The New Federal NESHAP Air Quality Rule for Oil and Natural Gas Area Sources

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Pollutants and Programs

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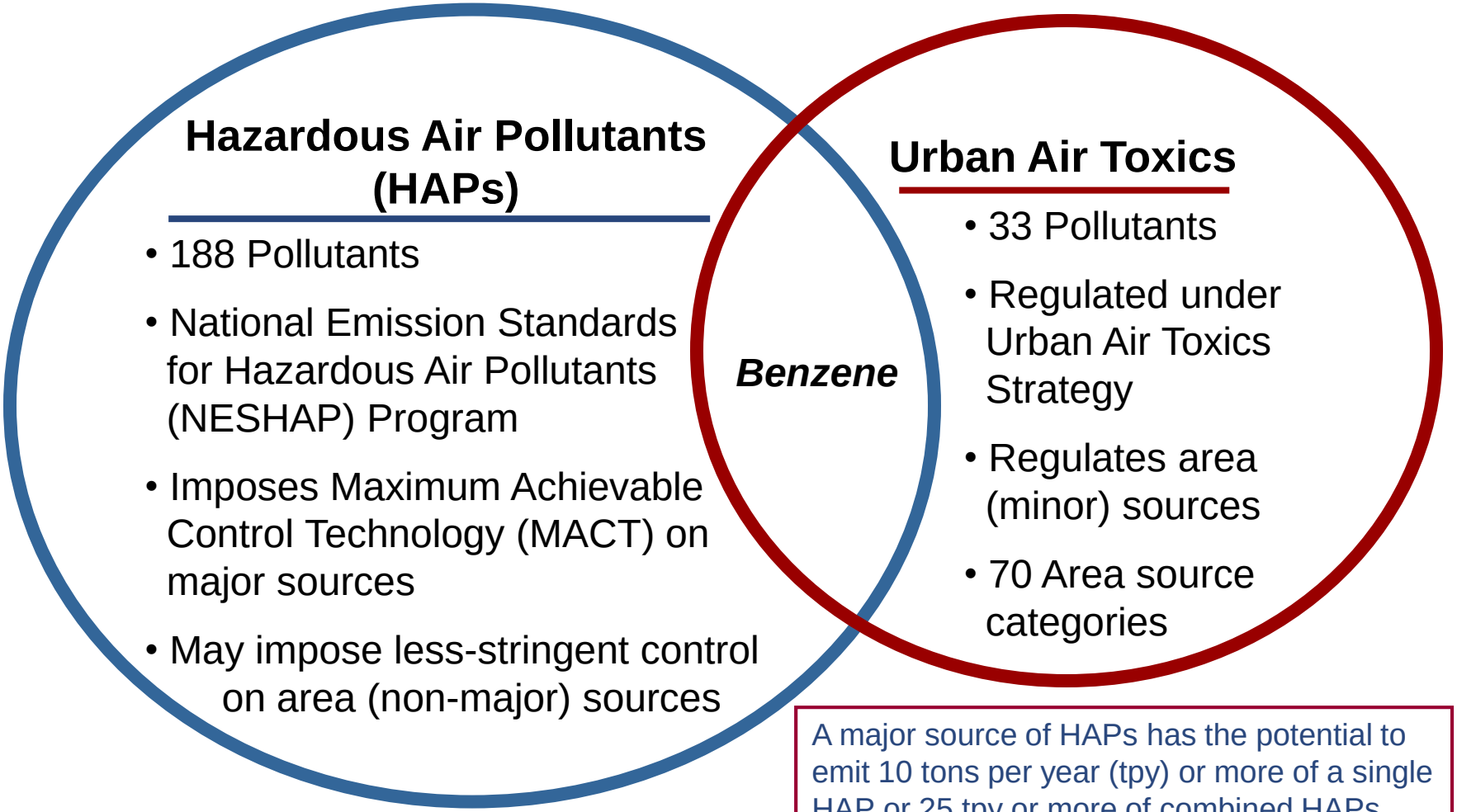

A major source of HAPs has the potential to emit 10 tons per year (tpy) or more of a single HAP or 25 tpy or more of combined HAPs.

Area Source Oil and Natural Gas Production Rule

- Published on January 3, 2007 (72 *FR* 26)
- Rule effective on January 3, 2007
- Revised 40 *CFR* Part 63, Subpart HH
  - Subpart HH formerly addressed only major sources
  - Area source requirements now included in Subpart HH
- Impacts
  - Expected to affect ~2,400 facilities
  - Approximately 50 facilities are expected to need add-on controls
- National Emission Standards for Hazardous Air Pollutants (NESHAP) with interesting “twist”

Overview

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- Rule introduction
- Applicability
  - Affected facilities & geographic areas
  - Affected emissions units
- Requirements for “rural” sources
- Requirements for “urban” sources
- Compliance deadlines
- Compliance strategies

Affected Facilities

- *Nearly all* oil and natural gas production facilities are now subject to Subpart HH
  - "Black oil" facilities are exempt
- Oil and natural gas production facility
  - Includes:
    - Facilities that process, upgrade, or store ***hydrocarbon liquids*** to the point of custody transfer
    - ***Natural gas*** from the well up to and including the natural gas processing plant

What Is an Area Source Under Subpart HH?

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- Short answer:
  - Any existing facility that is not subject to Subpart HH major source requirements
- Good time to check for major/area source status:
  - Emission threshold based on potential to emit (PTE):
    - 10 tpy or more of single HAP, or
    - 25 tpy or more of combined HAPs
- PTE calculations are less stringent
  - Can use maximum *actual* rather than maximum *design* throughput
  - Consider emissions only from glycol dehydration units and storage vessels with potential for flash emissions (rather than entire facility) for production field facilities
  - May use GRI-GLYCalc™ to calculate emissions

TEG Dehydration Unit

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- Removes water from gas
  - To meet sales contract specifications
  - To prevent hydrate formation
  - To prevent corrosion
- Increasing glycol circulation rate increases amount of organics and HAPs in glycol
- If no add-on emission control device, HAPs enter atmosphere via TEG dehydration unit process vent

TEG Dehydration Unit Process Diagram

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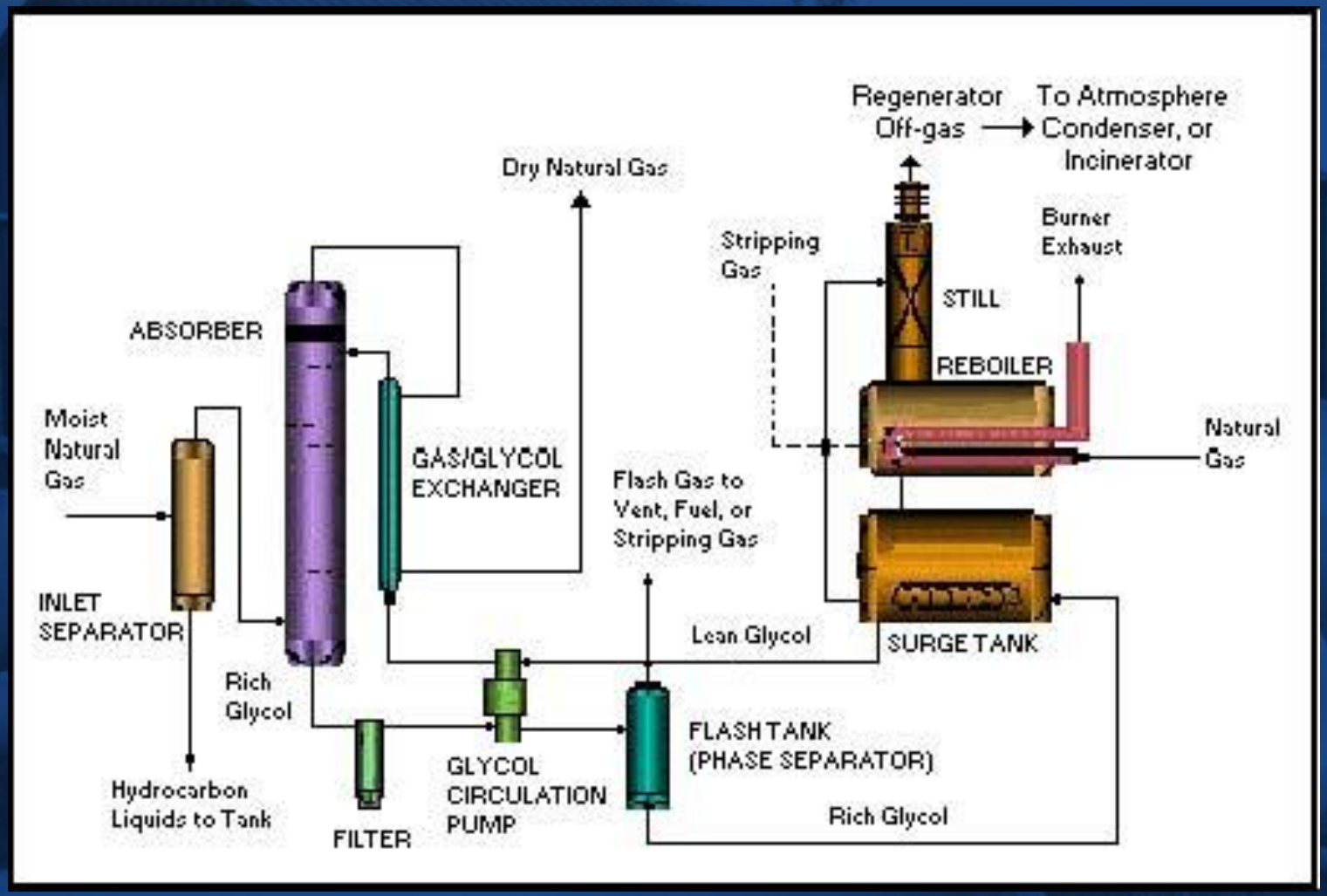

Source: GRI-GLYCalc™ Software.

Area Source Affected Units & Exemptions

- Only potentially affected unit is:
  - Each triethylene glycol (TEG) dehydration unit
  - All other types of dehydration units are exempt
- An exempt TEG dehydration unit has:
  - <85,000 SCM/D (<3 MMSCF/D) natural gas flow rate (actual annual average), OR
  - <0.90 Mg/yr (<1,984 lb/yr) actual benzene emissions from glycol dehydration vent
- For exempt units, document applicable information:
  - Natural gas flowrate monitoring
  - GRI-GLYCalc™ benzene calculations
  - Benzene emissions test

Geographic Location Determines Level of Control

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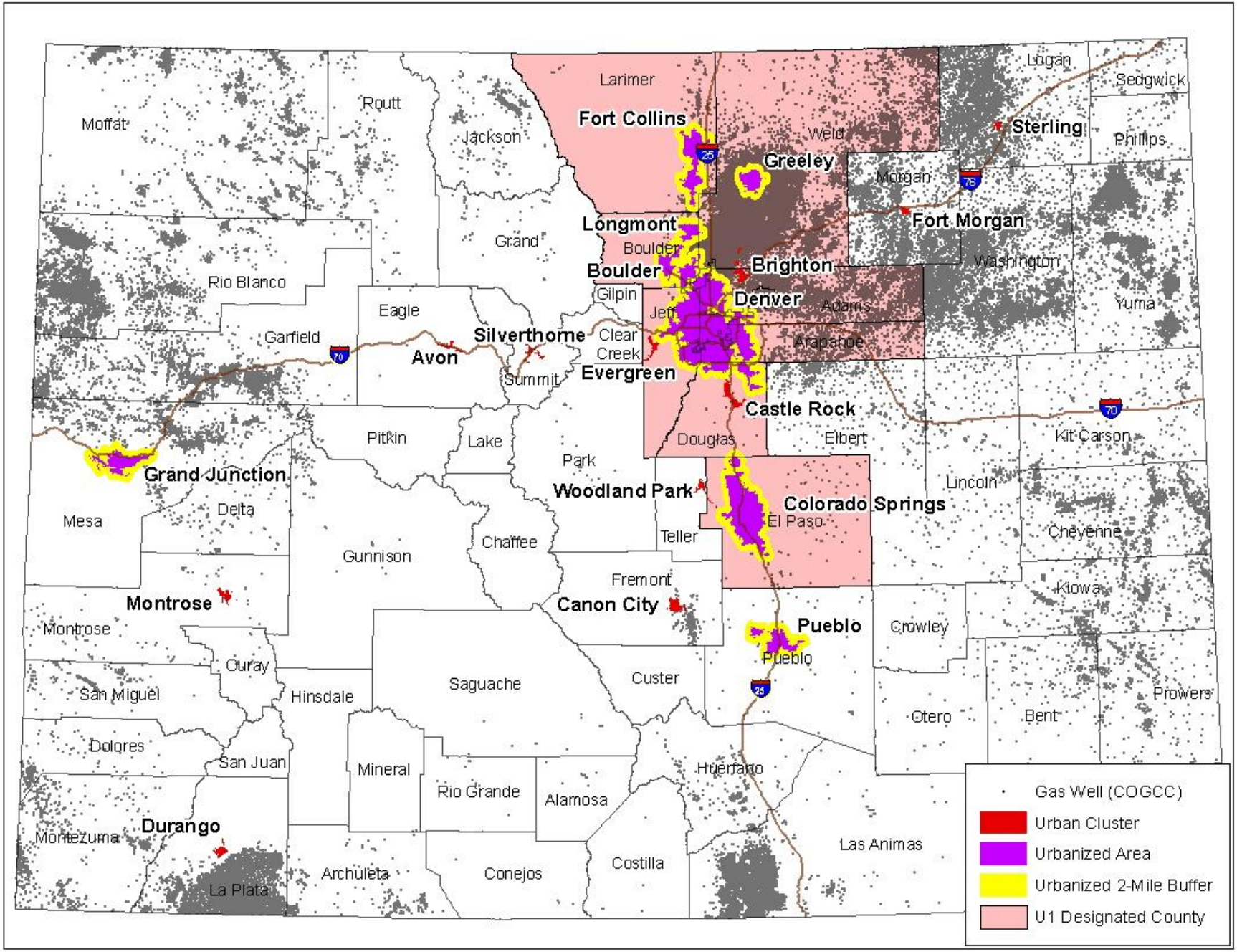
- In rural areas
  - Low level of control based on Generally Available Control Technology (GACT)
- In urban areas
  - High level of control equivalent to Maximum Achievable Control Technology (MACT)
- Urban area defined in regulations as:
  - Urbanized area plus offset and urban cluster boundaries (UA plus offset and UC)

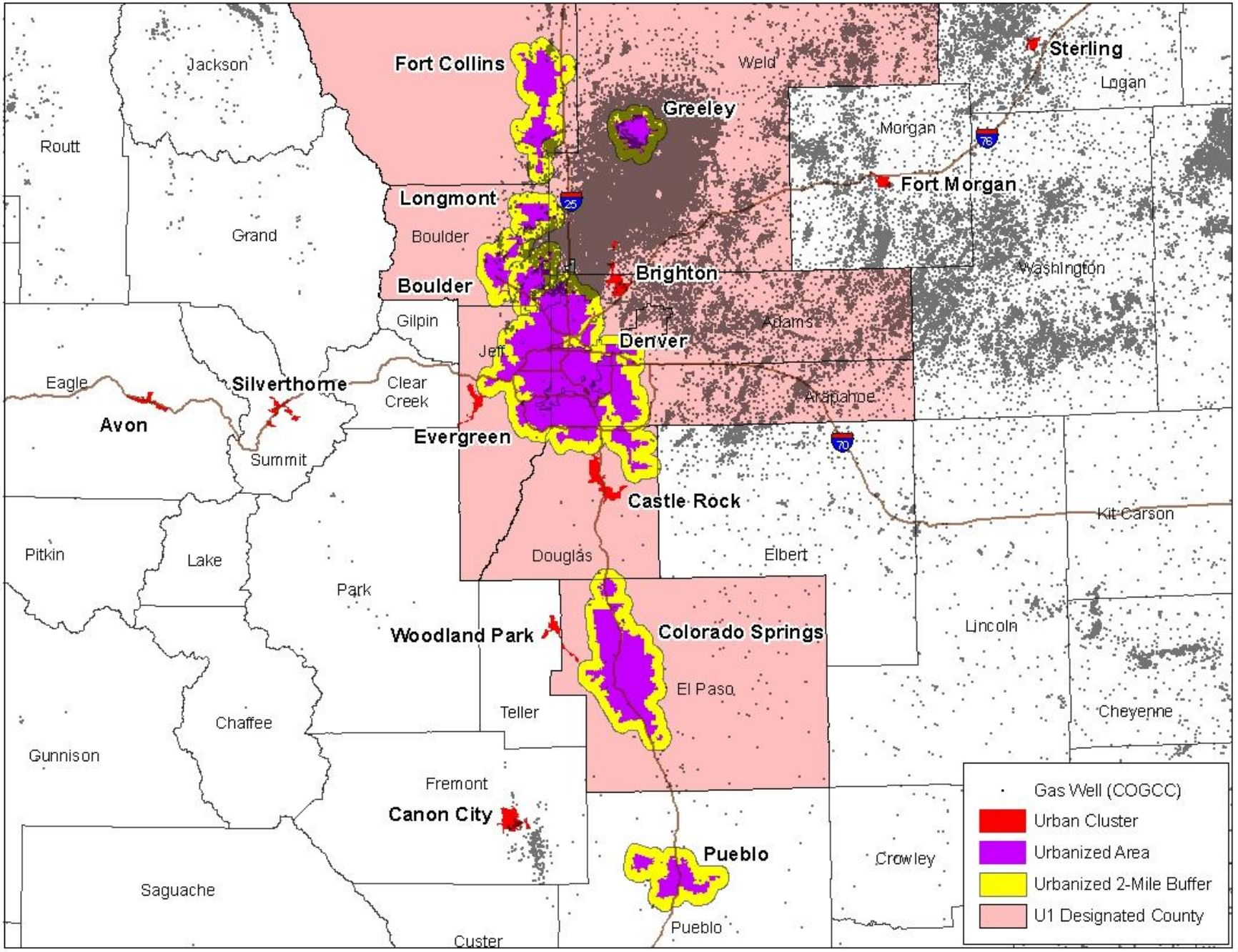
UA Plus Offset and UC

- Urbanized area (UA):
  - Densely settled area with >50,000 people (based on 2000 Census)
  - “UA plus offset” includes 2-mile buffer from boundary of UA
- Urban cluster (UC):
  - As used in Census, densely settled area with >2,500 people
  - As used in Subpart HH, densely settled area with >10,000 people

Colorado UA With Offset and UC Boundaries



Front Range UA With Offset and UC Boundaries



Location Status Tools

- Get instructions from EPA
  - http://www.epa.gov/ttn/atw/oilgas/Locating_UA_census_inst.pdf
- Find UAs and UCs at Census Bureau website
  - http://factfinder.census.gov
- Identify Urban-1 counties (for compliance deadline purposes only)
  - http://www.epa.gov/ttn/atw/oilgas/memo_u_r_co_class.pdf

Rural Areas — Emissions Control

- TEG dehydration unit located *outside* UA plus offset and UC boundary
- Optimize glycol circulation rate, as follows:

$$L_{OPT} = 1.15 \times 3.0 \frac{gal\,TEG}{lb\,H_2O} \times \left(\frac{F \times (I - O)}{24\ hr/day} \right)$$

Where:

L_{OPT} = Optimal circulation rate (gal/hr)

F = Gas flowrate (MMSCF/D)

I = Inlet water content (lb/MMSCF)

O = Outlet water content (lb/MMSCF)

Rural Areas — Emissions Control (cont.)

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- Operate so actual glycol circulation rate does not exceed optimal rate
- If cannot meet sales gas specification for moisture content:
  - Calculate an alternative rate using GRI-GLYCalc™, Version 3.0 or higher
- No other emissions control is needed
- No ongoing monitoring is required
- If operating conditions change, calculate new glycol circulation rate

Rural Areas — Recordkeeping and Reporting

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- If TEG dehydration unit is *exempt*, keep record demonstrating:
  - Low gas flowrate, or
  - Low benzene emissions
- If unit is subject to glycol circulation rate requirement:
  - Submit initial notification, including:
    - Demonstration that facility is outside UA plus offset and UC boundary
    - Calculation of optimal (or alternative) glycol circulation rate
    - Manufacturer and model number of glycol circulation pump
    - Statement that facility will operate in accordance with optimal circulation rate

Urban Areas — Emissions Control

- TEG dehydration unit located *inside* UA plus offset and UC boundary
- Area source TEG dehydration unit process vent requires same emissions control as does major source under Subpart HH
- No other major source Subpart HH emissions control requirements apply:
  - Area source condensate tanks need no control
  - Area source compressors and ancillary equipment not subject to leak detection and repair (LDAR) requirements

Urban Areas — Emissions Control (cont.)

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- TEG dehydration unit process vent subject to *one of the following*:
  - Achieve 95% HAP control efficiency using closed-vent system and emissions control device,
  - Achieve outlet benzene concentration <0.90 Mg/yr, or
  - Alternative compliance method:
    - Connect process vent to process natural gas line, or
    - Reduce total HAP emissions by 95% through process modifications and/or emissions control.
    - NOTE: Flash tank emissions need not be controlled if total emissions from glycol dehydration unit process vent meet 95% HAP emission reduction or benzene emissions <0.90 Mg/yr.

Urban Areas — Emissions Control (cont.)

- Closed-vent system has no detectable emissions
- Control devices can include:
  - Enclosed combustion devices (thermal vapor incinerator, catalytic vapor incinerator, boiler, or process heater)
  - Vapor recovery device (carbon adsorption system or condenser) achieving 95% HAP reduction
  - Flare meeting §63.11(b)

Urban Areas — Emissions Control (cont.)

- If chosen for control technology, enclosed combustion devices must meet one of the following:
  - Reduce HAP or total organic carbon (TOC) by 95% by weight
  - Reduce HAP or TOC to 20 ppmv (dry, corrected to 3% oxygen)
  - Operate at minimum residence time of 0.5 seconds at minimum temperature of 760°C
  - If boiler or process heater, introduce TEG unit vent stream into the flame zone of the device

Urban Areas — Emissions Control (cont.)

- If process modification is the emissions control strategy:
  - Determine TEG dehydration unit baseline operations
  - Demonstrate overall 95% HAP reduction (process modification only, or in conjunction with control devices)
- May not take credit for changes in natural gas inlet characteristics or throughput rate

Urban Areas — Initial Testing

- If closed-vent system used, demonstrate no detectable emissions
  (Method 21, 40 *CFR* Part 60, Appendix A)
- Control devices exempt from testing:
  - Boiler or process heater:
    - With a design heat capacity ≥44 MW
    - Into which the vent stream is introduced with the primary fuel or is used as the primary fuel
  - Flare designed and operated according to §63.11(b)

Urban Areas — Initial Testing (cont.)

- Other devices require testing in accordance with detailed procedures in §63.772(e)(3)
- If initial testing is needed, identify operating parameter ranges for acceptable emissions control

Urban Areas — Inspection & Monitoring

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- If used, closed-vent systems inspection and monitoring includes:
  - Annual visual inspections of joints, seams, covers, and sealed connections
  - Annual no-detectable-emissions inspections for other components
- Exemptions allowed for unsafe-to-inspect and difficult-to-inspect components

Urban Areas — Inspection & Monitoring

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- Some control devices are exempt from ongoing monitoring, including:
  - Flares designed and operated according to §63.11(b)
  - Boilers or process heaters:
    - With a design heat capacity ≥44 MW
    - Into which the vent stream is introduced with the primary fuel or is used as the primary fuel
- For other control devices and process modification strategies:
  - Demonstrate compliance with maximum or minimum operating parameters identified during initial testing
  - Parameter monitor must acquire data at least every hour
  - Compliance is based on daily average value

Urban Areas — SSM Plan

- Facilities located within UA plus offset and UC boundary must develop a Startup, Shutdown, and Malfunction (SSM) Plan, unless exempt from control requirements
- Operate in compliance with SSM Plan

Urban Areas — Recordkeeping

- Maintain records for 5 years
  - Keep last 12 months on-site or accessible within 2 hours
- Records demonstrating compliance
  - Inspection data
  - Monitoring data
  - Emissions data
  - SSM events
  - Flare design (if applicable)
- Records demonstrating exemptions

Urban Areas — Reporting

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- Submit initial notification by January 8, 2008 or upon commencing operation
- If initial testing is required, submit notice of performance test at least 60 days before planned test date
- Submit notification of compliance status within 180 days after compliance date
- Submit annual periodic reports by January 30 each year
- Submit SSM reports
  (may be included in periodic reports)

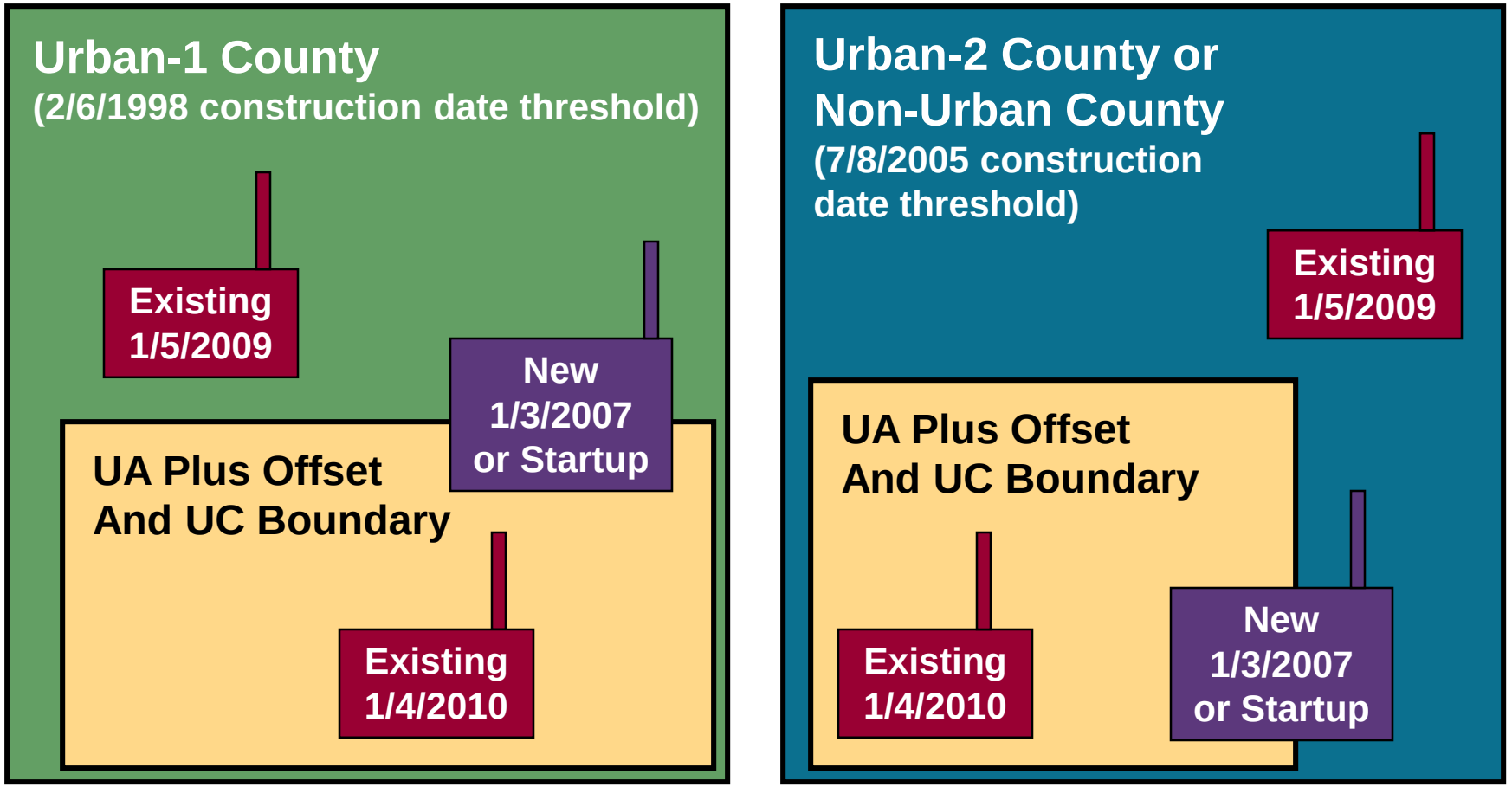
Title V Operating Permits

- Area sources need not obtain a Title V permit due to Subpart HH
- If the facility triggers Title V permitting for another reason, an operating permit would be required:
  - Subject to New Source Performance Standards (NSPS)
  - Major source of criteria air pollutants

Compliance Deadlines

- Compliance deadlines depend on:
  - Location of TEG dehydration unit
    - In Urban-1 County,
    - In non-Urban-1 County, and/or
    - In UA plus offset and UC boundary
  - Date that area source commenced construction

Compliance Deadlines



Existing: Construction commenced before the construction date threshold, based on the county designation (Urban-1 or non-Urban-1).

New: Construction commenced on or after the construction date threshold. For new sources, the compliance deadline is 1/3/2007 or upon initial startup, whichever is later.

Urban-1: Urban-1 counties in Colorado are: Adams, Arapahoe, Boulder, Denver, Douglas, El Paso, Jefferson, Larimer, and Weld. Broomfield?

Compliance Strategies

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- Avoid major source status?
  - Too late for most facilities:
    - Existing major sources already complying with MACT
- Avoid affected unit status?
  - Consider using non-TEG dehydration, such as:
    - Non-TEG types of glycol for absorption, or
    - Adsorption technology
  - If in “urban” area:
    - Consider adopting federally enforceable limits before compliance deadline
  - If in “rural” area:
    - Accept affected unit status because glycol circulation compliance is relatively easy—probably simpler than adopting federally enforceable limits

Additional Information

- EPA web page containing implementation information (Subpart HH major and minor sources):
  - http://www.eps.gov/ttn/atw/oilgas/oilgaspg.html
- Greg Nizich, USEPA
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  - nizich.greg@eps.gov
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