



SECOND QUARTER 2022
GROUNDWATER LEVEL MONITORING REPORT
Blythe Solar Power Project

Riverside County, California

Prepared for
Blythe Solar 110 LLC, Blythe Solar II LLC, and Blythe Solar III LLC
Mitigation Measure Soil & Water-5

July 15, 2022

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SIGNATURE PAGE

SECOND QUARTER 2022 GROUNDWATER MONITORING REPORT

BLYTHE SOLAR POWER PROJECT

RIVERSIDE COUNTY, CALIFORNIA

PROFESSIONAL STATEMENT

I declare under the penalty of law that I have personally examined and am familiar with the information submitted in this document, and that based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of a fine and imprisonment for knowing violations.

I further certify that this report has been reviewed by the appropriate authority at NextEra Energy Resources and is being submitted with their written consent.



Arlin W. Brewster

Professional Geologist 9207

July 15, 2022

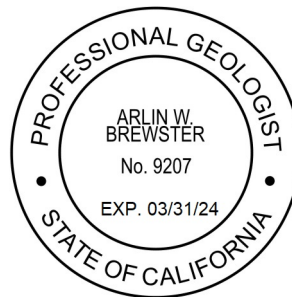


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1.0 INTRODUCTION

Northstar Environmental Remediation (Northstar) has prepared this Second Quarter 2022 Groundwater Monitoring Report on behalf of Blythe Solar 110 LLC, Blythe Solar II LLC, and Blythe Solar III LLC. This report details groundwater monitoring activities performed in April, May, and June 2022 at the Blythe Solar Power Project (BSPP).

The BSPP is a planned 485-megawatt photovoltaic solar energy generating facility located within the Palo Verde Mesa. Blythe 110 (Unit 1) and Blythe II (Unit 2) completed construction in 2016 and produce 110 and 125 megawatts, respectively. The perimeter fence for Unit 3 and 4 was constructed between February and June 2018. Construction on Blythe III (Unit 3 and 4) began in late August 2019 and is expected to be complete in the fourth quarter of 2022. Blythe III will produce up to an additional 250 megawatts. The McCoy Solar Energy Project (MSEP) and Arlington Solar Project (Arlington) are adjacent to the north of BSPP.

Northstar conducts groundwater monitoring in accordance with Adopted Mitigation Measure Soil & Water-5 (S&W-5) from Appendix 5 of the Record of Decision, issued by the Bureau of Land Management (BLM 2014).

1.1 Background

The BSPP lies roughly 10 miles west of the city of Blythe, California in eastern Riverside County on land managed by the Bureau of Land Management (BLM) and County of Riverside (**Figure 1**). The right-of-way grant issued by the BLM requires monitoring of groundwater wells potentially affected by drawdown due to groundwater extraction for construction or operational activities.

AECOM (2010) prepared a *Groundwater Level Monitoring, Mitigation, and Reporting Plan* to model potential groundwater drawdown related to project pumping, and to define roles and responsibilities of the monitoring and mitigation programs. A map showing the estimated area expected to exhibit one foot or greater drawdown during the life of the project, determined by groundwater modeling, is included on **Figure 2**.

Two groundwater extraction wells, BSPP Well-2 and Well-3, were installed for construction water supply. BSPP Well-2 was online from August to September 2014; from January to April 2015; from July 2015 to November 2016; intermittently during the first week of May 2018 while the pump in BSPP Well-3 was being repaired; and from August 2019 to April 2020 to support the construction of Unit 3 & 4. This well was shut down on April 17, 2020. BSPP Well-3 was online from March 2015 to August 2016, for fence construction from February 19 to May 29, 2018, intermittently for dust suppression in 2017, 2018, and 2019, and for dust suppression and construction support from January 2020 to present. **Table 2 and 3** provide a summary of all groundwater extraction to date from BSPP Well-2 and BSPP Well-3, respectively.

Another onsite well, BSPP Well WO-2, was installed as a potential groundwater extraction well, but will be used for groundwater monitoring for the duration of the project.

There are more than 75 known offsite groundwater extraction wells within a 5-mile radius of the BSPP. Groundwater elevation data is not regularly submitted to the National Water Information System (NWIS) and, in most cases, there is no data from the last several years. Many of these wells are equipped with agricultural pumps that operate on a seasonal basis, while the use of others is intermittent or unknown. The regional effect from these wells on the Palo Verde Mesa groundwater table and on water levels within the monitoring network is not well documented.

1.2 Soil & Water-5 Requirements

The following is a summary of adopted Mitigation Measure S&W-5 requirements and their status:

- A Groundwater Level Monitoring, Mitigation, and Reporting Plan shall be prepared prior to construction. **Status: Complete** (AECOM 2010).
- Establish pre-construction groundwater level trends. **Status: Complete** (AECOM 2014).
- Using groundwater modeling, define the area expected to exhibit one foot or greater drawdown during construction and operation. **Status: Complete (Figure 2)**.
- Perform annual groundwater quality sampling for onsite potable water sources. **Status: Not Applicable**. Potable water is not obtained from onsite groundwater extraction wells.
- Perform groundwater level monitoring on a quarterly basis and assess trends using the Mann-Kendall test during the construction phase. **Status: In Progress** (construction of Unit 3 and 4 infrastructure began in August 2019 and is expected to be complete in the fourth quarter of 2022).
- Perform groundwater level monitoring on a quarterly basis and assess trends using the Mann-Kendall test during the first year of the operational phase. **Status: Pending** (construction of Unit 3 and 4 is not yet complete).
- Perform groundwater level monitoring on a semi-annual basis and assess trends using the Mann-Kendall test during the second through fifth years of the operational phase. **Status: Pending** (task will begin one year after construction of Unit 3 and 4 is complete).
- On an annual basis, assess statistical trends in context of effect on offsite wells, and assess pressure transducer data for seasonal and diurnal trends. **Status: In Progress** (included in the fourth quarter/annual groundwater level monitoring reports).
- Assess if impacts to offsite wells, if any, exceed 5 feet of drawdown and are directly related to pumping activity at the BSPP. **Status: In Progress** (included in all groundwater level monitoring reports).

2.0 GROUNDWATER EXTRACTION

No groundwater was extracted from BSPP Well-2 during the reporting period. A total of 623,000 gallons was extracted from BSPP Well-3 during the reporting period. Construction on Units 3 & 4 began in late August 2019 and was supported by water from both BSPP Well-2 and Well-3. Northstar collects totalizer readings quarterly during regular well monitoring events (**Tables 2 and 3**).

Groundwater will not be extracted from BSPP Well WO-2 for the foreseeable future. BSPP Well-2 was used to support construction activity until April 17, 2020. Groundwater will continue to be extracted from BSPP Well-3 for the construction of Unit 3 and 4 (as needed). When necessary, the photovoltaic panels are cleaned with filtered, deionized water transported from an offsite source.

Daily, monthly, and quarterly groundwater extraction totalizer readings (when required) and cumulative extraction totals are provided in **Tables 2 and 3** for extraction wells BSPP Well-2 and BSPP Well-3, respectively. The pumping schedule for all wells on the BSPP and MSEP are displayed in **Appendix C**.

3.0 GROUNDWATER LEVEL MONITORING NETWORK

3.1 Monitoring Wells

Groundwater levels are monitored directly in four wells equipped with transducers, eight wells using only a water level meter and remotely in five wells on the NWIS website (**Table 1, Figure 1**). Wells within the monitoring network are as follows:

Onsite Wells:

- BSPP Well-2: Located in the eastern half of BSPP. Historically used for construction water supply and currently used for monitoring only.
- BSPP WO-2: Located northeast of BSPP Well-2. Used for monitoring only.
- BSPP Well-3: Located near the western edge of BSPP. Historically used for construction water supply and currently used for monitoring, intermittent dust suppression, and construction water supply as needed.

Offsite Wells:

- Gila Farm Well: Located about 4.0 miles southeast of the MSEP. Used for monitoring only.
- County Well 25A2S: Located northwest of the Blythe Airport. Currently abandoned but historically used for agricultural irrigation. Used for monitoring.
- County Well 25F1S: Located northwest of the Blythe Airport. Currently abandoned but historically used for agricultural irrigation. Used for monitoring.
- County Well 25L1S: Located west of the Blythe Airport. Currently abandoned but historically used for agricultural irrigation. Used for monitoring.
- County Well 36F1S: Located southwest of the Blythe Airport. Currently abandoned but historically used for agricultural irrigation. Used for monitoring.
- County Well 36G1S: Located southwest of the Blythe Airport. Currently abandoned but historically used for agricultural irrigation. Used for monitoring.
- 6S/22E-19N2S: Located about 4.0 miles south of the MSEP. This well was monitored by the USGS until June 2016 and reported through the NWIS website. It has been monitored quarterly by Northstar since December 2019.
- 6S/22E-09P1S: Located about 4.5 miles southeast of the MSEP. This well was monitored by the USGS until March 2022 and reported through the NWIS website. It has been monitored quarterly by Northstar since June 2022.
- 5S/22E-31E1S: Located near the eastern edge of the MSEP. This well was monitored by the USGS until March 2022 and reported through the NWIS website. It has been monitored quarterly by Northstar since June 2022.

NWIS Wells (monitored by others):

- 4S/21E-09B1S: Located about 5.5 miles north of the MSEP. Last monitored in Mar 2010.
- 5S/22E-16Q1S: Located about 3.5 miles northeast of the MSEP. Last monitored in Jun 2016.
- 5S/22E-21H2S: Located about 3.0 miles northeast of the MSEP. Last monitored in Oct 2011.
- 6S/22E-29M1S: Located about 4.5 miles south of the MSEP. Last monitored in Jun 2016.
- 6S/22E-29Q1S: Located about 5 miles southeast of the MSEP. Last monitored in Jun 2016.

3.2 Monitoring Equipment and Procedures

Solinst Levellogger pressure transducers installed in all directly monitored wells record feet of water above the sensor. Each transducer is suspended below the water table by a rope from a well cap in the sounding port. A Solinst Barologger suspended above the water table in BSPP WO-2 records barometric pressure in ambient air. The Barologger data is used to compensate for water level changes resulting from changes in barometric pressure.

Field staff remove the transducers and download the data to a USB drive using a Solinst DataGrabber or to a computer through an optical interface. A manual depth to water measurement is collected from the sounding port using a Solinst water level meter and recorded. Using Solinst software, manual water level measurements are used to calibrate the depth of the transducer. The Barologger data is applied to compensate for barometric changes. This data is tabulated for use in the statistical trend analysis.

The NWIS website is checked quarterly for new groundwater elevation data. Currently, none of the offsite wells are monitored regularly by the USGS. Data from all NWIS wells are recorded on **Table 1**.

4.0 CURRENT MONITORING DATA

4.1 Transducer Status

Northstar downloaded transducer data for the Second Quarter on June 1, 2022. All transducers were in normal condition and all data was recovered, with the following exceptions or notes:

- BSPP Well-3: The rope for this transducer appears to be wrapped around the pump discharge casing. The transducer has been stuck since the fourth quarter of 2019 and cannot be recovered until the pump is removed from the well, which is not feasible during the current phase of construction. However, a manual water level reading can still be obtained from an adjacent sounding port (which is too small for another transducer to be installed).

4.2 Groundwater Monitoring Data

Northstar staff collected manual depth to water measurements for the First Quarter on March 30, 2022. The NWIS data was checked on April 11, 2022, but no new data points were available. All depth to water measurements (feet below top of casing [ft btoc]) are converted to groundwater elevations (feet above mean sea level [ft amsl]) using surveyed reference points (summarized in **Table 1**). **Figure 3** provides a map illustrating current groundwater elevations, contours, and gradient. Hydrographs for each well are presented in **Appendix A**. The most recent measurements and their respective change from the previous measurement are as follows:

- BSPP Well-2: 255.33 ft amsl (increase of 0.03 feet)
- BSPP Well-3: 253.99 ft amsl (decrease of 0.05 feet)
- BSPP WO-2: 254.12 ft amsl (decrease of 0.12 feet)
- Gila Farm Well: 261.65 ft amsl (increase of 0.20 feet)
- 5S/22E-31E1S: 256.70 ft amsl (increase of 0.04 feet)
- 6S/22E-09P1S: 256.87 (decrease of 0.47 feet)
- 6S/22E-19N2S: 250.05 ft amsl (unchanged since previous quarter)
- County Well 25A2S: Dry (dry previous quarter)
- County Well 25F1S: Dry (dry previous quarter)
- County Well 25L1S: Obstructed (obstructed previous quarter)
- County Well 36F1S: Obstructed (obstructed previous quarter)
- County Well 36G1S: Dry (obstructed previous quarter)

The groundwater gradient near BSPP is approximately 0.0006 feet per linear foot (ft/ft) from the southeast (**Figure 3**). The groundwater contours indicate the presence of a cone of depression around BSPP Well-3 extending north into the MSEP due to extensive pumping activity during the quarter.

5.0 STATISTICAL ANALYSIS

Daily groundwater elevations obtained from the Solinst transducers are analyzed using the Mann-Kendall statistical trend analysis. The test is performed using the United States Environmental Protection Agency ProUCL statistical software. **Table 4** summarizes statistical trends to date. Mann-Kendall trend test charts for each monitoring well are provided in **Appendix B**. The most recent trend results and notable changes are as follows:

- BSPP Well-2: No trend (no change)
- BSPP Well-3: Data is currently not available
- BSPP WO-2: Increasing elevation trend (no change)
- Gila Farm Well: Increasing elevation trend (no change)
- 6S/22E-09P1S: Increasing elevation trend (no new data previous quarter)
- 6S/22E-19N2S: Increasing elevation trend (no change)
- 5S/22E-31E1S: Increasing elevation trend (no new data previous quarter)
- County Well 25A2S: Not enough data to establish trend
- County Well 25F1S: Not enough data to establish trend
- County Well 25L1S: Not enough data to establish trend
- County Well 36F1S: No new data this quarter (no change)
- County Well 36G1S: No new data this quarter (no change)

6.0 DATA EVALUATION

BSPP Well-2

The initial groundwater elevation, measured in September 2010, was 252.04 ft amsl. Groundwater elevations from April 2016 until present average 254.63 ft amsl. The most recent elevation measured on June 1, 2022 was 255.33 ft amsl, 0.70 feet higher than average. Daily elevations collected by transducer from March 30 to June 1, 2022 varied between 254.97 to 255.63 ft amsl, averaging 255.28 ft amsl. This well did not pump any groundwater during the reporting period. To date, all groundwater elevations exceeding the 5.00-foot drawdown threshold were collected while the BSPP Well-2 pump was online, and therefore are not attributed to MSEP pumping. The transducer data displayed slight diurnal fluctuations during the reporting period.

BSPP Well-3

The initial groundwater elevation, measured in March 2015, was 253.69 ft amsl. Groundwater elevations collected while this pump was offline average 253.11 ft amsl. The most recent elevation measured on June 1, 2022 was 253.99 ft amsl, 0.88 feet higher than average. The transducer data could not be recovered this quarter because the transducer is stuck inside the sounding tube, and though there is a second sounding tube, it is too narrow to install a transducer. This well pumped approximately 623,000 gallons during the reporting period. To date, all groundwater elevations exceeding the 5.00-foot drawdown threshold were collected while the BSPP Well-3 pump was online, and therefore are not attributed to MSEP pumping.

BSPP Well WO-2

The initial groundwater elevation, measured in September 2009, was 252.81 ft amsl. Groundwater elevations in this well average 253.60 ft amsl. The most recent elevation measured on June 1, 2022 was 254.12 ft amsl, 0.52 feet higher than average. Daily elevations collected by transducer from March 30 to June 1, 2022 varied between 253.89 to 254.45 ft amsl, averaging 254.08 ft amsl. To date, groundwater elevations have not exceeded the 5.00-foot drawdown threshold. The transducer data displayed slight diurnal fluctuations during the reporting period.

Gila Farm Well

The initial groundwater elevation, measured in December 2010, was 257.30 ft amsl. Groundwater elevations from June 2011 until present average 260.31 ft amsl. The most recent elevation measured on June 2, 2022 was 261.65 ft amsl, 1.34 feet higher than average. Daily elevations collected by the transducer from March 30 to June 1, 2022 varied between 261.37 to 261.66 ft amsl, averaging 261.55 ft amsl. To date, groundwater elevations have not exceeded the 5.00-foot drawdown threshold. The Mann-Kendall analysis displayed an increasing groundwater elevation during the reporting period. The transducer data displayed slight diurnal fluctuations during the reporting period.

USGS Well 5S/22E-31E1S

The initial groundwater elevation, measured in May 2010, was 254.98 ft amsl. Groundwater elevations from September 2015 until present average 256.32 ft amsl. The most recent elevation measured on June 2, 2022 was 256.70 ft amsl, 0.38 feet higher than average. Groundwater elevations are manually measured by Northstar quarterly and are not currently recorded on a transducer due to security concerns. To date, groundwater elevations have not exceeded the 5.00-foot drawdown threshold. The Mann-Kendall analysis displayed an increasing groundwater elevation during the reporting period.

USGS Well 6S/22E-19N2S

The initial groundwater elevation, measured in August 1977, was 246.50 ft amsl. Groundwater elevations from November 2013 until present average 249.76 ft amsl. The most recent elevation measured on June 2, 2022 was 250.05 ft amsl, 0.39 feet higher than average. Groundwater elevations are manually measured by Northstar quarterly and are not currently recorded on a transducer due to security concerns. To date, groundwater elevations have not exceeded the 5.00-foot drawdown threshold. The Mann-Kendall analysis displayed an increasing groundwater elevation trend during the reporting period.

USGS Well 6S/22E-09P1S

The initial groundwater elevation, measured in November 2001, was 254.25 ft amsl. Groundwater elevations from May 2012 until present average 256.38 ft amsl. The most recent elevation measured on June 2, 2022 was 256.87 ft amsl, 0.49 feet higher than average. Groundwater elevations are manually measured by Northstar quarterly and are not currently recorded on a transducer due to security concerns. To date, groundwater elevations have not exceeded the 5.00-foot drawdown threshold. The Mann-Kendall analysis displayed an increasing groundwater elevation trend during the reporting period. Data from 2001 to early 2012 displays a relatively stable, but lower, groundwater elevation indicating steady pumping activity in the vicinity.

County Well 25A2S

The first attempt to obtain a groundwater elevation from this well was in February 2011. A groundwater elevation could not be obtained from this well except for March 2021 because it was either dry or the sounding meter could not get past an obstruction in the sounding port. A water level was obtained for the first time on March 23, 2021 at an elevation of 258.51 ft amsl, consistent with the expected groundwater elevation in that area. The well has since been dry. Since this well was dry before pumping began, drawdown cannot be attributed to pumping. There is not enough data to perform a Mann-Kendall analysis for trend.

County Well 25F1S

The initial groundwater elevation, measured in February 2011, was 256.84 ft amsl. One additional reading was collected in June 2011 (261.27 ft amsl). The well casing has since been dry or obstructed. Since the well was dry before pumping began, drawdown cannot be attributed to pumping. There is not enough data to perform a Mann-Kendall analysis for trend.

County Well 25L1S

The initial groundwater elevation, measured in February 2011, was 256.00 ft amsl. This well was monitored regularly until May 2018, when it was discovered that the sounding port was obstructed. Northstar was able to maneuver the water level meter past the obstruction in each event since June 2021 but found the well was dry up until the second quarter of 2022, when it became obstructed again. To date, groundwater elevations have not exceeded the 5.00-foot drawdown threshold. The Mann-Kendall analysis could not be completed this quarter because the well was obstructed.

County Well 36F1S

The initial groundwater elevation, measured in February 2011, was 255.08 ft amsl. Readings were collected when possible until October 2015, and the well was dry from then until June 2019. Groundwater elevations were recorded between September 2019 and September 2020, after which the well went dry or has been obstructed again. Readings collected during the months of greatest historical groundwater extraction (July and October 2015) do not display drawdown below the initial groundwater elevation. It is unknown why this well is intermittently dry. Since the most recent groundwater elevation readings are significantly higher than baseline conditions, it may also be an indication of standing water that has infiltrated the well casing but is not in communication with the groundwater table due to degradation of the well casing. The Mann-Kendall analysis could not be calculated for this reporting period as there was no new data available (well was obstructed).

County Well 36G1S

The initial groundwater elevation, measured in February 2011, was 255.07 ft amsl. The most recent elevation measured on December 4, 2020 was 256.47 ft amsl, 1.40 feet higher. The well casing was obstructed by a beehive at an approximate depth of 49 feet during the most recent monitoring events. To date, groundwater elevations have not exceeded the 5.00-foot drawdown threshold. The Mann-Kendall analysis could not be calculated for this reporting period as there was no new data available.

Barometric Data

Barometric pressure and temperature data points were recorded at 6-hour intervals on a barometric logger installed at BSPP Well WO-2.

During the reporting period the recorded ambient pressures ranged from 14.2007 to 14.5264 pounds per square inch (PSI) and averaged 14.3471 PSI. During the reporting period, the pressure differential over a full day ranged from 0.0180 to 0.1247 PSI, correlating to a range of 0.04 to 0.29 feet of change in the groundwater table elevation on a daily basis. The barometric data displays minor diurnal and seasonal fluctuations.

During the reporting period the recorded subsurface ambient temperature ranged from 25.4 to 29.39 degrees Celsius (77.7 to 84.9 degrees Fahrenheit).

7.0 ANNUAL SUMMARY

The 2022 annual summary will be included in the Fourth Quarter 2022 and Annual Groundwater Level Monitoring Report, due in January 2023.

8.0 CONCLUSIONS

Based on the available data, the BSPP is compliant with the thresholds defined in the *Groundwater Level Monitoring, Mitigation, and Reporting Plan* (AECOM, 2010) and in S&W-5.

Though County Well 36F1S went dry after BSPP pumping began, readings collected during the period of greatest groundwater extraction do not indicate drawdown below the initial background groundwater elevation. The well was dry for an extended period between November 2016 and June 2019, and the most recent groundwater elevations were significantly above baseline conditions. These factors all lend evidence to the possibility of fouling of the well screen which is preventing communication with the groundwater table.

There is no indication of exceedance of the 5.00-foot drawdown threshold in any other offsite wells in the monitoring program.

9.0 REFERENCES

AECOM, 2010. *Groundwater Level Monitoring, Mitigation, and Reporting Plan (Soil & Water-5)*, Blythe Solar Power Project, October 2010.

AECOM, 2014. *Blythe Solar Power Project Baseline Groundwater Level Monitoring Report (Soil & Water-5)*, August 2014.

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United States Geological Survey (USGS), 2019. *National Water Information System*. <http://waterdata.usgs.gov/nwis>. Accessed July 8, 2022.

FIGURES

TABLES

APPENDIX A

HYDROGRAPHS

APPENDIX B

MANN-KENDALL CHARTS

APPENDIX C
PUMPING SCHEDULE