Proposed Lead Nonattainment Area Boundaries for Council Bluffs, IA

Iowa DNR – Air Quality Bureau

February 16, 2011

Public Meeting – Council Bluffs, IA

Jim McGraw
Matthew Johnson
David Brown
Chris Roling

IowaDNR
The Iowa Department of Natural Resources

Leading Iowans in caring for our natural resources

Overview

- Welcome and Introductions
- National Ambient Air Quality Standards
- Clean Air Act Requirements
  - Designations
  - Timelines
- Technical Analysis
  - 8-Factor Analysis
  - Modeling
  - Permitting
- Recommended Boundaries
- Questions/Comments

Air Quality Standards

- **Clean Air Act**
  - **Requires the U.S. EPA to establish health based standards for criteria pollutants**
  - **Called National Ambient Air Quality Standards (NAAQS)**

- **Establishes maximum concentrations of pollutants that are acceptable in the general air we breathe**
  - **Primary NAAQS: Protect public health with margin of safety**
  - **Secondary NAAQS: Protect public welfare, including soil, crops, and vegetation**

Air Quality Standards (cont.)

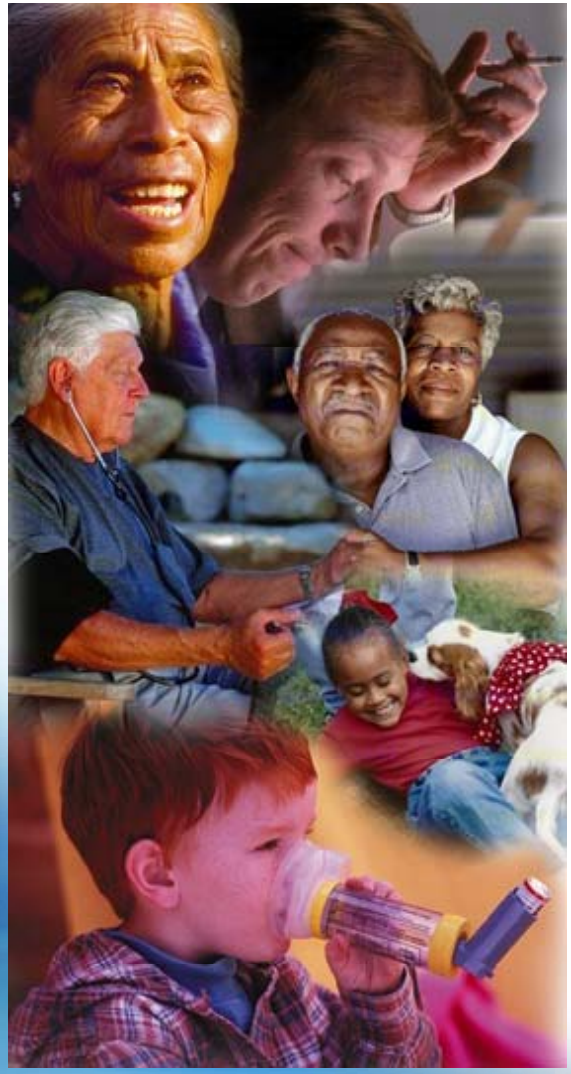
- **Six criteria pollutants**
  - **Lead (Pb)**
  - **Ground-level ozone (O3)**
  - **Particulate Matter (PM10/PM2.5)**
  - **Nitrogen Dioxide (NO2)**
  - **Sulfur Dioxide (SO2)**
  - **Carbon Monoxide (CO)**

- **Established with adequate margin of safety to protect vulnerable populations**
  - **Children, elderly, those with pre-existing conditions**

Lead Primer

- **An elemental metal**
  - **Particulate in atmosphere**
- **A unique pollutant**
  - **Criteria pollutant and hazardous air pollutant (lead compounds)**
- **Lead emissions in the U.S. reduced significantly with 1975 leaded gasoline phase-out**
- **Sources of Lead:**
  - **Industrial processes (lead smelting, lead battery manufacturing/recycling, iron foundries, coal combustion)**
  - **Leaded aviation gasoline (mostly piston aircraft)**
  - **Re-suspension (re-emitted) from earlier deposits**

Lead and Health



- **Since 1990, more than 6000 new studies related to lead and its health impacts**
- **Evidence suggests impacts at much lower levels than previously thought**
- **Affects nervous system, kidney function, immune system, reproductive and developmental systems**
- **Children: Exposures early in life have been linked to effects on:**
  - **IQ, learning, memory, and behavior**

EPA's Lead Standards: Old & New

	1978 Standards		2008 Standards	
Lead Health Standards*	Level:	1.5 ug/m3	Level	0.15 ug/m3
	Form:	Average concentration in a calendar quarter** No averages over 1.5 ug/m3 allowed (not to be exceeded)	Form:	Rolling 3-month average No averages over 0.15 ug/m3 allowed (not to be exceeded)

- **Atmospheric lead measured in total suspended particulates (TSP)**
  - **Any particulate matter (PM) suspended in the atmosphere and measured by a PM-TSP sampler**

*The secondary standard have been set to be identical to the primary standard

**Calendar quarters: Jan-Mar, April-Jun, Jul-Sep, Oct-Dec

NAAQS Revisions

- **Designations Process**
  - **1 year after NAAQS revision**
    - States submit recommended designations
  - **2 years after NAAQS revisions**
    - EPA finalizes their designations
    - EPA may take an additional year if data insufficient

3 Designations	Classification
Attainment	**Air quality that meets the NAAQS**
Nonattainment	**Unhealthy air - does not meet the NAAQS** **This is a violation of the NAAQS**
Unclassifiable	**No or insufficient data** **Generally, functionally equivalent to attainment**

Lead NAAQS Timeline

Oct 2008	**Lead NAAQS Revised**
Oct 2009	**State designations recommendations (due 1 year after NAAQS revision). IA recommendation - unclassifiable** **(Griffin Pipe source oriented monitor starts Nov 2009)**
Oct 2010	**EPA completes first round of lead designations**
Oct 2010 **Mar 2011** **Jun 2011** **Jul/Aug 2011**	**EPA starts second round of lead designations** **IDNR submits revised lead designation** **EPA provides states with their proposed designations & nonattainment boundaries** **Public/State responses on EPA's proposed boundaries due**
Oct 2011	**EPA issues final designations**
~ Dec 2011	**Designations become effective**
~ Jun 2013	**Attainment plan due (nonattainment areas):** **[Designations Effective + 18 months]**
~ Dec 2016	**Attainment date (nonattainment areas)** **[Designations Effective + a maximum of 5 years]**

New Lead Monitoring Requirements

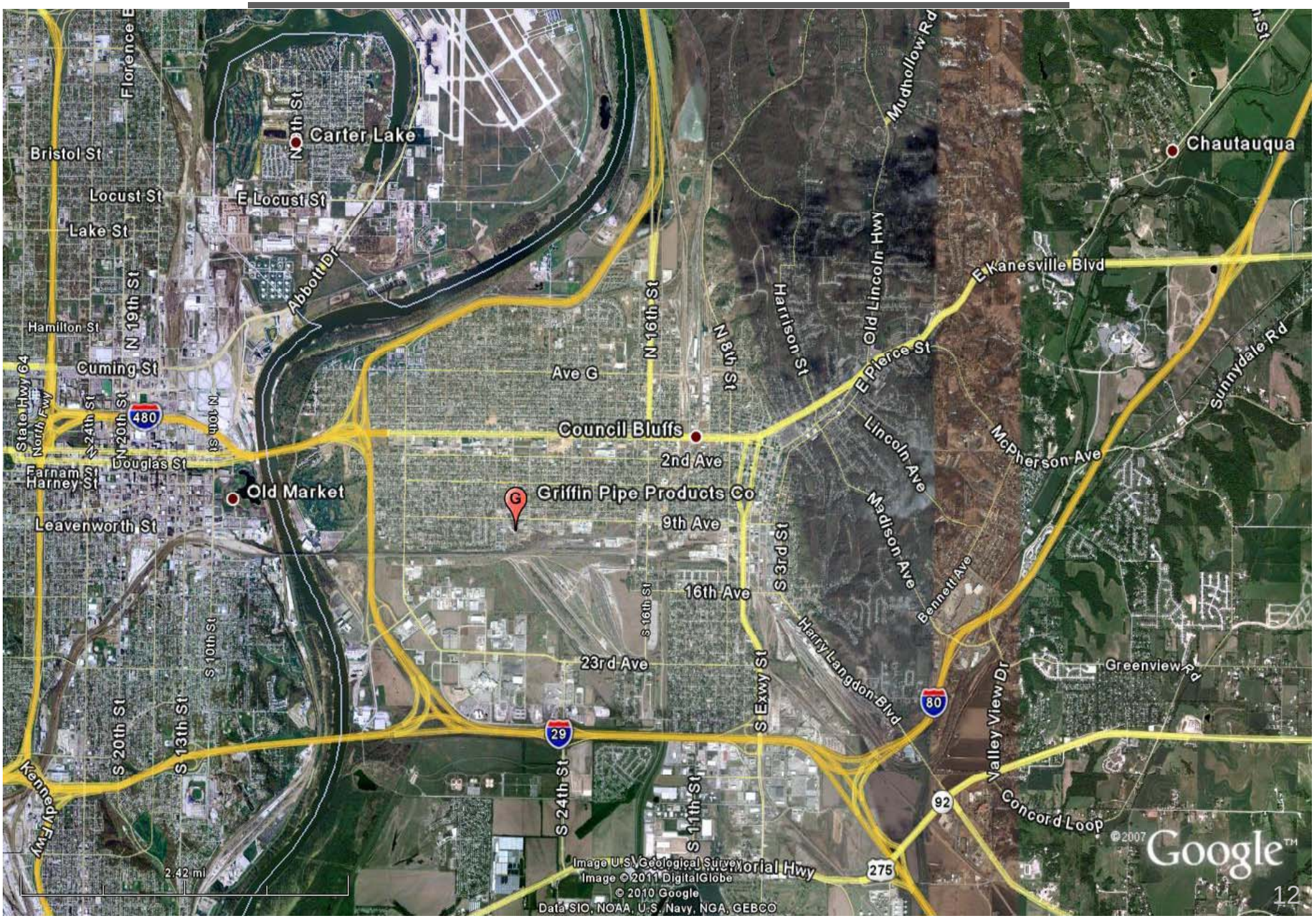
- **EPA's rulemaking to revise the NAAQS also included new monitoring provisions**
  - **Required states to monitor lead sources suspected or known of causing a NAAQS violation**
  - **EPA established a 1 ton per year* lead emission rate as a minimum emissions rate threshold to identify sources to monitor**
  - **Monitors had to be operational by January 1, 2010**
    - Monitoring waivers - Only available for sources with modeled impacts no greater than 50% NAAQS

*In a subsequent rulemaking, EPA lowered this threshold to 0.5 tons/yr

Source Oriented Lead Monitoring In Iowa

- **Department reviewed emissions inventory**
- **Required stack tests at facilities with higher potential for Pb emissions or uncertainty**
- **Modeled facility lead emissions to estimate air quality impacts**
  - **Facilities w/ modeled impacts no greater than 50% NAAQS eligible for monitoring waiver**
- **Griffin Pipe Products Company**
  - **The only facility with emissions greater than one ton per year and not eligible for a waiver**
  - **Source oriented monitor started November 3, 2009**

Lead Monitor - Area Overview



Lead Monitor Location

Air Quality - Lead Data

- **Data: November 2009 – December 2010**
- **14 months of data → Twelve 3-month rolling averages**

Time Period	3-Month Rolling Average	Over NAAQS
Nov '09 - Jan '10	0.10	
Dec '09 - Feb '10	0.03	
Jan-Mar (2010)	0.07	
Feb-Apr (2010)	0.12	
Mar-May (2010)	0.14	
Apr-Jun (2010)	**0.17**	X
May-Jul (2010)	**0.20**	X
Jun-Aug (2010)	**0.26**	Maximum
Jul-Sep (2010)	**0.24**	X
Aug-Oct (2010)	**0.25**	X
Sep-Nov (2010)	**0.18**	X
Oct-Dec (2010)	0.14	

Lead Monitoring Summary

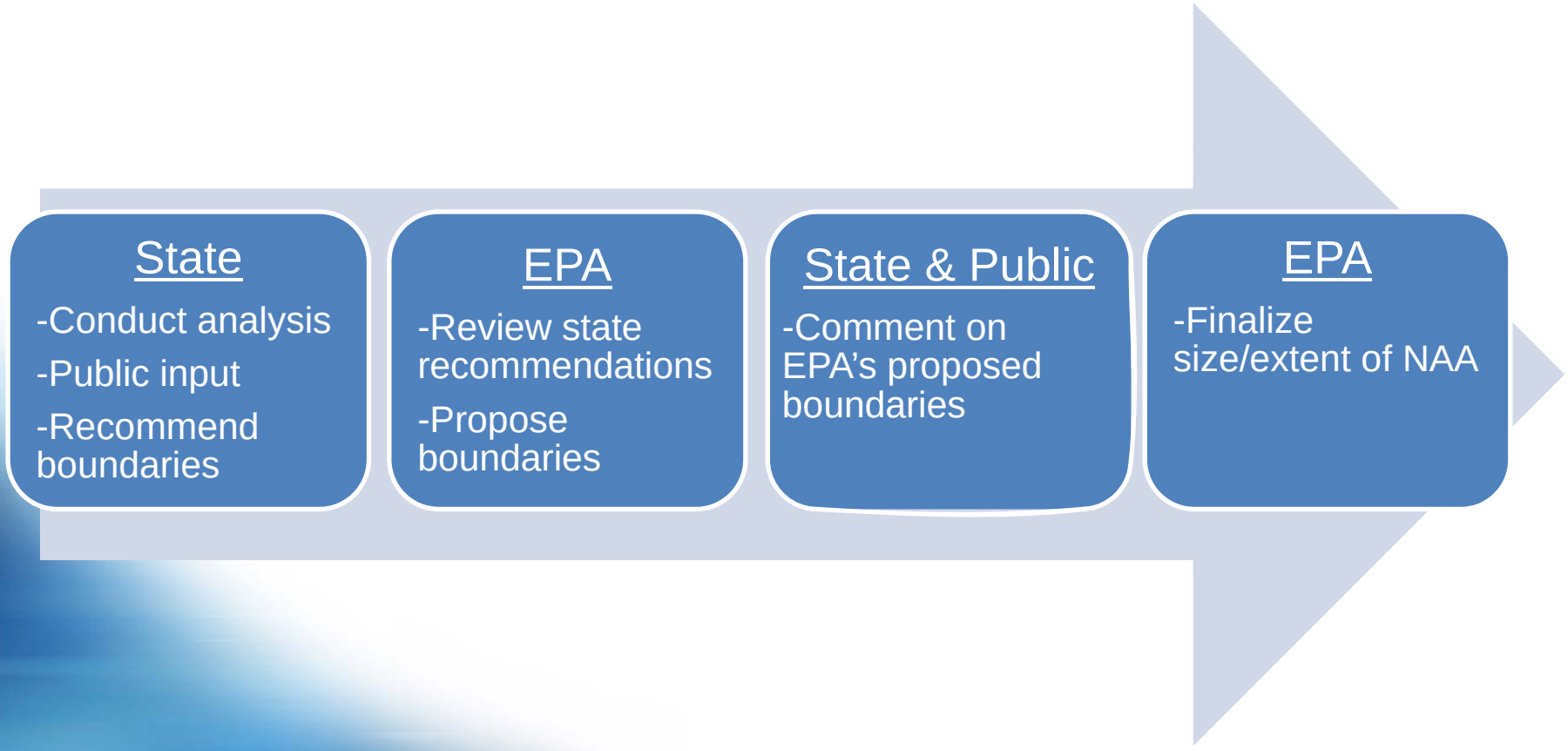
- **Measurements at Griffin Pipe lead monitor show a violation of the lead NAAQS**

- **Standard 0.15 ug/m3.**
  - **Measured maximum– 0.26 ug/m3**
  - **Six monitored violations**
    - Only one violation is needed for nonattainment

- **EPA will issue second designations in October 2011**

Nonattainment Designations Overview

- **Designations process ultimately establishes the extent of a non-attainment area (NAA)**



Designations – Boundary Development

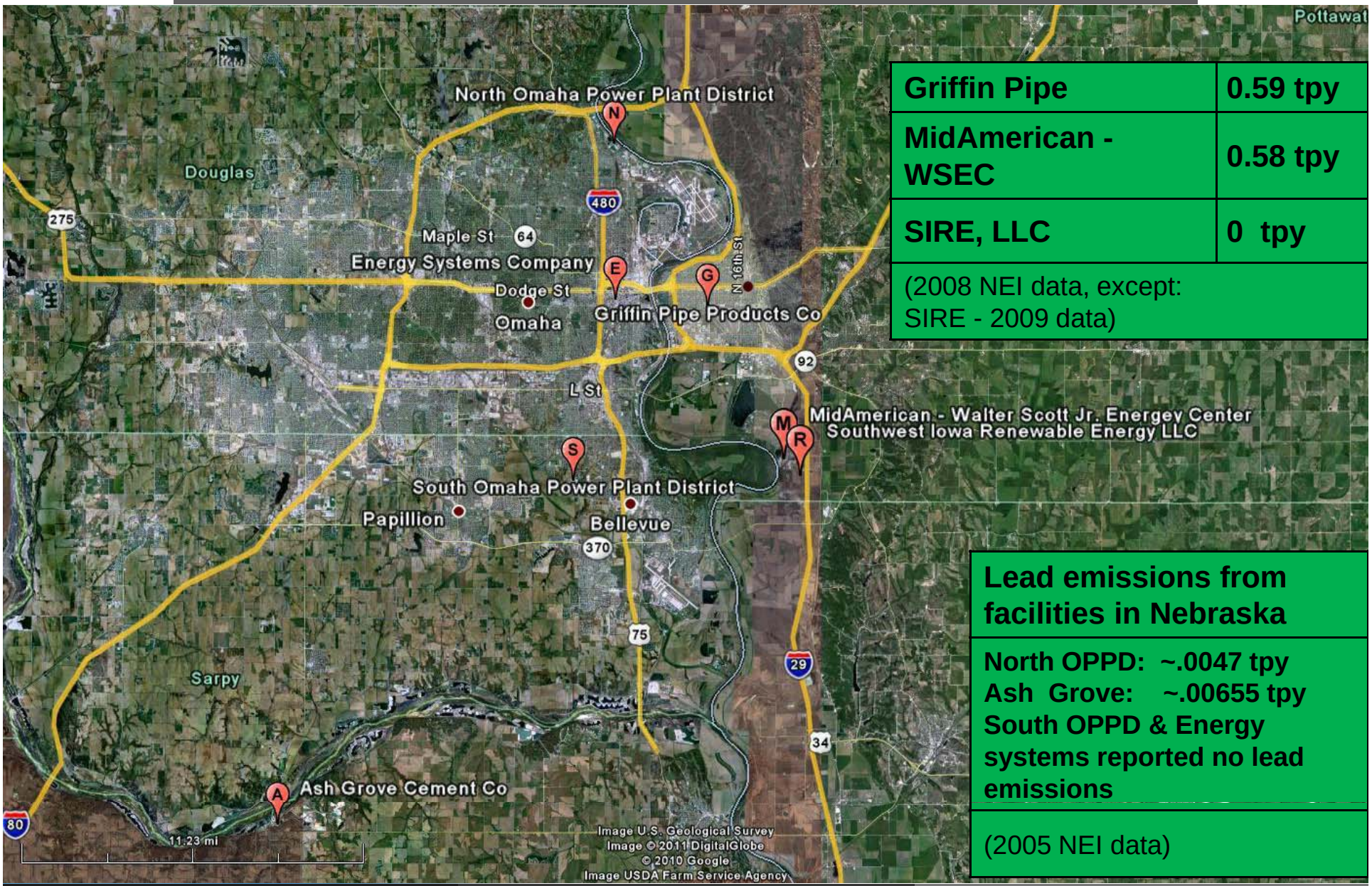
- **State can provide input/recommendations to EPA**
- **EPA presumptive nonattainment boundary:**
  - **County**
- **Perform 8-factor analysis**
  - **Additional analysis (*e.g.* dispersion modeling) to support state recommendations**
    - Particularly important if recommending non-presumptive boundary

Designations – Boundary Development (cont.)

Criteria for Determining Boundaries

- **Case-by-case basis**
- **Must include area that is violating the standard plus nearby areas that contribute to the violation**
- **Recommendations based on an evaluation of eight factors and other relevant data**
- **All factors & data considered in making a recommendation**
  - **No formulas or definitive tests; weight of evidence used**

Emissions: (lead actual emissions)



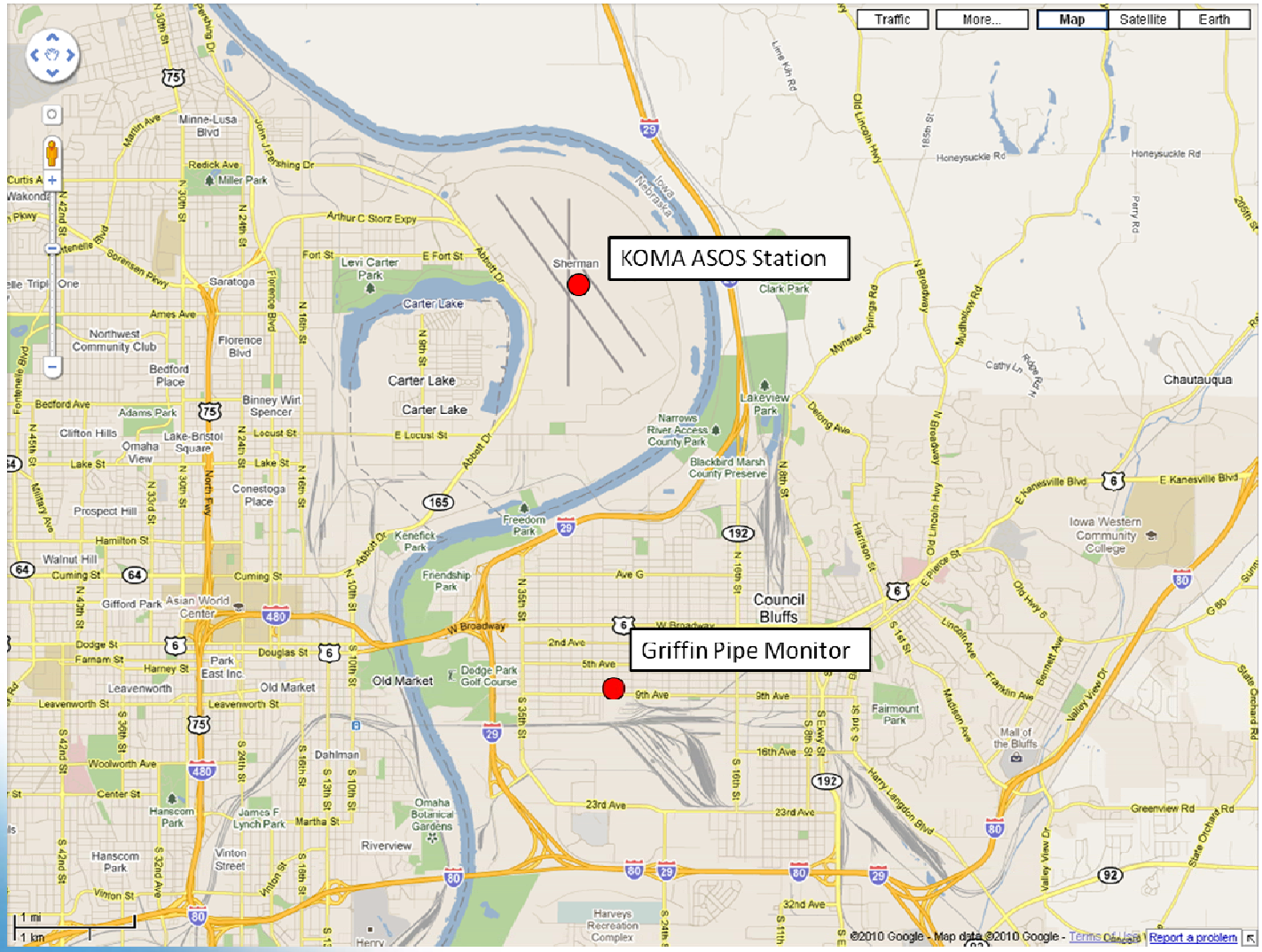
Griffin Pipe	**0.59 tpy**
MidAmerican - WSEC	**0.58 tpy**
SIRE, LLC	**0 tpy**
(2008 NEI data, except: SIRE - 2009 data)	

Lead emissions from facilities in Nebraska
North OPPD: ~.0047 tpy **Ash Grove: ~.00655 tpy** **South OPPD & Energy systems reported no lead emissions**
(2005 NEI data)

Meteorology

- **Analysis of meteorological variables that influence lead concentrations**
- **Focus is on wind direction**
- **Meteorological data collected at Eppley Airfield (KOMA) in Omaha, NE**

Meteorology

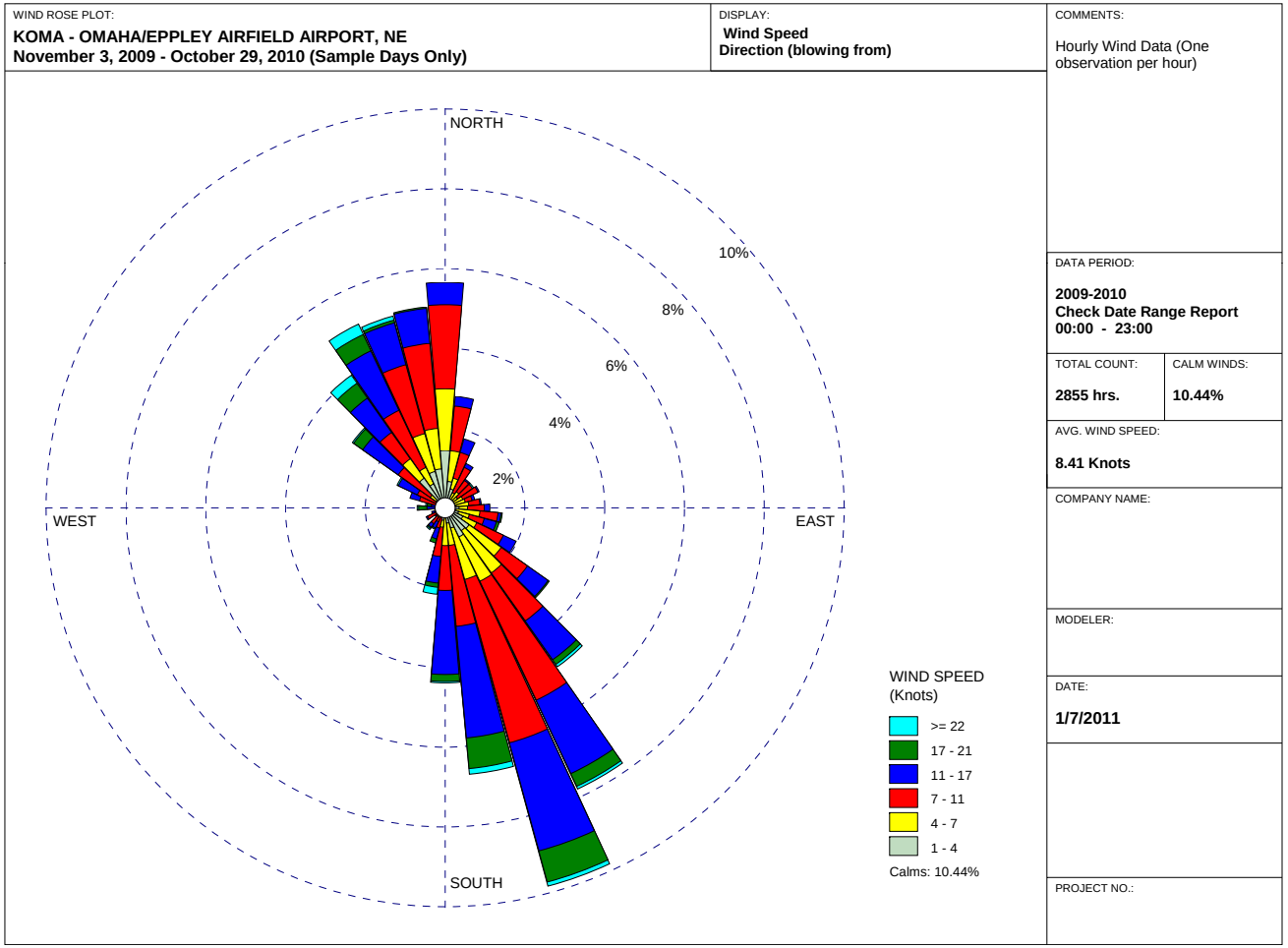


Meteorology

- **Wind rose is a graphical representation of prevailing wind directions**
- **Shows distribution of measured wind direction over a period of time**
- **Length of each bar represents frequency**
- **Azimuth represents the measured direction (coming from)**

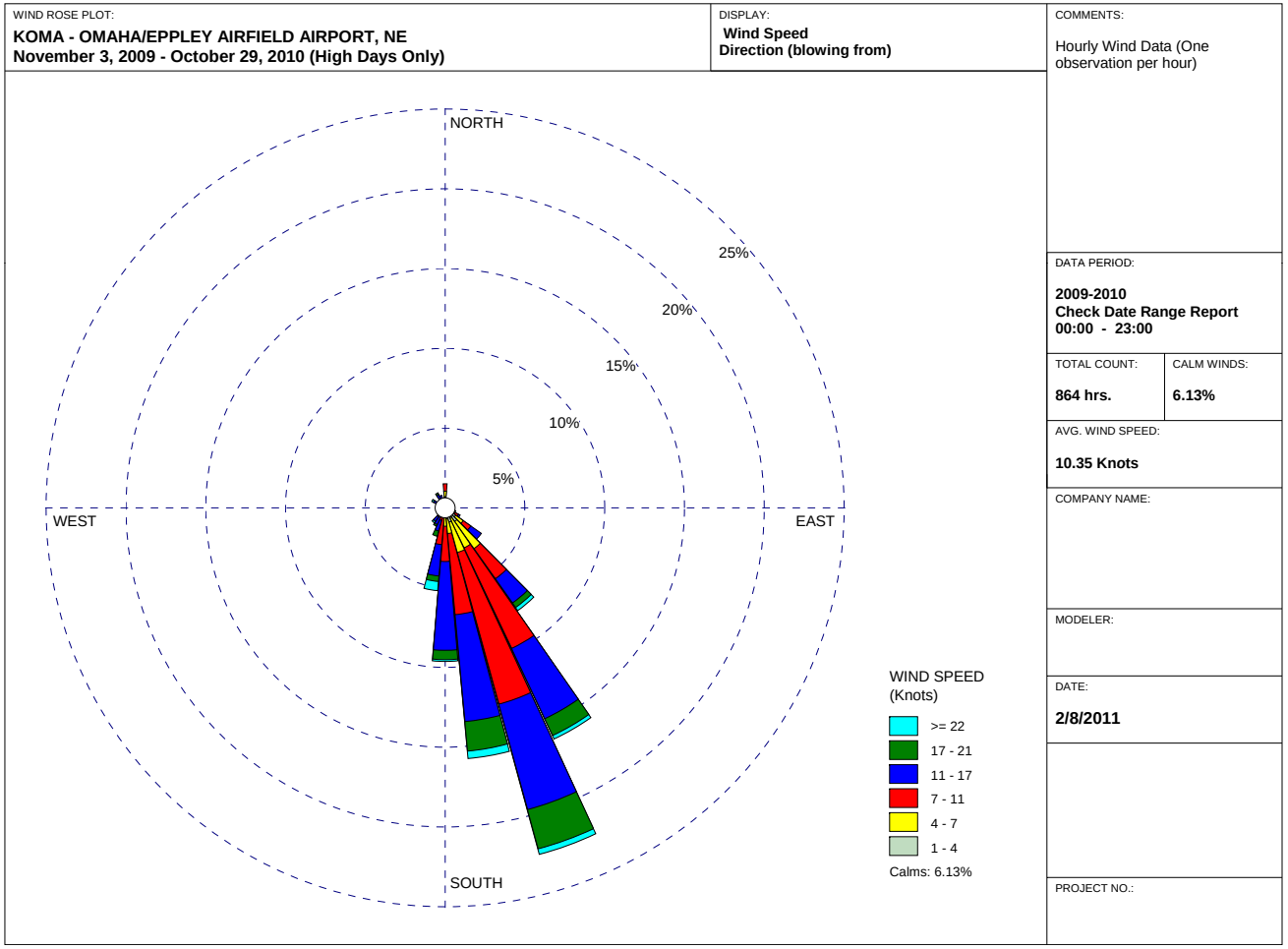
Meteorology

- **11/03/2009-10/29/2010 All Sample Days**



Meteorology

- **11/03/2009-10/29/2010 Days > 0.154 µg/m^3**



Meteorology

- **Winds over a year long period are generally from the south-southeast and north to northwest**
- **On days with elevated measured lead concentrations winds are predominantly from the south-southeast**
- **Coincides with the direction of Griffin Pipe from the monitor**

Level of Emissions Controls: Common Lead Controls for Foundries

- **Scrap Management Plan**
  - Best type of control
  - Eliminates lead (Pb) at the source
  - Not 100% efficient
- **Wet Scrubbers**
  - Rated up to 98% efficient
  - Test data demonstrates 95 – 97% efficient
  - Resource intensive (water)
- **Baghouses**
  - Best add-on control
  - Rated up to 99.99% efficient
  - Test data demonstrates 99.90 – 99.95%

Griffin Pipe Permitting Activities: Pre 2011 Add-on Control

- **Cupola**
  - **Wet Scrubber**
    - % control unknown
    - March & May 2009 tests averaged 1.20 lb/hr
- **Magnesium Inoculation**
  - **Majority vented through wet scrubber**
  - **Rest of emissions uncontrolled**
- **Desulfurization**
  - **No control**
  - **Actual emission rate unknown**

Griffin Pipe Permitting Activities: Changes in 2010

- **Replaced off-take system on cupola**
  - **Standard now used in industry**
  - **Collected more emissions from cupola**
  - **Reduced plugging of system**
  - **Lower pressure drop**
    - Increased performance of scrubber system
  - **Tested at 0.59 lb/hr in March 2010**

Griffin Pipe Permitting Activities: 2011 & Beyond Controls

- **New requirements for additional controls**
  - **Prevention of Significant Deterioration (PSD) project**
  - **PSD projects require Best Available Control Technology**
    - Lowest emissions possible considering technological, energy, and cost factors
- **Scrap Management Plan (SMP)**
  - **Percent reduction unknown**
- **Baghouse**
  - **Griffin Pipe used 99% in its application**
  - **Likely 99.9%+ based on test data elsewhere**
  - **Example:**
    - Inlet of 100 lbs @ 99% reduction = 1 lb
    - Inlet of 100 lbs @ 99.9% reduction = 0.1 lb

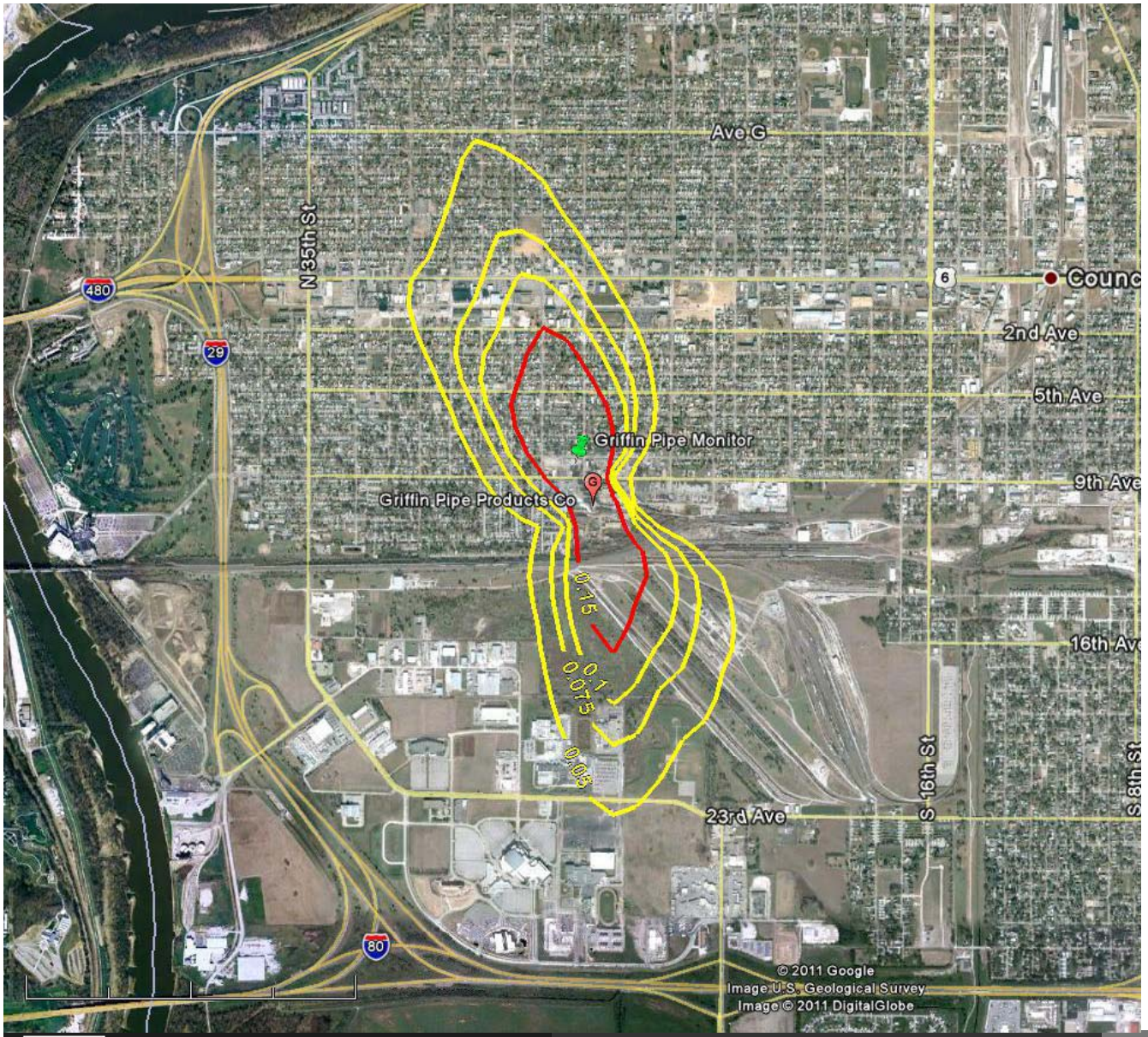
Griffin Pipe Permitting Activities: Emission Rates

- **Cupola**
  - **0.0044 lb of Pb/ton of metal charged**
    - Equivalent to 0.26 lb/hr at maximum production
- **Magnesium & Desulfurization**
  - **0.0055 lb of Pb/ton of metal charged**
    - Equivalent to 0.33 lb/hr at maximum production
- **Limits allow for variability**
  - **In lead (Pb) content**
  - **In control efficiency of baghouse**
- **Facility modification (stack location & stack height changes)**
- **NAAQS violations are not anticipated after controls**

Additional Factor: Air Dispersion Modeling

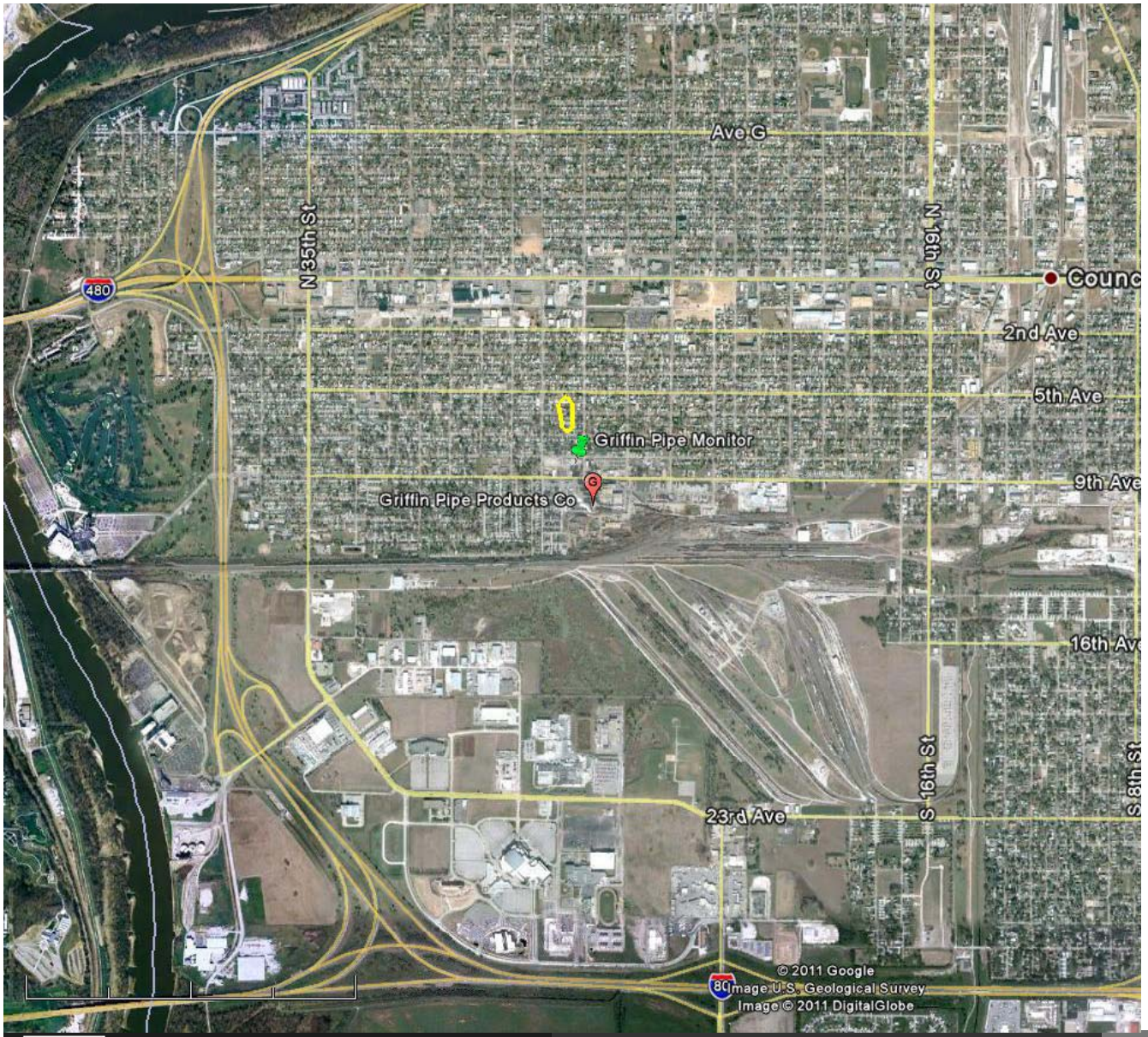
- **Included all point sources of lead in the region**
  - **EPA's AERMOD dispersion model**
  - **2000-2004 meteorological data**
- **Determine extent of area where predicted lead impacts are 0.15 ug/m3 or higher**
- **Consider how concentrations change with increasing distance from the facility**
- **Determine contributions to lead concentrations**
- **Model Griffin Pipe's changes & controls**

Impacts: Before PSD Permitting Project



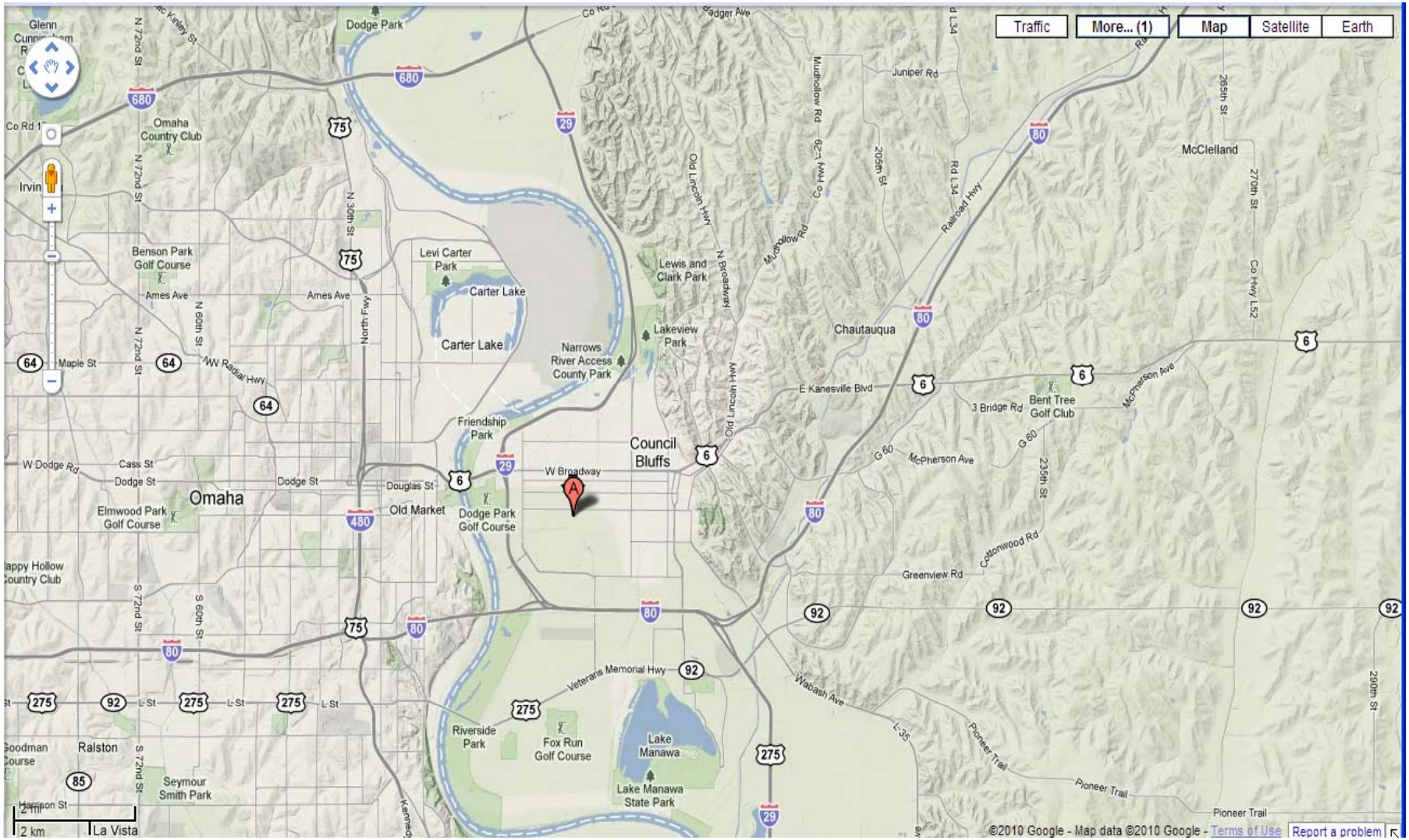
- **Contours: show areas with similar concentrations**
- **Red contour: Extent of modeled NAAQS violations**
- **Griffin Pipe emission rates: Actual emissions, based upon March 2010 stack test data**
- **Maximum: 0.60 ug/m3**

Impacts: After PSD Permitting Project



- **Griffin Pipe emission rates: Potential emission rates after recent PSD permitting activities**
- **No modeled NAAQS violations**
- **Maximum: 0.054 ug/m3**

Topography



- **Does not influence boundary determination. Any topographical effects inherently considered in meteorological data**

Jurisdictional Boundaries

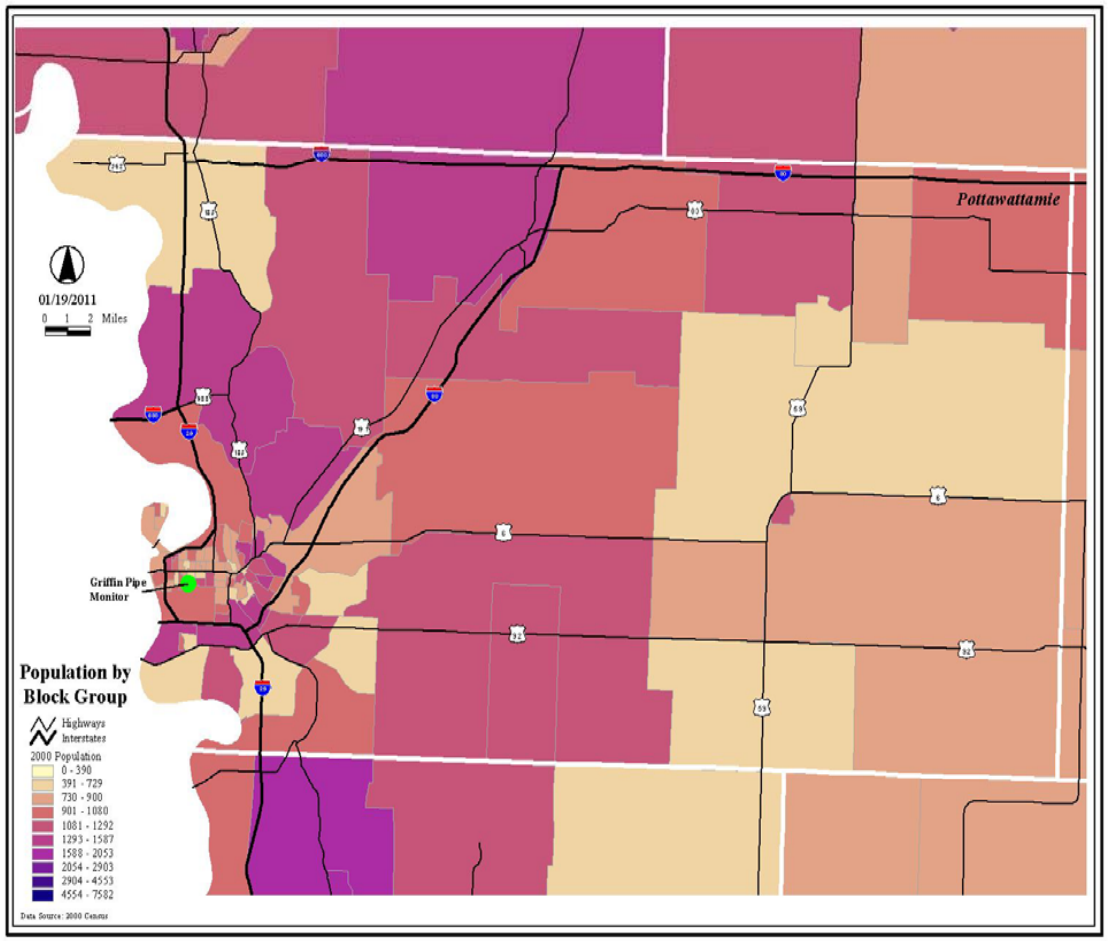
- **Boundary types often considered:**
  - **County border**
  - **City borders**
  - **Sections/Townships**
  - **IA/NE border**
  - **Metropolitan Planning Organization borders**

- **Not a factor in boundary determination at this time**

Growth

- **Population Growth 2000 – 2009 (US Census Data)**
  - **2.8 % in Pottawattamie County (2,417 person increase)**
- **Woods & Poole Economics, Inc**
  - **Forecast population increase ~0.5% between 2010 & 2020**
- **Industrial or business growth not expected to increase lead emissions**

Population Density / Urbanization

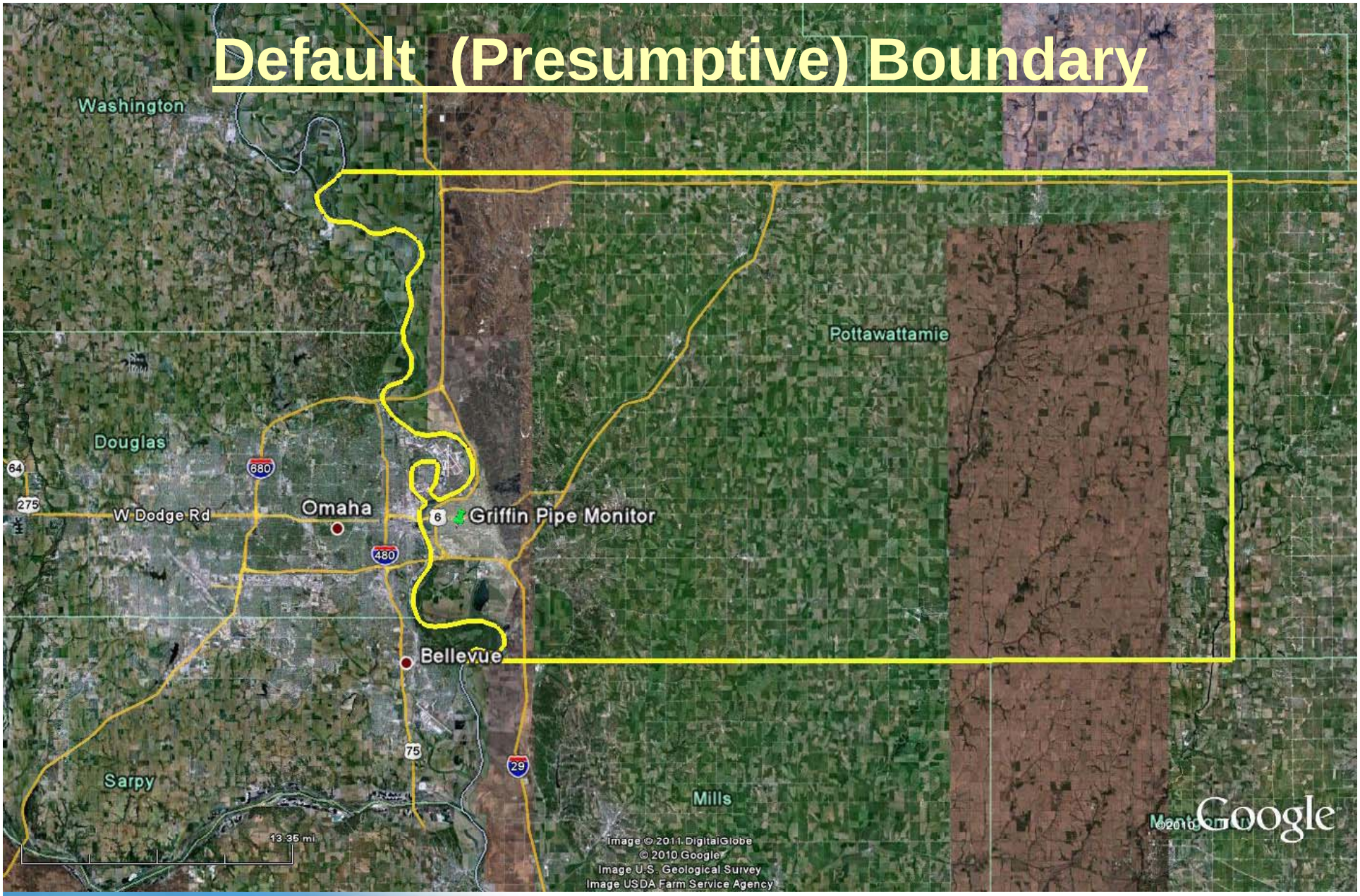


- **Pottawattamie Co:**
  - **Second largest in size (by area)**
  - **predominantly rural**
- **Population density less than 100 people/sq. mile**
- **~2/3rd of County population in Council Bluffs**
- **County boundary not appropriate**

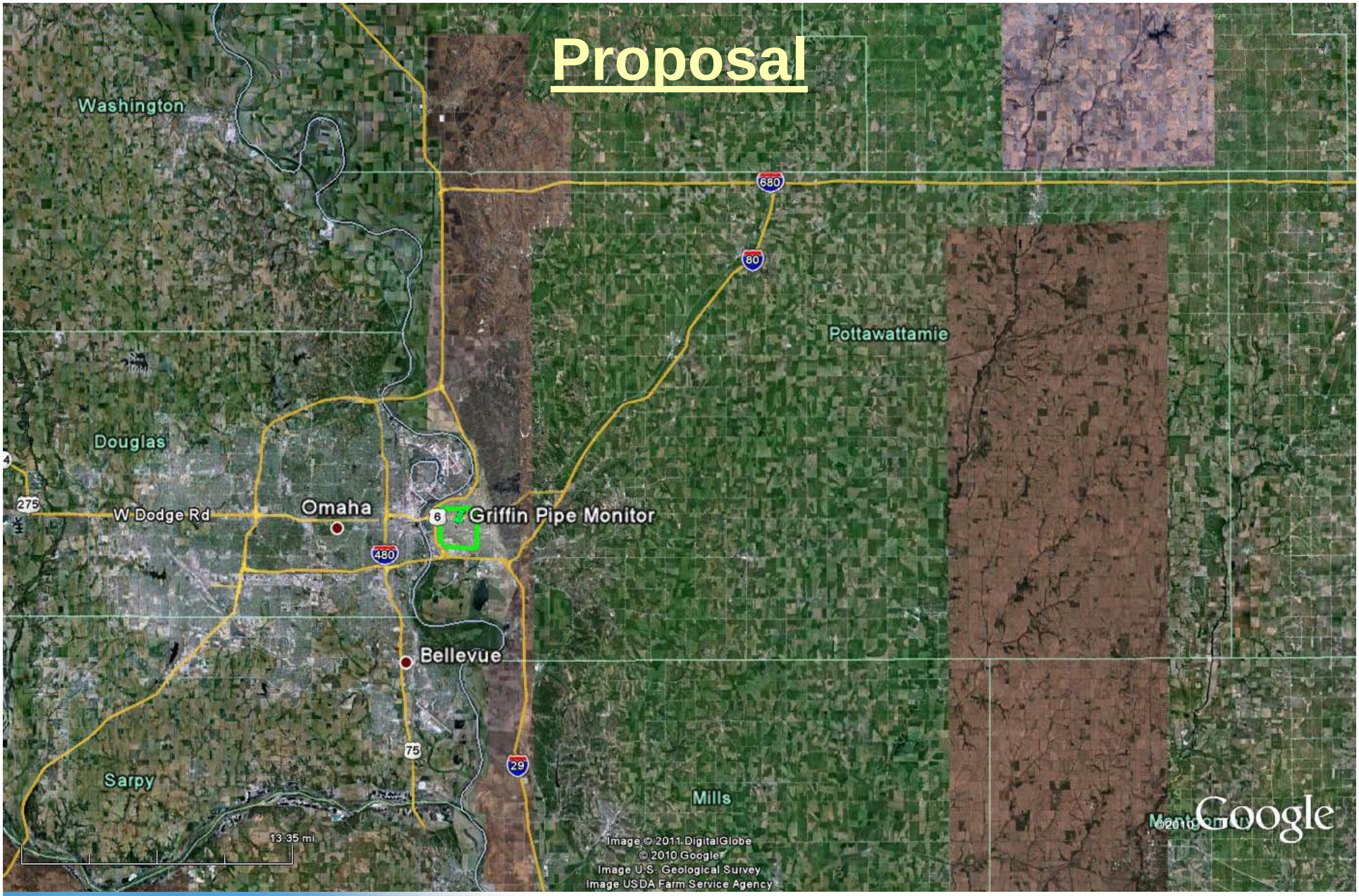
Boundary Development

- **Consider:**
  - **Weight of evidence from the 8-factor analysis**
  - **Modeling**
    - Combines many of the factors in a comprehensive, scientific framework
- **Conclusion:**
  - **Presumptive county boundary not appropriate**

Default (Presumptive) Boundary



Proposal


Washington
Douglas
Pottawattamie
Sarpy
Mills
Omaha
W Dodge Rd
Griffin Pipe Monitor
Bellevue
680
80
480
275
75
29
6
13.35 mi
Image © 2011 DigitalGlobe
© 2010 Google
Image U.S. Geological Survey
Image USDA Farm Service Agency
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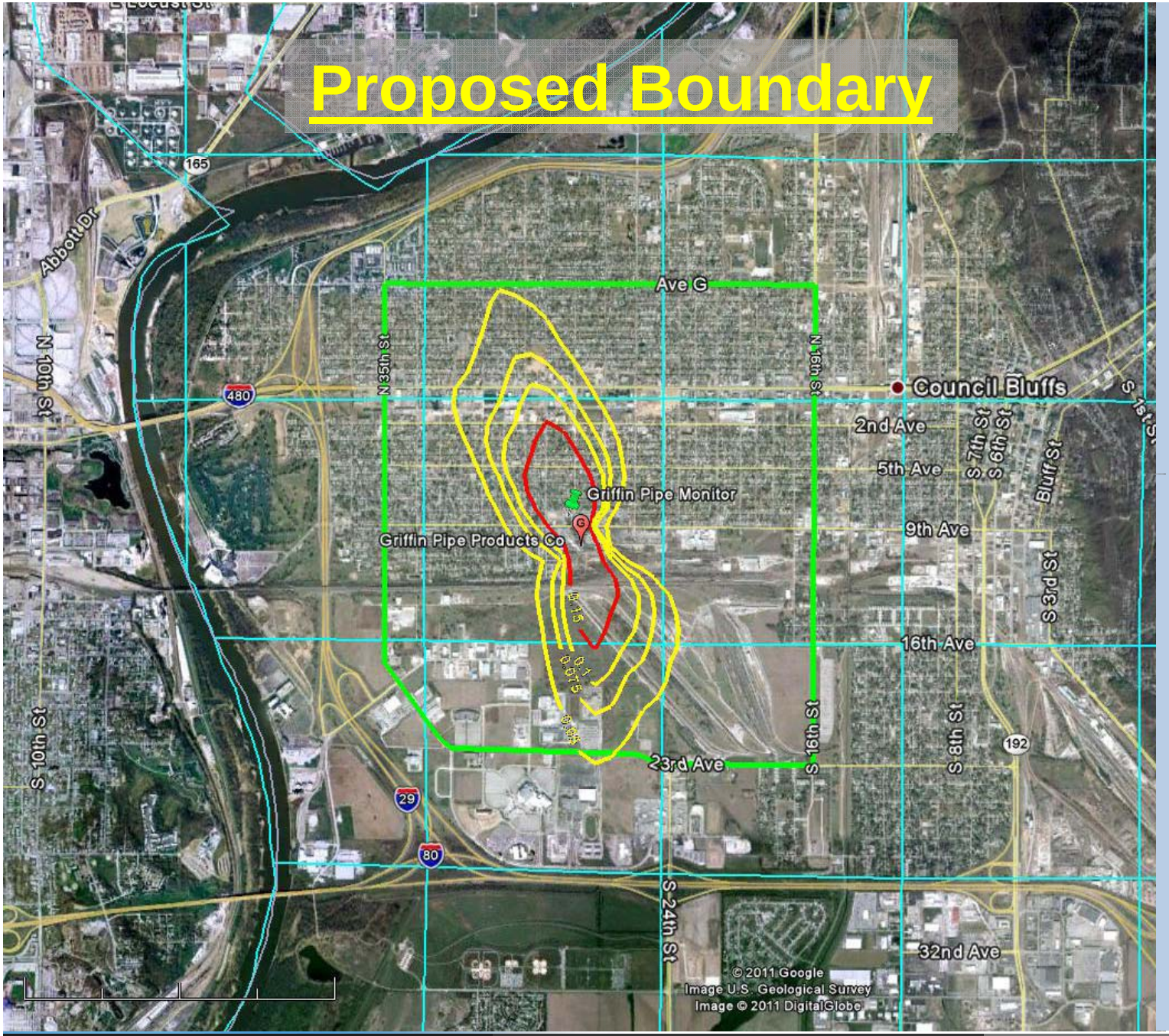
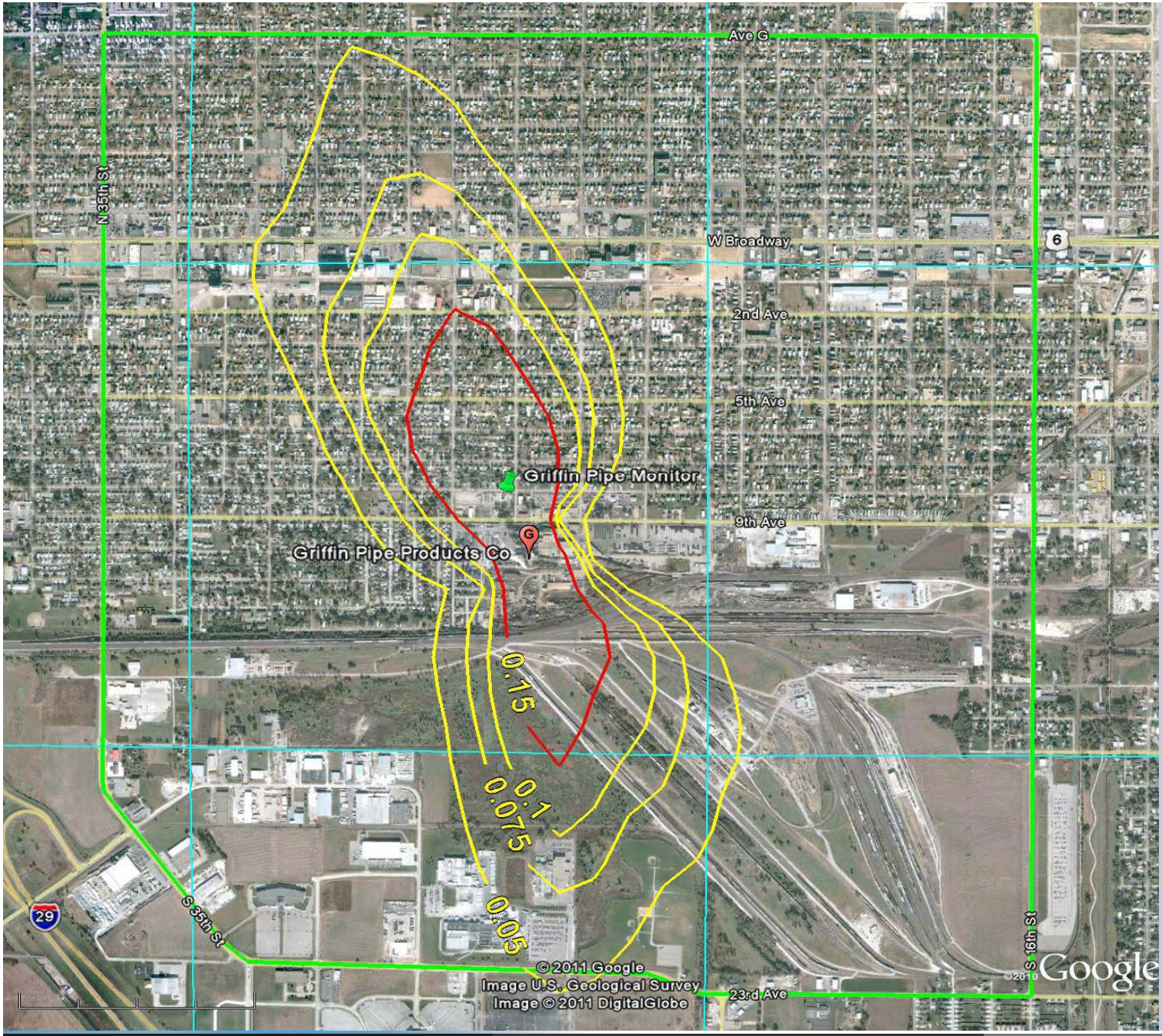
Proposed Boundary



- **Northern Border:**
  Ave G
- **Southern Border:**
  23rd Ave
- **Eastern Border:**
  N 16th St / S16th St
- **Western Border:**
  N 35th St / S 35th St
- **Legend**
  Proposed Boundary
  Section Lines
  Modeled NAAQS violation (pre PSD)
  Modeled Contours



- **Northern Border:** Ave G
- **Southern Border:** 23rd Ave
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- **Western Border:** N 35th St / S 35th St
- **Legend**
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Comments, Questions, Discussion

- **Jim McGraw**
  - jim.mcgraw@dnr.iowa.gov **515-242-5167**
- **Matthew Johnson**
  - matthew.johnson@dnr.iowa.gov **515-242-5164**
- **David Brown**
  - david.brown@dnr.iowa.gov **515-242-6494**
- **Chris Roling**
  - chris.roling@dnr.iowa.gov **515-242-6002**