

# Air Pollution Modeling

## What you need to Know about Criteria Pollutant and Air Toxics Modeling

CAPCA – Fall 2004

Nuts and Bolts -- Air Pollution  
Modeling

# Step 1

- What are your emissions?
  - NAAQS (CO, NO<sub>x</sub>, SO<sub>2</sub>, TSP, PM<sub>10</sub>, PM<sub>2.5</sub>, O<sub>3</sub><sup>\*</sup>)
  - State List of Air Toxics
    - Each state has separate list
    - Each state has different thresholds

MEK -- NC, 78 lbs/day

-- SC, 177 lbs/day

## Step 2

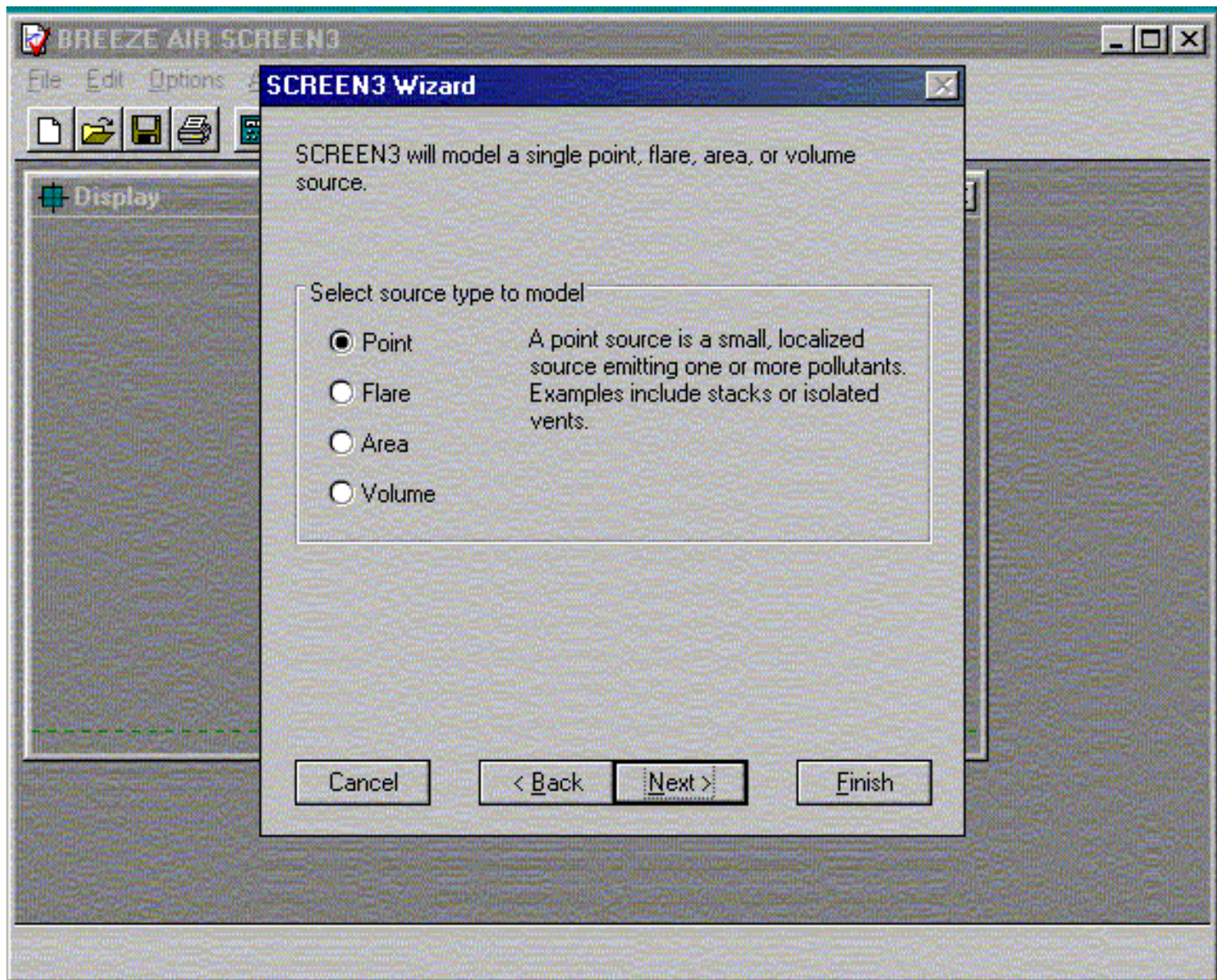
- If you have these emissions --
  - That impact NAAQS beyond property boundaries or
  - That create levels above ...
    - NC -- AAL
    - SC -- MAAC
  - Then modeling may be needed to insure no significant impact

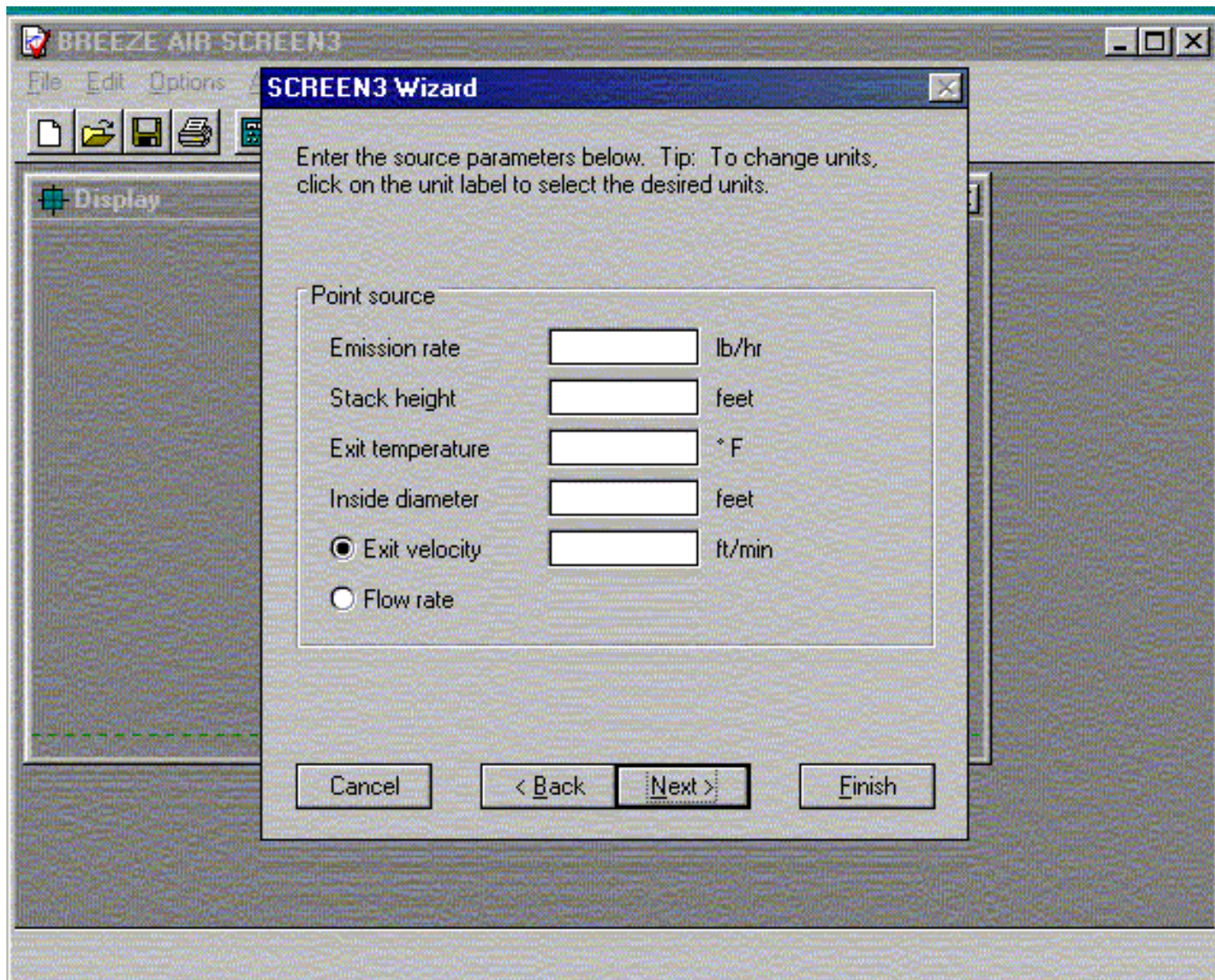
# Step 3

- If you have these emissions --
  - That impact NAAQS beyond property boundaries or
  - That create levels above ...
    - NC -- AAL
    - SC -- MAAC
  - Then modeling may be needed to insure no significant impact (below NAAQS or state toxics level)

# Step 4

- Do some modeling!!!
  - Computer programs from EPA and other vendors (See vendors in Exhibition Hall!)
  - Gather needed data
  - Run model -- see what happens
    - Always start with SCREEN3
    - Then get more sophisticated -- ISCST3, AERMOD, etc.





```

BREEZE AIR SCREEN3 - MATEAM1.DAT - [Output File - MATEAM1.LST]
File Edit Options Analysis Tools Window Help
06/23/97
10:44:05

*** SCREEN3r MODEL RUN ***
*** VERSION DATED 96043 ***

MATTHEWS, EPI-001, ETHYL ACETATE, MAX LOADING ** 142.9512

SIMPLE TERRAIN INPUTS:
SOURCE TYPE = POINT
EMISSION RATE (G/S) = 26.2076
STACK HEIGHT (M) = 20.1168
STK INSIDE DIAM (M) = 2.4384
STK EXIT VELOCITY (M/S) = 10.1102
STK GAS EXIT TEMP (K) = 463.7056
AMBIENT AIR TEMP (K) = 293.0000
RECEPTOR HEIGHT (M) = .0000
URBAN/RURAL OPTION = URBAN
BUILDING HEIGHT (M) = 7.9248
MIN HORIZ BLDG DIM (M) = 148.2242
MAX HORIZ BLDG DIM (M) = 212.5980

THE REGULATORY (DEFAULT) MIXING HEIGHT OPTION WAS SELECTED.
THE REGULATORY (DEFAULT) ANEMOMETER HEIGHT OF 10.0 METERS WAS ENTERED.

BUOY. FLUX = 54.252 M**4/S**3; MOM. FLUX = 96.006 M**4/S**2.

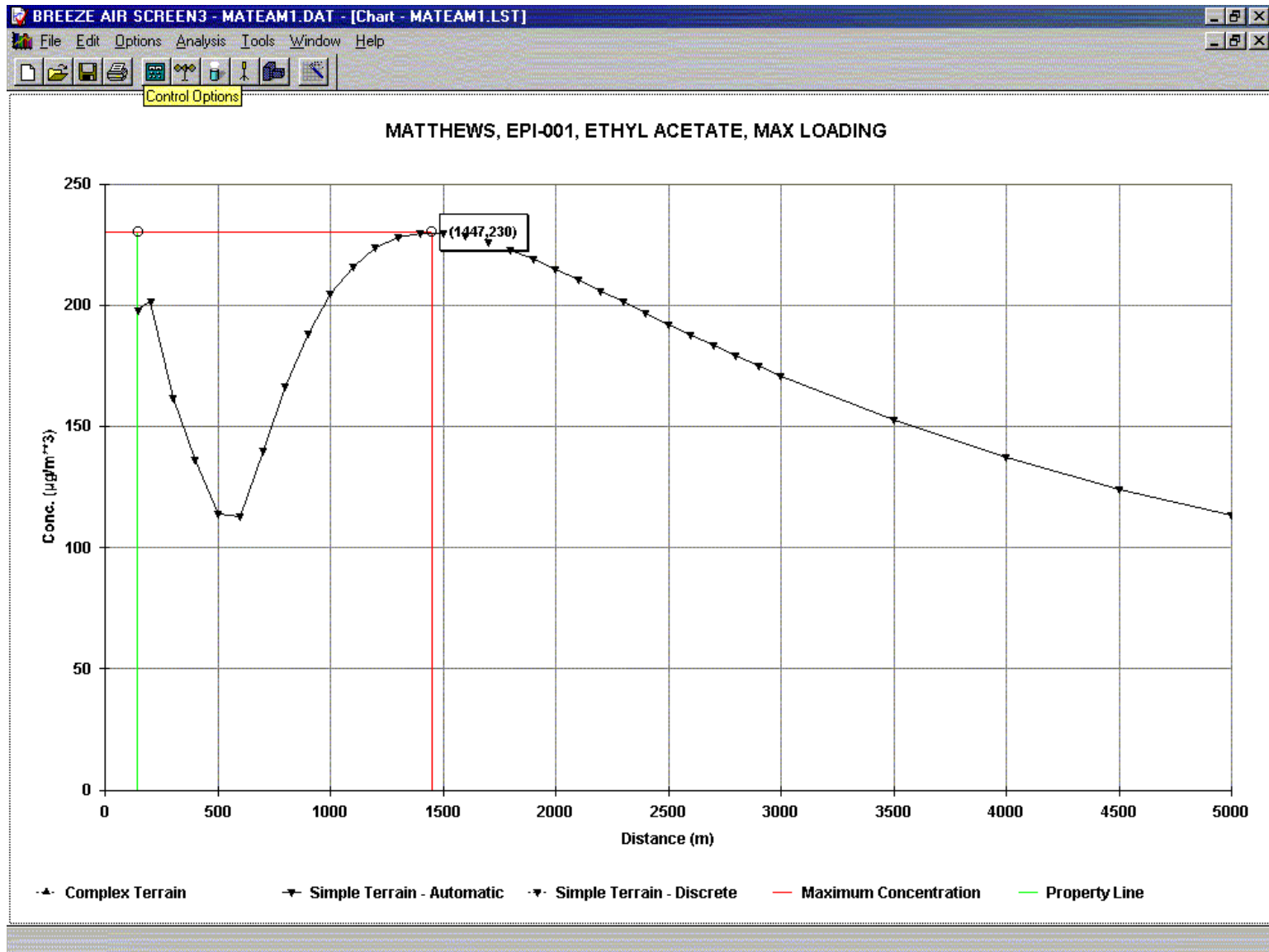
*** FULL METEOROLOGY ***

*****
*** SCREEN AUTOMATED DISTANCES ***
*****

*** TERRAIN HEIGHT OF 0. M ABOVE STACK BASE USED FOR FOLLOWING DISTANCES ***

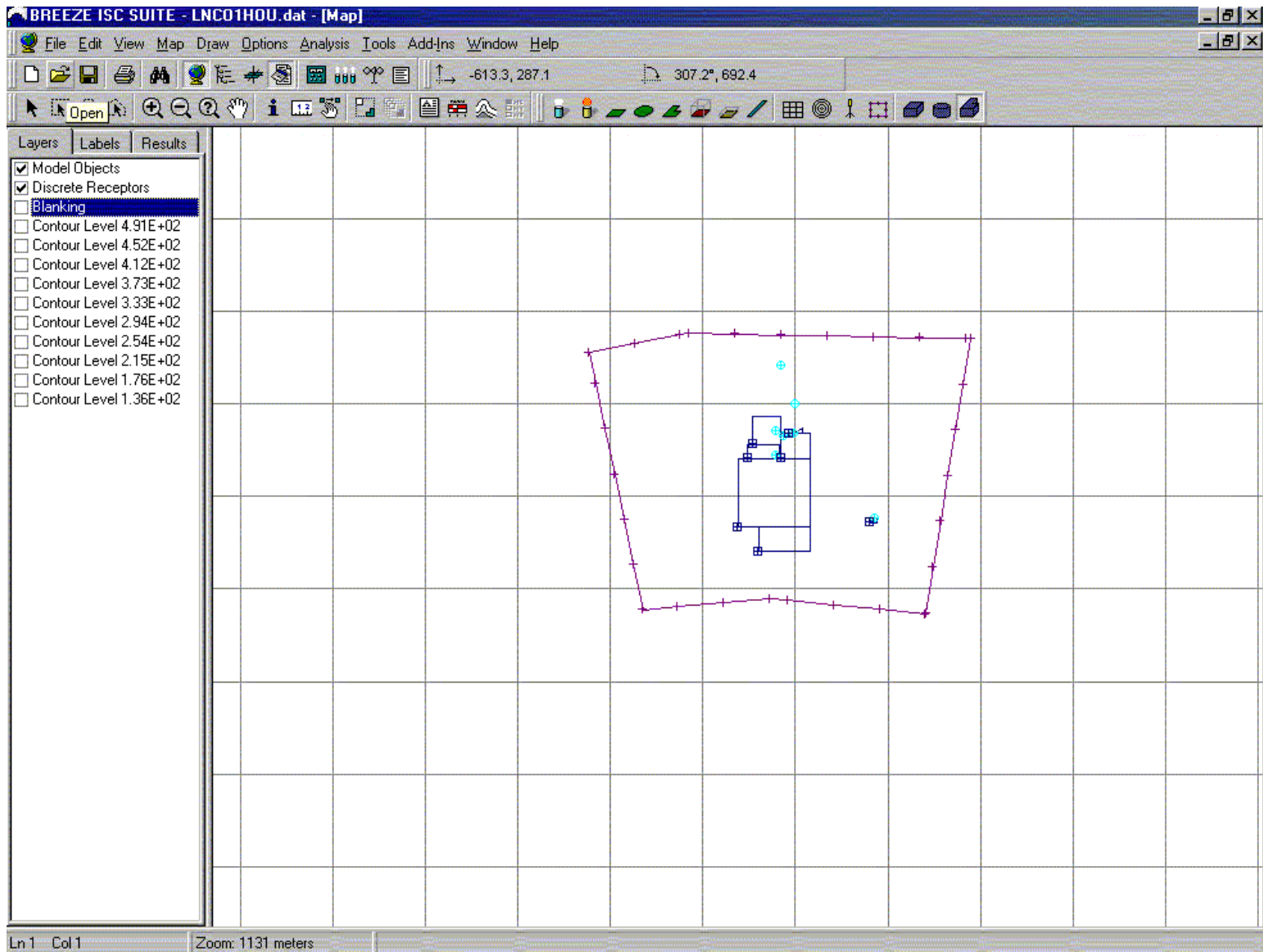
DIST CONC U10M USTK MIX HT PLUME SIGMA SIGMA
(M) (UG/M**3) STAB (M/S) (M/S) (M) HT (M) Y (M) Z (M) DWASH
-----
143. 198.1 4 20.0 23.8 6400.0 32.85 22.33 19.70
200. 201.3 4 20.0 23.8 6400.0 32.85 30.89 27.31
300. 161.5 4 10.0 11.9 3200.0 52.90 45.82 40.75
400. 136.3 4 8.0 9.5 2560.0 62.93 60.24 53.83
500. 113.9 4 8.0 9.5 2560.0 62.93 73.92 66.27
600. 112.8 6 2.0 2.5 10000.0 89.22 62.47 40.03
700. 140.0 6 1.5 1.8 10000.0 96.18 71.44 44.74
800. 166.5 6 1.0 1.2 10000.0 107.18 80.53 49.81
900. 188.3 6 1.0 1.2 10000.0 107.18 88.46 53.15
1000. 204.6 6 1.0 1.2 10000.0 107.18 96.24 56.38

```

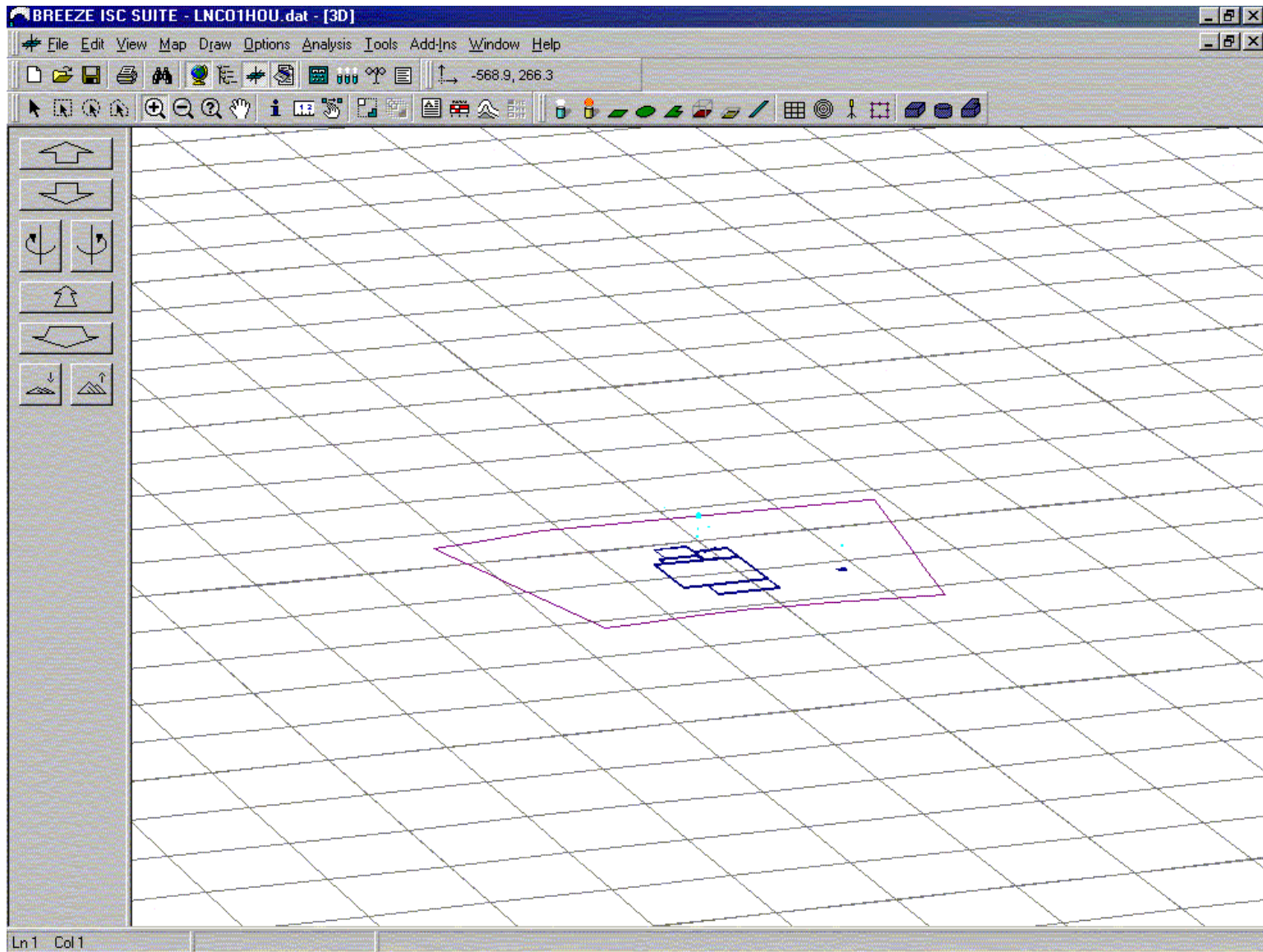




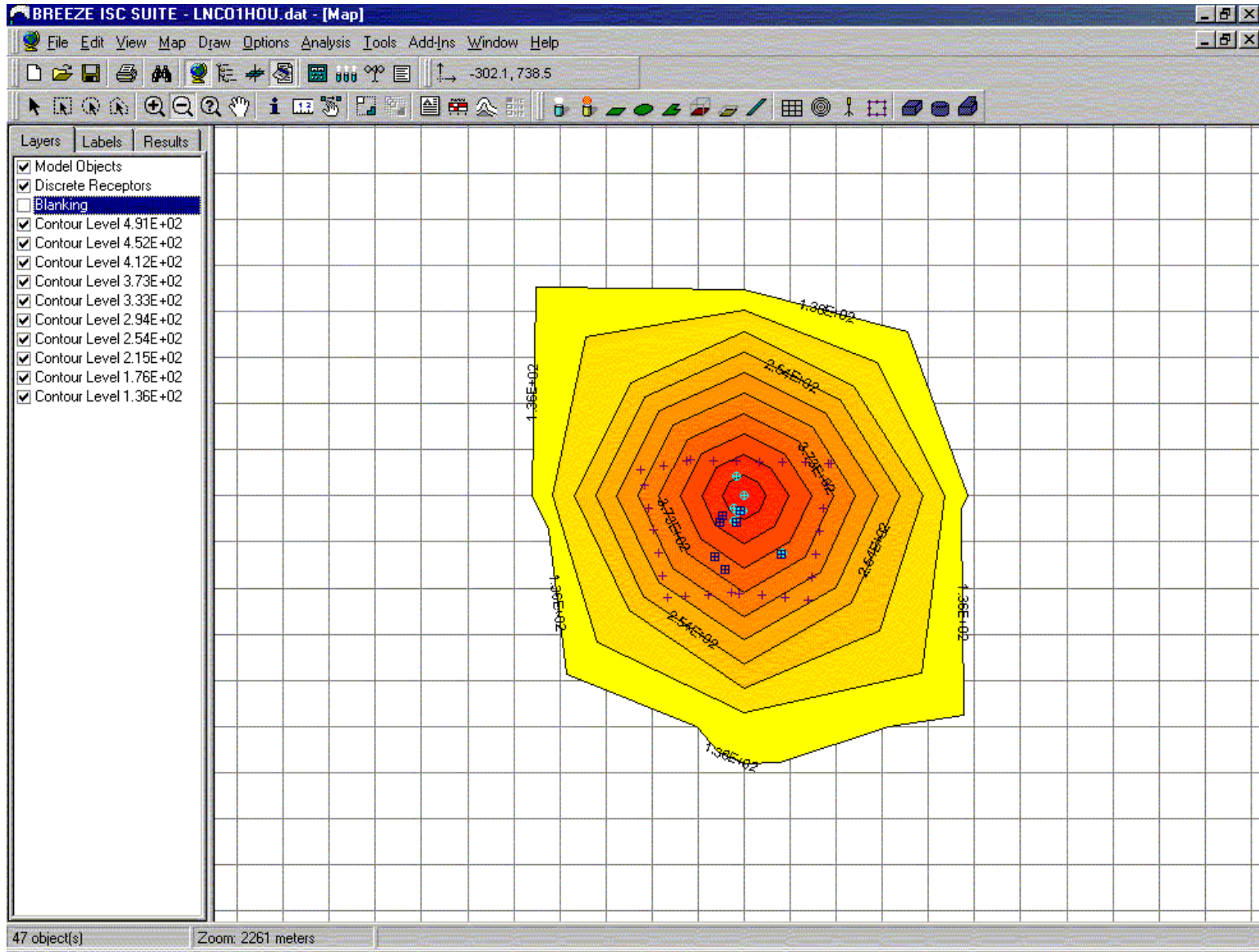




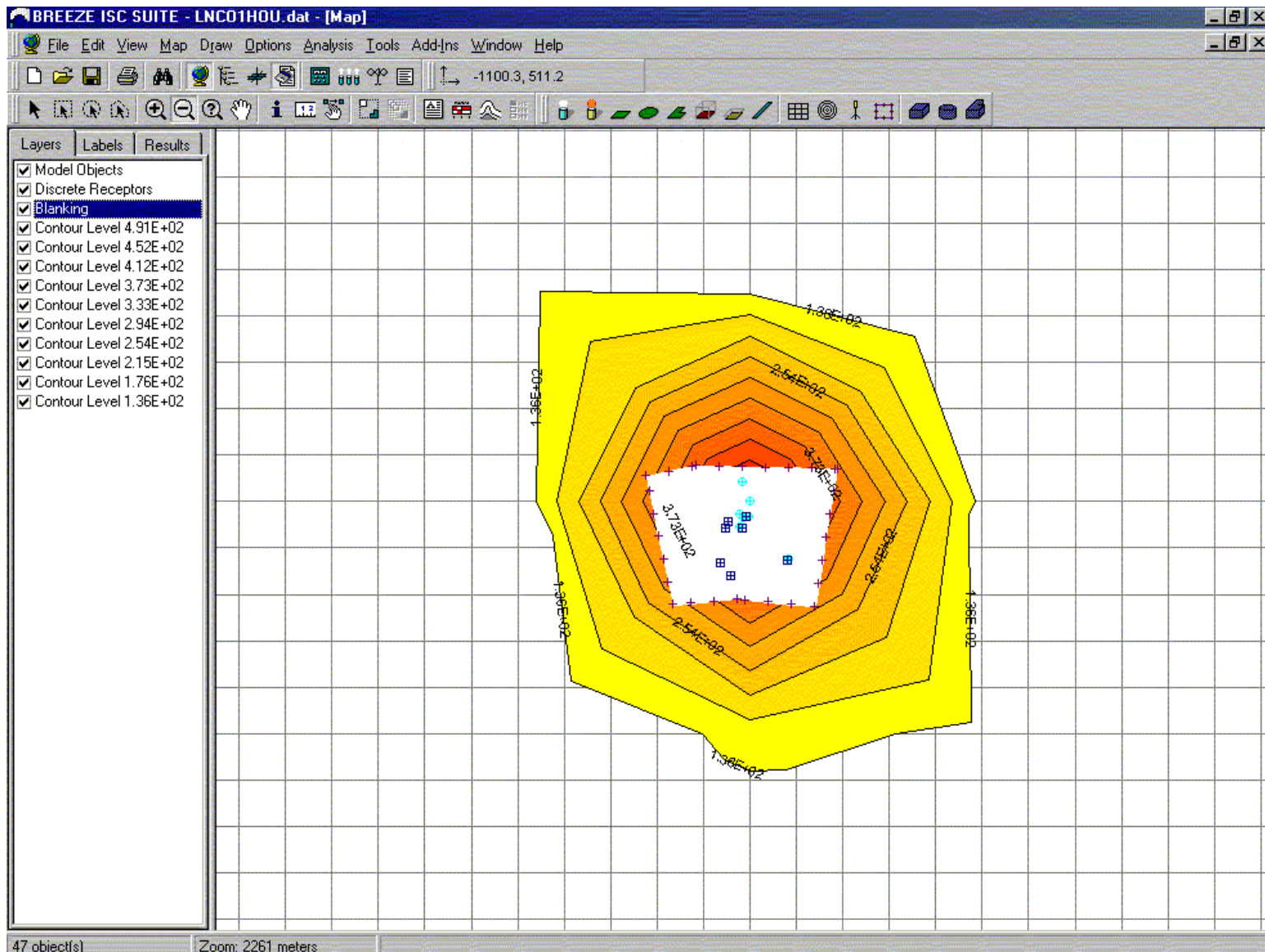
## Nuts and Bolts -- Air Pollution Modeling



Nuts and Bolts -- Air Pollution  
Modeling



Nuts and Bolts -- Air Pollution Modeling



Nuts and Bolts -- Air Pollution Modeling

# Step 5

- Compare findings to NAAQS or State Toxics Limit
  - Be sure to add any background
  - If below, breathe a sigh of relief
  - If above, you need to contact your state regulatory staff --

**"Houston, We Have A Problem!"**