

Using Advanced Air Monitoring to Better Understand Emissions & Compliance

MECC Conference – Overland Park, Kansas

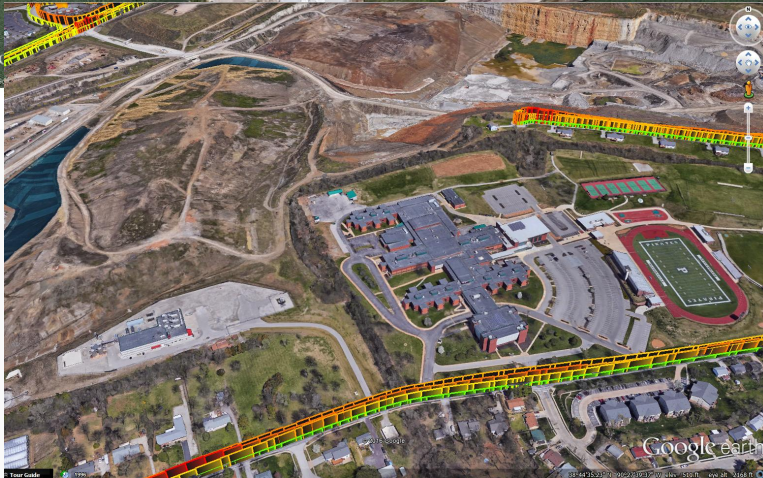
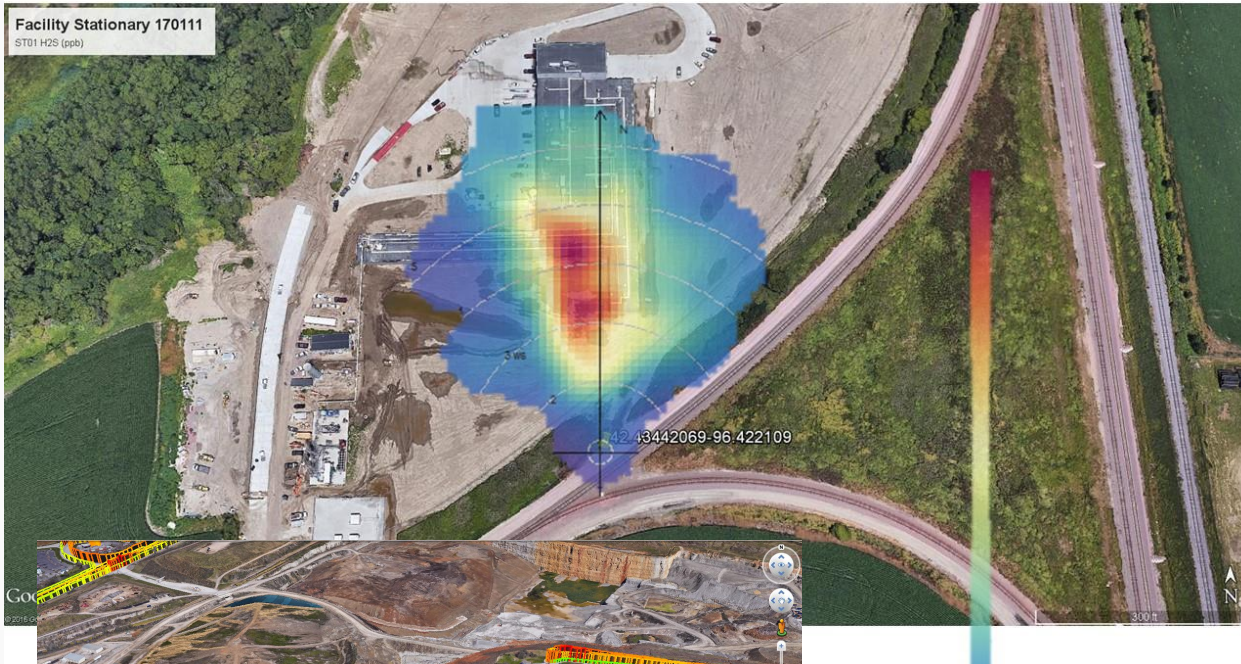
May 2017



Overview

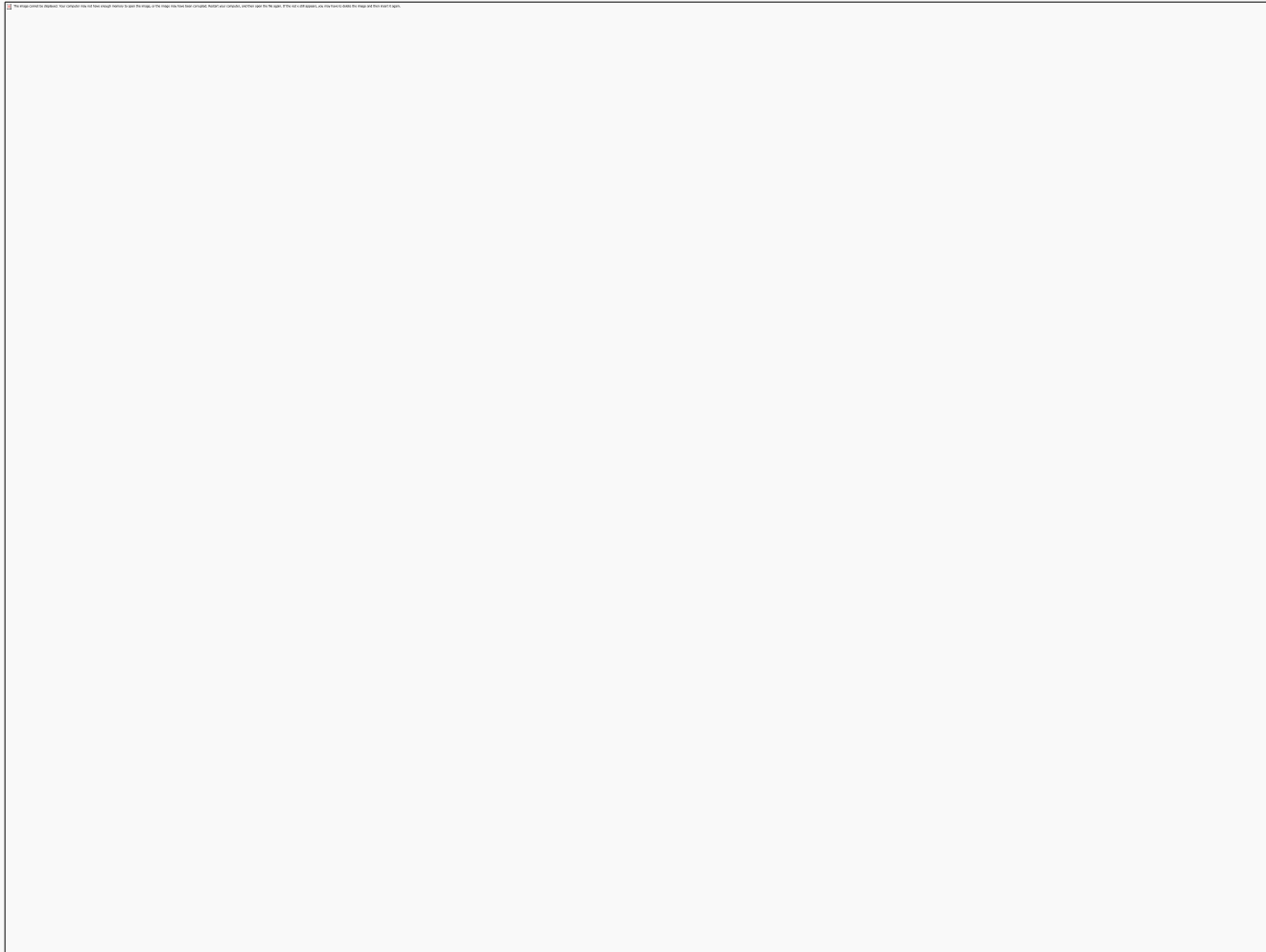
- Advanced Air Monitoring at EPA
 - Understanding Difficult Air Emission Issues
 - Compliance Screening
- Region 7 Inspection Findings at Landfills
- Analysis Tools
 - Geospatial Measurement of Air Pollution (GMAP)
 - Optical gas imaging cameras (e.g. FLIR)
 - Visual Representation of Data
 - Google Earth Mapping
 - “R”-related Statistical Software

Geospatial Measurement of Air Pollution (GMAP)



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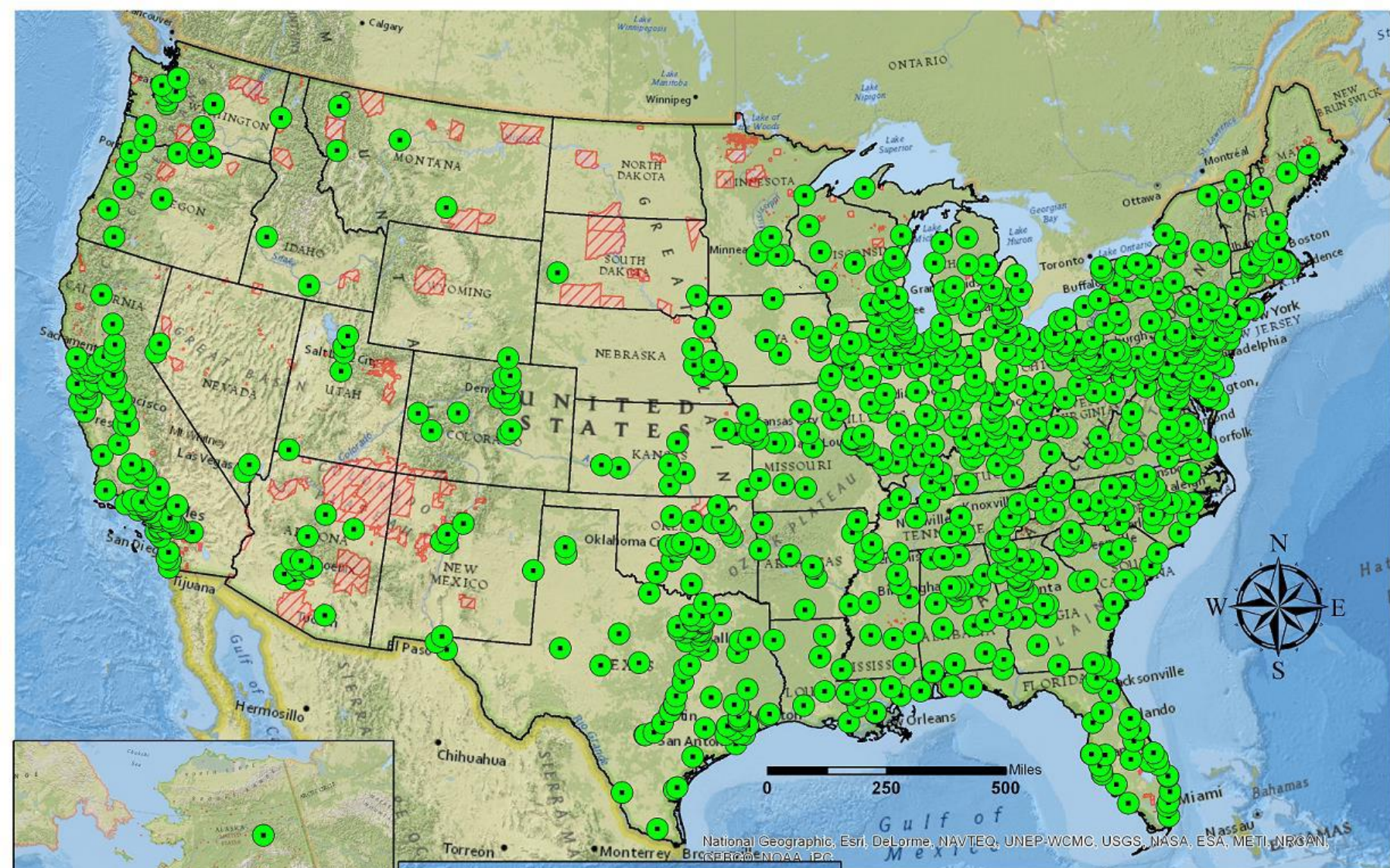
Geospatial Measurement of Air Pollution (GMAP)





Landfill gas and the Clean Air Act?

- Precursor to ozone or particulate matter formation
- Non-methane portion can contain air toxics, e.g. benzene
- Methane is a potent greenhouse gas (GHG)
- Sulfur compounds can result in citizen complaints about odors
- Prevent methane migration and fire hazard potential
- Beneficial use as a fuel or to generate electricity



Legend

- MSW Landfill Locations
- ▨ Tribal lands

National Geographic, Esri, DeLorme, NAVTEQ, UNEP-WCMC, USGS, NASA, ESA, METI, NRCAN, GEBCO, NOAA, IPC

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CAA Requires Landfill Gas Surface Emission Monitoring

- Threshold for corrective action is 500 ppm methane
- EPA inspections finding landfills with no recorded surface emission exceedances in years
 - Method 21 requires approximately twice the response time¹ for the equipment
 - Some landfills are using ATV's for monitoring
 - EPA inspections (using proper monitoring techniques/methods) find many exceedances at high concentrations (30,000 ppm +)

¹ NSPS Appendix A, Method 21, Section 4.3.1

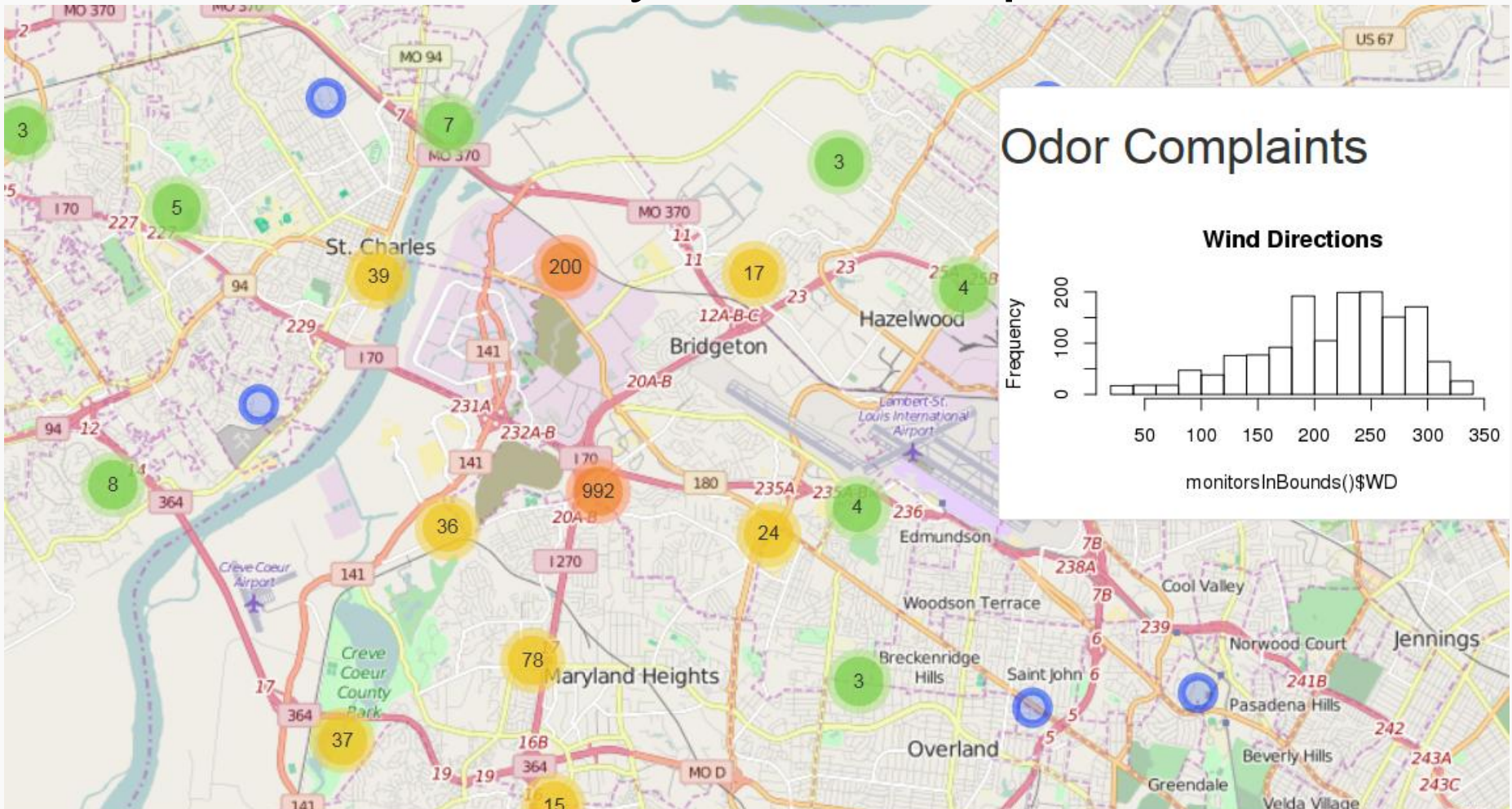
Landfill Inspections





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Community Odor Complaints





Geospatial Measurement of Air Pollution (GMAP) – mobile air monitoring





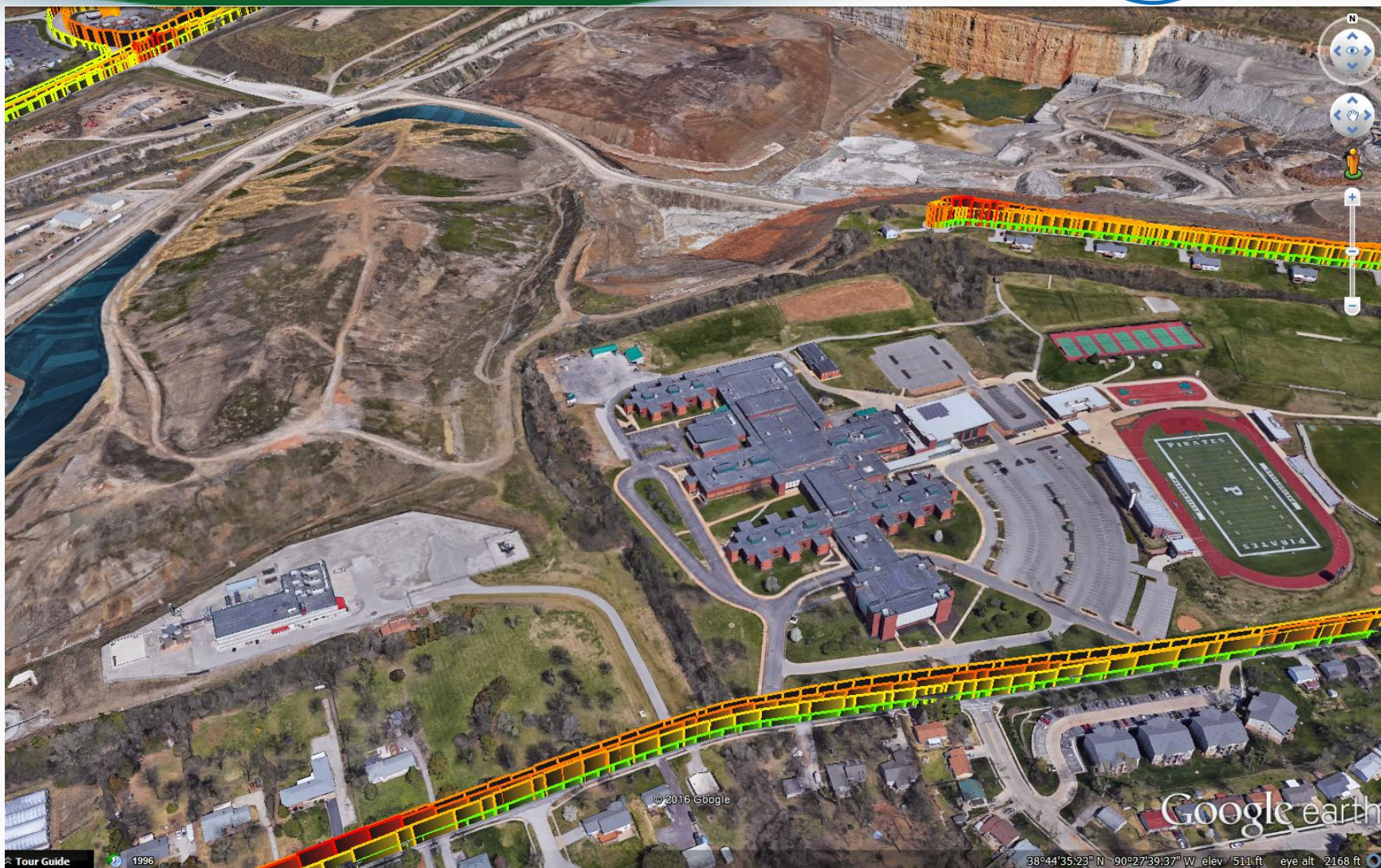
GMAP Readings



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U.S. Environmental Protection Agency

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U.S. Environmental Protection Agency

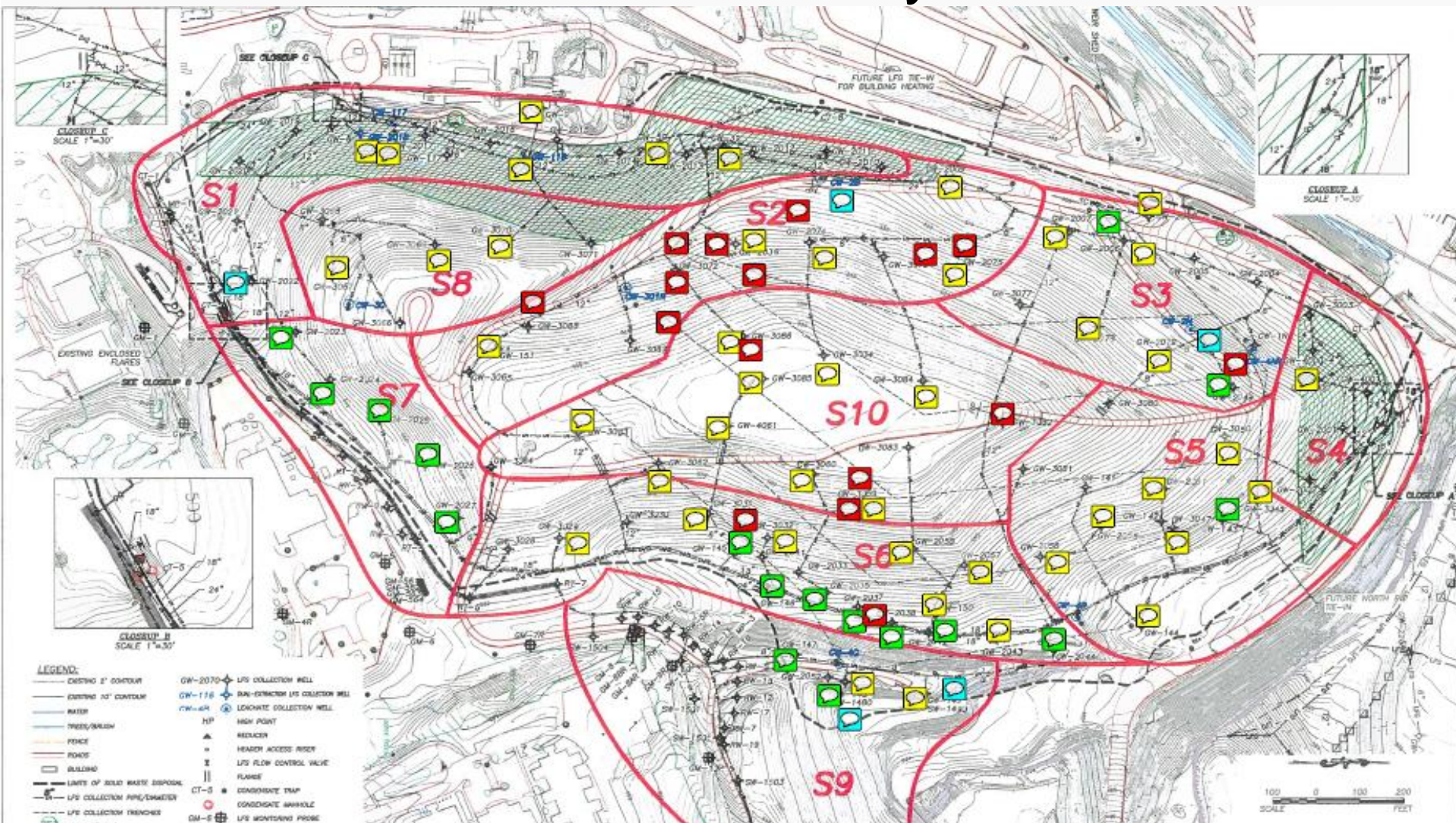
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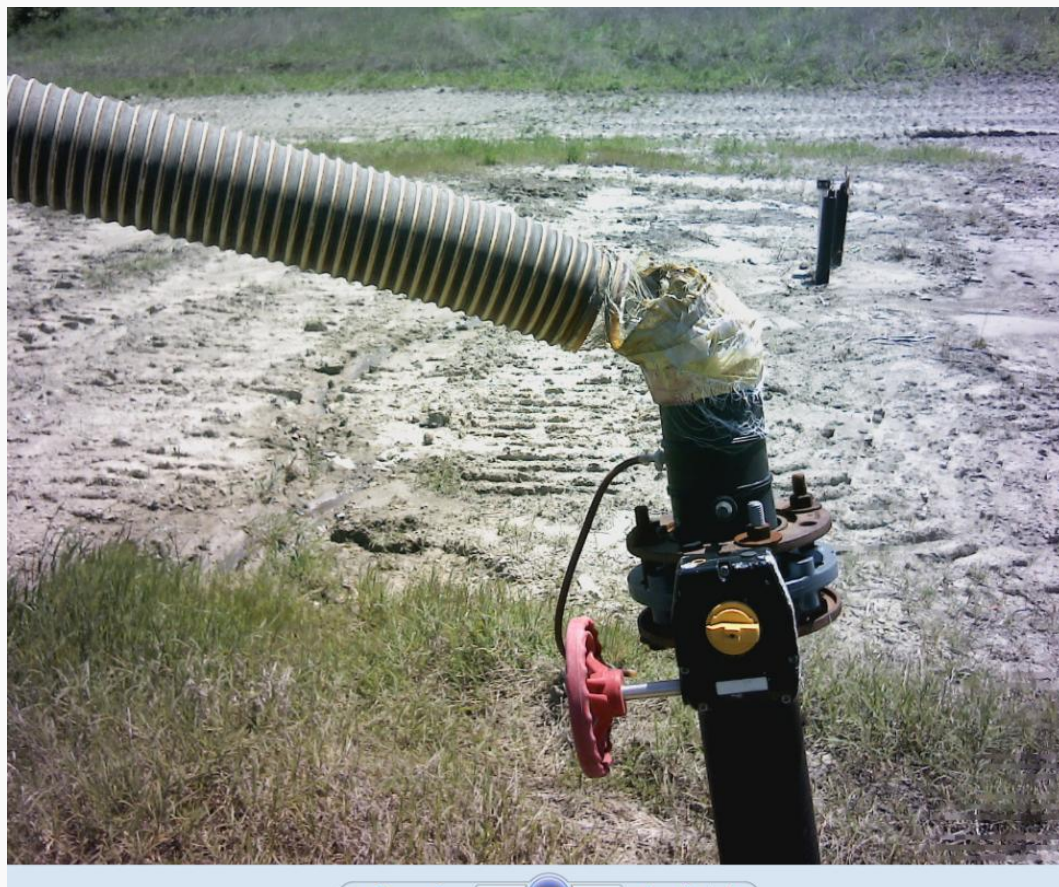
Landfill Gas Collection System Issues

- EPA Inspections May 5th and 19th, 2016
- Over the past 10 years, no reported pressure, temperature, or oxygen exceedances
- ~28 wells under negative pressure, but not drawing gas
 - Indication that they are plugged, damaged, or watered in

Landfill Gas Collection System Issues



Landfill Surface Emission Monitoring – Gas Imaging Camera



Gas collection system issues – gas-imaging camera footage

- Gas-imaging camera shows emissions from base of GW3082
- FID readings:
1,500 – 9,000 ppm



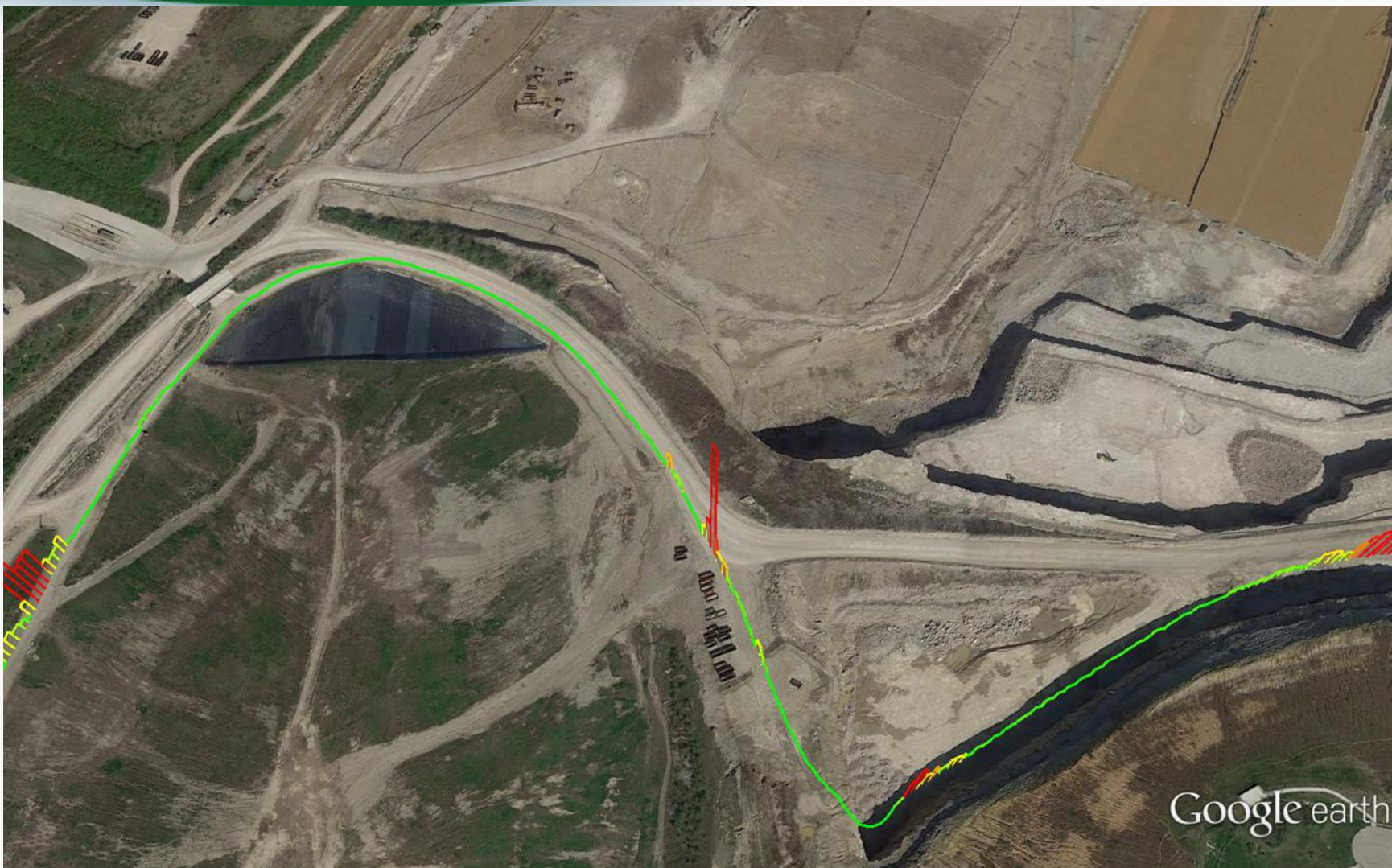
Landfill Surface Integrity Issues

- Cracks and gullies
- Established vegetation
- FID reading >10,000
- Camera visualized emissions



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Landfill Improvements and Success = 10ppm CH₄







Summary

- Utilizing EPA advanced air monitoring and analysis tools, Region 7 Clean Air inspections are finding compliance issues at landfills
 - Improper surface emission monitoring
 - Poorly designed, maintained, or operated gas collections systems
 - Inadequate surface integrity measures
- Compliance leads to improved gas collection
 - Reducing odors and community complaints
 - Increasing beneficial use of gas
 - Reducing air pollution



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