Performance Pipe, a division of Chevron Phillips Chemical Company LP
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November 12, 2013

To Our Driscopipe® Pipe Customers

Re: Final Report on the Investigation into Degraded Driscopipe® 8000 HDPE Pipes

In our last report on the investigation of Driscopipe® 8000 HDPE pipes, dated February 20, 2013, we advised that Performance Pipe had retained the services of Jana Laboratories to conduct tests and provide an engineering analysis of the pipe referenced above and specifically the occurrences of degradation. That work is now complete. Key findings are shown below. To date, the degradation issues have only been reported in Driscopipe 7000 and 8000 pipes and in the desert region of the southwestern US.

Findings

- The cause of the degradation is thermal oxidation of the pipes.
- The potential for thermal oxidation increases with increased temperature of the pipe and with increased time at the elevated temperature conditions.
- Laboratory tests replicated the failure mode in pipe that met thermal stability requirements.
- Only Driscopipe 7000 and 8000 HDPE pipes have been affected.
- The likelihood of degradation is not specific to any manufacturing facility or installation year.
- Only the highest temperature regions of the US appear to be of potential concern for degradation and degradation-induced leaks, which agrees with observed field performance.
- The vast majority of regions in the US do not appear to be a concern for degradation-induced leaks during the design service life of the pipe.

The testing and engineering analysis ruled out soil chemistry, chemical contaminants and gas constituents as contributory causes to the degradation. The testing and analysis identified that internal pressure was not a factor in the development of the degradation; however, internal pressure does have a smaller effect on the ultimate time to development of a leak in degraded pipe.

Investigation

The samples tested and examined included field degraded leak samples as well as samples from customers and Performance Pipe that had never been placed into service. Performance Pipe exhumed pipe samples from desert regions with known pipe degradation as part of the examination. Regions for samples exhumation were not selected at random; instead, they were targeted to locate degraded pipe samples.

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Through evaluation and categorization of the field samples and oven aging of the unused pipe samples, Jana developed a model to risk rank the impact of different environmental conditions on the development of degradation in Driscopipe 7000 and 8000 pipelines. We believe the model to be a useful tool; and we employed it to risk rank locations geographically and in the preparation of this Report. There are limitations to the model including that there is only a limited data set of known degradation-induced failures, and projections are intended to be conservative. In addition, in areas where the soil conditions are not typical of the arid desert, the model appears to produce results that are even more conservative. For these particular regions, the model may not be useful quantitatively, but can offer guidance to utilities and other users of Driscopipe® 7000 and 8000 HDPE pipe for their environmental conditions.

Recommendations

Operators of piping systems in moderate and cooler regions of North America may want to consider this Report as they continue to monitor the performance of Driscopipe 7000 and 8000 HDPE pipe in their pipe systems to ensure that it continues to perform as expected.

In the warmer regions of the United States, operators may want to take the further steps of sampling specific areas in their systems that represent a higher risk ranking.

Operators in the highest temperature regions, such as the desert southwest and southern most regions of the United States may want to inspect and sample a broader portion of their system in conjunction with the risk ranking.

A map of average temperatures is attached for a reference. A chart developed from the model showing relative sensitivity to different environmental factors is also attached.

Performance Pipe remains ready to answer your questions and provide additional information to aid you in assessing your Driscopipe 7000 and 8000 piping systems. In the meantime, please contact your Territory Sales Manager or me if you have questions or would like to discuss this further.

Sincerely,

KAREN LIVELY
Technical Manager

cc: Performance Pipe Territory Sales Managers
Heath Casteel
Allen Pearl

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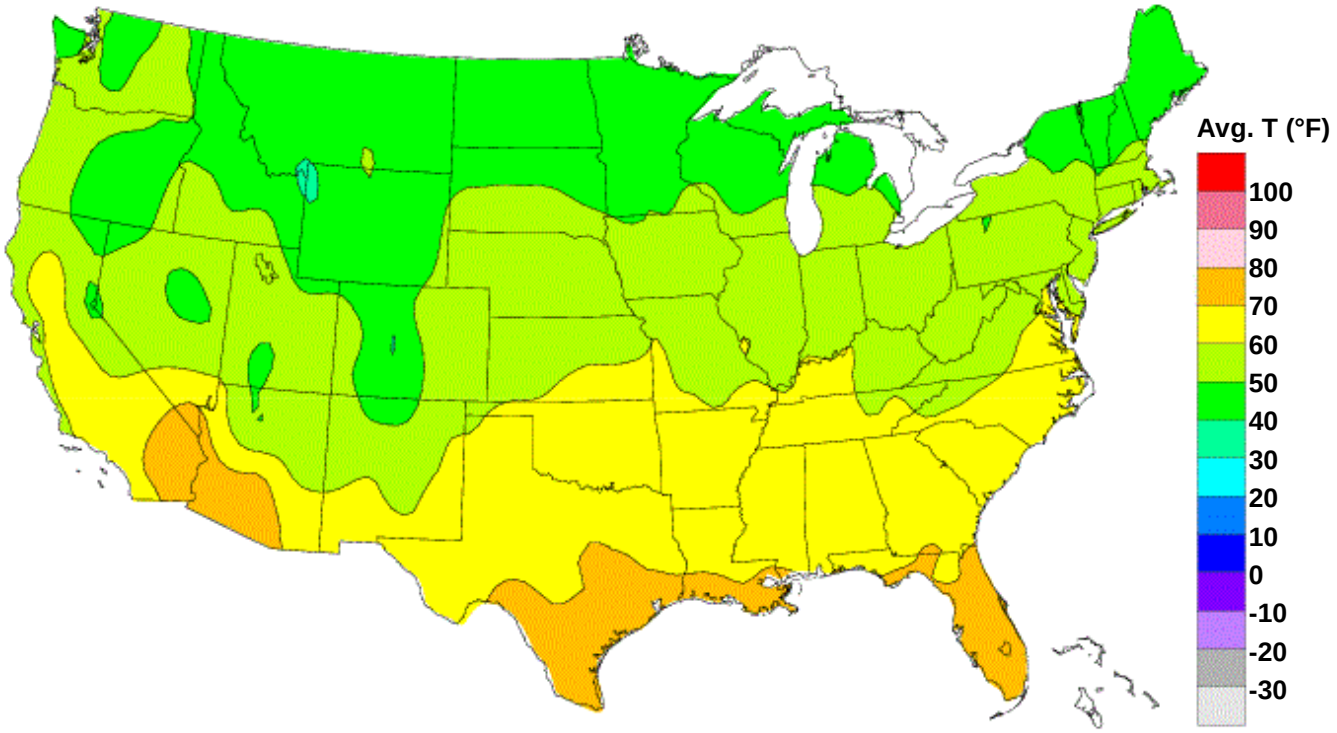

Figure 1 Average Annual Climate Temperature

Image modified from: NOAA National Weather Service Climate Prediction Centre Regional Climate Maps USA), 2012 http://www.cpc.ncep.noaa.gov/products/analysis_monitoring/regional_monitoring/us_12-month_avgt.shtml

Table 1 Rank of Factors affecting Pipe Temperature

Rank	Operating and Environmental Factors
1	Surrounding Soil Temperature
a	Average Annual Ambient Temperature (60-milder to 80-more aggressive)
b	Groundcover (vegetation-milder to asphalt cover-more aggressive)
c	Soil Type (moist loam-milder to dry fine sand-more aggressive)
d	Burial Depth (36 inch-milder to 12 inch-more aggressive)
2	Gas Flow Rate (typical range of 0.00-more aggressive to 0.02 SCFS-milder)
3	Gas Flow Temperature (typical range of 50-milder to 70deg F-more aggressive)