

# Environmental Response

## Improving Mass Balance Through Test Burns

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Mass balance estimates for product losses have long been a requirement of post-derailment reporting. Derailments during 2014 and 2015, involving crude oil and other flammable commodities, triggered an increased emphasis on the mass balance estimation process. The burn rates for commodities involved in pool fires are a critical element of mass balance calculations and there is an abundant literature associated with crude oil fires to draw from. However, the existing literature doesn't provide information on the pool fire conditions that we have seen at derailments. CSXT and ARCADIS teamed for a series of commodity test burns during 2015 to: 1) develop a test protocol to determine burn rates for commodities in pool fires similar to those occurring at derailments, 2) determine the critical variables affecting burn rates at this scale, 3) obtain benchmark burn rate data for common commodities, and 4) develop a basis to estimate burn rates for commodities that haven't been tested. Burn rate data will be presented for crude oil, kerosene and ethanol, tested under pool fire conditions similar to those observed at recent derailments.