Missouri Public Service Commission

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December 8, 1999

Mr. Dale Hardy Roberts
Secretary/Chief Regulatory Law Judge
Missouri Public Service Commission
P.O. Box 360
Jefferson City, MO 65102

FILED[2]
DEC 8 1999
Missouri Public Service Commission

RE: Case No. GS-2000-62

Dear Mr. Roberts:

Enclosed for filing in the above-captioned case are an original and fourteen (14) conformed copies of a GAS INCIDENT REPORT and MOTION TO FILE REPORT AND ORDER RESPONSE.

This filing has been mailed or hand-delivered this date to all counsel of record.

Thank you for your attention to this matter.

Sincerely,

Bruce H. Bates
Assistant General Counsel
(573) 751-7434
(573) 751-9285 (Fax)

BB/df
Enclosure
cc: Counsel of Record

BEFORE THE PUBLIC SERVICE COMMISSION

OF THE STATE OF MISSOURI

In the Matter of Missouri Gas Energy, a Division of Southern Union Company, Regarding an Incident Near 1204 Walnut in Kansas City, Missouri.	))))	Case No. GS-2000-62

MOTION TO FILE REPORT AND ORDER RESPONSE

COMES NOW the Staff of the Missouri Public Service Commission ("Staff") and for its *Motion to File Report and Order Response* states as follows:

1. On July 30, 1999 Staff filed a *Motion to Establish a Docket* in response to an apparent gas incident that occurred near 1204 Walnut in Kansas City, Missouri on July 6, 1999. Missouri Gas Energy ("MGE") provides natural gas service to that location.

2. On August 11, 1999 the Missouri Public Service Commission ("Commission") issued an *Order Establishing Case* and ordered Staff to file an incident report.

3. Staff has completed its investigation and the *Gas Incident Report* ("*Report*") is enclosed for filing.

4. Staff, in its *Report*, recommends that MGE be ordered to file a response within thirty (30) days of the filing of the *Report*.

WHEREFORE, Staff prays that the Commission accept the *Report* for filing and order MGE to respond to it within thirty (30) days of this filing. Staff also prays that the Commission make whatever other orders and judgments it deems to be just and proper in this cause.

Respectfully submitted,

DANA K. JOYCE
General Counsel

Bruce H. Bates
Assistant General Counsel
Missouri Bar No. 35442

Attorney for the Staff of the
Missouri Public Service Commission
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Jefferson City, MO 65102
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Certificate of Service

I hereby certify that copies of the foregoing have been mailed or hand-delivered to all counsel of record as shown on the attached service list this 8th day of December 1999.

Bruce H. Bates

Service List for
Case No. GS-2000-62
December 8, 1999

Office of the Public Counsel
P.O. Box 7800
Jefferson City, MO 65102

Robert Hack
Missouri Gas Energy
3420 Broadway
Kansas City, MO 64111

Missouri Public Service Commission

Gas Incident Report

Missouri Gas Energy
Case No. GS-2000-62

1204 Walnut Street
Kansas City, Missouri
July 6, 1999

Gas Safety Section ... Gas Department ... Utility Operations Division
December 1999 Jefferson City, Missouri

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SYNOPSIS

At approximately 3:10 p.m., Central Daylight Savings Time on Tuesday, July 6, 1999, a natural gas ignition and resultant flash fire occurred in an underground vault owned by Williams Communications, Inc. (Williams), located near the intersection of 12th Street and Walnut Street (Walnut) in Kansas City, Missouri. At the time of the flash fire, an employee of a subcontractor for Williams was working in the communications vault. The employee was burned by the flash fire and was hospitalized. No structures were damaged as a result of the ignition and flash fire.

Missouri Gas Energy, a division of Southern Union Company, (MGE or Company) provides natural gas service in Kansas City, Missouri. The 1200 block of Walnut is supplied natural gas through a 20-inch outside diameter (OD), high pressure, cast iron main located along the east side of Walnut. This main supplied natural gas to both a 2-inch OD coated-steel natural gas service line and a 3-inch OD coated-steel natural gas service line. At the time of the incident, the 3-inch OD coated-steel natural gas service line supplied natural gas to an inside meter set located within 1204 Walnut, a vacant Jones Store building. The 2-inch OD coated-steel natural gas line extended across Walnut, but the service line did not enter the building because it had been capped off under the street when the 3-inch OD coated-steel service line was installed in 1991.

The Missouri Public Service Commission's Gas Department - Gas Safety Staff (Staff) has determined that the probable cause of the incident was the escape of natural gas from the 2-inch OD coated-steel natural gas service line, located approximately 228 feet south of the communications vault. Upon excavating the 2-inch OD coated-steel service line, an approximate 1-inch by ½-inch hole was found in the service line, at an intersection of the service line and a 6-inch OD steel communications conduit (communications conduit). The 3-inch OD coated-steel service line was also damaged where it intersected with the same communications conduit.

Natural gas escaped from the 2-inch OD coated-steel service line, migrated uphill through loosened soil around the newly installed communications conduit, and accumulated in the communications vault. When the subcontractor entered the vault and used an electric drill, the natural gas was ignited and a flash fire resulted.

The probable cause of the damage to the 2-inch and 3-inch OD coated-steel service lines was construction in April or May of 1999 by K&W Underground, Inc. (K&W), a construction contractor for Williams. During the spring of 1999, Williams' underground cables were installed in the downtown area of Kansas City. During the construction, underground boring processes were utilized. It is probable that boring/reaming equipment damaged both the 2-inch and 3-inch OD coated-steel service lines, leaving the hole in the 2-inch OD coated-steel natural gas service line.

Throughout the construction project, K&W requested meetings with utilities to locate facilities. MGE met with K&W on numerous occasions during the construction, and during these meetings MGE would locate facilities based upon the locations where K&W would

indicate they would be working. The discussions at these meetings were not documented, and it cannot be concluded whether K&W specifically requested locates for facilities between 12th and 13th Streets on Walnut. However, if K&W made this specific request, it is probable that the 2-inch OD coated-steel service line was not located. At that time, MGE believed that the 2-inch OD service line was previously disconnected from the main in 1991, and MGE did not have records that this service line was in operation. It is not documented that MGE located the 3-inch OD coated-steel service line.

During the course of its investigation into this incident, the Staff found no probable violations of Missouri Public Service Commission (MoPSC or Commission) pipeline safety regulations that could have contributed to the incident.

The Staff is making several recommendations to MGE as a result of this incident. The Staff recommends that MGE more closely monitor the actions of its contractors to reduce the potential for contractors to inaccurately document their actions during natural gas construction projects and to ensure that the contractors follow MGE procedures.

MGE has taken steps to alert persons utilizing underground boring processes that when other utilities exist in the bore path, these utility crossings should be excavated and exposed prior to boring. The Staff recommends that MGE continue to encourage excavators to use this guideline. The Staff also recommends that MGE increase the number of on-site construction inspections when aware of underground boring installation projects located near natural gas facilities.

MGE is working with city governments and other local utilities to require special permitting for underground boring projects. The Staff recommends that MGE continue working in support of these permits.

MGE has improved its facility locate response process. The Staff recommends that MGE continue the improved system of documenting actions taken pursuant to facility locate requests.

FACTS

Note: Except for the information gathered during the on-site investigation and/or interviews, the information used to compile this portion of the report was obtained in record and/or statement form.

THE INCIDENT

At approximately 3:10 p.m., Central Daylight Savings Time (CDST, all times in this report are Central Daylight Savings Time) on Tuesday, July 6, 1999, a natural gas ignition and flash fire occurred in an underground communications vault owned by Williams Communications, Inc., located near the intersection of 12th and Walnut Streets in Kansas City, Missouri.

PERSONAL INJURIES

At the time of the incident, an employee of a subcontractor for Williams was working in the communications vault. The employee sustained second degree burns and was hospitalized for approximately one week.

PROPERTY DAMAGE

No structures were damaged as a result of the natural gas ignition and flash fire within the communications vault.

SITE DESCRIPTION

The incident site is located near the intersection of 12th and Walnut Streets in the downtown area of Kansas City, Missouri (see Appendix A-1, Figure 1). This area is in a business district with commercial shopping areas, office complexes, and a multi-story parking garage.

The property at 1204 Walnut is the address for the Jones Store. This multi-story building is located on the west side of Walnut between 12th and 13th Streets. At the time of the incident, the store was vacant.

The communications vault where the incident occurred is located 84 feet south of the south curb of 12th Street and 8 feet west of the east curb of Walnut. Walnut runs in a north/south direction, while 12th and 13th Streets run in an east/west direction. Walnut is a 4-lane street whose traffic is directed one-way, heading north. Walnut slopes uphill between 13th Street and 12th Street from south to north, with the highest point in the 1200 block of Walnut at the intersection of 12th and Walnut Streets.

METEOROLOGICAL DATA

The Kansas City Downtown Airport (MKC) recorded a high temperature of 88 degrees Fahrenheit (°F) and a low temperature of 75°F on July 6, 1999. At 3:00 p.m., the temperature was 87°F, and the wind was from the north-northeast at an average speed of 12 miles per hour. The amount of precipitation for July, up to and including the date of the incident, was 0.01 inches. The total amount of precipitation for June was 10.56 inches.

NATURAL GAS SYSTEM

Natural gas service in Kansas City, Missouri, is provided by MGE. Between 12th and 13th Streets, a 20-inch OD high pressure[1], cast iron natural gas main (main) is parallel to Walnut and is located approximately 4 feet west of the east curb line of Walnut (see Appendix A-2, Figure 2). It operates at 30 inches water column with a maximum allowable operating pressure[2] of 2.2 pounds per square-inch gauge (approximately 61 inches water column). The installation date of this main is not known. However, records available to MGE indicate that this main has been in service since at least 1935.

A 3-inch OD coated-steel service line (existing service line) supplies natural gas to an inside meter set for the Jones Store, at 1204 Walnut. The existing service line is tapped into the top of the main, approximately 308 feet south of the south curb line of 12th Street (see Appendix A-2, Figure 2). This existing service line was installed on May 22, 1991. The installation of the existing service line was to replace a 2-inch OD bare-steel service line serving 1204 Walnut. A contractor working for MGE completed this replacement.

MGE records indicate that on May 22, 1991, the flow of natural gas to the 2-inch OD bare-steel service line was stopped. MGE believed that 7 feet of the 2-inch OD bare-steel line was removed at the tap location when the existing service line was installed. However, during this incident investigation, a 2-inch OD coated-steel service line was found located 48 inches south of, and parallel to, the existing service line. At the time of the incident, MGE was not aware of the existence of this 2-inch OD coated-steel service line.

Through further investigation following the incident, MGE concluded that the 2-inch OD coated-steel service line was the 2-inch OD bare-steel service line that MGE previously believed was abandoned when the existing service line was installed on May 22, 1991. The 2-inch OD coated-steel line found during the incident investigation was pressurized and supplied natural gas across Walnut. In 1991, 7 feet of this service line was cut and removed near the west curb of Walnut, and the 2-inch OD service line was capped. This left a 2-inch OD coated-steel natural gas service line extending across Walnut to a point near the west curb

[1] Missouri Public Service Commission (MoPSC) Regulation 4 CSR 240-40.030(1)(B)10. defines a high pressure distribution system as a distribution system in which the gas pressure in the main is higher than an equivalent of 14 inches water column (approximately ½ pound per square-inch gauge).

[2] MoPSC Regulation 4 CSR 240-40.030(1)(B)16. defines the maximum allowable operating pressure as the maximum pressure at which a pipeline or segment of a pipeline may be operated.

(see Appendix A-2, Figure 2). The remaining section of the service line entered the basement of 1204 Walnut, but natural gas was not supplied into the building through this line.[3]

PREVIOUS MGE ACTIONS

MGE's Damage Prevention Program

As part of MGE's damage prevention program[4], it is a member of the Missouri One Call System, Inc.[5] (MOCS). MGE receives facility locate requests from excavators when an excavation is planned. If MGE has facilities in the area of the proposed excavation site, then a field locator marks the location of the facilities at the site. At the time of the incident, MGE maintained records of its actions taken pursuant to facility locate requests. This documentation included the original locate request, and limited information regarding the specific facilities located and/or meetings with the excavator, and the date of MGE's response.[6]

MGE develops and maintains a list of known excavators, identifying those who normally engage in excavation activities in areas near pipelines owned by MGE. Once each calendar year, MGE updates the list of excavators.

Through MOCS, persons listed on MGE's excavator list are sent semi-annual mailings with damage prevention information. MGE's list of excavators for the fall of 1998 and spring of 1999 included both K&W Underground in Olathe, Kansas, and Williams

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[3] MoPSC Regulation 4 CSR 240-40.030(13)(O)4. states that whenever service to a customer is discontinued, one of the following must be complied with:

A. The valve that is closed to prevent the flow of gas to the customer must be provided with a locking device or other means designed to prevent the opening of the valve by persons other than those authorized by the operator;

B. A mechanical device or fitting that will prevent the flow of gas must be installed in the service line or in the meter assembly; or

C. The customer's piping must be physically disconnected from the gas supply and the open pipe ends sealed.

[4] MoPSC Regulation 4 CSR 240-40.030(12)(I)1. states that each operator of a buried pipeline shall carry out a written program to prevent damage to that pipeline by excavation activities. Excavation activities include excavation, blasting, boring, tunneling, backfilling, the removal of above ground structures by either explosive or mechanical means, or other earth moving operations.

[5] The Missouri Underground Facility Safety and Damage Prevention Statute, RSMo Chapter 319, provides for a notification center to be used by participating utilities to receive locate requests. The Missouri One Call System, Inc. operates as a non-profit Missouri corporation and is the notification center providing a single-point of contact for notification of excavation activities to its members through a statewide toll-free telephone number.

[6] MoPSC Regulation 4 CSR 240-40.030(12)(I)2.E.(II) states that copies of notifications of planned excavation activities must be retained for 2 years. At a minimum, these records should include the date and the time the request was received, the actions taken pursuant to the request, and when the response actions were taken.

Telecommunications in Kansas City, Missouri. The MOCS's damage prevention mailings were sent to excavators on October 23, 1998, and April 29, 1999. Both of these mailings contained information regarding the importance of having facilities marked before excavating and the toll-free number to call before excavating.

MGE Response to Facility Locate Requests

MGE received facility locate requests for the 1200 block of Walnut in 1998 and 1999 from two organizations. The first was on June 15, 1998, from the City of Kansas City. The locate request indicates that individuals were repairing a hydrant at the southwest corner of 12th Street and Walnut, near 1201 Walnut. The locate request indicates that a backhoe was utilized to repair a fire hydrant at a depth of 4 to 6 feet. MGE records indicate that personnel responded to this request on June 17, 1998.

The only other organization requesting facility locates for this area in 1998 and 1999 was K&W. The notification dates and MGE's documented response actions are listed in the following table.

K&W FACILITY LOCATE REQUEST	MGE RESPONSE
On March 31, 1999, K&W contacted MOCS to request facility locates between 11th Street and Truman on Walnut (this included the 1200 block of Walnut). The locate request indicates that steel pipe will be installed at a depth of 4 feet. The locate request also states that it is unknown if underground boring equipment will be used for the excavation. The request indicates that the excavation is scheduled to begin April 2, 1999, at 8:15 a.m. K&W requested that utilities call to set up a date and time to meet and mark facilities.	MGE located facilities on April 2, 1999.
On April 7, 1999, K&W contacted MOCS to request facility locates on Walnut from 11th Street to the railroad tracks located near 22nd Street. The locate request indicates that they will install conduit lines at a depth of 4 feet. Underground boring equipment will be utilized. The request indicates the excavation is scheduled to begin April 9, 1999, at 3:15 p.m. K&W requested that utilities call to arrange a time to meet.	MGE met with K&W on April 7, 1999.
On April 27, 1999, K&W contacted MOCS to request a meeting with utilities and remark facility locations on Walnut from 11th Street to where Section 5 ends (this included the 1200 block of Walnut). The locate request indicates that they will install conduit lines at a depth of 4 feet. Underground boring equipment will be utilized. The request indicates that the excavation will start April 29, 1999, at 11:00 a.m.	MGE responded on April 30, 1999.

K&W FACILITY LOCATE REQUEST	MGE RESPONSE
On May 14, 1999, K&W contacted MOCS to request that utilities remark facility locations on Walnut from 11th Street to where Section 5 ends (this included the 1200 block of Walnut). The locate request indicates that they will install conduit lines at a depth of 4 feet. Underground boring equipment will be utilized. The request says that a crew is working on Walnut.	MGE responded on May 18, 1999.

MGE conducted additional site visits in the 1200 block of Walnut during April and May of 1999. MGE records indicate that MGE located facilities in the area of 12th Street and Walnut on April 20 and May 21, 1999.[7]

Leakage Surveys and Active Leaks in the 1200 Block of Walnut

Prior to the incident, MGE completed its most recent natural gas main and service line leak survey in the incident area on March 10, 1999.[8] The survey was conducted utilizing both mobile[9] and walking flame ionization surveys. The survey included facilities located in the downtown area between Jefferson and Charlotte Streets, from 6th Street to 15th Street. This included the MGE facilities on Walnut between 12th and 13th Streets.

During the leak survey on March 10, 1999, MGE found a leak north of the intersection of 13th and Walnut Streets. A reading of 5% gas-in-air (% gas) was found approximately 65 feet

[7] MoPSC Regulation 4 CSR 240-40.030(12)(I)3. states that locate requests received by the operator should be evaluated to determine the need for and the extent of inspections. The following factors should be considered in determining the need for and extent of those inspections:

A. The type and duration of the excavation activity involved;
B. The proximity to the operator's facilities;
C. The type of excavating equipment involved;
D. The importance of the operator's facilities;
E. The type of area in which the excavation activity is being performed;
F. The potential for serious incident should damage occur;
G. The prior history of the excavator with the operator; and
H. The potential for damage occurring which may not be easily recognized by the excavator.

[8] MoPSC Regulation 4 CSR 240-40.030(13)(M)2.A. requires that an instrument leak detection survey must be conducted in business districts, including tests of the atmosphere in gas, electric, telephone, sewer, and water system manholes, at cracks in pavement and sidewalks, and at other locations providing an opportunity for finding gas leaks, at intervals not exceeding 15 months but at least once each calendar year.

[9] A mobile leak survey is one which is conducted with a flame ionization unit that is mounted on/in a vehicle. Samples of the atmosphere are drawn into the flame ionization unit through hoses that are suspended from the vehicle just above ground level. The vehicle is driven slowly to allow adequate sampling of the atmosphere.

north of the north curb line of 13th Street at the east curb line of Walnut. MGE classified this leak as a Class 4 leak.[10]

The only other active leak near the incident area was located at the intersection of 13th and Walnut Streets. This leak was originally classified as a Class 3 leak[11] on March 14, 1998. A reading of 1% gas was found near the southwest corner of the intersection. Before the incident, this leak was last checked on March 15, 1999.

Odorization Records

MGE's monthly odorant concentration tests that were conducted in the area of the incident between January 11, 1999, and July 1, 1999, indicated that the natural gas was adequately odorized and readily detectable at an average concentration of 0.20% gas.[12]

MGE Notifications and Actions

Initial Notification and Response

MGE received a call at 3:10 p.m. on July 6, 1999, from the Kansas City Fire Department indicating that a contractor was burned in a communications vault located near the intersection of 12th and Walnut Streets in Kansas City, Missouri. A MGE serviceperson was immediately dispatched, and other MGE personnel followed. A man who was burned while working in the communications vault was taken to the Truman Medical Center. The Kansas City fire and police barricaded the area and closed traffic to 12th and Walnut Streets. MGE contacted MOCS at 3:55 p.m. to request facility locates.

First Responding MGE Personnel Actions

A MGE construction crew arrived at the incident site at approximately 4:00 p.m. This crew began a leak investigation of the area. MGE personnel checked manholes, water boxes, sewers and storm sewer inlets for natural gas indications. A reading of 5% gas was found in the Williams communications vault where the subcontractor was burned. The vault is located 84 feet south of the south curb line of 12th Street and 8 feet west of the east curb line of

[10] MoPSC Regulation 4 CSR 240-40.030(14)(C)4. defines a Class 4 leak as a leak that is confined or localized and completely non-hazardous. No further action is required.

[11] MoPSC Regulation 4 CSR 240-40.030(14)(C)3. defines a Class 3 leak as a leak that does not constitute a hazard to property or to the general public but is of a nature requiring routine actions. These leaks must be repaired within 5 years and be rechecked twice per calendar year, not to exceed 6½ months, until the facility is repaired or replaced.

[12] MoPSC Regulation 4 CSR 240-40.030(12)(P)1. requires the odorant in natural gas to be readily detectable at a concentration of less than 0.90% gas-in-air.

Walnut. A reading of 5% gas was also found in a second vault located 90 feet south of the south curb line of 12th Street and 8 feet west of the east curb line of Walnut.

MGE began a bar hole[13] leak survey of the area. Bar holes were made between 80 feet and 100 feet south of the south curb of 12th Street, and no indications of natural gas were detected in the bar holes. MGE gathered a gas sample from the communications vault where the man was burned and sent it to a lab to be tested for the presence of natural gas.

At approximately 6:22 p.m., a locating contractor, representing other utilities in the area, arrived at the site and located other utility facilities in the area. After the locating contractor located the facilities, MGE began making bar holes over the natural gas main located on the east side of Walnut, from 12th Street to 13th Street. At approximately 7:00 p.m., a reading of 100% gas was obtained in a bar hole at a location 308 feet south of the south curb of 12th Street and 5 feet west of the east curb of Walnut. This location was over the service tap to 1204 Walnut. MGE continued to monitor this area for natural gas, and the readings remained at 100% gas.

MGE began breaking through the street pavement to expose the service tap for 1204 Walnut at approximately 9:40 p.m. Upon exposing the pipe, the service was found to be tapped into the top of the main with the service tee facing south then turning 90 degrees to the west. A 3-inch OD coated-steel service line extended from the tee toward the west under a 16-inch OD concrete pipe and toward 1204 Walnut, the vacant Jones Store building. A 6-inch OD steel communications conduit laid beneath the 3-inch OD coated-steel service line (see Appendix B-1, Photograph 2). The communications conduit was in close proximity to this existing natural gas service line, which made it difficult to observe the condition of the service line pipe.

To better examine the condition of the existing service line, MGE plugged the service tee, then cut and removed a 71-inch long section of the existing service line, from the tap to past the point of contact with the communications conduit (see Appendix B-2, Photograph 3). Once removed from the ground, the pipe was found to be deeply gouged on the bottom, in the area that intersected with the communications conduit (see Appendix B-2, Photograph 4).

Natural gas indications began to dissipate when the existing service line was excavated. MGE continuously monitored bar holes, sewers, and vaults with combustible gas indicators throughout the evening and into the morning of July 7, 1999, until approximately 5:00 a.m. MGE replaced the manhole covers at approximately 5:30 a.m. At that time, the excavation was covered with a steel plate to preserve the working area until work would resume later that morning.

In conjunction with the response, MGE conducted two odorant tests at 1617 Walnut Street, approximately four blocks south of the incident area, at approximately 7:55 p.m. on July 6,

[13] Bar holes are small diameter holes punctured into the ground by a steel rod to facilitate sampling of the subsurface atmosphere for natural gas with a combustible gas indicator.

1999. These odorant tests indicated that the natural gas was adequately odorized and readily detectable at an average concentration of 0.30% gas.

Second Notification and Response Actions

MGE's dispatch center received a call at approximately 8:00 a.m. on July 7, 1999, reporting an odor of natural gas on Walnut, between 12th and 13th Streets. MGE personnel were dispatched to the site to investigate. At 8:32 a.m., MGE found readings between 10% and 20% gas in the area around the lower lip of the communication vault and 0% gas indication within the communication vault. MGE personnel found 15% gas under the steel plate that was placed over the excavation earlier that morning.

A construction and maintenance crew arrived at the site at approximately 8:40 a.m. and began to test the bar holes. A natural gas-in-air reading of 80% was found 361 feet south of the south curb of 12th Street and 5 feet west of the east curb of Walnut. At that time, MGE believed that this location was above a bell-joint on the main and the readings were associated with the Class 4 leak that was found on March 10, 1999 (refer to the **Leakage Surveys and Active Leaks in the 1200 Block of Walnut** section of this report). From 11:45 a.m. to 1:30 p.m., MGE purged this location with an air compressor and continued to monitor the natural gas readings.

At 1:30 p.m., MGE determined that natural gas readings were not decreasing as expected. Additional bar holes were made, and a natural gas-in-air reading of 100% was found 312 feet south of the south curb of 12th Street, 4 feet south of the intersection of the existing service line and the communications conduit.

The excavation at the service tap to 1204 Walnut was enlarged beginning at approximately 3:00 p.m. During this excavation, MGE found a 2-inch OD coated-steel natural gas service line tapped into the west side of the main. This 2-inch OD coated-steel service line was located 48 inches south of the existing service line, extended west from the main, and was located directly under the communications conduit. The 2-inch OD coated-steel service line was encased in concrete approximately 2 inches thick around the pipe.

MGE was not aware of the existence of the 2-inch OD coated-steel service line (old service line) until it was exposed on July 7, 1999. Through further investigation following the incident, MGE determined that the 2-inch OD coated-steel service line was the 2-inch OD bare-steel service line believed to have been abandoned when the existing service line was installed on May 22, 1991.

MGE plugged the natural gas tap for the old service line at the main. The old service line was cut at the tap, and it was cut west of its intersection with the communications conduit. This section was 45½ inches in length, and it was removed from the excavation.

MGE discovered that the concrete encasement was ground away and had exposed the old service line in the area of the intersection with the communications conduit. The top of the old service line was dented, flattened, and gouged. The damage on the old service line

extended approximately 8 inches along the top of the pipe and included a hole, approximately 1-inch by ½-inch (see Appendix B-3, Photograph 5).

MGE continued to monitor natural gas indications in the vaults and bar holes in the area. The natural gas readings began to dissipate, and by 8:45 p.m., the only gas-in-air reading obtained in the area between 1204 Walnut and the communications vault was a 3% gas reading at the inside rim of the vault located 90 feet south of the south curb line of 12th Street and 8 feet west of the east curb line of Walnut. The only other reading obtained in the area was a 15% gas reading at the location of the Class 4 leak found on March 10, 1999. Because the readings had dissipated and no hazardous conditions remained, the MGE crew monitoring the site was released at 9:00 p.m. A recheck of the area was scheduled for July 8, 1999.

At 10:00 a.m. on July 8, 1999, MGE personnel rechecked the site for natural gas indications. The recheck revealed 0% gas in all vaults, bar holes (except for the Class 4 leak found on March 10, 1999), and excavations.

MGE's Testing of the Collected Sample

As stated in the **First Responding MGE Personnel Actions** section of this report, MGE collected a gas sample on July 6, 1999, from the communications vault where the flash fire occurred. The sample was sent to an independent lab in Topeka, Kansas for gas chromatograph analysis. The chromatography report showed that methane and ethane were detected in the sample. The report concluded that the sample contained MGE's natural gas.

Additional Leak Survey

Following the investigation into this incident, MGE became concerned about other natural gas lines that may have been previously damaged during the Williams construction project and which may not have been identified. These lines may be leaking, or the severity of the damage may not have produced an immediate leak but may be a potential problem in the future.

To ensure that no hazardous leaks currently exist in areas where the Williams construction contractor had been working, MGE conducted a special leak survey. On July 15, 1999, MGE leak surveyed seventeen communications vaults in the area of the Williams construction project. Natural gas was detected in one of these seventeen communications vaults. This communications vault was located 75 feet north of the north curb of 18th Street and 9 feet west of the east curb of Walnut. A ½% gas reading was detected in the communications vault, and this leak was classified as a Class 3 leak.[14]

[14] MoPSC Regulation 4 CSR 240-40.030(14)(C)3. defines and states examples of Class 3 leaks. An example of a Class 3 leak is a reading less than the lower explosive limit in a vault, catch basin or manhole other than a sanitary sewer. The lower explosive limit is the least amount of gas-in-air mixture that will ignite. This mixture for natural gas is approximately 4.5% gas-in-air.

MGE's Actions Subsequent to the Incident to Prevent Future Damage

MGE believes that damage to underground facilities could be reduced by carefully excavating and exposing the utilities which cross the bore path, prior to boring. This would allow for a visual confirmation that the existing facility and the underground boring equipment do not come into contact during the underground boring excavation. MGE is encouraging excavators who use underground boring processes to follow this guideline. MGE is currently working with city governments and other local utilities to require special permitting for directional boring. MGE is proposing that these special permits require the person operating the underground boring equipment be trained on the manufacturer's instructions, agree and commit to exposing other utilities before boring, and agree to contact MGE when boring across natural gas lines so that these natural gas lines can be examined for leaks prior to backfilling the excavation.

MGE has worked to improve its response actions for facility locate requests. MGE is now documenting which natural gas mains and service lines are located in response to each request. In addition, when MGE personnel meet with contractors at an excavation site, MGE provides the contractor a flier with a direct number to MGE that the excavator may call if there is a doubt as to the location of a facility or if clarification is needed from MGE (see Appendix C-1, Exhibit 1 for a copy of this flier).

MoPSC Reporting Requirements

The Missouri Public Service Commission incident reporting requirements were completed as follows:

1. The Gas Safety Staff was notified at 4:45 p.m. on July 6, 1999; and

2. U.S. Department of Transportation form RSPA F7100.1 and a narrative statement were completed on August 4, 1999. A supplemental narrative statement for the same form was completed November 8, 1999.

STAFF INVESTIGATION

Notification of Staff by MGE and Initial Investigation

As noted in the previous section of this report, MGE notified the Staff at 4:45 p.m. on July 6, 1999. At the direction of the Assistant Manager - Gas Safety, two members of the Commission's Gas Department - Gas Safety Staff departed from Jefferson City at 6:00 p.m. on July 6, 1999, and arrived at the incident site in Kansas City, Missouri at 8:45 p.m.

Upon arriving at the site, the Staff met with MGE's Safety Specialist and was given a description of the events that had occurred and the actions taken to that time. MGE personnel explained that bar holes were made at 12-foot intervals along Walnut above the natural gas

main. The highest natural gas readings were found at a location 308 feet south of the south curb line of 12th Street.

The Staff observed two vaults located south of 12th Street on Walnut. The manhole lid covers for the vaults had been previously removed, and the manhole lid cover furthest north was labeled as "Williams". MGE informed the Staff that the communications vault furthest north, approximately 84 feet south of the south curb of 12th Street and approximately 8 feet west of the east curb of Walnut was the site of the flash fire. This communications vault had a dark discoloration around the upper portion of the vault (see Appendix B-1, Photograph 1). MGE informed the Staff that a subcontractor for Williams was working in the communications vault. It was initially reported to MGE that the subcontractor entered the communications vault and used an electric drill when a flash fire occurred. MGE informed the Staff that employees of the subcontractor stated that before entering the communications vault, the subcontractor had not tested the vault for flammable vapors and ventilation air was not utilized.

The Staff observed several street patches in the incident area. A street patch surrounded the 2 manhole covers and extended northwest into the intersection of 12th Street and Walnut. Several other patches were observed along Walnut, between 12th and 13th Streets, parallel to the east curb line of Walnut and the same distance from the curb as the Williams communications vault (see Appendix A-2, Figure 2 for locations of street patches).

The Staff also observed that the highest point in the 1200 block of Walnut is at the intersection of Walnut and 12th Street. Walnut gradually sloped downhill toward the south to the intersection of Walnut and 13th Street.

At 9:15 p.m., the Staff conducted an odorant intensity test at 1617 Walnut, approximately 4 blocks south of the incident site. The Staff found the odorant levels in the natural gas to be adequate, at a concentration of 0.30% gas.

At approximately 9:40 p.m., MGE began breaking through the street pavement to expose the area where the highest natural gas-in-air readings were detected. By 10:30 p.m., MGE had removed the pavement and began hand digging around the existing service line. MGE exposed a section of the existing service line that crossed in close proximity to a 6-inch OD steel line, believed to be a conduit for Williams telecommunication cables. MGE personnel entered the excavation and attempted to view the condition of the existing service line pipe, but could not see the bottom of it because the top of the communications conduit was too close. At approximately 2:10 a.m., MGE discontinued the flow in the existing service line by plugging the service tee on the main. The existing service line was cut west of the service tap and west of the 16-inch OD concrete line that it crossed under. This section of pipe was 71 inches in length, and it was removed from the excavation.

Once removed from the excavation, the condition of the existing service line could be better observed. The section of pipe included a Dresser® coupling and Posi-hold® coupling located toward the east end of the service line. Toward the west end of this pipe section, the 3-inch OD coated-steel service line had two elbow connections which offset the pipe approximately

13 inches south on the west side of the 16-inch OD concrete line (see Appendix B-2, Photograph 3). Between the Posi-hold® coupling and the first elbow connection, the pipe was found to be damaged in a 5-inch by 3-inch oval area, the pipe was gouged, with several deep scratches and grooves (see Appendix B-2, Photograph 4).

Further Investigation

On July 7, 1999, at 3:25 p.m., the Staff learned of the second leak investigation, the discovery of the old service line, and the approximate 1-inch by ½-inch hole in the service line. On July 9, 1999, at 8:00 a.m., two Gas Safety Staff members visited the MGE office where MGE secured the damaged 2-inch OD coated-steel service line.

The section of the old service line was approximately 45½ inches in length. The east section of the old service line was encased in a 2-inch thick layer of concrete (see Appendix B-3, Photograph 6). MGE informed the Staff that the old service line was tapped into the west side of the main, and the tap was also encased in concrete. The concrete layer had originally extended over the pipe, but it was removed by MGE during the excavation on July 7, 1999. Before the concrete was removed, MGE observed that the concrete encasement had been ground away in the area where the old service line intersected with the communications conduit.

Just east of the west end of the pipe, the pipe was dented and gouged (see Appendix B-3, Photograph 6). The damage included an approximate 8-inch by 4-inch area of deep scratches and grooves, similar to those found on the existing service line. The center of the damaged area contained a hole approximately 1-inch by ½-inch (see Appendix B-4, Photograph 7). This damaged area was in the location where the old service line intersected with the communications conduit.

MGE explained that the communications conduit was perpendicular to the existing service line and the old service line. The existing service line was damaged on the bottom of the pipe. The old service line, located 48 inches south of the existing service line, was damaged on the top (see Appendix A-3, Figure 3).

During the initial investigation, MGE could find no records or maps of the 2-inch OD coated-steel service line. MGE later learned that this old service line previously supplied gas to 1204 Walnut. The Company had believed that an MGE contractor abandoned this line at the main when the existing 3-inch OD coated-steel service line was installed in 1991. However, through this incident investigation, MGE discovered that in 1991, the old service line was cut and capped-off from service near the west curb of Walnut. This discontinued service to the Jones Store, but left a portion of the old service line still connected to the main and extending under Walnut Street.

ANALYSIS

THIRD PARTY DAMAGE TO THE NATURAL GAS LINES

K&W requested a number of meetings with utilities for facility locates through MOCS during the months of April and May in 1999. These facility locate requests were for a large communications cable installation project in the downtown area of Kansas City, Missouri. This area included Walnut between 12th and 13th Streets. Many of these locate requests indicated that underground boring equipment would be utilized. MGE met with K&W several times during this project. At the meetings, the companies would discuss which specific areas needed to be located at that particular time. The discussions at the meetings were not documented. The exact areas where K&W specifically requested facility locates and the corresponding dates cannot be determined.

On Walnut between 12th and 13th Streets, there are a number of street patches along the east side of Walnut. The manhole cover of the incident site, labeled as "Williams", is located approximately 8 feet west of the east curb of Walnut. In the 1200 block of Walnut, four street patches were observed south of the communications vault at approximately the same distance from the east curb of Walnut. Typically when underground boring processes are used to install facilities under a street, an excavation will be made to allow for the entrance of the underground boring equipment below the surface. A second excavation would be made to receive equipment on the opposite end. The street patches on Walnut that are in line with the Williams communications vault, would be consistent with those left when this construction method is utilized.

Often when utilizing underground boring processes, a reamer may be used to create a hole larger than the diameter of the facility to be installed. It appears that during the boring/reaming operation to create the excavation hole for the conduit, the boring/reaming equipment came into contact with the top of the old service line and the bottom of the existing service line. The boring/reaming equipment cut through the concrete encasement surrounding the old service line, then proceeded to scrape and gouge through the wall of the old service line. This boring/reaming operation most likely left the 1-inch by ½-inch hole in the top of the old service line (see Appendix A-3, Figure 3). The boring/reaming equipment also scraped and gouged the existing service line, leaving a minimal wall thickness. The communications conduit was installed in this excavation between the old service line and the existing service line.

NATURAL GAS FACILITY LOCATES

During the months of April and May in 1999, the construction contractor for Williams requested a number of meetings with utilities to locate facilities. MGE has documentation that it responded to these facility locate requests. However, it is not clear which specific areas were requested by K&W for locates, and it is not clear which natural gas facilities were located in response to these requests.

Because the 2-inch OD coated-steel natural gas service line was not included in MGE's record or map system, it is probable that this service line was not located before the construction contractor began the installation of the communications conduit. The 20-inch OD cast iron natural gas main and the 3-inch OD coated-steel natural gas service line may have been located pursuant to the locate requests, but MGE does not have the detailed documentation to verify these actions. If the Company was notified that excavation work was being done in that area, field locating personnel would have located these natural gas facilities, using normal MGE procedures. MGE records only indicate that personnel met with the construction contractor a number of times and located natural gas facilities during the construction project. MGE does not have detailed records indicating that these particular natural gas lines were located.

NATURAL GAS ESCAPE, MIGRATION, AND IGNITION

It is likely that the boring/reaming operation damaged the old service line and left the 1-inch by ½-inch hole through the pipe wall. This hole allowed natural gas to exit the line at a pressure of approximately 30 inches water column.

At the time of the installation of the communications conduit, the boring/reaming operation would have probably created a hole of 8 to 10 inches in diameter for the communications conduit. This boring/reaming process would have allowed for disturbance of the soil surrounding the conduit. This would have presented a path of low resistance for the migration of the natural gas escaping from the old service line. Because natural gas is lighter than air, it will migrate along paths of least resistance, through the soil and upward into the atmosphere. The highest point in the 1200 block of Walnut is at the intersection of Walnut and 12th Street, as the street gradually slopes uphill between the old service line and this intersection.

The escaping natural gas, restricted from venting by the street pavement and undisturbed soil, would have traveled upward, through the loosened soil surrounding the communications conduit. This path could have led the natural gas directly into the Williams communications vault, where it could have entered through a communications conduit entrance or any cracks, voids, or joints within the wall of the vault. Once inside the communications vault, the natural gas could accumulate to an explosive mixture.

Initial reports from persons at the incident site indicate that the subcontractor had used an electric power drill when the flash fire occurred. This power tool is the mostly likely source of ignition for the accumulated natural gas.

THE 2-INCH OD COATED-STEEL NATURAL GAS SERVICE LINE

Prior to the incident, MGE believed that the old service line to 1204 Walnut was abandoned at the main when the existing service line was installed on May 22, 1991. MGE used a contractor to install the existing service line and abandon the old service line. The Company's records indicate that 7 feet of the old service line was removed, and the Company

believed that this section of the service line was removed at the tap location. However, this incident investigation revealed that 7 feet of the old service line was cut and removed near the west curb of Walnut and the old line was capped. This left the remaining portion of the old service line still connected to the main and extending across Walnut to a point near the west curb.

Although the old service line was not abandoned at the main, this action is in compliance with MoPSC Gas Safety Regulations. MoPSC Regulation 4 CSR 240-40.030(13)(O)4. states that whenever service to a customer is discontinued, one of the following must be complied with: the valve that is closed to prevent the flow of gas to the customer must be provided with a locking device or other means designed to prevent the opening of the valve by persons other than those authorized by the operator; a mechanical device or fitting that will prevent the flow of gas must be installed in the service line or in the meter assembly; or, the customer's piping must be physically disconnected from the gas supply and the open pipe ends sealed. MGE is in compliance with the regulation because the gas supply was physically disconnected from the customer's piping, and the pipe ends were capped.

However, the Company's procedures at the time of the installation would have required that the old service line be disconnected at the main. Although this procedure was in place, the Company's contractor did not abandon the old service line at the main.

MONITORING FOR OTHER POSSIBLE DAMAGE

On July 15, 1999, MGE conducted a special leak survey to ensure that no hazardous leaks currently exist in areas where the Williams construction contractor had been working (refer to the **Additional Leak Survey** section of this report). This included leak surveying seventeen communications vaults in the area of the Williams construction project.

It is possible that other MGE facilities were damaged during the Williams project where the severity of the damage may not have produced an immediate leak but may be a potential problem in the future. Because the Williams construction area is in a business district, the Company will be leak surveying the natural gas lines in the area at least once each calendar year not to exceed 15 months, as required by MoPSC Regulation 4 CSR 240-40.030(13)(M)2.A. Any leaks that may develop should be detected during the annual leak survey.

CONCLUSIONS

1. At approximately 3:10 p.m., CDST, on Tuesday, July 6, 1999, a flash fire occurred in an underground vault owned by Williams Communications, Inc., located near 1204 Walnut in Kansas City, Missouri.

2. A subcontractor who was inside of the communications vault at the time of the flash fire, sustained burns and was hospitalized.

3. Laboratory test results of a gas sample collected from the communications vault indicate that the sample contained MGE's natural gas.

4. The probable cause of the incident was the escape of natural gas from a hole in a 2-inch OD coated-steel natural gas service line located approximately 228 feet south of the communications vault. It is likely that this service line was damaged during a Williams construction project that installed communication lines during April and May of 1999. During this project, a 6-inch OD steel communications conduit was installed using underground boring equipment. It appears that this underground boring equipment damaged the old 2-inch OD coated-steel service line and the existing 3-inch OD coated-steel service line for 1204 Walnut.

5. Natural gas escaping from the 2-inch OD coated-steel service line at a pressure of approximately 30 inches water column, migrated through loosened soil around the newly installed communications conduit, and eventually accumulated within the Williams communications vault. The natural gas that accumulated within the communications vault was most likely ignited when a subcontractor used an electric drill within the vault.

   Employees of the subcontractor informed MGE personnel that before entering the communications vault, the subcontractor had not tested the vault for flammable vapors and ventilation air was not utilized.

6. During the communication cable construction project, K&W requested meetings with MGE to locate natural gas facilities on a number of occasions. The construction project involved a large area in downtown Kansas City, and during these meetings K&W would inform MGE of the specific area that needed facility locates. Detailed documentation of these meetings was not maintained, and the exact areas where K&W specifically requested facility locates cannot be determined. However, if MGE received a facility locate request for the 1200 block of Walnut, it is likely that MGE did not locate the 2-inch OD coated-steel service line. MGE records at the time of the construction project indicated that this service line was previously abandoned.

   It is inconclusive whether the 3-inch OD coated-steel natural gas service line for 1204 Walnut was located. Using normal MGE procedures, field locating personnel would have located this line, if a locate request for this area was received. Company records indicate that MGE personnel located natural gas facilities and met with the construction contractor a number of times during the construction project, but MGE does not have detailed records indicating that this particular service line was located.

7. The Staff's investigation did not reveal any violations of Missouri Public Service Commission regulations by MGE that contributed to the incident.

RECOMMENDATIONS

1. The Staff recommends that the Company reduce the potential for contractors used by MGE to inaccurately document their actions during natural gas construction projects. The Staff recommends that MGE conduct more thorough on-site inspections of these projects. This would help improve the accuracy of the facility locating process by ensuring that construction records and maps of natural gas facilities are accurate.

2. The Staff recommends that MGE more closely monitor the actions of its contractors to ensure that the contractors follow MGE procedures. This includes verifying that each permanently inactive service line is abandoned according to normal Company procedures.

3. The Staff recommends that MGE increase the number of on-site inspections conducted when aware of underground boring installation processes located near natural gas facilities.

4. MGE has taken steps to alert persons utilizing underground boring processes that utilities crossing the bore path should be excavated and exposed prior to boring. The Staff recommends that MGE continue to encourage excavators to use this guideline.

5. MGE is currently working with city governments and other local utilities to require special permitting for underground boring. MGE is proposing that these special permits would require that the person operating the underground boring equipment be trained on the manufacturer's instructions, agree and commit to exposing other utilities before boring, and agree to contact MGE when boring across natural gas lines so that these natural gas lines can be examined for leaks prior to backfilling the excavation. The Staff recommends that MGE continue to work in support of these permits.

6. Since the incident, MGE has improved its methods for documenting actions taken pursuant to facility locate requests. The Staff recommends that MGE continue this improved system of documenting these actions. This improved documentation should include detailed information regarding the facilities located, the time of the marking, and who completed these actions.

7. The Staff recommends that MGE file a response to these recommendations in Case No. GS-2000-62 within 30 days of the filing of this report.

APPENDIX A
(Figures)

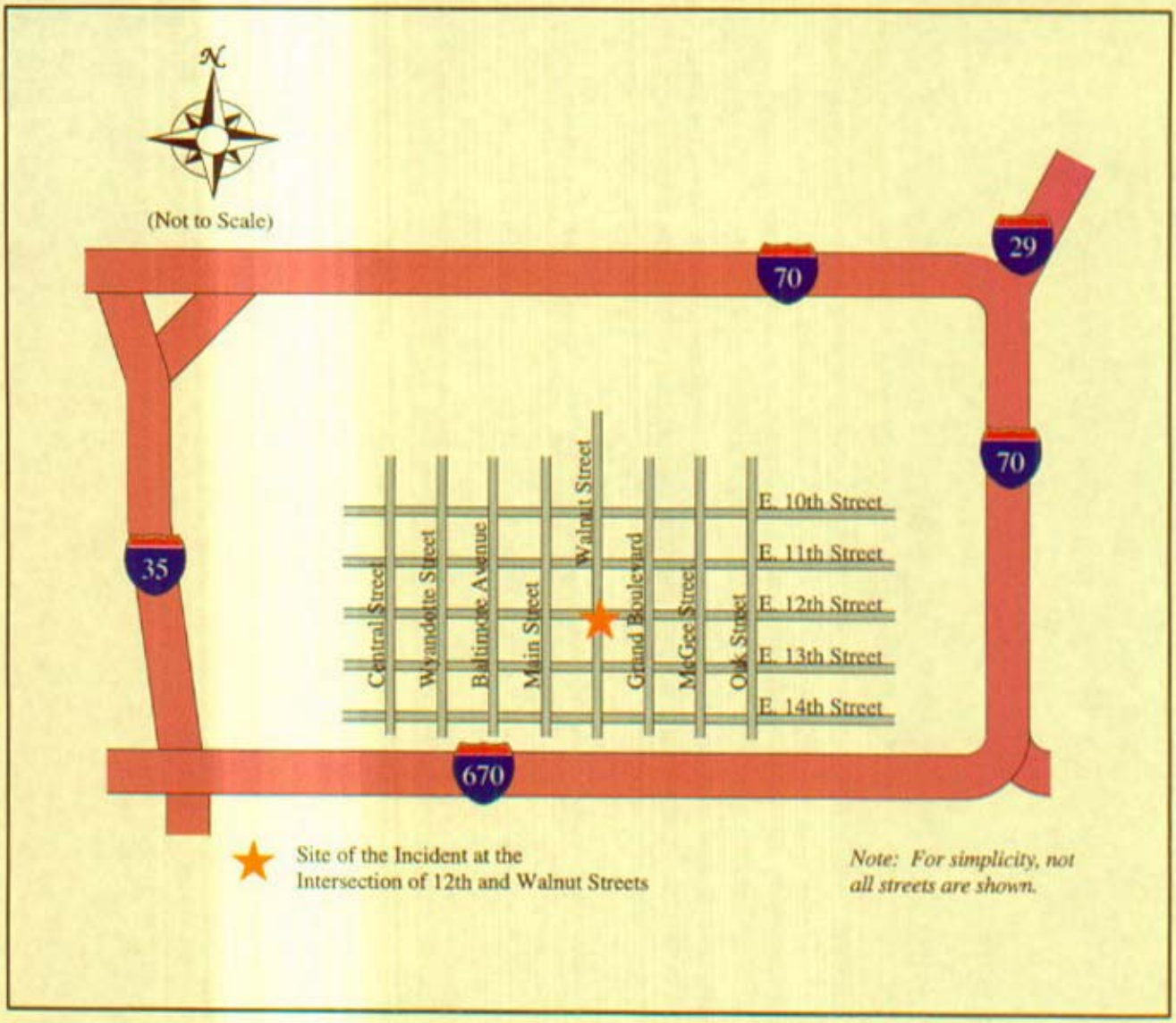

Figure 1
Area Map of the Incident Site in Downtown Kansas City

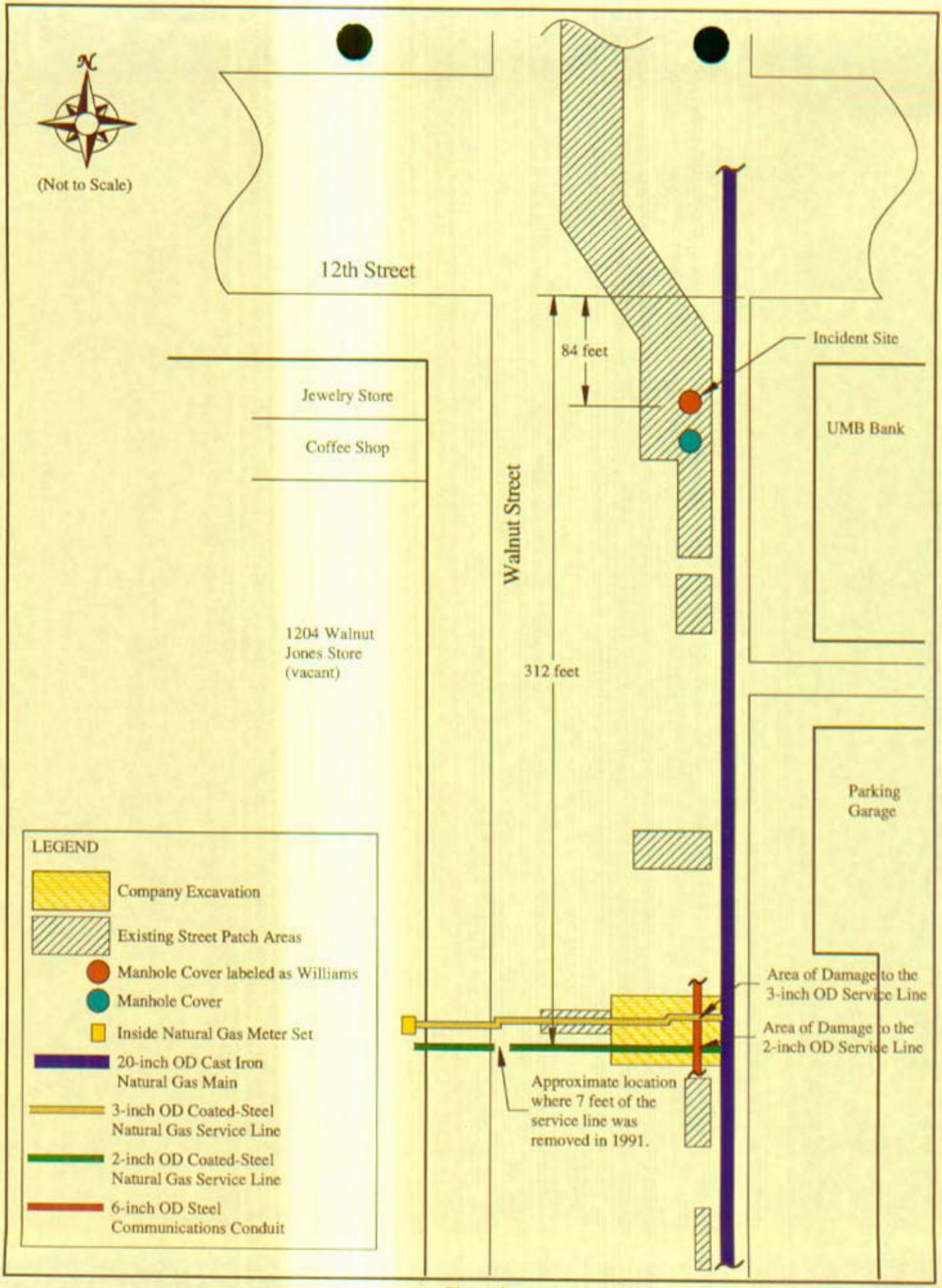

Figure 2
Plan View of the Incident Area

Appendix A-2