

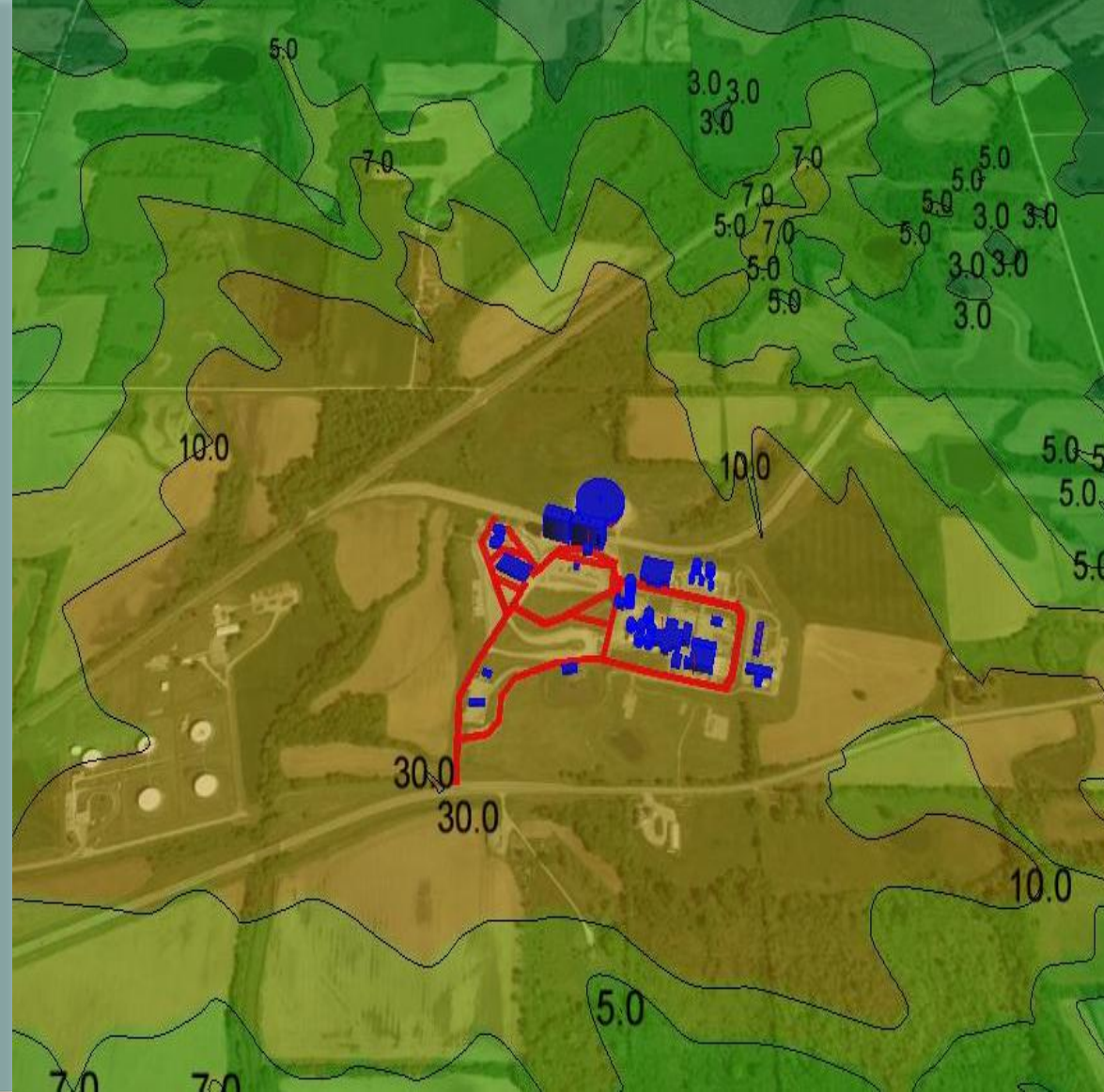
# Fugitive Dust Emissions: Permitting, and Modeling at Bluff Road Landfill

A Facility's Perspective  
into a Modeled PSD  
Increment Violation

**Midwest Environmental  
Compliance Conference**

**April 23, 2019**

**Presented by Tia Jeter**



# Tia Jeter, P.E.

- Project Advisor with SCS Engineers
  - Overland Park, Kansas
- Over 15 years providing air compliance services to industrial facilities
- Prior to SCS, Environmental Manager for DuPont Ethylene Manufacturing Unit in Orange, Texas
- University of Kansas
  - BS Chemical Engineering
  - MS Environmental Engineering

**Rock Chalk Jayhawk, Go KU!**



# SCS Engineers

- Founded in 1970 in Long Beach, CA
- Full service environmental and engineering consulting firm
- Over 800 employees
  - Average 20+ years of professional experience
  - Average of 11+ years with SCS
- Engineers News-Record 2018
  - ENR Top 200 Environmental Firms
    - # 58 Overall Top 200
    - #12 Top 30 All-Environmental Firm



# The Beginning!

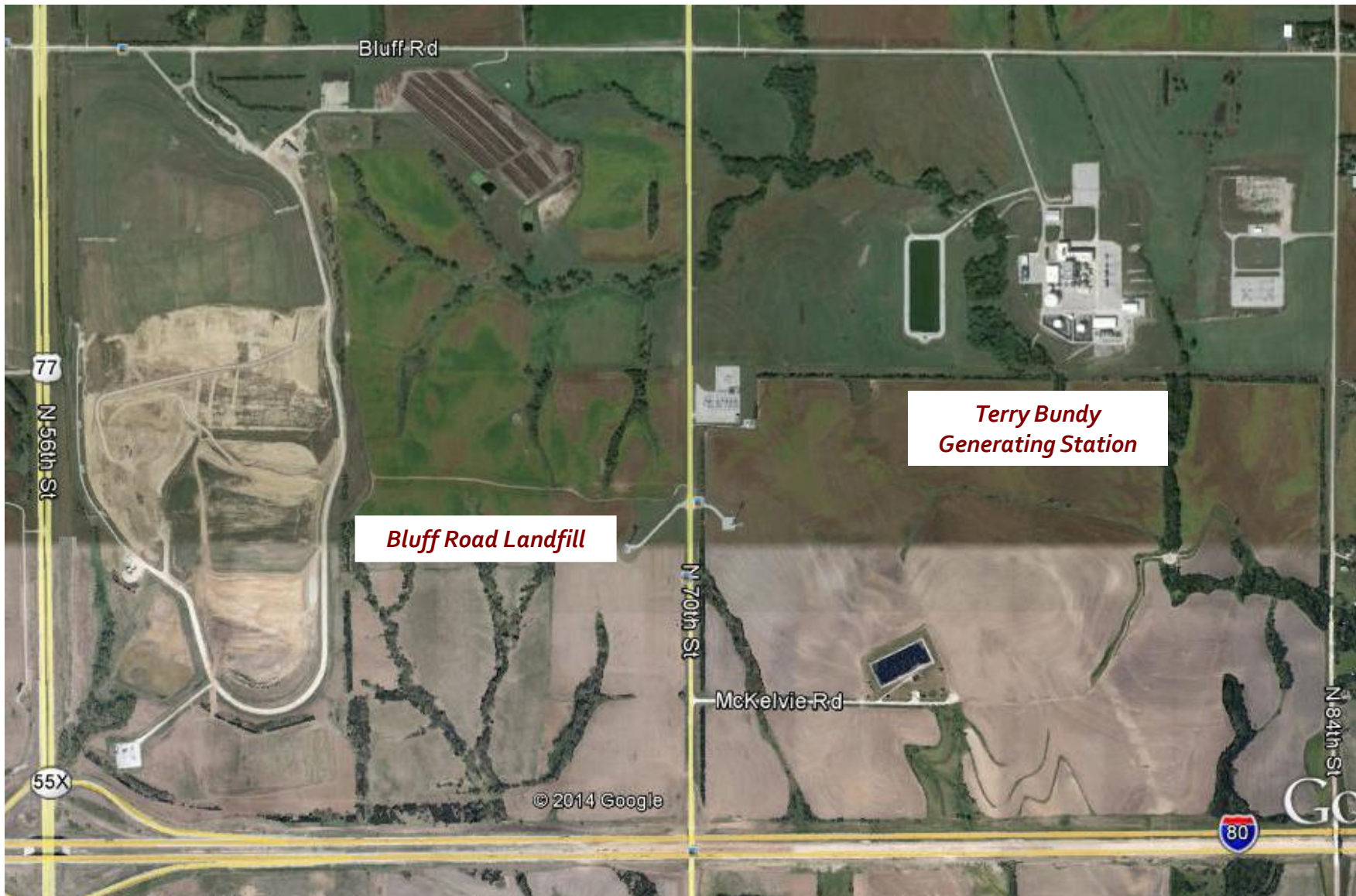


**SCS ENGINEERS**

# Problem Statement

- 2005 - Dispersion modeling was completed as part of the Terry Bundy Generating Station PSD construction permit application
- Model predicted a PSD increment violation for particulate matter (PM) from the Bluff Road Landfill; specifically the short term/24-hr increment for  $PM_{10}$  which is  $30 \text{ ug}/\text{m}^3$

**And so it began.....an 8-year journey about Dust!**



# Regulatory Background

- Prevention of Significant Deterioration Program (PSD) – a major source construction permit program
- PSD Increment – Maximum allowable increase in pollutant concentration in the ambient air.
  - Generally set to prevent the deterioration of air quality in a specific area to maintain air quality below the National Ambient Air Quality Standards (NAAQS)
- Ambient Air - means the portion of the atmosphere, external to buildings, to which the general public has access
- PM<sub>10</sub> - means particulate matter with an aerodynamic diameter less than 10 micrometers.

# The Players

Local  
Permitting  
Authority



Lincoln Lancaster County Health Department



Nebraska Department of Environmental Quality



U.S. Environmental Protection Agency Region 7



City of Lincoln – Bluff Road Landfill



SCS Engineers – City's Consultant



# Project Approach

Refine Facility Emissions-Model Setup



Evaluate Emission Controls



Modify Compliance Boundary

- What is considered "Ambient Air"?
- 

Submit Compliance Plan to LLCHD



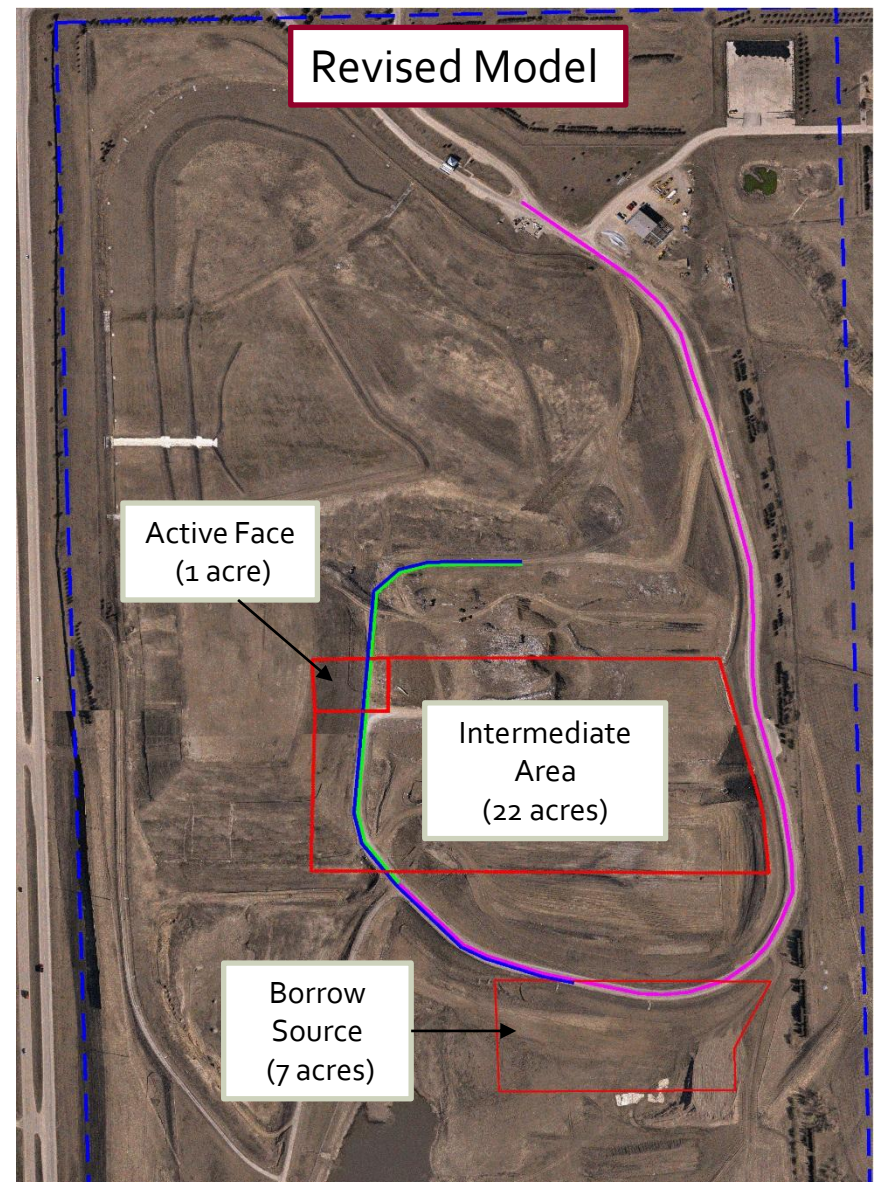
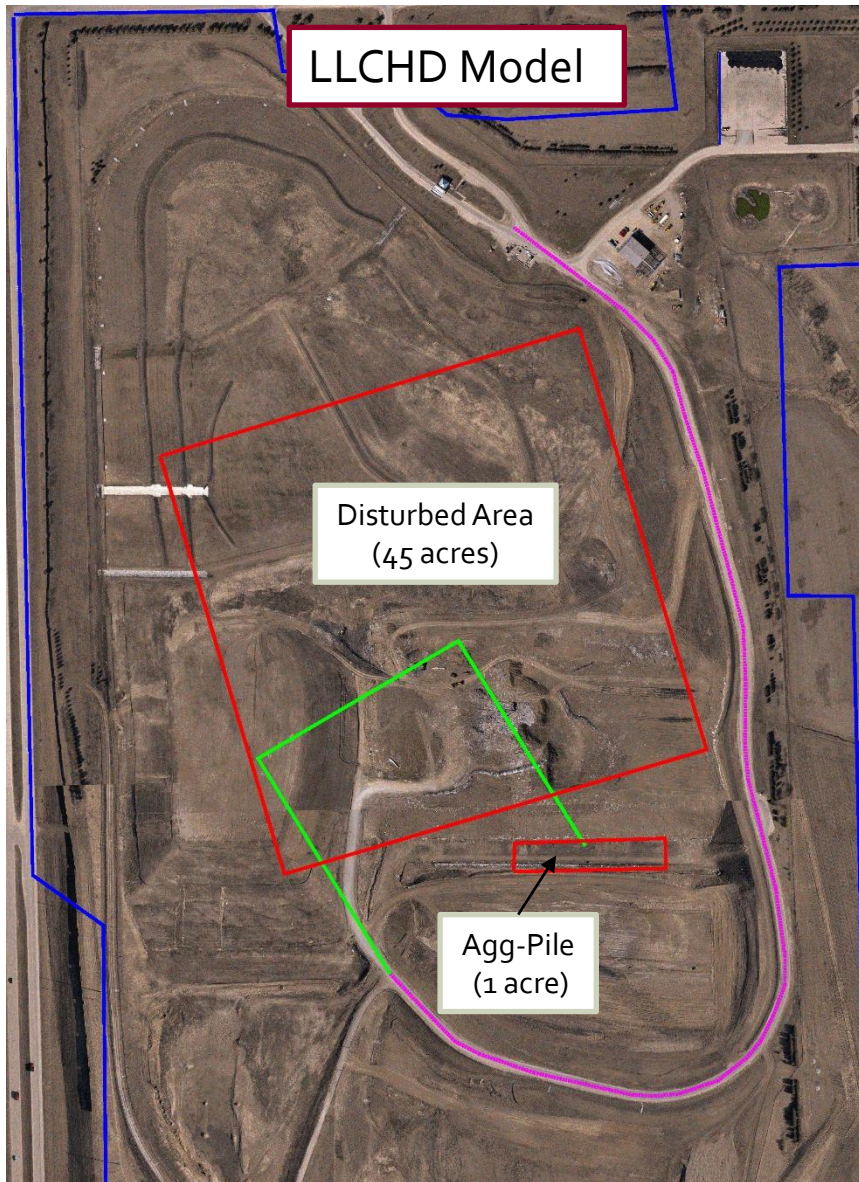
Obtain Federally Enforceable Permit

# Initial Modeling Efforts

- Initial model setup
  - Initial model provided to LLCHD as part of the Terry Bundy Generating Station's PSD application
  - Utilized the Industrial Source Complex Short Term (ISCST3) Model
  - Consisted of 4 emission points operating 24 hours a day
  - LLCHD model indicated exceedances to the north and east of the landfill
- SCS refined model setup to better reflect operations at the landfill

# Revised Model Setup

LLCHD PROVIDED MODEL		REFINED MODEL	
Emission Source	Emission Unit	Emission Source	Emission Unit
Paved Road	Road traffic (24-hr)	Paved road	Road traffic (10-hr)
Unpaved Road	Road traffic (24-hr)	Unpaved Road	Road traffic (10-hr)
		Borrow Road	Water truck/grader (10-hr)
Disturbed Area (45 acres)	Disturbed area (24-hr)	Active Area	Scrapper traffic (10-hr)
	Heavy equipment (24-hr)		Active face (1 acre) (24-hr)
Agg-piles (1 acre)	Soil/clay pile (24-hr)	Intermediate Area	Dozer/compactor (10-hr)
			Borrow Area
	Limestone pile (24-hr)	Borrow Area	Intermediate cover (22 acres) (24-hr)
			Borrow Area
			Soil pile (working) (10-hr)
			Limestone pile (working) (10-hr)
			Scrapper loading (10-hr)



# Initial Results

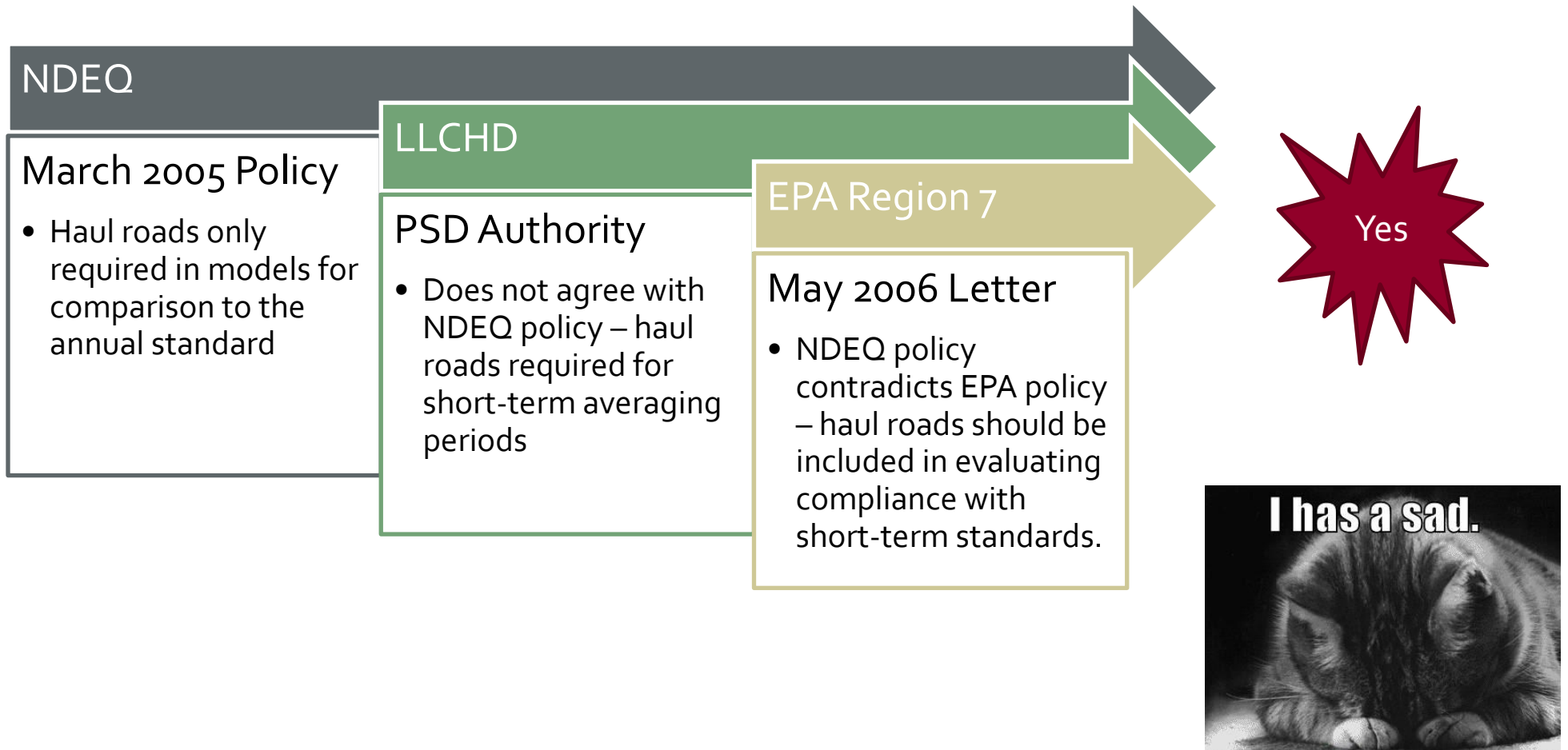
Model still shows violations to the north and east

Evaluate individual emission unit contributions

Haul roads are the likely culprit

AERMOD  
Source  
Groups

# Do We Need to Include Haul Roads?



# How to Reduce Emissions?

- Evaluated control measures and operational procedures to reduce the emissions generated from landfill haul traffic
  - Street sweeping
  - Gravel bed and paved track out aprons
  - Pipe grid track out devices
  - Surfactant applications
  - Watering of roads
  - Limiting vehicle speeds



# Road Control Measures

Source	Control Measures	PM <sub>10</sub> Control Efficiency
Unpaved Roads	Limit Maximum speed limit to 25 MPH	44%
	Daily watering of roads	55%
	Application of chemical dust suppressant	84%
Paved Roads	Utilize non-PM <sub>10</sub> efficient street sweeper (monthly frequency)	4%
	Utilize non-PM <sub>10</sub> efficient street sweeper (biweekly)	7%
	Utilize PM <sub>10</sub> efficient street sweeper (monthly)	9%
	Utilize PM <sub>10</sub> efficient street sweeper (Biweekly)	16%
	Install gravel bed track-out apron	46%
	Install pipe-grid track-out control device	80%

*From Western Regional Air Partnership's Fugitive Dust Handbook*

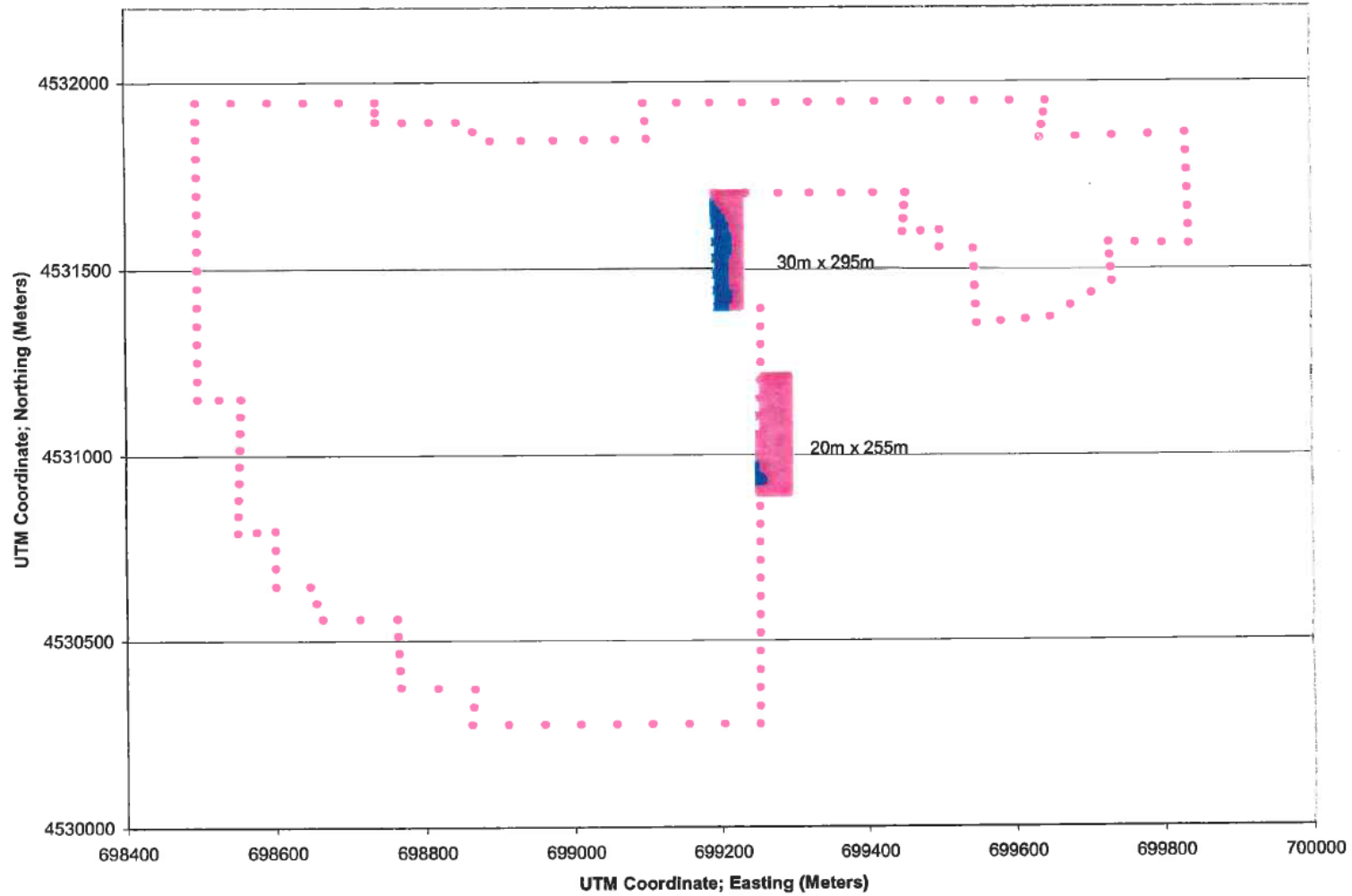


# Bluff Road Controls & Procedures

- Unpaved haul roads
  - Limit speeds to 25 mph (44% control)
  - Watering of roads (55% control)
- Paved roads
  - Paved aprons for interior roads (42%\* control – after first 100 feet)

\* Control from the “Final BACM Technological and Economical Feasibility Analysis”, Sierra Research, Inc., March 21, 2003

# Revised Model Results



# What Next?

- Additional controls were evaluated but ultimately decided not practical from an operational and/or economic standpoint

**Can we move exceeding receptors out of ambient air?**



# Ambient Air?

- Although the City of Lincoln owns a large portion of land, only that portion within a fence line that precludes the general public from access is not considered “Ambient Air”.
- The City also leases a portion of the property east of the landfill to others for agricultural use.
- Memorandum from the EPA Office of Air Quality and Planning
  - *“When leased land is within the confines of the lessor’s property and the lessor maintains the power to exclude the general public from the leased land through a physical barrier, the leased land is not considered ambient air with respect to the lessor”.*
  - In English = as long as the City maintains the power to exclude the general public from the leased portion of the property through a physical barrier (fence), the leased property is not considered “Ambient Air” to the City and does not have to be included in the modeling evaluation.

# 2007 Compliance Plan



- Proposed to construct a fence to the east, bringing the exceeding receptors into the landfill footprint (fence) and out of ambient air
- Plan transmitted to LLCHD **January 2007**

# The Waiting Game

- To make the compliance plan “enforceable” LLCHD would need to take a permit action; most likely issue a construction permit
- **July 2008** met with LLCHD to move permit action forward. Discussed LLCHD’s desire to use AERMOD in lieu of ISCST3 - **Agreed to ISCST3**
- **Late 2009/early 2010** - gas collection system flare and upcoming Title V renewal permit discussions with LLCHD
- “Over the Barrel” .....
- Update model to current site conditions and AERMOD

~The Middle!



**SCS ENGINEERS**

# AERMOD

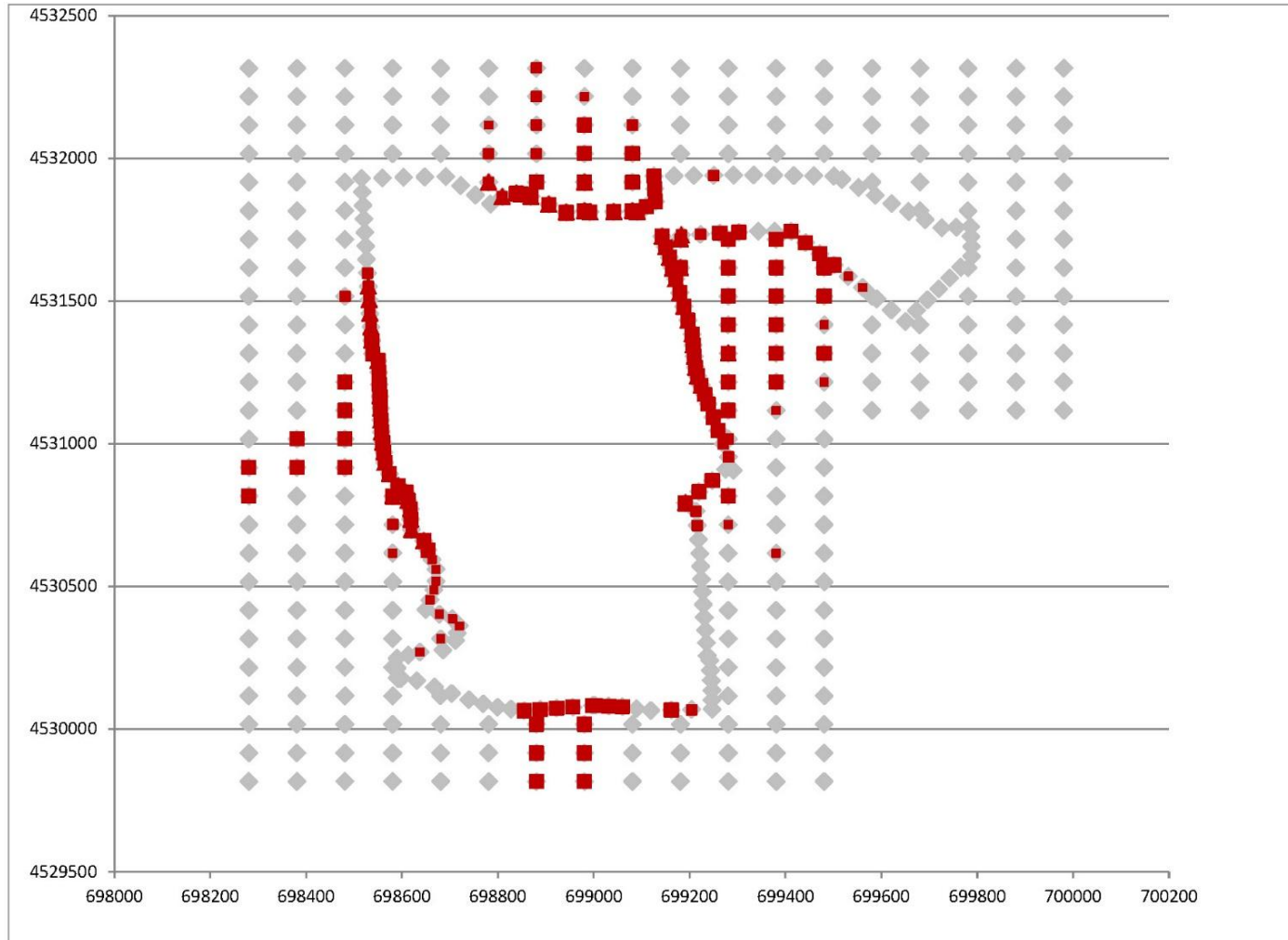
- Model setup was further refined
  - Added secondary borrow source and associated haul road
  - Added secondary unpaved waste haul road
  - Relocation/resizing of the intermediate cover area
  - Added separate paved inbound/outbound lanes
  - Incorporated various operating hour restrictions (Saturday/Sunday operations)



# AERMOD Model Setup

ISCST <sub>3</sub> REVISED MODEL SETUP		AERMOD REVISED MODEL SETUP				
Emission Source	Emission Unit	Emission source	Emission Unit	Hours (M-F)	Hours (Sat)	Hours (Sun)
Paved road	Road traffic (10-hr)	Inbound Paved Road	MSW hauling	10	8	5
		Primary & Secondary Paved Road		10	8	5
		1st 100' P&S Paved Road		10	8	5
		Outbound Paved Road		10	8	5
Unpaved Road	Road traffic (10-hr)	Primary Unpaved Road	MSW hauling	10	8	5
	Water truck/grader (10-hr)	Secondary Unpaved Road	Water truck/Grader	10	8	5
			MSW hauling	10	8	5
			Water truck/Grader	10	8	5
Borrow Road	Scraper traffic (10-hr)	Primary Borrow Road	Scraper traffic	10	10	10
		Secondary Borrow Road	Scraper traffic	10	10	10
Active Area	Active Disturbed area (24-hr)	Active area	Active face	24	24	24
	Dozer/compactor (10-hr)		Dozer/compactor	10	10	10
	Scraper unloading (10-hr)		Scraper unload	10	10	10
Intermediate Area	Intermediate area (24-hr)	Intermediate area	Intermediate cover	24	24	24
Borrow Area	Borrow disturbed area (24-hr)	Primary Borrow Area	Borrow Area	24	24	24
	Soil pile (working) (10-hr)		Soil pile (working)	10	10	10
			Limestone pile (working) (10-hr)	Limestone pile (working)	10	10
	Limestone pile (working) (10-hr)		Secondary Borrow Area	Scraper loading	10	10
		Borrow Area		24	24	24
Scraper loading (10-hr)	Scraper loading	10	10	10		

# Initial AERMOD Results



# Additional Control Evaluations



- Final capping (Phase 4) and seeding of intermediate cover (Phase 11) to reduce source area size
  - Modeled compliance to the east could not be achieved.
- Revise fence line (again) to bring exceedances within the facility boundary
- Revised Compliance Plan submitted to LLCHD in **July 2010**

# Compliance Plan Implementation

- Road Controls
- Seeding of Phase 11
- Final capping of Phase 4
- Building fences
  - Nebraska legal fence
  - Preclude “general public” to not be considered ambient air



The End!



**SCS ENGINEERS**

# Eight Years Later!

- Eight years after we started, and approximately 3 years after submittal of the 2010 Compliance Plan, a draft construction permit was issued by LLCHD to create federally enforceable permit limits.
- November 2013 final construction permit issued.
  - Construct perimeter fence
  - Hourly restrictions on various activities
  - Limit on vehicle speed on roads
  - Treat unpaved roads (water, chemical dust suppressant)
  - Maintain daily records to demonstrate compliance with permit limits

# PSD - Positively “Stinky” Deal



- Could this be you and your site?  
**ABSOLUTELY**
- Are you located close to “big/major” facilities?
- Does your state require modeling for “small” sources?
- Do you need to build close to your property boundary?
- Can you buy additional land around you?



# Questions

Contact:  
Tia Jeter, P.E.  
SCS Engineers  
[tjeter@scsengineers.com](mailto:tjeter@scsengineers.com)  
913-749-0712

**SCS ENGINEERS**