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December 22, 1992

Mr. Wayne Pruitt
Jewell Coal and Coke Company
Dismal Route
Vansant, VA 24656

Re: Charging Machine Hood Report - IT Project No. 406253.17

Dear Wayne:

Enclosed are three (3) copies of the test report "Engineering Evaluation of the Charging Machine Hood System."

Please contact me if you have any questions or need additional information.

Sincerely,

IT - Air Quality Services

John Carson, P.E.
Project Manager

cc: Charles Drevna (Sun Coal)
Jerry Knoerzer (Sun Coal)
Amanda Agnew (EPA)
Gene Crumpler (EPA)

Engineering Evaluation of the Charging Machine Hood System

Prepared For:

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IT Project No. 406253.17

December 1992

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1.0 Introduction

IT Corporation (IT) performed a study to evaluate charging emissions from a group of nonrecovery coke ovens at Jewell Coal and Coke Company in Vansant, Virginia. The emissions from a group of ovens are controlled by a traveling hood system. For these ovens, the captured charging plume is conveyed through a pulse jet baghouse prior to being exhausted to the atmosphere.

Measurements of the stack emissions from the charging hood system were performed June 17-19, 1992 at Batteries No. 3-B and 3-C. The basic scope of work included measurements of gas flowrate, particulate matter, condensible soluble organics, volatile organics, and semi-volatile organics. In all, 3 sets of test runs were performed - one each day. In addition to the direct measurements of emissions from the baghouse, estimates of total emissions from charging were made. These considered the overall hood system capture efficiency and analysis of the material collected in the baghouse.

During the testing, each oven was charged with 40 tons of coal. Each day, it required approximately 4 hours to charge both Batteries No. 3-B and 3-C. Sampling activities were scheduled so that the measurements would be a continuous as practical throughout the charging period without affecting usual pushing and charging operations.

Following this introduction, this report contains the following sections: Executive Summary (2.0); Charging Operations (3.0); Sampling Procedures (4.0); Baghouse Dust Analyses (5.0); and Discussion of Results (6.0). The Appendix contains process information, certificates of analysis, and field and calibration data.

2.0 Executive Summary

The hood system worked well, capturing essentially all of the plume that escaped the oven until the final minute of charging each oven. During that time, the charging plume sometimes appeared to exceed the capacity of the capture system. No visible emissions were observed in the baghouse exhaust at any time during the 3 days of testing.

The charging plume behavior was observed at various conditions during the 3 days. Charging operations were also observed with the hood system turned off. Based on these observations, the overall system capture efficiency was estimated to be 70%.

Charging emissions do not occur continuously. Because of Jewell's operating schedule, these emissions are produced once per oven in each 48 hour period. The total particulate matter emitted to the atmosphere from the 62 ovens tested was approximately 10 lbs/day. Expressed as emission factors, this would be equivalent to 0.16 lbs particulate/day per oven or 0.00807 lbs particulate/ton coal charged.

Compounds that have historically been identified as products of incomplete combustion were found in the baghouse exhaust and in the dust collected in the baghouse hopper. The levels and emission rates of these compounds were small. For example, the concentration in the baghouse exhaust of benzene (the volatile compound with the highest emission rate) averaged 30 parts per billion (ppb). The average concentration in the baghouse exhaust of naphthalene (the semi-volatile compound with the highest emission rate) was 12 ppb.

Polycyclic aromatic hydrocarbons (PAHs), the traditional compounds of concern from incomplete coal combustion, were found at in both the baghouse exhaust and the baghouse hopper dust. The total emission rate determined by adding together all of the polycyclic aromatic hydrocarbons detected was approximately 1 pound per 44,000 tons of coal charged.

The estimated emission rates of toxic metals were small. For example, the emission rate of manganese (the toxic metal found in the hopper dust at the highest concentration) was approximately 1 lb per 2,000,000 tons of coal charged.

3.0 Charging Operations

In charging a nonrecovery oven, one door is completely removed on the pushing/charging side of the oven. As coal is introduced, a leveling conveyor is extended into the oven, leveling the coal bed to a constant depth over the entire oven floor. During the process of charging the ovens, some of the coal is ignited by the heat retained in the oven and smoke is produced. As the conveyor is retracted and the top of the coal bed is exposed to radiant heat from the crown, an additional portion of the coal ignites. The standard operating practice is to fully open the draft control dampers in the oven being charged to maximize the capture of charging emissions. These dampers are moved to their normal early cycle position (approximately half open) after charging. Most of the smoke created during charging is drawn through the oven flue system where it is incinerated. However with the door open, some smoke is released to the atmosphere.

A traveling hood system is installed on the pushing/charging machine that operates at Coke Batteries 3-B and 3-C. The components of the system are shown in Figure 3-1. During charging, the 16 feet by 3 feet hood opening is centered above the oven door. During charging, the fan pulls a nominal 25,000 cfm through a pulse jet baghouse. Bypass dampers in the ductwork determine whether the source of the gas is the charging plume or ambient air. In the event that the thermocouples in the baghouse measure high temperatures, the bypass dampers shift so that ambient air is introduced instead of the hot charging plume. [The bypass dampers are also used in the normal operation of the system.] High temperatures also trigger water sprays in the baghouse. Spark detectors are in the ductwork as an additional protection against fire. As sparks are detected, they are quenched by hydraulic atomizing nozzles that spray a fine mist directly into the ductwork.

The ovens operate on a 2 day (48 hour) coking cycle. Coke is pushed and fresh coal is charged to any given oven every other day. Half of the 62 ovens in Batteries 3-B and 3-C are charged each day. During the testing, each oven was charged with 40 tons of coal.

The sequence of events related to the charging hood system are as follows:

- The coke is pushed from an oven at the end of its 48 hour cycle.
- The pushing/charging machine (with the hood system) is moved into position to charge the oven. At this time the bypass dampers are open and

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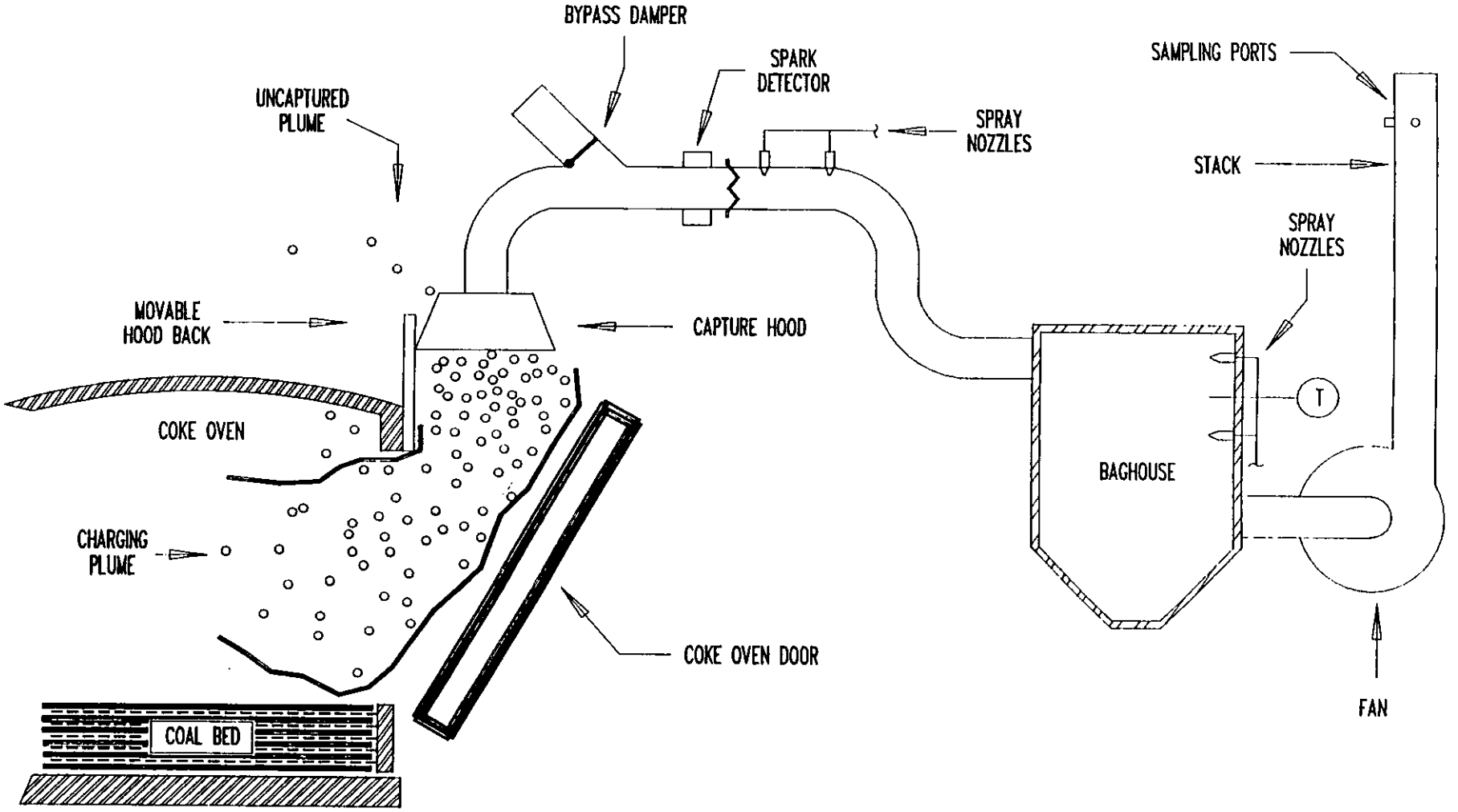

FIGURE 3-1

CHARGING PLUME CONTROL SYSTEM

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ambient air is flowing through the system. This protects the filter bags when the door is first removed and the air near the hood is heated by radiant heat transfer from the empty oven.

- As the coal starts flowing into the oven, the bypass dampers automatically close and the gas flow is switched from ambient to the hood.

- After the oven has been charged and the door replaced, the bypass dampers automatically open, and the cycle repeats.

The ovens were charged at approximately 8 minute intervals. It required approximately 4 minutes to push an oven and then move the pushing/charging machine into position to charge the oven. The coal charging procedure also required approximately 4 minutes. Consequently, the pattern of operation was 4 minutes of ambient air (bypass) followed by 4 minutes of gas flow from the hood (charging plume). The total time to charge both batteries (31 ovens) was approximately 4 hours.

The hood system captured essentially all of the charging plume that escaped the oven until the final minute. As the door was being replaced, particularly during the last 15 seconds, the charging plume sometimes appeared to exceed the capacity of the capture system.

The capture efficiency of the hood system was estimated in 2 ways. First, charging was observed with and without the hood system in operation. Second, the plume angle was observed at various conditions throughout the 3 days to estimate how much of the plume was "shifted" away from the hood face. During most conditions, the charging plume appeared to spread at an angle of approximately 30°. With increasing wind speed, the plume tended to move along the battery, away from the hood. The overall capture efficiency of the system was estimated to be 60 to 80%, depending on wind speed. This range agreed reasonably with the observations that were made with, and without, the hood system in operation. For purposes of estimating emissions, a total capture efficiency of 70% was used.

Oven charge sheets and other process information are included in Appendix A.

4.0 Sampling Procedures

Three sampling trains were used. These were: an EPA Method 5/202 train for gas flowrate, moisture, temperature, particulate matter, and toluene soluble organics (TSO); a VOST train (EPA Method 0030) for volatile organics; and a modified EPA Method TO-13 train (EPA Compendium Methods) for semi-volatile organics. One field blank was collected for each train using the reagents, filters, sorbent traps, etc. from the same batches as the sample trains. Each blank component or reagent was transported to and from the site and handled in the same manner as the samples with the exception that no air was drawn through them.

The charging operation produces cyclic emissions. That is, emissions occur for a 4 minute period followed by a 4 minute period of no emissions. All of the sampling trains were operated continuously throughout each run, as opposed to attempting to start and stop the trains at 4 minute intervals.

Sampling activities were scheduled so that the measurements from each run would be as continuous as practical throughout the 4 hours of charging the batteries without affecting usual pushing and charging operations. In all, 3 runs of each method were performed - one each day.

The certificates of analysis for all samples, copies of the field data sheets and related calculations, and calibration data for the sampling equipment are included in the Appendix.

4.1 Flowrate and Gas Characterization

4.1.1 Location of Traverse Points

The cross section of the stack was divided into discreet measurement points according to the procedures described in 40 **CFR** 60; Appendix A, Method 1, "Sample and Velocity Traverses for Stationary Sources." The measurement points were located on two perpendicular diameters of the stack. The absence of cyclonic flow was verified using the procedures specified in the method.

4.1.2 Velocity and Volumetric Flow Measurements

Velocity measurements were performed during each run using the Method 5/202 isokinetic sampling train as outlined in the procedures in 40 **CFR** 60, Appendix A, Method 2, "Determination of Stack Gas Velocity and Volumetric Flow Rate." The velocity pressures were

measured using "S"-type pitot tubes and standard oil filled manometers or calibrated electronic manometers. Temperatures were measured with a K-type thermocouple and electronic readout. Calibration information is included in Appendix G.

Traversing the stack was complicated by the cyclical nature of the process as well as due to the physical motion of the pushing/charging machine as it moved from oven to oven. For these reasons, the sampling trains were positioned at points within the stack with representative velocities. Prior to sampling for each test run, the velocity pressures were measured and recorded at each point. The relationship between the velocity at the test point and the average for the complete traverse was determined each day. Figure 4-1 shows the traverse layout of the stack, and the locations of the sampling points.

4.1.3 Carbon Dioxide and Oxygen

The CO_2 and O_2 gas concentrations were determined according to procedures specified in CFR 40, Part 60, Appendix A, Method 3, "Gas Analysis for Carbon Dioxide, Oxygen, Excess Air, and Dry Molecular Weight." The stack gas samples were collected utilizing a stainless steel sampling probe. Samples were collected in a 10 liter bag using a grab sampling train, as illustrated in CFR 40, Part 60, Appendix A, Method 3 or obtained directly from the duct. Each sample collected during each test run was analyzed using a FYRITE analyzer. For all samples, the CO_2 concentration was negligible.

4.1.4 Moisture Determinations

The moisture content of the gas stream was determined using procedures outlined in 40 CFR 60; Appendix A, Method 4, "Determination of Moisture in Stack Gases." The Method 4 sampling was incorporated with the Method 5/202 isokinetic sampling train. The moisture was determined for each run by gravimetrically measuring the weight gain of the chilled impingers after completion of the sampling. This weight gain was used in calculations in conjunction with the corrected sample volume to determine the moisture percentage of the gas stream. The specific procedures are outlined in the following sections of this report.

4.2 Particulate Matter/Toluene Soluble Organics (TSO) Sampling Procedure

Measurements of particulate matter and toluene soluble organics (TSO) were performed using the sampling procedures described in 40 CFR 60; Appendix A, Method 5, "Determination of Particulate Emissions from Stationary Sources" and the method in the Federal Register (FR), Vol. 56, Number 242, December 17, 1991, Method 202, "Determination of Condensible Particulate

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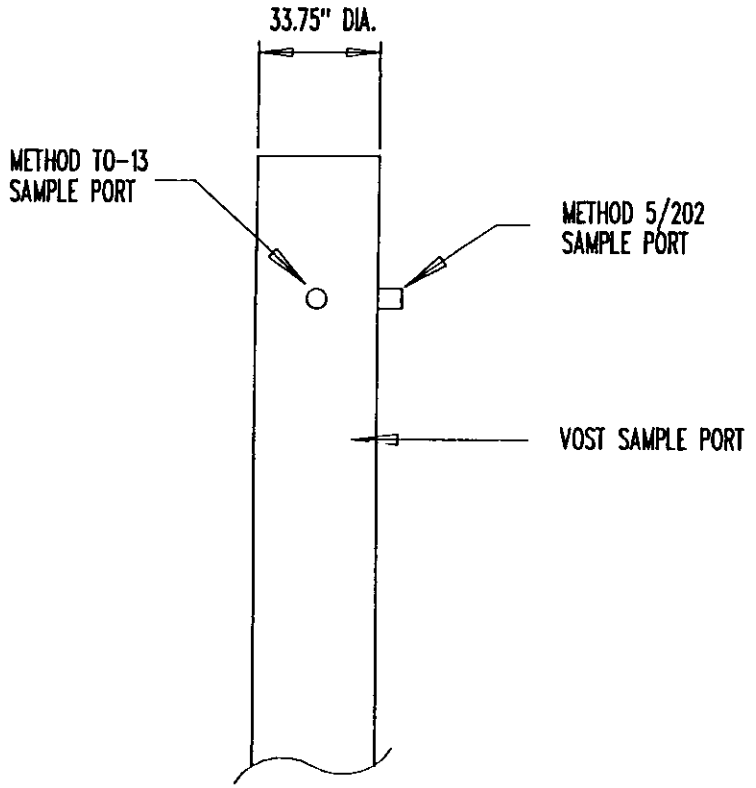

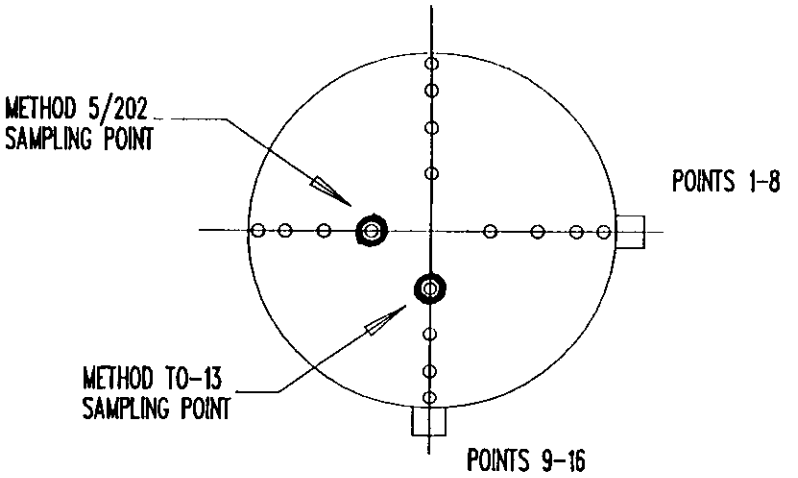

VELOCITY TRAVERSE LOCATIONS

TRAVERSE POINT NO.	DISTANCE FROM WALL (INCHES)
1/9	1.08
2/10	3.54
3/11	6.55
4/12	10.9
5/13	22.85
6/14	27.2
7/15	30.21
8/16	32.67

FIGURE 4-1

SCHEMATIC OF TRAVERSE LAYOUT AND SAMPLING POINTS

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Emissions From Stationary Sources." A slipstream was withdrawn isokinetically from the stack and particulate material was collected on a heated filter. Condensible material was collected in a series of chilled impingers containing distilled water. A schematic diagram of the sampling train is shown in Figure 4-2.

The general sampling procedures were performed in accordance with EPA Method 5. The TSO fraction was obtained by extracting the particulate residue and impinger liquids with toluene. The equipment used to perform the sampling was produced by Anderson Samplers, Inc. and NuTech Corporation. The equipment has the approval of and meets the standards of calibration accuracy as set forth by the EPA.

The sampling equipment consists of 3 main units: the pump, control box, and sampling train. The pump is a Gast lubricated fiber vane rotary pump altered for leak-free operation. The pump is connected to the control box, which contains a Rockwell dry gas meter, dual manometers, and a calibrated orifice system designed to enable isokinetic sampling. The sampling train is connected to the control unit by means of a flexible umbilical cord, and contains the impinger case, filter oven, stainless steel sampling nozzle and glass probe.

The probe used was constructed of glass wrapped with a heating element and incased in a 304 stainless steel tube. The probe was rigidly mounted to the sampling oven and was directly connected to the filter holder. The glass fiber filter was supported by a fritted glass substrate. The filter oven temperature was maintained between 225 and 275°F throughout the sampling runs.

The impinger portion of the sampling train consisted of four ball-topped borosilicate impingers in an ice bath, which were connected to the back of the filter holder. All the impingers used were: 1) washed and rinsed with soap and tap water; 2) rinsed with distilled water; 3) rinsed with acetone; 4) rinsed with methylene chloride; and 5) allowed to dry for at least 24 hours prior to use. The first and second impingers were of the Smith-Greenburg design and initially contained 100 ml of distilled, deionized water. The third impinger was of a modified Smith-Greenburg design, and initially contained 100 ml of distilled, deionized water. The fourth impinger contained approximately 200 grams of indicating silica gel, weighed to the nearest 0.1 gram. The impinger section of the train was assembled in a clean area prior to being taken to the stack where the probe and filter were attached to the train.

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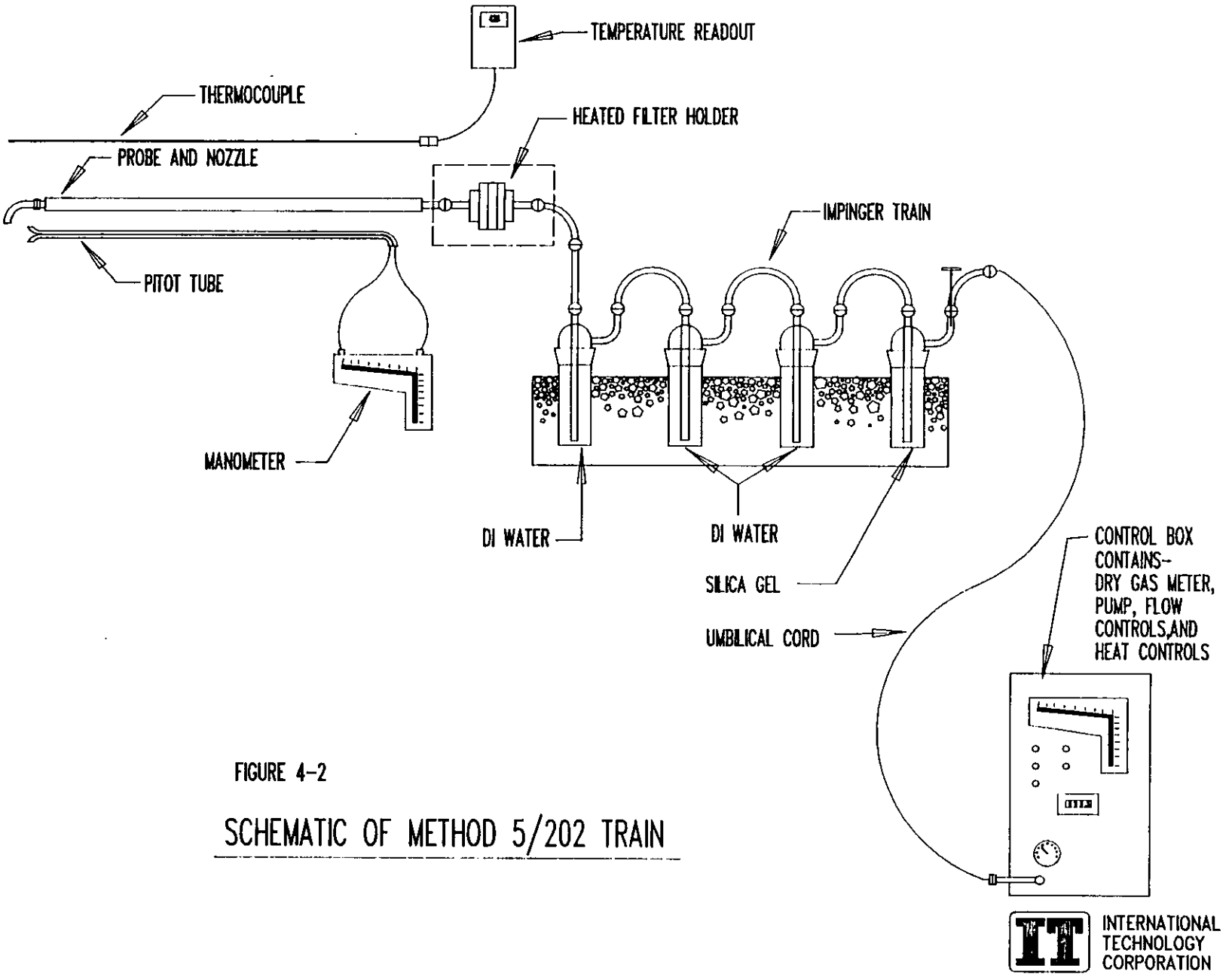

FIGURE 4-2

SCHEMATIC OF METHOD 5/202 TRAIN

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The stack sample was drawn isokinetically through the stainless steel nozzle, the heated glass probe, and into the heated filter assembly, where particulate matter was collected on a preweighed filter. The filtered gas then passed through the impinger system which condensed moisture and collected any vapor phase particulate matter which may have passed through the filter. The dry, cooled gas stream then passed through the umbilical cord to the dry gas meter, orifice, and pump. Following the sampling, the train was purged with ambient air.

The velocity and stack temperature were monitored at the sampling point to insure that isokinetic sampling rates were maintained. Leak checks were performed prior to sampling. All leak checks were performed as specified in Method 5. At the conclusion of the sampling run, the train then had to pass a final leak check before sample recovery procedures were initiated. The pre-test and post-test leak check requirements were met for all runs.

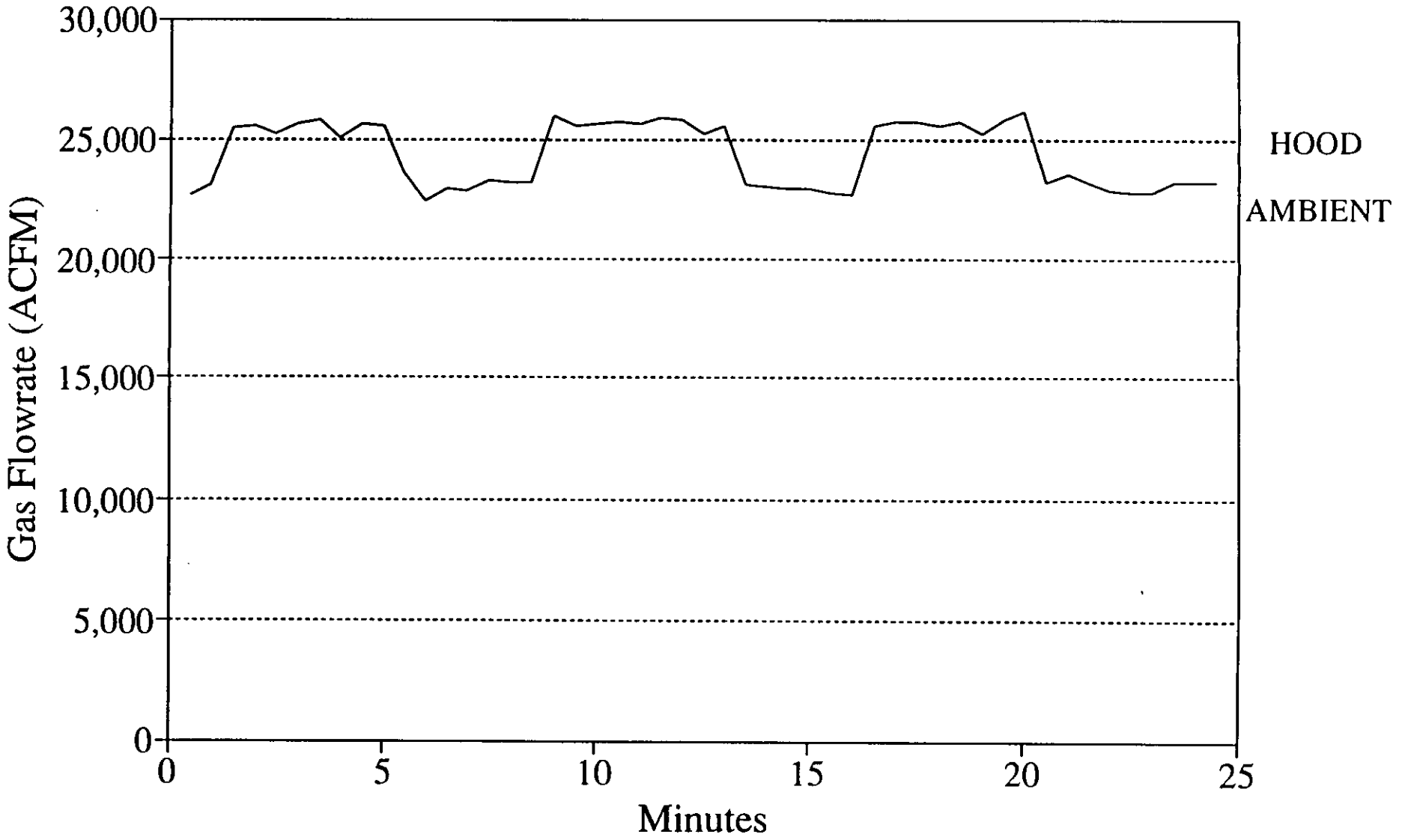
As discussed previously, the hood system operated continuously, but in 2 different modes. In the first mode, while the pushing/charging machine moved between ovens, the bypass dampers were open with ambient air flowing through the system. In the second mode, while charging the oven, the bypass dampers were closed and the gases from the hood flowed through the system. As illustrated in Figure 4-3, the flowrate was approximately 8% lower (at standard conditions) in the "ambient" mode.

The sampling train was operated continuously throughout each run as opposed to attempting to start and stop the train at 4 minute intervals. The sampling rate was not readjusted when the system switched into the ambient mode. Consequently, the data recorded on the data sheets (stack temperature, velocity pressure, etc.) and the isokinetic calculations indicate the conditions while charging.

The glass sampling probe was broken while the pushing/charging machine was moving between ovens during the sampling of Battery 3-B on June 19 (Run 3). The partially completed run was considered invalid and a new sampling train was installed for measurements while charging Battery 3-C. For this reason, the sampling time and sample gas volume were smaller for that Method 5/202 test run when compared to the others. This situation did not effect the volatile and semi-volatile sampling trains.

After each run, the samples were recovered from the train as follows:

Fig. 4-3. Baghouse Flowrate
Variation with Damper Position



- The particulate filter was removed from the filter holder and carefully placed into its original petri dish, which was sealed with tape and placed in a resealable plastic bag.

- The internal surfaces of the nozzle, probe, and filter holder were cleaned by rinsing and brushing each component three times using methylene chloride. The rinsate was stored in glass containers with Teflon® backed lids to reduce possible leakage or contamination.

- Each impinger was reweighed intact to the nearest 0.1 gram to determine the moisture gained due to the sampling. The liquid contents of the first three impingers were transferred into glass sample containers, labeled, and logged into sample collection records. After transferring the contents of each impinger, the impinger was rinsed twice with methylene chloride. The rinses were placed into separate sample containers and sealed for shipment to the analytical laboratory.

- Samples of the distilled water and methylene chloride reagents used in the preparation and sample recovery were collected as reagent blanks.

- All samples were assigned unique identification numbers, and labeled and packaged for shipment to the analytical laboratory.

The probe and filter holder rinses were placed into pre-weighed beakers and evaporated to dryness at ambient conditions. The beakers were then placed into a desiccator for 24 hours and then weighed at intervals of 6 or more hours until a constant weight was determined (to the nearest 0.1 mg). The particulate filters were placed in a desiccator and allowed to dry at ambient temperature for 24 hours. The filters were then weighed at intervals of 6 or more hours until a constant weight (to the nearest 0.1 mg) was determined.

The weights of the probe and filter residues and weight gain of the filter were combined to determine the suspended particulate matter emissions. The organic soluble fraction was determined after the particulate analyses had been completed. The probe and filter holder residues, filters, and impinger liquids were extracted using Method 202 procedures with the exception that toluene was used as the organic solvent instead of methylene chloride. This substitution was made to duplicate procedures used previously during EPA sponsored stack testing at Jewell. After the samples were extracted, the toluene was evaporated and the remaining fraction was measured gravimetrically.

The certificates of analysis for the Method 202 samples are included in Appendix D. Field data and related calculations for the Method 5/202, as well as other, sampling trains are included in Appendix F.

4.3 Volatile Organic Sampling Train (VOST) Procedure

The VOST sampling was conducted in accordance with EPA-600/8-84-007, Method 0030, SW-846; "Protocol for the Collection and Analysis of Volatile POHCs Using VOST." Two pairs of VOST tubes were collected per day - one pair during the charging of Battery 3-B and the second pair during the charging of Battery 3-C. The sampling procedure deviated from the method in that the sampling rate was reduced so that the time to obtain a 20 liter sample volume was 80 minutes (instead of the 40 minutes for SLO-VOST). Each day, sampling was conducted for 80 minutes of the approximately 104 minutes required to charge Battery 3-B; and for 80 minutes of the approximately 144 minutes required to charge Battery 3-C. This allowed the sampling train to be operated continuously throughout most of the charging of each battery without stopping to change tubes.

TENAX® and TENAX®/charcoal sorbent tubes were prepared, handled, stored and analyzed as per the EPA protocol. The TENAX® resin was soxhlet extracted, vacuum dried, thermally conditioned with organic-free nitrogen, and loaded into tubes. Each sorbent tube was labeled with a unique identification number.

Throughout the project, the sorbent tubes were protected from contamination by placing them in culture tubes which contained clean activated carbon. The tubes were shipped and stored on dry ice, maintaining sub-zero temperatures before and after use. At the completion of each run, the tubes were repacked on dry ice, and stored in insulated containers for shipment to the analytical laboratory. With the exception of the run time, the sample collection procedures followed the referenced EPA protocol. A schematic of the sampling train is shown in Figure 4-4.

After each pair of tubes were installed in the train, a leak check was performed at a minimum vacuum of 10 inches of Hg. The train was leak checked after sampling at a vacuum greater than the highest vacuum experienced during the run. Each pair of sorbent tubes was nominally exposed to 20 liters of stack gas over an 80 minute time period. The approximate flow rate through the sampling train was 0.25 liters per minute.

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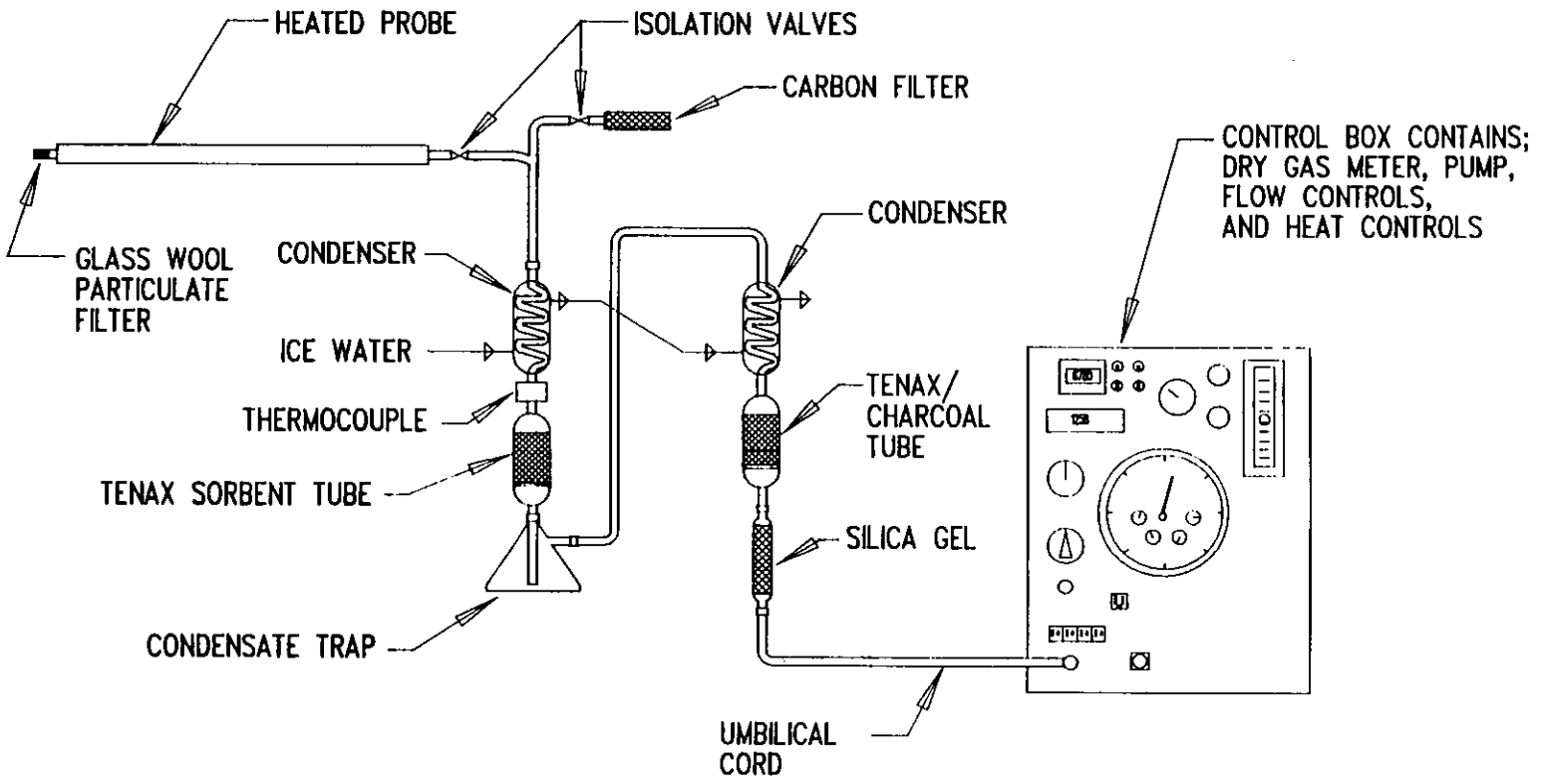

FIGURE 4-4

SCHEMATIC OF VOST SAMPLING TRAIN

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As required by the method, the probe temperature was maintained above 150°C for the duration of the sampling. The gas stream was cooled to below 20°C before passing through the sorbent tubes by a spiral condenser, which had ice water circulating through the jacket continuously during the sampling.

Before installing the first pair of tubes, the train was purged with stack gas to condition the glassware. After collecting the samples, each tube pair was removed from the train, end caps replaced, labeled, returned to the culture tubes, and stored. The gas stream was essentially ambient air with low moisture (approximately 2%) and no condensed moisture was collected.

On June 19, during Run 3, a field blank set of sorbent tubes was collected. The end caps were removed and the tubes were placed near the sampling train to simulate the normal handling procedures incurred during installation and removal of tubes from the train. The field blanks were allowed to remain exposed to ambient conditions for approximately ten minutes, then resealed and packed for shipment.

4.4 Semi-volatile Organic Sampling Train (Method TO-13) Procedures

The procedure used to collect the semi-volatile compounds was based on the method developed to measure polynuclear aromatic hydrocarbons in ambient air (Method TO-13, "Determination of Polynuclear Aromatic Hydrocarbons in Ambient Air Using High Volume Sampling...," in EPA's **Compendium of Methods for the Determination of Toxic Organic Compounds in Ambient Air**). It is similar to the Modified Method 5 stack test method used to collect semi-volatile organic compounds (EPA SW-846 Method 0010). In both methods, polymeric resin is used to adsorb semi-volatile organic compounds. The Modified Method 5 stack train contains a chilled condenser to cool hot gases and condense moisture before the sample gases pass through the sorbent. The TO-13 procedure was suitable in this particular situation due to the low moisture and relatively low temperature of the baghouse exhaust gas stream (2% moisture, 119°F average temperature during charging). The sampled gas stream was cooled to ambient temperature (or below) before it was introduced into the sorbent trap. The advantage of using this procedure instead of the Modified Method 5 train was that a larger sample volume and, conversely, a lower detection limit could be achieved. The average sample volume was 743 standard cubic feet for the 3 runs. For the approximately 4 hours when charging was conducted, this represents a sample volume that is 6 to 7 times larger than would typically be obtained when using the Modified Method 5 sampling train.

The modified TO-13 sample train consisted of a General Metal Works Model PS-1 sampler, sorbent trap, sample line, and the sampling nozzle. A schematic of the sample train is shown in Figure 4-5. The "modification" to the method consisted of transporting the gas to the sorbent trap through a nozzle and a Teflon® sample line. The nozzle was placed in the stack at a representative point. The sorbent trap consisted of XAD-2® resin "sandwiched" between polyurethane foam. The sorbent trap was placed in a clean glass sleeve, and this unit was placed inside a gastight aluminum sample housing. The sorbent and a section of the inlet sample line were kept in an ice water bath during sampling. The sample line was rinsed with hexane following each run. Both the hexane rinse and the sorbent were analyzed.

A leak check was performed prior to each run by sealing the nozzle opening and observing whether or not gas stopped flowing through the orifice meter. A leak check was also performed after each run. All pre-test and post-test leak checks were satisfactory for all test runs. During each run, the PS-1 sampler was switched on and the stack gas was drawn through the sample nozzle, sample line, sorbent trap, and then exhausted through the sampler. A magnahelic gage measured the pressure drop across the orifice meter. The pressure drop that corresponded to the desired sampling rate was determined and the flowrate was adjusted prior to operating the sampler. The pressure drop was recorded at timed intervals during the sampling period. If necessary, the sampler flowrate was adjusted to maintain a constant sampling rate throughout the test. Other data recorded included barometric pressure, sorbent trap identification number, and sample run time.

At the conclusion of each test run, the sorbent trap was removed from the aluminum sample housing, wrapped in aluminum foil, sealed, and stored on ice for shipment to the analytical laboratory. The Teflon® sample line was rinsed with hexane between each run, and the hexane rinse was captured, placed in a uniquely numbered sample container, and stored for shipment to the laboratory.

On June 19, during Run 3, a field blank sorbent trap was collected. An unused sorbent trap was removed from its glass container and placed near the sampling train to simulate the normal handling procedures incurred during installation and removal. The blank sorbent trap was allowed to remain exposed to ambient conditions for approximately ten minutes then resealed and packed for shipment along with the other samples.

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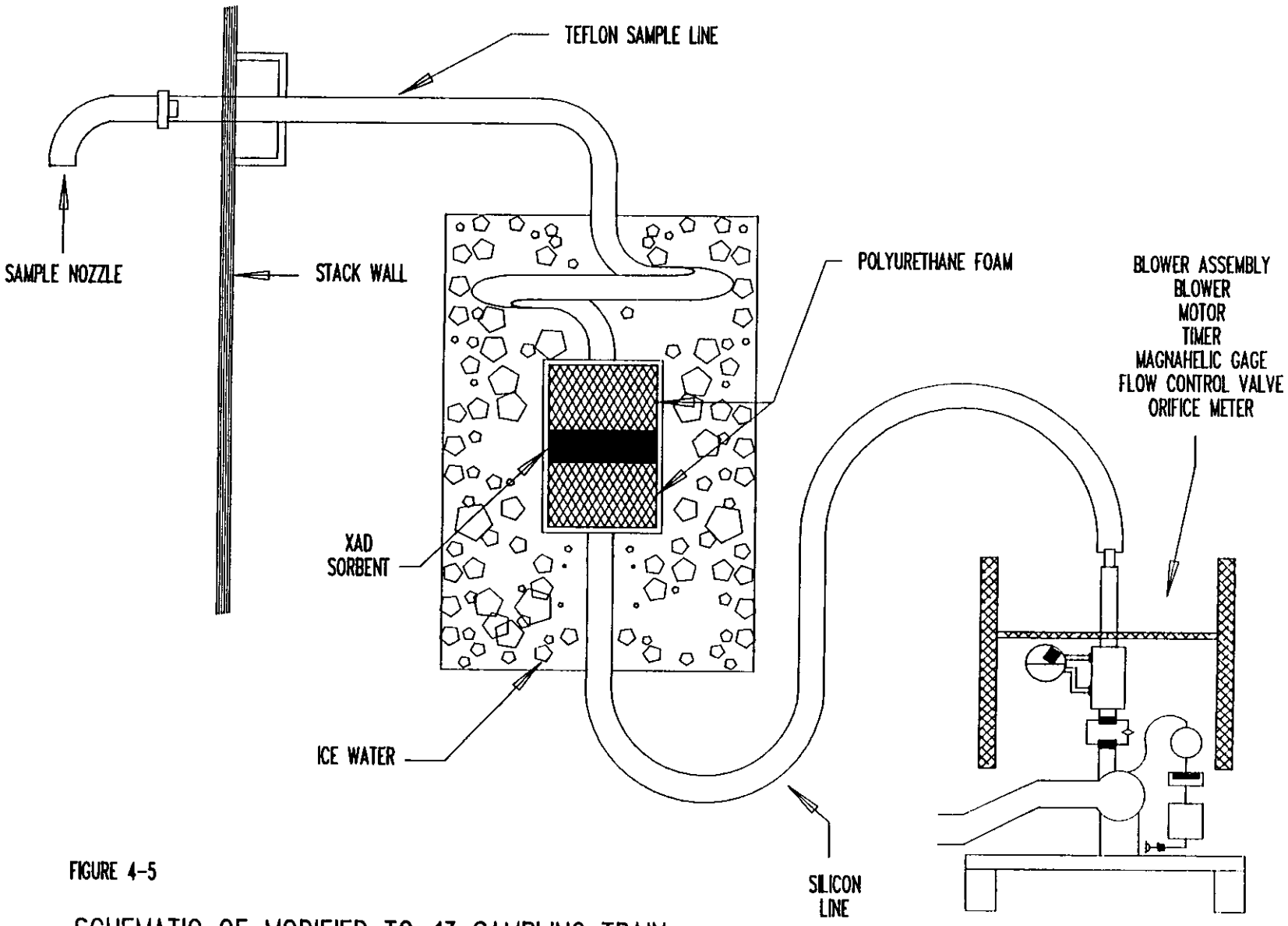

FIGURE 4-5

SCHEMATIC OF MODIFIED TO-13 SAMPLING TRAIN

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5.0 Baghouse Dust Analyses

At the end of each day, the material (mostly coal fines) that had accumulated in the baghouse hopper was collected. To insure that all of the dust was removed, the sides of the hoppers were rinsed into the collection barrel. Each sample was blended and its weight and moisture determined. On average, the rate of dust accumulation in the baghouse was 5.52 dry lbs/hr or 0.0184 lbs dust/ton coal charged.

A composite baghouse dust sample was analyzed for the following parameters: coal tar pitch volatiles (also referred to as benzene soluble organics or BSO), semi-volatiles (EPA 8270), metals (EPA 7471 and 6010), and phosphorous (EPA 365.3). The results of these analyses are summarized in Table 5-1. The collected mass rate of each compound was estimated based on the overall dust collection rate and the measured concentration of each compound.

The dust samples were dried at 100°C to determine moisture prior to being submitted for the listed analyses. Since this may have affected the results, an additional sample of baghouse dust was submitted for analyses of semi-volatiles, phosphorous, mercury, and BSO. This second sample of baghouse dust was obtained at a later date (August 16, 1992). The results of the analyses of this second sample are summarized in Table 5-2. As with the first sample, the collected mass rate of each compound was estimated based on the measured concentration of each compound and the initial dust collection rate (5.52 lbs/hr).

The same semi-volatile compounds were found both samples. The concentrations in the second (undried) sample were somewhat higher. Phosphorous and coal tar pitch volatiles (BSO) were also higher in the second sample. Mercury was not detected in the initial sample but was reported at the detection limit (0.1 ppm) in the second sample. The higher values from analysis of the second sample were used to estimate the total charging emissions.

Copies of the dust collection data are included in the process information in Appendix A. The laboratory certificates of analysis have been included in Appendix E.

TABLE 5-1
BAGHOUSE DUST SAMPLE
CHARGING MACHINE TEST
JEWELL COAL AND COKE CO.
JUNE 17-19, 1992
IT PROJECT NO. 406253.17

CATEGORY	COMPOUND	CONC. (PPM)	CONC. (PPB)	MASS [A] RATE (LBS/HR)	MASS [B] RATE (LBS/TON)
SEMI-VOLATILES	BENZO[A]ANTHRACENE		5900	3.26E-05	1.09E-07
	BENZO[B]FLUORANTHENE		9800	5.41E-05	1.80E-07
	BENZO[K]FLUORANTHENE		7400	4.08E-05	1.36E-07
	BENZO[A]PYRENE		5400	2.98E-05	9.94E-08
	BENZO[G,H,I]PERYLENE		9500	5.24E-05	1.75E-07
	CHRYSENE		11000	6.07E-05	2.02E-07
	FLUORANTHENE		10000	5.52E-05	1.84E-07
	INDENO[1,2,3]PYRENE		5700	3.15E-05	1.05E-07
	PHENANTHRENE		6900	3.81E-05	1.27E-07
	PYRENE		10000	5.52E-05	1.84E-07
	TOTAL PAHs		81600	4.50E-04	1.50E-06
TOXIC METALS	ARSENIC	30		1.66E-04	5.52E-07
	BERYLLIUM	1.1		6.07E-06	2.02E-08
	CADMIUM	ND		ND	ND
	CHROMIUM	13		7.18E-05	2.39E-07
	COBALT	9		4.97E-05	1.66E-07
	LEAD	13		7.18E-05	2.39E-07
	MANGANESE	58		3.20E-04	1.07E-06
	MERCURY	ND		ND	ND
	NICKEL	19		1.05E-04	3.50E-07
	SELENIUM	ND		ND	ND
OTHER	BARIUM	65.7		3.63E-04	1.21E-06
	PHOSPHORUS	78		4.31E-04	1.44E-06
	COAL TAR PITCH VOLATILES	8000		4.42E-02	1.47E-04

[A] - TOTAL DUST RATE = 5.52 LBS/HR
[B] - NORMALIZED DUST RATE = 0.0184 LBS/TON COAL

NOTES: ND = NOT DETECTED

TABLE 5-2.
BAGHOUSE DUST RESAMPLE
AUGUST 16, 1992
JEWELL COAL AND COKE CO.
IT PROJECT NO. 406253.17

CATEGORY	COMPOUND	CONC. (PPM)	CONC. (PPB)	MASS [A] RATE (LBS/HR)	MASS [B] RATE (LBS/TON)
SEMI-VOLATILES	BENZO[A]ANTHRACENE		14000	7.73E-05	2.58E-07
	BENZO[B]FLUORANTHENE		23000	1.27E-04	4.23E-07
	BENZO[K]FLUORANTHENE		19000	1.05E-04	3.50E-07
	BENZO[A]PYRENE		25000	1.38E-04	4.60E-07
	BENZO[G,H,I]PERYLENE		35000	1.93E-04	6.44E-07
	CHRYSENE		23000	1.27E-04	4.23E-07
	FLUORANTHENE		18000	9.94E-05	3.31E-07
	INDENO[1,2,3]PYRENE		20000	1.10E-04	3.68E-07
	PHENANTHRENE		12000	6.62E-05	2.21E-07
	PYRENE		21000	1.16E-04	3.86E-07
	TOTAL PAHs		210000	1.16E-03	3.86E-06
TOXIC METALS	ARSENIC	NM		NM	NM
	BERYLLIUM	NM		NM	NM
	CADMIUM	NM		NM	NM
	CHROMIUM	NM		NM	NM
	COBALT	NM		NM	NM
	LEAD	NM		NM	NM
	MANGANESE	NM		NM	NM
	MERCURY	0.1		5.52E-07	1.84E-09
	NICKEL	NM		NM	NM
	SELENIUM	NM		NM	NM
OTHER	BARIUM	NM		NM	NM
	PHOSPHORUS	138		7.62E-04	2.54E-06
	COAL TAR PITCH VOLATILES	21000		1.16E-01	3.86E-04

[A] - TOTAL DUST RATE = 5.52 LBS/HR
[B] - NORMALIZED DUST RATE = 0.0184 LBS/TON COAL

NOTES: NM = NOT MEASURED

6.0 Discussion of Results

The base data for the 3 day test are summarized in Table 6-1. During each day, 1240 tons of coal was charged to 31 ovens in approximately 4 hours. The average coal charging rate was 308 tons/hr. The average baghouse exhaust flowrate was 25,200 acfm at 119°F during charging (bypass damper closed). The average particulate concentration in the baghouse exhaust (0.00034 gr/dscf) indicated that the bag filters were all intact. The particulate removal efficiency of the baghouse was >99%. However the overall collection efficiency of the system was lower, because all of the charging plume was not captured by the hood.

The average baghouse stack emission rates of volatile compounds from the VOST analyses in lbs/hr and in lbs/ton coal charged are summarized in Table 6-2. The emission rates are based on the average of 5 of the 6 pairs of tubes. One tube pair was broken in transit and not included in the average. Benzene, toluene, xylenes, and carbon disulfide were measured volatile organic constituents of the charging plume. Chloromethane, ethylbenzene, and 1,1,1-trichloroethane were unexpected constituents that may be contaminants or true products of incomplete combustion. Based on the mechanism by which the charging plume is produced, styrene and dichlorodifluoromethane are unlikely compounds that are probably contaminants. Acetone, methylene chloride, methyl ethyl ketone, and tetrachloroethene were found in the laboratory method blank or field blank at similar levels as the samples and appear to be contaminants. The VOST certificates of analysis are included in Appendix B.

The average baghouse stack emission rates of semi-volatile compounds from the TO-13 sampling have been listed in Table 6-3. These values represent the average of Runs 1 and 3. A mechanical failure occurred at the laboratory during the extraction of the Run 2 sorbent trap that prevented solvent from circulating through the soxhlet extractor. The levels of several compounds were low compared with Runs 1 and 3 and the recoveries of some surrogates were also low. For this reason, the Run 2 results were not included in the average. The listed compounds were expected constituents of incomplete coal combustion. One compound, di-n-butyl phthalate, a common analytical contaminant, was found in one of the samples at the limit of detection and was not listed in the table. The TO-13 certificates of analysis are included in Appendix C.

Table 6-1. Base Data
Charging Machine Baghouse Test
Jewell Coal and Coke Company
June 17-19, 1992
IT Project No. 406253.17

	Run No. 1	Run No. 2	Run No. 3	Average
Date	6/17/92	6/18/92	6/19/92	
Time	16:13-20:25	16:05-20:28	16:03-20:03	
Net charging time (min)	242	254	230	242
Coal charged (tons)	1,240	1,240	1,240	1,240
Average charging rate (tons/hr)	307	293	323	308
Baghouse Exhaust				
Gas Flowrate ACFM[a]	25,900	25,400	24,300	25,200
Gas Flowrate DSCFM[b]	21,200	21,000	19,700	20,600
Temperature (°F)[a]	127	111	119	119
Moisture (% Volume)	1.8	2.7	2.8	2.4
CO_2 (% Vol - dry basis)	0	0	0	0
O_2 (% Vol - dry basis)	21	21	21	21
Particulate Matter				
Net Sample time (minutes)	200	222	128[c]	
Volume sampled @ STP (dscf)	125.7	151.5	85.7[c]	121.0
% Isokinetic	99	108	112	106
Concentration (gr/dscf)	0.00031	0.00012	0.00058	0.00034
Mass Rate (lbs/hr)	0.056	0.022	0.097	0.058
Mass Rate (lbs/ton coal)	0.00018	0.00008	0.00030	0.00019
Semi-Volatile Compounds				
Net Sample time (minutes)	190	223	230	214
Volume Sampled @ STP (dscf)	665	773	791	743

Table 6-1. Base Data
Charging Machine Baghouse Test
Jewell Coal and Coke Company
Jun 17-19, 1992
IT Project No. 406253.17

Volatile Compounds				
Net Sample time (minutes)				
•Set A	80	80	80	80
•Set B	80	80	80	80
Volume Sampled @ STP (dsl)				
•Set A	19.496	19.661	19.865	19.67
•Set B	19.791	19.424	19.195	19.47

a Bypass Damper closed (@ duct temperature and pressure).
b Average - Damper cycled between hood and ambient position (@ 29.92 in Hg, 68°F).
c Battery 3-C only.

TABLE 6-2.
VOLATILE COMPOUNDS
CHARGING MACHINE TEST
JEWELL COAL AND COKE CO.
JUNE 17-19, 1992
IT PROJECT NO. 406253.17

COMPOUND	-AVERAGE [A]- MASS RATE (LBS/HR)	MASS RATE (LBS/TON COAL)	COMMENTS
BENZENE	7.67E-03	2.52E-05	
TOLUENE	3.61E-03	1.18E-05	
XYLENES	1.45E-03	4.72E-06	
METHYLENE CHLORIDE	1.06E-03	3.45E-06	CONTAMINANT
ACETONE	4.53E-04	1.51E-06	CONTAMINANT
CARBON DISULFIDE	4.47E-04	1.49E-06	
CHLOROMETHANE	4.44E-04	1.42E-06	POSSIBLE CONTAMINANT
STYRENE	2.33E-04	7.53E-07	PROBABLE CONTAMINANT
DICHLORODIFLUOROMETHANE	2.17E-04	7.42E-07	PROBABLE CONTAMINANT
ETHYLBENZENE	1.57E-04	5.08E-07	POSSIBLE CONTAMINANT
METHYL ETHYL KETONE	1.35E-04	4.52E-07	CONTAMINANT
TETRACHLOROETHENE	1.31E-04	4.39E-07	CONTAMINANT
1,1,1-TRICHLOROETHANE	1.76E-05	6.01E-08	POSSIBLE CONTAMINANT

[A] - BASED ON 5 OF 6 SETS OF TUBES (1 SET BROKEN IN TRANSIT)

TABLE 6-3.
SEMI-VOLATILE COMPOUNDS
CHARGING MACHINE TEST
JEWELL COAL AND COKE CO.
JUNE 17-19, 1992
IT PROJECT NO. 406253.17

COMPOUND	-AVERAGE [A]- MASS RATE (LBS/HR)	MASS RATE (LBS/TON COAL)
NAPTHALENE	4.97E-03	1.59E-05
PHENANTHRENE	2.12E-03	6.79E-06
FLUORANTHENE	1.53E-03	4.91E-06
ACENAPTHALENE	1.25E-03	3.99E-06
CRESOLS	1.05E-03	3.35E-06
2-METHYLNAPTHALENE	1.00E-03	3.20E-06
PHENOL	7.06E-04	2.26E-06
ANTHRACENE	4.17E-04	1.34E-06
DIBENZOFURAN	3.80E-04	1.21E-06
FLUORENE	3.62E-04	1.16E-06
BENZYL ALCOHOL	3.58E-04	1.14E-06
2,4-DIMETHYLPHENOL	2.65E-04	8.49E-07
CHRYSENE	1.22E-04	3.92E-07
BENZO[A]ANTHRACENE	7.74E-05	2.48E-07
TOTAL PAHs	4.63E-03	1.48E-05

[A] - BASED ON RUNS 1 AND 3 (ANALYTICAL PROBLEMS WITH RUN 2)

The total charging emissions of particulate matter, soluble organics (BSO or TSO), volatile and semi-volatile organic compounds, and metals from the baghouse exhaust are summarized in Table 6-4. As discussed previously, the hood system did not collect 100% of the charging plume. The total emissions of particulate matter were estimated based on the observation that approximately 70% of the charging plume was captured and conveyed through the baghouse.

The uncaptured particulate rate was estimated based on the measured particulate emissions from the baghouse and the rate of dust accumulation in the baghouse hopper (average of 5.52 lbs/hr or 0.0184 lbs/ton coal charged). With the baghouse dust and stack assumed to represent approximately 70% of the total particulate, the uncaptured plume was estimated to be:

$$\text{uncaptured particulate} = 30\% \ / \ 70\% \times \text{captured particulate.}$$

The total particulate emission rate was then estimated as the sum of the baghouse exhaust and the uncaptured plume rate, or 0.00807 lbs/ton coal. The total particulate material emitted to the atmosphere would be 10 lbs/day from 62 ovens, or 0.16 lbs per oven per day.

The total TSO/BSO emission rate was estimated in the same way, with the assumption that the BSO concentration in the uncaptured particulate was the same as the coal tar pitch volatiles in the baghouse dust. The TSO from the stack emissions are probably much lower than the reported value. The total TSO blanks (from the filter and the probe rinse and impinger reagents) were higher than the samples for 2 of the 3 test runs. Also, the TSO value was substantially higher than the suspended particulate values. However, the uncorrected TSO value is reported as a worst case number.

The total emission rates of volatile organic compounds were estimated by assuming that the measured value was 70% of the total value. It was assumed that the baghouse did not remove volatile compounds, and:

$$\text{total volatiles} = \text{measured volatiles} \ / \ 0.7.$$

The total emission rates of semi-volatile compounds were based on whichever of the previous calculations produced the higher value. Note that, as discussed previously, an additional sample of baghouse dust was analyzed and the values in Table 6-4 represent the higher of the two analyses.

TABLE 6-4.
TOTAL CHARGING EMISSIONS
JEWELL COAL AND COKE CO.
IT PROJECT NO. 406253.17

CATEGORY	COMPOUND	BAGHOUSE CATCH [A] (LBS/TON COAL)	BAGHOUSE EXHAUST (LBS/TON COAL)	TOTAL EMISSION RATE [B] (LBS/TON COAL)
GENERAL	PARTICULATE MATTER	1.84E-02	1.86E-04	8.07E-03
	TSO/BSO [C]	3.86E-04	1.40E-03	1.57E-03
VOLATILES	BENZENE	NM	2.52E-05	3.60E-05
	TOLUENE	NM	1.18E-05	1.69E-05
	XYLENES	NM	4.72E-06	6.74E-06
	CARBON DISULFIDE	NM	1.49E-06	2.12E-06
	CHLOROMETHANE	NM	1.42E-06	2.03E-06
	ETHYLBENZENE	NM	5.08E-07	7.26E-07
SEMI-VOLATILES	NAPTHALENE	ND	1.59E-05	2.27E-05
	TOTAL PAHs	3.86E-06	1.48E-05	2.12E-05
	PHENANTHRENE	2.21E-07	6.79E-06	9.71E-06
	FLUORANTHENE	3.31E-07	4.91E-06	7.02E-06
	ACENAPTHALENE	ND	3.99E-06	5.70E-06
	CRESOLS	ND	3.35E-06	4.78E-06
	2-METHYLNAPTHALENE	ND	3.20E-06	4.57E-06
	PHENOL	ND	2.26E-06	3.23E-06
	ANTHRACENE	ND	1.34E-06	1.91E-06
	DIBENZOFURAN	ND	1.21E-06	1.73E-06
	FLUORENE	ND	1.16E-06	1.65E-06
	BENZYL ALCOHOL	ND	1.14E-06	1.63E-06
	2,4-DIMETHYLPHENOL	ND	8.49E-07	1.21E-06
	CHRYSENE	4.23E-07	3.92E-07	5.73E-07
	BENZO[A]ANTHRACENE	2.58E-07	2.48E-07	3.59E-07
	BENZO[G,H,I]PERYLENE	6.44E-07	ND	2.76E-07
	BENZO[A]PYRENE	4.60E-07	ND	1.97E-07
	BENZO[B]FLUORANTHENE	4.23E-07	ND	1.81E-07
	PYRENE	3.86E-07	ND	1.66E-07
	INDENO[1,2,3]PYRENE	3.68E-07	ND	1.58E-07
	BENZO[K]FLUORANTHENE	3.50E-07	ND	1.50E-07
TOXIC METALS	MANGANESE	1.07E-06	NM	4.57E-07
	ARSENIC	5.52E-07	NM	2.37E-07
	NICKEL	3.50E-07	NM	1.50E-07
	LEAD	2.39E-07	NM	1.03E-07
	CHROMIUM	2.39E-07	NM	1.03E-07
	COBALT	1.66E-07	NM	7.10E-08
	BERYLLIUM	2.02E-08	NM	8.67E-09
	MERCURY	1.84E-09	NM	7.89E-10
	SELENIUM	ND	NM	ND
	CADMIUM	ND	NM	ND
OTHER	PHOSPHORUS	2.54E-06	NM	1.09E-0
	BARIUM	1.21E-06	NM	5.18E

[A] - HIGHER VALUE OF 2 SAMPLES (SEE TEXT)
[B] - ESTIMATED USING HOOD SYSTEM CAPTURE EFFICIENCY OF 70%
[C] - TSO FROM BAGHOUSE EXHAUST APPEARS UNREASONABLY HIGH

NOTES:
ND - NOT DETECTED
NM - NOT MEASURED

The emission rates of metals were not measured from the baghouse stack. The metals emissions were estimated in Table 6-4 based on the uncaptured particulate matter rate and the concentrations of metals in the baghouse hopper dust sample. Since a baghouse controls particulate matter efficiently, and it is likely that the metals of concern would be present as particles at the baghouse temperature (average of 119°F during charging), the impact of not adding the stack emissions should not be significant.

Appendix A

Process Information

JEWELL COAL AND COKE COMPANY

Date: 6-17-92

Coke Plant - Battery 3-B

DAILY OPERATING SUMMARY

OVEN NO.	TIME PUSHED	TIME CHARGED	REMARKS	TONS	OVEN NO.	TIME PUSHED	TIME CHARGED	REMARKS	TONS
1					14	5:06	5:08		40.
2	4:11	4:13		40.0	15				
3					16	5:14	5:16		40.
4	4:24	4:26		40.0	17				
5					18	5:21	5:23		40.
6	4:33	4:35		40.0	19				
7					20	5:29	5:31		40.0
8	4:39	4:41		40.0	21				
9					22	5:35	5:37		40.0
10	4:48	4:50		40.0	23				
11					24	5:43	5:45		40.0
12	4:55	4:57		40.0	25				
13					26	5:50	5:52		40.0

JEWELL COAL AND COKE COMPANY

Date: 6-17-92

Coke Plant - Battery 3-C

DAILY OPERATING SUMMARY

OVEN NO.	TIME PUSHED	TIME CHARGED	REMARKS	TONS	OVEN NO.	TIME PUSHED	TIME CHARGED	REMARKS	TONS
1					19				
2	6:08	6:10		40.0	20	7:13	7:15		40.0
3					21				
4	6:15	6:17		40.0	22	7:20	7:22		40.0
5					23				
6	6:22	6:24		40.0	24	7:27	7:29		40.0
7					25				
8	6:29	6:31		40.0	26	7:34	7:36		40.0
9					27				
10	6:36	6:38		40.0	28	7:41	7:43		40.0
11					29				
12	6:43	6:45		40.0	30	7:50	7:52		40.0
13					31				
14	6:50	6:52		40.0	32	7:58	8:00		40.0
15					33				
16	6:58	7:00		40.0	34	8:06	8:08		40.0
17					35				
18	7:05	7:07		40.0	36	8:15	8:17		40.0

Remarks:

JEWELL COAL AND COKE COMPANY

Date: 6-18-92

Coke Plant - Battery 3-B

DAILY OPERATING SUMMARY

OVEN NO.	TIME PUSHED	TIME CHARGED	REMARKS	TONS	OVEN NO.	TIME PUSHED	TIME CHARGED	REMARKS	TONS
1	4:03	4:05		40.0	14				
2					15	4:59	5:01		40.2
3	4:13	4:15		40.0	16				
4					17	5:07	5:09		40.0
5	4:22	4:24		40.0	18				
6					19	5:14	5:16		40.2
7	4:29	4:31		40.0	20				
8					21	5:22	5:24		40.2
9	4:37	4:39		40.0	22				
10					23	5:29	5:31		40.0
11	4:43	4:45		40.0	24				
12					25	5:37	5:39		40.2
13	4:50	4:52		40.0	26				

JEWELL COAL AND COKE COMPANY

Date: 6-18-92

Coke Plant - Battery 3-C

DAILY OPERATING SUMMARY

OVEN NO.	TIME PUSHED	TIME CHARGED	REMARKS	TONS	OVEN NO.	TIME PUSHED	TIME CHARGED	REMARKS	TONS
1	5:54	5:56		40.0	19	7:09	7:11		40.0
2					20				
3	6:04	6:06		40.0	21	7:15	7:17		40.0
4					22				
5	6:12	6:14		40.0	23	7:23	7:25		40.0
6					24				
7	6:19	6:21		40.0	25	7:31	7:33		40.0
8					26				
9	6:27	6:29		40.0	27	7:39	7:41		40.0
10					28				
11	6:35	6:37		40.0	29	7:46	7:48		40.0
12					30				
13	6:44	6:46		40.0	31	7:54	7:56		40.0
14					32				
15	6:51	6:53		40.0	33	8:03	8:05		40.0
16					34				
17	6:59	7:01		40.0	35	8:18	8:20		40.0
18					36				

Remarks:

JEWELL COAL AND COKE COMPANY

Date: 6-19-92

Coke Plant - Battery 3-B

DAILY OPERATING SUMMARY

OVEN NO.	TIME PUSHED	TIME CHARGED	REMARKS	TONS	OVEN NO.	TIME PUSHED	TIME CHARGED	REMARKS	TONS
1					14	4:45	4:47		40.0
2	4:01	4:03		40.0	15				
3					16	4:53	4:55		40.0
4	4:07	4:09		40.0	17				
5					18	5:00	5:02		40.0
6	4:14	4:16		40.0	19				
7					20	5:07	5:09		40.0
8	4:22	4:24		40.0	21				
9					22	5:14	5:16		40.0
10	4:30	4:32		40.0	23				
11					24	5:21	5:23		40.0
12	4:38	4:40		40.0	25				
13					26	5:30	5:32		40.0

JEWELL COAL AND COKE COMPANY

Date: 6-19-92

Coke Plant - Battery 3-C

DAILY OPERATING SUMMARY

OVEN NO.	TIME PUSHED	TIME CHARGED	REMARKS	TONS	OVEN NO.	TIME PUSHED	TIME CHARGED	REMARKS	TONS
1					19				
2	5:48	5:50		40.0	20	6:54	6:56		40.0
3					21				
4	5:56	5:58		40.0	22	7:02	7:04		40.0
5					23				
6	6:04	6:06		40.0	24	7:08	7:10		40.0
7					25				
8	6:12	6:14		40.0	26	7:16	7:18		40.0
9					27				
10	6:19	6:21		40.0	28	7:23	7:25		40.0
11					29				
12	6:26	6:28		40.0	30	7:29	7:31		40.0
13					31				
14	6:33	6:35		40.0	32	7:37	7:39		40.0
15					33				
16	6:40	6:42		40.0	34	7:45	7:47		40.0
17					35				
18	6:47	6:49		40.0	36	7:53	7:55		40.0

Remarks:

Jewell Coal & Coke Company

P. O. Box 70
Vansant, Virginia 24656

Telephone 935-8810

COAL SAMPLES TAKEN FROM BAGHOUSE HOPPERS LOCATED ON THE NO. 3 COKE PUSHER

DATE	SAMPLE WEIGHTS AS COLLECTED
6/18/92	26.75 lbs.
6/19/92	38.2 lbs.
6/20/92	48.0 lbs.

Very wet. No moisture analysis.

TO: WAYNE PRUITT

FROM: DANNY BALL

SUBJECT: SPECIAL SAMPLE OF COAL TAKEN FROM BAGHOUSE HOPPERS ON #3 COKE PUSHER. TAKEN 6/18/1992.

	AS RECIEVED	DRY
MOISTURE	20.47	
ASH	8.82	11.09
VOL.	14.21	17.87
F.C.	56.50	71.04
	100.00	100.00
SULFUR	0.81	1.02
FSI	NON CONFORMING	

COPY: CHARLES ELLIS
WILLIAM LIPPS
RICK WADDELL
FILE

TO: WAYNE PRUITT

FROM: DANNY BALL

SUBJECT: SPECIAL SAMPLE OF COAL TAKEN FROM BAGHOUSSE HOPPER ON #3 COKE PUSHER. TAKEN 6/19/1992.

LAB. NO. 476507

	AS RECIEVED	DRY
MOISTURE	40.29	
ASH	6.47	10.83
VOL.	10.70	17.92
F. C.	42.54	71.25
	100.00	100.00
SULFUR	0.59	0.99
F . S. I		NON CONFORMING

COPY: CHARLES ELLIS
WILLIAM LIPPS
RICK WADDELL
FILE

INTERNATIONAL TECHNOLOGY CORPORATION

By JC Date 7/29/92 Subject Baghouse Dust Collection Rate Sheet No. 1 of 1

Chkd. By DDIC Date 8/11/92 Proj. No. 40C253.17

Intent: Estimate Dust Collection Rate in 84 Hopper

Data:

Run No.	Date	Total Dust	Moisture	Dry Dust	Wet Coal Charged	Charging time
1	6/18/92	26.75 lbs	20.47%	21.27 lbs	1240 Tons	242 min
2	6/19/92	38.2 +	40.29	22.81	1240	254
3	6/20/92	48.0	NA (very wet)	NA	1240	230

+ Note: Baghouse offline for 2 of 31 ovens charged

Collection Rate

- Run No. 1

$$\text{Dust Rate} = 21.27 \text{ lbs} / 242 \text{ min} \times 60 \text{ min/hr} = 5.274 \text{ lbs/hr}$$

$$\text{Normalized Rate} = \frac{21.27 \text{ lbs}}{1240 \text{ Tons}} = 0.01715 \text{ lbs/ton coal}$$

- Run No. 2

$$\text{Dust Collected} = 22.81 \times 31/29 = 24.38 \text{ lbs [for 31 ovens]}$$

$$\text{Dust Rate} = 24.38 \text{ lbs} / 254 \text{ min} \times 60 \text{ min/hr} = 5.759 \text{ lbs/hr}$$

$$\text{Normalized Rate} = \frac{24.38 \text{ lbs}}{1240 \text{ Tons}} = 0.01966 \text{ lbs/ton coal}$$

- Average

$$\text{Dust Rate} = \frac{5.274 + 5.759}{2} = 5.52 \text{ lbs/hr}$$

$$\text{Normalized Rate} = \frac{0.01715 + 0.01966}{2} = 0.0184 \text{ lbs/ton coal}$$

108-10-85

Appendix B

Volatile Compounds

p 1 of 4

VOLATILE COMPOUNDS
CHARGING MACHINE TEST
JEWELL COAL AND COKE CO.
JUNE 17-19, 1992
IT PROJECT NO. 406253.17

COMPOUND	MOL. WT.	TOTAL MATERIAL (nG)	RUN NO. 1A SAMPLE VOLUME (L)	GAS FLOWRATE (DSCFM)	GAS CONC. (PPB)	MASS RATE (LBS/HR)	MASS RATE (LBS/TON)	TOTAL MATERIAL (nG)
ACETONE	58		19.496	21200	0.000	0.00E+00	0.00E+00	150
BENZENE	78	2200	19.496	21200	34.808	8.96E-03	2.92E-05	1600
CARBON DISULFIDE	76	130	19.496	21200	2.111	5.30E-04	1.72E-06	60
CARBON TETRACHLORIDE	154		19.496	21200	0.000	0.00E+00	0.00E+00	
CHLOROMETHANE	50		19.496	21200	0.000	0.00E+00	0.00E+00	
DICHLORODIFLUOROMETHANE	121		19.496	21200	0.000	0.00E+00	0.00E+00	
ETHYLBENZENE	106		19.496	21200	0.000	0.00E+00	0.00E+00	69
METHYLENE CHLORIDE	85	640	19.496	21200	9.292	2.61E-03	8.49E-06	490
METHYL ETHYL KETONE	72		19.496	21200	0.000	0.00E+00	0.00E+00	84
STYRENE	104		19.496	21200	0.000	0.00E+00	0.00E+00	92
TETRACHLOROETHENE	166	33	19.496	21200	0.245	1.34E-04	4.38E-07	43
TOLUENE	92	460	19.496	21200	6.170	1.87E-03	6.10E-06	950
1,1,1-TRICHLOROETHANE	133		19.496	21200	0.000	0.00E+00	0.00E+00	
TRICHLOROFLUOROMETHANE	137		19.496	21200	0.000	0.00E+00	0.00E+00	
XYLENES	106		19.496	21200	0.000	0.00E+00	0.00E+00	580

VOLATILE COMPOUNDS
CHARGING MACHINE TEST
JEWELL COAL AND COKE CO.
JUNE 17-19, 1992
IT PROJECT NO. 406253.17

RUN NO. 1B					RUN NO. 2A					
SAMPLE VOLUME (L)	GAS CONC. (PPB)	MASS RATE (LBS/HR)	MASS RATE (LBS/TON)	TOTAL MATERIAL (nG)	SAMPLE VOLUME (L)	GAS FLOWRATE (DSCFM)	GAS CONC. (PPB)	MASS RATE (LBS/HR)	MASS RATE (LBS/TON)	TOTAL MATERIAL (nG)
19.791	3.144	6.02E-04	1.96E-06	160	19.661	21000	3.376	6.40E-04	2.18E-06	180
19.791	24.938	6.42E-03	2.09E-05	2200	19.661	21000	34.516	8.80E-03	3.00E-05	1600
19.791	0.960	2.41E-04	7.84E-07	200	19.661	21000	3.220	8.00E-04	2.73E-06	100
19.791	0.000	0.00E+00	0.00E+00		19.661	21000	0.000	0.00E+00	0.00E+00	
19.791	0.000	0.00E+00	0.00E+00	180	19.661	21000	4.405	7.20E-04	2.46E-06	
19.791	0.000	0.00E+00	0.00E+00	140	19.661	21000	1.416	5.60E-04	1.91E-06	130
19.791	0.791	2.77E-04	9.02E-07	53	19.661	21000	0.612	2.12E-04	7.24E-07	
19.791	7.008	1.97E-03	6.40E-06	37	19.661	21000	0.533	1.48E-04	5.05E-07	97
19.791	1.418	3.37E-04	1.10E-06	85	19.661	21000	1.445	3.40E-04	1.16E-06	
19.791	1.075	3.69E-04	1.20E-06	83	19.661	21000	0.977	3.32E-04	1.13E-06	
19.791	0.315	1.73E-04	5.62E-07	58	19.661	21000	0.428	2.32E-04	7.92E-07	29
19.791	12.553	3.81E-03	1.24E-05	960	19.661	21000	12.769	3.84E-03	1.31E-05	870
19.791	0.000	0.00E+00	0.00E+00	22	19.661	21000	0.202	8.80E-05	3.00E-07	
19.791	0.000	0.00E+00	0.00E+00		19.661	21000	0.000	0.00E+00	0.00E+00	
19.791	6.652	2.33E-03	7.58E-06	440	19.661	21000	5.080	1.76E-03	6.01E-06	120

VOLATILE COMPOUNDS
CHARGING MACHINE TEST
JEWELL COAL AND COKE CO.
JUNE 17-19, 1992
IT PROJECT NO. 406253.17

RUN NO. 2B					RUN NO. 3A (BROKEN)					
SAMPLE VOLUME (L)	GAS CONC. (PPB)	MASS RATE (LBS/HR)	MASS RATE (LBS/TON)	TOTAL MATERIAL (nG)	SAMPLE VOLUME (L)	GAS FLOWRATE (DSCFM)	GAS CONC. (PPB)	MASS RATE (LBS/HR)	MASS RATE (LBS/TON)	TOTAL MATERIAL (nG)
19.424	3.844	7.29E-04	2.49E-06	160	19.865	19700	3.341	5.94E-04	1.84E-06	77
19.424	25.409	6.48E-03	2.21E-05	1700	19.865	19700	26.397	6.32E-03	1.96E-05	2000
19.424	1.630	4.05E-04	1.38E-06	76	19.865	19700	1.211	2.82E-04	8.74E-07	68
19.424	0.000	0.00E+00	0.00E+00	35	19.865	19700	0.275	1.30E-04	4.03E-07	
19.424	0.000	0.00E+00	0.00E+00		19.865	19700	0.000	0.00E+00	0.00E+00	390
19.424	1.331	5.26E-04	1.80E-06		19.865	19700	0.000	0.00E+00	0.00E+00	
19.424	0.000	0.00E+00	0.00E+00	27	19.865	19700	0.309	1.00E-04	3.11E-07	77
19.424	1.414	3.93E-04	1.34E-06	880	19.865	19700	12.539	3.27E-03	1.01E-05	42
19.424	0.000	0.00E+00	0.00E+00	55	19.865	19700	0.925	2.04E-04	6.33E-07	
19.424	0.000	0.00E+00	0.00E+00		19.865	19700	0.000	0.00E+00	0.00E+00	120
19.424	0.216	1.17E-04	4.01E-07	47	19.865	19700	0.343	1.75E-04	5.41E-07	
19.424	11.714	3.52E-03	1.20E-05	840	19.865	19700	11.059	3.12E-03	9.66E-06	1300
19.424	0.000	0.00E+00	0.00E+00	78	19.865	19700	0.710	2.90E-04	8.97E-07	
19.424	0.000	0.00E+00	0.00E+00	48	19.865	19700	0.424	1.78E-04	5.52E-07	
19.424	1.402	4.86E-04	1.66E-06	190	19.865	19700	2.171	7.06E-04	2.19E-06	700

VOLATILE COMPOUNDS
CHARGING MACHINE TEST
JEWELL COAL AND COKE CO.
JUNE 17-19, 1992
IT PROJECT NO. 406253.17

RUN NO. 3B				-AVERAGE- *			
SAMPLE VOLUME (L)	GAS CONC. (PPB)	MASS RATE (LBS/HR)	MASS RATE (LBS/TON)	MASS RATE (LBS/HR)	MASS RATE (LBS/TON)	FIELD BLANK (nG)	METHOD BLANK (nG)
19.195	1.664	2.96E-04	9.17E-07	4.53E-04	1.51E-06	57	37
19.195	32.140	7.69E-03	2.38E-05	7.67E-03	2.52E-05		
19.195	1.122	2.61E-04	8.09E-07	4.47E-04	1.49E-06		
19.195	0.000	0.00E+00	0.00E+00	0.00E+00	0.00E+00		
19.195	9.777	1.50E-03	4.64E-06	4.44E-04	1.42E-06		
19.195	0.000	0.00E+00	0.00E+00	2.17E-04	7.42E-07		
19.195	0.911	2.96E-04	9.17E-07	1.57E-04	5.08E-07		
19.195	0.619	1.61E-04	5.00E-07	1.06E-03	3.45E-06		35
19.195	0.000	0.00E+00	0.00E+00	1.35E-04	4.52E-07	89	48
19.195	1.446	4.61E-04	1.43E-06	2.33E-04	7.53E-07		
19.195	0.000	0.00E+00	0.00E+00	1.31E-04	4.39E-07	200	
19.195	17.712	5.00E-03	1.55E-05	3.61E-03	1.18E-05		
19.195	0.000	0.00E+00	0.00E+00	1.76E-05	6.01E-08		
19.195	0.000	0.00E+00	0.00E+00	0.00E+00	0.00E+00		
19.195	8.278	2.69E-03	8.33E-06	1.45E-03	4.72E-06		

* Excluding 3A (Broken in transit)

ROSS®
ss Analytical Services, Inc. • 16433 Foltz Pkwy. • Strongsville, OH 44136 • (216) 572-3200 • FAX (216) 572-762

CERTIFICATE OF ANALYSIS

Client:

IT Corporation
312 Directors Drive
Knoxville, TN 37923

Attn: John Carson

Work Order #: 92-06-199
Client Code: IT_AQS_KNOX
Report Date: 07/06/92
Work ID: VOST for App. IX VOA's
Date Received: 06/24/92

Purchase Order: Proj# 406253.17/Jewell

SAMPLE IDENTIFICATION

Lab Number	Sample Description	Run
01	VOST Air 1545	1a
03	VOST Air 1547	2a
05	VOST Air 1549	3a (broken)
07	VOST Air 1551	Field Blank
02	VOST Air 1546	1b
04	VOST Air 1548	2b
06	VOST Air 1550	3b

Data are reported on an as-received basis unless stated otherwise. Practical Quantitation Limits (PQL's) are listed; they are higher than instrument detection limits and take the sample's matrix into account. Metals and other inorganic data are corrected for laboratory blank values; organic data are not. Unless otherwise noted, organic analysis blanks had no targets found above their PQL's.

Certificate approved by
Charles E. Simmons

REPORT COMMENTS

Acetone, methylene chloride, and methyl ethyl ketone was found in the blank at 37, 35, and 48 total ng, respectively. Sample results were not blank subtracted.

Sample VOST Air 1549 (RASI No. 05) was received in a broken condition. At your request, the sample was analyzed as the others.

TEST METHODOLOGIES

Appendix IX volatile organics were determined by gas chromatography/mass spectrometry as in EPA Method 8240 using a capillary column.

RESULTS BY SAMPLE

Sample Description VOST Air 1545 Lab No. 01
Test Description App. IX purgeables Test Code 8240A9

DATE RUN 07/01/92 DILUTION FACTOR 1 UNITS Total Nanograms

CAS No.	COMPOUND	RESULT	PQL	CAS No.	COMPOUND	RESULT	PQL
67-64-1	Acetone	<PQL	50	10061-01-5	cis-1,3-Dichloropropene	<PQL	5
75-05-8	Acetonitrile	<PQL	50	10061-02-6	trans-1,3-Dichloropropene	<PQL	5
107-02-8	Acrolein	<PQL	20	100-41-4	Ethylbenzene	<PQL	5
107-13-1	Acrylonitrile	<PQL	10	97-83-2	Ethyl methacrylate	<PQL	5
107-05-1	Allyl chloride	<PQL	5	591-78-6	2-Hexanone	<PQL	50
71-43-2	Benzene	2200	5	74-88-4	Iodomethane	<PQL	10
75-27-4	Bromodichloromethane	<PQL	5	126-98-7	Methacrylonitrile	<PQL	20
75-25-2	Bromoform	<PQL	5	74-95-3	Methylene bromide	<PQL	5
74-83-9	Bromomethane	<PQL	10	75-09-2	Methylene chloride	640	5
75-15-0	Carbon disulfide	130	5	78-93-3	Methyl ethyl ketone	<PQL	10
56-23-5	Carbon tetrachloride	<PQL	5	80-62-6	Methyl methacrylate	<PQL	5
108-90-7	Chlorobenzene	<PQL	5	108-10-1	4-Methyl-2-pentanone	<PQL	50
75-00-3	Chloroethane	<PQL	10	107-12-0	Propionitrile	<PQL	20
67-66-3	Chloroform	<PQL	5	100-42-5	Styrene	<PQL	5
74-87-3	Chloromethane	<PQL	10	630-20-6	1,1,1,2-Tetrachloroethane	<PQL	5
126-99-8	Chloroprene	<PQL	5	79-34-5	1,1,2,2-Tetrachloroethane	<PQL	5
124-48-1	Dibromochloromethane	<PQL	5	127-18-4	Tetrachloroethene	33	5
96-12-8	1,2-Dibromo-3-chloropropane	<PQL	10	108-88-3	Toluene	460	5
106-93-4	1,2-Dibromoethane	<PQL	5	71-55-6	1,1,1-Trichloroethane	<PQL	5
110-57-6	trans-1,4-Dichloro-2-butene	<PQL	5	79-00-5	1,1,2-Trichloroethane	<PQL	5
75-71-8	Dichlorodifluoromethane	<PQL	10	79-01-6	Trichloroethene	<PQL	5
75-34-3	1,1-Dichloroethane	<PQL	5	75-69-4	Trichlorofluoromethane	<PQL	5
107-06-2	1,2-Dichloroethane	<PQL	5	96-18-4	1,2,3-Trichloropropane	<PQL	5
75-35-4	1,1-Dichloroethene	<PQL	5	108-05-4	Vinyl acetate	<PQL	50
156-60-5	1,2-Dichloroethene (total)	<PQL	5	75-01-4	Vinyl chloride	<PQL	10
78-87-5	1,2-Dichloropropane	<PQL	5	1330-20-7	Xylenes (total)	<PQL	10

SURROGATE	%RECOVERY	LIMITS
1,2-Dichloroethane-d4	84	76 - 114
Toluene-d8	106	88 - 110
4-Bromofluorobenzene	89	86 - 115

Work Order # 92-06-199 Ross Analytical Services, Inc Reported: 07/06/92

Sample Description VOST Air 1545 Lab No. 01
Test Description Volatiles library search Test Code LIB_MA

DATE RUN 07/01/92 UNITS Total Nanograms

COMPOUND	SCAN #	APPROXIMATE RESULT
Pentane	682	80
2-Methyl-1,3-Butadiene	732	60
1,3-Cyclopentadiene	822	60
1-Hexene	932	50
Unknown Hydrocarbon, C7	945	100
Unknown Hydrocarbon	1103	40
Cyclohexane	1127	80
Dimethyl Cyclopentane	1192	20
Heptane	1204	50
Unknown Hydrocarbon, C8	1446	20

Work Order # 92-06-199 Ross Analytical Services, Inc Reported: 07/06/92

Sample Description VOST Air 1546 Lab No. 02
Test Description App. IX purgeables Test Code 8240A9

DATE RUN 07/01/92 DILUTION FACTOR 1 UNITS Total Nanograms

CAS No.	COMPOUND	RESULT	PQL	CAS No.	COMPOUND	RESULT	PQL
67-64-1	Acetone	150	50	10061-01-5	cis-1,3-Dichloropropene	<PQL	5
75-05-8	Acetonitrile	<PQL	50	10061-02-6	trans-1,3-Dichloropropene	<PQL	5
107-02-8	Acrolein	<PQL	20	100-41-4	Ethylbenzene	69	5
107-13-1	Acrylonitrile	<PQL	10	97-83-2	Ethyl methacrylate	<PQL	5
107-05-1	Allyl chloride	<PQL	5	591-78-6	2-Hexanone	<PQL	50
71-43-2	Benzene	1600	5	74-88-4	Iodomethane	<PQL	10
75-27-4	Bromodichloromethane	<PQL	5	126-98-7	Methacrylonitrile	<PQL	20
75-25-2	Bromoform	<PQL	5	74-95-3	Methylene bromide	<PQL	5
74-83-9	Bromomethane	<PQL	10	75-09-2	Methylene chloride	490	5
75-15-0	Carbon disulfide	60	5	78-93-3	Methyl ethyl ketone	84	10
56-23-5	Carbon tetrachloride	<PQL	5	80-62-6	Methyl methacrylate	<PQL	5
108-90-7	Chlorobenzene	<PQL	5	108-10-1	4-Methyl-2-pentanone	<PQL	50
75-00-3	Chloroethane	<PQL	10	107-12-0	Propionitrile	<PQL	20
67-66-3	Chloroform	<PQL	5	100-42-5	Styrene	92	5
74-87-3	Chloromethane	<PQL	10	630-20-6	1,1,1,2-Tetrachloroethane	<PQL	5
126-99-8	Chloroprene	<PQL	5	79-34-5	1,1,2,2-Tetrachloroethane	<PQL	5
124-48-1	Dibromochloromethane	<PQL	5	127-18-4	Tetrachloroethene	43	5
96-12-8	1,2-Dibromo-3-chloropropane	<PQL	10	108-88-3	Toluene	950	5
106-93-4	1,2-Dibromoethane	<PQL	5	71-55-6	1,1,1-Trichloroethane	<PQL	5
110-57-6	trans-1,4-Dichloro-2-butene	<PQL	5	79-00-5	1,1,2-Trichloroethane	<PQL	5
75-71-8	Dichlorodifluoromethane	<PQL	10	79-01-6	Trichloroethene	<PQL	5
75-34-3	1,1-Dichloroethane	<PQL	5	75-69-4	Trichlorofluoromethane	<PQL	5
107-06-2	1,2-Dichloroethane	<PQL	5	96-18-4	1,2,3-Trichloropropane	<PQL	5
75-35-4	1,1-Dichloroethene	<PQL	5	108-05-4	Vinyl acetate	<PQL	50
156-60-5	1,2-Dichloroethene (total)	<PQL	5	75-01-4	Vinyl chloride	<PQL	10
78-87-5	1,2-Dichloropropane	<PQL	5	1330-20-7	Xylenes (total)	580	10

SURROGATE	%RECOVERY	LIMITS
1,2-Dichloroethane-d4	91	76 - 114
Toluene-d8	99	88 - 110
4-Bromofluorobenzene	98	86 - 115

Work Order # 92-06-199 Ross Analytical Services, Inc Reported: 07/06/92

Sample Description VOST Air 1546 Lab No. 02
Test Description Volatiles library search Test Code LIB_MA

DATE RUN 07/01/92 UNITS Total Nanograms

COMPOUND	SCAN #	APPROXIMATE RESULT
Pentane	685	90
Unknown Hydrocarbon, C9	946	60
Heptane	1204	40
Unknown Hydrocarbon, C7	1284	60
Unknown Hydrocarbon, C8	1445	40
Ethylmethyl Benzene	1865	40
Trimethyl Benzene isomer	1877	50
Trimethyl Benzene isomer	1939	40
Unknown Aromatic, C9	2078	30
Naphthtalene	2362	100

Work Order # 92-06-199 Ross Analytical Services, Inc Reported: 07/06/92

Sample Description VOST Air 1547 Lab No. 03
Test Description App. IX purgeables Test Code 8240A9

DATE RUN 07/01/92 DILUTION FACTOR 1 UNITS Total Nanograms

CAS No.	COMPOUND	RESULT	PQL	CAS No.	COMPOUND	RESULT	PQL
67-64-1	Acetone	160	50	10061-01-5	cis-1,3-Dichloropropene	<PQL	5
75-05-8	Acetonitrile	<PQL	50	10061-02-6	trans-1,3-Dichloropropene	<PQL	5
107-02-8	Acrolein	<PQL	20	100-41-4	Ethylbenzene	53	5
107-13-1	Acrylonitrile	<PQL	10	97-83-2	Ethyl methacrylate	<PQL	5
107-05-1	Allyl chloride	<PQL	5	591-78-6	2-Hexanone	<PQL	50
71-43-2	Benzene	2200	5	74-88-4	Iodomethane	<PQL	10
75-27-4	Bromodichloromethane	<PQL	5	126-98-7	Methacrylonitrile	<PQL	20
75-25-2	Bromoform	<PQL	5	74-95-3	Methylene bromide	<PQL	5
74-83-9	Bromomethane	<PQL	10	75-09-2	Methylene chloride	37	5
75-15-0	Carbon disulfide	200	5	78-93-3	Methyl ethyl ketone	85	10
56-23-5	Carbon tetrachloride	<PQL	5	80-62-6	Methyl methacrylate	<PQL	5
108-90-7	Chlorobenzene	<PQL	5	108-10-1	4-Methyl-2-pentanone	<PQL	50
75-00-3	Chlorethane	<PQL	10	107-12-0	Propionitrile	<PQL	20
67-66-3	Chloroform	<PQL	5	100-42-5	Styrene	83	5
74-87-3	Chloromethane	180	10	630-20-6	1,1,1,2-Tetrachloroethane	<PQL	5
126-99-8	Chloroprene	<PQL	5	79-34-5	1,1,2,2-Tetrachloroethane	<PQL	5
124-48-1	Dibromochloromethane	<PQL	5	127-18-4	Tetrachloroethene	58	5
96-12-8	1,2-Dibromo-3-chloropropane	<PQL	10	108-88-3	Toluene	960	5
106-93-4	1,2-Dibromoethane	<PQL	5	71-55-6	1,1,1-Trichloroethane	22	5
110-57-6	trans-1,4-Dichloro-2-butene	<PQL	5	79-00-5	1,1,2-Trichloroethane	<PQL	5
75-71-8	Dichlorodifluoromethane	140	10	79-01-6	Trichloroethene	<PQL	5
75-34-3	1,1-Dichloroethane	<PQL	5	75-69-4	Trichlorofluoromethane	<PQL	5
107-06-2	1,2-Dichloroethane	<PQL	5	96-18-4	1,2,3-Trichloropropane	<PQL	5
75-35-4	1,1-Dichloroethene	<PQL	5	108-05-4	Vinyl acetate	<PQL	50
156-60-5	1,2-Dichloroethene (total)	<PQL	5	75-01-4	Vinyl chloride	<PQL	10
78-87-5	1,2-Dichloropropane	<PQL	5	1330-20-7	Xylenes (total)	440	10

SURROGATE	%RECOVERY	LIMITS
1,2-Dichloroethane-d4	91	76 - 114
Toluene-d8	104	88 - 110
4-Bromofluorobenzene	90	86 - 115

Work Order # 92-06-199 Ross Analytical Services, Inc Reported: 07/06/92

Sample Description VOST Air 1547 Lab No. 03
Test Description Volatiles library search Test Code LIB_MA

DATE RUN 07/01/92 UNITS Total Nanograms

COMPOUND	SCAN #	APPROXIMATE RESULT
Unknown Hydrocarbon, C3	343	200
Pentane	685	100
1,3-Cyclopentadiene	824	70
Unknown Hydrocarbon, C9	946	100
Dimethyl Cyclopentane	1192	20
Heptane	1204	40
Methyl Cyclohexane	1284	60
Unknown Hydrocarbon, C8	1445	30
1H-Indene	2077	20
Naphthalene	2362	100

Work Order # 92-06-199 Ross Analytical Services, Inc Reported: 07/06/92

Sample Description VOST Air 1548 Lab No. 04
Test Description App. IX purgeables Test Code 8240A9

DATE RUN 07/01/92 DILUTION FACTOR 1 UNITS Total Nanograms

CAS No.	COMPOUND	RESULT	PQL	CAS No.	COMPOUND	RESULT	PQL
67-64-1	Acetone	180	50	10061-01-5	cis-1,3-Dichloropropene	<PQL	5
75-05-8	Acetonitrile	<PQL	50	10061-02-6	trans-1,3-Dichloropropene	<PQL	5
107-02-8	Acrolein	<PQL	20	100-41-4	Ethylbenzene	<PQL	5
107-13-1	Acrylonitrile	<PQL	10	97-83-2	Ethyl methacrylate	<PQL	5
107-05-1	Allyl chloride	<PQL	5	591-78-6	2-Hexanone	<PQL	50
71-43-2	Benzene	1600	5	74-88-4	Iodomethane	<PQL	10
75-27-4	Bromodichloromethane	<PQL	5	126-98-7	Methacrylonitrile	<PQL	20
75-25-2	Bromoform	<PQL	5	74-95-3	Methylene bromide	<PQL	5
74-83-9	Bromomethane	<PQL	10	75-09-2	Methylene chloride	97	5
75-15-0	Carbon disulfide	100	5	78-93-3	Methyl ethyl ketone	<PQL	10
56-23-5	Carbon tetrachloride	<PQL	5	80-62-6	Methyl methacrylate	<PQL	5
108-90-7	Chlorobenzene	<PQL	5	108-10-1	4-Methyl-2-pentanone	<PQL	50
75-00-3	Chloroethane	<PQL	10	107-12-0	Propionitrile	<PQL	20
67-66-3	Chloroform	<PQL	5	100-42-5	Styrene	<PQL	5
74-87-3	Chloromethane	<PQL	10	630-20-6	1,1,1,2-Tetrachloroethane	<PQL	5
126-99-8	Chloroprene	<PQL	5	79-34-5	1,1,2,2-Tetrachloroethane	<PQL	5
124-48-1	Dibromochloromethane	<PQL	5	127-18-4	Tetrachloroethene	29	5
96-12-8	1,2-Dibromo-3-chloropropane	<PQL	10	108-88-3	Toluene	870	5
106-93-4	1,2-Dibromoethane	<PQL	5	71-55-6	1,1,1-Trichloroethane	<PQL	5
110-57-6	trans-1,4-Dichloro-2-butene	<PQL	5	79-00-5	1,1,2-Trichloroethane	<PQL	5
75-71-8	Dichlorodifluoromethane	130	10	79-01-6	Trichloroethene	<PQL	5
75-34-3	1,1-Dichloroethane	<PQL	5	75-69-4	Trichlorofluoromethane	<PQL	5
107-06-2	1,2-Dichloroethane	<PQL	5	96-18-4	1,2,3-Trichloropropane	<PQL	5
75-35-4	1,1-Dichloroethene	<PQL	5	108-05-4	Vinyl acetate	<PQL	50
156-60-5	1,2-Dichloroethene (total)	<PQL	5	75-01-4	Vinyl chloride	<PQL	10
78-87-5	1,2-Dichloropropane	<PQL	5	1330-20-7	Xylenes (total)	120	10

SURROGATE	%RECOVERY	LIMITS
1,2-Dichloroethane-d4	94	76 - 114
Toluene-d8	100	88 - 110
4-Bromofluorobenzene	91	86 - 115

Work Order # 92-06-199 Ross Analytical Services, Inc Reported: 07/06/92

Sample Description VOST Air 1548 Lab No. 04
Test Description Volatiles library search Test Code LIB_MA

DATE RUN 07/01/92 UNITS Total Nanograms

COMPOUND	SCAN #	APPROXIMATE RESULT
Unknown Hydrocarbon	343	200
Pentane	683	100
1,3-Pentadiene	732	70
Unknown Hydrocarbon, C9	945	60
Cyclohexene	1182	20
Dimethyl Cyclopentane	1191	20
Heptane	1203	80
Methyl Cyclohexane	1283	50
Unknown Hydrocarbon, C8	1444	30
Naphthalene	2361	40

Work Order # 92-06-199 Ross Analytical Services, Inc Reported: 07/06/92

Sample Description VOST Air 1549 Lab No. 05
Test Description App. IX purgeables Test Code 8240A9

DATE RUN 07/02/92 DILUTION FACTOR 1 UNITS Total Nanograms

CAS No.	COMPOUND	RESULT	PQL	CAS No.	COMPOUND	RESULT	PQL
67-64-1	Acetone	160	50	10061-01-5	cis-1,3-Dichloropropene	<PQL	5
75-05-8	Acetonitrile	<PQL	50	10061-02-6	trans-1,3-Dichloropropene	<PQL	5
107-02-8	Acrolein	<PQL	20	100-41-4	Ethylbenzene	27	5
107-13-1	Acrylonitrile	<PQL	10	97-83-2	Ethyl methacrylate	<PQL	5
107-05-1	Allyl chloride	<PQL	5	591-78-6	2-Hexanone	<PQL	50
71-43-2	Benzene	1700	5	74-88-4	Iodomethane	<PQL	10
75-27-4	Bromodichloromethane	<PQL	5	126-98-7	Methacrylonitrile	<PQL	20
75-25-2	Bromoform	<PQL	5	74-95-3	Methylene bromide	<PQL	5
74-83-9	Bromomethane	<PQL	10	75-09-2	Methylene chloride	880	5
75-15-0	Carbon disulfide	76	5	78-93-3	Methyl ethyl ketone	55	10
56-23-5	Carbon tetrachloride	35	5	80-62-6	Methyl methacrylate	<PQL	5
108-90-7	Chlorobenzene	<PQL	5	108-10-1	4-Methyl-2-pentanone	<PQL	50
75-00-3	Chloroethane	<PQL	10	107-12-0	Propionitrile	<PQL	20
67-66-3	Chloroform	<PQL	5	100-42-5	Styrene	<PQL	5
74-87-3	Chloromethane	<PQL	10	630-20-6	1,1,1,2-Tetrachloroethane	<PQL	5
126-99-8	Chloroprene	<PQL	5	79-34-5	1,1,2,2-Tetrachloroethane	<PQL	5
124-48-1	Dibromochloromethane	<PQL	5	127-18-4	Tetrachloroethene	47	5
96-12-8	1,2-Dibromo-3-chloropropane	<PQL	10	108-88-3	Toluene	840	5
106-93-4	1,2-Dibromoethane	<PQL	5	71-55-6	1,1,1-Trichloroethane	78	5
110-57-6	trans-1,4-Dichloro-2-butene	<PQL	5	79-00-5	1,1,2-Trichloroethane	<PQL	5
75-71-8	Dichlorodifluoromethane	<PQL	10	79-01-6	Trichloroethene	<PQL	5
75-34-3	1,1-Dichloroethane	<PQL	5	75-69-4	Trichlorofluoromethane	48	5
107-06-2	1,2-Dichloroethane	<PQL	5	96-18-4	1,2,3-Trichloropropane	<PQL	5
75-35-4	1,1-Dichloroethene	<PQL	5	108-05-4	Vinyl acetate	<PQL	50
156-60-5	1,2-Dichloroethene (total)	<PQL	5	75-01-4	Vinyl chloride	<PQL	10
78-87-5	1,2-Dichloropropane	<PQL	5	1330-20-7	Xylenes (total)	190	10

SURROGATE	%RECOVERY	LIMITS
1,2-Dichloroethane-d4	96	76 - 114
Toluene-d8	98	88 - 110
4-Bromofluorobenzene	97	86 - 115

Work Order # 92-06-199 Ross Analytical Services, Inc Reported: 07/06/92

Sample Description VOST Air 1549 Lab No. 05
Test Description Volatiles library search Test Code LIB_MA

DATE RUN 07/02/92 UNITS Total Nanograms

COMPOUND	SCAN #	APPROXIMATE RESULT
Unknown Hydrocarbon	619	200
Pentane	684	100
Unknown Hydrocarbon	946	200
Methyl Cyclopentane	1034	70
Unknown Hydrocarbon, C7	1193	6
Heptane	1205	40
Methyl Cyclohexane	1285	40
Unknown Hydrocarbon, C8	1366	20
Unknown Hydrocarbon, C8	1446	50
Naphthalene	2364	30

Work Order # 92-06-199 Ross Analytical Services, Inc Reported: 07/06/92

Sample Description VOST Air 1550 Lab No. 06
Test Description App. IX purgeables Test Code 8240A9

DATE RUN 07/01/92 DILUTION FACTOR 1 UNITS Total Nanograms

CAS No.	COMPOUND	RESULT	PQL	CAS No.	COMPOUND	RESULT	PQL
67-64-1	Acetone	57	50	10061-01-5	cis-1,3-Dichloropropene	<PQL	5
75-05-8	Acetonitrile	<PQL	50	10061-02-6	trans-1,3-Dichloropropene	<PQL	5
107-02-8	Acrolein	<PQL	20	100-41-4	Ethylbenzene	<PQL	5
107-13-1	Acrylonitrile	<PQL	10	97-83-2	Ethyl methacrylate	<PQL	5
107-05-1	Allyl chloride	<PQL	5	591-78-6	2-Hexanone	<PQL	50
71-43-2	Benzene	<PQL	5	74-88-4	Iodomethane	<PQL	10
75-27-4	Bromodichloromethane	<PQL	5	126-98-7	Methacrylonitrile	<PQL	20
75-25-2	Bromoform	<PQL	5	74-95-3	Methylene bromide	<PQL	5
74-83-9	Bromomethane	<PQL	10	75-09-2	Methylene chloride	<PQL	5
75-15-0	Carbon disulfide	<PQL	5	78-93-3	Methyl ethyl ketone	89	10
56-23-5	Carbon tetrachloride	<PQL	5	80-62-6	Methyl methacrylate	<PQL	5
108-90-7	Chlorobenzene	<PQL	5	108-10-1	4-Methyl-2-pentanone	<PQL	50
75-00-3	Chloroethane	<PQL	10	107-12-0	Propionitrile	<PQL	20
67-66-3	Chloroform	<PQL	5	100-42-5	Styrene	<PQL	5
74-87-3	Chloromethane	<PQL	10	630-20-6	1,1,1,2-Tetrachloroethane	<PQL	5
126-99-8	Chloroprene	<PQL	5	79-34-5	1,1,2,2-Tetrachloroethane	<PQL	5
124-48-1	Dibromochloromethane	<PQL	5	127-18-4	Tetrachloroethene	200	5
96-12-8	1,2-Dibromo-3-chloropropane	<PQL	10	108-88-3	Toluene	<PQL	5
106-93-4	1,2-Dibromoethane	<PQL	5	71-55-6	1,1,1-Trichloroethane	<PQL	5
110-57-6	trans-1,4-Dichloro-2-butene	<PQL	5	79-00-5	1,1,2-Trichloroethane	<PQL	5
75-71-8	Dichlorodifluoromethane	<PQL	10	79-01-6	Trichloroethene	<PQL	5
75-34-3	1,1-Dichloroethane	<PQL	5	75-69-4	Trichlorofluoromethane	<PQL	5
107-06-2	1,2-Dichloroethane	<PQL	5	96-18-4	1,2,3-Trichloropropane	<PQL	5
75-35-4	1,1-Dichloroethene	<PQL	5	108-05-4	Vinyl acetate	<PQL	50
156-60-5	1,2-Dichloroethene (total)	<PQL	5	75-01-4	Vinyl chloride	<PQL	10
78-87-5	1,2-Dichloropropane	<PQL	5	1330-20-7	Xylenes (total)	<PQL	10

SURROGATE	%RECOVERY	LIMITS
1,2-Dichloroethane-d4	99	76 - 114
Toluene-d8	92	88 - 110
4-Bromofluorobenzene	105	86 - 115

Work Order # 92-06-199 Ross Analytical Services, Inc Reported: 07/06/92

Sample Description VOST Air 1550 Lab No. 06
Test Description Volatiles library search Test Code LIB_MA

DATE RUN 07/01/92 UNITS Total Nanograms

COMPOUND	SCAN #	APPROXIMATE RESULT
No Unknowns Found		

Work Order # 92-06-199 Ross Analytical Services, Inc Reported: 07/06/92

Sample Description VOST Air 1551 Lab No. 07
Test Description App. IX purgeables Test Code 8240A9

DATE RUN 07/02/92 DILUTION FACTOR 1 UNITS Total Nanograms

CAS No.	COMPOUND	RESULT	PQL	CAS No.	COMPOUND	RESULT	PQL
67-64-1	Acetone	77	50	10061-01-5	cis-1,3-Dichloropropene	<PQL	5
75-05-8	Acetonitrile	<PQL	50	10061-02-6	trans-1,3-Dichloropropene	<PQL	5
107-02-8	Acrolein	<PQL	20	100-41-4	Ethylbenzene	77	5
107-13-1	Acrylonitrile	<PQL	10	97-83-2	Ethyl methacrylate	<PQL	5
107-05-1	Allyl chloride	<PQL	5	591-78-6	2-Hexanone	<PQL	50
71-43-2	Benzene	2000	5	74-88-4	Iodomethane	<PQL	10
75-27-4	Bromodichloromethane	<PQL	5	126-98-7	Methacrylonitrile	<PQL	20
75-25-2	Bromoform	<PQL	5	74-95-3	Methylene bromide	<PQL	5
74-83-9	Bromomethane	<PQL	10	75-09-2	Methylene chloride	42	5
75-15-0	Carbon disulfide	68	5	78-93-3	Methyl ethyl ketone	<PQL	10
56-23-5	Carbon tetrachloride	<PQL	5	80-62-6	Methyl methacrylate	<PQL	5
108-90-7	Chlorobenzene	<PQL	5	108-10-1	4-Methyl-2-pentanone	<PQL	50
75-00-3	Chloroethane	<PQL	10	107-12-0	Propionitrile	<PQL	20
67-66-3	Chloroform	<PQL	5	100-42-5	Styrene	120	5
74-87-3	Chloromethane	390	10	630-20-6	1,1,1,2-Tetrachloroethane	<PQL	5
126-99-8	Chloroprene	<PQL	5	79-34-5	1,1,2,2-Tetrachloroethane	<PQL	5
124-48-1	Dibromochloromethane	<PQL	5	127-18-4	Tetrachloroethene	<PQL	5
96-12-8	1,2-Dibromo-3-chloropropane	<PQL	10	108-88-3	Toluene	1300	5
106-93-4	1,2-Dibromoethane	<PQL	5	71-55-6	1,1,1-Trichloroethane	<PQL	5
110-57-6	trans-1,4-Dichloro-2-butene	<PQL	5	79-00-5	1,1,2-Trichloroethane	<PQL	5
75-71-8	Dichlorodifluoromethane	<PQL	10	79-01-6	Trichloroethene	<PQL	5
75-34-3	1,1-Dichloroethane	<PQL	5	75-69-4	Trichlorofluoromethane	<PQL	5
107-06-2	1,2-Dichloroethane	<PQL	5	96-18-4	1,2,3-Trichloropropane	<PQL	5
75-35-4	1,1-Dichloroethene	<PQL	5	108-05-4	Vinyl acetate	<PQL	50
156-60-5	1,2-Dichloroethene (total)	<PQL	5	75-01-4	Vinyl chloride	<PQL	10
78-87-5	1,2-Dichloropropane	<PQL	5	1330-20-7	Xylenes (total)	700	10

SURROGATE	%RECOVERY	LIMITS
1,2-Dichloroethane-d4	91	76 - 114
Toluene-d8	110	88 - 110
4-Bromofluorobenzene	90	86 - 115

Work Order # 92-06-199 Ross Analytical Services, Inc Reported: 07/06/92

Sample Description VOST Air 1551 Lab No. 07
Test Description Volatiles library search Test Code LIB_MA

DATE RUN 07/02/92 UNITS Total Nanograms

COMPOUND	SCAN #	APPROXIMATE RESULT
Pentane	682	200
Unknown Hydrocarbon, C9	944	100
Cyclohexane	1182	20
1-Heptene	1191	20
Heptane	1203	50
Unknown Hydrocarbon, C8	1444	50
Ethylmethyl Benzene	1864	40
Trimethyl Benzene isomer	1876	40
Trimethyl Benzene isomer	1937	40
Naphthalene	2361	100

Appendix C

Semi-Volatile Compounds

p 1 of 3

SEMI-VOLATILE COMPOUNDS
CHARGING MACHINE TEST
JEWELL COAL AND COKE CO.
JUNE 17-19, 1992
IT PROJECT NO. 406253.17

COMPOUND	MOL. WT.	TOTAL MATERIAL (uG)	RUN NO. 1 SAMPLE VOLUME (FT3)	GAS FLOWRATE (DSCFM)	GAS CONC. (PPB)	MASS RATE (LBS/HR)	MASS RATE (LBS/TON)	TOTAL MATERIAL (uG)
ACENAPTHALENE	154	380	665	21200	3.152	1.60E-03	5.22E-06	50
ANTHRACENE	178	130	665	21200	0.933	5.48E-04	1.79E-06	33
BENZO[A]ANTHRACENE	228	25	665	21200	0.140	1.05E-04	3.43E-07	
BENZYL ALCOHOL	108	97	665	21200	1.147	4.09E-04	1.33E-06	32
BIS(2-ETHYLHEXYL) PHTHALATE	391		665	21200	0.000	0.00E+00	0.00E+00	110
CHRYSENE	228	40	665	21200	0.224	1.69E-04	5.49E-07	11
CRESOLS	108	287	665	21200	3.395	1.21E-03	3.94E-06	98
DIBENZOFURAN	168	110	665	21200	0.836	4.64E-04	1.51E-06	33
DI-N-BUTYL PHTHALATE	278		665	21200	0.000	0.00E+00	0.00E+00	
2,4-DIMETHYLPHENOL	122	88	665	21200	0.921	3.71E-04	1.21E-06	24
FLUORANTHENE	202	530	665	21200	3.352	2.23E-03	7.28E-06	130
FLUORENE	166	100	665	21200	0.770	4.22E-04	1.37E-06	43
2-METHYLNAPTHALENE	142	280	665	21200	2.519	1.18E-03	3.85E-06	65
NAPTHALENE	128	1500	665	21200	14.970	6.33E-03	2.06E-05	280
PHENANTHRENE	178	670	665	21200	4.808	2.83E-03	9.20E-06	230
PHENOL	94	210	665	21200	2.854	8.86E-04	2.88E-06	68

TOTAL PAHs

SEMI-VOLATILE COMPOUNDS
CHARGING MACHINE TEST
JEWELL COAL AND COKE CO.
JUNE 17-19, 1992
IT PROJECT NO. 406253.17

RUN NO. 2 (LOW RECOVERIES)						RUN NO. 3				
SAMPLE VOLUME (FT3)	GAS FLOWRATE (DSCFM)	GAS CONC. (PPB)	MASS RATE (LBS/HR)	MASS RATE (LBS/TON)	TOTAL MATERIAL (uG)	SAMPLE VOLUME (FT3)	GAS FLOWRATE (DSCFM)	GAS CONC. (PPB)	MASS RATE (LBS/HR)	MASS RATE (LBS/TON)
773	21000	0.357	1.80E-04	6.13E-07	270	791	19700	1.883	8.89E-04	2.75E-06
773	21000	0.204	1.19E-04	4.05E-07	87	791	19700	0.525	2.87E-04	8.87E-07
773	21000	0.000	0.00E+00	0.00E+00	15	791	19700	0.071	4.94E-05	1.53E-07
773	21000	0.326	1.15E-04	3.92E-07	93	791	19700	0.925	3.06E-04	9.49E-07
773	21000	0.309	3.95E-04	1.35E-06		791	19700	0.000	0.00E+00	0.00E+00
773	21000	0.053	3.95E-05	1.35E-07	23	791	19700	0.108	7.58E-05	2.35E-07
773	21000	0.997	3.52E-04	1.20E-06	270	791	19700	2.685	8.89E-04	2.75E-06
773	21000	0.216	1.19E-04	4.05E-07	90	791	19700	0.575	2.96E-04	9.18E-07
773	21000	0.000	0.00E+00	0.00E+00	11	791	19700	0.042	3.62E-05	1.12E-07
773	21000	0.216	8.62E-05	2.94E-07	48	791	19700	0.423	1.58E-04	4.90E-07
773	21000	0.707	4.67E-04	1.59E-06	250	791	19700	1.329	8.24E-04	2.55E-06
773	21000	0.285	1.55E-04	5.27E-07	92	791	19700	0.595	3.03E-04	9.38E-07
773	21000	0.503	2.34E-04	7.97E-07	250	791	19700	1.891	8.24E-04	2.55E-06
773	21000	2.404	1.01E-03	3.43E-06	1100	791	19700	9.229	3.62E-03	1.12E-05
773	21000	1.420	8.27E-04	2.82E-06	430	791	19700	2.594	1.42E-03	4.39E-06
773	21000	0.795	2.44E-04	8.34E-07	160	791	19700	1.828	5.27E-04	1.63E-06

SEMI-VOLATILE COMPOUNDS
CHARGING MACHINE TEST
JEWELL COAL AND COKE CO.
JUNE 17-19, 1992
IT PROJECT NO. 406253.17

-AVERAGE OF 1 & 3- MASS RATE (LBS/HR)	MASS RATE (LBS/TON)	FIELD BLANK
1.25E-03	3.99E-06	10
4.17E-04	1.34E-06	10
7.74E-05	2.48E-07	10
3.58E-04	1.14E-06	20
0.00E+00	0.00E+00	10
1.22E-04	3.92E-07	10
1.05E-03	3.35E-06	20
3.80E-04	1.21E-06	10
1.81E-05	5.61E-08	10
2.65E-04	8.49E-07	20
1.53E-03	4.91E-06	10
3.62E-04	1.16E-06	10
1.00E-03	3.20E-06	12
4.97E-03	1.59E-05	44
2.12E-03	6.79E-06	10
7.06E-04	2.26E-06	10
4.63E-03	1.48E-05	

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CERTIFICATE OF ANALYSIS

Client:

IT Corporation
312 Directors Drive
Knoxville, TN 37923

Attn: John Carson

Work Order #: 92-06-198
Client Code: IT_AQS_KNOX
Report Date: 07/09/92
Work ID: PUF's for App. IX BNA'S
Date Received: 06/24/92

Purchase Order: Proj# 406253.17/Jewell

SAMPLE IDENTIFICATION

Lab Number	Sample Description	Run
01	PUF AIR 1541/Rnse Air 1552	1
03	PUF AIR 1543/Rnse Air 1554	3
02	PUF AIR 1542/Rns. 1553	2
04	PUF AIR 1544/Rns Air 1555	Field Blank

Data are reported on an as-received basis unless stated otherwise. Practical Quantitation Limits (PQL's) are listed; they are higher than instrument detection limits and take the sample's matrix into account. Metals and other inorganic data are corrected for laboratory blank values; organic data are not. Unless otherwise noted, organic analysis blanks had no targets found above their PQL's.

Certificate approved by
Charles E. Simmons

TEST METHODOLOGIES

Appendix IX semivolatile organics (base/neutral/acid) were determined by gas chromatography/mass spectrometry as in EPA Method 8270.

REPORT COMMENTS

There was a mechanical failure which occurred during the extraction of both PUF AIR 1542/Rns. 1553 (RASI No. 02) and PUF AIR 1544/Rns. Air 1555 (RASI No. 04). This failure clogged up the Soxlet extractor preventing solvent from circulating through the sample. This caused the collection flask to go dry. Hence, it should be noted that the reported results for these two samples are minimum estimates. Surrogates are low for these samples due to this problem, too.

RESULTS BY SAMPLE

Sample Description PUF AIR 1541/Rnse Air 1552 Lab No. 01
Test Description App. IX semivolatiles Test Code 8270A9

EXTRACTED 06/26/92 DATE RUN 07/07/92 DILUTION FACTOR 1 UNITS Total ug

CAS No.	COMPOUND	RESULT	PQL	CAS No.	COMPOUND	RESULT	PQL
83-32-9	Acenaphthene	<PQL	10	60-11-7	p-(Dimethylamino)azobenzene	<PQL	20
208-96-8	Acenaphthalene	380	10	57-97-6	7,12-Dimethylbenz(ah)anthracene	<PQL	20
98-86-2	Acetophenone	<PQL	10	119-93-7	3,3'-Dimethylbenzidine	<PQL	10
53-96-3	2-Acetylaminofluorene	<PQL	30	122-09-8	a,a-Dimethylphenethylamine	(1)	
92-67-1	4-Aminobiphenyl	<PQL	20	105-67-9	2,4-Dimethylphenol	88	20
62-53-3	Aniline	<PQL	10	131-11-3	Dimethyl phthalate	<PQL	10
120-12-7	Anthracene	130	10	99-65-0	1,3-Dinitrobenzene	<PQL	50
140-57-8	Aramite	<PQL	20	534-52-1	4,6-Dinitro-o-cresol	<PQL	50
56-55-3	Benzo(a)anthracene	25	10	51-28-5	2,4-Dinitrophenol	<PQL	50
205-99-2	Benzo(b)fluoranthene	<PQL	10	121-14-2	2,4-Dinitrotoluene	<PQL	10
207-08-9	Benzo(k)fluoranthene	<PQL	10	606-20-2	2,6-Dinitrotoluene	<PQL	10
191-24-2	Benzo(ghi)perylene	<PQL	10	88-85-7	Dinoseb	<PQL	20
50-32-8	Benzo(a)pyrene	<PQL	10	117-84-0	Di-n-octyl phthalate	<PQL	10
100-51-6	Benzyl alcohol	97	20	122-39-4	Diphenylamine	<PQL	10
111-91-1	Bis(2-chloroethoxy)methane	<PQL	10	62-50-0	Ethyl methanesulfonate	<PQL	10
111-44-4	Bis(2-chloroethyl)ether	<PQL	10	206-44-0	Fluoranthene	530	10
108-60-1	Bis(2-chloroisopropyl)ether	<PQL	10	86-73-7	Fluorene	100	10
117-81-7	Bis(2-ethylhexyl)phthalate	<PQL	10	118-74-1	Hexachlorobenzene	<PQL	10
101-53-3	4-Bromophenyl phenyl ether	<PQL	10	87-68-3	Hexachlorobutadiene	<PQL	10
85-68-7	Butyl benzyl phthalate	<PQL	20	77-47-4	Hexachlorocyclopentadiene	(1)	
106-47-8	4-Chloroaniline	<PQL	20	67-72-1	Hexachloroethane	<PQL	10
510-15-6	Chlorobenzilate	<PQL	30	70-30-4	Hexachlorophene	(1)	
59-50-7	p-Chloro-m-cresol	<PQL	10	1888-71-7	Hexachloropropene	<PQL	50
91-58-7	2-Chloronaphthalene	<PQL	10	193-39-5	Indeno(1,2,3-cd)pyrene	<PQL	10
95-57-8	2-Chlorophenol	<PQL	10	78-59-1	Isophorone	<PQL	10
7005-72-3	4-Chlorophenyl phenyl ether	<PQL	10	120-58-1	Isosafrole	<PQL	10
218-01-9	Chrysene	40	10	91-80-5	Methapyrilene	<PQL	100
95-48-7	o-Cresol	97	10	56-49-5	3-Methylcholanthrene	<PQL	10
	m- and p- Cresol (colelute)	190	10	66-27-3	Methyl methanesulfonate	<PQL	10
2303-16-4	Diallate	<PQL	10	91-57-6	2-Methylnaphthalene	280	10
53-70-3	Dibenz(ah)anthracene	<PQL	10	91-20-3	Naphthalene	1500	10
132-64-9	Dibenzofuran	110	10	130-15-4	1,4-Naphthoquinone	<PQL	200
84-74-2	Di-n-butyl phthalate	<PQL	10	134-32-7	1-Naphthylamine	<PQL	10
95-50-1	1,2-Dichlorobenzene	<PQL	10	91-59-8	2-Naphthylamine	<PQL	20
541-73-1	1,3-Dichlorobenzene	<PQL	10	88-74-4	2-Nitroaniline	<PQL	50
106-46-7	1,4-Dichlorobenzene	<PQL	15	99-09-2	3-Nitroaniline	<PQL	50
91-94-1	3,3'-Dichlorobenzidine	<PQL	25	100-01-6	4-Nitroaniline	<PQL	50
120-83-2	2,4-Dichlorophenol	<PQL	10	98-95-3	Nitrobenzene	<PQL	10
87-65-0	2,6-Dichlorophenol	<PQL	50	88-75-5	2-Nitrophenol	<PQL	10
84-66-2	Diethyl phthalate	<PQL	10	100-02-7	4-Nitrophenol	<PQL	50

Work Order # 92-06-198 Ross Analytical Services, Inc Reported: 07/09/92

Sample Description PUF AIR 1541/Rnse Air 1552 Lab No. 01
Test Description App. IX semivolatiles Test Code 8270A9

CAS No.	COMPOUND	RESULT	PQL	CAS No.	COMPOUND	RESULT	PQL
56-57-5	4-Nitroquinoline 1-oxide	<PQL	20	62-44-2	Phenacetin	<PQL	20
924-16-3	N-Nitrosodi-n-butylamine	<PQL	10	85-01-8	Phenanthrene	670	10
55-18-5	N-Nitrosodiethylamine	<PQL	10	108-95-2	Phenol	210	10
62-75-9	N-Nitrosodimethylamine	<PQL	20	106-50-3	p-Phenylenediamine	(1)	
86-30-6	N-Nitrosodiphenylamine (2)	<PQL	10	109-06-8	2-Picoline	<PQL	10
621-64-7	N-Nitrosodi-n-propylamine	<PQL	10	23950-58-5	Pronamide	<PQL	20
10595-95-6	N-Nitrosomethylethylamine	<PQL	20	110-86-1	Pyridine	<PQL	50
59-89-2	N-Nitrosomorpholine	<PQL	10	94-59-7	Safrole	<PQL	10
100-75-4	N-Nitrosopiperidine	<PQL	10	95-94-3	1,2,4,5-Tetrachlorobenzene	<PQL	20
930-55-2	N-Nitrosopyrrolidine	<PQL	10	58-90-2	2,3,4,6-Tetrachlorophenol	<PQL	50
99-55-8	5-Nitro-o-toluidine	<PQL	10	95-53-4	o-Toluidine	<PQL	10
608-93-5	Pentachlorobenzene	<PQL	10	120-82-1	1,2,4-Trichlorobenzene	<PQL	10
76-01-7	Pentachloroethane	<PQL	200	95-95-4	2,4,5-Trichlorophenol	<PQL	20
82-68-8	Pentachloronitrobenzene	<PQL	10	88-06-2	2,4,6-Trichlorophenol	<PQL	10
87-86-5	Pentachlorophenol	<PQL	50	99-35-4	1,3,5-Trinitrobenzene	<PQL	50

SURROGATE	%RECOVERY	LIMITS
Nitrobenzene-d5	57	35 - 114
2-Fluorobiphenyl	44	43 - 116
Terphenyl-d14	56	33 - 141
Phenol-d6	39	10 - 110
2-Fluorophenol	27	21 - 110
2,4,6-Tribromophenol	56	10 - 123

(1) These compounds are unstable in the standards or are not recovered from samples.
(2) Reported as diphenylamine.

Work Order # 92-06-198 Ross Analytical Services, Inc Reported: 07/09/92

Sample Description PUF AIR 1541/Rnse Air 1552 Lab No. 01
Test Description Semivols. library search Test Code LIB_MX

DATE EXTRACTED 06/26/92 DATE RUN 07/07/92
DILUTION FACTOR 1 UNITS Total ug

COMPOUND	SCAN #	APPROXIMATE RESULT
2-hexanone	562	300
Xylene isomer	763	300
Unknown Aromatic	1051	200
Unknown Hydrocarbon	1058	300
Unknown Hydrocarbon	1261	300
Unknown	1312	70
Unknown Aromatic	1368	40
Unknown	1383	50
Unknown Naphthalene	1413	50
Unknown Hydrocarbon	1621	60
Unknown PAH	1774	100
Unknown Hydrocarbon	1783	100
Dimethyl Naphthalene	1843	200
Trimethyl Naphthalene	2011	60
Unknown Hydrocarbon	2080	90
Unknown PAH	2264	100
Unknown PAH	2515	200
Unknown PAH	2524	200
Unknown PAH	2676	200
Unknown PAH	2748	100

Work Order # 92-06-198 Ross Analytical Services, Inc Reported: 07/09/92

Sample Description PUF AIR 1542/Rns. 1553 Lab No. 02
Test Description App. IX semivolatiles Test Code 8270A9

EXTRACTED 06/26/92 DATE RUN 07/07/92 DILUTION FACTOR 1 UNITS Total ug

CAS No.	COMPOUND	RESULT	PQL
83-32-9	Acenaphthene	<PQL	10
208-96-8	Acenaphthalene	50	10
98-86-2	Acetophenone	<PQL	10
53-96-3	2-Acetylaminofluorene	<PQL	30
92-67-1	4-Aminobiphenyl	<PQL	20
62-53-3	Aniline	<PQL	10
120-12-7	Anthracene	33	10
140-57-8	Aramite	<PQL	20
56-55-3	Benzo[a]anthracene	<PQL	10
205-99-2	Benzo[b]fluoranthene	<PQL	10
207-08-9	Benzo[k]fluoranthene	<PQL	10
191-24-2	Benzo[ghi]perylene	<PQL	10
50-32-8	Benzo[a]pyrene	<PQL	10
100-51-6	Benzyl alcohol	32	20
111-91-1	Bis(2-chloroethoxy)methane	<PQL	10
111-44-4	Bis(2-chloroethyl)ether	<PQL	10
108-60-1	Bis(2-chloroisopropyl)ether	<PQL	10
117-81-7	Bis(2-ethylhexyl)phthalate	110	10
101-53-3	4-Bromophenyl phenyl ether	<PQL	10
85-68-7	Butyl benzyl phthalate	<PQL	20
106-47-8	4-Chloroaniline	<PQL	20
510-15-6	Chlorobenzilate	<PQL	30
59-50-7	p-Chloro-m-cresol	<PQL	10
91-58-7	2-Chloronaphthalene	<PQL	10
95-57-8	2-Chlorophenol	<PQL	10
7005-72-3	4-Chlorophenyl phenyl ether	<PQL	10
218-01-9	Chrysene	11	10
95-48-7	o-Cresol	32	10
	m- and p- Cresol (colelute)	66	10
2303-16-4	Diallate	<PQL	10
53-70-3	Dibenz[ah]anthracene	<PQL	10
132-64-9	Dibenzofuran	33	10
84-74-2	Di-n-butyl phthalate	<PQL	10
95-50-1	1,2-Dichlorobenzene	<PQL	10
541-73-1	1,3-Dichlorobenzene	<PQL	10
106-46-7	1,4-Dichlorobenzene	<PQL	15
91-94-1	3,3'-Dichlorobenzidine	<PQL	25
120-83-2	2,4-Dichlorophenol	<PQL	10
87-65-0	2,6-Dichlorophenol	<PQL	50
84-66-2	Diethyl phthalate	<PQL	10
60-11-7	p-(Dimethylamino)azobenzene	<PQL	20
57-97-6	7,12-Dimethylbenz[ah]anthracene	<PQL	20
119-93-7	3,3'-Dimethylbenzidine	<PQL	10
122-09-8	a,a-Dimethylphenethylamine	(1)	
105-67-9	2,4-Dimethylphenol	24	20
131-11-3	Dimethyl phthalate	<PQL	10
99-65-0	1,3-Dinitrobenzene	<PQL	50
534-52-1	4,6-Dinitro-o-cresol	<PQL	50
51-28-5	2,4-Dinitrophenol	<PQL	50
121-14-2	2,4-Dinitrotoluene	<PQL	10
606-20-2	2,6-Dinitrotoluene	<PQL	10
88-85-7	Dinoseb	<PQL	20
117-84-0	Di-n-octyl phthalate	<PQL	10
122-39-4	Diphenylamine	<PQL	10
62-50-0	Ethyl methanesulfonate	<PQL	10
206-44-0	Fluoranthene	130	10
86-73-7	Fluorene	43	10
118-74-1	Hexachlorobenzene	<PQL	10
87-68-3	Hexachlorobutadiene	<PQL	10
77-47-4	Hexachlorocyclopentadiene	(1)	
67-72-1	Hexachloroethane	<PQL	10
70-30-4	Hexachlorophene	(1)	
1888-71-7	Hexachloropropene	<PQL	50
193-39-5	Indeno(1,2,3-cd)pyrene	<PQL	10
78-59-1	Isophorone	<PQL	10
120-58-1	Isosafrole	<PQL	10
91-80-5	Methapyrilene	<PQL	100
56-49-5	3-Methylcholanthrene	<PQL	10
66-27-3	Methyl methanesulfonate	<PQL	10
91-57-6	2-Methylnaphthalene	65	10
91-20-3	Naphthalene	280	10
130-15-4	1,4-Naphthoquinone	<PQL	200
134-32-7	1-Naphthylamine	<PQL	10
91-59-8	2-Naphthylamine	<PQL	20
88-74-4	2-Nitroaniline	<PQL	50
99-09-2	3-Nitroaniline	<PQL	50
100-01-6	4-Nitroaniline	<PQL	50
98-95-3	Nitrobenzene	<PQL	10
88-75-5	2-Nitrophenol	<PQL	10
100-02-7	4-Nitrophenol	<PQL	50
56-57-5	4-Nitroquinoline 1-oxide	<PQL	20

Work Order # 92-06-198 Ross Analytical Services, Inc Reported: 07/09/92

Sample Description PUF AIR 1542/Rns. 1553 Lab No. 02
Test Description App. IX semivolatiles Test Code 8270A9

CAS No.	COMPOUND	RESULT	PQL	CAS No.	COMPOUND	RESULT	PQL
924-16-3	N-Nitrosodi-n-butylamine	<PQL	10	85-01-8	Phenanthrene	230	10
55-18-5	N-Nitrosodiethylamine	<PQL	10	108-95-2	Phenol	68	10
62-75-9	N-Nitrosodimethylamine	<PQL	20	106-50-3	p-Phenylenediamine	(1)	
86-30-6	N-Nitrosodiphenylamine (2)	<PQL	10	109-06-8	2-Picoline	<PQL	10
621-64-7	N-Nitrosodi-n-propylamine	<PQL	10	23950-58-5	Pronamide	<PQL	20
10595-95-6	N-Nitrosomethylethylamine	<PQL	20	110-86-1	Pyridine	<PQL	50
59-89-2	N-Nitrosomorpholine	<PQL	10	94-59-7	Safrole	<PQL	10
100-75-4	N-Nitrosopiperidine	<PQL	10	95-94-3	1,2,4,5-Tetrachlorobenzene	<PQL	20
930-55-2	N-Nitrosopyrrolidine	<PQL	10	58-90-2	2,3,4,6-Tetrachlorophenol	<PQL	50
99-55-8	5-Nitro-o-toluidine	<PQL	10	95-53-4	o-Toluidine	<PQL	10
608-93-5	Pentachlorobenzene	<PQL	10	120-82-1	1,2,4-Trichlorobenzene	<PQL	10
76-01-7	Pentachloroethane	<PQL	200	95-95-4	2,4,5-Trichlorophenol	<PQL	20
82-68-8	Pentachloronitrobenzene	<PQL	10	88-06-2	2,4,6-Trichlorophenol	<PQL	10
87-86-5	Pentachlorophenol	<PQL	50	99-35-4	1,3,5-Trinitrobenzene	<PQL	50
62-44-2	Phenacetin	<PQL	20				

SURROGATE	%RECOVERY	LIMITS
Nitrobenzene-d5	8 Q	35 - 114
2-Fluorobiphenyl	14 Q	43 - 116
Terphenyl-d14	54	33 - 141
Phenol-d6	12	10 - 110
2-Fluorophenol	5 Q	21 - 110
2,4,6-Tribromophenol	12	10 - 123

(1) These compounds are unstable in the standards or are not recovered from samples.
(2) Reported as diphenylamine.

Work Order # 92-06-198 Ross Analytical Services, Inc Reported: 07/09/92

Sample Description PUF AIR 1542/Rns. 1553 Lab No. 02
Test Description Semivols. library search Test Code LIB_MX

DATE EXTRACTED 06/26/92 DATE RUN 07/07/92
DILUTION FACTOR 1 UNITS Total ug

COMPOUND	SCAN #	APPROXIMATE RESULT
2-Hexanone	565	100
Xylene isomer	765	200
Unknown Aromatic	1049	80
Unknown Cyclic Hydrocarbon	1331	30
Unknown PAH	1664	40
Unknown Hydrocarbon	2079	40
Unknown PAH	2261	50
Unknown PAH	2309	70
Unknown PAH	2333	40
Unknown Hydrocarbon	2347	30
Unknown PAH	2401	50
Unknown PAH	2460	50
Unknown Hydrocarbon	2471	30
Unknown PAH	2512	70
Unknown PAH	2520	90
Unknown PAH	2550	30
Unknown PAH	2673	70
Unknown Hydrocarbon	2747	70
Unknown	3087	40
Unknown hydrocarbon	1056	80

Work Order # 92-06-198 Ross Analytical Services, Inc Reported: 07/09/92

Sample Description PUF AIR 1543/Rnse Air 1554 Lab No. 03
Test Description App. IX semivolatiles Test Code 8270A9

EXTRACTED 06/26/92 DATE RUN 07/08/92 DILUTION FACTOR 1 UNITS Total ug

CAS No.	COMPOUND	RESULT	PQL
83-32-9	Acenaphthene	<PQL	10
208-96-8	Acenaphthalene	270	10
98-86-2	Acetophenone	<PQL	10
53-96-3	2-Acetylaminofluorene	<PQL	30
92-67-1	4-Aminobiphenyl	<PQL	20
62-53-3	Aniline	<PQL	10
120-12-7	Anthracene	87	10
140-57-8	Aramite	<PQL	20
56-55-3	Benzo[a]anthracene	15	10
205-99-2	Benzo[b]fluoranthene	<PQL	10
207-08-9	Benzo[k]fluoranthene	<PQL	10
191-24-2	Benzo[ghi]perylene	<PQL	10
50-32-8	Benzo[a]pyrene	<PQL	10
100-51-6	Benzyl alcohol	93	20
111-91-1	Bis(2-chloroethoxy)methane	<PQL	10
111-44-4	Bis(2-chloroethyl)ether	<PQL	10
108-60-1	Bis(2-chloroisopropyl)ether	<PQL	10
117-81-7	Bis(2-ethylhexyl)phthalate	<PQL	10
101-53-3	4-Bromophenyl phenyl ether	<PQL	10
85-68-7	Butyl benzyl phthalate	<PQL	20
106-47-8	4-Chloroaniline	<PQL	20
510-15-6	Chlorobenzilate	<PQL	30
59-50-7	p-Chloro-m-cresol	<PQL	10
91-58-7	2-Chloronaphthalene	<PQL	10
95-57-8	2-Chlorophenol	<PQL	10
7005-72-3	4-Chlorophenyl phenyl ether	<PQL	10
218-01-9	Chrysene	23	10
95-48-7	o-Cresol	90	10
	m- and p- Cresol (colelute)	180	10
2303-16-4	Diallate	<PQL	10
53-70-3	Dibenz[ah]anthracene	<PQL	10
132-64-9	Dibenzofuran	90	10
84-74-2	Di-n-butyl phthalate	11	10
95-50-1	1,2-Dichlorobenzene	<PQL	10
541-73-1	1,3-Dichlorobenzene	<PQL	10
106-46-7	1,4-Dichlorobenzene	<PQL	15
91-94-1	3,3'-Dichlorobenzidine	<PQL	25
120-83-2	2,4-Dichlorophenol	<PQL	10
87-65-0	2,6-Dichlorophenol	<PQL	50
84-66-2	Diethyl phthalate	<PQL	10
60-11-7	p-(Dimethylamino)azobenzene	<PQL	20
57-97-6	7,12-Dimethylbenz[ah]anthracene	<PQL	20
119-93-7	3,3'-Dimethylbenzidine	<PQL	10
122-09-8	a,a-Dimethylphenethylamine	(1)	
105-67-9	2,4-Dimethylphenol	48	20
131-11-3	Dimethyl phthalate	<PQL	10
99-65-0	1,3-Dinitrobenzene	<PQL	50
534-52-1	4,6-Dinitro-o-cresol	<PQL	50
51-28-5	2,4-Dinitrophenol	<PQL	50
121-14-2	2,4-Dinitrotoluene	<PQL	10
606-20-2	2,6-Dinitrotoluene	<PQL	10
88-85-7	Dinoseb	<PQL	20
117-84-0	Di-n-octyl phthalate	<PQL	10
122-39-4	Diphenylamine	<PQL	10
62-50-0	Ethyl methanesulfonate	<PQL	10
206-44-0	Fluoranthene	250	10
86-73-7	Fluorene	92	10
118-74-1	Hexachlorobenzene	<PQL	10
87-68-3	Hexachlorobutadiene	<PQL	10
77-47-4	Hexachlorocyclopentadiene	(1)	
67-72-1	Hexachloroethane	<PQL	10
70-30-4	Hexachlorophene	(1)	
1888-71-7	Hexachloropropene	<PQL	50
193-39-5	Indeno(1,2,3-cd)pyrene	<PQL	10
78-59-1	Isophorone	<PQL	10
120-58-1	Isosafrole	<PQL	10
91-80-5	Methapyrilene	<PQL	100
56-49-5	3-Methylcholanthrene	<PQL	10
66-27-3	Methyl methanesulfonate	<PQL	10
91-57-6	2-Methylnaphthalene	250	10
91-20-3	Naphthalene	1100	10
130-15-4	1,4-Naphthoquinone	<PQL	200
134-32-7	1-Naphthylamine	<PQL	10
91-59-8	2-Naphthylamine	<PQL	20
88-74-4	2-Nitroaniline	<PQL	50
99-09-2	3-Nitroaniline	<PQL	50
100-01-6	4-Nitroaniline	<PQL	50
98-95-3	Nitrobenzene	<PQL	10
88-75-5	2-Nitrophenol	<PQL	10
100-02-7	4-Nitrophenol	<PQL	50
56-57-5	4-Nitroquinoline 1-oxide	<PQL	20

Work Order # 92-06-198 Ross Analytical Services, Inc Reported: 07/09/92

Sample Description PUF AIR 1543/Rnse Air 1554 Lab No. 03
Test Description App. IX semivolatiles Test Code 8270A9

CAS No.	COMPOUND	RESULT	PQL	CAS No.	COMPOUND	RESULT	PQL
924-16-3	N-Nitrosodi-n-butylamine	<PQL	10	85-01-8	Phenanthrene	430	10
55-18-5	N-Nitrosodiethylamine	<PQL	10	108-95-2	Phenol	160	10
62-75-9	N-Nitrosodimethylamine	<PQL	20	106-50-3	p-Phenylenediamine	(1)	
86-30-6	N-Nitrosodiphenylamine (2)	<PQL	10	109-06-8	2-Picoline	<PQL	10
621-64-7	N-Nitrosodi-n-propylamine	<PQL	10	23950-58-5	Pronamide	<PQL	20
10595-95-6	N-Nitrosomethylethylamine	<PQL	20	110-86-1	Pyridine	<PQL	50
59-89-2	N-Nitrosomorpholine	<PQL	10	94-59-7	Safrole	<PQL	10
100-75-4	N-Nitrosopiperidine	<PQL	10	95-94-3	1,2,4,5-Tetrachlorobenzene	<PQL	20
930-55-2	N-Nitrosopyrrolidine	<PQL	10	58-90-2	2,3,4,6-Tetrachlorophenol	<PQL	50
99-55-8	5-Nitro-o-toluidine	<PQL	10	95-53-4	o-Toluidine	<PQL	10
608-93-5	Pentachlorobenzene	<PQL	10	120-82-1	1,2,4-Trichlorobenzene	<PQL	10
76-01-7	Pentachloroethane	<PQL	200	95-95-4	2,4,5-Trichlorophenol	<PQL	20
82-68-8	Pentachloronitrobenzene	<PQL	10	88-06-2	2,4,6-Trichlorophenol	<PQL	10
87-86-5	Pentachlorophenol	<PQL	50	99-35-4	1,3,5-Trinitrobenzene	<PQL	50
62-44-2	Phenacetin	<PQL	20				

SURROGATE	%RECOVERY	LIMITS
Nitrobenzene-d5	58	35 - 114
2-Fluorobiphenyl	48	43 - 116
Terphenyl-d14	60	33 - 141
Phenol-d6	41	10 - 110
2-Fluorophenol	27	21 - 110
2,4,6-Tribromophenol	57	10 - 123

(1) These compounds are unstable in the standards or are not recovered from samples.
(2) Reported as diphenylamine.

Work Order # 92-06-198 Ross Analytical Services, Inc Reported: 07/09/92

Sample Description PUF AIR 1543/Rnse Air 1554 Lab No. 03
Test Description Semivols. library search Test Code LIB_MX

DATE EXTRACTED 06/26/92 DATE RUN 07/07/92
DILUTION FACTOR 1 UNITS Total ug

COMPOUND	SCAN #	APPROXIMATE RESULT
2-Hexanone	565	300
Xylene isomer	765	200
Aldol Unknown	940	300
Aldol Unknown	963	300
Unknown	997	700
Unknown Hydrocarbon	1001	300
Unknown Aromatic	1052	200
Unknown Hydrocarbon	1058	100
Unknown Hydrocarbon	1261	200
Unknown	1313	40
Unknown PAH	1369	40
Unknown Hydrocarbon	1384	40
Unknown Naphthalene	1413	60
Unknown Hydrocarbon	1621	50
Unknown PAH	1775	100
Unknown Hydrocarbon	1784	90
Unknown Hydrocarbon	2081	80
Unknown PAH	2264	100
Unknown PAH	2514	100
Unknown PAH	2523	200

Work Order # 92-06-198 Ross Analytical Services, Inc Reported: 07/09/92

Sample Description PUF AIR 1544/Rns Air 1555 Lab No. 04
Test Description App. IX semivolatiles Test Code 8270A9

EXTRACTED 06/26/92 DATE RUN 07/07/92 DILUTION FACTOR 1 UNITS Total ug

CAS No.	COMPOUND	RESULT	PQL
83-32-9	Acenaphthene	<PQL	10
208-96-8	Acenaphthalene	<PQL	10
98-86-2	Acetophenone	<PQL	10
53-96-3	2-Acetylaminofluorene	<PQL	30
92-67-1	4-Aminobiphenyl	<PQL	20
62-53-3	Aniline	<PQL	10
120-12-7	Anthracene	<PQL	10
140-57-8	Aramite	<PQL	20
56-55-3	Benzo[a]anthracene	<PQL	10
205-99-2	Benzo[b]fluoranthene	<PQL	10
207-08-9	Benzo[k]fluoranthene	<PQL	10
191-24-2	Benzo[ghi]perylene	<PQL	10
50-32-8	Benzo[a]pyrene	<PQL	10
100-51-6	Benzyl alcohol	<PQL	20
111-91-1	Bis(2-chloroethoxy)methane	<PQL	10
111-44-4	Bis(2-chloroethyl)ether	<PQL	10
108-60-1	Bis(2-chloroisopropyl)ether	<PQL	10
117-81-7	Bis(2-ethylhexyl)phthalate	<PQL	10
101-53-3	4-Bromophenyl phenyl ether	<PQL	10
85-68-7	Butyl benzyl phthalate	<PQL	20
106-47-8	4-Chloroaniline	<PQL	20
510-15-6	Chlorobenzilate	<PQL	30
59-50-7	p-Chloro-m-cresol	<PQL	10
91-58-7	2-Chloronaphthalene	<PQL	10
95-57-8	2-Chlorophenol	<PQL	10
7005-72-3	4-Chlorophenyl phenyl ether	<PQL	10
218-01-9	Chrysene	<PQL	10
95-48-7	o-Cresol	<PQL	10
	m- and p- Cresol (colelute)	<PQL	10
2303-16-4	Diallate	<PQL	10
53-70-3	Dibenz[ah]anthracene	<PQL	10
132-64-9	Dibenzofuran	<PQL	10
84-74-2	Di-n-butyl phthalate	<PQL	10
95-50-1	1,2-Dichlorobenzene	<PQL	10
541-73-1	1,3-Dichlorobenzene	<PQL	10
106-46-7	1,4-Dichlorobenzene	<PQL	15
91-94-1	3,3'-Dichlorobenzidine	<PQL	25
120-83-2	2,4-Dichlorophenol	<PQL	10
87-65-0	2,6-Dichlorophenol	<PQL	50
84-66-2	Diethyl phthalate	<PQL	10
60-11-7	p-(Dimethylamino)azobenzene	<PQL	20
57-97-6	7,12-Dimethylbenz[ah]anthracene	<PQL	20
119-93-7	3,3'-Dimethylbenzidine	<PQL	10
122-09-8	a,a-Dimethylphenethylamine	(1)	
105-67-9	2,4-Dimethylphenol	<PQL	20
131-11-3	Dimethyl phthalate	<PQL	10
99-65-0	1,3-Dinitrobenzene	<PQL	50
534-52-1	4,6-Dinitro-o-cresol	<PQL	50
51-28-5	2,4-Dinitrophenol	<PQL	50
121-14-2	2,4-Dinitrotoluene	<PQL	10
606-20-2	2,6-Dinitrotoluene	<PQL	10
88-85-7	Dinoseb	<PQL	20
117-84-0	Di-n-octyl phthalate	<PQL	10
122-39-4	Diphenylamine	<PQL	10
62-50-0	Ethyl methanesulfonate	<PQL	10
206-44-0	Fluoranthene	<PQL	10
86-73-7	Fluorene	<PQL	10
118-74-1	Hexachlorobenzene	<PQL	10
87-68-3	Hexachlorobutadiene	<PQL	10
77-47-4	Hexachlorocyclopentadiene	(1)	
67-72-1	Hexachloroethane	<PQL	10
70-30-4	Hexachlorophene	(1)	
1888-71-7	Hexachloropropene	<PQL	50
193-39-5	Indeno(1,2,3-cd)pyrene	<PQL	10
78-59-1	Isophorone	<PQL	10
120-58-1	Isosafrole	<PQL	10
91-80-5	Methapyrilene	<PQL	100
56-49-5	3-Methylcholanthrene	<PQL	10
66-27-3	Methyl methanesulfonate	<PQL	10
91-57-6	2-Methylnaphthalene	<PQL	10
91-20-3	Naphthalene	<PQL	10
130-15-4	1,4-Naphthoquinone	<PQL	200
134-32-7	1-Naphthylamine	<PQL	10
91-59-8	2-Naphthylamine	<PQL	20
88-74-4	2-Nitroaniline	<PQL	50
99-09-2	3-Nitroaniline	<PQL	50
100-01-6	4-Nitroaniline	<PQL	50
98-95-3	Nitrobenzene	<PQL	10
88-75-5	2-Nitrophenol	<PQL	10
100-02-7	4-Nitrophenol	<PQL	50
56-57-5	4-Nitroquinoline 1-oxide	<PQL	20

Work Order # 92-06-198 Ross Analytical Services, Inc Reported: 07/09/92

Sample Description PUF AIR 1544/Rns Air 1555 Lab No. 04
Test Description App. IX semivolatiles Test Code 8270A9

CAS No.	COMPOUND	RESULT	PQL	CAS No.	COMPOUND	RESULT	PQL
924-16-3	N-Nitrosodi-n-butylamine	<PQL	10	85-01-8	Phenanthrene	<PQL	10
55-18-5	N-Nitrosodiethylamine	<PQL	10	108-95-2	Phenol	<PQL	10
62-75-9	N-Nitrosodimethylamine	<PQL	20	106-50-3	p-Phenylenediamine	(1)	
86-30-6	N-Nitrosodiphenylamine (2)	<PQL	10	109-06-8	2-Picoline	<PQL	10
621-64-7	N-Nitrosodi-n-propylamine	<PQL	10	23950-58-5	Pronamide	<PQL	20
10595-95-6	N-Nitrosomethylethylamine	<PQL	20	110-86-1	Pyridine	<PQL	50
59-89-2	N-Nitrosomorpholine	<PQL	10	94-59-7	Safrole	<PQL	10
100-75-4	N-Nitrosopiperidine	<PQL	10	95-94-3	1,2,4,5-Tetrachlorobenzene	<PQL	20
930-55-2	N-Nitrosopyrrolidine	<PQL	10	58-90-2	2,3,4,6-Tetrachlorophenol	<PQL	50
99-55-8	5-Nitro-o-toluidine	<PQL	10	95-53-4	o-Toluidine	<PQL	10
608-93-5	Pentachlorobenzene	<PQL	10	120-82-1	1,2,4-Trichlorobenzene	<PQL	10
76-01-7	Pentachloroethane	<PQL	200	95-95-4	2,4,5-Trichlorophenol	<PQL	20
82-68-8	Pentachloronitrobenzene	<PQL	10	88-06-2	2,4,6-Trichlorophenol	<PQL	10
87-86-5	Pentachlorophenol	<PQL	50	99-35-4	1,3,5-Trinitrobenzene	<PQL	50
62-44-2	Phenacetin	<PQL	20				

SURROGATE	%RECOVERY	LIMITS
Nitrobenzene-d5	5 Q	35 - 114
2-Fluorobiphenyl	11 Q	43 - 116
Terphenyl-d14	24 Q	33 - 141
Phenol-d6	5 Q	10 - 110
2-Fluorophenol	3 Q	21 - 110
2,4,6-Tribromophenol	0 Q	10 - 123

(1) These compounds are unstable in the standards or are not recovered from samples.
(2) Reported as diphenylamine.

Work Order # 92-06-198 Ross Analytical Services, Inc Reported: 07/09/92

Sample Description PUF AIR 1544/Rns Air 1555 Lab No. 04
Test Description Semivols. library search Test Code LIB_MX

DATE EXTRACTED 06/26/92 DATE RUN 07/07/92
DILUTION FACTOR 1 UNITS Total ug

COMPOUND	SCAN #	APPROXIMATE RESULT
Toluene	514	10
Aldol Unknown	555	30
2-Hexanone	566	60
Unknown Hydrocarbon	579	10
Unknown	588	20
Aldol Unknown	598	40
Aldol Unknown	935	30
Unknown	956	40
Unknown	989	80
Unknown Cyclic	1124	70
Xylene isomer	1159	40
Unknown Aromatic	1177	40
Unknown Hydrocarbon	1309	10
Unknown Cyclic Hydrocarbon	1320	20
Unknown Cyclic Hydrocarbon	1330	40
Unknown Cyclic Hydrocarbon	1350	20
Unknown Cyclic Hydrocarbon	1360	20
Unknown Aromatic	1409	30
Unknown Aromatic	3086	20
Unknown Hydrocarbon	3482	60

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CERTIFICATE OF ANALYSIS

Client:

IT Corporation
312 Directors Drive
Knoxville, TN 37923

Attn: John Carson

Work Order #: 92-07-109
Client Code: IT_AQS_KNOX
Report Date: 07/31/92
Work ID: PUF for APP IX BNA's
Date Received: 07/17/92

Purchase Order: Job# 406253.17/Jewell

SAMPLE IDENTIFICATION

Lab Number	Sample Description		Lab Number	Sample Description
01	PUF 0140 + Hexane 0141	Additional Field Blank		

Data are reported on an as-received basis unless stated otherwise. Practical Quantitation Limits (PQL's) are listed; they are higher than instrument detection limits and take the sample's matrix into account. Metals and other inorganic data are corrected for laboratory blank values; organic data are not. Unless otherwise noted, organic analysis blanks had no targets found above their PQL's.

Certificate approved by
Charles E. Simmons

REPORT COMMENTS

Surrogate, 2-fluorophenol, was out of control limits due to the large amount of hexane present in the sample.

TEST METHODOLOGIES

Appendix IX semivolatile organics (base/neutral/acid) were determined by gas chromatography/mass spectrometry as in EPA Method 8270.

RESULTS BY SAMPLE

Sample Description PUF 0140 + Hexane 0141 Lab No. 01
Test Description App. IX semivolatiles Test Code 8270A9

EXTRACTED 07/17/92 DATE RUN 07/30/92 DILUTION FACTOR 1 UNITS Total ug

CAS No.	COMPOUND	RESULT	PQL	CAS No.	COMPOUND	RESULT	PQL
83-32-9	Acenaphthene	<PQL	10	60-11-7	p-(Dimethylamino)azobenzene	<PQL	20
208-96-8	Acenaphthalene	<PQL	10	57-97-6	7,12-Dimethylbenz[ah]anthracene	<PQL	20
98-86-2	Acetophenone	<PQL	10	119-93-7	3,3'-Dimethylbenzidine	<PQL	10
53-96-3	2-Acetylaminofluorene	<PQL	30	122-09-8	a,a-Dimethylphenethylamine	(1)	
92-67-1	4-Aminobiphenyl	<PQL	20	105-67-9	2,4-Dimethylphenol	<PQL	20
62-53-3	Aniline	<PQL	10	131-11-3	Dimethyl phthalate	<PQL	10
120-12-7	Anthracene	<PQL	10	99-65-0	1,3-Dinitrobenzene	<PQL	50
140-57-8	Aramite	<PQL	20	534-52-1	4,6-Dinitro-o-cresol	<PQL	50
56-55-3	Benzo[a]anthracene	<PQL	10	51-28-5	2,4-Dinitrophenol	<PQL	50
205-99-2	Benzo[b]fluoranthene	<PQL	10	121-14-2	2,4-Dinitrotoluene	<PQL	10
207-08-9	Benzo[k]fluoranthene	<PQL	10	606-20-2	2,6-Dinitrotoluene	<PQL	10
191-24-2	Benzo[ghi]perylene	<PQL	10	88-85-7	Dinoseb	<PQL	20
50-32-8	Benzo[a]pyrene	<PQL	10	117-84-0	Di-n-octyl phthalate	<PQL	10
100-51-6	Benzyl alcohol	<PQL	20	122-39-4	Diphenylamine	<PQL	10
111-91-1	Bis(2-chloroethoxy)methane	<PQL	10	62-50-0	Ethyl methanesulfonate	<PQL	10
111-44-4	Bis(2-chloroethyl)ether	<PQL	10	206-44-0	Fluoranthene	<PQL	10
108-60-1	Bis(2-chloroisopropyl)ether	<PQL	10	86-73-7	Fluorene	<PQL	10
117-81-7	Bis(2-ethylhexyl)phthalate	<PQL	10	118-74-1	Hexachlorobenzene	<PQL	10
101-53-3	4-Bromophenyl phenyl ether	<PQL	10	87-68-3	Hexachlorobutadiene	<PQL	10
85-68-7	Butyl benzyl phthalate	<PQL	20	77-47-4	Hexachlorocyclopentadiene	(1)	
106-47-8	4-Chloroaniline	<PQL	20	67-72-1	Hexachloroethane	<PQL	10
510-15-6	Chlorobenzilate	<PQL	30	70-30-4	Hexachlorophene	(1)	
59-50-7	p-Chloro-m-cresol	<PQL	10	1888-71-7	Hexachloropropene	<PQL	50
91-58-7	2-Chloronaphthalene	<PQL	10	193-39-5	Indeno(1,2,3-cd)pyrene	<PQL	10
95-57-8	2-Chlorophenol	<PQL	10	78-59-1	Isophorone	<PQL	10
7005-72-3	4-Chlorophenyl phenyl ether	<PQL	10	120-58-1	Isosafrole	<PQL	10
218-01-9	Chrysene	<PQL	10	91-80-5	Methapyrilene	<PQL	100
95-48-7	o-Cresol	<PQL	10	56-49-5	3-Methylcholanthrene	<PQL	10
	m- and p- Cresol (coelute)	<PQL	10	66-27-3	Methyl methanesulfonate	<PQL	10
2303-16-4	Diallate	<PQL	10	91-57-6	2-Methylnaphthalene	12	10
53-70-3	Dibenz[ah]anthracene	<PQL	10	91-20-3	Naphthalene	44	10
132-64-9	Dibenzofuran	<PQL	10	130-15-4	1,4-Naphthoquinone	<PQL	200
84-74-2	Di-n-butyl phthalate	<PQL	10	134-32-7	1-Naphthylamine	<PQL	10
95-50-1	1,2-Dichlorobenzene	<PQL	10	91-59-8	2-Naphthylamine	<PQL	20
541-73-1	1,3-Dichlorobenzene	<PQL	10	88-74-4	2-Nitroaniline	<PQL	50
106-46-7	1,4-Dichlorobenzene	<PQL	15	99-09-2	3-Nitroaniline	<PQL	50
91-94-1	3,3'-Dichlorobenzidine	<PQL	25	100-01-6	4-Nitroaniline	<PQL	50
120-83-2	2,4-Dichlorophenol	<PQL	10	98-95-3	Nitrobenzene	<PQL	10
87-65-0	2,6-Dichlorophenol	<PQL	50	88-75-5	2-Nitrophenol	<PQL	10
84-66-2	Diethyl phthalate	<PQL	10	100-02-7	4-Nitrophenol	<PQL	50

Work Order # 92-07-109 Ross Analytical Services, Inc Reported: 07/31/92

Sample Description PUF 0140 + Hexane 0141 Lab No. 01
Test Description App. IX semivolatiles Test Code 8270A9

CAS No.	COMPOUND	RESULT	PQL	CAS No.	COMPOUND	RESULT	PQL
56-57-5	4-Nitroquinoline 1-oxide	<PQL	20	62-44-2	Phenacetin	<PQL	20
924-16-3	N-Nitrosodi-n-butylamine	<PQL	10	85-01-8	Phenanthrene	<PQL	10
55-18-5	N-Nitrosodiethylamine	<PQL	10	108-95-2	Phenol	<PQL	10
62-75-9	N-Nitrosodimethylamine	<PQL	20	106-50-3	p-Phenylenediamine	(1)	
86-30-6	N-Nitrosodiphenylamine (2)	<PQL	10	109-06-8	2-Picoline	<PQL	10
621-64-7	N-Nitrosodi-n-propylamine	<PQL	10	23950-58-5	Pronamide	<PQL	20
10595-95-6	N-Nitrosomethylethylamine	<PQL	20	110-86-1	Pyridine	<PQL	50
59-89-2	N-Nitrosomorpholine	<PQL	10	94-59-7	Safrole	<PQL	10
100-75-4	N-Nitrosopiperidine	<PQL	10	95-94-3	1,2,4,5-Tetrachlorobenzene	<PQL	20
930-55-2	N-Nitrosopyrrolidine	<PQL	10	58-90-2	2,3,4,6-Tetrachlorophenol	<PQL	50
99-55-8	5-Nitro-o-toluidine	<PQL	10	95-53-4	o-Toluidine	<PQL	10
608-93-5	Pentachlorobenzene	<PQL	10	120-82-1	1,2,4-Trichlorobenzene	<PQL	10
76-01-7	Pentachloroethane	<PQL	200	95-95-4	2,4,5-Trichlorophenol	<PQL	20
82-68-8	Pentachloronitrobenzene	<PQL	10	88-06-2	2,4,6-Trichlorophenol	<PQL	10
87-86-5	Pentachlorophenol	<PQL	50	99-35-4	1,3,5-Trinitrobenzene	<PQL	50

SURROGATE	%RECOVERY	LIMITS
Nitrobenzene-d5	51	35 - 114
2-Fluorobiphenyl	60	43 - 116
Terphenyl-d14	74	33 - 141
Phenol-d6	24	10 - 110
2-Fluorophenol	14 Q	21 - 110
2,4,6-Tribromophenol	15	10 - 123

(1) These compounds are unstable in the standards or are not recovered from samples.
(2) Reported as diphenylamine.

Work Order # 92-07-109 Ross Analytical Services, Inc Reported: 07/31/92

Sample Description PUF 0140 + Hexane 0141 Lab No. 01
Test Description Semivols. library search Test Code LIB_MX

DATE EXTRACTED 07/17/92 DATE RUN 07/30/92
DILUTION FACTOR 1 UNITS Total ug

COMPOUND	SCAN #	APPROXIMATE RESULT
Unknown	571	90
Ethylbenzene	665	100
Dimethyl Benzene	685	700
Unknown Hydrocarbon	884	100
Diethyl Benzene	1033	100
Unknown Hydrocarbon, C12	1155	40
Unknown Hydrocarbon, C12	1161	20
Unknown Hydrocarbon, C12	1175	100
Unknown Hydrocarbon, C12	1191	40
Unknown Hydrocarbon, C12	1199	70
Unknown Hydrocarbon, C12	1206	20
Unknown Hydrocarbon, C12	1215	30
Unknown PAH	1235	70
Unknown Hydrocarbon	1539	300
Unknown Hydrocarbon, C16	1788	400
Unknown Hydrocarbon, C18	2010	400
Unknown Hydrocarbon, C18	2112	100
Unknown Hydrocarbon, C18	2212	300
Unknown Hydrocarbon, C18	2396	200
Unknown Hydrocarbon, C18	2565	100

Appendix D

Toluene Soluble Organics

ROSS
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CERTIFICATE OF ANALYSIS

Client:

IT Corporation
312 Directors Drive
Knoxville, TN 37923

Attn: Tim Czysz

Work Order #: 92-07-048
Client Code: IT_AQS_KNOX
Report Date: 07/22/92
Work ID: Samples for method 202
Date Received: 07/08/92

Purchase Order: Proj# 406253.17/Jewell

SAMPLE IDENTIFICATION

Lab Number	Sample Description	Run
01	Filter Air 1563	1
03	Filter Air 1565	3
05	Impinger Air 1567	1
07	Impinger Air 1569	3
09	Rinses Air 1556/1557	1
11	Rinses Air 1560/1561	3

Lab Number	Sample Description	Run
02	Filter Air 1564	2
04	Filter Air 1566	Field Blank
06	Impinger Air 1568	2
08	Impinger Air 1570	Field Blank
10	Rinses Air 1558/1559	2
12	Blank Air 1562	Field Blank

Data are reported on an as-received basis unless stated otherwise. Practical Quantitation Limits (PQL's) are listed; they are higher than instrument detection limits and take the sample's matrix into account. Metals and other inorganic data are corrected for laboratory blank values; organic data are not. Unless otherwise noted, organic analysis blanks had no targets found above their PQL's.

Certificate approved by
Charles E. Simmons

TEST METHODOLOGIES

Toluene extractable matter and non-extractable residue were determined gravimetrically as in EPA Method 202.

REPORT COMMENTS

Lab Number	Sample Description	Volume (mL)
05	Impinger Air 1567	265
06	Impinger Air 1568	350
07	Impinger Air 1569	320
08	Impinger Air 1570	165
09	Rinses Air 1556/1557	115
10	Rinses Air 1558/1559	90
11	Rinses Air 1560/1561	80
12	Blank Air 1562	170

RESULTS BY SAMPLE

Sample Description: Filter Air 1563 **Lab No.:** 01

Analyte Description	Result	Units	PQL
EPA Method 202	11	total mg	0.4

Sample Description: Filter Air 1564 **Lab No.:** 02

Analyte Description	Result	Units	PQL
EPA Method 202	<PQL	total mg	0.4

Sample Description: Filter Air 1565 **Lab No.:** 03

Analyte Description	Result	Units	PQL
EPA Method 202	3.9	total mg	0.4

Sample Description: Filter Air 1566 **Lab No.:** 04

Analyte Description	Result	Units	PQL
EPA Method 202	5.1	total mg	0.4

Sample Description: Impinger Air 1567 **Lab No.:** 05

Analyte Description	Result	Units	PQL
EPA Method 202	<PQL	total mg	0.4

Sample Description: Impinger Air 1568 **Lab No.:** 06

Analyte Description	Result	Units	PQL
EPA Method 202	2.5	total mg	0.4

Sample Description: Impinger Air 1569 **Lab No.:** 07

Analyte Description	Result	Units	PQL
EPA Method 202	0.4	total mg	0.4

Sample Description: Impinger Air 1570 **Lab No.:** 08

Analyte Description	Result	Units	PQL
EPA Method 202	11	total mg	0.4

Sample Description: Rinses Air 1556/1557 **Lab No.:** 09

Analyte Description	Result	Units	PQL
EPA Method 202	19	total mg	0.4

Sample Description: Rinses Air 1558/1559 **Lab No.:** 10

Analyte Description	Result	Units	PQL
EPA Method 202	9.6	total mg	0.4

Sample Description: Rinses Air 1560/1561 **Lab No.:** 11

Analyte Description	Result	Units	PQL
EPA Method 202	9.4	total mg	0.4

Sample Description: Blank MeCl2, Air 1562 **Lab No.:** 12

Analyte Description	Result	Units	PQL
EPA Method 202	<PQL	total mg	0.4

Appendix E

Baghouse Hopper Dust

INTERNATIONAL TECHNOLOGY CORPORATION

ANALYTICAL SERVICES

CERTIFICATE OF ANALYSIS

IT Corporation
312 Directors Drive
Knoxville, TN 37923
Attn: John Carson

September 23, 1992

Job Number: ITAQ 52103

P.O. Number: 406253.17

This is the Certificate of Analysis for the following sample:

Client Project ID:	Jewell Coal and Coke
Date Received by Lab:	08/18/92
Number of Samples:	One (1)
Sample Type:	Solid

I. Introduction

On 08/18/92, one (1) solid sample arrived at the ITAS-Knoxville, Tennessee laboratory from IT-Air Quality Services, Knoxville, Tennessee, in support of the Jewell Charging project. The list of analytical tests performed, as well as date of receipt and analysis, can be found in the attached report.

II. Analytical Results/Methodology

The analytical results for this report are presented by analytical test. Each set of data will include sample identification information and the analytical results. Please note that the data are not blank corrected.

The sample was analyzed for priority pollutant semivolatile organic compounds by gas chromatography/mass spectroscopy (GC/MS) based on EPA SW-846 method 8270.

The sample was analyzed for mercury by cold vapor atomic absorption spectroscopy (CVAA) based on EPA method 7470.

Reviewed and Approved:

Alyce R. Moore
Laboratory Manager

II. Analytical Results/Methodology (continued)

The sample was analyzed for total phosphorus using EPA method 365.3.

The sample was analyzed for coal tar pitch volatiles at Environmental Health Laboratories, Macon, Georgia. A copy of the report is included.

III. Quality Control

Routine laboratory level I QC was followed.

The semivolatiles analyses were performed by direct injection of sample extract on a Restek XTI-5 capillary column on a Finnigan 4500 GC/MS/DS. The sample analyses went well, although there were some difficulties related to matrix. The sample was originally extracted as a low-level soil; however, the extract could not be concentrated to the method requirement of 1.0 ml. The sample was reextracted two days outside the sample holding time as a medium-level soil. The extract was diluted ten-fold in an attempt to reduce anticipated matrix problems. Although method compliant, the surrogate recoveries were consistently lower than the method blank, indicating sample matrix interference. The reported values and method detection limits should be considered as minimum values. There were no problems seen in final data review.

The sample was prepared just prior to analysis. The CVAA analysis for mercury was performed on 08/26/92. All run QC was acceptable. No problems were encountered.

The sample was analyzed for total phosphorus by persulfate digestion followed by the colorimetric, ascorbic acid, two-reagent procedure. No problems were encountered.

BASE/NEUTRAL EXTRACTABLE ORGANIC PRIORITY POLLUTANT ANALYSIS

Results in μg/kg (ppb)

Sample Matrix: Solid

Client Sample ID: Method Blank
Lab Sample ID: BL1455

Compound	Concentration		Compound	Concentration	
acenaphthene	10,000	U	bis(2-chloroisopropyl)ether	10,000	U
acenaphthylene	10,000	U	bis(2-ethylhexyl)phthalate	10,000	U
anthracene	10,000	U	4-bromophenyl phenyl ether	10,000	U
benzidine	50,000	U	2-chloronaphthalene	10,000	U
benzo(a)anthracene	10,000	U	4-chlorophenyl phenyl ether	10,000	U
benzo(b)fluoranthene	10,000	U	chrysene	10,000	U
benzo(k)fluoranthene	10,000	U	dibenz(a,h)anthracene	10,000	U
benzo(a)pyrene	10,000	U	di-n-butylphthalate	10,000	U
benzo(g,h,i)perylene	10,000	U	1,2-dichlorobenzene	10,000	U
butylbenzylphthalate	10,000	U	1,3-dichlorobenzene	10,000	U
bis(2-chloroethoxy)methane	10,000	U	1,4-dichlorobenzene	10,000	U
bis(2-chloroethyl)ether	10,000	U			

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
J - Indicates an estimated value less than the detection limit.

Date of Extraction: 09/01/92
Date of Analysis: 09/03/92

BASE/NEUTRAL EXTRACTABLE ORGANIC PRIORITY POLLUTANT ANALYSIS (continued)

Results in µg/kg (ppb)

Sample Matrix: Solid

Client Sample ID: Method Blank
Lab Sample ID: BL1455

Compound	Concentration		Compound	Concentration	
3,3'dichlorobenzidine	20,000	U	hexachloroethane	10,000	U
diethylphthalate	10,000	U	indeno(1,2,3-cd)pyrene	10,000	U
dimethyl phthalate	10,000	U	isophorone	10,000	U
2,4-dinitrotoluene	10,000	U	naphthalene	10,000	U
2,6-dinitrotoluene	10,000	U	nitrobenzene	10,000	U
di-n-octyl phthalate	10,000	U	n-nitroso-di-n-propylamine	10,000	U
1,2-diphenylhydrazine(1)	10,000	U	n-nitrosodimethylamine	10,000	U
fluoranthene	10,000	U	n-nitrosodiphenylamine(2)	10,000	U
fluorene	10,000	U	phenanthrene	10,000	U
hexachlorobenzene	10,000	U	pyrene	10,000	U
hexachlorobutadiene	10,000	U	1,2,4-trichlorobenzene	10,000	U
hexachlorocyclopentadiene	10,000	U			

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
J - Indicates an estimated value less than the detection limit.

(1) - Screened for as azobenzene
(2) - Detected as diphenylamine

Date of Extraction: 09/01/92
Date of Analysis: 09/03/92

ACID EXTRACTABLE ORGANIC PRIORITY POLLUTANT ANALYSIS

Results in µg/kg (ppb)

Sample Matrix: Solid

Client Sample ID: Method Blank
Lab Sample ID: BL1455

Compound	Concentration		Compound	Concentration	
4-chloro-3-methylphenol	10,000	U	2-nitrophenol	10,000	U
2-chlorophenol	10,000	U	4-nitrophenol	50,000	U
2,4-dichlorophenol	10,000	U	pentachlorophenol	50,000	U
2,4-dimethylphenol	10,000	U	phenol	10,000	U
2,4-dinitrophenol	50,000	U	2,4,6-trichlorophenol	10,000	U
2-methyl-4,6-dinitrophenol	50,000	U			

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
J - Indicates an estimated value less than the detection limit.

Date of Extraction: 09/01/92
Date of Analysis: 09/03/92

ADDITIONAL SEMIVOLATILE ORGANIC COMPOUNDS

Results in μg/kg (ppb)

Sample Matrix: Solid

Client Sample ID: Method Blank
Lab Sample ID: BL1455

Tentative Identification (1)	Concentration (2)
No additional compounds were detected	

Remarks:
(1) Identification is based on computer search of the NIST Library.
(2) Concentration is based on a response factor of 1.00 relative to the internal standard.

BASE/NEUTRAL EXTRACTABLE ORGANIC PRIORITY POLLUTANT ANALYSIS

Results in μg/kg (ppb)

Sample Matrix: Solid

Client Sample ID: Hopper Dust
Lab Sample ID: TT3913

Compound	Concentration		Compound	Concentration	
acenaphthene	100,000	U	bis(2-chloroisopropyl)ether	100,000	U
acenaphthylene	100,000	U	bis(2-ethylhexyl)phthalate	11,000	J
anthracene	100,000	U	4-bromophenyl phenyl ether	100,000	U
benzidine	520,000	U	2-chloronaphthalene	100,000	U
benzo(a)anthracene	14,000	J	4-chlorophenyl phenyl ether	100,000	U
benzo(b)fluoranthene	23,000	J	chrysene	23,000	J
benzo(k)fluoranthene	19,000	J	dibenz(a,h)anthracene	100,000	U
benzo(a)pyrene	25,000	J	di-n-butylphthalate	100,000	U
benzo(g,h,i)perylene	35,000	J	1,2-dichlorobenzene	100,000	U
butylbenzylphthalate	100,000	U	1,3-dichlorobenzene	100,000	U
bis(2-chloroethoxy)methane	100,000	U	1,4-dichlorobenzene	100,000	U
bis(2-chloroethyl)ether	100,000	U			

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
J - Indicates an estimated value less than the detection limit.

Date of Extraction: 09/01/92
Date of Analysis: 09/03/92

BASE/NEUTRAL EXTRACTABLE ORGANIC PRIORITY POLLUTANT ANALYSIS (continued)

Results in µg/kg (ppb)

Sample Matrix: Solid

Client Sample ID: Hopper Dust
Lab Sample ID: TT3913

Compound	Concentration		Compound	Concentration	
3,3'dichlorobenzidine	210,000	U	hexachloroethane	100,000	U
diethylphthalate	100,000	U	indeno(1,2,3-cd)pyrene	20,000	J
dimethyl phthalate	100,000	U	isophorone	100,000	U
2,4-dinitrotoluene	100,000	U	naphthalene	100,000	U
2,6-dinitrotoluene	100,000	U	nitrobenzene	100,000	U
di-n-octyl phthalate	100,000	U	n-nitroso-di-n-propylamine	100,000	U
1,2-diphenylhydrazine(1)	100,000	U	n-nitrosodimethylamine	100,000	U
fluoranthene	18,000	J	n-nitrosodiphenylamine(2)	100,000	U
fluorene	100,000	U	phenanthrene	12,000	J
hexachlorobenzene	100,000	U	pyrene	21,000	J
hexachlorobutadiene	100,000	U	1,2,4-trichlorobenzene	100,000	U
hexachlorocyclopentadiene	100,000	U			

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
J - Indicates an estimated value less than the detection limit.

(1) - Screened for as azobenzene
(2) - Detected as diphenylamine

Date of Extraction: 09/01/92
Date of Analysis: 09/03/92

ACID EXTRACTABLE ORGANIC PRIORITY POLLUTANT ANALYSIS

Results in μg/kg (ppb)

Sample Matrix: Solid

Client Sample ID: Hopper Dust
Lab Sample ID: TT3913

Compound	Concentration		Compound	Concentration	
4-chloro-3-methylphenol	100,000	U	2-nitrophenol	100,000	U
2-chlorophenol	100,000	U	4-nitrophenol	520,000	U
2,4-dichlorophenol	100,000	U	pentachlorophenol	520,000	U
2,4-dimethylphenol	100,000	U	phenol	100,000	U
2,4-dinitrophenol	520,000	U	2,4,6-trichlorophenol	100,000	U
2-methyl-4,6-dinitrophenol	520,000	U			

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
J - Indicates an estimated value less than the detection limit.

Date of Extraction: 09/01/92
Date of Analysis: 09/03/92

IT Corporation
September 23, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: Jewell Coal and Coke

Job Number: ITAQ 52103

ADDITIONAL SEMIVOLATILE ORGANIC COMPOUNDS

Results in µg/kg (ppb)

Sample Matrix: Solid

Client Sample ID: Hopper Dust
Lab Sample ID: TT3913

Tentative Identification (1)	Concentration (2)
No additional compounds were detected	

Remarks:
(1) Identification is based on computer search of the NIST Library.
(2) Concentration is based on a response factor of 1.00 relative to the internal standard.

SOLID SURROGATE PERCENT RECOVERY SUMMARY

	SEMIVOLATILE					
Client Sample ID	Nitro-Benzene-D5 (23-120%)*	2-Fluoro-Biphenyl (30-115%)*	Terphenyl-D14 (18-137%)*	Phenol-D5 (24-113%)*	2-Fluoro-Phenol (25-121%)*	2,4,6-Tribromo-Phenol (19-122%)*
Hopper Dust	41	49	45	36	40	36
Method Blank	72	74	69	70	76	78

*Values in parenthesis represent required QC limits.

IT Corporation
September 23, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: Jewell Coal and Coke

Job Number: ITAQ 52103

METALS ANALYSIS

Results in mg/kg (ppm)

Sample Matrix: Solid

Client Sample ID:	Method Blank	Hopper Dust
Lab Sample ID:	PBWC5235	TT3913
mercury	0.1 U	0.1

Analysis Date: 08/26/92

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.

IT Corporation
September 23, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: Jewell Coal and Coke

Job Number: ITAQ 52103

TOTAL PHOSPHORUS ANALYSIS

Results in mg/kg (ppm)

Sample Matrix: Solid

Client Sample ID	Lab Sample ID	Result
Method Blank	P4190	2 U
Hopper Dust	TT3913	138

Date of Analysis: 08/27/92

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.

LABORATORY ANALYSIS REPORT

Environmental Health Laboratory
a unit of CIGNA Loss Control Services
Insurance Company of North America

Location:
3920 Arkwright Road
Macon, GA 31213

Mailing Address:
P.O. Box 9093
Macon, GA 31297-5799

(800) 841-8919
(912) 471-4544 (in GA)
Laboratories in Macon, GA and Hartford, CT

CIGNA

To: Kim Laisy
IT Corporation
5815 Middlebrook Park
Knoxville, TN 37921

Report No.: 92H0121

P. O. No.: T-923503

Date Received: 8/20/92

Date Reported: 9/2/92

Project # ITA052103

Analysis: Coal Tar Pitch Volatiles, Benzene solubles
Analytical Method: NIOSH 5023, Gravimetric with extraction

Sample Number (Bulk)	Coal Tar Pitch Volatiles %
TT 3914	2.1

< = Less than.

Analyst William R. Stapleton Date: 9/2/92

William R. Stapleton

CP-28784d Ptd. in U.S.A.

INTERNATIONAL TECHNOLOGY CORPORATION

ANALYTICAL SERVICES

CERTIFICATE OF ANALYSIS

IT Corporation
312 Directors Drive
Knoxville, TN 37923
Attn: John Carson

June 19, 1992

Job Number: ITAQ 51427

P.O. Number: 406253.08

This is the Certificate of Analysis for the following sample:

Client Project ID:	Jewell
Date Received by Lab:	05/19/92
Number of Samples:	One (1)
Sample Type:	Solid

I. Introduction

On 05/19/92, one (1) solid sample arrived at the ITAS-Knoxville, Tennessee laboratory from IT-Air Quality Services, Knoxville, Tennessee, in support of the Jewell project. The list of analytical tests performed, as well as date of receipt and analysis, can be found in the attached report.

II. Analytical Results/Methodology

The analytical results for this report are presented by analytical test. Each set of data will include sample identification information and the analytical results. Please note that the data are not blank corrected.

The sample was analyzed for priority pollutant volatile organic compounds by gas chromatography/mass spectroscopy (GC/MS) based on EPA SW-846 method 8240.

The sample was analyzed for priority pollutant semivolatile organic compounds by gas chromatography/mass spectroscopy (GC/MS) based on EPA SW-846 method 8270.

Reviewed and Approved:

Alyce R. Moore

Alyce R. Moore
Laboratory Manager

II. Analytical Results/Methodology (continued)

The sample was analyzed for the requested metals by cold vapor atomic absorption spectroscopy (CVAA) and inductively coupled argon plasma spectroscopy (ICP) based on EPA methods 7471 and 6010.

The sample was analyzed for total phosphorus using EPA method 365.3.

The sample was analyzed for proximate and total sulfur at Galbraith Laboratories, Knoxville, Tennessee. A copy of the report is included.

The sample was analyzed for coal tar pitch VOAs by NIOSH at Environmental Health Laboratories, Macon, Georgia. A copy of the report is included.

III. Quality Control

Routine laboratory level I QC was followed.

The volatiles analyses were performed by purge and trap with a J&W DB-624 megabore column on a Finnigan OWA GC/MS/DS. The sample runs went well, although the coal dust did cause some matrix problems. These problems were solved by analyzing a fivefold dilution. Overall the analysis and QC looked good. There were no problems seen in final data review.

The semivolatiles analyses were performed by direct injection of sample extract on a Restek XTI-5 capillary column on a Finnigan 4500 GC/MS/DS. The sample runs went well. A number of fused ring aromatic hydrocarbons were detected at a tenfold dilution, which is not surprising considering the matrix of the sample. The TICs showed mostly the same hydrocarbon character. Overall the analysis and QC looked good. There were no problems seen in final data review.

The sample was digested on 05/27/92 for ICP. The sample for mercury analysis was prepared just prior to analysis. The CVAA analysis for mercury was performed on 05/29/92; the remaining metals were analyzed by ICP on 05/28/92. All run QC was acceptable. An elevated detection limit was reported for thallium due to interferences caused by the presence of iron. No problems were encountered.

The sample was analyzed for total phosphorus by persulfate digestion followed by the colorimetric, ascorbic acid, two-reagent procedure. No problems were encountered.

VOLATILE ORGANIC PRIORITY POLLUTANT ANALYSIS

Results in µg/kg (ppb)

Sample Matrix: Solid

Client Sample ID: Method Blank
Lab Sample ID: VB0521

Compound	Concentration	Compound	Concentration
acrolein	10 U	1,1-dichloroethene	5 U
acrylonitrile	10 U	trans-1,2-dichloroethene	5 U
benzene	5 U	1,2-dichloropropane	5 U
bromodichloromethane	5 U	cis-1,3-dichloropropene	5 U
bromoform	5 U	trans-1,3-dichloropropene	5 U
bromomethane	10 U	ethyl benzene	5 U
carbon tetrachloride	5 U	methylene chloride	1 J
chlorobenzene	5 U	1,1,2,2-tetrachloroethane	5 U
chloroethane	10 U	tetrachloroethene	5 U
2-chloroethylvinyl ether	10 U	toluene	5 U
chloroform	5 U	1,1,1-trichloroethane	5 U
chloromethane	10 U	1,1,2-trichloroethane	5 U
dibromochloromethane	5 U	trichloroethene	5 U
1,1-dichloroethane	5 U	trichlorofluoromethane	5 U
1,2-dichloroethane	5 U	vinyl chloride	10 U

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
J - Indicates an estimated value less than the detection limit.

Date of Analysis: 05/21/92

This method blank applies to the following sample: Coal Dust.

IT Corporation
June 19, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: Jewell

Job Number: ITAQ 51427

ADDITIONAL VOLATILE ORGANIC COMPOUNDS

Results in µg/kg (ppb)

Sample Matrix: Solid

Client Sample ID: Method Blank
Lab Sample ID: VB0521

Tentative Identification (1)	Concentration (2)
acetonitrile	6.2

Remarks:
(1) Identification is based on computer search of the NIST Library.
(2) Concentration is based on a response factor of 1.00 relative to the internal standard.

VOLATILE ORGANIC PRIORITY POLLUTANT ANALYSIS

Results in µg/kg (ppb)

Sample Matrix: Solid

Client Sample ID: Coal Dust
Lab Sample ID: K2606

Compound	Concentration		Compound	Concentration	
acrolein	50	U	1,1-dichloroethene	25	U
acrylonitrile	50	U	trans-1,2-dichloroethene	25	U
benzene	25	U	1,2-dichloropropane	25	U
bromodichloromethane	25	U	cis-1,3-dichloropropene	25	U
bromoform	25	U	trans-1,3-dichloropropene	25	U
bromomethane	50	U	ethyl benzene	25	U
carbon tetrachloride	25	U	methylene chloride	41	B
chlorobenzene	25	U	1,1,2,2-tetrachloroethane	25	U
chloroethane	50	U	tetrachloroethene	5	J
2-chloroethylvinyl ether	50	U	toluene	25	U
chloroform	25	U	1,1,1-trichloroethane	25	U
chloromethane	50	U	1,1,2-trichloroethane	25	U
dibromochloromethane	25	U	trichloroethene	25	U
1,1-dichloroethane	25	U	trichlorofluoromethane	25	U
1,2-dichloroethane	25	U	vinyl chloride	50	U

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
J - Indicates an estimated value less than the detection limit.
B - Analyte was found in the blank as well as the sample.

Date of Analysis: 05/21/92

IT Corporation
June 19, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: Jewell

Job Number: ITAQ 51427

ADDITIONAL VOLATILE ORGANIC COMPOUNDS

Results in µg/kg (ppb)

Sample Matrix: Solid

Client Sample ID: Coal Dust
Lab Sample ID: K2606

Tentative Identification (1)	Concentration (2)
2-propanone	48

Remarks:
(1) Identification is based on computer search of the NIST Library.
(2) Concentration is based on a response factor of 1.00 relative to the internal standard.

SOLID SURROGATE PERCENT RECOVERY SUMMARY

	VOLATILE		
Client Sample ID	Toluene-D8 (81-117%)*	BFB (74-121%)*	1,2 Dichloroethane-D4 (70-121%)*
Coal Dust	100	90	98
Method Blank	98	98	91

*Values in parenthesis represent required QC limits.

BASE/NEUTRAL EXTRACTABLE ORGANIC PRIORITY POLLUTANT ANALYSIS

Results in µg/kg (ppb)

Sample Matrix: Solid

Client Sample ID: Method Blank
Lab Sample ID: BL0595R

Compound	Concentration		Compound	Concentration	
acenaphthene	330	U	bis(2-chloroisopropyl)ether	330	U
acenaphthylene	330	U	bis(2-ethylhexyl)phthalate	41	J
anthracene	330	U	4-bromophenyl phenyl ether	330	U
benzidine	1,700	U	2-chloronaphthalene	330	U
benzo(a)anthracene	330	U	4-chlorophenyl phenyl ether	330	U
benzo(b)fluoranthene	330	U	chrysene	330	U
benzo(k)fluoranthene	330	U	dibenz(a,h)anthracene	330	U
benzo(a)pyrene	330	U	di-n-butylphthalate	330	U
benzo(g,h,i)perylene	330	U	1,2-dichlorobenzene	330	U
butylbenzylphthalate	60	J	1,3-dichlorobenzene	330	U
bis(2-chloroethoxy)methane	330	U	1,4-dichlorobenzene	330	U
bis(2-chloroethyl)ether	330	U			

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
J - Indicates an estimated value less than the detection limit.

Date of Extraction: 05/21/92
Date of Analysis: 06/10/92

BASE/NEUTRAL EXTRACTABLE ORGANIC PRIORITY POLLUTANT ANALYSIS
(continued)

Results in μg/kg (ppb)

Sample Matrix: Solid

Client Sample ID: Method Blank
Lab Sample ID: BL0595 R

Compound	Concentration	Compound	Concentration
3,3'dichlorobenzidine	660 U	hexachloroethane	330 U
diethylphthalate	330 U	indeno(1,2,3-cd)pyrene	330 U
dimethyl phthalate	330 U	isophorone	330 U
2,4-dinitrotoluene	330 U	naphthalene	330 U
2,6-dinitrotoluene	330 U	nitrobenzene	330 U
di-n-octyl phthalate	330 U	n-nitroso-di-n-propylamine	330 U
1,2-diphenylhydrazine(1)	330 U	n-nitrosodimethylamine	330 U
fluoranthene	330 U	n-nitrosodiphenylamine(2)	330 U
fluorene	330 U	phenanthrene	330 U
hexachlorobenzene	330 U	pyrene	330 U
hexachlorobutadiene	330 U	1,2,4-trichlorobenzene	330 U
hexachlorocyclopentadiene	330 U		

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
J - Indicates an estimated value less than the detection limit.

(1) - Screened for as azobenzene
(2) - Detected as diphenylamine

Date of Extraction: 05/21/92
Date of Analysis: 06/10/92

This method blank applies to the following sample: Coal Dust.

ACID EXTRACTABLE ORGANIC PRIORITY POLLUTANT ANALYSIS

Results in µg/kg (ppb)

Sample Matrix: Solid

Client Sample ID: Method Blank
Lab Sample ID: BL0595R

Compound	Concentration		Compound	Concentration	
4-chloro-3-methylphenol	330	U	2-nitrophenol	330	U
2-chlorophenol	330	U	4-nitrophenol	1,700	U
2,4-dichlorophenol	330	U	pentachlorophenol	1,700	U
2,4-dimethylphenol	330	U	phenol	330	U
2,4-dinitrophenol	1,700	U	2,4,6-trichlorophenol	330	U
2-methyl-4,6-dinitrophenol	1,700	U			

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
J - Indicates an estimated value less than the detection limit.

Date of Extraction: 05/21/92
Date of Analysis: 06/10/92

ADDITIONAL SEMIVOLATILE ORGANIC COMPOUNDS

Results in μg/kg (ppb)

Sample Matrix: Solid

Client Sample ID: Method Blank
Lab Sample ID: BL0609

Tentative Identification (1)	Concentration (2)	
2-pentene, 3,4-dimethyl-	180	
unknown (aldol?)	980	A
2-pentanone, 4-hydroxy-4-methyl-	8,900	A
unknown (C9 alkane)	160	
unknown (aldol?)	500	A
5-hexen-2-one, 5-methyl-	760	A
3-heptanone, 2,4-dimethyl-	200	A
unknown (halogenated)	340	

Remarks: (1) Identification is based on computer search of the NIST Library.
(2) Concentration is based on a response factor of 1.00 relative to the internal standard.

A - Suspected aldol condensation product.

IT Corporation
June 19, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: Jewell

Job Number: ITAQ 51427

BASE/NEUTRAL EXTRACTABLE ORGANIC PRIORITY POLLUTANT ANALYSIS

Results in µg/kg (ppb)

Sample Matrix: Solid

Client Sample ID: Coal Dust
Lab Sample ID: K2606R2

Compound	Concentration		Compound	Concentration	
acenaphthene	3,400	U	bis(2-chloroisopropyl)ether	3,400	U
acenaphthylene	570	J	bis(2-ethylhexyl)phthalate	2,800	J
anthracene	1,000	J	4-bromophenyl phenyl ether	3,400	U
benzidine	17,000	U	2-chloronaphthalene	3,400	U
benzo(a)anthracene	5,900		4-chlorophenyl phenyl ether	3,400	U
benzo(b)fluoranthene	9,800		chrysene	11,000	
benzo(k)fluoranthene	7,400		dibenz(a,h)anthracene	2,200	J
benzo(a)pyrene	5,400		di-n-butylphthalate	3,400	U
benzo(g,h,i)perylene	9,500		1,2-dichlorobenzene	3,400	U
butylbenzylphthalate	3,400	U	1,3-dichlorobenzene	3,400	U
bis(2-chloroethoxy)methane	3,400	U	1,4-dichlorobenzene	3,400	U
bis(2-chloroethyl)ether	3,400	U			

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
J - Indicates an estimated value less than the detection limit.

Date of Extraction: 05/21/92
Date of Analysis: 06/10/92

BASE/NEUTRAL EXTRACTABLE ORGANIC PRIORITY POLLUTANT ANALYSIS
(continued)

Results in µg/kg (ppb)

Sample Matrix: Solid

Client Sample ID: Coal Dust
Lab Sample ID: K2606R2

Compound	Concentration		Compound	Concentration	
3,3'dichlorobenzidine	6,700	U	hexachloroethane	3,400	U
diethylphthalate	3,400	U	indeno(1,2,3-cd)pyrene	5,700	
dimethyl phthalate	3,400	U	isophorone	3,400	U
2,4-dinitrotoluene	3,400	U	naphthalene	2,900	J
2,6-dinitrotoluene	3,400	U	nitrobenzene	3,400	U
di-n-octyl phthalate	3,400	U	n-nitroso-di-n-propylamine	3,400	U
1,2-diphenylhydrazine(1)	3,400	U	n-nitrosodimethylamine	3,400	U
fluoranthene	10,000		n-nitrosodiphenylamine(2)	3,400	U
fluorene	770	J	phenanthrene	6,900	
hexachlorobenzene	3,400	U	pyrene	10,000	
hexachlorobutadiene	3,400	U	1,2,4-trichlorobenzene	3,400	U
hexachlorocyclopentadiene	3,400	U			

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
J - Indicates an estimated value less than the detection limit.

(1) - Screened for as azobenzene
(2) - Detected as diphenylamine

Date of Extraction: 05/21/92
Date of Analysis: 06/10/92

IT Corporation
June 19, 1992

IT ANALYTICAL SERVICES
5815 MIDDLEBROOK PIKE
KNOXVILLE, TN

Client Project ID: Jewell

Job Number: ITAQ 51427

ACID EXTRACTABLE ORGANIC PRIORITY POLLUTANT ANALYSIS

Results in µg/kg (ppb)

Sample Matrix: Solid

Client Sample ID: Coal Dust
Lab Sample ID: K2606R2

Compound	Concentration		Compound	Concentration	
4-chloro-3-methylphenol	3,400	U	2-nitrophenol	3,400	U
2-chlorophenol	3,400	U	4-nitrophenol	17,000	U
2,4-dichlorophenol	3,400	U	pentachlorophenol	17,000	U
2,4-dimethylphenol	3,400	U	phenol	1,200	J
2,4-dinitrophenol	17,000	U	2,4,6-trichlorophenol	3,400	U
2-methyl-4,6-dinitrophenol	17,000	U			

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.
J - Indicates an estimated value less than the detection limit.

Date of Extraction: 05/21/92
Date of Analysis: 06/10/92

ADDITIONAL SEMIVOLATILE ORGANIC COMPOUNDS

Results in µg/kg (ppb)

Sample Matrix: Solid

Client Sample ID: Coal Dust
Lab Sample ID: K2606

Tentative Identification (1)	Concentration (2)	
2-pentanone, 4-hydroxy-4-methyl-	12,000	AB
methyl anthracene	3,500	Y
methyl phenanthrene	4,200	Y
methyl phenanthrene	4,300	Y
dimethyl phenanthrene	10,000	Y
11H-benzo[a]fluorene	8,300	
unknown (alkane)	4,400	
unknown	5,500	
dimethyl pyrene	5,100	Y
benzo[b]naphtho[2,1-D]thiophene	5,000	

Remarks:
(1) Identification is based on computer search of the NIST Library.
(2) Concentration is based on a response factor of 1.00 relative to the internal standard.

A - Suspected aldol condensation product.
B - Analyte was found in the blank as well as the sample.
Y - Indistinguishable isomer in tentatively identified compounds.

ADDITIONAL SEMIVOLATILE ORGANIC COMPOUNDS (continued)

Results in µg/kg (ppb)

Sample Matrix: Solid

Client Sample ID: Coal Dust
Lab Sample ID: K2606

Tentative Identification (1)	Concentration (2)
unknown (PAH)	7,300
unknown/HSL Overlap	22,000
unknown (alkane)	5,200
unknown (PAH)	4,800
unknown (PAH)	8,500
triphenylene, 2-methyl-	5,600
unknown	4,900
unknown	4,100
benzo[j]fluoranthene	13,000
unknown/HSL Overlap	9,100

Remarks:
(1) Identification is based on computer search of the NIST Library.
(2) Concentration is based on a response factor of 1.00 relative to the internal standard.

SOLID SURROGATE PERCENT RECOVERY SUMMARY

	SEMIVOLATILE					
Client Sample ID	Nitro-Benzene-D5 (23-120%)*	2-Fluoro-Biphenyl (30-116%)*	Terphenyl-D14 (18-137%)*	Phenol-D5 (24-113%)*	2-Fluoro-Phenol (26-121%)*	2,4,6-Tribromo-Phenol (18-122%)*
Coal Dust	51	53	43	51	48	45
Method Blank	71	75	77	70	50	34

*Values in parenthesis represent required QC limits.

METALS ANALYSIS

Results in mg/kg (ppm)

Sample Matrix: Solid

Client Sample ID: Method Blank
Lab Sample ID: PBSI0128/C5113

Compound	Concentration	Compound	Concentration
aluminum	4 U	magnesium	3 U
antimony	3 U	manganese	0.2 U
arsenic	5 U	mercury	0.1 U
barium	0.2 U	nickel	2 U
beryllium	0.1 U	potassium	100 U
cadmium	0.5 U	selenium	6 U
calcium	4	silver	0.5 U
chromium	1 U	sodium	20 U
cobalt	2 U	thallium	5 U
copper	1 U	vanadium	1 U
iron	1 U	zinc	0.5
lead	3 U		

Date of Digestion: 05/27/92
Date of Analysis: 05/28/92 (ICP), 05/29/92 (CVAA)

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.

METALS ANALYSIS

Results in mg/kg (ppm)

Sample Matrix: Solid

Client Sample ID: Coal Dust
Lab Sample ID: K2606

Compound	Concentration		Compound	Concentration	
aluminum	2,370		magnesium	303	
antimony	3	U	manganese	58	
arsenic	30		mercury	0.1	U
barium	65.7		nickel	19	
beryllium	1.1		potassium	100	U
cadmium	0.5	U	selenium	6	U
calcium	1,180		silver	0.5	U
chromium	13		sodium	309	
cobalt	9		thallium	25	U
copper	37		vanadium	15	
iron	17,400		zinc	1,150	
lead	13				

Date of Digestion: 05/27/92
Date of Analysis: 05/28/92 (ICP), 05/29/92 (CVAA)

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.

TOTAL PHOSPHORUS ANALYSIS

Results in mg/kg (ppm)

Sample Matrix: Solid

Client Sample ID	Lab Sample ID	Result
Method Blank	P3852	20 U
Coal Dust	K2606	78

Date of Analysis: 05/28/92

U - Compound was analyzed for but not detected. The number is the detection limit for the sample.

GALBRAITH
Laboratories, Inc.
QUANTITATIVE MICROANALYSES
ORGANIC — INORGANIC
PHONE 615/546-1335 FAX 615/546-7209

Ms. Kim Laisy
ITAS
5815 Middlebrook Pike
Knoxville, Tennessee 37921

May 27, 1992

Received: May 20th
PO#: T923782

Dear Ms. Laisy:

Analysis of your compounds gave the following results:

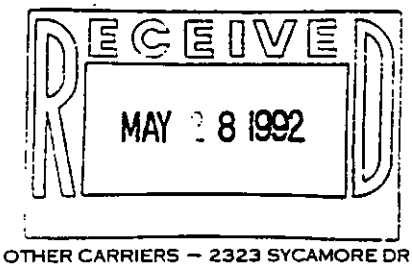
Your #,	Our #,	Analyses,	
K2606 ITAQ51427	W-1462	% Sulfur	0.98
		Proximate as Received	
		% Ash @ 950° C	10.40
		% Moisture @ 120°C	1.28
		% Volatile Matter @ 950° C	18.77
		% Fixed C (By Diff.)	69.55

Sincerely yours,

GALBRAITH LABORATORIES, INC.

Gail R. Hutchens
Exec. Vice-President

GRH:mml



LABORATORY ANALYSIS REPORT

Environmental Health Laboratory
a unit of CIGNA Loss Control Services
Insurance Company of North America

Location:
3920 Arkwright Road
Macon, GA 31213

Mailing Address:
P.O. Box 9093
Macon, GA 31297-5799

(800) 841-8919
(912) 471-4544 (in GA)
Laboratories in Macon, GA and Hartford, CT

CIGNA

To:

S. A. Summers
IT Corporation
5815 Middlebrook Pike
Knoxville, TN 37921

Report No.: 92E0101

P. O. No.: T923197

Date Received: 5-20-92

Date Reported: 5-21-92

Project #ITAQ51427

Analysis: Coal Tar Pitch Volatiles, Benzene Solubles
Analytical Method: Gravimetric with extraction; NIOSH 5023 modified

Sample No. (Bulk)	CTPV Percent
K2606	0.8

< = Less than.

Analyst David J. Horsefield Date: 5-21-92

David J. Horsefield

CP-28784d Ptd. in U.S.A.

Appendix F

Field Data and Related Calculations

M202 Part 2

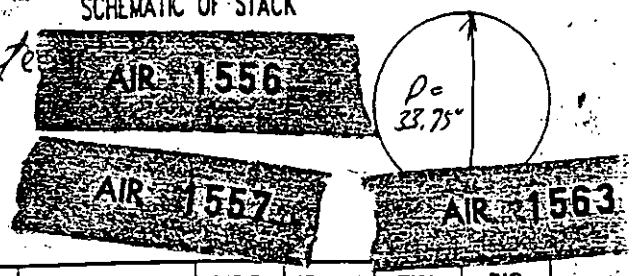
PROJECT NAME Iowa 11 — Blank per M202
PROJECT NUMBER 406253.17

RUN NO. B1
DATE 6/17/92
FILTER NO. 63131
METER BOX NO. BAC 5
SAMPLE BOX NO.
PROBE HEATER SETTING 35
PERSONNEL TY/TC

BAROMETRIC PSR. 28.86
STATIC PSR. -0.15
PROBE LENGTH 4ft
PROBE LINER Glass
PORT LENGTH
PORT DIAMETER 3.0"
γ = 1.016

SCHEMATIC OF STACK

Note



TRAVERSE POINT NUMBER	SAMPLING TIME CLOCK	SAMPLE	VELOCITY HEAD △Ps	√△Ps	ORIFICE METER △H in. H2O ACTUAL	1.0 DESIRED	GAS SAMPLE VOLUME (Vm) ft	GAS SAMPLE TEMP. AT DRY GAS METER INLET F	OUTLET F	SAMPLE BOX TEMP. F	TEMP. OF GAS IN LAST IMPINGER	STACK TEMP. F	PUMP VACUUM GAUGE in. Hg
15	4:43 pm	0	1.29	1.136	1.30	1.29	364.025	90	90	230	44	140	5.0
15	4:50	90	1.16	1.077	1.20	1.16	369.8	100	92	230	44	124	6.6
	5:07		1.48	1.217	1.5	1.48	377.0	110	98	253	44	130	7.0
	5:14		1.46	1.208	1.45	1.46	381.7	112	106	257	50	129	7.0
	5:22		1.57	1.25	1.60	1.57	386.8	120	106	260	50	133	7.0
	5:29	41	1.58	1.256	1.60	1.58	391.6	120	106	251	51	129	7.0
	5:37	50	1.52	1.233	1.5	1.52	397.1	118	106	230	51	129	7.0
	5:44	57	1.37	1.170	1.4	1.37	402.3	116	104	257	50	129	7.0
	5:51	104	1.48	1.217	1.5	1.48	407.1	118	104	250	51	126	7.0
	5:56	108	Moved to C cuts										
	6:08		1.46	1.208	1.45	1.46	410.4	104	100	240	48	111	7.0
	6:15		1.40	1.183	1.40	1.40	414.9	112	104	241	49	121	7.0
	6:28		1.43	1.200	1.40	1.43	420.4	114	106	250	50	125	7.0
	6:31		1.48	1.217	1.5	1.48	424.7	120	104	253	52	127	7.0
	6:38		1.48	1.217	1.5	1.48	429.6	122	106	258	52	125	7.0
	6:45		1.52	1.233	1.5	1.52	434.4	120	108	260	51	125	7.0
	8:53		1.71	1.308	1.7	1.71	440.4	122	106	250	52	125	7.0
	7:00		1.45	1.204	1.45	1.45	445.6	124	108	247	52	129	7.0
	7:07		1.47	1.212	1.45	1.47	450.6	124	106	254	49	126	7.0
	7:14		1.44	1.20	1.45	1.44	455.7	122	108	252	47	128	7.0
	7:21		1.42	1.19	1.40	1.42	460.6	120	108	250	46	126	7.0
	7:28		1.44	1.20	1.45	1.45	465.7	120	108	251	48	136	7.0
	7:35		1.42	1.19	1.40	1.40	471.0	122	110	246	49	128	7.0
	7:43		1.46	1.20	1.45	1.45	475.9	124	110	238	49	132	7.0
	7:51		1.44		1.45	1.44	481.8	122	110	245	48	119	7.0

STATIC PITOT LEAK-CHECK • 15 SEC.	✓
IMPACT PITOT LEAK-CHECK • 15 SEC.	✓
TRAIN LEAK RATE •60 SEC.	0 cfm 10 in.
TRAIN LEAK RATE •60 SEC.	.12 cfm .005 in.

0.005 .12

L. Burt

STACK GAS ANALYSIS			
CO2	O2	CO	N2
0	21		

AIR 1567

NOZZLE CALIBRATION I.D. NO.	N78
PRE-TEST	POST-TEST
DIA. 1	DIA. 1
DIA. 2	DIA. 2
DIA. 3	DIA. 3
AVERAGE 0.177	AVERAGE

INTERNATIONAL TECHNOLOGY CORPORATION

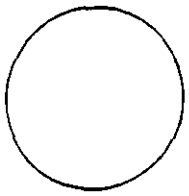
SIGNATURE Jim Yanez

Omega CB-7
TC 3769 (P12T)

PROJECT NAME Texaco Charging & Loading Baghouse M202

PROJECT NUMBER 406253.171

SCHEMATIC OF STACK



RUN NO. 1
DATE 6/12/92
FILTER NO. 63131
METER BOX NO. RK 5
SAMPLE BOX NO.
PROBE HEATER SETTING 85
PERSONNEL TT/TC/JH/JC

BAROMETRIC PSR. ~~28.72~~ 28.86
STATIC PSR.
PROBE LENGTH 4ft
PROBE LINER
PORT LENGTH
PORT DIAMETER 30

TRAVERSE POINT NUMBER	SAMPLING TIME CLOCK	SAMPLE	VELOCITY HEAD Δ Ps	√Δ Ps	ORIFICE METER Δ H in. H2O ACTUAL	DESIRED	GAS SAMPLE VOLUME (Vm) ft	GAS SAMPLE TEMP. AT DRY GAS METER INLET F	OUTLET F	SAMPLE BOX TEMP. F	TEMP. OF GAS IN LAST IMPINGER	STACK TEMP. F	PUMP VACUUM GAUGE in. Hg
	756		1.45		1.45	1.45	487.1	120	108	242	45	128	7.0
	806		1.50		1.50	1.50	492.5	118	108	240	46	129	7.0
	815		~~1.55~~ 1.55		1.00	1.00	499.3	116	108	230	46	116	8.0
	9:20	3:20					502.110						
	pm			1.2051		1	138.35		[illegible]			127	
		200 min											
			Note no high Happened		0.28 @ end @ 8:15								

STATIC PITOT LEAK-CHECK • 15 SEC.	
IMPACT PITOT LEAK-CHECK • 15 SEC.	
TRAIN LEAK RATE •60 SEC.	cfm in.
TRAIN LEAK RATE •60 SEC.	cfm in.

STACK GAS ANALYSIS			
CO2	O2	CO	N2

NOZZLE CALIBRATION I.D. NO.	
PRE-TEST	POST-TEST
DIA. 1	DIA. 1
DIA. 2	DIA. 2
DIA. 3	DIA. 3
AVERAGE	AVERAGE

INTERNATIONAL TECHNOLOGY CORPORATION

SIGNATURE Jon Ulrich

INTERNATIONAL
TECHNOLOGY
CORPORATION
AIR QUALITY SERVICES
KNOXVILLE, TENNESSEE

PARTICULATE TEST LAB DATA SHEET

PROJECT: JEWEL JOB NO.: 406253.17
SOURCE: Charging DATE: 6/18/92
TRAIN I.D.: BOX #1 TEST NO.: 2 1
COLLECTED BY: JC CHKD. BY: JC

CONDENSATION

IMPINGER NO.	INITIAL VOL., ml/g	FINAL VOL., ml/g	NET GAIN, ml/g
1	579.2	607.1	27.9
2	558.2	553.7	-4.5
3	475.9	478.6	2.7
4	717.3	739.8	22.5
5			
6			
7			
TOTAL			48.6

PARTICULATE

SAMPLE I.D. NO.	INITIAL WT., g	FINAL WT., g	NET WT., g
PROBE WASH	34.2578	34.2578	0.0000
REAGENT BLANK			
CORRECTED PROBE WASH*			
#1 FILTER	A313 0.4201	0.4226	0.0025
#2 FILTER			
IMPINGERS			

*subtract reagent blank from probe wash

TOTAL PARTICULATED COLLECTED

PARTICULATE COLLECTED (excluding impinger catch)	0.0025
PARTICULATE COLLECTED (including impinger catch)	

QA PROBE WASH (as required)

SAMPLE I.D. NO.	INITIAL WT., g	FINAL WT., g	NET WT., g

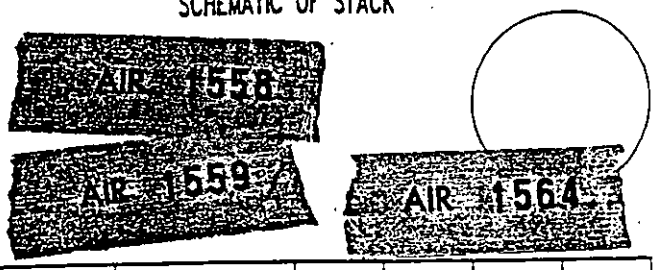
COMMENTS:

M202 p 1 of 2

PROJECT NAME Jewell Charging Unit

PROJECT NUMBER 4062817

SCHEMATIC OF STACK



RUN NO. 2
DATE 6/10/92
FILTER NO. G3135
METER BOX NO. KAC #5
SAMPLE BOX NO.
PROBE HEATER SETTING 555
PERSONNEL TY/TC/JC/JVC

BAROMETRIC PSR. 28.72
STATIC PSR. -0.15
PROBE LENGTH 4ft
PROBE LINER TC = 3769
PORT LENGTH 3.5
PORT DIAMETER 3.0

TRAVERSE POINT NUMBER	SAMPLING TIME CLOCK	SAMPLING TIME SAMPLE	VELOCITY HEAD Δ Ps	√Δ Ps	ORIFICE METER Δ H in. H2O ACTUAL	ORIFICE METER Δ H in. H2O DESIRED	GAS SAMPLE VOLUME (Vm) ft	GAS SAMPLE TEMP. AT DRY GAS METER INLET F	GAS SAMPLE TEMP. AT DRY GAS METER OUTLET F	SAMPLE BOX TEMP. F	TEMP. OF GAS IN LAST IMPINGER F	STACK TEMP. F	PUMP VACUUM GAUGE in. Hg
	4:07	0	1.50		1.50	1.50	502.335	80	80	234	49	96	3
	11:14	6	1.40		1.40	1.40	508.1	82	86	240	49	104	3
	21:23	15.39	1.40		1.40	1.40	513.8	100	82	242	50	104	5
		23.19	1.40		1.40	1.40	518.9	106	88	250	51	107	4
		30.40	1.40		1.40	1.40	524.2	110	90	242	51	111	4
		3757	1.40		1.40	1.40	529.7	110	92	240	50	111	4
		45.15	1.40		1.40	1.40	534.9	110	92	242	50	113	4
		52.30	1.40		1.40	1.40	541.4	112	92	255	50	115	4
	1000	1:00.00	1.50		1.50	1.50	545.7	108	94	232	50	112	4
		—	1.50		1.50	1.50	—	106	92	230	50	120	4
		1:15:50	1.40		1.40	1.40	557.6	106	94	234	50	107	4
		23:40	1.45		1.45	1.45	563.6	108	94	240	51	111	4
		31.24	1.40		1.40	1.40	568.7	108	96	265	50	112	4
	5:43	1:36:00	Finished 1st Set of Runs				3B						
	5:53	136:00	1.40		1.40	1.40	572.7	100	98	261	50	107	4
		47.40	1.40		1.40	1.40	581.7	104	96	260	50	108	4
		55:12	1.40		1.40	1.40	588.3	110	100	250	50	117	4
		2:02:18	1.45		1.45	1.45	593.2	112	100	250	50	109	4
		10:10	1.40		1.40	1.40	599.2	110	100	254	50	114	4
		17:00	1.50		1.50	1.50	604.6	110	100	240	51	111	4
		25:00	1.50		1.50	1.50	612.4	112	100	230	52	114	4
		35:07	1.40		1.40	1.40	617.8	114	102	227	50	109	4
		43:16	1.40		1.40	1.40	623.7	112	100	230	51	112	4
		51:10	1.40		1.40	1.40	629.4	112	100	234	50	113	4
		58:45	1.20		1.20	1.20	635.3	110	100	240	50	112	4

STATIC PITOT LEAK-CHECK • 15 SEC.	✓
IMPACT PITOT LEAK-CHECK • 15 SEC.	✓
TRAIN LEAK RATE •60 SEC. 0.000 cfm	10 in.
TRAIN LEAK RATE •60 SEC. cfm	in.

STACK GAS ANALYSIS			
CO2	O2	CO	N2

NOZZLE CALIBRATION I.D. NO. V78	
PRE-TEST	POST-TEST
DIA. 1 0.389	DIA. 1
DIA. 2 0.388	DIA. 2
DIA. 3 0.388	DIA. 3
AVERAGE 0.388	AVERAGE

0.177

INTERNATIONAL TECHNOLOGY CORPORATION

SIGNATURE

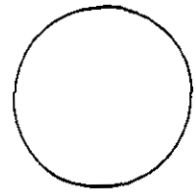
AIR 1568

M202

PROJECT NAME Jewell Charging Unit

PROJECT NUMBER 406253.17

SCHEMATIC OF STACK



RUN NO. 2
DATE 6/16/92
FILTER NO. 6-3135
METER BOX NO. KAC 5
SAMPLE BOX NO. —
PROBE HEATER SETTING 252
PERSONNEL TY/TC/JH/JC

BAROMETRIC PSR. —
STATIC PSR. 0.58
PROBE LENGTH 4ft
PROBE LINER TC-3769
PORT LENGTH 3.5
PORT DIAMETER 30

TRAVERSE POINT NUMBER	SAMPLING TIME CLOCK	SAMPLING TIME SAMPLE	VELOCITY HEAD Δ Ps	$\sqrt{\Delta Ps}$	ORIFICE METER ΔH In. H_2O ACTUAL	ORIFICE METER ΔH In. H_2O DESIRED	GAS SAMPLE VOLUME (Vm) ft	GAS SAMPLE TEMP. AT DRY GAS METER INLET F	GAS SAMPLE TEMP. AT DRY GAS METER OUTLET F	SAMPLE BOX TEMP. F	TEMP. OF GAS IN LAST IMPINGER	STACK TEMP. F	PUMP VACUUM GAUGE In. Hg
	7:19	3:06:23	1.45		1.45	1.45	640.7	110	100	232	51	114	3.0
		14:35	1.50		1.50	1.50	646.6	110	100	240	50	110	3.0
		3:22:10	1.40		1.60	1.6	652.5	110	100	238	53	120	3.0
		30:05	1.5		1.70	1.70	657.8	110	100	241	54	114	3.0
		38:00	1.5		1.5	1.5	663.7	112	100	243	53	113	3.0
	8:00	3:42:00	222min				666.700						

STATIC PITOT LEAK-CHECK @ 15 SEC.		
IMPACT PITOT LEAK-CHECK @ 15 SEC.		
TRAIN LEAK RATE @60 SEC.	cfm	in.
TRAIN LEAK RATE @60 SEC.	cfm	in.

STACK GAS ANALYSIS			
CO_2	O_2	CO	N_2

NOZZLE CALIBRATION I.D. NO.	
PRE-TEST	POST-TEST
DIA. 1	DIA. 1
DIA. 2	DIA. 2
DIA. 3	DIA. 3
AVERAGE	AVERAGE

INTERNATIONAL TECHNOLOGY CORPORATION

SIGNATURE Jim Yowell

INTERNATIONAL TECHNOLOGY CORPORATION
AIR QUALITY SERVICES
KNOXVILLE, TENNESSEE

PARTICULATE TEST LAB DATA SHEET

PROJECT: JEWEL JOB NO.: 406253.17
SOURCE: Charging DATE: 6/18/92
TRAIN I.D.: Box #2 TEST NO.: 2
COLLECTED BY: TC CHKD. BY: JC

CONDENSATION

IMPINGER NO.	INITIAL VOL., ml/g	FINAL VOL., ml/g	NET GAIN, ml/g
1	579.0	620.00	41.0
2	578.0	597.8	19.8
3	474.2	480.5	6.3
4	714.5	737.7	23.2
5			
6			
7			
TOTAL			90.83

(gc)

PARTICULATE

SAMPLE I.D. NO.	INITIAL WT., g	FINAL WT., g	NET WT., g
PROBE WASH	34.7626	<34.7626	0.0000
REAGENT BLANK			
CORRECTED PROBE WASH*			
#1 FILTER G3135	0.3179	0.3191	0.0012
#2 FILTER			
IMPINGERS			

*subtract reagent blank from probe wash

TOTAL PARTICULATED COLLECTED

PARTICULATE COLLECTED (excluding impinger catch)	0.0012
PARTICULATE COLLECTED (including impinger catch)	

QA PROBE WASH (as required)

SAMPLE I.D. NO.	INITIAL WT., g	FINAL WT., g	NET WT., g

COMMENTS:

PROJECT NAME Jewell Charging Unit Blank Filter AIR-1568

PROJECT NUMBER 40629317

OF STACK

AIR-1560 AIR-1561 AIR-1570 AIR-1567

DI Water

RUN NO. Run #3
DATE 6/19/92
FILTER NO. G3134
METER BOX NO. RK5
SAMPLE BOX NO. —
PROBE HEATER SETTING 55
PERSONNEL TY/JC/JK

BAROMETRIC PSR. 28.55
STATIC PSR. -0.15
PROBE LENGTH 4ft
PROBE LINER —
PORT LENGTH 3.5
PORT DIAMETER 3in

TRAVERSE POINT NUMBER	SAMPLING TIME CLOCK	SAMPLING TIME SAMPLE	VELOCITY HEAD Δ Ps	√Δ Ps	ORIFICE METER ΔH in. H2O ACTUAL	ORIFICE METER ΔH in. H2O DESIRED	GAS SAMPLE VOLUME (Vm) ft	GAS SAMPLE TEMP. AT DRY GAS METER INLET F	GAS SAMPLE TEMP. AT DRY GAS METER OUTLET F	SAMPLE BOX TEMP. F	TEMP. OF GAS IN LAST IMPINGER	STACK TEMP. F	PUMP VACUUM GAUGE In. Hg
	5:50	0	1.3		1.3	1.3	674.525	100	100	225	66	103	7
		8	1.4		1.4	1.4	680.2	102	100	230	56	120	7
		15:20	1.4		1.4	1.4	685.2	118	104	240	52	125	7
		23.04	1.2		1.2	1.2	690.6	120	102	240	54	125	8
		30:20	1.3		1.3	1.3	695.7	120	104	248	50	123	8
		37:40	1.41		1.4	1.4	701.1	122	106	250	51	119	8
		44:42	1.41		1.4	1.4	706.3	122	106	244	51	120	8
		52.0	1.3		1.3	1.3	711.7	120	108	244	51	116	8
		58.56	1.2		1.2	1.2	716.9	122	108	250	50	119	8
		1:06.20	1.3		1.3	1.3	727.6	122	102	260	52	121	9
		13:26	1.2		1.2	1.2	727.3	122	110	230	54	119	7
		20:20	1.1		1.1	1.1	732.1	126	110	230	55	130	6
		27:58	1.2		1.2	1.2	737.7	124	110	238	56	118	7
		35.18	1.2		1.2	1.2	7428	124	108	244	55	112	7
		42:46	1.3		1.3	1.3	747.8	124	108	248	56	114	8
		49:58	1.3		1.3	1.3	—	122	106	250	56	120	8
		57:40	1.3		1.3	1.3	758.9	120	106	250	55	118	8
	~~7:55~~	2:05:35	1.3		1.3	1.3	764.6	120	106	250	54	116	8
	8:02	2:08:00					769.985						
			128 min										

STATIC PITOT LEAK-CHECK • 15 SEC.	✓
IMPACT PITOT LEAK-CHECK • 15 SEC.	✓
TRAIN LEAK RATE •60 SEC.	✓ cfm 15 in.
TRAIN LEAK RATE •60 SEC.	0.000 cfm 12 in.

STACK GAS ANALYSIS			
CO2	O2	CO	N2
0	21		

NOZZLE CALIBRATION I.D. NO. N78	
PRE-TEST	POST-TEST
DIA. 1	DIA. 1
DIA. 2	DIA. 2
DIA. 3	DIA. 3
AVERAGE 0.177	AVERAGE

INTERNATIONAL TECHNOLOGY CORPORATION

SIGNATURE

AIR-1569

Note: Probe Heater Failed Used glass liner w.o. heat

INTERNATIONAL
TECHNOLOGY
CORPORATION
AIR QUALITY SERVICES
KNOXVILLE, TENNESSEE

PARTICULATE TEST LAB DATA SHEET

PROJECT: Jewel JOB NO.: 40675.17
SOURCE: Chimney Unit DATE: 6/19/92
TRAIN I.D.: Box #3 TEST NO.: R-3
COLLECTED BY: M/JC/NK CHKD. BY: JC

CONDENSATION

IMPINGER NO.	INITIAL VOL., ml/g	FINAL VOL., ml/g	NET GAIN, ml/g
1	~~568.5~~ 575.1	660.0	24.9
2	379.1	383.4	4.3
3	459.4	461.4	2.0
4	711.9	732.2	20.3
5			
6			
7			
TOTAL			51.5

PARTICULATE

SAMPLE I.D. NO.	INITIAL WT., g	FINAL WT., g	NET WT., g
PROBE WASH	37.5693	37.5709	0.0016
REAGENT BLANK			
CORRECTED PROBE WASH*			
#1 FILTER 63124	0.3172	0.3188	0.0016
#2 FILTER			
IMPINGERS			

*subtract reagent blank from probe wash

TOTAL PARTICULATED COLLECTED

PARTICULATE COLLECTED (excluding impinger catch)	0.0032
PARTICULATE COLLECTED (including impinger catch)	

QA PROBE WASH (as required)

SAMPLE I.D. NO.	INITIAL WT., g	FINAL WT., g	NET WT., g

COMMENTS:

COMPUTER RUN DATE -7/20/92
RUN BY -SM
PROJECT NAME -JEWELL
SOURCE -CHARGING UNIT
PROJECT NUMBER -406253.17
FIELD DATA TEST 1

TRAVERSE POINTS	VELOCITY HEAD (IN. W.C.)	ORIFICE METER (IN. W.C.)	GAS SAMPLE TEMP (DEG. F)		STACK TEMP (DEG. F)
1	1.29	1.30	90	90	140
2	1.16	1.20	100	92	124
3	1.48	1.50	110	98	130
4	1.46	1.45	112	106	129
5	1.57	1.60	120	106	133
6	1.58	1.60	120	106	129
7	1.52	1.50	118	106	129
8	1.37	1.40	116	104	129
9	1.48	1.50	118	104	126
10	1.46	1.45	104	100	111
11	1.40	1.40	112	104	121
12	1.43	1.40	114	106	125
13	1.48	1.50	120	104	127
14	1.48	1.50	122	106	125
15	1.52	1.50	120	108	125
16	1.71	1.70	122	106	125
17	1.45	1.45	124	108	129
18	1.47	1.45	124	108	126
19	1.44	1.45	122	108	128
20	1.42	1.40	120	108	126
21	1.44	1.45	120	108	136
22	1.42	1.40	122	110	128
23	1.44	1.45	124	110	132
24	1.44	1.45	122	110	119
25	1.45	1.45	120	108	128
26	1.50	1.50	118	108	129
27	1.55	1.80	116	108	116
TOTAL	* 32.602	39.750	5990.000		3425.000
AVERAGE	1.207	1.472	110.926		126.852

NET GAS SAMPLE VOLUME IS 138.085 (FT.CUBED).
* AVERAGE OF VELOCITY HEAD SQUARE ROOTS.

COMPUTER RUN DATE -7/20/92
RUN BY -SM
PROJECT NAME -JEWELL
SOURCE -CHARGING UNIT
PROJECT NUMBER -406253.17
FIELD DATA TEST 2

TRAVERSE POINTS	VELOCITY HEAD (IN. W.C.)	ORIFICE METER (IN. W.C.)	GAS SAMPLE TEMP (DEG. F)		STACK TEMP (DEG. F)
1	1.50	1.50	80	80	96
2	1.40	1.40	82	80	104
3	1.40	1.40	100	82	104
4	1.40	1.40	106	88	107
5	1.40	1.40	110	90	111
6	1.40	1.40	110	92	111
7	1.40	1.40	110	92	113
8	1.40	1.40	112	92	115
9	1.50	1.50	108	94	112
10	1.50	1.50	106	92	120
11	1.40	1.40	106	94	107
12	1.45	1.45	108	94	111
13	1.40	1.40	108	96	112
14	1.40	1.40	100	98	107
15	1.40	1.40	104	96	108
16	1.40	1.40	110	100	117
17	1.45	1.45	112	100	109
18	1.40	1.40	110	100	114
19	1.50	1.50	110	100	111
20	1.50	1.50	112	100	114
21	1.40	1.40	114	102	109
22	1.40	1.40	112	100	112
23	1.40	1.40	112	100	113
24	1.20	1.20	110	100	112
25	1.45	1.45	110	100	114
26	1.50	1.50	110	100	110
27	1.40	1.60	110	100	120
28	1.50	1.70	110	100	114
29	1.50	1.50	112	100	113
TOTAL	* 34.621	41.750	5866.000		3220.000
AVERAGE	1.194	1.440	101.138		1...034

NET GAS SAMPLE VOLUME IS 164.365 (FT.CUBED).
* AVERAGE OF VELOCITY HEAD SQUARE ROOTS.

COMPUTER RUN DATE -7/20/92
RUN BY -SM
PROJECT NAME -JEWELL
SOURCE -CHARGING UNIT
PROJECT NUMBER -406253.17
FIELD DATA TEST 3

TRAVERSE POINTS	VELOCITY HEAD (IN. W.C.)	ORIFICE METER (IN. W.C.)	GAS SAMPLE TEMP (DEG. F)		STACK TEMP (DEG. F)
1	1.30	1.30	100	100	103
2	1.40	1.40	102	100	120
3	1.40	1.40	118	104	125
4	1.20	1.20	120	102	125
5	1.30	1.30	120	104	123
6	1.40	1.40	122	106	119
7	1.40	1.40	122	106	120
8	1.30	1.30	120	108	116
9	1.20	1.20	122	108	119
10	1.30	1.30	122	108	121
11	1.20	1.20	122	110	119
12	1.10	1.10	126	110	130
13	1.20	1.20	124	110	118
14	1.20	1.20	124	108	112
15	1.30	1.30	124	108	114
16	1.30	1.30	122	106	120
17	1.30	1.30	120	106	118
18	1.30	1.30	120	106	116
TOTAL	* 20.380	23.100	4060.000		2138.000
AVERAGE	1.132	1.283	112.778		118.778

NET GAS SAMPLE VOLUME IS 95.45996 (FT.CUBED).
* AVERAGE OF VELOCITY HEAD SQUARE ROOTS.

checked by JC
8/13/92
See notes

ITAOS STACK SAMPLING CALCULATIONS
COMPUTER RUN DATE - 8/13/92
RUN BY - S.M.
PROJECT NAME - JEWELL
PROJECT NUMBER - 406253.17

SOURCE - CHARGING UNIT
ANALYSIS -PARTICULATE
TEST DATE - 6/17-19/92

	TEST 1	TEST 2	TEST 3	AVERAGE
ET TEST TIME (MIN)	200.00	222.00	128.00	
OL. SAMPLED AT STP FT3	125.7	151.5	85.7	121.0
ACK GAS TEMP (F)	127	111	119	119
IST. CONTENT (%VOL)	1.8	2.7	2.8	2.4
02 (%VOL - DRY BASIS)	0.0	0.0	0.0	0.0
2 (%VOL - DRY BASIS)	21.0	21.0	21.0	21.0
O (%VOL-DRY BASIS)	0.0	0.0	0.0	0.0
TACK VEL. (FT/MIN)	4,166	4,083	3,909	4,052
AS FLOW RATE (ACFM)	25,885	25,365	24,284	25,178
AS FLOW RATE (DSCFM)	~~22,069~~ 21,200	~~21,900~~ 21,000	~~20,863~~ 19,700	~~21,513~~ 20,600
ISOKINETIC	~~104~~ 99	~~112~~ 108	~~116~~ 112	~~112~~ 106
ART. CON. (GR/DSCF)	0.00031	0.00012	0.00058	0.00034
ART. MASS RATE-LBS/HR	~~0.1~~ 0.056	~~0.0~~ 0.022	~~0.1~~ 0.047	~~0.1~~ 0.058

	Run 1	Run 2	Run 3	Blank
TSP filter (mg)	11	0	3.9	5.1
impinger (mg)	0	2.5	0.4	11
rinse (mg)	19	9.6	9.4	0
Total (mg)	30	12.1	13.7	16.1
lbs/hr	0.67	0.22	0.42	0.44
lbs/ton	0.0022	0.00076	0.0013	0.0014

JEWELL

PROJECT # - 406253.17

PARAMETER	TEST 1	TEST 2	TEST 3
H	1.4720	1.4400	1.2830
P	1.2070	1.1940	1.1320
PB	28.8600	28.7200	28.5500
PS	28.8490	28.7090	28.5390
TM	570.5260	560.7381	572.3780
TSR	586.4520	570.6341	578.3780
VM	138.0850	164.3650	95.4600
VMSTD	125.7069	151.4949	85.6531
VLO	48.6000	90.3000	51.5000
VWSTD	2.2876	4.2504	2.4241
BWO	0.0179	0.0273	0.0275
MD	28.8400	28.8400	28.8400
MS	28.6463	28.5442	28.5417
VS	4,166.2340	4,082.5830	3,908.5250
QA	25,884.8100	25,365.0900	24,283.6600
QSTD	21,200 ~~22,049.0100~~	21,000 ~~21,905.4200~~	19,700 ~~20,543.2900~~
MN	0.0025	0.0012	0.0032
CS	0.0003	0.0001	0.0006

%IS	~~1.0755~~ 0.99	~~1.1527~~ 1.08	~~1.1652~~ 1.12
AS	6.2130	6.2130	6.2130
CP	0.8000	0.8000	0.8000
E	200.0000	222.0000	128.0000
Y	1.0160	1.0160	1.0160
AN	0.000171	0.000171	0.000171
%CO2	0.0000	0.0000	0.0000
%O2	21.0000	21.0000	21.0000
PMR	~~0.0581~~ 0.056	~~0.0250~~ 0.022	~~0.1016~~ 0.097

NOMECLATURE

- CROSS SECTIONAL AREA OF NOZZLE, SQ. FT.
- CROSS SECTIONAL AREA OF STACK, SQ. FT.
) - FRACTION BY VOLUME OF WATER VAPOR IN GAS STREAM.
- PITOT TUBE COEFFICIENT, DIMENSIONLESS.
- CONCENTRATION OF PARTICULATE MATTER IN STACK GAS, GR./DSCF.
- AVERAGE PRESSURE DROP ACROSS THE ORIFICE, INCHES H2O.
- AVERAGE SQ. ROOT VELOCITY HEAD OF STACK GAS, INCHES H2O.
- PERCENT OF ISOKINETIC SAMPLING .
- DRY MOLECULAR WEIGHT OF STACK GAS, LB/LB. MOLE.
- TOTAL AMOUNT OF PARTICULATE MATTER COLLECTED, G.
- MOLECULAR WEIGHT OF STACK GAS (WET BASIS), LB/LB. MOLE.
- BAROMETRIC PRESSURE, INCHES HG.
- ABSOLUTE STACK GAS PRESSURE, INCHES HG.
R - PARTICULATE MASS RATE, LBS/HR.
- VOLUMETRIC FLOW RATE, ACTUAL CONDITIONS FT3/MIN.
TD - VOLUMETRIC FLOW RATE AT STANDARD CONDITIONS, (DRY BASIS) FT3/MIN.
- AVERAGE DRY GAS METER TEMPERATURE, *R.
R - AVERAGE STACK TEMPERAATURE, *R.
- TOTAL SAMPLING TIME, MIN.
O - TOTAL VOLUME OF LIQUID COLLECTED IN IMPINGERS AND SILICA GEL, ML.
- VOLUME OF GAS SAMPLE THROUGH THE DRY GAS METER (METER CONDITIONS), CUBIC FT.
STD - VOLUME OF GAS SAMPLE THROUGH THE DRY GAS METER AT STANDARD CONDITONS FT3.
STD - VOLUME OF WATER COLLECTED AT 29.92 IN. HG. AND 70* F CUBIC FT.
- STACK GAS VELOCITY, ACTUAL FT. PER MINUTE.
- DRY METER GAS CALIBRATION FACTOR.

VOLUME OF WATER COLLECTED

VWSTD = (VLO)(0.04707)
VWSTD = 48.6 * .04707
VWSTD = 2.287602

VOLUME OF GAS METERED, STANDARD CONDITIONS

VMSTD = ((528/29.92)(VM)(PB + H / 13.6)(Y)) / TM
VMSTD = (17.64706 * 138.085 * (28.86 + 1.472 / 13.6) * 1.016) / 570.526
VMSTD = 125.7069

MOISTURE CONTENT

BWO = VWSTD / (VMSTD + VWSTD)
BWO = 2.287602 / 125.7069 + 2.287602
BWO = 1.787266E-02

MOLECULAR WEIGHT OF DRY GAS STREAM

MD = (0.44)(%CO2) + (.32)(%O2) + (0.28)(%CO + %N2)
MD = .44 * 0 + .32 * 21 + .28 *(0 + 79)
MD = 28.84

MOLECULAR WEIGHT OF STACK GAS

MS = MD(1 - BWO) + 18(BWO)
MS = 28.84 *(1 - 1.787266E-02) + 18 * 1.787266E-02
MS = 28.64626

VELOCITY OF STACK GAS

VS = 174 * CP * P * SQR (TS * (29.92 / PS) * (28.96 / MS))
VS = 174 * .8 * 1.207 *SQR(586.452 *(29.92 / 28.84897)*(28.96 / 28.64626))
VS = 4166.234

TOTAL FLOW OF STACK GAS

QA = AS * VS
QA = 6.213 * 4166.234
QA = 25884.81
QS = QA * (528 / TSR) * (PS / 29.92)
QS = 25884.81 * (528 / 586.452)*(28.84897 / 29.92)
QS = 22470.63
QSTD = QS(1 - BWO)
QSTD = 22470.63 (1 - 1.787266E-02)
QSTD = ~~22069.0~~
21,200

Note 1. Damper position changed at 4 minute intervals. Values in program based on "high" flowrate.
Average flowrate = 0.96 x Value
John Carson
8/13/92

PARTICULATE CONCENTRATION

CS = (15.43)(MN) / VMSTD
CS = (15.43 * .0025) / 125.7069
CS = 3.0686646E-04

PARTICULATE MASS RATE

PMR = (MN)(QSTD)(60) / (VMSTD)(453.6)
PMR = (.0025 * 22069.01 * 60) / (125.7069 * 453.6)
PMR = ~~5.805531E-02~~ 0.056 (See Note 1.)

PERCENT ISOKINETIC OF TEST

IS = VMSTD / (AN * E * VSSTD)
IS = 125.7069 / (1.708736E-04 * 200 * 3552.071)
IS = ~~1.036554~~
0.99

Note 2. Program contains correction from representative point to average point
Sampling point velocity = 1.05 x Value
John Carlson
8/13/92

VOLUME OF WATER COLLECTED

VWSTD = (VLC)(0.04707)
VWSTD = 90.3 * .04707
VWSTD = 4.250421

VOLUME OF GAS METERED, STANDARD CONDITIONS

VMSTD = ((528/29.92)(VM)(PB + H / 13.6)(Y)) / TM
VMSTD = (17.64706 * 164.365 * (28.72 + 1.44 / 13.6) * 1.016) / 560.7381
VMSTD = 151.4949

MOISTURE CONTENT

BWO = VWSTD / (VMSTD + VWSTD)
BWO = 4.250421 / 151.4949 + 4.250421
BWO = 2.729084E-02

MOLECULAR WEIGHT OF DRY GAS STREAM

MD = (0.44)(%CO2) + (.32)(%O2) + (0.28)(%CO + %N2)
MD = .44 * 0 + .32 * 21 + .28 *(0 + 79)
MD = 28.84

MOLECULAR WEIGHT OF STACK GAS

MS = MD(1 - BWO) + 18(BWO)
MS = 28.84 *(1 - 2.729084E-02) + 18 * 2.729084E-02
MS = 28.54417

VELOCITY OF STACK GAS

VS = 174 * CP * P * SQR (TS * (29.92 / PS) * (28.96 / MS))
VS = 174 * .8 * 1.194 *SQR(570.6341 *(29.92 / 28.70897)*(28.96 / 28.54417))
VS = 4082.583

TOTAL FLOW OF STACK GAS

QA = AS * VS
QA = 6.213 * 4082.583
QA = 25365.09
QS = QA * (528 / TSR) * (PS / 29.92)
QS = 25365.09 * (528 / 570.6341)*(28.70897 / 29.92)
QS = 22520.01
QSTD = QS(1 - BWO)
QSTD = 22520.01 (1 - 2.729084E-02)
QSTD = ~~21905.42~~ 21,000 See Note 1.

PARTICULATE CONCENTRATION

CS = (15.43)(MN) / VMSTD
CS = (15.43 * .0012) / 151.4949
CS = 1.222219E-04

PARTICULATE MASS RATE

PMR = (MN)(QSTD)(60) / (VMSTD)(453.6)
PMR = (.0012 * 21905.42 * 60) / (151.4949 * 453.6)
PMR = ~~2.295161E-02~~ 0.022 See Note 1

PERCENT ISOKINETIC OF TEST

IS = VMSTD / (AN * E * VSSTD)
IS = 151.4949 / (1.708736E-04 * 222 * 3525.74)
IS = ~~1.132715~~ 1.08 See Note 2

VOLUME OF WATER COLLECTED

VWSTD = (VLC)(0.04707)
VWSTD = 51.5 * .04707
VWSTD = 2.424105

VOLUME OF GAS METERED, STANDARD CONDITIONS

VMSTD = ((528/29.92)(VM)(PB + H / 13.6)(Y)) / TM
VMSTD = (17.64706 * 95.45996 * (28.55 + 1.283 / 13.6) * 1.016) / 572.378
VMSTD = 85.65311

MOISTURE CONTENT

BWO = VWSTD / (VMSTD + VWSTD)
BWO = 2.424105 / 85.65311 + 2.424105
BWO = .0275225

MOLECULAR WEIGHT OF DRY GAS STREAM

MD = (0.44)(%CO2) + (.32)(%O2) + (0.28)(%CO + %N2)
MD = .44 * 0 + .32 * 21 + .28 *(0 + 79)
MD = 28.84

MOLECULAR WEIGHT OF STACK GAS

MS = MD(1 - BWO) + 18(BWO)
MS = 28.84 *(1 - .0275225) + 18 * .0275225
MS = 28.54166

VELOCITY OF STACK GAS

VS = 174 * CP * P * SQR (TS * (29.92 / PS) * (28.96 / MS))
VS = 174 * .8 * 1.132 *SQR(578.378 *(29.92 / 28.53897)*(28.96 / 28.54166))
VS = 3908.525

TOTAL FLOW OF STACK GAS

QA = AS * VS
QA = 6.213 * 3908.525
QA = 24283.66
QS = QA * (528 / TSR) * (PS / 29.92)
QS = 24283.66 * (528 / 578.378)*(28.53897 / 29.92)
QS = 21145.26
QSTD = QS(1 - BWO)
QSTD = 21145.26 (1 - .0275225)
QSTD = ~~20563.29~~ 19,700 See Note 1

PARTICULATE CONCENTRATION

CS = (15.43)(MN) / VMSTD
CS = (15.43 * .0032) / 85.65311
CS = 5.764648E-04

PARTICULATE MASS RATE

PMR = (MN)(QSTD)(60) / (VMSTD)(453.6)
PMR = (.0032 * 20563.29 * 60) / (85.65311 * 453.6)
PMR = ~~.101~~ 0.097 See note 1

PERCENT ISOKINETIC OF TEST

IS = VMSTD / (AN * E * VSSTD)
IS = 85.65311 / (1.708736E-04 * 128 * 3309.72)
IS = ~~1.18~~ 1.12 See note 2

INTERNATIONAL TECHNOLOGY CORPORATION

By JC Date 6/22/92 Subject Jewell Charging Test Sheet No. 1 of 1

Chkd. By ___ Date ___ Proj. No. 406253.17

Intent: Calculate "correction" To use single point monitored with M5/202 train to average

Data:

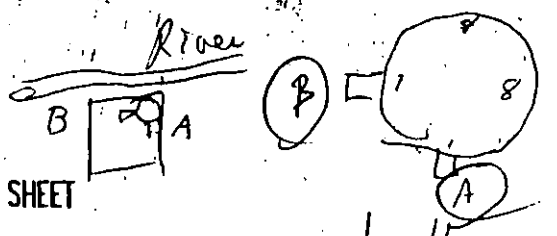
Date	Average $\sqrt{\Delta p}$ for traverse	Point 5 $\sqrt{\Delta p}$	"Correction Factor"
6/17/92	1.039	1.105	0.941
6/19/92	1.052	1.095	0.960
Average			0.95

Include "Correction Factor" Using Basic Stack Sampling computer program.

Apply correction To pitot Tube coefficient

Use $C_p' = 0.84 \times 0.95 = 0.80$

Pretest 1 (1)



GAS VELOCITY & VOLUME DATA SHEET

PROJECT NAME Jewell
PROJECT NUMBER 406253.17
DATE 6/17/94
TEST NO. Pretest 1
LOCATION
PERSONNEL

TRAVERSE POINT	POSITION * in.	VELOCITY HEAD ΔP in. H_2O	$\sqrt{\Delta P}$	STACK TEMP. F
A1		0.70		
2		0.64		
3		0.88		
4		0.95		
5		1.22		
6		1.27		
7		1.22		
8		1.18		
B1		0.65		
2		0.89		
3		0.99		
4		1.10		
5		1.24		
6		1.36		
7		1.52		
8		1.52		
		~~1.10~~	~~1.049~~	
		~~1.08~~	~~1.039~~	
		~~1.21~~	1.098	
		1.080	1.039	

Suppose sampling port 1302 *

STACK DIMENSIONS : 33.75" ϕ
STACK AREA : 6.213 FT²
BAROMETRIC PRESSURE, Pb : 28.86 in. Hg
STATIC PRESSURE, Pst : -0.15 in. H_2O
STACK ABS. PRESSURE, Ps : $\frac{Pst}{13.6} + Pb =$ in. Hg
STACK GAS TEMP., Ts : F + 460 = R
MOLECULAR WEIGHT OF STACK GAS, Ms :
PITOT TUBE COEFFICIENT, Cp : 0.84

STACK VELOCITY, Vs : $174\ Cp * \sqrt{\Delta P} * \sqrt{\frac{29.92}{Ps} * \frac{28.96}{Ms}} * Ts$ 3582

VOLUME, V : Vs * AREA = 22,257 FT³/MIN

VOLUME AT STD COND., Vstd : $V * \frac{528}{Ts} * \frac{Ps}{29.92} =$ 21,383 SCF

* FROM OUTSIDE OF PORT TO SAMPLING POINT

PITOT TUBE S-Type

MANOMETER - electronic

THERMOMETER -

Pretest Traverse 3

GAS VELOCITY & VOLUME DATA SHEET

PROJECT NAME Jewell
PROJECT NUMBER 406273.17
DATE 6/19/92
TEST NO. run 3
LOCATION
PERSONNEL

TRAVERSE POINT	POSITION * in.	VELOCITY HEAD ΔP in. H_2O	$\sqrt{\Delta P}$	STACK TEMP. F
1		.78		
2		.83		
3		.90		
4		1.00		
5		1.20		
6		1.20		
7		1.20		
8		1.30		
1		.82		
2		.92		
3		1.00		
4		1.10		
5		1.30		
6		1.30		
7		1.45		
8		1.60		
		1.107	1.052	

STACK DIMENSIONS : 33.75" ID
STACK AREA : 6.213 FT 2
BAROMETRIC PRESSURE, Pb : 28.55 in. Hg
STATIC PRESSURE, Pst : -0.15 in. H_2O
STACK ABS. PRESSURE, Ps : $\frac{Pst}{13.6} + Pb =$ in. Hg
STACK GAS TEMP., Ts : F + 460 = R
MOLECULAR WEIGHT OF STACK GAS, Ms :
PITOT TUBE COEFFICIENT, Cp : 0.84

STACK VELOCITY, Vs : $174\ Cp * \sqrt{\Delta P} * \sqrt{\frac{29.92}{Ps} * \frac{28.96}{Ms} * Ts} =$ 3646 FT/MIN

VOLUME FLOW (ACFM), V : Vs * AREA = 22,653 FT^3/MIN

VOLUME FLOW (SCFM), Vstd : $V * \frac{528}{Ts} * \frac{Ps}{29.92} =$ 21,530 SCFM

* - FROM OUTSIDE OF PORT TO SAMPLING POINT
PITOT TUBE - S-Type
MANOMETER - Inclined
THERMOMETER -

VELOCITY VARIATION DURING CHARGING/TRAMMING
OVENS 57, 59, AND 61
JEWELL CHARGING TEST
JUNE 18, 1992
PN 406253.17

TIME (MIN)	VP (IN WC)	TEMP (F)	VP^0.5	NET TIME (MIN)	NET TIME (MIN)	AVE VP^0.5	AVE TEMP (F)	ACTUAL VELOCITY (FT/MIN)	ACTUAL VELOCITY (FT/MIN)	STANDARD VELOCITY (FT/MIN)	STANDARD VELOCITY (FT/MIN)	DAMPER POSITION
0.5	1.15	105	1.072									
1.0	1.20	104	1.095		1	1.084	105		3580		3348	AMBIENT
1.5	1.45	108	1.204									
2.0	1.45	111	1.204									
2.5	1.40	112	1.183									
3.0	1.45	114	1.204									
3.5	1.45	121	1.204									
4.0	1.35	128	1.162									
4.5	1.40	133	1.183									
5.0	1.40	131	1.183	4		1.191	120	3986		3630		HOOD
5.5	1.20	127	1.095									
6.0	1.10	122	1.049									
6.5	1.15	117	1.072									
7.0	1.15	114	1.072									
7.5	1.20	111	1.095									
8.0	1.20	108	1.095									
8.5	1.20	107	1.095		3.5	1.082	115		3608		3312	AMBIENT
9.0	1.50	109	1.225									
9.5	1.45	111	1.204									
10.0	1.45	113	1.204									
10.5	1.45	116	1.204									
11.0	1.43	121	1.196									
11.5	1.45	125	1.204									
12.0	1.43	129	1.196									
12.5	1.35	135	1.162									
13.0	1.40	131	1.183	4.5		1.198	121	4013		3846		HOOD
13.5												
14.0	——MISSING DATA——											
14.5												
15.0												
15.5	1.15	113	1.072									
16.0	1.15	110	1.072		3	1.072						AMBIENT
16.5	1.45	111	1.204									
17.0	1.45	115	1.204									
17.5	1.45	119	1.204									
18.0	1.42	121	1.192									
18.5	1.42	130	1.192									
19.0	1.35	135	1.162									
19.5	1.40	142	1.183									
20.0	1.45	137	1.204	4		1.193	126	4016		3617		HOOD
20.5	1.15	132	1.072									
21.0	1.20	124	1.095									
21.5	1.17	120	1.082									
22.0	1.15	116	1.072									
22.5	1.15	113	1.072									
23.0	1.15	111	1.072									
23.5	1.20	110	1.095									
24.0	1.20	109	1.095									
24.5	1.20	107	1.095		4.5	1.084	116		3614		3314	AMBIENT
	TOTAL TIME (FULL RUNS)			12.5	12							

	—ACTUAL—		—STANDARD—	
AVE HOOD VELOCITY (FT/MIN)	4005	100.0%	3631	100.0%
AVE AMBIENT VELOCITY (FT/MIN)	3601	89.9%	3325	91.6%
TIME WEIGHTED VELOCITY (FT/MIN)	3807	95.1%	3481	95.9%

Average [illegible] = 0.76 x hood [illegible]
(@ [illegible]) ([illegible])
[illegible]

Run 1a

AIR - 1545

VOST DATA SHEET

IT CORPORATION

LOCATION: Jewell

DATE: 6/17/92

OPERATOR: J. Kelley

VOST Box No 1 & 2 (018)

UNIT NO. Charging Machine

FIELD BLANK NOs. None

BAROMETRIC PRESSURE 28.86

PAIR NO.	LEAK CHECK	CARTRIDGE I.D. TENAX	CARTRIDGE I.D. TENAX CHARCOAL	ROTAMETER READING l/min	TIME	SAMPLING DURATION (min)	PROBE TEMP. (C)	CONDENSER OUTLET TEMP (C)	METER TEMP (C)	DRY GAS METER READING		SAMPLE VOLUME	SYSTEM VACUUM
1-1	15"	TT75	TC114	18	4:33PM	5	137	8	30	2,811.25	2,814.27		4
				18		5	140	7	29	2,813.27	2,813.72		4
				18		5	139	7	29	2,813.72	2,814.97		4
				18		5	138	7	29	2,814.97	2,816.29		4
				18		5	137	7	29	2,816.29	2,818.62		4
				18		5	143	8	30	2,817.62	2,818.87		4
				18		5	140	8	31	2,818.87	2,820.3		4
				18		5	139	8	31	2,820.3	2,821.55		4
				18		5	139	9	31	2,821.55	2,822.8		4
				18		5	138	8	31	2,822.8	2,824.1		4
				18		5	139	8	30	2,824.1	2,825.35		4
				18		5	139	8	30	2,825.35	2,826.6		4
				18		5	139	9	30	2,826.6	2,827.85		4
				18		5	138	9	30	2,827.85	2,829.1		4
				18		5	137	9	29	2,829.1	2,830.31		4
15"				18	5:53PM		137	9	29	2,830.31	2,831.79		4

20.54 Liters

COMMENTS:

T≈50°C

Run 2b

AIR 1546

VOST DATA SHEET

IT CORPORATION

LOCATION: Jewell
DATE: 6/12/92
OPERATOR: J Kelley

UNIT NO. Chrysis Machine
FIELD BLANK NOs. None
BAROMETRIC PRESSURE 28.86

PAIR NO.	LEAK CHECK	CARTRIDGE I.D. TENAX	CARTRIDGE I.D. TENAX CHARCOAL	ROTAMETER READING l/min	TIME	SAMPLING DURATION (min)	PROBE TEMP. (C)	CONDENSER OUTLET TEMP (C)	METER TEMP (C)	DRY GAS METER READING		SAMPLE VOLUME	SYSTEM VACUUM
1-2	15"	T119	TC84	18	6:12PM	5	136	8	28	2,832.2	2,837.1		3
						5	135	8	29	2,837.5	2,874.75		2
						5	136	8	29	2,874.75	2,836.1		2
						5	137	9	28	2,836.1	2,837.35		2
						5	137	9	29	2,837.35	2,838.6		2
						5	136	8	27	2,838.6	2,839.9		2
						5	135	5	27	2,839.9	2,841.15		2
						5	135	6	27	2,841.15	2,842.4		2
						5	136	6	28	2,842.4	2,843.65		2
						5	135	7	26	2843.65	2,845.0		2
						5	134	7	25	2,845.0	2,846.29		2
						5	133	7	24	2,846.29	2,847.6		2
							134	8	24	2,847.6	2,848.85	17.9L	2
							133	8	24	2,848.85	2,850.2		2
							132	7	24	2,850.2	2,851.46		2
							132	7	24	2,851.46	2,852.91		2

COMMENTS:

15'

7:32

20.66 Liters

T 27°C

Run 2a

AIRS 15447

VOST DATA SHEET

IT CORPORATION

LOCATION: Jewell
DATE: 6/18/92
OPERATOR: J. Kelley

UNIT NO. 1
FIELD BLANK NOs. None
BAROMETRIC PRESSURE 28.72

PAIR NO.	LEAK CHECK	CARTRIDGE I.D. TENAX	CARTRIDGE I.D. TENAX CHARCOAL	ROTAMETER READING l/min	TIME	SAMPLING DURATION (min)	PROBE TEMP. (C)	CONDENSER OUTLET TEMP (C)	METER TEMP (C)	DRY GAS METER READING		SAMPLE VOLUME	SYSTEM VACUUM
1	15"	T29	TC155	18	4:13PM	5	140	4	26	2,855.17	2,855.17		3
				18		5	140	5	26	2,855.17	2,856.55		3
				18		5	139	5	24	2,856.55	2,857.82		3
				18		5	140	6	25	2,857.82	2,859.1		3
				18		5	139	6	26	2,859.1	2,860.41	6.48 Cor	3
				18		5	138	6	27	2,860.41	2,861.66		3
				18		5	139	6	27	2,861.66	2,862.94		3
				18		5	138	6	26	2,862.94	2,864.19		3
				18		5	137	6	26	2,864.19	2,865.48		3
				18		5	136	5	25	2,865.48	2,866.73		3
				18		5	135	5	24	2,866.73	2,868.03		3
				18		5	135	5	26	2,868.03	2,869.28		3
				18		5	135	4	25	2,869.28	2,870.53		3
				18		5	136	4	25	2,870.53	2,871.88		3
				18		5	135	5	26	2,871.88	2,873.13		3
						5	135	5	25	2,873.13	2,874.43		3

COMMENTS:

15"

5:33PM

F=26

20.51

Run 2b

AIR 1548

VOST DATA SHEET

IT CORPORATION

LOCATION: Jewell
DATE: 6/18/92
OPERATOR: J Kelley

UNIT NO. 1
FIELD BLANK NOs. None
BAROMETRIC PRESSURE 28.72

PAIR NO.	LEAK CHECK	CARTRIDGE I.D. TENAX	CARTRIDGE I.D. TENAX CHARCOAL	ROTAMETER READING l/min	TIME	SAMPLING DURATION (min)	PROBE TEMP. (C)	CONDENSER OUTLET TEMP (C)	METER TEMP (C)	DRY GAS METER READING		SAMPLE VOLUME	SYSTEM VACUUM
2	15 11	T28	TC264	18	6:02PM	5 5	139	9	26	2874.70	2875.95		5
				18		10 5	139	7	25	2875.95	2877.2		5
				18		15 5	138	6	25	2877.2	2878.45		5
				18		20 5	137	8	25	2878.45	2879.75		5
				18		25 5	135	8	25	2879.75	2881.0		5
				18		30 5	137	8	24	2881.0	2882.35		5
				18		35 5	137	7	24	2882.35	2883.6		5
				18		40 5	135	7	24	2883.6	2884.85	10.75	5
				18		45 5	136	7	26	2884.85	2886.15		5
				18		50 5	135	7	28	2886.15	2887.4		5
				18		55 5	135	6	28	2887.4	2888.7		5
				18		60 5	134	6	28	2888.7	2889.95		5
				18		65 5	134	6	28	2889.95	2891.2		5
				18		70 5	133	6	27	2891.2	2892.45		5
				18		75 5	134	6	27	2892.45	2893.75	19.05	5
15 11				18	7:22PM	80 5	134	6	27	2893.75	2895.0		5

COMMENTS:

20.30

= 20.6°C

Run 3a

AIR 1549

VOST DATA SHEET

IT CORPORATION

LOCATION: Jewell
DATE: 6/19/92
OPERATOR: J. Kelley

UNIT NO. 1
FIELD BLANK NOs. None
BAROMETRIC PRESSURE 28.55

PAIR NO.	LEAK CHECK	CARTRIDGE I.D. TENAX	CARTRIDGE I.D. TENAX CHARCOAL	ROTAMETER READING l/min	TIME	SAMPLING DURATION (min)	PROBE TEMP. (C)	CONDENSER OUTLET TEMP (C)	METER TEMP (C)	DRY GAS METER READING		SAMPLE VOLUME	SYSTEM VACUUM in H_2
1	15"	T9	TC94	18	4:05PM	5	133	7	27	2,895.91	2897.21		2.5
				18		5	133	6	27	2897.21	2898.46		2.5
				18		5	133	6	27	2898.46	2899.71		2.5
				18		5	134	6	28	2899.71	2900.96		2.5
				18		5	135	7	29	2900.96	2,901.61		2.5
				18		5	136	7	29	2,901.61	2902.86		2.5
				18		5	135	8	29	2902.96	2,904.15		3
				18		5	133	7	29	2904.15	2,905.4		3
				18		5	133	7	29	2905.4	2,906.64		3
				18		5	134	7	30	2906.64	2907.9		3
				18		5	134	7	29	2907.9	2909.14		3.5
				18		5	134	7	29	2,909.14	2,910.45		3.5
COMMENTS:				18		5	135	7	28	2,910.45	2,911.75		4
				18		5	134	7	29	2911.75	2913.15		4
				19		5	133	7	28	2,914.5	2,915.8		4
15"				19	5:25PM	5	132	7	27	2,915.8	2,916.95		4

Tamb 28c

31.04

Blank

Run 3b

VOST DATA SHEET

IT CORPORATION

LOCATION: Jewell

DATE: 6/19/92

OPERATOR: J. Kelley

UNIT NO. 1

FIELD BLANK NOs. T77 / TC89

BAROMETRIC PRESSURE 28.55

5:51 to 6:01

PAIR NO.	LEAK CHECK	CARTRIDGE I.D. TENAX	CARTRIDGE I.D. TENAX CHARCOAL	ROTAMETER READING l/min	TIME	SAMPLING DURATION (min)	PROBE TEMP. (C)	CONDENSER OUTLET TEMP (C)	METER TEMP (C)	DRY GAS METER READING		SAMPLE VOLUME	SYSTEM VACUUM
2	15"	TC1	TC137	18	5:51PM	5	136	8	28	2917.15	2918.48		2.5
				18		5	135	8	29	2,918.48	2,919.78		2.5
				18		5	135	8	30	2919.78	2,920.98		2.5
				18		20 5	135	7	30	2,920.98	2921.28		2.5
				18		5	135	7	30	2,921.28	2923.53		2.5
				18		5	134	7	29	2,923.53	2924.80		2.5
				18		5	134	7	28	2,924.80	2926.05		3
				18		5	134	7	28	2926.05	2,927.3		3
				18		5	134	6	28	2,927.3	2928.6		3
				18		5	135	6	27	2,928.6	2929.9		3
				18		5	135	5	27	2931.9	2934.2		3
				18		5	136	5	27	2934.2	2,932.5		3
				18		5	135	6	27	2,932.5	2,937.75		3
				18		5	134	7	27	2,937.75	2935.0		3
				18		5	134	6	27	2,155.0	2,936.27		3
				18	7:11PM	5	133	6	27	2,936.27	2,937.52		3

80

COMMENTS:

Trip Blank

20.33

VOLATILE COMPOUNDS
CHARGING MACHINE TEST
JEWELL COAL AND COKE CO.
JUNE 17-19, 1992
IT PROJECT NO. 406253.17

COMPOUND	MOL. WT.	TOTAL MATERIAL (nG)	RUN NO. 1A SAMPLE VOLUME (L)	GAS FLOWRATE (DSCFM)	GAS CONC. (PPB)	MASS RATE (LBS/HR)	MASS RATE (LBS/TON)	TOTAL MATERIAL (nG)
ACETONE	58		19.496	21200	0.000	0.00E+00	0.00E+00	150
BENZENE	78	2200	19.496	21200	34.808	8.96E-03	2.92E-05	1600
CARBON DISULFIDE	76	130	19.496	21200	2.111	5.30E-04	1.72E-06	60
CARBON TETRACHLORIDE	154		19.496	21200	0.000	0.00E+00	0.00E+00	
CHLOROMETHANE	50		19.496	21200	0.000	0.00E+00	0.00E+00	
DICHLORODIFLUOROMETHANE	121		19.496	21200	0.000	0.00E+00	0.00E+00	
ETHYLBENZENE	106		19.496	21200	0.000	0.00E+00	0.00E+00	69
METHYLENE CHLORIDE	85	640	19.496	21200	9.292	2.61E-03	8.49E-06	490
METHYL ETHYL KETONE	72		19.496	21200	0.000	0.00E+00	0.00E+00	84
STYRENE	104		19.496	21200	0.000	0.00E+00	0.00E+00	92
TETRACHLOROETHENE	166	33	19.496	21200	0.245	1.34E-04	4.38E-07	43
TOLUENE	92	460	19.496	21200	6.170	1.87E-03	6.10E-06	950
1,1,1-TRICHLOROETHANE	133		19.496	21200	0.000	0.00E+00	0.00E+00	
TRICHLOROFLUOROMETHANE	137		19.496	21200	0.000	0.00E+00	0.00E+00	
XYLENES	106		19.496	21200	0.000	0.00E+00	0.00E+00	580

VOLATILE COMPOUNDS
CHARGING MACHINE TEST
JEWELL COAL AND COKE CO.
JUNE 17-19, 1992
IT PROJECT NO. 406253.17

RUN NO. 1B					RUN NO. 2A					
SAMPLE VOLUME (L)	GAS CONC. (PPB)	MASS RATE (LBS/HR)	MASS RATE (LBS/TON)	TOTAL MATERIAL (nG)	SAMPLE VOLUME (L)	GAS FLOWRATE (DSCFM)	GAS CONC. (PPB)	MASS RATE (LBS/HR)	MASS RATE (LBS/TON)	TOTAL MATERIAL (nG)
19.791	3.144	6.02E-04	1.96E-06	160	19.661	21000	3.376	6.40E-04	2.18E-06	180
19.791	24.938	6.42E-03	2.09E-05	2200	19.661	21000	34.516	8.80E-03	3.00E-05	1600
19.791	0.960	2.41E-04	7.84E-07	200	19.661	21000	3.220	8.00E-04	2.73E-06	100
19.791	0.000	0.00E+00	0.00E+00		19.661	21000	0.000	0.00E+00	0.00E+00	
19.791	0.000	0.00E+00	0.00E+00	180	19.661	21000	4.405	7.20E-04	2.46E-06	
19.791	0.000	0.00E+00	0.00E+00	140	19.661	21000	1.416	5.60E-04	1.91E-06	130
19.791	0.791	2.77E-04	9.02E-07	53	19.661	21000	0.612	2.12E-04	7.24E-07	
19.791	7.008	1.97E-03	6.40E-06	37	19.661	21000	0.533	1.48E-04	5.05E-07	97
19.791	1.418	3.37E-04	1.10E-06	85	19.661	21000	1.445	3.40E-04	1.16E-06	
19.791	1.075	3.69E-04	1.20E-06	83	19.661	21000	0.977	3.32E-04	1.13E-06	
19.791	0.315	1.73E-04	5.62E-07	58	19.661	21000	0.428	2.32E-04	7.92E-07	29
19.791	12.553	3.81E-03	1.24E-05	960	19.661	21000	12.769	3.84E-03	1.31E-05	870
19.791	0.000	0.00E+00	0.00E+00	22	19.661	21000	0.202	8.80E-05	3.00E-07	
19.791	0.000	0.00E+00	0.00E+00		19.661	21000	0.000	0.00E+00	0.00E+00	
19.791	6.652	2.33E-03	7.58E-06	440	19.661	21000	5.080	1.76E-03	6.01E-06	120

VOLATILE COMPOUNDS
CHARGING MACHINE TEST
JEWELL COAL AND COKE CO.
JUNE 17-19, 1992
IT PROJECT NO. 406253.17

RUN NO. 2B					RUN NO. 3A (BROKEN)					
SAMPLE VOLUME (L)	GAS CONC. (PPB)	MASS RATE (LBS/HR)	MASS RATE (LBS/TON)	TOTAL MATERIAL (nG)	SAMPLE VOLUME (L)	GAS FLOWRATE (DSCFM)	GAS CONC. (PPB)	MASS RATE (LBS/HR)	MASS RATE (LBS/TON)	TOTAL MATERIAL (nG)
19.424	3.844	7.29E-04	2.49E-06	160	19.865	19700	3.341	5.94E-04	1.84E-06	77
19.424	25.409	6.48E-03	2.21E-05	1700	19.865	19700	26.397	6.32E-03	1.96E-05	2000
19.424	1.630	4.05E-04	1.38E-06	76	19.865	19700	1.211	2.82E-04	8.74E-07	68
19.424	0.000	0.00E+00	0.00E+00	35	19.865	19700	0.275	1.30E-04	4.03E-07	
19.424	0.000	0.00E+00	0.00E+00		19.865	19700	0.000	0.00E+00	0.00E+00	390
19.424	1.331	5.26E-04	1.80E-06		19.865	19700	0.000	0.00E+00	0.00E+00	
19.424	0.000	0.00E+00	0.00E+00	27	19.865	19700	0.309	1.00E-04	3.11E-07	77
19.424	1.414	3.93E-04	1.34E-06	880	19.865	19700	12.539	3.27E-03	1.01E-05	42
19.424	0.000	0.00E+00	0.00E+00	55	19.865	19700	0.925	2.04E-04	6.33E-07	
19.424	0.000	0.00E+00	0.00E+00		19.865	19700	0.000	0.00E+00	0.00E+00	120
19.424	0.216	1.17E-04	4.01E-07	47	19.865	19700	0.343	1.75E-04	5.41E-07	
19.424	11.714	3.52E-03	1.20E-05	840	19.865	19700	11.059	3.12E-03	9.66E-06	1300
19.424	0.000	0.00E+00	0.00E+00	78	19.865	19700	0.710	2.90E-04	8.97E-07	
19.424	0.000	0.00E+00	0.00E+00	48	19.865	19700	0.424	1.78E-04	5.52E-07	
19.424	1.402	4.86E-04	1.66E-06	190	19.865	19700	2.171	7.06E-04	2.19E-06	700

VOLATILE COMPOUNDS
CHARGING MACHINE TEST
JEWELL COAL AND COKE CO.
JUNE 17-19, 1992
IT PROJECT NO. 406253.17

RUN NO. 3B				-AVERAGE- *			
SAMPLE VOLUME (L)	GAS CONC. (PPB)	MASS RATE (LBS/HR)	MASS RATE (LBS/TON)	MASS RATE (LBS/HR)	MASS RATE (LBS/TON)	FIELD BLANK (nG)	METHOD BLANK (nG)
19.195	1.664	2.96E-04	9.17E-07	4.53E-04	1.51E-06	57	37
19.195	32.140	7.69E-03	2.38E-05	7.67E-03	2.52E-05		
19.195	1.122	2.61E-04	8.09E-07	4.47E-04	1.49E-06		
19.195	0.000	0.00E+00	0.00E+00	0.00E+00	0.00E+00		
19.195	9.777	1.50E-03	4.64E-06	4.44E-04	1.42E-06		
19.195	0.000	0.00E+00	0.00E+00	2.17E-04	7.42E-07		
19.195	0.911	2.96E-04	9.17E-07	1.57E-04	5.08E-07		
19.195	0.619	1.61E-04	5.00E-07	1.06E-03	3.45E-06		35
19.195	0.000	0.00E+00	0.00E+00	1.35E-04	4.52E-07	89	48
19.195	1.446	4.61E-04	1.43E-06	2.33E-04	7.53E-07		
19.195	0.000	0.00E+00	0.00E+00	1.31E-04	4.39E-07	200	
19.195	17.712	5.00E-03	1.55E-05	3.61E-03	1.18E-05		
19.195	0.000	0.00E+00	0.00E+00	1.76E-05	6.01E-08		
19.195	0.000	0.00E+00	0.00E+00	0.00E+00	0.00E+00		
19.195	8.278	2.69E-03	8.33E-06	1.45E-03	4.72E-06		

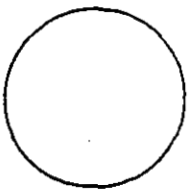
* Excluding 3A (Broken in Transit)

~~TO-3~~ TO-13

PROJECT NAME Jewell chassis & loading bay area

PROJECT NUMBER 406253.173

SCHEMATIC OF STACK



RUN NO. 1
DATE 5/17/93
FILTER NO. Pitot Cart I
METER BOX NO. 216
SAMPLE BOX NO.
PROBE HEATER SETTING
PERSONNEL TC-TY J.K.JC

BAROMETRIC PSR. 28.86
STATIC PSR. -0.15
PROBE LENGTH
PROBE LINER
PORT LENGTH
PORT DIAMETER

AIR 1541

AIR 1552

TRAVERSE POINT NUMBER	SAMPLING TIME CLOCK	SAMPLING TIME SAMPLE (Mag Reading)	VELOCITY HEAD Ps	VELOCITY HEAD √Δ Ps	ORIFICE METER Δ H in. H2O ACTUAL	ORIFICE METER Δ H in. H2O DESIRED	GAS SAMPLE VOLUME (Vm) ft	AT DRY GAS METER INLET F	AT DRY GAS METER OUTLET F	SAMPLE BOX TEMP. F	TEMP. OF GAS IN LAST IMPINGER	STACK TEMP. F	PUMP VACUUM GAUGE in. Hg
	0	10.0											
	10	10.0											
	20	10.0											
	30	10.0											
	40	10.00											
	50	10.0											
	60	10.0											
TF 5:56	7:08	10.0											
6:07	80	10.0											
	90	10.0											
	100	10.0											
	110	10.0											
	120	10.0											
	130	10.0											
	140	10.0											
	150	10.0											
	160	10.0											
	170	10											
	180	10											
	190	10											

STATIC PITOT LEAK-CHECK @ 15 SEC.		
IMPACT PITOT LEAK-CHECK @ 15 SEC.		
TRAIN LEAK RATE @60 SEC.	cfm	in.
TRAIN LEAK RATE @60 SEC.	cfm	in.

STACK GAS ANALYSIS			
CO2	O2	CO	N2

NOZZLE CALIBRATION I.D. NO. 7/16

PRE-TEST	POST-TEST
DIA. 1	DIA. 1
DIA. 2	DIA. 2
DIA. 3	DIA. 3
AVERAGE 0.4375	AVERAGE

INTERNATIONAL TECHNOLOGY CORPORATION

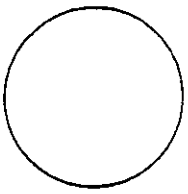
SIGNATURE Jim Cyg

TO BW-13

PROJECT NAME Jewell Charging Unit

PROJECT NUMBER 406253.17

SCHEMATIC OF STACK



RUN NO. 2
DATE 6/18/92
FILTER NO. Fil Cart. #2
METER BOX NO. 216
SAMPLE BOX NO. ____
PROBE HEATER SETTING ____
PERSONNEL TC, TY

BAROMETRIC PSR. 28.72
STATIC PSR. -0.15
PROBE LENGTH ____
PROBE LINER ____
PORT LENGTH ____
PORT DIAMETER ____

TRAVERSE POINT NUMBER	SAMPLING TIME CLOCK	SAMPLING TIME SAMPLE	VELOCITY HEAD Δ Ps	VELOCITY HEAD √Δ Ps	ORIFICE METER Δ H in. H2O ACTUAL	ORIFICE METER Δ H in. H2O DESIRED	GAS SAMPLE VOLUME (Vm) ft	TEMP. OF GAS IN LAST IMPINGER INLET F	TEMP. OF GAS IN LAST IMPINGER OUT F	SAMPLE BOX TEMP. F	TEMP. OF GAS IN LAST IMPINGER	STACK TEMP. F	PUMP VACUUM GAUGE In. Hg
	16:07	45974	10.0										
		46004	10.0										
		46034	10.0										
		46064	10.0										
	17:43	46070	Changing batteries (Run Time on Battery B - 96 minutes)										
	17:53	46070	10.0										
		46100	10.0										
		46130	10.0										
		46160	10.0										
	20:00	46197	10.0	(127 minutes on Battery C)									
	20:00			9.1									
				9.3									
				Total of 223 minutes									

STATIC PITOT LEAK-CHECK • 15 SEC.	
IMPACT PITOT LEAK-CHECK • 15 SEC.	✓
TRAIN LEAK RATE •60 SEC.	✓ cfm in.
TRAIN LEAK RATE •60 SEC.	✓ cfm in.

STACK GAS ANALYSIS			
CO2	O2	CO	N2

NOZZLE CALIBRATION I.D. NO.	7/16
PRE-TEST	POST-TEST
DIA. 1	DIA. 1
DIA. 2	DIA. 2
DIA. 3	DIA. 3
AVERAGE 0.4376	AVERAGE

INTERNATIONAL TECHNOLOGY CORPORATION

SIGNATURE Justin Capps

PROJECT NAME Lowell Charging Unit

PROJECT NUMBER 40627317

AIR-1543

AIR-1554

SCHEMATIC OF STACK

Note: Field Blank during this Run

RUN NO. Run #3
DATE 6/19/92
FILTER NO. FWF3
METER BOX NO. 000216
SAMPLE BOX NO. N/A
PROBE HEATER SETTING N/A
PERSONNEL JC/FY

BAROMETRIC PSR. ~~28.72~~ 28.55
STATIC PSR. -0.15
PROBE LENGTH
PROBE LINER
PORT LENGTH
PORT DIAMETER

TO Run 13

TRAVERSE POINT NUMBER	SAMPLING TIME CLOCK	SAMPLE	VELOCITY HEAD △ Ps	√△ Ps	ORIFICE METER △H In. H2O ACTUAL	DESIRED	GAS SAMPLE VOLUME (Vm) ft	GAS SAMPLE TEMP. AT DRY GAS METER INLET F	OUTLET F	SAMPLE BOX TEMP. F	TEMP. OF GAS IN LAST IMPINGER	STACK TEMP. F	PUMP VACUUM GAUGE In. Hg
	4:09	0	16		10								
		10			10								
		20			10								
		30			10								
		40			10								
		50			10								
		60			10								
		70			10								
		80			10								
	5:38	90			10								
Restart			Changed to C Bank										
	5:52	0			10								
		110			10								
		120			10								
		130			10								
		146			10								
		156			10								
		160			10								
		170			16								
		180			10								
		190			10								
		200			16								
		210			10								
		220			16								
	8:02:00	230			10								

Blank

AIR-1544

AIR-1555

STATIC PITOT LEAK-CHECK • 15 SEC.	✓	
IMPACT PITOT LEAK-CHECK • 15 SEC.		
TRAIN LEAK RATE •60 SEC.	✓ cfm	in.
TRAIN LEAK RATE •60 SEC.	cfm	in.

STACK GAS ANALYSIS			
CO2	O2	CO	N2

NOZZLE CALIBRATION I.D. NO. 7/16	
PRE-TEST	POST-TEST
DIA. 1	DIA. 1
DIA. 2	DIA. 2
DIA. 3	DIA. 3
AVERAGE 0.4375	AVERAGE

INTERNATIONAL TECHNOLOGY CORPORATION

SIGNATURE

INTERNATIONAL TECHNOLOGY CORPORATION

By JC Date 7/15/92 Subject TO13 Train Flowrates + Volume Sheet No. 1 of 1
Chkd. By DOK Date 8/11/92 Proj. No. 406253.17
Jewell-Coal + Coke

Intent: Calculate sampling rate and volume for TO-13 Train

Calibration (Calibrator 8-C)

$Q = 3.519\sqrt{P}$ @ 29.98 in Hg ; 74 °F (Calibrator equation)

Sampler Calibration Data

Calibrator DP	PUF Sampler (No. 216)	Barometric Press.	Temp.
1.1 in w.c.	10 in w.c.	29.2 in Hg	75°F

$$Q_{actual} = 3.519\sqrt{1.1 \times \frac{(75+460)}{29.2} \times \frac{29.98}{(74+460)}}$$

$Q_{actual} = 3.74$ acfm @ 29.2 in Hg ; 75°F @ 10 in w.c. orifice ΔP

Sampling Rates

$$Q_2 = Q_1 \times \sqrt{\frac{T_2}{P_2} \times \frac{P_1}{T_1}}$$ (compensate for temp. and pressu

$$Q_2 = 3.74 \times \sqrt{\frac{T_2}{P_2} \times \frac{29.2}{(75+460)}}$$

RUN NO.	DATE	ORIFICE DP (IN WC)	PBAR (IN HG)	TEMP (F)	MOIST (%)	SAMPLING RATE (ACFM)	SAMPLING RATE (SCFM)	SAMPLING RATE (DSCFM)	SAMPLE TIME (MIN)	SAMPLE VOL (DSCF)
1	17-Jun-92	10	28.86	80	1.8%	3.78	3.56	3.50	190	665
2	18-Jun-92	10	28.72	78	2.7%	3.78	3.56	3.47	223	773
3	19-Jun-92	10	28.55	82	2.8%	3.81	3.54	3.44	230	791

SEMI-VOLATILE COMPOUNDS
CHARGING MACHINE TEST
JEWELL COAL AND COKE CO.
JUNE 17-19, 1992
IT PROJECT NO. 406253.17

COMPOUND	MOL. WT.	TOTAL MATERIAL (uG)	RUN NO. 1 SAMPLE VOLUME (FT3)	GAS FLOWRATE (DSCFM)	GAS CONC. (PPB)	MASS RATE (LBS/HR)	MASS RATE (LBS/TON)	TOTAL MATERIAL (uG)
ACENAPTHALENE	154	380	665	21200	3.152	1.60E-03	5.22E-06	50
ANTHRACENE	178	130	665	21200	0.933	5.48E-04	1.79E-06	33
BENZO[A]ANTHRACENE	228	25	665	21200	0.140	1.05E-04	3.43E-07	
BENZYL ALCOHOL	108	97	665	21200	1.147	4.09E-04	1.33E-06	32
BIS(2-ETHYLHEXYL) PHTHALATE	391		665	21200	0.000	0.00E+00	0.00E+00	110
CHRYSENE	228	40	665	21200	0.224	1.69E-04	5.49E-07	11
CRESOLS	108	287	665	21200	3.395	1.21E-03	3.94E-06	98
DIBENZOFURAN	168	110	665	21200	0.836	4.64E-04	1.51E-06	33
DI-N-BUTYL PHTHALATE	278		665	21200	0.000	0.00E+00	0.00E+00	
2,4-DIMETHYLPHENOL	122	88	665	21200	0.921	3.71E-04	1.21E-06	24
FLUORANTHENE	202	530	665	21200	3.352	2.23E-03	7.28E-06	130
FLUORENE	166	100	665	21200	0.770	4.22E-04	1.37E-06	43
2-METHYLNAPTHALENE	142	280	665	21200	2.519	1.18E-03	3.85E-06	65
NAPTHALENE	128	1500	665	21200	14.970	6.33E-03	2.06E-05	280
PHENANTHRENE	178	670	665	21200	4.808	2.83E-03	9.20E-06	230
PHENOL	94	210	665	21200	2.854	8.86E-04	2.88E-06	68

TOTAL PAHs

SEMI-VOLATILE COMPOUNDS
CHARGING MACHINE TEST
JEWELL COAL AND COKE CO.
JUNE 17-19, 1992
IT PROJECT NO. 406253.17

RUN NO. 2 (LOW RECOVERIES)						RUN NO. 3				
SAMPLE VOLUME (FT3)	GAS FLOWRATE (DSCFM)	GAS CONC. (PPB)	MASS RATE (LBS/HR)	MASS RATE (LBS/TON)	TOTAL MATERIAL (uG)	SAMPLE VOLUME (FT3)	GAS FLOWRATE (DSCFM)	GAS CONC. (PPB)	MASS RATE (LBS/HR)	MASS RATE (LBS/TON)
773	21000	0.357	1.80E-04	6.13E-07	270	791	19700	1.883	8.89E-04	2.75E-06
773	21000	0.204	1.19E-04	4.05E-07	87	791	19700	0.525	2.87E-04	8.87E-07
773	21000	0.000	0.00E+00	0.00E+00	15	791	19700	0.071	4.94E-05	1.53E-07
773	21000	0.326	1.15E-04	3.92E-07	93	791	19700	0.925	3.06E-04	9.49E-07
773	21000	0.309	3.95E-04	1.35E-06		791	19700	0.000	0.00E+00	0.00E+00
773	21000	0.053	3.95E-05	1.35E-07	23	791	19700	0.108	7.58E-05	2.35E-07
773	21000	0.997	3.52E-04	1.20E-06	270	791	19700	2.685	8.89E-04	2.75E-06
773	21000	0.216	1.19E-04	4.05E-07	90	791	19700	0.575	2.96E-04	9.18E-07
773	21000	0.000	0.00E+00	0.00E+00	11	791	19700	0.042	3.62E-05	1.12E-07
773	21000	0.216	8.62E-05	2.94E-07	48	791	19700	0.423	1.58E-04	4.90E-07
773	21000	0.707	4.67E-04	1.59E-06	250	791	19700	1.329	8.24E-04	2.55E-06
773	21000	0.285	1.55E-04	5.27E-07	92	791	19700	0.595	3.03E-04	9.38E-07
773	21000	0.503	2.34E-04	7.97E-07	250	791	19700	1.891	8.24E-04	2.55E-06
773	21000	2.404	1.01E-03	3.43E-06	1100	791	19700	9.229	3.62E-03	1.12E-05
773	21000	1.420	8.27E-04	2.82E-06	430	791	19700	2.594	1.42E-03	4.39E-06
773	21000	0.795	2.44E-04	8.34E-07	160	791	19700	1.828	5.27E-04	1.63E-06

SEMI-VOLATILE COMPOUNDS
CHARGING MACHINE TEST
JEWELL COAL AND COKE CO.
JUNE 17-19, 1992
IT PROJECT NO. 406253.17

-AVERAGE OF 1 & 3- MASS RATE (LBS/HR)	MASS RATE (LBS/TON)	FIELD BLANK
1.25E-03	3.99E-06	10
4.17E-04	1.34E-06	10
7.74E-05	2.48E-07	10
3.58E-04	1.14E-06	20
0.00E+00	0.00E+00	10
1.22E-04	3.92E-07	10
1.05E-03	3.35E-06	20
3.80E-04	1.21E-06	10
1.81E-05	5.61E-08	10
2.65E-04	8.49E-07	20
1.53E-03	4.91E-06	10
3.62E-04	1.16E-06	10
1.00E-03	3.20E-06	12
4.97E-03	1.59E-05	44
2.12E-03	6.79E-06	10
7.06E-04	2.26E-06	10
4.63E-03	1.48E-05	

Appendix G

Calibration Data

INTERNATIONAL TECHNOLOGY
AIR QUALITY SERVICES

CONTROL BOX CALIBRATION SPREADSHEET
PRIMARY STANDARD: WET TEST METER

Orifice Manometer Setting (delta H)	Wet Test Meter Gas Volume (ft3) Actual Vw	Control Box Gas Volume (ft3) Vd	Calibrator Temp (F) Tw	Control Box Inlet (F) Tdi	Control Box Outlet (F) Tdo	Control Box Avg Temp (F) Td	Time Tenths (min)	Gamma (Y)	Delta H@	Barometric Pressure(in.Hg)
0.5	5	4.949	68	75	68	71.5	12.16283	1.015721	1.698846	29.15
1	5	4.994	69	85	71	78	8.9255	1.015673	1.82626	
2	10	10.116	69	97	76	86.5	12.79133	1.016109	1.857928	
4	10	10.226	69	107	82.5	94.75	9.226167	1.015257	1.910007	
								Avg Y	Avg Delta H@	
								1.01569	1.82326	
								0.99569	1.62326	
								1.03569	2.02326	

BOX ID NUMBER - 5
CALIBRATION STANDARD - PRIMARY
CALIBRATION STANDARD ID - WTM-1
DATE CALIBRATED - 6/17/92

CALIBRATED BY - TONY SIMPSON

SIGNATURE - Tony Simpson

APPROVAL SIGNATURE - Russell Buyea

IS THE UNIT WITHIN CALIBRATION TOLERANCES? YES

Y - RATIO OF ACCURACY OF WET TEST METER
TOLERANCE = +/- 0.02

DELTA H@ - ORIFICE PRESSURE DIFFERENTIAL THAT YIELDS 0.75 CFM OF AIR AT 70 DEGREES F AND 29.92 INCHES OF MERCURY
TOLERANCE = +/- 0.20

INTERNATIONAL TECHNOLOGY
AIR QUALITY SERVICES

CONTROL BOX CALIBRATION SPREADSHEET
PRIMARY STANDARD: WET TEST METER

Orifice Manometer Setting (delta H)	Wet Test Meter Gas Volume (ft3) Actual Vw	Control Box Gas Volume (ft3) Vd	Calibrator Temp (F) Tw	Control Box Inlet (F) Tdi	Control Box Outlet (F) Tdo	Control Box Avg Temp (F) Td	Time Tenths (min)	Gamma (Y)	Delta H@	Barometric Pressure(in.Hg)
0.5	5	5.016	71	85.5	75	80.25	11.88667	1.012899	1.617374	29.19
1	5	5.027	71	95	78.5	86.75	8.562167	1.021557	1.667462	
2	10	10.137	71	104.5	81.5	93	12.50617	1.022207	1.768863	
4	10	10.222	71	113.5	86.5	100	9.0945	1.021418	1.85371	

Avg Y	Avg Delta H@
1.01952	1.726852
0.99952	1.526852
1.03952	1.926852

BOX ID NUMBER - 5
CALIBRATION STANDARD - PRIMARY
CALIBRATION STANDARD ID - WTM-1
DATE CALIBRATED - 8/19/92

CALIBRATED BY - TONY SIMPSON

SIGNATURE - Tony Simpson

APPROVAL SIGNATURE - Russell Bujac

Y - RATIO OF ACCURACY OF WET TEST METER
TOLERANCE = +/- 0.02

DELTA H@ - ORIFICE PRESSURE DIFFERENTIAL THAT YIELDS 0.75 CFM OF AIR AT 70 DEGREES F AND 29.92 INCHES OF MERCURY
TOLERANCE = +/- 0.20

IS THE UNIT WITHIN CALIBRATION TOLERANCES? YES

INTERNATIONAL TECHNOLOGY
AIR QUALITY SERVICES

VOST BOX CALIBRATION SPREADSHEET
PRIMARY STANDARD: WET TEST METER

Orifice Manometer Setting (delta H)	Dry Gas Meter Gas Volume (ft3) Actual Vw	Control Box Gas Volume (ft3) Vd	Calibrator Temp (F) Tw	Control Box Inlet (F) Tdi	Control Box Outlet (F) Tdo	Control Box Avg Temp (F) Td	Time Tenths (min)	Gamma (Y)	Barometric Pressure(in.Hg)
0.25	0.25	0.25	73	77.0	77.0	77.0	25.8400	1.026296	29.16
0.25	0.25	0.25	74	78.8	78.8	78.8	14.0073	1.016145	
0.5	0.5	0.50	75	82.4	82.4	82.4	27.7890	1.010274	
1	0.5	0.50	75	86.0	86.0	86.0	14.1370	1.019125	
								Avg Y	
								1.01796	
								0.99796	
								1.03796	

BOX ID NUMBER - VOST 1
CALIBRATION STANDARD - PRIMARY
CALIBRATION STANDARD ID - WTM-1
DATE CALIBRATED - 4/10/92

Y - RATIO OF ACCURACY OF WET TEST METER
TOLERANCE = +/- 0.02

CALIBRATED BY - Laura Graves

SIGNATURE - Laura M. Graves

APPROVAL SIGNATURE - Russell Bryan

IS THE UNIT WITHIN CALIBRATION TOLERANCES? YES

INTERNATIONAL TECHNOLOGY CORPORATION

INTERNATIONAL TECHNOLOGY
AIR QUALITY SERVICES

VOST BOX CALIBRATION SPREADSHEET
PRIMARY STANDARD: WET TEST METER

Dry Gas Meter Gas Volume (ft3) Actual Vw	Control Box Gas Volume (ft3) Vd	Calibrator Temp (F) Tw	Control Box Inlet (F) Tdi	Control Box Outlet (F) Tdo	Control Box Avg Temp (F) Td	Time Tenths (min)	Gamma (Y)	Barometric Pressure(in.Hg)
0.25	0.26	71	75	75	75.1	24.30	0.954867	29.18
0.25	0.26	71	77	77	77.0	14.98	0.986973	
0.5	0.52	71	81	81	80.6	29.77	0.973845	
0.5	0.52	71	83	83	83.3	14.44	0.983345	
							Avg Y	
							0.974757	
							0.954757	
							0.994757	

BOX ID NUMBER - VOST 1
CALIBRATION STANDARD - PRIMARY
CALIBRATION STANDARD ID - WTM-1
DATE CALIBRATED - 8/21/92

Y - RATIO OF ACCURACY OF WET TEST METER
TOLERANCE = +/- 0.02

CALIBRATED BY - TONY SIMPSON

SIGNATURE - Tony Simpson

APPROVAL SIGNATURE - Russell Burgess

IS THE UNIT WITHIN CALIBRATION TOLERANCES? YES

INTERNATIONAL TECHNOLOGY CORPORATION

By JC Date 7/15/92 Subject TO13 Train Sheet No. 1 of 1
Chkd. By DOK Date 8/11/92 Flowrates & Volume Proj. No. 406253.17
Jewell Coal + Coke

Intent: Calculate sampling rate and volume for TO-13 Train

Calibration (Calibrator 8-C)

$Q = 3.519\sqrt{P}$ @ 29.98 in Hg ; 74 °F (Calibrator equation)

Sampler Calibration Data

Calibrator DP	PUF Sampler (No. 216)	Barometric Press.	Temp.
1.1 in w.c.	10 in w.c.	29.2 in Hg	75°F

$$Q_{actual} = 3.519\sqrt{1.1 \times \frac{(75+460)}{29.2} \times \frac{29.98}{(74+460)}}$$

Q_{actual} = 3.74 acfm @ 29.2 in Hg ; 75°F
@ 10 in w.c. orifice ΔP

Sampling Rates

$$Q_2 = Q_1 \times \sqrt{\frac{T_2}{P_2} \times \frac{P_1}{T_1}}$$ (compensate for temp. and press.

$$Q_2 = 3.74 \times \sqrt{\frac{T_2}{P_2} \times \frac{29.2}{(75+460)}}$$

RUN NO.	DATE	ORIFICE DP (IN WC)	PBAR (IN HG)	TEMP (F)	MOIST (%)	SAMPLING RATE (ACFM)	SAMPLING RATE (SCFM)	SAMPLING RATE (DSCFM)	SAMPLE TIME (MIN)	SAMPLE VOL (DSCF)
1	17-Jun-92	10	28.86	80	1.8%	3.78	3.56	3.50	190	665
2	18-Jun-92	10	28.72	78	2.7%	3.78	3.56	3.47	223	773
3	19-Jun-92	10	28.55	82	2.8%	3.81	3.54	3.44	230	791

CALIBRATOR

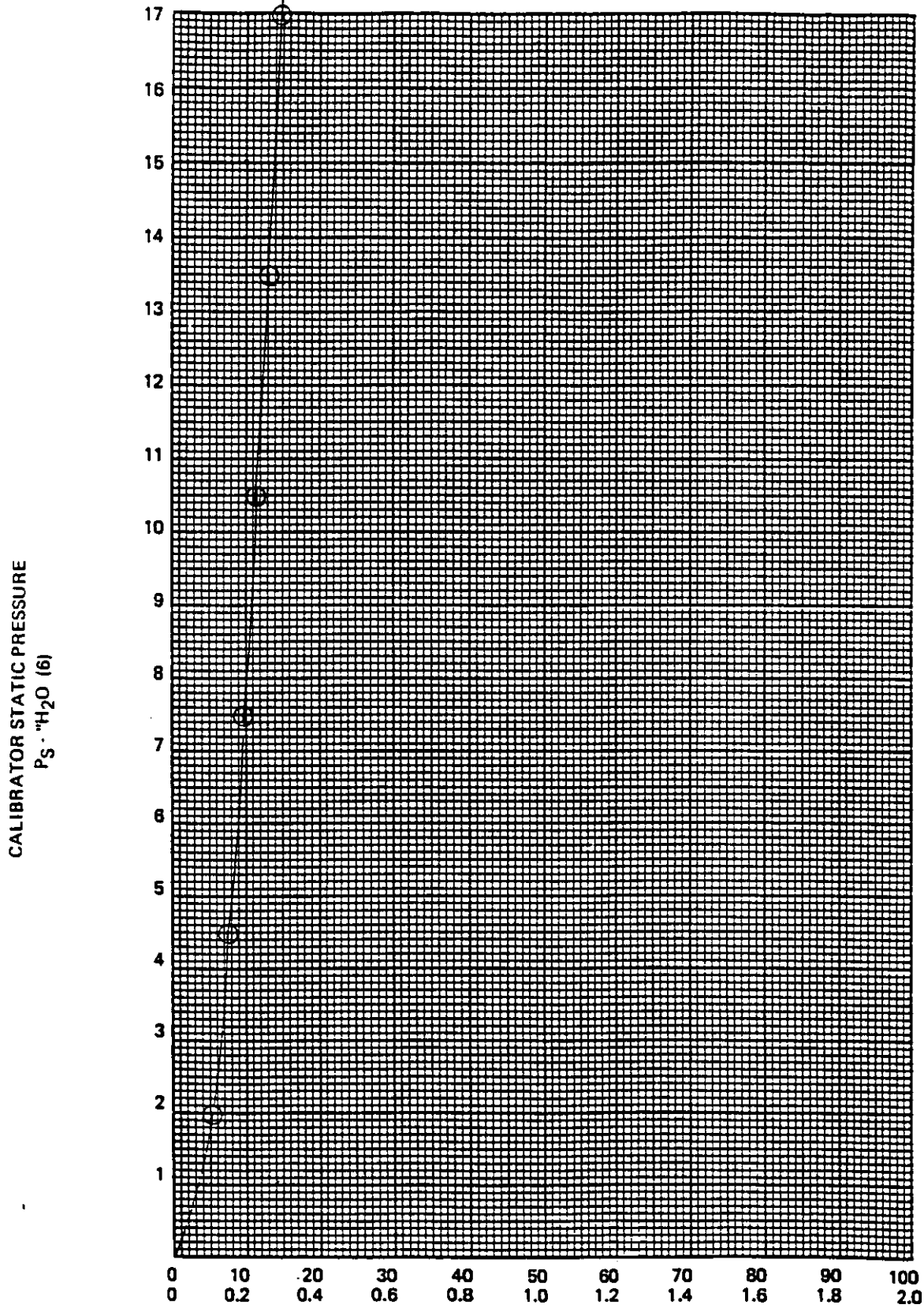
for

HIGH VOLUME AIR SAMPLER

CERTIFICATE
of
CALIBRATION

SERIAL NO. 8C

GENERAL METAL WORKS INC.
8368 BRIDGETOWN ROAD / VILLAGE OF CLEVES, OHIO 45002 / TEL. 513-941-2229



THIS PLOT IS IN (check one)

cfm ✓

M^3/min. _____

They are NOT EQUIVALENT

(9) and (10) are corrected t
760 mm of Hg and 25°C

CALIBRATION WORK SHEET $Q = 3.519\sqrt{P}$

(1) Test-Point No.	(2) Elapsed Time - Δt Min.	(3) Initial Volume V_{in} M^3	(4) Meter Static Pressure - P_S "Hg	(5) True Volume V_T M^3	(6) Calibrator Static Press. "H_2O	(7) Flow Rate Q M^3/min.	(8) Flow Rate Q ft^3/min.	(9) Corrected Flow Rate Q ft^3/min.	(10) Correctec Flow Rat Q M^3/min.
1	6.928	1	0.2	0.993	2.0	0.143	5.1	5.1	0.14
2	4.657	1	0.4	0.987	4.5	0.212	7.5	7.5	0.21
3	3.593	1	0.6	0.980	7.5	0.273	9.6	9.7	0.27
4	3.022	1	0.8	0.973	10.5	0.322	11.4	11.4	0.32
5	2.642	1	1.0	0.967	13.5	0.366	12.9	13.0	0.36
6	2.342	1	1.2	0.960	17.0	0.410	14.5	14.5	0.41
7									

(11) P_B: 29.98 "Hg

(12) T: 74 °F

(13) RH: 49 %

Roots Meter No.: 7509364

Calibrator: Model No.: GMW-SPEC

Serial No.: 8C

Calibration performed by: Brian Beaury

Date of Calibration: 12/10/18

Date placed in service: _____
(To be noted by user)

EQUATIONS

$$V_T = V_{in}\,\frac{P_B - P_S}{P_B}$$

$$= (3)\,\frac{(11) - (4)}{(11)}$$

$$Q = \frac{V_T}{\Delta t} = \frac{(5)}{(2)}$$

$$M^3 \times 35.31 = Ft^3$$

When using this instrument to calibrate a high volume sampler at conditions other than those at which the calibration took place, or was corrected to, (11) (12), the following relation should be applied.

$$Q_T = Q\left[\frac{T_T\ P_B}{T\ P_T}\right]^{1/2}$$

NOTE: IN THIS EQUATION USE ABSOLUTE TEMPERATURE (RANKINE

where:

Q_T = flow at new conditions T_T and P_T.

For additional information consult:

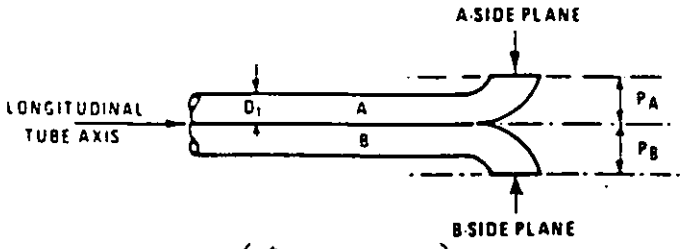
1. The Federal Register, Vol. 36, No. 84, pp. 8191 - 8194, April 30, 1971.
2. Guidelines for Development of a Quality Assurance Program — High Volume Method. EPA - 600/4-77-027a

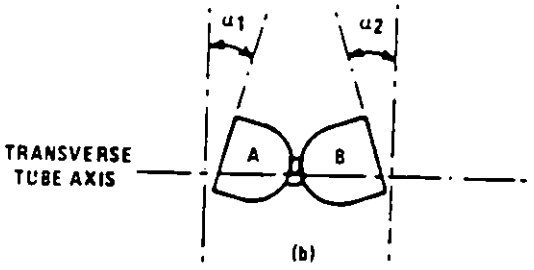
Notes:
1. Calibrators should be recalibrated after one year of field use.
2. Copies of this calibration are not kept on file.

INTERNATIONAL TECHNOLOGY CORPORATION

TYPE S PITOT TUBE
CONSTRUCTION CALIBRATIONS

Pitot I.D. No. 4' 9/95 3792 Date 6/16/92 Performed By JC





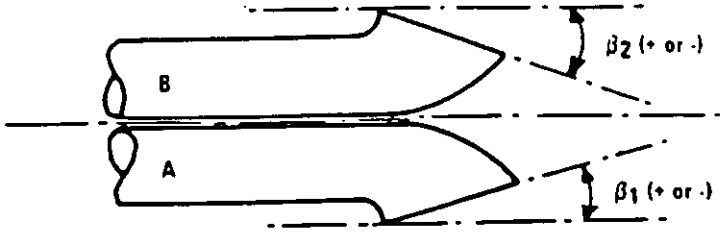
Dt = 3/8" (0.95cm) (0.48 to 0.95 cm)

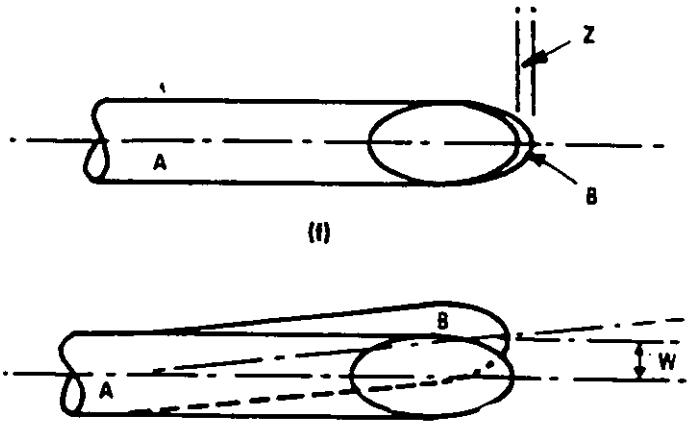
Pa = 9/16" (1.43cm) (1.05 Dt≤P≤1.50 Dt)

Pb = 9/16" (1.43cm) (1.05 Dt≤P≤1.50 Dt)

a1 = 0 (<10°)

a2 = 0 (<10°)





B1 = 0 (<5°)

B2 = 0 (<5°)

Z = 1/16" (0.16cm) (≤ 0.32cm)

W = 0 (≤ 0.08cm)

$C_p = 0.84$

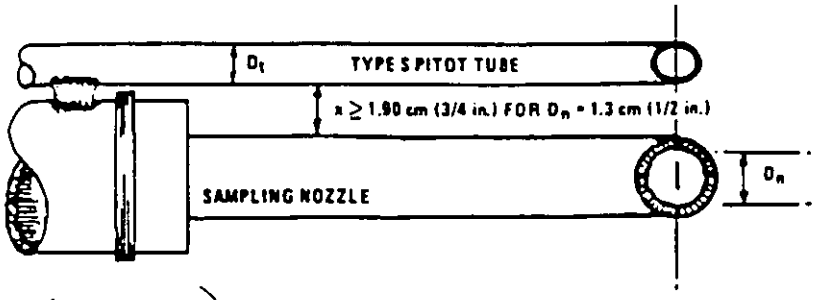
INTERNATIONAL TECHNOLOGY CORPORATION

PITOT ALIGNMENT CALIBRATIONS

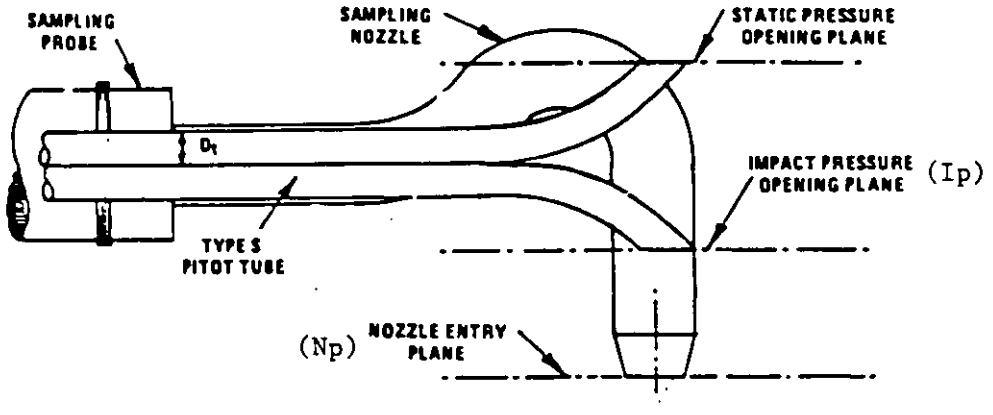
TYPE S PITOT TUBE

Pitot I.D. No. 4' 9/9 55 3792 Date 6/16/92 Performed By JC

Pitot Alignment Calibrations



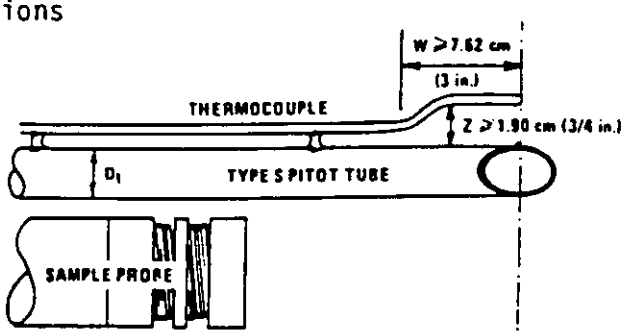
X = 7/8" (2.22cm) (X≥1.90 cm)



Is Ip higher than Np 1/8 (~1.0 inch) (Ip must be higher than Np)

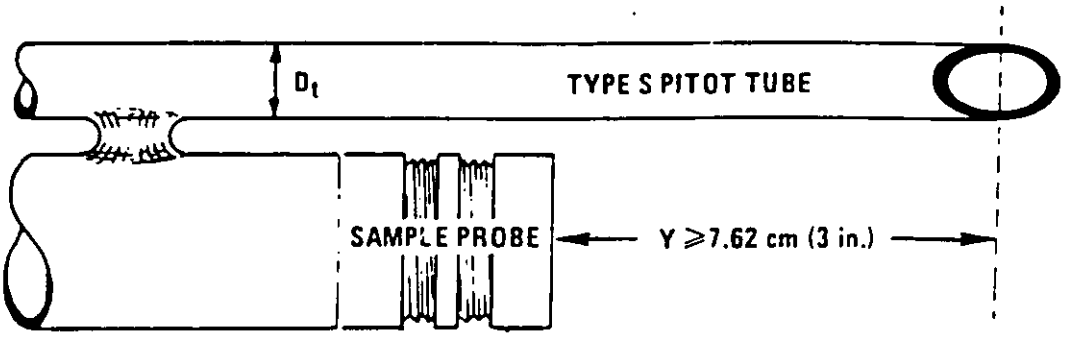
Pitot I.D. No. 4' 9/16SS 3792 Date 6/16/92 Performed BY JC

Pitot Alignment Calibrations



W = 8 in (20.3 cm) (W≥7.62 cm)

Z = 7/8" (2.22 cm) (Z≥1.90 cm)



Y = 3 1/4" (8.26 cm) (Y≥7.62 cm)

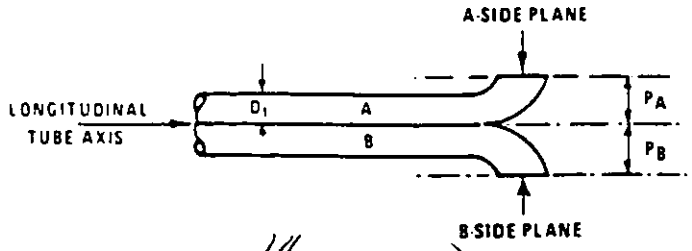
Determined Coefficient 0.84

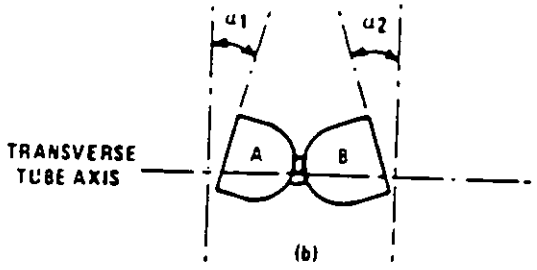
INTERNATIONAL TECHNOLOGY CORPORATION

TYPE S PITOT TUBE
CONSTRUCTION CALIBRATIONS

Pitot I.D. No. 3754 3½ ft S-Type (inconel)

Date 6/16/92 Performed By JC





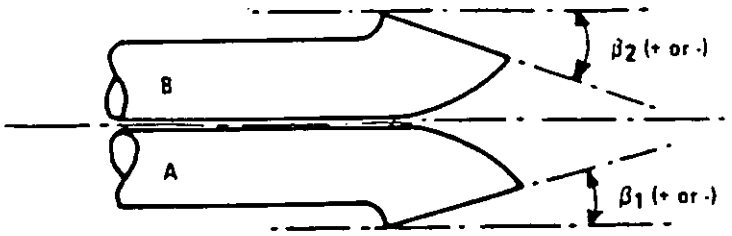
Dt = 3/8" (0.95cm) (0.48 to 0.95 cm)

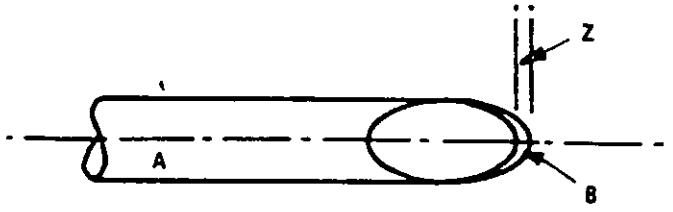
Pa = 17/32" (1.35cm) (1.05 Dt≤P≤1.50 Dt)

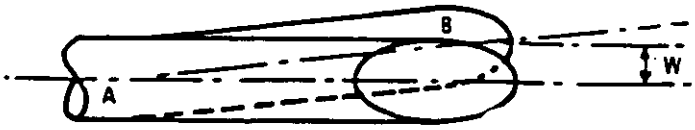
Pb = 17/32" (1.35cm) (1.05 Dt≤P≤1.50 Dt)

a1 = 0 (<10°)

a2 = 0 (<10°)







B1 = 0 (<5°)

B2 = 0 (<5°)

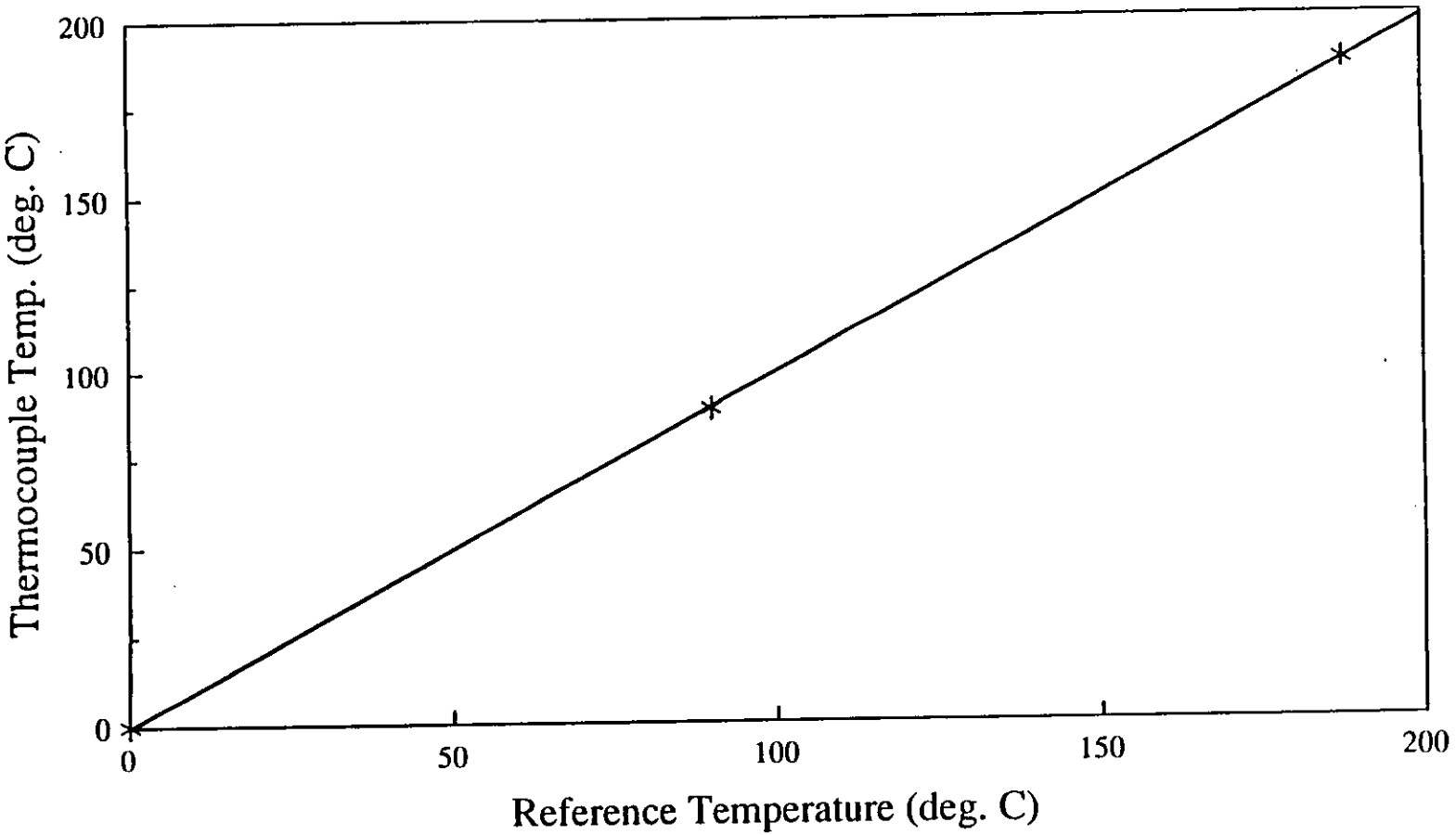
Z = 1/32" (0.08cm) (≤ 0.32cm)

W = 0 (≤ 0.08cm)

C_p = 0.84

Thermocouple Calibration

Thermocouple P12T



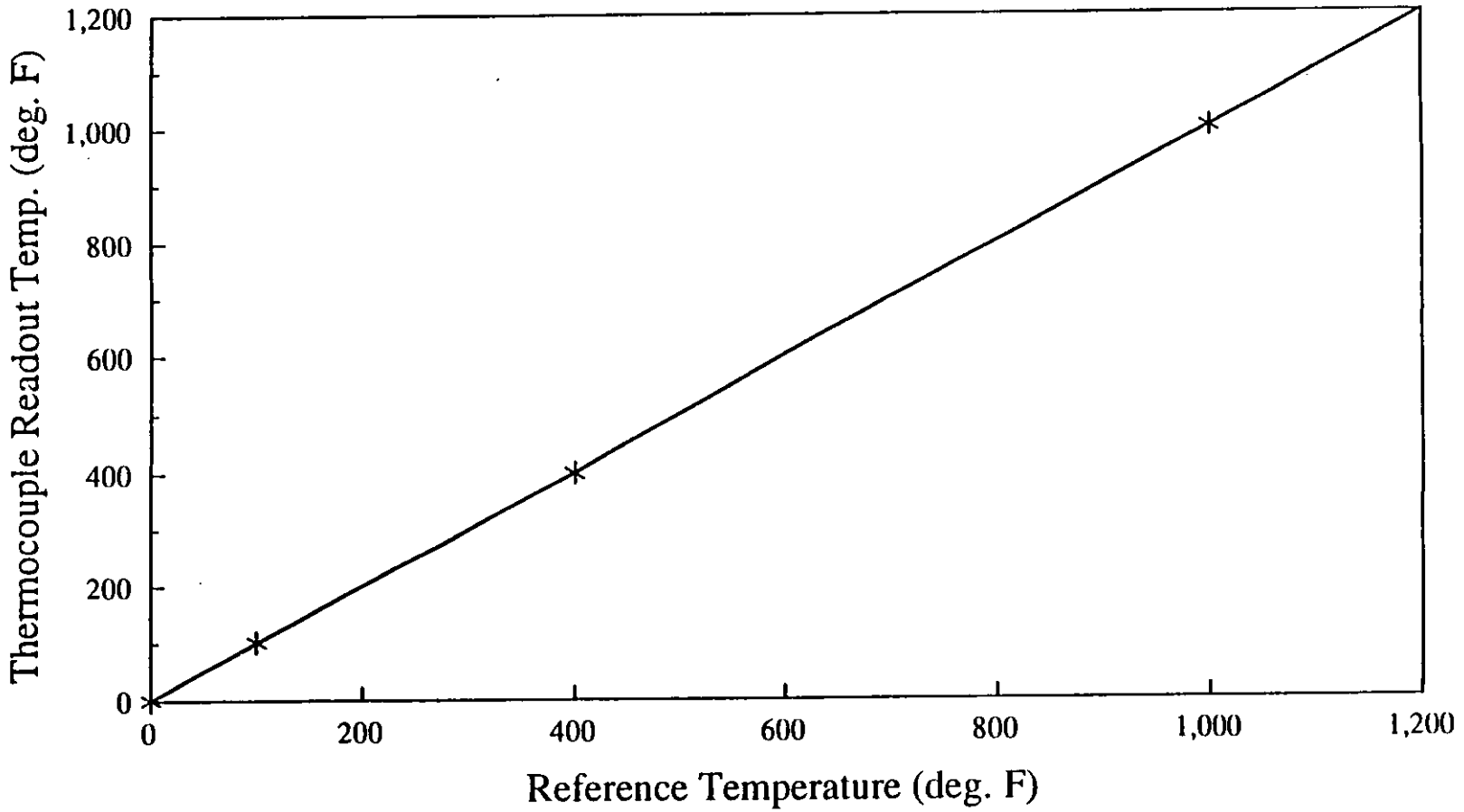
Date: 1-5-92

y = 0.9943 (x) - 0.3029

Thermocouple Readout

Calibration

Readout CB #7-RO



Date: 1-5-92
Reference: Omega Electronic Calibrator

$y = 1.0\,(x) + 0.7037$

THERMOCOUPLE READOUT CALIBRATION DATA FORM

DATE 1-5-92 THERMOCOUPLE READOUT ID EB #7 - RC

AMBIENT TEMPERATURE ~ C BAROMETERIC PRESSURE ~ in. Hg

CALIBRATOR TS REFERENCE - OMEGA ELECTRONIC CALIBRATOR

REFERENCE POINT	REFERENCE TEMPERATURE F	THERMOCOUPLE READOUT TEMP. F
1	0	0
2	100	102
3	400	400
4	1000	1001

THERMOCOUPLE READOUT CALIBRATION DATA FORM

DATE 1-5-92 THERMOCOUPLE READOUT ID CB #6 - RC

AMBIENT TEMPERATURE ~ C BAROMETERIC PRESSURE ~ in. Hg

CALIBRATOR TS REFERENCE - OMEGA ELECTRONIC CALIBRATOR

REFERENCE POINT	REFERENCE TEMPERATURE F	THERMOCOUPLE READOUT TEMP. F
1	0	4
2	100	102
3	400	401
4	1000	1004

THERMOCOUPLE READOUT CALIBRATION DATA FORM

DATE 1-5-92 THERMOCOUPLE READOUT ID CB #9 - RC

AMBIENT TEMPERATURE ~ C BAROMETERIC PRESSURE ~ in. Hg

CALIBRATOR TS REFERENCE - OMEGA ELECTRONIC CALIBRATOR

REFERENCE POINT	REFERENCE TEMPERATURE F	THERMOCOUPLE READOUT TEMP. F
1	0	1
2	100	95
3	400	394
4	1000	990