Advances in Oxygen and Communications.

“Exploiting Emerging Technologies”

Mine Safety & Health Administration

Reuben Padilla
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About PCI

• Leading manufacturer of portable air separation equipment for the Military, Medical, and Oil & Gas markets
  - Cryogenic and non-cryogenic systems
  - Eliminates the logistical supply chain

• Stable and diversified domestic and international client base
  - PCI has equipment actively operating and supported in over 20 countries

• Headquartered in Riverside, CA

• 148 Employees
Management Team

- **Chief Executive Officer – Rob Ruck**
  - Prior to PCI, Rob was President/CEO of Pentacon and spent 14 years at Honeywell Aerospace and AlliedSignal Aerospace in senior management positions.

- **Chief Financial Officer – Dave Bitter**
  - Over 20 years of experience in finance, including four years with PepsiCo and seven years with Price Waterhouse.

- **Senior Vice President – Jay McFadyen**
  - US Air Force Academy 1980 and former Air Force JAG.

- **Vice President, Sales & Marketing – Reuben Padilla**
  - USNA 1980 & 20 year career in the U.S. Marine Corps.

- **Director Engineering & Technology – Tarik Naheiri**
  - 20 years of experience in gas separation technologies at Air Products & Chemicals. Tarik is one of the global authorities in adsorption technologies.

- **Director Operations – Soeren Schmitz**
  - Soeren has over 10 years experience in management consulting providing growth strategies and operations improvement methodologies to manufacturing companies in industries such as consumer goods, building products, and medical equipment.

- **Chief Engineer – Randy Schiller**
  - 40 years experience in the mechanical engineering field, with specialization in cryogenic valves, low-noise valves, mobile liquid nitrogen pumper/converters, and air separation units.
Products - Cryogenic

- Liquid Oxygen (LOX)/Liquid Nitrogen (LIN) Generating Plants
  - Transportable units for aviator’s breathing oxygen, servicing aircraft tires/struts/accumulators, oil drilling/servicing applications, fast food freezing, cryo-grinding, liquid backup systems for gaseous operations

1.5-2 tons per day

5-7.5 tons per day

Trailer mounted
2 tons per day
LIN/LOX plant
Products - Membranes

- **Self Generating Nitrogen Servicing Cart (SGNSC)**
  - Mobile cart producing 95.5% pure nitrogen used on the flight line to service tires, struts, accumulators, and other maintenance needs for aircrafts
    - 1500+ produced to date
  - Other variants available
    - High purity (99.5%) nitrogen to support F-16 and Sidewinder missiles
    - Electric drive model for tire shops
    - Dry air version to support F-22
Products - Adsorption

• **EDOCS-120B: Expeditionary Deployable Oxygen Concentration System**
  - Mobile, rugged, and easy to operate FDA approved “military use” medical oxygen generator producing 120 liters/minute
  - In three months, one mobile E-DOCS-120B onsite, weighing 3,500 lbs., produces the equivalent of 800 “H” cylinders of oxygen, weighing 128,430 lbs., eliminating the need to fly-in/transport Oxygen to a medical facility

• **EDOCS-30**
  - Person portable oxygen generator capable of producing 30 liters/minute of medical grade oxygen and medical grade air simultaneously
  - Easy to operate and enclosed in extremely durable cases which also act as shipping containers
The units shown consist of two independent systems.

"RO#1" operates the upper two membranes which can produce 1800 GPD (75 GPH) of fresh water.

"RO#2" operates the lower membrane which can produce 900 GPD (37.5 GPH).

There is a vacant place on the frame for an additional membrane, which would make RO#2 an 1800 GPD unit as well.

The pump for each unit runs on 440 VAC 3 phase and draws 4.1 Amps at full load.

USN Patrol Craft
- USS Hurricane
- USS Squall
- USS Chinook
- USS Firebolt.....
Oxygen can be used in more than one way

- Medical gas
- Mine Safety
- Precursor for water treatment
  - Potable
  - Sterile
Oxygen - Mobile Oxygen Storage Tank (MOST)

DOWS

Post .50 cal AP round
DOWS: Deployable Oxygenated Water System.

- Ozonator
- Venturi Mixing
- Reaction Tank
### Effect of type of disinfectant on inactivation of pathogens

<table>
<thead>
<tr>
<th></th>
<th>Bacteria</th>
<th>Viruses</th>
<th>Giardia</th>
<th>Cryptosporidium</th>
<th>Overall</th>
</tr>
</thead>
<tbody>
<tr>
<td>Free Chlorine</td>
<td>E</td>
<td>E</td>
<td>F</td>
<td>P</td>
<td>G</td>
</tr>
<tr>
<td>Preformed Chloramines</td>
<td>P/F</td>
<td>P</td>
<td>VP</td>
<td>VP</td>
<td>P</td>
</tr>
<tr>
<td>In-situ Chloramines</td>
<td>F</td>
<td>F/G</td>
<td>P</td>
<td>VP</td>
<td>F</td>
</tr>
<tr>
<td>Chlorine Dioxide</td>
<td>G/E</td>
<td>G/E</td>
<td>F/G</td>
<td>F</td>
<td>G</td>
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<tr>
<td><strong>Ozone</strong></td>
<td>E</td>
<td>E</td>
<td>E</td>
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<tr>
<td><strong>UV light</strong></td>
<td>G</td>
<td>F</td>
<td>VP</td>
<td>VP</td>
<td>F</td>
</tr>
</tbody>
</table>

VP: Very Poor  
P: Poor  
F: Fair  
G: Good  
E: Excellent

Source:

“Waterborne viruses and parasites: resistance to treatment and disinfection”

*Pierre Payment*  
Institut Armand-Frappier, Université du Québec, Laval (Québec), Canada H7V 1B7
Treated Water
World Leader in Portable Oxygen and Nitrogen Generating Systems

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