



# HGB Modeling Update 2005 Baseline Emissions

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**SETPMTC Meeting  
HGAC Offices, Houston  
February 18, 2009**

February 18, 2009

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Air Quality Division



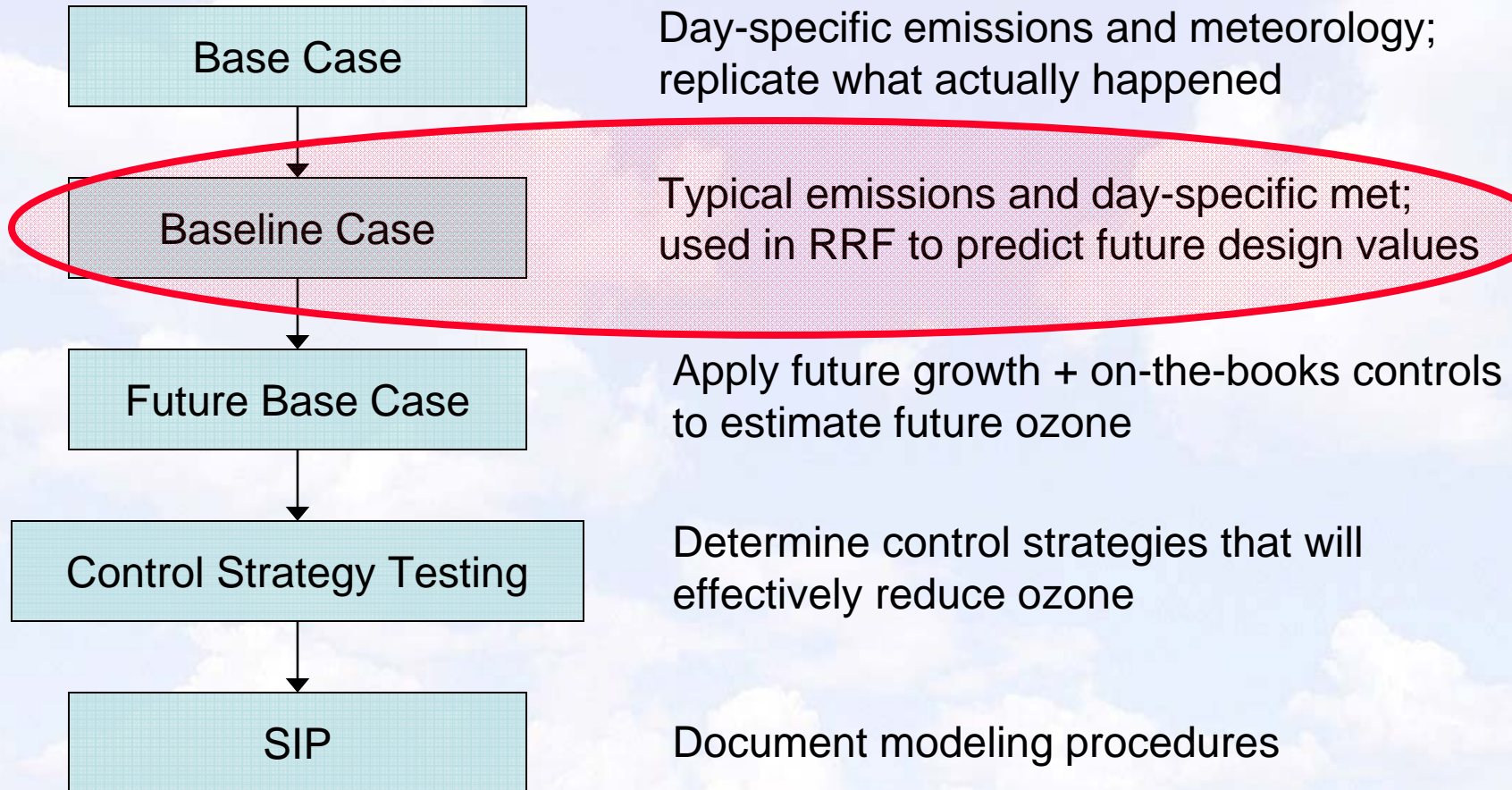
# Today's Presentation

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- **Why baseline emissions?  
(versus base case)**
- **EI development for modeling of  
the baseline**
  - **Biogenics**
  - **Area and non-road mobile sources**
  - **Onroad mobile sources**
  - **Point sources**

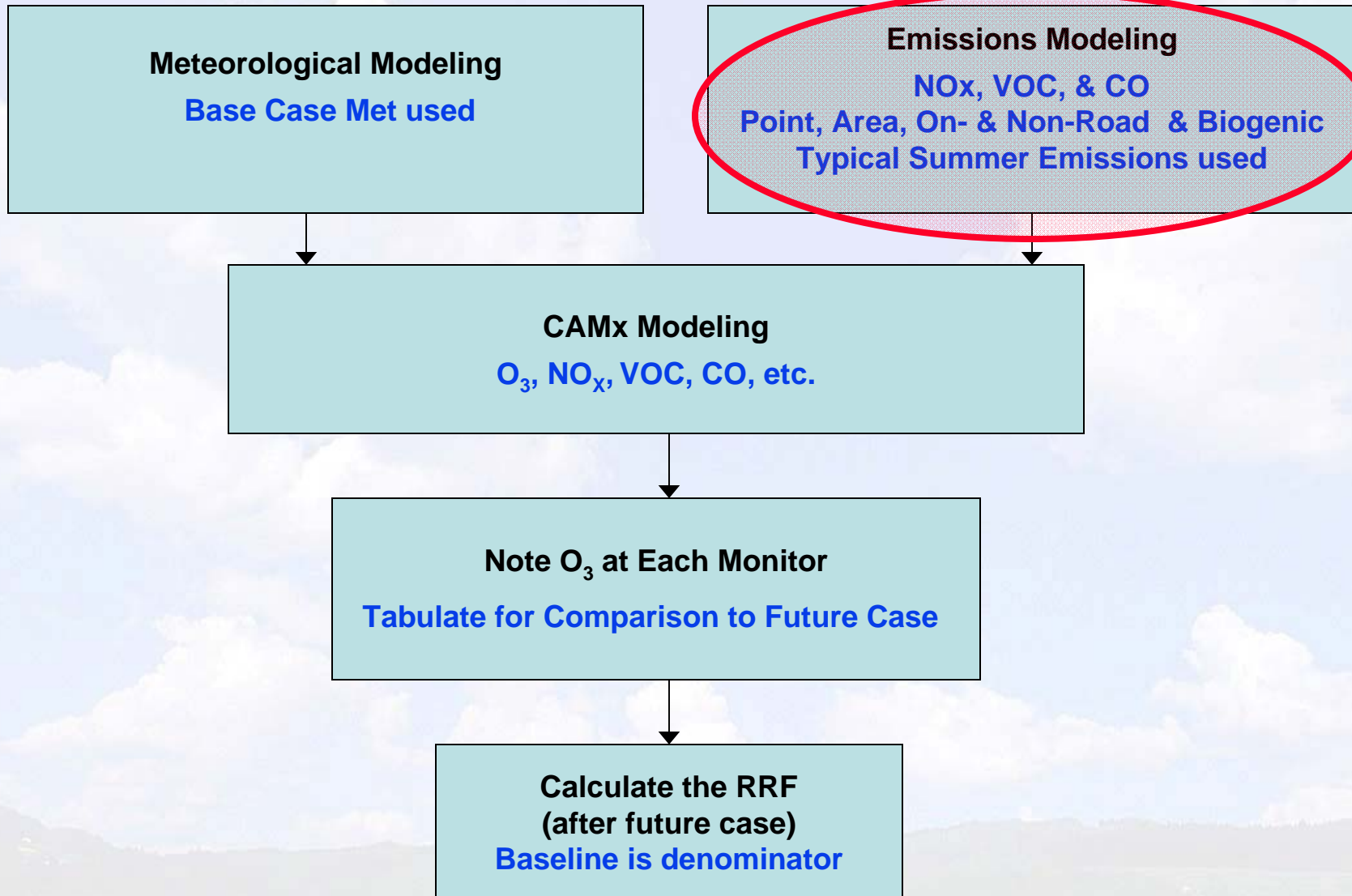


# CAMx Ozone Modeling in SIP Development The Big Picture





# CAMx Ozone Modeling in SIP Development Baseline – Basis for RRF Calculations





# EI Development of the 2005 Baseline

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## 1. **Biogenics**

Base case biogenic emissions are used for the baseline.

Biogenic emissions vary hourly with temperature and solar radiation similar to the meteorology.

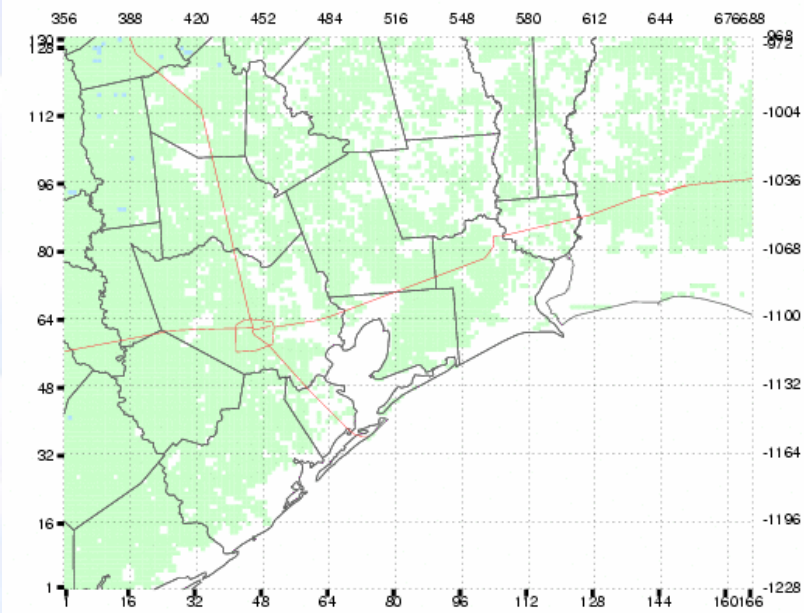
Biogenic emissions are the same for the base cases, baseline and future case.

(Note: the biogenic emissions are not considered a controllable category)



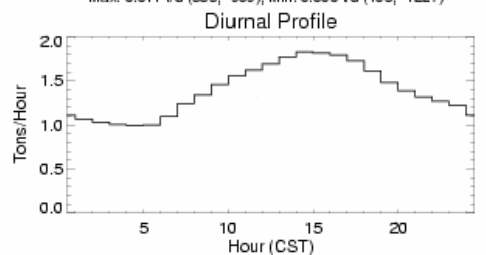
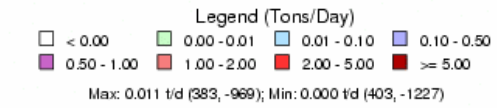
# 2005 Mid-Summer Biogenic Emissions

**NO<sub>x</sub>**

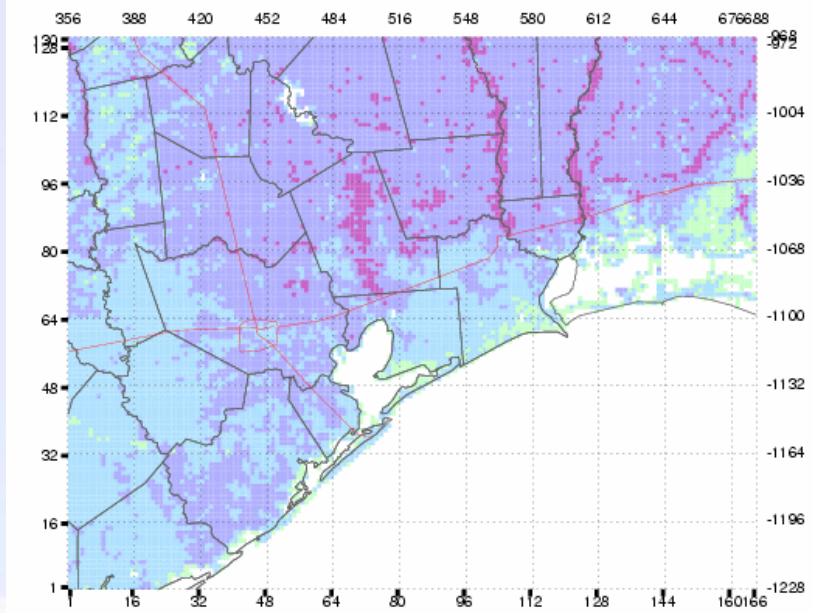


hgb8h2.bc05a.csr.hgbpa\_02km Biogenic Emissions, 06/30/2005: NO<sub>x</sub>

Emissions Plotted	
County	Tons/Day
Brazoria	1.50
Chambers	0.60
Fort Bend	1.36
Galveston	0.23
Harris	1.32
Liberty	1.36
Montgomery	1.26
Waller	1.22
<b>HGB SUBTOTAL:</b>	<b>8.85</b>
Hardin	0.75
Jefferson	0.64
Orange	0.24
<b>BPA SUBTOTAL:</b>	<b>1.62</b>
<b>MAP TOTAL:</b>	<b>33.41</b>

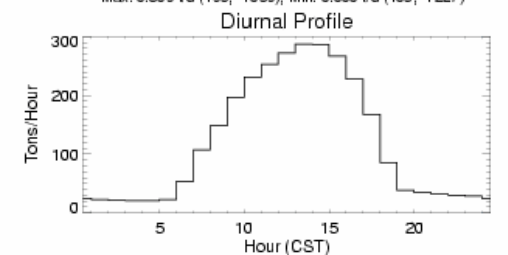
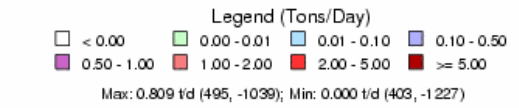


**VOC-cb05**



hgb8h2.bc05a.csr.hgbpa\_02km Biogenic Emissions, 06/30/2005: All VOC

Emissions Plotted	
County	Tons/Day
Brazoria	117.69
Chambers	42.30
Fort Bend	41.31
Galveston	24.41
Harris	172.59
Liberty	247.48
Montgomery	179.35
Waller	30.28
<b>HGB SUBTOTAL:</b>	<b>855.40</b>
Hardin	209.59
Jefferson	53.92
Orange	63.85
<b>BPA SUBTOTAL:</b>	<b>327.37</b>
<b>MAP TOTAL:</b>	<b>2883.68</b>





# EI Development of the 2005 Baseline – cont.

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## **2. Area source and non-/off-road mobile**

2005 OSD area and non-/off-road emissions are used for both the 2005 base cases and the baseline.

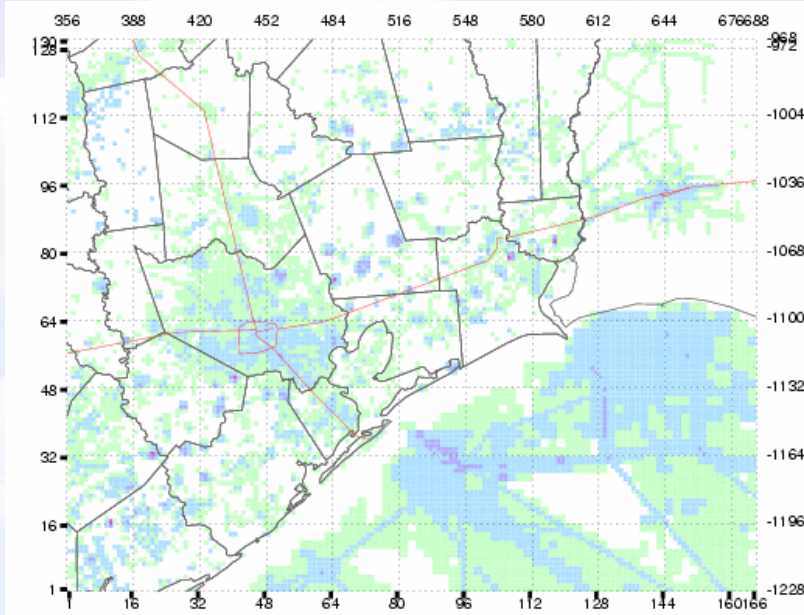
Base case emissions development produces typical ozone-season-day (OSD) emissions (including weekday versus weekend differences).

(Note: 2006 OSD area and non-/off-road emissions differ slightly from 2005 OSD due to growth (TexN/REMI-EGAS) and controls (diesel equipment turnover))



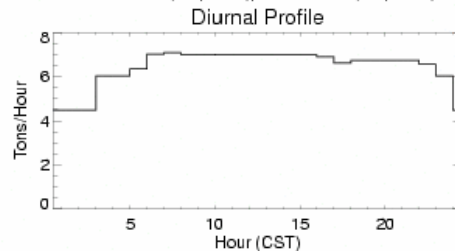
# 2005 Baseline: Area Source Emissions

## NO<sub>x</sub>

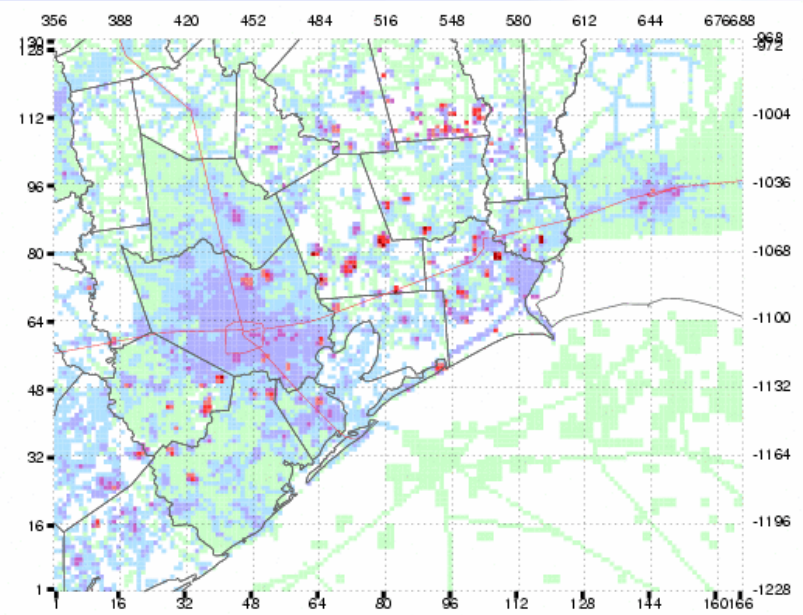


hgb8h2.bc05\_b8.hgbpa\_02km Area Source Emissions, 08/03/2005: NO<sub>x</sub>

Emissions Plotted	
County	Tons/Day
Brazoria	5.42
Chambers	2.12
Fort Bend	4.89
Galveston	2.25
Harris	12.40
Liberty	6.75
Montgomery	1.79
Waller	0.60
<b>HGB SUBTOTAL:</b>	<b>36.22</b>
Hardin	1.25
Jefferson	4.94
Orange	1.55
<b>BPA SUBTOTAL:</b>	<b>7.74</b>
<b>MAP TOTAL:</b>	<b>155.09</b>

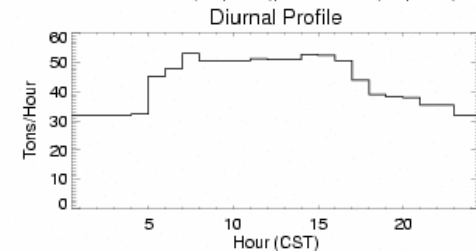


## VOC-cb05



hgb8h2.bc05\_b8.hgbpa\_02km Area Source Emissions, 08/03/2005: All VOC

Emissions Plotted	
County	Tons/Day
Brazoria	56.75
Chambers	26.53
Fort Bend	69.61
Galveston	46.29
Harris	183.52
Liberty	111.32
Montgomery	23.17
Waller	7.71
<b>HGB SUBTOTAL:</b>	<b>524.92</b>
Hardin	33.03
Jefferson	119.77
Orange	34.93
<b>BPA SUBTOTAL:</b>	<b>187.74</b>
<b>MAP TOTAL:</b>	<b>1027.31</b>

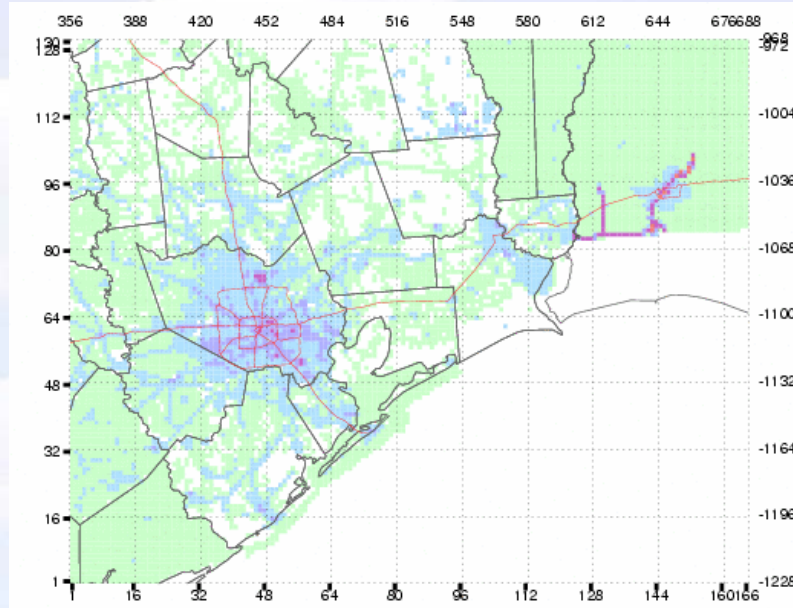






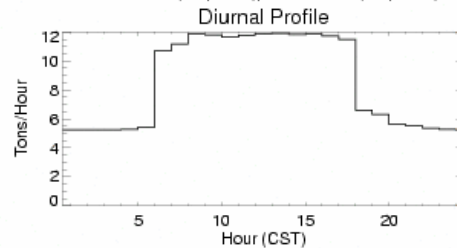
# 2005 Baseline: Non-Road Mobile Emissions

## NO<sub>x</sub>

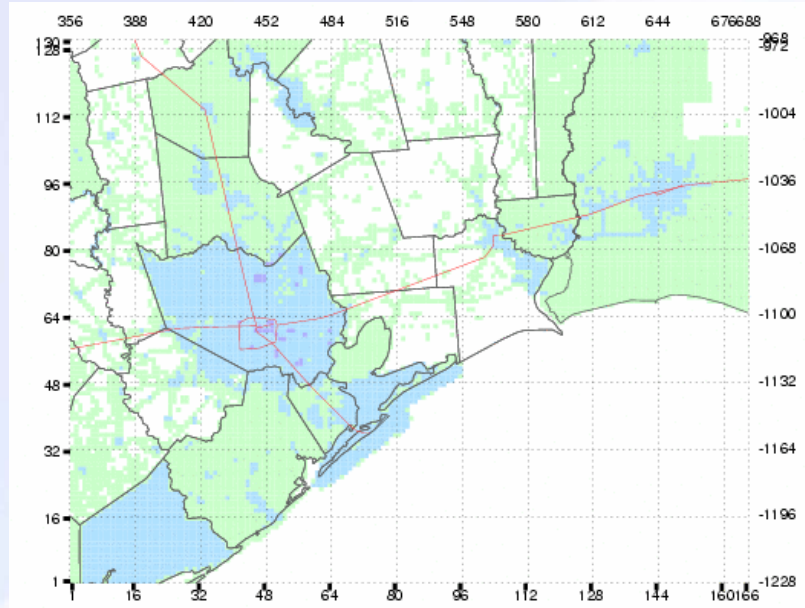


hgb8h2.bc05\_b9.hgbpa\_02km Non Road Mobile Emissions, 08/03/2005: NO<sub>x</sub>

Emissions Plotted	
County	Tons/Day
Brazoria	8.35
Chambers	1.53
Fort Bend	8.84
Galveston	5.05
Harris	85.43
Liberty	5.54
Montgomery	6.48
Waller	1.22
<b>HGB SUBTOTAL:</b>	<b>122.44</b>
Hardin	1.45
Jefferson	5.56
Orange	3.65
<b>BPA SUBTOTAL:</b>	<b>10.65</b>
<b>MAP TOTAL:</b>	<b>206.21</b>

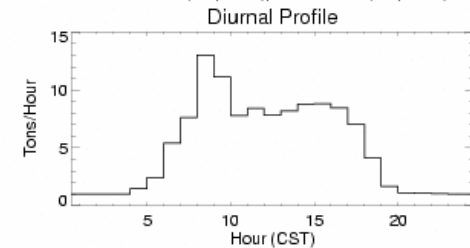
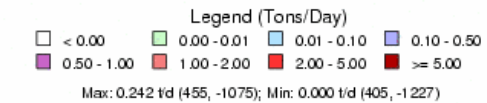


## VOC-cb05



hgb8h2.bc05\_b8.hgbpa\_02km Non Road Mobile Emissions, 08/03/2005: All VOC

Emissions Plotted	
County	Tons/Day
Brazoria	5.89
Chambers	2.02
Fort Bend	4.19
Galveston	15.66
Harris	43.56
Liberty	1.14
Montgomery	5.56
Waller	0.74
<b>HGB SUBTOTAL:</b>	<b>78.77</b>
Hardin	0.54
Jefferson	2.80
Orange	1.31
<b>BPA SUBTOTAL:</b>	<b>4.64</b>
<b>MAP TOTAL:</b>	<b>120.99</b>





# EI Development of the 2005 Baseline – cont.

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## 3. On-road mobile

- HGB and BPA
  - TTI developed day-type (Weekday, Friday, Saturday, and Sunday) link-based emissions for School and Non-School (Summertime) periods (there is a somewhat noteworthy VMT difference between the two periods). The 2005 Summertime emissions are used for the baseline.
- Texas, outside of HGB/BPA
  - TTI developed hourly Summertime emissions for the 4 day-types as above, but used HPMS data instead of travel demand modeling for VMT.
- Outside of Texas
  - Used EPA's NMIM Summer Weekday output and adjusted to obtain estimates for the other day-types.



## EI Development of the 2005 Baseline – cont.

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### 3. On-road mobile – cont.

- Temperature/humidity corrections
  - Mobile6.2 inputs by county for 2005 are based on May 15 - September 15 averages of CAMS monitors and NWS stations.
  - The same are used for the 2018 modeling.
  - For consistency, these were used for the baseline.

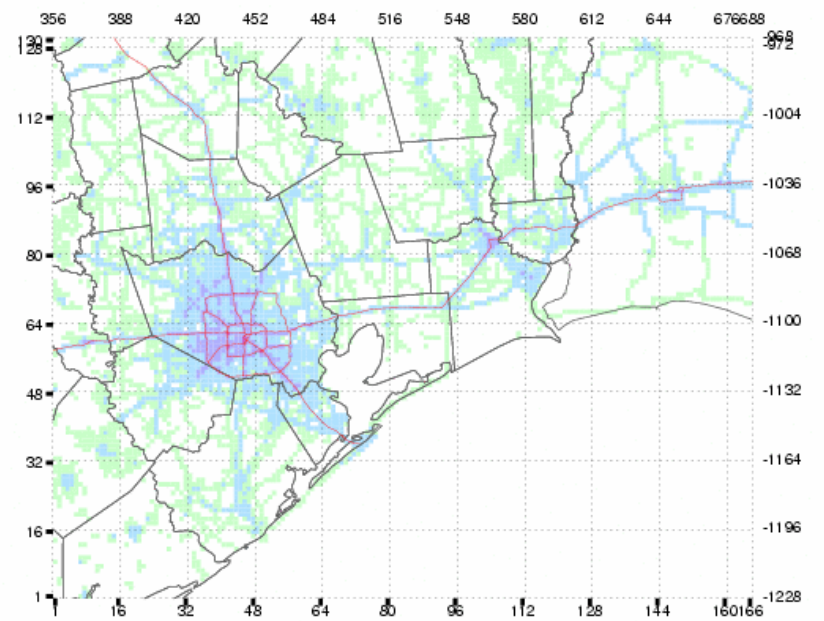
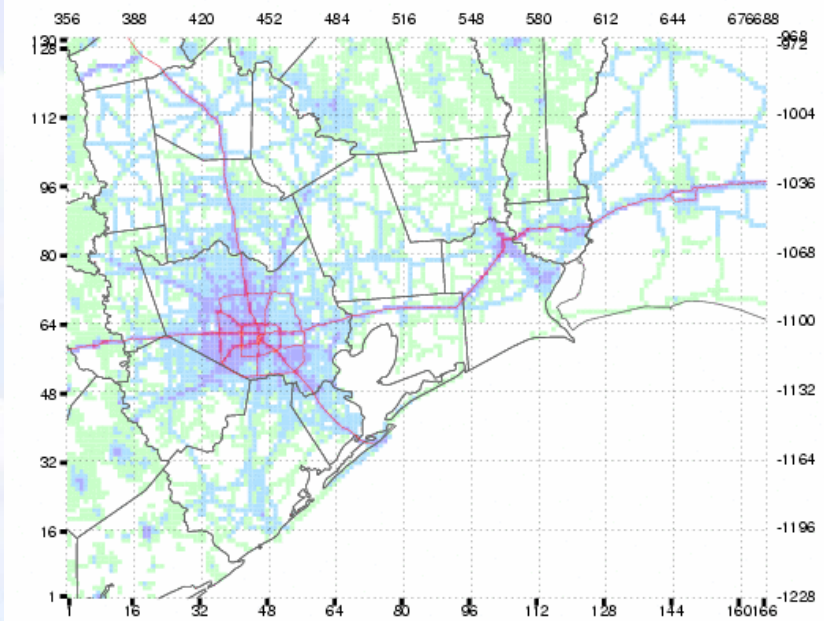
(Note: 2006 OSD and link-based on-road emissions differ from 2005 due to the combination of vehicle turnover and VMT growth).



# 2005 Baseline: On-Road Mobile Emissions

**NO<sub>x</sub>**

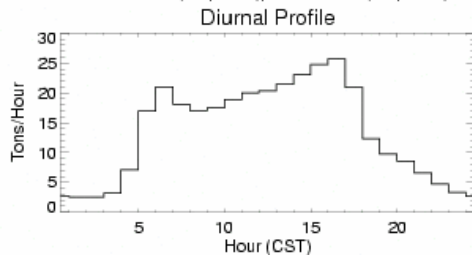
**VOC-cb05**



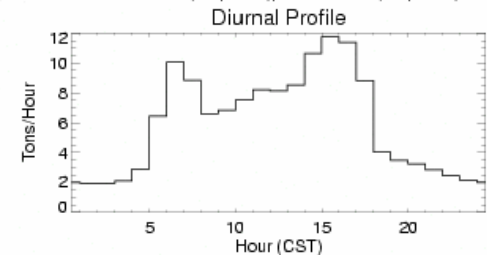
HGB8H2 On-road Mobile, m62.2005.summer.knox.08Sep17, weekday: NO<sub>x</sub>

HGB8H2 On-road Mobile, m62.2005.summer.knox.08Sep17, weekday: All VOC

Emissions Plotted	
County	Tons/Day
Brazoria	9.18
Chambers	5.82
Fort Bend	12.94
Galveston	9.05
Harris	158.35
Liberty	4.68
Montgomery	17.70
Waller	4.34
<b>HGB SUBTOTAL:</b>	<b>222.06</b>
Hardin	4.06
Jefferson	25.59
Orange	12.67
<b>BPA SUBTOTAL:</b>	<b>42.33</b>
<b>MAP TOTAL:</b>	<b>329.10</b>



Emissions Plotted	
County	Tons/Day
Brazoria	4.29
Chambers	2.25
Fort Bend	5.48
Galveston	4.45
Harris	76.36
Liberty	2.57
Montgomery	7.13
Waller	1.98
<b>HGB SUBTOTAL:</b>	<b>104.52</b>
Hardin	1.84
Jefferson	7.53
Orange	3.32
<b>BPA SUBTOTAL:</b>	<b>12.69</b>
<b>MAP TOTAL:</b>	<b>142.93</b>





# EI Development of the 2005 Baseline – cont.

## 4. Point sources

- NEGUs - 2005 base case OSD is used as the baseline
  - For the region beyond Texas, the 2005 base case NEGU OSD emissions were derived by growing the 2002 CENRAP/RPO inventory with EGAS. This provides consistency with the use of the 2018 CENRAP/RPO inventory for the future case.
  - For Texas, the 2005 base case NEGU emissions were acquired from the 2005 STARS extract as OSD emissions, and these are used in the baseline.
- EGUs - the 2005 baseline emissions were derived from the 2005 third quarter hourly Acid Rain Database (ARD). Average emissions and average diurnal profiles were calculated for each stack.



# EI Development of the 2005 Baseline – cont.

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## 4. Point sources – cont.

The 2005 Special Inventory and the CCEDS dataset are not typical emissions and therefore were not included in the baseline.

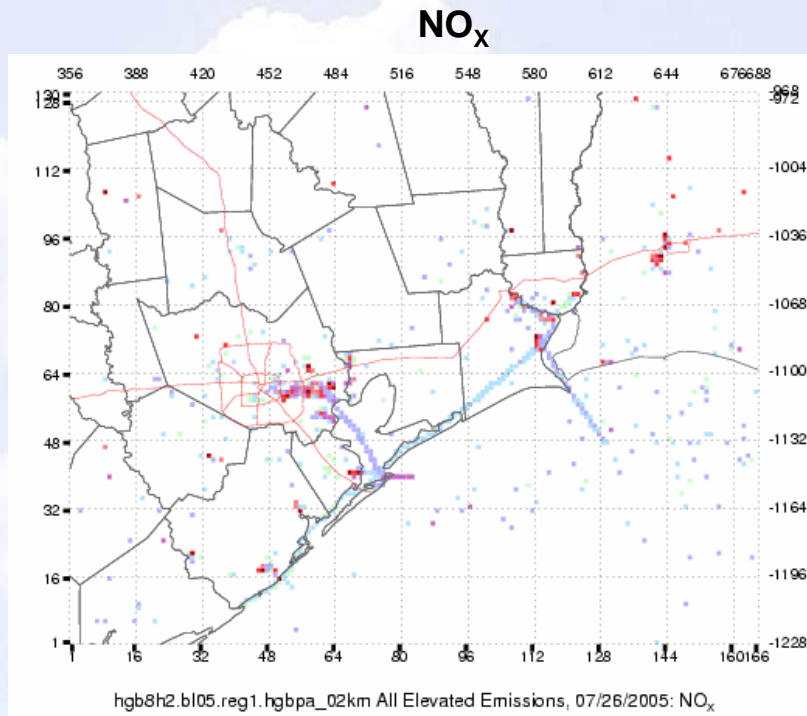
Hourly Tank Landing Loss (TLL) emissions for 2005 were available pursuant to a EI revision request. Average emissions and average diurnal profiles were calculated for each tank using the episode days from the 2005 base cases and used for the baseline.

The HRVOC EI-reconciliation based upon the Potential Source Contribution Function procedure produces average day emissions. The same emissions are used in the 2005 base cases and the baseline.

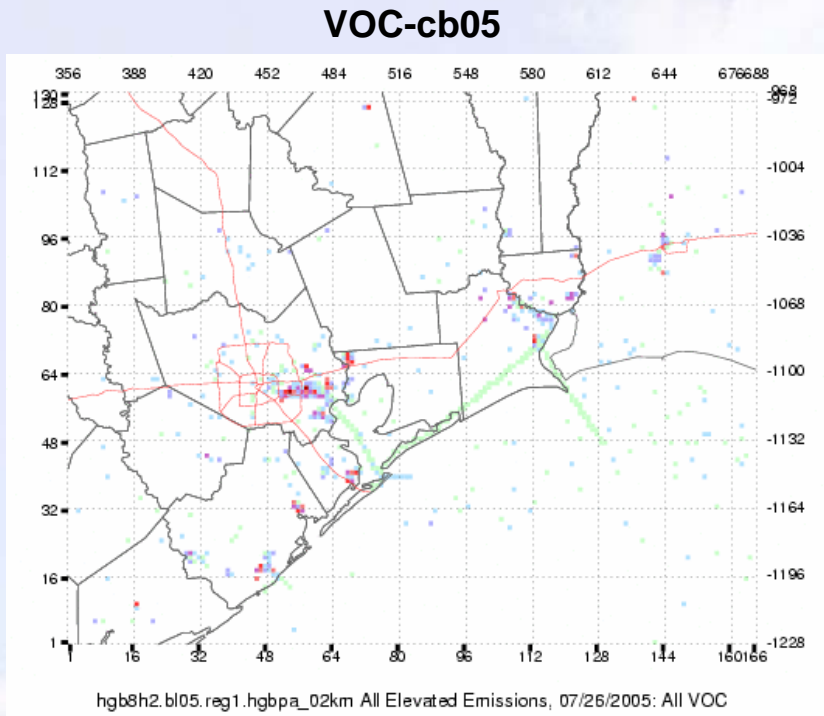
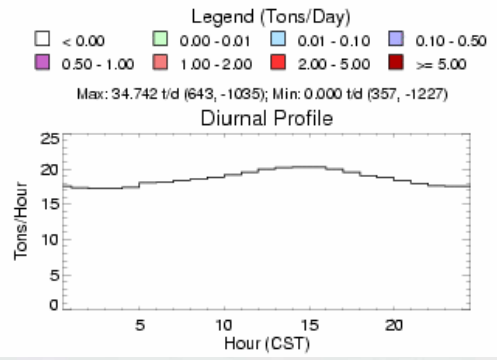
The 2005 Gulf-Wide EI (update to the 2000 GWEI) emissions were modeled as an average day. Therefore the same emissions are used in the 2005 base cases and the baseline.



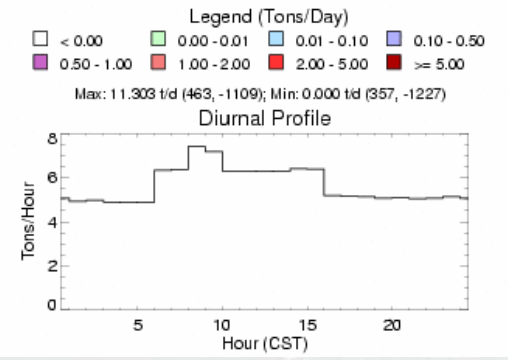
# 2005 Baseline: Elevated Point Emissions



Emissions Plotted	
County	Tons/Day
Brazoria	44.05
Chambers	11.69
Fort Bend	20.32
Galveston	28.75
Harris	103.97
Liberty	0.75
Montgomery	2.12
Waller	0.68
<b>HGB SUBTOTAL:</b>	<b>212.31</b>
Hardin	1.10
Jefferson	43.59
Orange	25.50
<b>BPA SUBTOTAL:</b>	<b>70.19</b>
<b>MAP TOTAL:</b>	<b>446.89</b>

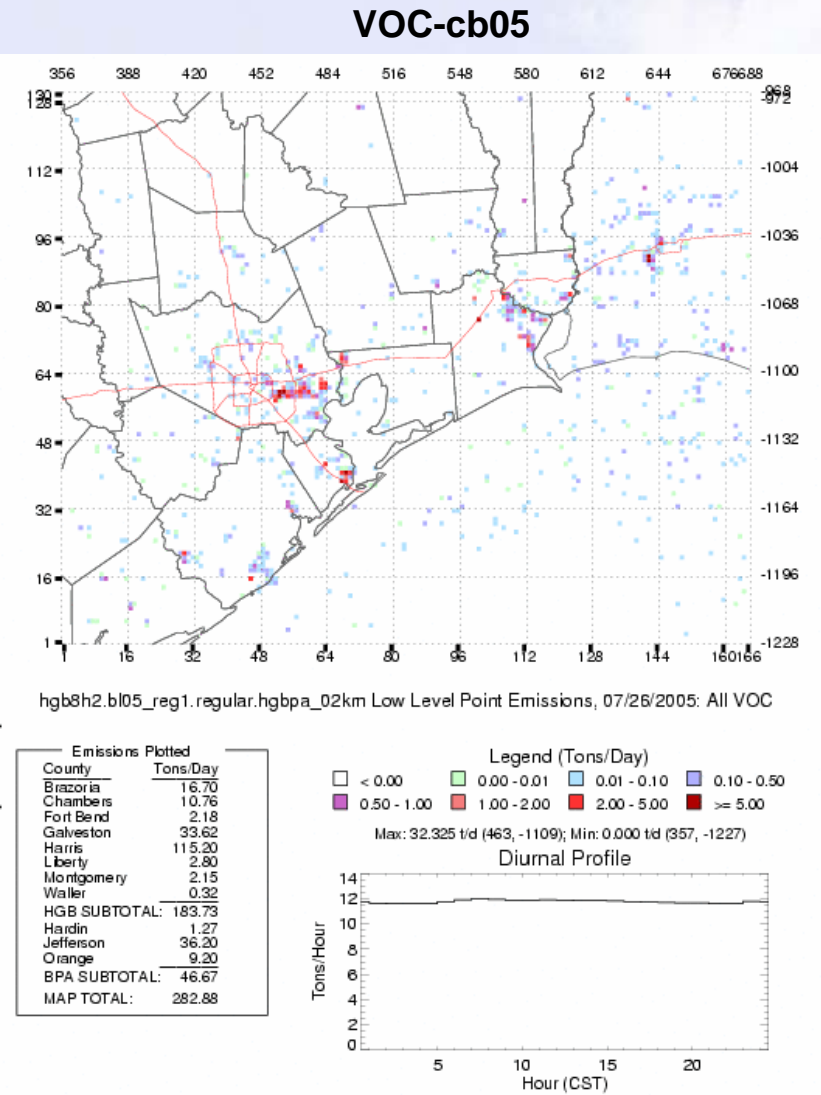
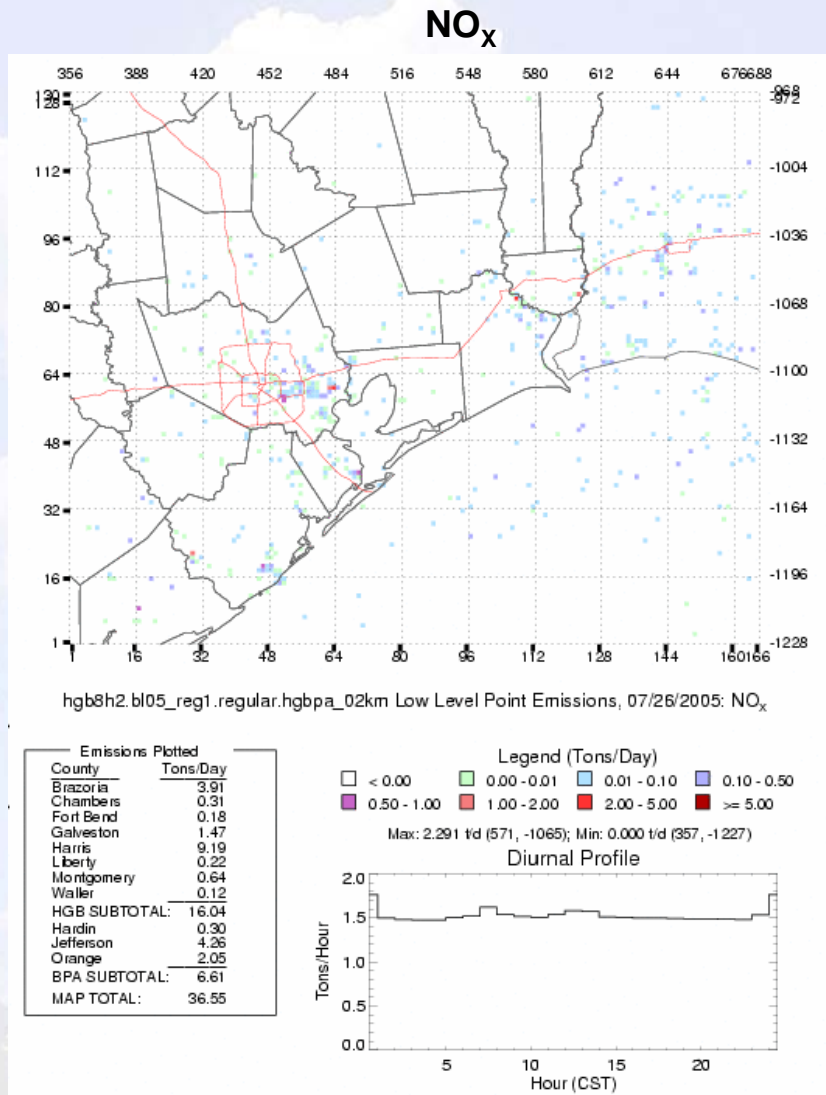


Emissions Plotted	
County	Tons/Day
Brazoria	18.72
Chambers	10.61
Fort Bend	1.51
Galveston	10.13
Harris	58.46
Liberty	0.30
Montgomery	0.73
Waller	0.06
<b>HGB SUBTOTAL:</b>	<b>100.52</b>
Hardin	0.44
Jefferson	12.08
Orange	6.02
<b>BPA SUBTOTAL:</b>	<b>18.54</b>
<b>MAP TOTAL:</b>	<b>135.88</b>





# 2005 Baseline: Low Level Point Emissions

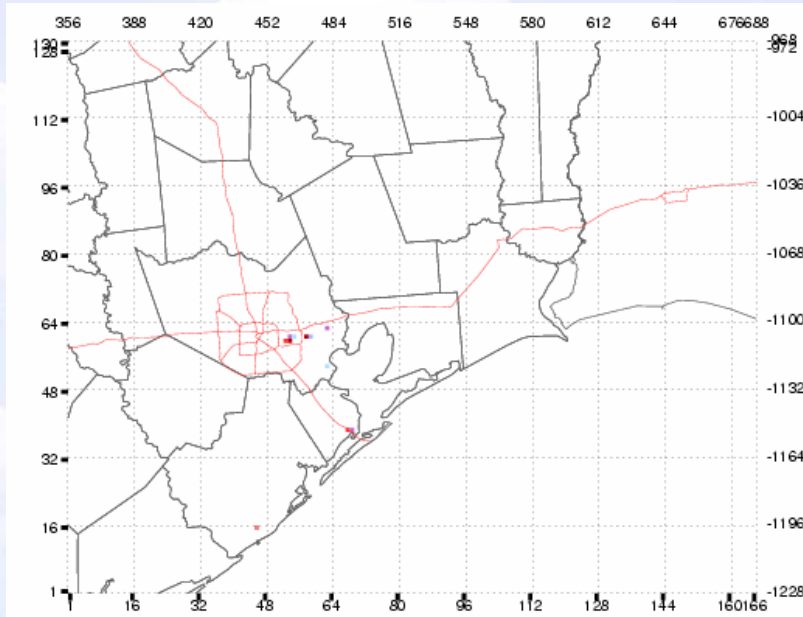






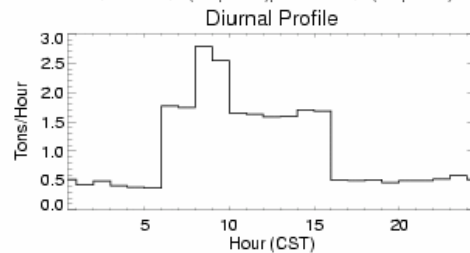
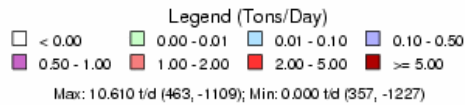
# 2005 Baseline: Tanks and PSCF Emissions

## Tank Landing Loss

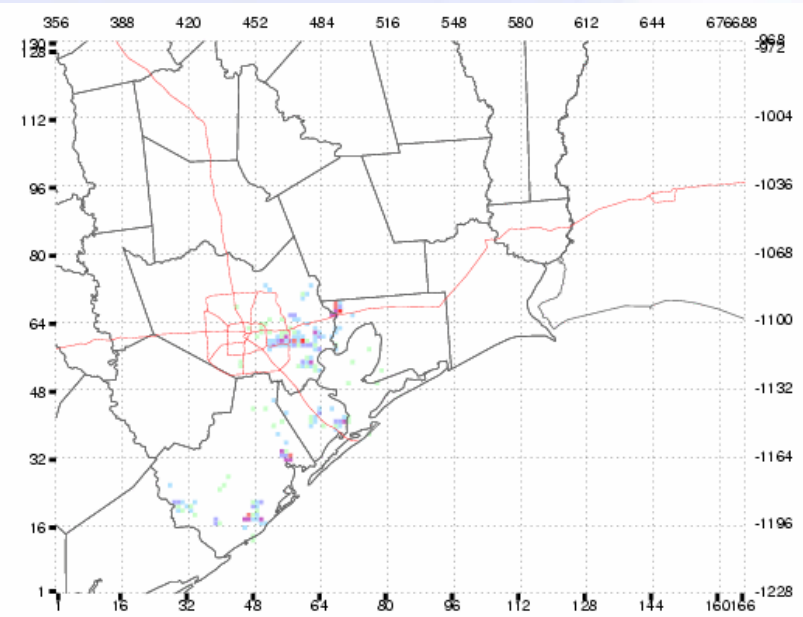


hgb8h2.bl1ne05d.hgbpa\_02km Tank Landing Loss Emissions, 07/20/2005: All VOC

Emissions Plotted	
County	Tons/Day
Brazoria	1.29
Chambers	0.00
Fort Bend	0.00
Galveston	3.05
Harris	21.06
Liberty	0.00
Montgomery	0.00
Waller	0.00
<b>HGB SUBTOTAL:</b>	<b>25.40</b>
Hardin	0.00
Jefferson	0.00
Orange	0.00
<b>BPA SUBTOTAL:</b>	<b>0.00</b>
<b>MAP TOTAL:</b>	<b>25.40</b>

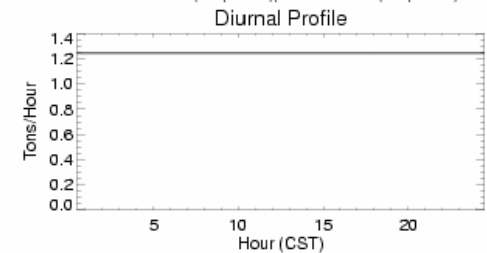


## PSCF



pscfv2.hgbpa\_02km PSCF Emissions, 06/22/2005: All VOC

Emissions Plotted	
County	Tons/Day
Brazoria	1.018
Chambers	6.98
Fort Bend	0.00
Galveston	1.91
Harris	10.84
Liberty	0.00
Montgomery	0.00
Waller	0.00
<b>HGB SUBTOTAL:</b>	<b>29.92</b>
Hardin	0.00
Jefferson	0.00
Orange	0.00
<b>BPA SUBTOTAL:</b>	<b>0.00</b>
<b>MAP TOTAL:</b>	<b>29.92</b>





## EI Development of the 2005 Baseline – cont.

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- All the source categories modeled in the baseline are modeled in the future case also.
- Only growth and controls are added to the baseline to create the future case.
- Thus, the baseline and future modeled concentrations that go in to the development of the RRF are directly compatible.



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# Questions