

Stork Twin City Testing Corporation

PROJECT NUMBER: SOU263-01-15-91979

DATE: January 21, 2008

PAGE 1 of 2

QUALITATIVE CHEMICAL ANALYSIS OF SURFACE DEPOSITS

Sample Identification:

Cracked 2" diameter gas pipe section from PS07-002 Natural Gas Incident, Mitchell, South Dakota

Test Location:

Sample 1- OD surface 1" from End A (side)
Sample 2- OD surface 13" from End A (side)
Sample 3- OD surface 25" from End A (side)
Sample 4- OD surface 31" from End A (side)
Sample 5- OD surface 43" from End A (side)
Sample 6- Dabbed sample at bottom of exposed crack
Sample 7- OD deposit 20"-22" from End A
Sample 8- Freshly cut surface of pipe coating

Specimen Size: N/A

Results:

Sample No.	Chemical Elements Detected	Photo/Data Identification
1	N/A	SEM BEI Sample 1 at 100X
1	Silicon, oxygen, aluminum, calcium, magnesium, carbon, iron, potassium, sodium and titanium	SEM EDS Sample 1
2	N/A	SEM BEI Sample 2 at 100X
2	Silicon, calcium, oxygen, aluminum, carbon, magnesium, sodium, potassium, iron, manganese and titanium	SEM EDS Sample 2
3	N/A	SEM BEI Sample 3 at 100X
3	Silicon, oxygen, aluminum, magnesium, calcium, carbon, iron, potassium, sodium, manganese and titanium	SEM EDS Sample 3
4	N/A	SEM BEI Sample 4 at 100X
4	Silicon, oxygen, aluminum, calcium, magnesium, carbon, iron, potassium, sodium, manganese and titanium	SEM EDS Sample 4
5	N/A	SEM BEI Sample 5 at 100X
5	Silicon, oxygen, aluminum, calcium, magnesium, carbon, iron, potassium, sodium, manganese and titanium	SEM EDS Sample 5
6	N/A	SEM BEI Sample 6 at 100X
6	Carbon, oxygen, silicon, iron, magnesium, aluminum, calcium, potassium, manganese, sulfur and chlorine	SEM EDS Sample 6
7	N/A	SEM BEI Sample 7 at 100X
7	Calcium, silicon, oxygen, aluminum, carbon, magnesium, potassium, iron, sodium, manganese and titanium	SEM EDS Sample 7
8	N/A	SEM BEI Sample 8 at 100X
8	Carbon, silicon, aluminum, iron, oxygen, magnesium, potassium, calcium, sulfur, chlorine, manganese and titanium	SEM EDS Sample 8
8	Carbon, silicon, aluminum, oxygen and iron	SEM EDS Sample 8 dark

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PAGE 2 of 2

QUALITATIVE CHEMICAL ANALYSIS OF SURFACE DEPOSITS (Cont.)

Results: (Cont.)

The scanning electron microscope photos using backscatter electron imaging (SEM BEI) represent the areas that were analyzed. The exception is the last spectrum (SEM EDS Sample 8 dark) where only the dark area was analyzed. Backscatter electron imaging identifies chemical elements with different atomic numbers by a difference in contrast; i.e. higher atomic number chemical elements will appear lighter. The SEM BEI photos and SEM EDS spectra are referenced separately and not included in this report

The qualitative chemical analysis was conducted on January 17, 2008 using energy dispersive spectrometry linked to a scanning electron microscope.

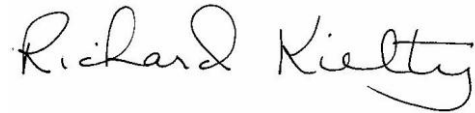
The chemical symbols in the SEM EDS spectra are identified as follows:

1. Aluminum-	Al	8. Oxygen-	O
2. Calcium-	Ca	9. Potassium-	K
3. Carbon-	C	10. Silicon-	Si
4. Chlorine/chlorides-	Cl	11. Sodium-	Na
5. Iron-	Fe	12. Sulfur-	S
6. Magnesium-	Mg	13. Titanium-	Ti
7. Manganese-	Mn		

Test Equipment:

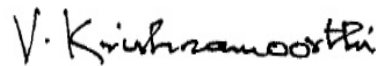
1. JEOL 5800LV low-vacuum scanning electron microscope
2. Oxford energy dispersive spectrometry system with thin window for light element analysis

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