ENSEVERE environmental sensors

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Provide sensor solutions for operation in severe environments

Exclusively licensed chemical sensor technology from Carnegie Mellon

Three additional provisional patents filed

Capable detecting:

- Hydrogen (ppm)
- Hydrocarbons (ppm)
- Ammonia (ppm)
- Bromide (ppm)

In severe environments such as:

- Elevated temperatures (500°C)
- Corrosion
- Elevated pressures (2500 PSI)
- Underwater

ensors market 2011: \$5.6B (US) \$15B (World) 2014: \$6.1B (US) \$20B (World)

2012 Report: Extreme Environment Sensors for Oil Fields "It is sobering that despite the extensive academic literature on sensors, there are comparatively few commercial ones available." Schlumberger

3

Sensors part of key safety or compliance infrastructure for client operations

Extremely sticky, but difficult to validate



Industry focused on safety, but limited by product availability



Chlorine and hydrogen explosion case study April 6th, 2011

A series of technology and operational errors had caused hydrogen-chlorine reaction explosions in a chorine production plant in September 2010.

On 18 September 2010 at 05:17 a section of a chlorine production plant was damaged by a



<u>Value Proposition</u> Monitoring every cell allows for improved safety and efficiency

Wireless desktop





Tested for over 10 months in lab wet chlorine cell

Hydrogen response in wet chlorine:



Proposed product has interest from:



"The industry would benefit from a cost effective upstream warning of whether hydrogen levels in chlorine are increasing. PPG confirms that we have an interest in the results."

- Technology Director Commodity Chemicals

6

"We are immediately interested and feel that if proven, the sensor can be utilized to improve safety and performance in numerous areas of our process" - Plant Engineer



"As you can tell, my colleagues are pretty excited about finding new solutions in this space. As you can also tell, this is a group that have studied this problem for some time and have pretty detailed knowledge of the challenges (and the promise)" - Senior Fellow, Ventures and Business Development

Laboratory Demonstration – Mar. 2011

COMPI

artnership with leading tech. distributor (rev. > \$1B) – July 2011

DE NORA

Se Nora validation of product – Aug. 2012

n field trial w/Fortune 500 company owned chemical plant Working towards competing requisite certifications

Installed in chemical plant located in New Martinsville, WV

Targeted commercial product launch – 2013









Refineries



Power Generation



Galvanizing



Energy Exploration



Nuclear



Other electrochemical



Automotive





| Year | 2011 | 2012 | 2013 | 2014 |
|------------------------|-------|-------|-------------|---------|
| Revenue (in \$1000) | \$160 | \$315 | \$1,500 | \$4,000 |

<u>1 – 3 years</u>

Membrane Chlor-Alkali



Right Now

Diaphragm Chlor-Alkali



2013 Capital Needs: Currently: Raising:

\$600,000 \$400,000 \$200,000

Increase team size from 3 to 7 in order to support chloralkali product launch and entry into other sensors market



Pennsylvania

Received funding from:



9