

Executive Summary

This document presents the Performance Standard Verification Plan (PSVP) for Operable Unit 1 (OU1) at Hill Air Force Base (HAFB). The PSVP establishes a monitoring program for OU1 post-Record of Decision operations including a long-term plan to reach site closeout. The PSVP defines long-term goals, types of decisions to be made, data analysis procedures, and reporting formats. The PSVP also defines a standardized assessment and monitoring protocol to provide HAFB with an improved, documented understanding and agreement with the Regulatory Agencies and the Public. Documenting procedures and decision criteria will provide continuity during personnel turnover, and lower costs by ensuring only necessary data is collected and sampling frequencies are optimized based on information goals.

The *Operable Unit 1 Record of Decision (ROD)* requires a PSVP as part of the remedial design which includes both compliance and performance monitoring to determine if Remedial Action Objectives (RAOs) are being met. These monitoring requirements are meant to ensure that selected remedies achieve appropriate protection of human health and the environment, comply with regulatory requirements, and continue to pursue attainment of remediation goals. The long-term RAOs for OU1 are stated in the *ROD* and are, in general, to protect human health and the environment by minimizing the potential for exposure to contaminated media, to prevent migration of contaminated media, and restore groundwater and surface water to MCLs. Media-specific RAOs were established in the *Operable Unit 1 Feasibility Study* to protect human health and the environment, and to address potential future unacceptable risk scenarios. Preliminary remediation goals (PRGs) were developed for soil, groundwater, surface water, Light Non-Aqueous Phase Liquid (LNAPL), and landfill contents and gas to establish media-specific concentrations for contaminants of concern. The various components of the remedial action were evaluated to determine which media-specific RAOs the remedial actions were associated with. This data is summarized in Table ES-1.

The *ROD* also requires the PSVP fully describe the data quality objectives (DQO) and programs to monitor progress toward achieving remediation goals, and achievement or resolution of those goals. The EPA recommended 7-step DQO Process was followed to establish criteria for data quality and develop data collection designs. The PSVP outlines the RAOs and data needs to address the issues of whether OU1 remedial actions are "operating properly and successfully." The phrase "operating properly and successfully" involves two separate concepts. A remedial action is operating "properly" if it is operating as designed. The system is operating "successfully" if its operation will achieve the clean up levels or performance goals delineated in the decision document. Additionally, in order to be successful, "that remedy must be protective of human health and the environment. "

Evaluation of whether the OU1 remedial actions are operating properly and successfully will occur and be documented in the OU1 Performance Standard Verification Report (PSVR). The first PSVR will be completed after a scheduled review of the OU1 Remedial Action operations in 2006. The frequency of the first review period allows sufficient data to

be collected during OU1 operations to provide a high degree of confidence that data collected represents true contaminant concentrations at OU1. As part of the PSVR, any needed changes to the monitoring program, data assessment methods, data collection frequency, review frequency, etc. will be recommended.

The geologic units underlying OU1 consist of the Recent Terrace Deposits, the Provo and Alpine Formations, and the Groundwater Aquifer. The geologic formations are divided into various geologic units based on water-bearing zones. Groundwater elevations and groundwater contamination levels differ for each of the various geologic units and are necessary to describe the units separately. These geologic units form the basis for the OU1 conceptual model. The conceptual model for OU1 is fully described in numerous other documents and only a brief description is presented in the PSVP.

The Source Areas are the disposal sites that are considered the source of OU1 contamination. The Non-Source areas are the contaminated groundwater plumes emanating from Source Areas. The goals of the Source Area remedial action are to prevent migration of contaminated groundwater and LNAPL from the Source Area, and to restore Source Area groundwater to MCLs. The Source Area remedy includes the installation of a series of dewatering trenches to prevent migration of contaminated groundwater and LNAPL from the Source Area into the Non-Source Area and repair of existing landfill caps. The Non-Source Area remedial action includes the upgrade and installation of spring/seep collection systems at springs with contamination levels above Maximum Contaminants Levels (MCLs), and excavation of arsenic-contaminated sediment exceeding background levels. The goal for the Non-Source Area remedial action is to minimize the potential for human exposure to contaminated groundwater and surface water and to restore the groundwater and surface water to MCLs. Monitored Natural Attenuation of contamination is the remedial action in the Non-Source Area groundwater. Elements of the remedial action common to both the Source Area and Non-Source Areas include: treatment of contaminated groundwater, long-term monitoring, and institutional and engineering controls.

In order to evaluate data to determine whether the OU1 remedial action is making progress toward achieving the RAOs, a statistical method was developed. The statistical method uses a comparison to the PRGs to determine whether concentrations of a particular constituent are above unacceptable levels for a monitoring well or group of monitoring wells (plume mean). The goal of the RAO comparison is to determine whether average onsite concentrations for a given constituent exceed a standard. Since only a finite number of samples are available to estimate true onsite concentrations, there is some uncertainty in this estimate. Based upon the sample size, the variability in measurements, and the assumed distribution of the target population, confidence limits can be calculated which bound the true concentration mean (or median) with a 95 percent confidence level. The 95 percent upper confidence limit (UCL) represents the one-sided upper confidence bound for the true mean (or median), while the 95 percent lower confidence limit (LCL) represents the one-sided lower confidence bound for the true mean (or median).

The UCL will be compared to the standard to ensure (with 95 percent confidence) that the true mean concentration is below the standard. If the UCL exceeds the standard, then the conclusion is made that the site is still contaminated, on average, at a level exceeding the standard. On the other hand, if the site is undergoing performance monitoring for areas

below MCLs, then the LCL is compared to the standard. This provides a reasonable level of confidence, for a location presumed clean, that the standard is not exceeded.

The remediation for OU1 has been divided into five distinct remedial actions:

1) construction and operation of groundwater extraction trenches, 2) repair of the existing landfill cap, 3) monitored natural attenuation of groundwater, 4) spring remediation systems, and 5) implementation of institutional and engineering controls. Performance monitoring parameters are established for direct measurement of performance of the remedial actions in achieving the RAOs. The performance monitoring criteria include measurement of groundwater elevations, analytical sampling of groundwater and surface water, measurement of surface water flow rates, sampling of landfill gasses, and visual inspection of institutional and engineering controls. In addition to the remedial actions described above, the Pond 10 bottom was regraded to better manage storm water. No Performance Monitoring Remedial Action Objectives are associated with the Pond 10 Remedial Action.

The performance indicators, monitoring network, monitoring frequency, data evaluation, and anticipated timeframe for achieving the RAO, have been identified for each of the remedial actions. These indicator criteria will be used to assess whether the treatment system is performing as anticipated. Exceedance of these criteria are not considered proof that the RAO is not being achieved. However, exceedance of these criteria will be reviewed to determine if modification to the system operation is warranted. Remedial action closure criteria were also developed for each remedial action. An OU1 Annual Report will be prepared to summarize monitoring activities conducted during the preceding 12 months. The OU1 Annual Report will be made up of three subreports; the Treatment System Operation Report, the Inspection, Monitoring and Maintenance Report, and the Annual Groundwater Sampling Report. The intent of the OU1 Annual Report will be to document the preceding year's monitoring results. The annual report will serve as a repository for the monitoring criteria result database (water level measurements, groundwater recovery volumes, water quality field measurements and analytical reports, total O&M costs, etc). The data documented in the annual reports will be interpreted in the PSVR. The PSVR process will thoroughly evaluate the performance of the OU1 system operation performance and progress toward RAOs. General evaluations regarding the effectiveness and efficiency of each remedial component of the selected remedy, as well as the cumulative effect of all components of the selected remedy, will be included in the PSVR report.