

Air Pollution Litigation in the US and the Role of Computer Modeling

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Brief Introduction

- ▶ I have worked on air pollution, and more generally on computer modeling for environmental sciences, since 1971
 - ▶ Italy (IBM Research); USA (consulting); Kuwait (research); Norway (IBM Research); UK (teaching)
- ▶ Started my own company EnviroComp Consulting, Inc. in 2001
- ▶ Conduct R&D with The EnviroComp Institute
- ▶ Worked (part-time) in litigation cases in the last 25 years, mostly in the US

What is “Litigation” Work?

- ▶ In litigation, one party (the plaintiff) files a legal case - a dispute - against another party (the defendant)
- ▶ Both parties, typically, hire attorneys to represent them
- ▶ The legal case goes to court in front of a judge and, sometimes, a jury
- ▶ In special cases, attorneys hire experts to investigate the matters of the case and provide expert opinions
- ▶ Experts may be medical doctors, scientists/engineers, crime investigators, financial specialists, etc.
- ▶ Experts often prepare reports and sometimes testify under oath
- ▶ Litigation, and the use of experts, is very common in the United States. Why?

Litigation in the US

- ▶ Very common
 - ▶ Plaintiff attorneys can work on “contingency” fees, i.e., for a fraction of the final settlement (e.g., 30%), and require no payments from individual plaintiffs
 - ▶ Class actions in which hundreds/thousands of plaintiffs are represented in a single case
- ▶ Of course, 30% of \$0 is \$0 ...
- ▶ Final settlement amounts can be very high, especially in class actions, and therefore, there is an incentive, on both sides, to hire capable experts to help understand the technical/scientific/medical aspect of a case
- ▶ Litigation is increasing outside the US, even though the legal systems of other countries are different and US-style litigation is not always possible

Environmental Litigation

- ▶ Environmental litigation mostly deals with
 - ▶ Air/water/soil/groundwater pollution
 - ▶ Claims of toxic impacts of pollutants
 - ▶ Acute human exposure, for short times (e.g., a few hours)
 - ▶ Chronic human exposure, for long times (e.g., several years)
 - ▶ Remediation/clean up costs
 - ▶ Regulatory compliance
 - ▶ Accidental releases from fires, explosions, leaks, unplanned events
- ▶ Computer modeling plays an important role!

Computer Modeling

- ▶ Environmental cases are so complex that, often, a valid scientific opinion can be given only with the use of computer models
- ▶ For example, in air pollution cases, models are used for:
 - ▶ Estimating the amount of chemicals released into the atmosphere
 - ▶ Simulating the turbulent transport and diffusion of these chemicals in the atmosphere
 - ▶ Including special issues, such as complex terrain, ground deposition, chemical reactions, decay
 - ▶ Calculating the chemical exposure at different locations and times (e.g., plaintiffs' locations)

A Typical Air Pollution Litigation Case: Accidental Release

The Accident







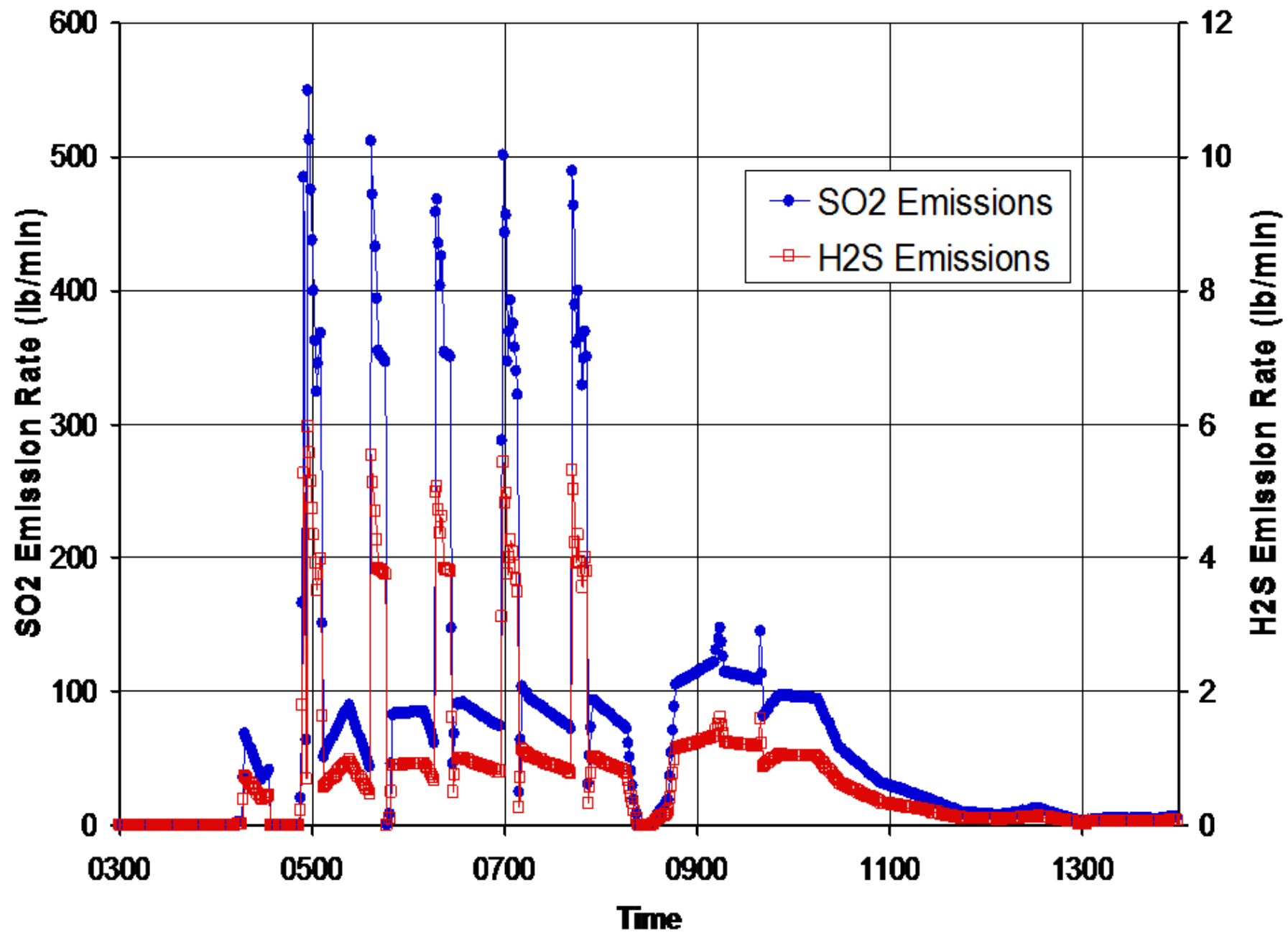
Technical Tasks

1. Accident Reconstruction
2. Emission Characterization (→)
3. Meteorological Characterization
4. Plume/Puff Modeling (→)
5. GIS Visualization
6. Adverse Effects

Example of Emission Characterization

- Average release rate and parameters
- Minute-by-minute estimates
- E.g., a flaring incident (1990s)





Some Available Simulation Models

15

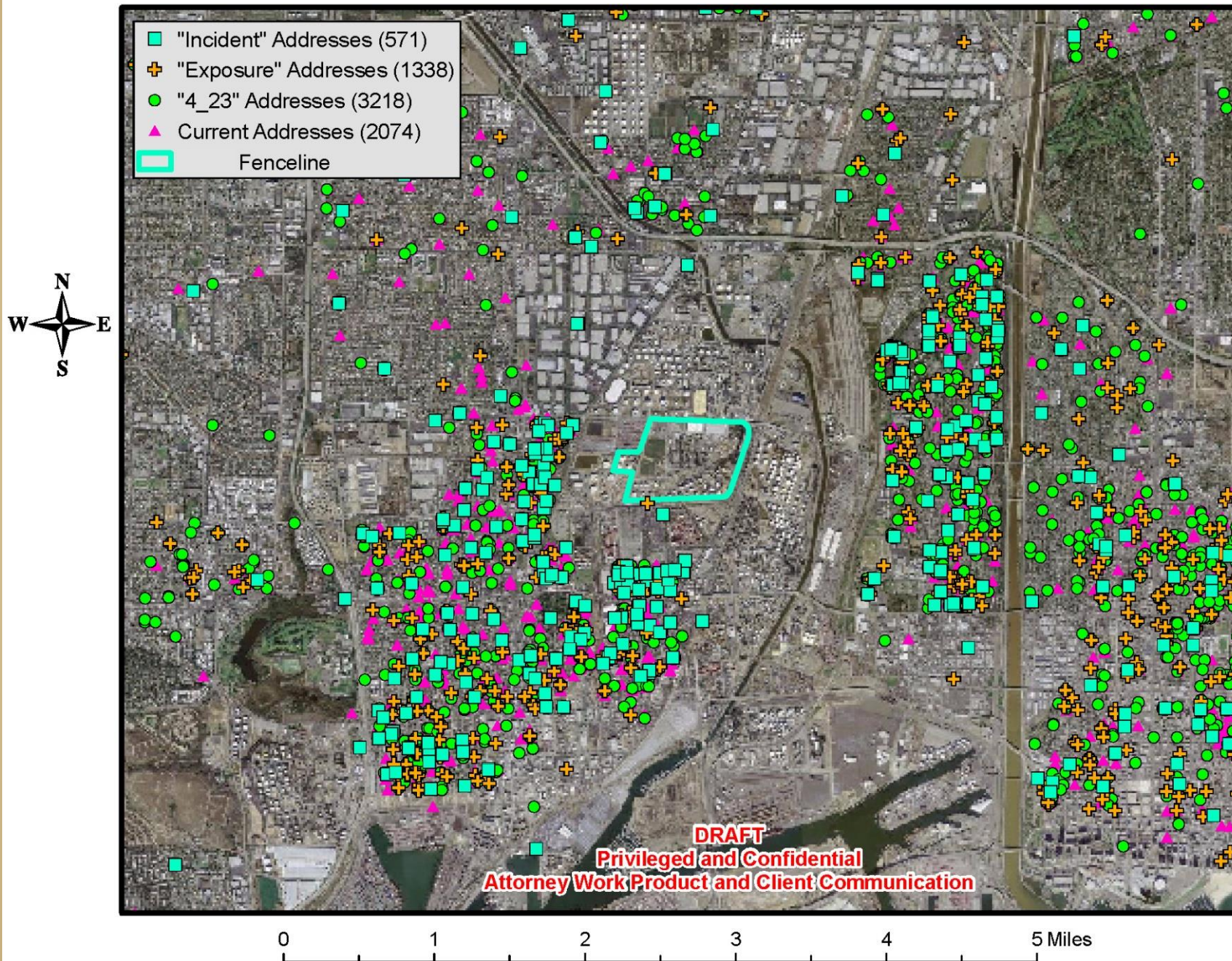
- ▶ Dispersion Models developed/recommended by government agencies <https://www.epa.gov/scram>
 - ▶ AERMOD
 - ▶ CALPUFF
 - ▶ Photochemical models, e.g., CAMx
- ▶ Models developed at National Laboratories and Universities
- ▶ Models developed by private industrial groups and consulting companies
- ▶ Models/Methodologies to calculate adverse health effects, e.g., risk assessment:
<https://www.epa.gov/fera/risk-assessment-and-modeling-epa-risk-assessment-policy-guidelines-and-related-materials>)
- ▶ Our Lagrangian particle simulation model LAPMOD:
<https://www.enviroware.com/lapmod/>

Results from: Accident Reconstruction, Modeling, and Visualization

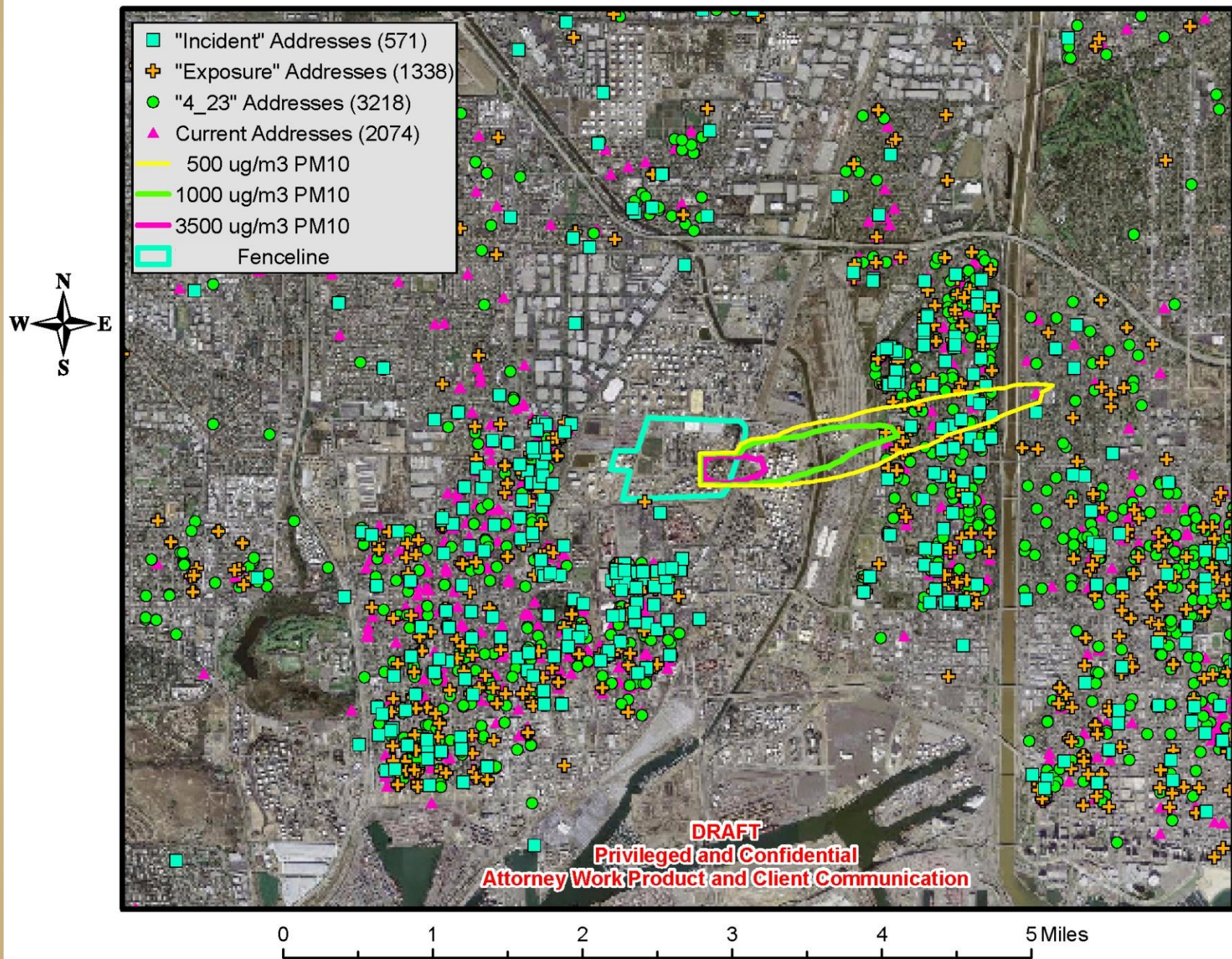
→ Animations

The Use of GIS is Crucial

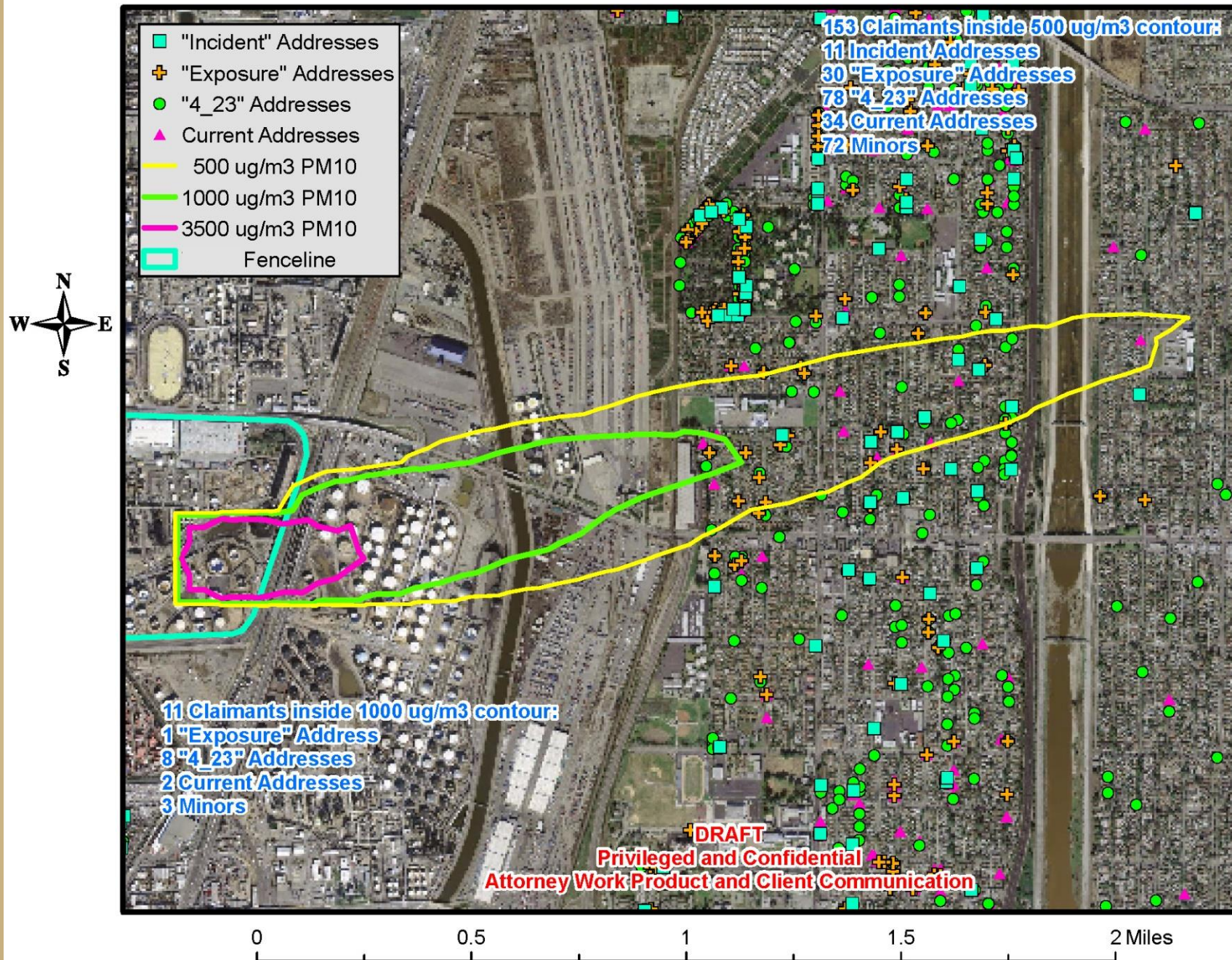
Geocoded Addresses



1-Hour Maximum Pointwise PM10 Concentrations and Geocoded Addresses



1-Hour Maximum Pointwise PM10 Concentrations and Geocoded Addresses



Conclusions

- ▶ Environmental litigation work will probably increase in Europe in the next few years
 - ▶ Opportunity for interesting scientific work and extra income
- ▶ Many scientists may be asked to work as experts
 - ▶ Litigation work is not for everybody
 - ▶ Very demanding, often with “impossible” deadlines; work under pressure
 - ▶ Interactions with attorneys may present challenges
 - ▶ Language, goals, culture are different

More reading on this topic

- ▶ My article “Environmental litigation - air pollution models and modelers in court”
<http://www.envirocomp.com/zcv/P.49.pdf>
- ▶ Material under “Selected Projects” at
<http://www.envirocomp.com/>

Спасибо !

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