



THE IMPACT OF FUEL SWITCHING
ON
ATMOSPHERIC SO₂ IN SOUTHEAST TEXAS

A One Day Symposium
Presented By
AIR POLLUTION CONTROL ASSOCIATION
(Gulf Coast Chapter)
and
CITIZENS' ENVIRONMENTAL COALITION

Monday
October 17, 1977
8:00 a.m.
University of Houston
Continuing Education Center

Symposium Chairman
Dr. Aziz Siddiqi

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PURPOSE OF THE SYMPOSIUM

Natural gas is the current home heating and industrial fuel in Southeast Texas. This fuel is free of sulfur and, as a consequence, its use has resulted in relatively low atmospheric concentrations of SO_2 - even though there is a large consumption of fuel (primarily industrial).

Currently, in the national interest, natural gas is being allocated to home heating; its use as an industrial fuel is being curtailed. This allocation of natural gas will require that industrial boilers and process heaters will be switched to other fuels. Since all other available fuels contain sulfur, the switch will result in an increase in SO_2 emissions. These emissions will, eventually, result in an exceedance of the SO_2 Significant Deterioration and Ambient Air Standards.

In addition, the logistical problems for industries to backfit coal-handling equipment or fuel oil storage equipment are enormous. Also, incorporation of the waste disposal areas for SO_2 -removal equipment may be impractical along the crowded Houston Ship Channel.

A paradox arises because Houston citizens should not find themselves being "legislated" into an air quality problem with SO_2 when Congress, so obviously with the new Clean Air Act, is trying to legislate Clean Air for everyone. Both citizens and representatives from industries, confused about this paradox, are using this Symposium as a forum to discuss and analyze the problem and bring to light criteria for future decision making on this issue.

Nationally recognized experts will, in the morning sessions, discuss basic concepts pertinent to the issue and, then in the afternoon session, will participate in an open forum discussion. This program contains some basic information for reference.

John Hathorn

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SYMPOSIUM
on
THE IMPACT OF FUEL SWITCHING
ON ATMOSPHERIC SO₂ IN SOUTHEAST, TEXAS

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Program:

8:00 a.m. Registration
8:30 a.m. Welcome and Introduction
9:00 a.m. Keynote Speech:
Ms. Adlene Harrison, Administrator
Environmental Protection Agency
Region VI
Dallas, Texas
9:15 a.m. Technical Session
Chairman:
Jim Tarr
Texas Air Control Board
Bellaire, Texas
SO₂ Health Effects:
Ms. Judith A. Graham
Health Effects Research Laboratory
Environmental Protection Agency
Research Triangle Park, North Carolina
SO₂ Ambient Air Quality:
Dr. Pete Roberts
Texas Air Control Board
Austin, Texas
SO₂ Regulations:
Mr. David J. Beck, Attorney
Fulbright & Jaworski
Houston, Texas
Coal Desulfurization:
Professor Amir Attar
University of Houston
Houston, Texas
Flue Gas Desulfurization:
Mr. John W. Tenini
Atlantic Richfield Company
Houston, Texas

12:00 Noon Lunch
 Speaker:
 Mr. Kenneth R. Woodcock
 Assistant Associate Administrator for
 Environmental Policy
 Federal Energy Administration
 Washington, D. C.

1:30 p.m. Priorities and Values:
 Professor Konstantin Kolenda
 Rice University
 Houston, Texas

2:00 p.m. Panel Discussion:
 Moderator: Mr. Kenneth W. Mackenzie
 Chief
 Air Pollution Control
 City of Houston
 Panelists: Mr. Allison Peirce
 Director
 Harris County
 Pollution Control
 Mr. David Marrack, MD
 Sierra Club
 Mr. Steve Naeve
 Houston Lighting & Power
 And all Symposium speakers

5:00 p.m. Symposium Ends

APPLICABLE SULFUR DIOXIDE STANDARDS

AMBIENT AIR STANDARDS FOR SO₂

National and Texas Ambient Air Quality Standards (µg/m³)

	<u>Primary</u>	<u>Secondary</u>
Annual	80	-
24-Hour	365 ¹	-
3-Hour	-	1300 ¹

Federal Significant Deterioration Regulations (µg/m³) (From Amended Clean Air Act)

Annual	20
24-Hour	91
3-Hour	512

Texas Standards (µg/m³)

30-Min	
Harris-Galveston Counties	734 (.28 ppm)
Jefferson-Orange Counties	838 (.32 ppm)
All other counties	1048 (.40 ppm)

EMISSION STANDARDS FOR SO₂

Federal New Source Performance Standards

Fossil Fuel Fired Steam Generators	
Liquid	0.80 lb/10 ⁶ BTU heat input
Solid	1.20 lb/10 ⁶ BTU heat input
Sulfuric Acid Plants	4.0 lb/ton produced
Primary Copper, Zinc, and Lead Smelters	0.065% by volume

Texas Standards

Solid Fossil Fuel Fired Steam Generators	3.0 lb/10 ⁶ BTU heat input
Liquid Fossil Fuel Fired Steam Generators, Furnaces, or Heaters	440 ppm by volume
Sulfuric Acid Plants	Various-Effluent Flow Dependent
Nonferrous Smelters	0.8% by volume

¹Not to be exceeded more than once per year

AMBIENT SULFUR DIOXIDE LEVELS IN AIR
QUALITY REGIONS OF TEXAS: 1974-1975

Region	Location	Concentration- $\mu\text{g}/\text{m}^3$				Concentration-ppm by vol				Nonattainment ^c Period Hours
		Max ^a	Min ^a	Avg ^b	Del ^b	Max ^a	Min ^a	Avg ^b	Del ^b	
1	West Central	2	0	2	1	0.001	0.000	0.001	0.001	0
2	High Plains	2	0	2	0	0.000	0.000	0.001	0.000	0
3	Central Texas	0	0	0	0	0.000	0.000	0.000	0.000	0
4	Rio Grande Valley	10	0	2	1	0.004	0.000	0.001	0.001	0
5	South Coastal	288	0	29	13	0.110	0.000	0.011	0.005	0
6	Permian Basin	36	0	2	4	0.014	0.000	0.001	0.002	0
7	Houston-Galveston	707	0	26	26	0.270	0.000	0.010	0.010	0
8	Dallas-Ft. Worth	79	0	26	9	0.030	0.000	0.010	0.003	0
9	South Texas	26	0	5	3	0.010	0.000	0.002	0.001	0
10	Southeast Coast	472	0	21	13	0.180	0.000	0.008	0.005	0
11	Trans Pecos	2,017	0	31	66	0.770	0.000	0.012	0.025	0
12	Northeast Texas	96	0	4	7	0.037	0.000	0.002	0.003	0

- Notes: a. Sulfur dioxide concentrations are one-hour average values.
b. Sulfur dioxide concentrations are annual averages of one-hour average values.
c. Hours exceeding 3 hour average concentration of 0.50 ppm by volume ($1,300 \mu\text{g}/\text{m}^3$).

*from Reference 2

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Table 5.7*

PROJECTED INCREASES IN UNCONTROLLED SULFUR OXIDES EMISSIONS FROM ELECTRIC
POWER GENERATION IN TEXAS: 1976-2000

Scenario	Description	Sulfur Dioxide Emission Rate - Tons per Year					
		1976	1980	1985	1990	2000	
0	Base Case	347,674	819,862	1,092,207	3,498,902	1,859,491	5,279,218
1	Constrained Nuclear	347,674	851,520	-	2,119,233	-	3,531,251
2	Medium Air Quality	347,674	851,520	-	1,843,601	-	2,682,871
3	High Air Quality	347,674	851,520	-	1,768,991	-	577,971
4	Gas Phaseout	347,674	715,056	-	2,011,468	-	3,440,363
5	Load Management	347,674	576,899	-	1,893,725	-	2,754,135
6	Ground Level Standards	347,674	851,520	-	1,976,861	-	3,498,430
7	Constrained Supply	347,674	705,619	-	1,952,382	-	3,472,723
8	Gas Restricted	347,674	867,468	-	1,884,600	-	3,216,138
BN	High Growth	347,674	815,953	-	3,874,438	-	6,838,932
BL	Low Growth	347,674	815,819	-	3,430,398	-	3,313,529

Table 5.8*

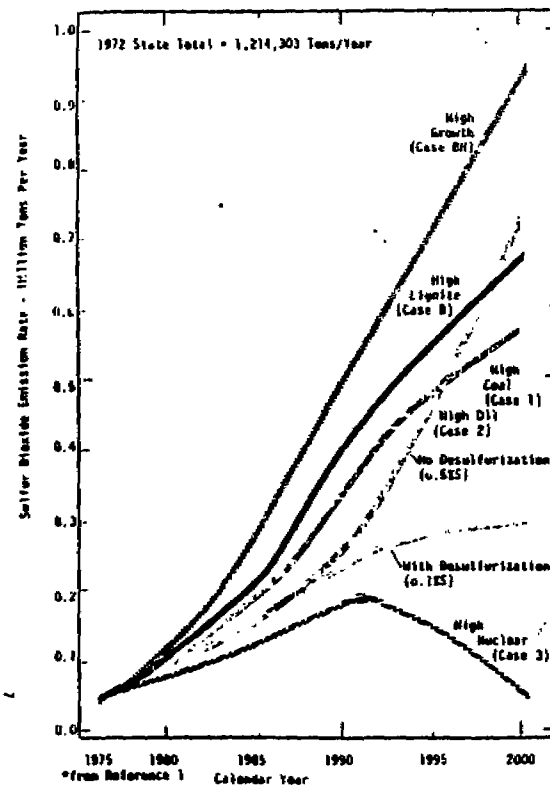
PROJECTED INCREASES IN CONTROLLED SULFUR OXIDES EMISSIONS FROM ELECTRIC
POWER GENERATION IN TEXAS: 1976-2000

Scenario	Description	Sulfur Dioxide Emission Rate - Tons per Year					
		1976	1980	1985	1990	2000	
0	Base Case	45,472	102,353	212,552	404,097	289,920	672,011
1	Constrained Nuclear	45,472	85,421	-	358,023	-	560,997
2	Medium Air Quality	45,472	85,421	-	259,518	-	703,894
3	High Air Quality	45,472	85,421	-	184,432	-	62,127
4	Gas Phaseout	45,472	72,912	-	211,763	-	379,787
5	Load Management	45,472	58,061	-	289,658	-	542,441
6	Ground Level Standards	45,472	85,421	-	201,908	-	350,423
7	Constrained Supply	45,472	73,467	-	201,217	-	348,908
8	Gas Restricted	45,472	101,378	-	242,649	-	465,711
BN	High Growth	45,472	102,445	-	516,789	-	927,913
BL	Low Growth	45,472	102,310	-	389,024	-	383,068

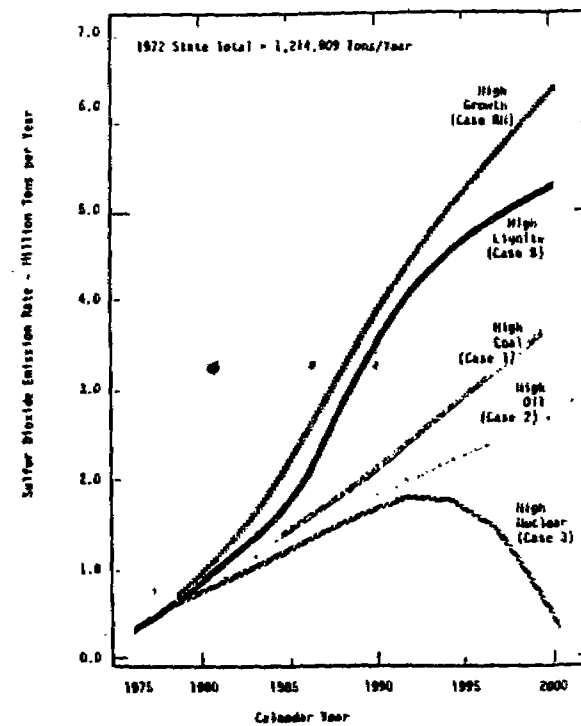
*from Reference 2

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GENERATION IN TEXAS: 1976 - 2000.



PROJECTED INCREASES IN UNCONTROLLED SULFUR DIOXIDE EMISSIONS FROM ELECTRIC PLANT GENERATION IN TEXAS: 1976 - 2000.



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- Reference 1: "Air Quality Impacts of Future Electric Power Generation in Texas;" Cooper, Hal. B. H., et al. Paper 54, Session 54 at 83rd National Meeting of the Amer. Inst. of Chem. Eng.; March 20-24, 1977.
- Reference 2: "Final Report on the Provisions of Electric Power in Texas: Key Issues and Uncertainties; Volume II." Center for Energy Studies, Univ. of Texas at Austin for Governor's Energy Advisory Council, Forecasting and Policy Analysis Division. Contract No. IAC-76-77(1148).

SYMPOSIUM COMMITTEE

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