Joint Application of Wisconsin Electric Power Company and Wisconsin Gas LLC
To Conduct a Biennial Review of Costs and Rates
Test Year 2013
Docket 05-UR-106
JJW-3

JJW-3-1:

By letter dated September 7, 2004, Bechtel requested that We Power issue a Proposal Request (CPR) for certain contract changes that We Power was interested in, one of which related to coal blending (response to data request JJW-013012 Part 1). Please explain when the idea of coal blending for ERGS was first discussed within Wisconsin Energy Corporation or any of its subsidiaries or affiliates. Please provide copies of the internal documents of Wisconsin Energy Corporation or any of its subsidiaries or affiliates that support that explanation.

Response:
The first documented record capturing discussion pertaining to coal blending was on July 2, 2004. It was an email from Mr. Steve Derenne to Mr. Tom Metcalfe discussing the Mercury (aka Hg) emissions (copy attached). In that email Mr. Derenne states "My plan is to investigate a matrix of options without redesigning the plant or employing advanced control technology. I hope to be able to find an option with a reasonable probability of meeting a 12-month rolling average under the EPA proposed rule." The "matrix of options" Mr. Derenne mentioned resulted in July 2, 2004 spreadsheet titled "Analysis of potential impact on ERGS SCPC design, Proposed EPA Mercury MACT Rules" (copy attached) and a July 7, 2004 spreadsheet titled "Elm Road Generating Station, Hg Emission Study" (copy attached). In the July 7, 2004 spreadsheet a graph was produced which identified what blends of coal would meet the proposed EPA rule limit and the existing air permit limit.

Then on July 9, 2004 Mr. Kuester sent out a proposed meeting agenda to discuss the source of coal for Elm Road. Mr. Kuester's email triggered various other responses which lead up to Bechtel requesting a Company Proposal Request from We Power on September 7, 2004. Copies of these July 9, 2004 emails are attached.

Please note that it is possible that some verbal discussions took place prior to the dates mentioned above but no earlier written correspondence was found.

Answered by: Robert P. Tutkowski
Date: May 14, 2012

Haase.Stephanie

From: Derenne.Steven
Sent: Friday, July 02, 2004 12:45 PM
To: Metcalfe.Tom
Cc: Tutkowski.Bob
Subject: RE: Hg Emissions

Yes to the first.

The Air Construction Permit has compliance measured by periodic testing, 4 stack tests within 18 months of the initial operation and then biannually. The tests are to verify that the 1.12 lb/Tbtu is being met. There is no continuous monitoring required as there is with the EPA proposed rule. There is also a provision to adjust the limit based on actual operation & testing ("The Department will use the testing information to adjust the emissions limit to more accurate reduction levels for mercury when the operation permit is issued.").

I think our current design (coal & AQCS) can meet the Air Construction Permit. The 90% removal rate is likely to be exceeded in actual operation.

I think we still have a big problem with the EPA proposed rule. While on average the emissions work, that still means an unacceptable level of risk of non-compliance.

I reviewed how the EPA determined the Hg emission rate for the proposed rule and believe it is based on unsound and erroneous science. It is highly likely that the rule will be revised and that in final form will be no more restrictive than our current air permit.

I spoke with Kathleen Standen, Dave Michaud, and Terry Coughlin regarding the study I have been charged with doing. They indicate that others are looking into various responses to the EPA proposed rule. They agreed that if I only focused on a technical response, there would be little overlap of effort.

My plan is to investigate a matrix of options without redesigning the plant or employing advanced control technology. I hope to be able to find an option with a reasonable probability of meeting a 12-month rolling average under the EPA proposed rule. The answer is likely to be non-optimum for the long term. However, the rule will most likely change anyway so it does not seem practical to pay for redesign at this point.

I did find one thing which is bothersome that you might be able to help correct. Recently, we stopped funding R&D in mercury control. Given the potential impact this issue has on ERGS, we should rethink this strategy.

-----Original Message-----
From: Metcalfe.Tom
Sent: Friday, July 02, 2004 11:00 AM
To: Derenne.Steven
Cc: Tutkowski.Bob
Subject: RE: Hg Emissions

I assume "design coal" is Pittsburg #8 bituminous and EPA's proposed new mercury limits?

What is specified in the Air Construction Permit regarding the measuring period? Is it an average or do we have to meet the 1.12lb/Tbtu at all times? If it's the former i.e. based on average and you are confident our equipment will meet the new EPA limits then is there a problem?

-----Original Message-----
From: Derenne.Steven
Sent: Friday, July 02, 2004 8:02 AM
To: Metcalfe.Tom
Cc: Tutkowski.Bob
Subject: Hg Emissions

I ran a quick check for ERGS using the design coal with typical values of heat content and mercury. Using MCR for the unit and assuming that the AQCS meets our air permit of 90% mercury removal, we would be in

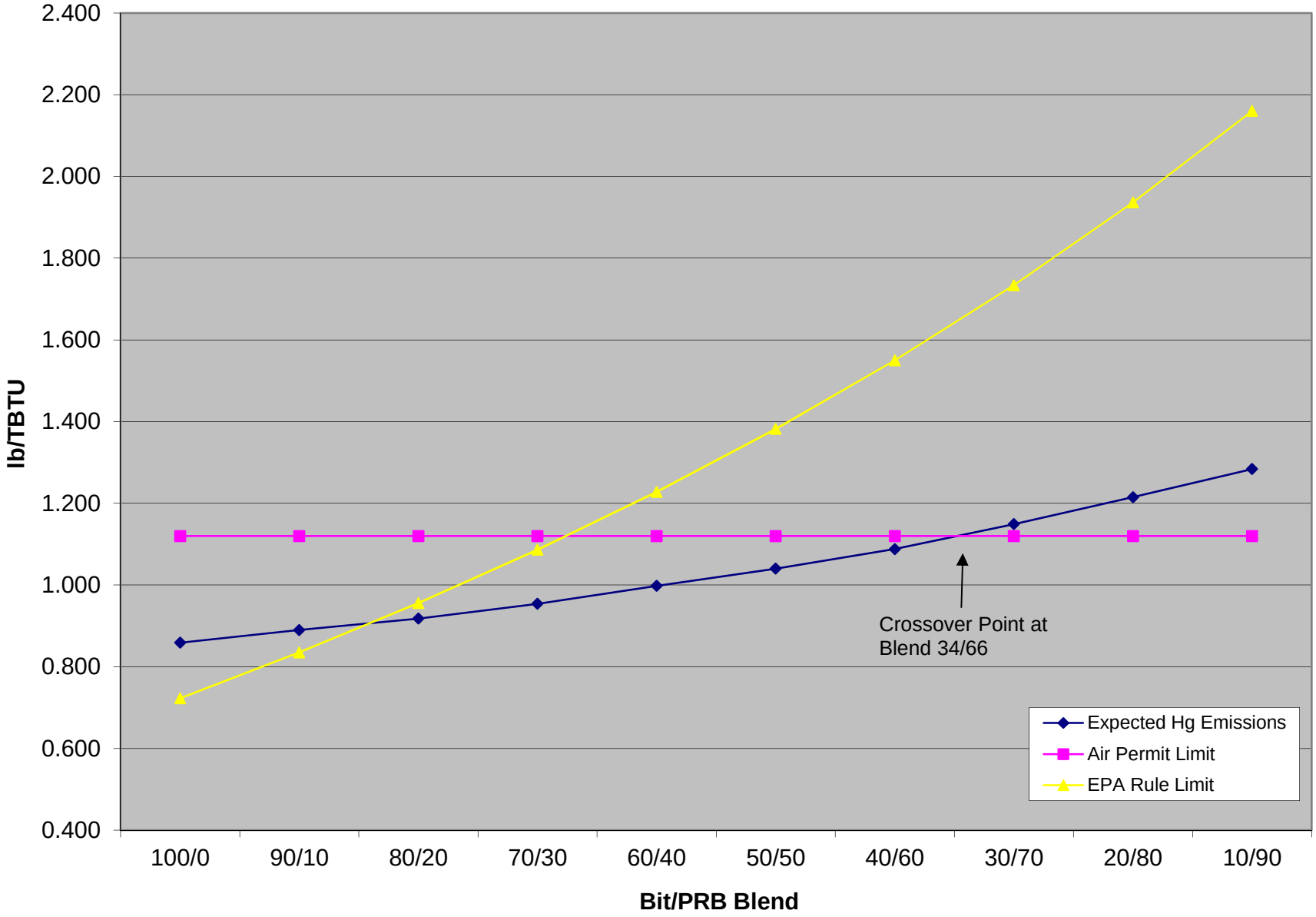
compliance. The problem with this is we would only be in compliance on average. Approximately 50% of the time, we would be out of compliance. My previous analysis and what I believe Environmental did was to use max Hg values so that probability of compliance was virtually 100%.

I would still recommend doing a probability analysis for this and other coals.

Klaus Mylotta is out of the country until 7/9, so I will wait for him to get back before getting his input on coal options. I will also check with Terry Coughlin regarding my calculations and other assumptions.

Steven Derenne
Principal Engineer
We Power
414-274-4426
Cell: 414-550-1528

Elm Road Generating Station
Hg Emission Study



EPA Rule Limit adjusted for heat input at ERGS normal full load conditions. Expected emissions estimated using 30-day rolling average basis.

Calculation of Hg emission limit for blended coal (change yellow cell for new result)

	BTU/lb	Type	BTU/kwh (gross)	MWH/H (gross)	Heat Input Require	Blend
Coal 1	13100	Bit.				37%
Coal 2	8400	Sub-Bit				63%
Total			8300	670	5561	100%

	Blend	100/0
	Statistic	Values for
	Trials	8.76E+03
Mean	Mean	6.04E-06
	Median	5.92E-06
	Mode	---
	Standard Deviation	1.74E-06
	Variance	3.02E-12
	Skewness	0.41
	Kurtosis	2.88
	Coeff. of Variability	2.90E-01
	Range Minimum	2.21E-06
	Range Maximum	1.36E-05
	Range Width	1.14E-05
	Mean Std. Error	1.86E-08
	EPA Rule Limit	6.00E-06
	Hg Untreated (lb/h	0.038205

	Cushion	-1%
	Hg Delta	

97.5% Confidence	lb/TBTU (97.5%)	1.06
	Air Permit Limit	1.12

	Statistic	Values for
	Trials	8760
	Mean	0.67
	Median	6.58E-01
	Mode	---
	Standard Deviation	0.189
	Variance	3.60E-02
	Skewness	0.35
	Kurtosis	2.74
	Coeff. of Variability	0.28
	Range Minimum	0.252
	Range Maximum	1.416
	Range Width	1.164
	Mean Std. Error	0.002

Mean + 1 std.dev.	Expected Hg Emis	0.859
	EPA Rule Limit	0.723

			Hg in coal (ppb)		
Coal Feed (lb/hr)	Heat Input (MBTU/h	Hg Limit (lb/MWH	Ave	Untreated Hg	Untreated Hg (l
202936	2658	6.00E-06	90	0.0182643	
345540	2903	2.00E-05	90	0.0310986	
548476	5561	1.33E-05		0.0493629	7.36759E-05

			Bit Coal/PRB		
90/10	80/20	70/30	60/40	50/50	40/60
Treated Hg (lb/MWH)					
8.76E+03	8.76E+03	8.76E+03	8,760	8,760	8,760
6.28E-06	6.49E-06	6.74E-06	7.05E-06	7.37E-06	7.68E-06
6.17E-06	6.42E-06	6.64E-06	6.96E-06	7.26E-06	7.60E-06
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1.80E-06	1.84E-06	1.89E-06	1.98E-06	2.07E-06	2.19E-06
3.23E-12	3.37E-12	3.57E-12	3.93E-12	4.28E-12	4.81E-12
0.35	0.32	0.3	0.29	0.31	0.35
2.7	2.69	2.56	2.6	2.66	2.78
2.90E-01	2.80E-01	2.80E-01	0.28	0.28	0.29
2.31E-06	2.43E-06	2.63E-06	2.55E-06	2.58E-06	2.79E-06
1.30E-05	1.36E-05	1.38E-05	1.51E-05	1.59E-05	1.70E-05
1.07E-05	1.11E-05	1.11E-05	1.25E-05	1.33E-05	1.42E-05
1.92E-08	1.96E-08	2.02E-08	2.12E-08	2.21E-08	2.34E-08
6.93112E-06	7.93421E-06	9.01796E-06	1.02E-05	1.147E-05	1.28638E-05
0.039627078	0.041158717	0.042813516	0.044606952	0.0465572	0.048685798
9%	18%	25%	31%	36%	40%
4%	8%	12%	17%	22%	27%
1.09	1.12	1.15	1.21	1.26	1.33
1.12	1.12	1.12	1.12	1.12	1.12
Treated Hg (lb/TBTU)					
8760	8760	8760	8760	8760	8760
0.695	0.719	0.748	0.782	0.816	0.851
6.86E-01	7.14E-01	0.738	0.772	0.805	0.844
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0.195	0.199	0.206	0.216	0.224	2.37E-01
3.80E-02	4.00E-02	0.042	0.047	0.05	5.60E-02
0.29	2.50E-01	0.26	0.24	0.25	2.70E-01
2.59	2.58	2.5	2.52	2.53	2.59
0.28	0.28	0.28	0.28	0.27	0.28
0.263	0.275	0.294	0.295	0.289	0.319
1.395	1.395	1.595	1.523	1.585	1.706
1.132	1.12	1.301	1.228	1.296	1.387
0.002	0.002	0.002	0.002	0.002	0.003
0.890	0.918	0.954	0.998	1.040	1.088
0.835	0.956	1.087	1.228	1.382	1.550

% Removal	Treated Hg (lb/	Treated Hg	Hg Limit (lb/TBTU)
90%	7.37E-06	0.888	1.60

30/70	20/80	10/90	0/100	33/67	34/66	35/65	36/64	37/63
8,760	8,760	8,760		8760	8760	8,760	8760	8760
8.05E-06	8.46E-06	8.89E-06		7.91E-06	0	7.82E-06	0	7.74E-06
7.91E-06	8.29E-06	8.63E-06		7.76E-06	0	7.68E-06	7.72E-06	7.63E-06
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2.36E-06	2.53E-06	2.75E-06		2.33E-06	2.25E-06	2.24E-06	0	2.21E-06
5.58E-12	6.42E-12	7.54E-12		5.41E-12	5.08E-12	5.04E-12	5.11E-12	4.87E-12
0.37	3.90E-01	0.48		0.38	3.20E-01	3.50E-01	3.30E-01	0.36
2.75	2.75	2.96		2.75	2.69E+00	2.74	2.67E+00	2.77
0.29	0.3	0.31		0.29	0.29	2.90E-01	2.90E-01	0.29
2.89E-06	2.94E-06	2.67E-06		2.53E-06	2.83E-06	2.68E-06	2.72E-06	2.72E-06
1.86E-05	1.92E-05	2.09E-05		1.71E-05	1.68E-05	1.77E-05	1.65E-05	1.69E-05
1.57E-05	1.63E-05	1.83E-05		1.45E-05	1.39E-05	1.49E-05	1.38E-05	1.41E-05
2.52E-08	2.71E-08	2.93E-08		2.49E-08	2.41E-08	2.40E-08	2.41E-08	2.36E-08
1.44E-05	1.61E-05	1.79E-05						
5.10E-02	5.36E-02	5.64E-02						
44%	47%	50%						
34%	40%	48%						
1.42	1.51	1.63						
1.12	1.12	1.12						
8760	8,760	8760		8760	8760	8760	8760	8760
0.892	0.939	0.985		0.875	0.874	0.867	0.867	0.858
0.88	0.921	0.959		0.859	0.863	0.853	0.856	0.85
---	---	---		---	---	---	---	---
0.257	0.276	0.299		0.253	0.246	0.245	0.245	0.239
0.066	0.076	0.09		0.064	0.06	0.06	0.06	0.057
0.32	0.35	0.44		0.33	0.28	0.31	0.28	0.28
2.71	2.63	2.86		2.63	2.59	2.65	2.54	2.61
0.29	0.29	0.3		0.29	0.28	0.28	0.28	0.28
0.324	0.336	0.319		0.296	0.32	0.306	0.302	0.287
2.176	1.942	2.463		1.86	1.785	1.853	1.719	1.731
1.852	1.606	2.144		1.564	1.465	1.547	1.417	1.444
0.003	0.003	0.003		0.003	0.003	0.003	0.003	0.003
1.149	1.215	1.284		1.1280	1.1200	1.1120	1.1120	1.0970
1.734	1.936	2.161		2.161	2.161	2.161	2.161	2.161

Forecast: Hg Emissions

Statistic	Value
Trials	8,760
Mean	8.58E-01
Median	8.50E-01
Mode	---
Standard D	2.39E-01
Variance	5.70E-02
Skewness	0.28
Kurtosis	2.61
Coeff. of V	0.28
Range Min	2.87E-01
Range Ma	1.73E+00
Range Wid	1.44E+00
Mean Std.	3.00E-03

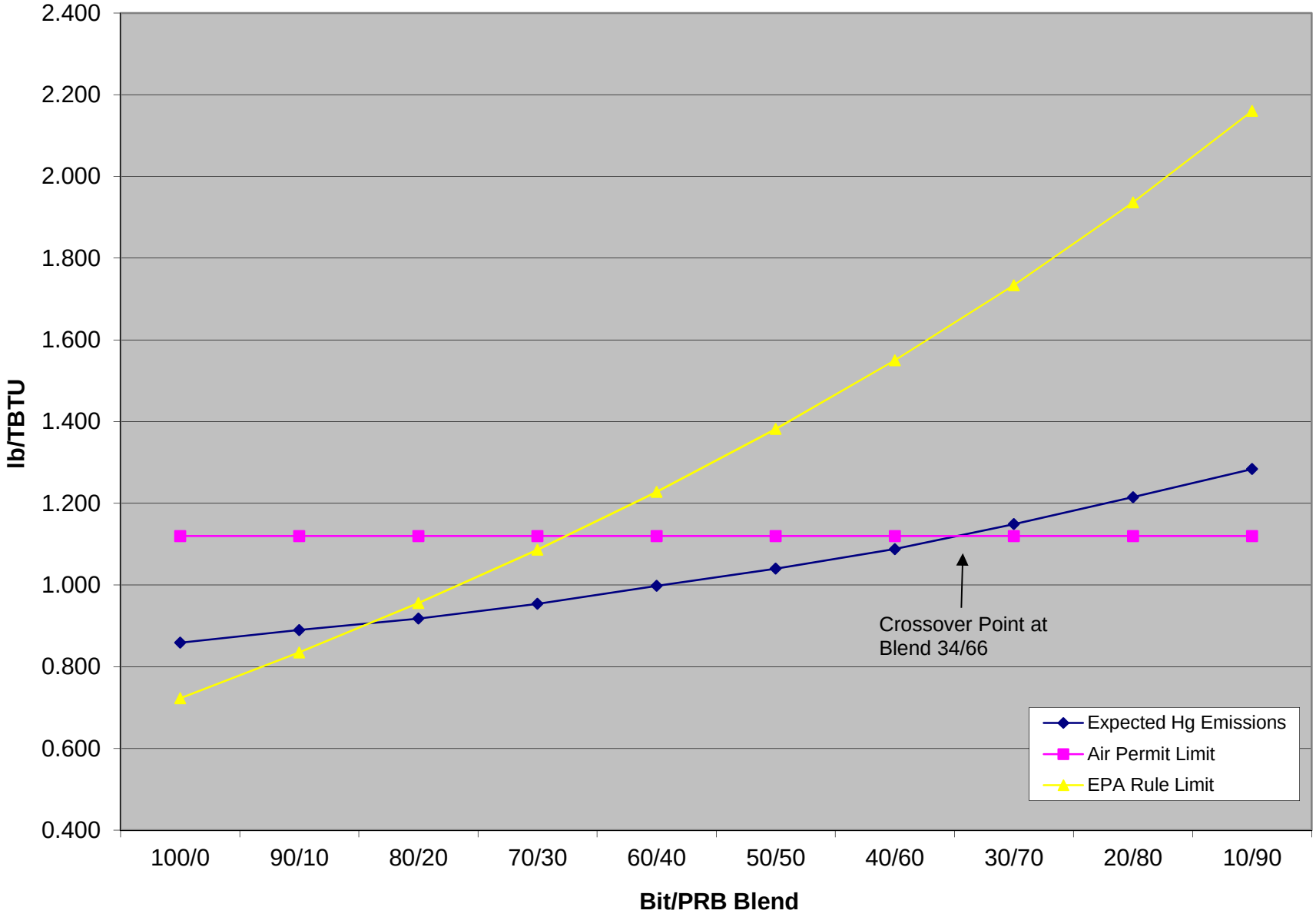
Coal	Heating Value (BTU/lb)			Inherent Hg (ppm)		
	Average	Minimum	Maximum	Average	Minimum	Maximum
Washed Blacksville (Pitt #8)	13,100	12,956	13,255	0.09	0.07	0.12
Illinois #6	10,300	10,150	10,450	0.05	0.03	0.06
Colorado Bit (Kennecott)	10,500	10,268	10,712	0.03	0.01	0.05
Cordero Rojo (PRB)	8,400	8,239	8,579	0.09	0.05	0.14

Hg Removal Efficiency

From EPRI report on mercury chemistry (iManage # 69743) for Bit coal:

"Limited data suggest that the SCR/FGD combination removes ~85-90+% of mercury"

Elm Road Generating Station
Hg Emission Study



EPA Rule Limit adjusted for heat input at ERGS normal full load conditions. Expected emissions estimated using 30-day rolling average basis.

Haase.Stephanie

From: Krause.Kris
Sent: Friday, July 09, 2004 4:55 PM
To: Metcalfe.Tom; Patulski.Scott
Cc: Tutkowski.Bob; Mylotta.Klaus; Derenne.Steven
Subject: RE: PRB Coal

I have also had a chance to do a little research on the permit aspect. Assuming Bruce Ramme hasn't jumped from his window, I will try and put a summary together prior to the meeting for our consideration.

Also, I did confirm that there is a formula (which I assume is the one Steve is using) in the proposed federal mercury rules that allows you to take a sliding approach, between bit and subbut, to mercury emission rate based on output.

From: Metcalfe.Tom
Sent: Friday, July 09, 2004 4:52 PM
To: Patulski.Scott
Cc: Tutkowski.Bob; Mylotta.Klaus; Derenne.Steven; Krause.Kris
Subject: RE: PRB Coal

All good points for discussion.

Steve's approach has been to look first at a blend rather than a complete switch to PRB. He's taking incremental steps i.e. gradually increasing the % of PRB to see how mercury emissions change versus the current permit and potential new regulations. I appreciate that blending and fuel switching have their own issues.

Steve, I suggest to save time at our meeting that you circulate your initial findings beforehand. We can use Rick's email as a meeting agenda.

-----Original Message-----
From: Patulski.Scott
Sent: Friday, July 09, 2004 3:56 PM
To: Metcalfe.Tom; Krause.Kris
Cc: Tutkowski.Bob; Mylotta.Klaus; Derenne.Steven; Haase.Stephanie
Subject: RE: PRB Coal

I will be happy to revisit this issue again. There are several issues that we will need to discuss including the ability to remove Mercury from PRB fired units, changes in the Hg emission limits from bit fired units, impact on unit efficiency that occurs firing sub-bit units and therefore increase CO2 emissions, gypsum production and limestone consumption - if the numbers are too small there are no practical takers for this product, increased number of trains to the site and the like. It will take more than an hour to get through all of these issues - but it is a good place to start.

From: Metcalfe.Tom
Sent: Friday, July 09, 2004 3:30 PM
To: Krause.Kris; Patulski.Scott
Cc: Tutkowski.Bob; Mylotta.Klaus; Derenne.Steven; Haase.Stephanie
Subject: RE: PRB Coal

Scott and Kris
I want to bring you guys into this debate. Kris and I have talked about it briefly but I think both of you have considerable knowledge and history with the project that will help ensure we don't travel down paths that already have road blocks.

Steve Derenne is tackling the items shown on Rick's list, and as you can see from Klaus' email, he is already thinking about the coal cost deltas.

I have let Rick know that I wanted to bring you into this discussion. I suggest we meet as a group after Steve has completed his initial findings.

Stephanie, could you see if you can find an opening in each of our calendars for either 14, 15 or 16 July for one hour.

Tom

-----Original Message-----
From: Mylotta.Klaus
Sent: Friday, July 09, 2004 2:58 PM
To: Kuester.Rick
Cc: Metcalfe.Tom; Tutkowski.Bob
Subject: RE:

There have been considerable changes in the coal markets since we made our Pittsburg # 8 coal selection (three or four years ago) that need to be updated including pricing, quality, supplier ownership, etc. (Example is our original fair market price was $28/ton…… spot today is $58/ton)

The environmental impacts of the coal choice needs to include (1) salability of the type of ash produced (PRB has been up to now easier to sell), (2) amount of and difficulty of disposing/selling of the synthetic gypsum need to be on the list to form a complete "environmental" cost which includes many other factors like NOX, mercury,etc. (air permit limits)

I met with CONSOL today (the primary supplier of Pittsburg #8) and indicated we need to know what has changed in their business plans including availability, pricing, contractural obligations for trace elements limits,etc. I asked for an update NTL the end of July.

I will work on an update of the original items used in selecting the Pittsburgh #8 as the bituminous coal and update our coal forecast including PRB, Colorado and anything else that you/others would suggest.

From: Kuester.Rick
Sent: Friday, July 09, 2004 2:29 PM
To: Metcalfe.Tom; Tutkowski.Bob; Mylotta.Klaus
Subject:

In contemplating the source of coal for ERGS I think we should have a feasibility discussion prior to the board. I'd like the agenda to address:

- Original rationale for Eastern bituminous
- What's changed
  - Eastern versus PRB price spreads
  - Mercury rules STEVE
- Technical changes required to power island and AQCS including approx cost STEVE (not cost)
- Technical changes required to coal handling including approx cost STEVE (not cost)
- NPV of building in flexibility to burn PRB
- Impact on 3000 MW site, if any STEVE (not cost)
- Environmental Permit Considerations STEVE (But needs support from environmental)
- PSCW issues
- External Public issues (Steve is looking at impacts for rail haulage)
- Suggested way forward

Thoughts?

Haase.Stephanie

From: Kuester.Rick
Sent: Friday, July 09, 2004 2:29 PM
To: Metcalfe.Tom; Tutkowski.Bob; Mylotta.Klaus

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- External Public issues
- Suggested way forward

Thoughts?