesa Ave. has been lifted. Homes facing 7th St. between Orchard Ave. and Mesa Ave. are still evacuated at this time. The next update for evacuees is scheduled for tomorrow (Friday, March 22) at 9:00am at the Seventh Day Adventist Church.

The Evacuee Hotline will be staffed until midnight tonight, and will be staffed again tomorrow beginning at 6:00am. That number is 970-549-5130.

Anyone who is returning to their homes today needs to check in at the Seventh Day Adventist Church prior to going into their residence. Xcel Energy employees will go with the residents to turn on the gas and electricity and to re-light their pilot lights.

For the next couple weeks, anyone who returns to their home needs to continue monitoring their toilets and drains, as part of the process for ventilating the gas out of the sewer system may have an effect on the sewer lines in the house. For example, if residents notice their toilets are not functioning properly, such as the water draining on its own or not refilling after being flushed, they should call 911 to report it. Also, if they smell any gas they should call 911 to report it.

Previously Released on March 21 at 9:30am

MESA COUNTY, Colo – The evacuation boundaries remain the same, as there are still pockets of gas in the soil and sewer systems that make it unsafe for residents to return to their homes.

This morning Xcel Energy needs to check inside each of the evacuated homes. To do this, a resident from each home needs to report to the Seventh Day Adventist Church at 730 Mesa Ave. as soon as possible to be partnered with an Xcel Energy employee and a Grand Junction Firefighter. Together they will enter the homes one by one to check inside. The resident will also have approximately five minutes to gather any necessary items from inside their home at that time.

Any evacuated resident who needs transportation assistance can call the Evacuee Hotline and we will send a shuttle. The hotline number is 970-549-5130.

Additional specialized Xcel Energy equipment is expected to arrive at the scene early this afternoon to help purge the gas that is under the surface. Gas readings in the area improved overnight, but are not yet at a safe level. This morning's rain did not help the ventilation efforts that are underway, as the wet soil makes it more difficult for the gas to dissipate.

The next evacuee update is scheduled for 1:00pm today at the Seventh Day Adventist Church. The Evacuee Hotline will also be updated at that time. We will also let residents know during that briefing if they will be allowed to return to their homes this evening. Evacuees who have not already signed up with the Red Cross for a hotel room can do so by coming to the Seventh Day Adventist Church.

Previously released on March 20 at 5:00pm

MESA COUNTY, Colo - Xcel Energy is in the process of restoring electricity to part of the area affected by the power outage. Only the homes facing 7th St. between Orchard Ave. and Elm Ave. will remain without electricity tonight.

The evacuation area due to the gas that leaked remains the same: the homes facing 7th St. between Orchard Ave. and Elm Ave. This will remain in effect at least through the night, with Xcel Energy crews re-evaluating first thing in the morning. Gas readings in this area remain too high for people to be allowed back into their homes. Venting will continue throughout the night, with the hopes of getting the gas to dissipate overnight.

A hotline has been set up for evacuees: 970-549-5130

This hotline will have the latest information on the status of the evacuations, and will be manned until midnight tonight. There will be a recorded message until 6:00am tomorrow (Thursday, March 21), at which time it will be manned again throughout the day. If you call and get a recording before midnight comes, it means we are answering another caller. Leave your name and phone number and we will have someone return your call.

Anyone who is either in the evacuation zone or who is without electricity can check in with the Red Cross to receive a hotel voucher for tonight (Wednesday, March 20). Vouchers will be distributed until 7:00pm tonight. The Red Cross is set up at the Seventh Day Adventist Church at 730 Mesa Ave.

The next briefing for evacuees is scheduled for 9:00am tomorrow (Thursday, March 21) at the Seventh Day Adventist Church.

Grand Junction Police officers will again have extra patrols in the area to watch for suspicious activity in the evacuation area.

Tope Elementary will open on a normal schedule Thursday, March 21, 2013. Xcel Energy teamed up with District 51 to check for safety issues at the school throughout the day Wednesday. Through these extra steps of precaution, it has been determined that Tope Elementary is safe and ready for students.

Previously released on March 20 at 3:00pm

MESA COUNTY, Colo - Several dozen residences on 7th St. between Orchard Ave. and Elm Ave. remain evacuated because of gas in the area. Xcel Energy crews are constantly testing for gas in the evacuated area, and have found several gas bubbles that are not dissipating as quickly as they would like. Crews have been drilling holes in the street to help the gas escape.

Electricity remains turned off for customers from 7th to 8th Streets and Orchard Ave. to Texas Ave.

Anyone who is either in the evacuation zone or who is without electricity can check in with the Red Cross to receive a hotel voucher for tonight. Vouchers will be distributed until 7pm tonight. The Red Cross is set up at the Seventh Day Adventist Church at 730 Mesa Ave. Volunteers will also be going door to door this afternoon to make sure people who may have returned to their homes despite not having electricity are aware of the hotel vouchers.

Periodic updates for evacuees are being held at the Seventh Day Adventist Church. The next update is planned for approximately 3:30pm.

Previously released on March 19 at 11:00pm

MESA COUNTY, Colo - A meeting is planned for 8:00 a.m. tomorrow morning (Wednesday, March 20) at the Seventh Day Adventist Church at 730 Mesa Ave for anyone who is still evacuated. At that time, crews from Xcel Energy will team up with residents to go into individual homes and check for safety issues related to the gas leak and to re-light any pilot lights that went out. If the homes are deemed to be safe, residents will be allowed to remain in their homes.

The evacuation area continues to be within the following boundaries:

- both sides of 7th St from Elm St. to Walnut Ave
- Orchard Ave. to Walnut between 6th St. and 8th St.

The exact cause of the gas leak and subsequent explosion is still under investigation. At this point we know a private company contracted by the City of Grand Junction was boring into the ground as part of the process to upgrade the traffic signal at 7th St. and Walnut. At some point a gas line was struck, followed by the gas leak and explosion.

Xcel Energy has been able to stop the gas from leaking further, however it will take several more hours to repair the line. The American Red Cross is sheltering more than a dozen evacuated residents inside the Grand Junction High School gym.

The gas is now back on at Colorado Mesa University and all of the lines should be functioning normally at that location.

Grand Junction High School will be open as usual tomorrow (Wednesday, March 20), with TCAP testing beginning at 7:25am for 9th and 10th grade.

Tope Elementary will remain closed tomorrow (Wednesday, March 20).

Grand Junction Police officers will be patrolling the evacuation area to help provide added security and to look for any suspicious activity.

Previously released at 7:30pm

MESA COUNTY, Colo - Some residents who have been evacuated are being allowed back into their homes, however others will remain evacuated overnight. The current evacuated area includes approximately 75 homes within the following boundaries:

- both sides of 7th St from Elm St. Walnut Ave
- Orchard Ave. to Walnut between 6th St. and 8th St.

The American Red Cross is on scene at Grand Junction High School providing assistance and shelter for anyone who is still evacuated. Evacuees can get dinner at the Salvation Army building on 6th St.

This evening the Grand Junction Fire Department is taking residents who are in the evacuation zone into their homes to make brief checks and collect necessary items such as medications and pets. If you need to get into your home tonight, please meet at the command post in the GJHS parking lot prior to 11:00 p.m. so you can be teamed up with Fire personnel who will take you to your home.

Previously released at 5:30pm

MESA COUNTY, Colo - Of the three injured victims, one has been released from the hospital and the other two victims are being admitted for overnight observations at this time. The two homes, 1752 and 1742 North 7th Street, were a total loss and they remain on fire to burn off any escaping gas that continues to leak and because there is no structure to salvage.

Xcel Energy has determined the location of the gas leak, which is approximately seven feet underground in the area of 7th Street and Orchard Avenue. Xcel Energy has a crew enroute to the area to do the dangerous work of repairing the leak. The gas line leaking is a "transmission line" to Colorado Mesa University (CMU), and does not feed gas to area residential homes. The gas is leaking into the sewer lines, which is why the area remains evacuated.

CMU is currently without gas. There are also about 104 buildings without power as well. Officials are optimistic the evacuation area will be considerably shrunk before dark today. However, anyone needing services because of the evacuation can find the Red Cross at the Grand Junction High School.

Previously released at 4:00 pm
MESA COUNTY, Colo - The evacuation area for this incident has been expanded. The current evacuation zone is 6th Street to 9th Street, North Avenue to Bookcliff Avenue. Residents who have been evacuated and need a temporary place to use facilities can come the Grand Junction High School. If this incident lasts into the evening, GJHS will be opened as a shelter for evacuees, however that has not happened at this point.

Xcel Energy and Grand Junction Fire crews are removing manhole covers to release the gas from the sewer system, and Grand Junction Police officers are going door to door to make sure people have been evacuated.

School District 51 officials are on scene, and at this point are not expecting classes to be canceled for tomorrow. Should that change, school officials will notify parents later today.

Previously released at 2:45 pm
MESA COUNTY, Colo - At approximately 12:50 pm Grand Junction Fire crews were working with Xcel Energy on scene of a gas leak in the area of 7th St. and Orchard Ave. Fire fighters spotted a fire in the home at 1752 7th St. and called for more units. As the units were responding the house exploded due to gas inside the residence. Three people who were inside the home at the time of the explosion received significant injuries and were transported to the hospital.

The fire from the home that exploded spread to the house next door at 1742 7th St. That fire is being fought defensively, which means fire crews are working it from the outside only.

Approximately 30 fire personnel are currently on scene, as well as Grand Junction Police Department, Mesa County Sheriff's Office, Colorado State Patrol personnel, and City of Grand Junction personnel.

Residents in a two block radius of the explosion were evacuated, as were Tope Elementary School and Grand Junction High School. Tope students were bussed to West Middle School for parent pickup. GJHS students were evacuated to either the Salvation Army building or Sherwood Park for pickup.

All lanes of 7th St. from Patterson Rd. to North Ave. are closed.

Xcel Energy has shut off gas to the area and is assessing the extent of the outage at this time.

*** Media Note*** - A media staging area has been set up in the north parking lot at GJHS. The media hotline is 970-986-0950.

A news conference has been scheduled for 3pm in the GJHS parking lot.

Appendix E

Post Incident Analysis Worksheet

Category	Ideas & Suggestions	Lessons Learned	Successes
Incident Command	Assign administrative staff as a scribe to record the event	Who should be in charge of unified command?	
	Obtain more real time information	Better inform the public of incident and its status	
	Incident Command training for employees outside of public safety		
	Provide better info to the PIO's within the unified command		
	Staging area and staging officer		
Dispatch	Air the location of the command post and provide updates to incoming units	No communication with utilities employees	The early deployment of IDT
	Obtain a dispatcher to help incident command with resource management	Conflicting messages and the flooding of the call center	Early recognition of needing help with phones
	Notify fire and police of City employees on scene		IDT able to help unified command
	Have dispatch notify fire of projects that public works is starting such as digging and drilling on scene		
EMS			Helping homeowners gather belongings and medications
Police	Better management of traffic control		Running security through the night
Resources	Determine best use of volunteers		Victim Advocates were extremely helpful to college students
			Volunteers working with IDT
			Red Cross assistance providing hotel and meal vouchers

Post Incident Analysis Worksheet Continued

Category	Ideas & Suggestions	Lessons Learned	Successes
Communication	Inform the utility workers of safety on scene	Provide better info for PIO's to share with the public	Setup of media hotline
	Evaluate the use of an alternative notification system for parents other than Parentbridge	Conflicting messages sent to public	Setup of evacuee hotline run by volunteers
	Inform the public about Everbridge		
	Find additional ways to notify the public		
	Setup hotlines earlier		
	Setup auto dialers at all schools		
	Correct times for public notifications		
	Better communication with public works and utilities		
	Notification of when the media will be on scene and where		
	Provide a radio to the City Safety Manager		
	Notification of where security areas at located on scene		
Utilities Control	Assign a lead person from the City	No communication with police and fire	House checks for homes along 7th St. for gas levels in homes
	Meet with public safety to become familiar with GIS map	Unsure how to communicate with public safety	
	Proper PPE for workers as well as training for them	Train more Xcel employees on how to work with emergency management	
	Have public works staff available for additional tasks not involved with the incident	How Xcel can communicate with Incident Command	
	Have public works employees speak with the 911 fire console		
	Notify the City Safety Manager to help assist in any capacity needed		

Appendix F

Summary of City Administration Interviews

Questions:

Who contacted you to respond, and where, or who, did you report to?

Typically, City supervisors were contacted by other City supervisors as they received information about the incident. In many cases, supervisors responded directly the scene and then made notifications to other supervisors and departments.

Some department heads were requested to respond by the City Manager who was already on scene as command was being setup.

Did you have clear information as to what type of incident you were responding to, or why you were being asked to respond?

Most supervisors had a basic understanding of what they were responding to. Some were notified that there was a gas leak but did not necessarily need to respond based on that information. Others responded initially and more responded once the incident escalated and they received notification that a house had exploded. Some did not necessarily correlate the earlier gas leak notification with the later explosion and fire until they either received more information or they arrived on scene and got more information at that point. Two supervisors had received notification of the gas leak and were working in another location south of downtown when they saw the black smoke, then responded to the scene.

Because most City supervisors were working in and around the command structure, most felt they were in the loop and understood what was happening.

What did you see when you arrived?

One supervisor passed Fire Truck 1 downtown on 7th Street as the truck was responding to the incident but he was en-route to work at another site. When he noticed the black smoke, he responded to the scene to see what he was able to do to help out. He indicated as he was driving north on 7th Street and while sitting at the light at North Avenue, noticed vapors coming from a manhole on 7th Street just north of North Avenue. He then knew this was a major incident and drove to City Hall to inform the Utilities Director. When he got there, the Director was not there as he had already been notified of the incident and responded to the scene. Most supervisors and department heads responded to the command post area in the parking lot at

Grand Junction High School. Other City Hall people noticed command post briefings taking place as they arrived.

The Red Cross was beginning to get set up at GJHS and news media were arriving on scene also.

What was your job assignment upon arrival?

Most people from City Hall responded to the command post and assisted wherever they could. Several supervisors from Persigo and City Hall were working together to identify underground pipe locations in an effort to relay information to crews working on scene, other personnel assisted with this when they arrived on scene. Other supervisors were filling necessary positions in the command center and helping with the overall incident management.

What was your first impression of the scene when you arrived?

- The Command Post area appeared to be fairly well organized.
- Smell of gas in the area was prevalent and pressurized gas vapor was being pushed through manhole covers.
- Realized in a short period of time that this was going to be a major incident and began to "gear up" accordingly.
- Saw smoke from a distance and houses burning as I got closer to incident site.
- Smelled gas in the air and was not sure if it was a safe area to be in.
- Very busy as expected. Somewhat chaotic as expected. Everyone was working together to get things done from a PIO perspective. The PIO's were working to get things done and taken care of.
- These scenes are always chaos.
- It was well organized but there was a feeling of chaos and high levels of stress. This was due to the unusual aspect of the call with evacuations and gas in the sewer. I was trying to get a hold of the scope of the danger.

What in your mind were the incident priorities?

- To get the gas source shut off and evacuate the area.
- Based on the gas vapor coming from the manhole at 7th Street near Glenwood, the priority then was to expand the evacuation area.
- Get people evacuated to minimize injury potential and to secure the area to people that did not belong there.
- To deal with the residents who were being displaced.
- To provide support to Incident Command in any way they could.

- Provide safety information to the public. Notifications of evacuations, closures, and working with School District 51 to get information out to the parents.
- Safety, scene security, and releasing accurate information to the public.
- Safety and evacuations.

Based on your knowledge and experience, did you feel comfortable with your assignment and safety?

Yes. Most City Hall personnel were working in or around the command post area so they were comfortable with their role and felt they were in a safe position. A couple of people as mentioned above, were directly at the scene and had times when they did not feel safe due to the gas in the air and the work and repair operations that were taking place in the area.

Did you understand everyone's locations and assignments?

Yes, working around the command center and being involved in discussions allowed us to stay in touch with what was going on.

Was there a time when your gut was trying to tell you something? If so, what?

After leaving the command post at about 4:00 p.m., two supervisors walked over to the incident site at 7th Street and Orchard Avenue. On the way, they saw Truck 3 who was cooling the embers on the two houses. After arriving at the intersection, they met an Xcel representative that showed them the gas line breech. While there they noticed a lot of people standing on the street corners and there did not appear to be much scene control. They indicated as they were working in the area, there was a strong smell of gas and Xcel was using a lot of equipment in the gas enriched atmosphere. They said they were nervous because they did not understand how safe it was to be in that area and thought there may be some potential for equipment to create an ignition source and cause an explosion. The citizens standing around so close to the gas line breech should not have been permitted.

There was a concern with employees working in hazardous areas without the proper personal protective equipment. The work that Persigo employees were conducting when pulling manhole covers was mentioned. We should have people with the proper training and protection doing these types of hazardous jobs and use Persigo people for example, for their expertise and resource support.

Were you aware that an "evacuation order" had been given? Did you assist with evacuation?

Did not assist with actual evacuation but worked to develop information that would indicate how large of an area needed to be evacuated. Most City Hall people were involved in discussions at some point assisting to determine evacuation areas.

Fire, Police and Xcel and school representatives were the ones that primarily assisted with the evacuation.

Later in the afternoon as Persigo was evaluating manholes, the evacuation perimeter was retracted between roughly Elm Avenue and North Avenue and kept in place further north between Elm Avenue and Orchard Avenue.

Did you encounter any issues or conflicts working with other people in other City departments or with anyone in private industry that was on scene?

In general, there were no conflicts and everyone appeared to be working well together for the common good. There was pretty good teamwork.

Heard reports during incident follow-up that a couple of police officers appeared to be "disengaged" and had attitude issues when dealing with other City departments. It appeared that they did not want to help other employees when they were asked for help. One involved a request to keep people back and the other dealt with a request to better control traffic so other departments could work safely.

What do you feel could be done to improve scene communications?

Computer communications in the command vehicle were extremely slow. They had what they thought was the equivalent to a 256 kbps connection and it was not even close to adequate. They needed information quicker to establish an operational plan.

Cell phones batteries dying were an issue and there was no place to charge them. With dead phones and no two-way radio capability (amongst most people), key City people were left with primarily face-to-face communications. This may or may not have been effective based on the physical location of the parties needing to communicate.

Again, cell phone coverage and dead batteries became an issue. Need to look at ways to correct this on prolonged incidents. Without many City personnel having portable radios, communications could become a major issue especially if we were to have an incident in a weak cellular area or dead zone. Radios would not only be operationally beneficial but could be used as a backup or alternative communication medium.

Using the command vehicle worked very well overall but we had problems accessing GIS information as the computers were very slow. In an effort to get information more quickly, an IT person used his own laptop in the rear meeting room as the group gathered around to access the information they needed. This worked very well, was fast and gave the decision making group the information they were seeking. There is a need to upgrade the IT infrastructure in the command vehicle.

In the days following, using the dry-erase board in the church to keep track of issues and decisions proved to be a good tool. The information could be copied or photographed daily to provide incident documentation. It would work well on future incidents.

What training would help improve the scenario if an incident like this happened again?

Fire GIS training may not be adequate or the GIS information they need to access to determine pipeline locations, may not be available. Need to understand the process to look up underground pipeline information so decisions can be made sooner, or if Persigo personnel are not immediately available as a resource.

Need more ICS training for City Hall and other departments so people have a better understanding of how ICS works, how they fit in and where and who to report to when responding.

Persigo personnel and expertise are a key resource and they should be dispatched quickly on future incidents.

Fire and Persigo departments should develop cross-training so that Persigo personnel understand what procedures fire will use and why and fire will understand what capabilities and resources Persigo has and will utilize. One example is that Persigo personnel are not properly protected to work in a gas enriched environments so they may have to depend on fire personnel to remove manhole covers. Instruction on removal techniques to minimize spark potential may be beneficial to fire.

Provide more training to Fire regarding gas leaks due to boring operations. The idea would be to gain knowledge and recognition on the underground potential and be able to be proactive and expedite resources to an incident. This would allow for a more gradual ICS build-up to better manage an incident before getting overwhelmed. More resources responding quicker would allow personnel to shut off gas ignition sources to houses and businesses and conduct evacuations sooner.

Incident command and organizational processes worked well during the initial stages of the incident through Tuesday night. The ball was dropped beginning the next day (Wednesday) as

no one was really in charge. Command had broken down the night before and there was little continuity to proceed the next day so things became confusing. This related primarily to the City planning and citizen meetings that began to be held at the church. Things began to become more organized later that afternoon but initially did not start off too well.

Do you have additional comments or recommendations?

- From the command vehicle, obtaining necessary GIS information to base operational decisions on were to slow and not effective. This caused unnecessary delays in obtaining key information and getting it out to the field crews. Additionally, could not printout color maps to identify pipe types and locations. Recommendation would be to upgrade command vehicle infrastructure to provide for faster connections and to have color printing capabilities.
- At times, there were too many people in the command center and it was too congested, especially in the back conference room. In the future, only truly key people should be in there so that operational decisions can be made quickly and efficiently. Often times people would meet outside in parking lot where there was more room.
- At approximately 2:20 p.m. during the command post operational planning, incorrect information was given by Xcel (Fred). He indicated the gas line that was breeched was a high pressure, 700 psi line. This was apparently based on information he was getting from his Xcel sources and this proved to be incorrect as we later learned that the breeched line was an intermediate pressure (IP) line at about 150 psi. This misinformation from the gas line owners and operators during an incident planning and evacuation process can make a tremendous difference in the decisions being made when developing operational plans. We need to have accurate information to base decisions on.
- Fire and Xcel appeared to have a very cavalier and casual attitude toward the incident and its potential and it appeared as though they did not understand the scope and extent of the problem. Persigo personnel knowing that they had a major problem with gas in the sewer lines were trying to get them to understand the great potential and that they needed to expand the evacuation area.
- Need to develop a way so all City Department Heads receive an early notification of major incidents. They can then obtain more information and decide whether to respond or not, or go to the scene and determine if they need to stay or not.
- In the days following the incident, the Utility Director assumed the Incident Commander position. He indicated it was very helpful to have a couple of people (one Fire and one City Hall) to use as runners or to take care of citizens needs as things arose. This helped to ease his load while at the same time, being more responsive to citizen's needs.
- Having regularly scheduled planning meetings followed by citizen meetings worked very well and kept everyone informed. This also provided deadlines for the IC and City staff so they had time to prepare for the meetings. Organization began to smooth out as meetings were developed and information was given out later Wednesday.
- The decision made at City Hall to purchase gift cards to hand out to citizens was a good idea and was received well by the community. This allowed affected residents to obtain necessary services to temporarily get them by while being displaced from their homes.

- When the Public Works and Utilities Director assumed the IC role, he wore a yellow vest so he was easily identifiable. Residents and others needing to contact the person in charge were able to easily find him. This appeared to work very well.
- Need to provide training to all command staff personnel on the use of GIS, how to access it and how to obtain the information you need. This would include both public safety departments as well as others, i.e. City hall personnel.
- The volunteer staff was great to have and worked very well. It was nice to have them take care of any needs that came up, and to keep track of residents, contact numbers, checklists, run errands and anything else that needed to be dealt with. They were invaluable to have on site.
- Incident Commander needs to make sure all key players are at the meetings before starting. In some cases people that should have been attending were not there for whatever reason. It was thought that it was the IC's responsibility to round everyone up and make sure the proper representation was at the meeting.
- From the JIC debriefing a few items were discussed regarding this incident.
    a. Things we didn't do:
        i. Utilize 211 better (already coordinating this for the future).
        ii. Have a JIC website but didn't use it on this incident.
        iii. Emergency notification system use is important and we need to get more people to sign up.
        iv. Continually working on campaigns to get more people signed up for the emergency notification system.
        v. Working on coordinating Facebook pages between all agencies so common and consistent emergency information can be placed on all pages.
        vi. If there is the ability to make maps on scene for the JIC to show the public that would be very helpful.
- When a training scenario occurs make sure JIC is a part of the training. How do you take care of or remove individuals that refuse to evacuate? Social media information really helped to reduce the total number of calls coming into the JIC. Information from the individuals in the communications truck was very forthcoming.
- Generally speaking we did as well as we could have done given the weird situation. It was hard to plan and safety was an issue. How do we know is we have evacuated all of the persons in the area? What can we do to keep them out?

Appendix G

Summary of Grand Junction Regional Communication Center Interviews

Questions:

How many dispatchers were on-duty at the time of the incident? Is this normal staffing for this time of day?

According to the daily schedule there were nine Tele-Communicators and two Supervisors. To supplement the number of phone calls they were receiving, administrators and IT personnel also went onto the floor to help answer phones. One additional dispatcher came in early around 2:00 p.m. Normal staffing for that day would have been seven Tele-Communicators and one Supervisor but it was by chance the additional personnel were available.

What console were you working at the time of the explosion? Did your console assignment change after the explosion?

For the most part console assignments remained the same throughout the Tele-communicator's shift. The FD dispatcher ended his shift at 1:00 p.m. and responded to the scene as a member of the Incident Dispatch Team and one of the Call-Takers took over the fire channel at that shift change. The Call-Taker who was assigned to monitor the Tactical Channel moved to Tac 1 upon opening that channel. The PD dispatcher remained on PD Primary throughout the event and this channel became the PD's Tactical Channel for this incident. One of the Call-Takers also moved over to assist on PD Primary with incident traffic. The SO dispatcher remained on that console and that channel became the "all law" channel for the county. It may appear that many of the Call-Takers moved from Call-Take to dispatch channels but they all continued to answer phone calls throughout the incident.

What is the Grand Junction Regional Communications Center policy for monitoring the Tactical Channels?

Throughout the day there is one person that is assigned to monitor the tactical channel if one needs to be opened up. This duty is not a primary assignment but assigned to someone that can break away or monitor both duties at once. The channel will be opened up when there is a structure fire or other incident involving two or more units. The Fire Primary dispatcher can also use their discretion to move units onto a tactical channel if the primary channel becomes busy. Once the tactical channel is opened up the dispatcher will monitor the traffic, document the traffic, and respond to needs of the units on scene.

Would a second Tactical Channel have been helpful or a hindrance on this call?

The responses to this question were varied but basically came down to the fact that there were already three channels assigned to this incident. The Fire Department was on Tac 1, the Incident Dispatch Team was on Tac 2, and the PD Primary channel was their tactical channel for this incident.

Many were in agreement that multiple tactical channels would be helpful and there were technically three assigned to this incident. The only change recommended would have been to move the PD onto a true tactical channel instead of utilizing the PD Primary channel. One dispatcher suggested possibly having fire operations move onto a separate tactical channel from Incident Command but luckily there was not much radio traffic in the Unified Command Post. One area that did work well with regards to the tactical channel was assigning a second person to monitor the PD Primary channel to make sure all of the traffic was heard and documented.

Do you feel there was adequate staffing in the communications center at the time of this call? What would have helped you or center during this incident?

Every response except one stated that they felt there was adequate staffing for this incident. The one comment stating that there was not enough staffing did also recognize that, "Can you ever be prepared for that volume?" Looking at the staffing numbers, the number of personnel available to come in and assist, and the response to the scene from the Incident Dispatch Team to the scene you could not have hoped for better staffing of this incident. All of the personnel involved worked very hard to make this a successful operation.

The only area that would have helped ease the volume of calls received in the center would have been to open up the "Hotline" earlier in the event. This was a common recommendation across the board that would have alleviated the number of calls received.

How many calls for service did you receive during this incident? Were you or could you have been prepared for the number of calls received?

This answer varied but came down to approximately 700-800 in first couple of hours. Everyone felt that they were prepared for this number of calls both technologically and mentally. Again, it was brought up that setting up the "Hotline" earlier would have helped the number of calls going into the center.

What was your assignment during this incident and do you feel you could have been used differently to assist the incident?

Across the board everyone felt as though they were utilized appropriately. Most everyone was prepared to help in any capacity throughout the incident and everyone seemed to work well together. Some general themes throughout the responses included the benefit of having a second "ear" listening to the tactical channels and how well it worked out that there was a second supervisor in the center so one could handle operations and the other could take care of requests.

There was some channel consistency throughout the incident because of the few moves that were made. If dispatchers were moved from channel to channel there would have to be information passed on that would have lost in the continual updates. There were also several comments stating that the response of the Incident Dispatch Team was appropriate and the use of the communications van as the Command Post worked well. This allowed everyone to work together and to be visible.

What recommendations would you like to see?

The recommendations are compiled and listed below and taken directly from the interviews:

- Dispatch should have access to the "utility maps" that show gas and water lines for quick access. There needs to be way to print these maps from the dispatch computers. The ability to print a single large map showing the evacuation area and the utilities would have helped versus printing out a bunch of little maps. A single large map could also be used to show the public where the evacuation zone was so they could quickly determine if they were in the evacuation zone. This same site could have also been used answer questions of the public and kept them further removed from the Command Post.

- Nothing. The center worked very well together.
- Maybe send one Incident Dispatch Team member per public safety agency involved.
- Everyone worked well together with the information that they had.
- We needed faster decisions to be made on who was going to handle what issues. More communication with the Incident Dispatch Team members on scene to make sure we were not duplicating efforts.
- Provide Incident Dispatch Team member proportionately to the incident. We should provide some cached radios to give to other City departments that are not on the 800 MHz system. Maybe we should look at whether the Incident Dispatch Team is automatically dispatched on confirmed structure fires, as we do for a SWAT callout.

- There was a lack of time to react to the situation. We needed more information from Command and the supervisors. An example is when the evacuation boundary changed, information was slow to get to the citizens.
- I would like to see more dispatchers go through Incident Command training and that would help with the tactical channel dispatcher. They would be able to look ahead in the incident and maybe look at the bigger picture and help Command and anticipate the incident needs. Maybe go through similar training as the Incident Dispatch Team members.
- Having a second person help with the tactical channel was very beneficial.
- Usually a Joint Command is difficult to manage but it seemed to work well this time. In the center I felt like we had one point of contact with command and one information source. We could have put the "Hotline" up earlier and with better information to give the citizens.
- It was difficult getting information out about the schools and the evacuations of the schools. Parents were calling and we didn't have enough updated information for them. We didn't know until later to direct people to the school's website to get updated information on the evacuations.
- Communications went well. It doesn't always work to have radios and dispatch on the scene because of noise and the fact that CAD is slower. This time it worked out well not dispatching from the communications van.
- We should call out the Incident Dispatch Team members sooner if we know this is going to be a long incident.
- Coordination went well. Distinctive roles in the command post needed to be established to keep the incident moving.

Do you have any additional comments?

The comments are compiled and listed below and taken directly from the interviews:

- The incident was well run and establishing a Unified Command was a good idea. Using the communications van as the Command Post and a meeting place for all the players was a good choice.
- No. The incident seemed to work well overall.
- Overall, I think PD needs a better understanding of fire operations on the dispatch side. We had a lot of requests from PD officers for fire assistance and it takes time to get the fire units dispatched and on scene. A number of officers were already in the area at the time of the call and there was a wait for fire to get dispatched and respond. That's the biggest difference between the two agencies. One is mobile and the other responds from fixed locations.
- I was confused about when the Incident Dispatch Team members were supposed to take over monitoring the tactical channel since they never did it from the scene.

- No. It felt like everyone did a good job.
- Non public safety personnel did not get a chance to rehab or have dinners. Command needs to be sure to address the needs of all of the workers on scene. Some City departments did not allow rehab or dinners for their crews and they should have been allowed to come to the public safety area for rest and meals.
- Personally, watching and listening to the communication center, the communications were good. The Incident Dispatch Team support for this incident was good and we are here to help.
- No. I thought it went well.
- I think it would be beneficial to participate in incident command training. From a technical standpoint we are trying to outfit the SUV with computers and printers to assist the IC.

The following questions were for Incident Dispatch Team members.

How could the Incident Dispatch Team have been better utilized?

It was unfortunate that incident dispatching could not have taken place from the communications van but the incident communications worked well as it was handled. Utilizing Incident Dispatch Team members to fill the role Logistics was perfect since we, as dispatchers, deal with these requests on a daily basis from agency requests. The only area to change might be assigning one Incident Dispatch Team member per agency to work with them in the Command Post.

What worked well and what worked poorly as a member of the Incident Dispatch Team?

The comments are compiled and listed below and taken directly from the interviews:

- Using the communications van as the Command Post was great. There was easy access to everyone involved in the Command Post. The Incident Dispatch Team members were also used very well for any needs that came up from Command. We provided the needed logistical support.
- Technologically the communications van was not ready since we could not dispatch from scene but this was corrected and didn't affect the scene. The communications van worked well as a Command Post since the chiefs were able to meet in private. Sending one Incident Dispatch Team member to the scene was a good decision. Logistical support is something we can provide as Incident Dispatch Team members.
- We were utilized appropriately.
- Overall, most of it worked well. The biggest function of the Incident Dispatch Team is to support Command. It's such a flexible role and they can really help the incident. They can be a second "ear" to command staff. We have improved internal communications with each other and

communications center staff. Having Incident Dispatch Team members assigned to the scene helps. They are another set of eyes and ears.

- It's too bad we were not able to take over communications from the field. Everyone worked well and worked hard. Dispatch and the Fire Department really have a good handle on the Incident Command System.
- It is always good to have the Incident Dispatch Team on scene since they speak the same "lingo" as the dispatchers and can make requests quicker.

Do you feel the communications van and Incident Dispatch Team members supported the incident appropriately? Why or why not?

The comments are compiled and listed below and taken directly from the interviews:

- Yes.
- Yes, to the best of their ability on that day.
- Yes, but maybe expand the role by exploring how we can assist in other ways such as being assigned to lead players. Maybe as a scribe for all major players.

- Yes, it worked out well. Ultimately though, not having the CAD and dispatching done in the communications van worked out better having it all up in dispatch because there was less noise and belter communications with other dispatchers.
- Yes. Whatever needs to be done we will do.
- Yes.
- No. The assumption of the Incident Dispatch Team is to be communications since that is what is stated in our Mission Statement and it does not state that we are to provide logistical support.
- I wasn't on scene but from what I heard it worked out well.

Appendix H

Summary of Grand Junction Fire Department Interviews

Questions:

What did you see when you arrived?

All fire units arrived at different times during this incident and the perspective of what they saw varied based on the time of their arrival. The responses have been re-ordered here to reflect a chronological perspective of what the arriving fire crews first saw on their arrival.

Truck 3 was first dispatched to a report of a gas leak and upon their arrival they saw private contracting crews and City crews standing in the intersection of North 7th Street and Orchard Avenue. These crews were discussing the break in the gas line and what needed to be done. Truck 3 crew witnessed gas coming out of the bore hole in the street and they pulled past the intersection to place the apparatus upwind from the incident.

The remaining incoming units saw the exposure zero structure either immediately after the explosion with collapsed walls and minimal fire to it being fully involved with flames spreading to the delta one structure. Truck 1 was initially dispatched prior to the explosion for manpower. They were at the intersection of North 7th Street and North Avenue with Battalion 1 when they both witnessed a large plume of black smoke in the area of the gas leak. Upon their arrival they saw the exposure zero structure partially collapsed with minimal fire and multiple people running from the area. Ambulance 2 and Ambulance 6 were next to arrive at the intersection of North 7th Street and Mesa Ave where the victims were located with Grand Junction Police Department Sergeant Stassen. They witnessed lots of black smoke and ash falling in the area. Engine 2 arrived on scene and saw Truck 1 engaged in extinguishment of the exposure zero structure and exposure protection of the delta one structure. Truck 3 was located north of the exposure zero structure and engaged in extinguishment of the exposure zero structure from the north. Engine 4 arrived to find the exposure zero structure well involved in fire with signs of fire spreading to the delta one structure in the roof area. The units that arrived prior to Engine 4 were already working on the exposure zero and delta one structures. They also noticed gas coming from the sewer manhole. Engine 5 was the last company to respond and they noticed that both structures were involved in fire.

What was your assignment upon arrival?

Truck 3 was the first fire unit on scene when Captain 3 established command and sized-up the incident. Traffic was moved back an additional block in each direction from North 7th Street and Orchard Avenue by the road crews. There were still quite a few pedestrians in the area walking down the alley and around the road blocks and Captain 3 recognized that they needed to be moved back. Truck 3

performed air monitoring with nothing significant in the immediate area surrounding the gas leak. A protection line was pulled for the workers in the area of the gas leak as they began to dig down to the gas line break. Crews took notice of the wind direction and started to make contact with resident/business owners in the area. These parties were initially sheltered in place. As the gas leak increased they started to recognize that there was a need to evacuate the few surrounding buildings starting with the group home and the Art Center.

At this time Truck 1 was dispatched for additional manpower. During the response of Truck 1 the explosion occurred and they were assigned to assist with extinguishment upon their arrival. Battalion 1 arrived at the same time as Truck 1 and assumed "7th Street command" and aired the location of the command post at the Art Center. Ambulance 2 was assigned to stand-by as medical for the incident and Ambulance 6 was assigned to treat and transport the three victims of the explosion and fire. Ambulance 3 arrived on scene and assisted with the protection line for the workers digging down to the gas line break. Engine 2 was assigned to assist with extinguishment and exposure protection working with Truck 1. Once Engine 2 arrived on scene Captain 1 established Delta Division to concentrate efforts on the delta one structure. Engine 4 was assigned to assist with search of the bravo 1 structure and securing utilities of the same bravo and delta exposures on North 7th Street. Once this assignment was completed they re-positioned to the CD corner of the delta one structure for exposure protection of the delta two structure. Engine 5 was assigned to assist with search of the bravo 2-5 structures on North 7th Street. Once this assignment was completed Captain 5 was assigned to be the Incident Safety Officer and his crew was assigned to be the Rapid Intervention Team (RIT).

What was your first impression of the scene upon your arrival?

The first impression of the incident varied based on when crews arrived on scene. For the most part everyone realized that this was a significant call that would involve all crews for an extended time.

What in your mind were the incident priorities?

Almost across the board everyone knew that life safety was of the utmost importance. This included the safety of the emergency response personnel, the City and private workers in the area, and of the public. The next priority was incident stabilization through controlling the gas leak and extinguishment of the fire. Lastly was getting residents back into their homes.

For company officers and command officers: What was your initial Incident Action Plan?

- Pull a 1 ¾" hand-line for delta one structure protection. This was quickly changed over to a 2 ½" protection line. We then had to back-lay to the hydrant for a water source since we knew this was going to use more water than what we had in the tank. Confirm which structures had been cleared by Captain 3.

- We were kind of the cleanup group. Initial crews were dealing with the incident and we were there to work on the "other" things. We took care of utilities and exposure protection. We also took care of removing the vehicles from the delta one structure.
- Pull a 2 ½" and provide exposure protection with CAFS engine and prevent fire from getting into the delta one structure which happened quickly. Next action was aggressive interior attack on the attic of the delta one structure in an attempt to knock down the fire and save the house. Risk vs. benefit was weighed and it was determined to be safe to risk a little to save the delta one structure.
- As the company officer on scene at the time of the explosion I initially had to determine the scope of the incident. I needed air monitoring to determine the perimeter around the gas leak. We needed to move the roadblocks further out in each direction from North 7th Street and Orchard Avenue. Check the immediate houses / businesses for gas on the interior with nothing noted upon inspection. For the remaining buildings in the area we elected to shelter in place.
- My Incident Action Plan was primarily based upon the incident priorities set up by the Battalion Chief. When I got to the command post and spoke to everyone there, I viewed this as a 3-phase approach. First, the emergent phase, how big is the gas leak, firefight is ongoing, and how do we stop the leak. Second, was communications, we need to keep the public informed. When we knew about something that information needed to get out to the public. We need to begin our return to normalcy at some point. How big of a problem do we have and when can we scale back so we can get people back in their homes. The third, final return to normalcy phase was to get everyone home and back to normal.
- Sort through (for self) what actions were going on and what else needed to be done. Trying to fit into existing plan.
- My role was to work on logistics. I did not have a cell phone to use so that hampered my efforts to take care of logistics. I located someone from dispatch who had a phone and had her order food. Another person from dispatch picked up water at fire administration. I opened up the Arts Center for a rehab location.
- In order to get a handle on the situation I felt that I needed to break this incident into individual and manageable parts. We had to continue to support the protection of the workers trying to repair and stop the gas leak and to monitor the surrounding air due to the amount of gas in the area. We had to confine then control the fire of the two involved structures and to prevent the fire from spreading to additional homes. The third part of this incident was to evaluate the need to evacuate the area and determine how large of an area this will be. By breaking this down I felt better about maintaining control of the incident and prioritizing needs.

Based on your knowledge and experience did you feel comfortable with your assignment and safety?

The majority of responses were that all crews were comfortable with their assignment and safety. Only three fire department members stated that they were not comfortable with their assignment. One firefighter was not comfortable lifting the manhole covers with tools that may have caused a spark. One firefighter did not know what their job was as they were protecting the Xcel workers with a hose line and they were unsure if more explosions would occur. Finally, one firefighter stated that they did not feel safe because they did not know how big the gas line was nor did they know where the problems were going.

Did you understand everyone's location and assignment?

Across the board everyone knew about the location and assignment of other crews on scene. At times it did take a little while for some firefighters to get a handle on the scope of the incident and to see what everyone was doing but as assignments were handed out everyone was on the same page.

Was there a time when your gut was trying to tell you something? If so, what?

- I was initially concerned when I heard reports of gas venting from the manhole covers but didn't think there was anything that could be done immediately. I was also concerned when I saw smoke venting from the attic on the second structure.
- When Engine 2's crew was in the interior of the delta one structure performing fire attack and I realized that they have been fighting fire for approximately 10 minutes with no change in fire conditions.
- Yes. When I noticed the gas pushing out of the manhole in the street on North 7th Street.
- When I saw the gas in the sewer I thought, "This doesn't look good."
- When I saw the gas in the sewer we moved Engine 4.
- When I arrived on scene with the patients it was very hot and there was ash falling so we immediately put the patients in the ambulance and left scene and treated enroute.
- We needed to get out of the unsafe environment. We were too close to treat the patients on scene and needed to leave.
- Yes. It felt like the interior crews were in too long as the exterior signs of fire inside the house didn't change as quickly as I was expecting. The interior crews were stating they were knocking down fire but the exterior fire was not changing so I knew this was not going well. This occurred shortly before the order to evacuate occurred.
- A firefighter decided to remove a gas grill propane bottle from the back of the delta one structure and I wasn't sure if that was safe with the fire in the area. This was after the notice to evacuate and I wasn't sure if we should be that close to the structure.
- I was aware of the amount of gas in the area but I knew we were doing what we needed to do.

- I had a weird feeling while in the interior of the delta one structure. I was thinking, "Well, that house exploded so what else will explode." I didn't like hearing the three air horn blasts. I knew something bad was going on.
- I was on the ambulance and wanted to go fight fire.
- When on the second floor of the delta one structure I realized the fire was too far advanced for us to stop. When we were outside the delta one structure changing bottles I discussed what the conditions were like and whether we needed to evacuate the structure.
- When the delta one structure began burning and we could see fire from vents on the roof I figured we should get out.
- When we entered the delta one structure we worked hard to knock down fire on the first floor. We continued to second floor and extinguished room and contents fires. We started to get significant heat and needed to consider our options. We were working hard to get through the walls and ceiling and needed to make that decision between finding the fire right now and getting out.
- While assigned to RIT I could see the flame pushing from the vent pipe on the top of delta one structure. Heard that interior crews had lots of smoke and looking for fire in the interior but didn't put that mental picture together right away.
- I kept my head on a swivel and we watched each other's back.
- Yes. From the point of hearing the gas "percolate" in the sewer throughout the incident. Figured this will get big fast. We need more people and more help.
- I was concerned when we realized the gas was in the sewer and looked around to figure out what we can or need to do. So we moved the truck further from the venting manhole.
- Yes. In the command post my gut was telling me we needed more help within the command post. Possibly an emergency operations center needed to be established. That would have helped address the long term planning and a key opportunity to assign a Planning Chief to look at the "what if" options. We could then start the addition of needs to be passed on through each following operational period. For the command post, using the communications van was inappropriate. The High School would have been better with more room. We needed to control access to the command post and we had too many people coming in and out and asking questions. Of course when someone comes into the command post with their question we had to drop everything and answer their question or meet their need and this took us away from our priorities. We also needed to formalize the staging area with a Staging Officer.
- Other than the gas in the sewer, I was comfortable. I had confidence in my crew and company officer.
- Right from the start. Very aware of the gas around us. There just weren't any safe areas. We just had to be hyper-vigilant about our safety.

- Looking down the street and seeing gas coming from the manhole. After the explosion I kept waiting for the next one to come.
- When I was RIT and saw gas coming out of the second structure. I talked to Captain 3 and Xcel and we agreed to evacuate the delta one structure.
- Yes. This is going to be a long incident.
- Yes. While I was command and located in the command post so far from the scene and then the radio traffic started about the evacuation of the delta one structure. I felt helpless to manage the scene and be effective in making operational decisions. This is when I passed command to Chief Williams so that I could make first hand operational decisions about the incident as Operations and to be "mobile" on the fire ground in order to be visible to all crews operating in the hot zone yet still be readily available to all of the needs of the fire crews.

When the order to evacuate was given where were you and what were you doing?

Throughout the incident everyone worked within their assignment and this continued at the time of the call to evacuate. We had RIT established along with an Incident Safety Officer who determined the need to evacuate based on what he was seeing and discussions with Captain3, Captain 2, and Xcel. Truck 1 crew was working on the second floor of the delta one structure when they heard the radio traffic about evacuating the structure so Captain 1 was directing his crew to move towards the exit of the structure.

What was your action immediately following the order to evacuate?

Even with the order to evacuate all crews maintained their current assignments. Truck 1 was making their way towards the exit from the second floor of the delta one structure when they heard the emergency evacuation signal. At this point they realized that they needed to exit immediately and following procedures they exited the structure immediately. After the order to evacuate a PAR was called for and confirmed with all units on scene.

Were your actions following the order to evacuate self-guided or from your company officer/command?

All actions on scene were either directed by the company officer or command.

Did you have an opportunity for rehab?

All crews on scene were able to rehab. One firefighter felt that they were working too hard to contain the situation and did not get to rehab soon enough.

What changes could be made to rehab?

As a general comment there was not enough food in the initial establishment of rehab. This was due to a lack of direction to the emergency workers on scene. We had two locations established but most all workers went to one location and the food did not last long enough for all of the fire units to get a chance to eat and rest. This was remedied but it did slow the rehab process. We also did not have enough crews on scene to allow everyone to rehab in a timely fashion. We had to continue to manage the incident while allowing one crew at a time to rehab. Maybe the use of call backs to assist in rehab

rotations would help the incident. On a positive note it was felt that the location was appropriate since it was isolated from the public, had a shady place to rest, and access to restroom facilities.

What training would help improve the scenario if it occurred again?

Much of the crew felt that we needed additional training in dealing with utilities. This includes gas, sewer, and water. Along with training on how to manage incidents involving these utilities they felt that additional live fire training involving gas would be needed. Some of the other training that the crew felt would be beneficial is listed below.

- The use of divisions on large incidents.
- Emergency evacuation drills.
- Fireground operations for ambulance 6 personnel.
- Crowd control and how to evacuate a residence.
- Command post operations.
- Exposure protection with CAFS.
- Incident command system scenarios

Do you have any additional comments?

- Overall, I thought it went smooth.
- I think everyone did a good job. There was no freelancing. Only issue we had was trying to coordinate getting the cars removed from the delta one structure. There were too many company officers trying to run that task and it became confusing.
- I thought it went well for what we had. There was good command and control, there was no freelancing, and everyone worked together.
- We run out of resources very quickly in our system.
- It always appears that things take a long time to happen when you are just assigned to an outer area of the incident.
- It went very well given what occurred. Luckily there weren't more injuries.
- Captain 3 did a good job in calling for more resources prior to the explosion.

- With the number of City departments and private companies it worked fairly well.
- On most structure fires we should bring in more than one water supply and on large incidents or commercial businesses each engine should bring in their own water supply.
- Continue to utilize groups/divisions on small incidents so we are better prepared for large incidents. This was a hard working scene that lasted for many hours and we need to make sure we are prepared to give 100% throughout the shift.
- Felt safe throughout the call. Impressed with our guys and was impressed with our upgrade officers and everyone worked hard and worked well together.
- There were some communications problems between call back crews and units on scene. They didn't know who to call. They called both command and ops for information they needed. On scene communications were good though. Safety officer was giving continuous feedback and updates to RIT and bouncing ideas off of them as the incident progressed. As RIT, I felt I knew what was going on because of the close ties to the safety officer. Crews were able to adapt to the changing scene and did this well. Security around the incident needs more communication between PD and the FD. At no time did I think there was a problem. We changed as the scene changed and we adapted to it. The incident action plan was dynamic as it should be. Everyone had an assignment and they were given the ability to take care of their own job and didn't need specific directions. They thought for themselves on how to manage their task.
- If someone knows that a major line is cut then maybe a full structure assignment is warranted for manpower.
- It would have been more appropriate to have two separate PIA's on two separate days. Having two in one day made for a long day.
- Maybe we need City wide special teams. There are several City departments that have expertise beyond our level such as confined space and trench rescue. They work with these scenarios every day and we do not. We have the scene management down but could use their knowledge of the systems. This would be a perfect opportunity to work together.
- This was a big incident to handle with the resources we had.
- Unmanned defensive lines would have freed up firefighters for other tasks. We could have asked for mutual aid. We needed to define the entire evacuation area sooner.
- This was a learning opportunity to open the door for further training across the entire City organization with incident command topics. We did a good job of addressing things as they came up but not a good job of anticipating needs before they came up. My final comment would be, "In spite of all this, I was very impressed with the level of cooperation from every department. No one was putting up walls or barriers. Everyone had the same plan. This is the first time I have seen this in the City. The level of cooperation was outstanding."
- I thought the incident went well from what I saw and heard. Everyone did what was expected of them.

- Make sure training is brought up to help everyone understand that calls can go from zero to sixty and be ready to respond.
- Things went really well. If we are going to be on scene for this extended time we need call backs to respond to give the on scene crews a break and let them rest and have the call back crew work on the scene.
- When additional apparatus are toned to respond to the scene at the request of command it is rare that dispatch will give any more information to the responding crew other than “assist on a structure fire.” The additional resources need more information from dispatch on what they are responding to. On this call our crew did not know we were responding to a gas leak with an explosion.

Appendix I

Summary of Persigo Interviews

Questions:

Who contacted you to respond, and where, or who, did you report to?

Supervisors were generally contacted by the 911 communications center to respond to the incident at the request of the fire department. Supervisors then dispatched field crews and trucks to respond and assist. The first supervisor on scene contacted Fire Captain 3 at 7th Street and Orchard to obtain information. At this point, only a gas leak was present and Truck 3 was standing by operating in an Xcel crew protection mode. As additional crews arrived, they responded to the 7th Street and Orchard area and checked in with their supervisor.

Did you have clear information as to what type of incident you were responding to, or why you were being asked to respond?

Responses to this question ranged from "we knew we were responding to some type of a gas leak" to "we had no idea what we were responding to or why we were being asked to respond". One supervisor knew he was responding to a gas leak based on dispatch information and another supervisor had kind of heard that some type of an incident was happening but did not know what, until an explosion occurred, then he self-dispatched to the scene. Field crews did not generally have information as to what they were responding to.

What did you see when you arrived?

A scene that was unorganized and chaotic. Initial supervisor indicated he saw a lack of excitement from the fire department and did not feel that they understood the potential of the incident. There was a visible gas plume emitting from the manhole and he said he immediately understood the severity of this incident and the underground potential. He relayed his concerns to the Fire Captain.

Other crews coming in indicated the scene was very busy and chaotic. Scene security was not nearly tight enough. They said there were cars driving and people were walking everywhere with what appeared to be very little scene control. There was a mailman delivering mail and no one stopped him or made him leave the area. They said the scene appeared to be very unorganized and they were not sure who was doing what. They reported to their supervisor and then focused on the task at hand which was to assist with sewer ventilation.

What was your job assignment upon arrival?

To assist the fire department by providing information regarding underground utility maps and to provide resources and expertise to the situation. Removing manhole covers to provide ventilation and try to reduce the hazard. Helping with traffic control as it was not adequate.

What was your first impression of the scene when you arrived?

Initial supervisor on scene indicated that his primary impression was that the fire crew did not understand the potential or severity of the incident. He thought the decision to evacuate came too slow but indicated the Fire Captain was planning on evacuating a one-block area. When he saw gas blowing out of the manhole, the Persigo supervisor recommended that they start with a two-block evacuation area.

What in your mind were the incident priorities?

First supervisor on scene indicated that ventilation and evacuation were major priorities. He attempted to naturally ventilate underground spaces and piping as much as possible by removing manhole covers to allow the gas to escape into ambient air, thereby, reducing the underground explosion potential. In-coming crews said they were told to help with pulling manhole covers and to assist with traffic control as they could.

Based on your knowledge and experience, did you feel comfortable with your assignment and safety?

Most people interviewed said they did not feel safe doing what they were doing at scene. Their primary goal was to pull manhole covers for ventilation and with the extreme amount of gas in the sewer system as well as in the ambient air, and the fact that they did not have any protective equipment, they did not feel safe. The general thought was that the fire department is probably the appropriate people to conduct work in these types of atmospheres and Persigo personnel should be used in more of a support and resource role.

Did you understand everyone's locations and assignments?

No, not generally at all. Because they performed the immediate tasks given to them by the supervisor, they understood what they were doing but not what others around them we're doing. They indicated there was no communication between City departments or with private contractors at their "street" level.

Was there a time when your gut was trying to tell you something? If so, what?

That we should not have been doing what we were doing in the immediate environment we were in. They understood the potential and realized they needed to get some things done quickly to head off a potential major problem but did not like the position they were put in.

As they cleared the manhole pick hole to get a hook in it, gas blew out under pressure. This scared them as they were not properly protected. Additionally, Xcel was jack hammering at the gas breech site and conducting other major operations using a variety of equipment and with significant gas present in the area. Persigo crews were working in close proximity to Xcel and this type of work scared them as they were concerned about them creating a spark or ignition source. While fire crews were completely ”dressed out” and protected, several Persigo people were working right next to them and were not protected at all, this bothered them.

Were you aware that an “evacuation order” had been given? Did you assist with evacuation?

Most people on scene were not aware that an evacuation order had been given. This was due to a lack of communication and the fact that they did not see anyone leaving their houses and that there were still a lot of people milling around the area.

Supervisors on scene were using sewer pipeline maps as a resource to determine where the underground gas may go. He was consulting with members of City Engineering to help determine what the evacuation areas should be based on the information they had at the time. So while he was making evacuation plans, that information was not necessarily relayed to crews working in the area.

Did you encounter any issues or conflicts working with other people in other City departments or with anyone in private industry that was on scene?

Following the house explosion, several people came out of their houses and began to walk around to see what was happening. One Persigo employee who was on scene when the house exploded, called over to a police officer who was nearby and stated to him that it might be a good idea to “keep those people back” since a house just exploded. He said the officer said to him, “that’s what the fire department is for” and walked away. He said he did not appreciate his attitude toward the situation and there was absolutely no teamwork involved. The employee definitely felt that he was being blown off by the police officer when he was only trying to help and keep people safe.

Persigo supervisors had uncomfortable discussions and disagreements with Xcel supervisors “in the street” when trying to determine if it was safe to allow residents to return to their homes. Xcel personnel who are supposed to be the gas experts were saying it was safe to allow people

to return to their homes. Persigo personnel strongly felt it was not safe based on the gas concentration levels they were getting with their gas detectors. The Xcel supervisor was trying to take charge and was aggressive is stating what was going to happen and that people could go back to their homes, without consulting other City personnel who were there. Persigo supervisors were placed in a bad position by having to prove to Xcel that they were wrong and that it was not safe. Xcel conceded this point and went with the advice of City personnel and residents were not allowed to go back to their homes for some time. Had we followed Xcel's advice, residents would have been placed in potential danger if they would have re-entered their homes. This was a good decision by the City and they had to stand their ground in order to accomplish this, but it never should have resulted in this type of disagreement in public with other supervisors, managers and citizens looking on. These decisions should take place behind closed doors in a meeting type of setting so everyone has a chance to give their input and justifications.

What do you feel could be done to improve scene communications?

Have better organization so that people coming into the scene understood why they were there and what was expected of them. They did not understand what was happening around them and/or why. Make sure that when someone is called to respond to any incident, they are told why they are being asked to respond and what they are responding to. This communication will allow them to understand what they are responding to so they can bring the appropriate resources. An example in this instance is that Persigo has fans and ventilation equipment

available to bring to a scene but it was not brought and used initially because personnel did not know what they were responding to. This caused a delay that could have been important if ventilation had occurred sooner.

Additionally, City crews cannot talk to dispatch on the radio now that police and fire switched over to the new 800 MHz radio system. This can cause delays in getting information to or from dispatch. Each truck (two person crew) should have two pac-set portable radios that would allow them to communicate with each other, or other crews or supervisors on a scene. Key supervisors should have access to an 800 MHz radio so they can communicate with Incident Command then relay information to their crews on a different frequency. Radio communications allow for everyone to hear a transmission so that more people understand what's going on and it brings more people into the loop. Cell to cell phone communication may be useful and effective in some instances but the overall communication is limited to only two people, therefore, effective communication can suffer.

Since this incident developed into a several day event and most people were using cell phones, many people lost their use due to dead batteries. Due to the activity, sometimes it was not

possible to get somewhere to charge their phone in a timely manner. We believe a change should be made in this area by purchasing a few cell phone chargers that would be stored in the mobile command vehicle and charging stations could be setup on a table outside the vehicle for anyone to use if necessary. In past years, it would have been more difficult to buy phone charging cables since many were proprietary and you would have needed many types of cables to achieve the goal. Now, phone ports are more universal so it would only take a few types to have on hand that would allow for the charging of most phones. Also, having a few portable battery charging packs that someone could grab, plug in their phone and put in their pocket would allow for instant use and portability. Having phone chargers and battery packs available at any large scene would certainly enhance communications and decrease the possibility of down time or ineffective communications.

Too many people were in the command vehicle and it made making essential decisions more difficult. It was felt that Persigo people were brought into the command system later than they should have been which may have contributed to decisions being made more slowly.

Only one primary person to represent the Utilities Division should be in the command unit. He could do the face-to-face with command personnel and then relay information out to his field crews.

What training would help improve the scenario if an incident like this happened again?

Knowing more about the Incident Command System and who to report to when asked to respond to an incident. Sometimes we as employees are asked to respond to various incidents and we are not sure who to check in with or who to report to, or at what location. We need to receive better initial information from whoever is asking us to respond.

Do you have additional comments or recommendations?

- Initial scene control was weak and not effective until incident geared up and more resources were on scene to manage road closures and people
- Traffic control was weak as we had vehicles driving over the 440 volt electrical cords that were powering the ventilation fans
- The generator powering the large fan was not explosion proof. Tried to keep it at a hopefully safe distance and run extension cords
- If major work such as jack hammering, cutting, digging, welding, etc. is being conducted in what does not appear to be a safe area, it needs to be conveyed to other crews working nearby that the area is safe to be in, and why the work they are conducting is being done in a safe manner. Workers felt they may not be safe based on all of the work Xcel was doing in the area

- Having portable pac-set radios would have enhanced our level of communications. Only the trucks have fixed-mount radios so if you're outside of the vehicle, you may not be able to hear the radio
- Was never notified that food and drinks were available on scene and where. Crews were making independent runs to convenience stores to grab something to eat when they could
- Work shifts were pretty long and could have used more personnel to reduce the number of hours worked per person
- Employees reported they thought they had a very good overall working relationship with everyone on scene, especially with the fire department. Communication was good and worked well together. Only problem was with attitude and comment made by police officer as outlined above
- Glad to see that Persigo was using their brand new gas detectors as they worked very well and they had a good deal of trust in them. Additionally, each person had their own so they felt more protected as they worked in the area
- It would be nice to have anti-spark tools to minimize spark or ignition potential when removing manhole covers
- While the use of a nearby building was a good idea in terms of a general meeting place and to provide citizen updates, the church at 7th Street and Elm was in the wrong location for that use. We evacuated a large area along 7th Street for several days that was not safe for residents to return to their homes. Then we turned right around and asked people to enter the secured area immediately adjacent to and inside the evacuation zone to congregate for information. If citizens had been directed to respond to another location for incident information they would have been in a safer location, could still have obtained the necessary information and the immediate scene would have been more secure and easier to manage as events changed. When citizens arrived for morning briefings many were led to believe that they would most likely be able to go back to their homes. Some issues were created when delays occurred and they were told they could not return i.e. them wanting to go back into their homes anyway since they were only feet away from their home. It appears to be a contradiction that it's alright to have many citizens hanging out in a church in an area right next to a house that is evacuated and not safe to be around
- Need to purchase explosion proof fans to have available that could be transported to a scene for quick ventilation should another gas incident occur. This is the quickest way to provide necessary ventilation to decrease the dangers

Appendix J

Summary of Grand Junction Police Department Interviews

Questions:

How many officers were on-duty at the time of the incident? Is this normal staffing for this time of day?

There were two to three Commanders, four Sergeants (2 Patrol, 1 CMU, 1 SRO/PST), two Corporals, five Patrol Officers, three SRO's, three CMU Officers, and four PST's working on at the time of this event. Note – Volunteer Coordinator Terri Gird responded along with two to three volunteers as I recall. Yes, this is normal staffing for this time of day.

When you arrived on scene what did you see in reference to the explosion?

There were many varied answers to this question but all responses related to seeing a lot of black smoke and the odor of gas in the immediate area.

Were you able to pass any of this information onto dispatch or any fire department members?

All of the officers with the exception of one stated that they either did not need to get on the radio or they were able to pass along information as necessary. Most of the police department's communication was through the Deputy Chiefs or Sergeant Stassen. Sergeant Stassen stated that his ability to communicate with fire units on Tac 1 allowed him to accurately communicate all pertinent information.

Did you know what the incident priorities were and what your responsibility was during this incident?

From a police perspective all officers knew what the incident priorities were and what their responsibility was during the event. The officers were primarily involved in the evacuations of the public in the immediate area and also to assist with the evacuation of the two near-by schools. They also provided scene security and scene safety.

Were the communications with dispatch or other units and the command post adequate and were instructions clear? What changes if any could be made?

Across the board, many felt that the initial communications with field units was slow to get out from the command post. As the incident progressed the communications improved. Some of the areas to improve based on responses include quicker notification to officers where the evacuation perimeter was, difficulty in talking to command on the law channel, lack of information for officers to give to the public on when they could get items from their homes or

where they needed to evacuate to, difficulty in finding the fire command post, and confusion regarding the dispatching of tow trucks to the scene.

A couple of recommended changes to improve the communications suggested sending one Incident Team Member to each agency representative in the command post. This would have provided a documentation of the conversations that took place in the command post for later review. Another recommendation is establishing a line of communication through the Incident Team Members on scene. Multiple requests were going through dispatch instead of the Incident Team Member on scene for resource requests.

Did you encounter any logistical issues while on scene?

For the most part things seemed to progress smoothly. A couple of areas that would have helped the incident would have been an information board or table set up near the command post for citizens to gather information on the incident in a timely manner. Also, regular updates for officers on the perimeter to pass along to citizens such as where the location of the evacuation center was and how they could retrieve needed items from their homes.

Do you have any additional comments or recommendations?

- I felt the City response was very well coordinated between and fire and responding law enforcement agencies. Great job by all!
- Sgt. Creasy seemed to be overwhelmed. Assign him a scribe or assistant.
- It went very well for as many agencies involved.
- For what happened, I think things went as good as they could have.
- Start the “Hotline” earlier in the incident.
- Not really. I think for the situation everyone did an outstanding job, performed admirably, and took care of what needed to be done.
- Additional personnel to call upon in these types of rare situations to help keep the public at bay until full control can be established and maintained at the onset.
- There was a lack of communication on where the FD command post was located and there was a lack of communications between all agencies on airing when the location of the command post changed.

Appendix K

Summary of Public Works, Utility and Planning Department Interviews

Questions:

Who contacted you to respond, and where, or who, did you report to?

Water supervisor received call from 911 to respond to gas coming out of a manhole at 7th Street and Orchard Avenue. He then immediately called Persigo to get their crews on the way. He responded to the scene with another water supervisor and then contacted other people that were on scene i.e. Fire and City traffic personnel.

Three people from the City traffic department were working on scene in the traffic cabinet at the time of the gas breech and were sprayed with pressurized gas, water and mud. They initiated calls to their supervisors to advise what had happened.

City locator called by traffic personnel to help locate gas line already breeched. He indicated that he did not know there was a gas leak until he arrived on scene and stepped out of his vehicle.

Did you have clear information as to what type of incident you were responding to, or why you were being asked to respond?

Some supervisors did have some information regarding the incident but others who were responding did not. Most crews responding did not have much information until they got there.

One water supervisor thought he was responding to a water break or water issue when he was asked to respond and did not know it was a gas issue until he arrived on scene.

One traffic person on scene was told by the boring contractor that he had hit something but based on locates and potholing, did not think anything was there.

What did you see when you arrived?

Found City locator trying to block the intersection at 6th Street and Orchard to control traffic the best he could and checked in with him to get more information. Also saw City traffic personnel on scene working at the southwest corner of 7th Street and Orchard Avenue. Saw boring contractor also working at intersection. Noticed that the manhole cover at 7th Street and Orchard Avenue was already pulled and gas vapor was coming from the manhole. Heard a gurgling sound coming from a pothole and thought it was water from the boring process.

Following the gas line breech, the boring contractor called his boss while the City locator called his brother at Xcel to get faster notification to them. The boring contractor then called 911 after talking to his boss.

What was your job assignment upon arrival?

- To begin "popping" manhole covers to provide ventilation to allow the gas to escape and trying to help control traffic and pedestrians as things were a nightmare
- To work on traffic cabinet conduits prior to gas line breech
- Access the situation and help ventilate
- To help with traffic control as it was not adequate

What was your first impression of the scene when you arrived?

- Chaotic and very busy
- Very little control and people were running around trying to figure out what happened
- Scene was very busy and vehicles and people were trying to sneak through what traffic control devices were already in place
- Needed to get traffic and people controlled.
- City locator at first thought this was a routine incident and once he arrived and evaluated it, he understood the severity of what had occurred and tried to convey that
- Did not have enough help to control traffic and people

What in your mind were the incident priorities?

- Get the gas leak shutoff as there was a big problem with strong gas odor and vapors in the air
- Traffic control was the biggest issue they had as people and vehicles were everywhere
- Start placing cones where they could to try and divert traffic
- To divert the Orchard Avenue traffic that was turning south across the gas line breech to the north, away from the incident
- To shut down the traffic cabinet to eliminate the potential ignition sources in the switches or electronics
- To ventilate the underground piping, sewers and manholes. To get better traffic control

Based on your knowledge and experience, did you feel comfortable with your assignment and safety?

Felt relatively safe being in the area but not popping manhole covers. Too much risk removing covers but felt that it was a priority and needed to be done. We were concerned with killing the power inside the traffic cabinet and not causing an arc that might ignite the gas. Understood danger but needed to pull manhole covers. One water supervisor asked Truck 3 Captain to get

fans brought to scene and setup for ventilation. Yes, felt comfortable with assignment. Diverted traffic and stepped back and waited for Xcel to arrive. It was difficult to control traffic and was concerned about a gas explosion.

Did you understand everyone's locations and assignments?

No, it was chaos, too much going on and not sure what others were doing. Contacted Public Works Communications Coordinator to try and get information out over the radio for people to stay out of the area. There appeared to be two GJPD units and one MCSO driving through the area but were not stopping to see if they could help. Yes, I had a pretty good idea of what most people were doing. I had no idea what was going on. Yes, boring contractor was calling for help and traffic control was being done. After initial breech occurred and stabilized out a bit, traveled back to office to report findings to supervisor. No, did not know other crews had been called out.

Was there a time when your gut was trying to tell you something? If so, what?

Yes, evacuations were going too slowly and should have been done sooner based on the gas in the air and the apparent severity of the breech. Also, I had no communication with either fire or police so I didn't feel good about that. Needed to kill the intersection power to prevent any ignition sources. Gut was telling me that I probably shouldn't be here due to gas volume in air but needed to do job and help divert traffic.

Were you aware that an "evacuation order" had been given? Did you assist with evacuation?

No, not aware that evacuation order had been given. No, already left scene before evacuation occurred. No, not until later. It appeared that Xcel was going down 7th Street doing evacuations and I found gas in the manhole at Tope school and contacted 911 to make sure that the school was evacuated, they advised it had been. Minimally, but not to what extent.

Did you encounter any issues or conflicts working with other people in other City departments or with anyone in private industry that was on scene?

No, I was pretty much working on my own and somewhat with Xcel. No problems, everything went well in terms of working together. No one took control but everyone worked together.

Thought Xcel could have shut off gas sooner to help alleviate the danger. A police officer drove by early on and did not stop to talk to anyone or see if he could help. Xcel personnel appeared to be walking around but not doing much, or using any equipment. No problem, experienced good working relationships.

What do you feel could be done to improve scene communications?

The boring contractor told the Fire Captain that gas was in the sewer system and that something needed to be done. He felt the Captain apparently did not understand the potential and decisions were developing too slowly. More communication to get more resources there quicker would have helped.

Having portable pac-set radios would be helpful to enhance scene communications and coordinate operations between crews and supervisors. Only trucks have radios and most of the time we were out of the truck or at other locations so we had no communications other than cell phones.

More incident communication so that people were advised of exactly what they were supposed to do and what their job functions were. We showed up on scene and did what we thought needed to be done but there was no coordination or assignments given and I don't think command had a handle on what we were doing.

What training would help improve the scenario if an incident like this happened again?

We need to take these incidents more seriously and not get in a "routine" mode. Gas line breeches that we usually have involve small, low pressure distribution lines that are typically hit during backhoe excavations. This leaves an open hole for the gas to escape and vent into the air thereby reducing the danger. Whenever we have a gas incident involving a boring operation, things need to be geared up quickly and more resources called to the scene immediately.

More training on the Incident Command System would be good so that there is better communication to us as to what we should be doing and so that we better understand what everyone else is doing.

Training on how to approach gas incidents in a safe manner and knowing what to do. They did not have any knowledge regarding gas properties and what is safe and what is not. Need more training to understand the dangers.

Water Department brings in Xcel each year to provide a basic gas class. We need to get this information out to other departments so if they have personnel that need to attend, they can.

This will improve the overall awareness regarding gas and its dangers and potential.

Do you have additional comments or recommendations?

The water department is very proactive with using gas detection and having up-to-date gas meters. We use them on a daily basis and understand how to use and interpret the information.

I would like to see other City departments update their equipment and receive more training in their use so we are all on the same page throughout all City departments that need to use gas detection. One example given was a manhole cover that was being pulled and the firefighter doing the work had a gas detector with him but it was turned off and was in his pocket. He had no ability to measure the gas concentration then determine is it safe to remove the manhole cover. Need more training know when and how to use the meters.

We need to get the word out that if were working somewhere and a similar incident occurs our first call needs to be to 911 and to do it quickly. There was too much delay on this incident because people thought other people had already called 911. A quicker call to 911 would have gotten resources to the scene quicker.

Need to develop a City-wide resource list by department that includes personnel contact lists and equipment resources. Need to quickly know who to contact to get a particular resource.

Distribute copies to City personnel and place in each vehicle.

Appendix L

Summary of Companies/Outside Agency Interviews

(Grand Valley Traffic Control, Mesa County Valley School District, Western Colorado Chapter of the American Red Cross, and Xcel Energy)

Questions:

Did you have clear information as to what type of incident you were responding to, or why you were being asked to respond?

- Yes. I was notified approximately one hour after the incident began. I staffed our "EOC" and opened the evacuation center.
- Yes but I have access to the 800 MHz radios to communicate with law enforcement at the schools and this was very helpful. With the radios I was able to communicate with PD during the school evacuations. The school district is looking into a program called "School Safe" which is a pilot program providing schools with the capability to patch school radios with public safety radios when an incident occurs. This program will initially be used at Grand Junction High School and Fruita Monument High School.
- Yes, I was already on site at the time of the incident.
- Yes, at first it was a gas leak, then after the explosion it was to stop the gas flow. It then moved to venting the gas to make the area safe.

What in your mind were the emergency incident priorities?

- For the American Red Cross it was to open and staff a shelter and provide accurate information to clients.
- Getting students and staff to a safe area and providing accountability of both.
- To get the road closed prior to the explosion. After the explosion it was to keep the road closed and get everyone in the neighborhood evacuated.
- Determine the status of stopping the flow of gas. Determine how much gas had moved into the dirt and not vented. After the gas was discovered in the sewer it was then how to isolate the gas in the sewer and get it vented. Then it was to vent all gas in the soils and sewer to make it safe.

Based your knowledge and experience, did you feel comfortable with your assignment and safety?

- Yes.
- Yes. The evacuation of the schools went fairly smooth.
- Yes. I never felt any imminent danger while inside the work zone.
- Yes.

Was there a time when your gut was trying to tell you something? If so, what?

- Keeping our shelter open for a meeting the next morning or shift. We didn't know what would be needed for housing the clients.
- During the early stages at Tope Elementary we wanted to be sure that we didn't evacuate the students and staff to an area that we would have to evacuate from a second time. We also felt that the evacuation the following Friday was the appropriate thing to do.
- When the sewer manholes were starting to bubble I felt the urgency to get everyone out of the immediate area.
- No. As information came in it developed a picture of what was happening and what needed to be done.

Did you encounter any issues or conflicts working with people in the City departments or with anyone in private industry that was on scene?

- No.
- No. I thought it all went well.
- No. Everybody cooperated and communicate thoroughly.
- No. Upon arriving at the scene it is a challenge to gain a clear picture of events and activities.

What do you feel could be done to improve scene communications?

- I felt the internal briefings provided adequate situational awareness. Day one we needed earlier notification of sheltering needs.
- I thought it went well with the early establishment of ICS. I never felt out of the loop.
- Different Xcel workers ordered different boundaries as far as who could re-enter and who couldn't. That caused confusion amongst the residents.
- Nothing at this time.

Did you know who the point of contact was for the fire department and did you have any problems contacting them?

- Fire department was a good contact but primary interface was with GJPD Chief Camper, GJ City Manager Rich Englehart, and Greg Trainor.
- Yes I knew to contact on scene and did not have any issues contacting them.
- I did not need to contact the FD at any point. All communications were run through the City officials and Xcel.
- I knew upon arriving at the scene who the key contacts were. I never had any problems communicating with any of them.

What policies or training would help improve the scenario if an incident like this happened again?

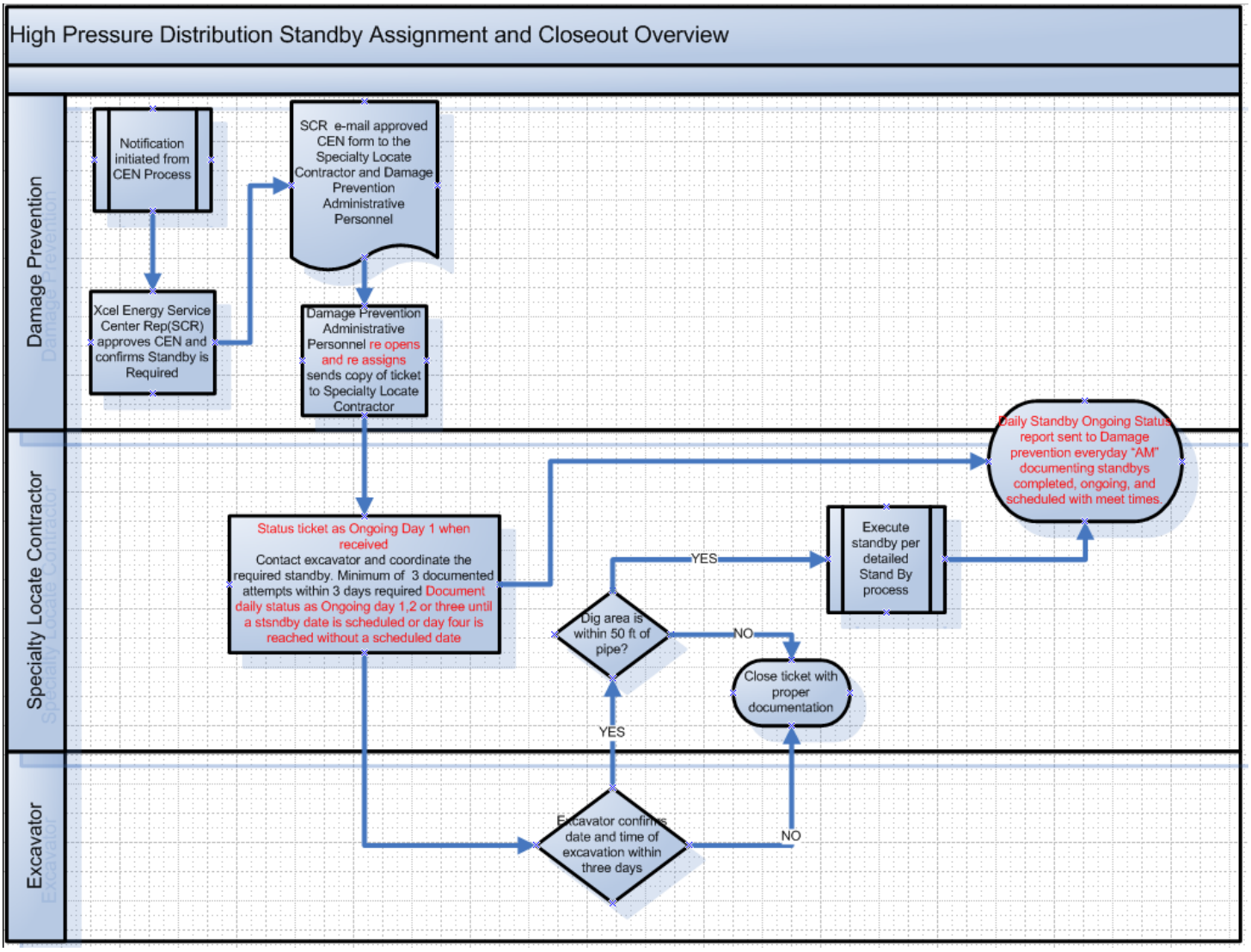
- The City of Grand Junction needs to participate in county run drills.
- The Grand Junction High School needs to work on their evacuation plan within the school district.
- Evacuations need to be made immediately. Then you need to check the gas levels in the houses and in the street.
- The only improvement that comes to mind would be training. I would suggest that once a year, gather representatives of each group that could respond. Place them in a room such as a gym then trigger the mock drill. People who have not responded to this type of event could get a feel of what could happen and whit it is like to respond to. The first time a person responds to an event like this can be a shock.

Do you have additional comments or recommendations?

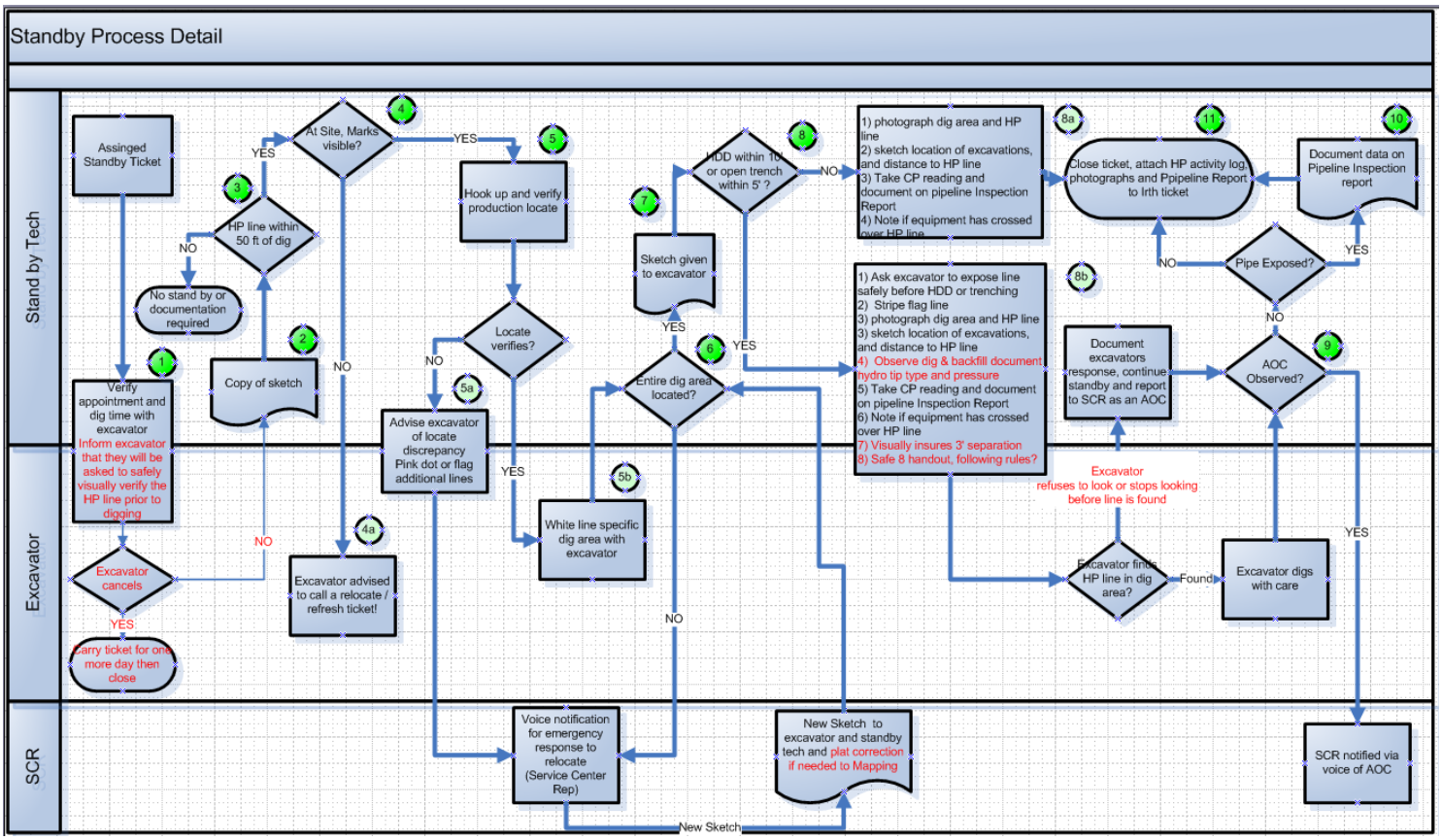
- The American Red Cross has a "Mass Care" threshold for opening a shelter for an incident at seven or more units affected. For seven or less units affected we provide hotel rooms. There was a bit of a breakdown in Incident Command between the first and second operational periods. There was no direction for the next day after the event. There was a lot of confusion. This could have been an opportunity for an "EOC".
- Overall the incident command was great. They kept the school district in the loop when decisions were made about the schools and were a part of those conversations. Over the subsequent days the command post should have remained at the high school.
- No.
- No.

Appendix M

Xcel Energy Intermediate Pressure Gas Line Protocol




7th Street Gas Leak
After Action Report


Standby Process Detail
Stand by Tech
Excavator
SCR
Assinged Standby Ticket
Verify appointment and dig time with excavator
Inform excavator that they will be asked to safely visually verify the HP line prior to digging
Excavator cancels
YES
Carry ticket for one more day then close
NO
Copy of sketch
HP line within 50 ft of dig
NO
No stand by or documentation required
YES
At Site, Marks visible?
YES
NO
Excavator advised to call a relocate / refresh ticket!
Hook up and verify production locate
Locate verifies?
NO
Advise excavator of locate discrepancy Pink dot or flag additional lines
YES
White line specific dig area with excavator
Entire dig area located?
YES
NO
Sketch given to excavator
HDD within 10' or open trench within 5' ?
NO
1) photograph dig area and HP line
2) sketch location of excavations, and distance to HP line
3) Take CP reading and document on pipeline Inspection Report
4) Note if equipment has crossed over HP line
1) Ask excavator to expose line safely before HDD or trenching
2) Stripe flag line
3) photograph dig area and HP line
3) sketch location of excavations, and distance to HP line
4) Observe dig & backfill document hydro tip type and pressure
5) Take CP reading and document on pipeline Inspection Report
6) Note if equipment has crossed over HP line
7) Visually insures 3' separation
8) Safe 8 handout, following rules?
Excavator refuses to look or stops looking before line is found
Excavator finds HP line in dig area?
Found
Excavator digs with care
Document excavators response, continue standby and report to SCR as an AOC
Close ticket, attach HP activity log, photographs and Ppipeline Report to Irth ticket
Pipe Exposed?
YES
NO
Document data on Pipeline Inspection report
AOC Observed?
YES
Voice notification for emergency response to relocate (Service Center Rep)
New Sketch to excavator and standby tech and plat correction if needed to Mapping
New Sketch
SCR notified via voice of AOC

Acknowledgements

This After Action Report was produced and published by the City of Grand Junction 7th Street Gas Leak Task Force and the Grand Junction Fire Department

April – September 2013

7th Street Gas Leak Task Force Members:

Terry Franklin, Utilities Manager

Gus Hendricks, Captain

Mike Hill, Mesa County EMS Coordinator

Bob Kelley, Safety Coordinator

Andy Martsolf, Mesa County Emergency Manager

Monica Million, Communications Center Manager

Dave Roper, Risk Manager

Bill Roth, Deputy Fire Chief

Dave Stassen, Sergeant

Harmony Ward, Senior Administrative Assistant

Ken Watkins, Fire Chief

Photos Courtesy of:

Jonathan Hobbs

Mike Page

Publication Staff:

Editor/Publisher: 7th Street Task Force