



## HOW IT WORKS: Smart Pigs (Inline Inspection)

Colonial uses many different tools to assess the integrity of its pipelines and identify areas of possible concern, from aerial flyovers and acoustic detection devices to cathodic protection and inline inspection technologies (also referred to as smart pigs).

Smart pigs are one of the most effective tools in a pipeline operator's arsenal, because they allow operators to preemptively identify potential integrity threats along the system. Since 1999, corrosion-caused pipeline incidents industry-wide have been reduced by 76%, largely due to the use of inline inspection tools.

### THE HISTORY OF PIGS

The earliest pipeline pigs were purely mechanical devices used to clean the pipeline. But as technology developed, the industry recognized the value of diagnostic imaging of the internal and external surfaces of the pipe. Mechanical pigs evolved into "smart pigs," so called because they were able to scan pipe walls, looking for dents, cracks, corrosion, and other threats to the safe operation of the pipeline.

The term "pig" is an acronym derived from *pipeline inspection gauge*, the proper – though rarely-used name – for the technology. The acronym has stuck, because the noise pigs can make when moving through the pipeline has been said to sound like a squealing pig. Today's smart pigs are highly-advanced devices that travel through Colonial's system with the flow of the product while gathering information about anomalies in the wall of the pipe.

### HOW DOES A PIG WORK?

A smart pig is inserted into the pipeline at a launching trap, which is an oversized section in the pipeline that is isolated from the line, and allows for the pig to be inserted. Once the pig is inserted, the trap is closed, and the pig is pushed through the line by product flow until it reaches a downstream receiving trap. Smart pigs can be over 20 feet long, weigh as much as 2 tons, and travel at speeds up to 10 miles per hour.

Sensors in smart pigs are able to measure the thickness of the pipe wall and tell pipeline operators where potential problems exist that may need to be investigated and repaired.

Different types of smart pigs are used to look for different types of anomalies in the pipeline system. They can detect dents, corrosion, and cracks as small as a half-inch in size.



*A smart pig is pulled from a receiving trap to complete an inline inspection.*

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### HOW OFTEN DO OPERATORS PERFORM INLINE INSPECTIONS?

Federal regulation requires liquid operators to conduct a continuous process of assessment and evaluation to maintain the integrity of the pipeline. Every mile of regulated pipeline in Colonial's system undergoes inline inspection at least once every five years.

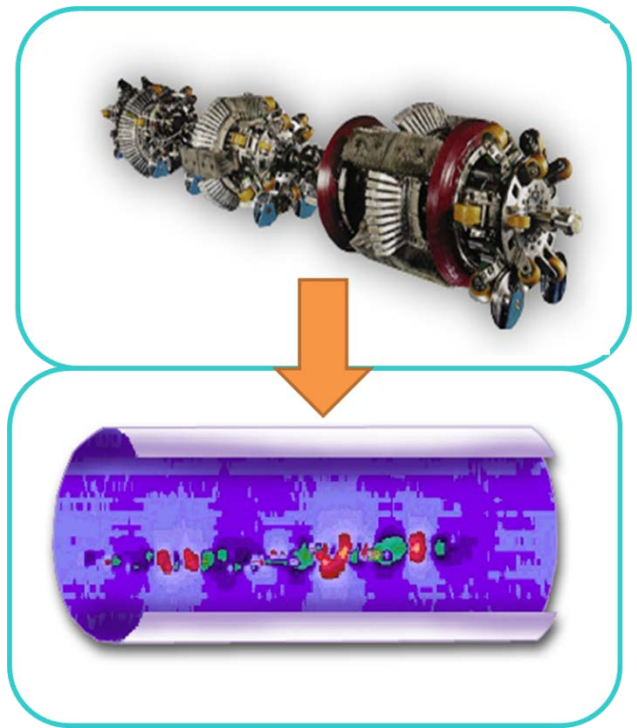
### HOW IS INLINE INSPECTION DATA USED?

Large amounts of raw data are generated as a result of smart pig inspections. Many of the anomalies identified by smart pigs are non-injurious to the pipeline, but the sensors collect enough information to help determine which anomalies are more likely to result in a leak if not addressed in a timely manner. Sophisticated computer programs allow the inline inspection vendors and pipeline operators to look at the data graphically, in tabular form, or as 3D images to assist in evaluating the significance of the findings. Colonial uses the information to prioritize which anomalies should be investigated

Maintenance activities initiated as a result of a smart pig inspection are called, "pig digs." Pig digs typically include uncovering the pipeline at the location of the anomaly, visually inspecting the pipe, repairing pipeline protective coatings, and/or repairing or removing that section of pipe.

### HOW EFFECTIVE IS INLINE INSPECTION?

No technology is foolproof, but inline inspection has provided the pipeline industry with a valuable tool to identify defects with a high degree of accuracy. The ability to find anomalies before they threaten pipeline safety makes inline inspection a critical tool in preventing pipeline incidents.



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