

Field Verification of Sound Attenuation Modeling and Air Pollutant Emission Testing in Support of Missile Motor Disposal Activities

The US Department of Defense (DoD) approved activities conducted at the Utah Test and Training Range (UTTR) include the destruction of obsolete or otherwise unusable intercontinental ballistic missile (ICBM) motors through open burn/open detonation (OB/OD). Within the Utah Division of Air Quality, these activities have been identified as having the potential to generate unacceptable noise levels as well as significant amounts of hazardous air pollutants (HAPs).

Hill Air Force Base, UT has completed a series of field tests at the UTTR in which sound-monitoring surveillance of OB/OD activities was conducted to validate the Sound Intensity Prediction System (SIPS) model. Using results generated by the SIPS model to support the decision to detonate, the UTTR successfully disposed of missile motors having an aggregate net explosive weight (NEW) of 81,374 lbs without generating adverse noise levels within populated areas. These results suggested that, under appropriate atmospheric conditions, missile motors of even larger NEW may be detonated without exceeding regulatory noise limits.

In addition to collecting noise monitoring data, air emissions generated from the 81,374 lb NEW detonation event were sampled using fifteen (15) ground-based air samplers, two (2) above-ground based air samplers and nine (9) continuous flow sampling pumps. Comparison of air sampling data to theoretical emission predictions generated by the US Navy's energetic combustion pollutant formation model, POLU4WN, verified that, as the detonation fireball expanded, hydrogen, carbon monoxide as well as organic compounds continued to oxidize as the hot gases reacted with ambient air. HAP analysis of air samplers confirmed the presence of chloromethane, benzene, ethanedinitrile, toluene, 1-2 propadiene and 2-methyl-1-propene while adsorption test results suggested that free chlorine is not generated in significant amounts during the detonation process.