

Potential Problems
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I work as a process engineer at the PSDF in Wilsonville on the transport gasifier and I am heavily involved in the design of the Orlando gasifier. As we move towards commercialization of the technology, there are areas in which modeling and testing could prove to be useful in optimizing the design of the transport gasifier. The densities and fluxes that we experience are above those that have been commonly experienced by others in previous fluidized bed work.

As we scale up, one area of concern is jet penetration into the bed. For both air feed nozzles and especially for the coal feed nozzles, having a better model of the penetration and mixing of the jets into the circulating bed would be very useful. This would help in knowing how to design feed nozzles today and could also help in efforts to determine the maximum, practical gasifier size. Knowing how the materials that are fed distribute through the bed would also help improve the layout of the gasifier regarding such things as the arrangement and distance between nozzles.

The hydrodynamics at high densities and fluxes should also be better studied. Two areas that I see as important are the behavior of the riser and the behavior around the area of the solids return to the mixing zone. In the riser, it would be useful to know how the flow patterns and the mixing change as diameters, flux, velocity, etc. change. This work would likely involve modeling, cold flow testing and hot testing. Applying the results from different areas would help improve the others.

For my contribution, I don't frankly have experience in the modeling software. I do, however, have ample experience in operating the PSDF gasifier and I am dealing firsthand with issues that come up in the scale up of the gasifier. I could be useful in comparing some of the cold flow work and modeling work to actual operating experience. Over the lifetime of the program, the possibility exists that this could expand to the scaled up gasifier as well. I could also try and work with others at the PSDF to get specific tests performed that could then be used to improve the models that are being developed.