ATTACHMENT ___

STATEMENT OF WORK

FOR SITE-WIDE REMEDIAL INVESTIGATION AND FEASIBILITY STUDY

ANACONDA COPPER MINE SITE

INTERIM ADMINISTRATIVE ORDER ON CONSENT

_____ 2017

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STATEMENT OF WORK

FOR REMEDIAL INVESTIGATION AND FEASIBILITY STUDY

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1. INTRODUCTION

1.1 Purpose

This Statement of Work (SOW) sets forth the scope and sequencing for completing site-wide Remedial Investigation and Feasibility Studies (RI/FS) for the Anaconda Copper Mine Site, Lyon County, Nevada (the Site). The Work described in this SOW was developed consistent with Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) and National Contingency Plan (40 CFR Part 300) requirements.

This SOW is attached to the Nevada Division of Environmental Protection (NDEP) Interim Administrative Settlement Agreement and Order On Consent for: (i) Site-Wide Remedial Investigation / Feasibility Study, (ii) Remedial Design / Remedial Action, and (iii) Fluid Management (Order). Any discrepancies between the Order and this SOW are unintended, and whenever necessary, the Order will control.

Atlantic Richfield Company (ARC) will complete the RI/FS by implementing the Work set forth in this SOW, consistent with the Order, until NDEP provides written notice of completion of the Work in accordance with Section XXX (Notice of Completion of Work) of the Order.

1.2 Description and Current Status of the Site

The Site is located in Mason Valley in Lyon County, Nevada, approximately 65 miles southeast of Reno. Mason Valley covers about 510 square miles, and the valley floor lies at an altitude between 4,300 and 4,700 feet above mean sea level (amsl). The principal agricultural activities in the valley include farming and cattle ranching. Irrigation water is provided by surface water diversions from the Walker River and from pumped groundwater. The Walker River flows northerly and northeasterly between the Site and the City of Yerington.

Subsequent to small-scale copper mining in the 1860s and early 1900s, large scale copper mining and ore processing operations were conducted between 1953 and 1978 for oxide and sulfide ores by The Anaconda Company (Anaconda). Post-Anaconda operations by Arimetco, Inc. and other entities resulted in additional mining and non-mining operations at the site including the construction of various heap leach pads, evaporation ponds, and leach processing facilities.

The approximately 3,000-acre Site currently consists of an inactive open pit, waste rock piles, sulfide and oxide tailings facilities, spent heap leach pads, evaporation ponds, and processing facilities that include tanks, buildings, and remnant foundations. There are no current active mining operations at the Site; however, a portion of the Site property is owned by Singatse Peak Services (SPS), a subsidiary of Quaterra Resources Inc. SPS has conducted drilling, exploration, and fluid management activities at the Site.

Pursuant to a 2007 US Environmental Protection Agency (EPA) Administrative Order for Remedial Investigation and Feasibility Study (2007 EPA Order) (CERCLA Docket No. 9-2007-0005) (EPA, 2007), EPA divided the Site into operable units (OUs) as follows:

- Site-Wide Groundwater (OU-1);
- Pit Lake (OU-2);
- Process Areas (OU-3);
- Evaporation Ponds (OU-4a) and Sulfide Tailings (OU-4b);
- Waste Rock Areas (OU-5);
- Oxide Tailings (OU-6);
- Wabuska Drain (OU-7); and
- Arimetco operated portions of the site (OU-8).

Under the 2007 EPA Order, site characterization has progressed through various stages of the RI/FS process for OU-1, OU-3, OU-4a, and OU-7 (formerly referred to as Priority 1 OUs). The RI/FS process is less advanced for OU-2, OU-4b, OU-5, and OU-6 (formerly referred to as Priority 2 OUs). The RI/FS process for OU-8 was completed by EPA (CH2M HILL, 2011; 2012). For purposes of this SOW, the Site Boundary utilized during the past RI/FS activities at the Site will continue to serve as the Site Boundary. Figure 1 provides a figure of the Site Boundary and general OU boundaries.

2. ROLE OF NDEP

NDEP will oversee ARC's activities throughout implementation of the RI/FS under the Order and this SOW. ARC shall support and cooperate fully with NDEP's initiation and conduct of activities related to implementation of oversight activities. This will include the review and comment on deliverables such as work plans, reports, and other required submittals as well as the collection of split samples for independent analysis if so requested by NDEP. NDEP's approval of deliverables is required, and allows ARC to proceed to the next steps in implementing the Work. NDEP's approval does not imply any warranty of performance, nor does it imply that the RI/FS, when completed, will be ultimately accepted by NDEP. NDEP retains the right to disapprove deliverables and require revision to meet NDEP requirements. NDEP may disapprove deliverables including, but not limited to, submissions concerning such matters as contractor selection, work plans, schedules, processes, sampling, or any other deliverables within the context of the Order. NDEP may grant ARC extensions of time on individual activity deadlines

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and deliverables. As described in Section X of the Order (Submission and Approval of Deliverables), after initial review of any deliverable that is required to be submitted to NDEP for approval under this SOW, NDEP shall: 1) approve, in whole or in part, the submission; 2) approve the submission upon specified conditions; 3) disapprove, in whole or in part, the submission; or 4) any combination of the foregoing.

3. WORK TO BE PERFORMED

The Work will be performed in accordance with the Order and this SOW. The Work under this SOW shall consist of the completion of RI/FS activities for the Site. This SOW recognizes that significant RI activities have been completed at the Site; therefore, only remaining Work tasks are described. Work completed under the 2007 EPA Order shall be considered as supporting information in the preparation of Work Plans and other deliverables required by this SOW, and the tasks outlined in this SOW shall build upon the foundation of work that has been completed and approved by EPA and/or NDEP.

The Work described herein is separated into the following primary tasks as follows:

- Project Planning (Section 4);
- Community Involvement (Section 5);
- Site Characterization for OU-1, OU-3, OU-4a, and OU-7 (Section 6);
- Combined Site Characterization for OU-2, OU-4b, OU-5, and OU-6 (Section 7);
- Remedial Action Objectives (Section 8); and
- Feasibility Studies (Section 9).

In addition to the primary tasks described above, the following sections describe additional general requirements and considerations for the Work.

3.1 Definitions

The definitions set forth in the Order are incorporated herein by reference and shall apply to this SOW unless expressly provided otherwise herein.

3.2 Meetings

ARC and NDEP will meet, as needed or requested by either party, to discuss the development of deliverables and the implementation of RI/FS activities. Additional meetings or conference calls will be scheduled as needed to provide updates on investigation progress or to discuss technical matters, remedial investigation, risk assessment, alternative analysis and feasibility studies.

3.3 Annual Data Summary and Quarterly Progress Reports

ARC shall submit annual data summary reports and quarterly progress reports to NDEP, describing the actions undertaken to implement the RA, in accordance with Paragraphs [60] and [68] of the Order.

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3.4 Closure Management Unit (CMU) Definitions and Implementation

As stated in Section 1.2, the 2007 EPA Order organized the Site into OUs and then categorized the OUs based upon priority. Since 2007, RI/FS activities have been conducted pursuant to the 2007 EPA Order under the OU structure. Completion of the RI tasks under this SOW, including any necessary Human Health Risk Assessment and/or Ecological Risk Assessment activities shall continue to be conducted pursuant to the existing OU structure.

Following completion of RI activities and any necessary risk assessment activities for a given OU, the OU structure shall conclude, and that portion of the site will be organized according to Closure Management Units (CMUs) for the remainder of the FS process and remedial design / remedial action (RD/RA). This reorganization into CMUs is intended to recognize that the remedial alternatives, and ultimately the remedial action will proceed in a manner that is likely to cross OU boundaries in order to take advantage of efficiencies derived from fewer mobilizations, and to maximize the utilization of on-site materials for filling, contouring, and capping. This allows for remedial alternatives to be developed and for the remedial action to ultimately proceed in a site-wide, holistic approach, rather than in a manner constrained by OU boundaries. Based upon this approach, 10 CMUs were developed and are described in Table 1 along with the approximate correlation to the pre-existing OUs. Figure 2 illustrates the CMU boundaries.

TABLE 1: CMU Relationship to OU

CMU	General Description of the Portions of Areas Included in the CMU	Portions of OUs included in the CMU
CMU 1	Evaporation ponds, northern portion of the sulfide tailings, Wabuska Drain, and on-site and off-site groundwater	OU-1, OU-4 (4a and 4b), OU-7
CMU 2	Phase IV-VLT HLP, oxide tailings, evaporation ponds	OU-4, OU-6, OU-8 (Phase IV-VLT HLP and Ponds)
CMU 3	Process area, southern portion of the sulfide tailings, VLT stockpile area, and oxide tailings	OU-3, OU-4a (Calcine ditch), OU-4b, OU-6
CMU 4	Phase III-4X HLP, oxide tailings	OU-6, OU-8
CMU 5	Phase III-South HLP, process area	OU-3, OU-8
CMU 6	Phase I/II HLP, S-23 waste rock area, W-3 waste rock area	OU-5, OU-8
CMU 7	Phase IV-Slot HLP, W-3 waste rock area	OU-5, OU-8
CMU 8	Pit Lake	OU-2
CMU 9	South Waste Rock Area - Alluvium	OU-5
CMU 10	South Waste Rock Area - Rock	OU-5

In summary, the CMUs were delineated to accommodate future reclamation activities, allow for efficiency in remedial action, and to provide a framework for development and evaluation of remedial alternatives. As the FS process progresses, assumptions and synergies may change; therefore, the CMU boundaries may be adjusted during the FS process to accommodate remedial alternative efficiencies, regulatory requirements, changes in land ownership, design considerations, or other factors.

4. PROJECT PLANNING

RI/FS investigations for specific OUs and related Site-wide activities included in this SOW include characterizing the nature and extent of contamination, and assessing potential human health and ecological risks, and are designed to allow for the OU-specific and Site-wide RI/FS activities to be performed in a consistent and comprehensive manner. As such, ARC will prepare and submit, for NDEP review and approval the following documents:

- Site-Wide Quality Assurance Project Plan (QAPP);
- Site-Wide Health and Safety Plan (review only); and
- Site-Wide Data Management Plan.

Site-wide project plans for quality assurance, safety, and data management have previously been developed in support of prior site activities. The most recent document will be updated to include information related to the Order and this SOW as necessary and will serve as the basis for development of each new plan. Revisions to these project plans may be required by NDEP during the course of the Work to reflect current site organization, conditions, or other factors.

ARC will also prepare and submit a baseline RI/FS Project Schedule consistent with the Deliverables Schedule in Section 10.2 detailing the milestones and activities specified within this SOW. The Project Schedule will be submitted to NDEP within sixty (60) calendar days following the Effective Date of the Order. ARC may submit proposed revised RI/FS Project Schedules for NDEP approval. Upon NDEP's approval, the revised RI/FS Project Schedule will supersede any prior RI/FS Project Schedule submitted and any prior Deliverables Schedule including that which is provided in Section 10.2.

5. COMMUNITY INVOLVEMENT

NDEP has the lead responsibility for developing and implementing community involvement activities at the Site and providing technical assistance to the Yerington Paiute Tribe. As appropriate, NDEP will provide ARC with the opportunity to review and provide comments on the draft Community Involvement Participation Plan (CIPP), any Technical Assistance Plan(s), and community fact sheets prior to distribution. If requested by NDEP, ARC will support NDEP's community involvement activities including participation in (1) the preparation of information regarding the Work for dissemination to the public, with consideration given to

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including mass media and/or Internet notification, and (2) public meetings that may be held or sponsored by NDEP to explain activities at or relating to the Site. ARC's support of NDEP's community involvement activities may include providing online access to initial submissions and updates of deliverables, as well as providing online storage of all Site documents. NDEP may describe in its CIPP ARC's responsibilities for community involvement activities.

6. SITE CHARACTERIZATION FOR OU-1, OU-3, OU-4a, AND OU-7

OUs 1, 3, 4a, and 7 are grouped together under this task since these have been historically referred to as the priority OUs, RI activities are close to completion, and the geochemical character of the process solutions associated with these areas is similar. A synopsis of the RI objective and investigative status is provided below for each OU, followed by the specific RI SOW tasks. Certain Site Characterization tasks may be combined for these OUs, including the combination of certain OU RI Reports together and the combination of certain OU Human Health Risk Assessment and Screening Level Ecological Risk Assessments together. However, if combination of such OU tasks is likely to result in unnecessary delays to the project, ARC may elect to sequence the tasks individually.

6.1 OU-1 Groundwater

The purpose of the Site-wide Groundwater RI is to characterize and monitor the groundwater within and downgradient of the Mine Site Boundary, as defined in the Order. The Groundwater OU underlies the other OUs identified in this SOW, and elements of the other OUs may be integrated with this Groundwater OU. In this SOW, the term "Site" refers to the mine site boundary that encompasses the area where mining and ore beneficiation activities have occurred. The term "Study Area" refers to a larger area encompassing both on-Site and off-Site locations where OU-1 groundwater RI activities have been conducted.

Groundwater in the vicinity of the site has been the subject of investigation since the late 1970s. Groundwater monitoring was initiated in 2007, and quarterly monitoring of over 300 wells has been ongoing for approximately five years. Groundwater quality beneath the Site has been locally impacted by process solutions and operations, based on investigations performed to date. Other sources of constituents of interest (COI) to groundwater in addition to historic releases from the Site include, past and current agricultural operations, and naturally occurring mineralization. Irrigation wells located to the north and east of the Site pump water from the deep aquifer. Groundwater and surface water used to irrigate the fields immediately adjacent to the Site affect off-site groundwater flow directions.

In a recent Background Groundwater Quality Assessment (Brown and Caldwell, 2015), significant data gaps were resolved in regard to the technical approach for establishment of background groundwater quality and establishment of a weight of evidence approach for defining the extent of both mine-impacted groundwater and other anthropogenic groundwater impacts. As such, the hydrogeologic Site model is well developed and supported by an extensive

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quarterly monitoring regime. The geochemical signature of mine-related groundwater varies, but appears to reflect elevated concentrations of metals, radiochemicals, sulfate, and total dissolved solids (TDS). In conjunction with OU-specific site characterizations, the extensive amount of existing groundwater information is considered adequate to complete the RI, predict chemical fate and transport, quantify potential risk to human receptors, and evaluate remedial alternatives.

For OU-1, a number of technical memoranda have already been prepared and submitted to EPA for review and approval describing the results of the OU-1 site characterization activities. Those technical memoranda have included, but are not limited to, the following documents:

- Groundwater Geochemical Characterization Data Summary Report (Brown and Caldwell, 2016a)
- Bedrock Groundwater Assessment Technical Memorandum (Brown and Caldwell, 2015a)
- Background Groundwater Quality Assessment - Revision 3 (Brown and Caldwell, 2016b)
- Groundwater Flow Model Yerington Mine Site (SSPA, 2014)
- Flow Model "Supplemental" Materials (SSPA, 2015)

The OU-1 RI Report (Section 6.6) will essentially consist of the content already developed and provided within those technical memoranda.

Based upon this supporting information, the following SOW tasks are anticipated to complete the site characterization activities for OU-1:

(a) **Groundwater Monitoring**

ARC shall continue to monitor groundwater quarterly according to the Site-Wide Groundwater Operable Unit (OU-1) Remedial Investigation Work Plan Revision 1 (Brown and Caldwell, 2014a). Upon approval of the Groundwater Monitoring Optimization Technical Memorandum in Section 6.1(c), the groundwater monitoring requirements will be modified according to the recommendations in the memorandum, following approval of the memorandum by NDEP. ARC shall provide monitoring data summary reports in accordance with Section 3.3 of this SOW to NDEP for review.

(b) **Plume Stability Technical Memorandum**

ARC shall submit to NDEP for approval a Plume Stability Technical Memorandum. This memorandum is intended to provide the methodology and results of an evaluation of the stability of the groundwater plume both on-Site and off-Site. This will include statistical analysis of monitoring data as well as other lines of evidence such as movement or stability of centers of mass of the various COI plumes. The results of the plume stability evaluation will be used to assist in the evaluation of remedial options for the groundwater FS.

(c) **Groundwater Monitoring Optimization Technical Memorandum**

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Following approval of the Plume Stability Technical Memorandum, ARC shall submit to NDEP a Groundwater Optimization Technical Memorandum. This memorandum is intended to reduce the groundwater monitoring network since site characterization is completed and recommend the interim groundwater monitoring requirements to confirm future findings and observations regarding plume stability. The monitoring recommended by this memorandum will continue until the implementation of the remedy for on-site and off-site groundwater is selected and remedy implementation begins. The final monitoring requirements during remedy implementation and following remedy implementation will be provided during the FS and will include the performance evaluation criteria within separate on-site and off-site groundwater performance monitoring protocols.

6.2 OU-3 Process Areas

Historical beneficiation of oxide and sulfide copper ore was conducted at the Site in the process areas, designated by EPA as OU-3. The purpose of this SOW in relation to OU-3 is to describe the tasks needed to complete the RI/FS process. Site Characterization for OU-3 was substantially completed with the submittal of the OU-3 RI Report (Brown and Caldwell, 2016) to EPA in 2016. A Final RI Report will be submitted to NDEP for review and approval. Given that the Draft RI Report has been submitted to EPA, the existing dataset is considered adequate to predict chemical fate and transport, quantify potential risk to human and ecological receptors, and assess the need for and types of remediation that may be appropriate.

6.3 OU-4a Evaporation Ponds

OU-4a includes the Unlined Evaporation Pond (UEP), Lined Evaporation Pond (LEP), the Finger and Thumb Ponds, the Pumpback Collection Ponds, Weed Heights Sewage Ponds, and the Calcine Ditch. The purpose of the OU-4a investigation to date has been to characterize pond solids, liners (where existing) and underlying native soils; and assess the nature and extent of contaminated materials. Because the Evaporation Ponds are adjacent to the Calcine Ditch, the northern portion of the Calcine Ditch was investigated concurrent with work in OU-4a, and the results were reported in 2017, while the southern portion of the Calcine Ditch was investigated as part of OU-3 with results reported in 2005 and 2014.

The ponds have been included in numerous surveys and investigations as far back as 1976. The ponds were characterized in 2008, in support of an EPA-directed removal action, and in 2015-2016 pursuant to the EPA-approved Phase 1 Field Sampling and Analysis Plan (FSAP) (Brown and Caldwell, 2014b). Collected data suggest that evaporation pond operations historically resulted in the sourcing of constituents to underlying soils and groundwater via infiltration at times when the ponds were receiving process liquids. The accumulation of evaporation pond sediments is also documented. Interpretation of data collected during the 2015-2016 investigations is currently being conducted to evaluate whether deposited sediments and underlying vadose zone soils are a current source of constituent loading to shallow groundwater. This information will be presented in a technical memorandum or the RI report for OU-4a.

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Potential data gaps associated with characterizing the nature and extent of mining-related impacts within the northern half of the Calcine Ditch may be identified as a result of ongoing data evaluation. OU-4a RI activities will build on the work completed to date as documented within the various characterization reports for soil and groundwater.

Based upon this supporting information, the following SOW tasks are anticipated to complete the site characterization activities for OU-4a:

(a) **Field Sampling and Analysis Plan for OU-4a**

ARC shall submit to NDEP for approval a FSAP for OU-4a, should further data gaps be identified. This FSAP may address data gaps associated with characterizing the nature and extent of mining-related impacts within the northern half of the Calcine Ditch, if identified, or other data that may result from interpretation of the 2015-2016 data. If prepared, the FSAP will include sampling objectives, sample locations, sampling equipment and procedures, and sample handling and analysis. The FSAP is intended to ensure that sample collection and analytical activities are conducted in accordance with technically acceptable protocols to ensure usability within the RI/FS and risk assessment, and provide a basis for engineering design decisions.

6.4 OU-7 Wabuska Drain

The Wabuska Drain is a 13.8-mile long, manmade, surface ditch which currently serves as one of many irrigation return-flow ditches used to manage water from agricultural uses across Mason Valley. The Drain originates immediately north of the Site and is aligned to the north past its intersection with the West Campbell Irrigation Ditch, and through the Yerington Paiute Tribe Reservation. Further to the north, it crosses Highway 95A approximately one mile south of the town of Wabuska, where it is aligned to the east-northeast to its intersection with the Walker River. Construction of drain segments appears to have begun as early as 1938 based upon historical aerial photographs. The Wabuska Drain alignment has changed over time with portions of the former alignment now buried beneath agricultural fields.

The Wabuska Drain was constructed prior to 1938 to dewater and stabilize the former Nevada Copper Belt Railroad tracks and to drain agricultural tail water and shallow groundwater. Conceptually, it was recognized that chemicals originating from the process solutions may have impacted soils in the southern reach of the Wabuska Drain. Additionally, anthropogenic sources unrelated to mine-Site operations have been introduced to the drain including agricultural tail water, stormwater runoff (including runoff from adjacent former railway), and amendments applied to fields adjacent to or draining to the Wabuska Drain.

Results for soil samples collected within OU-7 and the Wabuska Drain reported detectable concentrations of COI. Data within the January 3, 2017 Wabuska Drain (OU-7) Field Sampling and Analysis Plan Data Summary Report and Conceptual Site Model Update preliminarily indicate that there is no evidence of percolation of COIs through the vadose zone to groundwater within drain alignments, that elevated concentrations of COIs originating from site sources appear to be limited to the drain area south of Luzier Lane, and that north of Luzier Lane COI

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concentrations are at background levels (including levels that are most likely attributable to agricultural practices).

The purpose of the RI for OU-7 has been to characterize the native soil and potential deposits of sediment within the Wabuska Drain OU. A remaining data gap is associated with characterization of the drain water. Further OU-7 RI activities will build on the work completed to date as documented within the various characterization reports for soil and groundwater.

Based upon this supporting information, the following SOW tasks are anticipated to complete the site characterization activities for OU-7:

(a) **Drain Water Observation Program Standard Operating Procedure**

ARC shall submit to NDEP for approval a Drain Water Observation Program Standard Operating Procedure (SOP). The SOP partially addresses a data gap identified in the October 7, 2015 Draft Wabuska Drain (OU-7) Remedial Investigation Work Plan - Conceptual Site Model and Data Quality Objectives for characterization of Wabuska Drain water. This SOP is intended to support characterization of the drain using observations of conditions and modeling of the hydraulic characteristics. The SOP shall provide a standard program for documenting the frequency of drain water accumulation and/or flow, if present, within the current drain, evaluate if surface water is a mechanism for transporting mine-originated materials to the current drain, and detailed assessment of physical drain features and geomorphology to document evidence of past flow and sediment transport. The work under this SOP shall be performed within the Wabuska Drain at the point it originates north of the mine site and extending north to the southern end of the YPT reservation.

6.5 Risk Assessments for OU-1, OU-3, OU-4a, and OU-7

ARC will perform human health risk assessment (HHRA) and screening level risk assessment (SLERA) in accordance with the Order and this SOW. The risk assessments will be conducted according to NDEP requirements and direction and USEPA risk assessment guidance, and will consider current and future land-uses, institutional controls, and groundwater use restrictions. This SOW text describes combined deliverables for certain OUs and for certain HHRA and SLERA Work Plans and Reports; however, if combination of such deliverables is likely to result in unnecessary delays to the project or if deemed technically appropriate or necessary, ARC may elect to sequence the deliverables individually (i.e. split HHRA and SLERA deliverables and/or split deliverables by OU).

ARC will produce an HHRA/SLERA Work Plan for OU-1, OU-4a, and OU-7 for NDEP approval. Following completion of the HHRA/SLERA Work Plan, ARC will submit an HHRA/SLERA Report for OU-1, OU-4a, and OU-7. Note that OU-1 does not require an ecological risk assessment due to the lack of a complete ecological exposure pathway. Additionally, for each OU, if site characterization results indicate that the soil or surface water (drain water) constituent concentrations are statistically within the range of natural and/or anthropogenic background concentrations unrelated to mine operations, then ARC can request

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that NDEP eliminate the requirement to complete a SLERA for that OU. Should NDEP determine that the SLERA results for an OU require additional evaluation, then ARC will submit an OU-specific ERA work plan and risk assessment.

The HHRA portion of the HHRA/SLERA Report may include the following components to the extent that they are applicable: 1) human health conceptual site model (CSM) identifying exposure media, receptor populations, and complete exposure pathways; 2) description of exposure media and constituent concentrations; 3) summary of applicable background concentration limits and comparison to media concentrations; and 4) risk-based screening process to identify constituents of potential concern (COPCs). If COPCs are identified, the HHRA also will delineate exposure areas, estimate exposure point concentrations, and quantify exposures and risks for relevant receptor populations.

For OU-3, a Draft HHRA Work Plan was submitted to EPA in December 2016. Following NDEP review and approval of the Work Plan, ARC will produce an OU-3 Final HHRA/SLERA Work Plan for NDEP approval. Following completion of the HHRA and SLERA work activities, ARC will submit an OU-3 HHRA/SLERA Report that is consistent with the components described above.

The SLERA portion of the HHRA/SLERA Report may include the following components to the extent that they are applicable: 1) description of media concentrations and data treatment methods; 2) identification of the constituents of potential ecological concern (COPECs); 3) description of the representative ecological receptors and exposure pathways in a conceptual site model; 4) comparison of the COPEC media concentrations to screening values; 5) identification of constituents and radionuclides of concern; and 6) characterization of OU-specific risks for ecological receptors. Following completion of the screening-level preliminary exposure estimate and risk calculation, ARC will determine, with input from NDEP, whether the information available is adequate to support a risk management decision. Four outcomes are possible at the conclusion of the screening-level assessment and are generally summarized as follows:

1. There is adequate information to conclude that ecological risks are negligible and therefore no need for remediation on the basis of ecological risk;
2. The information is not adequate to make a decision at this point, and the ecological risk assessment process will continue;
3. The information indicates a potential for adverse ecological effects, and a more thorough assessment is warranted; or
4. There is adequate information to support a risk management decision such as taking action to mitigate an identified COPEC exposure pathway and risk to an acceptable level.

ARC will document the recommendation and the basis for it in the respective HHRA/SLERA Reports.

6.6 RI Reports for OUs 1, 3, 4a, and 7

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ARC will prepare and submit RI reports to NDEP for approval in accordance with the Order and this SOW. The RI reports shall summarize results of field activities, the sources of contamination, the nature and extent of contamination and the fate and transport of contaminants. The RI reports will include the actual and potential magnitude of releases from identified sources, and horizontal and vertical migration of contamination as well as mobility and persistence of contaminants. ARC will submit the following RI Report deliverables for NDEP approval:

(a) **OU-1 RI Report**
(b) **OU-4a and OU-7 RI Report(s)**
(c) **OU-3 Final RI Report** (maintained as separate report, since draft report has already been submitted).

7. COMBINED SITE CHARACTERIZATION FOR OU-2, OU-4b, OU-5, and OU-6

OUs 2, 4b, 5 and 6 are grouped together under this Combined SOW task, as RI site characterization activities have not formally commenced for these OUs. RI field work on these OUs may occur on a holistic basis across the OUs or be sequenced so that field implementation can proceed without unnecessary delay. To the extent possible, certain deliverables will be combined for these OUs, such as the RI Sampling and Analysis Plan, the RI Report, and the HHRA and SLERA deliverables. Shallow groundwater beneath these OUs will be addressed via OU-1 RI/FS.

A brief synopsis of the RI objective and status of previous data collection activities is provided below for each OU.

7.1 OU-2 Pit Lake

The Pit Lake is located within that portion of the Site south of Burch Drive and is adjacent to the Waste Rock Areas (WRAs) and the Phase IV-Slot Heap Leach Pad (HLP). The RI objective of the Pit Lake OU is to characterize surface water conditions in the Pit Lake.

As documented on potentiometric surface maps of the Site, a cone-of-depression surrounds the pit lake in the shallow zone of the alluvial aquifer and in the bedrock flow system, with an associated groundwater divide between this area and the northern portion of the Site. The cone-of-depression and groundwater divide is expected to persist after the pit lake level approaches a steady state condition (i.e. in perpetuity), which suggests that the pit lake water will not impact groundwater.

February 2016 water quality analysis from the pit lake surface reported chemical concentrations below regulatory screening thresholds with the exception of total dissolved solids, uranium and gross alpha. Additional data collection activities are necessary to assess changes in water quality due to climatic and limnology processes (e.g., seasonal turnover) on water quality.

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OU-2 RI activities will build on the work completed to date as documented within the various characterization reports. Groundwater in the vicinity of OU-2 will be addressed via OU-1 RI/FS. However, data from continued monitoring and summary of groundwater conditions around the pit will be assessed for chemical stability of surrounding bedrock and alluvial groundwater, and the continued existence of a groundwater divide and cone-of-depression.

7.2 OU-4b Sulfide Tailings

The sulfide tailings area is located north and northeast of the OU-3 Process Area, and occupies a total surface area of approximately 385 acres. The estimated volume of tailings material contained in the Sulfide Tailings Pond is approximately 12.4 million cubic yards. The average thickness of tailings is approximately 20 feet. The ground underlying the tailings materials is unlined native soil. The sulfide tailings represent one of the most homogeneous material types on the Site as a result of the sulfide ore beneficiation process.

The purpose of the OU-4b investigation is to characterize the materials and other structural units within the limits of the Sulfide Tailings area and assess the nature and extent of contaminated materials.

Shallow zone groundwater monitoring beneath OU-4b indicate: 1) sulfate concentrations are similar to or less than an order of magnitude lower than seen beneath OU-4a; and 2) generally stable conditions in the context of dissolved sulfate beneath the sulfide tailings, an area that is recharged by seasonal irrigation practices on the Hunewill Ranch fields.

The stability of groundwater quality beneath OU-4b suggests that the sulfide tailings have sufficiently drained to reach field capacity in terms of soil moisture storage. This is supported by prior hydraulic property analysis.

Investigations to date have led to collection of four characterization samples within the sulfide tailings: three surface samples were collected as part of the cover materials characterization program and one collected during the Phase 1 Evaporation Ponds characterization program. Soil cores from installation of groundwater monitoring wells were archived without collection of at depth samples.

OU-4b RI activities will build on the work completed to date as documented within the various characterization reports. Groundwater in the vicinity of OU-2 will be addressed via the OU-1 RI/FS process.

Though existing data indicate that the material in the sulfide tailings area is generally homogeneous, additional limited investigation may be necessary to characterize the nature and extent of mining-related impacts, predict chemical fate and transport, and quantify potential risk to human and ecological receptors.

7.3 OU-5 Waste Rock Areas

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OU-5 is comprised of three waste rock areas (WRA) – W-3 WRA, W-23 WRA, and South WRA. The three WRAs have a combined area of approximately 490 acres. A total of 23 samples have been collected from the WRAs for geochemical analyses. Five of the nine samples from the South WRA were rock samples, which represent weakly mineralized bedrock that was not economic to process at the time of mining. The WRAs do not exhibit impacts to shallow groundwater, and potential leachate that reaches shallow groundwater will be captured in the pit lake cone-of-depression. Though existing data indicate that the individual WRAs appear generally homogeneous, limited additional surface soil sampling and borings to collect samples at depth are necessary to provide enough information to characterize the nature and extent of contamination and to provide adequate information regarding the potential use of waste rock material for cover construction.

7.4 OU-6 Oxide Tailings

The oxide tailings area occupies approximately 344 acres immediately north of the Process Area. Spent oxide ore removed from the Vat Leach tanks after acid leaching for copper recovery is referred to as oxide tailings or Vat Leach Tailings (VLT). VLT materials have been used across the Site for road base, capping material, pond embankments, and general fill material.

The purpose of the RI for this OU is to characterize the tailings materials and other structural units with the limits of the Oxide Tailings OU boundary. A significant number of VLT samples have been collected and analyzed in support of cover materials assessment and for various EPA and/or NDEP approved Site construction activities. Given the significant quantity of existing data, the homogeneity of this material type, and no indication of groundwater impacts from OU-6, further characterization work is not expected for this OU.

7.5 Combined RI Sampling and Analysis Plan for OU-2, OU-4b, and OU-5

ARC shall prepare and submit to NDEP for approval a Combined RI Sampling and Analysis Plan (SAP) for OU-2, OU-4b, and OU-5. This document will provide details regarding the proposed remaining data collection activities required to characterize the nature and extent of contamination and provide enough information to adequately assess human health and ecological risk to the extent necessary for each OU. The Combined RI SAP shall describe the sampling program including the rationale, number, type, and location of samples; the sample collection, handling and custody procedures; the required field documentation and the required analytical methods. The Combined RI SAP shall make reference to the Site-Wide QAPP to ensure that the data generated is of sufficient quality for use in the RI and risk assessments.

7.6 Risk Assessment for OU-2, OU-4b, OU-5, and OU-6

ARC will perform human health risk assessment (HHRA) and screening level risk assessment (SLERA) for OU-2, OU-4b, OU-5, and OU-6 in accordance with the Order and this SOW. The risk assessments will be conducted according to NDEP requirements and direction and USEPA risk assessment guidance, and will consider current and future land-uses, institutional controls,

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and groundwater use restrictions. This SOW text describes combined deliverables for certain OUs and for certain HHRA and SLERA Work Plans and Reports; however, if combination of such deliverables is likely to result in unnecessary delays to the project or if deemed technically appropriate or necessary, ARC may elect to sequence the deliverables individually (i.e. split HHRA and SLERA deliverables and/or split deliverables by OU).

According to NDEP guidance (*Pit Lake Water Quality Characterization Program, NDEP Profile III, May 2014*), a baseline HHRA is not required for OU-2, as risks are limited to physical (i.e., fall from steep slopes, loose terrain) rather than chemical hazards and access to the pit will continue to be prohibited. A technical memorandum will be drafted for NDEP review documenting the lack of public access to the pit and incomplete exposure pathways for humans.

ARC shall submit an HHRA/SLERA Work Plan for OU-2, OU-4b, OU-5, and OU-6 for NDEP approval. Following implementation of the HHRA and SLERA work activities, ARC will then submit a HHRA/SLERA Report for OU-2, OU-4b, OU-5, and OU-6.

The HHRA portion of the HHRA/SLERA Report may include the following components to the extent that they are applicable: 1) human health CSM identifying exposure media, receptor populations, and complete exposure pathways; 2) description of exposure media and constituent concentrations; 3) summary of applicable background concentration limits and comparison to media concentrations; and 4) risk-based screening process to identify COPCs. If COPCs are identified, the HHRA also will delineate exposure areas, estimate exposure point concentrations, and quantify exposures and risks for relevant receptor populations.

For each OU, if site characterization results indicate that the soil constituent concentrations are statistically within the range of natural and/or anthropogenic background concentrations unrelated to mine site operations, then ARC can request that NDEP eliminate the requirement to complete a SLERA for that OU. Should NDEP determine that the SLERA results for an OU require additional evaluation, then ARC will submit an OU-specific ERA work plan and risk assessment.

The SLERA portion of the HHRA/SLERA Report may include the following components to the extent that they are applicable: 1) description of media concentrations and data treatment methods; 2) identification of the COPECs; 3) description of the representative ecological receptors and exposure pathways in a conceptual site model; 4) comparison of the COPEC media concentrations to screening values; 5) identification of constituents and radionuclides of concern; and 6) characterization of OU-specific risks for ecological receptors. Following completion of the screening-level preliminary exposure estimate and risk calculation, ARC will determine, with input from NDEP, whether the information available is adequate to support a risk management decision. Four outcomes are possible at conclusion of the screening-level assessment and are generally summarized as follows:

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1. There is adequate information to conclude that ecological risks are negligible and therefore no need for remediation on the basis of ecological risk;
2. The information is not adequate to make a decision at this point, and the ecological risk assessment process will continue;
3. The information indicates a potential for adverse ecological effects, and a more thorough assessment is warranted; or
4. There is adequate information to support a risk management decision such as taking action to mitigate an identified COPEC exposure pathway and risk to an acceptable level.

ARC will document the recommendation and the basis for it in the HHRA/SLERA Report.

7.7 Combined RI Report for OU-2, OU-4b, OU-5, and OU-6

ARC shall prepare and submit a Combined RI Report for OU-2, OU-4b, OU-5, and OU-6 to NDEP for approval in accordance with the Order and this SOW. The Combined RI Report shall summarize results of field activities, the sources of contamination, the nature and extent of contamination and the fate and transport of contaminants. The Combined RI Report will include the actual and potential magnitude of releases from identified sources, and horizontal and vertical migration of contamination as well as mobility and persistence of contaminants.

8. REMEDIAL ACTION OBJECTIVES

ARC shall develop and submit to NDEP for review a preliminary identification of potential state, federal, and tribal Applicable or Relevant and Appropriate Requirements (ARARs) and to-be-considered (TBC) advisories, criteria or guidance. The preliminary identification of ARARs will assist in the refinement of remedial action objectives (RAOs) and the initial identification of remedial alternatives and associated ARARs for particular actions.

ARC will develop the RAOs and a list of potential ARARs based on the information provided in the final NDEP approved RI Reports and the approved human health risk assessments and ecological risk assessments.

9. FEASIBILITY STUDIES

ARC will prepare and submit Feasibility Studies to NDEP for approval which document the development and analysis of remedial alternatives and provide the basis for any recommended remedy. As described in Section 3.4, the organization for implementation of work at the Site under this SOW will transition from OUs to CMUs at the start of the Feasibility Study (FS) process. Feasibility Studies for certain CMUs will be grouped generally according to commonality of geographical location and/or remedial alternative type. Feasibility Studies will be prepared for the following CMU groups:

- CMUs 1 and 3 (on- and off-site groundwater included in CMU1); and
- CMUs 8, 9, and 10

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ARC will perform the Feasibility Studies in accordance with the Order and this SOW. The Feasibility Studies will include, but not be limited to, the development and screening of alternatives for remedial action, a detailed analysis of alternatives for remedial action, and submission of the FS Reports as described below.

9.1 Development and Screening of Alternatives for Remedial Action

The purpose of the development and screening of remedial alternatives is to compile an appropriate range of remedial options for evaluation in the Detailed Analysis of Alternatives. Concurrent with Project Planning and Site Characterization, ARC will develop and evaluate a range of appropriate remedial options protective of human health and the environment. ARC will perform the following activities to complete the development and screening of remedial alternatives:

(a) Develop General Response Actions

ARC will develop general response actions that will satisfy the RAOs. For each environmental medium for which remedial action objectives have been developed, ARC will make an initial determination of areas or volumes to which general response actions may apply, taking into account Site conditions, the nature and extent of contamination, and acceptable exposure levels and potential exposure routes identified in the remedial action objectives.

(b) Identify and Screen Remedial Technology Types and Process Options

ARC will identify and evaluate remedial technology types and process options applicable to each general response action. Several broad technology types may be identified for each general response action and numerous technology process options may exist within each technology type. ARC will use information from the RI on contaminant types and concentrations and Site characteristics to screen out technologies and process options that cannot be effectively implemented at the Site.

(c) Assemble and Document Alternatives

ARC will assemble selected representative technologies into alternatives that represent a range of alternatives that will address the remedial action objectives for the Site.

(d) Alternative Screening and Selection of Alternatives for Detailed Analysis

ARC will perform a screening of each remedial alternative based on effectiveness, implementability, and cost. As appropriate, the screening will preserve the range of alternatives initially developed.

9.2 Treatability Studies

ARC will perform treatability studies in instances where data is insufficient to allow treatment alternatives to be fully developed and evaluated during the feasibility study and/or to reduce the cost and performance uncertainties for treatment alternatives.

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If necessary, ARC will submit a treatability study work plan to NDEP in accordance with the Order, this SOW, and relevant EPA guidance. The work plan will describe the type of treatability study to be performed (e.g., bench scale or pilot scale) and will include:

- discussion of background information;
- list of key personnel and responsibilities;
- description of the remedial technology or technologies to be tested;
- Data Quality Objectives (DQOs) for each test including measurements of performance;
- experimental procedures for each test;
- SAP which describes the samples to be collected, sample collection procedures, sampling handling and tracking procedures, reference to the Site-Wide QAPP, and analytical methods; and
- schedule.

Following completion of the treatability study (if conducted), ARC will analyze and interpret the study results in a technical report submitted to NDEP. In the report, ARC will evaluate the effectiveness, implementability, and cost of each technology and compare test results with predicted results. ARC will also evaluate full-scale application of the technology, identifying key parameters affecting full-scale operation.

9.3 Detailed Analysis Of Alternatives

ARC will perform a detailed analysis of the screened remedial alternatives. The detailed analysis shall be sufficient to allow NDEP to compare the alternatives, select a remedial action for, and demonstrate satisfaction of the CERCLA remedy selection requirements.

Each alternative will be evaluated against the nine criteria contained in the National Contingency Plan (40 CFR Part 300.430(e)(9) (iii)):

1. Overall protection of human health and the environment
2. Compliance with ARARs
3. Long term effectiveness and permanence
4. Reduction of toxicity, mobility, or volume through treatment
5. Short-term effectiveness
6. Implementability
7. Cost
8. State acceptance
9. Community acceptance

ARC will conduct the detailed analysis of alternatives by evaluating each alternative against the evaluation criteria and then performing a comparative analysis between remedial alternatives.

9.4 Feasibility Study Reports

ARC shall prepare and submit FS reports that summarize the development and screening of remedial alternatives and the detailed analysis of alternatives detailed above in Sections 9.1 and 9.3. ARC will submit the following FS deliverables for NDEP approval:

(a) **FS Report for CMUs 1 and 3**

(b) **FS Report for CMUs 8, 9, and 10**

10. DELIVERABLE SCHEDULE

10.1 Applicability and Revisions

Deliverables and tasks required under this SOW must be submitted or completed within the time durations listed in the RI/FS Schedule set forth below. ARC may submit proposed revisions to the RI/FS schedule for NDEP approval. Upon NDEP's approval, the revised schedule will supersede the RI/FS Schedule set forth below, and any previously-approved RI/FS Schedule.

10.2 RI/FS Deliverable Schedule

RI/FS Deliverables	Schedule
1 Progress Reports (Quarterly Progress and Annual Summary)	Quarterly
Project Planning	
2 Baseline RI/FS Schedule	60 days after Effective Date of Order
3 Site-Wide Quality Assurance Project Plan	60 days after Effective Date of Order
4 Site-Wide Health and Safety Plan	60 days after Effective Date of Order
5 Site-Wide Data Management Plan	60 days after Effective Date of Order
Site Characterization for OU-1, OU-3, OU-4a, and OU-7	
6 Plume Stability Technical Memorandum	90 days after Effective Date of Order
7 OU-1 RI Report	90 days after Effective Date of Order
8 Groundwater Monitoring Optimization Technical Memorandum	180 days after Plume Stability Technical Memorandum Approved by NDEP
9 OU-4a Field Sampling and Analysis Plan (if determined necessary)	180 days after Effective Date of Order
10 OU-7 Drain Water Observation Program SOP	60 days after Effective Date of Order
11 OU-1, OU-4a, and OU-7 HHRA/SLERA Work Plan(s) (1)	12 months after Effective Date of Order
12 OU-3 Final HHRA/SLERA Work Plan (1)	9 months after Effective Date of Order
13 OU-1, OU-4a, and OU-7 HHRA/SLERA Report(s) (1)	18 months after OU-1, OU-4A, and OU-7 Risk Assessment Work Plan approved by NDEP
14 OU-3 HHRA/SLERA Report (1)	12 months after OU-3 HHRA Work Plan approved by NDEP

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RI/FS Deliverables	Schedule
15 OU-4a and OU-7 RI Report (s)	24 months after OU-4a Field Sampling and Analysis Plan (if developed) and Drain Water Observation Program SOP Approved by NDEP
16 OU-3 Final RI Report	180 days after Receiving OU-3 RI Comments from Agency
Combined Characterization for OU-2, OU-4b, OU-5, and OU-6	
17 RI Sampling and Analysis Plan (SAP) for OU-2, OU-4b, and OU-5	180 days after Effective Date of Order
18 OU-2 Technical Memorandum regarding Human Health Risk Pathways	180 days after NDEP Approval of RI SAP
19 OU-2, OU-4b, OU-5, and OU-6 HHRA/SLERA Work Plan (1)	180 days after NDEP Approval of RI SAP
20 OU-2, OU-4b, OU-5, and OU-6 HHRA/SLERA Report (1)	20 months after Risk Assessment Work Plan approved by NDEP
21 RI Report for OU-2, OU-4b, OU-5, and OU-6	24 months after RI SAP Approved by NDEP
Remedial Action Objectives	
22 Preliminary RAOs and ARARs	6 months after NDEP Approval of RI and Risk Assessment Reports for all OUs.
Feasibility Study for CMUs 1 & 3	
23 Treatability Studies Work Plan (if required)	
24 Treatability Studies Technical Report (if required)	
25 FS Report for CMUs 1 and 3 (2)	180 days after NDEP Approval of Preliminary RAOs and ARARs
Feasibility Study for CMUs 8, 9, & 10	
26 Treatability Studies Work Plan (if required)	
27 Treatability Studies Technical Report (if required)	
28 FS Report for CMUs 8, 9, and 10 (3)	12 months after NDEP Approval of Preliminary RAOs and ARARs

Table Notes:

(1) HHRA and SLERA Work Plans and HHRA and SLERA Reports are shown as combined deliverables in the table; however, as specified in the SOW text, ARC may elect to submit the documents separately.

(2) CMUs 1 and 3 include OUs-1, 3, 4, 6, 7, and a portion of OU-5.

(3) CMUs 8, 9, and 10 include OU-2 and a portion of OU-5.

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11. REFERENCES

The following references are provided:

Atlantic Richfield Company, 2016. *Proposed Modifications to the Phase 1 FSAP Anaconda Evaporation Ponds*. January 22.

Brown and Caldwell, 2014a. *Site-wide Groundwater Operable Unit (OU-1) Remedial Investigation Work Plan.* Prepared for Atlantic Richfield Company. February 7.

Brown and Caldwell, 2014b. *Phase 1 Field Sampling and Analysis Plan Anaconda Evaporation Ponds*. Technical Memorandum. July 31.

Brown and Caldwell, 2014c. Supplemental Characterization Work Plan Anaconda Evaporation Ponds Yerington Mine Site. Prepared for Atlantic Richfield Company. January 31.

Brown and Caldwell, 2015. *Background Groundwater Quality Assessment – Revision 2, Yerington Mine Site.* Prepared for Atlantic Richfield Company. July 2.

Brown and Caldwell, 2015a. *Bedrock Groundwater Assessment Technical Memorandum, Yerington Mine Site, Lyon County, Nevada*. Prepared for Atlantic Richfield Company. January 28.

Brown and Caldwell, 2016. *Process Areas (OU-3) Remedial Investigation Report Yerington Mine Site.* Prepared for Atlantic Richfield Company. November.

Brown and Caldwell, 2016a. *Groundwater Geochemical Characterization Data Summary Report - Revision 2, Yerington Mine Site, Lyon County, Nevada*. Prepared for Atlantic Richfield Company.

Brown and Caldwell, 2016b. *Background Groundwater Quality Assessment - Revision 3, Yerington Mine Site, Lyon County, Nevada*. Prepared for Atlantic Richfield Company. November 11.

Brown and Caldwell, 2017. *Phase 1 Evaporation Ponds Characterization Data Summary Report.* Prepared for Atlantic Richfield Company. March 16.

CH2M HILL, 2011. *Final Remedial Investigation Report Arimetco Facilities Operable Unit 8 Anaconda Yerington Copper Mine.* Prepared for EPA Region 9. September.

CH2M HILL, 2012. Draft *Final Feasibility Study for Arimetco Facilities Operable Unit 8 Heap Leach Pads and Drain-down Fluids Anaconda-Yerington Copper Mine Yerington, Nevada.* Prepared for EPA Region 9. May.

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ED_001725A_00000995-00023

EPA, 2007. *Administrative Order for the Remedial Investigation and Feasibility Study. In the Matter of Anaconda / Yerington Mine Site, Yerington, Lyon County, Nevada. Atlantic Richfield, Respondent. U.S. EPA Region 9, Docket No. 9-2007-0005. Proceeding under Section 106(a) of CERCLA, as amended, 42 USC § 9606(a). Including Attachment A: Scope of Work for the Remedial Investigations / Feasibility Studies Continued Response Action*. January 12.

S.S. Papadopulos & Associates, Inc., 2014. *Groundwater Flow Model, Yerington Mine Site, Nevada*. Prepared for Atlantic Richfield Company. March 18.

S.S. Papadopulos & Associates, Inc., 2015. *Flow Model Supplemental Materials, Yerington Mine Site, Nevada*. Prepared for Atlantic Richfield Company.

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FIGURES 1 and 2

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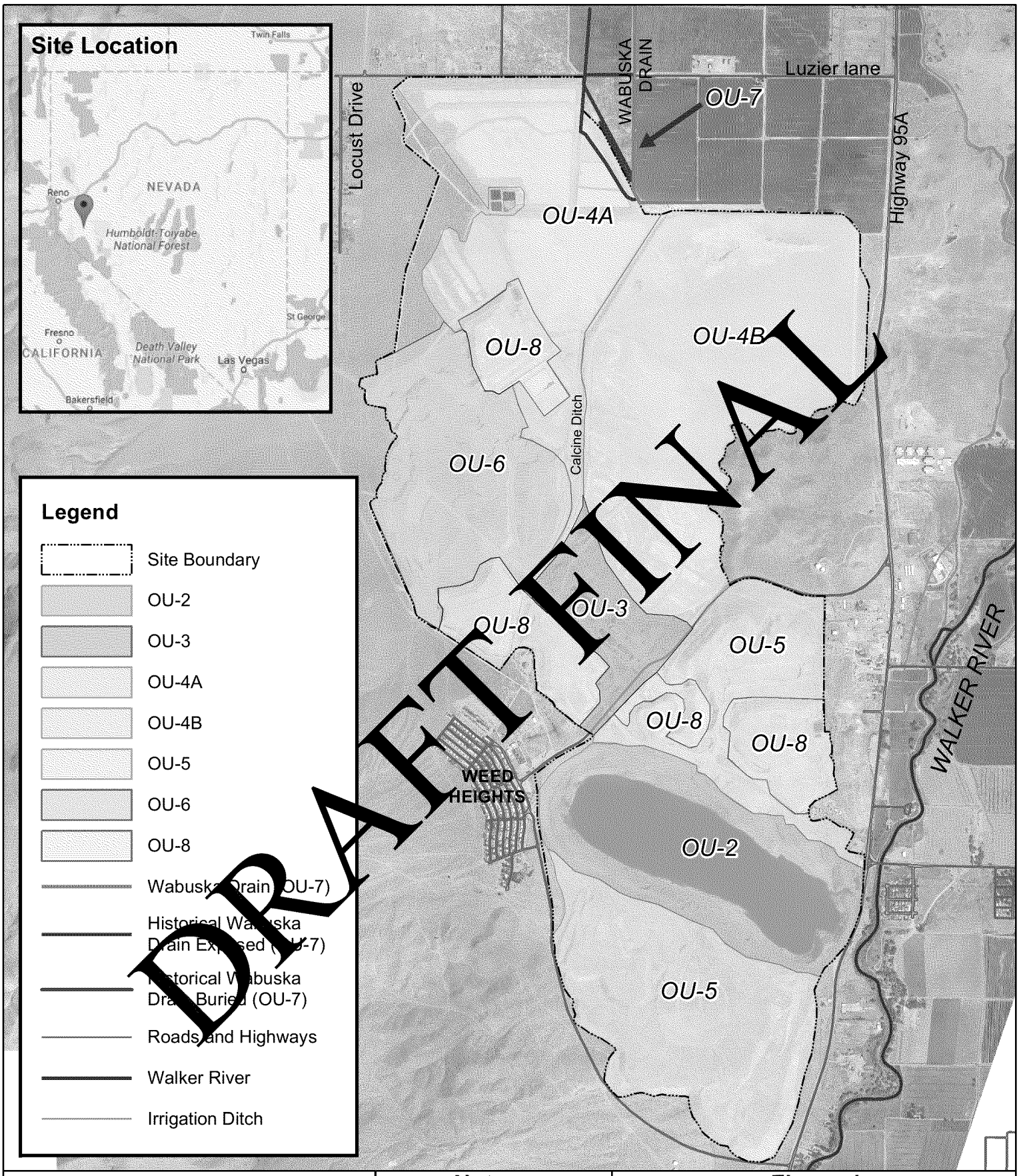

Copper Environmental Consulting

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Feet

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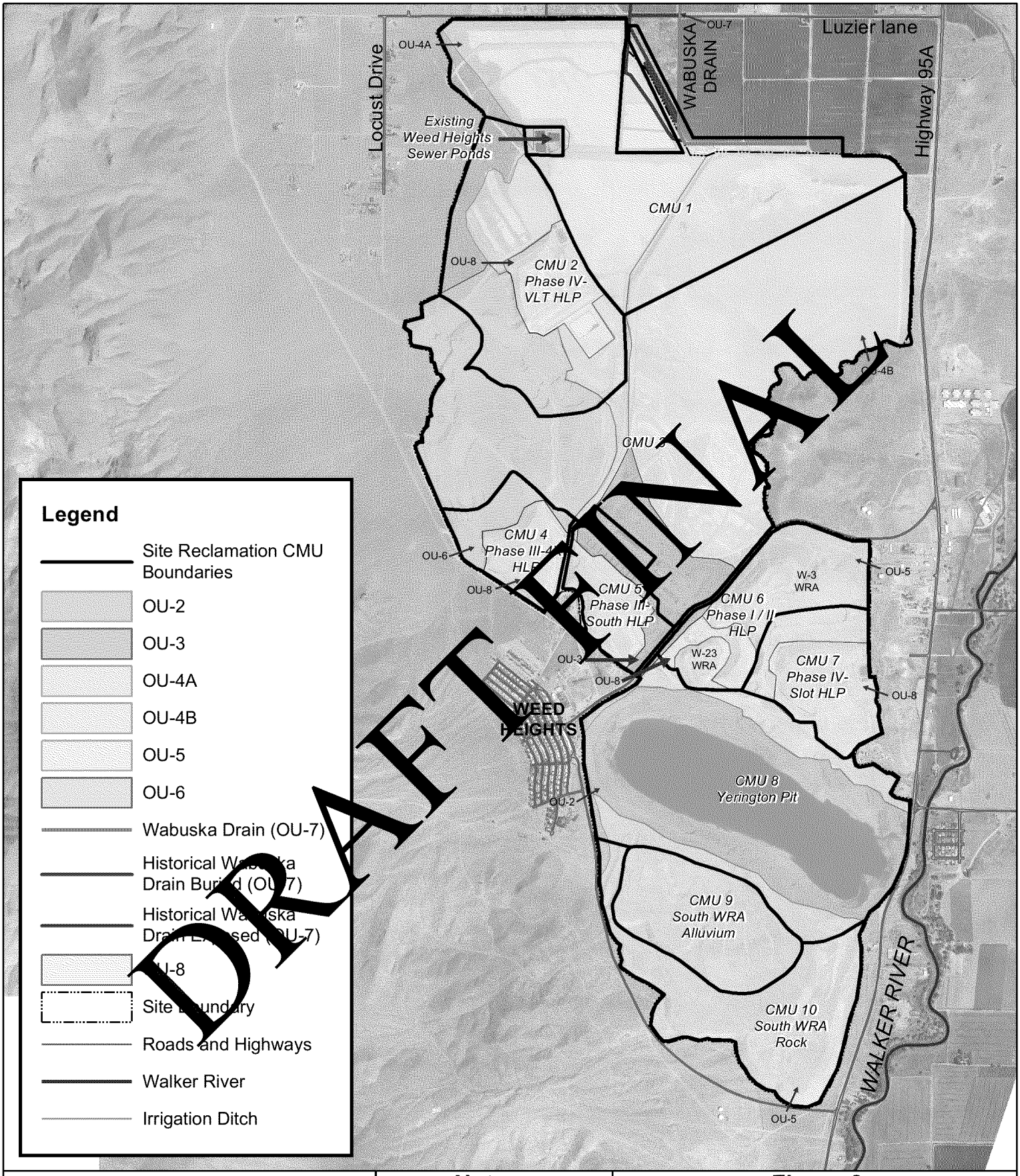
Notes:

- PRIVILEGED
- DRAFT VERSION April 2017
- OU-1: Is groundwater at and adjacent to site. Boundary is not shown here.

Figure 1

Anaconda Copper Mine Site
Operable Units (OU)

DATE: 4/20/2017	BY: AMW	FOR: Atlantic Richfield Co.



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Notes:

-PRIVILEGED

-DRAFT version April 2017

- OU-1: Is groundwater at and adjacent to site. Boundary is not shown here.

-CMU Boundaries current as of April 2017.

Figure 2

Anaconda Copper Mine Site
CMU and OU Boundaries

DATE: 4/20/2017	BY: AMW	FOR: Atlantic Richfield Co.