Quarterly Report

Date of Report: *November 14, 2009*

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Prepared for: *Government Agency: DOT and Co-funders: British Petroleum*

Project Title: *Internal Corrosion Detection in Liquids Pipelines*

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For quarterly period ending: *November 14, 2009*

List Activities/Deliverables Completed during this reporting period.

TECHNICAL STATUS –

In this report we will summarize the milestones achieved over the last 1 year.

Wetness Sensor

A new ball design and sensor was put together for eventual field trials

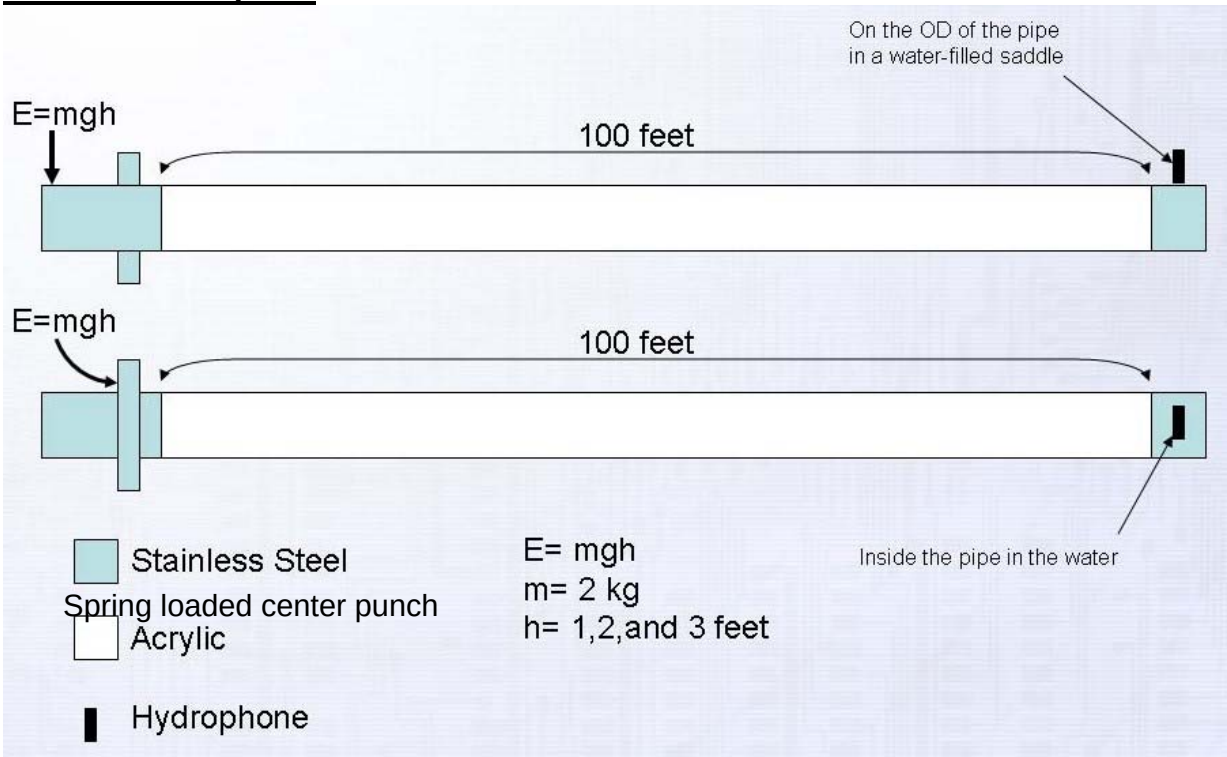
Acoustics for Location

The Table below summarizes the setups built for the various acoustic experiments

Type of Setup	Length	Acoustic Sign Generator	Method for Listening	Key Finding
Bench top setup	6ft	Center Punch, Drop Weight	Hydrophone, Accelerometer	Able to generate/listen to acoustic signal with hydrophone Not very successful with accelerometer Saddle with hydrophone was built to be used outside pipe
Outdoor setup	100ft	Center Punch, Drop Weight	Hydrophone, Accelerometer	Center punch does not work Hydrophone inside the pipe or with saddle the best approach
Proxy field testing	~750ft	Drop Weight	Hydrophone with Saddle	Acoustic signal between 100Hz to 500Hz can be detected Trial was considered successful

Here we show the various setup and a few details:

Outdoor 100ft Pipeline



100ft Pipeline setup at DNV outdoors

Summary & Conclusions from the Experiments

1. We were successful in consistently generating an acoustic signal
2. The signal easily carried for at least 750 ft even when using a microphone outside
3. The frequency of interest is between 100Hz to 500Hz
4. A 2" package with the wetness sensor has been shown to be functional

Path Forward

It is clear we will not be allowed to use the current hydrophone for field trial on actual LP pipeline. Therefore, we have to build a device that will be permissible inside LP line. Design work for such a device that will fit inside a 2" ball has been initiated.

Transition Step: We go to the BP facility at Houston that uses water in the pipeline, as a place to do the next set of experiments. Here we can do the following:

- [ ] Use the current hydrophone at the Houston facility. We are assuming that we can insert the hydrophone inside
- [ ] Test the ball at the Houston facility
- [ ] Cost the trials at the Houston facility and determine how many can be arranged. If only 1 trial can be held then prepare for all experiments in one go
- [ ] Work with operators to determine how to insert and remove the ball
- [ ] Before going forward with the “Transition step” test the new ball design in the 6ft and 100ft facility