



West Lake Update

July 13, 2016

Pyrolysis Testing Results Indicate Heating Did Not Increase Radon

EPA Region 7 released results today from laboratory tests that indicate heating radiologically impacted material (RIM) from the West Lake Landfill did not increase radon production. In the case of wet or saturated RIM, heating the material actually decreased radon production.

The new heat extraction system in the neck area and the EVOH cover being installed in the North Quarry are both expected to further mitigate the risk of the subsurface smoldering event (SSE) from moving out of the South Quarry.

In the winter of 2015, EPA began developing scientific testing to estimate the potential effects of a SSE coming in contact with RIM located in the West Lake Landfill. Tom Mahler, a nuclear engineer and On-Scene Coordinator with EPA Region 7, worked closely with experts from the US Army Corps of Engineers, the US Geological Survey, EPA's office of Research and Development, EPA contractors, and other experts from EPA Region 7 to design a study that could accurately test the effects of pyrolysis on the radon production (also called emanation) from RIM.

Pyrolysis is a process that occurs during an SSE and consists of the chemical decomposition of waste at elevated temperatures in the absence of oxygen. Radon is a radioactive noble gas that is produced from the decay of an isotope of radium. Radon emanation describes the process by which radon is released from materials that contain radium. Specifically, the radon emanation coefficient describes the fraction of the radon that is able to escape or emanate from the source material.

Six samples were collected for this study from Operable Unit 1, Area 1 and Area 2 between November, 2015 and January, 2016. The radon emanation coefficients were measured from each of these six samples under nine different testing criteria. These nine testing criteria were designed to include a range of possible conditions that

represent the temperature and moisture conditions within the West Lake Landfill currently, and in the event of a potential SSE. Radon emanation along with the moisture conditions are key parameters that ultimately affect the amount of radon that could be released.

The laboratory testing for this study was conducted by Southwest Research Institute (SwRI) and validated by EPA. The results from this testing provide important data to estimate any changes to the amount of radon emanating from RIM that is exposed to elevated temperatures equal to or greater than temperatures associated with an SSE.

The results provide high precision measurements of the Uranium, Thorium, Radium, and other gamma emitting radionuclides present in the samples, as well as, a full suite of metals. The thermogravimetric analysis (a method that measures changes in physical and chemical properties of materials when exposed to increasing temperatures) was conducted to determine whether RIM could chemically react when exposed to elevated temperatures up to 500 degrees Celsius and to provide data to support the selection of the test conditions.



The data from this study indicates that there is not a direct relationship between radon emanation and RIM that has been heated to temperatures consistent with, and greater than, the current SSE in the Bridgeton Landfill. The data from this study indicates that radon emanation does increase as the moisture of RIM increases up to a maximum and then moisture content no longer has an effect once the sample is saturated. This relationship is con-

sistent with previously documented studies and scientific literature related to radon emanation.

These two conclusions together indicate that a SSE in general would temporarily decrease radon emanation from RIM in areas of the landfill that are effectively dried or moisture conditions are reduced until moisture conditions return to a steady state. While the study indicates there would not be an increase in radon production from increased temperatures, natural radon production would continue and could be more readily released on site if there were cracks or fissures at the surface.

The radon emanation results, laboratory testing procedures, and other analytical data associated with this study are now available on our website: <https://www.epa.gov/mo/west-lake-landfill>. EPA will publish the final report for the Radon Emanation Coefficient study once it is complete.

Additional Sulfur Dioxide (SO₂) Monitors at the Bridgeton Landfill

In April 2016, EPA and the Bridgeton Landfill, LLC, signed the Administrative Settlement Agreement and Order on Consent for Removal Actions, which required in part that Bridgeton Landfill install and operate two sulfur dioxide (SO₂) ambient air monitors for 1-hour SO₂ measurements for a period of one year.

The purpose of this SO₂ air monitoring is to evaluate SO₂ levels in the area around the Bridgeton Landfill. Recent landfill gas sampling results provided by Bridgeton Landfill to the Missouri Department of Natural Resources and Department of Health and Senior Services indicate that the flares located on site may be producing more SO₂ than previously estimated. The precision of these instruments coupled with methodology being used will help provide a more accurate characterization of SO₂ levels in the area. Prior SO₂ monitoring results from MDNR's AreaRae real-time field monitors are not directly comparable to EPA's public health benchmark for SO₂, i.e. the National Ambient Air Quality Standards (NAAQS), due to differences in the instruments' precision and methodology.

On July 8, 2016, EPA approved a SO₂ monitoring work plan and instructed Bridgeton Landfill to begin baseline air monitoring at two locations: one

near the water tower in Spanish Village and another near St. Charles Rock Road just north of the Bridgeton landfill. The approved SO₂ air monitoring plan is now available on our website: <https://www.epa.gov/mo/west-lake-landfill>.

These locations were selected to ensure the monitors provide coverage of air emissions under a variety of wind directions. The data will be made available to the public in a similar format to what is currently available from MDNR's "Rider Trail" SO₂ monitor located just south of the Bridgeton Landfill (<http://dnr.mo.gov/env/esp/aqm/docs/Allrep.PDF>). Bridgeton Landfill is required to install and operate the monitors within 30 days of EPA's approval of the work plan.

Site Progress Updates

- Drilling activities for installation of the heat extraction system (cooling loops) in the neck area began this week. Contractors mobilized to the site on Sunday, July 10, and drilling work began on Monday July 11. EPA has personnel on-site to oversee this work.
- Installation of the non-combustible cover and crushed rock is nearly complete.
- EPA has collected three of five planned sediment samples at the site. The remaining two samples will be collected when the standing water recedes. We will release the results of the sediment sampling after quality assurance/quality control processes are complete.

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