

Assessment of Air Quality and Risk Analysis for the Moab Site

FIU's Applied Research Center (ARC) developed a methodology for the preliminary assessment of air quality in the vicinity of the Moab Uranium Mill Tailings Remedial Action (UMTRA) Project Site and neighboring areas as a result of evaporation of contaminated groundwater using evaporator systems or ammonia stripping towers at the Moab site. Basic risk analysis has been performed for the Moab and neighboring sites, comparing the air contamination with OSHA's standard.

In order to reduce the contaminant mass in the groundwater system at the Moab site, the U.S. DOE has initiated interim remedial actions to disperse the contaminated groundwater in the air using Landshark evaporating systems or ammonia stripping towers. As a result, the air in the vicinity of the Moab Tailings Project Site as well as neighboring sites (i.e., Matheson Wetland Preserve, the City of Moab and Arches National Park) can be polluted by hazardous substances present in the contaminated groundwater. Preliminary computations were performed using a Gaussian air dispersion model to determine the peak contaminant concentrations at the selected sites, ensuring that the concentration values do not exceed the exposure inhalation limits suggested by OSHA. Two major assumptions of the developed model are: (i) Steady-state distribution of a fully developed plume (the most conservative approach) and (ii) Dispersed aerosol particles in the air are not deposited.



Figure 1. Moab project site

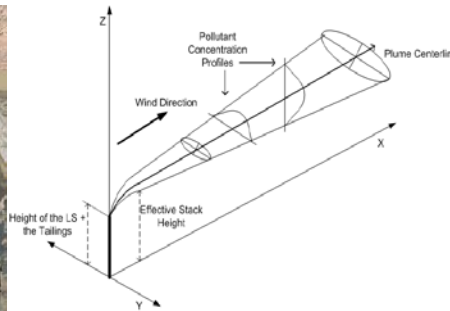


Figure 2. Conceptual Gaussian model



Figure 3. Evaporator in operation

Project Objectives

- Qualitatively analyze the risk of using Landshark evaporators and ammonia stripping towers to dilute the contaminated groundwater in air.
- Develop a conceptual Gaussian numerical model for the dispersion of contaminants spread out in air from the contaminated groundwater using evaporators and ammonia stripping towers.
- Assess the quality of air in the vicinity of the Moab Tailings Project and neighboring sites such as the DOE offices, Matheson Wetland Preserve, the City of Moab, and Arches National Park.

Project Accomplishments

Numerical results demonstrate that:

- The Landshark provides sufficient dilution which results in concentration values below the OSHA 8-hr exposure limits of 25 ppm and an odor threshold of 5 ppm for hazardous contaminants.
- The evaporator is more effective than the stripping tower, although in both cases the

ammonia concentrations are below OSHA's 8-hr exposure limits.

- Operation of two Landshark evaporators will not increase the concentration values, however, the contaminants will likely travel further.

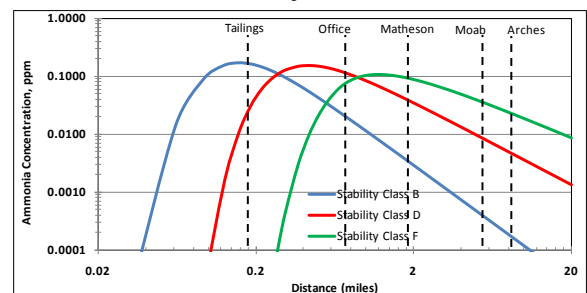


Figure 4. Spread pattern of ammonia for average wind speed of 2.5 m/s

- Evaporators should not be used to disperse highly contaminated tailing fluids or evaporated pond water. This water should be discharged to an irrigation system on the berm of the tailings to prevent aerosol transport and inhalation.