Kansas Smoke Management Advisory Committee

Meeting 1 – Newton, Kansas
April 9, 2010

Thomas Gross, Bureau of Air
Kansas Department of Health and Environment
Goals of Meeting #1

- Provide information to participants about air quality issues from Flint Hills burning
- Listen to concerns regarding all aspects of the issue
- Build consensus on a path forward
- Establish next meeting date and location
Air Quality and Flint Hills Burning

- History of the Flint Hills air quality issue
- Ozone and Particulate Matter (PM)
  - Health Effects
  - Standards
- New Ozone Standard
- Monitoring and Emissions Data
- Kansas City and Wichita Status
- Nonattainment Designation and its Impacts
History of the Flint Hills Issue

- 2003 burning caused ozone exceedances in KC and elsewhere
- EPA and KDHE have met with Ag officials from late 2003 through present
  - KLA, Farm Bureau, KSU researchers, KSU extension, NRCS, DoA, Prescribed Fire Council and more
- Research, education, outreach and field training have been primary outcomes to date
- EPA denied KDHE request to flag 2009 data due to the lack of a smoke management plan
Pollutants "bake" together in direct sunlight forming ozone.
Ozone and PM – Health Effects

**Respiratory:**
- Coughing, wheezing, reduced lung function
- Reduced resistance to infection
- Aggravation of asthma, emphysema and bronchitis

**Cardiovascular:**
- Inflammation
- Heart failure
- Cardiac arrhythmia
- Hardening of the arteries
- Stroke
- Heart attack
These health effects lead to:
- Increased medication use among asthmatics,
- More frequent doctors visits and school absences
- Increased emergency room visits and hospital admissions, and
- Increased risk of premature death in people with heart and lung disease

At-risk groups include:
- People with lung disease (asthma, emphysema or chronic obstructive pulmonary disease)
- Children and older adults
- People who are active outdoors, including children and outdoor workers
September 21, 2006 – EPA promulgated new standard for particulate matter

- PM$_{2.5}$ – fine particles < 2.5 micrometers in diameter
  - EPA strengthened 24-hour standard from 1997 level of 65 microgram per cubic meter (µg/m$^3$) to 35 µg/m$^3$
  - Retained current annual standard at 15µg/m$^3$

- PM$_{10}$ – particles < 10 micrometers in diameter
  - Retained existing national 24-hour standard of 150µg/m$^3$
  - Revoked the annual standard
Ozone Standard

- Revised in 1997
  - 8-hour standard of 0.084 ppm
- Revised in 2008
  - 8-hour standard of 0.075 ppm
  - Primary standard equals secondary standard
  - Form: 3 year average of the 4th highest daily maximum 8-hr average ozone concentration
- January 6, 2010 – Proposed new 8-hour standard
  - primary “health” standard 0.060-0.070 ppm
  - secondary “welfare” standard 7-15 ppm-hours
  - Will require new monitoring locations
Kansas Ozone Data

- **Proposed Range**: 0.06 - 0.07 PPM
- **2008 Standard**: 0.075 PPM

Data for:
- Kansas City (Wyandotte)
- Cedar Bluff (Trego)
- Peck (Sumner)
- Rocky Creek MO (Clay)
April 8-Hour Ozone Maximum Values

Kansas City
Heritage Park
Park City
Peck
Wichita

2003 2004 2005 2006 2007 2008 2009
2005 Kansas Man-Made Emissions of NOx and VOCs

Source: KDHE and USEPA 2005 NEI Data
Kansas Ozone Status

- KC violated the 2008 - 0.075 ppm standard
  - Standard under reconsideration by EPA
- KDHE in final stages of adopting new rules for industry and trucks in KC
- Wichita met 0.075 ppm standard
- 2008 and 2009 were relatively good years for ozone due to cool summers
- Highest readings during entire 2009 ozone season for KC and Wichita were due to burning
- KDHE will recommend counties for designation to be included in ozone planning area
Designation Process

- Governor makes recommendations to EPA
  - Recommendation Principles
    • Does a monitor in a county violate the standard?
    • Do emission sources in a county contribute to violations in a “nearby” area?
  - Designation Criteria
    • Emissions: source location, level of control, transport
    • Population density, growth, traffic and urbanization
    • Monitoring data in surrounding area
    • Geography, topography, meteorology
Nonattainment Impacts

- State Implementation Plan (SIP) preparation
  - Enhanced emissions inventory
  - Additional photochemical modeling
- Transportation plan conformity with SIP
- Curtails economic development
- New rules to reduce NOx and VOCs emissions
- Potential sanctions for failure to meet standard
- Increased cost for fuel, electricity, consumer products, etc.
- Citizens breathing polluted air
Flint Hills Smoke Events

- Satellite Imagery
- Monitoring Results
- Impacts on Other States

Doug Watson, Bureau of Air
Kansas Department of Health and Environment
April 12, 2003 – Rangeland Fires and Smoke Plume
April 13, 2003 – Rangeland Fires and Smoke Plume
Out of State PM$_{2.5}$

Continuous PM$_{2.5}$ data downloaded from [http://www.airnowtech.org](http://www.airnowtech.org)
Data has not gone through final QA/QC and should be considered preliminary
April 7, 2009 Smoke Plumes
April 7, 2009
Fire and Smoke Plumes

Disclaimer: Location accuracy of fires may be off by several miles. Please see FAQ for details.
### April 7, 2009 – Ozone (ppm)

<table>
<thead>
<tr>
<th>KC Area Sites</th>
<th>Wichita Sites</th>
</tr>
</thead>
<tbody>
<tr>
<td>JFK: 0.061</td>
<td>Health Dept.: 0.048</td>
</tr>
<tr>
<td><strong>Heritage Park:</strong> 0.079</td>
<td>Park City: 0.044</td>
</tr>
<tr>
<td>Leavenworth: 0.064</td>
<td>Sedgwick: 0.050</td>
</tr>
<tr>
<td>Mine Creek: 0.071</td>
<td>Peck: 0.051</td>
</tr>
</tbody>
</table>

8 Hour Standard: 0.075 PPM
April 7, 2009 – Particulate Matter

<table>
<thead>
<tr>
<th>KC Area Sites PM 2.5</th>
<th>Wichita Sites – PM10</th>
</tr>
</thead>
<tbody>
<tr>
<td>JFK</td>
<td>Health Dept</td>
</tr>
<tr>
<td>138.5 µg/m³</td>
<td>53.5 µg/m³</td>
</tr>
<tr>
<td>Mine Creek</td>
<td>Glen &amp; Pawnee</td>
</tr>
<tr>
<td>106.3 µg/m³</td>
<td>54.8 µg/m³</td>
</tr>
<tr>
<td>K96 &amp; Hydraulic</td>
<td>G.Wash &amp; Skinner</td>
</tr>
<tr>
<td>44.6 µg/m³</td>
<td>55.8 µg/m³</td>
</tr>
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</table>
April 8, 2009 Smoke Plumes
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Fire and Smoke Plumes
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<td>JFK: 0.051</td>
<td>Health Dept.: 0.095</td>
</tr>
<tr>
<td>Heritage Park: 0.054</td>
<td>Park City: 0.080</td>
</tr>
<tr>
<td>Leavenworth 0.054</td>
<td>Sedgwick: 0.081</td>
</tr>
<tr>
<td>Mine Creek 0.061</td>
<td>Peck: 0.081</td>
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</tbody>
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8 Hour Standard: 0.075 PPM
### April 8, 2009 – Particulate Matter

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<th>Wichita Sites – PM10</th>
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</thead>
<tbody>
<tr>
<td>JFK</td>
<td>Health Dept 186.2 µg/m³</td>
</tr>
<tr>
<td>Mine Creek 72.1 µg/m³</td>
<td>Glen &amp; Pawnee 182.1 µg/m³</td>
</tr>
<tr>
<td>K96 &amp; Hydraulic</td>
<td>K96 &amp; Hydraulic 163.4 µg/m³</td>
</tr>
<tr>
<td>G.Wash &amp; Skinner</td>
<td>G.Wash &amp; Skinner 204.3 µg/m³</td>
</tr>
</tbody>
</table>
Contact Information:
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Topeka, Kansas 66612
(785) 296-0910

dwatson@kdheks.gov
Smoke Management Plan Process

- State of Kansas Law and Regulations
- Exceptional Events
- Wildland and Prescribed Fires
- Why do a Smoke Management Plan (SMP)?
- EPA Smoke Management Plan Guidance
- Other State SMP links
**Relevant Kansas Law**

65-3005. Powers of the Secretary. The secretary shall have the power to... adopt regulations.....control air pollution..... encourage local units of government to handle air pollution problems

...the standards so established **shall not be any more stringent, restrictive or expansive** than those required under the federal clean air act, *(HB 2369 amendment)*

65-3010. Emission control requirements.
The secretary shall establish emission control requirements, and requirements for open burning...
Relevant Kansas Regulations

- 28-19-645. Open burning prohibited

- 28-19-647. Exceptions to prohibition on open burning. .....open burning for the purpose of crop, range, pasture, wildlife or watershed management in accordance with K.A.R. 28-19-648

- 28-19-648. Agricultural open burning. (a) Open burning of vegetation......shall be exempt.....provided that the following conditions are met:
  ....notify the local fire control authority......unless the appropriate local governing body has established a policy that notification is not required; ........
Counties that require notification and approval: 10

Counties that require notification only: 11
### County and Acres Burned (2003)

<table>
<thead>
<tr>
<th>County</th>
<th>Acres Burned (2003)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Greenwood</td>
<td>369,344</td>
</tr>
<tr>
<td>Chase</td>
<td>302,734</td>
</tr>
<tr>
<td>Butler</td>
<td>250,425</td>
</tr>
<tr>
<td>Elk</td>
<td>210,981</td>
</tr>
<tr>
<td>Lyon</td>
<td>209,328</td>
</tr>
<tr>
<td>Cowley</td>
<td>205,853</td>
</tr>
<tr>
<td>Chautauqua</td>
<td>203,768</td>
</tr>
<tr>
<td>Wabaunsee</td>
<td>124,988</td>
</tr>
<tr>
<td>Morris</td>
<td>94,996</td>
</tr>
<tr>
<td>Woodson</td>
<td>89,288</td>
</tr>
<tr>
<td>Coffey</td>
<td>85,143</td>
</tr>
<tr>
<td>Riley</td>
<td>63,830</td>
</tr>
<tr>
<td>Osage</td>
<td>57,838</td>
</tr>
<tr>
<td>Marion</td>
<td>48,000</td>
</tr>
<tr>
<td>Wilson</td>
<td>42,178</td>
</tr>
<tr>
<td>Pottawatomie</td>
<td>36,293</td>
</tr>
<tr>
<td>Geary</td>
<td>29,436</td>
</tr>
<tr>
<td>Shawnee</td>
<td>28,046</td>
</tr>
<tr>
<td>Montgomery</td>
<td>27,969</td>
</tr>
<tr>
<td>Other Counties</td>
<td>81,869</td>
</tr>
</tbody>
</table>

### Ecoregion and Acres Burned (2003)

<table>
<thead>
<tr>
<th>Area</th>
<th>Acres Burned (2003)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flint Hills Ecoregion</td>
<td>1,670,271</td>
</tr>
<tr>
<td>Outside Ecoregion</td>
<td>892,032</td>
</tr>
<tr>
<td>Study Area Total</td>
<td>2,562,303</td>
</tr>
</tbody>
</table>
EPA’s Exceptional Event Rule

- Definition of Exceptional Event (40 CFR 50.1):
  - Affects air quality;
  - Is not reasonably controllable or preventable;
  - Is an event that is caused by human activity that is unlikely to recur at a particular location, or is a natural event; and
  - Is determined by EPA through the process established in the rule.

- Examples: Structural fires, fireworks, natural events and prescribed fires…
EPA’s Exceptional Event Rule

- Prescribed Fire Criteria (40 CFR 50.14):
  - Meets the definition of exceptional event; and
  - State has certified to EPA that it has adopted and is implementing a Smoke Management Program; or
  - State has ensured that the burner employed basic smoke management practices
  - Preamble of March 2007 revision of this rule states that approval will require a Smoke Management Plan [72 FR 13567]
Procedure for Excluding Air Quality Data

- **States must:**
  - Flag the data in the Air Quality System database
  - Flagged data must meet criteria for exceptional event;
  - Submit documentation demonstrating exceedence
    - Emissions related to the event were transported in the direction of violating monitor
    - Size of the affected area
    - Relationship in time between event, transport and recorded concentrations

- **EPA must:**
  - Concur on the flag for the data to be excluded from regulatory decisions
2009 Attempt to Flag Data

- June 19, 2009 – KDHE sent a letter of intent to EPA to flag ozone and PM data due to prescribed burning in the Flint Hills

- KDHE submitted technical documentation to EPA including satellite images, monitoring and meteorological data, and news articles.

- December 23, 2009 – KDHE received a letter from EPA denying KDHE’s flagging of data request stating:
  
  “One of the most significant requirements that has not been addressed is the implementation of the requisite smoke management program (SMP) or best management burn practices required under 50.14 for prescribed burns.”
EPA’s Wildland and Prescribed Fire Guidance

- 1998 Interim Air Quality Policy for Wildland and Prescribed Fires
  - Outlines the responsibilities of land owners and State air quality managers
    - Coordinate fire activities,
    - Minimize air pollutant emissions,
    - Manage smoke from wildland and prescribed fires, and
    - Establish emergency action programs

- EPA working on revised guidance document
Why do a smoke management plan?

- To reduce the impact of emissions from range fires on the public health
- To ensure that the national air quality standards are met
- To ensure that the Flint Hills counties are not designated as part of a Wichita or KC non-attainment area
- To be eligible for an exceptional event flag in the event of an exceedance
Smoke Management Plan
Requirements

- Reduce impacts of prescribed and wildland fire on public health, safety and visibility
- Authorization/restrictions on burning
  - Based on meteorological conditions
- Minimize Air Pollution Emissions
- Public Education and Awareness
- Enforcement
- Program Evaluation
**Congress**

Clean Air Act Section 109
Authority for National Ambient Air Quality Standards

**EPA**

40 C.F.R. Part 50 – National Ambient Air Quality Standards

**Flint Hills Burning**

Exceedance or Violation of NAAQS

**Smoke Management Plan**

<table>
<thead>
<tr>
<th>EPA</th>
<th>KDHE</th>
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<tbody>
<tr>
<td>§51.14 Exceptional Events Rule</td>
<td>Request to Flag Data</td>
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**Possible EPA Approval**

Flint Hills Burning influenced data excluded from use in determinations of exceedances and NAAQS violations

**No Smoke Management Plan**
Goals of SMP
Development Process

- In place by 2011 burn season
- Fully transparent
- Includes all perspectives
- Draws on all available technical expertise
- Final plan that works
Some Questions to Be Answered

- Who will participate in drafting the plan?
- What counties will be in the planning area?
- What are the approval/restriction criteria?
- How will the plan be implemented?
- Who will enforce the plan?
- Who will evaluate the plan?
Smoke Management Plan Links

- Oregon
  - http://www.odf.state.or.us/DIVISIONS/protection/fire_protection/smp/smokemgt_onthe_web.asp
- Minnesota
  - http://files.dnr.state.mn.us/forestry/wildfire/rxfire/minnesotasmokemanagementplan.pdf
- Missouri
- Arkansas
  - http://www.forestry.state.ar.us/manage/smoke_management.pdf
- Illinois
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