US EPA ARCHIVE DOCUMENT

Creation of an Air Quality Database for Health Effects Studies

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Health Effects Institute

- An independent, non-profit organization established in 1980
- Funded jointly by the EPA and industrial sponsors (predominantly car and engine manufacturers)
- Mission to fund research and health effects of mobile source-derived air pollutants.

One Aspect of the HEI Strategic Plan

Develop a program to systematically address which components and characteristics of the ambient PM mixture (and which sources) are the major contributors to the health effects of PM.

HEI's approach

1. Create a database of air pollutant and other information relevant for health studies (RFP December 2003).

2. Hold workshop to discuss study design issues for multi-site epi and parallel tox studies (August 2004).

3. Issue RFA to fund multi-site epi and/or tox studies (RFA 05-1A and B, July 2005).

HEI Air Quality Database for Health Effects Studies

Website/database http://hei.aer.com

released September 2005

Information compiled by Atmospheric and Environmental Research Inc, San Ramon California

Christian Seigneur, Betty Pun,
S.-Y. Chen, M. Sze

Information in HEI Air Quality Database

EPA's Speciation Trends Network (2000-2004)

EPA's AQS PM Air Quality Data

- Site characteristics
- Ambient measurements of $PM_{2.5}$ and components

Gases SO_2, O_3, NO_x, CO (2000-2004)

- AQS

Local population (2000)

- Census Population Data

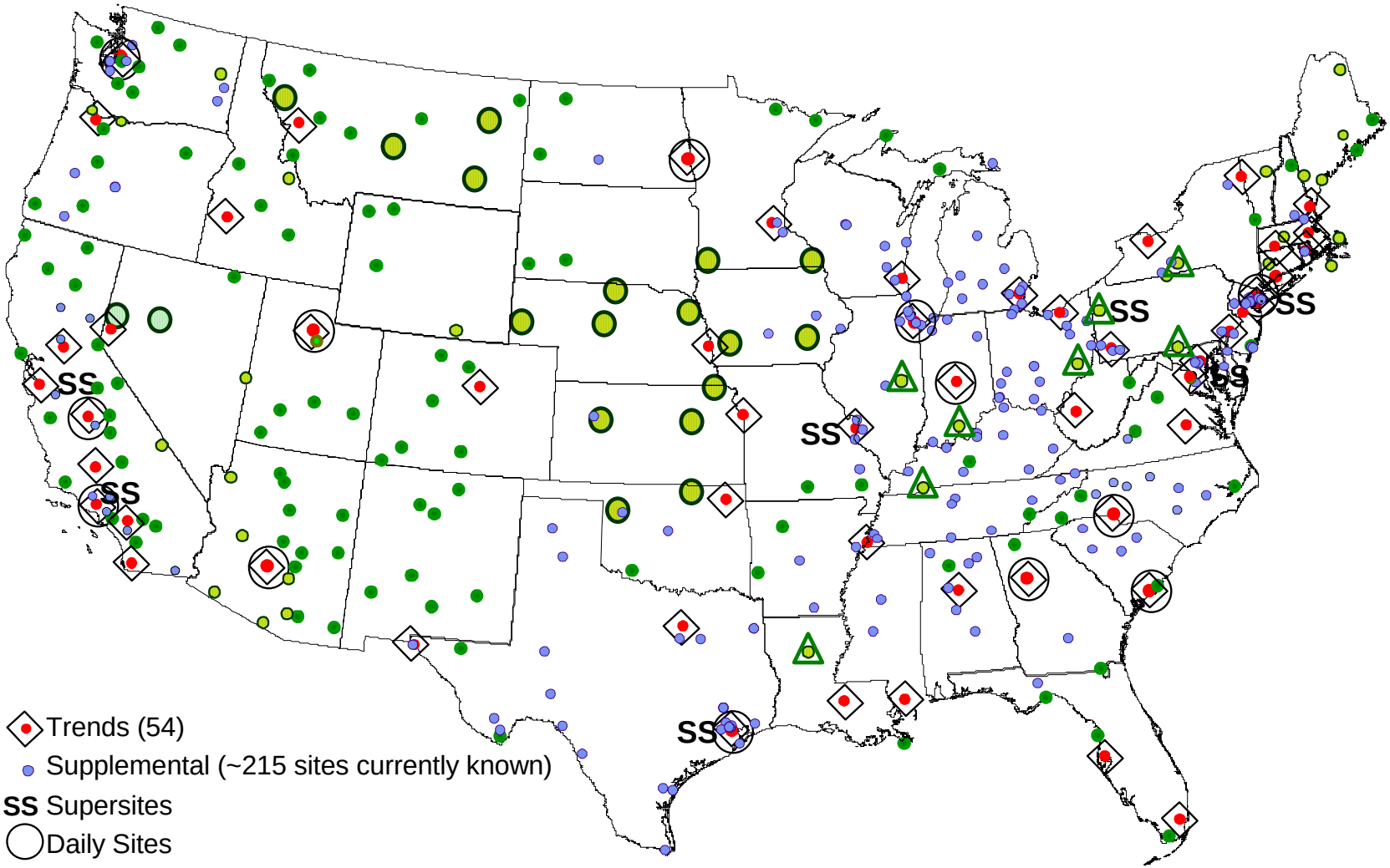
Local emissions (1999)

- National Emission Inventory $PM_{2.5}$ Emission Inventory Data

Meteorology (2000-2004)

- EPA or NCDC

Current/Planned
Urban & Rural $PM_{2.5}$ Speciation Networks



01/02

Core STN is geared towards population exposure monitoring

Monitoring Purpose

- Population exposure: 27 sites (50%)
- Population exposure + other: 7 sites (14%)
- Highest concentration: 5 sites (9%)
- Other: 14 sites (26%)

Setting

- Urban: 25 sites (46%)
- Suburban: 26 sites (48%)
- Rural: 2 sites (4%)

Land use

- Commercial: 19 sites (35%)
- Residential: 28 sites (52%)
- Agricultural + industrial + mobile: 6 sites (12%)

Some STN sites have co-located gaseous pollutant measurements

Ozone: 34 sites (63%)

NO_x: 28 sites (52%)

CO: 25 sites (46%)

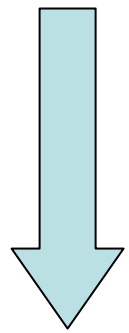
SO_2: 17 sites (31%)

All 4 pollutants: 11 sites (20%)

None of the 4 pollutants: 16 sites (30%)

PM measurements at STN sites

- $PM_{2.5}$ mass
- Ions: sulfate, nitrate, ammonium
- Carbon: elemental (black) and organic
- Elements
  - Ca, Cu, Fe, K, Mn, Si, S, Zn
  - Al, Br, Cr, Pb, Ni, Se, Ti, V
  - As, Ba, Cl, Mg, Na, P, Sb, Sn
  - 24 others



Increasing uncertainty

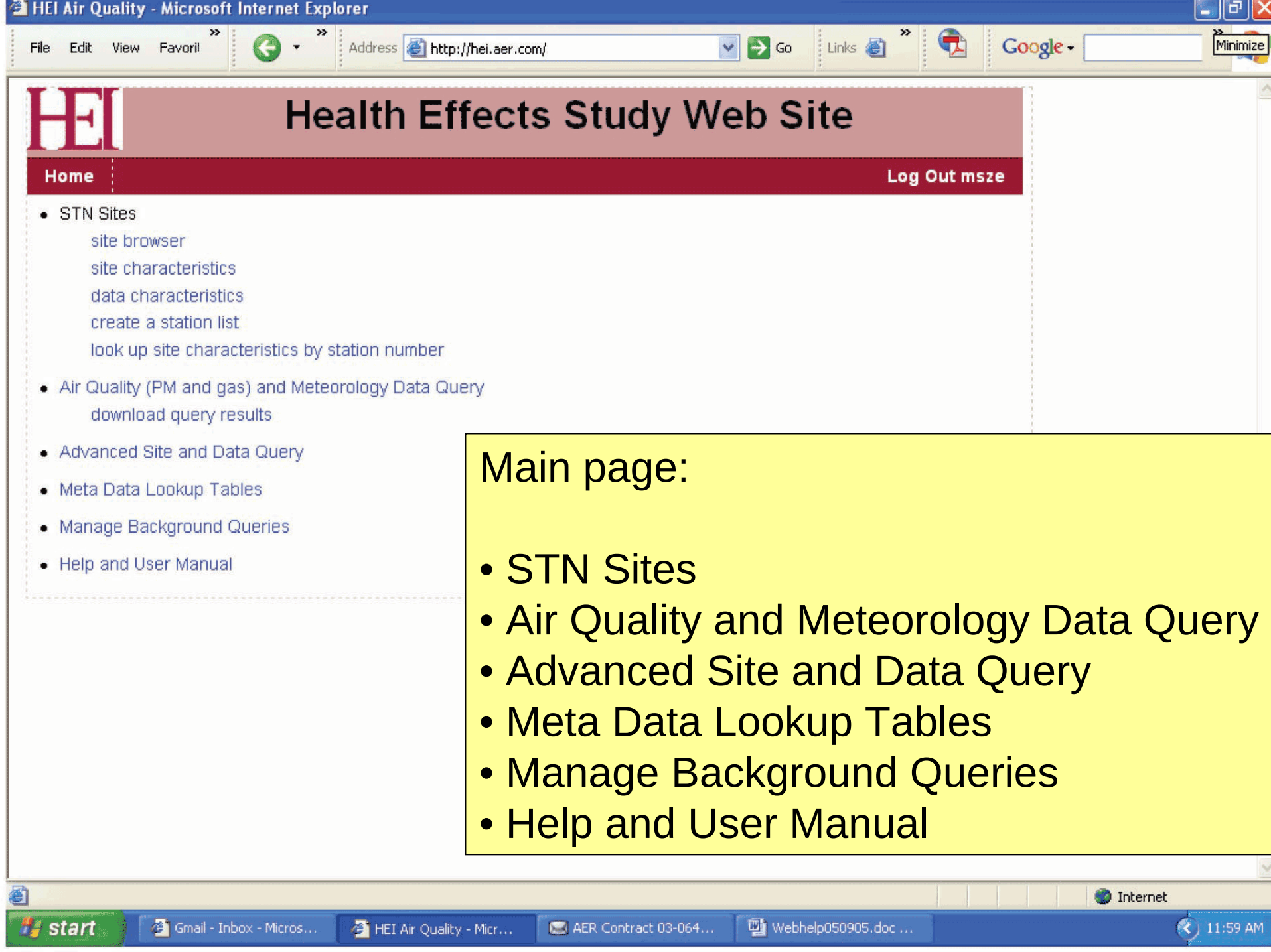
Accessing the HEI Air Quality Database

Contact Betty Pun at AER

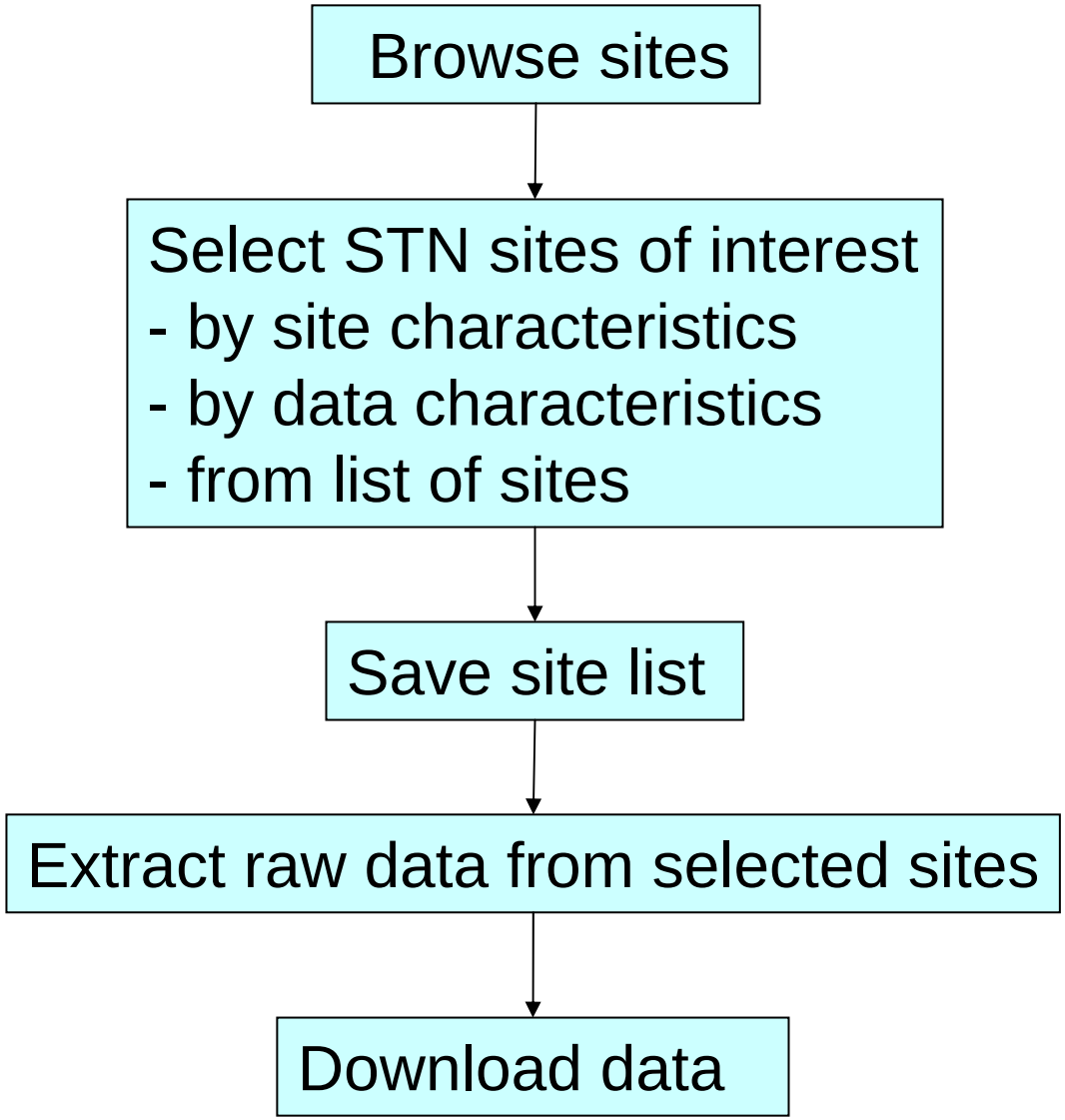
pun@aer.com (925) 244-7125

to obtain log-in information and password

Go to: http://hei.aer.com


HEI Air Quality - Microsoft Internet Explorer
File Edit View Favoril
Address http://hei.aer.com/
Go
Links
Google
Minimize
HEI
Health Effects Study Web Site
Home
Log Out msze
STN Sites
site browser
site characteristics
data characteristics
create a station list
look up site characteristics by station number
Air Quality (PM and gas) and Meteorology Data Query
download query results
Advanced Site and Data Query
Meta Data Lookup Tables
Manage Background Queries
Help and User Manual
Main page:
• STN Sites
• Air Quality and Meteorology Data Query
• Advanced Site and Data Query
• Meta Data Lookup Tables
• Manage Background Queries
• Help and User Manual
Internet
start
Gmail - Inbox - Micros...
HEI Air Quality - Micr...
AER Contract 03-064...
Webhelp050905.doc ...
11:59 AM

STEPS TO OBTAINING DATA



Site Browser: Map - Microsoft Internet Explorer

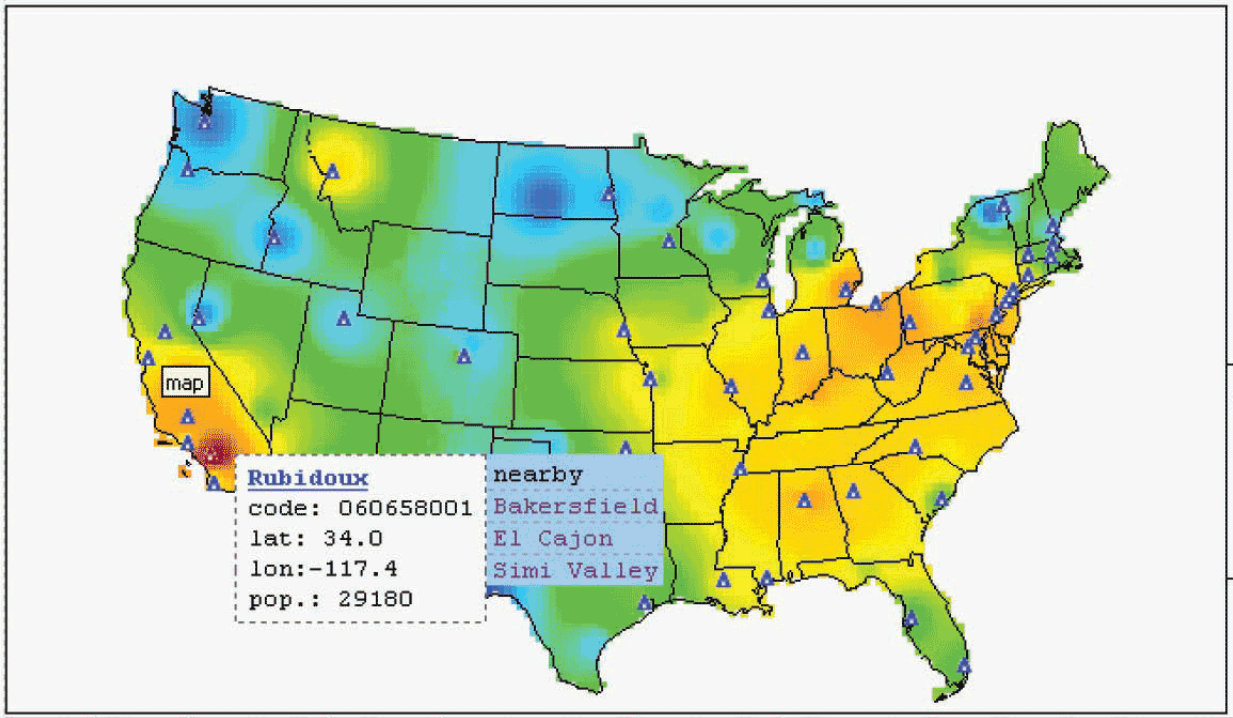
File | Address http://hei.aer.com/ll2xy.php?p=FPM | Go | Links | Google

Health Effects Study Web Site

Home | Log Out bpun

Site Browser: FPM map

(2003 average concentration in $\mu g/m^3$)



site browser help

- all sites
- core sites

(please note: the display of all sites may be slow)

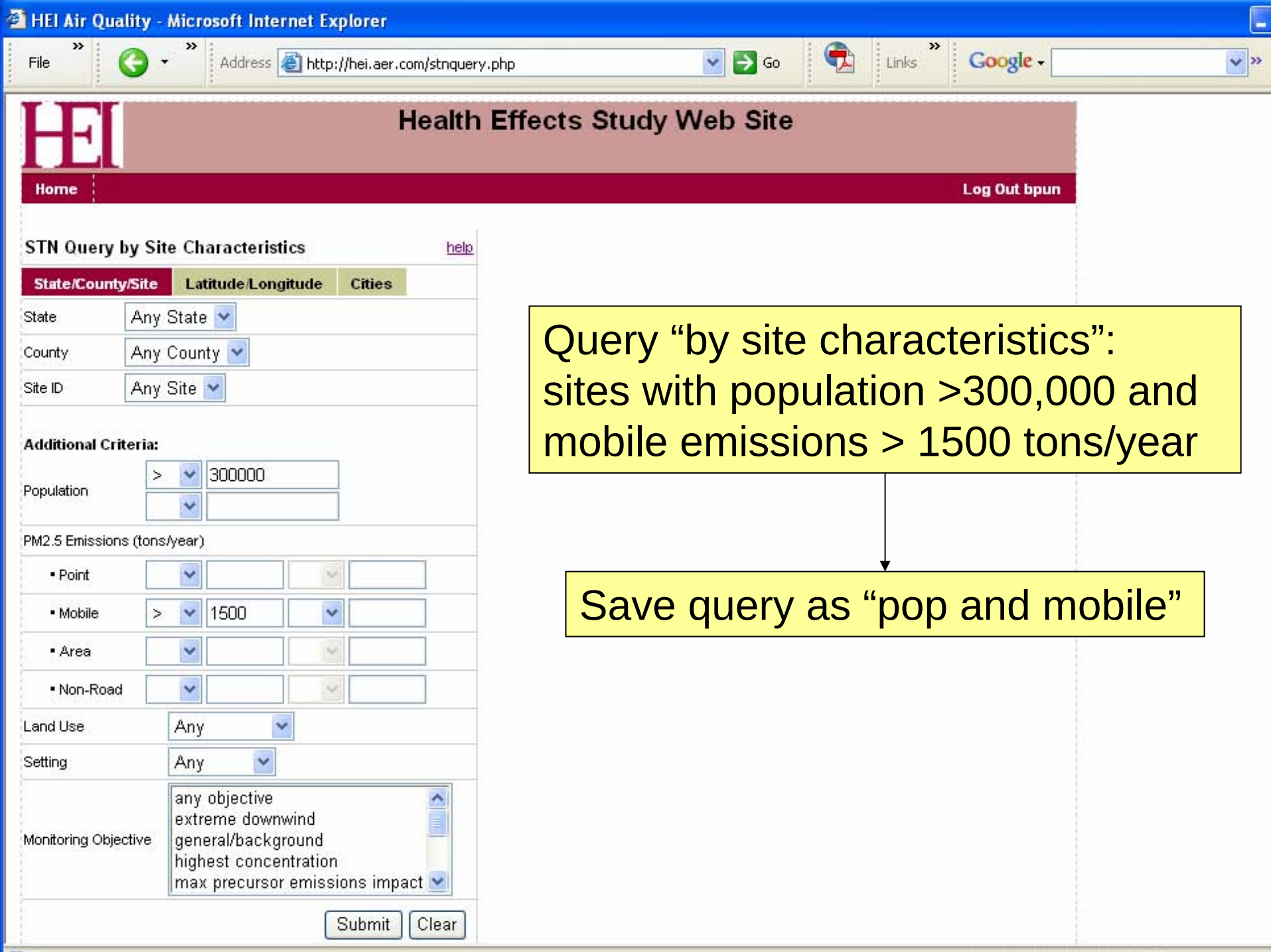
FPM_map_all by _COL4

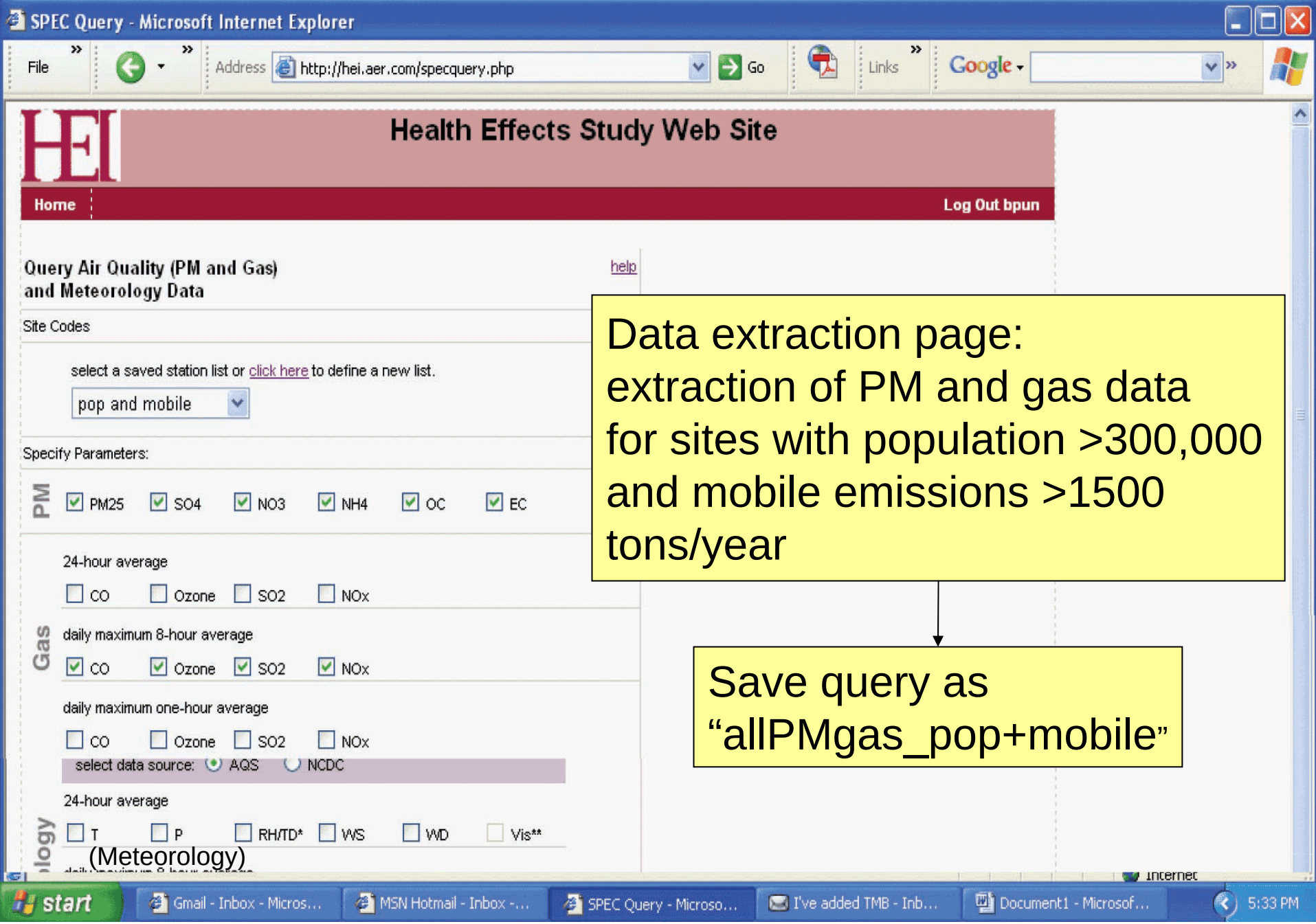
- 23.7
- 13.6
- 11.3
- 9.9
- 4.9

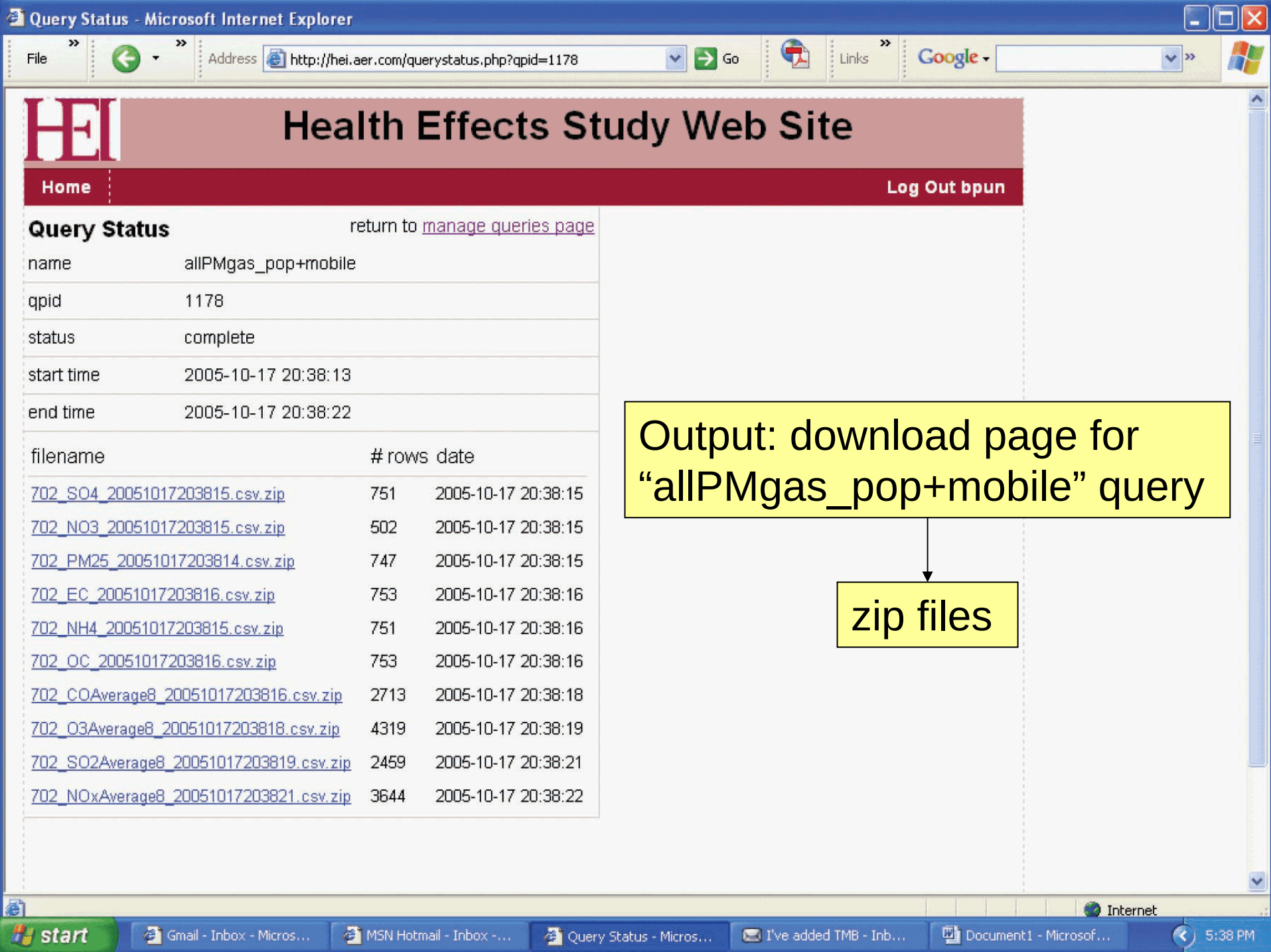
EC | OC | nitrate | FPM | ammonium | sulfate

Done | Internet

start | Gmail - Inbox - Micros... | MSN Hotmail - Inbox -... | Site Browser: Map - ... | I've added TMB - Inb... | Document1 - Microsof... | 5:24 PM


HEI Air Quality - Microsoft Internet Explorer
File
Address
http://hei.aer.com/stnquery.php
Go
Links
Google
Health Effects Study Web Site
Home
Log Out bpun
STN Query by Site Characteristics
help
State/County/Site
Latitude/Longitude
Cities
State
Any State
County
Any County
Site ID
Any Site
Additional Criteria:
Population
>
300000
PM2.5 Emissions (tons/year)
• Point
• Mobile
>
1500
• Area
• Non-Road
Land Use
Any
Setting
Any
Monitoring Objective
any objective
extreme downwind
general/background
highest concentration
max precursor emissions impact
Submit
Clear
Query “by site characteristics”: sites with population >300,000 and mobile emissions > 1500 tons/year
Save query as “pop and mobile”


SPEC Query - Microsoft Internet Explorer
File
Address
http://hei.aer.com/specquery.php
Go
Links
Google
Health Effects Study Web Site
Home
Log Out bpun
Query Air Quality (PM and Gas) and Meteorology Data
help
Site Codes
select a saved station list or click here to define a new list.
pop and mobile
Specify Parameters:
PM
PM25
SO4
NO3
NH4
OC
EC
Gas
24-hour average
CO
Ozone
SO2
NOx
daily maximum 8-hour average
CO
Ozone
SO2
NOx
daily maximum one-hour average
CO
Ozone
SO2
NOx
select data source: AQS NCDC
24-hour average
T
P
RH/TD*
WS
WD
Vis**
(Meteorology)
Data extraction page: extraction of PM and gas data for sites with population >300,000 and mobile emissions >1500 tons/year
Save query as "allPMgas_pop+mobile"
start
Gmail - Inbox - Micros...
MSN Hotmail - Inbox -...
SPEC Query - Microso...
I've added TMB - Inb...
Document1 - Microsof...
5:33 PM


Query Status - Microsoft Internet Explorer
File
Address
http://hei.aer.com/querystatus.php?qpid=1178
Go
Links
Google
Health Effects Study Web Site
Home
Log Out bpun
Query Status
return to manage queries page
name allPMgas_pop+mobile
qpid 1178
status complete
start time 2005-10-17 20:38:13
end time 2005-10-17 20:38:22
filename # rows date
702_SO4_20051017203815.csv.zip 751 2005-10-17 20:38:15
702_NO3_20051017203815.csv.zip 502 2005-10-17 20:38:15
702_PM25_20051017203814.csv.zip 747 2005-10-17 20:38:15
702_EC_20051017203816.csv.zip 753 2005-10-17 20:38:16
702_NH4_20051017203815.csv.zip 751 2005-10-17 20:38:16
702_OC_20051017203816.csv.zip 753 2005-10-17 20:38:16
702_COAverage8_20051017203816.csv.zip 2713 2005-10-17 20:38:18
702_O3Average8_20051017203818.csv.zip 4319 2005-10-17 20:38:19
702_SO2Average8_20051017203819.csv.zip 2459 2005-10-17 20:38:21
702_NOxAverage8_20051017203821.csv.zip 3644 2005-10-17 20:38:22
Output: download page for “allPMgas_pop+mobile” query
zip files
Internet
start
Gmail - Inbox - Micros...
MSN Hotmail - Inbox -...
Query Status - Micros...
I've added TMB - Inb...
Document1 - Microsof...
5:38 PM

HEI Air Quality Database for health effects studies

- Funding anticipated through 2007
- Available for investigators applying to RFA 05-1 and other epi/tox studies