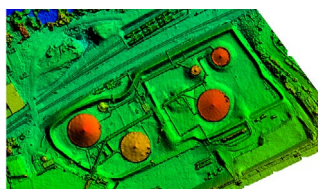


Drones Enhancing SPCC Planning



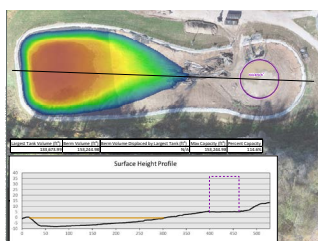
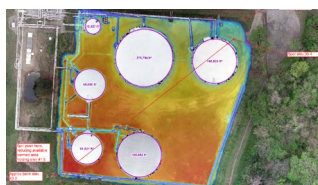
High-Resolution Aerial Data Collection

GES' latest AST/UST service offerings feature the enhanced data collection and infrastructure visual inspection capabilities of our small, unmanned aerial systems (sUAS), commonly referred to as drones. Drones have the advantage of being able to capture greater levels of detail in images and data than traditional inspection and mapping methods; thereby improving the accuracy and completeness of spill containment volumes and infrastructure condition. Using drones for asset inspection radically improves safety; as personnel do not need to climb ladders or access hard to reach areas that can be readily viewed from the air.



Drones to Augment SPCC Plan Update

During a routine SPCC plan update for a client's site, GES used a drone in place of traditional methods to measure the secondary containment berm. Using the drones combined with photogrammetry software, a highly-accurate 3D digital elevation model of the site was generated, allowing engineers, GIS specialists, and CAD drafters to simultaneously assess the parameters of the berm. The berm was found to be out of compliance due to previous inaccurate field measurements, grade of the spill surface, and degradation of the berm since the last inspection. Using our 3D model, we provided minimum elevations of the berm to optimize: 1) effectiveness for spill containment; and 2) adjustments for stormwater runoff from parking drainage. GES provided the client with an updated aerial map and accurate digital site documentation to assist with addressing facility deficiencies.



Enhanced Data Provides Basis for Tank Upgrade and Berm Modification

After demolition of an AST, GES' client began planning for tank replacement, and noted persistent standing water within the spill containment berm resulting from topography and stormwater management practices. GES performed a drone flight, in place of traditional ground-based methods, to document site topography and calculate the secondary containment volume. Our visualization tools allowed us to account for the loss of secondary containment capacity due to the chronic standing water in the bermed area along with the new AST and tank pad. GES was able to determine the minimum berm height required to ensure compliance with the federal SPCC requirements.