*the Energy to Lead*

# CALIFORNIA NATURAL GAS PIPELINE ASSESSMENT
## CEC #500-10-050

GTI Project Joint PAC Meeting

July 9, 2012

# Project Goals - Summary

> **Identify Quick "Wins" Commercial Technologies Not is Use That Could/Should Be**

> **or**

> **Emerging Technologies That Could Be Moved to Commercial Availability Quicker**

> **Leverage and Optimize the Use of the Advanced Metering Infrastructure (AMI)**

> **Develop an Implementation Plan**

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# REVIEW OF TASKS and DELIVERABLES

> Baseline Technology Assessment for Pipeline Integrity and Monitoring Technology in the State of California
  - Deliverables – Review of current state of technologies being used
  - Scheduled Completion Date – April 30, 2012 (Completed)

> Assessment of Currently Available Pipeline Integrity Assessment and Monitoring Technology
  - Deliverables – Catalogue of available technologies and gap analysis
  - Scheduled Completion Date – July 31, 2012

> Evaluate Emerging Pipeline Integrity Assessment and Monitoring Technology
  - Deliverables – identification of technologies that could be developed or enhanced in the next 2-4 years with emphasis on integration with the AMI communications backbone
  - Scheduled Completion Date – October 31, 2012

> Implementation Plan to Introduce New Pipeline Integrity Assessment and Monitoring Technologies to the California Pipeline Network
  - Goal - to recommend specific technologies and the actions necessary to implement them in a timely and cost effective manner
  - Deliverables
    > A testing, deployment, and implementation plan for currently available technologies
    > Recommendations for the development of select emerging technologies
    > Recommendations for the development of new technologies to meet outstanding gaps
  - Scheduled Completion Date – February 28, 2013

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# Task 3 – Currently Available Assessment – Overview (1)

> Catalogue of Technologies
  - Tools, Processes and Systems for Monitoring
    > 11 Categories
      - Description
      - Strengths
      - Weaknesses
      - Pictures – if Applicable
      - Provider - if Limited Number
      - Communications Capability
  - Bibliography
  - List of Acronyms
  - Glossary of Terms

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# Task 3 – Currently Available Assessment – Overview (2)

> Gap Analysis
  - Weaknesses
  - Communications Capability
  - From Interviews During Task 2
    > Previously Used
    > Being evaluated for Use
    > "Wish List"
  - Input from SME's
  - Pipeline Assessment Technology Workshop

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# Task 3 - Pipeline Assessment Technology Workshop

- Purpose - to identify the needs and gaps in existing or emerging transmission pipeline assessment and monitoring technologies
- Conducted June 5-6, 2012
- Included
  - > California Pipeline Operators
  - > INGAA – Interstate Natural Gas Association of America
  - > GTI – Gas Technology Institute
  - > PRCI – Pipeline Research Council International

# Food For Thought - 1

> Top Three Needs, Gaps, Concerns

> No Technology with the Capability of Interest

> Used in Another Industry But Not in Natural Gas

> Short Comings:
  – Detection Limits
  – Missing Parameters of Interest/Concern
  – Cumbersome or Difficult to Use

> Information Technology Requirements

> Database Issues
  – SCADA with GIS, GIS with Stoner

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# Food For Thought - 2

> Communications Limitations
  - Proprietary vs Interoperable
  - Different Generations
  - Varying Ability – How Much, How Frequent, What Language, Level of Sensitivity, Accuracy vs Precision, Storage is too Small, Timeliness of Data Refresh – "What is Real Now?" "10,000 Versions of the Truth!"
  - None Available for Device of Interest
  - One-Way vs Two-Way
  - Limited Availability – Cellular, RF, Satellite

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# Pipeline Assessment Technology Workshop - Outcome

> Ensure Goals/Roadmaps of the 3 Industry R&D Groups are Aligned

> Commercially Available Not Useful Due to Operational or Regulatory Barriers – "Prove it, Get it Accepted"
> > Need the Three Legs of the Stool – Industry, Regulators and Manufacturers
> > What's Missing
> > Standard of Acceptance – Operator, Regulator

> Three Areas of Focus For Rapid Deployment
> 1. ROW Encroachment and Excavation Damage Prevention
> 2. Alternate Inspection Technologies
> 3. Education

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# ROW Encroachment & Excavation Damage Prevention (1)

> Know When Someone is on the ROW

> Cost Effective Retrofit for Existing
  - Focus on HCA's
  - Fence Post Approach

> New Installations

> Visual or Vibration

> Date/Time Stamped

> Record Events for Download

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# ROW Encroachment & Excavation Damage Prevention (2)

> Below or at Ground Level
> - Wet or Dry
> - Acoustics
> - Fiber
> - Other
>   - > Pressure Sensor as a Microphone
>   - > Visual Recognition

> Aerial
> - Fixed Wing
> - Helicopter
> - Unmanned

> Satellite

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# Alternate Inspection Technologies

> Focus on Alternative to Hydro Test – Piggable and Non-Piggable
  - No Water
  - Leak/Rupture Boundary - Threat/Risk, Likely failure – Probability/Severity
  - Virtual Records - Industry Database – Common Threads
  - Guided Wave – Address PHMSA's 18 Points
    > http://primis.phmsa.dot.gov/gasimp/docs/GuidedWaveCheckList110107.pdf
  - Non-Piggable Assessment Tools
    > Robotics
    > Non-Invasive Data Collection Techniques
  - ILI Decision Matrix/Assessment Tool Guidelines
    > 30+ ILI Vendors
    > Multiple Tool(s)/Pig

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# Education

> ## Needs
>   - Primer on Integrity Management – Non-Industry Author
>   - Situational Awareness – Emergency Responders and Public
>   - Real Time Knowledge to the Situation – Video Link to Advisor
>   - Training and Retention of Workforce
>     > - Need a Larger Pool – Education System with Degree Programs
>     > - Documented Process, Training Matrix, Improved Delivery Format – New Generation of Learning Styles

> ## Audience
>   - Emergency Responders
>   - Public
>   - Regulators
>   - Employees

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# Additional Opportunities – 12 Months to Deploy

> Hand-held devices for field use

> Integration of field data immediately into a GIS

> Survey grade GPS w/o post-processing immediately into a GIS

> Bar coding to optimize and automate field data collection and entry

> RFID tags to locate facilities and collect and store field data for later processing

> A lessons learned and technology demonstration workshop

> An industry database as the first step toward the development of a predictive performance based (proactive) modeling tool

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# Additional Opportunities – 12 - 24 Months to Deploy (1)

> Upgraded and integrated GIS with enterprise software available to the field "**Make My Pipeline Like My House – Where is my stuff, I want to control it**"

> Accurate measurement of crack length and depth in the ditch with transmittal to the back office

> Predictive performance based modeling tool integrated with an industry database to supplement man-made decision making

> Remote, low cost methane detectors in the 100 to 200 ppm range and providing an alarm

> Tracking and work management software for HCA's as accurate and reliable as "boots on the ground"

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# Additional Opportunities – 12 - 24 Months to Deploy (2)

> Low cost, low power technologies at smaller intervals - an accurate "picture" in real-time

> Requires verification of the AMI and sensor capabilities:
  - AMI has redundancy and security in the areas of sensor deployment
  - Full access to and inter-operability of the AMI system
  - Cost advantage of sensors under development
  - Full inter-operability of the all sensors

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# Additional Opportunities – 12 - 24 Months to Deploy (3)

> Once verified use the AMI system to provide:

- Redundant two-way communications for data flow
- Data collection, monitoring and system control as new technologies are developed – Ex. Right-of-Way (ROW) encroachment and excavation damage prevention, leak detection
- Improved real-time monitoring of flow and pressure
- Improved operation of selected valves
- Instantaneous identification of an issue or failure requiring pipeline shutdown

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# QUESTIONS???