

1 *Delaware Air Regulation Development*

2
3 Regulation 1142 Section 2

4 “Control of NO_x Emissions from Large Boilers and Process Heaters
5 At Petroleum Refineries”
6

7 **Committee Meeting #5 (August 23, 2006) Minutes**
8 **(Final version as of Oct. 3, 2006)**
9

10 **1. Participants**

11 **Committee members**

12 Heather Chelpaty, Premcor’s Delaware City Refinery

13 Kevin Stewart, American Lung Association

14 Mike Gansner, Environmental Resources Management

15 Alan Muller, Green Delaware

16 Jerry Llewellyn, DHSS

17 Rick Perkins, DHSS

18 Ron Amirikian, AQM

19 Ravi Rangan, AQM

20 Bruce Steltzer, AQM

21 Bill Harris, AQM

22 Mark Lutrzykowski, AQM

23 Frank Gao, AQM

24 **Non-committee participants**

25 Todd Kantorczyk, MGKF Attorney representing Valero

26 June MacArtor, participant from public

27 Ali Mirzakhali, AQM Administrator
28

29 **2. Meeting Minutes**
30

31 Frank opened the meeting at 10:05 AM, and all committee members made self-
32 introductions. Frank informed the committee that Alan called and said he would be about
33 30 minutes late. Then, Frank briefly introduced the agenda items of the meeting.
34

35 The first agenda item was to discuss and approve the meeting 4 minutes. Frank
36 mentioned that the first draft of the meeting 4 minutes was sent out to the committee on
37 August 11, but no significant comments had been received from the committee members,
38 except some additions/corrections from AQM members. Frank proposed that, if no
39 comment was to be added, the draft be approved as a final version. Kevin said that he did
40 not have major comments but did have some corrections for minor grammatical/spelling
41 errors and/or typos. He also pointed out that in the draft there were some places that
42 would need members’ clarifications and/or additional inputs from post-meeting review,
43 and those needed information should be added to the minutes before it was finalized.
44 Heather stated that (since John Deemer left the Delaware City facility recently) they did
45 not see the draft minutes and therefore could not provide comments. After a brief
46 discussion of each party’s situation, the committee agreed that (1) within one week after

1 the meeting, Frank would work out those clarification/input issues, Kevin would provide
2 corrections on errors/typos, and Valero would review the draft minutes and provide
3 comments if necessary, (2) then, Frank would revise the draft and finalize it in the
4 following week.

5
6 Before the committee moved to the next agenda item, which was to discuss the second
7 draft of the regulatory language, Heather presented to the committee 4-page written
8 comments. The comments included 2 parts, one part with general comments/questions for
9 this regulatory development, and one part with specific comments on the draft rule.
10 Heather mentioned that, since John Deemer left, she and others did not know much about
11 background of this rule-making, and what were discussed and agreed upon in the
12 previous meetings. Heather said that her preference was to address the entire set of
13 comments, starting with the "General Issues" part. Kevin commented that he would not
14 have objection to more discussions on many general issues related to the proposed rule,
15 such as background, Delaware air quality, reasons for this rule, needed and potential NOx
16 reductions, reasons for the proposed rate limits, etc. He added, however, that (1) the
17 committee had spent more than 5 months and 4 meetings on those issues, (2) the whole
18 rule-making process had been delayed for a month already from the initial schedule, and
19 (3) this current meeting was scheduled for discussing the draft 2 of the regulatory
20 language, and all committee members, including Valero, had known this at least since the
21 fourth meeting in July, therefore, this meeting should concentrate on the draft regulatory
22 language. Ali suggested to the committee that Valero's comments specific to the draft
23 language be addressed completely first in this meeting, and if we have time left at the
24 end, the general comments be addressed. The committee agreed on Ali's suggestion.

25 {Post-meeting comments from Heather, 09/29/2006:

26 On page 2, lines 10-12, the minutes indicate that I stated that I "and others did not know much
27 about the background of this rule-making." This sentence implies, incorrectly, that Premcor was
28 not familiar with the background of the Regulation 1142 development process at the time of the
29 meeting. To the contrary, Premcor has remained familiar with the issues surrounding the
30 Regulation 1142 development process. My statement during the meeting was intended to convey
31 that after reviewing the materials related to the committee process and speaking with John
32 Deemer, people at Premcor, including myself, continued to have questions about certain
33 key issues that may have been discussed in previous meetings. Because I was now attending the
34 meetings instead of John Deemer, further discussions concerning these remaining questions may
35 take additional time.

36 On page 2, lines 10-12, the minutes indicate that I said I was not familiar with certain items that
37 "were discussed and agreed upon in the previous meetings." It is my understanding that the
38 purpose of the Regulation 1142 Committee process was to provide participants with a forum to
39 comment on the proposed regulation and to aid the Department in formulating the rule.
40 Consistent with that purpose, I wish to clarify that in these committee meetings, Premcor has not
41 agreed to or with any particular aspect of proposed Regulation 1142, including the Department's
42 bases for the proposed rule or the positions the Department has taken with respect to any
43 technical or economic issues. In addition, the fact that Premcor has not chosen to comment upon
44 any particular statement by the Department or any other member of the committee as reflected in
45 any meeting minutes should not be construed as Premcor agreeing with such a statement. }

46

1 Heather first asked what the bases for the 0.04 lb/mmBTU daily limit and 0.03
2 lb/mmBTU annual average limit were. Ravi replied that the committee had discussed this
3 issue several times already, in particular in the last meeting (i.e., Meeting 4). The 0.04
4 limit was based on many technically-feasible and cost-effective CD cases, including one
5 with Valero, and other states around the country. In addition, other states, in particular,
6 CA and TX, had required 0.03 limit on an average basis. Frank added that the 0.04 daily
7 limit and 0.03 annual limit in the draft language were proposed based on discussion in the
8 last meeting, and Valero should review the meeting minutes that was sent to the
9 committee members a couple of weeks ago.

10
11 Ali asked Heather how the refinery would think about the 0.03 annual average limit.
12 {*Post-meeting comment from Heather, 09/29/2006: I believe that Ali had asked me what*
13 *Premcor's position was on averaging, generally.*} Heather replied that they liked the idea
14 of an average limit, but the 0.03 limit was too close for the affected units and very hard
15 for the refinery to average on cost-effectiveness basis. For example, if a unit could only
16 get to 0.08, how to average would become a problem. In addition, she said she would like
17 to keep the averaging provision in the rule, but would ask if it could expand to a larger
18 group of units at the refinery.

19
20 The first specific comment was for Section 2.3.1.1. Heather mentioned that the refinery
21 asked if it could be changed to an average daily limit. Ron replied that an daily average
22 0.04 limit might leave some units with higher emission rates, which would lead to further
23 controls for these units in the future. Regarding averaging, Kevin proposed to consider a
24 0.03 daily average limit to replace the 0.03 annual average, while removing the 0.04 daily
25 limit from the rule. Kevin stated that a daily average 0.03 limit should produce lower
26 NOx emissions, and ALA's point of view was that the lower emissions were better for air
27 quality and for public health.

28
29 Heather asked if the case-by-case compliance date could be beyond 12/31/08. {*Post-*
30 *meeting comment from Heather, 09/29/2006: I believe I asked if the compliance date for*
31 *the entire rule, not just the case-by-case provisions, could extend beyond the compliance*
32 *date. I also explained that the 12/31/08 compliance date was unreasonable based upon*
33 *the time that would be necessary to complete required engineering, apply for and receive*
34 *required construction permits, acquire the necessary materials, and complete*
35 *construction.*} Ali replied that it would depend on how far beyond the proposed 12/31/08
36 date. Frank mentioned that the end of 2008 date was based on the first phase of RFP
37 reduction requirements (i.e., the 15% emission reduction by the end of 2008). Alan stated
38 that if there were delays, there should be reduction from other sources for offsetting the
39 required reductions. Ali said that we hoped that the refinery could provide potential
40 lengths of extension, for example, 1 year, 18 months, etc., and we would be open for
41 discussion on extension for special unit under the case-by-case provision.

42 Alan further stated that history did not encourage case-by-case provision because it often
43 let the regulated parties get away from the regulation, and therefore he was very
44 concerned about this provision. Ali replied that in fact the case-by-case provisions

1 sometimes put regulatory agencies in disadvantages. However, he pointed out that would
2 not happen with this rule since we had the requirement to include case-by-case unit in the
3 annual average limit.

4
5 At this point, Alan asked how the department could determine compliance of individual
6 units. Ali pointed out that the rule had a provision for CEM requirement for determining
7 compliance. Alan further asked if the department would have real-time access to monitor
8 operation. Ron's answer was no. Alan followed that the department should have real-time
9 access to the monitoring records, though this was only a comment. Alan also suggested
10 that the regulatory language include a provision to require CEM data available on-line for
11 public review.

12
13 Valero's written comments included a suggestion that the proposed Section 2.3.1.3 allow
14 a source to be wholly excluded due to technical infeasibility and/or cost-ineffectiveness
15 (page 3 comment 2). Heather explained that this (exclusion) might not actually happen,
16 but the refinery hoped to have such a provision in the regulation. Ron pointed out that
17 among the 10 units only 4 boilers would be actually affected by this section and none of
18 them would be in that case. Ravi asked how the refinery would determine cost-
19 ineffectiveness. Heather said that she did not know at this time but would say that \$5,000
20 per ton or under \$10,000 per ton should be reasonable. However, she said that from John
21 Deemer's estimates, a cost-effectiveness of over \$100,000 should be considered out of
22 range. *{Post-meeting comment from Heather, 09/29/2006: I believe that Ravi asked me*
23 *whether Premcor had a "line" for evaluating cost-effectiveness, and that I replied that*
24 *while Premcor had not determined such a line, I thought that \$5,000 to \$10,000 per ton*
25 *"might" be considered reasonable.}* Ravi pointed out that \$100,000 per ton was at the
26 high end of the cost-effectiveness range, but if we looked at the websites of other states,
27 the cost at several \$10,000- levels should be reasonable.

28
29 Regarding John Deemer's cost-effectiveness estimate of >\$100K per ton reduction for
30 the unit 37-H-1 and its 500 burners, Alan stated that the committee discussed the issue of
31 installing 500 burners vs. end-of-pipe control and believed that the cost would change
32 significantly. He said that he raised this issue several times and wanted to know if there
33 had been any answer from the refinery. Mark added that the committee asked John
34 several times, in the previous meetings and in an AQM request list, if the refinery would
35 consider any end-of-pipe control to reduce its current rate 0.06 to 0.04, and estimate cost
36 for such end-of-pipe control. But so far, John's reply was that the refinery did not
37 evaluate end-of-pipe control and the related cost for this unit. Heather said the refinery
38 would take this request back for further consideration and analysis.

39
40 At this point, the committee started discussion of provisions for the CO boilers. Heather
41 asked if the department considered the recently-installed SNCR on the coker CO boiler
42 when developing this regulation, and stated that this boiler should not be applicable in
43 this rule. Ali answered that we did consider the installation of SNCR on the coker CO
44 boiler, but we believed that SNCR control only was not enough for such a large source.
45 Ravi pointed out that the SNCR had in fact produced no significant NOx reduction from

1 the coker CO boiler due to its heat input increase in the permit. Heather said they would
2 check this no-reduction situation soon. *{Post-meeting comment from Ravi, 10/02/06: I
3 would add the clarification that I said the installation of the SNCR yielded no net
4 reductions. This is because the uncontrolled inlet to the SNCR NOx emissions also
5 increased and the anticipated 30 %reductions from the SNCR merely maintained the
6 status quo.} {Post-meeting comment from Heather, 09/29/2006: I recall saying that I
7 disagreed with Ravi's opinion that the SNCR would provide no significant NOx
8 reduction, but that I would look into the issue further.}*

9 Ravi mentioned that there were currently 6 coker boilers in the country and none of them
10 had effective NOx controls. Ali added that the coker CO boiler at Delaware City's
11 facility was the largest unit in the country, and therefore we should lead the control effort
12 to achieve NOx reduction. Ali asked what the refinery's position would be on control
13 options, such as averaging the coker boiler and the cracker boiler, or just including the
14 coker boiler in this rule while leaving the cracker boiler under the CD. Heather said that
15 averaging could always help, but the refinery was not ready to provide comments on the
16 average limit proposed. Also, the refinery believed that the 2008 compliance date would
17 not be feasible for this coker boiler.

18
19 Heather mentioned again that since John Deemer left recently the refinery (at Delaware
20 City), the new representatives of the refinery did not know much about the previous
21 committee meetings and background information, such as why and how DNREC
22 developed this regulation, why DNREC targeted the refinery but not other sources, how
23 the proposed rate limits were developed, feasibility of technology, and cost-effectiveness
24 information, etc. Ali commented that although he did not participate in the previous
25 committee meetings, but according the staff's reports to him, he believed that all relevant
26 issues mentioned by Heather had been discussed extensively in the previous meetings and
27 post-meeting discussions among the committee members. Regarding other sources and
28 cost effectiveness, Ali pointed out that we did consider all potential sources that could
29 produce NOx emission reductions. For example, he specifically pointed out that we even
30 considered possibility and feasibility with DelDOT and local MPOs about installing a rail
31 link between Wilmington and Dover to reduce on-road mobile emission, and such an
32 option would cost several million dollars per ton of NOx reduction.

33
34 Kevin raised his concern about the proposed 20 ppm rate limit over the CO boilers. He
35 said if using the data in Table 1 provided by AQM in the previous meeting (Meeting 4), a
36 simple calculation could convert the 20 ppm to 0.07-0.08 lb/mmBTU, which was much
37 higher than the proposed 0.04 lb/mmBTU rate for the other units. He would like to hear
38 some justifications for choosing 20 ppm to satisfy the department's need for NOx
39 reduction. Ravi replied that we considered that the baseline emission of CO boilers were
40 about 100-120 ppm, and using a 80% reduction estimate as for the other units, a 20 ppm
41 rate would be a matching limit to provide same level of control and reduction. At this
42 point, Ravi and Mark demonstrated on the board that the 20 ppm rate could actually be
43 equivalent to about 0.05 lb/mmBTU, not 0.07-0.08 lb/mmBTU. *{A post-meeting
44 discussion via e-mails telephone conversation between Kevin and Mark provided*

1 *explanations satisfactory to Kevin. The discussion is provided as **Attachment 1** at the end*
2 *of this meeting minutes.}*

3
4 Kevin further asked if there was control technology available to get the CO boilers to
5 0.03-0.04 lb/mmBTU level. Alan followed the question and pointed out that availability
6 of control technology would depend on how bad you want to get there. Ali mentioned
7 again that there was no control technology information available for NOx control over
8 the CO boilers, and we were currently thinking that the 20 ppm rate was reasonable for
9 the large CO boilers to an achievable low emission level, which was demonstrated in the
10 consent decree for the cracker boiler.

11
12 At this point, Frank moved the discussion to Section 2.3.3 of the proposed draft 2, natural
13 gas curtailment provision. After a brief discussion, the committee decided that this
14 provision was not applicable for the affected units in this regulation, and therefore should
15 be deleted from the draft language.

16
17 The next issue was the effective date of this rule. Frank explained that we proposed it to
18 be July 1, 2007, immediately after our planned (also required) submittal date of
19 Delaware's 8-hour ozone SIPs. Both Ron and Ali commented that this date would be the
20 latest date if we would include this rule as a control in the 8-hour ozone SIPs.

21
22 Next, Frank showed a tentative plan of this rule making in the coming months. Ali asked
23 the committee if we really need a public workshop in September. Ali explained the
24 reasons for this question included (1) workshops were in general for educational
25 purposes, (2) our records showed very low attending rate from the public, (3) we usually
26 had enough time in public hearing to collect public comments, and (4) our resources were
27 limited. Therefore, he would propose not to have a workshop. Alan expressed a different
28 opinion by saying that due to emission violations and accidents at the refinery in the
29 recent years, there had been a growing concern and interest on the refinery's activities
30 and regulations, and more opportunities and time should be provided to the public.
31 Heather mentioned that a workshop would be fine with the refinery and they would send
32 the refinery people to exchange information with the public. However, she preferred to
33 have one or two more committee meetings to address refinery's concerns and comments.

34
35 Kevin said that another committee meeting would be ok to him, but it should be held
36 soon. He said we were already behind the schedule and timing became tight since the
37 department would need this rule to gain NOx emission reduction for its SIPs and the
38 refinery would need time to design and install necessary control systems. His suggestion
39 was that the committee should not wait for another whole committee meeting before
40 making the next draft for the hearing. Ron and Frank agreed that the committee should
41 not delay the rule-making process any further. Ali proposed that we then would have a
42 public workshop in late September, which could be seen as an expanded committee
43 meeting, and would provide another opportunity for the refinery to provide additional
44 comments. Meanwhile, our staff would review carefully Valero's written comments and
45 questions presented in the meeting, then provide our responses and make necessary
46 revisions of the draft language.

1

2 June MacArtor asked that AQM's responses to Valero's comments and questions be
3 provided to all committee members and meeting participants, as well as to the public
4 workshop. Frank answered that we would. He said that in fact many issues raised in
5 Valero's written comments had been addressed extensively in the previous meetings, and
6 it seemed to him that Valero's representatives today were not familiar with those
7 discussions and therefore not ready for this meeting to discuss the draft of the rule. Todd
8 Kantorczyk said that Frank's statement was not accurate because Valero's written
9 comments and questions today were results of review of all previous materials available
10 to Valero. Mark followed that he did not agree with Todd's comments. He said, for
11 example, the committee raised the issue of end-of-pipe control for the 500-burner 37-H-1
12 and the refinery knew this at least a few months ago, but John did not provide an answer.
13 *{Post-meeting comment from Heather, 09/29/2006: the minutes do not reflect that Todd*
14 *Kantorczyk also said that Premcor's comments concerned issues about which Premcor*
15 *believes the Department has not provided sufficient information. In addition, I don't*
16 *recall Mark Lutryzkowski expressing an opinion on the substance of Todd's comments.*
17 *Rather, I recall that Mark responded that Premcor had also not yet provided certain*
18 *information that had been requested, for example cost-estimates for stack controls at the*
19 *reformer heater.}* Frank followed that his statement was based on his impression from
20 the fact that many issues and questions repeatedly asked by Valero's representatives
21 today were discussed and explained already in the previous meetings. He said that in the
22 up-coming responses to Valero's written comments he would point to the places in
23 meeting minutes or other materials where relevant issues/questions were addressed.
24 Heather said that would be appreciated.

25 At this point, Ali wrapped up the issue by suggesting that after this meeting Valero
26 carefully review all previous materials and provide the committee further comments, if
27 any, in 2 to 3 weeks. Frank mentioned that we had not received any comment from John
28 on the meeting 4 minutes and would ask John (or others) to provide comments on the
29 meeting 4 minutes in one week after this meeting. Heather agreed that Valero would
30 provide additional comments on the whole rule-making process in 2-3 weeks and
31 comments on the meeting 4 minutes in one week. She stated the refinery would work
32 cooperatively with the whole committee to make the proposed rule a better regulation.

33
34 Regarding the public hearing, Ali said that he would reserve the proposed date of
35 December 1. Frank explained that if we would have the hearing on December 1, then we
36 would need to publish the proposed rule in the register on November 1, which would
37 require us to submit the proposed rule to the register by October 15. Ron added that if we
38 could have the hearing on December 1, we could submit the rule to EPA for approval in
39 January 2007, and have the final rule published on the register on February 1, which
40 would allow a rule effective date of February 11 (11 days after publication). The whole
41 committee did not have objection to this schedule.

42

43 The meeting adjourned at 2 PM.

44

1 **Attachment 1**
2 **Post-meeting e-mails between Kevin and Mark regarding emission rate calculations.**

3
4 Note: After Kevin's last e-mail (immediately below), Mark and Kevin had a telephone
5 conversation, which lead to satisfaction of both parties.

6
7 From: Kevin Stewart [kstewart@lunginfo.org]
8 Sent: Friday, September 15, 2006 10:04 AM
9 To: Lutrzykowski Mark J. (DNREC)
10 Cc: Gao Frank F. (DNREC); Rangan Ravi (DNREC); Amirikian Ronald A.
11 (DNREC); Steltzer Bruce (DNREC); Harris Bill (DNREC); Mirzakhali Ali
12 (DNREC)
13 Subject: RE: Reg. 1142 Sec. 2: Post-mtg 5 Items

14
15 Hello Mark,

16
17 Yes, Thank you. This analysis is definitely helpful. I think that I
18 am "almost there." I knew that these kinds of assumptions would have
19 an impact on the results. It helps that you have spelled them out
20 fairly clearly, at least for the Coker for 2002 data. I therefore have
21 no further doubts about the Table 1 information.

22
23 However, I still have a question about the numbers used for the
24 calculation that was done with the 20 ppm number:

25
26 To review what you have showed.

27
28 (1) The 2002 Coker numbers of 117 ppm and 178,000 dscfm give
29 1.79 tpd, then with a heat input of 329 mmBTU/hr, you got 0.45
30 lb/mmBTU, exactly as shown in Table 1. All well and good.

31
32 (2) And using numbers of 20 ppm, 159,238 dscfm and a heat
33 input of 679 mmBTU/hr, one obtains the result of 0.034 lb/mmBTU.

34
35 [Note: If the calculations for line (2) above are for the Cracker, not
36 the Coker, I would appreciate seeing similarly spelled-out
37 calculations and discussion for an apples-to-apples analysis (2002
38 figures vs. 20 ppm in the future) for each unit.]

39
40 My chief unanswered question is about the confidence you place the
41 numbers used in the calculations for line (2) above. I now observe
42 that while in 2002, values of 178,000 dscfm and 329 mmBTU/hr are used,
43 the new calculation referenced in line (2) shows more than 10% less
44 volumetric flow, but over 100% more heat input.

45
46 Do these differences make sense to you? How can you have twice as
47 large a heat input but less (dry, standard, 0% O2) volumetric flow? I
48 ask because 679 mmBTU/hr is simply the rated capacity for the cracker,
49 and I am wondering if either

- 50 - the actual heat input figure used should be more in the vicinity of
51 the actual 2002 figure, or
52 - the the volumetric flow should be larger to reflect running the unit
53 at its rated heat input?

54

1 Sorry if this line of questioning seems tiresome, but I am truly trying
2 to understand the emissions regime we're coming from and the one we're
3 going to, and I need to see that the arithmetic makes sense before I'll
4 be completely satisfied.

5
6 Yours,

7
8 Kevin Stewart
9

10
11 From: Lutrzykowski Mark J. (DNREC)
12 [mailto:Mark.Lutrzykowski@state.de.us]
13 Sent: Fri 9/15/2006 9:09 AM
14 To: Kevin Stewart
15 Cc: Gao Frank F. (DNREC); Rangan Ravi (DNREC); Amirikian Ronald A.
16 (DNREC); Steltzer Bruce (DNREC); Harris Bill (DNREC); Mirzakhali Ali
17 (DNREC)
18 Subject: RE: Reg. 1142 Sec. 2: Post-mtg 5 Items

19
20 Kevin,

21
22 To use a straight ratio to go from 2002 baseline to post Regulation 42,
23 a series of assumptions have to be made. In these assumptions is were
24 the discrepancy exists.

25
26 In applying the ratio of 20ppm/130ppm to the 2002 baseline
27 concentration 0.45 lbs/mmBtu, you have assumed the only variable to be
28 the pollutant concentration (ppm). The lb/mmBtu concentration is not
29 only a function of the pollutant concentration but also the stack gas
30 volumetric flow, the stack moisture concentration, the heating value of
31 the fuel, the composition of the fuel, and the amount of fuel being
32 combusted. In addition, the ratio is not an apples to apples
33 comparison. The 20 ppm is dry at 0% oxygen. The 130 ppm is probably
34 dry (which would be consistent with past test data) but likely not been
35 corrected to 0% oxygen.

36
37 During the 2002 baseline year the average actual heat input to the CO
38 boiler was 329 mmBtu/hr. Daily NOx emissions were 1.79 tpd. Using
39 these average values, an average lb/mmBtu concentration of 0.45
40 lbs/mmBtu was determined for 2002. Using flow data collected on the
41 Coker during testing in 2002, a determination can be made if 130 ppm is
42 in the ballpark. The test data indicated a flow rate of 178,000 dscfm.
43 Using 178,000 dsfm and 1.79 tpd a NOx value of 117 ppm can be back
44 calculated. 130 ppm appears to be in the ballpark.

45
46 To clarify your following statement,

47
48 "Indeed, if your value for the dry volumetric flow rate is applicable
49 to 2002, you may simply use your formula to see what the true
50 concentrations or rates would have to have been:

51
52 - If 120 ppm was the true 2002 NOx concentration, then the 2002
53 emission rate would have been about 0.20 lb/mmBTU, not a value twice as
54 high;
55

1 - Or if 0.41 lb/mmBTU was the true 2002 emission rate, then the 2002
2 NOx concentration would have been about 240 ppm, not a value half as
3 large."
4

5 Using 159,238 dscfm @ 0% O2 in your calculation would be inappropriate
6 because the flow does not reflect the oxygen, but the 120 ppm does. In
7 addition, your calculation assumes 676 mmBtu/hr of heat input, when the
8 actual average heat input for 2002 was 329 mmBtu/hr.
9

10 Please note, the 2002 data in Table 1 was collected using certified,
11 quality assured continuous emission monitors. I believe the values are
12 credible.
13

14 I hope my explanation has been helpful. If you have any further
15 questions please contact me.
16

17 Mark
18 Mark J. Lutrzykowski, P.E
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25

26 The views and opinions of the authors expressed herein do not
27 necessarily state or reflect those of the Department of Natural
28 Resources and Environmental Control or the State of Delaware.
29

30 -----Original Message-----

31 From: Kevin Stewart [mailto:kstewart@lunginfo.org]
32 Sent: Thursday, September 14, 2006 3:24 PM
33 To: Lutrzykowski Mark J. (DNREC)
34 Subject: RE: Reg. 1142 Sec. 2: Post-mtg 5 Items
35

36 Hi Mark,
37

38 Thanks for the quick response. In the meeting #4 minutes you will see
39 that reference is made to 120 ppm for 23-H-3. And in my notes I know
40 someone (probably John Deemer) indicated that the SNCR (installed 2005
41 I believe) for 22-H-3 was reducing emissions formerly at 130 ppm down
42 to something "under a hundred". I realize that when numbers are flying
43 it is possible not to have all the necessary conditional statements
44 accompany the numbers, but I think you can see from the above why I am
45 assuming these numbers are applicable to the units' 2002 figures in
46 Table 1.
47

48 First, a small correction: When I rechecked your arithmetic below,
49

50
$$\text{NOx lbs/hr} = (20 \text{ ppmd NOx @ } 0\% \text{ O}_2) \times (46 \text{ lbs NOx}/385.3\text{e}6 \text{ dscf}) \times$$

51
$$(159,238 \text{ dscfm @ } 0\% \text{ O}_2) \times (60 \text{ min}/1 \text{ hr}) = 23 \text{ lbs/hr}$$

52
$$\text{Heat Input} = 679 \text{ mmBtu/hr}$$

53
$$\text{NOx lbs/mmBtu} = \text{NOx lbs/hr}/\text{Heat Input} = 23 \text{ lbs/hr}/679 \text{ mmBtu/hr} =$$

54
$$0.039 \text{ lbs/mmBtu.}$$

55

56 I got a result of about 0.034 lb/mmBTU.
57

1 Simply, IF the heat input of 679 mmBTU/hr is valid, and IF you will
2 truly get NOx emissions of ~0.034 lb/mmBTU, then at least one of the
3 following must be true:

- 4
- 5 -The true emission concentrations in 2002 were not in the 120-130 ppm
- 6 range
- 7 -The 2002 emission rates shown on Table 1 for the CO boilers are not in
- 8 the 0.41-0.45 lb/mmBTU range.
- 9

10 Indeed, if your value for the dry volumetric flow rate is applicable to
11 2002, you may simply use your formula to see what the true
12 concentrations or rates would have to have been:

- 13
- 14 -If 120 ppm was the true 2002 NOx concentration, then the 2002 emission
- 15 rate would have been about 0.20 lb/mmBTU, not a value twice as high;
- 16
- 17 -Or if 0.41 lb/mmBTU was the true 2002 emission rate, then the 2002 NOx
- 18 concentration would have been about 240 ppm, not a value half as large.
- 19

20 Yours,

21
22 Kevin

23 Kevin M. Stewart, kstewart@lunginfo.org <<mailto:kstewart@lunginfo.org>>
24 Director of Environmental Health
25 American Lung Association of the Mid-Atlantic
26 Serving the communities of Delaware, Pennsylvania and West Virginia
27 101 Good Drive, Suite 1
28 Lancaster, PA 17603
29 Phone: 717.397.5203 Fax: 717.397.5244 HelpLine: 1-800-LUNG-USA ext.2
30 Website: www.lunginfo.org <<http://www.lunginfo.org/>>

31
32 Improving Life, One Breath at a Time
33 EDUCATE. ADVOCATE. DONATE. ELIMINATE.

34
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38 will one day reach our ultimate goal: a world without lung disease.

39
40 Help us eliminate lung disease today so we can all breathe easier
41 tomorrow!

42
43
44 From: Lutrzykowski Mark J. (DNREC)
45 [<mailto:Mark.Lutrzykowski@state.de.us>]
46 Sent: Thu 9/14/2006 3:32 PM
47 To: Kevin Stewart
48 Subject: RE: Reg. 1142 Sec. 2: Post-mtg 5 Items

49
50 Kevin,
51 In effort to provide comment on your analysis I need to know where the
52 120 ppm and 130 ppm come from in your calculation?

53
54 Mark
55 Mark J. Lutrzykowski, P.E
56 Engineer
57 Air Quality Management Section

1 715 Grantham Lane
2 New Castle, DE 19720
3 Phone: (302) 323-4542
4 Fax: (302) 323-4598
5

6 The views and opinions of the authors expressed herein do not
7 necessarily state or reflect those of the Department of Natural
8 Resources and Environmental Control or the State of Delaware.
9

10 -----Original Message-----

11 From: Kevin Stewart [mailto:kstewart@lunginfo.org]
12 Sent: Thursday, September 14, 2006 2:03 PM
13 To: Gao Frank F. (DNREC); amuller@dca.net; mdfiorentino@widener.edu;
14 eft@envirotruth.com; Patrick.Covert@valero.com;
15 Heather.Chelpaty@valero.com; pjacoby@powrtechsolutions.com;
16 taras.lewus@erm.com; Llewellyn Gerald (DHSS); Perkins Richard E.
17 (DHSS); Rose.Quinto@epamail.epa.gov; nicholasdi@comcast.net
18 Cc: dbrown@alade.org; Morris.Makeba@epamail.epa.gov;
19 Delaware.chapter@sierraclub.org; dasmail@delawareaudubon.org;
20 John.Deemer@valero.com; Amirikian Ronald A. (DNREC); Rangan Ravi
21 (DNREC); Harris Bill (DNREC); Lutrzykowski Mark J. (DNREC); Steltzer
22 Bruce (DNREC); Mirzakhalili Ali (DNREC)
23 Subject: RE: Reg. 1142 Sec. 2: Post-mtg 5 Items
24

25 Thank you, Frank,
26

27 I appreciate the responses. Although I appreciate Mark's effort, I am
28 still not quite satisfied with the response to my item number 2 (both
29 my item and AQM's response are within your email below).
30

31 IF the result of 0.039 lb/mmBTU shown is truly a reflection of what we
32 can expect when NOx is reduced to 20 ppm, then this is indeed very good
33 news, a much better result than I had been expecting.
34

35 HOWEVER, I had been given given to understand that the "250,000 cfm"
36 cited initially was just the number from a permit dropped into the
37 calculation, and so naturally I am wondering if the new value of
38 "159,238 dscfm" is simply calculated from that assumption or if it
39 truly reflects the reality of the process. I ask this because the
40 calculation I had done -- based on what I also understood to be real
41 numbers from participant statements and from the Emission Rate Analysis
42 provided on Table 1 -- gives a distinctly different result, around 0.07
43 lb/mmBTU, almost twice as large.
44

45 I'm afraid that Mark's analysis doesn't really get to the heart of my
46 question, which asked for "a discussion showing where my analysis [or
47 data I used in it] is wrong, and also by comparison how much confidence
48 DNREC is placing in the reality of the 250,000 sfcfm [now 159,238 dscfm]
49 volume flow figure."
50

51 Thank you.
52

53 Kevin M. Stewart, kstewart@lunginfo.org <mailto:kstewart@lunginfo.org>
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13
14 From: Gao Frank F. (DNREC) [mailto:Frank.Gao@state.de.us]
15 Sent: Thu 9/14/2006 2:16 PM
16 To: Kevin Stewart; amuller@dca.net; mdfiorentino@widener.edu;
17 eft@envirotruth.com; Patrick.Covert@valero.com;
18 Heather.Chelpaty@valero.com; pjacoby@powrtechsolutions.com;
19 taras.lewus@erm.com; Llewellyn Gerald (DHSS); Perkins Richard E.
20 (DHSS); Rose.Quinto@epamail.epa.gov; nicholasdi@comcast.net
21 Cc: dbrown@alade.org; Morris.Makeba@epamail.epa.gov;
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24 (DNREC); Harris Bill (DNREC); Lutrzykowski Mark J. (DNREC); Steltzer
25 Bruce (DNREC); Mirzakhali Ali (DNREC)
26 Subject: RE: Reg. 1142 Sec. 2: Post-mtg 5 Items

27
28 Kevin, and other committee members,

29
30 Thanks for the comments of 08/25. Our responses are below ([in blue words, imbedded in](#)
31 [your original e-mail](#)). You will note that some of your comments have been already
32 addressed by our actions since we received them.

33
34 Please revisit our website
35 (<http://www.awm.delaware.gov/Info/Regs/AQMPlansRegs.htm>
36 <<http://www.awm.delaware.gov/Info/Regs/AQMPlansRegs.htm>>) in the near
37 future. We will post some new stuff there, such as Valero's comments/AQM
38 responses, final version of Meeting 4 minutes, public workshop announcement, etc.

39
40 Thanks.

41
42 Frank
43 Air Quality Management-DNREC
44 New Castle, DE 19720
45 Phone: (302)323-4542 FAX: (302)323-4598

46
47 -----Original Message-----

48 From: Kevin Stewart [mailto:kstewart@lunginfo.org]
49 Sent: Friday, August 25, 2006 2:38 PM
50 To: Gao Frank F. (DNREC); amuller@dca.net; mdfiorentino@widener.edu;
51 eft@envirotruth.com; Patrick.Covert@valero.com;
52 Heather.Chelpaty@valero.com; pjacoby@powrtechsolutions.com;

1 taras.lewus@erm.com; Llewellyn Gerald (DHSS); Perkins Richard E.
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3 Cc: dbrown@alade.org; Morris.Makeba@epamail.epa.gov;
4 Delaware.chapter@sierraclub.org; dasmail@delawareaudubon.org;
5 John.Deemer@valero.com; Amirikian Ronald A. (DNREC); Rangan Ravi
6 (DNREC); Harris Bill (DNREC); Lutrzykowski Mark J. (DNREC); Steltzer
7 Bruce (DNREC); Mirzakhali Ali (DNREC)
8 Subject: Reg. 1142 Sec. 2: Post-mtg 5 Items
9

10 Hello Frank,

11
12 I am just getting back to you with the following:

13
14 1) The few small comments on the minutes I promised I would get back
15 to you with:

- 16 - page 3 line 11: Write: "the American Lung Association
- 17 would be concerned about timely..."
- 18 - page 3 line 21: Delete "be" at end of line.
- 19 - page 3 line 29: Write: "...would be the..."
- 20 - page 3 line 44: Write: "but" instead of "bur"
- 21 - page 4 line 5: Write: "heat" instead of "hear"
- 22 - page 1 line 5: Simply to clarify: My recollection is that

23
24 Alan's doubting the cost number for 37-H-1 had a lot to do with the
25 issue of why control of the two stacks was not explored and costs of
26 controls determined; it was simply the issue of whether an end-of-pipe
27 solution in this case might be more cost-effective than a solution
28 controlling 500 individual burners. Alan and others should feel free
29 to modify or correct my perception of what was said on July 19 in this
30 regard.

- 31 - page 5 line 32: Do you mean "between 0.04 and 0.02"?
- 32 - page 6 line 6: Write "Lung" instead of "Lang"

33
34 Your comments above have been incorporated in the second draft of the minutes, which was sent
35 to all committee members on 09/07.

36
37 2) Not to belabor this too much, but I wanted to briefly outline what
38 my thinking was about the estimates for the lb/mmBTU figures for the CO
39 boilers:

40
41 - First, the calculation from first principles provided on the
42 whiteboard (20 ppm NOx being equivalent to about 0.05 lb/mmBTU) makes
43 good sense and appears quite correct, so long as the initial
44 assumptions are correct about the volume flow (250,000 scfm) and the
45 heat input (679 mmBTU/h).

46
47 - The basis for my calculation was taken from the Emission
48 Rate Analysis provided on Table 1. I seem to recall year 2002 NOx
49 concentrations being given in the range of 130 ppm for the coker, and
50 120 ppm for the cat. Using straightforward ratios, I take the 2002
51 Emission Rates and get: $0.45 * (20/130) \approx 0.07$ and $0.41 * (20/120) \approx$
52 0.07 , hence an estimate of about 0.07 lb/mmBTU for the CO boilers after
53 control to 20 ppm had been achieved.

54
55 - It therefore seems to me if my calculations provide
56 incorrect values for control to 20 ppm, that perhaps either

1 a) the 2002 emission rates are somehow wrong (For example,
2 if I have 120 ppm NOx emissions for the cat., then using the same
3 formula shown in the meeting, I get only 0.32 lb/mmBTU, not the
4 0.41 lb/mmBTU shown on Table 1) or

5 b) I have misunderstood what the true NOx emission
6 concentrations were in 2002 (For example, taking 0.41 lb/mmBTU as
7 correct, I use the AQM formula to obtain a NOx concentration of about
8 155 ppm, not 120 ppm.)

9 - I would therefore appreciate seeing a discussion showing
10 where my analysis is wrong, and also by comparison how much confidence
11 DNREC is placing in the reality of the 250,000 scfm volume flow figure.
12

13 Mark has reviewed the issue again and provided the following explanation: The 250,000 scfm is
14 wet with the O2 included. Because the NOx concentration was 20 ppm @ 0% O2, a flow rate of
15 159,238 dscfm @ 0% O2 should be used. The calculation should be as follows,
16

17 $\text{NOx lbs/hr} = (20 \text{ ppm NOx @ } 0\% \text{ O}_2) \times (46 \text{ lbs NOx}/385.3\text{e}6 \text{ dscf}) \times (159,238 \text{ dscfm @ } 0\%$
18 $\text{O}_2) \times (60 \text{ min}/1 \text{ hr}) = 23 \text{ lbs/hr}$

19 $\text{Heat Input} = 679 \text{ mmBtu/hr}$

20 $\text{NOx lbs/mmBtu} = \text{NOx lbs/hr}/\text{Heat Input} = 23 \text{ lbs/hr}/679 \text{ mmBtu/hr} = 0.039 \text{ lbs/mmBtu}.$
21

22 3) A concern that has occurred to me that I would appreciate being
23 addressed:

24 - We have already observed that despite emission controls
25 being applied to a unit (SNCR on the coker CO boiler), the total
26 tonnage of emissions from this unit has not changed much despite the
27 achievement of lower NOx concentrations, simply because total
28 throughput has been increased. Is this not so?
29

30 - Recalling that the root purpose of this regulation is to
31 reduce the tonnage of NOx emissions from this sector -- thereby to
32 decrease ozone levels and to protect public health -- my concern is
33 simply this: What is the potential for similar things occurring with
34 any of the units subject to this regulation? There seems to be an
35 unspoken assumption of sorts that the heat inputs for the units
36 throughout the facility would remain substantially unchanged throughout
37 the years subsequent to implementation of the rule. If that assumption
38 truly reflects what the reality will actually be, then I would be
39 satisfied. However, I would be concerned if there would be the
40 potential for a significant increase in heat input to units at the
41 facility. I could envision a scenario in which units would be
42 controlled to more stringent emission rates, yet the facility's total
43 NOx emissions would not change much.
44

45 - The preceding raises the question for me as to whether the
46 regulation should have some sort of safeguard in place to prevent
47 failure to achieve the amount of tonnage reductions we are trying to
48 achieve by implementing it.
49

50 The purpose of this proposed rule is, by setting up new emission rate limits lower than the current
51 rates, to require the refinery to install necessary and effective controls on the affected units.
52

53 Actual emission level of a unit may fluctuate due to fluctuation of throughput within normal
54 operation range allowed in the permit. However, we do have Reg. 2 and Reg. 25 to protect from
55 uncontrolled increases due

1 to physical changes or non-permitted operation changes at a facility. The Coker CO boiler case is
2 unusual and not expected to occur often, as it involved emission reductions and control
3 technology installation under a consent decree that involved multiple refineries in multiple states.
4

5 I agree that the root (or overall) purpose of this regulation (in fact, all NOx control regulations) is
6 to reduce the tonnage of NOx emissions. However, this "root purpose" are being addressed in our
7 SIP planning process, where we consider all factors, such as potential heat input change,
8 production growth along with economic development, efficiency of control systems, rule
9 effectiveness, emission increases due to population growth, etc, in estimating overall emission
10 reductions needed for RFP and attainment. In addition, emission milestone compliance
11 demonstrations are conducted every three years to determine if overall mass emissions in DE are
12 consistent with the SIP, and if at any time they are not we would at that time adopt regulatory
13 requirements to reduce emissions in the State.
14

15 4) It might be good to release very soon, even prior to draft minutes
16 and such, a tentative schedule for what you are looking to do over the
17 next couple of months. I am thinking that this would be particularly
18 useful for everyone to have, and especially for those who could not
19 attend on August 23 and are unaware as to what did and did not
20 transpire. For example, the sooner you have dates or even a range of
21 dates for the envisioned meeting/workshop, the better, so that people
22 can put that on their calendars; some people may have been expecting
23 that the Committee's work would have been concluded by this point, and
24 they should be made aware that it has not.
25

26 Based on your suggestion, a schedule for the next 4 months (Oct., Nov., Dec. 06 and Jan. 07) was
27 proposed and sent to the committee on 09/05.
28

29 The above constitutes my comments for the time being.
30

31 Thank you for your ongoing work.
32

33 Yours,
34

35 Kevin M. Stewart, kstewart@lunginfo.org <<mailto:kstewart@lunginfo.org>>
36 Director of Environmental Health
37 American Lung Association of the Mid-Atlantic
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52
53
54