Hanford’s 177 underground waste tanks contain a complex mixture of radioactive materials and hazardous chemicals – the legacy of 45 years of plutonium production for the U.S. nuclear arsenal.

Radiological conditions in the tanks are well documented by a radiological protection program that minimizes radiation exposure and contamination hazards to workers.

Hazardous chemicals in the waste are not as easily detected and controlled, but a comprehensive Industrial Hygiene program has kept tank-farm worker exposure to chemical vapors well below federal occupational exposure limits.

Chemical vapors: A continuing presence in Hanford’s tank farms

Hanford’s double-shell waste tanks are vented to the atmosphere through risers connected to ventilation systems. Single-shell tanks where waste is being retrieved are actively ventilated with exhaust systems. Other single-shell tanks are passively ventilated, allowing the tanks to "breathe" with changes in atmospheric pressure, temperature differences between the inside of the tank and the surrounding atmosphere, and wind speed.

WRPS’ Industrial Hygiene program relies on a Technical Basis, a first-of-its-kind reference document that characterized more than 1,500 chemicals known or suspected to be in the tank waste. WRPS sought guidance from independent experts; installed engineered controls, such as exhaust stack extensions that move vapors up and away from the workers’ breathing space; implemented an extensive vapor sampling and monitoring program to measure and identify chemicals, assess hazards and determine protective actions, and instituted detection, sampling and monitoring technologies for chemicals of potential concern to worker safety.

Industrial Hygiene technicians collect thousands of vapor samples using real-time logging instruments and sampling devices. Area and source samples are collected from open areas in the tank farms, at breather filters, and in exhaust stacks on the tanks. Personal samples are collected in the workers’ breathing space using devices attached to workers’ clothing. Personal sampling determines work-area vapor concentrations and individual exposure to chemicals and hazardous materials.

Vapor Control Zones are established in tank farms where there is the potential that have high concentrations of chemicals. These zones are marked to keep workers away, unless they are equipped with personal protective equipment. Vapor Reduction Zones are established in and around tank farms to minimize worker exposure to low levels of chemical vapors. Although respiratory equipment is not required in Vapor Reduction Zones, workers are kept out of these areas unless they have specific work activities.

Path Forward

Chemical vapors will always be a hazard in the tank farms. Through technical analyses, sophisticated sampling and monitoring, engineered controls and conservative administrative controls, Washington River Protection Solutions is keeping tank farm worker exposure to chemical vapors well below federal occupational exposure limits.

Protective equipment, up to self-contained breathing apparatus using bottled air, are available to workers on a voluntary basis. Administrative controls are regularly reviewed and updated to reflect employee concerns and suggestions. And WRPS is working closely with Hanford’s medical provider to ensure its workers get the best information and health care available when they have concerns.