Brunner Island, LLC
REGULATORY DELIVERABLE
SUBMITTAL COVER SHEET

Date:	April 4, 2022	**Transmittal No.:**	BI-47-2022-04-04-v.1 (Part A)
DOCUMENT DESCRIPTION:		Quarterly Groundwater Report: 1st Quarter 2022--Basin 5, Disposal Area 8 and Pyrite Tomb Area Report - Brunner Island, LLC	
CONSENT DECREE REFERENCE:		Paragraph No.:	47
BRIEF DESCRIPTION OF OUTLINED REQUIREMENT:		Brunner shall promptly provide Citizens with all deliverables required under this Consent Decree, as well as quarterly groundwater monitoring data from Ash Basins 5 and 6 and Disposal Area 8.	
RECIPIENT(S):			
NAME:		ORGANIZATION:	
Thomas Weissinger		Talen Energy	
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March 14, 2022

Mr. Kurt Fritz
Pennsylvania Department of Environmental Protection
Waste Management Program
909 Elmerton Ave.
Harrisburg, Pennsylvania 17110

RE: **Quarterly Groundwater Report: 1st Quarter 2022**
Basin 5, Disposal Area 8, and Pyrite Tomb Area
Brunner Island, LLC

Dear Mr. Fritz:

Please accept this letter and attachments as the quarterly report for Basin 5 at the Brunner Island Steam Electric Station.

Note that a data table (water depth and pH) and associated trend plots for pyrite tomb standpipe monitoring have been added to this Basin 5 report, beginning with the second quarter 2017 groundwater report.

The analytical results are provided on Form 14Rs (enclosed) in accordance with the Basin 5 closure plan approved by the PADEP in December 2000. A summary table of results, an Excel spreadsheet file (on CD), and maps showing well locations are also enclosed.

Please call or email me with any questions. Thank you.

Sincerely,

M. E. Mengel

Martin E. Mengel, PG/CHMM

Attachments: Report, Data Table, Pyrite Tomb Standpipe Monitoring Results, Maps; CD containing LandLinks EDD, trend plots, 14Rs, statistics summary, and a PDF of this report

Cc: Marcia Thiess (w/atts.) – Brunner Island, LLC
Tom Weissinger (w/atts.) – Talen Energy Supply, LLC
Ed Much (w/atts.) – Talen Energy Supply, LLC
Citizens (w/atts.)

Groundwater Monitoring Report – First Quarter 2022
Brunner Island, LLC - Basin 5
Brunner Island Steam Electric Station

BACKGROUND

The Brunner Island Steam Electric Station (Brunner Island SES) is located in York Haven, York County, Pennsylvania and is owned and operated by Brunner Island, LLC (Brunner). An overall Brunner Island SES map and a basin specific map are attached (Attachments 3 and 4).

The PADEP issued Residual Waste Permit # 301337 on December 28, 2000, approving the Basin 5 closure plan. The residual waste permit expired on December 27, 2007 and was not renewed by the PADEP. Brunner believes that Mandatory Abatement Trigger Levels (MATLs) no longer apply to Basin 5, as a result of the permit expiration, and therefore, Brunner no longer uses MATLs as the primary data screening tool for Basin 5 groundwater results.

Disposal Area 8 (a Class 2 residual waste landfill) was constructed on top of Basin 5. Construction was completed and disposal into the landfill began in late 2008. The permitted area for the landfill encompasses approximately 20 acres, however, currently only 9 acres have been constructed and only 4 acres are actively utilized. The existing groundwater monitoring network for Basin 5 was chosen and approved by the PADEP to serve as the monitoring network for Area 8 as well.

In accordance with Brunner's PADEP-approved *Workplan – Groundwater Risk Evaluation – Ash Basin 4 and Pyrite Tomb* dated September 29, 2016, a downgradient monitoring well MW-PT-1 was installed in January 2017 to help assess potential impacts from the pyrite tomb. Additionally, pH and liquid depth monitoring data and associated trend plots for water within the pyrite tomb standpipe have been added to this Basin 5 report, beginning with the second quarter of 2017.

In accordance with the closure/ post closure use plan, construction of the rail extension on Basin 5 was completed in 2013. As a result, moderate subsurface disturbance has occurred in the area.

Groundwater monitoring in the vicinity of Basin 5 is currently conducted quarterly as required in accordance with the approved Basin 5 closure plan. This groundwater monitoring generally includes sampling wells upgradient and downgradient of Basin 5 for indicator parameters of fly ash such as arsenic, boron, lithium, selenium, strontium, and total dissolved solids. Other parameters are routinely monitored in the vicinity of Basin 5 in accordance with permit requirements and are listed on the attached summary table of quarterly groundwater monitoring results (Attachment 1). Brunner reviews current and historical data (approximately the past 10 years) to identify trends and to compare data with Pennsylvania Act 2 residential Statewide Health Standards for used aquifers and/or EPA National Drinking Water Standards.

GROUNDWATER MONITORING PROGRAM

Monitoring Locations – Basin 5

Downgradient and upgradient monitoring wells for Basin 5 are listed below and shown on the attached Site Plan of Basin 5 (Attachment 4).

- Background monitoring well – MW-19
- Upgradient monitoring well – MW-4-7A
- Downgradient monitoring wells – MW-4-10, MW-8-1N, MW-8-2, MW-8-3A, MW-8-3B, MW-8-4, MW-8-5A, MW-8-5B, MW-8-10A, MW-8-10B, MW-8-10C, MW-8-12C, and MW-PT-1
- Pyrite tomb standpipe (lab analytical concluded in 2017; field pH and water elevation monitoring to continue)

Monitoring Schedule

For all the monitoring wells listed above, except MW-8-10C and MW-8-12C, quarterly sampling of field parameters, non-metals, and metals are performed. For MW-8-10C and MW-8-12C, these parameters are only required to be sampled annually during the second calendar quarter. All the monitoring parameters are listed on the attached Summary Table of Basin 5 Groundwater Monitoring Results (Attachment 1). Additionally, for quality assurance/quality control (QA/QC), field blanks and duplicates are routinely collected during each sampling event.

QA/QC Results

For the site-wide monitoring event conducted at Brunner Island SES for the first quarter of 2022, Brunner samplers collected six field blanks (all groundwater field blanks) and six duplicate samples. The duplicate samples were collected from six groundwater wells (including MW-4-10, MW-8-3B, MW-6-6, MW-7-5N, EQ-1, and GC-1N). These field blanks and duplicates were analyzed by the laboratory along with the routinely collected groundwater samples. For the six field blanks, six water quality parameters were detected above respective limits of quantification (arsenic, calcium, chromium, iron, molybdenum, and vanadium) for a total of 10 analyses. In Brunner's opinion, analysis of the field blanks indicated no significant evidence of sample contamination related to field sampling procedures or sample containers. For the six duplicates, a total of 349 paired analyses were performed with eight paired analyses exceeding Brunner's acceptable level of less than 20% relative percent difference (RPD) between duplicates. Based on these QA/QC results, Brunner believes that the laboratory precision is reasonable, and the monitoring results are acceptable for reporting to the PADEP.

GROUNDWATER MONITORING RESULTS

The groundwater sampling results for this quarter are summarized on Attachment 1, Summary Table of Basin 5 Groundwater Monitoring Results. Upgradient and downgradient wells are indicated in the headings at the top of this table. Any groundwater concentrations that exceeded the listed regulatory standards are indicated in red text color. Groundwater monitoring results are also reported on the 14R forms for each well (Attachment 5).

Below are the findings for each Basin 5 monitoring well:

Upgradient Monitoring Well (MW-4-7A)

Upgradient monitoring well MW-4-7A is located near the northwest corner of Basin 5 and serves as an upgradient well to the basin. Key results for this quarter and trends for MW-4-7A are as follows:

- pH is consistently near neutral.
- Total dissolved solids concentration of 1,200 mg/L exceeded the Secondary Drinking Water Standard of 500 mg/L, and TDS exhibits a slightly increasing trend.
- Sulfate concentration of 644 mg/L exceeded the Secondary Drinking Water Standard of 250 mg/L, and sulfate exhibits a slightly increasing trend.
- Boron concentrations have been relatively stable since 2012 and are far below the Act 2 residential Statewide Health Standard of 6,000 µg/L, although concentrations at MW-4-7A have fluctuated upward slightly since the fourth quarter of 2018.
- Calcium concentrations historically exhibit a stable long-term trend, but concentrations have exhibited increased variability since the fourth quarter of 2018.
- Lithium (dissolved) concentration of 278 µg/L exceeded the Act 2 residential Statewide Health Standard of 69 µg/L. Lithium concentrations at MW-4-7A have exhibited an increasing trend since 2011, and now exceed the Act 2 standard (with increased variability since the first quarter of 2020).
- Manganese (dissolved) concentration of 330 µg/L exceeded the Secondary Drinking Water Standard of 50 µg/L and the Act 2 residential Statewide Health Standard of 300 µg/L. Manganese concentrations are seasonally variable (within a fairly stable range) at MW-4-7A with peak concentrations typically exceeding the Secondary Drinking Water Standard and occasionally exceeding the Act 2 standard.
- Sodium concentrations demonstrate a gradual long-term increasing trend, but appear to be stabilizing at about 60 mg/L. Sodium has also exhibited recent increased variability (similar to boron and calcium). There are no EPA drinking water or PA Act 2 standards for sodium.

Downgradient Monitoring Wells

1. **MW-4-10 -** Monitoring well MW-4-10 is located on the dike between Basin 4 and Basin 5 and would be expected to be more representative of basin leachate than the groundwater surrounding the basin. Relatively significant ash-related impact would be expected and is observed, as compared to monitoring wells which are not bounded by ash on both sides. The general area around MW-4-10 has periodically experienced earth disturbance related to wastewater treatment plant construction. This disturbance has apparently impacted groundwater/leachate quality in MW-4-10. Key results for this quarter and trends for MW-4-10 are as follows:

- Recent (since mid-2018) substantial upward fluctuations (beyond respective historical ranges in many cases) for numerous parameters (including total dissolved solids, sulfate, boron, calcium, selenium, specific conductance, and strontium) appear to be related to recent increased groundwater elevations. These parameters have decreased since mid-2019 but remain somewhat elevated, except for selenium which has decreased to within the prior historical range.
- Field pH (5.70 S.U.) is below the Secondary Drinking Water Standard range of 6.5 to 8.5 S.U. The historical pH range for this well is approximately 4 to 6.5.
- Total dissolved solids concentration of 1,130 mg/L exceeded the Secondary Drinking Water Standard of 500 mg/L. Historically, total dissolved solids concentrations typically vary from about 700 to 1,300 mg/L but generally exhibit a long-term stable trend. However, since 2018, total dissolved solids have been higher than the typical historical range (due to the upward fluctuations noted above).
- Sulfate concentration of 714 mg/L exceeded the Secondary Drinking Water Standard of 250 mg/L. Sulfate concentrations typically vary from about 400 to 1,050 mg/L, but generally exhibit a long-term stable trend, with increased variability since 2018.
- Concentrations of aluminum, arsenic, beryllium, cadmium, fluoride, nickel, and zinc have exhibited similar elevated and variable concentration trends for the past few years, with noticeable peaks in 2011, 2014, 2016, and 2018, resulting in some exceedances of respective regulatory standards. Elevated concentrations of these metals are likely related to low pH occurrences when groundwater elevations are high.
- Boron concentrations are elevated and variable (ranging from about 1,000 to 4,500 µg/L) relative to the other Basin 5 wells, but meet the Act 2 residential Statewide Health Standard of 6,000 µg/L. Boron exhibits a general decreasing trend since 2012 (except for upward fluctuations since mid-2018 as noted above).
- Iron is present at low concentrations, and typically is below the Secondary Drinking Water Standard. Iron (total) occasionally exceeds the standard.
- Lithium (dissolved) concentration of 1,140 µg/L exceeded the Act 2 residential Statewide Health Standard of 69 µg/L. Lithium concentrations at MW-4-10 are the most elevated of all Basin 5 wells and exhibit a general long-term increasing trend, which appears to be stabilizing/decreasing since 2012.
- Manganese (dissolved) concentration of 1,690 µg/L exceeded the Secondary Drinking Water Standard of 50 µg/L and the Act 2 residential Statewide Health Standard of 300 µg/L. Manganese concentrations are elevated and variable, but exhibit a relatively stable long-term trend.
- Molybdenum (dissolved) concentration of 475 µg/L exceeded the Act 2 residential Statewide Health Standard of 40 µg/L. Molybdenum concentrations at MW-4-10 are the most elevated and variable of the Basin 5 wells, but the long-term trend is decreasing.

- Potassium and sodium concentrations are elevated relative to the other Basin 5 wells. Potassium demonstrates an increasing trend, while sodium demonstrates a decreasing trend. There are no EPA drinking water or PA Act 2 standards for potassium and sodium.
- Selenium is seasonally variable and demonstrates a long-term increasing trend, similar to the increasing trend at background well MW-19, but more variable since 2014. Concentrations have been below the Act 2 residential Statewide Health Standard of 50 µg/L, except for the fourth quarter of 2018.

2. **MW-8-1N** - MW-8-1 was decommissioned on March 27, 2013, shortly after first quarter 2013 sampling was conducted, to accommodate the footprint of the railroad extension project. MW-8-1 was replaced by MW-8-1N (as installed on September 17, 2013) and quarterly sampling was initiated in the third quarter of 2013. Key results for this quarter and trends for MW-8-1N are as follows:
   - pH is near neutral, but slightly acidic, sometimes below the Secondary Drinking Water Standard range of 6.5 to 8.5 S.U.
   - Total dissolved solids concentration of 674 mg/L exceeded the Secondary Drinking Water Standard of 500 mg/L. Total dissolved solids concentrations increased after the well was installed (in 2013) until the second quarter of 2015. Since then, concentrations have generally decreased. Specific conductance exhibits a similar trend. These trends for TDS and specific conductance are likely related to similar trends for calcium, magnesium, sodium, strontium, and sulfate at MW-8-1N.
   - Sulfate concentration of 308 mg/L exceeded the Secondary Drinking Water Standard of 250 mg/L. Like total dissolved solids, sulfate concentrations had increased until the second quarter of 2015, but concentrations have since decreased and are now below 400 mg/L.
   - Boron concentrations are well below the Act 2 residential Statewide Health Standard of 6,000 mg/L, and are the lowest of all Basin 5 wells.
   - Calcium and magnesium concentrations were elevated (compared to most other Basin 5 wells) from 2015 to 2018, but recent concentrations have decreased similar to the trend for total dissolved solids (discussed above). There are no EPA drinking water or PA Act 2 standards for these parameters.
   - Chloride and sodium concentrations have historically been elevated and variable compared to the other Basin 5 wells, but chloride has always been below the Secondary Drinking Water Standard of 250 mg/L. Since 2014 and 2015 respectively, chloride and sodium concentrations have decreased significantly (with variability), and are now comparable to concentrations at several other Basin 5 wells.
   - Iron (total) concentration of 0.39 mg/L exceeded the Secondary Drinking Water Standard of 0.3 mg/L. Iron concentrations are elevated and variable relative to most Basin 5 wells.
   - Manganese (dissolved) concentration of 1,190 µg/L exceeded the Secondary Drinking Water Standard of 50 µg/L and the Act 2 residential Statewide Health Standard of 300 µg/L.

Manganese concentrations are elevated, but exhibit a long-term stable trend with some variability.

- Strontium is usually the most elevated of all the Basin 5 wells (except for recent upward fluctuations at MW-4-10) and exhibits a decreasing trend since 2015 similar to total dissolved solids (discussed above). Strontium concentrations are below the Act 2 residential Statewide Health Standard of 4,000 µg/L.

3. **MW-8-2** - Key results for this quarter and trends for MW-8-2 are as follows:
   - pH is stable and near neutral, but is occasionally below the Secondary Drinking Water range of 6.5 to 8.5 S.U.
   - Sulfate and total dissolved solids exhibit relatively stable trends, and concentrations are below respective Secondary Drinking Water Standards of 250 mg/L and 500 mg/L.
   - Manganese (dissolved) concentration of 272 µg/L exceeded the Secondary Drinking Water Standard of 50 µg/L but did not exceed the Act 2 residential Statewide Health Standard of 300 µg/L. Concentrations exhibit a long-term stable trend with some variability.
   - Molybdenum (dissolved) concentration of 291 µg/L exceeded the Act 2 residential Statewide Health Standard of 40 µg/L. However, concentrations exhibit a fairly stable trend.
   - Strontium concentrations had evidenced a slight long-term increasing trend, but have stabilized around 400 to 500 µg/L since 2011. Strontium concentrations are below the Act 2 residential Statewide Health Standard of 4,000 µg/L.

4. **MW-8-3A and MW-8-3B** - Key results for this quarter and trends for MW-8-3A and MW-8-3B are as follows:
   - pH is stable and near neutral at both wells, but slightly lower at MW-8-3A. pH at MW-8-3A is sometimes slightly below the Secondary Drinking Water Standard range of 6.5 to 8.5 S.U.
   - Total dissolved solids concentrations at both wells exhibit slightly increasing long-term trends with some variability. Concentrations are comparable in both wells, but tend to be slightly higher and more variable at MW-8-3A. The total dissolved solids concentration at MW-8-3A typically exceeds the Secondary Drinking Water Standard of 500 mg/L, while concentrations at MW-8-3B typically fluctuate around the standard.
   - Sulfate concentrations in both wells exhibit relatively stable long-term trends with some variability. Sulfate concentrations at MW-8-3A typically fluctuate around the Secondary Drinking Water Standard of 250 mg/L, while concentrations at MW-8-3B are typically below the standard.
   - Arsenic (dissolved) concentrations at both wells exhibit stable long-term trends with seasonal variability. Peak concentrations exceed the Primary Drinking Water Standard of 10 µg/L (not since 2011 at MW-8-3B). Dissolved arsenic concentrations at MW-8-3A typically range from 3 to 20 µg/L over the past 10 years. At MW-8-3B, arsenic concentrations exhibit a similar stable/decreasing trend at slightly lower concentrations.

Since 2019, total arsenic at MW-8-3A exhibits increased variability. Brunner believes that relatively permeable material is associated with relic stream channels existing beneath Basin 5, potentially accounting for arsenic detections at wells MW-8-3A and MW-8-3B.

- Iron concentrations at MW-8-3A are variable and exceed the Secondary Drinking Water Standard of 0.3 mg/L (possibly due to impacts from historical pyritic material handling). Iron is present in MW-8-3B, but at a much lower concentrations than at MW-8-3A, suggesting possibly more impact in the upper part of the water-bearing zone (and/or possibly a higher iron concentration related to the high turbidity within MW-8-3A groundwater). Peak iron concentrations in MW-8-3B exceed the standard.
- Manganese concentrations in both wells exceed the Secondary Drinking Water Standard of 50 µg/L and the Act 2 residential Statewide Health Standard of 300 µg/L but exhibit long-term stable trends with some variability.
- Molybdenum concentrations in both wells normally exceed the Act 2 residential Statewide Health Standard of 40 µg/L but exhibit long-term stable/slight decreasing trends.

5. **MW-8-4** - Key results for this quarter and trends for MW-8-4 are as follows:
   - Field pH (5.62 S.U.) remains below the Secondary Drinking Water Standard range of 6.5 to 8.5 S.U. The historical pH range for this well is approximately 4.5 to 6.0. Buffering capacity is typically minimal.
   - Sulfate and total dissolved solids concentrations are elevated and variable at MW-8-4, and exceed Secondary Drinking Water Standards but exhibit decreasing long-term trends.
   - Aluminum concentrations are elevated and variable relative to most other Basin 5 wells, sometimes exceeding the Secondary Drinking Water Standard of 200 µg/L.
   - Beryllium, cadmium, nickel, and zinc concentrations are variable and elevated relative to other Basin 5 wells. However, since 2012, concentrations have generally decreased and have been less variable. These parameters now meet respective regulatory standards.
   - Chloride concentrations are seasonally variable but remain well below the Secondary Drinking Water Standard of 250 mg/L. Peak chloride concentrations have decreased since 2015.
   - Manganese concentrations remain elevated at 6,120 µg/L compared to the Secondary Drinking Water Standard of 50 µg/L and the Act 2 residential Statewide Health Standard of 300 µg/L. Manganese concentrations at MW-8-4 are the most elevated and variable of all the Basin 5 wells, but concentrations exhibit a gradual long-term downward trend with decreasing variability.

6. **MW-8-5A and MW-8-5B** - These wells are located at the northwestern corner of Basin 5. Key results for this quarter and trends for MW-8-5A and MW-8-5B are as follows:
   - pH is stable and near neutral at both wells.

- Total dissolved solids concentrations are elevated in excess of the Secondary Drinking Water Standard in both wells, with increasing trends (current concentrations of 798 and 724 µg/L for MW-8-5A and MW-8-5B, respectively). These increasing TDS trends are likely related to similar increasing trends for calcium, magnesium, and specific conductivity in both wells.
- Sulfate concentrations demonstrate slight increasing/stable long-term trends in MW-8-5A and MW-8-5B with current concentrations of 333 mg/L and 289 mg/L, respectively, compared to the Secondary Drinking Water Standard of 250 mg/L. Sulfate concentrations in these two wells appear to be stabilizing since 2015.
- Arsenic (dissolved) concentrations in MW-8-5A and MW-8-5B are elevated (current concentrations of 113 µg/L and 226 µg/L, respectively) in excess of the Primary Drinking Water Standard of 10 µg/L. Arsenic concentrations at MW-8-5B exhibit a long-term stable trend, but concentrations have exhibited increased variability since late 2020. Concentrations at MW-8-5A exhibit a slight decreasing trend.

  Note: PPL's groundwater consultant, Ish Inc., confirmed that Basin 5 is the source of arsenic identified in MW-8-5A and MW-8-5B. As part of the assessment conducted to investigate the elevated arsenic in MW 8-5 area, Ish Inc. established that arsenic attenuates quickly and is not elevated in the new point of compliance wells MW-8-10A and MW 8-10B.
- Lithium concentrations exceed the Act 2 residential Statewide Health Standard of 69 µg/L, but demonstrate fairly stable long-term trends at both wells (current concentrations of 260 µg/L and 212 µg/L for MW-8-5A and MW-8-5B, respectively), but concentrations have exhibited increased variability since the fourth quarter of 2019.
- Manganese concentrations exceed the Secondary Drinking Water Standard of 50 µg/L and the Act 2 residential Statewide Health Standard of 300 µg/L in both wells (current concentrations of 496 and 450 µg/L for MW-8-5A and MW-8-5B respectively). Manganese exhibits a stable trend at MW-8-5A and a slight decreasing trend at MW-8-5B.
- Molybdenum concentrations exceed the Act 2 residential Statewide Health Standard of 40 µg/L in both wells (current concentrations of 388 and 360 µg/L for MW-8-5A and MW-8-5B respectively), but exhibit slightly decreasing long-term concentration trends with increased variability since the third quarter of 2019.
- Strontium concentrations exhibit increasing trends in both wells. Strontium concentrations are below the Act 2 residential Statewide Health Standard of 4,000 µg/L.

7. **MW-8-10A, MW-8-10B, and MW-8-10C** - Monitoring wells MW-8-10A, MW-8-10B, and MW-8-10C were added to the monitoring program as part of Area 8 monitoring system located within Basin 5. These wells also serve as the point of compliance wells, downgradient of MW-8-5A and MW-8-5B. MW-8-10A and MW-8-10B are sampled quarterly while MW-8-10C is sampled annually during the second calendar quarter. Most importantly, arsenic concentrations in MW-8-10A, MW-8-10B, and MW-8-10C continue to meet the Primary

Drinking Water Standard of 10 µg/L and exhibit stable/decreasing trends. Other key results and trends for these wells for this quarter are as follows:

- MW-8-10B demonstrates typically slightly alkaline pH and overall better and more stable water quality than MW-8-10A and MW-8-10C. pH at MW-8-10C is also slightly alkaline.
- pH at MW-8-10A is near neutral, but lower than pH at MW-8-10B and MW-8-10C. pH at MW-8-10A is sometimes slightly below the Secondary Drinking Water Standard range of 6.5 to 8.5 S.U.
- Sulfate and total dissolved solids concentrations at MW-8-10A are fluctuating around/slightly above Secondary Drinking Water Standards. Sulfate and total dissolved solids concentrations have been stable/decreasing since 2015 with a prominent drop occurring during 2018, and are now only slightly above the respective standards. These trends appear to be related to trends for calcium, magnesium, specific conductivity, and strontium (which have also generally decreased since early 2018 following long-term increasing trends). At MW-8-10B, total dissolved solids concentrations are fairly stable and fluctuate around the 500 mg/L standard. Sulfate concentrations at MW-8-10B are below the 250 mg/L standard, and exhibit a slight decreasing trend.
- Iron concentrations at MW-8-10C are variable and occasionally exceed the Secondary Drinking Water Standard of 0.3 mg/L.
- Manganese concentrations at MW-8-10A are elevated and seasonally variable, exceeding the Secondary Drinking Water Standard of 50 µg/L and sometimes exceeding the Act 2 residential Statewide Health Standard of 300 µg/L. However, peak manganese concentrations at MW-8-10A have decreased significantly since 2018. Manganese concentrations at MW-8-10C also normally exceed both standards, but are less variable than at MW-8-10A.
- Molybdenum concentrations at MW-8-10C exceed the Act 2 residential Statewide Health Standard of 40 µg/L, while concentrations at MW-8-10A and MW-8-10B sometimes exceed the standard. Similar to manganese, peak molybdenum concentrations at MW-8-10A have decreased significantly since 2018 and have not exceeded the standard since the first quarter of 2018.
- Vanadium concentrations at MW-8-10B fluctuate around the Act 2 residential Statewide Health Standard of 2.9 µg/L, which was lowered in 2016 along with the analytical limit of quantification.

8. **MW-8-12C** - Sampling is required at MW-8-12C annually in the second calendar quarter. Key results and trends for the second quarter of 2021 were as follows:
   - Iron (dissolved) concentration of 0.49 mg/L exceeded the Secondary Drinking Water Standard of 0.3 mg/L. Iron concentrations have generally decreased with variability since 2016.

- Manganese (dissolved) concentration of 1,730 µg/L exceeded the Secondary Drinking Water Standard of 50 µg/L and the Act 2 residential Statewide Health Standard of 300 µg/L.
- Molybdenum (dissolved) concentration of 520 µg/L exceeded the Act 2 residential Statewide Health Standard of 40 µg/L. Molybdenum concentrations have fluctuated between approximately 150 and 450 µg/L over the past ten years.
- Several parameters fluctuated downward during the second quarter of 2019 at MW-8-12C including boron, calcium, iron, magnesium, manganese, molybdenum, potassium, specific conductivity, sulfate, total dissolved solids, and total organic carbon. Barium and strontium fluctuated upward. Since the second quarter of 2020, each of these parameters returned to concentrations consistent with respective historical trends.

Pyrite Tomb Monitoring

1. **Pyrite Tomb Standpipe –** The pyrite tomb is monitored at least monthly for water depth and field pH, and quarterly reporting (via this quarterly groundwater report) began in the 2nd quarter of 2017. Brunner planned to collect two additional (last) samples from the pyrite tomb standpipe during the 3rd and 4th quarters of 2017 for laboratory analysis (as previously). However, on both quarterly sampling occasions, the standpipe contained too little water to sample (lack of water is a favorable condition). A summary table of the field monitoring results for 2017 thru current is provided in Attachment 2. Trend plots for the field parameters (pH, water depths, water elevations) are provided on the enclosed CD.

2. **MW-PT-1 –** Downgradient monitoring well MW-PT-1 was installed in January 2017 to help assess the Pyrite Tomb area. This well is located outside of the Basin 5 berm material in native alluvial sediments. Since monitoring of MW-PT-1 commenced, many parameters have exhibited significant variability with no defined trends yet. Analytical results for the pyrite tomb monitoring well MW-PT-1 are included on Attachment 1, *Summary Table of Basin 5 Groundwater Monitoring Results*, and trend plots for these parameters (as applicable) are provided on the enclosed CD. Key results for this quarter are as follows:
   - pH (5.36 S.U.) was below the Secondary Drinking Water Standard range of 6.5 to 8.5 S.U. Lower pH and alkalinity values at MW-PT-1 appear to correlate with higher groundwater elevations.
   - Aluminum (total) concentration of 1,010 µg/L exceeded the Secondary Drinking Water Standard of 200 µg/L.
   - Manganese (total) concentration of 1,490 µg/L exceeded the Secondary Drinking Water Standard of 50 µg/L and Act 2 residential Statewide Health Standard of 300 µg/L.

ATTACHMENTS

1. Summary Table of Groundwater Monitoring Results
2. Pyrite Tomb Standpipe Monitoring Results
3. Site Plan – Overall Map – Brunner Island SES
4. Site Plan – Brunner Island Basin 5
5. PADEP Form 14Rs (on CD for PADEP)
6. Statistics Summary (on CD for PADEP)

Brunner Island, LLC

Basin No. 5 Groundwater Monitoring Results

PARAMETER	UNITS	REGULATORY CRITERIA LIMIT	GROUNDWATER MONITORING WELLS														
			Downgradient												Pyrite Tomb Monitoring	Upgradient	
Location ID			MW-4-10	MW-8-1N	MW-8-2	MW-8-3A	MW-8-3B	MW-8-4	MW-8-5A	MW-8-5B	MW-8-10A	MW-8-10B	MW-8-10C	MW-8-12C	MW-PT-1	MW-4-7A	MW-19
Sampling Date			1/27/2022	1/22/2022	1/24/2022	1/24/2022	1/24/2022	1/22/2022	1/22/2022	1/22/2022	1/25/2022	1/25/2022			1/24/2022	1/24/2022	1/26/2022
Field Parameters (monitored quarterly)																	
Well Depth	FT		38.70	26.20	22.40	26.50	46.80	21.70	39.10	59.20	37.30	57.00			21.24	39.88	45.40
Sampling Depth	FT		34.00	23.00	15.00	20.00	40.00	18.00	33.00	52.00	32.00	52.00			19.00	35.00	33.00
Well Purge Volume	L		3.50	3.00	6.45	3.00	3.20	4.25	4.95	3.60	3.10	3.10			3.00	3.00	2.40
Depth to Water	FT		24.60	11.96	6.18	9.72	12.33	12.18	23.15	17.60	16.74	16.73			10.81	26.15	18.24
Water Surface Elevation	FT		268.11	268.68	265.32	257.66	255.38	258.01	261.89	267.28	259.73	259.54			260.96	261.86	287.56
Temperature, field	°C		11.84	9.49	9.92	8.38	9.44	7.82	12.28	11.75	11.50	10.67			6.74	12.21	10.50
pH, field	S.U.	6.5 - 8.5 S	**5.70**	6.57	**6.30**	**6.19**	6.72	**5.62**	6.77	6.92	**6.38**	7.32			**5.36**	6.62	6.79
pH, lab	S.U.	6.5 - 8.5 S	**6.12**	7.02	6.93	6.65	7.15	**5.87**	7.45	7.57	7.12	7.87			**5.26**	7.20	6.81
Specific Conductance, field	umhos/cm		1,550.00	1,003.00	606.00	1,263.00	930.00	826.00	1,143.00	1,039.00	942.00	824.00			536.00	1,568.00	238.00
Specific Conductance, lab	umhos/cm		1,560.00	1,010.00	610.00	1,260.00	924.00	841.00	1,160.00	1,050.00	944.00	834.00			538.00	1,580.00	243.00
Turbidity, field	NTU		1.17	0.86	0.28	27.60	0.18	2.28	0.80	0.59	0.25	0.17			0.65	0.43	3.66
Dissolved Oxygen, field	mg/L		2.52	1.90	4.92	1.98	1.44	0.39	0.25	0.44	1.50	1.49			5.37	0.47	2.91
Redox, field	mV		262.00	50.30	169.70	70.80	1.40	207.00	149.10	155.80	218.30	174.80			252.40	189.20	145.00
Non-Metals (monitored quarterly)																	
Alkalinity, total as CaCO3	mg/L		54.50	183.00	121.00	194.00	251.00	45.60	259.00	234.00	145.00	107.00			< 20	232.00	46.20
Total Organic Carbon	mg/L		0.71	0.98	0.78	1.18	0.96	0.75	0.66	0.67	< 0.5	< 0.5			1.40	1.09	< 0.5
Total Dissolved Solids	mg/L	500 S	**1,130.00**	**674.00**	371.00	**794.00**	**578.00**	**588.00**	**798.00**	**724.00**	**640.00**	**517.00**			375.00	**1,200.00**	141.00
Chemical Oxygen Demand	mg/L		< 20	5.3 ND	5.3 ND	< 20	5.3 ND	5.3 ND	5.3 ND	5.3 ND	5.3 ND	5.3 ND			5.3 ND	5.3 ND	25.40
Bicarbonate	mg/L		54.50	183.00	121.00	194.00	252.00	45.60	259.00	234.00	145.00	107.00			< 20	232.00	46.20
Chloride, total as Cl	mg/L	250 S	8.08	22.00	26.50	140.00	53.80	23.00	21.10	15.00	38.00	84.30			2.75	13.90	8.72
Fluoride, total as F	mg/L	2 S, 4 M	< 0.2	0.26	0.97	0.40	0.43	0.47	0.91	0.68	< 0.2	< 0.2			0.28	< 0.2	< 0.2
Ammonia, as N	mg/L		0.78	< 0.2	0.066 ND	< 0.2	0.066 ND	0.066 ND	0.46	0.29	0.066 ND	0.066 ND			0.066 ND	0.25	< 0.2
Nitrate, as N	mg/L	10 M	< 0.5	0.0218 ND	< 0.5	< 0.5	0.0218 ND	0.82	0.0218 ND	0.0218 ND	0.0218 ND	0.0218 ND			1.13	0.0218 ND	3.86
Sulfate, as SO4	mg/L	250 S	**714.00**	**308.00**	135.00	**261.00**	161.00	**324.00**	**333.00**	**289.00**	**295.00**	175.00			233.00	**644.00**	33.70
Metals (monitored quarterly)																	
Aluminum, total	ug/L	200 S	**280.00**	< 100	26.8 ND	< 100	< 100	**507.00**	< 100	< 100	< 100	26.8 ND			**1,010.00**	< 100	26.8 ND
Aluminum, dissolved	ug/L	200 S	< 100	< 100	< 100	< 100	26.8 ND	**258.00**	< 100	< 100	26.8 ND	< 100				< 100	26.8 ND
Antimony, total	ug/L	6 M	< 1	0.39 ND	0.39 ND	0.39 ND	0.39 ND	0.39 ND	0.39 ND	0.39 ND	0.39 ND	0.39 ND			0.39 ND	0.39 ND	0.39 ND
Antimony, dissolved	ug/L	6 M	< 1	0.39 ND	1.00	0.39 ND	0.39 ND	0.39 ND	0.39 ND	0.39 ND	0.39 ND	0.39 ND				0.39 ND	0.39 ND
Arsenic, total	µg/L	10 M	< 1	< 1	1.22	**12.40**	8.54	1.47	**155.00**	**264.00**	1.43	2.96			0.55 ND	< 1	0.55 ND
Arsenic, dissolved	µg/L	10 M	0.55 ND	0.55 ND	0.55 ND	3.55	5.57	0.55 ND	**113.00**	**226.00**	0.55 ND	< 1				0.55 ND	< 1
Barium, total	µg/L	2,000 M	12.10	20.30	28.20	42.60	73.60	18.20	48.60	75.40	23.20	44.20			14.10	23.20	230.00
Barium, dissolved	µg/L	2,000 M	11.90	17.70	29.90	38.40	71.00	18.70	47.20	67.80	21.00	40.60				23.90	233.00
Beryllium, total	ug/L	4 M	0.19 ND	0.19 ND	0.19 ND	0.19 ND	0.19 ND	< 1	0.19 ND	0.19 ND	0.19 ND	0.19 ND			1.64	0.19 ND	0.19 ND
Beryllium, dissolved	ug/L	4 M	0.19 ND	0.19 ND	0.19 ND	0.19 ND	0.19 ND	0.19 ND	0.19 ND	0.19 ND	0.19 ND	0.19 ND				0.19 ND	0.19 ND
Boron, total	µg/L	6,000 A	2,290.00	< 100	446.00	434.00	374.00	221.00	889.00	861.00	359.00	264.00			48.3 ND	1,730.00	119.00
Boron, dissolved	µg/L	6,000 A	2,180.00	< 100	431.00	429.00	378.00	218.00	890.00	875.00	349.00	265.00				1,720.00	114.00
Cadmium, total	µg/L	5 M	1.10	0.15 ND	< 1	0.15 ND	< 1	1.34	< 1	< 1	0.15 ND	0.15 ND			< 1	0.15 ND	0.15 ND
Cadmium, dissolved	µg/L	5 M	1.08	0.15 ND	< 1	0.15 ND	< 1	1.43	< 1	< 1	0.15 ND	0.15 ND				0.15 ND	0.15 ND
Calcium, total	mg/L		216.00	153.00	79.60	172.00	143.00	90.80	168.00	160.00	135.00	116.00			61.20	242.00	31.30
Calcium, dissolved	mg/L		209.00	144.00	76.20	164.00	142.00	83.90	172.00	166.00	137.00	115.00				234.00	31.70
Chromium, total	µg/L	100 M	0.41 ND	0.41 ND	0.41 ND	0.41 ND	0.41 ND	0.41 ND	0.41 ND	0.41 ND	0.41 ND	0.41 ND			0.41 ND	0.41 ND	< 1
Chromium, dissolved	µg/L	100 M	0.41 ND	0.41 ND	0.41 ND	0.41 ND	0.41 ND	0.41 ND	0.41 ND	0.41 ND	0.41 ND	0.41 ND				0.41 ND	0.41 ND
Copper, total	µg/L	1,000 S, 1,300 M	6.70	1.83	< 1	1.87	1.55	3.20	3.56	2.93	1.85	1.25			3.80	3.30	2.15
Copper, dissolved	µg/L	1,000 S, 1,300 M	6.24	1.75	< 1	< 1	0.39 ND	1.66	< 1	1.20	< 1	< 1				1.32	< 1
Iron, total	mg/L	0.3 S	0.16	**0.39**	< 0.02	**4.08**	**0.41**	0.0122 ND	0.0122 ND	0.0122 ND	0.0122 ND	0.0122 ND			0.05	0.0122 ND	< 0.02
Iron, dissolved	mg/L	0.3 S	< 0.02	0.23	< 0.02	**1.69**	**0.38**	< 0.02	< 0.02	0.12	< 0.02	0.001 ND				< 0.02	< 0.02

Brunner Island, LLC

Basin No. 5 Groundwater Monitoring Results

PARAMETER	UNITS	REGULATORY CRITERIA LIMIT	GROUNDWATER MONITORING WELLS														
			Downgradient												Pyrite Tomb Monitoring	Upgradient	
Location ID Sampling Date			MW-4-10 1/27/2022	MW-8-1N 1/22/2022	MW-8-2 1/24/2022	MW-8-3A 1/24/2022	MW-8-3B 1/24/2022	MW-8-4 1/22/2022	MW-8-5A 1/22/2022	MW-8-5B 1/22/2022	MW-8-10A 1/25/2022	MW-8-10B 1/25/2022	MW-8-10C	MW-8-12C	MW-PT-1 1/24/2022	MW-4-7A 1/24/2022	MW-19 1/26/2022
Lead, total	µg/L	5 A, 15 M	0.23 ND	0.23 ND	0.23 ND	0.23 ND	0.23 ND	0.23 ND	0.23 ND	0.23 ND	0.23 ND	0.23 ND			0.23 ND	0.23 ND	0.23 ND
Lead, dissolved	µg/L	5 A, 15 M	0.23 ND	0.23 ND	0.23 ND	0.23 ND	0.23 ND	0.23 ND	0.23 ND	0.23 ND	0.23 ND	0.23 ND				0.23 ND	0.23 ND
Lithium, total	µg/L	69 A	**1,140.00**	< 1	18.40	18.00	24.40	11.60	**192.00**	**160.00**	11.40	10.00			31.00	**209.00**	3.12
Lithium, dissolved	µg/L	69 A	**1,140.00**	< 1	21.40	17.90	35.80	10.30	**260.00**	**212.00**	11.50	10.20				**278.00**	2.83
Magnesium, total	mg/L		14.80	29.60	16.10	39.90	30.10	37.20	42.50	36.00	38.20	24.90			19.30	46.20	5.77
Magnesium, dissolved	mg/L		14.10	29.30	15.90	39.30	30.50	35.40	42.80	36.00	36.60	24.30				46.20	5.43
Manganese, total	µg/L	50 S, 300 A	**1,780.00**	**1,180.00**	**287.00**	**3,950.00**	**1,650.00**	**6,580.00**	**474.00**	**435.00**	**150.00**	< 20			**1,490.00**	**317.00**	< 20
Manganese, dissolved	µg/L	50 S, 300 A	**1,690.00**	**1,190.00**	**272.00**	**3,580.00**	**1,670.00**	**6,120.00**	**496.00**	**450.00**	**126.00**	6.39 ND				**330.00**	6.39 ND
Mercury, total	µg/L	2 M	0.72 ND	0.72 ND	0.72 ND	0.72 ND	0.72 ND	0.72 ND	0.72 ND	0.72 ND	0.72 ND	0.72 ND			0.72 ND	0.72 ND	0.72 ND
Mercury, dissolved	µg/L	2 M	0.72 ND	0.72 ND	0.72 ND	0.72 ND	0.72 ND	0.72 ND	0.72 ND	0.72 ND	0.72 ND	0.72 ND				0.72 ND	0.72 ND
Molybdenum, total	µg/L	40 A	**478.00**	< 1	**259.00**	35.80	**124.00**	2.56	**357.00**	**327.00**	17.90	31.20			10.20	28.60	< 1
Molybdenum, dissolved	µg/L	40 A	**475.00**	< 1	**291.00**	33.80	**149.00**	1.61	**388.00**	**360.00**	17.30	32.00				28.50	< 1
Nickel, total	ug/L	100 A	30.30	< 1	1.54	1.96	< 1	58.20	< 1	< 1	< 1	< 1			48.00	2.32	1.49
Nickel, dissolved	ug/L	100 A	30.40	4.53	3.26	5.37	4.30	62.50	4.86	5.64	4.33	3.66				9.30	1.59
Potassium, total	mg/L		146.00	6.60	4.60	3.13	1.65	1.35	3.98	3.83	2.09	1.96			2.86	4.14	< 1
Potassium, dissolved	mg/L		139.00	6.55	4.54	3.04	1.71	1.29	4.04	3.88	2.06	1.94				3.93	< 1
Selenium, total	µg/L	50 M	20.20	0.63 ND	0.63 ND	0.63 ND	0.63 ND	< 5	0.63 ND	< 5	0.63 ND	< 5			< 5	0.63 ND	21.80
Selenium, dissolved	µg/L	50 M	19.60	0.63 ND	0.63 ND	0.63 ND	0.63 ND	0.63 ND	0.63 ND	0.63 ND	0.63 ND	0.63 ND				0.63 ND	20.90
Silver, total	µg/L	100 A	0.13 ND	0.13 ND	0.13 ND	0.13 ND	0.13 ND	0.13 ND	0.13 ND	0.13 ND	0.13 ND	0.13 ND			0.13 ND	0.13 ND	0.13 ND
Silver, dissolved	µg/L	100 A	0.13 ND	0.13 ND	0.13 ND	0.13 ND	0.13 ND	0.13 ND	0.13 ND	0.13 ND	0.13 ND	0.13 ND				0.13 ND	0.13 ND
Sodium, total	mg/L		80.00	21.30	13.90	28.90	8.68	17.80	13.30	10.20	14.60	7.03			10.10	57.90	9.66
Sodium, dissolved	mg/L		76.20	20.80	13.80	28.90	8.95	16.80	13.60	10.50	14.30	6.84				54.40	8.92
Strontium, total	µg/L	4,000 A	1,700.00	1,020.00	506.00	943.00	422.00	289.00	813.00	937.00	226.00	219.00			240.00	378.00	56.00
Strontium, dissolved	µg/L	4,000 A	1,570.00	1,020.00	489.00	947.00	434.00	273.00	797.00	951.00	221.00	213.00				379.00	52.00
Titanium, total	µg/L		< 5	1.45 ND	1.45 ND	1.45 ND	1.45 ND	< 5	1.45 ND	1.45 ND	1.45 ND	1.45 ND			< 5	< 5	5.70
Titanium, dissolved	µg/L		< 5	1.45 ND	1.45 ND	< 5	< 5	5.57	< 5	< 5	< 5	< 5				< 5	6.13
Vanadium, total	µg/L	2.9 A	2.35 ND	2.35 ND	2.35 ND	2.35 ND	2.35 ND	2.35 ND	2.35 ND	2.35 ND	2.35 ND	< 5			2.35 ND	2.35 ND	2.35 ND
Vanadium, dissolved	µg/L	2.9 A	2.35 ND	2.35 ND	2.35 ND	2.35 ND	2.35 ND	2.35 ND	2.35 ND	2.35 ND	2.35 ND	< 5				2.35 ND	2.35 ND
Zinc, total	µg/L	2,000 A, 5,000 S	33.00	2.24 ND	2.24 ND	2.24 ND	2.24 ND	70.10	2.24 ND	2.24 ND	< 5	2.24 ND			72.70	2.24 ND	2.24 ND
Zinc, dissolved	µg/L	2,000 A, 5,000 S	33.00	7.05	< 5	< 5	< 5	82.50	6.15	< 5	7.26	< 5				9.10	2.24 ND

Notes:

1. Regulatory qualifier codes: M = EPA Primary Drinking Water MCL/TT, S = EPA Secondary Drinking Water MCL, and A = Pennsylvania Act 2 residential Statewide Health Standard for used aquifers.
2. MW-19 was sampled for additional parameters (Ga, Ge, Rb, Y) pursuant to Basin No. 7 sampling requirements.
3. MW-4-7A, MW-4-10, and MW-19 are additionally sampled for organic parameters during the second and third calendar quarters pursuant to Basin No. 4 South sampling requirements.
4. MW-8-10C and MW-8-12C are sampled anually during the second calendar quarter.

Pyrite Tomb Standpipe Monitoring Results

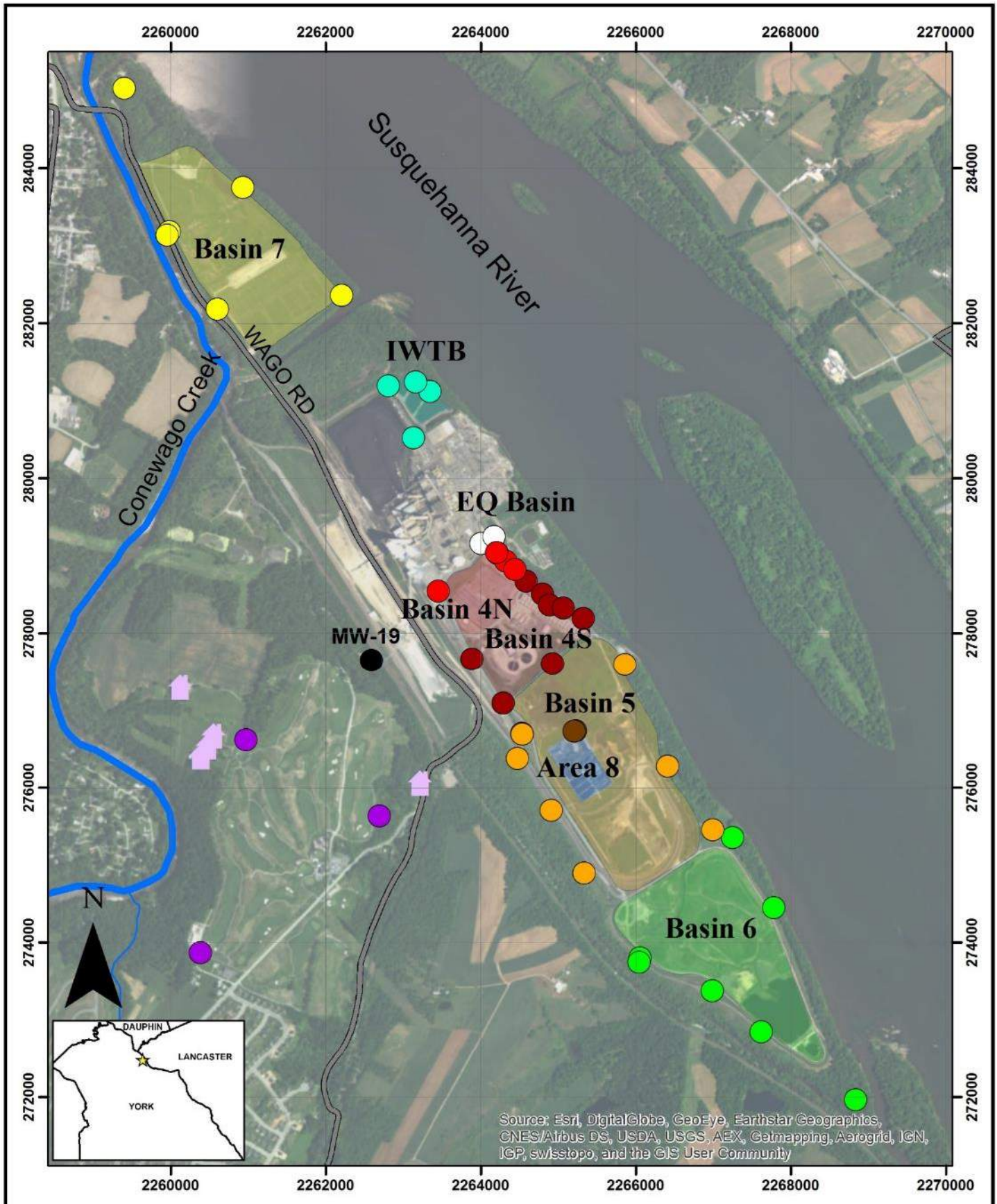
	Pyrite Tomb Standpipe			
Date	Water Depth (ft)	Water Surface Elevation (ft)	pH (S.U.)	Comments
1/3/2017	25.85	269.60	7.61	
1/12/2017	26.00	269.45	7.54	
1/18/2017	29.03	266.42	8.88	Standpipe cleanout 1/17/2017
1/25/2017	28.79	266.66	7.84	Sampled the tomb (with bailer)
1/31/2017	28.79	266.66	8.25	
2/7/2017	28.78	266.67	7.97	
2/13/2017	28.85	266.60	7.41	
3/6/2017	28.70	266.75	7.11	
4/4/2017	28.62	266.83	7.49	
4/15/2017	28.57	266.88	7.11	
4/20/2017	30.71	264.74	7.70	
5/9/2017	29.08	266.37	7.77	
6/22/2017	27.72	267.73	7.43	Purged 24.5 gal.
6/23/2017	30.92	264.53	7.97	Sampled the tomb after recharging (17.5 hours)
8/3/2017	28.41	267.04	7.53	
9/1/2017	28.18	267.27	7.15	
9/21/2017	30.80	264.65	N/A	Sample attempted, but not enough water in standpipe.
9/28/2017	30.70	264.75	N/A	Sample attempted again, but not enough water in standpipe.
10/2/2017	30.65	264.80	7.18	
12/5/2017	30.21	265.24	7.48	
12/14/2017	N/A	N/A	N/A	Sample attempted again, but not enough water in standpipe.
Lab analytical attempts discontinued in 2018; Attempts to purge water continuing quarterly.				
1/25/2018	N/A	N/A	N/A	Water elevation not high enough to record depth to water.
2/19/2018	30.57	264.88	6.94	
3/4/2018	30.33	265.12	6.48	Purged 5.25 Liters
4/12/2018	31.20	264.25	7.24	
5/14/2018	31.16	264.29	6.96	Purged 1.7 liters. Wouldn't purge further.
5/29/2018	31.24	264.21	N/A	Not enough water in tomb to get a pH reading
6/7/2018	31.32	264.13	N/A	Not enough water in tomb to get a pH reading
7/7/2018	29.40	266.05	7.38	
8/2/2018	28.64	266.81	7.42	
8/13/2018	27.93	267.52	N/A	
9/13/2018	23.56	271.89	7.76	Pumped tomb down to 31.43'. Purged 35.25 L.
10/5/2018	22.22	273.23	7.69	
11/5/2018	22.15	273.30	8.2	Purged 52.5 L.
12/10/2018	19.55	275.90	7.95	

Pyrite Tomb Standpipe Monitoring Results

	Pyrite Tomb Standpipe			
Date	Water Depth (ft)	Water Surface Elevation (ft)	pH (S.U.)	Comments
1/10/19	19.75	275.70	7.62	
2/22/19	19.22	276.23	7.46	Purged 20 L. Water level was not dropping.
3/13/19	18.80	276.65	7.43	
4/2/2019	18.18	277.27	7.4	
5/16/2019	18.20	277.25	8.22	
6/18/2019	18.55	276.90	7.28	Purged 45 L. Water level was not dropping.
7/23/2019	18.58	276.87	7.35	
8/13/2019	19.00	276.45	7.39	Water level did not drop after 7 hours of pumping. Purged 91 L.
9/5/2019	19.71	275.74	7.24	
10/1/2019	20.32	275.13	7.43	
11/19/2019	21.14	274.31	7.88	Purged 42.5 L. Temp = 13.45^{o}C, SpC = 2465 µmhos/cm, Redox = -85.5 mV, DO = 2.01 mg/L, Turb = 1.00 NTU.
12/19/2019	21.65	273.80	7.39	
1/16/2020	21.47	273.98	7.42	
2/24/2020	21.11	274.34	7.66	Purged 53.5 L. Water level did not drop during purge.
3/11/2020	21.21	274.24	7.07	
4/1/2020	21.37	274.08	6.85	
5/28/2020	21.20	274.25	6.88	Purged 24 L.
6/1/2020	21.38	274.07	7.45	
7/17/2020	22.05	273.40	7.17	
8/20/2020	22.66	272.79	7.12	
9/30/2020	23.44	272.01	6.92	Purged 36 L on 10/6/2020. Did not drop.
10/13/2020	23.63	271.82	7.18	
11/5/2020	24.06	271.39	7.05	Purged 24 L. Temp = 14.7^{o}C, Recharge rate = 0.00165 L/min
12/22/2020	24.67	270.78	7.23	
1/12/2021	24.67	270.78	7.22	Temp = 13.1°C
2/25/2021	24.82	270.63	7.42	Temp = 12.8°C
3/10/2021	24.75	270.70	7.11	Temp = 13.9°C
4/30/2021	23.90	271.55	7.31	Purged 27 L. Temp = 14.1°C
5/4/2021	23.88	271.57	7.22	
6/10/2021	24.16	271.29	7.54	Temp = 15.0°C
7/28/2021	25.53	269.92	7.06	Purged 20 L. Temp = 15.0°C
8/16/2021	24.63	270.82	7.32	Temp = 15.5°C
9/22/2021	24.48	270.97	7.02	
10/23/2021	23.75	271.10	6.82	Purged 84 L
11/30/2021	23.86	271.59	7.28	Temp = 11.6°C
12/1/2021	23.80	271.65	7.31	
1/29/2022	24.52	270.93	7.62	Purged 66 L

Pyrite Tomb Standpipe Monitoring Results

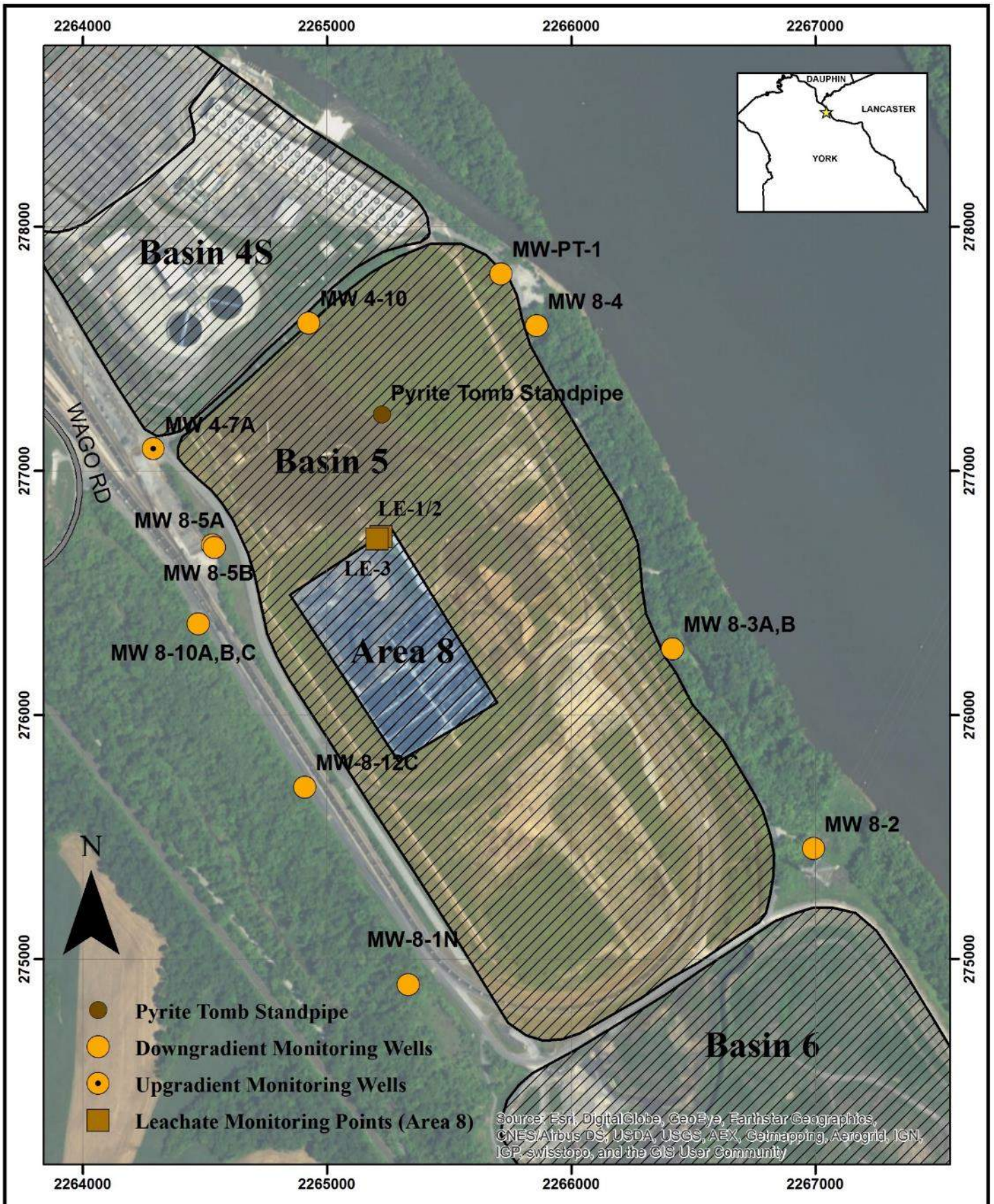
	Pyrite Tomb Standpipe			
Date	Water Depth (ft)	Water Surface Elevation (ft)	pH (S.U.)	Comments
2/2/2022	24.54	270.91	7.62	Temp = 12.6°C



Talen Energy
Brunner Island SES

OVERALL MAP

North American Datum of 1983 (NAD83)
State Plane Pennsylvania South
0 0.125 0.25 0.5
Miles



Talen Energy
Brunner Island SES
Basin No. 5

SITE MAP

North American Datum of 1983 (NAD83)
State Plane Pennsylvania South
0 250 500 1,000 Feet

2540-PM-BWM0373 6/2005

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF WASTE MANAGEMENT

Date Prepared/Revised
03/08/2022
DEP USE ONLY
Date Received

FORM 14R
RESIDUAL WASTE LANDFILLS AND DISPOSAL IMPOUNDMENTS
QUARTERLY AND ANNUAL WATER QUALITY ANALYSES

This form must be fully and accurately completed. All required information must be typed or legibly printed in the spaces provided. If additional space is necessary, identify each attached sheet as Form 14R, reference the item number and identify the date prepared. The "date prepared/revised" on any attached sheets needs to match the "date prepared/revised" on this page.

General References: Section 288.254, 289.264

SECTION A. SITE IDENTIFIER

Applicant/permittee:	Brunner Island, LLC - Basin No. 5
Site Name:	Basin No. 5
Facility ID (as issued by DEP):	301309

SECTION B. FACILITY INFORMATION

Monitoring wells must be designed and constructed in accordance with Department standards. **INDICATE THE LATITUDE AND LONGITUDE TO THE NEAREST ONE TENTH OF A SECOND (DD° MM' SS.S").**

Monitoring Point Number: MW-19 ☒ Well ☐ Spring ☐ Stream ☐ Other

☒ Upgradient/Upstream ☐ Downgradient/Downstream

Location: County York Municipality: East Manchester Township

Sampling Point: Latitude: 40 ° 5 ' 26.55 " Longitude: 76 ° 41 ' 55.87 "

Depth to Water Level: 18.24 ft. Measured from: ☐ Land Surface ☒ TOC

Casing Stick Up: 1.60 ft. Elevation of Water Level: 287.56 ft./MSL

Sampling Depth: 33.00 ft. Volume of Water Column: _____ gal.

Total Well Depth: 45.40 ft. Sampling Method: ☒ Pumped ☐ Bailed ☐ Grab

Well Purged: ☒ Yes ☐ No Well Volumes Purged: 2.4 L

Sample Field Filtered (must be 0.45 micron)? ☒ Yes ☐ No

Spring Flow Rate: _____ GPM

Sample Date (mm/dd/yy): 01/26/2022 Sample Collection Time: 8:57AM

Sample Collector's Name: NL

Sample Collector's Affiliation: Talen Generation, LLC

Laboratory(ies) Performing Analysis: Hawk Mtn Labs, Inc.

Were any holding times exceeded? ☐ Yes ☒ No. If yes, please explain in comments field.

Lab Certification Number(s): 40-417

Lab Sample Number(s): 220101241-001 Final Lab Analysis Completion Date: 02/18/2022

Name/Affiliation of Person who Filled out Form Martin Mengel / Talen Energy Supply, LLC

Comments:

I.D. No.	301309
Monitoring Point No.	MW-19
Sample Date	01/26/2022

FORM 14 R

QUARTERLY AND ANNUAL WATER QUALITY ANALYSES

ANALYTES

1-Q. Inorganics (Enter all data in mg/l except as noted)

ANALYTE	VALUE (T)	ANALYSIS METHOD NUMBER
Ammonia, as N (mg/l)	0.2 <	SM 4500-NH3 F
Bicarbonate (mg/l)	46.2	SM 2320
Calcium, total (mg/l)	31.3	EPA 200.7
Calcium, dissolved (mg/l)	31.7	EPA 200.7
Chemical Oxygen Demand (mg/l)	25.4	SM 5220 D
Chloride, total as Cl (mg/l)	8.72	EPA 300.0
Fluoride, total as F (mg/l)	0.2 <	EPA 300.0
Iron, total (µg/l)	20 <	EPA 200.7
Iron, dissolved (µg/l)	20 <	EPA 200.7
Magnesium, total (mg/l)	5.77	EPA 200.7
Magnesium, dissolved (mg/l)	5.43	EPA 200.7
Manganese, total (µg/l)	20 <	EPA 200.7
Manganese, dissolved (µg/l)	6.39 ND	EPA 200.7
Nitrate, as N (mg/l)	3.86	EPA 300.0
pH, field (su)	6.79	SM 4500-H+B
pH, lab (su)	6.81 H	SM 4500-H+B
Potassium, total (mg/l)	1 <	EPA 200.7
Potassium, dissolved (mg/l)	1 <	EPA 200.7
Sodium, total (mg/l)	9.66	EPA 200.7
Sodium, dissolved (mg/l)	8.92	EPA 200.7
Specific Conductance, field (umhos/cm)	238	EPA 120.1, FIELD
Specific Conductance, lab (umhos/cm)	243	SM 2510 B
Sulfate, as SO4 (mg/l)	33.7	EPA 300.0
Alkalinity, total as CaCO3 (mg/l)	46.2	SM 2320 B
Total Dissolved Solids (mg/l)	141	SM 2540 C
Total Organic Carbon (mg/l)	0.5 <	SM 5310 C
Turbidity, field (n.t.u.)	3.66	
Dissolved O2, field (mg/l)	2.91	Field Meter
Redox, field (mv)	145	Field Meter
Temperature, field (°c)	10.5	Field Meter
Acidity, total as CaCO3 (mg/l)	1 ND	SM 2310 B

T Please indicate detection limit if analyte is not detected.

I.D. No.	301309
Monitoring Point No.	MW-19
Sample Date	01/26/2022

FORM 14 R

QUARTERLY AND ANNUAL WATER QUALITY ANALYSES

1-A. Organics (Enter all data in ug/l)

ANALYTE	VALUE (T)	ANALYSIS METHOD NUMBER
Benzene (µg/l)		
1,2-Dibromoethane (µg/l)		
1,1-Dichloroethane (µg/l)		
1,1-Dichloroethene (µg/l)		
1,2-Dichloroethane (µg/l)		
cis-1,2-Dichloroethene (µg/l)		
trans-1,2-Dichloroethene (µg/l)		
Ethylbenzene (µg/l)		
Methylene Chloride (µg/l)		
Tetrachloroethene (µg/l)		
Toluene (µg/l)		
1,1,1-Trichloroethane (µg/l)		
Trichloroethene (µg/l)		
Vinyl chloride (µg/l)		
Xylenes (µg/l)		

T Please indicate detection limit if analyte is not detected.

I.D. No.	301309
Monitoring Point No.	MW-19
Sample Date	01/26/2022

FORM 14 R

ANNUAL WATER QUALITY ANALYSES

2-A. **Metals (Enter all data in ug/l) If initial background analyses of four consecutive analyses show essentially identical (within 5%) dissolved and total analyses, dissolved analyses may not be required, subject to written DEP approval.**

ANALYTE	VALUE (T)	ANALYSIS METHOD NUMBER
Arsenic, total (µg/l)	0.55 ND	EPA 200.8
Arsenic, dissolved (µg/l)	1 <	EPA 200.8
Barium, total (µg/l)	230	EPA 200.8
Barium, dissolved (µg/l)	233	EPA 200.8
Cadmium, total (µg/l)	0.15 ND	EPA 200.8
Cadmium, dissolved (µg/l)	0.15 ND	EPA 200.8
Chromium, total (µg/l)	1 <	EPA 200.8
Chromium, dissolved (µg/l)	0.41 ND	EPA 200.8
Copper, total (µg/l)	2.15	EPA 200.8
Copper, dissolved (µg/l)	1 <	EPA 200.8
Lead, total (µg/l)	0.23 ND	EPA 200.8
Lead, dissolved (µg/l)	0.23 ND	EPA 200.8
Mercury, total (µg/l)	0.72 ND	EPA 200.8
Mercury, dissolved (µg/l)	0.72 ND	EPA 200.8
Selenium, total (µg/l)	21.8	EPA 200.8
Selenium, dissolved (µg/l)	20.9	EPA 200.8
Silver, total (µg/l)	0.13 ND	EPA 200.8
Silver, dissolved (µg/l)	0.13 ND	EPA 200.8
Zinc, total (µg/l)	2.24 ND	EPA 200.8
Zinc, dissolved (µg/l)	2.24 ND	EPA 200.8
Boron, total (µg/l)	119	EPA 200.7
Boron, dissolved (µg/l)	114	EPA 200.7
Lithium, total (µg/l)	3.12	EPA 200.8
Lithium, dissolved (µg/l)	2.83	EPA 200.8
Molybdenum, total (µg/l)	1 <	EPA 200.8
Molybdenum, dissolved (µg/l)	1 <	EPA 200.8
Strontium, total (µg/l)	56	EPA 200.7
Strontium, dissolved (µg/l)	52	EPA 200.7

T Please indicate detection limit if analyte is not detected.

I.D. No.	301309
Monitoring Point No.	MW-19
Sample Date	01/26/2022

FORM 14 R

ANNUAL WATER QUALITY ANALYSES

2-A. **Metals (Enter all data in ug/l) If initial background analyses of four consecutive analyses show essentially identical (within 5%) dissolved and total analyses, dissolved analyses may not be required, subject to written DEP approval.**

ANALYTE	VALUE (T)	ANALYSIS METHOD NUMBER
Aluminum, total (µg/l)	26.8 ND	EPA 200.7
Aluminum, dissolved (µg/l)	26.8 ND	EPA 200.7
Antimony, total (µg/l)	0.39 ND	EPA 200.8
Antimony, dissolved (µg/l)	0.39 ND	EPA 200.8
Beryllium, total (µg/l)	0.19 ND	EPA 200.8
Beryllium, dissolved (µg/l)	0.19 ND	EPA 200.8
Cobalt, total (µg/l)		
Cobalt, dissolved (µg/l)		
Gallium, total (µg/l)	8.32	EPA 200.8
Gallium, dissolved (µg/l)	8.19	EPA 200.8
Germanium, total (µg/l)	1 ND	EPA 200.8
Germanium, dissolved (µg/l)	1 ND	EPA 200.8
Nickel, total (µg/l)	1.49	EPA 200.8
Nickel, dissolved (µg/l)	1.59	EPA 200.8
Rubidium, total (µg/l)	1 ND	EPA 200.8
Rubidium, dissolved (µg/l)	1 ND	EPA 200.8
Titanium, total (µg/l)	5.7	EPA 200.8
Titanium, dissolved (µg/l)	6.13	EPA 200.8
Vanadium, total (µg/l)	2.35 ND	EPA 200.8
Vanadium, dissolved (µg/l)	2.35 ND	EPA 200.8
Yittrium, total (µg/l)	1 ND	EPA 200.8
Yittrium, dissolved (µg/l)	1 ND	EPA 200.8

T Please indicate detection limit if analyte is not detected.

2540-PM-BWM0373 6/2005

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF WASTE MANAGEMENT

Date Prepared/Revised
03/08/2022
DEP USE ONLY
Date Received

FORM 14R
RESIDUAL WASTE LANDFILLS AND DISPOSAL IMPOUNDMENTS
QUARTERLY AND ANNUAL WATER QUALITY ANALYSES

This form must be fully and accurately completed. All required information must be typed or legibly printed in the spaces provided. If additional space is necessary, identify each attached sheet as Form 14R, reference the item number and identify the date prepared. The "date prepared/revised" on any attached sheets needs to match the "date prepared/revised" on this page.

General References: Section 288.254, 289.264

SECTION A. SITE IDENTIFIER

Applicant/permittee:	Brunner Island, LLC - Basin No. 5
Site Name:	Basin No. 5
Facility ID (as issued by DEP):	301309

SECTION B. FACILITY INFORMATION

Monitoring wells must be designed and constructed in accordance with Department standards. **INDICATE THE LATITUDE AND LONGITUDE TO THE NEAREST ONE TENTH OF A SECOND (DD° MM' SS.S").**

Monitoring Point Number: MW-4-10 ☒ Well ☐ Spring ☐ Stream ☐ Other
☐ Upgradient/Upstream ☑ Downgradient/Downstream

Location: County York Municipality: East Manchester Township

Sampling Point: Latitude: 40 ° 5 ' 25.84 " Longitude: 76 ° 41 ' 25.83 "

Depth to Water Level: 24.6 ft. Measured from: ☐ Land Surface ☒ TOC

Casing Stick Up: 2.26 ft. Elevation of Water Level: 268.11 ft./MSL

Sampling Depth: 34.00 ft. Volume of Water Column: _____ gal.

Total Well Depth: 38.60 ft. Sampling Method: ☒ Pumped ☐ Bailed ☐ Grab

Well Purged: ☒ Yes ☐ No Well Volumes Purged: 3.5 L

Sample Field Filtered (must be 0.45 micron)? ☒ Yes ☐ No

Spring Flow Rate: _____ GPM

Sample Date (mm/dd/yy): 01/27/2022 Sample Collection Time: 1:43PM

Sample Collector's Name: JO

Sample Collector's Affiliation: Talen Generation, LLC

Laboratory(ies) Performing Analysis: Hawk Mtn Labs, Inc.

Were any holding times exceeded? ☐ Yes ☒ No. If yes, please explain in comments field.

Lab Certification Number(s): 40-417

Lab Sample Number(s): 220101236-005 Final Lab Analysis Completion Date: 02/18/2022

Name/Affiliation of Person who Filled out Form Martin Mengel / Talen Energy Supply, LLC

Comments:

I.D. No.	301309
Monitoring Point No.	MW-4-10
Sample Date	01/27/2022

FORM 14 R

QUARTERLY AND ANNUAL WATER QUALITY ANALYSES

ANALYTES

1-Q. Inorganics (Enter all data in mg/l except as noted)

ANALYTE	VALUE (T)	ANALYSIS METHOD NUMBER
Ammonia, as N (mg/l)	0.781	SM 4500-NH3 F
Bicarbonate (mg/l)	54.5	SM 2320
Calcium, total (mg/l)	216	EPA 200.7
Calcium, dissolved (mg/l)	209	EPA 200.7
Chemical Oxygen Demand (mg/l)	20 <	SM 5220 D
Chloride, total as Cl (mg/l)	8.08	EPA 300.0
Fluoride, total as F (mg/l)	0.2 <	EPA 300.0
Iron, total (µg/l)	164	EPA 200.7
Iron, dissolved (µg/l)	20 <	EPA 200.7
Magnesium, total (mg/l)	14.8	EPA 200.7
Magnesium, dissolved (mg/l)	14.1	EPA 200.7
Manganese, total (µg/l)	1,780	EPA 200.7
Manganese, dissolved (µg/l)	1,690	EPA 200.7
Nitrate, as N (mg/l)	0.5 <	EPA 300.0
pH, field (su)	5.7	SM 4500-H+B
pH, lab (su)	6.12 H	SM 4500-H+B
Potassium, total (mg/l)	146	EPA 200.7
Potassium, dissolved (mg/l)	139	EPA 200.7
Sodium, total (mg/l)	80	EPA 200.7
Sodium, dissolved (mg/l)	76.2	EPA 200.7
Specific Conductance, field (umhos/cm)	1,550	EPA 120.1, FIELD
Specific Conductance, lab (umhos/cm)	1,560	SM 2510 B
Sulfate, as SO4 (mg/l)	714	EPA 300.0
Alkalinity, total as CaCO3 (mg/l)	54.5	SM 2320 B
Total Dissolved Solids (mg/l)	1,130	SM 2540 C
Total Organic Carbon (mg/l)	0.71	SM 5310 C
Turbidity, field (n.t.u.)	1.17	
Dissolved O2, field (mg/l)	2.52	Field Meter
Redox, field (mv)	262	Field Meter
Temperature, field (°c)	11.84	Field Meter
Acidity, total as CaCO3 (mg/l)		

T Please indicate detection limit if analyte is not detected.

I.D. No.	301309
Monitoring Point No.	MW-4-10
Sample Date	01/27/2022

FORM 14 R

QUARTERLY AND ANNUAL WATER QUALITY ANALYSES

1-A. Organics (Enter all data in ug/l)

ANALYTE	VALUE (T)	ANALYSIS METHOD NUMBER
Benzene (µg/l)		
1,2-Dibromoethane (µg/l)		
1,1-Dichloroethane (µg/l)		
1,1-Dichloroethene (µg/l)		
1,2-Dichloroethane (µg/l)		
cis-1,2-Dichloroethene (µg/l)		
trans-1,2-Dichloroethene (µg/l)		
Ethylbenzene (µg/l)		
Methylene Chloride (µg/l)		
Tetrachloroethene (µg/l)		
Toluene (µg/l)		
1,1,1-Trichloroethane (µg/l)		
Trichloroethene (µg/l)		
Vinyl chloride (µg/l)		
Xylenes (µg/l)		

T Please indicate detection limit if analyte is not detected.

I.D. No.	301309
Monitoring Point No.	MW-4-10
Sample Date	01/27/2022

FORM 14 R

ANNUAL WATER QUALITY ANALYSES

2-A. **Metals (Enter all data in ug/l) If initial background analyses of four consecutive analyses show essentially identical (within 5%) dissolved and total analyses, dissolved analyses may not be required, subject to written DEP approval.**

ANALYTE	VALUE (T)	ANALYSIS METHOD NUMBER
Arsenic, total (µg/l)	1 <	EPA 200.8
Arsenic, dissolved (µg/l)	0.55 ND	EPA 200.8
Barium, total (µg/l)	12.1	EPA 200.8
Barium, dissolved (µg/l)	11.9	EPA 200.8
Cadmium, total (µg/l)	1.1	EPA 200.8
Cadmium, dissolved (µg/l)	1.08	EPA 200.8
Chromium, total (µg/l)	0.41 ND	EPA 200.8
Chromium, dissolved (µg/l)	0.41 ND	EPA 200.8
Copper, total (µg/l)	6.7	EPA 200.8
Copper, dissolved (µg/l)	6.24	EPA 200.8
Lead, total (µg/l)	0.23 ND	EPA 200.8
Lead, dissolved (µg/l)	0.23 ND	EPA 200.8
Mercury, total (µg/l)	0.72 ND	EPA 200.8
Mercury, dissolved (µg/l)	0.72 ND	EPA 200.8
Selenium, total (µg/l)	20.2	EPA 200.8
Selenium, dissolved (µg/l)	19.6	EPA 200.8
Silver, total (µg/l)	0.13 ND	EPA 200.8
Silver, dissolved (µg/l)	0.13 ND	EPA 200.8
Zinc, total (µg/l)	33	EPA 200.8
Zinc, dissolved (µg/l)	33	EPA 200.8
Boron, total (µg/l)	2,290	EPA 200.7
Boron, dissolved (µg/l)	2,180	EPA 200.7
Lithium, total (µg/l)	1,140	EPA 200.8
Lithium, dissolved (µg/l)	1,140	EPA 200.8
Molybdenum, total (µg/l)	478	EPA 200.8
Molybdenum, dissolved (µg/l)	475	EPA 200.8
Strontium, total (µg/l)	1,700	EPA 200.7
Strontium, dissolved (µg/l)	1,570	EPA 200.7

T Please indicate detection limit if analyte is not detected.

I.D. No.	301309
Monitoring Point No.	MW-4-10
Sample Date	01/27/2022

FORM 14 R

ANNUAL WATER QUALITY ANALYSES

2-A. **Metals (Enter all data in ug/l) If initial background analyses of four consecutive analyses show essentially identical (within 5%) dissolved and total analyses, dissolved analyses may not be required, subject to written DEP approval.**

ANALYTE	VALUE (T)	ANALYSIS METHOD NUMBER
Aluminum, total (µg/l)	280	EPA 200.7
Aluminum, dissolved (µg/l)	100 <	EPA 200.7
Antimony, total (µg/l)	1 <	EPA 200.8
Antimony, dissolved (µg/l)	1 <	EPA 200.8
Beryllium, total (µg/l)	0.19 ND	EPA 200.8
Beryllium, dissolved (µg/l)	0.19 ND	EPA 200.8
Cobalt, total (µg/l)		
Cobalt, dissolved (µg/l)		
Gallium, total (µg/l)		
Gallium, dissolved (µg/l)		
Germanium, total (µg/l)		
Germanium, dissolved (µg/l)		
Nickel, total (µg/l)	30.3	EPA 200.8
Nickel, dissolved (µg/l)	30.4	EPA 200.8
Rubidium, total (µg/l)		
Rubidium, dissolved (µg/l)		
Titanium, total (µg/l)	5 <	EPA 200.8
Titanium, dissolved (µg/l)	5 <	EPA 200.8
Vanadium, total (µg/l)	2.35 ND	EPA 200.8
Vanadium, dissolved (µg/l)	2.35 ND	EPA 200.8
Yittrium, total (µg/l)		
Yittrium, dissolved (µg/l)		

T Please indicate detection limit if analyte is not detected.

2540-PM-BWM0373 6/2005

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF WASTE MANAGEMENT

Date Prepared/Revised
03/08/2022
DEP USE ONLY
Date Received

FORM 14R
RESIDUAL WASTE LANDFILLS AND DISPOSAL IMPOUNDMENTS
QUARTERLY AND ANNUAL WATER QUALITY ANALYSES

This form must be fully and accurately completed. All required information must be typed or legibly printed in the spaces provided. If additional space is necessary, identify each attached sheet as Form 14R, reference the item number and identify the date prepared. The "date prepared/revised" on any attached sheets needs to match the "date prepared/revised" on this page.

General References: Section 288.254, 289.264

SECTION A. SITE IDENTIFIER

Applicant/permittee:	Brunner Island, LLC - Basin No. 5
Site Name:	Basin No. 5
Facility ID (as issued by DEP):	301309

SECTION B. FACILITY INFORMATION

Monitoring wells must be designed and constructed in accordance with Department standards. **INDICATE THE LATITUDE AND LONGITUDE TO THE NEAREST ONE TENTH OF A SECOND (DD° MM' SS.S").**

Monitoring Point Number: MW-4-7A ☒ Well ☐ Spring ☐ Stream ☐ Other

☒ Upgradient/Upstream ☐ Downgradient/Downstream

Location: County York Municipality: East Manchester Township

Sampling Point: Latitude: 40 ° 5 ' 20.84 " Longitude: 76 ° 41 ' 34.11 "

Depth to Water Level: 26.15 ft. Measured from: ☐ Land Surface ☒ TOC

Casing Stick Up: 2.23 ft. Elevation of Water Level: 261.86 ft./MSL

Sampling Depth: 35.00 ft. Volume of Water Column: _____ gal.

Total Well Depth: 39.90 ft. Sampling Method: ☒ Pumped ☐ Bailed ☐ Grab

Well Purged: ☒ Yes ☐ No Well Volumes Purged: 3 L

Sample Field Filtered (must be 0.45 micron)? ☒ Yes ☐ No

Spring Flow Rate: _____ GPM

Sample Date (mm/dd/yy): 01/24/2022 Sample Collection Time: 11:36AM

Sample Collector's Name: AF

Sample Collector's Affiliation: Talen Generation, LLC

Laboratory(ies) Performing Analysis: Hawk Mtn Labs, Inc.

Were any holding times exceeded? ☐ Yes ☒ No. If yes, please explain in comments field.

Lab Certification Number(s): 40-417

Lab Sample Number(s): 220101236-002 Final Lab Analysis Completion Date: 02/12/2022

Name/Affiliation of Person who Filled out Form Martin Mengel / Talen Energy Supply, LLC

Comments:

I.D. No.	301309
Monitoring Point No.	MW-4-7A
Sample Date	01/24/2022

FORM 14 R

QUARTERLY AND ANNUAL WATER QUALITY ANALYSES

ANALYTES

1-Q. Inorganics (Enter all data in mg/l except as noted)

ANALYTE	VALUE (T)	ANALYSIS METHOD NUMBER
Ammonia, as N (mg/l)	0.248	SM 4500-NH3 F
Bicarbonate (mg/l)	232	SM 2320
Calcium, total (mg/l)	242	EPA 200.7
Calcium, dissolved (mg/l)	234	EPA 200.7
Chemical Oxygen Demand (mg/l)	5.3 ND	SM 5220 D
Chloride, total as Cl (mg/l)	13.9	EPA 300.0
Fluoride, total as F (mg/l)	0.2 <	EPA 300.0
Iron, total (µg/l)	12.2 ND	EPA 200.7
Iron, dissolved (µg/l)	20 <	EPA 200.7
Magnesium, total (mg/l)	46.2	EPA 200.7
Magnesium, dissolved (mg/l)	46.2	EPA 200.7
Manganese, total (µg/l)	317	EPA 200.7
Manganese, dissolved (µg/l)	330	EPA 200.7
Nitrate, as N (mg/l)	0.022 ND	EPA 300.0
pH, field (su)	6.62	SM 4500-H+B
pH, lab (su)	7.2 H	SM 4500-H+B
Potassium, total (mg/l)	4.14	EPA 200.7
Potassium, dissolved (mg/l)	3.93	EPA 200.7
Sodium, total (mg/l)	57.9	EPA 200.7
Sodium, dissolved (mg/l)	54.4	EPA 200.7
Specific Conductance, field (umhos/cm)	1,568	EPA 120.1, FIELD
Specific Conductance, lab (umhos/cm)	1,580	SM 2510 B
Sulfate, as SO4 (mg/l)	644	EPA 300.0
Alkalinity, total as CaCO3 (mg/l)	232	SM 2320 B
Total Dissolved Solids (mg/l)	1,200	SM 2540 C
Total Organic Carbon (mg/l)	1.09	SM 5310 C
Turbidity, field (n.t.u.)	0.43	
Dissolved O2, field (mg/l)	0.47	Field Meter
Redox, field (mv)	189.2	Field Meter
Temperature, field (°c)	12.21	Field Meter
Acidity, total as CaCO3 (mg/l)		

T Please indicate detection limit if analyte is not detected.

I.D. No.	301309
Monitoring Point No.	MW-4-7A
Sample Date	01/24/2022

FORM 14 R

QUARTERLY AND ANNUAL WATER QUALITY ANALYSES

1-A. Organics (Enter all data in ug/l)

ANALYTE	VALUE (T)	ANALYSIS METHOD NUMBER
Benzene (µg/l)		
1,2-Dibromoethane (µg/l)		
1,1-Dichloroethane (µg/l)		
1,1-Dichloroethene (µg/l)		
1,2-Dichloroethane (µg/l)		
cis-1,2-Dichloroethene (µg/l)		
trans-1,2-Dichloroethene (µg/l)		
Ethylbenzene (µg/l)		
Methylene Chloride (µg/l)		
Tetrachloroethene (µg/l)		
Toluene (µg/l)		
1,1,1-Trichloroethane (µg/l)		
Trichloroethene (µg/l)		
Vinyl chloride (µg/l)		
Xylenes (µg/l)		

T Please indicate detection limit if analyte is not detected.

I.D. No.	301309
Monitoring Point No.	MW-4-7A
Sample Date	01/24/2022

FORM 14 R

ANNUAL WATER QUALITY ANALYSES

2-A. **Metals (Enter all data in ug/l) If initial background analyses of four consecutive analyses show essentially identical (within 5%) dissolved and total analyses, dissolved analyses may not be required, subject to written DEP approval.**

ANALYTE	VALUE (T)	ANALYSIS METHOD NUMBER
Arsenic, total (µg/l)	1 <	EPA 200.8
Arsenic, dissolved (µg/l)	0.55 ND	EPA 200.8
Barium, total (µg/l)	23.2	EPA 200.8
Barium, dissolved (µg/l)	23.9	EPA 200.8
Cadmium, total (µg/l)	0.15 ND	EPA 200.8
Cadmium, dissolved (µg/l)	0.15 ND	EPA 200.8
Chromium, total (µg/l)	0.41 ND	EPA 200.8
Chromium, dissolved (µg/l)	0.41 ND	EPA 200.8
Copper, total (µg/l)	3.3	EPA 200.8
Copper, dissolved (µg/l)	1.32	EPA 200.8
Lead, total (µg/l)	0.23 ND	EPA 200.8
Lead, dissolved (µg/l)	0.23 ND	EPA 200.8
Mercury, total (µg/l)	0.72 ND	EPA 200.8
Mercury, dissolved (µg/l)	0.72 ND	EPA 200.8
Selenium, total (µg/l)	0.63 ND	EPA 200.8
Selenium, dissolved (µg/l)	0.63 ND	EPA 200.8
Silver, total (µg/l)	0.13 ND	EPA 200.8
Silver, dissolved (µg/l)	0.13 ND	EPA 200.8
Zinc, total (µg/l)	2.24 ND	EPA 200.8
Zinc, dissolved (µg/l)	9.1	EPA 200.8
Boron, total (µg/l)	1,730	EPA 200.7
Boron, dissolved (µg/l)	1,720	EPA 200.7
Lithium, total (µg/l)	209	EPA 200.8
Lithium, dissolved (µg/l)	278	EPA 200.8
Molybdenum, total (µg/l)	28.6	EPA 200.8
Molybdenum, dissolved (µg/l)	28.5	EPA 200.8
Strontium, total (µg/l)	378	EPA 200.7
Strontium, dissolved (µg/l)	379	EPA 200.7

T Please indicate detection limit if analyte is not detected.

I.D. No.	301309
Monitoring Point No.	MW-4-7A
Sample Date	01/24/2022

FORM 14 R

ANNUAL WATER QUALITY ANALYSES

2-A. **Metals (Enter all data in ug/l) If initial background analyses of four consecutive analyses show essentially identical (within 5%) dissolved and total analyses, dissolved analyses may not be required, subject to written DEP approval.**

ANALYTE	VALUE (T)	ANALYSIS METHOD NUMBER
Aluminum, total (µg/l)	100 <	EPA 200.7
Aluminum, dissolved (µg/l)	100 <	EPA 200.7
Antimony, total (µg/l)	0.39 ND	EPA 200.8
Antimony, dissolved (µg/l)	0.39 ND	EPA 200.8
Beryllium, total (µg/l)	0.19 ND	EPA 200.8
Beryllium, dissolved (µg/l)	0.19 ND	EPA 200.8
Cobalt, total (µg/l)		
Cobalt, dissolved (µg/l)		
Gallium, total (µg/l)		
Gallium, dissolved (µg/l)		
Germanium, total (µg/l)		
Germanium, dissolved (µg/l)		
Nickel, total (µg/l)	2.32	EPA 200.8
Nickel, dissolved (µg/l)	9.3	EPA 200.8
Rubidium, total (µg/l)		
Rubidium, dissolved (µg/l)		
Titanium, total (µg/l)	5 <	EPA 200.8
Titanium, dissolved (µg/l)	5 <	EPA 200.8
Vanadium, total (µg/l)	2.35 ND	EPA 200.8
Vanadium, dissolved (µg/l)	2.35 ND	EPA 200.8
Yittrium, total (µg/l)		
Yittrium, dissolved (µg/l)		

T Please indicate detection limit if analyte is not detected.

2540-PM-BWM0373 6/2005

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF WASTE MANAGEMENT

Date Prepared/Revised
03/08/2022
DEP USE ONLY
Date Received

FORM 14R
RESIDUAL WASTE LANDFILLS AND DISPOSAL IMPOUNDMENTS
QUARTERLY AND ANNUAL WATER QUALITY ANALYSES

This form must be fully and accurately completed. All required information must be typed or legibly printed in the spaces provided. If additional space is necessary, identify each attached sheet as Form 14R, reference the item number and identify the date prepared. The "date prepared/revised" on any attached sheets needs to match the "date prepared/revised" on this page.

General References: Section 288.254, 289.264

SECTION A. SITE IDENTIFIER

Applicant/permittee:	Brunner Island, LLC - Basin No. 5
Site Name:	Basin No. 5
Facility ID (as issued by DEP):	301309

SECTION B. FACILITY INFORMATION

Monitoring wells must be designed and constructed in accordance with Department standards. **INDICATE THE LATITUDE AND LONGITUDE TO THE NEAREST ONE TENTH OF A SECOND (DD° MM' SS.S").**

Monitoring Point Number: MW-8-10A ☒ Well ☐ Spring ☐ Stream ☐ Other
☐ Upgradient/Upstream ☑ Downgradient/Downstream

Location: County York Municipality: East Manchester Township

Sampling Point: Latitude: 40 ° 5 ' 13.72 " Longitude: 76 ° 41 ' 31.84 "

Depth to Water Level: 16.74 ft. Measured from: ☐ Land Surface ☒ TOC

Casing Stick Up: 1.62 ft. Elevation of Water Level: 259.73 ft./MSL

Sampling Depth: 32.00 ft. Volume of Water Column: _____ gal.

Total Well Depth: 37.30 ft. Sampling Method: ☒ Pumped ☐ Bailed ☐ Grab

Well Purged: ☒ Yes ☐ No Well Volumes Purged: 3.1 L

Sample Field Filtered (must be 0.45 micron)? ☒ Yes ☐ No

Spring Flow Rate: _____ GPM

Sample Date (mm/dd/yy): 01/25/2022 Sample Collection Time: 8:59AM

Sample Collector's Name: AM

Sample Collector's Affiliation: Talen Generation, LLC

Laboratory(ies) Performing Analysis: Hawk Mtn Labs, Inc.

Were any holding times exceeded? ☐ Yes ☒ No. If yes, please explain in comments field.

Lab Certification Number(s): 40-417

Lab Sample Number(s): 220101239-009 Final Lab Analysis Completion Date: 02/12/2022

Name/Affiliation of Person who Filled out Form Martin Mengel / Talen Energy Supply, LLC

Comments:

I.D. No.	301309
Monitoring Point No.	MW-8-10A
Sample Date	01/25/2022

FORM 14 R

QUARTERLY AND ANNUAL WATER QUALITY ANALYSES

ANALYTES

1-Q. Inorganics (Enter all data in mg/l except as noted)

ANALYTE	VALUE (T)	ANALYSIS METHOD NUMBER
Ammonia, as N (mg/l)	0.066 ND	SM 4500-NH3 F
Bicarbonate (mg/l)	145	SM 2320
Calcium, total (mg/l)	135	EPA 200.7
Calcium, dissolved (mg/l)	137	EPA 200.7
Chemical Oxygen Demand (mg/l)	5.3 ND	SM 5220 D
Chloride, total as Cl (mg/l)	38	EPA 300.0
Fluoride, total as F (mg/l)	0.2 <	EPA 300.0
Iron, total (µg/l)	12.2 ND	EPA 200.7
Iron, dissolved (µg/l)	20 <	EPA 200.7
Magnesium, total (mg/l)	38.2	EPA 200.7
Magnesium, dissolved (mg/l)	36.6	EPA 200.7
Manganese, total (µg/l)	150	EPA 200.7
Manganese, dissolved (µg/l)	126	EPA 200.7
Nitrate, as N (mg/l)	0.022 ND	EPA 300.0
pH, field (su)	6.38	SM 4500-H+B
pH, lab (su)	7.12 H	SM 4500-H+B
Potassium, total (mg/l)	2.09	EPA 200.7
Potassium, dissolved (mg/l)	2.06	EPA 200.7
Sodium, total (mg/l)	14.6	EPA 200.7
Sodium, dissolved (mg/l)	14.3	EPA 200.7
Specific Conductance, field (umhos/cm)	942	EPA 120.1, FIELD
Specific Conductance, lab (umhos/cm)	944	SM 2510 B
Sulfate, as SO4 (mg/l)	295	EPA 300.0
Alkalinity, total as CaCO3 (mg/l)	145	SM 2320 B
Total Dissolved Solids (mg/l)	640	SM 2540 C
Total Organic Carbon (mg/l)	0.5 <	SM 5310 C
Turbidity, field (n.t.u.)	0.25	
Dissolved O2, field (mg/l)	1.5	Field Meter
Redox, field (mv)	218.3	Field Meter
Temperature, field (°c)	11.5	Field Meter
Acidity, total as CaCO3 (mg/l)		

T Please indicate detection limit if analyte is not detected.

I.D. No.	301309
Monitoring Point No.	MW-8-10A
Sample Date	01/25/2022

FORM 14 R

QUARTERLY AND ANNUAL WATER QUALITY ANALYSES

1-A. Organics (Enter all data in ug/l)

ANALYTE	VALUE (T)	ANALYSIS METHOD NUMBER
Benzene (µg/l)		
1,2-Dibromoethane (µg/l)		
1,1-Dichloroethane (µg/l)		
1,1-Dichloroethene (µg/l)		
1,2-Dichloroethane (µg/l)		
cis-1,2-Dichloroethene (µg/l)		
trans-1,2-Dichloroethene (µg/l)		
Ethylbenzene (µg/l)		
Methylene Chloride (µg/l)		
Tetrachloroethene (µg/l)		
Toluene (µg/l)		
1,1,1-Trichloroethane (µg/l)		
Trichloroethene (µg/l)		
Vinyl chloride (µg/l)		
Xylenes (µg/l)		

T Please indicate detection limit if analyte is not detected.

I.D. No.	301309
Monitoring Point No.	MW-8-10A
Sample Date	01/25/2022

FORM 14 R

ANNUAL WATER QUALITY ANALYSES

2-A. **Metals (Enter all data in ug/l) If initial background analyses of four consecutive analyses show essentially identical (within 5%) dissolved and total analyses, dissolved analyses may not be required, subject to written DEP approval.**

ANALYTE	VALUE (T)	ANALYSIS METHOD NUMBER
Arsenic, total (µg/l)	1.43	EPA 200.8
Arsenic, dissolved (µg/l)	0.55 ND	EPA 200.8
Barium, total (µg/l)	23.2	EPA 200.8
Barium, dissolved (µg/l)	21	EPA 200.8
Cadmium, total (µg/l)	0.15 ND	EPA 200.8
Cadmium, dissolved (µg/l)	0.15 ND	EPA 200.8
Chromium, total (µg/l)	0.41 ND	EPA 200.8
Chromium, dissolved (µg/l)	0.41 ND	EPA 200.8
Copper, total (µg/l)	1.85	EPA 200.8
Copper, dissolved (µg/l)	1 <	EPA 200.8
Lead, total (µg/l)	0.23 ND	EPA 200.8
Lead, dissolved (µg/l)	0.23 ND	EPA 200.8
Mercury, total (µg/l)	0.72 ND	EPA 200.8
Mercury, dissolved (µg/l)	0.72 ND	EPA 200.8
Selenium, total (µg/l)	0.63 ND	EPA 200.8
Selenium, dissolved (µg/l)	0.63 ND	EPA 200.8
Silver, total (µg/l)	0.13 ND	EPA 200.8
Silver, dissolved (µg/l)	0.13 ND	EPA 200.8
Zinc, total (µg/l)	5 <	EPA 200.8
Zinc, dissolved (µg/l)	7.26	EPA 200.8
Boron, total (µg/l)	359	EPA 200.7
Boron, dissolved (µg/l)	349	EPA 200.7
Lithium, total (µg/l)	11.4	EPA 200.8
Lithium, dissolved (µg/l)	11.5	EPA 200.8
Molybdenum, total (µg/l)	17.9	EPA 200.8
Molybdenum, dissolved (µg/l)	17.3	EPA 200.8
Strontium, total (µg/l)	226	EPA 200.7
Strontium, dissolved (µg/l)	221	EPA 200.7

T Please indicate detection limit if analyte is not detected.

I.D. No.	301309
Monitoring Point No.	MW-8-10A
Sample Date	01/25/2022

FORM 14 R

ANNUAL WATER QUALITY ANALYSES

2-A. **Metals (Enter all data in ug/l) If initial background analyses of four consecutive analyses show essentially identical (within 5%) dissolved and total analyses, dissolved analyses may not be required, subject to written DEP approval.**

ANALYTE	VALUE (T)	ANALYSIS METHOD NUMBER
Aluminum, total (µg/l)	100 <	EPA 200.7
Aluminum, dissolved (µg/l)	26.8 ND	EPA 200.7
Antimony, total (µg/l)	0.39 ND	EPA 200.8
Antimony, dissolved (µg/l)	0.39 ND	EPA 200.8
Beryllium, total (µg/l)	0.19 ND	EPA 200.8
Beryllium, dissolved (µg/l)	0.19 ND	EPA 200.8
Cobalt, total (µg/l)		
Cobalt, dissolved (µg/l)		
Gallium, total (µg/l)		
Gallium, dissolved (µg/l)		
Germanium, total (µg/l)		
Germanium, dissolved (µg/l)		
Nickel, total (µg/l)	1 <	EPA 200.8
Nickel, dissolved (µg/l)	4.33	EPA 200.8
Rubidium, total (µg/l)		
Rubidium, dissolved (µg/l)		
Titanium, total (µg/l)	1.45 ND	EPA 200.8
Titanium, dissolved (µg/l)	5 <	EPA 200.8
Vanadium, total (µg/l)	2.35 ND	EPA 200.8
Vanadium, dissolved (µg/l)	2.35 ND	EPA 200.8
Yittrium, total (µg/l)		
Yittrium, dissolved (µg/l)		

T Please indicate detection limit if analyte is not detected.

2540-PM-BWM0373 6/2005

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF WASTE MANAGEMENT

Date Prepared/Revised
03/08/2022
DEP USE ONLY
Date Received

FORM 14R
RESIDUAL WASTE LANDFILLS AND DISPOSAL IMPOUNDMENTS
QUARTERLY AND ANNUAL WATER QUALITY ANALYSES

This form must be fully and accurately completed. All required information must be typed or legibly printed in the spaces provided. If additional space is necessary, identify each attached sheet as Form 14R, reference the item number and identify the date prepared. The "date prepared/revised" on any attached sheets needs to match the "date prepared/revised" on this page.

General References: Section 288.254, 289.264

SECTION A. SITE IDENTIFIER

Applicant/permittee:	Brunner Island, LLC - Basin No. 5
Site Name:	Basin No. 5
Facility ID (as issued by DEP):	301309

SECTION B. FACILITY INFORMATION

Monitoring wells must be designed and constructed in accordance with Department standards. **INDICATE THE LATITUDE AND LONGITUDE TO THE NEAREST ONE TENTH OF A SECOND (DD° MM' SS.S").**

Monitoring Point Number: MW-8-10B ☒ Well ☐ Spring ☐ Stream ☐ Other
☐ Upgradient/Upstream ☑ Downgradient/Downstream

Location: County York Municipality: East Manchester Township

Sampling Point: Latitude: 40 ° 5 ' 13.72 " Longitude: 76 ° 41 ' 31.84 "

Depth to Water Level: 16.73 ft. Measured from: ☐ Land Surface ☒ TOC

Casing Stick Up: 1.44 ft. Elevation of Water Level: 259.54 ft./MSL

Sampling Depth: 52.00 ft. Volume of Water Column: _____ gal.

Total Well Depth: 57.00 ft. Sampling Method: ☒ Pumped ☐ Bailed ☐ Grab

Well Purged: ☒ Yes ☐ No Well Volumes Purged: 3.1 L

Sample Field Filtered (must be 0.45 micron)? ☒ Yes ☐ No

Spring Flow Rate: _____ GPM

Sample Date (mm/dd/yy): 01/25/2022 Sample Collection Time: 10:58AM

Sample Collector's Name: AM

Sample Collector's Affiliation: Talen Generation, LLC

Laboratory(ies) Performing Analysis: Hawk Mtn Labs, Inc.

Were any holding times exceeded? ☐ Yes ☒ No. If yes, please explain in comments field.

Lab Certification Number(s): 40-417

Lab Sample Number(s): 220101239-010 Final Lab Analysis Completion Date: 02/12/2022

Name/Affiliation of Person who Filled out Form Martin Mengel / Talen Energy Supply, LLC

Comments:

I.D. No.	301309
Monitoring Point No.	MW-8-10B
Sample Date	01/25/2022

FORM 14 R

QUARTERLY AND ANNUAL WATER QUALITY ANALYSES

ANALYTES

1-Q. Inorganics (Enter all data in mg/l except as noted)

ANALYTE	VALUE (T)	ANALYSIS METHOD NUMBER
Ammonia, as N (mg/l)	0.066 ND	SM 4500-NH3 F
Bicarbonate (mg/l)	107	SM 2320
Calcium, total (mg/l)	116	EPA 200.7
Calcium, dissolved (mg/l)	115	EPA 200.7
Chemical Oxygen Demand (mg/l)	5.3 ND	SM 5220 D
Chloride, total as Cl (mg/l)	84.3	EPA 300.0
Fluoride, total as F (mg/l)	0.2 <	EPA 300.0
Iron, total (µg/l)	12.2 ND	EPA 200.7
Iron, dissolved (µg/l)	1.02 ND	EPA 200.7
Magnesium, total (mg/l)	24.9	EPA 200.7
Magnesium, dissolved (mg/l)	24.3	EPA 200.7
Manganese, total (µg/l)	20 <	EPA 200.7
Manganese, dissolved (µg/l)	6.39 ND	EPA 200.7
Nitrate, as N (mg/l)	0.022 ND	EPA 300.0
pH, field (su)	7.32	SM 4500-H+B
pH, lab (su)	7.87 H	SM 4500-H+B
Potassium, total (mg/l)	1.96	EPA 200.7
Potassium, dissolved (mg/l)	1.94	EPA 200.7
Sodium, total (mg/l)	7.03	EPA 200.7
Sodium, dissolved (mg/l)	6.84	EPA 200.7
Specific Conductance, field (umhos/cm)	824	EPA 120.1, FIELD
Specific Conductance, lab (umhos/cm)	834	SM 2510 B
Sulfate, as SO4 (mg/l)	175	EPA 300.0
Alkalinity, total as CaCO3 (mg/l)	107	SM 2320 B
Total Dissolved Solids (mg/l)	517	SM 2540 C
Total Organic Carbon (mg/l)	0.5 <	SM 5310 C
Turbidity, field (n.t.u.)	0.17	
Dissolved O2, field (mg/l)	1.49	Field Meter
Redox, field (mv)	174.8	Field Meter
Temperature, field (°c)	10.67	Field Meter
Acidity, total as CaCO3 (mg/l)		

T Please indicate detection limit if analyte is not detected.

I.D. No.	301309
Monitoring Point No.	MW-8-10B
Sample Date	01/25/2022

FORM 14 R

QUARTERLY AND ANNUAL WATER QUALITY ANALYSES

1-A. Organics (Enter all data in ug/l)

ANALYTE	VALUE (T)	ANALYSIS METHOD NUMBER
Benzene (µg/l)		
1,2-Dibromoethane (µg/l)		
1,1-Dichloroethane (µg/l)		
1,1-Dichloroethene (µg/l)		
1,2-Dichloroethane (µg/l)		
cis-1,2-Dichloroethene (µg/l)		
trans-1,2-Dichloroethene (µg/l)		
Ethylbenzene (µg/l)		
Methylene Chloride (µg/l)		
Tetrachloroethene (µg/l)		
Toluene (µg/l)		
1,1,1-Trichloroethane (µg/l)		
Trichloroethene (µg/l)		
Vinyl chloride (µg/l)		
Xylenes (µg/l)		

T Please indicate detection limit if analyte is not detected.

I.D. No.	301309
Monitoring Point No.	MW-8-10B
Sample Date	01/25/2022

FORM 14 R

ANNUAL WATER QUALITY ANALYSES

2-A. **Metals (Enter all data in ug/l) If initial background analyses of four consecutive analyses show essentially identical (within 5%) dissolved and total analyses, dissolved analyses may not be required, subject to written DEP approval.**

ANALYTE	VALUE (T)	ANALYSIS METHOD NUMBER
Arsenic, total (µg/l)	2.96	EPA 200.8
Arsenic, dissolved (µg/l)	1 <	EPA 200.8
Barium, total (µg/l)	44.2	EPA 200.8
Barium, dissolved (µg/l)	40.6	EPA 200.8
Cadmium, total (µg/l)	0.15 ND	EPA 200.8
Cadmium, dissolved (µg/l)	0.15 ND	EPA 200.8
Chromium, total (µg/l)	0.41 ND	EPA 200.8
Chromium, dissolved (µg/l)	0.41 ND	EPA 200.8
Copper, total (µg/l)	1.25	EPA 200.8
Copper, dissolved (µg/l)	1 <	EPA 200.8
Lead, total (µg/l)	0.23 ND	EPA 200.8
Lead, dissolved (µg/l)	0.23 ND	EPA 200.8
Mercury, total (µg/l)	0.72 ND	EPA 200.8
Mercury, dissolved (µg/l)	0.72 ND	EPA 200.8
Selenium, total (µg/l)	5 <	EPA 200.8
Selenium, dissolved (µg/l)	0.63 ND	EPA 200.8
Silver, total (µg/l)	0.13 ND	EPA 200.8
Silver, dissolved (µg/l)	0.13 ND	EPA 200.8
Zinc, total (µg/l)	2.24 ND	EPA 200.8
Zinc, dissolved (µg/l)	5 <	EPA 200.8
Boron, total (µg/l)	264	EPA 200.7
Boron, dissolved (µg/l)	265	EPA 200.7
Lithium, total (µg/l)	10	EPA 200.8
Lithium, dissolved (µg/l)	10.2	EPA 200.8
Molybdenum, total (µg/l)	31.2	EPA 200.8
Molybdenum, dissolved (µg/l)	32	EPA 200.8
Strontium, total (µg/l)	219	EPA 200.7
Strontium, dissolved (µg/l)	213	EPA 200.7

T Please indicate detection limit if analyte is not detected.

I.D. No.	301309
Monitoring Point No.	MW-8-10B
Sample Date	01/25/2022

FORM 14 R

ANNUAL WATER QUALITY ANALYSES

2-A. **Metals (Enter all data in ug/l) If initial background analyses of four consecutive analyses show essentially identical (within 5%) dissolved and total analyses, dissolved analyses may not be required, subject to written DEP approval.**

ANALYTE	VALUE (T)	ANALYSIS METHOD NUMBER
Aluminum, total (µg/l)	26.8 ND	EPA 200.7
Aluminum, dissolved (µg/l)	100 <	EPA 200.7
Antimony, total (µg/l)	0.39 ND	EPA 200.8
Antimony, dissolved (µg/l)	0.39 ND	EPA 200.8
Beryllium, total (µg/l)	0.19 ND	EPA 200.8
Beryllium, dissolved (µg/l)	0.19 ND	EPA 200.8
Cobalt, total (µg/l)		
Cobalt, dissolved (µg/l)		
Gallium, total (µg/l)		
Gallium, dissolved (µg/l)		
Germanium, total (µg/l)		
Germanium, dissolved (µg/l)		
Nickel, total (µg/l)	1 <	EPA 200.8
Nickel, dissolved (µg/l)	3.66	EPA 200.8
Rubidium, total (µg/l)		
Rubidium, dissolved (µg/l)		
Titanium, total (µg/l)	1.45 ND	EPA 200.8
Titanium, dissolved (µg/l)	5 <	EPA 200.8
Vanadium, total (µg/l)	5 <	EPA 200.8
Vanadium, dissolved (µg/l)	5 <	EPA 200.8
Yittrium, total (µg/l)		
Yittrium, dissolved (µg/l)		

T Please indicate detection limit if analyte is not detected.

2540-PM-BWM0373 6/2005

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF WASTE MANAGEMENT

Date Prepared/Revised
03/08/2022
DEP USE ONLY
Date Received

FORM 14R
RESIDUAL WASTE LANDFILLS AND DISPOSAL IMPOUNDMENTS
QUARTERLY AND ANNUAL WATER QUALITY ANALYSES

This form must be fully and accurately completed. All required information must be typed or legibly printed in the spaces provided. If additional space is necessary, identify each attached sheet as Form 14R, reference the item number and identify the date prepared. The "date prepared/revised" on any attached sheets needs to match the "date prepared/revised" on this page.

General References: Section 288.254, 289.264

SECTION A. SITE IDENTIFIER

Applicant/permittee:	Brunner Island, LLC - Basin No. 5
Site Name:	Basin No. 5
Facility ID (as issued by DEP):	301309

SECTION B. FACILITY INFORMATION

Monitoring wells must be designed and constructed in accordance with Department standards. **INDICATE THE LATITUDE AND LONGITUDE TO THE NEAREST ONE TENTH OF A SECOND (DD° MM' SS.S").**

Monitoring Point Number: MW-8-1N ☒ Well ☐ Spring ☐ Stream ☐ Other
☐ Upgradient/Upstream ☑ Downgradient/Downstream

Location: County York Municipality: East Manchester Township

Sampling Point: Latitude: 40 ° 4 ' 59.01 " Longitude: 76 ° 41 ' 21.00 "

Depth to Water Level: 11.96 ft. Measured from: ☐ Land Surface ☒ TOC

Casing Stick Up: 1.95 ft. Elevation of Water Level: 268.68 ft./MSL

Sampling Depth: 23.00 ft. Volume of Water Column: _____ gal.

Total Well Depth: 26.30 ft. Sampling Method: ☒ Pumped ☐ Bailed ☐ Grab

Well Purged: ☒ Yes ☐ No Well Volumes Purged: 3 L

Sample Field Filtered (must be 0.45 micron)? ☒ Yes ☐ No

Spring Flow Rate: _____ GPM

Sample Date (mm/dd/yy): 01/22/2022 Sample Collection Time: 11:50AM

Sample Collector's Name: ST

Sample Collector's Affiliation: Talen Generation, LLC

Laboratory(ies) Performing Analysis: Hawk Mtn Labs, Inc.

Were any holding times exceeded? ☐ Yes ☒ No. If yes, please explain in comments field.

Lab Certification Number(s): 40-417

Lab Sample Number(s): 220101239-001 Final Lab Analysis Completion Date: 02/12/2022

Name/Affiliation of Person who Filled out Form Martin Mengel / Talen Energy Supply, LLC

Comments:

I.D. No.	301309
Monitoring Point No.	MW-8-1N
Sample Date	01/22/2022

FORM 14 R

QUARTERLY AND ANNUAL WATER QUALITY ANALYSES

ANALYTES

1-Q. Inorganics (Enter all data in mg/l except as noted)

ANALYTE	VALUE (T)	ANALYSIS METHOD NUMBER
Ammonia, as N (mg/l)	0.2 <	SM 4500-NH3 F
Bicarbonate (mg/l)	183	SM 2320
Calcium, total (mg/l)	153	EPA 200.7
Calcium, dissolved (mg/l)	144	EPA 200.7
Chemical Oxygen Demand (mg/l)	5.3 ND	SM 5220 D
Chloride, total as Cl (mg/l)	22	EPA 300.0
Fluoride, total as F (mg/l)	0.26	EPA 300.0
Iron, total (µg/l)	388	EPA 200.7
Iron, dissolved (µg/l)	227	EPA 200.7
Magnesium, total (mg/l)	29.6	EPA 200.7
Magnesium, dissolved (mg/l)	29.3	EPA 200.7
Manganese, total (µg/l)	1,180	EPA 200.7
Manganese, dissolved (µg/l)	1,190	EPA 200.7
Nitrate, as N (mg/l)	0.022 ND	EPA 300.0
pH, field (su)	6.57	SM 4500-H+B
pH, lab (su)	7.02 H	SM 4500-H+B
Potassium, total (mg/l)	6.6	EPA 200.7
Potassium, dissolved (mg/l)	6.55	EPA 200.7
Sodium, total (mg/l)	21.3	EPA 200.7
Sodium, dissolved (mg/l)	20.8	EPA 200.7
Specific Conductance, field (umhos/cm)	1,003	EPA 120.1, FIELD
Specific Conductance, lab (umhos/cm)	1,010	SM 2510 B
Sulfate, as SO4 (mg/l)	308	EPA 300.0
Alkalinity, total as CaCO3 (mg/l)	183	SM 2320 B
Total Dissolved Solids (mg/l)	674	SM 2540 C
Total Organic Carbon (mg/l)	0.98	SM 5310 C
Turbidity, field (n.t.u.)	0.86	
Dissolved O2, field (mg/l)	1.9	Field Meter
Redox, field (mv)	50.3	Field Meter
Temperature, field (°c)	9.49	Field Meter
Acidity, total as CaCO3 (mg/l)		

T Please indicate detection limit if analyte is not detected.

I.D. No.	301309
Monitoring Point No.	MW-8-1N
Sample Date	01/22/2022

FORM 14 R

QUARTERLY AND ANNUAL WATER QUALITY ANALYSES

1-A. Organics (Enter all data in ug/l)

ANALYTE	VALUE (T)	ANALYSIS METHOD NUMBER
Benzene (µg/l)		
1,2-Dibromoethane (µg/l)		
1,1-Dichloroethane (µg/l)		
1,1-Dichloroethene (µg/l)		
1,2-Dichloroethane (µg/l)		
cis-1,2-Dichloroethene (µg/l)		
trans-1,2-Dichloroethene (µg/l)		
Ethylbenzene (µg/l)		
Methylene Chloride (µg/l)		
Tetrachloroethene (µg/l)		
Toluene (µg/l)		
1,1,1-Trichloroethane (µg/l)		
Trichloroethene (µg/l)		
Vinyl chloride (µg/l)		
Xylenes (µg/l)		

T Please indicate detection limit if analyte is not detected.

I.D. No.	301309
Monitoring Point No.	MW-8-1N
Sample Date	01/22/2022

FORM 14 R

ANNUAL WATER QUALITY ANALYSES

2-A. **Metals (Enter all data in ug/l) If initial background analyses of four consecutive analyses show essentially identical (within 5%) dissolved and total analyses, dissolved analyses may not be required, subject to written DEP approval.**

ANALYTE	VALUE (T)	ANALYSIS METHOD NUMBER
Arsenic, total (µg/l)	1 <	EPA 200.8
Arsenic, dissolved (µg/l)	0.55 ND	EPA 200.8
Barium, total (µg/l)	20.3	EPA 200.8
Barium, dissolved (µg/l)	17.7	EPA 200.8
Cadmium, total (µg/l)	0.15 ND	EPA 200.8
Cadmium, dissolved (µg/l)	0.15 ND	EPA 200.8
Chromium, total (µg/l)	0.41 ND	EPA 200.8
Chromium, dissolved (µg/l)	0.41 ND	EPA 200.8
Copper, total (µg/l)	1.83	EPA 200.8
Copper, dissolved (µg/l)	1.75	EPA 200.8
Lead, total (µg/l)	0.23 ND	EPA 200.8
Lead, dissolved (µg/l)	0.23 ND	EPA 200.8
Mercury, total (µg/l)	0.72 ND	EPA 200.8
Mercury, dissolved (µg/l)	0.72 ND	EPA 200.8
Selenium, total (µg/l)	0.63 ND	EPA 200.8
Selenium, dissolved (µg/l)	0.63 ND	EPA 200.8
Silver, total (µg/l)	0.13 ND	EPA 200.8
Silver, dissolved (µg/l)	0.13 ND	EPA 200.8
Zinc, total (µg/l)	2.24 ND	EPA 200.8
Zinc, dissolved (µg/l)	7.05	EPA 200.8
Boron, total (µg/l)	100 <	EPA 200.7
Boron, dissolved (µg/l)	100 <	EPA 200.7
Lithium, total (µg/l)	1 <	EPA 200.8
Lithium, dissolved (µg/l)	1 <	EPA 200.8
Molybdenum, total (µg/l)	1 <	EPA 200.8
Molybdenum, dissolved (µg/l)	1 <	EPA 200.8
Strontium, total (µg/l)	1,020	EPA 200.7
Strontium, dissolved (µg/l)	1,020	EPA 200.7

T Please indicate detection limit if analyte is not detected.

I.D. No.	301309
Monitoring Point No.	MW-8-1N
Sample Date	01/22/2022

FORM 14 R

ANNUAL WATER QUALITY ANALYSES

2-A. **Metals (Enter all data in ug/l) If initial background analyses of four consecutive analyses show essentially identical (within 5%) dissolved and total analyses, dissolved analyses may not be required, subject to written DEP approval.**

ANALYTE	VALUE (T)	ANALYSIS METHOD NUMBER
Aluminum, total (µg/l)	100 <	EPA 200.7
Aluminum, dissolved (µg/l)	100 <	EPA 200.7
Antimony, total (µg/l)	0.39 ND	EPA 200.8
Antimony, dissolved (µg/l)	0.39 ND	EPA 200.8
Beryllium, total (µg/l)	0.19 ND	EPA 200.8
Beryllium, dissolved (µg/l)	0.19 ND	EPA 200.8
Cobalt, total (µg/l)		
Cobalt, dissolved (µg/l)		
Gallium, total (µg/l)		
Gallium, dissolved (µg/l)		
Germanium, total (µg/l)		
Germanium, dissolved (µg/l)		
Nickel, total (µg/l)	1 <	EPA 200.8
Nickel, dissolved (µg/l)	4.53	EPA 200.8
Rubidium, total (µg/l)		
Rubidium, dissolved (µg/l)		
Titanium, total (µg/l)	1.45 ND	EPA 200.8
Titanium, dissolved (µg/l)	1.45 ND	EPA 200.8
Vanadium, total (µg/l)	2.35 ND	EPA 200.8
Vanadium, dissolved (µg/l)	2.35 ND	EPA 200.8
Yittrium, total (µg/l)		
Yittrium, dissolved (µg/l)		

T Please indicate detection limit if analyte is not detected.

2540-PM-BWM0373 6/2005

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF WASTE MANAGEMENT

Date Prepared/Revised
03/08/2022
DEP USE ONLY
Date Received

FORM 14R
RESIDUAL WASTE LANDFILLS AND DISPOSAL IMPOUNDMENTS
QUARTERLY AND ANNUAL WATER QUALITY ANALYSES

This form must be fully and accurately completed. All required information must be typed or legibly printed in the spaces provided. If additional space is necessary, identify each attached sheet as Form 14R, reference the item number and identify the date prepared. The "date prepared/revised" on any attached sheets needs to match the "date prepared/revised" on this page.

General References: Section 288.254, 289.264

SECTION A. SITE IDENTIFIER

Applicant/permittee:	Brunner Island, LLC - Basin No. 5
Site Name:	Basin No. 5
Facility ID (as issued by DEP):	301309

SECTION B. FACILITY INFORMATION

Monitoring wells must be designed and constructed in accordance with Department standards. **INDICATE THE LATITUDE AND LONGITUDE TO THE NEAREST ONE TENTH OF A SECOND (DD° MM' SS.S").**

Monitoring Point Number: MW-8-2 ☒ Well ☐ Spring ☐ Stream ☐ Other
☐ Upgradient/Upstream ☑ Downgradient/Downstream

Location: County York Municipality: East Manchester Township

Sampling Point: Latitude: 40 ° 5 ' 4.33 " Longitude: 76 ° 40 ' 59.57 "

Depth to Water Level: 6.18 ft. Measured from: ☐ Land Surface ☒ TOC

Casing Stick Up: 2.00 ft. Elevation of Water Level: 265.32 ft./MSL

Sampling Depth: 15.00 ft. Volume of Water Column: _____ gal.

Total Well Depth: 22.30 ft. Sampling Method: ☒ Pumped ☐ Bailed ☐ Grab

Well Purged: ☒ Yes ☐ No Well Volumes Purged: 6.45 L

Sample Field Filtered (must be 0.45 micron)? ☒ Yes ☐ No

Spring Flow Rate: _____ GPM

Sample Date (mm/dd/yy): 01/24/2022 Sample Collection Time: 8:44AM

Sample Collector's Name: AM

Sample Collector's Affiliation: Talen Generation, LLC

Laboratory(ies) Performing Analysis: Hawk Mtn Labs, Inc.

Were any holding times exceeded? ☐ Yes ☒ No. If yes, please explain in comments field.

Lab Certification Number(s): 40-417

Lab Sample Number(s): 220101239-002 Final Lab Analysis Completion Date: 02/12/2022

Name/Affiliation of Person who Filled out Form Martin Mengel / Talen Energy Supply, LLC

Comments:

I.D. No.	301309
Monitoring Point No.	MW-8-2
Sample Date	01/24/2022

FORM 14 R

QUARTERLY AND ANNUAL WATER QUALITY ANALYSES

ANALYTES

1-Q. Inorganics (Enter all data in mg/l except as noted)

ANALYTE	VALUE (T)	ANALYSIS METHOD NUMBER
Ammonia, as N (mg/l)	0.066 ND	SM 4500-NH3 F
Bicarbonate (mg/l)	121	SM 2320
Calcium, total (mg/l)	79.6	EPA 200.7
Calcium, dissolved (mg/l)	76.2	EPA 200.7
Chemical Oxygen Demand (mg/l)	5.3 ND	SM 5220 D
Chloride, total as Cl (mg/l)	26.5	EPA 300.0
Fluoride, total as F (mg/l)	0.97	EPA 300.0
Iron, total (µg/l)	20 <	EPA 200.7
Iron, dissolved (µg/l)	20 <	EPA 200.7
Magnesium, total (mg/l)	16.1	EPA 200.7
Magnesium, dissolved (mg/l)	15.9	EPA 200.7
Manganese, total (µg/l)	287	EPA 200.7
Manganese, dissolved (µg/l)	272	EPA 200.7
Nitrate, as N (mg/l)	0.5 <	EPA 300.0
pH, field (su)	6.3	SM 4500-H+B
pH, lab (su)	6.93 H	SM 4500-H+B
Potassium, total (mg/l)	4.6	EPA 200.7
Potassium, dissolved (mg/l)	4.54	EPA 200.7
Sodium, total (mg/l)	13.9	EPA 200.7
Sodium, dissolved (mg/l)	13.8	EPA 200.7
Specific Conductance, field (umhos/cm)	606	EPA 120.1, FIELD
Specific Conductance, lab (umhos/cm)	610	SM 2510 B
Sulfate, as SO4 (mg/l)	135	EPA 300.0
Alkalinity, total as CaCO3 (mg/l)	121	SM 2320 B
Total Dissolved Solids (mg/l)	371	SM 2540 C
Total Organic Carbon (mg/l)	0.781	SM 5310 C
Turbidity, field (n.t.u.)	0.28	
Dissolved O2, field (mg/l)	4.92	Field Meter
Redox, field (mv)	169.7	Field Meter
Temperature, field (°c)	9.92	Field Meter
Acidity, total as CaCO3 (mg/l)		

T Please indicate detection limit if analyte is not detected.

I.D. No.	301309
Monitoring Point No.	MW-8-2
Sample Date	01/24/2022

FORM 14 R

QUARTERLY AND ANNUAL WATER QUALITY ANALYSES

1-A. Organics (Enter all data in ug/l)

ANALYTE	VALUE (T)	ANALYSIS METHOD NUMBER
Benzene (µg/l)		
1,2-Dibromoethane (µg/l)		
1,1-Dichloroethane (µg/l)		
1,1-Dichloroethene (µg/l)		
1,2-Dichloroethane (µg/l)		
cis-1,2-Dichloroethene (µg/l)		
trans-1,2-Dichloroethene (µg/l)		
Ethylbenzene (µg/l)		
Methylene Chloride (µg/l)		
Tetrachloroethene (µg/l)		
Toluene (µg/l)		
1,1,1-Trichloroethane (µg/l)		
Trichloroethene (µg/l)		
Vinyl chloride (µg/l)		
Xylenes (µg/l)		

T Please indicate detection limit if analyte is not detected.

I.D. No.	301309
Monitoring Point No.	MW-8-2
Sample Date	01/24/2022

FORM 14 R

ANNUAL WATER QUALITY ANALYSES

2-A. **Metals (Enter all data in ug/l) If initial background analyses of four consecutive analyses show essentially identical (within 5%) dissolved and total analyses, dissolved analyses may not be required, subject to written DEP approval.**

ANALYTE	VALUE (T)	ANALYSIS METHOD NUMBER
Arsenic, total (µg/l)	1.22	EPA 200.8
Arsenic, dissolved (µg/l)	0.55 ND	EPA 200.8
Barium, total (µg/l)	28.2	EPA 200.8
Barium, dissolved (µg/l)	29.9	EPA 200.8
Cadmium, total (µg/l)	1 <	EPA 200.8
Cadmium, dissolved (µg/l)	1 <	EPA 200.8
Chromium, total (µg/l)	0.41 ND	EPA 200.8
Chromium, dissolved (µg/l)	0.41 ND	EPA 200.8
Copper, total (µg/l)	1 <	EPA 200.8
Copper, dissolved (µg/l)	1 <	EPA 200.8
Lead, total (µg/l)	0.23 ND	EPA 200.8
Lead, dissolved (µg/l)	0.23 ND	EPA 200.8
Mercury, total (µg/l)	0.72 ND	EPA 200.8
Mercury, dissolved (µg/l)	0.72 ND	EPA 200.8
Selenium, total (µg/l)	0.63 ND	EPA 200.8
Selenium, dissolved (µg/l)	0.63 ND	EPA 200.8
Silver, total (µg/l)	0.13 ND	EPA 200.8
Silver, dissolved (µg/l)	0.13 ND	EPA 200.8
Zinc, total (µg/l)	2.24 ND	EPA 200.8
Zinc, dissolved (µg/l)	5 <	EPA 200.8
Boron, total (µg/l)	446	EPA 200.7
Boron, dissolved (µg/l)	431	EPA 200.7
Lithium, total (µg/l)	18.4	EPA 200.8
Lithium, dissolved (µg/l)	21.4	EPA 200.8
Molybdenum, total (µg/l)	259	EPA 200.8
Molybdenum, dissolved (µg/l)	291	EPA 200.8
Strontium, total (µg/l)	506	EPA 200.7
Strontium, dissolved (µg/l)	489	EPA 200.7

T Please indicate detection limit if analyte is not detected.

I.D. No.	301309
Monitoring Point No.	MW-8-2
Sample Date	01/24/2022

FORM 14 R

ANNUAL WATER QUALITY ANALYSES

2-A. **Metals (Enter all data in ug/l) If initial background analyses of four consecutive analyses show essentially identical (within 5%) dissolved and total analyses, dissolved analyses may not be required, subject to written DEP approval.**

ANALYTE	VALUE (T)	ANALYSIS METHOD NUMBER
Aluminum, total (µg/l)	26.8 ND	EPA 200.7
Aluminum, dissolved (µg/l)	100 <	EPA 200.7
Antimony, total (µg/l)	0.39 ND	EPA 200.8
Antimony, dissolved (µg/l)	1	EPA 200.8
Beryllium, total (µg/l)	0.19 ND	EPA 200.8
Beryllium, dissolved (µg/l)	0.19 ND	EPA 200.8
Cobalt, total (µg/l)		
Cobalt, dissolved (µg/l)		
Gallium, total (µg/l)		
Gallium, dissolved (µg/l)		
Germanium, total (µg/l)		
Germanium, dissolved (µg/l)		
Nickel, total (µg/l)	1.54	EPA 200.8
Nickel, dissolved (µg/l)	3.26	EPA 200.8
Rubidium, total (µg/l)		
Rubidium, dissolved (µg/l)		
Titanium, total (µg/l)	1.45 ND	EPA 200.8
Titanium, dissolved (µg/l)	1.45 ND	EPA 200.8
Vanadium, total (µg/l)	2.35 ND	EPA 200.8
Vanadium, dissolved (µg/l)	2.35 ND	EPA 200.8
Yittrium, total (µg/l)		
Yittrium, dissolved (µg/l)		

T Please indicate detection limit if analyte is not detected.

2540-PM-BWM0373 6/2005

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF WASTE MANAGEMENT

Date Prepared/Revised
03/08/2022
DEP USE ONLY
Date Received

FORM 14R
RESIDUAL WASTE LANDFILLS AND DISPOSAL IMPOUNDMENTS
QUARTERLY AND ANNUAL WATER QUALITY ANALYSES

This form must be fully and accurately completed. All required information must be typed or legibly printed in the spaces provided. If additional space is necessary, identify each attached sheet as Form 14R, reference the item number and identify the date prepared. The "date prepared/revised" on any attached sheets needs to match the "date prepared/revised" on this page.

General References: Section 288.254, 289.264

SECTION A. SITE IDENTIFIER

Applicant/permittee:	Brunner Island, LLC - Basin No. 5
Site Name:	Basin No. 5
Facility ID (as issued by DEP):	301309

SECTION B. FACILITY INFORMATION

Monitoring wells must be designed and constructed in accordance with Department standards. **INDICATE THE LATITUDE AND LONGITUDE TO THE NEAREST ONE TENTH OF A SECOND (DD° MM' SS.S").**

Monitoring Point Number: MW-8-3A ☒ Well ☐ Spring ☐ Stream ☐ Other

☐ Upgradient/Upstream ☑ Downgradient/Downstream

Location: County York Municipality: East Manchester Township

Sampling Point: Latitude: 40 ° 5 ' 12.49 " Longitude: 76 ° 41 ' 6.87 "

Depth to Water Level: 9.72 ft. Measured from: ☐ Land Surface ☒ TOC

Casing Stick Up: 1.72 ft. Elevation of Water Level: 257.66 ft./MSL

Sampling Depth: 20.00 ft. Volume of Water Column: _____ gal.

Total Well Depth: 26.90 ft. Sampling Method: ☒ Pumped ☐ Bailed ☐ Grab

Well Purged: ☒ Yes ☐ No Well Volumes Purged: 3 L

Sample Field Filtered (must be 0.45 micron)? ☒ Yes ☐ No

Spring Flow Rate: _____ GPM

Sample Date (mm/dd/yy): 01/24/2022 Sample Collection Time: 10:24AM

Sample Collector's Name: AM

Sample Collector's Affiliation: Talen Generation, LLC

Laboratory(ies) Performing Analysis: Hawk Mtn Labs, Inc.

Were any holding times exceeded? ☐ Yes ☒ No. If yes, please explain in comments field.

Lab Certification Number(s): 40-417

Lab Sample Number(s): 220101239-003 Final Lab Analysis Completion Date: 02/12/2022

Name/Affiliation of Person who Filled out Form Martin Mengel / Talen Energy Supply, LLC

Comments:

I.D. No.	301309
Monitoring Point No.	MW-8-3A
Sample Date	01/24/2022

FORM 14 R

QUARTERLY AND ANNUAL WATER QUALITY ANALYSES

ANALYTES

1-Q. Inorganics (Enter all data in mg/l except as noted)

ANALYTE	VALUE (T)	ANALYSIS METHOD NUMBER
Ammonia, as N (mg/l)	0.2 <	SM 4500-NH3 F
Bicarbonate (mg/l)	194	SM 2320
Calcium, total (mg/l)	172	EPA 200.7
Calcium, dissolved (mg/l)	164	EPA 200.7
Chemical Oxygen Demand (mg/l)	20 <	SM 5220 D
Chloride, total as Cl (mg/l)	140	EPA 300.0
Fluoride, total as F (mg/l)	0.4	EPA 300.0
Iron, total (µg/l)	4,080	EPA 200.7
Iron, dissolved (µg/l)	1,690	EPA 200.7
Magnesium, total (mg/l)	39.9	EPA 200.7
Magnesium, dissolved (mg/l)	39.3	EPA 200.7
Manganese, total (µg/l)	3,950	EPA 200.7
Manganese, dissolved (µg/l)	3,580	EPA 200.7
Nitrate, as N (mg/l)	0.5 <	EPA 300.0
pH, field (su)	6.19	SM 4500-H+B
pH, lab (su)	6.65 H	SM 4500-H+B
Potassium, total (mg/l)	3.13	EPA 200.7
Potassium, dissolved (mg/l)	3.04	EPA 200.7
Sodium, total (mg/l)	28.9	EPA 200.7
Sodium, dissolved (mg/l)	28.9	EPA 200.7
Specific Conductance, field (umhos/cm)	1,263	EPA 120.1, FIELD
Specific Conductance, lab (umhos/cm)	1,260	SM 2510 B
Sulfate, as SO4 (mg/l)	261	EPA 300.0
Alkalinity, total as CaCO3 (mg/l)	194	SM 2320 B
Total Dissolved Solids (mg/l)	794	SM 2540 C
Total Organic Carbon (mg/l)	1.18	SM 5310 C
Turbidity, field (n.t.u.)	27.6	
Dissolved O2, field (mg/l)	1.98	Field Meter
Redox, field (mv)	70.8	Field Meter
Temperature, field (°c)	8.38	Field Meter
Acidity, total as CaCO3 (mg/l)		

T Please indicate detection limit if analyte is not detected.

I.D. No.	301309
Monitoring Point No.	MW-8-3A
Sample Date	01/24/2022

FORM 14 R

QUARTERLY AND ANNUAL WATER QUALITY ANALYSES

1-A. Organics (Enter all data in ug/l)

ANALYTE	VALUE (T)	ANALYSIS METHOD NUMBER
Benzene (µg/l)		
1,2-Dibromoethane (µg/l)		
1,1-Dichloroethane (µg/l)		
1,1-Dichloroethene (µg/l)		
1,2-Dichloroethane (µg/l)		
cis-1,2-Dichloroethene (µg/l)		
trans-1,2-Dichloroethene (µg/l)		
Ethylbenzene (µg/l)		
Methylene Chloride (µg/l)		
Tetrachloroethene (µg/l)		
Toluene (µg/l)		
1,1,1-Trichloroethane (µg/l)		
Trichloroethene (µg/l)		
Vinyl chloride (µg/l)		
Xylenes (µg/l)		

T Please indicate detection limit if analyte is not detected.

I.D. No.	301309
Monitoring Point No.	MW-8-3A
Sample Date	01/24/2022

FORM 14 R

ANNUAL WATER QUALITY ANALYSES

2-A. **Metals (Enter all data in ug/l) If initial background analyses of four consecutive analyses show essentially identical (within 5%) dissolved and total analyses, dissolved analyses may not be required, subject to written DEP approval.**

ANALYTE	VALUE (T)	ANALYSIS METHOD NUMBER
Arsenic, total (µg/l)	12.4	EPA 200.8
Arsenic, dissolved (µg/l)	3.55	EPA 200.8
Barium, total (µg/l)	42.6	EPA 200.8
Barium, dissolved (µg/l)	38.4	EPA 200.8
Cadmium, total (µg/l)	0.15 ND	EPA 200.8
Cadmium, dissolved (µg/l)	0.15 ND	EPA 200.8
Chromium, total (µg/l)	0.41 ND	EPA 200.8
Chromium, dissolved (µg/l)	0.41 ND	EPA 200.8
Copper, total (µg/l)	1.87	EPA 200.8
Copper, dissolved (µg/l)	1 <	EPA 200.8
Lead, total (µg/l)	0.23 ND	EPA 200.8
Lead, dissolved (µg/l)	0.23 ND	EPA 200.8
Mercury, total (µg/l)	0.72 ND	EPA 200.8
Mercury, dissolved (µg/l)	0.72 ND	EPA 200.8
Selenium, total (µg/l)	0.63 ND	EPA 200.8
Selenium, dissolved (µg/l)	0.63 ND	EPA 200.8
Silver, total (µg/l)	0.13 ND	EPA 200.8
Silver, dissolved (µg/l)	0.13 ND	EPA 200.8
Zinc, total (µg/l)	2.24 ND	EPA 200.8
Zinc, dissolved (µg/l)	5 <	EPA 200.8
Boron, total (µg/l)	434	EPA 200.7
Boron, dissolved (µg/l)	429	EPA 200.7
Lithium, total (µg/l)	18	EPA 200.8
Lithium, dissolved (µg/l)	17.9	EPA 200.8
Molybdenum, total (µg/l)	35.8	EPA 200.8
Molybdenum, dissolved (µg/l)	33.8	EPA 200.8
Strontium, total (µg/l)	943	EPA 200.7
Strontium, dissolved (µg/l)	947	EPA 200.7

T Please indicate detection limit if analyte is not detected.

I.D. No.	301309
Monitoring Point No.	MW-8-3A
Sample Date	01/24/2022

FORM 14 R

ANNUAL WATER QUALITY ANALYSES

2-A. **Metals (Enter all data in ug/l) If initial background analyses of four consecutive analyses show essentially identical (within 5%) dissolved and total analyses, dissolved analyses may not be required, subject to written DEP approval.**

ANALYTE	VALUE (T)	ANALYSIS METHOD NUMBER
Aluminum, total (µg/l)	100 <	EPA 200.7
Aluminum, dissolved (µg/l)	100 <	EPA 200.7
Antimony, total (µg/l)	0.39 ND	EPA 200.8
Antimony, dissolved (µg/l)	0.39 ND	EPA 200.8
Beryllium, total (µg/l)	0.19 ND	EPA 200.8
Beryllium, dissolved (µg/l)	0.19 ND	EPA 200.8
Cobalt, total (µg/l)		
Cobalt, dissolved (µg/l)		
Gallium, total (µg/l)		
Gallium, dissolved (µg/l)		
Germanium, total (µg/l)		
Germanium, dissolved (µg/l)		
Nickel, total (µg/l)	1.96	EPA 200.8
Nickel, dissolved (µg/l)	5.37	EPA 200.8
Rubidium, total (µg/l)		
Rubidium, dissolved (µg/l)		
Titanium, total (µg/l)	1.45 ND	EPA 200.8
Titanium, dissolved (µg/l)	5 <	EPA 200.8
Vanadium, total (µg/l)	2.35 ND	EPA 200.8
Vanadium, dissolved (µg/l)	2.35 ND	EPA 200.8
Yittrium, total (µg/l)		
Yittrium, dissolved (µg/l)		

T Please indicate detection limit if analyte is not detected.

2540-PM-BWM0373 6/2005

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF WASTE MANAGEMENT

Date Prepared/Revised
03/08/2022
DEP USE ONLY
Date Received

FORM 14R
RESIDUAL WASTE LANDFILLS AND DISPOSAL IMPOUNDMENTS
QUARTERLY AND ANNUAL WATER QUALITY ANALYSES

This form must be fully and accurately completed. All required information must be typed or legibly printed in the spaces provided. If additional space is necessary, identify each attached sheet as Form 14R, reference the item number and identify the date prepared. The "date prepared/revised" on any attached sheets needs to match the "date prepared/revised" on this page.

General References: Section 288.254, 289.264

SECTION A. SITE IDENTIFIER

Applicant/permittee:	Brunner Island, LLC - Basin No. 5
Site Name:	Basin No. 5
Facility ID (as issued by DEP):	301309

SECTION B. FACILITY INFORMATION

Monitoring wells must be designed and constructed in accordance with Department standards. **INDICATE THE LATITUDE AND LONGITUDE TO THE NEAREST ONE TENTH OF A SECOND (DD° MM' SS.S").**

Monitoring Point Number: MW-8-3B ☒ Well ☐ Spring ☐ Stream ☐ Other

☐ Upgradient/Upstream ☑ Downgradient/Downstream

Location: County York Municipality: East Manchester Township

Sampling Point: Latitude: 40 ° 5 ' 12.49 " Longitude: 76 ° 41 ' 6.87 "

Depth to Water Level: 12.33 ft. Measured from: ☐ Land Surface ☒ TOC

Casing Stick Up: 1.90 ft. Elevation of Water Level: 255.38 ft./MSL

Sampling Depth: 40.00 ft. Volume of Water Column: _____ gal.

Total Well Depth: 47.00 ft. Sampling Method: ☒ Pumped ☐ Bailed ☐ Grab

Well Purged: ☒ Yes ☐ No Well Volumes Purged: 3.2 L

Sample Field Filtered (must be 0.45 micron)? ☒ Yes ☐ No

Spring Flow Rate: _____ GPM

Sample Date (mm/dd/yy): 01/24/2022 Sample Collection Time: 12:21PM

Sample Collector's Name: AM

Sample Collector's Affiliation: Talen Generation, LLC

Laboratory(ies) Performing Analysis: Hawk Mtn Labs, Inc.

Were any holding times exceeded? ☐ Yes ☒ No. If yes, please explain in comments field.

Lab Certification Number(s): 40-417

Lab Sample Number(s): 220101239-004 Final Lab Analysis Completion Date: 02/12/2022

Name/Affiliation of Person who Filled out Form Martin Mengel / Talen Energy Supply, LLC

Comments:

I.D. No.	301309
Monitoring Point No.	MW-8-3B
Sample Date	01/24/2022

FORM 14 R

QUARTERLY AND ANNUAL WATER QUALITY ANALYSES

ANALYTES

1-Q. Inorganics (Enter all data in mg/l except as noted)

ANALYTE	VALUE (T)	ANALYSIS METHOD NUMBER
Ammonia, as N (mg/l)	0.066 ND	SM 4500-NH3 F
Bicarbonate (mg/l)	252	SM 2320
Calcium, total (mg/l)	143	EPA 200.7
Calcium, dissolved (mg/l)	142	EPA 200.7
Chemical Oxygen Demand (mg/l)	5.3 ND	SM 5220 D
Chloride, total as Cl (mg/l)	53.8	EPA 300.0
Fluoride, total as F (mg/l)	0.43	EPA 300.0
Iron, total (µg/l)	408	EPA 200.7
Iron, dissolved (µg/l)	382	EPA 200.7
Magnesium, total (mg/l)	30.1	EPA 200.7
Magnesium, dissolved (mg/l)	30.5	EPA 200.7
Manganese, total (µg/l)	1,650	EPA 200.7
Manganese, dissolved (µg/l)	1,670	EPA 200.7
Nitrate, as N (mg/l)	0.022 ND	EPA 300.0
pH, field (su)	6.72	SM 4500-H+B
pH, lab (su)	7.15 H	SM 4500-H+B
Potassium, total (mg/l)	1.65	EPA 200.7
Potassium, dissolved (mg/l)	1.71	EPA 200.7
Sodium, total (mg/l)	8.68	EPA 200.7
Sodium, dissolved (mg/l)	8.95	EPA 200.7
Specific Conductance, field (umhos/cm)	930	EPA 120.1, FIELD
Specific Conductance, lab (umhos/cm)	924	SM 2510 B
Sulfate, as SO4 (mg/l)	161	EPA 300.0
Alkalinity, total as CaCO3 (mg/l)	251	SM 2320 B
Total Dissolved Solids (mg/l)	578	SM 2540 C
Total Organic Carbon (mg/l)	0.964	SM 5310 C
Turbidity, field (n.t.u.)	0.18	
Dissolved O2, field (mg/l)	1.44	Field Meter
Redox, field (mv)	1.4	Field Meter
Temperature, field (°c)	9.44	Field Meter
Acidity, total as CaCO3 (mg/l)		

T Please indicate detection limit if analyte is not detected.

I.D. No.	301309
Monitoring Point No.	MW-8-3B
Sample Date	01/24/2022

FORM 14 R

QUARTERLY AND ANNUAL WATER QUALITY ANALYSES

1-A. Organics (Enter all data in ug/l)

ANALYTE	VALUE (T)	ANALYSIS METHOD NUMBER
Benzene (µg/l)		
1,2-Dibromoethane (µg/l)		
1,1-Dichloroethane (µg/l)		
1,1-Dichloroethene (µg/l)		
1,2-Dichloroethane (µg/l)		
cis-1,2-Dichloroethene (µg/l)		
trans-1,2-Dichloroethene (µg/l)		
Ethylbenzene (µg/l)		
Methylene Chloride (µg/l)		
Tetrachloroethene (µg/l)		
Toluene (µg/l)		
1,1,1-Trichloroethane (µg/l)		
Trichloroethene (µg/l)		
Vinyl chloride (µg/l)		
Xylenes (µg/l)		

T Please indicate detection limit if analyte is not detected.

I.D. No.	301309
Monitoring Point No.	MW-8-3B
Sample Date	01/24/2022

FORM 14 R

ANNUAL WATER QUALITY ANALYSES

2-A. **Metals (Enter all data in ug/l) If initial background analyses of four consecutive analyses show essentially identical (within 5%) dissolved and total analyses, dissolved analyses may not be required, subject to written DEP approval.**

ANALYTE	VALUE (T)	ANALYSIS METHOD NUMBER
Arsenic, total (µg/l)	8.54	EPA 200.8
Arsenic, dissolved (µg/l)	5.57	EPA 200.8
Barium, total (µg/l)	73.6	EPA 200.8
Barium, dissolved (µg/l)	71	EPA 200.8
Cadmium, total (µg/l)	1 <	EPA 200.8
Cadmium, dissolved (µg/l)	1 <	EPA 200.8
Chromium, total (µg/l)	0.41 ND	EPA 200.8
Chromium, dissolved (µg/l)	0.41 ND	EPA 200.8
Copper, total (µg/l)	1.55	EPA 200.8
Copper, dissolved (µg/l)	0.39 ND	EPA 200.8
Lead, total (µg/l)	0.23 ND	EPA 200.8
Lead, dissolved (µg/l)	0.23 ND	EPA 200.8
Mercury, total (µg/l)	0.72 ND	EPA 200.8
Mercury, dissolved (µg/l)	0.72 ND	EPA 200.8
Selenium, total (µg/l)	0.63 ND	EPA 200.8
Selenium, dissolved (µg/l)	0.63 ND	EPA 200.8
Silver, total (µg/l)	0.13 ND	EPA 200.8
Silver, dissolved (µg/l)	0.13 ND	EPA 200.8
Zinc, total (µg/l)	2.24 ND	EPA 200.8
Zinc, dissolved (µg/l)	5 <	EPA 200.8
Boron, total (µg/l)	374	EPA 200.7
Boron, dissolved (µg/l)	378	EPA 200.7
Lithium, total (µg/l)	24.4	EPA 200.8
Lithium, dissolved (µg/l)	35.8	EPA 200.8
Molybdenum, total (µg/l)	124	EPA 200.8
Molybdenum, dissolved (µg/l)	149	EPA 200.8
Strontium, total (µg/l)	422	EPA 200.7
Strontium, dissolved (µg/l)	434	EPA 200.7

T Please indicate detection limit if analyte is not detected.

I.D. No.	301309
Monitoring Point No.	MW-8-3B
Sample Date	01/24/2022

FORM 14 R

ANNUAL WATER QUALITY ANALYSES

2-A. **Metals (Enter all data in ug/l) If initial background analyses of four consecutive analyses show essentially identical (within 5%) dissolved and total analyses, dissolved analyses may not be required, subject to written DEP approval.**

ANALYTE	VALUE (T)	ANALYSIS METHOD NUMBER
Aluminum, total (µg/l)	100 <	EPA 200.7
Aluminum, dissolved (µg/l)	26.8 ND	EPA 200.7
Antimony, total (µg/l)	0.39 ND	EPA 200.8
Antimony, dissolved (µg/l)	0.39 ND	EPA 200.8
Beryllium, total (µg/l)	0.19 ND	EPA 200.8
Beryllium, dissolved (µg/l)	0.19 ND	EPA 200.8
Cobalt, total (µg/l)		
Cobalt, dissolved (µg/l)		
Gallium, total (µg/l)		
Gallium, dissolved (µg/l)		
Germanium, total (µg/l)		
Germanium, dissolved (µg/l)		
Nickel, total (µg/l)	1 <	EPA 200.8
Nickel, dissolved (µg/l)	4.3	EPA 200.8
Rubidium, total (µg/l)		
Rubidium, dissolved (µg/l)		
Titanium, total (µg/l)	1.45 ND	EPA 200.8
Titanium, dissolved (µg/l)	5 <	EPA 200.8
Vanadium, total (µg/l)	2.35 ND	EPA 200.8
Vanadium, dissolved (µg/l)	2.35 ND	EPA 200.8
Yittrium, total (µg/l)		
Yittrium, dissolved (µg/l)		

T Please indicate detection limit if analyte is not detected.

2540-PM-BWM0373 6/2005

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF WASTE MANAGEMENT

Date Prepared/Revised
03/08/2022
DEP USE ONLY
Date Received

FORM 14R
RESIDUAL WASTE LANDFILLS AND DISPOSAL IMPOUNDMENTS
QUARTERLY AND ANNUAL WATER QUALITY ANALYSES

This form must be fully and accurately completed. All required information must be typed or legibly printed in the spaces provided. If additional space is necessary, identify each attached sheet as Form 14R, reference the item number and identify the date prepared. The "date prepared/revised" on any attached sheets needs to match the "date prepared/revised" on this page.

General References: Section 288.254, 289.264

SECTION A. SITE IDENTIFIER

Applicant/permittee:	Brunner Island, LLC - Basin No. 5
Site Name:	Basin No. 5
Facility ID (as issued by DEP):	301309

SECTION B. FACILITY INFORMATION

Monitoring wells must be designed and constructed in accordance with Department standards. **INDICATE THE LATITUDE AND LONGITUDE TO THE NEAREST ONE TENTH OF A SECOND (DD° MM' SS.S").**

Monitoring Point Number: MW-8-4 ☒ Well ☐ Spring ☐ Stream ☐ Other
☐ Upgradient/Upstream ☑ Downgradient/Downstream

Location: County York Municipality: East Manchester Township

Sampling Point: Latitude: 40 ° 5 ' 25.61 " Longitude: 76 ° 41 ' 13.82 "

Depth to Water Level: 12.18 ft. Measured from: ☐ Land Surface ☒ TOC

Casing Stick Up: 1.81 ft. Elevation of Water Level: 258.01 ft./MSL

Sampling Depth: 18.00 ft. Volume of Water Column: _____ gal.

Total Well Depth: 21.70 ft. Sampling Method: ☒ Pumped ☐ Bailed ☐ Grab

Well Purged: ☒ Yes ☐ No Well Volumes Purged: 4.25 L

Sample Field Filtered (must be 0.45 micron)? ☒ Yes ☐ No

Spring Flow Rate: _____ GPM

Sample Date (mm/dd/yy): 01/22/2022 Sample Collection Time: 9:24AM

Sample Collector's Name: AM

Sample Collector's Affiliation: Talen Generation, LLC

Laboratory(ies) Performing Analysis: Hawk Mtn Labs, Inc.

Were any holding times exceeded? ☐ Yes ☒ No. If yes, please explain in comments field.

Lab Certification Number(s): 40-417

Lab Sample Number(s): 220101239-006 Final Lab Analysis Completion Date: 02/12/2022

Name/Affiliation of Person who Filled out Form Martin Mengel / Talen Energy Supply, LLC

Comments:

I.D. No.	301309
Monitoring Point No.	MW-8-4
Sample Date	01/22/2022

FORM 14 R

QUARTERLY AND ANNUAL WATER QUALITY ANALYSES

ANALYTES

1-Q. Inorganics (Enter all data in mg/l except as noted)

ANALYTE	VALUE (T)	ANALYSIS METHOD NUMBER
Ammonia, as N (mg/l)	0.066 ND	SM 4500-NH3 F
Bicarbonate (mg/l)	45.6	SM 2320
Calcium, total (mg/l)	90.8	EPA 200.7
Calcium, dissolved (mg/l)	83.9	EPA 200.7
Chemical Oxygen Demand (mg/l)	5.3 ND	SM 5220 D
Chloride, total as Cl (mg/l)	23	EPA 300.0
Fluoride, total as F (mg/l)	0.47	EPA 300.0
Iron, total (µg/l)	12.2 ND	EPA 200.7
Iron, dissolved (µg/l)	20 <	EPA 200.7
Magnesium, total (mg/l)	37.2	EPA 200.7
Magnesium, dissolved (mg/l)	35.4	EPA 200.7
Manganese, total (µg/l)	6,580	EPA 200.7
Manganese, dissolved (µg/l)	6,120	EPA 200.7
Nitrate, as N (mg/l)	0.82	EPA 300.0
pH, field (su)	5.62	SM 4500-H+B
pH, lab (su)	5.87 H	SM 4500-H+B
Potassium, total (mg/l)	1.35	EPA 200.7
Potassium, dissolved (mg/l)	1.29	EPA 200.7
Sodium, total (mg/l)	17.8	EPA 200.7
Sodium, dissolved (mg/l)	16.8	EPA 200.7
Specific Conductance, field (umhos/cm)	826	EPA 120.1, FIELD
Specific Conductance, lab (umhos/cm)	841	SM 2510 B
Sulfate, as SO4 (mg/l)	324	EPA 300.0
Alkalinity, total as CaCO3 (mg/l)	45.6	SM 2320 B
Total Dissolved Solids (mg/l)	588	SM 2540 C
Total Organic Carbon (mg/l)	0.749	SM 5310 C
Turbidity, field (n.t.u.)	2.28	
Dissolved O2, field (mg/l)	0.39	Field Meter
Redox, field (mv)	207	Field Meter
Temperature, field (°c)	7.82	Field Meter
Acidity, total as CaCO3 (mg/l)		

T Please indicate detection limit if analyte is not detected.

I.D. No.	301309
Monitoring Point No.	MW-8-4
Sample Date	01/22/2022

FORM 14 R

QUARTERLY AND ANNUAL WATER QUALITY ANALYSES

1-A. Organics (Enter all data in ug/l)

ANALYTE	VALUE (T)	ANALYSIS METHOD NUMBER
Benzene (µg/l)		
1,2-Dibromoethane (µg/l)		
1,1-Dichloroethane (µg/l)		
1,1-Dichloroethene (µg/l)		
1,2-Dichloroethane (µg/l)		
cis-1,2-Dichloroethene (µg/l)		
trans-1,2-Dichloroethene (µg/l)		
Ethylbenzene (µg/l)		
Methylene Chloride (µg/l)		
Tetrachloroethene (µg/l)		
Toluene (µg/l)		
1,1,1-Trichloroethane (µg/l)		
Trichloroethene (µg/l)		
Vinyl chloride (µg/l)		
Xylenes (µg/l)		

T Please indicate detection limit if analyte is not detected.

I.D. No.	301309
Monitoring Point No.	MW-8-4
Sample Date	01/22/2022

FORM 14 R

ANNUAL WATER QUALITY ANALYSES

2-A. **Metals (Enter all data in ug/l) If initial background analyses of four consecutive analyses show essentially identical (within 5%) dissolved and total analyses, dissolved analyses may not be required, subject to written DEP approval.**

ANALYTE	VALUE (T)	ANALYSIS METHOD NUMBER
Arsenic, total (µg/l)	1.47	EPA 200.8
Arsenic, dissolved (µg/l)	0.55 ND	EPA 200.8
Barium, total (µg/l)	18.2	EPA 200.8
Barium, dissolved (µg/l)	18.7	EPA 200.8
Cadmium, total (µg/l)	1.34	EPA 200.8
Cadmium, dissolved (µg/l)	1.43	EPA 200.8
Chromium, total (µg/l)	0.41 ND	EPA 200.8
Chromium, dissolved (µg/l)	0.41 ND	EPA 200.8
Copper, total (µg/l)	3.2	EPA 200.8
Copper, dissolved (µg/l)	1.66	EPA 200.8
Lead, total (µg/l)	0.23 ND	EPA 200.8
Lead, dissolved (µg/l)	0.23 ND	EPA 200.8
Mercury, total (µg/l)	0.72 ND	EPA 200.8
Mercury, dissolved (µg/l)	0.72 ND	EPA 200.8
Selenium, total (µg/l)	5 <	EPA 200.8
Selenium, dissolved (µg/l)	0.63 ND	EPA 200.8
Silver, total (µg/l)	0.13 ND	EPA 200.8
Silver, dissolved (µg/l)	0.13 ND	EPA 200.8
Zinc, total (µg/l)	70.1	EPA 200.8
Zinc, dissolved (µg/l)	82.5	EPA 200.8
Boron, total (µg/l)	221	EPA 200.7
Boron, dissolved (µg/l)	218	EPA 200.7
Lithium, total (µg/l)	11.6	EPA 200.8
Lithium, dissolved (µg/l)	10.3	EPA 200.8
Molybdenum, total (µg/l)	2.56	EPA 200.8
Molybdenum, dissolved (µg/l)	1.61	EPA 200.8
Strontium, total (µg/l)	289	EPA 200.7
Strontium, dissolved (µg/l)	273	EPA 200.7

T Please indicate detection limit if analyte is not detected.

I.D. No.	301309
Monitoring Point No.	MW-8-4
Sample Date	01/22/2022

FORM 14 R

ANNUAL WATER QUALITY ANALYSES

2-A. **Metals (Enter all data in ug/l) If initial background analyses of four consecutive analyses show essentially identical (within 5%) dissolved and total analyses, dissolved analyses may not be required, subject to written DEP approval.**

ANALYTE	VALUE (T)	ANALYSIS METHOD NUMBER
Aluminum, total (µg/l)	507	EPA 200.7
Aluminum, dissolved (µg/l)	258	EPA 200.7
Antimony, total (µg/l)	0.39 ND	EPA 200.8
Antimony, dissolved (µg/l)	0.39 ND	EPA 200.8
Beryllium, total (µg/l)	1 <	EPA 200.8
Beryllium, dissolved (µg/l)	0.19 ND	EPA 200.8
Cobalt, total (µg/l)		
Cobalt, dissolved (µg/l)		
Gallium, total (µg/l)		
Gallium, dissolved (µg/l)		
Germanium, total (µg/l)		
Germanium, dissolved (µg/l)		
Nickel, total (µg/l)	58.2	EPA 200.8
Nickel, dissolved (µg/l)	62.5	EPA 200.8
Rubidium, total (µg/l)		
Rubidium, dissolved (µg/l)		
Titanium, total (µg/l)	5 <	EPA 200.8
Titanium, dissolved (µg/l)	5.57	EPA 200.8
Vanadium, total (µg/l)	2.35 ND	EPA 200.8
Vanadium, dissolved (µg/l)	2.35 ND	EPA 200.8
Yittrium, total (µg/l)		
Yittrium, dissolved (µg/l)		

T Please indicate detection limit if analyte is not detected.

2540-PM-BWM0373 6/2005

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF WASTE MANAGEMENT

Date Prepared/Revised
03/08/2022
DEP USE ONLY
Date Received

FORM 14R
RESIDUAL WASTE LANDFILLS AND DISPOSAL IMPOUNDMENTS
QUARTERLY AND ANNUAL WATER QUALITY ANALYSES

This form must be fully and accurately completed. All required information must be typed or legibly printed in the spaces provided. If additional space is necessary, identify each attached sheet as Form 14R, reference the item number and identify the date prepared. The "date prepared/revised" on any attached sheets needs to match the "date prepared/revised" on this page.

General References: Section 288.254, 289.264

SECTION A. SITE IDENTIFIER

Applicant/permittee:	Brunner Island, LLC - Basin No. 5
Site Name:	Basin No. 5
Facility ID (as issued by DEP):	301309

SECTION B. FACILITY INFORMATION

Monitoring wells must be designed and constructed in accordance with Department standards. **INDICATE THE LATITUDE AND LONGITUDE TO THE NEAREST ONE TENTH OF A SECOND (DD° MM' SS.S").**

Monitoring Point Number: MW-8-5A ☒ Well ☐ Spring ☐ Stream ☐ Other
☐ Upgradient/Upstream ☑ Downgradient/Downstream

Location: County York Municipality: East Manchester Township

Sampling Point: Latitude: 40 ° 5 ' 16.91 " Longitude: 76 ° 41 ' 31.04 "

Depth to Water Level: 23.15 ft. Measured from: ☐ Land Surface ☒ TOC

Casing Stick Up: 1.97 ft. Elevation of Water Level: 261.89 ft./MSL

Sampling Depth: 33.00 ft. Volume of Water Column: _____ gal.

Total Well Depth: 39.20 ft. Sampling Method: ☒ Pumped ☐ Bailed ☐ Grab

Well Purged: ☒ Yes ☐ No Well Volumes Purged: 4.95 L

Sample Field Filtered (must be 0.45 micron)? ☒ Yes ☐ No

Spring Flow Rate: _____ GPM

Sample Date (mm/dd/yy): 01/22/2022 Sample Collection Time: 11:11AM

Sample Collector's Name: AM

Sample Collector's Affiliation: Talen Generation, LLC

Laboratory(ies) Performing Analysis: Hawk Mtn Labs, Inc.

Were any holding times exceeded? ☐ Yes ☒ No. If yes, please explain in comments field.

Lab Certification Number(s): 40-417

Lab Sample Number(s): 220101239-007 Final Lab Analysis Completion Date: 02/12/2022

Name/Affiliation of Person who Filled out Form Martin Mengel / Talen Energy Supply, LLC

Comments:

I.D. No.	301309
Monitoring Point No.	MW-8-5A
Sample Date	01/22/2022

FORM 14 R

QUARTERLY AND ANNUAL WATER QUALITY ANALYSES

ANALYTES

1-Q. Inorganics (Enter all data in mg/l except as noted)

ANALYTE	VALUE (T)	ANALYSIS METHOD NUMBER
Ammonia, as N (mg/l)	0.461	SM 4500-NH3 F
Bicarbonate (mg/l)	259	SM 2320
Calcium, total (mg/l)	168	EPA 200.7
Calcium, dissolved (mg/l)	172	EPA 200.7
Chemical Oxygen Demand (mg/l)	5.3 ND	SM 5220 D
Chloride, total as Cl (mg/l)	21.1	EPA 300.0
Fluoride, total as F (mg/l)	0.91	EPA 300.0
Iron, total (µg/l)	12.2 ND	EPA 200.7
Iron, dissolved (µg/l)	20 <	EPA 200.7
Magnesium, total (mg/l)	42.5	EPA 200.7
Magnesium, dissolved (mg/l)	42.8	EPA 200.7
Manganese, total (µg/l)	474	EPA 200.7
Manganese, dissolved (µg/l)	496	EPA 200.7
Nitrate, as N (mg/l)	0.022 ND	EPA 300.0
pH, field (su)	6.77	SM 4500-H+B
pH, lab (su)	7.45 H	SM 4500-H+B
Potassium, total (mg/l)	3.98	EPA 200.7
Potassium, dissolved (mg/l)	4.04	EPA 200.7
Sodium, total (mg/l)	13.3	EPA 200.7
Sodium, dissolved (mg/l)	13.6	EPA 200.7
Specific Conductance, field (umhos/cm)	1,143	EPA 120.1, FIELD
Specific Conductance, lab (umhos/cm)	1,160	SM 2510 B
Sulfate, as SO4 (mg/l)	333	EPA 300.0
Alkalinity, total as CaCO3 (mg/l)	259	SM 2320 B
Total Dissolved Solids (mg/l)	798	SM 2540 C
Total Organic Carbon (mg/l)	0.659	SM 5310 C
Turbidity, field (n.t.u.)	0.8	
Dissolved O2, field (mg/l)	0.25	Field Meter
Redox, field (mv)	149.1	Field Meter
Temperature, field (°c)	12.28	Field Meter
Acidity, total as CaCO3 (mg/l)		

T Please indicate detection limit if analyte is not detected.

I.D. No.	301309
Monitoring Point No.	MW-8-5A
Sample Date	01/22/2022

FORM 14 R

QUARTERLY AND ANNUAL WATER QUALITY ANALYSES

1-A. Organics (Enter all data in ug/l)

ANALYTE	VALUE (T)	ANALYSIS METHOD NUMBER
Benzene (µg/l)		
1,2-Dibromoethane (µg/l)		
1,1-Dichloroethane (µg/l)		
1,1-Dichloroethene (µg/l)		
1,2-Dichloroethane (µg/l)		
cis-1,2-Dichloroethene (µg/l)		
trans-1,2-Dichloroethene (µg/l)		
Ethylbenzene (µg/l)		
Methylene Chloride (µg/l)		
Tetrachloroethene (µg/l)		
Toluene (µg/l)		
1,1,1-Trichloroethane (µg/l)		
Trichloroethene (µg/l)		
Vinyl chloride (µg/l)		
Xylenes (µg/l)		

T Please indicate detection limit if analyte is not detected.

I.D. No.	301309
Monitoring Point No.	MW-8-5A
Sample Date	01/22/2022

FORM 14 R

ANNUAL WATER QUALITY ANALYSES

2-A. **Metals (Enter all data in ug/l) If initial background analyses of four consecutive analyses show essentially identical (within 5%) dissolved and total analyses, dissolved analyses may not be required, subject to written DEP approval.**

ANALYTE	VALUE (T)	ANALYSIS METHOD NUMBER
Arsenic, total (µg/l)	155	EPA 200.8
Arsenic, dissolved (µg/l)	113	EPA 200.8
Barium, total (µg/l)	48.6	EPA 200.8
Barium, dissolved (µg/l)	47.2	EPA 200.8
Cadmium, total (µg/l)	1 <	EPA 200.8
Cadmium, dissolved (µg/l)	1 <	EPA 200.8
Chromium, total (µg/l)	0.41 ND	EPA 200.8
Chromium, dissolved (µg/l)	0.41 ND	EPA 200.8
Copper, total (µg/l)	3.56	EPA 200.8
Copper, dissolved (µg/l)	1 <	EPA 200.8
Lead, total (µg/l)	0.23 ND	EPA 200.8
Lead, dissolved (µg/l)	0.23 ND	EPA 200.8
Mercury, total (µg/l)	0.72 ND	EPA 200.8
Mercury, dissolved (µg/l)	0.72 ND	EPA 200.8
Selenium, total (µg/l)	0.63 ND	EPA 200.8
Selenium, dissolved (µg/l)	0.63 ND	EPA 200.8
Silver, total (µg/l)	0.13 ND	EPA 200.8
Silver, dissolved (µg/l)	0.13 ND	EPA 200.8
Zinc, total (µg/l)	2.24 ND	EPA 200.8
Zinc, dissolved (µg/l)	6.15	EPA 200.8
Boron, total (µg/l)	889	EPA 200.7
Boron, dissolved (µg/l)	890	EPA 200.7
Lithium, total (µg/l)	192	EPA 200.8
Lithium, dissolved (µg/l)	260	EPA 200.8
Molybdenum, total (µg/l)	357	EPA 200.8
Molybdenum, dissolved (µg/l)	388	EPA 200.8
Strontium, total (µg/l)	813	EPA 200.7
Strontium, dissolved (µg/l)	797	EPA 200.7

T Please indicate detection limit if analyte is not detected.

I.D. No.	301309
Monitoring Point No.	MW-8-5A
Sample Date	01/22/2022

FORM 14 R

ANNUAL WATER QUALITY ANALYSES

2-A. **Metals (Enter all data in ug/l) If initial background analyses of four consecutive analyses show essentially identical (within 5%) dissolved and total analyses, dissolved analyses may not be required, subject to written DEP approval.**

ANALYTE	VALUE (T)	ANALYSIS METHOD NUMBER
Aluminum, total (µg/l)	100 <	EPA 200.7
Aluminum, dissolved (µg/l)	100 <	EPA 200.7
Antimony, total (µg/l)	0.39 ND	EPA 200.8
Antimony, dissolved (µg/l)	0.39 ND	EPA 200.8
Beryllium, total (µg/l)	0.19 ND	EPA 200.8
Beryllium, dissolved (µg/l)	0.19 ND	EPA 200.8
Cobalt, total (µg/l)		
Cobalt, dissolved (µg/l)		
Gallium, total (µg/l)		
Gallium, dissolved (µg/l)		
Germanium, total (µg/l)		
Germanium, dissolved (µg/l)		
Nickel, total (µg/l)	1 <	EPA 200.8
Nickel, dissolved (µg/l)	4.86	EPA 200.8
Rubidium, total (µg/l)		
Rubidium, dissolved (µg/l)		
Titanium, total (µg/l)	1.45 ND	EPA 200.8
Titanium, dissolved (µg/l)	5 <	EPA 200.8
Vanadium, total (µg/l)	2.35 ND	EPA 200.8
Vanadium, dissolved (µg/l)	2.35 ND	EPA 200.8
Yittrium, total (µg/l)		
Yittrium, dissolved (µg/l)		

T Please indicate detection limit if analyte is not detected.

2540-PM-BWM0373 6/2005

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF WASTE MANAGEMENT

Date Prepared/Revised
03/08/2022
DEP USE ONLY
Date Received

FORM 14R
RESIDUAL WASTE LANDFILLS AND DISPOSAL IMPOUNDMENTS
QUARTERLY AND ANNUAL WATER QUALITY ANALYSES

This form must be fully and accurately completed. All required information must be typed or legibly printed in the spaces provided. If additional space is necessary, identify each attached sheet as Form 14R, reference the item number and identify the date prepared. The "date prepared/revised" on any attached sheets needs to match the "date prepared/revised" on this page.

General References: Section 288.254, 289.264

SECTION A. SITE IDENTIFIER

Applicant/permittee:	Brunner Island, LLC - Basin No. 5
Site Name:	Basin No. 5
Facility ID (as issued by DEP):	301309

SECTION B. FACILITY INFORMATION

Monitoring wells must be designed and constructed in accordance with Department standards. **INDICATE THE LATITUDE AND LONGITUDE TO THE NEAREST ONE TENTH OF A SECOND (DD° MM' SS.S").**

Monitoring Point Number: MW-8-5B ☒ Well ☐ Spring ☐ Stream ☐ Other

☐ Upgradient/Upstream ☑ Downgradient/Downstream

Location: County York Municipality: East Manchester Township

Sampling Point: Latitude: 40 ° 5 ' 16.81 " Longitude: 76 ° 41 ' 30.96 "

Depth to Water Level: 17.6 ft. Measured from: ☐ Land Surface ☒ TOC

Casing Stick Up: 2.54 ft. Elevation of Water Level: 267.28 ft./MSL

Sampling Depth: 52.00 ft. Volume of Water Column: _____ gal.

Total Well Depth: 59.60 ft. Sampling Method: ☒ Pumped ☐ Bailed ☐ Grab

Well Purged: ☒ Yes ☐ No Well Volumes Purged: 3.6 L

Sample Field Filtered (must be 0.45 micron)? ☒ Yes ☐ No

Spring Flow Rate: _____ GPM

Sample Date (mm/dd/yy): 01/22/2022 Sample Collection Time: 12:41PM

Sample Collector's Name: AM

Sample Collector's Affiliation: Talen Generation, LLC

Laboratory(ies) Performing Analysis: Hawk Mtn Labs, Inc.

Were any holding times exceeded? ☐ Yes ☒ No. If yes, please explain in comments field.

Lab Certification Number(s): 40-417

Lab Sample Number(s): 220101239-008 Final Lab Analysis Completion Date: 02/12/2022

Name/Affiliation of Person who Filled out Form Martin Mengel / Talen Energy Supply, LLC

Comments:

I.D. No.	301309
Monitoring Point No.	MW-8-5B
Sample Date	01/22/2022

FORM 14 R

QUARTERLY AND ANNUAL WATER QUALITY ANALYSES

ANALYTES

1-Q. Inorganics (Enter all data in mg/l except as noted)

ANALYTE	VALUE (T)	ANALYSIS METHOD NUMBER
Ammonia, as N (mg/l)	0.288	SM 4500-NH3 F
Bicarbonate (mg/l)	234	SM 2320
Calcium, total (mg/l)	160	EPA 200.7
Calcium, dissolved (mg/l)	166	EPA 200.7
Chemical Oxygen Demand (mg/l)	5.3 ND	SM 5220 D
Chloride, total as Cl (mg/l)	15	EPA 300.0
Fluoride, total as F (mg/l)	0.68	EPA 300.0
Iron, total (µg/l)	12.2 ND	EPA 200.7
Iron, dissolved (µg/l)	120	EPA 200.7
Magnesium, total (mg/l)	36	EPA 200.7
Magnesium, dissolved (mg/l)	36	EPA 200.7
Manganese, total (µg/l)	435	EPA 200.7
Manganese, dissolved (µg/l)	450	EPA 200.7
Nitrate, as N (mg/l)	0.022 ND	EPA 300.0
pH, field (su)	6.92	SM 4500-H+B
pH, lab (su)	7.57 H	SM 4500-H+B
Potassium, total (mg/l)	3.83	EPA 200.7
Potassium, dissolved (mg/l)	3.88	EPA 200.7
Sodium, total (mg/l)	10.2	EPA 200.7
Sodium, dissolved (mg/l)	10.5	EPA 200.7
Specific Conductance, field (umhos/cm)	1,039	EPA 120.1, FIELD
Specific Conductance, lab (umhos/cm)	1,050	SM 2510 B
Sulfate, as SO4 (mg/l)	289	EPA 300.0
Alkalinity, total as CaCO3 (mg/l)	234	SM 2320 B
Total Dissolved Solids (mg/l)	724	SM 2540 C
Total Organic Carbon (mg/l)	0.666	SM 5310 C
Turbidity, field (n.t.u.)	0.59	
Dissolved O2, field (mg/l)	0.44	Field Meter
Redox, field (mv)	155.8	Field Meter
Temperature, field (°c)	11.75	Field Meter
Acidity, total as CaCO3 (mg/l)		

T Please indicate detection limit if analyte is not detected.

I.D. No.	301309
Monitoring Point No.	MW-8-5B
Sample Date	01/22/2022

FORM 14 R

QUARTERLY AND ANNUAL WATER QUALITY ANALYSES

1-A. Organics (Enter all data in ug/l)

ANALYTE	VALUE (T)	ANALYSIS METHOD NUMBER
Benzene (µg/l)		
1,2-Dibromoethane (µg/l)		
1,1-Dichloroethane (µg/l)		
1,1-Dichloroethene (µg/l)		
1,2-Dichloroethane (µg/l)		
cis-1,2-Dichloroethene (µg/l)		
trans-1,2-Dichloroethene (µg/l)		
Ethylbenzene (µg/l)		
Methylene Chloride (µg/l)		
Tetrachloroethene (µg/l)		
Toluene (µg/l)		
1,1,1-Trichloroethane (µg/l)		
Trichloroethene (µg/l)		
Vinyl chloride (µg/l)		
Xylenes (µg/l)		

T Please indicate detection limit if analyte is not detected.

I.D. No.	301309
Monitoring Point No.	MW-8-5B
Sample Date	01/22/2022

FORM 14 R

ANNUAL WATER QUALITY ANALYSES

2-A. **Metals (Enter all data in ug/l) If initial background analyses of four consecutive analyses show essentially identical (within 5%) dissolved and total analyses, dissolved analyses may not be required, subject to written DEP approval.**

ANALYTE	VALUE (T)	ANALYSIS METHOD NUMBER
Arsenic, total (µg/l)	264	EPA 200.8
Arsenic, dissolved (µg/l)	226	EPA 200.8
Barium, total (µg/l)	75.4	EPA 200.8
Barium, dissolved (µg/l)	67.8	EPA 200.8
Cadmium, total (µg/l)	1 <	EPA 200.8
Cadmium, dissolved (µg/l)	1 <	EPA 200.8
Chromium, total (µg/l)	0.41 ND	EPA 200.8
Chromium, dissolved (µg/l)	0.41 ND	EPA 200.8
Copper, total (µg/l)	2.93	EPA 200.8
Copper, dissolved (µg/l)	1.2	EPA 200.8
Lead, total (µg/l)	0.23 ND	EPA 200.8
Lead, dissolved (µg/l)	0.23 ND	EPA 200.8
Mercury, total (µg/l)	0.72 ND	EPA 200.8
Mercury, dissolved (µg/l)	0.72 ND	EPA 200.8
Selenium, total (µg/l)	5 <	EPA 200.8
Selenium, dissolved (µg/l)	0.63 ND	EPA 200.8
Silver, total (µg/l)	0.13 ND	EPA 200.8
Silver, dissolved (µg/l)	0.13 ND	EPA 200.8
Zinc, total (µg/l)	2.24 ND	EPA 200.8
Zinc, dissolved (µg/l)	5 <	EPA 200.8
Boron, total (µg/l)	861	EPA 200.7
Boron, dissolved (µg/l)	875	EPA 200.7
Lithium, total (µg/l)	160	EPA 200.8
Lithium, dissolved (µg/l)	212	EPA 200.8
Molybdenum, total (µg/l)	327	EPA 200.8
Molybdenum, dissolved (µg/l)	360	EPA 200.8
Strontium, total (µg/l)	937	EPA 200.7
Strontium, dissolved (µg/l)	951	EPA 200.7

T Please indicate detection limit if analyte is not detected.

I.D. No.	301309
Monitoring Point No.	MW-8-5B
Sample Date	01/22/2022

FORM 14 R

ANNUAL WATER QUALITY ANALYSES

2-A. **Metals (Enter all data in ug/l) If initial background analyses of four consecutive analyses show essentially identical (within 5%) dissolved and total analyses, dissolved analyses may not be required, subject to written DEP approval.**

ANALYTE	VALUE (T)	ANALYSIS METHOD NUMBER
Aluminum, total (µg/l)	100 <	EPA 200.7
Aluminum, dissolved (µg/l)	100 <	EPA 200.7
Antimony, total (µg/l)	0.39 ND	EPA 200.8
Antimony, dissolved (µg/l)	0.39 ND	EPA 200.8
Beryllium, total (µg/l)	0.19 ND	EPA 200.8
Beryllium, dissolved (µg/l)	0.19 ND	EPA 200.8
Cobalt, total (µg/l)		
Cobalt, dissolved (µg/l)		
Gallium, total (µg/l)		
Gallium, dissolved (µg/l)		
Germanium, total (µg/l)		
Germanium, dissolved (µg/l)		
Nickel, total (µg/l)	1 <	EPA 200.8
Nickel, dissolved (µg/l)	5.64	EPA 200.8
Rubidium, total (µg/l)		
Rubidium, dissolved (µg/l)		
Titanium, total (µg/l)	1.45 ND	EPA 200.8
Titanium, dissolved (µg/l)	5 <	EPA 200.8
Vanadium, total (µg/l)	2.35 ND	EPA 200.8
Vanadium, dissolved (µg/l)	2.35 ND	EPA 200.8
Yittrium, total (µg/l)		
Yittrium, dissolved (µg/l)		

T Please indicate detection limit if analyte is not detected.

2540-PM-BWM0373 6/2005

COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF WASTE MANAGEMENT

Date Prepared/Revised
03/08/2022
DEP USE ONLY
Date Received

FORM 14R
RESIDUAL WASTE LANDFILLS AND DISPOSAL IMPOUNDMENTS
QUARTERLY AND ANNUAL WATER QUALITY ANALYSES

This form must be fully and accurately completed. All required information must be typed or legibly printed in the spaces provided. If additional space is necessary, identify each attached sheet as Form 14R, reference the item number and identify the date prepared. The "date prepared/revised" on any attached sheets needs to match the "date prepared/revised" on this page.

General References: Section 288.254, 289.264

SECTION A. SITE IDENTIFIER

Applicant/permittee:	Brunner Island, LLC - Basin No. 5
Site Name:	Basin No. 5
Facility ID (as issued by DEP):	301309

SECTION B. FACILITY INFORMATION

Monitoring wells must be designed and constructed in accordance with Department standards. **INDICATE THE LATITUDE AND LONGITUDE TO THE NEAREST ONE TENTH OF A SECOND (DD° MM' SS.S").**

Monitoring Point Number: MW-PT-1 ☒ Well ☐ Spring ☐ Stream ☐ Other
☐ Upgradient/Upstream ☑ Downgradient/Downstream

Location: County York Municipality: East Manchester Township

Sampling Point: Latitude: 40 ° 55 ' 26.53 " Longitude: 76 ° 40 ' 28.05 "

Depth to Water Level: 10.81 ft. Measured from: ☐ Land Surface ☒ TOC

Casing Stick Up: 2.04 ft. Elevation of Water Level: 260.956 ft./MSL

Sampling Depth: 19.00 ft. Volume of Water Column: _____ gal.

Total Well Depth: _____ ft. Sampling Method: ☒ Pumped ☐ Bailed ☐ Grab

Well Purged: ☒ Yes ☐ No Well Volumes Purged: 3 L

Sample Field Filtered (must be 0.45 micron)? ☒ Yes ☐ No

Spring Flow Rate: _____ GPM

Sample Date (mm/dd/yy): 01/24/2022 Sample Collection Time: 8:31AM

Sample Collector's Name: AF

Sample Collector's Affiliation: Talen Generation, LLC

Laboratory(ies) Performing Analysis: Hawk Mtn Labs, Inc.

Were any holding times exceeded? ☐ Yes ☒ No. If yes, please explain in comments field.

Lab Certification Number(s): 40-417

Lab Sample Number(s): 220101240-001 Final Lab Analysis Completion Date: 02/10/2022

Name/Affiliation of Person who Filled out Form Martin Mengel / Talen Energy Supply, LLC

Comments:

I.D. No.	301309
Monitoring Point No.	MW-PT-1
Sample Date	01/24/2022

FORM 14 R

QUARTERLY AND ANNUAL WATER QUALITY ANALYSES

ANALYTES

1-Q. Inorganics (Enter all data in mg/l except as noted)

ANALYTE	VALUE (T)	ANALYSIS METHOD NUMBER
Ammonia, as N (mg/l)	0.066 ND	SM 4500-NH3 F
Bicarbonate (mg/l)	20 <	SM 2320
Calcium, total (mg/l)	61.2	EPA 200.7
Calcium, dissolved (mg/l)		
Chemical Oxygen Demand (mg/l)	5.3 ND	SM 5220 D
Chloride, total as Cl (mg/l)	2.75	EPA 300.0
Fluoride, total as F (mg/l)	0.28	EPA 300.0
Iron, total (µg/l)	51	EPA 200.7
Iron, dissolved (µg/l)		
Magnesium, total (mg/l)	19.3	EPA 200.7
Magnesium, dissolved (mg/l)		
Manganese, total (µg/l)	1,490	EPA 200.7
Manganese, dissolved (µg/l)		
Nitrate, as N (mg/l)	1.13	EPA 300.0
pH, field (su)	5.36	SM 4500-H+B
pH, lab (su)	5.26 H	SM 4500-H+B
Potassium, total (mg/l)	2.86	EPA 200.7
Potassium, dissolved (mg/l)		
Sodium, total (mg/l)	10.1	EPA 200.7
Sodium, dissolved (mg/l)		
Specific Conductance, field (umhos/cm)	536	EPA 120.1, FIELD
Specific Conductance, lab (umhos/cm)	538	SM 2510 B
Sulfate, as SO4 (mg/l)	233	EPA 300.0
Alkalinity, total as CaCO3 (mg/l)	20 <	SM 2320 B
Total Dissolved Solids (mg/l)	375	SM 2540 C
Total Organic Carbon (mg/l)	1.4	SM 5310 C
Turbidity, field (n.t.u.)	0.65	
Dissolved O2, field (mg/l)	5.37	Field Meter
Redox, field (mv)	252.4	Field Meter
Temperature, field (°c)	6.74	Field Meter
Acidity, total as CaCO3 (mg/l)		

T Please indicate detection limit if analyte is not detected.

I.D. No.	301309
Monitoring Point No.	MW-PT-1
Sample Date	01/24/2022

FORM 14 R

QUARTERLY AND ANNUAL WATER QUALITY ANALYSES

1-A. Organics (Enter all data in ug/l)

ANALYTE	VALUE (T)	ANALYSIS METHOD NUMBER
Benzene (µg/l)		
1,2-Dibromoethane (µg/l)		
1,1-Dichloroethane (µg/l)		
1,1-Dichloroethene (µg/l)		
1,2-Dichloroethane (µg/l)		
cis-1,2-Dichloroethene (µg/l)		
trans-1,2-Dichloroethene (µg/l)		
Ethylbenzene (µg/l)		
Methylene Chloride (µg/l)		
Tetrachloroethene (µg/l)		
Toluene (µg/l)		
1,1,1-Trichloroethane (µg/l)		
Trichloroethene (µg/l)		
Vinyl chloride (µg/l)		
Xylenes (µg/l)		

T Please indicate detection limit if analyte is not detected.

I.D. No.	301309
Monitoring Point No.	MW-PT-1
Sample Date	01/24/2022

FORM 14 R

ANNUAL WATER QUALITY ANALYSES

2-A. **Metals (Enter all data in ug/l) If initial background analyses of four consecutive analyses show essentially identical (within 5%) dissolved and total analyses, dissolved analyses may not be required, subject to written DEP approval.**

ANALYTE	VALUE (T)	ANALYSIS METHOD NUMBER
Arsenic, total (µg/l)	0.55 ND	EPA 200.8
Arsenic, dissolved (µg/l)		
Barium, total (µg/l)	14.1	EPA 200.8
Barium, dissolved (µg/l)		
Cadmium, total (µg/l)	1 <	EPA 200.8
Cadmium, dissolved (µg/l)		
Chromium, total (µg/l)	0.41 ND	EPA 200.8
Chromium, dissolved (µg/l)		
Copper, total (µg/l)	3.8	EPA 200.8
Copper, dissolved (µg/l)		
Lead, total (µg/l)	0.23 ND	EPA 200.8
Lead, dissolved (µg/l)		
Mercury, total (µg/l)	0.72 ND	EPA 200.8
Mercury, dissolved (µg/l)		
Selenium, total (µg/l)	5 <	EPA 200.8
Selenium, dissolved (µg/l)		
Silver, total (µg/l)	0.13 ND	EPA 200.8
Silver, dissolved (µg/l)		
Zinc, total (µg/l)	72.7	EPA 200.8
Zinc, dissolved (µg/l)		
Boron, total (µg/l)	48.3 ND	EPA 200.7
Boron, dissolved (µg/l)		
Lithium, total (µg/l)	31	EPA 200.8
Lithium, dissolved (µg/l)		
Molybdenum, total (µg/l)	10.2	EPA 200.8
Molybdenum, dissolved (µg/l)		
Strontium, total (µg/l)	240	EPA 200.7
Strontium, dissolved (µg/l)		

T Please indicate detection limit if analyte is not detected.

I.D. No.	301309
Monitoring Point No.	MW-PT-1
Sample Date	01/24/2022

FORM 14 R

ANNUAL WATER QUALITY ANALYSES

2-A. **Metals (Enter all data in ug/l) If initial background analyses of four consecutive analyses show essentially identical (within 5%) dissolved and total analyses, dissolved analyses may not be required, subject to written DEP approval.**

ANALYTE	VALUE (T)	ANALYSIS METHOD NUMBER
Aluminum, total (µg/l)	1,010	EPA 200.7
Aluminum, dissolved (µg/l)		
Antimony, total (µg/l)	0.39 ND	EPA 200.8
Antimony, dissolved (µg/l)		
Beryllium, total (µg/l)	1.64	EPA 200.8
Beryllium, dissolved (µg/l)		
Cobalt, total (µg/l)		
Cobalt, dissolved (µg/l)		
Gallium, total (µg/l)		
Gallium, dissolved (µg/l)		
Germanium, total (µg/l)		
Germanium, dissolved (µg/l)		
Nickel, total (µg/l)	48	EPA 200.8
Nickel, dissolved (µg/l)		
Rubidium, total (µg/l)		
Rubidium, dissolved (µg/l)		
Titanium, total (µg/l)	5 <	EPA 200.8
Titanium, dissolved (µg/l)		
Vanadium, total (µg/l)	2.35 ND	EPA 200.8
Vanadium, dissolved (µg/l)		
Yittrium, total (µg/l)		
Yittrium, dissolved (µg/l)		

T Please indicate detection limit if analyte is not detected.

Result Qualifier Codes

CODE	DESCRIPTION
*	Value exceeds Maximum Contaminant Level
B	Analyte detected in Method, Reagent, or Cal Blank
C	Calculated Value
E	Value above quantitation range
F	Required sample not collected
H	Holding times for preparation or analysis exceeded
I	Instrument failure, not recoverable
J	Analyte detected below quantitation limits
L	Analyzed by contract laboratory
LOD	Limit of Detection (LOD) = Laboratory Detection Limit
LOQ	Limit of Quantitation (LOQ) = Laboratory Reporting Limit
M	Value exceeds Monthly Avg. or MCL
NC	Analyte not certified in NELAC Scope of Accreditation
ND	Not Detected at the Detection Limit
NM	Analyte not measured
O	Result exceeds practical range of determination
P	Sample not preserved properly
Q	QC control standard failure
R	Replicate Recovery outside accepted recovery limits
S	Spike Recovery outside accepted recovery limits
T	Reporting error
V	Sample contamination suspected
X	Other (note required)

Attachment – Statistics Summary

Statistical Analysis

Temporal trends of selected parameters were analyzed using a Theil-Sen estimator, a robust linear regression method. The Theil-Sen estimator is insensitive to outlying spikes in data, making it advantageous over the traditional least squares method of linear regression in identifying significant temporal trends. To comply with proposed RCRA Subtitle D regulations, a nonparametric analysis of variants (ANOVA) of the data is also utilized. The nonparametric ANOVA analysis is a method for comparing medians of two or more groups. In this case, it is utilized to determine if parameter concentrations in downgradient wells are significantly greater than or less than parameter concentrations in the upgradient wells.

An Excel workbook was developed to evaluate historical groundwater monitoring data from Talen sites with the aforementioned statistical tools. This Excel application was used to perform statistical analyses of each site-related groundwater parameter at all monitoring locations for each basin/area of the site. The Excel workbook includes a worksheet containing a summary table of the statistical analyses results for all groundwater parameters and monitoring locations along with other supporting worksheets containing raw data and more detailed statistical information. The most pronounced parameter trends and regulatory exceedances are highlighted on the summary table.

PARAMETER	UNITS	STD.	UPGRADIENT VS DOWNGRADIENT	Up														Down														Up													
				MW-19														MW-4-10														MW-4-7A													
				Trend (%)		p	x̄	x̄ (%)	n	ND	J	>		Max		b (comparison		Trend (%)		p	x̄	x̄ (%)	n	ND	J	>		Max		b (comparison		Trend (%)		p	x̄	x̄ (%)	n	ND	J	>		Max		b (comparison	
Iron, dissolved	mg/l	0.3	83.63	NC		NC	0.0	4.6	41	34	0	0		0.1	06/10/14	0.01	< Up n	NC		NC	0.0	6.1	41	25	0	0		0.1	03/14/12	0.09	n	NC		NC	0.0	0.9	41	39	0	0		0.0	11/05/20	0.00	< Up n
Arsenic, dissolved	µg/l	10	56.31	NC		NC	0.8	8.1	41	32	0	0		2.0	12/10/13	0.00	> Up n	NC		NC	1.1	11.5	41	31	0	1	08/14/18	10.2	08/14/18	0.12	n	NC		NC	0.4	4.1	41	40	0	0		0.6	03/03/14	0.00	< Up n
Manganese, dissolved	µg/l	300	23.73	NC		NC	2.5	0.8	41	40	0	0		20.0	08/16/19	0.00	< Up n	-41.7	↓	0.01	2678.8	892.9	41	0	0	41	01/27/22	7220.0	06/05/14	0.00	> Up n	51.3	↑	0.10	216.4	72.1	41	0	0	7	01/24/22	559.0	11/05/20	0.00	> Up n
Molybdenum, dissolved	µg/l	40	17.08	NC		NC	1.6	3.9	41	39	0	0		4.0	12/10/13	0.00	< Up n	21.0	↑	0.31	589.3	1473.2	41	0	0	38	01/27/22	1740.0	09/18/13	0.00	> Up n	-10.1	↓	0.14	21.0	52.5	41	1	0	0		29.9	07/24/21	0.00	> Up n
Aluminum, dissolved	µg/l	200	10.18	NC		NC	25.1	12.5	41	41	0	0		100.0	08/16/19	NC		NC		NC	2871.8	1435.9	41	25	0	10	11/07/18	28800.0	08/14/18	0.00	> Up n	NC		NC	57.6	28.8	41	41	0	0		100.0	01/24/22	NC	
Nickel, dissolved	µg/l	100	5.91	NC		NC	1.7	1.7	41	37	0	0		5.0	08/16/18	0.00	> Up n	-49.5	↓	0.05	37.8	37.8	41	3	0	5	08/14/18	175.0	06/07/16	0.00	> Up n	NC		NC	3.4	3.4	41	30	0	0		17.2	11/11/19	0.31	n
Potassium, dissolved	mg/l	--	5.14	45.4	↑	0.00	0.8	NA	41	11	0	0		1.0	01/26/22	0.00	< Up n	69.1	↑	0.00	100.5	NA	41	0	0	0		139.0	01/27/22	0.00	> Up n	-3.3	↔	0.18	3.9	NA	41	0	0	0		4.5	08/17/20	0.00	> Up n
Cadmium, dissolved	µg/l	5	4.65	NC		NC	0.1	2.0	41	41	0	0		0.2	12/10/13	NC		0.0	↔	0.42	1.0	20.4	41	9	0	0		2.4	08/14/18	0.00	> Up n	NC		NC	0.1	2.5	41	41	0	0		0.2	11/05/18	NC	
Zinc, dissolved	µg/l	2000	4.07	NC		NC	6.7	0.3	41	30	0	0		20.0	12/10/13	0.11	n	-64.3	↓	0.02	84.1	4.2	41	0	0	0		488.0	08/14/18	0.00	> Up n	NC		NC	6.4	0.3	41	37	0	0		20.0	12/02/13	0.00	< Up n
Fluoride, total as F	mg/l	2	2.91	NC		NC	0.1	4.7	41	38	0	0		0.2	01/26/22	0.00	< Up n	NC		NC	0.2	8.7	41	31	0	0		1.8	08/14/18	0.02	> Up n	0.0	↔	0.42	0.2	9.4	41	5	0	0		0.3	06/04/14	0.02	> Up n
Strontium, dissolved	µg/l	4000	2.83	-8.6	↔	0.00	50.5	1.3	41	0	0	0		59.3	03/12/15	0.00	< Up n	137.3	↑	0.00	1168.1	29.2	41	0	0	0		2190.0	08/25/19	0.00	> Up n	6.2	↔	0.10	349.0	8.7	41	0	0	0		430.0	11/05/20	0.00	> Up n
Beryllium, dissolved	µg/l	4	2.33	NC		NC	0.1	3.6	41	41	0	0		0.5	06/10/14	NC		NC		NC	0.8	19.2	41	33	0	2	08/14/18	5.4	06/05/14	0.00	> Up n	NC		NC	0.1	3.4	41	41	0	0		0.2	12/02/13	NC	
Lithium, dissolved	µg/l	83	2.10	-29.4	↓	0.00	4.0	4.8	41	8	0	0		10.0	12/10/13	0.00	< Up n	-15.3	↓	0.04	1105.2	1331.6	41	0	0	41	01/27/22	1550.0	09/18/13	0.00	> Up n	343.2	↑	0.00	122.6	147.8	41	0	0	30	01/24/22	278.0	01/24/22	0.00	> Up n
Chemical Oxygen Demand	mg/l	--	2.10	NC		NC	2.6	NA	41	40	0	0		25.4	01/26/22	0.42	n	NC		NC	2.5	NA	41	40	0	0		20.7	05/19/20	0.49	n	NC		NC	3.2	NA	41	40	0	0		53.2	06/03/13	0.07	n
Chloride, total as Cl	mg/l	250	1.96	6.6	↔	0.02	8.4	3.3	41	0	0	0		9.9	08/26/20	0.00	< Up n	-69.8	↓	0.00	13.6	5.4	41	0	0	0		24.7	12/03/12	0.37	n	-22.3	↓	0.00	17.7	7.1	41	0	0	0		21.3	03/12/12	0.00	> Up n
Copper, dissolved	µg/l	1000	1.42	NC		NC	1.1	0.1	41	38	0	0		23.6	03/13/12	0.00	> Up n	NC		NC	6.1	0.6	41	24	0	0		32.2	06/05/14	0.11	n	NC		NC	2.1	0.2	41	35	0	0		5.0	02/11/19	0.00	> Up n
Vanadium, dissolved	µg/l	2.9	1.40	NC		NC	1.4	49.9	41	41	0	0		2.3	01/26/22	0.00	< Up n	NC		NC	1.4	47.6	41	41	0	0		2.3	01/27/22	0.00	< Up n	NC		NC	1.5	51.7	41	32	0	0		2.3	01/24/22	0.00	> Up n
Ammonia, as N	mg/l	--	1.33	NC		NC	0.0	NA	41	41	0	0		0.2	01/26/22	0.00	< Up n	52.6	↑	0.12	0.4	NA	41	5	0	0		1.1	06/04/13	0.00	> Up n	-12.2	↓	0.21	0.2	NA	41	7	0	0		0.7	06/06/16	0.00	> Up n
Silver, dissolved	µg/l	100	1.29	NC		NC	0.5	0.5	41	41	0	0		2.0	12/10/13	NC		NC		NC	1.3	1.3	41	41	0	0		10.0	12/11/13	NC		NC		NC	1.7	1.7	41	41	0	0		10.0	12/02/13	NC	
Magnesium, dissolved	mg/l	--	1.26	-4.1	↔	0.16	4.6	NA	41	0	0	0		5.7	03/12/15	0.00	< Up n	-4.7	↔	0.40	15.8	NA	41	0	0	0		27.2	08/14/18	0.49	n	14.0	↑	0.00	39.0	NA	41	0	0	0		53.8	11/05/20	0.00	> Up n
Specific Conductance, field	umhos/cm	--	1.11	0.6	↔	0.43	226.0	NA	41	0	0	0		267.0	10/13/21	0.00	< Up n	17.1	↑	0.00	1545.0	NA	41	0	0	0		1953.0	05/07/19	0.00	> Up n	18.7	↑	0.00	1443.5	NA	41	0	0	0		1643.0	11/05/20	0.00	> Up n
Total Dissolved Solids	mg/l	500	1.05	-3.0	↔	0.16	142.8	28.6	41	0	0	0		173.0	08/16/19	0.00	< Up n	20.5	↑	0.01	1163.0	232.6	41	0	0	41	01/27/22	1670.0	05/07/19	0.00	> Up n	23.6	↑	0.00	1133.2	226.6	41	0	0	41	01/24/22	1300.0	11/05/20	0.00	> Up n
Titanium, dissolved	µg/l	--	1.03	NC		NC	1.1	NA	41	40	0	0		6.1	01/26/22	0.15	n	NC		NC	1.7	NA	41	41	0	0		5.0	01/27/22	0.24	n	NC		NC	1.9	NA	41	41	0	0		5.0	01/24/22	0.24	n
Total Organic Carbon	mg/l	--	1.02	NC		NC	0.5	NA	41	37	0	0		0.8	05/13/19	0.00	< Up n	-7.9	↔	0.26	0.7	NA	41	1	0	0		1.5	03/14/12	0.31	n	23.3	↑	0.02	1.2	NA	41	0	0	0		2.2	06/11/12	0.00	> Up n
Chromium, dissolved	µg/l	100	1.02	NC		NC	1.1	1.1	41	41	0	0		2.0	12/10/13	NC		NC		NC	1.0	1.0	41	41	0	0		2.0	12/11/13	NC		NC		NC	1.1	1.1	41	41	0	0		2.0	12/02/13	NC	
Calcium, dissolved	mg/l	--	1.01	-6.7	↔	0.03	27.1	NA	41	0	0	0		32.0	08/26/20	0.00	< Up n	110.3	↑	0.00	148.3	NA	41	0	0	0		328.0	08/25/19	0.10	n	16.0	↑	0.00	230.0	NA	41	0	0	0		340.0	08/21/19	0.00	> Up n
Sulfate, as SO4	mg/l	250	1.00	-17.7	↓	0.05	26.8	10.7	41	0	0	0		49.2	05/20/20	0.00	< Up n	19.3	↑	0.03	722.5	289.0	40	0	0	40	01/27/22	1040.0	05/07/19	0.00	> Up n	25.0	↑	0.00	575.8	230.3	41	0	0	41	01/24/22	718.0	01/27/21	0.00	> Up n
Antimony, dissolved	µg/l	6	1.00	NC		NC	0.4	6.7	1	1	0	0		0.4	02/19/19	NC		NC		NC	0.4	6.7	1	1	0	0		0.4	02/19/19	NC		NC		NC	0.4	6.7	1	1	0	0		0.4	02/11/19	NC	
Lead, dissolved	µg/l	5	0.99	NC		NC	0.3	6.4	41	41	0	0		1.0	12/10/13	NC		NC		NC	0.5	9.1	41	39	0	0		1.1	06/05/14	0.00	> Up n	NC		NC	0.4	7.4	41	41	0	0		1.0	12/02/13	NC	
pH, field	s.u.	6.5-8.5	0.99	-3.7	↔	0.07	6.6	88.7	41	0	0	12	10/13/21	7.2	08/26/20	0.00	< Up n	12.4	↑	0.00	5.4	206.7	41	0	0	41	01/27/22	6.2	09/18/13	0.00	< Up n	-3.7	↔	0.00	6.9	61.7	41	0	0	1	05/12/15	7.2	12/07/15	0.00	> Up n
Mercury, dissolved	µg/l	2	0.94	NC		NC	0.2	10.6	41	41	0	0		0.7	01/26/22	0.00	< Up n	NC		NC	0.2	10.6	41	41	0	0		0.7	01/27/22	0.00	< Up n	NC		NC	0.2	11.8	41	40	0	0		0.7	01/24/22	0.00	> Up n
Boron, dissolved	µg/l	6000	0.84	380.6	↑	0.00	50.3	0.8	41	9	0	0		144.0	11/11/20	0.00	< Up n	-28.6	↓	0.00	2473.2	41.2	41	0	0	0		4500.0	03/14/12	0.00	> Up n	20.0	↑	0.00	1555.4	25.9	41	0	0	0		1990.0	11/05/18	0.00	> Up n
Sodium, dissolved	mg/l	--	0.66	-4.8	↔	0.07	8.8	NA	41	0	0	0		9.7	02/19/19	0.00	< Up n	-49.1	↓	0.00	105.1	NA	41	0	0	0		143.0	09/18/13	0.00	> Up n	9.5	↔	0.00	58.1	NA	41	0	0	0		81.2	08/21/19	0.00	> Up n
Barium, dissolved	µg/l	2000	0.31	-20.7	↓	0.00	249.6	12.5	41	0	0	0		297.0	08/26/20	0.00	> Up n	13.5	↑	0.15	12.8	0.6	41	0	0	0		18.6	11/05/20	0.00	< Up n	-17.4	↓	0.00	21.4	1.1	41	0	0	0		24.6	03/11/13	0.00	< Up n
Selenium, dissolved	µg/l	50	0.25	146.7	↑	0.00	12.2	24.4	41	0	0	0		20.9	01/26/22	0.00	> Up p	150.4	↑	0.00	13.6	27.2	41	3	0	1	11/07/18	55.6	11/07/18	0.00	> Up n	NC		NC	0.5	1.1	41	39	0	0		5.0	11/11/19	0.00	< Up n
Nitrate, as N	mg/l	10	0.09	-13.8	↓	0.00	4.3	43.3	41	0	0	0		8.8	06/05/17	0.00	> Up n	-53.1	↓	0.02	0.9	8.6	41	13	0	0		2.2	12/11/13	0.03	< Up n	NC		NC	0.1	1.2	41	37	0	0		3.0	09/18/13	0.00	< Up n

Brunner Island - Basin 5 - Statistics Summary

1st Quarter 2022

Down — MW-8-10A

PARAMETER	UNITS	STD.	UPGRADIENT VS DOWNGRADIENT	Trend (%)		p	x̄	x̄ (%)	n	ND	J	>		Max		p (comparison	
Iron, dissolved	mg/l	0.3	83.63	NC		NC	0.0	5.7	41	33	0	0		0.1	06/05/14	0.02	> Up n
Arsenic, dissolved	µg/l	10	56.31	NC		NC	0.5	5.3	41	41	0	0		2.0	06/13/12	0.00	< Up n
Manganese, dissolved	µg/l	300	23.73	-89.4	↓	0.00	587.5	195.8	41	3	0	15	11/06/18	1950.0	12/07/16	0.00	> Up n
Molybdenum, dissolved	µg/l	40	17.08	-65.7	↓	0.00	36.6	91.6	41	0	0	14	02/13/18	78.7	12/07/16	0.00	> Up n
Aluminum, dissolved	µg/l	200	10.18	NC		NC	61.6	30.8	41	40	0	1	06/13/12	253.0	06/13/12	0.08	n
Nickel, dissolved	µg/l	100	5.91	NC		NC	1.0	1.0	41	36	0	0		9.2	11/11/19	0.00	< Up n
Potassium, dissolved	mg/l	--	5.14	-13.2	↓	0.00	2.3	NA	41	0	0	0		2.7	02/13/18	0.48	n
Cadmium, dissolved	µg/l	5	4.65	NC		NC	0.2	3.7	41	41	0	0		1.0	10/16/21	NC	
Zinc, dissolved	µg/l	2000	4.07	-35.4	↓	0.03	6.2	0.3	41	18	0	0		29.1	11/11/19	0.00	< Up n
Fluoride, total as F	mg/l	2	2.91	65.6	↑	0.00	0.1	7.1	41	19	0	0		0.2	01/25/22	0.00	> Up n
Strontium, dissolved	µg/l	4000	2.83	-31.2	↓	0.00	296.6	7.4	41	0	0	0		417.0	12/07/16	0.01	> Up n
Beryllium, dissolved	µg/l	4	2.33	NC		NC	0.1	3.4	41	41	0	0		0.2	12/11/13	NC	
Lithium, dissolved	µg/l	83	2.10	-35.9	↓	0.00	13.7	16.5	41	1	0	0		19.3	12/07/16	0.39	n
Chemical Oxygen Demand	mg/l	--	2.10	NC		NC	6.2	NA	41	41	0	0		20.0	07/23/21	0.16	n
Chloride, total as Cl	mg/l	250	1.96	133.5	↑	0.00	30.8	12.3	41	0	0	0		53.6	02/13/18	0.00	> Up n
Copper, dissolved	µg/l	1000	1.42	NC		NC	2.6	0.3	41	38	0	0		20.0	09/11/13	0.00	> Up n
Vanadium, dissolved	µg/l	2.9	1.40	NC		NC	1.8	63.0	41	41	0	2	09/11/13	10.0	09/11/13	0.00	> Up n
Ammonia, as N	mg/l	--	1.33	NC		NC	0.1	NA	41	29	0	0		0.4	02/02/20	0.00	< Up n
Silver, dissolved	µg/l	100	1.29	NC		NC	1.9	1.9	41	41	0	0		10.0	12/11/13	NC	
Magnesium, dissolved	mg/l	--	1.26	-20.8	↓	0.01	37.7	NA	41	0	0	0		44.1	09/16/15	0.00	> Up n
Specific Conductance, field	umhos/cm	--	1.11	-7.4	↔	0.11	969.4	NA	41	0	0	0		1132.0	02/13/18	0.50	n
Total Dissolved Solids	mg/l	500	1.05	-15.4	↓	0.08	730.1	146.0	41	0	0	41	01/25/22	949.0	09/19/17	0.50	n
Titanium, dissolved	µg/l	--	1.03	NC		NC	1.8	NA	39	39	0	0		5.0	01/25/22	0.25	n
Total Organic Carbon	mg/l	--	1.02	0.0	↔	0.42	0.6	NA	41	12	0	0		1.4	11/11/19	0.02	< Up n
Chromium, dissolved	µg/l	100	1.02	NC		NC	1.1	1.1	41	41	0	0		2.0	12/11/13	NC	
Calcium, dissolved	mg/l	--	1.01	-11.7	↓	0.02	144.0	NA	41	0	0	0		163.0	03/09/15	0.47	n
Sulfate, as SO4	mg/l	250	1.00	-33.0	↓	0.00	344.3	137.7	41	0	0	39	01/25/22	421.0	05/12/15	0.50	n
Antimony, dissolved	µg/l	6	1.00	NC		NC	NC	NC	0	0	0	0		NC		NC	
Lead, dissolved	µg/l	5	0.99	NC		NC	0.4	7.4	41	41	0	0		1.0	02/02/20	NC	
pH, field	s.u.	6.5-8.5	0.99	-1.5	↔	0.18	6.5	98.7	41	0	0	21	01/25/22	7.1	02/02/20	0.00	< Up n
Mercury, dissolved	µg/l	2	0.94	NC		NC	0.2	10.6	41	41	0	0		0.7	01/25/22	0.00	< Up n
Boron, dissolved	µg/l	6000	0.84	-38.1	↓	0.00	426.8	7.1	41	0	0	0		530.0	12/09/14	0.50	n
Sodium, dissolved	mg/l	--	0.66	23.8	↑	0.00	11.9	NA	41	0	0	0		14.3	01/25/22	0.48	n
Barium, dissolved	µg/l	2000	0.31	-56.5	↓	0.00	28.8	1.4	41	0	0	0		45.3	12/09/14	0.02	< Up n
Selenium, dissolved	µg/l	50	0.25	NC		NC	0.5	0.9	41	41	0	0		5.0	10/16/21	0.00	< Up n
Nitrate, as N	mg/l	10	0.09	NC		NC	0.1	0.7	41	39	0	0		1.3	08/15/18	0.00	< Up n

Down — MW-8-10B

PARAMETER	Trend (%)		p	x̄	x̄ (%)	n	ND	J	>		Max		p (comparison	
Iron, dissolved	NC		NC	0.0	4.4	41	37	0	0		0.1	06/05/14	0.00	< Up n
Arsenic, dissolved	-32.5	↓	0.00	1.5	15.4	41	12	0	0		2.1	03/13/12	0.00	> Up n
Manganese, dissolved	NC		NC	5.0	1.7	41	26	0	0		20.0	08/24/20	0.00	< Up n
Molybdenum, dissolved	-22.4	↓	0.00	35.8	89.5	41	0	0	8	08/11/19	43.5	03/13/13	0.00	> Up n
Aluminum, dissolved	NC		NC	55.7	27.9	41	40	0	0		184.0	06/13/12	0.08	n
Nickel, dissolved	NC		NC	0.8	0.8	41	37	0	0		8.2	11/11/19	0.00	< Up n
Potassium, dissolved	-9.4	↔	0.13	2.4	NA	41	0	0	0		3.9	06/13/12	0.41	n
Cadmium, dissolved	NC		NC	0.1	2.6	41	41	0	0		1.0	08/24/20	NC	
Zinc, dissolved	NC		NC	3.3	0.2	41	36	0	0		31.0	11/11/19	0.00	< Up n
Fluoride, total as F	232.1	↑	0.00	0.1	5.4	41	16	0	0		0.2	01/25/22	0.00	< Up n
Strontium, dissolved	23.5	↑	0.01	247.5	6.2	41	0	0	0		362.0	05/19/20	0.28	n
Beryllium, dissolved	NC		NC	0.1	3.6	41	41	0	0		0.5	09/14/16	NC	
Lithium, dissolved	-14.5	↓	0.15	15.8	19.0	41	1	0	0		31.6	06/05/14	0.36	n
Chemical Oxygen Demand	NC		NC	6.5	NA	41	41	0	0		20.0	07/23/21	0.16	n
Chloride, total as Cl	3798.6	↑	0.00	38.9	15.6	41	0	0	0		84.3	01/25/22	0.00	> Up n
Copper, dissolved	NC		NC	2.1	0.2	41	38	0	0		20.0	09/11/13	0.00	> Up n
Vanadium, dissolved	NC		NC	4.7	162.8	41	32	0	30	01/25/22	10.0	09/11/13	0.21	n
Ammonia, as N	NC		NC	0.0	NA	41	41	0	0		0.2	11/05/20	0.00	< Up n
Silver, dissolved	NC		NC	1.5	1.5	41	41	0	0		10.0	12/11/13	NC	
Magnesium, dissolved	21.7	↑	0.00	20.7	NA	41	0	0	0		24.3	01/25/22	0.46	n
Specific Conductance, field	29.0	↑	0.00	726.9	NA	41	0	0	0		824.0	01/25/22	0.49	n
Total Dissolved Solids	13.6	↑	0.00	496.0	99.2	41	0	0	16	01/25/22	555.0	07/23/21	0.49	n
Titanium, dissolved	NC		NC	1.9	NA	39	39	0	0		5.0	01/25/22	0.25	n
Total Organic Carbon	NC		NC	0.5	NA	41	33	0	0		0.9	06/13/12	0.00	< Up n
Chromium, dissolved	NC		NC	1.1	1.1	41	41	0	0		2.0	12/11/13	NC	
Calcium, dissolved	13.0	↑	0.00	110.9	NA	41	0	0	0		139.0	08/11/19	0.43	n
Sulfate, as SO4	-20.8	↓	0.00	197.2	78.9	41	0	0	0		236.0	03/13/12	0.47	n
Antimony, dissolved	NC		NC	NC	NC	0	0	0	0		NC		NC	
Lead, dissolved	NC		NC	0.4	7.2	41	41	0	0		1.0	05/19/20	NC	
pH, field	-5.5	↔	0.00	7.4	6.5	41	0	0	0		7.8	06/03/13	0.00	> Up n
Mercury, dissolved	NC		NC	0.2	10.6	41	40	0	0		0.7	01/25/22	0.00	< Up n
Boron, dissolved	-14.9	↓	0.00	280.3	4.7	41	0	0	0		327.0	06/05/14	0.48	n
Sodium, dissolved	4.9	↔	0.07	6.9	NA	41	0	0	0		8.2	02/13/19	0.00	< Up n
Barium, dissolved	-0.8	↔	0.45	42.2	2.1	41	0	0	0		52.3	03/13/12	0.49	n
Selenium, dissolved	NC		NC	0.6	1.2	41	41	0	0		5.0	10/16/21	0.00	< Up n
Nitrate, as N	NC		NC	0.0	0.3	41	40	0	0		0.9	03/13/12	0.00	< Up n

Down — MW-8-10C

PARAMETER	Trend (%)		p	x̄	x̄ (%)	n	ND	J	>		Max		p (comparison	
Iron, dissolved	88.6	↑	0.32	0.2	74.9	11	2	0	4	05/09/18	0.4	06/07/17	0.00	> Up n
Arsenic, dissolved	-57.8	↓	0.07	1.2	11.6	11	5	0	0		2.0	06/03/13	0.01	> Up n
Manganese, dissolved	17.6	↑	0.11	284.1	94.7	11	2	0	8	04/24/21	658.0	06/08/16	0.00	> Up n
Molybdenum, dissolved	-5.7	↔	0.32	59.9	149.7	11	0	0	11	04/24/21	67.0	04/24/21	0.00	> Up n
Aluminum, dissolved	NC		NC	41.5	20.8	11	11	0	0		100.0	04/24/21	NC	
Nickel, dissolved	NC		NC	1.4	1.4	11	11	0	0		4.0	06/03/13	0.00	< Up n
Potassium, dissolved	-38.6	↓	0.04	3.2	NA	11	0	0	0		6.8	05/12/15	0.15	n
Cadmium, dissolved	NC		NC	0.1	2.4	11	11	0	0		0.2	05/08/19	NC	
Zinc, dissolved	NC		NC	4.0	0.2	11	11	0	0		5.0	05/08/19	0.00	< Up n
Fluoride, total as F	0.0	↔	0.50	0.1	6.6	11	1	0	0		0.2	04/24/21	0.19	n
Strontium, dissolved	23.3	↑	0.00	207.1	5.2	11	0	0	0		240.0	04/24/21	0.50	n
Beryllium, dissolved	NC		NC	0.2	4.3	11	11	0	0		0.5	05/08/19	NC	
Lithium, dissolved	-41.6	↓	0.08	15.1	18.2	11	1	0	0		35.5	05/12/15	0.36	n
Chemical Oxygen Demand	NC		NC	8.2	NA	11	11	0	0		20.0	04/24/21	0.30	n
Chloride, total as Cl	109.9	↑	0.00	10.4	4.2	11	0	0	0		14.3	04/24/21	0.03	< Up n
Copper, dissolved	NC		NC	1.6	0.2	11	10	0	0		14.2	06/09/14	0.02	> Up n
Vanadium, dissolved	NC		NC	1.3	44.5	11	11	0	0		2.3	04/24/21	0.01	< Up n
Ammonia, as N	NC		NC	0.0	NA	11	11	0	0		0.1	04/24/21	0.00	< Up n
Silver, dissolved	NC		NC	1.3	1.3	11	11	0	0		10.0	06/03/13	NC	
Magnesium, dissolved	23.8	↑	0.01	17.3	NA	11	0	0	0		20.7	04/24/21	0.50	n
Specific Conductance, field	15.0	↑	0.00	504.0	NA	11	0	0	0		553.0	04/24/21	0.49	n
Total Dissolved Solids	12.5	↑	0.00	339.4	67.9	11	0	0	0		361.0	05/19/20	0.49	n
Titanium, dissolved	NC		NC	1.1	NA	10	10	0	0		1.5	04/24/21	0.36	n
Total Organic Carbon	NC		NC	0.6	NA	11	7	0	0		0.8	06/13/12	0.01	< Up n
Chromium, dissolved	NC		NC	1.4	1.4	11	11	0	0		5.0	05/12/15	NC	
Calcium, dissolved	18.4	↑	0.01	60.9	NA	11	0	0	0		69.1	04/24/21	0.50	n
Sulfate, as SO4	-2.1	↔	0.24	119.5	47.8	11	0	0	0		125.0	06/08/16	0.48	n
Antimony, dissolved	NC		NC	NC	NC	0	0	0	0		NC		NC	
Lead, dissolved	NC		NC	0.3	5.7	11	11	0	0		1.0	06/03/13	NC	
pH, field	-9.5	↔	0.00	7.3	17.6	11	0	0	0		7.7	06/13/12	0.00	> Up n
Mercury, dissolved	NC		NC	0.2	7.6	11	11	0	0		0.7	04/24/21	0.00	< Up n
Boron, dissolved	9.8	↔	0.08	480.8	8.0	11	0	0	0		573.0	06/09/14	0.50	n
Sodium, dissolved	-11.4	↓	0.18	16.2	NA	11	0	0	0		21.2	05/12/15	0.50	n
Barium, dissolved	23.5	↑	0.06	71.7	3.6	11	0	0	0		83.8	04/24/21	0.50	n
Selenium, dissolved	NC		NC	0.3	0.7	11	11	0	0		0.8	06/03/13	0.00	< Up n
Nitrate, as N	NC		NC	0.1	0.6	11	11	0	0		0.1	06/09/14	0.00	< Up n

PARAMETER	UNITS	STD.	UPGRADIENT VS DOWNGRADIENT	Down	MW-8-12C																		Down	MW-8-1N																Down	MW-8-2															
				Trend (%)		p	x̄	x̄ (%)	n	ND	J	>		Max		p (comparison		Trend (%)		p	x̄	x̄ (%)	n	ND	J	>		Max		p (comparison		Trend (%)		p	x̄	x̄ (%)	n	ND	J	>		Max		p (comparison	
Iron, dissolved	mg/l	0.3	83.63	-45.6	↓	0.01	0.9	289.8	11	0	0	10	04/24/21	1.2	06/10/14	0.00	> Up n	-65.3	↓	0.02	0.8	273.8	35	0	0	24	04/24/21	5.4	09/15/16	0.00	> Up n	NC		NC	0.0	1.3	41	39	0	0		0.1	01/25/21	0.00	< Up n
Arsenic, dissolved	µg/l	10	56.31	99.6	↑	0.11	0.8	8.0	11	5	0	0		2.0	06/10/14	0.18	n	NC		NC	0.5	5.0	35	35	0	0		0.6	01/22/22	0.00	< Up n	NC		NC	0.1	1.2	41	40	0	0		1.0	08/24/20	0.00	< Up n
Manganese, dissolved	µg/l	300	23.73	-6.2	↔	0.29	1411.5	470.5	11	0	0	10	04/24/21	1730.0	04/24/21	0.00	> Up n	-42.6	↓	0.00	1780.6	593.5	35	0	0	35	01/22/22	3210.0	09/15/16	0.00	> Up n	4.0	↔	0.32	348.9	116.3	41	0	0	31	10/14/21	453.0	10/14/21	0.00	> Up n
Molybdenum, dissolved	µg/l	40	17.08	33.8	↑	0.20	343.2	858.0	11	0	0	11	04/24/21	520.0	04/24/21	0.00	> Up n	NC		NC	1.6	4.0	35	31	0	0		5.0	11/08/18	0.00	< Up n	-18.6	↓	0.00	292.0	730.1	41	0	0	41	01/24/22	346.0	09/10/12	0.00	> Up n
Aluminum, dissolved	µg/l	200	10.18	NC		NC	56.1	28.0	11	11	0	0		100.0	04/24/21	NC		NC		NC	64.2	32.1	35	35	0	0		100.0	01/22/22	NC		NC		NC	45.9	22.9	41	41	0	0		100.0	01/24/22	NC	
Nickel, dissolved	µg/l	100	5.91	NC		NC	3.8	3.8	11	9	0	0		5.0	05/09/18	0.10	n	NC		NC	1.8	1.8	35	30	0	0		15.8	11/03/19	0.00	> Up n	NC		NC	1.9	1.9	41	31	0	0		7.4	11/04/19	0.26	n
Potassium, dissolved	mg/l	--	5.14	-67.4	↓	0.02	8.4	NA	11	0	0	0		12.4	05/11/15	0.00	> Up n	-5.3	↔	0.23	7.5	NA	35	0	0	0		12.1	09/15/16	0.00	> Up n	9.8	↔	0.07	5.0	NA	41	0	0	0		5.9	09/11/17	0.00	> Up n
Cadmium, dissolved	µg/l	5	4.65	NC		NC	0.3	7.0	11	8	0	0		1.0	04/24/21	0.00	> Up n	NC		NC	0.2	3.6	35	35	0	0		0.2	05/12/19	NC		NC		NC	0.4	8.6	41	28	0	0		1.1	08/24/20	0.00	> Up n
Zinc, dissolved	µg/l	2000	4.07	NC		NC	2.1	0.1	11	10	0	0		12.8	06/10/14	0.05	< Up n	NC		NC	5.0	0.2	35	33	0	0		20.0	09/30/13	0.00	< Up n	NC		NC	4.4	0.2	41	32	0	0		60.3	06/21/12	0.00	< Up n
Fluoride, total as F	mg/l	2	2.91	-21.3	↓	0.27	0.2	7.7	11	0	0	0		0.3	05/20/20	0.39	n	0.0	↔	0.31	0.2	11.1	35	12	0	0		0.4	12/05/13	0.00	> Up n	-5.6	↔	0.12	1.0	48.9	41	0	0	0		1.1	09/08/14	0.00	> Up n
Strontium, dissolved	µg/l	4000	2.83	-1.5	↔	0.44	309.5	7.7	11	0	0	0		424.0	05/08/19	0.30	n	10.3	↑	0.16	1050.6	26.3	35	0	0	0		1320.0	09/15/16	0.00	> Up n	8.3	↔	0.03	447.2	11.2	41	0	0	0		539.0	04/26/21	0.00	> Up n
Beryllium, dissolved	µg/l	4	2.33	NC		NC	0.2	4.3	11	11	0	0		0.5	06/10/14	NC		NC		NC	0.1	3.1	35	35	0	0		0.2	12/05/13	NC		NC		NC	0.1	3.4	41	41	0	0		0.2	12/02/13	NC	
Lithium, dissolved	µg/l	83	2.10	-55.0	↓	0.08	17.6	21.2	11	0	0	0		28.7	06/08/16	0.46	n	-67.3	↓	0.00	2.1	2.5	35	10	0	0		4.8	09/15/16	0.00	< Up n	-2.3	↔	0.36	21.5	25.9	41	0	0	0		26.8	09/10/12	0.49	n
Chemical Oxygen Demand	mg/l	--	2.10	NC		NC	8.2	NA	11	11	0	0		20.0	04/24/21	0.30	n	NC		NC	7.6	NA	35	35	0	0		20.0	07/22/21	0.18	n	NC		NC	6.7	NA	41	41	0	0		20.0	10/14/21	0.16	n
Chloride, total as Cl	mg/l	250	1.96	-10.6	↓	0.03	9.0	3.6	11	0	0	0		11.4	06/05/13	0.10	n	-96.2	↓	0.00	68.4	27.4	35	0	0	0		209.0	03/06/14	0.00	> Up n	4.0	↔	0.19	27.8	11.1	41	0	0	0		31.9	11/04/19	0.00	> Up n
Copper, dissolved	µg/l	1000	1.42	NC		NC	1.4	0.1	11	11	0	0		4.0	06/05/13	0.00	< Up n	NC		NC	1.4	0.1	35	31	0	0		5.0	05/12/19	0.00	> Up n	NC		NC	1.9	0.2	41	37	0	0		5.0	02/11/19	0.00	> Up n
Vanadium, dissolved	µg/l	2.9	1.40	NC		NC	1.3	44.5	11	11	0	0		2.3	04/24/21	0.01	< Up n	NC		NC	1.3	44.7	35	35	0	0		2.3	01/22/22	0.00	< Up n	NC		NC	2.2	76.9	41	40	0	4	11/26/12	10.0	11/26/12	0.00	> Up n
Ammonia, as N	mg/l	--	1.33	NC		NC	0.1	NA	11	6	0	0		0.2	05/20/20	0.02	> Up n	-62.3	↓	0.00	0.3	NA	35	9	0	0		1.1	02/02/20	0.00	> Up n	-20.0	↓	0.10	0.1	NA	41	15	0	0		0.3	02/03/20	0.08	n
Silver, dissolved	µg/l	100	1.29	NC		NC	1.4	1.4	11	10	0	0		10.0	06/05/13	0.00	> Up n	NC		NC	0.5	0.5	35	35	0	0		10.0	09/30/13	NC		NC		NC	1.5	1.5	41	41	0	0		10.0	12/02/13	NC	
Magnesium, dissolved	mg/l	--	1.26	-1.9	↔	0.41	17.9	NA	11	0	0	0		20.0	04/24/21	0.49	n	-28.2	↓	0.02	34.7	NA	35	0	0	0		48.4	05/13/15	0.01	> Up n	2.9	↔	0.28	13.7	NA	41	0	0	0		16.2	10/14/21	0.47	n
Specific Conductance, field	umhos/cm	--	1.11	-1.2	↔	0.44	621.1	NA	11	0	0	0		651.0	04/24/21	0.50	n	-40.5	↓	0.00	1352.9	NA	35	0	0	0		1886.0	05/13/15	0.00	> Up n	-1.4	↔	0.24	574.1	NA	41	0	0	0		630.0	10/14/21	0.48	n
Total Dissolved Solids	mg/l	500	1.05	-3.3	↔	0.24	423.9	84.8	11	0	0	0		452.0	05/20/20	0.50	n	-46.9	↓	0.00	999.3	199.9	35	0	0	35	01/22/22	1520.0	09/15/16	0.01	> Up n	-2.0	↔	0.16	367.1	73.4	41	0	0	0		396.0	08/13/18	0.47	n
Titanium, dissolved	µg/l	--	1.03	NC		NC	1.1	NA	10	10	0	0		1.5	04/24/21	0.36	n	NC		NC	1.5	NA	33	33	0	0		5.0	08/25/20	0.26	n	NC		NC	1.4	NA	39	39	0	0		5.0	08/24/20	0.25	n
Total Organic Carbon	mg/l	--	1.02	-13.5	↓	0.29	1.3	NA	11	1	0	0		2.1	06/18/12	0.00	> Up n	8.1	↔	0.16	1.1	NA	35	0	0	0		1.9	11/03/19	0.00	> Up n	8.1	↔	0.05	0.8	NA	41	5	0	0		1.2	06/21/12	0.23	n
Chromium, dissolved	µg/l	100	1.02	NC		NC	1.1	1.1	11	11	0	0		2.0	06/05/13	NC		NC		NC	0.9	0.9	35	35	0	0		2.0	12/05/13	NC		NC		NC	1.1	1.1	41	41	0	0		2.0	12/02/13	NC	
Calcium, dissolved	mg/l	--	1.01	-4.4	↔	0.22	91.6	NA	11	0	0	0		109.0	04/24/21	0.50	n	-35.5	↓	0.00	204.1	NA	35	0	0	0		299.0	09/15/16	0.01	> Up n	-5.8	↔	0.06	79.9	NA	41	0	0	0		93.7	04/26/21	0.49	n
Sulfate, as SO4	mg/l	250	1.00	-13.9	↓	0.01	137.1	54.8	11	0	0	0		153.0	06/18/12	0.50	n	-49.9	↓	0.00	448.5	179.4	35	0	0	34	01/22/22	702.0	09/15/16	0.02	> Up n	-21.2	↓	0.00	134.2	53.7	41	0	0	0		155.0	09/18/13	0.47	n
Antimony, dissolved	µg/l	6	1.00	NC		NC	NC	NC	0	0	0	0		NC		NC		NC		NC	NC	NC	0	0	0	0		NC		NC		NC		NC	NC	NC	0	0	0	0		NC		NC	
Lead, dissolved	µg/l	5	0.99	NC		NC	0.3	5.7	11	11	0	0		1.0	06/05/13	NC		NC		NC	0.2	4.8	35	35	0	0		1.0	12/05/13	NC		NC		NC	0.4	7.2	41	41	0	0		1.0	02/03/20	NC	
pH, field	s.u.	6.5-8.5	0.99	-4.5	↔	0.01	7.1	36.9	11	0	0	0		7.4	09/09/14	0.00	> Up n	1.6	↔	0.10	6.6	90.4	35	0	0	8	10/14/21	6.8	11/08/18	0.00	< Up n	-1.1	↔	0.26	6.7	82.7	41	0	0	5	01/24/22	7.0	12/07/15	0.06	n
Mercury, dissolved	µg/l	2	0.94	NC		NC	0.2	8.1	11	10	0	0		0.7	04/24/21	0.00	< Up n	NC		NC	0.3	12.7	35	35	0	0		0.7	01/22/22	0.00	> Up n	NC		NC	0.2	10.9	41	41	0	0		0.7	01/24/22	0.00	< Up n
Boron, dissolved	µg/l	6000	0.84	-8.7	↔	0.06	1159.5	19.3	11	0	0	0		1330.0	06/10/14	0.50	n	47.5	↑	0.01	71.4	1.2	35	11	0	0		100.0	01/22/22	0.00	< Up n	-6.5	↔	0.14	457.7	7.6	41	0	0	0		581.0	09/08/14	0.50	n
Sodium, dissolved	mg/l	--	0.66	-17.3	↓	0.02	10.0	NA	11	0	0	0		10.9	05/11/15	0.19	n	-89.0	↓	0.00	45.4	NA	35	0	0	0		92.4	09/17/15	0.00	> Up n	0.0	↔	0.49	13.7	NA	41	0	0	0		15.9	01/25/21	0.41	n
Barium, dissolved	µg/l	2000	0.31	-8.3	↔	0.18	76.5	3.8	11	0	0	0		137.0	05/08/19	0.50	n	-44.5	↓	0.00	24.2	1.2	35	0	0	0		43.0	03/06/14	0.00	< Up n	-15.4	↓	0.00	29.1	1.5	41	0	0	0		35.1	09/08/14	0.49	n
Selenium, dissolved	µg/l	50	0.25	NC		NC	0.3	0.6	11	11	0	0		0.8	06/05/13	0.00	< Up n	NC		NC	0.5	1.0	35	29	0	0		5.0	08/11/19	0.12	p	NC		NC	0.8	1.6	41	41	0	0		5.0	08/24/20	0.00	< Up n
Nitrate, as N	mg/l	10	0.09	NC		NC	0.1	1.0	11	10	0	0		1.0	06/05/17	0.00	< Up n	NC		NC	0.4	3.8	35	29	0	0		5.4	06/02/14	0.00	< Up n	NC		NC	0.0	0.5	41	39	0	0		1.2	03/03/14	0.00	< Up n

PARAMETER	UNITS	STD.	UPGRADIENT VS DOWNGRADIENT	Down MW-8-3A																Down MW-8-3B														Down MW-8-4													
				Trend (%)		p	x̄	x̄ (%)	n	ND	J	>		Max		p (comparison		Trend (%)		p	x̄	x̄ (%)	n	ND	J	>		Max		p (comparison		Trend (%)		p	x̄	x̄ (%)	n	ND	J	>		Max		p (comparison	
Iron, dissolved	mg/l	0.3	83.63	-14.1	↓	0.24	6.0	1995.1	41	0	0	40	01/24/22	11.0	06/06/17	0.00	> Up n	-16.7	↓	0.22	0.4	130.4	41	3	0	25	01/24/22	0.9	09/19/16	0.00	> Up n	NC		NC	0.0	4.7	41	41	0	0		0.0	11/16/18	0.00	< Up n
Arsenic, dissolved	µg/l	10	56.31	0.1	↔	0.47	10.5	104.5	41	1	0	25	10/14/21	19.6	10/14/21	0.00	> Up n	-23.2	↓	0.06	6.2	62.0	41	0	0	0		9.8	12/03/12	0.00	> Up n	NC		NC	0.8	8.0	41	30	0	0		3.8	09/16/14	0.23	n
Manganese, dissolved	µg/l	300	23.73	13.8	↑	0.19	6464.1	2154.7	41	0	0	41	01/24/22	9120.0	10/14/21	0.00	> Up n	-0.5	↔	0.49	1333.1	444.4	41	0	0	41	01/24/22	1980.0	11/06/20	0.00	> Up n	-58.6	↓	0.00	15460.5	5153.5	41	0	0	41	01/22/22	42600.0	12/06/12	0.00	> Up n
Molybdenum, dissolved	µg/l	40	17.08	-4.2	↔	0.38	65.7	164.1	41	0	0	38	10/14/21	94.6	11/04/19	0.00	> Up n	-16.4	↓	0.00	147.8	369.6	41	0	0	41	01/24/22	200.0	03/19/12	0.00	> Up n	NC		NC	0.6	1.6	41	37	0	0		5.1	07/23/21	0.00	< Up n
Aluminum, dissolved	µg/l	200	10.18	NC		NC	65.0	32.5	41	40	0	1	06/12/12	244.0	06/12/12	0.08	n	NC		NC	56.2	28.1	41	40	0	0		190.0	06/12/12	0.08	n	-84.7	↓	0.00	1599.5	799.8	41	1	0	22	01/22/22	11900.0	12/06/12	0.00	> Up n
Nickel, dissolved	µg/l	100	5.91	NC		NC	2.9	2.9	41	31	0	0		11.7	11/04/19	0.49	n	NC		NC	1.0	1.0	41	37	0	0		9.8	11/04/19	0.00	< Up n	-56.8	↓	0.00	124.0	124.0	41	0	0	20	08/24/20	330.0	12/06/12	0.00	> Up n
Potassium, dissolved	mg/l	--	5.14	14.2	↑	0.00	2.8	NA	41	0	0	0		3.4	11/06/20	0.47	n	1.3	↔	0.33	1.6	NA	41	0	0	0		2.0	11/06/20	0.46	n	-32.5	↓	0.00	2.1	NA	41	0	0	0		4.5	09/18/12	0.43	n
Cadmium, dissolved	µg/l	5	4.65	NC		NC	0.1	2.9	41	41	0	0		1.0	08/24/20	NC		NC		NC	0.4	7.1	41	41	0	0		1.0	01/24/22	NC		-58.8	↓	0.00	2.6	52.0	41	2	0	5	09/22/16	8.2	12/06/12	0.00	> Up n
Zinc, dissolved	µg/l	2000	4.07	NC		NC	6.1	0.3	41	33	0	0		20.0	12/12/13	0.02	< Up n	NC		NC	5.9	0.3	41	35	0	0		20.0	12/12/13	0.00	< Up n	-72.4	↓	0.00	187.1	9.4	41	0	0	0		678.0	12/06/12	0.00	> Up n
Fluoride, total as F	mg/l	2	2.91	-15.7	↓	0.03	0.4	21.6	41	0	0	0		0.7	02/03/20	0.00	> Up n	-14.6	↓	0.01	0.5	25.3	41	1	0	0		0.9	05/13/15	0.00	> Up n	-10.9	↓	0.34	0.4	20.6	41	8	0	0		1.3	12/06/12	0.00	> Up n
Strontium, dissolved	µg/l	4000	2.83	33.7	↑	0.00	747.7	18.7	41	0	0	0		1000.0	01/25/21	0.00	> Up n	11.9	↑	0.00	359.5	9.0	41	0	0	0		434.0	01/24/22	0.00	> Up n	-47.2	↓	0.00	416.6	10.4	41	0	0	0		751.0	12/06/12	0.00	> Up n
Beryllium, dissolved	µg/l	4	2.33	NC		NC	0.1	3.6	41	41	0	0		0.5	08/22/18	NC		NC		NC	0.1	3.4	41	41	0	0		0.2	12/12/13	NC		NC		NC	1.7	42.4	41	23	0	6	09/22/16	8.4	09/18/12	0.00	> Up n
Lithium, dissolved	µg/l	83	2.10	-18.8	↓	0.02	16.3	19.7	41	0	0	0		22.0	10/14/21	0.48	n	-11.9	↓	0.01	26.2	31.5	41	0	0	0		35.8	01/24/22	0.48	n	-49.1	↓	0.00	20.5	24.7	41	1	0	0		56.8	09/18/12	0.42	n
Chemical Oxygen Demand	mg/l	--	2.10	NC		NC	9.7	NA	41	40	0	0		20.0	01/24/22	0.00	> Up n	NC		NC	5.8	NA	41	41	0	0		20.0	01/25/21	0.16	n	NC		NC	2.9	NA	41	39	0	0		21.2	07/23/21	0.25	n
Chloride, total as Cl	mg/l	250	1.96	1273.5	↑	0.00	23.3	9.3	41	1	0	0		140.0	01/24/22	0.00	> Up n	435.8	↑	0.00	13.8	5.5	41	0	0	0		92.4	11/06/20	0.00	> Up n	-42.0	↓	0.00	35.8	14.3	41	0	0	0		82.5	09/24/15	0.00	> Up n
Copper, dissolved	µg/l	1000	1.42	NC		NC	1.6	0.2	41	37	0	0		4.0	12/12/13	0.00	> Up n	NC		NC	0.7	0.1	41	37	0	0		6.1	03/07/17	0.00	< Up n	NC		NC	4.4	0.4	41	22	0	0		20.1	09/18/12	0.01	> Up n
Vanadium, dissolved	µg/l	2.9	1.40	NC		NC	1.4	48.9	41	41	0	0		2.3	01/24/22	0.00	< Up n	NC		NC	1.7	58.9	41	35	0	1	03/19/12	10.0	03/19/12	0.00	> Up n	NC		NC	1.8	62.4	41	41	0	2	06/16/13	10.0	06/16/13	0.00	> Up n
Ammonia, as N	mg/l	--	1.33	-6.2	↔	0.28	0.2	NA	41	5	0	0		0.4	08/24/20	0.00	< Up n	NC		NC	0.0	NA	41	27	0	0		0.3	02/03/20	0.00	< Up n	NC		NC	0.0	NA	41	30	0	0		0.3	05/20/20	0.00	< Up n
Silver, dissolved	µg/l	100	1.29	NC		NC	1.5	1.5	41	41	0	0		10.0	12/12/13	NC		NC		NC	1.8	1.8	41	40	0	0		34.3	09/21/15	0.08	n	NC		NC	1.5	1.5	41	41	0	0		10.0	12/12/13	NC	
Magnesium, dissolved	mg/l	--	1.26	28.6	↑	0.00	29.7	NA	41	0	0	0		39.3	01/24/22	0.40	n	16.7	↑	0.00	23.1	NA	41	0	0	0		30.5	01/24/22	0.48	n	-40.9	↓	0.00	51.7	NA	41	0	0	0		67.4	03/20/13	0.00	> Up n
Specific Conductance, field	umhos/cm	--	1.11	42.3	↑	0.00	922.0	NA	41	0	0	0		1263.0	01/24/22	0.50	n	22.1	↑	0.00	749.1	NA	41	0	0	0		930.0	01/24/22	0.50	n	-35.1	↓	0.00	1182.8	NA	41	0	0	0		1660.0	12/06/12	0.13	n
Total Dissolved Solids	mg/l	500	1.05	36.2	↑	0.00	658.6	131.7	41	0	0	41	01/24/22	794.0	01/24/22	0.50	n	19.1	↑	0.00	498.0	99.6	41	0	0	18	01/24/22	580.0	11/06/20	0.49	n	-36.8	↓	0.00	963.1	192.6	41	0	0	41	01/22/22	1380.0	12/06/12	0.02	> Up n
Titanium, dissolved	µg/l	--	1.03	NC		NC	2.0	NA	39	39	0	0		5.0	01/24/22	0.25	n	NC		NC	1.8	NA	39	39	0	0		5.0	01/24/22	0.25	n	NC		NC	1.2	NA	39	36	0	0		5.6	01/22/22	0.00	> Up n
Total Organic Carbon	mg/l	--	1.02	-11.8	↓	0.13	1.7	NA	41	0	0	0		2.8	06/12/12	0.00	> Up n	1.6	↔	0.41	0.9	NA	41	3	0	0		1.9	09/17/12	0.14	n	-8.8	↔	0.20	0.9	NA	41	4	0	0		1.9	09/18/12	0.43	n
Chromium, dissolved	µg/l	100	1.02	NC		NC	1.1	1.1	41	41	0	0		2.0	12/12/13	NC		NC		NC	1.1	1.1	41	41	0	0		2.0	12/12/13	NC		NC		NC	1.1	1.1	41	41	0	0		2.0	12/12/13	NC	
Calcium, dissolved	mg/l	--	1.01	32.2	↑	0.00	142.4	NA	41	0	0	0		198.0	04/26/21	0.47	n	15.7	↑	0.00	121.8	NA	41	0	0	0		156.0	11/06/20	0.45	n	-36.4	↓	0.00	146.1	NA	41	0	0	0		207.0	12/06/12	0.48	n
Sulfate, as SO4	mg/l	250	1.00	15.0	↑	0.07	247.7	99.1	41	0	0	19	01/24/22	331.0	05/06/19	0.49	n	13.8	↑	0.02	148.7	59.5	41	0	0	1	05/13/15	281.0	05/13/15	0.47	n	-44.2	↓	0.00	561.7	224.7	41	0	0	41	01/22/22	902.0	12/06/12	0.00	> Up n
Antimony, dissolved	µg/l	6	1.00	NC		NC	NC	NC	0	0	0	0		NC		NC		NC		NC	NC	NC	0	0	0	0		NC		NC		NC		NC	NC	NC	0	0	0	0		NC		NC	
Lead, dissolved	µg/l	5	0.99	NC		NC	0.3	6.6	41	41	0	0		1.0	12/12/13	NC		NC		NC	0.3	6.8	41	41	0	0		1.0	11/04/19	NC		NC		NC	0.4	7.2	41	41	0	0		1.0	12/12/13	NC	
pH, field	s.u.	6.5-8.5	0.99	-2.8	↔	0.01	6.4	108.0	41	0	0	27	01/24/22	6.7	08/22/18	0.00	< Up n	-2.2	↔	0.04	6.9	63.8	41	0	0	0		7.2	11/08/18	0.01	> Up n	5.8	↔	0.02	5.3	220.6	41	0	0	41	01/22/22	5.8	02/04/20	0.00	< Up n
Mercury, dissolved	µg/l	2	0.94	NC		NC	0.2	11.1	41	41	0	0		0.7	01/24/22	0.00	< Up n	NC		NC	0.2	10.8	41	41	0	0		0.7	01/24/22	0.00	< Up n	NC		NC	0.2	10.7	41	41	0	0		0.7	01/22/22	0.00	< Up n
Boron, dissolved	µg/l	6000	0.84	-1.8	↔	0.31	410.2	6.8	41	0	0	0		472.0	11/06/20	0.50	n	-3.3	↔	0.14	347.1	5.8	41	0	0	0		406.0	11/06/20	0.48	n	-17.2	↓	0.07	314.6	5.2	41	0	0	0		521.0	09/18/12	0.49	n
Sodium, dissolved	mg/l	--	0.66	57.0	↑	0.00	8.9	NA	41	0	0	0		28.9	01/24/22	0.00	< Up n	11.4	↑	0.00	6.5	NA	41	0	0	0		8.9	01/24/22	0.00	< Up n	-35.6	↓	0.00	23.2	NA	41	0	0	0		45.6	09/24/15	0.49	n
Barium, dissolved	µg/l	2000	0.31	-2.4	↔	0.41	45.6	2.3	41	0	0	0		69.0	11/06/20	0.47	n	24.0	↑	0.01	54.1	2.7	41	0	0	0		76.7	11/06/20	0.50	n	-4.0	↔	0.28	14.2	0.7	41	0	0	0		18.7	01/22/22	0.00	< Up n
Selenium, dissolved	µg/l	50	0.25	NC		NC	0.5	1.1	41	41	0	0		5.0	08/12/19	0.00	< Up n	NC		NC	0.5	1.0	41	41	0	0		5.0	08/12/19	0.00	< Up n	NC		NC	1.0	1.9	41	24	0	0		5.0	02/08/21	0.12	p
Nitrate, as N	mg/l	10	0.09	NC		NC	0.0	0.3	41	39	0	0		0.6	09/21/15	0.00	< Up n	NC		NC	0.1	1.1	41	37	0	0		0.5	04/26/21	0.00	< Up n	NC		NC	0.6	6.2	41	27	0	1	09/16/14	12.2	09/16/14	0.00	< Up n

Brunner Island - Basin 5 - Statistics Summary

1st Quarter 2022

PARAMETER	UNITS	STD.	UPGRADIENT VS DOWNGRADIENT	Down MW-8-5A																Down MW-8-5B															
				Trend (%)		p	x̄	x̄ (%)	n	ND	J	>		Max		p (comparison		Trend (%)		p	x̄	x̄ (%)	n	ND	J	>		Max		p (comparison	
Iron, dissolved	mg/l	0.3	83.63	NC		NC	0.0	5.8	41	35	0	0		0.1	06/04/14	0.00	> Up n	NC		NC	0.0	2.2	41	35	0	0		0.1	01/22/22	0.00	< Up n
Arsenic, dissolved	µg/l	10	56.31	-22.9	↓	0.00	126.1	1261.3	41	0	0	41	01/22/22	163.0	03/14/12	0.00	> Up n	-11.8	↓	0.01	261.5	2614.6	41	0	0	41	01/22/22	372.0	07/23/21	0.00	> Up n
Manganese, dissolved	µg/l	300	23.73	18.6	↑	0.00	396.7	132.2	41	0	0	41	01/22/22	496.0	01/22/22	0.00	> Up n	-20.2	↓	0.00	428.3	142.8	41	0	0	41	01/22/22	532.0	09/12/13	0.00	> Up n
Molybdenum, dissolved	µg/l	40	17.08	-13.1	↓	0.00	390.9	977.2	41	0	0	41	01/22/22	453.0	08/25/20	0.00	> Up n	-10.5	↓	0.03	348.6	871.5	41	0	0	41	01/22/22	412.0	08/25/20	0.00	> Up n
Aluminum, dissolved	µg/l	200	10.18	NC		NC	63.3	31.7	41	40	0	1	06/11/12	255.0	06/11/12	0.08	n	NC		NC	68.3	34.2	41	40	0	1	06/12/12	235.0	06/12/12	0.08	n
Nickel, dissolved	µg/l	100	5.91	NC		NC	1.6	1.6	41	36	0	0		14.7	08/25/20	0.00	> Up n	NC		NC	1.3	1.3	41	37	0	0		13.8	08/25/20	0.00	< Up n
Potassium, dissolved	mg/l	--	5.14	11.8	↑	0.00	4.0	NA	41	0	0	0		4.5	11/05/20	0.00	> Up n	14.4	↑	0.00	3.8	NA	41	0	0	0		4.6	11/05/20	0.00	> Up n
Cadmium, dissolved	µg/l	5	4.65	NC		NC	0.4	8.0	41	30	0	0		1.0	01/22/22	0.00	> Up n	NC		NC	0.4	7.9	41	34	0	0		1.0	01/22/22	0.12	n
Zinc, dissolved	µg/l	2000	4.07	NC		NC	5.8	0.3	41	36	0	0		20.0	09/12/13	0.00	< Up n	NC		NC	5.8	0.3	41	38	0	0		20.0	09/12/13	0.00	< Up n
Fluoride, total as F	mg/l	2	2.91	-12.9	↓	0.01	0.9	46.8	41	0	0	0		1.1	11/28/12	0.00	> Up n	-20.3	↓	0.00	0.7	36.7	41	0	0	0		0.9	06/12/12	0.00	> Up n
Strontium, dissolved	µg/l	4000	2.83	24.9	↑	0.00	699.8	17.5	41	0	0	0		797.0	01/22/22	0.00	> Up n	14.6	↑	0.00	831.2	20.8	41	0	0	0		991.0	11/05/20	0.00	> Up n
Beryllium, dissolved	µg/l	4	2.33	NC		NC	0.1	3.6	41	41	0	0		0.5	09/15/14	NC		NC		NC	0.1	3.4	41	41	0	0		0.2	12/02/13	NC	
Lithium, dissolved	µg/l	83	2.10	1.8	↔	0.33	190.7	229.8	41	0	0	41	01/22/22	260.0	01/22/22	0.00	> Up n	-0.4	↔	0.46	152.1	183.3	41	0	0	41	01/22/22	217.0	10/15/21	0.00	> Up n
Chemical Oxygen Demand	mg/l	--	2.10	NC		NC	4.5	NA	41	41	0	0		20.0	10/15/21	0.16	n	NC		NC	4.7	NA	41	41	0	0		20.0	07/23/21	0.16	n
Chloride, total as Cl	mg/l	250	1.96	287.5	↑	0.00	20.1	8.0	41	0	0	0		33.0	02/13/19	0.00	> Up n	144.2	↑	0.00	14.9	5.9	41	0	0	0		24.0	08/15/18	0.05	> Up n
Copper, dissolved	µg/l	1000	1.42	NC		NC	1.4	0.1	41	33	0	0		10.4	03/07/17	0.01	> Up n	NC		NC	2.2	0.2	41	37	0	0		5.0	05/07/19	0.00	> Up n
Vanadium, dissolved	µg/l	2.9	1.40	NC		NC	4.0	138.6	41	32	0	19	02/13/19	10.0	03/13/13	0.07	n	NC		NC	1.8	63.5	41	38	0	2	03/13/13	10.0	03/13/13	0.00	> Up n
Ammonia, as N	mg/l	--	1.33	-11.1	↓	0.11	0.4	NA	41	0	0	0		0.6	11/06/19	0.00	> Up n	-22.4	↓	0.00	0.3	NA	41	1	0	0		1.2	08/25/20	0.00	> Up n
Silver, dissolved	µg/l	100	1.29	NC		NC	1.5	1.5	41	41	0	0		10.0	12/02/13	NC		NC		NC	1.5	1.5	41	41	0	0		10.0	12/02/13	NC	
Magnesium, dissolved	mg/l	--	1.26	11.4	↑	0.00	37.0	NA	41	0	0	0		42.8	01/22/22	0.00	> Up n	9.6	↔	0.00	30.9	NA	41	0	0	0		36.1	11/05/20	0.47	n
Specific Conductance, field	umhos/cm	--	1.11	23.2	↑	0.00	1016.1	NA	41	0	0	0		1143.0	01/22/22	0.49	n	15.9	↑	0.00	932.9	NA	41	0	0	0		1075.0	07/23/21	0.50	n
Total Dissolved Solids	mg/l	500	1.05	20.6	↑	0.00	734.0	146.8	41	0	0	41	01/22/22	828.0	09/12/17	0.49	n	13.9	↑	0.00	664.2	132.8	41	0	0	41	01/22/22	754.0	07/23/21	0.49	n
Titanium, dissolved	µg/l	--	1.03	NC		NC	1.7	NA	39	39	0	0		5.0	01/22/22	0.25	n	NC		NC	1.8	NA	39	39	0	0		5.0	01/22/22	0.25	n
Total Organic Carbon	mg/l	--	1.02	5.8	↔	0.28	0.7	NA	41	7	0	0		1.5	06/11/12	0.13	n	1.5	↔	0.39	0.7	NA	41	7	0	0		1.5	06/12/12	0.08	n
Chromium, dissolved	µg/l	100	1.02	NC		NC	1.1	1.1	41	40	0	0		2.0	12/02/13	0.00	> Up n	NC		NC	1.1	1.1	41	41	0	0		2.0	12/02/13	NC	
Calcium, dissolved	mg/l	--	1.01	19.0	↑	0.00	162.7	NA	41	0	0	0		203.0	04/26/21	0.47	n	14.3	↑	0.00	152.2	NA	41	0	0	0		193.0	07/23/21	0.45	n
Sulfate, as SO4	mg/l	250	1.00	18.7	↑	0.00	293.8	117.5	41	0	0	38	01/22/22	340.0	05/11/15	0.49	n	10.1	↑	0.02	264.9	106.0	41	0	0	28	01/22/22	325.0	07/23/21	0.48	n
Antimony, dissolved	µg/l	6	1.00	NC		NC	NC	NC	0	0	0	0		NC		NC		NC		NC	NC	NC	0	0	0	0		NC		NC	
Lead, dissolved	µg/l	5	0.99	NC		NC	0.3	6.4	41	41	0	0		1.0	12/02/13	NC		NC		NC	0.4	7.6	41	41	0	0		1.0	12/02/13	NC	
pH, field	s.u.	6.5-8.5	0.99	-4.8	↔	0.00	7.0	48.7	41	0	0	1	02/13/19	7.4	12/07/15	0.00	> Up n	-5.0	↔	0.00	7.2	34.2	41	0	0	0		7.6	12/02/13	0.00	> Up n
Mercury, dissolved	µg/l	2	0.94	NC		NC	0.2	11.4	41	41	0	0		0.7	01/22/22	0.00	> Up n	NC		NC	0.2	11.9	41	28	0	0		0.7	01/22/22	0.01	> Up n
Boron, dissolved	µg/l	6000	0.84	-6.0	↔	0.02	862.6	14.4	41	0	0	0		949.0	04/26/21	0.49	n	-13.0	↓	0.00	831.6	13.9	41	0	0	0		943.0	12/04/14	0.49	n
Sodium, dissolved	mg/l	--	0.66	87.5	↑	0.00	9.0	NA	41	0	0	0		13.6	01/22/22	0.00	< Up n	47.9	↑	0.00	8.2	NA	41	0	0	0		10.5	01/22/22	0.00	< Up n
Barium, dissolved	µg/l	2000	0.31	6.3	↔	0.09	43.6	2.2	41	0	0	0		50.0	05/11/15	0.49	n	-0.8	↔	0.40	67.5	3.4	41	0	0	0		80.6	12/04/14	0.49	n
Selenium, dissolved	µg/l	50	0.25	NC		NC	0.4	0.8	41	41	0	0		0.8	12/02/13	0.00	< Up n	NC		NC	0.4	0.8	41	41	0	0		0.8	12/02/13	0.00	< Up n
Nitrate, as N	mg/l	10	0.09	NC		NC	0.0	0.3	41	40	0	0		0.9	06/14/16	0.00	< Up n	NC		NC	0.1	0.8	41	41	0	0		0.2	03/10/15	0.00	< Up n

Notes:

1. Upgradient vs downgradient represents the ratio of average concentration in all downgradient wells to average concentration of all upgradient wells (i.e. how many times greater is the concentration in downgradient v
2. Rows are sorted according to "Upgradient vs. Downgradient" ratio. Parameters with higher downgradient concentrations are on top (orange formatting indicates greater downgradient concentrations; blue formatting ir
3. Sub-headings for each location are as follows:

Trend (%):	Percent increase/decrease in concentration of the Theil-Sen trendline over 10-year period (red arrow = increse; blue arrow = decrease; arrow size is proportional to increase/decrease).
p:	p-value of Theil-Sen trend.
$\bar{x}$:	Mean measured concentration over time frame.
$\bar{x}$ (%):	Proportion of $\bar{x}$ to applicable standard (red formatting indicates $\bar{x}$ is 1000% of the standard; orange formatting indicates $\bar{x}$ is 100% of the standard; gradation of orange and red are proportional
n:	Number of samples over time frame.
ND:	Number of "non-detect" samples over time frame. For concentrations between LOD and LOQ (reported as "< LOQ"), the LOQ is treated as an additional detection limit in the analysis.
J:	Number of samples with estimated concentrations (J-values). Currently concentrations between LOD and LOQ are reported as "< LOQ" instead of estimated values.
>:	Number of exceedances over time frame; date of most recent exceedance.
Max:	Maximum measured concentration over time frame; date of maximum concentration.
p (comparison):	p-value of two-group comparison analysis (comparison to upgradient wells).
	Analysis test results based on either: p = parametric (t-test) or n = nonparametric (Wilcoxon test); determined based on number of detections and Shapiro-Wilk (S-W) normality test results.
	If p-value of normality test for either group is < 0.05 then defaults to nonparametric comparison (Wilcoxon test).
	If p (comparison) < 0.05 then: < Up means data are statistically less than upgradient data; > Up means data are statistically greater than upgradient data.

4. "NC" refers to not calculated (when there is insufficient data to run statistical analysis).