COLSTRIP PLANT SITE LANDFILL 1

ALTERNATIVE SOURCE DEMONSTRATION

COLSTRIP STEAM ELECTRIC STATION

TALEN MONTANA, LLC

In Accordance with 40 CFR §§ 257.94(e)(2)

Prepared for:
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ACRONYMS AND ABBREVIATIONS

(Alphabetical Order)

1&2 BAP	Colstrip 1&2 Bottom Ash Pond
ACM	Assessment of Corrective Measures
AOC	Administrative Order on Consent
ASD	Alternative Source Demonstration
BCSDA	Brine Concentrator Solids Disposal Area
CCR	Coal Combustion Residuals
CFR	Code of Federal Regulations
Colstrip SES	Colstrip Steam Electric Station
DC Pond	Former Units 3&4 Scrubber Drain Collection Pond
EHP	Units 3&4 Effluent Holding Ponds
FOR	Facility Operating Record
GWMP	Groundwater Management Plan
MDEQ	Montana Department of Environmental Quality
MNA	Monitored Natural Attenuation
PPLMT	PPL Montana, LLC
RAA	Remedial Alternative Assembly
RCRA	Resource Conservation and Recovery Act
SAP	Sampling and Analysis Plan
SC	Specific Conductance
SOR	Selection of Remedy
SSI	Statistically Significant Increase
SSL	Statistically Significant Levels
STEP	Units 1&2 Stage II Evaporation Pond
Talen	Talen Montana, LLC
TDS	Total Dissolved Solids
US EPA	U.S. Environmental Protection Agency
WRMP	Water Resources Management Plan
WTP	Former Units 3&4 Wash Tray Pond

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1.0 INTRODUCTION

This report is prepared by Hydrometrics, Inc. on behalf of Talen Montana, LLC (Talen) as an Alternative Source Demonstration (ASD) for Appendix III constituents found in the groundwater monitoring system at Plant Site Landfill 1, a new CCR Landfill at the Colstrip Steam Electric Station in Colstrip, Montana.

1.1 BACKGROUND

On April 17, 2015, the United States Environmental Protection Agency (US EPA) published the final rule to regulate the disposal of Coal Combustion Residuals (CCR) as solid waste under Subtitle D of the Resource Conservation and Recovery Act (RCRA) (US EPA 2015). The "CCR Rule", and subsequent amendments, sets minimum criteria for existing and new CCR landfills and existing and new CCR surface impoundments. All CCR landfills, surface impoundments, and lateral expansions (collectively referred to as CCR units) are subject to groundwater monitoring and corrective action under Title 40 Code of Federal Regulations (CFR) Parts 257.90 through 257.98, effective October 19, 2015 (amendments US EPA 2018, 2020, and 2024). Among the requirements for regulated CCR units, § 257.93(h) requires that the owner or operator of the CCR unit must determine whether or not there is a statistically significant increase (SSI) over background values for each constituent required in the particular groundwater monitoring program that applies to the CCR unit, as determined under § 257.94(a) or § 257.95(a).

The Colstrip Steam Electric Station (Colstrip SES) has 17 existing and planned CCR units that are regulated by the CCR Rule (Figure 1-1). An annual report documenting the CCR Rule

monitoring and corrective action activities for the previous calendar year has been completed and placed in the Colstrip SES Facility Operating Record (FOR) by January 31 of each year since the initiation of monitoring. Results of the most recent SSI determinations were published in the 2024 annual report (Hydrometrics, Inc. 2025). This report pertains specifically to the CCR landfill referred to as Colstrip Plant Site Landfill 1, as shown in Figure 1-2.

Per §257.93(h)(1), SSI of Appendix III constituents at Plant Site Landfill 1 were evaluated on an interwell basis by comparing groundwater quality of each constituent at each monitoring well designated pursuant to §257.91(a)(2) or (d)(1) to the background value of that constituent. While not required, the interwell statistical comparison was conducted on samples, all of which were collected prior to placing waste in the CCR unit, to evaluate initial site-specific groundwater quality relative to background concentrations of Appendix III constituents. SSI were determined for multiple Appendix III constituents in the background dataset at each of the seven Plant Site Landfill 1 downgradient compliance wells; however, the SSI are not attributable to Plant Site Landfill 1 since groundwater samples were collected prior to final construction or placement of waste in the CCR unit. As such, the statistical comparison informed the need for an immediate ASD, thereby avoiding false positive results in future SSI evaluations.

1.2 PURPOSE

The purpose of this report is to demonstrate that a source other than Plant Site Landfill 1 is responsible for concentrations of Appendix III detection monitoring constituents observed downgradient of the CCR unit that are inconsistent with detected upgradient background concentrations. As provided by §257.94(e)(2), the owner or operator of a CCR unit may demonstrate that a source other than the CCR unit caused an SSI over background levels for a constituent or that the SSI resulted from error in sampling, analysis, statistical evaluation, or natural variation in groundwater quality. This process is referred to herein as an ASD.

1.3 ALTERNATIVE SOURCE DEMONSTRATION PROCESS

Once an SSI has been identified, the next step of an ASD is to identify the potential sources of the SSI, which may include sampling, laboratory, or statistical error, anthropogenic sources (i.e. alternative sources of process water), or natural variability (EPRI 2017). Sampling procedures, laboratory analysis, and statistical evaluation were all conducted as outlined in the Plant Site Landfill 1 Groundwater Sampling and Analysis Plan (SAP) (Hydrometrics, Inc. 2024a); and data were validated in accordance with Montana Department of Environmental Quality (MDEQ) and US EPA guidelines (MDEQ 2016; US EPA 2016). Data acquisition and analysis are not further evaluated as potential sources of the SSI. For this ASD, a weight of evidence approach is presented that indicates anthropogenic sources related to prior plant operations are responsible for current groundwater conditions in the area of Plant Site Landfill 1.

1.4 ORGANIZATION

A detailed description of Plant Site Landfill 1 and its groundwater monitoring system are provided in the remaining introductory sections (1.5 and 1.6) of this report. A summary of CCR Rule groundwater monitoring activities and results is presented relative to a timeline of operational and corrective actions that have taken place in the area of present day Plant Site Landfill 1 and its groundwater monitoring system as the key line of evidence to support a successful ASD in Section 2.0. Conclusions derived from this ASD are summarized in Section 3.0. Certification by a qualified professional engineer, as required by §257.94(e)(2), is provided in Section 4.0. References made to supporting documents and other independent works throughout this ASD are listed in Section 5.0. Figures and Tables are referenced throughout and attached at the end of the document.

1.5 PLANT SITE LANDFILL 1 DESCRIPTION

A location map of Plant Site Landfill 1 and the associated groundwater monitoring system is shown in Figure 1-2. The CCR Landfill was constructed on the footprint of the former 1&2 Bottom Ash Pond, which is not to be confused with the current federally regulated

1&2 BAP CCR Unit. Ash was removed from the former 1&2 Bottom Ash Pond prior to 2015; and sub-soil confirmation sampling was conducted in 2024 prior to liner installation at Plant Site Landfill 1 to verify complete ash removal and document that remaining soils were not a source of constituents leaching to groundwater. Construction of Plant Site Landfill 1 is one component of a modified remedy that is described in the Selection of Remedy Report (SOR) Addendum for the Plant Site CCR Units (Hydrometrics, Inc. 2024b). Under the modified remedy, CCR currently contained in Units 1&2 A Pond, 1&2 B Pond, and 1&2 BAP will be removed to two new CCR Rule compliant landfills (Plant Site Landfill 1 and Plant Site Landfill 2). Plant Site Landfill 1 was completed in 2024 and began receiving CCR excavated from the 1&2 BAP in December 2024.

1.5.1 Plant Site Landfill 1 Groundwater Monitoring System

Prior to construction of Plant Site Landfill 1, a groundwater monitoring system was established in 2023 that consists of six existing wells and one new well installed at the CCR Landfill boundary (Hydrometrics, Inc. 2024a). The groundwater monitoring system for Plant Site Landfill 1 is shown in Figure 1-2. Details for each monitoring well in the system are presented in Table 1-1. The number of monitoring wells included in the Plant Site Landfill 1 groundwater monitoring system meets or exceeds the minimum requirements of 40 CFR §257.91(c)(1) and (2); and the groundwater monitoring system is certified by a professional engineer in accordance with §257.91(f) (Hydrometrics, Inc. 2024c). As described in the 2024 Annual Groundwater Monitoring and Corrective Action Report (Hydrometrics, Inc. 2025), two additional wells will be added to the Plant Site Landfill 1 groundwater monitoring system in 2025 to evaluate a potential secondary groundwater flow path in shallow groundwater southeast of the CCR unit. The locations of additional wells proposed for the Plant Site Landfill 1 groundwater monitoring system are shown in Figure 1-2.

1.5.2 2024 Plant Site Landfill 1 Groundwater Sampling

Groundwater monitoring began at the Plant Site Landfill 1 groundwater monitoring system in 2023, when a total of 14 samples, two samples at each of the seven downgradient monitoring wells, were collected. A total of 24 samples were collected at the Plant Site Landfill 1 groundwater monitoring system in 2024. Sample totals for 2023 and 2024 do not include samples collected at background wells 104A, 63S, 38M and 39M that are part of groundwater monitoring systems for other Plant Site CCR units (i.e. 1&2 B Pond and 1&2 BAP); however, two samples were collected in each of 2023 and 2024, one in spring and one in fall, at background wells 104A, 63S, 38M and 39M. Samples from existing wells 72M, 162M-CCR, 163M-CCR, and 164M-CCR were collected in conjunction with the 1&2 B Pond groundwater monitoring program (intermediate wells) but are also aptly used to evaluate existing concentrations of Appendix III and IV constituents downgradient of Plant Site Landfill 1. More than eight independent samples had already been collected at wells 164M-CCR, 72M, 163M-CCR, and 162M-CCR prior to 2023; but additional background samples were collected at AB17-S, AB19-S/M, and 201M in 2023 and 2024 to fulfill requirements of §257.94(b). Six (6) samples were collected at each of these wells in 2024, bringing the total number of background samples at each well to eight (8) when added to two samples that were collected at the end of 2023. The complete list of Appendix III and IV constituents was analyzed for all samples collected at wells of the Plant Site Landfill 1 groundwater monitoring system in 2023 and 2024. A summary of sample collection dates, identification of applicable groundwater monitoring programs, and complete sample results for Plant Site Landfill 1 are presented in the 2023 and 2024 Annual Groundwater Monitoring and Corrective Action Reports (Hydrometrics, Inc. 2024d and 2025).

1.5.3 2024 Plant Site Landfill 1 SSI Detection

Per §257.93(h)(1), SSI of Appendix III constituents were evaluated on an interwell basis by comparing groundwater quality of each constituent at each monitoring well designated pursuant to §257.91(a)(2) or (d)(1) to the background value of that constituent. Further

discussion of the statistical methods used and results are presented in the 2024 annual report (Hydrometrics, Inc. 2025).

A summary of statistically significant ($\alpha = 0.05$) increases above background for well/Appendix III constituent pairs in the Plant Site Landfill 1 groundwater monitoring system through fall 2024 is presented in Table 2-1. SSI were determined for multiple Appendix III constituents in the background dataset at each of the seven Plant Site Landfill 1 downgradient compliance wells. Constituents with at least one SSI in the groundwater monitoring system include boron, calcium, chloride, sulfate, and total dissolved solids (TDS).

2.0 PLANT SITE LANDFILL 1 ALTERNATIVE SOURCE DEMONSTRATION

The key line of evidence that a source other than Plant Site Landfill 1 caused SSI of Appendix III detection monitoring constituents in downgradient wells is that samples used in the SSI determination were collected prior to and throughout construction of the landfill or prior to receipt of CCR once the landfill was constructed. As reported in the Annual Groundwater Monitoring and Corrective Action Report (Hydrometrics, Inc. 2025), the latest background/detection monitoring samples at Plant Site Landfill 1 were collected in early October 2024. Plant Site Landfill 1 began receiving CCR from 1&2 BAP in December 2024. A timeline of major events (construction and operation of waste/water treatment facilities, well completion, groundwater monitoring, and Plant Site remedy components) that have taken place in or around the area of present day Plant Site Landfill 1 throughout the period of operation of the Colstrip SES (Figure 2-1) is presented relative to previously described groundwater monitoring and statistical analyses results as the centerpiece of the ASD. In summary, elevated concentrations of Appendix III detection monitoring constituents were documented in wells of the Plant Site Landfill 1 groundwater monitoring system prior to construction of the CCR landfill; and current SSI detected downgradient of Plant Site Landfill 1 are the result of prior plant operations. Further, extensive groundwater remediation is ongoing in the area of Plant Site Landfill 1 in compliance with state and federal (the CCR Rule) regulatory requirements as described in Section 2.3.

2.1 SOURCE IDENTIFICATION

Potential sources of Appendix III detection monitoring constituents identified in the timeline (Figure 2-1) and mapped in Figure 2-2 include the following.

- Former 1&2 Bottom Ash Pond – Plant Site Landfill 1 occupies an area that is entirely encompassed by the footprint of the former 1&2 Bottom Ash Pond. The former 1&2 Bottom Ash Pond was used as the collection area for bottom ash and drain collection pit effluent from 1976 to 1988. The former 1&2 Bottom Ash Pond was a clay-lined pond. As previously described, CCR were removed from the former 1&2 Bottom Ash

Pond prior to 2015. Sub-soil confirmation sampling was conducted in 2024 prior to liner installation at Plant Site Landfill 1 to verify complete ash removal and document that remaining soils were not a source of constituents leaching to groundwater.

- Former Units 1&2 Brine Ponds - The Units 1&2 Brine Ponds consisted of four Hypalon-lined cells (D1 – D4 Pond) that served as the disposal location for brine from the Wastewater Concentrator. Brine is not CCR but was generated as part of the wastewater treatment process. The cells were constructed in a phased approach beginning with D1 and D2 Ponds in 1976, the D3 Pond in 1980, and D4 Pond in 1984. Potential sources of constituents to groundwater from the 1&2 Brine Ponds included a failure of the D3 Pond liner that was identified and repaired in 1981. In 1985, a group of capture wells was installed to collect groundwater that may have mixed with seepage from the ponds. D1 – D3 ponds were closed in 1994. Solids from D1-D3 Ponds were removed to 3&4 EHP F Cell. D1-D3 Pond liners were removed; but depressions from these ponds were left to provide a clean water collection area for precipitation recharge. The Wastewater Concentrator was removed in 2000, so only residual brine was held in the D4 Pond from then on. In November 2005, a problem was identified with the D4 Pond liner and the pond was drained and removed from service. The D4 Pond was closed with solids stored over a Hypalon liner with an under-liner collection system and capped with a 45-mil reinforced polypropylene liner in 2006; and a soil cover was placed over the cap and seeded in 2007. Sub-soil from beneath the former D4 Brine Pond Liner was removed in Fall 2014. In 2019, the Brine Concentrator Solids Disposal Area (BCSDA) was constructed over the former Units 1&2 Brine Ponds area to contain solids from the Units 3&4 Pond Return Brine Concentrator/Crystallizer. Solids contained in the BCSDA are not CCR. The BCSDA is associated with a wastewater treatment facility and was constructed with a double liner, consisting of a 40-mil HDPE geomembrane over a composite 60-mil HDPE geomembrane/geosynthetic clay underliner, with a between-liiner leachate collection system.
- Former Units 3&4 Scrubber Drain Collection Pond (DC Pond) – The DC Pond was a clay lined pond that received miscellaneous scrubber plant drains, slurry, and washdown

from 1983 to 1999. In 1999, this pond was taken out of service and the scrubber drains/washdown were sent to the 3&4 EHP. In 2009, DC Pond was used to store materials cleaned out from a secondary settling cell of the 1&2 Bottom Ash Pond. CCR was removed from DC Pond and placed in Units 1&2 A Pond in 2015. Upon removal of CCR, DC Pond was renamed Stormwater Pond 2; and Plant Site stormwater was actively routed to the pond until 2023. At present, Stormwater Pond 2 only contains direct precipitation and minimal runoff from the immediate contributing area.

- Former Units 3&4 Wash Tray Pond - The former Units 3&4 Wash Tray Pond (WTP) is located south of Plant Site Landfill 1. The WTP served as a scrubber pond for the wash tray loop beginning in 1983. The WTP was abandoned in 1995 when the feed for the wash tray loop transitioned to Units 3&4 EHP return water. Residual flyash was removed from WTP and placed in A Pond in 2015. The pond remains but it has been renamed Stormwater Pond 1 and repurposed to store stormwater that is routed from the Plant Site.

2.2 INTERMEDIATE GROUNDWATER MONITORING RESULTS

As previously described, wells 72M, 162M-CCR, 163M-CCR, and 164M-CCR were designated as intermediate wells in the 1&2 B Pond groundwater monitoring system to represent site specific conditions that included prior influences from upgradient facilities that are not regulated by the CCR Rule, including former facilities such as 1&2 Brine Ponds, DC Pond, 3&4 WTP, and 1&2 Bottom Ash Pond (formerly in footprint of Plant Site Landfill 1). At the conclusion of background detection monitoring sample collection in 2017 (§257.94(b)), differences in the distribution and maximum values of Appendix III constituents were apparent between background and intermediate wells of the 1&2 B Pond groundwater monitoring system (Hydrometrics, Inc. 2018). Further, upon formal statistical evaluation conducted in accordance with §257.93(h)(1) in 2018 (Hydrometrics, Inc. 2019a), concentrations of Appendix III constituents in downgradient wells of the 1&2 B Pond groundwater monitoring system were detected at SSI above background concentrations and above concentrations observed in intermediate wells (72M, 162M-CCR, 163M-CCR, and

164M-CCR). Evaluation of Appendix III constituents in groundwater of the 1&2 B Pond groundwater monitoring system in 2017 and 2018 are shown in the timeline in Figure 2-1. Through tiered statistical evaluation, former upgradient facilities are identified as a separate source than 1&2 B Pond because concentrations of Appendix III constituents in intermediate wells were generally statistically lower than downgradient wells but higher than in background wells of the 1&2 B Pond groundwater monitoring system. Further, an east to west groundwater flow direction has prevailed between the current site of Plant Site Landfill 1 and 1&2 B Pond throughout the CCR Rule groundwater monitoring program.

2.3 REMEDY

Sources of Appendix III constituents in groundwater upgradient of Plant Site Landfill 1 identified in this report have been addressed throughout the history of operation at Colstrip SES. Interim groundwater remedial actions that pre-date the CCR Rule, such as installation of the Brine Pond groundwater collection system and 1&2 Brine Pond closure, are noted in prior sections of this report. Comprehensive site characterization and remedy evaluation have been conducted under parallel state and federal regulatory requirements that include an Administrative Order on Consent (AOC) between the MDEQ and PPL Montana, LLC (PPLMT) (Talen's predecessor) (PPLMT/MDEQ 2012) and the CCR Rule. An assessment of corrective measures (ACM) was conducted in accordance with §257.96 for 1&2 B Pond, 1&2 BAP, and 3&4 BAP (Hydrometrics, Inc. 2019b) after Appendix IV constituents were detected at statistically significant levels (SSL) through the course of assessment monitoring required by §257.94(e)(1). As detailed throughout the ACM, requirements were achieved largely by remedial evaluation activities conducted under the AOC. Ultimately, pond closures (including CCR unit closures), capture system upgrades, and a freshwater flushing program were identified as components of the preferred remedial alternative assembly (RAA) known as Alternative 4 (Geosyntec 2018).

Although it was prepared under a separate regulatory framework, the AOC remedy evaluation (Geosyntec 2018) meets or exceeds the applicable CCR Rule ACM (§257.96)

requirements. Thus, the results of that process became the foundation of the ACM for 1&2 B Pond, 1&2 BAP, and 3&4 BAP (Hydrometrics, Inc. 2019) and are applicable to selecting a final remedy for Appendix IV constituents in groundwater at the Plant Site CCR units (§257.97). A SOR was prepared to satisfy federal requirements of §257.97(a) that similarly identified Alternative 4 as the selected remedy (Hydrometrics, Inc. 2020). Implementation of the selected remedy began in 2019. Freshwater flushing and enhanced groundwater capture components of the selected remedy address source areas beyond CCR units, such as source areas surrounding Plant Site Landfill 1, as shown in Figure 2-3.

In 2023, Talen began further evaluating source control measures for the Units 1 & 2 surface impoundments (B Pond and 1&2 BAP) and 1&2 A Pond, which was previously unregulated but is now subject to a facility evaluation review as a CCR management unit under the CCR Legacy Rule. Results of the evaluation of source control measures were presented to MDEQ in an Alternatives Analysis Report in May 2023 (Geosyntec 2023a). A letter detailing proposed modifications to the selected remedy for the Plant Site CCR units was submitted in July 2023 (Geosyntec 2023b). MDEQ released a final decision selecting the modified remedy, identified as Alternative 4B, on April 19, 2024 (MDEQ 2024). Alternative 4B retains many of the components from Alternative 4 including operation of a freshwater flushing system, enhanced groundwater capture, and the option for Monitored Natural Attenuation (MNA). The primary change associated with Alternative 4B is the shift from closure in place for the Units 1 & 2 B Pond and 1&2 BAP to closure by removal. Plant Site Landfill 1 was constructed and Plant Site Landfill 2 will be constructed on the Colstrip SES Plant Site for the relocation and final disposal of CCR and affected soil from A Pond, B Pond, and the 1&2 BAP. Construction specifications are detailed in the Alternative 4B Engineering Report (Geosyntec 2024). The modified remedy was presented in an addendum report and certified by a qualified professional engineer, as required by §257.97(a) (Hydrometrics, Inc. 2024b).

Thus, Plant Site Landfill 1 is one source control component of a larger remedy for the Colstrip SES Plant Site. Construction of Plant Site Landfill 1 and later Plant Site Landfill 2 will facilitate removal and final disposal of CCR currently held in unlined CCR units. Enhanced groundwater capture and freshwater flushing have been implemented to improve groundwater quality in the source area upgradient of Plant Site Landfill 1 (Figure 2-3).

3.0 CONCLUSION

In conclusion, it has been successfully demonstrated based on the weight of evidence provided in this ASD that a source other than Plant Site Landfill 1 is responsible for concentrations of Appendix III detection monitoring constituents recorded downgradient of the CCR unit at SSI above background concentrations. A summary of supporting evidence is as follows:

- The key line of evidence that a source other than Plant Site Landfill 1 caused SSI of Appendix III detection monitoring constituents in downgradient wells is that samples used in the SSI determination were collected prior to and throughout construction of the landfill or prior to receipt of CCR once the landfill was constructed. As reported in the Annual Groundwater Monitoring and Corrective Action Report (Hydrometrics, Inc. 2025), the latest background/detection monitoring samples at Plant Site Landfill 1 were collected in early October 2024, while the landfill did not start receiving CCR until December 2024.
- Potential sources of Appendix III detection monitoring constituents in the Plant Site Landfill 1 groundwater monitoring system were identified to include the former 1&2 Bottom Ash Pond (which was formerly located in the current Plant Site Landfill 1 footprint), former Units 1&2 Brine Ponds, former Units 3&4 Scrubber Drain Collection Pond, and former Units 3&4 Wash Tray Pond. Each of these facilities are now closed by removal but were upgradient of the current Plant Site Landfill 1 groundwater monitoring system during their period of operation.
- Downgradient wells 72M, 162M-CCR, 163M-CCR, and 164M-CCR of the Plant Site Landfill 1 groundwater monitoring system were originally designated as intermediate wells in the 1&2 B Pond groundwater monitoring system to represent site specific conditions that included prior influences from upgradient facilities such as former 1&2 Bottom Ash Pond, 1&2 Brine Ponds, DC Pond, and 3&4 WTP. At the conclusion of background detection monitoring sample collection in 2017 (§257.94(b)), differences in the distribution and maximum values of Appendix III constituents were apparent

between background and intermediate wells (Hydrometrics, Inc. 2018). Upon formal statistical evaluation conducted in accordance with §257.93(h)(1) in 2018 (Hydrometrics, Inc. 2019), concentrations of Appendix III constituents in wells 72M, 162M-CCR, 163M-CCR, and 164M-CCR were generally statistically lower than in 1&2 B Pond downgradient wells but higher than background. An east to west groundwater flow direction has prevailed between the current site of Plant Site Landfill 1 and 1&2 B Pond throughout the CCR Rule groundwater monitoring program.

- Plant Site Landfill 1 is one source control component of a larger remedy for the Colstrip SES Plant Site. Construction of Plant Site Landfill 1 and later Plant Site Landfill 2 will facilitate removal and final disposal of CCR currently held in unlined CCR units. Enhanced groundwater capture and freshwater flushing have been implemented to improve groundwater quality in the source area upgradient of Plant Site Landfill 1 (Figure 2-3).

This successful written demonstration was completed within 90 days of detecting SSI of Appendix III constituents over background levels. Certification from a qualified professional engineer verifying the accuracy of the information in the report is included in the following section. As a result of this ASD, Plant Site Landfill 1 will remain in a detection monitoring program under §257.94. Colstrip SES operators will include this ASD in the 2025 annual groundwater monitoring and corrective action report, required by § 257.90(e).

4.0 CERTIFICATION

I, Richard Labbe, a registered Professional Engineer in the State of Montana, certify that the information provided in this report is accurate to the best of my knowledge and that the weight of evidence presented in this report indicates that Colstrip Plant Site Landfill 1 is not responsible for statistically significant increases of Appendix III Detection Monitoring Constituents above background concentrations. This report meets the requirements of a successful written alternative source demonstration as allowed by § 257.95(g)(3)(ii).

Richard Labbe, P.E.
License No. 48761PE
April 14, 2025

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TABLES

TABLE 1-1. PLANT SITE LANDFILL 1 GROUNDWATER MONITORING SYSTEM WELLS

Well Type/ID	Date of Completion	Total Depth (feet bgs)	Perforated Interval (feet bgs)	Hydrostratigraphic Unit
Background Wells				
38M	8/7/1993	113	98-113	McKay Coal
39M	8/8/1993	93.5	84-93.5	McKay Coal
Downgradient Wells				
72M	11/21/2005	75	64-71	McKay Coal
162M-CCR	4/13/2016	72	67-72	McKay Coal
163M-CCR	4/13/2016	72	67-72	McKay Coal
164M-CCR	4/14/2016	70	65-70	McKay Coal
201M	11/8/2023	72	63-72	McKay Coal
AB-17S	8/22/1996	38	35-38	Shallow Fill
AB-19S/M	8/22/1996	35	30-35	Shallow Fill

TABLE 2-1. PLANT SITE LANDFILL 1 2024 APPENDIX III SSI

McKay Coal

Well/Prediction Limit	Date Sampled	Boron 0.605	Calcium 325	Chloride 10.0	Fluoride 0.3	pH 7.1 - 7.6	Sulfate 1266.2	TDS 2170.0
162M-CCR	10/1/24	**1**	**569**	**132**	0.2	**7.0**	**3190**	**5970**
163M-CCR	10/2/24	**0.85**	146	**12**	0.2	**7.7**	758	1580
164M-CCR	10/3/24	**6.31**	**591**	**569**	0.1	7.1	**3630**	**6780**
201M	10/1/24	0.6	205	**15**	0.1	**7.8**	**1360**	**2430**
72M	10/1/24	**1.07**	252	**29**	0.2	7.6	**1540**	**2730**

SSI are indicated by bold type and highlighted entries.

All units in mg/L, except pH (s.u.) ; ND = non-detect

***Well has "A" designation but is completed in eroded McKay coal in contact with alluvium.**

Shallow Fill/Alluvium

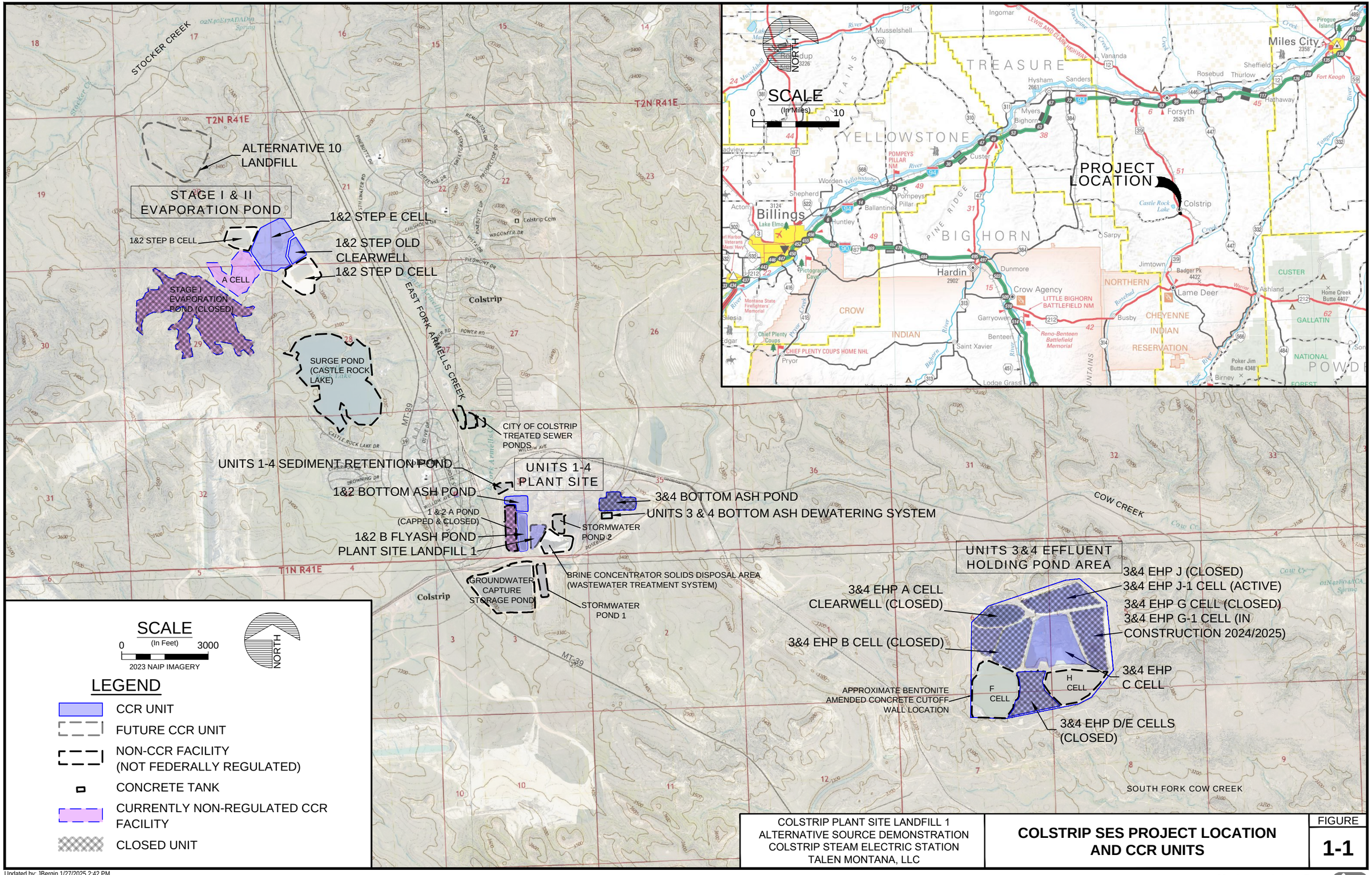
Well/Prediction Limit	Date Sampled	Boron 0.80	Calcium 380.0	Chloride 287.0	Fluoride 0.2	pH 7.2 - 7.4	Sulfate 2790.4	TDS 4440.3
AB17-S	10/2/24	**3.2**	**472**	**524**	0.2	**6.9**	**5680**	**10100**
AB19-S/M	10/2/24	**5.22**	**566**	**667**	0.2	**6.9**	**3430**	**6620**

SSI are indicated by bold type and highlighted entries.

All units in mg/L, except pH (s.u.) ; ND = non-detect

Background concentrations for shallow fill/alluvium based on wells 63S and 104A.

FIGURES



COLSTRIP PLANT SITE LANDFILL 1
ALTERNATIVE SOURCE DEMONSTRATION
COLSTRIP STEAM ELECTRIC STATION
TALEN MONTANA, LLC

COLSTRIP SES PROJECT LOCATION AND CCR UNITS

FIGURE
1-1

Updated by: JBergin 1/27/2025 2:42 PM
I:\Land Projects\TALEN\CCR\1601624B042.dwg [FIG 1-1 LOC]

Hydrometrics, Inc.

UNITS 1-4 SEDIMENT RETENTION POND

1 & 2 BAP

1&2 B POND

164M-CCR

201M

AB-17S

72M

PLANT SITE LANDFILL 1

STORM WATER POND #2

163M-CCR
AB-19S/M

162M-CCR

179SP

BRINE CONCENTRATOR SOLIDS DISPOSAL AREA (WASTEWATER TREATMENT SYSTEM)

63S

FORMER UNITS 1&2 A POND
(CAPPED & CLOSED)

104A

GROUNDWATER CAPTURE STORAGE POND

STORM WATER POND #1

39M

38M

SCALE
(In Feet)
0 400
2023 NAIP IMAGERY

NORTH

LEGEND

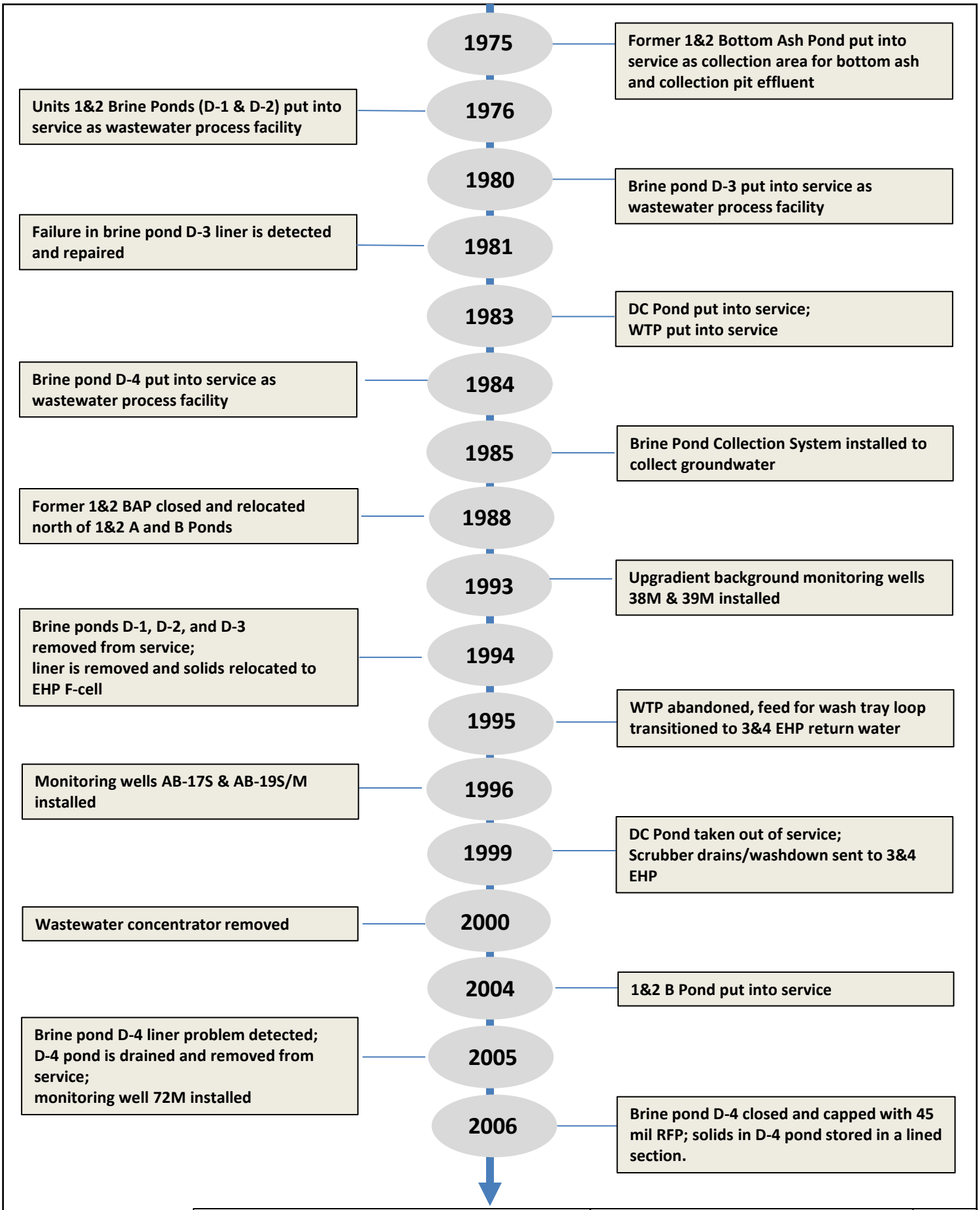
38M	BACKGROUND CCR RULE MONITORING WELL
160M-CCR	DOWNGRADIENT CCR RULE MONITORING WELL
179SP	2025 WELL
	NEW WELL
	EAST FORK ARMELLS CREEK
	1&2 B POND CCR UNIT
	1&2 BOTTOM ASH POND (BAP) CCR UNIT
	PLANT SITE LANDFILL 1 (PS LF 1) CCR UNIT
	NON-CCR FACILITY (NOT FEDERALLY REGULATED)
	CURRENTLY NON-REGULATED CCR FACILITY

COLSTRIP PLANT SITE LANDFILL 1
ALTERNATIVE SOURCE DEMONSTRATION
COLSTRIP STEAM ELECTRIC STATION
TALEN MONTANA, LLC

**PLANT SITE LANDFILL 1
GROUNDWATER MONITORING SYSTEM**

FIGURE
1-2

Hydrometrics, Inc.

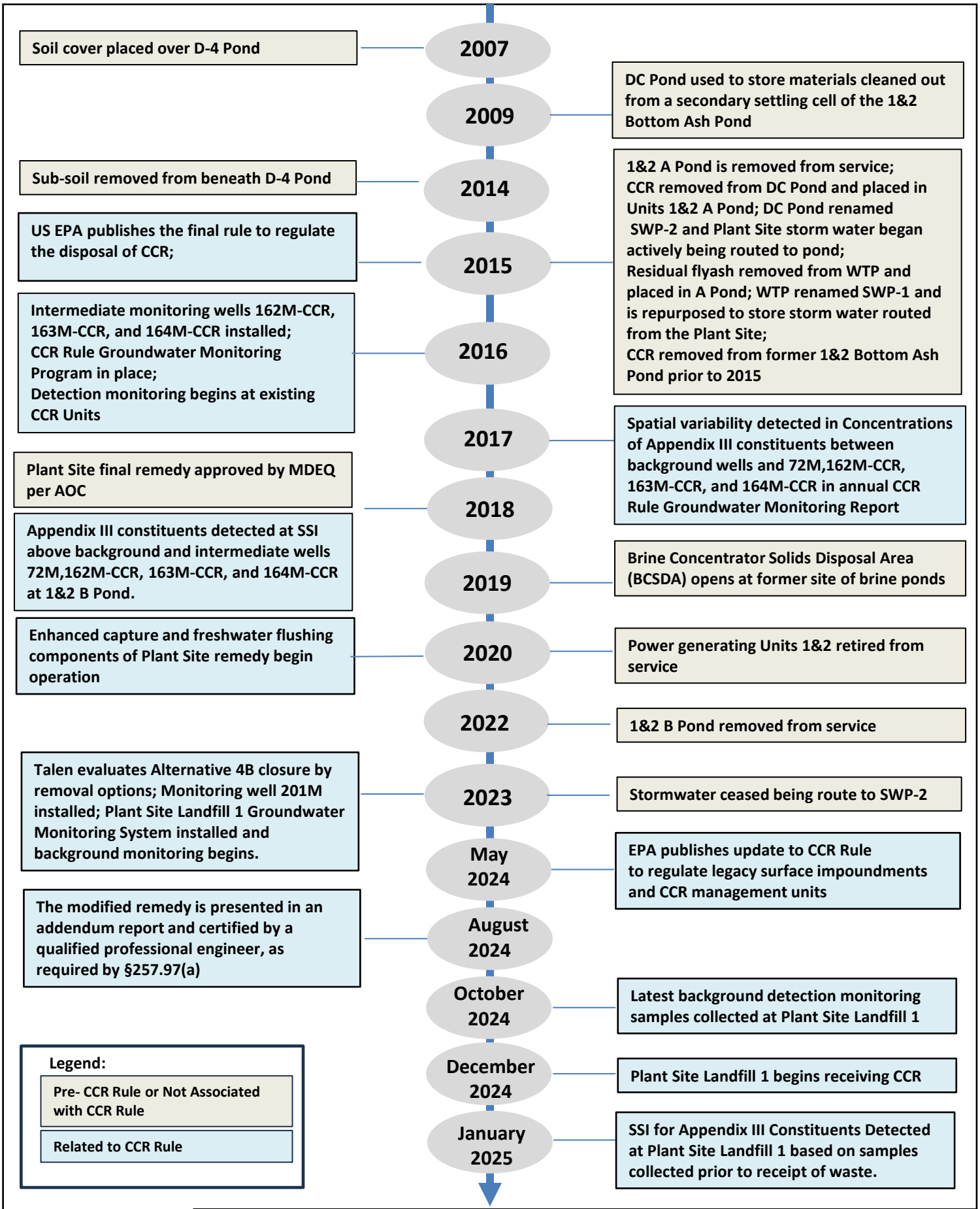


Hydrometrics, Inc.
Consulting Scientists and Engineers

COLSTRIP PLANT SITE LANDFILL 1
ALTERNATIVE SOURCE DEMONSTRATION
COLSTRIP STEAM ELECTRIC STATION
TALEN MONTANA, LLC

Plant Site Landfill 1 Area Timeline

Figure 2-1

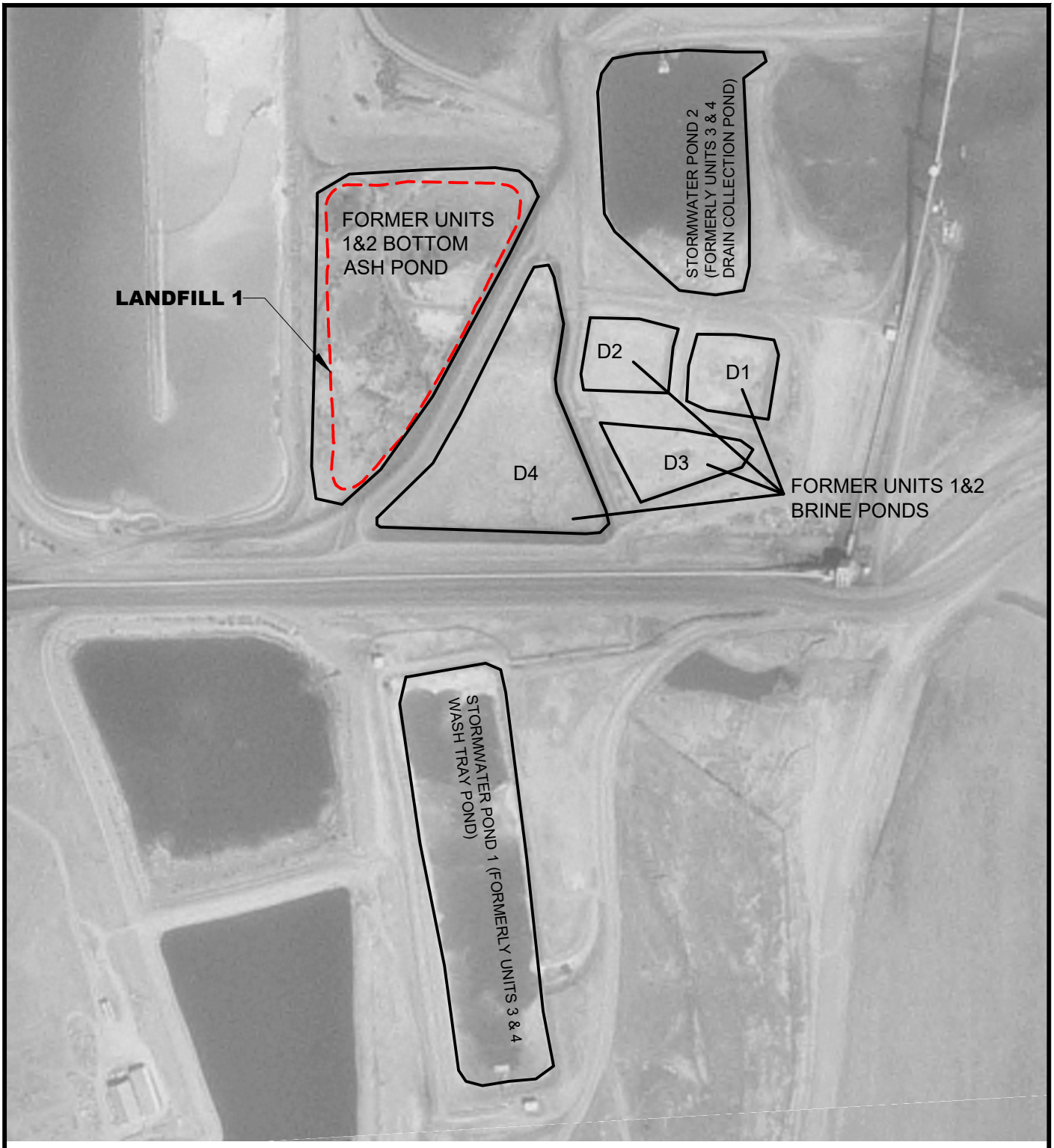


Hydrometrics, Inc.
Consulting Scientists and Engineers

COLSTRIP PLANT SITE LANDFILL 1
ALTERNATIVE SOURCE DEMONSTRATION
COLSTRIP STEAM ELECTRIC STATION
TALEN MONTANA, LLC

Plant Site Landfill 1 Area Timeline

Figure 2-1



LEGEND

LANDFILL1 CCR UNIT

FORMER POND

NORTH

SCALE

(In Feet)

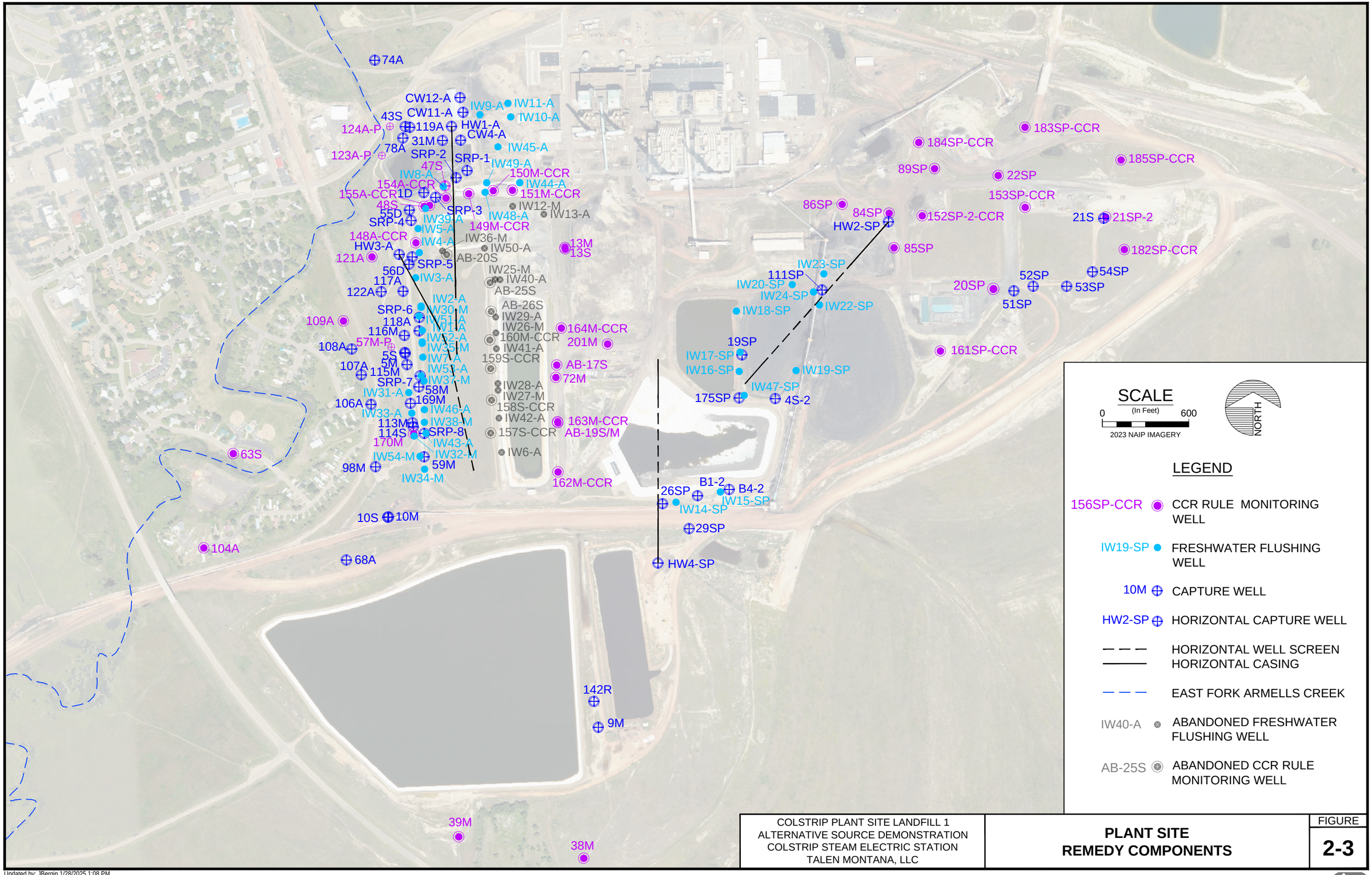
0 400

1996 AERIAL IMAGE

COLSTRIP PLANT SITE LANDFILL 1 **ALTERNATIVE SOURCE DEMONSTRATION** **COLSTRIP STEAM ELECTRIC STATION** **TALEN MONTANA, LLC**	**FORMER POTENTIAL SOURCE AREAS UPGRADIENT OF PLANT SITE LANDFILL 1**	FIGURE **2-2**

Updated by: JBergin 4/2/2025 11:11 AM
I:\Land Projects\TALEN\2303200\2303200B023.dwg [FIG 2-2 FORMER PONDS]

Hydrometrics, Inc.



SCALE
(In Feet)
0 600
2023 NAIP IMAGERY

NORTH

LEGEND

- 156SP-CCR — CCR RULE MONITORING WELL
- IW19-SP — FRESHWATER FLUSHING WELL
- 10M — CAPTURE WELL
- HW2-SP — HORIZONTAL CAPTURE WELL
- HORIZONTAL WELL SCREEN
- HORIZONTAL CASING
- EAST FORK ARMELLS CREEK
- IW40-A — ABANDONED FRESHWATER FLUSHING WELL
- AB-25S — ABANDONED CCR RULE MONITORING WELL

COLSTRIP PLANT SITE LANDFILL 1
ALTERNATIVE SOURCE DEMONSTRATION
COLSTRIP STEAM ELECTRIC STATION
TALEN MONTANA, LLC

PLANT SITE
REMEDY COMPONENTS

FIGURE
2-3

Updated by: JBergin 1/28/2025 1:08 PM
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Hydrometrics, Inc.