Attachment A
Case-By-Case MACT Assessment
Auxiliary Boiler

On June 8, 2007, the U.S. Court of Appeals for the District of Columbia Circuit vacated the National Emission Standard for Hazardous Air Pollutants (NESHAP) for industrial, commercial and institutional boilers and process heaters (40 CFR 63, Subpart DDDDD). In the vacated standard, EPA determined that only particulate matter, hydrogen chloride, and carbon monoxide emissions from liquid fuel-fired boilers or process heaters warranted rulemaking. Based on guidance from Georgia EPD, a case-by-case MACT determination has been prepared for non-mercury metals, acid gases, and organics from Yellow Pine Energy's proposed Auxiliary Boiler. This categorization of what constitutes a HAP was taken from the archived documents generated by the economic impact analysis that was performed by EPA during development of the Boiler MACT. These three categories of HAPs encompass all of the individual HAPs EPA investigated in its process to determine whether liquid fuel-fired boilers warranted listing as a MACT category. 40 CFR 63.43 sets forth the following two principles to be used in the establishment of MACT emission limitations in a case-by-case MACT determination:

> "The MACT emission limitation or MACT requirements recommended by the applicant and approved by the permitting authority shall not be less stringent than the emission control which is achieved in practice by the best controlled similar source, as determined by the permitting authority."
>
> "Based upon available information, the MACT emission limitation and control technology recommended by the applicant and approved by the permitting authority shall achieve the maximum degree of reduction in emissions of HAP which can be achieved by utilizing those control technologies that can be identified from the available information, taking into consideration the costs of achieving such emission reduction and any non-air quality health and environmental impacts and energy requirements associated with the emission reduction.

In February 2002, EPA issued "Guidelines for MACT Determinations under Section 112(j) Requirements". These guidelines offer a step-by-step process for making a MACT determination consistent with the above two principles. The process can be summarized as follows:

Step 1 – Identify the MACT-affected emissions unit
Step 2 – Make a MACT floor finding
Step 3 – List all available/reasonable applicable control technologies
Step 4 – Eliminate technically infeasible control technologies
Step 5 – Determine efficiency of applicable control technologies
Step 6 – Identify the maximum emission reduction control technology

Step 7 – Conduct an impact analysis
Step 8 – Establish the MACT emission limitation

This eight-step process is used in this permit application to make a case-by-case MACT determination for the proposed Facility.

Case-By-Case MACT Determination for Non-Mercury Metals

Particulate matter emitted from the auxiliary boiler will include entrained metals that are contained in the fuel. The non-mercury metals may include the following HAPs: arsenic, beryllium, cadmium, chromium, lead, manganese, nickel, and selenium.

Step 1 – Identify the MACT Affected Emissions Unit

The MACT-affected emissions unit at the proposed Facility is the auxiliary boiler. The Facility will be located in Clay County, Georgia. Construction is expected to commence in April 2008.

Uncontrolled non-mercury metal emissions from the auxiliary boiler firing fuel oil were estimated using U.S. EPA AP-42 emission factors. The uncontrolled emissions are shown in Table A-1.

TABLE A-1
SUMMARY OF CONTROLLED NON-MERCURY METAL EMISSIONS FROM THE AUXILIARY BOILER FIRING FUEL OIL
YELLOW PINE ENERGY
CLAY COUNTY, GEORGIA

Metal	lb/hr	TPY[1]
Arsenic	1.00E-04	1.25E-05
Beryllium	7.50E-05	9.38E-06
Cadmium	7.50E-05	9.38E-06
Chromium	7.50E-05	9.38E-06
Lead	2.25E-04	2.81E-05
Manganese	1.50E-04	1.88E-05
Nickel	7.50E-05	9.38E-06
Selenium	7.50E-04	9.38E-05

[1] Auxiliary boiler is limited to 250 operating hours per year.

Step 2 – Make a MACT Floor Finding

A MACT floor refers to the level of emission control that is achieved in practice by the best controlled similar source. There are no oil-fired auxiliary boilers in the RBLC database which have add-on controls for particulate or non-mercury metals. Any form of control for non-mercury metals is achieved through the use of low ash fuels and good combustion practices. However, the MACT floor established by EPA is ESPs for new limited use liquid

fuel-fired units (February 2004, Revised MACT Floor Analysis for Industrial, Boilers and Process Heaters).

Given that non-mercury metals will be a subset of PM emitted from the auxiliary boiler, it is reasonable to use a PM emission limit as a surrogate for the MACT standard for individual non-mercury metal HAPs. Several recent case-by-case MACT determinations made for boilers have used PM and good combustion practice as the surrogate for non-mercury metal HAPs. Therefore, Yellow Pine Energy is proposing using PM as a surrogate pollutant as MACT for non-mercury metals for the auxiliary boiler. Yellow Pine Energy proposes the use of low ash fuels and good combustion practices as MACT for non-mercury metals. Compliance with the non-mercury metal MACT standard will be verified by compliance with the PM limit of 0.03 lb/MMBtu and through opacity readings. This is the PM emission limit in the recently vacated Boiler MACT for new limited use liquid fuel-fired units.

Case-By-Case MACT Determination for Acid Gases

The acid gases, hydrogen fluoride and hydrogen chloride, will be emitted from the auxiliary boiler due to trace concentrations of fluoride and chloride compounds present in the fuel oil.

Step 1 – Identify the MACT Affected Emissions Unit

As discussion in the previous section on non-mercury metals, the MACT affected unit in the proposed Facility is the auxiliary boiler.

Uncontrolled acid gas emissions from the auxiliary boiler firing fuel oil were estimated using U.S. EPA AP-42. The uncontrolled emissions are shown in Table A-2.

TABLE A-2
SUMMARY OF SUMMARY OF UNCONTROLLED ACID GAS EMISSIONS FROM THE AUXILIARY BOILER FIRING FUEL OIL
YELLOW PINE ENERGY
CLAY COUNTY, GEORGIA

Metal	lb/hr	TPY[1]
Hydrogen Fluoride	0.00E+00	0.00E+00
Hydrogen Chloride	0.00E+00	0.00E+00

[1] Auxiliary boiler is limited to 250 operating hours per year.

Step 2 – Make a MACT Floor Finding

Fluoride is a PSD pollutant and the RACT/BACT/LAER Clearinghouse (RBLC) database does not contain any information regarding its control and emission limits in permits since 1978 for distillate fuel oil-fired boilers with heat input ratings of less than 100 MMBtu/hr.

Similar to fluoride, the RBLC database does not contain any information for hydrogen chloride emissions from distillate fuel oil-fired boilers with heat input ratings of less than 100 MMBtu/hr. However, the MACT floor established by EPA's February 2004 Memorandum is wet scrubbers for new limited use liquid fuel-fired units.

Step 3 – List All Available/Reasonable Applicable Control Technologies

Two categories of control technologies are available to control acid gases: particulate control devices and flue gas desulfurization systems. The most common particulate control devices for boilers are ESPs and fabric filter baghouses. These devices are generally only slightly effective in removing acid gases when used alone. FGD systems include wet scrubbers and spray dryer absorbers. These devices are generally slightly more effective than particulate control devices. Given that there are no significant emissions of acid gas expected to be emitted from the auxiliary boiler (Table A-2), the efficiency of acid gas removal for any control device is expected to be extremely low.

Step 4 – Eliminate Technically Infeasible Control Technologies

There is no indication that particulate control devices, such as ESPs and fabric filter baghouses, and FGD systems, such as wet scrubbers and spray dry absorbers have been effective on small oil-fired boilers with heat input ratings of less than 100 MMBtu/hr.

Table A-2 shows the uncontrolled acid gas emissions from the auxiliary boiler to be insignificant. For the auxiliary boiler, Yellow Pine Energy proposes that compliance with the proposed HCl emission limit of 0.0009 lb/MMBtu by analyzing fuel oil for heat content and chlorine concentration and converting the concentration into units of lb/MMBtu. This is the HCl emission limit in the recently vacated Boiler MACT for new limited use liquid fuel-fired units.

Case-By-Case MACT Determination for Organic HAP Emissions

Organic emissions can be formed as a result of incomplete combustion in the auxiliary boiler.

Step 1 – Identify the MACT Affected Emissions Unit

As discussed in the previous section on non-mercury metals, the MACT affected unit in the proposed Facility is the auxiliary boiler.

Total organic emissions were estimated using U.S. EPA AP-42 emission factors. The uncontrolled emissions are shown in Table A-3.

Organic emissions are not controllable by using add-on abatement equipment. The generally accepted method of limiting organic emissions from combustion processes is by employing good combustion and operating practices. This makes the quantification of controlled and uncontrolled organic emissions difficult to quantify. Thus, the emissions listed in Table A-3 are considered to be controlled emissions.

TABLE A-3
SUMMARY OF SUMMARY OF UNCONTROLLED ORGANIC HAP EMISSIONS FROM THE AUXILIARY BOILER FIRING FUEL OIL
YELLOW PINE ENERGY
CLAY COUNTY, GEORGIA

Organic HAP	lb/hr	TPY[1]
Benzene	3.83E-05	4.78E-06
Ethylbenzene	1.14E-05	1.42E-06

TABLE A-3 SUMMARY OF SUMMARY OF UNCONTROLLED ORGANIC HAP EMISSIONS FROM THE AUXILIARY BOILER FIRING FUEL OIL YELLOW PINE ENERGY *CLAY COUNTY, GEORGIA*		
Formaldehyde	5.89E-03	7.37E-04
Naphthalene	2.02E-04	2.52E-05
1,1,1 Trichloroethane	4.21E-05	5.27E-06
Toluene	1.11E-03	1.38E-04
O-Xylene	1.95E-05	2.43E-06
Polycyclic Organic Matter	1.08E-5	1.35E-06
[1] Auxiliary boiler is limited to 250 operating hours per year.		

Step 2 – Make a MACT Floor Finding

In the February 2004 Memorandum, EPA noted that with respect to organic emissions, "No add-on control technology being used in the existing population of boilers and process heaters that consistently achieve lower emission rates for uncontrolled levels, such that a best controlled similar source for organic HAP could be identified". Accordingly, a numerical MACT emission limit with respect to organic emissions does not appear to be appropriate for the auxiliary boiler. Additionally, the recently vacated Boiler MACT did not list specific emission limits or controls for organic HAP emissions from solid fuel boilers.

Step 3 – List All Available/Reasonable Applicable Control Technologies

The only technology available to reduce organic HAP emissions from the auxiliary boiler is considered to be good combustion controls and operating practices.

Step 4 – Eliminate Technically Infeasible Control Technologies

Combustion controls are used for control of CO and VOC emissions and are therefore considered to be technically feasible.

Step 5 – Determine Efficiency of Applicable Control Technologies

Combustion controls are the best control for organic emissions. There is insufficient data to determine the efficiency of combustion controls for organic HAP emissions.

Step 6 – Identify the Maximum Emission Control Technology

Combustion controls provide the maximum emission reduction technology.

Step 7 – Conduct an Impact Analysis

A new auxiliary boiler is expected to be designed, built, and operated using current combustion controls for control of CO and VOC emissions. Therefore, there are no economic, environmental, or energy impacts that would need to be considered with respect

to organic HAP removal that were not otherwise considered with respect to the two criteria pollutants.

Step 8 – Establish the MACT Emission Limitation

The estimated organic HAP emissions from the auxiliary boiler are shown in Table A-3. However, given the precedents established in previous MACT determinations, it is reasonable to use CO emissions as a surrogate for the MACT standard for organic HAP emissions. The recently vacated Boiler MACT stated that CO monitoring is considered to be adequate for demonstrating compliance with MACT for new limited use liquid fuel-fired units. Therefore, Yellow Pine Energy is proposing compliance with the CO BACT limit as a demonstration of compliance with MACT for organic HAP emissions.