

Road Map to... Redefining the Leak Management Process

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Topics for Discussion Today

- **PG&E's Journey ~ Redefining the Leak Management Process**
- **Advances to Leak Detection**
- **PG&E Utilization of Advanced Leak Detection:**
 - **The Super Crew Process / Concept**
- **Operational Benefits**

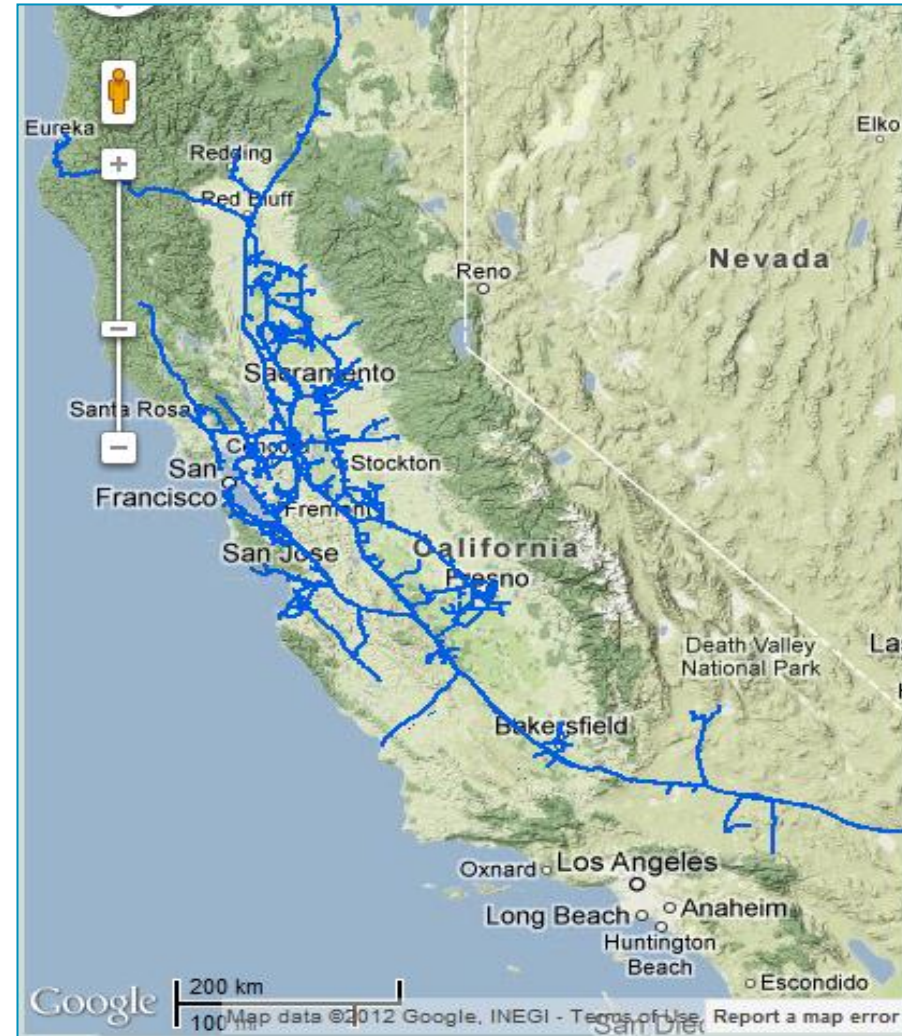


PG&E Company Profile

- Pacific Gas and Electric Company, incorporated in California in 1905, is one of the largest combination natural gas and electric utilities in the United States.
- The company provides natural gas and electric to approximately 15 million people throughout a 70,000-square-mile service area in northern and central California.
- Service area stretches from Eureka in the north to Bakersfield in the south, and from the Pacific Ocean in the west to the Sierra Nevada in the east.

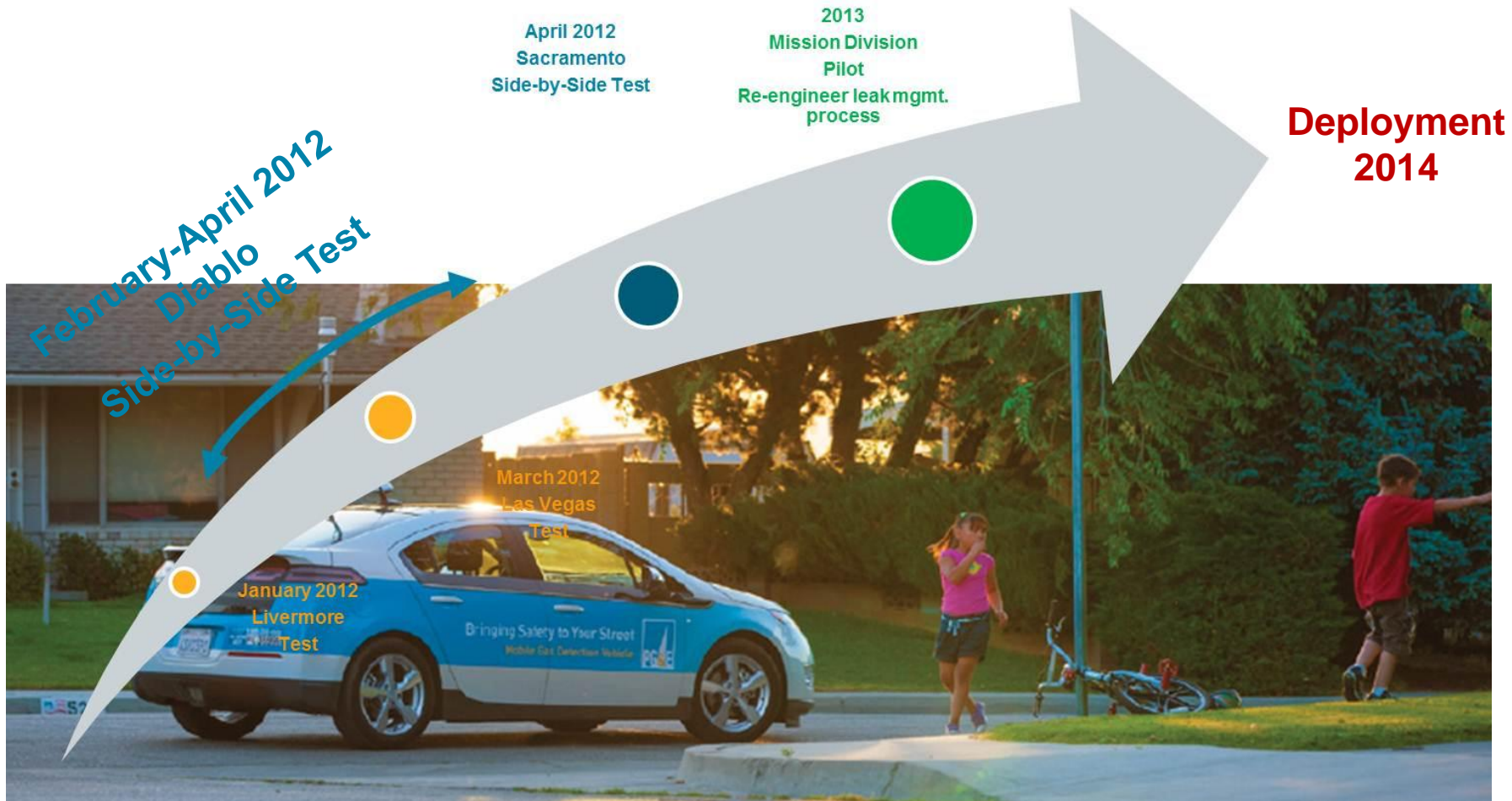
Gas Pipeline Key Statistics

- 5,800 miles of gas DOT transmission pipeline
- 6,750 miles of pipeline > 60 psig
- Approx. 84,000 miles of gas distribution pipe
- 4.3 million natural gas customer accounts.
- Deliver 970 BCF/year (2.6 BCF/daily average)





Launching a breakthrough Leak Management Process





Advanced Leak Detection ~ What Makes it So Special?

Picarro Surveyor™, a very Powerful Leak Detection instrument

- 1,000 times more sensitive (PPB)
- Fast & Efficient – mobile / computer application (flight)
- Distinguishes between natural occurring methane to pipeline gas
- Finds more gas leaks
- Pinpoints “Hard-to-Locate” leaks
- Quality Control / Training
- Leak Cluster Identification
- Job Planning efficiency (economics of scale)
- Special surveys
- Verifiable, Traceable & Complete records
- Redefining the way we view leak detection & correction protocols



- Long distance migration downward in stable conditions

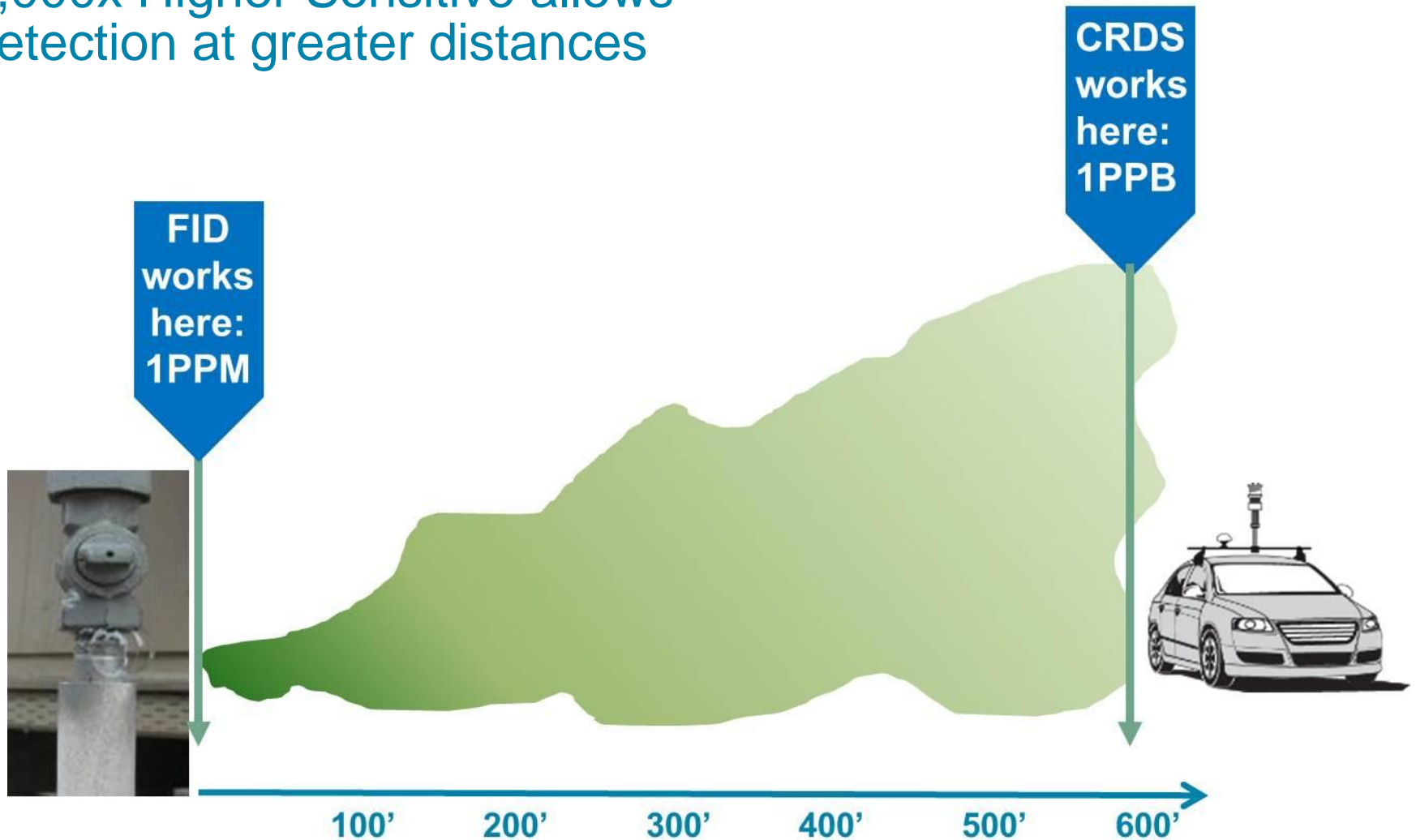


– Good understanding of atmospheric airflow is critical.



Advanced Leak Detection Technology is a Game Changer

1,000x Higher Sensitive allows detection at greater distances





Coverage by the Picarro Surveyor™



Combined surveys
Coverage: 89% of services
99% of main

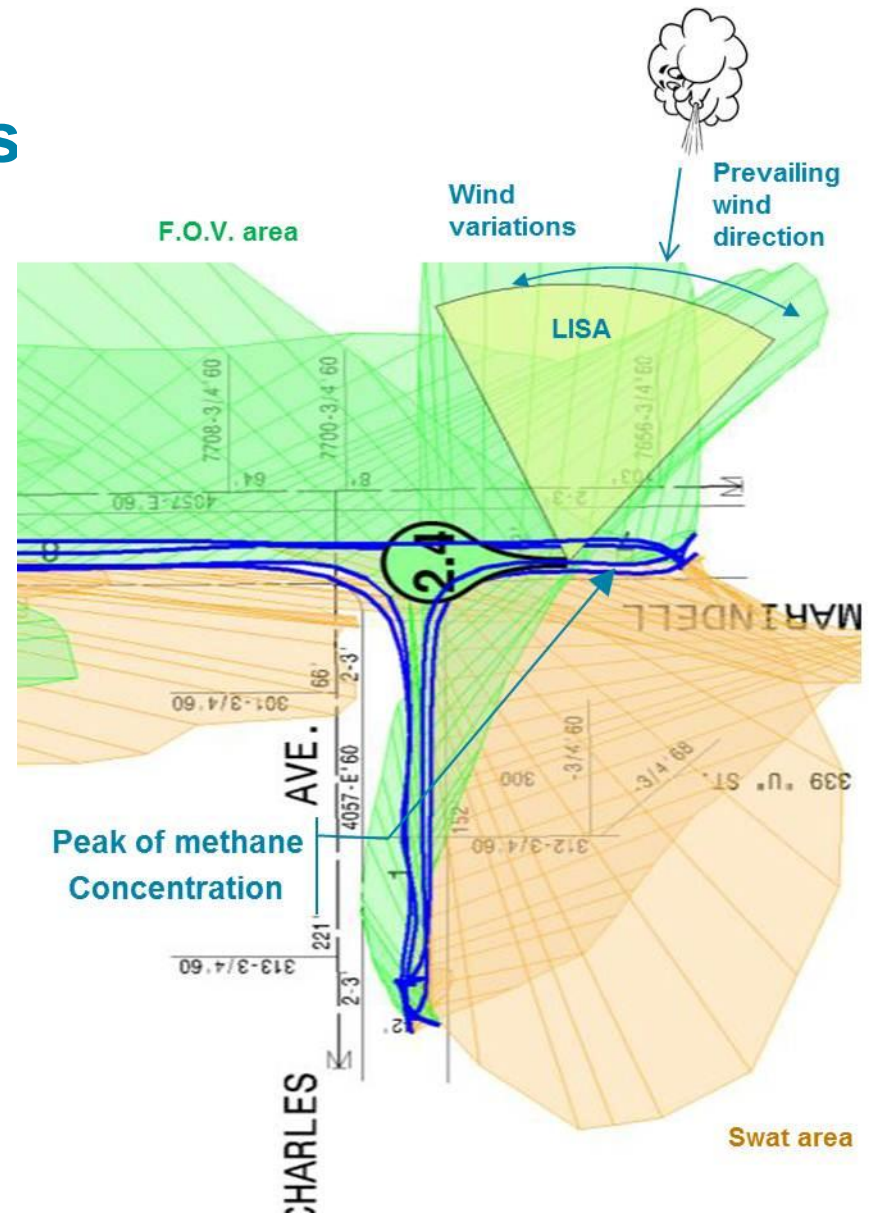
Capturing Critical Information

■ Atmospheric Conditions

- Weather conditions impacts results
- Wind information is critical

■ Leak Indication Search Areas (LISA)

■ Field-of-View areas





How did PG&E Utilize this Powerful Tool?

Process Re-engineering

Super Crew Process / Concept!



Team's Key Objectives **(33 member cross-functional team)**

- **Completely redefine a new leak survey & repair model**
- **Increase system safety by finding & fixing more leaks**
- **Maximize operating efficiencies**
- **Improve system capitalization rates**
- **High quality documentation**
- **Strengthen reputation in the communities**
- **Delight customers by not coming back**
- **Knowledge transfer outside of Super Crew**
- **Develop strategic plan for 2014 & beyond**

More effective leak detection technology drives step-change in survey and repair goals



Advanced survey technology that finds many more leaks per shift...

	Today	With Picarro
Services surveyed per hour	• 10-11	• 500
Leaks found per service	• ~3.4%	• ~6.4%
Leaks found per hour	• 0.4	• 32
Proportion of leaks found Grade 1, 2+, 2	• 18%	• 27%

...creates opportunity for more effective gas leak repair model

- Increase safety and “fix” an entire neighborhood at once with multiple crews
- Increase capacity as pre-staged crews will be more effective and fix more leaks/day
- Decrease leak rechecks and customer calls as more issues resolved
- Increase replacement rate as we identify more leaks on same pipe

Project goals:

- Find 1.5-2x as many leaks
- Average cost per leak reduced by 50%
- Increase rate of pipe replacement from 40% → 60%

Project is end-to-end redefinition how PG&E operates leak management

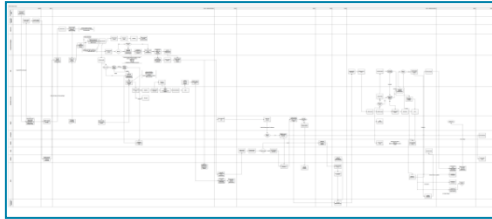


Old model

Traditional surveyors walk the lines over 12 months



Work goes into queue: Spaghetti process of 15+ back-office systems out to M&C crews



→ Tremendous inefficiency results from piecemeal nature of work

New PG&E Model

Picarro does 1 year of division survey in ~ 4 weeks



Tightly compressed process Find and fix leaks with SuperCrew in 3 week window



→ Vast economies of scale from fixing a year's worth of leaks in a neighborhood

Getting the new model right was a complicated endeavor

- Different scale than today: Step-change in volume and speed of work moving through system
- Cross-functional team: Need all functions involved for smooth handoffs in tight process
- Measurement mindset: Track metrics on everything to ensure new process is driving performance



Permanent team of A-level talent critical to our success in defining how we operate in the future and take on leadership of process



Summary — The Super Crew model works

- **Increased safety:** Found & fixed more leaks (1.81 times more), faster and more accurately than ever before
- **Superior economics:** Lower unit cost in every work category (up to 50% unit cost savings), higher capitalization rate (exceeding integrity management goals for pipe replacement)
- **More Reliable:** Safe operations, including QC; and strong compliance culture
- **Scalable:** Opens up opportunities to reduce cost across Gas Ops — overhead, engineering, and construction all benefit
- **Created Capacity**
- **Garnered strong political and regulatory support**
- **Grassroots approach to customer satisfaction**



new Currents video posted last week



Questions?



Thank you!

■ **Contact for more information:**

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Appendix



Super Crew roll-out to cover ~230k services in remainder of 2014

Stop Division survey
 Super Crew survey
 Super Crew begins survey

2014

