Silver Bow Creek/Butte Area Superfund Site   Montana Superfund

Winter 2-2022

BUTTE AREA NPL SITE BUTTE PRIORITY SOILS OPERABLE UNIT (BPSOU)

TREC Inc., A Woodard and Curran Company

BUTTE AREA NPL SITE
BUTTE PRIORITY SOILS OPERABLE UNIT (BPSOU)

Draft Final

2022 Data Management Plan (DMP)

Prepared for:

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Butte Priority Soils Operable Unit Data Management Plan

Revision: 1

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Approvals:

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Acronym List

BPSOU	Butte Priority Soils Operable Unit
BRES	Butte Reclamation Evaluation System
BRW	Butte Reduction Works
BSB	Butte Silver Bow County
BTC	Blacktail Creek
BTL	Butte Treatment Lagoons
AR	Atlantic Richfield Company
Agencies	Environmental Protection Agency and the Montana Department of Environmental Quality
CCR	Construction Completion Report
CD	Compact Disc
CFWEP	Clark Fork Watershed Education Program
COC	Contaminants of Concern
DEQ	Montana Department of Environmental Quality
DMP	Data Management Plan
DSR	Data Summary Report
DVD	Digital Video Disc
EDD	Electronic Data Deliverable
EPA	Environmental Protection Agency
ESRI	Environmental Systems Research Institute
FGDC	Federal Geographic Data Committee
FTP	File Transfer Protocol
GIS	Geographic Information System
GPS	Global Positioning System
GWIC	Groundwater Information Center
HHRA	Human Health Risk Assessment
IC	Institutional Controls
IIS	Internet Information Services
ID	Identification
LAO	Lower Area One
M&M	Monitoring and Maintenance
MBMG	Montana Bureau of Mines and Geology
MS	Microsoft
MSD	Metro Storm Drain
NAD83	North American Datum 83
NADV88	North American Vertical Datum 88
NPL	National Priorities List
ORP	Oxidation Reduction Potential
PPI	Personal Protected Information
QA	Quality Assurance
QAPP	Quality Assurance Project Plan
QC	Quality Control

QMP	Quality Management Plan
RA	Remedial Action
RAM	Random Access Memory
RAWP	Remedial Action Work Plan
RD	Remedial Design
RI	Remedial Investigation
RMAP	Residential Metals Abatement Program
ROD	Record of Decision
SAP	Sampling and Analysis
SBC	Silver Bow Creek
SCADA	Supervisory Control and Data Acquisition
SIS	Server Integration Services
SQL	Structured Query Language
USB	Universal Serial Bus
uSBC	Upper Silver Bow Creek
USGS	United State Geological Survey

1.0   Introduction

1.1   Site Background

After more than 120 years of metals mining, ore processing, and waste disposal within Butte, Walkerville, and other locations in the Silver Bow Creek (SBC) watershed, Butte Area National Priority List (NPL) was designated a Superfund site by United States Environmental Protection Agency (EPA) in September 1983. The Butte Area NPL Site, referred hereafter as the Site, is one of four Superfund Sites in the upper Clark Fork River Basin. The Butte Priority Soils Operable Unit (BPSOU) is located within the Butte NPL Site, and encompasses approximately 5 square miles of land within Summit Valley, including Walkerville, Butte (west of the Berkeley Pit), north Silver Bow Creek, and land extending from Timber Butte north to Silver Bow Creek. The Site also comprises two primary streams: Blacktail Creek (BTC), with headwaters in the Highland Mountains, and SBC. SBC above the confluence with BTC is a reconstructed channel in the historic SBC drainage, whose headwaters was eliminated with mining expansion of the Berkeley Pit and the Yankee Doodle Tailings Pond.

Over the last 20 years, numerous remediation efforts have been implemented to improve surface water and ground water quality in SBC to reduce the transport of Contaminants of Concern (COCs) and sediment via ground water, storm water, and surface water flow from source areas on the Butte Hill. This Data Management Plan (DMP) covers the process of managing data, collected to better understand the conceptual site model and to support the design and implementation of response actions, within Butte, Walkerville, and the SBC watershed.

1.2   Purpose of Data Management Plan

The purpose of this DMP is to detail the process of checking, storing, and using data associated with the Butte Area NPL and BPSOU. Project data will be used to support evaluations and decision making for Remedial Design (RD)/Remedial Action (RA) projects and post-remedy monitoring and maintenance (M&M). Currently geospatial data are stored in a Geodatabase, non-geospatial data are stored in Microsoft (MS) Structured Query Language (SQL) databases or MS Access databases that can be accessed by an on-line portal. This SQL/Geodatabase combination allows integration of spatial data (site locations, property information, geographic place names, site features, topography, and aerial collected imagery) with non-spatial information (analytical data) to provide a comprehensive database that contains all relevant site information.

The long-term data management objective is to establish a centralized database system, maintained by both Atlantic Richfield (AR) and Butte Silver Bow County (BSB), enabling all users to manage and use spatial and non-spatial information consistently, effectively and efficiently. However, at this time the data are stored in multiple component databases as described below. As work progresses toward centralizing this data, future revisions of this document will capture these changes and describe the revised process.

Effective data accessibility will require implementation of standardized communication avenues between the data producers and the Database Coordinator. A good data sharing protocol should:

- Ensure all produced data are delivered to the Database Coordinator in a standardized usable electronic format.
- Provide sufficient descriptive information about the data (metadata).
- Provide sufficient Quality Assurance (QA) / Quality Control (QC) of the data prior to distribution.

The successful implementation of a centralized database system weighs heavy on the ability to organize the flow of produced data and to ultimately achieve the goals outlined in this plan.

1.3   Scope of the Data Management Plan

This DMP has been developed to outline the procedures and work practices that support effective data management. Specifically, the primary objectives of the DMP are to:

- Encourage effective data management practices as an integral part of project management so all data are made available and usable for decisions now and into the future;

- Outline the procedures and work practices that support effective data management and describe data management system components such as personnel, hardware, and software;

- Develop an organized structure and procedures for the storage and management (i.e. security and export) of data;

- Identify necessary elements for a functional data management program and describe any anticipated changes to those elements;

- Establish basic quality control standards; and

- Establish standards for data, data distribution, and data archiving to ensure the long-term integrity of data, associated metadata, and any supporting information.

1.4   Data Management Plan Review and Revisions

This DMP will be reviewed annually to reconfirm the suitability and effectiveness of the approved data management practices. This review will be conducted and documented by the Database Coordinator and any changes will be submitted to the EPA for approval in consultation with Department of Environmental Quality (DEQ). As official versions of the various databases are finalized attachments to the revised DMP will be included that will detail location, data storage and retrieval procedures and contact information for each database administrator.

2.0   Roles and Responsibilities

2.1   Database Personnel and Responsibilities

The entities involved in this database system include Data Collectors, Data Producers, Database Coordinators, Server Administrators, and Data Users. This section will describe the responsibilities of each. See Figure 1 below for a reference of the various databases and their data coordinators.
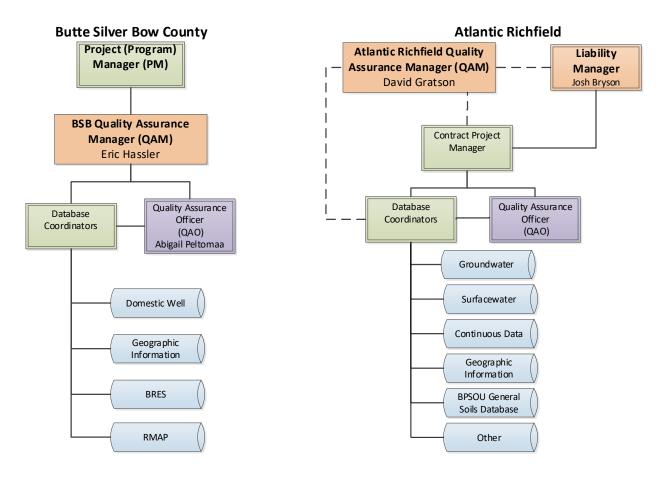

Figure 1 - Component Database Coordinators

2.1.1   Data Collectors

Data Collectors include all entities involved in collection of field samples and field data according to Quality Assurance Project Plans (QAPPs) or work plan documents. Field samples will be documented (via field logbooks/field forms and chain-of-custody forms) and the samples provided to the Database Coordinator, along with a chain-of-custody form, for analysis.

Atlantic Richfield (AR), Butte Silver Bow (BSB) and their designee(s) are the primary Data Collectors for solid media, surface and ground water within the Site. Other parties, such as the Agencies (EPA and DEQ), and other governmental Agencies (i.e., Montana Bureau of Mines and Geology [MBMG], United States Geological Survey [USGS]) may occasionally act as Data Collectors and data collected within the site may be incorporated into the database.

In addition to field samples, Data Collectors will also collect field data (vegetation observations, sample numbers, pH, temperature, date/time sampled, etc.) as defined in the applicable QAPP or work plan. Data collectors will provide this data to the Database Coordinator for input into the database in a format determined by the Database Coordinator in consultation with the data collectors. These formats will be determined on an individual basis based on the type of data, and as such, example formats for all types of data are not provided. Part of these formats will include a confirmation that the data was collected following the correct standardized procedure. Once laboratory and field data from samples have been imported into the Database, the Data Collectors may be asked by the Database Coordinator to verify or check the accuracy of the imported data relative to date, time, station sampled, etc. Data Collectors may also be asked to evaluate data quality by statistical comparison of split and duplicate samples.

2.1.2   Data Producers

Data producers consist primarily of analytical laboratories that analyze field samples for various chemical and physical properties and field conditions. Data producers will perform analyses according to the appropriate test methods and standards identified by the applicable QAPP, work plan or laboratory services request, including appropriate internal QA/QC, per the instructions of the Data Collector on the chain-of-custody forms. Data Producers will provide analytical data to AR, BSB or its designee(s) (usually Data Collectors).

2.1.3   Database Coordinators

The Database Coordinators will be the individual(s) responsible for developing, operating, and maintaining the database(s). The Database Coordinator will: receive the data from Data Collectors; provide appropriate QA/QC to verify that the submitted data was collected according to the specified Work Plan or QAPP; ensure that data was accurately incorporated into the database; maintain the database system; and be available to provide hardcopy output to the Data Users, upon request. Once data are imported into the database, only the Database Coordinator can perform edits to the datasets. This restricted access is necessary so the Database Coordinator can maintain metadata documentation and eliminate redundancy within the database while also maintaining the integrity of the data.

As part of the duties of operating and maintaining the database, the Database Coordinator shall develop specific procedures, forms, and systems for accurate import and export of data. For instance, the Database Coordinator shall work with Data Collectors or Data Producers to identify appropriate formats and procedures for receiving data into the system. Part of these formats will include a confirmation that the data was collected following the correct standardized procedure. This may mean that Data Producers supply laboratory data in standard, approved electronic data deliverables (EDD). The Database Coordinator shall verify the accurate import of data supplied by Data Collectors and Data Producers. This shall include working with Data Collectors/Producers to perform appropriate QA and input of appropriate supplemental information (e.g., metadata) to document and describe the receipt and handling of the data. The Database Coordinator will also develop standard request forms or procedures by which Data Users may request data to be exported from the database.

2.1.4   Server Administrators

The Server Administrators are responsible for the setup, development, and maintenance of the hardware and software needed to run the various component databases. The Server Administrator configures the hardware server and installs all applications. This position is also responsible for all data backups, the restoration of data (if necessary), updates to the server, power consumption, internet connectivity, and internet speeds. The creation and editing of user groups as well as individual access permissions to the portal are performed by this position.

2.1.5   Data Users

Data Users include AR, BSB, various governmental agencies (EPA and DEQ), and consultants and subcontractors of AR and BSB or these governmental agencies. Data Users, as a result of evaluation of exported data, may generate additional data for inclusion in the database. For example, points, lines or polygons depicting areas requiring additional maintenance or reclamation may be identified by evaluation of existing reclamation areas and surface soil metal concentrations as outlined in the Solid Media Management Program Plan (Atlantic Richfield, 2018). In this case, this spatial data would be appropriately imported into the component database. The Database Coordinator will perform the review and import of data derived from Data Users.

3.0   Data Acquisition, Types and Sources

Data collected at the Site typically fits into three general categories: pre-design data, construction data, and M&M data. Within those categories, the data consists of the following kinds of data:

- Field Data: including field measurements, photographs, field book notes, sampling logs, survey data, and data from observation forms.

- Analytical Laboratory Data: includes chain of custody copies, validation documentation, laboratory quality control information, electronic data deliverables, analytical chemistry data, units, and quality control sample results from laboratories.

- Other types of data: Documents, aerial photos, correspondence, transmittal letters for reports and maps, and as-built engineering drawings.

All of the data consists of either spatial or non-spatial data. Spatial data are data that identify the geographic location of features, boundaries, or structures on the Earth. Non-spatial data consists of site photos, qualitative summaries of observed conditions, ancillary .PDF diagrams, and engineering as-built diagrams. This non-spatial data is linked to the spatial data by site location/station identifications (IDs) or by referencing coordinates found in both data sets.

3.1   Data Acquisition

Sample collection and analysis are the genesis of data management. Thus, it is important that these two activities are performed correctly in accordance with standard sampling and analysis procedures. Additionally, validating that the data are of acceptable quality is equally important to Data Users, as an evaluation is only as good as the data used to perform that evaluation. Collection, analysis and validation of data are performed in accordance with the *Butte Area NPL Site, Butte Priority Soils Operable Unit (BPSOU) Final Quality Management Plan (QMP)* (AR, 2020a) and the project specific QAPPs, Sampling and Analysis Plans (SAPs) and/or monitoring plans.

3.2   Data Categories and Types

The input of data will vary depending on the type of data to be entered. Each of the component databases contains different categories and parameters of information in various forms or formats.

Personal Protected Information (PPI) such as blood lead data is stored in a stand-alone database managed by the Butte Silver Bow County Health Department. Requests for this data must go through the Health Department and any data that is shared has the personal identifying information removed. Since PPI data is governed by additional rules and managed as a separate database this data and database is not discussed in this document.

3.2.1   Data Categories

Generally, data will fall into one of the following three categories: field data, analytical laboratory data, and other types of data. Explanations of each category are as follows.

- Field Data includes field measurements, photographs, field book notes, sampling logs, survey data and data from observation forms. For this type of data, the data collector is responsible for submitting the information to the data coordinator in the appropriate format (defined by the administrator or coordinator).

- Analytical Laboratory Data includes chemistry data from laboratories. Laboratory analytical data will be transmitted from subcontractors to the Database Coordinator via email distribution, a compact disk (CD), digital video disk (DVD), or file transfer protocol (FTP). This will facilitate the subsequent QA/QC and analysis of these data while avoiding transcription errors that may occur with computer data entry. Data validation and all appropriate flags and labels will be added to electronic and paper transmissions.

- Other types of data may include documents, photos, correspondence and transmittal letters for reports and maps and as built engineering drawings. These types of data shall be submitted electronically where possible using file types such as (but not limited to) .xlsx, .docx, .pdf, .jpg, .tif, etc.

3.2.2   Data Types

Data included in the above categories will comprise spatial, non-spatial or image data. These data types must be received in one of the supported formats identified by the Database Coordinator.

- Spatial data consists of features that can be represented by a point, line or polygon. These features must be in a frame that is georeferenced (has a known coordinate system). Spatial data sent to the Database Coordinator must be in the Montana State Plane North American Datum 83 (NAD83) (feet) for horizontal projection and datum and North American Vertical Datum 88 (NADV88) (feet) for vertical projection and datum.

- Non-spatial data, such as tabular data, includes analytical data, field observations or other information. This data must also include the location of the data by referencing coordinates or station locations (such as a GW-1, a groundwater well at a specific and permanent location) with coordinates identified in other data sets.

- Image data includes such items as monitoring and maintenance photographs or aerial photographs. Geo-reference information must also be included with image data, (such as photo location, direction of picture) as well as time and date that photograph was taken and a general description of the photograph. Aerial photographs must have a projection specified in which they were taken as well as time, date and altitude.

3.3   Component Databases and Data Sources

This section serves to provide an understanding of the existing component databases. It is anticipated that existing component databases will be maintained into the future. Although it is likely that there will be efforts to reformat component databases to more efficiently manage data and to facilitate retrieval of data through the web portal, no creation of new databases for management of existing data or that collected in the future is expected. Existing component databases include:

- Water Databases;

- Continuous Data Database;

- Geographical Information Databases;

- Reclamation Database;

- Residential Metals Abatement Program Database; and the

- BPSOU General Soils Database.

The division of component databases has been determined by media. It is not anticipated that the component databases will be combined into one database since the benefit of doing so is limited. Each database can be related to the others by key data fields (location coordinates, geographic names, individual analytes, etc.). However, the relationships between the different media are primarily geographical. The most effective way to integrate and evaluate the relationships between data of different mediums is through use of Environmental Systems Research Institute (ESRI) software products including ArcMap, or other ArcView/ArcInfo software product, Geographic Information System (GIS) tools and the custom web-based portal. The component databases are described in the following subsections.

There are several ongoing monitoring projects that act as continuing data sources within the BPSOU. In addition, several new data sources are anticipated as work on the site progresses. These data will be stored via the appropriate existing component databases described below and will be maintained and operated within the guidelines of this DMP.

3.3.1   Water Databases and Sources

3.3.1.1   AR Water Databases and Sources

The Water Database contains the surface water and groundwater data collected within the BPSOU beginning mid-1998. The Water Database utilizes SQL Server software and is often referred to as the Butte Data Management System or BDMS. The water database includes data from studies and reports including Lower Area One (LAO) Phase II Monitoring activities, LAO and Butte Reduction Works (BRW) Lagoon Demonstration Project data and Interim Surface Water Monitoring Plan (base flow and storm flow) data. Additionally, significant quantities of surface and groundwater data available for the period before 1998 have been included in the Water Database. Parameters included in the Water Database generally include field and laboratory results from surface normal flow conditions and wet weather conditions, Butte treatment lagoon facility influent and effluent, and groundwater. Some public data, generated primarily by government agencies including the U.S. Geological Survey are included in the water database, and the continuous component of this is being migrated over to the continuous data database. In addition, database parameters include groundwater monitoring well construction details and groundwater elevation readings.

Surface Water Sampling

AR has collected extensive surface water monitoring data within the BPSOU since 1998. This surface water monitoring data are described under three groupings - general monitoring, diagnostic monitoring and project specific monitoring. General monitoring covers data collected under the AR prepared post-Record of Decision (ROD) interim surface water monitoring plan entitled *Draft Interim Surface Water Monitoring Plan* (AR, 2007). There have been numerous updates to this plan – the latest being the Draft BPSOU Surface Water Monitoring QAPP 2021 Monitoring Period (AR, 2021). Diagnostic monitoring describes data collected under the various diagnostic monitoring plans, the *Addendum 1: Butte Hill Diagnostic Surface Water Monitoring Plan* (Atlantic Richfield, 2013) and most recently the Draft *BPSOU Surface Water Monitoring QAPP* (Atlantic Richfield, 2021). The diagnostic monitoring covers diagnostic wet weather, expanded analyses of wet weather samples, opportunistic surface water and sediment monitoring, wet weather pH sampling, and ambient particulate monitoring. Project specific monitoring includes more focused studies that are diagnostic in nature and have occurred over the years. Additionally, water quality

and daily average flow data for the Montana Pole Plant discharge to SBC is collected by the Montana Pole Plant and provided to AR.

Ground Water

AR has collected extensive ground water monitoring data within the BPSOU since 1998. EPA, in consultation with DEQ, created a post-ROD interim ground water monitoring plan entitled *Final BPSOU Comprehensive Monitoring Plan* (EPA, 2007) and revised the plan in 2011 and retitled *Revised Interim Groundwater Monitoring Plan* (EPA, 2011). AR has collected groundwater data according to these interim monitoring plans since 2007, with verbally agreed upon modifications documented in a letter to the agencies entitled *BPSOU Water Quality and Water Level Monitoring Network Coordination* (Atlantic Richfield, 2015). AR is currently collecting groundwater data according to the BPSOU Groundwater Monitoring QAPP (Atlantic Richfield, 2021).

Butte Treatment Lagoon

The Butte Treatment Lagoon (BTL) Treatability Study is ongoing. The ROD identifies that groundwater treatment via the treatment lagoons will continue to document operational success or failure. The system currently treats groundwater from the West Camp bedrock system, and alluvial groundwater collected in the Hydraulic Control Channel and uSBC sub-drain. AR started collecting data with the initial operation of the Demonstration Lagoons in 1998 and has continued to date.

Upper Silver Bow Creek

The uSBC Loading Study is an ongoing investigation required by the ROD, it will be continued as an operational measurement under the long-term groundwater management of the Butte NPL site.

3.3.1.2   BSB Water Databases and Sources

The BSB private well database currently contains the well data for wells within the Controlled Groundwater Area and is currently maintained utilizing MS Excel software. BSB tests water for heavy metals or other identified contaminants to ensure the water is safe to drink. This testing can occur on an annual basis. This database is planned to be migrated to SQL Server in the future.

3.3.2   Continuous Data Database and Sources

The Continuous Data Database is a separation of the voluminous tabular-based data that was once stored in the largely parameter-based (pivot-like) Water Database to more efficiently store/retrieve data supportive of the Water Database. This database contains millions of transducer data records. Data includes surface water flow and stage, ground water levels, and precipitation data. Additionally, summarized Supervisory Control and Data Acquisition (SCADA) data associated with the Butte Treatment Lagoons is carried in the continuous data database. This database is maintained by AR.

3.3.3   Geographical Information Databases and Sources

AR and BSB each maintain their own geographic information systems. These databases consist of geographical information not otherwise contained within the other database subsets. They primarily consist of GIS data (those data with spatial coordinate components) including points, lines, and polygons delineating boundaries of sites, areas, sub-areas, etc.; building location and dimension data, hydraulic feature locations, storm sewer locations, topographic data, street and road location and name data, ortho-corrected aerial photography and other map-type information, as appropriate. Database structures are not anticipated to change significantly as a result of collection of additional data. BSB will maintain the authoritative database with periodic updates provided to BSB from AR of data collected by AR.

3.3.4   Reclamation Database and Sources

Butte Reclamation Evaluation System (BRES) is an evaluation methodology developed for the BPSOU by the EPA and is detailed in the Final Draft BRES (EPA, 2006). BRES data collection and management was initiated in 2007. BRES data are used specifically to evaluate and maintain cap integrity. This database is currently stored as a combination of Microsoft SharePoint and ESRI ArcGIS online tools and maintained by BSB.

The Reclamation Database consists of 178 reclaimed Source Areas within the BPSOU, sites commonly referred to as BRES Sites, which have been divided among four geographic quadrants of the operable unit. Each quadrant contains a similar acreage of BRES Sites. The sites falling into a particular quadrant are then independently evaluated by a consulting evaluation team, typically the Clark Fork Watershed Education Program (CFWEP).

3.3.5   Residential Metals Abatement Program (RMAP) Database

The Long-term RMAP database was Microsoft Access based which was housed and maintained by BSB. The RMAP database has been transferred to a SQL Server based system that is currently housed by AR and maintained by BSB. This database contains records of all sampling data conducted for all media under the RMAP, including yard soils, attic dust, indoor dust and basement soils within the BPSOU and the city of Butte.

RMAP program covers the analysis and abatement of properties where COCs are present above human health action levels in BPSOU and the city of Butte. Sampling is conducted for yard soils, attic dust, indoor dust, and basement soils within BPSOU. Within the Greater-Butte area attic dust and indoor dust are sampled. The public is provided access to the RMAP program services through public outreach. Sampling occurs once the RMAP Program receives a sample request form and permission to enter the property. The samples are collected according to the appropriate RMAP QAPP. The RMAP program requires AR/BSB to provide service to all of the properties in the BPSOU where the property owner approves access and any property owner in the greater Butte area that wish to participate in the program. This database is currently housed in a SQL Server environment with a web facing front end. As this database evolves, the current state of the database will be captured as part of this documents annual review process.

The long-term database includes at a minimum:

- Property Status – Ability to maintain a record that documents the status of every property within the BPSOU boundary as it goes through the RMAP process and those properties outside the boundary where the owner has volunteered to participate in the RMAP process.
- Outreach – Ability to document communications between property owners and AR, BSB, and EPA. This record should include communications initiated by either the property owner or AR, BSB, and/or EPA.
- Property Access – Ability to track current and historic access to properties so it is clear what properties are available for sampling or abatement work and so property owners' determination about access to their properties are respected.
- Program Status – To summarize, at any point, the status of the RMAP process regarding property access and property status.
- DSRs – Ability to automate production of the tables necessary to prepare DSRs.
- Human Health Risk Assessment (HHRA) Reports – Ability to provide risk assessment teams with laboratory data for their analysis work and query data and export it into an un-cross tabbed Excel file format that matches the needs of the risk assessors.
- Homeowner Letters Table – Ability to produce a table of sampling results that shall be sent to homeowners with a letter describing the results.

- Construction Completion Reports (CCR) – Ability to query for properties that require a CCR and produce summary tables and photographs that shall be include in the CCR.
- Sensitive Population Indicator - Ability to track properties where sensitive citizens reside within the RMAP database providing a means to track which properties will require, or have required prioritization in the program.

3.3.6   BPSOU General Soils Database and Sources

This database currently contains the soils data used for characterization of solid media in the BPSOU Remedial Investigation (RI) Report and other soils data that do not fit in one of the other component databases and is currently maintained in the Geocortex system. It contains data from 21 separate data sources. These include solid media data from sampling of residential yards, mine waste areas and other potential source areas, railroad bed areas, stream sediments and cover soil sources. Data fields within the soils database generally include data source/study, date, location/coordinates, sample interval and analyte concentration. Analyte concentrations are included for the primary COCs including arsenic, cadmium, copper, lead, mercury and zinc. Other COCs have been analyzed during the various sampling and analytical events. These other COCs may be added to the soils database in the future, as required. Additional soil data may be collected as part of future response/remedial actions and it may be necessary to add data to the soils database. This database is currently maintained by AR in Geocortex and in a GIS database for BSB. Future plans for these systems are to merge them into a single geodatabase maintained by BSB.

3.3.7   Existing Data

AR and BSB collects the majority of the data needed for the various projects on the BPSOU site. However, third party data sets generated by other entities such as the US Geological Survey (USGS), the Montana Bureau of Mines and Geology (MBMG) and agencies such as the EPA and the Montana DEQ may provide information and data useful at the Site. Any such data collected in the future will be stored in the appropriate component database(s).

4.0   Data Storage and Management

This section describes the Data Management System for the Site. The system consists of the following components:

- Computer hardware;
- Computer software;
- Data and database access and security;
- Data imports and storage;
- Metadata;
- Data redundancy and backup;
- Library; and
- Data exports and reports.

4.1   Computer Hardware

It is anticipated that the component databases of the BPSOU Database System will be stored and operated on domain-controlled networked computers. Because of the large volume of project data, or potential for, and the need to manipulate and evaluate that data, the personal computer will require both large fixed (hard or solid-state drive) storage and random access memory (RAM).

Additionally, the computers should have the capability to both read and write to a Universal Serial Bus (USB), CD and/or DVD ROM drive, or have a CD/DVD writer plug in. This will allow the retrieval of very large files (e.g., aerial photographs) or other files that are not routinely used and not stored on the local fixed storage drive. Being able to write to USB, CD and/or DVD will also enable efficient export of data.

4.2   Computer Software

The AR component databases accessed through a custom web portal and/or through the web based Geocortex Essentials are being used to facilitate efficient data management. For this reason, software packages used in the process of data management can be broken out into the three following user categories: Developer Software, Operator Software, and Data User Software. BSB provides many of their data sets as downloadable PDF maps from their website. The below list of software under each category is meant to be representative and not inclusive of all software that could be used for data management.

1) Developer Software:

- Microsoft SQL Server;

- Microsoft SQL Server Integration Services (SIS);

- Google Chart API;

- Google Maps API;

- Google Chrome;

- Microsoft .NET Framework;

- Microsoft Internet Information Services (IIS);

- Microsoft Windows Server;

- AmCharts JavaScript Framework;

- Bootstrap CSS Framework; and

- Query JavaScript Framework.

2) Operator Software:

- Microsoft SQL Server;

- Microsoft SQL Server Integration Services (SIS);

- Microsoft Access;

- Microsoft Excel;

- Microsoft SharePoint;

- Microsoft Word;

- Microsoft Azure services:

- Adobe .pdf;

- Bluebeam .pdf

- ESRI ArcGIS Server;

- Geocortex Essentials;

- ESRI ArcGIS ArcMap;

- ESRI ArcGIS Online; and

- Field Maps/Survey 123 for ArcGIS.

3) Data User Software:

- Google Chrome;

- Microsoft Access; and

- Microsoft Excel.

The Geocortex is a computer-based tool for mapping and analyzing information and events that are associated with a specific location (spatial data). The way maps and other data have been stored or filed as layers of information in a GIS makes it possible to perform complex analyses. GIS technology integrates common database operations such as queries and statistical analyses with the unique visualization and geographic analysis benefits offered by the graphical interface (maps). This simple but extremely powerful and versatile concept has proven to be a valuable tool for performing analyses and producing graphics that convey the results of analyses to decision-makers.

The AR custom web portal builds on the AR component databases to provide an easy to use interface for data retrieval. The web portal allows a user to easily perform the basic tasks of sorting and searching the database. In addition, the web portal has simplified the more complex queries into easily read series of graphs that can be customized to show and analyze multiple aspects of the data at once for a specific area or broader areas.

4.3   Data and Database Access and Security

This section describes the procedures for access to and security of the component databases including the protection of data to ensure that data are not lost or modified without proper authority. Access to the data and component databases will be controlled by database administrators pursuant to this Data Management Plan. Unauthorized personnel will not be allowed to access the database system and import and export of data will only occur through a database administrator.

Component databases will be maintained on a computer system located such that public or unauthorized access to the computer is not possible. Local computer system will be located in a secure facility capable of being locked when not attended, online server systems comply with Microsoft's server farm security protocols. Additionally, access to the databases will be controlled by domain-enforced user access with password so that only authorized personnel with knowledge of the password can enter the system.

Access to the database can be made available to approved users by request and approval of the appropriate manager. In addition to the physical access to component databases, copies of the databases may be provided to approved users as needed.

4.4   Data Imports and Storage

Specific procedures have been and continue to be developed to import data. In the case of new data sources, the database coordinator may work with the data collectors or data producers to identify appropriate formats and procedures for receiving data. Typically, this includes transfer of data via electronic format to minimize potential transcription errors. In the case of laboratory data, data producers shall supply standard, approved electronic data distribution files or other specified form. For other data, data integration tools may be used to pre-process, convert and import data from the data collectors and data producers to component databases.

Data are reviewed for completeness (based upon a QAPP, SAP or monitoring plan that identifies data to be collected) and visible errors, and then the data are imported into the appropriate database. If data received

from data collectors or producers is incomplete or appears to be erroneous, the data coordinator will contact the appropriate data collector(s)/producer prior to import into a database. Once resolved, the data are imported into the appropriate database.

The database coordinator will verify the accurate import of data and indicate if the data are provisional or final within the database. The coordinator will generate a report for review by data collectors and/or other project personnel to ensure that data was imported properly and that the data are accurate. Any problems with the data will be brought to the attention of the coordinator and resolved. Revisions to data will be made carefully and documented clearly.

4.4.1   Water/Continuous Data

Substantial quantities of surface/storm water monitoring data have been imported to the water database. The data includes both field and laboratory data such as stage, flow, pH, conductivity and concentrations of dissolved and total recoverable metals. Surface/storm water data will continue to be imported to the water database as it is available. Transducer data and meteorological data are imported to the continuous data database.

Ground water monitoring data includes field and laboratory data such as water level, pH, water temperature, conductivity, ORP, and dissolved oxygen, method for development, and concentrations of dissolved metals and includes monitoring for well development as new wells are added to the monitoring well network. Spatial survey data and well log information is carried in the Water Database. Additionally, links to well log source files in the MBMG Ground Water Information Center (GWIC) online database are accessed through the BPSOU Geocortex Essentials viewer and transducer data are imported to the continuous data database.

The BTL operations data collection is ongoing. The data includes both field and laboratory data such as flow, water temperature, pH, conductivity, and concentrations of dissolved (upon request) and total recoverable metals. Operations data will continue to be imported to the Water Database as it is available. BTL hourly summarized SCADA data are imported to the continuous data database.

The data includes both field and laboratory data, such as flow, pH, temperature, specific conductance, and concentrations of dissolved and total recoverable metals, nitrate/nitrite, and sulfate. uSBC Loading Study Sampling results are reported in the uSBC Loading Study Data Summary Report (DSR) and are currently stored in an Access database but in the future will be stored in a SQL Server database.

4.4.2   Butte Reclamation Evaluation System Data

Collection of reclamation data including O&M data and site evaluation data are ongoing. Many source areas, identified as a result of soil data collected and stored in the soils database, have been reclaimed. Descriptions of the reclamation, subsequent annual evaluations of that reclamation, and maintenance activities are stored within the BRES database. Additional reclamation data collected in the future will be incorporated into the BRES database as it becomes available. BSB is responsible for administering and maintaining the BRES database.

4.4.3   Residential Metals Abatement Program

All abatement activities conducted on a property are recorded in the RMAP database using a project description and abatement code. A completion statement is signed by the property owner and RMAP staff upon successful completion. A Residential Access Agreement for each property abated is recorded and filed with the BSB Land Records office as an attachment to the deed of the property. Copies are then provided to the owner of record. Hard files and digital records of abated properties are kept for future reference.

4.4.4   BPSOU General Soils Database

Collection of soil data are typically not an on-going activity but rather a short-term monitoring/sampling event associated with specific reclamation projects or to delineate reclamation projects. Data will be incorporated into the soils database as it becomes available.

4.4.5   Existing Data

Some third-party data not collected by AR and BSB such as the USGS surface water data and GWIC groundwater data are currently being stored in the various component databases as described in the previous sections. Any additional data not collected by AR and BSB that needs to be stored in one of the component databases will be reviewed by the Database Coordinator in accordance with the Silver Bow Creek/Butte Area NPL Site Final BPSOU Existing Data QAPP (Atlantic Richfield, 2020b) for accuracy who will determine which component database is appropriate for the storage and maintenance of the data.

4.5   Metadata

Metadata (information about data) identifies who, what, when, where and why information about data. Appropriate metadata that will meet the requirements of the Federal Geographic Data Committee (FGDC) and those set forth in EPA Region 8 GIS Standards will be included with all GIS data information and any other data for which it is appropriate, as determined by the database administrator and/or data coordinator. Metadata will be entered, and updated, as appropriate through metadata files created and linked to the databases. Appendix A lists the types of metadata which should be attached to incoming data sets.

4.6   Data Redundancy and Backup

Regular backup of component databases shall be performed to provide security against damage or loss of data. Data shall be backed up electronically using hard-disk storage, on a daily basis. Daily backups will be retained for a minimum of two weeks, weekly backups for two months, monthly backups for one year and yearly backups for 5 years. Long-term storage (greater than one year) may be transferred to optical disk (CD/DVD/Blu-Ray), or other viable technology and stored in a secure location. At the discretion of a database administrator/data coordinator, additional backups may be performed after large quantities of data are imported or after significant manipulation or evaluation of the data in the database. Additionally, backup copies, copied bi-weekly or after large additions of data shall be maintained at another location than the component database. These offsite copies will only contain the latest backup and will be used in the case of irreparable damage to core systems.

As portions of the site become inactive through closure or deletion, or certain portions of the site move into different phases of the work (i.e., from remedial design to monitoring and maintenance), pre- construction and construction data may be archived to make the database less cumbersome and avoid possible confusion of data points. Where deemed appropriate (by AR, BSB and/or Agencies), such data would be available, however not as readily accessible.

4.7   Document Repository

Digital and some hard copies of documents created by AR, BSB, EPA, DEQ, Contractors, and other entities, (i.e. DSRs, Remedial Action Work Plan's [RAWP's], Feasibility Studies, etc.) are stored in the BPSOU Document SharePoint Site. Each document is assigned a unique code. Backups of the documents contained in the BPSOU Document SharePoint can be found in AR's internal SharePoint site and EPA's document repository.

4.8   Data Export

It is anticipated that regulators, designers, construction and maintenance personnel will request information from the component databases periodically. Commonly requested data will be accessible and retrievable through the custom web portal and/or through the web based Geocortex Essentials.

For specific data needs not met through the web data portal, a written request can be submitted to the Database Coordinator(s). Requests must include the following information at a minimum:

- Name of requestor;

- Date of request;

- Data requested;

- Form of requested data (electronic spreadsheet or map;) and

- Summary of use (this will help get all of the necessary information needed.)

To the extent possible, requests for data will be fulfilled as soon as possible but within two weeks of receiving the request. If the request will take longer, the requesting party will be notified accordingly. Data will only be made available after it has been deemed to be accurate for distribution.

Data will be provided electronically via CD or other similar media, secure FTP site or e-mail. Data will be provided in spreadsheet or other appropriate format as it exists in the component database. If data are requested in the form of a map it will be provided as a GIS figure. Electronic maps will typically be provided only as .pdf files so that they cannot be modified. Data, layers, themes and source files used to create maps can be provided if approved by the Project Manager.

4.9   Data Reports

Data reporting will occur on both a routine basis and by request and are identified in site specific QAPPs and Monitoring Plans. Data will be generated from the various databases in support of reports as required in the various superfund plans.

Request for reports should be made to the appropriate Project Manager, who, upon agreement with the request, will pass the request on to the appropriate Database Coordinator. At that time, the coordinator will compile the appropriate data and will work with appropriate data collectors and producers and other project personnel to prepare the report. All such reports will be submitted in draft form for Project Manager review, comment and approval prior to submittal to the requestor.

5.0   Public Data Sharing Plan

The primary method of disseminating the data collected for BPSOU is through the web base data portal and the Geocortex. Currently there is no public access to these tools but as the tools are further developed access could be made available upon request with approval from AR, BSB and the Agencies. Once available, information can be retrieved from the system and could provide owners and other interested parties with limited information regarding remedial activities, land use restrictions, and maintenance requirements related to a given property. The account would be read-only so the data cannot be edited. As these tools are expanded their capabilities and access requirements will be revised in this section in future annual review updates of this document.

6.0   References

Atlantic Richfield, 2013. Addendum 1: Butte Hill Diagnostic Surface Water Monitoring Plan. Atlantic Richfield, 2013.

Atlantic Richfield, 2015. Silver Bow Creek/Butte Area NPL Site Butte Priority Soils Operable Unit Water Quality and Water Level Monitoring Network Coordination, Atlantic Richfield, 2015.

Atlantic Richfield 2018, Butte Area NPL Site, Butte Priority Soils Operable Unit (BPSOU), Draft Final Solid Media Management Program Plan. Atlantic Richfield, October 2018.

Atlantic Richfield, 2020a, Butte Area NPL Site, Butte Priority Soils Operable Unit (BPSOU), Draft Final Quality Management Plan (QMP), Atlantic Richfield, April, 2020.

Atlantic Richfield, 2020b, Silver Bow Creek/Butte Area NPL Site Final Butte Priority Soils Operable Unit Existing Data Quality Assurance Project Plan, Atlantic Richfield, October 2020.

Atlantic Richfield, 2021a. Silver Bow Creek/Butte Area NPL Site Butte Priority Soils Operable Unit Surface Water Monitoring Quality Assurance Project Plan, Atlantic Richfield 2021.

Atlantic Richfield, 2021b. Silver Bow Creek/Butte Area NPL Site Butte Priority Soils Operable Unit Groundwater Monitoring Quality Assurance Project Plan, Atlantic Richfield 2021.

EPA 2006, Final Draft Butte Reclamation Evaluation System (BRES) Butte Priority Soils Operable Unit Silver Bow Creek./Butte Area NPL Site Butte, Montana, prepared for the U.S. Environmental Protection Agency by CDM, March 2006

EPA, 2007. Butte Priority Soils Operable Unit Comprehensive Monitoring Plan, Environmental Protection Agency, 2007.

EPA, 2011. Butte Priority Soils Operable Unit Revised Interim Groundwater Monitoring Plan, Environmental Protection Agency, 2011.

APPENDIX A

Data Source Documentation

Appendix   A
Data Source Documentation

- **Description of the Data Source** [Type of data collected, period, location]

- **Data Quality Objective for Collecting Data** [Purpose for collecting data]

- **Supporting Documents** [Documents used to support data collection or management. SAP, QAPP, DMP, Quality Procedures, etc.]

- **Collected By** [Who is in charge of what activities to collect or maintain data]

- **Data Management Documentation:**

  - **Description of Data** [types of data collected, what it was analyzed for, whether it was validate, any know errors or issues with the data]

  - **Data Collection Methodology** [How data was collected – i.e. Scribe, GPS Unit, Lab EDD, iPhone camera. Information on data collection procedures]

  - **Datum** [NAD 83, NAD 27, NAVD88 etc.]

  - **Data Repository Description** [Description of the format the data is being stored and backed up – i.e. MS Access database stored on backed up PRP networked server]

  - **Minimum Data Requirements/Valid Values** [Information pertaining to how the data are represented – i.e. data dictionaries]

  - **Quality Control Activities** [Quality controls steps for compiling, managing and reporting data source. Should contain a description of the control step and role responsible for completion of step]

  - **Deliverables** [List of data deliverable associated with data sources including field books, field measurement forms, COCs, lab electronic copy, lab EDDs, database, document management systems]

  - **Protocol for Accessing Data** [Contact information and directions for requesting data]