

Chris E Shoop 10/17/2002 10:07 AM

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Subject: Explanation of Input Data for Modeling Studies

Bob,

Per your request and in preparation for discussions with the Ohio EPA, please see the following description of the development of the emission numbers used in the modeling studies for 2002 and 2003.

The attached Excel workbook has data for the years 2001, 2002, and 2003. We used a separate sheet to summarize the emission point data for Mulrooney. I can provide that one as well if you wish, but the one attached contains all the assumptions and adjustments.

The emissions data for 2001 and for 2002 through July is based on the C-8 mass balance sheet we use for reporting air emissions to the WV DEP.

The data for the remainder of 2002 and for 2003 is based on projections Karl and I obtained from the two area schedulers. The monthly numbers are shown just below the main calculation tables. Note the Fine Powder production is broken out into FP-1, -2, and -3 figures.

The emissions for Fine Powder in 2002 are based on use of the original (primary) scrubber from January through April and use of the new Deep-bed scrubber from May through July. The projection for the remainder of the year also based on use of the Deep-bed scrubber.

The C-8 mass balance calculations provide a single emissions number and do not provide for allocation of emissions to the respective vents. I distributed the emissions stated from that calculation (2001 and 2002 January through July) as follows. First, I presumed the efficiency of the Fine Powder primary scrubber to be 50% which is consistent with the test results from February 2002 and Zipfel's earlier data. We used 95% as the efficiency for the Deep-bed scrubber. Though the August 13 test data indicates the Deep-bed scrubber efficiency is higher, the pound per hour emission rates is not that different so we chose to be conservative here. Second, Karl and I assigned an efficiency to PFA, based on test data and or internal studies conducted in the 2001 to early 2002 time frame. Finally, I assumed that all three FEP scrubbers had the same efficiency, which probably is not quite true, and used the Excel "Goal Seek" function to "fit" the efficiency to meet the total reported emissions. Please see the "fitted" efficiencies cited on the sheet for each year. Note that emissions from Granular are not recovered, so they are calculated directly and are not part of the "fitting" process.

For the projections in 2002 remainder and for 2003, I applied the following conversion from production data to emissions estimate. The production number is multiplied by the QPU for C-8 concentration (lb C-8 per lb dry product). This value is adjusted for the split of C-8 to the polymer versus water in the coagulators (and other water separation devices). The is also adjusted based on the expected efficiency of the control device for the emitting vent. The QPU's, fractions to dryer, and efficiencies are shown in the main table. The fraction to dryer values are consistent with the assumptions we have used for the earlier modeling studies and were the best available at the time we assembled the table. The efficiencies were also stated at the values we felt were being and can be achieved, for copoly as well as for Fine Powder.

For the pending application for FEP, Karl has applied a fraction to dryer of 0.35 after discussion with Ta-Wei. He has also stated the efficiencies of the scrubbers to be 87.5% which results in the emission rates being unchanged from those stated in the attached sheets.

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After several discussions with Ta-Wei and Trini, we have reached the understanding that the mass balance calculations we are using for the reporting, and the modeling study, tend to over-estimate the actual emissions. The impact of this on the modeling study is that much of the over-estimated emissions are forced to the shorter copoly stacks which causes higher modeled emissions at the closer receptors. We believe the efficiencies of the copoly scrubbers are actually at or close to 90%. But the conservative nature of the mass balance calculation makes it difficult to show this. The planned preliminary testing at FEP to be conducted later this month will be valuable for our reassurance that we can achieve the emission rates described in the projections.

Chris Shoop



Stack Emissions Project

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2001 Actual Emissions lb/yr ¹	Current Permit/Application/PDF #	"Fitted Efficiencies"
11055.0	815D (FP/D Scrubber)	0.5
0.0	815D (FP/D Deep Bed)	0.95
2.5	1353A Granular L2)	
5.5	Pre-Existing (Granular L1)	
4238.0	614A (FEP L1)	0.477614
4112.3	614A (FEP L2)	0.477614
2300.7	1953 (FEP L3)	0.477614
4296.0	2365A (PFA)	0.5
26005.0		

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Current	2002	2002	Projected	Total
Permit/Application/PDF #	YTD Actual Emissions lb/yr ¹	Projected Production lb/yr ¹	Calculated Emissions lb/yr	Calculated Emissions lb/yr
815D (FP/D Scrubber)	3851.9	3,511,560 (See note 1)	0	3851.9
816D (FP/D Deep Bed)	358.1		527.3	358.1
1353A Granular L2)	1.7		11.0	1.7
Pre-Existing (Granular L1)	3.3		26.3	3.3
614A (FEP L1)	1247.8		544.3	1247.8
614A (FEP L2)	1799.1		272.1	1799.1
1853 (FEP L3)	697.8		64.3	697.8
2365A (PFA)	2644.3		504.4	2644.3
			1949.7	12553.7

"Fitted
Efficiencies"
0.652208
0.652208
0.652208
0.55

Production Projections:

FP-1	1711967	0.0025	0.92	0.95	196,8762	3937,524
FP-2	914827.5	0.0035	0.92	0.95	147,2872	
FP-3	884765	0.0045	0.92	0.95	183,1464	

	Aug-02	Sep-02	Oct-02	Nov-02	Dec-02	End 2002	2003
FEP lines 1/2	747	583	877	934	861	4002	11566
FEP line 3	11	120	170	14	0	315	744
PFA process K	230	143	219	219	206	1017	2542

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DJM001144

Current	2003	Calculated		
Permit/Application/PDF #	Production lb/yr ¹	Fraction to Dryer	Scrubber Efficiency	Emissions lb/yr
815D (FP/D Scrubber)	9,631,432 (See note 1)	0.92	0.95	1446.2976
815D (FP/D Deep Bed)				33.0
1353A Granular L2)				79.0
Pre-Existing (Granular L1)				1,573.0
614A (FEP L1)				786.5
614A (FEP L2)				151.8
1953 (FEP L3)				1,260.8
2365A (PFA)				5330.37

Production Projections:

FP-1	4695544	0.0025	0.92	0.95	539.9876
FP-2	2509104	0.0035	0.92	0.95	403.8657
FP-3	2426784	0.0045	0.92	0.95	502.3443