

Title V Operating Permit

Insignificant Activities

MDA L Soil Vapor Extraction Units

Activity Summary

LANL Environmental Programs, Corrective Actions Program (EP-CAP) is implementing a soil vapor extraction system (SVE) at MDA L in TA-54 to remediate soil vapors occurring from past disposal of waste drums and debris. The SVE system has been selected as a RCRA interim measure with approval by the NMED-Hazardous Waste Bureau for in situ remediation of the volatile contaminants in the vadose zone (unsaturated) soils. This is intended to assure the contaminant plume will not increase in size. SVE is a proven technology for the physical treatment of soil contaminants. The technology uses vacuum blowers and extraction wells to induce gas flow through the subsurface to collection and potential treatment aboveground before being exhausted to the air. Two extraction wells will be utilized to collect and contain organic soil vapors. The wells are designated MDA L SVE East and MDA L SVE West. This activity was described in a No Permit Required (NPR) application submitted to NMED on April 30, 2014 and approved on May 29, 2014.

There are no applicable requirements – EPA or NMED air regulations – which apply to this operation. Thus, the operation is defined as a Title V insignificant activity if potential emissions are below specific thresholds in the NMED Title V Operating Permit List of Insignificant Activities.

Potential to Emit

The NPR application provided two estimates of PTE for the pollutants emitted.

The higher estimates were based on worst-case assumptions regarding contaminant concentrations in soil pore gas. This included the assumption that the current pore-gas concentrations would not diminish over time due to operation of the SVE system but remain constant over an entire year. This does not reflect correctly how the system will operate and lower current soil pore-gas concentrations. The intent of this estimate was to demonstrate an air permit under 20.2.72 NMAC would not be required.

The second estimate provided is more realistic and was developed by LANL's EP-CAP using a three-dimensional multiphase numerical model developed specifically for MDA L. The site-scale numerical model evolved over many years (1999–2006) and has been used to evaluate the nature and extent of the subsurface contaminant 1,1,1-trichloroethane (TCA) associated with waste disposal. This model was refined to include a 2006 soil-vapor extraction (SVE) pilot test and calibrated permeabilities for the site were developed to match flow-rate versus pressure drop and concentrations in the exhaust gas. A blind validation simulation that begins with the pre-SVE test in 2006 and predicts present day (2010) plume concentrations yields a data/model correlation coefficient (r^2) for over 150 data model pairs that is greater than 90% in the year 2010. The ability of the model to align with data after four years that include two active SVE demonstration tests provides confidence that the model captures the dominant physical transport processes at this site, and can thus be used with confidence to explore future

scenarios of site behavior. For the air quality estimate of organic compound removal, the model was run from 2010 to 2014 assuming both SVE boreholes are pumped at maximum capacity for one year. Given that TCA is close to 60-70% of the total plume mass, a conservative estimate of total organic emissions from the SVE units for the first year of operation is approximately 1 ton at 900 kg per year.

Using the projected annual emissions from the site-scale model, the potential to emit was estimated for each compound present by assuming conservatively 100% of all organic emissions which are not TCA will be the maximum value for each remaining compound. Using this approach, the annual TCA emission is estimated to be 0.59 tons per year. Each additional compound is estimated to be emitted less than 0.4 tons per year. These emission rates were then compared to the NMED Title V Operating Permit List of Insignificant Activities criteria in 1.a and 1.b. Each compound will be emitted at maximum capacity below the corresponding annual emission rate which defines an insignificant activity.

Conclusion

Emission rates assuming continuous operation of both SVE units are below insignificant activity thresholds. Importantly, the NMED NPR approval requires LANL to report emissions from the SVE units in the Title V semi-annual emission reports. The SVE units will be continuously monitored for key compounds such as TCA, and other contaminants will be measured using Summa canisters and subsequent analysis. LANL will use this data to verify the emission rates in this review. This data will also be reported in future Title V semi-annual emission reports.