PRELIMINARY RESULTS

MathPro Specialty Fuels Study for 8-hour Ozone NAAQS

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For American Petroleum Institute

By MathPro Inc. and
Stillwater Associates LLC

February 22, 2005

MathPro Study Phases

PRELIMINARY RESULTS

- Distribution infrastructure analysis
- Notional refinery economic analysis

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Distribution Infrastructure Phase

PRELIMINARY RESULTS

- Conducted detailed survey of industry infrastructure
- Analyzed distribution operations
- Projected likely spillover areas where distribution infrastructure was limited

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Distribution Infrastructure Phase

PRELIMINARY RESULTS

- Projected new fuels controls
  - Each non-attainment area under the new 8-hour NAAQS would opt for the next most stringent fuel
    - 9.0 RVP would select 7.8 RVP
    - 7.8 RVP would select 7.0 RVP
    - 7.0 RVP would select RFG
    - Current RFG areas would continue with RFG

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Exhibit 2.1: Summer Gasoline Programs, As Of January 2004

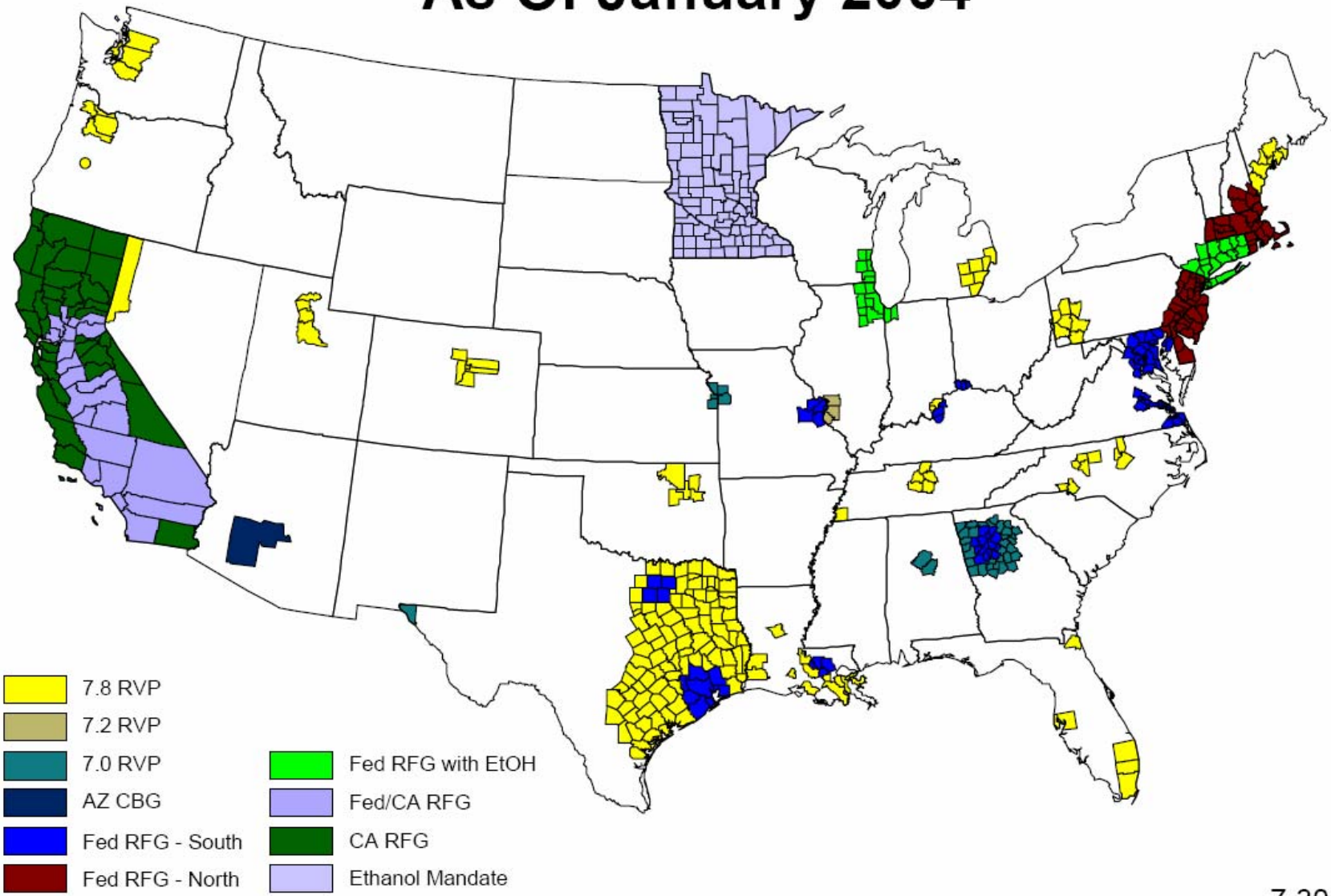

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Exhibit 2.4: 8-Hour Ozone Standard Non-Attainment Areas, by Classification

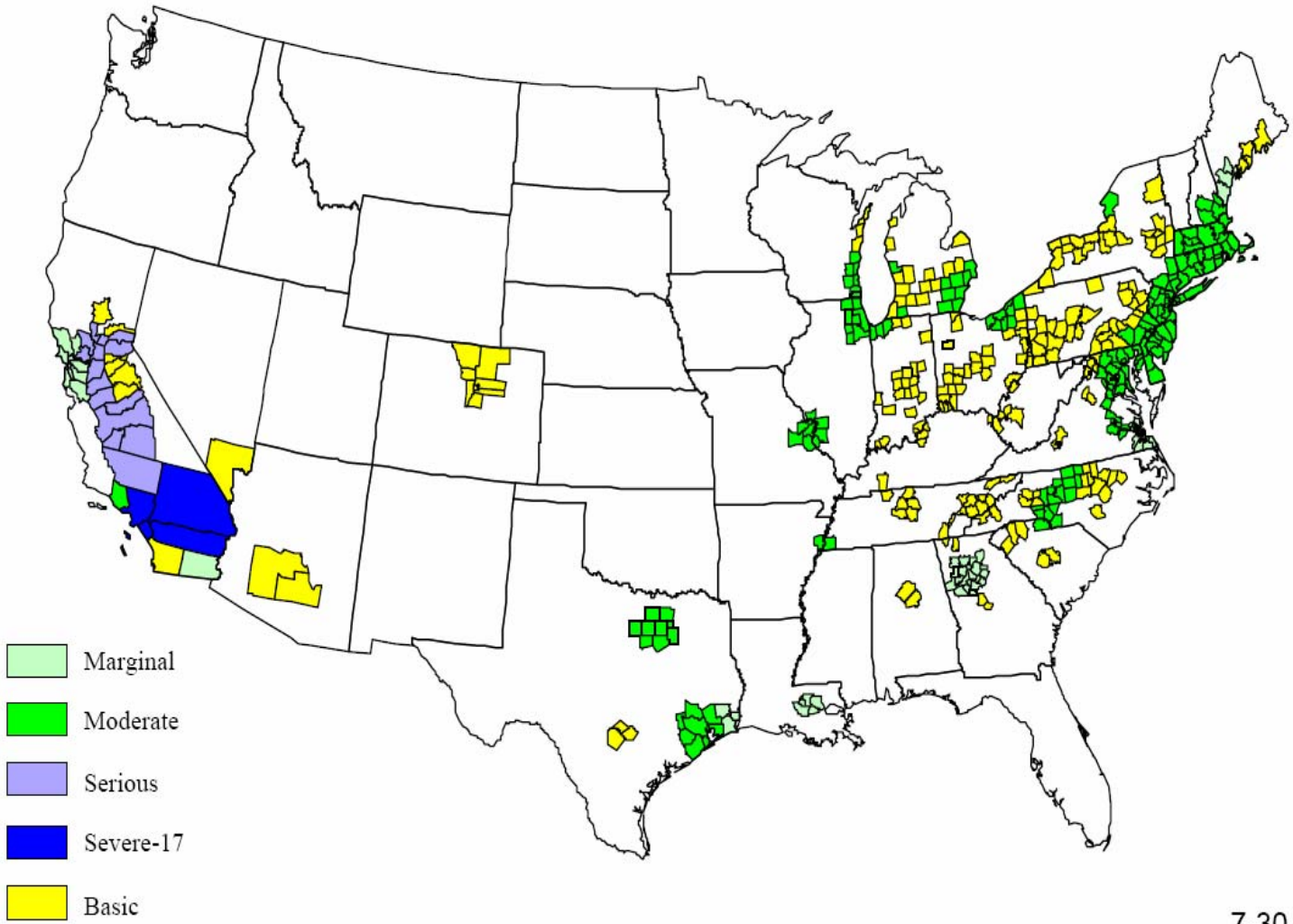
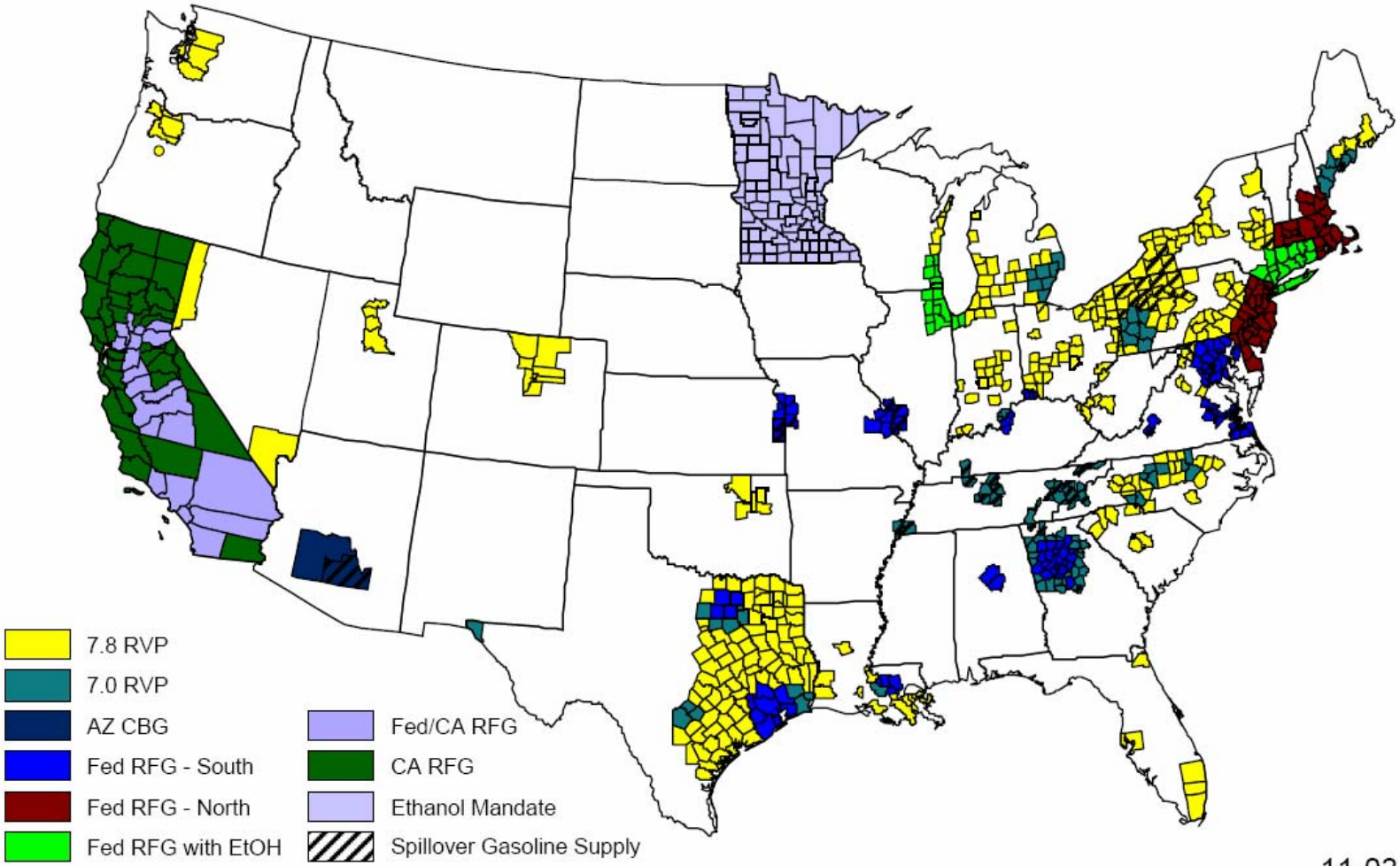


Exhibit 2.6: Projected Pattern of Special Gasoline Use, Summer 2008



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Distribution Infrastructure Phase

PRELIMINARY RESULTS

- Findings:
  - If states select controls as assumed, the distribution system is generally capable of handling the projected new volumes of known specialty fuels
  - But, distribution system capabilities must be considered in selecting new fuels controls
  - States and Oil Industry should coordinate the implementation and timing of new fuels controls
  - A few areas present supply concerns

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Distribution Infrastructure Phase

PRELIMINARY RESULTS

- Distribution Areas of Concern
  - 32 counties around Atlanta
  - Nashville and Knoxville
  - West Memphis
  - Roanoke, Va, Va Tidewater area, N. Va
  - Western Pa and NY
  - Kansas City
  - Three other locales: Albany, E. St. Louis, and Phoenix

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Notional Refinery Cost Phase

PRELIMINARY RESULTS

- Used MathPro notional refinery concept
  - Refinery configuration composite of PADD processes and size typical for the PADD of consideration
  - Refinery fuel production representative of PADD-average properties and fuel mix
  - Notional refinery by definition has greater flexibility than any one actual facility – tends to over optimization
- Notional refineries analyzed for PADDs 1, 2, and 3
- Analysis reflects PADD 3 supplies of significant volumes to PADDs 1 & 2

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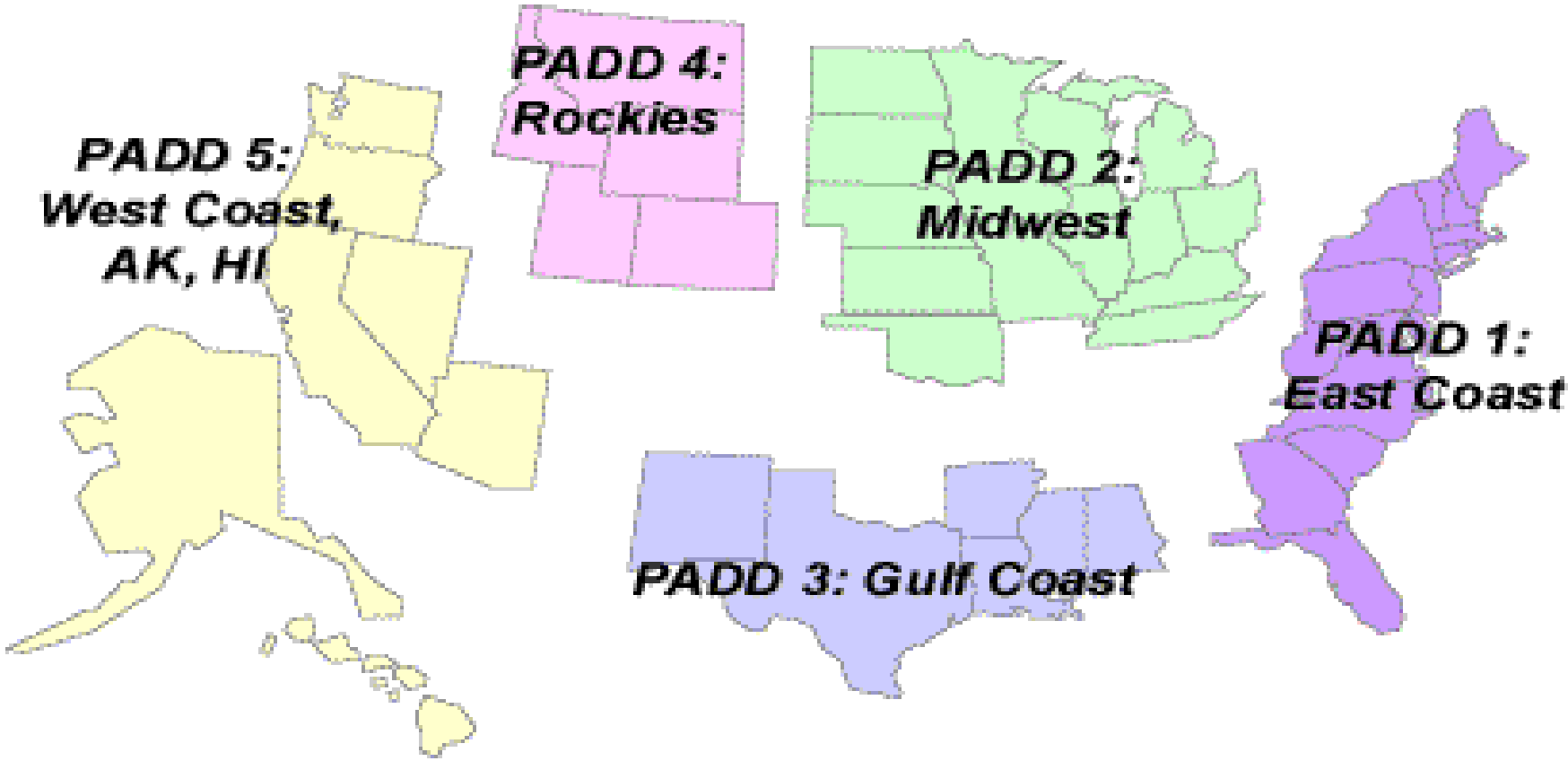
Petroleum Administration for Defense Districts



PADD'S CONTINUE TO BE USED BY EIA AND MUCH OF THE US PRODUCTION AND DEMAND DATA IS AVAILABLE BY PADD

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Notional Refinery Cost Phase

PRELIMINARY RESULTS

- This is a modeling effort, and results may not reflect the specific capabilities and economics of individual refineries.
- However, the primary finding of the analysis seems directionally valid.
- Incremental refining costs are an increasing function of the volumes of specialty fuels produced by any specific refinery.
- Any fuel choice that is new and unique to the Mid-west region will compound and exacerbate supply concerns

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Notional Refinery Cost Phase

PRELIMINARY RESULTS

- Baseline was existing PADD mix
- For RFG, study estimated avg. cost to
  - Shift ½ 7.8 RVP production to RFG
  - Shift all 7.8 RVP production to RFG
  - Shift all non-RFG production to RFG
- For 7.0 RVP, study estimated avg. cost to
  - Shift ½ 7.8 RVP production to 7.0 RVP
  - Shift all 7.8 RVP production to 7.0 RVP
  - Shift all non-RFG production to 7.0 RVP

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Notional Refinery Cost Phase

PRELIMINARY RESULTS

- Average incremental costs vary widely, depending mainly on the volume share shifted to specialty fuels.
- Other factors also influence refining costs.

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	RFG	7.0 RVP
PADD 1	1.3-13 cpg*	0.7-2.4 cpg *
PADD 2	1.7-6.2 cpg *	0.6-3.0 cpg *
PADD 3	4.1-9.3 cpg *	0.7-3.1 cpg *

* CENTS PER GALLON

SEMCOG-Specific Gasoline Supply Considerations

PRELIMINARY RESULTS

- The MathPro study did not consider SEMCOG-specific issues. These comments do not reflect findings of the study, but simply delineate known industry capabilities.

- If SEMCOG adopts a new fuel
  - The single Detroit refinery will likely have to produce 100% new SEMCOG fuel
  - The two Toledo refineries will have to make significant volumes of new SEMCOG fuel

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SEMCOG Specific Gasoline Supply Considerations

PRELIMINARY RESULTS

- Chicago refineries, which already produce significant volumes of RFG, currently also supply the SEMCOG area.

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- PADD 3 refineries supply significant RFG volumes to the Chicago/Milwaukee area.

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- PADD 3 refineries would likely be incremental suppliers of RFG to any PADD 2 non-attainment areas that opt into additional RFG.

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