



ABB-Totalflow

Experience the Difference

PGC1000 Process Gas Chromatograph

Process GC Experience

- ABB introduced the Btu-8000 in 1995
 - C6+ application suitable for custody transfer of natural gas
 - On-line chromatograph comprised of “off-the-shelf” modules
 - Controller Module
 - Stream Selector Module
 - Pressure Regulator Module
 - GC Module



Process GC Experience

- **ABB introduced the NGC-8206 in 2004**
 - **C6+ application suitable for custody transfer of natural gas**
 - **On-line chromatograph comprised of “off-the-shelf” modules**
 - **Digital Controller Assembly**
 - **Analytical Module Assembly**
 - **GC Module Assembly**



Process GC Experience

- **ABB Introduced the PGC1000 in 2008**
 - **PGC1000 has all the same basic features and functions as the NGC-8206**
 - **Capable of a variety of applications**
 - **Channel to market went thru Process Analytics until 2011**
 - **As of Jan. 2011, Totalflow was established as feeder factory directly to sales channels**



PGC1000 Overview

- **Compact Design**
 - Mounted much closer to sample point
- **Versatile**
 - Capable of a variety of simple vapor applications
- **Conventional Analytical Components**
- **Cost Effective**
 - Shelterless (if sample conditions allow)
 - Low Utility Consumption
- **Leading Edge Technology**
 - Highly Sensitive TCD
 - Dual EPC's

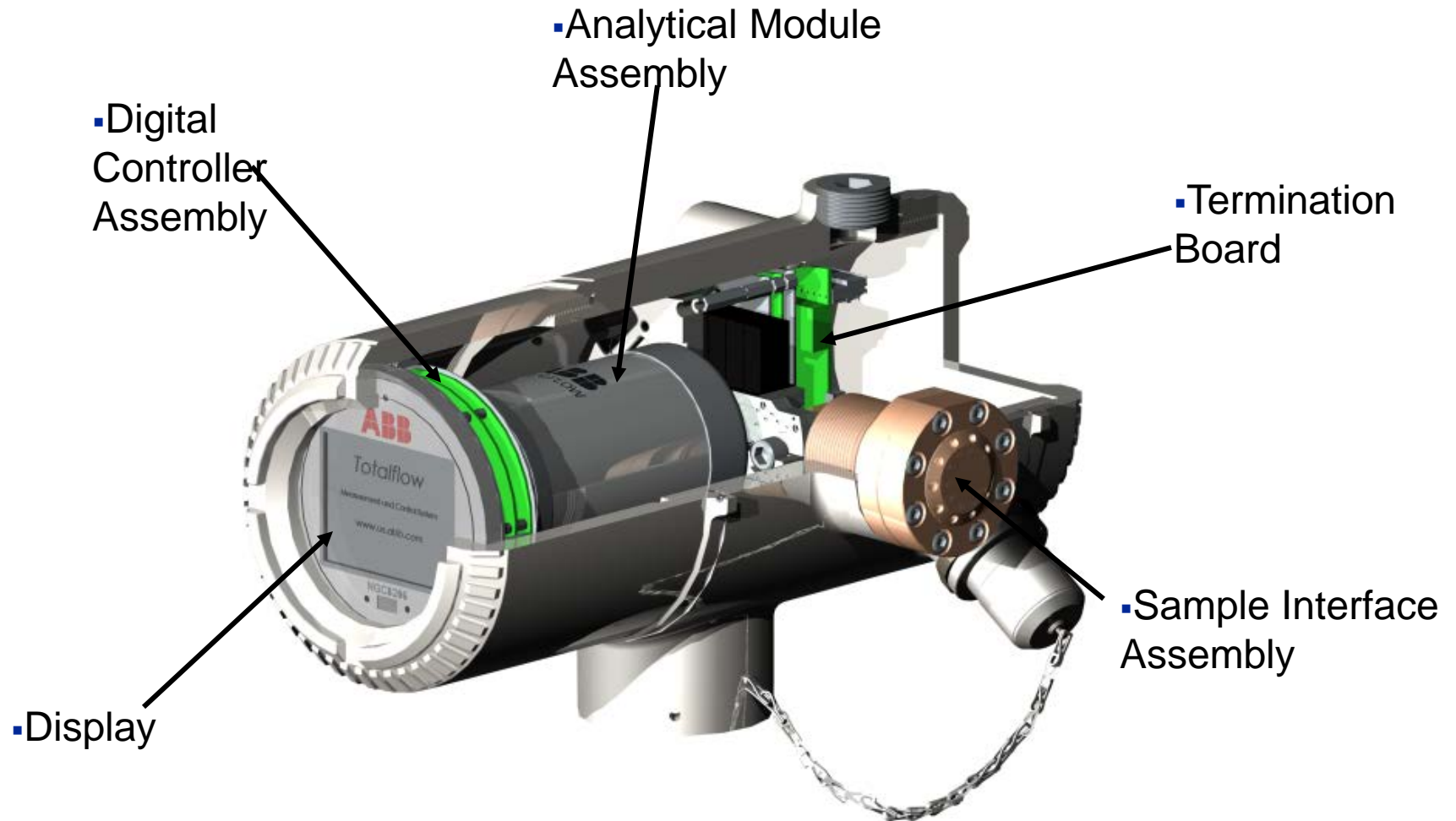


PGC1000 Specifications

- **Class I, Div. 1, B,C&D**
- **Four streams-manual cal**
- **Three streams-auto cal**
- **Dual Calibration Streams possible**
- **SD Flash memory card slot on processor**
- **Operating Temperature—20 to 130 deg F**
- **Power: 12 or 24 VDC, 8 watts nominal**



PGC1000 Modular Design

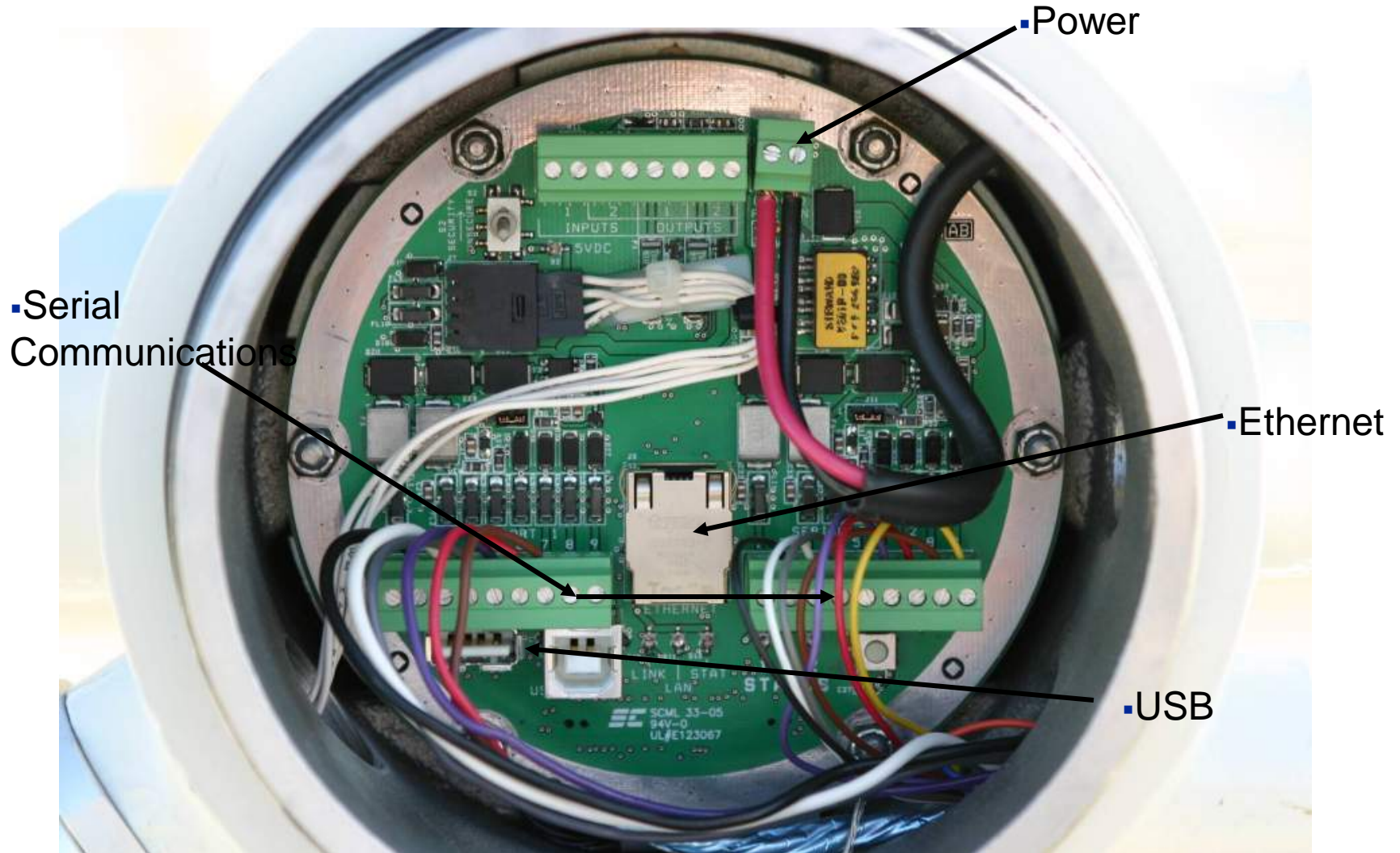


PGC1000 Digital Controller Assembly

- Contains ARM Processor
- Contains SD Card Socket for Data Storage in addition to on-board memory
- Contains 1/4 VGA Display



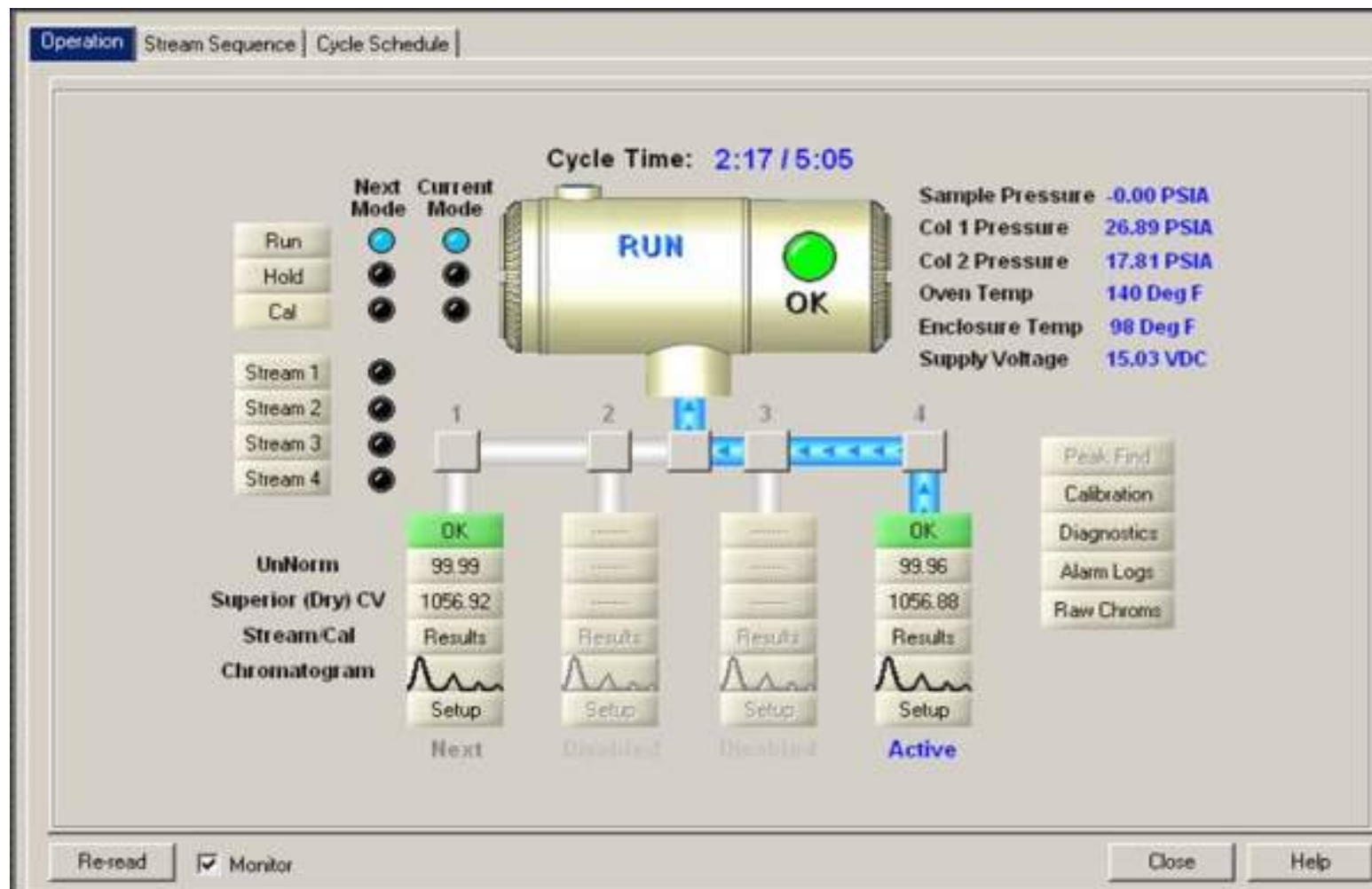
PGC1000 Termination Board



PGC1000 Communications

- **Variety of Modbus protocols supported**
 - **ASCII**
 - **RTU**
 - **Dananalyzer**
- **Serial connections are software selectable RS 232, 485, 422**
- **External MMI Ex connection will be USB standard with 232 optional**

User Interface Screen/Entry Screen



PGC1000 Graphical Display

PGC1000 Menu

Analyzer Control	Chrom Display	Cal Results
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Analyzer ID: **PGC1000**

Current Results	Alarms	BACK
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Alarm	Mode	Stream	Time
Normal	Run	???	0

PGC1000 Sample Interface Module



- S1 THRU S4 = Process and Cal Streams @ 15 psig
- CAR = Helium Carrier @ 90 psig
- SV = Sample Valve Vent
- CV 1 & CV2 = Column Train Vents (Detector Vents)
- GPV = Enclosure Vent
- Optional Heater

PGC1000 Installation Requirements

- **Power: 10.5 to 16 VDC @ 7 Watts – Normal Operation, 4 AMP Minimum Power Source (Double power usage if manifold heater is used)**
- **Power: 21 to 28 VDC @ 7 Watts- Normal Operation 3 AMP Minimum Power Source (Double power usage if manifold heater is used)**
- **Carrier gas: Helium 99.995 High Purity**
- **Calibration gas: As required for application**



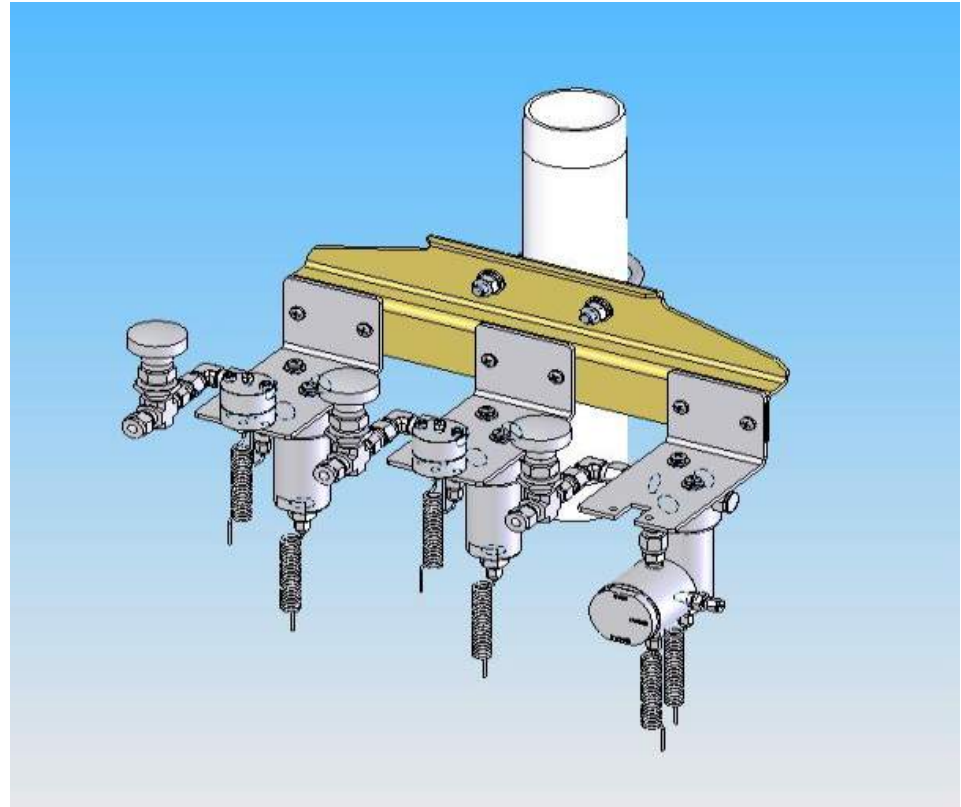
PGC1000 Installation Requirements

- 100 Watt Solar Panel
- 200 Amp Hour Battery Backup
- Nema 4 Box to house battery and control circuitry



PGC1000 Sample Conditioning

- 4 types of pre-engineered sample conditioning systems are available
- Custom sample conditioning systems are also available



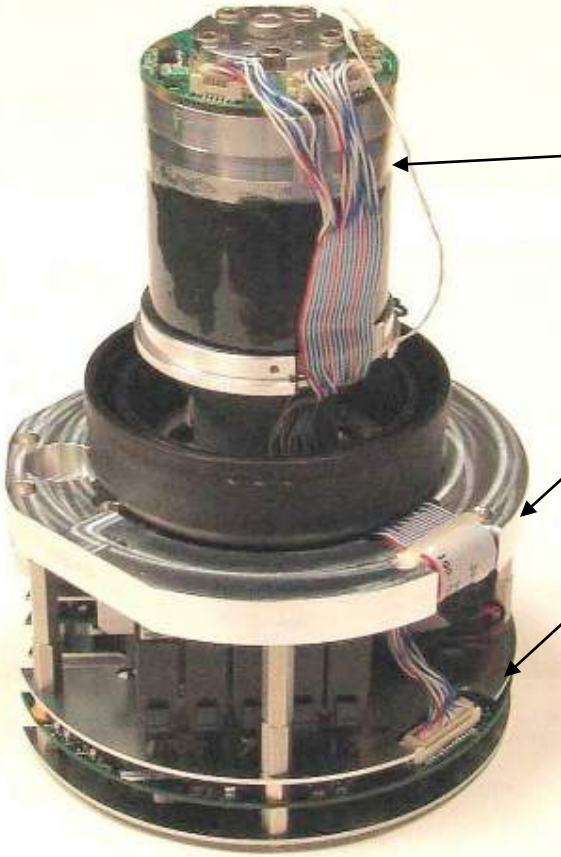
PGC1000 Mounting Options



- **Free Standing Pipe in Open Environment**
- **Inside Environmental Enclosure when Required by Sample Conditions**



PGC1000 Analytical Module Assembly

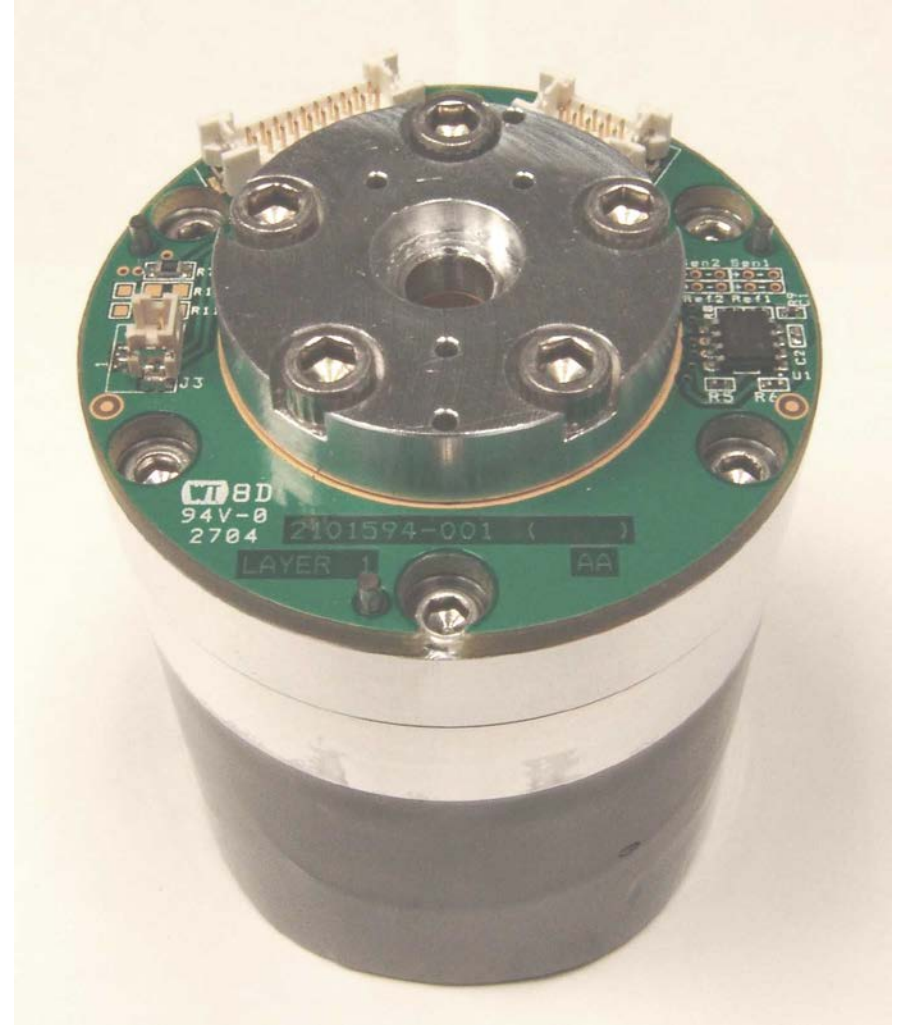


PGC modular internals consist of three primary components:

- **GC Module (Detector Pressure Sensor, Column & Sample Loop Spool)**
- **Manifold Assembly (Valves, Heater Plate Ass.& Manifold)**
- **Analytical Processor Assembly**

PGC GC Module

- **Module containing:**
 - 2 - thermal conductivity detectors
 - 2 - 10 port valves
 - 4 - 1/16" micropacked gc columns
 - Detector plate houses pressure sensors for EPC
 - EEPROM for storing RF's, Rt's, Carrier Pressure, etc.



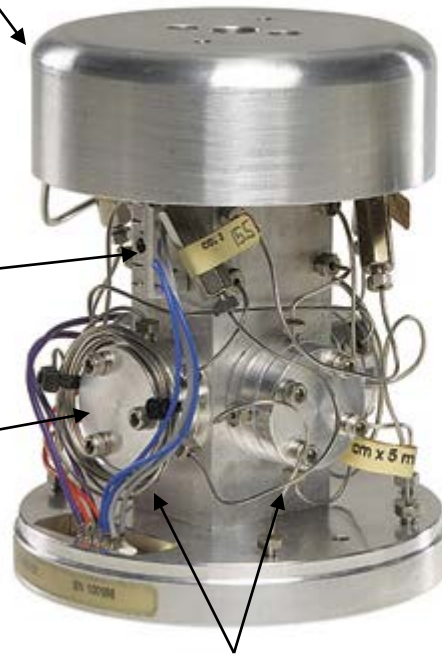
Old vs New

▪ Column Spool

▪ Detectors

▪ Valves

▪ 1/32" Tubing
(lots of it)



▪ Detector Plate

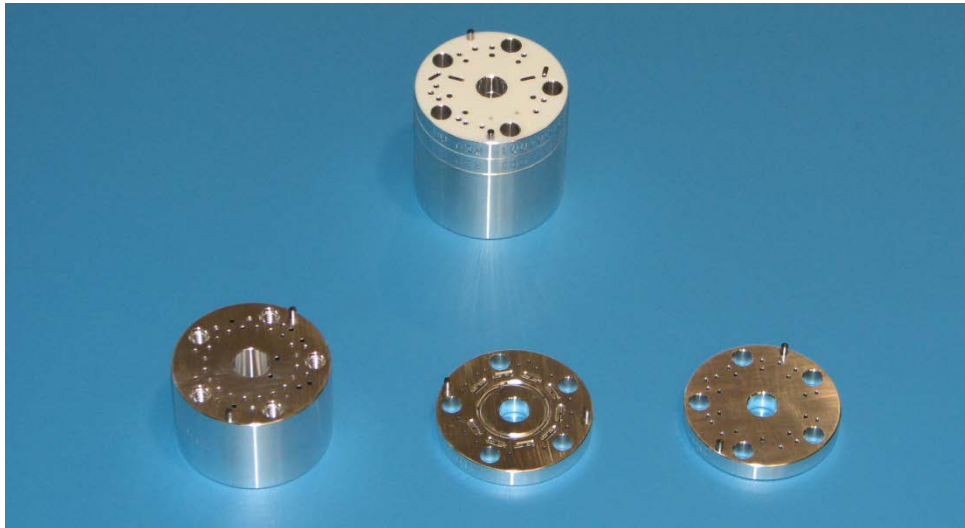
▪ Column Spool

▪ No Tubing

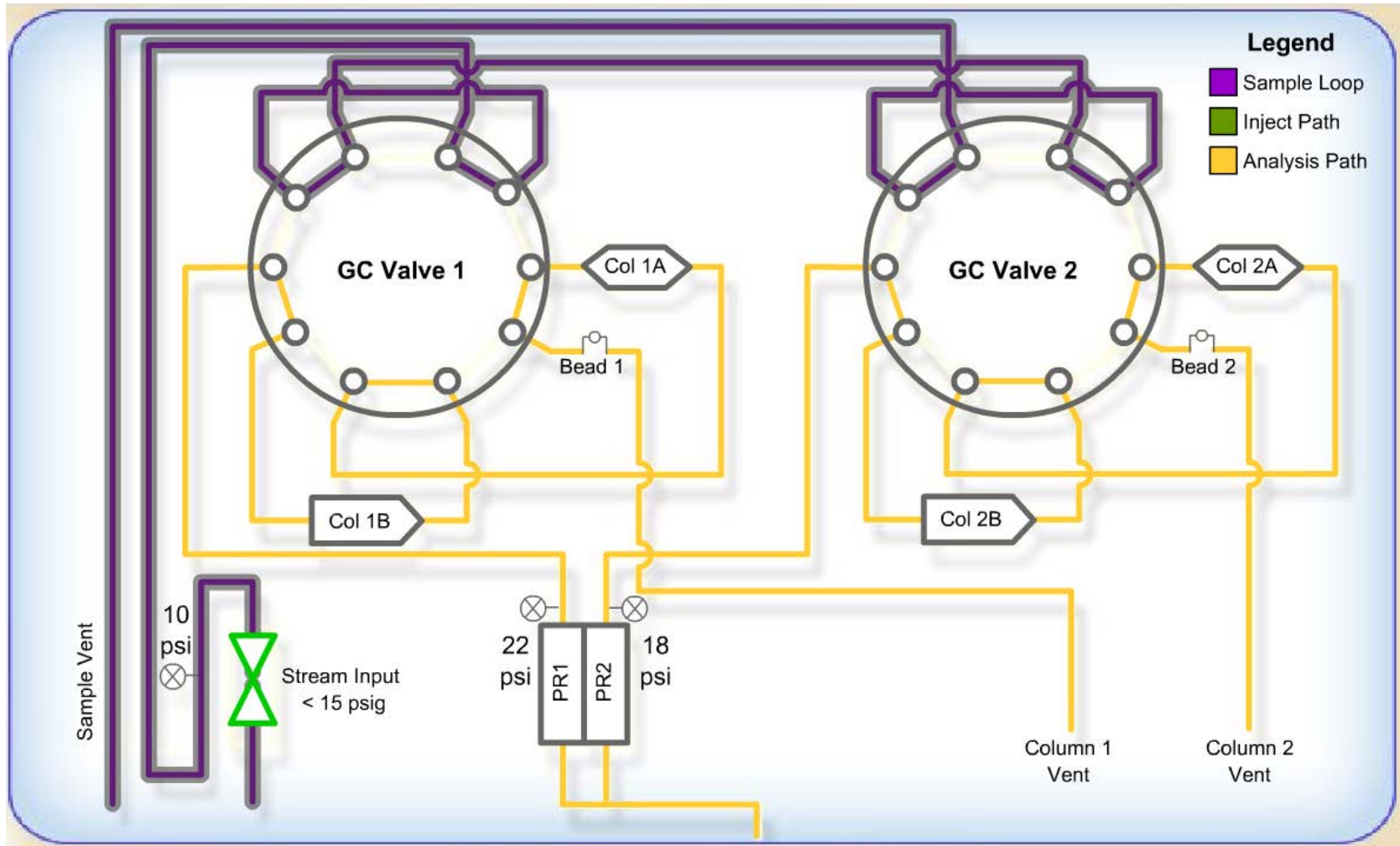


PGC GC Module

- Valve Assembly
 - No external tubing
 - Dual 10 port valve arrangement (RCS)
 - Million of cycles

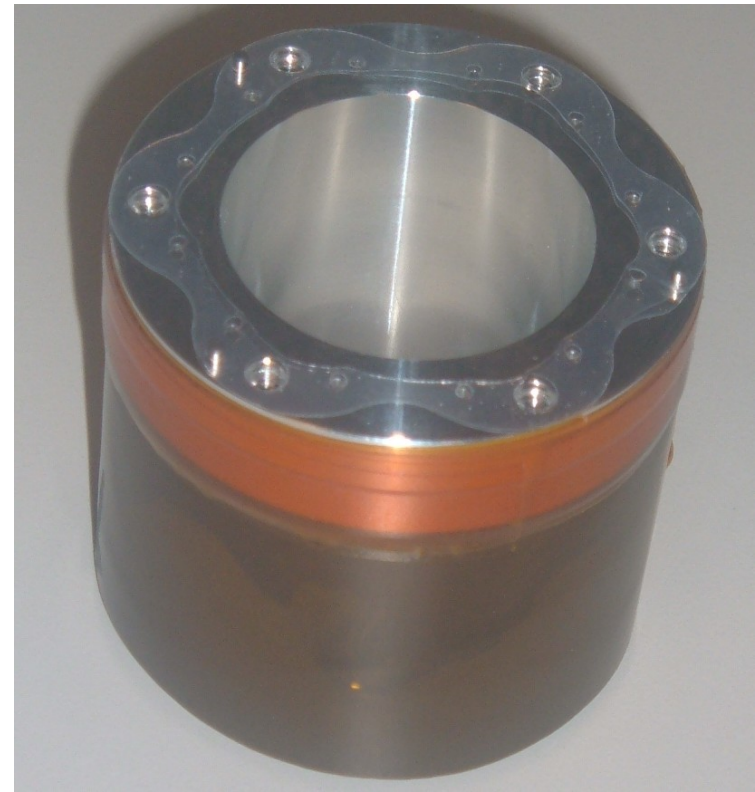
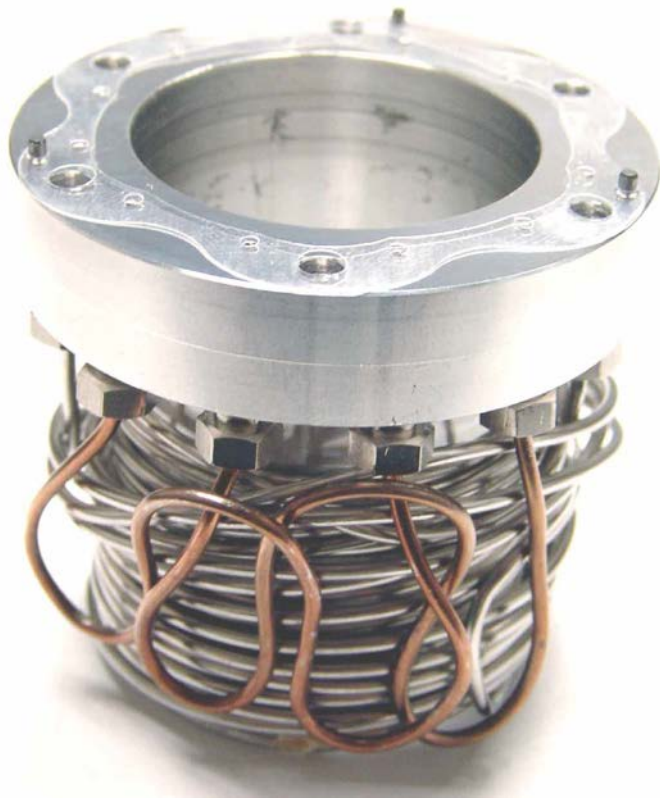


Plumbing Arrangement



PGC1000 Column Spool

- Column Spool Assembly



PGC1000 Configuration

- **Basic Rules**
 - Only 2 trains combined in one enclosure
 - Up to 2 enclosures
 - Maximum of 4 trains per Analyzer System



ABB PGC1000 Targeted Applications

- **Single Component Gas Applications**
 - **H₂S in Fuel Gas**
 - **Trace and Percent Level Analyzers for:**
 - **Hydrogen**
 - **Oxygen**
 - **Moisture**
 - **CO**



ABB PGC1000 Targeted Applications

- Single Gas Applications
- **Gas Quality Applications**
 - **Light Hydrocarbons Gas**
 - **Natural Gas**
 - **Fast Natural Gas for Boiler Control**



PGC 1000 Product Family

ABB PGC1000 Targeted Applications

- Single Gas Applications
- Gas Quality Applications
- **Petrochem/Refinery Applications**
 - **De-methanizer**
 - **De-ethanizer**
 - **De-propanizer**
 - **De-butanizer**
 - **De-butamer**
 - **De-pentanizer**
 - **Propane/Propylene Split**
 - **C4 Parrafin/Olefins**
 - **Permanent Gases**



ABB PGC1000 Platform – Superior Performance

- Digital Control for Oven Temperature and Carrier Pressure

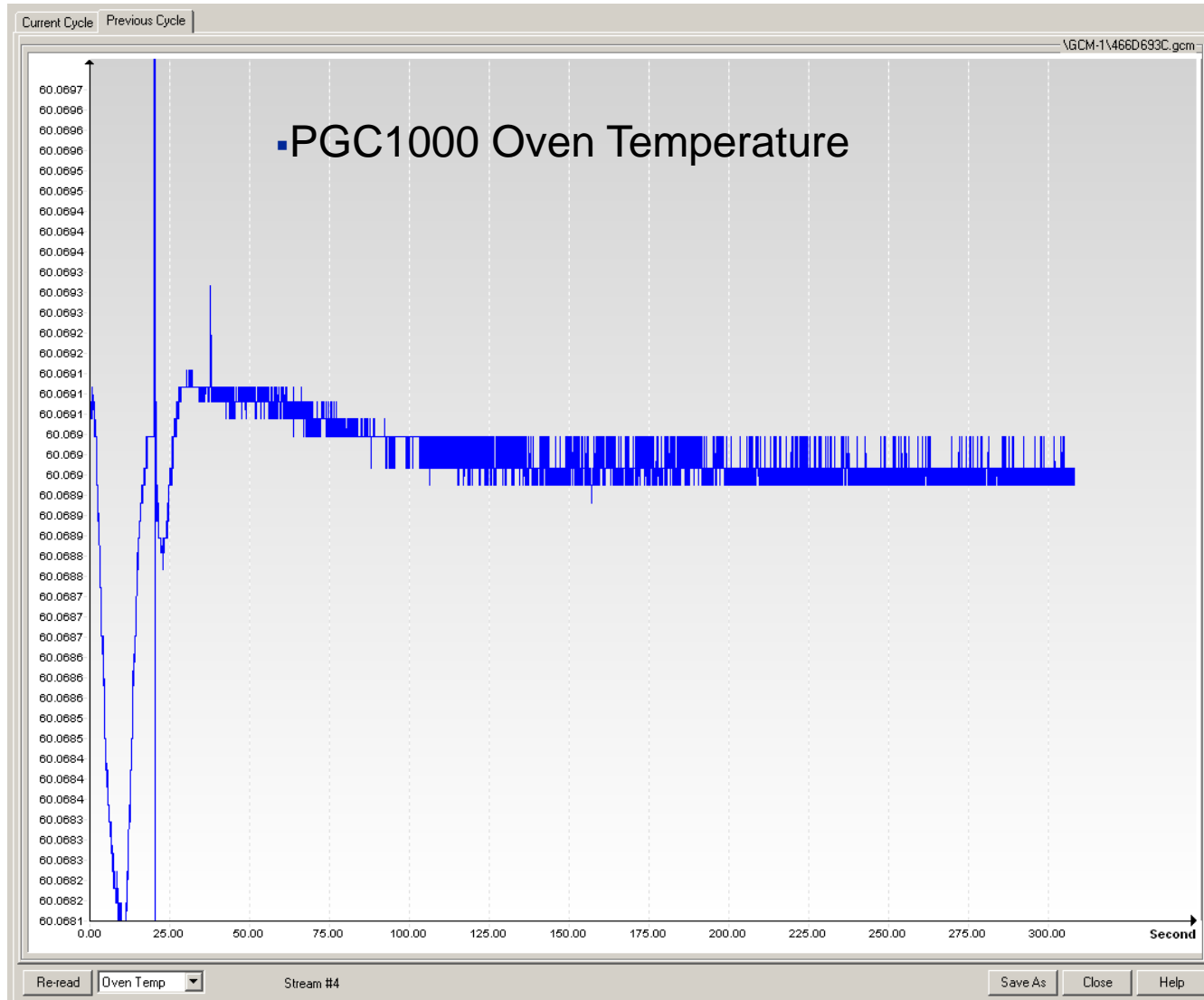
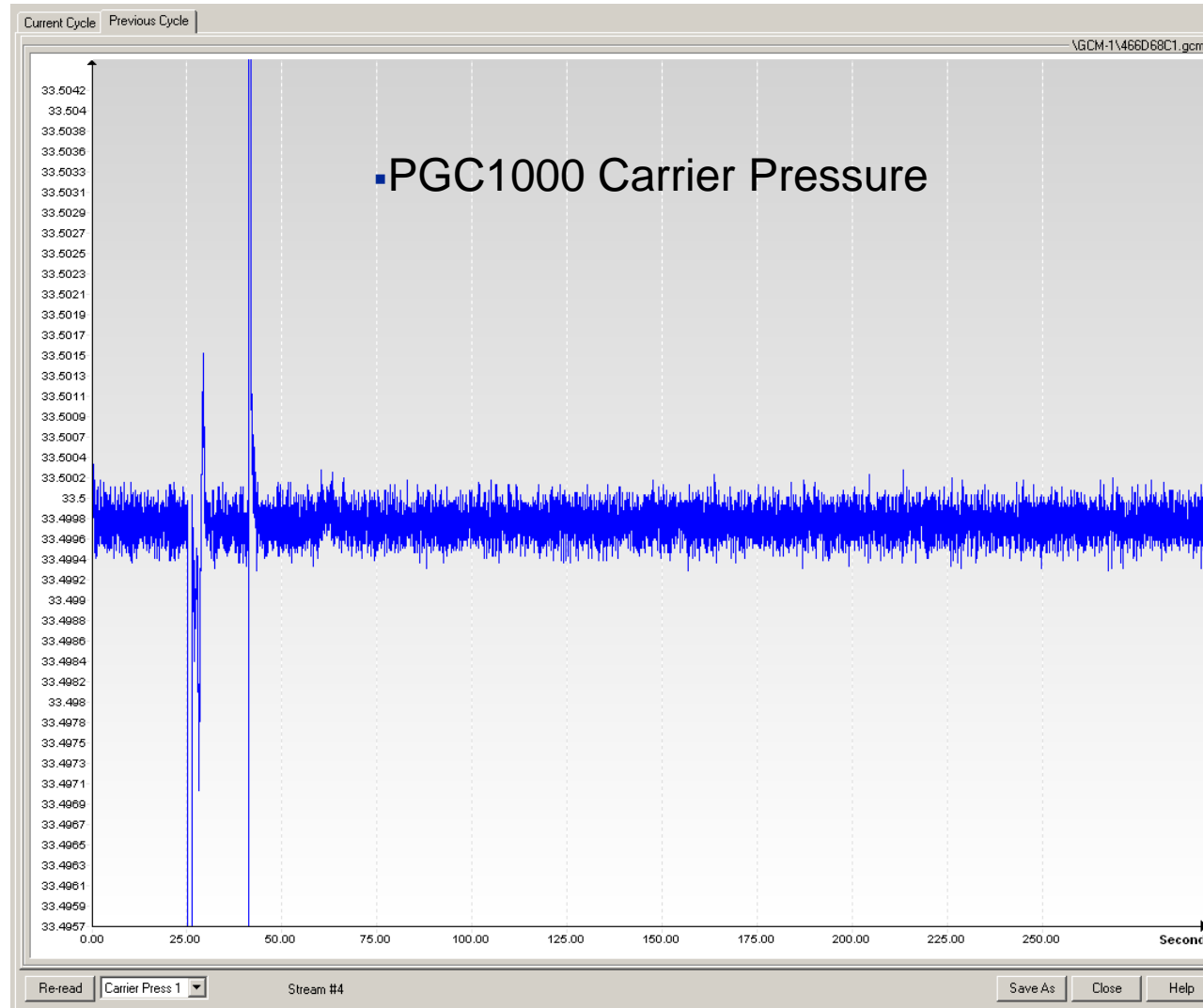


ABB PGC1000 Platform – Superior Performance

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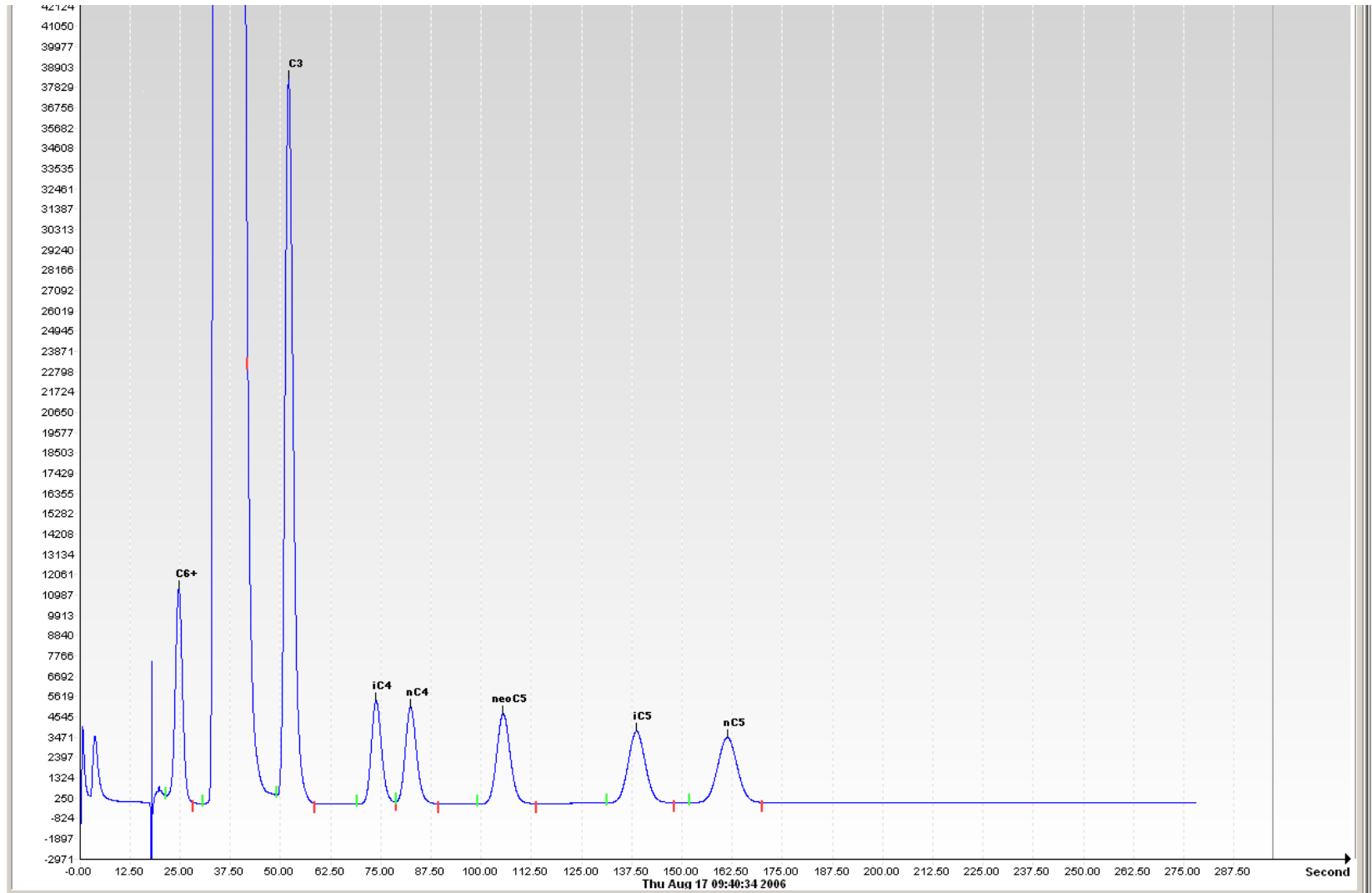


C6+ Application

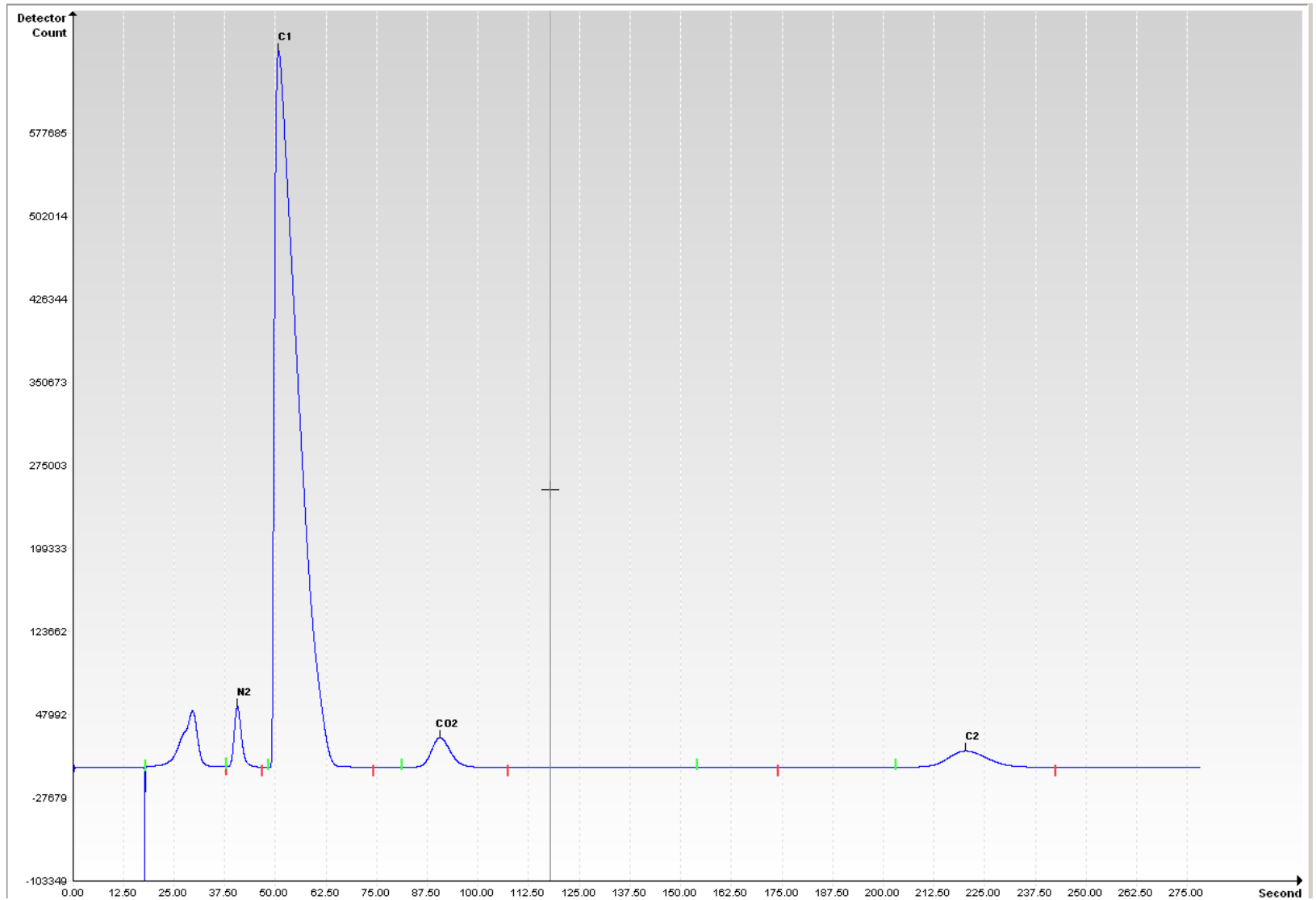
▪ Methane	40-100%
▪ Ethane	0-15%
▪ Propane	0-10%
▪ Isobutane	0-2%
▪ Butane	0-2%
▪ Isopentane	0-1%
▪ Pentane	0-1%
▪ Neopentane	0-1%
▪ C6+	0-1%
▪ Nitrogen	0-15%
▪ CO2	0-15%



C6+ Chromatograms

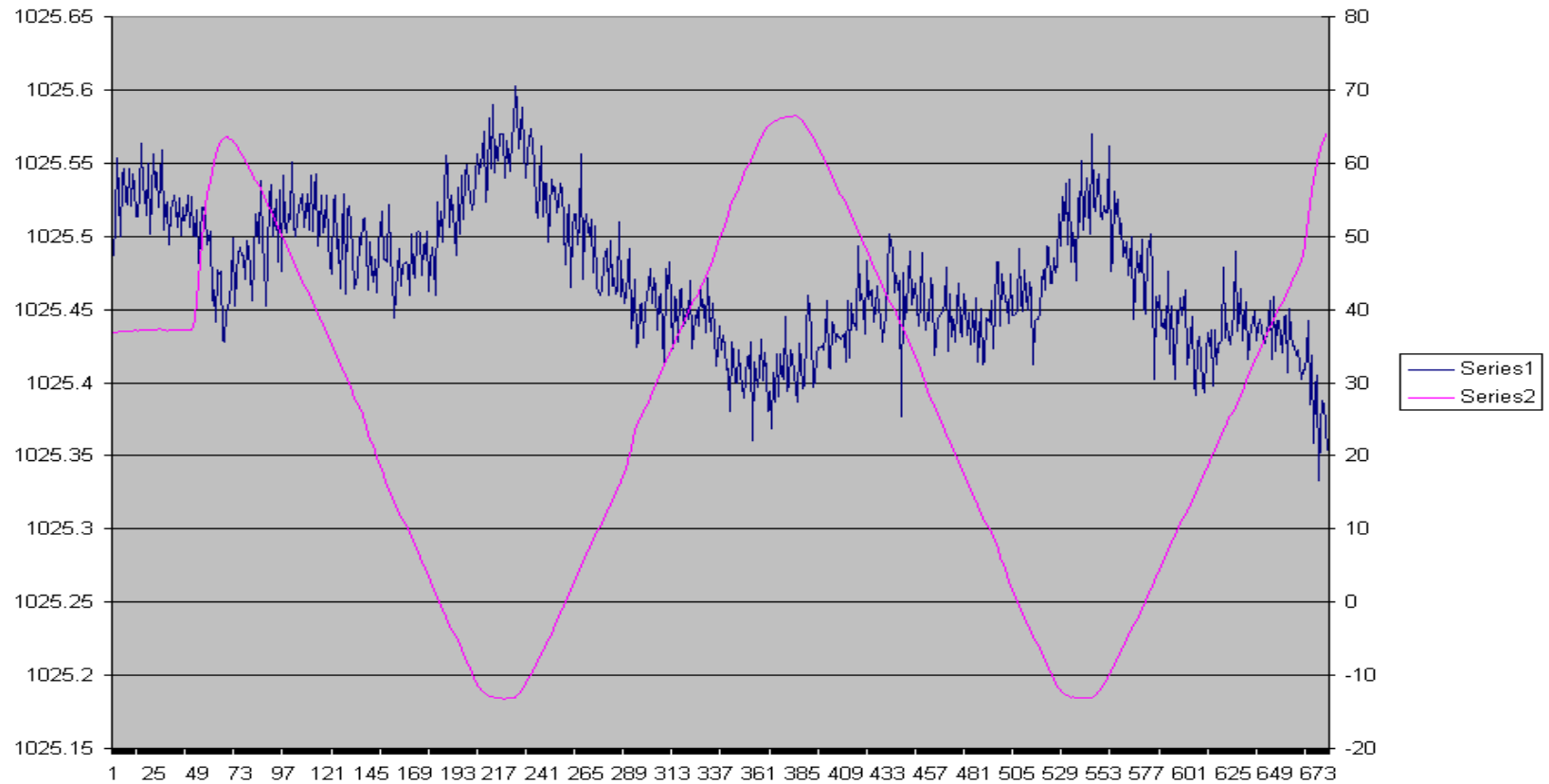


C6+ Chromatograms



C6+ Performance

- Btu Repeatability Over Temperature 0F to 130F

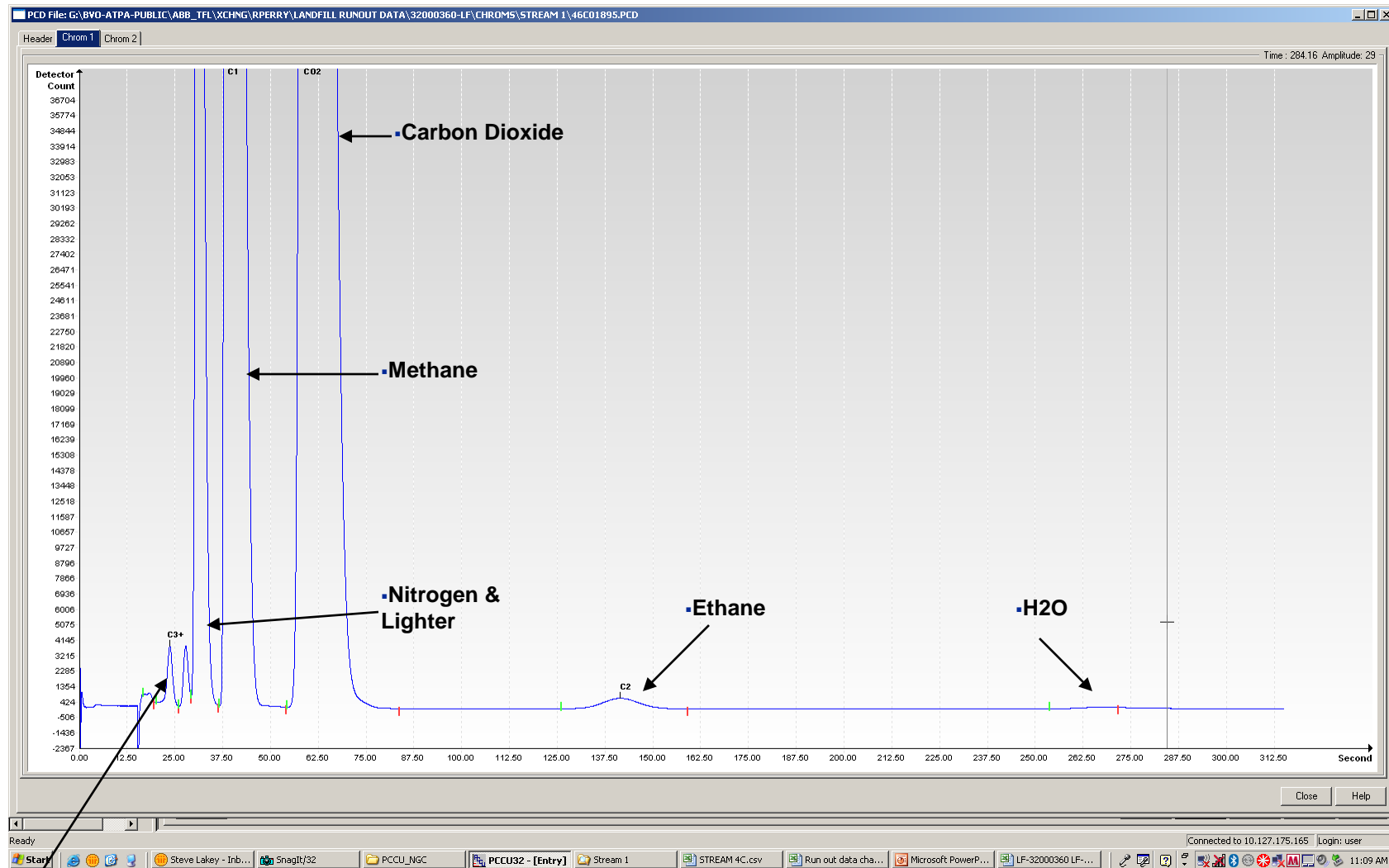


Landfill Gas Application

- Methane .05 - 100%
- CO₂ 0.1 - 100%
- Ethane 0.1 - 100%
- Hydrogen 0.5 - 20%
- Oxygen 0.2 – 20%
- Nitrogen 0.1 – 100%
- CO 0.2 – 100%
- Light Hydrocarbons gas typically runs between 400 and 500 Btu



Landfill Gas Chromatograms



•C3+
Backflushed

Landfill Gas Chromatograms

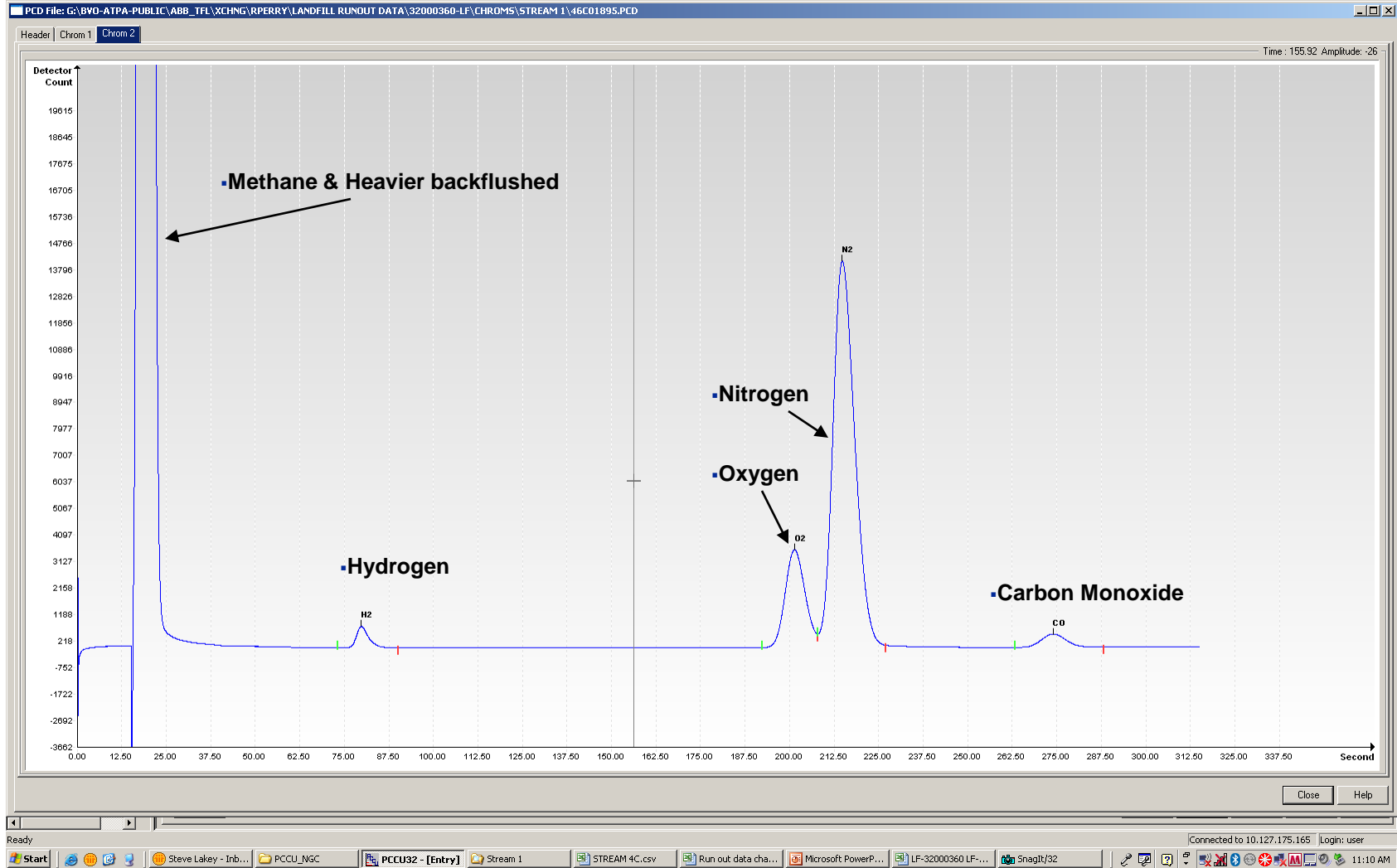
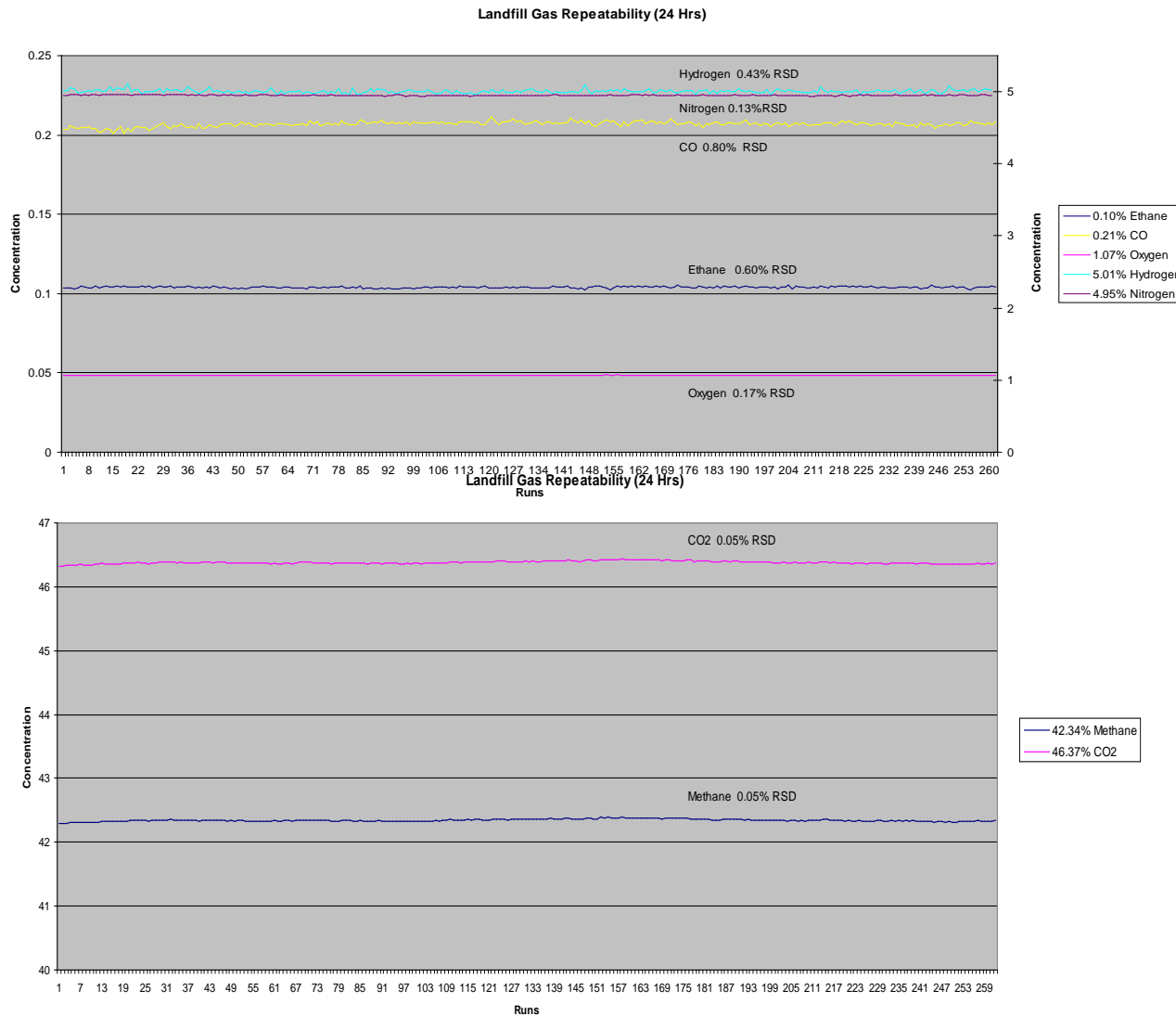


ABB PGC1000 Platform – Repeatability

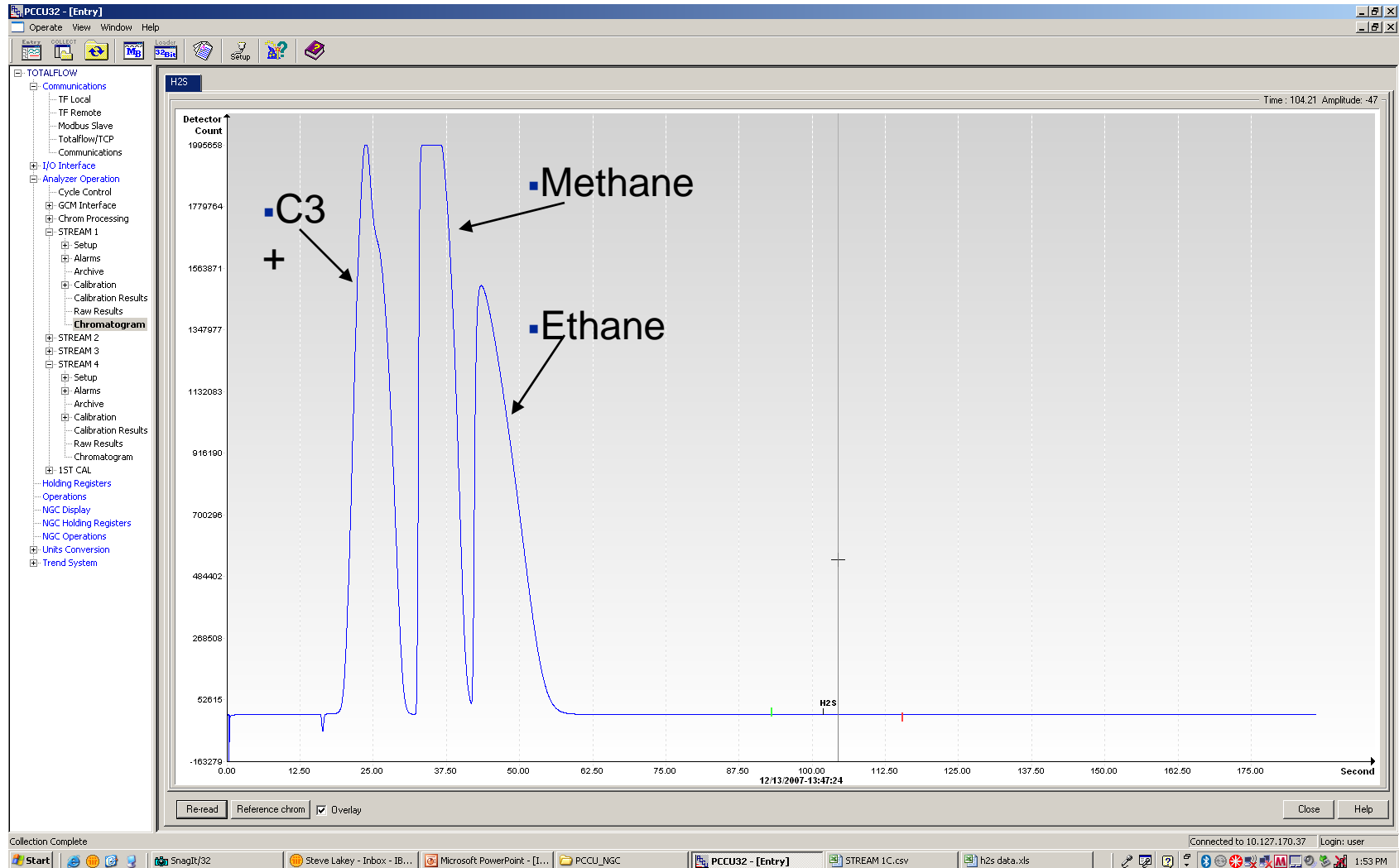


H2S in Fuel Gas Application

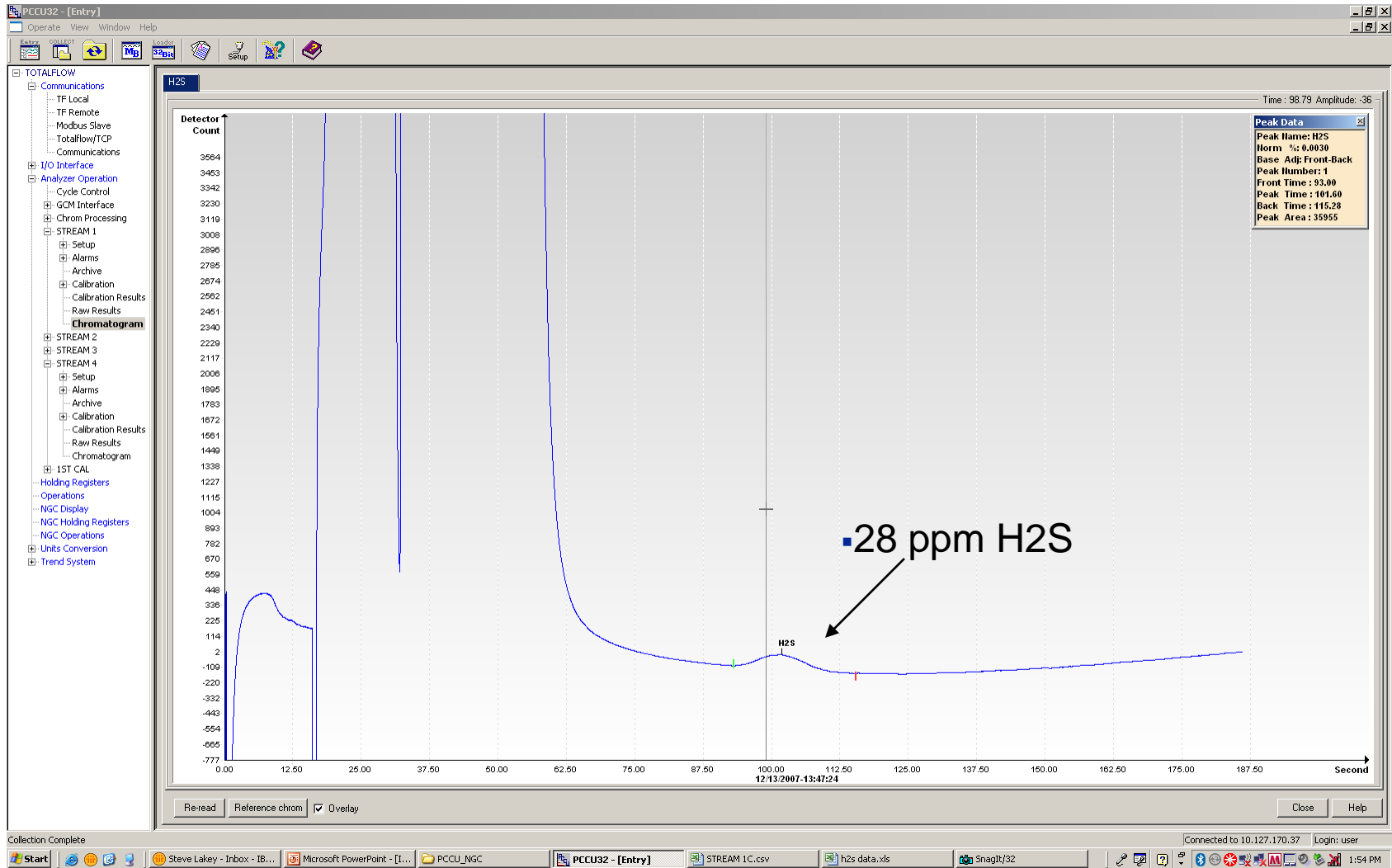
- No FPD!!
- Range
 - 0 – 300 ppm
- MDQ
 - 2 ppm
- Repeatability
 - +/- 3% RSD



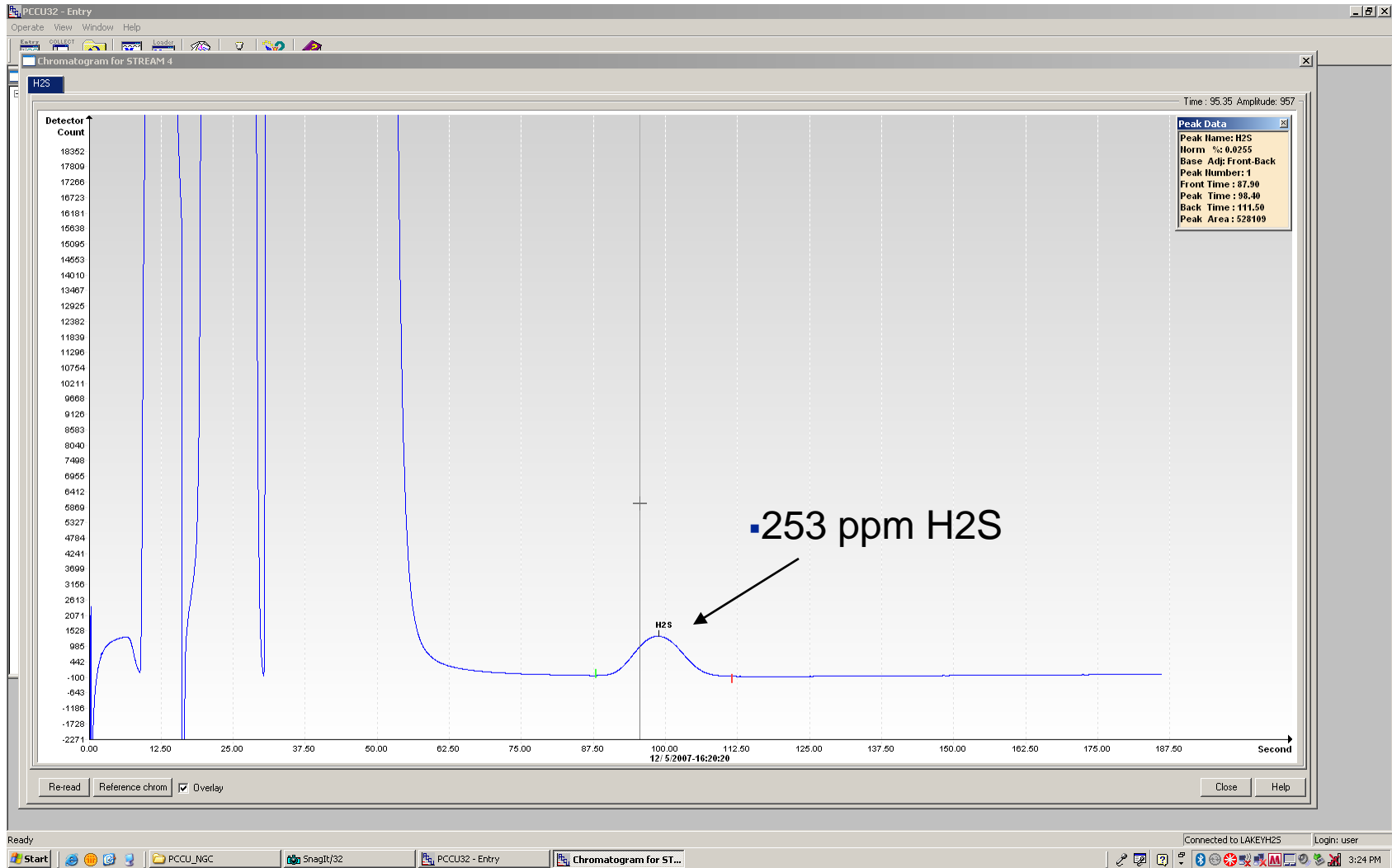
H2S in Fuel Gas Application



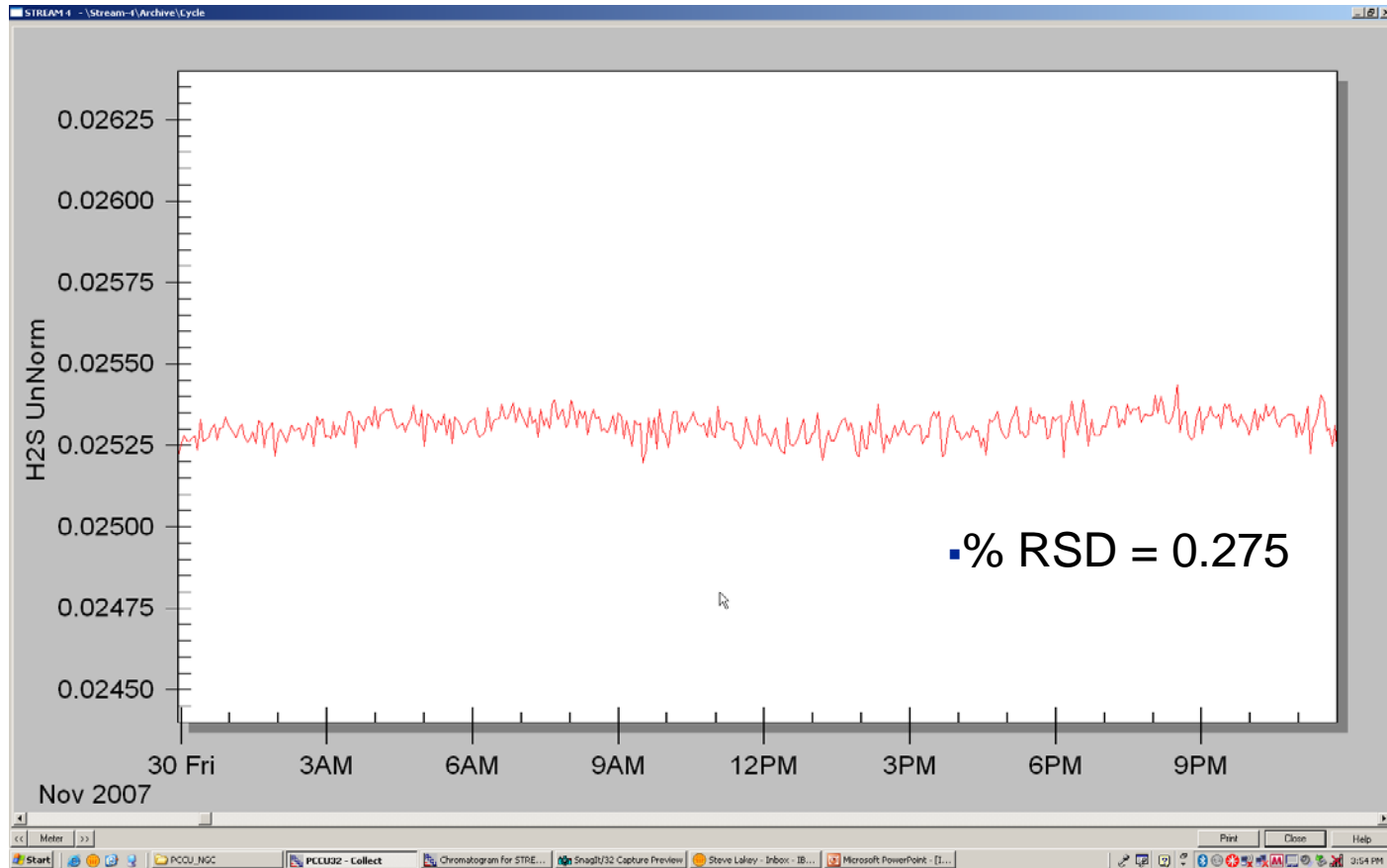
H2S in Fuel Gas Application



H2S in Fuel Gas Application



H2S in Fuel Gas Performance



H2S in Fuel Gas Performance

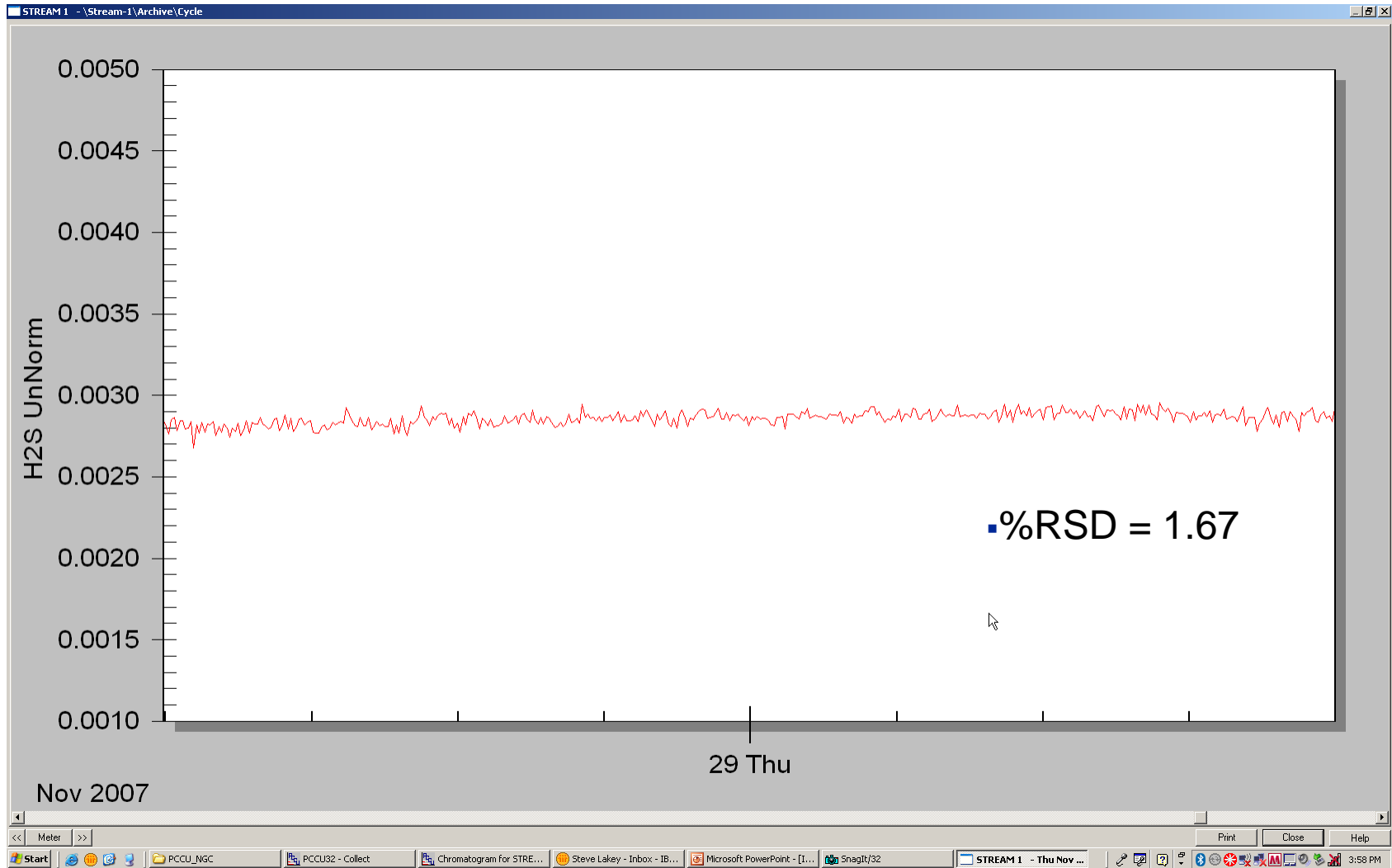


ABB PGC1000 Pricing

- Aggressive pricing designed to make it hard to continue to ignore the PGC1000
- Pricing is application based, but in general:
 - Single Train Targeted Ap around 16K USD
 - Single Train Custom Ap around 18K USD
 - Dual Train Targeted Ap around 17K USD
 - Dual Train Custom Ap around 19K USD
 - Adder on International Orders



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