Trial Burn Review Checklist/Tech Review

(For use by NSR Air Permit Coordinators) Revised 05/05/97... pdq

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Facility Description: Hot Oil Heater (Boiler) H-1, 250 MMBTU/hr

I. OVERVIEW

Georgia Gulf Corporation operates a petrochemical facility in Pasadena, Harris County, Texas. The plant has two manufacturing units: one that produces cumene, and one that produces phenol and acetone from cumene. The waste generated from this process is a hazardous waste listed as K022 and composed of phenolic tars and wet acetone. The phenolic wastes are accumulated in tank V-3410 and wet acetone wastes are accumulated in tank V-3204. These wastes are piped to a hot oil heater H-1 (BIF Unit) to produce hot oil which provides a heat transfer medium to be used in the facility. The Georgia Gulf BIF unit is part of a manufacturing process. Its primary purpose is to serve as a process heater, with a secondary use being waste disposal.

Currently, the waste fuels routinely burned in this unit for energy recovery are phenolic tars and a wet acetone waste stream. An alternate fuel stream, distillation fuel (a gaseous stream), is also burned in the heater and, occasionally, excess product grade alpha methyl styrene (AMS) may be burned. However, there is only one burner dedicated for liquid waste feed, therefore, liquid waste feed rates are not additive. Any (or all) of the on-site wastes may also be disposed off-site at an authorized TSD facility.

The facility has established Interim Status under RCRA by submitting a part A permit application and a Certification of Precompliance prior to August 21, 1991. Certification of Compliance with BIF rules was initially submitted in August 1992, and revised in August 1995 and July 1998. The facility should operate according to the standards set forth in the Certification of Compliance.

Texas Natural Resource Conservation Commission (TNRCC) requested that a trial/risk burn plan be submitted by correspondence dated September 1998. Georgia Gulf Corporation responded to the request by submitting the subject Trial/Risk Burn Plan which was received by NSR Permit Division on January 20, 1999. The Burn plan constitutes both the trial burn plan for performance demonstration and the risk burn plan for acquiring data necessary to perform an indirect risk assessment. Only one plan is submitted since the company indicates that expected wastestreams and firing conditions that are worst-case for the trial burn are also worst-case for the risk burn.

Worst case is defined as that which would have the greatest potential to emit hazardous constituents as a result of materials being passed through the combustion zone or as a result of products of incomplete combustion (PIC) formation.

The proposed objectives of the trial burn are as follows:

1. Demonstrate that the standards for BIF units burning hazardous waste are met pursuant to the following federal and state regulations:

   40 CFR Part 266, Subpart H: Hazardous Waste Burned in Boilers & Industrial Furnaces
   40 CFR §266.102: Permit Standards for Burners
   40 CFR §§266.104-107: Permit Standards
   40 CFR §270.22: Specific Part B Information Requirements for Boilers and Industrial Furnaces Burning Hazardous Waste
   40 CFR §270.66: Permits for Boilers and Industrial Furnaces Burning Hazardous Waste
   30 TAC Chapter 305, Subchapter C: Application for Permit
   30 TAC Chapter 305, Subchapter Q: Permits for Boilers and Industrial Furnaces Burning Hazardous Waste
   30 TAC §335.152(a)(13): Adoption of 40 CFR Part 264, Subpart O
   30 TAC §§335.221-229: Hazardous Waste Burned for Energy Recovery

2. Generate the necessary data to perform an indirect risk assessment demonstrating that emissions from hazardous waste combustion and ancillary operations are less than specified target risks.

GGC proposes to conduct the test at worst-case conditions for demonstrating destruction and removal efficiency (DRE) compliance and generating potential high risk emissions. Worst case conditions that will be used during the trial/risk burn are as follows:

- firing of the distillation fuel at or near maximum rates, which maximizes the input of benzene which is a thermally resistant compound (Benzene Degradation Temp. 1150^{o}C),

- firing of the phenolic tar stream at or near the maximum rate that can be put through the liquid fuel burner. This introduces a second thermally resistant compound and a mixture of other heavy organic compounds to the other waste fuels burned in this unit (Phenol Degradation Temp. 775oC),

- minimization of excess oxygen to maximize conditions that promote incomplete combustion, and minimum residence time in the combustion chamber,

- firing at or near minimum combustion temperature (to increase the potential for passthrough and incomplete combustion) to the extent possible when firing the maximum waste fuels and distillation fuel. (Previous testing in 1998 resulted in a minimum combustion temperature of 764^{o}C). The heater can have a maximum combustion temperature of 2500^{o}F (1371 ^{o}C).

Two waste fuel streams consisting of distillation fuel (nonhazardous) and phenolic tar (hazardous) are proposed to be fed during the burn to obtain the risk burn data and demonstrate compliance with DRE standards. Inputs proposed to be sampled are phenolic tar and distillation fuel stream. There will be no solid combustion residues. Stack gases will be sampled for Principal Organic Hazardous Constituents (POHC) for DRE compliance demonstration, particulate matter (total emissions), CO and O2, products of incomplete combustion (PIC's) including volatile and semi-volatile organic components, total organic emissions, aldehydes, ketones and particle size distribution. Stack gases are not proposed to be sampled for hydrogen chloride, chlorine gas, PCBs, dioxins or furans because of the insignificant levels of halides found in the feed streams during the previous compliance tests. Compliance with metals standards is proposed to be shown using Tier 1 Feed Rate Screening limits.

At a minimum, the following parameters will be defined during the test under worst-case operating conditions:

Group A: Carbon Monoxide Conc. Corrected to 7% O2 in Flue Gas
Oxygen Conc. In Flue Gas
Pressure in the Combustion Chamber
High and Low Combustion Temperatures
Waste Feed Rates
Combustion Air Flow Rate

Group B; Total Chloride Feed Rate
Total Halide Feed Rate
Ash Feed Rate
Metals Feed Rate

Group C: Heat Input
Waste viscosity

H-1 Hot Oil Heater, (BIF Boiler):

H-1 Hot Oil heater; manufactured by ENTEC Corporation, is a 250 MMBtu/hr oil heater. The primary fuels that can be used to fire the heater are propane, No.6 fuel oil and the

fuel gas. Therminol 66 oil; manufactured by Monsanto, is used as a heat transfer fluid to supply process energy for the cumene plant. Therminol 66 is contained in a closed loop system and is heated in the hot oil heater (BIF boiler). The oil is split into eight parallel symmetrical passes before entering hot oil heater H-1. The hot oil is circulated with hot oil circulation pumps to the reaction vessels where it acts as a non-contact heat exchange fluid and is then returned to the heater.

Heat input and combustion air flow are controlled by the circulating hot oil's outlet temperature. A decrease in hot oil temperature will first cause an increase in combustion air flow followed by a corresponding increase in fuel flow. Conversely, an increase in hot oil temperature will first cause a decrease in fuel input and then a decrease in combustion air flow. The flow controller is reset (remote setpoint) by the higher of either the total fuel flow or hot oil temperature.

Average conditions during maximum firing rates in the firebox are temperatures of 2,500 ^{o}F, a gas velocity of 8.1 ft/sec, and a residence time of 9.9 seconds.

The safety interlock system on the H-1 oil heater is designed to prevent startup under unsafe conditions and to shut all or part of the heater sown, as necessary, to prevent development of unsafe conditions.

Georgia Gulf proposes to submit a trial/risk burn report containing the results within 90 days of completion of the field testing.

II. TESTING CONDITIONS

For each combustion unit, please list the expected trial burn conditions that are planned and what standards will be tested for under each condition. If data in lieu of testing has been submitted to satisfy the requirement, please note this and designate what the testing conditions were at the time the data was recorded.

A test run is not proposed at maximum combustion temperature.

The TB/RB test will consist of 3 runs conducted at minimum combustion chamber temperature conditions:

Test 1 Run: This is proposed to be accomplished by firing the heater with the predetermined worst-case primary fuel combination, increasing the waste fuel feed rate to the maximum value achievable (10-20 gallons per minute for phenolic tar waste), and adjusting the rate of primary fuels until the maximum heater firing rate of 250 MMBtu/hr is reached.

Test 2 Run: This will be accomplished by firing the heater with primary fuels; propane and distillation fuel only, to the maximum heater firing rate attainable.

Test 3 Run: During normal operating conditions, sooth blowing is proposed to be

performed once per shift for 5 minutes per event. To evaluate the impact of soot blowing on average daily emissions, this run will be conducted during the period of higher emissions so that data can be gathered for soot blowing events. To accomplish this, the routine soot blowing event which is performed during the evening shift will not be performed the evening prior to the the start of Run 3. A soot blowing event will then be initiated during the Method 5 particulate emission testing. From the time of the soot blowing event until the emissions testing event, waste fuel will be fed under normal to maximum operating conditions (i.e., approximately 10 gpm phenolic waste). Particulate emission rates will be calculated from this run.

Proposed Boiler Set Points for the Test 1 Trial/Risk Burn:

Minimum Combustion Chamber Temperataure: 764^{o}C unless a new minimum temperature is established in this run.

Combustion Air Flow Rate: Will be monitored

Maximum Hot Oil(Therminol 66) Production Rate: 3.5 MM lb/hr

Maximum Hot Oil (Therminal 66) Temperature: Will be monitored

Primary Fuel (Propane Gas) Feed Rate: will be adjusted to provide 50% of the total heat input. Total heat input will be at or below the design heat input rate of 250 MMBtu/hr.

Maximum Auxiliary Fuel (Waste Distillation Fuel, Nonhazardous) Feed Rate: Will be monitored. 1998 Certificate of Compliance Test indicated 2,000 lb/hr

Maximum Phenolic Tar (Hazardous Waste) Feed Rate: Maximum value achievable between 10 gallons per minute to 20 gallons per minute. The company requests a permit limit of 5,438.4 lb/hr based on Certificate of Compliance test conducted in 1998. If higher penolic waste feed rate can be achieved in this test run, the company intends to modify their request.

1998 Certificate of Compliance Data for the chlorine and metals are given below:

Phenolic Tar Chlorine Feed Rate: 246.90 g/hr;
Phenolic Tar Antimony Feed Rate: 70.37 g/hr;
Phenolic Tar Arsenic Feed Rate: 6.17 g/hr
Phenolic Tar Barium Feed Rate: 23.04
Phenolic Tar Berylium Feed Rate: 1.85 g/hr
Phenolic Tar Cadmium Feed Rate: 1.46 g/hr

Phenolic Tar Chromium Feed Rate: 11.70 g/hr
Phenolic Tar Lead Feed Rate: 19.09 g/hr
Phenolic Tar Mercury Feed Rate: 0.99 g/hr
Phenolic Tar Silver Feed Rate: 1.85 g/hr
Phenolic Tar Thallium Feed rate: 115.06 g/hr

Historical data indicates the following heating values for the waste streams:

Distillation Fuel Stream: 19,000 Btu/lb
Phenolic Tar Stream; 16,300 Btu/lb
Density of Phenolic Tar (lb/gal): 8.8 lb/gal

Waste streams will be analyzed for the ash and the metals to determine the exact feed rates of the individual metals fed into the BIF unit. Assuming that 100 percent of the metals in the waste feed streams are emitted (worst-case emission scenario), a determination will be made if any of the metal emissions will exceed BIF Tier 1 feed rates screening limits.

Maximum CO Concentration@7%O2 at the exit of combustion chamber: <100 ppmv on any 60 min rolling average. Automatic waste feed cut-off system shall activate or an alarm will sound if CO concentration in the stack gas is greater than 75 ppmv corrected to 7% O2 for a 60 minute rolling average.

DRE Standard: 40 CFR 266.104 requires that a boiler or industrial furnace burning hazardous waste(excluding dioxin-listed wastes) must achieve a destruction and removal efficiency (DRE) of 99.99% for all organic hazardous constituents in the waste feed. To demonstrate conformance with this requirement, 99.99% DRE must be demonstrated during a trial burn for each principal organic hazardous constituent (POHC).

The applicant proposes to demonstrate a 99.99% destruction and removal efficiency (DRE) for the principal organic hazardous constituents (POHCs) of phenol and benzene while operating at the maximum feed rate and minimum residence time.

Worst-case operating conditions for the risk burn testing are the same as those proposed for the trial burn DRE testing.

CO Standard: 40 CFR 266.104 requires that when burning liquid residue in the boiler, emissions of CO should be maintained below 100 ppm corrected to 7% O2 on an hourly rolling basis.

The heater is equipped with a CEMS that measure CO and O2 in the stack gases. The

heater is also equipped with an automatic hazardous feed cutoff that will shut off the waste streams when the hourly rolling average CO value reaches 75 ppm corrected to 7% O2. Prior or during this trial burn, the BIF unit CEMS for CO and O2 will be calibrated and tested for performance specifications. The data from the CEMS will be used to demonstrate compliance with permit limits for these parameters in addition to redundant data from stack testing for these parameters.

Particulate Standard (40 CFR 266.105); requires that PM emissions be less than 0.08 gr/dscf corrected to 7%O2.

Georgia Pacific proposes to demonstrate compliance with the PM standard by conducting emissions testing in the exhaust stack during a scheduled soot blowing for Test Run 3. This test will be conducted to demonstrate that particulate standard emission limits are not exceeded during a soot blow.

HCl/Cl2 Standard (40CFR266.107);requires that the offsite reference air concentration (RAC) for HCl and Cl2 not exceed 7 ug/m3 and 0.4 mg/m3 respectively.

Based on January 1998 analysis, maximum total chloride concentration measured is 100 ppm, corresponding to a feed rate of <250 g/hr. For a terrain-adjusted effective stack height of 71.2 meters, 40 CFR Part 266, Subpart H, Apppendix II allowable chloride feed rate is 7,200g/hr. Therefore, conformance with the HCl and Cl2 standards has been demonstrated using Tier 1 Feed Rate Screening Limits. Waste feed sample analysis that will be obtained during the test runs will be used to verify this demonstration.

Metals Standard (40 CFR 266.106); requires that the offsite Reference Air Concentration (RAC) and/or Reference Specific Dose (RSD) for the ten BIF metals not exceed the values in the following Table:

Constituent	RAC or RSD (ug/m3)
Lead	0.09
Antimony	0.3
Barium	50
Mercury	0.08
Nickel	20
Selenium	4
Silver	3
Thallium	0.5
Arsenic	0.0023
Beryllium	0.0042

Cadmium	0.0056
Chromium+6	0.00083

Georgia Gulf Corporation (GGC) will do stack testing for nickel, selenium and zinc as part of the risk assessment program. GGC proposes to comply with the Metals Standard for the rest of the metals via Tier 1 feed rate screening limits pursuant to 40 CFR §266.106(b)(7). GGC facility meets the criteria specified in 40 CFR §266.106(b)(7), therefore it is eligible to use the Tier 1 feed rate screening limits for those metals.

For an adjusted stack height of 71.2 meters, Tier 1 feed rate screening levels for metals for rural land use and non-complex terrain are given below:

Constituent	Tier 1 Allowable Feed Rate (g/hr)	Waste Feed Input* Avg.(g/hr)
Noncarcinogenic Metals:		
Antimony	5,400	70.37
Barium	900,000	23.04
Beryllium	76	1.85
Lead	1,600	19.09
Mercury	5,400	0.99
Silver	54,000	1.85
Thallium	5,400	115.06
Carcinogenic Metals:		
Arsenic	43	6.17
Cadmium	100	1.46
Chromium	15	11.70

Sum of ratios for carcinogenic metals:

$$6.17/43 + 1.46/100 + 11.7/15 + 1.85/76 = 0.96 < 1.0$$

Expected feed rates of metals are much less than the 40 CFR Part 266, Subpart H, Appendix I Tier 1 levels, and the sum of the ratios (of Tier 1 Feed rates to waste feed input rates) for carcinogenic metals is less than 1.0, therefore, no emission testing is proposed to be conducted during the trial burn for these metals. Feed rate of the metals will be monitored during this test to ensure that the feed rate screening levels not be exceeded.

Georgia Gulf Corporation requests a permit feed rate of 5,438.4 lb/hr for phenolic tar. Although waste feed rates are limited by the burner device flow capability, if this trial/risk burn testing can be used to demonstrate higher feeds for these waste feeds, then Georgia Pacific intends to request higher limits for waste feed rates and metal feed rates as long as they show continued compliance with Tier 1 Feed Rate Screening limits.

III. REGULATORY REQUIREMENTS

Incinerators:
40 CFR 264, Subpart O, Incinerator Regulations
40 CFR 270.19, Specific part B information requirements for incinerators
40 CFR 270.62, Hazardous waste permits
BIFs:
40 CFR 266, Subpart H, BIF Regulations
40 CFR 270.22, Specific part B informations for BIFs burning hazardous waste40 CFR 270.66, Permits for BIFS burning hazardous waste

A. Standards Checklist Table

Mark whether the facility will test or submit data

Combustion Unit	DRE Std		PM Std		HCl/Cl2		CO/THC		Metals	
	Test	Data	Test	Data	Test	Data	Test	Data	Test	Data
Hot Oil Heater. (BIF)	Yes, POHC test		Yes		No	Yes, Tier 1 feed rate screening	Yes, CEMS		No	Yes, Tier 1 feed rate screening for the rest of the metals

Notes:
1. BIF Units cannot submit data in lieu of testing for compliance with the DRE standard.
2. Although Subpart O does not specifically require compliance with the BIF metals standards, we will be requiring this through RCRA omnibus authority.
3. Discuss all data submittal below in section B.

B. Data In Lieu of Testing

Discuss below each and any submittal of data in lieu of testing to satisfy an emission standards. While reviewing a data lieu of submittal, it is important to ensure that the testing is representative and properly QA/QC'd (per Engineering Services).

Data In Lieu of Metals Testing :

Compliance with the metals standard is proposed based on the January 1998 test data and Tier 1 Feed rate screening limits for metals pursuant to 40 CFR Part 266, Subpart H, Appendix I.

Data in Lieu of HCl/Cl2 Testing:
Compliance with the HCl/Cl2 testing is proposed based on the January 1998 test data and Tier 1 Feed rate screening limit for chloride pursuant to 40 CFR Part 266, Subpart H, Appendix II.

C. POHC Selection per § 264.342 and § 270.62
Discuss below the rationale behind the POHC(s) selected for demonstrating the DRE standard.

Principal Organic Hazardous Constituents (POHCs) are hazardous organic constituents that are representiative of the constituents most difficult to burn to destroy and most abundant in the waste. During the trial/risk burn, the DRE of the POHCs will be measured and used as an indication of the overall efficiency performance in combusting organic waste.

The waste streams and the fuels were subjected to a complete 40 CFR Part 261,Appendix VIII organic hazardous constituent analysis to identify all potential POHCs including volatile and semi-volatile compounds, polycyclic organic materials, plychlorinated biphenol compounds (PCBs), and polychlorinated dibenzo dioxins and furans, that may be present in significant quantities.

According to GGC's analysis, the only Appendix VIII constituent that was detected in the phenolic tar waste is phenol which was found to be present at about 5 percent on a weight basis. The only Appendix VIII constituent found in the acetone waste feed is the acetophenone (13 ppm). Although acetone waste contains almost 96 percent water and approximately 3 percent isopropylbenzene, these compounds are not Appendix VIII constituents.

Alpha methyl styrene (AMS) stream is not being currently burned. However, its is included in the POHC selection analysis in order for the company to have flexibility to burn this waste in the future.
Alpha methyl styrene (AMS) waste stream contains two Appendix VIII constituents: benzene at about 9.4 percent and acetophenone at 191 ppm.

The gaseous distillation fuel, although not a hazardous waste fuel, contains a significant quantity of benzene which is an Appendix VIII compound at a concentration of about 96.4 percent.

The following table summarizes Georgia Gulf Corporation's assessment regarding the presence of Appendix VIII constituents in the fuels and in the waste streams

	Appendix VIII Constituents
Fuels	
Propane	None
Fuel Gas	None
Waste Streams	
Phenolic Tar	Phenol (5% on weight basis) (Class* 3 compound On thermal stability chart, Thermal stability-based Incinerability Rank**; 86 to 90)
Wet Acetone	Acetophenone (13 ppm)
Alpha Methyl Styrene(AMS)	Benzene (9.4%) and Acetophenone (191 ppm)
Distillation Fuel	Benzene (96.4%) (Class* 1 Compound on thermal stability Chart, Thermal stability-based Incinerability Rank**: 3)

The waste streams which are found to contain refractory (hard to destroy) organics are proposed to be benzene and phenolic tar. Based on this evaluation, the worst-case waste combination for a risk burn would be firing of both the distillation fuel and phenolic tar wastestreams at the maximum input rate.

* There are seven thermal stability classifications. Class 1 compounds are the most resistant to thermal degradation, while Class 7 compounds are the easiest to destruct by burning

** This ranking is based on the T99(^{o}C)(the measured temperature at which at least 99 percent of the material will thermally degrade). Rank No. 1 is the hardest to thermally destroy. T99 for Benzene is 1150^{o}C. T99 for phenol is 775^{o}C.

Two of the potential POHC's; phenol and benzene, appear to be present in sufficient concentrations in the phenolic waste and distillation fuel to be accurately measured in the stack gas assuming a 99.99 percent DRE. Acetophenone does not appear to be present at sufficient concentrations to allow determination of DRE. Therefore, acetophenone is not selected as a POHC.

Benzene (from distillation fuel) is proposed to be selected as the primary and Phenol (from phenolic waste) is selected as the secondary POHCs. This selection means that if this unit can demonstrate a 99.99 percent DRE for benzene, then it will destroy any compound with a thermal ranking of 3 or higher. It is stated that sufficient quantities of gaseous distillation fuel (Benzene POHC) and phenolic tar (Phenol POHC) are available

for the test run.

Stack gases are proposed to be sampled and analyzed for the identification and quantification of acetophenone, aldehydes and ketones. Therefore, under the risk burn portion of the sampling and analysis program, it is proposed that a determination will be made if emissions of acetophenone present a potential health risk.

D. Emissions Monitoring/Testing per § 264.347 and § 266.102(e)(8)

The following BIF unit stack gas parameters will be determined during the proposed trial/risk burn test:

- Stack gas velocity
- Stack gas dry molecular weight
- Stack gas moisture content
- Concentrations of POHCs(benzene and phenol),
- Particulate matter concentration,
- Carbon monoxide concentration,
- Carbon dioxide concentration
- Oxygen concentration,
- Volatile organic compounds (PICs) concentrations,
- Semi-volatile organic compounds (PICs) concentrations,
- Total organic compound concentrations,
- Aldehydes and ketones
- Particulate matter particle size distribution

IV. RISK BURN REQUIREMENTS

Volatiles per EPA Method 0030
Semi Volatiles per EPA Method 0010
Dioxin/Furan emissions per EPA Method 23
Total Organic Emission per draft EPA Method
Particle Size Distribution

A. Risk Assessment Data Table

Combustion Units	Volatiles		Semi-Vols		D/Fs		Ttl Organics		Part. Size	
	Test	Data	Test	Data	Test	Data	Test	Data	Test	Data
H-1 Hot Oil Heater(BIF Unit)	Yes		Yes		No	Yes	Yes		Yes	

The phenolic tar stream is expected to contain a higher percentage of high molecular weight compounds and a greater variety of contaminants than any of the other waste streams. Therefore, the worst-case hazardous wastestream for the risk burn is proposed to be the phenolic tar, the primary hazardous waste fuel.

Based on recent analyses of all waste feed streams, it is stated that the metals content, PAH content, PCB content, Polychlorinated Dibenzo Dioxin (PCDD) content and Polychlorinated Dibenzo Furan (TCDF) content of the wastes are at levels which do not warrant consideration on the basis of worst-case risk criteria. The nitrogen content of the waste feed streams is also stated to be very low, therefore, nitrogen testing is not proposed to be included in the risk burn.

The presence of compounds that contain oxygen (alcohols, aldehydes and ketones) and compounds that are resistant to thermal degradation, and, therefore, could pass through the combustion unit or generate PICs during the combustion process, are of primary concern. Therefore, trial/risk burn proposes to include these compounds.

B. Surrogate Risk Data

Discuss below each and any submittal of surrogate data to satisfy a data requirment of the risk assessment. While reviewing the data, it is important to ensure that the testing is representative, properly QA/QC'd (per Engineering Services) and suitable for drafting permit conditions.

None.

C. Stack Parameters

Includes velocity, flow rate, O2 and CO2 concentration and molecular weight via EPA Methods 1 through 4.

The following stack parameters for the hot oil heater (boiler) are submitted for this trial/risk burn plan:

Stack Diameter (ft):	9.5
Stack Height (ft):	140 ft above grade

The following stack parameters will be determined during the trial/risk burn test:

Stack Exit Velocity (ft/s):	Will be determined using EPA Methods 1 and 2
Stack Flow Rate (ft^3/s):	Will be determined
Stack Temperature(^oF):	Will be determined
Stack Gas Dry Molecular Weight:	Will be determined using EPA Methods 3 and 4
Stack Gas CO2 Conc.(%):	" "
Stack Gas O2 Conc (%) :	" "
Stack Gas Moisture Content(%)	" "

Based on the chemical composition of the exit gas released during previous tests, the stack effluent consists of the following (assuming the stack conditions using fuel gas are typical):

O2 Concentration(% by volume): 3.0
CO2 Concentration(% by volume): 8.1
N2 Concentration (% by volume): 72.6
H2O Concentration (% by volume): 16.3

Expected concentrations of air pollutants in this test based on previous test results are as follows:

NOx: 199 ppmv
SO2: 170 ppmv
CO: 43 ppmv
VOC: 6 ppmv
PM: 0.02ppmv

D. Waste Feed Testing

Includes calorific value, ultimate and proximate analysis per ASTM methods, full scans via GC/MS (SW-846-8260 and 8270) and metals content. Proximate analysis is determination of moisture, volatile matter, fixed carbon (be difference) and ash. Ultimate analysis is a determination of the percentages carbon, hydrogen, sulfur, nitrogen, chlorine, ash and

Feed samples of the phenolic tar waste will be collected from a sample tap valve of the feed pump every 15 minutes into precleaned glass bottles. A 25 ml aliquot amount would provide a 800 ml sample for 15-minute sampling on a 8-hour maximum test run. The composite phenolic waste samples will be analyzed for the following: Density, heating value, volatile matter, total solids, ash, total halides, total chloride, elemental analysis (C, O, H, N, S, Ash, Moisture), chlorine, viscosity, metals (Sb, As, Ba, Be, Cd, Cr, Pb, Hg, Ag, Tl, Ni, Se, Zn), volatile organics (full scan), semi volatile organics (full scan) and POHC (benzene and phenol).

Gaseous distillation fuel stream will be sampled via a port in the gas process line using EPA SW-846 Method 0040 into a sampling bag. The bag will then be transported immediately to an on-site gas chromatograph. The sample in the bag will be directly injected into the gas chromatograph to determine the concentration of POHC (benzene and phenol) in the distillation fuel. Samples of the distillation fuel will be collected every 30 minutes, at a minimum, over the period of each test run in which the VOC samples for the stack gas emission stream are being collected. The benzene concentrations will then be averaged and used with the lb/hr feed input data to calculate the mass feed rate of benzene to the BIF unit during the test period and the total benzene feed.

E. Residuals Testing

via GC/MS (SW-846-8260 and 8270)

Because the primary fuel (propane), auxiliary fuel (distillation fuel gas) and the liquid waste fuel (phenolic tar and wet acetone) are all organic-based with very low inorganic content, no bottom ash is produced during normal operations. Some buildup of residue may occur on the heater refractory over an extended period of operation. Since there is no bottom ash produced, residual testing requirement is not applicable to this TB/RB plan.

V. DISCUSSION

Maximum Combustion Temperature Conditions - Compliance with Metals Standard(40 CFR266.106)

Phenolic waste stream contains metals. However, TB/RB Plan does not propose a test at the maximum combustion temperature conditions. Tier 1 Feed Rate Metal Screening Limits are proposed instead to indicate complicance with the metals standard.

Minimum Combustion Chamber Temperature Conditions - Compliance with Organics Standard (40CFR 266.104)

Achievement of Minimum Combustion Temperature:

Achievement of minimum combustion zone temperature at the same time as achieving maximum waste feed and minimum residence time in a combustion chamber may be difficult. Residence time is related to maximizing fuel inputs (primary and waste fuels) which may make it difficult to achieve low combustion zone temperatures. This unit is not equipped with tempering devices such as water sprays to control combustion zone temperatures. Therefore, minimum combustion temperatures may not be attainable.

Emission Testing for PCB, Polychlorinated Dibenzo Furan (PCDF), and Polychlorinated Dibenzo Dioxin (PCDD):

Emission testing is not proposed for measurement of PCBs, total chlorinated dibenzo furans and dioxins based on the limited feed data submitted. Missing data is requested from the applicant concerning the presence and levels of these substances in all waste streams.

Deficiencies identified by this review are listed in the NOD Memo to I& HW Division.