

Brunner Island, LLC
REGULATORY DELIVERABLE
SUBMITTAL COVER SHEET

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RECIPIENT(S):			
NAME:		ORGANIZATION:	
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July 13, 2020

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

**RE: Quarterly Groundwater Report: 2nd Quarter 2020
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,

A handwritten signature in black ink that reads "M. E. Mengel". The signature is written in a cursive, flowing style.

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
Citizens (w/atts.)

Groundwater Monitoring Report – Second Quarter 2020

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. 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. Talen believes that Mandatory Abatement Trigger Levels (MATLs) no longer apply to Basin 5, as a result of the permit expiration, and therefore, Talen 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 Talen'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). Talen 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 second quarter of 2020, Talen samplers collected seven field blanks (all groundwater field blanks) and seven duplicate samples. The duplicate samples were collected from seven groundwater wells (including CL-1A, MW-4-8, MW-8-10C, MW-6-1, MW-7-5, MW-4-2B, and GC-3). These field blanks and duplicates were analyzed by the laboratory along with the routinely collected groundwater samples. For the seven field blanks, five water quality parameters were detected above respective limits of quantification (calcium, copper, iron, molybdenum, and total dissolved solids) for a total of 12 analyses. In Talen's opinion, analysis of the field blanks indicated no significant evidence of sample contamination related to field sampling procedures or sample containers. For the seven duplicates, a total of 425 paired analyses were performed with 13 paired analyses exceeding Talen's acceptable level of less than 20% relative percent difference (RPD) between duplicates. Based on these QA/QC results, Talen 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 1,270 mg/L exceeded the Secondary Drinking Water Standard of 500 mg/L, and exhibits a slightly increasing trend.
- Sulfate concentration of 642 mg/L exceeded the Secondary Drinking Water Standard of 250 mg/L, but exhibits a slightly increasing trend.
- Boron concentrations exhibit a gradual long-term increasing trend since 2004. After being stable from 2012 to 2018 at about 1,500 µg/L (which meets the Act 2 residential Statewide Health Standard of 6,000 µg/L), boron concentrations 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 162 µg/L exceeded the Act 2 residential Statewide Health Standard of 83 µg/L. Lithium concentrations at MW-4-7A have exhibited an increasing trend since 2011, after historically averaging approximately 30 µg/L.
- Manganese (dissolved) concentration of 56 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. Manganese concentrations are seasonally variable 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 remain elevated, except for selenium which has decreased to within the prior historical range.
- Field pH (5.78 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 1,420 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 864 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.
- 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 1,280 µg/L exceeded the Act 2 residential Statewide Health Standard of 83 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 2,400 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 concentrations at MW-4-10 are the most elevated and variable of the Basin 5 wells, with peak concentrations in 2011/2012 of about 2,000 µg/L, 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 792 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 371 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.
 - Last quarter, cadmium (total) was atypically detected (at 2.31 µg/L), but was below the Primary Drinking Water Standard of 5 µg/L. Cadmium (dissolved) was not detected. This quarter, cadmium (total and dissolved) was not detected.
 - 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, and are now comparable to concentrations at several other Basin 5 wells.

- Iron (dissolved) concentration of 0.65 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 1,410 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 344 µg/L exceeded the Secondary Drinking Water Standard of 50 µg/L and 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 263 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 and 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 relatively stable 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/decreasing 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 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 an increasing trend with increased variability. Talen 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. Last quarter, iron (total) at MW-8-3A fluctuated upward beyond the historical range, possibly related to an upward fluctuation of turbidity. This quarter, iron (total) returned to a lower concentration within the historical range.
- 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.
- Last quarter, titanium (total) was atypically detected (at 6.16 µg/L) at MW-8-3A, and titanium (dissolved) was not detected. This quarter, total and dissolved titanium were below the limit of detection.

5. MW-8-4 - Key results for this quarter and trends for MW-8-4 are as follows:

- Field pH (5.50 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 slightly 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. Aluminum concentrations have decreased and become less variable since 2017. Dissolved concentrations have been below the standard since the second quarter of 2018.

- 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. Nickel concentrations fluctuate around the Act 2 standard, but the other parameters meet respective regulatory standards.
 - Boron concentrations exhibit a gradual long-term increasing trend with variability, but concentrations remain low, well below the Act 2 residential Statewide Health Standard of 6,000 µg/L. Peak boron concentrations have not increased since 2012.
 - 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 12,600 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 756 and 687 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 302 mg/L and 279 mg/L, respectively, compared to the Secondary Drinking Water Standard of 250 mg/L. Sulfate concentrations in these two wells appear to be stabilizing/decreasing since 2015.
 - Arsenic (dissolved) concentrations in MW-8-5A and MW-8-5B are elevated (current concentrations of 126 µg/L and 242 µg/L, respectively) in excess of the Primary Drinking Water Standard of 10 µg/L. Arsenic concentrations at MW-8-5B exhibit a fairly stable trend with some variability, while 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 83 µg/L, but demonstrate fairly stable trends at both wells (current concentrations of 236 µg/L and 178 µg/L for MW-8-5A and MW-8-5B, respectively). During the previous two quarters,

lithium (total) atypically fluctuated above the historical range, but this quarter the concentration was consistent with the long-term trend.

- 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 395 and 392 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 398 and 310 µg/L for MW-8-5A and MW-8-5B respectively), but exhibit slightly decreasing long-term concentration trends with some variability.
- 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 (and decreasing slightly).
- 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 elevated above Secondary Drinking Water Standards. Sulfate and total dissolved solids concentrations have been stable/decreasing since 2015, especially decreasing since early 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 often 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 the 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.
- 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 2019 were as follows:

- Iron (dissolved) concentration of 0.79 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 1,580 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. Manganese concentrations fluctuated downward significantly during the second quarter of 2019. However, during the second quarter of 2020, manganese fluctuated upward again, consistent with the historical trend.
- Molybdenum (dissolved) concentration of 339 µg/L exceeded the Act 2 residential Statewide Health Standard of 40 µg/L. Molybdenum concentrations exhibit a decreasing trend (with variability) since 2016, after exhibiting a long-term gradual increasing trend.
- 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. During 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. Talen 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 (5.88 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.
- Total dissolved solids concentration of 880 mg/L exceeded the Secondary Drinking Water Standard of 500 mg/L.
- Sulfate concentration of 546 mg/L exceeded the Secondary Drinking Water Standard of 250 mg/L.
- Aluminum (total) concentration of 349 µg/L exceeded the Secondary Drinking Water Standard of 200 µg/L.
- Lithium (total) concentration of 525 µg/L exceeded the Act 2 residential Statewide Health Standard of 83 µg/L.
- Manganese (total) concentration of 8,950 µg/L exceeded the Secondary Drinking Water Standard of 50 µg/L and Act 2 residential Statewide Health Standard of 300 µg/L.
- Molybdenum (total) concentration of 174 µg/L exceeded the Act 2 residential Statewide Health Standard of 40 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														Pyrite Tomb Monitoring	Upgradient	
			Downgradient																
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-4-7A	MW-19		
Sampling Date			5/19/2020	5/19/2020	5/20/2020	5/20/2020	5/20/2020	5/20/2020	5/20/2020	5/20/2020	5/19/2020	5/19/2020	5/19/2020	5/20/2020	5/19/2020	5/18/2020	5/20/2020		
Field Parameters (monitored quarterly)																			
Well Depth	FT		38.70	26.40	22.40	26.60	46.80	21.80	39.00	59.00	37.30	57.00	78.50	77.60	21.20	39.90	45.40		
Sampling Depth	FT		34.00	20.00	15.00	20.00	40.00	18.00	33.00	52.00	32.00	52.00	72.00	72.00	19.00	35.00	33.00		
Well Purge Volume	L		2.50	4.26	2.07	3.02	1.53	1.84	3.29	0.98	1.46	1.77	3.66	3.51	2.75	1.80	1.75		
Depth to Water	FT		22.17	16.61	6.49	13.61	14.72	15.92	26.50	19.51	20.32	20.06	19.53	11.50	12.12	25.84	18.10		
Water Surface Elevation	FT		270.54	264.03	265.01	253.77	252.99	254.27	258.54	265.37	256.15	256.21	257.00	261.78	259.65	262.17	287.70		
Temperature, field	°C		13.30	13.36	13.90	13.01	13.34	12.58	14.10	14.58	16.17	15.50	14.34	12.75	12.30	16.00	11.11		
pH, field	S.U.	6.5 - 8.5 S	5.78	6.62	6.77	6.34	6.91	5.50	7.00	7.21	6.66	7.52	7.20	7.14	5.88	6.90	7.09		
pH, lab	S.U.	6.5 - 8.5 S	6.24	6.98	7.06	6.61	7.18	5.95	7.37	7.47	7.03	7.69	7.47	7.45	6.06	7.36	6.44		
Specific Conductance, field	umhos/cm		1,808.00	1,077.00	526.00	992.00	739.00	1,013.00	1,055.00	970.00	842.00	772.00	533.00	629.00	1,190.00	1,604.00	226.00		
Specific Conductance, lab	umhos/cm		1,800.00	1,096.00	527.00	998.00	738.00	1,029.00	1,064.00	980.00	864.00	795.00	549.00	638.00	1,198.00	1,567.00	243.00		
Turbidity, field	NTU		2.20	11.40	0.30	117.00	11.60	0.30	0.00	0.10	0.60	0.50	1.60	0.70	1.81	1.47	0.38		
Dissolved Oxygen, field	mg/L		0.70	0.56	0.51	0.61	0.49	0.75	0.64	1.48	2.56	1.12	0.74	0.67	0.35	0.73	3.00		
Redox, field	mV		274.40	-23.90	82.40	-27.50	38.00	253.90	104.70	74.90	131.80	107.00	-134.20	-136.90	392.00	242.80	249.00		
Non-Metals (monitored quarterly)																			
Alkalinity, total as CaCO3	mg/L		58.00	206.00	121.00	191.00	254.00	44.80	263.00	239.00	138.00	113.00	136.00	194.00	63.40	235.00	60.40		
Total Organic Carbon	mg/L		0.66	1.02	0.73	1.91	0.85	0.68	0.61	0.55	< 0.5	< 0.5	< 0.5	1.11	1.11	1.13	< 0.5		
Total Dissolved Solids	mg/L	500 S	1,420.00	792.00	370.00	746.00	503.00	833.00	756.00	687.00	624.00	522.00	361.00	452.00	880.00	1,270.00	155.00		
Chemical Oxygen Demand	mg/L		20.70	< 20	5.3 ND	< 20	5.3 ND	< 20	5.3 ND	5.3 ND	< 20	< 20	< 20	< 20	< 20	< 20	< 20		
Bicarbonate	mg/L		58.00	206.00	121.00	191.00	254.00	44.80	263.00	239.00	138.00	113.00	136.00	194.00	63.40	235.00	60.40		
Chloride, total as Cl	mg/L	250 S	7.72	21.50	25.00	27.40	13.10	21.40	24.30	16.90	30.10	64.30	13.70	8.35	4.68	15.10	9.11		
Fluoride, total as F	mg/L	2 S, 4 M	< 0.2	0.31	1.05	0.53	0.60	0.38	1.06	0.81	< 0.2	< 0.2	0.20	0.25	0.33	0.25	< 0.2		
Ammonia, as N	mg/L		0.87	0.25	0.33	0.37	< 0.2	0.30	0.47	0.40	< 0.2	< 0.2	0.061 ND	< 0.2	< 0.2	0.061 ND	< 0.2		
Nitrate, as N	mg/L	10 M	< 0.5	0.0115 ND	0.0115 ND	0.0115 ND	< 0.5	0.0115 ND	0.0115 ND	0.0115 ND	< 0.5	< 0.5	0.0115 ND	0.0115 ND	< 0.5	< 0.5	3.92		
Sulfate, as SO4	mg/L	250 S	864.00	371.00	104.00	324.00	136.00	471.00	302.00	279.00	262.00	187.00	120.00	131.00	546.00	642.00	49.20		
Metals (monitored quarterly)																			
Aluminum, total	ug/L	200 S	< 100	26.8 ND	26.8 ND	< 100	26.8 ND	283.00	< 100	< 100	< 100	26.8 ND	< 100	< 100	349.00	< 100	26.8 ND		
Aluminum, dissolved	ug/L	200 S	< 100	26.8 ND	26.8 ND	26.8 ND	26.8 ND	147.00	26.8 ND	26.8 ND	26.8 ND	26.8 ND	26.8 ND	26.8 ND		< 100	26.8 ND		
Antimony, total	ug/L	6 M	0.388 ND	0.388 ND	0.388 ND	0.388 ND	0.388 ND	0.388 ND	0.388 ND	0.388 ND	0.388 ND	0.388 ND	0.388 ND	0.388 ND	0.388 ND	0.388 ND	0.388 ND		
Antimony, dissolved	ug/L	6 M	0.388 ND	0.388 ND	0.388 ND	0.388 ND	0.388 ND	0.388 ND	0.388 ND	0.388 ND	0.388 ND	0.388 ND	0.388 ND	0.388 ND		0.388 ND	0.388 ND		
Arsenic, total	µg/L	10 M	0.548 ND	0.548 ND	0.548 ND	20.50	11.60	0.548 ND	132.00	260.00	0.548 ND	1.39	< 1	< 1	0.548 ND	0.548 ND	0.548 ND		
Arsenic, dissolved	µg/L	10 M	0.548 ND	0.548 ND	0.548 ND	5.72	2.61	0.548 ND	126.00	242.00	0.548 ND	1.37	0.548 ND	< 1		0.548 ND	0.548 ND		
Barium, total	µg/L	2,000 M	17.80	21.50	25.80	40.80	56.60	12.70	47.60	62.00	22.70	45.50	67.10	68.20	21.00	21.90	250.00		
Barium, dissolved	µg/L	2,000 M	14.60	20.60	24.90	34.80	44.20	12.90	44.50	65.00	19.00	46.80	69.90	64.20		21.50	237.00		
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	0.19 ND	0.19 ND	< 1	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	< 1	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	2,470.00	48.3 ND	418.00	383.00	361.00	350.00	893.00	829.00	335.00	269.00	488.00	1,230.00	1,020.00	1,720.00	< 100		
Boron, dissolved	µg/L	6,000 A	2,430.00	48.3 ND	381.00	375.00	330.00	326.00	825.00	800.00	299.00	257.00	494.00	1,180.00		1,760.00	< 100		
Cadmium, total	µg/L	5 M	1.17	0.152 ND	< 1	0.152 ND	< 1	1.32	< 1	< 1	0.152 ND	0.152 ND	0.152 ND	< 1	1.22	0.152 ND	0.152 ND		
Cadmium, dissolved	µg/L	5 M	1.06	0.152 ND	< 1	0.152 ND	< 1	1.43	< 1	< 1	0.152 ND	0.152 ND	0.152 ND	< 1		0.152 ND	0.152 ND		
Calcium, total	mg/L		241.00	183.00	80.40	159.00	128.00	133.00	172.00	160.00	124.00	120.00	67.00	94.60	137.00	278.00	27.60		
Calcium, dissolved	mg/L		233.00	170.00	74.20	151.00	121.00	124.00	161.00	155.00	118.00	114.00	67.10	92.80		262.00	26.90		
Chromium, total	µg/L	100 M	0.411 ND	0.411 ND	0.411 ND	0.411 ND	0.411 ND	0.411 ND	0.411 ND	0.411 ND	0.411 ND	0.411 ND	0.411 ND	0.411 ND	< 1	< 1	0.411 ND		
Chromium, dissolved	µg/L	100 M	0.411 ND	0.411 ND	0.411 ND	0.411 ND	0.411 ND	0.411 ND	0.411 ND	0.411 ND	0.411 ND	0.411 ND	0.411 ND	0.411 ND		0.411 ND	0.411 ND		
Copper, total	µg/L	1,000 S, 1,300 M	2.62	0.39 ND	0.39 ND	0.39 ND	0.39 ND	< 1	2.45	< 1	0.39 ND	3.37	0.39 ND	0.39 ND	< 1	2.02	0.39 ND		
Copper, dissolved	µg/L	1,000 S, 1,300 M	1.75	0.39 ND	0.39 ND	0.39 ND	0.39 ND	0.39 ND	1.20	0.39 ND	0.39 ND	0.39 ND	0.39 ND	0.39 ND		2.55	0.39 ND		
Iron, total	mg/L	0.3 S	0.22	1.27	< 0.02	12.60	0.85	< 0.02	< 0.02	< 0.02	< 0.02	0.001 ND	0.28	0.88	0.07	< 0.02	0.001 ND		
Iron, dissolved	mg/L	0.3 S	0.001 ND	0.65	< 0.02	5.09	< 0.02	0.001 ND	0.001 ND	0.001 ND	0.001 ND	0.001 ND	0.28	0.79		0.03	0.001 ND		

Brunner Island, LLC
Basin No. 5 Groundwater Monitoring Results

PARAMETER	UNITS	REGULATORY CRITERIA LIMIT	GROUNDWATER MONITORING WELLS														Pyrite Tomb Monitoring	Upgradient	
			Downgradient																
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					
Sampling Date			5/19/2020	5/19/2020	5/20/2020	5/20/2020	5/20/2020	5/20/2020	5/20/2020	5/20/2020	5/19/2020	5/19/2020	5/19/2020	5/20/2020	5/19/2020	5/18/2020	5/20/2020		
Lead, total	µg/L	5 A, 15 M	0.229 ND	0.229 ND	0.229 ND	0.229 ND	0.229 ND	0.229 ND	< 1	0.229 ND	0.229 ND	0.229 ND	1.62	0.229 ND	0.229 ND	0.229 ND	0.229 ND		
Lead, dissolved	µg/L	5 A, 15 M	0.229 ND	0.229 ND	0.229 ND	0.229 ND	0.229 ND	0.229 ND	0.229 ND	0.229 ND	0.229 ND	< 1	0.229 ND	0.229 ND		0.229 ND	0.229 ND		
Lithium, total	µg/L	83 A	1,090.00	1.20	19.30	14.50	23.30	16.20	168.00	140.00	9.36	20.30	8.23	9.84	525.00	173.00	2.80		
Lithium, dissolved	µg/L	83 A	1,280.00	< 1	18.40	13.30	22.40	19.50	236.00	178.00	9.91	24.30	9.08	10.00		162.00	1.39		
Magnesium, total	mg/L		17.30	32.60	13.60	33.20	24.30	45.00	38.90	31.80	31.90	21.40	18.60	19.90	31.30	41.50	4.21		
Magnesium, dissolved	mg/L		17.10	30.50	12.50	32.20	22.30	42.90	35.90	30.80	29.50	21.60	19.20	18.60		41.30	4.16		
Manganese, total	µg/L	50 S, 300 A	2,430.00	1,500.00	391.00	8,750.00	1,480.00	13,900.00	443.00	424.00	283.00	6.39 ND	342.00	1,680.00	8,950.00	54.00	6.39 ND		
Manganese, dissolved	µg/L	50 S, 300 A	2,400.00	1,410.00	344.00	8,250.00	612.00	12,600.00	395.00	392.00	< 20	6.39 ND	353.00	1,580.00		56.00	6.39 ND		
Mercury, total	µg/L	2 M	0.717 ND	0.717 ND	0.717 ND	0.717 ND	0.717 ND	0.717 ND	0.717 ND	0.717 ND	0.717 ND	0.717 ND	0.717 ND	0.717 ND	0.717 ND	0.717 ND	0.717 ND		
Mercury, dissolved	µg/L	2 M	0.717 ND	0.717 ND	0.717 ND	0.717 ND	0.717 ND	0.717 ND	0.717 ND	0.717 ND	0.717 ND	0.717 ND	0.717 ND	0.717 ND		0.717 ND	0.717 ND		
Molybdenum, total	µg/L	40 A	657.00	< 1	258.00	57.70	150.00	< 1	365.00	327.00	17.50	30.60	58.60	352.00	174.00	13.80	< 1		
Molybdenum, dissolved	µg/L	40 A	653.00	< 1	263.00	48.50	143.00	0.3 ND	398.00	310.00	14.20	31.60	60.20	339.00		14.30	1.40		
Nickel, total	ug/L	100 A	18.70	< 1	1.21	2.78	< 1	92.90	< 1	< 1	< 1	0.284 ND	< 1	1.27	42.40	15.80	0.284 ND		
Nickel, dissolved	ug/L	100 A	19.80	1.03	1.26	2.42	< 1	96.00	< 1	< 1	0.284 ND	0.284 ND	0.284 ND	1.33		15.60	0.284 ND		
Potassium, total	mg/L		122.00	6.64	4.44	3.04	1.64	1.78	4.35	4.09	2.15	2.52	1.95	4.93	36.10	3.93	< 1		
Potassium, dissolved	mg/L		121.00	6.20	4.04	2.95	1.50	1.66	4.09	3.95	1.99	2.51	1.94	5.06		3.98	< 1		
Selenium, total	µg/L	50 M	15.00	0.632 ND	0.632 ND	0.632 ND	0.632 ND	0.632 ND	0.632 ND	0.632 ND	0.632 ND	0.632 ND	0.632 ND	0.632 ND	0.632 ND	0.632 ND	15.80		
Selenium, dissolved	µg/L	50 M	16.30	0.632 ND	0.632 ND	0.632 ND	0.632 ND	0.632 ND	0.632 ND	0.632 ND	0.632 ND	0.632 ND	0.632 ND	0.632 ND		0.632 ND	15.60		
Silver, total	µg/L	100 A	0.132 ND	0.132 ND	0.132 ND	0.132 ND	0.132 ND	0.132 ND	0.132 ND	0.132 ND	0.132 ND	0.132 ND	0.132 ND	0.132 ND	0.132 ND	0.132 ND	0.132 ND		
Silver, dissolved	µg/L	100 A	0.132 ND	0.132 ND	0.132 ND	0.132 ND	0.132 ND	0.132 ND	0.132 ND	0.132 ND	0.132 ND	0.132 ND	0.132 ND	0.132 ND		0.132 ND	0.132 ND		
Sodium, total	mg/L		76.20	21.20	13.20	10.50	6.67	16.60	11.20	9.56	12.50	6.99	14.40	8.96	43.30	71.60	8.04		
Sodium, dissolved	mg/L		75.40	19.50	12.30	10.10	6.26	15.60	10.60	9.33	11.40	7.07	14.60	9.09		59.60	7.72		
Strontium, total	µg/L	4,000 A	2,050.00	1,110.00	476.00	931.00	388.00	342.00	797.00	925.00	230.00	372.00	223.00	289.00	950.00	362.00	52.00		
Strontium, dissolved	µg/L	4,000 A	2,030.00	1,010.00	437.00	908.00	367.00	323.00	741.00	892.00	211.00	362.00	226.00	298.00		329.00	50.00		
Titanium, total	µg/L		1.45 ND	1.45 ND	1.45 ND	1.45 ND	1.45 ND	1.45 ND	1.45 ND	1.45 ND	1.45 ND	1.45 ND	1.45 ND	1.45 ND	1.45 ND	< 5	1.45 ND		
Titanium, dissolved	µg/L		1.45 ND	1.45 ND	1.45 ND	1.45 ND	1.45 ND	1.45 ND	1.45 ND	1.45 ND	1.45 ND	1.45 ND	1.45 ND	1.45 ND		< 5	1.45 ND		
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	2.35	2.35 ND	2.35 ND	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	2.35 ND	2.35 ND	2.35 ND		2.35 ND	2.35 ND		
Zinc, total	µg/L	2,000 A, 5,000 S	34.30	< 5	8.37	< 5	2.24 ND	78.70	< 5	2.24 ND	< 5	2.24 ND	2.24 ND	2.24 ND	52.80	2.24 ND	2.24 ND		
Zinc, dissolved	µg/L	2,000 A, 5,000 S	30.80	2.24 ND	< 5	2.24 ND	2.24 ND	87.80	< 5	2.24 ND	5.28	2.24 ND	2.24 ND	2.24 ND		2.24 ND	2.24 ND		

Notes:

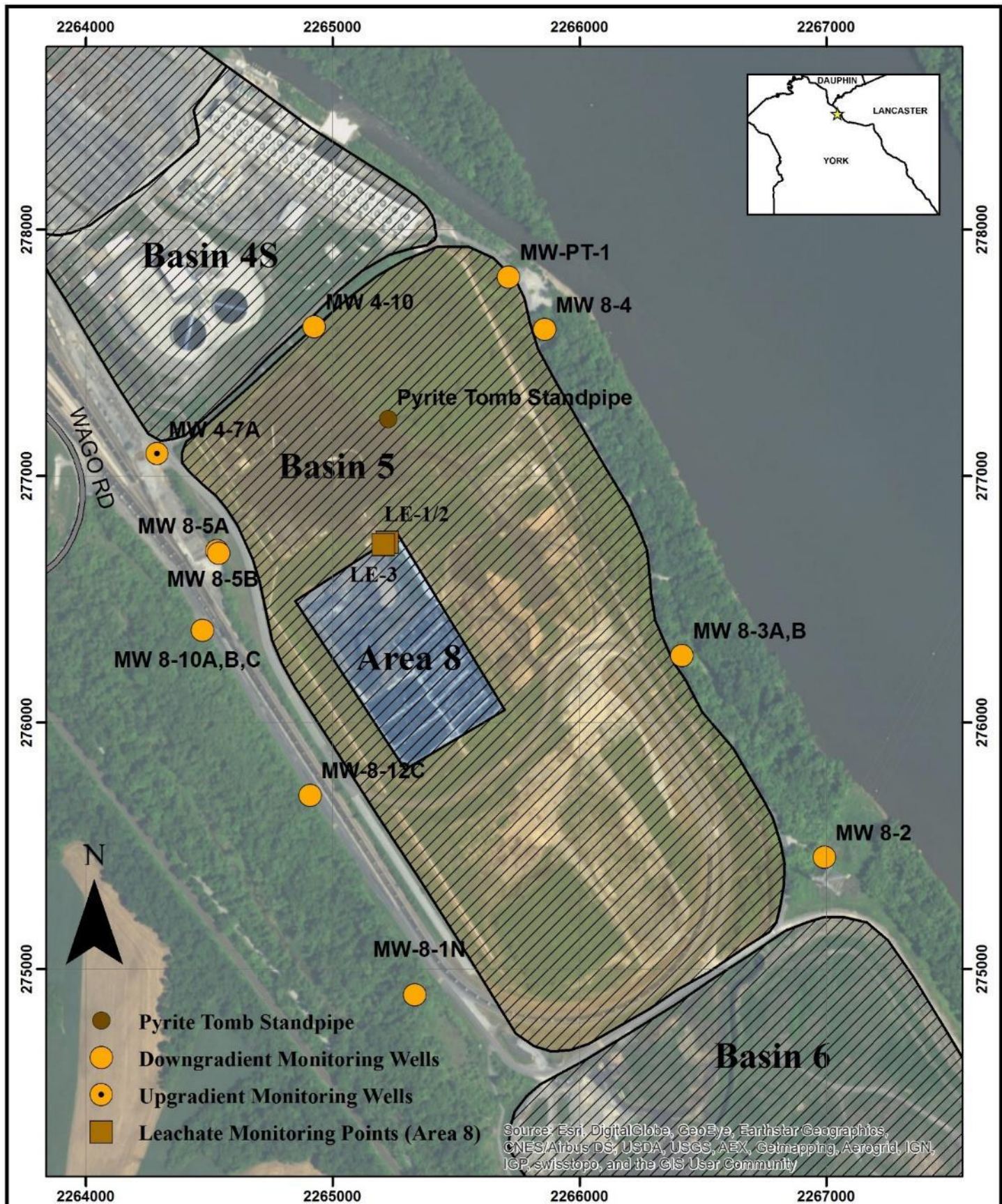
- Regulatory qualifier codes: M = EPA Primary Drinking Water MCL/TT, S = EPA Secondary Drinking Water MCL, and A = Pennsylvania Act 2 residential Statewide Health Standard for used aquifers.
- MW-19 was sampled for additional parameters (Ga, Ge, Rb, Y) pursuant to Basin No. 7 sampling requirements.
- 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.
- MW-8-10C and MW-8-12C are sampled annually 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°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	



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

Date Prepared/Revised
07/13/2020

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: 18.1 ft.

Measured from: ☐ Land Surface ☒ TOC

Casing Stick Up: 1.60 ft.

Elevation of Water Level: 287.7 ft./MSL

Sampling Depth: 33.00 ft.

Volume of Water Column: gal.

Total Well Depth: 45.40 ft.

Sampling Method: ☒ Pumped ☐ Bailed ☐ GrabWell Purged: ☒ Yes ☐ No

Well Volumes Purged: 1.75 L

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

Spring Flow Rate: GPM

Sample Date (mm/dd/yy): 05/20/2020

Sample Collection Time: 7:43AM

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): 200401162-001

Final Lab Analysis Completion Date: 06/15/2020

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	05/20/2020

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)	60.4	SM 2320B
Calcium, total (mg/l)	27.6	EPA 200.2/200.7/6010A
Calcium, dissolved (mg/l)	26.9	EPA 200.2/200.7/6010A
Chemical Oxygen Demand (mg/l)	20 <	SM 5220D
Chloride, total as Cl (mg/l)	9.11	EPA 300.0
Fluoride, total as F (mg/l)	0.2 <	EPA 300.0
Iron, total (µg/l)	1.02 ND	EPA 200.2/200.7/6010A
Iron, dissolved (µg/l)	1.02 ND	EPA 200.2/200.7/6010A
Magnesium, total (mg/l)	4.21	EPA 200.2/200.7/6010A
Magnesium, dissolved (mg/l)	4.16	EPA 200.2/200.7/6010A
Manganese, total (µg/l)	6.39 ND	EPA 200.2/200.7/6010A
Manganese, dissolved (µg/l)	6.39 ND	EPA 200.2/200.7/6010A
Nitrate, as N (mg/l)	3.92	EPA 300.0
pH, field (su)	7.09	Field Meter
pH, lab (su)	6.44 H	SM 4500-H+B
Potassium, total (mg/l)	1 <	EPA 200.2/200.7/6010A
Potassium, dissolved (mg/l)	1 <	EPA 200.2/200.7/6010A
Sodium, total (mg/l)	8.04	EPA 200.2/200.7/6010A
Sodium, dissolved (mg/l)	7.72	EPA 200.2/200.7/6010A
Specific Conductance, field (umhos/cm)	226	Field Meter
Specific Conductance, lab (umhos/cm)	243	SM 2510 B
Sulfate, as SO4 (mg/l)	49.2	EPA 300.0
Alkalinity, total as CaCO3 (mg/l)	60.4	SM 2320B
Total Dissolved Solids (mg/l)	155	SM 2540B
Total Organic Carbon (mg/l)	0.5 <	SM 5310C
Turbidity, field (n.t.u.)	0.38	Field Meter
Dissolved O2, field (mg/l)	3	Field Meter
Redox, field (mv)	249	Field Meter
Temperature, field (°c)	11.11	Field Meter
Acidity, total as CaCO3 (mg/l)	1 ND	SM 2310C

T Please indicate detection limit if analyte is not detected.

I.D. No.	301309
Monitoring Point No.	MW-19
Sample Date	05/20/2020

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)	0.166 ND	SW846 8260
1,2-Dibromoethane (µg/l)	0.263 ND	SW846 8260
1,1-Dichloroethane (µg/l)	0.172 ND	SW846 8260
1,1-Dichloroethene (µg/l)	0.244 ND	SW846 8260
1,2-Dichloroethane (µg/l)	0.127 ND	SW846 8260
cis-1,2-Dichloroethene (µg/l)	0.14 ND	SW846 8260
trans-1,2-Dichloroethene (µg/l)	0.195 ND	SW846 8260
Ethylbenzene (µg/l)	0.172 ND	SW846 8260
Methylene Chloride (µg/l)	0.285 ND	SW846 8260
Tetrachloroethene (µg/l)	0.447 ND	SW846 8260
Toluene (µg/l)	0.238 ND	SW846 8260
1,1,1-Trichloroethane (µg/l)	0.189 ND	SW846 8260
Trichloroethene (µg/l)	0.182 ND	SW846 8260
Vinyl chloride (µg/l)	0.219 ND	SW846 8260
Xylenes (µg/l)	0.549 ND	SW846 8260

T Please indicate detection limit if analyte is not detected.

I.D. No.	301309
Monitoring Point No.	MW-19
Sample Date	05/20/2020

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)	0.548 ND	EPA 200.2/200.8/6020A
Arsenic, dissolved (µg/l)	0.548 ND	EPA 200.2/200.8/6020A
Barium, total (µg/l)	250	EPA 200.2/200.8/6020A
Barium, dissolved (µg/l)	237	EPA 200.2/200.8/6020A
Cadmium, total (µg/l)	0.152 ND	EPA 200.2/200.8/6020A
Cadmium, dissolved (µg/l)	0.152 ND	EPA 200.2/200.8/6020A
Chromium, total (µg/l)	0.411 ND	EPA 200.2/200.8/6020A
Chromium, dissolved (µg/l)	0.411 ND	EPA 200.2/200.8/6020A
Copper, total (µg/l)	0.39 ND	EPA 200.2/200.8/6020A
Copper, dissolved (µg/l)	0.39 ND	EPA 200.2/200.8/6020A
Lead, total (µg/l)	0.229 ND	EPA 200.2/200.8/6020A
Lead, dissolved (µg/l)	0.229 ND	EPA 200.2/200.8/6020A
Mercury, total (µg/l)	0.717 ND	EPA 200.8
Mercury, dissolved (µg/l)	0.717 ND	EPA 245.7
Selenium, total (µg/l)	15.8	EPA 200.2/200.8/6020A
Selenium, dissolved (µg/l)	15.6	EPA 200.2/200.8/6020A
Silver, total (µg/l)	0.132 ND	EPA 200.2/200.8/6020A
Silver, dissolved (µg/l)	0.132 ND	EPA 200.2/200.8/6020A
Zinc, total (µg/l)	2.24 ND	EPA 200.0/200.8/6020
Zinc, dissolved (µg/l)	2.24 ND	EPA 200.0/200.8/6020
Boron, total (µg/l)	100 <	EPA 200.2/200.7/6010A
Boron, dissolved (µg/l)	100 <	EPA 200.2/200.7/6010A
Lithium, total (µg/l)	2.8	EPA 200.2/200.8/6020A
Lithium, dissolved (µg/l)	1.39	EPA 200.2/200.8/6020A
Molybdenum, total (µg/l)	1 <	EPA 200.2/200.8/6020A
Molybdenum, dissolved (µg/l)	1.4	EPA 200.2/200.8/6020A
Strontium, total (µg/l)	52	EPA 200.0/200.7/6010
Strontium, dissolved (µg/l)	50	EPA 200.0/200.7/6010

T Please indicate detection limit if analyte is not detected.

I.D. No.	301309
Monitoring Point No.	MW-19
Sample Date	05/20/2020

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 200.0/200.7/6010
Aluminum, dissolved (µg/l)	26.8 ND	EPA 200.0/200.7/6010
Antimony, total (µg/l)	0.388 ND	EPA 200.2/200.8/6020A
Antimony, dissolved (µg/l)	0.388 ND	EPA 200.2/200.8/6020A
Beryllium, total (µg/l)	0.19 ND	EPA 200.2/200.8/6020A
Beryllium, dissolved (µg/l)	0.19 ND	EPA 200.2/200.8/6020A
Cobalt, total (µg/l)		
Cobalt, dissolved (µg/l)		
Gallium, total (µg/l)	4.37	EPA 200.2/200.8
Gallium, dissolved (µg/l)	3.93	EPA 200.2/200.8
Germanium, total (µg/l)	1 ND	EPA 200.2/200.8
Germanium, dissolved (µg/l)	1 ND	EPA 200.2/200.8
Nickel, total (µg/l)	0.284 ND	EPA 200.8
Nickel, dissolved (µg/l)	0.284 ND	EPA 200.8
Rubidium, total (µg/l)	1 ND	EPA 200.2/200.8
Rubidium, dissolved (µg/l)	1 ND	EPA 200.2/200.8
Titanium, total (µg/l)	1.45 ND	EPA 200.2/200.8
Titanium, dissolved (µg/l)	1.45 ND	EPA 200.2/200.8
Vanadium, total (µg/l)	2.35 ND	EPA 200.8
Vanadium, dissolved (µg/l)	2.35 ND	EPA 200.8
Yttrium, total (µg/l)	1 ND	EPA 200.2/200.8
Yttrium, dissolved (µg/l)	1 ND	EPA 200.2/200.8

T Please indicate detection limit if analyte is not detected.


 Date Prepared/Revised
 07/13/2020

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: 22.17 ft.

Measured from: ☐ Land Surface ☒ TOC

Casing Stick Up: 2.26 ft.

Elevation of Water Level: 270.54 ft./MSL

Sampling Depth: 34.00 ft.

Volume of Water Column: gal.

Total Well Depth: 38.60 ft.

Sampling Method: ☒ Pumped ☐ Bailed ☐ GrabWell Purged: ☒ Yes ☐ No

Well Volumes Purged: 2.5 L

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

Spring Flow Rate: GPM

Sample Date (mm/dd/yy): 05/19/2020

Sample Collection Time: 8:55AM

Sample Collector's Name: SH

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): 200401154-006

Final Lab Analysis Completion Date: 06/11/2020

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	05/19/2020

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)	0.869	SM 4500-NH3-F
Bicarbonate (mg/l)	58	SM 2320B
Calcium, total (mg/l)	241	EPA 200.2/200.7/6010A
Calcium, dissolved (mg/l)	233	EPA 200.2/200.7/6010A
Chemical Oxygen Demand (mg/l)	20.7	SM 5220D
Chloride, total as Cl (mg/l)	7.72	EPA 300.0
Fluoride, total as F (mg/l)	0.2 <	EPA 300.0
Iron, total (µg/l)	223	EPA 200.2/200.7/6010A
Iron, dissolved (µg/l)	1.02 ND	EPA 200.2/200.7/6010A
Magnesium, total (mg/l)	17.3	EPA 200.2/200.7/6010A
Magnesium, dissolved (mg/l)	17.1	EPA 200.2/200.7/6010A
Manganese, total (µg/l)	2,430	EPA 200.2/200.7/6010A
Manganese, dissolved (µg/l)	2,400	EPA 200.2/200.7/6010A
Nitrate, as N (mg/l)	0.5 <	EPA 300.0
pH, field (su)	5.78	Field Meter
pH, lab (su)	6.24 H	SM 4500-H+B
Potassium, total (mg/l)	122	EPA 200.2/200.7/6010A
Potassium, dissolved (mg/l)	121	EPA 200.2/200.7/6010A
Sodium, total (mg/l)	76.2	EPA 200.2/200.7/6010A
Sodium, dissolved (mg/l)	75.4	EPA 200.2/200.7/6010A
Specific Conductance, field (umhos/cm)	1,808	Field Meter
Specific Conductance, lab (umhos/cm)	1,800	SM 2510 B
Sulfate, as SO4 (mg/l)	864	EPA 300.0
Alkalinity, total as CaCO3 (mg/l)	58	SM 2320B
Total Dissolved Solids (mg/l)	1,420	SM 2540B
Total Organic Carbon (mg/l)	0.655	SM 5310C
Turbidity, field (n.t.u.)	2.2	Field Meter
Dissolved O2, field (mg/l)	0.7	Field Meter
Redox, field (mv)	274.4	Field Meter
Temperature, field (°c)	13.3	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	05/19/2020

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)	0.166 ND	SW846 8260
1,2-Dibromoethane (µg/l)	0.263 ND	SW846 8260
1,1-Dichloroethane (µg/l)	0.172 ND	SW846 8260
1,1-Dichloroethene (µg/l)	0.244 ND	SW846 8260
1,2-Dichloroethane (µg/l)	0.127 ND	SW846 8260
cis-1,2-Dichloroethene (µg/l)	0.14 ND	SW846 8260
trans-1,2-Dichloroethene (µg/l)	0.195 ND	SW846 8260
Ethylbenzene (µg/l)	0.172 ND	SW846 8260
Methylene Chloride (µg/l)	0.285 ND	SW846 8260
Tetrachloroethene (µg/l)	0.447 ND	SW846 8260
Toluene (µg/l)	0.238 ND	SW846 8260
1,1,1-Trichloroethane (µg/l)	0.189 ND	SW846 8260
Trichloroethene (µg/l)	0.182 ND	SW846 8260
Vinyl chloride (µg/l)	0.219 ND	SW846 8260
Xylenes (µg/l)	0.549 ND	SW846 8260

T Please indicate detection limit if analyte is not detected.

I.D. No.	301309
Monitoring Point No.	MW-4-10
Sample Date	05/19/2020

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)	0.548 ND	EPA 200.2/200.8/6020A
Arsenic, dissolved (µg/l)	0.548 ND	EPA 200.2/200.8/6020A
Barium, total (µg/l)	17.8	EPA 200.2/200.8/6020A
Barium, dissolved (µg/l)	14.6	EPA 200.2/200.8/6020A
Cadmium, total (µg/l)	1.17	EPA 200.2/200.8/6020A
Cadmium, dissolved (µg/l)	1.06	EPA 200.2/200.8/6020A
Chromium, total (µg/l)	0.411 ND	EPA 200.2/200.8/6020A
Chromium, dissolved (µg/l)	0.411 ND	EPA 200.2/200.8/6020A
Copper, total (µg/l)	2.62	EPA 200.2/200.8/6020A
Copper, dissolved (µg/l)	1.75	EPA 200.2/200.8/6020A
Lead, total (µg/l)	0.229 ND	EPA 200.2/200.8/6020A
Lead, dissolved (µg/l)	0.229 ND	EPA 200.2/200.8/6020A
Mercury, total (µg/l)	0.717 ND	EPA 200.8
Mercury, dissolved (µg/l)	0.717 ND	EPA 245.7
Selenium, total (µg/l)	15	EPA 200.2/200.8/6020A
Selenium, dissolved (µg/l)	16.3	EPA 200.2/200.8/6020A
Silver, total (µg/l)	0.132 ND	EPA 200.2/200.8/6020A
Silver, dissolved (µg/l)	0.132 ND	EPA 200.2/200.8/6020A
Zinc, total (µg/l)	34.3	EPA 200.0/200.8/6020
Zinc, dissolved (µg/l)	30.8	EPA 200.0/200.8/6020
Boron, total (µg/l)	2,470	EPA 200.2/200.7/6010A
Boron, dissolved (µg/l)	2,430	EPA 200.2/200.7/6010A
Lithium, total (µg/l)	1,090	EPA 200.2/200.8/6020A
Lithium, dissolved (µg/l)	1,280	EPA 200.2/200.8/6020A
Molybdenum, total (µg/l)	657	EPA 200.2/200.8/6020A
Molybdenum, dissolved (µg/l)	653	EPA 200.2/200.8/6020A
Strontium, total (µg/l)	2,050	EPA 200.0/200.7/6010
Strontium, dissolved (µg/l)	2,030	EPA 200.0/200.7/6010

T Please indicate detection limit if analyte is not detected.

I.D. No.	301309
Monitoring Point No.	MW-4-10
Sample Date	05/19/2020

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 200.0/200.7/6010
Aluminum, dissolved (µg/l)	100 <	EPA 200.0/200.7/6010
Antimony, total (µg/l)	0.388 ND	EPA 200.2/200.8/6020A
Antimony, dissolved (µg/l)	0.388 ND	EPA 200.2/200.8/6020A
Beryllium, total (µg/l)	0.19 ND	EPA 200.2/200.8/6020A
Beryllium, dissolved (µg/l)	0.19 ND	EPA 200.2/200.8/6020A
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)	18.7	EPA 200.8
Nickel, dissolved (µg/l)	19.8	EPA 200.8
Rubidium, total (µg/l)		
Rubidium, dissolved (µg/l)		
Titanium, total (µg/l)	1.45 ND	EPA 200.2/200.8
Titanium, dissolved (µg/l)	1.45 ND	EPA 200.2/200.8
Vanadium, total (µg/l)	2.35 ND	EPA 200.8
Vanadium, dissolved (µg/l)	2.35 ND	EPA 200.8
Yttrium, total (µg/l)		
Yttrium, dissolved (µg/l)		

T Please indicate detection limit if analyte is not detected.


 Date Prepared/Revised
 07/13/2020

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: 25.84 ft.

Measured from: ☐ Land Surface ☒ TOC

Casing Stick Up: 2.23 ft.

Elevation of Water Level: 262.17 ft./MSL

Sampling Depth: 35.00 ft.

Volume of Water Column: gal.

Total Well Depth: 39.90 ft.

Sampling Method: ☒ Pumped ☐ Bailed ☐ GrabWell Purged: ☒ Yes ☐ No

Well Volumes Purged: 1.8 L

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

Spring Flow Rate: GPM

Sample Date (mm/dd/yy): 05/18/2020

Sample Collection Time: 12:40PM

Sample Collector's Name: SH

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): 200401154-002

Final Lab Analysis Completion Date: 06/11/2020

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	05/18/2020

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)	0.061 ND	SM 4500-NH3-F
Bicarbonate (mg/l)	235	SM 2320B
Calcium, total (mg/l)	278	EPA 200.2/200.7/6010A
Calcium, dissolved (mg/l)	262	EPA 200.2/200.7/6010A
Chemical Oxygen Demand (mg/l)	20 <	SM 5220D
Chloride, total as Cl (mg/l)	15.1	EPA 300.0
Fluoride, total as F (mg/l)	0.25	EPA 300.0
Iron, total (µg/l)	20 <	EPA 200.2/200.7/6010A
Iron, dissolved (µg/l)	34	EPA 200.2/200.7/6010A
Magnesium, total (mg/l)	41.5	EPA 200.2/200.7/6010A
Magnesium, dissolved (mg/l)	41.3	EPA 200.2/200.7/6010A
Manganese, total (µg/l)	54	EPA 200.2/200.7/6010A
Manganese, dissolved (µg/l)	56	EPA 200.2/200.7/6010A
Nitrate, as N (mg/l)	0.5 <	EPA 300.0
pH, field (su)	6.9	Field Meter
pH, lab (su)	7.36 H	SM 4500-H+B
Potassium, total (mg/l)	3.93	EPA 200.2/200.7/6010A
Potassium, dissolved (mg/l)	3.98	EPA 200.2/200.7/6010A
Sodium, total (mg/l)	71.6	EPA 200.2/200.7/6010A
Sodium, dissolved (mg/l)	59.6	EPA 200.2/200.7/6010A
Specific Conductance, field (umhos/cm)	1,604	Field Meter
Specific Conductance, lab (umhos/cm)	1,567	SM 2510 B
Sulfate, as SO4 (mg/l)	642	EPA 300.0
Alkalinity, total as CaCO3 (mg/l)	235	SM 2320B
Total Dissolved Solids (mg/l)	1,270	SM 2540B
Total Organic Carbon (mg/l)	1.13	SM 5310C
Turbidity, field (n.t.u.)	1.47	Field Meter
Dissolved O2, field (mg/l)	0.73	Field Meter
Redox, field (mv)	242.8	Field Meter
Temperature, field (°c)	16	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	05/18/2020

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)	0.166 ND	SW846 8260
1,2-Dibromoethane (µg/l)	0.263 ND	SW846 8260
1,1-Dichloroethane (µg/l)	0.172 ND	SW846 8260
1,1-Dichloroethene (µg/l)	0.244 ND	SW846 8260
1,2-Dichloroethane (µg/l)	0.127 ND	SW846 8260
cis-1,2-Dichloroethene (µg/l)	0.14 ND	SW846 8260
trans-1,2-Dichloroethene (µg/l)	0.195 ND	SW846 8260
Ethylbenzene (µg/l)	0.172 ND	SW846 8260
Methylene Chloride (µg/l)	1 <	SW846 8260
Tetrachloroethene (µg/l)	0.447 ND	SW846 8260
Toluene (µg/l)	0.238 ND	SW846 8260
1,1,1-Trichloroethane (µg/l)	0.189 ND	SW846 8260
Trichloroethene (µg/l)	0.182 ND	SW846 8260
Vinyl chloride (µg/l)	0.219 ND	SW846 8260
Xylenes (µg/l)	0.549 ND	SW846 8260

T Please indicate detection limit if analyte is not detected.

I.D. No.	301309
Monitoring Point No.	MW-4-7A
Sample Date	05/18/2020

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)	0.548 ND	EPA 200.2/200.8/6020A
Arsenic, dissolved (µg/l)	0.548 ND	EPA 200.2/200.8/6020A
Barium, total (µg/l)	21.9	EPA 200.2/200.8/6020A
Barium, dissolved (µg/l)	21.5	EPA 200.2/200.8/6020A
Cadmium, total (µg/l)	0.152 ND	EPA 200.2/200.8/6020A
Cadmium, dissolved (µg/l)	0.152 ND	EPA 200.2/200.8/6020A
Chromium, total (µg/l)	1 <	EPA 200.2/200.8/6020A
Chromium, dissolved (µg/l)	0.411 ND	EPA 200.2/200.8/6020A
Copper, total (µg/l)	2.02	EPA 200.2/200.8/6020A
Copper, dissolved (µg/l)	2.55	EPA 200.2/200.8/6020A
Lead, total (µg/l)	0.229 ND	EPA 200.2/200.8/6020A
Lead, dissolved (µg/l)	0.229 ND	EPA 200.2/200.8/6020A
Mercury, total (µg/l)	0.717 ND	EPA 200.8
Mercury, dissolved (µg/l)	0.717 ND	EPA 245.7
Selenium, total (µg/l)	0.632 ND	EPA 200.2/200.8/6020A
Selenium, dissolved (µg/l)	0.632 ND	EPA 200.2/200.8/6020A
Silver, total (µg/l)	0.132 ND	EPA 200.2/200.8/6020A
Silver, dissolved (µg/l)	0.132 ND	EPA 200.2/200.8/6020A
Zinc, total (µg/l)	2.24 ND	EPA 200.0/200.8/6020
Zinc, dissolved (µg/l)	2.24 ND	EPA 200.0/200.8/6020
Boron, total (µg/l)	1,720	EPA 200.2/200.7/6010A
Boron, dissolved (µg/l)	1,760	EPA 200.2/200.7/6010A
Lithium, total (µg/l)	173	EPA 200.2/200.8/6020A
Lithium, dissolved (µg/l)	162	EPA 200.2/200.8/6020A
Molybdenum, total (µg/l)	13.8	EPA 200.2/200.8/6020A
Molybdenum, dissolved (µg/l)	14.3	EPA 200.2/200.8/6020A
Strontium, total (µg/l)	362	EPA 200.0/200.7/6010
Strontium, dissolved (µg/l)	329	EPA 200.0/200.7/6010

T Please indicate detection limit if analyte is not detected.

I.D. No.	301309
Monitoring Point No.	MW-4-7A
Sample Date	05/18/2020

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 200.0/200.7/6010
Aluminum, dissolved (µg/l)	100 <	EPA 200.0/200.7/6010
Antimony, total (µg/l)	0.388 ND	EPA 200.2/200.8/6020A
Antimony, dissolved (µg/l)	0.388 ND	EPA 200.2/200.8/6020A
Beryllium, total (µg/l)	0.19 ND	EPA 200.2/200.8/6020A
Beryllium, dissolved (µg/l)	0.19 ND	EPA 200.2/200.8/6020A
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)	15.8	EPA 200.8
Nickel, dissolved (µg/l)	15.6	EPA 200.8
Rubidium, total (µg/l)		
Rubidium, dissolved (µg/l)		
Titanium, total (µg/l)	5 <	EPA 200.2/200.8
Titanium, dissolved (µg/l)	5 <	EPA 200.2/200.8
Vanadium, total (µg/l)	2.35 ND	EPA 200.8
Vanadium, dissolved (µg/l)	2.35 ND	EPA 200.8
Yttrium, total (µg/l)		
Yttrium, dissolved (µg/l)		

T Please indicate detection limit if analyte is not detected.


 Date Prepared/Revised
 07/13/2020

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: 20.32 ft.

Measured from: ☐ Land Surface ☒ TOC

Casing Stick Up: 1.62 ft.

Elevation of Water Level: 256.15 ft./MSL

Sampling Depth: 32.00 ft.

Volume of Water Column: gal.

Total Well Depth: 37.30 ft.

Sampling Method: ☒ Pumped ☐ Bailed ☐ GrabWell Purged: ☒ Yes ☐ No

Well Volumes Purged: 1.46 L

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

Spring Flow Rate: GPM

Sample Date (mm/dd/yy): 05/19/2020

Sample Collection Time: 2:41PM

Sample Collector's Name: MIM

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): 200401159-008

Final Lab Analysis Completion Date: 06/12/2020

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	05/19/2020

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)	138	SM 2320B
Calcium, total (mg/l)	124	EPA 200.2/200.7/6010A
Calcium, dissolved (mg/l)	118	EPA 200.2/200.7/6010A
Chemical Oxygen Demand (mg/l)	20 <	SM 5220D
Chloride, total as Cl (mg/l)	30.1	EPA 300.0
Fluoride, total as F (mg/l)	0.2 <	EPA 300.0
Iron, total (µg/l)	20 <	EPA 200.2/200.7/6010A
Iron, dissolved (µg/l)	1.02 ND	EPA 200.2/200.7/6010A
Magnesium, total (mg/l)	31.9	EPA 200.2/200.7/6010A
Magnesium, dissolved (mg/l)	29.5	EPA 200.2/200.7/6010A
Manganese, total (µg/l)	283	EPA 200.2/200.7/6010A
Manganese, dissolved (µg/l)	20 <	EPA 200.2/200.7/6010A
Nitrate, as N (mg/l)	0.5 <	EPA 300.0
pH, field (su)	6.66	Field Meter
pH, lab (su)	7.03 H	SM 4500-H+B
Potassium, total (mg/l)	2.15	EPA 200.2/200.7/6010A
Potassium, dissolved (mg/l)	1.99	EPA 200.2/200.7/6010A
Sodium, total (mg/l)	12.5	EPA 200.2/200.7/6010A
Sodium, dissolved (mg/l)	11.4	EPA 200.2/200.7/6010A
Specific Conductance, field (umhos/cm)	842	Field Meter
Specific Conductance, lab (umhos/cm)	864	SM 2510 B
Sulfate, as SO4 (mg/l)	262	EPA 300.0
Alkalinity, total as CaCO3 (mg/l)	138	SM 2320B
Total Dissolved Solids (mg/l)	624	SM 2540B
Total Organic Carbon (mg/l)	0.5 <	SM 5310C
Turbidity, field (n.t.u.)	0.6	Field Meter
Dissolved O2, field (mg/l)	2.56	Field Meter
Redox, field (mv)	131.8	Field Meter
Temperature, field (°c)	16.17	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	05/19/2020

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	05/19/2020

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)	0.548 ND	EPA 200.2/200.8/6020A
Arsenic, dissolved (µg/l)	0.548 ND	EPA 200.2/200.8/6020A
Barium, total (µg/l)	22.7	EPA 200.2/200.8/6020A
Barium, dissolved (µg/l)	19	EPA 200.2/200.8/6020A
Cadmium, total (µg/l)	0.152 ND	EPA 200.2/200.8/6020A
Cadmium, dissolved (µg/l)	0.152 ND	EPA 200.2/200.8/6020A
Chromium, total (µg/l)	0.411 ND	EPA 200.2/200.8/6020A
Chromium, dissolved (µg/l)	0.411 ND	EPA 200.2/200.8/6020A
Copper, total (µg/l)	0.39 ND	EPA 200.2/200.8/6020A
Copper, dissolved (µg/l)	0.39 ND	EPA 200.2/200.8/6020A
Lead, total (µg/l)	0.229 ND	EPA 200.2/200.8/6020A
Lead, dissolved (µg/l)	0.229 ND	EPA 200.2/200.8/6020A
Mercury, total (µg/l)	0.717 ND	EPA 200.8
Mercury, dissolved (µg/l)	0.717 ND	EPA 245.7
Selenium, total (µg/l)	0.632 ND	EPA 200.2/200.8/6020A
Selenium, dissolved (µg/l)	0.632 ND	EPA 200.2/200.8/6020A
Silver, total (µg/l)	0.132 ND	EPA 200.2/200.8/6020A
Silver, dissolved (µg/l)	0.132 ND	EPA 200.2/200.8/6020A
Zinc, total (µg/l)	5 <	EPA 200.0/200.8/6020
Zinc, dissolved (µg/l)	5.28	EPA 200.0/200.8/6020
Boron, total (µg/l)	335	EPA 200.2/200.7/6010A
Boron, dissolved (µg/l)	299	EPA 200.2/200.7/6010A
Lithium, total (µg/l)	9.36	EPA 200.2/200.8/6020A
Lithium, dissolved (µg/l)	9.91	EPA 200.2/200.8/6020A
Molybdenum, total (µg/l)	17.5	EPA 200.2/200.8/6020A
Molybdenum, dissolved (µg/l)	14.2	EPA 200.2/200.8/6020A
Strontium, total (µg/l)	230	EPA 200.0/200.7/6010
Strontium, dissolved (µg/l)	211	EPA 200.0/200.7/6010

T Please indicate detection limit if analyte is not detected.

I.D. No.	301309
Monitoring Point No.	MW-8-10A
Sample Date	05/19/2020

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 200.0/200.7/6010
Aluminum, dissolved (µg/l)	26.8 ND	EPA 200.0/200.7/6010
Antimony, total (µg/l)	0.388 ND	EPA 200.2/200.8/6020A
Antimony, dissolved (µg/l)	0.388 ND	EPA 200.2/200.8/6020A
Beryllium, total (µg/l)	0.19 ND	EPA 200.2/200.8/6020A
Beryllium, dissolved (µg/l)	0.19 ND	EPA 200.2/200.8/6020A
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)	0.284 ND	EPA 200.8
Rubidium, total (µg/l)		
Rubidium, dissolved (µg/l)		
Titanium, total (µg/l)	1.45 ND	EPA 200.2/200.8
Titanium, dissolved (µg/l)	1.45 ND	EPA 200.2/200.8
Vanadium, total (µg/l)	2.35 ND	EPA 200.8
Vanadium, dissolved (µg/l)	2.35 ND	EPA 200.8
Yttrium, total (µg/l)		
Yttrium, dissolved (µg/l)		

T Please indicate detection limit if analyte is not detected.


 Date Prepared/Revised
 07/13/2020

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: 20.06 ft.

Measured from: ☐ Land Surface ☒ TOC

Casing Stick Up: 1.44 ft.

Elevation of Water Level: 256.21 ft./MSL

Sampling Depth: 52.00 ft.

Volume of Water Column: _____ gal.

Total Well Depth: 57.00 ft.

Sampling Method: ☒ Pumped ☐ Bailed ☐ GrabWell Purged: ☒ Yes ☐ No

Well Volumes Purged: 1.77 L

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

Spring Flow Rate: _____ GPM

Sample Date (mm/dd/yy): 05/19/2020

Sample Collection Time: 3:50PM

Sample Collector's Name: MIM

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): 200401159-009

Final Lab Analysis Completion Date: 06/12/2020

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	05/19/2020

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)	113	SM 2320B
Calcium, total (mg/l)	120	EPA 200.2/200.7/6010A
Calcium, dissolved (mg/l)	114	EPA 200.2/200.7/6010A
Chemical Oxygen Demand (mg/l)	20 <	SM 5220D
Chloride, total as Cl (mg/l)	64.3	EPA 300.0
Fluoride, total as F (mg/l)	0.2 <	EPA 300.0
Iron, total (µg/l)	1.02 ND	EPA 200.2/200.7/6010A
Iron, dissolved (µg/l)	1.02 ND	EPA 200.2/200.7/6010A
Magnesium, total (mg/l)	21.4	EPA 200.2/200.7/6010A
Magnesium, dissolved (mg/l)	21.6	EPA 200.2/200.7/6010A
Manganese, total (µg/l)	6.39 ND	EPA 200.2/200.7/6010A
Manganese, dissolved (µg/l)	6.39 ND	EPA 200.2/200.7/6010A
Nitrate, as N (mg/l)	0.5 <	EPA 300.0
pH, field (su)	7.52	Field Meter
pH, lab (su)	7.69 H	SM 4500-H+B
Potassium, total (mg/l)	2.52	EPA 200.2/200.7/6010A
Potassium, dissolved (mg/l)	2.51	EPA 200.2/200.7/6010A
Sodium, total (mg/l)	6.99	EPA 200.2/200.7/6010A
Sodium, dissolved (mg/l)	7.07	EPA 200.2/200.7/6010A
Specific Conductance, field (umhos/cm)	772	Field Meter
Specific Conductance, lab (umhos/cm)	795	SM 2510 B
Sulfate, as SO4 (mg/l)	187	EPA 300.0
Alkalinity, total as CaCO3 (mg/l)	113	SM 2320B
Total Dissolved Solids (mg/l)	522	SM 2540B
Total Organic Carbon (mg/l)	0.5 <	SM 5310C
Turbidity, field (n.t.u.)	0.5	Field Meter
Dissolved O2, field (mg/l)	1.12	Field Meter
Redox, field (mv)	107	Field Meter
Temperature, field (°c)	15.5	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-8-10B
Sample Date	05/19/2020

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	05/19/2020

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)	1.39	EPA 200.2/200.8/6020A
Arsenic, dissolved (µg/l)	1.37	EPA 200.2/200.8/6020A
Barium, total (µg/l)	45.5	EPA 200.2/200.8/6020A
Barium, dissolved (µg/l)	46.8	EPA 200.2/200.8/6020A
Cadmium, total (µg/l)	0.152 ND	EPA 200.2/200.8/6020A
Cadmium, dissolved (µg/l)	0.152 ND	EPA 200.2/200.8/6020A
Chromium, total (µg/l)	0.411 ND	EPA 200.2/200.8/6020A
Chromium, dissolved (µg/l)	0.411 ND	EPA 200.2/200.8/6020A
Copper, total (µg/l)	3.37	EPA 200.2/200.8/6020A
Copper, dissolved (µg/l)	0.39 ND	EPA 200.2/200.8/6020A
Lead, total (µg/l)	0.229 ND	EPA 200.2/200.8/6020A
Lead, dissolved (µg/l)	1 <	EPA 200.2/200.8/6020A
Mercury, total (µg/l)	0.717 ND	EPA 200.8
Mercury, dissolved (µg/l)	0.717 ND	EPA 245.7
Selenium, total (µg/l)	0.632 ND	EPA 200.2/200.8/6020A
Selenium, dissolved (µg/l)	0.632 ND	EPA 200.2/200.8/6020A
Silver, total (µg/l)	0.132 ND	EPA 200.2/200.8/6020A
Silver, dissolved (µg/l)	0.132 ND	EPA 200.2/200.8/6020A
Zinc, total (µg/l)	2.24 ND	EPA 200.0/200.8/6020
Zinc, dissolved (µg/l)	2.24 ND	EPA 200.0/200.8/6020
Boron, total (µg/l)	269	EPA 200.2/200.7/6010A
Boron, dissolved (µg/l)	257	EPA 200.2/200.7/6010A
Lithium, total (µg/l)	20.3	EPA 200.2/200.8/6020A
Lithium, dissolved (µg/l)	24.3	EPA 200.2/200.8/6020A
Molybdenum, total (µg/l)	30.6	EPA 200.2/200.8/6020A
Molybdenum, dissolved (µg/l)	31.6	EPA 200.2/200.8/6020A
Strontium, total (µg/l)	372	EPA 200.0/200.7/6010
Strontium, dissolved (µg/l)	362	EPA 200.0/200.7/6010

T Please indicate detection limit if analyte is not detected.

I.D. No.	301309
Monitoring Point No.	MW-8-10B
Sample Date	05/19/2020

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 200.0/200.7/6010
Aluminum, dissolved (µg/l)	26.8 ND	EPA 200.0/200.7/6010
Antimony, total (µg/l)	0.388 ND	EPA 200.2/200.8/6020A
Antimony, dissolved (µg/l)	0.388 ND	EPA 200.2/200.8/6020A
Beryllium, total (µg/l)	0.19 ND	EPA 200.2/200.8/6020A
Beryllium, dissolved (µg/l)	0.19 ND	EPA 200.2/200.8/6020A
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)	0.284 ND	EPA 200.8
Nickel, dissolved (µg/l)	0.284 ND	EPA 200.8
Rubidium, total (µg/l)		
Rubidium, dissolved (µg/l)		
Titanium, total (µg/l)	1.45 ND	EPA 200.2/200.8
Titanium, dissolved (µg/l)	1.45 ND	EPA 200.2/200.8
Vanadium, total (µg/l)	2.35	EPA 200.8
Vanadium, dissolved (µg/l)	2.35 ND	EPA 200.8
Yttrium, total (µg/l)		
Yttrium, dissolved (µg/l)		

T Please indicate detection limit if analyte is not detected.


 Date Prepared/Revised
 07/13/2020

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-8-10C

☒ 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: 19.53 ft.

 Measured from: ☐ Land Surface ☒ TOC

Casing Stick Up: 1.73 ft.

Elevation of Water Level: 257 ft./MSL

Sampling Depth: 72.00 ft.

Volume of Water Column: gal.

Total Well Depth: 75.20 ft.

 Sampling Method: ☒ Pumped ☐ Bailed ☐ Grab

 Well Purged: ☒ Yes ☐ No

Well Volumes Purged: 3.66 L

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

Spring Flow Rate: GPM

Sample Date (mm/dd/yy): 05/19/2020

Sample Collection Time: 4:45PM

Sample Collector's Name: MIM

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): 200401159-010

Final Lab Analysis Completion Date: 06/12/2020

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

Comments:

I.D. No.	301309
Monitoring Point No.	MW-8-10C
Sample Date	05/19/2020

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)	0.061 ND	SM 4500-NH3-F
Bicarbonate (mg/l)	136	SM 2320B
Calcium, total (mg/l)	67	EPA 200.2/200.7/6010A
Calcium, dissolved (mg/l)	67.1	EPA 200.2/200.7/6010A
Chemical Oxygen Demand (mg/l)	20 <	SM 5220D
Chloride, total as Cl (mg/l)	13.7	EPA 300.0
Fluoride, total as F (mg/l)	0.2	EPA 300.0
Iron, total (µg/l)	278	EPA 200.2/200.7/6010A
Iron, dissolved (µg/l)	278	EPA 200.2/200.7/6010A
Magnesium, total (mg/l)	18.6	EPA 200.2/200.7/6010A
Magnesium, dissolved (mg/l)	19.2	EPA 200.2/200.7/6010A
Manganese, total (µg/l)	342	EPA 200.2/200.7/6010A
Manganese, dissolved (µg/l)	353	EPA 200.2/200.7/6010A
Nitrate, as N (mg/l)	0.012 ND	EPA 300.0
pH, field (su)	7.2	Field Meter
pH, lab (su)	7.47 H	SM 4500-H+B
Potassium, total (mg/l)	1.95	EPA 200.2/200.7/6010A
Potassium, dissolved (mg/l)	1.94	EPA 200.2/200.7/6010A
Sodium, total (mg/l)	14.4	EPA 200.2/200.7/6010A
Sodium, dissolved (mg/l)	14.6	EPA 200.2/200.7/6010A
Specific Conductance, field (umhos/cm)	533	Field Meter
Specific Conductance, lab (umhos/cm)	549	SM 2510 B
Sulfate, as SO4 (mg/l)	120	EPA 300.0
Alkalinity, total as CaCO3 (mg/l)	136	SM 2320B
Total Dissolved Solids (mg/l)	361	SM 2540B
Total Organic Carbon (mg/l)	0.5 <	SM 5310C
Turbidity, field (n.t.u.)	1.6	Field Meter
Dissolved O2, field (mg/l)	0.74	Field Meter
Redox, field (mv)	-134.2	Field Meter
Temperature, field (°c)	14.34	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-8-10C
Sample Date	05/19/2020

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-8-10C
Sample Date	05/19/2020

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 200.2/200.8/6020A
Arsenic, dissolved (µg/l)	0.548 ND	EPA 200.2/200.8/6020A
Barium, total (µg/l)	67.1	EPA 200.2/200.8/6020A
Barium, dissolved (µg/l)	69.9	EPA 200.2/200.8/6020A
Cadmium, total (µg/l)	0.152 ND	EPA 200.2/200.8/6020A
Cadmium, dissolved (µg/l)	0.152 ND	EPA 200.2/200.8/6020A
Chromium, total (µg/l)	0.411 ND	EPA 200.2/200.8/6020A
Chromium, dissolved (µg/l)	0.411 ND	EPA 200.2/200.8/6020A
Copper, total (µg/l)	0.39 ND	EPA 200.2/200.8/6020A
Copper, dissolved (µg/l)	0.39 ND	EPA 200.2/200.8/6020A
Lead, total (µg/l)	1.62	EPA 200.2/200.8/6020A
Lead, dissolved (µg/l)	0.229 ND	EPA 200.2/200.8/6020A
Mercury, total (µg/l)	0.717 ND	EPA 200.8
Mercury, dissolved (µg/l)	0.717 ND	EPA 245.7
Selenium, total (µg/l)	0.632 ND	EPA 200.2/200.8/6020A
Selenium, dissolved (µg/l)	0.632 ND	EPA 200.2/200.8/6020A
Silver, total (µg/l)	0.132 ND	EPA 200.2/200.8/6020A
Silver, dissolved (µg/l)	0.132 ND	EPA 200.2/200.8/6020A
Zinc, total (µg/l)	2.24 ND	EPA 200.0/200.8/6020
Zinc, dissolved (µg/l)	2.24 ND	EPA 200.0/200.8/6020
Boron, total (µg/l)	488	EPA 200.2/200.7/6010A
Boron, dissolved (µg/l)	494	EPA 200.2/200.7/6010A
Lithium, total (µg/l)	8.23	EPA 200.2/200.8/6020A
Lithium, dissolved (µg/l)	9.08	EPA 200.2/200.8/6020A
Molybdenum, total (µg/l)	58.6	EPA 200.2/200.8/6020A
Molybdenum, dissolved (µg/l)	60.2	EPA 200.2/200.8/6020A
Strontium, total (µg/l)	223	EPA 200.0/200.7/6010
Strontium, dissolved (µg/l)	226	EPA 200.0/200.7/6010

T Please indicate detection limit if analyte is not detected.

I.D. No.	301309
Monitoring Point No.	MW-8-10C
Sample Date	05/19/2020

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 200.0/200.7/6010
Aluminum, dissolved (µg/l)	26.8 ND	EPA 200.0/200.7/6010
Antimony, total (µg/l)	0.388 ND	EPA 200.2/200.8/6020A
Antimony, dissolved (µg/l)	0.388 ND	EPA 200.2/200.8/6020A
Beryllium, total (µg/l)	0.19 ND	EPA 200.2/200.8/6020A
Beryllium, dissolved (µg/l)	0.19 ND	EPA 200.2/200.8/6020A
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)	0.284 ND	EPA 200.8
Rubidium, total (µg/l)		
Rubidium, dissolved (µg/l)		
Titanium, total (µg/l)	1.45 ND	EPA 200.2/200.8
Titanium, dissolved (µg/l)	1.45 ND	EPA 200.2/200.8
Vanadium, total (µg/l)	2.35 ND	EPA 200.8
Vanadium, dissolved (µg/l)	2.35 ND	EPA 200.8
Yttrium, total (µg/l)		
Yttrium, dissolved (µg/l)		

T Please indicate detection limit if analyte is not detected.

Date Prepared/Revised
07/13/2020

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-8-12C

☒ Well ☐ Spring ☐ Stream ☐ Other☐ Upgradient/Upstream ☒ Downgradient/Downstream

Location: County York

Municipality: East Manchester Township

Sampling Point: Latitude: 40° 5' 7.06"

Longitude: 76° 41' 26.35"

Depth to Water Level: 11.5 ft.

Measured from: ☐ Land Surface ☒ TOC

Casing Stick Up: 1.96 ft.

Elevation of Water Level: 261.779 ft./MSL

Sampling Depth: 72.00 ft.

Volume of Water Column: gal.

Total Well Depth: ft.

Sampling Method: ☒ Pumped ☐ Bailed ☐ GrabWell Purged: ☒ Yes ☐ No

Well Volumes Purged: 3.51 L

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

Spring Flow Rate: GPM

Sample Date (mm/dd/yy): 05/20/2020

Sample Collection Time: 8:10AM

Sample Collector's Name: MIM

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): 200401159-012

Final Lab Analysis Completion Date: 06/12/2020

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

Comments:

I.D. No.	301309
Monitoring Point No.	MW-8-12C
Sample Date	05/20/2020

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 2320B
Calcium, total (mg/l)	94.6	EPA 200.2/200.7/6010A
Calcium, dissolved (mg/l)	92.8	EPA 200.2/200.7/6010A
Chemical Oxygen Demand (mg/l)	20 <	SM 5220D
Chloride, total as Cl (mg/l)	8.35	EPA 300.0
Fluoride, total as F (mg/l)	0.25	EPA 300.0
Iron, total (µg/l)	880	EPA 200.2/200.7/6010A
Iron, dissolved (µg/l)	786	EPA 200.2/200.7/6010A
Magnesium, total (mg/l)	19.9	EPA 200.2/200.7/6010A
Magnesium, dissolved (mg/l)	18.6	EPA 200.2/200.7/6010A
Manganese, total (µg/l)	1,680	EPA 200.2/200.7/6010A
Manganese, dissolved (µg/l)	1,580	EPA 200.2/200.7/6010A
Nitrate, as N (mg/l)	0.012 ND	EPA 300.0
pH, field (su)	7.14	Field Meter
pH, lab (su)	7.45 H	SM 4500-H+B
Potassium, total (mg/l)	4.93	EPA 200.2/200.7/6010A
Potassium, dissolved (mg/l)	5.06	EPA 200.2/200.7/6010A
Sodium, total (mg/l)	8.96	EPA 200.2/200.7/6010A
Sodium, dissolved (mg/l)	9.09	EPA 200.2/200.7/6010A
Specific Conductance, field (umhos/cm)	629	Field Meter
Specific Conductance, lab (umhos/cm)	638	SM 2510 B
Sulfate, as SO4 (mg/l)	131	EPA 300.0
Alkalinity, total as CaCO3 (mg/l)	194	SM 2320B
Total Dissolved Solids (mg/l)	452	SM 2540B
Total Organic Carbon (mg/l)	1.11	SM 5310C
Turbidity, field (n.t.u.)	0.7	Field Meter
Dissolved O2, field (mg/l)	0.67	Field Meter
Redox, field (mv)	-136.9	Field Meter
Temperature, field (°c)	12.75	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-8-12C
Sample Date	05/20/2020

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-8-12C
Sample Date	05/20/2020

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 200.2/200.8/6020A
Arsenic, dissolved (µg/l)	1 <	EPA 200.2/200.8/6020A
Barium, total (µg/l)	68.2	EPA 200.2/200.8/6020A
Barium, dissolved (µg/l)	64.2	EPA 200.2/200.8/6020A
Cadmium, total (µg/l)	1 <	EPA 200.2/200.8/6020A
Cadmium, dissolved (µg/l)	1 <	EPA 200.2/200.8/6020A
Chromium, total (µg/l)	0.411 ND	EPA 200.2/200.8/6020A
Chromium, dissolved (µg/l)	0.411 ND	EPA 200.2/200.8/6020A
Copper, total (µg/l)	0.39 ND	EPA 200.2/200.8/6020A
Copper, dissolved (µg/l)	0.39 ND	EPA 200.2/200.8/6020A
Lead, total (µg/l)	0.229 ND	EPA 200.2/200.8/6020A
Lead, dissolved (µg/l)	0.229 ND	EPA 200.2/200.8/6020A
Mercury, total (µg/l)	0.717 ND	EPA 200.8
Mercury, dissolved (µg/l)	0.717 ND	EPA 245.7
Selenium, total (µg/l)	0.632 ND	EPA 200.2/200.8/6020A
Selenium, dissolved (µg/l)	0.632 ND	EPA 200.2/200.8/6020A
Silver, total (µg/l)	0.132 ND	EPA 200.2/200.8/6020A
Silver, dissolved (µg/l)	0.132 ND	EPA 200.2/200.8/6020A
Zinc, total (µg/l)	2.24 ND	EPA 200.0/200.8/6020
Zinc, dissolved (µg/l)	2.24 ND	EPA 200.0/200.8/6020
Boron, total (µg/l)	1,230	EPA 200.2/200.7/6010A
Boron, dissolved (µg/l)	1,180	EPA 200.2/200.7/6010A
Lithium, total (µg/l)	9.84	EPA 200.2/200.8/6020A
Lithium, dissolved (µg/l)	10	EPA 200.2/200.8/6020A
Molybdenum, total (µg/l)	352	EPA 200.2/200.8/6020A
Molybdenum, dissolved (µg/l)	339	EPA 200.2/200.8/6020A
Strontium, total (µg/l)	289	EPA 200.0/200.7/6010
Strontium, dissolved (µg/l)	298	EPA 200.0/200.7/6010

T Please indicate detection limit if analyte is not detected.

I.D. No.	301309
Monitoring Point No.	MW-8-12C
Sample Date	05/20/2020

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 200.0/200.7/6010
Aluminum, dissolved (µg/l)	26.8 ND	EPA 200.0/200.7/6010
Antimony, total (µg/l)	0.388 ND	EPA 200.2/200.8/6020A
Antimony, dissolved (µg/l)	0.388 ND	EPA 200.2/200.8/6020A
Beryllium, total (µg/l)	0.19 ND	EPA 200.2/200.8/6020A
Beryllium, dissolved (µg/l)	0.19 ND	EPA 200.2/200.8/6020A
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)	1.27	EPA 200.8
Nickel, dissolved (µg/l)	1.33	EPA 200.8
Rubidium, total (µg/l)		
Rubidium, dissolved (µg/l)		
Titanium, total (µg/l)	1.45 ND	EPA 200.2/200.8
Titanium, dissolved (µg/l)	1.45 ND	EPA 200.2/200.8
Vanadium, total (µg/l)	2.35 ND	EPA 200.8
Vanadium, dissolved (µg/l)	2.35 ND	EPA 200.8
Yttrium, total (µg/l)		
Yttrium, dissolved (µg/l)		

T Please indicate detection limit if analyte is not detected.


 Date Prepared/Revised
 07/13/2020

DEP USE ONLY

Date Received

FORM 14R

RESIDUAL WASTE LANDFILLS AND DISPOSAL IMPOUNDMENTS

QUARTERLY AND ANNUAL WATER QUALITY ANALYSES

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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: 16.61 ft.

Measured from: ☐ Land Surface ☒ TOC

Casing Stick Up: 1.95 ft.

Elevation of Water Level: 264.03 ft./MSL

Sampling Depth: 20.00 ft.

Volume of Water Column: gal.

Total Well Depth: 26.30 ft.

Sampling Method: ☒ Pumped ☐ Bailed ☐ GrabWell Purged: ☒ Yes ☐ No

Well Volumes Purged: 4.26 L

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

Spring Flow Rate: GPM

Sample Date (mm/dd/yy): 05/19/2020

Sample Collection Time: 1:36PM

Sample Collector's Name: MIM

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): 200401159-001

Final Lab Analysis Completion Date: 06/12/2020

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	05/19/2020

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)	0.252	SM 4500-NH3-F
Bicarbonate (mg/l)	206	SM 2320B
Calcium, total (mg/l)	183	EPA 200.2/200.7/6010A
Calcium, dissolved (mg/l)	170	EPA 200.2/200.7/6010A
Chemical Oxygen Demand (mg/l)	20 <	SM 5220D
Chloride, total as Cl (mg/l)	21.5	EPA 300.0
Fluoride, total as F (mg/l)	0.31	EPA 300.0
Iron, total (µg/l)	1,270	EPA 200.2/200.7/6010A
Iron, dissolved (µg/l)	645	EPA 200.2/200.7/6010A
Magnesium, total (mg/l)	32.6	EPA 200.2/200.7/6010A
Magnesium, dissolved (mg/l)	30.5	EPA 200.2/200.7/6010A
Manganese, total (µg/l)	1,500	EPA 200.2/200.7/6010A
Manganese, dissolved (µg/l)	1,410	EPA 200.2/200.7/6010A
Nitrate, as N (mg/l)	0.012 ND	EPA 300.0
pH, field (su)	6.62	Field Meter
pH, lab (su)	6.98 H	SM 4500-H+B
Potassium, total (mg/l)	6.64	EPA 200.2/200.7/6010A
Potassium, dissolved (mg/l)	6.2	EPA 200.2/200.7/6010A
Sodium, total (mg/l)	21.2	EPA 200.2/200.7/6010A
Sodium, dissolved (mg/l)	19.5	EPA 200.2/200.7/6010A
Specific Conductance, field (umhos/cm)	1,077	Field Meter
Specific Conductance, lab (umhos/cm)	1,096	SM 2510 B
Sulfate, as SO4 (mg/l)	371	EPA 300.0
Alkalinity, total as CaCO3 (mg/l)	206	SM 2320B
Total Dissolved Solids (mg/l)	792	SM 2540B
Total Organic Carbon (mg/l)	1.02	SM 5310C
Turbidity, field (n.t.u.)	11.4	Field Meter
Dissolved O2, field (mg/l)	0.56	Field Meter
Redox, field (mv)	-23.9	Field Meter
Temperature, field (°c)	13.36	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	05/19/2020

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	05/19/2020

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)	0.548 ND	EPA 200.2/200.8/6020A
Arsenic, dissolved (µg/l)	0.548 ND	EPA 200.2/200.8/6020A
Barium, total (µg/l)	21.5	EPA 200.2/200.8/6020A
Barium, dissolved (µg/l)	20.6	EPA 200.2/200.8/6020A
Cadmium, total (µg/l)	0.152 ND	EPA 200.2/200.8/6020A
Cadmium, dissolved (µg/l)	0.152 ND	EPA 200.2/200.8/6020A
Chromium, total (µg/l)	0.411 ND	EPA 200.2/200.8/6020A
Chromium, dissolved (µg/l)	0.411 ND	EPA 200.2/200.8/6020A
Copper, total (µg/l)	0.39 ND	EPA 200.2/200.8/6020A
Copper, dissolved (µg/l)	0.39 ND	EPA 200.2/200.8/6020A
Lead, total (µg/l)	0.229 ND	EPA 200.2/200.8/6020A
Lead, dissolved (µg/l)	0.229 ND	EPA 200.2/200.8/6020A
Mercury, total (µg/l)	0.717 ND	EPA 200.8
Mercury, dissolved (µg/l)	0.717 ND	EPA 245.7
Selenium, total (µg/l)	0.632 ND	EPA 200.2/200.8/6020A
Selenium, dissolved (µg/l)	0.632 ND	EPA 200.2/200.8/6020A
Silver, total (µg/l)	0.132 ND	EPA 200.2/200.8/6020A
Silver, dissolved (µg/l)	0.132 ND	EPA 200.2/200.8/6020A
Zinc, total (µg/l)	5 <	EPA 200.0/200.8/6020
Zinc, dissolved (µg/l)	2.24 ND	EPA 200.0/200.8/6020
Boron, total (µg/l)	48.3 ND	EPA 200.2/200.7/6010A
Boron, dissolved (µg/l)	48.3 ND	EPA 200.2/200.7/6010A
Lithium, total (µg/l)	1.2	EPA 200.2/200.8/6020A
Lithium, dissolved (µg/l)	1 <	EPA 200.2/200.8/6020A
Molybdenum, total (µg/l)	1 <	EPA 200.2/200.8/6020A
Molybdenum, dissolved (µg/l)	1 <	EPA 200.2/200.8/6020A
Strontium, total (µg/l)	1,110	EPA 200.0/200.7/6010
Strontium, dissolved (µg/l)	1,010	EPA 200.0/200.7/6010

T Please indicate detection limit if analyte is not detected.

I.D. No.	301309
Monitoring Point No.	MW-8-1N
Sample Date	05/19/2020

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 200.0/200.7/6010
Aluminum, dissolved (µg/l)	26.8 ND	EPA 200.0/200.7/6010
Antimony, total (µg/l)	0.388 ND	EPA 200.2/200.8/6020A
Antimony, dissolved (µg/l)	0.388 ND	EPA 200.2/200.8/6020A
Beryllium, total (µg/l)	0.19 ND	EPA 200.2/200.8/6020A
Beryllium, dissolved (µg/l)	0.19 ND	EPA 200.2/200.8/6020A
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)	1.03	EPA 200.8
Rubidium, total (µg/l)		
Rubidium, dissolved (µg/l)		
Titanium, total (µg/l)	1.45 ND	EPA 200.2/200.8
Titanium, dissolved (µg/l)	1.45 ND	EPA 200.2/200.8
Vanadium, total (µg/l)	2.35 ND	EPA 200.8
Vanadium, dissolved (µg/l)	2.35 ND	EPA 200.8
Yttrium, total (µg/l)		
Yttrium, dissolved (µg/l)		

T Please indicate detection limit if analyte is not detected.


 Date Prepared/Revised
 07/13/2020

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: 6.49 ft.

Measured from: ☐ Land Surface ☒ TOC

Casing Stick Up: 2.00 ft.

Elevation of Water Level: 265.01 ft./MSL

Sampling Depth: 15.00 ft.

Volume of Water Column: gal.

Total Well Depth: 22.30 ft.

Sampling Method: ☒ Pumped ☐ Bailed ☐ GrabWell Purged: ☒ Yes ☐ No

Well Volumes Purged: 2.07 L

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

Spring Flow Rate: GPM

Sample Date (mm/dd/yy): 05/20/2020

Sample Collection Time: 4:56PM

Sample Collector's Name: MIM

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): 200401159-002

Final Lab Analysis Completion Date: 06/12/2020

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	05/20/2020

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)	0.329	SM 4500-NH3-F
Bicarbonate (mg/l)	121	SM 2320B
Calcium, total (mg/l)	80.4	EPA 200.2/200.7/6010A
Calcium, dissolved (mg/l)	74.2	EPA 200.2/200.7/6010A
Chemical Oxygen Demand (mg/l)	5.3 ND	SM 5220D
Chloride, total as Cl (mg/l)	25	EPA 300.0
Fluoride, total as F (mg/l)	1.05	EPA 300.0
Iron, total (µg/l)	20 <	EPA 200.2/200.7/6010A
Iron, dissolved (µg/l)	20 <	EPA 200.2/200.7/6010A
Magnesium, total (mg/l)	13.6	EPA 200.2/200.7/6010A
Magnesium, dissolved (mg/l)	12.5	EPA 200.2/200.7/6010A
Manganese, total (µg/l)	391	EPA 200.2/200.7/6010A
Manganese, dissolved (µg/l)	344	EPA 200.2/200.7/6010A
Nitrate, as N (mg/l)	0.012 ND	EPA 300.0
pH, field (su)	6.77	Field Meter
pH, lab (su)	7.06 H	SM 4500-H+B
Potassium, total (mg/l)	4.44	EPA 200.2/200.7/6010A
Potassium, dissolved (mg/l)	4.04	EPA 200.2/200.7/6010A
Sodium, total (mg/l)	13.2	EPA 200.2/200.7/6010A
Sodium, dissolved (mg/l)	12.3	EPA 200.2/200.7/6010A
Specific Conductance, field (umhos/cm)	526	Field Meter
Specific Conductance, lab (umhos/cm)	527	SM 2510 B
Sulfate, as SO4 (mg/l)	104	EPA 300.0
Alkalinity, total as CaCO3 (mg/l)	121	SM 2320B
Total Dissolved Solids (mg/l)	370	SM 2540B
Total Organic Carbon (mg/l)	0.726	SM 5310C
Turbidity, field (n.t.u.)	0.3	Field Meter
Dissolved O2, field (mg/l)	0.51	Field Meter
Redox, field (mv)	82.4	Field Meter
Temperature, field (°c)	13.9	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	05/20/2020

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	05/20/2020

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)	0.548 ND	EPA 200.2/200.8/6020A
Arsenic, dissolved (µg/l)	0.548 ND	EPA 200.2/200.8/6020A
Barium, total (µg/l)	25.8	EPA 200.2/200.8/6020A
Barium, dissolved (µg/l)	24.9	EPA 200.2/200.8/6020A
Cadmium, total (µg/l)	1 <	EPA 200.2/200.8/6020A
Cadmium, dissolved (µg/l)	1 <	EPA 200.2/200.8/6020A
Chromium, total (µg/l)	0.411 ND	EPA 200.2/200.8/6020A
Chromium, dissolved (µg/l)	0.411 ND	EPA 200.2/200.8/6020A
Copper, total (µg/l)	0.39 ND	EPA 200.2/200.8/6020A
Copper, dissolved (µg/l)	0.39 ND	EPA 200.2/200.8/6020A
Lead, total (µg/l)	0.229 ND	EPA 200.2/200.8/6020A
Lead, dissolved (µg/l)	0.229 ND	EPA 200.2/200.8/6020A
Mercury, total (µg/l)	0.717 ND	EPA 200.8
Mercury, dissolved (µg/l)	0.717 ND	EPA 245.7
Selenium, total (µg/l)	0.632 ND	EPA 200.2/200.8/6020A
Selenium, dissolved (µg/l)	0.632 ND	EPA 200.2/200.8/6020A
Silver, total (µg/l)	0.132 ND	EPA 200.2/200.8/6020A
Silver, dissolved (µg/l)	0.132 ND	EPA 200.2/200.8/6020A
Zinc, total (µg/l)	8.37	EPA 200.0/200.8/6020
Zinc, dissolved (µg/l)	5 <	EPA 200.0/200.8/6020
Boron, total (µg/l)	418	EPA 200.2/200.7/6010A
Boron, dissolved (µg/l)	381	EPA 200.2/200.7/6010A
Lithium, total (µg/l)	19.3	EPA 200.2/200.8/6020A
Lithium, dissolved (µg/l)	18.4	EPA 200.2/200.8/6020A
Molybdenum, total (µg/l)	258	EPA 200.2/200.8/6020A
Molybdenum, dissolved (µg/l)	263	EPA 200.2/200.8/6020A
Strontium, total (µg/l)	476	EPA 200.0/200.7/6010
Strontium, dissolved (µg/l)	437	EPA 200.0/200.7/6010

T Please indicate detection limit if analyte is not detected.

I.D. No.	301309
Monitoring Point No.	MW-8-2
Sample Date	05/20/2020

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 200.0/200.7/6010
Aluminum, dissolved (µg/l)	26.8 ND	EPA 200.0/200.7/6010
Antimony, total (µg/l)	0.388 ND	EPA 200.2/200.8/6020A
Antimony, dissolved (µg/l)	0.388 ND	EPA 200.2/200.8/6020A
Beryllium, total (µg/l)	0.19 ND	EPA 200.2/200.8/6020A
Beryllium, dissolved (µg/l)	0.19 ND	EPA 200.2/200.8/6020A
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)	1.21	EPA 200.8
Nickel, dissolved (µg/l)	1.26	EPA 200.8
Rubidium, total (µg/l)		
Rubidium, dissolved (µg/l)		
Titanium, total (µg/l)	1.45 ND	EPA 200.2/200.8
Titanium, dissolved (µg/l)	1.45 ND	EPA 200.2/200.8
Vanadium, total (µg/l)	2.35 ND	EPA 200.8
Vanadium, dissolved (µg/l)	2.35 ND	EPA 200.8
Yttrium, total (µg/l)		
Yttrium, dissolved (µg/l)		

T Please indicate detection limit if analyte is not detected.


 Date Prepared/Revised
 07/13/2020

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: 13.61 ft.

Measured from: ☐ Land Surface ☒ TOC

Casing Stick Up: 1.72 ft.

Elevation of Water Level: 253.77 ft./MSL

Sampling Depth: 20.00 ft.

Volume of Water Column: gal.

Total Well Depth: 26.90 ft.

Sampling Method: ☒ Pumped ☐ Bailed ☐ GrabWell Purged: ☒ Yes ☐ No

Well Volumes Purged: 3.02 L

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

Spring Flow Rate: GPM

Sample Date (mm/dd/yy): 05/20/2020

Sample Collection Time: 2:45PM

Sample Collector's Name: MIM

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): 200401159-003

Final Lab Analysis Completion Date: 06/12/2020

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	05/20/2020

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)	0.368	SM 4500-NH3-F
Bicarbonate (mg/l)	191	SM 2320B
Calcium, total (mg/l)	159	EPA 200.2/200.7/6010A
Calcium, dissolved (mg/l)	151	EPA 200.2/200.7/6010A
Chemical Oxygen Demand (mg/l)	20 <	SM 5220D
Chloride, total as Cl (mg/l)	27.4	EPA 300.0
Fluoride, total as F (mg/l)	0.53	EPA 300.0
Iron, total (µg/l)	12,600	EPA 200.2/200.7/6010A
Iron, dissolved (µg/l)	5,090	EPA 200.2/200.7/6010A
Magnesium, total (mg/l)	33.2	EPA 200.2/200.7/6010A
Magnesium, dissolved (mg/l)	32.2	EPA 200.2/200.7/6010A
Manganese, total (µg/l)	8,750	EPA 200.2/200.7/6010A
Manganese, dissolved (µg/l)	8,250	EPA 200.2/200.7/6010A
Nitrate, as N (mg/l)	0.012 ND	EPA 300.0
pH, field (su)	6.34	Field Meter
pH, lab (su)	6.61 H	SM 4500-H+B
Potassium, total (mg/l)	3.04	EPA 200.2/200.7/6010A
Potassium, dissolved (mg/l)	2.95	EPA 200.2/200.7/6010A
Sodium, total (mg/l)	10.5	EPA 200.2/200.7/6010A
Sodium, dissolved (mg/l)	10.1	EPA 200.2/200.7/6010A
Specific Conductance, field (umhos/cm)	992	Field Meter
Specific Conductance, lab (umhos/cm)	998	SM 2510 B
Sulfate, as SO4 (mg/l)	324	EPA 300.0
Alkalinity, total as CaCO3 (mg/l)	191	SM 2320B
Total Dissolved Solids (mg/l)	746	SM 2540B
Total Organic Carbon (mg/l)	1.91	SM 5310C
Turbidity, field (n.t.u.)	117	Field Meter
Dissolved O2, field (mg/l)	0.61	Field Meter
Redox, field (mv)	-27.5	Field Meter
Temperature, field (°c)	13.01	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	05/20/2020

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	05/20/2020

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)	20.5	EPA 200.2/200.8/6020A
Arsenic, dissolved (µg/l)	5.72	EPA 200.2/200.8/6020A
Barium, total (µg/l)	40.8	EPA 200.2/200.8/6020A
Barium, dissolved (µg/l)	34.8	EPA 200.2/200.8/6020A
Cadmium, total (µg/l)	0.152 ND	EPA 200.2/200.8/6020A
Cadmium, dissolved (µg/l)	0.152 ND	EPA 200.2/200.8/6020A
Chromium, total (µg/l)	0.411 ND	EPA 200.2/200.8/6020A
Chromium, dissolved (µg/l)	0.411 ND	EPA 200.2/200.8/6020A
Copper, total (µg/l)	0.39 ND	EPA 200.2/200.8/6020A
Copper, dissolved (µg/l)	0.39 ND	EPA 200.2/200.8/6020A
Lead, total (µg/l)	0.229 ND	EPA 200.2/200.8/6020A
Lead, dissolved (µg/l)	0.229 ND	EPA 200.2/200.8/6020A
Mercury, total (µg/l)	0.717 ND	EPA 200.8
Mercury, dissolved (µg/l)	0.717 ND	EPA 245.7
Selenium, total (µg/l)	0.632 ND	EPA 200.2/200.8/6020A
Selenium, dissolved (µg/l)	0.632 ND	EPA 200.2/200.8/6020A
Silver, total (µg/l)	0.132 ND	EPA 200.2/200.8/6020A
Silver, dissolved (µg/l)	0.132 ND	EPA 200.2/200.8/6020A
Zinc, total (µg/l)	5 <	EPA 200.0/200.8/6020
Zinc, dissolved (µg/l)	2.24 ND	EPA 200.0/200.8/6020
Boron, total (µg/l)	383	EPA 200.2/200.7/6010A
Boron, dissolved (µg/l)	375	EPA 200.2/200.7/6010A
Lithium, total (µg/l)	14.5	EPA 200.2/200.8/6020A
Lithium, dissolved (µg/l)	13.3	EPA 200.2/200.8/6020A
Molybdenum, total (µg/l)	57.7	EPA 200.2/200.8/6020A
Molybdenum, dissolved (µg/l)	48.5	EPA 200.2/200.8/6020A
Strontium, total (µg/l)	931	EPA 200.0/200.7/6010
Strontium, dissolved (µg/l)	908	EPA 200.0/200.7/6010

T Please indicate detection limit if analyte is not detected.

I.D. No.	301309
Monitoring Point No.	MW-8-3A
Sample Date	05/20/2020

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 200.0/200.7/6010
Aluminum, dissolved (µg/l)	26.8 ND	EPA 200.0/200.7/6010
Antimony, total (µg/l)	0.388 ND	EPA 200.2/200.8/6020A
Antimony, dissolved (µg/l)	0.388 ND	EPA 200.2/200.8/6020A
Beryllium, total (µg/l)	0.19 ND	EPA 200.2/200.8/6020A
Beryllium, dissolved (µg/l)	0.19 ND	EPA 200.2/200.8/6020A
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)	2.78	EPA 200.8
Nickel, dissolved (µg/l)	2.42	EPA 200.8
Rubidium, total (µg/l)		
Rubidium, dissolved (µg/l)		
Titanium, total (µg/l)	1.45 ND	EPA 200.2/200.8
Titanium, dissolved (µg/l)	1.45 ND	EPA 200.2/200.8
Vanadium, total (µg/l)	2.35 ND	EPA 200.8
Vanadium, dissolved (µg/l)	2.35 ND	EPA 200.8
Yttrium, total (µg/l)		
Yttrium, dissolved (µg/l)		

T Please indicate detection limit if analyte is not detected.


 Date Prepared/Revised
 07/13/2020

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: 14.72 ft.

Measured from: ☐ Land Surface ☒ TOC

Casing Stick Up: 1.90 ft.

Elevation of Water Level: 252.99 ft./MSL

Sampling Depth: 40.00 ft.

Volume of Water Column: gal.

Total Well Depth: 47.00 ft.

Sampling Method: ☒ Pumped ☐ Bailed ☐ GrabWell Purged: ☒ Yes ☐ No

Well Volumes Purged: 1.53 L

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

Spring Flow Rate: GPM

Sample Date (mm/dd/yy): 05/20/2020

Sample Collection Time: 3:51PM

Sample Collector's Name: MIM

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): 200401159-004

Final Lab Analysis Completion Date: 06/12/2020

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	05/20/2020

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)	254	SM 2320B
Calcium, total (mg/l)	128	EPA 200.2/200.7/6010A
Calcium, dissolved (mg/l)	121	EPA 200.2/200.7/6010A
Chemical Oxygen Demand (mg/l)	5.3 ND	SM 5220D
Chloride, total as Cl (mg/l)	13.1	EPA 300.0
Fluoride, total as F (mg/l)	0.6	EPA 300.0
Iron, total (µg/l)	847	EPA 200.2/200.7/6010A
Iron, dissolved (µg/l)	20 <	EPA 200.2/200.7/6010A
Magnesium, total (mg/l)	24.3	EPA 200.2/200.7/6010A
Magnesium, dissolved (mg/l)	22.3	EPA 200.2/200.7/6010A
Manganese, total (µg/l)	1,480	EPA 200.2/200.7/6010A
Manganese, dissolved (µg/l)	612	EPA 200.2/200.7/6010A
Nitrate, as N (mg/l)	0.5 <	EPA 300.0
pH, field (su)	6.91	Field Meter
pH, lab (su)	7.18 H	SM 4500-H+B
Potassium, total (mg/l)	1.64	EPA 200.2/200.7/6010A
Potassium, dissolved (mg/l)	1.5	EPA 200.2/200.7/6010A
Sodium, total (mg/l)	6.67	EPA 200.2/200.7/6010A
Sodium, dissolved (mg/l)	6.26	EPA 200.2/200.7/6010A
Specific Conductance, field (umhos/cm)	739	Field Meter
Specific Conductance, lab (umhos/cm)	738	SM 2510 B
Sulfate, as SO4 (mg/l)	136	EPA 300.0
Alkalinity, total as CaCO3 (mg/l)	254	SM 2320B
Total Dissolved Solids (mg/l)	503	SM 2540B
Total Organic Carbon (mg/l)	0.845	SM 5310C
Turbidity, field (n.t.u.)	11.6	Field Meter
Dissolved O2, field (mg/l)	0.49	Field Meter
Redox, field (mv)	38	Field Meter
Temperature, field (°c)	13.34	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	05/20/2020

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	05/20/2020

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)	11.6	EPA 200.2/200.8/6020A
Arsenic, dissolved (µg/l)	2.61	EPA 200.2/200.8/6020A
Barium, total (µg/l)	56.6	EPA 200.2/200.8/6020A
Barium, dissolved (µg/l)	44.2	EPA 200.2/200.8/6020A
Cadmium, total (µg/l)	1 <	EPA 200.2/200.8/6020A
Cadmium, dissolved (µg/l)	1 <	EPA 200.2/200.8/6020A
Chromium, total (µg/l)	0.411 ND	EPA 200.2/200.8/6020A
Chromium, dissolved (µg/l)	0.411 ND	EPA 200.2/200.8/6020A
Copper, total (µg/l)	0.39 ND	EPA 200.2/200.8/6020A
Copper, dissolved (µg/l)	0.39 ND	EPA 200.2/200.8/6020A
Lead, total (µg/l)	0.229 ND	EPA 200.2/200.8/6020A
Lead, dissolved (µg/l)	0.229 ND	EPA 200.2/200.8/6020A
Mercury, total (µg/l)	0.717 ND	EPA 200.8
Mercury, dissolved (µg/l)	0.717 ND	EPA 245.7
Selenium, total (µg/l)	0.632 ND	EPA 200.2/200.8/6020A
Selenium, dissolved (µg/l)	0.632 ND	EPA 200.2/200.8/6020A
Silver, total (µg/l)	0.132 ND	EPA 200.2/200.8/6020A
Silver, dissolved (µg/l)	0.132 ND	EPA 200.2/200.8/6020A
Zinc, total (µg/l)	2.24 ND	EPA 200.0/200.8/6020
Zinc, dissolved (µg/l)	2.24 ND	EPA 200.0/200.8/6020
Boron, total (µg/l)	361	EPA 200.2/200.7/6010A
Boron, dissolved (µg/l)	330	EPA 200.2/200.7/6010A
Lithium, total (µg/l)	23.3	EPA 200.2/200.8/6020A
Lithium, dissolved (µg/l)	22.4	EPA 200.2/200.8/6020A
Molybdenum, total (µg/l)	150	EPA 200.2/200.8/6020A
Molybdenum, dissolved (µg/l)	143	EPA 200.2/200.8/6020A
Strontium, total (µg/l)	388	EPA 200.0/200.7/6010
Strontium, dissolved (µg/l)	367	EPA 200.0/200.7/6010

T Please indicate detection limit if analyte is not detected.

I.D. No.	301309
Monitoring Point No.	MW-8-3B
Sample Date	05/20/2020

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 200.0/200.7/6010
Aluminum, dissolved (µg/l)	26.8 ND	EPA 200.0/200.7/6010
Antimony, total (µg/l)	0.388 ND	EPA 200.2/200.8/6020A
Antimony, dissolved (µg/l)	0.388 ND	EPA 200.2/200.8/6020A
Beryllium, total (µg/l)	0.19 ND	EPA 200.2/200.8/6020A
Beryllium, dissolved (µg/l)	0.19 ND	EPA 200.2/200.8/6020A
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)	1 <	EPA 200.8
Rubidium, total (µg/l)		
Rubidium, dissolved (µg/l)		
Titanium, total (µg/l)	1.45 ND	EPA 200.2/200.8
Titanium, dissolved (µg/l)	1.45 ND	EPA 200.2/200.8
Vanadium, total (µg/l)	2.35 ND	EPA 200.8
Vanadium, dissolved (µg/l)	2.35 ND	EPA 200.8
Yttrium, total (µg/l)		
Yttrium, dissolved (µg/l)		

T Please indicate detection limit if analyte is not detected.


 Date Prepared/Revised
 07/13/2020

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: 15.92 ft.

Measured from: ☐ Land Surface ☒ TOC

Casing Stick Up: 1.81 ft.

Elevation of Water Level: 254.27 ft./MSL

Sampling Depth: 18.00 ft.

Volume of Water Column: gal.

Total Well Depth: 21.70 ft.

Sampling Method: ☒ Pumped ☐ Bailed ☐ GrabWell Purged: ☒ Yes ☐ No

Well Volumes Purged: 1.84 L

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

Spring Flow Rate: GPM

Sample Date (mm/dd/yy): 05/20/2020

Sample Collection Time: 1:05PM

Sample Collector's Name: MIM

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): 200401159-005

Final Lab Analysis Completion Date: 06/12/2020

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	05/20/2020

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)	0.304	SM 4500-NH3-F
Bicarbonate (mg/l)	44.8	SM 2320B
Calcium, total (mg/l)	133	EPA 200.2/200.7/6010A
Calcium, dissolved (mg/l)	124	EPA 200.2/200.7/6010A
Chemical Oxygen Demand (mg/l)	20 <	SM 5220D
Chloride, total as Cl (mg/l)	21.4	EPA 300.0
Fluoride, total as F (mg/l)	0.38	EPA 300.0
Iron, total (µg/l)	20 <	EPA 200.2/200.7/6010A
Iron, dissolved (µg/l)	1.02 ND	EPA 200.2/200.7/6010A
Magnesium, total (mg/l)	45	EPA 200.2/200.7/6010A
Magnesium, dissolved (mg/l)	42.9	EPA 200.2/200.7/6010A
Manganese, total (µg/l)	13,900	EPA 200.2/200.7/6010A
Manganese, dissolved (µg/l)	12,600	EPA 200.2/200.7/6010A
Nitrate, as N (mg/l)	0.012 ND	EPA 300.0
pH, field (su)	5.5	Field Meter
pH, lab (su)	5.95 H	SM 4500-H+B
Potassium, total (mg/l)	1.78	EPA 200.2/200.7/6010A
Potassium, dissolved (mg/l)	1.66	EPA 200.2/200.7/6010A
Sodium, total (mg/l)	16.6	EPA 200.2/200.7/6010A
Sodium, dissolved (mg/l)	15.6	EPA 200.2/200.7/6010A
Specific Conductance, field (umhos/cm)	1,013	Field Meter
Specific Conductance, lab (umhos/cm)	1,029	SM 2510 B
Sulfate, as SO4 (mg/l)	471	EPA 300.0
Alkalinity, total as CaCO3 (mg/l)	44.8	SM 2320B
Total Dissolved Solids (mg/l)	833	SM 2540B
Total Organic Carbon (mg/l)	0.676	SM 5310C
Turbidity, field (n.t.u.)	0.3	Field Meter
Dissolved O2, field (mg/l)	0.75	Field Meter
Redox, field (mv)	253.9	Field Meter
Temperature, field (°c)	12.58	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	05/20/2020

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	05/20/2020

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)	0.548 ND	EPA 200.2/200.8/6020A
Arsenic, dissolved (µg/l)	0.548 ND	EPA 200.2/200.8/6020A
Barium, total (µg/l)	12.7	EPA 200.2/200.8/6020A
Barium, dissolved (µg/l)	12.9	EPA 200.2/200.8/6020A
Cadmium, total (µg/l)	1.32	EPA 200.2/200.8/6020A
Cadmium, dissolved (µg/l)	1.43	EPA 200.2/200.8/6020A
Chromium, total (µg/l)	0.411 ND	EPA 200.2/200.8/6020A
Chromium, dissolved (µg/l)	0.411 ND	EPA 200.2/200.8/6020A
Copper, total (µg/l)	1 <	EPA 200.2/200.8/6020A
Copper, dissolved (µg/l)	0.39 ND	EPA 200.2/200.8/6020A
Lead, total (µg/l)	0.229 ND	EPA 200.2/200.8/6020A
Lead, dissolved (µg/l)	0.229 ND	EPA 200.2/200.8/6020A
Mercury, total (µg/l)	0.717 ND	EPA 200.8
Mercury, dissolved (µg/l)	0.717 ND	EPA 245.7
Selenium, total (µg/l)	0.632 ND	EPA 200.2/200.8/6020A
Selenium, dissolved (µg/l)	0.632 ND	EPA 200.2/200.8/6020A
Silver, total (µg/l)	0.132 ND	EPA 200.2/200.8/6020A
Silver, dissolved (µg/l)	0.132 ND	EPA 200.2/200.8/6020A
Zinc, total (µg/l)	78.7	EPA 200.0/200.8/6020
Zinc, dissolved (µg/l)	87.8	EPA 200.0/200.8/6020
Boron, total (µg/l)	350	EPA 200.2/200.7/6010A
Boron, dissolved (µg/l)	326	EPA 200.2/200.7/6010A
Lithium, total (µg/l)	16.2	EPA 200.2/200.8/6020A
Lithium, dissolved (µg/l)	19.5	EPA 200.2/200.8/6020A
Molybdenum, total (µg/l)	1 <	EPA 200.2/200.8/6020A
Molybdenum, dissolved (µg/l)	0.3 ND	EPA 200.2/200.8/6020A
Strontium, total (µg/l)	342	EPA 200.0/200.7/6010
Strontium, dissolved (µg/l)	323	EPA 200.0/200.7/6010

T Please indicate detection limit if analyte is not detected.

I.D. No.	301309
Monitoring Point No.	MW-8-4
Sample Date	05/20/2020

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)	283	EPA 200.0/200.7/6010
Aluminum, dissolved (µg/l)	147	EPA 200.0/200.7/6010
Antimony, total (µg/l)	0.388 ND	EPA 200.2/200.8/6020A
Antimony, dissolved (µg/l)	0.388 ND	EPA 200.2/200.8/6020A
Beryllium, total (µg/l)	1 <	EPA 200.2/200.8/6020A
Beryllium, dissolved (µg/l)	1 <	EPA 200.2/200.8/6020A
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)	92.9	EPA 200.8
Nickel, dissolved (µg/l)	96	EPA 200.8
Rubidium, total (µg/l)		
Rubidium, dissolved (µg/l)		
Titanium, total (µg/l)	1.45 ND	EPA 200.2/200.8
Titanium, dissolved (µg/l)	1.45 ND	EPA 200.2/200.8
Vanadium, total (µg/l)	2.35 ND	EPA 200.8
Vanadium, dissolved (µg/l)	2.35 ND	EPA 200.8
Yttrium, total (µg/l)		
Yttrium, dissolved (µg/l)		

T Please indicate detection limit if analyte is not detected.


 Date Prepared/Revised
 07/13/2020

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: 26.5 ft.

Measured from: ☐ Land Surface ☒ TOC

Casing Stick Up: 1.97 ft.

Elevation of Water Level: 258.54 ft./MSL

Sampling Depth: 33.00 ft.

Volume of Water Column: gal.

Total Well Depth: 39.20 ft.

Sampling Method: ☒ Pumped ☐ Bailed ☐ GrabWell Purged: ☒ Yes ☐ No

Well Volumes Purged: 3.29 L

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

Spring Flow Rate: GPM

Sample Date (mm/dd/yy): 05/20/2020

Sample Collection Time: 10:15AM

Sample Collector's Name: MIM

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): 200401159-006

Final Lab Analysis Completion Date: 06/12/2020

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	05/20/2020

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)	0.47	SM 4500-NH3-F
Bicarbonate (mg/l)	263	SM 2320B
Calcium, total (mg/l)	172	EPA 200.2/200.7/6010A
Calcium, dissolved (mg/l)	161	EPA 200.2/200.7/6010A
Chemical Oxygen Demand (mg/l)	5.3 ND	SM 5220D
Chloride, total as Cl (mg/l)	24.3	EPA 300.0
Fluoride, total as F (mg/l)	1.06	EPA 300.0
Iron, total (µg/l)	20 <	EPA 200.2/200.7/6010A
Iron, dissolved (µg/l)	1.02 ND	EPA 200.2/200.7/6010A
Magnesium, total (mg/l)	38.9	EPA 200.2/200.7/6010A
Magnesium, dissolved (mg/l)	35.9	EPA 200.2/200.7/6010A
Manganese, total (µg/l)	443	EPA 200.2/200.7/6010A
Manganese, dissolved (µg/l)	395	EPA 200.2/200.7/6010A
Nitrate, as N (mg/l)	0.012 ND	EPA 300.0
pH, field (su)	7	Field Meter
pH, lab (su)	7.37 H	SM 4500-H+B
Potassium, total (mg/l)	4.35	EPA 200.2/200.7/6010A
Potassium, dissolved (mg/l)	4.09	EPA 200.2/200.7/6010A
Sodium, total (mg/l)	11.2	EPA 200.2/200.7/6010A
Sodium, dissolved (mg/l)	10.6	EPA 200.2/200.7/6010A
Specific Conductance, field (umhos/cm)	1,055	Field Meter
Specific Conductance, lab (umhos/cm)	1,064	SM 2510 B
Sulfate, as SO4 (mg/l)	302	EPA 300.0
Alkalinity, total as CaCO3 (mg/l)	263	SM 2320B
Total Dissolved Solids (mg/l)	756	SM 2540B
Total Organic Carbon (mg/l)	0.613	SM 5310C
Turbidity, field (n.t.u.)	0	Field Meter
Dissolved O2, field (mg/l)	0.64	Field Meter
Redox, field (mv)	104.7	Field Meter
Temperature, field (°c)	14.1	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	05/20/2020

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	05/20/2020

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)	132	EPA 200.2/200.8/6020A
Arsenic, dissolved (µg/l)	126	EPA 200.2/200.8/6020A
Barium, total (µg/l)	47.6	EPA 200.2/200.8/6020A
Barium, dissolved (µg/l)	44.5	EPA 200.2/200.8/6020A
Cadmium, total (µg/l)	1 <	EPA 200.2/200.8/6020A
Cadmium, dissolved (µg/l)	1 <	EPA 200.2/200.8/6020A
Chromium, total (µg/l)	0.411 ND	EPA 200.2/200.8/6020A
Chromium, dissolved (µg/l)	0.411 ND	EPA 200.2/200.8/6020A
Copper, total (µg/l)	2.45	EPA 200.2/200.8/6020A
Copper, dissolved (µg/l)	1.2	EPA 200.2/200.8/6020A
Lead, total (µg/l)	1 <	EPA 200.2/200.8/6020A
Lead, dissolved (µg/l)	0.229 ND	EPA 200.2/200.8/6020A
Mercury, total (µg/l)	0.717 ND	EPA 200.8
Mercury, dissolved (µg/l)	0.717 ND	EPA 245.7
Selenium, total (µg/l)	0.632 ND	EPA 200.2/200.8/6020A
Selenium, dissolved (µg/l)	0.632 ND	EPA 200.2/200.8/6020A
Silver, total (µg/l)	0.132 ND	EPA 200.2/200.8/6020A
Silver, dissolved (µg/l)	0.132 ND	EPA 200.2/200.8/6020A
Zinc, total (µg/l)	5 <	EPA 200.0/200.8/6020
Zinc, dissolved (µg/l)	5 <	EPA 200.0/200.8/6020
Boron, total (µg/l)	893	EPA 200.2/200.7/6010A
Boron, dissolved (µg/l)	825	EPA 200.2/200.7/6010A
Lithium, total (µg/l)	168	EPA 200.2/200.8/6020A
Lithium, dissolved (µg/l)	236	EPA 200.2/200.8/6020A
Molybdenum, total (µg/l)	365	EPA 200.2/200.8/6020A
Molybdenum, dissolved (µg/l)	398	EPA 200.2/200.8/6020A
Strontium, total (µg/l)	797	EPA 200.0/200.7/6010
Strontium, dissolved (µg/l)	741	EPA 200.0/200.7/6010

T Please indicate detection limit if analyte is not detected.

I.D. No.	301309
Monitoring Point No.	MW-8-5A
Sample Date	05/20/2020

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 200.0/200.7/6010
Aluminum, dissolved (µg/l)	26.8 ND	EPA 200.0/200.7/6010
Antimony, total (µg/l)	0.388 ND	EPA 200.2/200.8/6020A
Antimony, dissolved (µg/l)	0.388 ND	EPA 200.2/200.8/6020A
Beryllium, total (µg/l)	0.19 ND	EPA 200.2/200.8/6020A
Beryllium, dissolved (µg/l)	0.19 ND	EPA 200.2/200.8/6020A
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)	1 <	EPA 200.8
Rubidium, total (µg/l)		
Rubidium, dissolved (µg/l)		
Titanium, total (µg/l)	1.45 ND	EPA 200.2/200.8
Titanium, dissolved (µg/l)	1.45 ND	EPA 200.2/200.8
Vanadium, total (µg/l)	2.35 ND	EPA 200.8
Vanadium, dissolved (µg/l)	2.35 ND	EPA 200.8
Yttrium, total (µg/l)		
Yttrium, dissolved (µg/l)		

T Please indicate detection limit if analyte is not detected.


 Date Prepared/Revised
 07/13/2020

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: 19.51 ft.

 Measured from: ☐ Land Surface ☒ TOC

Casing Stick Up: 2.54 ft.

Elevation of Water Level: 265.37 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: 0.98 L

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

Spring Flow Rate: GPM

Sample Date (mm/dd/yy): 05/20/2020

Sample Collection Time: 11:15AM

Sample Collector's Name: MIM

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): 200401159-007

Final Lab Analysis Completion Date: 06/12/2020

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	05/20/2020

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)	0.4	SM 4500-NH3-F
Bicarbonate (mg/l)	239	SM 2320B
Calcium, total (mg/l)	160	EPA 200.2/200.7/6010A
Calcium, dissolved (mg/l)	155	EPA 200.2/200.7/6010A
Chemical Oxygen Demand (mg/l)	5.3 ND	SM 5220D
Chloride, total as Cl (mg/l)	16.9	EPA 300.0
Fluoride, total as F (mg/l)	0.81	EPA 300.0
Iron, total (µg/l)	20 <	EPA 200.2/200.7/6010A
Iron, dissolved (µg/l)	1.02 ND	EPA 200.2/200.7/6010A
Magnesium, total (mg/l)	31.8	EPA 200.2/200.7/6010A
Magnesium, dissolved (mg/l)	30.8	EPA 200.2/200.7/6010A
Manganese, total (µg/l)	424	EPA 200.2/200.7/6010A
Manganese, dissolved (µg/l)	392	EPA 200.2/200.7/6010A
Nitrate, as N (mg/l)	0.012 ND	EPA 300.0
pH, field (su)	7.21	Field Meter
pH, lab (su)	7.47 H	SM 4500-H+B
Potassium, total (mg/l)	4.09	EPA 200.2/200.7/6010A
Potassium, dissolved (mg/l)	3.95	EPA 200.2/200.7/6010A
Sodium, total (mg/l)	9.56	EPA 200.2/200.7/6010A
Sodium, dissolved (mg/l)	9.33	EPA 200.2/200.7/6010A
Specific Conductance, field (umhos/cm)	970	Field Meter
Specific Conductance, lab (umhos/cm)	980	SM 2510 B
Sulfate, as SO4 (mg/l)	279	EPA 300.0
Alkalinity, total as CaCO3 (mg/l)	239	SM 2320B
Total Dissolved Solids (mg/l)	687	SM 2540B
Total Organic Carbon (mg/l)	0.552	SM 5310C
Turbidity, field (n.t.u.)	0.1	Field Meter
Dissolved O2, field (mg/l)	1.48	Field Meter
Redox, field (mv)	74.9	Field Meter
Temperature, field (°c)	14.58	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	05/20/2020

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	05/20/2020

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)	260	EPA 200.2/200.8/6020A
Arsenic, dissolved (µg/l)	242	EPA 200.2/200.8/6020A
Barium, total (µg/l)	62	EPA 200.2/200.8/6020A
Barium, dissolved (µg/l)	65	EPA 200.2/200.8/6020A
Cadmium, total (µg/l)	1 <	EPA 200.2/200.8/6020A
Cadmium, dissolved (µg/l)	1 <	EPA 200.2/200.8/6020A
Chromium, total (µg/l)	0.411 ND	EPA 200.2/200.8/6020A
Chromium, dissolved (µg/l)	0.411 ND	EPA 200.2/200.8/6020A
Copper, total (µg/l)	1 <	EPA 200.2/200.8/6020A
Copper, dissolved (µg/l)	0.39 ND	EPA 200.2/200.8/6020A
Lead, total (µg/l)	0.229 ND	EPA 200.2/200.8/6020A
Lead, dissolved (µg/l)	0.229 ND	EPA 200.2/200.8/6020A
Mercury, total (µg/l)	0.717 ND	EPA 200.8
Mercury, dissolved (µg/l)	0.717 ND	EPA 245.7
Selenium, total (µg/l)	0.632 ND	EPA 200.2/200.8/6020A
Selenium, dissolved (µg/l)	0.632 ND	EPA 200.2/200.8/6020A
Silver, total (µg/l)	0.132 ND	EPA 200.2/200.8/6020A
Silver, dissolved (µg/l)	0.132 ND	EPA 200.2/200.8/6020A
Zinc, total (µg/l)	2.24 ND	EPA 200.0/200.8/6020
Zinc, dissolved (µg/l)	2.24 ND	EPA 200.0/200.8/6020
Boron, total (µg/l)	829	EPA 200.2/200.7/6010A
Boron, dissolved (µg/l)	800	EPA 200.2/200.7/6010A
Lithium, total (µg/l)	140	EPA 200.2/200.8/6020A
Lithium, dissolved (µg/l)	178	EPA 200.2/200.8/6020A
Molybdenum, total (µg/l)	327	EPA 200.2/200.8/6020A
Molybdenum, dissolved (µg/l)	310	EPA 200.2/200.8/6020A
Strontium, total (µg/l)	925	EPA 200.0/200.7/6010
Strontium, dissolved (µg/l)	892	EPA 200.0/200.7/6010

T Please indicate detection limit if analyte is not detected.

I.D. No.	301309
Monitoring Point No.	MW-8-5B
Sample Date	05/20/2020

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 200.0/200.7/6010
Aluminum, dissolved (µg/l)	26.8 ND	EPA 200.0/200.7/6010
Antimony, total (µg/l)	0.388 ND	EPA 200.2/200.8/6020A
Antimony, dissolved (µg/l)	0.388 ND	EPA 200.2/200.8/6020A
Beryllium, total (µg/l)	0.19 ND	EPA 200.2/200.8/6020A
Beryllium, dissolved (µg/l)	0.19 ND	EPA 200.2/200.8/6020A
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)	1 <	EPA 200.8
Rubidium, total (µg/l)		
Rubidium, dissolved (µg/l)		
Titanium, total (µg/l)	1.45 ND	EPA 200.2/200.8
Titanium, dissolved (µg/l)	1.45 ND	EPA 200.2/200.8
Vanadium, total (µg/l)	2.35 ND	EPA 200.8
Vanadium, dissolved (µg/l)	2.35 ND	EPA 200.8
Yttrium, total (µg/l)		
Yttrium, dissolved (µg/l)		

T Please indicate detection limit if analyte is not detected.


 Date Prepared/Revised
 07/13/2020

DEP USE ONLY

Date Received

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

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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: 12.12 ft.

Measured from: ☐ Land Surface ☒ TOC

Casing Stick Up: 2.04 ft.

Elevation of Water Level: 259.646 ft./MSL

Sampling Depth: 19.00 ft.

Volume of Water Column: gal.

Total Well Depth: ft.

Sampling Method: ☒ Pumped ☐ Bailed ☐ GrabWell Purged: ☒ Yes ☐ No

Well Volumes Purged: 2.75 L

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

Spring Flow Rate: GPM

Sample Date (mm/dd/yy): 05/19/2020

Sample Collection Time: 5:32PM

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): 200401160-001

Final Lab Analysis Completion Date: 06/12/2020

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	05/19/2020

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)	63.4	SM 2320B
Calcium, total (mg/l)	137	EPA 200.2/200.7/6010A
Calcium, dissolved (mg/l)		
Chemical Oxygen Demand (mg/l)	20 <	SM 5220D
Chloride, total as Cl (mg/l)	4.68	EPA 300.0
Fluoride, total as F (mg/l)	0.33	EPA 300.0
Iron, total (µg/l)	74	EPA 200.2/200.7/6010A
Iron, dissolved (µg/l)		
Magnesium, total (mg/l)	31.3	EPA 200.2/200.7/6010A
Magnesium, dissolved (mg/l)		
Manganese, total (µg/l)	8,950	EPA 200.2/200.7/6010A
Manganese, dissolved (µg/l)		
Nitrate, as N (mg/l)	0.5 <	EPA 300.0
pH, field (su)	5.88	Field Meter
pH, lab (su)	6.06 H	SM 4500-H+B
Potassium, total (mg/l)	36.1	EPA 200.2/200.7/6010A
Potassium, dissolved (mg/l)		
Sodium, total (mg/l)	43.3	EPA 200.2/200.7/6010A
Sodium, dissolved (mg/l)		
Specific Conductance, field (umhos/cm)	1,190	Field Meter
Specific Conductance, lab (umhos/cm)	1,198	SM 2510 B
Sulfate, as SO4 (mg/l)	546	EPA 300.0
Alkalinity, total as CaCO3 (mg/l)	63.4	SM 2320B
Total Dissolved Solids (mg/l)	880	SM 2540B
Total Organic Carbon (mg/l)	1.11	SM 5310C
Turbidity, field (n.t.u.)	1.81	Field Meter
Dissolved O2, field (mg/l)	0.35	Field Meter
Redox, field (mv)	392	Field Meter
Temperature, field (°c)	12.3	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	05/19/2020

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	05/19/2020

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)	0.548 ND	EPA 200.2/200.8/6020A
Arsenic, dissolved (µg/l)		
Barium, total (µg/l)	21	EPA 200.2/200.8/6020A
Barium, dissolved (µg/l)		
Cadmium, total (µg/l)	1.22	EPA 200.2/200.8/6020A
Cadmium, dissolved (µg/l)		
Chromium, total (µg/l)	1 <	EPA 200.2/200.8/6020A
Chromium, dissolved (µg/l)		
Copper, total (µg/l)	1 <	EPA 200.2/200.8/6020A
Copper, dissolved (µg/l)		
Lead, total (µg/l)	0.229 ND	EPA 200.2/200.8/6020A
Lead, dissolved (µg/l)		
Mercury, total (µg/l)	0.717 ND	EPA 200.8
Mercury, dissolved (µg/l)		
Selenium, total (µg/l)	0.632 ND	EPA 200.2/200.8/6020A
Selenium, dissolved (µg/l)		
Silver, total (µg/l)	0.132 ND	EPA 200.2/200.8/6020A
Silver, dissolved (µg/l)		
Zinc, total (µg/l)	52.8	EPA 200.0/200.8/6020
Zinc, dissolved (µg/l)		
Boron, total (µg/l)	1,020	EPA 200.2/200.7/6010A
Boron, dissolved (µg/l)		
Lithium, total (µg/l)	525	EPA 200.2/200.8/6020A
Lithium, dissolved (µg/l)		
Molybdenum, total (µg/l)	174	EPA 200.2/200.8/6020A
Molybdenum, dissolved (µg/l)		
Strontium, total (µg/l)	950	EPA 200.0/200.7/6010
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	05/19/2020

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)	349	EPA 200.0/200.7/6010
Aluminum, dissolved (µg/l)		
Antimony, total (µg/l)	0.388 ND	EPA 200.2/200.8/6020A
Antimony, dissolved (µg/l)		
Beryllium, total (µg/l)	1 <	EPA 200.2/200.8/6020A
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)	42.4	EPA 200.8
Nickel, dissolved (µg/l)		
Rubidium, total (µg/l)		
Rubidium, dissolved (µg/l)		
Titanium, total (µg/l)	1.45 ND	EPA 200.2/200.8
Titanium, dissolved (µg/l)		
Vanadium, total (µg/l)	2.35 ND	EPA 200.8
Vanadium, dissolved (µg/l)		
Yttrium, total (µg/l)		
Yttrium, dissolved (µg/l)		

T Please indicate detection limit if analyte is not detected.

Result Qualifier Codes

<u>CODE</u>	<u>DESCRIPTION</u>
*	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.

Brunner Island - Basin 5 - Statistics Summary

PARAMETER		UNITS	STD.	UPGRADIENT VS DOWNGRADIENT	Up										Down										Up																							
					MW-19										MW-4-10										MW-4-7A																							
					Trend (%)	p	$\bar{x}$	$\bar{x}$ (%)	n	ND	J	>	Max	p (comparison)	Trend (%)	p	$\bar{x}$	$\bar{x}$ (%)	n	ND	J	>	Max	p (comparison)	Trend (%)	p	$\bar{x}$	$\bar{x}$ (%)	n	ND	J	>	Max	p (comparison)														
	Iron, dissolved	mg/l	0.3	73.26	NC		NC	0.0	4.8	41	34	0	0	0.1	06/10/14	0.00	< Up	n	NC		NC	0.0	6.1	41	25	0	0	0.1	03/14/12	0.09	n	NC		NC	0.0	1.6	41	40	0	0	0.0	05/18/20	0.00	< Up	n			
	Arsenic, dissolved	µg/l	10	49.83	NC		NC	1.0	9.8	41	34	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	0.19	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	29.42	NC		NC	1.7	0.6	41	38	0	0	20.0	08/16/19	0.00	< Up	p	-43.9	↓	0.02	3099.5	1033.2	41	0	0	41	05/19/20	10400.0	06/14/11	0.00	> Up	n	-21.9	↓	0.23	184.7	61.6	41	0	0	4	12/05/16	371.0	11/26/12	0.00	> Up	p
	Molybdenum, dissolved	µg/l	40	17.35	NC		NC	2.1	5.2	41	40	0	0	4.0	12/10/13	0.00	< Up	n	56.1	↑	0.11	618.7	1546.6	41	1	0	36	05/19/20	1970.0	03/22/11	0.00	> Up	n	-22.6	↓	0.00	20.4	51.0	41	4	0	0	28.1	11/26/12	0.00	> Up	n	
	Aluminum, dissolved	µg/l	200	15.27	NC		NC	23.9	12.0	41	41	0	0	100.0	08/16/19	NC			-36.7	↓	0.01	4464.7	2232.4	41	20	0	14	11/07/18	48400.0	06/14/11	0.00	> Up	n	NC		NC	49.3	24.6	41	41	0	0	100.0	05/18/20	NC			
	Nickel, dissolved	µg/l	100	6.18	NC		NC	2.1	2.1	41	39	0	0	5.0	08/16/18	0.00	> Up	n	-54.4	↓	0.10	44.1	44.1	41	6	0	6	08/14/18	200.0	09/12/11	0.00	> Up	n	NC		NC	3.3	3.3	41	37	0	0	17.2	11/11/19	0.26	n		
	Zinc, dissolved	µg/l	2000	5.03	NC		NC	4.6	0.2	41	29	0	0	33.7	06/10/10	0.12	n		-68.0	↓	0.07	102.8	5.1	41	2	0	0	488.0	08/14/18	0.00	> Up	n	NC		NC	7.1	0.4	41	38	0	0	20.0	12/02/13	0.00	> Up	p		
	Potassium, dissolved	mg/l	--	4.96	12.0	↑	0.01	0.7	NA	41	4	0	0	1.0	05/20/20	0.00	< Up	n	79.3	↑	0.00	90.3	NA	41	0	0	0	121.0	05/19/20	0.00	> Up	n	0.0	↔	0.50	3.8	NA	41	0	0	0	4.3	12/01/14	0.00	> Up	p		
	Cadmium, dissolved	µg/l	5	4.09	NC		NC	0.1	2.2	41	41	0	0	0.2	12/10/13	NC			-29.0	↓	0.10	1.0	20.7	41	9	0	0	3.2	06/14/11	0.00	> Up	n	NC		NC	0.1	2.7	41	41	0	0	0.2	11/05/18	NC				
	Fluoride, total as F	mg/l	2	3.26	NC		NC	0.1	3.8	41	34	0	0	0.2	05/20/20	0.00	< Up	n	NC		NC	0.3	13.9	41	24	0	0	1.8	08/14/18	0.10	n			-9.7	↔	0.19	0.2	8.9	41	5	0	0	0.3	06/04/14	0.00	> Up	n	
	Strontium, dissolved	µg/l	4000	2.79	-6.6	↔	0.00	50.9	1.3	41	0	0	0	59.3	03/12/15	0.00	< Up	n	100.5	↑	0.00	1007.8	25.2	41	0	0	0	2190.0	08/25/19	0.00	> Up	n	0.0	↔	0.45	337.8	8.4	41	0	0	0	368.0	11/26/12	0.00	> Up	p		
	Lithium, dissolved	µg/l	83	2.69	-42.1	↓	0.00	4.8	5.7	41	15	0	0	10.0	12/10/13	0.00	< Up	n	12.5	↑	0.15	1059.8	1276.9	41	0	0	41	05/19/20	1550.0	09/18/13	0.00	> Up	n	545.5	↑	0.00	91.5	110.2	41	0	0	23	05/18/20	168.0	02/09/20	0.00	> Up	p
	Beryllium, dissolved	µg/l	4	2.59	NC		NC	0.1	3.7	41	41	0	0	0.5	06/10/14	NC			NC		NC	1.1	28.0	41	29	0	3	08/14/18	9.6	06/14/11	0.00	> Up	n	NC		NC	0.1	3.4	41	41	0	0	0.2	12/02/13	NC			
	Chloride, total as Cl	mg/l	250	1.72	-0.3	↔	0.46	8.3	3.3	41	0	0	0	9.9	12/06/11	0.00	< Up	n	-71.6	↓	0.00	16.2	6.5	41	0	0	0	28.0	12/02/10	0.03	> Up	n	-14.9	↓	0.00	18.8	7.5	41	0	0	0	23.8	11/29/10	0.00	> Up	p		
	Copper, dissolved	µg/l	1000	1.46	NC		NC	1.1	0.1	41	38	0	0	23.6	03/13/12	0.00	> Up	n	NC		NC	5.7	0.6	41	30	0	0	32.2	06/05/14	0.39	n			NC	NC	2.6	0.3	41	37	0	0	5.0	02/11/19	0.00	> Up	p		
	Ammonia, as N	mg/l	--	1.42	NC		NC	0.0	NA	41	41	0	0	0.2	05/20/20	0.00	< Up	n	-48.1	↓	0.10	0.4	NA	41	4	0	0	1.1	06/04/13	0.00	> Up	n	-35.2	↓	0.07	0.2	NA	41	7	0	0	0.7	06/06/16	0.00	> Up	p		
	Chemical Oxygen Demand	mg/l	--	1.41	NC		NC	4.9	NA	41	41	0	0	20.0	05/20/20	0.24	n		NC		NC	2.7	NA	41	39	0	0	20.7	05/19/20	0.09	n			NC	NC	3.2	NA	41	40	0	0	53.2	06/03/13	0.15	n			
	Magnesium, dissolved	mg/l	--	1.31	7.9	↔	0.04	4.6	NA	41	0	0	0	5.7	03/12/15	0.00	< Up	n	-12.1	↓	0.30	16.9	NA	41	0	0	0	33.5	06/14/11	0.49	n			5.6	↔	0.00	37.2	NA	41	0	0	0	41.3	05/18/20	0.00	> Up	p	
	Vanadium, dissolved	µg/l	2.9	1.18	NC		NC	1.4	47.9	41	41	0	0	2.3	05/20/20	0.00	< Up	n	NC		NC	1.7	59.0	41	41	0	2	09/12/11	10.0	09/12/11	0.00	< Up	n	NC		NC	1.6	55.2	41	29	0	5	09/14/11	16.9	03/21/11	0.01	> Up	p
	Chromium, dissolved	µg/l	100	1.14	NC		NC	1.3	1.3	41	41	0	0	2.0	12/10/13	NC			NC		NC	2.1	2.1	41	41	0	0	10.0	12/05/11	NC					NC	NC	1.7	1.7	41	41	0	0	10.0	09/13/10	NC			
	Silver, dissolved	µg/l	100	1.13	NC		NC	0.9	0.9	41	41	0	0	2.0	12/10/13	NC			NC		NC	1.6	1.6	41	41	0	0	10.0	12/11/13	NC					NC	NC	2.6	2.6	41	41	0	0	10.0	12/02/13	NC			
	Specific Conductance, field	umhos/cm	--	1.13	-1.8	↔	0.24	227.1	NA	41	0	0	0	253.0	03/12/15	0.00	< Up	n	10.6	↑	0.09	1536.4	NA	41	0	0	0	1953.0	05/07/19	0.00	> Up	n	10.7	↑	0.00	1396.8	NA	41	0	0	0	1604.0	05/18/20	0.00	> Up	p		
	Total Dissolved Solids	mg/l	500	1.08	-1.2	↔	0.32	143.1	28.6	41	0	0	0	173.0	08/16/19	0.00	< Up	n	16.4	↑	0.05	1157.9	231.6	41	0	0	41	05/19/20	1670.0	05/07/19	0.00	> Up	n	16.1	↑	0.00	1097.4	219.5	41	0	0	41	05/18/20	1270.0	05/18/20	0.00	> Up	p
	Sulfate, as SO4	mg/l	250	1.07	25.0	↑	0.03	26.3	10.5	41	0	0	0	49.2	05/20/20	0.00	< Up	n	15.3	↑	0.13	724.9	290.0	40	0	0	40	05/19/20	1040.0	05/07/19	0.00	> Up	n	16.6	↑	0.00	546.4	218.5	41	0	0	41	05/18/20					

Brunner Island - Basin 5 - Statistics Summary

PARAMETER		UNITS	STD.	UPGRADIENT VS DOWNGRADIENT	Down										Down										Down																								
					MW-8-10A										MW-8-10B										MW-8-10C																								
					Trend (%)	p	$\bar{x}$	$\bar{x}$ (%)	n	ND	J	>	Max	p (comparison)	Trend (%)	p	$\bar{x}$	$\bar{x}$ (%)	n	ND	J	>	Max	p (comparison)	Trend (%)	p	$\bar{x}$	$\bar{x}$ (%)	n	ND	J	>	Max	p (comparison)															
	Iron, dissolved	mg/l	0.3	73.26	NC		NC	0.0	5.6	41	33	0	0	0.1	06/05/14	0.01	> Up	n	NC		NC	0.0	4.6	41	37	0	0	0.1	06/05/14	0.00	< Up	n	1163.2	↑	0.04	0.2	62.8	12	4	0	4	05/09/18	0.4	06/07/17	0.00	> Up	n		
	Arsenic, dissolved	µg/l	10	49.83	NC		NC	0.6	5.9	41	41	0	0	2.0	06/13/12	0.00	< Up	n	-28.8	↓	0.00	1.8	17.5	41	12	0	0	2.7	06/15/11	0.00	> Up	n	-74.7	↓	0.01	1.3	12.8	12	5	0	0		4.7	06/15/11	0.00	> Up	n		
	Manganese, dissolved	µg/l	300	29.42	-71.7	↓	0.01	715.6	238.5	41	2	0	19	11/06/18	1950.0	12/07/16	0.00	> Up	n	-26.2	↓	0.14	3.8	1.3	41	20	0	0	19.2	03/03/14	0.00	< Up	n	21.7	↑	0.12	277.3	92.4	12	2	0	7	05/19/20	658.0	06/08/16	0.00	> Up	n	
	Molybdenum, dissolved	µg/l	40	17.35	-60.1	↓	0.00	43.3	108.2	41	0	0	20	02/13/18	79.0	09/16/10	0.00	> Up	n	-23.8	↓	0.00	36.4	91.1	41	0	0	11	08/11/19	44.6	09/13/10	0.00	> Up	n	-6.3	↔	0.10	59.2	148.0	12	0	0	12	05/19/20	64.1	06/08/16	0.00	> Up	n
	Aluminum, dissolved	µg/l	200	15.27	NC		NC	55.1	27.6	41	40	0	1	06/13/12	253.0	06/13/12	0.08	n	NC		NC	47.4	23.7	41	40	0	0	184.0	06/13/12	0.08	n	NC		NC	33.1	16.5	12	12	0	0		100.0	06/08/16	NC					
	Nickel, dissolved	µg/l	100	6.18	NC		NC	3.5	3.5	41	39	0	0		10.0	09/16/10	0.00	> Up	n	NC		NC	0.5	0.5	41	39	0	0	8.2	11/11/19	0.00	< Up	n	NC		NC	1.8	1.8	12	12	0	0		4.0	06/03/13	0.00	< Up	n	
	Zinc, dissolved	µg/l	2000	5.03	0.0	↔	0.31	6.8	0.3	41	20	0	0		29.1	11/11/19	0.03	> Up	n	NC		NC	3.3	0.2	41	36	0	0	31.0	11/11/19	0.00	< Up	n	NC		NC	4.1	0.2	12	12	0	0		5.0	05/08/19	0.00	< Up	n	
	Potassium, dissolved	mg/l	--	4.96	2.1	↔	0.28	2.4	NA	41	0	0	0		2.7	02/13/18	0.47	n	-16.0	↓	0.04	2.5	NA	41	0	0	0	3.9	06/13/12	0.37	n	-65.5	↓	0.01	3.7	NA	12	0	0	0		6.8	05/12/15	0.02	> Up	n			
	Cadmium, dissolved	µg/l	5	4.09	NC		NC	0.2	3.0	41	41	0	0		0.2	08/15/18	NC		NC		NC	0.1	2.3	41	41	0	0	0.2	08/15/18	NC		NC		NC	0.1	2.6	12	12	0	0		0.2	05/08/19	NC					
	Fluoride, total as F	mg/l	2	3.26	0.0	↔	0.38	0.1	6.4	41	15	0	0		0.3	06/11/10	0.02	> Up	n	33.7	↑	0.05	0.1	4.4	41	10	0	0	0.2	05/19/20	0.00	< Up	n	-16.5	↓	0.39	0.1	6.5	12	0	0	0		0.2	05/19/20	0.43	n		
	Strontium, dissolved	µg/l	4000	2.79	20.1	↑	0.13	305.7	7.6	41	0	0	0		417.0	12/07/16	0.00	> Up	n	15.4	↑	0.04	236.7	5.9	41	0	0	0	362.0	05/19/20	0.30	n	17.0	↑	0.00	202.1	5.1	12	0	0	0		226.0	05/19/20	0.50	n			
	Lithium, dissolved	µg/l	83	2.69	-17.5	↓	0.03	14.5	17.5	41	1	0	0		19.3	12/07/16	0.40	n	-14.6	↓	0.18	16.3	19.6	41	1	0	0	31.6	06/05/14	0.36	n	-42.7	↓	0.06	16.2	19.5	12	1	0	0		35.5	05/12/15	0.37	n				
	Beryllium, dissolved	µg/l	4	2.59	NC		NC	0.1	3.4	41	41	0	0		0.2	12/11/13	NC		NC		NC	0.1	3.7	41	41	0	0	0.5	09/14/16	NC		NC		NC	0.2	4.4	12	12	0	0		0.5	05/08/19	NC					
	Chloride, total as Cl	mg/l	250	1.72	252.5	↑	0.00	27.7	11.1	41	0	0	0		53.6	02/13/18	0.00	> Up	n	1417.5	↑	0.00	29.0	11.6	41	0	0	0	65.4	08/11/19	0.00	> Up	n	86.7	↑	0.01	9.7	3.9	12	0	0	0		13.7	05/19/20	0.00	< Up	n	
	Copper, dissolved	µg/l	1000	1.46	NC		NC	3.1	0.3	41	39	0	0		20.0	09/11/13	0.00	> Up	n	NC		NC	2.6	0.3	41	39	0	0	20.0	09/11/13	0.00	> Up	n	NC		NC	1.5	0.2	12	11	0	0		14.2	06/09/14	0.01	> Up	n	
	Ammonia, as N	mg/l	--	1.42	NC		NC	0.0	NA	41	30	0	0		0.4	02/02/20	0.00	< Up	n	NC		NC	0.0	NA	41	41	0	0	0.2	05/19/20	0.00	< Up	n	NC		NC	0.0	NA	12	12	0	0		0.1	05/19/20	0.00	< Up	n	
	Chemical Oxygen Demand	mg/l	--	1.41	NC		NC	5.9	NA	41	41	0	0		20.0	05/19/20	0.24	n	NC		NC	5.6	NA	41	40	0	0	20.0	05/19/20	0.01	> Up	n	NC		NC	7.0	NA	12	11	0	0		20.0	05/19/20	0.47	n			
	Magnesium, dissolved	mg/l	--	1.31	10.8	↑	0.19	38.1	NA	41	0	0	0		44.1	09/16/15	0.00	> Up	n	12.9	↑	0.00	20.2	NA	41	0	0	0	23.4	02/02/20	0.46	n	10.2	↑	0.06	16.9	NA	12	0	0	0		19.2	05/19/20	0.49	n			
	Vanadium, dissolved	µg/l	2.9	1.18	NC		NC	0.5	16.2	41	40	0	6	09/11/13	15.3	03/21/11	0.00	< Up	n	NC		NC	2.7	92.8	41	31	0	30	02/02/20	10.1	03/23/11	0.15	n	NC		NC	2.0	68.5	12	12	0	1	06/15/11	10.0	06/15/11	0.01	< Up	n	
	Chromium, dissolved	µg/l	100	1.14	NC		NC	1.7	1.7	41	41	0	0		10.0	09/16/10	NC		NC		NC	1.7	1.7	41	41	0	0	10.0	09/13/10	NC		NC		NC	2.3	2.3	12	12	0	0		10.0	06/10/10	NC					
	Silver, dissolved	µg/l	100	1.13	NC		NC	2.2	2.2	41	41	0	0		10.0	12/11/13	NC		NC		NC	2.2	2.2	41	41	0	0	10.0	12/11/13	NC		NC		NC	2.2	2.2	12	12	0	0		10.0	06/03/13	NC					
	Specific Conductance, field	umhos/cm	--	1.13	23.1	↑	0.01	968.3	NA	41	0	0	0		1132.0	02/13/18	0.49	n	23.1	↑	0.00	704.6	NA	41	0	0	0	810.0	02/02/20	0.49	n	10.6	↑	0.00	497.5	NA	12	0	0	0		533.0	05/19/20	0.49	n				
	Total Dissolved Solids	mg/l	500	1.08	27.3	↑	0.01	737.3	147.5	41	0	0	41	05/19/20	949.0	09/19/17	0.49	n	9.6	↔	0.01	488.4	97.7	41	0	0	13	05/19/20	543.0	05/08/19	0.49	n	12.1	↑	0.01	336.8	67.4	12	0	0	0		361.0	05/19/20	0.49	n			
	Sulfate, as SO4	mg/l	250	1.07	5.6	↔	0.28	356.0	142.4	41	0	0	41	05/19/20	421.0	05/12/15	0.50	n	-19.2	↓	0.00	205.9	82.4	41	0	0	2	12/01/10	262.0	12/01/10	0.47	n	-8.7	↔	0.05	122.5	49.0	12	0	0	0		145.0	06/10/10	0.49	n			
	Total Organic Carbon	mg/l	--	1.05	0.0</																																												

Brunner Island - Basin 5 - Statistics Summary

PARAMETER		UNITS	STD.	UPGRADIENT VS DOWNGRADIENT	Down										Down										Down																					
					MW-8-12C										MW-8-1N										MW-8-2																					
					Trend (%)	p	$\bar{x}$	$\bar{x}$ (%)	n	ND	J	>	Max	p (comparison)	Trend (%)	p	$\bar{x}$	$\bar{x}$ (%)	n	ND	J	>	Max	p (comparison)	Trend (%)	p	$\bar{x}$	$\bar{x}$ (%)	n	ND	J	>	Max	p (comparison)												
	Iron, dissolved	mg/l	0.3	73.26	-33.2	↓	0.02	0.9	311.4	12	0	0	11	05/20/20	1.2	06/10/14	0.00	> Up n	-48.5	↓	0.13	1.0	316.9	28	0	0	20	05/19/20	5.4	09/15/16	0.00	> Up n	NC		NC	0.0	1.6	41	40	0	0		0.0	06/21/12	0.00	< Up n
	Arsenic, dissolved	µg/l	10	49.83	NC		NC	1.0	9.7	12	7	0	0		2.0	06/14/11	0.36	n	NC		NC	0.5	4.9	28	28	0	0		0.5	05/19/20	0.00	< Up n	NC		NC	0.5	4.7	41	41	0	0		1.0	08/14/19	0.00	< Up n
	Manganese, dissolved	µg/l	300	29.42	-9.4	↔	0.01	1415.6	471.9	12	0	0	11	05/20/20	1600.0	06/10/10	0.00	> Up n	-43.2	↓	0.00	1870.4	623.5	28	0	0	28	05/19/20	3210.0	09/15/16	0.00	> Up p	-15.7	↓	0.05	355.8	118.6	41	0	0	32	05/20/20	563.0	06/13/11	0.00	> Up p
	Molybdenum, dissolved	µg/l	40	17.35	27.1	↑	0.17	314.1	785.2	12	0	0	12	05/20/20	444.0	06/08/16	0.00	> Up n	NC		NC	1.6	4.1	28	27	0	0		5.0	11/08/18	0.00	< Up n	-14.4	↓	0.00	294.0	735.0	41	0	0	41	05/20/20	346.0	09/10/12	0.00	> Up n
	Aluminum, dissolved	µg/l	200	15.27	NC		NC	46.4	23.2	12	12	0	0		100.0	05/08/19	NC		NC		NC	63.1	31.6	28	28	0	0		100.0	05/12/19	NC		NC		NC	37.6	18.8	41	41	0	0		100.0	11/04/19	NC	
	Nickel, dissolved	µg/l	100	6.18	NC		NC	3.9	3.9	12	11	0	0		5.0	05/09/18	0.07	n	NC		NC	1.9	1.9	28	25	0	0		15.8	11/03/19	0.03	> Up n	NC		NC	4.7	4.7	41	37	0	0		10.0	11/29/10	0.26	n
	Zinc, dissolved	µg/l	2000	5.03	NC		NC	5.8	0.3	12	11	0	0		20.0	06/10/10	0.03	> Up n	NC		NC	5.2	0.3	28	27	0	0		20.0	09/30/13	0.00	> Up n	NC		NC	5.8	0.3	41	32	0	0		60.3	06/21/12	0.00	> Up n
	Potassium, dissolved	mg/l	--	4.96	-48.6	↓	0.04	9.2	NA	12	0	0	0		12.4	05/11/15	0.00	> Up n	-13.7	↓	0.04	7.5	NA	28	0	0	0		12.1	09/15/16	0.00	> Up n	8.8	↔	0.07	4.9	NA	41	0	0	0		5.9	09/11/17	0.00	> Up n
	Cadmium, dissolved	µg/l	5	4.09	NC		NC	0.3	5.4	12	9	0	0		1.0	05/20/20	0.00	> Up n	NC		NC	0.2	3.7	28	28	0	0		0.2	05/12/19	NC		NC		NC	0.3	5.8	41	29	0	0		1.0	05/20/20	0.00	> Up n
	Fluoride, total as F	mg/l	2	3.26	-18.6	↓	0.23	0.1	7.2	12	0	0	0		0.3	05/20/20	0.25	n	-9.1	↔	0.09	0.2	10.7	28	11	0	0		0.4	12/05/13	0.00	> Up n	3.5	↔	0.32	0.9	44.7	41	2	0	0		1.1	09/08/14	0.00	> Up n
	Strontium, dissolved	µg/l	4000	2.79	1.5	↔	0.45	309.7	7.7	12	0	0	0		424.0	05/08/19	0.29	n	3.2	↔	0.41	1038.2	26.0	28	0	0	0		1320.0	09/15/16	0.00	> Up n	1.7	↔	0.32	430.3	10.8	41	0	0	0		469.0	09/08/14	0.00	> Up n
	Lithium, dissolved	µg/l	83	2.69	-35.8	↓	0.15	19.1	23.0	12	0	0	0		28.7	06/08/16	0.47	n	-33.6	↓	0.07	2.4	2.9	28	7	0	0		4.8	09/15/16	0.00	< Up n	-21.9	↓	0.00	22.5	27.1	41	0	0	0		31.5	09/29/11	0.48	n
	Beryllium, dissolved	µg/l	4	2.59	NC		NC	0.2	4.4	12	12	0	0		0.5	06/10/14	NC		NC		NC	0.1	2.7	28	28	0	0		0.2	12/05/13	NC		NC		NC	0.1	3.4	41	41	0	0		0.2	12/02/13	NC	
	Chloride, total as Cl	mg/l	250	1.72	-14.7	↓	0.01	9.1	3.6	12	0	0	0		11.4	06/05/13	0.18	n	-87.9	↓	0.00	77.6	31.1	28	0	0	0		209.0	03/06/14	0.00	> Up n	18.2	↑	0.00	26.7	10.7	41	2	0	0		31.9	11/04/19	0.00	> Up n
	Copper, dissolved	µg/l	1000	1.46	NC		NC	1.9	0.2	12	12	0	0		4.0	06/05/13	0.00	< Up n	NC		NC	1.4	0.1	28	26	0	0		5.0	05/12/19	0.00	> Up n	NC		NC	2.5	0.3	41	38	0	0		5.0	02/11/19	0.00	> Up n
	Ammonia, as N	mg/l	--	1.42	NC		NC	0.1	NA	12	7	0	0		0.2	05/20/20	0.04	> Up n	-80.5	↓	0.00	0.3	NA	28	2	0	0		1.1	02/02/20	0.00	> Up n	-43.6	↓	0.00	0.1	NA	41	16	0	0		0.3	02/03/20	0.05	> Up n
	Chemical Oxygen Demand	mg/l	--	1.41	NC		NC	7.5	NA	12	12	0	0		20.0	05/20/20	0.35	n	NC		NC	6.1	NA	28	28	0	0		20.0	05/19/20	0.28	n	NC		NC	5.8	NA	41	41	0	0		18.0	08/13/18	0.24	n
	Magnesium, dissolved	mg/l	--	1.31	-9.3	↔	0.01	17.9	NA	12	0	0	0		19.2	06/10/10	0.49	n	-24.4	↓	0.09	35.6	NA	28	0	0	0		48.4	05/13/15	0.00	> Up n	-9.3	↔	0.00	13.5	NA	41	0	0	0		15.0	03/21/11	0.46	n
	Vanadium, dissolved	µg/l	2.9	1.18	NC		NC	1.3	45.5	12	12	0	0		2.3	05/20/20	0.01	< Up n	NC		NC	1.0	35.6	28	28	0	0		2.3	05/19/20	0.00	< Up n	NC		NC	2.8	95.0	41	40	0	7	11/26/12	10.0	11/26/12	0.00	> Up n
	Chromium, dissolved	µg/l	100	1.14	NC		NC	2.0	2.0	12	12	0	0		10.0	06/10/10	NC		NC		NC	1.0	1.0	28	28	0	0		2.0	12/05/13	NC		NC		NC	1.5	1.5	41	41	0	0		10.0	09/13/10	NC	
	Silver, dissolved	µg/l	100	1.13	NC		NC	2.3	2.3	12	11	0	0		10.0	06/05/13	0.00	> Up n	NC		NC	0.6	0.6	28	28	0	0		10.0	09/30/13	NC		NC		NC	1.8	1.8	41	41	0	0		10.0	12/02/13	NC	
	Specific Conductance, field	umhos/cm	--	1.13	-4.5	↔	0.01	624.5	NA	12	0	0	0		661.0	06/10/10	0.50	n	-37.4	↓	0.00	1417.5	NA	28	0	0	0		1886.0	05/13/15	0.00	> Up n	-5.6	↔	0.00	569.7	NA	41	0	0	0		607.0	06/13/11	0.48	n
	Total Dissolved Solids	mg/l	500	1.08	-7.1	↔	0.05	427.9	85.6	12	0	0	0		458.0	06/10/10	0.50	n	-40.4	↓	0.00	1058.7	211.7	28	0	0	28	05/19/20	1520.0	09/15/16	0.00	> Up n	-5.9	↔	0.02	367.5	73.5	41	0	0	0		411.0	06/13/11	0.48	n
	Sulfate, as SO4	mg/l	250	1.07	-23.2	↓	0.00	142.3	56.9	12	0	0	0		173.0	06/10/10	0.50	n	-36.8	↓	0.09	474.4	189.8	28	0	0	27	05/19/20	702.0	09/15/16	0.00	> Up n	-20.1	↓	0.00	130.0	52.0	41	2	0	0		160.0	06/13/11	0.36	n
	Total Organic Carbon	mg/l	--	1.05	-37.7	↓	0.02	1.3	NA	12	1	0	0		2.1	06/18/12	0.00	> Up n	12.7	↑	0.09	1.1	NA	28	0	0	0		1.																	

Brunner Island - Basin 5 - Statistics Summary

PARAMETER		UNITS	STD.	UPGRADIENT VS DOWNGRADIENT	Down										Down										Down																									
					MW-8-3A										MW-8-3B										MW-8-4																									
					Trend (%)	p	$\bar{x}$	$\bar{x}$ (%)	n	ND	J	>	Max	p (comparison)	Trend (%)	p	$\bar{x}$	$\bar{x}$ (%)	n	ND	J	>	Max	p (comparison)	Trend (%)	p	$\bar{x}$	$\bar{x}$ (%)	n	ND	J	>	Max	p (comparison)																
	Iron, dissolved	mg/l	0.3	73.26	-8.5	↔	0.29	5.9	1975.6	41	0	0	40	05/20/20	11.0	06/06/17	0.00	> Up	n	-12.1	↓	0.32	0.4	127.5	41	4	0	25	02/03/20	0.9	09/19/16	0.00	> Up	n	NC		NC	0.0	0.8	41	40	0	0		0.1	03/24/11	0.00	< Up	n	
	Arsenic, dissolved	µg/l	10	49.83	-23.8	↓	0.10	11.0	109.9	41	1	0	27	11/04/19	18.2	12/08/11	0.00	> Up	n	-20.0	↓	0.09	6.7	67.3	41	0	0	2	12/08/11	12.0	12/06/10	0.00	> Up	n	NC		NC	0.8	8.0	41	30	0	0		3.8	09/16/14	0.25	n		
	Manganese, dissolved	µg/l	300	29.42	0.3	↔	0.50	6233.4	2077.8	41	0	0	41	05/20/20	8560.0	03/19/12	0.00	> Up	p	-23.2	↓	0.10	1273.9	424.6	41	0	0	40	05/20/20	2050.0	06/15/10	0.00	> Up	n	-43.9	↓	0.00	16832.7	5610.9	41	0	0	41	05/20/20	42600.0	12/06/12	0.00	> Up	n	
	Molybdenum, dissolved	µg/l	40	17.35	-18.4	↓	0.03	68.4	171.0	41	0	0	39	05/20/20	94.6	11/04/19	0.00	> Up	n	-23.3	↓	0.00	155.8	389.5	41	0	0	41	05/20/20	204.0	09/15/11	0.00	> Up	n	NC		NC	2.1	5.4	41	41	0	0		5.0	02/12/18	0.00	< Up	n	
	Aluminum, dissolved	µg/l	200	15.27	NC		NC	56.7	28.3	41	40	0	1	06/12/12	244.0	06/12/12	0.08	n		NC		NC	49.7	24.8	41	40	0	0		190.0	06/12/12	0.08	n		-81.5	↓	0.00	1740.8	870.4	41	0	0	24	02/12/18	11900.0	12/06/12	0.00	> Up	n	
	Nickel, dissolved	µg/l	100	6.18	NC		NC	5.2	5.2	41	37	0	0		20.0	09/15/11	0.18	n		NC		NC	1.4	1.4	41	39	0	0		9.8	11/04/19	0.00	> Up	n	-34.3	↓	0.01	130.2	130.2	41	1	0	26	05/09/19	330.0	12/06/12	0.00	> Up	n	
	Zinc, dissolved	µg/l	2000	5.03	NC		NC	2.8	0.1	41	32	0	0		27.3	12/08/11	0.02	< Up	n		NC		NC	7.1	0.4	41	35	0	0		20.0	12/12/13	0.00	> Up	n	-51.8	↓	0.00	199.5	10.0	41	0	0	0		678.0	12/06/12	0.00	> Up	n
	Potassium, dissolved	mg/l	--	4.96	-3.6	↔	0.22	2.8	NA	41	0	0	0		3.3	03/16/11	0.47	n		-1.6	↔	0.28	1.6	NA	41	0	0	0		1.7	12/14/15	0.44	n		-24.8	↓	0.02	2.2	NA	41	0	0	0		4.5	09/18/12	0.30	n		
	Cadmium, dissolved	µg/l	5	4.09	NC		NC	0.1	2.7	41	41	0	0		0.2	05/21/18	NC			NC		NC	0.3	5.1	41	41	0	0		1.0	05/20/20	NC			-51.0	↓	0.00	2.8	56.2	41	0	0	6	09/22/16	8.2	12/06/12	0.00	> Up	n	
	Fluoride, total as F	mg/l	2	3.26	-15.9	↓	0.03	0.4	21.6	41	0	0	0		0.7	02/03/20	0.00	> Up	n	-15.2	↓	0.00	0.5	26.1	41	1	0	0		0.9	05/13/15	0.00	> Up	n	-28.3	↓	0.11	0.4	20.4	41	8	0	0		1.3	12/06/12	0.00	> Up	n	
	Strontium, dissolved	µg/l	4000	2.79	10.6	↑	0.08	714.5	17.9	41	0	0	0		908.0	05/20/20	0.00	> Up	n	4.5	↔	0.14	346.9	8.7	41	0	0	0		383.0	08/12/19	0.00	> Up	n	-31.1	↓	0.00	442.3	11.1	41	0	0	0		751.0	12/06/12	0.00	> Up	n	
	Lithium, dissolved	µg/l	83	2.69	-41.0	↓	0.00	17.0	20.5	41	0	0	0		24.9	06/14/11	0.49	n		-19.3	↓	0.00	26.8	32.3	41	0	0	0		32.4	06/14/11	0.45	n		-22.6	↓	0.03	22.1	26.6	41	1	0	0		56.8	09/18/12	0.48	n		
	Beryllium, dissolved	µg/l	4	2.59	NC		NC	0.1	3.7	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	1.8	45.8	41	21	0	7	09/22/16	8.4	09/18/12	0.00	> Up	n	
	Chloride, total as Cl	mg/l	250	1.72	112.7	↑	0.00	8.2	3.3	41	1	0	0		39.5	11/04/19	0.00	< Up	n	195.2	↑	0.00	6.7	2.7	41	0	0	0		13.7	11/04/19	0.00	< Up	n	-29.6	↓	0.02	37.4	15.0	41	0	0	0		82.5	09/24/15	0.00	> Up	n	
	Copper, dissolved	µg/l	1000	1.46	NC		NC	2.1	0.2	41	38	0	0		4.0	12/12/13	0.00	> Up	n	NC		NC	0.6	0.1	41	38	0	0		6.1	03/07/17	0.00	< Up	n	NC		NC	4.4	0.4	41	27	0	0		20.1	09/18/12	0.08	n		
	Ammonia, as N	mg/l	--	1.42	-11.0	↓	0.17	0.3	NA	41	3	0	0		0.4	09/20/10	0.00	> Up	n	NC		NC	0.0	NA	41	28	0	0		0.3	02/03/20	0.00	< Up	n	NC		NC	0.1	NA	41	29	0	0		0.3	05/20/20	0.00	< Up	n	
	Chemical Oxygen Demand	mg/l	--	1.41	NC		NC	7.6	NA	41	40	0	0		20.0	05/20/20	0.00	> Up	n	NC		NC	5.1	NA	41	41	0	0		20.0	08/12/19	0.24	n		NC		NC	7.3	NA	41	41	0	0		20.0	05/20/20	0.24	n		
	Magnesium, dissolved	mg/l	--	1.31	12.9	↑	0.00	28.2	NA	41	0	0	0		32.3	02/14/19	0.48	n		4.2	↔	0.08	22.2	NA	41	0	0	0		24.5	08/12/19	0.47	n		-25.5	↓	0.00	54.9	NA	41	0	0	0		67.4	03/20/13	0.00	> Up	n	
	Vanadium, dissolved	µg/l	2.9	1.18	NC		NC	2.3	80.5	41	41	0	5	09/15/11	10.0	09/15/11	0.00	> Up	n	NC		NC	2.6	90.5	41	35	0	6	03/19/12	10.0	03/19/12	0.00	> Up	n	NC		NC	1.0	34.3	41	39	0	7	06/16/13	23.9	03/24/11	0.00	< Up	n	
	Chromium, dissolved	µg/l	100	1.14	NC		NC	1.7	1.7	41	41	0	0		10.0	09/20/10	NC			NC		NC	1.7	1.7	41	41	0	0		10.0	09/20/10	NC			NC		NC	1.7	1.7	41	41	0	0		10.0	09/23/10	NC			
	Silver, dissolved	µg/l	100	1.13	NC		NC	2.2	2.2	41	41	0	0		10.0	12/12/13	NC			NC		NC	2.3	2.3	41	40	0	0		34.3	09/21/15	0.08	n		NC		NC	2.0	2.0	41	41	0	0		10.0	12/12/13	NC			
	Specific Conductance, field	umhos/cm	--	1.13	18.7	↑	0.00	859.2	NA	41	0	0	0		992.0	05/20/20	0.49	n		9.2	↔	0.00	719.0	NA	41	0	0	0		792.0	08/12/19	0.49	n		-21.7	↓	0.00	1237.7	NA	41	0	0	0		1660.0	12/06/12	0.08	n		
	Total Dissolved Solids	mg/l	500	1.08	22.6	↑	0.00	624.8	125.0	41	0	0	40	05/20/20	746.0	05/20/20	0.50	n		10.5	↑	0.00	481.4	96.3	41	0	0	13	05/20/20	566.0	08/12/19	0.49	n		-21.7	↓	0.00	1002.3	200.5	41	0	0	41	05/20/20	1380.0	12/06/12	0.01	> Up	n	
	Sulfate																																																	

Brunner Island - Basin 5 - Statistics Summary

PARAMETER		UNITS	STD.	UPGRADIENT VS DOWNGRAIENT	Down													Down														
					MW-8-5A													MW-8-5B														
					Trend (%)	p	$\bar{x}$	$\bar{x}$ (%)	n	ND	J	>	Max	p (comparison)	Trend (%)	p	$\bar{x}$	$\bar{x}$ (%)	n	ND	J	>	Max	p (comparison)								
	Iron, dissolved	mg/l	0.3	73.26	NC		NC	0.0	5.3	41	36	0		0.1	06/04/14	0.00	> Up n	NC		NC	0.0	5.3	41	36	0		0.1	06/04/14	0.00	> Up n		
	Arsenic, dissolved	µg/l	10	49.83	-25.5	↓	0.00	130.7	1307.5	41	0	0	41	05/20/20	163.0	03/14/12	0.00	> Up n	0.0	↔	0.46	257.5	2574.9	41	0	0	41	05/20/20	293.0	12/04/14	0.00	> Up n
	Manganese, dissolved	µg/l	300	29.42	5.3	↔	0.05	384.2	128.1	41	0	0	41	05/20/20	434.0	09/12/17	0.00	> Up p	-21.9	↓	0.00	429.7	143.2	41	0	0	41	05/20/20	532.0	09/12/13	0.00	> Up p
	Molybdenum, dissolved	µg/l	40	17.35	-14.2	↓	0.00	397.2	993.0	41	0	0	41	05/20/20	434.0	03/14/12	0.00	> Up n	-16.1	↓	0.00	349.1	872.9	41	0	0	41	05/20/20	393.0	09/18/12	0.00	> Up n
	Aluminum, dissolved	µg/l	200	15.27	NC		NC	55.0	27.5	41	40	0	1	06/11/12	255.0	06/11/12	0.08	n	NC		NC	58.3	29.1	41	40	0	1	06/12/12	235.0	06/12/12	0.08	n
	Nickel, dissolved	µg/l	100	6.18	NC		NC	1.8	1.8	41	38	0	0		14.2	11/06/19	0.00	> Up n	NC		NC	1.5	1.5	41	39	0	0		13.2	11/06/19	0.00	> Up n
	Zinc, dissolved	µg/l	2000	5.03	NC		NC	5.9	0.3	41	37	0	0		20.0	09/12/13	0.00	> Up n	NC		NC	3.7	0.2	41	37	0	0		50.2	11/30/10	0.00	> Up n
	Potassium, dissolved	mg/l	--	4.96	16.3	↑	0.00	3.9	NA	41	0	0	0		4.4	02/13/19	0.00	> Up n	16.7	↑	0.00	3.7	NA	41	0	0	0		4.3	02/05/20	0.00	> Up n
	Cadmium, dissolved	µg/l	5	4.09	NC		NC	0.3	5.7	41	30	0	0		1.0	05/20/20	0.00	> Up n	NC		NC	0.3	5.6	41	34	0	0		1.0	05/20/20	0.01	> Up n
	Fluoride, total as F	mg/l	2	3.26	-20.3	↓	0.00	0.9	47.1	41	0	0	0		1.1	11/28/12	0.00	> Up n	-26.6	↓	0.00	0.8	37.9	41	0	0	0		0.9	06/08/10	0.00	> Up n
	Strontium, dissolved	µg/l	4000	2.79	24.0	↑	0.00	669.3	16.7	41	0	0	0		792.0	05/11/15	0.00	> Up n	12.4	↑	0.00	791.6	19.8	41	0	0	0		930.0	12/04/14	0.00	> Up n
	Lithium, dissolved	µg/l	83	2.69	8.7	↔	0.04	187.4	225.8	41	0	0	41	05/20/20	236.0	05/20/20	0.00	> Up n	2.3	↔	0.31	148.2	178.6	41	0	0	41	05/20/20	178.0	05/20/20	0.00	> Up n
	Beryllium, dissolved	µg/l	4	2.59	NC		NC	0.1	3.7	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	
	Chloride, total as Cl	mg/l	250	1.72	945.2	↑	0.00	18.0	7.2	41	0	0	0		33.0	02/13/19	0.01	> Up n	419.1	↑	0.00	13.1	5.2	41	0	0	0		24.0	08/15/18	0.26	n
	Copper, dissolved	µg/l	1000	1.46	NC		NC	4.1	0.4	41	35	0	0		20.0	09/13/10	0.01	> Up n	NC		NC	2.7	0.3	41	39	0	0		5.0	05/07/19	0.00	> Up n
	Ammonia, as N	mg/l	--	1.42	-21.0	↓	0.00	0.4	NA	41	0	0	0		0.6	11/06/19	0.00	> Up n	-27.9	↓	0.00	0.3	NA	41	1	0	0		0.4	09/13/10	0.00	> Up n
	Chemical Oxygen Demand	mg/l	--	1.41	NC		NC	4.2	NA	41	41	0	0		10.0	09/18/12	0.24	n	NC		NC	4.0	NA	41	41	0	0		10.0	03/12/14	0.24	n
	Magnesium, dissolved	mg/l	--	1.31	13.3	↑	0.00	35.8	NA	41	0	0	0		40.1	05/11/15	0.00	> Up n	7.3	↔	0.01	29.9	NA	41	0	0	0		33.2	12/04/14	0.47	n
	Vanadium, dissolved	µg/l	2.9	1.18	NC		NC	2.3	78.8	41	31	0	24	02/13/19	18.5	03/21/11	0.22	n	NC		NC	0.9	30.0	41	37	0	5	03/13/13	15.0	03/21/11	0.00	< Up n
	Chromium, dissolved	µg/l	100	1.14	NC		NC	1.7	1.7	41	40	0	0		10.0	09/13/10	0.00	> Up n	NC		NC	1.7	1.7	41	41	0	0		10.0	09/13/10	NC	
	Silver, dissolved	µg/l	100	1.13	NC		NC	2.2	2.2	41	41	0	0		10.0	12/02/13	NC		NC		NC	1.8	1.8	41	41	0	0		10.0	12/02/13	NC	
	Specific Conductance, field	umhos/cm	--	1.13	23.2	↑	0.00	978.9	NA	41	0	0	0		1064.0	02/13/18	0.49	n	14.5	↑	0.00	901.8	NA	41	0	0	0		972.0	12/04/14	0.50	n
	Total Dissolved Solids	mg/l	500	1.08	27.6	↑	0.00	709.1	141.8	41	0	0	41	05/20/20	828.0	09/12/17	0.50	n	14.9	↑	0.00	643.0	128.6	41	0	0	41	05/20/20	717.0	12/04/14	0.50	n
	Sulfate, as SO4	mg/l	250	1.07	15.5	↑	0.00	283.9	113.5	41	0	0	37	05/20/20	340.0	05/11/15	0.49	n	2.6	↔	0.29	256.9	102.8	41	0	0	24	05/20/20	299.0	12/13/16	0.48	n
	Total Organic Carbon	mg/l	--	1.05	-8.7	↔	0.17	0.8	NA	41	6	0	0		1.8	03/21/11	0.30	n	-14.2	↓	0.12	0.7	NA	41	6	0	0		1.6	12/06/11	0.19	n
	Calcium, dissolved	mg/l	--	1.02	21.0	↑	0.00	155.8	NA	41	0	0	0		180.0	05/11/15	0.47	n	11.6	↑	0.00	145.3	NA	41	0	0	0		163.0	12/04/14	0.44	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	
	pH, field	s.u.	6.5-8.5	0.98	-6.7	↔	0.00	7.1	43.1	41	0	0	1	02/13/19	7.5	06/08/10	0.00	> Up p	-6.1	↔	0.00	7.2	29.4	41	0	0	0		7.7	06/08/10	0.00	> Up p
	Lead, dissolved	µg/l	5	0.98	NC		NC	0.5	9.0	41	41	0	0		1.0	12/02/13	NC		NC		NC	0.5	10.2	41	41	0	0		1.0	12/02/13	NC	
	Titanium, dissolved	µg/l	--	0.96	NC		NC	1.3	NA	39	39	0	0		5.0	02/05/20	NC		NC		NC	1.2	NA	39	39	0	0		5.0	11/06/19	NC	
	Mercury, dissolved	µg/l	2	0.95	NC		NC	0.1	6.7	40	40	0	0		0.7	05/20/20	0.00	> Up n	NC		NC	0.1	7.2	40	27	0	0		0.7	05/20/20	0.03	> Up n
	Boron, dissolved	µg/l	6000	0.90	-2.2	↔	0.28	854.8	14.2	41	0	0	0		929.0	03/10/15	0.49	n	-9.7	↔	0.01	825.6	13.8	41	0	0	0		943.0	12/04/14	0.49	n
	Sodium, dissolved	mg/l	--	0.73	79.0	↑	0.00	8.0	NA	41	0	0	0		10.8	02/05/20	0.00	< Up n	47.0	↑	0.00	7.5	NA	41	0	0	0		9.8	02/05/20	0.00	< Up n
	Barium, dissolved	µg/l	2000	0.31	0.8	↔	0.37	42.8	2.1	41	0	0	0		50.0	05/11/15	0.49	n	-0.8	↔	0.41	66.3	3.3	41	0	0	0		80.6	12/04/14	0.49	n
	Selenium, dissolved	µg/l	50	0.27	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 wells).
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 indicates greater upgradient concentrations)
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 = increase; 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 to magnitude).
 - 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).