FINAL OBSERVATION REPORT OF COMPLIANCE TESTING AT CF&I STEEL'S COKE PLANT PUSHING OPERATIONS IN PUEBLO, COLORADO

AP-42 Section 12.2
Reference
Report Sect. 4
Reference 132

handwritten corrections on TRC memos 8/7/80

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July 16, 1980

Under

EPA CONTRACT 68-01-4145
TASK 76

TRC PROJECT NO. 1274-E28

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OBSERVATION REPORT OF PARTICULATE EMISSION TESTING CONDUCTED AT CF&I STEEL CORPORATION'S COKE PLANT PUEBLO, COLORADO

INTRODUCTION

Particulate emission tests were conducted on CF&I Steel Corporation's Coke Plant (coke pushing operations) in Pueblo, Colorado for compliance determination under Colorado Air Pollution Control Commission Regulation 1-I.A.1 of the federally approved Colorado SIP and under agreement of the Consent Decree (13.B,(1)(a)) issued July 19, 1978. The testing contractor was The Almega Corporation of Chicago, Illinois, led by Dr. Eric Aynsley. The particulate emission tests were first performed on the north gas cleaning car beginning March 4, 1980, and then performed on the south gas cleaning car from March 17, 1980 to March 20, 1980. During the testing activities, process data and coal samples were obtained and visible emissions were recorded (a final Summary Report of VEO's was issued June 25, 1980 by TRC under separate cover). A total of eight complete tests were performed: five on the north gas cleaning car and three on the south. Particulates, flue gas velocities, temperatures, moisture, oxygen, and carbon dioxide were measured during each test run, with preliminary results presented in this report. All testing, observational, and data collection activities were monitored by CF&I personnel. Participants of the testing program are listed in the Activities Log.

TESTING PROGRAM

The testing program consisted of three particulate sampling tests incorporating modified USEPA Reference Methods 1-5. Testing protocol, as delineated in the Consent Decree issued July 19, 1978 and further detailed in correspondence dated May 26, 1978, was followed. These documents are included as an appendix (Appendix A) to this report.

For this test series, compliance testing on the north gas cleaning car was performed for the first time. However, for the south gas cleaning car,

the testing was necessary since previous (August, November, and December, 1979) test series had shown non-compliance. A pre-test meeting between CF&I, contractor, and regulatory personnel was held March 4, 1980 and testing commenced later that day. Several meetings were held throughout the testing program to discuss various problems that arose and a post-test meeting, in which data was exchanged and reviewed, was held March 20, 1980 upon completion of the final test. In addition, report requirements and submittal dates were discussed at the post-test meeting.

GENERAL PROCESS OPERATIONS

The basic pushing operation as described in TRC's Observation Report dated September 25, 1979 was followed with the exception that many of the previous problems were corrected. For review, the following steps were followed:

1) Gas cleaning car lines up with coke oven door to be pushed.
2) Bench car lines up with coke oven door, removes it, and moves articulated coke hood into place.
3) Hood is lowered to gas cleaning car, scrubber sprays turned on, dampers closed, fan louvers opened, push begun.
4) Push completed, hood raised, gas cleaning car begins trip to quench tower.
5) Gas cleaning car enters quench tower, dampers opened, fan louvers closed, scrubber sprays turned off, quenching cycle begun.

This basic procedure was followed throughout the testing program for both north and south gas cleaning cars. Nearly all of the process related problems encountered in previous test series were absent, except some persistent communication problems between door car and gas cleaning car personnel which resulted in some pushing delays, most significantly on March 11 and again on March 18, 1980. Review of the pushing schedule for March 11, 1980 reveals that ovens were being pushed up to nine hours late and two hours early due to major process delays first encountered on March 7, 1980. For March 18, 1980, some excessive pushing delays were encountered (up to forty-five minutes). When coke pushing operations are delayed, the scrubber system of the gas cleaning car loses it's collection efficiency (lower temperatures, lower velocities often resulted in lower capture and water separation efficiencies). Selected process

data recorded during the test program and a summary of the process as submitted by CF&I Steel is included as an appendix (Appendix B). Additional process data was transmitted on April 7, 1980 but not included in this report.

TESTING AND PROCESS OBSERVATIONS

The Almega Corporation completed equipment set-up on the north gas cleaning car on March 3, 1980 and preliminary data was taken.

As described in previous reports, EPA Reference Methods 1-5 were modified to meet the space limitations of both gas cleaning cars. As described by Method 1, the equivalent diameter of the scrubber outlet was 3.299 feet (24.5" x 50.25") for the north and 3.316 feet (50.75" x 24.5") for the south gas cleaning car. Per agreement among the concerned parties, the minimum upstream and downstream requirements were waived (see Appendix A).

For scrubber outlets, four sampling ports are located on the twenty-four inch side of the outlet, with eight points sampled per port. However, the 'outside' or the port nearest the coke ovens on the north gas cleaning car was moved approximately two inches from the center to avoid hazardous sampling conditions. Each sampling point was sampled per 'coke push', resulting in a total of 32 points, or 'coke pushes', for each test. As defined in the testing protocol, each point (or 'push') was sampled from when the fan louvers opened until they were closed upon quench cycle initiation.

Because of the intermittent nature of the process, integral sampling times were not obtained for each point. The sampling times however, were fairly consistent for all tests, averaging 2.5 minutes for the north and 3.1 minutes for the south gas cleaning car. Table I (A-C) lists the scheduled time and the actual time the push occurred, battery/oven number, & elapsed time of each sample point for each gas cleaning car during the testing period.

The particulate emission testing at CF&I Steel Corporation's Coke Plant operations can be divided into four phases:

1) March 4-7: Incomplete testing on north gas cleaning car.
2) March 11-14: Testing on north gas cleaning car.
3) March 17-20: Testing on south gas cleaning car.
4) March 23-25: Lab analysis of samples.

The first phase activities were detailed in a TRC memo dated March 7, 1980 (see Appendix C). Briefly, particulate testing on the north gas cleaning car began March 4, 1980. Almega used approved Method 5 equipment for the tests, incorporating a four foot glass probe rigidly attached to a heated filter box and impinger train. Pretest calibration sheets were provided by the testing personnel. The test performed on March 4, 1980 was deemed unacceptable by all parties for two reasons: high isokinetic (113%) sample and an adjusted sample volume of 22 dscf (less than the required 30 dscf). In addition, the frequent opacity violations could have possibly invalidated the mass emission tests. The testing on the next day was cancelled because of diesel (hydraulic) shutdown. When testing resumed on March 6, 1980, the testing equipment was damaged such that the day's work was cancelled at 10:30 that morning, although observed process and operational parameters were apparently normal.

Particulate testing on the north gas cleaning car resumed on Tuesday, March 11, 1980 and was completed on March 14, 1980. Each test was conducted in the following manner: two or three preliminary pushes to obtain sampling rate, actual sampling, and final leak checks. All post test leak checks were observed and no post test leak check exceeded 0.020 cfm @15" Hg.

As briefly mentioned in "General Process Operations", the coke plant was in an 'abnormal mode', with evidence that the ovens were being pushed up to nine hours late and two hours early on March 11, 1980. In addition, those pushes involving ovens from D Battery resulted with noticeable stack emissions and visible emission violations could possibly have invalidated the mass emission tests for the day. Because of these problems, CF&I Steel personnel requested that the test for the day be considered invalid.

Single point grab samples were taken during each test and analyzed in the field with an Orsat analyzer for carbon dioxide and oxygen. One observed

leak check was performed on the instrument during the testing program.

During the sampling period on the north gas cleaning car, the probe assembly - with the uncovered nozzle facing into the gas stream - remained in the stack at all times. The 'snuffer', designed by Almega for use on the gas cleaning cars, was not able to be used because of scrubber outlet design and physical constraints of the testing platform. For the testing on the south gas cleaning car, the ducts were removed and the sample ports enlarged to facilitate probe removal between points, thus alleviating the possible contamination of collecting particulate by scraping the portals on removal or losing entrained, particulate-laden moisture from the probe.

All sample recovery and clean-up procedures were performed in the coke plant lab and observed by regulatory personnel. In general, the probe assembly was rinsed and brushed after each test with reagent grade acetone and each filter was recovered with fingers and seated in a petri dish. After the sample recovery was completed, each container was sealed with USEPA seals (Form 7500-2 (R7-75)).

The condensed moisture captured in the first three impingers was volumetrically determined and retained for further analysis. The condensed moisture captured in the fourth, or silica gel impinger, was initially determined in the field and then placed in a marked polyethylene bottle for comparison weighing at the testing contractor's facilities. Preliminary results indicate that saturated conditions were not present (except March 14, 1980) during the testing.

Phase three, the particulate series on the south gas cleaning car, began March 17, 1980. However, because of scrubber related problems (i.e. plugged spray nozzles), no testing was attempted until March 18, and testing was completed on March 20, 1980.

The test performed on March 18, 1980 was conducted under the following "upset" conditions:

1) For Push #1, scrubber system stalled as coke fell into the hot car, causing venturi to lose pressure (42" down to 5").
2) For Push #2, the scrubber system again stalled, causing venturi to lose pressure (42" down to 15").
3) Diesel problems for first four pushes prevented consistent venturi operation.
4) Delays between pushes (see Table IC) caused loss of scrubber temperatures. This loss was often as much as 40° F.
5) B/B-13 oven was not able to be pushed (Pt #8): forty-five minute delay, resulting in a temperature drop in the scrubber.
6) Empirical inspection of sample showed "orange" residue, unlike all previous samples. Possible cause was rust build-up in piping and connections from car being shutdown for two week period.

Besides the enlargement of the sampling port, Almega opted to employ, with prior (from Mr. Humphries) approval, a four foot stainless steel probe instead of the glass probe used on the north gas cleaning car. The use of this probe assembly was an attempt by Almega to ensure that no breakage would occur when moving the sample train in-and-out of the scrubber outlet between sample points. Also, because of the heating characteristics of the steel probe, higher temperatures were maintained which possibly contributed to the absence of any moisture being collected in the cyclone drop-out bottle.

LABORATORY OBSERVATIONS

On March 12, 1980 it was agreed by all parties that Almega personnel would analyze the previously taken samples in CF&I Steel Corporation's Metallurgy Lab, under Mr. Humphries scrutiny. This analysis would include filter weight determinations and front half (probe washings) drying and weighing. The samples, after analysis, would be sealed for later verification at Almega facilities.

Mr. Humphries assisted Dr. Aynsley in the onsite lab with balance and data verification of the following filter and front half samples: March

4, 11-13, and March 18. Laboratory procedures essentially followed those established in EPA Reference Method 5. An acetone blank, consisting of reagent grade acetone used for the first four tests on the north gas cleaning car, was analyzed and revealed a high (0.0042g/100ml) value. Subsequently, blanks were taken after each day's sample recovery was completed to verify this high value.

Upon completion of the testing on March 20, 1980, Mr. Humphries traveled to the testing contractor's laboratory facilities near Chicago, Illinois to validate the preliminary data and to verify quality control techniques. The seals from all containers were broken by Mr. Humphries and balance errors were checked using certified 'S' type weights. Each day's samples were grouped and prepared for analysis. Sample analysis followed USEPA Reference Method 5 procedures, with Mr. Humphries witnessing all tare and initially determined final weights. A post test calibration check on the control box used for the testing was also performed.

PRELIMINARY CALCULATIONS

Table II illustrates preliminary calculations performed by this office utilizing an EPA computer program. All test runs are included to allow full data analysis. As shown in the table, Test #1 performed on March 4, 1980 is above the acceptable isokinetic range (100±10%). Also, preliminary calculations indicate that the tests performed on March 4, and March 11, 1980 resulted in adjusted sample volumes below the 30 dscf requirement (22.7 for the former and 28.7 for the latter).

The calculated mass emission rates are based on preliminary laboratory analysis and previously determined process values (12.42 ~~lb/ton~~ T coke/oven) supplied by CF&I Steel Corporation. The final audit results may differ slightly, depending upon the various post-test calibration checks and final laboratory analysis.

The preliminary average particulate emission rates from the north and south gas cleaning cars are 0.032 and 0.027 lb/ton of coke, respectively. These average emission values are based on those tests which are acceptable from a testing standpoint. For the north gas cleaning car, the tests would be those completed March 12, through March 14, 1980. For the south gas cleaning car, the acceptable tests would be the two conducted on March 19 and March 20, 1980. These preliminary test results are marginal with respect to the allowable concentration of 0.03 lb/ton of coke.

VISIBLE EMISSION OBSERVATIONS

During the entire test series, visible emissions from each gas cleaning car were recorded by various regulatory and contractual personnel (See Activities Log). Recorded visible emissions included both hood (or 'uncaptured') and stack emissions. A final report on the visible emission observations was issued by TRC under separate cover (July 16, 1980). That report included all observation sheets for each test day.

GENERAL PROBLEMS

Various problems were encountered during the testing program, but considerably less than previous test series. As described in TRC's Summary Report of Visible Emission Observations at CF&I Steel's Coke Plant Pushing Operations (issued July 17, 1980), visible emissions - and therefore possibly particulate emissions - can have three possible explanations: 1) improper coking operations, 2) improper scrubber operation and, 3) improper personnel operation. Of the three, improper coking operations and operator related problems are the most significant since the scrubber operation was designed to handle 'normal' coking and handling operations[1]. A full description of possible 'upset' conditions is given in "Testing and Process Observation" section of this report.

Sampling related problems were not as numerous as previous test series. The single most serious problem was the possible contamination of two (March 11 & 12, 1980) front-half samples with glass shards from the glass-lined probe.

Upon initiation of sample analysis, it was noted that some unknown amount of glass was recovered with the sample. Examination of the probe however, revealed no apparent damage. Dr. Aynsley, with Mr. Humphries approval and assistance, quantitatively removed all visible glass particules.

In general, the sample recovery techniques of the testing contractor could be of higher quality; the use of fingers to remove the filter from its holder and the lack of brushes to clean the front-half glassware are the two areas of possible concern.

The sampling techniques of the testing contractor were acceptable and of high quality when considering the hazardous conditions present. However, the results indicate that the lack of probe/nozzle capping or probe removal from the scrubber outlet between pushes greatly biases the results. This is readily seen by comparing the two cars' cyclone drop-out bottle that is located between the probe assembly and filter holder. For the north gas cleaning car with the probe remaining stationary, the average moisture collected in the bottle was 70 milliliters with 'pepper'-sized particulate. The south gas cleaning car (removing the s/s probe) had no moisture and little particulate in the sampling train's cyclone drop-out bottle.

SUMMATION

Though the contractor, The Almega Corporation, performed the tests under arduous conditions, the apparent biases introduced by leaving the probe assembly within the north car scrubber outlet has a detrimental effect in obtaining truly representative samples.

Also, the continuing process related problems, though improving, have a direct effect on particulate emission results.

[1]Per conversations with Tom Houf, Stan Koschar, John Lane, and Don Cairns (See Activities Log for affiliations).

In addition, it is the opinion of TRC that the tests selected and summarized (as discussed in this report) are representative of actual stack emissions for this test program. However, until the final report is submitted by the contractor, no final statement can be made as to the actual emission levels at CF&I Steel Corporation's Coke Plant pushing operations.

TABLE IA

TESTING SCHEDULE - NORTH CAR

CF&I STEEL - COKE PLANT OPERATIONS

		MARCH 4, 1980					MARCH 11, 1980		
PT #	B/OVEN #	SCHEDULED PUSH TIME	TIME PUSHED	ELAPSED TIME	PT #	B/OVEN #	SCHEDULED PUSH TIME	TIME PUSHED	ELAPSED TIME
1	C/F-20	0948	0915	218	1	C/E-18	0359	0849	246
2	B/B-22	0924	0925	250	2	C/F-16	0338	0903	401
3	D/D-25	0923	0937	243	3	C/F-18	0421	0915	305
4	C/E-22	1010	0947	232	4	C/F-20	0504	0930	244
5	B/A-1	0939	0957	255	5	C/E-20	0442	0947	308
6	C/F-22	1032	1010	307	6	C/E-22	0526	1004	237
7	B/B-1	0955	1021	315	7	D/D-25	0426	1023	236
8	C/F-24	1054	1031	318	8	B/A-3	0908	1035	249
9	C/E-1	1116	1114	253	9	C/F-22	0548	1059	258
10	D/D-27	1006	1126	235	10	B/A-5	0955	1112	246
11	C/F-1	1138	1147	238	11	C/E-1	0632	1141	227
12	C/E-3	1159	1158	347	12	C/F-1	0654	1152	245
13	B/B-5	1128	1219	327	13	C/F-24	0610	1203	238
14	C/F-3	1221	1231	240	14	D/D-27	0508	1222	234
15	D/D-29	1048	1245	410	15	D/D-29	0550	1237	215
16	C/E-5	1242	1300	254	16	D/D-31	0632	1252	220
17	B/B-7	1215	1315	304	17	C/E-3	0716	1308	223
18	C/F-5	1304	1327	254	18	C/F-3	0738	1320	248
19	D/D-31	1131	1339	247	19	C/E-5	0759	1334	223
20	C/E-7	1326	1353	254	20	C/F-5	0821	1349	230
21	C/F-7	1348	1407	301	21	B/A-11	1215	1402	307
22	B/A-11	1333	1421	248	22	D/D-2	0715	1414	247
23	D/D-2	1214	1434	224	23	B/A-13	1302	1440	357
24	D/D-4	1256	1445	233	24	C/E-7	0843	1451	238
25	C/E-9	1410	1456	241	25	C/F-7	0925	1506	232
26	C/F-9	1432	1506	248	26	B/B-15	1404	1518	325
27	C/E-11	1454	1517	238	27	C/E-9	0927	1529	238
28	C/F-11	1516	1527	247	28	C/F-9	0948	1541	246
29	C/E-13	1538	1541	237	29	B/B-17	1451	1551	326
30	C/F-13	1559	1551	245	30	C/E-11	1010	1601	237
31	D/D-6	1339	1605	228	31	D/D-6	0840	1613	225
32	D/D-8	1422	1617	245	32	D/D-8	0923	1624	214
	TOTAL SAMPLE TIME: (Min:Sec)			91:56		TOTAL SAMPLE TIME (Min:Sec)			89:05

TABLE IB

TESTING SCHEDULE - NORTH CAR

CF&I STEEL - COKE PLANT OPERATIONS

MARCH 12, 1980

PT #	B/OVEN #	SCHEDULED PUSH TIME	TIME PUSHED	ELAPSED TIME
1	D/D-25	0928	1029	228
2	B/B-19	1042	1041	319
3	B/C-17	0932	1052	302
4	B/C-19	1113	1104	300
5	D/D-27	1006	1115	240
6	C/F-9	0843	1127	231
7	B/A-21	1144	1138	257
8	C/E-11	0905	1148	236
9	C/F-11	0927	1159	233
10	C/E-13	0948	1209	329
11	B/B-21	1215	1218	302
12	B/A-23	1246	1230	313
13	D/D-29	1048	1242	246
14	C/F-13	1010	1255	235
15	C/E-15	1032	1306	227
16	C/F-15	1054	1318	242
17	B/B-23	1318	1328	302
18	B/A-2	1349	1339	311
19	D/D-31	1131	1351	244
20	B/C-2	1420	1421	405
21	B/A-4	1436	1435	312
22	B/B-4	1451	1450	314
23	C/E-17	1116	1501	230
24	C/F-17	1138	1531	240
25	C/E-19	1153	1524	239
26	C/F-19	1221	1538	252
27	C/E-21	1242	1549	254
28	B/C-6	1554	1600	306
29	B/A-8	1609	1612	321
30	B/B-8	1625	1625	328
31	B/C-8	1640	1635	322
32	B/A-10	1656	1648	326

TOTAL SAMPLE TIME: (Min:Sec) 95:06

MARCH 13, 1980

PT #	B/OVEN #	SCHEDULED PUSH TIME	TIME PUSHED	ELAPSED TIME
1	B/A-6	0821	0829	250
2	D/D-19	0840	0840	240
3	B/B-6	0837	0850	350
4	C/F-17	0759	0904	222
5	C/E-19	0821	0915	218
6	D/D-21	0923	0924	228
7	B/C-6	0852	0935	310
8	D/D-23	1006	0945	228
9	B/A-8	0908	0955	248
10	D/D-27	1131	1007	212
11	C/F-19	0843	1017	227
12	C/E-21	0905	1027	226
13	B/B-8	0924	1041	319
14	B/C-8	0939	1052	311
15	B/A-10	0955	1102	308
16	C/F-21	0927	1116	222
17	B/B-10	1010	1125	315
18	C/E-23	0948	1135	232
19	B/C-10	1026	1145	324
20	B/A-12	1042	1155	330
21	D/D-25	1048	1208	228
22	B/B-12	1057	1218	319
23	D/D-29	1214	1228	230
24	B/C-12	1113	1239	326
25	B/A-14	1128	1250	300
26	C/F-23	1010	1307	234
27	B/B-14	1144	1318	305
28	C/E-2	1032	1330	220
29	C/F-2	1054	1343	232
30	C/E-4	1116	1403	214
31	C/F-4	1138	1418	212
32	C/E-6	1159	1432	214

TOTAL SAMPLE TIME: (Min:Sec) 88:34

MARCH 14, 1980

PT #	B/OVEN #	SCHEDULED PUSH TIME	TIME PUSHED	ELAPSED TIME
1	B/B-14	0908	0816	314
2	B/C-14	0939	0828	323
3	B/A-16	1010	0839	303
4	D/D-13	0840	0850	227
5	C/E-21	0654	0900	242
6	C/F-21	0721	0910	239
7	C/E-23	0723	0923	229
8	B/B-16	1042	0933	305
9	B/A-18	1144	0944	303
10	D/D-15	0923	0954	219
11	C/F-23	0759	1003	228
12	C/E-2	0821	1013	222
13	C/F-2	0843	1022	242
14	C/E-4	0905	1032	233
15	B/B-18	1215	1042	308
16	C/F-4	0927	1053	300
17	C/E-6	0948	1104	240
18	C/F-6	1010	1120	258
19	B/A-20	1318	1130	356
20	B/C-16	1113	1144	311
21	B/C-18	1246	1159	340
22	D/D-17	1006	1211	221
23	D/D-19	1048	1220	217
24	D/D-21	1131	1230	216
25	C/E-8	1032	1238	214
26	C/F-8	1054	1250	229
27	C/E-10	1116	1301	215
28	C/F-10	1138	1312	228
29	C/E-12	1159	1328	223
30	C/F-12	1221	1339	218
31	C/E-14	1242	1353	228
32	C/F-14	1304	1405	253

TOTAL SAMPLE TIME: (Min:Sec) 87:24

TABLE IC

TESTING SCHEDULE - SOUTH CAR

CF&I STEEL - COKE PLANT OPERATIONS

PT #	B/OVEN #	SCHEDULED PUSH TIME	TIME PUSHED	ELAPSED TIME
		MARCH 18, 1980		
1	C/E-20	0759	0849	254
2	B/B-9	0750	0858	252
3	B/C-9	0806	0910	253
4	B/A-11	0821	0923	304
5	B/B-11	0837	0940	234
6	B/C-11	0852	0952	234
7	B/A-13	0908	1005	239
8	C/F-22	0905	1044	348
9	B/C-13	0939	1054	320
10	B/A-15	0955	1108	246
11	B/B-15	1010	1122	234
12	B/C-15	1026	1134	329
13	B/A-17	1042	1147	339
14	B/B-17	1057	1200	343
15	B/C-17	1113	1215	325
16	B/A-19	1128	1230	308
17	B/B-19	1144	1241	302
18	B/C-19	1200	1252	236
19	B/A-21	1215	1305	302
20	B/B-21	1231	1317	251
21	B/A-23	1246	1343	256
22	B/B-23	1302	1357	258
23	B/A-2	1318	1413	320
24	B/B-2	1333	1434	311
25	B/C-2	1349	1444	314
26	B/A-4	1404	1435	304
27	B/B-4	1420	1518	315
28	B/C-4	1436	1529	303
29	B/A-6	1451	1547	307
30	B/B-6	1507	1558	300
31	B/C-6	1522	1611	312
32	B/A-8	1538	1632	303
	TOTAL SAMPLE TIME (Min:Sec)		98:16	

PT #	B/OVEN #	SCHEDULED PUSH TIME	TIME PUSHED	ELAPSED TIME
		MARCH 19, 1980		
1	B/B-4	0821	1022	340
1	C/F-13	0738	1035	255
3	C/E-15	0759	1047	245
4	B/C-4	0837	1058	305
5	B/A-6	0852	1111	327
6	B/B-6	0908	1124	251
7	B/C-6	0924	1135	321
8	B/A-8	0939	1146	326
9	B/B-8	0955	1157	242
10	B/C-8	1010	1208	238
11	B/A-10	1026	1220	337
12	B/B-10	1042	1235	312
13	B/C-10	1057	1252	246
14	C/E-23	1054	1304	311
15	B/A-12	1113	1313	255
16	C/E-2	1138	1323	248
17	B/B-12	1128	1332	255
18	B/C-12	1144	1341	243
19	B/A-14	1200	1351	308
20	B/B-14	1215	1402	230
21	B/C-14	1231	1412	242
22	B/A-16	1246	1423	256
23	B/B-16	1302	1435	243
24	B/C-16	1318	1448	245
25	B/A-18	1333	1500	246
26	B/B-18	1349	1511	245
27	C/E-6	1304	1525	320
28	B/C-18	1404	1535	252
29	B/A-20	1420	1547	242
30	B/B-20	1423	1557	246
31	C/F-8	1410	1607	304
32	B/A-22	1451	1618	258
	TOTAL SAMPLE TIME (Min:Sec)		94:54	

PT #	B/OVEN #	SCHEDULED PUSH TIME	TIME PUSHED	ELAPSED TIME
		MARCH 20, 1980		
1	B/B-16	0852	0916	307
2	C/F-6	0948	0936	247
3	C/E-8	1010	0948	257
4	C/F-8	1032	0958	234
5	B/C-16	0908	1010	337
6	B/A-18	0924	1024	252
7	B/B-18	0939	1034	310
8	B/C-18	0955	1044	238
9	B/A-20	1010	1055	322
10	B/B-20	1026	1107	300
11	C/F-10	1116	1116	257
12	C/F-12	1139	1141	311
13	C/E-12	1138	1152	251
14	B/A-22	1042	1202	305
15	B/B-22	1057	1210	314
16	B/A-1	1113	1221	258
17	B/B-1	1128	1232	304
18	B/C-1	1144	1242	300
19	B/A-3	1200	1254	304
20	B/B-3	1215	1308	238
21	B/C-3	1231	1319	304
22	B/A-5	1246	1339	247
23	B/B-5	1302	1350	402
24	B/C-5	1318	1402	254
25	B/A-7	1333	1415	254
26	B/B-7	1349	1426	305
27	B/C-7	1404	1436	301
28	B/A-9	1420	1446	300
29	B/B-9	1436	1458	258
30	B/C-9	1451	1509	255
31	B/A-11	1507	1523	254
32	B/B-11	1522	1533	313
	TOTAL SAMPLE TIME (Min:Sec)		96:53	

SUMMARY OF PRELIMINARY RESULTS

CF&I STEEL CORPORATION - COKE PLANT

NORTH & SOUTH GAS CLEANING CARS

TABLE IIA - NORTH CAR

TEST #	DATE	TIME	% MOISTURE	VELOCITY (fps)	FLOWRATE (dscfm)	EMISSION RATE (gr/dscf)/(lb/Ton)		% ISOKINETIC
1	3/04/80[B]	0918-1618	26.48	100.47	27,549	0.0303	0.028	112.9
1	3/11/80[B]	0849-1628	29.74	94.87	24,579	0.0398	0.031	91.5
2	3/12/80	0928-1627	22.75	96.84	28,058	0.0361	0.035	99.4
3	3/13/80	0829-1434	26.52	98.93	27,609	0.0315	0.028	102.6
4	3/14/80	0816-1408	26.32[A]	98.06	27,447	0.0394	0.034	94.0
AVERAGE								
(3/11-3/14)			26.33	97.18	26,923	0.0367	0.032	96.9
(3/12-3/14)			25.20	97.94	27,705	0.0357	0.032	98.7

TABLE IIB - SOUTH CAR

TEST #	DATE	TIME	% MOISTURE	VELOCITY (fps)	FLOWRATE (dscfm)	EMISSION RATE (gr/dscf)/(lb/Ton)		% ISOKINETIC
1	3/18/80[B]	0849-1635	22.11	94.94	28,412	0.0407	0.041	97.0
2	3/19/80	1022-1620	24.38	102.01	29,551	0.0262	0.026	94.9
3	3/20/80	0916-1535	22.60	97.12	29,222	0.0277	0.028	95.8
AVERAGE								
(3/18-3/20)			23.03	98.02	29,062	0.0315	0.032	95.9
(3/19-3/20)			23.49	99.57	29,387	0.0270	0.027	95.4

A DETERMINED SATURATED MOISTURE LEVEL; MEASURED MOISTURE CONTENT WAS 29.2%

B THE VALIDITY OF THE TESTS IS QUESTIONABLE; SEE TEXT

ACTIVITIES LOG

NAME	REPRESENTING
S. Humphries	USEPA Region VIII (TRC-Denver)
R. Chartier	USEPA Region VIII
M. Byrne	USEPA Region VIII (8S-S)
R. Kauffman	TRC-Denver
E. Hance	Pueblo, City/County Health Department
L. Atencio	Pueblo, City/County Health Department
B. Jackson	Almega Corporation
E. Aynsley	Almega Corporation
D. Chapman	Almega Corporation
T. Houf	National Engineers & Associates
D. Cairns	National Engineers & Associates
J. Pierce	National Engineers & Associates
S. Koschar	Ducon
A. Tosario	Ducon
J. Winkley	CF&I Steel Corporation
J. Lane	CF&I Steel Corporation
H. Love	CF&I Steel Corporation
C. Hund	CF&I Steel Corporation
G. von Dehn	CF&I Steel Corporation

ACTIVITIES

March 4, 1980

0730	Personnel arrive CF&I. Short pre-test meeting for introductions.
0910	Test #1 Begins.
1622	Test #1 Ends.
1645	Sample recovery begins. Meeting to discuss low volume.
1815	Sample recovery ends. Meeting ends. All out of plant.

March 5, 1980

0730 Personnel on site. North gas cleaning car shutdown. Discussion of testing with personnel.

1030 Testing for day scrubbed.

1115 All out of plant.

March 6, 1980

0715 Personnel on site. Almega experiencing equipment problems.

0905 Test #1 Begins.

1020 Test #1 Ends. Testing equipment malfunctioning.

1115 All out of plant.

1330 Meeting to discuss future testing on following week.

1420 Meeting ends. Personnel off site.

March 11, 1980

0700 Personnel on site. Almega sets up equipment.

0850 Test #1 Starts.

1626 Test #1 Ends.

1650 Sample recovery begins.

1800 Sample recovery completed. All out of plant.

March 12, 1980

0700 All personnel on site. Almega preparing equipment.

0845 Falling hot coke damages test equipment. Almega initiates repairs.

1029 Test #2 Begins.

1400 Decision to analyze samples on-site made. Messrs Humphries and Aynsley transfer samples to lab.

1430 Initiate sample analysis.

1648 Test #2 Ends. Samples transferred to clean-up area and sealed. No recovery planned until March 13, 1980.

March 12, 1980, continued

1730 All out of plant.

2230 Messrs Humphries and Aynsley arrive at clean-up area to recover Test #2 sample per CF&I request.

2315 Sample recovery completed. All out of plant.

March 13, 1980

0645 All personnel on site. Almega preparing equipment.

0829 Test #3 Begins.

1130 Messrs Humphries and Aynsley to lab for sample analysis. Preliminary results determined.

1432 Test #3 Ends.

1500 Sample recovery begins.

1530 Sample recovery completed. Messrs Humphries and Anysley transfer samples to lab for analysis. Samples prepped for analysis.

1701 All out of plant.

March 14, 1980

0730 All personnel on site. Equipment being prepped for testing.

0816 Test #4 Begins.

0902 Messrs Humphries and Aynsley to lab for analysis.

1300 Messrs Humphries and Aynsley return to test site.

1405 Test #4 Ends.

1420 Sample recovery begins. Meeting to discuss results and following week schedule.

1510 Sample recovery completed. Meeting ends. All out of plant.

1600 Personnel return to Denver.

March 16, 1980

1500 Mr. Humphries travels to Pueblo.

1830 Meeting with Almega personnel to discuss lab results and calibration data.

March 17, 1980

0715 Personnel on site. Almega setting up equipment on south gas cleaning car.

1000 Scrubber problems on car. CF&I attempts to repair.

1145 Testing for the day scrubbed.

1217 All personnel off site.

March 18, 1980

0700 All personnel on site. Almega ready to test.

0725 South gas cleaning car has continuing diesel problems.

0849 Test #1 Begins.

1005 Push #7. Pushing problems with oven. Does not push the oven after three tries. Long delay.

1149 Messrs Humphries and Aynsley to lab for preparing equipment for Test #1 analysis.

1636 Test #1 Ends.

1652 Sample recovery begins.

1741 Sample recovery ends. Messrs Humphries and Aynsley transfer samples to lab for analysis. Analysis begins.

1845 All out of plant.

MARCH 19, 1980

0730 Personnel on site (Mr. Humphries absent). Almega ready to test.

0800 South gas cleaning car experiencing problems.

1022 Test #2 Begins.

March 19, 1980, continued

1210 Mr. Humphries on site. Meeting with CF&I to discuss rest of test series and presence during final analysis.

1618 Test #2 Ends.

1630 Sample recovery begins.

1742 Sample recovery completed. All out of plant.

March 20, 1980

0800 Personnel at plant. Almega setting up equipment.

0916 Test #3 Begins.

1536 Test #3 Ends.

1550 Sample recovery begins.

1620 Post Test meeting to discuss results of all tests. Describe needs of report and presence of Mr. Humphries during final analysis.

1650 Post Test meeting ends. Sample recovery completed. All personnel out of plant.

1700 Personnel travel to Denver.

March 23-25, 1980

Mr. Humphries travels to Almega headquarters, observes lab activities, travels to Denver.

SOURCES: CF&I STEEL CORPORATION - COKE PLANT - PUEBLO COLORADO
LOCATION: NORTH GAS CLEANING CAR - SCRUBBER OUTLET
DATE RECEIVED:
TESTED BY: THE ARMEGA CORPORATION CHICAGO, ILLINOIS
OBSERVED BY: S E HUMPHRIES TRC-DENVER
AUDIT DATE: PRELIMINARY 24 MARCH 80
AUDITED BY: S E HUMPHRIES TRC-DENVER

*RUN NO. NSC-1 DATE 4 MARCH 80 TIME 0918 - 1618

INPUT DATA

PRELIMINARY

% CO	0.0
% CO_2	3.8
% O_2	15.025
ΔH_{avg} ("H_2O)	0.274
P_b ("H_g)	24.96
V_m ($ft.^3$)	27.758
T_m (^oF)	77.5
Y	0.9993
V_w (ml) (If unknown, enter zero)	174
B_{ws} (decimal) from tables	.2807
*R/S	
P_{st} ("H_2O)	+0.967
ΔP_i	
GTO 216	
T_s (^oF)	147.5
C_p	0.8367
d_s (ft) (EQUIVALENT)	3.29932341
*R/S	
T_t (MIN)	91.93
d_n (IN)	0.1117
M_n (mg)	44.7
C_a (mg/g)	—
V_{aw} (ml)	—
ρ (g/ml)	—

'F' Factor

OFFICE AUDIT OF PARTICULATE EMISSION REPORT

4 MARCH 80

OUTPUT DATA

% EA	228.9
V_m (dscf)	22.750
B_{WS} (Decimal)	0.2648
M_s (Wet)	25.181
ΔP AVG.	2.047
($\sqrt{\Delta P}$) AVG.	1.431
V_s (fps)	100.47
Q_{sd} (dscfm)	27549.0
% Isokinetic	112.9
M_n (mg corrected for blank)	44.7
mg/dscf	1.9649
gn/dscf	0.0303
lb./dscf	4.3-E06
lb./hr	7.16
lb./10^6 BTU (Boilers)	

Inv. list memories
CMS, RST, CLR

15.02500
228.89672
24.96000
22.74961
174.00000
0.26484
25.18109
1.
1.5
2.1
2.4
2.7
2.9
2.8
1.4
1.6
1.8
1.9
2.1
2.2
2.8
0.9
1.5
1.5
1.45
1.5
1.65
1.8
1.1
1.4
1.6
1.5
1.9
1.8
1.8
2.
16.
2.0469
1.4307
100.4680
2.7549 04
1.1285 02 %ISO

4.4700 01
1.9649 00
3.0323-02
4.3318-06
7.1602 00
1.0971 01 lb
2.7603-02 lb/TON

SOURCES: CF&I STEEL CORPORATION - COKE PLANT - PUEBLO, COLORADO
LOCATION: NORTH GAS CLEANING CAR - SCRUBBER OUTLET
DATE RECEIVED:
TESTED BY: THE ALMEGA CORPORATION CHICAGO, ILLINOIS
OBSERVED BY: S E HUMPHRIES TRC-DENVER
AUDIT DATE: PRELIMINARY 27 MARCH 80
AUDITED BY: S E HUMPHRIES TRC-DENVER

RUN NO. NSC-1 DATE 11 MARCH 80 TIME 0849-1628

INPUT DATA

% CO	0.00
% CO_2	5.03
% O_2	15.07
ΔH_{avg} ("H_2O)	0.317
P_b ("H_g)	25.06
V_m ($ft.^3$)	35.059
T_m (^oF)	82.8
Y	1.0053
V_w (ml) (If unknown, enter zero)	260
B_{ws} (decimal) from tables	.3490
*R/S	
P_{st} ("H_2O)	+0.963
ΔP_i	
GTO 216	
T_s (^oF)	155.7
C_p	0.8367
d_s (ft) (EQUIVALENT)	3.29932341
*R/S	
T_t (MIN)	89.08
d_n (IN)	0.150
M_n (mg)	74.2
C_a (mg/g)	—
V_{aw} (ml)	—
ρ (g/ml)	—
'F' Factor	

PRELIMINARY

11 March 80

OUTPUT DATA

% EA	243.9
V_m (dscf)	28.742
B_{WS} (Decimal)	0.2988
M_S (Wet)	24.804
ΔP AVG.	1.781
($\sqrt{\Delta P}$) AVG.	1.335
V_s (fps)	94.87
Q_{sd} (dscfm)	24579.0
% Isokinetic	91.5
M_n (mg corrected for blank)	74.2
mg/dscf	2.5816
gn/dscf	0.0398
lb./dscf	5.7-E06
lb./hr	8.39
lb./10^6 BTU (Boilers)	

Inv. list memories
CMS, RST, CLR

```
  15.0700
 243.85113
  25.06000
  28.74177
 260.00000
   0.29877
  24.80424
         1.2
         1.9
         2.1
         2.2
         2.1
         2.1
         1.9
         1.6
         1.3
         1.2
         1.1
         1.2
         1.3
         1.1
         1.7
         2.1
         2.4
         2.1
         1.9
         1.9
         2.
         2.1
         2.2
         2.9
         1.4
         2.9
         2.4
         1.4
   1.7808
   1.3345
  94.8651
   2.4579 04
   9.1454 01 %ISO

   7.4200 01
   2.5816 00
   3.9840-02
   5.6914-06
   8.3935 00
   1.2461 01 lb
   3.1354-02 lb/ton
```

SOURCES: CF&I STEEL CORPORATION - COKE PLANT - PUEBLO, COLORADO
LOCATION: NORTH GAS CLEANING CAR - SCRUBBER OUTLET
DATE RECEIVED:
TESTED BY: THE ALMEGA CORPORATION CHICAGO, ILLINOIS
OBSERVED BY: S E HUMPHRIES TRL-DENVER
AUDIT DATE: PRELIMINARY 27 MARCH 80
AUDITED BY: SE HUMPHRIES TRL-DENVER

*RUN NO. NSC-2 DATE 12 MARCH 80 TIME 0928-1627

INPUT DATA

% CO	0.00
% CO_2	4.60
% O_2	15.125
ΔH_{avg} ("H_2O)	0.470
P_b ("H_g)	24.99
V_m ($ft.^3$)	46.66
T_m (^oF)	84.2
Y	1.0053
V_w (ml) (If unknown, enter zero)	238
B_{ws} (decimal) from tables .2666	
*R/S	
P_{st} ("H_2O)	+1.05
ΔP_i	
GTO 216	
T_s (^oF)	145
C_p	0.8367
d_s (ft)	3.29932341
*R/S	
T_t (MIN)	95.10
d_n (IN)	0.150
M_n (mg)	89.1
C_a (mg/g)	—
V_{aw} (ml)	—
ρ (g/ml)	—
'F' Factor	

PRELIMINARY

12 MARCH 90

OUTPUT DATA

% EA	243.0
V_m (dscf)	38.065
B_{ws} (Decimal)	22.75
M_s (Wet)	25.851
ΔP AVG.	1.963
($\sqrt{\Delta P}$) AVG.	1.401
V_s (fps)	96.84
Q_{sd} (dscfm)	24058.0
% Isokinetic	99.4
M_n (mg corrected for blank)	89.1
mg/dscf	2.3408
gn/dscf	0.0361
lb./dscf	5.2-E06
lb./hr	8.69
lb./10^6 BTU (Boilers)	———

Inv. list memories
CMS, RST, CLR

15.125
242.98227
24.99000
38.06463
238.00000
0.22750
25.85096
2.6
2.6
3.1
2.5
2.8
2.9
2.9
2.8
1.6
1.7
1.8
1.7
1.7
1.2
1.4
1.4
1.5
1.
1.5
1.8
1.8
1.9
1.9
1.8
2.1
2.2
2.4
1.9
1.9
1.9
1.6
1.9631
1.4011
96.8364
2.8058 04
9.9386 01 %ISO

8.9100 01
2.3408 00
3.6123-02
5.1604-06
8.6875 00
1.3770 01 16
3.4646-02 16/TOP

SOURCES: CF&I STEEL CORPORATION - COKE PLANT - PUEBLO, COLORADO
LOCATION: NORTH GAS CLEANING CAR - SCRUBBER OUTLET
DATE RECEIVED:
TESTED BY: THE ARMEGA CORPORATION CHICAGO, ILLINOIS
OBSERVED BY: SE HUMPHRIES TRC-DENVER
AUDIT DATE: PRELIMINARY - 27 MARCH 80
AUDITED BY: SE HUMPHRIES TRC - DENVER

RUN NO. NSC-3 DATE 13 MARCH 80 TIME 0829-1434

INPUT DATA

% CO	0.00
% CO_2	4.70
% O_2	15.025
ΔH_{avg} ("H_2O)	0.462
P_b ("H_g)	25.31
V_m ($ft.^3$)	42.810
T_m (^oF)	74.5
Y	1.0053
V_w (ml) (If unknown, enter zero)	276.
B_{ws} (decimal) from tables	.2633
*R/S	
P_{st} ("H_2O)	+1.000
ΔP_i	
GTO 216	
T_s (^oF)	145
C_p	0.8367
d_s (ft) (EQUIVALENT)	3.29932341
*R/S	
T_t (MIN)	88.57
d_n (IN)	0.150
M_n (mg)	73.6
C_a (mg/g)	
V_{aw} (ml)	
ρ (g/ml)	

PRELIMINARY

'F' Factor

13 March 80

OUTPUT DATA

% EA	237.6	13.025 237.55940
V_m (dscf)	36.012	25.31000 36.01150
B_{ws} (Decimal)	0.2652	276.00000 0.26524
M_s (Wet)	25.281	25.28080
ΔP AVG.	2.029	2.5 1.9 2.6 2.9
($\sqrt{\Delta P}$) AVG.	1.425	3. 2.8 2.9 2.1
V_s (fps)	98.93	1.8 1.8 1.5 1.4
Q_{sd} (dscfm)	27609.0	1.4 1.3 1.5 2.6
% Isokinetic	102.6	1.5 1.7 1.8 1.8
M_n (mg corrected for blank)	73.6	1.8 1.9 1.8 2.1
mg/dscf	2.0438	2.4 2.4 2.5 2.1
gn/dscf	0.0315	2.4 1.9 1.9 2.0291
lb./dscf	4.5 -E06	1.4245 98.9342
lb./hr	7.46	2.7609 04 1.0260 02 %ISO
lb./10^6 BTU (Boilers)	———	7.3600 01 2.0438 00
Inv. list memories CMS, RST, CLR		3.1541-02 4.5057-06 7.4641 00 1.1018 01 lb 2.7722-02 lb/100

SOURCES: CF&I STEEL CORPORATION - COKE PLANT - PUEBLO, COLORADO
LOCATION: NORTH GAS CLEANING CAR - SCRUBBER OUTLET
DATE RECEIVED:
TESTED BY: THE ALMEGA CORPORATION - CHICAGO, ILLINOIS
OBSERVED BY: S.E. HUMPHRIES TRC-DENVER
AUDIT DATE: PRELIMINARY 28 MARCH 80
AUDITED BY: SE HUMPHRIES TRC-DENVER

RUN NO. NSC-4 DATE 14 MARCH 80 TIME 0816-1408

INPUT DATA

PRELIMINARY

% CO	0.00
% CO_2	4.625
% O_2	15.00
ΔH_{avg} ("H_2O)	0.404
P_b ("H_g)	25.32
V_m ($ft.^3$)	39.160
T_m (^oF)	84.3
Y	1.0053
V_w (ml) (If unknown, enter zero)	282.0
B_{ws} (decimal) from tables .2672	
*R/S	
P_{st} ("H_2O)	+0.95
ΔP_i	
GTO 216	
T_s (^oF)	145
C_p	0.8367
d_s (ft) (EQUIVALENT)	3.299>2341
*R/S	
T_t (MIN)	87.40
d_n (IN)	0.150
M_n (mg)	82.5
C_a (mg/g)	—
V_{aw} (ml)	—
ρ (g/ml)	—
'F' Factor	

OFFICE AUDIT OF PARTICULATE EMISSION REPORT

14 March 80

OUTPUT DATA

% EA	235.2
V_m (dscf)	32.355
B_{ws} (Decimal)	0.2632
M_s (Wet)	25.303
ΔP AVG.	1.956
($\sqrt{\Delta P}$) AVG.	1.413
V_s (fps)	98.06
Q_{sd} (dscfm)	27447.0
% Isokinetic	94.0
M_n (mg corrected for blank)	82.5
mg/dscf	2.5498
gn/dscf	0.0394
lb./dscf	5.6-E06
lb./hr	9.26
lb./10^6 BTU (Boilers)	———

Inv. list memories
CMS, RST, CLR

```
15.0000
235.24505
25.32000
32.35536
245.39271
0.26320
25.30251
2.6
2.7
2.2
2.5
2.7
2.7
2.6
1.6
1.7
1.8
1.7
1.8
1.4
1.6
1.9
1.8
1.6
1.5
1.9
1.9
1.8
1.8
1.9
2.4
2.5
2.4
2.
2.
2.
1.5
1.5
2.5
1.9955
1.4126
98.0563
2.7447 04
9.3967 01 %ISO

8.2300 01
2.5498 00
3.9350-02
5.6213-06
9.2573 00
1.3485 01 lb
3.3929-02 lb/ton
```

SOURCES: CF&I STEEL CORPORATION - COKE PLANT - PUEBLO, COLORADO
LOCATION: SOUTH GAS CLEANING CAR - SCRUBBER OUTLET
DATE RECEIVED:
TESTED BY: THE ALMEGA CORPORATION
OBSERVED BY: S E HUMPHRIES TRC-DENVER
AUDIT DATE: PRELIMINARY 24 MARCH 80
AUDITED BY: SE HUMPHRIES TRC-DENVER

RUN NO. SSC-1 DATE 18 MARCH 80 TIME 0849-1635

INPUT DATA

PRELIMINARY

% CO	0.00
% CO_2	4.35
% O_2	15.025
ΔH_{avg} ("H_2O)	0.458
P_b ("H_g)	25.35
V_m ($ft.^3$)	47.944
T_m (^oF)	101.0
Y	1.0053
V_w (ml) (If unknown, enter zero)	232.0
B_{ws} (decimal) from tables .2628	
*R/S	
P_{st} ("H_2O)	+1.017
ΔP_i	
GTO 216	
T_s (^oF)	145
C_p	0.8367
d_s (ft)	3.315697324
*R/S	
T_t (MIN)	98.27
d_n (IN)	0.150
M_n (mg)	101.62
C_a (mg/g)	—
V_{aw} (ml)	—
ρ (g/ml)	—
'F' Factor	—

OFFICE AUDIT OF PARTICULATE EMISSION REPORT

19 March 80

OUTPUT DATA

% EA	234.1	15.0250 234.11380
V_m (dscf)	38.485	25.35000 38.48531
B_{ws} (Decimal)	0.2211	232.00000 0.22114
M_s (Wet)	25.914	25.91418
ΔP AVG.	1.919	
($\sqrt{\Delta P}$) AVG.	1.385	
V_s (fps)	94.94	
Q_{sd} (dscfm)	28412.0	
% Isokinetic	97.0	
M_n (mg corrected for blank)	101.62	
mg/dscf	2.6405	
gn/dscf	0.0407	
lb./dscf	5.8-E06	
lb./hr	9.92	
lb./10^6 BTU (Boilers)	———	

Inv. list memories
CMS, RST, CLR

1. 1.7 2. 3. 2.8 3. 2.8 2.5 1.5 1.8 1.8 2. 2.3 2.6 2.5 2.6 1.3 1.3 1.5 1.8 1.8 1.8 2.4 1.2 1.3 1.9 1.9 1.8 2. 1.3 1.5

1.9187
1.3852

94.9446
2.8412 04
9.6988 01 %ISD

1.0162 02
2.6405 00
4.0749-02
5.8212-06
9.9234 00
1.6253 01 lb
4.0894-02 lb/ton

SOURCES: CF&I STEEL CORPORATION - COKE PLANT - PUEBLO, COLORADO
LOCATION: SOUTH GAS CLEANING CAR - SCRUBBER OUTLET
DATE RECEIVED:
TESTED BY: THE ALMEGA CORPORATION CHICAGO, ILLINOIS
OBSERVED BY: SE HUMPHRIES TRC-DENVER
AUDIT DATE: PRELIMINARY 28 MARCH 80
AUDITED BY: SE HUMPHRIES TRC-DENVER

RUN NO. SSC-2 DATE 19 MARCH 80 TIME 1022-1620

INPUT DATA

% CO	0.00
% CO_2	4.375
% O_2	15.075
ΔH_{avg} ("H_2O)	0.511
P_b ("H_g)	25.28
V_m ($ft.^3$)	47.545
T_m (^oF)	104.3
Y	1.0053
V_w (ml) (If unknown, enter zero)	259.0
B_{ws} (decimal) from tables .2636	
*R/S	
P_{st} ("H_2O)	+0.93
ΔP_i	
GTO 216	
T_s (^oF)	145
C_p	0.8367
d_s (ft)	3.3156973 24
*R/S	
T_t (MIN)	94.90
d_n (IN)	0.150
M_n (mg)	64.3
C_a (mg/g)	—
V_{aw} (ml)	—
ρ (g/ml)	—
'F' Factor	—

PRELIMINARY

OFFICE AUDIT OF PARTICULATE EMISSION REPORT

19 March 80

OUTPUT DATA

% EA	237.5	15.0750 237.48115
V_m (dscf)	37.843	25.28000 37.84303
B_{ws} (Decimal)	0.2438	259.00000 0.24377
M_s (Wet)	25.573	25.57253
ΔP AVG.	2.180	1.6 2.3
$(\sqrt{\Delta P}$) AVG.	1.476	2.4 2.6
V_s (fps)	102.01	2.9 3.5
Q_{sd} (dscfm)	29551.0	3.1 2.9
% Isokinetic	94.9	1.6 1.7
M_n (mg corrected for blank)	64.3	2. 2.1
mg/dscf	1.6991	2.1 2.3
gn/dscf	0.0262	2.7 2.
lb./dscf	3.7-E06	1.5 1.7
lb./hr	6.64	1.6 1.5
lb./10^6 BTU (Boilers)	———	1.7 1.8
		2. 1.8
Inv. list memories CMS, RST, CLR		1.7 2.8
		2.5 2.8
		2.8 2.8
		2.1793 1.4762
		102.0130 2.9551 04
		9.4949 01 %ISO
		6.4300 01 1.6991 00
		2.6221-02 3.7459-06
		6.6416 00 1.0505 01 lb
		2.6432-02 lb/TON

SOURCES: CF&I STEEL CORPORATION - COKE PLANT - PUEBLO, COLORADO
LOCATION: SOUTH GAS CLEANING CAR - SCRUBBER OUTLET
DATE RECEIVED:
TESTED BY: THE ALMEGA CORPORATION CHICAGO, ILLINOIS
OBSERVED BY: SE HUMPHRIES TRC-DENVER
AUDIT DATE: PRELIMINARY 24 MARCH 90
AUDITED BY: SE HUMPHRIES TRC-DENVER

RUN NO. SSC-3 DATE 20 MARCH 90 TIME 0916 - 1535

INPUT DATA

% CO	0.00
% CO_2	4.70
% O_2	15.025
ΔH_{avg} ("H_2O)	0.461
P_b ("H_g)	25.66
V_m ($ft.^3$)	46.922
T_m (^oF)	94.9
Y	1.0053
V_w (ml) (If unknown, enter zero)	239
B_{ws} (decimal) from tables .2598	
*R/S	
P_{st} ("H_2O)	+0.975
ΔP_i	
GTO 216	
T_s (^oF)	145
C_p	0.8367
d_s (ft) (EQUIVALENT)	3.315697324
*R/S	
T_t (MIN)	96.88
d_n (IN)	0.150
M_n (mg)	69.1
C_a (mg/g)	—
V_{aw} (ml)	—
ρ (g/ml)	—
'F' Factor	—

PRELIMINARY

20 March 80

OUTPUT DATA

% EA	237.6	13.02500 237.55940
V_m (dscf)	38.544	25.66000 38.54436
B_{WS} (Decimal)	0.2260	239.00000 0.22604
M_S (Wet)	25.883	25.88266
ΔP AVG.	2.029	1.4 1.6 2.4
($\sqrt{\Delta P}$) AVG.	1.424	2. 2.5 2.5 3. 3. 2.9 1.3 1.6 1.5 1.8 2.2 1.8 1.8 2.2 1.5 1.6 1.8 1.7 1.8 1.6 2.1 2. 1.5 1.5 2. 2.4 2.4 2.9 2.8 2.4
V_s (fps)	97.124	2.0290 1.4244 97.1242
Q_{sd} (dscfm)	29,222.0	2.9222 04
% Isokinetic	95.8	9.5799 01 %ISO
M_n (mg corrected for blank)	69.1	6.9100 01
mg/dscf	1.7927	1.7927 00
gn/dscf	0.0276	2.7666-02
lb./dscf	3.95-E06	3.9523-06
lb./hr	6.93	6.9295 00
lb./10^6 BTU (Boilers)	—	1.1189 01 lb 2.8153-02 lb/TON

Inv. list memories
CMS, RST, CLR

CF&I STEEL CORPORATION
A subsidiary of Crane Co.
P.O. Box 316
Pueblo, Colorado 81002

15/tons/cake pulled

May 26, 1978

John Clouse
Mr. ~~Dan E. Donahue~~
Air Pollution Control Specialist
Air Pollution Control Division
Colorado Department of Health
4210 E. 11th Avenue
Denver, Colorado 80220

3

Dennis Myers - Pueblo (State rep)
545-4650

RE: Pushing Emission Control System Test Protocol

Dear Dan:

As per our prior discussions, both with you and Region VIII EPA, the original draft test protocol for testing of this equipment after installation was modified to represent the mutually agreed to protocol as established by the parties involved. A copy of this modified draft is enclosed for your records.

At this time, it would appear that 32 sampling points would be anticipated for each stack test. The full Method 5 train will be used with the front half to determine particulates and the back half for CTPV, as per your request. I am sure you recognize that the CTPV analytical procedure, as provided by your Mr. Dunhill, relates to analysis of industrial hygiene samples, and it must be recognized that the use of the back half of the train in no way relates to the acceptance or performance of the system with regard to its purpose of controlling particulates.

At this time, we would anticipate submitting this protocol to appropriate testing groups, so as to establish our contractor for performing this work after the control equipment is completely operational.

Should you have any questions in this area, please contact me.

Very truly yours,

John C. Winkley

John C. Winkley
Manager
Air & Water Quality Control

JCW:las
Enclosure

PARTICULATE EMISSIONS SAMPLING PROCEDURE FOR THE ENCLOSED ONE-SPOT COKE PUSHING EMISSION CONTROL SYSTEM FOR CF&I STEEL CORPORATION SUPPLIED BY NATIONAL STEEL CORPORATION

I. GENERAL

a. Methods 1 through 5 as contained in the Federal Register, Vol. 42, No. 160, Thursday, August 18, 1977, "Standards of Performance for New Stationary Sources," are to be generally used as a primary guide in conducting this test. Modifications to these procedures due to the functional limitations of operation of a one-spot pushing control system are included. Corrections as noted in Federal Register, Vol. 43, No. 57, Thursday, March 23, 1978, pages 11984 to 11986 as apply to Methods 1 through 5 will be incorporated in this procedure.

b. One-spot coke pushing emission control system is operated on a batch type process and will be tested as such under any applicable sections as contained in Methods 1 through 5, referenced above.

c. Each sampling point will be sampled for one cycle which will include the time period to push the coke from the oven into the system and the travel of the system to the quench tower. This sampling period is defined with regard to the systems' operation as follows:

The sampling of each point will start with the opening of the fan louvers and stop when the fan louvers are closed upon the initiation of the quench in the quench tower.

d. The objective of the sampling technique will be to measure the solid dry particulate collected on the "front portion" of a USEPA sampling train, such measurement to be representative of the emission from the stack tributary to the particulate scrubbing equipment used. The back half of the sampling train will also be analyzed for coal tar pitch volatiles (CTPV) according to the attached method entitled "Analytical Method for Coal Tar Products" (Appendix I). The results of the front half of the sampling train and the back half of the sampling train are to be reported separately.

II. METHOD 1

A. The sampling ports will be located on a straight section of the rectangular stack at one-half an equivalent diameter upstream from the opening and one and one-half equivalent diameters downstream from the transition into the fan. Assuming the cross-sectional dimensions of the stack to be thirty inches by seventy-two inches, four sampling ports will be located on the thirty inch side of the stack. This location is necessary due to clearance

restrictions encountered during the traveling of the system to the quench tower. Straightening vanes will be included at the base of the stack to help assure the proper directional flow of the gases. Stack configuration will be maintained to as close to a square as possible during design but is limited due to the previously mentioned restrictions.

III. METHOD 2

a. Method 2 will be used to obtain the necessary preliminary velocity and temperature measurements with administrator approval of the stack configuration and port location as previously described.

IV. METHOD 3

a. Integrated gas samples will be taken over three individual sampling periods as previously defined. The samples will be analyzed for CO, CO_2, oxygen, and nitrogen by means of an Orsat analyzer. The sampling and analysis will be performed in accordance with Method 3. The average values from the three samples will be used in determining the dry molecular weight of the exhaust gas. If a complete test is not performed during the day, at least one sample will be taken.

a. Based on design and previous test data, saturated moisture conditions are assumed. The moisture content will be calculated as per Method 4 based on the stack conditions obtained from the preliminary velocity and temperature traverses.

VI. METHOD 5

a. The stack sampling equipment and procedure as described in the previously referenced Method 5 will be used in performing the particulate emissions test. The volume of gas sampled during the test period as described in II, Method 1, will be at least 30 dscf using the pump supplied with a standard USEPA sampling tain. The following variations from the method as described are recommended for the purpose of this application.

1. Due to the varying times required for the system to travel from the oven pushed to the quench tower, an integer sampling time increment cannot be guaranteed. Therefore, the sampling will be performed for the actual cycle time periods of the sampling period as previously described. These varying sampling times will then be used to time-weight the averages necessary in the final calculation.

2. The use of a glass cyclone between the probe and filter holder will be optional based upon approval of the administrator.

3. A probe and filter temperature of 320° F will be maintained during the particulate emissions test run.

4. Acetone will be used as the rinsing agent in performing the washing procedure as described in the previously referenced Method 5. Cleanup will be done after each test.

5. The heating of the sampling probe nozzle and connector fitting at 320° F for the same duration as the total sample time prior to washing will be optional based upon approval of the administrator.

VII. ADDITIONAL REQUIREMENTS AND PROCEDURES

1. The following operating parameters will be recorded during each test and included in the final report:

   a. Pressure differential (inches H_2O) across venturi throat.

   b. Feedwater rate (gpm) and temperature (°F) to scrubber.

   c. Ram amperage.

   d. Coal charged/push.

   e. Proximate and ultimate coal analysis.

   f. Coking time/push.

   g. Standard calculation for amount of coke pushed/oven.

2. All source test and analytical instrumentation shall be calibrated against the appropriate primary standard within a six-month period prior to the actual test. All such calibration data must be certified by the responsible party and included in the final report.

3. All raw source test and operational data must be included in the final report and certified by the responsible party.

4. The final test report should be in a format similar to that presented in Appendix II (attached).

5. All standards utilized for the analysis of stack samples shall be primary standards made from either certified standard samples obtained from the National Bureau of Standards, a commercially available primary standard directly traceable to such, or where no certified NBS standard is available, an appropriate commercially available primary standard. ASTM Method E-200-67 should be consulted for the appropriate methodology for the preparation, standardization and storage of standard solutions.

ANALYTICAL METHOD FOR COAL TAR PRODUCTS

Principle of the Method

The cyclohexane-soluble material in the particulates on the glass fiber filters is extracted ultrasonically. Blank filters are extracted along with, and in the same manner as, the samples. After extraction, the cyclohexane solution is filtered through a fritted glass funnel. The total material extracted is determined by weighing a dried aliquot of the extract.

Range and Sensitivity

When the electrobalance is set at 1 mg, this method can detect 75-2000 ug/sample.

Precision and Accuracy

When nine aliquots of a benzene solution from a sample of aluminum-reduction plant emissions containing 1,350 ug/sample were analyzed, the standard deviation was 25 ug (109). Experimental verification of this method using cyclohexane is not yet complete.

Advantages and Disadvantages of the Method

(a) Advantages

This procedure is much faster and easier to run than the Soxhlet method.

(b) Disadvantages

If the whole sample is not used for cyclohexane-extraction analysis, small weighing errors make large errors in final results.

Apparatus

(a) Ultrasonic bath, 90 Kc, 60 watts, partially filled with water.

(b) Ultrasonic generator, Series 200, 90 Kc, 60 watts.

(c) Electrobalance capable of weighing to 1 ug.

(d) Stoppered glass test tube, 150- x 16-mm.

(e) Teflon weighing cups, 2-ml, approximate tare weight 60 mg.

(f) Dispensing bottle, 5-ml.

(g) Pipets, with 0.5-ml graduations.

(h) Glass fiber filters, 30-mm diameter, Gelman Type A or equivalent.

(i) Silver membrane filters, 37-mm diameter, 0.8 micrometer pore size.

(j) Vacuum oven.

(k) Tweezers.

(l) Beaker, 50-ml.

(m) Glassine paper, 3.5- x 4.5-inches.

(n) Wood application sticks for manipulating filters.

(o) Funnels, glass fritted, 15-ml.

(p) Graduated evaporative concentrator, 10-ml.

Reagents

(a) Cyclohexane, ACS nanograde reagent.

(b) Dichromic acid cleaning solution.

(c) Acetone, ACS reagent grade.

Procedure

(a) All extraction glassware is cleaned with dichromic acid cleaning solution, rinsed first with tap water, then with deionized water followed by acetone, and allowed to dry completely. The glassware is rinsed with nanograde cyclohexane before use. The Teflon cups are cleaned with cyclohexane, then with acetone.

(b) Preweigh the Teflon cups to one hundredth of a milligram (0.01 mg).

(c) Remove top of cassette and hole over glassine paper. Remove plug on bottom of cassette. Insert end of application stick through hole and gently raise filters around tweezers. Slide rolled filters into test tube and push them to bottom of tube with application stick. Add any particulates remaining in cassette and on glassine paper to test tube.

(d) Pipet 5 ml of cyclohexane into test tube from dispensing bottle.

(e) Put test tube into sonic bath so that water level in bath is above liquid level in test tube. Do not hold tube in hand while sonifying. A 50-ml beaker filled with water to level of cyclohexane in tube works well.

(f) Sonify sample for 5 minutes.

(g) Filter the extract in 15-ml medium glass fritted funnels.

(h) Rinse test tube and filters with two 1.5-ml aliquots of cyclohexane and filter through the fritted-glass funnel.

(i) Collect the extract and two rinses in the 10-ml graduated evaporative concentrator.

(j) Evaporate down to 1 ml while rinsing the slides with cyclohexane.

(k) Pipet 0.5 ml of the extract to preweighed Teflon weighing cup. These cups can be reused after washing with acetone.

(l) Evaporate the dryness in a vacuum oven at 40 C for 3 hours.

(m) Weigh the Teflon cup. Use counterweighing techniques on electrobalance with full scale range of 1 mg to determine weight of aliquot to nearest microgram. The weight gain is due to the cyclohexane-soluble residue.

Calculations

The amount of cyclohexane-extractable fraction present in the sample (in mg) may be determined according to the following equation:

mg/sample = 2 x (wt sample aliquot [mg] - wt blank aliquot [m

The amount of cyclohexane-extractable fraction present in the air may then be determined according to the following equation

$$\text{mg/cu m} = \frac{\text{mg/sample}}{\text{air volume collected (cu m)}}$$

APPENDIX II

COMPLIANCE TEST REPORT FORMAT

Cover

1. Plant name and location.
2. Source sampled.
3. Testing company or agency, name and address.

Certification

1. Certification by team leader.
2. Certification by reviewer _____.

Introduction

1. Test purpose
2. Test location, type of process.
3. Test dates.
4. Pollutants tested.
5. Observers' names (industry and agency).
6. Any other important background information.

Summary of Results

1. Emission results.
2. Process data, as related to determination of compliance.
3. Allowable emissions.
4. Description of collected samples.
5. Visible emissions summary.
6. Discussion of errors, both real and apparent.

Source Operation

1. Description of process and control devices.
2. Process and control equipment flow diagram.
3. Process data and results, with example calculations.
4. Representatives of raw materials and products.
5. Any specially required operation demonstrated.

Sampling and analysis Procedures

1. Sampling port location and dimensioned cross-section.
2. Sampling point description, including labeling system.
3. Sampling train description.
4. Brief description of sampling procedures, with discussion of deviations from standard methods.
5. Brief description of analytical procedures, with discussion of deviations from standard methods.

Appendix

1. Complete results with example calculations.
2. Raw field data (original, not computer printouts).
3. Laboratory report, with chain of custody.
4. Raw production data, signed by plant official.
5. Test log.
6. Calibration procedures and results.
7. Project participants and titles.
8. Related correspondence.
9. Standard procedures.

IN THE UNITED STATES DISTRICT COURT

FOR THE DISTRICT OF COLORADO

Civil Action No. 76-A-670

UNITED STATES OF AMERICA,	)	
	)	
Plaintiff,	)	
	)	
v.	)	CONSENT DECREE
	)	
CF&I STEEL CORPORATION, a Colorado corporation,	)	
	)	
Defendant.	)	

PRELIMINARY STATEMENT

1. A complaint for injunctive relief under 42 U.S.C. 7401, et seq. (the Clean Air Act) was filed by the United States of America (U.S.A.) in this action on July 2, 1976, and a supplemental complaint seeking civil penalties was filed on November 3, 1977;

2. U.S.A. contends that emissions from CF&I Steel Corporation's (CF&I) basic oxygen furnace (BOF) precipitator stack and coke side pushing, coke side doors, and coke side bench cleanup operations at CF&I's Pueblo plant violated Colorado Air Pollution Control Commission Regulation 1-I.A.1 of the Colorado State Implementation Plan (SIP) and that CF&I violated Environmental Protection Agency (EPA) Order Nos. A-74-3 and A-74-5 which set forth schedules and increments of progress for achieving compliance with said Regulation 1-I.A.1 with regard to these facilities and operations;

3. CF&I contends, among other things, that the subject facilities and operations were not in violation of the SIP, that the EPA Orders were invalid, and that it was not in violation of the EPA Orders;

4. U.S.A. seeks civil penalties under the Clean Air Act on the basis of economic benefit to the defendant of delayed compliance with the requirements of the Act;

5. U.S.A. has calculated that an economic benefit accrued to CF&I from delaying compliance with regard to the sources which are the subject of this litigation;

6. CF&I does not agree that the U.S.A. can or should recover civil penalties on the basis of any alleged economic benefit from delayed compliance; CF&I further contends that it has not gained an economic benefit, and in fact has suffered an economic loss, by any alleged delay in installing air quality control equipment on the facilities and operations involved in this action;

7. U.S.A. considers the environmental performance standards which are to be achieved by CF&I pursuant to paragraph 13 of this Consent Decree and which CF&I has committed to achieve at its Pueblo coke plant to be more stringent than the Colorado SIP requirements and any other known obligations of law applicable to CF&I;

8. CF&I's commitment to these stringent standards for air pollution control at its coke plant will necessarily require the commitment of capital and operation and maintenance expenditures;

9. U.S.A. has determined that its claims are satisfied by a credit for such commitment and expenditures against the calculated economic benefit; and

10. The parties desire to settle this action without trial as to any issues of fact or law.

ORDER, JUDGMENT AND DECREE

NOW, THEREFORE, upon the pleadings and the consent of the parties hereto, and before the taking of any testimony, and without adjudication of any issue of fact or law, and the Court being fully advised in the premises, it is hereby Ordered, Adjudged, and Decreed as follows:

11. The U.S.A. and CF&I have consented to the entry of this Consent Decree, without trial of any issue of fact or law herein; this Court has personal and subject matter jurisdiction for the purpose of entering this Consent Decree; and this Consent Decree shall not constitute an admission or waiver by either party hereto with respect to any issue of fact or law.

12. Compliance Schedule - Coke Plant Pushing Emissions Control

A. Control Concept. CF&I shall install, operate, and maintain a pushing emission control system which will basically consist of an enclosed coke guide and an enclosed one-spot quench car equipped with a trailer mounted exhaust and gas cleaning system. This system, consisting of two units, will be designed and installed to control pushing emissions from all of the Pueblo coke oven batteries. The system will be designed such that one car is capable of servicing all CF&I coke oven batteries while the other car is undergoing maintenance.

B. Schedule. This system will be placed into operation in accordance with the following schedule, each increment of which is a separate and distinct requirement, subject to the provisions of paragraph 14 below.

Compliance Increment		To be achieved no later than
(1)	Application to the Division of Administration of the Colorado Department of Health (Division) for Authority to Construct.	Complete
(2)	Equipment ordered.	Complete
(3)	On-site preparation completed. On-site assembly and construction of the control system initiated.	May 1, 1979
(4)	On-site assembly and construction of the control system completed.	July 15, 1979
(5)	System placed in operation.	August 1, 1979
(6)	Final compliance with Colorado Air Pollution Control Commission Regulation 1-I.A.1.	[redacted] 1979

C. General Reporting Requirements. In addition to other reporting requirements contained herein, CF&I shall submit quarterly progress reports to the EPA, commencing on May 1, 1978, and continuing thereafter until completion of the requirements

of this paragraph 12. Each such report shall detail the progress toward completion of the project described above, and, where applicable, shall include certification by CF&I that compliance with scheduled increments has been obtained during the preceding quarter.

D. Stipulated Contempt Fine

CF&I shall pay to the Clerk of the Court by check made payable to the Treasurer of the United States as a stipulated fine the sum of $5,000 for each calendar day of delay in meeting compliance schedule increment (6) of paragraph 12.B., unless the delay is excused under paragraph 14. At such time as CF&I has met compliance schedule increment (6) of paragraph 12.B., CF&I shall no longer be subject to the imposition of stipulated fines as set forth herein. The EPA shall submit certification to the Court when CF&I has met said compliance schedule increment (6). If CF&I believes it has met said increment, but the EPA has not so certified, CF&I may petition the Court for appropriate relief.

13. CF&I shall achieve compliance with the emission standards set forth below:

A. Charging

(1) Performance Standard

Emissions from the charging operation shall be limited to a total of 55 seconds of any visible emissions accumulated over five (5) consecutive charges at CF&I's coke plant.

It is recognized that a manually operated larry car will be retained for use in emergency situations.

(2) Procedure

To determine compliance with the charging performance standard, the following inspection procedure shall be used:

The observer shall be positioned on the topside of a coke oven battery so that he or she has a good view of all charging holes of the oven being charged (approximately five to ten oven

widths away). During the charging period the observer watches the entire charging system, including the charging holes and larry car hoppers. Upon observing any visible emission from any of these sources, an "accumulative" stopwatch is started. The watch is stopped when all emissions stop and is restarted when another emission appears. The observer continues this procedure for the entire charging period. The charging period begins when the first slide gate is opened and ends when the last charging hole lid is replaced. Emissions may occur simultaneously from several points during a charge, e.g., from around all drop sleeves at the same time. In this case, the emissions are timed collectively, not independently. Also, emissions may start from one source immediately after another source stops. This is timed as one continuous emission. The following emissions are not timed:

a. Visible emissions from burning coal spilled on top of the oven or oven lid during charging.

b. Visible emissions emitted from any equipment other than the charging system or charging holes of the oven being charged.

c. Visible emissions emanating from one source, but which have already been timed as a visible emission from another source, e.g., drop sleeves and charging hopper.

When recording charging emissions, the time recorded on the stopwatch is the total time that emissions were observed during the charge. The number of seconds visible emissions were observed is recorded on the worksheet.

B. Coke Oven Pushing

(1) Performance Standard

a. Pushing emissions will be controlled with the system described in paragraph 12.A. [redacted] emissions from the gas cleaning devices of each unit shall not exceed a [redacted]

particulate per ton of coke pushed, measured by the front half of EPA Method 5 (40 CFR 60.275, and Appendix A of Part 60) or its equivalent.

b. Visible emissions from the gas cleaning devices of each unit and from any uncaptured pushing emissions shall not exceed 20% opacity at any time, measured by EPA Method 9 [40 CFR Part 60, Appendix A (1977)], excluding Section 2.5 and the sentence of Section 2.4 reading "A minimum of 24 observations shall be recorded."

It is recognized that conventional quench cars and equipment will be retained for use in emergency situations when both of the enclosed quench car units are not operational or when one enclosed quench car unit is not operational and the use of the other for all batteries is not feasible. CF&I will not schedule simultaneous routine maintenance for the two units, and commencing October 15, 1979, will maintain records of the use, duration, and reason for use of the conventional system.

(2) Emissions Subject to this Standard

Pushing emissions shall be considered as those emissions which occur from the time the pusher ram begins to move coke into the quench car until the quench car enters the quench tower, but shall not include pusher side emissions.

(3) Testing. CF&I or its contractor shall perform or cause to be performed a source test to determine mass emissions from the pushing control system in accordance with methods approved by the EPA. The test of the pushing control system shall be completed by six (6) weeks after the date for achieving compliance schedule increment (6) of paragraph 12.B. CF&I or its contractor shall submit to the EPA for approval, at least twenty (20) days prior to the commencement of said test, a detailed written plan and procedures for evaluating emissions. The EPA shall advise CF&I or its contractor of any necessary changes in the plan and procedures within ten (10) days of receipt.

Representatives of the EPA shall have the opportunity to observe such test and procedures. A written report of the test and results shall be submitted to the EPA regarding the data, analyses, and results of such source test no later than thirty (30) days after completion of the test, or such later date as may be agreed upon by the EPA and CF&I in writing.

C. Topside Emissions: Offtakes

(1) Performance Standard

An offtake is defined as the apparatus for each oven that provides a passage for gases from the oven to the collection main, including all parts of the standpipe, standpipe cap, and gooseneck assembly from the base of the standpipe to the interface with the collection main. Each coke oven at CF&I's coke plant has two offtakes.

Visible emissions shall not occur from more than 6% of the total number of offtakes at CF&I's coke plant, as measured by the following procedure.

(2) Procedure

The observer makes the observation from the topside of the coke batteries, traversing the batteries near the centerline. During the traverse, the observer may stray from the centerline of the battery if the observer believes an investigation is required to determine whether or not a leak exists. If the observer does deviate from the centerline of the battery during a traverse to look at a particular offtake, this is noted on the data sheet.

In performing a traverse, the observer observes offtake leaks on both sides of the batteries traversing in one direction. One or more leaks from a single offtake shall be counted as one leak. The offtake system leak traverse is conducted in the direction where the sun is most directly behind the observer's back. The observer traverses the coke plant at a

steady pace, pausing only to make appropriate entries on the data sheet. The time of the start and end of each traverse is recorded on the data sheet. If for some reason the centerline cannot be used to provide a clear view of the offtakes, the observer shall select a viewing location on the topside farther from (rather than closer to) the offtakes being inspected.

The observer records on the data sheet the number of any offtake (e.g., pusher side, oven 1, battery B) which is observed to have any visible emission emanating from any part of the offtake and whether the leak was from a cap or other part of the offtake involved.

The following visible emissions are not recorded:

a. Steam vapor;

b. Coal smoldering on the topside; or

c. Visible emissions from flue caps.

In computing the offtake leak percentage no offtake shall be included in the numerator and denominator if:

a. The oven to which it is attached is the most recently charged oven on a coke battery, or

b. The oven to which it is attached is dampered off from the collection main, provided that standpipes open for this purpose have been ignited within two minutes after being opened, or

c. The standpipes are open for the purpose of burning out of carbon. This exclusion shall be limited to one-half hour after the oven is pushed.

D. Topside Emissions: Charging Hole Lids

(1) Performance Standard

Each coke oven at CF&I's plant is considered to have four (4) charging holes, which are covered by lids during the coking cycle. Visible emissions from CF&I's charging

hole lids shall be limited to 2% of the total number of such lids at CF&I's coke plant, measured by the following procedure.

(2) Procedure

The observer makes the observation from the topside of the battery, traversing the top of the ovens near the centerline. During the traverse, the observer may stray from the centerline of the battery if the observer believes an investigation is required to determine whether or not a leak exists. If the observer does deviate from the centerline of the battery during a traverse to look at a particular source, this is noted on the data sheet. In performing a traverse, the observer observes charging hole lid leaks traversing in one direction.

The observer traverses the coke battery at a steady pace, pausing only to make appropriate entries on the data sheet. The time of the beginning and the ending of the traverse is recorded on the data sheet. If for some reason the centerline cannot be used to provide a clear view of the charging hole lids, the observer shall select a viewing location on the topside farther from (rather than closer to) the charging hole lids being inspected.

During any one traverse, the observer records on the data sheet the identity of each charging hole lid (i.e., oven, battery, lid) which is observed to have any visible emission.

The following visible emissions are not recorded:

a. Steam vapor; and

b. Coal smoldering on the topside.

Lids on the most recently charged oven on each battery shall not be included in either the numerator or denominator in calculating the leak rate percentage.

E. Combustion Stacks

(1) Performance Standard

a. Visible emissions from each of the three combustion stacks shall not exceed 20% opacity at any time, measured by EPA Method 9 [40 CFR Part 60, Appendix A (1977)], excluding Section 2.5 and the sentence in Section 2.4 reading "A minimum of 24 observations shall be recorded."

b. CF&I shall perform a stack test of Battery D stack by July 1, 1978, to determine its mass emission rate, measured by the front half of EPA Method 5 (40 CFR 60.275, and Appendix A of Part 60) or its equivalent. Visible emissions shall be measured simultaneously with the stack test by EPA Method 9 referred to above. Three (3) 2-hour tests shall be performed while the visible emissions from Battery D stack are within the 20% opacity limitation set forth in E.(1)a., above. The average of the measured mass emission rates (in grains per dry standard cubic foot) of such three tests shall be deemed the standard and shall apply to each of CF&I's combustion stacks. But, in no case shall such standard exceed 0.03 grains per dry standard cubic foot.

F. Coke Oven Doors

(1) Performance Standard

a. From the date of this Consent Decree until July 1, 1979, visible emissions from coke oven doors at CF&I's coke plant shall not be emitted from more than 10% of the total number of observed operating oven doors, plus 3 doors (10% x observed operating doors + 3).

b. On and after July 1, 1979, visible emissions from coke oven doors at CF&I's coke plant shall not be emitted from more than 7% of the total number of observed operating oven doors, plus 3 doors (7% x observed operating doors + 3).

(2) Procedure

For the purpose of ascertaining coke oven door leaks, the following inspection procedure will be followed:

Each oven shall be considered to have two doors. A chuck door shall be considered an extension of the pusher side door, and a leak in either or both shall be considered one leak.

A coke oven door inspection shall consist of an observer walking completely around the coke batteries at a steady pace from a ground-level position just outside the pusher machine and quencher car tracks as close to the battery as safety and visibility conditions permit. The observer shall traverse each side of the batteries expeditiously, recording the time of the beginning and end of each side's traverse, and the identity of each door having a visible emission. A complete inspection of doors should not exceed thirty minutes.

A visible emission on an individual door shall be noted when the observer determines that any visible emission is emanating from any location on the perimeter of a door or chuck door, but not when emissions are seen to come from the area between a buckstay and adjacent jamb. Emissions observed at the top of the battery above a specific door, but not clearly attributable to the door shall not be counted.

An observer shall observe each door only once, scanning the perimeter for any visible emissions. After a brief scan of a door, the observer shall move along his traverse, checking subsequent doors in the battery in a like manner. If a temporary machine obstruction occurs, blocking the view of a series of ovens, the ovens shall be bypassed and the remaining doors on that side of the batteries inspected. After a traverse is made on one side of the batteries, the observer shall expeditiously reobserve any initially blocked doors, recording any visible emissions from these doors. Reobservation shall occur only once per side. The observer shall then go directly to the opposite side of the batteries and proceed to perform a like traverse repeating the above procedures. The observer shall record the number of operating oven doors observed on each side of the coke oven batteries and shall also record the total number of operating oven doors observed on both sides of the coke oven batteries.

(3) Door Program

In addition to CF&I's efforts to achieve the performance standard set forth in F.(1), above, CF&I agrees to enter into a program to further reduce coke oven door emissions. This program shall include:

a. All operating and spare coke oven doors at CF&I's plant will be equipped with either NiCuTi knife edges or a more effective seal.

b. The modification of all coke side doors at CF&I's plant to provide for the ability to laterally adjust and align the sealing edges.

c. The experimentation with at least two kinds of coke oven jamb cleaning devices and the adoption of any such device or system of cleaning or maintaining jambs which proves to be practical and reasonably effective in reducing door emissions.

d. The continued monitoring and consideration of all reasonably effective coke oven door emission control techniques or equipment which may become available for use at CF&I's coke plant.

(4) CF&I reserves the right to seek modification of the standard set forth in F.(1)b., if, despite diligent effort, it is unable to achieve that standard by July 1, 1979. Such modification will be sought not later than December 31, 1979.

G. The following facilities and operations shall be subject to the performance standards indicated:

(1) Leveler Bars.

All leveler bars will be equipped with a smoke boot which will be maintained in good repair.

(2) Spooning of Gas Mains.

Spooning tools and spooning procedures will be designed and operated to minimize emissions. Spooning bars will be equipped with a mechanical seal to limit the opening

into the main during spooning operations. Openings on the main will be closed immediately upon completion of the spooning operation.

(3) Bench Cleanup.

All coke dragback from an oven just pushed may be immediately shoveled into the empty oven and the bench cleanup may be placed into spillage boxes.

(4) Top Cleanup.

Coal spillage and cleanup on top of the battery, or tar and pitch which have been removed from pitch traps, shall be placed into a charged coke oven in an expeditious manner so as to minimize visible emissions, providing the following operating procedures are followed.

a. All exterior openings to the atmosphere are closed except for the one charging hole through which the cleanup material is introduced into the oven.

b. The coke oven is under full aspiration during the time this material is being introduced into the oven.

(5) Door Removal for Pushing.

Door plugs will be maintained in order to minimize emissions occurring when oven doors are removed prior to pushing the oven.

H. Certain of the foregoing performance standards are based on either the length of time a visible emission exists or the number of visible emissions observed during a defined inspection. In this context, a visible emission is defined as an emission which is readily visible to an observer following the specified procedure.

It is agreed that the EPA will establish an on-site training course for CF&I observers, and observers of the State of Colorado or the Pueblo City-County Health Department should they desire to be involved. The training course will be for the purpose of implementing the observation procedures contained herein, and shall include, to the extent applicable to such

observation procedures, the techniques and methods used by the EPA observers at CF&I's coke plant during the week of July 25, 1977, in counting and timing visible emissions. Both parties will thereafter utilize those same techniques and methods in following the observation procedures for all future inspections pursuant hereto.

I. Internal Monitoring.

(1) For purposes of internal monitoring of coke plant emissions, CF&I shall make the following inspections at the frequency shown.

a. Charging - At least five consecutive charges each day seven days per week, as long as coal is being charged.

b. Pushing - At least one push per hot car per day for opacity.

c. Doors, Topside Offtakes and Charging Hole Lids - Once per day, seven days per week.

d. Coke Oven Stacks - Each stack once per day, seven days per week, for opacity.

(2) CF&I shall submit a quarterly summary of such inspections to the EPA. The first quarter shall commence on June 1, 1978, and the reports shall be submitted within thirty days following the end of each quarter.

(3) These requirements shall supersede the requirements of the Clean Air Act § 114 letter from EPA Region VIII to CF&I, dated February 17, 1978, and any modifications thereof.

J. It is recognized by the parties that violations of the coke oven standards set forth above may occur. Before the U.S.A. initiates an enforcement action to seek contempt penalties for violations of the within standards, at a minimum it shall take the following action and consider the following factors:

(1) Notify CF&I in writing of the alleged violation(s).

(2) Allow CF&I fifteen days (15) after receipt of notice of alleged violation(s) to submit information bearing upon the alleged violation(s) to EPA.

(3) Consider the degree and frequency of the alleged violation(s).

(4) Consider whether the alleged violation(s) was/were beyond the control of CF&I.

(5) Consider CF&I's performance history with respect to any standard allegedly violated.

(6) Consider CF&I's efforts to comply with the standard and to correct the alleged violation(s).

(7) Consider all information submitted by CF&I prior to the initiation of an enforcement action.

These factors may also be considered by the Court in determining whether the imposition of a contempt penalty would be appropriate.

14. Force Majeure

If any event occurs which causes delay in the achievement of the requirements of this Consent Decree, CF&I shall notify the Director, Enforcement Division, U.S. Environmental Protection Agency (EPA), Region VIII, immediately in writing of the delay or anticipated delay, as appropriate, describing in detail the anticipated length of the delay, the cause or causes of the delay, the measures taken and to be taken by CF&I to prevent or minimize the delay, and the timetable by which those measures will be implemented. CF&I will adopt all reasonable measures to avoid or minimize any such delay. If the EPA and CF&I can agree that the delay or anticipated delay, has been or will be caused by circumstances beyond the control of CF&I, the time for performance hereunder will be extended for a period equal to the delay resulting from such circumstances. In such event, the parties shall stipulate to such extension of time and so inform the Court. In the event the parties cannot agree, then either party may submit the matter to this Court for resolution. The burden of proving that any delay is caused by circumstances beyond the control of CF&I shall rest with CF&I. Increased costs or expenses associated with achievement of the requirements of this Consent Decree shall not be considered a circumstance beyond the control of CF&I for purposes of this paragraph.

15. An alleged violation of this Consent Decree which is beyond the control of CF&I shall not be deemed a violation.

16. Right to Cease Operations or Pursue Other Course

Any other provisions of this Consent Decree notwithstanding, CF&I shall have the right to effect compliance herein at any time or from time to time by ceasing to operate any production facility or by pursuing any other course it may select, provided CF&I's action does not result in a delay in the achievement of final compliance. CF&I shall notify the Court and the EPA in writing of any election under this section, and the reasons therefor, within two weeks of deciding to exercise such an election.

17. Reservation of Rights

It is understood that neither party to this Consent Decree has waived its right to seek a modification in the event of unforeseen circumstances beyond the control of the respective parties.

18. Correspondence.

The submission of documents or reports or the giving of notice by CF&I pursuant to this Consent Decree shall be made to the Director, Enforcement Division, Region VIII, United States Environmental Protection Agency, 1860 Lincoln Street, Denver, Colorado 80295, unless CF&I receives notice of a change of address prior to the submission of such document, report, or notice.

19. BOF Precipitator Stack.

CF&I or its contractor shall perform or cause to be performed a source test to determine mass emissions from the new BOF precipitator stack measured by EPA Method 5 (40 CFR 60.275, and Appendix A of Part 60), or its equivalent. A written report of the test and results shall be submitted to the EPA regarding the data, analyses, and results of such source test no later than thirty (30) days after completion of the test, or such later date as may be agreed upon by the EPA and CF&I in writing.

20. Modifications

Any modification of this Consent Decree must be approved by the Court before it shall be deemed an effective part of this decree.

21. Compliance by CF&I with the requirements of this Consent Decree for those facilities and operations at CF&I's coke plant which are subject hereto shall be deemed by the U.S.A. to constitute compliance with the presently applicable SIP requirements or revisions thereto which are not more stringent than the performance standards provided herein. This Consent Decree, however, shall not be construed to affect the applicability of other Federal, State, or local statutes, regulations, or ordinances to CF&I.

22. The provisions of this Consent Decree shall apply to and be binding upon the parties to this action, their successors and assigns.

23. Jurisdiction by this Court is retained for the purpose of enabling either of the parties to this Consent Decree to apply to the Court at any time for such further orders, directions, and relief as may be necessary or appropriate for the construction and effectuation of this Consent Decree.

Done in open court this _____ day of _____, 1978.

_____
District Judge

We hereby consent to the entry of the foregoing Consent Decree.

UNITED STATES OF AMERICA

By: _____
Alan Merson, Regional Administrator
United States Environmental Protection Agency, Region VIII

CF&I STEEL CORPORATION

_____
D. R. Luster, Vice President

UNITED STATES OF AMERICA

By:_____

United States Department of
Justice

Approved as to Form:

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PRL - 3/14/80

Provided by Duran — NORTH CAR

Push	Oven #	Time	Dial Gage ΔP Venturi	Inside Fan RPM	U-Tube T. Fan Static Press.	Temp °F	Note
1	B-14	8:20	43.00	1700	38.8	145	Nozzle kept in stack Ref. Push
2	C-12	8:30	43.00	1700	39.7	144	
3	A-16	8:40	42.50	1690	39.8	144	
4	D-13	8:50	42.50	1690	39.6	145	
5	E-21	9:03	42.00	1690	40.0	146	
6	F-21	9:15	42.5	1690	39.6	146	RPM ↑ by quarter
7	E-23	9:23	43.5	1700	41.0	146	
8	B-16	9:35	44.0	1700	41.2	140	
9	A-18	9:46	43.5	1700	40.9	143	
10	D-15	9:57	43.5	1700	40.6	147	
11	F-23	10:06	42.5	1700	40.1	148	
12	E-21	10:16	43.0	1700	40.7	145	*Therm. Gone. - Using Dial Ther. — From here on - Estimated.
13	F-2	10:25	42.5	1700	40.1	≈148	
14	E-4	10:36	42.5	1700	40.2	≈148	
15	B-18	10:45	43.5	1700	40.7	≈140	
16	F-4	10:55	43.0	1700	40.3	≈145	
17	E-6	11:06	43.0	1700	40.0	≈147	*Temp. is Inlet Exhaust Here.
18	F-6	11:17	43.5	1700	40.6	≈140	
19	A-20	11:35	43.5	1700	40.7	143	
20	C-16	11:45	43.5	1700	40.7	53 143 53°C	Damper closed during the push opened after push. No intake
21	C-18	12:00	43.5	1700	41.5	53°C	
22	D-17	12:10	43.5	1700	40.7	54°C	
23	D-19	12:20	43.0	1700	41.1	53°C	

Push #	Oven #	Time	Dial Gage ΔP Venturi	Inside Fan Rpm	U-Tube T. Fan Static Press.	Temp °F	Notes:
24	D-21	~~1239~~ 1239	43.0	1700	40	~~153~~	
25	E-8	1245	42.5	1700	40.0	60°C	
26	F-8	1255	42.5	1700	40.1	50°C ~~148F~~	
27	E-10	105	43.0	1700	40.2	60°C 147F	
28	F-10	117	43.0	1700	39.8	147°F	
29	E-12	130	43.0	1700	41.0	148F	
30	F-12	~~142~~ 142	42.5	1700	40.3	149F	
31	E-14	200	43.0	1700	40.2	147°F	
32	F-14	210	43.0	1700	40.0	147°F	

WATER ROOM DATA

DATE	LOCATION	QUENCH Cyc.	BLOWDOWN DURATION	BLOWDOWN INTERVAL
3/6/80 AM	NORTH	2 MIN	2 MIN	10 MIN
3/6/80 PM	NORTH	2 MIN	2 MIN	10 MIN
3/11/80 AM	NORTH	2.5 MIN	25 SEC	1.5 HRS
3/11/80 PM	NORTH	2.5 MIN	25 SEC	1.5 HRS
3/14/80 AM	NORTH	2.5 MIN	25 SEC	1.5 HRS
3/14/80 PM	NORTH	2.5 MIN	25 SEC	1.5 HRS
3/17/80 AM	SOUTH	2.2 MIN	25 SEC	50 MIN
3/18/80 AM	SOUTH	2.2 MIN	25 SEC	50 MIN
3/18/80 PM	SOUTH	2.2 MIN	25 SEC	1 HR
3/19/80 AM	SOUTH	2.2 MIN	25 SEC	1 HR
3/20/80 AM	SOUTH	2.2 MIN	25 SEC	1 HR
3/20/80 PM	SOUTH	2.5 MIN	25 SEC	1.5 HR

DATA TAKEN BY: S.E. HUMPHRIES
TRC ENVIRONMENTAL CONSULTANTS
DENVER

Process Data Taken
CLAI Scrubber Cells

Date		Push	Block/Cell	Schedule Push Time	Push Time	Fan RPM	Venturi Pressure	ΔP Chart	gpm Rate
3/4/80	North	1	C/F-20	0948	0915	1650	40	37	—
3/4/80	North	2	B/B-22	0924	0925	1650	40	40	—
3/4/80	North	3	D/D-25	0923	0937	1625	39	38	—
3/4/80	North	4	C/E-22	1010	0947	1650	38	39.5	—
3/4/80	North	5	B/A-1	0939	0957	1650	40	39	—
3/4/80	North	6	C/F-22	1032	1010	1650	39	39.5	—
3/4/80	North	7	B/B-1	0955	1021	1625	40	39	—
3/4/80	North	8	C/F-24	1054	1031	1650	38	40	—
3/18/80	South	4	B/A-11	0821	0923	1675	42	42	450
3/18/80	South	5	B/B-11	0837	0940	1650	42	42	450
3/18/80	South	6	B/C-11	0852	0952	1650	40	40	460
3/18/80	South	28	B/C-4	1436	1529	1650	40	40	450
3/18/80	South	29	B/A-6	1451	1547	1650	40	40	450
3/18/80	South	30	B/B-6	1507	1558	1650	42	42	425
3/20/80	South	2	C/F-6	0948	0936	1675	42	42	450
3/20/80	South	17	B/B-1	1128	1232	1630	42	42	450
3/20/80	South	18	B/C-1	1144	1242	1650	42	42	450
3/20/80	South	19	B/A-3	1200	1254	1675	40	42	425
3/20/80	South	28	B/A-9	1420	1446	1700	40	42	425
3/20/80	South	29	B/B-9	1436	1458	1675	40	40	450
3/20/80	South	30	B/C-9	1451	1509	1750	42	42	475
3/20/80	South	31	B/A-11	1507	1523	1725	42	42	450

Data Taken By: S.E. Humphries
TRC Environmental Consultants
Denver

CF&I STEEL CORPORATION
A SUBSIDIARY OF CRANE CO.

TO: J. C. Winkley FROM: J. F. Oliver DATE: 3/24/80

SUBJECT: EPA Stack Test of the Number 1 Gas Cleaning Car - Pushing Emissions Control System (March 18-20, 1980)

The scrubber stack emissions samples from the Number 1 gas cleaning car were collected by CF&I's contractor on March 18-20, 1980. Relative to this visit is the information requested and/or provided as follows:

Process Description

Coke is produced in slot type ovens by the destructive distillation of special types of bituminous coal. The coking process begins when coal is charged into an oven by a mechanical unit called a larry car. The gases which are driven out of the coal during the heating process are drawn into the collecting mains by steam aspiration jets located in the goosenecks. The collecting main transports the gases to the By-Product plant for processing. After the coal has been transformed into coke it is removed from the oven by the pusher machine. The machine pushes the coke from the oven through the coke guide, located on the opposite side of the oven into the waiting quench car. The quench car transports the hot coke to a quenching tower to cool the coke with water. The coke is then screened and sent to the Blast Furnace to be used as a fuel and reducing agent for the production of iron.

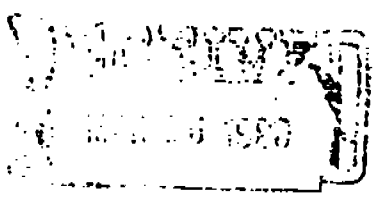
Coal Samples

Coal samples of oven prepared coal were processed for analysis and given to Mr. Shilton. A duplicate sample was retained for proximate analysis at the Coke Plant Laboratory. The results of those analyses are as follows:

Date	Moisture	Ash	Volatile Matter	Sulphur	Free Swelling Index
3/18/80	8.3	9.4	30.1	.59	6.5
3/19/80	8.0	9.8	31.3	.72	6.0
3/20/80	6.8	9.0	29.4	.63	6.5

Ovens Pushing Data

Attached are completed copies of CF&I Form 451 (R3), "Coke Plant Pusherman's Daily Report" for batteries B and C dated March 17-20, 1980.



Ovens Pushing Data (Cont'd)

Data from these sheets was used to determine net coking time for the ovens pushed during the test. The dates, oven numbers, and net coking times are summarized below:

Date: March 18, 1980

Oven Number	Net Coking Time (Hours/Minutes)	Oven Number	Net Coking Time (Hours/Minutes)
B- 9	17:23	C-19	16:56
C- 9	17:22	A-21	16:55
A-11	17:18	B-21	16:52
B-11	17:23	A-23	16:59
C-11	17:03	B-23	16:53
A-13	16:58	A- 2	17:01
F-22	18:42	B- 2	16:56
C-13	17:25	C- 2	16:50
A-15	17:27	A- 4	16:45
B-15	17:26	B- 4	16:57
C-15	17:21	C- 4	16:37
A-17	17:22	A- 6	16:28
B-17	17:23	B- 6	16:22
C-17	16:50	C- 6	16:26
A-19	16:54	A- 8	16:34
B-19	16:54		

Date: March 19, 1980

B- 4	18:18	B-12	18:16
F-13	17:30	C-12	18:13
E-15	17:34	A-14	18:14
C- 4	18:37	B-14	18:14
A- 6	18:37	C-14	18:13
B- 6	18:41	A-16	18:12
C- 6	18:25	B-16	18:14
A- 8	18:24	C-16	18:17
B- 8	18:23	A-18	18:18
C- 8	18:24	B-18	18:19
A-10	18:25	E- 6	18:54
B-10	18:27	C-18	18:27
C-10	18:05	A-20	18:31
E-23	17:15	B-20	18:26
A-12	18:13	F- 8	17:44
E- 2	17:27	A-22	18:33

Date: March 20, 1980

Oven Number	Net Coking Time (Hours/Minutes)	Oven Number	Net Coking Time (Hours/Minutes)
B-16	17:54	B- 1	18:40
F- 6	17:13	C- 1	18:32
E- 8	17:17	A- 3	18:06
F- 8	17:07	B- 3	18:04
C-16	18:37	C- 3	18:02
A-18	18:34	A- 5	18:07
B-18	18:31	B- 5	18:04
C-18	18:31	C- 5	17:37
A-20	18:30	A- 7	17:17
B-20	18:23	B- 7	17:12
F-10	17:26	C- 7	17:10
F-12	17:26	A- 9	17:08
E-14	17:35	B- 9	17:05
A-22	18:48	C- 9	17:11
B-22	18:48	A-11	16:50
A- 1	18:43	B-11	16:52

The scheduled net coking times during the test period were as follows:

Battery B - 16 Hrs. 17 Min.
Battery C - 16 Hrs. 37 Min.

Production Weights

During the month of February, 1980 the Coke Plant produced 62,753 tons of coke and 3392 tons of coke breeze for a monthly total of 66,145 tons (dry weight). A total of 5301 ovens were pushed for the month, resulting in an average monthly production per oven of 12.47 tons. 12.478

SAME COMMENTS AS NORTH CAR

J. F. Oliver/nm

J. F. Oliver
Assistant Superintendent
Coke Plant

JFO/nm/GF

COKE PLANT — PUSHERMAN'S DAILY REPORT FOR BATTERY 13 FOR [illegible] 19[illegible]

	OVEN NO.	SCHEDULE TIME	TIME PUSHED	TIME CHARGED	AMPS.	NOTES
1	B 21	6 32	[illegible]	[illegible]	130	[illegible]
2	[illegible]	6 48	[illegible]	[illegible]	[illegible]	[illegible]
3	[illegible]	7 03	[illegible]	[illegible]	[illegible]	[illegible]
4	A 2	7 19	[illegible]	9 [illegible]	[illegible]	[illegible]
5	B 2	7 34	[illegible]	[illegible]	140	150
6	C 2	7 50	[illegible]	10 [illegible]	[illegible]	130
7	A 4	8 06	[illegible]	11 14	[illegible]	[illegible]
8	B 4	8 21	[illegible]	11 [illegible]	120	140
9	C 4	8 37	11 20	[illegible]	[illegible]	[illegible]
10	[illegible]	8 52	11 [illegible]	11 51	[illegible]	[illegible]
11	[illegible]	9 08	[illegible]	12 24	[illegible]	[illegible]
12	[illegible]	9 24	11 [illegible]	[illegible]	140	140
13	[illegible]	9 39	[illegible]	12 35	[illegible]	140
14	[illegible]	9 55	11 57	12 50	[illegible]	[illegible]
15	[illegible]	10 10	[illegible]	[illegible]	140	150
16	[illegible]	10 26	[illegible]	1 15	[illegible]	[illegible]
17	[illegible]	10 42	[illegible]	1 [illegible]	[illegible]	[illegible]
18	[illegible]	10 57	12 52	1 [illegible]	140	120
19	[illegible]	11 13	1 15	[illegible]	120	110
20	[illegible]	11 28	[illegible]	2 [illegible]	[illegible]	[illegible]
21	[illegible]	11 44	1 47	[illegible]	[illegible]	130
22	[illegible]	12 00	1 [illegible]	2 24	[illegible]	[illegible]
23	[illegible]	12 15	[illegible]	[illegible]	[illegible]	[illegible]
24	[illegible]	12 31	[illegible]	[illegible]	[illegible]	[illegible]
25	[illegible]	12 46	[illegible]	[illegible]	[illegible]	[illegible]
26	[illegible]	1 02	[illegible]	[illegible]	[illegible]	[illegible]
27	[illegible]	1 18	[illegible]	[illegible]	140	[illegible]
28	[illegible]	1 33	[illegible]	[illegible]	[illegible]	[illegible]
29	[illegible]	1 49	[illegible]	[illegible]	[illegible]	130
30	[illegible]	2 04	[illegible]	[illegible]	[illegible]	[illegible]
31	[illegible]	2 20	3 50	4 27	190	140
32	[illegible]	2 36	4 [illegible]	4 [illegible]	170	120
33	[illegible]	2 51	4 [illegible]	5 [illegible]	[illegible]	[illegible]
34	[illegible]	3 07	[illegible]	[illegible]	[illegible]	[illegible]
35	[illegible]	3 22	[illegible]	[illegible]	[illegible]	[illegible]
36	B 1	3 38	5 [illegible]	[illegible]	[illegible]	[illegible]
37	C 1	3 54	5 27	[illegible]	[illegible]	[illegible]
38	A 3	4 09	5 42	6 50	[illegible]	120
39	B 3	4 25	[illegible]	7 26	[illegible]	[illegible]
40	C 3	4 40	[illegible]	7 20	[illegible]	120
41	A 5	4 56	6 52	7 34	240	180 (150)
42	B 5	5 12	7 55	7 45	200	170
43	C 5	5 27	7 1[illegible]	8 27	170	120
44	A 7	5 43	7 [illegible]	[illegible]	160	[illegible]
45	B 7	5 58	[illegible]	[illegible]	[illegible]	[illegible]
46	C 7	6 14	[illegible]	9 [illegible]	[illegible]	[illegible]
47	[illegible]	6 30	[illegible]	9 [illegible]	[illegible]	[illegible]
48	[illegible]	6 45	9 [illegible]	9 55	[illegible]	[illegible]
49	[illegible]	7 01	9 21	10 03	160	[illegible]
50	A 11	7 16	9 35	10 35	160	120

	OVEN NO.	SCHEDULE TIME	TIME PUSHED	TIME CHARGED	AMPS.	NOTES
51	B 11	7 32	9 41	10 44	[illegible]	[illegible]
52	[illegible]	7 48	9 57	10 57	140	130
53	[illegible]	8 03	10 21	11 00	150	110
54	B 13	8 19	—	10 25	—	
55	C 13	8 34	10 42	11 13	120	120
56	A 15	8 50	10 54	11 24	140	130
57	B 15	9 06	11 06	11 35	140	120
58	C 15	9 21	11 17	11 50	120	120
59	A 17	9 37	11 28	11 58	130	120
60	B 17	9 52	11 38	12 07	130	120
61	C 17	10 08	11 49	12 24	130	120
62	A 19	10 24	11 59	12 33	120	120
63	B 19	10 39	12 09	12 41	120	120
64	C 19	10 55	12 20	12 52	120	110
65	A 21	11 10	12 31	1 04	140	120
66	B 21	11 26	12 43	1 50	130	120
67	A 23	11 42	12 55	2 09	140	130
68	B 23	11 57	1 49	2 51	120	110
69	A 2	12 13	2 01	3 01	120	120
70	B 2	12 28	2 11	3 12	130	120
71	C 2	12 44	2 53	3 58	140	130
72	[illegible] 4	1 00	3 06	4 04	120	110
73	[illegible] 4	1 15	3 17	4 13	120	110
74	[illegible] 4	1 31	3 55	5 13	200	150
75	A 6	1 46	4 09	5 27	150	150
76	B 6	2 02	4 20	6 03	140	120
77	C 6	2 18	5 16	6 13	200	150
78	[illegible]	2 33	5 50	6 25	120	120
79	[illegible]	2 49	5 55		130	110
80	[illegible]	3 04	6 08		170	150
81	[illegible]	3 20	6 20		140	120
82	B 10	3 36				
83	C 10	3 51				
84	A 12	4 07				
85	B 12	4 22				
86	C 12	4 38				
87	A 14	4 54				
88	B 14	5 09				
89	C 14	5 25				
90	A 16	5 40				
91	B 16	5 56				
92	C 16	6 12				
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COKE PLANT – FOREMAN'S DAILY REPORT FOR BATTERY ______

	OVEN NO.	SCHEDULE TIME	TIME PUSHED	TIME CHARGED	AMPS.	NOTES
1	E11	6 32	[illegible]	[illegible]	[illegible]	100
2	F11	6 54	7 12	[illegible]	[illegible]	[illegible]
3	E13	7 16	[illegible]	[illegible]	[illegible]	[illegible]
4	F13	7 38	10 [illegible]	11 06	[illegible]	90
5	E15	7 59	10 [illegible]	[illegible]	[illegible]	100
6	F15	8 21	11 [illegible]	11 29	110	90
7	E17	8 43	11 11	12 [illegible]	[illegible]	[illegible]
8	F17	9 05	11 20	12 12	[illegible]	[illegible]
9	E19	9 27	12 [illegible]	[illegible]	[illegible]	[illegible]
10	F19	9 48	[illegible]	[illegible]	[illegible]	[illegible]
11	E21	10 10	12 [illegible]	12 50	[illegible]	[illegible]
12	F21	10 32	12 [illegible]	1 12	110	90
13	E23	10 54	1 15	1 29	[illegible]	110
14	F23	11 16	1 [illegible]	1 37	110	90
15	E2	11 38	1 26	1 53	[illegible]	90
16	F2	11 59	1 2[illegible]	3 23	[illegible]	[illegible]
17	E4	12 21	1 [illegible]	3 40	[illegible]	[illegible]
18	F4	12 42	3 15	3 55	110	100
19	E6	1 04	3 27	4 07	120	100
20	F6	1 26	3 4[illegible]	4 24	110	90
21	E8	1 48	3 5[illegible]	4 38	120	110
22	F[illegible]	2 10	4 10	4 53	110	95
23	E[illegible]	2 32	4 [illegible]	5 05	[illegible]	[illegible]
24	[illegible]	2 54	4 40	5 53	110	110
25	E[illegible]	3 16	4 55	6 07	[illegible]	80
26	F[illegible]	3 38	5 [illegible]	6 17	120	100
27	E10	3 59	5 50	6 29	110	[illegible]
28	F10	4 21	[illegible]	[illegible] 37	[illegible]	90
29	E[illegible]	4 43	6 [illegible]	9 47	[illegible]	[illegible]
30	F[illegible]	5 05	9 [illegible]	8 57	[illegible]	[illegible]
31	E1[illegible]	5 27	8 45	9 08	100	80
32	F[illegible]	5 48	9 55	9 30	100	80
33	E[illegible]	6 10	9 [illegible]	9 48	110	100
34	F[illegible]	6 32	9 [illegible]	10 00	100	90
35	[illegible]	6 54	9 [illegible]	10 36	110	[illegible]
36	F[illegible]	7 16	9 [illegible]	10 [illegible]	100	90
37	F[illegible]	7 38	10 05	11 21	110	100
38	E1	7 59	11 12	11 53	110	100
39	F1	8 21	11 24	12 03	110	100
40	E3	8 42	11 42	12 15	110	100
41	F3	9 04	11 55	12 25	110	100
42	E5	9 26	12 07	12 37	110	100
43	F5	9 48	12 18	12 46	110	100
44	[illegible]7	10 10	12 28	12 55	110	100
45	[illegible]	10 32	12 39	2 39	110	100
46	[illegible]	10 54	12 49	2 47	110	100
47	[illegible]	11 16	2 35	2 55	110	100
48	[illegible]	11 38	2 44	3 03	110	100
49	F[illegible]	11 59	2 53	3 58	110	100
50	[illegible]	12 21	3 05	4 07	110	100

	OVEN NO.	SCHEDULE TIME	TIME PUSHED	TIME CHARGED	AMPS.	NOTES
51	F13	12 43	3 29	4 16	110	100
52	E15	1 05	4 09	4 23	110	100
53	F15	1 27	4 14	5 14	110	[illegible]
54	E17	1 48	4 25	5 08	110	5:[illegible]
55	F17	2 10	5 10	5 45	110	5:10
56	E19	2 32	5 21	5 28	110	5:20
57	F19	2 54	5 43	5 57	110	5:3[illegible]
58	E21	3 16	5 33	6 05	110	5:[illegible]
59	F21	3 38	5 55		110	6:[illegible]
60	E23	3 59	6 02		110	6:30
61	F23	4 21				—
62	E2	4 42				—
63	F2	5 04				
64	E4	5 26				
65	F4	5 48				
66	E6	6 10				
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68	—	—	—	—	—	—
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TO: MARTIN J. BYRNE (8S-S)
AIR SURVEILLANCE SECTION

FROM: STEPHEN E. HUMPHRIES SEH
TRC ENVIRONMENTAL CONSULTANTS, INC.

SUBJ: COMPLIANCE TESTING AT C F & I'S COKE PUSHING OPERATIONS

DATE: MARCH 7, 1980

Beginning March 4, 1980, and continuing until March 6, 1980, testing was conducted at C F & I Steel Corporation's Coke Oven Pushing Operations (North Quench Scrubber Car) to determine compliance with Colorado Regulation 1-I.A.1 and with the consent degree issued July 2, 1979. The testing contractor was the Almega Corporation of Chicago, Illinois and essentially followed the established testing protocol.

This testing was the first attempted on the North Scrubber Car and was observed by Mr. S. Humphries of TRC and, in part, by Mr. M. Byrne. Visible Emission Observations (VEO), using modified USEPA Method 9 procedures, were recorded by various regulatory and C F & I personnel, including Mr. R. Kauffman of TRC.

Numerous problems were experienced during this testing series, resulting in one unacceptable and one incomplete test run. The first test run on the North Scrubber Car was deemed unacceptable for two reasons: a high isokinetic (120%) sample and an adjusted sample volume of 22 dscf (less than the required 30 dscf).

In addition, the testing contractors experienced equipment malfunctions including the burning of the sample train umbilical cord by falling coke. Process problems include hydraulic failure in the coke car and the emergency quenching of the entire scrubber car, which resulted in the testing equipment being completely inundated.

On March 6, 1980, a post-test meeting was held amoung C F & I and regulatory personnel to establish a schedule for additional testing. As of March 7, 1980, the schedule calls for testing to begin on Tuesday, March 11, 1980, on the North Scrubber Car and then beginning testing on the South Scrubber Car on March 14, 1980. However, if equipment or process malfunctions occur, the testing will continue until the series on both are completed.

The observation of Almega's lab procedures by Mr. M. Byrne or Mr. S. Humphries was approved by C F & I and the schedule finalized during the week of March 10, 1980.

An observation report, including all VEO forms, will be issued upon completion of the testing program.

cc: Keith Tipton (8S-S)
Connelly Mears (8E-PC)