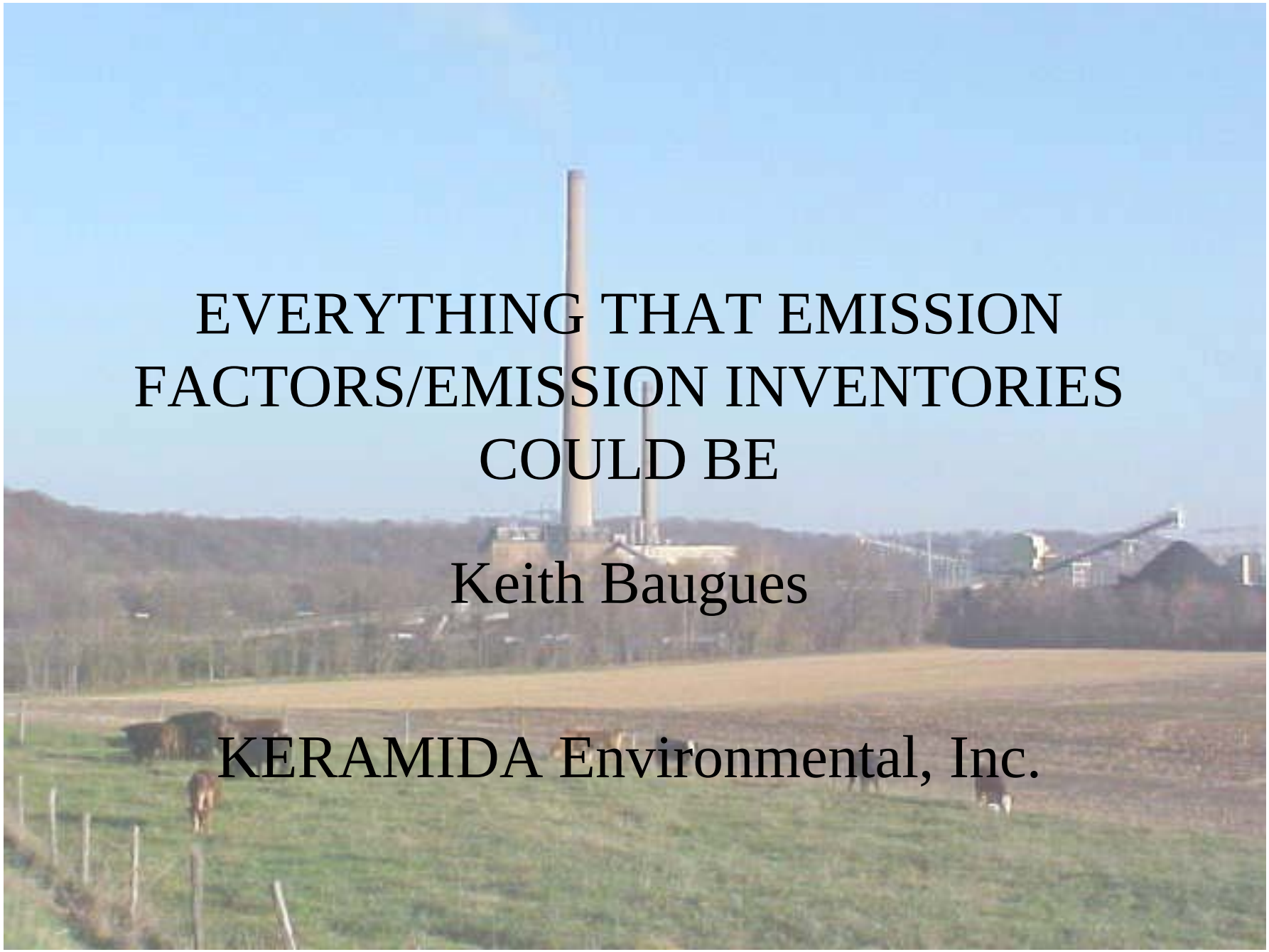
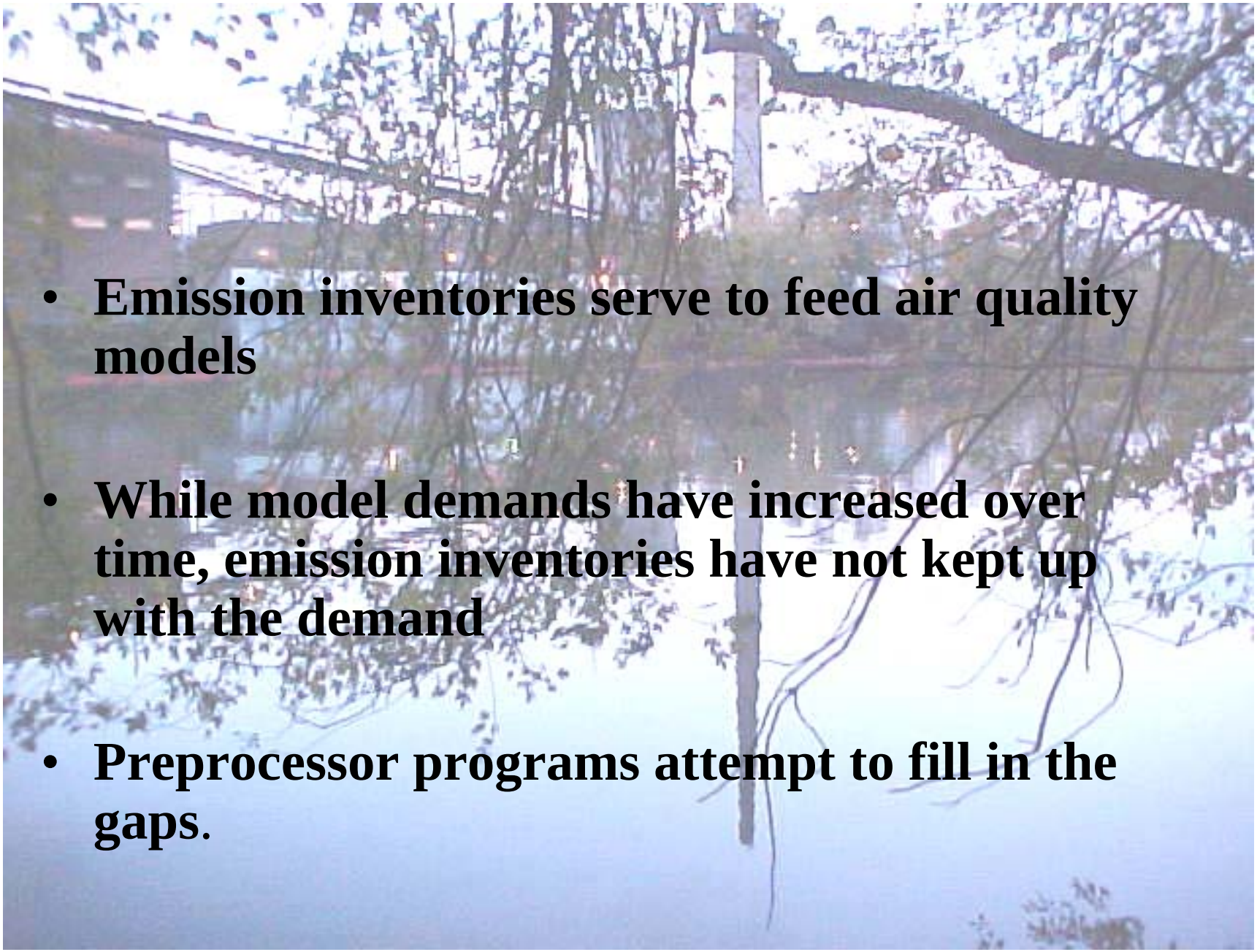


EVERYTHING THAT EMISSION FACTORS/EMISSION INVENTORIES COULD BE

Keith Baugues

KERAMIDA Environmental, Inc.



- **Emission inventories serve to feed air quality models**
- **While model demands have increased over time, emission inventories have not kept up with the demand**
- **Preprocessor programs attempt to fill in the gaps.**

Emission Factors

- **The development of an emission factor should depend upon the end use**

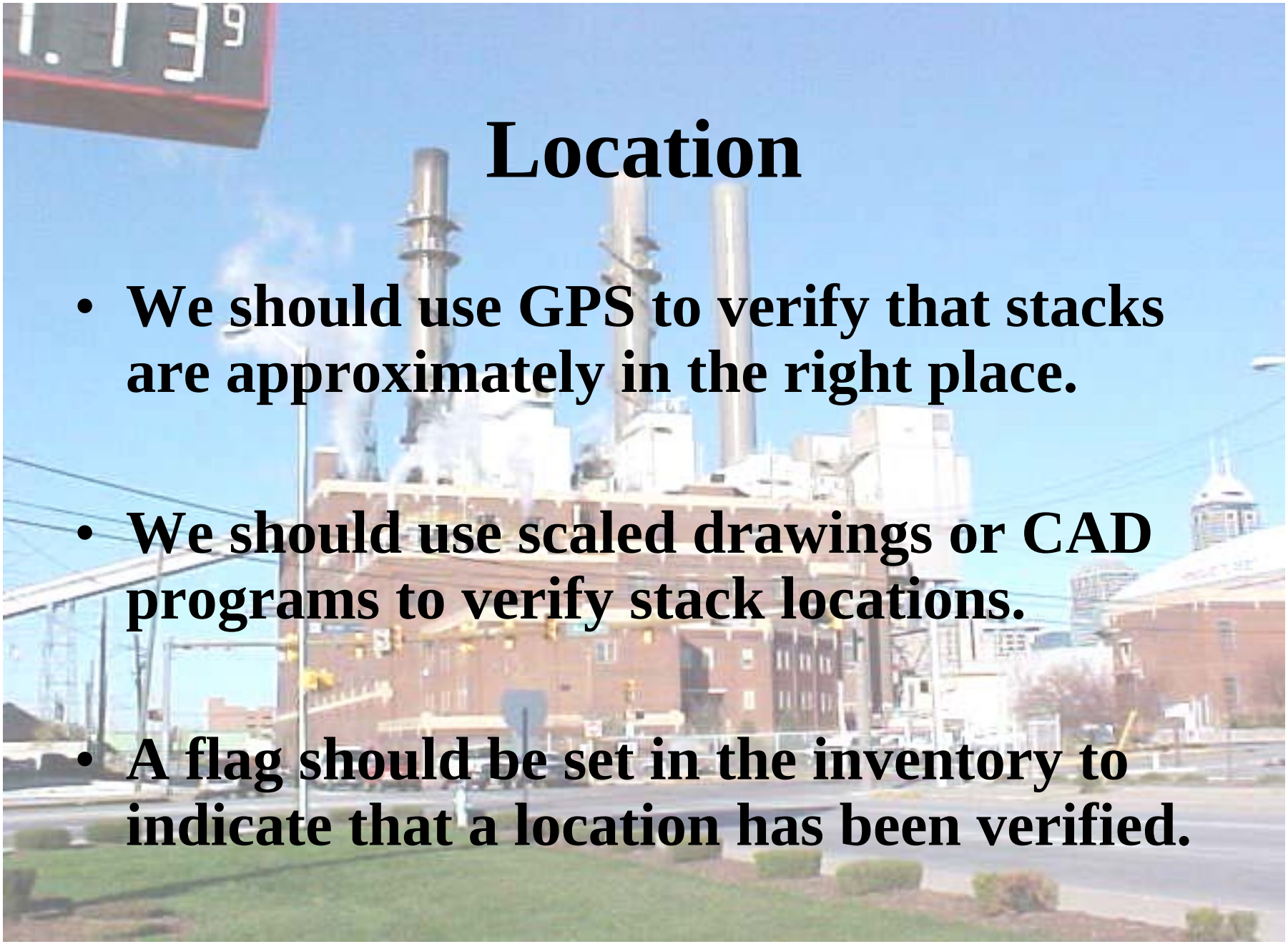
- **State wide totals (average factor is OK)**
- **Emission limit for an individual stack (average factor is not OK)**
- **Inputs to most models for individual stacks (average factor is not OK)**

Emission Factors (continued)

- **Establishment of a data base with stack tests and CEM data would allow users to make more informed choices**
- **Need to discourage emission factor shopping**

Emission Factors (continued)

- **Are emission rates always linear with load?**
- **We assume so when we develop factors in pounds per ton or pounds per MMcf.**
- **Some processes may operate more efficiently near maximum load**
- **Others may behave just the opposite.**

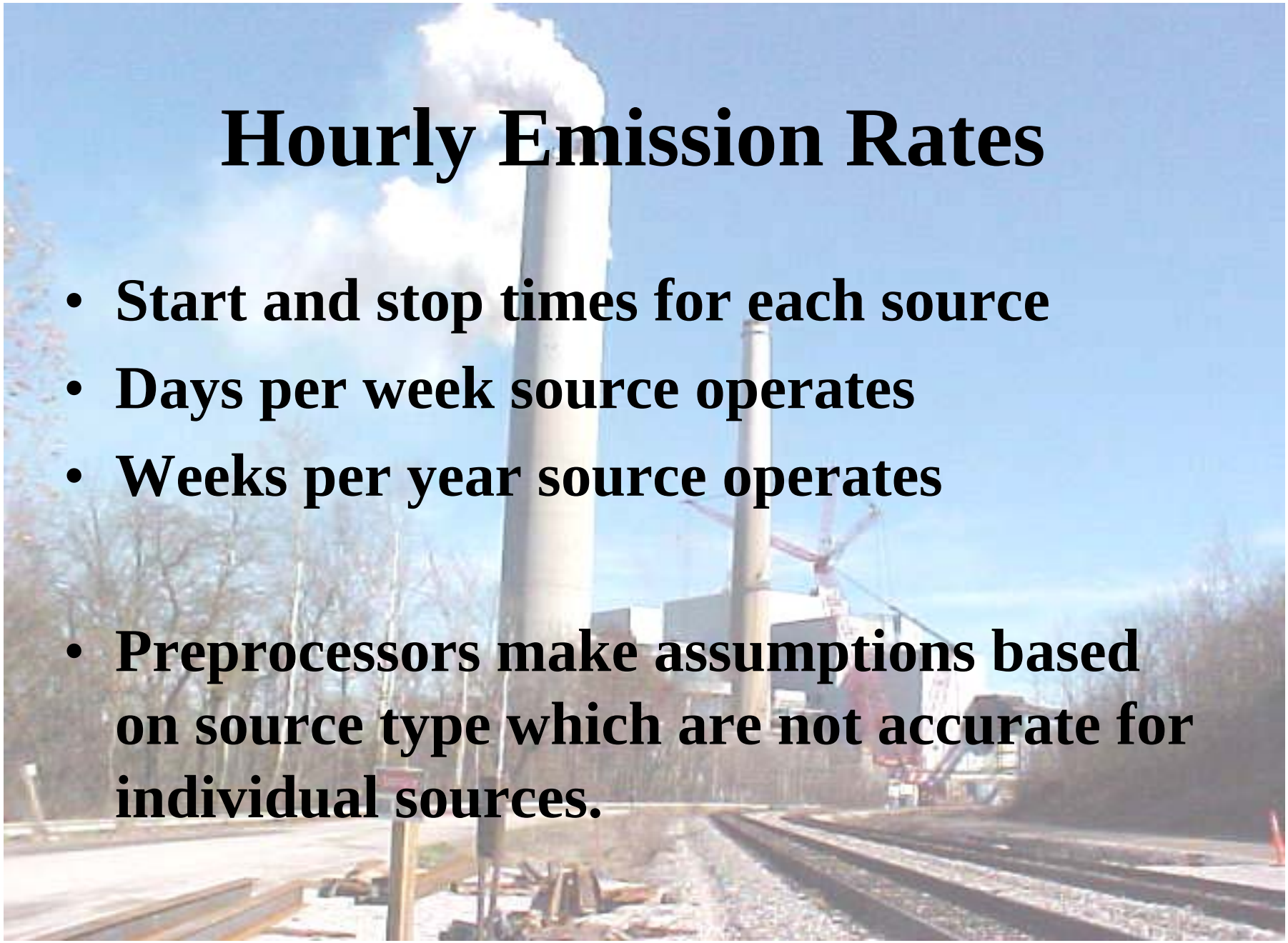


Location

- **We should use GPS to verify that stacks are approximately in the right place.**
- **We should use scaled drawings or CAD programs to verify stack locations.**
- **A flag should be set in the inventory to indicate that a location has been verified.**

Stack Parameters

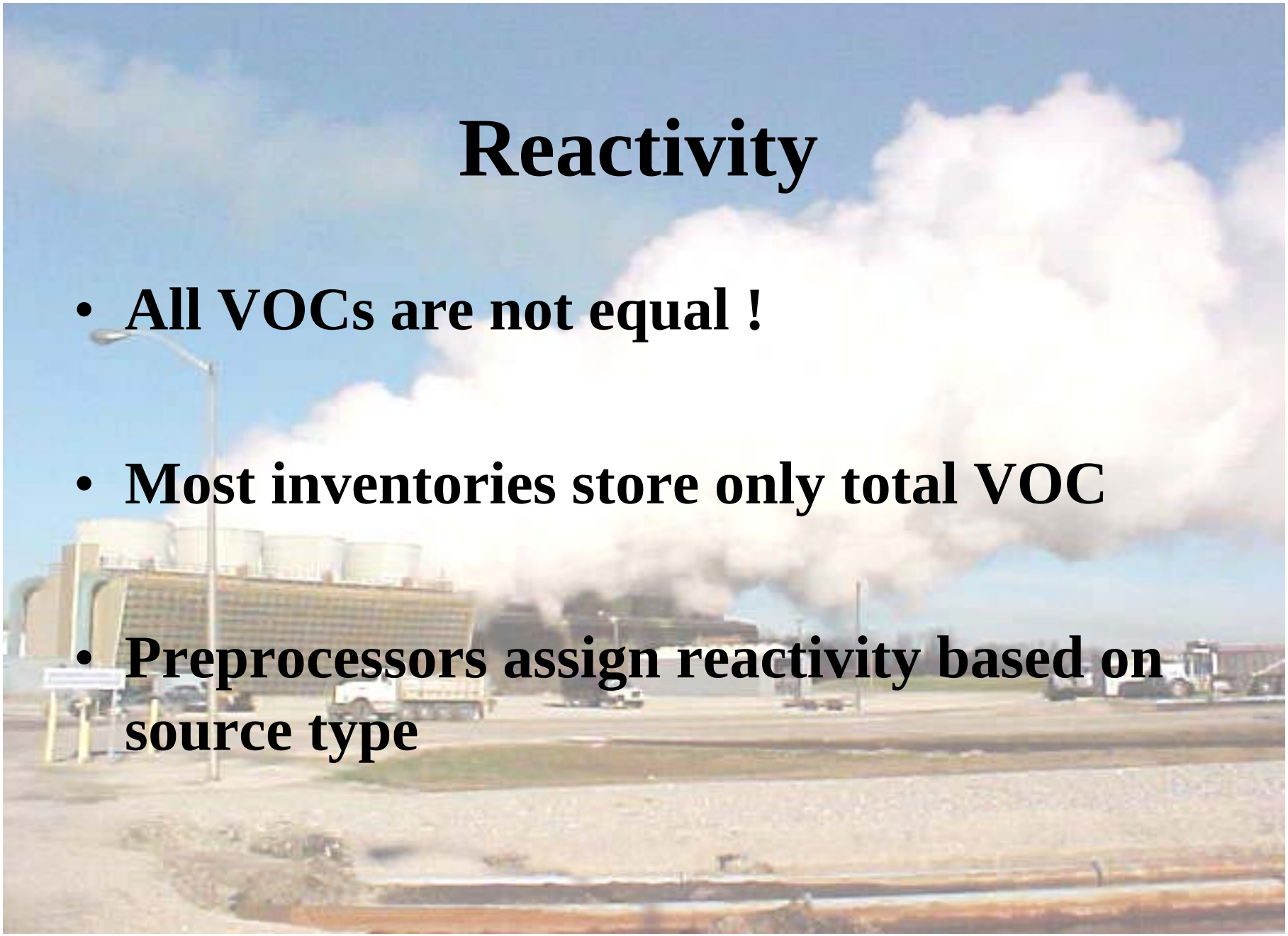
- **Exit gas temperatures and air flow volumes often vary with load for combustion sources.**
- **Most inventories allow storage of only one set of values.**
- **OH EPA allows storage of maximum and minimum values**
- **Do stack parameters for non-combustion sources vary with load?**



Hourly Emission Rates

- Start and stop times for each source
- Days per week source operates
- Weeks per year source operates

- Preprocessors make assumptions based on source type which are not accurate for individual sources.



Reactivity

- **All VOCs are not equal !**
- **Most inventories store only total VOC**
- **Preprocessors assign reactivity based on source type**

Reactivity (continued)

- Two errors involved
- Industry average is applied to all sources
- Profile is based on historical surveys and is not current.

Increment-Consuming Sources

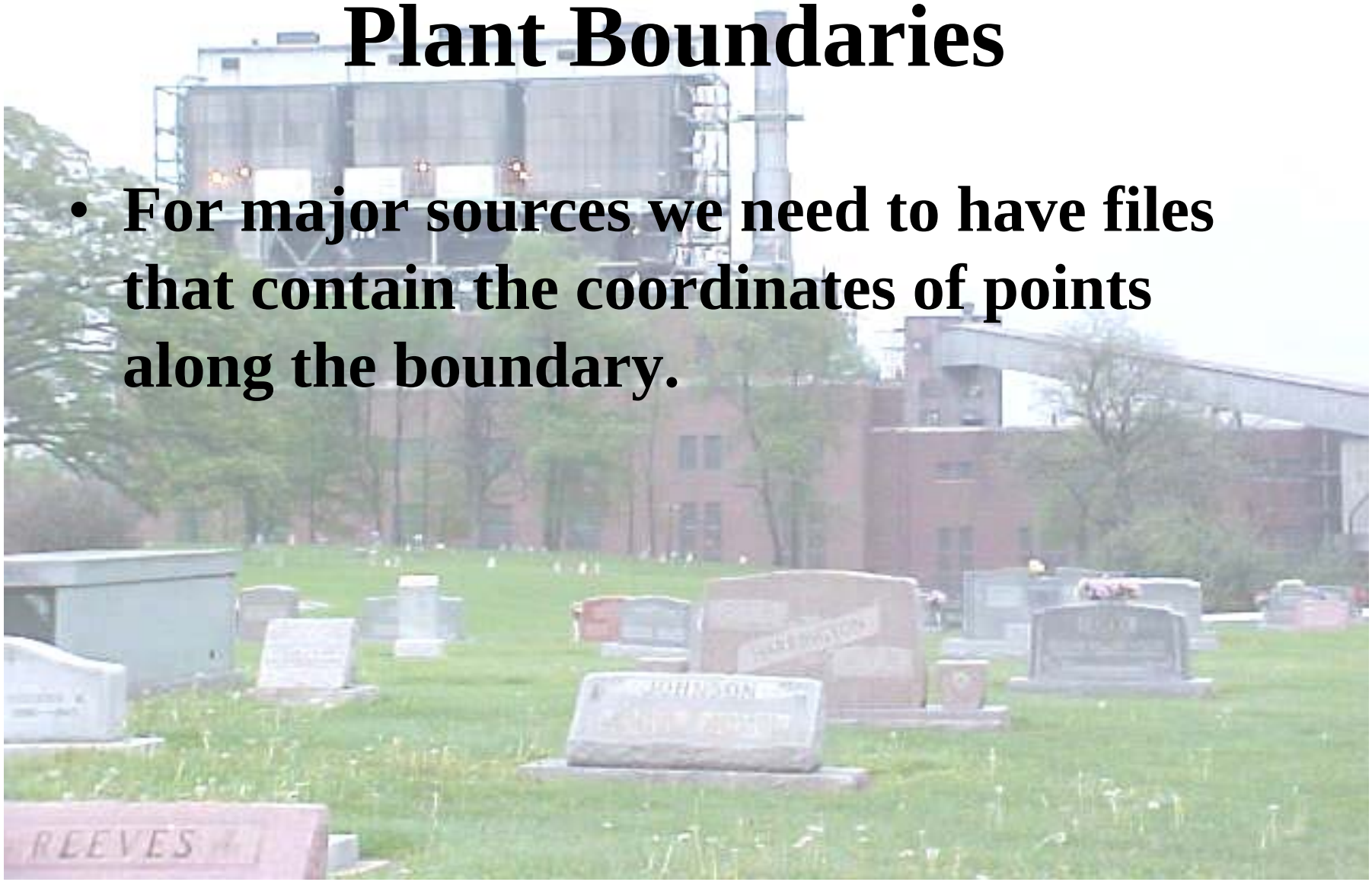
- **Emission inventories of increment consuming sources are rarely available.**
- **Indiana has one available on the web.**
- **All states should develop these inventories.**

Allowable Emission Rates

- **Allowable emission rates are often expressed in varying ways that require understanding the underlying state regulation.**

- **For example, if a process is allowed 10 lb/hr, is it allowed 5 lb/hr if it runs at 50 % load?**

Plant Boundaries



- **For major sources we need to have files that contain the coordinates of points along the boundary.**

Building Dimensions

- **Permit modeling often requires building dimensions which are rarely available.**
- **OH EPA has some information available in a database.**
- **Other states should make this information available.**

Terrain Elevations

- **Data used for elevations may be 20 to 30 years old.**
- **If significant earthmoving work has been done near a source in the last 20 years, elevations may be off.**

Quality Assurance with Feedback

- **Preprocessors often flag problems that get fixed in the modeling files.**
- **Corrections need to be made to the original inventory.**

Real World Example

- **Source made modifications, state models and shows violations of NAAQS**
- **Review of inputs shows problems with:**
- **emission rates, stack locations, stack parameters, receptor elevations, building locations, building heights, property boundaries**

SUMMARY

- **If put on the witness stand and asked about emission inventories, if we replied that we didn't know exactly where the stacks were located, or the buildings or property boundaries and were unsure about emission rates and stack parameters, do we think we would get a favorable judgment from an impartial jury?**