2.0 Facility Description

2.1 General

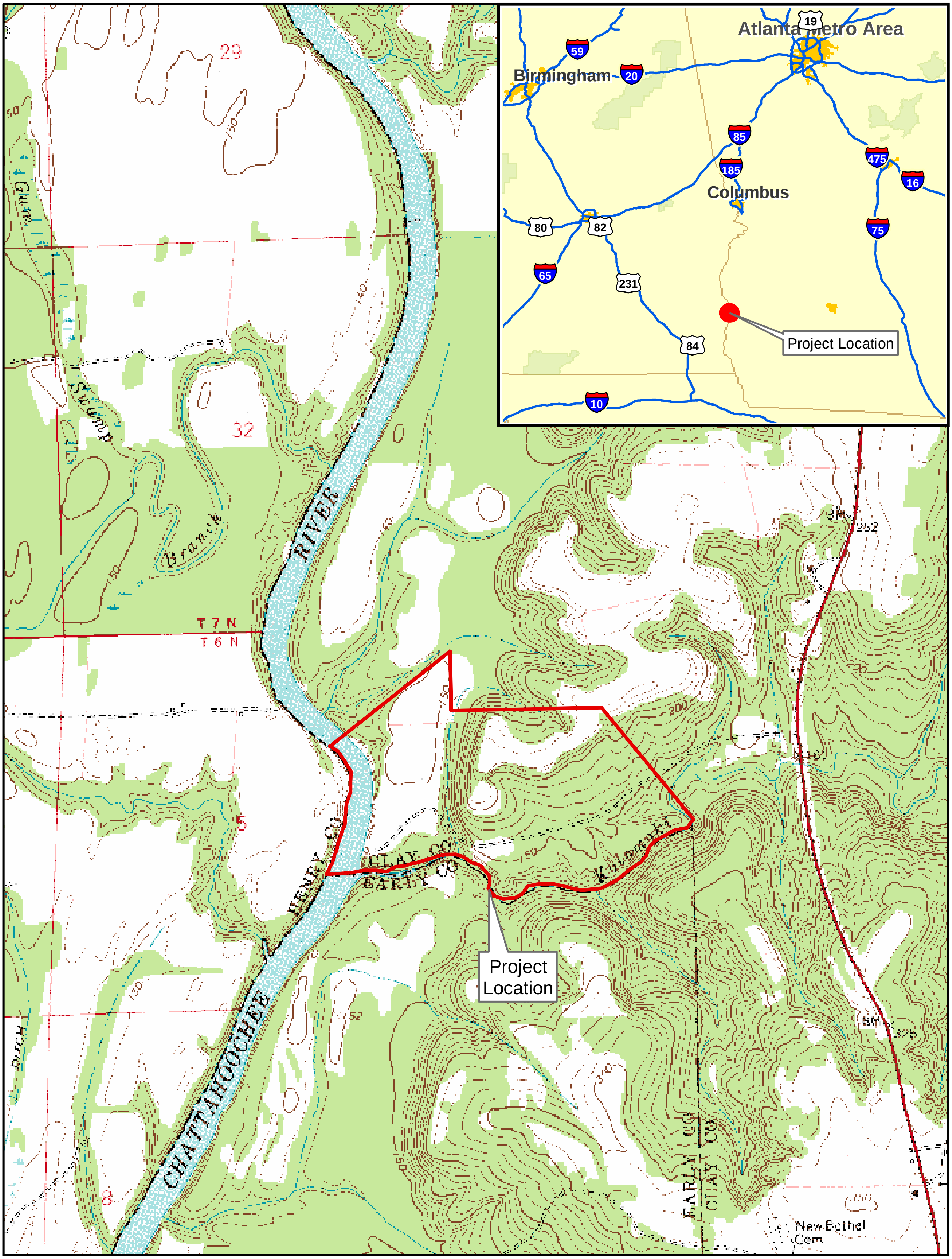
Facility Name/Owner:	Yellow Pine Energy Company, LLC
Location:	Georgia Highway 39 Clay County, Georgia
Facility:	110 MW Biomass-Fired Power Plant
Contact:	Mr. Mark S. Sajer Managing Director Summit Energy Partners, LLC 99 Summit Avenue, Suite 2C Summit, NJ 07901 Telephone (908) 918 9151 FAX (908) 918 9153 e-mail: mark.sajer@sep-llc.com

2.2 Site Description

The proposed Facility will be located on a 200 acre parcel of land, approximately 8 miles south of Fort Gaines, Georgia on Georgia Highway 39, as shown on Figure 2-1. The site was formerly used by the Omnivest Company as a light-weight aggregate manufacturing plant, which processed clay into pebble-sized aggregate, also known as "pea gravel". The aggregate manufacturing plant closed approximately ten years ago and the site has since been abandoned.

The site is connected by an access road to Georgia Highway 39 and is bordered by the Chattahoochee River on the west, the Kolomoki Creek and U.S. Army Corps of Engineers lands on the south, and timber/farm property on the north and east. The proposed layout of the Facility is illustrated in Figure 2-2.

The site is zoned Industrial (I-1) and Yellow Pine Energy has received conditional use authorizations pursuant to Clay County Ordinance 05-115, as amended, for the power plant, ash/inert landfill and ancillary activities.



N

0 500 1,000 2,000

Feet

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Figure 2-1
Site Location Map
Yellow Pine Energy
Clay County, Georgia

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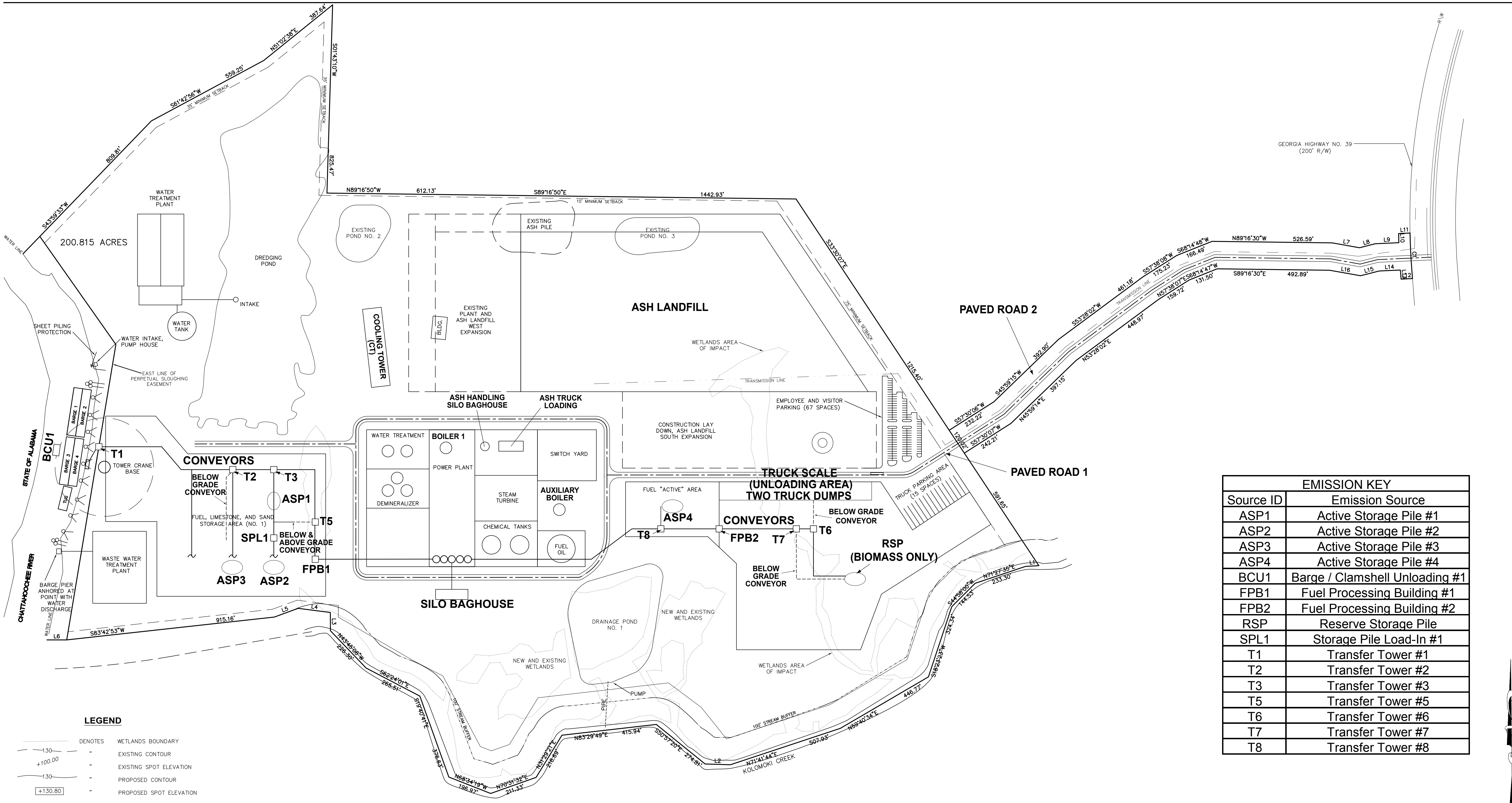

EMISSION KEY	
Source ID	Emission Source
ASP1	Active Storage Pile #1
ASP2	Active Storage Pile #2
ASP3	Active Storage Pile #3
ASP4	Active Storage Pile #4
BCU1	Barge / Clamshell Unloading #1
FPB1	Fuel Processing Building #1
FPB2	Fuel Processing Building #2
RSP	Reserve Storage Pile
SPL1	Storage Pile Load-In #1
T1	Transfer Tower #1
T2	Transfer Tower #2
T3	Transfer Tower #3
T5	Transfer Tower #5
T6	Transfer Tower #6
T7	Transfer Tower #7
T8	Transfer Tower #8

GRAPHIC SCALE

200 0 100 200 400 800

(IN FEET)
1 inch = 200 ft.

CURVE TABLE

CURVE	LENGTH	RADIUS	CHORD BEARING	CHORD DIST.
C1	200.01'	2940.30'	S03°07'58"E	199.98'

LINE TABLE

LINE	BEARING	DISTANCE
L1	S86°57'41"W	58.05'
L2	N88°13'53"W	110.94'
L3	N00°14'08"W	80.00'
L4	N82°38'07"W	142.20'
L5	S69°48'53"W	110.90'
L6	N90°00'00"W	86.66'
L7	N79°53'11"W	121.22'
L8	S75°41'17"W	71.05'
L9	S87°24'24"W	103.72'
L10	S01°35'25"E	40.00'
L11	S87°24'24"W	50.01'
L12	N87°24'25"E	50.05'
L13	S04°39'21"E	40.00'
L14	N87°24'23"E	92.52'
L15	N75°41'16"E	84.71'
L16	S79°53'11"E	137.34'

CLAY COUNTY REGULATIONS FOR ZONNG DISTRICT I-1

	(EXISTING)	(PROPOSED)
MINIMUM LOT SIZE:	5.00 ACRES	176.074 ACRES
MINIMUM LOT WIDTH:	100 FEET	120.00 FEET
FRONT YARD SETBACK:	75 FEET	75 FEET
REAR YARD SETBACK:	75 FEET	60 FEET (ALONG RIVER BUT EXCLUDING BARGE TERMINAL DECK AND THE INTAKE AND DISCHARGE PIPING.
SIDE YARD SETBACK:	40 FEET	40 FEET
MAXIMUM BUILDING HEIGHT:	35 FEET	280 FEET

FIGURE 2-2
Site Plan
Yellow Pine Energy
Clay County, Georgia

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The fluidized bed boiler(s) has been designed to be 100% biomass-fired, but it can also be supplemented with up to 15% fossil fuels, on a heat input basis, or approximately 5% on a weight basis. This permit application requests that biomass fuel for the boiler be supplemented when necessary to achieve start-up, reliability and flame stability when there are less than optimal biomass fuel conditions such as wet fuel or low heat content. The fossil-derived fuels that will be used in the boiler will include bituminous coal (Coal), petroleum coke (Pet Coke), or 95% metal-free tire-derived fuel (TDF). Low sulfur No. 2 fuel oil or propane will be used for start-up of the fluidized bed boiler and as the primary fuel for the auxiliary boiler fuels.

The Facility is designed to include the following components:

- 1,529 MMBTU/hr fluidized bed boiler(s)
- One 210-foot exhaust stack that will exhaust the products of combustion from the boiler(s)
- Air pollution controls on the fluidized bed boiler(s) will include: Selective Non-Catalytic Reduction (SNCR), dry scrubber system, and fabric filter bag house
- Condensing steam turbine generator
- 25 MMBTU/hr Auxiliary Boiler
- One 100-foot exhaust stack for the Auxiliary Boiler
- Mechanical draft wet cooling towers (multi-cell units).
- Water intake structures in the Chattahoochee River and an on-site pond
- Water treatment plant
- Cooling tower water and boiler feed water make-up systems
- Wastewater treatment plant and outfall in the Chattahoochee River
- Ash/Inert landfill
- Ash pneumatic truck loading station
- Barge terminal in the Chattahoochee River, crane and conveyors
- Two open-air and covered fuel storage areas, one on the river side and one on the highway side
- Truck dumps, scales, stack-out/reclaim systems
- Outdoor electrical switchyard

- Tanks for aqueous ammonia storage for the SNCR
- Water storage tanks
- Limestone storage bins
- No. 2 fuel oil tank for start-up of the fluidized bed boiler and the primary fuel for the auxiliary boiler
- Diesel fuel oil tanks for on-site mobile equipment and emergency systems
- Back-up emergency diesel generator and diesel firewater pumps
- Paved and unpaved plant roads and parking areas
- Miscellaneous maintenance buildings/sheds, control room, laboratory and office

The main components of the Facility are illustrated in Figure 2-2, which is a plan view of the site. Note some fluidized bed boiler manufactures have the capability to supply a single unit and others will require two boilers with an aggregate 1,529 MMBTU/Hr capacity. In either case, the boiler(s) exhaust into a single pollution control train and single stack.

2.3 Process Description

Pursuant to the Facility's electricity supply commitments, the Facility will normally be operated in a base load mode between 95 MWs and 110 MWs for 24 hours per day, 365 days per year except for four (4) weeks/year of scheduled maintenance, which occurs in the fall and spring months, when electricity customers' demand is lowest. The lowest viable operating condition, excluding startup and shutdown sequences, will be at 80% of the maximum load of 110 MW or 88 MWs. For purposes of this permit application, the Facility was assumed to be able to operate all 8,760 hours of the year at full capacity.

Biomass will be the plant's primary fuel. Biomass consists of wood wastes in chip or shredded form from timber harvesting, pre-commercial thinning of forest plantation stands, harvesting non-commercial, dead or deformed species for fuel purposes and land clearing activities (limbs, tops, stumps and non-commercial trees), and may also include peanut hulls, pecan shells, cotton stalks, lumber and pallet wood wastes (unpainted/untreated only) and similar woody biomass. This application is based on wood waste from timber harvesting (i.e. green tons), due to the considerable supply in the vicinity of the site. The boiler is designed to be able to operate on 100% biomass or to operate on an approximate

85% biomass / 15% fossil fuel mix (heat input basis). For purposes of this permit application, the maximum fossil fuel input to the boiler will be 15% by BTU/hour heat input, which given the BTU contents of Coal, Pet Coke and TDF, translates into approximately 5% by weight for those fuels.

Biomass will be received either by barge or by truck delivery. A tower crane equipped with a clam-shell bucket will be used to unload biomass from barges and to load a hopper and conveyor. The conveyor will move the biomass up the river escarpment to a transfer tower and onto the storage area. Two truck dumps will be used to unload chip vans arriving at the site on a daily basis. After unloading at the barge terminal or the truck dump areas, the biomass will be sampled, and then sent via covered conveyor to a stacker-reclaimer system. Two biomass stacker-reclaimers are used, one on the river (western) side of the plant and one on the highway (eastern) side. These systems will form a "kidney bean" shaped conical pile around the stacker. A traveling ground level drum reclaimer will recover the biomass to a central below-grade conveyor and then transfers the biomass to a processing area. In the processing area, biomass will be sifted for size and ferrous metals are collected by fixed magnets. Oversized biomass will be milled to size and returned to the conveyor. Processed biomass will be sent via covered conveyor to the storage bins on the boiler structure. Fossil fuels may also be delivered by barge or truck. The barge terminal will handle fossil fuels just as biomass, but the conveyor system directs fossil fuels to their own covered storage area. Fossil fuels delivered by truck will be dumped onto the same storage area. A fossil fuel reclaimer will recover fossil fuels as needed, sending them through a sizer/crusher, and then into the storage silo on the boiler structure. Limestone and sand will be delivered by barge or truck and conveyed or dumped onto separate open-air piles. Sand and limestone will be sized/crushed and sent to silos on the boiler structure.

Start-up of the fluidized bed boiler involves heating the boiler using burners until the fuel auto-ignition temperature is reached. The fluidized bed boiler will be equipped with dry low NO_X burners and will be fired on low sulfur No. 2 fuel oil or propane. During start-up, the auxiliary boiler will be fired on either low sulfur No. 2 fuel oil or propane and will generate steam to heat the steam turbine. As the system is heated, air flow is introduced into the bottom of the fluidized bed boiler and sand/limestone is added into the boiler to form a bed. The air flow fluidizes the sand/limestone bed. During periods of 100 percent biomass firing, a sand bed will be used instead of a sand/limestone bed. During periods of biomass/fossil fuel blend firing, a sand/limestone bed is used in stoichiometric ratio corresponding to the percent of fossil fuel. The limestone in the bed reacts with sulfur released from the fuels as a result of the combustion process to form gypsum, which thereby captures the sulfur into the ash. Once the bed and air flow reaches auto-ignition temperature, fuels are introduced via chutes and air locks from the storage silos into the boiler. The start-up time is approximately 8 hours from beginning to achieving 30% load (33 MWs); the operation is then ramped up over another two hours to normal operating load of 95 to 110 MWs. As noted above, the supply commitment to the electric utilities will require the plant to operate in this range until the next scheduled maintenance. However after an emergency shut down as a result of a mechanical problem, the start-up process would need to be repeated.

Exhaust gasses pass through the super-heater and economizer tube bundles to generate steam. Aqueous ammonia in injected in the duct section (SNCR) to reduce nitrogen oxides (NO_X). Ammonia reacts with NO_X to form nitrogen (N_2) and water (H_2O). The gasses continue into a heat exchanger, which preheats incoming air, and then to a dry scrubber tower. A limestone/lime/reclaimed boiler limestone mix is injected into the dry scrubber tower to reduce sulfur dioxide (SO_2) and sulfuric acid (H_2SO_4) emissions. The sulfur content of biomass (0.02%) is very low with respect to that of fossil fuels (up to 6.5%). The amount of lime/limestone injected into the dry scrubber will be based on the stoichiometric proportions of sulfur in the fuel mix and the required sulfur removal efficiency. In other words during 100 percent biomass firing, less limestone/lime/reclaimed boiler limestone mix will be required than during biomass/fossil fuel mix firing. After exiting the dry scrubber tower, the exhaust gasses will pass through a fabric filter baghouse, which removes ash (particulates), and then an induced draft fan sends the gasses up the stack.

Figure 2-3 shows a side view of the power plant and Figure 2-4 shows a general flow diagram of the overall plant processes.

During periods of introducing fossil fuels or changing the fossil fuel mix, the plant’s emissions may vary as the stoichiometric proportion of limestone to fossil fuel and the

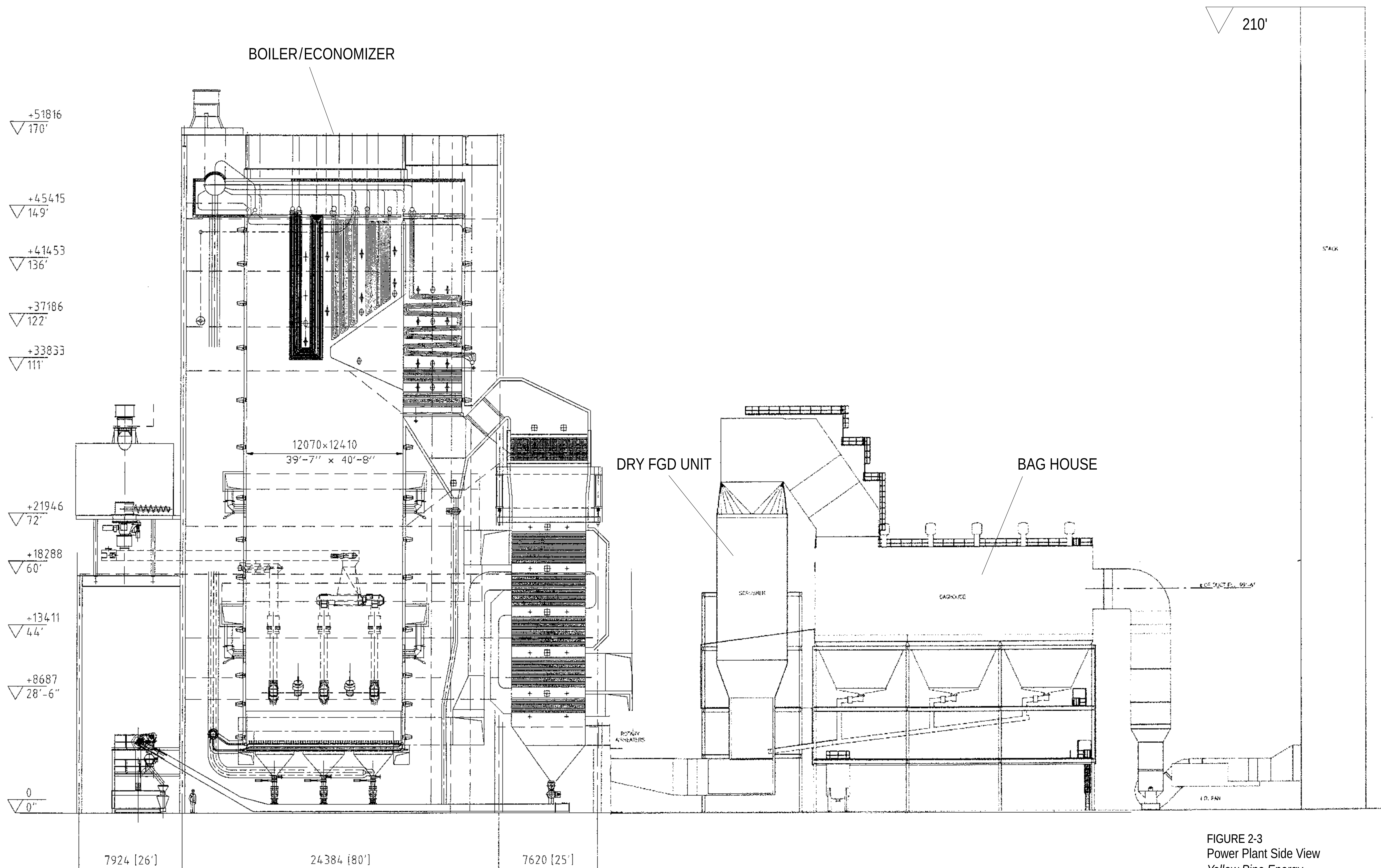

FIGURE 2-3
Power Plant Side View
Yellow Pine Energy
Clay County, Georgia

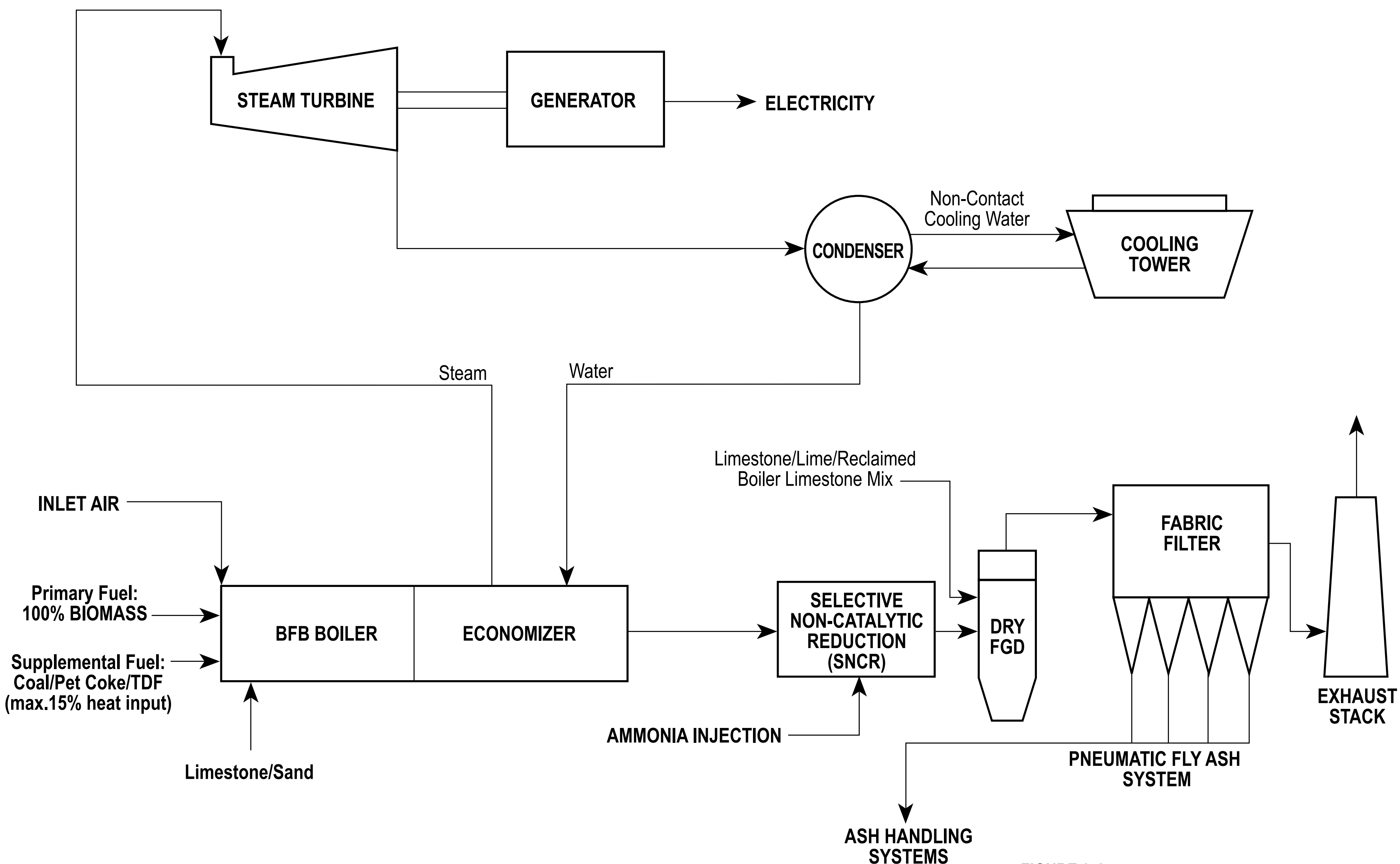

FIGURE 2-4
Process Flow Schematic
Yellow Pine Energy
Clay County, Georgia

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reaction to form gypsum ensues. Generally, fossil fuels will be used for "flame stabilization" during conditions when the biomass cannot support a stable ramp-up of output, stable load generation or reliable and consistent operation of the boiler. Flame stabilization may also be required during periods when the biomass fuel has a higher than normal water content (lower net calorific heat content). The fossil fuel provides a much higher calorific input per cubic foot of boiler space, and thereby can raise the boiler temperature rapidly, such as needed during the start-up sequence or to drive off the excess or above normal water in the biomass to preserve the bed temperature and sustain load. Generally, the process becomes stable within a 3 hour period.

2.4 Other Processes

In addition to the power plant, its fuel handling systems and operation of the boiler, steam turbine-generator and pollution controls, there are several other operations on the site. This section briefly describes these other operations.

The Facility is designed to withdraw water from the Chattahoochee River and the large on-site pond. The water withdrawal systems will use a specially designed intake screen that will limit intake water velocities to avoid drawing in aquatic species that are near the intake. The details of this design will be described in Yellow Pine Energy's water withdrawal permit application and permit. Raw water will be processed to remove silt and some dissolved solids, and then transferred to a holding tank. Processed water will be piped to the cooling tower and boiler feedwater make-up systems. Drinking water may be produced via further treating processed water or via a small-capacity drinking water well. The cooling tower water will be regulated by the number of cycles of water flow through the cooling tower. As it recirculates through the cooling tower, there will be evaporation of water. Make-up water and certain chemicals will be added to maintain the pH, organism control, and dissolved solids. A portion of the water containing dissolved solids will be sent to the waste water treatment plant.

Boiler feedwater will be demineralized in an onsite treatment plant. Backwash water from the treatment plant will be collected and reused in the cooling tower. Plant washings will be collected and sent to the wastewater treatment plant.

The Facility intends to sell ash in powder form for commercial uses and will be transported from the site via a pneumatic truck loading station. However, no assurances can be given that all of the ash will be reused during Facility operation. Unreclaimed ash will be wetted and sent to the ash/inert landfill. The landfill is being designed to have built in cells, with each cell having a membrane floor and a leachate collection system, which will collect rain water passing through the ash. Leachate will be collected, tested, and sent to the waste water treatment plant. As cells are filled, they will be capped and monitored via a series of wells.

Rainwater run-off from the open-air storage yards will be collected and sent to the waste water treatment plant. At the waste water treatment plant, all of the above noted water streams will be mixed in a large concrete tank, which will allow the streams to neutralize each other. The resultant water's pH will be monitored and adjusted to comply with the discharge standards. Oil will be skimmed off the surface and precipitated material will fall to the bottom. The wastewater will then passes out of a clarifier and the treated water will be monitored and discharged into the Chattahoochee River.

The Facility will have a small emergency generator. During normal operation, the Facility will generate all of its own power needs. In addition, the Facility will be capable of importing power from the grid via the transmission line. However if both the Facility and transmission line fail, the emergency generator will be used to keep the control room and certain essential equipment energized, awaiting a restart.

The Facility will have an emergency diesel firewater pump. During normal operation, the power supply from the Facility or the transmission line (back-up) would run the firewater system. Generally, the fuel storage areas must be monitored for fire and re-wetted from time to time, which also reduces dust. If both power sources fail, the emergency pump will be available to maintain water pressure of the fire water systems.

The Facility will have its own sample testing laboratory. Generally, the fuel and limestone will be sampled and tested to check for conformance with specifications. Also the water chemistry of the water treatment, landfill leachate, and waste water plants will be analyzed. Any wastes generated by these areas will be sent off-site for municipal disposal.

2.5 Operation

With the exception of the auxiliary boiler, the Facility will be capable of operating up to a maximum of 24 hours per day, 365 days per year. The fluidized bed boiler can be operated on a continuous basis with the capability to operate down to a load level of 80 percent power output for maximum flexibility. However, Yellow Pine Energy intends to operate the facility as a base load power generating facility capable of producing 95 – 110 MW on a full time basis. The auxiliary boiler will be limited to a total of 250 hours per year. The Facility will employ approximately 32 personnel once fully operational.