Compliance Report
Groundwater Monitoring Requirements
40 CFR 257.90(b)(1)

Prepared for:
Colstrip Energy Limited Partnership
Rosebud Power Plant

Prepared by:
Bison Engineering Inc.
&
Allied Engineering Services, Inc.

Report Date:
October 17, 2017

Introduction

This document and the attached report[1] serve as fulfillment of the requirements found in 40 CFR 257.90(b)(1).

The Rosebud Power Plant is located in Rosebud County, Montana. The facility generates "Coal combustion residuals (CCR)"[2] and places CCR in a "CCR landfill"[3] post October 19, 2015. Therefore, the facility is subject to various provisions found in 40 CFR 257.50 – 107. This rule is generally referred to as the CCR rule.

[1] "Groundwater Monitoring and Action Plan", October 17, 2017.
[2] 40 CFR 257.53.
[3] Ibid.

Compliance Report

Among the requirements of the CCR rule include:

> *"(1) Existing CCR landfills and existing CCR surface impoundments. No later than October 17, 2017, the owner or operator of the CCR unit must be in compliance with the following groundwater monitoring requirements:*
>
> *(i) Install the groundwater monitoring system as required by §257.91;*
>
> *(ii) Develop the groundwater sampling and analysis program to include selection of the statistical procedures to be used for evaluating groundwater monitoring data as required by §257.93;*
>
> *(iii) Initiate the detection monitoring program to include obtaining a minimum of eight independent samples for each background and downgradient well as required by §257.94(b); and*
>
> *(iv) Begin evaluating the groundwater monitoring data for statistically significant increases over background levels for the constituents listed in appendix III of this part as required by §257.94."*
>
> [40 CFR 257.90(b)]

This report (and associated document) demonstrates the status and compliance with the requirements found above. The following is a summary of the status of those individual requirements:

Requirement:

> *(i) Install the groundwater monitoring system as required by §257.91;*

Status:

> The "groundwater monitoring system as required by §257.91" has been installed and operating. The monitoring system, per §257.91, consists of 5 wells. Three wells are down-gradient (OMW 1, OMW 7 and OMW 8). Two of the wells are up-gradient (OMW 5 and OMW 9).
>
> Information about the monitoring system and a discussion of the geology and various groundwater monitoring parameters is found in the attached document: "Groundwater Monitoring and Action Plan". The reader is referred to this document since the monitoring program and groundwater monitoring for this area does not fit well with the traditional concepts of an obvious up and down-gradient monitoring system.

Requirement:

> *(ii) Develop the groundwater sampling and analysis program to include selection of the statistical procedures to be used for evaluating groundwater monitoring data as required by §257.93;*

Status:

> The groundwater sampling program itself is more fully described in the attached document: "Groundwater Sampling and Statistical Analysis." The discussion is

found primarily in Section 2 through 8 of that document. The statistical analysis to be used for the program is found in Sections 9.

Requirement:

(iii) Initiate the detection monitoring program to include obtaining a minimum of eight independent samples for each background and downgradient well as required by §257.94(b); and

Status:

The groundwater sampling program was initiated in December 2016. The (initial) sampling program continued through September of 2017. A total of 10 independent samples were gathered from each of the sample wells.[4] That data is the subject of current and future analyses as more fully described in requirements (ii) and (iv).

Requirement:

(iv) Begin evaluating the groundwater monitoring data for statistically significant increases over background levels for the constituents listed in appendix III of this part as required by §257.94

Status:

An evaluation of the monitoring data has begun. Some of these analyses are discussed in Appendix A (Section 9) to this associated report. The data has been reviewed for 'normality' (transformed or otherwise). In some cases, the data supports the 'normal' hypothesis and as such parametric analyses will follow. In other cases (fluoride and pH, for example) the data does not appear to be 'normal' and thus non-parametric analyses will follow.

Summary

The CCR rule requires the facility to "*be in compliance with"* four specific requirements found in 40 CFR 257.90(b)(1) by October 17, 2017. Those four requirements include (paraphrased):

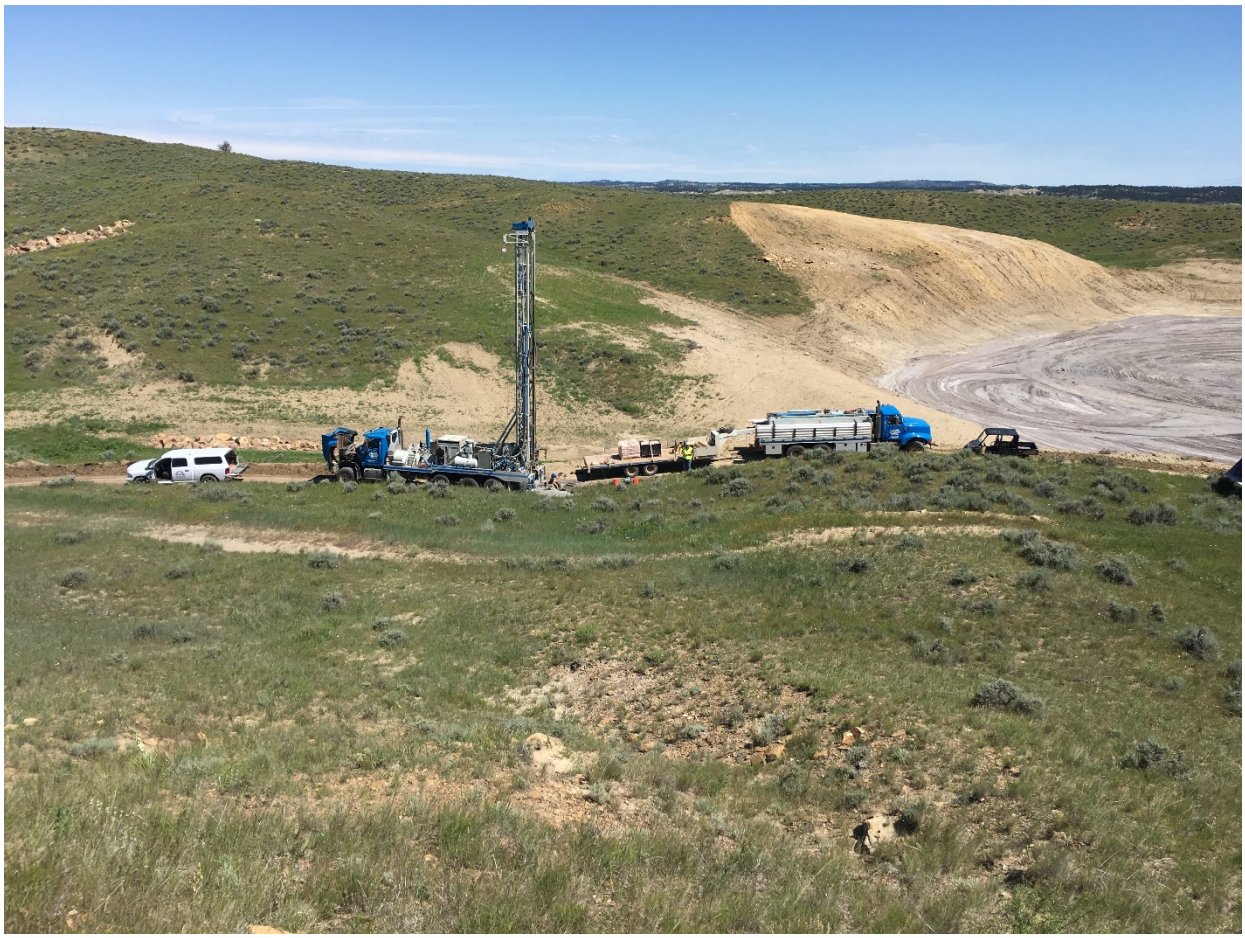
1. Install a groundwater system
2. Develop a sampling, analysis and statistical program
3. Initiate monitoring and collect at least 8 samples
4. Begin evaluating the monitoring data

The groundwater monitoring was installed, monitoring initiated and at least 8 samples gathered prior to October 17, 2017. The attached document "Groundwater Sampling and Statistical Analysis Plan" outlines the sampling, analysis and statistical program associated with the CCR rule. Finally, evaluation of the first round of CCR data has begun.

[4] No samples were collected from OMW 9 since the well was dry for all sample periods. Since it was known that OMW 9 was dry prior to December 2016, an additional well was installed earlier that year to fulfill the 'up-gradient' requirement. However, that well (OMW 10) was also, and continues, to be dry. See "Groundwater Monitoring and Action Plan" report for further information.

Therefore, this document and the associated attached report fulfills the "*be in compliance with"* requirement found in 40 CFR 257.90(b)(1).

Rosebud Power Plant
Groundwater Monitoring and Action Plan



Prepared for Rosebud Operating Services, Inc.
by Allied Engineering Services, Inc. and Bison Engineering, Inc.

October 17, 2017

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1.0 INTRODUCTION

This groundwater monitoring and action plan is for a CCR landfill located at the Rosebud Power Plant in Rosebud County, Montana. The landfill holds hydrated fly ash, which is solid and of low permeability to water, similar to concrete. Previous testing has indicated that the ash is not completely hydrated, thereby giving it the ability to assimilate more water that may come in contact with it. This characteristic further prevents water from percolating through the ash and continuing into the underlying natural formations and groundwater.

The project site is located approximately seven miles north of the town of Colstrip, Montana in the southwest quarter of Section 29, and the northwest quarter of Section 32, Township 3 North, Range 41 East (Latitude 45.978859°, Longitude -106.663772° (WGS 84)). The landfill serves an on-site Power Plant owned by Colstrip Energy Limited Partnership (CELP). The Power Plant and the landfill are operated by Rosebud Operating Services, Inc.

The landfill area covered by this plan is an active landfill located on the subject property. There is also a closed landfill, last used in October of 2005, that has since been reclaimed in general accordance with permits and regulations at the time. This closed landfill is not subject to regulation by current CCR rules and is not the subject of this plan. The active landfill includes Phase I and Phase II of a contiguous landfill permitted in 1997 and placed in service in October of 2005. This active landfill is subject to regulation by current Federal CCR rules.

Conventional environmental monitoring and analyses of landfills includes sampling and testing of up-gradient and down-gradient water from the "uppermost aquifer" under the site. Water quality of the up-gradient and down-gradient samples are then compared to evaluate the possibility of the contaminant transport from the landfill via groundwater. Although relatively shallow groundwater has been encountered beneath and around the Rosebud Power Plant Ash Landfill, the nature of the uppermost aquifer(s) are, transient, and discontinuous. As a result, the up-gradient and down-gradient samples are ill-defined. As a result, caution is needed in evaluating the water quality data since the typical comparison between up- and down-gradient wells is not necessarily appropriate.

In addition, the uppermost aquifer(s) in the local hydrogeologic regime are accumulated from localized surface infiltration of direct precipitation, snowmelt, and ephemeral streams, as is the case with a surface impoundment on a neighboring property that influences a downgradient monitoring well. Based on the data, and experience in similar conditions, these waters naturally accumulate soluble components of the local geologic materials which include shale, coal, and other marine and continental sedimentary rock and their derivatives including residual clays and alluvium/colluvium. These soluble components, including sulfate, calcium, and other analytes generally considered unfavorable for water quality, often increase with time in contact with the various geologic materials. These conditions result in a somewhat random array of groundwater quality under the site that does not appear related to the presence of the CCR landfill. This preliminary report presents the data and description of this condition, and our preliminary conclusions and recommendations relating to the use of the groundwater sampling and testing data.

2.0 BACKGROUND

Rosebud Power Plant is a waste coal burning facility using a fluidized bed combustor. During the burning process of the coal, bed and fly ash or combusted coal residuals (CCR) are produced. The CCR are either sold for commercial/industrial purposes or landfilled on-site near the power plant. The active landfill, consisting of two phases, is located northwest of the power plant.

In 1996, Chandler Geotechnical, Inc. (a predecessor to Allied Engineering Services, Inc.) was hired as a sub-consultant to JSM, Inc. to provide engineering analysis and design of the current active landfill (Phases 1 and 2). During the initial construction of Phase 1, the planned landfill footprint/area was reduced. Over the course of operations at the plant, ash was sold during some years; thus the amount of ash placed in the Phase 1 area was less than anticipated with the original design. These changes resulted in the need for minor modifications of the original design of the landfill area. Phase 2 modifications began in September of 2015 with simultaneous re-design and construction. Construction has been completed for Phase 2 of the active landfill in general conformance with the original 1996 design with modifications undertaken during construction under the direction of Allied Engineering Services, Inc.

The natural site topography is gently rolling to broken with natural slopes as steep as about 2H: 1 V. The climate is semi-arid with vegetation being primarily native grasses and sagebrush. The CCR landfill is generally a valley fill with buried pipe conveying the ephemeral flows under the landfill for the duration of landfill construction/use. After closure, surface perimeter drainage around the landfill will be established for long-term stability.

3.0 REGULATORY SETTING

As of April 17, 2015, new rules for coal combustion residuals (CCR) were published in the Federal Register Volume 80, Number 74, dated Friday April 17, 2015. The applicable sections include 40 CFR Parts 257 and 261. These rules spell out the conditions for existing operating CCR landfills such as the active landfill at the Rosebud Power Plant. The rules address closure planning, location restrictions, structural stability assessment requirements, groundwater monitoring requirements, surface water protection, design and operating criteria, along with inspection requirements. Included among the requirements is the preparation of an Annual Engineers Inspection Report. The first two reports were completed and posted to the CELP website in accordance with the CCR rule.

The power plant is currently operating under several permits that include protection criteria for air, surface water, and groundwater quality. Permits include:

- Montana Ground Water Pollution Control System (MGWPCS) Permit No. MTX000052
- Multi-Sector General Permit for Storm Water Discharges Associated with Industrial Activity. Permit No. MTR000058
- Air Quality Permit Nos. #2035-06 and OP2035-3
- CCR Rule 40 CFR Parts 257 and 261; as applicable

The applicable requirements of the current CCR rule cover active CCR landfills and exclude closed landfills.

The major milestones associated with the final closure of the CCR landfill include:

1. Regulatory timeframes associated with the CCR rule as well as several other permits that include protection criteria for air, surface water, and groundwater quality are as follows:
   - The CCR rule statutory implementation timeframes:
     - Recordkeeping, Notification, and Internet Requirements – Begin 10/19/15 (40 CFR Parts §257.105-107). Required recordkeeping, required notifications, and establishment of a public website has been initiated and maintained.
     - Air Criteria – Due 10/19/15 (40 CFR Part §257.80). Preparation of the fugitive dust control plan has been completed.
     - Weekly Inspections – Begin By 10/19/15 (40 CFR Part §257.84). Weekly inspections have been undertaken and will continue until final closure.
     - Annual Engineer's Inspection Reports – The first two reports were completed in January 2016 and 2017 respectively as required by 40 CFR Part §257.84. Annual inspections and report will continue until final closure.
     - Run-on Run-off Controls – Due 10/17/16. Initial run-on and run-off control system plan has been completed. Plans must be revised every 5 years (10/17/21).
     - Closure and Post-Closure – Due 10/17/16 (40 CFR Part §257.102) - Written closure and post-closure plans have been completed (10/17/16). Amendments can be made at any time with notification requirements.
     - Groundwater Monitoring and Action – Due 10/17/17 (40 CFR Part §257.102) - Install the groundwater monitoring system, develop the groundwater sampling and analysis program, initiate the detection monitoring program, and begin evaluating the groundwater monitoring data for statistically significant increase over background levels. The requirements under this section apply from the effective date through the post closure care period (7/1/2054).
     - Annual groundwater monitoring and action report. For existing CCR landfills and existing CCR surface impoundments, no later than January 31, 2018, and annually thereafter.
     - Location Restrictions – Due 10/17/2018 (40 CFR Part §257.64) – Completed. Location restrictions were addressed in the 1st Annual Engineers Inspection Report (January, 2016).

   - Montana Ground Water Pollution Control System (MGWPCS) Permit No. MTX000052. This operational permit included quarterly groundwater monitoring from January 16, 1989 until January 31, 1992 when the permit was modified to reduce sampling frequency to semi-annual monitoring.
   - Multi-Sector General Permit for Storm Water Discharges Associated with Industrial Activity. Permit No. MTR000058. This permit is valid until 12/31/20 and will be renewed every four years until the final stabilization of reclamation is attained (11/1/27). The Stormwater Pollution Prevention Plan (SWPPP) is scheduled to be evaluated at least every three years. Post closure care requirements of the CCR Rule will continue following termination of this authorization.
   - Air Quality Permit Nos. #2035-06 and OP2035-3. These operational permits for plant emissions includes the treatment of all unpaved portions of the haul roads, access roads, parking lots, or general plant area with water and/or chemical dust suppressant as necessary to maintain compliance with the reasonable precautions limitation (ARM 17.8.749). Termination of these permits are anticipated within one-year of plant closure. The Fugitive Dust requirements (available on the CELP website) in the CCR Rule will be followed.

This groundwater monitoring and action plan is the operational plan as outlined in 40 CFR Part §257.90 through §257.98. Most elements of this plan were implemented prior to the publishing of the CCR Rule on April 17, 2015 and July 2, 2015. The implementation of this plan will be documented in a groundwater monitoring and action report no later than January 31, 2018, and annually thereafter. The report will summarize key actions completed, describe any problems encountered, discuss actions to resolve the problems, and project key activities for the upcoming year.

4.0 REGIONAL GEOLOGY

The geology of the area is published by the Montana Bureau of Mines and Geology in Open-File Reports MBMG-428 (Geologic map of the Lame Deer 30' x 60' quadrangle, eastern Montana, revised 2007 by Vuke, S.M., Heffern, E.L., Bergantino, R.N., and Colton, R.B. (2007)). The site and the general Colstrip region are located within a large area of outcropping Fort Union Formation. The Fort Union Formation is Tertiary-aged sediments, roughly horizontal in this area and is composed of coal, shale, and sandstone. In general, the topography is cut into the bedrock with a mantle of residual and colluvial soils on the slopes and deposits of windblown and alluvial soils in the drainages. According to the geology map (Figure GE-1) the Lebo Member of the Fort Union Formation outcrops beneath the site, near the boundary of the overlying Tongue River Member of the Fort Union Formation.

Based on a summary from *Sedimentology of Coal and Coal-Bearing Sequences* by R.A. Ramani and other coal resource references, the Tongue River and Lebo Members of the Fort Union Formation record a history of paludal (swamp), fluvial-deltaic, and lacustrine sedimentation. Tongue River deltas filled the basin primarily from the eastern margin as they prograded into a lake (comprising the underlying Lebo Shale Member) which occupied the basin axis. Major streams entered the Fort Union coastal plain resulting in areas of broad interdeltaic coastal plain isolated from major sediment influx. Peat accumulation began in interdeltaic and interdistributary areas. Upon delta abandonment, peat swamps overspread the abandoned lobes. The result is a somewhat discontinuous combination of thick, interdeltaic coal seams bounded by discontinuous fluvial-deltaic, lacustrine, and much thinner paludal (coal) deposits.

Exposure of site geology in the landfill base excavation revealed discontinuous layers of weathered shale, siltstone, and coal dipping gently to the northeast, roughly coincident with the surface topography (i.e. dipping generally eastward roughly 5 degrees) with a discontinuous mantling of sandy and clayey colluvial and alluvial deposits.

5.0 SITE GEOLOGY

A moist area was encountered in the storm drain trench excavation near the southwest portion (up-gradient) of the CCR landfill. Test pit 5 was dug approximately 6 feet deep in the moist area to reveal a saturated coal seam under confining pressure. Additional test pit excavations up to approximately 18 feet deep were dug around the perimeter of the Phase II landfill area to assess the possibility of encountering additional groundwater. No other groundwater was encountered by the test pits or by the landfill base excavation.

The groundwater encountered by Test Pit 5 was generally observed to be in a coal seam with apparently limited extent, although some confining pressure was observed to be present. When left overnight, the water level would rise in the test pit and eventually spill. The water was a dark black color like coffee or tea. A water sample was obtained from the test pit and analyzed for both Appendix III and IV constituents

as called for by the CCR rules. The results of the water quality testing of this water are provided in Appendix B.

During construction, the test pit was pumped down when it rose to within a foot or so of the surface. Although the rate of filling slowed, the inflow continued for several sequences of pumping down and letting it refill.

Several possible means of dealing with this groundwater condition were considered, including daylighting a ground water drain into the storm drain pipe or backfilling the test pit to re-establish a hydraulic separation from the isolated aquifer and the overlying CCR landfill. Considering the relatively low water quality observed, and the lack of encountering groundwater in nearby test pits, the latter option was deemed more favorable and the test pit area was pumped down and then backfilled with native clay material and compacted to seal it off from the landfill. The design grade of the storm drain pipe was also raised as much as possible (approximately two feet) to allow additional separation with compacted clay between the apparent water level and the storm drain pipe trench. In addition, a 4-inch vertical PVC pipe was installed and screened in the storm drain pipe bedding approximately 250-feet downstream of the moist area just above a section where a trench plug was installed around the storm drain pipe. If seepage occurs into the gravel storm pipe bedding, it should accumulate above the plug and be detected by the vertical pipe, and it could be pumped down or drained into the storm drain pipe with weep holes if deemed appropriate.

The backfilled test pit/pipe bottom area remained dry and stable for the duration of the construction period (several months) and we believe the natural clay subgrade at the site including the clay backfilled test pit provide reasonable separation/liner from the hydrated ash landfill. This is particularly true since the hydrated ash is also of low permeability and has little potential for interacting significantly with the groundwater which in this case appears to be an isolated perched lens of groundwater with relatively poor quality.

6.0 HYDROGEOLOGY/GROUNDWATER MONITORING SYSTEM

The surface hydrology is characterized as ephemeral drainage basins draining to the east. The local topography influences the locations of significant infiltration in that well-drained ridges and steep slopes generally infiltrate less than flatter drainage bottoms and ephemeral streams that accumulate surface flow. Surface materials also influence infiltration in exposures of more permeable materials infiltrating more than exposures of low permeability materials. In any case, once infiltrated, the water moves vertically and horizontally in saturated and unsaturated flow conditions in response to the relative permeability and geologic dip of the local rock, which is generally about 5 degrees to the east.

Groundwater at the site is presently monitored using nine groundwater monitoring wells located throughout the project site as shown on Sheet G-0 (Appendix C). Historical data is available for wells OMW-1 thru OMW-6 from 1989. OMW-7 and OMW-8 were first sampled in 2002. OMW-9 was installed in 2011 and OMW-10 installed in 2016. OMW-3 and OMW-9 have been mostly dry during their lifetime. OMW-9, the intended up-gradient well located just upslope of the CCR Landfill, was drilled in late 2011 after one of the wettest years of record (approximately 25 inches of annual precipitation). The well was sampled and tested shortly after drilling, but has not had enough water to sample since. Therefore OMW-10 was constructed downgradient of OMW-9 near the upper boundary of the active landfill. However, OMW-10 has not produced water since.

Depths to groundwater in the on-site wells varies, with some wells having water at 8 feet and others with water at 80 to 100 feet deep. Many of these wells are completed in bedrock that are pressurized indicating confined aquifer characteristics. The hydrologic head varies between wells that exhibit confining conditions adding to the discontinuous nature of the underlying aquifers. The shallow groundwater observed in the on-site monitoring wells can be characterized as perched or confined water tables flowing intermittently and/or ephemerally in alluvial deposits or shallow coal seams bound by low permeability bedrock or weathered bedrock (clay). The regional water table, as indicated by nearby production wells, typically ranges from about 295 to 430 feet below natural ground. Regional groundwater flow direction appears to be northeasterly.

The uppermost aquifers appear to generally flow to the northeast following the geologic dip and the topography of surface drainage basins. The upper-most aquifer appears more continuous or perennial lower in the drainage basin in the vicinity of OMW-7 and OMW-8. The uppermost aquifer higher in the drainage basin in the vicinity of OMW-9 and OMW-10 is generally discontinuous and produces little, if any, water in the wells in most years.

On June 15, 2016, a new monitoring well OMW-10 and two borings were completed in an attempt to obtain an up-gradient groundwater monitoring site as well as collect additional down-gradient lithological data. Boring logs including lithology and completion details are provided in Appendix D.

Elevations of the observed uppermost groundwater in the monitoring wells are summarized in Figure 1 of Appendix B. While the uppermost aquifer elevation is discontinuous and does not follow surface topography exclusively, interpolated groundwater surfaces were developed based on the available well data. The interpolated groundwater surfaces are presented on Sheet G-1 thru G-6 along with two groundwater profiles cut roughly east-west and south-north through the site.

Based on the Montana Groundwater Information Center (GWIC) data, consistent (usable) groundwater is encountered in the site vicinity at depths of between 295 and 430 feet.

6.1 GROUNDWATER CHARACTERISTICS

As outlined earlier, the uppermost aquifer is discontinuous in nature and is influenced by precipitation and site hydrology. Estimates of groundwater characteristics are derived from lithological and monitoring well data along with laboratory data for hydraulic conductivity. The saturated and unsaturated lithology in the uppermost aquifer typically varies between sandy/gravelly clay to clay. The confining layers are typically clay. Well logs are included in Appendix D. A summary of groundwater characteristics are as follows:

- Saturated and unsaturated geologic units overlying the uppermost aquifer generally include alluvium/colluvium comprised of mixtures of clay, sand, and gravel. Fill material includes clayey soils as the bottom liner for the active CCR landfill.
- Groundwater gradients are relatively flat, were calculated between various wells, and average between 0.02-0.03 feet per foot.
- Groundwater flow direction is generally northeast to east and remains relatively constant over time.
- The uppermost aquifer thickness varies between wells and ranges between 3.0 feet to 15.5 feet and is seasonally thicker in the spring of each year.
- Hydraulic conductivities of soils underlying the active landfill vary between $2.1x10^{-07}$ cm/second and $4.5x10^{-08}$ cm/second.

- Porosity is estimated between 45%-55% for clayey substrate indicative of site soils
- Based on the hydraulic conductivity, gradient, and porosity of the uppermost aquifer at the active landfill, the average linear groundwater velocities are estimated between $1.26x10^{-08}$ meters/second and $2.7x10^{-09}$ meters/second.

6.2 APPLICABILITY AND COMPLIANCE WITH CCR RULES FOR GROUNDWATER MONITORING

As discussed above, hydrogeology in the upper-most aquifers appear to be variable and discontinuous at the site. As outlined in the CCR Rule 257.91, (*a) Performance standard. The owner or operator of a CCR unit must install a groundwater monitoring system that consists of a sufficient number of wells, installed at appropriate locations and depths, to yield groundwater samples from the uppermost aquifer that:*
(1) Accurately represent the quality of background groundwater that has not been affected by leakage from a CCR unit. A determination of background quality may include sampling of wells that are not hydraulically up-gradient of the CCR management area where:

(i) Hydrogeologic conditions do not allow the owner or operator of the CCR unit to determine what wells are hydraulically up-gradient; or

(ii) Sampling at other wells will provide an indication of background groundwater quality that is as representative or more representative than that provided by the up-gradient wells; and (2) Accurately represent the quality of groundwater passing the waste boundary of the CCR unit. The down-gradient monitoring system must be installed at the waste boundary that ensures detection of groundwater contamination in the uppermost aquifer. All potential contaminant pathways must be monitored. (b) The number, spacing, and depths of monitoring systems shall be determined based upon site-specific technical information that must include thorough characterization of:

(1) Aquifer thickness, groundwater flow rate, groundwater flow direction including seasonal and temporal fluctuations in groundwater flow; and

(2) Saturated and unsaturated geologic units and fill materials overlying the uppermost aquifer, materials comprising the uppermost aquifer, and materials

The Rosebud Power Plant groundwater monitoring and action report will adequately define the hydrogeologic conditions and "background" groundwater quality at the site. However, it does not follow the conventional system of obtaining "*groundwater samples from the uppermost aquifer that: (1) Accurately represent the quality of background groundwater that has not been affected by leakage from a CCR unit"* in that the groundwater quality present in the uppermost aquifer at the site varies considerably and somewhat randomly such that the water quality appears to be more dependent upon depth and contact with natural geologic materials than to its position relative to the CCR Landfill. We have documented that the local groundwater quality in the uppermost aquifer fluctuates considerably in response to precipitation and infiltration patterns. For example, to demonstrate the variability and the effects of precipitation and infiltration, we present the following observations of the data:

1) The total dissolved solids (TDS) and total sulfates results over time for each well, are illustrated in the same graphs showing the annual precipitation since 1990. The precipitation record shows a series of years from about 1990 through 2002 with relatively uniform annual precipitation amounts of between about 12 and 16 inches per year. Starting in 2004, a series of widely fluctuating annual precipitation values ranging from about 8 to 25 inches per year occurs. The fluctuating pattern of annual rainfall appears to be reflected in at least three of the monitoring

wells (OMW-1, OMW-4, and OMW-5). These fluctuations, which range between about 300 and 700 ppm for any given well, demonstrate that precipitation patterns are probably more significant than the presence of the CCR landfill with respect to water quality.

2) The cleanest groundwater (lowest TDS and Sulfates of around 500 ppm and 50 ppm respectively) occurs in OMW-6, which is an up-gradient well located close to a drainage that was dammed to form a stock watering pond in about 2011, and the hardest groundwater (highest TDS and Sulfates of about 2000 ppm and 4000 ppm respectively) occurs in up-gradient well OMW-9 (its single sample in 2011) and in OMW-5, which is located upslope of the landfills but with the upper-most aquifer that is confined at about 100' below ground surface and has a piezometric head elevation that is lower than most of the down gradient wells. This high variability in "background" water quality between three potential up-gradient wells demonstrates that other factors than the presence of the CCR landfill greatly influence the water quality of the uppermost aquifers.

3) OMW-7 and OMW-8, which are down-gradient of the CCR landfill, exhibit substantial fluctuations in TDS and Sulfates which include a decrease shortly after construction of the CCR landfill (in 2002 and 2005 respectively), and then an increase in TDS and Sulfate in 2011 and 2012, and finally a decrease in TDS and Sulfate in OMW-7 in 2014. The lag in water quality response between OMW-7 and OMW-8 thus appears to range from between 1 and 3 years; which, based on preliminary calculations, is in the range of the groundwater travel time between the two wells. This record demonstrates that factors other than the presence of the CCR landfill likely effect the down-gradient wells. Additionally, the presence of the CCR landfill may affect the groundwater quality in ways that are not fully understood to result in both substantial increases and decreases in TDS and Sulfates. For example, the observed groundwater quality fluctuations may arise from the capping (by the impervious partially hydrated ash) of the recharge areas for OMW-7 and OMW-8 (i.e. a reduction of inflow to the monitoring well rather than degradation due to leachate or other phenomena normally associated with landfills).

6.3 GROUNDWATER MONITORING SYSTEM SUMMARY

In consultation with Montana Department of Environmental Quality Ten monitoring wells have been completed at the Rosebud Power Plant. The following provides a summary and applicability of the monitoring points.

- OMW-1 down/cross gradient in uppermost aquifer.
- OMW-2 down/cross gradient in a lower aquifer (Not a CCR Well).
- OMW-3 cross gradient, but abandoned in 1990 (Not a CCR Well).
- OMW-4 cross gradient uppermost aquifer and not likely representative of the active landfill, but is downgradient of the existing closed landfill that is exempt from the CCR Rule (Not a CCR Well).
- OMW-5 is in the uppermost aquifer and is up-gradient/cross-gradient from the existing closed landfill that is exempt from the CCR Rule. This well represents the upgradient well due to the lack of another representative producing well directly up-gradient of the active landfill.
- OMW-6 is in the uppermost aquifer and up-gradient of the existing closed landfill that is exempt from the CCR Rule and is up-gradient/cross gradient of the active landfill. However, this well is immediately downstream of a stock-watering pond that is hydraulically connected to the pond.

Based on groundwater quality data, it is not representative of the typical condition of the uppermost aquifer (Not a CCR Well).

- OMW-7 is in the uppermost aquifer and downgradient of the active landfill and is considered representative for the purposes of a downgradient well as required in the CCR Rule.
- OMW-8 is in the uppermost aquifer and downgradient of the active landfill and is considered representative for the purposes of a downgradient well as required in the CCR Rule.
- OMW-9 is in the uppermost aquifer and up-gradient of the active landfill and is considered representative for the purposes of an upgradient well as required in the CCR Rule. However, the on-going monitoring of this well data is problematic because the well was constructed during an unusually wet year and since then has not exhibited the presence of groundwater in the uppermost aquifer.
- OMW-10 was installed in 2016 in order to establish a reliable up-gradient monitoring point. However, like OMW-9 it has not produced measurable water (Not a CCR Well).

7.0 GROUNDWATER SAMPLING AND STATISTICAL ANALYSIS

A sampling and analysis plan has been prepared to include the requirements the CCR Rule in §257.93. This plan is attached as Appendix A and includes specific procedures for the sampling locations, schedule, decontamination, purging, field measurements, constituents, laboratory QA/QC, and statistical methods. The plan was developed to provide site personnel with specific QA/QC protocols to ensure consistent data integrity.

8.0 CONCLUSIONS AND RECOMMENDATIONS

Based on the above presented data and observations, we summarize our preliminary conclusions related to the hydrologic regime in and around the referenced site as follows:

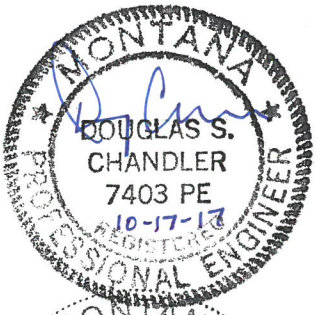
Annual sampling and analysis reports will include the results of the implementation of this Groundwater Monitoring and Action Plan including the statistical analysis of analytical results. These results will assess the monitoring program and provide relevant information for compliance with the CCR Rule. The first annual report is due January 31, 2018 and annually thereafter.

CERTIFICATION

This report was prepared by Allied Engineering Services, Inc., under the direction of Douglas S. Chandler, PhD, PE, with assistance from Andrew Graham, PE, and Ronald Orton, Environmental Scientist, and QC review by Brock Athman, PE.

ALLIED ENGINEERING SERVICES, INC

Douglas S. Chandler, PhD, PE



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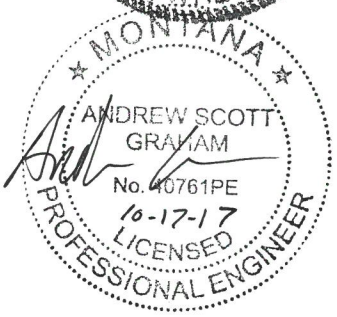

Ron Orton

QC Approval: Brock D. Athman, PE

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Appendix A: Groundwater Sampling and Statistical Sampling Plan

Groundwater Sampling and Statistical Analysis Plan

For:

Rosebud Power Plant

In accordance with:

MTX000052 & 40 CFR Parts 257 and 261
Hazardous and Solid Waste Management System; Disposal of Coal Combustion Residuals from Electric Utilities; Final Rule

Prepared for:

Colstrip Energy Limited Partnership
1087 W. River Street, Ste. 200
Boise, ID 83702
(208) 344-3570

Project Site Location:
Latitude: 45.976664°, Longitude: -106.657769°
Section 29 & 32, T3 North, R41 East
Richland County, Montana

Prepared by:

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32 Discovery Drive
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1400 11th Avenue
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Contents

1.0 Introduction

This sampling and analysis plan has been prepared to include the requirements of the coal combustion residuals (CCR) that were published in the Federal Register Volume 80, Number 74, dated Friday April 17, 2015. The applicable sections include 40 CFR Parts 257 and 261. The applicable section for groundwater sampling and analysis is covered in §257.93.

Included in this plan are site specific purging, sampling, decontamination, analytical parameters, schedule, and statistical procedures to ensure overall Quality Assurance/Quality Control (QA/QC) for the Rosebud Power Plant sampling and analysis program.

This plan supplements the Groundwater Monitoring and Corrective Action Plan for compliance with the CCR Rule.
The CCR rule requires a statistical analysis of the ground water monitoring data to determine if there is a "statistically significant increase" (SSI) over background or up-gradient values and requires the selection of one of five statistical methods.

In addition to the CCR Rule, the Montana Ground Water Pollution Control System (MGWPCS) Permit No. MTX000052 includes sampling, analytical, and frequency requirements that may be more stringent than the CCR Rule.

2.0 Sample Locations, Analytical Parameters and Schedule

The Groundwater Monitoring and Corrective Action Plan includes the rationale and data for groundwater monitoring locations. The required analytical parameters are outlined in the Appendix III to Part 257—Constituents for Detection Monitoring and Appendix IV to Part 257—Constituents for Assessment Monitoring. The CCR Rule requires semiannual monitoring at minimum for detection monitoring.

Sampling locations include:

- OMW 1
- OMW 5
- OMW 7
- OMW 8
- OMW 9 or OMW 10 (if possible)

Appendix III Detection Monitoring analytical parameters include:

- Boron
- Calcium
- Chloride
- Fluoride
- pH

- Sulfate
- Total Dissolved Solids (TDS)

Appendix IV Assessment Monitoring analytical parameters include:

- Antimony
- Arsenic
- Barium
- Beryllium
- Cadmium
- Chromium
- Cobalt
- Fluoride
- Lead
- Lithium
- Mercury
- Molybdenum
- Selenium
- Thallium
- Radium 226 and 228 combined

In addition to the above constituents MGWPCS Permit No. MTX000052 requires the sampling and analysis of the following:

- Specific Conductivity
- Alkalinity, total
- Bicarbonate, as HC03
- Carbonate, as C03
- Chloride
- Hardness, as CaC03
- Nitrate+Nitrite, as N
- Calcium
- Magnesium
- Potassium
- Sodium
- Aluminum
- Iron
- Strontium
- Titanium
- Silica
- Copper
- Cyanide, total
- Nickel
- Silver
- Thallium
- Zinc

3.0 Field Sampling Cleaning Procedures

The following describes methods used for preventing or reducing cross-contamination, and provides general guidelines for sampling equipment decontamination procedures. Preventing or minimizing cross-contamination in sampled media and in samples is important for preventing the introduction of error into sampling results and for protecting the health and safety of site personnel. Removing or neutralizing contaminants that have accumulated on sampling equipment ensures protection of personnel from permeating substances, reduces or eliminates transfer of contaminants to clean areas, prevents the mixing of incompatible substances, and minimizes the likelihood of sample cross-contamination.

Contaminants can be physically removed from equipment, or deactivated by sterilization or disinfection. Gross contamination (typically non-dissolved solids such as mud or other debris) of equipment requires physical decontamination, including abrasive and non-abrasive methods. These include the use of brushes, air and wet blasting, and high-pressure water cleaning, followed by a wash/rinse process using appropriate cleaning solutions.

3.1 Decontamination Materials

Make sure to decontaminate equipment before moving to the next well. The following is a list of equipment and supplies necessary for proper cleaning:

- Appropriate personal protective clothing, mainly nitrile gloves and boots that can be de-contaminated before purging/sampling each well. Disposable gloves can be used as an alternative.
- non-phosphate detergent (Liquinox® or equivalent)
- long-handled brushes
- drop cloths/plastic sheeting
- trash container
- paper towels
- galvanized tubs or buckets
- tap water
- distilled/deionized water
- pressurized sprayers if necessary
- trash bags
- aluminum foil (use to wrap submersible pump, or bailer during transport in order to limit the possibility of contamination)
- safety glasses or splash shield
- emergency eyewash bottle

The following generalized decontamination sequence should be followed:

1. Where applicable, remove soil or mud with a brush, scraper or pressure washer
2. Wash equipment with a non-phosphate detergent solution (Liquinox® or equivalent) solution.
3. Rinse with tap water
4. Rinse with 10% nitric acid in distilled/de-ionized water solution.
5. Rinse with distilled/de-ionized water.

Essentially, utilize four wash/rinse tubs – One detergent wash, one tap water rinse, one 10% nitric acid solution rinse, and one distilled/deionized water rinse.

In order to decontaminate the hose and reel, the following procedures are recommended by the manufacturer and have been specifically adapted for the Rosebud Power Plant.

3.2 Pump Decontamination

Pumping Hose Decontamination

The *REEL E-Z* was designed to make the decontamination process as easy as possible. To decontaminate, simply hand wash the system or use a pressure washer to clean the outside surfaces of the system. To decontaminate the Happy Hose, either back flush the Happy Hose with wash and rinse solutions (as outlined in steps 1-5 above) via the discharge port or simply pump the solution as you would normally pump fluid with the pump.

Pump Decontamination (Replacing Motor Fluid)

Whenever any maintenance is done on the pump, the motor fluid should be replaced. If the pump is moved from well-to-well, it should be thoroughly decontaminated prior to being installed in the next well.

In addition to cleaning the individual components inside and outside, the water in the pump motor should be replaced using the syringe that came with your pump. This can be accomplished through the following steps:

1. Disconnect *REEL E-Z* system and converter from power source.
2. Turn the pump and motor upside down.
3. Use a flathead screwdriver to remove the filling screw on the bottom of the motor.
4. Empty the water from the motor and refill the reservoir using contaminant-free water and the syringe that came with your *REEL E-Z*. The water level should be even with the bottom edge of the screw hole.
5. Replace and tighten the filling screw.
6. Turn the pump over several times, then remove the filling screw again to let any trapped air escape (if air is left inside the motor, the life of the motor will be shortened). Add more water, if necessary. Repeat steps 4, 5, & 6 if necessary.
7. Replace and tighten the filling screw.

4.0 Materials

Samplers and evacuation equipment (bladders, pumps, bailers, tubing, etc.) should be limited to those made with stainless steel, Teflon, and glass in areas where concentrations are expected to be at or near the detection limit. The tendency of organics to leach into and out of many materials make the selection of materials critical for trace analyses. The use of plastics, such as PVC or polyethylene, should be avoided when analyzing for organics. However, PVC may be used for evacuation equipment as it will not come in contact with the sample.

4.1 Groundwater Sampling Equipment

- water level indicator, or
  - electric sounder
  - steel tape
  - transducer
  - reflection sounder
  - airline
  - depth sounder
- appropriate keys for well cap locks
- steel brush
- logbook
- calculator
- field data sheets
- chain of custody forms
- forms and seals
- sample containers
- Engineer's rule
- sharp knife (locking blade)
- tool box (to include at least):
  - screwdrivers,
  - pliers,
  - hacksaw,
  - hammer,
  - flashlight
- adjustable wrench)
- leather work gloves
- appropriate health and safety gear
- 5-gallon pail
- plastic sheeting
- shipping containers
- packing materials
- bolt cutters
- Ziploc plastic bags
- containers for evacuation of liquids
- decontamination solutions
- tap water

- non-phosphate soap
- several brushes
- pails or tubs
- aluminum foil
- garden sprayer
- preservatives
- distilled or deionized water

Bailer (if used)

- clean, decontaminated bailer(s) of appropriate size and construction material
- nylon line, enough to dedicate to each well
- Teflon-coated bailer wire
- sharp knife
- aluminum foil (to wrap clean bailers)
- 5-gallon bucket

Submersible Pump (if used)

- pump(s)
- generator (110, 120, or 240 volt) or 12-volt battery if inaccessible to field vehicle
- l-inch black PVC coil pipe or technical equivalent -- enough to pump entire well casing with 4 ft. additional dedicated to each well (if applicable)
- hose clamps
- safety cable
- tool box supplement
  - pipe wrenches, 2
  - wire strippers
  - electrical tape
  - heat shrink
  - hose connectors
  - Teflon tape
- winch or pulley
- gasoline for generator
- flow meter with gate valve (or graduated bucket)
- l-inch nipples and various plumbing (i.e.,
- pipe connectors)

5.0 Field Preparation

1. Monitoring Well Borehole Volume Measurement Procedure:

Start at the least contaminated well, if known.

1. Lay plastic sheeting around the well to minimize likelihood of contamination of equipment from soil adjacent to the well.

2. Remove locking well cap, note location, time of day, and date in field notebook or an appropriate log form.
3. Remove well casing cap.
4. Measure depth to groundwater inside well casing from reference mark at the top of the casing (do this at least twice to confirm measurement) and record in log book.
5. Measure total depth of well (do this at least twice to confirm measurement) and record in site logbook.
6. Determine depth of water column by deducting depth to groundwater from the total well casing depth.
7. Calculate the borehole volume to be purged using the data in Table 2 and the depth of water column.
8. Select the appropriate purging and sampling equipment. Purge monitoring well as outlined in Section 6.0 below.

Table 1 - Monitoring Well Information

Monitoring Well Volumes			
Monitoring Well	Borehole Diameter	Volume per Linear Foot	Screened Interval Below Ground Surface (ft.)
OMW 1	7.875”	2.53 gal/ft	10-20
OMW 2*	7.875”	2.53 gal/ft	65-80
OMW 4*	7.875”	2.53 gal/ft	97-111
OMW 5	7.875”	2.53 gal/ft	98-111
OMW 6*	7.875”	2.53 gal/ft	21-25
OMW 7	6.25”	1.59 gal/ft	unknown
OMW 8	6.25”	1.59 gal/ft	unknown
OMW 9	6.25”	1.59 gal/ft	8-12
OMW 10	7.875”	2.53 gal/ft	15-23

*Non-CCR wells shown for information purposes only.

6.0 Evacuation of Static Water (Purging)

The amount of flushing a well receives prior to sample collection depends on the intent of the monitoring program as well as the hydrogeologic conditions. Programs where the determination of overall quality of water resources is involved may require long pumping periods to obtain a sample that is representative of a large volume of that aquifer. The pumped volume can be determined prior to sampling so that the sample is a composite of known volume of the aquifer, or the well can be pumped until the stabilization of parameters such as temperature, electrical conductance, or pH has occurred. However, monitoring for defining a contaminant plume requires a representative sample of a small volume of the aquifer. These circumstances require that the well be pumped enough to remove the stagnant water but not enough to induce flow from other areas. Generally, three well volumes are considered effective, or calculations can be made to determine, on the basis of the aquifer parameters and well dimensions, the appropriate volume to remove prior to sampling.

In a non-pumping well, there will be little or no vertical mixing of the water and stratification will occur. The well water in the screened section will mix with the groundwater due to normal flow patterns, but the well water above the screened section will remain isolated and become stagnant. Sampling personnel should realize that stagnant water may contain foreign material inadvertently or deliberately introduced from the surface, resulting in an unrepresentative sample. To safeguard against collecting non-representative stagnant water, follow these guidelines during sampling:

- As a general rule, all monitoring wells should be pumped or bailed prior to sampling. Purge water should be containerized on site or handled as specified in the site-specific project plan. Evacuation of a minimum of one volume of water in the well casing, and preferably three to five volumes, is recommended for a representative sample. In a high-yielding ground water formation and where there is no stagnant water in the well above the screened section, evacuation prior to sample withdrawal is not as critical. However, in all cases where the monitoring data is to be used for enforcement actions, evacuation is recommended.

- For wells that can be pumped or bailed to dryness with the equipment being used, the well should be evacuated and allowed to recover prior to sample withdrawal. If the recovery rate is fairly rapid and the schedule allows, evacuation of more than one volume of water is preferred. If recovery is slow, sample the well upon recovery after one evacuation.

- A non-representative sample can also result from excessive pre-pumping of the monitoring well. Stratification of the leachate concentration in the groundwater formation may occur, or heavier-than-water compounds may sink to the lower portions of the aquifer. Excessive pumping can dilute or increase the contaminant concentrations from what is representative of the sampling point of interest.

The following well evacuation devices are most commonly used. Other evacuation devices are available, but have been omitted in this discussion due to their limited use.

Bailers

Bailers are the simplest purging device used and have many advantages. They generally consist of a rigid length of tube, usually with a ball check-valve at the bottom. A line is used to lower the bailer into the well and retrieve a volume of water. The three most common types of bailer are PVC, Teflon, and stainless steel. This manual method of purging is best suited to shallow or narrow diameter wells. For deep, larger diameter wells which require evacuation of large volumes of water, other mechanical devices may be more appropriate. Bailing equipment includes a clean decontaminated bailer, Teflon or nylon line, a sharp knife, and plastic sheeting.

Bailer Purging Procedure:

1. Determine the volume of water to be purged as described above.
2. Lay plastic sheeting around the well to prevent contamination of the bailer line with foreign materials.
3. Attach the line to the bailer and lower until the bailer is completely submerged.

4. Pull bailer out ensuring that the line either falls onto a clean area of plastic sheeting or never touches the ground.
5. Empty the bailer into 5 gallon bucket until full to determine the number of bails necessary to achieve the required purge volume.

Submersible Pumps

Submersible pumps are generally constructed of plastic, rubber, and metal parts which may affect the analysis of samples for certain trace organics and inorganics. As a consequence, submersible pumps may not be appropriate for investigations requiring analyses of samples for trace contaminants. However, they are still useful for pre-sample purging. The pump must have a check valve to prevent water in the pump and the pipe from rushing back into the well.

Submersible Pump Purging Procedure:

1. Determine the volume of water to be purged as described above.
2. Lay plastic sheeting around the well to prevent contamination of pumps, hoses or lines with foreign materials.
3. Assemble pump, hoses, and safety cable, and lower the pump into the well. Make sure the pump is deep enough so that purging does not evacuate all the water. (Running the pump without water may cause damage to the pump.)
4. Attach flow meter to the outlet hose to measure the volume of water purged. A graduated bucket can be used to determine purge water volume as an alternative.
5. Attach power supply, and purge well until specified volume of water has been evacuated (or until field parameters, such as temperature, pH, conductivity, etc. have stabilized). Do not allow the pump to run dry. If the pumping rate exceeds the well recharge rate, lower the pump further into the well, and continue pumping.

7.0 Sampling Methods

Sample withdrawal methods require the use of pumps, compressed air, bailers, and samplers. Ideally, purging and sample withdrawal equipment should be completely inert, economical to use, easily cleaned, sterilized, reusable, able to operate at remote sites in the absence of power resources, and capable of delivering variable rates for sample collection. There are several factors to take into consideration when choosing a sampling device. Care should be taken when reviewing the advantages or disadvantages of any one device. It may be appropriate to use a different device to sample than that which was used to purge. The most common example of this is the use of a submersible pump to purge and a bailer to sample.

7.1 Bailer

Generally, bailers can provide an acceptable sample, providing that sampling personnel use extra care in the collection process.

1. Surround the monitoring well with clean plastic sheeting.
2. Attach a line to the bailer. If a bailer was used for purging, the same bailer and line may be used for sampling.

3. Lower the bailer slowly and gently into the well, taking care not to scrape the casing sides or to splash the bailer into the water. Stop lowering at a point adjacent to the screen.
4. Allow bailer to fill and then slowly and gently retrieve the bailer from the well, avoiding contact with the casing, so as not to knock flakes of rust or other foreign materials into the bailer.
5. Remove the cap from the sample container and place it on the plastic sheet or in a location where it will not become contaminated.
6. Begin pouring slowly from the bailer.
7. Preserve samples as required by sampling plan.
8. Cap the sample container tightly and place pre-labeled sample container in a carrier.
9. Water level measurements may be taken during recovery regularly at 15- to 30-second intervals and recorded in the log book. This data may be used to compute aquifer transmissivity and other hydraulic characteristics.
10. Replace the well cap.
11. Log all samples in the site logbook and on field data sheets and label all samples.
12. Package samples and complete necessary paperwork.
13. Transport sample to decontamination zone to prepare it for transport to analytical laboratory.

7.2 Submersible Pump

Although it is recommended that samples not be collected with a submersible pump, there are some situations where they may be used.

1. Allow the monitoring well to recharge after purging, keeping the pump just above the screened section,
2. Attach gate valve to hose (if not already fitted), and reduce flow of water to a manageable sampling rate.
3. Assemble the appropriate bottles.
4. Fill sample containers as required.
5. Preserve samples as required by sampling plan.
6. Cap the sample container tightly and place pre-labeled sample container in a carrier.
7. Water level measurements may be taken during recovery regularly at 15- to 30-second intervals and recorded in the log book. This data may be used to compute aquifer transmissivity and other hydraulic characteristics.
8. Replace the well cap.
9. Log all samples in the site logbook and on the field data sheets and label all samples.
10. Package samples and complete necessary paperwork.
11. Transport sample to decontamination zone for preparation for transport to analytical laboratory.
12. Upon completion, remove pump and assembly and fully decontaminate prior to setting into the next sample well. Dedicate the tubing to the hole.

8.0 Sample Handling and Custody/Analytical Testing

Field personnel are responsible for the integrity of the sample from the time of collection until shipment to the Analytical Laboratory. This responsibility includes proper storage, preservation, and establishing the sample custody documentation. Samples will be collected in containers supplied by the analytical laboratory and hand delivered or shipped via overnight delivery. Delivery time should be completed so as to not compromise the preservation of the sample(s). Sampling and shipments should be completed such that the Analytical Laboratory will receive them during normal days and hours of operation (unless prior arrangements are made).

Currently Energy Laboratories provides the sampling kits that include the required containers and preservatives along with instructions, QA/QC bottles and chain-of-custody forms necessary for them to perform analytical testing. Specific questions regarding analytical methods, sample handling, and ordering, should be directed to:

Energy Laboratories
1120 S. 27th St.
Billings, MT 59101
(406) 252-6352
https://www.energylab.com/

8.1 Laboratory QA/QC

Energy Laboratories, Inc. (ELI) as a coordinated company of four participating laboratories, has developed a QA program that takes into account the various method types and EPA programs, while also considering sample matrices, to develop a single comprehensive set of QA guidance. They have used scientific approaches, Good Laboratory Practices, EPA Methods and Guidance documents, and accreditation audit guidance to develop our overall QA Program. The Quality Assurance Program establishes acceptable performance criteria for all routine analytical procedures being performed by laboratory personnel. The Quality Assurance Assessment Program provides a formal system for evaluating the quality of data being generated and reported. The ELI Laboratory Safety Manual & Chemical Hygiene Plan defines the safety and monitoring procedures used by laboratory personnel in laboratory operations. These, in addition to the experience and expertise of their analysts, provide a comprehensive Quality Assurance Program. Energy Laboratories, Inc., in Billings, Montana, is certified under the Safe Drinking Water Act by Region VIII EPA for Wyoming, and the States of Montana, Idaho, Colorado, Nevada, Texas, North Dakota, and South Dakota. ELI-Billings also holds accreditation for Clean Water Act, Safe Drinking Water Act and Resource Conservation Recovery Act (RCRA) parameters through the National Environmental Laboratory Accreditation Program (NELAP), which is supported by the EPA. The NELAP certification is maintained through the state of Florida. Individual State approval for RCRA and CWA (NPDES) is managed through the Federal/State DMRQA program or through reciprocal certifications when required by a specific state. ELI obtains these certifications either through reciprocal recognition of ELI's primary Montana State or NELAP certification. To perform radon testing, ELI is certified under the National Radon Proficiency Program administered by the National Environmental Health Association. Copies of ELI's certificates for all laboratories are maintained on ELI's website: www.energylab.com.

The ELI Quality Assurance Manual and the ELI Professional Services Guide (Fee Schedule) together are used to outline the ELI Quality Assurance/Quality Control Program. This Quality

Assurance Manual is appropriate to all departments of Energy Laboratories-Billings. The procedures discussed or referenced in this manual describe their day-to-day laboratory practices and adhere to USEPA Safe Drinking Water Act, and TNI (The NELAC Institute) requirements as well as Good Laboratory Practices (GLPs). The primary NELAC accreditation for the ELI Billings laboratory can be found in Appendix A of ELI's Quality Assurance Plan . Where possible, ELI uses EPA, AOAC, ASTM, APHA, NIOSH, OSHA, or published analytical methods and follows the procedures with strict adherence to described protocol and recommended QA/QC parameters. The analytical methods approved and in use are described in Standard Operating Procedures, and are available for review at the laboratory. Vital parts of ELI's Quality Assurance Program, Quality Control and Quality Assessment programs are outlined in Chapters One and Two of ELI's Quality Assurance Plan.

9.0 Statistical Method and Analysis

The CCR rules requires a statistical analysis of the ground water monitoring data to determine if there is a "statistically significant increase" (SSI) over background or up-gradient values.[1] Moreover, §93(f) requires CELP to select one of five listed methods. Those methods are:[2]

(1) A parametric analysis of variance followed by multiple comparison procedures to identify statistically significant evidence of contamination. The method must include estimation and testing of the contrasts between each compliance well's mean and the background mean levels for each constituent.

(2) An analysis of variance based on ranks followed by multiple comparison procedures to identify statistically significant evidence of contamination. The method must include estimation and testing of the contrasts between each compliance well's median and the background median levels for each constituent.

(3) A tolerance or prediction interval procedure, in which an interval for each constituent is established from the distribution of the background data and the level of each constituent in each compliance well is compared to the upper tolerance or prediction limit.

(4) A control chart approach that gives control limits for each constituent.

(5) Another statistical test method that meets the performance standards of paragraph (g) of this section.

Along with the necessary selection of a statistical methodology, the CCR rule further places various requirements/restrictions on the performance standard for the chosen methodology itself. The details of these performance standards are found in §93(g)(1) through (6). Rather than list each requirement in detail, the following is a summary of those requirements.

(a) Sampling data that exhibits a (near) Gaussian (normal) distribution is required to use parametric methods. Non-normal data requires non-parametric methods.

(b) Type I error levels should not be less than 0.01 for individual well constituent comparison. A type I error level less than 0.05 should be not used for multiple comparison analyses (comparing multiple means across a single ANOVA test, for example).

(c) If a control chart approach is used, the specific type of control chart must be at least as effective as the approach in (1) or (2) above.

[1] 40 CFR 257.93(h) and elsewhere.
[2] 40 CFR 257.93(f)(1) through (5).

(d) If a tolerance interval (or prediction interval) is used, that approach must be at least as effective as the approach in (1) or (2) above.

(e) The statistical method chosen must account for data that is below the detection levels.

(f) If necessary, the statistical method must 'control' or 'correct' for seasonal, spatial or temporal (other than seasonal) variability.

In order to select the appropriate method and to ensure that method meets the performance specifications of (a) through (f), the EPA reference document "Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities"[3] was consulted. This document contains a detailed explanation of various statistical tests and their use and applicability to groundwater monitoring in particular.

9.1 Parametric

The method selection began with a cursory review of the data collected specifically for this CCR rule. That data, primarily December 2016 through September 2017, consists of well sampling and analysis at five monitoring sites. The wells are named: OMW 1, OMW 6, OMW 7, OMW 8 and OMW 9. The discussion below is meant to provide a summary of the available data as it relates to CCR. A more detailed discussion of the site locations and hydrogeology may be found in the main body of this report. Additionally, Section 2 of this document contains a list of the constituents of interest (Appendices III and IV of the CCR rule).

Well	Appendix III Data: (12/16 to 9/17)	Appendix IV Data: (12/16 to 9/17)	Comment
OMW 1	Complete	Complete	Down-cross-gradient
OMW 5	Complete	Complete	Up-gradient
OMW 7	Complete	Complete	Down-cross-gradient
OMW 8	Complete	Complete	Down-cross-gradient
OMW 9 *	Partial single sample pre-CCR	No data for these constituents	Well was dry during CCR sample events.

* This well is up-gradient to the landfill, but has contained almost no water for several years.

A decision of whether an SSI condition exists is based solely (during the "detection" monitoring)[4] on Appendix III constituents. A review of these constituent data structures was appropriate in order to choose which of the five methods appear most reasonable at this time. The basis of a decision lies in whether the data supports a parametric (or non-parametric) analysis. Additionally, that decision is to be based on a constituent by constituent comparison and might also be reflected in a well vs. well analysis.

As such an initial review of the data was conducted. The decision regarding parametric or non-parametric analysis rested primarily on whether the underlying data has a near-normal (Gaussian)

[3] EPA 530-R-09-007; March 2009.
[4] "Detection" monitoring described in 40 CFR 257.94.

distribution. There are a number of statistics and tests that may be used. For purposes of this study, the following were employed:

- Coefficient of Variation
- Skewness Coefficient
- Shapiro-Wilk Test

No single statistic or test was considered definitive. Rather the decision as to normality was based on the weight of evidence of the three methods.

The test for normality was not limited to the use of the raw data. In some cases the data was subject to a linear transformation of the dataset to determine if perhaps a better normal distribution might emerge. (This transformed data may then be used for purposes of accepting or rejecting a particular null hypothesis within a specific statistical test.) For this CCR project a logarithmic (geometric) transformation was conducted (where needed). This 'transformed' data (per constituent and well) was then subjected to the same tests above to determine if the geometric transformation improved the 'normal' distribution null hypothesis.

In the interest of brevity, the results of these analyses are not presented here. Those analyses may be included in future reporting. Regardless, the results of this investigation conclude that it would be reasonable to treat all wells and Appendix III constituents as "normal" for purposes of choosing and conducting statistical analyses for CCR purposes. Some of the data may be subject to the geometric transformation; however, that decision will be made at the time of the first and, as necessary, subsequent annual reporting.

9.2 Statistics Method

Because the initial data from the CCR well analyses indicates at near-normal distribution for some of the constituents, the next task is to choose the statistical method(s) to be applied for the data. The purpose of the statistics will be to determine if there is an SSI in constituent concentrations above the background or up-gradient well(s). As noted earlier and based on parametric data, there are effectively three methodology choices. The following is a discussion of each.

Method	Description
Analysis of variance to determine difference between and among various populations	The most common test is the ANOVA. It also might include t-tests and other related tests which seek to determine differences in means (or in some cases single values) and/or variances among and within a population of constituent well data.
Control chart(s)	Control charts may be used to plot and thus distinguish a trend of changes in data over or between time and wells. The control chart would be plotted for each constituent and compared to the background/up-gradient data.

Method	Description
Tolerance (prediction) interval	A tolerance (one-sided) interval is a method that identifies a concentration range of underlying data (wells and constituents) that effectively identifies a probability range (95% for example). Data that fall outside of that range may be considered as evidence of a difference outside the range. (That is, the statistical null hypothesis is rejected.)

Because all of the data has yet to be analyzed, it is not possible to present a specific plan for conducting the analysis. It is possible, however, to provide the anticipated methodologies and their rationale. While the method below is the analysis of choice at this point in time, it is entirely possible that the analysts may change their minds in the future and move to a different method as described in the CCR rule.[5]

Based on initial evaluations of the data, it appears that some of the constituent parameters (log-transformed or otherwise) will support the null hypothesis that the data is normally (Gaussian) distributed. Some of the constituents, on the other hand, will not despite linear transformations to the contrary. For the data sets that do not reject the null hypothesis, the most likely approach will be the use of the ANOVA test. The 'single factor' or 'one-way' ANOVA test is able to provide a quick comparison between all population variances (and means) during the same statistical test. The results will give the analyst a picture as to differences in data as a whole. Should the ANOVA test indicate the means are not the same (Type I error level = 0.05), then a side-by-side comparison will be made between the background/up-gradient well(s) and the well of interest for that particular constituent. This will be accomplished through either a standard student's t-test or ANOVA.

In those instances where normality may not be assumed, a non-parametric approach will be attempted. In the interest of consistency and statistical power an ANOVA approach will be used for this data as well. However, rather than using the standard one-way ANOVA which requires the underlying populations to be near normal, the Kruskal-Wallis test[6] will be attempted. That test, similar to the one-way test, also compares means across multiple populations. However, the statistic does not require normality in the data. The same test may also be used for multiple single well or single constituent comparisons.

Both these parametric and non-parametric approaches fulfill the requirement for "… multiple comparison procedures …" in the method selection of the CCR rule [§257.93(f)(1)].

While it appears that the ANOVA test is a reasonable method for assessing SSI, the Tolerance Interval method may also be employed. The Tolerance Interval test may be executed in either a parametric or non-parametric mode. The tolerance test might prove useful in subsequent reporting (post 2018) when the nature of the analysis changes somewhat. In following years, the dataset will be asking the statistical question of whether newly acquired sample results (2018 and beyond) are statistically different from the underlying population data (2016/2017 CCR data). For that analysis,

[5] The methods and performance specifications are those described earlier and contained in 40 CFR 257.93(h) and (g).
[6] https://en.wikipedia.org/wiki/Kruskal%E2%80%93Wallis_one-way_analysis_of_variance

tolerance testing is a distinct possibility. The decision regarding the use of the (one-site) tolerance interval methodology will be left to subsequent year reporting after the additional data becomes available.

9.3 Limit of Detection

One of the confounding variables in conducting statistical tests of trace concentrations of various compounds in well water is when the laboratory is not able to report values above its detection limit. It is not possible to conduct an ANOVA test, for example, unless there are cardinal (numeric) values for all categories. In many analyses, one might simply ignore a particular value and proceed with the analysis using a smaller sample population. However, the performance standard for the chosen statistical method states "… the method must account for data below the detection limit …."[7] In particular the rule goes on to require that any value used must, effectively, be the lowest concentration the laboratory can reliably achieve.[8]

As a practical matter, the need for addressing values reported below the detection limit is nearly non-existent for the Appendix III constituents. A review of the CCR data shows that all wells report values above the detection limit for every Appendix III constituent save one - boron. In the case of boron, only one well (OMW 1: 12/2016 through 9/2017) yielded a single value that was below detectable levels. Therefore, there appears to be little need for a robust analysis for data substitution (ND vs. numerical value). For the boron case, the minimum detectable value will be substituted for that single case.

If the need arises to conduct statistical analyses for the Appendix IV constituents, it will be addressed at that time. The inclusion of non-detectable data will prove more difficult than Appendix III since there are multiple cases in which the lab has reported all values as 'non-detectable.' For example, no well has indicated reportable values for beryllium, cadmium and thallium. The same is nearly true for several others such as antimony, lithium and mercury. It has been decided not to address the 'level or detection' issue for Appendix IV at this time There is no immediate need to conduct any statistical analysis of this Appendix IV data.

9.4 Temporal

One additional item that may need addressing in the annual report is the treatment of seasonal or other temporal variations. It would be important that the statistical methods do not reject a (statistical) null hypothesis of no difference between an up- and down-gradient well when the difference is primarily due to seasonal or other temporal variation. As a result, the statistics may take this into account when necessary.

An initial review of the CCR data is not able to ascertain if such variability exists. The time period for this initial dataset is not long enough to establish a pattern on its face. It is not a straight-forward matter to determine if differences (if there are any) are or could be due to contamination or temporal (including seasonal) reasons. Other historical data, which does not include all of the Appendix III or Appendix IV constituents, has indicated influence from precipitation events. (Precipitation is a form of seasonable variability.) It is entirely possible that a statistical adjustment

[7] 40 CFR 257.93(g)(5).
[8] See §257.93(g)(5) for further details on this value.

may be necessary in the future, but not enough analysis has been conducted to reach a conclusion about the methods that may be employed if necessary.

9.5 Summary

The statistical methods and performance standards for such methods have been described above. The following is a brief summary of the chosen (to date) method(s) and rationale.

Item	Description/Parameter	Discussion
1	Data Structure	A cursory review has been undertaken of the CCR well data from 12/2016 through 9/2017. That review, using statistics described in 10.1 above, supports the notion that the data, raw or log-transformed, is (near) normally distributed.
2	Parametric	The results of 1 above indicate that the statistical tests to be performed may use parametric testing.
3	Chosen Method	The initial chosen method will be an ANOVA test. The analysis will begin with a one-way ANOVA to determine changes between and among any and all wells. Additional ANOVA or t-tests will be used for multiple comparisons between a specific constituent and up- vs. down-gradient wells.
4	Alternative Method	A Tolerance Interval analysis may be used in some cases; this is yet to be determined. A Tolerance Interval is among the methods specified in the CCR rule. The use of the method is most likely to be implemented in post-2017 reporting due to its statistical use.
5	Detection Level	For purposes of the Appendix III analyses, the need for substituting a 'non-detectable' value with a specific number is very limited. For those rare cases, the laboratory detectable value will be substituted.
6	Temporal/Seasonal	There is not enough CCR-specific data at this time to ascertain the need to control for a temporal variability. This will be reviewed and addressed on an on-going basis as needed.

Appendix A: Laboratory QA/QC Plan

ENERGY LABORATORIES-BILLINGS, MT
QUALITY ASSURANCE MANUAL

Revision June 26, 2017

Energy Laboratories, Inc.
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President:

Laboratory Manager

Quality Assurance Officer:

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ELI COMMITMENT

Energy Laboratories, Inc. Strives Toward:

1. Being highly skilled in the field of analytical chemistry.
2. Delivering quality and service with integrity.
3. Encouraging the professional development of our staff.
4. Offering our employees a safe and positive work environment.
5. Being profitable and using resources wisely for a sustainable future.

INTRODUCTION

Energy Laboratories, Inc. provides chemical, industrial hygiene, and environmental analytical services to private industry, agricultural industry, engineering consultants, government agencies, and private individuals. Analytical services include: analysis of waters and soils for inorganic and organic constituents, aquatic toxicity testing, hazardous waste analysis, radiochemistry, industrial hygiene, microbiology, soils and water physical parameters, and petroleum analysis.

Founded in 1952, Energy Laboratories currently incorporates four separate testing laboratories. The corporate headquarters are located in Billings, MT, with laboratories located in Casper, WY; Gillette, WY; and Helena, MT.

ELI, as a coordinated company of four participating laboratories, has developed a QA program that takes into account the various method types and EPA programs, while also considering sample matrices, to develop a single comprehensive set of QA guidance. We have used scientific approaches, Good Laboratory Practices, EPA Methods and Guidance documents, and accreditation audit guidance to develop our overall QA Program.

The Quality Assurance Program establishes acceptable performance criteria for all routine analytical procedures being performed by laboratory personnel. The Quality Assurance Assessment Program provides a formal system for evaluating the quality of data being generated and reported. The ELI Laboratory Safety Manual & Chemical Hygiene Plan defines the safety and monitoring procedures used by laboratory personnel in laboratory operations. These, in addition to the experience and expertise of our analysts, provide a comprehensive Quality Assurance Program. Energy Laboratories, Inc., in Billings, Montana, is certified under the Safe Drinking Water Act by Region VIII EPA for Wyoming, and the States of Montana, Idaho, Colorado, Nevada, Texas, North Dakota, and South Dakota. ELI-Billings also holds accreditation for Clean Water Act, Safe Drinking Water Act and Resource Conservation Recovery Act (RCRA) parameters through the National Environmental Laboratory Accreditation Program (NELAP), which is supported by the EPA. The NELAP certification is maintained through the state of Florida. Individual State approval for RCRA and CWA (NPDES) is managed through the Federal/State DMRQA program or through reciprocal certifications when required by a specific state. ELI obtains these certifications either through reciprocal recognition of ELI's primary Montana State or NELAP certification. To perform radon testing, ELI is certified

under the National Radon Proficiency Program administered by the National Environmental Health Association. Copies of ELI's certificates for all laboratories are maintained on ELI's website: www.energylab.com.

The ELI Quality Assurance Manual and the ELI Professional Services Guide (Fee Schedule) together are used to outline the ELI Quality Assurance/Quality Control Program. This Quality Assurance Manual is appropriate to all departments of Energy Laboratories-Billings. The procedures discussed or referenced in this manual describe our day-to-day laboratory practices and adhere to USEPA Safe Drinking Water Act, and TNI (The NELAC Institute) requirements as well as Good Laboratory Practices (GLPs). The primary NELAC accreditation for the ELI Billings laboratory can be found in Appendix A of this plan. Where possible, ELI uses EPA, AOAC, ASTM, APHA, NIOSH, OSHA, or published analytical methods and follows the procedures with strict adherence to described protocol and recommended QA/QC parameters. The analytical methods approved and in use are described in Standard Operating Procedures, and are available for review at the laboratory. Vital parts of our Quality Assurance Program, Quality Control and Quality Assessment programs are outlined in Chapters One and Two of this manual.

To generate data that will meet project-specific requirements, it is necessary to define the type of decisions that will be made and identify the intended use of the data. Data Quality Objectives (DQOs) are an integrated set of specifications that define data quality requirements and the intended use of the data. Project-specific DQOs will be established as needed for both field and lab operations. Through the DQO process, appropriate reporting limits, extraction/digestion methods, clean-up methods, analytical methods, target analytes, method quality control samples, sample security requirements, quality control acceptance ranges, corrective action procedures, reporting formats and reporting limits can be specified. Professional laboratory project managers are available to assist clients in specifying appropriate laboratory analyses and reporting procedures necessary to meet project requirements.

Client-specific DQOs can be coordinated with the laboratory through our Project Managers via quotations or contracts, or with relevant documentation provided to the laboratory prior to (or at time of) sample receipt. Client-specific requirements are communicated to analysts and final report validators through the laboratory LIMS system. By default, our methods, analytes, and QC parameters are set up to meet the DQOs specified in the referenced method and/or federal/state regulations. ELI encourages clients to provide ELI documentation of any client-specific, regulatory or project monitoring requirements.

Certain types of requests may not be suitable to standardized analytical methods. These custom requests are handled individually with laboratory management and staff scientists. Project-specific methods and reporting packages are available. Attention to documentation of the analytical procedure and use of suitable QC parameters is maintained according to good scientific discipline and Good Laboratory Practice guidelines.

The ELI-Billings laboratory manager, or the designee, will evaluate all new contracts to determine that the laboratory is capable of performing the requested work. This process includes ensuring that the laboratory maintains the required accreditation, equipment and

resources. In the event that sample analysis is not performed at our Billings location, clients are notified on the laboratory analytical report if the work is subcontracted to a qualified ELI laboratory or an outside laboratory (See Subcontracting Policy – Chapter 6 in this QA Manual).

This Quality Manual and related quality documentation meet requirements of the National Environmental Laboratory Accreditation Program (NELAP), which is an EPA approved accreditation program.

CHAPTER 1 – QUALITY CONTROL PROGRAM

Quality Policy Statement

Energy Laboratories, Inc. is committed to producing laboratory data of known and documented quality that is scientifically valid, meets method specifications, satisfies regulatory requirements, and accomplishes the data quality objectives of the client and project. Management ensures that the laboratory maintains current certifications and is in compliance with accreditations through USEPA, State Agencies, and NELAP. Those method, regulatory, and client requirements (as well as the policies, procedures, and all referenced documents) are incorporated into our Quality Assurance Program; which is outlined within this Quality Assurance Manual. Our Quality Systems are designed to comply with the standards as defined by the most current version of the NELAC accreditation standard and ISO 17025 standards. To ensure compliance with these standards, all laboratory personnel are required to be familiar with quality documentation and implement those policies and procedures in their work. ELI is dedicated to the continual improvement of the management system's effectiveness by providing appropriate corporate resources to set objectives, offering training opportunities, and monitoring the quality performance of our staff. ELI also provides facilities and equipment adequate and appropriate to these objectives.

Quality Assurance Program

The purpose of the Quality Assurance Program is to ensure that the analytical services provided by Energy Laboratories are of high quality, data is within established accuracy and precision limits (required by the referenced method or Standard Operating Procedure), and each analytical result produced meets or exceeds our accreditation requirements. Management ensures that the integrity of the management system is maintained. The Technical Director, or their designee, ensures that changes to the management system are planned, implemented and documented.

Management establishes and maintains data integrity by providing the following to ELI's data integrity system:

1) Data Integrity Training (Including the highest standards of ethical behavior)
2) Periodic review of data integrity procedural documentation
3) Annual review of data integrity procedures with updates as needed
4) Periodic, in-depth monitoring of data integrity
5) Maintenance of signed data integrity documentation for all laboratory employees

All employees are expected to implement and follow the policies contained within the Quality Assurance Program.

The quality systems in the program consist of the policies and procedures, and all referenced documents, described in this Quality Assurance Manual. The Quality Control Program also functions to maintain the laboratory's compliance with accreditations through USEPA, State Agencies, and NELAP.

The Quality Control Program requires that the following points be met for each applicable analytical method:

- Performance of any analytical method requires that the proper equipment and instrumentation are available. A list of major equipment is listed in Appendix E. The procedure for operation of an analytical instrument is described in the equipment manufacturer's operating manual, and may also be supplemented with a specific Standard Operating Procedure (SOP) for the instrument and/or the method.

- Specific SOPs cover operation of the instrument including the sequence of operations involved in instrument start-up, calibration, analysis, and shut down. Chapter 13 of this manual includes recommended preventative maintenance, and/or a list of parameters used to identify other types of maintenance. SOPs outline any special safety precautions for operation of the instrumentation.

- SOPs of well-detailed EPA, ASTM, NIOSH, APHA, OSHA, or other published procedures include, as appropriate, a list of any method-specific items or variances, a list of QC parameters and their recommended method performance ranges, recommended or example analytical sequences, specific or unique safety information, method references, and a signed signature page. SOPs details, and format of method SOPs, follow NELAP requirements. Detailed SOPs may be prepared for those procedures that do not have published methods. Further details of SOP format and information required in method SOPs can be found in the ELI SOP, *Preparation, Numbering, Use, and Revision of Standard Operating Procedures.* Written Standard Operating Procedures referenced within this manual are available at the laboratory for review. (ELI SOPs are considered confidential proprietary information.

- For radiochemical analysis performed at ELI-Casper, each method undergoes Method Validation as outlined in EPA's specific method and/or the Multi-Agency Radiological Laboratory Analytical Protocols Manual (MARLAP), Chapter 6.

- The required detection level (RDL) for radiochemical analysis of drinking water samples is calculated based on the requirements in 40 CFR 141.25(c), which is a sample specific determination. The equation is specific for each method and noted in the method-specific SOP where appropriate.

- The initial test method evaluation for chemical analysis involves Method Detection Limit (MDL) studies, (refer to ELI SOP, *Determination of Method Detection Limits (MDL) and Quantitation Limits*), confirmation of the Limit of Detection (LOD) and/or Practical Quantitation Limit (PQL), also known as the Limit of Quantitation (LOQ), an evaluation of method performance (using four or more replicates of quality control samples), evaluation of the selectivity of the method, and any additional method-specific requirements

- ELI demonstrates that laboratory staff is qualified and capable of performing the method. Analysts are assigned duties based on their skills and experience. Training records are

maintained for all analysts. Curricula vitae of supervisory and senior analysts are described in Appendix D.

- It is the responsibility of the analyst to become thoroughly familiar with the methodology and instrument operation before performing the analysis. It is the responsibility of the person providing training to monitor all laboratory results generated for a reasonable time. The amount of time necessary may vary depending on the method and the experience of the analyst. At a minimum, the analyst's performance is to be monitored until the analyst demonstrates the ability to generate results of acceptable accuracy and precision according to the method.

- All analysts are required to demonstrate and maintain a record of proof of competency by routinely analyzing quality control samples appropriate to the analytical procedures they perform. Competency in analyzing these control samples is documented in analysts' training files per NELAP requirements (for more information, see ELI SOP, *Personnel Training and Training Records*). For those analyses where external proficiency testing (PT) samples are not routinely analyzed, competency is documented by including the results of routine analysis of method-specific quality control samples (prepared by laboratory staff) and/or a verifying statement of procedural review by a supervisor or trained analyst.

- Each analytical method is subjected to quality control monitoring. The purpose is to demonstrate that results generated meet acceptable accuracy and precision criteria for the method. Precision and bias are determined for standard and non-standard methods. Precision and bias are determined for standard methods through control charting of data from quality control samples. Precision and bias using non-standard, modified standard or laboratory-developed methods are compared to the criteria established by the client (when requested), the method, or the laboratory.

- Quality control requirements are outlined in the methods and ELI, at a minimum, follows the guidelines specified in the methods used. Additional QC requirements are also added as appropriate. Statistical method performance is periodically evaluated against method requirements using control charts.

- Quality control monitoring to measure accuracy for each method generally requires that five to ten percent of all samples analyzed be fortified (spiked) with a known concentration of target analytes tested by the method. The percent recovery is then calculated. This provides a means for monitoring method accuracy and evaluating sample matrix effects. Where appropriate, surrogates are included in the method to monitor method performance on each individual sample. Blank spike samples replace matrix spike samples for certain methods, or when there is insufficient sample for a matrix spike analysis. Historical, routine batch QC sample performance can be used to estimate the precision and accuracy of the method.

- Quality control monitoring to measure precision for each method requires replicate samples be prepared and analyzed when appropriate. Actual requirements are outlined

in the specific SOP. When replicate samples or matrix spike duplicates are analyzed, relative percent difference is calculated and used to monitor precision of the method. In instances where there are no specific method requirements, it is the policy of this laboratory to analyze five to ten percent of all samples in duplicate. Duplicate test results must be within the control limits established for each analysis type or data is qualified. Acceptance limits generally follow specifications listed in the method. Matrix spike duplicates replace sample duplicates for most methods.

- When not defined in the method, and as appropriate, method blanks and/or instrument blanks are analyzed one in every 20 samples at a minimum. Method blanks are used to verify that contamination from laboratory reagents and glassware is not present in the analytical sample process. Generally, the method blank should be less than the reporting limit, or 10 times less than the concentration amount in the sample, for the analytical parameter being tested, whichever is greater.

- When not defined in the method and as appropriate, method spikes (blank spikes) are analyzed one in every 20 samples, at a minimum.

- Calibration standards are analyzed and calibration curves are developed for all applicable methods. For additional information on instrument calibration, see Chapter 7 of this QA manual.

- The initial calibration is continuously monitored by analyzing a continuing calibration standard every 10 to 20 samples, or within a specified time frequency, and at the end of each analytical sequence; depending on the method and instrumentation. Results must be within an established range as described by the method SOP. Initial calibrations are verified against a standard from a second source.

- Proficiency testing samples and further quality control check samples may be required for various methods. Refer to Chapter 2 of this QA manual for further details.

Estimation of Uncertainty

The estimation of uncertainty consists of the sum of the uncertainties of the individual steps or processes of an analytical procedure. The variability of the sampling plan, sample heterogeneity, extraction procedure, instrument calibration, instrument drift, systematic bias, and many other factors all contribute to the uncertainty of a measurement or result.

ELI estimates uncertainty utilizing Confidence Intervals defined as ±2σ (95%) and ±3σ (99%) where σ is the standard deviation of the recovery of quality control samples. The confidence intervals calculated from these QC samples are based on the spike level concentrations for each method. Uncertainty at low concentrations may be one to three times the quantitation limit. Real world samples, depending on matrix interferences, may have a greater amount of uncertainty associated. Due to limitations in assessing the uncertainty for each matrix type, the confidence intervals calculated from method QC samples provides an estimate of uncertainty.

Energy Laboratories, Inc. uses the procedures outlined in ELI SOP, *Control Chart Generation and Maintenance*, for the purpose of evaluating estimation of uncertainty for chemical analyses and uses the determination of uncertainty on a sample-specific basis for all radiochemistry measurements. These estimates of uncertainty have formulas documented in the individual SOP.

Maintenance of Performance Records

All quality control monitoring is recorded and documented. Quality control data is recorded in laboratory notebooks, electronic summary files, and/or analysis sheets. Generally, review of QC data and trends is managed within the Laboratory LIMS system. QC data management and control chart generation, maintenance, and usage are described in ELI SOP, *Control Chart Generation and Maintenance*. It is the responsibility of the analyst to see that all results are recorded in a timely manner.

All quality control data is filed and available for inspection and assessment by analysts, supervisors, management, and quality control personnel.

Method Quality Control Specifications

Summaries of Quality Assurance/Quality Control specifications for a selected subset of procedures offered by ELI are outlined in Appendix B. These types of tables are available upon request for our clients to use in the preparation of Quality Assurance Project Plans (QAPPs). Exact details of method QC can be found in the applicable method SOPs.

CHAPTER 2 – QUALITY ASSESSMENT PROGRAM

The function of the Quality Assessment Program is to provide formal evaluation of the quality of data being generated and reported by the laboratory. External and internal quality control measures are used in this assessment. These measures include proficiency testing samples, laboratory quality control check samples, and routine internal and external audits on methodology and documentation procedures.

Proficiency Testing (PT) Samples

PT samples are supplied by an outside entity and contain known amounts of constituents. The laboratory does not have access to known values of the samples. Only the PT provider has knowledge of constituent levels prior to the formal publishing of the test results.

PT samples are received on a routine basis, with results sent to the providing entity for evaluation. Proficiency Testing (PT) samples for USEPA, NELAP and various State certifications are Water Pollution Study samples (WP or DMRQA), Water Supply Study samples (WS), and LPTP Soil PT samples provided by either Resource Technology Corporation (RTC) and/or Environmental Resource Associates (ERA); both being NELAP approved PT providers. Routine participation in LPTP, WS and WP PT sample studies is used to maintain certifications for Safe Drinking Water Act (SDWA), Clean Water Act (CWA), National Pollutant Discharge Elimination System (NPDES), Discharge Monitoring Report Quality Assurance (DMRQA), permit monitoring analyses, Resource Conservation and Recovery Act (RCRA) analyses, as well as other states and projects requiring method accredited parameter analyses. The samples are analyzed in the same manner as any routine sample in the laboratory. Acceptable results are those that fall within a defined range as determined by the vendor/EPA/ NELAP; based on multi-laboratory study results. The provider sends results to USEPA and other certifying agencies as requested by ELI-Billings. PT study results are posted on the ELI website www.energylab.com.

A copy of the certificate for our primary certifications to perform drinking water analyses issued by the State of Montana and the NELAP certificate from Florida Department of Health are included in Appendix A. The Montana certification includes a list of parameters/methods for which drinking water certification has been granted. The NELAP certificate also includes RCRA methods used for hazardous waste characterizations and CWA parameters/methods which are used for NPDES monitoring permits. ELI also participates in the Federal/State DMRQA programs for clients which require/request this with their NPDES permits. Reciprocal accreditation in other states is based on either of these, or both, depending on specific state certification requirements/parameters.

Proficiency testing samples for Radon Proficiency testing certification are from the National Environmental Health Association (NEHA), an EPA approved commercial Radon testing certification association. Our own radon sampling canisters are submitted to NEHA for known levels of radon exposure. Acceptable results are those that fall within a defined range based on multi-laboratory study results.

Blind Quality Control Check Samples are samples submitted as regular lab samples and are processed through the system in the same manner as any other routine environmental sample. The analysts do not know the true values of these samples when performing the analyses. Method performance reports are returned to the analysts. Clients occasionally submit these types of samples for their QAPP.

Inter-Laboratory comparison samples are samples containing known or unknown quantities of analytes that are split and analyzed by more than one laboratory.

Quality Control Check Samples

Quality Control Check Samples are performance evaluation samples used for routine method performance monitoring. As appropriate, analytical procedures include the analysis of a quality control sample with every sample batch analyzed. The materials are obtained from a commercial source when available, or they may be prepared in-house. Acceptable results are within a defined range based on certified ranges, or against statistically determined control limits, method-defined criteria, or client defined Data Quality Objectives. Routinely used methods not subjected to PT sample monitoring are evaluated with Quality Control Check Samples, as appropriate.

QC samples are processed through the system in the same manner as any other sample, except the analyst is aware of the source, concentration, and acceptance ranges of target analytes and calculates analyte recoveries to evaluate method performance in real time.

Quality Assurance Audits

Quality Assurance Audits consist of internal and external laboratory inspections designed to monitor adherence to Quality Systems and quality control requirements. These audits check general laboratory operations, overall Quality Systems, adherence to QA program requirements, sample tracking procedures, sample holding times, storage requirements, adherence to procedures during analysis, calculations, completion of required quality control samples within the group surrounding the sample, and proper record-keeping.

Internal quality control audits are conducted or coordinated by the Quality Assurance Officer of the laboratory. See ELI SOP, *Internal Quality Assurance Audits*, for further information. ELI conducts internal inspections on a regular basis to monitor adherence to quality control requirements. Results of formal audits are given to management with possible recommendations for corrective action in the event any discrepancies are found. As necessary, a follow-up review is conducted to determine that identified problems have been addressed. Annually, the overall quality systems of the laboratory are reviewed and a summary report is prepared.

Per NELAP/ISO 17025-2005 requirements, the management of the laboratory will conduct an annual review of the Quality System, including policies, procedures and environmental testing activities. This is done to ensure the continuing suitability and effectiveness of the QA systems,

as well as provide the opportunity to introduce necessary changes or improvements. The review shall take into account, at a minimum, the following:

- The suitability of policies and procedures
- Reports from managerial and supervisory personnel
- The outcome of recent internal audits
- Corrective and preventative actions
- Assessments by external bodies
- The results of inter-laboratory comparisons or proficiency tests
- Changes in the volume and type of work
- Client feedback
- Complaints
- Recommendations for improvement
- Other relevant factors, such as quality control activities, resources and staff training

The findings from management reviews and the corrective actions that arise from these findings shall be recorded. The management shall ensure that any corrective actions are carried out within an appropriate, pre-determined time frame.

ELI also conducts Peer Audits as part of an internal auditing program established within the company. This process utilizes analysts and supervisors from other ELI laboratories to evaluate a designated ELI branch. The Peer Audits serve to not only address conformance issues, but also provide ELI with a tool to continuously improve process and consistency throughout the company. The goals of the Peer Audits are to:

- Encourage relationships between analysts
- Transfer technical knowledge between peers
- Establish consistency of analytical process/method between ELI laboratories
- Identify the depth of analysts' knowledge at each position by observing what analysts are doing at the bench
- Determine training needs of personnel
- Document process/method and verify that issues are being corrected when found
- Work with, and in support of, QA department efforts

Depending on the size of the laboratory, a large number of methods and processes can be examined during a Peer Audit. Results from these audits are provided to the branch management, as well as Corporate Management. Corrective Action Plans of a Peer Audit are initiated with the assistance of the Quality Assurance Officer for resolution of any findings.

ELI welcomes external Quality Assurance Audits, by qualified outside auditors, for review and comment on the overall QA program. To maintain certifications, accrediting authorities from the State of Montana, USEPA, and NELAP conduct periodic comprehensive external audits. External audits to meet Quality Assurance Project Plans (QAPPs), as applicable to environmental remediation projects, or for major industries, are conducted as requested. For more information, see ELI SOP, *External Quality Assurance Audits*.

CHAPTER 3 – LABORATORY FACILITIES

The facility for Energy Laboratories, Inc. – Billings, MT consists of multiple buildings with over 35,000 square feet of total space; these buildings are located in Billings at 1120 South 27th Street, Billings MT 59101.

The phone number for Billings Energy Laboratories, Inc. is (406) 252-6325, the fax number is 406-252-6069, the toll free number is 800-735-4489, and the email address is eli@energylab.com.

Laboratory space includes adequate bench top and floor space to accommodate periods of peak work load. Working space includes sufficient bench top area for processing samples; storage space for reagents, chemicals, glassware, bench and portable equipment items; floor space for stationary equipment; and adequate associated area for cleaning glassware. Laboratory departments are organized and the facilities are designed for specific laboratory operations in order to protect the safety of analysts and to minimize potential sources of contamination between and within department areas (for more information, see ELI SOP, *Facility Description, Access, and Security*).

The laboratory is appropriately ventilated and illuminated, and is not subject to excessive temperature changes. Specific laboratory areas are temperature and humidity controlled as required. Ample cabinets, drawers and shelves are available for storage and protection of glassware. Exhaust fume hoods are available as needed for use during preparation, extraction, and analysis of samples. Employee exposure monitoring is conducted to provide a safe working environment.

To maintain security, all visitors must enter their name on the ELI sign-in log at the front desk and wear a visitor's badge.

The laboratory has provisions for the disposal of chemical and microbiological wastes. These provisions are described in Standard Operating Procedures as well as outlined in the Laboratory Safety Manual & Chemical Hygiene Plan along with other safety and health guidelines. For more information, see ELI SOP, *General Laboratory Waste Disposal*.

CHAPTER 4 – PERSONNEL REQUIREMENTS AND LABORATORY ORGANIZATION

Relationship between Management, Technical Operations, Support Services and the Quality System

Laboratory Organization

The corporate organization of the four ELI laboratories located in Montana (2), and Wyoming (2), is provided in Appendix C. The Billings laboratory is the center for all corporate functions. Each laboratory is managed and operated individually under the supervision of a Laboratory Manager. All ELI laboratories have fiscal and QA/QC responsibilities to the corporate office, as well as general operating policies and goals. Quality Assurance Manuals are prepared individually for each laboratory and follow the QA/QC program outlined in the ELI-Billings QA manual.

The ELI-Billings Organizational Chart is also included in Appendix C with curricula vitae of key ELI-Billings laboratory personnel maintained in Appendix D of this manual. Job descriptions are maintained by the Human Resources Department.

Quality Assurance receives direct support from senior management. Laboratory Quality Assurance Officer reports directly to the Corporate Quality Assurance Officer as well as their Laboratory Manager. Quality Assurance Officers provide independent oversight of Quality Systems within the overall Energy Laboratories structure. When Quality Assurance Officers fill more than one role within the organization, they operate independently of direct environmental data generation while fulfilling quality assurance responsibilities. Quality Assurance Officers facilitate development of and maintain the Quality Assurance Manual, provide assistance to personnel on quality assurance / quality control issues, maintain a quality assurance training program, and review quality documentation including SOPs.

Management ensures the development and implementation of programs and policies to continuously improve the effectiveness of ELI's QA Program and Management Systems. Management performs an annual review of the laboratory's Quality System (policies, procedures, work instructions) to assure their continuing suitability and effectiveness (See ELI SOP: *Management Reviews*, for detailed procedures). As appropriate, management identifies and implements any necessary changes or improvements. Corrective and preventive actions are detailed in a Corrective Action Report and filed with the QA Department. (Refer to ELI SOP: *Nonconformance Procedures and Corrective/Preventive Action Reports,* for detailed procedures.) In addition, management performs meetings with supervisory and key staff members throughout the year. Supervisors and QA personnel provide input on their specific areas of responsibility and evaluate the following:

1) Client-Related Items
2) Internal and External Audit Reports

3) Proficiency Testing Results
4) Review of Performance by Department
5) Corrective and Preventive Actions
6) Personnel Training Needs
7) Quality System Policies and Procedures
8) Resources including Personnel, Equipment and Facilities

Laboratory Management Review findings are compiled into a summary report. The report includes deficiencies identified and areas for improvement. The QA department ensures items from the Management Review are tracked, including actions that must be addressed, assignment of parties responsible for the actions to be taken, and recommendations on improvements to the Quality System. The Technical Director, Laboratory Manager, Quality Assurance Officer or designee, shall assign specific persons to address management review findings and establish deadlines for their completion. The Technical Director, Laboratory Manager, Quality Assurance Officer or designee, reviews and approves all QA documents issued to personnel in the laboratory as part of the management system. The Technical Director, or designee, has overall responsibility for the technical operations of the laboratory. Any procedural deviations to SOPs that are client or project-specific must receive approval either from the Technical Director, Laboratory Manager, or Quality Assurance Officer. Work is stopped when identification of any of the following is made: unapproved departures from the management system, unauthorized deviations from the procedures for performing tests and/or calibrations, and data quality or data integrity issues. The Technical Director, Laboratory Manager, QA Officer, or designee, is responsible for providing authorization for the work to resume once the identified issue has been addressed.

Personnel Requirements

ELI maintains experienced staff and management. Below is a summary of the primary roles, responsibilities and qualifications for the designated positions. Laboratory experience can be substituted for academic requirements. At ELI's smaller laboratory operations, the technical director may serve multiple roles. Detailed job descriptions are maintained by the Human Resources department. Specific titles of employees are at the discretion of the Laboratory Manager.

Laboratory Manager

The Laboratory Manager is required to have education and experience equivalent to a Bachelor of Science degree in Chemistry or a related science. Five years of relevant laboratory experience is required.

The Laboratory Manager is responsible for all operations, client management, analysis scheduling, and equipment acquisition, as well as compliance with all employment, safety, environmental and NELAP /ISO 17025 regulations. The Laboratory Manager may delegate daily activities of these work aspects to appropriate personnel. The Laboratory Manager reports directly to the Corporate Director of Operations. All Laboratory Managers have both technical and management responsibilities.

Quality Assurance Officer

The Quality Assurance Officer is required to have an education and experience equivalent to a Bachelor's of Science degree in Chemistry or a related science. Five years of relevant laboratory experience is preferred.

The Quality Assurance Officer is responsible for quality systems development, implementation, and management. The Quality Assurance Officer is also responsible for maintaining and improving compliance with all applicable state and federal regulations as well as maintaining compliance with NELAP/ISO 17025 regulations regarding Quality Systems. The Quality Assurance Officer or his/her designee with the help of the Laboratory Manager manages the laboratory's certification programs to meet government regulatory and specific client requirements. The QA program is implemented in cooperation with all levels of management and staff. Quality Assurance Officers report directly to the Corporate Quality Assurance Officer. The Laboratory Manager will direct daily laboratory-specific QA/QC requirements. The Corporate Quality Assurance Officer reports directly to the ELI President.

Technical Director

The Technical Director is required to have a Bachelor of Science degree in Chemistry or a related science. Five years of relevant laboratory experience is required.

The Technical Director is responsible for ensuring compliance with all laboratory policies and that the analyses conducted under their supervision are compliant with all state, EPA, and NELAC/ISO17025 standards. The Technical Director reports directly to the Laboratory Manager.

The Technical Director may serve multiple roles. Laboratory Managers serve as one of the laboratory Technical Directors.

Laboratory Supervisor

A Laboratory Supervisor is required to have education and experience equivalent to a Bachelor of Science degree in Chemistry or related science. Two years of relevant laboratory experience is required.

ELI's Laboratory Supervisors are responsible for the day-to-day operation of the laboratories: scheduling testing, assigning work, and completing the technical review of laboratory data. Supervisors are responsible for ensuring compliance with all laboratory policies and ensure that the analyses conducted under their supervision are compliant with all state, EPA, and NELAC/ISO17025 standards. They report directly to the Laboratory Manager.

Analysts

Laboratory Analysts are required to have an education equivalent to a Bachelor of Science degree in Chemistry (or related science), or a High School diploma with experience as an

analyst in training. New analysts require a minimum of six months of on-the-job training, under direct supervision of a qualified analyst. The training shall be relevant to the present and anticipated tasks required and the effectiveness of the training is evaluated (for more information, see ELI SOP, Personnel Training and Training Records). After the initial training period, and on a continuing basis thereafter, the analyst must demonstrate acceptable skills through the successful participation in the analysis of applicable performance evaluation and quality control samples.

Analysts perform the following duties: Preparation of samples and reagents, analysis and preliminary data input, as well as various other tasks assigned by the supervisor. Analysts are responsible for complying with all laboratory policies and procedures.

Laboratory Technicians

Laboratory Technicians are required to have a High School Diploma or equivalent. Laboratory Technicians work under the supervision of the primary analyst performing general laboratory tests.

Under the supervision of a primary analyst, Laboratory Technicians perform the following duties: preparation of samples and reagents, analysis, and preliminary data input, as well as various other tasks assigned by the supervisor.

Laboratory Technicians are responsible for complying with all laboratory policies and procedures.

Approved Signatories

Signatures for policies are based on appropriate individuals, roles and responsibilities as determined by the policy being reviewed and approved. A list of significant signatories is included below. Additional signatures may be required for specific procedures.

- Laboratory Manager
- Technical Director
- Quality Assurance Officer
- Corporate Officer- ELI Board of Directors

A master list including signatures and initials for all employees is maintained for reference and signature verification.

CHAPTER 5 – SAMPLING PROCEDURES

Private individuals or companies, who are responsible for using proper collection procedures, collect most of the samples processed in this laboratory. Members of the staff are acquainted with proper sample collection and handling procedures and advise those who need help in this area. Instructions and forms for initiating Chain-of-Custody are available from ELI. Laboratory procedures for logging in samples for analysis and maintaining Chain-of-Custody are described in ELI SOP, *Sample Receipt, Login, and Labeling*.

When the laboratory has been assigned the responsibility of sample collection, there is strict adherence to correct sampling protocols, initiation of chain-of-custody, sampling documentation, complete sample identification, and prompt transfer of sample(s) to the laboratory. Procedures are described in ELI SOP, *Field Sampling*.

This laboratory provides proper sample containers and preservatives as specified for the procedure. Certified sample bottles may be ordered upon request. Sample containers, preservatives, coolers for shipping, re-sealable plastic bags for ice containment, trip blanks for monitoring contamination during shipping, temperature blanks for accurately monitoring sample receiving temperatures, Chain-of-Custody forms, Chain-of-Custody seals, sample bottle labels, instructions for sampling, sample labeling, sample preservation, and sample packaging/shipping are provided upon request. Sample container type, sample volume, preservation requirements, and maximum holding times, are detailed for each analyte/method in the ELI Professional Services Guide. See the ELI website, www.energylab.com for the current pricing.

Energy Laboratories maintains a strict Sample Acceptance Policy. The client is immediately notified (as appropriate) upon sample receipt if there is any doubt concerning the sample's suitability for testing, including but not limited to, when:

- Samples are out of temperature compliance;
- Samples are received in unacceptable containers;
- Samples have not been properly preserved*;
- Samples have labels or chain-of-custody procedures that are incomplete;
- Samples cannot be analyzed within method recommended holding time; or
- The custody seal has been broken.

Notification of sample receipt condition is available through the final report, Energy Source, Email, telephone, and/or voice.

Samples not collected or documented properly can be rejected for any regulatory-based analysis with re-sampling recommended. If re-sampling is not possible, or the client cannot be contacted, the sample may be analyzed, and if analyzed, the sample will be clearly qualified on the analytical report.

The laboratory will preserve samples at the time of sample login if samples are unpreserved and preservation is required by the methodology. Aqueous samples for volatile analysis are checked

for preservation at the time of analysis. Samples for microbiological analysis are collected in pre-sterilized 120 mL plastic bottles containing sodium thiosulfate.

Sample preservation should be performed immediately upon sample collection. For composite samples, each aliquot should be preserved at collection. Refer to ELI Professional Services Guide for detailed information on sample preservation requirements per applicable method and regulatory requirements.

The laboratory initiates a sample condition report titled Workorder Receipt Checklist at the time of sample receipt. The sample condition report contains Chain-of-Custody procedures, sample preservation status, carrier used for sample shipment, sample receipt temperature, and provides general comments concerning sample condition. The sample condition report is provided with the analytical data report package. For more information, see ELI SOP, *Sample Receipt, Login, and Labeling*.

When any sample is shipped by common carrier or sent through the United States Mail, it must comply with the Department of Transportation Hazardous Materials Regulations (49 CFR Part 172). The person offering such material for transportation is responsible for ensuring such compliance. For the preservation requirements as described in the ELI Professional Services Guide, the Office of Hazardous Materials, Material Transportation Bureau, and Department of Transportation have determined the Federal Hazardous Materials Regulations do not apply to the following:

A) Hydrochloric Acid - (HCl) in water solutions of 0.04 % by weight or less (pH of 1.96 or greater).
B) Nitric Acid - (HNO_3) in water solutions of 0.15 % by weight or less (pH of 1.62 or greater).
C) Sulfuric Acid - (H_2SO_4) in water solutions of 0.35% by weight or less (pH of 1.15 or greater).
D) Sodium Hydroxide - (NaOH) in water solutions of 0.080% by weight or less (pH of 12.30 or less).

For regulatory compliance monitoring, it is required that all samples be analyzed within the prescribed holding times. Holding times are the maximum times allowed between sampling and analysis for results to still be considered valid. Samples should be delivered to the laboratory as soon as possible following collection to assure that holding times can be met. Samples are analyzed as soon as possible after sample receipt. When maximum holding times cannot be met, re-sampling is requested. If samples are analyzed out of hold, data is appropriately qualified.

To ensure that drinking water analysis requirements for radiochemistry analyses are met, the requirements for sample handling, preservation, and instrumentation for radiochemical analysis are included in ELI SOP: "*Sample Receipt, Log-In and Labeling*". (For additional information, refer to "Manual for the Certification of Laboratories Analyzing Drinking Water", Table VI-2: Sample Handling, Preservation, and Instrumentation, EPA 5th Edition, January 2005).

CHAPTER 6 – SAMPLE HANDLING

The ELI laboratory utilizes a sample tracking policy that includes client-initiated chain of custody. Upon receipt, the security of the samples is maintained by the implementation of the laboratory access and security policies. See ELI SOP, *Facility Description, Access and Security*.

Sample Receipt

All samples arriving at the laboratory are logged in the Laboratory Information Management System (LIMS). Each sample container is given a unique laboratory sample number. The sample receipt checklist evaluates Chain-of-Custody procedures, sample preservation status, carrier used for sample shipment, sample temperature, and provides general comments concerning sample condition. The completed checklist is provided with the analytical report package. Chain-of-Custody forms are checked for pertinent information. If necessary information has been omitted, the collector is notified, if possible, and the missing information is requested.

Samples requiring preservation are checked to determine if the client performed preservation. If requested, ELI staff will preserve or filter samples as appropriate. Samples that degrade quickly or cannot be opened (such as aqueous samples for volatiles) are not preserved at the time of sample login. If samples are improperly preserved, or the maximum holding times are exceeded upon arrival at the laboratory, the client is notified and re-sampling may be recommended.

Samples are stored per method specifications, or as method/parameter storage requirements are updated per later EPA guidance in Federal Regulations posted in 40CFR Part 136 and Part 140.

During sample login, all sample information such as sample description, client name and address, analyses requested, special requirements, etc. are entered into the computer database of the Laboratory Information Management System (LIMS). Requested analysis parameters and special requirements are communicated to the analysts via their LIMS work lists. Project-specific requirements are maintained in the LIMS for any samples received from a special project. This process ensures that individual requirements are maintained.

Chain-of-Custody

Evidence level internal chain-of-custody (COC) procedures are available on a project-specific basis. For these procedures, internal COC sample custody is maintained down to the individual analyst level. When transferring the possession of the samples, the transferee must sign and record the date and time on the chain-of-custody record. Every person who takes custody must fill in the appropriate section of the chain-of-custody record. When received by ELI, sample identification information on the sample containers is compared to the custody report form. The sample is inspected and information regarding the condition of the sample and seal (if used) is

recorded on a report form; the method of shipping is also documented on the report form. A copy of the report form is kept with the sample data file and a copy is sent to the client with the analysis report. Internal chain-of-custody forms are used to document the progress of the sample through the laboratory, when appropriate. ELI's routine COC policy is maintained at the laboratory level through our laboratory access and security policies. See ELI SOP, *Facility Description, Access, and Security*.

Sample Tracking

Samples are tracked through the analytical process by the LIMS. Completed analyses, which have been approved by the appropriate reviewer as valid data, are reported in the LIMS. When all analyses are complete, the data is reviewed as a whole to ensure results pass data quality checks. The completed report is signed by an approved signatory. The signed report is sent to the client via requested delivery format. Generation of the invoice automatically completes the work order in the LIMS and removes the samples from the status report. For more information, see ELI SOP, *Document and Record Management, Control and Archiving*.

Sample Disposal

It is preferred that remaining hazardous sample material be returned to the originator (client) for disposal. When this is not possible or reasonable, ELI will dispose of remaining hazardous sample materials with a waste disposal surcharge added to the cost of the analysis.

The disposal of laboratory wastes will be performed in accordance with local, state, and federal regulations which apply to such activities. Each method SOP addresses waste minimization and management specific to the method procedure. See ELI SOP, *General Laboratory Waste Disposal,* for more information.

Subcontracting Policy

The ELI Billings laboratory utilizes the expanded branch laboratory capability and expertise to provide comprehensive analytical services. This occurs when the laboratory is requested to perform an analysis outside of the laboratory's capabilities (If sample overload is experienced; if equipment is out of service; or when the laboratory is not accredited for the particular analysis). Upon completion of the analyses, the subcontracted ELI laboratories report the sample results, and their quality control package, to the primary laboratory. The results are reviewed before being reported.

All ELI laboratories are certified to perform drinking water analysis in their state and in neighboring states. Samples are forwarded to our branch laboratories only if the laboratory is certified in the state from which the sample originated per State certification requirements. Individual ELI laboratory Quality Assurance Programs are consistent with the Corporate Quality Assurance Program and are monitored through internal laboratory audits.

To support Energy Laboratories, Inc. Billings's analytical services, ELI branch laboratories (which maintain specific instrumentation for specialized analysis) are utilized to provide

complete analytical services. Refer to Appendix A for the certificates detailing routine analyses performed by the Billings laboratory. All ELI laboratory certificates are also available on the Energy Laboratories website at www.energylab.com.

ELI Billings routinely subcontracts the following parameters/methods to other ELI laboratories:

Total Organic Halogens (TOX) by SW-846 9020
Total Arsenic CVAA by ASTM 3114
Low level EDB and DBCP by EPA 504
Carbamates by EPA 531.1
Glyphosate by EPA 547
Diquat by EPA 549.2
Total Organic Carbon (TOC/DOC) by A5310 C or A5310B, and SW-846 9060
Oil & Grease by SW-846 1664A
All Radiochemistry except Radon in air

In the event that ELI is dependent on the service of an outside laboratory for analyses not available through our facility or our other company laboratories, the client is notified that their samples are subcontracted to a pre-approved outside laboratory. The outside laboratory reports the results to ELI and these results become part of the final report. Any external or internal subcontracted analyses that require accredited analyses will be performed by a laboratory accredited for those parameters required in the State from which the sample originated. All final reports indicate where the analyses were performed. Certification files of pre-approved subcontract laboratories are maintained by the ELI QA departments.

CHAPTER 7 – INSTRUMENT OPERATION AND CALIBRATION

Laboratory instruments and equipment are operated and calibrated according to the manufacturer's instructions and according to the requirements of the method being used. Exact calibration procedures are outlined in the appropriate SOP. For most instruments, a calibration curve composed of three to five standards covering the concentration range of the samples is prepared. The acceptance criteria for the calibration curves are listed in the individual methods. Unless otherwise specified in the method, at least one of the standards is at or below the practical quantitation limit (PQL) of the method. Routine PQLs for each method are given in the ELI Professional Services Guide. Calibration standards are routinely compared to second source calibration standards to verify accuracy. These second source standard results must fall within an established range, as described by the SOP, to be accepted. Whenever possible, the laboratory uses calibration standards prepared from certified stock standards. Initial instrument calibration curves are verified and routinely monitored by analyzing a continuing calibration standard every 10 to 20 samples (or within a specified time frequency) and at the end of every analytical sequence, depending on the analysis method and instrumentation. When applicable to the method, high-level samples, which produce an analytical response outside the calibrated range of the instrument, are diluted (or reduced in mass) and re-analyzed until a response within the calibrated range is obtained and/or the result is appropriately qualified.

System cleanliness is verified through the analysis of reagent/instrument blanks prior to analysis, between highly contaminated samples, and at regular intervals during the analysis.

Use of measuring equipment and reagents (glassware, water, chemical reagents, and industrial gases) conform to Good Laboratory Practice guidelines. Good Laboratory Practices (GLPs) are laboratory guidelines which were established by the Food and Drug Administration and published in the Federal Register (21 CFR, part 58). The GLP guidelines were adopted by the Environmental Protection Agency. SOPs are developed in accordance with GLP and NELAP guidelines. Laboratory volumetric glassware conforms to National Institute of Standards and Technology (NIST), American Society for Testing and Materials (ASTM) Class A or B standards. All mechanical pipettes are calibrated at least quarterly. Laboratory balances are serviced and calibrated by certified technicians annually. Calibration checks of balances are performed each day of use, using ASTM Class 1 or 2 weights. Laboratory thermometers are calibrated annually against a NIST traceable thermometer and routinely checked for accuracy. Laboratory drying ovens, incubators, freezers, refrigerators, and water bath temperatures are monitored and recorded each working day, or at frequencies as described in the specific SOP. Laboratory pure water is generated by commercial water purification systems and is monitored and documented each working day in accordance with specifications needed for applicable methods. The routine analysis of laboratory blanks is used to verify laboratory water quality and the suitability of sampling containers. Chemical reagents and gases meet or exceed purity requirements for their intended uses. Laboratory stock and working standards are derived from ISO 17025 and/or 9001 (or equivalent-certified) commercially available primary standards whenever possible. Standard preparation notebooks document the reagent/standard type, source, purity, content, concentrations, preparation date, and analyst. All calibration standards are documented in each daily analytical sequence such that they are uniquely identified and traceable to stock standards and their source.

Standard Operating Procedures (SOPs) detail the sequence of operations involved in instrument start-up, calibration, analysis, shut-down, and routine maintenance. Suggestions for corrective action are included with the SOPs and parameters are identified which dictate certain types of maintenance. Instrument and method detection limit studies are performed at the method required frequency or whenever there is a significant change in instrumentation. Method Detection Limits are determined according to EPA guidelines found in 40 CFR, part 136, Appendix B (except for the few methods that are not amenable to MDLs). Refer to ELI's Professional Services Guide for practical quantitation limits (method reporting limits). Acceptable instrument response/performance criteria are based upon the manufacturer or the analytical method specifications. SOPs exist for all major pieces of analytical equipment/methods.

Instrument logbooks are used to document instrument maintenance and repairs. Instruments that are no longer being utilized are documented in the applicable instrument logbook as "out-of-service" with the date the instrument was taken out of use noted. All out-of-service instruments are labeled with an out-of-service tag that identifies the effective date the instrument was taken out of use.

Laboratory analysts record and document all instrumental runs in Laboratory Instrument Logbooks .or LIMS system, or computer files. Instrument Logbooks and/or dated computer files record instrument performance data, analytical sequences, instrument maintenance, calibration standards data, and any other additional information pertinent to operation of the instrument.

CHAPTER 8 – RECORDS AND REPORTING

Document Management

Energy Laboratories Inc. manages three types of documents: 1) controlled, 2) approved, and 3) obsolete.

A CONTROLLED document is one that is uniquely identified, issued, tracked, and kept current as part of the Quality or Management System. Controlled documents may be internal documents or external documents. Controlled documents are considered to be all documents issued to personnel in the laboratory as part of the management system such as accreditation standards, forms, test and/or calibration methods, and company policies and procedures. All internal ELI controlled documents are written and reviewed by personnel technically competent to perform the procedure and are approved for use by the Laboratory Manager, or managers designee(s).

APPROVED document is one that has been reviewed and approved for use by the Laboratory Manager or manager's designee(s).

OBSOLETE document is a document that has been superseded by more recent versions. Obsolete documents are retained for legal use or historical knowledge preservation. Old or archived SOPs are available for review using the laboratory's electronic document system. ELI's OBSOLETE document records are maintained for at least ten years.

Documents are reviewed on an annual basis to ensure their contents are suitable and in compliance with the current quality systems requirements, and accurately describe current operations. SOPs include a Record of Revision page, which details revisions or reviews. The Quality Assurance Officer maintains a master list of controlled documents (which include title, author, and date of issue).

Procedures for identification, collection, access, filing, storage, and disposal of records are found in ELI SOP, *Document and Record Management Control and Archiving*.

Laboratory Notebooks

Several different types of Laboratory Notebooks are maintained at the ELI Laboratory. These include, but are not limited to, the following:

Method/Parameter Notebooks
Project Notebooks
Instrument/Equipment Use and Maintenance Notebooks
Standard Preparation Logbooks
Balance Calibration Logbooks
Pipet Calibration Logbooks
General Logbooks

The general purpose of maintaining each of these Laboratory Notebooks is to record the details that may be important in repeating a procedure, interpreting data, or documenting certain operations. Entries in the notebook may include data such as standard and sample weights, pH measurements, instrument operating parameters, preparation of calibration curves, analytical run sequences, calculations, recording of instrument operating parameters, sample condition, etc. The analyst's notebook is particularly important in documenting analyses that deviate in any way from routine or standard practices. It can also be an important training record. All pertinent data is to be recorded directly in the notebook. Most notebooks or data records are maintained in electronic format (LIMS, spreadsheets, or databases). Electronic data records are duplicated using hardcopy and/or alternate electronic backup techniques.

It is the responsibility of each analyst to maintain a laboratory notebook according to Good Laboratory Practices (GLP) Guidelines. All physical laboratory notebooks are assigned a unique logbook control number and are assigned to an analyst and/or supervisor. These notebooks remain the responsibility of the ELI staff member's supervisor to whom they are assigned until they are formally transferred to another staff member, until they are completely filled and returned to the ELI QA Department for archiving, or until the staff member resigns and returns them as a part of the check-out process. ELI staff members, other than the individual to whom the laboratory notebook is issued to, may make entries in the notebook as long as those entries are consistent with the intended use of the notebook and such entries are initialed and dated. Procedures for use and maintenance of laboratory notebooks are detailed in ELI SOP, *Laboratory Notebooks*.

Records

The laboratory maintains records of all chemical analyses, including all quality control records, for a minimum of ten years. In the event that Energy Laboratories, Inc., or any individual laboratory transfers ownership or goes out of business, the records will be transferred to the new owners. If an ELI laboratory is closed, records will be maintained by Energy Laboratories Corporate office in Billings, Montana. Energy Laboratories, Inc. reserves the right to offer the records to the clients in the event of complete closure. Details are described in ELI SOP, *Document and Record Management, Control and Archiving*.

Data Reduction

Data reduction refers to the process of converting raw data to reportable units. The reporting units used and analytical methods performed are described in the Professional Services Guide.

Wherever possible, the instrument is calibrated to read out directly in the units reported. In this case, the value is recorded directly into a laboratory notebook, logbook, bench sheet, or electronic file and presented for review.

In cases such as titration, gravimetric measurements, or other techniques that require calculation prior to reporting, raw data is recorded in the appropriate laboratory notebook or electronic file, or on the appropriate laboratory form. The calculations specified in the methods are used to determine the reported value. That value is also entered into the laboratory

notebook or bench sheet. Most calculations are automated to reduce the chance of arithmetic or transcription errors.

Wherever possible, electronic data results are transmitted throughout the laboratory via the LIMS computer network. This process is intended to minimize manual data transcriptions within the laboratory. Additional advantages include the opportunity for rapid comprehensive data validation by supervisors, and more rapid data reporting.

Validation

Data validation includes the procedures used to ensure that the reported values are consistent with the raw data, calculated values, sample type, sample history, and other analysis parameters requested.

The data recorded is validated with several review steps. The analyst who submits the analytical results checks all the values reported for omissions and accuracy. Elements of this review also evaluate all instrument and method QC results. Automated data management programs are designed with an interactive step allowing data review by the analyst. Results to be reported are approved by the analyst.

The report is reviewed for the suitability of the data according to project and method performance specifications. Analytical results for each requested parameter may be evaluated against other requested parameters, project specifications, other samples within the set, historical files associated with the project/client, and/or any other information provided with the sample.

The reports are generated, proofread, and reviewed by designated reporting staff.

Laboratory managers, project managers, supervisors, QA managers or their designees, may also examine the data included in the final report.

Internal and external laboratory audits review selected sets of data to ensure that the analytical results are correct and accurate, analytical methods are appropriate, documentation and record keeping procedures are complete, and that there is compliance to the overall objectives of the Quality Assurance Program. Data integrity is monitored on an on-going basis. See ELI SOP: *Assessment of Data Integrity*, for details.

All controlled automated programs used to process and report data are initially verified using manually calculated results. Whenever a modification is performed to a program, re-verification of overall software function is performed.

One step of the Quality Control process involves data outlier detection; data that falls outside of established limits. If an outlier is observed, corrective action is taken as appropriate, to investigate and/or correct the cause. Actions to correct these causes may include, but are not limited to, inspection of the instrumentation, checking calibrations, checking sample numbers or dilutions, re-analyzing samples or calibrations.

Reporting

One copy of the report is distributed to the client, via requested delivery format, after the report is validated and signed. A standardized report format is used unless otherwise specified. Client-specified report formats are available upon request. Results can be sent via physical media, email, EDD, website FTP and/or FAX when requested by the client. Energy Laboratories, Inc. offers its clients access to electronic records through our Energy Source Portal.

Various levels of data reporting are available. All analytical results, regardless of the level of reporting used, have record keeping procedures which allow an appropriate "data validation package" to be produced. Note that a comprehensive "data validation package" is most easily generated at the time of sample analysis. Example data packages are available upon request.

Safe Drinking Water Act (SDWA) compliance monitoring samples for microbiological and chemistry samples that exceed the SDWA maximum contaminant level (MCL) may require notification to the appropriate state agencies. Generally, notification to the client, and to the state, of any SDWA MCL exceedance must be within 24 hours of completion of analysis/review, or by noon the next business day. If requested by the client, additional copies of the report will be sent to a specified address or person.

The final copy of a completed report is maintained in an electronic format. An electronic copy of this file is available upon request. Energy Source is a client resource of ELI that provides secure online access for clients to view their data and documents. Clients are able to access their electronic files through ELI's secure website at *https://energysource.energylab.com/*. For more information, see ELI SOP, *Document and Record Management, Control and Archiving*.

In addition to traditional ink signatures, Energy Laboratories has approved the use of electronic signatures within our company-produced PDF documents. These signatures comply with Title 15 of the US Code Section 101 regarding legal requirements of a digital signature.

Electronic signatures verify that the document has not changed after it was produced. Upon opening the document, notifications automatically display to inform the recipient of the validity of the sender's electronic signature and all included certificates. Should any changes be detected, an alert message is automatically displayed, noting that the signatures cannot be validated due to changes made to the document. Detailed instruction on how to view/validate ELI's electronic signatures is available.

CHAPTER 9 – GENERAL LABORATORY PRACTICES

Chemicals and Reagents

When available and appropriate, chemicals used in the laboratory are analytical reagent grade (AR) chemicals purchased from reliable suppliers. Reagents are prepared, standardized, and made fresh as mandated by the method, their stability, and according to Good Laboratory Practices. Procedures for purchasing of materials may be found in ELI SOP, *Property Procurement, Inventory, and Control*.

Normalized standards are checked regularly against independently prepared reference materials.

All standards and reagents are dated when received, opened, or prepared, and each is labeled with an expiration date when applicable. Standards and reagents are checked for discoloration or signs of degradation and are discarded if these are observed.

Certified primary standards are obtained from ISO accredited commercial sources when available. Standards used for calibration are verified against second source standards. Secondary and working standards are accurately prepared with volumetric flasks, or other calibrated glassware, from primary standards and stored in appropriate containers.

ELI has determined 5 years to be a reasonable expiration date for stable salts where the manufacturer does not supply such information. Titrants, standards, and other solutions used for analytical purposes are frequently standardized upon preparation with certified or traceable standards. Method SOPs specify if standardization is necessary. The date and analyst's initials must be recorded on the container whenever re-standardized and these records are maintained in a laboratory notebook or in the LIMS.

Individual SOPs may also provide additional details for reagent requirements.

Reagent Interference

To determine the extent of reagent interference, method blanks are analyzed prior to sample analysis whenever appropriate.

If any interference cannot be eliminated, the magnitude of the interference is considered when calculating the concentration of the specific constituent in the sample, but only when permitted within the applicable method.

If reagents, materials, or solvents contain substances that interfere with a particular determination, they are replaced.

Individual method SOPs may also provide additional requirements for handling reagent interferences.

Glassware Preparation

All glassware used for inorganic and radiochemical analyses is washed in warm detergent solution and thoroughly rinsed in tap water. Glassware is then rinsed well three times with laboratory-purified water. This cleaning procedure is sufficient for many analytical needs, but individual SOPs detail additional procedures when necessary. Glassware washing procedures for inorganic analyses are described in ELI SOP, *Cleaning of Glassware Used in Inorganic Analyte Sample Preparation and Analysis*.

All glassware used for organic analysis is washed in warm synthetic detergent solution and thoroughly rinsed in tap water. The glassware is then rinsed well with laboratory-purified water, followed by rinses with acetone to remove any residual organics. Prior to use, the glassware is rinsed three times with the organic solvent to be used with the glassware. Glassware washing procedures for cleaning glassware for organic analysis are described in ELI SOP, *Cleaning of Glassware Used in Volatile and Semivolatile Analyte Sample Preparation and Analysis*.

All glassware used for microbiological analysis is washed in warm detergent solution. The detergent must be proven to contain no bacteriostatic or inhibiting substances. The glassware is rinsed thoroughly with laboratory-purified water. Specific details are described in SOPs.

Disposable, glassware/plasticware is preferred for many procedures in the laboratory. The cleanliness and suitability of disposable glassware/plasticware is continuously evaluated for each test with the routine analysis of method blanks.

All volumetric glassware used in precise measurements of volume is Class A or laboratory calibrated.

Laboratory Pure Water

Laboratory-purified water is used in the laboratory for dilution, preparation of reagent solutions and final rinsing of glassware. For organic analysis, organic-free water is prepared and used. Energy Laboratories, Inc. uses water purification systems that are designed to produce deionized water that meets the requirements of the methods. Use and maintenance of laboratory reagent water systems are described in ELI SOP, *Use and Maintenance of the Milli-Q Water System*.

Water quality is monitored for acceptability in the procedure in which it is used. Specific details are listed in the appropriate SOPs.

Employee Training

All new ELI employees and contract personnel are given an initial general orientation and tour of the laboratory facilities. Personnel are shown the locations of safety equipment such as safety showers, eye wash fountains, fire extinguishers, and first aid supplies. Personal protective equipment such as lab coats, disposable gloves, and safety glasses (if applicable) are issued at this time.

Safety considerations are a vital part of the training process. All hazards associated with the performance of a procedure or with the operation of an instrument are to be understood by the trainee before training can be considered complete. General laboratory safety procedures are a part of the new and current employee training. Specific safety procedures are outlined in SOPs and in instrument Operator's Manuals. Training in use of protective clothing, eye protection, ventilation, and general safety are provided to each employee. Each employee is required to read and sign the *Laboratory Safety Manual & Chemical Hygiene Plan*.

All new and existing employees must demonstrate capability prior to performing an analytical procedure independently (see Chapter One). Method performance on Quality Control Samples is used to document employee training and work quality. Employees are required to read the Quality Assurance Manual and all appropriate SOPs. Employees are required to sign, for all applicable Manuals and SOPs, a Record of Acknowledgement Form that states they have read, understood, and agree to abide by the Manual/SOP.

Employees also receive training on general laboratory policies including ethics and conflict of interest. All employees are required to read, understand and comply with the Corporate Compliance & Ethics Manual. Data integrity training is provided for all employees initially upon hire and annually thereafter. In addition to the *Corporate Compliance & Ethics Manual*, the ELI Quality Assurance department maintains a *Laboratory Ethics & Data Integrity Manual*, which supplements the corporate manual and provides specific training on data integrity. All employees are required to read, understand and comply with the ELI *Laboratory Ethics & Data Integrity Manual*. An annual Ethics training course is given to all laboratory employees. Attendance is required and is recorded with a signature attendance sheet or other form of documentation that demonstrates all staff has participated and understands their obligations related to data integrity and ethics policies. For details pertaining to ethics training and additional ethical procedures and policies refer to ELI SOP, *Personnel Training and Training Records*.

ELI encourages attendance at courses, workshops and other forms of continuing education available from on-site seminars, private institutions, local schools, and State and Federal regulatory agencies. Staff and department meetings are held routinely to communicate company policies and procedures. All training on procedures and policies is documented, per NELAP guidelines, in employee training files. For more information see ELI SOP, *Personnel Training and Training Records*.

Data Integrity

In order to provide for the integrity of ELI and client data, the laboratory has multiple controls on the network, LIMS and applications used. These controls limit access to and the ability to change data as well as provide for redundancy in case of loss.

These include but are not limited to:

- Users connecting to ELI computer systems are authenticated through a user name and password combination.
- Passwords are required to be changed on a regular basis.
- Permissions within ELI applications are role based with different roles having various levels of access and control. Users (analysts, supervisors, and managers) are assigned to these roles.
- In the LIMS, analytical data locks after a period of time and cannot be modified without special handling.
- Certain information has been identified for additional tracking and logging. Changes to this information is not only tracked in an audit log but also reported to select personnel.
- Information on ELI servers including the ELI LIMS system is backed up and recoverable.

Standard Operating Procedures

Laboratory operations and procedures are documented in Standard Operating Procedures (SOPs). SOPs provide information on the consistent and safe operation of the laboratory. For analytical methods, SOPs provide information on the details of the analysis that is not specified in a published analytical method. For routine procedures other than analytical methods, SOPs define the steps required in accomplishing a given task. All SOPs are reviewed and updated periodically to reflect any changes in laboratory operations. Method SOPs follow NELAP requirements. For more information on generation and distribution of SOPs, see ELI SOP, *Preparation, Numbering, Use, and Revision of Standard Operating Procedures*.

Client Confidentiality

Each employee has the responsibility to maintain confidentiality in all matters pertaining to our clients, samples submitted, and Energy Laboratories, Inc. Information obtained during employment with this laboratory, regarding the specific business of this laboratory, or its clients shall at no time be revealed to any outside sources without permission from the owner of the data.

Sample submittal, analysis and the report contents are considered confidential information of the client. When requested to provide results (either in person, via telephone or email), the employees shall verify that the requestor is either the person associated with the project, on the COC, or on a list provided by the client who are authorized to receive data. If a person who is not associated with the project personnel (or is not on the approved list), the base client will be contacted to inquire about authorization to release data. These contacts are documented and associated with the work order in the LIMS system to provide archival proof of authorization to release data. If the client does not authorize a release of data, the requestor will be contacted and told of this decision.

Client confidentially is maintained electronically through the use of password-protected logins on all laboratory computer systems. Additionally, the laboratory maintains network security such as

anti-virus programs and firewalls that prevent any unauthorized outside access. All copies of the original report are stored on the laboratory's document archival system, which is also protected from unauthorized use by the network security systems. Raw data, reports, and LIMS records are kept in a secure location of the laboratory or off-site. All client confidential paper waste, including printouts, is shredded.

CHAPTER 10 – QUALITY CONTROL MONITORING

Routine Monitoring

Temperatures of incubators, water baths, refrigerators, and ovens are checked and recorded according to a prescribed schedule using a continuous monitoring system.

Conductivity of the laboratory-purified water is continuously monitored using an automated monitoring system and as method blanks in routine analytical runs.

Reagents are dated and initialed at the time of receipt. Expiration dates are assigned as a fundamental component of their receipt and/or preparation. Reagents are not used after manufacturer's expiration date is exceeded.

Balances are checked daily, or as required, against ASTM Class 1 or 2 NIST traceable weights and are calibrated and serviced by certified technicians annually.

SOPs are reviewed annually for accuracy.

Laboratory Notebooks are reviewed periodically for correctness and accuracy by supervisors.

Proficiency Testing (PT) Samples are analyzed as required (See Chapter 2 of this QA Manual).

Quality Control Check Samples are analyzed with each analytical batch.

Internal and external audits are performed as specified or requested (See Chapter 2 of this QA Manual for additional discussion).

Additional monitoring requirements may also be specified in individual SOPs.

The Laboratory maintains an active fraud protection program that is implemented through the laboratory ethics policy. Additionally, the potential of fraud is monitored through analyst supervision, management supervision, regular internal audits, PT study participation, and an active quality assurance program.

Instruments/Methods

Calibration is performed as outlined in Chapter 7 of this QA Manual.

Generally, and depending on method requirements, the standard curve is verified with a known second source reference sample. The reference sample results must fall within the appropriate target range for the calibration to be accepted.

In most cases, the calibration stability is checked by analyzing a continuing calibration standard every 10 to 20 samples, depending on the analysis and instrumentation. The verification

standard results must fall within an established range as described by the SOP.

All laboratory instruments are subjected to preventive maintenance schedules. Preventive maintenance schedules are specified in instrument maintenance logbooks.

As appropriate, instrument and/or method detection limits are determined annually, or more frequently if changes in instrument performance are noted or per method requirements. Procedures for the determination of instrument detection and method detection limits are described in ELI SOP, *Determination of Method Detection Limits (MDL) and Quantitation Limits*.

Precision and accuracy requirements for each method are specified in the SOPs. General guidelines are given below.

- Each analytical batch will contain QC samples to measure the accuracy of the method. Each QC sample result is monitored to be within QC specifications of the method. Results of blank spiked sample analysis must be within the established control limits. Quality Control Limits are specified in the SOPs and meet recommended QC limits as described in the referenced method.

- Each analytical batch will contain QC samples to measure the precision of the method. (See Chapter One for discussion on duplicate sample analysis.) Criteria for duplicate sample acceptance are found in the SOP and are generally taken from the referenced method.

- Each analytical batch will contain QC samples to measure the performance of the method on the sample matrix. These are typically identified as a matrix spike analysis and may be performed in duplicate to assess method precision. Typically the sample is fortified with a known amount of target analyte and spike recoveries are calculated. Results outside of method QC guidance are flagged. Quality control limits and appropriate corrective actions steps are specified in the method SOP.

- Several methods are considered to be concurrent methods in that they are either nearly identical or are identical to a method with a different citation. Even if two methodologies are identical in procedure, slight differences in the QC requirements might be the only difference between the two methodologies. These types of methods may also be considered "concurrent" if the procedures are identical and the more stringent of the two method criteria are used. During data reduction and reporting, the referenced method specifications and criteria will always take priority.

As appropriate, the performance trends of QC sample results are evaluated with Quality Control Charts. Suitability of existing QC limits is evaluated and possibly adjusted, but not to exceed method specification.

CHAPTER 11 – CORRECTIVE ACTION

When the quality control checks indicate that an analysis is not within the established control limits, corrective action is needed. This section gives general guidelines for corrective action. Corrective actions for each method or instrument are detailed in individual SOPs. Records are maintained of non-conformances requiring corrective action to show that the root cause(s) was investigated, and includes the results of the investigation. The QA Officer will monitor implementation and documentation of the corrective action to assure that the corrective actions were effective.

Method QC samples that fail to fall within QC control limits may be analyzed again to verify if a problem exists. However, matrix spike or matrix spike duplicate QC samples are not required to be re-analyzed if the performance can be attributed to matrix effects; data results are then reported and flagged.

If the repeat analysis is not within control limits, the particular instrument or procedure is checked according to the specific protocols outlined in the method or according to the instrument manufacturer's guidelines. Once results are within control limits, analysis of all samples that were analyzed while the procedure was out of control are repeated, i.e., all analyses are repeated back to the previous acceptable control sample. In the case of radiochemical analysis, the term “analyze again” means to recount the final sample on the same (or different) detector.

If the analyst is unable to achieve acceptable results after following the corrective action guidelines detailed in the SOP, a supervisor is consulted. If necessary, the appropriate service personnel are contacted if the problem is determined to be due to instrument error, and cannot be resolved. It is also possible that the result is due to statistical variation of the results based on the tolerable error rate that has been determined for the analysis (usually 0.05). In certain cases, where control limits are exceeded, it is possible that problems cannot be corrected to satisfy QC criteria. This could be due to problems such as matrix interference, instrument problems, lack of sufficient sample, missed holding times, high blank contamination, etc. If all possible solutions available to correct the problem are examined and the sample results are still considered valid, qualifying comments are attached to the sample report describing the non-compliance and probable cause.

In the case of a single radiochemistry detector being returned to service, this refers only to the samples counted on that detector. For example, an individual gas proportional counter instrument may have up to 16 detectors; if only one does not pass the QC check the others are still valid and sample analyses performed on the others do not need to be repeated.

In the event that a QC audit or other informational review shows an analysis report to be incorrect, incomplete, or adversely compromised, a revised report and explanation is submitted to the client within ten business days unless otherwise communicated to the client with another time period. The report will clearly be identified as a revised report. As appropriate, an explanation submitted to the client should give a detailed review of the problem and document any unapproved deviations from the regulations, standard operating procedures, or project-

specific scope of work that may have caused it. The explanation to the client may include, but not be limited to, the following components:

1) What actions have been taken regarding the affected data set(s),
2) Identification of the cause, and
3) Corrective action(s) taken to prevent future occurrence.

In the event that a QC check fails, the analyst will follow the procedures outlined in the QA/QC summary of the SOP.

Quality Control Checks for each method or instrument may vary. Energy Laboratories Inc. follows the QC checks set by each governing method. Due to the wide variations between methods, specifics are listed within each SOP for the given method. Please reference the SOP for specific QC checks for the given method. The QC checks may include: ICV, MB, CCV, CCB, LCS, LCSD, LOD, MS, MSD or others specific to that method.

A summary of Quality Assurance /Quality control specifications and QC corrective actions for representative methods is outlined in Appendix B. Any deviation from the SOP/method shall be documented in laboratory records.

Procedure for Dealing with Complaints

DEFINITIONS

Complaint: For the purposes of this procedure, a complaint comes from a client, a user of our data, or employee. The complaint might cover issues about the quality of our data, sample turnaround time, method used, pricing, or other expectations.

Client: The client is a person or company that ordered and paid for the services.

Procedure: The staff person receiving the complaint exercises judgment in deciding the severity and disposition of every complaint. The judgment must be used to decide whom, if anyone, is alerted to the complaint and what actions are appropriate. The complaint issued should be handled with a high degree of discretion and tact by the supervisor or manager involved. The individual handling the complaint is instructed to follow ELI's guidelines provided in this section on how to handle the complaint. This involves listening to the client and getting adequate information so the complaint can be investigated and resolved. The appropriate laboratory staff is notified and a solution to the problem, as well as a timeline for action, is given.

After the complaint is investigated or resolved, as necessary, the client is made aware of the results and determination is made as to what further actions are needed. Complaints and investigations may result in the need to submit a revised report or invoice. Complaints that are straightforward and can be resolved using the resources available to the person handling the complaint should be resolved there. These include such things as minor revisions of reports or invoices. If other decisions need to be made, the appropriate person should be contacted.

It may be appropriate to initiate or prepare a non-compliance report. This report should be completed with the intention of informing the affected staff about the problem so that everyone can learn from it, it can be used as a training tool, change our procedures and improve our service. A procedure to document non-compliance reports is documented in ELI SOP, *Nonconformance Procedures and Corrective/Preventive Action Reports.*

If an employee or former employee sees an issue, they are encouraged to report concerns regarding Quality Systems, unethical behavior, and/or financial mismanagement. This issue should initially be brought to the attention of their supervisor. The supervisor will take appropriate action to resolve the concern. If the employee is uncomfortable with approaching their supervisor or feels that the issue was not properly dealt with, they may approach higher levels of management with their issue.

Energy Laboratories, Inc., has also implemented a program to facilitate confidential reporting to upper management. This tool allows employees to report situations or behaviors that they consider to be unethical, immoral, or improper. It also allows the reporting of suggestions or comments. The program has been implemented at ELI so that anyone reporting a situation can be assured that there will not be retaliation for reporting. It is meant to encourage parties to communicate with upper management when there appears to be no alternative for resolving the

types of issues already described. Access to the program is available on the ELI internal website.

Penalty for Improper, Unethical or Illegal Actions

Energy Laboratories, Inc. employees are expected to work in an ethical, proper, and legal manner. They are expected to perform laboratory analyses according to the cited method(s) and in conjunction with the SOP and the Quality Assurance Plan. Employees are expected and required to report any violations of this policy. All employees are mandated to participate in an ethics-training program as part of their orientation upon hire.

Improper, unethical, or illegal actions by an employee will be addressed on a case-by-case basis as determined by the seriousness of the offense. Corrective actions may include disciplinary action up to and including discharge.

CHAPTER 12 – MANAGEMENT OF CHANGE

Management of change is the process used to review and manage proposed changes to materials, technology, equipment, procedures, personnel and facility operations. These changes may be permanent or temporary depending on circumstances. Change is managed, communicated, and documented as appropriate to the level of change, by the Laboratory Manager and the Supervisors of each department. Significant revisions to controlled documents may require employees to sign a record of acknowledgement.

- New Equipment Validation – Documented in the Instrument Maintenance Module. Supporting studies are documented in the LIMS.
- Implementation of new test methods and method updates – Documented in the method SOP and Instrument Maintenance Module. Supporting studies are documented in the LIMS.
- The QA Manual and SOPs – Documented in the Record of Revision and stored in the Document Control Software.
- Work order changes are documented in the work order report and stored in the LIMS or Document Control Software.
- LIMS changes - documented in a version control repository.
- Personnel changes - documented in employee training records or personnel records.

CHAPTER 13 – MAJOR EQUIPMENT AND METHODS

A summarized listing of major instrumentation utilized in the laboratory is included in Appendix E. See attached NELAP certificate in Appendix A for a complete list of accredited methods and analytes that ELI performs to support SDWA, RCRA and CWA regulated methods. Refer to ELI's Professional Services Guide, located on the ELI website at www.energylab.com, for a list of all methods and analyte parameters that Energy Laboratories, Inc. as a company performs for comprehensive services.

CHAPTER 14 – PREVENTIVE MAINTENANCE

Preventive maintenance is performed on laboratory equipment according to the manufacturer's guidelines and our operational experience. Repairs and maintenance are accomplished in-house by experienced laboratory personnel whenever possible. Other than consumable equipment items, an inventory of spare parts is not maintained. Spare parts are available from outside vendors on an as needed basis. (To ensure method capability, some methods have more than one instrument available). An example of maintenance performed follows:

Instrument	**Maintenance**	**Frequency – Note that Daily is based on use.**
Balances	Check with Class 1 weights	Daily
	Independent Service	Annually
Pipettes	Check volume	Quarterly/Daily
IC	Change Bed supports	Weekly
	Change Guard Column	As Needed
	Change Analytical Column	As Needed
	Calibrate	After maintenance or as needed
	Clean Stator Plate	Annually
	Change tubing	As needed
	Calibrate Conductivity Cell	Every 6 months
	Backup Data	Monthly
ICP-Atomic Emission	Check Pump Tubing	Daily
	Check Coolant Levels	Monthly
	Lubricate Autosampler	As needed
	Air Filter	Quarterly
	Optics Servicing	As needed
ICP-Mass Spectrometry	Check Pump Tubing	Daily
	Check Coolant Levels	Monthly
	Check Electron Multiplier	Daily
	Lubricate Autosampler	As needed
	Air Filter	Quarterly
Gas Chromatograph	Change Septum	As needed
	Check Injection Liner	Daily
	Clean Detector	As needed
	Change Gas Cylinders	At 200 psi
	Change Column	As needed
Auto Analyzers		
	Check For Leaks	Daily
	Change Tubing	When wear is visible
	Lubricate Pumps	Annually
	Lubricate Sampler	Annually
Man-tech Auto-titrator	Visually inspect all probes/ stirrer/ thermometer and fill probes	Daily/As needed
	Flush pH probe/ Fluoride probe	Every 15 days
	Calibrate sample dosing pump	Quarterly
	Replace Tubing	Annually/ As needed
	Clean out titration vessel and rinse station	Quarterly/ As needed
	Clean buret	Quarterly
	Calibrate buret	Monthly

Instrument	**Maintenance**	**Frequency – Note that Daily is based on use.**
	Replace pH/ Fluoride probe	As needed
	Replace Tubing	As needed
	Change Lip seals gland washers on dosing pump	As needed
Man-tech Auto-titrator	Visually inspect all probes/ stirrer/ thermometer and fill probes	Daily/As needed
Metrohm-automated pH, conductivity, ion electrode analyzer	Visually inspect all probes/ stirrer/ thermometer and fill probes	Daily/As needed
	Flush pH probe/ change storage solution	Monthly/ As needed
	Replace Tubing	As needed
	Calibrate buret	Monthly
	Replace pH probe	As needed
Mass Spectrometers	Monitor Vacuum Pressures	Daily
	Monitor Background Levels	Daily
	Monitor Electron Multiplier	Daily
	Change Pump Oil	As Needed
Microbiology	Monitor Room Temperature	Twice daily
	Monitor Incubator Temperature	Twice daily
	Autoclave Maintenance	Annually
	Monitor Water Bath Temperature	Twice daily
Reagent Water Systems	Change/Check Cartridges	Quarterly, or as needed
Compressed Gases	Change Gas Cylinders	At 50 psi, monitor daily
Liquid Chromatograph	Flush System	Daily
	Change Filters	As needed
	Replace Seals	As needed
Continuous Monitoring System	Check Temperatures	Daily, calibrated annually

CHAPTER 15 - REFERENCES

ANSI N42.23-1996, American National Standard Measurement and Associated Instrument Quality Assurance for Radioassay Laboratories.

ASTM Annual Book of Standards, Part 31 (water), American Society for Testing and Materials.

ASTM D 7282-06 Standard Practices for Set-up, Calibration, and Quality Control of Instruments Used for Radioactive Measurements.

Handbook for Analytical Quality Control in Water and Wastewater Laboratories, Environmental Protection Agency. EPA 600/4-79-019

ELI Professional Services Guide (Fee Schedule), Current Revision, Energy Laboratories, Inc.

Manual for the Certification of Laboratories Analyzing Drinking Water, 5th Ed., EPA 815-R-05-004, 2005.

Manual for the Certification of Laboratories Analyzing Drinking Water, Supplement to 5th Ed., EPA 815-F-08-006, June 2008.

Methods for Chemical Analysis of Water and Wastes Environmental Protection Agency, 600/4-79-020.

Methods for the Determination of Metals in Environmental Samples – Supplement I, EPA/600/R-94-111, May 1994.

Methods for the Determination of Inorganic Substances in Environmental Samples, EPA/600/R-93-100, August 1993.

Methods for the Determination of Organic Compounds in Drinking Water, EPA/600/4-88/039, December 1998.

Methods for the Determination of Organic Compounds in Drinking Water – Supplement I, EPA/600/4-90/020, July 1990.

Methods for the Determination of Organic Compounds in Drinking Water – Supplement II, EPA/600/R-92/129, August 1992.

NELAC Chapter 5: Quality System Standard, 2003 or most current version approved by Florida and Texas NELAC Accreditation program.

NELAP, National Environmental Laboratory Accreditation Program http://www.nelac-institute.org/newnelap.php

Standard Methods for the Examination of Water and Wastewater; 20th, 21st and -22nd Editions, APHA.

Technical Notes on Drinking Water Methods, EPA/600/R-94/173, October 1994.

Test Methods for Evaluating Solid Waste, Physical/Chemical Methods (SW846), Environmental Protection Agency. http://www.epa.gov/epawaste/hazard/testmethods/sw846/online/index.htm

TNI Standard, Volume 1 (EL-V1-2009), The NELAP Institute.

CHAPTER 16 – GLOSSARY OF TERMS

Accuracy - The degree of agreement between an observed value and an accepted reference value.

Analyst - The designated individual who performs the "hands-on" analytical methods and associated techniques and who is the one responsible for applying required laboratory practices and other pertinent quality controls to meet the required level of quality.

Analytical Sample - Any solution or media introduced into an instrument on which an analysis is performed, excluding instrument calibration, initial calibration verification, initial calibration blank, continuing calibration verification, and continuing calibration blank.

Audit or Assessment- A systematic evaluation to determine the conformance to quantitative specifications of some operational function or activity.

Batch – A group of environmental samples that are prepared and/or analyzed together with the same process and personnel, using the same lot(s) of reagents. A preparation batch is composed of one to twenty environmental samples of the same matrix, meeting the criteria above. An analytical batch is composed of prepared environmental samples, extracts, digestates, or concentrates, which are analyzed together as a group.

Blank (BLK) - A sample of clean matrix, which accompanies the samples through different aspects of sampling and/or sample preparation. It is used to monitor contamination during sampling, transport, storage or analysis. The blank is subjected to the usual analytical and measurement process to establish a zero baseline or background value. There are various types of blanks: equipment blank, field blank, instrument blank, method blank, and reagent blank.

Blank Spike - See Laboratory Fortified Blank.

Blind QC Check Samples - Samples whose analyte concentrations are not known to the analyst. That the sample is a QC check sample may or may not be known to the analyst.

Calibration - The set of operations that establish, under specified conditions, the relationship between values indicated by the measuring instrument and the corresponding known value of the property being measured.

Calibration Blank - A volume of reagent water fortified with the same matrix as the calibration standards, but without the analytes, internal standards, or surrogate analytes.

Calibration Check Standard - See Check Standard.

Calibration Curve – The graphical relationship between the known values and the instrument responses for a series of calibration standards.

Calibration Standard - A solution of known concentration used in the calibration of an analytical instrument.

Chain of Custody Form- A record that documents the possession of the samples from the time of collection to receipt in the laboratory. This record generally includes: the number and types of containers; the mode of collection; collector; time of collection; preservation; and requested analyses.

Check Standard - A material of known composition that is analyzed concurrently with test samples to evaluate a measurement process.

Clean Water Act - Public Law PL 92-500. Found at 40 CFR 100-140 and 400-470. The act regulates the discharge of pollutants into surface waters.

Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) - The enabling legislation (42 USC 9601 - 9675 et seq., as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA), 42 USC 9601 et seq.), to eliminate the health and environmental threats posed by hazardous waste sites.

Continuing Calibration Blank (CCB) – See Check Standard.

Continuing Calibration Standard - See Check Standard.

Continuing Calibration Verification (CCV) - See Check Standard.

Control Limits - A range within which specified measurement results must fall to be compliant.

Control Standard - See Check Standard.

Corrective Action (CA) - An action taken to eliminate the causes of an existing nonconformity, defect, or other undesirable situation in order to prevent recurrence.

Data Quality Objectives (DQO) - An integrated set of specifications that define data quality requirements and the intended use of the data.

Demonstration of Capability (DOC) - A procedure to establish the ability of the analyst to generate data of acceptable quality.

Detectability – For radiochemical analysis, detectability as a Lower Limit Detection (LLD) or Minimum Detection Concentration (MDC), is assessed based on the requirements of 40 CFR 141.25(c) and is a sample-specific determination. The equation is specific for each method and noted in the method SOP.

Detection Limit - See Practical Quantitation Limit and Method Detection Limit. Reporting of detection in radiochemistry is based on specific formulas identified in individual procedures.

Single activity point standards are used for efficiency calibration. When required, multiple energy emitters are used for energy calibration.

Document Control - The act of ensuring that documents and revisions are proposed, reviewed for accuracy, approved for release by authorized personnel, distributed properly and controlled to ensure use of the correct version at the location where the prescribed activity is performed.

Duplicate (DUP) - A second aliquot of a sample that is treated the same as the original sample to determine the precision of the method.

Duplicate Sample - See Duplicate.

Fortified Sample - See Matrix Spike.

Holding Times (Maximum Allowable Holding Times) - The maximum time that samples may be held prior to analysis and still be considered valid or not compromised.

Initial Calibration Verification (ICV) - A sample of known concentration, from a source other than that of the calibration standards, analyzed following calibration to demonstrate validity of the calibration and standards used.

Instrument Blank - See Calibration Blank.

Internal Standard – A known amount of standard added to a test portion of a sample as a reference for evaluating and controlling the precision and bias of the applied analytical method.

Laboratory Control Sample (LCS) – A sample with a known concentration prepared and/or analyzed as a measure of accuracy for the method.

Laboratory Fortified Blank (LFB) – An aliquot of reagent water to which known quantities of specific compounds are added and which is analyzed as a measure of method recovery.

Laboratory Inter-comparison Sample - A performance evaluation sample analyzed by numerous laboratories. Acceptance criteria are often based statistically on the analysis results.

Limit of Detection (LOD) - For chemical analysis, the LOD is an estimate of the minimum amount of a substance that an analytical process can reliably detect. An LOD is analyte and matrix specific and may be laboratory-dependent.

Limit of Quantitation (LOQ) – For chemical analysis, the LOQ is an estimate of the minimum amount of a substance that can be reported with a specified degree of confidence. An LOQ is an evaluation of precision and bias.

LIMS - Laboratory Information Management System.

Matrix – The substrate of a test sample.

Matrix Spike - (MS) – An aliquot of a sample to which known quantities of specific compounds are added, and which is carried through the entire analytical process to determine the effect of the matrix on the methods recovery efficiency.

Matrix Spike Duplicate (MSD) – A second aliquot of a sample to which known quantities of specific compounds are added, and which is carried through the entire analytical process to determine the effect of the matrix on the method's recovery efficiency and the precision of the method.

Maximum Contaminant Level (MCL) – Regulatory action level for a contaminant of concern.

Method Blank (MBLK)- A clean sample processed simultaneously with, and under the same conditions as, samples being tested for an analyte of interest through all steps of the analytical procedure.
Method Detection Limit (MDL) - A measure of the limit of detection for an analytical method determined according to the procedure given in 40 CFR Part 136 Appendix B.

Method Validation - The confirmation by examination and the provision of objective evidence that the particular requirements for a specific intended use are fulfilled (NELAC 2003) (MARLAP 2004 for radiochemical methods).

NELAC - National Environmental Laboratory Accreditation Conference.

NELAP - National Environmental Laboratory Accreditation Program (Now TNI).

NPDES - National Pollutant Discharge Elimination System- A discharge permit system authorized under the Clean Water Act.

Performance Evaluation (PE) Sample - A sample with a composition unknown to the analyst that is provided to test whether the analyst/laboratory can produce analytical results within specified limits.

Practical Quantitation Limit (PQL) – The lowest concentration or amount of the target analyte that can be identified, measured, and reported with confidence that the analyte concentration is not a false positive value.

Precision - The degree to which a set of observations or measurements of the same property conform to themselves.

Preservation - Refrigeration and/or reagents added at the time of sample collection to maintain the chemical and/or biological integrity of the sample.

Proficiency Testing (PT) Sample - A sample with a composition unknown to the analyst which is provided to test whether the analyst/laboratory can produce analytical results within specified limits.

Quality Assurance – An integrated system of activities involving planning, quality control, quality assessment, reporting and quality improvement to ensure that a product or service meets defined standards of quality with a stated level of confidence.

Quality Assurance Project Plan (QAPP) - A formal document describing the detailed quality control procedures pertaining to a specific project. For environmental clean-up projects, this is typically produced by an engineering firm with references to include a laboratory's Quality Assurance Manual.

Quality Control – The overall system of technical activities whose purpose is to measure and control the quality of a product or service so that it meets the needs of users.

Quality Control Sample – A sample used to assess the performance of all, or a portion, of the measurement system.

Replicate - See Duplicate.

Reporting Limit (RL) –. The lowest level of concentration reported for an analyte.

Resource Conservation and Recovery Act (RCRA) - The enabling legislation under 42 USC 321 et seq. (1976) that gives EPA the authority to control hazardous waste.

Safe Drinking Water Act (SDWA) - The enabling legislation, 42 USC 300f et seq. (1974), which requires the USEPA to protect the quality of drinking water in the U.S. by setting maximum allowable contaminant levels, monitoring, and enforcing violations.

Sample (SAMP) - A portion of material to be analyzed.

Spiked Sample – See Matrix Spike.

Standardization - See Calibration.

Standard Operating Procedure (SOP) - A written document which details the method of an operation, analysis or action whose techniques and procedures are thoroughly prescribed and which is accepted as the method for performing certain routine or repetitive tasks.

TNI – The NELAC Institute

Traceability – The property of a result of a measurement whereby it can be related to appropriate standards.

Trip Blank - One type of Field Blank. An aliquot of analyte-free water or solvent transported to the field in a sealed container and returned to the laboratory with the sample containers.

Acronyms and Abbreviations

AA	-	Accrediting Authority
AB	-	Accrediting Body
ANSI	-	American National Standards Institute
AOAC	-	The Scientific Association Dedicated to Analytical Excellence
APHA	-	American Public Health Association
ASQC	-	American Society for Quality Control
ASTM	-	American Society for Testing and Materials
Bq	-	Becquerel
BLK	-	Blank
Bg	-	Background
°C	-	Degrees Celsius
Cal	-	Calibration
CAS	-	Chemical Abstract Service
CCB	-	Continuing Calibration Blank
CCV	-	Continuing Calibration Verification
COC	-	Chain of Custody
DOC	-	Demonstration of Capability
DO	-	Dissolved Oxygen
DQO	-	Data Quality Objectives
DMRQA	-	NPDES Discharge Monitoring Report Quality Assurance
DUP	-	Duplicate
ELI	-	Energy Laboratories, Inc.
EPA	-	Environmental Protection Agency
FDA	-	Food and Drug Administration
g/L	-	Grams per Liter
GC	-	Gas Chromatography
GC-MS	-	Gas Chromatography-Mass Spectrometry
ICP-AES	-	Inductively Coupled Plasma Atomic Emission Spectrophotometry
ICP-MS	-	Inductively Coupled Plasma-Mass Spectrometry
ICV	-	Initial Calibration Verification
ISO	-	International Organization for Standardization
LCS	-	Laboratory Control Sample
LFB	-	Laboratory Fortified Blank
LIMS	-	Laboratory Information Management System
LLD	-	Low Limit Detection
LOD	-	Limit of Detection
LOQ	-	Limit of Quantitation
MDC	-	Minimum Detection Concentration
MDL	-	Method Detection Limit
MBLK	-	Method Blank
MS/MSD	-	Matrix Spike/Matrix Spike Duplicate
NEHA	-	National Environmental Health Association
NELAC	-	National Environmental Laboratory Accreditation Conference
NELAP	-	National Environmental Laboratory Accreditation Program
NIOSH	-	National Institute for Occupational Safety and Health
NIST	-	National Institute of Standards and Technology
NPDES	-	National Pollutant Discharge Elimination System
OSHA	-	Occupational Safety and Health Administration

pCi/L	-	Picocuries per Liter
PT	-	Proficiency Testing
QA/QC	-	Quality Assurance / Quality Control
QS	-	Quality Systems
QAM	-	Quality Assurance Manual
RDL	-	Required Detection Level
RCRA	-	Resource Conservation and Recovery Act
RL	-	Reporting Limit
RPD	-	Relative Percent Difference
RSD	-	Relative Standard Deviation
SOP	-	Standard Operating Procedure
SPK	-	Spike
Std	-	Standard
SVOC	-	Semi-Volatile Organic Compound
TNI	-	The NELAC Institute
ug/L	-	Micrograms Per Liter
UV/VIS	-	Ultraviolet/Visible Spectroscopy
VOC	-	Volatile Organic Compound
WET	-	Whole Effluent Toxicity

APPENDIX A

Laboratory Certifications

The following are included in this Appendix:

- Montana State Drinking Water Certificate
- NELAP Accreditation Certificate

Current certifications and performance evaluation studies are available at www.energylab.com website and include:

- North Dakota State Certification
- South Dakota State Certification
- Wyoming State Certification (EPA Region VIII)
- Idaho State Certification
- Colorado State Certification
- Nevada State Certification
- Current Montana Certification
- Current NELAC Certification (Florida State Dept. of Health)
- Recent EPA WS and WP/DMRQA Study Results
- Recent NELAC Water/Soil Study Results

Montana Department of Public Health and Human Services
Environmental Laboratory
PO Box 4369 Helena MT 59604
1400 Broadway Helena MT 59620
phone: 406-444-2642
fax: 406-444-2617

Andy Valkenburg 12/2/2016
Energy Laboratories Inc - Billings
1120 South 27th Street
Billings MT 59107-

MONTANA CERTIFICATE NUMBER CERT0044

Dear Dr. Valkenburg

Your laboratory has been granted approval for the analysis of drinking water compliance samples in the State of Montana in accordance with the Administrative Rules of Montana, Title 37 Chapter 12 Subchapter 3, "Licensure of Laboratories Conducting Analyses of Public Water Supplies". The current parameter list and certificate are attached.

The parameters for which your laboratory is certified must be analyzed with EPA's approved or recommend (for secondary parameters) drinking water methods.

The expiration date(s) for your Certificate is:

Chem Expiration Date 01/01/2018

Micro Expiration Date 01/01/2018

If you have any questions or concerns about you laboratory's parameter list, certificate or certification status, please feel free to contact me at 406-444-2642 or by e-mail at rleu2@mt.gov.

Russell Leu

State of Montana
Environmental Laboratory
Laboratory Certification Officer

Montana Department of Public Health and Human Services

Recognizes that

Energy Laboratories Inc - Billings
Billings MT

has completed the requirements for Montana certification and is licensed to analyze Montana's Public Drinking Water Supplies. See attached listing.

Montana Certification Number:	CERT0044

	Chemistry	Microbiology
Expiration Date:	01/01/2018	01/01/2018

Russell Lee

Laboratory Certification Officer
DPHHS Environmental Laboratory

Effective Date: 12/2/16

DEPARTMENT OF
PUBLIC HEALTH AND HUMAN SERVICES
STATE OF MONTANA

ENVIRONMENTAL LABORATORY

CERTIFIED DRINKING WATER PARAMETERS

ENERGY LABORATORY, INC.
1120 South 27th Street
Billings MT 59107-0916
CERT0044
Chemistry Expiration 01/01/2018
Microbiology Expiration 01/01/2018

MICROBIOLOGY PARAMETERS

PARAMETER	METHOD 1	METHOD2	METHOD 3
Total Coliforms	9223 B Colilert (Detect) 9223 B Colisure (Detect)	9223 B Colilert-18 (Detect)	9221 A,B,C (MTF,Detect)
E. coli	9223 B Colilert (Detect)	9223 B Colilert-18 (Detect)	9223 B Colisure (Detect)
Fecal Coliforms	9222 D (MF Count)	9221 E (Detect, Count)	
Heterotrophic Plate Count	9215E SimPlate®		
E. coli Enumeration	EPA 1603 (MF Count)	9223 B Colilert Quantitray (Count)	
Total Coliform Enumeration	9222 B (MF Count)	9223 B Colilert Quantitray (Count)	

HERBICIDE PARAMETERS

PARAMETER	METHOD	METHOD
2,4,5-TP (Silvex)	EPA 515.1	EPA 515.4
2,4-D	EPA 515.1	EPA 515.4

PRIMARY INORGANIC PARAMETERS

PARAMETER	METHOD 1	METHOD 2
Antimony	EPA 200.8	
Arsenic	EPA 200.8	
Barium	EPA 200.8	EPA 200.7
Beryllium	EPA 200.8	EPA 200.7
Cadmium	EPA 200.8	EPA 200.7
Chromium	EPA 200.8	EPA 200.7
Copper	EPA 200.8	EPA 200.7
Lead	EPA 200.8	
Mercury	EPA 200.8	EPA 245.1
Nickel	EPA 200.8	EPA 200.7
Selenium	EPA 200.8	
Thallium	EPA 200.8	
Uranium	EPA 200.8	
Cyanide	Kelada-01	EPA 335.4
Free Cyanide as Amenable Cyanide	SM 4500-CN G	
Fluoride	SM 4500-F-C	EPA 300.0
Nitrate	EPA 353.2	EPA 300.0
Nitrite	EPA 353.2	EPA 300.0
Total nitrate-nitrite	EPA 300.0	
Turbidity	SM 2130B	
UV 254	SM 5910 B	

Date Issued 12/2/16 RL
Laboratory Certification Officer

PRIMARY ORGANIC PARAMETERS

PARAMETER	METHOD 1	METHOD 2
Alachlor	EPA 525.2	
Atrazine	EPA 525.2	
Chlordane	EPA 525.2	
Dalapon	EPA 515.1	EPA 515.4
Dinoseb	EPA 515.1	EPA 515.4
Endothal	EPA 548.1	
Endrin	EPA 525.2	
Heptachlor	EPA 525.2	
Heptachlor Epoxide	EPA 525.2	
Lindane	EPA 525.2	
Methoxychlor	EPA 525.2	
Pentachlorophenol	EPA 515.1	EPA 525.2
Pentachlorophenol	EPA 515.4	
Picloram	EPA 515.1	EPA 515.4
Simazine	EPA 525.2	
Toxaphene	EPA 525.2	
1,2-Dibromo-3-Chlorpropane	EPA 504.1	
1,2,3-Trichloropropane	EPA 504.1	
Benzo(A) Pyrene	EPA 525.2	
Di (Ethylhexyl) Phthalate	EPA 525.2	
Di (Ethylhexyl)Adipate	EPA 525.2	
Ethylene Dibromide	EPA 504.1	
Hexachlorobenzene	EPA 525.2	
Hexachlorocyclopentadiene	EPA 525.2	
PCBs As Decachlorbiphenyl	EPA 508A	
PCB Screen	EPA 525.2	
Bromodicloromethane	EPA 524.2	
Bromoform	EPA 524.2	
Chlorodibromethane	EPA 524.2	
Chloroform	EPA 524.2	
Total Trihalomethanes	EPA 524.2	
1,1,1-Trichloroethane	EPA 524.2	
1,1,2-Trichloroethane	EPA 524.2	
1,1-Dichloroethylene	EPA 524.2	
1,2 Dichlorobenzene	EPA 524.2	
1,2,4-Trichlorobenzene	EPA 524.2	
1,2-Dichloroethane	EPA 524.2	
1,2-Dichloropropane	EPA 524.2	
1,4-Dichlorobenzene	EPA 524.2	
Benzene	EPA 524.2	
Carbon Tetrachloride	EPA 524.2	
Chlorobenzene	EPA 524.2	
cis-1,2-Dichloroethylene	EPA 524.2	
Dichloromethane	EPA 524.2	
Ethylbenzene	EPA 524.2	
Styrene	EPA 524.2	
Tetrachloroethylene	EPA 524.2	
Toluene	EPA 524.2	
trans-1,2-Dichloroethylene	EPA 524.2	
Trichloroethylene	EPA 524.2	
Vinyl Chloride	EPA 524.2	
Xylenes	EPA 524.2	

Date Issued: 12/2/16

Laboratory Certification Officer

SECONDARY PARAMETERS

PARAMETER	METHOD 1	METHOD 2
Aluminum	EPA 200.8	EPA 200.7
Iron	EPA 200.7	EPA 200.8
Manganese	EPA 200.8	EPA 200.7
Silver	EPA 200.8	EPA 200.7
Zinc	EPA 200.8	EPA 200.7
Chloride	EPA 300.0	
Corrosivity (Langlier index)	SM 2320 B	
Odor	SM 2150 B	
pH	SM 4500-H	
Sulfate	EPA 300.0	
Total Dissolved Solids	SM 2540 C	
Alkalinity	SM 2320 B	
Silica as SiO2	EPA 200.7	
Color	SM 2120 B	

STATE MONITORED AND/OR UNREGULATED PARAMETERS

PARAMETER	METHOD 1	METHOD 2
Calcium	EPA 200.7	EPA 200.8
Sodium	EPA 200.7	EPA 200.8
Conductivity	SM 2510 B	
Ortho-Phosphate	EPA 365.1	
Temperature	SM 2550	
Butachlor	EPA 525.2	
Dichloroprop (Dichlorprop)	EPA 515.1	EPA 515.4
2,4-DB	EPA 515.1	EPA 515.4
Metaloachlor	EPA 525.2	
Metribuzin	EPA 525.2	
Aldrin	EPA 525.2	
Dicamba	EPA 515.1	EPA 515.4
Dieldrin	EPA 525.2	
Propachlor	EPA 525.2	
1-Chlorobutane	EPA 524.2	
1,1-Dichloroethane	EPA 524.2	
1,1-Dichloro-2-propanone	EPA 524.2	
1,1,1,2-Tetrachloroethane	EPA 524.2	
1,1,2,2-Tetrachloroethane	EPA 524.2	
1,1-Dichloropropene	EPA 524.2	
1,2,3-Trichlorobenzene	EPA 524.2	
1,2,3-Trichloropane	EPA 524.2	
1,2,4-Trimethylbenzene	EPA 524.2	
1,3,5-Trimethylbenzene	EPA 524.2	
1,3-Dichlorobenzene	EPA 524.2	
1,3-Dichloropropane	EPA 524.2	
2,2-Dichlorpropane	EPA 524.2	
3-Chloropropene (Allyl chloride)	EPA 524.2	
Bromobenzene	EPA 524.2	
Bromochloromethane	EPA 524.2	
Bromomethane	EPA 524.2	
Chloroacetonitrile	EPA 524.2	
Chloroethane	EPA 524.2	
Cis-1,3-Dichloropropene	EPA 524.2	
Dibromomethane	EPA 524.2	
Dichlorodifluoromethane	EPA 524.2	

Date Issued: 12/2/16

Laboratory Certification Officer

Diethyl ether	EPA 524.2
Ethyl methacrylate	EPA 524.2
Fluorotrichloromethane	EPA 524.2
Hexachlorobutadiene	EPA 524.2
Hexachloroethane	EPA 524.2
Isopropylbenzene	EPA 524.2
m/p-Xylenes	EPA 524.2
Methyl acrylate	EPA 524.2
Methyl chloride (Chloromethane)	EPA 524.2
Methyl tert-butyl ether (MTBE)	EPA 524.2
Naphthalene	EPA 524.2
n-Butylbenzene	EPA 524.2
n-Propylbenzene	EPA 524.2
o-Chlorotoluene	EPA 524.2
0-Xylene	EPA 524.2
p-Chlorotoluene	EPA 524.2
p-Isopropyltoluene	EPA 524.2
sec-Butylbenzene	EPA 524.2
tert-Butylbenzene	EPA 524.2
Tetrahydrofuran (THF)	EPA 524.2
trans-1,3-Dichloropropene	EPA 524.2
Arochlor-1016 (PCB-1016)	EPA 525.2
Arochlor-1221 (PCB-1221)	EPA 525.2
Arochlor-1232 (PCB-1232)	EPA 525.2
Arochlor-1242 (PCB-1242)	EPA 525.2
Arochlor-1248 (PCB-1248)	EPA 525.2
Arochlor-1254 (PCB-1254)	EPA 525.2
Arochlor-1260 (PCB-1260)	EPA 525.2

DISINFECTION BYPRODUCTS

PARAMETER	METHOD 1	METHOD 2
Bromochloroacetic Acid	EPA 552.2	
Dibromoacectic Acid	EPA 552.2	
Dichloroacetic Acid	EPA 552.2	
Monobromoacetic Acid	EPA 552.2	
Monochloroacetic Acid	EPA 552.2	
TrichloroAcetic Acid	EPA 552.2	
Total haloacetic acids(HAA5)	EPA 552.2	
Residual Free Chlorine	SM 4500-CL-G	
Boron	EPA 200.8	EPA 200.7
Molybdenum	EPA 200.8	EPA 200.7
Bromide	EPA 300.0	
Hydrogen Sulfide	ASTM D1945	
Langelier Index	SM 2330B	
Phenols	EPA 420.4	
Ammonia	EPA 350.1	
Total Hardness	EPA 200.7	SM2340B
Magnesium	EPA 200.8	EPA 200.7
Potassium	EPA 200.8	EPA 200.7
Maximum THM Potential (MT Specific)	EPA 524.2	
Maximum HAA5 potential(MT Specific)	EPA 552.2	

State of Florida
Department of Health, Bureau of Public Health Laboratories
This is to certify that

E87668

ENERGY LABORATORIES, INC. - MT
1120 SOUTH 27TH STREET
BILLINGS, MT 59107-0916

has complied with Florida Administrative Code 64E-1,
for the examination of environmental samples in the following categories

DRINKING WATER - GROUP I UNREGULATED CONTAMINANTS, DRINKING WATER - GROUP II UNREGULATED CONTAMINANTS, DRINKING WATER - GROUP III UNREGULATED CONTAMINANTS, DRINKING WATER - OTHER REGULATED CONTAMINANTS, DRINKING WATER - PRIMARY INORGANIC CONTAMINANTS, DRINKING WATER - SECONDARY INORGANIC CONTAMINANTS, DRINKING WATER - RADIOCHEMISTRY, DRINKING WATER - SYNTHETIC ORGANIC CONTAMINANTS, NON-POTABLE WATER - EXTRACTABLE ORGANICS, NON-POTABLE WATER - GENERAL CHEMISTRY, NON-POTABLE WATER - METALS, NON-POTABLE WATER - PESTICIDES-HERBICIDES-PCB'S, NON-POTABLE WATER - TOXICITY, NON-POTABLE WATER - VOLATILE ORGANICS, SOLID AND CHEMICAL MATERIALS - EXTRACTABLE ORGANICS, SOLID AND CHEMICAL MATERIALS - GENERAL CHEMISTRY, SOLID AND CHEMICAL MATERIALS - METALS, SOLID AND CHEMICAL MATERIALS - PESTICIDES-HERBICIDES-PCB'S, SOLID AND CHEMICAL MATERIALS - VOLATILE ORGANICS

Continued certification is contingent upon successful on-going compliance with the NELAC Standards and FAC Rule 64E-1 regulations. Specific methods and analytes certified are cited on the Laboratory Scope of Accreditation for this laboratory and are on file at the Bureau of Public Health Laboratories, P. O. Box 210, Jacksonville, Florida 32231. Clients and customers are urged to verify with this agency the laboratory's certification status in Florida for particular methods and analytes.

Date Issued: July 01, 2017 Expiration Date: June 30, 2018

Susanne Crowe

Susanne Crowe, MHA
Acting Chief, Bureau of Public Health Laboratories
DH Form 1697, 7/04
NON-TRANSFERABLE E87668-39-07/01/2017
Supersedes all previously issued certificates

Laboratory Scope of Accreditation

Attachment to Certificate #: E87668-39, expiration date June 30, 2018. This listing of accredited analytes should be used only when associated with a valid certificate.

State Laboratory ID: **E87668** EPA Lab Code: **MT00005** **(406) 252-6325**

E87668
Energy Laboratories, Inc. - MT
1120 South 27th Street
Billings, MT 59107-0916

Matrix: **Drinking Water**

Analyte	Method/Tech	Category	Certification Type	Effective Date
1,1,1,2-Tetrachloroethane	EPA 524.2	Group II Unregulated Contaminants	NELAP	1/5/2004
1,1,1-Trichloroethane	EPA 524.2	Other Regulated Contaminants	NELAP	1/5/2004
1,1,2,2-Tetrachloroethane	EPA 524.2	Group II Unregulated Contaminants	NELAP	1/5/2004
1,1,2-Trichloroethane	EPA 524.2	Other Regulated Contaminants	NELAP	1/5/2004
1,1-Dichloro-2-propanone	EPA 524.2	Group III Unregulated Contaminants	NELAP	6/30/2016
1,1-Dichloroethane	EPA 524.2	Group II Unregulated Contaminants	NELAP	1/5/2004
1,1-Dichloroethylene	EPA 524.2	Other Regulated Contaminants	NELAP	1/5/2004
1,1-Dichloropropene	EPA 524.2	Group II Unregulated Contaminants	NELAP	1/5/2004
1,2,3-Trichlorobenzene	EPA 524.2	Group II Unregulated Contaminants	NELAP	1/5/2004
1,2,3-Trichloropropane	EPA 504.1	Group II Unregulated Contaminants	NELAP	1/5/2004
1,2,3-Trichloropropane	EPA 524.2	Group II Unregulated Contaminants	NELAP	1/5/2004
1,2,4-Trichlorobenzene	EPA 524.2	Group II Unregulated Contaminants	NELAP	1/5/2004
1,2,4-Trimethylbenzene	EPA 524.2	Group II Unregulated Contaminants	NELAP	1/5/2004
1,2-Dibromo-3-chloropropane (DBCP)	EPA 504.1	Synthetic Organic Contaminants	NELAP	1/5/2004
1,2-Dibromo-3-chloropropane (DBCP)	EPA 524.2	Synthetic Organic Contaminants	NELAP	12/16/2008
1,2-Dibromoethane (EDB, Ethylene dibromide)	EPA 504.1	Synthetic Organic Contaminants	NELAP	1/5/2004
1,2-Dibromoethane (EDB, Ethylene dibromide)	EPA 524.2	Synthetic Organic Contaminants	NELAP	12/16/2008
1,2-Dichlorobenzene	EPA 524.2	Other Regulated Contaminants	NELAP	1/5/2004
1,2-Dichloroethane	EPA 524.2	Other Regulated Contaminants	NELAP	1/5/2004
1,2-Dichloropropane	EPA 524.2	Other Regulated Contaminants	NELAP	1/5/2004
1,3,5-Trimethylbenzene	EPA 524.2	Group II Unregulated Contaminants	NELAP	1/5/2004
1,3-Dichlorobenzene	EPA 524.2	Group II Unregulated Contaminants	NELAP	1/5/2004
1,3-Dichloropropane	EPA 524.2	Group II Unregulated Contaminants	NELAP	1/5/2004
1,4-Dichlorobenzene	EPA 524.2	Other Regulated Contaminants	NELAP	1/5/2004
1-Chlorobutane	EPA 524.2	Group III Unregulated Contaminants	NELAP	6/30/2016
2,2',3,3',4,4',6-Heptachlorobiphenyl (BZ 171)	EPA 525.2	Group I Unregulated Contaminants	NELAP	1/24/2005
2,2',3,3',4,5',6,6'-Octachlorobiphenyl (BZ 201)	EPA 525.2	Group I Unregulated Contaminants	NELAP	1/24/2005
2,2',3',4,6-Pentachlorobiphenyl (525.2 typo for 2,2',3,4',6'-Pentachlorobiphenyl)	EPA 525.2	Group I Unregulated Contaminants	NELAP	1/24/2005
2,2',4,4',5,6'-Hexachlorobiphenyl (BZ 154)	EPA 525.2	Group I Unregulated Contaminants	NELAP	6/12/2007
2,2',4,4'-Tetrachlorobiphenyl (BZ 47)	EPA 525.2	Group I Unregulated Contaminants	NELAP	6/12/2007
2,2-Dichloropropane	EPA 524.2	Group II Unregulated Contaminants	NELAP	1/5/2004
2,3-Dichlorobiphenyl (BZ 5)	EPA 525.2	Group I Unregulated Contaminants	NELAP	1/24/2005
2,4',5-Trichlorobiphenyl (BZ 31)	EPA 525.2	Group I Unregulated Contaminants	NELAP	1/24/2005
2,4-D	EPA 515.1	Synthetic Organic Contaminants	NELAP	1/5/2004
2,4-D	EPA 515.4	Synthetic Organic Contaminants	NELAP	6/17/2014
2,4-DB	EPA 515.1	Group I Unregulated Contaminants	NELAP	6/12/2007

Laboratory Scope of Accreditation

Attachment to Certificate #: E87668-39, expiration date June 30, 2018. This listing of accredited analytes should be used only when associated with a valid certificate.

State Laboratory ID: **E87668** EPA Lab Code: **MT00005** **(406) 252-6325**

E87668
Energy Laboratories, Inc. - MT
1120 South 27th Street
Billings, MT 59107-0916

Matrix: **Drinking Water**

Analyte	Method/Tech	Category	Certification Type	Effective Date
2,4-DB	EPA 515.4	Synthetic Organic Contaminants	NELAP	6/17/2014
2-Butanone (Methyl ethyl ketone, MEK)	EPA 524.2	Group II Unregulated Contaminants	NELAP	1/5/2004
2-Chlorobiphenyl (BZ 1)	EPA 525.2	Group I Unregulated Contaminants	NELAP	1/24/2005
2-Chlorotoluene	EPA 524.2	Group II Unregulated Contaminants	NELAP	1/5/2004
2-Hexanone	EPA 524.2	Group II Unregulated Contaminants	NELAP	1/5/2004
4-Chlorotoluene	EPA 524.2	Group II Unregulated Contaminants	NELAP	1/5/2004
4-Isopropyltoluene	EPA 524.2	Group II Unregulated Contaminants	NELAP	1/5/2004
4-Methyl-2-pentanone (MIBK)	EPA 524.2	Group II Unregulated Contaminants	NELAP	1/5/2004
Acenaphthylene	EPA 525.2	Group III Unregulated Contaminants	NELAP	1/24/2005
Acetochlor	EPA 525.2	Group I Unregulated Contaminants	NELAP	6/12/2007
Acetone	EPA 524.2	Group II Unregulated Contaminants	NELAP	1/5/2004
Acrylonitrile	EPA 524.2	Group II Unregulated Contaminants	NELAP	1/5/2004
Alachlor	EPA 525.2	Synthetic Organic Contaminants	NELAP	1/5/2004
Aldrin	EPA 525.2	Group I Unregulated Contaminants	NELAP	1/5/2004
Alkalinity as CaCO3	SM 2320 B	Primary Inorganic Contaminants	NELAP	6/8/2009
Allyl chloride (3-Chloropropene)	EPA 524.2	Group III Unregulated Contaminants	NELAP	6/30/2016
alpha-Chlordane	EPA 525.2	Group I Unregulated Contaminants	NELAP	1/24/2005
Aluminum	EPA 200.7	Secondary Inorganic Contaminants	NELAP	6/8/2009
Aluminum	EPA 200.8	Secondary Inorganic Contaminants	NELAP	6/8/2009
Amenable cyanide	SM 4500-CN- G	Primary Inorganic Contaminants	NELAP	2/3/2012
Anthracene	EPA 525.2	Group III Unregulated Contaminants	NELAP	1/24/2005
Antimony	EPA 200.8	Primary Inorganic Contaminants	NELAP	6/13/2001
Aroclor-1016 (PCB-1016)	EPA 525.2	Group I Unregulated Contaminants	NELAP	6/8/2009
Aroclor-1221 (PCB-1221)	EPA 525.2	Group I Unregulated Contaminants	NELAP	2/3/2012
Aroclor-1232 (PCB-1232)	EPA 525.2	Group I Unregulated Contaminants	NELAP	2/3/2012
Aroclor-1242 (PCB-1242)	EPA 525.2	Group I Unregulated Contaminants	NELAP	2/3/2012
Aroclor-1248 (PCB-1248)	EPA 525.2	Group I Unregulated Contaminants	NELAP	2/3/2012
Aroclor-1254 (PCB-1254)	EPA 525.2	Group I Unregulated Contaminants	NELAP	2/3/2012
Aroclor-1260 (PCB-1260)	EPA 525.2	Group I Unregulated Contaminants	NELAP	6/8/2009
Arsenic	EPA 200.8	Primary Inorganic Contaminants	NELAP	6/13/2001
Atrazine	EPA 525.2	Synthetic Organic Contaminants	NELAP	1/5/2004
Barium	EPA 200.7	Primary Inorganic Contaminants	NELAP	6/13/2001
Barium	EPA 200.8	Primary Inorganic Contaminants	NELAP	6/13/2001
Benzene	EPA 524.2	Other Regulated Contaminants	NELAP	1/5/2004
Benzo(a)anthracene	EPA 525.2	Group III Unregulated Contaminants	NELAP	1/24/2005
Benzo(a)pyrene	EPA 525.2	Synthetic Organic Contaminants	NELAP	1/5/2004

Laboratory Scope of Accreditation

Attachment to Certificate #: E87668-39, expiration date June 30, 2018. This listing of accredited analytes should be used only when associated with a valid certificate.

State Laboratory ID: **E87668** EPA Lab Code: **MT00005** **(406) 252-6325**

E87668
Energy Laboratories, Inc. - MT
1120 South 27th Street
Billings, MT 59107-0916

Matrix: **Drinking Water**

Analyte	Method/Tech	Category	Certification Type	Effective Date
Benzo(b)fluoranthene	EPA 525.2	Group III Unregulated Contaminants	NELAP	1/24/2005
Benzo(g,h,i)perylene	EPA 525.2	Group III Unregulated Contaminants	NELAP	1/24/2005
Benzo(k)fluoranthene	EPA 525.2	Group III Unregulated Contaminants	NELAP	1/24/2005
Beryllium	EPA 200.7	Primary Inorganic Contaminants	NELAP	6/13/2001
Beryllium	EPA 200.8	Primary Inorganic Contaminants	NELAP	6/13/2001
bis(2-Ethylhexyl) phthalate (DEHP)	EPA 525.2	Synthetic Organic Contaminants	NELAP	1/5/2004
Boron	ENMT 50-213/ICP-MS	Secondary Inorganic Contaminants	NELAP	6/17/2014
Boron	EPA 200.7	Secondary Inorganic Contaminants	NELAP	6/8/2009
Bromide	EPA 300.0	Primary Inorganic Contaminants	NELAP	1/24/2005
Bromoacetic acid	EPA 552.2	Group I Unregulated Contaminants	NELAP	1/5/2004
Bromobenzene	EPA 524.2	Group II Unregulated Contaminants	NELAP	1/5/2004
Bromochloroacetic acid	EPA 552.2	Group I Unregulated Contaminants	NELAP	1/5/2004
Bromochloromethane	EPA 524.2	Group II Unregulated Contaminants	NELAP	12/16/2008
Bromodichloromethane	EPA 524.2	Group II Unregulated Contaminants	NELAP	1/5/2004
Bromoform	EPA 524.2	Group II Unregulated Contaminants	NELAP	1/5/2004
Butachlor	EPA 525.2	Group I Unregulated Contaminants	NELAP	1/5/2004
Butyl benzyl phthalate	EPA 525.2	Group III Unregulated Contaminants	NELAP	1/24/2005
Cadmium	EPA 200.7	Primary Inorganic Contaminants	NELAP	6/13/2001
Cadmium	EPA 200.8	Primary Inorganic Contaminants	NELAP	6/13/2001
Calcium	ENMT 50-213/ICP-MS	Secondary Inorganic Contaminants	NELAP	6/17/2014
Calcium	EPA 200.7	Primary Inorganic Contaminants	NELAP	6/13/2001
Carbon disulfide	EPA 524.2	Group II Unregulated Contaminants	NELAP	1/5/2004
Carbon tetrachloride	EPA 524.2	Other Regulated Contaminants	NELAP	1/5/2004
Chlordane (tech.)	EPA 525.2	Synthetic Organic Contaminants	NELAP	1/5/2004
Chloride	EPA 300.0	Secondary Inorganic Contaminants	NELAP	6/13/2001
Chloroacetic acid	EPA 552.2	Group I Unregulated Contaminants	NELAP	1/5/2004
Chloroacetonitrile	EPA 524.2	Group III Unregulated Contaminants	NELAP	6/30/2016
Chlorobenzene	EPA 524.2	Other Regulated Contaminants	NELAP	1/5/2004
Chloroethane	EPA 524.2	Group II Unregulated Contaminants	NELAP	1/5/2004
Chloroform	EPA 524.2	Group II Unregulated Contaminants	NELAP	1/5/2004
Chromium	EPA 200.7	Primary Inorganic Contaminants	NELAP	6/13/2001
Chromium	EPA 200.8	Primary Inorganic Contaminants	NELAP	6/13/2001
Chrysene	EPA 525.2	Group III Unregulated Contaminants	NELAP	1/24/2005
cis-1,2-Dichloroethylene	EPA 524.2	Other Regulated Contaminants	NELAP	1/5/2004
cis-1,3-Dichloropropene	EPA 524.2	Group II Unregulated Contaminants	NELAP	1/5/2004
Cobalt	EPA 200.7	Secondary Inorganic Contaminants	NELAP	6/17/2014

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E87668
Energy Laboratories, Inc. - MT
1120 South 27th Street
Billings, MT 59107-0916

Matrix: **Drinking Water**

Analyte	Method/Tech	Category	Certification Type	Effective Date
Cobalt	EPA 200.8	Secondary Inorganic Contaminants	NELAP	6/17/2014
Color	SM 2120 B	Secondary Inorganic Contaminants	NELAP	2/3/2012
Conductivity	SM 2510 B	Primary Inorganic Contaminants	NELAP	6/8/2009
Copper	EPA 200.7	Primary Inorganic Contaminants	NELAP	6/13/2001
Copper	EPA 200.8	Primary Inorganic Contaminants	NELAP	6/13/2001
Corrosivity (langlier index)	SM 2330 B	Secondary Inorganic Contaminants	NELAP	6/30/2016
Dalapon	EPA 515.1	Synthetic Organic Contaminants	NELAP	1/5/2004
Dalapon	EPA 515.4	Synthetic Organic Contaminants	NELAP	6/17/2014
DCPA mono-acid	EPA 515.1	Group I Unregulated Contaminants	NELAP	1/24/2005
Decachlorobiphenyl (BZ 209)	EPA 508A	Synthetic Organic Contaminants	NELAP	1/5/2004
Di(2-ethylhexyl)adipate	EPA 525.2	Synthetic Organic Contaminants	NELAP	1/5/2004
Diazinon	EPA 525.2	Group I Unregulated Contaminants	NELAP	1/24/2005
Dibenz(a,h)anthracene	EPA 525.2	Group III Unregulated Contaminants	NELAP	1/24/2005
Dibromoacetic acid	EPA 552.2	Group I Unregulated Contaminants	NELAP	1/5/2004
Dibromochloromethane	EPA 524.2	Group II Unregulated Contaminants	NELAP	1/5/2004
Dibromomethane	EPA 524.2	Group II Unregulated Contaminants	NELAP	1/5/2004
Dicamba	EPA 515.1	Group I Unregulated Contaminants	NELAP	1/5/2004
Dicamba	EPA 515.4	Synthetic Organic Contaminants	NELAP	6/17/2014
Dichloroacetic acid	EPA 552.2	Group I Unregulated Contaminants	NELAP	1/5/2004
Dichlorodifluoromethane	EPA 524.2	Group II Unregulated Contaminants	NELAP	1/5/2004
Dichloromethane (DCM, Methylene chloride)	EPA 524.2	Other Regulated Contaminants	NELAP	1/5/2004
Dichloroprop (Dichlorprop)	EPA 515.1	Group I Unregulated Contaminants	NELAP	6/12/2007
Dichloroprop (Dichlorprop)	EPA 515.4	Synthetic Organic Contaminants	NELAP	6/17/2014
Dieldrin	EPA 525.2	Group I Unregulated Contaminants	NELAP	1/5/2004
Diethyl ether	EPA 524.2	Group III Unregulated Contaminants	NELAP	6/30/2016
Diethyl phthalate	EPA 525.2	Group III Unregulated Contaminants	NELAP	1/24/2005
Dimethyl phthalate	EPA 525.2	Group III Unregulated Contaminants	NELAP	1/24/2005
Di-n-butyl phthalate	EPA 525.2	Group III Unregulated Contaminants	NELAP	1/24/2005
Dinoseb (2-sec-butyl-4,6-dinitrophenol, DNBP)	EPA 515.1	Synthetic Organic Contaminants	NELAP	1/5/2004
Dinoseb (2-sec-butyl-4,6-dinitrophenol, DNBP)	EPA 515.4	Synthetic Organic Contaminants	NELAP	6/17/2014
Endothall	EPA 548.1	Synthetic Organic Contaminants	NELAP	1/5/2004
Endrin	EPA 525.2	Synthetic Organic Contaminants	NELAP	1/5/2004
Ethyl methacrylate	EPA 524.2	Group III Unregulated Contaminants	NELAP	6/30/2016
Ethylbenzene	EPA 524.2	Other Regulated Contaminants	NELAP	1/5/2004
Fluorene	EPA 525.2	Group III Unregulated Contaminants	NELAP	1/24/2005
Fluoride	EPA 300.0	Primary Inorganic Contaminants	NELAP	1/5/2004

Laboratory Scope of Accreditation

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State Laboratory ID: **E87668** EPA Lab Code: **MT00005** **(406) 252-6325**

E87668
Energy Laboratories, Inc. - MT
1120 South 27th Street
Billings, MT 59107-0916

Matrix: **Drinking Water**

Analyte	Method/Tech	Category	Certification Type	Effective Date
Fluoride	SM 4500 F-C	Primary Inorganic Contaminants	NELAP	2/7/2005
gamma-BHC (Lindane, gamma-Hexachlorocyclohexane)	EPA 525.2	Synthetic Organic Contaminants	NELAP	1/5/2004
gamma-Chlordane	EPA 525.2	Group I Unregulated Contaminants	NELAP	1/24/2005
Hardness	SM 2340 B	Secondary Inorganic Contaminants	NELAP	6/8/2009
Heptachlor	EPA 525.2	Synthetic Organic Contaminants	NELAP	1/5/2004
Heptachlor epoxide	EPA 525.2	Synthetic Organic Contaminants	NELAP	1/5/2004
Hexachlorobenzene	EPA 525.2	Synthetic Organic Contaminants	NELAP	1/5/2004
Hexachlorobutadiene	EPA 524.2	Group II Unregulated Contaminants	NELAP	1/5/2004
Hexachlorocyclopentadiene	EPA 525.2	Synthetic Organic Contaminants	NELAP	1/5/2004
Hexachloroethane	EPA 524.2	Group III Unregulated Contaminants	NELAP	6/30/2016
Indeno(1,2,3-cd)pyrene	EPA 525.2	Group III Unregulated Contaminants	NELAP	6/12/2007
Iron	EPA 200.7	Secondary Inorganic Contaminants	NELAP	6/8/2009
Iron	EPA 200.8	Secondary Inorganic Contaminants	NELAP	6/30/2016
Isopropylbenzene	EPA 524.2	Group II Unregulated Contaminants	NELAP	1/5/2004
Lead	EPA 200.8	Primary Inorganic Contaminants	NELAP	6/13/2001
Lithium	EPA 200.7	Secondary Inorganic Contaminants	NELAP	6/17/2014
m/p-Xylenes	EPA 524.2	Group II Unregulated Contaminants	NELAP	6/17/2014
Magnesium	ENMT 50-213/ICP-MS	Secondary Inorganic Contaminants	NELAP	6/17/2014
Magnesium	EPA 200.7	Primary Inorganic Contaminants	NELAP	6/13/2001
Manganese	EPA 200.7	Secondary Inorganic Contaminants	NELAP	6/13/2001
Manganese	EPA 200.8	Secondary Inorganic Contaminants	NELAP	6/13/2001
Mercury	EPA 200.8	Primary Inorganic Contaminants	NELAP	6/13/2001
Mercury	EPA 245.1	Primary Inorganic Contaminants	NELAP	6/13/2001
Methacrylonitrile	EPA 524.2	Group II Unregulated Contaminants	NELAP	1/5/2004
Methoxychlor	EPA 525.2	Synthetic Organic Contaminants	NELAP	1/5/2004
Methyl acrylate	EPA 524.2	Group III Unregulated Contaminants	NELAP	6/30/2016
Methyl bromide (Bromomethane)	EPA 524.2	Group II Unregulated Contaminants	NELAP	1/5/2004
Methyl chloride (Chloromethane)	EPA 524.2	Group II Unregulated Contaminants	NELAP	1/5/2004
Methyl methacrylate	EPA 524.2	Group II Unregulated Contaminants	NELAP	1/5/2004
Methyl tert-butyl ether (MTBE)	EPA 524.2	Group II Unregulated Contaminants	NELAP	1/5/2004
Metolachlor	EPA 525.2	Group I Unregulated Contaminants	NELAP	1/5/2004
Metribuzin	EPA 525.2	Group I Unregulated Contaminants	NELAP	1/5/2004
Molybdenum	EPA 200.7	Secondary Inorganic Contaminants	NELAP	6/8/2009
Molybdenum	EPA 200.8	Secondary Inorganic Contaminants	NELAP	6/8/2009
Naphthalene	EPA 524.2	Group II Unregulated Contaminants	NELAP	1/5/2004
n-Butylbenzene	EPA 524.2	Group II Unregulated Contaminants	NELAP	1/5/2004

Laboratory Scope of Accreditation

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E87668
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1120 South 27th Street
Billings, MT 59107-0916

Matrix: **Drinking Water**

Analyte	Method/Tech	Category	Certification Type	Effective Date
Nickel	EPA 200.7	Primary Inorganic Contaminants	NELAP	6/13/2001
Nickel	EPA 200.8	Primary Inorganic Contaminants	NELAP	6/13/2001
Nitrate as N	EPA 300.0	Primary Inorganic Contaminants	NELAP	1/5/2004
Nitrate as N	EPA 353.2	Primary Inorganic Contaminants	NELAP	6/13/2001
Nitrite as N	EPA 300.0	Primary Inorganic Contaminants	NELAP	1/5/2004
Nitrite as N	EPA 353.2	Primary Inorganic Contaminants	NELAP	6/13/2001
Nitrobenzene	EPA 524.2	Group II Unregulated Contaminants	NELAP	1/5/2004
Norflurazon	EPA 525.2	Group I Unregulated Contaminants	NELAP	1/24/2005
n-Propylbenzene	EPA 524.2	Group II Unregulated Contaminants	NELAP	1/5/2004
Odor	SM 2150 B	Secondary Inorganic Contaminants	NELAP	2/3/2012
Orthophosphate as P	EPA 365.1	Primary Inorganic Contaminants	NELAP	6/8/2009
o-Xylene	EPA 524.2	Group II Unregulated Contaminants	NELAP	6/17/2014
PCBs	EPA 525.2	Synthetic Organic Contaminants	NELAP	6/12/2007
Pentachloroethane	EPA 524.2	Group II Unregulated Contaminants	NELAP	1/5/2004
Pentachlorophenol	EPA 515.1	Synthetic Organic Contaminants	NELAP	1/5/2004
Pentachlorophenol	EPA 515.4	Synthetic Organic Contaminants	NELAP	6/17/2014
Pentachlorophenol	EPA 525.2	Synthetic Organic Contaminants	NELAP	1/24/2005
pH	SM 4500-H+-B	Primary Inorganic Contaminants,Secondary Inorganic Contaminants	NELAP	6/12/2007
Phenanthrene	EPA 525.2	Group III Unregulated Contaminants	NELAP	1/24/2005
Phosphorus	EPA 200.7	Secondary Inorganic Contaminants	NELAP	6/17/2014
Picloram	EPA 515.1	Synthetic Organic Contaminants	NELAP	1/5/2004
Picloram	EPA 515.4	Synthetic Organic Contaminants	NELAP	6/17/2014
Potassium	ENMT 50-213/ICP-MS	Secondary Inorganic Contaminants	NELAP	6/17/2014
Potassium	EPA 200.7	Secondary Inorganic Contaminants	NELAP	6/8/2009
Propachlor (Ramrod)	EPA 525.2	Group I Unregulated Contaminants	NELAP	1/5/2004
Propionitrile (Ethyl cyanide)	EPA 524.2	Group II Unregulated Contaminants	NELAP	1/5/2004
Pyrene	EPA 525.2	Group III Unregulated Contaminants	NELAP	1/24/2005
Residual free chlorine	SM 4500-Cl G	Primary Inorganic Contaminants	NELAP	6/8/2009
Residue-filterable (TDS)	SM 2540 C	Secondary Inorganic Contaminants	NELAP	6/13/2001
Residue-nonfilterable (TSS)	SM 2540 D	Secondary Inorganic Contaminants	NELAP	6/17/2014
Residue-settleable	SM 2540 F	Secondary Inorganic Contaminants	NELAP	6/17/2014
sec-Butylbenzene	EPA 524.2	Group II Unregulated Contaminants	NELAP	1/5/2004
Selenium	EPA 200.8	Primary Inorganic Contaminants	NELAP	6/13/2001
Silica as SiO2	EPA 200.7	Primary Inorganic Contaminants	NELAP	12/16/2008
Silver	EPA 200.7	Secondary Inorganic Contaminants	NELAP	6/13/2001

Laboratory Scope of Accreditation

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E87668
Energy Laboratories, Inc. - MT
1120 South 27th Street
Billings, MT 59107-0916

Matrix: **Drinking Water**

Analyte	Method/Tech	Category	Certification Type	Effective Date
Silver	EPA 200.8	Secondary Inorganic Contaminants	NELAP	6/13/2001
Silvex (2,4,5-TP)	EPA 515.1	Synthetic Organic Contaminants	NELAP	1/5/2004
Silvex (2,4,5-TP)	EPA 515.4	Synthetic Organic Contaminants	NELAP	6/17/2014
Simazine	EPA 525.2	Synthetic Organic Contaminants	NELAP	1/5/2004
Sodium	ENMT 50-213/ICP-MS	Secondary Inorganic Contaminants	NELAP	6/17/2014
Sodium	EPA 200.7	Primary Inorganic Contaminants	NELAP	6/13/2001
Strontium	EPA 200.7	Secondary Inorganic Contaminants	NELAP	6/17/2014
Styrene	EPA 524.2	Other Regulated Contaminants	NELAP	1/5/2004
Sulfate	EPA 300.0	Primary Inorganic Contaminants	NELAP	6/13/2001
tert-Butylbenzene	EPA 524.2	Group II Unregulated Contaminants	NELAP	1/5/2004
Tetrachloroethylene (Perchloroethylene)	EPA 524.2	Other Regulated Contaminants	NELAP	1/5/2004
Tetrahydrofuran (THF)	EPA 524.2	Group III Unregulated Contaminants	NELAP	6/30/2016
Thallium	EPA 200.8	Primary Inorganic Contaminants	NELAP	6/13/2001
Tin	EPA 200.7	Secondary Inorganic Contaminants	NELAP	6/17/2014
Titanium	EPA 200.7	Secondary Inorganic Contaminants	NELAP	6/17/2014
Toluene	EPA 524.2	Other Regulated Contaminants	NELAP	1/5/2004
Total cyanide	EPA 335.4	Primary Inorganic Contaminants	NELAP	6/17/2014
Total cyanide	KELADA-01	Primary Inorganic Contaminants	NELAP	6/8/2009
Total haloacetic acids (HAA5)	EPA 552.2	Synthetic Organic Contaminants	NELAP	1/5/2004
Total nitrate-nitrite	EPA 300.0	Primary Inorganic Contaminants	NELAP	6/30/2016
Total nitrate-nitrite	EPA 353.2	Primary Inorganic Contaminants	NELAP	6/13/2001
Total trihalomethanes	EPA 524.2	Other Regulated Contaminants	NELAP	1/5/2004
Toxaphene (Chlorinated camphene)	EPA 525.2	Synthetic Organic Contaminants	NELAP	6/8/2009
trans-1,2-Dichloroethylene	EPA 524.2	Other Regulated Contaminants	NELAP	1/5/2004
trans-1,3-Dichloropropene	EPA 524.2	Group II Unregulated Contaminants	NELAP	1/5/2004
trans-1,4-Dichloro-2-butene	EPA 524.2	Group II Unregulated Contaminants	NELAP	1/5/2004
trans-Nonachlor	EPA 525.2	Group I Unregulated Contaminants	NELAP	1/24/2005
Trichloroacetic acid	EPA 552.2	Group I Unregulated Contaminants	NELAP	1/5/2004
Trichloroethene (Trichloroethylene)	EPA 524.2	Other Regulated Contaminants	NELAP	1/5/2004
Trichlorofluoromethane	EPA 524.2	Group II Unregulated Contaminants	NELAP	1/5/2004
Trifluralin (Treflan)	EPA 525.2	Group I Unregulated Contaminants	NELAP	1/24/2005
Turbidity	SM 2130 B	Secondary Inorganic Contaminants	NELAP	6/17/2014
Uranium	EPA 200.8	Radiochemistry	NELAP	6/12/2007
UV 254	SM 5910 B	Primary Inorganic Contaminants	NELAP	6/30/2016
Vanadium	EPA 200.7	Secondary Inorganic Contaminants	NELAP	6/8/2009
Vanadium	EPA 200.8	Secondary Inorganic Contaminants	NELAP	6/8/2009

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E87668
Energy Laboratories, Inc. - MT
1120 South 27th Street
Billings, MT 59107-0916

Matrix: **Drinking Water**

Analyte	Method/Tech	Category	Certification Type	Effective Date
Vernolate	EPA 525.2	Group I Unregulated Contaminants	NELAP	1/24/2005
Vinyl chloride	EPA 524.2	Other Regulated Contaminants	NELAP	1/5/2004
Xylene (total)	EPA 524.2	Other Regulated Contaminants	NELAP	1/5/2004
Zinc	EPA 200.7	Secondary Inorganic Contaminants	NELAP	6/8/2009
Zinc	EPA 200.8	Secondary Inorganic Contaminants	NELAP	6/8/2009

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E87668
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Billings, MT 59107-0916

Matrix: **Non-Potable Water**

Analyte	Method/Tech	Category	Certification Type	Effective Date
1,1,1,2-Tetrachloroethane	EPA 8260	Volatile Organics	NELAP	7/1/2003
1,1,1-Trichloroethane	EPA 624	Volatile Organics	NELAP	6/13/2001
1,1,1-Trichloroethane	EPA 8260	Volatile Organics	NELAP	7/1/2003
1,1,2,2-Tetrachloroethane	EPA 624	Volatile Organics	NELAP	6/13/2001
1,1,2,2-Tetrachloroethane	EPA 8260	Volatile Organics	NELAP	7/1/2003
1,1,2-Trichloroethane	EPA 624	Volatile Organics	NELAP	6/13/2001
1,1,2-Trichloroethane	EPA 8260	Volatile Organics	NELAP	7/1/2003
1,1-Dichloroethane	EPA 624	Volatile Organics	NELAP	6/13/2001
1,1-Dichloroethane	EPA 8260	Volatile Organics	NELAP	7/1/2003
1,1-Dichloroethylene	EPA 624	Volatile Organics	NELAP	6/13/2001
1,1-Dichloroethylene	EPA 8260	Volatile Organics	NELAP	7/1/2003
1,1-Dichloropropene	EPA 8260	Volatile Organics	NELAP	7/1/2003
1,2,3-Trichlorobenzene	EPA 8260	Volatile Organics	NELAP	7/1/2003
1,2,3-Trichloropropane	EPA 8260	Volatile Organics	NELAP	7/1/2003
1,2,4,5-Tetrachlorobenzene	EPA 625	Extractable Organics	NELAP	6/17/2014
1,2,4,5-Tetrachlorobenzene	EPA 8270	Extractable Organics	NELAP	7/1/2003
1,2,4-Trichlorobenzene	EPA 625	Extractable Organics	NELAP	2/3/2012
1,2,4-Trichlorobenzene	EPA 8270	Extractable Organics	NELAP	2/3/2012
1,2,4-Trimethylbenzene	EPA 8260	Volatile Organics	NELAP	7/1/2003
1,2-Dibromo-3-chloropropane (DBCP)	EPA 8260	Volatile Organics	NELAP	7/1/2003
1,2-Dibromoethane (EDB, Ethylene dibromide)	EPA 624	Volatile Organics	NELAP	6/17/2014
1,2-Dibromoethane (EDB, Ethylene dibromide)	EPA 8260	Volatile Organics	NELAP	7/1/2003
1,2-Dichlorobenzene	EPA 624	Volatile Organics	NELAP	6/13/2001
1,2-Dichlorobenzene	EPA 625	Extractable Organics	NELAP	6/13/2001
1,2-Dichlorobenzene	EPA 8260	Volatile Organics	NELAP	7/1/2003
1,2-Dichlorobenzene	EPA 8270	Extractable Organics	NELAP	7/1/2003
1,2-Dichloroethane	EPA 624	Volatile Organics	NELAP	6/13/2001
1,2-Dichloroethane	EPA 8260	Volatile Organics	NELAP	7/1/2003
1,2-Dichloropropane	EPA 624	Volatile Organics	NELAP	6/13/2001
1,2-Dichloropropane	EPA 8260	Volatile Organics	NELAP	7/1/2003
1,2-Diphenylhydrazine	EPA 625	Extractable Organics	NELAP	6/17/2014
1,2-Diphenylhydrazine	EPA 8270	Extractable Organics	NELAP	7/1/2003
1,3,5-Trimethylbenzene	EPA 8260	Volatile Organics	NELAP	7/1/2003
1,3,5-Trinitrobenzene (1,3,5-TNB)	EPA 8270	Extractable Organics	NELAP	7/1/2003
1,3-Dichlorobenzene	EPA 624	Volatile Organics	NELAP	6/13/2001
1,3-Dichlorobenzene	EPA 625	Extractable Organics	NELAP	6/13/2001

Laboratory Scope of Accreditation

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E87668
Energy Laboratories, Inc. - MT
1120 South 27th Street
Billings, MT 59107-0916

Matrix: **Non-Potable Water**

Analyte	Method/Tech	Category	Certification Type	Effective Date
1,3-Dichlorobenzene	EPA 8260	Volatile Organics	NELAP	7/1/2003
1,3-Dichlorobenzene	EPA 8270	Extractable Organics	NELAP	7/1/2003
1,3-Dichloropropane	EPA 8260	Volatile Organics	NELAP	7/1/2003
1,3-Dinitrobenzene (1,3-DNB)	EPA 8270	Extractable Organics	NELAP	1/5/2004
1,4-Dichlorobenzene	EPA 624	Volatile Organics	NELAP	6/13/2001
1,4-Dichlorobenzene	EPA 625	Extractable Organics	NELAP	6/13/2001
1,4-Dichlorobenzene	EPA 8260	Volatile Organics	NELAP	7/1/2003
1,4-Dichlorobenzene	EPA 8270	Extractable Organics	NELAP	7/1/2003
1,4-Naphthoquinone	EPA 8270	Extractable Organics	NELAP	7/1/2003
1-Methylnaphthalene	EPA 8270	Extractable Organics	NELAP	6/12/2007
1-Naphthylamine	EPA 8270	Extractable Organics	NELAP	7/1/2003
2,2-Dichloropropane	EPA 8260	Volatile Organics	NELAP	7/1/2003
2,2'-Oxybis(1-chloropropane),bis(2-Chloro-1-methylethyl)ether (fka bis(2-Chloroisopropyl) ether	EPA 625	Extractable Organics	NELAP	2/3/2012
2,2'-Oxybis(1-chloropropane),bis(2-Chloro-1-methylethyl)ether (fka bis(2-Chloroisopropyl) ether	EPA 8270	Extractable Organics	NELAP	2/3/2012
2,3,4,6-Tetrachlorophenol	EPA 625	Extractable Organics	NELAP	6/17/2014
2,3,4,6-Tetrachlorophenol	EPA 8270	Extractable Organics	NELAP	7/1/2003
2,4,5-T	EPA 615	Pesticides-Herbicides-PCB's	NELAP	6/13/2001
2,4,5-T	EPA 8151	Pesticides-Herbicides-PCB's	NELAP	7/1/2003
2,4,5-Trichlorophenol	EPA 625	Extractable Organics	NELAP	6/17/2014
2,4,5-Trichlorophenol	EPA 8270	Extractable Organics	NELAP	7/1/2003
2,4,6-Trichlorophenol	EPA 625	Extractable Organics	NELAP	6/13/2001
2,4,6-Trichlorophenol	EPA 8270	Extractable Organics	NELAP	7/1/2003
2,4-D	EPA 615	Pesticides-Herbicides-PCB's	NELAP	6/13/2001
2,4-D	EPA 8151	Pesticides-Herbicides-PCB's	NELAP	7/1/2003
2,4-DB	EPA 615	Pesticides-Herbicides-PCB's	NELAP	6/13/2001
2,4-DB	EPA 8151	Pesticides-Herbicides-PCB's	NELAP	7/1/2003
2,4-Dichlorophenol	EPA 625	Extractable Organics	NELAP	6/13/2001
2,4-Dichlorophenol	EPA 8270	Extractable Organics	NELAP	7/1/2003
2,4-Dimethylphenol	EPA 625	Extractable Organics	NELAP	6/13/2001
2,4-Dimethylphenol	EPA 8270	Extractable Organics	NELAP	7/1/2003
2,4-Dinitrophenol	EPA 625	Extractable Organics	NELAP	6/13/2001
2,4-Dinitrophenol	EPA 8270	Extractable Organics	NELAP	7/1/2003
2,4-Dinitrotoluene (2,4-DNT)	EPA 625	Extractable Organics	NELAP	6/13/2001
2,4-Dinitrotoluene (2,4-DNT)	EPA 8270	Extractable Organics	NELAP	7/1/2003
2,6-Dichlorophenol	EPA 8270	Extractable Organics	NELAP	7/1/2003

Laboratory Scope of Accreditation

Attachment to Certificate #: E87668-39, expiration date June 30, 2018. This listing of accredited analytes should be used only when associated with a valid certificate.

State Laboratory ID: **E87668** EPA Lab Code: **MT00005** **(406) 252-6325**

E87668
Energy Laboratories, Inc. - MT
1120 South 27th Street
Billings, MT 59107-0916

Matrix: **Non-Potable Water**

Analyte	Method/Tech	Category	Certification Type	Effective Date
2,6-Dinitrotoluene (2,6-DNT)	EPA 625	Extractable Organics	NELAP	2/3/2012
2,6-Dinitrotoluene (2,6-DNT)	EPA 8270	Extractable Organics	NELAP	2/3/2012
2-Acetylaminofluorene	EPA 8270	Extractable Organics	NELAP	7/1/2003
2-Butanone (Methyl ethyl ketone, MEK)	EPA 624	Volatile Organics	NELAP	6/17/2014
2-Butanone (Methyl ethyl ketone, MEK)	EPA 8260	Volatile Organics	NELAP	7/1/2003
2-Chloroethyl vinyl ether	EPA 624	Volatile Organics	NELAP	6/13/2001
2-Chloroethyl vinyl ether	EPA 8260	Volatile Organics	NELAP	7/1/2003
2-Chloronaphthalene	EPA 625	Extractable Organics	NELAP	2/3/2012
2-Chloronaphthalene	EPA 8270	Extractable Organics	NELAP	2/3/2012
2-Chlorophenol	EPA 625	Extractable Organics	NELAP	6/13/2001
2-Chlorophenol	EPA 8270	Extractable Organics	NELAP	7/1/2003
2-Chlorotoluene	EPA 8260	Volatile Organics	NELAP	7/1/2003
2-Hexanone	EPA 8260	Volatile Organics	NELAP	7/1/2003
2-Methyl-4,6-dinitrophenol	EPA 625	Extractable Organics	NELAP	6/13/2001
2-Methyl-4,6-dinitrophenol	EPA 8270	Extractable Organics	NELAP	7/1/2003
2-Methylnaphthalene	EPA 625	Extractable Organics	NELAP	6/8/2009
2-Methylnaphthalene	EPA 8270	Extractable Organics	NELAP	2/3/2012
2-Methylphenol (o-Cresol)	EPA 625	Extractable Organics	NELAP	6/8/2009
2-Methylphenol (o-Cresol)	EPA 8270	Extractable Organics	NELAP	7/1/2003
2-Naphthylamine	EPA 8270	Extractable Organics	NELAP	6/8/2009
2-Nitroaniline	EPA 8270	Extractable Organics	NELAP	7/1/2003
2-Nitrophenol	EPA 625	Extractable Organics	NELAP	6/13/2001
2-Nitrophenol	EPA 8270	Extractable Organics	NELAP	7/1/2003
2-Nitropropane	ENMT 50-006/GC-MS	Volatile Organics	NELAP	6/12/2007
2-Picoline (2-Methylpyridine)	EPA 8270	Extractable Organics	NELAP	7/1/2003
3,3'-Dichlorobenzidine	EPA 625	Extractable Organics	NELAP	6/13/2001
3,3'-Dichlorobenzidine	EPA 8270	Extractable Organics	NELAP	2/3/2012
3,3'-Dimethylbenzidine	EPA 8270	Extractable Organics	NELAP	7/1/2003
3,5-Dichlorobenzoic acid	EPA 8151	Pesticides-Herbicides-PCB's	NELAP	7/1/2003
3/4-Methylphenols (m/p-Cresols)	EPA 625	Extractable Organics	NELAP	6/17/2014
3/4-Methylphenols (m/p-Cresols)	EPA 8270	Extractable Organics	NELAP	2/3/2012
3-Methylcholanthrene	EPA 8270	Extractable Organics	NELAP	7/1/2003
3-Nitroaniline	EPA 8270	Extractable Organics	NELAP	7/1/2003
4,4'-DDD	EPA 608	Pesticides-Herbicides-PCB's	NELAP	6/13/2001
4,4'-DDD	EPA 8081	Pesticides-Herbicides-PCB's	NELAP	7/1/2003
4,4'-DDE	EPA 608	Pesticides-Herbicides-PCB's	NELAP	6/13/2001

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E87668
Energy Laboratories, Inc. - MT
1120 South 27th Street
Billings, MT 59107-0916

Matrix: **Non-Potable Water**

Analyte	Method/Tech	Category	Certification Type	Effective Date
4,4'-DDE	EPA 8081	Pesticides-Herbicides-PCB's	NELAP	7/1/2003
4,4'-DDT	EPA 608	Pesticides-Herbicides-PCB's	NELAP	6/13/2001
4,4'-DDT	EPA 8081	Pesticides-Herbicides-PCB's	NELAP	7/1/2003
4-Aminobiphenyl	EPA 8270	Extractable Organics	NELAP	7/1/2003
4-Bromophenyl phenyl ether	EPA 625	Extractable Organics	NELAP	6/13/2001
4-Bromophenyl phenyl ether	EPA 8270	Extractable Organics	NELAP	7/1/2003
4-Chloro-2-methylphenol	ENMT 50-009/GC-MS	Extractable Organics	NELAP	6/12/2007
4-Chloro-3-methylphenol	EPA 625	Extractable Organics	NELAP	6/13/2001
4-Chloro-3-methylphenol	EPA 8270	Extractable Organics	NELAP	7/1/2003
4-Chloroaniline	EPA 8270	Extractable Organics	NELAP	6/12/2007
4-Chlorophenol	ENMT 50-009/GC-MS	Extractable Organics	NELAP	6/8/2009
4-Chlorophenyl phenylether	EPA 625	Extractable Organics	NELAP	2/3/2012
4-Chlorophenyl phenylether	EPA 8270	Extractable Organics	NELAP	2/3/2012
4-Chlorotoluene	EPA 8260	Volatile Organics	NELAP	6/8/2009
4-Dimethyl aminoazobenzene	EPA 8270	Extractable Organics	NELAP	2/7/2005
4-Methyl-2-pentanone (MIBK)	EPA 8260	Volatile Organics	NELAP	7/1/2003
4-Nitroaniline	EPA 8270	Extractable Organics	NELAP	7/1/2003
4-Nitrophenol	EPA 625	Extractable Organics	NELAP	6/13/2001
4-Nitrophenol	EPA 8151	Pesticides-Herbicides-PCB's	NELAP	7/1/2003
4-Nitrophenol	EPA 8270	Extractable Organics	NELAP	7/1/2003
5-Nitro-o-toluidine	EPA 8270	Extractable Organics	NELAP	7/1/2003
6-Methylchrysene	ENMT 50-009/GC-MS	Extractable Organics	NELAP	6/12/2007
7,12-Dimethylbenz(a) anthracene	EPA 8270	Extractable Organics	NELAP	7/1/2003
Acenaphthene	EPA 625	Extractable Organics	NELAP	6/13/2001
Acenaphthene	EPA 8270	Extractable Organics	NELAP	7/1/2003
Acenaphthylene	EPA 625	Extractable Organics	NELAP	6/13/2001
Acenaphthylene	EPA 8270	Extractable Organics	NELAP	7/1/2003
Acetone	EPA 624	Volatile Organics	NELAP	6/17/2014
Acetone	EPA 8260	Volatile Organics	NELAP	7/1/2003
Acetonitrile	EPA 8260	Volatile Organics	NELAP	7/1/2003
Acetophenone	EPA 8270	Extractable Organics	NELAP	7/1/2003
Acidity, as CaCO3	SM 2310 B	General Chemistry	NELAP	1/5/2004
Acifluorfen	EPA 8151	Pesticides-Herbicides-PCB's	NELAP	7/1/2003
Acrolein (Propenal)	EPA 624	Volatile Organics	NELAP	6/13/2001
Acrolein (Propenal)	EPA 8260	Volatile Organics	NELAP	7/1/2003
Acrylonitrile	EPA 624	Volatile Organics	NELAP	6/13/2001

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E87668
Energy Laboratories, Inc. - MT
1120 South 27th Street
Billings, MT 59107-0916

Matrix: **Non-Potable Water**

Analyte	Method/Tech	Category	Certification Type	Effective Date
Acrylonitrile	EPA 8260	Volatile Organics	NELAP	7/1/2003
Aldrin	EPA 608	Pesticides-Herbicides-PCB's	NELAP	6/13/2001
Aldrin	EPA 8081	Pesticides-Herbicides-PCB's	NELAP	7/1/2003
Alkalinity as CaCO3	SM 2320 B	General Chemistry	NELAP	6/13/2001
Allyl chloride (3-Chloropropene)	EPA 8260	Volatile Organics	NELAP	7/1/2003
alpha-BHC (alpha-Hexachlorocyclohexane)	EPA 608	Pesticides-Herbicides-PCB's	NELAP	6/13/2001
alpha-BHC (alpha-Hexachlorocyclohexane)	EPA 8081	Pesticides-Herbicides-PCB's	NELAP	7/1/2003
alpha-Chlordane	EPA 608	Pesticides-Herbicides-PCB's	NELAP	6/17/2014
alpha-Chlordane	EPA 8081	Pesticides-Herbicides-PCB's	NELAP	1/5/2004
Aluminum	EPA 200.7	Metals	NELAP	6/13/2001
Aluminum	EPA 200.8	Metals	NELAP	6/13/2001
Aluminum	EPA 6010	Metals	NELAP	7/1/2003
Aluminum	EPA 6020	Metals	NELAP	7/1/2003
Amenable cyanide	SM 4500-CN- G	General Chemistry	NELAP	2/3/2012
Ammonia as N	EPA 350.1	General Chemistry	NELAP	6/13/2001
Aniline	EPA 625	Extractable Organics	NELAP	6/8/2009
Aniline	EPA 8270	Extractable Organics	NELAP	7/1/2003
Anthracene	EPA 625	Extractable Organics	NELAP	6/13/2001
Anthracene	EPA 8270	Extractable Organics	NELAP	7/1/2003
Antimony	EPA 200.7	Metals	NELAP	6/13/2001
Antimony	EPA 200.8	Metals	NELAP	6/13/2001
Antimony	EPA 6010	Metals	NELAP	7/1/2003
Antimony	EPA 6020	Metals	NELAP	7/1/2003
Aramite	EPA 8270	Extractable Organics	NELAP	7/1/2003
Aroclor-1016 (PCB-1016)	EPA 608	Pesticides-Herbicides-PCB's	NELAP	6/13/2001
Aroclor-1016 (PCB-1016)	EPA 8082	Pesticides-Herbicides-PCB's	NELAP	7/1/2003
Aroclor-1221 (PCB-1221)	EPA 608	Pesticides-Herbicides-PCB's	NELAP	6/13/2001
Aroclor-1221 (PCB-1221)	EPA 8082	Pesticides-Herbicides-PCB's	NELAP	7/1/2003
Aroclor-1232 (PCB-1232)	EPA 608	Pesticides-Herbicides-PCB's	NELAP	6/13/2001
Aroclor-1232 (PCB-1232)	EPA 8082	Pesticides-Herbicides-PCB's	NELAP	7/1/2003
Aroclor-1242 (PCB-1242)	EPA 608	Pesticides-Herbicides-PCB's	NELAP	6/13/2001
Aroclor-1242 (PCB-1242)	EPA 8082	Pesticides-Herbicides-PCB's	NELAP	7/1/2003
Aroclor-1248 (PCB-1248)	EPA 608	Pesticides-Herbicides-PCB's	NELAP	6/13/2001
Aroclor-1248 (PCB-1248)	EPA 8082	Pesticides-Herbicides-PCB's	NELAP	7/1/2003
Aroclor-1254 (PCB-1254)	EPA 608	Pesticides-Herbicides-PCB's	NELAP	6/13/2001
Aroclor-1254 (PCB-1254)	EPA 8082	Pesticides-Herbicides-PCB's	NELAP	7/1/2003

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State Laboratory ID: **E87668** EPA Lab Code: **MT00005** **(406) 252-6325**

E87668
Energy Laboratories, Inc. - MT
1120 South 27th Street
Billings, MT 59107-0916

Matrix: **Non-Potable Water**

Analyte	Method/Tech	Category	Certification Type	Effective Date
Aroclor-1260 (PCB-1260)	EPA 608	Pesticides-Herbicides-PCB's	NELAP	6/13/2001
Aroclor-1260 (PCB-1260)	EPA 8082	Pesticides-Herbicides-PCB's	NELAP	7/1/2003
Aroclor-1262 (PCB-1262)	EPA 608	Pesticides-Herbicides-PCB's	NELAP	6/17/2014
Aroclor-1262 (PCB-1262)	EPA 8082	Pesticides-Herbicides-PCB's	NELAP	6/17/2014
Aroclor-1268 (PCB-1268)	EPA 608	Pesticides-Herbicides-PCB's	NELAP	6/17/2014
Aroclor-1268 (PCB-1268)	EPA 8082	Pesticides-Herbicides-PCB's	NELAP	6/17/2014
Arsenic	EPA 200.7	Metals	NELAP	6/13/2001
Arsenic	EPA 200.8	Metals	NELAP	6/13/2001
Arsenic	EPA 6010	Metals	NELAP	7/1/2003
Arsenic	EPA 6020	Metals	NELAP	7/1/2003
Available cyanide	KELADA-01	General Chemistry	NELAP	6/17/2014
Barium	EPA 200.7	Metals	NELAP	6/13/2001
Barium	EPA 200.8	Metals	NELAP	6/13/2001
Barium	EPA 6010	Metals	NELAP	7/1/2003
Barium	EPA 6020	Metals	NELAP	7/1/2003
Bentazon	EPA 8151	Pesticides-Herbicides-PCB's	NELAP	7/1/2003
Benzene	EPA 624	Volatile Organics	NELAP	6/13/2001
Benzene	EPA 8021	Volatile Organics	NELAP	7/1/2003
Benzene	EPA 8260	Volatile Organics	NELAP	7/1/2003
Benzidine	EPA 625	Extractable Organics	NELAP	2/3/2012
Benzidine	EPA 8270	Extractable Organics	NELAP	2/3/2012
Benzo(a)anthracene	EPA 625	Extractable Organics	NELAP	6/13/2001
Benzo(a)anthracene	EPA 8270	Extractable Organics	NELAP	7/1/2003
Benzo(a)pyrene	EPA 625	Extractable Organics	NELAP	6/13/2001
Benzo(a)pyrene	EPA 8270	Extractable Organics	NELAP	7/1/2003
Benzo(b)fluoranthene	EPA 625	Extractable Organics	NELAP	6/13/2001
Benzo(b)fluoranthene	EPA 8270	Extractable Organics	NELAP	7/1/2003
Benzo(g,h,i)perylene	EPA 625	Extractable Organics	NELAP	6/13/2001
Benzo(g,h,i)perylene	EPA 8270	Extractable Organics	NELAP	7/1/2003
Benzo(k)fluoranthene	EPA 625	Extractable Organics	NELAP	6/13/2001
Benzo(k)fluoranthene	EPA 8270	Extractable Organics	NELAP	7/1/2003
Benzoic acid	EPA 8270	Extractable Organics	NELAP	7/1/2003
Benzyl alcohol	EPA 8270	Extractable Organics	NELAP	7/1/2003
Beryllium	EPA 200.7	Metals	NELAP	6/13/2001
Beryllium	EPA 200.8	Metals	NELAP	6/13/2001
Beryllium	EPA 6010	Metals	NELAP	7/1/2003

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Billings, MT 59107-0916

Matrix: **Non-Potable Water**

Analyte	Method/Tech	Category	Certification Type	Effective Date
Beryllium	EPA 6020	Metals	NELAP	7/1/2003
beta-BHC (beta-Hexachlorocyclohexane)	EPA 608	Pesticides-Herbicides-PCB's	NELAP	6/13/2001
beta-BHC (beta-Hexachlorocyclohexane)	EPA 8081	Pesticides-Herbicides-PCB's	NELAP	7/1/2003
Biochemical oxygen demand	SM 5210 B	General Chemistry	NELAP	2/7/2005
bis(2-Chloroethoxy)methane	EPA 625	Extractable Organics	NELAP	2/3/2012
bis(2-Chloroethoxy)methane	EPA 8270	Extractable Organics	NELAP	2/3/2012
bis(2-Chloroethyl) ether	EPA 625	Extractable Organics	NELAP	2/3/2012
bis(2-Chloroethyl) ether	EPA 8270	Extractable Organics	NELAP	2/3/2012
bis(2-Ethylhexyl) phthalate (DEHP)	EPA 625	Extractable Organics	NELAP	2/3/2012
bis(2-Ethylhexyl) phthalate (DEHP)	EPA 8270	Extractable Organics	NELAP	2/3/2012
Bismuth	ENMT 50-213/ICP-MS	Metals	NELAP	2/3/2012
Boron	EPA 200.7	Metals	NELAP	6/13/2001
Boron	EPA 200.8	General Chemistry	NELAP	2/3/2012
Boron	EPA 6010	Metals	NELAP	7/1/2003
Boron	EPA 6020	Metals	NELAP	6/8/2009
Bromide	EPA 300.0	General Chemistry	NELAP	6/13/2001
Bromobenzene	EPA 8260	Volatile Organics	NELAP	7/1/2003
Bromochloromethane	EPA 8260	Volatile Organics	NELAP	7/1/2003
Bromodichloromethane	EPA 624	Volatile Organics	NELAP	6/13/2001
Bromodichloromethane	EPA 8260	Volatile Organics	NELAP	7/1/2003
Bromoform	EPA 624	Volatile Organics	NELAP	6/13/2001
Bromoform	EPA 8260	Volatile Organics	NELAP	7/1/2003
Butyl benzyl phthalate	EPA 625	Extractable Organics	NELAP	2/3/2012
Butyl benzyl phthalate	EPA 8270	Extractable Organics	NELAP	2/3/2012
Cadmium	EPA 200.7	Metals	NELAP	6/13/2001
Cadmium	EPA 200.8	Metals	NELAP	6/13/2001
Cadmium	EPA 6010	Metals	NELAP	7/1/2003
Cadmium	EPA 6020	Metals	NELAP	7/1/2003
Calcium	EPA 200.7	Metals	NELAP	6/13/2001
Calcium	EPA 200.8	Metals	NELAP	6/17/2014
Calcium	EPA 6010	Metals	NELAP	7/1/2003
Calcium	EPA 6020	Metals	NELAP	6/8/2009
Carbazole	EPA 8270	Extractable Organics	NELAP	7/1/2003
Carbon disulfide	EPA 8260	Volatile Organics	NELAP	7/1/2003
Carbon tetrachloride	EPA 624	Volatile Organics	NELAP	6/13/2001
Carbon tetrachloride	EPA 8260	Volatile Organics	NELAP	7/1/2003

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Matrix: **Non-Potable Water**

Analyte	Method/Tech	Category	Certification Type	Effective Date
Carbonaceous BOD (CBOD)	SM 5210 B	General Chemistry	NELAP	2/7/2005
Ceriodaphnia dubia	EPA 821-R-02-012 (FW acute)(2002.0)	Toxicity	NELAP	6/12/2007
Ceriodaphnia dubia	EPA 821-R-02-013 (FW chronic)(1002.0)	Toxicity	NELAP	6/12/2007
Chemical oxygen demand	EPA 410.4	General Chemistry	NELAP	6/13/2001
Chlordane (tech.)	EPA 608	Pesticides-Herbicides-PCB's	NELAP	6/13/2001
Chlordane (tech.)	EPA 8081	Pesticides-Herbicides-PCB's	NELAP	7/1/2003
Chloride	EPA 300.0	General Chemistry	NELAP	6/13/2001
Chlorobenzene	EPA 624	Volatile Organics	NELAP	6/13/2001
Chlorobenzene	EPA 8260	Volatile Organics	NELAP	7/1/2003
Chlorobenzilate	EPA 8270	Extractable Organics	NELAP	7/1/2003
Chloroethane	EPA 624	Volatile Organics	NELAP	6/13/2001
Chloroethane	EPA 8260	Volatile Organics	NELAP	7/1/2003
Chloroform	EPA 624	Volatile Organics	NELAP	6/13/2001
Chloroform	EPA 8260	Volatile Organics	NELAP	7/1/2003
Chloroprene	EPA 8260	Volatile Organics	NELAP	7/1/2003
Chromium	EPA 200.7	Metals	NELAP	6/13/2001
Chromium	EPA 200.8	Metals	NELAP	6/17/2014
Chromium	EPA 6010	Metals	NELAP	7/1/2003
Chromium	EPA 6020	Metals	NELAP	6/17/2014
Chromium VI	SM 3500-Cr B (20th/21st/22nd Ed.)/UV-VIS	General Chemistry	NELAP	6/8/2009
Chrysene	EPA 625	Extractable Organics	NELAP	9/17/2014
Chrysene	EPA 8270	Extractable Organics	NELAP	9/17/2014
cis-1,2-Dichloroethylene	EPA 624	Volatile Organics	NELAP	6/17/2014
cis-1,2-Dichloroethylene	EPA 8260	Volatile Organics	NELAP	7/1/2003
cis-1,3-Dichloropropene	EPA 624	Volatile Organics	NELAP	6/13/2001
cis-1,3-Dichloropropene	EPA 8260	Volatile Organics	NELAP	7/1/2003
Cobalt	EPA 200.7	Metals	NELAP	6/13/2001
Cobalt	EPA 200.8	Metals	NELAP	6/13/2001
Cobalt	EPA 6010	Metals	NELAP	7/1/2003
Cobalt	EPA 6020	Metals	NELAP	7/1/2003
Color	SM 2120 B	General Chemistry	NELAP	2/3/2012
Conductivity	SM 2510 B	General Chemistry	NELAP	6/13/2001
Copper	EPA 200.7	Metals	NELAP	6/13/2001
Copper	EPA 200.8	Metals	NELAP	6/13/2001

Laboratory Scope of Accreditation

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State Laboratory ID: **E87668** EPA Lab Code: **MT00005** **(406) 252-6325**

E87668
Energy Laboratories, Inc. - MT
1120 South 27th Street
Billings, MT 59107-0916

Matrix: **Non-Potable Water**

Analyte	Method/Tech	Category	Certification Type	Effective Date
Copper	EPA 6010	Metals	NELAP	7/1/2003
Copper	EPA 6020	Metals	NELAP	7/1/2003
Corrosivity (langlier index)	SM 2330 B	General Chemistry	NELAP	6/30/2016
Cyclohexanone	ENMT 50-006/GC-MS	Volatile Organics	NELAP	6/12/2007
Dacthal (DCPA)	EPA 8151	Pesticides-Herbicides-PCB's	NELAP	7/1/2003
Dalapon	EPA 615	Pesticides-Herbicides-PCB's	NELAP	6/13/2001
Dalapon	EPA 8151	Pesticides-Herbicides-PCB's	NELAP	7/1/2003
Daphnia magna	EPA 821-R-02-012 (FW acute)(2021.0)	Toxicity	NELAP	6/12/2007
delta-BHC	EPA 608	Pesticides-Herbicides-PCB's	NELAP	6/13/2001
delta-BHC	EPA 8081	Pesticides-Herbicides-PCB's	NELAP	7/1/2003
Diallate	EPA 8270	Extractable Organics	NELAP	7/1/2003
Dibenz(a,h)acridine	ENMT 50-009/GC-MS	Extractable Organics	NELAP	6/12/2007
Dibenz(a,h)anthracene	EPA 625	Extractable Organics	NELAP	6/13/2001
Dibenz(a,h)anthracene	EPA 8270	Extractable Organics	NELAP	7/1/2003
Dibenzofuran	EPA 8270	Extractable Organics	NELAP	2/3/2012
Dibromochloromethane	EPA 624	Volatile Organics	NELAP	6/13/2001
Dibromochloromethane	EPA 8260	Volatile Organics	NELAP	7/1/2003
Dibromomethane	EPA 8260	Volatile Organics	NELAP	7/1/2003
Dicamba	EPA 615	Pesticides-Herbicides-PCB's	NELAP	6/13/2001
Dicamba	EPA 8151	Pesticides-Herbicides-PCB's	NELAP	7/1/2003
Dichlorodifluoromethane	EPA 8260	Volatile Organics	NELAP	7/1/2003
Dichloroprop (Dichlorprop)	EPA 615	Pesticides-Herbicides-PCB's	NELAP	6/13/2001
Dichloroprop (Dichlorprop)	EPA 8151	Pesticides-Herbicides-PCB's	NELAP	7/1/2003
Dieldrin	EPA 608	Pesticides-Herbicides-PCB's	NELAP	6/13/2001
Dieldrin	EPA 8081	Pesticides-Herbicides-PCB's	NELAP	7/1/2003
Diesel range organics (DRO)	EPA 8015	Extractable Organics	NELAP	2/7/2005
Diesel range organics (DRO)	MADEP-EPH (MA-EPH)	Extractable Organics	NELAP	7/1/2003
Diesel range organics (DRO)	MT-DRO	Extractable Organics	NELAP	1/5/2004
Diethyl ether	EPA 8260	Volatile Organics	NELAP	7/1/2003
Diethyl phthalate	EPA 625	Extractable Organics	NELAP	2/3/2012
Diethyl phthalate	EPA 8270	Extractable Organics	NELAP	2/3/2012
Dimethoate	EPA 8270	Extractable Organics	NELAP	7/1/2003
Dimethyl phthalate	EPA 625	Extractable Organics	NELAP	2/3/2012
Dimethyl phthalate	EPA 8270	Extractable Organics	NELAP	2/3/2012
Di-n-butyl phthalate	EPA 625	Extractable Organics	NELAP	2/3/2012
Di-n-butyl phthalate	EPA 8270	Extractable Organics	NELAP	2/3/2012

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State Laboratory ID: **E87668** EPA Lab Code: **MT00005** **(406) 252-6325**

E87668
Energy Laboratories, Inc. - MT
1120 South 27th Street
Billings, MT 59107-0916

Matrix: **Non-Potable Water**

Analyte	Method/Tech	Category	Certification Type	Effective Date
Di-n-octyl phthalate	EPA 625	Extractable Organics	NELAP	2/3/2012
Di-n-octyl phthalate	EPA 8270	Extractable Organics	NELAP	2/3/2012
Dinoseb (2-sec-butyl-4,6-dinitrophenol, DNBP)	EPA 615	Pesticides-Herbicides-PCB's	NELAP	6/13/2001
Dinoseb (2-sec-butyl-4,6-dinitrophenol, DNBP)	EPA 8151	Pesticides-Herbicides-PCB's	NELAP	7/1/2003
Disulfoton	EPA 8270	Pesticides-Herbicides-PCB's	NELAP	7/1/2003
Endosulfan I	EPA 608	Pesticides-Herbicides-PCB's	NELAP	6/13/2001
Endosulfan I	EPA 8081	Pesticides-Herbicides-PCB's	NELAP	7/1/2003
Endosulfan II	EPA 608	Pesticides-Herbicides-PCB's	NELAP	6/13/2001
Endosulfan II	EPA 8081	Pesticides-Herbicides-PCB's	NELAP	7/1/2003
Endosulfan sulfate	EPA 608	Pesticides-Herbicides-PCB's	NELAP	6/13/2001
Endosulfan sulfate	EPA 8081	Pesticides-Herbicides-PCB's	NELAP	7/1/2003
Endrin	EPA 608	Pesticides-Herbicides-PCB's	NELAP	6/13/2001
Endrin	EPA 8081	Pesticides-Herbicides-PCB's	NELAP	7/1/2003
Endrin aldehyde	EPA 608	Pesticides-Herbicides-PCB's	NELAP	6/13/2001
Endrin aldehyde	EPA 8081	Pesticides-Herbicides-PCB's	NELAP	7/1/2003
Endrin ketone	EPA 608	Pesticides-Herbicides-PCB's	NELAP	6/17/2014
Endrin ketone	EPA 8081	Pesticides-Herbicides-PCB's	NELAP	1/5/2004
Ethyl acetate	EPA 8260	Volatile Organics	NELAP	7/1/2003
Ethyl methacrylate	EPA 8260	Volatile Organics	NELAP	7/1/2003
Ethyl methanesulfonate	EPA 8270	Extractable Organics	NELAP	7/1/2003
Ethylbenzene	EPA 624	Volatile Organics	NELAP	6/13/2001
Ethylbenzene	EPA 8021	Volatile Organics	NELAP	7/1/2003
Ethylbenzene	EPA 8260	Volatile Organics	NELAP	7/1/2003
Famphur	EPA 8270	Extractable Organics	NELAP	7/1/2003
Fluoranthene	EPA 625	Extractable Organics	NELAP	6/13/2001
Fluoranthene	EPA 8270	Extractable Organics	NELAP	7/1/2003
Fluorene	EPA 625	Extractable Organics	NELAP	6/13/2001
Fluorene	EPA 8270	Extractable Organics	NELAP	7/1/2003
Fluoride	EPA 300.0	General Chemistry	NELAP	1/5/2004
Fluoride	SM 4500 F-C	General Chemistry	NELAP	6/8/2009
Gallium	ENMT 50-213/ICP-MS	Metals	NELAP	2/3/2012
gamma-BHC (Lindane, gamma-Hexachlorocyclohexane)	EPA 608	Pesticides-Herbicides-PCB's	NELAP	6/13/2001
gamma-BHC (Lindane, gamma-Hexachlorocyclohexane)	EPA 8081	Pesticides-Herbicides-PCB's	NELAP	7/1/2003
gamma-Chlordane	EPA 608	Pesticides-Herbicides-PCB's	NELAP	6/17/2014
gamma-Chlordane	EPA 8081	Pesticides-Herbicides-PCB's	NELAP	1/5/2004

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E87668
Energy Laboratories, Inc. - MT
1120 South 27th Street
Billings, MT 59107-0916

Matrix: **Non-Potable Water**

Analyte	Method/Tech	Category	Certification Type	Effective Date
Gasoline range organics (GRO)	EPA 8015	Extractable Organics	NELAP	2/7/2005
Gasoline range organics (GRO)	MADEP-VPH (MA-VPH)	Extractable Organics	NELAP	7/1/2003
Gasoline range organics (GRO)	MT-GRO	Extractable Organics	NELAP	1/5/2004
Hardness	SM 2340 B	General Chemistry	NELAP	6/17/2014
Heptachlor	EPA 608	Pesticides-Herbicides-PCB's	NELAP	6/13/2001
Heptachlor	EPA 8081	Pesticides-Herbicides-PCB's	NELAP	7/1/2003
Heptachlor epoxide	EPA 608	Pesticides-Herbicides-PCB's	NELAP	6/13/2001
Heptachlor epoxide	EPA 8081	Pesticides-Herbicides-PCB's	NELAP	7/1/2003
Hexachlorobenzene	EPA 625	Extractable Organics	NELAP	2/3/2012
Hexachlorobenzene	EPA 8270	Extractable Organics	NELAP	2/3/2012
Hexachlorobutadiene	EPA 625	Extractable Organics	NELAP	2/3/2012
Hexachlorobutadiene	EPA 8260	Volatile Organics	NELAP	7/1/2003
Hexachlorobutadiene	EPA 8270	Extractable Organics	NELAP	2/3/2012
Hexachlorocyclopentadiene	EPA 625	Extractable Organics	NELAP	2/3/2012
Hexachlorocyclopentadiene	EPA 8270	Extractable Organics	NELAP	2/3/2012
Hexachloroethane	EPA 625	Extractable Organics	NELAP	2/3/2012
Hexachloroethane	EPA 8270	Extractable Organics	NELAP	2/3/2012
Hexachloropropene	EPA 8270	Extractable Organics	NELAP	7/1/2003
Ignitability	EPA 1010	General Chemistry	NELAP	7/1/2003
Indene	ENMT 50-009/GC-MS	Extractable Organics	NELAP	6/8/2009
Indeno(1,2,3-cd)pyrene	EPA 625	Extractable Organics	NELAP	6/13/2001
Indeno(1,2,3-cd)pyrene	EPA 8270	Extractable Organics	NELAP	7/1/2003
Iodomethane (Methyl iodide)	EPA 8260	Volatile Organics	NELAP	7/1/2003
Iron	EPA 200.7	Metals	NELAP	6/13/2001
Iron	EPA 200.8	Metals	NELAP	6/17/2014
Iron	EPA 6010	Metals	NELAP	7/1/2003
Iron	EPA 6020	Metals	NELAP	6/8/2009
Isobutyl alcohol (2-Methyl-1-propanol)	EPA 8260	Volatile Organics	NELAP	7/1/2003
Isodrin	EPA 8081	Pesticides-Herbicides-PCB's	NELAP	7/1/2003
Isophorone	EPA 625	Extractable Organics	NELAP	2/3/2012
Isophorone	EPA 8270	Extractable Organics	NELAP	2/3/2012
Isopropylbenzene	EPA 8260	Volatile Organics	NELAP	7/1/2003
Isosafrole	EPA 8270	Extractable Organics	NELAP	7/1/2003
Kepone	EPA 8081	Pesticides-Herbicides-PCB's	NELAP	7/1/2003
Kjeldahl nitrogen - total	EPA 351.2	General Chemistry	NELAP	6/13/2001
Lead	EPA 200.7	Metals	NELAP	6/13/2001

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E87668
Energy Laboratories, Inc. - MT
1120 South 27th Street
Billings, MT 59107-0916

Matrix: **Non-Potable Water**

Analyte	Method/Tech	Category	Certification Type	Effective Date
Lead	EPA 200.8	Metals	NELAP	6/13/2001
Lead	EPA 6010	Metals	NELAP	7/1/2003
Lead	EPA 6020	Metals	NELAP	7/1/2003
Lithium	EPA 200.7	Metals	NELAP	1/5/2004
Lithium	EPA 6010	Metals	NELAP	7/1/2003
m/p-Xylenes	EPA 8021	Volatile Organics	NELAP	2/3/2012
m/p-Xylenes	EPA 8260	Volatile Organics	NELAP	2/3/2012
m+p-Xylenes	EPA 624	Volatile Organics	NELAP	6/17/2014
Magnesium	EPA 200.7	Metals	NELAP	6/13/2001
Magnesium	EPA 200.8	Metals	NELAP	6/17/2014
Magnesium	EPA 6010	Metals	NELAP	7/1/2003
Magnesium	EPA 6020	Metals	NELAP	6/8/2009
Manganese	EPA 200.7	Metals	NELAP	6/13/2001
Manganese	EPA 200.8	Metals	NELAP	6/17/2014
Manganese	EPA 6010	Metals	NELAP	7/1/2003
Manganese	EPA 6020	Metals	NELAP	6/17/2014
MCPA	EPA 615	Pesticides-Herbicides-PCB's	NELAP	6/13/2001
MCPA	EPA 8151	Pesticides-Herbicides-PCB's	NELAP	7/1/2003
MCPP	EPA 615	Pesticides-Herbicides-PCB's	NELAP	6/13/2001
MCPP	EPA 8151	Pesticides-Herbicides-PCB's	NELAP	7/1/2003
Mercury	EPA 200.8	Metals	NELAP	6/13/2001
Mercury	EPA 245.1	Metals	NELAP	6/13/2001
Mercury	EPA 245.7	Metals	NELAP	6/30/2016
Mercury	EPA 6020	Metals	NELAP	1/5/2004
Mercury	EPA 7470	Metals	NELAP	7/1/2003
Mercury	EPA 7473	Metals	NELAP	6/17/2014
Methacrylonitrile	EPA 8260	Volatile Organics	NELAP	7/1/2003
Methapyrilene	EPA 8270	Extractable Organics	NELAP	1/5/2004
Methoxychlor	EPA 608	Pesticides-Herbicides-PCB's	NELAP	6/17/2014
Methoxychlor	EPA 8081	Pesticides-Herbicides-PCB's	NELAP	7/1/2003
Methyl bromide (Bromomethane)	EPA 624	Volatile Organics	NELAP	6/13/2001
Methyl bromide (Bromomethane)	EPA 8260	Volatile Organics	NELAP	7/1/2003
Methyl chloride (Chloromethane)	EPA 624	Volatile Organics	NELAP	6/13/2001
Methyl chloride (Chloromethane)	EPA 8260	Volatile Organics	NELAP	7/1/2003
Methyl methacrylate	EPA 8260	Volatile Organics	NELAP	7/1/2003
Methyl methanesulfonate	EPA 8270	Extractable Organics	NELAP	1/5/2004

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State Laboratory ID: **E87668** EPA Lab Code: **MT00005** **(406) 252-6325**

E87668
Energy Laboratories, Inc. - MT
1120 South 27th Street
Billings, MT 59107-0916

Matrix: **Non-Potable Water**

Analyte	Method/Tech	Category	Certification Type	Effective Date
Methyl parathion (Parathion, methyl)	EPA 8270	Pesticides-Herbicides-PCB's	NELAP	7/1/2003
Methyl tert-butyl ether (MTBE)	EPA 624	Volatile Organics	NELAP	6/30/2016
Methyl tert-butyl ether (MTBE)	EPA 8021	Volatile Organics	NELAP	9/17/2014
Methyl tert-butyl ether (MTBE)	EPA 8260	Volatile Organics	NELAP	7/1/2003
Methylene chloride	EPA 624	Volatile Organics	NELAP	6/13/2001
Methylene chloride	EPA 8260	Volatile Organics	NELAP	7/1/2003
Mirex	EPA 8081	Pesticides-Herbicides-PCB's	NELAP	7/1/2003
Molybdenum	EPA 200.7	Metals	NELAP	6/13/2001
Molybdenum	EPA 200.8	Metals	NELAP	6/13/2001
Molybdenum	EPA 6010	Metals	NELAP	7/1/2003
Molybdenum	EPA 6020	Metals	NELAP	6/8/2009
Naphthalene	EPA 624	Volatile Organics	NELAP	6/17/2014
Naphthalene	EPA 625	Extractable Organics	NELAP	6/13/2001
Naphthalene	EPA 8021	Volatile Organics	NELAP	1/24/2005
Naphthalene	EPA 8260	Volatile Organics	NELAP	7/1/2003
Naphthalene	EPA 8270	Extractable Organics	NELAP	7/1/2003
n-Butyl alcohol	EPA 8260	Volatile Organics	NELAP	7/1/2003
n-Butylbenzene	EPA 8260	Volatile Organics	NELAP	7/1/2003
Nickel	EPA 200.7	Metals	NELAP	6/13/2001
Nickel	EPA 200.8	Metals	NELAP	6/13/2001
Nickel	EPA 6010	Metals	NELAP	7/1/2003
Nickel	EPA 6020	Metals	NELAP	7/1/2003
Nitrate as N	EPA 300.0	General Chemistry	NELAP	1/5/2004
Nitrate as N	EPA 353.2	General Chemistry	NELAP	1/5/2004
Nitrite as N	EPA 300.0	General Chemistry	NELAP	9/17/2014
Nitrite as N	EPA 353.2	General Chemistry	NELAP	1/5/2004
Nitrobenzene	EPA 625	Extractable Organics	NELAP	2/3/2012
Nitrobenzene	EPA 8270	Extractable Organics	NELAP	2/3/2012
Nitroquinoline-1-oxide	EPA 8270	Extractable Organics	NELAP	7/1/2003
n-Nitrosodiethylamine	EPA 625	Extractable Organics	NELAP	6/17/2014
n-Nitrosodiethylamine	EPA 8270	Extractable Organics	NELAP	7/1/2003
n-Nitrosodimethylamine	EPA 625	Extractable Organics	NELAP	2/3/2012
n-Nitrosodimethylamine	EPA 8270	Extractable Organics	NELAP	2/3/2012
n-Nitroso-di-n-butylamine	EPA 625	Extractable Organics	NELAP	6/17/2014
n-Nitroso-di-n-butylamine	EPA 8270	Extractable Organics	NELAP	7/1/2003
n-Nitrosodi-n-propylamine	EPA 625	Extractable Organics	NELAP	2/3/2012

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Matrix: **Non-Potable Water**

Analyte	Method/Tech	Category	Certification Type	Effective Date
n-Nitrosodi-n-propylamine	EPA 8270	Extractable Organics	NELAP	2/3/2012
n-Nitrosodiphenylamine	EPA 625	Extractable Organics	NELAP	2/3/2012
n-Nitrosodiphenylamine	EPA 8270	Extractable Organics	NELAP	2/3/2012
n-Nitrosomethylethylamine	EPA 8270	Extractable Organics	NELAP	7/1/2003
n-Nitrosomorpholine	EPA 8270	Extractable Organics	NELAP	7/1/2003
n-Nitrosopiperidine	EPA 8270	Extractable Organics	NELAP	7/1/2003
n-Nitrosopyrrolidine	EPA 8270	Extractable Organics	NELAP	7/1/2003
n-Propylbenzene	EPA 8260	Volatile Organics	NELAP	7/1/2003
o,o,o-Triethyl phosphorothioate	EPA 8270	Extractable Organics	NELAP	7/1/2003
Organic nitrogen	TKN minus AMMONIA	General Chemistry	NELAP	6/13/2001
Orthophosphate as P	EPA 300.0	General Chemistry	NELAP	1/5/2004
Orthophosphate as P	EPA 365.1	General Chemistry	NELAP	6/13/2001
o-Toluidine	EPA 8270	Extractable Organics	NELAP	7/1/2003
Oxygen, dissolved	SM 4500-O G	General Chemistry	NELAP	6/17/2014
o-Xylene	EPA 624	Volatile Organics	NELAP	6/17/2014
o-Xylene	EPA 8021	Volatile Organics	NELAP	2/3/2012
o-Xylene	EPA 8260	Volatile Organics	NELAP	2/3/2012
Palladium	ENMT 50-213/ICP-MS	Metals	NELAP	2/3/2012
Parathion, ethyl	EPA 8270	Pesticides-Herbicides-PCB's	NELAP	2/7/2005
p-Dioxane	EPA 8260	Volatile Organics	NELAP	7/1/2003
Pentachlorobenzene	EPA 625	Extractable Organics	NELAP	6/17/2014
Pentachlorobenzene	EPA 8270	Extractable Organics	NELAP	7/1/2003
Pentachloroethane	EPA 8260	Volatile Organics	NELAP	7/1/2003
Pentachloronitrobenzene (Quintozene)	EPA 8270	Extractable Organics	NELAP	7/1/2003
Pentachlorophenol	EPA 625	Extractable Organics	NELAP	6/13/2001
Pentachlorophenol	EPA 8151	Pesticides-Herbicides-PCB's	NELAP	7/1/2003
Pentachlorophenol	EPA 8270	Extractable Organics	NELAP	7/1/2003
pH	EPA 9040	General Chemistry	NELAP	1/5/2004
pH	SM 4500-H+-B	General Chemistry	NELAP	6/12/2007
Phenacetin	EPA 8270	Extractable Organics	NELAP	7/1/2003
Phenanthrene	EPA 625	Extractable Organics	NELAP	6/13/2001
Phenanthrene	EPA 8270	Extractable Organics	NELAP	7/1/2003
Phenol	EPA 625	Extractable Organics	NELAP	6/13/2001
Phenol	EPA 8270	Extractable Organics	NELAP	7/1/2003
Phorate	EPA 8270	Pesticides-Herbicides-PCB's	NELAP	7/1/2003
Phosphorus, total	EPA 200.7	Metals	NELAP	1/5/2004

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1120 South 27th Street
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Matrix: **Non-Potable Water**

Analyte	Method/Tech	Category	Certification Type	Effective Date
Phosphorus, total	EPA 365.1	General Chemistry	NELAP	6/13/2001
Phosphorus, total	EPA 6010	Metals	NELAP	7/1/2003
Picloram	EPA 8151	Pesticides-Herbicides-PCB's	NELAP	7/1/2003
Pimephales promelas	EPA 821-R-02-012 (FW acute)(2000.0)	Toxicity	NELAP	6/12/2007
Pimephales promelas	EPA 821-R-02-013 (FW chronic)(1000.0)	Toxicity	NELAP	6/12/2007
p-Isopropyltoluene	EPA 8260	Volatile Organics	NELAP	7/1/2003
Platinum	ENMT 50-213/ICP-MS	Metals	NELAP	2/3/2012
Potassium	EPA 200.7	Metals	NELAP	6/13/2001
Potassium	EPA 200.8	Metals	NELAP	6/17/2014
Potassium	EPA 6010	Metals	NELAP	7/1/2003
Potassium	EPA 6020	Metals	NELAP	6/8/2009
Pronamide (Kerb)	EPA 8270	Extractable Organics	NELAP	7/1/2003
Propionitrile (Ethyl cyanide)	EPA 8260	Volatile Organics	NELAP	7/1/2003
Pyrene	EPA 625	Extractable Organics	NELAP	6/13/2001
Pyrene	EPA 8270	Extractable Organics	NELAP	7/1/2003
Pyridine	EPA 625	Extractable Organics	NELAP	6/17/2014
Pyridine	EPA 8270	Extractable Organics	NELAP	7/1/2003
Quinoline	ENMT 50-009/GC-MS	Extractable Organics	NELAP	6/12/2007
Residual free chlorine	SM 4500-Cl G	General Chemistry	NELAP	6/8/2009
Residue-filterable (TDS)	SM 2540 C	General Chemistry	NELAP	6/13/2001
Residue-nonfilterable (TSS)	SM 2540 D	General Chemistry	NELAP	6/12/2007
Residue-settleable	SM 2540 F	General Chemistry	NELAP	6/17/2014
Residue-total	SM 2540 B	General Chemistry	NELAP	2/7/2005
Rhodium	ENMT 50-213/ICP-MS	Metals	NELAP	2/3/2012
Ruthenium	ENMT 50-213/ICP-MS	Metals	NELAP	2/3/2012
Safrole	EPA 8270	Extractable Organics	NELAP	7/1/2003
Scandium	ENMT 50-213/ICP-MS	Metals	NELAP	2/3/2012
sec-Butylbenzene	EPA 8260	Volatile Organics	NELAP	7/1/2003
Selenium	EPA 200.7	Metals	NELAP	6/13/2001
Selenium	EPA 200.8	Metals	NELAP	6/13/2001
Selenium	EPA 6010	Metals	NELAP	7/1/2003
Selenium	EPA 6020	Metals	NELAP	6/8/2009
Silica as SiO2	EPA 200.7	Metals	NELAP	6/17/2014
Silicon	EPA 200.7	Metals	NELAP	6/13/2001
Silicon	EPA 6010	Metals	NELAP	7/1/2003

Laboratory Scope of Accreditation

Attachment to Certificate #: E87668-39, expiration date June 30, 2018. This listing of accredited analytes should be used only when associated with a valid certificate.

State Laboratory ID: **E87668** EPA Lab Code: **MT00005** **(406) 252-6325**

E87668
Energy Laboratories, Inc. - MT
1120 South 27th Street
Billings, MT 59107-0916

Matrix: **Non-Potable Water**

Analyte	Method/Tech	Category	Certification Type	Effective Date
Silver	EPA 200.7	Metals	NELAP	6/13/2001
Silver	EPA 200.8	Metals	NELAP	6/13/2001
Silver	EPA 6010	Metals	NELAP	7/1/2003
Silver	EPA 6020	Metals	NELAP	7/1/2003
Silvex (2,4,5-TP)	EPA 615	Pesticides-Herbicides-PCB's	NELAP	6/13/2001
Silvex (2,4,5-TP)	EPA 8151	Pesticides-Herbicides-PCB's	NELAP	7/1/2003
Sodium	EPA 200.7	Metals	NELAP	6/13/2001
Sodium	EPA 200.8	Metals	NELAP	6/17/2014
Sodium	EPA 6010	Metals	NELAP	7/1/2003
Sodium	EPA 6020	Metals	NELAP	6/8/2009
Strontium	EPA 200.7	Metals	NELAP	1/5/2004
Strontium	EPA 200.8	Metals	NELAP	6/17/2014
Strontium	EPA 6010	Metals	NELAP	7/1/2003
Strontium	EPA 6020	Metals	NELAP	6/8/2009
Styrene	EPA 8260	Volatile Organics	NELAP	7/1/2003
Sulfate	EPA 300.0	General Chemistry	NELAP	6/13/2001
Sulfide	SM 4500-S D/UV-VIS	General Chemistry	NELAP	6/12/2007
Sulfide	SM 4500-S F (19th/20th/21st Ed.)/TITR	General Chemistry	NELAP	6/8/2009
Sulfite-SO3	SM 4500-SO3 B	General Chemistry	NELAP	2/3/2012
Sulfotepp	EPA 8270	Pesticides-Herbicides-PCB's	NELAP	7/1/2003
Surfactants - MBAS	SM 5540 C	General Chemistry	NELAP	6/30/2016
Tannin & Lignin	SM 5550 B	General Chemistry	NELAP	2/3/2012
tert-Butyl alcohol (2-Methyl-2-propanol)	EPA 8260	Volatile Organics	NELAP	6/8/2009
tert-Butylbenzene	EPA 8260	Volatile Organics	NELAP	7/1/2003
Tetrachloroethylene (Perchloroethylene)	EPA 624	Volatile Organics	NELAP	6/13/2001
Tetrachloroethylene (Perchloroethylene)	EPA 8260	Volatile Organics	NELAP	7/1/2003
Thallium	EPA 200.7	Metals	NELAP	6/13/2001
Thallium	EPA 200.8	Metals	NELAP	6/13/2001
Thallium	EPA 6010	Metals	NELAP	7/1/2003
Thallium	EPA 6020	Metals	NELAP	7/1/2003
Thionazin (Zinophos)	EPA 8270	Pesticides-Herbicides-PCB's	NELAP	7/1/2003
Thiophenol (Benzenethiol)	EPA 8270	Extractable Organics	NELAP	6/12/2007
Thorium	EPA 6020	Metals	NELAP	6/30/2016
Tin	EPA 200.7	Metals	NELAP	6/13/2001
Tin	EPA 200.8	Metals	NELAP	6/17/2014
Tin	EPA 6010	Metals	NELAP	7/1/2003

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State Laboratory ID: **E87668** EPA Lab Code: **MT00005** **(406) 252-6325**

E87668
Energy Laboratories, Inc. - MT
1120 South 27th Street
Billings, MT 59107-0916

Matrix: **Non-Potable Water**

Analyte	Method/Tech	Category	Certification Type	Effective Date
Tin	EPA 6020	Metals	NELAP	6/8/2009
Titanium	EPA 200.7	Metals	NELAP	6/13/2001
Titanium	EPA 200.8	Metals	NELAP	6/17/2014
Titanium	EPA 6010	Metals	NELAP	6/8/2009
Titanium	EPA 6020	Metals	NELAP	6/8/2009
Toluene	EPA 624	Volatile Organics	NELAP	6/13/2001
Toluene	EPA 8021	Volatile Organics	NELAP	7/1/2003
Toluene	EPA 8260	Volatile Organics	NELAP	7/1/2003
Total cyanide	EPA 335.4	General Chemistry	NELAP	6/13/2001
Total cyanide	EPA 9012	General Chemistry	NELAP	6/12/2007
Total cyanide	KELADA-01	General Chemistry	NELAP	6/8/2009
Total nitrate-nitrite	EPA 300.0	General Chemistry	NELAP	1/5/2004
Total nitrate-nitrite	EPA 353.2	General Chemistry	NELAP	6/13/2001
Total nitrogen	TKN + Total nitrate-nitrite	General Chemistry	NELAP	2/3/2012
Total Petroleum Hydrocarbons (TPH)	TX1005	Extractable Organics	NELAP	2/7/2005
Total phenolics	EPA 420.4	General Chemistry	NELAP	6/8/2009
Total trihalomethanes	EPA 624	Volatile Organics	NELAP	6/17/2014
Total trihalomethanes	EPA 8260	Volatile Organics	NELAP	6/17/2014
Toxaphene (Chlorinated camphene)	EPA 608	Pesticides-Herbicides-PCB's	NELAP	6/13/2001
Toxaphene (Chlorinated camphene)	EPA 8081	Pesticides-Herbicides-PCB's	NELAP	7/1/2003
trans-1,2-Dichloroethylene	EPA 624	Volatile Organics	NELAP	6/13/2001
trans-1,2-Dichloroethylene	EPA 8260	Volatile Organics	NELAP	7/1/2003
trans-1,3-Dichloropropene	EPA 624	Volatile Organics	NELAP	6/13/2001
trans-1,3-Dichloropropene	EPA 8260	Volatile Organics	NELAP	7/1/2003
trans-1,4-Dichloro-2-butene	EPA 8260	Volatile Organics	NELAP	7/1/2003
Trichloroethene (Trichloroethylene)	EPA 624	Volatile Organics	NELAP	6/13/2001
Trichloroethene (Trichloroethylene)	EPA 8260	Volatile Organics	NELAP	7/1/2003
Trichlorofluoromethane	EPA 624	Volatile Organics	NELAP	6/13/2001
Trichlorofluoromethane	EPA 8260	Volatile Organics	NELAP	7/1/2003
Turbidity	SM 2130 B	General Chemistry	NELAP	6/17/2014
Uranium	EPA 200.8	Metals	NELAP	6/13/2001
Uranium	EPA 6020	Metals	NELAP	6/12/2007
Vanadium	EPA 200.7	Metals	NELAP	6/13/2001
Vanadium	EPA 200.8	Metals	NELAP	6/13/2001
Vanadium	EPA 6010	Metals	NELAP	7/1/2003
Vanadium	EPA 6020	Metals	NELAP	1/5/2004

Laboratory Scope of Accreditation

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State Laboratory ID: **E87668** EPA Lab Code: **MT00005** **(406) 252-6325**

E87668
Energy Laboratories, Inc. - MT
1120 South 27th Street
Billings, MT 59107-0916

Matrix: **Non-Potable Water**

Analyte	Method/Tech	Category	Certification Type	Effective Date
Vinyl acetate	EPA 8260	Volatile Organics	NELAP	7/1/2003
Vinyl chloride	EPA 624	Volatile Organics	NELAP	6/13/2001
Vinyl chloride	EPA 8260	Volatile Organics	NELAP	7/1/2003
Weak acid dissociable cyanide	ASTM D2036-98C/UV-VIS	General Chemistry	NELAP	2/3/2012
Xylene (total)	EPA 624	Volatile Organics	NELAP	6/8/2009
Xylene (total)	EPA 8021	Volatile Organics	NELAP	7/1/2003
Xylene (total)	EPA 8260	Volatile Organics	NELAP	7/1/2003
Zinc	EPA 200.7	Metals	NELAP	6/13/2001
Zinc	EPA 200.8	Metals	NELAP	6/13/2001
Zinc	EPA 6010	Metals	NELAP	7/1/2003
Zinc	EPA 6020	Metals	NELAP	7/1/2003

Laboratory Scope of Accreditation

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State Laboratory ID: **E87668** EPA Lab Code: **MT00005** **(406) 252-6325**

E87668
Energy Laboratories, Inc. - MT
1120 South 27th Street
Billings, MT 59107-0916

Matrix: **Solid and Chemical Materials**

Analyte	Method/Tech	Category	Certification Type	Effective Date
1,1,1,2-Tetrachloroethane	EPA 8260	Volatile Organics	NELAP	6/13/2001
1,1,1-Trichloroethane	EPA 8260	Volatile Organics	NELAP	6/13/2001
1,1,2,2-Tetrachloroethane	EPA 8260	Volatile Organics	NELAP	6/13/2001
1,1,2-Trichloroethane	EPA 8260	Volatile Organics	NELAP	6/13/2001
1,1-Dichloroethane	EPA 8260	Volatile Organics	NELAP	6/13/2001
1,1-Dichloroethylene	EPA 8260	Volatile Organics	NELAP	6/13/2001
1,1-Dichloropropene	EPA 8260	Volatile Organics	NELAP	6/13/2001
1,2,3-Trichlorobenzene	EPA 8260	Volatile Organics	NELAP	6/13/2001
1,2,3-Trichloropropane	EPA 8260	Volatile Organics	NELAP	6/13/2001
1,2,4,5-Tetrachlorobenzene	EPA 8270	Extractable Organics	NELAP	6/13/2001
1,2,4-Trichlorobenzene	EPA 8260	Volatile Organics	NELAP	6/13/2001
1,2,4-Trichlorobenzene	EPA 8270	Extractable Organics	NELAP	6/13/2001
1,2,4-Trimethylbenzene	EPA 8260	Volatile Organics	NELAP	6/13/2001
1,2-Dibromo-3-chloropropane (DBCP)	EPA 8260	Volatile Organics	NELAP	9/3/2014
1,2-Dibromoethane (EDB, Ethylene dibromide)	EPA 8260	Volatile Organics	NELAP	6/13/2001
1,2-Dichlorobenzene	EPA 8260	Volatile Organics	NELAP	6/13/2001
1,2-Dichlorobenzene	EPA 8270	Extractable Organics	NELAP	6/13/2001
1,2-Dichloroethane	EPA 8260	Volatile Organics	NELAP	6/13/2001
1,2-Dichloropropane	EPA 8260	Volatile Organics	NELAP	6/13/2001
1,2-Diphenylhydrazine	EPA 8270	Extractable Organics	NELAP	6/13/2001
1,3,5-Trimethylbenzene	EPA 8260	Volatile Organics	NELAP	6/13/2001
1,3,5-Trinitrobenzene (1,3,5-TNB)	EPA 8270	Extractable Organics	NELAP	2/17/2011
1,3-Dichlorobenzene	EPA 8260	Volatile Organics	NELAP	6/13/2001
1,3-Dichlorobenzene	EPA 8270	Extractable Organics	NELAP	6/13/2001
1,3-Dichloropropane	EPA 8260	Volatile Organics	NELAP	6/13/2001
1,3-Dinitrobenzene (1,3-DNB)	EPA 8270	Extractable Organics	NELAP	2/17/2011
1,4-Dichlorobenzene	EPA 8260	Volatile Organics	NELAP	6/13/2001
1,4-Dichlorobenzene	EPA 8270	Extractable Organics	NELAP	6/13/2001
1,4-Naphthoquinone	EPA 8270	Extractable Organics	NELAP	6/13/2001
1-Methylnaphthalene	EPA 8270	Extractable Organics	NELAP	6/12/2007
1-Naphthylamine	EPA 8270	Extractable Organics	NELAP	6/13/2001
2,2-Dichloropropane	EPA 8260	Volatile Organics	NELAP	6/13/2001
2,2'-Oxybis(1-chloropropane),bis(2-Chloro-1-methylethyl)ether (fka bis(2-Chloroisopropyl) ether	EPA 8270	Extractable Organics	NELAP	6/13/2001
2,3,4,6-Tetrachlorophenol	EPA 8270	Extractable Organics	NELAP	6/13/2001
2,4,5-T	EPA 8151	Pesticides-Herbicides-PCB's	NELAP	6/13/2001
2,4,5-Trichlorophenol	EPA 8270	Extractable Organics	NELAP	6/13/2001

Laboratory Scope of Accreditation

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State Laboratory ID: **E87668** EPA Lab Code: **MT00005** **(406) 252-6325**

E87668
Energy Laboratories, Inc. - MT
1120 South 27th Street
Billings, MT 59107-0916

Matrix: **Solid and Chemical Materials**

Analyte	Method/Tech	Category	Certification Type	Effective Date
2,4,6-Trichlorophenol	EPA 8270	Extractable Organics	NELAP	6/13/2001
2,4-D	EPA 8151	Pesticides-Herbicides-PCB's	NELAP	6/13/2001
2,4-DB	EPA 8151	Pesticides-Herbicides-PCB's	NELAP	6/13/2001
2,4-Dichlorophenol	EPA 8270	Extractable Organics	NELAP	6/13/2001
2,4-Dimethylphenol	EPA 8270	Extractable Organics	NELAP	6/13/2001
2,4-Dinitrophenol	EPA 8270	Extractable Organics	NELAP	6/13/2001
2,4-Dinitrotoluene (2,4-DNT)	EPA 8270	Extractable Organics	NELAP	6/13/2001
2,6-Dichlorophenol	EPA 8270	Extractable Organics	NELAP	2/17/2011
2,6-Dinitrotoluene (2,6-DNT)	EPA 8270	Extractable Organics	NELAP	6/13/2001
2-Acetylaminofluorene	EPA 8270	Extractable Organics	NELAP	6/13/2001
2-Butanone (Methyl ethyl ketone, MEK)	EPA 8260	Volatile Organics	NELAP	9/3/2014
2-Chloroethyl vinyl ether	EPA 8260	Volatile Organics	NELAP	6/13/2001
2-Chloronaphthalene	EPA 8270	Extractable Organics	NELAP	6/13/2001
2-Chlorophenol	EPA 8270	Extractable Organics	NELAP	6/13/2001
2-Chlorotoluene	EPA 8260	Volatile Organics	NELAP	6/13/2001
2-Hexanone	EPA 8260	Volatile Organics	NELAP	6/13/2001
2-Methyl-4,6-dinitrophenol	EPA 8270	Extractable Organics	NELAP	6/13/2001
2-Methylnaphthalene	EPA 8270	Extractable Organics	NELAP	6/13/2001
2-Methylphenol (o-Cresol)	EPA 8270	Extractable Organics	NELAP	6/13/2001
2-Naphthylamine	EPA 8270	Extractable Organics	NELAP	4/27/2005
2-Nitroaniline	EPA 8270	Extractable Organics	NELAP	6/13/2001
2-Nitrophenol	EPA 8270	Extractable Organics	NELAP	6/13/2001
2-Nitropropane	EPA 8260	Volatile Organics	NELAP	2/3/2012
2-Picoline (2-Methylpyridine)	EPA 8270	Extractable Organics	NELAP	6/13/2001
3,3'-Dichlorobenzidine	EPA 8270	Extractable Organics	NELAP	6/13/2001
3,3'-Dimethylbenzidine	EPA 8270	Extractable Organics	NELAP	6/13/2001
3,5-Dichlorobenzoic acid	EPA 8151	Pesticides-Herbicides-PCB's	NELAP	6/13/2001
3/4-Methylphenols (m/p-Cresols)	EPA 8270	Extractable Organics	NELAP	2/3/2012
3-Methylcholanthrene	EPA 8270	Extractable Organics	NELAP	6/13/2001
3-Nitroaniline	EPA 8270	Extractable Organics	NELAP	6/13/2001
4,4'-DDD	EPA 8081	Pesticides-Herbicides-PCB's	NELAP	6/13/2001
4,4'-DDE	EPA 8081	Pesticides-Herbicides-PCB's	NELAP	6/13/2001
4,4'-DDT	EPA 8081	Pesticides-Herbicides-PCB's	NELAP	6/13/2001
4-Aminobiphenyl	EPA 8270	Extractable Organics	NELAP	6/13/2001
4-Bromophenyl phenyl ether	EPA 8270	Extractable Organics	NELAP	6/13/2001
4-Chloro-2-methylphenol	ENMT 50-009/GC-MS	Extractable Organics	NELAP	6/12/2007

Laboratory Scope of Accreditation

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State Laboratory ID: **E87668** EPA Lab Code: **MT00005** **(406) 252-6325**

E87668
Energy Laboratories, Inc. - MT
1120 South 27th Street
Billings, MT 59107-0916

Matrix: **Solid and Chemical Materials**

Analyte	Method/Tech	Category	Certification Type	Effective Date
4-Chloro-3-methylphenol	EPA 8270	Extractable Organics	NELAP	6/13/2001
4-Chloroaniline	EPA 8270	Extractable Organics	NELAP	6/12/2007
4-Chlorophenol	ENMT 50-009/GC-MS	Extractable Organics	NELAP	6/8/2009
4-Chlorophenyl phenylether	EPA 8270	Extractable Organics	NELAP	6/13/2001
4-Chlorotoluene	EPA 8260	Volatile Organics	NELAP	6/8/2009
4-Methyl-2-pentanone (MIBK)	EPA 8260	Volatile Organics	NELAP	6/13/2001
4-Nitroaniline	EPA 8270	Extractable Organics	NELAP	6/13/2001
4-Nitrophenol	EPA 8151	Pesticides-Herbicides-PCB's	NELAP	6/13/2001
4-Nitrophenol	EPA 8270	Extractable Organics	NELAP	6/13/2001
5-Nitro-o-toluidine	EPA 8270	Extractable Organics	NELAP	6/13/2001
6-Methylchrysene	ENMT 50-009/GC-MS	Extractable Organics	NELAP	6/8/2009
7,12-Dimethylbenz(a) anthracene	EPA 8270	Extractable Organics	NELAP	6/13/2001
Acenaphthene	EPA 8270	Extractable Organics	NELAP	6/13/2001
Acenaphthylene	EPA 8270	Extractable Organics	NELAP	6/13/2001
Acetone	EPA 8260	Volatile Organics	NELAP	9/3/2014
Acetonitrile	EPA 8260	Volatile Organics	NELAP	6/13/2001
Acetophenone	EPA 8270	Extractable Organics	NELAP	6/13/2001
Acifluorfen	EPA 8151	Pesticides-Herbicides-PCB's	NELAP	6/13/2001
Acrolein (Propenal)	EPA 8260	Volatile Organics	NELAP	6/13/2001
Acrylonitrile	EPA 8260	Volatile Organics	NELAP	6/13/2001
Aldrin	EPA 8081	Pesticides-Herbicides-PCB's	NELAP	6/13/2001
Allyl chloride (3-Chloropropene)	EPA 8260	Volatile Organics	NELAP	6/13/2001
alpha-BHC (alpha-Hexachlorocyclohexane)	EPA 8081	Pesticides-Herbicides-PCB's	NELAP	6/13/2001
alpha-Chlordane	EPA 8081	Pesticides-Herbicides-PCB's	NELAP	1/5/2004
Aluminum	EPA 6010	Metals	NELAP	6/13/2001
Aluminum	EPA 6020	Metals	NELAP	6/13/2001
Aniline	EPA 8270	Extractable Organics	NELAP	6/13/2001
Anthracene	EPA 8270	Extractable Organics	NELAP	6/13/2001
Antimony	EPA 6010	Metals	NELAP	6/13/2001
Antimony	EPA 6020	Metals	NELAP	6/13/2001
Aramite	EPA 8270	Extractable Organics	NELAP	6/13/2001
Aroclor-1016 (PCB-1016)	EPA 8082	Pesticides-Herbicides-PCB's	NELAP	6/13/2001
Aroclor-1221 (PCB-1221)	EPA 8082	Pesticides-Herbicides-PCB's	NELAP	6/13/2001
Aroclor-1232 (PCB-1232)	EPA 8082	Pesticides-Herbicides-PCB's	NELAP	6/13/2001
Aroclor-1242 (PCB-1242)	EPA 8082	Pesticides-Herbicides-PCB's	NELAP	6/13/2001
Aroclor-1248 (PCB-1248)	EPA 8082	Pesticides-Herbicides-PCB's	NELAP	6/13/2001

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E87668
Energy Laboratories, Inc. - MT
1120 South 27th Street
Billings, MT 59107-0916

Matrix: **Solid and Chemical Materials**

Analyte	Method/Tech	Category	Certification Type	Effective Date
Aroclor-1254 (PCB-1254)	EPA 8082	Pesticides-Herbicides-PCB's	NELAP	6/13/2001
Aroclor-1260 (PCB-1260)	EPA 8082	Pesticides-Herbicides-PCB's	NELAP	6/13/2001
Aroclor-1262 (PCB-1262)	EPA 8082	Pesticides-Herbicides-PCB's	NELAP	6/17/2014
Aroclor-1268 (PCB-1268)	EPA 8082	Pesticides-Herbicides-PCB's	NELAP	6/17/2014
Arsenic	EPA 6010	Metals	NELAP	6/13/2001
Arsenic	EPA 6020	Metals	NELAP	6/13/2001
Barium	EPA 6010	Metals	NELAP	6/13/2001
Barium	EPA 6020	Metals	NELAP	6/13/2001
Bentazon	EPA 8151	Pesticides-Herbicides-PCB's	NELAP	6/13/2001
Benzene	EPA 8021	Volatile Organics	NELAP	6/13/2001
Benzene	EPA 8260	Volatile Organics	NELAP	6/13/2001
Benzidine	EPA 8270	Extractable Organics	NELAP	6/13/2001
Benzo(a)anthracene	EPA 8270	Extractable Organics	NELAP	6/13/2001
Benzo(a)pyrene	EPA 8270	Extractable Organics	NELAP	6/13/2001
Benzo(b)fluoranthene	EPA 8270	Extractable Organics	NELAP	6/13/2001
Benzo(g,h,i)perylene	EPA 8270	Extractable Organics	NELAP	6/13/2001
Benzo(k)fluoranthene	EPA 8270	Extractable Organics	NELAP	6/13/2001
Benzoic acid	EPA 8270	Extractable Organics	NELAP	6/13/2001
Benzyl alcohol	EPA 8270	Extractable Organics	NELAP	6/13/2001
Beryllium	EPA 6010	Metals	NELAP	6/13/2001
Beryllium	EPA 6020	Metals	NELAP	6/13/2001
beta-BHC (beta-Hexachlorocyclohexane)	EPA 8081	Pesticides-Herbicides-PCB's	NELAP	6/13/2001
bis(2-Chloroethoxy)methane	EPA 8270	Extractable Organics	NELAP	6/13/2001
bis(2-Chloroethyl) ether	EPA 8270	Extractable Organics	NELAP	6/13/2001
bis(2-Ethylhexyl) phthalate (DEHP)	EPA 8270	Extractable Organics	NELAP	6/13/2001
Boron	EPA 6010	Metals	NELAP	6/13/2001
Boron	EPA 6020	Metals	NELAP	6/17/2014
Bromobenzene	EPA 8260	Volatile Organics	NELAP	6/13/2001
Bromochloromethane	EPA 8260	Volatile Organics	NELAP	6/13/2001
Bromodichloromethane	EPA 8260	Volatile Organics	NELAP	6/13/2001
Bromoform	EPA 8260	Volatile Organics	NELAP	6/13/2001
Butyl benzyl phthalate	EPA 8270	Extractable Organics	NELAP	6/13/2001
Cadmium	EPA 6010	Metals	NELAP	6/13/2001
Cadmium	EPA 6020	Metals	NELAP	6/13/2001
Calcium	EPA 6010	Metals	NELAP	6/13/2001
Calcium	EPA 6020	Metals	NELAP	6/30/2016

Laboratory Scope of Accreditation

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E87668
Energy Laboratories, Inc. - MT
1120 South 27th Street
Billings, MT 59107-0916

Matrix: **Solid and Chemical Materials**

Analyte	Method/Tech	Category	Certification Type	Effective Date
Carbazole	EPA 8270	Extractable Organics	NELAP	6/13/2001
Carbon disulfide	EPA 8260	Volatile Organics	NELAP	6/13/2001
Carbon tetrachloride	EPA 8260	Volatile Organics	NELAP	6/13/2001
Chlordane (tech.)	EPA 8081	Pesticides-Herbicides-PCB's	NELAP	6/13/2001
Chlorobenzene	EPA 8260	Volatile Organics	NELAP	6/13/2001
Chlorobenzilate	EPA 8270	Pesticides-Herbicides-PCB's	NELAP	6/13/2001
Chloroethane	EPA 8260	Volatile Organics	NELAP	6/13/2001
Chloroform	EPA 8260	Volatile Organics	NELAP	6/13/2001
Chloroprene	EPA 8260	Volatile Organics	NELAP	6/13/2001
Chromium	EPA 6010	Metals	NELAP	6/13/2001
Chromium	EPA 6020	Metals	NELAP	6/13/2001
Chrysene	EPA 8270	Extractable Organics	NELAP	6/17/2014
cis-1,2-Dichloroethylene	EPA 8260	Volatile Organics	NELAP	6/13/2001
cis-1,3-Dichloropropene	EPA 8260	Volatile Organics	NELAP	6/13/2001
Cobalt	EPA 6010	Metals	NELAP	6/13/2001
Cobalt	EPA 6020	Metals	NELAP	6/13/2001
Copper	EPA 6010	Metals	NELAP	6/13/2001
Copper	EPA 6020	Metals	NELAP	6/13/2001
Dacthal (DCPA)	EPA 8151	Pesticides-Herbicides-PCB's	NELAP	6/13/2001
Dalapon	EPA 8151	Pesticides-Herbicides-PCB's	NELAP	6/13/2001
delta-BHC	EPA 8081	Pesticides-Herbicides-PCB's	NELAP	6/13/2001
Diallate	EPA 8270	Pesticides-Herbicides-PCB's	NELAP	6/13/2001
Dibenz(a,h)acridine	ENMT 50-009/GC-MS	Extractable Organics	NELAP	6/8/2009
Dibenz(a,h)anthracene	EPA 8270	Extractable Organics	NELAP	6/13/2001
Dibenzofuran	EPA 8270	Extractable Organics	NELAP	6/13/2001
Dibromochloromethane	EPA 8260	Volatile Organics	NELAP	6/13/2001
Dibromomethane	EPA 8260	Volatile Organics	NELAP	6/13/2001
Dicamba	EPA 8151	Pesticides-Herbicides-PCB's	NELAP	6/13/2001
Dichlorodifluoromethane	EPA 8260	Volatile Organics	NELAP	6/13/2001
Dichloroprop (Dichlorprop)	EPA 8151	Pesticides-Herbicides-PCB's	NELAP	6/13/2001
Dieldrin	EPA 8081	Pesticides-Herbicides-PCB's	NELAP	6/13/2001
Diesel range organics (DRO)	AK102	Extractable Organics	NELAP	6/30/2016
Diesel range organics (DRO)	EPA 8015	Extractable Organics	NELAP	6/8/2009
Diesel range organics (DRO)	MADEP-EPH (MA-EPH)	Extractable Organics	NELAP	6/13/2001
Diesel range organics (DRO)	MT-DRO	Extractable Organics	NELAP	1/5/2004
Diethyl ether	EPA 8260	Volatile Organics	NELAP	6/13/2001

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State Laboratory ID: **E87668** EPA Lab Code: **MT00005** **(406) 252-6325**

E87668
Energy Laboratories, Inc. - MT
1120 South 27th Street
Billings, MT 59107-0916

Matrix: **Solid and Chemical Materials**

Analyte	Method/Tech	Category	Certification Type	Effective Date
Diethyl phthalate	EPA 8270	Extractable Organics	NELAP	6/13/2001
Dimethoate	EPA 8270	Pesticides-Herbicides-PCB's	NELAP	6/13/2001
Dimethyl phthalate	EPA 8270	Extractable Organics	NELAP	6/13/2001
Di-n-butyl phthalate	EPA 8270	Extractable Organics	NELAP	6/13/2001
Di-n-octyl phthalate	EPA 8270	Extractable Organics	NELAP	6/13/2001
Dinoseb (2-sec-butyl-4,6-dinitrophenol, DNBP)	EPA 8151	Pesticides-Herbicides-PCB's	NELAP	6/13/2001
Disulfoton	EPA 8270	Pesticides-Herbicides-PCB's	NELAP	6/13/2001
Endosulfan I	EPA 8081	Pesticides-Herbicides-PCB's	NELAP	6/13/2001
Endosulfan II	EPA 8081	Pesticides-Herbicides-PCB's	NELAP	6/13/2001
Endosulfan sulfate	EPA 8081	Pesticides-Herbicides-PCB's	NELAP	6/13/2001
Endrin	EPA 8081	Pesticides-Herbicides-PCB's	NELAP	6/13/2001
Endrin aldehyde	EPA 8081	Pesticides-Herbicides-PCB's	NELAP	6/13/2001
Endrin ketone	EPA 8081	Pesticides-Herbicides-PCB's	NELAP	1/5/2004
Ethyl acetate	EPA 8260	Volatile Organics	NELAP	6/13/2001
Ethyl methacrylate	EPA 8260	Volatile Organics	NELAP	6/13/2001
Ethyl methanesulfonate	EPA 8270	Extractable Organics	NELAP	6/13/2001
Ethylbenzene	EPA 8021	Volatile Organics	NELAP	6/13/2001
Ethylbenzene	EPA 8260	Volatile Organics	NELAP	6/13/2001
Famphur	EPA 8270	Pesticides-Herbicides-PCB's	NELAP	6/13/2001
Fluoranthene	EPA 8270	Extractable Organics	NELAP	6/13/2001
Fluorene	EPA 8270	Extractable Organics	NELAP	6/13/2001
gamma-BHC (Lindane, gamma-Hexachlorocyclohexane)	EPA 8081	Pesticides-Herbicides-PCB's	NELAP	6/13/2001
gamma-Chlordane	EPA 8081	Pesticides-Herbicides-PCB's	NELAP	1/5/2004
Gasoline range organics (GRO)	AK101	Extractable Organics	NELAP	6/30/2016
Gasoline range organics (GRO)	EPA 8015	Extractable Organics	NELAP	6/30/2016
Gasoline range organics (GRO)	MADEP-VPH (MA-VPH)	Extractable Organics	NELAP	6/13/2001
Gasoline range organics (GRO)	MT-GRO	Extractable Organics	NELAP	1/5/2004
Heptachlor	EPA 8081	Pesticides-Herbicides-PCB's	NELAP	6/13/2001
Heptachlor epoxide	EPA 8081	Pesticides-Herbicides-PCB's	NELAP	6/13/2001
Hexachlorobenzene	EPA 8270	Extractable Organics	NELAP	6/13/2001
Hexachlorobutadiene	EPA 8260	Volatile Organics	NELAP	6/13/2001
Hexachlorobutadiene	EPA 8270	Extractable Organics	NELAP	6/13/2001
Hexachlorocyclopentadiene	EPA 8270	Extractable Organics	NELAP	6/13/2001
Hexachloroethane	EPA 8270	Extractable Organics	NELAP	6/13/2001
Hexachloropropene	EPA 8270	Extractable Organics	NELAP	6/13/2001
Ignitability	EPA 1010	General Chemistry	NELAP	6/13/2001

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Energy Laboratories, Inc. - MT
1120 South 27th Street
Billings, MT 59107-0916

Matrix: **Solid and Chemical Materials**

Analyte	Method/Tech	Category	Certification Type	Effective Date
Indene	ENMT 50-009/GC-MS	Extractable Organics	NELAP	6/8/2009
Indeno(1,2,3-cd)pyrene	EPA 8270	Extractable Organics	NELAP	6/13/2001
Iodomethane (Methyl iodide)	EPA 8260	Volatile Organics	NELAP	6/13/2001
Iron	EPA 6010	Metals	NELAP	6/13/2001
Iron	EPA 6020	Metals	NELAP	6/30/2016
Isobutyl alcohol (2-Methyl-1-propanol)	EPA 8260	Volatile Organics	NELAP	6/13/2001
Isodrin	EPA 8081	Pesticides-Herbicides-PCB's	NELAP	6/13/2001
Isophorone	EPA 8270	Extractable Organics	NELAP	6/13/2001
Isopropylbenzene	EPA 8260	Volatile Organics	NELAP	6/13/2001
Isosafrole	EPA 8270	Extractable Organics	NELAP	6/13/2001
Lead	EPA 6010	Metals	NELAP	6/13/2001
Lead	EPA 6020	Metals	NELAP	6/13/2001
Lithium	EPA 6010	Metals	NELAP	6/13/2001
m/p-Xylenes	EPA 8021	Volatile Organics	NELAP	6/17/2014
m/p-Xylenes	EPA 8260	Volatile Organics	NELAP	6/17/2014
Magnesium	EPA 6010	Metals	NELAP	6/13/2001
Magnesium	EPA 6020	Metals	NELAP	6/30/2016
Manganese	EPA 6010	Metals	NELAP	6/13/2001
Manganese	EPA 6020	Metals	NELAP	6/13/2001
MCPA	EPA 8151	Pesticides-Herbicides-PCB's	NELAP	6/13/2001
MCPP	EPA 8151	Pesticides-Herbicides-PCB's	NELAP	6/13/2001
Mercury	EPA 7471	Metals	NELAP	6/13/2001
Mercury	EPA 7473	General Chemistry	NELAP	6/17/2014
Meteoric water mobility procedure	ASTM E2242-02	Volatile Organics	NELAP	6/30/2016
Methacrylonitrile	EPA 8260	Volatile Organics	NELAP	6/13/2001
Methapyrilene	EPA 8270	Extractable Organics	NELAP	1/5/2004
Methoxychlor	EPA 8081	Pesticides-Herbicides-PCB's	NELAP	6/13/2001
Methyl bromide (Bromomethane)	EPA 8260	Volatile Organics	NELAP	6/13/2001
Methyl chloride (Chloromethane)	EPA 8260	Volatile Organics	NELAP	6/13/2001
Methyl methacrylate	EPA 8260	Volatile Organics	NELAP	6/13/2001
Methyl methanesulfonate	EPA 8270	Extractable Organics	NELAP	1/5/2004
Methyl parathion (Parathion, methyl)	EPA 8270	Pesticides-Herbicides-PCB's	NELAP	2/17/2011
Methyl tert-butyl ether (MTBE)	EPA 8021	Volatile Organics	NELAP	6/13/2001
Methyl tert-butyl ether (MTBE)	EPA 8260	Volatile Organics	NELAP	6/13/2001
Methylene chloride	EPA 8260	Volatile Organics	NELAP	6/13/2001
Molybdenum	EPA 6010	Metals	NELAP	6/13/2001

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Matrix: **Solid and Chemical Materials**

Analyte	Method/Tech	Category	Certification Type	Effective Date
Molybdenum	EPA 6020	Metals	NELAP	6/17/2014
Naphthalene	EPA 8021	Volatile Organics	NELAP	1/24/2005
Naphthalene	EPA 8260	Volatile Organics	NELAP	6/13/2001
Naphthalene	EPA 8270	Extractable Organics	NELAP	6/13/2001
n-Butyl alcohol	EPA 8260	Volatile Organics	NELAP	6/13/2001
n-Butylbenzene	EPA 8260	Volatile Organics	NELAP	6/13/2001
Nickel	EPA 6010	Metals	NELAP	6/13/2001
Nickel	EPA 6020	Metals	NELAP	6/13/2001
Nitrobenzene	EPA 8270	Extractable Organics	NELAP	6/13/2001
Nitroquinoline-1-oxide	EPA 8270	Extractable Organics	NELAP	6/13/2001
n-Nitrosodiethylamine	EPA 8270	Extractable Organics	NELAP	6/13/2001
n-Nitrosodimethylamine	EPA 8270	Extractable Organics	NELAP	6/13/2001
n-Nitroso-di-n-butylamine	EPA 8270	Extractable Organics	NELAP	6/13/2001
n-Nitrosodi-n-propylamine	EPA 8270	Extractable Organics	NELAP	6/13/2001
n-Nitrosodiphenylamine	EPA 8270	Extractable Organics	NELAP	6/13/2001
n-Nitrosomethylethylamine	EPA 8270	Extractable Organics	NELAP	6/13/2001
n-Nitrosomorpholine	EPA 8270	Extractable Organics	NELAP	6/13/2001
n-Nitrosopiperidine	EPA 8270	Extractable Organics	NELAP	6/13/2001
n-Nitrosopyrrolidine	EPA 8270	Extractable Organics	NELAP	6/13/2001
n-Propylbenzene	EPA 8260	Volatile Organics	NELAP	6/13/2001
o,o,o-Triethyl phosphorothioate	EPA 8270	Pesticides-Herbicides-PCB's	NELAP	6/13/2001
o-Toluidine	EPA 8270	Extractable Organics	NELAP	6/13/2001
o-Xylene	EPA 8021	Volatile Organics	NELAP	6/17/2014
o-Xylene	EPA 8260	Volatile Organics	NELAP	6/17/2014
p-Dioxane	EPA 8260	Volatile Organics	NELAP	6/13/2001
Pentachlorobenzene	EPA 8270	Extractable Organics	NELAP	6/13/2001
Pentachloroethane	EPA 8260	Volatile Organics	NELAP	6/13/2001
Pentachloronitrobenzene (Quintozene)	EPA 8270	Extractable Organics	NELAP	6/13/2001
Pentachlorophenol	EPA 8151	Pesticides-Herbicides-PCB's	NELAP	6/13/2001
Pentachlorophenol	EPA 8270	Extractable Organics	NELAP	6/13/2001
pH	EPA 9045	General Chemistry	NELAP	6/13/2001
Phenacetin	EPA 8270	Extractable Organics	NELAP	6/13/2001
Phenanthrene	EPA 8270	Extractable Organics	NELAP	6/13/2001
Phenol	EPA 8270	Extractable Organics	NELAP	6/13/2001
Phorate	EPA 8270	Pesticides-Herbicides-PCB's	NELAP	6/13/2001
Phosphorus, total	EPA 6010	Metals	NELAP	6/17/2014

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Matrix: **Solid and Chemical Materials**

Analyte	Method/Tech	Category	Certification Type	Effective Date
Picloram	EPA 8151	Pesticides-Herbicides-PCB's	NELAP	6/13/2001
p-Isopropyltoluene	EPA 8260	Volatile Organics	NELAP	6/13/2001
Potassium	EPA 6010	Metals	NELAP	6/13/2001
Pronamide (Kerb)	EPA 8270	Extractable Organics	NELAP	6/13/2001
Propionitrile (Ethyl cyanide)	EPA 8260	Volatile Organics	NELAP	6/13/2001
Pyrene	EPA 8270	Extractable Organics	NELAP	6/13/2001
Pyridine	EPA 8270	Extractable Organics	NELAP	6/13/2001
Quinoline	ENMT 50-009/GC-MS	Extractable Organics	NELAP	6/8/2009
Reactive cyanide	EPA 7.3.3.2	General Chemistry	NELAP	6/13/2001
Reactive sulfide	EPA 7.3.4.2	General Chemistry	NELAP	6/13/2001
Residual range organics (RRO)	AK103	Extractable Organics	NELAP	6/30/2016
Safrole	EPA 8270	Extractable Organics	NELAP	6/13/2001
sec-Butylbenzene	EPA 8260	Volatile Organics	NELAP	6/13/2001
Selenium	EPA 6010	Metals	NELAP	6/13/2001
Selenium	EPA 6020	Metals	NELAP	6/17/2014
Silica as SiO2	EPA 6010	Metals	NELAP	6/17/2014
Silicon	EPA 6010	Metals	NELAP	6/13/2001
Silver	EPA 6010	Metals	NELAP	6/13/2001
Silver	EPA 6020	Metals	NELAP	6/13/2001
Silvex (2,4,5-TP)	EPA 8151	Pesticides-Herbicides-PCB's	NELAP	6/13/2001
Sodium	EPA 6010	Metals	NELAP	6/13/2001
Sodium	EPA 6020	Metals	NELAP	6/30/2016
Strontium	EPA 6010	Metals	NELAP	6/13/2001
Strontium	EPA 6020	Metals	NELAP	6/17/2014
Styrene	EPA 8260	Volatile Organics	NELAP	6/13/2001
Sulfotepp	EPA 8270	Pesticides-Herbicides-PCB's	NELAP	6/13/2001
Synthetic Precipitation Leaching Procedure	EPA 1312	General Chemistry	NELAP	6/13/2001
tert-Butylbenzene	EPA 8260	Volatile Organics	NELAP	6/13/2001
Tetrachloroethylene (Perchloroethylene)	EPA 8260	Volatile Organics	NELAP	6/13/2001
Thallium	EPA 6010	Metals	NELAP	6/13/2001
Thallium	EPA 6020	Metals	NELAP	6/13/2001
Thionazin (Zinophos)	EPA 8270	Pesticides-Herbicides-PCB's	NELAP	6/13/2001
Tin	EPA 6010	Metals	NELAP	6/13/2001
Tin	EPA 6020	Metals	NELAP	6/17/2014
Titanium	EPA 6010	Metals	NELAP	6/17/2014
Titanium	EPA 6020	Metals	NELAP	6/17/2014

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1120 South 27th Street
Billings, MT 59107-0916

Matrix: **Solid and Chemical Materials**

Analyte	Method/Tech	Category	Certification Type	Effective Date
Toluene	EPA 8021	Volatile Organics	NELAP	6/13/2001
Toluene	EPA 8260	Volatile Organics	NELAP	6/13/2001
Total cyanide	EPA 9012	General Chemistry	NELAP	6/12/2007
Total Petroleum Hydrocarbons (TPH)	TX1005	Extractable Organics	NELAP	6/8/2009
Toxaphene (Chlorinated camphene)	EPA 8081	Pesticides-Herbicides-PCB's	NELAP	6/13/2001
Toxicity Characteristic Leaching Procedure	EPA 1311	General Chemistry	NELAP	6/13/2001
trans-1,2-Dichloroethylene	EPA 8260	Volatile Organics	NELAP	6/13/2001
trans-1,3-Dichloropropene	EPA 8260	Volatile Organics	NELAP	6/13/2001
trans-1,4-Dichloro-2-butene	EPA 8260	Volatile Organics	NELAP	6/13/2001
Trichloroethene (Trichloroethylene)	EPA 8260	Volatile Organics	NELAP	10/1/2014
Trichlorofluoromethane	EPA 8260	Volatile Organics	NELAP	6/13/2001
Uranium	EPA 6020	Metals	NELAP	6/12/2007
Vanadium	EPA 6010	Metals	NELAP	6/13/2001
Vanadium	EPA 6020	Metals	NELAP	1/5/2004
Vinyl acetate	EPA 8260	Volatile Organics	NELAP	6/13/2001
Vinyl chloride	EPA 8260	Volatile Organics	NELAP	6/13/2001
Xylene (total)	EPA 8021	Volatile Organics	NELAP	6/13/2001
Xylene (total)	EPA 8260	Volatile Organics	NELAP	6/13/2001
Zinc	EPA 6010	Metals	NELAP	6/13/2001
Zinc	EPA 6020	Metals	NELAP	6/13/2001

APPENDIX B

Quality Assurance / Quality Control Specifications

APPENDIX B
Quality Assurance / Quality Control Specifications
Example Methods: 245.1/7470A, 200.7/6010B, 200.8, VPH, EPH, 8260B, 8270C

MERCURY ANALYSIS BY COLD VAPOR AA EPA METHODS 245.1/7470A For Aqueous Analysis				
QA SAMPLE/ INDICATOR	**FREQUENCY**	**ACCEPTANCE CRITERIA**	**CORRECTIVE ACTION**	**COMMENTS**
Sample Preparation	All samples digested	Meet method QC criteria for the matrix.	1) Re-analyze sample. 2) Re-prepare sample/batch.	
Instrument Calibration (IC)	Daily, after maintenance, or when needed. At least 5-point calibration including blank. Calibration Standards are not digested per 245.1	Correlation coefficient ≥0.995 also includes visual interpretation for quadratic or higher order calibration fit types.	1) Perform instrument maintenance. 2) Re-calibrate. 3) Prepare new standard.	Establishes calibration curve over a range of analyte concentrations to quantify analytes of interest. Calibration validity Tested by ICV and ICB.
Initial Calibration Verification (ICV) =QCS per 245.1	Immediately follows calibration or when new standards are prepared. Analyzed each analytical sequence.	%R= 90-110	1) Recalibrate and reanalyze. 2) Prepare fresh standards and/or ICV. 3) Instrument maintenance.	Evaluates calibration accuracy and method performance. Must be prepared from Second source standard.
Method Blank (MBLK) =LRB per 245.1	Minimum 1/20 samples or for each batch-whichever is more frequent.	Larger of ±1 * lowest reporting limit or 2.2 X MDL (245.1) < Reporting limit (7470)	1) Re-analyze MBLK. 2) Re-digest samples from batch which fail acceptance criteria or flag and report data. 3) Test/re-prep all reagents for contamination.	Evaluates calibration accuracy, reagent/glassware contamination, and instrument carryover.
Laboratory Control Sample (LCS) = LFB per 245.1	Minimum 1/20 samples or for each batch-whichever is more frequent.	%R = 80-120 (7470) %R = 85-115 (245.1)	1) Repeat analyses 2) Prepare new standards 3) Re-calibrate 4) Re-extract and re-analyze samples associated with failed LCS.	Evaluates method accuracy. Must be Second Source Standard per NELAC. Also used to evaluate spiking technique for MS/MSD analysis.
Continuing Calibration Verification (CCV) = Instrument Performance Check (IPC) per 245.1	Analyzed at beginning of run, every 10 samples and at end of run. Same source standard.	%R = 95-105 Immediately after IC (245.1 only) %R = 90-110 as continuing calibration check.	1) Recalibrate and reanalyze all samples since last valid CCV. 2) Check for sample matrix problem.	Evaluates Instrument calibration drift.
Continuing Calibration Blank (CCB)	Analyzed after every CCV. Run every 10 samples and at end of run.	Larger of ±1 * lowest reporting limit or 2.2 X MDL	1) Check for high concentration sample. 2) Re-analyze CCB. 3) Re-analyze all samples associated with failing CCB.	Evaluates baseline drift, contamination in the analytical system, and analyte carryover.

MERCURY ANALYSIS BY COLD VAPOR AA EPA METHODS 245.1/7470A For Aqueous Analysis				
QA SAMPLE/ INDICATOR	**QA SAMPLE/ INDICATOR**	**QA SAMPLE/ INDICATOR**	**QA SAMPLE/ INDICATOR**	**QA SAMPLE/ INDICATOR**
Matrix Spike Sample and Matrix Spike Duplicate (MS/MSD) = LFM per 245.1	Minimum 1 set/10 samples for 245.1 Minimum 1 set/20 samples for 7470	%R = 70-130 for 245.1 %R = 75-125 for 7470 RPD < 30% for 245.1 RPD < 20% for 7470	1) If matrix interference suspected report as found, or 2) Re-analyze and re-spike if no matrix interference suspected, or 3) Use "A" qualifier for sample amount > 4X spike level.	Evaluates effect of matrix on method performance. Results not evaluated when sample analyte concentration > 3X spike level. Spike with same source as LCS. Control limits valid for spike level 1/3 of sample amount or higher.
Dilution Sample (SD)	Minimum 1/20 samples for method 7470A	RPD 10%	1) Repeat dilution analysis. 2) Investigate cause. 3) Redigest batch or flag data results.	Measures method precision/sample homogeneity.
MDL Studies	Annually, or whenever instrument changes might affect sensitivity.	< PQL, Spike level < 1X-10X MDL, consistent with prior studies.	1) Repeat if obvious problem occurs. 2) Adjust reporting limit to >MDL.	Evaluates overall method detection limits in clean sample matrix. Actual samples may have higher MDL.
LOD Verification Required for each analyte/method to verify calculated MDL.	Annually or whenever a new MDL study is required	Positive Result above signal-to-noise	1) Examine method or preparatory steps, 2) Verify MDL study, 3) Repeat analysis. 4) Consult QA.	Spike at 2-3X calculated MDL for single analyte test .
Linear Dynamic Range (LDR)	Annually, or whenever method changes might affect sensitivity.	Calculated standard values within 10% of expected.	1) Repeat. 2) Correct problem. 3) Adjust upper calibration limit.	Used to determine upper linear range for instrument.
External PE Samples	Semi-annually, WS (245.1) and WP 7470) study samples.	PT sample defined acceptance limits (Must pass 2 out of last 3 PT studies).	1) Complete corrective action report. 2) Repeat with another make-up study (for failure of 2 out of 3).	External review of analytical method accuracy.
Control Charting	Annual statistical review of method performance.	Data statistically within control limits.	1) Trend Analysis/Method Review. 2) Correct method/instrument problem. 3) Replace Analyst.	For statistical process control.
Batch Definition	Each batch of 20 samples	Must pass all method QC criteria as specified above	Re-analyze batch or qualify results.	A group of samples and associated QC.

METHOD QA/QC PARAMETERS
ELEMENTAL ANALYSIS OF WATER EPA METHOD 200.7/6010
EPA METHOD 200.7(Rev 4.4, May 1994)/6010B

QA SAMPLE/ INDICATOR	FREQUENCY	ACCEPTANCE CRITERIA	CORRECTIVE ACTION	COMMENTS
Sample Preparation	Dissolved Waters: Analyze direct. Drinking Waters: Turbidity <1 Analyze direct. Turbidity >1 Digest using 200.2. CWA samples: Digest using 200.2 6010B Total Waters: 3010 Digestion. Soils: 3050 Digestion. Extracts: 3010 Digestion.	Meet method QC criteria for the matrix.	1) Reanalyze sample. 2) Re-prepare sample/batch.	
Instrument Calibration (IC)	Daily, or when needed. Minimum 1-point calibration and blank.	If used, multipoint calibration must have correlation coefficient ≥0.996	See QC Samples.	Calibration of Instrument. Calibration validity tested by ICV, ICB.
Quality Control Sample (QCS) /Initial Calibration Verification (ICV)	Immediately follows calibration. Second source standard used.	6010B %R =90-110 200.7 %R=95-105 Immediately after IC when new standards are prepared.	1) Recalibrate and rerun. 2) Prepare fresh standards and/or ICV.	Evaluates accuracy of calibration standards.
Initial Calibration Blank verification sample (ICB)	Analyzed at beginning of run.	Must be less than the larger of: 1) ± 1*lowest reporting limit or 2) 2.2 X MDL.	1) Re-pour blanks, recalibrate, and rerun. 2) Prepare fresh blank.	Evaluates instrument calibration, reagent contamination, and instrument carryover.
Low Level Calibration Verification (CRI)	Analyzed at beginning of run. Count as sample for CCVs.	%R = 50-150, except for Be, Cd where %R = 70-130	None – Limits are advisory only.	Verifies Instrument ability to detect/quantitate analytes near the reporting limit.

METHOD QA/QC PARAMETERS
ELEMENTAL ANALYSIS OF WATER EPA METHOD 200.7/6010
EPA METHOD 200.7(Rev 4.4, May 1994)/6010B

QA SAMPLE/ INDICATOR	FREQUENCY	ACCEPTANCE CRITERIA	CORRECTIVE ACTION	COMMENTS
Interference Check Sample "A" (ICSA)	Analyzed at beginning of run. Count as sample for CCVs.	%R = 80-120 for interferents. Advisory limit ± 2* reporting limit for other analytes	1) Evaluate sample data. Results near reporting limit suspect if failing. 2) Rerun samples as needed.	Evaluates spectral interference correction factors.
Interference Check Sample "AB" (ICSAB)	Analyzed at beginning of run. Count as sample for CCVs.	%R% = 80-120 for interferents and analytes	1) Re-determine IECs if failures persist. 2) Rerun samples as needed.	Evaluates spectral interference correction factors.
Continuing Calibration Verification (CCV) /Instrument Performance Check (IPC)	Analyzed at beginning of run, every 10 samples and at end of run. Same source standard.	200.7: %R=95-105 Immediately after Initial Calibration. %R = 90-110 as continuing calibration check.	1) Recalibrate and rerun samples since last valid CCV. 2) Check for sample matrix problem.	Evaluates Instrument calibration drift.
Continuing Calibration Blank (CCB)	Analyzed after every CCV.	Must be less than the larger of: 1) ± 1*lowest reporting limit or 2) 2.2 X MDL.	1) Check for high concentration sample carryover. 2) Reanalyze CCB. 3) Reanalyze samples as needed.	Measures instrument drift and/or analyte carryover.
Analytical Matrix Spike Sample (Direct analysis) (MS2)	200.7: Minimum 1/10 samples. 6010B: Minimum 1/20 samples.	6010B: %R = 75-125 200.7: %R = 70-130	1) Evaluate LCS/LFB performance. 2) Report spike as analyzed if LCS/LFB is acceptable.	Evaluates effect of matrix on analytical part of method performance. Results not evaluated when sample analyte concentration > 4X spike level.
Analytical Spike Duplicate (MSD2), or Analytical Duplicate Sample	200.7: Minimum 1/10 samples. 6010B: Minimum 1/20 samples.	Larger of 3 * PQL or 20% RPD %R see MS2	1) See LCS/LFB performance. 2) Report spike as analyzed if LCS/LFB is acceptable.	Measures method precision/sample homogeneity.
Serial Dilution Sample	When new matrix is encountered or 1 per batch or 1 per 20 samples	%R = 90-110 for analytes greater than 50 * PQL	1) Rerun samples. 2) Run samples on dilution.	Used for screening analyses evaluating new matrices.

METHOD QA/QC PARAMETERS
ELEMENTAL ANALYSIS OF WATER EPA METHOD 200.7/6010
EPA METHOD 200.7(Rev 4.4, May 1994)/6010B

QA SAMPLE/ INDICATOR	FREQUENCY	ACCEPTANCE CRITERIA	CORRECTIVE ACTION	COMMENTS
Method Blank (MBLK) /Laboratory Reagent Blank (LRB)	1 per analytical run for direct samples, or 1 per digestion batch.	Must be less than the larger of: 1) ± 1*lowest reporting limit or 2) 2.2 X MDL.	1) Reanalyze LRB/MBLK. 2) Redigest samples from batch which fail acceptance criteria or flag and report data.	Evaluates possible contamination in reagents and glassware.
Laboratory Fortified Blank (LFB) /Laboratory Control Sample (LCS)	1 per analytical run for direct samples, or 1 per digestion batch.	200.7: %R = 85-115 6010B: %R = 80-120	1) Reanalyze. 2) Redigest sample batch or flag data.	Evaluates preparation method accuracy.
Soil/Solid Standard Reference Material (SRM)	Prepared and analyzed quarterly or as needed.	Within SRM-established acceptance ranges.	1) Reanalyze SRM. 2) Redigest SRM. 3) Evaluate prep method.	Evaluates preparation method accuracy.
Predigestion Spike / Laboratory Fortified Sample Matrix (MS3)	200.7: Minimum 1/10 samples or 1/digestion batch. 6010B: Minimum 1/20 samples or 1/digestion batch.	200.7: %R =70-130 6010B: %R =75–125	1) See LCS performance. 2) Report spike as analyzed if LCS/LFB is acceptable.	Evaluates effect of matrix on overall method performance. Results not evaluated when sample analyte concentration > 4X spike level.
Matrix Spike Duplicate (MSD3) or Digestion Duplicate Sample	200.7: Minimum 1/10 samples or 1/digestion batch. 6010B: Minimum 1/20 samples or 1/digestion batch.	200.7: %R =70-130 6010B: %R =75–125 Larger of 3 * PQL or 20% RPD	1) See LCS performance. 2) Report spike as analyzed if LCS/LFB is acceptable.	Evaluates effect of matrix on overall method performance. Results not evaluated when sample analyte concentration > 4X spike level. Measures method precision/sample homogeneity.
Internal Standards (IS), when used.	All sample & QC in sequence.	50-150% Recovery Advisory Limits	1) Evaluate data for sample matrix affects	Quantitation using Internal Standards improves method accuracy. IS recoveries can be affected by sample matrix.

METHOD QA/QC PARAMETERS
ELEMENTAL ANALYSIS OF WATER EPA METHOD 200.7/6010
EPA METHOD 200.7(Rev 4.4, May 1994)/6010B

QA SAMPLE/ INDICATOR	FREQUENCY	ACCEPTANCE CRITERIA	CORRECTIVE ACTION	COMMENTS
MDL Studies	Annually, or whenever method changes might affect sensitivity. 6010B: Semi-annually.	Prior studies	1) Repeat if obvious problem occurs. 2) Adjust reporting limit to >MDL.	Evaluates overall method detection limits in clean sample matrix. Actual samples may have higher MDL.
LOD Verification Required for each analyte/method to verify calculated MDL.	Annually or whenever a new MDL study is performed.	Positive result above signal-to-noise.	1) Examine method or preparatory steps. 2) Verify MDL Study. 3) Repeat analysis.	Spike at 1-4 X MDL for multiple analyte tests.
Inter-Element Correction Factor Studies	Annually, or whenever instrument changes might affect interelement effects. Verified every 6 months.	Comparison to historical data.	1) Repeat. 2) Correct problem.	Correction factors to account for spectral overlap between differing elements.
Upper Linear Range Studies	Annually, or whenever method changes might affect sensitivity.	Comparison to historical data.	1) Repeat. 2) Correct problem. 3) Adjust upper calibration limit.	Used to determine upper linear range for instrument.
External PE Samples	WS and WP, LPTP (soil) and internal blind samples	EPA/PE Provider-defined control limits.	1) Repeat. 2) Correct problem.	External review of analytical method accuracy.
Batch Definition	Each daily analytical sequence. Prepped samples: Each batch of 20 samples/matrix or when there is a change of reagents, whichever is more frequent.	Must pass all method QC criteria.	Reanalyze batch, re-prepare samples, or qualify results.	A group of samples and associated QC.

Method QA/QC Parameters Analysis of Trace Elements in Aqueous Samples by ICP/MS: EPA Method 200.8 For Water, Waste and Soil Analyses				
QA SAMPLE/ INDICATOR	**FREQUENCY**	**ACCEPTANCE CRITERIA**	**CORRECTIVE ACTION**	**COMMENTS**
Sample Preparation	Dissolved Waters: analyze direct Drinking Waters: Turbidity <1 analyze direct Turbidity >1 digest using 200.2 CWA samples: digest using 200.2	Meet method QC criteria for the matrix.	1) Re-analyze sample. 2) Re-prepare sample/batch.	
Instrument Calibration (IC)	Daily, after maintenance, or when needed. Multipoint calibration, usually 4 points and blank.	Calibration correlation coefficient must be =0.996 or better	1) Perform instrument maintenance 2) Re-calibrate 3) Prepare new standard	Establishes calibration curve over a range of analyte concentrations to quantify analytes of interest. Calibration validity Tested by ICV and ICB.
Initial Calibration Verification/ Quality Control Sample (ICV/QCS)	Immediately follows calibration. Must be prepared from second source standard.	%R=90-110	1) Recalibrate and rerun. 2) Prepare fresh standards and/or ICV. 3) Instrument maintenance.	Evaluates calibration accuracy and method performance.
Initial Calibration Blank (ICB)	Analyzed at beginning of run.	Larger of ± 1*lowest reporting limit or 2.2 X MDL.	1) Re-pour blanks, recalibrate, and rerun. 2) Prepare fresh blank.	Evaluates instrument calibration, reagent contamination, and instrument carryover.
Interference Check Sample "A" (ICSA)	Analyzed at beginning of run. Count as sample for CCVs.	%R% = 70-130 For interferents ± 2* reporting limit for analytes	1) Evaluate sample data. Results near reporting limit suspect if failing. 2) Rerun samples as needed.	Evaluates elemental equations and collision cell performance (when in use).
Interference Check Sample "AB" (ICSAB)	Analyzed at beginning of run. Count as sample for CCVs.	%R% = 70-130 For analytes present in the standard	1) Confirm elemental equations per method. 2) Recalibrate/rerun samples as needed.	Evaluates elemental equations and collision cell performance (when in use).
Method Blank (MBLK) / Laboratory Reagent Blank (LRB)	1 per analytical run for direct samples, or 1 per digestion batch	Larger of ±1*lowest reporting limit or 2.2 X MDL < Reporting limit	1) Re-analyze LRB/MBLK. 2) Re-digest samples from batch which fail acceptance criteria or flag and report data.	Evaluates calibration accuracy, reagent/glassware contamination, and instrument carryover.
Laboratory Control Sample (LCS)/ Laboratory Fortified Blank (LFB) Water Sample	1 per analytical run for direct samples, or 1 per digestion batch	%R = 85-115	1) Re-analyze LCS 2) Redigest samples associated with failed LCS.	Evaluates method accuracy. Must be Second Source Standard. Also used to evaluate spiking technique for MS/MSD analysis.
Continuing Calibration Verification (CCV) Instrument Performance Check (IPC)	Analyzed at beginning of run, every 10 samples and at end of run. Same source standard.	% R = 90-110	1) Recalibrate and rerun all samples since last valid CCV. 2) Check for sample matrix problem.	Evaluates Instrument calibration drift.

Method QA/QC Parameters Analysis of Trace Elements in Aqueous Samples by ICP/MS: EPA Method 200.8 For Water, Waste and Soil Analyses				
QA SAMPLE/ INDICATOR	**FREQUENCY**	**ACCEPTANCE CRITERIA**	**CORRECTIVE ACTION**	**COMMENTS**
Continuing Calibration Blank (CCB)	Analyzed after every CCV	Larger of ±1*lowest reporting limit or 2.2 X MDL	1) Check for high concentration sample carryover. 2) Re-analyze CCB. 3) Re-analyze samples as needed.	Evaluates baseline drift, contamination in the analytical system, and analyte carryover
Matrix Spike (MS) Direct Analysis	Minimum 1/10 samples	%R = 70-130	Evaluate LCS and LFB performance (must be passing) 1) If matrix interference suspected report as found, or 2) Re-analyze and re-spike if no matrix interference suspected, or 3) Use "A" qualifier for sample amount > 4X spike level.	Evaluates affect of matrix on method performance. Results not evaluated when sample analyte concentration > 4X spike level. Use the same solution and concentration as LFB.
Direct Analysis Matrix Spike Duplicate (MSD) Or Analytical Duplicate Sample	Minimum 1/10 samples	Larger of 3* PQL or 20% RPD %R = 70-130	Evaluate LCS and LFB performance (must be passing) 1) If matrix interference suspected report as found, or 2) Re-analyze and re-spike if no matrix interference suspected, or 3) Use "A" qualifier for sample amount > 4X spike level.	Duplicate analysis measures method precision/ sample homogeneity.
Pre-Digestion Matrix Spike (MS3)	Minimum 1/10 samples	%R = 70-130	Evaluate LCS and LFB performance (must be passing) 1) If matrix interference suspected report as found, or 2) Re-analyze and re-spike if no matrix interference suspected, or 3) Use "A" qualifier for sample amount > 4X spike level.	Evaluates affect of matrix on method performance. Results not evaluated when sample analyte concentration > 4X spike level. Use the same solution and concentration as LCS/LFB.

Method QA/QC Parameters Analysis of Trace Elements in Aqueous Samples by ICP/MS: EPA Method 200.8 For Water, Waste and Soil Analyses				
QA SAMPLE/ INDICATOR	**FREQUENCY**	**ACCEPTANCE CRITERIA**	**CORRECTIVE ACTION**	**COMMENTS**
Matrix Spike Duplicate (MSD3) Or Digestion Duplicate Sample	Minimum 1/10 samples	%R = 70-130 Larger of 3* PQL or 20% RPD	Evaluate LCS and LFB performance (must be passing) 1) If matrix interference suspected report as found, or 2) Re-analyze and re-spike if no matrix interference suspected, or 3) Use "A" qualifier for sample amount > 4X spike level.	Duplicate analysis measures method precision/ sample homogeneity.
Internal Standards (IS)	All sample & QC in sequence	60-125% Recovery	Reanalyze samples on dilution, as needed.	Corrects data for sample matrix effects. Quantitation using Internal Standards is required for ICP-MS.
MDL Studies	Annually, or whenever instrument changes might affect sensitivity.	< PQL Spike level 1X-10X MDL, consistent with prior studies	1. Repeat if obvious problem occurs. 2. Adjust reporting limit to >MDL.	Evaluates overall method detection limits in clean sample matrix. Actual samples may have higher MDL.
LOD Verification Required for each analyte/method to verify calculated MDL.	Annually or whenever a new MDL study is required	Positive Result above signal-to-noise	1) Examine method or preparatory steps, 2) Verify MDL study, 3) Repeat analysis. 4) Consult QA	Spike at 1-4X calculated MDL for multiple analyte tests.
Linear Dynamic Range Studies	Annually, or whenever method changes might affect sensitivity.	Comparison to historical data.	1) Repeat. 2) Correct problem. 3) Adjust upper calibration limit.	Used to determine upper linear range for instrument.
External PE Samples	WS and WP and internal blind samples.	PT sample defined acceptance limits (Must pass 2 out of last 3 PT studies)	1) Complete corrective action report 2) Repeat with another make-up study (for failure of 2 out of 3)	External review of analytical method accuracy.
Control Charting	Annual statistical review of method performance.	Data statistically within control limits.	1) Trend Analysis/Method Review 2) Correct method/instrument problem 3) Replace Analyst	For statistical process control

Method QA/QC Parameters Analysis of Trace Elements in Aqueous Samples by ICP/MS: EPA Method 200.8 For Water, Waste and Soil Analyses				
QA SAMPLE/ INDICATOR	**FREQUENCY**	**ACCEPTANCE CRITERIA**	**CORRECTIVE ACTION**	**COMMENTS**
Batch Definition	Each daily analytical sequence. Prepped samples: Each batch of 20 samples/matrix or when there is a change of reagents, whichever is more frequent.	Must pass all method QC criteria as specified above	Re-analyze batch or qualify results	A group of samples and associated QC

Method QA/QC Parameters Volatile Petroleum Hydrocarbons (VPH) per Massachusetts Method				
QA SAMPLE/ INDICATOR	**FREQUENCY**	**ACCEPTANCE CRITERIA**	**CORRECTIVE ACTION**	**COMMENTS**
Sample Preparation	Soils: Extracted by 5035, then analyzed by Purge & Trap. 10 grams Soil/10mL of methanol VPH Surrogates added to all samples before extraction. Waters: VOA Vials, preserve to a PH<2.	Meet all method QC criteria for the matrix.	1) Re-analyze sample	VPH surrogates added to all sample before extraction. Waters are introduced into the GC/MS using Purge & Trap. Soils are extracted into methanol and the methanol extract is added to water and analyzed by Purge and Trap/GC/MS.
Instrument Calibration (IC)	5 Point calibration to precede analyses. Use average response factors. Certain compounds are selected for FID calibration and other compounds are used for PID calibration.	25% RSD of Mean Response Factors. Includes individual compound response factors and range response factors.	1. Correct problem. 2. Prepare new standards. 3. Recalibrate.	Establishes calibration curve over a range of analyte concentrations to quantify analytes of interest. Calibration of instrument and check of response linearity. Consists of a 13 component standard containing both aliphatic and aromatic hydrocarbons
Initial Calibration Verification (ICV)	Follows valid initial calibration (See Blank Spike)	75-125%	1. Correct problem. 2. Re-calibrate and rerun ICV.	Evaluates accuracy/bias in calibration standards.
Continuing Calibration Verification (CCV)	Every 24 Hours and at the end of every analytical sequence	75-125% of Initial Calibration for the CCV preceding sample analyses.	1. Correct problem. 2. Re-analyze CCV. 3. Recalibrate and re-analyze all samples since last valid calibration check.	Evaluates instrument drift throughout analytical sequence. Typically uses midpoint calibration standard or ICV.
Method Blank	Before samples, and at least one MB every 24 hours.	½ of PQL for target analytes	1. Repeat analyses once. 2. Correct problem. 3. Re-extract and re-analyze all samples associated with failing method blank.	Evaluates overall method including possible contamination in reagents and glassware utilized in preparatory batch. Soil method blanks use clean sand.
Matrix Spike and Matrix Spike duplicate (MS/MSD)	Each batch of 20 samples/matrix or when there is a change of reagents, whichever is more frequent.	%R = 70-130 %RPD < 20	1. Repeat analyses. 2. Re-extract and re-analyze MS, (if sufficient sample).	Evaluates affect of matrix on method performance.
Lab Control Sample (LCS) (Blank Spike)	Minimum 1/20 samples Soils are prepared using a blank sand matrix.	%R = 70 - 130	1. Repeat analyses. 2. Prepare new standards. 3. Recalibrate. 4. Re-extract and re-analyze all samples associated with failing LCS (laboratory fortified blank).	Evaluates overall method precision and accuracy. Method specifies 70-130.

Method QA/QC Parameters Volatile Petroleum Hydrocarbons (VPH) per Massachusetts Method				
QA SAMPLE/ INDICATOR	**FREQUENCY**	**ACCEPTANCE CRITERIA**	**CORRECTIVE ACTION**	**COMMENTS**
Surrogates	Present in all extracted samples (including QC)	Trifluorotoluene %R = 70-130	1. Repeat analyses. 2. Recalibrate with fresh fortification standard. 3. Re-extract samples.	Evaluates method performance on each individual sample analyzed.
Analyte Confirmation in Samples	Confirm target VPH analytes by GC/MS analyses.	Upon client request.	None	Analyte identifications in samples are not routinely confirmed. GC/MS confirmation done only per client request.
MDL Studies	MDL - Annually for water and soils and initially for each new instrument setup or analyst.	MDL< PQL	1. Repeat once. 2. Correct problem.	Evaluates overall method detection limits in clean sample matrix. Actual samples may have higher MDL.
LOD Verification Required for each analyte/method to verify calculated MDL.	Annually based on MDL Study frequency.	Positive Result, (Above background)	1) Examine method or preparatory steps. 2) Verify MDL study. 3) Repeat analysis. 4) Consult QA.	Spike at 2-3X calculated MDL.
External PE Samples	Semi-annually, WP study samples.	PT sample defined acceptance limits (Must pass 2 out of last 3 PT studies)	1. Complete corrective action report. 2. Repeat with another make-up study (for failure of 2 out of 3).	External review of analytical method accuracy.
Control Charting and Proof of Competency	Annual, statistical review of method.	Data statistically within control limits.	1. Trend Analysis/ Method Review. 2. Correct method/instrument problem. 3. Replace analyst.	For statistical process control.
Batch	Each batch consists of a maximum of 20 samples	Must pass all method QC criteria	Re-analyze batch or qualify results	

METHOD QA/QC PARAMETERS Extractable Petroleum Hydrocarbons (EPH) per Massachusetts Method 2004 Revision				
QA SAMPLE/ INDICATOR	**FREQUENCY**	**ACCEPTANCE CRITERIA**	**CORRECTIVE ACTION**	**COMMENTS**
Sample Preparation	Methods: Soils: 3550 (30 grams to 2mL) Waters: 3510 or 3520 (1 Liter to 2 mL) EPH extraction surrogates added to all samples prior to extraction. EPH fractionation surrogates added to extract just prior to fractionation.	Meet all method QC criteria for the matrix.	1) Re-analyze sample	Samples are extracted using Methylene chloride solvent and then the extract is concentrated. Following separation of extract into an aliphatic and aromatic fraction each fraction is independently analyzed by GC/FID. Sample amount and final extract volume may be adjusted based on analyte levels and/or sample matrix.
Fractionation Check	Per each Lot # of Separation Cartridges Used	Effective separation of target analytes into appropriate fraction. R%=40-140 except the more volatile target analytes with R%=40-140	1. Repeat once 2. Correct problem (adjust elution volumes) 3. Prepare new standards 4. Recalibrate	Uses aliphatic and aromatic hydrocarbon standards in hexane. The more volatile aromatic and aliphatic compounds may have lower recoveries than method specified limits.
Initial Calibration (IC)	5 point initial calibration each for aliphatics and aromatics, external standardization option of method chosen. Aliphatic Standard Solutions Aromatic Standard Solutions 1, 20, 50, 200, and 500 ug/mL in each component. (EPH Screen: aliphatic standard solutions 1, 20, 200, 500, and 1000 ug/mL). To precede sample analyses.	25% RSD MnRF 25%RSD each component.	1. Repeat once 2. Correct problem 3. Prepare new standards 4. Recalibrate	Used to Calibrate instrument, evaluates chromatographic separation effectiveness, and instrument response linearity. .
Chromatography	1) Each IC or CCV-Resolution is verified 2) Retention Time Windows –Use RRT and analyst discretion for instrument stability.	Chromatographic resolution: Monitored against historical performance levels. 50% separation of phenanthrene and anthracene.	1. Repeat once 2. Adjust column conditions 3. Perform instrument maintenance 4. Replace GC column	Verifies that gas chromatographic system is operating properly. Resolution criteria for two selected PAH pairs are not met as per method specifications.

METHOD QA/QC PARAMETERS Extractable Petroleum Hydrocarbons (EPH) per Massachusetts Method 2004 Revision				
QA SAMPLE/ INDICATOR	**FREQUENCY**	**ACCEPTANCE CRITERIA**	**CORRECTIVE ACTION**	**COMMENTS**
Initial Calibration Verification (ICV)	Follows the IC, using second source calibration standards. DRO standard used to verify aliphatic IC standard and a separate PAH standard is used for aromatics.	+/- 25% of MnRF +/- 25% RF each component	1. Repeat once 2. Prepare fresh standards and reanalyze. 3. Recalibrate and re-analyze all affected samples.	Evaluates accuracy of calibration standards.
Continuing Calibration Verification (CCV)	Mid-level standard analyzed every 12 hours and at the end of every analytical sequence	+/- 25% of MnRF +/- 25% RF each component	1. Repeat once 2. Correct problem 3. Re-calibrate and re-analyze all samples since last valid calibration check.	Verifies instrument calibration and stability throughout analyses. No QC criteria for the CC following sample analyses.
Method Blank	Each batch of 20 samples/matrix or when there is a change of reagents, whichever is more frequent.	<½ PQL	1. Repeat analyses once 2. Correct problem 3. Re-extract and re-analyze all samples associated with method blank.	Measures and evaluates possible contamination in reagents and glassware used in method.
Instrument Blank	Each 12 hour sequence or as indicated, such as after a heavily contaminated extract. A method blank analysis can be substituted for an instrument blank.	<½ PQL	1. Repeat analyses once 2. Perform Instrument maintenance 3. Re-analyze all associated samples in sequence where contamination level may affect result.	Measures and evaluates possible contamination in gas chromatographic analysis system.
Matrix Spike/Matrix Spike Duplicate (MS/MSD)	Each batch of 20 samples/matrix or when there is a change of reagents, whichever is more frequent. Fortified with all aliphatic and aromatic compounds present in ICAL standards. Uses a second source standard.	%R = 40-140 except for the more volatile aromatic and aliphatic compounds which may have lower recovery. %RPD = 50% (advisory)	1. Repeat GC analyses 2. Re-extract and reanalyze MS/MSD, (if sufficient sample) or select another sample to MS. 3. Evaluate LCS performance.	Evaluates affect of individual matrix on method performance and method precision. Poor MS/MSD QC performance does not necessarily reject extraction batch group. Control limits are advisory due to sample matrix effects.
Laboratory Control Sample (LCS)	Minimum 1/20 samples/matrix and each batch of samples, whichever is more frequent. Same spiking solution as for MS/MSD	%R = 40-140 Except for nonane, %R = 40-140 .	1. Repeat analyses 2. Prepare new standards 3. Recalibrate 4. Re-extract and re-analyze all samples associated with LCS.	Evaluates method accuracy. Used for ongoing proof of competency.

METHOD QA/QC PARAMETERS Extractable Petroleum Hydrocarbons (EPH) per Massachusetts Method 2004 Revision				
QA SAMPLE/ INDICATOR	**FREQUENCY**	**ACCEPTANCE CRITERIA**	**CORRECTIVE ACTION**	**COMMENTS**
Extraction Surrogate	Added to all samples prior to extraction (including QC). Ortho-Terphenyl (Aromatic f and 1-Chloro-octadecane (Aliphatic fraction).	%R = 40-140 Control limits are advisory due to possible sample matrix effects.	1. Repeat analyses 2. Evaluate for matrix effects 3. Re-extract samples if method batch performance is suspected.	Evaluates extraction and separation method performance on each individual sample analyzed. Water samples containing sediment may have reduced analyte and surrogate extraction efficiency. Extraction performance alone can be evaluated from an EPH screening result.
Fractionation Surrogates	2-Bromonapthalene and 2-Fluorobiphenyl surrogates are added to sample extract prior to fractionation, These and OTP from extractions are Aromatic Surrogates. 1-Chloro-octadecane (from extractions) is Aliphatic Surrogate.	%R = 40-140 in Aromatic fraction. Control limits are advisory due to possible sample matrix effects.	1. Repeat analyses 2. Evaluate for matrix effects 3. Re-extract samples if method batch performance is suspected.	Evaluates the effectiveness of the aliphatic/aromatic separation step. Proportional Level of presence of either surrogate in the aliphatic fraction suggests incomplete separation of the more volatile PAHs from the aliphatic fraction.
EPH Screening	Analyses of extract prior to the separation step of the EPH method.	%R = 40-140 for OTP extraction surrogate. Full EPH recommended if TEH result >0.1 mg/L for waters or 200 mg/kg for soils.	1. Repeat analyses 2. Evaluate for matrix effects 3. Re-extract samples if method batch performance is suspected.	Evaluates method extraction performance on each individual sample analyzed. Target analyte levels in result are used to determine if full EPH analyses is necessary.
PAH Target Analyte Confirmations	Analyses performed by 8270 on Aromatic fraction if PAH target analytes are present above MTDEQ limits.	Meets 8270 analyses criteria	1. Repeat analyses to meet all 8270 method QC criteria	Confirms and accurately quantitates PAH levels in aromatic extract. 8270 method is considered less sensitive to false positives than the EPH method.
MDL Studies	MDL – Annually for water and soils and initially for each new instrument setup or analyst.	MDL< PQL	1. Repeat once 2. Correct problem	Evaluates overall method detection limits in clean sample matrix. Actual samples may have higher MDL.
LOD Verification	Following MDL to confirm calculated MDL value.	Positive Result	1) Examine method or preparatory steps, 2) Verify MDL study, 3) Repeat analysis.	Spike at 1-4X MDL for multiple analyte tests.

METHOD QA/QC PARAMETERS Extractable Petroleum Hydrocarbons (EPH) per Massachusetts Method 2004 Revision				
QA SAMPLE/ INDICATOR	**FREQUENCY**	**ACCEPTANCE CRITERIA**	**CORRECTIVE ACTION**	**COMMENTS**
External PE Samples	Semi-annually, WP study samples.	PT sample defined acceptance limits (Must pass 2 out of last 3 PT studies).	1) Complete corrective action report 2) Repeat with another make-up study (for failure of 2 out of 3).	External review of analytical method accuracy.
Control Charting and Proof of Competency	Annual, statistical review of method QC data for each analyst, or as needed	Data statistically within control limits.	1. Correct method problem 2. Adjust control limits 3. Replace analyst	For statistical process control and demonstration of capability for analysts.
Batch Definition	Prepped Samples = Each batch of 20 samples/matrix or when there is a change of reagents, whichever is more frequent.	Must pass all method QC criteria.	Re-analyze batch or qualify results	A group of samples and associated QC

METHOD QA/QC PARAMETERS Method 8260B Volatile Organic Compounds (VOCs) By Gas Chromatography/Mass Spectrometry (GC/MS)				
QA SAMPLE/ INDICATOR	**FREQUENCY**	**ACCEPTANCE CRITERIA**	**CORRECTIVE ACTION**	**COMMENTS**
Initial Calibration	7-point initial calibration range: 12.5, 25, 50, 125, 250, 375, 500 ng to the GC. 8th point at 2.5 ng to the GC for low level. For analytes with a normal purging efficiency. Analyte concentrations vary based on purging efficiency; please see attachment 17.3 Spike and Calibration Protocols.	If %RSD < 15 may use average RF, if %RSD > 15 use 1st or 2nd order calibration curve with R2 > 0.99. CCC = Continuing Calibration Check Compounds %RSD must be < 30 Average RF for SPCCs must be > 0.3000 for Chlorobenzene and 1,1,2,2-Tetrachloroethane; and must be > 0.1000 for Chloromethane, 1,1-dichloroethane, and Bromoform.	1. Perform instrument maintenance. 2. Recalibrate. 3. Prepare new Standards.	Establishes calibration curve over a range of analyte concentrations to quantify analytes of interest.
Tuning	BFB Initially and every 12 hours thereafter.	Meet criteria in Table 4 of Method 8260B.	1. Re-analyze BFB 2. Perform instrument maintenance. 3. Run software tuning programs.	Evaluate mass sensitivity, mass resolution, isotope ratio, and baseline threshold.
Continuing Calibration Verification (CCV)	Mid-level standard analyzed every 12 hours	RF Drift ± 20% of Initial Calibration for CCCs, RF Drift ± 30% for all other compounds. RF for SPCCs must be > 0.3000 for Chlorobenzene and 1,1,2,2-Tetrachloroethane; and must be > 0.1000 for Chloromethane, 1,1-dichloroethane, and Bromoform. EICP Area of the Internal Standards must be 50-200% of the Initial Calibration and the retention time must not shift more than 30 seconds.	1. Remake and rerun CCV. 2. Perform instrument maintenance 3. Recalibrate or demonstrate 2 consecutive passing CCV's.	Evaluates instrument drift throughout analytical sequence. Typically uses midpoint calibration standard.

METHOD QA/QC PARAMETERS Method 8260B Volatile Organic Compounds (VOCs) By Gas Chromatography/Mass Spectrometry (GC/MS)				
QA SAMPLE/ INDICATOR	**FREQUENCY**	**ACCEPTANCE CRITERIA**	**CORRECTIVE ACTION**	**COMMENTS**
Method Blank (MBLK)	Each batch of 20 samples or when there is a change of reagents, whichever is more frequent.	<½ PQL	1. Repeat analyses. 2. Correct problem. 3. Re-extract and re-analyze all samples associated with failing method blank.	Evaluates overall method including possible contamination in reagents and glassware utilized in preparatory batch.
Matrix Spike/ Matrix Spike Duplicate (MS/MSD)	Each batch of 20 samples or when there is a change of reagents, whichever is more frequent.	Statistical Control Limits	1. Repeat analyses. 2. Re-extract and re-analyze MS (if sufficient sample). 3. Evaluate LCS performance.	Evaluates effect of matrix on method performance.
Lab Control Sample (LCS)	Minimum 1/20 samples/matrix and each batch of samples, whichever is more frequent. Use second source standards to check calibration.	Statistical Control Limits	1. Repeat analyses. 2. Prepare new standards. 3. Recalibrate. 4. Re-extract and re-analyze all samples associated with failing LCS.	Evaluates overall method precision and accuracy.
Internal Standards (All Samples & QC Standards)	Monitor total areas in each analyses: Fluorobenzene Chlorobenzene-d5 1,2-Dichlorobenzene-d5	CCV area 50-200% of Initial Calibration and Sample / QC area 50-200% of preceding CCV. RT = ± 30 seconds of Initial Calibration / CCV.	1. Repeat analyses. 2. Re-extract samples. 3. Re-analyze at higher dilution.	Measures instrument stability and sensitivity.
Surrogates	Present in all samples (including QC): Dibromofluoromethane 1,2-Dichloroethane-d4 Toluene-d8 p-Bromofluorobenzene	Statistical Control Limits	1. Repeat analyses. 2. Re-extract samples. 3. Re-analyze at higher dilution. 4. Re-calibrate.	Evaluates method performance on each individual sample analyzed.

METHOD QA/QC PARAMETERS Method 8260B Volatile Organic Compounds (VOCs) By Gas Chromatography/Mass Spectrometry (GC/MS)				
QA SAMPLE/ INDICATOR	**FREQUENCY**	**ACCEPTANCE CRITERIA**	**CORRECTIVE ACTION**	**COMMENTS**
MDL Studies	MDL - Each instrument annually for each matrix and initially for new analytes and new instruments and major instrument modifications.	MDL< PQL	1. Repeat at different spike concentrations 2. Perform instrument maintenance or new initial calibration	Evaluates overall method detection limits in clean sample matrix. Actual samples may have higher MDL.
LOD Verification (Required for each analyte/method to verify calculated MDL. If not completed, then LOQ verification must be performed.)	Annually based on MDL Study frequency.	Positive Result, (Above background)	1) Examine method or preparatory steps. 2) Verify MDL study. 3) Repeat analysis. 4) Consult QA.	Spike at 2-3 times the calculated MDL.
External PT Samples	Performed semi-annually.	PT sample defined acceptance limits (Must pass 2 out of last 3 PT studies)	1. Complete corrective action report. 2. Repeat with another make-up study (for failure of 2 out of 3).	External review of analytical method accuracy.
Control Charting and Demonstration of Capability	Annual, statistical review of method.	Data statistically within control limits.	1. Trend Analysis/ Method Review. 2. Correct method/instrument problem.	For statistical process control.
Individual Analyte QC Failures	When re-analysis and corrective action does not solve the issue; or when re-analysis is not possible or deemed necessary to meet quality objectives.	QC failures must be reported in the case narrative and/or flagged on QC Reports	Perform instrument maintenance and re-calibrate if QC failures continue.	

Method QA/QC Parameters
SEMIVOLATILE ANALYSES BY GC/MS
By SW-846 Method 8270C, 8270D and EPA 625

QA SAMPLE/ INDICATOR	2 FREQUENCY	ACCEPTANCE CRITERIA	CORRECTIVE ACTION	COMMENTS
Sample Preparation Extraction	SW-846 Methods: Soils: 3550B or 3545 Waters: 3510C or3520C Wastes: 3550B, 3545, 3580 Surrogates added to all samples.	Meet Method QC criteria for the matrix	1) Re-analyze sample or re-extract sample. If re-extraction outside of holding time, report both sets of data.	Minimum sample volume required per sample. Soils: 30 grams Water: 1 Liter
Instrument Calibration (IC)	7-point calibration Range: 10, 20,50,75,100,120, 150ug/mL Bottom point or two may be dropped for reactive compounds as long as five consecutive points are used at a minimum	See Note #1 at bottom	1) Perform instrument maintenance. 2) Recalibrate. 3) Prepare new Standards.	Establishes calibration curve over a range of analyte concentrations to quantify analytes of interest.
Instrument Blank	Following instrument calibration or beginning of each analytical sequence. May be substituted with batch method blank.	Clean baseline. No target analytes.	1) Rerun. 2) Perform instrument maintenance.	Evaluates instrument performance chromatographic baseline.
Tuning	DFTPP Initially and every 12 hours thereafter	Meet method-tuning criteria (Attachment 17.4)	1) Adjust instrument. 2) Recheck tune. 3) Until successful.	Evaluates mass sensitivity, mass resolution, isotope ration, and baseline threshold.
Initial Calibration Verification (ICV)	Immediately following calibration.	RF for SPCC>0.050 %R of CCCs must be ±20% difference from IC. 625 and 8270D Method: %R for all compounds is ±20%.	1) Repour and rerun. 2) Prepare fresh calibration standards and/or ICV. 3) Recalibrate and rerun.	Evaluates calibration accuracy and method performance. Must be prepared from second source standard.
Method Blank (MBLK)	Immediately follows ICV. Each batch of 20 samples/matrix or when there is a change of reagents, whichever is more frequent.	< ½ PQL excepting phthalates	1) Prepare fresh blank 2) Re-extract and re-analyze all samples associated with failing method blank.	Evaluates calibration accuracy, reagent/ glassware contamination, and instrument carryover.
Continuing Calibration Verification (CCV)	Mid-level standard analyzed every 12 hours to update internal standard response factors (RF).	RF for SPCC>0.050 %R of CCCs must be ±20% difference from IC. 625 Method: %R for all compounds is ±20%.	1) Remake and rerun. 2) Rerun instrument tune. 3) Recalibrate and rerun samples since last valid CCV	Evaluates instrument drift throughout analytical sequence. Typically uses midpoint calibration standard or ICV.
GC Performance Analyte Degradation	Each tuning; Evaluate TIC areas of DDT breakdown products and chromatographic profile.	< 20% breakdown	1) Instrument maintenance. 2) Re-check tune.	Evaluates chromatographic system for reactivity.

Matrix Spike (MS/MSD)	Each batch of 20 samples/matrix or when there is a change of reagents, whichever is more frequent. For 8270-a representative list. For 625- all target analytes	See LCS limits. Statistical control limits. RPD: 40%	LCS must be passing 1) If matrix interference suspected report as found, or 2) Re-extract and re-analyze MS if no matrix interference suspected (if sufficient sample) 3) Evaluate LCS performance (See Note #3 at bottom)	Evaluates effect of matrix on method performance. MSD also evaluates method precision.
Duplicate Sample (DUP)	1/10 samples Or 1/20 samples depending on method	5, 10, 20% RPD or 2X PQL depending on method	1) Rerun sample pair, evaluate for sample homogeneity or 2) Report with qualifiers	Evaluates method precision. MSD duplicate analyses preferred on some methods.
Laboratory Control Sample (LCS)	Minimum 1/20 samples/matrix and each batch of samples, whichever is more frequent.	Reference Material specified limits or laboratory statistical limits. 625 method: Limits don't exceed method criteria.	1) Prepare new Standards. 2) Re-calibrate. 3) Re-extract and re-analyze all samples associated with failing LCS.	Evaluates spiking technique and when prepared from a source independent of the calibration standards can also measure method performance.
Internal Standards	Monitor total areas in each analyses Acenapthene-d10 Phenanthrene-d10 Chrysene-d12 1,4-Dichlorobenzene-d4 Napthalene-d8 And Perylene-d12	Samples: Area %50-150% of IC. RT = ±30 sec of IC.	1) Repeat analyses 2) Re-prepare samples. 3) Analyze different sample. 4) Re-extract and re-analyze set of samples.	Measures instrument stability and sensitivity.
Mass Spectra	Review all target analytes in standards and reported analytes in samples.	Spectra must be consistent with library database.	1) Verify calibration spectra and retention times. 2). Repeat analyses.	Used to qualitatively identify target compound hits in samples.
Surrogates	Present in all extracted samples (Including QC).	Reference Material specified limits or laboratory statistical limits. 625 Method: Limits don't exceed method criteria.	1) Repeat analyses. 2) Recalibrate with fresh fortification standard. 3) Re-extract samples.	Evaluates method performance on each individual sample analyzed.
MDL Studies	Annually for water and soils. Initially for each new instrument setup or analysts.	0.5X of PQL, PQL = 10 ug/L or 0.33 ug/g with exceptions (See Note #4 at bottom).	1) Repeat if obvious problem occurs 2) Adjust reporting limit to > MDL. 30 LOD analysis.	Evaluates overall method detection limits in clean sample matrix. Actual samples may have higher MDL.
LOD Verification	Following MDL to confirm calculated MDL value.	Positive Result	1) Examine method or preparatory steps, 2) Verify MDL study, 3) Repeat analysis.	Spike at 1-4X MDL for multiple analyte tests.
External PE Samples	WP and LPTP PT studies.	PT sample defined acceptance limits (Must pass 2 out of last 3 PT studies).	1) Complete corrective action report 2) Repeat with another make-up study (for failure of 2 out of 3).	External review of analytical method accuracy.
Control Charting and Proof of Competency	Annual statistical review of method.	Data statistically within control limits. Evaluate statistical limits reasonableness.	1) Trend Analysis/ Method Review. 2) Correct method/instrument problem. 3) Replace analyst.	For statistical process control.

Batch Definition	Prepped Samples = Each batch of 20 samples/matrix or when there is a change of reagents, whichever is more frequent.	Must pass all method QC criteria.	Re-analyze batch or qualify results	A group of samples and associated QC

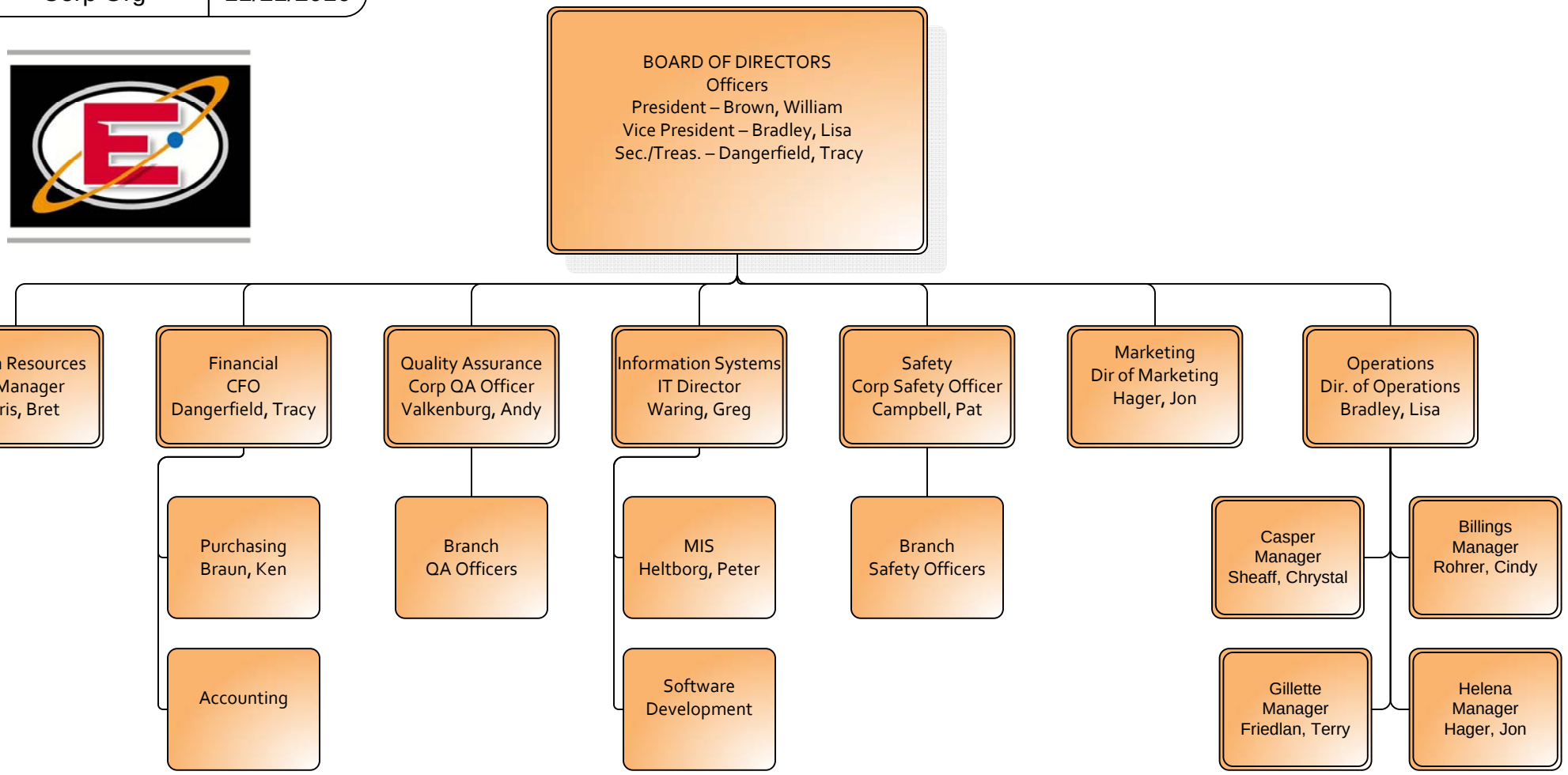
APPENDIX C

Organizational Charts

Corporate Organizational Chart
Billings Branch Lab Organizational Chart

Energy Laboratories	
Corp Org	11/21/2016

Energy Laboratories / Corporate Structure



Billings

Department Heads | 11/21/2016

BOARD OF DIRECTORS
Officers
President – Brown, William
Vice President – Bradley, Lisa
Sec./Treas.- Dangerfield, Tracy

Safety
Campbell, Pat

Quality Assurance
Valkenburg, Andy

Director of Information Systems
Waring, Greg

Human Resources
Burris, Bret

Rohrer, Cindy
Lab Manager

Edwards Tabitha
Front Office Supervisor

Jasper, Michelle
Inorganics Supervisor

Weis, LaDonna
Wise, Leigh Ann
Organics Supervisors

Project Management

Log In

Admin Support

Shipping

Wet Chemistry

Elemental Analysis

Aquatic Toxicology

Soils/Agronomy

APPENDIX D

Curricula Vitae of Key Laboratory Personnel

Curricula Vitae of Key Laboratory Personnel

Contents

WILLIAM T. BROWN

President

Responsible for corporate direction and operations of Energy Laboratories, Inc.

Experience: Thirty plus years of experience in environmental laboratory operations including Laboratory Manager, Supervisor of Organic Analysis and Senior Organic Chemist. Experienced in Gas Chromatography, Gas Chromatography/Mass Spectrometry (GC/MS), sample preparation and extraction, ion chromatography and chromatography data systems.

Education
Bachelor of Science in Fish and Wildlife, Montana State University, Bozeman, Montana, 1977

Professional Experience
1986 to present, President - Energy Laboratories, Inc.

1981 - 1987, Manager - Energy Laboratories, Inc., Branch Laboratory, Gillette, Wyoming. Responsible for routine analysis and quality control of water, natural gas, and petroleum products. Involved in field on site sampling and testing, meter calibrations, and supervision of branch laboratory staff.

1979 - 1981, Laboratory Technician - Energy Laboratories, Inc., Billings, Montana. Responsible for the natural gas and petroleum products department of the lab including field natural gas testing. Also involved with various work in water and soil analysis including formal training in ion chromatography.

1977 - 1979, Fisheries Biologist - Water and Forests Department of the Government of Niger, Africa. While in the Peace Corps, responsible for developing fisheries management programs in a specific region including monitoring water quality by on-site testing.

LISA A BRADLEY PH.D.

Vice President/ Director of Corporate Laboratory Operations

Responsible for development and oversight of technical operations for Energy Laboratories, Inc.

Experience: Interim Laboratory Manager, Supervisor of Inorganic Analysis, Supervisor of Elemental Analysis, Senior Elemental Analyst, Research Assistant, Laboratory Environmental Technician. Experienced in atomic absorption spectroscopy (AA), inductively coupled plasma optical emission (ICPOES), and mass spectrometry (ICP-MS).

Education
Ph.D., Analytical Chemistry, Indiana University - Bloomington, Indiana, 1996
Bachelor of Science, Chemistry, Montana State University, Bozeman, Montana, 1990

Professional Experience
2007-Present, Director of Corporate Technical Operations- Energy Laboratories, Inc., Billings, MT.
2008- Interim Laboratory Manager- Energy Laboratories, Inc., Casper, WY: Supervision of the Casper laboratory.

2005-2008, Supervisor, Inorganics Dept. - Energy Laboratories, Inc., Billings, MT: Responsible for supervision and management of inorganics laboratory.

2000-2005-Supervisor, Metals Department. - Energy Laboratories, Inc., Billings, MT: Supervised metals department; performed chemical analyses using laboratory instrumentation.

1996- 2000, Analytical Chemist - Energy Laboratories, Inc., Billings, Montana: Performed atomic absorption spectroscopy (AA), inductively coupled plasma optical emission (ICP-OES), and mass spectrometry (ICP-MS) analyses.
October 1990-1995, Research Assistant/Department of Chemistry - Indiana University, Bloomington, Indiana.
August, 1990-December, 1992, Associate Instructor of Chemistry - Indiana University, Bloomington, Indiana.

1989, Laboratory Technician - Intermountain Laboratory, Bozeman, Montana.

1986-1990, Undergraduate Research Assistant - Montana State University, Bozeman, Montana

TRACY A. DANGERFIELD, CPA, MBA

Treasurer and Chief Financial Officer

Experienced in business leadership, management and strategic development. Extensive background in accounting, finance and organizational development.

Education

Master of Business Administration, University of Montana, Missoula, MT 2013
Certified Public Accountant, 1992
Bachelor of Science, Business Administration, Minor in Accounting, Eastern Montana College, Billings, MT 1989

Professional Experience

1989-Present, Chief Financial Officer-Energy Laboratories, Inc., Billings, Montana.
Responsible for initiating, developing, and directing administrative operations including finance, human resources, taxation and marketing. . Steered the implementation of an Employee Stock Ownership Plan, transacted the ensuing 30% purchase of ELI, and continues to serve as Plan Trustee.

1985 -1989 Office Management-Energy Laboratories, Inc., Billings, Montana.
Responsible for daily office operations and management of staff.

CORNELIUS A. VALKENBURG PH.D.

Senior Analytical Chemist/Quality Assurance Officer

Education

Ph.D., Analytical Chemistry, Montana State University, Bozeman, Montana, 1987
Bachelor of Arts, Biology with minor in Chemistry, Carroll College, Helena, Montana, 1979

Professional Experience

1992- Present, Analytical Chemist/Quality Assurance Officer - Energy Laboratories, Inc., Billings, Montana. Corporate Quality Assurance Officer responsible for the Quality Assurance monitoring of laboratory operations. Performs method development, prepares and updates standard operating procedures, performs technical training, and involved with special projects. .
1989 - 1992, Senior Organic Analytical Chemist - ICF Kaiser Engineers, Las Vegas, Nevada. Provide supervisory and technical support in the design, preparation, analysis, and multi-laboratory certification of analytical method performance evaluation materials used to evaluate current and proposed EPA organic analytical procedures. Also review proposed EPA methods contracts for technical accuracy. Secondary duties as Laboratory Safety Officer.
1987 - 1989, Senior Scientist - Lockheed Engineering and Sciences Company, Environmental Programs (Organic Chemistry Section), Las Vegas, Nevada. Responsible for research and development projects as applied to improved methods for the analysis of EPA priority pollutants. Areas of study include: liquid-liquid extractions, solid-phase extraction, soil leachability modeling (TCLP), chemical derivatives for gas and liquid chromatography, production of performance evaluation materials, gas chromatographic methods, supercritical fluid chromatography and extraction, and laboratory automation.
1981 - 1987, Ph.D. Candidate, Graduate Research, Assistant - Montana State University, Department of Chemistry, Bozeman, Montana. Research in gas chromatographic detector design, modification, and characterization by computer modeling. Teaching of undergraduate laboratories in the areas of inorganic, organic, and analytical chemistry.
1981 - 1981, Research and Development Chemist - Falls Chemicals, Great Falls, Montana. Methods development for the analysis of raw materials and formulated products used or produced by Falls Chemicals. Performed optimization studies for plant chemical processes.
1980 - 1981, Research Technician - Oregon Graduate Center, Beaverton, Oregon. Synthesis and purification of polyamine dueterated analogues for their use as internal standards in mass spectrometry.
1978 - 1979, Field Technician and Student Researcher - State of Montana Water Quality Bureau and Carroll College, Helena, Montana. Evaluate the effects of subsurface drainage on saline seep areas.
Summer 1978, Lab Technician - American Chemet Corporation, East Helena, Montana. Quality control for the manufacture of CuO and CuO2, and the trace analysis of Pb. Methods used were wet chemistry, electrochemistry, and atomic absorption.

Technical Training

Technical Writing, University of Nevada, Las Vegas, Nevada, 1988
Mass Spectrometry, Oregon Graduate Center, 1981
Dale Carnegie Management Training, Billings, Montana, 1996
Dale Carnegie Graduate Assistant Training, Billings, Montana 1997
Interaction Management Training 2008
Numerous TNI sponsored training courses related to QA/QC

Professional Organizations

American Chemical Society
TNI (The NELAC Institute

CINDY ROHRER

Laboratory Manager

Experienced in supervision and management of staff, training analysts, and performing the following analyses: Anion, alkalinity, acidity, metals analysis (ICP-MS), Mercury analysis, Flame FAA, UV and pH.

Education

Bachelor of Science, Rocky Mountain College, Billings, MT 2000

Professional Experience

2014-Present-Laboratory Manager Energy Laboratories, Inc., Billings, MT. Ms. Rohrer supervises department operation, staff training, maintains QA/QC criteria, oversees audits, coordinates tasks with other departments, and performs data validation.

2011-2014- Inorganics and Aquatic Toxicology Supervisor-Energy Laboratories, Inc., Billings, MT. Responsible for daily operations and management of Inorganics and aquatic toxicology department. Responsibilities include supervision of Inorganics and Aquatic Toxicology staff, maintain QA/QC criteria, oversee audits, review and improve Inorganics and Aquatic Toxicology department operations, coordinate tasks with other departments, and proofing data.

2008-2014- Inorganics Supervisor-Energy Laboratories, Inc., Billings, MT.
Responsible for daily operations and management of Inorganics department. Responsibilities include supervision of Inorganics staff, maintain QA/QC criteria, oversee audits, review and improve Inorganics department operations, coordinate tasks with other departments, and proofing data.

2006-2007- Inorganics Assistant Supervisor- Energy Laboratories, Inc., Billings, MT.
Responsibilities included training of new analysts, QC method development; oversee audits, and management of samples.

1999- Montana State University, Billings, MT. Researched SOD mimetics, studied SOD mimetic activity of Copper Kinetin. Ran UV Spectrometry, pH meter, Mass Spec, and Flame AA.

Technical Training

Dale Carnegie Course 2004
Interaction Management Training 2008

MICHELLE JASPER

Inorganics Supervisor
Supervisor of Inorganics, Hazardous Waste, Soils, and Aquatic Toxicology Departments

Experienced in Supervision and Management of staff, training analysts, and performing the following analyses:

Metals:
Inductively Coupled Plasma-Mass Spectrometry, Inductively Coupled Plasma- Optical Emission Spectrometry, Mercury in water by Oxidation-Purge and Trap, and Cold Vapor Atomic Fluorescence Spectrometry, GFAA Graphite Furnace Atomic Absorption

Inorganics:
Colorimetric analysis of Nutrients-Segmented Flow, Colorimetric analysis of Nutrients- Discrete analyzer, Ion Chromatography, Total/dissolved Organic Carbon, Biochemical Oxygen demand, Chemical Oxygen demand, UV254

Radio Chemistry:
Gross Alpha, Gross Beta, Radium-226, Radium-228

Microbiology:
Colilert 18, M-coliblue, MF-coliform, MF-fecal, MPN

Education

Bachelor of Science, Forensic Chemistry; Buffalo State College, Buffalo, New York 2005
Bachelor of Arts, Chemistry; Buffalo State College, Buffalo, New York 2005

Professional Experience

2014- Present- Inorganics and Aquatic Toxicology Supervisor-Energy Laboratories, Inc., Billings, MT. Responsible for daily operations and management of Inorganics and aquatic toxicology departments. Responsibilities include supervision of Inorganics and Aquatic Toxicology staff, maintain QA/QC criteria, oversee audits, review and improve Inorganics and Aquatic Toxicology department operations, coordinate tasks with other departments, and proofing data.

2006-2014- Inorganic Manager, Southern Analytical Laboratories, Inc., Oldsmar, Florida.
Responsible for supervision and management of the Inorganic, Metals, Microbiology, and Radiochem Departments.

2004-2006- Wet Chemistry Analyst, Severn Trent, Buffalo, New York

LEIGH ANN WISE

Co-Supervisor Billings Organics Department
Supervisor of Semi Volatile Drinking Water and Volatile Organic Analysis

Experience: Experienced in the management and quality control of the organic department including organic analysis, staff training and supervision, instrument maintenance, sample extraction and preparation, and the technical review and reporting of data and proficiency testing samples. Experienced in Gas Chromatography, Gas Chromatography/Mass Spectrometry (GC/MS), Purge and Trap, Electron Capture Detector (ECD) and Flame Ionization Detector (FID) instrumentation.

Education
Bachelor of Science, Biology, Montana State University, Billings, MT 2000
Bachelor of Science, Chemistry, Montana State University, Billings, MT 2003

Professional Experience
2013 – Present: Co-Supervisor Organics Department, Supervisor of Semi Volatile Drinking Water and Volatile Organic Analysis Energy Laboratories, Inc., Billings, MT. Supervises the various areas of the Billings Organics Department groups, encourage the professional development of staff, and continually maintains and refines quality assurance and control criteria. Oversees audits, sample load, technically reviews data and reports and assists with the requirements and maintenance of laboratory certifications.

2009 – 2013: Supervisor of Semi Volatile Drinking Water Analysis, Energy Laboratories, Inc., Billings, MT. Coached staff and managed sample load and analysis. Developed modules and guidelines for training, employee performances, and compensation reviews. Provided goals and expectations to staff and monitored progress. Managed department and laboratory issues as they arose and addressed employee performance as needed. Maintained method standard operating procedures and technically reviewed data and reports.

2000 – 2009: Chemist, Energy Laboratories, Inc., Billings, MT. Became certified in the analysis of volatile organic, semi volatile organic, pesticide, herbicide, and polychlorinated biphenyl compounds in various sample matrices. Maintained and operated various types of instrumentation including Gas Chromatography, Gas Chromatography/Mass Spectrometry, Electron Capture Detector, Chemical Ionization, and Purge and Trap. Managed sample loads, maintained quality assurance and control criteria, and performed method development and improvements.

Technical Training
Interaction Management Essentials of Leadership, Development Dimensions International, Billings, MT 2012
Excelling as a Manager or Supervisor, SkillPath Seminar, Billings, MT 2010
GC/MS Training Seminar, Restek Corporation, Butte, Montana 2005

LADONNA WEIS

Co-Supervisor Billings Organics Department
Supervisor of Pesticides and Herbicide Analysis

Education
Bachelor of Science in Biology, Chemistry minor, Montana State University, Billings, MT 2003

Professional Experience
2013 – Present: Co-Supervisor Organics Department, Energy Laboratories Inc., Billings, MT. Responsibilities include training of new analysts, EPA method development, maintaining instrumentation, overseeing audits, and management of samples. Handle and resolve critical quality problems using research abilities and hands-on experience. Provides team leadership, data review and project management.

2009 – 2013: Supervisor of Pest/Herb Department, Energy Laboratories Inc., Billings, MT. Supervised and trained extraction analysts with an emphasis on proper laboratory technique and accurate, reproducible data. Combined effective communication, organizational skills and planning for successful time management. Assigned duties/shifts to employees, monitored performance of the employees and maintained/documented work completed. Participated in the development and implementation of Peer Audits throughout the company branch labs. Managed sample loads, maintained quality assurance and control criteria, and recommended new/modified method developments.

2005 – 2009: Chemist, Energy Laboratories Inc., Billings, MT. Performed analyses of pesticide, herbicide, and PCB compounds in various sample matrices. Maintained and operated Electron Capture Detectors (ECD). Increased knowledge of quality control measures. Documented and prepared timely reports on the tests conducted and the results obtained.

2003-2005: Lead Pest/Herb Extractions, Energy Laboratories Inc. Billings, MT. Began as analyst of pesticide, herbicide and polychlorinated biphenyl compounds; became lead analyst in 2004. Became proficient and knowledgeable with regulatory guidelines, managed incoming samples and prioritized sample load based on sample collection date, hold time and client's needs. Mastered all software associated with the analysis process.

2002: Aquatic Toxicologist, Energy Laboratories Inc. Billings, MT. Performed toxicity reduction evaluations for chronic and acute testing of water samples and determined causative toxicity in effluent waters. Determined electrical conductivity, concentrations of dissolved oxygen, alkalinity, ammonia, total residual and free chlorine in aqueous solutions. Calculated inhibition concentration point and determined lethal and effective concentration end points using analytical graphical methods.

Technical Training
Supervisory Leadership Skills Training, Development Dimensions International, 2011
Interaction Management Training, 2008

TIMOTHY D. BAILEY PH.D.

Senior Analytical Chemist/Software Architect

Laboratory instrumentation experience working for a commercial laboratory and for a major international chemical producer. Tim is knowledgeable with inductively coupled plasma optical emission (ICP-OES) and mass spectrometer (ICP-MS), and atomic absorption (AA) techniques. He has extensive experience with implementation of EPA Good Laboratory Practices programs, statistical quality management for laboratory analysis, and EPA SW-846, 500, and 600 series analytical methodologies. Tim is a senior member of the IT development staff. He helps to architect solutions that improve the quality and efficiency of Energy Laboratories analytical operations. These solutions range across our Laboratory Information System, metals and radiochemistry applications. Tim brings a solid understanding of the laboratory chemistry to our IT organization to help generate best in class solutions.

Education

Ph.D., Analytical Chemistry, University of Wisconsin-Madison, Madison, Wisconsin, 1989
Bachelor of Arts, Chemistry, Montana State University, Bozeman, Montana, 1980

Professional Experience

1994- Present, Senior Analytical Chemist/Software Architect - Energy Laboratories, Inc., Billings, Montana.

1989-1994, Project Leader/Senior Research Chemist - The Dow Chemical Company, Midland, Michigan.

1988-1989, Graduate Technical Assistant/Chemistry Department Instrument Center - University of Wisconsin-Madison, Madison, Wisconsin.

1984-1988, Graduate Teaching Assistant/Analytical and General Chemistry - University of Wisconsin-Madison, Madison, Wisconsin.

1980-1984, Analytical Chemist - Energy Laboratories, Inc., Billings, Montana.

STEPHEN B. DILTS, PH.D.

Senior Analytical Chemist

Education

Ph.D., Analytical Chemistry, Washington State University, Pullman, WA, 1993
M.S., Analytical Chemistry, Washington State University, Pullman, WA, 1985
B.S., Chemistry, Montana State University, Bozeman, MT, 1981

Professional Experience

1994-Present, Senior Analytical Chemist- Energy Laboratories, Inc., Billings, MT.
Volatile organics GC/MS analyst.

1993-1994, Senior Analytical Chemist- Energy Laboratories, Inc., Billings, MT.
Supervisor of the organics extraction laboratory.

1989-1993, Research Assistant- Department of Civil and Environmental Engineering, WSU, Pullman, WA.
Performed field research in the analysis of atmospheric organic compounds.

1986-1989, Chemist- Montana Department of Agriculture-Laboratory Bureau, Bozeman, MT. Performed pesticide, hazardous waste and toxicological analysis for regulatory purposes.

1982-1985, Research Assistant- Department of Civil and Environmental Engineering, WSU, Pullman, WA.
Performed field research in the analysis of atmospheric sulfur compounds.

1982, Laboratory Technician- Halliburton Services, Inc., Evansville, WY. Performed oil field water, cement, and soils analysis.

Professional Organizations

American Chemical Society

WYNN PIPPIN

Senior Project Manager

Education

B.S. Microbiology, Agronomy, South Dakota State University, Brookings, South Dakota 1977
B.A. Biology/Chemistry, South Dakota State University, Brookings, South Dakota 1977
Masters credits in Hydrology, University of Wyoming, Laramie, Wyoming 1981-1982

Professional Experience

1997-Present, Project Manager, Energy Laboratories, Inc., Billings, Montana. Duties include Project Management of Safe Drinking Water Act (SDWA), refinery RFI clients and others. Performs data review of technical reports issued to clients. Represents Energy Laboratories, Inc. at various marketing activities.

1989-1997, Project Manager, Inter-Mountain Laboratories, Inc., Bozeman, Montana. Analyzed water and soil samples for VOCs, SVOCs, Pesticides and Herbicides. Supervised laboratory personnel, served as project manager for Safe Drinking Water Act (SDWA), Resource Conservation and Recovery Act (RCRA), mining and refinery clients. Served as Quality Assurance Officer for the laboratory.

1981-1989, Chemist, Wyoming Department of Agriculture, Laramie, Wyoming. Analyzed water, soil, tissue samples for general chemistry, metals, VOCs, pesticides, herbicides, method development for metals in tissue.

1978-1981, Program Director, South Dakota Department of Agriculture, Pierre, South Dakota. Supervised soil/water irrigation compatibility program.

1977-1978, Chemist, Desert Research Institute, Reno, Nevada. Analyzed water samples for anions, perform cation/anion balances, and experiment with extraction of U w/resin.

SHARI ENDY

Senior Project Manager

Education

B.S. Petroleum Engineering, Montana College of Mineral Science and Technology, Butte, MT - 1988
Masters credits in Petroleum Engineering, Montana College of Mineral Science and Technology, Butte, MT – 1988.

Professional Experience

2002 – Present, Project Manager, Energy Laboratories, Inc., Billings, Montana. Duties include Project Management of mining, refining, oil and gas and government-regulated clients. Representative for company at various marketing activities. Maintained employee training files and laboratory SOPs.

2000 – 2002, NELAP Coordinator, Energy Laboratories, Inc., Billings, Montana. Responsible for maintaining laboratory national certification status under NELAP (National Environmental Laboratory Accreditation Program).

1994 – 2000, Project Manager, Maxim Technologies, Inc., Billings, Montana. Responsible for client projects and business development.

1988 – 1993, Environmental Engineer, Exxon Billings, Refinery, Billings, MT. Responsible for collection of environmental samples and maintaining compliance with permit for hazardous waste operations.

Professional Training

40 hour Hazardous Waste Operations Training
Licensed Wastewater Treatment Operation – State of Montana

LINDA VALKENBURG

Supervisor Same Day Analysis and Microbiology
Microbiology Senior Analyst

Education

Bachelor of Science, Microbiology with Minor in Chemistry, Montana State University, Bozeman, Montana-Graduated with Honors 1985
United States Navy, Hospital Corps School-Graduated with Honors 1973

Professional Experience

2016-Present Same Day Analysis and Microbiology Supervisor, Energy Laboratories Inc., Billings, MT
Responsible for Ion Chromatography, Sulfide/Sulfite, pH, Conductivity, Alkalinity, Acidity, Fluoride, Total/dissolved/suspended Solids, Color, Foaming Agents, Turbidity, Odor, Tannins, Biochemical Oxygen demand, Carbonaceous Biochemical Oxygen demand, UV254, and duties also include performance of bacteriologic analyses of drinking water, wastewater, and soil, and client interaction.
2002-2016 Microbiology Supervisor/Chemist, Energy Laboratories Inc., Billings, MT.
Microbiology supervisor and analyst. Responsible for supervision and management of Microbiology department.
1997-2002 Chemist, Energy Laboratories, Inc., Billings, MT
Duties included performing Ion Chromatography, Alkalinities, Acidities, and Solids analyses.
1985-1986 Microbiologist, Montana State Diagnostic Lab/Veterinary Research Center, Bozeman, MT.
Microbiology scientist: Isolation and research on bovine and porcine Campylobacter. Duties included transfer of cultures, collection of cultures, plating cultures, gram-staining characterization of optimal growing condition. Group earned "Father's of invention" Award for creating a bovine vaccine for Campylobacter.
2000-2003, 2004-2005 Command Master Chief, Naval Reserve Center, Billings, MT
Duties included command and leadership role as Command Master Chief.
1997-1999 Leading Senior Chief Petty Officer, Naval Reserve Fleet Hospital, Billings, MT
1997 Command Senior Chief, Naval and Marine Corps Reserve Center, Billings, MT
1987-1991 Command Senior Chief, Naval and Marine Corps Reserve Center, Las Vegas, NV
1973-2005 United States Navy, United States Navy Reserve, Retired

Technical Training

Certified to analyze MT Public Drinking Water Supplies for Microbiological Contaminants 2003
Command Master Chief Training Course, New Orleans, LA 1999
Health and Resource Management Course, Bethesda, Ma 1996
Naval Fleet Hospital Operations and Training Course, Phase 1 & 11, 1994, 1995
Medical Effects of Nuclear Weapons, Fort Lewis, Tacoma, WA 1992
Instructor Training Course, Las Vegas, NV 1988
Medical Entomology & Pest Management Technology Course, Alameda, CA 1987
Leadership and Management, Education Training, Bangor, WA 1984
Annual Montana Emergency Medical Symposium, Billings, MT 1993-2000
CPR Instructor: recertified 1996, 1997, 2005
EMT certification 1980, 1999
CPR/AED certification renewal every two years

GREG WARING

IT Director

Experienced in information technology operations and management including: infrastructure support, hardware provisioning, software development and vendor management.

Education

Bachelor of Science in Computer Science, Minor in Business Management. Montana Tech of the University of Montana. December 1996

Professional Experience

2011-Present. IT Director – Energy Laboratories. Billings MT.
Responsible for all aspects of IT operations including: personnel management, process improvement, software maintenance and development, desktop support operations, server and network management, vendor management.

2007-2010 Client Care Manager – Zoot Enterprises. Bozeman, MT.
Responsible for delivery, client satisfaction and growth of major client accounts including some of the largest financial institutions in the nation.

2005-2007 PM and Consulting Group Manager. Zoot Enterprises. Bozeman, MT.
Managed the operation of the Project Management and Consulting teams. Responsible for: process development and delivery standardization, resolution of client escalations, personnel management.

1997-2005 Project Manager. EDS (Electronic Data Systems a component of HP).
Managed projects and delivered IT initiatives for multiple clients and industries. Projects ranged from upgrade and testing initiatives to large multi-system application development for Fortune 100 companies and government agencies.

APPENDIX E

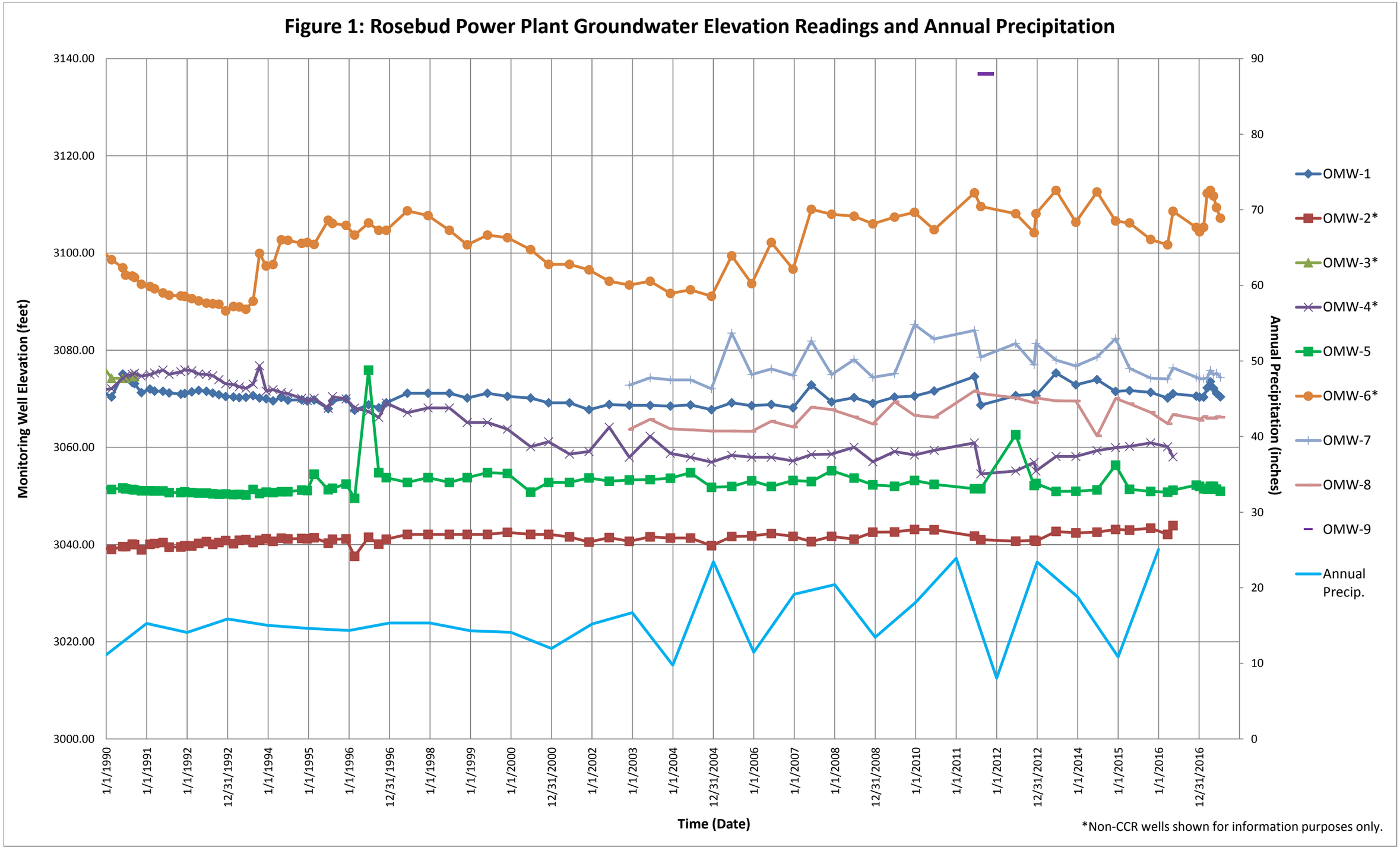
Equipment and Methods List

APPENDIX E
Major Equipment and Methods

Equipment	Quantity	Methods
Gas Chromatograph - FID with auto sampler	4	MA-EPH, DRO, SW8015
Gas Chromatograph - PID/FID with purge and trap and auto sampler	4	MA-VPH, GRO, SW8015, SW8021
Gas Chromatograph - Dual ECD with auto sampler	4	SW8011, SW8081, SW8082, SW8151, E504.1, E508A, E515.1, 515.4, E552.2, E608
Gas Chromatograph - Mass Spectrometer with auto sampler	7	SW8270, E525, E507Mod, E548.1, E625
Gas Chromatograph - Mass Spectrometer with purge and trap and auto sampler	5	SW8260, E524.2, E624
Closed Cup Flashpoint Analyzer	1	SW1010M
Ion Chromatography System (IC)	2	E300.0
Inductively Coupled Atomic Emission Spectrophotometer (ICP-AES)	2	E200.7, SW6010
Inductively Coupled Mass Spectrometer (ICPMS)	3	E200.8, SW6020
Block Digestors	7	E200.2, SW3010, SW3050, SW7471
Cold Vapor Atomic Absorption (CVAA) Analyzer	2	E245.1, SW7470, SW7471
Cold Vapor Atomic Fluorescence (CVAFS) Analyzer	1	E245.7
Direct Mercury Atomic Absorption Analyzer	1	SW7473
Flow Injection Analyzer (FIA)	3	E335.4, E350.1, E351.2, E353.2, E365.1, A4500-CN L
Total Kjeldahl Nitrogen (TKN) Block Digestor	2	E351.2
Total Phosphorus Block Digestor	1	E365.1
AutoAnalyzer	1	E353.2, E365.1
Segmented Flow Analyzer (SFA)	1	A4500-CN G, SW9012, Kelada-01, E335.4, A4500-CN-F, D2036C, E420.1, E420.4
Automatic Titrator	2	A2310 B, A2320 B, A4500-F C
Turbidimeter	2	A2130B
Automated pH/SC	1	A2510 B, A4500-H B
pH /Conductivity/DO/ISE meters and probes	multiple	A2510 B, A4500-H B, A4500-O G, A4500-F C, A4500-CN-F
Automated Biochemical Oxygen Demand (BOD) Analyzer	1	A5210 B, A5210 C
Fixed Wavelength IR Spectrophotometer	1	E413.1, E413.2, E418.1
UV-Vis Spectrophotometer	2	410.4, A3500-CR B, A4500-S D, N3500M, A4500-CN M, A5550 B
Leco Carbon Sulfur Analyzer	2	D1552, Leco
Balances	multiple	A2540 C, A2540 D, A2540 G, A2540 B
Autoclave, Ovens, Incubators	multiple	

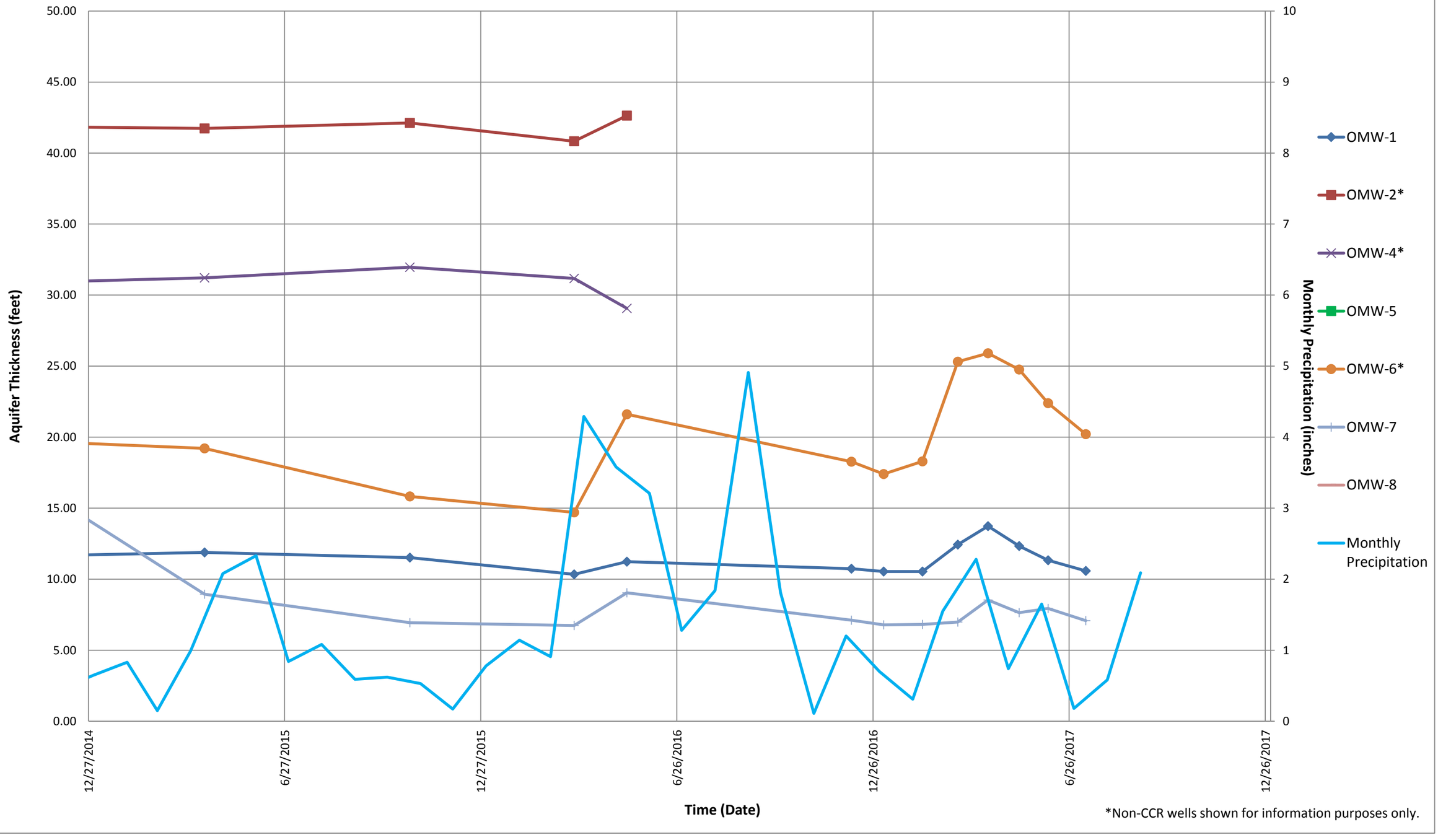
Appendix B: Tables/Results

Figure 1: Rosebud Power Plant Groundwater Elevation Readings and Annual Precipitation



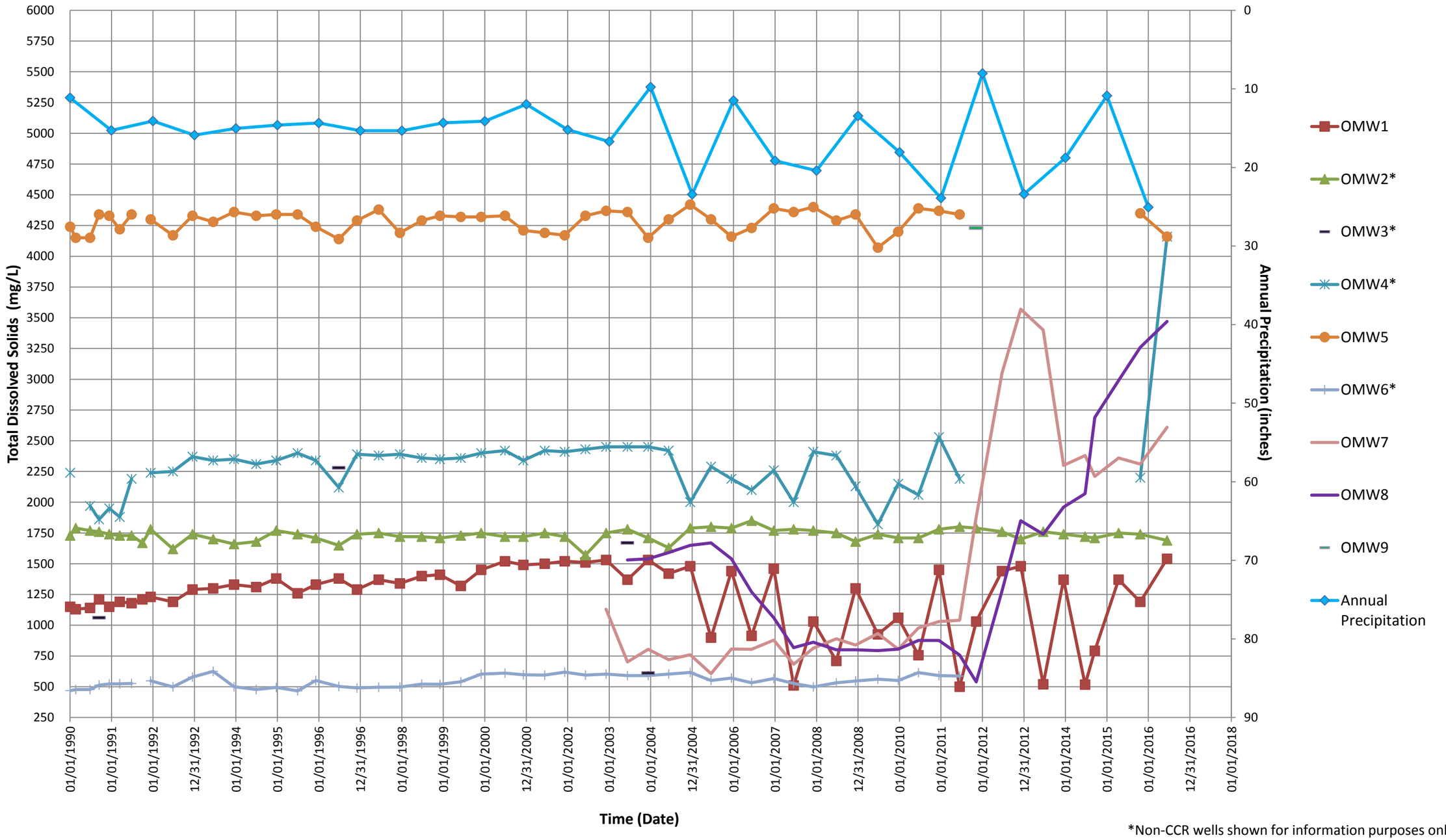
*Non-CCR wells shown for information purposes only.

Figure 2: Rosebud Power Plant Aquifer Thickness and Monthly Precipitation



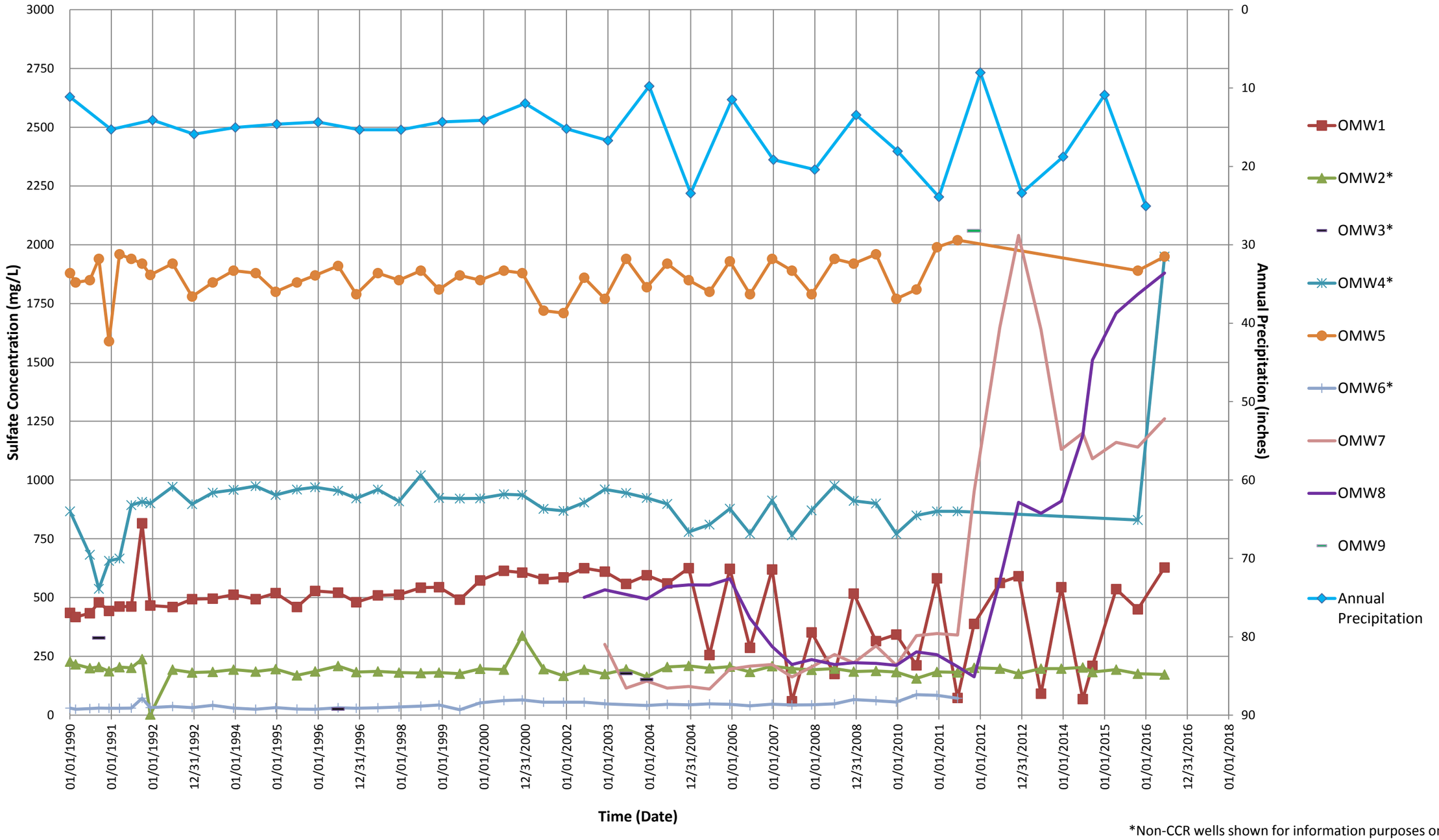
*Non-CCR wells shown for information purposes only.

Rosebud Groundwater Sampling Results - Total Dissolved Solids (TDS) + Annual Precipitation



*Non-CCR wells shown for information purposes only.

Rosebud Groundwater Sampling Results - Sulfate + Annual Precipitation



*Non-CCR wells shown for information purposes only.

PIONEER TECHNICAL SERVICES, INC.

September 13, 2016

Mr. Ron Orton
Allied Engineering Services, Inc.
32 Discovery Drive
Bozeman, MT 59718

RE: Job #15-125

Dear Mr. Orton,

On August 15, two samples were delivered to our Bozeman, MT laboratory. The samples were identified as B-1 (composite base) and SP-1 (composite stockpile). The samples were given Lab Nos. G16344 and G16345 respectively. The requested testing was performed in general accordance with the following Standards:

- Standard Proctor (ASTM D698); and
- Hydraulic Conductivity using a Flexible Wall Permeameter (ASTM D5084).

The hydraulic conductivity values are provided in Table 1. The proctor results and hydraulic conductivity sheets are attached with this report.

Table 1.

Lab No.	Sample Identification	Hydraulic Conductivity (cm/sec)
G16344	B-1 (composite base)	2.1×10^{-07}
G16345	SP-1 (composite stockpile)	4.5×10^{-08}

The hydraulic conductivity samples were screened over the ½" sieve and passing material was used to construct the specimen. At the request of Allied Engineering, the hydraulic conductivity samples were re-molded by compacting the specimens at optimum moisture to a dry unit weight equal to 95% of the uncorrected standard proctor value corrected for ½" minus material. Allied Engineering also requested a confining pressure of zero, but a minimum of 3 psi confining pressure was applied in order to perform the testing.

Please contact us at (406)388-8578 if you have any questions or require any additional information regarding this report.

Sincerely,
PIONEER TECHNICAL SERVICES, INC

Niki Griffis
Project Scientist/Laboratory Manager

HYDRAULIC CONDUCTIVITY FOR FLEXIBLE-WALLED TEST SAMPLES
FALLING HEAD APPARATUS, ASTM D5084

Client:	Allied Engineering						**Project:**	#15-125			
Sample Description:	G16344	B-1									
Test Specimen											
Dry Density (pcf):		102.1									
Standard Proctor (ASTM D698)		95%									
Specimen Length (cm):		15.24									
Specimen Diameter (cm):		7.112									
				Testing Equipment							
				Height Inlet Above Floor (cm):							
				Height Outlet Above Bench (cm):		21.9					
				Area of Standpipe (cm^2):		0.912					

Increment Number	Initial Reading Influent (cm^3)	Inital Reading Effluent (cm^3)	Final Reading Influent (cm^3)	Final Reading Effluent (cm^3)	Time Increment (min.)	Applied Pressure Differential (psi)	Initial Head (cm)	Final Head (cm)	Average Hydraulic Gradient (cm/cm)	Hydraulic Conductivity (cm/sec)	Hydraulic Conductivity at 20 C (cm/sec)
1	2.5	41.4	6.9	37.9	554	1.6	147.96	140.75	9.47	2.6E-07	2.4E-07
2	6.9	37.9	12.3	33	886	1.5	133.72	124.33	8.47	2.4E-07	2.3E-07
3	12.3	33	14.9	30.6	572	1.6	131.36	126.80	8.47	1.8E-07	1.7E-07
4	14.9	30.6	19.3	26.4	968	1.6	126.80	118.96	8.06	1.9E-07	1.9E-07

Average Hydraulic Conductivity of Last Four Test Increments = **2.1E-07** **cm/sec**

k = (aL/At) ln (h1/h2)

Water Content Before Test		Water Content After Test	
Tare #		Tare #	
Wet Soil + Tare (grams)	1136.00	Wet Soil + Tare (grams)	1332.30
Dry Soil + Tare (grams)	982.18	Dry Soil + Tare (grams)	1093.20
Tare Weight (grams)	0.00	Tare Weight (grams)	111.02
Water Content (%)	15.66	Water Content (%)	24.34
Source	Specimen	Source	Specimen

HYDRAULIC CONDUCTIVITY FOR FLEXIBLE-WALLED TEST SAMPLES
FALLING HEAD APPARATUS, ASTM D5084

Client:	Allied Engineering						**Project:**	#15-125			
Sample Description:	G16345	SP-1									
Test Specimen											
Dry Density (pcf):		97.1									
% Max ASTM (D698)		95%									
Specimen Length (cm):		15.24									
Specimen Diameter (cm):		7.112									
				Testing Equipment							
				Height Inlet Above Floor (cm):							
				Height Outlet Above Bench (cm):		21.9					
				Area of Standpipe (cm^2):		0.912					

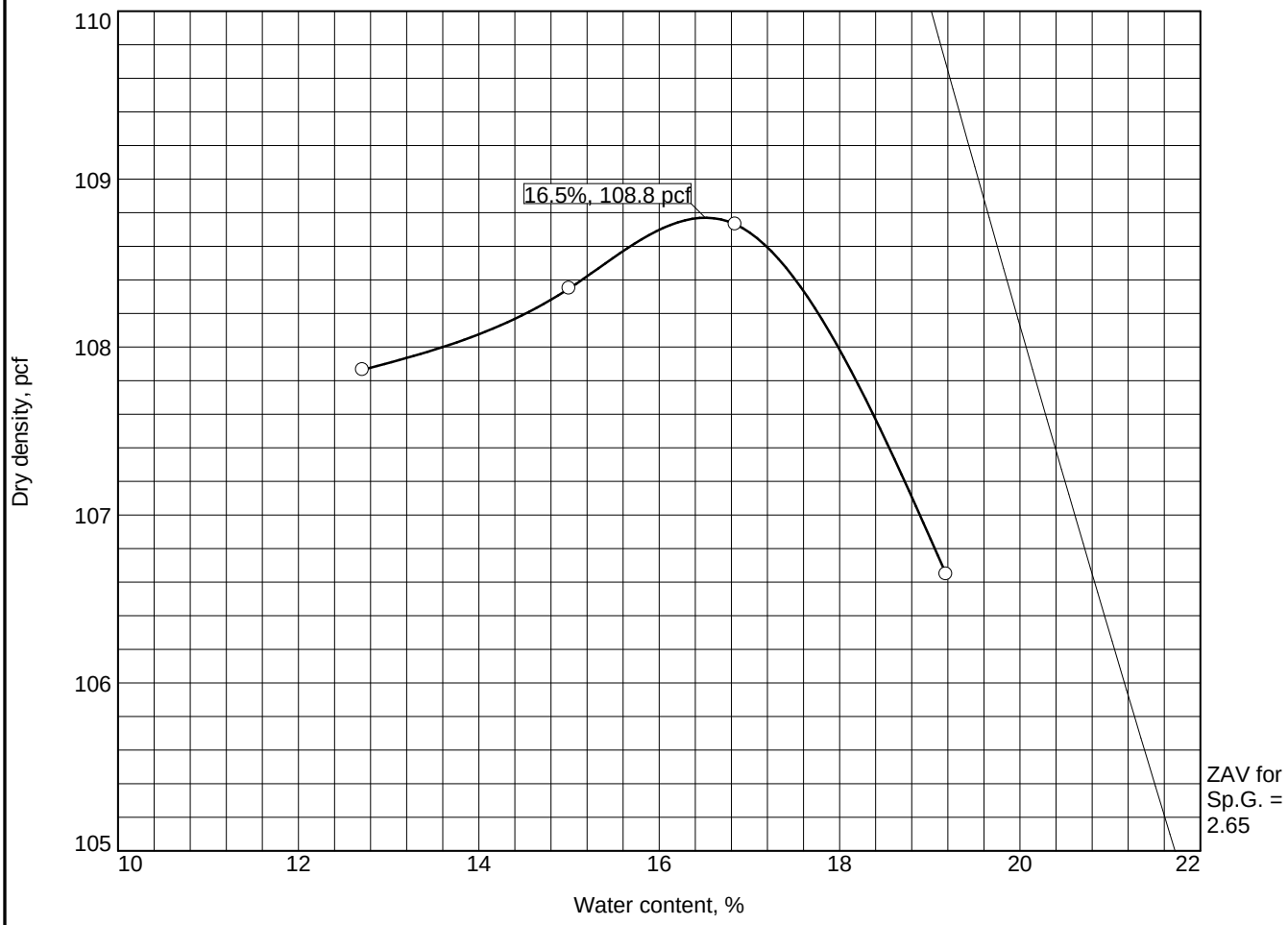
Increment Number	Initial Reading Influent (cm^3)	Inital Reading Effluent (cm^3)	Final Reading Influent (cm^3)	Final Reading Effluent (cm^3)	Time Increment (min.)	Applied Pressure Differential (psi)	Initial Head (cm)	Final Head (cm)	Average Hydraulic Gradient (cm/cm)	Hydraulic Conductivity (cm/sec)	Hydraulic Conductivity at 20 C (cm/sec)
1	1.9	43.2	5.4	42.6	547	2.0	178.27	174.53	11.57	1.1E-07	1.0E-07
2	5.4	42.6	7.1	41.8	888	1.1	111.26	108.98	7.23	6.8E-08	6.6E-08
3	7.1	41.8	11.9	41.1	512	2.3	193.34	188.32	12.52	1.5E-07	1.4E-07
4	15	39.2	16.6	38	949	2.2	176.73	174.18	11.51	4.5E-08	4.3E-08
5	16.6	38	17.4	37.5	476	2.2	174.18	172.99	11.39	4.2E-08	4.0E-08
6	18.1	37.4	19.3	36.6	506	2.3	179.29	177.47	11.70	5.9E-08	5.7E-08
7	19.3	36.6	20.7	35.5	914	2.3	177.47	175.19	11.57	4.1E-08	4.0E-08

Average Hydraulic Conductivity of Last Four Test Increments = **4.5E-08** **cm/sec**

k = (aL/At) ln (h1/h2)

Water Content Before Test		Water Content After Test	
Tare #		Tare #	
Wet Soil + Tare (grams)	1082.50	Wet Soil + Tare (grams)	1297.90
Dry Soil + Tare (grams)	921.68	Dry Soil + Tare (grams)	1033.10
Tare Weight (grams)	0.00	Tare Weight (grams)	111.42
Water Content (%)	17.45	Water Content (%)	28.73
Source	Specimen	Source	Specimen

COMPACTION TEST REPORT



Test specification: ASTM D 698-12 Method C Standard

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > 3/4 in.	% < No.200
	USCS	AASHTO						
							4.25	

TEST RESULTS	MATERIAL DESCRIPTION
Maximum dry density = 108.8 pcf Optimum moisture = 16.5 %	Clay with sand, CL (visual)

Project No. **Client:** Allied Engineering

Project: Job #15-125

○**Source of Sample:** B-1 **Sample Number:** G16344

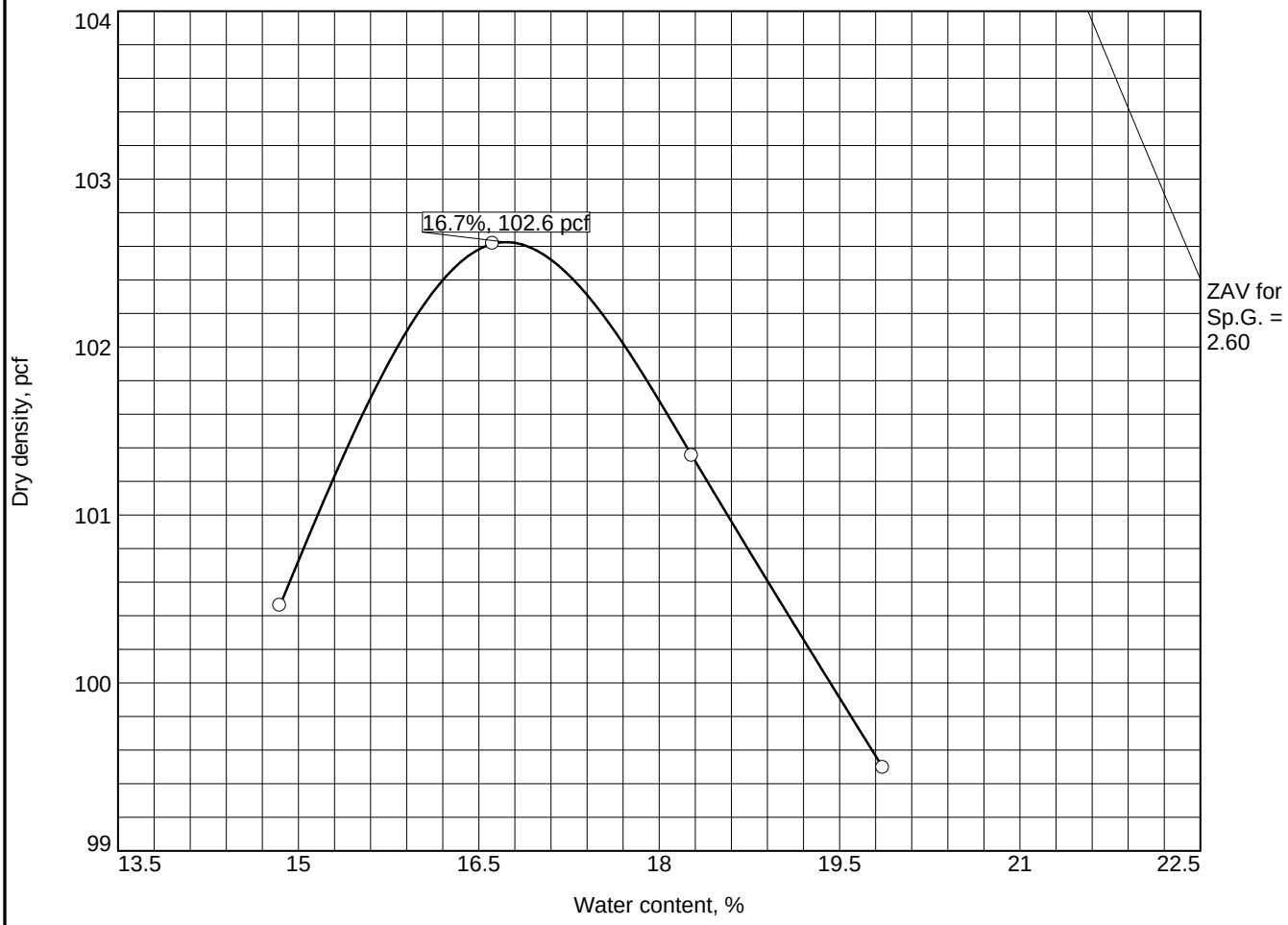
Remarks:

Pioneer Technical Services, Inc.
106 Pronghorn Trail, Suite A - Bozeman, MT 59718
Ph. 406-388-8578 - Fax 406-388-8579

Figure

Tested By: RG/SJ **Checked By:** NG

COMPACTION TEST REPORT



Test specification: ASTM D 698-12 Method C Standard

Elev/ Depth	Classification		Nat. Moist.	Sp.G.	LL	PI	% > 3/4 in.	% < No.200
	USCS	AASHTO						
							3.07	

TEST RESULTS	MATERIAL DESCRIPTION
Maximum dry density = 102.6 pcf Optimum moisture = 16.7 %	Sandy Clay w/ Gravel (visual)

Project No. **Client:** Allied Engineering

Project: Job #15-125

○**Source of Sample:** SP-1 **Sample Number:** G16345

Remarks:

Pioneer Technical Services, Inc.
106 Pronghorn Trail, Suite A - Bozeman, MT 59718
Ph. 406-388-8578 - Fax 406-388-8579

Figure

Tested By: SJ **Checked By:** NG

ANALYTICAL SUMMARY REPORT

November 24, 2015

Rosebud Power
PO Box 189
Colstrip, MT 59323

Work Order: B15102394 Quote ID: B3689 - Well Water, Wastewater

Project Name: Not Indicated

Energy Laboratories Inc Billings MT received the following 1 sample for Rosebud Power on 10/28/2015 for analysis.

Lab ID	Client Sample ID	Collect Date	Receive Date	Matrix	Test
B15102394-001	Phase II Ash Pit Water Sample	10/28/15 12:00	10/28/15	Aqueous	Metals by ICP/ICPMS, Dissolved Metals by ICP/ICPMS, Total Alkalinity Mineral Balance Review Cyanide, Total Manual Distillation Conductivity Fluoride Hardness as CaCO3 Anions by Ion Chromatography Nitrogen, Nitrate + Nitrite pH Metals Preparation by EPA 200.2 Preparation, Dissolved Filtration Preparation for TDS Radium 226, Total Radium 228, Total Solids, Total Dissolved

The analyses presented in this report were performed by Energy Laboratories, Inc., 1120 S 27th St., Billings, MT 59101, unless otherwise noted. Any exceptions or problems with the analyses are noted in the Laboratory Analytical Report, the QA/QC Summary Report, or the Case Narrative.

The results as reported relate only to the item(s) submitted for testing.

If you have any questions regarding these test results, please call.

Report Approved By:

CLIENT: Rosebud Power
Project: Not Indicated
Work Order: B15102394

Report Date: 11/24/15

CASE NARRATIVE

Tests associated with analyst identified as ELI-CA were subcontracted to Energy Laboratories, PO Box 247, Casper, WY, EPA Number WY00002 and WY00937.

LABORATORY ANALYTICAL REPORT

Prepared by Billings, MT Branch

Client: Rosebud Power
Project: Not Indicated
Lab ID: B15102394-001
Client Sample ID: Phase II Ash Pit Water Sample

Report Date: 11/24/15
Collection Date: 10/28/15 12:00
DateReceived: 10/28/15
Matrix: Aqueous

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
PHYSICAL PROPERTIES							
pH	6.2	s.u.	H	0.1		A4500-H B	11/09/15 09:41 / cnm
Conductivity @ 25 C	1890	umhos/cm		5		A2510 B	10/30/15 10:54 / cnm
Solids, Total Dissolved TDS @ 180 C	1950	mg/L	D	100		A2540 C	10/30/15 14:57 / rbf
INORGANICS							
Alkalinity, Total as CaCO3	185	mg/L		4		A2320 B	10/30/15 22:26 / ajr
Bicarbonate as HCO3	226	mg/L		4		A2320 B	10/30/15 22:26 / ajr
Carbonate as CO3	ND	mg/L		4		A2320 B	10/30/15 22:26 / ajr
Chloride	15	mg/L		1		E300.0	11/03/15 18:02 / ajr
Sulfate	711	mg/L	D	4		E300.0	11/03/15 18:02 / ajr
Cyanide, Total	ND	mg/L		0.005		Kelada-01	11/02/15 10:40 / jpv
Fluoride	0.3	mg/L		0.1		A4500-F C	11/03/15 17:25 / ajr
Hardness as CaCO3	208	mg/L		1		A2340 B	11/04/15 03:12 / klc
NUTRIENTS							
Nitrogen, Nitrate+Nitrite as N	ND	mg/L		0.01		E353.2	10/30/15 15:58 / bas
METALS, DISSOLVED							
Antimony	0.002	mg/L		0.001		E200.8	11/03/15 13:30 / mas
Arsenic	0.001	mg/L		0.001		E200.8	11/03/15 13:30 / mas
Barium	0.10	mg/L		0.05		E200.8	11/03/15 13:30 / mas
Beryllium	0.002	mg/L		0.001		E200.8	11/06/15 03:57 / amm
Boron	1.53	mg/L		0.05		E200.8	11/06/15 03:57 / amm
Cadmium	ND	mg/L		0.001		E200.8	11/03/15 13:30 / mas
Calcium	56	mg/L	D	4		E200.7	11/04/15 03:12 / jjw
Chromium	0.016	mg/L		0.005		E200.8	11/06/15 03:57 / amm
Cobalt	0.023	mg/L		0.005		E200.8	11/03/15 13:30 / mas
Copper	0.049	mg/L		0.005		E200.8	11/04/15 18:17 / amm
Iron	6.1	mg/L	D	0.1		E200.7	11/04/15 03:12 / jjw
Lead	0.017	mg/L		0.001		E200.8	11/03/15 13:30 / mas
Lithium	0.2	mg/L		0.1		E200.7	11/04/15 03:12 / jjw
Magnesium	17	mg/L		1		E200.7	11/04/15 03:12 / jjw
Mercury	0.0002	mg/L	D	0.0002		E200.8	11/03/15 13:30 / mas
Molybdenum	0.002	mg/L		0.001		E200.8	11/03/15 13:30 / mas
Nickel	0.079	mg/L		0.005		E200.8	11/06/15 03:57 / amm
Potassium	ND	mg/L	D	2		E200.7	11/04/15 03:12 / jjw
Selenium	ND	mg/L	D	0.003		E200.8	11/03/15 13:30 / mas
Silver	ND	mg/L		0.001		E200.8	11/03/15 13:30 / mas
Sodium	467	mg/L		1		E200.7	11/04/15 03:12 / jjw
Strontium	1.12	mg/L		0.01		E200.8	11/03/15 13:30 / mas
Thallium	ND	mg/L		0.0005		E200.8	11/03/15 13:30 / mas
Titanium	0.587	mg/L		0.005		E200.8	11/06/15 03:57 / amm
Zinc	0.18	mg/L		0.01		E200.8	11/03/15 13:30 / mas

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
D - RL increased due to sample matrix.
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.
H - Analysis performed past recommended holding time.

LABORATORY ANALYTICAL REPORT

Prepared by Billings, MT Branch

Client: Rosebud Power
Project: Not Indicated
Lab ID: B15102394-001
Client Sample ID: Phase II Ash Pit Water Sample

Report Date: 11/24/15
Collection Date: 10/28/15 12:00
DateReceived: 10/28/15
Matrix: Aqueous

Analyses	Result	Units	Qualifiers	RL	MCL/ QCL	Method	Analysis Date / By
METALS, TOTAL							
Aluminum	54.8	mg/L	D	0.1		E200.7	11/03/15 02:39 / jjw
Silica	277	mg/L	D	0.9		E200.7	11/03/15 02:39 / jjw
Silicon	129	mg/L	D	0.4		E200.7	11/03/15 02:39 / jjw
RADIONUCLIDES - TOTAL							
Radium 226	0.96	pCi/L				E903.0	11/23/15 08:15 / eli-ca
Radium 226 precision (±)	0.28	pCi/L				E903.0	11/23/15 08:15 / eli-ca
Radium 226 MDC	0.23	pCi/L				E903.0	11/23/15 08:15 / eli-ca
Radium 228	3.1	pCi/L				RA-05	11/17/15 10:46 / eli-ca
Radium 228 precision (±)	1.1	pCi/L				RA-05	11/17/15 10:46 / eli-ca
Radium 228 MDC	1.6	pCi/L				RA-05	11/17/15 10:46 / eli-ca

Report Definitions:
RL - Analyte reporting limit.
QCL - Quality control limit.
MDC - Minimum detectable concentration
MCL - Maximum contaminant level.
ND - Not detected at the reporting limit.
D - RL increased due to sample matrix.

QA/QC Summary Report

Prepared by Billings, MT Branch

Client: Rosebud Power
Project: Not Indicated

Report Date: 11/06/15
Work Order: B15102394

Analyte	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: A2510 B									Batch: R251727
Lab ID: SC 2nd 1413	Laboratory Control Sample				Run: PHSC _101-B_151030A				10/30/15 08:45
Conductivity @ 25 C	1370	umhos/cm	5.0	97	90	110			
Lab ID: MBLK	Method Blank				Run: PHSC _101-B_151030A				10/30/15 10:48
Conductivity @ 25 C	2	umhos/cm	1						
Lab ID: B15102400-001ADUP	Sample Duplicate				Run: PHSC _101-B_151030A				10/30/15 10:59
Conductivity @ 25 C	710	umhos/cm	5.0				0.6	10	
Lab ID: B15102408-005ADUP	Sample Duplicate				Run: PHSC _101-B_151030A				10/30/15 11:17
Conductivity @ 25 C	496	umhos/cm	5.0				0.0	10	

Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.

QA/QC Summary Report

Prepared by Billings, MT Branch

Client: Rosebud Power
Project: Not Indicated

Report Date: 11/06/15
Work Order: B15102394

Analyte		Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method:	**A4500-F C**								Analytical Run: MAN-TECH_151103A	
Lab ID:	**ICV**	Initial Calibration Verification Standard							11/03/15 12:12	
Fluoride		1.01	mg/L	0.10	101	90	110			
Method:	**A4500-F C**								Batch: R251930	
Lab ID:	**MBLK**	Method Blank				Run: MAN-TECH_151103A			11/03/15 12:07	
Fluoride		ND	mg/L	0.01						
Lab ID:	**LFB**	Laboratory Fortified Blank				Run: MAN-TECH_151103A			11/03/15 12:10	
Fluoride		0.940	mg/L	0.10	94	90	110			
Lab ID:	**B15102407-001AMS**	Sample Matrix Spike				Run: MAN-TECH_151103A			11/03/15 17:38	
Fluoride		1.70	mg/L	0.10	110	80	120			
Lab ID:	**B15102407-001AMSD**	Sample Matrix Spike Duplicate				Run: MAN-TECH_151103A			11/03/15 17:41	
Fluoride		1.74	mg/L	0.10	114	80	120	2.3	10	

Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.

QA/QC Summary Report

Prepared by Billings, MT Branch

Client: Rosebud Power
Project: Not Indicated

Report Date: 11/06/15
Work Order: B15102394

Analyte	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: **A4500-H B**								Analytical Run: PHSC _101-B_151030A	
Lab ID: **pH 8**	Initial Calibration Verification Standard							10/30/15 08:34	
pH	7.91	s.u.	0.10	99	98	102			
Method: **A4500-H B**								Batch: R251727	
Lab ID: **B15102400-001ADUP**	Sample Duplicate				Run: PHSC _101-B_151030A			10/30/15 10:59	
pH	7.81	s.u.	0.10				0.5	3	
Lab ID: **B15102408-005ADUP**	Sample Duplicate				Run: PHSC _101-B_151030A			10/30/15 11:17	
pH	6.97	s.u.	0.10				0.3	3	

Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.

QA/QC Summary Report

Prepared by Billings, MT Branch

Client: Rosebud Power
Project: Not Indicated

Report Date: 11/06/15
Work Order: B15102394

Analyte	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E353.2									Analytical Run: FIA203-B_151030C
Lab ID: ICV	Initial Calibration Verification Standard								10/30/15 14:48
Nitrogen, Nitrate+Nitrite as N	0.601	mg/L	0.010	106	90	110			
Method: E353.2									Batch: R251780
Lab ID: MBLK	Method Blank				Run: FIA203-B_151030C				10/30/15 14:50
Nitrogen, Nitrate+Nitrite as N	ND	mg/L	0.005						
Lab ID: LFB	Laboratory Fortified Blank				Run: FIA203-B_151030C				10/30/15 14:51
Nitrogen, Nitrate+Nitrite as N	0.972	mg/L	0.010	97	90	110			
Lab ID: B15102344-001DMS	Sample Matrix Spike				Run: FIA203-B_151030C				10/30/15 15:48
Nitrogen, Nitrate+Nitrite as N	1.23	mg/L	0.010	101	90	110			
Lab ID: B15102344-001DMSD	Sample Matrix Spike Duplicate				Run: FIA203-B_151030C				10/30/15 15:49
Nitrogen, Nitrate+Nitrite as N	1.23	mg/L	0.010	102	90	110	0.1	10	
Lab ID: B15102405-003AMS	Sample Matrix Spike				Run: FIA203-B_151030C				10/30/15 16:05
Nitrogen, Nitrate+Nitrite as N	4.41	mg/L	0.010	81	90	110			S
Lab ID: B15102405-003AMSD	Sample Matrix Spike Duplicate				Run: FIA203-B_151030C				10/30/15 16:06
Nitrogen, Nitrate+Nitrite as N	4.42	mg/L	0.010	82	90	110	0.3	10	S

Qualifiers:

RL - Analyte reporting limit.
ND - Not detected at the reporting limit.
S - Spike recovery outside of advisory limits.

QA/QC Summary Report

Prepared by Billings, MT Branch

Client: Rosebud Power
Project: Not Indicated

Report Date: 11/06/15
Work Order: B15102394

Analyte	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: **Kelada-01**								Analytical Run: SFA-201-B_151102A	
Lab ID: **ICV**	Initial Calibration Verification Standard							11/02/15 10:13	
Cyanide, Total	0.103	mg/L	0.0050	103	90	110			
Method: **Kelada-01**								Batch: R251845	
Lab ID: **ICB**	Method Blank				Run: SFA-201-B_151102A			11/02/15 10:16	
Cyanide, Total	ND	mg/L	0.002						
Lab ID: **LFB**	Laboratory Fortified Blank				Run: SFA-201-B_151102A			11/02/15 10:19	
Cyanide, Total	0.108	mg/L	0.0050	108	90	110			
Lab ID: **LCS1-K4Fe(CN)6**	Laboratory Control Sample				Run: SFA-201-B_151102A			11/02/15 10:21	
Cyanide, Total	0.217	mg/L	0.0050	109	90	110			
Lab ID: **B15102383-001BMS**	Sample Matrix Spike				Run: SFA-201-B_151102A			11/02/15 12:44	
Cyanide, Total	0.110	mg/L	0.0050	110	90	110			
Lab ID: **B15102383-001BMSD**	Sample Matrix Spike Duplicate				Run: SFA-201-B_151102A			11/02/15 12:47	
Cyanide, Total	0.110	mg/L	0.0050	110	90	110	0.1	20	
Lab ID: **B15110011-006EMS**	Sample Matrix Spike				Run: SFA-201-B_151102A			11/02/15 14:21	
Cyanide, Total	0.101	mg/L	0.0050	101	90	110			
Lab ID: **B15110011-006EMSD**	Sample Matrix Spike Duplicate				Run: SFA-201-B_151102A			11/02/15 14:24	
Cyanide, Total	0.104	mg/L	0.0050	104	90	110			

Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.

QA/QC Summary Report

Prepared by Billings, MT Branch

Client: Rosebud Power
Report Date: 11/24/15
Project: Not Indicated
Work Order: B15102394

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: A2320 B										Batch: R251793
Lab ID: MBLK		Method Blank				Run: MAN-TECH_151030B				10/30/15 22:14
Alkalinity, Total as CaCO3		1	mg/L	1.0						
Lab ID: LCS		Laboratory Control Sample				Run: MAN-TECH_151030B				10/30/15 22:21
Alkalinity, Total as CaCO3		98.8	mg/L	4.0	98	90	110			
Lab ID: B15102407-001AMS		Sample Matrix Spike				Run: MAN-TECH_151030B				10/30/15 22:41
Alkalinity, Total as CaCO3		312	mg/L	4.0	91	80	120			
Lab ID: B15102434-001ADUP	3	Sample Duplicate				Run: MAN-TECH_151030B				10/30/15 22:54
Alkalinity, Total as CaCO3		227	mg/L	4.0				1.8	10	
Bicarbonate as HCO3		277	mg/L	4.0				1.8	10	
Carbonate as CO3		ND	mg/L	4.0					10	
Lab ID: B15102437-006ADUP	3	Sample Duplicate				Run: MAN-TECH_151030B				10/30/15 23:52
Alkalinity, Total as CaCO3		56.6	mg/L	4.0				2.3	10	
Bicarbonate as HCO3		69.0	mg/L	4.0				2.3	10	
Carbonate as CO3		ND	mg/L	4.0					10	

Qualifiers:

RL - Analyte reporting limit.
MDC - Minimum detectable concentration
ND - Not detected at the reporting limit.

QA/QC Summary Report

Prepared by Billings, MT Branch

Client: Rosebud Power
Report Date: 11/24/15
Project: Not Indicated
Work Order: B15102394

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: A2540 C										Batch: 94486
Lab ID: MB-94486		Method Blank				Run: BAL #SD-15_151030B				10/30/15 14:52
Solids, Total Dissolved TDS @ 180 C		ND	mg/L	10						
Lab ID: LCS-94486		Laboratory Control Sample				Run: BAL #SD-15_151030B				10/30/15 14:52
Solids, Total Dissolved TDS @ 180 C		1020	mg/L	10	106	90	110			
Lab ID: B15102048-001A DUP		Sample Duplicate				Run: BAL #SD-15_151030B				10/30/15 14:54
Solids, Total Dissolved TDS @ 180 C		76.1	mg/L	10				1.6	5	
Lab ID: B15102252-011A DUP		Sample Duplicate				Run: BAL #SD-15_151030B				10/30/15 14:56
Solids, Total Dissolved TDS @ 180 C		1850	mg/L	42				0.9	5	

Qualifiers:

RL - Analyte reporting limit.
MDC - Minimum detectable concentration
ND - Not detected at the reporting limit.

QA/QC Summary Report

Prepared by Billings, MT Branch

Client: Rosebud Power **Report Date:** 11/24/15

Project: Not Indicated **Work Order:** B15102394

Analyte		Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method:	**E300.0**									Analytical Run: IC METROHM 2_151103A	
Lab ID:	**ICV**	2	Initial Calibration Verification Standard							11/03/15 16:28	
Chloride			2.12	mg/L	1.0	94	90	110			
Sulfate			8.65	mg/L	1.0	96	90	110			
Method:	**E300.0**									Batch: R251955	
Lab ID:	**MB**	2	Method Blank				Run: IC METROHM 2_151103A			11/03/15 16:14	
Chloride			ND	mg/L	0.02						
Sulfate			ND	mg/L	0.2						
Lab ID:	**LFB**	2	Laboratory Fortified Blank				Run: IC METROHM 2_151103A			11/03/15 16:41	
Chloride			2.93	mg/L	1.0	98	90	110			
Sulfate			8.84	mg/L	1.0	98	90	110			
Lab ID:	**B15102239-001AMS**	2	Sample Matrix Spike				Run: IC METROHM 2_151103A			11/03/15 17:22	
Chloride			16.0	mg/L	1.0	99	90	110			
Sulfate			53.7	mg/L	1.0	100	90	110			
Lab ID:	**B15102239-001AMSD**	2	Sample Matrix Spike Duplicate				Run: IC METROHM 2_151103A			11/03/15 17:35	
Chloride			16.1	mg/L	1.0	100	90	110	0.8	20	
Sulfate			54.2	mg/L	1.0	101	90	110	1.0	20	

Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.

MDC - Minimum detectable concentration

QA/QC Summary Report

Prepared by Billings, MT Branch

Client: Rosebud Power **Report Date:** 11/09/15

Project: Not Indicated **Work Order:** B15102394

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E200.7										Analytical Run: ICP203-B_151102A
Lab ID: ICV	3	Continuing Calibration Verification Standard								11/02/15 11:45
Aluminum		2.49	mg/L	0.10	100	95	105			
Silicon		5.04	mg/L	0.10	101	95	105			
Silica		10.8	mg/L	0.21	101	95	105			
Method: E200.7										Batch: 94461
Lab ID: MB-94461	3	Method Blank				Run: ICP203-B_151102A				11/03/15 02:13
Aluminum		0.010	mg/L	0.006						
Silicon		ND	mg/L	0.02						
Silica		ND	mg/L	0.04						
Lab ID: LCS-94461	3	Laboratory Control Sample				Run: ICP203-B_151102A				11/03/15 02:17
Aluminum		2.65	mg/L	0.10	106	85	115			
Silicon		5.63	mg/L	0.10	113	85	115			
Silica		12.0	mg/L	0.21	113	85	115			
Lab ID: B15102390-006AMS3	3	Sample Matrix Spike				Run: ICP203-B_151102A				11/03/15 02:31
Aluminum		2.76	mg/L	0.030	100	70	130			
Silicon		20.2	mg/L	0.10	100	70	130			
Silica		43.2	mg/L	0.21	100	70	130			
Lab ID: B15102390-006AMSD	3	Sample Matrix Spike Duplicate				Run: ICP203-B_151102A				11/03/15 02:35
Aluminum		2.76	mg/L	0.030	100	70	130	0.1	20	
Silicon		19.9	mg/L	0.10	95	70	130	1.3	20	
Silica		42.6	mg/L	0.21	95	70	130	1.3	20	

Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.

QA/QC Summary Report

Prepared by Billings, MT Branch

Client: Rosebud Power **Report Date:** 11/09/15

Project: Not Indicated **Work Order:** B15102394

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: **E200.7**									Analytical Run: ICP203-B_151103A	
Lab ID: **ICV**	6	Continuing Calibration Verification Standard							11/03/15 13:46	
Calcium		24.5	mg/L	1.0	98	95	105			
Iron		2.48	mg/L	0.020	99	95	105			
Lithium		1.32	mg/L	0.10	105	95	105			
Magnesium		25.4	mg/L	1.0	101	95	105			
Potassium		25.5	mg/L	1.0	102	95	105			
Sodium		25.5	mg/L	1.0	102	95	105			
Method: **E200.7**									Batch: R251908	
Lab ID: **MB-6500DIS151103A**	6	Method Blank				Run: ICP203-B_151103A			11/03/15 15:07	
Calcium		ND	mg/L	0.08						
Iron		ND	mg/L	0.003						
Lithium		ND	mg/L	0.001						
Magnesium		ND	mg/L	0.006						
Potassium		ND	mg/L	0.04						
Sodium		ND	mg/L	0.01						
Lab ID: **LFB-6500DIS151103A**	6	Laboratory Fortified Blank				Run: ICP203-B_151103A			11/03/15 15:11	
Calcium		48.9	mg/L	1.0	98	85	115			
Iron		4.97	mg/L	0.020	99	85	115			
Lithium		1.03	mg/L	0.10	103	85	115			
Magnesium		50.4	mg/L	1.0	101	85	115			
Potassium		50.0	mg/L	1.0	100	85	115			
Sodium		50.4	mg/L	1.0	101	85	115			
Lab ID: **MB-94510**	6	Method Blank				Run: ICP203-B_151103A			11/04/15 03:08	
Calcium		ND	mg/L	0.08						
Iron		ND	mg/L	0.003						
Lithium		0.002	mg/L	0.001						
Magnesium		ND	mg/L	0.006						
Potassium		0.1	mg/L	0.04						
Sodium		0.04	mg/L	0.01						
Lab ID: **B15102394-001BMS2**	6	Sample Matrix Spike				Run: ICP203-B_151103A			11/04/15 03:15	
Calcium		2710	mg/L	4.3	106	70	130			
Iron		275	mg/L	0.13	108	70	130			
Lithium		52.3	mg/L	0.10	104	70	130			
Magnesium		2670	mg/L	1.6	106	70	130			
Potassium		2650	mg/L	2.2	106	70	130			
Sodium		3120	mg/L	13	106	70	130			
Lab ID: **B15102394-001BMSD**	6	Sample Matrix Spike Duplicate				Run: ICP203-B_151103A			11/04/15 03:19	
Calcium		2700	mg/L	4.3	106	70	130	0.4	20	
Iron		271	mg/L	0.13	106	70	130	1.7	20	
Lithium		50.4	mg/L	0.10	100	70	130	3.7	20	
Magnesium		2610	mg/L	1.6	104	70	130	2.3	20	

Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.

QA/QC Summary Report

Prepared by Billings, MT Branch

Client: Rosebud Power
Report Date: 11/09/15
Project: Not Indicated
Work Order: B15102394

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: **E200.7**										Batch: R251908
Lab ID: **B15102394-001BMSD**	6	Sample Matrix Spike Duplicate				Run: ICP203-B_151103A				11/04/15 03:19
Potassium		2570	mg/L	2.2	103	70	130	2.8	20	
Sodium		3040	mg/L	13	103	70	130	2.8	20	

Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.

QA/QC Summary Report

Prepared by Billings, MT Branch

Client: Rosebud Power **Report Date:** 11/09/15

Project: Not Indicated **Work Order:** B15102394

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E200.8									Analytical Run: ICPMS202-B_151103A	
Lab ID: QCS	13	Initial Calibration Verification Standard							11/03/15 13:16	
Antimony		0.0478	mg/L	0.050	96	90	110			
Arsenic		0.0504	mg/L	0.0050	101	90	110			
Barium		0.0491	mg/L	0.10	98	90	110			
Cadmium		0.0250	mg/L	0.0010	100	90	110			
Cobalt		0.0509	mg/L	0.010	102	90	110			
Lead		0.0497	mg/L	0.010	99	90	110			
Mercury		0.00207	mg/L	0.0010	103	90	110			
Molybdenum		0.0481	mg/L	0.0050	96	90	110			
Selenium		0.0499	mg/L	0.0050	100	90	110			
Silver		0.0245	mg/L	0.0050	98	90	110			
Strontium		0.0512	mg/L	0.10	102	90	110			
Thallium		0.0503	mg/L	0.10	101	90	110			
Zinc		0.0515	mg/L	0.010	103	90	110			
Method: E200.8									Batch: R251901	
Lab ID: LRB	13	Method Blank				Run: ICPMS202-B_151103A			11/03/15 10:28	
Antimony		8E-05	mg/L	1E-05						
Arsenic		ND	mg/L	0.0001						
Barium		ND	mg/L	0.0001						
Cadmium		1E-05	mg/L	1E-05						
Cobalt		0.0001	mg/L	3E-05						
Lead		ND	mg/L	2E-05						
Mercury		ND	mg/L	2E-05						
Molybdenum		ND	mg/L	8E-05						
Selenium		ND	mg/L	0.0003						
Silver		4E-05	mg/L	2E-05						
Strontium		ND	mg/L	1E-05						
Thallium		ND	mg/L	1E-05						
Zinc		ND	mg/L	0.0002						
Lab ID: MB-94510	13	Method Blank				Run: ICPMS202-B_151103A			11/03/15 13:27	
Antimony		0.0002	mg/L	1E-05						
Arsenic		ND	mg/L	0.0001						
Barium		0.0002	mg/L	0.0001						
Cadmium		0.0001	mg/L	1E-05						
Cobalt		0.0001	mg/L	3E-05						
Lead		0.0002	mg/L	2E-05						
Mercury		ND	mg/L	2E-05						
Molybdenum		0.0002	mg/L	8E-05						
Selenium		ND	mg/L	0.0003						
Silver		6E-05	mg/L	2E-05						
Strontium		0.0004	mg/L	1E-05						
Thallium		3E-05	mg/L	1E-05						
Zinc		0.004	mg/L	0.0002						

Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.

QA/QC Summary Report

Prepared by Billings, MT Branch

Client: Rosebud Power **Report Date:** 11/09/15

Project: Not Indicated **Work Order:** B15102394

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E200.8									Batch: R251901	
Lab ID: B15102394-001BMS	13	Sample Matrix Spike				Run: ICPMS202-B_151103A			11/03/15 13:32	
Antimony		0.498	mg/L	0.0010	99	70	130			
Arsenic		0.505	mg/L	0.0012	101	70	130			
Barium		0.613	mg/L	0.050	102	70	130			
Cadmium		0.521	mg/L	0.0010	104	70	130			
Cobalt		0.574	mg/L	0.0050	110	70	130			
Lead		0.594	mg/L	0.0010	115	70	130			
Mercury		0.0114	mg/L	0.00017	112	70	130			
Molybdenum		0.541	mg/L	0.0010	108	70	130			
Selenium		0.490	mg/L	0.0031	98	70	130			
Silver		0.114	mg/L	0.0010	57	70	130			S
Strontium		1.55	mg/L	0.010	86	70	130			
Thallium		0.534	mg/L	0.00050	107	70	130			
Zinc		1.48	mg/L	0.010	261	70	130			S
Lab ID: B15102394-001BMSD	13	Sample Matrix Spike Duplicate				Run: ICPMS202-B_151103A			11/03/15 13:35	
Antimony		0.508	mg/L	0.0010	101	70	130	2.0	20	
Arsenic		0.508	mg/L	0.0012	101	70	130	0.6	20	
Barium		0.613	mg/L	0.050	102	70	130	0.1	20	
Cadmium		0.522	mg/L	0.0010	104	70	130	0.2	20	
Cobalt		0.571	mg/L	0.0050	110	70	130	0.5	20	
Lead		0.527	mg/L	0.0010	102	70	130	12	20	
Mercury		0.0116	mg/L	0.00017	114	70	130	1.5	20	
Molybdenum		0.542	mg/L	0.0010	108	70	130	0.2	20	
Selenium		0.490	mg/L	0.0031	98	70	130	0.0	20	
Silver		0.131	mg/L	0.0010	66	70	130	14	20	S
Strontium		1.59	mg/L	0.010	94	70	130	2.4	20	
Thallium		0.509	mg/L	0.00050	102	70	130	4.8	20	
Zinc		0.708	mg/L	0.010	107	70	130	70	20	R
Lab ID: LFB	13	Laboratory Fortified Blank				Run: ICPMS202-B_151103A			11/03/15 14:45	
Antimony		0.0446	mg/L	0.050	89	85	115			
Arsenic		0.0469	mg/L	0.0050	94	85	115			
Barium		0.0472	mg/L	0.10	95	85	115			
Cadmium		0.0479	mg/L	0.0010	96	85	115			
Cobalt		0.0481	mg/L	0.010	96	85	115			
Lead		0.0467	mg/L	0.010	93	85	115			
Mercury		0.000924	mg/L	0.0010	92	85	115			
Molybdenum		0.0456	mg/L	0.0050	91	85	115			
Selenium		0.0489	mg/L	0.0050	98	85	115			
Silver		0.0186	mg/L	0.0050	93	85	115			
Strontium		0.0488	mg/L	0.10	98	85	115			
Thallium		0.0469	mg/L	0.10	94	85	115			
Zinc		0.0488	mg/L	0.010	98	85	115			

Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.

R - RPD exceeds advisory limit.

S - Spike recovery outside of advisory limits.

QA/QC Summary Report

Prepared by Billings, MT Branch

Client: Rosebud Power **Report Date:** 11/09/15

Project: Not Indicated **Work Order:** B15102394

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: **E200.8**									Analytical Run: ICPMS202-B_151104C	
Lab ID: **QCS**		Initial Calibration Verification Standard							11/04/15 16:44	
Copper		0.0486	mg/L	0.010	97	90	110			
Method: **E200.8**									Batch: R251994	
Lab ID: **LRB**		Method Blank				Run: ICPMS202-B_151104C			11/04/15 16:55	
Copper		ND	mg/L	9E-05						
Lab ID: **LFB**		Laboratory Fortified Blank				Run: ICPMS202-B_151104C			11/04/15 16:58	
Copper		0.0494	mg/L	0.010	99	85	115			
Lab ID: **B15110196-001BMS**		Sample Matrix Spike				Run: ICPMS202-B_151104C			11/04/15 17:25	
Copper		0.0475	mg/L	0.0050	91	70	130			
Lab ID: **B15110196-001BMSD**		Sample Matrix Spike Duplicate				Run: ICPMS202-B_151104C			11/04/15 17:35	
Copper		0.0476	mg/L	0.0050	91	70	130	0.2	20	
Lab ID: **MB-94510**		Method Blank				Run: ICPMS202-B_151104C			11/04/15 18:12	
Copper		ND	mg/L	9E-05						

Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.

QA/QC Summary Report

Prepared by Billings, MT Branch

Client: Rosebud Power **Report Date:** 11/09/15

Project: Not Indicated **Work Order:** B15102394

Analyte	Count	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: **E200.8**									Analytical Run: ICPMS206-B_151105A	
Lab ID: **QCS**	5	Initial Calibration Verification Standard							11/05/15 17:05	
Beryllium		0.0249	mg/L	0.0010	99	90	110			
Boron		0.0496	mg/L	0.10	99	90	110			
Chromium		0.0497	mg/L	0.010	99	90	110			
Nickel		0.0512	mg/L	0.010	102	90	110			
Titanium		0.0473	mg/L	0.010	95	90	110			
Method: **E200.8**									Batch: R252039	
Lab ID: **LRB**	5	Method Blank				Run: ICPMS206-B_151105A			11/05/15 12:14	
Beryllium		ND	mg/L	1E-05						
Boron		ND	mg/L	0.0005						
Chromium		ND	mg/L	4E-05						
Nickel		ND	mg/L	6E-05						
Titanium		ND	mg/L	0.0001						
Lab ID: **LFB**	5	Laboratory Fortified Blank				Run: ICPMS206-B_151105A			11/05/15 12:18	
Beryllium		0.0450	mg/L	0.0010	90	85	115			
Boron		0.0441	mg/L	0.10	88	85	115			
Chromium		0.0463	mg/L	0.010	93	85	115			
Nickel		0.0450	mg/L	0.010	90	85	115			
Titanium		0.0520	mg/L	0.010	104	85	115			
Lab ID: **B15110244-002BMS**	5	Sample Matrix Spike				Run: ICPMS206-B_151105A			11/06/15 03:23	
Beryllium		0.0461	mg/L	0.0010	92	70	130			
Boron		0.146	mg/L	0.050	80	70	130			
Chromium		0.0480	mg/L	0.0050	95	70	130			
Nickel		0.0469	mg/L	0.0050	94	70	130			
Titanium		0.0540	mg/L	0.0050	105	70	130			
Lab ID: **B15110244-002BMSD**	5	Sample Matrix Spike Duplicate				Run: ICPMS206-B_151105A			11/06/15 03:42	
Beryllium		0.0451	mg/L	0.0010	90	70	130	2.2	20	
Boron		0.146	mg/L	0.050	80	70	130	0.3	20	
Chromium		0.0468	mg/L	0.0050	92	70	130	2.5	20	
Nickel		0.0452	mg/L	0.0050	90	70	130	3.8	20	
Titanium		0.0526	mg/L	0.0050	102	70	130	2.6	20	
Lab ID: **MB-94510**	5	Method Blank				Run: ICPMS206-B_151105A			11/06/15 03:52	
Beryllium		ND	mg/L	1E-05						
Boron		0.008	mg/L	0.0005						
Chromium		ND	mg/L	4E-05						
Nickel		ND	mg/L	6E-05						
Titanium		ND	mg/L	0.0001						

Qualifiers:

RL - Analyte reporting limit.

ND - Not detected at the reporting limit.

QA/QC Summary Report

Prepared by Casper, WY Branch

Client: Rosebud Power
Project: Not Indicated

Report Date: 11/23/15
Work Order: B15102394

Analyte	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: E903.0									Batch: RA226-7897
Lab ID: LCS-RA226-7897	Laboratory Control Sample				Run: BERTHOLD 770-1_151110A				11/23/15 08:15
Radium 226	9.6	pCi/L		94	80	120			
Lab ID: MB-RA226-7897	Method Blank				Run: BERTHOLD 770-1_151110A				11/23/15 08:15
Radium 226	-0.02	pCi/L							U
Radium 226 precision (±)	0.09	pCi/L							
Radium 226 MDC	0.2	pCi/L							
Lab ID: C15110165-002FMS	Sample Matrix Spike				Run: BERTHOLD 770-1_151110A				11/23/15 09:51
Radium 226	19	pCi/L		84	70	130			
Lab ID: C15110165-002FMSD	Sample Matrix Spike Duplicate				Run: BERTHOLD 770-1_151110A				11/23/15 09:51
Radium 226	21	pCi/L		93	70	130	9.5	49.2	

Qualifiers:

RL - Analyte reporting limit.
MDC - Minimum detectable concentration
ND - Not detected at the reporting limit.
U - Not detected at minimum detectable concentration

QA/QC Summary Report

Prepared by Casper, WY Branch

Client: Rosebud Power
Project: Not Indicated

Report Date: 11/23/15
Work Order: B15102394

Analyte	Result	Units	RL	%REC	Low Limit	High Limit	RPD	RPDLimit	Qual
Method: RA-05									Batch: RA228-5082
Lab ID: LCS-228-RA226-7897	Laboratory Control Sample				Run: TENNELEC-3_151110A				11/17/15 10:46
Radium 228	8.8	pCi/L		86	80	120			
Lab ID: MB-RA226-7897	Method Blank				Run: TENNELEC-3_151110A				11/17/15 10:46
Radium 228	2	pCi/L							
Radium 228 precision (±)	0.8	pCi/L							
Radium 228 MDC	1	pCi/L							
Lab ID: C15110165-004FMS	Sample Matrix Spike				Run: TENNELEC-3_151110A				11/17/15 10:46
Radium 228	14.3	pCi/L		86	70	130			
Lab ID: C15110165-004FMSD	Sample Matrix Spike Duplicate				Run: TENNELEC-3_151110A				11/17/15 10:46
Radium 228	15.7	pCi/L		96	70	130	9.4	51	

Qualifiers:

RL - Analyte reporting limit.
MDC - Minimum detectable concentration
ND - Not detected at the reporting limit.

Work Order Receipt Checklist

Rosebud Power

B15102394

Login completed by: Leslie S. Cadreau
Date Received: 10/28/2015
Reviewed by: BL2000\jmueller
Received by: dlf
Reviewed Date: 10/30/2015
Carrier name: Hand Del

Shipping container/cooler in good condition?	Yes ☑	No ☐	Not Present ☐
Custody seals intact on all shipping container(s)/cooler(s)?	Yes ☑	No ☐	Not Present ☐
Custody seals intact on all sample bottles?	Yes ☐	No ☐	Not Present ☑
Chain of custody present?	Yes ☑	No ☐	
Chain of custody signed when relinquished and received?	Yes ☑	No ☐	
Chain of custody agrees with sample labels?	Yes ☑	No ☐	
Samples in proper container/bottle?	Yes ☑	No ☐	
Sample containers intact?	Yes ☑	No ☐	
Sufficient sample volume for indicated test?	Yes ☑	No ☐	
All samples received within holding time? (Exclude analyses that are considered field parameters such as pH, DO, Res Cl, Sulfite, Ferrous Iron, etc.)	Yes ☑	No ☐	
Temp Blank received in all shipping container(s)/cooler(s)?	Yes ☑	No ☐	Not Applicable ☐
Container/Temp Blank temperature:	0.8°C On Ice		
Water - VOA vials have zero headspace?	Yes ☐	No ☐	Not Applicable ☑
Water - pH acceptable upon receipt?	Yes ☐	No ☑	Not Applicable ☐

Standard Reporting Procedures:

Lab measurement of analytes considered field parameters that require analysis within 15 minutes of sampling such as pH, Dissolved Oxygen and Residual Chlorine, are qualified as being analyzed outside of recommended holding time.

Solid/soil samples are reported on a wet weight basis (as received) unless specifically indicated. If moisture corrected, data units are typically noted as –dry. For agricultural and mining soil parameters/characteristics, all samples are dried and ground prior to sample analysis.

Contact and Corrective Action Comments:

Sample for Dissolved Metals/Hardness was subsampled, filtered and preserved to pH <2 with 2 mL of nitric acid per 250 mL in the laboratory. According to 40CFR136, samples for Dissolved Metals should be filtered and preserved within 15 minutes of collection.

Chain of Custody and Analytical Request Record

Page ____ of ____

PLEASE PRINT (Provide as much information as possible.)

Company Name: Colstrip Energy Limited Partnership

Report Mail Address (Required): PO Box 189 Colstrip MT 59323

❑ No Hard Copy Email: _____

Invoice Address (Required):

❑ No Hard Copy Email: _____

Special Report/Formats:
- ☐ DW
- ☐ POTW/WWTP
- ☐ State: _____
- ☐ Other: _____
- ☐ EDD/EDT (Electronic Data) Format: _____
- ☐ LEVEL IV
- ☐ NELAC

Project Name, PWS, Permit, Etc.

Sample Origin State: Montana

EPA/State Compliance: Yes ☐ No ☐

Contact Name: Joel Zimmerman Phone/Fax: 4067484729 Cell:

Sampler: (Please Print) Ken McFarland

Invoice Contact & Phone: ~~Susan Hart~~ Joel Zimmerman joelz@rosi-colstrip.com

Purchase Order:

Quote/Bottle Order: 96459

Shipped by: Hand

Cooler ID(s):

Receipt Temp 13 6.8 °C

On Ice: (Y) N

Custody Seal On Bottle Y (N) On Cooler (Y) N

Intact (Y) N

Signature Match (Y) N

Contact ELI prior to **RUSH** sample submittal for charges and scheduling – See Instruction Page

Standard Turnaround (TAT) — R U S H

Comments:

ANALYSIS REQUESTED

Number of Containers
Sample Type: A Air W Water S Soils/Solids V Vegetation B Bioassay O Other D DW - Drinking Water

SEE ATTACHED

See Shari Eddy

	SAMPLE IDENTIFICATION (Name, Location, Interval, etc.)	Collection Date	Collection Time	MATRIX	
1	Phase II	10/28/15	Noon	W	B15102394-001
2	Ash pit water Sample				↓
3					
4					
5					
6					
7					
8					
9					
10					

LABORATORY USE ONLY

Custody Record MUST be Signed

Relinquished by (print): Ken McFarland Date/Time: 10/28/15 Signature:

Relinquished by (print): _____ Date/Time: 10/28/15 1693 Signature:

Sample Disposal: Return to Client: _____ Lab Disposal: ✓

Received by (print): _____ Date/Time: _____ Signature:

Received by (print): _____ Date/Time: _____ Signature:

Received by Laboratory: 10/28/15 1623 Signature:

In certain circumstances, samples submitted to Energy Laboratories, Inc. may be subcontracted to other certified laboratories in order to complete the analysis requested. This serves as notice of this possibility. All sub-contract data will be clearly notated on your analytical report.

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College Station, TX 888.690.2218 • Gillette, WY 866.686.7175 • Helena, MT 877.472.0711

BOTTLE ORDER 96459

SHIPPED TO: Rosebud Power

Contact: Ken McFarland
18 Snider Subdivision Rd.
Colstrip MT 59323
Phone: (406) 748-4729
Project:

Order Created by: Shari Endy
Shipped From: Billings, MT
Ship Date: 10/27/2015
VIA: Ground

Bottle Size/Type	Bottles Per Samp	Method	Tests	Critical Hold Time	Preservative	Notes	Num of Samp
1 Liter Plastic	1	A2540 C	Solids, Total Dissolved				1
		A4500-H B	pH	0.24 hrs			
		E300.0	Anions by Ion Chromatography				
		A4500-F C	Fluoride				
		A2510 B	Conductivity				
		A2320 B	Alkalinity				
250 mL Plastic	1	E200.7_8	Metals by ICP/ICPMS, Dissolved				1
		A2340 B	Hardness as CaCO3				
250 mL Plastic	1	E200.7_8	Metals by ICP/ICPMS, Total		■ HNO3		1
250 mL Plastic	1	E353.2	Nitrogen, Nitrate + Nitrite		□ H2SO4		1
500 mL Plastic	1	Kelada-01	Cyanide, Total Manual Distillation		■ NaOH		1
2 Liter Plastic	1	RA-05	Radium 228, Total		■ HNO3		1
2 Liter Plastic	2	E903.0	Radium 226, Total		■ HNO3		1

Comments

Dissolved Metals: Sb, As, Ba, Be, B, Cd, Ca, Cr, Cu, Fe, Hg, Hg, Ni, K, Se, Ag, Na, Sr, Tl Ti, Zn, Co, Pb, Li, Mo
Total Metals: Al, Si, SiO2

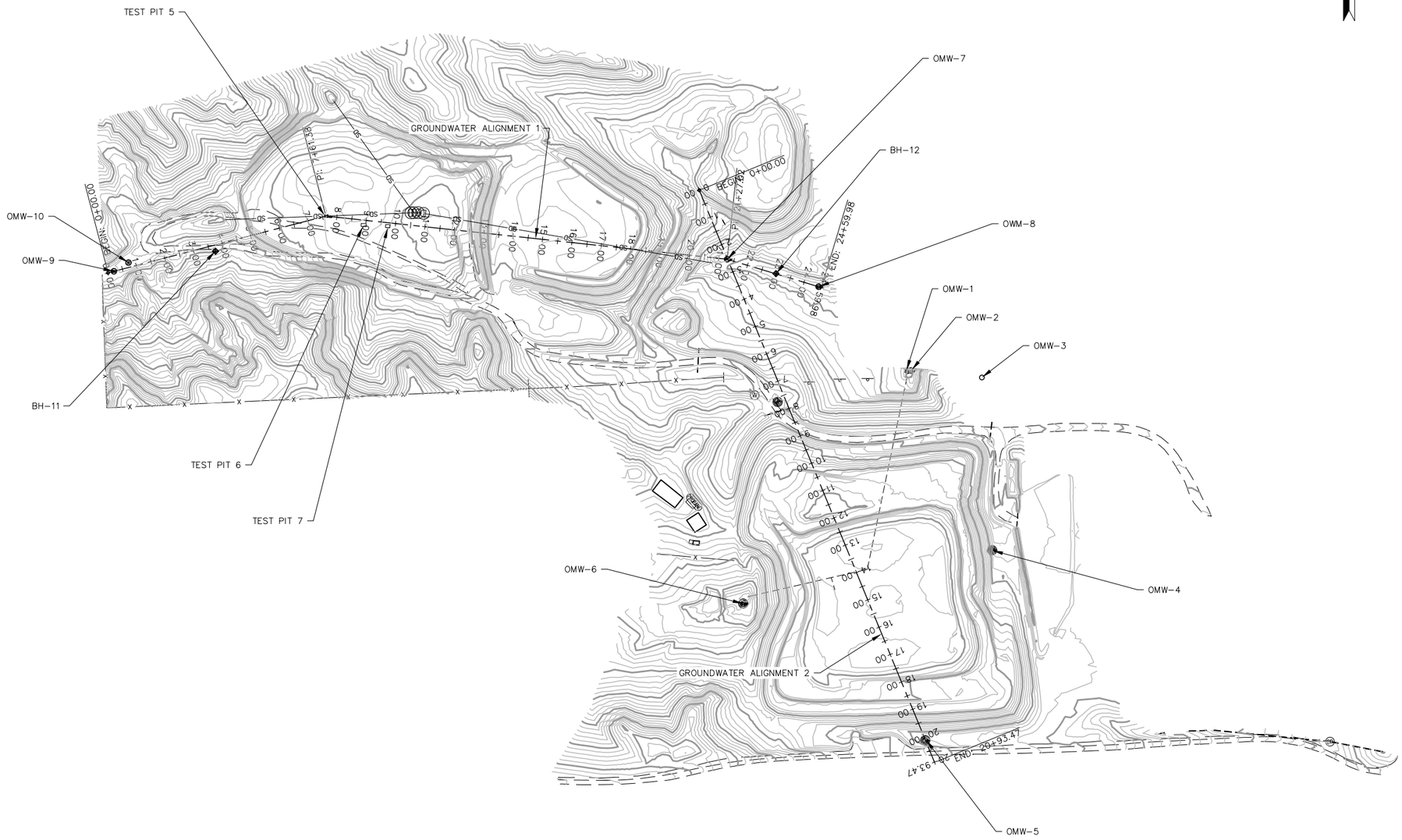
■ HNO3 - Nitric Acid	☐ H2SO4 - Sulfuric Acid	■ NaOH - Sodium Hydroxide	**We strongly suggest that the samples are shipped the same day as they are collected.**
■ ZnAc - Zinc Acetate	■ HCl - Hydrochloric Acid	☐ H3PO4 - Phosphoric Acid	

Material Safety Data Sheets(MSDS) Available @ EnergyLab.com ->Services -> MSDS Sheets

Corrosive Chemicals: Nitric, Sulfuric, Phosphoric, Hydrochloric Acids and Sodium Hydroxide. Zinc Acetate is a skin irritant.

Subcontracting of sample analyses to an outside laboratory may be required. If so, Energy Laboratories will utilize its branch laboratories or qualified contract laboratories for this service. Any such laboratories will be indicated within the Laboratory Analytical Report.

Appendix C: Figures



NO.	REVISIONS	DRAWN BY	DATE

0 200 400 600
SCALE (FEET)

PROJECT ENGINEER: DSC	DRAWN BY: ASG
DESIGNED BY:	REVIEWED BY: BDA

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ROSEBUD COUNTY, MT

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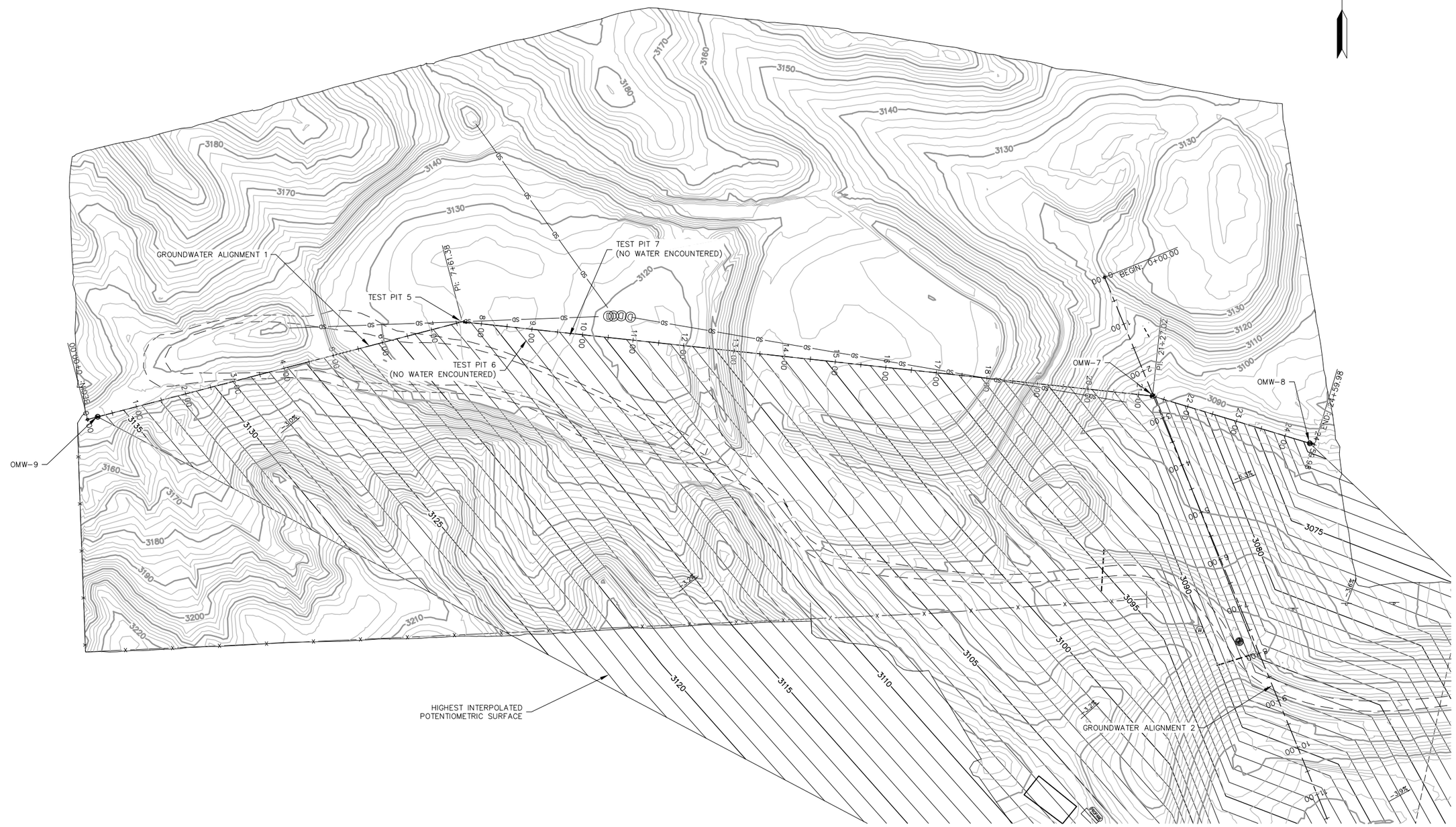

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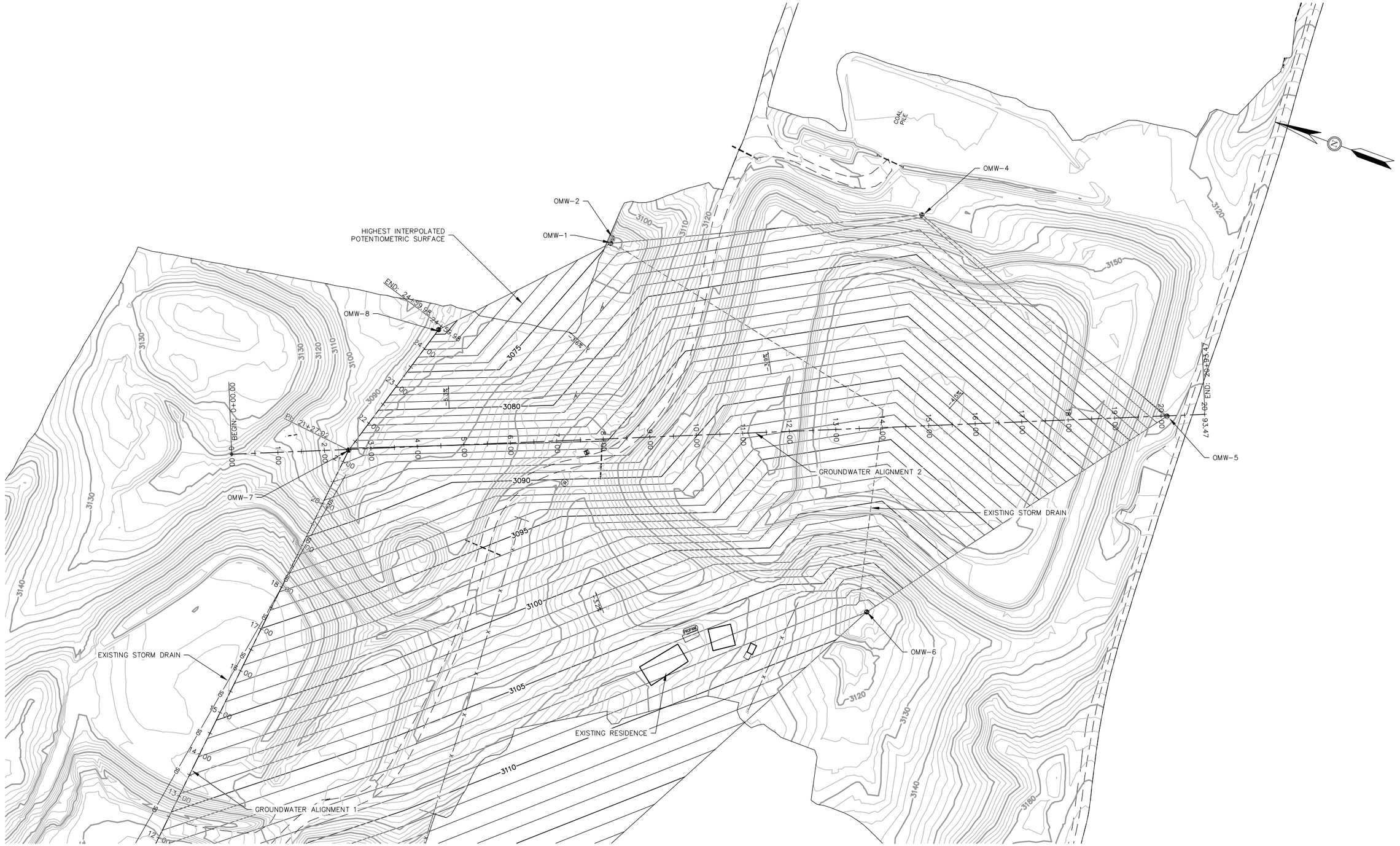
DATE: 7/7/2016	G-1



NO.	REVISIONS	DRAWN BY	DATE

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SCALE (FEET)

PROJECT ENGINEER: DSC	DRAWN BY: ASG
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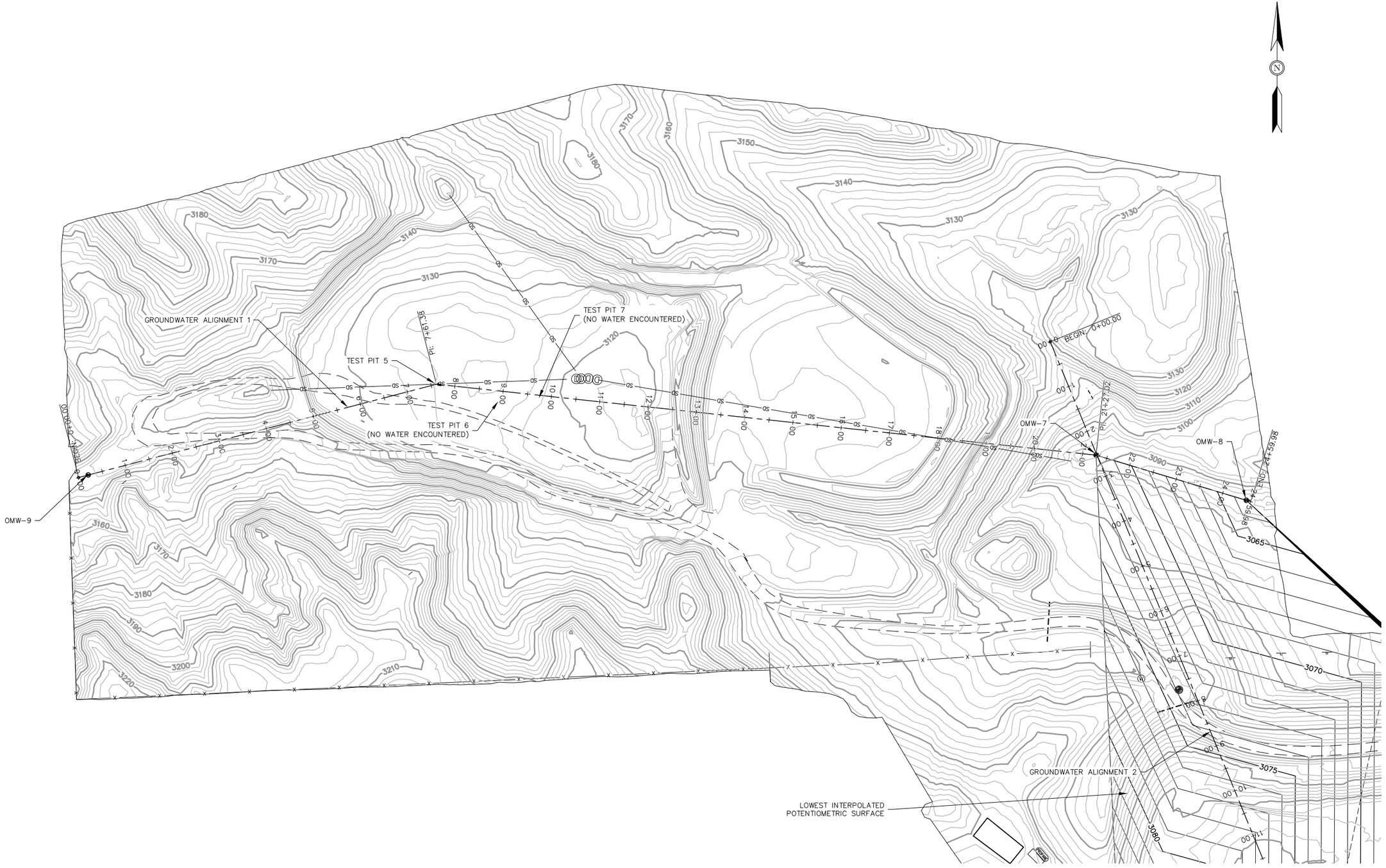

NO.	REVISIONS	DRAWN BY	DATE

0 100 200 300
SCALE (FEET)

PROJECT ENGINEER: DSC	DRAWN BY: ASG
DESIGNED BY:	REVIEWED BY: BDA

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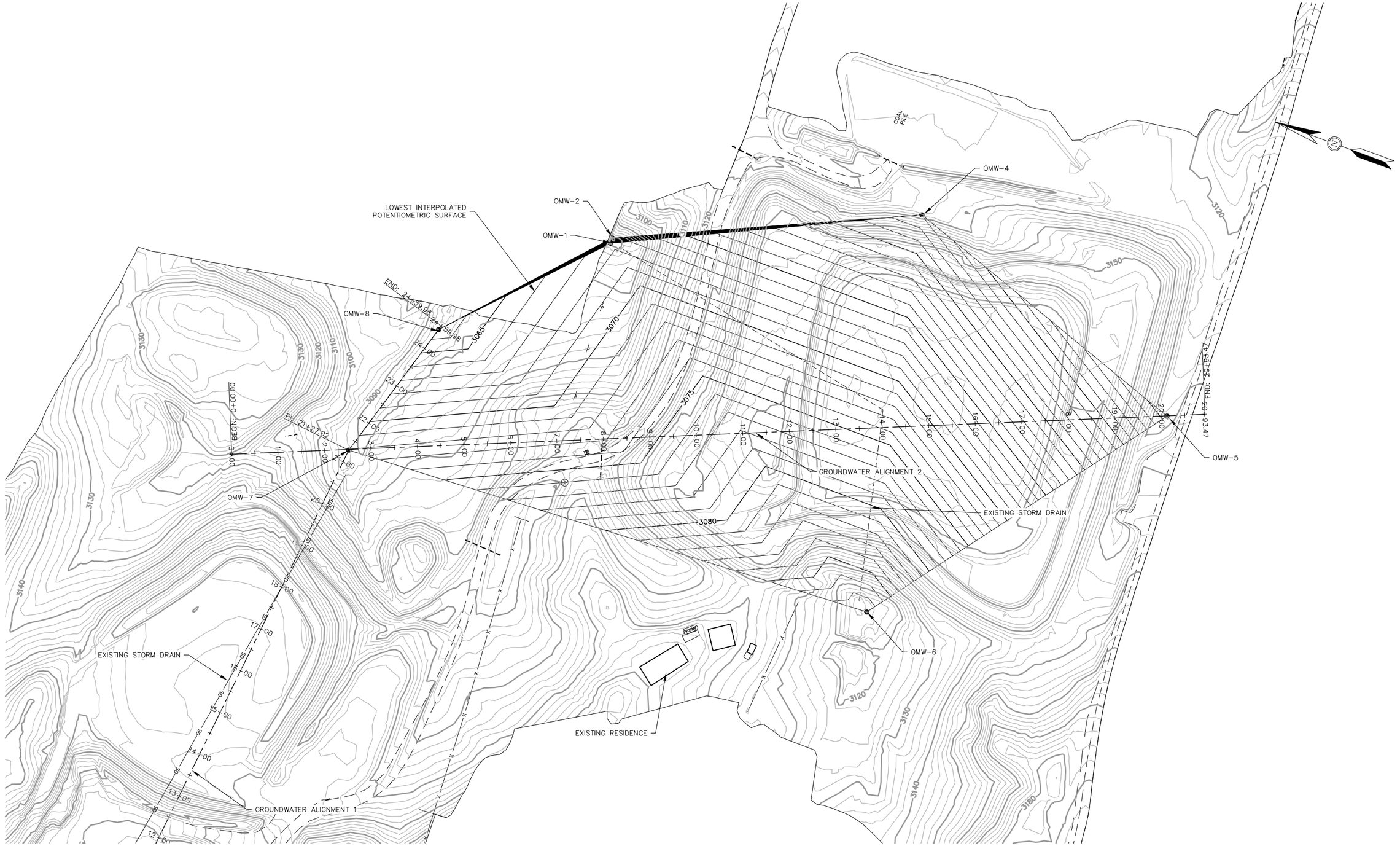

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SCALE (FEET)

PROJECT ENGINEER: DSC	DRAWN BY: ASG
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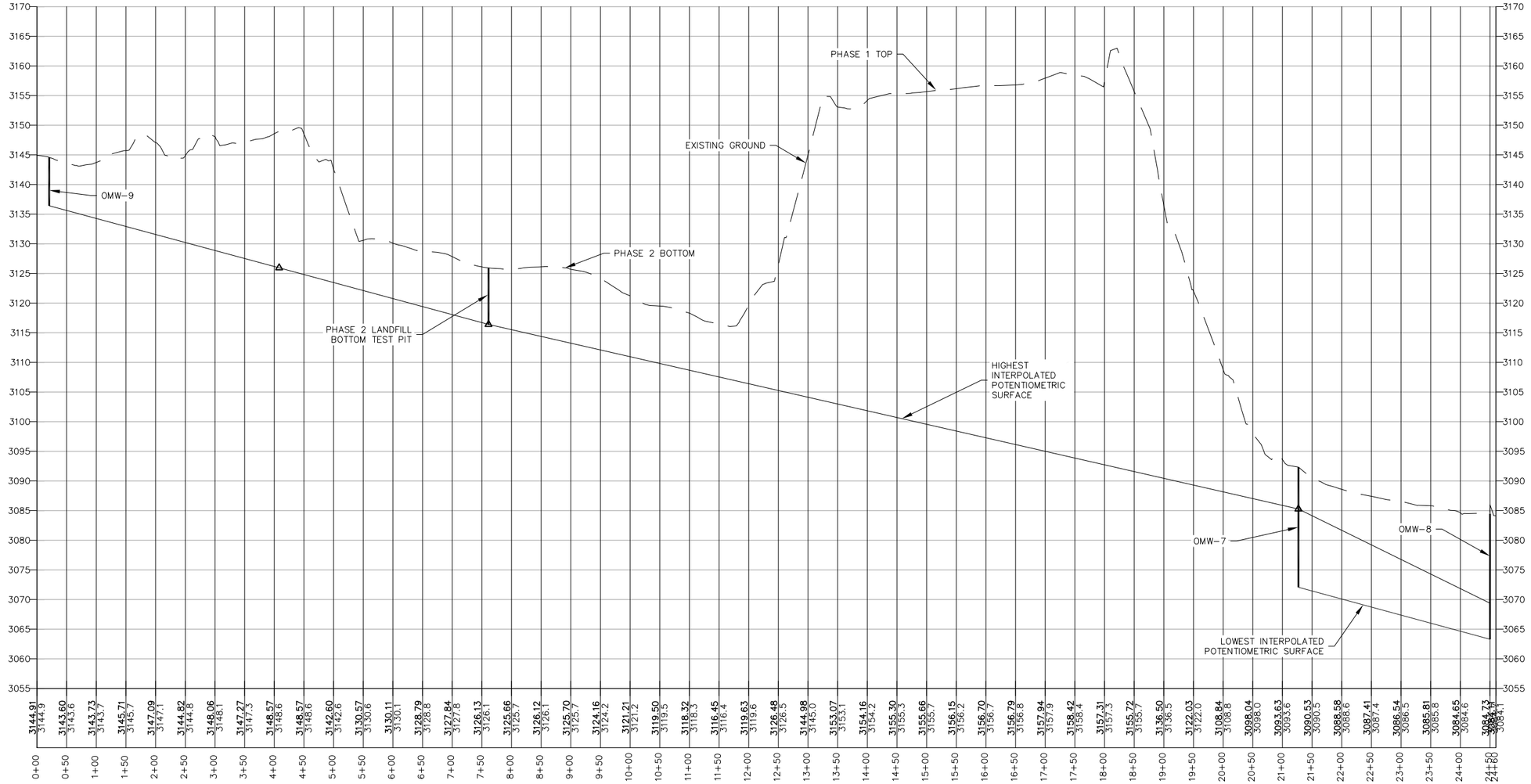

The potentiometric surface is not exact and is only linearly interpolating between known elevation and may not represent the true surface at a given point.

PROFILE VIEW - ALIGNMENT 1

NO.	REVISIONS	DRAWN BY	DATE

HORIZONTAL SCALE FEET 0 100 200

VERTICAL SCALE FEET 0 10 20

PROJECT ENGINEER: DSC	DRAWN BY: ASG
DESIGNED BY:	REVIEWED BY: BDA

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DATE: 7/7/2016	

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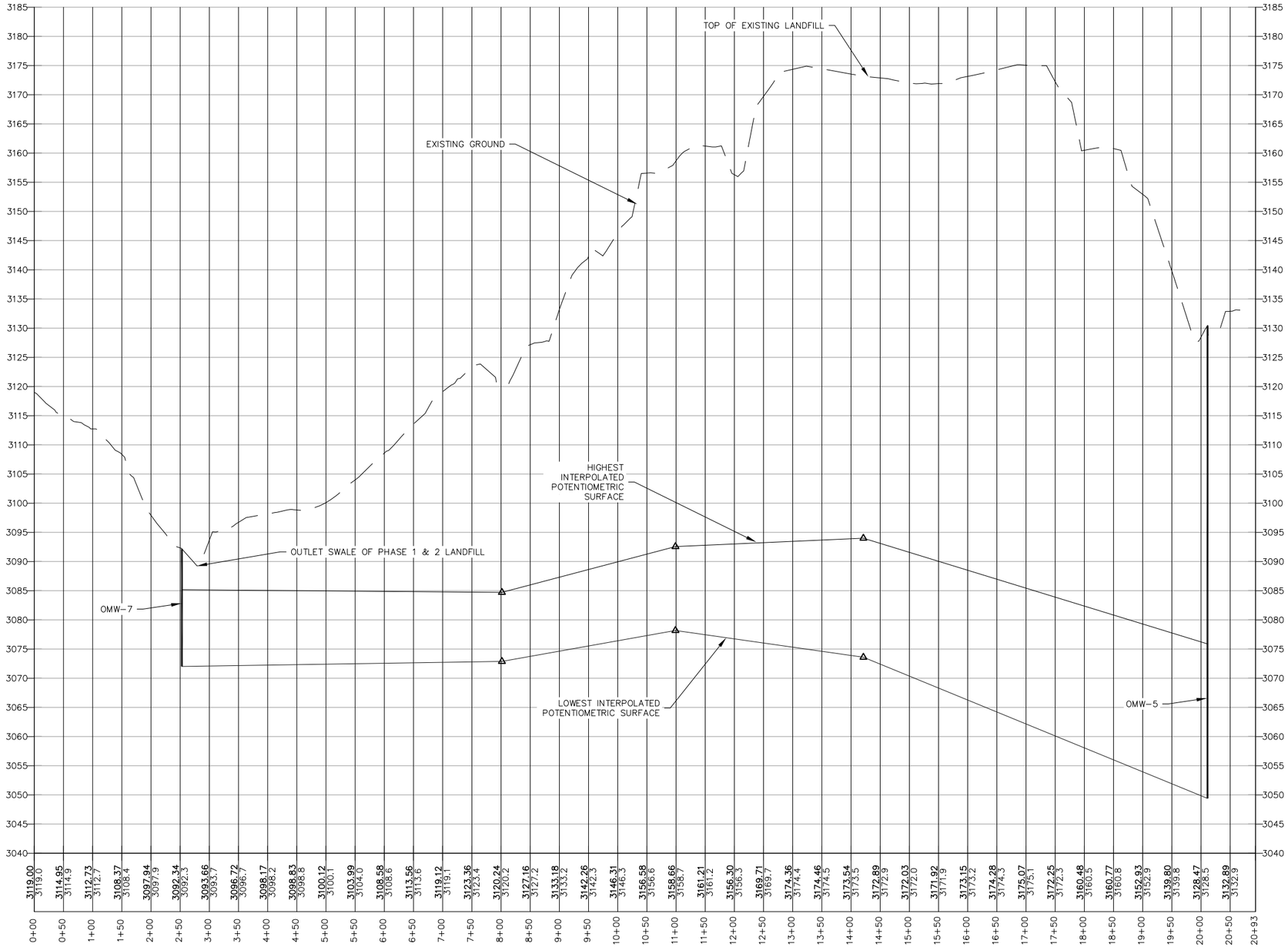

PROFILE VIEW - ALIGNMENT 2

The potentiometric surface is not exact and is only linearly interpolating between known elevation and may not represent the true surface at a given point.

NO.	REVISIONS	DRAWN BY	DATE

HORIZONTAL SCALE FEET 0 100 200 | VERTICAL SCALE FEET 0 10 20

PROJECT ENGINEER: DSC	DRAWN BY: ASG
DESIGNED BY:	REVIEWED BY: BDA

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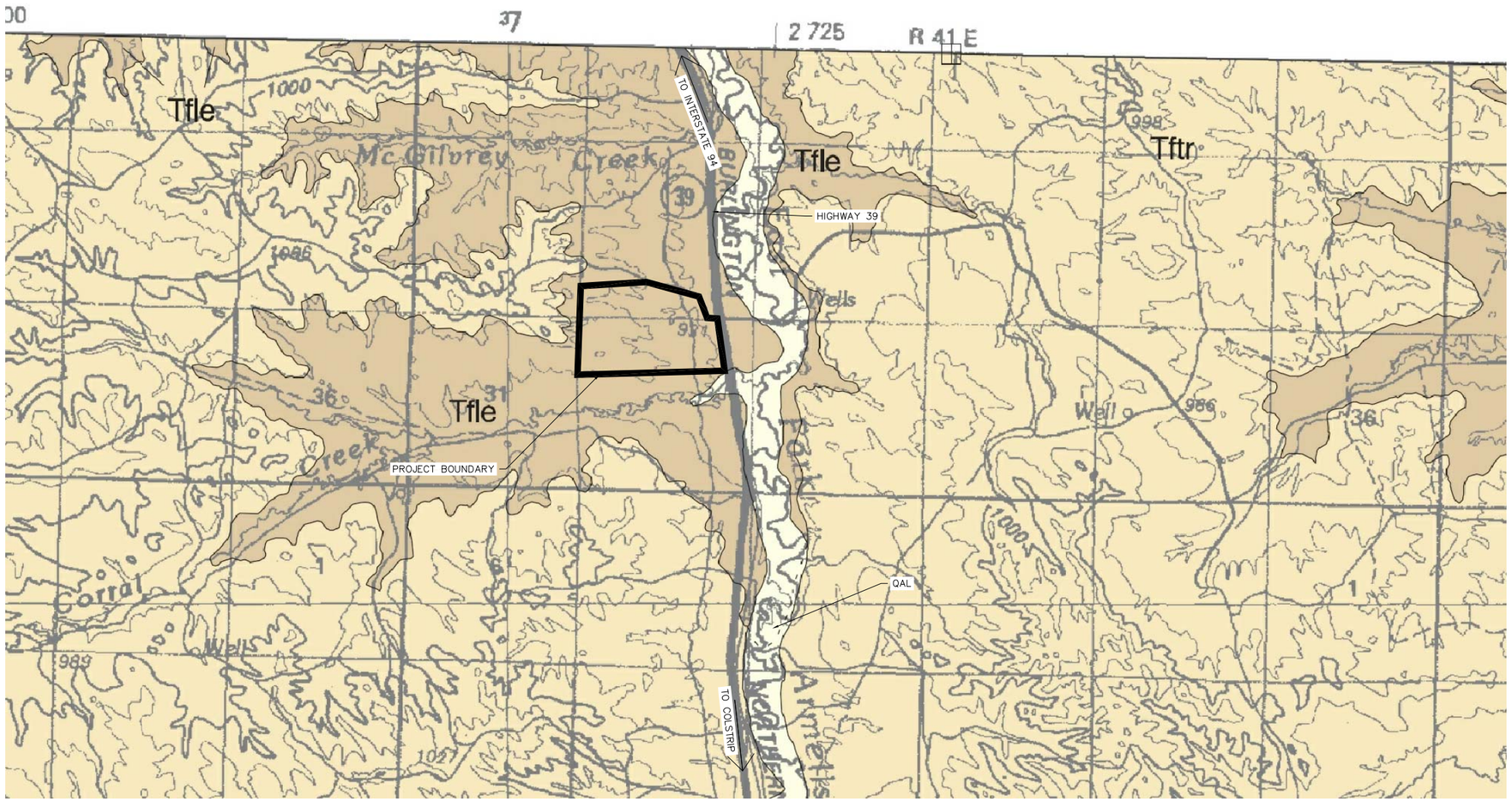
PROJECT #: 15-125	SHEET
DATE: 7/7/2016	G-6

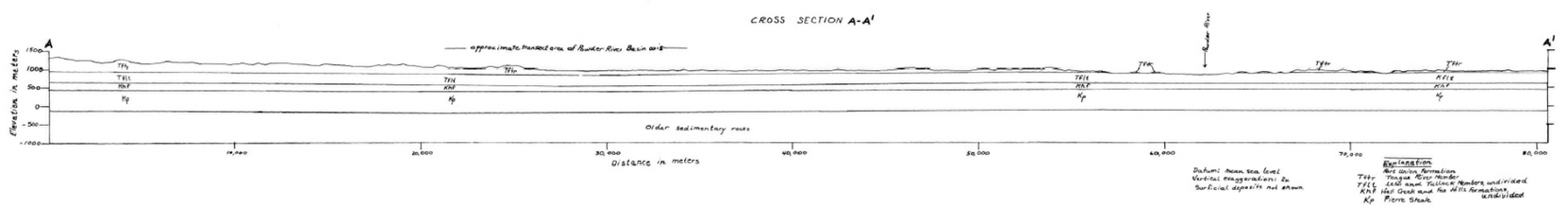
MAP UNITS

Qal	Alluvium of modern channels and flood plains
Qat	Alluvium of alluvial terrace deposit
QTat	Alluvium of alluvial terrace deposit
Tw	Wasatch formation
Tftr	Tongue River Member of Fort Union Formation
Tfle	Lebo Member of Fort Union Formation
Tft	Tullock Member of Fort Union Formation
	Clinker

GEOLOGY LEGEND



PLAN VIEW - GEOLOGY MAP VIEW



GEOLOGY CROSS SECTION

GEOLOGY MAP REFERENCE:

MONTANA BUREAU OF MINES AND GEOLOGY, 2007. GEOLOGIC MAP OF THE LAME DEER 30' X 60' QUADRANGLE, EASTERN MONTANA. VUKE, S.M., HEFFERN, E.L., BERGANTINO, R.N., AND COLTON, R.B.

NO.	REVISIONS	DRAWN BY	DATE

0 2000 4000 6000
SCALE (FEET)

PROJECT ENGINEER: DSC	DRAWN BY: ASG
DESIGNED BY:	REVIEWED BY: BDA

ROSEBUD POWER PLANT
GEOLOGY MAP
ROSEBUD COUNTY, MT

32 DISCOVERY DRIVE
BOZEMAN, MT 59718
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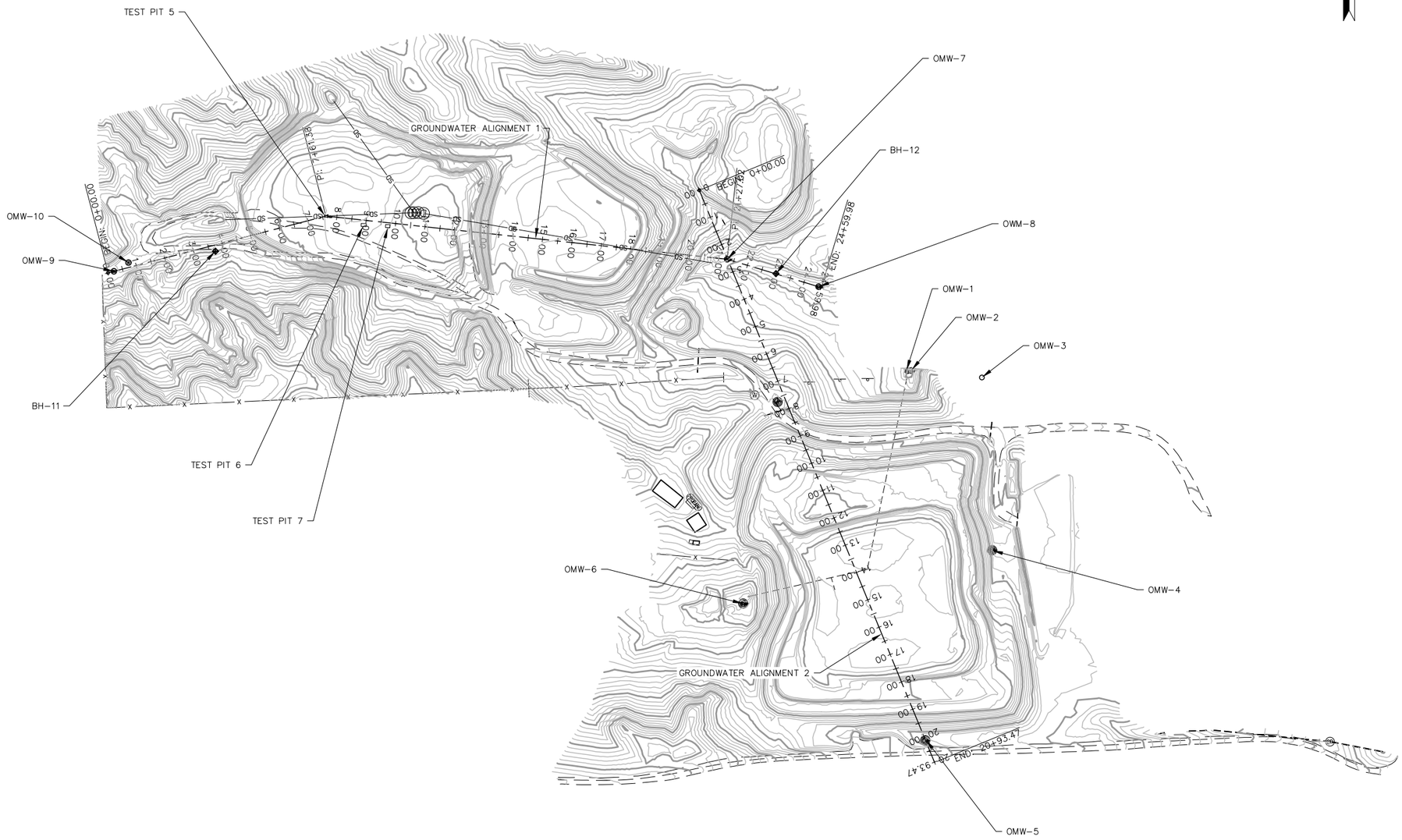
PROJECT #: 15-125	SHEET
DATE: 7/8/2016	GE-1

P:\2015\15-125 Rosebud Power Plant Ash Disposal Site\09 CAD Data\Geology Map.dwg

Appendix D: Borehole/Monitoring Well Logs



NO.	REVISIONS	DRAWN BY	DATE

0 200 400 600
SCALE (FEET)

PROJECT ENGINEER: DSC	DRAWN BY: ASG
DESIGNED BY:	REVIEWED BY: BDA

ROSEBUD POWER PLANT
GROUNDWATER MONITORING OVERVIEW
ROSEBUD COUNTY, MT

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PROJECT #: 15-125	SHEET
DATE: 7/12/2016	G-0

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TEST HOLE LOG

HYDROMETRICS — Helena, Mt.

State: Montana County: Rosebud Project: Colstrip Energy Hole Name or Number: OMW-1

Legal Location: T 3N R 41E Sec. 32 Tract ____ Descriptive Location: 20 feet north of ash Ash Landfill drainage outlet

Recorded by: RLH Date Hole Started: 9/12/89 Date Hole Completed: 9/12/89 Driller: Ron Drilling Company: Askins

Drill Method: air rotary Drilling Fluids Used: air Pilot Hole Diameter: 7 7/8 Reamed Hole Diameter: --

Total Depth Drilled: 20 Total Depth Reamed: -- Total Depth Cased Below G.S.: 20 Diameter and Type of Casing: 4½" PVC

Weight or Gage of Casing: Sch 40 Interval Perforated or Screened Below G.S.: 10-20 Target Aquifer: Perched sand Packer Type and Depth Below G.S.: neoprene 9 & 6 ft.

	YES	NO
Well Developed?	X	
Well Test Pumped?		X
Water Samples Taken?	X	
Material Samples Taken?		X
E - Logs?		X

Method Perforated or Screened:

- ____ No casing in hole.
- ____ Open bottom only.
- ____ Slotted with Mill's Knife.
- ____ Slotted with a torch.
- ____ Screened by pulling casing.
- ____ Saw cut
- X Other (specify) Factory #20

Static Water Level: 9.68 Date: 9/14/89

Measuring Point Description/Elevation: Top of PVC MP Height Above (+) or Below (-) G.S.: ____

Well Annulus Completion Description: 1 bucket of pellets, 1 bag of crumbles, pumped bentonite slurry to surface, bottom cap, cemented locking steel surface cap.

Remarks: Water moves in very slow, well makes very little water

From	To	DRILLING LOG Geological, Drilling, and Water Conditions and Sampling
0	12	SAND - Brown, fine grained moderately moist to moist, intermixed clay.
12	19.5	SAND - Brown, fine to medium grained, moist to very moist.
19.5	20	SILTSTONE - Gray, soft, moist to wet.

Aquifer thickness 7/12/17 3070.41
-3059.82 =10.59'

HYDROMETRICS

TEST HOLE LOG

Helena, Mt.

State: Montana County: Rosebud Project: Colstrip Energy Hole Name or Number: OMW-2

Legal Location: T 3N R 41E Sec. 32 Tract ____ Descriptive Location: 15 feet east of OMW-1

Recorded by: RLH Date Hole Started: 9/12/89 Date Hole Completed: 9/12/89 Driller: Ron Drilling Company: Askins

Drill Method: Air rotary Drilling Fluids Used: air Pilot Hole Diameter: 7 7/8 Reamed Hole Diameter: --

Total Depth Drilled: 80 ft. Total Depth Reamed: -- Total Depth Cased Below G.S.: 80 ft. Diameter and Type of Casing: 4½" PVC

Weight or Gage of Casing: Sch 40 Interval Perforated or Screened Below G.S.: 65-80 Target Aquifer: sandstone Packer Type and Depth Below G.S.: neoprene 64 & 59

	YES	NO
Well Developed?	X	
Well Test Pumped?		X
Water Samples Taken?	X	
Material Samples Taken?		X
E - Logs?		X

Method Perforated or Screened:

- ____ No casing in hole.
- ____ Open bottom only.
- ____ Slotted with Mill's Knife.
- ____ Slotted with a torch.
- ____ Screened by pulling casing.
- ____ Saw cut
- X Other (specify) Factory #20

Static Water Level: 42.26 Date: 9/14/89

Measuring Point Description/Elevation: Top of PVC MP Height Above (±) or Below G.S.: ____

Well Annulus Completion Description: 1 bucket of pellets, 1 bag of crumbles, bentonite slurry pumped to surface. Bottom cap, cemented locking steel surface cap.

Remarks: Well may make 1-2 gpm

From	To	DRILLING LOG Geological, Drilling, and Water Conditions and Sampling
0	11	SAND - Brown, fine grained, moderately moist to moist, intermixed clay.
11	18	SAND - Brown, fine to medium grained, moist to very moist.
18	30	SILTSTONE - Very soft, gray, grades into a very light colored gray at 25 feet and becomes harder at 25-30 feet. Slightly moist to dry.
30	40	SHALE - Carbonaceous, brittle, moderately hard, slightly moist.
40	41	COAL - Dull black, powdery, dry.
41	46	SILTSTONE - Dark gray, soft, dry.
46	55	COAL - Dull black, powdery, dry, slightly fragmented.
55	59	COAL AND CARBONACEOUS SHALE -Interbedded, coal is blocky and dull black, shale is moderately hard; slightly moist.
59	65	SILTSTONE - Sandy, gray, sand is very fine grained, moist to wet.
65	78	SANDSTONE - Gray, silty, very fine to fine grained, grades into a medium graded sand at 75 feet, wet.
78	80	SHALE - Carbonaceous, gray to black, brittle, moist.

HYDROMETRICS

TEST HOLE LOG

Helena, Mt.

State: Montana County: Rosebud Project: Colstrip Energy Hole Name or Number: OMW-3

Legal Location: T 3N R 41F Sec. 32 Tract ____ Descriptive Location: Along north property line in the bottom of swale east of OMW-1 and 2

Recorded by: RLH Date Hole Started: 9/12/89 Date Hole Completed: 9/12/89 Driller: Ron Drilling Company: Askins

Drill Method: Air rotary Drilling Fluids Used: -- Pilot Hole Diameter: 7 7/8 Reamed Hole Diameter: --

Total Depth Drilled: 20 Total Depth Reamed: -- Total Depth Cased Below G.S.: 19 ft. Diameter and Type of Casing: 4½" PVC

Weight or Gage of Casing: Sch 40 Interval Perforated or Screened Below G.S.: 9-19 Target Aquifer: Perched sand Packer Type and Depth Below G.S.: neoprene at 7 & 4 ft.

	YES	NO
Well Developed?	X	
Well Test Pumped?		X
Water Samples Taken?	X	
Material Samples Taken?		X
E - Logs?		X

Method Perforated or Screened:

- ____ No casing in hole.
- ____ Open bottom only.
- ____ Slotted with Mill's Knife.
- ____ Slotted with a torch.
- ____ Screened by pulling casing.
- ____ Saw cut
- X Other (specify) Factory #20

Static Water Level: 19.53 Date: 9/14/89

Measuring Point Description/Elevation: Top of PVC MP Height Above (±) or Below G.S.: ____

Well Annulus Completion Description: 1 bucket of pellets, 1 bag crumbles, bentonite slurry pumped to surface. Bottom cap, cemented locking steel surface cap.

Remarks: Well makes very little water

From	To	DRILLING LOG Geological, Drilling, and Water Conditions and Sampling
0	18	SAND - Brown, very poorly graded, medium grained becomes moist at 10-12 feet, clinker material at 10-14 feet.
18	19	SHALE - Carbonaceous, hard to moderately hard, moist.
19	20	CLAY - Brown, moist, plastic, homogenous.

HYDROMETRICS

TEST HOLE LOG

Helena, Mt.

State: Montana County: Rosebud Project: Colstrip Energy Hole Name or Number: OMW-4

Legal Location: T 3N R 41E Sec. 32 Tract ____ Descriptive Location: Central, eastern edge of landfill, 30 ft. west of Haul Road

Recorded by: RLH Date Hole Started: 9/12/89 Date Hole Completed: 9/12/89 Driller: Ron Drilling Company: Askins

Drill Method: air rotary Drilling Fluids Used: air Pilot Hole Diameter: 7 7/8 Reamed Hole Diameter: --

Total Depth Drilled: 123 Total Depth Reamed: -- Total Depth Cased Below G.S.: 123 Diameter and Type of Casing: 4½" PVC

Weight or Gage of Casing: Sch 40 Interval Perforated or Screened Below G.S.: 97-111 Target Aquifer: Coal Packer Type and Depth Below G.S.: neoprene 97 & 93

	YES	NO
Well Developed?	X	
Well Test Pumped?		X
Water Samples Taken?	X	
Material Samples Taken?		X
E - Logs?		X

Static Water Level: 54.88 Date: 9/14/89

Measuring Point Description/Elevation: ____ MP Height Above (±) or Below G.S.: ____

Method Perforated or Screened:

- ____ No casing in hole.
- ____ Open bottom only.
- ____ Slotted with Mill's Knife.
- ____ Slotted with a torch.
- ____ Screened by pulling casing.
- ____ Saw cut
- X Other (specify) Factory #20

Well Annulus Completion Description: 1 bucket pellets, 1 bag crumbles, pumped in bentonite slurry to surface. Bottom cap, cemented locking steel furface cap.

Remarks: Well makes very little water.

From	To	DRILLING LOG — Geological, Drilling, and Water Conditions and Sampling
0	3	SAND AND SILT - Brown, sand is very fine grained.
3	8	SAND - Brown, a few pieces of clinker material,
8	35	SAND - Brown, moderately moist, medium grained and homogenous in grain size, blew hole for 10-15 minutes and it made no water.
35	40	SAND - As above but with coarse sand size clinker particles, moist.
40	47	SAND - Brown, interlayered clay lenses, very soft drilling, moist to dry.
47	51	CLAY AND SAND - As above grading into a gray color at 48 feet and much higher clay content.
51	85	SILTSTONE - Gray to gray black, some carbonaceous portions. Drills hard from 51 to 52 feet, may be a carbonaceous shale layer?
85	97	SILTSTONE - Becoming darker in color with interlayered carbonaceous shale, soft to moderately soft, dry to moist.
97	108	COAL - Dull black in color, powdery in composition, moist to moderately moist, makes some water <1 gpm.
108	110	SILTSTONE - Gray, moderately hard and carbonaceous.
110	111	COAL - Similar to that at 97 ft., moist to moderately moist.

HYDROMETRICS

TEST HOLE LOG (CONTINUED)

Helena, Mt.

State: Montana County: Rosebud Project: Colstrip Energy Hole Name or Number: OMW-4

From	To	DRILLING LOG Geological, Drilling, and Water Conditions and Sampling
111	122	SILTSTONE - Gray, soft to moderately soft, moist.
122	123	SANDSTONE - Very hard, gray, medium grained.

HYDROMETRICS

TEST HOLE LOG

Helena, Mt.

State: Montana County: Rosebud Project: Colstrip Energy Hole Name or Number: OMW-5

Legal Location: T 3N R 41E Sec. 32 Tract ____ Descriptive Location: Southern edge of landfill 20 ft. north of road

Recorded by: RLH Date Hole Started: 9/12/89 Date Hole Completed: 9/12/89 Driller: Ron Drilling Company: Askin Drilling

Drill Method: Air rotary Drilling Fluids Used: Water Pilot Hole Diameter: 6" Reamed Hole Diameter: 7 7/8'

Total Depth Drilled: 111 Total Depth Reamed: 111 Total Depth Cased Below G.S.: 111 Diameter and Type of Casing: 4½" PVC

Weight or Gage of Casing: Sch 40 Interval Perforated or Screened Below G.S.: 98-111 Target Aquifer: Sandstone Packer Type and Depth Below G.S.: neoprene 97' & 93'

	YES	NO
Well Developed?	X	
Well Test Pumped?		X
Water Samples Taken?	X	
Material Samples Taken?		X
E - Logs?		X

Method Perforated or Screened:

____ No casing in hole.
____ Open bottom only.
____ Slotted with Mill's Knife.
____ Slotted with a torch.
____ Screened by pulling casing.
____ Saw cut
X Other (specify) Factory #20

Static Water Level: 79.02 Date: 9/14/89

Measuring Point Description/Elevation: Top of PVC MP Height Above (±) or Below G.S.: ____

Well Annulus Completion Description: 1 bucket of pellets, 1 bag crumbles, slurry pumped to surface. Bottom cap, cemented steel surface cap.

Remarks: Makes less than 1 gpm

From	To	DRILLING LOG Geological, Drilling, and Water Conditions and Sampling
0	14	SAND - Fine to medium grained, brown, very poorly graded, slightly moist.
14	30	CLAY - Brown, interbedded, brown sand, medium to coarse grained, sand is moderately moist.
30	33	SILTSTONE - Carbonaceous, black, soft to moderately soft, some pebble sized pieces of coal.
33	50	SILTSTONE - Changing from a black to a gray color, same composition as above, dry.
50	65	SILTSTONE - As above but becoming dark in color and carbonaceous, dry.
65	75	SHALE - Carbonaceous, slightly hard, dry.
75	82	COAL - Dull black, powdery, some pebble size pieces blacker, very dry.
82	86	SILTSTONE - Gray, soft to moderately soft, dry.
86	87	COAL - Short stringer, same as above, dry.
87	96	SILTSTONE - Gray, soft, drills easy, dry.
96	98	SANDSTONE - Gray, very hard, drills very slow, medium grained, begins to get moist at 98 feet.
98	111	SANDSTONE - Gray, softer than above and more fine grained. Becomes more moist. Gets silty in composition at at 109

TEST HOLE LOG

Roland, Mt.

HYDROMETRICS

State: Montana County: Rosebud Project: Colstrip Energy Hole Name or Number: OMW-6

Legal Location: T 3N R 41E Sec. 32 Tract ____ Descriptive Location: Near west property line in Gulch which intersects landfill

Recorded by: RLH Date Hole Started: 9/12/89 Date Hole Completed: 5/12/89 Driller: Ron Drilling Company: Askins

Drill Method: Air rotary Drilling Fluids Used: air Pilot Hole Diameter: 7 7/8 Reamed Hole Diameter: --

Total Depth Drilled: 25 Total Depth Reamed: -- Total Depth Cased Below G.S.: 25 Diameter and Type of Casing: 4½" PVC

Weight or Gage of Casing: Sch 40 Interval Perforated or Screened Below G.S.: 21-25 Target Aquifer: sand Packer Type and Depth Below G.S.: neoprene 19 & 15 ft.

	YES	NO
Well Developed?	X	
Well Test Pumped?		X
Water Samples Taken?	X	
Material Samples Taken?		X
E - Logs?		X

Method Perforated or Screened:

- ____ No casing in hole.
- ____ Open bottom only.
- ____ Slotted with Mill's Knife.
- ____ Slotted with a torch.
- ____ Screened by pulling casing.
- ____ Saw cut
- X Other (specify) Factory #20

Static Water Level: 12.42 Date: 9/14/89

Measuring Point Description/Elevation: Top of PVC MP Height Above (+) or Below G.S.: ____

Well Annulus Completion Description: 1 bucket of pellets, 1 bag crumbles, bentonite slurry to surface. Bottom cap, cemented steel surface cap.

Remarks: Well makes very little water

From	To	DRILLING LOG Geological, Drilling, and Water Conditions and Sampling
0	21	CLAY - Brown, moist, changes color from a darker brown grading into a light brown and into a gray brown at 18 feet. No sand.
21	24	COAL - Interlayered carbonaceous shale, moist to very moist. Well makes a small amount of water <1 gallon in 10 minutes.
24	25	SHALE - Carbonaceous, moderately hard, black, moist.

HYDROMETRICS INC.

Consulting Scientists and Engineers
Billings, Montana

Monitor Well Log

Hole Name: OMW-9

Date Hole Started: 9/26/11 Date Hole Finished: 9/26/11

Client: Bison Engineering
Project: Bison Engineering-Well Installation
11084.00 State: Montana
County: Rosebud
Legal Description: N45°, 58' 43.2", E106°, 40' 10.5"
Property Owner: Rosebud Energy-CELP
Descriptive Location: West boundary fence upgradient of active disposal facility

Recorded By: ajh
Drilling Company: Askin Drilling
Driller: Ron Askin
Drilling Method: Air Rotary
Drilling Fluids Used: None
Purpose of Hole: Monitor Well
Target Aquifer: Alluvium
Hole Diameter (in): 7 7/8"
Total Depth Drilled (ft): 12

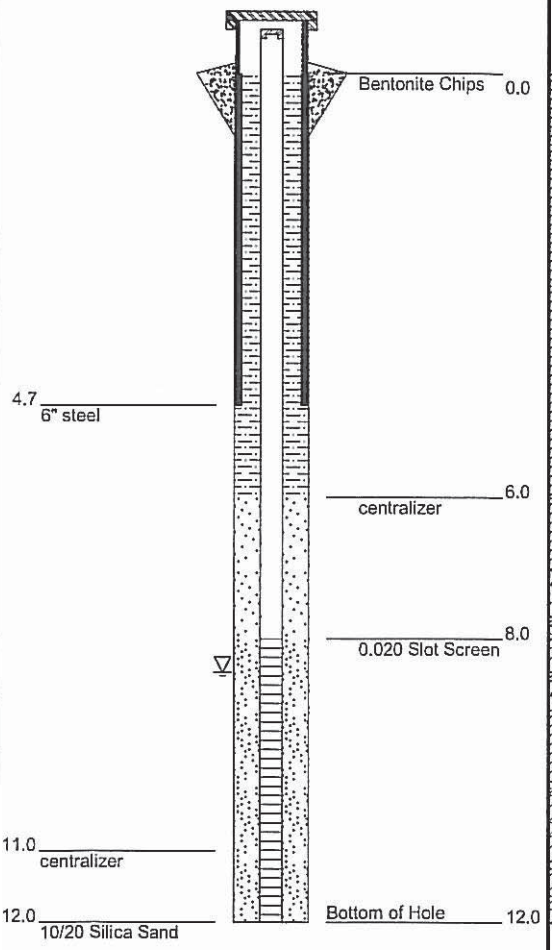
WELL COMPLETION	Y/N	DESCRIPTION	INTERVAL
Well Installed?	Y	4.5" Sch 40, PVC	0-12
Surface Casing Used?	Y	6" steel	+2.3 to -4.7
Screen/Perforations?	Y	0.020-inch slot, Sch 40 PVC	8-12
Sand Pack?	Y	10/20 silica sand	6-12
Annular Seal?	Y	Bentonite Chips	0-6
Surface Seal?	N		
DEVELOPMENT/SAMPLING			
Well Developed?	Y	Air Rotary	
Water Samples Taken?	N		
Boring Samples Taken?	N		

Static Water Level Below MP: 10.78
Date: 9/26/2011
MP Description: Top Steel
MP Height Above or Below Ground (ft): 2.3

Surface Casing Height (ft): 2.3
Riser Height (ft): 2.0
Ground Surface Elevation (ft): 3145.41
MP Elevation (ft): 3147.68

Remarks: Bailed 2 gallons during development, turbid, dark grayish brown, some silt, slow recovery.

WELL CONSTRUCTION



GRAPHICS

GEOLOGICAL DESCRIPTION

0.0 - 1.0' **Clayey silt** - Dry, moderate yellowish brown (10YR 5/4), cohesive, non-calcareous, roots [Topsoil]

1.0 - 3.0' **Clayey silt** - Dry, moderate yellowish brown (10YR 5/4), cohesive, less roots, and calcareous [Topsoil]

3.0 - 6.0' **Clayey silt** - Moist, becoming very moist at 5', moderate yellowish brown (10YR 5/4), cohesive, trace fine sand, calcareous [Colluvium]

6.0 - 7.0' **Clayey silt** - Very moist, moderate yellowish brown (10YR 5/4), silty, cohesive, trace fine sand, calcareous [Colluvium]

7.0 - 9.0' **Gravel, clay and silt** - Very moist to wet, moderate yellowish brown (10YR 5/4), calcareous, fines are cohesive [Alluvium]

9.0 - 10.0' **Clay, trace silt** - Wet, moderate yellowish brown (10YR 5/4), calcareous, cohesive [Alluvium/Colluvium]

10.0 - 11.8' **Clay and gravel** - Wet, fines cohesive, calcareous; rock fragments to 3/4", angular; siltstone and clinker fragments, moderate yellowish brown (10YR 5/4) [Alluvium]

11.8 - 12.0' **Coal** - Soft, weathered, black [Bedrock]

STANDARD OMW-9.GPJ HYD-TUC.GDT 10/12/11

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LOG OF BORING

PROJECT: CELP - Rosebud Plant **JOB #: 15-125** **DATE: 6/15/16** **PAGE: 1 of 1**

LOCATION: 45.97873, -106.66940 **ELEVATION: ~ 3146** **DEPTH: 23-feet** **GW: None**

DRILL TYPE: Air Rotary **FIELD ENGINEER: RCO** **BORING: BH-10/OMW-10**

DRILLER: Ron Askin - Matt **CASING/HAMMER/SAMPLER: 7-7/8"/none/none**

DEPTH (FT)	GEOLOGY LOG	DESCRIPTION OF MATERIALS	WELL CONST.	N(UNCOR) BLOWS/FT	MOISTURE CONTENT	OTHER FIELD OR SAMPLE INFORMATION
		{0.0' - 5.0'}:Alluvium Med. stiff; Yellowish brown (10YR5/6); Fine sandy CLAY; Sl. Moist.				Concrete surface seal. 8" Schedule Steel casing installed 2' above ground to 4' below ground surface.
10.0		**{5.0' - 12.0'}: Alluvium** Stiff; Light olive brown; Med. sandy CLAY; Sl. moist to moist.				3/8" Bentonite hole plug from 0.5' to 12.0' Filter pack from 12' to 23' Screened interval 15.0'–23.0'
		{12.0' -23.0'}: Bedrock **Powdery soft; Black (10YR2/1)**; COAL; Dry. Total Depth = 23.0'. No water encountered. 4" PVC Monitoring Well Installed. Screened interval 12.0'-23.0' Filter pack				Centralizer at 19' 4" Schedule 40 PVC monitoring well installed 18" above ground to the total depth at 23'. Bottom cap at 23'
20.0		**End of Boring**				

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LOG OF BORING

PROJECT: CELP - Rosebud Plant JOB #: 15-125 **DATE: 6/15/16** **PAGE: 1 of 4**

LOCATION: 45.978806°, -106.668236° **ELEVATION: ~ 3151** **DEPTH: 125-Feet** **GW: None**

DRILL TYPE: Air Rotary **FIELD ENGINEER: RCO** **BORING: BH-11**

DRILLER: Ron Askin - Matt **CASING/HAMMER/SAMPLER: 7-7/8"/none/none**

DEPTH (FT)	GEOLOGY LOG	DESCRIPTION OF MATERIALS	SAMPLES	N(UNCOR) BLOWS/FT	MOISTURE CONTENT	OTHER FIELD OR SAMPLE INFORMATION
		{0.0' - 4.0'}: Colluvium Med. stiff; dark grayish brown (2.5YR4/2); silty CLAY with some fine sand; Sl. Moist.				
		{4.0' -5.0'}: Colluvium Med stiff; yellowish brown (10YR5/6); fine sandy silty CLAY; Sl. moist.				
		{5.0' - 7.0'}: Bedrock Hard; Gray (10YR 4/1); SILTSTONE; Dry				
		{7.0' - 8.0'}: Med. dense; gray (10YR5\2); med. SAND; Sl. moist.				
10.0		**{8.0' - 11.0'}:** Stiff; black (10YR 2/1); CLAY; Sl. moist.				**Borehole filled with 3/8" Bentonite hole plug.**
		{11.0' - 14.0'}: Med. dense; grayish brown (10YR 4/2); silty fine SAND; Sl. moist.				
		{14.0' - 18.0'}: Stiff; very dark brown (10YR 3/2); silty CLAY; Sl. moist.				
		{18.0' - 19.0'}: Med. dense; pale brown (10YR 6/3); silty fine SAND; Sl. moist.				
20.0		**{19.0' - 20.0'}:** Med. stiff; very dark brown (10YR 2/2); silty CLAY; Sl. moist.				
		{20.0' - 31.0'}: Soft; Black (10YR 2/1); blocky COAL; Dry.				

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LOG OF BORING

PROJECT: CELP - Rosebud Plant **JOB #: 15-125** **DATE: 6/15/16** **PAGE: 2 of 4**

LOCATION: 45.978806°, -106.668236° **ELEVATION: ~ 3151** **DEPTH: 125-Feet** **GW: None**

DRILL TYPE: Air Rotary **FIELD ENGINEER: RCO** **BORING: BH-11**

DRILLER: Ron Askin - Matt **CASING/HAMMER/SAMPLER: 7-7/8"/none/none**

DEPTH (FT)	GEOLOGY LOG	DESCRIPTION OF MATERIALS	SAMPLES	N(UNCOR) BLOWS/FT	MOISTURE CONTENT	OTHER FIELD OR SAMPLE INFORMATION
		{20.0' - 31.0'}: Soft; Black (10YR 2/1); blocky COAL; Dry.				
		{31.0' -36.0'}: Dense; gray (10YR5/1); SILTSTONE; Dry.				
		{36.0' - 37.0'}: Soft; black (10YR 2/1); COAL; Dry				
40.0						
60.0		**{37.0' - 65.0'}:** Dense; gray (10YR5/1); SILTSTONE; Dry.				

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LOG OF BORING

PROJECT: CELP - Rosebud Plant **JOB #: 15-125** **DATE: 6/15/16** **PAGE: 3 of 4**

LOCATION: 45.978806°, -106.668236° **ELEVATION: ~ 3151** **DEPTH: 125-Feet** **GW: None**

DRILL TYPE: Air Rotary **FIELD ENGINEER: RCO** **BORING: BH-11**

DRILLER: Ron Askin - Matt **CASING/HAMMER/SAMPLER: 7-7/8"/none/none**

DEPTH (FT)	GEOLOGY LOG	DESCRIPTION OF MATERIALS	SAMPLES	N(UNCOR) BLOWS/FT	MOISTURE CONTENT	OTHER FIELD OR SAMPLE INFORMATION
		{65.0' - 75.0'}: Soft; black (10YR 2/1); COAL; Dry				
80.0						
90.0		**75.0' -92.0'}:** Med dense; very dark gray (10YR 3/1); Shale; Dry; Sl. moist at 89'.				
		{92.0' - 94.0'}: Soft; Black (10YR 2/1); COAL; Dry.				
		{94.0' - 99.0'}: Med. dense; Very dark gray (10YR3/1); Shale; Dry. Thin coal seam at 97'				

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LOG OF BORING

PROJECT: CELP - Rosebud Plant **JOB #: 15-125** **DATE: 6/15/16** **PAGE: 4 of 4**

LOCATION: 45.978806°, -106.668236° **ELEVATION: ~ 3151** **DEPTH: 125-Feet** **GW: None**

DRILL TYPE: Air Rotary **FIELD ENGINEER: RCO** **BORING: BH-11**

DRILLER: Ron Askin - Matt **CASING/HAMMER/SAMPLER: 7-7/8"/none/none**

DEPTH (FT)	GEOLOGY LOG	DESCRIPTION OF MATERIALS	SAMPLES	N(UNCOR) BLOWS/FT	MOISTURE CONTENT	OTHER FIELD OR SAMPLE INFORMATION
		{99.0' - 101.0'}: Med. dense; Gray (10YR 5/1); SILTSTONE; Dry.				
		{101' - 102.0'}: Soft; Very dark brown; SHALE; Dry.				
110.0						
120.0						
		{102.0' - 125.0'}: Dense to hard; Gray to dark gray; SILTSTONE; Dry.				**End of Boring at 125.0' No water encountered in drill hole.**

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LOG OF BORING

PROJECT: CELP - Rosebud Plant **JOB #:** 15-125 **DATE:** 6/15/16 **PAGE:** 1 of 2

LOCATION: 45.97841°, -106.66079° **ELEVATION:** ~ 3089 **DEPTH:** 40-feet **GW:** ~22-feet

DRILL TYPE: Air Rotary **FIELD ENGINEER:** RCO **BORING:** BH-12

DRILLER: Ron Askin - Matt **CASING/HAMMER/SAMPLER:** 6-1/4"/none/none

DEPTH (FT)	GEOLOGY LOG	DESCRIPTION OF MATERIALS	SAMPLES	N(UNCOR) BLOWS/FT	MOISTURE CONTENT	OTHER FIELD OR SAMPLE INFORMATION
		{0.0' - 11.0'}: Alluvium Med.stiff; Olive brown (2.5Y 4\3); Sandy CLAY with some subangular to subrounded gravel at 8'; Sl. moist.				
10.0		**{11.0' -22.0'}: Alluvium** Soft to med. stiff; Olive brown (2.5Y 4/3); Sandy lean CLAY or clayey SAND. Moist at 17'.				**Borehole filled with 3/8" Bentonite hole plug.**
20.0 ▽		**{22.0' -25.0'}: Weathered bedrock?** Hard; Light olive brown (2.5Y 5/3); CLAY with some orange staining (7.5YR 5/6). Sl. moist.				**Moist to wet at 21'.**
		{25.0' -28.0'}: Bedrock Hard; Gray (10YR 4/1); SILTSTONE. Sl. moist.				
		{28.0' -29.0'}: Bedrock Hard; Very dark gray (2.5Y 3/1); SILTSTONE. Sl. moist.				

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LOG OF BORING

PROJECT: CELP - Rosebud Plant **JOB #:** 15-125 **DATE:** 6/15/16 **PAGE:** 2 of 2

LOCATION: 45.97841°, -106.66079° **ELEVATION:** ~ 3089 **DEPTH:** 40-feet **GW:** ~22

DRILL TYPE: Air Rotary **FIELD ENGINEER:** RCO **BORING:** BH-12

DRILLER: Ron Askin - Matt **CASING/HAMMER/SAMPLER:** 6-1/4"/none/none

DEPTH (FT)	GEOLOGY LOG	DESCRIPTION OF MATERIALS	SAMPLES	N(UNCOR) BLOWS/FT	MOISTURE CONTENT	OTHER FIELD OR SAMPLE INFORMATION
30.0						
		{29.0' -40.0'}: Bedrock Dense; Black (10YR 2/1); COAL With fine blocky structure. Dry.				**Hole filled with 3/8"Bentonite hole plug.**
40.0						