

Executive Summary

During 2011 and 2012, BHP Copper conducted voluntary soil remediation activities on 77 action properties within the Northwest Study Area (NSA) Voluntary Remediation Program (VRP) site located in Superior, Arizona. Soil remediation was conducted to address tailings-impacted soils and to reduce the concentrations of metals of concern, including arsenic, copper, lead, and manganese. The effectiveness of the remediation was positively confirmed by comparing the results of confirmation soil sampling to soil remediation levels that the Arizona Department of Environmental Quality (ADEQ) approved for the NSA site.

BHP Copper also completed soil sampling on 6 properties not previously accessible for evaluation to assess the potential presence of tailings-impacted soils. The results of that sampling determined that these properties meet ADEQ's approved soil remediation levels without requiring remediation. Previously, BHP Copper submitted information to ADEQ regarding 40 other non-action properties that demonstrated compliance with the approved soil remediation levels. ADEQ has since issued written no further action (NFA) determinations for each of those 40 properties.

BHP Copper conducted the remediation and sampling work under ADEQ oversight and in accordance with work plans and procedures reviewed and approved by ADEQ. While performing the field work, BHP Copper maintained a priority focus on the safety of residents and project workers. This NSA Project Completion Report (Completion Report) describes the remediation and sampling procedures and reports the results of recent and historical sampling activities. Property-specific information (including activities conducted, sampling data, and photographs) is provided in an individual Remediation Summary Report for each action property and a Data Summary Report for each non-action property. The Summary Reports are being submitted to ADEQ concurrently with this Completion Report.

Previous soil sampling investigation and data evaluation identified

arsenic, copper, lead, and manganese as chemicals of potential concern (COPCs) for the NSA. These metals were the only analytes found to exceed their predetermined residential soil remediation levels (SRLs) during a multi-phased and tiered sampling program that included 19 metals and cyanide (Table 2-1). Based on the Phase IV Human Health Risk Assessment (Brown and Caldwell, 2009), ADEQ approved a site-specific soil remediation level for arsenic consisting of a cumulative excess lifetime cancer risk (CELCR) of 2×10^{-5} and a hazard index that is not greater than 1.0. For copper, lead, and manganese, ADEQ approved soil remediation levels equivalent to each metal's predetermined residential SRLs.

Delineation of whether an NSA property was “action” and required remediation, versus “non-action” where no remediation was needed, was determined by comparing the results of comprehensive composite sampling conducted on each individual NSA property to the approved soil remediation levels. Typical subsample locations for composite samples collected from each property are illustrated in Figures 2-2 and 2-3. Results of this comparison for the 6 non-action properties addressed by this report are provided in Table 3-1, while the results for all other sampled NSA properties are shown in Table 2-3. Action and non-action properties, and properties BHP Copper was unable to access, are identified on Figure 1-3 and listed in Tables 1-1, 1-2, and 1-3.

Soil remediation activities conducted by BHP Copper at the 77 action properties included excavation of impacted soil, confirmation sampling throughout the excavated and non-excavated portions of each property to confirm the approved soil remediation levels were achieved, and backfill of the excavated areas with clean replacement soil and crushed landscape rock (unless the property owner declined placement of landscape rock). The results of confirmation soil samples collected prior to backfilling the



properties are presented in Table 5-1. Analytical results for samples collected from the replacement soil used to backfill the excavations is presented in Table 5-2; crushed landscape rock analytical results are provided in Table 5-3. To represent conditions to which residents at the remediated action properties are exposed, data for replacement soil were used to estimate post-backfill conditions. The methodology for this analysis is illustrated in Figure 6-1 and the results are detailed in Table 6-1, including a comparison of confirmation samples and post-backfill conditions against the approved soil remediation levels.

Using the data referenced above, property-specific risk calculations were performed for arsenic and comparisons of COPC concentrations and risk values were made to the approved soil remediation levels. Those evaluations demonstrated that current conditions on the 77 action properties and 6 non-action properties addressed by this Completion Report meet the approved soil remediation levels. The risk calculations were conducted using the procedures and assumptions previously developed in conjunction with ADEQ for the Phase IV Human Health Risk Assessment (Brown and Caldwell, 2009). These assumptions included all potentially complete exposure pathways and are based on representative exposure concentrations, conservative exposure assumptions, and conservative toxicity factors, thus minimizing uncertainty and establishing a high level of confidence in the results.

Based on the information presented in this Completion Report and the property-specific Summary Reports submitted herewith, compliance with the approved soil remediation levels is demonstrated for all 83 properties addressed by this Completion Report, and no further action is necessary.