

DISCLAIMER

Please note that this is a summary of a *draft* report of TERC Research Project H60. In order to fully respond to comments on the draft report received from TERC's Science Advisory Committee and others the final report will not be available until Friday, August 25, 2006

Ozone Impacts of Proposed Power Plants and Offsets

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Results from TERC Project H60 Phase 1

Background

- DFW SIP Modeling
 - Using August 13-21, 1999 ozone model
 - Seeking to demonstrate attainment in 2009
- Earlier results from TERC Project H60
 - Developed 2002 modeling to extend strategy evaluation to 3 more episodes
 - Evaluated potential regional control strategies that may help DFW
- New EGUs and offsets have been proposed – how do they impact DFW?

Power Plant (EGU) Proposals

- 8 proposed new EGUs were modeled previously in project H60
 - Including 2 TXU units
- 8 new 800 MW EGUs from TXU
- 1 new EGU at Limestone
- 17 EGUs in total, 10 from TXU

- TXU has proposed an offset strategy

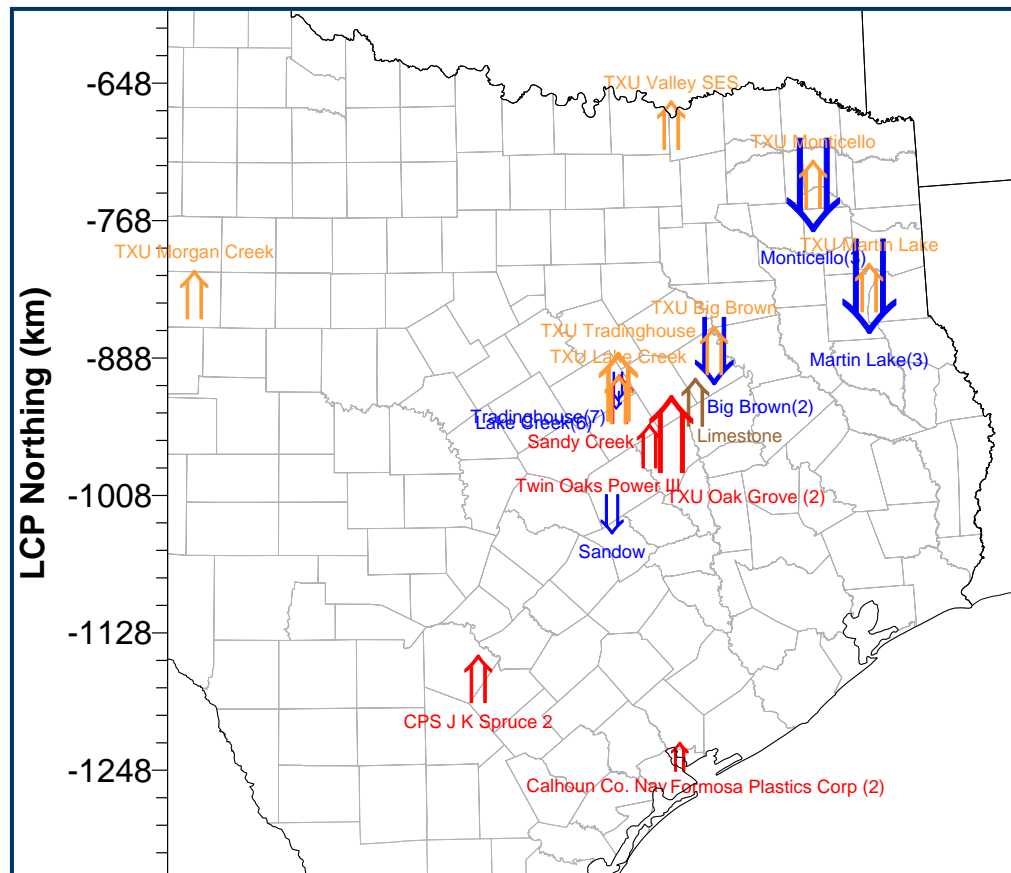
Today's Presentation

- EGU emissions changes
 - New units
 - TXU's offsets
- Ozone Impacts
 - New units
 - New units with TXU's offsets
- Summary

EGU Emissions Data

- 2009 base emissions provided by TCEQ (referred to as version “a2”)
 - Emissions for existing Texas EGUs based on 2005 CEM data
- Proposed EGU emissions provided by TCEQ
 - Based on permit applications
 - Using 30-day emission limits
- TXU’s offset strategy provided by TXU
 - Changes to the 2009 base emission rates
 - NOx reductions at coal units
 - Shutdown of other units

Location of EGU Emission Changes



Arrows identify EGU emission increases and decreases

Proposed EGUs and Offsets

- ↑ = Original proposed EGUs
- ↑ = New TXU proposed EGUs
- ↑ = Proposed Limestone EGU
- ↓ = TXU proposed offsets
- ↑↑ = 20 TPD
- ↑ = 10 TPD
- ↑ = 5 TPD

Summary of Emission Changes

- 103 tpd NO_x from all 17 new EGUs
- 72 tpd NO_x from ten new TXU units
- TXU's offsets reduced NO_x emissions by 73 tpd

tpd = tons per day

Detailed Emissions Summary

Plant	City	County	LCPx [km]	LCPy [km]	NOx [tpd]	VOC [tpd]	CO [tpd]
Original 8 proposed EGUs							
TXU Oak Grove (2)	Franklin	Robertson	332.23	-954.47	17.22	1.13	73.20
Twin Oaks Power III	Bremond	Robertson	313.04	-964.88	5.58	0.36	11.95
CPS J K Spruce 2	San Antonio	Bexar	163.45	-1168.08	6.62	0.35	53.76
Sandy Creek	Riesel	McLennan	286.89	-923.87	6.88	0.35	29.47
Formosa Plastics Corp (2)	Point Comfort	Calhoun	339.68	-1236.29	2.52	0.19	3.96
Calhoun Co. Nav. Dist.	Point Comfort	Calhoun	339.10	-1236.22	2.23	0.16	4.78
Total					41.05	2.53	177.12
All (17) proposed EGUs (including the 8 EGUs above)							
TXU Valley SES	Savoy	Fannin	332.13	-684.6	6.88	0.35	29.47
TXU Big Brown	Fairfield	Freestone	369.65	-881.51	6.88	0.35	29.47
TXU Lake Creek	Riesel	McLennan	286.06	-924.36	6.88	0.35	29.47
TXU Tradinghouse (2)	Waco	McLennan	286.02	-913.24	13.75	0.70	58.94
TXU Morgan Creek	Colorado City	Mitchell	-84.73	-832.61	6.88	0.35	29.47
TXU Martin Lake	Tatum	Rusk	505.1	-826.52	6.88	0.35	29.47
TXU Monticello	Mt Pleasant	Titus	456.07	-736.39	6.88	0.35	29.47
NRG Limestone	Jewett	Limestone	353.23	-926.53	6.72	0.43	53.76
Total from all 17 EGUs					102.78	5.75	466.66
17 proposed EGUs with TXU offsets¹ (includes all EGUs listed above)							
TXU Valley	Savoy	Fannin	331.45	-684.57	0	0	0
TXU Big Brown(2)	Fairfield	Freestone	369.72	-881.84	-13.22	0	0
TXU Lake Creek (6)	Riesel	McLennan	284.01	-924.87	-0.94	-0.03	-0.29
TXU Tradinghouse (7)	Waco	McLennan	285.59	-912.82	-2.41	-0.10	-0.50
TXU Morgan Creek	Colorado City	Mitchell	-85.33	-833.99	0	0	0
TXU Martin Lake(3)	Tatum	Rusk	505.38	-825.34	-26.04	0	0
TXU Monticello(3)	Mt Pleasant	Titus	456.31	-736.85	-25.50	0	0
TXU Sandow	Rockdale	Milam	280.4	-1024.54	-4.51	0	0
Total from offsets					-72.63	-0.13	-0.79
Grand Total					30.15	5.62	465.86

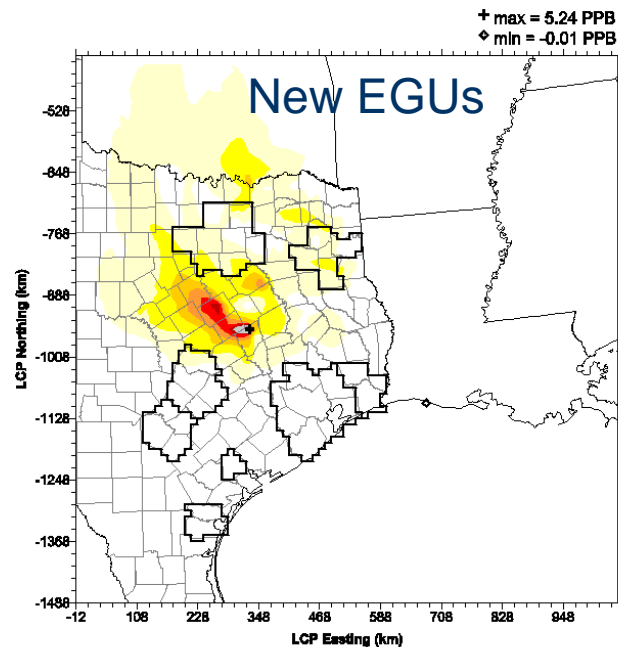
(This information is also in the report)

Ozone Modeling Results

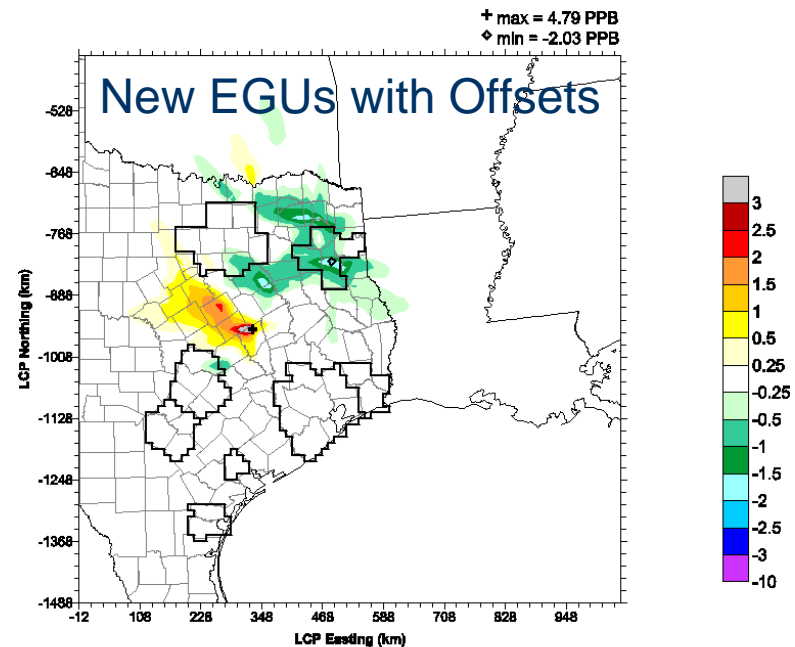
- Presenting two types of information
- Projected 2009 design values (DFW only)
 - The models have been used for Design Value calculations only in DFW
 - Direct link to projected ozone attainment status
- Maps of changes in episode average daily max 8-hour ozone
 - Show episode average because concise and similar to the way models are used in Design Value calculations
 - Indicates where ozone changes across eastern Texas, but model results alone can not project attainment status (also need monitored ozone data)

10 TXU New EGUs with TXU Offsets

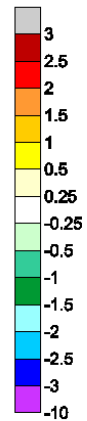
DFW
SIP
Episode



Difference in Episode Average of the Daily Max 8hr O₃ (ppb)
DFW 2009.a2 12km. Change from adding 10 TXU-proposed EGUs
August 15-22, 1999 for FY 2009



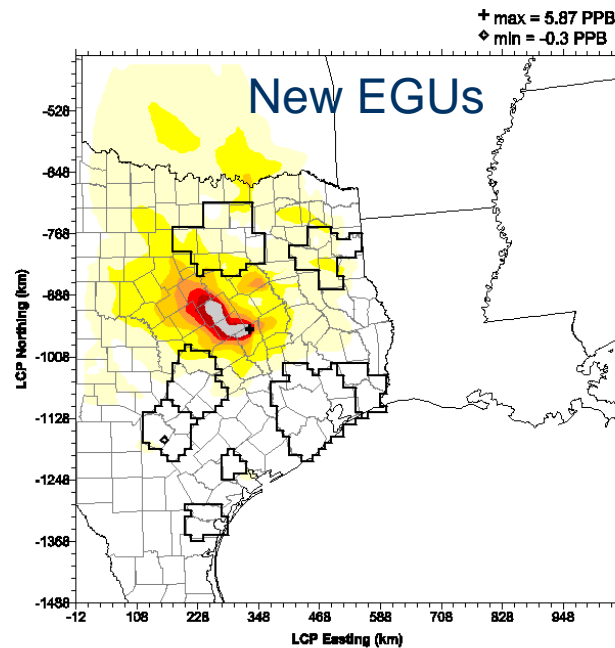
Difference in Episode Average of the Daily Max 8hr O₃ (ppb)
DFW 2009.a2 12km. Change from adding 10 TXU-proposed EGUs + offsets
August 15-22, 1999 for FY 2009



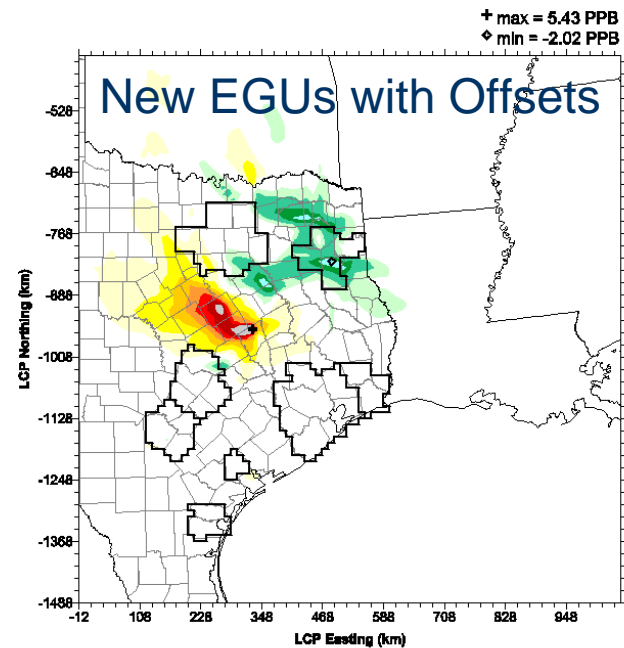
- Increases mainly in Central Texas (some in Northeast Texas)
- Offsets mainly in Northeast Texas (some in Central Texas)
- Ozone changes tend not to impact DFW

17 New EGUs with TXU Offsets

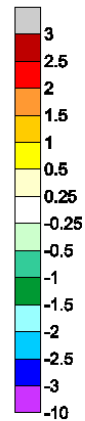
DFW
SIP
Episode



Difference in Episode Average of the Daily Max 8hr O3 (ppb)
DFW 2009.a2 12km. Change from adding 17 proposed EGUs
August 15-22, 1999 for FY 2009



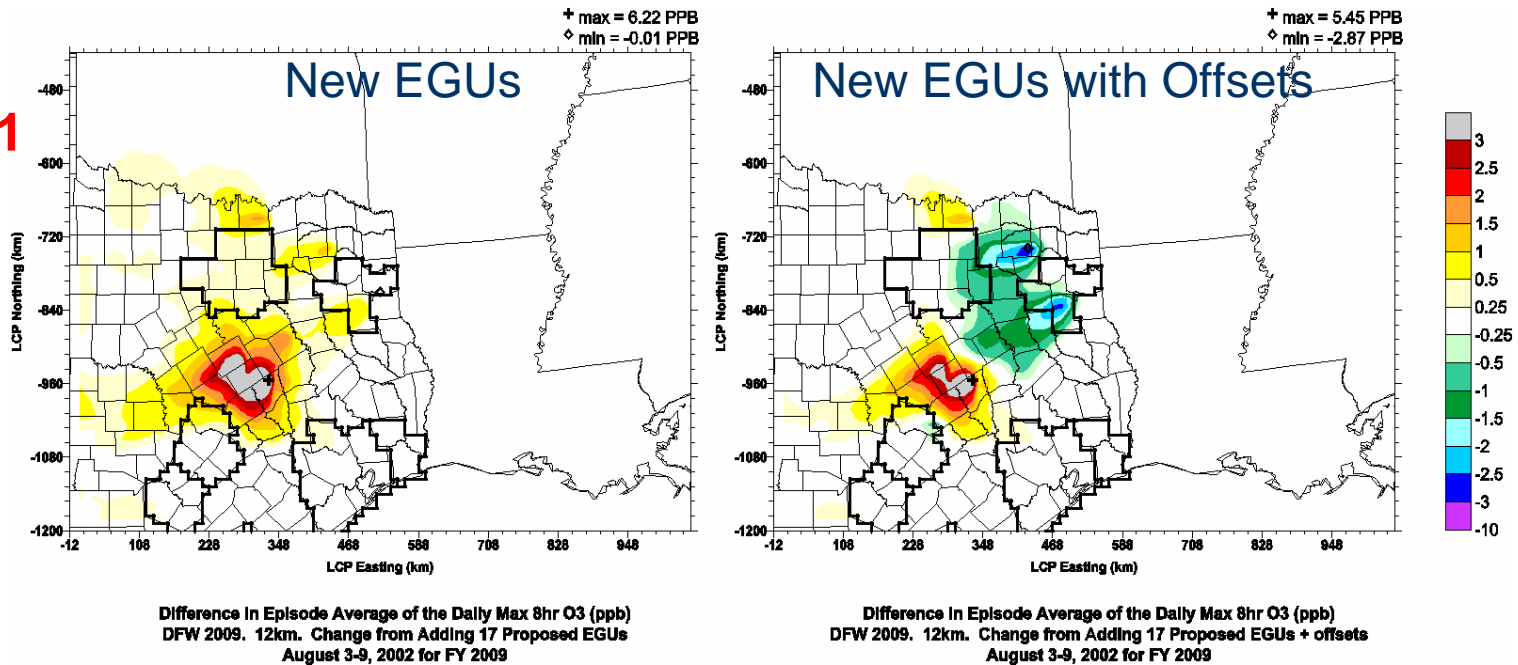
Difference in Episode Average of the Daily Max 8hr O3 (ppb)
DFW 2009.a2 12km. Change from adding 17 proposed EGUs + offsets
August 15-22, 1999 for FY 2009



- Increases mainly in Central Texas, larger than 10 TXU units
- Offsets mainly in Northeast Texas (some in Central Texas)
- Ozone changes tend not to impact DFW

17 New EGUs with TXU Offsets

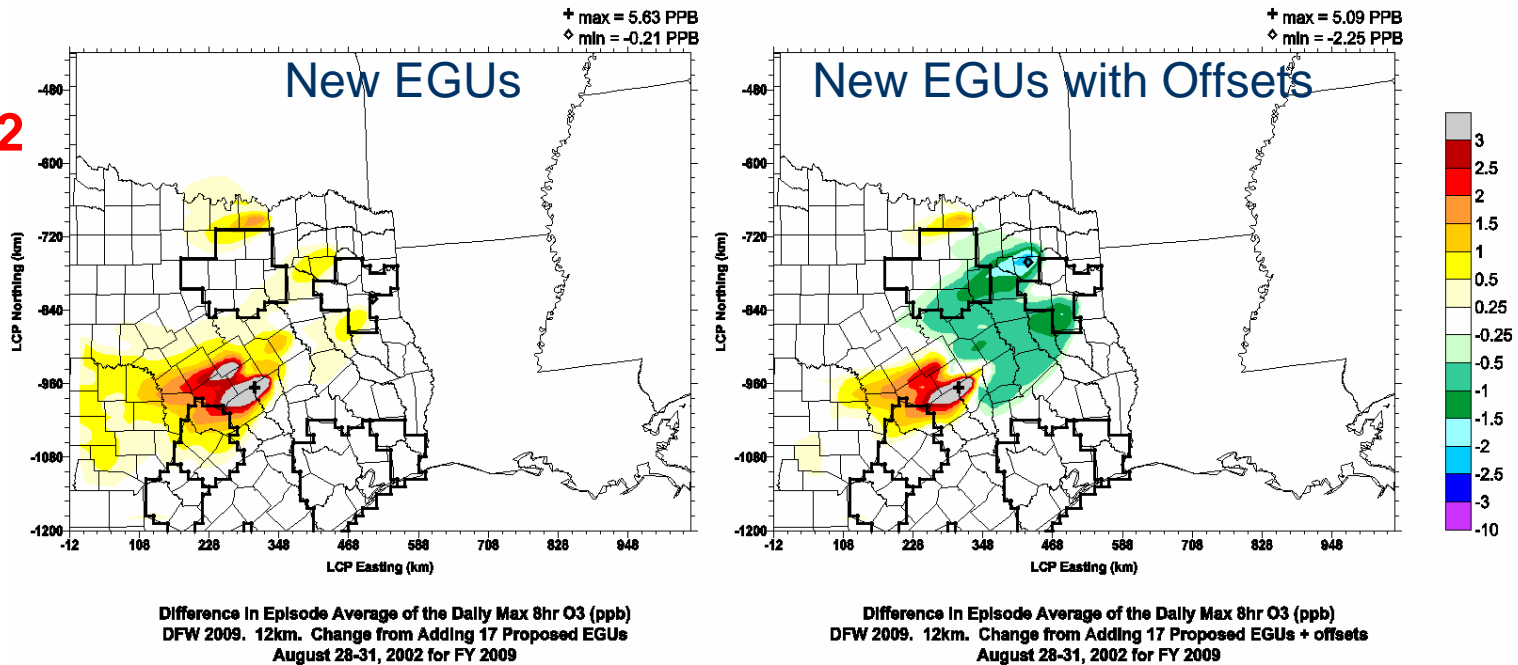
2002
Episode 1



- Increases mainly in Central Texas
- Offsets mainly in Northeast Texas (some in Central Texas)
- Ozone reductions tend to impact DFW more than increases

17 New EGUs with TXU Offsets

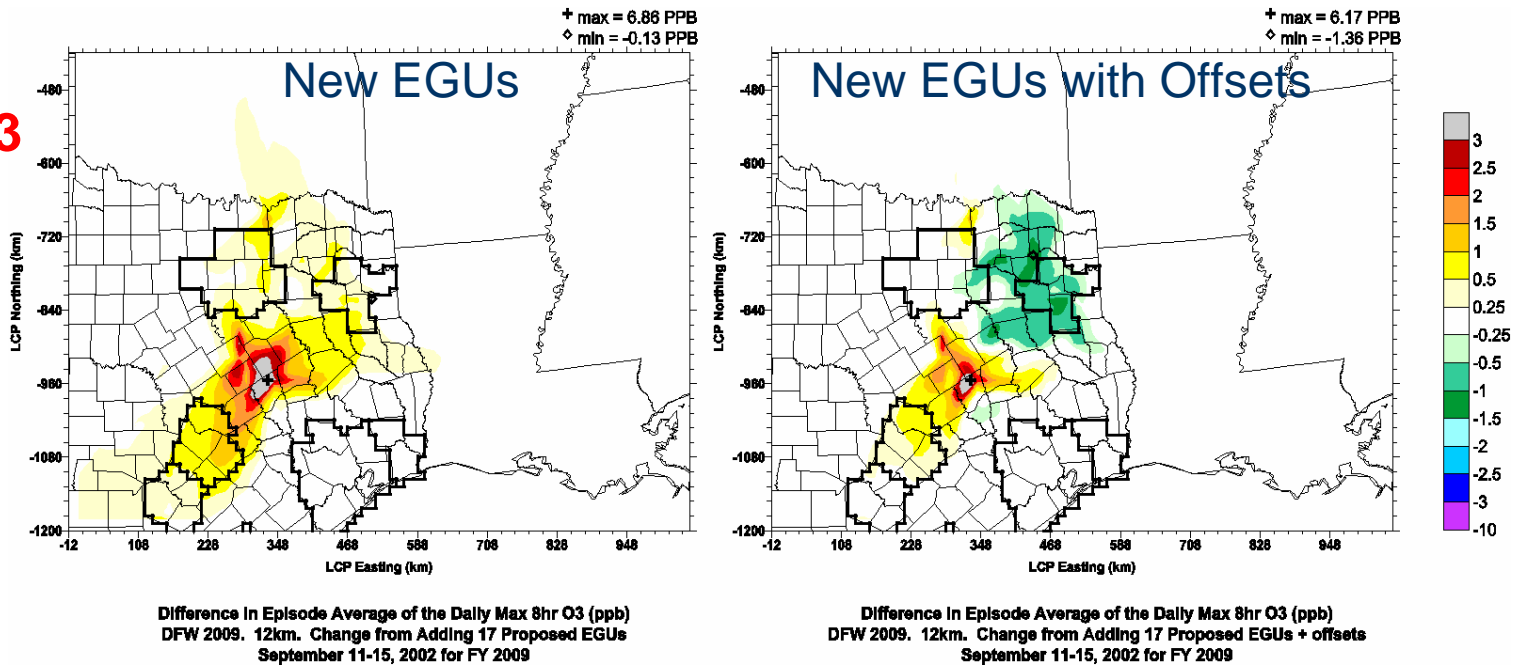
2002
Episode 2



- Increases mainly in Central Texas extending into Austin
- Offsets mainly in Northeast Texas (some in Central Texas)
- Ozone reductions tend to impact DFW more than increases

17 New EGUs with TXU Offsets

2002
Episode 3



- Increases mainly in Central Texas extending to Austin/San Antonio
- Offsets mainly in Northeast Texas (some in Central Texas)
- Ozone changes tend not to impact DFW (except from North)

Changes in NO_x Emissions and DFW DVs

	Add the original 8 EGUs	Add 10 TXU EGUs	Add 10 TXU EGUs with TXU offsets	Add all 17 EGUs	Add all 17 EGUs with TXU offsets
NO_x Change (tpd)	41	72	-1	103	31
Changes in DFW average 2009 8-hr ozone DVs (ppb)					
Aug 15-22, 1999 DFW SIP Episode	0.06	0.29	-0.04	0.34	-0.02
Aug 3-9, 2002 2002 Episode 1	0.08	0.27	-0.18	0.31	-0.14
Aug 28-31, 2002 2002 Episode 2	0	0.09	-0.31	0.09	-0.31
Sept 11-15, 2002 2002 Episode 3	0.08	0.25	-0.04	0.28	-0.01

Summary Points (1 of 4)

- Ozone increases from 17 proposed new EGUs were largest in Central Texas (Waco area) and also impacted DFW, Northeast Texas, Austin and San Antonio
- Ozone decreases from TXU's offset strategy were greatest in Northeast Texas and also benefited Central Texas, DFW, Austin and San Antonio

Summary Points (2 of 4)

- DFW tended to miss both the greatest ozone increases and decreases in all four episodes
- Increases in average DFW design values for 2009 from 17 new EGUs were up to 0.34 ppb
 - TXU units accounted for most of these increases
- Decreases in average DFW design values for 2009 for 17 new EGUs with TXU's offsets were up to -0.31 ppb
- These changes are in the context of needing a few ppb reduction in 2009 DFW ozone to demonstrate attainment

Summary Points (3 of 4)

- Robertson County in Central Texas consistently had the largest ozone impacts from proposed new EGUs
 - Increases of ~5 to ~7 ppb in episode average maximum ozone from all 17 proposed EGUs and only about half a ppb lower with TXU's offsets
 - Monitoring data are lacking to place these modeled ozone changes in context

Summary Points (4 of 4)

- TXU's offset strategy mitigated most ozone impacts from proposed EGUs in Northeast Texas and DFW
- TXU's offsets were less successful in Central Texas because the offsets (Tradinghouse and Lake Creek EGUs) were smaller and non-TXU plants were not involved in the offset strategy