Attachment A
Operator Questionnaire

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Michael Baker Jr., Inc.
A Unit of Michael Baker Corporation

Airside Business Park
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Moon Township, PA 15108
(412) 269-6023
(412) 375-3996 (FAX)

February 13, 2004

Dear Pipeline Operator:

Michael Baker Jr., Inc., a full service engineering firm providing engineering and energy expertise for public and private clients worldwide, has been contracted by the U.S. Department of Transportation Research and Special Programs Administration's Office of Pipeline Safety (OPS) to provide expert technical assistance to them under their Integrity Management Initiative. Since 2002, Baker has supported OPS through technical studies and assessments on issues ranging from ecological effects of releases from HVL pipelines, evaluation of longitudinal seams of LF-ERW pipe and lap welded pipe, and an evaluation of wrinkle bends and buckles in pipelines.

In this current effort, Baker is assisting OPS with a study of Stress Corrosion Cracking (SCC) issues relating to pipeline integrity for both gas and liquid lines, including history of SCC, level of risk, indicators of potential for SCC, detection methods, mitigation measures, and assessment procedure. An initial step in the study process was the workshop on SCC held on December 2, 2003, in Houston, Texas, where Baker presented an outline of the study effort. OPS and the National Association of Pipeline Safety Representatives (NAPSR) cosponsored this workshop along with API, AOPL, INGAA, AGA and NACE.

Baker has prepared the attached survey document to assist in gathering information from pipeline operators on SCC occurrence history and operating company practices for SCC detection, management and mitigation. We are asking for your cooperation in supplying this information so that we can have as complete a picture as possible on the practices currently being employed to address SCC. It is our intent to selectively follow-up with more in-depth interviews with some operators to learn more about the effectiveness of measures taken by operators for dealing with SCC. OPS intends that the study be made public, which will be later in 2004.

Baker wishes to thank the industry trade organizations for their support of this study effort. The survey itself has been reviewed by a working group led by Dave Johnson of Enron and its final format has been developed with the cooperation of that group.

We are requesting that the survey be returned to Baker by March 3, 2004. It can be returned electronically to me at cmayernik@mbakercorp.com, mailed to me at the above address, or faxed to me at 412-375-3996

We appreciate your efforts in completing this survey. If you have any questions, please contact me at 412-269-6023.

Sincerely,

Christine S. Mayernik, P.E.
Project Manager

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PIPELINE OPERATOR RESPONSE

STRESS CORROSION CRACKING STUDY

Conducted by Michael Baker, Jr., Inc.
In support of

US DOT RSPA/Office of Pipeline Safety
Contract No. DTRS56-02-D-70036
Technical Task Order 8 – SCC Study

Baker has been tasked by OPS to conduct a study of Stress Corrosion Cracking (SCC). The study effort will include discussion of the current state of knowledge by operators regarding SCC. Through this survey instrument and follow-up select interviews, the study will attempt to address the following questions:

- *Are operators are being prudent in the detection, management and mitigation of SCC?*
- *How are operators addressing SCC in their Integrity Management Programs?*
- *How effective are measures taken by operators to mitigate SCC?*
- *What are best industry practices with regard to SCC?*
- *What gaps exist in operator knowledge, application and response that need to be addressed to improve SCC detection, management and mitigation?*

Baker appreciates the support of INGAA, AOPL and API in their assistance and endorsement of this survey effort and of their support of the study.

Operator Information

Company Name:

Address:

Contact Name:

Contact Title:

Phone Number

Fax Number:

Email Address:

SCC Occurrence Information

1. **Has SCC been detected on any of your pipelines in the past?** ☐ **Yes** ☐ **No**
   a. **If YES, when was SCC first detected on your pipeline system?** _____
   b. **If YES, what was the system age at that time?** _____
2. **Approximate number of SCC in-service failures:** _____
3. **Approximate number of hydrostatic test failures:** _____
4. **How prevalent is SCC on your system?**
   a. **Number of main line valve sections where SCC has been detected:** _____
   b. **Percentage of total number of valve sections:** _____ **%**
5. **If SCC occurrence was found during an inspection(s), what was the reason for the inspection(s)?**
   ☐ **Looking for SCC** ☐ **Other (please describe:)**
6. **Product in pipeline where SCC was found:**
   ☐ **Natural Gas** ☐ **Liquid** ☐ **Other:** _____
7. **Has an in-service failure or a hydrostatic test failure at or below the prior test pressure occurred on a line segment previously subjected to SCC mitigation activities?**
   ☐ **Yes** ☐ **No**
   a. **If YES, how many years elapsed from initial occurrence or discovery to the failure?**

SCC Occurrence Information (cont.)

8. Geographic region or state/province where SCC has been detected:

Please provide a range of pipeline characteristics where SCC has occurred:

OD:

Wall Thickness:

Grade:

Year Installed:

Coating Type:

Operating Pressure:

Operating Temperature:

Soil Type and Condition:

Other relevant information:

SCC Detection Methods

What NDE methods has your company used to identify SCC?
(check all that apply)

☐ **Visual**

(The pipe is exposed and the pipe coating is examined for soundness and performance. Some coating is removed at locations where disbanding is suspected. A technician examines the pipe after removing the coating. The technician then examines the pipe for evidence of cracks.)

☐ **Magnetic Particle**

(The pipe in question is examined visually with the assistance of magnetic particle imaging.)

☐ **Liquid Dye Penetrant**

(The use of dyes on the surface of the pipe to enhance the visualization of cracks.)

☐ **Eddy Current**

(The use of eddy currents to measure the occurrences of cracking.)

☐ **ILI Tool (type of tool used: _____)**

☐ **Other (please describe: _____)**

Does your company have written procedures that:

- **Describe reassessment intervals if SCC is detected?** ☐ **Yes** ☐ **No**
- **Describe physical field practices for SCC detection?** ☐ **Yes** ☐ **No**
- **Describe NDE evaluation procedures?** ☐ **Yes** ☐ **No**

Other information or comments:

SCC Management

Which of the following practices does your company use to manage SCC?
(check all that apply)

☐ **Failure History Characterization**

(Use information of past SCC failures as an indication of the specific conditions that may result in the future occurrence of SCC.)

☐ **Coating Type Characterization (Coal tar, tape, etc.)**

(Characterizes the condition and type of coating, and correlates the information with the occurrence of SCC.)

☐ **Pipe Material Characterization (API Grades, Pipe Mill, etc.)**

(Characterizes the type of pipe and correlates it to the occurrence of SCC.)

☐ **Operation Characterization (Pressure, Temperature, etc.)**

(Correlates the specific operating conditions of the pipeline with the occurrence of SCC.)

☐ **Location Characterization**

(Correlates the environmental conditions near the pipe with the occurrence of SCC.)

☐ **Age Characterization**

(Correlates the age of the facilities with the occurrence of SCC.)

☐ **Bell Hole Characterization**

(Results of buried pipe inspection reports are utilized to determine if there are common characteristics in pipe with SCC compared to pipe with no SCC utilizing trending analysis..)

☐ **Magnetic Flux Leakage ILI Characterization**

(Utilization of MFL pigs to detect wall loss primarily due to corrosion.)

☐ **Other ILI Characterization**

(Utilization of other pigs to detect SCC.)

☐ **Cathodic Protection Level Characterization (Voltage Levels)**

(Monitoring of CP voltage levels at locations with and without active SCC for use as a predictive tool.)

☐ **Hydrostatic Retest Program**

(Destructively testing pipe to determine presence of SCC.)

☐ **External Corrosion Direct Assessment**

☐ **Risk Assessment Ranking (Segment by Segment Comparison)**

Does your company have written procedures for SCC management? ☐ **Yes** ☐ **No**

If YES, how long have you had written procedures?

SCC Management (cont.)

Describe any SCC predictive models used by your company

SCC Mitigation

What actions does your company use to mitigate SCC (or SCC failures)?

(check all that apply)

- ☐ **Operating Condition Modification (Pressure or temperature reduction, etc.)**
- ☐ **Selective Sleeve Installation**
- ☐ **Clean Pipe and Recoat**
- ☐ **Grind Pipe and Recoat**
- ☐ **Soil Condition Modification (Drainage pattern change, replacement or chemical treatment of soil, etc.)**
- ☐ **Other (please describe below:)**

Does your company have written procedures for SCC mitigation? ☐ **Yes** ☐ **No**

Please return form (preferably in electronic format) by March 1, 2004, and address any questions to:

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