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PUBLIC SERVICE COMMISSION

June 28, 2010

Darrell Nitschke, Executive Secretary
North Dakota Public Service Commission
State Capitol Building, Dept. 408
600 East Boulevard
Bismarck, ND 58505-0480

Re: Additional Xcel Energy Response to April 1, 2010 Notice of Probable Violations and Proposed Compliance Order (Case No. GS-08-765)

Dear Mr. Nitschke:

Enclosed with this letter is a summary of the investigation into the event of September 2, 2008 by Northern States Power Co., a Minnesota Corporation (the "Company"). The Company provides this summary to more specifically respond to the Staff's concerns in its April 1, 2010 Notice of Probable Violation ("NPV") and Proposed Compliance Order in Case No. GS-08-765.

We stated in our May 7th response to the NPV that we believe that our emergency plans and procedures were followed during and after the event. We also acknowledged that, partly due to comments and guidance from Commission Staff, we have made some improvements to our incident investigation review process. It is our understanding that Staff believes a summary report of our investigation and conclusions is an important component of this process. We are submitting the attached investigation summary to address Staff's concern, and to provide a concise overview for the Commission's upcoming Work Session on July 2nd.

Providing a safe and reliable natural gas system remains our top priority. This additional information reflects our commitment to work with the Commission to make our emergency procedures even more effective.

If you need further information or clarification, please contact Lisa Kallberg at 651-229-2282 or myself. Thank you.

Sincerely,

William L Kaphing
Vice President Control Center

Enclosures

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Summary of investigation of Sept. 2, 2008 event

Northern States Power Company

William Kaphing, VP Control Center

# Northern States Power Company (MN)
# Sept. 2, 2008 Natural Gas Incident
# Investigation Summary

## I. Background

On September 2, 2008, at 12:37 AM, an explosion occurred at the south unit of a twin home located at 2215 and 2213, 15th Street South in Fargo, ND. NSP personnel were dispatched at 12:41 AM and arrived on site at 12:55 AM. At 1:41 AM, NSP contacted the NDPSC and provided a report of the incident over the phone to a gas pipeline safety representative. At 3:07 AM, NSP determined the incident was a probable natural gas incident as defined under 49 CFR Part 191.3, and made a telephonic incident report to the National Response Center as required under 49 CFR Part 191.5. NDPSC staff personnel arrived on the scene at 11:30 AM.

NSP informed the NDPSC staff representative that NSP had turned off gas and disconnected electric service to the duplex, and erected a temporary security fence around the site. NSP had detected 80% raw gas in the ground at the service riser of the 2215 unit. The service line had been excavated at the boulevard, squeezed shut and capped. NSP also checked the service risers and tapping tees at 2213, 2203, 2301, and 2303 15th St. South, and 1507, 1513, and 1508 23rd Ave. South, and found no gas leaks. In addition, NSP used an odorometer to verify that odorant was readily detectable at 1525 23rd Ave. S., 2301 15th St. S., and 2203 15th St. S.

Five people at the 2215 dwelling (south unit) were injured from the explosion; three were treated at a local hospital in Fargo and two were flown to Hennepin Medical Center in Minneapolis, MN for in-patient medical care

## II. Investigation

In the hours after the explosion, NSP personnel excavated the service line and performed preliminary testing. NSP pressurized the line between the cut and capped end and the riser shut-off valve with air to 60 psi, as measured by pressure gauge. The line pressure shown by the gauge did not remain at 60 psig but dropped off, indicating that the service riser was defective. A leak was audibly apparent at or near a plastic socket fusion connecting the riser to the service line below ground level. The riser was excavated, and the soil located approximately twelve to eighteen inches upstream of the leak was grey in color, dry, and smelled strongly of natural gas odorant. At the service line, the grey soil was adjacent to a polyethylene (PE) socket coupler that joined the buried PE distribution system service line to the service riser. The grey soil was dry and smelled of natural gas odorant. NSP covered the meter set with a tarp and the NDPSC representative confirmed the security of the site. Further investigation was postponed until all interested parties could participate.

On September 15, 2008, the investigation resumed, with the tests performed on September 2 repeated for all parties. Further excavation continued, and NSP personnel preserved the segment of service pipe that had apparently failed for possible further tests. The meter, regulator, inside piping, and natural gas appliances were also secured for future testing. Subsequent pressure testing revealed an apparent leak at a PE socket coupler that joined the service line to the service riser.

On September 26, Xcel Energy prepared its report to the U.S. Dept. of Transportation Pipeline and Hazardous Materials Safety Administration, as required. The report stated that natural gas migrated into the house and was ignited by an unknown source. The service pipe was manufactured by Century Utility Products, Inc.

The NDPSC Testing and Safety Department opted to begin the process of selecting an outside testing lab before all of the parties of interest could be organized to provide input and reach consensus on a testing protocol. The NDPSC Testing and

Safety Department selected CRT Laboratories, Inc. to perform the testing, with the forensic work to be carried out by Forensic Engineering Consultants, LLC under CRT's supervision. NSP worked with the NDPSC to ensure that it would be represented during the destructive testing process. On February 2, 2009, NSP couriered the gas riser with an approximately 3 foot pigtail and an in-line PE coupling fused to Century PE tubing to CRT Labs for analysis. Representative experts of NSP and of the occupants of the home arrived on March 25, 2009 to witness the slicing of the tube along its axis. According to its report, CRT Labs performed the following tests:

- Pinhole Leak Scope: Fiber-optic, stereo-zoom microscopic inspection; double-scan thermal analysis; Fourier-transform infrared microspectroscopy; fractology; and melt flow rate.

- Fusion Bead Scope: SEM-EDS (x-ray); tensile bead properties; double-scan thermal analysis; calorimetry; Fourier-transform infrared microspectroscopy; and fractology.

## III. Findings

A review of Company records revealed that the service line at this duplex unit was installed in 1975. In 1978, NSP replaced a coupling and a riser on the natural gas service at 2213 15th St. South. Consistent with our leak survey procedures, these services were surveyed seven times in the past 20 years, including the most recent survey in September 2007 and no leaks were found. The underground pipe serving the twin home unit at 2215 15th St. S. was manufactured by Century Utility Products, Inc.

Excavation of the service line at the 2215 unit revealed an area of grey-colored soil located between the service line and the house foundation drain field pipe. At the service line, the grey soil was adjacent to a polyethylene (PE) socket coupler that

joined the buried PE distribution system service line to the service riser. The grey soil was dry and smelled strongly of natural gas odorant. Soil will turn grey when exposed to natural gas for a period of time. Subsequent pressure testing revealed a leak at a PE socket coupler that joined the service line to the service riser.

The laboratory analysis performed by CRT Labs did not identify any evidence that the joint had been weakened during service. Laboratory testing results indicated that the fracture of the PE gas service line was due to a single, sudden event caused by a relatively high bending load as of the time of the failure. NSP's expert reviewed CRT's testing and report, and found no reason to dispute the conclusion that the pipe cracked due to a single, sudden event. In his expert opinion, this was not the type of Century Pipe failure (brittle cracking due to long-term stress and fatigue) that has been observed in the past or that was discussed in the 1998 NTSB Special Investigative Report on "Brittle-Like Cracking" of plastic gas pipe.

Inspection via a binocular microscope revealed a somewhat irregular, but sound, fusion between the fitting and tube on one longitudinal section of the plastic weld, with no visual evidence of any lack of fusion, entrapped foreign material, or voids. The other section was similarly sound, except for the presence of 8 grains of sand entrapped in the socket coupler joint fusion, and a lack of fusion for approximately 0.03 inch at the end of the fitting. The report concluded that the failure of the pipe could be attributed to the combination of the cavity formed by the debris (sand grains) entrapped at the time of welding and a relatively high bending load at the time of failure. NSP believes the analysis was reasonable, and adopts the lab findings.

## IV. Action Plan to Minimize the Possibility of Recurrence

Even though the lab test and analysis did not suggest that the Century Pipe material contributed to the cause of failure, NSP believed it to be prudent to accelerate its system-wide replacement program of all Century Pipe by initiating a replacement project in

North Dakota during the fourth quarter of 2009. This precautionary step involved, eventually, replacing about 22.2 miles of existing main, and over 2,345 services in Fargo.

In addition to the replacement of Century Pipe, the Company will remain diligent its ongoing maintenance programs including leak surveys, cathodic protection testing, and annual testing of pressure regulators and valve operations. Before a natural gas pipeline is placed in service, the Company will continue to pressure test the installation to ensure its integrity. We will also continue to monitor and regulate pressure to ensure levels are properly maintained throughout our natural gas system. And, since natural gas is odorless, proper levels of odorant will continue to be added to the system so that the public can be made aware of any potential leaks. Finally, we will also continue to provide safety tips and precautionary messages to our customers and the public.