MICHAEL BAKER JR., INC.

Mechanical Damage Study
Outline and Overview

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Vice President and Chief Pipeline Engineer

Mechanical Damage Workshop
Houston, TX
February 28 – March 1, 2006

ChallengeUs.

Baker

Mechanical Damage Study – Baker's Role

- **Consensus study on how best to identify and address mechanical damage issues**
- **Phase 1 is a detailed study outline; revised following workshop**
  - Understand the issues
  - Direct the study focus
  - Solicit industry understanding and support
- **Phase 2 is the Mechanical Damage Report**
- **Opportunity for public comment on draft final report (same approach as SCC Report)**

Mechanical Damage Study

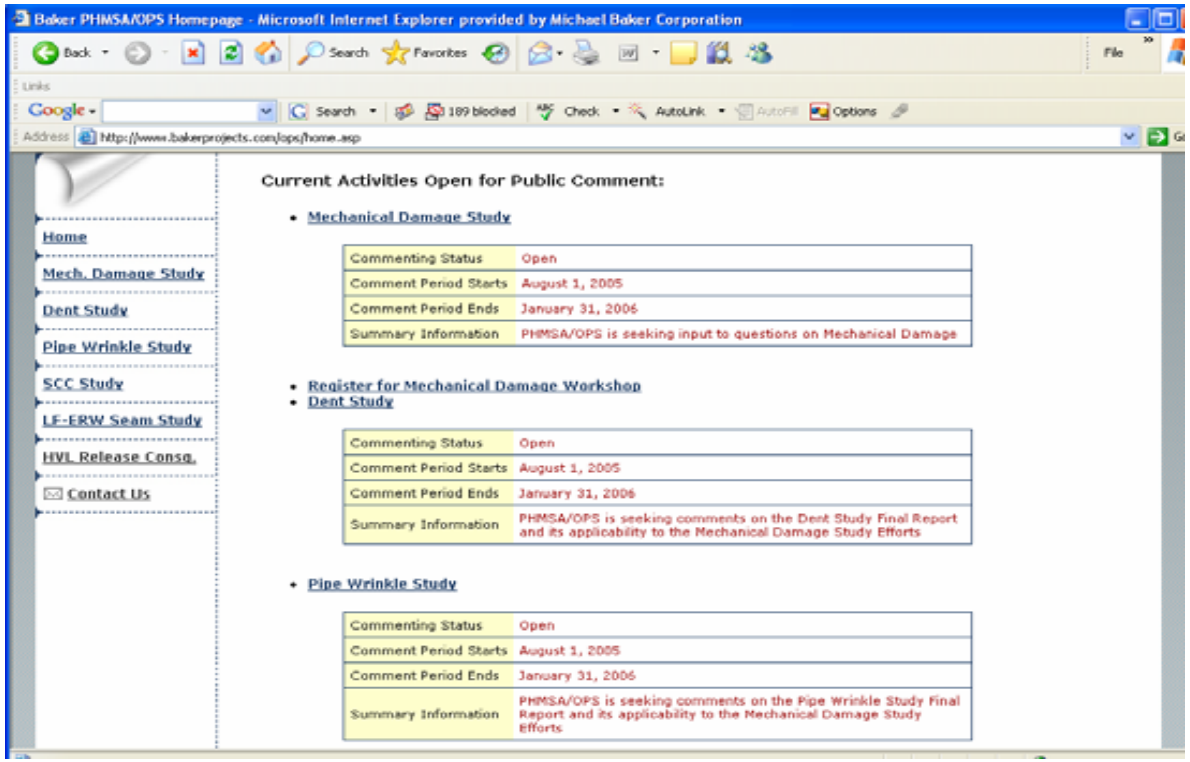
Website created for public comment process:

www.BakerProjects.com/OPS

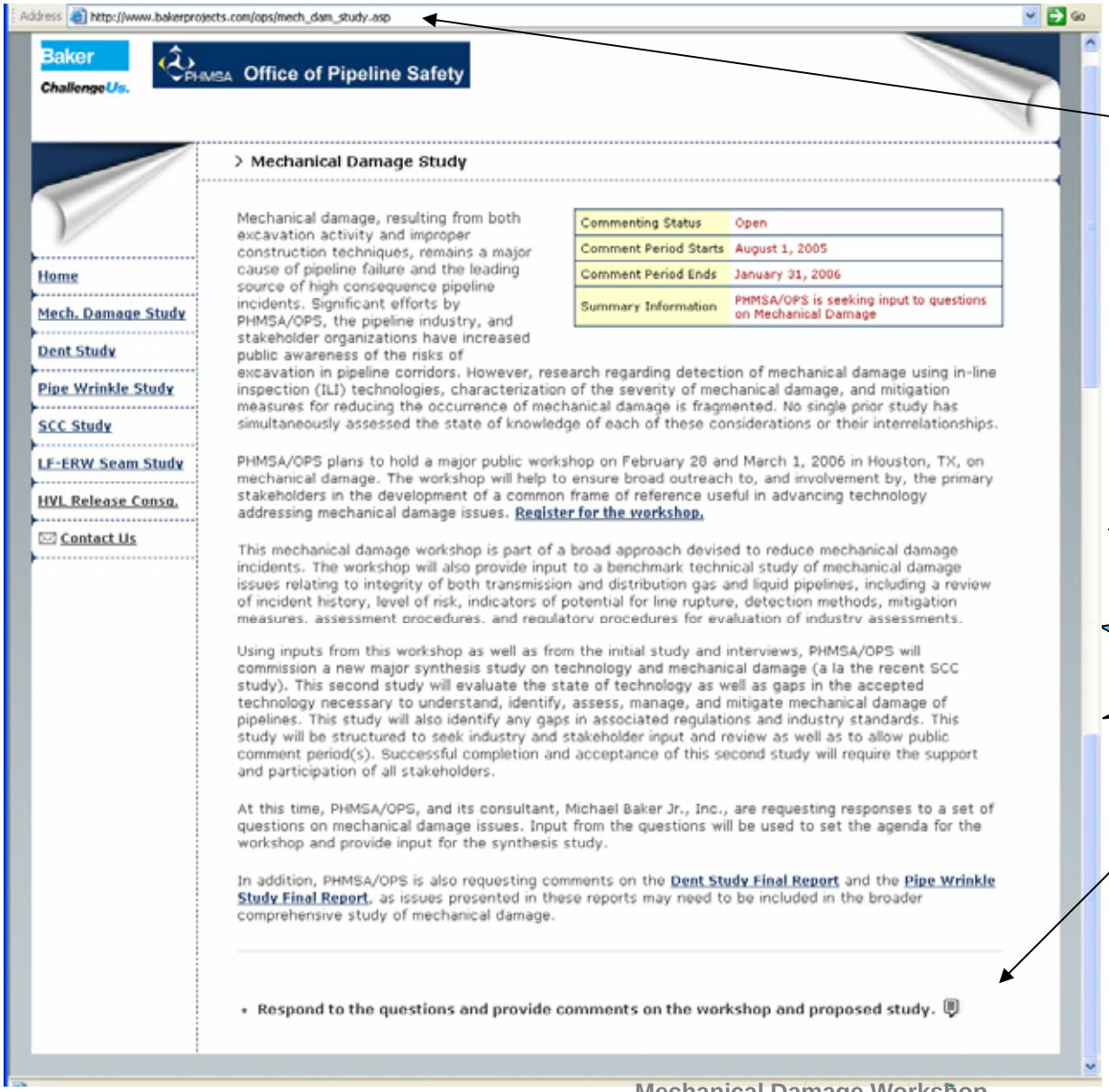
Mechanical Damage Study

Accepted public comments on:

- Mechanical Damage questions
- Dent Study
- Pipe Wrinkle Study



Mechanical Damage Study



Link here from PHMSA Public Meeting Site

Solicited comments via website

MD Survey Questionnaire

- How do you define mechanical damage?
- Which source or sources of mechanical damage, such as original construction damage, excavation damage, etc., have the most significant impact on the integrity of your pipeline system and why?
- Which class or classes of mechanical damage, such as dents, gouges, dents with gouge, etc., present the greatest integrity threat to your pipeline system and why?
- Where has mechanical damage been the greatest problem?
- Which methods for screening a pipeline segment for the likelihood of mechanical damage have proven to be the most and least effective for your pipeline system?.....

Mechanical Damage Study

- **How is Mechanical Damage defined?**
  - Damage to pipe (metallic and non-metallic)
  - Caused by outside force
    - **Scrapes, scratches and gouges resulting in metal loss**
    - **Dents??**
    - **Wrinkles??**
  - Caused by movement of the surrounding soil??
    - **landslides, earthquakes, subsidence, washouts etc.**
  - Both onshore and offshore??

Mechanical Damage Study

Was the bullet hole in TAPS Mechanical Damage?????

Mechanical Damage Study - Overview

- **Definition of MD**
  - Incident history
  - Subcategories and causes
- **MD Prevention**
  - Risk models (available, effective, reliable?)
  - One-call systems (what's essential?)
  - Preventative technological measures
  - Technology gaps
- **MD Detection**
  - Tool effectiveness and selection
  - Technology gaps

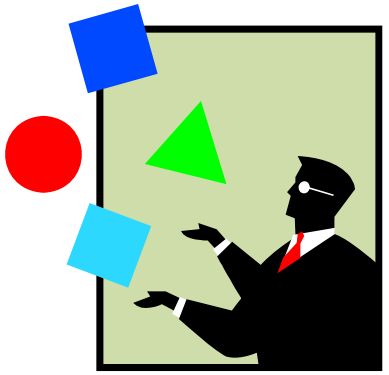
Mechanical Damage Study - Overview

- **MD Characterization**
  - Acceptance criteria
  - Technology gaps
  - Integrity assessment methods
- **MD Mitigation**
  - Effective methods
  - Technology gaps
- **Elements for addressing MD that a prudent operator would incorporate into its IMP**

Mechanical Damage Study - Overview

- **Summary:**
  - **What are the gaps in technology?**

  - **What are the priority issues?**



  - **What are short and long-term courses of action?**

Mechanical Damage Study

We're here to listen ……

…. learn

….and dialogue

Mechanical Damage Study – Project Team

- Keith Meyer, Ph.D., P.E. – Anchorage
- Paul Carson, P.E. – Anchorage
- Chris Mayernik, P.E. – Pittsburgh
- Wes Watkins, P.E., PMP – Houston

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