Emergency Response Planning for Urban Remediation Project – 14392

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ABSTRACT

As part of the project design it was necessary to excavate radiological contaminated material 360 degrees around a 150 meter long high pressure gas main. The gas main was 20 cm in diameter and had a working pressure of 725 kilo Pascal. In the event the gas line was damaged by Site activities it would be necessary to evacuation an area of 0.8 km^2 in size. This may not sound like a huge area, but included in this area was a bridge for a major city river crossing, railroad distribution lines, sea port trucking operations, light industrial facilities, and residential properties. State, Local, and private entities had to participate in the development of the Emergency Action Response Plan in the event the gas main was compromised.

INTRODUCTION

In the late 1800s it was common to light homes, businesses, and communities with manufactured gas and kerosene. Illumination was generated by piping the fuel source through a lamp that contained a ceramic mesh mantle. When the manufactured gas was ignited the flame would generate heat causing the mantle to glow. Mantles are made by impregnating cotton fabric sacks with different oxides. When the mantle is lite the silk burns away and leaves behind a brittle ceramic shell.

It wasn't until 1890 that Carl Auer von Welsbach discovered that if he soaked cotton mesh in a solution of 99% thorium oxide and 1% cerium dioxide the mantle would burn with a pure white light once the cotton was burned out of the mantle.[1] At the turn of the 20th century, Camden and Gloucester City, New Jersey were at the center of ceramic mesh mantle manufacturing. The Welsbach Company was located in Gloucester City the General Gas Mantle Facility was located in Camden. These two companies made thousands of these mantles a day from the late 1890s to 1941, sometimes producing as many as 250,000 per day. When the two New Jersey companies went out of business in the mid-1940s they left behind a legacy of soil contamination by thorium and other radioactive materials.[2]

Figure 1
Carl Auer von Welsbach

Figure 2
Welsbach Mantle

The wide spread radiological contamination in the Gloucester City and Camden area was mainly from the Welsbach Company. The Welsbach Company actually performed thorium extraction from monazite ores while the General Gas Mantle Facility only used refined thorium in its process. [3] Contaminated residuals as well as extraction waste were used as backfill throughout the Gloucester City and Camden areas.

In the 1990 the New Jersey Department of Environmental Protection conducted a radiological contamination investigation on more than 1,000 properties in Gloucester City and Camden. The investigation identified about 100 properties being contaminated. As a result the Welsbach/GGM properties were placed on the Superfund's National Priority List in June 1996.[2]

Figure 3
Welsbach/GGM
Superfund Site Study
Areas

THE WORK

One of the properties that required remediation is owned by Gloucester Logistics Terminal (GLT,) which is an active river port storage and shipping yard. The site is surrounded by additional terminal facilities west and north of the site. An active railroad is located on the east side. The Walt Whitman Bridge, a major crossing of the Delaware River that links South Jersey residents to the Philadelphia area and residential neighborhoods bounds the south side of the site. This property is an active storage area and was only partially closed off to support remediation activities.

There remediation of this property required several tasks to be performed. These included:

- Lane relocation on North Broadway to allow excavation along the road's east sidewalk.
- Installation of construction fence (six foot chain link)

around the remediation and support area to protect site workers, members of the community, and GLT East Yard workers and visitors.
- Establishment of an operations support area, contaminated water storage tank area, and temporary electrical services.
- Excavate radiologically contaminated soils and transport to the Trans-Shipment Facility for railcar loading and shipment for disposal.
- Conduct a Final Status Survey sampling to demonstrate that remediation goals have been achieved.

Several plans were prepared to support remediation and restoration activities for this property. These plans included an Accident Prevention Plan, Site Safety and Health Plan, Emergency Response Plan, Quality Assurance Project Plan, Operations Plan, and Transportation and Disposal Plan. These plans were used as means and methods to safely and effectively remove the radiologically contaminated soils, materials, and debris.

THE PROBLEM

A modest sized high pressure natural gas main (20 cm in diameter at 5,000 to 5,500 kPa) owned by the Williams Companies (Williams) of Tulsa, Oklahoma runs north and south alongside the sidewalk. This natural gas main is maintained by Transco Energy Company (Transco) a subsidiary of Williams. This natural gas main is located inside the excavation area and had to be protected from damage or movement during remediation activities. A Williams-Transco representative was present on site while excavation and backfilling around the pipeline was performed. The remediation designed required 168 meters of natural gas main be remediated around.

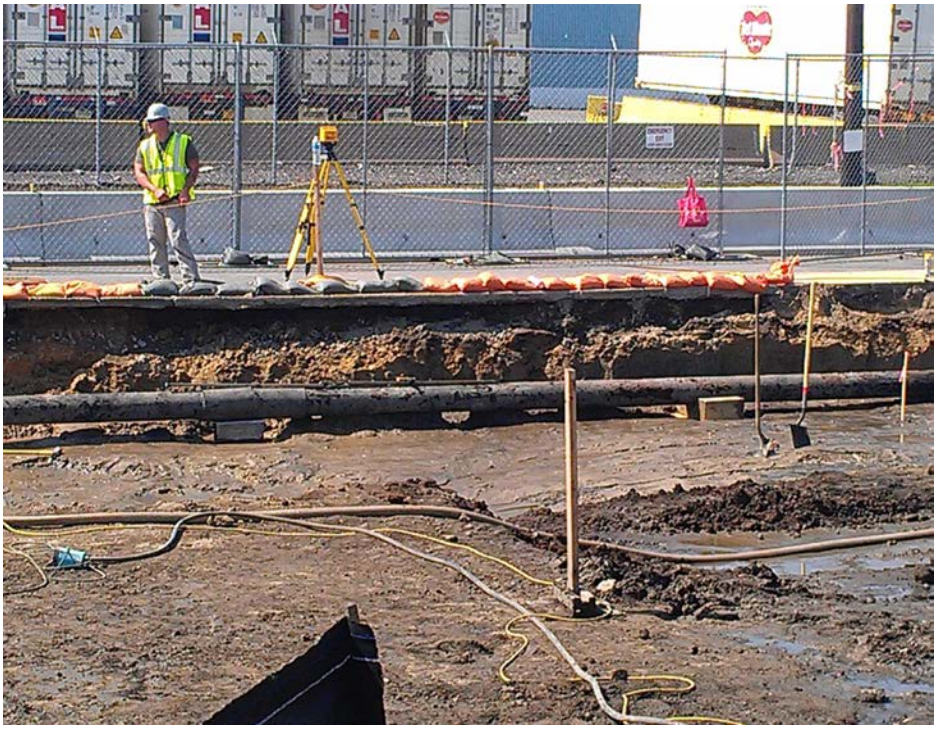

Figure 4
Williams-Transco Gas Pipeline

The major concern with working around a high pressure gas main is the possibility for compromising the pipe. Protocols for excavation around the gas main limit the use earth moving equipment to a 0.6 meter radius around the pipe. The pipe is uncovered by hand digging inside that radius. There is a concerned that when the soils from around the gas main are removed, it may cause a crack or other defect in the pipe to let go and release natural gas into the immediate area. This release of natural gas could be minor or catastrophic. Williams-Transco established an evacuation/blast radius of 460 meters to define an area that Transco considered in the danger zone if a blast were to occur. The total affected evacuation/blast area is 0.8 km^2. Figure 5 provides an overview of the affected area.

Figure 5
Overview of Evacuation/Blast Area

The evacuation/blast area included a portion of GLT to the west of North Broadway and the docking facilities for McAllister Towing, a tugboat service for the Delaware River, the South Jersey Port Corp across Newton Creek on South Broadway located in Camden. These areas can be evacuated quickly to prevent the loss of life. There remaining areas of the evacuation/blast area is more difficult to manage in the event of catastrophic gas release. These areas include a main rail line operated by Conrail to the east, a residential area of Gloucester City and the Walt Whitman suspension bridge to the south.

The Walt Whitman Bridge handles a large volume of automobile and truck traffic between Southern New Jersey and Philadelphia, Pennsylvania. The bridge is operated by the Delaware River Port Authority (DRPA) which provides maintenance and police services as well as administrative functions. Several emergency planning meetings were held with the various businesses and local government agencies to determine the necessary protocols and situation

responsibilities in the event of a catastrophic event or evacuation situation.

EMERGENCY PLANNING

Emergency planning began early in the planning process due to the number of businesses and agencies required to participate. Businesses and agencies were sent a description of the work to be performed and an explanation of the evacuation/blast area requirements. The main responsible parties involved were, the Gloucester City and City of Camden Police and Fire Departments, Walt Whitman Bridge and DRPA, Conrail Operations, Holt Terminal Operations and Security, Williams-Transco Gas Company, McAllister Towing (tug boat operations on the Delaware River), the United States Army Corps of Engineers, and Sevenson.

Several planning meetings were held with various members of the group to determine which agency would provide incident command if there was an evacuation event. Sevenson's Site Safety and Health Officer was responsible to activate evacuation and notification protocols. As part of the notification protocols, the Site Safety and Health Officer was responsible for contacting 911 and notification to the Holt Terminal Gate 5 security, Conrail operations, and McAllister Towing. The Williams-Transco onsite representative was responsible for notifying Williams-Transco control room to shut down gas feeds to the pipe.

Once onsite, the Gloucester City Fire Department would assume command of the site and notify the DRPA. Gloucester City Police was responsible for securing traffic around the site on Gloucester City roads. City of Camden Police was responsible for securing traffic on Broadway on the north side of the Site. City of Camden Fire Department was available to provide mutual aid in the event of fire.

Several evacuation areas were designated for affected personnel. Site personnel that evacuated the Site to the south would muster at the WGGM Site Office located several blocks south. Site personnel that evacuated the Site to the north would muster north of the Site at Broadway and Morgan Boulevard in Camden.

Gloucester City Fire Department and City of Camden Fire Department were responsible for decisions that affected residents and non-site personnel once they arrived on scene. The DRBA was responsible for shutting down bridge traffic as well as directing contractors working on the bridge.

CONCLUSIONS AND RECOMMENDATIONS

The hazards associated with the remediation of radiologically contaminated material was minimal when compared to the severe hazards associated with a compromised high pressure gas main in a residential and light industrial area. The overall responsibility planning was simple compared to the complexity of preparing a schedule that allowed all the key participants to be present.

Fortunately we never had to put the emergency plan into play during the project. The earlier you can start the planning process the better. This situation was one that required several volleys of information and decision making amongst the different groups of affected parties. All groups involved were reasonable and approachable during the planning process and in the end all responsibilities were designated and agreed to prior to the start of the project.

REFERENCES

[1] The Nuclear Metals, "Thorium," [Online]. Available: http://www.thenuclearmetals.com/thorium/. [Accessed 3 November 2013].

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[3] E. R. 2, "Welsbach & General Gas Mantle Contamination," 14 August 2012. [Online]. Available: http://www.epa.gov/region2/superfund/npl/0203580c.pdf.