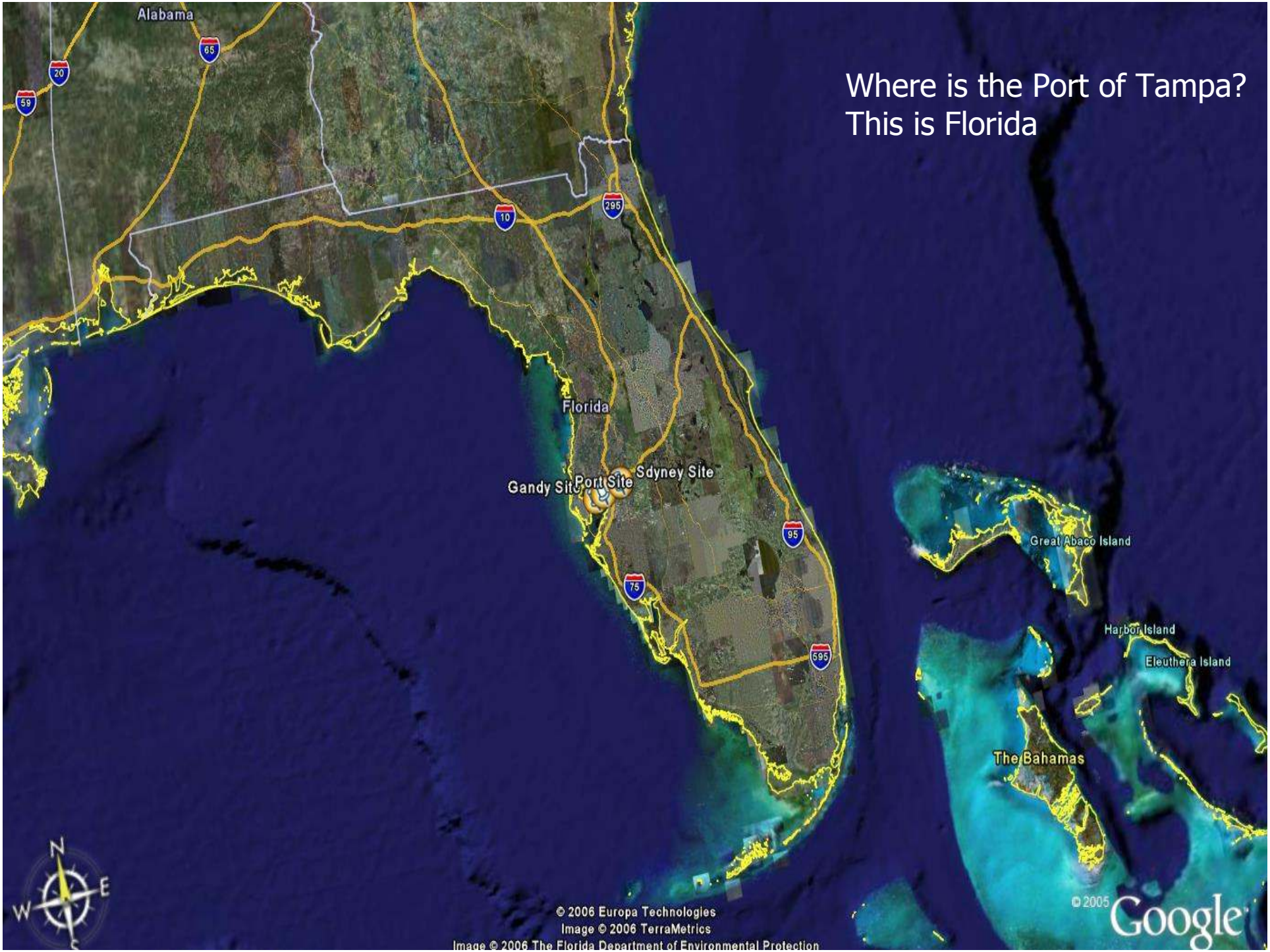
2006 National Air Monitoring Conference
"Port of Tampa"
Air Emissions and Monitoring Equipment Comparison Study

November 6-9 Las Vegas, Nevada

Environmental Protection Commission of Hillsborough County

Clemente Lopez

Debra Price, Ph.D.


Where is the Port of Tampa?
This is Florida
Alabama
Florida
Gandy Site
Port Site
Sdyney Site
Great Abaco Island
Harbor Island
Eleuthera Island
The Bahamas
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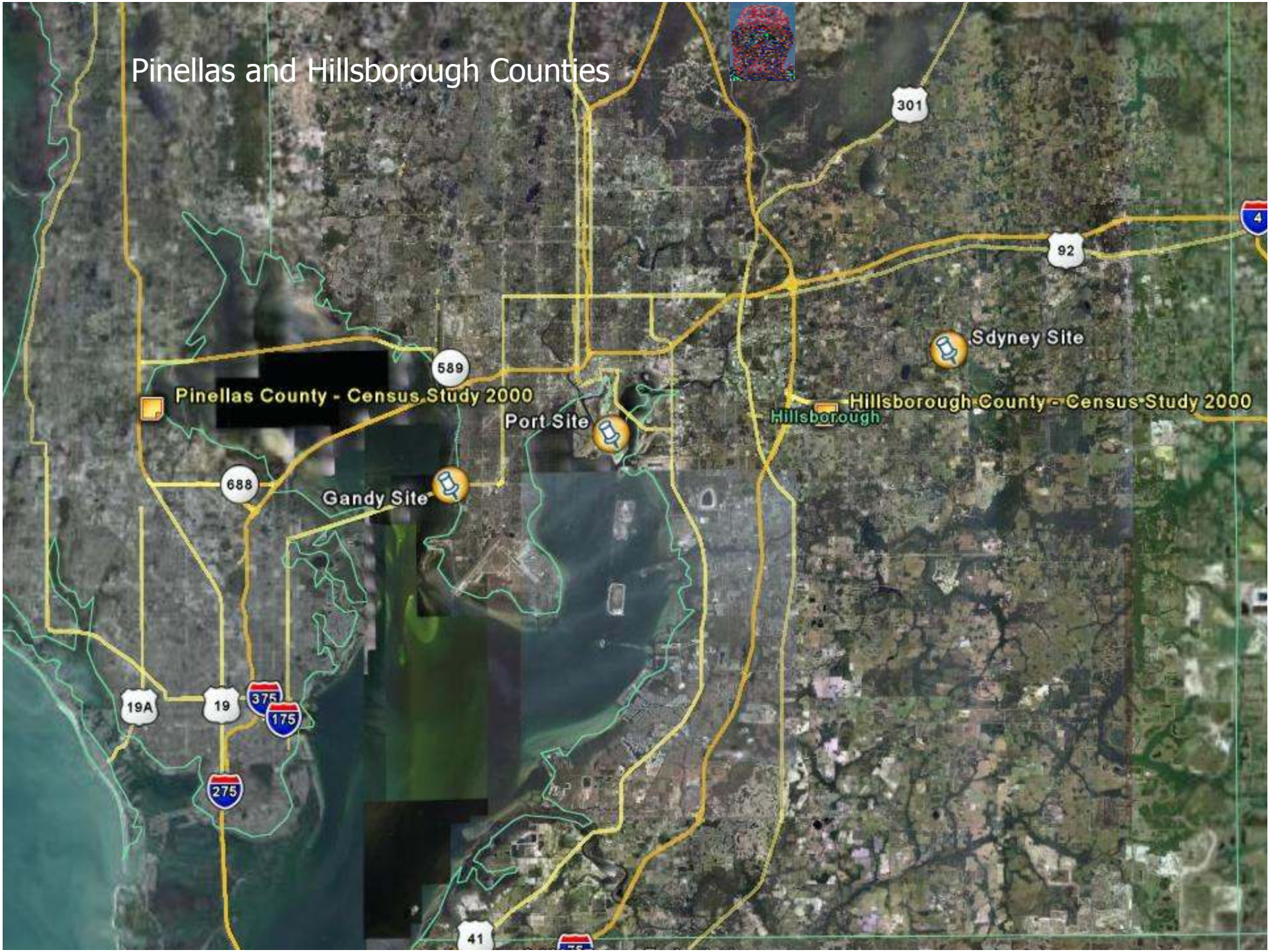
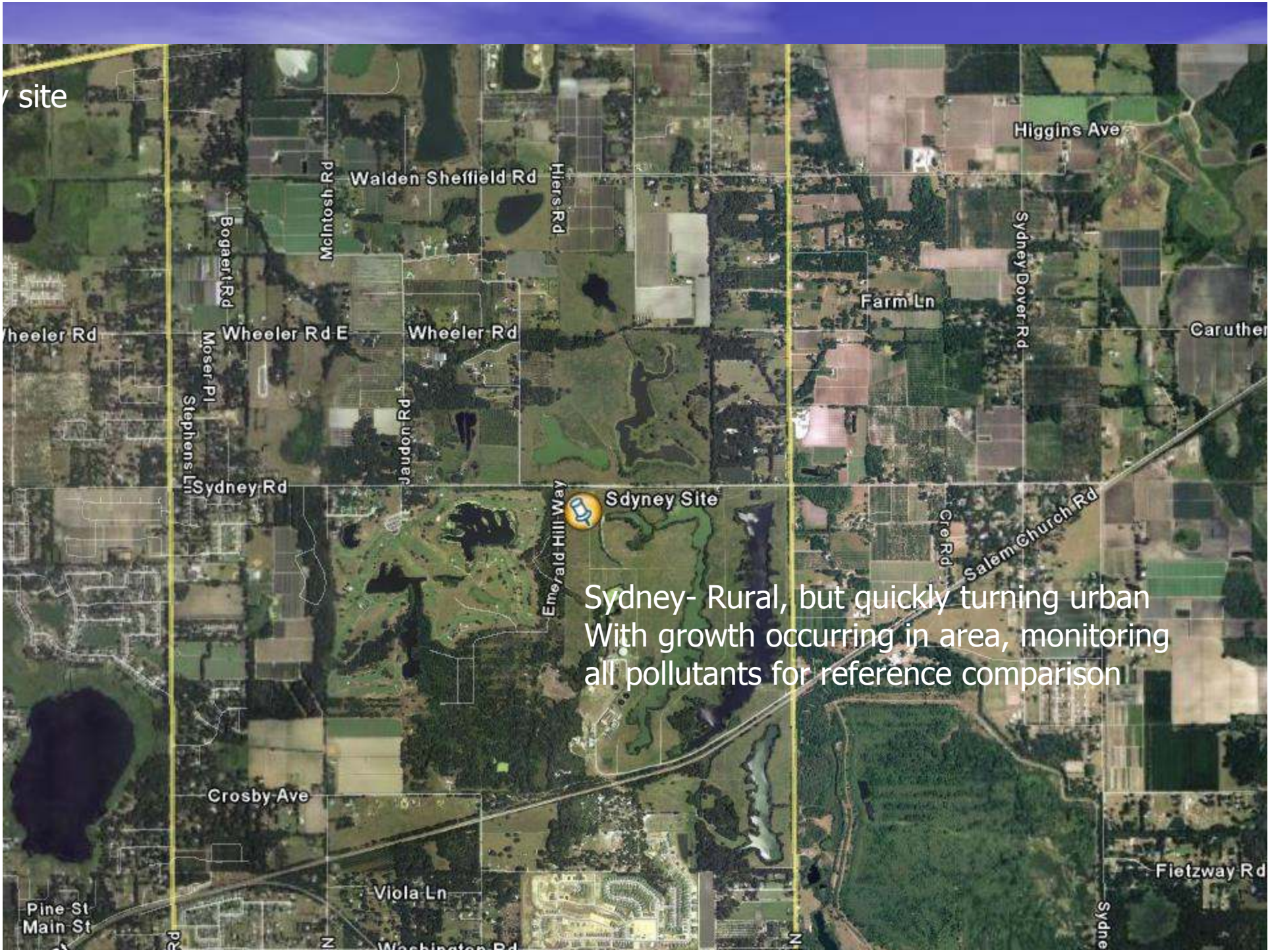

Pinellas and Hillsborough Counties
301
92
4
Sdyney Site
589
Pinellas County - Census Study 2000
Port Site
Hillsborough County - Census Study 2000
Hillsborough
688
Gandy Site
19A
19
375
175
275
41

Port of Tampa
Port- industrial- all pollutants, UV, FTIR
And FRM monitoring
Harbour
Island
Hookers Point
Davis Island

Gandy site- all pollutants, located at the USMC military base



Sydney- Rural, but quickly turning urban
With growth occurring in area, monitoring all pollutants for reference comparison

Barbados Ave
E Davis Blvd
Biscayne Ave
Chesapeake Ave
Huron Ave
Chippewa Ave
Cayuga Ave
Davis Islands
Trinidad Ave
Danube Ave
Luzon Ave
Hudson Ave
Marmora Ave
Riviera Dr
Severn Ave
Ontario Ave
S Davis Blvd
Lucerne Ave
W Davis Blvd
Ladrone Ave
McCloskey Blvd
Arias Ave
Shoreline Ave
Port Ave
Port Site
Guy N Verger Blvd
Galt Dr
Delmar B Drawdy Dr
Studebaker Dr
Maritime Blvd
Gas & ammonia storage and transport,
sewage treatment plant
Image © 2006 Sanborn
© 2006 Europa Technologies
© 2006 Navteq
55'13.70" N 82°26'20.30" W
Streaming 100%

Why is Tampa important?

- Tampa has a large range of point sources
  - Fuel oil fired power plant, large natural gas-fired power plant, 7 bulk petroleum, 3 shipbuilding and repair facilities, 4 liquid sulfur terminals/tank complexes, large wastewater treatment plant, waste incinerator and many other important emission sources
- Mobile sources are also considerate
- And the Tampa Bay Area is highly populated
  - 2004 Census reports Hillsborough County of 1.1 million
- Lots of pollution….

  ….and lots of people….

  ….can lead to health problems

- So….in 2004 EPA proposed the FY2004 Community –Based monitoring project.
  - EPC hypothesized that emissions from the Port might be harmful to the public
    - And set out to find….

"*Inhalation Risk Posed by Toxic Emissions from the Port of Tampa*"

- Focus of the study;
  - Investigate/compare monitoring systems
  - Determine if sources at Port pose a health threat
  - Identify the chemicals of concern

EPA Method	Core Pollutants	Additional HAPS	Additional HAPS
	Benzene	Methyl Chloride	Styrene
	1,3-butadiene	Methyl Bromide	O-xylene
	Carbon tetrachloride	Ethyl Chloride	1,4-dichlorobenzene
	Chloroform	1,1-dichloroethene	1,2,4-trichlorobenzene
	1,2-dichloropropane	1,1-dichloroethane	Hexachloro-1,3-butadiene
	Methylene Chloride	1,1,1-trichloroethane	Acrylonitrile
	Tetrachloroethene	1,1,2-trichloroethane	1,2-dibromoethane
	Trichloroethene	Toluene	cis-1,3-dichloropropene
	Vinyl Chloride	Chlorobenzene	trans-1,3-dichloropropene
		Ethylbenzene	1,2-dichloroethane
		M-xylene	1,1,2,2-tetrachloroethane
TO-15		P-xylene	
	Arsenic	Antimony	
	Beryllium	Cobalt	
	Cadmium	Selenium	
	Chromium (total)		
	Lead		
	Manganese		
IO-3	Nickel		
	Acetaldehyde	Propionaldehyde	
TO-11	Formaldehyde		
	Acrolein		
	Hexavalent Chromium		

Sites, equipment and chemicals

Site	Type area	Equipment	At site?	Fed approved ?	Chems. Monitored ?
PORT	Industrial	FTIR	yes	no	all
		UV	yes	no	all
		SO2	no	no	none
		NO2	no	no	none
		Ozone	yes	yes	Ozone
		VOC's	yes	yes	VOC's
GANDY	City Urban	FTIR	no	no	
		UV	no	no	
		SO2	yes	yes	SO2
		NO2	yes	yes	NO2
		Ozone	yes	yes	Ozone
		VOC's	yes	yes	VOC's
SYDNEY	Rural	FTIR	no	no	
		UV	yes	no	all
		SO2	yes	yes	SO2
		NO2	yes	yes	NO2
		Ozone	yes	yes	Ozone
		VOC's	yes	yes	VOC's

Monitoring Method Comparison: Open Path (FTIR & UV) vs. Fixed Monitor (FRM)

- Open Path Samplers
  - Fourier Transform Infra-Red (FTIR) Spectrometer
    - Air toxics, criteria pollutants
  - UV Sentry
    - Air toxics, criteria pollutants

FRM FTIR vs UV Sentry

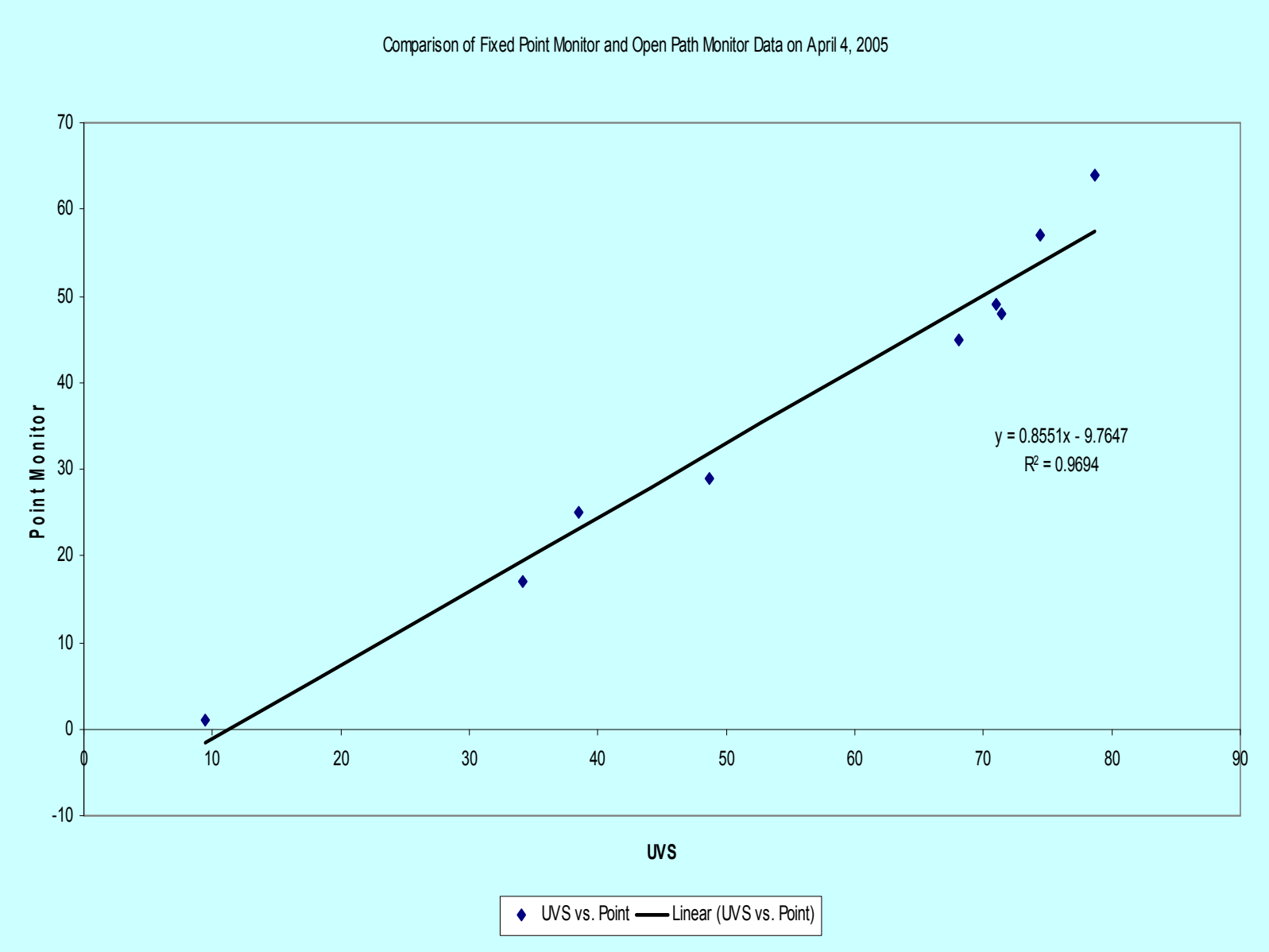
Method Comparison Con't

- Fixed Point Monitors (left)
  - Mobile monitoring unit

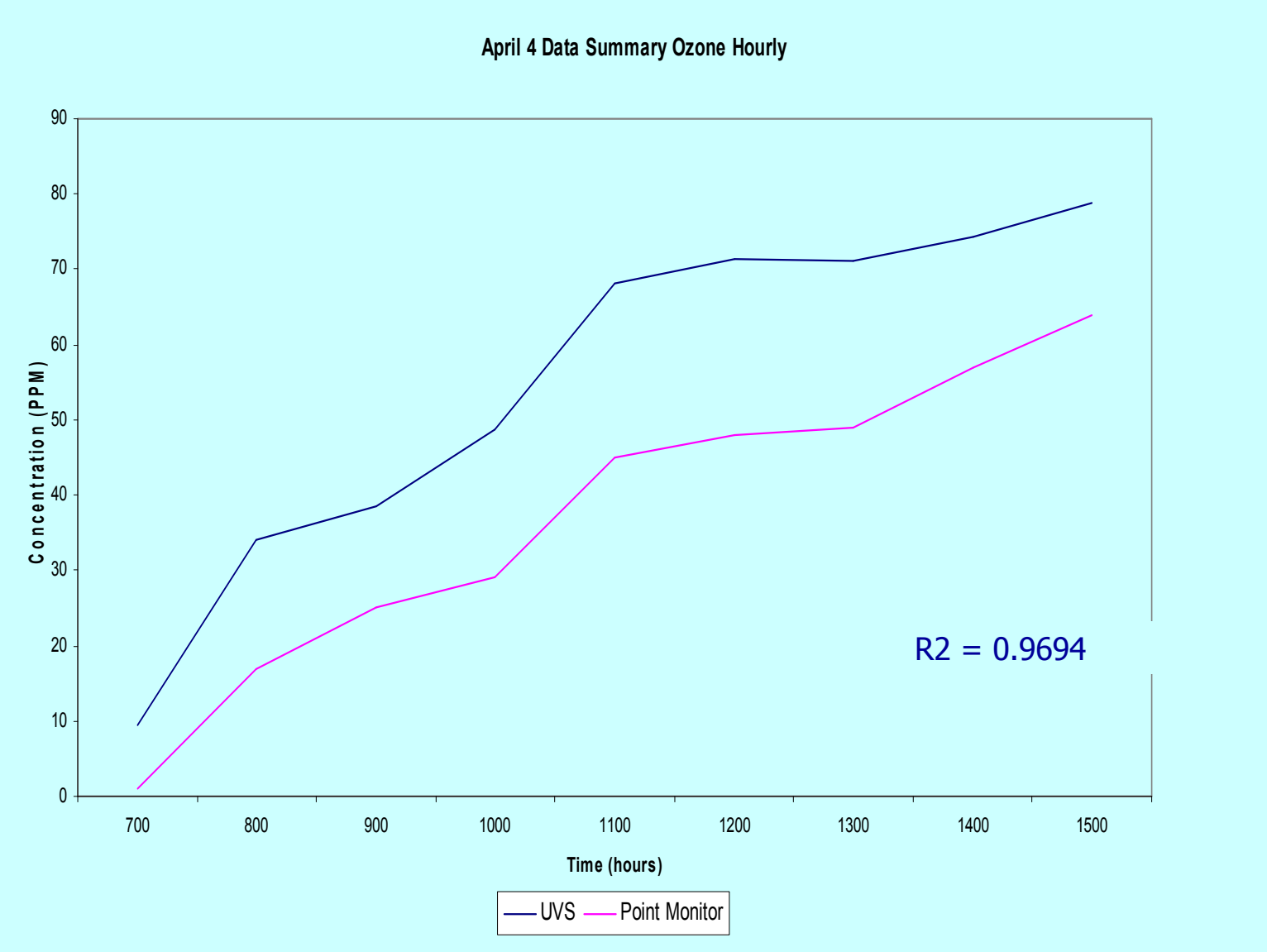
Compare the new techniques to older already approved techniques…

- Air Toxics Samplers
  - Using…Canisters and passive samplers
    - VOC's
  - Cylindrical gel cartridges
    - Carbonyl comps
  - Quartz filter media
    - Metals
  - Treated 47 mm filters
    - Hexavalent Chromium

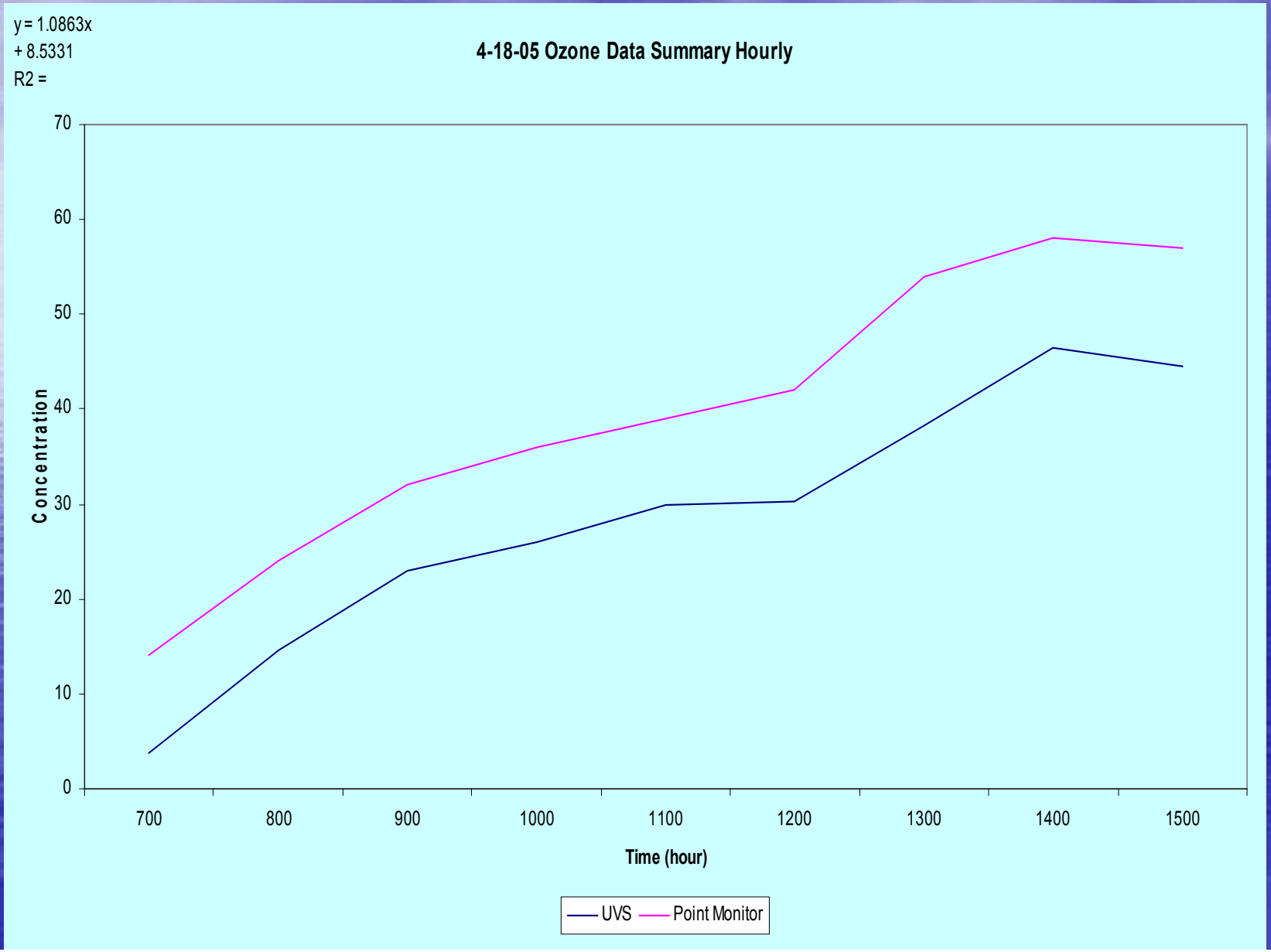
Equipment comparison…Fixed Point monitor and Open path monitor (UV)
Both track each other pretty well. R2 = 0.97



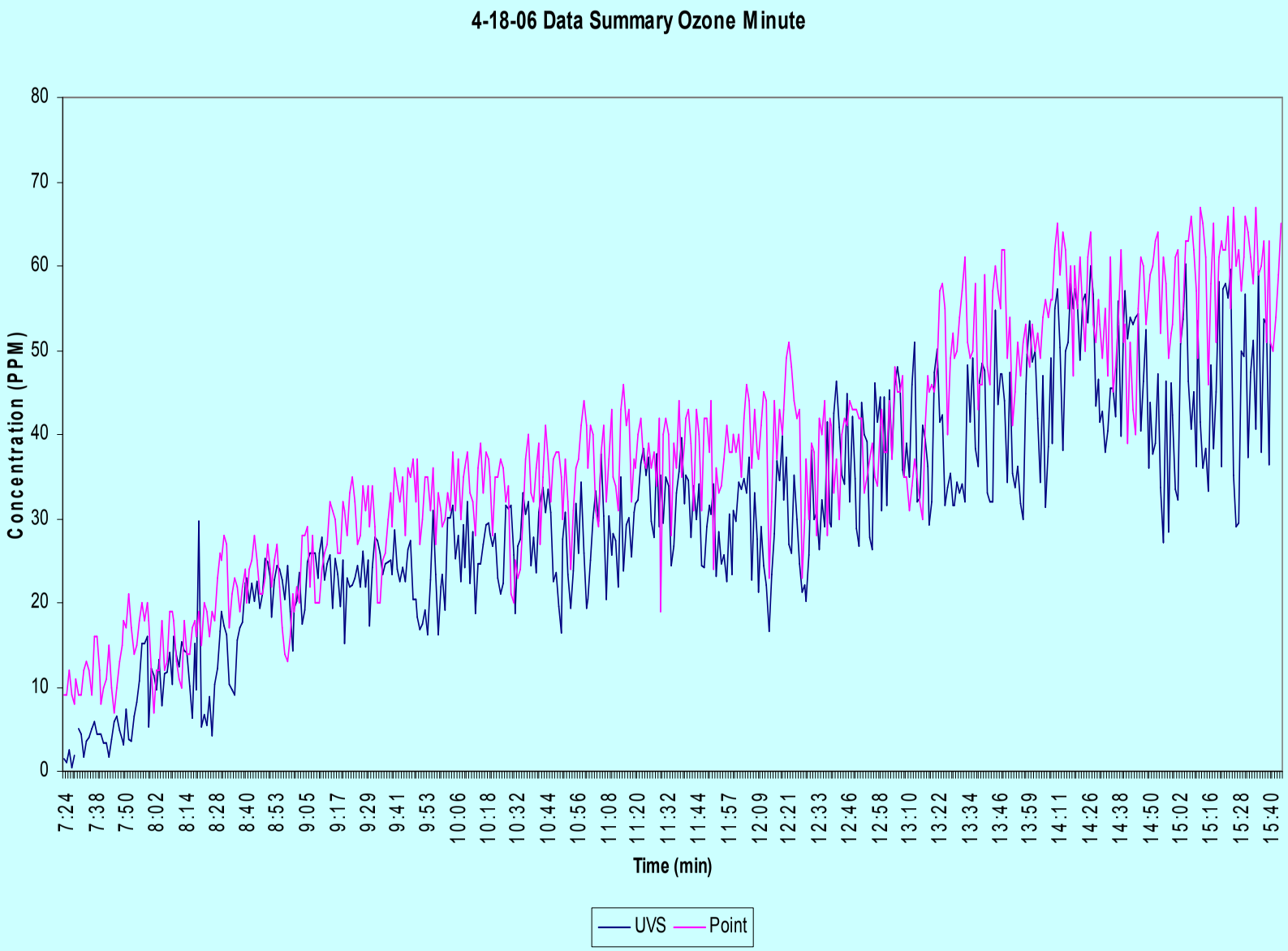
- Equipment comparison… Hourly ozone data from the two types of monitors, Fixed point and Open Path.
- Open path (blue) shows that there is ozone in the background reference spectrum being used by the UV system of about 10 ppm



… Hourly data on a different day.



… and a summary of minute data.



Additional work needed

- Data analysis completion and summary
- Intercomparison of open path method
- Risk assessment

And…
More pictures of our three Comparison sites…

- PORT
  - Industrial area
- GANDY
  - City Urban area
- SYDNEY
  - Rural area

ESC
Thermo
Thermo
Thermo Environmental Instruments Inc.
Thermo Environmental Instruments
ERG/C-8

CCA
FLORIDA

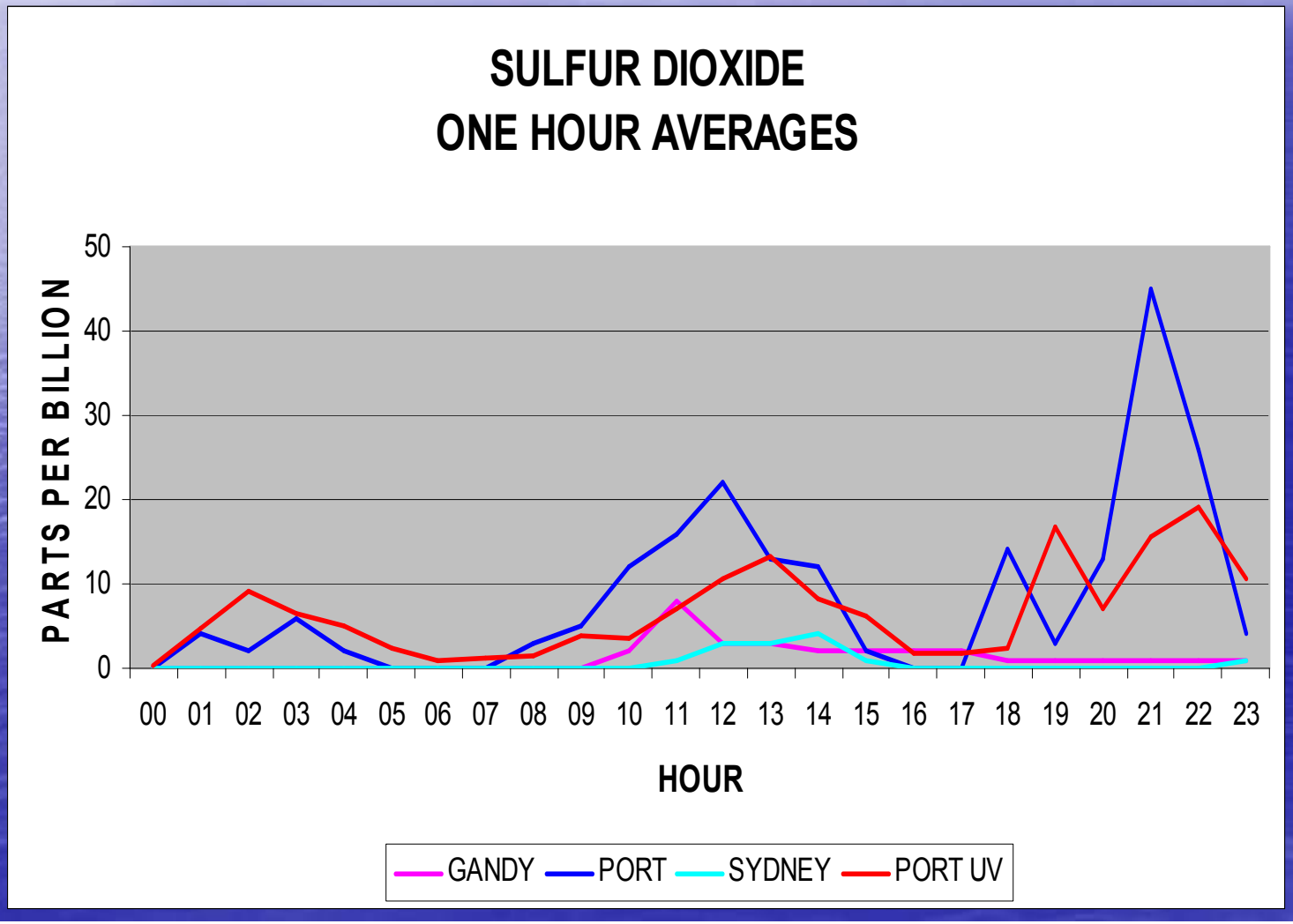
SO2 data from our 3 sites for Sept 16, 2005:

Gandy City urban

Sydney rural

Port industrial…appear to track well

No stats on data to see if differences in UV FRM and Open path are significant



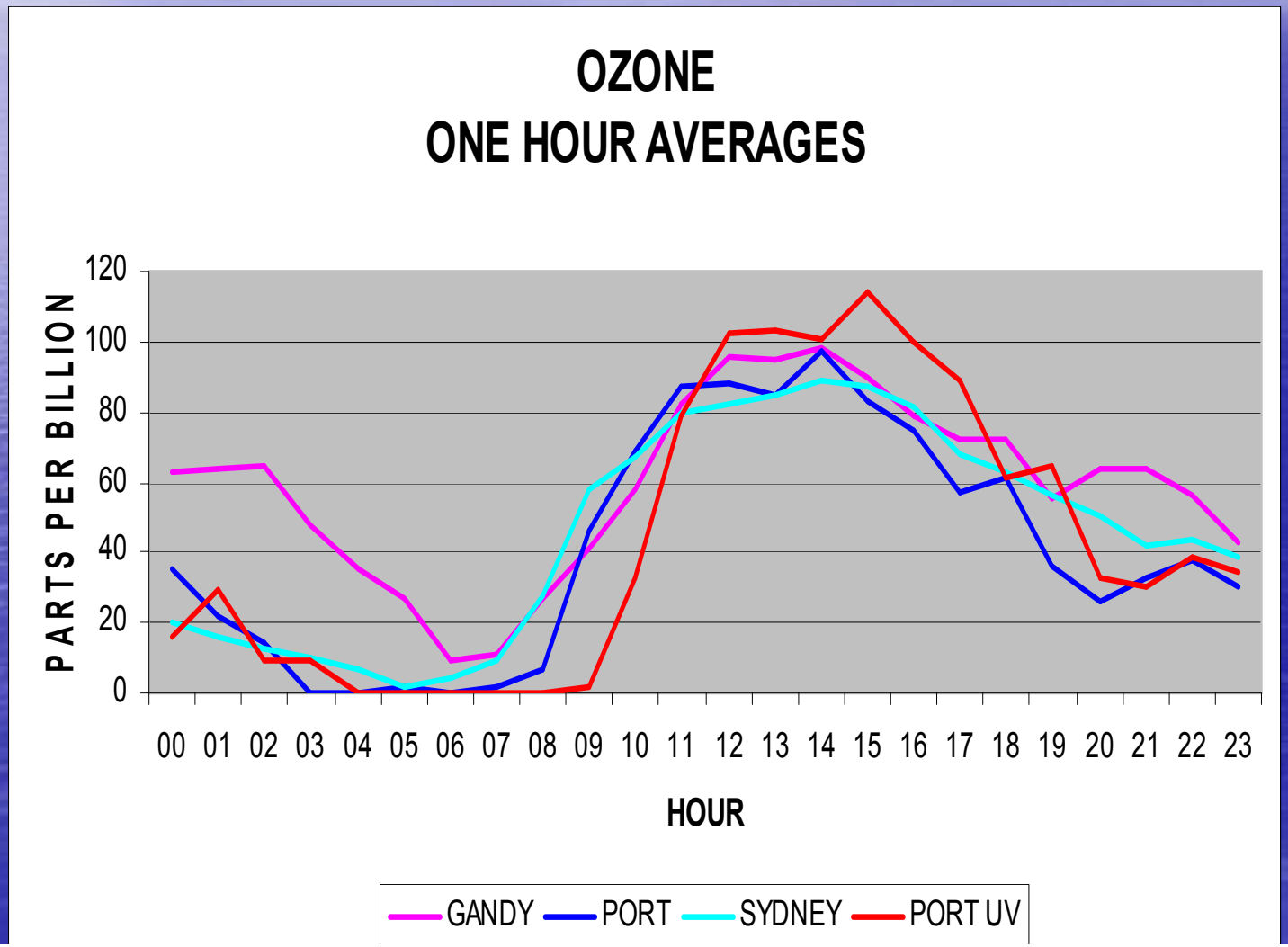
Again… last Friday's Ozone data from our 3 sites for Oct 24, 2005:

Gandy City urban

Sydney rural

Port industrial…also appear to track well

No stats on data to see if differences in UV FRM and Open path are significant



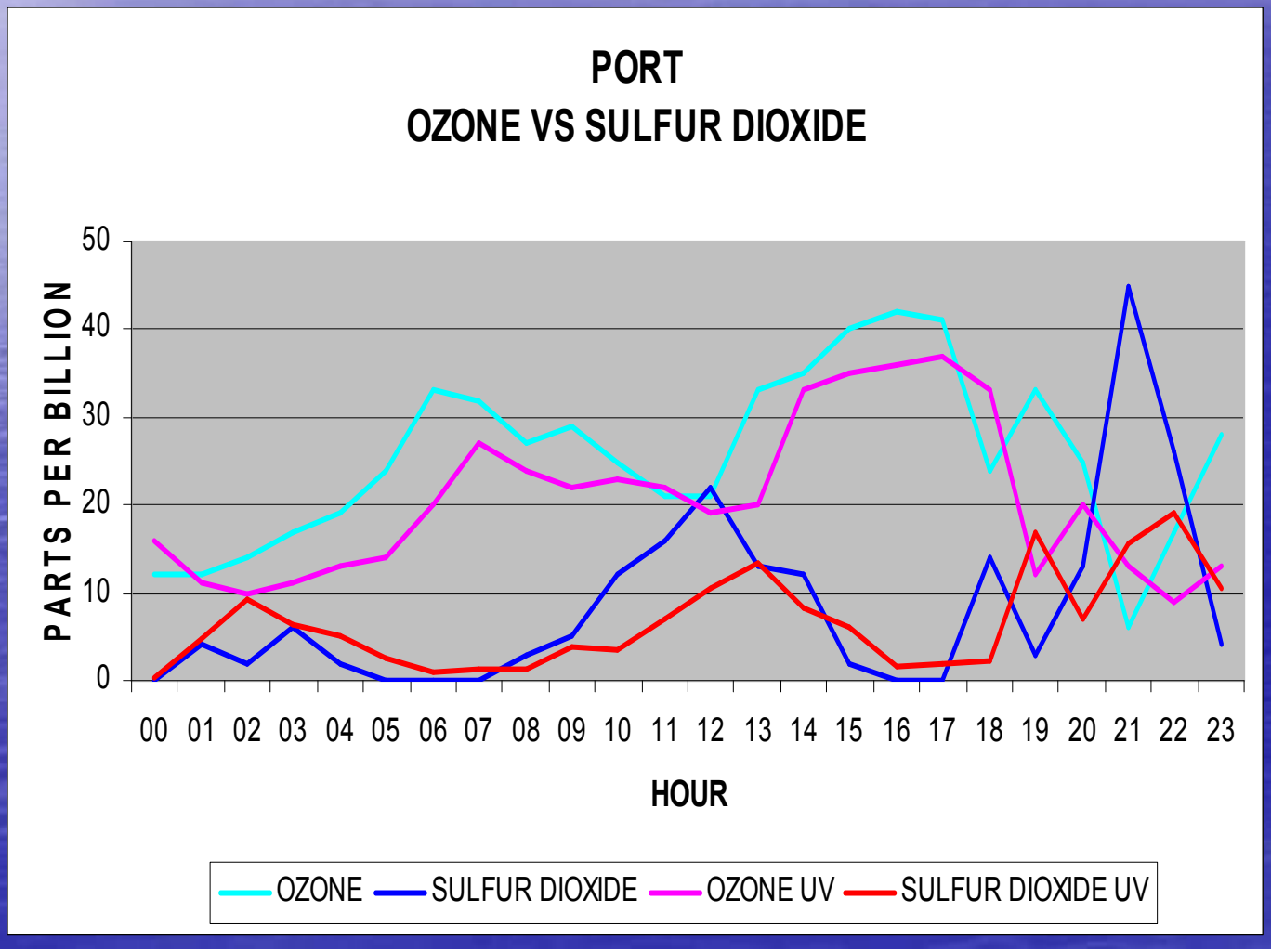
And our last graph…Ozone vs SO2 data from the PORT Oct 24, 2005:
Compares the fixed point monitor and the open path monitor;

SO2 fixed vs. open

Ozone fixed vs open

Shows interaction between Sulfur dioxide and Ozone

No stats on data to see if differences in UV FRM and Open path are significant



Additional work needed…

- Finish analysis on UV data
- FTIR data has not been evaluated yet
- Risk assessment

Thank you