

Tradewinds'
Response to DOH for EPA
Regarding CO and Fuel Moisture
November 14, 2007

Boiler Design

The boiler manufacturer informed Tradewinds that they have designed the boiler combustion chamber to produce high combustion temperatures and adequately long retention time of the flue gas in the furnace, to obtain sufficient carbon burn out to control CO emissions. Factory Sales and Engineering will control the CO emissions to the permit levels for fuel with moisture up to 55%. They recognize the moisture variability of biomass fuel and have developed a design that responds to these varying demands since this is *not* a unique challenge of the Tradewinds project.

Fuel Supply

Tradewinds has tested its fuel sources for moisture in several ways:

1. We were attempting to determine if there were differences between timber growing close to the sea compared to those growing inland (as measured by elevation associated with these island locations). The trees used for this testing are growing in the Waiakea area. We found no such correlation but the tests performed provided the following moisture content results;
 - a. Cassurina at 250' elevation – Moisture 32.49%
 - b. Eucalyptus at 500' elevation – Moisture 53.28%
 - c. Eucalyptus at 1500' elevation – Moisture 47.55%
 - d. Cassurina at 1500' elevation – Moisture 44.60%
2. A large percentage of the fuel Tradewinds will burn in their boiler will come from the top of the trees being harvested that is too small to economically convert to veneer. These tops will be decked (stacked) in the forest for 4 weeks before being hogged and brought to the power plant for fuel. This plan is in place because eucalyptus dries extremely fast during the period immediately after being harvested. This is one of the reasons that the logs must be peeled within 36 hours of being cut to avoid excessive checking. This is compared to Douglas fir which can be stored for many weeks before being peeled. Tradewinds has conducted testing by cutting some sample trees and allowing them to air dry in the forest for 4 weeks. From these tests, Tradewinds determined that these tree tops will dry to an average moisture level of approximately 37% when left for 4 weeks. This validates that a significant reduction in moisture level will result from this drying period. We intend to manage our fuel source in this manner to reduce the moisture level of our fuel, which is one of the largest energy losses in the boiler.
3. Tradewinds also recently contracted with Nicholas Koch of Forest Solutions, an independent forestry consulting company located at Paauilo, to test several trees from the Hamakua timber stand that contains trees with a much greater average age than those discussed in paragraph 1 above. The results of these tests validated that these older trees contain moisture levels similar to, or even slightly lower than the trees from Waiakea discussed in paragraph 1. The tested average moisture level for these trees was 48.5%. This is the moisture measured within a few hours of being cut, rather than after 4 weeks as discussed in paragraph 2.

Fuel Management

Tradewinds intends to manage the fuel storage pile in such a manner that the fuel from the veneer mill and from the logging operations will be blended prior to being admitted into the boiler. This will help assure more uniform fuel moisture content, making it easier to operate the boiler and stabilize emissions.

Summary

The robust boiler design, the moisture content of the fuel supply, and Tradewinds' fuel pile management will all contribute to efficient combustion in the boiler to maintain emissions below permit limits.