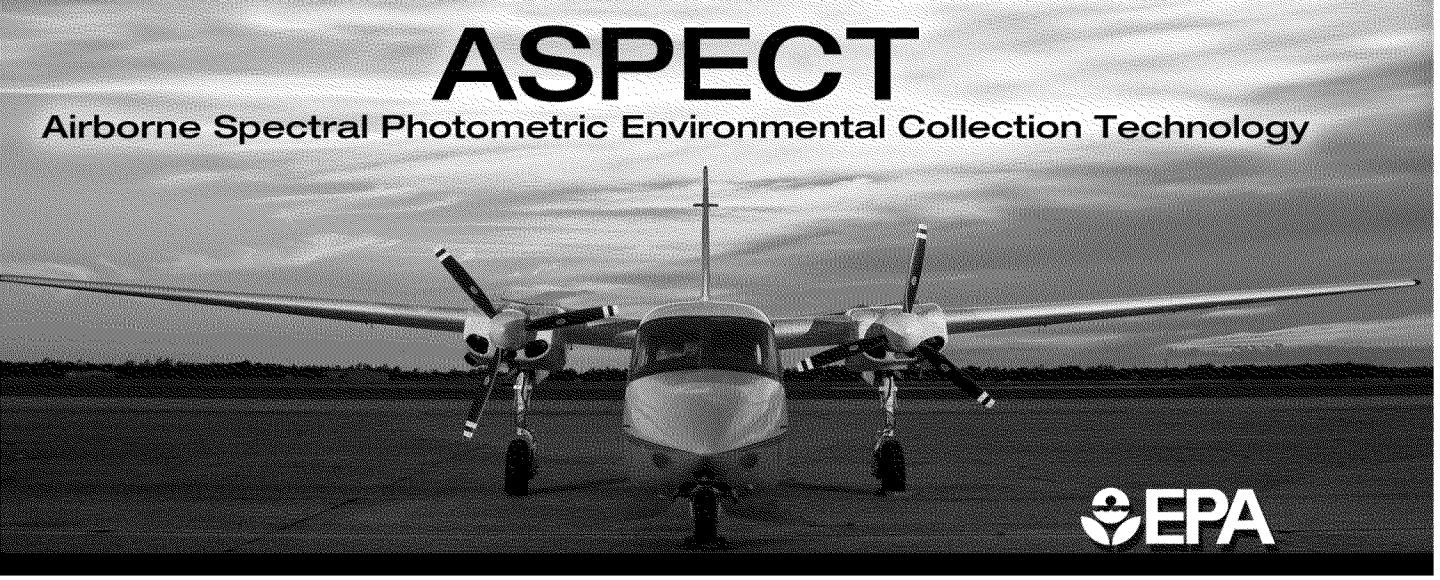


Summary of March, 2013 ASPECT Survey
West Lake Landfill, Bridgeton, Missouri

The United States Environmental Protection Agency (EPA) manages the Airborne Spectral Photometric Environmental Collection Technology (ASPECT) Program. This program provides scientific and technical support nationwide to characterize the environment using airborne technologies for environmental assessments, homeland security events, and emergency responses.

In January 2013, EPA Region 7 requested that the ASPECT Program conduct radiological and infrared surveys over the West Lake Landfill and surrounding areas in Bridgeton, Missouri. The surveys were conducted on March 8, 2013, between 10:00 a.m. and 12:00 noon. The West Lake Landfill is a Superfund site that was placed on the Superfund National Priorities List (NPL) in 1990. The site is known to contain leached barium sulfate residue from uranium ore processing activities.

The purpose of the radiological survey was to identify areas of elevated gamma radiation in Operable Unit 1 as compared to normal background levels. The purpose of the infrared survey was to identify any heat signatures associated with the ongoing subsurface smoldering event in one of the non-radiological cells in Operable Unit 2, and to help delineate the extent of this event. EPA chose to use the ASPECT airplane for this survey due to access issues on the site that prevented ground-based scanning, specifically the heavy vegetation on parts of the landfill.

The responsible parties at the site conducted a ground-based radiation survey as part of the Operable Unit 1 Remedial Investigation in the 1990s and EPA chose to refresh the radiation survey and reconfirm its results. The ASPECT radiological survey confirmed the previous data showing surface gamma emissions above background levels in a portion of Area 2 of Operable Unit 1, but this area above background levels is within the fenced area of the site and is inaccessible to the public, so it does not pose a public health risk. About 800 gamma radiation measurements were collected and only 10 indicated excess uranium or uranium decay products. The results are consistent with previous studies indicating that the radiological wastes remain in the previously identified areas of Operable Unit 1, Areas 1 and 2. All of the gamma radiation measurements that were significantly higher than background were detected at 20 contiguous acres within Operable Unit 1, Area 2.

Since the ASPECT airplane can also collect infrared imagery, EPA chose to use these capabilities in an effort to assist the Missouri Department of Natural Resources (MDNR) in assessing the extent of the subsurface smoldering event in the Former Active Sanitary Landfill cell (the Bridgeton Sanitary Landfill). The infrared surveys covered about 600 acres of the West Lake Landfill and surrounding areas. These thermal contour images did not reveal any obvious subterranean heat signatures. This is due in part to the depth of the subsurface smoldering event (ranging from approximately 40 to 160 feet below the surface, based on data reported to MDNR).

In April, 2013, the Potentially Responsible Parties (PRPs) for Operable Unit 1 (OU1) at the West Lake Landfill conducted the second of four seasonal rounds of groundwater sampling. This sampling event included ## wells across the site. Samples were analyzed for volatile organic compounds (VOCs), unfiltered and filtered metals, and unfiltered and filtered isotopes of radium, thorium and uranium.

Radium was detected above its maximum contaminant level (MCL) of 5 picocuries per liter (pCi/L) in ## wells across the site in the unfiltered samples, and ## wells across the site in the filtered samples. The wells exceeding the radium MCL were spread across the site in no specific pattern. The maximum concentrations of radium detected were ## pCi/L for unfiltered samples and ## pCi/L for filtered samples.

Uranium was detected above its MCL of 30 micrograms per liter (ug/L) in ## wells in the unfiltered samples, and ## wells in the filtered samples.

Thorium has no established MCL. The maximum concentration of thorium detected during this sampling event was ## pCi/L for the unfiltered samples, and ## pCi/L for the filtered samples.

Trace metals exceeding their MCLs in one or more wells included ???.

VOCs exceeding their MCLs in one or more wells included ???

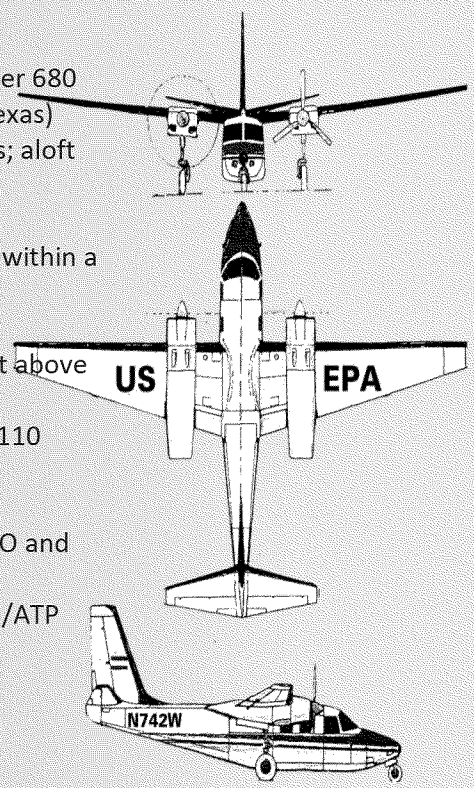
EPA Region 7 collected split samples from twelve wells during the PRPs' sampling event, to provide a quality control check on the PRPs' results. The split sample results generally agreed well with the PRPs' results.

There are two more groundwater sampling events planned in 2013, one in July and one in October. EPA has signed an agreement with the US Geological Survey (USGS) to help EPA evaluate and interpret the groundwater data being collected.

Nation's only 24/7 Airborne Stand-off Chemical and Radiological Detection, Infrared and Photographic Imagery Platform

ASPECT TECHNOLOGIES:

- **Infrared line scanner** (IRLS) to image chemical plumes
- **High-speed infrared spectrometer** to identify and quantify the composition of the chemical plume in the ppb to ppm range
- **Gamma-ray spectrometer** systems for radiological detection
- **High resolution digital cameras** (aerial & oblique) with ability to rectify for inclusion into geographical informa- tion system (GIS)
- **Central platform integrates** all sensor data and processes it through custom-ized scientifically-validated software, producing data and images within minutes while in flight
- **Broadband satellite data system** (SatComm) for communications with and data transfer to the ground team

AIRCRAFT

- **Plane:** 1968 Aero Commander 680 FL/G Platform (near Dallas, Texas)
- **Range:** 1,100 nautical miles; aloft time
4 – 6 hours
- **Coverage:** 4-hour coverage within a 700 mile radius
- **Service Altitude:** Data collection at 300 to 5,000 feet above ground level
- **Speeds:** Data collection at ~110 knots;
cruise at 180 – 200 knots
- **Ground Needs:** Standard FBO and high speed internet
- **Aircraft Crew:** 2 commercial/ATP rated pilots and 1 operator