

Rex Lumber, Bristol, FL  
FACILITY I.D. # 0770007  
EU 001, EU 002, EU015

ENERGY RECOVERY SYSTEM  
OPERATION AND MAINTENANCE PLAN  
AND  
STARTUP, SHUTDOWN, AND MALFUNCTION PLAN

Background

The existing boilers at Rex Bristol currently produce steam to heat Kilns 1, 2, 3, and 4 with current combustion gasses discharging through multiclones and discharging to the atmosphere. Kilns 1 and 2 are continuous kilns while Kilns 3 and 4 are batch kilns. This project will take the combustion gasses from the existing boilers that currently discharge to the atmosphere and duct them to Kilns 1 and 2. This will allow for additional energy recovery and convert the existing boilers to process heaters and create a unique new energy efficient type of kiln that is a hybrid combination direct fired and steam heated kiln. EU 001 and EU 002 will continue to produce steam that will be utilized in all kilns.

Because emission controls for drying kilns are unavailable at this time, EPA believes work practices may be appropriate substitutes for emission controls and/or numerical emission limits for kilns to minimize HAP emissions (Appendix A). Operating practices that minimize HAP emissions, while producing a marketable product, consist of the following: 1) Prevention of over drying the lumber, 2) Ensure consistent moisture content throughout the charge to prevent re-processing in the kiln and 3) Drying at the minimum temperature necessary to achieve the required moisture content.

The emissions of HAPs from the drying of wood are a function of temperature and moisture content of the wood. In general, drying wood to lower final moisture contents will result in more HAP emissions. Drying at higher temperatures to target moisture content generally results in more HAP emissions than drying to the same moisture content at a lower temperature. Exposing drier wood to higher temperatures produces more HAPs. Therefore, kiln operating practices that reduce over drying and piece-to-piece moisture variability will reduce total HAP emissions.

***OPERATION AND MAINTENANCE PLAN***

1) Prevention of Over Drying

Minimize the degree of over drying by:

- a. Setting the charge target moisture content relative to the industry lumber grade requirement and or customer required moisture content at the

maximum value possible that does not result in an unacceptable redry rate.

- b. Maintain records of actual charge average moisture contents and computing a monthly average and twelve month rolling average over dry percent.
  - c. Properly maintaining critical kiln components such as baffles, fans, vents, steam heating coils and kiln controls to provide as uniform a temperature and air flow throughout the kiln as reasonably possible.
  - d. Reversing the direction of kiln air flow at appropriate intervals to improve uniformity of drying and thereby reduce over drying the charge.
  - e. Maintaining records of kiln conditions for each charge dried, including dry bulb temperature, wet bulb temperature, and drying time.
- 2) Ensure Consistent Moisture Content  
Minimize the piece-to-piece moisture content variability by:
- a. Proper stacking and spacer stick placement to provide good air flow through the charge
  - b. Properly maintaining critical kiln components such as baffles, fans, vents, steam heating coils, and kiln controls to provide as uniform a temperature and air flow as reasonably possible.
  - c. Reversing the direction of kiln air flow at appropriate intervals to improve drying uniformity.
  - d. Maintain records of piece to piece moisture content variability on each charge and computing a mean and standard deviation of the data. Track mean values and standard deviations on a monthly and twelve month rolling basis.
- 3) Drying at the Minimum Temperature  
Monitor thermocouples at various locations inside the kiln to identify and prevent "hot spots". Adjustments will be made to maintain temperatures slightly above the minimum drying temperature, approximately 250 °F.

#### *STARTUP, SHUTDOWN, AND MALFUNCTION PLAN*

- 1) Boilers will be started up slowly to minimize heat stress with exhaust gasses being directed to one or more loaded kilns as soon as practical. One or more boilers may be idled or shut down due to load or for maintenance. Emergency vents will be installed to assure proper air flow through the boilers and avoid blow backs and may be used upon startup if necessary.
- 2) Kilns 1 and 2 are not subject to a lot of quick startups, shutdowns, and malfunctions due to the nature of the operation. Heat is provided through steam coils which generally heat and cool relatively slowly thus preventing quick overheating of the kiln. Startups, Shutdowns, and Malfunctions of the kiln are not expected to produce excess emissions unless the temperature of

the kiln becomes overheated. The temperature of the kiln will be monitored continuously and controlled during startup and operation to prevent overheating. If the temperature of the kiln rises beyond acceptable limits the plant will reduce the steam heat which will in turn cause the boilers to throttle back thereby reducing the direct heat as well. If necessary direct heat will also be reduced or removed from the unit to reduce the temperature.