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Coke Oven Flue Temperatures  
Dated: June 1994

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Date: June 24, 1994

P. Egbers  
C. Lin

To: J. Garzella  
From: V. Beaucaire  
Subject: COKE OVEN FLUE  
TEMPERATURES  
Reference:

*cc. Dick Perry. Comment*  
*5279ef*  
*gls*

Following our discussion last Friday about lowering the coke oven flue temperatures, I asked Charlie to review Coke Plant Morning Reports for the past few years to obtain data on average flue temperatures for different production schedules. Charlie and his assistants assembled the attached information. The four production schedules listed, 99, 111, 114 and 129 ovens per day are from 1989-1994. This data is summarized in Table 1.

Since Charlie and I are recommending lowering the flue temperature from the current level of 2280°F for a pushing schedule of 99 ovens per day, discussion here will be limited to the lower flue temperatures the coke plant has operated with for significant periods of time:

<u>Ovens/Day</u>	<u>Time Period</u>	<u>No. of Days</u>	<u>Avg. Flue Temp., °F</u>
99	early 1991	50	2176
111	late 1991, early 1992	63	2231
129	mid 1989	81	2405

The coke produced during these periods generally had a stability of 60 or higher and a volatile matter content below 0.60%. Coal blend moisture levels were in the range of 7-10%.

Since we have operated at these lower flue temperatures for extended periods in the past and produced good coke, we should be able to come close to these conditions again. Dirtier gas and additional years on the ovens may take a toll, but Charlie and I are convinced we have some room and recommend the following aim flue temperatures:

<u>Ovens/Day</u>	<u>Flue Temperature, °F</u>
99	2200
114	2300
125	2400

Flue temperatures for intermediate production levels should be proportional.

- continued -

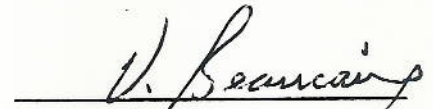
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To avoid overcorrecting, any change from present operating conditions should be done slowly and in stages. For a constant production level, temperatures should be lowered in increments of 25<sup>o</sup>F. For a constant flue temperature, production should be increased only a few ovens at a time.

Hoped-for improvements from lower flue temperatures are: higher production rates, easier pushing (less fissuring), better carbon buildup on the walls (more continuous gas evolution), lower tar quinoline insolubles (lower wall temperatures) and possibly a small reduction in cyanide (lower temperatures). On the negative side, coke strength after reaction will probably decrease, causing the blast furnace coke rate to increase, probably 10-20 lb./NTHM. Overall, however, we should be better off with lower flue temperatures.

VDB/sj



V. D. Beaucaire

TABLE I

## SOME COKE OVEN FLUE TEMPERATURES

<u>Ovens/Day</u>	<u>Year</u>	<u>No. of Days</u>	<u>Avg. Flue Temp., °F</u>
99	1990	51	2294
	1991	50	2176
	1992	76	2264
	1992-93	151	2241
	1993	11	2327
111	1991-92	63	2231
	1993	47	2343
114	1992	8	2227
	1994	34	2355
	1994	5	2341
129	1989	81	2405

99 Ovens / DAY

Date	Temp	Date	Temp
3/11/92	2230	4/16/92	2205
3/12/92	2222	4/17/92	2245
3/13/92	2206	4/18/92	2232
3/14/92	2200	4/19/92	2260
3/15/92	2216	4/20/92	2270
3/16/92	2222	4/21/92	2276
3/17/92	2221	4/22/92	2261
3/27/92	2296	4/23/92	2265
3/28/92	2331	4/24/92	2236
3/29/92	2295	4/26/92	2223
3/30/92	2272	4/28/92	2264
3/31/92	2239	4/29/92	2196
4/1/92	2222	4/30/92	2166
4/3/92	2262	5/3/92	2299
4/4/92	2273	5/4/92	2279
4/5/92	2253	5/5/92	2256
4/7/92	2287	5/6/92	2248
4/8/92	2309	5/10/92	2260
4/12/92	2271	5/12/92	2272
4/13/92	2246	5/13/92	2246
4/14/92	2208	5/14/92	2357
4/15/92	2195	5/15/92	2321
sub total	49476	sub total	49687

## 99 Oven / Day

Date	Temp	Date	Temp
5/16/92	2333	6/10/92	2322
5/17/92	2320	6/11/92	2308
5/18/92	2317	6/12/92	2306
5/19/92	2277	6/13/92	2281
5/20/92	2259	6/14/92	2287
5/21/92	2257	6/21/92	2318
5/22/92	2267	6/22/92	2321
5/23/92	2294	6/23/92	2286
5/24/92	2314	6/24/92	2220
5/25/92	2276	6/25/92	2193
5/26/92	2277	sub total	22842
5/27/92	2258		
5/28/92	2233		
5/30/92	2288		
5/31/92	2265		
6/1/92	2238		
6/2/92	2288		
6/5/92	2230		
6/6/92	2264		
6/7/92	2269		
6/8/92	2260		
6/9/92	2250		
sub total	50034	Grand Total =	172039
		Avg.	2264°

111 Ovens/day

(12)

<u>Date</u>	<u>Temperature</u>	<u>Date</u>	<u>Temperature</u>
12/9/91	2255	12/31/91	2206
12/10/91	2202	1/1/92	2198
12/11	2184	1/2/92	2202
12/12	2221	1/5	2247
12/13	2227	1/6	2224
12/14	2217	1/7	2241
12/15	2271	1/8	2230
12/16	2293	1/9	2278
12/17	2286	1/10	2238
12/18	2226	1/11	2197
12/19	2180	1/12	2189
12/20	2232	1/13	2193
12/21	2210	1/14	2245
12/22	2192	1/15	2234
12/23	2225	1/17	2230
12/24	2220	1/18	2242
12/25	2232	1/19	2238
12/26	2261	1/20	2224
12/27	2269	1/21	2221
12/28	2260	1/23	2226
12/29	2242	1/24	2210
12/30	2241	1/25	2237
sub total	49146	sub total	48950

111 OVENS / DAY

(19)

Date	Temp	Date	Temp
1/26/92	2218		
1/27	2242		
1/28	2227		
1/29	2241		
1/30	2244		
1/31	2228		
2/1	2235		
2/2	2232		
2/3	2226		
2/4	2250		
2/5	2225		
2/6	2209		
2/9	2274		
2/10	2259		
2/11	2200		
2/16	2265		
2/17	2254		
2/18	2133		
2/19	2215		
Sub total	42477		



114 Ovens / DAY

(17)

Date	Temp	Date	Temp
1/4/94	2346	3/21/94	<del>2345</del> 2333
1/5	2351	3/22	2325
1/6	2339	3/23	2352
1/7	2322	3/24	2339
1/10	2354	3/28	2327
1/11	2379	3/31	2350
1/12	2395	4/1	2366
<del>1/17</del> 2/6	<del>2374</del> 2374	4/2	2342
2/8	2385	4/3	2359
2/11	2398	4/4	2354
2/12	2380	4/5	2359
2/13	2353	4/6	2352
2/14	2331	<del>4/21</del>	
2/15	2313		
2/17	2357		
2/20	2372		
2/21	2351		
2/28	2359		
3/2	2350		
3/6	2417		
3/16	2347		
3/17	2345		
Sub total =	51926	Sub total =	29158

Sub total = 90044 = 23550



129 Ovens/day

Date	Temperature	Date	Temperature
2/14/89	2355	5/30/89	2406
2/27/89	2331	6/1/89	2405
3/4/89	2420	6/4/89	2402
3/27/89	2428	6/5/89	2404
5/1/89	2422	6/6/89	2408
5/2/89	2414	6/12/89	2389
5/3/89	2420	6/13/89	2402
5/7/89	2382	6/14/89	2412
7/3/89	2400	6/15/89	2428
7/9/89	2427	6/16/89	2472
7/10/89	2431	6/17/89	2456
7/11/89	2432	6/18/89	2433
7/15/89	2417	6/20/89	2443
7/16/89	2390	6/21/89	2444
7/17/89	2415	6/22/89	2435
7/18/89	2417	6/23/89	2427
7/21/89	2390	6/24/89	2432
7/22/89	2412	6/25/89	2432
7/23/89	2436	6/26/89	2423
7/25/89	2384	6/28/89	2399
7/29/89	2410	6/29/89	2408

# 129 Ovens / Day

<u>Date</u>	<u>Temperature</u>	<u>Date</u>	<u>Temperature</u>
7/30/89	2388	7/24/89	2412
7/1/89	2396	7/25/89	2384
7/2/89	2410	7/26/89	2405
7/3/89	2407	7/28/89	2403
7/4/89	2408	7/29/89	2393
7/5/89	2390	7/30/89	2395
7/6/89	2389	7/31/89	2411
7/9/89	2392	8/2/89	2412
7/10/89	2379	8/3/89	2409
7/11/89	2379	8/4/89	2403
7/12/89	2386	8/5/89	2390
7/13/89	2385	8/6/89	2402
7/14/89	2404	8/8/89	2426
7/15/89	2408	8/9/89	2416
7/16/89	2364	8/10/89	2396
7/17/89	2369	8/19/89	2404
7/18/89	2372	8/20/89	2403
7/19/89	2379	8/21/89	2391
7/20/89	2379		
7/21/89	2368		
7/22/89	2390		

151535

144790

total = 194790

avg = 2405