

**ANNUAL GROUNDWATER MONITORING AND CORRECTIVE ACTION
REPORT
ASH LANDFILL GROUNDWATER MONITORING WELLS
SPRINGVILLE GENERATING STATION
SPRINGVILLE, ARIZONA**

Prepared for
TUCSON ELECTRIC POWER COMPANY
January 29, 2021

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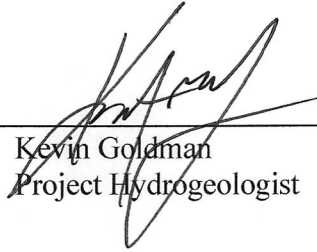
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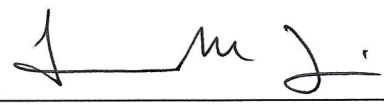
**Annual Groundwater Monitoring and Corrective Action Report
Ash Landfill Groundwater Monitoring Wells
Springerville Generating Station
Tucson Electric Power Company
Springerville, Arizona**

The material and data in this report were prepared under the supervision and direction of the undersigned.

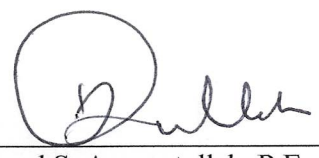
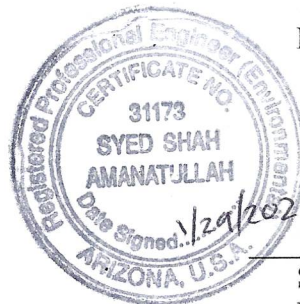
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EXECUTIVE SUMMARY §257.90(e)(6)

The ash disposal landfill (Ash Landfill) at the Springerville Generating Station (SGS), operated by Tucson Electric Power Company (TEP), is an “existing CCR landfill” under the US EPA’s Coal Combustion Residuals (CCR) Rule in 40 CFR §257. The SGS, a coal-fired, steam electric generating facility located approximately 15 miles northeast of Springerville, Arizona, has been in operation since 1985.

A groundwater monitoring system for the Ash Landfill, comprised of 2 upgradient and 3 downgradient groundwater wells, was installed in 2016. The wells are listed below:

- Well CCR-1U (upgradient);
- Well CCR-2U (upgradient);
- Well CCR-1D (downgradient);
- Well CCR-2D (downgradient); and
- Well CCR-3D (downgradient).

At the start of the current annual reporting period, the CCR unit was operating under the detection monitoring program under the CCR Rule. Semi-annual groundwater monitoring was conducted at each CCR well for all constituents listed in appendix III of the rule.

During the 2020 monitoring year, TEP completed two (2) semi-annual groundwater monitoring events (including any verification sampling events) in accordance with the CCR rule and Sampling and Analysis Plan (SAP). No major actions or corrective actions were required based on the comparison of the analytical results and the numeric limits for each well-constituent pair. There were no Statistically Significant Increases (SSIs) over background for one or more of the constituents listed in appendix III to 40 CFR §257.94(e). At the end of the current annual reporting period, the SGS Ash Landfill continues to operate under the detection monitoring program.

1 INTRODUCTION

1.1 Purpose and Content

AMTECH Associates L.L.C. (AMTECH) has prepared this 2020 Annual Groundwater Monitoring and Corrective Action Report (2020 Annual Groundwater Report) on behalf of Tucson Electric Power Company (TEP) to comply with the Coal Combustion Residuals (CCR) Rule. The CCR Rules are codified under Title 40 of the US Code of Federal Regulations (40 CFR), Parts 257 and 261. The Springerville Generating Station (SGS, or Facility) is an electric generating facility with an existing ash disposal landfill that is defined as an “existing CCR landfill,” under 40 CFR §257.53.

1.1.1 Annual Report Requirements (§257.90(e))

To comply with 40 CFR §257.90(e), the owner or operator of an existing CCR landfill must prepare an annual report for the preceding calendar year to document the status of groundwater monitoring and summarize key actions completed. This Report also describes problem(s) encountered in relation to the groundwater monitoring program, actions taken to resolve the problems, and project key activities for the upcoming year.

To comply with these requirements, at a minimum, this Report contains the following information for the 2020 calendar year, to the extent applicable:

- CCR unit and CCR monitoring wells map;
- Identification of installed CCR monitoring wells;
- Summary of groundwater monitoring data;
- A narrative discussion of any transition between monitoring programs; and
- Other information specified in 40 CFR §257.90 through 40 CFR §257.98.

1.2 Facility Description

The TEP SGS is located approximately 15 miles northeast of Springerville, in Apache County, Arizona and has been in operation since 1985. The SGS is a four-unit, pulverized coal-fired, steam electric generating facility that has a combined net generating output of approximately 1,600 megawatts.

The SGS site occupies 15,777 acres, which includes the power plant area, ash landfill area and the east and west production well fields. The power plant area of SGS is located in Sections 27, 28, 33, and 34, of Township 11 North, Range 30 East of the Salt and Gila River Baseline and Meridian, northeast of the Ash Landfill.

The Ash Landfill is primarily used for the disposal of fly and bottom ash, products of the coal-fired units at the plant. A delineated portion of the Ash Landfill is also used for the disposal of other items in lesser quantities (e.g., various process wastes and other inert and non-hazardous materials).

1.3 Project Background

Initial groundwater quality conditions were determined following the minimum required eight (8) groundwater samples from each well in the monitoring network, in accordance with 40 CFR §257.94(b). These results were used to calculate numeric (prediction) limits for the detection monitoring Program constituents at each CCR well (i.e., well-constituent pairs), pursuant to 40 CFR §257.93(f), using the US Environmental Protection Agency (USEPA) Unified Guidance Document.

Historically, prediction limits have been used in the state of Arizona for the statistical analysis of groundwater monitoring results in relation to solid waste facilities. The initial prediction limits established for this Facility in 2017 were revised in early 2018 (Addendum No. 1 to the 2017 Annual Groundwater Report) following the recognition and correction of an error in the calculations.

TEP may revise the statistical method(s) employed (i.e., prediction limits) to any of those identified in 40 CFR §257.93(f) or any other that can meet the performance standards in 40 CFR §257.93(g). If the statistical analysis method(s) are revised or replaced, the Statistical Method Certification, which is required by 40 CFR §257.93(f)(6), will also be revised.

2 SGS CCR MONITORING WELL NETWORK

2.1 CCR Unit and Monitoring Wells Map (§257.90(e)(1))

An aerial image of the SGS Ash Landfill with the background (i.e., upgradient) wells, compliance (i.e., downgradient) wells, and well identification numbers, are shown on the Monitoring Well Locations and Groundwater Contour Map (**Figure 1**).

2.2 Identification of Installed Monitoring Wells (§257.90(e)(2))

The installation of the groundwater monitoring system at the SGS Ash Landfill was completed in 2016. There have been no monitoring wells installed or decommissioned during the present reporting period. The system consists of five (5) groundwater monitoring wells: two (2) upgradient wells and three (3) downgradient wells, each with its own dedicated, low-flow pump manufactured and installed by QED Environmental Systems, Inc. (QED). The CCR monitor wells are identified as follows:

- Well CCR-1U (upgradient);
- Well CCR-2U (upgradient);
- Well CCR-1D (downgradient);
- Well CCR-2D (downgradient); and
- Well CCR-3D (downgradient).

A Groundwater Monitoring System Certification report was completed in October 2017 to certify that the groundwater monitoring system installed at the SGS Ash Landfill meets the CCR groundwater monitoring systems requirements of 40 CFR §257.91.

A summary table of the CCR groundwater monitoring well construction is included in **Appendix A**.

2.3 Summary of Groundwater Monitoring Activities (§257.90(e)(3))

The SGS Ash Landfill is currently subject to the detection monitoring program requirements. This program includes semi-annual groundwater monitoring at each CCR

well for all constituents listed in Appendix III of the rule. This frequency is in agreement with the minimum required sampling frequency for the statistical method employed. The data collected are evaluated for SSIs above the established numeric limits as discussed in Section 1.3 and shown on Table 2. As such, semi-annual monitoring activities were conducted by Confluence Environmental, Inc. (Confluence) in accordance with the SGS CCR Monitoring Network Sampling and Analysis Plan (SAP, June 2016). These activities are discussed below.

2.4 Groundwater Elevations

Confluence measured and documented static groundwater levels prior to well purging. Static groundwater elevations (prior to sampling) are presented in **Table 1**, and are illustrated in the most recent groundwater contour map shown on **Figure 1**. The 2020 semi-annual sampling events also confirmed minimal fluctuations in groundwater elevations. These fluctuations are consistent with the minimal fluctuations measured during the initial eight (8) rounds of sampling, and the 2017 through 2019 semi-annual sampling events. Therefore, AMTECH concludes there is little overall change in groundwater velocity and direction across the Ash Landfill.

In addition, Confluence measured groundwater quality markers (e.g., pH, conductivity, temperature, etc.) prior and during well purging. Field documentation and reports for all the semi-annual monitoring events are filed in the Facility operating record.

2.5 Groundwater Quality Results

Groundwater samples were analyzed by TestAmerica Laboratories, Inc. (TestAmerica) for the constituents listed in Appendix III of the rule using EPA-approved methods, in accordance with 40 CFR §136 and as referenced in the SAP. Analytical results were compared against established numeric limits (**Table 2**) to determine if there is a SSI over background levels. Results for the sampling events are summarized in **Table 2** and discussed below. Sampling documentation and laboratory analytical reports for the semi-annual monitoring events are filed in the Facility operating record.

2.5.1 First Semi-Annual Monitoring Event

The first semi-annual monitoring event (2020 Semiannual 01) occurred on February 2, 2020. For this monitoring event, the analytical results indicated that all well-constituent pairs were within their respective numeric limits and confirms no SSIs for these well-constituent pairs.

2.5.2 Second Semi-Annual Monitoring Event

The second semi-annual monitoring event (2020 Semiannual 02) occurred on August 26 and 27, 2020. The analytical results indicated that all well-constituent pairs were within

their respective numeric limits with the exception of one (1) well-constituent pair, 2D-TDS. The concentration level of 2D-TDS was 4,020 mg/L, higher than the respective numeric limit of 3,898 mg/L, (**Table 2**).

A verification sample was collected on October 1, 2020, to confirm the 2D-TDS concentration. The analytical results obtained from the CCR-2D verification sampling event demonstrated that the 2D-TDS well-constituent pair concentration was 3,640 mg/L, which is below its respective numeric limit (**Table 2**) and confirms no SSI for this well-constituent pair. The higher TDS concentration detected in August 2020 may be attributed to natural variation in groundwater quality.

For this monitoring event, the analytical results indicated that all well-constituent pairs were within their respective numeric limits and confirms no SSIs for these well-constituent pairs.

2.6 Transition between Monitoring Programs §257.90(e)(4)

The detection monitoring Program was initiated following completion of the initial eight rounds of groundwater quality sampling in June 2017, in accordance with 40 CFR §257.94(a). No SSI was determined for any well-constituent pair during the 2020 groundwater monitoring events. Consequently, the Facility is continuing to operate under the detection monitoring Program.

2.7 Other Information §257.90(e)(5)

In accordance with 40 CFR §257.93(e), other information to be provided regarding the current annual reporting period includes the following, which are summarized below:

- Summarizing key actions completed;
- Describing problems encountered;
- Discussing actions to resolve the problems;
- Projecting key activities for the upcoming year.

2.7.1 Key Actions Completed

Completion of the 2019 Annual Groundwater Report and completion of the required 2020 semi-annual groundwater monitoring events were the major actions completed this reporting period.

2.7.2 Problems Encountered and Related Corrective Actions

There were no major problems encountered during the 2020 first and second semi-annual monitoring events.

2.7.3 Key Actions Projected for Upcoming Year

During 2021, the facility will complete this 2020 Annual Groundwater Report and continue with the required groundwater monitoring. No other actions are anticipated.

2.8 Conclusion

TEP completed the two semi-annual groundwater monitoring events in 2020 as required by 40 CFR §257.94(b). No other major actions or corrective actions were required. Analytical results were compared against established numeric limits and reviewed for exceedances. It was concluded that there were no verified SSIs in the three compliance (downgradient) wells, therefore, the SGS Ash Landfill remains under the detection monitoring program.

3 RECORDKEEPING, NOTIFICATION, INTERNET POSTING

As per CFR Part 40 CFR §257.90(f), the owner or operator of the CCR landfill must comply with the recordkeeping requirements specified in 40 CFR §257.105(h)(1), the notifications requirements specified in 40 CFR §257.106(h)(1), and the internet requirements specified in 40 CFR §257.107(h)(1).

In accordance with CFR Part 40 CFR §257.105(h)(1), TEP will place this Annual Groundwater Monitoring and Corrective Action report in the facility's operating record.

In accordance with CFR Part 40 CFR §257.106(h)(1), within 30 days of placing this 2020 Annual Groundwater Report in the operating record, TEP will notify the State Director when this report has been placed in the operating record and on the facility's publicly accessible internet site.

In accordance with CFR Part 40 CFR §257.107(h)(1), within 30 days of placing this 2020 Annual Groundwater Report in the operating record, TEP will place this report on the facility's CCR internet site.

TABLES

TABLE 1**SGS CCR Ash Landfill Groundwater Monitoring Well Elevations**

SAMPLING EVENT	SGS CCR WELLS GROUNDWATER ELEVATIONS (FT AMSL)				
	CCR-1U	CCR-2U	CCR-1D	CCR-2D	CCR-3D
November 15, 2016	6,147.43	5,991.80	5,873.86	5,941.66	6,038.82
December 20, 2016	6,147.25	6,008.89	5,874.83	5,942.68	6,038.63
January 31, 2017	6,146.56	6,009.42	5,875.35	5,939.64	6,036.36
February 21, 2017	6,147.38	5,999.37	5,875.33	5,934.89	6,038.54
March 28, 2017	6,147.23	6,003.52	5,875.30	5,934.83	6,038.94
April 26, 2017	6,147.78	6,002.62	5,877.65	5,936.14	6,038.86
May 24, 2017	6,150.62	6,001.08	5,879.83	5,937.38	6,041.41
June 21, 2017	6,147.16	6,003.40	5,875.32	5,934.72	6,038.84
July 18, 2017	6,147.75	5,997.77	5,877.24	5,936.01	6,038.99
February 27, 2018	6,147.81	5,999.82	5,875.30	5,937.00	6,037.55
May 30, 2018 *	N/S	N/S	N/S	N/S	6,038.97
August 20, 2018	6,147.60	5,998.52	5,867.19	5,941.06	6,038.85
October 10, 2018 *	6,147.72	N/S	5,865.38	N/S	N/S
February 26, 2019	6,147.44	5,994.41	5,868.34	5,940.55	6,038.86
April 9, 2019 *	N/S	N/S	N/S	N/S	6,038.93
August 20, 2019	6,147.63	5,990.02	5,867.79	5,940.49	6,039.15
October 1, 2019 *	6,148.55	N/S	N/S	N/A	6,039.04
February 25, 2020	6,146.22	5,989.22	5,875.83	5,940.04	6,037.70
August 25, 2020	6,147.63	5,990.61	5,873.99	5,941.28	6,039.32
October 1, 2020 *	N/S	N/S	N/S	5,940.74	N/S

Notes: FT AMSL - feet above mean sea level

* Verification Sampling Date.

N/S - No Sample collected and water level not recorded.

N/A - Not Available (well sounder stuck at ~515' depth).

TABLE 2
SUMMARY OF 2020 GROUNDWATER QUALITY DETECTION SAMPLING RESULTS
SGS CCR Ash Landfill Groundwater Monitoring Wells

Well ID	Constituent	Lab Report ID 550-138508-1	Lab Report ID 550-148094-1	Numeric Limits	Units
		Sampling Date 2/25/2020	Sampling Date 8/26/2020		
1U	Boron	0.87	0.90	0.98	mg/L
1U	Calcium	440	460	499	mg/L
1U	Chloride	470	510	581	mg/L
1U	Fluoride	2.8	3.3	3.4	mg/L
1U	pH	6.4	6.97	5.8-7.3	SU
1U	Sulfate	1,270	1,270	1,379	mg/L
1U	TDS	3,100	3,360	3,525	mg/L
2U	Boron	1.2	1.2	1.33	mg/L
2U	Calcium	680	740	752	mg/L
2U	Chloride	410	440	516	mg/L
2U	Fluoride	2.2	2.6	3.1	mg/L
2U	pH	6.4	6.65	6.0-7.6	SU
2U	Sulfate	1,900	1,860	2,112	mg/L
2U	TDS	3,800	4,080	4,130	mg/L
2U Dup	Boron	1.1	1.2	1.33	mg/L
2U Dup	Calcium	660	680	752	mg/L
2U Dup	Chloride	420	440	516	mg/L
2U Dup	Fluoride	2.2	2.6	3.1	mg/L
2U Dup	pH	6.3	6.65	6.0-7.6	SU
2U Dup	Sulfate	1910	1,830	2,112	mg/L
2U Dup	TDS	3800	3,940	4,130	mg/L
1D	Boron	0.83	0.88	0.98	mg/L
1D	Calcium	410	460	546	mg/L
1D	Chloride	450	490	557	mg/L
1D	Fluoride	2.8	3.0	3.9	mg/L
1D	pH	6.5	6.72	5.8-7.7	SU
1D	Sulfate	1,140	1,240	1,523	mg/L
1D	TDS	2,900	3,120	3,489	mg/L
2D	Boron	0.95	0.97	1.03	mg/L
2D	Calcium	630	660	693	mg/L
2D	Chloride	500	540	596	mg/L
2D	Fluoride	2.4	2.7	3.6	mg/L
2D	pH	6.6	7.03	5.9-7.5	SU
2D	Sulfate	1,830	1,770	1,929	mg/L
2D	TDS	3,700	4,020	3,898	mg/L
2D*	TDS (Verification)	NA	3,640	3,898	mg/L
3D	Boron	0.88	0.93	0.97	mg/L
3D	Calcium	420	460	486	mg/L
3D	Chloride	490	520	615	mg/L
3D	Fluoride	2.8	3.2	3.9	mg/L
3D	pH	6.5	6.67	6.2-7.3	SU
3D	Sulfate	1,300	1,290	1,402	mg/L
3D	TDS	3,000	3,180	3,402	mg/L

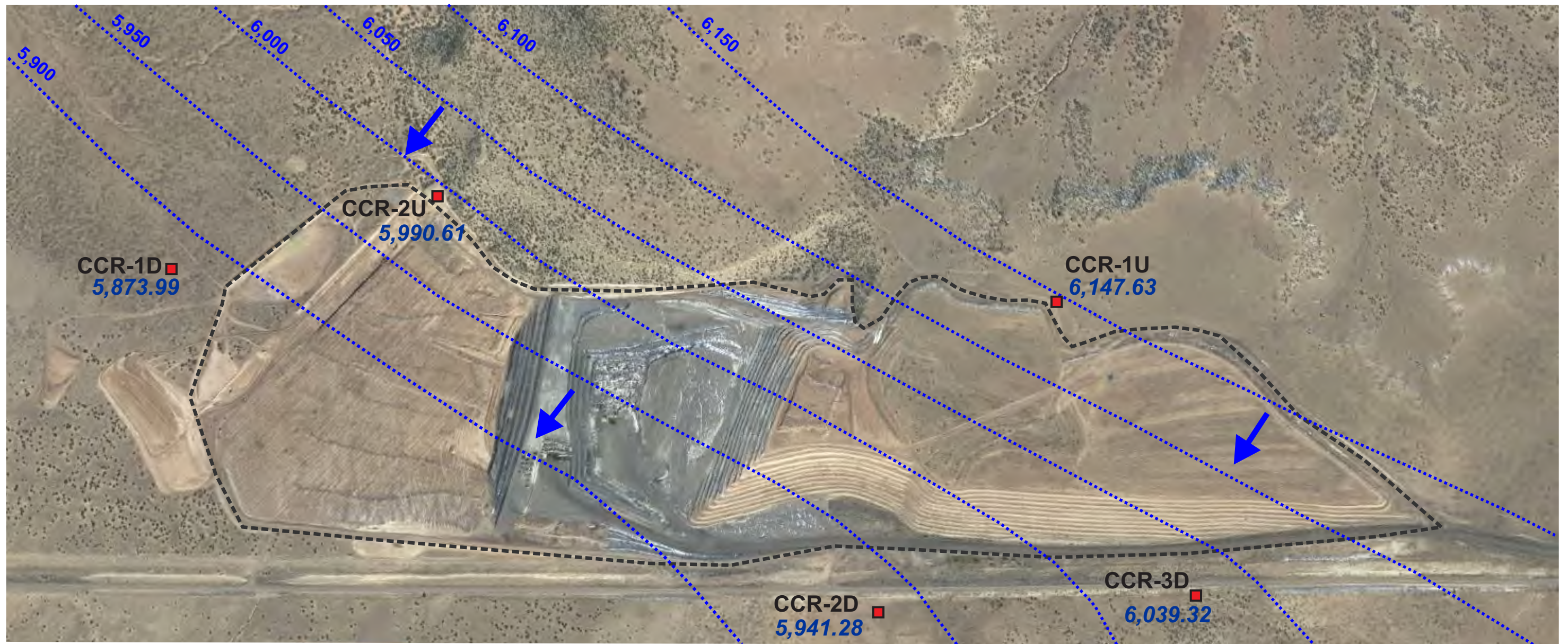
Notes: Samples analyzed by TestAmerica. pH values measured by sampling team (Confluence).

Abbreviations: TDS - Total Dissolved Solids. mg/L - milligrams per liter. SU - standard units. NA - Not Applicable.

* A verification sample for CCR 2D-TDS was collected on 10/01/20 (Ref: Laboratory Report ID J150123-1).

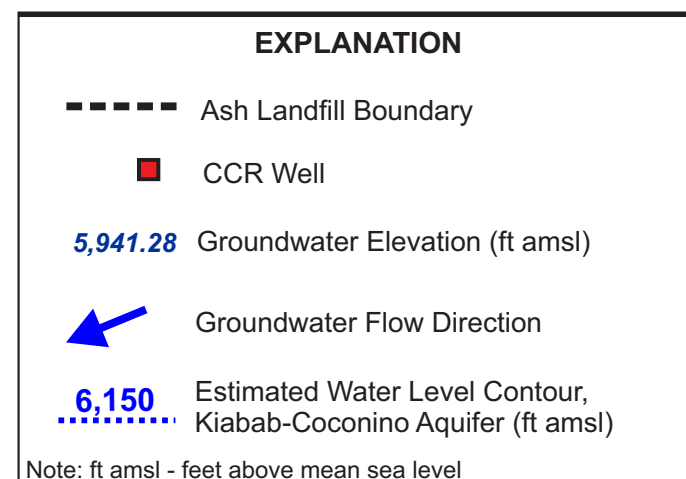
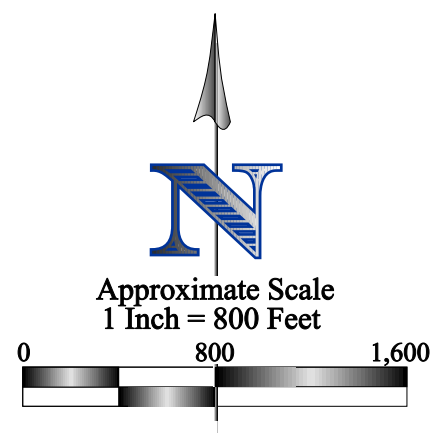
FIGURE

MONITORING WELL LOCATIONS AND GROUNDWATER
CONTOUR MAP



Notes:

1. Groundwater water level elevation contours modified from Montgomery & Associates, Groundwater Elevation, Figure 3 (2016).
2. Groundwater elevations reflect the measurements obtained during the August 2020 sampling event.





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**MONITORING WELL LOCATIONS
AND GROUNDWATER CONTOUR MAP**

Springerville Generating Station
Tucson Electric Power Company
Springerville, Arizona

Figure

1

APPENDIX A

MONITORING WELL CONSTRUCTION SUMMARY

Springerville Generating Station
Ash Landfill Facility
CCR Monitoring Wells Construction Summary

Well Name	Upgradient or Downgradient	Approx. Distance from CCR Landfill Boundary (FT)	Completion Date	Total Drilled Depth (FT)	Screened Interval (FT)	Casing Material	Pump Placement Depth (FT)	Pump Installation Date	Groundwater Level (FT)	Date Measured
CCR-1U	Upgradient	150	3/1/2016	860	792-842	PVC	826.4	6/22/2016	803.95	6/22/2016
CCR-2U	Upgradient	92	4/28/2016	1067	740-840	PVC	790.8	6/22/2016	768.44	6/22/2016
CCR-1D	Downgradient	575	3/12/2016	904	820-900	PVC	846.3	6/22/2016	830	6/22/2016
CCR-2D	Downgradient	195	4/7/2016	1000	860-960	PVC	910	6/21/2016	894.55	6/21/2016
CCR-3D	Downgradient	190	4/9/2016	963	810-910	PVC	839.7	6/21/2016	827.78	6/21/2016

Note: All depths in feet (FT) are below ground surface.