

MEMORANDUM

TO: Docket

FROM: EPA, Clean Air Markets Division

SUBJECT: Assumptions used in sensitivity analysis for the Clean Air Mercury Rule

DATE: March 15, 2005

This memorandum provides a summary of the assumptions used in EPA's Integrated Planning Model (IPM) for the advanced sorbent sensitivity analysis discussed in Chapter 7 of the Regulatory Impact Analysis for the final Clean Air Mercury Rule (CAMR). The sensitivity analysis presented examined the impacts of possible improvements in Hg control costs over time.

The Agency's position on the state of Hg technology is contained in the EPA's Office of Research and Development whitepaper and that IPM is a modeled abstraction from that position (see *Control of Emissions from Coal-Fired Electric Utility Boilers: An Update*, EPA/Office of Research and Development, March 2005).

The sensitivity analysis presented includes examination of the impact of mercury technology improvements by providing a lower cost mercury control option in future years. Specifically, the sensitivity analysis examines the impact of providing a second ACI option in 2013 with advanced sorbents and lower capital costs. The assumptions of costs and performance for the sensitivity analysis is based on recent testing sponsored by EPA, DOE, and industry and more information on these advanced sorbents can be found in the docket (see *Control of Emissions from Coal-Fired Electric Utility Boilers: An Update*, EPA/Office of Research and Development, March 2005).

For purposes of modeling, EPA has assumed the availability of two ACI options: (1) ACI using conventional sorbents and achieving 90% removal with the addition of a fabric filter; and (2) ACI using advanced sorbents and achieving 80 to 90% removal without the addition of a fabric filter. The first ACI option is available at the start of the model and the second ACI is available in 2013. The assumptions for ACI using conventional sorbents can be found in the EPA's IPM documentation (*Documentation Supplement for EPA Modeling Applications (V.2.1.6) Using the Integrated Planning Model*, EPA 430/R-03-007, July 2003), which is available in the CAMR docket or at www.epa.gov/airmarkets/epa-ipm.

The assumptions for ACI using advanced sorbents can be found in Table 1 below. The assumptions for capital cost and O&M costs are similar to those for the ACI option using conventional sorbents. The advanced sorbent ACI option has different sorbent injection rates, no added pulse-jet fabric filter, and higher sorbent cost (\$0.75 per lb). Noting these differences, the discussion of ACI model assumptions in EPA's IPM documentation would still apply.

Table 1: Sorbent-Feed Concentration and Cost Components for Advanced Sorbent Sensitivity Analysis

	Coal Type	Existing Air Pollution Control	Sulfur Level	Sorbent Feed 90%	Sorbent Feed 80%	Capital Cost Components	O&M Cost Components
1A	BIT	ESP	L	4		(2) + (3)	1a+2b+2c+2e+2f
2A	BIT	ESP/O	L	4		(2) + (3)	1a+2b+2c+2e+2f
3A	BIT	ESP+FF	L	4		((2) + (3)	1a+2b+2c+2e+2f
4A	BIT	ESP+FGD	H	6		(2) + (3)	1a+2b+2c+2e+2f
5A	BIT	ESP+FGD+SCR	H	NA		none	none
6A	BIT	ESP+SCR	L	4		(2) + (3)	1a+2b+2c+2e+2f
7A	BIT	FF	L	4		(2) + (3)	1a+2b+2c+2e+2f
8A	BIT	FF+DS	H	6		(2) + (3)	1a+2b+2c+2e+2f
9A	BIT	FF+FGD	H	6		(2) + (3)	1a+2b+2c+2e+2f
10A	BIT	HESP	L	NA	6	(2) + (3)	1a+2b+2c+2e+2f
11A	BIT	HESP+FGD	H	NA	6	(2) + (3)	1a+2b+2c+2e+2f
12A	BIT	HESP+SCR	L	NA	6	(2) + (3)	1a+2b+2c+2e+2f
13A	BIT	PMSCRUB+FGD	H	6		(2) + (3)	1a+2b+2c+2e+2f
14A	BIT	PMSCRUB+FGD+SCR	H	NA		none	none
1B	BIT	ESP	H	6		(2) + (3)	1a+2b+2c+2e+2f
2B	BIT	ESP/O	H	6		(2) + (3)	1a+2b+2c+2e+2f
3B	BIT	ESP+FF	H	6		(2) + (3)	1a+2b+2c+2e+2f
4B	BIT	FF	L	4		(2) + (3)	1a+2b+2c+2e+2f
5B	BIT	ESP+FGD+SCR	L	NA		none	none
6B	BIT	ESP+SCR	H	6		(2) + (3)	1a+2b+2c+2e+2f
7B	BIT	FF	H	6		(2) + (3)	1a+2b+2c+2e+2f
8B	BIT	FF+DS	L	4		(2) + (3)	1a+2b+2c+2e+2f
9B	BIT	FF+FGD	L	4		(2) + (3)	1a+2b+2c+2e+2f
10B	BIT	HESP	H	NA	6	(2) + (3)	1a+2b+2c+2e+2f
11B	BIT	HESP+FGD	L	NA	6	(2) + (3)	1a+2b+2c+2e+2f
12B	BIT	HESP+SCR	H	NA	6	(2) + (3)	1a+2b+2c+2e+2f
13B	BIT	PMSCRUB+FGD	L	4		(2) + (3)	1a+2b+2c+2e+2f
14B	BIT	PMSCRUB+FGD+SCR	L	NA		none	none
15	LIG	ESP	L	4		(1) + (2) + (3)	1a+2a+2b+2c+2e+2f
16	LIG	ESP+FF	L	4		(1) + (2) + (3)	1a+2a+2b+2c+2e+2f
17	LIG	ESP+FGD	L	4		(1) + (2) + (3)	1a+2a+2b+2c+2e+2f
18	LIG	FF+DS	L	4		(2) + (3)	1a+2b+2c+2e+2f
19	LIG	FF+FGD	L	4		(1) + (2) + (3)	1a+2a+2b+2c+2e+2f
20	SUB	ESP	L	4		(2) + (3)	1a+2b+2c+2e+2f
21	SUB	ESP+DS	L	4		(2) + (3)	1a+2b+2c+2e+2f
22	SUB	ESP+FGD	L	4		(2) + (3)	1a+2b+2c+2e+2f
23	SUB	ESP+SCR	L	4		(2) + (3)	1a+2b+2c+2e+2f
24	SUB	FF	L	4		(2) + (3)	1a+2b+2c+2e+2f
25	SUB	FF+DS	L	4		(2) + (3)	1a+2b+2c+2e+2f
26	SUB	FF+FGD	L	4		(2) + (3)	1a+2b+2c+2e+2f
27	SUB	HESP	L	NA	6	(2) + (3)	1a+2b+2c+2e+2f
28	SUB	HESP+FGD	L	NA	6	(2) + (3)	1a+2b+2c+2e+2f
29	SUB	HESP+SCR	L	NA	6	(2) + (3)	1a+2b+2c+2e+2f
30	SUB	PMSCRUB	L	4		(2) + (3)	1a+2b+2c+2e+2f
31	SUB	PMSCRUB+FGD+SCR	L	4		(2) + (3)	1a+2b+2c+2e+2f

Note: Capital costs include (1) spray cooling, (2) sorbent injection, and (3) sorbent disposal. O&M costs include (1) fixed costs and (2) variable O&M for (2a) water, (2b) sorbent, (2c) sorbent disposal, (2d) power for spray cool, (2e) power for sorbent injection, and (2f) fan power.