



Prepared by
Georgia Power Company
241 Ralph McGill Blvd NE
Atlanta, Georgia 30308

**LEGACY CCR SURFACE
IMPOUNDMENT APPLICABILITY
REPORT
PLANT BRANCH ASH POND A (AP-A)**

November 8, 2024

CERTIFICATION STATEMENT

Pursuant to § 257.100(f)(1)(ii)(A), I hereby certify under penalty of law that I have personally examined and am familiar with the information submitted in this demonstration and all attached documents, and that, based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the submitted information is true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment.



Jennifer McNelly
Vice President, Environmental Affairs
Georgia Power Company

November 8, 2024

Date

LEGACY CCR SURFACE IMPOUNDMENT APPLICABILITY REPORT

Legacy CCR Surface Impoundment Contact Information

Facility Name:	Plant Branch
Legacy CCR Surface Impoundment:	AP-A
Identification number:	N/A
Site Location:	1100 Milledgeville Rd Milledgeville, GA 31061 33.196307, -83.296462
Owner:	Georgia Power Company
Owner Address:	241 Ralph McGill Blvd NE, Atlanta, GA 30308
Owner e-mail address:	Gpcenv2@southernco.com
Owner phone number:	404-506-4750

Introduction

On April 17, 2015, the United States Environmental Protection Agency (EPA) published in the Federal Register requirements regarding the management and disposal of CCR titled “40 CFR Parts 257 and 261: Hazardous and Solid Waste Management System; Disposal of Coal Combustion Residuals from Electric Utilities; Final Rule” (i.e., 2015 federal CCR Rule). The 2015 federal CCR Rule, which became effective on October 19, 2015, established requirements regarding the design, operation, closure, post-closure care, monitoring, and corrective action for inactive, existing, and new CCR surface impoundments and existing and new CCR landfills.

In November 2016, the Georgia Environmental Protection Division (GA EPD) adopted amendments to the state’s Rules for Solid Waste Management that incorporated the 2015 federal CCR Rule (GA EPD 391-3-4-.10, i.e., the State CCR Rule). Plant Branch ceased generation activities prior to October 19, 2015 [2015 CCR Rule at 40 C.F.R. 257.50(e)], and the ash pond was closed by removal prior to the November 22, 2016, effective date of the State CCR Rule, therefore it was not subject to either the 2015 CCR Rule or the State CCR Rule, which was authorized by EPA on February 10, 2020.

On May 8, 2024, EPA published in the Federal Register a final rule entitled, “Hazardous and Solid Waste Management System: Disposal of Coal Combustion Residuals From Electric Utilities; Legacy CCR Surface Impoundments” (i.e., Legacy Rule). The Legacy Rule establishes regulatory requirements for inactive CCR surface impoundments at inactive facilities that meet the definition of “legacy CCR surface impoundment” as defined in 40 CFR § 257.53.

This applicability report for Plant Branch Ash Pond A (AP-A) has been prepared to meet regulatory requirements of 40 CFR § 257.100(f)(1)(i-ii). AP-A is a “Legacy CCR Surface Impoundment” under the Legacy Rule.

Site Description and Background

Plant Branch is located on approximately 3,200 acres of land, off State Route 24 (US 441), on the northern shore of Lake Sinclair near Milledgeville and Eatonton, Putnam County, Georgia. The plant commenced operations in the 1960s, ceased generating electricity prior to April 2015. The former coal-fired plant buildings have been demolished; however, administrative buildings remain, and site access is controlled. The current use of the property is limited to closure construction activities that include construction of a beneficial use facility and a new CCR landfill (CCR Permit No. 117-008D(CCR)) associated with CCR rule compliance. Over the course of power generation at the facility, five ash ponds, identified as Ash Ponds A, B, C, D and E were utilized for storage of CCR. AP-A was located in the eastern part of the property (Figure 1).

AP-A was constructed in 1965 and was in service during the initial years of the plant's operation. AP-A was small, approximately 1.2 acres, and ceased receipt of CCR sometime around 1967. Following cessation of use, the CCR unit was subsequently covered with soil fill to match surrounding grades, and the space was utilized for a parking lot, grassed areas, storage buildings, and equipment laydown.

Closure Status

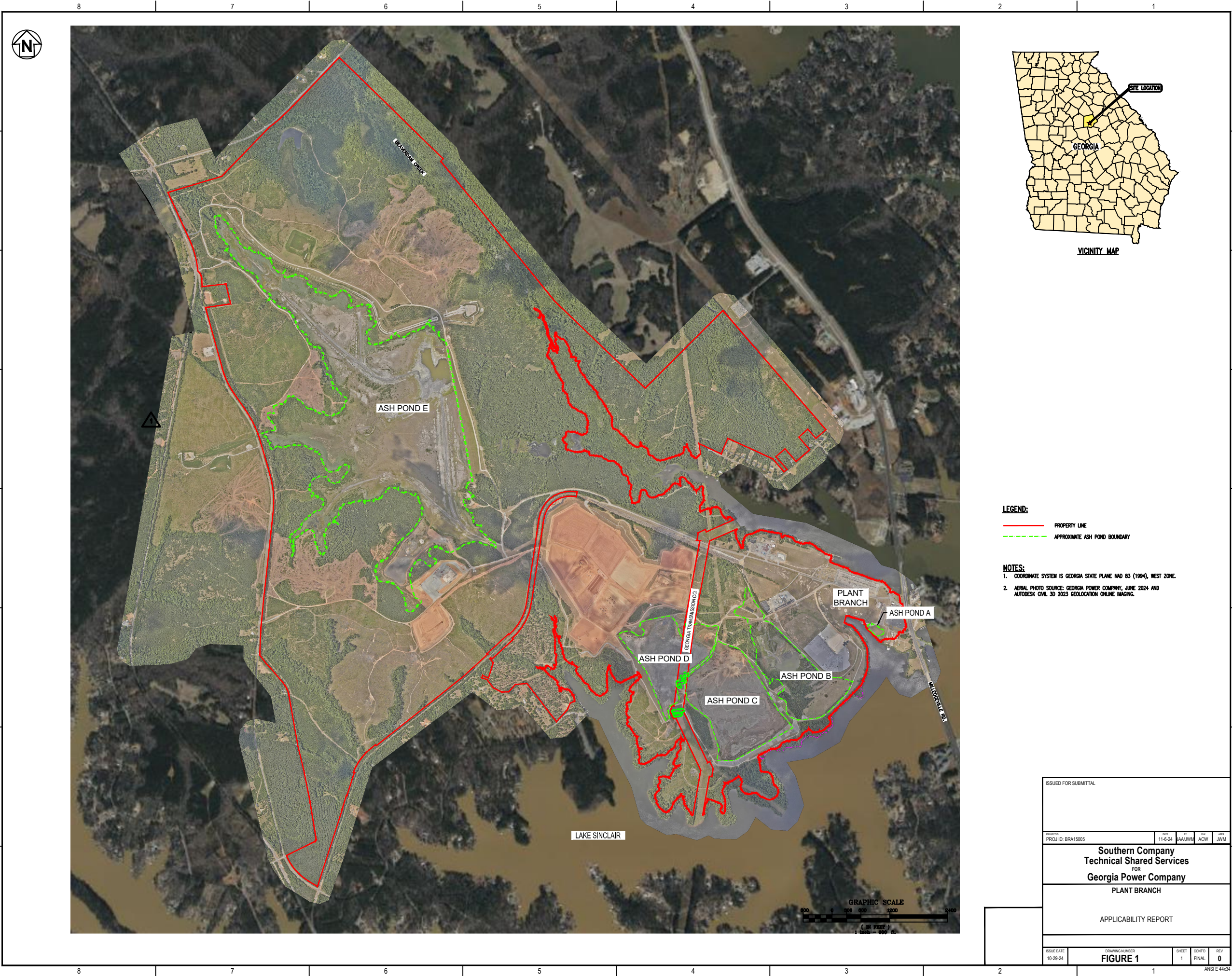
Between November 2015 and April 2016, CCR materials were removed from Branch AP-A. An additional six inches of soil beneath the CCR was also removed to complete closure of AP-A. Georgia Power submitted a Certification of Ash Removal to the GA EPD on January 26, 2018, prepared and certified by a Professional Engineer. Groundwater samples collected from wells installed upgradient and downgradient of AP-A document that Appendix IV constituents have been below the groundwater protection standards (GWPS) established for Plant Branch for the last four post-closure groundwater monitoring events conducted between June 2017 and January 2019. Therefore, groundwater in the vicinity of AP-A has been observed to achieve the GWPS. Accordingly, because Georgia Power completed closure of AP-A by removal of CCR prior to Friday, November 8, 2024, and groundwater data shows that Appendix IV parameters are below the GWPS, a Closure Certification pursuant to 40 CFR § 257.100(g) is attached here as Appendix A, serving as the demonstration that Branch A is not subject to any further requirements under the Legacy Rule. *See* 89 Fed. Reg. 38985; 39009.

CCR Rule Compliance Data and Information Website

More information can be found at the Georgia Power CCR website located at: <https://www.georgiapower.com/company/environmental-compliance/plant-list/plant-branch.html>

Attachments:

Figure 1	Plant Branch Site Map
Appendix A	Closure Certification Demonstration Under 40 CFR § 257.100(g)(1) through (6)
Appendix B	Ash Pond A – Certification of Ash Removal, 26 January 2018
Appendix C	Ash Pond A Closure Post Excavation Topographic Map
Appendix D	Erosion, Sedimentation and Pollution Control Plan (ES&PCP) Ash Pond A Excavation & Grading Plan, E23531, 15 April 2015
Appendix E	Boring Logs, PA-16, PA-17a, PA-17b, and PA-18
Appendix F	Summary of Groundwater Monitoring Data (2016/2017 – 2019)
Appendix G	Sanitas Statistical Results
Appendix H	Plant Branch Piezometer Installation Report – Pond A, 29 September 2017
Appendix I	Groundwater Elevation Summary for AP-A Network
Appendix J	Installation Report for Surface Impoundment Groundwater Piezometers, 29 September 2017



**APPENDIX A — CLOSURE CERTIFICATION DEMONSTRATION
UNDER 40 CFR § 257.100(g)(1) through (6)**

Plant Branch Ash Pond A (AP-A) was closed by removal between November 2015 and April 2016 with a certification of closure submitted to Georgia Environmental Protection Division (GA EPD) on 26 January 2018. “If a facility can certify that [...] legacy CCR surface impoundments on-site met the standards in 40 CFR § 257.102(c) prior to the effective date of this rule, the facility would not be subject to any further requirements under this final rule [...] For these units, the certification of closure by removal would be due no later than the effective date of this final rule and must be placed in the facility operating record then posted on their public CCR website.” 89 Fed. Reg. 39009. As detailed below, the closure of AP-A meets the standards specified under 40 CFR § 257.100(g) related to closure certification.

This document provides details and supplements information provided in the Applicability Report demonstrating that all standards specified in 40 CFR § 257.100(g)(1) through (6) were met for AP-A.

As detailed below:

- (1) The owner or operator of the CCR unit must document the type and volume of CCR and all other materials in the unit prior to closure.*

Plant Branch AP-A was constructed in 1965 and was in service during the initial years of plant operation. AP-A was small, approximately 1.2 acres, and ceased receipt of CCR sometime around 1967. Following cessation of use, the CCR was covered with soil fill to meet surrounding grades with positive drainage; the space was utilized for a parking lot and equipment laydown. Storage buildings were present within this area until they were razed in 2015 as part of the unit closure activities. Between November 2015 and April 2016, CCR materials were removed from Branch AP-A. The CCR present in AP-A consisted primarily of fly ash mixed with small amounts of bottom ash. According to the post excavation topographic map developed post closure of AP-A, approximately 19,500 cubic yards of CCR along with the underlying 6 inches of native soil were removed from AP-A (Appendix B and C).

- (2) The owner or operator of the CCR unit must document the methods used to verify complete removal of all CCR and other contaminated materials from the unit, including any post-removal sampling and analysis.*

Between November 2015 and April 2016, Georgia Power removed the soil fill and underlying CCR from AP-A, followed by visual inspection of the area, an industry standard practice for confirmation of CCR removal. At least an additional six (6) inches of soil beneath the CCR was also removed to complete closure of AP-A. The CCR excavated from AP-A was hauled onsite to Ash Pond E (AP-E). Following removal of CCR and at least the underlying 6-inches of soil, AP-

A was backfilled with soil from an on-site borrow source. The borrow soil was compacted, with the final grades sloped to provide positive drainage to avoid ponding of surface water. The disturbed area was hydro-seeded and a vegetative cover established. The certification of ash removal was prepared and submitted to GA EPD on 26 January 2018, which includes photographic documentation of the removal activities (Appendix B). Finally, as discussed further below, post-closure groundwater monitoring for CCR-related constituents was conducted.

(3) The owner or operator of the CCR unit must document that all CCR and other contaminated materials were removed from the unit, including, the results of any post-removal sampling and analysis that was conducted.

As detailed in the Erosion, Sedimentation and Pollution Control Plan (ES&PCP) issued for the excavation of AP-A in 2015, ten borings (PA-16 through PA-22) were installed within the boundary of AP-A to identify the extent and depth of CCR to be removed (Appendix D). Boring logs for select boring locations within AP-A indicate a maximum depth of CCR within AP-A occurs at approximately elevation 343 feet North American vertical datum of 1988 (ft NAVD88) (15 feet of CCR at location PA-16) (Appendix E). In addition, the ES&PCP plan for AP-A excavation indicates a targeted excavation down to undisturbed grade at approximately 340 ft NAVD88 elevation (Appendix D), which generally coincides with the elevation of the proximal feature of Lake Sinclair. As discussed in the response to 40 CFR § 257.100(g)(2), a certification of ash removal documents that the CCR placed in AP-A during operation along with at least the underlying 6-inches of soil was excavated from AP-A. The certification of ash removal was prepared and submitted to GA EPD on 26 January 2018 (Appendix B).

(4) The owner or operator of the CCR unit must document the methods used to verify complete decontamination of all areas affected by released from the unit, including but not limited to post-decontamination sampling and analysis.

Verification of decontamination of AP-A was achieved through visual inspection of the excavated area post-CCR removal, photographic documentation, and post-closure groundwater monitoring for CCR-related constituents. As identified in the response to 40 CFR § 257.100(g)(2), a certification of ash removal documented that the CCR placed in AP-A along with at least the underlying 6-inches of soil was excavated from AP-A. The certification of ash removal was prepared and submitted to GA EPD on 26 January 2018 and included photographic documentation of removal activities (Appendix B).

In 2016 and 2017, one upgradient (PZ-42S) and three downgradient (BRGWC-24S/PZ-24S, PZ-40S, and PZ-41S) groundwater monitoring wells were installed to confirm that potential impacts from the unit operations were not observed in groundwater. A summary of the groundwater monitoring data between 2016/2017 and 2019 (Appendix F). The groundwater monitoring data

were compared to the groundwater protection standards (GWPS) established for Ash Pond B, C, and D (AP-BCD) using the most recent (July 2024) groundwater monitoring data.¹ The GWPS for AP-BCD was used because it represents the greatest population of background monitoring wells at Plant Branch that also serve as upgradient locations for AP-A. The background groundwater monitoring wells for AP-E are included in the background monitoring network for AP-BCD. The AP-BCD background monitoring network includes additional monitoring wells that would serve as upgradient for AP-A as well. Therefore, the AP-BCD background network is considered appropriate for AP-A and AP-A is proximally closer to AP-BCD than AP-E. The data indicate a single sample that exceeded the background GWPS for cobalt (0.014 mg/L) in PZ-41S in March 2017. The four samples collected after that in June 2017, August 2017, September 2017, and January 2019 were below the GWPS. The remaining groundwater samples from the four monitoring wells were below the GWPS for the other Appendix IV constituents. Statistical analysis for the determination of confidence intervals did not identify any statistically significant levels (SSL) of Appendix IV constituents in the groundwater monitoring data (Appendix G).

(5) The owner or operator of the CCR unit must document that all areas affected by releases from the unit were decontaminated and that all groundwater affected by releases has achieved groundwater protections standards.

As identified in the response to 40 CFR § 257.100(g)(4), groundwater monitoring conducted upgradient and downgradient of the closed unit documents that Appendix IV constituents have been below the GWPS (as determined for AP-BCD in July 2024) for the last four post-closure groundwater monitoring events conducted between June 2017 and January 2019 (Appendix F). Therefore, groundwater in the vicinity of AP-A has been observed to achieve the GWPS.

(6) The owner or operator of the CCR unit must document groundwater monitoring concentrations do not exceed the groundwater protection standards established pursuant to § 257.95(h) for constituents listed in appendix IV to this part. The documentation must also include a demonstration that the groundwater monitoring system has met all of the following:

(i) Was capable of accurately representing background water quality unaffected by a CCR unit;

The groundwater monitoring network installed for AP-A was capable of accurately representing background water quality. The groundwater monitoring network meets the standard of one upgradient and three downgradient monitoring locations as identified in 40 CFR § 257.91(c)(1). In February 2017, one groundwater monitoring well (PZ-42S) was installed upgradient of potential

¹ Annual Groundwater Monitoring and Corrective Action Report, 31 July, 2024, [Report Link - Plant Branch Compliance Website](#).

impacts from operations at Plant Branch AP-A (Appendix H), as evidenced by a review of groundwater elevation between 2016 and 2019 in the AP-A groundwater monitoring network that confirms that PZ-42S was an accurate representation of background water quality unaffected by the CCR unit (Appendix I).

(ii) Was capable of accurately representing the quality of water passing the waste boundary of the unit;

AP-A was a small, shallow unit of approximately 1.2 acres. Boring logs for select boring locations within AP-A (Appendix E) indicate a maximum depth of CCR occurs at an approximate elevation of 343 ft NAVD88 (approximate maximum of 15 feet of CCR materials). The surface water elevation of the adjacent Lake Sinclair is consistently maintained around 340 ft NAVD88. Given the limited elevation difference between the bottom of CCR and the lake, water passing through the waste boundary would do so under relatively low hydraulic head, and a relatively flat hydraulic gradient. The limited gradient for water passing through the waste boundary would be from the base of the former unit in the direction of the lake.

Between September 2016 and February 2017, three hydraulically downgradient groundwater monitoring wells (PZ-24S, PZ-40S, and PZ-41S) were installed proximal to the waste boundary, as close as practically possible based on site conditions at the time (Appendix H and J). The downgradient groundwater monitoring wells were installed with well screens in the uppermost saturated saprolite of the surficial aquifer (screen intervals between elevation 325 and 310 ft NAVD88). These screen intervals would be capable of accurately representing the quality of water discharging from the base of the CCR unit (approximately 340 ft NAVD88 elevation) and passing through the waste boundary. A review of groundwater elevation between 2016 and 2019 in the AP-A groundwater monitoring network (Appendix I) supports a limited hydraulic gradient consistent with local topography and indicates that the downgradient wells accurately represent the quality of water passing the waste boundary of the unit prior to reaching Lake Sinclair where elevation is maintained around 340 ft NAVD88.

The groundwater monitoring network installed for AP-A was capable of accurately representing water quality passing the waste boundary. The groundwater monitoring network meets the standard of one upgradient and three downgradient locations as identified in 40 CFR § 257.91(c)(1). As identified in the response to 40 CFR § 257.100(g)(4), a groundwater sampling program was implemented to obtain groundwater quality data at each monitoring well location, including waste boundary locations, from 2016-2019.

(iii) Was capable of detecting contamination in the uppermost aquifer;

The uppermost aquifer at the Site is an unconfined regional groundwater aquifer that occurs primarily in the saprolite, PWR (transition zone), and fractured bedrock. While the aquifer characteristics of each unit may vary, the groundwater is interpreted to be interconnected between these units, and they effectively act as one, unconfined aquifer. Generally, the water table surface at the Site is a subdued reflection of topography, with groundwater generally flowing east, west, and south.

The groundwater monitoring well network was installed such that it is capable of detecting contamination in the uppermost aquifer given the screen intervals and hydraulic locations of the installed monitoring wells as discussed in the response to 40 CFR § 257.100(g)(6)(ii). The monitoring wells were screened in the saprolitic zone (moist silt or sand) where shallow groundwater is expected to be present and just below the bottom of CCR materials placed in AP-A. The boring logs detailing the subsurface lithology of the screen intervals are provided in the piezometer installation reports (Appendix H and J). Given this and in the context of the site-specific setting, the groundwater monitoring well network was adequate to intercept any potential releases from AP-A to the uppermost aquifer and deeper groundwater monitoring would not be necessary.

(iv) Monitored all potential contaminant pathways;

The potential contaminant pathway from CCR placed in AP-A is release from the unit to the uppermost, shallow aquifer observed in the subsurface saprolite region. As discussed in the response to 40 CFR § 257.100(g)(6)(iii), the downgradient monitoring wells (BRGWC-24S/PZ-24S, PZ-40S, and PZ-41S) were installed in appropriate locations to intercept a potential release and monitor this potential contaminant pathway. The water levels in these monitoring wells are on the same order as the elevation of the adjacent surface water in Lake Sinclair (maintained consistent surface water elevation around 340 ft NAVD88) indicating a limited hydraulic head in the area near AP-A (Appendix I). Provided the limited footprint of CCR in AP-A, the limited hydraulic head, and the monitoring well locations and screen intervals, these three downgradient monitoring wells satisfy the standard in 40 CFR § 257.100(g)(6)(iv).

(v) Established groundwater background concentrations for appendix IV constituents and compared samples to those background concentrations;

As discussed in the response to 40 CFR § 257.100(g)(4), a summary of the groundwater monitoring data collected from the wells installed to monitor AP-A between 2016/2017 and 2019 (Appendix F). The groundwater monitoring data was compared to GWPS established for AP-BCD. The data indicates a single sample exceeded the background GWPS for cobalt (0.014 mg/L) in PZ-41S in

March 2017. The four samples collected after that in June 2017, August 2017, September 2017, and January 2019 were below the GWPS for cobalt. The four groundwater samples were below the GWPS for remaining Appendix IV constituents. Statistical analysis for the determination of confidence intervals did not identify any statistically significant levels (SSL) of any Appendix IV parameters in the groundwater monitoring data (Appendix G).

(vi) Monitoring wells must have been cased in a manner that maintains the integrity of the monitoring well borehole. This casing must have been screened or perforated and packed with gravel or sand, where necessary, to enable collection of groundwater samples. The annular space (i.e., the space between the borehole and well casing) above the sampling depth must have been sealed to prevent contamination of samples and the groundwater; and

The four groundwater monitoring piezometers (BRGWC-24S/PZ-24S, PZ-40S, PZ-41S, and PZ-42S) were installed in a manner that meets the standard in 40 CFR § 257.100(g)(6)(vi) as documented in the piezometer installation reports (Appendix H and J).

(vii) The last groundwater monitoring sample used to document that the standard in paragraph (g)(3) of this section has been met must have been collected no earlier than one year prior to the initiation of closure.

The closure of AP-A began in November 2015 and was completed in April 2016. A certification of ash removal was prepared and submitted to GA EPD on 26 January 2018 (Appendix B). Groundwater monitoring wells proximal to AP-A were installed between 2016 and 2017 with groundwater monitoring being conducted between 2016/2017 (depending on installation date) and 2019. Therefore, the last groundwater monitoring sample was collected post-closure, meeting the standard in 40 CFR § 257.100(g)(6)(vii).

**PROFESSIONAL ENGINEER CERTIFICATION FOR EXEMPTION UNDER 40 CFR §
257.100(g)**

I, Lauren E. Fitzgerald, am a professional engineer and licensed in the State of Georgia. I hereby certify that this Closure Certification Demonstration was prepared by, or under the direct supervision of, a Qualified Groundwater Scientist, in accordance with the Georgia Environmental Protection Division Rules of Solid Waste Management. According to 391- 3-4-.01, a Qualified Groundwater Scientist is “a professional engineer or geologist registered to practice in Georgia who has received a baccalaureate or post-graduate degree in the natural sciences or engineering and has sufficient training and experience in groundwater hydrology and related fields that enable individuals to make sound professional judgments regarding groundwater monitoring, contaminant fate and transport, and corrective action.” By affixing my professional seal and signature, I hereby acknowledge that this demonstration for deferral pending a future permitting action has been prepared in conformance with and meets the technical requirements of 40 CFR § 257.100(g).



 Digitally signed
by Lauren
Fitzgerald
Date: 2024.11.07
14:49:38 -06'00'

November 8, 2024

Lauren E. Fitzgerald, Ph.D.
Georgia Professional Engineer No. 048960

Date

**APPENDIX B — ASH POND A – CERTIFICATION OF ASH REMOVAL, 26 JANUARY
2018**

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Mr. William Cook
 Program Manager
 Georgia Environmental Protection Division
 4244 International Parkway, Suite 104
 Atlanta, GA 30354

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Program Manager
Georgia Environmental Protection Division
4244 International Parkway, Suite 104
Atlanta, GA 30354



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GEORGIA POWER COMPANY
241 RALPH MCGILL BLVD
ATLANTA, GA 30308
BIN#10221



January 26, 2018

Submitted Electronically via Email At
william.cook@dnr.ga.gov

Mr. William Cook
Program Manager
Georgia Environmental Protection Division
4244 International Parkway, Suite 104
Atlanta, GA 30354

**Re: Ash Pond A - Certification of Ash Removal
Harlee Branch Power Plant
Milledgeville, Georgia**

Dear Mr. Cook:

Enclosed is a certification of removal of all coal combustion residuals (CCR) from Ash Pond A (AP-A) at Georgia Power's former Plant Branch located in Milledgeville, Georgia. Plant Branch utilized five (5) surface impoundments (e.g. ash ponds) to support its coal-fired electricity generation. These ash ponds are referenced as AP-A, AP-B, AP-C, AP-D, and AP-E. Power generation of all forms at the facility ceased on April 15, 2015 before the effective date of the Federal CCR Rule (October 19, 2015); therefore, the CCR Units at Plant Branch are not regulated by the Federal CCR Rule.

Plant Branch AP-A was constructed in 1965 and was in service during the initial years of the plant's operation. AP-A was small at approximately 1.2 acres and ceased to operate sometime around 1967. Following cessation of use, the CCR was subsequently covered with soil fill to match surrounding grades, and the space was utilized for a parking lot, grassed areas, and equipment laydown.

Between November 2015 and April 2016, Georgia Power removed all the soil fill and the underlying CCR. An additional six (6) inches of soil beneath the CCR was also removed to complete closure of AP-A. The CCR excavated from AP-A was consolidated into Plant Branch AP-E. Following CCR removal and the underlying 6-inches of soil, AP-A was backfilled with soil obtained from an on-site borrow source. The imported soil was compacted and the surface sloped to provide positive drainage. The disturbed ground surface has been hydro-seeded and a vegetative cover established.

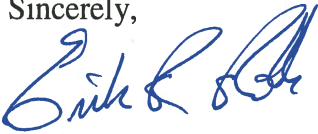
Georgia's Solid Waste Management Rule for Coal Combustion Residuals (391-3-4-.10, referred to as State CCR Rule) was effective on November 22, 2016. AP-A was completely removed prior to the effective date of the State CCR Rule. Therefore, AP-A is not subject to the State CCR Rule. However, applications for permits for the remaining CCR Units (AP-B, AP-C, AP-D, and AP-E) are being prepared and will be submitted to EPD by November 22, 2018, as required by the State CCR Rule.

January 26, 2018

The attached Certification was prepared by a professional engineer. The closure certification includes additional information regarding AP-A closure activities including photographic documentation and post-excavation and post-restoration topographic maps.

If you have any questions, please feel free to contact Yiwen Cao at 404-506-6272 or myself at 404-506-1365.

Sincerely,



Erik Rolle
Environmental Affairs Supervisor

Attachment



September 7, 2017

Mr. Yiwen Cao
Georgia Power Company
Environmental Affairs
BIN 10221
Atlanta, Georgia 30308

Plant Branch Ash Pond A (AP-A)
Certification of Ash Removal

Mr. Cao,

This letter is to certify that all visually identifiable CCR materials (i.e., ash), plus approximately six inches of residual subgrade soils underneath the CCR materials from Ash Pond A (AP-A) at Plant Branch have been removed. The excavation of overburden soil, CCR materials and six inches of the residual subgrade soils subgrade were performed under observation by construction personnel from Engineering and Construction Services, Southern Company Services (SCS).

The overburden soils and ash excavation in AP-A began on November 16, 2015, and continued until January 13, 2016. The excavation area was backfilled with compacted fill material and sloped to provide positive drainage. After completion of backfilling, the AP-A area was hydro seeded and mulched for erosion control. The residual subgrade soils encountered during excavation consisted of reddish brown to tan silty sands and sandy silts.

SCS Engineering personnel and Georgia Power Environmental Affairs personnel (GPC EA) observed the ash excavation, relocation, and soil backfilling activities during periodic site visits. After substantial completion of ash excavation from AP-A, the residual subgrade soils were visually observed by professional engineers from SCS (Mr. Gary McWhorter, P.E. and Mr. Rajendra Gondhalekar, P.E.) and by GPC EA personnel to verify that the criteria for ash removal (i.e., all visually identifiable ash plus 6" of underlying soil) had been satisfied. Ash removal from the remaining two isolated locations was observed and documented on February 18, 2016, by other SCS construction personnel designated by the professional engineer.

Photographic documentation of ash excavation from AP-A is attached. The excavation process was photographically documented by Southern Company Services (SCS) personnel. As depicted, the majority of the ash was excavated from AP-A by January 13, 2016, with the exception of two localized areas along the southwest edge of AP-A, where presence of a chain-link fence and an electrical utility pole temporarily prevented ash excavation at the time. The ash from the remaining two localized areas was excavated on February 18, 2016. After completion of excavation of ash and underlying residual subgrade soil, the excavation grades were surveyed by SCS surveying



personnel. The post excavation and post restoration topographic grades are depicted on the attached topographic maps.

I hereby certify that, based on visual inspection by Georgia Power Environmental Affairs and SCS Environmental Services and Field Support, Land Strategy and CCR personnel, all visible indications of CCR materials, plus a minimum of six inches of residual subgrade soils underneath the CCR materials from AP-A at Plant Branch have been removed.


9/15/2012

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Photograph 1
Ash Pond A Prior to Excavation



Photograph 2
Start of Ash Pond A Excavation



Photograph 3
Continued Ash Pond A Excavation



Photograph 4
Ash Pond A Ash Placement at Ash Pond E







Photograph 9
Ash Pond A Excavation Completion (Eastern Section)



Photograph 10
Ash Pond A - Isolated Remaining Ash Location 1



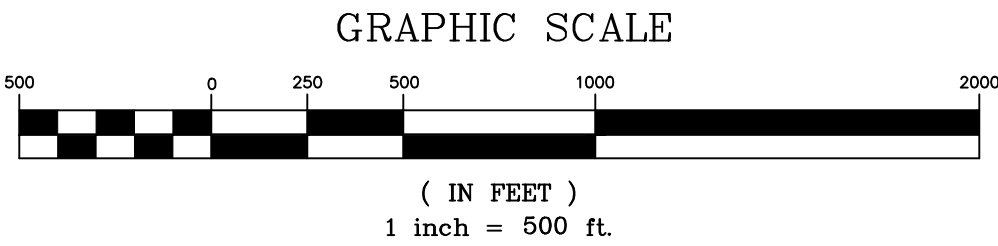
Photograph 11
Ash Pond A - Isolated Ash Removal from Location 1



Photograph 12
Ash Pond A - Isolated Remaining Ash Location 2



TOPOGRAPHIC MAPS



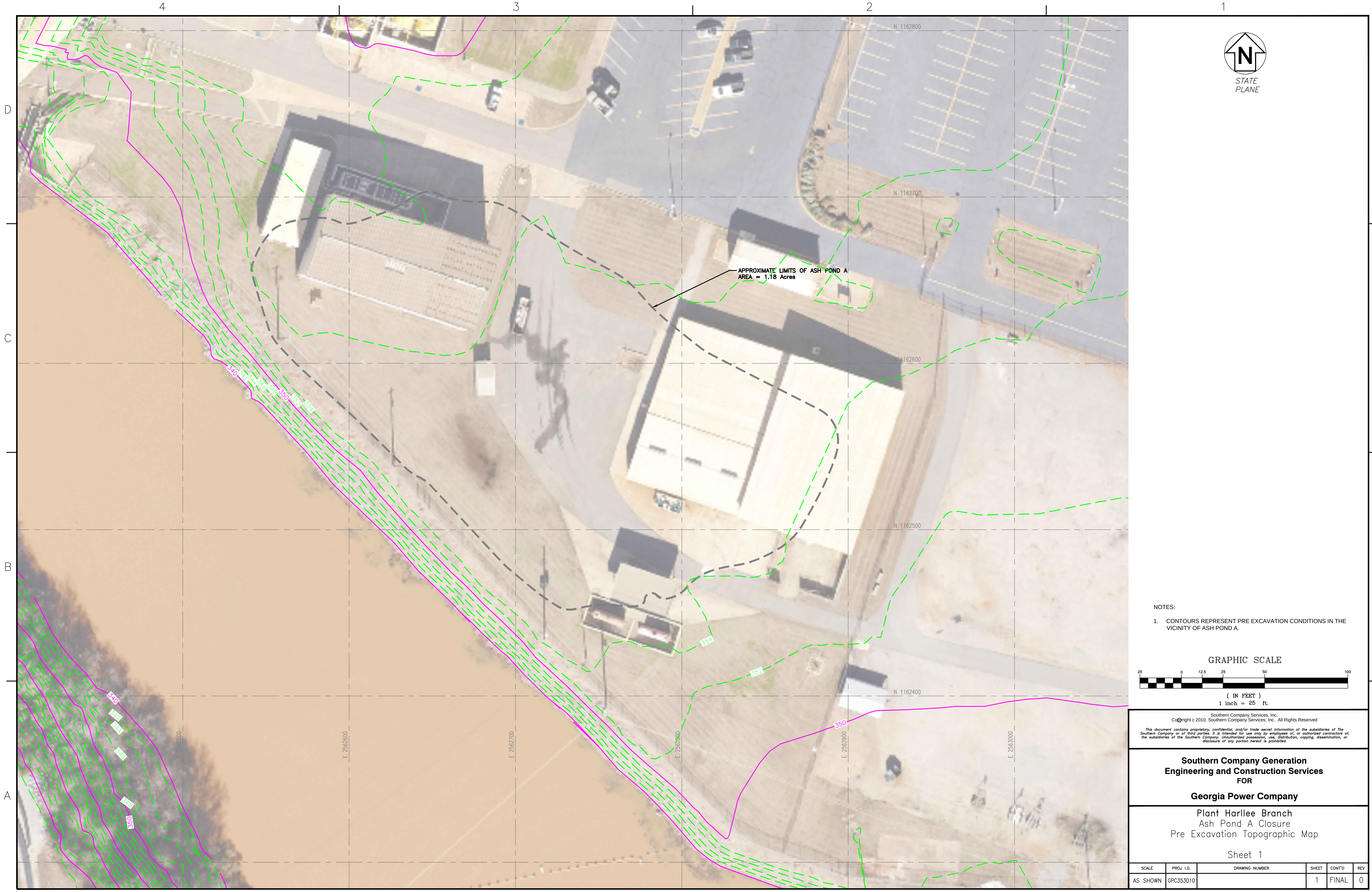
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Engineering and Construction Services
FOR
Georgia Power Company**

Plant Harllee Branch
Ash Pond A Closure

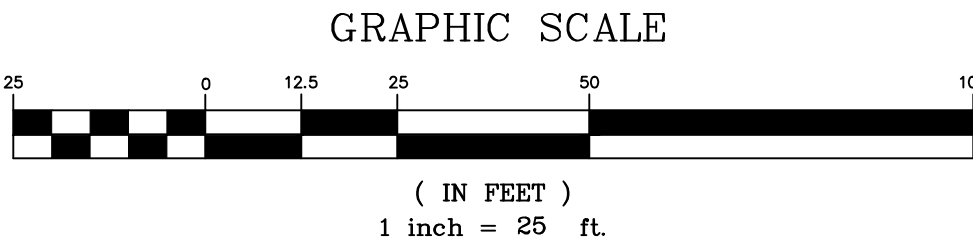
Overall Site Map

SCALE	PROJ. I.D.	DRAWING NUMBER	SHEET	CONT'D	REV
AS SHOWN	GPC353010		—	FINAL	0



NOTES:

1. CONTOURS REPRESENT PRE EXCAVATION CONDITIONS IN THE VICINITY OF ASH POND A.



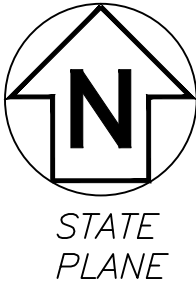
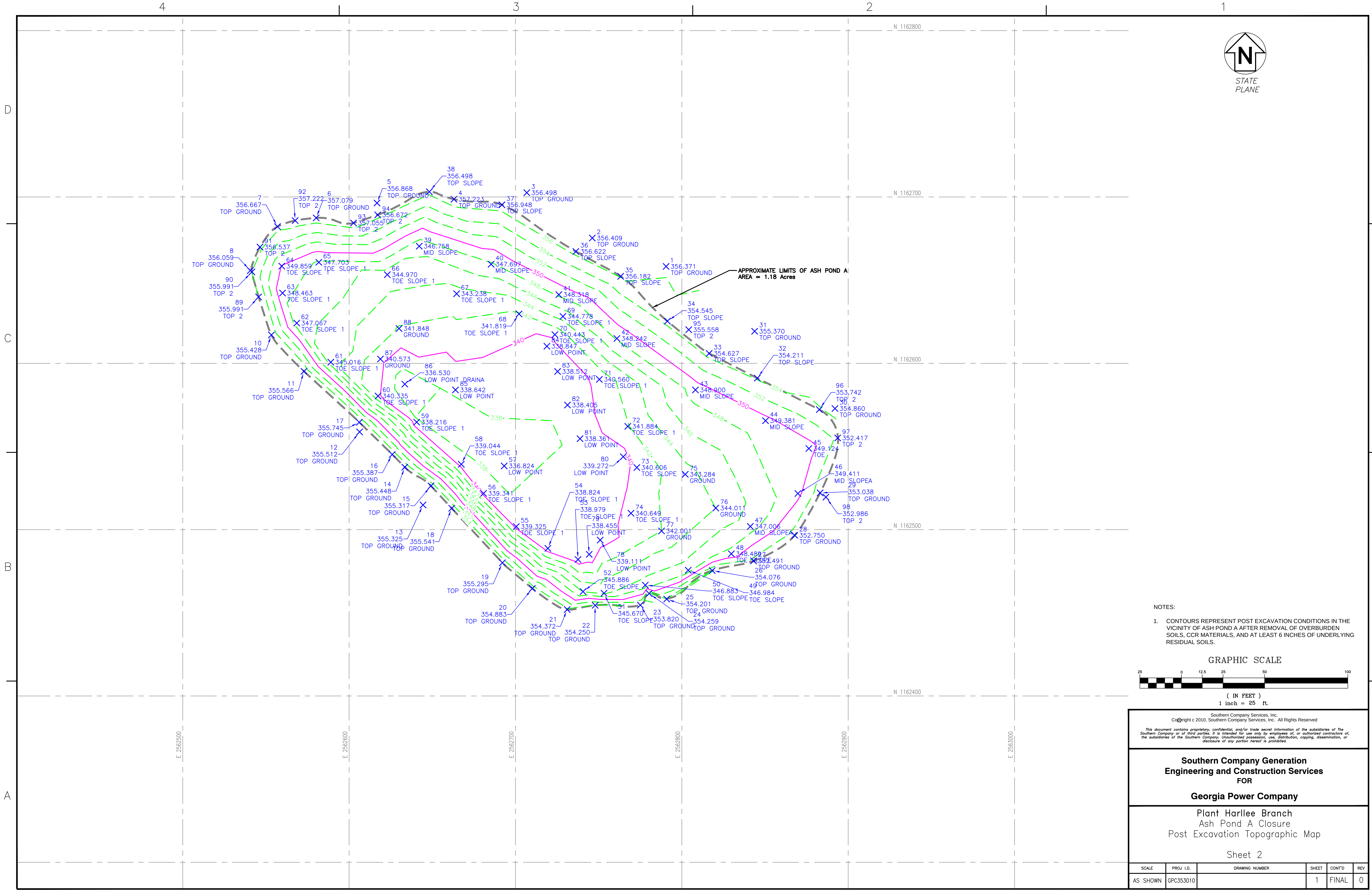
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Plant Harllee Branch
Ash Pond A Closure
Pre Excavation Topographic Map

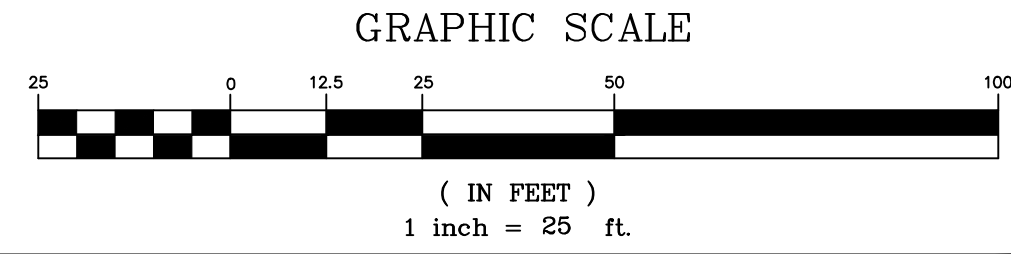
Sheet 1

SCALE	PROJ. I.D.	DRAWING NUMBER	SHEET	CONT'D	REV
AS SHOWN	GPC353010		1	FINAL	0



APPROXIMATE LIMITS OF ASH POND A
AREA = 1.18 Acres

- NOTES:
1. CONTOURS REPRESENT POST EXCAVATION CONDITIONS IN THE VICINITY OF ASH POND A AFTER REMOVAL OF OVERBURDEN SOILS, CCR MATERIALS, AND AT LEAST 6 INCHES OF UNDERLYING RESIDUAL SOILS.



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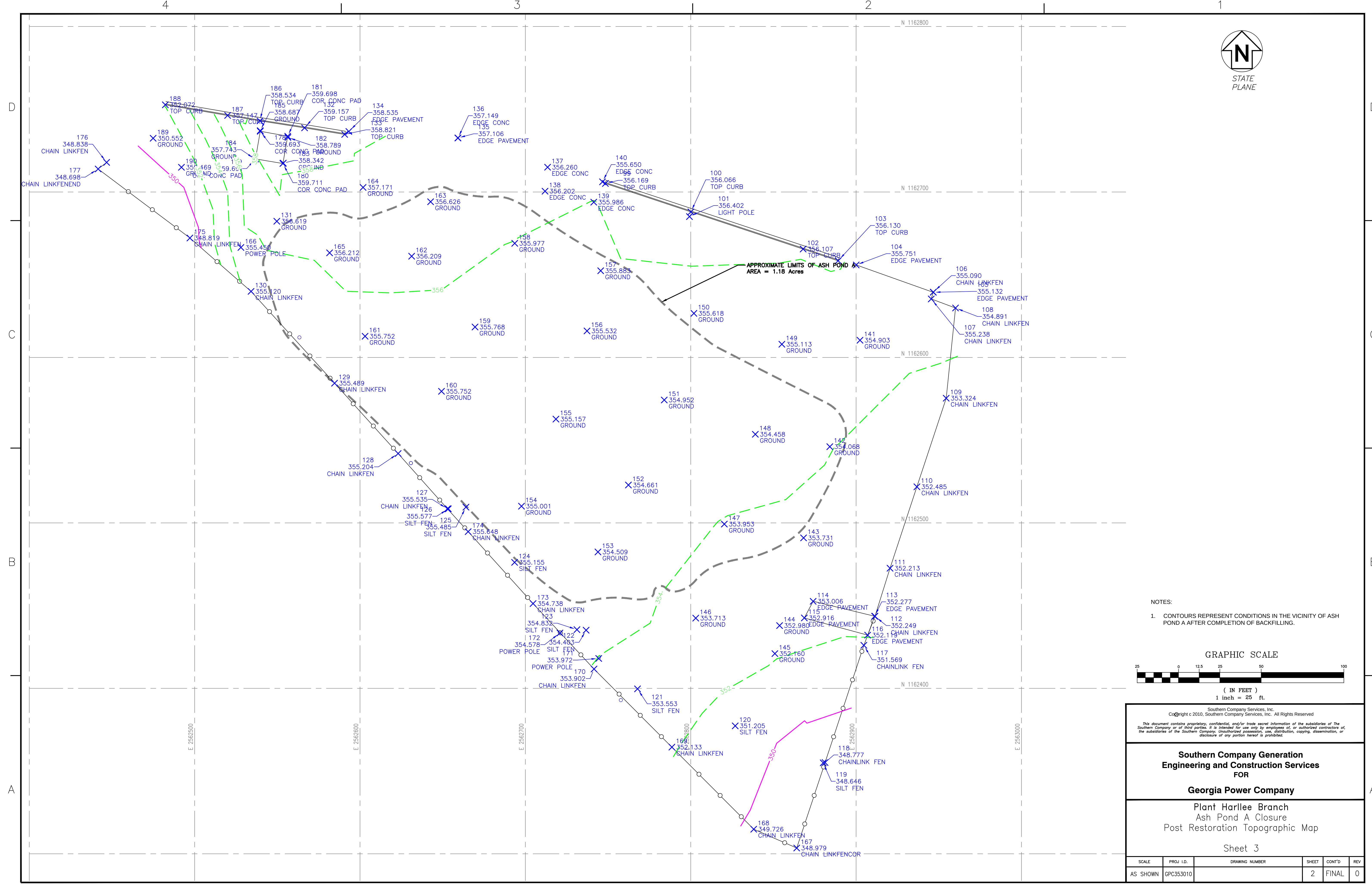
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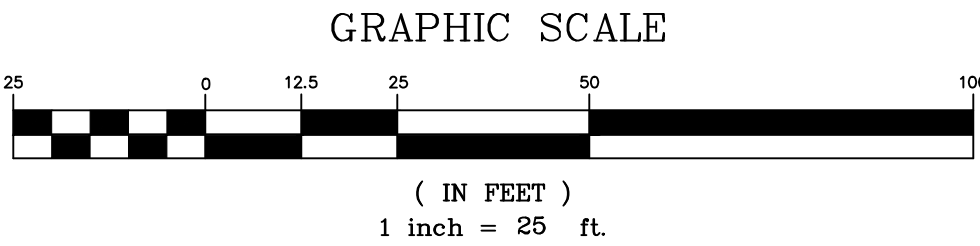
Plant Harllee Branch
Ash Pond A Closure
Post Excavation Topographic Map

Sheet 2

SCALE	PROJ. I.D.	DRAWING NUMBER	SHEET	CONT'D	REV
AS SHOWN	OPC353010		1	FINAL	0



- NOTES:
1. CONTOURS REPRESENT CONDITIONS IN THE VICINITY OF ASH POND A AFTER COMPLETION OF BACKFILLING.



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Plant Harllee Branch
Ash Pond A Closure
Post Restoration Topographic Map

Sheet 3

SCALE	PROJ. I.D.	DRAWING NUMBER	SHEET	CONT'D	REV
AS SHOWN	GPC353010		2	FINAL	0

**APPENDIX C — ASH POND A CLOSURE POST EXCAVATION TOPOGRAPHIC
MAP**

4

3

2

1

D

D

C

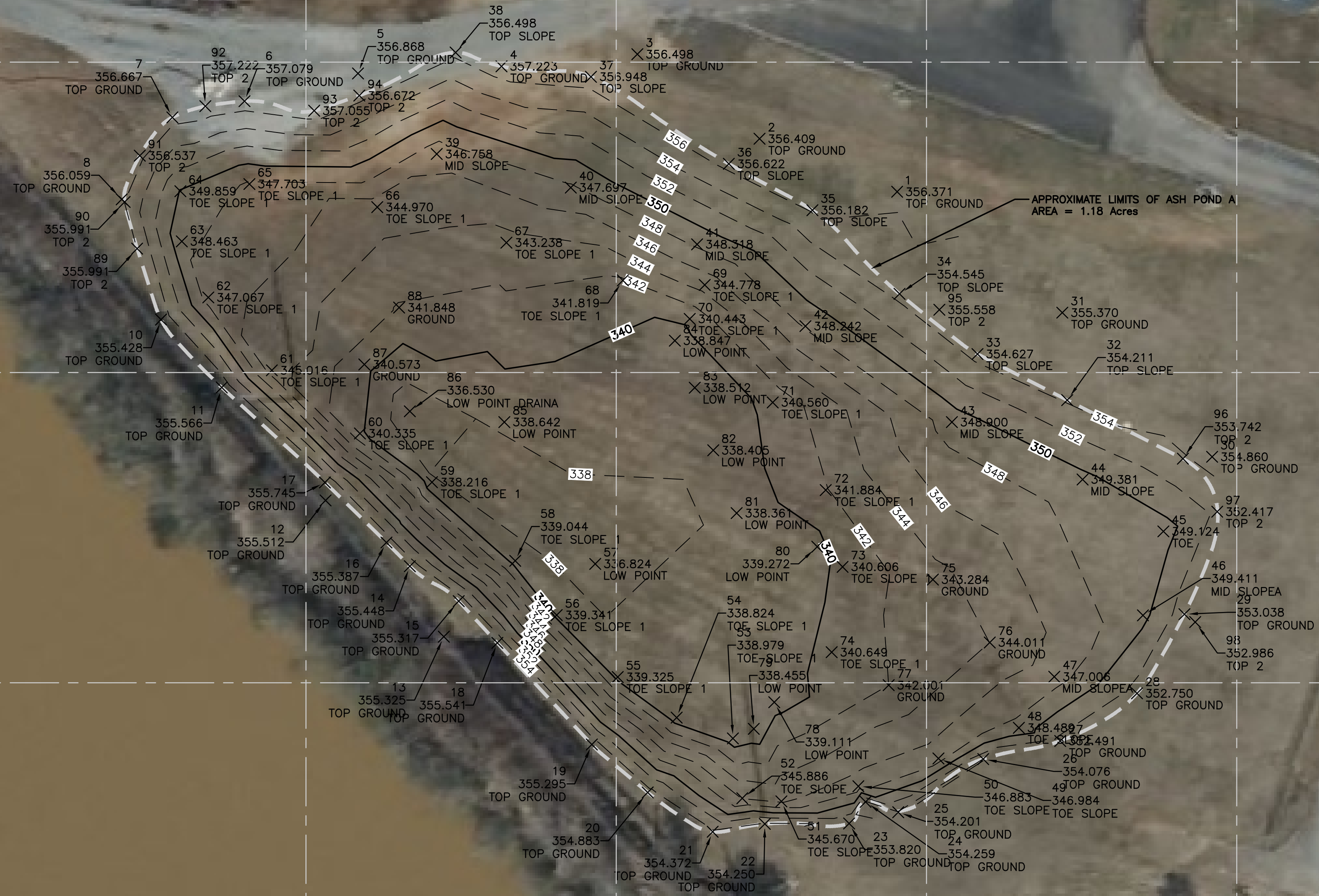
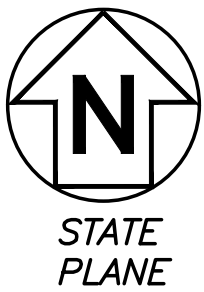
C

B

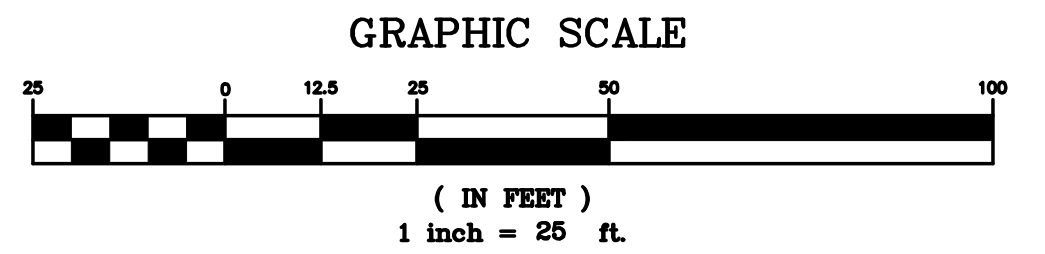
B

A

A



- NOTES:
1. CONTOURS REPRESENT POST EXCAVATION CONDITIONS IN THE VICINITY OF ASH POND A AFTER REMOVAL OF OVERBURDEN SOILS, CCR MATERIALS, AND AT LEAST 6 INCHES OF UNDERLYING RESIDUAL SOILS.



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**Plant Harllee Branch
Ash Pond A Closure
Post Excavation Topographic Map**

Sheet 2

SCALE	PROJ. I.D.	DRAWING NUMBER	SHEET	CONT'D	REV
AS SHOWN	GPC353010		1	FINAL	0

**APPENDIX D — EROSION, SEDIMENTATION AND POLLUTION CONTROL PLAN
(ES&PCP) ASH POND A EXCAVATION & GRADING PLAN, E23531, 15 APRIL 2015**

APPENDIX E — BORING LOGS, PA-16, PA-17a, PA-17b, AND PZ-18



LOG OF TEST BORING

BORING PA-16
PAGE 1 OF 1

SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

PROJECT Branch Ash Pond Closure Feasibility Study

LOCATION Plant Branch

DATE STARTED 4/22/2014 **COMPLETED** 4/23/2014 **SURF. ELEV.** 360.5 **COORDINATES:** N:1,162,505.69 E:2,562,714.59

CONTRACTOR SCS Field Services **EQUIPMENT** CME 550 **METHOD** Hydrovac; Hollow Stem Auger

DRILLED BY T. Milam **LOGGED BY** W. Shaughnessy **CHECKED BY** **ANGLE** **BEARING**

BORING DEPTH 20 ft. **GROUND WATER DEPTH: DURING** **COMP.** **DELAYED**

NOTES

2012 GEOTECH ENGINEERING LOGS - ESEE2012DATABASE.GDT - 4/25/14 09:37 - VALTRCFP011X2WSHAUG\$IDESTOP\BRANCH\BRANCH GEOTECH BORING LOGS - COPY.GPJ

DEPTH (ft)	GRAPHIC LOG	STRATA DESCRIPTION	ELEV.	SAMPLE TYPE NUMBER	SAMPLE DEPTH (ft.)	BLOW COUNTS (N-VALUE)	COMMENTS
						PERCENT RECOVERY (RQD)	
		Fill (FILL) - red, dry, CLAY with gravel					Boring hydro-excavated surface to 11 ft..
			358.5				
		Coal Combustion Byproduct (ASH)					
5		- ASH: gray, dry		GB -1	4.0		
10		- ASH: gray, wet		GB -2	8.0		
		- ASH: gray, wet		SS -3	11.0-12.5	WH-WH-WH (0)	
15		- ASH: gray, wet		SS -4	13.5-15.0	WH-WH-WH (0)	
		- ASH: gray, wet		SS -5	16.0-17.5	WH-4-4 (8)	
		Fat Clay (CH) - red, wet, CLAY	343.5				
			342.0				
20		Silty Sand (SM) - silty SAND, dark gray-brown and red, silty	340.5	SS -6	18.5-20.0	7-11-11 (22)	

Bottom of borehole at 20.0 feet.

Bottom of borehole at 8.0 feet.



LOG OF TEST BORING

BORING PA-17 B
PAGE 1 OF 1

SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

PROJECT Branch Ash Pond Closure Feasibility Study

LOCATION Plant Branch

DATE STARTED 4/22/2014 **COMPLETED** 4/23/2014 **SURF. ELEV.** 361.8 **COORDINATES:**

CONTRACTOR SCS Field Services **EQUIPMENT** CME 550 **METHOD** Hydrovac; Hollow Stem Auger

DRILLED BY T. Milam **LOGGED BY** W. Shaughnessy **CHECKED BY** **ANGLE** **BEARING**

BORING DEPTH 16.5 ft. **GROUND WATER DEPTH: DURING** **COMP.** **DELAYED**

NOTES Boring PA-17B located approximately 12 feet east from boring PA-17A.

2012 GEOTECH ENGINEERING LOGS - ESEE2012DATABASE.GDT - 4/25/14 09:37 - VALTRCFP011X2WSHAUG\$IDESKTOP\BRANCH\BRANCH GEOTECH BORING LOGS - COPY.GPJ

DEPTH (ft)	GRAPHIC LOG	STRATA DESCRIPTION	ELEV.	SAMPLE TYPE NUMBER	SAMPLE DEPTH (ft.)	BLOW COUNTS (N-VALUE)	COMMENTS
						PERCENT RECOVERY (RQD)	
		Fill (FILL) - red, dry, CLAY with gravel					
			359.8				
5		- ASH: gray, (based on observation/measurement made inside boring)					
			356.8				
		- FILL: red, damp, CLAY with gravel/debris		GB -1	6.0		
		- FILL: red, damp, CLAY with gravel/debris		GB -2	7.0		
10							
		- FILL: red, wet, clayey SAND		SS -3	10.0-11.5	4-5-6 (11)	
		- FILL: red, wet, clayey SILT		SS -4	12.5-14.0	3-4-6 (10)	
15		- FILL: red, wet, clayey SILT		SS -5	15.0-16.5	2-3-2 (5)	
			345.3				

Bottom of borehole at 16.5 feet.



LOG OF TEST BORING

BORING PA-18
PAGE 1 OF 1

SOUTHERN COMPANY SERVICES, INC.
EARTH SCIENCE AND ENVIRONMENTAL ENGINEERING

PROJECT Branch Ash Pond Closure Feasibility Study

LOCATION Plant Branch

DATE STARTED 4/22/2014 **COMPLETED** 4/23/2014 **SURF. ELEV.** 360.5 **COORDINATES:**

CONTRACTOR SCS Field Services **EQUIPMENT** CME 550 **METHOD** Hydrovac; Hollow Stem Auger

DRILLED BY T. Milam **LOGGED BY** W. Shaughnessy **CHECKED BY** **ANGLE** **BEARING**

BORING DEPTH 16.5 ft. **GROUND WATER DEPTH: DURING** **COMP.** **DELAYED**

NOTES Boring PA-18 located approximately 60 feet northwest from boring PA-16.

2012 GEOTECH ENGINEERING LOGS - ESEE2012DATABASE.GDT - 4/25/14 09:37 - VALTRCFP011X2WSHAUG\$IDESTOP\BRANCH\BRANCH GEOTECH BORING LOGS - COPY.GPJ

DEPTH (ft)	GRAPHIC LOG	STRATA DESCRIPTION	SAMPLE TYPE NUMBER	SAMPLE DEPTH (ft.)	BLOW COUNTS (N-VALUE)	COMMENTS
					PERCENT RECOVERY (RQD)	
		ELEV.				
		Fill (FILL) - red, dry, CLAY with gravel				Boring hydro-excavated surface to 10 ft..
5		Coal Combustion Byproduct (ASH) - ASH: gray, dry	GB -1	4.0		
10		- ASH: gray, wet	SS -2	10.0- 11.5	WH-WH-WH (0)	
		- ASH: gray, wet	SS -3	12.5- 14.0	WH-1-2 (3)	
15		- ASH: gray, wet	SS -4	15.0- 16.5	WH-2-3 (5)	
		Elastic Silt (MH) - red, wet, clayey SILT				
		Bottom of borehole at 16.5 feet.				

**APPENDIX F — SUMMARY OF GROUNDWATER MONITORING DATA (2016/2017 –
2019)**

Appendix F.
Summary of Groundwater Monitoring Data (2016/2017 – 2019)
Georgia Power Company
Plant Branch - Ash Pond A
Putnam County, GA

Sample Location			PZ-24S	PZ-24S	PZ-24S	PZ-24S	PZ-24S	PZ-24S
Sample Date			09/07/2016	02/21/2017	03/13/2017	06/13/2017	09/27/2017	01/21/2019
ANALYTE	GWPS (AP-BCD) July 2024	UNITS						
Boron		mg/L	0.0179 J	0.0105 J	0.0125 J	0.0105 J	0.0103 J	0.0075 J
Calcium		mg/L	18.9	19	18.9	19.1	19.1	21.0 J
Chloride		mg/L	14	14	14	14	14	15.1
Fluoride		mg/L	0.25 J	0.09 J	0.11 J	0.09 J	< 0.03	< 0.029
pH, Field		SU	5.94	5.9	NA	5.9	6.18	5.8
Sulfate		mg/L	21	16	17	18	12	11.6
TDS		mg/L	235	107	267	220	170	205
APPENDIX IV								
Antimony	0.006	mg/L	< 0.0008	< 0.0008	0.0005 J	0.0008 J	0.0008 J	< 0.00078
Arsenic	0.01	mg/L	< 0.0016	< 0.0016	0.001 J	0.0012 J	< 0.0005	< 0.00057
Barium	2	mg/L	0.0598	0.0527	0.0533	0.0509	0.0475	0.052
Beryllium	0.004	mg/L	< 0.00008	< 0.00008	< 0.00007	< 0.00009	< 0.00009	0.000082 J
Cadmium	0.005	mg/L	< 0.00007	< 0.00007	< 0.000060	< 0.0001	< 0.0001	< 0.000093
Chromium	0.1	mg/L	< 0.0009	< 0.0009	0.0005 J	< 0.0005	< 0.0005	< 0.0016
Cobalt	0.014	mg/L	0.0034 J	0.0021 J	0.0024 J	0.0021 J	0.0014 J	0.0010 J
Lead	0.015	mg/L	< 0.0001	< 0.0001	< 0.00005	< 0.00007	< 0.00007	< 0.00027
Lithium	0.089	mg/L	0.0036 J	0.0037 J	0.0038 J	0.0038 J	0.0037 J	0.0031 J
Mercury	0.002	mg/L	< 0.000041	< 0.000041	< 0.000041	0.00004 J	0.00004 J	< 0.000036
Molybdenum	0.1	mg/L	0.0026 J	< 0.0017	0.001 J	< 0.0010	< 0.0010	< 0.0019
Combined Radium 226 + 228	5	pCi/L	0.862 U	0.677 U	NA	0.288 U	0.792 U	NA
Selenium	0.05	mg/L	< 0.0010	< 0.0010	< 0.0014	< 0.0018	< 0.0018	< 0.0014
Thallium	0.002	mg/L	< 0.0002	< 0.0002	0.00004 J	< 0.00005	< 0.00005	< 0.00014
Fluoride	4	mg/L	0.25 J	0.09 J	0.11 J	0.09 J	< 0.03	< 0.029

Notes:

1. mg/L = milligrams per liter
2. pCi/L = picocuries per liter
3. J = Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.
4. < or U = Not Detected at or above adjusted reporting limit.
5. NA = not applicable
6. TDS = total dissolved solids

Appendix F.
Summary of Groundwater Monitoring Data (2016/2017 – 2019)
Georgia Power Company
Plant Branch - Ash Pond A
Putnam County, GA

Sample Location			PZ-40S	PZ-40S	PZ-40S	PZ-40S	PZ-40S	PZ-40S
Sample Date			02/24/2017	03/14/2017	06/14/2017	08/30/2017	09/27/2017	01/21/2019
ANALYTE	GWPS (AP-BCD) July 2024	UNITS						
Boron		mg/L	0.0163 J	0.0219 J	0.0294 J	0.0299 J	0.0234 J	0.035 J
Calcium		mg/L	16	17.5	18.9	19	18.2	18.8 J
Chloride		mg/L	7.9	8.8	9	9.2	9.1	7.5
Fluoride		mg/L	0.13 J	0.11 J	0.13 J	0.14 J	0.16 J	0.27 J
pH, Field		SU	6.09	NA	6.1	6.08	6.51	6.06
Sulfate		mg/L	9.6	12	16	20	13	9.2
TDS		mg/L	172	261	200	238	187	300
APPENDIX IV								
Antimony	0.006	mg/L	< 0.0008	< 0.0003	0.0009 J	< 0.0006	< 0.0006	< 0.00078
Arsenic	0.01	mg/L	< 0.0016	< 0.0004	0.0008 J	0.0012 J	< 0.0005	< 0.00057
Barium	2	mg/L	0.0574	0.0586	0.0568	0.0562	0.0536	0.054
Beryllium	0.004	mg/L	< 0.00008	< 0.00007	< 0.00009	< 0.00009	< 0.00009	< 0.00005
Cadmium	0.005	mg/L	< 0.00007	< 0.000060	< 0.0001	< 0.0001	< 0.0001	< 0.000093
Chromium	0.1	mg/L	< 0.0009	0.0005 J	< 0.0005	0.0005 J	< 0.0005	< 0.0016
Cobalt	0.014	mg/L	0.0044 J	0.0055 J	0.0041 J	0.0041 J	0.001 J	0.0014 J
Lead	0.015	mg/L	< 0.0001	< 0.00005	< 0.00007	< 0.00007	0.00008 J	< 0.00027
Lithium	0.089	mg/L	0.0036 J	0.0029 J	0.0028 J	0.0028 J	0.003 J	0.0027 J
Mercury	0.002	mg/L	< 0.000041	< 0.000041	0.00007 J	< 0.000036	0.00004 J	< 0.000036
Molybdenum	0.1	mg/L	< 0.0017	0.0007 J	< 0.0010	< 0.0010	< 0.0010	< 0.0019
Combined Radium 226 + 228	5	pCi/L	0.636 U	0.314 U	0.194 U	0.892	0.336 U	NA
Selenium	0.05	mg/L	< 0.0010	< 0.0014	< 0.0018	< 0.0018	< 0.0018	< 0.0014
Thallium	0.002	mg/L	< 0.0002	< 0.00003	< 0.00005	< 0.00005	< 0.00005	< 0.00014
Fluoride	4	mg/L	0.13 J	0.11 J	0.13 J	0.14 J	0.16 J	0.27 J

Notes:

- 1. mg/L = milligrams per liter
- 2. pCi/L = picocuries per liter
- 3. J = Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.
- 4. < or U = Not Detected at or above adjusted reporting limit.
- 5. NA = not applicable
- 6. TDS = total dissolved solids

Appendix F.
Summary of Groundwater Monitoring Data (2016/2017 – 2019)
Georgia Power Company
Plant Branch - Ash Pond A
Putnam County, GA

Sample Location			PZ-41S	PZ-41S	PZ-41S	PZ-41S	PZ-41S	PZ-41S
Sample Date			02/23/2017	03/14/2017	06/14/2017	08/30/2017	09/27/2017	01/19/2019
ANALYTE	GWPS (AP-BCD) July 2024	UNITS						
Boron		mg/L	0.859	0.695	0.496	0.457	0.428	0.37
Calcium		mg/L	20.3	21.1	23.1	21.5	22.4	20.9 J
Chloride		mg/L	4.3	5.9	5.7	5.2	5.4	4.8
Fluoride		mg/L	0.12 J	0.03 J	0.09 J	0.07 J	0.28 J	< 0.029
pH, Field		SU	5.83	NA	5.87	5.81	5.92	5.78
Sulfate		mg/L	91	110	99	100	100	92.5
TDS		mg/L	241	374	272	316	246	246
APPENDIX IV								
Antimony	0.006	mg/L	< 0.0008	< 0.0003	< 0.0006	< 0.0006	< 0.0006	< 0.00078
Arsenic	0.01	mg/L	< 0.0016	0.0006 J	0.0017 J	0.0029 J	0.0022 J	0.0011 J
Barium	2	mg/L	0.078	0.0937	0.082	0.0788	0.0748	0.070
Beryllium	0.004	mg/L	0.0001 J	< 0.00007	< 0.00009	< 0.00009	< 0.00009	0.000060 J
Cadmium	0.005	mg/L	< 0.00007	< 0.000060	< 0.0001	< 0.0001	< 0.0001	< 0.000093
Chromium	0.1	mg/L	< 0.0009	0.0004 J	< 0.0005	< 0.0005	< 0.0005	< 0.0016
Cobalt	0.014	mg/L	0.0051 J	0.0178	0.013	0.0099 J	0.0097 J	0.0028 J
Lead	0.015	mg/L	< 0.0001	< 0.00005	< 0.00007	< 0.00007	< 0.00007	< 0.00027
Lithium	0.089	mg/L	0.0029 J	0.0033 J	0.0033 J	0.0033 J	0.0033 J	0.0027 J
Mercury	0.002	mg/L	< 0.000041	< 0.000041	0.00007 J	< 0.000036	0.00004 J	< 0.000036
Molybdenum	0.1	mg/L	< 0.0017	0.0003 J	< 0.0010	< 0.0010	< 0.0010	< 0.0019
Combined Radium 226 + 228	5	pCi/L	1.16 U	0.543 U	0.86 U	1.1	0.52 U	NA
Selenium	0.05	mg/L	< 0.0010	< 0.0014	< 0.0018	< 0.0018	< 0.0018	< 0.0014
Thallium	0.002	mg/L	< 0.0002	< 0.00003	< 0.00005	< 0.00005	< 0.00005	< 0.00014
Fluoride	4	mg/L	0.12 J	0.03 J	0.09 J	0.07 J	0.28 J	< 0.029

Notes:

- 1. mg/L = milligrams per liter
- 2. pCi/L = picocuries per liter
- 3. J = Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.
- 4. < or U = Not Detected at or above adjusted reporting limit.
- 5. NA = not applicable
- 6. TDS = total dissolved solids

Appendix F.
Summary of Groundwater Monitoring Data (2016/2017 – 2019)
Georgia Power Company
Plant Branch - Ash Pond A
Putnam County, GA

Sample Location			PZ-42S	PZ-42S	PZ-42S	PZ-42S	PZ-42S	PZ-42S
Sample Date			02/23/2017	03/14/2017	06/13/2017	08/31/2017	09/26/2017	01/21/2019
ANALYTE	GWPS (AP-BCD) July 2024	UNITS						
Boron		mg/L	0.0228 J	0.0214 J	0.0201 J	0.0209 J	0.0193 J	0.013 J
Calcium		mg/L	13.5	13.3	14.7	15	15.8	14.1 J
Chloride		mg/L	5.1	6.4	5.7	5.6	5.4	5.9
Fluoride		mg/L	0.15 J	0.29 J	0.19 J	0.17 J	0.21 J	0.25 J
pH, Field		SU	6.56	NA	6.67	6.5	6.66	6.55
Sulfate		mg/L	13	13	13	13	13	16.8
TDS		mg/L	131	265	145	143	119	120
APPENDIX IV								
Antimony	0.006	mg/L	< 0.0008	< 0.0003	< 0.0006	< 0.0006	< 0.0006	< 0.00078
Arsenic	0.01	mg/L	< 0.0016	0.0007 J	0.0009 J	0.0011 J	0.0012 J	< 0.00057
Barium	2	mg/L	0.0178	0.014	0.0133	0.0125	0.0114	0.011
Beryllium	0.004	mg/L	< 0.00008	< 0.00007	< 0.00009	< 0.00009	< 0.00009	< 0.00005
Cadmium	0.005	mg/L	< 0.00007	< 0.000060	< 0.0001	< 0.0001	< 0.0001	< 0.000093
Chromium	0.1	mg/L	0.0014 J	0.0004 J	0.001 J	0.0017 J	0.0011 J	0.0019 J
Cobalt	0.014	mg/L	0.0023 J	0.0018 J	< 0.0003	0.0003 J	< 0.0003	< 0.00052
Lead	0.015	mg/L	< 0.0001	< 0.00005	< 0.00007	0.0001 J	0.00008 J	< 0.00027
Lithium	0.089	mg/L	< 0.0021	< 0.0011	< 0.0015	< 0.0015	< 0.0015	< 0.00097
Mercury	0.002	mg/L	< 0.000041	< 0.000041	< 0.000041	< 0.000036	< 0.000036	< 0.000036
Molybdenum	0.1	mg/L	0.0023 J	0.0055 J	0.0046 J	0.0029 J	0.0036 J	< 0.0019
Combined Radium 226 + 228	5	pCi/L	0.19 U	0.34 U	0.444 U	1.03	0.478 U	NA
Selenium	0.05	mg/L	< 0.0010	< 0.0014	< 0.0018	< 0.0018	< 0.0018	< 0.0014
Thallium	0.002	mg/L	< 0.0002	< 0.00003	< 0.00005	< 0.00005	< 0.00005	< 0.00014
Fluoride	4	mg/L	0.15 J	0.29 J	0.19 J	0.17 J	0.21 J	0.25 J

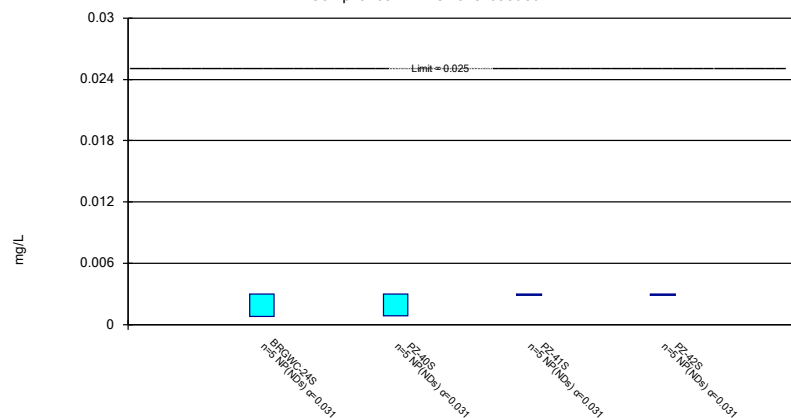
Notes:

1. mg/L = milligrams per liter
2. pCi/L = picocuries per liter
3. J = Estimated concentration above the adjusted method detection limit and below the adjusted reporting limit.
4. < or U = Not Detected at or above adjusted reporting limit.
5. NA = not applicable
6. TDS = total dissolved solids

APPENDIX G — SANITAS STATISTICAL RESULTS

Non-Parametric Confidence Interval

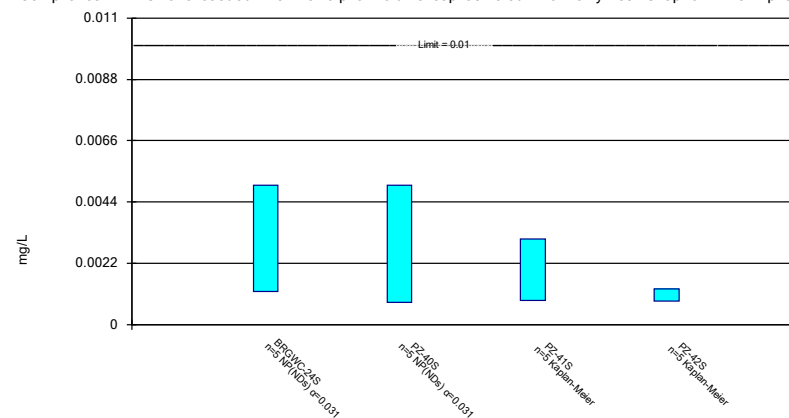
Compliance Limit is not exceeded.



Constituent: Antimony Analysis Run 10/25/2024 12:17 PM
Data: Plant Branch AP flat

Parametric and Non-Parametric (NP) Confidence Interval

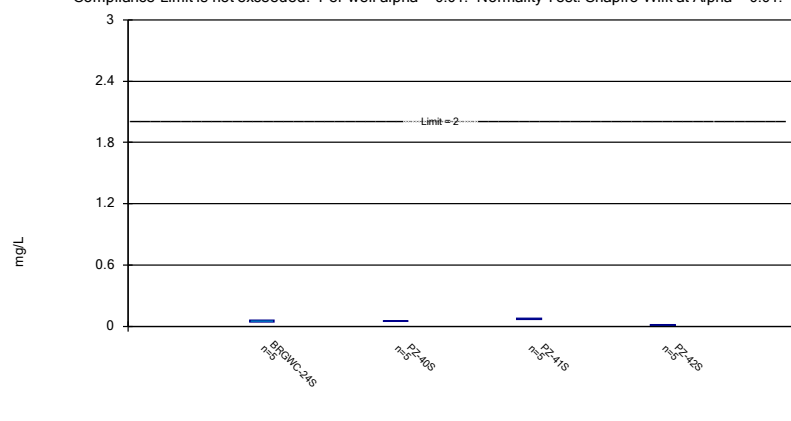
Compliance Limit is not exceeded. Per-well alpha = 0.01 except as noted. Normality Test: Shapiro Wilk at Alpha = 0.01.



Constituent: Arsenic Analysis Run 10/25/2024 12:17 PM
Data: Plant Branch AP flat

Parametric Confidence Interval

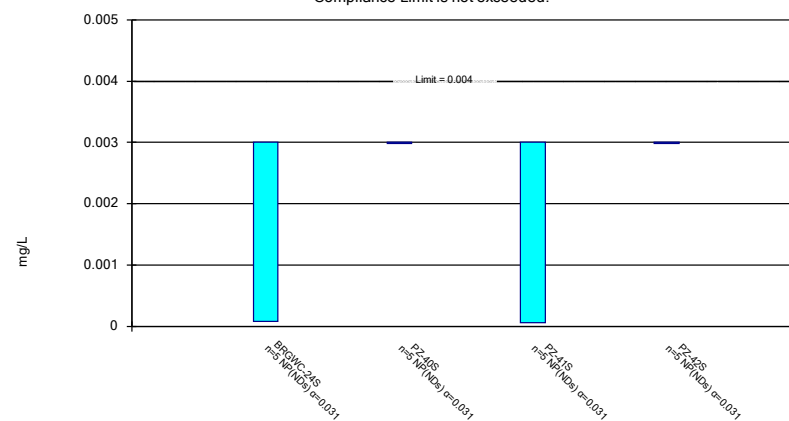
Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk at Alpha = 0.01.



Constituent: Barium Analysis Run 10/25/2024 12:17 PM
Data: Plant Branch AP flat

Non-Parametric Confidence Interval

Compliance Limit is not exceeded.



Constituent: Beryllium Analysis Run 10/25/2024 12:18 PM
Data: Plant Branch AP flat

Confidence Interval

Constituent: Antimony (mg/L) Analysis Run 10/25/2024 12:18 PM
Data: Plant Branch AP flat

	BRGWC-24S	PZ-40S	PZ-41S	PZ-42S
9/7/2016	<0.003			
2/21/2017	<0.003			
2/23/2017			<0.003	<0.003
2/24/2017		<0.003		
6/13/2017	0.0008 (J)			<0.003
6/14/2017		0.0009 (J)	<0.003	
8/30/2017		<0.003	<0.003	
8/31/2017				<0.003
9/26/2017				<0.003
9/27/2017	0.0008 (J)	<0.003	<0.003	
1/19/2019			<0.003	
1/21/2019	<0.003	<0.003		<0.003
Mean	0.00212	0.00258	0.003	0.003
Std. Dev.	0.001205	0.0009391	0	0
Upper Lim.	0.003	0.003	0.003	0.003
Lower Lim.	0.0008	0.0009	0.003	0.003

Confidence Interval

Constituent: Arsenic (mg/L) Analysis Run 10/25/2024 12:18 PM
Data: Plant Branch AP flat

	BRGWC-24S	PZ-40S	PZ-41S	PZ-42S
9/7/2016	<0.005			
2/21/2017	<0.005			
2/23/2017			<0.005	<0.005
2/24/2017		<0.005		
6/13/2017	0.0012 (J)			0.0009 (J)
6/14/2017		0.0008 (J)	0.0017 (J)	
8/30/2017		0.0012 (J)	0.0029 (J)	
8/31/2017				0.0011 (J)
9/26/2017				0.0012 (J)
9/27/2017	<0.005	<0.005	0.0022 (J)	
1/19/2019			0.0011 (J)	
1/21/2019	<0.005	<0.005		<0.005
Mean	0.00424	0.0034	0.00258	0.00264
Std. Dev.	0.001699	0.002195	0.001506	0.002157
Upper Lim.	0.005	0.005	0.003083	0.001276
Lower Lim.	0.0012	0.0008	0.0008674	0.0008577

ND substitution: RL or RL/2 if <15% NDs.

Confidence Interval

Constituent: Barium (mg/L) Analysis Run 10/25/2024 12:18 PM
Data: Plant Branch AP flat

	BRGWC-24S	PZ-40S	PZ-41S	PZ-42S
9/7/2016	0.0598			
2/21/2017	0.0527			
2/23/2017			0.078	0.0178
2/24/2017		0.0574		
6/13/2017	0.0509			0.0133
6/14/2017		0.0568	0.082	
8/30/2017		0.0562	0.0788	
8/31/2017				0.0125
9/26/2017				0.0114
9/27/2017	0.0475	0.0536	0.0748	
1/19/2019			0.07	
1/21/2019	0.052	0.054		0.011
Mean	0.05258	0.0556	0.07672	0.0132
Std. Dev.	0.004503	0.001703	0.004547	0.002727
Upper Lim.	0.06013	0.05845	0.08434	0.01777
Lower Lim.	0.04503	0.05275	0.0691	0.008631

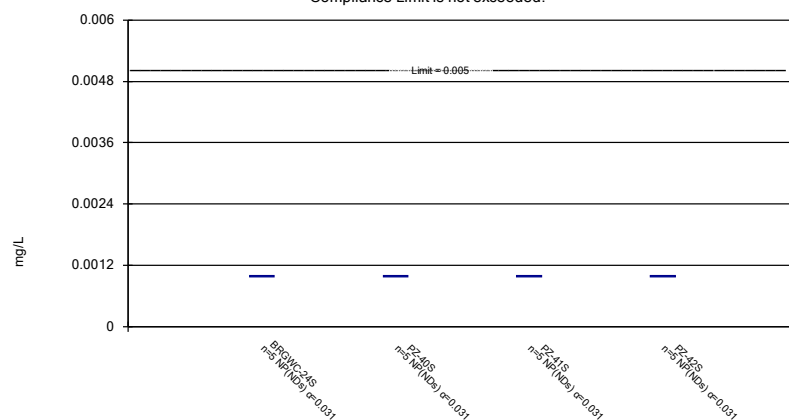
Confidence Interval

Constituent: Beryllium (mg/L) Analysis Run 10/25/2024 12:18 PM
Data: Plant Branch AP flat

	BRGWC-24S	PZ-40S	PZ-41S	PZ-42S
9/7/2016	<0.003			
2/21/2017	<0.003			
2/23/2017			0.0001 (J)	<0.003
2/24/2017		<0.003		
6/13/2017	<0.003			<0.003
6/14/2017		<0.003	<0.003	
8/30/2017		<0.003	<0.003	
8/31/2017				<0.003
9/26/2017				<0.003
9/27/2017	<0.003	<0.003	<0.003	
1/19/2019			6E-05 (J)	
1/21/2019	8.2E-05 (J)	<0.003		<0.003
Mean	0.002416	0.003	0.001832	0.003
Std. Dev.	0.001305	0	0.001599	0
Upper Lim.	0.003	0.003	0.003	0.003
Lower Lim.	8.2E-05	0.003	6E-05	0.003

Non-Parametric Confidence Interval

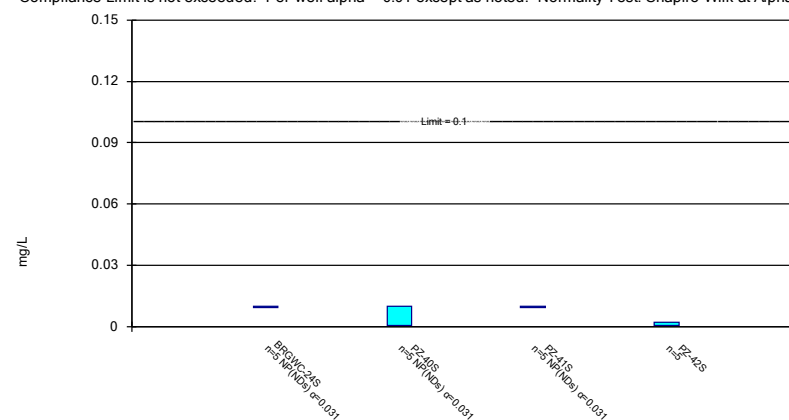
Compliance Limit is not exceeded.



Constituent: Cadmium Analysis Run 10/25/2024 12:18 PM
Data: Plant Branch AP flat

Parametric and Non-Parametric (NP) Confidence Interval

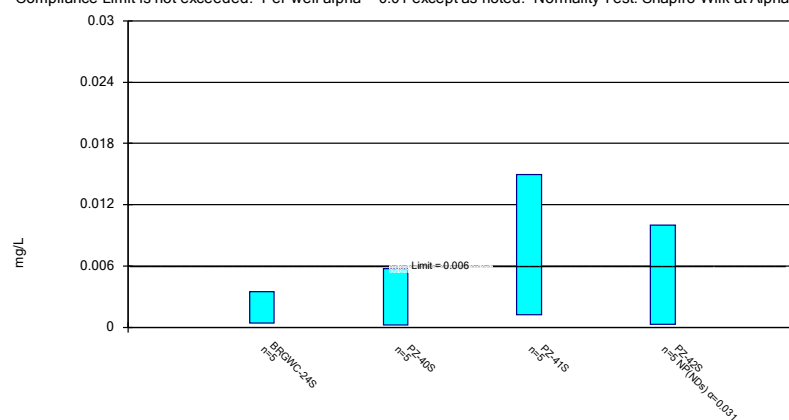
Compliance Limit is not exceeded. Per-well alpha = 0.01 except as noted. Normality Test: Shapiro Wilk at Alpha = 0.01.



Constituent: Chromium Analysis Run 10/25/2024 12:18 PM
Data: Plant Branch AP flat

Parametric and Non-Parametric (NP) Confidence Interval

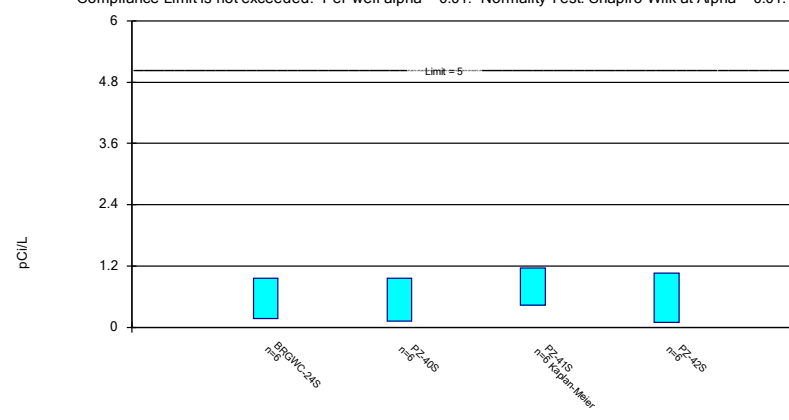
Compliance Limit is not exceeded. Per-well alpha = 0.01 except as noted. Normality Test: Shapiro Wilk at Alpha = 0.01.



Constituent: Cobalt Analysis Run 10/25/2024 12:18 PM
Data: Plant Branch AP flat

Parametric Confidence Interval

Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk at Alpha = 0.01.



Constituent: Combined Radium 226 + 228 Analysis Run 10/25/2024 12:18 PM
Data: Plant Branch AP flat

Confidence Interval

Constituent: Cadmium (mg/L) Analysis Run 10/25/2024 12:18 PM
Data: Plant Branch AP flat

	BRGWC-24S	PZ-40S	PZ-41S	PZ-42S
9/7/2016	<0.001			
2/21/2017	<0.001			
2/23/2017			<0.001	<0.001
2/24/2017		<0.001		
6/13/2017	<0.001			<0.001
6/14/2017		<0.001	<0.001	
8/30/2017		<0.001	<0.001	
8/31/2017				<0.001
9/26/2017				<0.001
9/27/2017	<0.001	<0.001	<0.001	
1/19/2019			<0.001	
1/21/2019	<0.001	<0.001		<0.001
Mean	0.001	0.001	0.001	0.001
Std. Dev.	0	0	0	0
Upper Lim.	0.001	0.001	0.001	0.001
Lower Lim.	0.001	0.001	0.001	0.001

Confidence Interval

Constituent: Chromium (mg/L) Analysis Run 10/25/2024 12:18 PM
Data: Plant Branch AP flat

	BRGWC-24S	PZ-40S	PZ-41S	PZ-42S
9/7/2016	<0.01			
2/21/2017	<0.01			
2/23/2017			<0.01	0.0014 (J)
2/24/2017		<0.01		
6/13/2017	<0.01			0.001 (J)
6/14/2017		<0.01	<0.01	
8/30/2017		0.0005 (J)	<0.01	
8/31/2017				0.0017 (J)
9/26/2017				0.0011 (J)
9/27/2017	<0.01	<0.01	<0.01	
1/19/2019			<0.01	
1/21/2019	<0.01	<0.01		0.0019 (J)
Mean	0.01	0.0081	0.01	0.00142
Std. Dev.	0	0.004249	0	0.0003834
Upper Lim.	0.01	0.01	0.01	0.002062
Lower Lim.	0.01	0.0005	0.01	0.0007775

Confidence Interval

Constituent: Cobalt (mg/L) Analysis Run 10/25/2024 12:18 PM
Data: Plant Branch AP flat

	BRGWC-24S	PZ-40S	PZ-41S	PZ-42S
9/7/2016	0.0034 (J)			
2/21/2017	0.0021 (J)			
2/23/2017			0.0051 (J)	0.0023 (J)
2/24/2017		0.0044 (J)		
6/13/2017	0.0021 (J)			<0.01
6/14/2017		0.0041 (J)	0.013	
8/30/2017		0.0041 (J)	0.0099 (J)	
8/31/2017				0.0003 (J)
9/26/2017				<0.01
9/27/2017	0.0014 (J)	0.001 (J)	0.0097 (J)	
1/19/2019			0.0028 (J)	
1/21/2019	0.001 (J)	0.0014 (J)		<0.01
Mean	0.002	0.003	0.0081	0.00652
Std. Dev.	0.0009138	0.001654	0.00409	0.004817
Upper Lim.	0.003531	0.005771	0.01495	0.01
Lower Lim.	0.0004688	0.0002288	0.001247	0.0003

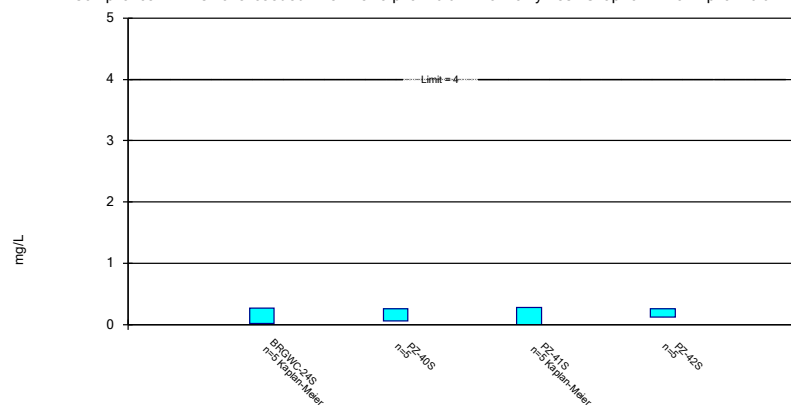
Confidence Interval

Constituent: Combined Radium 226 + 228 (pCi/L) Analysis Run 10/25/2024 12:18 PM
Data: Plant Branch AP flat

	BRGWC-24S	PZ-40S	PZ-41S	PZ-42S
9/7/2016	0.643 (U)			
2/21/2017	0.677 (U)			
2/23/2017			1.16 (U)	0.19 (U)
2/24/2017		0.636 (U)		
3/13/2017	0.158 (U)			
3/14/2017		0.314 (U)	0.543 (U)	0.34 (U)
6/13/2017	0.288 (U)			0.444 (U)
6/14/2017		0.194 (U)	0.86 (U)	
8/30/2017		0.892	1.1	
8/31/2017				1.03
9/26/2017				0.478 (U)
9/27/2017	0.792 (U)	0.336 (U)	0.52 (U)	
1/19/2019			<0.937	
1/21/2019	0.875	0.889		1.01
Mean	0.5722	0.5435	0.8533	0.582
Std. Dev.	0.2858	0.3057	0.2718	0.3538
Upper Lim.	0.9647	0.9634	1.166	1.068
Lower Lim.	0.1796	0.1236	0.4419	0.09594

Parametric Confidence Interval

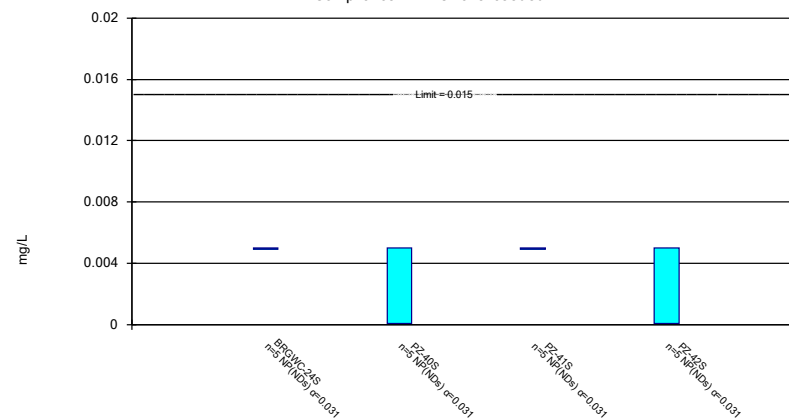
Compliance Limit is not exceeded. Per-well alpha = 0.01. Normality Test: Shapiro Wilk at Alpha = 0.01.



Constituent: Fluoride Analysis Run 10/25/2024 12:18 PM
Data: Plant Branch AP flat

Non-Parametric Confidence Interval

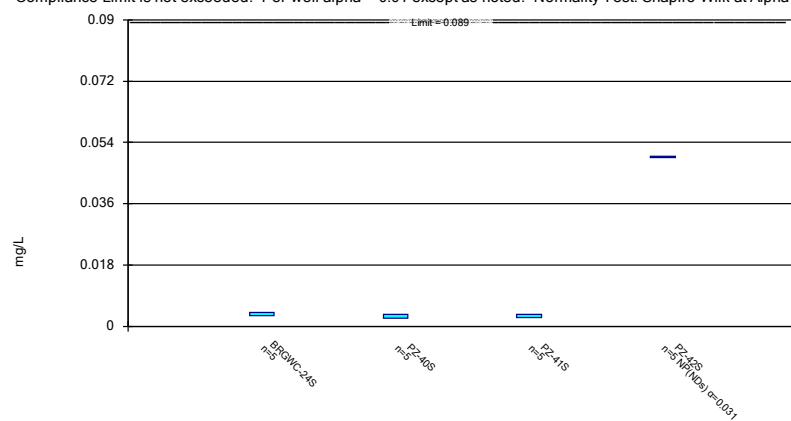
Compliance Limit is not exceeded.



Constituent: Lead Analysis Run 10/25/2024 12:18 PM
Data: Plant Branch AP flat

Parametric and Non-Parametric (NP) Confidence Interval

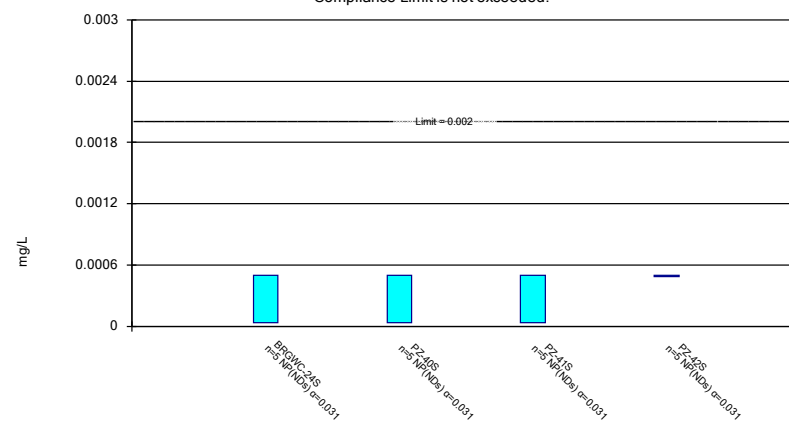
Compliance Limit is not exceeded. Per-well alpha = 0.01 except as noted. Normality Test: Shapiro Wilk at Alpha = 0.01.



Constituent: Lithium Analysis Run 10/25/2024 12:18 PM
Data: Plant Branch AP flat

Non-Parametric Confidence Interval

Compliance Limit is not exceeded.



Constituent: Mercury Analysis Run 10/25/2024 12:18 PM
Data: Plant Branch AP flat

Confidence Interval

Constituent: Fluoride (mg/L) Analysis Run 10/25/2024 12:18 PM
Data: Plant Branch AP flat

	BRGWC-24S	PZ-40S	PZ-41S	PZ-42S
9/7/2016	0.25 (J)			
2/21/2017	0.09 (J)			
2/23/2017			0.12 (J)	0.15 (J)
2/24/2017		0.13 (J)		
6/13/2017	0.09 (J)			0.19 (J)
6/14/2017		0.13 (J)	0.09 (J)	
8/30/2017		0.14 (JB)	0.07 (JB)	
8/31/2017				0.17 (JB)
9/26/2017				0.21 (J)
9/27/2017	<0.3	0.16 (J)	0.28 (J)	
1/19/2019			<0.3	
1/21/2019	<0.3	0.27 (J)		0.25 (J)
Mean	0.206	0.166	0.172	0.194
Std. Dev.	0.1078	0.05941	0.1094	0.03847
Upper Lim.	0.2697	0.2656	0.2787	0.2585
Lower Lim.	0.01695	0.06644	0.001312	0.1295

Confidence Interval

Constituent: Lead (mg/L) Analysis Run 10/25/2024 12:18 PM
Data: Plant Branch AP flat

	BRGWC-24S	PZ-40S	PZ-41S	PZ-42S
9/7/2016	<0.005			
2/21/2017	<0.005			
2/23/2017			<0.005	<0.005
2/24/2017		<0.005		
6/13/2017	<0.005			<0.005
6/14/2017		<0.005	<0.005	
8/30/2017		<0.005	<0.005	
8/31/2017				0.0001 (J)
9/26/2017				8E-05 (J)
9/27/2017	<0.005	8E-05 (J)	<0.005	
1/19/2019			<0.005	
1/21/2019	<0.005	<0.005		<0.005
Mean	0.005	0.004016	0.005	0.003036
Std. Dev.	0	0.0022	0	0.002689
Upper Lim.	0.005	0.005	0.005	0.005
Lower Lim.	0.005	8E-05	0.005	8E-05

Confidence Interval

Constituent: Lithium (mg/L) Analysis Run 10/25/2024 12:18 PM
Data: Plant Branch AP flat

	BRGWC-24S	PZ-40S	PZ-41S	PZ-42S
9/7/2016	0.0036 (J)			
2/21/2017	0.0037 (J)			
2/23/2017			0.0029 (J)	<0.05
2/24/2017		0.0036 (J)		
6/13/2017	0.0038 (J)			<0.05
6/14/2017		0.0028 (J)	0.0033 (J)	
8/30/2017		0.0028 (J)	0.0033 (J)	
8/31/2017				<0.05
9/26/2017				<0.05
9/27/2017	0.0037 (J)	0.003 (J)	0.0033 (J)	
1/19/2019			0.0027 (J)	
1/21/2019	0.0031 (J)	0.0027 (J)		<0.05
Mean	0.00358	0.00298	0.0031	0.05
Std. Dev.	0.0002775	0.0003633	0.0002828	0
Upper Lim.	0.004045	0.003589	0.003574	0.05
Lower Lim.	0.003115	0.002371	0.002626	0.05

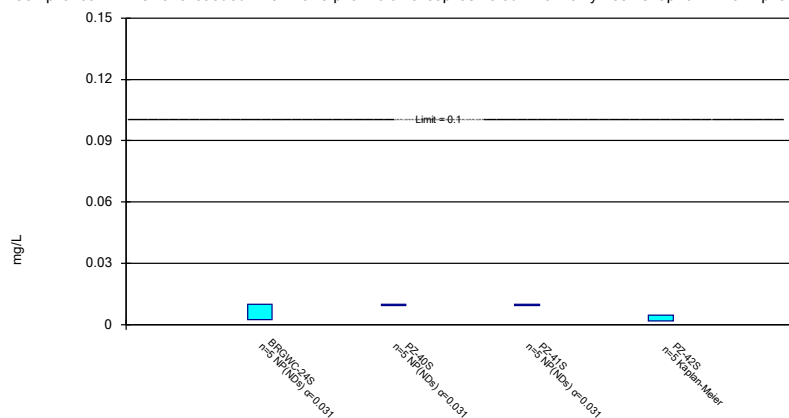
Confidence Interval

Constituent: Mercury (mg/L) Analysis Run 10/25/2024 12:18 PM
Data: Plant Branch AP flat

	BRGWC-24S	PZ-40S	PZ-41S	PZ-42S
9/7/2016	<0.0005			
2/21/2017	<0.0005			
2/23/2017			<0.0005	<0.0005
2/24/2017		<0.0005		
6/13/2017	4E-05 (J)			<0.0005
6/14/2017		7E-05 (J)	7E-05 (J)	
8/30/2017		<0.0005	<0.0005	
8/31/2017				<0.0005
9/26/2017				<0.0005
9/27/2017	4E-05 (J)	4E-05 (J)	4E-05 (J)	
1/19/2019			<0.0005	
1/21/2019	<0.0005	<0.0005		<0.0005
Mean	0.000316	0.000322	0.000322	0.0005
Std. Dev.	0.000252	0.000244	0.000244	0
Upper Lim.	0.0005	0.0005	0.0005	0.0005
Lower Lim.	4E-05	4E-05	4E-05	0.0005

Parametric and Non-Parametric (NP) Confidence Interval

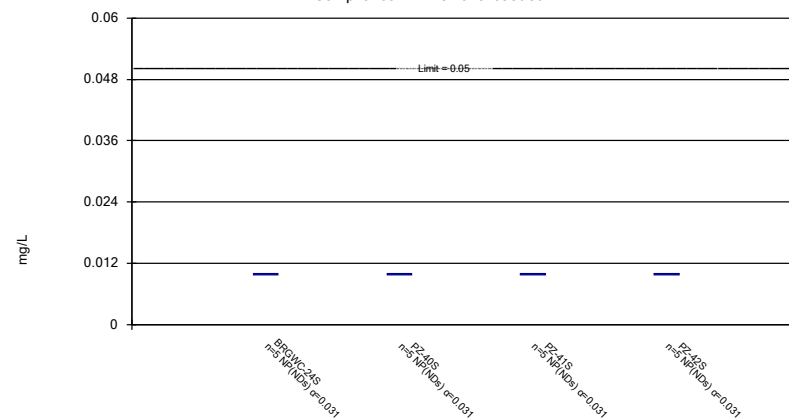
Compliance Limit is not exceeded. Per-well alpha = 0.01 except as noted. Normality Test: Shapiro Wilk at Alpha = 0.01.



Constituent: Molybdenum Analysis Run 10/25/2024 12:18 PM
Data: Plant Branch AP flat

Non-Parametric Confidence Interval

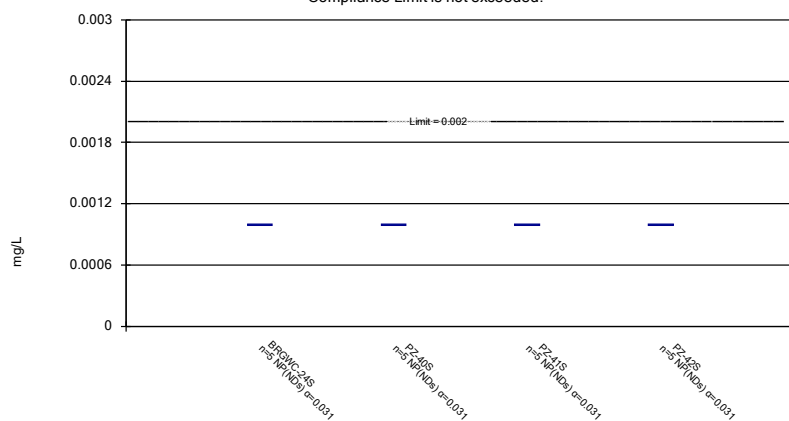
Compliance Limit is not exceeded.



Constituent: Selenium Analysis Run 10/25/2024 12:18 PM
Data: Plant Branch AP flat

Non-Parametric Confidence Interval

Compliance Limit is not exceeded.



Constituent: Thallium Analysis Run 10/25/2024 12:18 PM
Data: Plant Branch AP flat

Confidence Interval

Constituent: Molybdenum (mg/L) Analysis Run 10/25/2024 12:18 PM
Data: Plant Branch AP flat

	BRGWC-24S	PZ-40S	PZ-41S	PZ-42S
9/7/2016	0.0026 (J)			
2/21/2017	<0.01			
2/23/2017			<0.01	0.0023 (J)
2/24/2017		<0.01		
6/13/2017	<0.01			0.0046 (J)
6/14/2017		<0.01	<0.01	
8/30/2017		<0.01	<0.01	
8/31/2017				0.0029 (J)
9/26/2017				0.0036 (J)
9/27/2017	<0.01	<0.01	<0.01	
1/19/2019			<0.01	
1/21/2019	<0.01	<0.01		<0.01
Mean	0.00852	0.01	0.01	0.00468
Std. Dev.	0.003309	0	0	0.003095
Upper Lim.	0.01	0.01	0.01	0.004784
Lower Lim.	0.0026	0.01	0.01	0.001916

Confidence Interval

Constituent: Selenium (mg/L) Analysis Run 10/25/2024 12:18 PM
Data: Plant Branch AP flat

	BRGWC-24S	PZ-40S	PZ-41S	PZ-42S
9/7/2016	<0.01			
2/21/2017	<0.01			
2/23/2017			<0.01	<0.01
2/24/2017		<0.01		
6/13/2017	<0.01			<0.01
6/14/2017		<0.01	<0.01	
8/30/2017		<0.01	<0.01	
8/31/2017				<0.01
9/26/2017				<0.01
9/27/2017	<0.01	<0.01	<0.01	
1/19/2019			<0.01	
1/21/2019	<0.01	<0.01		<0.01
Mean	0.01	0.01	0.01	0.01
Std. Dev.	0	0	0	0
Upper Lim.	0.01	0.01	0.01	0.01
Lower Lim.	0.01	0.01	0.01	0.01

Confidence Interval

Constituent: Thallium (mg/L) Analysis Run 10/25/2024 12:18 PM
Data: Plant Branch AP flat

	BRGWC-24S	PZ-40S	PZ-41S	PZ-42S
9/7/2016	<0.001			
2/21/2017	<0.001			
2/23/2017			<0.001	<0.001
2/24/2017		<0.001		
6/13/2017	<0.001			<0.001
6/14/2017		<0.001	<0.001	
8/30/2017		<0.001	<0.001	
8/31/2017				<0.001
9/26/2017				<0.001
9/27/2017	<0.001	<0.001	<0.001	
1/19/2019			<0.001	
1/21/2019	<0.001	<0.001		<0.001
Mean	0.001	0.001	0.001	0.001
Std. Dev.	0	0	0	0
Upper Lim.	0.001	0.001	0.001	0.001
Lower Lim.	0.001	0.001	0.001	0.001

**APPENDIX H — PLANT BRANCH PIEZOMETER INSTALLATION REPORT – POND
A, 29 SEPTEMBER 2017**

September 29, 2017

1666254-01, 1666254

Mr. Joju Abraham
Southern Company Services, Inc.
241 Ralph McGill Blvd NE
Atlanta, GA 30308
jabraham@southernco.com
(404) 506-7239

**Re: Piezometer Installation Report – Pond A
Georgia Power Plant Branch, Milledgeville, Georgia**

Dear Joju:

Golder Associates Inc. (Golder) is submitting this Piezometer Installation Report to Southern Company Services, Inc. (SCS) and Georgia Power Company (GPC), which documents the activities related to drilling, construction, development, and aquifer testing of three piezometers at Plant Branch in Milledgeville, Georgia. Piezometer construction activities were performed in general accordance with the standards described in the *RCRA Technical Enforcement Guidance Document* (1986) and the *Georgia Water Wells Standards Act of 1985*. The installation of the piezometers was conducted under the oversight and direction of Rachel Kirkman and Michael Boatman, both of whom are Georgia registered Professional Geologists (PGs).

The field activities for this investigation were performed between February 8 and 14, 2017. The field work consisted of the installation, development, and water level gauging of three (3) piezometers. SCS conducted a survey of the recently installed piezometers on February 17, 2017. A summary of the activities is presented below.

PIEZOMETER DRILLING AND CONSTRUCTION ACTIVITIES

Piezometers PZ-40, PZ-41, and PZ-42 were drilled and installed by SCS at the facility in February 2017. SCS has current and valid bonds with the Water Wells Standards Advisory Council for the state of Georgia (Appendix A). The driller information is provided on the boring/construction diagrams presented in Appendix B. An experienced Golder geologist was present on site to oversee and record the drilling and piezometer construction under the supervision of a professional geologist registered to practice in Georgia. Drilling methods employed for borehole advancement were rotary hollow stem auger with collection of Standard Penetration Test (SPT) samples.

The drilling equipment consisted of a CME-550 drilling rig, equipped with 4.25-inch hollow stem augers. During the drilling, SPT core samples were collected on 5-foot centers and logged in the field for lithologic and geotechnical properties.

Prior to use and between boreholes, downhole equipment was steam cleaned. The boring (lithologic) logs and piezometer construction records for the newly installed piezometers are included in Appendix B. The construction data are summarized in Table 1 and the locations of the piezometers are provided on Figure 1.



Piezometers were constructed within the borehole using factory-cleaned and sealed Schedule 40 polyvinyl chloride (PVC) products with flush-threaded fittings. Specifically, piezometers were constructed with a 10 foot section of 4-inch outer diameter (OD) and 2-inch inner diameter (ID), flush-threaded, 0.010-inch factory-slotted PVC pre-packed screen. The drillers filled the annulus of each pre-pack screen section with No. 10 filter sand. In each case, the screen was placed near the bottom of the borehole, with the remainder of the piezometer being constructed from 10-foot sections of 2-inch ID, flush-threaded, PVC casing riser. A flush-threaded PVC end cap placed on the bottom of each piezometer to provide a 0.4-foot sump/sediment trap, and the top of the casing extend approximately 30 inches above grade. Construction details for the piezometers are shown on the boring/piezometer construction logs in Appendix B. The PVC products used were American Society for Testing and Materials (ASTM) and National Sanitation Foundation (NSF) rated.

Following placement of the piezometer screen and casing, the annular space in each borehole adjacent to the screen was filled with U.S. Standard Sieve size No. 20-40 filter pack sand as appropriate for the formation. The filter pack sand was placed into the borehole and extends approximately 2 feet above each screen. Immediately following placement of the filter pack, the piezometers were pumped using a portable submersible pump for approximately one hour or until visibly clear water was discharged. If settling occurred during pumping, additional sand was placed so that the filter sand thickness was approximately 2 feet above the screen. A filter pack seal, composed of up to 5 feet of hydrated time-release coated bentonite pellets, was then placed on top of the filter pack by slowly pouring the material down the borehole and tamping it into place with a tremie pipe. The bentonite was hydrated using potable water and allowed to cure prior to grouting the piezometer.

Following hydration of the bentonite, the remaining annular space was grouted with a Portland cement / bentonite mixture consisting of approximately 6% bentonite, and approximately 10 pounds per gallon, to approximately 3 feet below ground surface using a tremie pipe method. Each piezometer surface completion consists of a locked, aluminum protective casing and a 4-foot by 4-foot by 4-inch concrete pad.

PIEZOMETER DEVELOPMENT ACTIVITIES

The newly installed piezometers were developed in accordance with the Monitoring Well Development Procedures prepared by Southern Company Services, Inc. (March 2016). The piezometers were surged using a Geotech Reclaimer pump system. During development, water quality measurements of pH, temperature, specific conductance, and turbidity were periodically collected using field-calibrated water quality equipment after the piezometer responded to improving conditions. Development activities were conducted utilizing an In-Situ SmarTroll and a Lamotte 2020we turbidimeter for monitoring water quality measurements. Piezometer development and SmarTroll forms are included in Appendix B and summarized on Table 2.

As presented on the development forms, development water volumes removed ranged between 70 gallons (PZ-42) and 223 gallons (PZ-41). During development, attempts were made for each piezometer to achieve a turbidity value below 10 nephelometric turbidity units (NTUs). Further development may be warranted for some piezometers depending on future intended use. A round of water levels for the newly installed and developed piezometers was collected on February 17, 2017 (Table 3). The measurements were collected using a decontaminated electronic water level indicator. The surveyed point on the top of the casing was used as reference, and the measurements were recorded to within 0.01 foot.

AQUIFER TESTING ACTIVITIES

Aquifer tests (slug tests) were performed for all newly installed piezometers during the field investigation (Table 4). The purpose of the testing was to estimate the horizontal hydraulic conductivity of aquifer materials encountered at the site. In situ rising- and falling-head slug tests were chosen for the assessment due to the relatively low piezometer yields noted during piezometer installation and development.

Slug tests were conducted in February 2017 by an experienced Golder field representative. Falling- and rising-head tests were performed on the 3 newly installed piezometers. Prior to slug testing, the piezometers were opened and groundwater levels were allowed to equilibrate. Groundwater level measurements were then measured using an electronic water level indicator referenced to a surveyed point on the top of the casing. A 100 pounds per square inch (psi) pressure transducer was lowered inside the piezometer casing and placed approximately 2 feet above the bottom of the piezometer. A polyvinyl chloride (PVC) slug measuring 5 feet in length was then used to displace water inside the piezometer.

The first portion of the test was a falling-head test that measured the rate water levels fell back to static levels after the insertion of the PVC slug. The pressure transducer was programmed to record changes in groundwater level at logarithmic time intervals. Changes in groundwater levels were also measured with hand-held electronic water level indicators to field-verify the data collected by the transducer. Falling-head tests were terminated after water levels had recovered to within at least 90% of their pre-test level. A rising-head test was performed on each piezometer after the falling-head test was completed. The rising-head test was performed with the same methodology as the falling-head test, with the exception that the PVC slug was removed simultaneously with the start of the test.

In situ rising- and falling-head tests provide a quantitative estimate of horizontal hydraulic conductivity and a qualitative estimate of aquifer anisotropy in water-bearing units. The slug test data were analyzed using the Bouwer and Rice (1976 and 1989) equation, which is applicable to fully or partially penetrating piezometers in unconfined or confined aquifers. Aquifer thicknesses was set at 30 feet based on measured water levels and assumed top of rock.

The computer software program AQTESOLV, produced by HydroSOLVE, Inc., was used to assist in the analysis and plotting of data. The best fit lines were initially calculated by the computer software and were then adjusted manually to ignore skin effects typically found at the start of aquifer tests and/or to ignore stabilized water levels at the end of the tests or fluctuations in the water level as they approached stabilization. Professional judgement was used to distinguish skin effects with the fact that during many tests, there is faster recovery near the beginning of an aquifer test than when water levels approach stabilization. The individual data points and computer plots of time versus groundwater displacement are presented in Appendix C. A summary of the aquifer testing and the calculated geometric mean for hydraulic conductivity for each of the hydrogeologic units are presented in Table 4.

PIEZOMETER SURVEY

The newly installed piezometers were surveyed on February 17, 2017 by SCS's Engineering and Civil Field Services group. The survey was completed using LEICA GS14 Antenna and CS15 Sensor with a positional tolerance of 0.10'H:V. Surveyed locations and elevations are presented

on the boring/construction diagrams, and a site map showing the locations of the newly installed piezometers is presented in Figure 1.

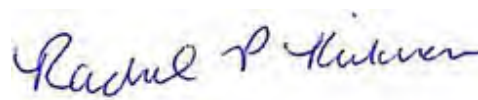
CLOSING

We appreciate the opportunity to assist SCS and GPC with this project. Should you have any questions or require additional information, please contact the undersigned at (770) 496-1893.

Sincerely,
GOLDER ASSOCIATES INC.



Timothy Richards, PG
Associate and Senior Consultant



Rachel P. Kirkman, PG
Associate and Senior Consultant

Attachments:	Figure 1	Monitoring Well and Piezometer Location Map
	Table 1	Piezometer Installation Summary
	Table 2	Summary of Piezometer Development Data
	Table 3	Summary of Post-Development Water Level and Survey Data
	Table 4	Summary of Aquifer Test Data
	Appendix A	Drilling Bonds
	Appendix B	Boring Logs/ Construction Diagrams and Development Forms
	Appendix C	Single Well Aquifer (Slug) Test Results

FIGURE

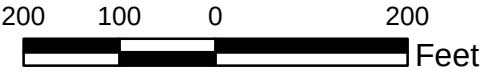


LEGEND

- PIEZOMETER
- PROPERTY BOUNDARY

REFERENCE

- SERVICE LAYER CREDITS: ESRI, HERE, DELORME, MAPMYINDIA, © OPENSTREETMAP CONTRIBUTORS, AND THE GIS USER COMMUNITY
SOURCE: ESRI, DIGITALGLOBE, GEOEYE, EARTHSTAR GEOGRAPHICS, CNES/AIRBUS DS, USDA, USGS, AEROGRID, IGN, AND THE GIS USER COMMUNITY
- COORDINATE SYSTEM: NAD 1983 STATE PLAN GEORGIA WEST (U.S. FEET).
- BORING/PIEZOMETER LOCATIONS AND PROPERTY LINE PROVIDED BY SOUTHERN COMPANY SERVICES.



CLIENT
SOUTHERN COMPANY SERVICES, INC.
PLANT BRANCH



PROJECT
GROUNDWATER MONITORING PROGRAM

TITLE
WELL LOCATION MAP

CONSULTANT	YYYY-MM-DD	2017-09-26
	PREPARED	DJC
	DESIGN	MS
	REVIEW	TIR
	APPROVED	RPK



PROJECT No. 1666254	CONTROL 1666254A008-GIS.mxd	Rev. 0	FIGURE 1
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Service Layer Credits: Esri, HERE, DeLorme, MapmyIndia, © OpenStreetMap contributors, and the GIS user community
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

TABLES

September 2017

Table 1
Piezometer Installation Summary
Plant Branch-Milledgeville, GA

1666254-01

Well / Piezometer Name	Driller	Date Well Started	Date Well Completed	Drill Method	Drill Depth (ft. bgs)	Well Screen Interval (ft. bgs)	Depth Top of Sand Pack (ft. bgs)	Depth of Annular Seal (ft. bgs)	Depth to Water (ft. bgs)
PZ-40	SCS	2/14/2017	2/14/2017	Hollow Stem Auger	40.2	29.8-39.8	27.8	24.7	12.7 (2/14/17)
PZ-41	SCS	2/13/2017	2/13/2017	Hollow Stem Auger	45	33.8-43.8	32	29.3	13.7 (2/14/17)
PZ-42	SCS	2/8/2017	2/8/2017	Hollow Stem Auger	32	21.8-31.8	16.2	14	22.55 (2/8/17)

Notes: ft. bgs = feet below ground surface, SCS = Southern Company Services

September 2017

Table 2
Summary of Piezometer Development Data
Plant Branch-Milledgeville, GA

1666254-01

Well / Piezometer Name	Date Started	Time Started (hr:min)	Date Completed	Elapsed Time (hr:min)	Development Method	Measured Depth of Well (ft. btoc)	Initial Water Level (ft. btoc)	Final Water Level (ft. btoc)	Volume of Casing (gal)	Total Volume Removed (gal)	pH (SU)	Specific Cond (ms/cm)	Temp (°C)	Turb (NTU)	ORP (mV)	DO (mg/L)
PZ-40	2/22/2017	10:15	2/22/2017	10:20	Reclaimer	43.3	15.7	38.3	4.5	90	5.98	0.258	20.44	4.86	175.03	1.22
PZ-41	2/20/2017	12:40	2/21/2017	5:15	Reclaimer	48.4	17.1	21.1	5.1	223	5.65	0.329	20.53	6.04	179.8	0.8
PZ-42	2/10/2017	10:45	2/21/2017	6:15	Reclaimer	35	20.84	21.3	2.3	76.5	6.41	0.181	21.28	2.25	16.69	5.7

Notes:

hr:min - hours:minutes; ft. btoc - feet below top of casing; gal - gallons; SU - Standard Units; mS/cm - millisiemens per centimeter; °C - degrees Celsius; NTU - nephelometric turbidity units; mv - millivolts; mg/L - milligrams per liter; Cond - conductivity; Temp - temperature; Turb - turbidity; ORP - oxygen reduction potential; DO - dissolved oxygen

September 2017

Table 3
Summary of Post-Development Piezometer Water Level and Survey Data
Plant Branch-Milledgeville, GA

1666254-01

Well / Piezometer Name	Survey Date	Survey Time	Water Level (ft. btoc)	Water Elevation (ft. msl)	NAD 83 Northing (ft.)	NAD 83 Easting (ft.)	Latitude (dd)	Longitude (dd)	Elevation Top of Casing (ft. msl)	Ground Surface Elevation (ft. msl)
PZ-40	2/17/2017	NA	15.88	340.18	1162415.975	2562807.95	33.19267153	-83.29639687	356.06	353.13
PZ-41	2/17/2017	NA	17.1	340.13	1162432.809	2562760.034	33.19271888	-83.29655305	357.23	353.99
PZ-42	2/17/2017	NA	20.79	340.9	1162844.49	2562734.877	33.19385083	-83.29662407	361.69	358.72

Notes:

NA = Not Available; ft. BTOC = feet below top of casing; ft. MSL = feet mean sea level; NAD = North American Datum; dd = decimal degrees

Survey data collected by Southern Company Services, Inc. ; Georgia NAD83 West Zone

Table 4
Summary of Aquifer Test Data
Plant Branch

PIEZOMETER IDENTIFICATION	SATURATED AQUIFER THICKNESS VALUE (feet)	SCREEN LENGTH (feet)	PIEZOMETER DIAMETER (inches)	AQUIFER ANALYSIS METHOD	AQUIFER TEST TYPE	HYDRAULIC CONDUCTIVITY (cm/sec)	SCREENED LITHOLOGY
PZ-40	30	10	2	Bouwer-Rice	Falling	8.77E-05	Silt and Silty Sand
					Rising	2.36E-04	
PZ-41	30	10	2	Bouwer-Rice	Falling	3.06E-04	Silt and Silty Sand
					Rising	6.05E-04	
PZ-42	30	10	2	Bouwer-Rice	Falling	3.03E-04	Sand and Silty Sand
					Rising	3.45E-04	
					Geomean	2.71E-04	

NOTES:

1. Geomean = geometric mean
2. cm/sec = centimeter per second

**APPENDIX A
DRILLING BONDS**

CONTINUATION
CERTIFICATE

SAFECO Insurance Company of America

, Surety upon

a certain Bond No. 4993104

dated effective June 30, 1987
(MONTH-DAY-YEAR)

on behalf of Southern Company Services, Inc.
(PRINCIPAL)

and in favor of Georgia - Dept. of Natural Resources
(OBLIGEE)

does hereby continue said bond in force for the further period

beginning on June 30, 2016
(MONTH-DAY-YEAR)

and ending on June 30, 2017
(MONTH-DAY-YEAR)

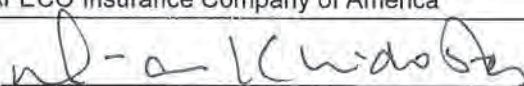
Amount of bond \$10,000.00

Description of bond Water Well Contractors & Drillers

PROVIDED: That this continuation certificate does not create a new obligation and is executed upon the express condition and provision that the Surety's liability under said bond and this and all Continuation Certificates issued in connection therewith shall not be cumulative and that the said Surety's aggregate liability under said bond and this and all such Continuation Certificates on account of all defaults committed during the period (regardless of the number of years) said bond had been and shall be in force, shall not in any event exceed the amount of said bond as hereinbefore set forth.

Signed and dated on April 07, 2016
(MONTH-DAY-YEAR)

SAFECO Insurance Company of America

By 

D-Ann Kleidosty, Attorney-in-Fact

THIS POWER OF ATTORNEY IS NOT VALID UNLESS IT IS PRINTED ON RED BACKGROUND.

This Power of Attorney limits the acts of those named herein, and they have no authority to bind the Company except in the manner and to the extent herein stated.

Certificate No. 7310252

First National Insurance Company of America
General Insurance Company of America
Safeco Insurance Company of America

POWER OF ATTORNEY

KNOWN ALL PERSONS BY THESE PRESENTS: That First National Insurance Company of America, General Insurance Company of America, and Safeco Insurance Company of America are corporations duly organized under the laws of the State of New Hampshire (herein collectively called the "Companies"), pursuant to and by authority herein set forth, does hereby name, constitute and appoint, Brooke A. Sharp; Christine Doczy; D-Ann Kleidosty; Gary D. Eklund; Sharon J. Potts; Sylvia M. Ogle; William G. Moody

all of the city of Atlanta, state of GA each individually if there be more than one named, its true and lawful attorney-in-fact to make, execute, seal, acknowledge and deliver, for and on its behalf as surety and as its act and deed, any and all undertakings, bonds, recognizances and other surety obligations, in pursuance of these presents and shall be as binding upon the Companies as if they have been duly signed by the president and attested by the secretary of the Companies in their own proper persons.

IN WITNESS WHEREOF, this Power of Attorney has been subscribed by an authorized officer or official of the Companies and the corporate seals of the Companies have been affixed thereto this 1st day of April, 2016.



First National Insurance Company of America
General Insurance Company of America
Safeco Insurance Company of America

By: David M. Carey
David M. Carey, Assistant Secretary

STATE OF PENNSYLVANIA ss
COUNTY OF MONTGOMERY

On this 1st day of April, 2016, before me personally appeared David M. Carey, who acknowledged himself to be the Assistant Secretary of First National Insurance Company of America, General Insurance Company of America, and Safeco Insurance Company of America, and that he, as such, being authorized so to do, execute the foregoing instrument for the purposes therein contained by signing on behalf of the corporations by himself as a duly authorized officer.

IN WITNESS WHEREOF, I have hereunto subscribed my name and affixed my notarial seal at Plymouth Meeting, Pennsylvania, on the day and year first above written.



COMMONWEALTH OF PENNSYLVANIA
Notarial Seal
Teresa Pastella, Notary Public
Plymouth Twp., Montgomery County
My Commission Expires March 28, 2017
Member, Pennsylvania Association of Notaries

By: Teresa Pastella
Teresa Pastella, Notary Public

This Power of Attorney is made and executed pursuant to and by authority of the following By-law and Authorizations of First National Insurance Company of America, General Insurance Company of America, and Safeco Insurance Company of America, which are now in full force and effect reading as follows:

ARTICLE IV - OFFICERS - Section 12. Power of Attorney. Any officer or other official of the Corporation authorized for that purpose in writing by the Chairman or the President, and subject to such limitation as the Chairman or the President may prescribe, shall appoint such attorneys-in-fact, as may be necessary to act in behalf of the Corporation to make, execute, seal, acknowledge and deliver as surety any and all undertakings, bonds, recognizances and other surety obligations. Such attorneys-in-fact, subject to the limitations set forth in their respective powers of attorney, shall have full power to bind the Corporation by their signature and executed, such instruments shall be as binding as if signed by the President and attested to by the Secretary. Any power or authority granted to any representative or attorney-in-fact under the provisions of this article may be revoked at any time by the Board, the Chairman, the President or by the officer or officers granting such power or authority.

Certificate of Designation - The President of the Company, acting pursuant to the Bylaws of the Company, authorizes David M. Carey, Assistant Secretary to appoint such attorneys-in-fact as may be necessary to act on behalf of the Company to make, execute, seal, acknowledge and deliver as surety any and all undertakings, bonds, recognizances and other surety obligations.

Authorization - By unanimous consent of the Company's Board of Directors, the Company consents that facsimile or mechanically reproduced signature of any assistant secretary of the Company, wherever appearing upon a certified copy of any power of attorney issued by the Company in connection with surety bonds, shall be valid and binding upon the Company with the same force and effect as though manually affixed.

I, Gregory W. Davenport, the undersigned, Assistant Secretary, of First National Insurance Company of America, General Insurance Company of America, and Safeco Insurance Company of America do hereby certify that the original power of attorney of which the foregoing is a full, true and correct copy of the Power of Attorney executed by said Companies, is in full force and effect and has not been revoked.

IN TESTIMONY WHEREOF, I have hereunto set my hand and affixed the seals of said Companies this 7th day of April, 2016.



By: Gregory W. Davenport
Gregory W. Davenport, Assistant Secretary

APPENDIX B
BORING LOGS/ CONSTRUCTION DIAGRAMS AND DEVELOPMENT FORMS

RECORD OF BOREHOLE PZ-40

SHEET 1 of 1

PROJECT: Plant Branch
PROJECT NUMBER: 1666254-01
DRILLED DEPTH: 40.20 ft
LOCATION: Aera A

DRILL RIG: CME 550
DATE STARTED: 2/14/17
DATE COMPLETED: 2/14/17

NORTHING: 1,162,415.98
EASTING: 2,562,807.95
GS ELEVATION: 353.13
TOC ELEVATION: 356.06 ft

DEPTH W.L.: 12.7'
ELEVATION W.L.:
DATE W.L.: 2/14/2017
TIME W.L.: 13:45

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE				SAMPLES					MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES	WELL CONSTRUCTION DETAILS
		DESCRIPTION	USCS	GRAPHIC LOG	ELEV. DEPTH (ft)	SAMPLE NO.	TYPE	BLOWS per 6 in 140 lb hammer 30 inch drop	N-VALUE	REC		
0		0.00 - 10.00 Boring was Hydrovacuum to 10 feet.									Pure Gold Grout (70:30) with / Aluminum Protective Casing	WELL CASING Interval: 0-28.5' Material: Schedule 40 PVC Diameter: 2" Joint Type: Flush/Screw WELL SCREEN Interval: 28.8-38.8' Material: Schedule 40 PVC Pre-Pack Diameter: 2 Slot Size: 0.010 End Cap: 39.8-40.2' FILTER PACK Interval: 27.8-40.2' Type: FilterSil FILTER PACK SEAL Interval: 24.7-27.8' Type: 3/8" PEL-PLUG Bentonite Pellets ANNULUS SEAL Interval: 0-24.7 Type: Pure Gold Grout (70:30) WELL COMPLETION Pad: 4' x 4' Protective Casing: 4" x 4" x 5' Aluminum DRILLING METHODS Soil Drill: 4.25 inch HSA Rock Drill: None
350												
5												
345												
10		10.00 - 23.50 ML, SILT, with some sand, fine to medium grained, non-plastic; gray/silver to red; cohesive, moist, w<PL.			343.13 10.00							
340												
15			ML			S1	DO	2-2-2	4	1.50 1.50	Pure Gold Grout (70:30)	
335												
20						S2	DO	2-2-3	5	1.50 1.50		
330												
25		23.50 - 33.50 SM, SILTY SAND, fine to coarse, non plastic; light brown to black to white; non-cohesive, dry to moist, W<PL.			329.63 23.50	S3	DO	21-37-50/3	87/9	1.25 1.50		3/8" PEL-PLUG Bentonite Pellets FilterSil 0.010" Slotted Schedule 40 PVC Pre-Pack Screen
325			SM									
30						S4	DO	11-20-35	55	1.50 1.50		
320												
35		33.50 - 38.50 ML, SILT, with trace fine sand, non-plastic, white to black to bronze, weathered; cohesive, moist, firm to stiff, W<PL.			319.63 33.50	S5	DO	7-13-17	30	1.00 1.50		
315			ML									
40		38.50 - 40.20 SP, SAND, fine to coarse grained with trace silt, non-plastic; white to bronze; non-cohesive, dry, W<PL.			314.63 38.50	S6	DO	12-18-24	42	1.00 1.50		
			SP		312.93							
		Boring completed at 40.20 ft										

LOG SCALE: 1 in = 5 ft
DRILLING COMPANY: Southern Company Services
DRILLER: S. Milam

GA INSPECTOR: Michael Boatman
CHECKED BY: TIR
DATE: 9/29/17



BOREHOLE RECORD 1666254-01.GPJ PIEDMONT.GDT 9/15/17

RECORD OF BOREHOLE PZ-41

SHEET 1 of 2

PROJECT: Plant Branch
PROJECT NUMBER: 1666254-01
DRILLED DEPTH: 45.00 ft
LOCATION: Aera A

DRILL RIG: CME 550
DATE STARTED: 2/13/17
DATE COMPLETED: 2/14/17

NORTHING: 1,162,432.81
EASTING: 2,562,760.03
GS ELEVATION: 353.99
TOC ELEVATION: 357.23 ft

DEPTH W.L.: 13.7
ELEVATION W.L.:
DATE W.L.: 2/14/2017
TIME W.L.: 0735

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE			SAMPLES				MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES	WELL CONSTRUCTION DETAILS	
		DESCRIPTION	USCS	GRAPHIC LOG	ELEV.	TYPE	BLOWS per 6 in 140 lb hammer 30 inch drop	N-VALUE			REC
					DEPTH (ft)						
0		0.00 - 10.00 Boring was Hydrovacuum to 10 feet.								Pure Gold Grout (70:30) with Aluminum Protective Casing	WELL CASING Interval: 0-29.3' Material: Schedule 40 PVC Diameter: 2" Joint Type: Flush/Screw
350											
5											
345											
10		10.00 - 28.50 CL, CLAY, with trace-some sand, fine to coarse, and trace silt, moderate plasticity; white to red orange brown; cohesive, dry to moist, soft to stiff, W< to ~PL.			343.99 10.00						
340						S1	DO	2-1-5	6	1.00 1.50	
15											Pure Gold Grout (70:30)
335			CL			S2	DO	5-8-11	19	1.50 1.50	
20											
330						S3	DO	3-5-8	13	1.50 1.50	
25											
325		28.50 - 38.50 SM, SILTY SAND, non to low plasticity; silvery bronze to light brown to red brown, contains mica, biotite gneiss saprolite; cohesive, moist, soft to firm, W<PL.			325.49 28.50	S4	DO	2-3-3	6	1.50 1.50	
30											3/8" PEL-PLUG Bentonite Pellets
320			SM			S5	DO	3-4-7	11	1.16 1.50	
35											FilterSil
315		38.50 - 45.00 ML, SILT, with trace fine sand, non plastic; white to bronze, weathered, biotite gneiss saprolite; cohesive, moist, soft, W<PL.			315.49 38.50	S6	DO	3-7-11	18	1.50 1.50	0.010" Slotted Schedule 40 PVC Pre-Pack Screen
40			ML								
Log continued on next page											

Log continued on next page

LOG SCALE: 1 in = 5 ft
DRILLING COMPANY: Southern Company Services
DRILLER: S. Milam

GA INSPECTOR: Michael Boatman
CHECKED BY: TIR
DATE: 9/29/17



BOREHOLE RECORD 1666254-01.GPJ PIEDMONT.GDT 9/15/17

RECORD OF BOREHOLE PZ-41

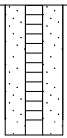
SHEET 2 of 2

PROJECT: Plant Branch
PROJECT NUMBER: 1666254-01
DRILLED DEPTH: 45.00 ft
LOCATION: Aera A

DRILL RIG: CME 550
DATE STARTED: 2/13/17
DATE COMPLETED: 2/14/17

NORTHING: 1,162,432.81
EASTING: 2,562,760.03
GS ELEVATION: 353.99
TOC ELEVATION: 357.23 ft

DEPTH W.L.: 13.7
ELEVATION W.L.:
DATE W.L.: 2/14/2017
TIME W.L.: 0735

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE				SAMPLES					MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES	WELL CONSTRUCTION DETAILS
		DESCRIPTION	USCS	GRAPHIC LOG	ELEV. DEPTH (ft)	SAMPLE NO.	TYPE	BLOWS per 6 in 140 lb hammer 30 inch drop	N-VALUE	REC		
310		38.50 - 45.00 ML, SILT, with trace fine sand, non plastic; white to bronze, weathered, biotite gneiss saprolite; cohesive, moist, soft, W<PL. (Continued)	ML									WELL CASING Interval: 0-29.3' Material: Schedule 40 PVC Diameter: 2" Joint Type: Flush/Screw WELL SCREEN Interval: 33.8-43.8' Material: Schedule 40 PVC Pre-Pack Diameter: 2 Slot Size: 0.010 End Cap: 43.8-44.2' FILTER PACK Interval: 32-44.2' Type: FilterSil FILTER PACK SEAL Interval: 29.3-32' Type: 3/8" PEL-PLUG Bentonite Pellets ANNULUS SEAL Interval: 0-29.3' Type: Pure Gold Grout (70:30) WELL COMPLETION Pad: 4' x 4' Protective Casing: 4" x 4" x 5' Aluminum DRILLING METHODS Soil Drill: 4.25 inch HSA Rock Drill: None
45		Boring completed at 45.00 ft			308.99	S7	DO	8-12-13	25	1.33 1.50		
305												
50												
300												
55												
295												
60												
290												
65												
285												
70												
280												
75												
275												
80												

LOG SCALE: 1 in = 5 ft
DRILLING COMPANY: Southern Company Services
DRILLER: S. Milam

GA INSPECTOR: Michael Boatman
CHECKED BY: TIR
DATE: 9/29/17



BOREHOLE RECORD 1666254-01.GPJ PIEDMONT.GDT 9/15/17

RECORD OF BOREHOLE PZ-42

SHEET 1 of 1

PROJECT: Plant Branch
PROJECT NUMBER: 1666254-01
DRILLED DEPTH: 32.20 ft
LOCATION: Aera A

DRILL RIG: CME 550
DATE STARTED: 2/8/17
DATE COMPLETED: 2/9/17

NORTHING: 1,162,844.49
EASTING: 2,562,734.88
GS ELEVATION: 358.72
TOC ELEVATION: 361.69 ft

DEPTH W.L.: 20.84
ELEVATION W.L.:
DATE W.L.: 2/10/2017
TIME W.L.: 10:45

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE				SAMPLES					MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES	WELL CONSTRUCTION DETAILS
		DESCRIPTION	USCS	GRAPHIC LOG	ELEV. DEPTH (ft)	SAMPLE NO.	TYPE	BLOWS per 6 in 140 lb hammer 30 inch drop	N-VALUE	REC		
0		0.00 - 10.00 Boring was Hydrovacuum for the first 10 feet.									Pure Gold Grout (70:30) with Aluminum Protective Casing	WELL CASING Interval: 0-14' Material: Schedule 40 PVC Diameter: 2" Joint Type: Flush/Screw WELL SCREEN Interval: 21.8-31.8 Material: Schedule 40 PVC Pre-Pack Diameter: 2 Slot Size: 0.010 End Cap: 31.8-32.2' FILTER PACK Interval: 16.2-32.2' Type: FilterSil FILTER PACK SEAL Interval: 14-16.2' Type: 3/8" PEL-PLUG Bentonite Pellets ANNULUS SEAL Interval: 0-16.2 Type: Pure Gold Grout (70:30) WELL COMPLETION Pad: 4' x 4' Protective Casing: 4" x 4" x 5' Aluminum DRILLING METHODS Soil Drill: 4.25 inch HSA Rock Drill: None
355												
5												
350												
10		10.00 - 28.50 SM, SILTY SAND, fine to medium grained, non-plastic; brown to black to white, non-cohesive, dry, compact, W<PL. **Becomes more saprolitic with depth.			348.72 10.00						Pure Gold Grout (70:30)	
345						S1	DO	4-5-8	13	1.50 1.50	3/8" PEL-PLUG Bentonite Pellets	
15												
340			SM			S2	DO	4-11-20	31	1.33 1.50		
20												
335						S3	DO	14-40-50/5	90/11	1.18 1.50	FilterSil	
25												
330		28.50 - 32.20 SP, SAND, medium grained, with trace silt, non-plastic; black; non-cohesive, moist, very dense, W<PL. Auger Refusal.			330.22 28.50	S4	DO	50/2	50/2	0.17 1.50	0.010" Slotted Schedule 40 PVC Pre-Pack Screen	
30			SP									
325		Boring completed at 32.20 ft			326.52							
35												
320												
40												

BOREHOLE RECORD 1666254-01.GPJ PIEDMONT.GDT 9/15/17

LOG SCALE: 1 in = 5 ft
DRILLING COMPANY: Southern Company Services
DRILLER: S. Milam

GA INSPECTOR: Michael Boatman
CHECKED BY: TIR
DATE: 9/29/17





WELL DEVELOPMENT FIELD RECORD

JOB NAME Southern Company/ Plant Branch
 DEVELOPED BY M.L. Boatman
 STARTED DEVEL. 2/22/17 1 10:15
 DATE TIME
 W.L. BEFORE DEVEL. 15.7 1 2/22/17 0945
 DEPTH DATE TIME
 WELL DEPTH: BEFORE DEVEL. 48.25
 STANDING WATER COLUMN (FT.) 27.55
 SCREEN LENGTH 10'

JOB NO. 1773773 WELL NO. P2-40
 DATE OF INSTALL. 2/14/2017 SHEET 1 OF 2
 COMPLETED DEVEL. 2/22/17 1 20:30
 DATE TIME
 AFTER DEVEL. 38.3 12/22 10835 2035
 DEPTH DATE TIME
 AFTER DEVEL. 43.3 WELL DIA. (In) 2"
 STANDING WELL VOLUME 4.5 gal.
 DRILLING WATER LOSS gal.

DATE/TIME	VOLUME REMOVED (GALS)	FIELD PARAMETERS				REMARKS
		SPEC. COND. (umhos/cm)	TEMP. (°F)	pH (s.u.)	OTHER	
10:20	5	—	—	—	—	34.6' >1000 NTU
10:40	5	—	—	—	—	38.1' >1000 NTU
11:00	5	—	—	—	—	41.0' Top of dump ~700 NTU
11:17	5	—	—	—	—	~700 NTU, Rise dump 24" PSI 80, 40:20
11:52	5	—	—	—	—	~700 NTU 29.7'
12:10	5	—	—	—	—	" " 34.9'
12:30	5	—	—	—	—	" " 40.2'
12:50	5	—	—	—	—	" " 29' Rise dump, 1' below top of screen
13:27	5	—	—	—	—	" " 29' (Top) lower to bottom
13:46	5	—	—	—	—	44.8 38.9' 700 NTU
14:03	5	—	—	—	—	>1000 NTU
14:26	5	—	—	—	—	>1000 NTU 38.8'
14:46	5	—	—	—	—	" " "
15:05	5	—	—	—	—	>500 NTU 40.0' (Top)
15:23	5	—	—	—	—	>500 NTU " "
15:25						PUMP off.
16:00						Recharged to 19.5' BTOC
17:00						Restart W/L @ 16.5' BTOC
= TOTAL VOLUME REMOVED (gal.)						

DEVELOPMENT METHOD: ★ Rain to heaver to run equipment with exposed cable reels and engine, even with tent.

NOTES:

WELL DEVELOPMENT FIELD RECORD

JOB NAME	Southern Company/ Plant Branch		
DEVELOPED BY	M.L. Boatman		
STARTED DEVEL.	2/22/17, 10:15		
	DATE	TIME	
W.L. BEFORE DEVEL.	15.7	2/22, 0945	
	DEPTH	DATE	TIME
WELL DEPTH: BEFORE DEVEL.		43.25'	
STANDING WATER COLUMN (FT.)		27.55	
SCREEN LENGTH		10'	

JOB NO. 2773773 WELL NO. PZ-40
DATE OF INSTALL. 2/14/2017 SHEET 2 OF 2
COMPLETED DEVEL. 2/22/17 08:20:30
DATE TIME
AFTER DEVEL. 38.3 2/22/17 08:35 20:35
DEPTH DATE TIME
AFTER DEVEL. 43.3 WELL DIA. (In) 2
STANDING WELL VOLUME 4.5 gal.
DRILLING WATER LOSS - gal.

DATE/TIME	VOLUME REMOVED (GALS)	FIELD PARAMETERS				REMARKS
		SPEC. COND. (umhos/cm)	TEMP. (°F)	pH (s.u.)	OTHER	
2/22/17 1708	5	—	—	—	—	39.0' WL > 1000 NTU
17:23	5	—	—	—	—	39.5' ≈ 100 NTU
17:41	5	—	—	—	—	" "
		= TOTAL VOLUME REMOVED (gal.)				

DEVELOPMENT METHOD:

NOTES:

Product Name: Low-Flow System

Date: 2017-02-22 20:41:32

Project Information:

Operator Name Michael Boatman
Company Name Golder
Project Name Plant branch
Site Name Plant Branch
Latitude 0° 0' 0"
Longitude 0° 0' 0"
Sonde SN 463453
Turbidity Make/Model

Pump Information:

Pump Model/Type
Tubing Type
Tubing Diameter in
Tubing Length 48 ft

Pump placement from TOC 42 ft

Well Information:

Well ID Pz-40
Well diameter 2 in
Well Total Depth 43.2 ft
Screen Length 10 ft
Depth to Water 16.2 ft

Pumping Information:

Final Pumping Rate 1600 mL/min
Total System Volume 0.09 L
Calculated Sample Rate 300 sec
Stabilization Drawdown 48 in
Total Volume Pumped 0 L

Low-Flow Sampling Stabilization Summary

	Time	Elapsed	Temp C	pH	SpCond µS/cm	Turb NTU	DTW ft	RDO mg/L	ORP mV
Stabilization			+/- 0.5	+/- 0.1%	+/- 5%	+/- 10%		+/- 0.3	+/- 10
Last 5	20:17:37	7199.89	20.43	5.97	258.92	11.80	38.10	1.27	166.89
Last 5	20:22:37	7499.89	20.43	5.96	258.91	9.93	38.20	1.27	173.50
Last 5	20:27:37	7799.83	20.41	5.96	258.67	8.83	38.30	1.31	174.34
Last 5	20:32:37	8099.83	20.44	5.97	258.68	6.43	38.30	1.22	173.15
Last 5	20:37:37	8399.83	20.44	5.98	258.46	4.86	38.30	1.22	175.03
Variance 0			-0.02	0.00	-0.24			0.04	0.84
Variance 1			0.03	0.01	0.00			-0.08	-1.19
Variance 2			-0.00	0.00	-0.22			-0.00	1.88

Notes

Control box went bad for a bit. Once stabilized the discharge was still at 1600 ml/min. The new inches once stable is about 12

Grab Samples



WELL DEVELOPMENT FIELD RECORD

JOB NAME Southern Company/ Plant Branch
DEVELOPED BY M.L. Boatman
STARTED DEVEL 2/20/2017 12:40
DATE TIME
W.L. BEFORE DEVEL 17.1 12/24/12:15
DEPTH DATE TIME
WELL DEPTH BEFORE DEVEL 48.4 ~~7.1~~ BTAC
STANDING WATER COLUMN (FT.) 31.3'
SCREEN LENGTH 10

JOB NO. 1773773 WELL NO. P2-41
DATE OF INSTALL 2/2017 SHEET 1 OF 2
COMPLETED DEVEL 2/21/2017 10:45
DATE TIME
AFTER DEVEL 21.1 12/24/10:50
DEPTH DATE TIME
AFTER DEVEL 48.4 WELL DIA. (In) 2
STANDING WELL VOLUME 5.10 gal.
DRILLING WATER LOSS gal.

DATE/TIME	VOLUME REMOVED (GALS)	FIELD PARAMETERS				REMARKS
		SPEC. COND. (umhos/cm)	TEMP. (°F)	pH (s.u.)	OTHER	
12:40 - Start						60 PSI in MP50
12:45	5	—	—	—	—	71000 NTU MP 50 to 80 PSI WELLS
12:50	5	—	—	—	—	" " " " 26.7'
12:54	5	—	—	—	—	" " " " 26.5' PSI 10120
12:58	5	—	—	—	—	" " " " 26.7' surge
13:06	5	—	—	—	—	" " " " 23.3 PSI @ 30
13:12	5	—	—	—	—	" " " " 23.9 PSI @ 30 surge
13:20	5	—	—	—	—	" " " " 23.3 PSI @ 30
13:26	5	—	—	—	—	" " " " 23.3
13:40	5					air compressor tripped out
13:46	—					Back on, PSI @ 130, 120 28' L2
13:52	5	—	—	—	—	71000 NTU 28.3' BTAC PSI @ 130
13:55	5	—	—	—	—	28.5' BTAC
14:00	—	—	—	—	—	compressor out again
14:10	—	—	—	—	—	Started again 28.7'
14:14	5	—	—	—	—	71000 NTU 28.3' BTAC May PSI
14:18	5	—	—	—	—	Surged
14:23	5	—	—	—	—	71000 NTU 28.65'
14:35	~15	= TOTAL VOLUME REMOVED (gal.)				71000 NTU 28.9
14:41	5					" " pulled to top of screen

DEVELOPMENT METHOD: _____

NOTES:



WELL DEVELOPMENT FIELD RECORD

JOB NAME Southern Company/ Plant Branch

JOB NO. 1773773

WELL NO. PZ-41

DEVELOPED BY M.L. Boatman

DATE OF INSTALL. 2/20/17 SHEET 2 OF 2

STARTED DEVEL. 2/20/17 11240

COMPLETED DEVEL. 2/21/2017 1045

W.L. BEFORE DEVEL. 17.1 DATE 2/20/17 TIME 12:15

AFTER DEVEL. 21.1 DATE 2/21/17 TIME 1050

WELL DEPTH: BEFORE DEVEL. 48.4 BToc

AFTER DEVEL. 48.4 WELL DIA. (in) 2

STANDING WATER COLUMN (FT.) 31.3

STANDING WELL VOLUME 5.10 gal.

SCREEN LENGTH 10

DRILLING WATER LOSS gal.

DATE/TIME	VOLUME REMOVED (GALS)	FIELD PARAMETERS				REMARKS
		SPEC. COND. (umhos/cm)	TEMP. (°F)	pH (s.u.)	NTU OTHER	
14:48/2-2-17	5 (90)					71000 NTU, WLG @ 28.9 max out
15:04	≈ 20					7100 NTU, WLG @ 28.8
15:15	≈ 15					7100 NTU, WLG @ 28.0
15:18	Back on					Compressor out
15:30	≈ 5					700 NTU - PSI @ 40.
15:43	≈ 3					generator out of fuel
						try to pump test tomorrow
2/21/2017 0805						WLG @ 17.1 BToc.
0830						Start pumping.
0835	5					71000 NTU 23.1' base
0935	≈ 50					71000 NTU 23.5
1025	≈ 30					2100 NTU 23.8'
1031	—	330.1	20.48	5.65	2.88	Start reading
1035	≈ 1 gal	329.6	20.44	5.65	8.73	
1039	—	329.2	20.48	5.66	4.80	
1043	—	328.9/3290	20.53	5.65	6.04	Stop Readings
1047						
1051	223	= TOTAL VOLUME REMOVED (gal.)				

DEVELOPMENT METHOD: _____

NOTES:

WELL DEVELOPMENT FIELD RECORD

JOB NAME	Southern Company/ Plant Branch		
DEVELOPED BY	M.L. Boatman		
STARTED DEVEL.	10:45	1	2/10/17
	DATE	TIME	
W.L. BEFORE DEVEL.	26.84	12/10/17	10:00
BTC	DEPTH	DATE	TIME
WELL DEPTH: BEFORE DEVEL.	20.84		
STANDING WATER COLUMN (FT.)	11.16		
SCREEN LENGTH	10'		

JOB NO. 1773773 WELL NO. PZ-42
DATE OF INSTALL. 2/8/17 SHEET 1 OF 2
COMPLETED DEVEL. 2/21/17 1530
DATE TIME
AFTER DEVEL. 21.3' 12/21/17 1530
DEPTH DATE TIME
AFTER DEVEL. 35' WELL DIA. (In) 2
STANDING WELL VOLUME 1.81 gal.
DRILLING WATER LOSS gal.

DATE/TIME	VOLUME REMOVED (GALS)	FIELD PARAMETERS				REMARKS
		SPEC. COND. (umhos/cm)	TEMP. (°F)	pH (s.u.)	OTHER	
10:50	4	—	—	—	—	71000 NTU 30.2 BToc
11:00	1	—	—	—	—	30.4 BToc 30.4 BToc
11:05	1	—	—	—	—	dry
11:40						22.75 BToc
11:45	4	—	—	—	—	30.45 BToc 71000 NTU
12:15	5	—	—	—	—	71000 NTU 31.7 WL BToc
12:35	4	—	—	—	—	71000 NTU 32.0 BToc
12:50	3	—	—	—	—	71000 NTU 32.0 BToc
13:00	2	—	—	—	—	71000 NTU " "
13:20	3	—	—	—	—	" " " "
13:50	5	—	—	—	—	" " " "
14:00	0.5	—	—	—	—	dry
14:40	Start	—	—	—	—	71000 NTU 21.21 BToc
14:20	5	—	—	—	—	dry
	35.5	= TOTAL VOLUME REMOVED (gal.)				

DEVELOPMENT METHOD:

NOTES:



JOB NO. 1773773 WELL NO. PZ-42
DATE OF INSTALL. 2/8/17 SHEET 2 OF 2
COMPLETED DEVEL. 2/21/17 1530
DATE TIME
AFTER DEVEL. 21.3' 12/21/17 1530
DEPTH DATE TIME
AFTER DEVEL. 35' WELL DIA. (in) 2'
STANDING WELL VOLUME 2.3 gal.
DRILLING WATER LOSS gal.

DEVELOPMENT METHOD: _____

Golder Associates

Product Name: Low-Flow System

Date: 2017-02-21 16:27:35

Project Information:

Operator Name Michael Boatman
Company Name Golder
Project Name Car
Site Name Plant Branch
Latitude 0° 0' 0"
Longitude 0° 0' 0"
Sonde SN 463453
Turbidity Make/Model LaMotte

Pump Information:

Pump Model/Type
Tubing Type
Tubing Diameter in
Tubing Length 40 ft

Pump placement from TOC 34.5 ft

Well Information:

Well ID Pz-42
Well diameter 2 in
Well Total Depth 35 ft
Screen Length 10 ft
Depth to Water 20.76 ft

Pumping Information:

Final Pumping Rate 800 mL/min
Total System Volume 0.09 L
Calculated Sample Rate 300 sec
Stabilization Drawdown 5 in
Total Volume Pumped 16 L

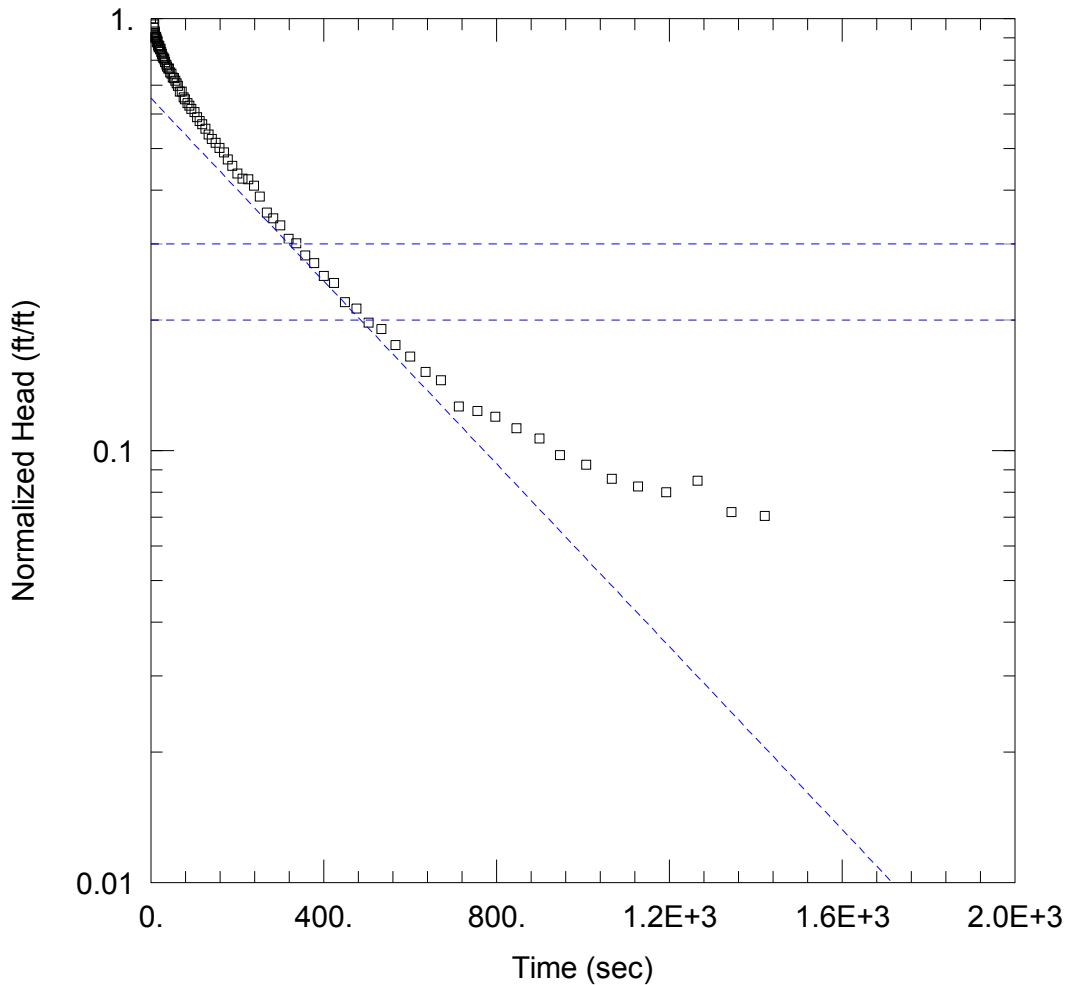
Low-Flow Sampling Stabilization Summary

	Time	Elapsed	Temp C	pH	SpCond µS/cm	Turb NTU	DTW ft	RDO mg/L	ORP mV
Stabilization			+/- 0.5	+/- 0.1%	+/- 5%	+/- 10%		+/- 0.3	+/- 10
Last 5	16:02:33	300.04	21.27	6.41	181.41	2.49	28.70	5.82	19.61
Last 5	16:07:33	600.02	21.27	6.40	181.41	4.28	28.80	5.78	18.65
Last 5	16:12:33	900.02	21.28	6.40	181.51	2.80	29.10	5.72	17.94
Last 5	16:17:33	1200.02	21.26	6.41	181.39	3.26	29.00	5.71	17.13
Last 5	16:22:33	1500.02	21.28	6.41	181.30	2.25	29.05	5.70	16.69
Variance 0			0.02	0.00	0.10			-0.06	-0.71
Variance 1			-0.02	0.01	-0.12			-0.01	-0.81
Variance 2			0.03	0.00	-0.09			-0.01	-0.44

Notes

Grab Samples

APPENDIX C
SINGLE WELL AQUIFER (SLUG) TEST RESULTS



WELL TEST ANALYSIS

Data Set: C:\Users\jrjones\Desktop\Aqtesolv Files\PZ-40 Slug In.aqt
 Date: 04/21/17 Time: 11:26:10

PROJECT INFORMATION

Company: Golder
 Client: SoCo
 Project: 1666254
 Location: Branch
 Test Well: PZ-40

AQUIFER DATA

Saturated Thickness: 30. ft Anisotropy Ratio (K_z/K_r): 1.

WELL DATA (PZ-40)

Initial Displacement: 2.073 ft Static Water Column Height: 15.71 ft
 Total Well Penetration Depth: 43.3 ft Screen Length: 10. ft
 Casing Radius: 0.08 ft Well Radius: 0.25 ft
 Gravel Pack Porosity: 0.

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice
 $K = 8.773E-5$ cm/sec $y_0 = 1.355$ ft

Data Set: X:\Clients\Southern Company\1666254-01 Branch CCR-A Well Installation\300_Field Information\Slug Te
Date: 04/21/17
Time: 10:00:19

PROJECT INFORMATION

Company: Golder
Client: SoCo
Project: 1666254
Location: Branch
Test Date: 2/27/17
Test Well: PZ-40

AQUIFER DATA

Saturated Thickness: 30. ft
Anisotropy Ratio (Kz/Kr): 1.

SLUG TEST WELL DATA

Test Well: PZ-40

X Location: 0. ft
Y Location: 0. ft

Initial Displacement: 2.073 ft
Static Water Column Height: 15.71 ft
Casing Radius: 0.08 ft
Well Radius: 0.25 ft
Well Skin Radius: 0.25 ft
Screen Length: 10. ft
Total Well Penetration Depth: 43.3 ft
Corrected Casing Radius (Bouwer-Rice Method): 0.08 ft
Gravel Pack Porosity: 0.

No. of Observations: 95

<u>Observation Data</u>			
<u>Time (sec)</u>	<u>Displacement (ft)</u>	<u>Time (sec)</u>	<u>Displacement (ft)</u>
6.361	2.073	100.8	1.258
6.721	1.923	106.9	1.225
7.141	1.976	112.8	1.198
7.561	2.009	119.4	1.18
7.98	1.892	126.7	1.151
8.461	1.912	134.4	1.118
9.001	1.934	142.2	1.091
9.481	1.893	150.6	1.069
10.08	1.913	159.6	1.039
10.68	1.878	169.2	1.015
11.28	1.871	178.8	0.978
11.94	1.876	189.6	0.943
12.66	1.873	201.	0.906
13.44	1.855	213.	0.883
14.22	1.826	225.6	0.88

<u>Time (sec)</u>	<u>Displacement (ft)</u>	<u>Time (sec)</u>	<u>Displacement (ft)</u>
15.06	1.834	238.8	0.85
15.96	1.83	253.2	0.801
16.92	1.791	268.2	0.736
17.88	1.792	283.8	0.714
18.96	1.778	300.6	0.687
20.1	1.79	318.6	0.64
21.3	1.757	337.2	0.624
22.56	1.76	357.6	0.586
23.88	1.732	378.6	0.562
25.32	1.714	400.8	0.526
26.82	1.695	424.8	0.505
28.38	1.682	450.	0.457
30.06	1.676	476.5	0.442
31.86	1.661	504.6	0.41
33.72	1.642	534.6	0.396
35.77	1.618	566.4	0.363
37.86	1.603	600.	0.342
40.08	1.587	636.	0.315
42.48	1.584	672.	0.301
45.	1.556	714.	0.262
47.64	1.545	756.	0.256
50.46	1.513	798.	0.248
53.46	1.505	846.	0.233
56.66	1.487	900.	0.221
60.	1.465	948.	0.202
63.6	1.445	1008.	0.192
67.2	1.405	1068.	0.178
71.4	1.402	1128.	0.171
75.6	1.36	1194.	0.166
79.8	1.347	1266.	0.176
84.6	1.319	1344.	0.149
90.	1.301	1422.	0.146
94.8	1.278		

SOLUTION

Slug Test
Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
 $\ln(R_e/r_w)$: 3.692

VISUAL ESTIMATION RESULTS

Estimated Parameters

<u>Parameter</u>	<u>Estimate</u>	
K	8.773E-5	cm/sec
y0	1.355	ft

$$T = K \cdot b = 0.08022 \text{ cm}^2/\text{sec}$$

AUTOMATIC ESTIMATION RESULTS

Estimated Parameters

<u>Parameter</u>	<u>Estimate</u>	<u>Std. Error</u>	<u>Approx. C.I.</u>	<u>t-Ratio</u>	
K	0.0001223	3.153E-6	+/- 6.261E-6	38.8	cm/sec
y0	1.883	0.01486	+/- 0.02952	126.7	ft

C.I. is approximate 95% confidence interval for parameter

t-ratio = estimate/std. error

No estimation window

$$T = K \cdot b = 0.1119 \text{ cm}^2/\text{sec}$$

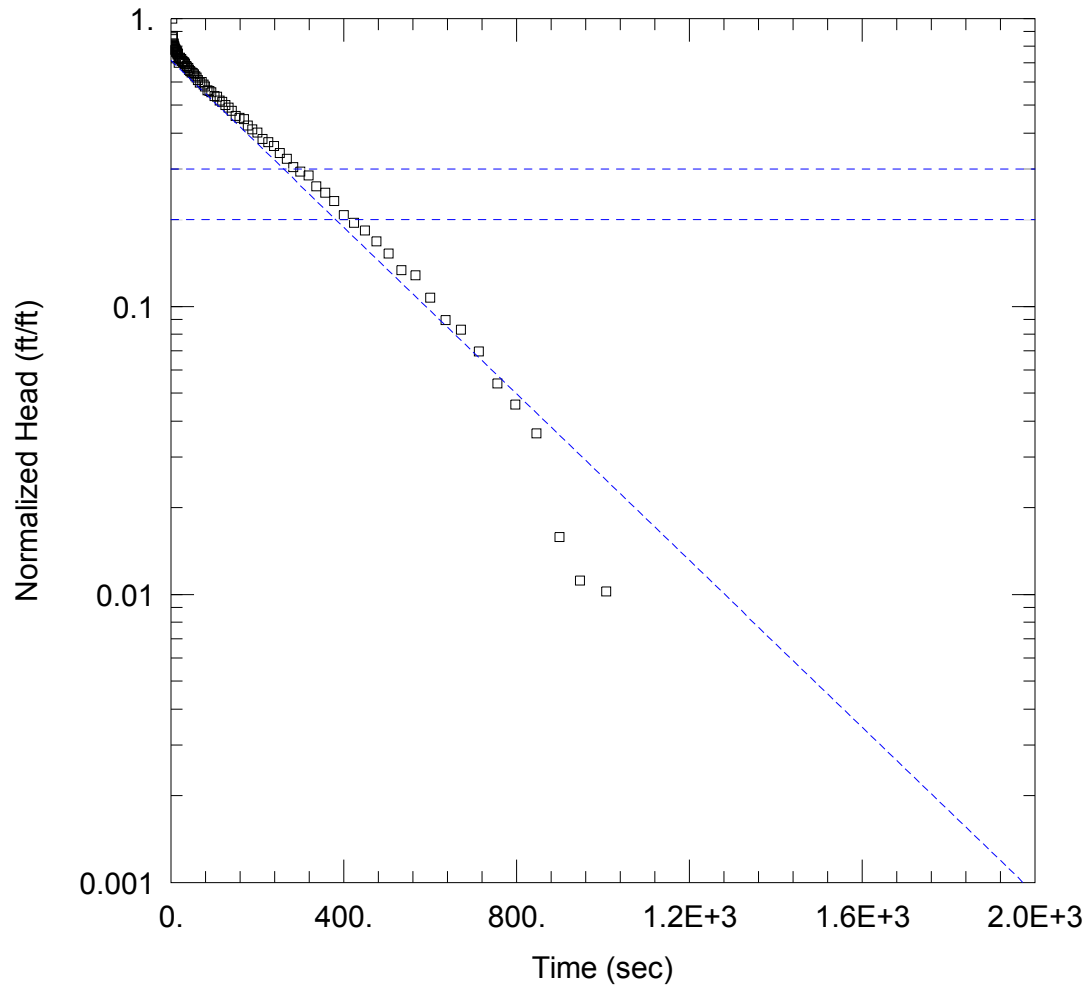
Parameter Correlations

	<u>K</u>	<u>y0</u>
K	1.00	0.59
y0	0.59	1.00

Residual Statistics

for weighted residuals

Sum of Squares .. 0.6106 ft²
Variance 0.006565 ft²
Std. Deviation 0.08103 ft
Mean 0.01852 ft
No. of Residuals . 95
No. of Estimates.. 2



WELL TEST ANALYSIS

Data Set: C:\Users\jrjones\Desktop\Aqtesolv Files\PZ-40 Slug Out.aqt
 Date: 04/21/17 Time: 11:27:33

PROJECT INFORMATION

Company: Golder
 Client: SoCo
 Project: 1666254
 Location: Branch
 Test Well: PZ-40

AQUIFER DATA

Saturated Thickness: 30. ft Anisotropy Ratio (K_z/K_r): 1.

WELL DATA (PZ-40)

Initial Displacement: -2.154 ft Static Water Column Height: 15.71 ft
 Total Well Penetration Depth: 43.3 ft Screen Length: 10. ft
 Casing Radius: 0.08 ft Well Radius: 0.25 ft
 Gravel Pack Porosity: 0.

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice
 $K = 0.0002361$ ft/min $y_0 = -1.539$ ft

Data Set: X:\Clients\Southern Company\1666254-01 Branch CCR-A Well Installation\300_Field Information\Slug Te
Date: 04/21/17
Time: 10:06:16

PROJECT INFORMATION

Company: Golder
Client: SoCo
Project: 1666254
Location: Branch
Test Date: 2/27/17
Test Well: PZ-40

AQUIFER DATA

Saturated Thickness: 30. ft
Anisotropy Ratio (Kz/Kr): 1.

SLUG TEST WELL DATA

Test Well: PZ-40

X Location: 0. ft
Y Location: 0. ft

Initial Displacement: -2.154 ft
Static Water Column Height: 15.71 ft
Casing Radius: 0.08 ft
Well Radius: 0.25 ft
Well Skin Radius: 0.25 ft
Screen Length: 10. ft
Total Well Penetration Depth: 43.3 ft
Corrected Casing Radius (Bouwer-Rice Method): 0.08 ft
Gravel Pack Porosity: 0.

No. of Observations: 107

<u>Observation Data</u>			
<u>Time (sec)</u>	<u>Displacement (ft)</u>	<u>Time (sec)</u>	<u>Displacement (ft)</u>
4.001	-2.154	84.6	-1.214
4.251	-1.852	90.	-1.208
4.501	-1.584	94.8	-1.191
4.751	-1.684	100.8	-1.159
5.001	-1.867	106.8	-1.15
5.251	-1.824	112.8	-1.116
5.501	-1.712	119.4	-1.102
5.751	-1.714	126.6	-1.077
6.001	-1.76	134.4	-1.056
6.361	-1.756	142.2	-1.027
6.721	-1.721	150.6	-0.989
7.141	-1.733	159.6	-0.974
7.561	-1.718	169.2	-0.963
7.981	-1.721	178.8	-0.915
8.461	-1.717	189.6	-0.885

<u>Time (sec)</u>	<u>Displacement (ft)</u>	<u>Time (sec)</u>	<u>Displacement (ft)</u>
9.001	-1.689	201.	-0.865
9.481	-1.69	213.	-0.823
10.08	-1.691	225.6	-0.802
10.68	-1.679	238.8	-0.777
11.28	-1.676	253.2	-0.735
11.94	-1.654	268.2	-0.7
12.66	-1.647	283.8	-0.656
13.44	-1.651	300.6	-0.633
14.22	-1.638	318.6	-0.612
15.06	-1.637	337.2	-0.561
15.96	-1.613	357.6	-0.534
16.92	-1.618	378.6	-0.499
17.88	-1.551	400.8	-0.446
18.96	-1.513	424.8	-0.421
20.1	-1.562	450.	-0.395
21.3	-1.571	476.4	-0.362
22.56	-1.553	504.6	-0.328
23.88	-1.553	534.6	-0.287
25.32	-1.53	566.4	-0.276
26.82	-1.532	600.	-0.231
28.38	-1.514	636.	-0.193
30.06	-1.516	672.	-0.179
31.86	-1.507	714.	-0.15
33.72	-1.492	756.	-0.116
35.76	-1.472	798.	-0.098
37.86	-1.46	846.	-0.078
40.08	-1.448	900.	-0.034
42.48	-1.43	948.	-0.024
45.	-1.412	1008.	-0.022
47.64	-1.396	1068.	0.009
50.46	-1.391	1128.	0.029
53.46	-1.376	1194.	0.03
56.64	-1.357	1266.	0.042
60.	-1.34	1344.	0.069
63.6	-1.314	1422.	0.078
67.2	-1.29	1506.	0.092
71.4	-1.293	1596.	0.095
75.6	-1.266	1692.	0.107
79.8	-1.251		

SOLUTION

Slug Test
Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
 $\ln(R_e/r_w)$: 3.692

VISUAL ESTIMATION RESULTS

Estimated Parameters

<u>Parameter</u>	<u>Estimate</u>
K	0.0002361 ft/min

y0 -1.539 ft

K = 0.00012 cm/sec

T = K*b = 0.007084 ft²/min (0.1097 sq. cm/sec)

AUTOMATIC ESTIMATION RESULTS

Estimated Parameters

<u>Parameter</u>	<u>Estimate</u>	<u>Std. Error</u>	<u>Approx. C.I.</u>	<u>t-Ratio</u>	
K	0.0002531	5.821E-6	+/- 1.154E-5	43.48	ft/min
y0	-1.727	0.01124	+/- 0.0223	-153.6	ft

C.I. is approximate 95% confidence interval for parameter

t-ratio = estimate/std. error

No estimation window

K = 0.0001286 cm/sec

T = K*b = 0.007592 ft²/min (0.1176 sq. cm/sec)

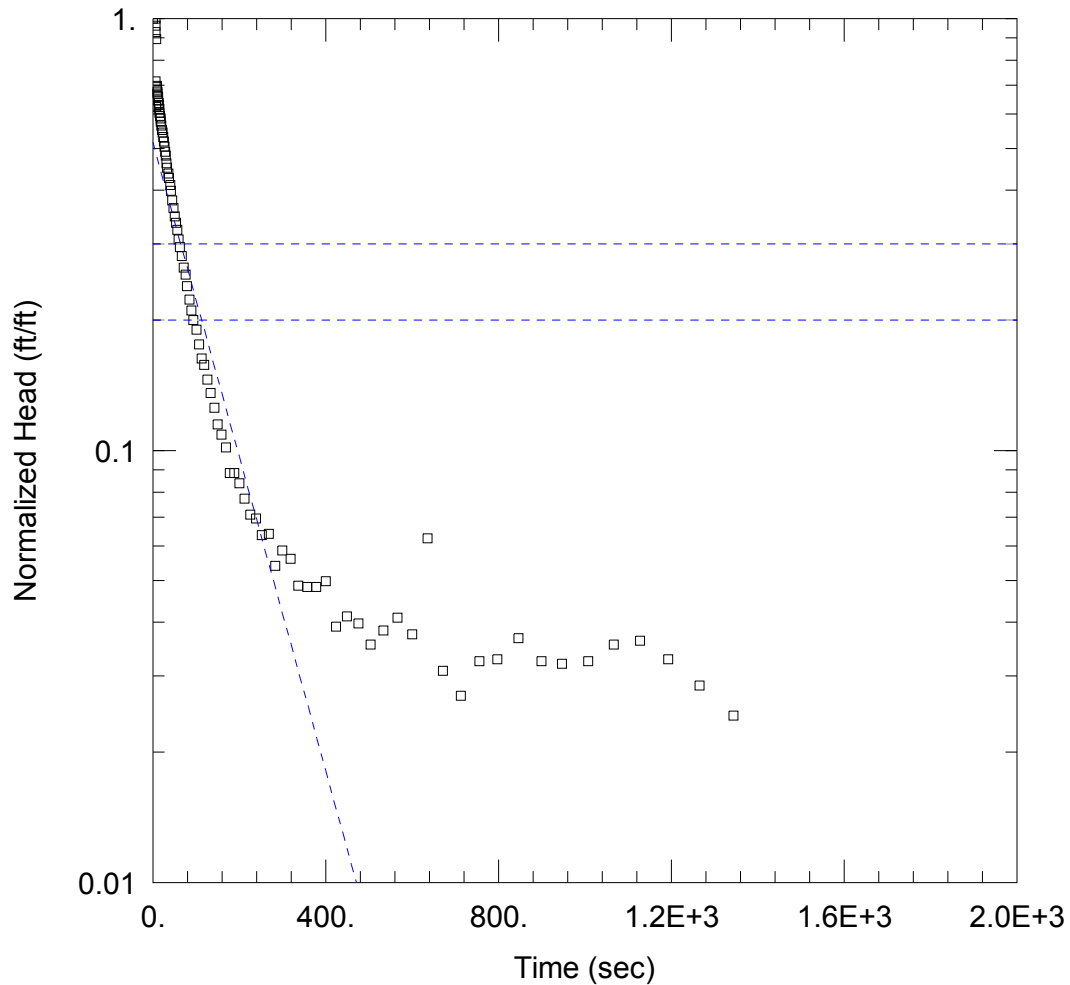
Parameter Correlations

	<u>K</u>	<u>y0</u>
K	1.00	-0.56
y0	-0.56	1.00

Residual Statistics

for weighted residuals

Sum of Squares .. 0.492 ft²
Variance 0.004685 ft²
Std. Deviation 0.06845 ft
Mean 0.004314 ft
No. of Residuals . 107
No. of Estimates.. 2



WELL TEST ANALYSIS

Data Set: C:\Users\jrjones\Desktop\Aqtesolv Files\PZ-41 Slug In.aqt

Date: 04/21/17

Time: 11:28:05

PROJECT INFORMATION

Company: Golder

Client: SoCo

Project: 1666254

Location: Branch

Test Well: PZ-40

AQUIFER DATA

Saturated Thickness: 30. ft

Anisotropy Ratio (K_z/K_r): 1.

WELL DATA (PZ-41)

Initial Displacement: 2.589 ft

Total Well Penetration Depth: 48.4 ft

Casing Radius: 0.08 ft

Static Water Column Height: 16.95 ft

Screen Length: 10. ft

Well Radius: 0.25 ft

Gravel Pack Porosity: 0.

SOLUTION

Aquifer Model: Unconfined

Solution Method: Bouwer-Rice

$K = 0.0003064$ cm/sec

$y_0 = 1.336$ ft

Data Set: X:\Clients\Southern Company\1666254-01 Branch CCR-A Well Installation\300_Field Information\Slug Te
Date: 04/21/17
Time: 10:10:01

PROJECT INFORMATION

Company: Golder
Client: SoCo
Project: 1666254
Location: Branch
Test Date: 2/27/17
Test Well: PZ-40

AQUIFER DATA

Saturated Thickness: 30. ft
Anisotropy Ratio (Kz/Kr): 1.

SLUG TEST WELL DATA

Test Well: PZ-41

X Location: 0. ft
Y Location: 0. ft

Initial Displacement: 2.589 ft
Static Water Column Height: 16.95 ft
Casing Radius: 0.08 ft
Well Radius: 0.25 ft
Well Skin Radius: 0.25 ft
Screen Length: 10. ft
Total Well Penetration Depth: 48.4 ft
Corrected Casing Radius (Bouwer-Rice Method): 0.08 ft
Gravel Pack Porosity: 0.

No. of Observations: 95

<u>Observation Data</u>			
<u>Time (sec)</u>	<u>Displacement (ft)</u>	<u>Time (sec)</u>	<u>Displacement (ft)</u>
6.	2.589	94.8	0.519
6.36	2.49	100.8	0.492
6.72	1.848	106.8	0.456
7.14	2.404	112.8	0.422
7.56	2.318	119.4	0.408
7.98	1.625	126.6	0.377
8.46	1.616	134.4	0.351
9.	1.806	142.3	0.325
9.48	1.794	150.6	0.297
10.08	1.768	159.6	0.281
10.68	1.734	169.2	0.263
11.28	1.753	178.8	0.229
11.94	1.703	189.6	0.229
12.66	1.669	201.	0.217
13.44	1.65	213.	0.2

<u>Time (sec)</u>	<u>Displacement (ft)</u>	<u>Time (sec)</u>	<u>Displacement (ft)</u>
14.22	1.629	225.6	0.184
15.06	1.596	238.8	0.18
15.96	1.567	253.2	0.165
16.92	1.539	268.2	0.166
17.88	1.52	283.8	0.14
18.96	1.492	300.6	0.152
20.1	1.463	318.6	0.145
21.3	1.428	337.2	0.126
22.56	1.408	357.6	0.125
23.88	1.376	378.6	0.125
25.32	1.344	400.8	0.129
26.82	1.308	424.8	0.101
28.38	1.27	450.	0.107
30.06	1.244	476.4	0.103
31.86	1.195	504.6	0.092
33.72	1.168	534.6	0.099
35.76	1.132	566.4	0.106
37.86	1.105	600.	0.097
40.08	1.064	636.	0.162
42.48	1.032	672.	0.08
45.	0.98	714.	0.07
48.64	0.943	756.	0.084
50.46	0.902	798.	0.085
53.46	0.87	846.	0.095
56.64	0.838	900.	0.084
60.	0.796	948.	0.083
63.6	0.764	1008.	0.084
67.2	0.728	1068.	0.092
71.53	0.686	1128.	0.094
75.6	0.66	1194.	0.085
79.8	0.621	1266.	0.074
84.6	0.579	1344.	0.063
90.	0.545		

SOLUTION

Slug Test

Aquifer Model: Unconfined

Solution Method: Bouwer-Rice

$\ln(R_e/r_w)$: 3.755

VISUAL ESTIMATION RESULTS

Estimated Parameters

<u>Parameter</u>	<u>Estimate</u>
K	0.0003064 cm/sec
y0	1.336 ft

$$T = K \cdot b = 0.2802 \text{ cm}^2/\text{sec}$$

AUTOMATIC ESTIMATION RESULTS

Estimated Parameters

<u>Parameter</u>	<u>Estimate</u>	<u>Std. Error</u>	<u>Approx. C.I.</u>	<u>t-Ratio</u>	
K	0.0004397	8.649E-5	+/- 0.0001718	5.084	cm/sec
y0	1.099	0.1337	+/- 0.2656	8.221	ft

C.I. is approximate 95% confidence interval for parameter

t-ratio = estimate/std. error

No estimation window

$$T = K \cdot b = 0.4021 \text{ cm}^2/\text{sec}$$

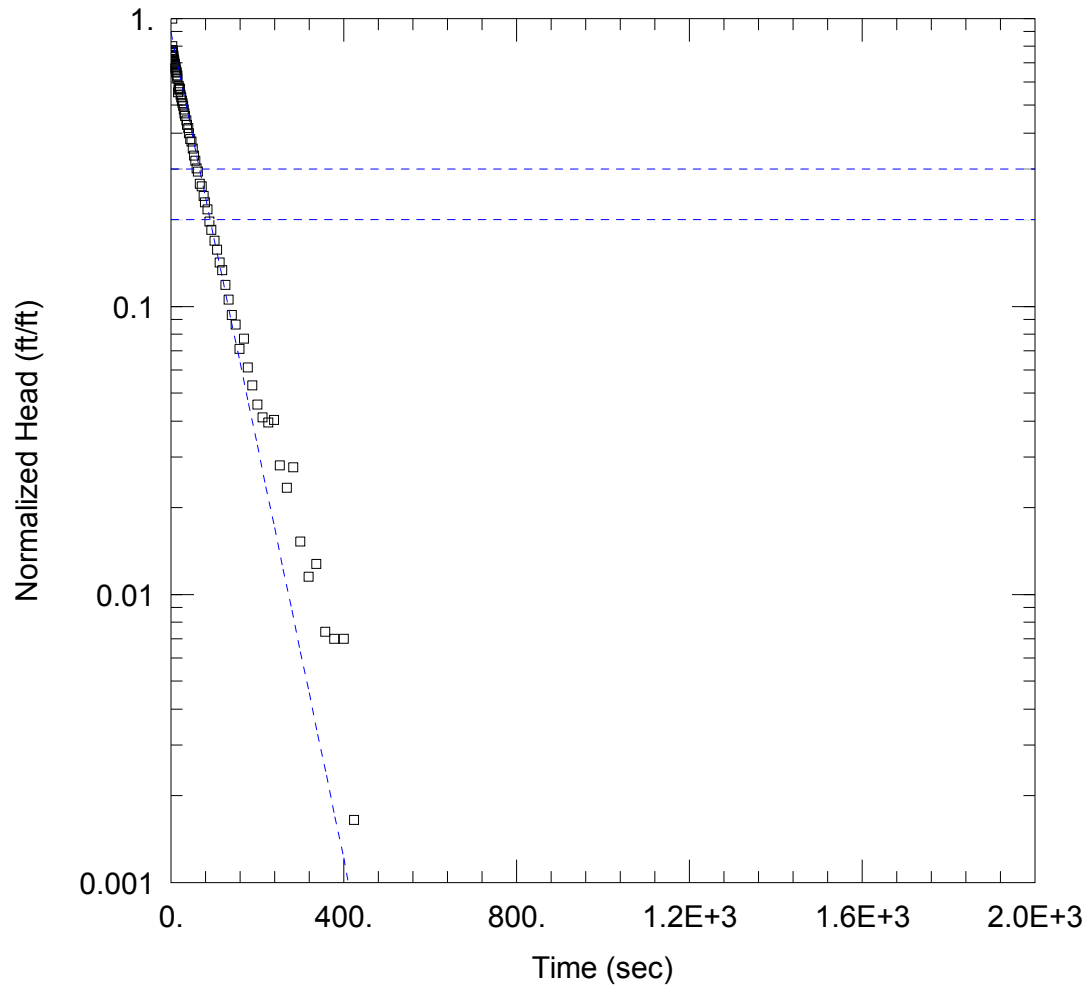
Parameter Correlations

	<u>K</u>	<u>y0</u>
K	1.00	0.71
y0	0.71	1.00

Residual Statistics

for weighted residuals

Sum of Squares .. 21.92 ft²
Variance 0.2357 ft²
Std. Deviation 0.4855 ft
Mean 0.3487 ft
No. of Residuals . 95
No. of Estimates.. 2



WELL TEST ANALYSIS

Data Set: C:\Users\jrjones\Desktop\Aqtesolv Files\PZ-41 Slug Out.aqt
 Date: 04/21/17 Time: 11:28:34

PROJECT INFORMATION

Company: Golder
 Client: SoCo
 Project: 1666254
 Location: Branch
 Test Well: PZ-40

AQUIFER DATA

Saturated Thickness: 30. ft Anisotropy Ratio (K_z/K_r): 1.

WELL DATA (PZ-41)

Initial Displacement: -2.431 ft Static Water Column Height: 16.95 ft
 Total Well Penetration Depth: 48.4 ft Screen Length: 10. ft
 Casing Radius: 0.08 ft Well Radius: 0.25 ft
 Gravel Pack Porosity: 0.

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice
 $K = 0.0006047$ cm/sec $y_0 = -2.182$ ft

Data Set: X:\Clients\Southern Company\1666254-01 Branch CCR-A Well Installation\300_Field Information\Slug Te
Date: 04/21/17
Time: 10:14:08

PROJECT INFORMATION

Company: Golder
Client: SoCo
Project: 1666254
Location: Branch
Test Date: 2/27/17
Test Well: PZ-40

AQUIFER DATA

Saturated Thickness: 30. ft
Anisotropy Ratio (Kz/Kr): 1.

SLUG TEST WELL DATA

Test Well: PZ-41

X Location: 0. ft
Y Location: 0. ft

Initial Displacement: -2.431 ft
Static Water Column Height: 16.95 ft
Casing Radius: 0.08 ft
Well Radius: 0.25 ft
Well Skin Radius: 0.25 ft
Screen Length: 10. ft
Total Well Penetration Depth: 48.4 ft
Corrected Casing Radius (Bouwer-Rice Method): 0.08 ft
Gravel Pack Porosity: 0.

No. of Observations: 112

<u>Observation Data</u>			
<u>Time (sec)</u>	<u>Displacement (ft)</u>	<u>Time (sec)</u>	<u>Displacement (ft)</u>
3.	-2.431	75.6	-0.588
3.25	-1.797	79.8	-0.558
3.5	-1.891	84.7	-0.528
3.75	-1.941	90.	-0.478
4.	-1.865	94.8	-0.449
4.25	-1.883	100.8	-0.41
4.5	-1.858	106.8	-0.382
4.75	-1.842	112.8	-0.345
5.	-1.836	119.4	-0.325
5.25	-1.812	126.6	-0.288
5.5	-1.803	134.4	-0.256
5.75	-1.783	142.2	-0.227
6.	-1.799	150.6	-0.21
6.36	-1.756	159.6	-0.173
6.72	-1.761	169.2	-0.188

<u>Time (sec)</u>	<u>Displacement (ft)</u>	<u>Time (sec)</u>	<u>Displacement (ft)</u>
7.14	-1.741	178.8	-0.149
7.56	-1.72	189.6	-0.129
7.98	-1.706	201.	-0.111
8.46	-1.718	213.	-0.1
9.	-1.687	225.8	-0.096
9.48	-1.673	238.8	-0.098
10.08	-1.679	253.2	-0.068
10.68	-1.646	268.2	-0.057
11.28	-1.626	283.8	-0.067
11.94	-1.606	300.6	-0.037
12.66	-1.579	318.6	-0.028
13.44	-1.574	337.2	-0.031
14.22	-1.534	357.6	-0.018
15.06	-1.535	378.6	-0.017
15.96	-1.498	400.8	-0.017
16.92	-1.343	424.8	-0.004
17.88	-1.373	450.	0.003
18.96	-1.419	476.4	-0.001
20.1	-1.392	504.6	0.
21.3	-1.378	534.6	0.008
22.56	-1.319	566.4	0.01
23.88	-1.295	600.	0.01
25.32	-1.262	636.	0.013
26.82	-1.231	672.	0.024
28.38	-1.206	714.	0.019
30.06	-1.174	756.	0.027
31.86	-1.138	798.	0.031
33.72	-1.112	846.	0.02
35.76	-1.077	900.	0.027
37.86	-1.035	948.	0.028
40.08	-1.011	1008.	0.02
42.48	-0.972	1068.	0.031
45.	-0.925	1128.	0.031
47.64	-0.907	1194.	0.018
50.46	-0.859	1266.	0.026
53.46	-0.812	1344.	0.03
56.64	-0.78	1422.	0.028
60.	-0.734	1506.	0.032
63.6	-0.714	1596.	0.039
67.2	-0.647	1692.	0.018
71.4	-0.634	1788.	0.035

SOLUTION

Slug Test
Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
ln(Re/rw): 3.755

VISUAL ESTIMATION RESULTS

Estimated Parameters

Parameter	Estimate	
K	0.0006047	cm/sec
y0	-2.182	ft

$$T = K \cdot b = 0.553 \text{ cm}^2/\text{sec}$$

AUTOMATIC ESTIMATION RESULTS

Estimated Parameters

Parameter	Estimate	Std. Error	Approx. C.I.	t-Ratio	
K	0.0006021	1.239E-5	+/- 2.456E-5	48.58	cm/sec
y0	-1.978	0.01484	+/- 0.02941	-133.3	ft

C.I. is approximate 95% confidence interval for parameter

t-ratio = estimate/std. error

No estimation window

$$T = K \cdot b = 0.5506 \text{ cm}^2/\text{sec}$$

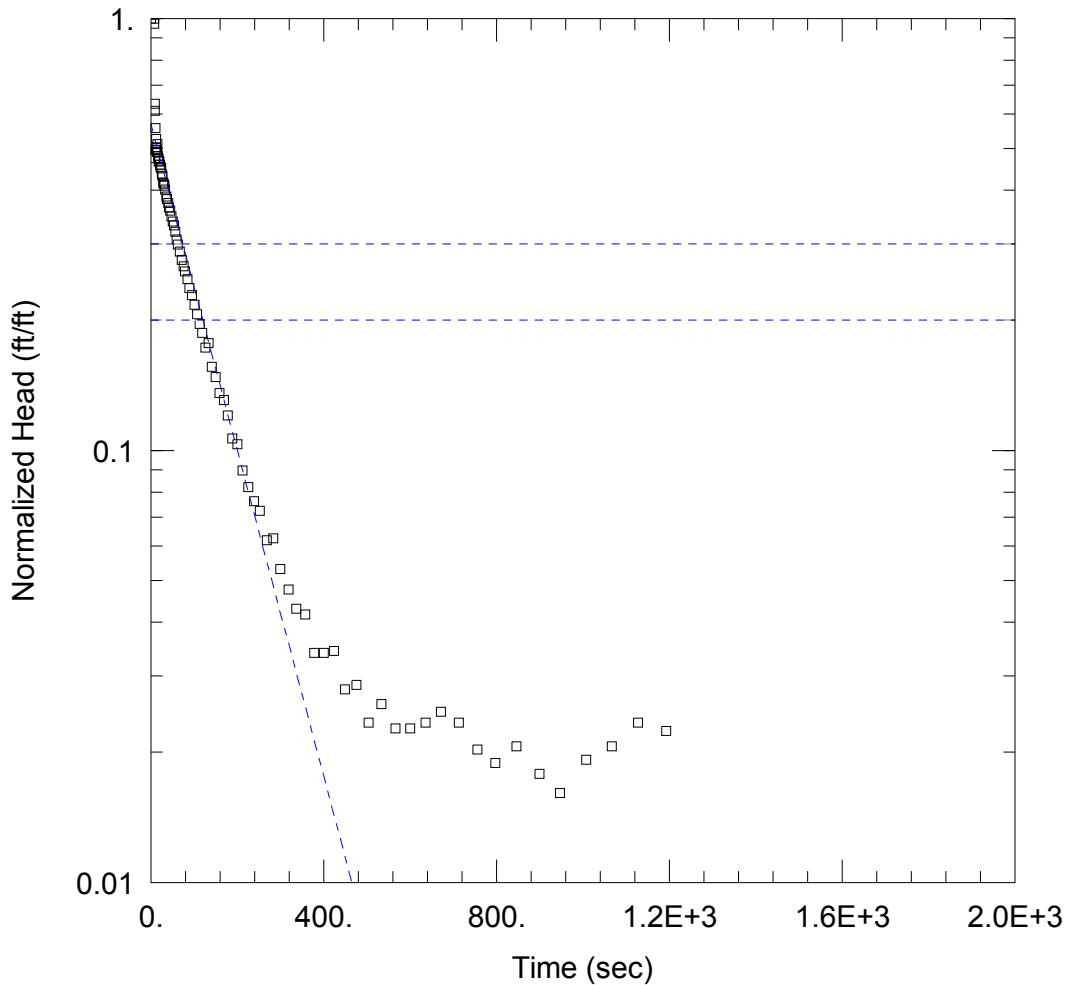
Parameter Correlations

	K	y0
K	1.00	-0.67
y0	-0.67	1.00

Residual Statistics

for weighted residuals

Sum of Squares .. 0.4289 ft²
Variance 0.003899 ft²
Std. Deviation 0.06244 ft
Mean -0.00173 ft
No. of Residuals . 112
No. of Estimates.. 2



WELL TEST ANALYSIS

Data Set: C:\Users\jrjones\Desktop\Aqtesolv Files\PZ-42 Slug In.aqt
 Date: 04/21/17 Time: 11:29:24

PROJECT INFORMATION

Company: Golder
 Client: SoCo
 Project: 1666254
 Location: Branch
 Test Well: PZ-40

AQUIFER DATA

Saturated Thickness: 30. ft Anisotropy Ratio (K_z/K_r): 1.

WELL DATA (PZ-42)

Initial Displacement: 2.859 ft Static Water Column Height: 20.75 ft
 Total Well Penetration Depth: 35. ft Screen Length: 10. ft
 Casing Radius: 0.08 ft Well Radius: 0.25 ft
 Gravel Pack Porosity: 0.

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice
 $K = 0.0003026$ cm/sec $y_0 = 1.628$ ft

Data Set: X:\Clients\Southern Company\1666254-01 Branch CCR-A Well Installation\300_Field Information\Slug Te
Date: 04/21/17
Time: 10:16:50

PROJECT INFORMATION

Company: Golder
Client: SoCo
Project: 1666254
Location: Branch
Test Date: 2/27/17
Test Well: PZ-40

AQUIFER DATA

Saturated Thickness: 30. ft
Anisotropy Ratio (Kz/Kr): 1.

SLUG TEST WELL DATA

Test Well: PZ-42

X Location: 0. ft
Y Location: 0. ft

Initial Displacement: 2.859 ft
Static Water Column Height: 20.75 ft
Casing Radius: 0.08 ft
Well Radius: 0.25 ft
Well Skin Radius: 0.25 ft
Screen Length: 10. ft
Total Well Penetration Depth: 35. ft
Corrected Casing Radius (Bouwer-Rice Method): 0.08 ft
Gravel Pack Porosity: 0.

No. of Observations: 88

<u>Observation Data</u>			
<u>Time (sec)</u>	<u>Displacement (ft)</u>	<u>Time (sec)</u>	<u>Displacement (ft)</u>
7.56	2.859	100.8	0.621
7.98	2.777	106.8	0.591
9.001	1.812	112.8	0.561
9.481	1.744	119.4	0.534
10.08	1.357	126.6	0.495
10.68	1.595	134.5	0.507
11.28	1.419	142.2	0.446
11.94	1.437	150.6	0.422
12.66	1.503	159.6	0.388
13.44	1.402	169.2	0.374
14.22	1.419	178.8	0.344
15.06	1.464	189.6	0.305
15.96	1.402	201.	0.295
16.92	1.371	213.	0.257
17.88	1.354	225.6	0.235

<u>Time (sec)</u>	<u>Displacement (ft)</u>	<u>Time (sec)</u>	<u>Displacement (ft)</u>
18.96	1.333	238.8	0.218
20.1	1.332	253.2	0.207
21.3	1.31	268.2	0.177
22.56	1.294	283.8	0.179
23.88	1.284	300.6	0.152
25.32	1.246	318.6	0.136
26.82	1.232	337.2	0.123
28.38	1.193	357.6	0.119
30.06	1.183	378.6	0.097
31.86	1.17	400.8	0.097
33.72	1.147	424.8	0.098
35.76	1.105	450.	0.08
37.86	1.091	476.4	0.082
40.08	1.068	504.6	0.067
42.48	1.043	534.7	0.074
45.	1.025	566.4	0.065
47.64	0.995	600.	0.065
50.46	0.969	636.	0.067
53.46	0.949	672.	0.071
56.64	0.918	714.	0.067
60.	0.881	756.	0.058
63.6	0.857	798.	0.054
67.2	0.824	846.	0.059
71.4	0.79	900.	0.051
75.6	0.763	948.	0.046
79.8	0.743	1008.	0.055
84.66	0.712	1068.	0.059
90.	0.678	1128.	0.067
94.92	0.654	1194.	0.064

SOLUTION

Slug Test

Aquifer Model: Unconfined

Solution Method: Bouwer-Rice

$\ln(R_e/r_w)$: 3.571

VISUAL ESTIMATION RESULTS

Estimated Parameters

<u>Parameter</u>	<u>Estimate</u>	
K	0.0003026	cm/sec
y0	1.628	ft

$$T = K \cdot b = 0.2767 \text{ cm}^2/\text{sec}$$

AUTOMATIC ESTIMATION RESULTS

Estimated Parameters

<u>Parameter</u>	<u>Estimate</u>	<u>Std. Error</u>	<u>Approx. C.I.</u>	<u>t-Ratio</u>	
K	0.0002926	0.0001327	+/- 0.0002638	2.205	cm/sec

y0	-0.01778	0.26	+/- 0.5168	-0.06841	ft
----	----------	------	------------	----------	----

C.I. is approximate 95% confidence interval for parameter

t-ratio = estimate/std. error

No estimation window

$T = K \cdot b = 0.2675 \text{ cm}^2/\text{sec}$

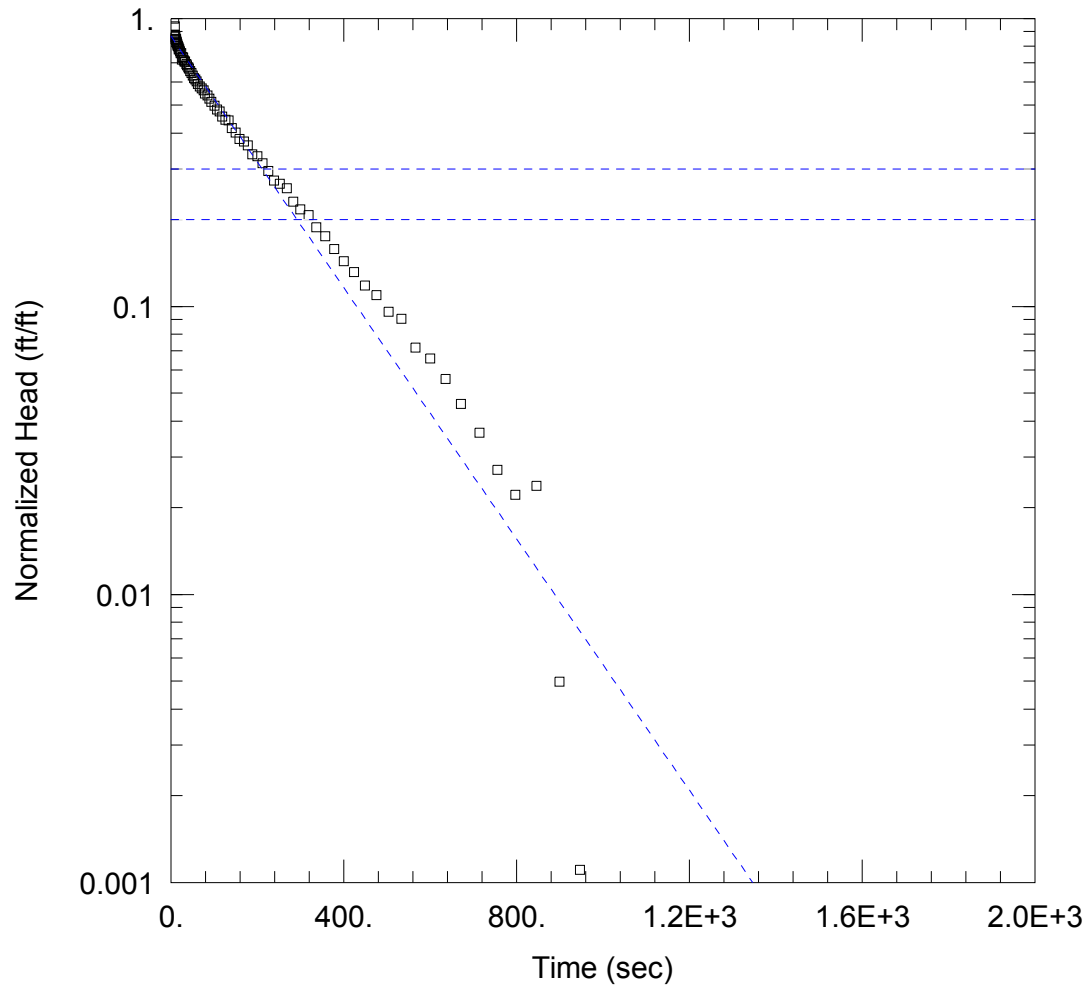
Parameter Correlations

	K	y0
K	1.00	0.70
y0	0.70	1.00

Residual Statistics

for weighted residuals

Sum of Squares .. 81.5 ft²
Variance 0.9476 ft²
Std. Deviation 0.9735 ft
Mean 0.7332 ft
No. of Residuals . 88
No. of Estimates.. 2



WELL TEST ANALYSIS

Data Set: C:\Users\jrjones\Desktop\Aqtesolv Files\PZ-42 Slug Out.aqt
 Date: 04/21/17 Time: 11:30:04

PROJECT INFORMATION

Company: Golder
 Client: SoCo
 Project: 1666254
 Location: Branch
 Test Well: PZ-40

AQUIFER DATA

Saturated Thickness: 30. ft Anisotropy Ratio (K_z/K_r): 1.

WELL DATA (PZ-42)

Initial Displacement: -1.809 ft Static Water Column Height: 20.75 ft
 Total Well Penetration Depth: 35. ft Screen Length: 10. ft
 Casing Radius: 0.08 ft Well Radius: 0.25 ft
 Gravel Pack Porosity: 0.

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice
 $K = 0.0003445$ ft/min $y_0 = -1.57$ ft

Data Set: X:\Clients\Southern Company\1666254-01 Branch CCR-A Well Installation\300_Field Information\Slug Te
Date: 04/21/17
Time: 10:18:10

PROJECT INFORMATION

Company: Golder
Client: SoCo
Project: 1666254
Location: Branch
Test Date: 2/27/17
Test Well: PZ-40

AQUIFER DATA

Saturated Thickness: 30. ft
Anisotropy Ratio (Kz/Kr): 1.

SLUG TEST WELL DATA

Test Well: PZ-42

X Location: 0. ft
Y Location: 0. ft

Initial Displacement: -1.809 ft
Static Water Column Height: 20.75 ft
Casing Radius: 0.08 ft
Well Radius: 0.25 ft
Well Skin Radius: 0.25 ft
Screen Length: 10. ft
Total Well Penetration Depth: 35. ft
Corrected Casing Radius (Bouwer-Rice Method): 0.08 ft
Gravel Pack Porosity: 0.

No. of Observations: 94

<u>Observation Data</u>			
<u>Time (sec)</u>	<u>Displacement (ft)</u>	<u>Time (sec)</u>	<u>Displacement (ft)</u>
7.56	-1.809	112.8	-0.858
7.98	-1.584	119.4	-0.826
8.46	-1.501	126.6	-0.805
9.	-1.698	134.4	-0.799
9.48	-1.582	142.2	-0.754
10.08	-1.525	150.6	-0.725
10.68	-1.534	159.6	-0.688
11.28	-1.555	169.2	-0.676
11.94	-1.535	178.8	-0.654
12.66	-1.515	189.6	-0.611
13.44	-1.499	201.	-0.601
14.22	-1.483	213.	-0.567
15.06	-1.474	225.6	-0.535
15.96	-1.454	238.8	-0.494
16.92	-1.447	253.2	-0.483

<u>Time (sec)</u>	<u>Displacement (ft)</u>	<u>Time (sec)</u>	<u>Displacement (ft)</u>
17.88	-1.433	268.2	-0.464
18.96	-1.415	283.8	-0.417
20.1	-1.412	300.6	-0.392
21.3	-1.388	318.6	-0.375
22.56	-1.372	337.2	-0.34
23.88	-1.366	357.6	-0.317
25.32	-1.301	378.6	-0.286
26.82	-1.33	400.8	-0.26
28.38	-1.322	424.8	-0.238
30.06	-1.296	450.	-0.214
31.86	-1.283	476.4	-0.198
33.72	-1.279	504.6	-0.173
35.76	-1.256	534.6	-0.164
37.86	-1.243	566.4	-0.13
40.08	-1.223	600.	-0.119
42.48	-1.209	636.	-0.101
45.	-1.186	672.	-0.083
47.64	-1.168	714.1	-0.066
50.46	-1.146	756.	-0.049
53.46	-1.123	798.	-0.04
56.64	-1.111	846.	-0.043
60.	-1.092	900.	-0.009
63.6	-1.07	948.	-0.002
67.2	-1.05	1008.	0.003
71.4	-1.031	1068.	0.016
75.6	-1.017	1128.	0.009
79.8	-0.99	1194.1	0.013
84.6	-0.974	1266.	0.015
90.	-0.954	1344.	0.025
94.8	-0.93	1422.	0.036
100.8	-0.9	1506.	0.044
106.8	-0.874	1596.	0.048

SOLUTION

Slug Test

Aquifer Model: Unconfined

Solution Method: Bouwer-Rice

$\ln(R_e/r_w)$: 3.571

VISUAL ESTIMATION RESULTS

Estimated Parameters

<u>Parameter</u>	<u>Estimate</u>
K	0.0003445 ft/min
y ₀	-1.57 ft

K = 0.000175 cm/sec

T = K*b = 0.01033 ft²/min (0.16 sq. cm/sec)

AUTOMATIC ESTIMATION RESULTS

Estimated Parameters

<u>Parameter</u>	<u>Estimate</u>	<u>Std. Error</u>	<u>Approx. C.I.</u>	<u>t-Ratio</u>	
K	0.0003449	8.052E-6	+/- 1.599E-5	42.83	ft/min
y0	-1.564	0.01252	+/- 0.02486	-125.	ft

C.I. is approximate 95% confidence interval for parameter

t-ratio = estimate/std. error

No estimation window

K = 0.0001752 cm/sec

T = K*b = 0.01035 ft²/min (0.1602 sq. cm/sec)

Parameter Correlations

	<u>K</u>	<u>y0</u>
K	1.00	-0.64
y0	-0.64	1.00

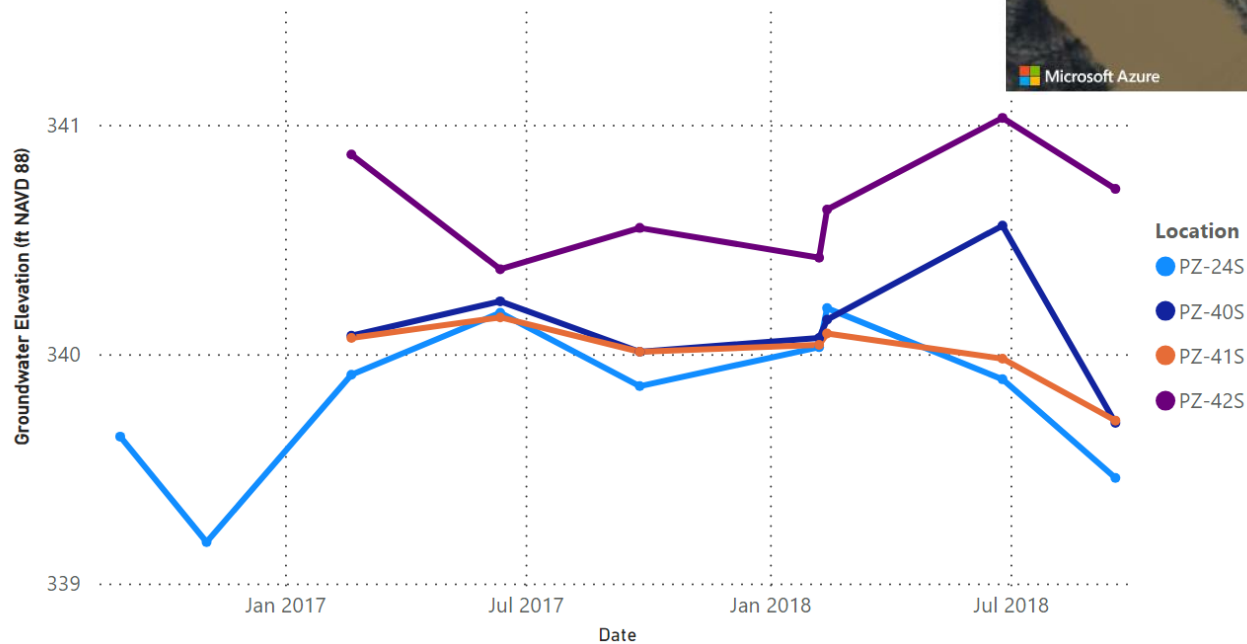
Residual Statistics

for weighted residuals

Sum of Squares .. 0.3086 ft²
Variance 0.003354 ft²
Std. Deviation 0.05792 ft
Mean -0.003349 ft
No. of Residuals . 94
No. of Estimates.. 2

APPENDIX I — GROUNDWATER ELEVATION SUMMARY FOR AP-A NETWORK

Groundwater Elevation (ft NAVD 88)



Water Elevation Locations



Groundwater Elevation Summary for AP-A Network

Georgia Power Company
Plant Branch AP-A
Putnam County, Georgia

Prepared For:
 Georgia Power

Prepared By:
 Geosyntec
consultants

Kennesaw, GA

November 2024

Appendix

I

**APPENDIX J — INSTALLATION REPORT FOR SURFACE IMPOUNDMENT
GROUNDWATER PIEZOMETERS, 29 SEPTEMBER 2017**

September 29, 2017

1660939,1666254

Mr. Joju Abraham
Southern Company Services, Inc.
241 Ralph McGill Blvd NE
Atlanta, GA 30308
jabraham@southernco.com
(404) 506-7239

**RE: INSTALLATION REPORT FOR SURFACE IMPOUNDMENT GROUNDWATER PIEZOMETERS
GEORGIA POWER PLANT BRANCH, MILLEDGEVILLE, GEORGIA**

Dear Joju:

Golder Associates Inc. (Golder) is submitting this *Installation Report for Surface Impoundment Groundwater Piezometers* to Southern Company Services, Inc. (SCS) and Georgia Power Company (GPC), which documents the construction of piezometers at Plant Branch in Milledgeville, Georgia. Piezometer construction activities were performed in general accordance with the standards described in the *RCRA Technical Enforcement Guidance Document* (1986) and the *Georgia Water Wells Standards Act of 1985* such that conversion to monitoring wells would be appropriate. The installation of the piezometers was conducted under the oversight and direction of Rachel Kirkman, a Georgia registered Professional Geologist (PG).

The field activities for this investigation were performed in July and August 2016. The field work consisted of the installation, development, slug testing, and water level gauging of eighteen (18) piezometers and additional development of fourteen (14) existing piezometers. SCS conducted a survey of the recently installed piezometers. A summary of the activities is presented below.

DRILLING AND CONSTRUCTION ACTIVITIES

Piezometers PZ-23S/BRGWC-23S, PZ-23I, PZ-24S/BRGWC-24S, PZ-25I/BRGWC-25I, PZ-26I, PZ-27S/BRGWC-27I, PZ-28I, PZ-29I/BRGWC-29I, PZ-30I/BR-GWC-30I, PZ-31S, PZ-32S/BRGWC-32S, PZ-33S/BRGWC-33S, PZ-34S/BRGWC-34S, PZ-35S/BRGWC-35S, PZ-36S/BRGWC-36S, PZ-37S/BRGWC-37S, PZ-38S/BRGWC-38S, and PZ-39 were drilled and installed by Cascade Drilling, LP, who was contracted through SCS, at the facility in July 2016. Cascade has a current and valid bond with the Water Wells Standards Advisory Council for the state of Georgia (Appendix A). The drillers' names are provided on the boring/construction diagrams presented in Appendix B.

Experienced Golder geologists were present on site to oversee and record the drilling and piezometer construction under the supervision of a PG licensed to practice in Georgia (Rachel Kirkman). Drilling methods employed for borehole advancement were roto-sonic drilling techniques with continuous core collected. The drilling equipment consisted of a multiple types of rigs (Terra Sonic International TSi 150CC track-mounted rig, Boart Longyear LS250 MiniSonic track-mounted rig, Full Size track-mounted, Prosonic truck-mounted), equipped with 4-inch sonic rods with an outer-casing sleeve. During the drilling, continuous core samples were logged in the field for lithologic and geotechnical properties.

Prior to use, and between boreholes, downhole equipment was steam cleaned. The boring (lithologic) logs and piezometer construction records for the newly installed piezometers are included in Appendix B. The piezometer construction data are summarized in Table 1, and the locations of the piezometers are provided on Figure 1.



Piezometers were constructed within the borehole using factory-cleaned and sealed Schedule 40 polyvinyl chloride (PVC) products with flush-threaded fittings. Specifically, piezometers were constructed with a 10-foot section of 4-inch outer diameter (OD) and 2-inch inner diameter (ID), flush-threaded, 0.010-inch factory-slotted PVC pre-packed screen. The drillers filled the annulus of each pre-packed screen section with No. 10 filter sand. In each case, the screen was placed near the bottom of the borehole, with the remainder of the piezometer being constructed from 10-foot sections of 2-inch ID, flush-threaded, PVC casing riser. A flush-threaded PVC end cap placed on the bottom of each piezometer to provide a 0.4-foot sump/sediment trap, and the top of the piezometers extend approximately 30 inches above grade. Construction details for the piezometers are shown on the boring/piezometer construction logs in Appendix B. The PVC products used were American Society for Testing and Materials (ASTM) and National Sanitation Foundation (NSF) rated.

Following placement of the piezometer screen and casing, the annular space in each borehole adjacent to the screen was filled with U.S. Standard Sieve size No. 20-40 filter pack sand as appropriate for the formation. The filter pack sand was placed into the borehole and extends approximately 2 feet above the screen. Immediately following placement of the filter pack, the piezometer was pumped using a portable submersible pump until visibly clear water was discharged. If settling occurred during pumping, additional sand was placed so that the filter sand thickness was approximately 2 feet above the screen. A filter pack seal, composed of approximately 5 feet of hydrated time-release coated bentonite pellets, was then placed on top of the filter pack by slowly pouring the material down the borehole and tamping it into place with a tremie pipe. The bentonite was hydrated using potable water and allowed to cure prior to grouting the piezometer.

Following hydration of the bentonite, the remaining annular space was grouted with a Portland cement / bentonite mixture consisting of approximately 6% bentonite, and approximately 10 pounds of cement per gallon, to 3 feet below ground surface using a tremie method. Each piezometer surface completion consists of a locked, aluminum protective casing and a 4-foot by 4-foot by 4-inch concrete pad.

DEVELOPMENT ACTIVITIES

The newly installed and existing piezometers were developed between July and August 2016 in accordance with the Monitoring Well Development Procedures prepared by SCS (March 2016). The piezometers were surged using a Waterra inertial pump system; a reclaimer pump was also utilized for some piezometers to achieve the desired turbidity values. During piezometer development, water quality measurements of pH, temperature, specific conductance, and turbidity were periodically collected using field-calibrated water quality equipment after the piezometer responded to improving conditions. Development activities were conducted utilizing an In-Situ smarTROLL and a Lamotte 2020 turbidimeter for monitoring water quality measurements. Piezometer development forms are included in Appendix B and summarized on Table 2.

As presented on the piezometer development forms, a minimum of 35 gallons and a maximum of 830 gallons of water were removed from each piezometer during development. During development, attempts were made for each piezometer to achieve a turbidity value below 10 nephelometric turbidity units (NTUs). A full round of water levels for the newly installed and developed piezometers was collected by SCS on August 23, 2016 (Table 4). The measurements were collected using a decontaminated electronic water level indicator. The surveyed point on the top of the piezometer casing was used as reference, and the measurements were recorded to within 0.01 foot.

AQUIFER TESTING ACTIVITIES

Aquifer tests (slug tests) were performed for all newly installed piezometers during the field investigation (Table 5). The purpose of the testing was to estimate the horizontal hydraulic conductivity of aquifer materials encountered at the site. In situ rising- and falling-head slug tests were chosen for the assessment due to the relatively low piezometer yields noted during piezometer installation and development.

Slug tests were conducted in August 2016 by experienced Golder field representatives. Falling- and rising-head tests were performed on the 18 newly installed piezometers. Prior to slug testing, the piezometers were opened and groundwater levels were allowed to equilibrate. Groundwater level measurements were then measured using an electronic water level indicator referenced to a surveyed point on the top of the casing. A 100 pounds per square inch (psi) pressure transducer was lowered inside the piezometer casing and placed approximately 2 feet above the bottom of the piezometer. A polyvinyl chloride (PVC) slug measuring 5 feet in length was then used to displace water inside the piezometer.

The first portion of the test was a falling-head test that measured the rate water levels fell back to static levels after the insertion of the PVC slug. The pressure transducer was programmed to record changes in groundwater level at logarithmic time intervals. Changes in groundwater levels were also measured with hand-held electronic water level indicators to field-verify the data collected by the transducer. Falling-head tests were terminated after water levels had recovered to within at least 90% of their pre-test level. A rising-head test was performed on each piezometer after the falling-head test was completed. The rising-head test was performed with the same methodology as the falling-head test, with the exception that the PVC slug was removed simultaneously with the start of the test.

In situ rising- and falling-head tests provide a quantitative estimate of horizontal hydraulic conductivity and a qualitative estimate of aquifer anisotropy in water-bearing units. The slug test data were analyzed using the Bouwer and Rice (1976 and 1989) equation, which is applicable to fully or partially penetrating piezometers in unconfined or confined aquifers. Piezometer-specific aquifer thicknesses of approximately 18 to 35 feet was assumed for the saprolite portion of the aquifer based upon information from the boring logs. An aquifer thickness of 100 feet was assumed for the bedrock portion of the aquifer.

The computer software program AQTESOLV, produced by HydroSOLVE, Inc., was used to assist in the analysis and plotting of data. The best fit lines were initially calculated by the computer software and were then adjusted manually to ignore skin effects typically found at the start of aquifer tests and/or to ignore stabilized water levels at the end of the tests or fluctuations in the water level as they approached stabilization. Professional judgement was used to distinguish skin effects with the fact that during many tests, there is faster recovery near the beginning of an aquifer test than when water levels approach stabilization. The individual data points and computer plots of time versus groundwater displacement are presented in Appendix C. A summary of the aquifer testing and the calculated geometric mean for hydraulic conductivity for each of the hydrogeologic units are presented in Table 5.

SURVEY

The newly installed monitoring piezometers were surveyed on July 29, 2016, by SCS's Engineering and Civil Field Services group. The survey was completed using LEICA GS14 Antenna and CS15 Sensor with a positional tolerance of 0.10'H:V. Surveyed locations and elevations are presented on the boring/construction diagrams and a site map showing the locations of the newly installed piezometers is presented in Figure 1.

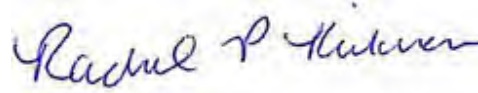
CLOSING

We appreciate the opportunity to assist SCS and GPC with this project. Should you have any questions or require additional information, please contact the undersigned at (770) 496-1893.

Sincerely,
GOLDER ASSOCIATES INC.



Timothy Richards, PG
Associate and Senior Consultant



Rachel P. Kirkman, PG
Associate and Senior Consultant

Attachments:	Figure 1	Piezometer Location Map
	Table 1	Piezometer Installation Summary
	Table 2	Summary of Newly Installed Piezometer Development Data
	Table 3	Summary of Existing Piezometer Development Data
	Table 4	Summary of Post-Development Water Level and Survey Data
	Table 5	Summary of Aquifer Test Data
	Appendix A	Cascade Drilling Bond
	Appendix B	Boring Logs/ Construction Diagrams and Development Forms
	Appendix C	Single Well Aquifer (Slug) Test Results

C: File

G:\PROJECTS\Southern Company Services\Confidential Plant Branch Drilling\Installation Report\Final\Final Branch Piezometer Installation Report.docx

FIGURE



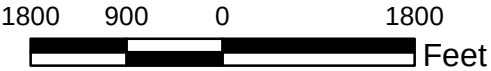
LEGEND

- MONITORING WELL
- PIEZOMETER
- PROPERTY BOUNDARY

REFERENCE

- SERVICE LAYER CREDITS: ESRI, HERE, DELORME, MAPMYINDIA, © OPENSTREETMAP CONTRIBUTORS, AND THE GIS USER COMMUNITY
SOURCE: ESRI, DIGITALGLOBE, GEOEYE, EARTHSTAR GEOGRAPHICS, CNES/AIRBUS DS, USDA, USGS, AEROGRID, IGN, AND THE GIS USER COMMUNITY
- COORDINATE SYSTEM: NAD 1983 STATE PLAN GEORGIA WEST (U.S. FEET).
- BORING/PIEZOMETER LOCATIONS AND PROPERTY LINE PROVIDED BY SOUTHERN COMPANY SERVICES.

KEY MAP



CLIENT
SOUTHERN COMPANY SERVICES, INC.
PLANT BRANCH



PROJECT
GROUNDWATER MONITORING PROGRAM

TITLE
WELL LOCATION MAP

CONSULTANT	YYYY-MM-DD	2017-02-27
	PREPARED	DJC
	DESIGN	MS
	REVIEW	TIR
	APPROVED	RPK



PROJECT No.
1666254

CONTROL
1666254A003-GIS.mxd

Rev.
0

FIGURE
1

Service Layer Credits: Esri, HERE, DeLorme, MapmyIndia, © OpenStreetMap contributors, and the GIS user community
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

TABLES

Table 1
Piezometer Installation Summary
Plant Branch

Piezometer	Monitoring Well Designation	Driller	Date Started Well	Date Completed Well	Drill Method	Drill Depth	Total depth of well	Depth to top sand pack	Depth to top bentonite seal	Depth to water (date)	Depth to water (date)
						(ft bgs)	(ft bgs)	(ft bgs)	(ft bgs)	(ft bgs)	(ft bgs)
PZ-23S	BRGWC-23S	Scotty Vermillon	7/25/2016	7/26/2016	Sonic	41	40	27.5	22.5	27.21 (7/26/2016)	32.59 (8/23/2016)
PZ-24S	BRGWC-24S	John Vasquez	7/27/2016	7/27/2016	Sonic	42	41.5	28.5	23.5	11.25 (7/28/2016)	na
PZ-25I	BRGWC-25I	Scotty Vermillon	7/24/2016	7/25/2016	Sonic	21	20.5	7.5	2.5	5.50 (7/24/2016)	8.49 (8/23/2016)
PZ-26I	na	Trenton Herod	7/26/2016	7/26/2016	Sonic	30.49	30	17.0	12.0	18.71 (7/26/2016)	22.34 (8/23/2016)
PZ-27S	BRGWC-27I	Scotty Vermillon	7/21/2016	7/22/2016	Sonic	24	23.5	9.0	4.0	3.45 (7/23/2016)	4.48 (8/23/2016)
PZ-28I	na	Scotty Vermillon	7/23/2016	7/24/2016	Sonic	25	24	11.0	6.0	10.5 (7/24/2016)	14.47 (8/23/2016)
PZ-29I	BRGWC-29I	Ray Whitt	7/22/2016	7/23/2016	Sonic	21	20	7.0	2.0	6.56 (7/24/2016)	na
PZ-30I	BRGWC-30I	Trenton Herod	7/18/2016	7/18/2016	Sonic	20.25	19.75	7.0	2.0	1.55 (7/20/2016)	4.21 (8/23/2016)
PZ-31S	na	John Vasquez	7/15/2016	7/26/2016	Sonic	39.5	39	26.5	21.5	19.67 (7/26/2016)	24 (8/23/2016)
PZ-32S	BRGWC-32S	Trenton Herod	7/19/2016	7/20/2016	Sonic	45.15	44.65	32.0	27.0	30.05 (7/22/2016)	9.56 (8/23/2016)
PZ-33S	BRGWC-33S	Dale Osterburg	7/26/2016	7/26/2016	Sonic	26.5	25.58	13.0	8.0	5.16 (7/27/2016)	8.11 (8/23/2016)
PZ-34S	BRGWC-34S	Ray Whitt	7/24/2016	7/25/2016	Sonic	25	23.5	10.0	5.0	0.5 (7/25/2016)	2.69 (8/23/2016)
PZ-35S	BRGWC-35S	Ray Whitt	7/22/2016	7/23/2016	Sonic	30	26.5	14.0	9.0	>TOC (7/25/2016)	2.11 (8/23/2016)
PZ-36S	BRGWC-36S	Dale Osterburg	7/25/2016	7/26/2016	Sonic	28.7	28.2	14.8	9.5	>TOC (7/27/2016)	>TOC (8/23/2016)
PZ-37S	BRGWC-37S	Dale Osterburg	7/23/2016	7/24/2016	Sonic	66	63.59	50.0	45.0	43.40 (7/25/2016)	46.42 (8/23/2016)
PZ-38S	BRGWC-38S	Dale Osterburg	7/22/2016	7/22/2016	Sonic	38.5	37.31	24.5	19.5	16.70 (7/23/2016)	na
PZ-23I	na	John Vasquez	7/27/2016	7/28/2016	Sonic	67	66	54.5	48.5	32.7 (7/29/2016)	33.71 (8/23/2016)
PZ-39	na	Trenton Herod	7/26/2016	7/26/2016	Sonic	56.5	44.2	31.4	26.2	46.02 (8/2/2016)	na

NOTES:

ft bgs = feet below ground surface

na = not applicable

Piezometer	Date Started	Time Started	Date Completed	Elapsed Time	Development Method	Measured depth of well	Initial Water Level	Final Water Level	Volume of Casing	Total Volume Removed	pH	ORP	Specific Cond	DO	Temp	Turb
		(hr:min)		(hr:min)		(feet bgs)	(feet btoc)	(feet btoc)	(gal)	(gal)	(SU)	(mv)	(mS/cm)	(mg/L)	(°C)	(NTU)
PZ-24S	8/4/2016	13:34	8/5/2016	8:40	Surging/ Pumping	45.25	14.42	18.39	5.0	134	5.84	-282.4	247	0.84	22.4	8.10
PZ-25I	8/2/2016	10:20	8/2/2016	5:45	Surging/ Pumping	23.63	8.26	8.90	2.5	119	5.94	-27	527.9	0.49	19.9	9.75
PZ-26I	8/2/2016	10:50	8/11/2016	1:36	Surging/ Pumping	33.70	21.89	27.54	1.9	54	6.17	186.9	618.81	9.43	19.3	6.32
PZ-27S	8/4/2016	7:50	8/4/2016	3:45	Surging/ Pumping	27.28	4.03	4.08	3.8	99	5.58	102.6	730.2	0.09	24.4	8.52
PZ-28I	8/3/2016	11:50	8/4/2016	4:55	Surging/ Pumping	27.61	14.71	14.90	2.1	44	5.14	168.6	903.01	1.21	19.1	0.29
PZ-29I	8/3/2016	8:20	8/3/2016	8:40	Surging/ Pumping	23.45	9.69	9.85	2.2	88	4.63	102.3	907.95	0.05	23.4	6.23
PZ-30I	8/4/2016	8:05	8/9/2016	6:54	Surging/ Pumping	22.68	4.32	4.70	3.0	177	6.22	141.9	728.37	0.14	21.1	3.37
PZ-31S	8/4/2016	8:45	8/5/2016	9:35	Surging/ Pumping	42.09	23.56	23.70	3.0	170	5.83	109.6	918.48	0.32	22.1	9.71
PZ-32S	8/4/2016	13:35	8/5/2016	4:44	Surging/ Pumping	48.31	33.83	34.60	2.4	78	5.87	270.3	772.76	5.00	21.4	2.93
PZ-33S	8/3/2016	8:30	8/3/2016	5:34	Surging/ Pumping	28.47	8.29	8.10	3.3	123	5.15	442.3	582.74	0.17	23.5	1.73
PZ-34S	8/3/2016	9:45	8/3/2016	5:12	Surging/ Pumping	26.93	2.67	2.76	4.0	144	5.90	99.7	903.8	0.05	26.8	0.97
PZ-35S	8/3/2016	22:30	8/5/2016	6:30	Surging/ Pumping	30.21	2.18	2.21	4.6	190	6.08	52.4	656.21	0.08	20.1	1.47
PZ-36S	8/8/2016	10:20	8/9/2016	4:40	Surging/ Pumping	33.00	> TOC	> TOC	5.4	194	5.53	318.1	706.99	3.07	18.3	1.19
PZ-37S	8/3/2016	14:20	8/4/2016	4:17	Surging/ Pumping	66.21	46.40	43.54	3.2	96	5.94	278.1	72.15	7.77	20.6	1.44
PZ-38S	8/2/2016	15:20	8/4/2016	8:35	Surging/ Pumping	40.80	19.65	21.74	3.4	133	5.30	146.9	951.7	1.70	20.4	0.03
PZ-23I	8/2/2016	15:50	Not Completed	--	Surging/ Pumping	69.20	--	--	--	--	--	--	--	--	--	--
PZ-23S	8/2/2016	10:10	8/3/2016	4:11	Surging/ Pumping	43.65	32.00	35.49	1.9	40	5.93	-6.1	325.99	4.99	23.6	9.41
PZ-39	8/2/2016	14:15	Not Completed	--	Surging/ Pumping	46.02	--	--	--	--	--	--	--	--	--	--

NOTES:

hr:min - hours:minutes; bgs - below ground surface; btoc - below top of casing; gal - gallons; SU - Standard Units; mS/cm - millisiemens per centimeter; °C - degrees Celsius; NTU - nephelometric turbidity units; mv - millivolts; mg/L - milligrams per liter; Cond - conductivity; Temp - temperature; Turb - turbidity; ORP - oxygen reduction potential; DO - dissolved oxygen

Development for PZ-23I and GWA-3 was not completed as neither location appeared to produce sufficient water for sampling.

Wells were surged and pumps using a combination of methods and pumps as described in the text.

Piezometer	Date Started	Time Started	Date Completed	Elapsed Time	Development Method	Measured depth of well	Initial Water Level	Final Water Level	Volume of Casing	Total Volume Removed	pH	ORP	Specific Cond	DO	Temp	Turb
		(hr:min)		(hr:min)		(feet bgs)	(feet btoc)	(feet btoc)	(gal)	(gal)	(SU)	(mv)	(mS/cm)	(mg/L)	(°C)	(NTU)
PZ-2S	7/19/2016	13:30	7/25/2016	13:10	Surging/ Pumping	46.60	17.16	17.39	4.8	411	6.11	90.2	64.1	1.88	19.5	3.62
PZ-2I	7/19/2016	11:15	7/19/2016	3:25	Surging/ Pumping	68.77	39.34	22.91	4.8	205	6.01	21.3	149.3	1.61	20.3	2.79
PZ-4I	7/20/2016	10:05	7/20/2016	8:05	Surging/ Pumping	50.20	35.31	37.15	2.4	259	5.75	687.5	65.3	7.15	24.4	10.00
PZ-5I	7/26/2016	10:40	7/27/2016	3:41	Surging/ Pumping	64.11	11.90	12.39	8.5	184	6.31	698.1	169.43	3.72	20.8	2.36
PZ-5S	7/26/2016	16:12	7/28/2016	7:31	Surging/ Pumping	43.24	12.01	12.40	5.1	442	6.52	579.6	175.77	3.20	19.5	1.92
PZ-6S	7/25/2016	14:30	7/26/2016	9:19	Surging/ Pumping	53.10	23.57	23.34	4.8	211	6.62	140.9	87.4	7.02	21.1	8.47
PZ-10S	7/14/2016	13:30	7/21/2016	16:20	Surging/ Pumping	43.37	25.93	26.45	2.8	830	5.49	828	488.24	1.94	22.5	0.26
PZ-12S	7/20/2016	13:34	7/21/2016	5:20	Surging/ Pumping	61.81	48.89	49.33	2.1	153	5.64	211.5	86.34	7.42	24.5	2.47
PZ-12I	7/20/2016	16:30	7/22/2016	11:16	Surging/ Pumping	83.33	48.61	59.60	5.7	67	6.67	526.1	178.2	6.01	24.3	4.08
PZ-14S	7/14/2016	14:30	7/22/2016	17:44	Surging/ Pumping	40.70	19.50	19.66	3.5	449	5.23	692.4	608.08	0.66	23.3	5.02
PZ-15S	7/26/2016	10:30	7/26/2016	1:25	Surging/ Pumping	42.20	10.03	1.17	5.2	35	5.72	136.3	841.8	0.05	21.2	1.97
PZ-16S	7/14/2016	10:50	7/15/2016	6:37	Surging/ Pumping	23.22	12.60	12.92	1.7	495	6.66	81	438.81	0.05	20.6	1.07
PZ-17S	7/13/2016	15:00	7/14/2016	6:05	Surging/ Pumping	9.24	8.24	7.75	0.2	50	6.49	51.1	396.19	8.66	20.4	2.43
PZ-17I	7/13/2016	13:33	7/13/2016	1:22	Surging/ Pumping	46.04	3.73	3.98	6.9	127	6.63	125.2	411.29	2.82	21.3	4.12

NOTES:

hr:min - hours:minutes; bgs - below ground surface; btoc - below top of casing; gal - gallons; SU - Standard Units; mS/cm - millisiemens per centimeter; °C - degrees Celsius; NTU - nephelometric turbidity units; mv - millivolts; mg/L - milligrams per liter; Cond - conductivity; Temp - temperature; Turb - turbidity; ORP - oxygen reduction potential; DO - dissolved oxygen

Table 4
Summary of Post-Development Water Level and Survey Data
Plant Branch

Piezometer	Date	Water Level (BTOC)	Water Elev. (FT MSL)	NAD 83 NORTHING	NAD 83 EASTING	LATITUDE	LONGITUDE	ELEVATION TOP OF CASING	ELEVATION TOP OF PK NAIL	ELEVATION OF HIGH SIDE GROUND
PZ-24S	8/23/2016	na	na	1,162,401.91	2,562,862.69	33.1926316	-83.2962183	354.00	351.25	351.15
PZ-25I	8/23/2016	8.94	348.52	1,160,584.61	2,561,315.07	33.1876726	-83.3013260	357.46	355.05	354.95
PZ-26I	8/23/2016	22.34	348.59	1,160,669.95	2,561,625.75	33.1879001	-83.3003083	370.93	368.30	368.10
PZ-27S	8/23/2016	4.48	363.51	1,159,696.53	2,559,712.98	33.1852683	-83.3065862	367.99	365.08	364.88
PZ-28I	8/23/2016	14.77	350.11	1,159,504.90	2,560,150.20	33.1847317	-83.3051623	364.88	362.50	362.40
PZ-29I	8/23/2016	na	na	1,160,298.63	2,561,050.06	33.1868927	-83.3021999	353.30	350.67	350.37
PZ-30I	8/23/2016	4.21	348.12	1,161,608.18	2,557,692.53	33.1905673	-83.3131387	352.33	349.98	349.78
PZ-31S	8/23/2016	24	352.94	1,160,937.05	2,557,972.68	33.1887166	-83.3122410	376.94	374.51	374.21
PZ-32S	8/23/2016	9.56	396.95	1,160,678.65	2,558,497.57	33.1879947	-83.3105323	406.51	403.71	403.51
PZ-33S	8/23/2016	8.11	408.81	1,168,056.81	2,554,063.96	33.21	-83.32	416.92	414.34	414.14
PZ-34S	8/23/2016	2.69	389.37	1,167,383.97	2,554,230.23	33.21	-83.32	392.06	389.24	389.04
PZ-35S	8/23/2016	2.11	364.43	1,166,645.80	2,554,475.19	33.20	-83.32	366.54	363.88	363.68
PZ-36S	8/23/2016	> TOC	>386	1,165,743.30	2,554,694.19	33.20	-83.32	386.00	383.24	382.94
PZ-37S	8/23/2016	46.72	400.51	1,165,092.09	2,554,978.90	33.20	-83.32	447.23	444.50	444.20
PZ-38S	8/23/2016	na	na	1,164,391.62	2,555,015.42	33.20	-83.32	432.33	429.75	429.55
PZ-23I	8/23/2016	33.71	394.19	1,162,974.25	2,557,877.88	33.19	-83.31	427.90	425.15	424.95
PZ-23S	8/23/2016	32.59	395.83	1,162,970.68	2,557,868.18	33.19	-83.31	428.42	425.60	425.50
PZ-39	8/23/2016	na	na	na	na	na	na	na	na	na

NOTE:

Survey data collected by Southern Company Services, Inc. August 2, 2016
 Georgia NAD83 West Zone
 GWA-3 was not surveyed.
 na = not available

PIEZOMETER IDENTIFICATION	SATURATED AQUIFER THICKNESS VALUE (feet)	SCREEN LENGTH (feet)	PIEZOMETER DIAMETER (inches)	AQUIFER ANALYSIS METHOD	AQUIFER TEST TYPE	HYDRAULIC CONDUCTIVITY (cm/sec)	SCREENED LITHOLOGY
Saprolite							
PZ-24S	35	10	2	Bouwer-Rice	Falling	1.20E-04	Silt and Silty Sand
					Rising	1.39E-04	
PZ-25I	100	10	2	Bouwer-Rice	Falling	1.14E-03	Silty Sand, TWR & Gneiss
					Rising	1.36E-03	
PZ-27S	19.07	10	2	Bouwer-Rice	Falling	2.16E-03	Sand, Silt & Clay
					Rising	2.16E-03	
PZ-28I	100	10	2	Bouwer-Rice	Rising	3.29E-04	Gravelly Sand, TWR & Gneiss
PZ-30I	100	9.5	2	Bouwer-Rice	Falling	9.13E-04	Sand, Silty Sand & Gneiss
					Rising	1.98E-03	
PZ-31S	100	9.5	2	Bouwer-Rice	Falling	2.15E-03	Gravelly Sand & TWR
					Rising	7.61E-03	
PZ-32S	20	9.5	2	Bouwer-Rice	Falling	1.34E-04	Sand & Sandy Silt
					Rising	2.38E-04	
PZ-33S	17.92	9.5	2	Bouwer-Rice	Falling	4.13E-03	Silty Sand
					Rising	9.16E-03	
PZ-34S	25	10.5	2	Bouwer-Rice	Falling	1.18E-02	Silty Sand & Sandy Silt
					Rising	1.31E-02	
PZ-35S	30	9.5	2	Bouwer-Rice	Falling	1.04E-02	Sandy Silt
					Rising	5.10E-03	
PZ-36S	35	9.5	2	Bouwer-Rice	Falling	1.45E-03	Sand
					Rising	1.36E-03	
PZ-37S	25	10	2	Bouwer-Rice	Falling	1.86E-04	Sand
					Rising	1.27E-04	
PZ-38S	25	9.5	2	Bouwer-Rice	Falling	1.69E-04	Sand, Silty Sand, Silt & Sandy Silt
					Rising	1.37E-04	
PZ-23S	100	9.2	2	Bouwer-Rice	Rising	4.26E-05	Sand & TWR
Geomean =						9.76E-04	
Bedrock							
PZ-26I	100	9.5	2	Bouwer-Rice	Rising	4.47E-06	Gneiss
PZ-29I	100	9.5	2	Bouwer-Rice	Falling	1.65E-03	Gneiss
					Rising	1.36E-03	
PZ-23I	100	9.5	2	Bouwer-Rice	Rising	5.62E-07	Gneiss
Geomean =						4.87E-05	
Saprolite/TWR/Bedrock Geomean =						6.54E-04	

NOTES:

1. Geomean = geometric mean
2. cm/sec = centimeter per second
3. TWR = transitionally weathered rock

APPENDIX A
CASCADE DRILLING BOND

CLIENT'S COPY

SURETY BOND CONTINUATION CERTIFICATE

TO: State of Georgia
Division of Environmental Protection
2 Martin Luther King Jr. Drive SE
Suite 1252
Atlanta, GA 30334

To be attached to and form a part of: Performance Bond for Well Contractors and Drillers

Principal on the Bond: Michael C. Rice/Cascade Drilling, L.P.

Surety Bond Number: K08315607

Bond Amount: Twenty Thousand and 00/100 Dollars (\$20,000.00)

In consideration of the agreed premium charged for this bond, it is understood and agreed that the following change shall be made to this obligation:

[x] CONTINUATION CERTIFICATE

This certificate extends the life of the bond to June 30, 2017. It is executed upon the express condition that the surety's liability under said bond, together with this and all previous continuation certificates, shall not be cumulative and shall in no event exceed the amount specifically set forth in said bond or any existing certificate changing the amount of said bond.

Signed, sealed and dated this 26th day of May , 2015 .

Westchester Fire Insurance Company

By: Katie S

Katie Snider, Attorney-in-Fact

Surety of Record: Westchester Fire Insurance Company
436 Walnut Street
Philadelphia, PA 19106
Phone: (415) 547-4513

Agent of Record: Kibble & Prentice, a USI Company
601 Union Street, Suite 1000
Seattle, WA 98101
Phone: (206) 441-6300

Power of Attorney

WESTCHESTER FIRE INSURANCE COMPANY

Know all men by these presents: That WESTCHESTER FIRE INSURANCE COMPANY, a corporation of the Commonwealth of Pennsylvania pursuant to the following Resolution, adopted by the Board of Directors of the said Company on December 11, 2006, to wit:

"RESOLVED, that the following authorizations relate to the execution, for and on behalf of the Company, of bonds, undertakings, recognizances, contracts and other written commitments of the Company entered into the ordinary course of business (each a "Written Commitment"):

- (1) Each of the Chairman, the President and the Vice Presidents of the Company is hereby authorized to execute any Written Commitment for and on behalf of the Company, under the seal of the Company or otherwise.
- (2) Each duly appointed attorney-in-fact of the Company is hereby authorized to execute any Written Commitment for and on behalf of the Company, under the seal of the Company or otherwise, to the extent that such action is authorized by the grant of powers provided for in such persons written appointment as such attorney-in-fact.
- (3) Each of the Chairman, the President and the Vice Presidents of the Company is hereby authorized, for and on behalf of the Company, to appoint in writing any person the attorney-in-fact of the Company with full power and authority to execute, for and on behalf of the Company, under the seal of the Company or otherwise, such Written Commitments of the Company as may be specified in such written appointment, which specification may be by general type or class of Written Commitments or by specification of one or more particular Written Commitments.
- (4) Each of the Chairman, the President and Vice Presidents of the Company is hereby authorized, for and on behalf of the Company, to delegate in writing any other officer of the Company the authority to execute, for and on behalf of the Company, under the Company's seal or otherwise, such Written Commitments of the Company as are specified in such written delegation, which specification may be by general type or class of Written Commitments or by specification of one or more particular Written Commitments.
- (5) The signature of any officer or other person executing any Written Commitment or appointment or delegation pursuant to this Resolution, and the seal of the Company, may be affixed by facsimile on such Written Commitment or written appointment or delegation.

FURTHER RESOLVED, that the foregoing Resolution shall not be deemed to be an exclusive statement of the powers and authority of officers, employees and other persons to act for and on behalf of the Company, and such Resolution shall not limit or otherwise affect the exercise of any such power or authority otherwise validly granted or vested.

Does hereby nominate, constitute and appoint Heather Allen, Holly E Ulfers, Katie Snider, Nancy N Hill, Roxana Palacios, Steven W Palmer, all of the City of SEATTLE, Washington, each individually if there be more than one named, its true and lawful attorney-in-fact, to make, execute, seal and deliver on its behalf, and as its act and deed any and all bonds, undertakings, recognizances, contracts and other writings in the nature thereof in penalties not exceeding Fifteen million dollars & zero cents (\$15,000,000.00) and the execution of such writings in pursuance of these presents shall be as binding upon said Company, as fully and amply as if they had been duly executed and acknowledged by the regularly elected officers of the Company at its principal office,

IN WITNESS WHEREOF, the said Stephen M. Haney, Vice-President, has hereunto subscribed his name and affixed the Corporate seal of the said WESTCHESTER FIRE INSURANCE COMPANY this 22 day of December 2014.

WESTCHESTER FIRE INSURANCE COMPANY



Stephen M. Haney, Vice President

COMMONWEALTH OF PENNSYLVANIA
COUNTY OF PHILADELPHIA ss.

On this 22 day of December, AD. 2014 before me, a Notary Public of the Commonwealth of Pennsylvania in and for the County of Philadelphia came Stephen M. Haney, Vice-President of the WESTCHESTER FIRE INSURANCE COMPANY to me personally known to be the individual and officer who executed the preceding instrument, and he acknowledged that he executed the same, and that the seal affixed to the preceding instrument is the corporate seal of said Company; that the said corporate seal and his signature were duly affixed by the authority and direction of the said corporation, and that Resolution, adopted by the Board of Directors of said Company, referred to in the preceding instrument, is now in force.

IN TESTIMONY WHEREOF, I have hereunto set my hand and affixed my official seal at the City of Philadelphia the day and year first above written.



COMMONWEALTH OF PENNSYLVANIA
NOTARIAL SEAL
KAREN E. BRANDT, Notary Public
City of Philadelphia, Phila. County
My Commission Expires Sept. 26, 2018

Notary Public

I, the undersigned Assistant Secretary of the WESTCHESTER FIRE INSURANCE COMPANY, do hereby certify that the original POWER OF ATTORNEY, of which the foregoing is a substantially true and correct copy, is in full force and effect.

In witness whereof, I have hereunto subscribed my name as Assistant Secretary, and affixed the corporate seal of the Corporation, this 26th day of May, 2015.



William L. Kelly, Assistant Secretary

THIS POWER OF ATTORNEY MAY NOT BE USED TO EXECUTE ANY BOND WITH AN INCEPTION DATE AFTER December 22, 2016.



APPENDIX B
BORING LOGS/ CONSTRUCTION DIAGRAMS AND DEVELOPMENT FORMS

RECORD OF BOREHOLE BRGWA-23S/PZ-23S

SHEET 1 of 1

PROJECT: SCS Plant Branch
PROJECT NUMBER: 166-0939
DRILLED DEPTH: 41.00 ft
LOCATION: Milledgeville, GA

DRILL RIG: Mini-Sonic Track Mounted Rig
DATE STARTED: 7/25/16
DATE COMPLETED: 7/26/16

NORTHING: 1,162,970.68
EASTING: 2,557,868.18
GS ELEVATION: 425.50
TOC ELEVATION: 428.42 ft

DEPTH W.L.: 27.2 (bgs)
ELEVATION W.L.: 401.22 (amsl)
DATE W.L.: 7/25/16
TIME W.L.: na

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE		SAMPLES			MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES	WELL CONSTRUCTION DETAILS								
		DESCRIPTION	USCS	GRAPHIC LOG	ELEV.	SAMPLE NO.			TYPE	REC						
					DEPTH (ft)											
0	425	0.00 - 5.00 SILT, NP, reddish brown, white mottling, highly weathered, massive, friable, relic foliation structure micaceous, SAPROLITE; cohesive, dry, very stiff	ML			420.5 5.00	1		5.00 5.00	Portland Type 1		WELL CASING Interval: 0'-30.8' Material: Schedule 40 PVC Diameter: 2" Joint Type: Threaded WELL SCREEN Interval: 30.8'-40.8' Material: Schedule 40 PVC Diameter: 2" Slot Size: 0.010" End Cap: Schedule 40 PVC FILTER PACK Interval: 27.5'-40.0' Type: 27.5'-28.5', 30/45 fine sand; 28.5'-40.0', #1 sand FILTER PACK SEAL Interval: 22.5'-27.5' Type: 22.5'-25.5', 3/8" Bentonite Chips; 25.5'-27.5', Bentonite Pellets ANNULUS SEAL Interval: 2.0'-22.5' Type: Portland Cement (Type I) WELL COMPLETION Pad: 4"x4" Protective Casing: Anodized Aluminum DRILLING METHODS Soil Drill: 4-inch Sonic Rock Drill: 4-inch Sonic				
5	420	5.00 - 19.00 SILT, low plasticity; reddish brown, white mottling, massive, semi-friable, micaceous, SAPROLITE; cohesive, moist, soft											2			5.00 5.00
10	415															
15	410												4			5.00 5.00
20	405	19.00 - 20.00 trace fine-coarse subangular sand, pinkish brown 20.00 - 28.00 NP, well graded; reddish brown, light brown, dark grey, white mottling, moderately weathered, massive, micaceous, SAPROLITE; cohesive, moist, very soft	406.5 19.00 405.5 20.00	5		5.00 5.00										
25	400						6						5.00 5.00			
30	395	28.00 - 31.40 silty SAND, fine grained sand, NP, trace coarse subangular grain sand; reddish brown, white mottling, moderately weathered, massive, micaceous, SAPROLITE; cohesive, moist, very soft	SM			397.5 28.00										
35	390	31.40 - 35.00 SAND, poorly graded, very fine grained, few silt, trace subangular medium grain sand; light grey, brown, white mottling, medium weathered, massive, micaceous, SAPROLITE; non-cohesive, moist, loose 35.00 - 37.00 SAND, poorly graded, fine grained, trace silt; light grey brown, white mottling, highly weathered quartz nodules, heterogenous, micaceous, SAPROLITE; NC, moist-wet, very loose					SP						394.1 31.40 390.5 35.00 388.5 37.00			
40	385	37.00 - 40.50 TRANSITIONALLY WEATHERED ROCK, biotite GNEISS, moderately weathered, banded, dark grey, coarsely crystalline, strong rock, iron oxide staining, Sand part of weathered matrix	TWR			385 384.5										
45		40.50 - 41.00 BEDROCK, biotite GNEISS, slightly weathered, banded, grey to light tan, medium crystalline, highly competent rock Boring completed at 41.00 ft					GNEISS									

LOG SCALE: 1 in = 5.5 ft

DRILLING COMPANY: Cascade Drilling

DRILLER: Scotty Vermillon

GA INSPECTOR: Will Ethier

CHECKED BY: Rachel P. Kirkman, P.G.

DATE: 9/29/17



BOREHOLE RECORD PLAT BRANCH LOGS2.GPJ PIEDMONT GDT 9/18/17

RECORD OF BOREHOLE BRGWC-24S/PZ-24S

SHEET 1 of 1

PROJECT: SCS Plant Branch
PROJECT NUMBER: 166-0939
DRILLED DEPTH: 42.00 ft
LOCATION: Milledgeville, GA

DRILL RIG: Prosonic Truck Mounted Rig
DATE STARTED: 7/27/16
DATE COMPLETED: 7/27/16

NORTHING: 1,162,401.91
EASTING: 2,562,862.69
GS ELEVATION: 351.15
TOC ELEVATION: 354.00 ft

DEPTH W.L.: 11.25 (bgs)
ELEVATION W.L.: 342.75 (amsl)
DATE W.L.: 7/28/16
TIME W.L.: na

BOREHOLE RECORD PLAT BRANCH LOGS2.GPJ PIEDMONT.GDT 9/18/17

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE				SAMPLES			MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES	WELL CONSTRUCTION DETAILS
		DESCRIPTION	USCS	GRAPHIC LOG	ELEV. DEPTH (ft)	SAMPLE NO.	TYPE	REC		
0	350	0.00 - 10.00 No Recovery; Hydrovac							Well Construction Details: WELL CASING Interval: 0.0'-31.5' Material: Schedule 40 PVC Diameter: 2" Joint Type: Threaded WELL SCREEN Interval: 31.5'-41.5' Material: Schedule 40 PVC Diameter: 2" Slot Size: 0.010" End Cap: Schedule 40 PVC FILTER PACK Interval: 28.5'-29.5', 30/45 fine sand; 29.5'-41.5', #1 sand FILTER PACK SEAL Interval: 23.5'-28.5' Type: 28.5'-29.5', 30/45 fine sand; 29.5'-41.5', #1 sand ANNULUS SEAL Interval: 0.0'-23.5' Type: Portland Cement (Type I) WELL COMPLETION Pad: 4"x4"x4" Protective Casing: Anodized Aluminum DRILLING METHODS Soil Drill: 4-inch Sonic Rock Drill: N/A	Soil Profile Details: 10.00 - 11.00: SILT, NP, light grey brown, mottled; moderately weathered, relic structure foliations, friable, micaceous, saprolite; cohesive, dry, firm 11.00 - 12.00: SILT, NP, few fine sand; light grey brown, white brown, mottled, moderately weathered, relic structure foliations, micaceous, saprolite; cohesive, dry, soft 12.00 - 13.30: SAND, medium grain, well graded, trace few silt, trace coarse sand, subangular; light grey, mottled, moderately weathered, massive, micaceous, saprolite; cohesive, moist, very loose 13.30 - 14.00: sandy SILT, low plasticity, fine-medium grain sand, well graded, trace subrounded coarse sand; grey brown and white, moderately weathered, massive, micaceous, SAPROLITE; cohesive, moist, loose 14.00 - 16.80: SAND, medium grain, well graded, trace few silt, trace coarse sand, subangular; light grey, mottled, moderately weathered, massive, micaceous, SAPROLITE; cohesive, moist, very loose 16.80 - 17.50: SILT, NP, light grey brown, mottled; moderately weathered, relic structure foliations, friable, micaceous, SAPROLITE; cohesive, moist, firm 17.50 - 18.80: SILT, NP, trace fine grain sand; grey brown, moderately weathered, massive, micaceous, SAPROLITE; cohesive, moist, very loose 18.80 - 22.00: SILT, NP, trace medium sand; grey brown, moderately weathered, massive, micaceous, SAPROLITE; cohesive, moist, loose 22.00 - 23.30: sandy SILT, NP, fine sand; light brown, moderately weathered, massive, micaceous, SAPROLITE; cohesive, moist, very soft 23.30 - 24.50: SILT, NP; grey brown mottled dark grey white, moderately weathered, massive, micaceous, SAPROLITE; cohesive, moist, stiff 24.50 - 26.10: SILT, NP, trace fine-medium grain sand; mottled white and grey brown, lightly weathered, relic structure foliation, micaceous, SAPROLITE; cohesive, moist, soft 26.10 - 27.00: silty SAND, low plasticity, well graded fine-medium sand; white, light grey brown mottling, lightly weathered, relic structure foliations, micaceous, SAPROLITE; cohesive, moist, very soft 27.00 - 34.50: SILT, NP, trace fine sand; grey brown and white mottling, lightly weathered, relic structure foliation, micaceous, SAPROLITE; cohesive, moist, soft 34.50 - 35.50: SILT, NP, trace fine sand; grey brown and white mottling, lightly weathered, relic structure foliation, micaceous, SAPROLITE; cohesive, moist, firm 35.50 - 40.50: SAND, fine-coarse sand, gap graded, subangular, trace silt; light grey brown, white mottling, lightly weathered, relic structure foliation, micaceous, SAPROLITE; NC, moist, compact 40.50 - 42.00: No Recovery
5	345									
10	340	10.00 - 11.00 SILT, NP, light grey brown, mottled; moderately weathered, relic structure foliations, friable, micaceous, saprolite; cohesive, dry, firm	ML		341.15	1		7.00		
		11.00 - 12.00 SILT, NP, few fine sand; light grey brown, white brown, mottled, moderately weathered, relic structure foliations, micaceous, saprolite; cohesive, dry, soft	SW		12.00			10.00		
		12.00 - 13.30 SAND, medium grain, well graded, trace few silt, trace coarse sand, subangular; light grey, mottled, moderately weathered, massive, micaceous, saprolite; cohesive, moist, very loose	MLS		337.85					
		13.30 - 14.00 sandy SILT, low plasticity, fine-medium grain sand, well graded, trace subrounded coarse sand; grey brown and white, moderately weathered, massive, micaceous, SAPROLITE; cohesive, moist, loose	SW		337.15					
		14.00 - 16.80 SAND, medium grain, well graded, trace few silt, trace coarse sand, subangular; light grey, mottled, moderately weathered, massive, micaceous, SAPROLITE; cohesive, moist, very loose	ML		14.00					
		16.80 - 17.50 SILT, NP, light grey brown, mottled; moderately weathered, relic structure foliations, friable, micaceous, SAPROLITE; cohesive, moist, firm			334.35					
		17.50 - 18.80 SILT, NP, trace fine grain sand; grey brown, moderately weathered, massive, micaceous, SAPROLITE; cohesive, moist, very loose			333.65					
		18.80 - 22.00 SILT, NP, trace medium sand; grey brown, moderately weathered, massive, micaceous, SAPROLITE; cohesive, moist, loose			17.50					
		22.00 - 23.30 sandy SILT, NP, fine sand; light brown, moderately weathered, massive, micaceous, SAPROLITE; cohesive, moist, very soft			332.35					
		23.30 - 24.50 SILT, NP; grey brown mottled dark grey white, moderately weathered, massive, micaceous, SAPROLITE; cohesive, moist, stiff			18.80					
		24.50 - 26.10 SILT, NP, trace fine-medium grain sand; mottled white and grey brown, lightly weathered, relic structure foliation, micaceous, SAPROLITE; cohesive, moist, soft			329.15					
		26.10 - 27.00 silty SAND, low plasticity, well graded fine-medium sand; white, light grey brown mottling, lightly weathered, relic structure foliations, micaceous, SAPROLITE; cohesive, moist, very soft			22.00					
		27.00 - 34.50 SILT, NP, trace fine sand; grey brown and white mottling, lightly weathered, relic structure foliation, micaceous, SAPROLITE; cohesive, moist, soft			327.85					
		34.50 - 35.50 SILT, NP, trace fine sand; grey brown and white mottling, lightly weathered, relic structure foliation, micaceous, SAPROLITE; cohesive, moist, firm			23.30					
		35.50 - 40.50 SAND, fine-coarse sand, gap graded, subangular, trace silt; light grey brown, white mottling, lightly weathered, relic structure foliation, micaceous, SAPROLITE; NC, moist, compact			326.65					
		40.50 - 42.00 No Recovery			24.50					
		Boring completed at 42.00 ft			325.05					
					26.10					
					324.15					
					27.00					
					316.65					
					34.50					
					315.65					
					35.50					
					310.65					
					40.50					
					309.15					

LOG SCALE: 1 in = 5.5 ft
DRILLING COMPANY: Cascade Drilling
DRILLER: John Vasquez

GA INSPECTOR: Will Ethier
CHECKED BY: Rachel P. Kirkman, P.G.
DATE: 9/29/17



RECORD OF BOREHOLE BRGWC-25I/PZ-25I

SHEET 1 of 1

PROJECT: SCS Plant Branch
PROJECT NUMBER: 166-0939
DRILLED DEPTH: 21.00 ft
LOCATION: Milledgeville, GA

DRILL RIG: Mini-Sonic Track Mounted Rig
DATE STARTED: 7/24/16
DATE COMPLETED: 7/25/16

NORTHING: 1,160,584.61
EASTING: 2,561,315.07
GS ELEVATION: 354.95
TOC ELEVATION: 357.46 ft

DEPTH W.L.: 5.5 (bgs)
ELEVATION W.L.: 351.96 (amsl)
DATE W.L.: 7/24/16
TIME W.L.: 9:45

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE				SAMPLES			MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES	WELL CONSTRUCTION DETAILS
		DESCRIPTION	USCS	GRAPHIC LOG	ELEV. DEPTH (ft)	SAMPLE NO.	TYPE	REC		
0		0.00 - 3.30 SILT, NP, trace fine-medium sand, trace roots; reddish brown, highly weathered, massive, micaceous, regolith; cohesive, dry (perched water~2.0'-2.8'), firm	ML		351.65	1		5.00 5.00	Portland Type 1	WELL CASING Interval: 0'-10.5' Material: Schedule 40 PVC Diameter: 2" Joint Type: Threaded
5	350	3.30 - 4.00 TRANSITIONALLY WEATHERED ROCK, Moderately weathered, massive, opaque white, slightly yellow, very coarsely crystalline, medium strong, biotite GNEISS, veined, quartz, feldspar, vuggy	TWR		350.95				3/8" Bentonite Chips	WELL SCREEN Interval: 10.5'-20.5' Material: Schedule 40 PVC Diameter: 2" Slot Size: 0.010" End Cap: Schedule 40 PVC
		4.00 - 5.00 SILT, NP, trace fine-medium sand, trace roots; reddish brown, highly weathered, massive, micaceous, regolith; cohesive, dry, firm	ML		4.00 349.95					
		5.00 - 7.00 SILT, NP, trace fine-medium sand, trace roots; reddish brown, highly weathered, massive, micaceous, regolith; cohesive, moist, firm	MLS		5.00				3/8" Bentonite Pellets	FILTER PACK Interval: 7.5'-20.5' Type: 7.5'-8.5', 30/45 fine sand; 8.5'-20.5', #1 sand
10	345	7.00 - 9.50 sandy SILT, low plasticity, subangular medium-coarse grain; reddish light brown with light brown mottling, moderately weathered, massive, micaceous, SAPROLITE; cohesive, moist, loose	SM		347.95	2		5.00 10.00	#1 30/45 Fine Sand	FILTER PACK SEAL Interval: 2.5'-7.5' Type: 2.5'-5.5', 3/8" Bentonite Chips; 5.5'-7.5', 3/8" Bentonite Pellets
		9.50 - 10.00 silty SAND, angular medium-coarse grain, well graded, NP; medium reddish brown, slightly weathered, massive, micaceous, SAPROLITE; NC, moist, very loose			7.00					
		10.00 - 15.00 silty SAND, well graded, angular fine-coarse grain, NP, trace subangular coarse gravel; medium reddish brown, medium weathered, massive, micaceous, SAPROLITE; NC, moist, loose			345.45 344.95				#1 Coarse Sand	ANNULUS SEAL Interval: 2.0'-2.5' Type: Portland Cement (Type I)
15	340	15.00 - 16.00 TRANSITIONALLY WEATHERED ROCK, slightly weathered, foliated, dark grey, pink, opaque off-white, fine-coarsely crystalline, highly competent rock, weathered granitic biotite GNEISS, intensely fractured, saturated rock, discontinuities normal to core axis	PWR		344.95				0.010" Screen Slot	WELL COMPLETION Pad: 4"x4"x4" Protective Casing: Anodized Aluminum
		16.00 - 20.00 Fresh, foliated, dark grey, white, medium-coarsely crystalline, strong rock, biotite GNEISS, intensely fractured	GNEISS		15.00 339.95	3		5.00 15.00	#1 Sand	DRILLING METHODS Soil Drill: 4-Inch Sonic Rock Drill: 4-Inch Sonic
20	335	20.00 - 21.00 No Recovery	GNEISS		16.00					
		Boring completed at 21.00 ft			338.95					
					334.95					
					20.00 333.95					
25	330					4		1.00 16.00		
						5		4.00 21.00		
30	325									
35	320									
40	315									
45	310									

BOREHOLE RECORD PLAT BRANCH LOGS2.GPJ PIEDMONT.GDT 9/18/17

LOG SCALE: 1 in = 5.5 ft
DRILLING COMPANY: Cascade Drilling
DRILLER: Scotty Vermillion

GA INSPECTOR: Will Ethier
CHECKED BY: Rachel P. Kirkman, P.G.
DATE: 9/29/17



RECORD OF BOREHOLE BRGWC-27I/PZ-27S

SHEET 1 of 1

PROJECT: SCS Plant Branch
PROJECT NUMBER: 166-0939
DRILLED DEPTH: 24.00 ft
LOCATION: Milledgeville, GA

DRILL RIG: Mini-Sonic Track Mounted Rig
DATE STARTED: 7/21/16
DATE COMPLETED: 7/22/16

NORTHING: 1,159,696.53
EASTING: 2,559,712.98
GS ELEVATION: 364.88
TOC ELEVATION: 367.99 ft

DEPTH W.L.: 3.45 (bgs)
ELEVATION W.L.: 364.54 (amsl)
DATE W.L.: 7/22/16
TIME W.L.: 15:00

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE				SAMPLES			MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES	WELL CONSTRUCTION DETAILS
		DESCRIPTION	USCS	GRAPHIC LOG	ELEV. DEPTH (ft)	SAMPLE NO.	TYPE	REC		
0		0.00 - 10.00 No Recovery; Hydrovac							Portland Type 1 3/8" Bentonite Chips 3/8" Bentonite Pellets #1 30/45 Fine Sand #1 Coarse Sand 0.010" Screen Slot #1 Sand	WELL CASING Interval: 0'-14' Material: Schedule 40 PVC Diameter: 2" Joint Type: Threaded WELL SCREEN Interval: 14'-24' Material: Schedule 40 PVC Diameter: 2" Slot Size: 0.010" End Cap: Schedule 40 PVC FILTER PACK Interval: 9.0'-24' Type: 9.0'-10.0', 30/45 fine sand; 10.0'-23.5', #1 sand FILTER PACK SEAL Interval: 4.0'-9.0' Type: 4.0'-7.0', 3/8" Bentonite Chips; 7.0'-9.0', Bentonite Pellets ANNULUS SEAL Interval: 0.0'-4.0' Type: Portland Cement (Type I) WELL COMPLETION Pad: 4"x4"x4" Protective Casing: Anodized Aluminum DRILLING METHODS Soil Drill: 4-Inch Sonic Rock Drill: N/A Hydrovac left standing water at 3.45'
5	360					1		0.00 10.00		
10	355	10.00 - 15.00 SAND with CLAY, medium plasticity, medium-coarse sand, trace fine angular gravel; moderate reddish brown (10R 4/6), moderately weathered, massive, micaceous, SAPROLITE; cohesive, wet, firm	SP-SC		354.88 10.00					
15	350	15.00 - 17.50 lean CLAY, medium plasticity, some silt, trace medium grain angular sand; medium reddish brown (10R 4/6), moderate orange pink (5YR 8/4), moderately weathered, laminated, micaceous, SAPROLITE; cohesive, wet, dense	CL		349.88 15.00					
		17.50 - 18.30 SILT, non-plastic, coarse angular sand, fine angular gravel; moderate reddish brown (10R 4/6), moderately weathered, massive, micaceous, SAPROLITE; non-cohesive, wet, loose	ML		347.38 346.58	2		5.00 15.00		
20	345	18.30 - 20.00 lean CLAY, medium plasticity, some silt, trace medium grain angular sand; medium reddish brown (10R 4/6), moderate orange pink (5YR 8/4), moderately weathered, laminated, micaceous, SAPROLITE; cohesive, wet, dense	CL		344.88 20.00					
		20.00 - 22.00 silty SAND, medium-coarse angular sand, NP, trace subrounded cobbles; moderate brown (5YR 4/4), moderately weathered, massive, micaceous, SAPROLITE; NC, wet, very loose	SM		342.88 341.88					
25	340	22.00 - 22.50 gravelly SAND, fine-coarse grain sand, well graded, coarse sub rounded gravel, trace silt; light brown (5YR 5/6), slightly weathered, massive, quartzitic, micaceous, SAPROLITE; NC, wet, very loose	SW		23.00 340.88	3		5.00 20.00		
		22.50 - 23.00 silty SAND, fine-medium grain, well graded, subrounded, trace subrounded coarse quartz gravel; light brown (5YR 6/4) mottled with pale brown (5YR 5/2), lightly weathered, relic foliation structures, micaceous, SAPROLITE; NC, moist, loose	SM							
30	335	23.00 - 24.00 No Recovery				4		4.00 24.00		
		Boring completed at 24.00 ft								
35	330									
40	325									
45	320									

LOG SCALE: 1 in = 5.5 ft
DRILLING COMPANY: Cascade Drilling
DRILLER: Scotty Vermillion

GA INSPECTOR: Will Ethier
CHECKED BY: Rachel P. Kirkman, P.G.
DATE: 9/29/17



BOREHOLE RECORD PLAT BRANCH LOGS2.GPJ PIEDMONT.GDT 9/18/17

RECORD OF BOREHOLE BRGWC-29I/PZ-29I

SHEET 1 of 1

PROJECT: SCS Plant Branch
PROJECT NUMBER: 166-0939
DRILLED DEPTH: 21.00 ft
LOCATION: Milledgeville, GA

DRILL RIG: Mini-Sonic Track Mounted Rig
DATE STARTED: 7/22/16
DATE COMPLETED: 7/23/16

NORTHING: 1,160,298.63
EASTING: 2,561,050.06
GS ELEVATION: 350.37
TOC ELEVATION: 353.30 ft

DEPTH W.L.: 6.56 (bgs)
ELEVATION W.L.: 346.74 (amsl)
DATE W.L.: 7/24/2016
TIME W.L.: 06:52

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE				SAMPLES			MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES	WELL CONSTRUCTION DETAILS
		DESCRIPTION	USCS	GRAPHIC LOG	ELEV. DEPTH (ft)	SAMPLE NO.	TYPE	REC		
0	350	0.00 - 1.00 TOPSOIL, SILTY SAND, some organic matter; dark brown; moist	SM		349.37	1		5.00 5.00	Concrete —	WELL CASING Interval: 0.0'-10.0' Material: Schedule 40 PVC Diameter: 2" Joint Type: Threaded
		1.00 - 7.00 Sandy SILT sub-angular fine sand; brown-orange, relic foliation present, SAPROLITE; moist, loose	ML		1.00					
5	345				343.37	2		5.00 5.00	3/8" Bentonite — Chips 3/8" Bentonite — Pellets 30/45 Sand —	WELL SCREEN Interval: 10.0'-20.0' Material: Schedule 40 PVC Diameter: 2" Slot Size: 0.010" End Cap: Schedule 40 PVC
		7.00 - 8.00 SILTY SAND, micaceous; densely foliated, SAPROLITE; Dense	SM		7.00					
10	340	8.00 - 20.00 TRANSITIONALLY WEATHERED ROCK, highly weathered (W4), densely foliated, white-black, medium grained, weak (R2) with some strong (W4) fresh sections, BIOTITE GNEISS, with biotite, quartz and some weathered feldspars	TWR		8.00	3		2.50 5.00	#1 Sand —	FILTER PACK Interval: 7.0'-21.0' Type: 7.0'-8.0' 30/45 Sand - 8.0'-21.0' #1 Sand
					342.37					
15	335				330.37	4		1.00 5.00	0.010" Screen Slot	FILTER PACK SEAL Interval: 2.0'-7.0' Type: 2.0'-5.0' 3/8" Bentonite Chips - 5.0'-7.0' 3/8" Bentonite Pellets
					329.37					
20	330	20.00 - 21.00 No recovery			20.00	5		0.00 1.00	#1 Sand —	ANNULUS SEAL Interval: 0.0'-2.0' Type: Concrete
		Boring completed at 21.00 ft			329.37					
25	325									WELL COMPLETION Pad: 4"x4"x4" Protective Casing: Anodized Aluminum
30	320									
35	315									DRILLING METHODS Soil Drill: 4-inch Sonic Rock Drill: N/A
40	310									
45										

BOREHOLE RECORD PLAT BRANCH LOGS GPJ PIEDMONT.GDT 9/18/17

LOG SCALE: 1 in = 5.5 ft
DRILLING COMPANY: Cascade
DRILLER: Ray Whitt

GA INSPECTOR: Mike Smiley, P.G.
CHECKED BY: Rachel P. Kirkman, P.G.
DATE: 9/29/17



RECORD OF BOREHOLE BRGWC-30I/PZ-30I

SHEET 1 of 1

PROJECT: SCS Plant Branch
PROJECT NUMBER: 166-0939
DRILLED DEPTH: 20.25 ft
LOCATION: Milledgeville, GA

DRILL RIG: Mini-Sonic Track Mounted Rig
DATE STARTED: 7/18/16
DATE COMPLETED: 7/18/16

NORTHING: 1,161,608.18
EASTING: 2,557,692.53
GS ELEVATION: 349.78
TOC ELEVATION: 352.33 ft

DEPTH W.L.: 1.55 (bgs)
ELEVATION W.L.: 350.78 (amsl)
DATE W.L.: 7/20/2016
TIME W.L.: 08:57

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE				SAMPLES			MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES	WELL CONSTRUCTION DETAILS
		DESCRIPTION	USCS	GRAPHIC LOG	ELEV. DEPTH (ft)	SAMPLE NO.	TYPE	REC		
0		0.00 - 4.70 Sandy CLAYEY SILT, low plasticity fines, fine to medium sub-angular sand, trace organics (roots); moderate reddish brown (10YR 4/6), cohesive, w<PL, soft	ML						Concrete — 3/8" Bentonite — Chips 3/8" Bentonite — Pellets 30/45 Sand — #1 Sand — 0.010" Screen Slot #1 Sand —	WELL CASING Interval: 0'-10' Material: Schedule 40 PVC Diameter: 2" Joint Type: Threaded WELL SCREEN Interval: 10'-20' Material: Schedule 40 PVC Diameter: 2" Slot Size: 0.010" End Cap: Schedule 40 PVC FILTER PACK Interval: 7.0'-20.25' Type: 7.0'-8.0' 30/45 Sand - 8.0'-20.25' #1 Sand FILTER PACK SEAL Interval: 2.0'-7.0' Type: 2.0'-5.0' 3/8" Bentonite Chips - 5.0'-7.0' 3/8" Bentonite Pellets ANNULUS SEAL Interval: 0'-2' Type: Concrete WELL COMPLETION Pad: 4'x4'x4" Protective Casing: Anodized Aluminum DRILLING METHODS Soil Drill: 4-inch Sonic Rock Drill: N/A
5	345	4.70 - 6.60 Sandy SILTY CLAY, medium plasticity fines, fine sand; grayish blue green (5BG 5/2) to light blue gray (5B 7/1) mottled with moderate yellowish brown (10YR 5/4) and white (N9), cohesive, w~PL, firm	CL		345.08 4.70	1		8.00 10.00		
		6.60 - 6.80 SAND, fine to medium sub-angular sand, non-plastic fines; greenish gray (5G 6/1) to pale olive (10Y 6/2), non-cohesive, moist, loose	SP		343.18					
		6.80 - 7.40 Sandy SILTY CLAY, medium plasticity fines, fine sand; grayish blue green (5BG 5/2) to light blue gray (5B 7/1) mottled with moderate yellowish brown (10YR 5/4) and white (N9), cohesive, w~PL, firm	CL		342.38					
10	340	7.40 - 10.50 SILTY SAND, fine to coarse well graded sub-angular sand, low plasticity fines, trace fine sub-angular gravels; dark yellowish orange (10YR 6/6) to very pale orange (10YR 8/2), SAPROLITE; non-cohesive, moist, compact	SM		339.28					
		10.50 - 11.10 SAND, fine to medium sub-angular sand, trace non-plastic fines, trace fine angular gravels; dusky brown (5YR 2/2) to moderate brown (5YR 4/4), highly weathered (W4), quartz, biotite, and weathered micaceous grains, SAPROLITE; non-cohesive, moist, dense	SP		338.68					
		11.10 - 13.90 SAND, fine angular sand, some non-plastic fines, trace fine angular gravels; dark yellowish orange (10YR 6/6) and grayish orange (10YR 7/4), highly weathered (W4), weathered micaceous grains, quartz, and biotite, SAPROLITE; non-cohesive, wet, very dense	SP-SM		335.88					
		13.90 - 15.40 SAND, fine to coarse angular sand, trace non-plastic fines, some fine to coarse soft angular gravel (core stones); moderate yellowish brown (10YR 5/4) mottled white (N9) and pale olive (10YR 6/2), moderately to highly weathered (W3 to W4), weathered micaceous grains, quartz, plagioclase, biotite, SAPROLITE; non-cohesive, wet, very dense	SW		334.38	2		7.00 7.00		
		15.40 - 15.80 TRANSITIONALLY WEATHERED ROCK, fine to coarse angular sand, fine to coarse angular gravels (core stones), trace non-plastic fines; light gray (N7), slightly to moderately weathered (W2-W3), quartz, biotite and weathered micaceous grains, non-cohesive, wet, very dense	TWR		15.80					
		15.80 - 16.80 Slightly weathered (W2), medium bedded, light olive gray (5Y 5/2) to medium light gray (N7), fine grained, slightly porous, weak rock (R2), GNEISS, some weathering staining, quartz, biotite and weathered micaceous grains.	GNEISS		332.98					
		16.80 - 20.00 Slightly weathered (W2), medium to thinly wavy foliated, medium to coarse grained, white (N1) and grayish black (N2) with some dark yellowish orange (10YR 6/6) weathered surfaces, slightly porous (fracture surfaces), medium strong to strong (R3 to R4), BIOTITE GNEISS, with biotite, quartz, hornblende, frequent weathering surfaces			16.80					
		17.00: (17.0) fresh (W1), occasional weathered surfaces			329.78	3		2.80 3.00		
		20.00 Boring completed at 20.25 ft			20.00					

BOREHOLE RECORD PLAT BRANCH LOGS GPJ PIEDMONT.GDT 9/18/17

LOG SCALE: 1 in = 5.5 ft
DRILLING COMPANY: Cascade Drilling
DRILLER: Trenton Herod

GA INSPECTOR: Jeffrey Ingram
CHECKED BY: Rachel P. Kirkman, P.G.
DATE: 9/29/17



RECORD OF BOREHOLE BRGWC-32S/PZ-32S

SHEET 1 of 1

PROJECT: SCS Plant Branch
PROJECT NUMBER: 166-0939
DRILLED DEPTH: 45.00 ft
LOCATION: Milledgeville, GA

DRILL RIG: TS-150 Track Mounted Rig
DATE STARTED: 7/19/16
DATE COMPLETED: 7/20/16

NORTHING: 1,160,678.65
EASTING: 2,558,497.57
GS ELEVATION: 403.51
TOC ELEVATION: 406.51 ft

DEPTH W.L.: 30.05 (bgs)
ELEVATION W.L.: 322.28 (amsl)
DATE W.L.: 7/22/2016
TIME W.L.: 08:00

BOREHOLE RECORD PLAT BRANCH LOGS GPJ PIEDMONT.GDT 9/18/17

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE			SAMPLES			MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES	WELL CONSTRUCTION DETAILS				
		DESCRIPTION	USCS	GRAPHIC LOG	ELEV.	TYPE	REC						
					DEPTH (ft)								
0		0.00 - 0.70 TOPSOIL, SILTY SAND, fine poorly graded sand, non-plastic fines, some organics (roots); dark yellowish brown (10YR 4/2); non-cohesive, dry, loose	SM		402.81 0.70	1		8.80 10.00	Portland Cement – (Type II)	WELL CASING Interval: 0.0'-35' Material: Schedule 40 PVC Diameter: 2" Joint Type: Threaded			
400		0.70 - 8.30 non-plastic to low plasticity fines, trace organics (roots); moderate reddish brown (10R 4/6), completely weathered (W5), some weathered micaceous grains, SAPROLITE; non-cohesive, moist, loose											WELL SCREEN Interval: 35'-45' Material: Schedule 40 PVC Diameter: 2" Slot Size: 0.010" End Cap: Schedule 40 PVC
5													FILTER PACK Interval: 32.0'-45.15 Type: 32.0'-33.0' 30/45 Sand - 33.0'-45.15' #1 Sand
395		8.30 - 17.90 fine to coarse well graded angular sand, non-plastic to low plasticity fines, some fine to coarse soft angular gravels (core stones); pale yellowish brown (10YR 6/2), light brown (5YR 5/6) and black (N1), highly to completely weathered (W4 to W5), some relic foliations in core stones, weathered micaceous grains, quartz, biotite, SAPROLITE; non-cohesive, moist, compact			395.21 8.30	2		7.90 10.00		FILTER PACK SEAL Interval: 27.0'-32.0' Type: 27.0'-30.0' 3/8" Bentonite Chips - 30.0'-32.0' 3/8" Bentonite Pellets			
10													ANNULUS SEAL Interval: 3'-27' Type: Portland Cement (Type II)
390													WELL COMPLETION Pad: 4"x4"x4" Protective Casing: Anodized Aluminum
385		17.90 - 19.10 fine to coarse well graded angular sand, non-plastic to low plasticity fines, some fine to coarse soft angular gravels (core stones); layers of dark yellowish orange (10YR 6/6), pale yellowish brown (10YR 6/2), pale reddish brown (10R 5/4) mottled black (N1) and white (N9), highly weathered (W4), some relic foliations in core stones, weathered micaceous grains, biotite, quartz, SAPROLITE; non-cohesive, moist, compact			385.61 17.90 384.41 19.10	3		10.00 10.00		3/8" Bentonite – Chips 3/8" Bentonite – Pellets 30/45 Sand – #1 Sand – 0.010" Screen Slot #1 Sand –	DRILLING METHODS Soil Drill: 4-inch Sonic Rock Drill: N/A		
20		19.10 - 28.50 (SP-SM) SAND, fine to coarse sub-angular sand, non-plastic to low plasticity fines, some soft angular gravels (core stones); pale yellowish brown (10YR 6/2), white (N9), and black (N1), highly weathered (W4), some relic foliations in core stones, weathered micaceous grains, biotite, quartz, SAPROLITE; non-cohesive, moist, Dense	SP-SM										
380		25.00: (25.0) some white (N9) fresh quartz pockets											
375		28.50 - 30.00 SILTY SAND, fine to medium sub-angular poorly graded sand, non-plastic to low plasticity fines; light brown (5YR 5/6) black (N1), and pale yellowish brown (10YR 6/2), highly weathered (W4), some relic foliations, biotite, quartz, weathered micaceous grains, SAPROLITE; non-cohesive, moist, dense	SM		375.01 28.50 373.51 30.00	4		10.00 10.00					
30		30.00 - 32.00 CLAYEY SAND, fine sand, medium plasticity fines; pale yellowish brown (10YR 6/2), to light olive gray (5Y 5/2) mottled black (N1) and white (N9), some relic foliations, weathered micaceous grains, biotite, quartz, SAPROLITE; cohesive, w~PL, hard	SC		371.51 32.00								
370		32.00 - 38.70 SAND, fine sand, non-plastic fines; light brown (5YR 5/6), black (N1) and pale yellowish brown (10YR 6/2), highly weathered (W4), weathered micaceous grains, SAPROLITE; non-cohesive, wet, loose	SP-SM										
365		38.70 - 40.00 SAND, fine to coarse sub-angular sand, trace non-plastic fines; pale yellowish brown (10YR 6/2) mottled white (N9) and Black (N1), moderately weathered (W3), some foliation layers, SAPROLITE; non-cohesive, wet, dense	SW		364.81 38.70 363.51 40.00	5		5.00 5.15					
40		40.00 - 42.50 SANDY SILT, fine sand, low plasticity fines; light olive gray (5Y 5/2), completely weathered rock (W6), weathered micaceous grains, biotite, quartz, SAPROLITE; cohesive, w>PL, firm	ML		361.01 42.50								
360		42.50 - 45.00 SAND, fine to medium angular sand, trace non-plastic fines; pale yellowish brown (10YR 6/2), some relic foliations, weathered micaceous grains, biotite, quartz, SAPROLITE; non-cohesive, wet, dense	SP		358.51								
45		Boring completed at 45.00 ft											
355													
50													

LOG SCALE: 1 in = 6.5 ft
DRILLING COMPANY: Cascade Drilling
DRILLER: Trenton Herod

GA INSPECTOR: Jeffrey Ingram
CHECKED BY: Rachel P. Kirkman, P.G.
DATE: 9/29/17



RECORD OF BOREHOLE BRGWC-33S/PZ-33S

SHEET 1 of 1

PROJECT: SCS Plant Branch
PROJECT NUMBER: 166-0939
DRILLED DEPTH: 26.50 ft
LOCATION: Milledgeville, GA

DRILL RIG: Full Size Track Mounted Sonic
DATE STARTED: 7/26/16
DATE COMPLETED: 7/26/16

NORTHING: 1,168,056.81
EASTING: 2,554,063.96
GS ELEVATION: 414.14
TOC ELEVATION: 416.92 ft

DEPTH W.L.: 5.16 (bgs)
ELEVATION W.L.: 411.76 (amsl)
DATE W.L.: 7/27/2016
TIME W.L.: 09:00

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE				SAMPLES			MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES	WELL CONSTRUCTION DETAILS
		DESCRIPTION	USCS	GRAPHIC LOG	ELEV. DEPTH (ft)	SAMPLE NO.	TYPE	REC		
0		0.00 - 0.40 TOPSOIL, Sandy SILT, non-plastic fines, fine sand, some organics (roots); light brown (5YR 5/6), residual soil (W6), non-cohesive, dry, loose	ML		0.40	1		5.30 6.50	Portland Cement (Type II)	WELL CASING Interval: 0'-16' Material: Schedule 40 PVC Diameter: 2" Joint Type: Threaded WELL SCREEN Interval: 16'-26' Material: Schedule 40 PVC Diameter: 2" Slot Size: 0.010" End Cap: Schedule 40 PVC FILTER PACK Interval: 13.0'-26.5' Type: 13.0'-14.0' 30/45 Sand - 14.0'-26.5' #1 Sand FILTER PACK SEAL Interval: 0'-16' Type: 8.0'-11.0' 3/8" Bentonite Chips - 11.0'-13.0' 3/8" Bentonite Pellets ANNULUS SEAL Interval: 2'-8' Type: Portland Cement (Type II) WELL COMPLETION Pad: 4"x4"x4" Protective Casing: Anodized Aluminum DRILLING METHODS Soil Drill: 4-inch Sonic Rock Drill: 4-inch Sonic
		0.40 - 1.50 non-plastic fines, fine sand, trace organics (roots); moderate reddish brown (10R 4/6), completely weathered (W5), weathered micaceous grains, quartz, SAPROLITE; non-cohesive, dry, compact			1.50					
410		1.50 - 8.00 Sandy SILT, non-plastic fines, some low plasticity fines pockets, fine sand; moderate reddish brown (10R4/6), highly weathered to completely weathered (W4-W5), trace relict foliations, weathered micaceous grains, SAPROLITE; non-cohesive, moist, compact								
5			SM		406.14	2	7.20 10.00		3/8" Bentonite Chips 3/8" Bentonite Pellets 30/45 Sand #1 Sand	
		8.00 - 11.00 SILTY SAND, fine to medium sub-angular sand, non-plastic to very low plasticity fines; light brown (5YR 5/6) to moderate reddish brown (10R 4/6) mottled dark yellowish brown (10YR 4/2), highly to completely weathered (W4 to W5), weathered micaceous grains, quartz, biotite, SAPROLITE; non-cohesive, wet, compact			8.00					
405		11.00 - 24.50 some low plasticity fines; pale yellowish brown (10YR 6/2) mottled white (N9), black (N1) and light brown (5YR 5/6), highly weathered (W4), some relict foliations, weathered micaceous grains, biotite, feldspar, quartz, SAPROLITE; non-cohesive, wet, compact			403.14 11.00					
10						3	2.00 2.00			
400										
15						4	7.40 8.00		0.010" Screen Slot	
395										
20										
390										
25		24.50 - 26.00 TRANSITIONALLY WEATHERED ROCK, fine to medium sub-angular sand, non-plastic fines, fine to coarse angular soft gravels (core stones); medium gray (N5), highly weathered (W4), some moderately weathered (W3) core stones, quartz, weathered micaceous grains, biotite, some relict foliations in core stones, non-cohesive, wet, dense	TWR		389.64 24.50					#1 Sand
		26.00 - 26.50 BEDROCK, moderately weathered (W3), thin foliation bands, grayish orange (10YR 7/4), black (N1) and medium gray (N5), fine to medium grained, slightly porous, weak (R2), GNEISS, quartz, biotite, feldspar, weathered micaceous grains	GNEISS		388.14 387.64					
385		Boring completed at 26.50 ft								
30										
35										
375										
370										
45										

BOREHOLE RECORD PLAT BRANCH LOGS GPJ PIEDMONT.GDT 9/18/17

LOG SCALE: 1 in = 5.5 ft
DRILLING COMPANY: Cascade Drilling
DRILLER: Dale Osterburg

GA INSPECTOR: Jeffrey Ingram
CHECKED BY: Rachel P. Kirkman, P.G.
DATE: 9/29/17



RECORD OF BOREHOLE BRGWC-34S/PZ-34S

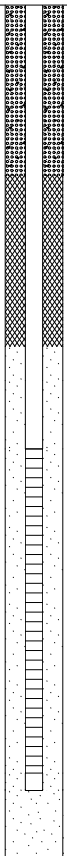
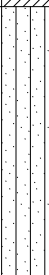
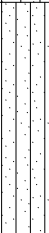
SHEET 1 of 1

PROJECT: SCS Plant Branch
PROJECT NUMBER: 166-0939
DRILLED DEPTH: 25.00 ft
LOCATION: Milledgeville, GA

DRILL RIG: Mini-Sonic Track Mounted Rig
DATE STARTED: 7/24/16
DATE COMPLETED: 7/25/16

NORTHING: 1,167,383.97
EASTING: 2,554,230.23
GS ELEVATION: 389.04
TOC ELEVATION: 392.06 ft

DEPTH W.L.: 0.50 (bgs)
ELEVATION W.L.: 391.56 (amsl)
DATE W.L.: 07/25/2016
TIME W.L.: na

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE				SAMPLES			MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES	WELL CONSTRUCTION DETAILS
		DESCRIPTION	USCS	GRAPHIC LOG	ELEV. DEPTH (ft)	SAMPLE NO.	TYPE	REC		
0		0.00 - 5.00 CLAY, trace sand; red-orange; cohesive, moist	CL			1		<u>4.50</u> 5.00	 Portland Cement – (Type II) 3/8" Bentonite – Chips 3/8" Bentonite – Pellets 30/45 Sand – #1 Sand – 0.010" – Screen Slot #1 Sand –	WELL CASING Interval: 0.0'-13.0' Material: Schedule 40 PVC Diameter: 2" Joint Type: Threaded WELL SCREEN Interval: 13.0'-23.0' Material: Schedule 40 PVC Diameter: 2" Slot Size: 0.010" End Cap: Schedule 40 PVC FILTER PACK Interval: 10.0'-25.0' Type: 10.0'-11.0' 30/45 Sand - 11.0'-25.0' #1 Sand FILTER PACK SEAL Interval: 5.0'-10.0' Type: 5.0'-8.0' 3/8" Bentonite Chips - 8.0'-10.0' 3/8" Bentonite Pellets ANNULUS SEAL Interval: 3.0'-5.0' Type: Portland Cement (Type II) WELL COMPLETION Pad: 4"x4"x4" Protective Casing: Anodized Aluminum DRILLING METHODS Soil Drill: 4-inch Sonic Rock Drill: N/A
5		5.00 - 13.00 sandy SILT, micaceous; brown, SAPROLITE; cohesive, moist, firm	ML		384.04 5.00	2		<u>5.00</u> <u>5.00</u>		
10					376.04	3		<u>5.00</u> <u>5.00</u>		
15		13.00 - 16.00 SILTY SAND, micaceous; brown, SAPROLITE; moist	SM		13.00					
20		16.00 - 23.00 sandy SILT, micaceous; black-brown, SAPROLITE; moist	ML		373.04 16.00	4		<u>5.00</u> <u>5.00</u>		
25		23.00 - 25.00 SILTY SAND, micaceous; brown-white, quartz and feldspar grains; moist	SM		366.04 23.00	5		<u>5.00</u> <u>5.00</u>		
		Boring completed at 25.00 ft			364.04					

BOREHOLE RECORD PLAT BRANCH LOGS GPJ PIEDMONT.GDT 9/18/17

LOG SCALE: 1 in = 5.5 ft
DRILLING COMPANY: Cascade
DRILLER: Ray Whitt

GA INSPECTOR: Mike Smiley, P.G.
CHECKED BY: Rachel P. Kirkman, P.G.
DATE: 9/29/17



RECORD OF BOREHOLE BRGWC-35S/PZ-35S

SHEET 1 of 1

PROJECT: SCS Plant Branch
PROJECT NUMBER: 166-0939
DRILLED DEPTH: 30.00 ft
LOCATION: Milledgeville, GA

DRILL RIG: Mini-Sonic Track Mounted Rig
DATE STARTED: 7/22/16
DATE COMPLETED: 7/23/16

NORTHING: 1,166,645.80
EASTING: 2,554,475.19
GS ELEVATION: 363.68
TOC ELEVATION: 366.54 ft

DEPTH W.L.: 0.4 (bgs)
ELEVATION W.L.: 366.14 (amsl)
DATE W.L.: 7/25/2016
TIME W.L.: 07:20

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE				SAMPLES			MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES	WELL CONSTRUCTION DETAILS
		DESCRIPTION	USCS	GRAPHIC LOG	ELEV. DEPTH (ft)	SAMPLE NO.	TYPE	REC		
0		0.00 - 5.00 Sandy SILT, fine to medium sub-angular sand; brown-orange; dry, loose	ML			1		3.50 5.00	Portland Cement (Type II) 3/8" Bentonite Chips 3/8" Bentonite Pellets 30/45 Sand #1 Sand 0.010" Screen Slot #1 Sand 3/8" Bentonite Chips	WELL CASING Interval: 0.0'-17.0' Material: Schedule 40 PVC Diameter: 2" Joint Type: Threaded WELL SCREEN Interval: 17.0'-27.0' Material: Schedule 40 PVC Diameter: 2" Slot Size: 0.010" End Cap: Schedule 40 PVC FILTER PACK Interval: 14.0'-28.0' Type: 14.0'-15.0' 30/45 Sand - 15.0'-17.0' #1 Sand FILTER PACK SEAL Interval: 9.0'-14.0' Type: 9.0'-12.0' 3/8" Bentonite Chips - 12.0'-14.0' 3/8" Bentonite Pellets ANNULUS SEAL Interval: 0.0'-9.0' Type: Portland Cement (Type II) WELL COMPLETION Pad: 4"x4"x4" Protective Casing: Anodized Aluminum DRILLING METHODS Soil Drill: 4-inch Sonic Rock Drill: N/A
5		5.00 - 12.50 CLAY; brown/gray, cohesive, firm, moist	CH		358.68 5.00	2		5.00 5.00		
10										
15		12.50 - 14.00 sandy SILTY CLAY; blue/gray; cohesive, moist, soft	CL		351.18 12.50	3		4.50 5.00		
20		14.00 - 30.00 Sandy SILT, fine to coarse sand, some loose cohesive clay balls; orange/brown, micaceous, SAPROLITE; moist, loose	ML		349.68 14.00	4		5.00 5.00		
25						5		5.00 5.00		
30		25.00: Wet core				6		5.00 5.00		
35										
40										
45										
		Boring completed at 30.00 ft			333.68					

LOG SCALE: 1 in = 5.5 ft
DRILLING COMPANY: Cascade
DRILLER: Ray Whitt

GA INSPECTOR: Mike Smiley, P.G.
CHECKED BY: Rachel P. Kirkman, P.G.
DATE: 9/29/17



BOREHOLE RECORD PLAT BRANCH LOGS GPJ PIEDMONT.GDT 9/18/17

RECORD OF BOREHOLE BRGWC-36S/PZ-36S

SHEET 1 of 1

PROJECT: SCS Plant Branch
PROJECT NUMBER: 166-0939
DRILLED DEPTH: 28.70 ft
LOCATION: Milledgeville, GA

DRILL RIG: Full Size Track Mounted Sonic
DATE STARTED: 7/25/16
DATE COMPLETED: 7/26/16

NORTHING: 1,165,743.30
EASTING: 2,554,694.19
GS ELEVATION: 382.94
TOC ELEVATION: 386.00 ft

DEPTH W.L.: 0.00 (bgs)
ELEVATION W.L.: 386.00 (amsl)
DATE W.L.: 08/6/2016
TIME W.L.: 10:00

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE			SAMPLES			MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES	WELL CONSTRUCTION DETAILS
		DESCRIPTION	USCS	GRAPHIC LOG	ELEV. DEPTH (ft)	SAMPLE NO.	TYPE		
0		0.00 - 1.10 TOPSOIL, SILTY SAND, fine sand, non-plastic fines, some organics (roots); dark reddish brown (10YR 5/4), residual soil (W6), some weathered micaceous grains, non-cohesive, moist, loose	SM		381.84				
			ML		381.04				
380		1.10 - 1.90 Sandy CLAYEY SILT, low plasticity fines, fine sand, some organics (roots); very dusky red (10R 2/2) to dark yellowish brown (10YR 4/2), residual soil (W6), some weathered micaceous grains, RESIDUUM; cohesive, w<PL, firm	SP-SM		1.90 379.94	1			
5		1.90 - 3.00 SAND, fine to medium sub-angular sand, some non-plastic fines, trace fine sub-angular gravel; dark yellowish brown (10YR 4/2), residual soil (W6), quartz, trace weathered micaceous grains, RESIDUUM; non-cohesive, moist, loose	CL		3.00			Portland Cement (Type II)	
375		3.00 - 8.00 Sandy SILTY CLAY, moderate plasticity fines, fine sand, moderate yellowish brown (10YR 5/4), residual soil (W6), quartz, trace weathered micaceous grains, cohesive, w~PL, firm			374.94 8.00				
10		8.00 - 13.90 trace fine angular gravel; pale yellowish brown (10YR 6/2) mottled medium gray (N5), residual soil (W6), trace feldspars, quartz and weathered micaceous grains, cohesive, w~PL, firm				2		3/8" Bentonite - Chips	
370					369.04			3/8" Bentonite - Pellets	
15		13.90 - 28.50 SAND, fine to medium sub-angular sand, trace non-plastic fines, some fine to coarse angular soft gravels (core stones); brownish gray (5YR 6/1) mottled light brown (5YR 5/6) white (N9) and black (N1), with feldspar, quartz, biotite, and weathered micaceous grains, highly weathered (W4) with moderately weathered (W3) core stones, relic foliations in core stones, non-cohesive, moist, compact, SAPROLITE			13.90			30/45 Sand -	
365								#1 Sand -	
20			SP			3			
360								0.010" Screen Slot	
25						4			
355						5			
30		Boring completed at 28.70 ft			354.44 28.50			#1 Sand -	
350									
35									
345									
40									
340									
45									

BOREHOLE RECORD PLAT BRANCH LOGS GPJ PIEDMONT.GDT 9/18/17

LOG SCALE: 1 in = 5.5 ft
DRILLING COMPANY: Cascade Drilling
DRILLER: Dale Osterburg

GA INSPECTOR: Jeffrey Ingram
CHECKED BY: Rachel P. Kirkman, P.G.
DATE: 9/29/17



RECORD OF BOREHOLE BRGWC-37S/PZ-37S

SHEET 1 of 2

PROJECT: SCS Plant Branch
PROJECT NUMBER: 166-0939
DRILLED DEPTH: 66.00 ft
LOCATION: Milledgeville, GA

DRILL RIG: Full Size Track Mounted Sonic
DATE STARTED: 7/23/16
DATE COMPLETED: 7/24/16

NORTHING: 1,165,092.09
EASTING: 2,554,978.90
GS ELEVATION: 444.20
TOC ELEVATION: 447.23 ft

DEPTH W.L.: 43.40 (bgs)
ELEVATION W.L.: (amsl)
DATE W.L.: 7/25/2016
TIME W.L.: 06:45

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE			SAMPLES			MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES	WELL CONSTRUCTION DETAILS
		DESCRIPTION	USCS	GRAPHIC LOG	ELEV. DEPTH (ft)	SAMPLE NO.	TYPE	REC	
0		0.00 - 0.60 TOPSOIL, Sandy SILT, non-plastic fines, fine rounded sand, some organics (roots); dark yellowish brown (10YR 6/2), residual soil (W6), non-cohesive, dry, loose	ML		443.6 0.60				WELL CASING Interval: 0.0'-53.6' Material: Schedule 40 PVC Diameter: 2" Joint Type: Threaded WELL SCREEN Interval: 53.6'-53.6' Material: U-Pack Schedule 40 PVC Diameter: 2" Slot Size: 0.010" End Cap: Schedule 40 PVC FILTER PACK Interval: 50.0'-64.0' Type: 50.0'-51.0' 30/45 Sand - 51.0'-64.0' #1 Sand FILTER PACK SEAL Interval: 50.0'-45.0' Type: 45.0'-48.0' 3/8" Bentonite Chips - 48.0'-50.0' 3/8" Bentonite Pellets ANNULUS SEAL Interval: 2'-45' Type: Portland Cement (Type II) WELL COMPLETION Pad: 4"x4"x4" Protective Casing: Anodized Aluminum DRILLING METHODS Soil Drill: 4-inch Sonic Rock Drill: N/A
440		0.60 - 2.40 Sandy SILT, non-plastic fines, fine sand; light brown (5YR 5/6), to moderate reddish brown (10R 4/6), residual soil to completely weathered (W6-W5), SAPROLITE, non-cohesive, dry, dense	SP & ML		441.8 2.40	1		6.00 6.00	
5		2.40 - 8.50 SAND and SILT, fine sand, non-plastic fines, some low plasticity fines, some soft fine to coarse angular gravels (core stones); moderate reddish brown (10R 4/6), completely weathered (W5), trace relic foliations in core stones, weathered micaceous grains, SAPROLITE, non-cohesive, dry, compact	SP & ML		435.7				
435		8.50 - 18.00 Sandy SILT, non-plastic to low plasticity fines, fine sand, some weak fine to coarse angular gravels (core stones); light brown (5YR 5/6) mottled moderate reddish brown (10R 4/6), highly to completely weathered (W4 to W5), trace relic foliations in core stones, weathered micaceous grains, SAPROLITE, cohesive, w<PL, firm	ML		8.50	2		7.70 10.00	
430					426.2				
15					18.00				Portland Cement - (Type II)
425		18.00 - 25.00 SILTY SAND, fine sand, non-plastic to low plasticity fines, some soft fine to coarse angular gravels (core stones); pale yellowish brown (10YR 6/2) mottled white (N9) and black (N1) with some light brown (5YR 5/6) staining, frequent relic foliations, quartz, weathered micaceous grains, biotite, feldspar, SAPROLITE, non-cohesive, moist, compact	SM		18.00	3		5.70 10.00	
420					419.2				
25		25.00 - 25.10 0.1 foot layer of light brown (5YR 5/6) SILT	ML		25.10				
415		25.10 - 33.50 SILTY SAND, fine sand, non-plastic to very low plasticity fines, trace angular weak fine to coarse gravels (core stones); pale yellowish brown (10YR 6/2), to very pale orange (10YR 8/2) mottled black (N1) and white (N9), highly weathered (W4), quartz, feldspar, weathered micaceous grains, biotite, trace relic foliations, SAPROLITE, non-cohesive, moist, compact	SM			4		7.20 10.00	
30					410.7				
410		33.50 - 36.00 SILTY SAND, fine sand, non-plastic to very low plasticity fines, trace soft fine to coarse angular gravels (core stones); light brown (5YR 5/6) mottled black (N1) and white (N9), highly to completely weathered (W4 to W5), weathered micaceous grains, biotite, feldspar, SAPROLITE, non-cohesive, moist, dense			33.50				
35		36.00 - 38.00 SILTY SAND, fine sand, non-plastic fines; grayish orange (10YR 7/4), completely weathered (W5), quartz, weathered micaceous grains, SAPROLITE, non-cohesive, wet, compact			408.2 36.00				
405		38.00 - 42.00 SILTY SAND, fine sand, non-plastic to low plasticity fines, trace soft fine to coarse angular gravels (core stones); light brown (5YR 5/6) to pale yellowish brown (10YR 6/2), mottled white (N9) and black (N1), highly weathered (W4), weathered micaceous grains, biotite, quartz, SAPROLITE, non-cohesive, moist, dense			406.2 38.00				
40					402.2	5		9.50 10.00	
400			SP & ML		42.00				
45		Log continued on next page							

LOG SCALE: 1 in = 5.5 ft
DRILLING COMPANY: Cascade Drilling
DRILLER: Dale Osterburg

GA INSPECTOR: Jeffrey Ingram
CHECKED BY: Rachel P. Kirkman, P.G.
DATE: 9/29/17



BOREHOLE RECORD PLAT BRANCH LOGS GPJ PIEDMONT.GDT 9/18/17

RECORD OF BOREHOLE BRGWC-37S/PZ-37S

SHEET 2 of 2

PROJECT: SCS Plant Branch
PROJECT NUMBER: 166-0939
DRILLED DEPTH: 66.00 ft
LOCATION: Milledgeville, GA

DRILL RIG: Full Size Track Mounted Sonic
DATE STARTED: 7/23/16
DATE COMPLETED: 7/24/16

NORTHING: 1,165,092.09
EASTING: 2,554,978.90
GS ELEVATION: 444.20
TOC ELEVATION: 447.23 ft

DEPTH W.L.: 43.40 (bgs)
ELEVATION W.L.: (amsl)
DATE W.L.: 7/25/2016
TIME W.L.: 06:45

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE				SAMPLES			MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES	WELL CONSTRUCTION DETAILS
		DESCRIPTION	USCS	GRAPHIC LOG	ELEV. DEPTH (ft)	SAMPLE NO.	TYPE	REC		
45		42.00 - 53.00 SAND & SILT, fine sand, non-plastic to very low plasticity fines; some soft angular fine to coarse gravels (core stones); pale yellowish brown (10YR 6/2) mottled white (N9) and light olive gray (5Y 5/2), highly weathered (W4), some relic foliations, feldspar, quartz, weathered micaceous grains, biotite, SAPROLITE, non-cohesive, moist, dense (Continued) 46.00: highly weathered (W4) to moderately weathered (W3)	SP & ML			5			3/8" Bentonite — Chips 3/8" Bentonite — Pellets 30/45 Sand — #1 Sand — 0.010" Screen Slot #1 Sand — #1 Sand — Natural Cave In	WELL CASING Interval: 0.0'-53.6' Material: Schedule 40 PVC Diameter: 2" Joint Type: Threaded WELL SCREEN Interval: 53.6'-53.6' Material: U-Pack Schedule 40 PVC Diameter: 2" Slot Size: 0.010" End Cap: Schedule 40 PVC FILTER PACK Interval: 50.0'-64.0' Type: 50.0'-51.0' 30/45 Sand - 51.0'-64.0' #1 Sand FILTER PACK SEAL Interval: 50.0'-45.0' Type: 45.0'-48.0' 3/8" Bentonite Chips - 48.0'-50.0' 3/8" Bentonite Pellets ANNULUS SEAL Interval: 2'-45' Type: Portland Cement (Type II) WELL COMPLETION Pad: 4'x4'x4" Protective Casing: Anodized Aluminum DRILLING METHODS Soil Drill: 4-inch Sonic Rock Drill: N/A
395						6		10.00 10.00		
50					391.2					
55		53.00 - 63.00 SAND, fine to medium sub-angular sand, non-plastic fines, some fine to coarse angular soft gravel (core stones); pale yellowish brown (10YR 6/2) to moderate yellowish brown (10YR 5/6) mottled black (N1) and white (N9), strong foliations in core stones, moderately to highly weathered (W3-W4), weathered micaceous grains, biotite, quartz, feldspar, SAPROLITE; non-cohesive, wet, dense	SP		53.00					
390						7		3.50 3.50		
385										
60										
65		63.00 - 66.00 TRANSITIONALLY WEATHERED ROCK, fine to medium sub-angular sand, non-plastic fines, trace fine to coarse soft gravels (core stones); pale yellowish brown (10YR 6/2) to yellowish gray (5Y 2/2) mottled white (N9) and black (N1), moderately weathered (W3), quartz, feldspar, weathered micaceous grains, biotite, PARTIALLY WEATHERED ROCK; non-cohesive, wet, very dense Boring completed at 66.00 ft	TWR		381.2	8		6.50 6.50		
380					63.00					
375					378.2					
70										
75										
370										
80										
365										
85										
360										
90										

BOREHOLE RECORD PLAT BRANCH LOGS GPJ PIEDMONT.GDT 9/18/17

LOG SCALE: 1 in = 5.5 ft
DRILLING COMPANY: Cascade Drilling
DRILLER: Dale Osterburg

GA INSPECTOR: Jeffrey Ingram
CHECKED BY: Rachel P. Kirkman, P.G.
DATE: 9/29/17



RECORD OF BOREHOLE BRGWC-38S/PZ-38S

SHEET 1 of 1

PROJECT: SCS Plant Branch
PROJECT NUMBER: 166-0939
DRILLED DEPTH: 38.50 ft
LOCATION: Milledgeville, GA

DRILL RIG: Full Size Track Mounted Sonic
DATE STARTED: 7/22/16
DATE COMPLETED: 7/22/16

NORTHING: 1,164,391.62
EASTING: 2,555,015.42
GS ELEVATION: 429.55
TOC ELEVATION: 432.33 ft

DEPTH W.L.: 16.70 (bgs)
ELEVATION W.L.: 415.63 (amsl)
DATE W.L.: 7/23/2016
TIME W.L.: 18:20

BOREHOLE RECORD PLAT BRANCH LOGS GPJ PIEDMONT.GDT 9/18/17

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE				SAMPLES			MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES	WELL CONSTRUCTION DETAILS
		DESCRIPTION	USCS	GRAPHIC LOG	ELEV. DEPTH (ft)	SAMPLE NO.	TYPE	REC		
0		0.00 - 10.00 (0.0-10.0) HYDROVAC (no recovery)	NA			1		0.00 10.00		WELL CASING Interval: 0.0'-27.8' Material: Schedule 40 PVC Diameter: 2" Joint Type: Threaded WELL SCREEN Interval: 27.8'-37.8' Material: Schedule 40 PVC Diameter: 2" Slot Size: 0.010" End Cap: Schedule 40 PVC FILTER PACK Interval: 24.5'-38.5' Type: 24.5'-25.5' 30/45 Sand - 25.5'-38.5' #1 Sand FILTER PACK SEAL Interval: 19.5'-24.5' Type: 19.5'-22.5' 3/8" Bentonite Chips - 22.5'-24.5' 3/8" Bentonite Pellets ANNULUS SEAL Interval: 3.0'-19.5' Type: Portland Cement (Type II) WELL COMPLETION Pad: 4"x4"x4" Protective Casing: Anodized Aluminum DRILLING METHODS Soil Drill: 4-inch Sonic Rock Drill: N/A
5	425									
10	420	10.00 - 10.60 Sandy SILT, low plasticity fines, fine sand; moderate reddish brown (10R 4/6) to light brown (5YR 5/6), completely to highly weathered (W4 to W5), some relict foliations, weathered micaceous grains, biotite, quartz, SAPROLITE; cohesive, w<PL, firm	ML		419.55	2		4.60 6.00	Portland Cement - (Type II)	
		10.60 - 11.20 SILTY SAND, fine to coarse sub-angular sand, non-plastic fines; light brown (5YR 5/6), highly to completely weathered (W4 to W5), weathered micaceous grains, biotite, quartz, feldspar, SAPROLITE; non-cohesive, moist, compact	SM		418.95					
					418.35					
15	415	11.20 - 18.00 Sandy SILT, low plasticity fines, fine sand; moderate reddish brown (10R 4/6) to light brown (5YR 5/6), completely to highly weathered (W4 to W5), some relict foliations, weathered micaceous grains, biotite, quartz, SAPROLITE; cohesive, w<PL, firm	ML		11.20	3		5.10 10.00	3/8" Bentonite - Chips 3/8" Bentonite - Pellets 30/45 Sand - #1 Sand -	
		18.00 - 23.50 SAND and SILT, fine sand, low plasticity fines; light brown (5YR 5/6) to moderate reddish brown (10R 4/6), highly weathered (W4), some relict foliations, weathered micaceous grains, biotite, quartz, feldspar, SAPROLITE; cohesive, w-PL, firm	SP & ML		18.00					
					406.05					
20	410	23.50 - 25.00 SAND, fine to coarse angular sand, non-plastic fines, some angular fine gravels (core stones); yellowish gray (5Y 7/2) to very pale orange (10YR 8/2), highly to moderately weathered (W4 to W3), strong relict foliations, weathered micaceous grains, biotite, quartz, feldspar, SAPROLITE; non-cohesive, moist, compact	SM		23.50	4		6.70 10.00	0.010" - Screen Slot	
		25.00 - 26.00 SAND, fine to coarse angular sand, non-plastic fines, some angular fine gravels (core stones); yellowish gray (5Y 7/2) to very pale orange (10YR 8/2), highly to moderately weathered (W4 to W3), strong relict foliations, weathered micaceous grains, biotite, quartz, feldspar, SAPROLITE; non-cohesive, moist, compact	SP-SM		404.55					
					403.55					
25	405	26.00 - 29.00 SAND, medium sub-rounded sand, trace non-plastic fines; light brown (5YR 5/6), completely weathered (W5), quartz, feldspar, weathered micaceous grains, SAPROLITE; non-cohesive, wet, compact	SP		400.55	5		2.50 2.50	#1 Sand -	
		29.00 - 33.00 SAND, fine to medium sub-angular sand, low plasticity fines, trace fine angular gravels (core stones); pale yellowish brown (10YR 6/2) mottled black (N1) and light brown (5YR 5/6) and greenish gray (5GY 6/1), highly to moderately weathered (W4 to W3), strong relict foliations, quartz, weathered micaceous grains, biotite, feldspar, SAPROLITE; cohesive, w>PL, very stiff	SM		29.00					
					396.55					
30	400	33.00 - 36.00 SAND, medium sub-rounded sand, trace non-plastic fines; light brown (5YR 5/6), completely weathered (W5), quartz, feldspar, weathered micaceous grains, SAPROLITE; non-cohesive, wet, compact	ML		33.00	5		2.50 2.50	#1 Sand -	
		36.00 - 38.50 TRANSITIONALLY WEATHERED ROCK, low plasticity fines, fine sand; light brown (5YR 5/6), white (N9) black (N1), some relict foliations, moderately weathered (W3), feldspar, biotite, quartz, weathered micaceous grains, cohesive, w-PL, hard	SM		393.55					
					36.00					
35	395	38.50 - 39.00 TRANSITIONALLY WEATHERED ROCK, low plasticity fines, fine sand; light brown (5YR 5/6), white (N9) black (N1), some relict foliations, moderately weathered (W3), feldspar, biotite, quartz, weathered micaceous grains, cohesive, w-PL, hard	TWR		391.05					
40	390									
45	385									

LOG SCALE: 1 in = 5.5 ft
DRILLING COMPANY: Caribbean Drilling Services
DRILLER: Dale Osterburg

GA INSPECTOR: Jeffrey Ingram
CHECKED BY: Rachel P. Kirkman, P.G.
DATE: 9/29/17



RECORD OF BOREHOLE PZ-231

SHEET 1 of 2

PROJECT: SCS Plant Branch
PROJECT NUMBER: 166-0939
DRILLED DEPTH: 67.00 ft
LOCATION: Milledgeville, GA

DRILL RIG: Mini-Sonic Track Mounted Rig
DATE STARTED: 7/27/16
DATE COMPLETED: 7/29/16

NORTHING: 1,162,974.25
EASTING: 2,557,877.88
GS ELEVATION: 424.95
TOC ELEVATION: 427.90 ft

DEPTH W.L.: 52.00 (bgs)
ELEVATION W.L.: 375.90 (amsl)
DATE W.L.: 07/29/2016
TIME W.L.: na

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE				SAMPLES			MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES	WELL CONSTRUCTION DETAILS
		DESCRIPTION	USCS	GRAPHIC LOG	ELEV. DEPTH (ft)	SAMPLE NO.	TYPE	REC		
0		0.00 - 6.00 sandy SILT, fine sand, reddish brown, cohesive, w < PL	ML			1		6.00 6.00		WELL CASING Interval: 0'-56.5' Material: Schedule 40 PVC Diameter: 2" Joint Type: Threaded WELL SCREEN Interval: 56.5'-66.5' Material: Schedule 40 PVC Diameter: 2" Slot Size: 0.010" End Cap: PVC FILTER PACK Interval: 54.5'-67' Type: 54.5-55.0 - 30/45 Sand; 55.5-67 - #1 Sand FILTER PACK SEAL Interval: 48.5'-54.5' Type: 52.5'-54.5' - 3/8" Bentonite Pellets, 50.5' -52.5' - 3/8" Bentonite Chips ANNULUS SEAL Interval: 0' - 48.5' Type: Portland Cement (Type II) WELL COMPLETION Pad: 4'x4'x4" Protective Casing: Anodized Aluminium DRILLING METHODS Soil Drill: 4-inch Sonic Rock Drill: 4-inch Sonic
5	420	6.00 - 16.00 silty SAND, fine to medium sand, light reddish brown, non-cohesive, moist, micaceous			418.95 6.00					
10	415					2		8.00 10.00		
15	410	16.00 - 24.00 light grayish brown	SM		408.95 16.00					
20	405					3		5.40 10.00		
25	400	24.00 - 36.00 silty SAND, fine to coarse, trace gravel, light grayish brown, moist, relict rock structure apparent, SAPROLITE			400.95 24.00				Portland Cement - (Type II)	
30	395					4		7.50 10.00		
35	390	36.00 - 37.00 No Recovery			388.95 36.00 387.95	5		0.00 1.00		
40	385	37.00 - 40.00 Biotite Gneiss, highly competent, little weathering	GNEISS		37.00	6		2.50 3.00		
		40.00 - 42.00 Difficult drilling			384.95 40.00					
		42.00 - 67.00 Biotite Gneiss			382.95 42.00	7		0.00 6.00		
45	380	Log continued on next page								

BOREHOLE RECORD PLAT BRANCH LOGS GPJ PIEDMONT.GDT 9/18/17

LOG SCALE: 1 in = 5.5 ft
DRILLING COMPANY: Cascade
DRILLER: John Vasquez

GA INSPECTOR: Randy Pettyjohn
CHECKED BY: Rachel P. Kirkman, P.G.
DATE: 9/29/17



RECORD OF BOREHOLE PZ-231

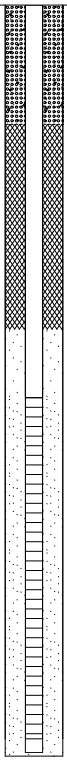
SHEET 2 of 2

PROJECT: SCS Plant Branch
PROJECT NUMBER: 166-0939
DRILLED DEPTH: 67.00 ft
LOCATION: Milledgeville, GA

DRILL RIG: Mini-Sonic Track Mounted Rig
DATE STARTED: 7/27/16
DATE COMPLETED: 7/29/16

NORTHING: 1,162,974.25
EASTING: 2,557,877.88
GS ELEVATION: 424.95
TOC ELEVATION: 427.90 ft

DEPTH W.L.: 52.00 (bgs)
ELEVATION W.L.: 375.90 (amsl)
DATE W.L.: 07/29/2016
TIME W.L.: na

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE				SAMPLES			MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES	WELL CONSTRUCTION DETAILS
		DESCRIPTION	USCS	GRAPHIC LOG	ELEV. DEPTH (ft)	SAMPLE NO.	TYPE	REC		
45		42.00 - 67.00 Biotite Gneiss (Continued)				7			 3/8" Bentonite Pellets 3/8" Bentonite Chips #1 Sand - 0.010" Slot Size	WELL CASING Interval: 0'-56.5' Material: Schedule 40 PVC Diameter: 2" Joint Type: Threaded WELL SCREEN Interval: 56.5'-66.5' Material: Schedule 40 PVC Diameter: 2" Slot Size: 0.010" End Cap: PVC FILTER PACK Interval: 54.5'-67' Type: 54.5-55.0 - 30/45 Sand; 55.5-67 - #1 Sand FILTER PACK SEAL Interval: 48.5'-54.5' Type: 52.5'-54.5' - 3/8" Bentonite Pellets, 50.5'-52.5' - 3/8" Bentonite Chips ANNULUS SEAL Interval: 0' - 48.5' Type: Portland Cement (Type II) WELL COMPLETION Pad: 4'x4'x4" Protective Casing: Anodized Aluminium DRILLING METHODS Soil Drill: 4-inch Sonic Rock Drill: 4-inch Sonic
50	375					8		6.00 10.00		
55	370									
60	365					9		8.60 10.00		
65	360									
		Boring completed at 67.00 ft			357.95					
70	355									
75	350									
80	345									
85	340									
90	335									

LOG SCALE: 1 in = 5.5 ft
DRILLING COMPANY: Cascade
DRILLER: John Vasquez

GA INSPECTOR: Randy Pettyjohn
CHECKED BY: Rachel P. Kirkman, P.G.
DATE: 9/29/17



BOREHOLE RECORD PLAT BRANCH LOGS GPJ PIEDMONT.GDT 9/18/17

RECORD OF BOREHOLE PZ-261

SHEET 1 of 1

PROJECT: SCS Plant Branch
PROJECT NUMBER: 166-0939
DRILLED DEPTH: 30.50 ft
LOCATION: Milledgeville, GA

DRILL RIG: TS-150 Track Mounted Rig
DATE STARTED: 7/26/16
DATE COMPLETED: 7/26/16

NORTHING: 1,160,669.95
EASTING: 2,561,625.75
GS ELEVATION: 368.10
TOC ELEVATION: 370.93 ft

DEPTH W.L.: 18.71 (bgs)
ELEVATION W.L.: 352.22 (amsl)
DATE W.L.: 7/21/2016
TIME W.L.: 13:00

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE				SAMPLES			MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES	WELL CONSTRUCTION DETAILS
		DESCRIPTION	USCS	GRAPHIC LOG	ELEV.	SAMPLE NO.	TYPE	REC		
					DEPTH (ft)					
0		0.00 - 4.30 SILTY SAND, fine to coarse angular sand, non-plastic fines, trace fine to coarse sub-angular gravels; moderate reddish brown (10YR 4/6), some weathered micaceous grains, non-cohesive, compact, dry	SM							
365					363.8	1		6.90 7.00	Portland Cement – (Type II)	WELL CASING Interval: 0.0'-20.5' Material: Schedule 40 PVC Diameter: 2" Joint Type: Threaded
5		4.30 - 6.10 SAND, fine to medium sub-angular sand, trace fine angular gravel (weathered bedrock); dusky brown (5YR 2/2), completely weathered (W5), SAPROLITE; non-cohesive, dry, compact	SP		4.30					WELL SCREEN Interval: 20.5'-30.5' Material: Schedule 40 PVC Diameter: 2" Slot Size: 0.006" End Cap: Schedule 40 PVC
360		6.10 - 8.50 SILTY SAND, fine sand, non-plastic to low plasticity fines; light brown (5YR 6/6) to moderate reddish brown (10YR 4/6), highly weathered (W4), some relic foliations in core stones, weathered micaceous grains and quartz, SAPROLITE; cohesive, w<PL, firm	SM		362					FILTER PACK Interval: 17.0'-30.5' Type: 17.0'-18.0' 30/45 Sand - 18.0'-30.5' #1 Sand
10		8.50 - 9.40 Gravelly SAND, fine to medium angular sand, fine to coarse soft angular gravels (weathered core stones), trace non-plastic fines; very pale orange (10YR 8/6) with black (N1) and pale yellowish orange (10YR 6/6) core stones, highly weathered (W4), weathered micaceous grains, biotite, and quartz, SAPROLITE; non-cohesive, dry, dense	SP		359.6	2		3.00 3.00		FILTER PACK SEAL Interval: 12.0'-17.0' Type: 12.0'-15.0' 3/8" Bentonite Chips - 15.0'-17.0' 3/8" Bentonite Pellets
355		9.40 - 12.80 SAND, medium to coarse sub-angular sand, some coarse soft angular gravels (weathered core stones); light brown (5YR 5/6), completely weathered (W5), SAPROLITE; non-cohesive, dry, dense to very dense	SP		358.7					ANNULUS SEAL Interval: 2'-12' Type: Portland Cement (Type II)
15		12.80 - 14.30 SILTY SAND, fine to medium sub-angular sand, non-plastic to low plasticity fines, some fine to coarse soft angular gravels (weathered core stones); very pale orange (10YR 8/2) to dark yellowish orange (10YR 6/6), highly weathered (W4), weathered micaceous minerals, biotite and quartz, SAPROLITE; non-cohesive, moist, dense	SM		355.3	3		6.00 6.00		WELL COMPLETION Pad: 4'x4'x4" Protective Casing: Anodized Aluminum
350		14.30 - 15.50 TRANSITIONALLY WEATHERED ROCK, fine to medium sub-angular sand, non-plastic to low plasticity fines, trace soft angular gravels (weathered core stones); light gray (N7), medium weathered (W3), quartz and biotite, non-cohesive, moist, very dense	TWR		353.8					DRILLING METHODS Soil Drill: 4-inch Sonic Rock Drill: 4-inch Sonic
20		15.50 - 20.00 BEDROCK, Fresh (W1) to slightly weathered (W2), strongly foliated (1 to 2 cm thick), light gray (N7) to grayish black (N2) mottled brownish gray (5YR 4/1) and medium bluish gray (5B 5/10) with some light brown (5YR 5/6) staining, fine to medium grained, non-porous to faintly porous, very strong (R4), GNEISS with hornblende, biotite and quartz, moist.	GNEISS		14.30	4		3.30 4.00		
345		20.00 - 30.50 fresh (W1), some weathered fracture surfaces (spaced ~2 feet apart), trace weathered micaceous grains			352.6					
340					15.50					
30					348.1					
335					20.00					
330										
325										
320										
315										
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BOREHOLE RECORD PLAT BRANCH LOGS GPJ PIEDMONT.GDT 9/18/17

LOG SCALE: 1 in = 5.5 ft
DRILLING COMPANY: Cascade Drilling
DRILLER: Trenton Herod

GA INSPECTOR: Jeffrey Ingram
CHECKED BY: Rachel P. Kirkman, P.G.
DATE: 9/29/17



RECORD OF BOREHOLE PZ-281

SHEET 1 of 1

PROJECT: SCS Plant Branch
PROJECT NUMBER: 166-0939
DRILLED DEPTH: 25.00 ft
LOCATION: Milledgeville, GA

DRILL RIG: Mini-Sonic Track Mounted Rig
DATE STARTED: 7/23/16
DATE COMPLETED: 7/24/16

NORTHING: 1,159,504.90
EASTING: 2,560,150.20
GS ELEVATION: 362.40
TOC ELEVATION: 364.88 ft

DEPTH W.L.: 10.5 (bgs)
ELEVATION W.L.: 354.38 (amsl)
DATE W.L.: 7/23/16
TIME W.L.: 7:30

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE				SAMPLES			MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES	WELL CONSTRUCTION DETAILS
		DESCRIPTION	USCS	GRAPHIC LOG	ELEV. DEPTH (ft)	SAMPLE NO.	TYPE	REC		
0		0.00 - 5.00 SILT, NP, some fine-medium sand, trace subrounded fine gravel; reddish brown mottled light grey, whigly weathered, massive, micaceous, SAPROLITE; NC, dry, compact	ML			1		4.00 5.00	Portland Type 1	WELL CASING Interval: 0'-14.0' Material: Schedule 40 PVC Diameter: 2" Joint Type: Threaded
5		5.00 - 6.10 sandy SILT, NP, finesand, trace subrounded fine quartz gravel; light reddish grey brown, moderately weathered, massive, micaceous, SAPROLITE; NC, dry, loose	MLS		357.4 5.00 356.3	2		5.00 5.00	3/8" Bentonite -- Chips	WELL SCREEN Interval: 14.0-24.0' Material: Schedule 40 PVC Diameter: 2" Slot Size: 0.010" End Cap: Schedule 40 PVC
		6.10 - 9.50 SAND, poorly graded, fine-medium grain, some silt, trace subangular coarse gravel; grey lightly weathered, massive, micaceous, SAPROLITE; NC, dry, very loose	SP		6.10					FILTER PACK Interval: 11.0'-24.0' Type: 11.0'-12.0', 30/45 fine sand; 12.0'-24.0', #1 sand
10		9.50 - 10.00 TRANSITIONALLY WEATHERED ROCK, slightly weathered, foliated; brown to light yellowish brown, medium crystalline, weak rock, biotite GNEISS, biotite, quartz, feldspar, intensely fractured	TWR SPG		352.9 352.4	3		5.00 5.00	3/8" Bentonite -- Pellets #1 30/45 FineSand	FILTER PACK SEAL Interval: 6.0'-11.0' Type: 6.0'-9.0', 3/8" Bentonite Chips; 9.0'-11.0', Bentonite Pellets
		10.00 - 10.80 gravelly SAND, well graded, medium-coarse grain, some subangular coarse grain gravel, trace silt, trace subrounded cobbles; olive brown, moderately weathered, massive, homogenous, micaceous, SAPROLITE; NC, moist, loose	ML		351.6 350.9					ANNULUS SEAL Interval: 2.0'-6.0' Type: Portland Cement (Type I)
		10.80 - 11.50 SILT, NP, some medium-coarse sand, trace quartz fine angular gravel; reddish brown, moderately weathered, massive, micaceous, SAPROLITE; cohesive, wet, firm	SPG		11.50					
15		11.50 - 15.00 gravelly SAND, well graded, medium-coarse grain, some subangular coarse grain gravel, trace silt, trace subrounded cobbles; olive brown, moderately weathered, massive, homogenous, micaceous, SAPROLITE; NC, moist, loose	TWR		347.4 15.00	4		3.50 5.00	#1 Coarse Sand	WELL COMPLETION Pad: 4"x4"x4" Protective Casing: Anodized Aluminum
		15.00 - 17.80 TRANSITIONALLY WEATHERED ROCK, slightly weathered, foliated; grey brown to light yellowish brown, medium crystalline, weak rock, biotite GNEISS, biotite, quartz, feldspar, moderately fractured, fine-medium sand present, wet			344.6 17.80					
20		17.80 - 20.00 sluff in hole	GNEISS		342.4 20.00	5		5.00 5.00	0.010" Screen Slot	DRILLING METHODS Soil Drill: 4-Inch Sonic Rock Drill: 4-Inch Sonic
		20.00 - 25.00 BEDROCK, biotite GNEISS, fresh, foliated, dark grey and light grey, yellow brown discoloration, medium-very coarsely crystalline, little fractures, biotite, quartz, feldspar, wet			337.4					
25		Boring completed at 25.00 ft							#1 Sand --	
30										
35										
40										
45										

BOREHOLE RECORD PLAT BRANCH LOGS2.GPJ PIEDMONT.GDT 9/18/17

LOG SCALE: 1 in = 5.5 ft
DRILLING COMPANY: Cascade Drilling
DRILLER: Scotty Vermillion

GA INSPECTOR: Will Ethier
CHECKED BY: Rachel P. Kirkman, P.G.
DATE: 9/29/17



RECORD OF BOREHOLE PZ-31S

SHEET 1 of 1

PROJECT: SCS Plant Branch
PROJECT NUMBER: 166-0939
DRILLED DEPTH: 39.50 ft
LOCATION: Milledgeville, GA

DRILL RIG: Prosonic Truck Mounted Rig
DATE STARTED: 7/15/16
DATE COMPLETED: 7/26/16

NORTHING: 1,160,937.05
EASTING: 2,557,972.68
GS ELEVATION: 374.21
TOC ELEVATION: 376.94 ft

DEPTH W.L.: 19.6 (bgs)
ELEVATION W.L.: 357.34 (amsl)
DATE W.L.: 7/26/16
TIME W.L.: 10:07

BOREHOLE RECORD PLAT BRANCH LOGS2.GPJ PIEDMONT.GDT 9/18/17

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE				SAMPLES			MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES	WELL CONSTRUCTION DETAILS
		DESCRIPTION	USCS	GRAPHIC LOG	ELEV. DEPTH (ft)	SAMPLE NO.	TYPE	REC		
0		0.00 - 5.50 sandy SILT, NP, medium grain, trace fine gravel; reddish brown, massive, micaceous, SAPROLITE; NC, dry loose	MLS			1		7.00 7.00		WELL CASING Interval: 0'-29.5' Material: Schedule 40 PVC Diameter: 2" Joint Type: Threaded
5		5.50 - 5.80 SAND, poorly graded, fine grain; light yellowish brown; NC, dry, loose	SP MLS		368.71 5.80 367.21					WELL SCREEN Interval: 29.5'-39.5' Material: Schedule 40 PVC Diameter: 2" Slot Size: 0.010" End Cap: Schedule 40 PVC
10		5.80 - 7.00 sandy SILT, NP, medium grain, trace fine gravel; reddish brown, massive, micaceous, SAPROLITE; NC, dry, loose			7.00					FILTER PACK Interval: 26.5'-39.5' Type: 26.5'-27.5', 30/45 fine sand; 27.5'-39.5', #1 sand
15		7.00 - 9.50 fine sand, trace coarse subangular sand; brown, homogenous, micaceous, SAPROLITE; NC, dry, compact			364.71 9.50					FILTER PACK SEAL Interval: 21.5'-26.5' Type: 21.5'-24.5', 3/8" Bentonite Chips; 24.5'-26.5', Bentonite Pellets
20		9.50 - 17.00 SAND, well graded, medium grain, trace subrounded coarse sand, trace silt; grey brown with white mottle, massive, micaceous, SAPROLITE; NC, dry (moist at 16 ft), compact	SW			2		10.00 10.00		ANNULUS SEAL Interval: 2.0'-21.5' Type: Portland Cement (Type I)
25		17.00 - 19.50 clayey SAND, medium grain, poorly graded, highly plastic clay, trace subangular coarse sand; yellowish brown sand, grey clay, moderately weathered, heterogenous, micaceous; NC, moist, slightly loose	SC		357.21 17.00					WELL COMPLETION Pad: 4"x4"x4" Protective Casing: Anodized Aluminum
30		19.50 - 23.00 poorly graded, medium grain sand, low plastic clay; grey with brown mottling, homogenous, micaceous, SAPROLITE; cohesive, wet, firm	SC		354.71 19.50	3		10.00 10.00		DRILLING METHODS Soil Drill: 4-inch Sonic Rock Drill: 4-inch Sonic
35		23.00 - 25.00 highly plastic clay, trace subangular coarse sand; yellowish brown sand, grey clay, moderately weathered, heterogenous, micaceous, SAPROLITE; NC, moist, slightly loose	SC		351.21 23.00					
40		25.00 - 27.00 well graded, medium-coarse grained sand, few clay, trace subangular fine gravel, trace cobbles; dark grey clay, light brown sand with white mottling, heterogenous, micaceous, SAPROLITE; NC, moist, loose	SC		349.21 25.00					
45		27.00 - 29.50 CLAYEY SAND, poorly graded, medium grained sand, low plastic clay; grey with brown mottling, homogenous, micaceous, SAPROLITE; cohesive, wet, firm	SC		347.21 27.00					
50		29.50 - 31.50 gravelly SAND, medium-coarse sand, well graded, some angular cobbles; grey-white mottling, highly weathered bedrock, micaceous; NC, wet, very loose	SPG		344.71 29.50					
55		31.50 - 33.00 TRANSITIONALLY WEATHERED ROCK, biotite GNEISS, highly weathered, yellow, white brown, medium-coarsely crystalline, soft rock, feldspar, quartz, biotite, pulverized rock, moist, highly fractured	TWR		342.71 31.50 341.21 33.00	4		10.00 10.00		
60		33.00 - 37.00 No Recovery			337.21 336.41 38.00 334.71	5		1.00 2.50		
65		37.00 - 37.80 stuff in hole								
70		37.80 - 38.00 TRANSITIONALLY WEATHERED ROCK, biotite GNEISS, highly weathered, yellow, white brown, medium-coarsely crystalline, soft rock, feldspar, quartz, biotite, pulverized rock, wet, highly fractured								
75		38.00 - 39.50 No Recovery								
80		Boring completed at 39.50 ft								

LOG SCALE: 1 in = 5.5 ft

DRILLING COMPANY: Cascade Drilling

DRILLER: John Vasquez

GA INSPECTOR: Will Ethier

CHECKED BY: Rachel P. Kirkman, P.G.

DATE: 9/29/17



RECORD OF BOREHOLE PZ-35I

SHEET 1 of 2

PROJECT: SCS Plant Branch
PROJECT NUMBER: 166-0939
DRILLED DEPTH: 60.00 ft
LOCATION: Milledgeville, GA

DRILL RIG: Mini-Sonic Track Mounted Rig
DATE STARTED: 7/25/16
DATE COMPLETED: 7/26/16

not surveyed
GS ELEVATION:
TOC ELEVATION:

DEPTH W.L.: NA (bgs)
ELEVATION W.L.: (amsl)
DATE W.L.: NA
TIME W.L.: NA

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE				SAMPLES			MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES	WELL CONSTRUCTION DETAILS
		DESCRIPTION	USCS	GRAPHIC LOG	ELEV. DEPTH (ft)	SAMPLE NO.	TYPE	REC		
0		0.00 - 4.00 Sandy SILT, sub-angular fine to medium sand; brown-orange; dry	ML			1		4.20 5.00		WELL CASING Interval: NA Material: NA Diameter: NA Joint Type: NA WELL SCREEN Interval: NA Material: NA Diameter: NA Slot Size: NA End Cap: NA FILTER PACK Interval: NA Type: NA FILTER PACK SEAL Interval: NA Type: NA ANNULUS SEAL Interval: 0'-60' Type: 3/8" Bentonite Chips WELL COMPLETION Pad: NA Protective Casing: NA DRILLING METHODS Soil Drill: 4-inch Sonic Rock Drill: N/A NA
5		4.00 - 7.00 SILTY SAND, sub-angular fine to medium sand; brown orange; moist, firm	SM		4.00					
		7.00 - 13.00 CLAY; brown-gray, ALLUVIAL; moist, firm	CH		7.00	2		5.00 5.00		
10										
		13.00 - 16.00 Sandy SILTY CLAY; blue-gray; moist, soft	CL		13.00	3		4.50 5.00		
15										
		16.00 - 20.00 Sandy SILT, fine to medium sand; brown-orange, micaceous, SAPROLITE	ML		16.00	4		5.00 5.00		
20										
		20.00 - 22.00 Silty SAND; black and white (salt and pepper grains), amphibole, quartz, and feldspar	SM		20.00					
		22.00 - 60.00 Sandy SILT, fine to medium sand; brown-orange, weathered micaceous grains, biotite, quartz, feldspar, SAPROLITE; moist, firm			22.00	5		5.00 5.00		
25									3/8" Bentonite Chips	
						6		4.50 5.00		
30										
						7		4.50 5.00		
35										
		35.00: stiff core	ML			8		5.00 5.00		
40										
						9		5.00 5.00		
45										
		Log continued on next page								

BOREHOLE RECORD PLAT BRANCH LOGS GPJ PIEDMONT.GDT 9/18/17

LOG SCALE: 1 in = 5.5 ft
DRILLING COMPANY: Cascade
DRILLER: Ray Whitt

GA INSPECTOR: Mike Smiley, P.G.
CHECKED BY: Rachel P. Kirkman, P.G.
DATE: 9/29/17



RECORD OF BOREHOLE PZ-351

SHEET 2 of 2

PROJECT: SCS Plant Branch
PROJECT NUMBER: 166-0939
DRILLED DEPTH: 60.00 ft
LOCATION: Milledgeville, GA

DRILL RIG: Mini-Sonic Track Mounted Rig
DATE STARTED: 7/25/16
DATE COMPLETED: 7/26/16

not surveyed
GS ELEVATION:
TOC ELEVATION:

DEPTH W.L.: NA (bgs)
ELEVATION W.L.: (amsl)
DATE W.L.: NA
TIME W.L.: NA

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE				SAMPLES			MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES	WELL CONSTRUCTION DETAILS
		DESCRIPTION	USCS	GRAPHIC LOG	ELEV. DEPTH (ft)	SAMPLE NO.	TYPE	REC		
45		22.00 - 60.00 Sandy SILT, fine to medium sand; brown-orange, weathered micaceous grains, biotite, quartz, feldspar, SAPROLITE; moist, firm (Continued) 45.00: soft core stones containing relict foliations	ML			10		5.00 5.00		WELL CASING Interval: NA Material: NA Diameter: NA Joint Type: NA WELL SCREEN Interval: NA Material: NA Diameter: NA Slot Size: NA End Cap: NA FILTER PACK Interval: NA Type: NA FILTER PACK SEAL Interval: NA Type: NA ANNULUS SEAL Interval: 0'-60' Type: 3/8" Bentonite Chips WELL COMPLETION Pad: NA Protective Casing: NA DRILLING METHODS Soil Drill: 4-inch Sonic Rock Drill: N/A NA
50						11		5.00 5.00		
55						12		5.00 5.00		
60		Boring completed at 60.00 ft								
65										
70										
75										
80										
85										
90										

BOREHOLE RECORD PLAT BRANCH LOGS GPJ PIEDMONT.GDT 9/18/17

LOG SCALE: 1 in = 5.5 ft
DRILLING COMPANY: Cascade
DRILLER: Ray Whitt

GA INSPECTOR: Mike Smalley, P.G.
CHECKED BY: Rachel P. Kirkman, P.G.
DATE: 9/29/17



RECORD OF BOREHOLE PZ-39

SHEET 1 of 2

PROJECT: SCS Plant Branch
PROJECT NUMBER: 166-0939
DRILLED DEPTH: 56.50 ft
LOCATION: Milledville, GA

DRILL RIG: TS-150 Track Mounted Rig
DATE STARTED: 7/30/16
DATE COMPLETED: 7/30/16

not surveyed
GS ELEVATION:
TOC ELEVATION:

DEPTH W.L.: 46.02 (bgs)
ELEVATION W.L.: 388.68 (amsl)
DATE W.L.: 08/02/2016
TIME W.L.: 14:15

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE				SAMPLES			MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES	WELL CONSTRUCTION DETAILS
		DESCRIPTION	USCS	GRAPHIC LOG	ELEV. DEPTH (ft)	SAMPLE NO.	TYPE	REC		
0		0.00 - 10.00 SILT, NP, reddish brown, moderately weathered, massive, micaceous, SAPROLITE; cohesive, dry, firm	ML			1				WELL CASING Interval: 0'-34.7' Material: Schedule 40 PVC Diameter: 2" Joint Type: Threaded WELL SCREEN Interval: 34.7'-44.7' Material: U-Pack Schedule 40 PVC Diameter: 2" Slot Size: 0.010" End Cap: Schedule 40 PVC FILTER PACK Interval: 31.4'-44.7' Type: 31.4'-32.5', 30/45 fine sand; 32.5'-44.7', #1 sand FILTER PACK SEAL Interval: 26.2'-31.4' Type: 26.2'-29.4', 3/8" Bentonite Chips; 29.4'-31.4', Bentonite Pellets ANNULUS SEAL Interval: 2'-26.2' Type: Portland Cement (Type II) WELL COMPLETION Pad: 4'x4'x4" Protective Casing: Anodized Aluminum DRILLING METHODS Soil Drill: 4-inch Sonic Rock Drill: N/A
5								10.00 10.00		
10		10.00 - 15.00 No Recovery			10.00	2		5.00 10.00	Portland Cement — (Type II)	
15		15.00 - 19.50 SILT, NP, trace fine sand; reddish brown, moderately weathered, massive, micaceous, SAPROLITE; cohesive, dry, firm	ML		15.00					
20		19.50 - 20.00 trace fine-coarse sand; white mottling, relict rock structure, micaceous, SAPROLITE; cohesive, dry, soft			19.50 20.00	3			3/8" Bentonite — Chips	
25		20.00 - 22.00 No Recovery			22.00					
30		22.00 - 30.00 SILT, NP, trace fine-coarse sand; reddish brown with white mottling, moderately weathered, relict rock structure, micaceous, SAPROLITE; cohesive, moist, soft	ML			4		8.00 10.00	3/8" Bentonite — Pellets	
35		30.00 - 33.00 No Recovery			30.00					
40		33.00 - 34.00 SILT, NP, trace fine-coarse sand; reddish brown with white mottling, moderately weathered, relict rock structure, micaceous, SAPROLITE; cohesive, moist, soft	ML		33.00 34.00	5		7.00 10.00	30/45 Sand —	
45		34.00 - 40.00 light grey brown								
		40.00 - 45.20 sandy SILT, NP, fine-medium grain sand, trace coarse sand; reddish light grey brown mottled, moderately weathered, relict foliation structure, micaceous, SAPROLITE; cohesive, wet, very soft	MLS		40.00			6.50 6.50	#1 Sand —	
		40.00 - 45.20 sandy SILT, NP, fine-medium grain sand, trace coarse sand; reddish light grey brown mottled, moderately weathered, relict foliation structure, micaceous, SAPROLITE; cohesive, wet, very soft							0.010" — Screen Slot	
45		Log continued on next page								

LOG SCALE: 1 in = 5.5 ft
DRILLING COMPANY: Cascade Drilling
DRILLER: Trenton Herod

GA INSPECTOR: Will Ethier
CHECKED BY: Rachel P. Kirkman, P.G.
DATE: 9/29/17



BOREHOLE RECORD PLAT BRANCH LOGS2.GPJ PIEDMONT.GDT 9/18/17

RECORD OF BOREHOLE PZ-39

SHEET 2 of 2

PROJECT: SCS Plant Branch
PROJECT NUMBER: 166-0939
DRILLED DEPTH: 56.50 ft
LOCATION: Milledgeville, GA

DRILL RIG: TS-150 Track Mounted Rig
DATE STARTED: 7/30/16
DATE COMPLETED: 7/30/16

not surveyed
GS ELEVATION:
TOC ELEVATION:

DEPTH W.L.: 46.02 (bgs)
ELEVATION W.L.: 388.68 (amsl)
DATE W.L.: 08/02/2016
TIME W.L.: 14:15

DEPTH (ft)	ELEVATION (ft)	SOIL PROFILE				SAMPLES			MONITORING WELL/ PIEZOMETER DIAGRAM and NOTES	WELL CONSTRUCTION DETAILS
		DESCRIPTION	USCS	GRAPHIC LOG	ELEV. DEPTH (ft)	SAMPLE NO.	TYPE	REC		
45		45.20 - 46.20 silty SAND, well graded fine-coarse sand, angular, NP, trace subangular cobbles, weathered bedrock, quartz, mica; grey brown, lightly weathered, relict foliation structures, micaceous, SAPROLITE, cohesive, wet, very soft	SM		45.20	5		6.50 6.50	#1 Sand	WELL CASING Interval: 0'-34.7' Material: Schedule 40 PVC Diameter: 2" Joint Type: Threaded WELL SCREEN Interval: 34.7'-44.7' Material: U-Pack Schedule 40 PVC Diameter: 2" Slot Size: 0.010" End Cap: Schedule 40 PVC FILTER PACK Interval: 31.4'-44.7' Type: 31.4'-32.5', 30/45 fine sand; 32.5'-44.7', #1 sand FILTER PACK SEAL Interval: 26.2'-31.4' Type: 26.2'-29.4', 3/8" Bentonite Chips; 29.4'-31.4', Bentonite Pellets ANNULUS SEAL Interval: 2'-26.2' Type: Portland Cement (Type II) WELL COMPLETION Pad: 4'x4'x4" Protective Casing: Anodized Aluminum DRILLING METHODS Soil Drill: 4-inch Sonic Rock Drill: N/A
		46.20 - 56.50 Fresh, foliated, dark grey, white, red, finely-medium crystalline, highly competent rock, biotite GNEISS, little fractured			46.20	6		3.50 3.50		
50			GNEISS						3/8" Bentonite Chips	
55									3/8" Bentonite Pellets	
60		Boring completed at 56.50 ft								
65										
70										
75										
80										
85										
90										

LOG SCALE: 1 in = 5.5 ft
DRILLING COMPANY: Cascade Drilling
DRILLER: Trenton Herod

GA INSPECTOR: Will Ethier
CHECKED BY: Rachel P. Kirkman, P.G.
DATE: 9/29/17



BOREHOLE RECORD PLAT BRANCH LOGS2.GPJ PIEDMONT.GDT 9/18/17

WELL DEVELOPMENT FIELD RECORD

Job Name Plant Branch Job No. 1660939 Well No. PZ-245 / A-GWC-1
 Developed By J Grimes Date Of Installation 8-4 Sheet _____ Of _____
 Started Development 8-4 / 1335 Completed Development 8/5/16 / 18:35 11:45
DATE TIME DATE TIME
 W.L. Before Development 8-4 / 1335 14.42 After Development 8/5/16 1125 16.39
DATE TIME DATE TIME
 Well Depth: _____
 Before Development 45.25 After Development _____ Well Diameter _____ in.
 Standing Water Column (Ft) _____ Standing Well Volume _____ gal.
 Screen Length 10 Drilling Water Loss _____ gal.

DATE/TIME	VOLUME REMOVED (GALS)	FIELD PARAMETERS				REMARKS
		SPEC.COND. (unhos/cm)	TEMP (C)	pH (s.u.)	OTHER	
8-4 / 1345	0				>1000	WL 17.02, 2.75' min
1500					946	WL 29.75, "
1635	121 (467.5)				48.1	WL 31.03, 200 ml/min
1715	123 (475.5)				35.2	end due to rain / 1 hour later
8-5 / 0735	123 (475.5)				19.1	WL 15.31, 150 ml/min
0940	128 (494.3)				67	end w/ attorn 290
1005	128 (494.3)				998	WL 19.42, 150 ml/min
1120	132 (513.1)				12.6	WL 18.40, readings
1145	134 (511.1)	247.00	22.39	5.84	8.10	WL, 18.39, end
				DO 0.84		
				ORP -282.40		
		= TOTAL VOLUME REMOVED (gal.)				

DEVELOPMENT METHOD: _____

NOTES:

PZ-25I /
B-6WC-1

Started Development 8/2 0945 Completed Development 8/2 1605
DATE TIME DATE TIME

Well Depth: Before Development 23.63 After Development 23.56 Well Diameter 2 in.

Screen Length 10 Drilling Water Loss _____ gal

DEVELOPMENT METHOD: _____

NOTES: Subtract 10 mins from initial pump duration, valve stuck open
LaMotte 5131-5014
Smartroll 25475

WELL DEVELOPMENT FIELD RECORD

Job Name Branch Job No. 1660939 Well No. PZ-26I / B-GWC-2
 Developed By Will Ballow Date Of Installation _____ Sheet _____ Of _____
 Started Development 8-2 / 1040 Completed Development _____ / _____
DATE TIME DATE TIME
 W.L. Before Development 8-2 / 1040 21.84 After Development _____ / _____
DATE TIME DATE TIME
 Well Depth: _____
 Before Development 33.70 After Development _____ Well Diameter _____ in.
 Standing Water Column (Ft.) 11.86 Standing Well Volume 1.93 gal.
 Screen Length 10 ft Drilling Water Loss _____ gal.

DATE/TIME	VOLUME REMOVED (GALS)	FIELD PARAMETERS				REMARKS
		SPEC.COND. (unhos/cm)	TEMP (C)	pH (s.u.)	OTHER	
8/2 / 1050					21000	WL 21.95, 2 1/2 min
1105						Well dry
1635					73.8	WL 24.31, 2 1/2 min
1645	21					Well dry
/						
/						
/						
/						
/						
/						
/						
/						
/						
/						
		= TOTAL VOLUME REMOVED (gal.)				

DEVELOPMENT METHOD: _____

NOTES:

WELL DEVELOPMENT FIELD RECORD

P2-26I1

Job Name Branch Job No. 1660939 Well No. B-GWC-2

Developed By A-ELLIS Date Of Installation _____ Sheet _____ Of _____

Started Development 8/2/16 10:40 Completed Development _____ / _____
DATE TIME DATE TIME

W.L. Before Development 8/2/16 10:40 21.89 After Development 8/11/16 / 27 / 27.54
DATE TIME DATE TIME

Well Depth: 33.70
~~8/10~~ Before Development 33.65 After Development 33.05 Well Diameter 2 in.

Standing Water Column (Ft.) 11.86 Standing Well Volume 1.93 gal.

Screen Length 10 ft Drilling Water Loss _____ gal.

DATE/TIME	VOLUME REMOVED (GALS)	FIELD PARAMETERS				REMARKS
		SPEC.COND. (unhos/cm)	TEMP (C)	pH (s.u.)	OTHER NTU	
8/10 / 1026					297	WL = 23.00
/ 1046						
/ 1305					104	WL = 25.40
/ 1316	30				23.9	
8/11 / 1130						WL = 22.23
/ 1146	START					RATE = 400ML/M
/ 1217	END(3)	618.81	19.27	6.17	6.32	WL = 26.55
/						
/						
/						
/						
	33	= TOTAL VOLUME REMOVED (gal.)				

DEVELOPMENT METHOD: RECLAIMER LOW-FLOW

NOTES: SMARTROLL - R26214
HACH 2100Q - 31406

WELL DEVELOPMENT FIELD RECORD

Job Name Plant Branch Job No. 1660939 Well No. PZ-275/ C-GWC-1
 Developed By J Grimes Date Of Installation 8/4 Sheet _____ Of _____
 Started Development 8-4 / 0735 Completed Development 8-4 / 1140
DATE TIME DATE TIME
 W.L. Before Development 8-4 / 0735 4.03 After Development 8-4 / 1140 4.08
DATE TIME DATE TIME
 Well Depth: _____
 Before Development 27.28 After Development 27.23 Well Diameter 2 in.
 Standing Water Column (Ft) _____ Standing Well Volume _____ gal
 Screen Length 10 Drilling Water Loss _____ gal

DATE/TIME	VOLUME REMOVED (GALS)	FIELD PARAMETERS				REMARKS
		SPEC.COND. (unhos/cin)	TEMP (C)	pH (s.u.)	OTHER	
8-4 / 0750	0				21000	WL 4.97, 2.5 L/min
1020	1020 97 (375)				23.7	WL 4.58, 170 ml/min
1110	1110 98 (381)				8.67	WL 4.11, " readings
1135	99 (384)	730.20	24.41	5.58	8.52	WL 4.10, end
/				DO	0.09	
/				ORP	102.60	
/						
/						
/						
/						
/						
/						
/						
/						
/						
		= TOTAL VOLUME REMOVED (gal.)				

DEVELOPMENT METHOD: _____

NOTES La Matte 5131 - 5014
Smartroll 369922

WELL DEVELOPMENT FIELD RECORD

PZ-281/

Job Name Pant Branch Job No. 1660939 Well No. C-64C-2

Developed By J. Grimes Date Of Installation _____ Sheet _____ Of _____

Started Development 8/3 / 1135 Completed Development _____ / _____

DATE TIME DATE TIME DATE TIME

W.L. Before Development 8/3 / 1140 14.7 After Development 8/04/2016 10:00 121.90

DATE TIME DATE TIME DATE TIME

Well Depth: _____

Before Development 27.61 After Development 27.6844 Well Diameter 2 in.

Standing Water Column (Ft) 12.9 Standing Well Volume 2.107 gal

Screen Length 10 ft Drilling Water Loss _____ gal

DATE/TIME	VOLUME REMOVED (GALS)	FIELD PARAMETERS				REMARKS
		SPEC.COND. (unhos/cm)	TEMP (C)	pH (s.u.)	OTHER	
8/3 / 1150					>1000	WL 16.81, 2 L/min
1225						Well dry
1240					440	WL 16.00, 2 L/min
1309						Well dry
1325					48.8	WL 16.00, 2 L/min
1400	34				107.1	Well dry
1420	36				18.1	WL 16.05, 200 mL/min
1450	36				65.8	WL 15.92, 1.5 L/min
1455	38				24.6	WL 16.35, 100 mL/min
1635	41				25.4	WL 15.65, end Wellbore
8/04 / 9:30	Starte	low flow				
8/04 / 9:50	3	903.01	19.14	5.14	0.89	WL = 15.75
/						
/						
		= TOTAL VOLUME REMOVED (gal.)				

DEVELOPMENT METHOD: _____

NOTES:

WELL DEVELOPMENT FIELD RECORD

P2-29I/
C-6WC-3

Job Name Plant Branch Well Development Job No. 1660939 Well No. C-6WC-3
Developed By J. Grimes Date Of Installation 8/3 Sheet 1 Of 1
Started Development 8/3 / 0800 Completed Development 8-3-16 / 1700
DATE TIME DATE TIME

W.L. Before Development 8/3 / 0800 9.69 After Development 8/3/16 / 1717 9.85
DATE TIME DATE TIME

Well Depth:

Before Development 23.45 After Development 23.11 Well Diameter 2 in.

Standing Water Column (Ft.) 13.76 Standing Well Volume _____ gal.

Screen Length 10' Drilling Water Loss _____ gal.

DATE/TIME	VOLUME REMOVED (GALS)	FIELD PARAMETERS				REMARKS
		SPEC.COND. (unhos/cm)	TEMP (C)	pH (s.u.)	OTHER	
<u>8/3 0820</u>	<u>0</u>				<u>21000</u>	<u>WL 10.68, 2.5 gpm</u>
<u>1020</u>	<u>79.18.4</u>				<u>18.1</u>	<u>WL 10.02, 120 ml/min</u>
<u>1045</u>	<u>79.8</u>				<u>12.1</u>	<u>WL 10.21, stop wait for 7 min</u>
<u>1225</u>	<u>79.8</u>				<u>35.1</u>	<u>WL 10.18, 225 ml/min</u>
<u>1240</u>	<u>80.6</u>				<u>41.5</u>	<u>WL 9.86, 100 ml/min</u>
<u>1430</u>	<u>83.5</u>	<u>Stop Water</u>			<u>38.9</u>	<u>WL 9.58, 100 ml/min</u>
<u>1445</u>	<u>83.5</u>	<u>Begin Reclaimer</u>			<u>12.8</u>	<u>WL 9.76, 325 ml/min</u>
<u>1535</u>	<u>87.8</u>				<u>12.3</u>	<u>WL 9.99, 1.0 gpm</u>
<u>1625</u>					<u>12.1</u>	<u>WL 12.67, 200 ml/min</u>
<u>1640</u>					<u>12.00</u>	<u>WL 9.94, "</u>
<u>1700</u>		<u>907.95</u>	<u>23.43</u>	<u>4.63</u>	<u>6.23</u>	<u>WL 9.89, "</u>
= TOTAL VOLUME REMOVED (gal)						

DEVELOPMENT METHOD: Water Pump → Reclaimer

NOTES: DTP = Depth to Pump (ft)

WELL DEVELOPMENT FIELD RECORD

P2-30I/

Job Name BRANCH MIN DEVELOPMENT Job No. 11660939 Well No. D-GWC-1

Developed By A. Ellis Date Of Installation _____ Sheet 1 Of 1

Started Development 8/4/2016 0805 Completed Development 8/9/2016 13:40
DATE TIME DATE TIME

W.L. Before Development 8/4/2016 0800 4.32 After Development 8/9/2016 13:40
DATE TIME DATE TIME

Well Depth:

Before Development 22.68 After Development 22.63 Well Diameter 2 in.

Standing Water Column (Ft.) 18.36 Standing Well Volume 3 gal

Screen Length 10' Drilling Water Loss _____ gal

DATE/TIME	VOLUME REMOVED (GALS)	FIELD PARAMETERS				REMARKS
		SPEC.COND. (unhos/cm)	TEMP (C)	pH (s.u.)	OTHER	
8/4 805	0				>1000	2 L/m
1150	120					STOPPED
8/5 900	120				>1000	2 L/m
915	128				>1000	200 mL/m
940					5.18	
950					3.25	
1000					3.13	
1045	133				194	STOPPED
8/9 1300	133				>1000	2 L/m
1310					91.3	
1320					8.18	
1340					71.7	
		= TOTAL VOLUME REMOVED (gal.)				

1350 173

1424 177

728.37 21.08 6.22

7.75

3.37

375 mL/m START LOW FLOW

DO = 0.14 / ORP = 141.87

DEVELOPMENT METHOD: 8/4-5 - WATER SURGING
8/5 - WATER LOW FLOW

NOTES:

WELL DEVELOPMENT FIELD RECORD

Job Name BRANCH MW DEVELOPMENT Job No. 1660939 Well No. P2-315/D-GWC-2
 Developed By A. ELLIS Date Of Installation _____ Sheet 1 Of 1
 Started Development 8/4/2016 / 0845 Completed Development 8/5/2016 / 11:45
 DATE TIME DATE TIME
 W.L. Before Development 8/4/2016 / 0830 / 23.56 After Development (23.70) 8/5/2016 12:05
 DATE TIME DATE TIME
 Well Depth: _____
 Before Development 42.09 After Development 42.80 Well Diameter 2 in.
 Standing Water Column (Ft) 12.53 Standing Well Volume 3.02 gal.
 Screen Length 10 ft Drilling Water Loss _____ gal.

DATE/TIME	VOLUME REMOVED (GALS)	FIELD PARAMETERS				REMARKS
		SPEC.COND. (unhos/cm)	TEMP (C)	pH (s.u.)	OTHER Turbidity (NTU)	
8/4 0845	0				>1000	2 L/m
1145	95				>1000	STOPPED
8/4 14:15	0				71000	PR=221min pipe returned
14:35					45.6	WL=24.65 ft PR=221min
15:00	26.4				28.4	WL=24.05 ft PR=221min
15:05					18.1	WL=23.70 ft PR=221min
15:20					10.96	WL=23.70 ft PR=221min
15:40					12.32	WL=23.67 ft PR=221min
16:45	33				65.32	WL=23.69 ft PR=221min
8/5/16 10:00	128				208	WL=24.8 ft PR=421min
10:20	144				26.7	WL=24.05 ft PR=221min
11:00	146				27.3	WL=26.3 ft PR=421min
11:21	168				1.3	WL=24.3 ft PR=421min
11:45	170	918.48	22.13	5.83	9.91	Finished low flow
		= TOTAL VOLUME REMOVED (gal.)				

DEVELOPMENT METHOD: 8/4 WATER Sucking

NOTES

WELL DEVELOPMENT FIELD RECORD

P2-291/

Job Name Plant Branch Well Development Job No. 1660939 Well No. D-6W6-3
 Developed By William Ballou Date Of Installation _____ Sheet 1 Of 1
 Started Development 8-4-16 / 1335 Completed Development 8-5-16 / 0909
DATE TIME DATE TIME

W.L. Before Development 8-4-16 / 1323 33.83' After Development 8-5-16 / 0924 34.60'
DATE TIME DATE TIME

Well Depth:

Before Development 48.31' After Development 48.34' Well Diameter 2 in.

Standing Water Column (Ft.) 14.48' Standing Well Volume _____ gal.

Screen Length 10' Drilling Water Loss _____ gal.

DATE/TIME	VOLUME REMOVED (GALS)	FIELD PARAMETERS				REMARKS
		SPEC.COND. (unhos/cm)	TEMP (C)	pH (s.u.)	OTHER N/A	
8-4-16 / 1335	0				> 1000	WL = 33.91 600 ml/min
1405	4.7				198	39.76 "
1420	7.9				195	36.34 0.5 gpm
1600	57.9				121	40.84 "
1620	72.9				58.5	40.56 400 ml/min
1715	77.6				15.9	34.94 "
8-5-16 / 0805	77.6				13.4	34.07 225 ml/min
0840					4.59	35.66 "
0849					4.56	34.98 " started low fl
0909	81.4					
8-5-16 / 9.09	73	772.76	21.44	5.77	2.93	WL = 34.88 finished low fl
/						
/						
/						
		= TOTAL VOLUME REMOVED (gal.)				

DEVELOPMENT METHOD:

Water on Pump

NOTES:

WELL DEVELOPMENT FIELD RECORD

PZ-335/

Job Name Phite Branch Job No. 1660939 Well No. EGWC 2
 Developed By Samis Sones Date Of Installation _____ Sheet _____ Of _____
 Started Development 08:15 08/3/2016 Completed Development 14:30 08/03/2016
 DATE TIME DATE TIME

W.L. Before Development [8.29] 08/15 08/3/2016 After Development [8.10] 08/3/2016
 DATE TIME DATE TIME

Well Depth:

Before Development 28.47 After Development 28.98 Well Diameter 2 in.

Standing Water Column (Ft.) 20.13 Standing Well Volume 33 gal.

Screen Length 10 Drilling Water Loss _____ gal.

DATE/TIME	VOLUME REMOVED (GALS)	FIELD PARAMETERS				REMARKS
		SPEC.COND. (unhos/cm)	TEMP (C)	pH (s.u.)	OTHER NTU	
08:30 08/3/2016	0				7100	rate = 1.5'/min, depth = 28.42
09:30 08/3/2016	24				26.8	W.L. = 9.01, depth = 28.42, rate = 1.5'/min
09:55 08/3/2016	34				12.9	W.L. = 9.63, depth = 27.42, rate = 1.5'/min
10:27 08/3/2016	36				15.0	W.L. = 9.05, depth = 26.92, rate = 1.5'/min
10:10 08/3/2016	40				10.87	W.L. = 8.42, depth = 26.42, rate = 1.5'/min
10:45 08/3/2016	40				—	Begin pumping, generator died at 10:15
10:50 08/3/2016	42				27.5	W.L. = 2.47, depth = 22.92, rate = 1.5'/min
11:00 08/3/2016	46				4.04	W.L. = 8.49, rate = 1.5'/min, depth = 21.42
11:10 08/3/2016	50				3.40	W.L. = 8.49, rate = 1.5'/min, depth = 20.42
11:30 08/3/2016	56				8.52	W.L. = 8.11, rate = 1.5'/min, depth = 19.42
13:15 08/3/2016	123				6.71	W.L. = 8.16, rate = 30' / min, depth = 20.42
14:04 8/3/16	123	582.74	23.50	5.15	1.73	W.L. = 7.16
		= TOTAL VOLUME REMOVED (gal)				

DEVELOPMENT METHOD: purging / surging

NOTES

WELL DEVELOPMENT FIELD RECORD

P2-345/

Job Name Plant Branch Job No. 1660939 Well No. E6WL 4

Developed By JAMES SOVES Date Of Installation _____ Sheet _____ Of _____

Started Development 04:00 08/3/2016 Completed Development 14:57 08/3/2016
DATE TIME DATE TIME

W.L. Before Development [2.67] 08/3/2016 After Development [2.76] 08/3/2016
DATE TIME DATE TIME

Well Depth:

Before Development 26.93 After Development 26.93 Well Diameter 2 in.

Standing Water Column (Ft) 24.26 Standing Well Volume 3.95 gal

Screen Length 10 Drilling Water Loss _____ gal

DATE/TIME	VOLUME REMOVED (GALS)	FIELD PARAMETERS				REMARKS
		SPEC.COND. (unhos/cm)	TEMP (C)	pH (s.u.)	OTHER NTU	
09:45 08/3/2016	0				21000	W.L. = 3.55, rate = 21/min, depth = 26.53
10:15 08/3/2016	16				44	W.L. = 3.59, rate = 21/min, depth = 26.53
10:55 08/3/2016	37				154	W.L. = 3.43, rate = 21/min, depth = 26.47
12:00 08/3/2016	71				21000	W.L. = 3.25, rate = 21/min, depth = 26.53
12:20 08/3/2016	87				47.8	W.L. = 3.35, rate = 21/min, depth = 26.53
12:40 08/3/2016	93				8.84	W.L. = 3.45, rate = 21/min, depth = 26.43
12:55 08/3/2016	101				19.5	W.L. = 3.45, rate = 1.5/min, depth = 26.43
13:05 08/3/2016	107				8.73	W.L. = 3.44, rate = 21/min, depth = 26.43
13:20 08/3/2016	115				1.95	W.L. = 3.44, rate = 21/min, depth = 26.43
13:45 08/3/2016	128				2.11	depth = 18.43
14:05 08/3/2016	140				2.77	depth = 16.53, rate = 300 1/min
14:57 08/3/2016	144				2.97	Finished low flow.
14:58 8/3/16	144	903.21	26.78	5.90	0.97	
		= TOTAL VOLUME REMOVED (gal)				

DEVELOPMENT METHOD:

surging / purging

NOTES

WELL DEVELOPMENT FIELD RECORD

PZ-355/LS

Job Name Plant Branch Job No. 166933 Well No. E-6W-25

Developed By JAMES SOVES Date Of Installation _____ Sheet _____ Of _____

Started Development 16:30 08/3/2016 Completed Development 22:50 08/5/2016
DATE TIME DATE TIME

W.L. Before Development [2.18] 08/3/2016 After Development [2.21] 08/5/2016
DATE TIME DATE TIME

Well Depth:

Before Development 30.21 After Development 30.21 Well Diameter _____ in.

Standing Water Column (Ft) 28.03 Standing Well Volume 4.6 gal

Screen Length 10 Drilling Water Loss _____ gal

DATE/TIME	VOLUME REMOVED (GALS)	FIELD PARAMETERS				REMARKS
		SPEC.COND. (unhos/cm)	TEMP (C)	pH (s.u.)	OTHER-NTU	
10:30 08/4/2016	0				21000	W.L. = 2.13, rate = 2/min, depth = 20.0
11:00 08/4/2016	29				21000	W.L. = 2.57, rate = 2/min, depth = 20.0
11:15 08/4/2016	36				21000	W.L. = 3.05, rate = 2/min, depth = 20.5
11:30 08/4/2016	48				21000	W.L. = 3.01, rate = 2/min, depth = 22.0
11:45 08/4/2016	60				21000	W.L. = 3.01, rate = 2/min, depth = 26
1:15 08/4/2016	60				21000	W.L. = 3.18, rate = 2/min, depth = 26
1:30 08/4/2016	72				21000	W.L. = 3.17, rate = 2/min, depth = 25.6
2:00 08/4/2016	96				21000	W.L. = 3.31, rate = 2/min, depth = 24.5
2:15 08/4/2016	105				21000	W.L. = 2.5, rate = 2/min, depth = 23.5
2:45 08/4/2016	10 132				21 13.6	W.L. = 2.8, rate = 2/min, depth = 22.5
3:05 08/4/2016	148				15.8	W.L. = 2.71, rate = 2/min, depth = 23-
3:25 08/4/2016	104				10.45	W.L. = 2.66, rate = 2/min, depth = 22.5
3:35 08/4/2016	172				-	rate = 300 ml/min
5:00 08/4/2016	178				17.5	end pumping
22:50 08/5/2016	190	= TOTAL VOLUME REMOVED (gal)			1.47	end (low) screen
		656.21	20.17	6.03	1.47	

DEVELOPMENT METHOD: pulsing / surging, backflow pump

NOTES

11:45 end pumping

WELL DEVELOPMENT FIELD RECORD

P2-365/

Job Name BRANCH MIN DEVELOPMENT Job No. 1660939 Well No. E-GWC-B

Developed By A. ELLIS Date Of Installation _____ Sheet 1 Of 1

Started Development 8/8/2016 / 10 20 Completed Development 8/9 / 12 10
DATE TIME DATE TIME

W.L. Before Development 8/8/2016 / 1100 / > 100 After Development 8/9 / 12 10
DATE TIME (ARTESIAN) DATE TIME

Well Depth:

Before Development 33.0 After Development 33.05 Well Diameter 2 in.

Standing Water Column (Ft) 33.00 Standing Well Volume _____ gal.

Screen Length 10 Drilling Water Loss _____ gal.

DATE/TIME	VOLUME REMOVED (GALS)	FIELD PARAMETERS				REMARKS
		SPEC.COND. (unhos/cm)	TEMP (C)	pH (s.u.)	OTHER	
8/8 / 1020	0				NTU	3 L/m
/ 1320	143				824	
8/9 / 1030					4.94	4 L/m
/ 1100	175					1.2 L/m
/ 1200	194					
/ 1210		306.99	18.32	5.53	1.19	DO = 3.07 ORP = 318.11
/						
/						
/						
/						
/						
		= TOTAL VOLUME REMOVED (gal.)				

DEVELOPMENT METHOD: WATERRA SURGING
RECLAIMER LOW FLOW

NOTES:

SMARTROLL - R 20214

HAZ 21009 - 31406

WELL DEVELOPMENT FIELD RECORD

Job Name BRANCH MW DEVELOP. Job No. 11660937 Well No. P2-375/ E-GWC-9
 Developed By A. ELLIS / W. BAUGH Date Of Installation _____ Sheet 1 Of 1
 Started Development 8/3/2016 / 1420 Completed Development 8/4/16 / 9:02
 DATE TIME DATE TIME
 W.L. Before Development 8/3/2016 / 1415 / 46.40 After Development 8/4 / 9:14 / 43.54
 DATE TIME DATE TIME
 Well Depth: _____
 Before Development 66.21 After Development 66.31 Well Diameter 2 in.
 Standing Water Column (Ft.) 19.81 Standing Well Volume 3.23 gal.
 Screen Length 10' Drilling Water Loss _____ gal.

DATE/TIME	VOLUME REMOVED (GALS)	FIELD PARAMETERS				REMARKS
		SPEC.COND. (unhos/cm)	TEMP (C)	pH (s.u.)	OTHER (NTU)	
8/3 / 1420	0				21000	RATE = 2 L/m
/ 1445	13				257	
/ 1600	53				42.3	
/ 1700	85				15.5	
/ 1720	96				9.41	STOPPED
8/4 / 745	96					600 ml/m WL: 46.47
/ 830					4.67	400 ml/m WL: 50.60
/ 842					1.95	WL: 51.13
/ 902		72.15	22.58	5.94	1.44	WL: 49.96 DONE
/						
/						
/						
		= TOTAL VOLUME REMOVED (gal.)				

DEVELOPMENT METHOD: 8/3-4 WATERBATH SURGING
8/4 - LOW FLOW

NOTES

WELL DEVELOPMENT FIELD RECORD

PZ-385/

Job Name BRANCH MW DEVEL. Job No. 1660939 Well No. EGWC-10

Developed By A. ELLIS Date Of Installation _____ Sheet 1 Of 1

Started Development 8/2/2016 / 15:20 Completed Development 8/04/2016 / 10:20
DATE TIME DATE TIME

W.L. Before Development 8/2/2016 / 15:15 / 19.65 After Development (21.74) 8/04/2016 / 10:40
DATE TIME DATE TIME

Well Depth:

Before Development 40.80 After Development 40.88 Well Diameter 2 in.

Standing Water Column (Ft.) 21.15 Standing Well Volume 3.45 gal

Screen Length 10' Drilling Water Loss _____ gal

DATE/TIME	VOLUME REMOVED (GALS)	FIELD PARAMETERS				REMARKS
		SPEC.COND. (unhos/cm)	TEMP (C)	pH (s.u.)	OTHER NTU	
8/2 / 1520	0				>1000	RATE = 3 L/m
/ 1630	18.5				556	
8/3 / 0800	18.5				>1000	WL: 19.75 2 L/m
/ 0910					428	
/ 1066					239	SLOW TO 300 mL/m
/ 1106	113.5				69.9	
/ 1210					27.5	100 mL/m
/ 1305	124					
/ 1409	124				25.5	STOPPED
8/04 / 1400 9:00					10.06	
/ 9:40					1.66	Reclaimer PR=200 L WL=21.85A PR=250 L WL=22.56 PD=38.4
/ 9:48					0.42	
/ 10:20	9.2	Started low flow			0.03	WL=21.85
	133	951.66	20.41	5.30		WL=21.85 finished low flow
		= TOTAL VOLUME REMOVED (gal.)				

DEVELOPMENT METHOD: 8/2-3 WATER PUMPING / reclaimer low flow

NOTES: 8/2 - STOPPED BC OF STORM - WILL START 8/3

WL = water level (Depth to water)

PD = pump depth

PR = pumping rate.

WELL DEVELOPMENT FIELD RECORD

Job Name BRANCH MW DEVELOP. Job No. 1660939 Well No. PZ-23I / GWA-2D
 Developed By A. ELIS Date Of Installation _____ Sheet 1 Of 1
 Started Development 8/2/2016 / 1550 Completed Development _____ / _____
 DATE TIME DATE TIME
 W.L. Before Development 8/2/2016 / 1545 / 41.00 After Development _____ / _____
 DATE TIME DATE TIME
 Well Depth: _____
 Before Development 69.20 After Development _____ Well Diameter _____ in.
 Standing Water Column (Ft) _____ Standing Well Volume _____ gal.
 Screen Length 10' Drilling Water Loss _____ gal.

DATE/TIME	VOLUME REMOVED (GALS)	FIELD PARAMETERS				REMARKS
		SPEC.COND. (unhos/cm)	TEMP (C)	pH (s.u.)	OTHER NTU	
8/2 / 1550	0				> 1000	RATE = 1 L/M
1650	16				71006	STOPPED
8/3 / 0900	16				71000	WL = 61.0
0905	17					DRY WL = 68.50
8/4 / 1056						WL = 59.83 @ 0.5 L/min
1107						DRY WL = 68.71
8/8 / 1002						WL = 45.90
8/8 / 1418					71000	WL = 45.31 70.81 TO 1 gal/min
8/9 / 1531					71000	WL = 68.51 DRY
8/9 / 1346					71200	
		= TOTAL VOLUME REMOVED (gal.)				

DEVELOPMENT METHOD: WATER SURGING

NOTES: 8/2 - STOPPED @ 16.50 B/C OF STORM - WILL RESTART 8/3

DID NOT COMPLETE B/C OF
SLOW RECOVERY

WELL DEVELOPMENT FIELD RECORD

P2-235/

Job Name BRANCH MW DEVEL. Job No. 11666939 Well No. GWA-25

Developed By A-ELUS Date Of Installation 7/25/2016 Sheet 1 Of 2

Started Development 08/21/2016 10:10 Completed Development 8/4 10:46
DATE TIME DATE TIME

W.L. Before Development 8/2/2016 / 1000 / 32.00 After Development 8/4 / 1054 / 35.49
DATE TIME DATE TIME

Well Depth:

Before Development 43.65 After Development 2 Well Diameter _____ in.

Standing Water Column (Ft) 11.65 Standing Well Volume 1.80 gal

Screen Length 10' Drilling Water Loss _____ gal

(M) TIME	DATE/TIME		VOLUME REMOVED (GALS)	FIELD PARAMETERS				REMARKS
				SPEC.COND. (unhos/cm)	TEMP (C)	pH (s.u.)	OTHER NTU	
	8/2	1010	0				>1000	RATE = 2 L/m
		1040	8				>1000	RATE 0.5 L/m WL: 42.20
35	STOP	1045	9				>1000	DRY-STOPPED
	RESTART	1155	—				—	WL = 32.66 RATE = 0.5 L/m
25	STOP	1220	(4) 13				>1000	DRY-STOPPED
	START	1445	—				>1000	WL: 32.11 RATE = 1 L/m
		1500	17				748	
45	STOP	1530	25				—	DRY STOPPED
	8/3	0740	25				42.1	WL: 32.00 / 2 L/m
20		0800	30					GEN. OUT OF GAS
		0830						RESTART
20		1850	35					DRY
		1620	35				8.41	RESTART
15		1635	40	= TOTAL VOLUME REMOVED (gal)				DRY
100								

DEVELOPMENT METHOD: 8/2-3 WATER SURGING

8/4 - RECLAIMER

NOTES

PZ-235/

Screen Length _____ Drilling Water Loss _____ gal

DEVELOPMENT METHOD: RECLAIMER LOW FLOW

NOTES: SMARTROLL R 26214
TVEH2100Q 31400

WELL DEVELOPMENT FIELD RECORD

Job Name BRANCH MW Develop. Job No. 11660939 Well No. GWA-3
 Developed By A. ELLIS Date Of Installation _____ Sheet 1 Of 1
 Started Development 8/2/2016 / _____ Completed Development _____ / _____
 DATE TIME DATE TIME
 W.L. Before Development 8/2/2016 / 1415 / 46.02 After Development _____ / _____
 DATE TIME DATE TIME
 Well Depth: _____
 Before Development 48.82 After Development _____ Well Diameter _____ in.
 Standing Water Column (Ft) _____ Standing Well Volume _____ gal.
 Screen Length 10' Drilling Water Loss _____ gal.

DATE/TIME	VOLUME REMOVED (GALS)	FIELD PARAMETERS				REMARKS
		SPEC.COND. (unhos/cm)	TEMP (C)	pH (s.u.)	OTHER NTU	
8/2 /	0				2000	WL = 46.02
8/3 /						WL = 46.03
8/8 /	0.5				>1000	WL = 46.03
8/9 /	1.0				>1000	WL = 46.16
8/10 / 905	1.5				>1000	WL = 46.18
/ 1340	2.0				>1000	
/						
/						
/						
/						
/						
/						
/						
= TOTAL VOLUME REMOVED (gal.)						

DEVELOPMENT METHOD: WILL NOT DEVELOP BE LACK OF WATER

NOTES

DID NOT COMPLETE B/C
 OF SLOW RECOVERY

WELL DEVELOPMENT FIELD RECORD

Job Name Plant Branch Job No. 1660939 Well No. P2-25

Developed By JAMES JONES Date Of Installation _____ Sheet _____ Of _____

Started Development 13:30 07/19/2016 Completed Development _____
DATE TIME DATE TIME

W.L. Before Development (17.16) 07/19/2016 13:30 After Development _____
DATE TIME DATE TIME

Well Depth: _____
Before Development 46.6 After Development _____ Well Diameter _____ in

Standing Water Column (Ft) 28.99 Standing Well Volume 4.72 gal

Screen Length 10 Drilling Water Loss _____ gal

DATE/TIME	VOLUME REMOVED (GALS)	FIELD PARAMETERS				REMARKS
		SPEC.COND. (unhos/cm)	TEMP (C)	pH (s.u.)	OTHER NTU	
13:30 07/19/2016	0				71000	W.L. = 17.16 feet, depth = 46.6, rate = 0%/min
14:30 07/19/2016	63				71000	W.L. = 19.35, depth = 44.6, rate = 4%/min
15:00 07/19/2016	95				71000	W.L. = 14.36, depth = 44.6, rate = 44%/min
16:00 07/19/2016	196				71000	W.L. = 11.34, depth = 44.6, rate = 5.5%/min
16:55 07/19/2016	209				71000	W.L. = 18.34, depth = 44.6, rate = 7.5%/min
17:07 07/19/2016	209				71000	W.L. = 17.15, depth = 44.6, rate = 7.5%/min
08:45 07/20/2016	287				71000	W.L. = 12.87, rate = 7%/min, depth = 45.0
10:15 07/20/2016	316				71000	W.L. = 18.93, rate = 7%/min, depth = 96.0
10:45 07/20/2016	334				71000	W.L. = 18.78, rate = 34%/min, depth = 46.0
11:00 07/20/2016	346				71000	W.L. = 18.78, rate = 7%/min, depth = 46.0
12:00 07/20/2016	346				83.5	W.L. = 18.78, rate = 7%/min, depth = 39.1, rate = 24%/min
12:15 07/20/2016	354				57.6 88.7	W.L. = 18.21, depth = 38.1, rate = 24%/min
12:30 07/20/2016	363				37.2	W.L. = 18.79, depth = 37.1, rate = 24%/min
12:45 07/20/2016	370				21.7	W.L. = 18.15, depth = 36.1, rate = 200%/min
14:00 07/20/2016	370	TOTAL VOLUME REMOVED (gal)			43.0	W.L. = 17.85, depth = 36.1, rate = 200%/min
14:30 07/20/2016	372				33.6	W.L. = 17.16, depth = 36.1, rate = 200%/min

DEVELOPMENT METHOD Surging / pigging. High turbidity well, Could not maintain low turbidity at low flows.

NOTES

WELL DEVELOPMENT FIELD RECORD

Job Name Plant Branch Job No. 1660939 Well No. PZ25
 Developed By Jon Perry Date Of Installation _____ Sheet _____ Of _____
 Started Development 7/19/16 13:30 Completed Development 7/25/16 13:28
 DATE 7/19/16 TIME _____ DATE _____ TIME _____
 W.L. Before Development (17.16 ft) 7/19/16 13:30 After Development 17.59 7/25/16 13:53
 DATE _____ TIME _____ DATE _____ TIME _____
 Well Depth: _____
 Before Development 46.6 ft After Development 47.5 Well Diameter 2
 Standing Water Column (Ft.) 28.99 ft Standing Well Volume 4.22
 Screen Length 10' Drilling Water Loss _____ gal

DATE/TIME	VOLUME REMOVED L (GALS)	FIELD PARAMETERS				REMARKS
		SPEC. COND. (unho/cm)	TEMP (C)	pH (s.u.)	OTHER CNTU	
7/25/16 0930						17.38 well depth 47.5
1005		pump on	on			
1010	36					17.55, 0.9 L/min
1029	43.2					17.81, 0.4 L/min
1028	67.2					17.40
1145	97.9				12.5	18.2 L/min
1207	115.9				32.7	18.2 L/min
1223	120.2					17.5 L/min
1229	126.6				9.97	
1245	129.3				5.64	17.5, 0.45 L/min
1253	132.9	begin low flow sampling			4.52	17.5, 0.45 L/min
7/25/16 1328	148.65 L	finish low flow				17.5, 0.45 L/min
1328	149.3 gal	64.15	19.47	6.11	3.62	17.85
	441.5	= TOTAL VOLUME REMOVED (gal.)				
	148.65 L = 39.36 gal					

372 gal

DEVELOPMENT METHOD: reclaimer pump

NOTES: button pump is @ 47', 148.65 L = 39.3 gallons

SU (Smartroll) 332462

WFL DEVELOPMENT FUND RECORD

Job Name Plant Branch Job No. 166959 Well No. P2-22
Developed By James Savoy Date Of Installation _____ Sheet _____ Of _____
Started Development 07/19/2016 11:15 Completed Development 07/19/2016 15:10
DATE TIME DATE TIME

WT Before Development (1646 Pave) 02/19/2016 10:20 After Development (2362) 02/19/2016 15:20
DATE TIME DATE TIME

Well Depth

Before Development 68.72' After Development 69.35' Well Diameter 2 in.

Standing Water Column (Ft) 51.81 Standing Well Volume 8.5 gal

Screen Length 10 Drilling Water Loss 5.1

[illegible]

DEVELOPMENT METHOD Surgery / proglut

NOTES Smartool MP calibration

	Lot #	Expiration
	7.0 2508700	07/2017
PM	4.0 2509875	11/2017
	10. 2507895	01/2017

conductivity: 66 D21 01/02/2017

ORP: 9567 11/7020

WELL DEVELOPMENT FIELD RECORD

Job Name Dlant Branch Job No. 1660939 Well No. PZ 41
 Developed By D. Herrera Date Of Installation 3/06/2014 Sheet 1 Of 1
 Started Development 7/20/2016 10:05 Completed Development 7/20/2016 16:00
DATE TIME DATE TIME

W.L. Before Development (35.31 ft) 7/20/2016 9:45 After Development (37.15 ft) 7/20/2016 16:00
DATE TIME DATE TIME

Well Depth:

Before Development 50.20 ft After Development _____ Well Diameter 2 in

Standing Water Column (Ft) 14.89 Standing Well Volume 2.43 gal

Screen Length 10.4 Drilling Water Loss _____ gal

DATE/TIME	VOLUME REMOVED (GALS)	FIELD PARAMETERS				REMARKS
		SPEC. COND. (unhos/cm)	TEMP (C)	pH (s.u.)	OTHER TURBIDITY (NTU)	
7/20/16 10:05	0				126	WL=35.5 P.R.=42/min
10:15	40.4					Dry
12:17	40.2				105	WL=35.0 P.R.=42/min
12:24	68.2					Dry
12:55	68.2				98.5	WL=36.5
13:00	73.2					WL=36.2 P.R.=12/min
14:00	133.2				79.2	WL=35.20 P.R.=12/min
14:55	198.2					WL=35.20 P.R.=12/min
15:05	198.2				73.2	WL=46.25 P.R.=12/min
15:50	243.2				13.0	WL=48.62 P.R.=12/min
15:52	245.2					Pump off to let well recover
17:20	245.2				12.00	related pump WL=36.80 ft
17:27	247.2				2.00	WL=37.4 P.R.=300ml/min + started
18:00	259.2	65.31	24.37	5.75	10.00	WL=37.15 P.R.=300ml/min low flow
(68.4 gal) = 259.2		= TOTAL VOLUME REMOVED (gal)				

DEVELOPMENT METHOD: mechanical pumping water (water pumps)

NOTES:

P.R. = pumping rate
 W.L. = water level
 P.D. = pump depth

WELL DEVELOPMENT FIELD RECORD

Job Name Plant Branch Job No. 1660939 Well No. PZ 55
 Developed By Jon Reavis Date Of Installation 4/3/2014 Sheet 1 Of 2
 Started Development 7/26/16 / 1612 Completed Development _____
 DATE TIME DATE TIME
 W.L. Before Development 7/26/16 / 1555 12.01 After Development _____
 DATE TIME DATE TIME
 Well Depth:
 Before Development 43.24' After Development _____ Well Diameter 2 in
 Standing Water Column (Ft.) 31.23' Standing Well Volume _____ gal
 Screen Length 10 Drilling Water Loss _____ gal

DATE/TIME	VOLUME REMOVED (GALS)	FIELD PARAMETERS				REMARKS
		SPEC.COND. (unhos/cm)	TEMP (C)	pH (s.u.)	OTHER	
7/26/16 1612	0	Pump on				OTW' 12.01 0.5 gpm
7/26/16 1622	5					14.85' 0.5 gpm
6 6' 1632	11				>1000	15.5
6 6' 1642	17				>1000	15.12
7/26/16 1652	23				>1000	15.21
7/26/16 1702	29	Pump off			>1000	15.94
7/27/16 1010	29	Pump on				11.97 1.1 gpm
1016						14.88
102050	73				133	15.69
1110	95				109	15.79
1120	106				150	15.80
1150	129				108	41.55 gpm
1220	161					Pump @ 35.2' bto 1.2 gpm
1250	194				21000	Pump @ 34.2' bto 40.5
= TOTAL VOLUME REMOVED (gal)						

DEVELOPMENT METHOD: Water + surge/bulk

NOTES: pump starts approximately 0.7 ft from bottom of well (~36.2' bto) 42.5

WELL DEVELOPMENT FIELD RECORD

Job Name Plant Branch Job No. 1660939 Well No. PZ55

Developed By Jon Reever Date Of Installation 4/3/2014 Sheet 2 Of 2

Started Development 7/26/2016 16:12 Completed Development /
DATE TIME DATE TIME

W.L. Before Development 7/26/16 / 1555 (12.04) After Development _____ / _____
DATE TIME DATE TIME

Well Depth:

Before Development 43.24' After Development _____ Well Diameter 2 in.

Standing Water Column (Ft.) 31.23 Standing Well Volume _____ gal.

Screen Length 10' Drilling Water Loss gal.

DATE/TIME		VOLUME REMOVED (GALS)	FIELD PARAMETERS				REMARKS
			SPEC.COND. (unhos/cm)	TEMP (C)	pH (s.u.)	OTHER	
7/27/16	1337	250				Turbidity (NTU)	DTW
	1401	280				616	15.95 1.2 g Pna
/	1436	322				87	pump at 39.5
/						71000	pump at 38.5
/							
/							
/							
/							
/							
/							
/							
/							
/							
			= TOTAL VOLUME REMOVED (gal.)				

DEVELOPMENT METHOD: WATERG + SURGE BLOCK

NOTES:

WELL DEVELOPMENT FIELD RECORD

Job Name Plant Branch Job No. 1660939 Well No. PZ 55
 Developed By Tim Kooles Date Of Installation 4/3/2014 Sheet Of
 Started Development 7/26/2016 16:12 Completed Development 7/28/16 1135
DATE TIME DATE TIME
 W.L. Before Development 7/26/2016 15:55 (12.01 ft) After Development 7/28/16 11:51 12:10
DATE TIME DATE TIME
 Well Depth: Before Development 43.24 ft After Development 43.4 Well Diameter 2 in
 Standing Water Column (Ft.) 31.23 ft Standing Well Volume 5.09 gal
 Screen Length 10 Drilling Water Loss gal

DATE/TIME	VOLUME REMOVED (GALS)	FIELD PARAMETERS				REMARKS
		SPEC.COND. (unhos/cm)	TEMP (C)	pH (s.u.)	OTHER (N/A)	
7/26/16 8:20	0	pump on			7/26/16	12.08, 1.5 gpm 43.5' blos. well depth
9:20	15					15.50
9:40	32	Begin Low Flow 175.77 19.52 pump off		6.52	2.57	~15.5 1.7 gpm until 10:45
10:45	110.5					~15.5 400 inch faucet = 0.10% gallons
11:04	0.954					~12.34
11:30						~12.40 finish low flow
11:35						pump off
		= TOTAL VOLUME REMOVED (gal)				

DEVELOPMENT METHOD: Reclaimer

NOTES: water level variable from 920-1045 (~.7 ft), pump in let @ ~42.8' blos

WELL DEVELOPMENT FIELD RECORD

Job Name Plant branch No. 1660939 PZSI
 Developed By Jon Fawcett Date Of Test 4/3/2014
 Started Development 7/27/16 10:14 Casing Size (inches) _____
 DATE TIME
 W.L. Before Development 7/26/16 167 1190 After Development _____
 DATE TIME
 Well Depth _____
 Before Development 64.11 ft After Development _____
 Standing Water Column (ft) 52.21 Standing Well Water _____
 Screen Length 10 Drilling Water Loss _____

FIELD PARAMETERS						
DATE/TIME	VOLUME REMOVED (GALS)	SPEC COND (unhos/cm)	TEMP (C)	pH (pH)	WATER (NTU)	FLOW (gpm)
7/27/16 1040	0	pump on			12.04'	0.4 gpm
1045					5.22'	
1050	9				41	5.55'
1055	12.5				77.9	12.36 pump clamp loosened
1100	12.5					12.5 gpm
1115					2.5	pump moved up 61.7' (62.7)
1130	41.5				81.9	15.51 pump up (61.7' flow)
1150	58				11.98	pump up (60.7' flow)
1200	58				15.01	0.4 gpm
1205	58					pump up (59.7)
1215					9.99	14.90 pump up (58.7)
1225					46.3	5.95 pump up (57.7)
1245					18.2	pump up (56.7)
1330	148				42.5	pump up (55.7)
= TOTAL VOLUME REMOVED (gals)						

DEVELOPMENT METHOD: Water surge block, pump starts @ ~ 63.1

NOTES: mica present
 Smartroll 332462

WELL DEVELOPMENT FIELD RECORD

Job Name _____ Plant Branch _____ Job No. 160959 Well No. F55

Developed By Jon Reeves m/y 4/3/2014 Date Of Installation 4/3/2014 Sheet 2 Of 2

Started Development 7/28/16 16:11:10 Completed Development
DATE TIME DATE TIME

W.L. Before Development 7/26/16 / 1617 11:40 After Development 12.01.18 (712312016) 19:44
DATE TIME DATE TIME

Well Depth: _____ DATE _____ TIME _____ DATE _____ TIME _____
Before Development 84.11 After Development 65.21 ft Well Diameter 2 in

Standing Water Column (Ft.) 52.21 Standing Well Volume _____ gal

Screen Length 10 Drilling Water Loss _____ gal

DATE/TIME	VOLUME REMOVED (GALS)	FIELD PARAMETERS				REMARKS
		SPEC.COND. (unhos/cm)	TEMP (C)	pH (s.u.)	OTHER	
7/7/16 / 1340	157				28.9	
/ 1350	166				22.9	400 ml/min pump up (SH-7)
/ 1550	179				4.84	200 ml/min pump down (CS-1)
/ 16:51	Jan 19 182	Begin low flow sampling			2.30	Qals 3 gph 0.0
/ 17:24	184	End low flow sampling				12:39 blue.
/						
/ 18:24						
/						
/						
/						
/						
/						
✓ 17:24	184	60.43	20.77	6.31	2.36	final reading
/	184	= TOTAL VOLUME REMOVED (gal.)				

DEVELOPMENT METHOD: _____

NOTES:

Smart wall 332462
butter pad 418959

WELL DEVELOPMENT FIELD RECORD

Job Name Plant Branch Job No. 1660939 Well No. PZ-65
Developed By W. E. Thier Date Of Installation 07/14 Sheet 2 Of 2
Started Development 7/19/16 0910 Completed Development /
DATE TIME DATE TIME
W.L. Before Development 23.57 F + tie After Development /
DATE TIME DATE TIME
Well Depth: _____
Before Development 53.1 F + tie After Development _____ Well Diameter _____ in.
Standing Water Column (Ft) _____ Standing Well Volume _____ gal
Screen Length _____ Drilling Water Loss _____ gal

DATE/TIME	VOLUME REMOVED (GALS)	FIELD PARAMETERS				L/min	REMARKS	depth above bottom of screen
		SPEC. COND. (unhos/cm)	TEMP (C)	pH (s.u.)	OTHER turbidity			
7/12/11 740	1405				763	4	23.55	8
" 810	1525				71000	4	33.7	8
/								
/								
/								
/								
/								
/								
/								
/								
/								
/								
/								
/								
		= TOTAL VOLUME REMOVED (gal.)						

DEVELOPMENT METHOD: _____

NOTES:

WELL DEVELOPMENT FIELD RECORD

Job Name Plant branch Job No. 1660937 Well No. PZ-65
Developed By In Rev 10 Date Of Installation _____ Sheet _____ Of _____
Started Development 10/25/16 Completed Development _____ / _____
DATE TIME DATE TIME

W.L. Before Development 23.724 7/25/16 14:30 After Development _____ / _____
DATE TIME DATE TIME

Well Depth: _____
Before Development _____ After Development _____ Well Diameter 2 in.

Standing Water Column (Ft) _____ Standing Well Volume _____ gal

Screen Length 10' Drilling Water Loss gal

DATE/TIME		VOLUME REMOVED (GALS) L	FIELD PARAMETERS				REMARKS
			SPEC. COND. (unhos/cm)	TEMP (C)	pH (s.u.)	OTHER (MTA)	
7/25/76	14:30						WL = 23.72 ft small depth 5' - 08'
↑	15:01	123	pump on			33.0	25.65 3 L/min
	15:47 15:42						28.01 5 L/min
	15:42 557						26.23
	16:07						
	16:24						26.55 15 L/min
	17:00						28.5 ft 0.5 L/min DO = 5.14
9:00 AM	17:30	177	Stopped pumping				
7/25/76							
		448.76	= TOTAL VOLUME REMOVED (gal.)				

~~448.76~~ = TOTAL VOLUME REMOVED (gal.)
46.76 gal Today

DEVELOPMENT METHOD: reclaim pump

NOTES Flow rate variable from 1501 - 1542, 3 L/min is an average, 462 gallons removed as of 7/20/16
pump inlet is @ ~52.5' bbl
SU (Smartroll): 332462

WELL DEVELOPMENT FIELD RECORD

Job Name Plant Branch Job No. 1660939 Well No. PZ 65
 Developed By Jon Reeves Date Of Installation _____
 Started Development 7/26/15 / 0811 Completed Development _____
 DATE TIME
 W.L. Before Development 7/26/15 / 758 23:00 After Development (23.96 ft) 7/26/16 15:05
 DATE TIME
 Well Depth: _____
 Before Development NM After Development 83.19 ft Well Diameter 2
 Standing Water Column (Ft) _____ Standing Well Volume _____
 Screen Length 10 Drilling Water Loss _____

DATE/TIME	VOLUME REMOVED (GALS)	FIELD PARAMETERS				REMARKS
		SPEC.COND. (unhos/cm)	TEMP (C)	pH (s.u.)	OTHER	
7/26/15 811	0		pump on			
716						31.7' surge w/ pump
833					60.9	32.4
844	38					0.9 gpm
1240	200				8.4	32.5
1245	203.5					0.5 gpm
1252					0.95	27.25
1306	206		Begin low flow sampling		0.67	26.5
1424	210.2		End low flow sampling			200 ml/min
1430	210.7		pump off			
7/26/2016 1430	910.7	87.37	21.06	6.62	8.47	DTW=25.34
= TOTAL VOLUME REMOVED (gal)						

DEVELOPMENT METHOD: Reclaimer pump

NOTES: calibration on lanette, ^{0.7 gpm} average of initial + final flow rate @ 1240 used. ^{inlet} pump is 2 ft from screened well depth, tubing length is well depth + 3 ft.

WELL DEVELOPMENT FIELD RECORD

Job Name Plant Branch Job No. 166939 Well No. P2-105
 Developed By James Sany Date Of Installation _____ Sheet _____ Of _____
 Started Development 07/14/2016 13:30 Completed Development _____
 DATE TIME DATE TIME
 W.L. Before Development (25.93 ft) 07/14/2016 13:40 After Development _____
 DATE TIME DATE TIME
 Well Depth _____
 Before Development 43.37 feet After Development _____ Well Diameter 2 in.
 Standing Water Column (Ft) 17.44 Standing Well Volume 3 gal
 Screen Length 10 Drilling Water Loss _____ gal

DATE/TIME	VOLUME REMOVED (GALS)	FIELD PARAMETERS				REMARKS
		SPEC COND. (unhos cm)	TEMP (C)	pH (s.u.)	OTHER (NTU)	
07/14/2016 13:30	0				71000	depth = 41.0 feet, W.L. = 29.05, rate = 1.5 gpm
07/14/2016 14:30	24				71000	depth = 41.0 feet, W.L. = 40.35, rate = 1.5 gpm
07/14/2016 14:40	28				71000	depth = 40.0 feet, W.L. = 40.0, rate = 2.5 gpm
07/14/2016 15:20	55				71000	depth = 40.0 feet, W.L. = 40.0, rate = 2.5 gpm
07/14/2016 16:30	55				71000	depth = 40.0 feet, W.L. = 26.0, rate = 2.5 gpm
07/14/2016 17:00	75				810	depth = 40.0, W.L. = 53.5, rate = 2.5 gpm
07/14/2016 17:30	95				813	depth = 39.0, W.L. = 51.74, rate = 2.5 gpm
07/15/2016 08:00	114				613	depth = 38.0, W.L. = 25.81, rate = 1.5 gpm
07/15/2016 09:00	119				33.1	depth = 38.0, W.L. = 25.8, rate = 1.5 gpm
07/15/2016 10:30	121				71000	depth = 38.0, W.L. = 26.0, rate = 2.5 gpm
07/15/2016 11:00	121				71000	depth = 38.0, W.L. = 26.25, rate = 2.5 gpm
07/15/2016 11:15	211				71000	depth = 34.0, W.L. = 26.0, rate = 2.5 gpm
07/15/2016 12:30	211				67.1	depth = 34.0, W.L. = 32.4, rate = 1.5 gpm
07/15/2016 14:50	218				71000	depth = 33.5, W.L. = 26.0, rate = 2.5 gpm
07/15/2016 15:25	247	TOTAL VOLUME REMOVED (gal)				34.7
07/15/2016 15:45	258				71000	depth = 33.0, W.L. = 26.97, rate = 2.5 gpm
07/15/2016 16:50	258				71000	depth = 32.0, W.L. = 32.0, rate = 2.5 gpm

DEVELOPMENT METHOD Surging / pigging, difficult to maintain low turbidity
75 BW flows

NOTES SMARTRELL CALIBRATION

Expiration	<u>10:01/2017</u>	conductivity	<u>ORP</u>
	<u>4:02/2017</u>	<u>04/30/17</u>	<u>03/2021</u>
	<u>7:07/2017</u>		
	<u>N: 2507895</u>		
Lot#	<u>4: 2509875</u>	<u>60211</u>	<u>9912</u>
	<u>7: 2508700</u>		

WELL DEVELOPMENT FIELD RECORD

Job Name Plant Branch Job No. 1660939 Well No. PZ 105

Developed By D. Herrera Date Of Installation _____ Sheet 3 Of 3

Started Development 7/15/2016 8:00 Completed Development 7/21/2016 12:20
DATE TIME DATE TIME

W.L. Before Development _____ After Development (26.45 ft) 7/21/2016 12:20
DATE TIME DATE TIME

Well Depth:

Before Development _____ After Development 41.96 Well Diameter 2 in.

Standing Water Column (Ft.) _____ Standing Well Volume _____ gal

Screen Length 10 ft Drilling Water Loss _____ gal

DATE/TIME	VOLUME REMOVED (GALS)	FIELD PARAMETERS				REMARKS
		SPEC.COND. (unhos/cm)	TEMP (C)	pH (s.u.)	OTHER Turbidity (NTU)	
7/21/2016 8:30	785					WL = 30.86 begin pumping (42/min)
7/21/2016 8:35	790					pump rate 22/min
7/21/2016 9:00	803				3.18	WL = 31.09 22/min
7/21/2016 9:25	816				3.76	pumping rate 22/min
7/21/2016 9:30	823				14.26	
7/21/2016 9:40	824					pumping rate 150ml/min
7/21/2016 9:53					9.51	WL = 27.13 Pumping rate 150ml/min
7/21/2016 9:11:50	829				3.56	WL = 27.40 @ (150ml/min)
7/21/2016 11:55						begin low flow
7/21/2016 12:20	830	488.24	22.51	5.49	0.26	WL = 27.40 finished low flow
/						
/						
/						
830		= TOTAL VOLUME REMOVED (gal)				

DEVELOPMENT METHOD: _____

NOTES:

WELL DEVELOPMENT FIELD RECORD

Job Name Plantbranch Job No. 1660939 Well No. PZ125
 Developed By Jon Reese Date Of Installation 3/24/2014 Sheet 1 Of 1
 Started Development 7/20/16 13:34 Completed Development 1
 DATE TIME DATE TIME
 W.L. Before Development 48.69 1243 After Development 1
 DATE TIME DATE TIME
 Well Depth:
 Before Development 67.81' After Development Well Diameter 2 in.
 Standing Water Column (Ft.) 12.92' Standing Well Volume 2.11 gal.
 Screen Length 10' Drilling Water Loss gal.

DATE/TIME	VOLUME REMOVED (GALS)	FIELD PARAMETERS				REMARKS
		SPEC. COND. (unhos/cm)	TEMP (C)	pH (s.u.)	OTHER	
7/20/16 1334	0				NTA	OTW = 48.81, 500 mL / 4 sec
1341		Pump on				
1359					71000	OTW = 58.7
1400					71000	OTW = 59.8 500 mL / 8 sec
1401						
1403	14.86	pump off				water is bright orangey brown
1407		pump on JMA				
1410		4th Pump on			>11000	OTW = 55.75
1418						OTW = 58.64 500 mL / 7 s
1420	JMA					500 mL / 40 s
1425	20/42 25.31				wait out nitrate	pump off
1448					>1000	pump back on OTW 50.15
1458					>1000	OTW = 50.90
7/20/2016 1504	28.48	pump off			>1000	OTW = 50.98, muddy orange
		- TOTAL VOLUME REMOVED (gal)				

DEVELOPMENT METHOD: Water + surge block

NOTES:
$$\frac{500 \text{ mL}}{1 \text{ min}} \div \frac{1 \text{ min}}{60 \text{ s}} = \frac{1 \text{ L}}{30 \text{ s}} = \frac{.5 \text{ L}}{15 \text{ s}} \rightarrow 15-30 \text{ s per 500 mL}$$

$$\frac{500 \text{ mL}}{8 \text{ s}} \div \frac{1 \text{ L}}{1000 \text{ mL}} \div \frac{60 \text{ s}}{1 \text{ min}} = \frac{3.75 \text{ L}}{\text{min}}$$

WELL DEVELOPMENT FIELD RECORD

Job Name Platform Job No. 1610934 Well No. P2175
Developed By Jon Raves Date Of Installation 3/24/04 Sheet 2 Of
Started Development 7/20/06 1334 Completed Development
DATE TIME DATE TIME
W.L. Before Development 48.09 1243 After Development
DATE TIME DATE TIME
Well Depth
Before Development 61.81 After Development Well Diameter 2 in
Standing Water Column (Ft) 12.92 Standing Well Volume 2.11 g.d
Screen Length 1' Drilling Water Loss g.d

DATE/TIME	VOLUME REMOVED (GALS)	FIELD PARAMETERS				REMARKS
		SPEC COND. (unhos cm)	TEMP (C)	pH (s.u.)	OTHER (N/A)	
7/20 1507					71000	
1510					71000	Flow 49.97
1522	31.9	pump off			71000	Flow 50.24
1530		pump on			71000	Flow 50.25 11/min
1548	35.55	pump off			71000	
1549		pump on			71000	
1605	40	pump off			71000	
1608		pump on			71000	
7/20/2016 1623	44	pump off			71000	Flow 49.9 16.7 L pumped
		= TOTAL VOLUME REMOVED (gal)				

DEVELOPMENT METHOD: Water and surge block

NOTES

WELL DEVELOPMENT FIELD RECORD

Job Name Plant Branch Job No. 1460139 Well No. P2-125

Developed By James Jones & Son Inc Date Of Installation _____ Sheet _____ Of _____

Started Development _____ / _____ Completed Development _____ / _____
DATE TIME DATE TIME

W.L. Before Development (48.89) 07/20/2016 After Development 49.33 07/21/2016 15:05
DATE TIME DATE TIME

Well Depth:

Before Development 61.81 After Development 63.54 Well Diameter 2 in.

Standing Water Column (Ft.) 12.92 Standing Well Volume 0.11 gal

Screen Length 10 Drilling Water Loss _____ gal

*see well development log for details regarding developing on 7/20/2016

DATE/TIME	VOLUME REMOVED (GALS)	FIELD PARAMETERS				REMARKS
		SPEC.COND. (unhos/cm)	TEMP (C)	pH (s.u.)	OTHER NTU	
11:30 07/21/2016	28.48				51000	W.L. = 52.68, depth = 60.8', rate = 1 1/2 in
12:30 07/21/2016	46				53.7	W.L. = 50.74, depth = 58.8', rate = 1 1/2 in
13:45 07/21/2016	50				36.8	W.L. = 51.56, depth = 58.8', rate = 1 1/2 in
13:50 07/21/2016	60				12.4	W.L. = 51.04, depth = 57.3', rate = 1 1/2 in
13:50 07/21/2016	68				15.4	W.L. = 51.45, depth = 55.8', rate = 1 1/2 in
14:05 07/21/2016	72				20.1	W.L. = 51.43, depth = 54.3', rate = 1 1/2 in
14:20 07/21/2016	76				7.01	rate = 1 1/2 in
14:30 07/21/2016	79				4.55	W.L. = 51.45, depth = 51.8', rate = 1 1/2 in
14:50 07/21/2016	80				2.02	W.L. = 49.42, rate = 200 ml/min, depth = 51.8'
15:05 07/21/2016	81	86.34	24.5	5.64	2.47	W.L. = 49.33
		= TOTAL VOLUME REMOVED (gal)				

DEVELOPMENT METHOD: surgin / purging

NOTES

WELL DEVELOPMENT FIELD RECORD

Job Name PLANT BRANCH Job No. 1660939 Well No. P2-12
 Developed By JAMES JONES Date Of Installation _____ Sheet _____ Of _____
 Started Development 16:30 07/20/2016 Completed Development _____ / _____
 DATE TIME DATE TIME
 W.L. Before Development 16.00 07/20/2016 [48.61] After Development _____ / _____
 DATE TIME DATE TIME
 Well Depth _____
 Before Development 83.33 After Development _____ Well Diameter 2 in
 Standing Water Column (Ft) 34.72 Standing Well Volume 5.7 gal
 Screen Length 10 Drilling Water Loss _____ gal

DATE/TIME	VOLUME REMOVED (GALS)	FIELD PARAMETERS				REMARKS
		SPEC.COND. (unhos/cm)	TEMP (C)	pH (s.u.)	OTHER NTU	
16:30 07/20/2016	0				35.4	depth = 82.33, W.L. = 58.25, rate = 3 1/4 in
16:45 07/20/2016	12				-	well runs dry
17:00 07/20/2016	12				-	W.L. = 73.01 feet
08:45 07/21/2016	12				-	W.L. = 48.67 feet, rate = 3 1/4 in, depth = 80.53
12:30 07/21/2016	33				26.3	W.L. = 62.56, depth = 80.73, rate = 3 1/4 in
10:50 07/21/2016	26				72.5	W.L. = 66.89, rate = 3 1/4 in, depth = 80.83
12:30 07/21/2016	43				-	well runs dry
13:45 07/21/2016	43				25.2	W.L. = 59.75, depth = 80.83, rate = 1 1/4 in
14:15 07/21/2016	51				30.0	W.L. = 72.8, depth = 76.33, rate = 500 in
14:30 07/21/2016					4.55	W.L. = 51.43
14:45 07/21/2016	53				-	well runs dry
15:34 07/21/2016	53				-	W.L. = 55.98, rate = 500 in, depth = 76.83
16:00 07/21/2016	56				13.1	rate = 500 in
16:10 07/21/2016	58				7.55	W.L. = 67.43, depth = 75.3
16:15 07/21/2016	59	= TOTAL VOLUME REMOVED (gal)				pump runs dry

DEVELOPMENT METHOD Surgin / purging

NOTES

WELL DEVELOPMENT FIELD RECORD

Job Name Plant Branch Job No. 1660393 Well No. PZ 121
 Developed By D. Hoppers Date Of Installation 2/20/2014 Sheet 1 Of 1
 Started Development 7/22/16 / 9:30 Completed Development / / /
 DATE TIME DATE TIME
 W.L. Before Development (48.614) 7/22/16 9:20 After Development (59.604) 7/22/16 11:50
 DATE TIME DATE TIME
 Well Depth: _____
 Before Development 83.33 After Development 82.97 Well Diameter 2 in.
 Standing Water Column (Ft) 34.72 Standing Well Volume 5.7 gal.
 Screen Length 10 ft Drilling Water Loss _____ gal.

DATE/TIME	VOLUME REMOVED (GALS)	FIELD PARAMETERS				REMARKS
		SPEC.COND. (unhos/cm)	TEMP (C)	pH (s.u.)	OTHER Turbidity (NTU)	
7/22/2016 9:30	0				5.62	WL=48.58ft P.R.=150ml/min P.D.=76ft
7/22/2016 9:45					5.75	WL=58.97ft PR=150ml/min
7/22/2016 10:49					5.45	WL=59.48 PR=150ml/min
7/22/2016 11:16					4.20	WL=59.42 PR=150ml/min
7/22/2016 11:46	7.77	178.20	24.33	6.67	4.08	WL=59.60 PR=150ml/min
/						* finish low-flow test
/						
/						
/						
/						
/						
/						
7.77 gal = TOTAL VOLUME REMOVED (gal.)						

DEVELOPMENT METHOD: waterflooding (surge development)

NOTES:

Smart roll serial # 369557
 WL = water level
 P.R. = pumping rate

WELL DEVELOPMENT FIELD RECORD

Job Name Plant Branch Job No. 1660939 Well No. PZ-145

Developed By W. E. H. H. Date Of Installation _____ Sheet 1 Of _____

Started Development 07/14 14:30 Completed Development _____ / _____
DATE TIME DATE TIME

W.L. Before Development (19.5 ft) 7/14/2016 14:30 After Development _____ / _____
DATE TIME DATE TIME

Well Depth:

Before Development 40.7 After Development _____ Well Diameter 2 in.

Standing Water Column (Ft.) 21.2 Standing Well Volume 3.46 gal.

Screen Length 10 Drilling Water Loss _____ gal.

DATE/TIME	VOLUME REMOVED L (GALS) (gal)	FIELD PARAMETERS <i>height from screen bottom</i>				REMARKS
		SPEC. COND. (unhos/cm)	TEMP (C)	pH (s.u.)	OTHER <i>turbidity</i>	
<u>7/14 14:30</u>	<u>2</u>		<u>0</u>		<u>>1000</u>	<u>WL: 19.5 ft tie</u>
<u>" 14:40</u>	<u>8</u>		<u>0</u>		<u>>1000</u>	<u>20.4 14</u>
<u>" 14:50</u>	<u>8</u>		<u>0.5</u>		<u>>1000</u>	<u>22.1 14</u>
<u>" 14:50</u>	<u>12</u>		<u>0.5</u>		<u>>1000</u>	<u>20.1 14</u>
<u>" 15:10</u>	<u>16</u>		<u>0.5</u>		<u>>1000</u>	<u>20.1 "</u>
<u>" 15:30</u>	<u>20</u>				<u>"</u>	<u>" "</u>
<u>" 15:30</u>	<u>24</u>		<u>1</u>		<u>"</u>	<u>" "</u>
<u>" 15:40</u>	<u>28</u>		<u>1</u>		<u>"</u>	<u>" "</u>
<u>" 15:50</u>	<u>32</u>		<u>1</u>		<u>"</u>	<u>" "</u>
<u>" 16:00</u>	<u>36</u>		<u>1.5</u>		<u>>1000</u>	<u>" "</u>
<u>" 16:10</u>	<u>40</u>		<u>1.5</u>		<u>>1000</u>	<u>" "</u>
<u>" 16:20</u>	<u>44</u>		<u>2</u>		<u>>1000</u>	<u>" "</u>
<u>" 16:30</u>	<u>48</u>		<u>2.5</u>		<u>>1000</u>	<u>" "</u>
<u>" 16:40</u>	<u>52</u>		<u>3</u>		<u>>1000</u>	<u>" "</u>
<u>16:50</u>	<u>56 (14.3)</u>	TOTAL VOLUME REMOVED (gal.)				<u>100</u>
			<u>3.5</u>			

DEVELOPMENT METHOD: _____

NOTES:

WELL DEVELOPMENT FIELD RECORD

Job Name Plant Branch Job No. 1660939 Well No. PZ-HS
 Developed By TK Fraley Date Of Installation March 2016 Sheet 2 Of
 Started Development 7/16/16 1017 Completed Development
 DATE TIME DATE TIME
 W.L. Before Development 7/16/16 1016 19.54 (1100) After Development
 DATE TIME DATE TIME
 Well Depth: Before Development 1954 40.7 After Development NM Well Diameter 2 in.
 Standing Water Column (Ft.) 21.16 Standing Well Volume 3.38 gal
 Screen Length 10 Drilling Water Loss gal

DATE/TIME	VOLUME REMOVED (GALS)	FIELD PARAMETERS				REMARKS
		Water level SPEC. COND. (unhos/cm)	Height From Screen Bottom (ft)	TEMP (°F) (°C)	pH (s.u.)	
7/16/16 1047	33	NM	80			Bottom
7/16/16 1050	33	20.25	1'			Start
7/16/16 1120	2472	20.17	1'			STOP
7/16/16 1130	72	20.25	2'			Start
7/16/16 1200	111	20.25	2'			STOP cool down
7/16/16 1300	111	20.15	3'			Sub 14.53' Start
7/16/16 1330	147	20.15	3'			STOP
7/16/16 1333	177	20.26	4'			Start
7/16/16 1403	186	20.22	4'			STOP
7/16/16 1405	186	20.21	5'			Start
7/16/16 1435	228	20.32	5'			STOP
7/16/16 1436	228	20.16	6'			Start
7/16/16 1511	273	20.10	6'			STOP Cool down
7/16/16 1530	273	20.20	7'			Start
= TOTAL VOLUME REMOVED (gal)						
7/16/16 1600	315	20.31	7'			71000 STOP
7/16/16 1600	315	20.51	8'			> 10000 STOP
7/16/16 1619	340	20.50	8'			169 STOP
DEVELOPMENT METHOD:						
7/16/16 1620	340	20.58	9'			58 START
7/16/16 1633	373	20.59	9'			46.8 STOP
7/16/16 1639	373	20.55	10'			160 START
7/16/16 1643	381	20.48	10'			45.6 STOP

NOTES:

WELL DEVELOPMENT FIELD RECORD

Job Name Plant Branch Job No. 1660939 Well No. P2145
 Developed By TK Fdy Date Of Installation March 2014 Sheet Of
 Started Development 7/17/16 / 08 40 Completed Development /
DATE TIME DATE TIME
 W.L. Before Development 7/17/16 / 0834 20.57 From TOC After Development /
DATE TIME DATE TIME
 Well Depth: 40.7
 Before Development 20.57 After Development NM Well Diameter 2 in.
 Standing Water Column (Ft.) 20.13 Standing Well Volume 3.22 gal.
 Screen Length 10' Drilling Water Loss gal.

DATE/TIME	VOLUME REMOVED (GALS)	water level SPEC.COND. (unhos/cm)	FIELD PARAMETERS Height From Screen (C) TEMP 150 F	pH (s.u.)	Turbidity (OTHER NTU)	REMARKS
7/17/16 0840	0	19.89	8'		824	Start
7/17/16 0854	7	20.09	8'		75	Stop
7/17/16 0857	7	20.22	2'		71000	Start
7/17/16 0927	35.40	20.05	2'		119	Stop
7/17/16 0928	35.40	20.21	3'		71000	Start
7/17/16 1002	103.770	20.27	3'		127	Stop
7/17/16 1006	110	20.14	4'		71000	Start
7/17/16 1026	143	20.21	4'		153	Stop
7/17/16 1037	143	20.19	5'		71000	Start
7/17/16 1051	163	20.24	5'		147	Stop
7/17/16 1058	163	20.22	6'		84	Stop
7/17/16 1108	173	20.16	6'		86.1	Stop, cool down
7/17/16 1332	173	20.03	7'		71000	Start
7/17/16 151402	203	20.12	7'		126	Stop SWL 12.58
= TOTAL VOLUME REMOVED (gal.)						
7/17/16 1425	203	20.14	2'		931	Start
7/17/16 1440						Stopped to Repair Pump
7/17/16 1447		20.07			89	ON Start
DEVELOPMENT METHOD:						
7/17/16 1503	234	20.11	2'		112	Stopped
7/17/16 1506	234	20.20	3'		156	Start
7/17/16 1535	269	20.12	3'		10.9	Stopped
7/17/16 1537	269	20.12	4'		266	Start
7/17/16 1607	291	20.11	4'		66.8	Stopped

NOTES:

WELL DEVELOPMENT FIELD RECORD

Job Name Plant Branch Job No. 1660939 Well No. P7-145
 Developed By D. HERRS Date Of Installation 3/20/2014 Sheet Of
 Started Development 7/14/2016 14:30 Completed Development 7/22/2016 16:32
DATE TIME DATE TIME

W.L. Before Development (19.5 ft) 7/14/2016 14:30 After Development (19.64 ft) 7/22/2016 16:35
DATE TIME DATE TIME

Well Depth:

Before Development 40.7 ft After Development 41.35 Well Diameter 2 in.

Standing Water Column (Ft) 21.2 Standing Well Volume 346 gal.

Screen Length 10 ft Drilling Water Loss gal.

DATE/TIME	VOLUME REMOVED (GALS)	FIELD PARAMETERS				REMARKS
		SPEC.COND. (unhos/cm)	TEMP (C)	pH (s.u.)	OTHER Turbidity (NTU)	
7/22/2016 14:30	0				54.4	WL=19.61 PR=350ml/min
7/22/2016 15:35					15.8	WL=17.61 PR=350ml/min
7/22/2016 15:55					7.91	WL=19.64 ft PR=350ml/min
7/22/2016 16:07					6.18	WL=19.66 ft PR=350ml/min
7/22/2016 16:32	12.2	608.08	23.32	5.23	5.02	started low-flow PD=37ft WL=19.66
/						
/						
/						
/						
/						
/						
= TOTAL VOLUME REMOVED (gal.)						

DEVELOPMENT METHOD: Waterra (Surge and development)

NOTES:

WL= water level
 P.R= pumping rate
 P.D= pump depth

Smartroll SN: 369557

WELL DEVELOPMENT FIELD RECORD

Job Name Plant Branch Job No 1660939 Well No PZ-155

Developed By Jim Reeves Date Of Installation 3/27/2014 Sheet 1 Of 1

Started Development 7/26/16 10:30 Completed Development 7/26/16 11:45

W.L. Before Development 7/26/16 09:57 10.35 After Development 7/26/16 12:04 10.4

Well Depth: Before Development 42.2 After Development 42.2 Well Diameter 2 in

Standing Water Column (Ft.) 31.9 Standing Well Volume _____ gal

Screen Length 10' Drilling Water Loss _____ gal

DATE/TIME	VOLUME REMOVED (GALS)	FIELD PARAMETERS				REMARKS
		SPEC.COND. (unhos/cm)	TEMP (C)	pH (s.u.)	OTHER	
7/26/16 10:20	0	pump on			7.00	1 gpm
10:30					8.4	10.36
10:40					12.7	10.8
10:50	30				13.07	200 ml/min = 0.053 gpm, mica present, 10.1' blot
11:00	20.5				9.84	10.10' blot, 300 ml/min = 0.06 gpm
11:10		begin low flow sampling			3.04	10.12' blot
11:40	34.7	end low flow sampling				
7/26/16 11:45		pump off				
7/26/16 11:45	34.7	891.78	21.19	5.72	1.97	DTW = 10.17 ft
	34.7	= TOTAL VOLUME REMOVED (gal)				

DEVELOPMENT METHOD: Reclaimer Pump

NOTES: pump inlet is @ 41.6' blot, 130 gallons pumped as of 7/28/16

WELL DEVELOPMENT FIELD RECORD

Job Name Plant Branch Job No. 1660939 Well No. PZ-165
 Developed By W. Ethier Date Of Installation _____ Sheet _____ Of _____
 Started Development 7/14/16 10:02 Completed Development _____ / _____
 DATE TIME DATE TIME

W.L. Before Development 7/14/16 118.15 (12.60) After Development _____ / _____
 DATE TIME DATE TIME

Well Depth: _____

Before Development 23.22 ft After Development _____ Well Diameter _____ in.

Standing Water Column (Ft.) 10.62 ft Standing Well Volume 1.73 gal.

Screen Length 10 ft Drilling Water Loss _____ gal.

Comette SN: 700

DATE/TIME	VOLUME REMOVED (A) (GALS)	FIELD PARAMETERS				REMARKS
		SPEC.COND. (unhos/cm)	TEMP (C)	pH (s.u.)	OTHER Turbidity (NTU)	
7/14/16 10:50	0				71000	12.56 ft for 60 sec
7/14/16 11:10	(80) (21.13)				71000	WL=13.30 ft P.R. = 42 l/min
7/14/16 11:12	(88) (23.25)				71000	WL=13.30 ft pump off to adjust
7/14/16 11:15	(68) (23.25)				71000	WL=12.20 ft pump restarted.
7/14/16 11:40	(188) (49.7)				71000	WL=13.30 ft pipe broke 42 l/min
7/14/16 12:00	(268) (70.9)				71000	WL=13.25 ft PR=42 l/min PD=12 ft
7/14/16 12:30	(378) (102.9)				71000	WL=13.35 ft PR=42 l/min
7/14/16 12:44	(444) (117.3)				71000	WL=13.35 ft PR=42 l/min PD=14 ft
7/14/16 12:52	(484) (127.9)				71000	WL=13.35 ft pump stopped
7/14/16 13:15	(484) (127.9)				71000	WL=13.43 ft started pump
7/14/16 13:45	(604) (160)				71000	WL=13.39 ft PR=42 l/min
7/14/16 14:15	(724) (191)				71000	WL=13.10 ft PR shut pump off
7/14/16 14:30	(724) (191)				71000	WL=13.30 ft PR started pump cool
7/14/16 15:40	(1108) (296)				71000	WL=13.25 ft PR 42 l/min
7/14/16 16:10	(1128) (298)				71000	WL=13.57 ft pump stopped to
7/14/16 16:30	(1128) (298)				71000	WL=13.25 ft pump restarted
7/14/16 17:25	(1348) (356)				71000	WL=13.25 ft P.R.=42 l/min
TOTAL VOLUME REMOVED (gal.)						

DEVELOPMENT METHOD: _____

NOTES:

WL = water level
 P.R. = pumping rate
 P.D. = pump depth

WELL DEVELOPMENT FIELD RECORD

Job Name Pine Branch Job No. 1660739 Well No. PZ-175

Developed By SANDY JONES Date Of Installation _____ Sheet _____ Of _____

Started Development 07/13/2016 14:00 Completed Development _____ / _____
DATE TIME DATE TIME

W1. Before Development 07/13/2016 (6/45L) After Development _____ / _____
DATE TIME DATE TIME

Well Depth:

Before Development 9.24 After Development _____ Well Diameter _____ in.

Standing Water Column (Ft.) 3.1 Standing Well Volume .50 gal.

Screen Length _____ Drilling Water Loss _____ gal.

DATE/TIME	VOLUME REMOVED (GALS)	FIELD PARAMETERS				REMARKS
		SPEC.COND. (unhos/cm)	TEMP (C)	pH (s.u.)	OTHER UTU	
07/13/2016 15:00	0				710uv	depth = 8.24' rate = 1 1/4 min.
07/13/2016 16:00	16				22.9	rate = 5 1/4 min U.L. = 7.4'
07/13/16 16:05	1 (17)				—	depth = 7.25' pull rws d.
07/13/16 16:45	6 (23)				835	depth = 6.00 rate = 5 1/4 min
07/13/16 17:00	1 (24)				50.7	depth = 6.00 rate = 200mg/l
07/13/2016 17:05	1 (25)				62	depth = 7.5 rate = 200mg/l
		= TOTAL VOLUME REMOVED (gal)				

DEVELOPMENT METHOD: pump runs dry when not placed near well bottom

NOTES

WELL DEVELOPMENT FIELD RECORD

Job Name Plant Branch Job No. 1660939 Well No. P2-16S

Developed By TK Sraley Date Of Installation _____ Sheet 1 Of 1

Started Development 7/15/16 / 1310 Completed Development _____ / _____
DATE TIME DATE TIME

W.L. Before Development NM / _____ After Development _____ / _____
DATE TIME DATE TIME

Well Depth:

Before Development NM After Development _____ Well Diameter 2 in.

Standing Water Column (Ft.) _____ Standing Well Volume _____ gal.

Screen Length 10 Ft Drilling Water Loss _____ gal.

DATE/TIME	VOLUME REMOVED (GALS)	FIELD PARAMETERS				REMARKS
		SPEC.COND. (unhos/cm)	TEMP (C)	pH (s.u.)	OTHER	
7/15/16 1310	0	NM	NM	NM	71000	PD: 23 WL: 13.12
7/15/16 1430	40				71000	PD: 23 WL: 12.9
7/15/16 1430	40				71000	PD: 22 WL: 12.9
7/15/16 1510	72				71000	PD: 22 WL: 13.9
7/15/16 1510	72				71000	PD: 20 WL: 13.25
7/15/16 1540	87.8				749	PD: 21 WL: 13.30
7/15/16 1550	87.8				753	PD: 20 WL: 13.05
7/15/16 1620	102.8				142	PD: 20 WL: 13.12
7/15/16 1630	117.8				864 NM	PD: 19 WL: 13.25
7/15/16 1650	117.8				864	PD: 19 WL: 13.25
7/15/16 1650	117.8				71000	PD: 18 WL: 13.08
7/15/16 1720	132.8				85.6	PD: 18 WL: 15.27
7/15/16 1754	132.8				NM	PD: 17 WL: 12.79
7/15/16 1807	139.1				71000	PD: 17 WL: 12.92
		= TOTAL VOLUME REMOVED (gal.)				139.4

Stopped
cool down
pump

1287
pump
cool down

DEVELOPMENT METHOD: _____

NOTES:

WELL DEVELOPMENT FIELD RECORD

Job Name Pine Branch Job No. 140779 Well No. PZ-175
 Developed By Sam Jones Date Of Installation _____ Sheet 1 Of 1
 Started Development 07/13/2016 14:00 Completed Development 7/14/2016 11:36
 DATE TIME DATE TIME
 W.L. Before Development 07/13/2016 (6.14 ft) After Development (7.75 ft) 7/14/16 11:35
 DATE TIME DATE TIME
 Well Depth: _____ Well Diameter 2 in.
 Before Development 9.24 After Development _____
 Standing Water Column (Ft) 3.1 Standing Well Volume .50 gal.
 Screen Length 10 ft Drilling Water Loss _____ gal.

DATE/TIME	VOLUME REMOVED (GALS)	FIELD PARAMETERS				REMARKS
		SPEC. COND. (unhos/cm)	TEMP (C)	pH (s.u.)	OTHER UTU	
07/13/2016 15:00	0				710.0	depth = 8.24' rate = 1.5 gpm W.L. = 7.01
07/13/2016 16:00	16				22.9	rate = 5.5 gpm W.L. = 7.2' rate, depth = 8
07/13/16 16:05	1 (19)				835	depth = 7.75' pull rods 15' rate = 5.5 gpm W.L. = 6.2'
07/13/16 16:15	6 (23)				50.7	depth = 6.00' rate = 200 gpm W.L. = 6.1
07/13/16 16:00	1 (24)				62	depth = 6.00' rate = 200 gpm W.L. = 6.1
07/13/2016 17:05	1 (25)				39	depth = 7.75' rate = 3.5 gpm W.L. = 5.94
07/14/2016 09:45	25				11.1	rate = 0.5 gpm W.L. = 7.75 ft
07/14/2016 10:05	2.6 27.6				7.97	rate = 0.5 gpm W.L. = 7.75 ft
07/14/2016 10:15	1.3 28.9				7.27	rate = 0.5 gpm W.L. = 7.75 ft
07/14/2016 10:45	1.3 30.2				5.87	rate = 0.5 gpm W.L. = 7.75 ft
07/14/2016 10:35	1.3 31.5				50	lowered lowered pumping rate W.L. = 7.75
07/14/2016 10:45	1.3 32.8				18.9	started low flow W.L. = 7.75 Rate = 400 ml/min
07/14/2016 10:57	34.4				2.43	Finished low flow
07/14/2016 11:35	49.6	396-19	20.42	6.49		
		= TOTAL VOLUME REMOVED (gal.)				

DEVELOPMENT METHOD: pump runs day when not placed over well bottom

NOTES:

WELL DEVELOPMENT FIELD RECORD

Job Name Plant Branch Job No. 166-0939 Well No. PZ 171

Developed By Jeff Ingram Date Of Installation _____ Sheet 1 Of 1

Started Development 7/13/2016 13:33 Completed Development 7/13/2016 16:35
DATE TIME DATE TIME

W.L. Before Development (3.73 ft) 7/13/2016 13:33 After Development (3.98 ft) 7/13/2016 16:55
DATE TIME DATE TIME

Well Depth: _____

Before Development 46.0 ft After Development _____ Well Diameter 2 in.

Standing Water Column (Ft.) 42.27 Standing Well Volume 6.89 gal

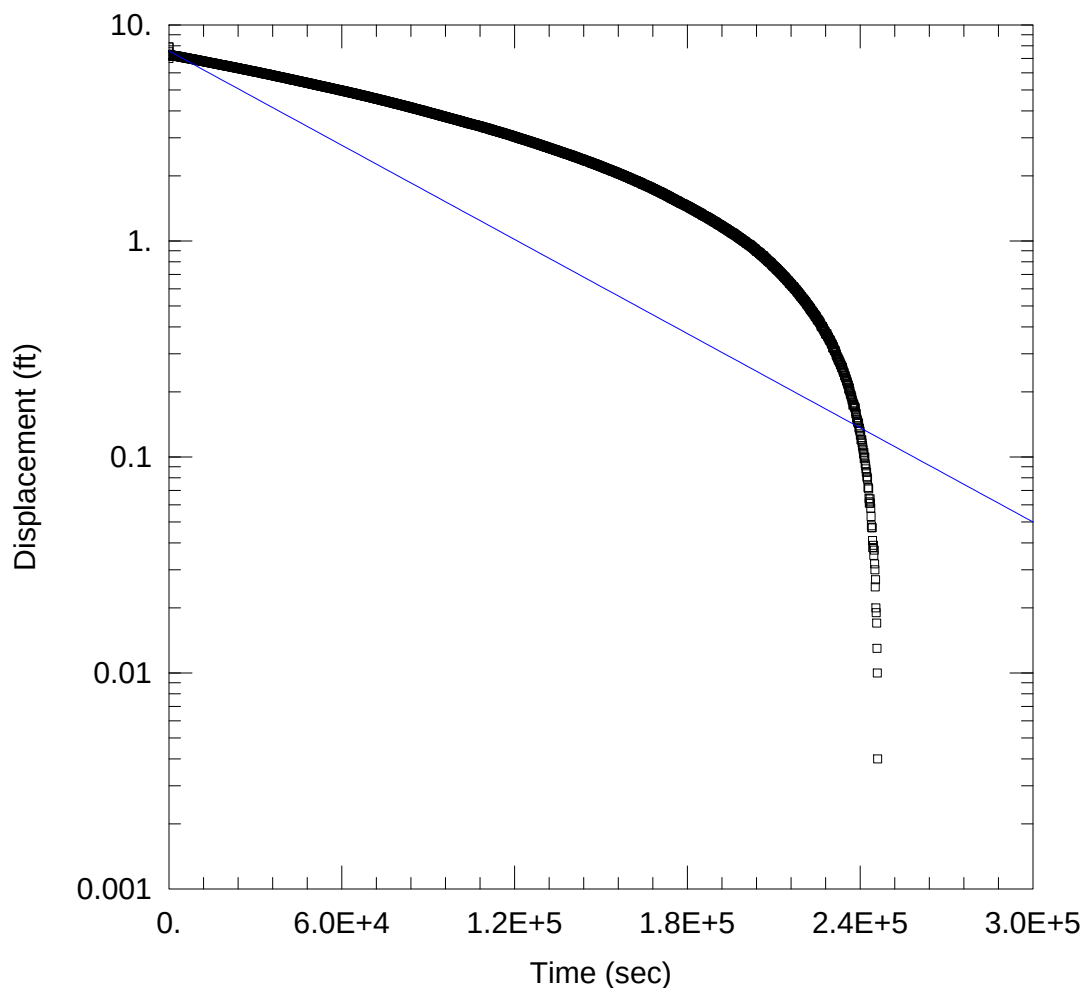
Screen Length 10 ft Drilling Water Loss _____ gal.

DATE/TIME	VOLUME REMOVED (GALS)	FIELD PARAMETERS				REMARKS
		SPEC.COND. (unhos/cm)	TEMP (C)	pH (s.u.)	OTHER Turbidity	
7/13/2016 13:33	40.26				35.30	WL=4.42 ft Pump rate = 42 l/min
7/13/2016 14:43	46.43				38.73	WL=4.19 ft start pump off to cool
7/13/2016 15:10	51.51				38.7	WL=6.05 ft RE start pump
7/13/2016 16:00	99.06				11.8	WL=4.58 ft pump rate = 42 l/min
7/13/2016 16:24	124.4				11.5	WL=4.51 ft pump rate = 300 l/min
7/13/2016 16:55	126.8	410.77	20.75	6.64	4.12	WL=3.98 ft End of low flow
/						
/						
/						
/						
/						
/						
		= TOTAL VOLUME REMOVED (gal.)				

DEVELOPMENT METHOD: _____

NOTES:

APPENDIX C
SINGLE WELL AQUIFER (SLUG) TEST RESULTS



PZ-23I RISING

Data Set: G:\...\PZ-23I Rising.aqt

Date: 09/19/16

Time: 13:07:36

PROJECT INFORMATION

Company: Golder Associates

Client: Southern Company Services

Project: 1660939

Location: Plant Branch

Test Well: PZ-23I Rising

Test Date: 08/12/16

AQUIFER DATA

Saturated Thickness: 100. ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (PZ-23I Rising)

Initial Displacement: 7.907 ft

Static Water Column Height: 27.21 ft

Total Well Penetration Depth: 27.21 ft

Screen Length: 10. ft

Casing Radius: 0.08333 ft

Well Radius: 0.08333 ft

Gravel Pack Porosity: 0.15

SOLUTION

Aquifer Model: Unconfined

Solution Method: Bouwer-Rice

K = 0.001593 ft/day

y0 = 7.568 ft

Data Set: G:\Projects\Southern Company Services\Confidential Plant Branch Drilling\Slug Test Data\August 2016\VC
 Title: PZ-23I Rising
 Date: 09/19/16
 Time: 13:07:04

PROJECT INFORMATION

Company: Golder Associates
 Client: Southern Company Services
 Project: 1660939
 Location: Plant Branch
 Test Date: 08/12/16
 Test Well: PZ-23I Rising

AQUIFER DATA

Saturated Thickness: 100. ft
 Anisotropy Ratio (Kz/Kr): 1.

SLUG TEST WELL DATA

Test Well: PZ-23I Rising

X Location: 0. ft
 Y Location: 0. ft

Initial Displacement: 7.907 ft
 Static Water Column Height: 27.21 ft
 Casing Radius: 0.08333 ft
 Well Radius: 0.08333 ft
 Well Skin Radius: 0.25 ft
 Screen Length: 10. ft
 Total Well Penetration Depth: 27.21 ft
 Corrected Casing Radius (Bouwer-Rice Method): 0.07725 ft
 Gravel Pack Porosity: 0.15

No. of Observations: 2143

Observation Data			
Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
4.501	7.907	1.178E+5	3.104
4.751	7.514	1.179E+5	3.104
5.001	7.	1.181E+5	3.101
5.251	7.156	1.182E+5	3.1
5.501	7.313	1.183E+5	3.092
5.751	7.313	1.184E+5	3.091
6.001	7.279	1.185E+5	3.086
6.36	7.17	1.187E+5	3.08
6.721	7.194	1.188E+5	3.079
7.14	7.254	1.189E+5	3.073
7.56	7.204	1.19E+5	3.073
7.98	7.211	1.191E+5	3.07
8.461	7.23	1.193E+5	3.062
9.	7.208	1.194E+5	3.063
9.48	7.218	1.195E+5	3.059
10.08	7.214	1.196E+5	3.054
10.68	7.212	1.197E+5	3.05
11.28	7.218	1.199E+5	3.045
11.94	7.22	1.2E+5	3.044
12.66	7.223	1.201E+5	3.035
13.44	7.217	1.202E+5	3.037
14.22	7.215	1.203E+5	3.033
15.06	7.219	1.205E+5	3.026
15.96	7.223	1.206E+5	3.025
16.92	7.223	1.207E+5	3.018
17.88	7.221	1.208E+5	3.019
18.96	7.219	1.209E+5	3.014

<u>Time (sec)</u>	<u>Displacement (ft)</u>	<u>Time (sec)</u>	<u>Displacement (ft)</u>
20.28	7.216	1.211E+5	3.009
21.3	7.224	1.212E+5	3.006
22.56	7.223	1.213E+5	2.999
23.88	7.223	1.214E+5	2.996
25.32	7.224	1.215E+5	2.996
26.82	7.222	1.217E+5	2.989
28.38	7.219	1.218E+5	2.985
30.06	7.226	1.219E+5	2.985
31.86	7.222	1.22E+5	2.979
33.72	7.223	1.221E+5	2.977
35.76	7.226	1.223E+5	2.971
37.86	7.224	1.224E+5	2.967
40.08	7.227	1.225E+5	2.967
42.48	7.231	1.226E+5	2.965
45.	7.225	1.227E+5	2.961
47.64	7.226	1.229E+5	2.957
50.46	7.231	1.23E+5	2.955
53.46	7.225	1.231E+5	2.948
56.64	7.228	1.232E+5	2.948
60.	7.226	1.233E+5	2.946
63.6	7.228	1.235E+5	2.938
67.2	7.206	1.236E+5	2.933
71.4	7.225	1.237E+5	2.932
75.6	7.254	1.238E+5	2.931
79.8	7.237	1.239E+5	2.926
84.6	7.232	1.241E+5	2.921
90.	7.23	1.242E+5	2.919
94.8	7.228	1.243E+5	2.916
100.8	7.228	1.244E+5	2.913
106.8	7.229	1.245E+5	2.909
112.8	7.228	1.247E+5	2.905
119.4	7.229	1.248E+5	2.903
126.6	7.231	1.249E+5	2.898
134.4	7.228	1.25E+5	2.897
142.2	7.228	1.251E+5	2.896
150.6	7.228	1.253E+5	2.885
159.6	7.235	1.254E+5	2.887
169.2	7.233	1.255E+5	2.882
178.8	7.231	1.256E+5	2.879
189.6	7.233	1.257E+5	2.873
201.	7.231	1.259E+5	2.87
213.	7.235	1.26E+5	2.867
225.6	7.233	1.261E+5	2.866
238.8	7.238	1.262E+5	2.861
253.2	7.232	1.263E+5	2.852
268.2	7.235	1.265E+5	2.852
283.8	7.238	1.266E+5	2.852
300.6	7.237	1.267E+5	2.846
318.6	7.24	1.268E+5	2.845
337.2	7.238	1.269E+5	2.839
357.6	7.239	1.271E+5	2.84
378.6	7.233	1.272E+5	2.836
400.8	7.239	1.273E+5	2.83
424.8	7.235	1.274E+5	2.826
450.	7.236	1.275E+5	2.822
476.4	7.236	1.277E+5	2.816
504.6	7.237	1.278E+5	2.82
534.6	7.234	1.279E+5	2.817
566.4	7.231	1.28E+5	2.812
600.	7.227	1.281E+5	2.809
636.	7.232	1.283E+5	2.804
672.	7.233	1.284E+5	2.798
714.	7.23	1.285E+5	2.795
756.	7.232	1.286E+5	2.79
798.	7.232	1.287E+5	2.79
846.	7.232	1.289E+5	2.789

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
900.	7.226	1.29E+5	2.784
948.	7.227	1.291E+5	2.781
1008.	7.225	1.292E+5	2.773
1068.	7.225	1.293E+5	2.771
1128.	7.221	1.295E+5	2.769
1194.	7.222	1.296E+5	2.764
1266.	7.216	1.297E+5	2.763
1344.	7.219	1.298E+5	2.759
1422.	7.214	1.299E+5	2.755
1506.	7.214	1.301E+5	2.749
1596.	7.21	1.302E+5	2.748
1692.	7.208	1.303E+5	2.743
1788.	7.207	1.304E+5	2.745
1896.	7.197	1.305E+5	2.734
2010.	7.19	1.307E+5	2.734
2130.	7.192	1.308E+5	2.735
2250.	7.188	1.309E+5	2.73
2370.	7.184	1.31E+5	2.721
2490.	7.176	1.311E+5	2.72
2610.	7.167	1.313E+5	2.717
2730.	7.165	1.314E+5	2.715
2850.	7.164	1.315E+5	2.71
2970.	7.159	1.316E+5	2.708
3090.	7.16	1.317E+5	2.706
3210.	7.153	1.319E+5	2.704
3330.	7.145	1.32E+5	2.697
3450.	7.14	1.321E+5	2.694
3570.	7.132	1.322E+5	2.69
3690.	7.131	1.323E+5	2.687
3810.	7.124	1.325E+5	2.681
3930.	7.119	1.326E+5	2.681
4050.	7.113	1.327E+5	2.677
4170.	7.111	1.328E+5	2.674
4290.	7.108	1.329E+5	2.671
4410.	7.103	1.331E+5	2.668
4530.	7.097	1.332E+5	2.66
4650.	7.095	1.333E+5	2.66
4770.	7.085	1.334E+5	2.661
4890.	7.081	1.335E+5	2.652
5010.	7.078	1.337E+5	2.652
5130.	7.071	1.338E+5	2.65
5250.	7.067	1.339E+5	2.645
5370.	7.059	1.34E+5	2.64
5490.	7.059	1.341E+5	2.633
5610.	7.049	1.343E+5	2.632
5730.	7.044	1.344E+5	2.632
5850.	7.041	1.345E+5	2.631
5970.	7.035	1.346E+5	2.622
6090.	7.032	1.347E+5	2.622
6210.	7.025	1.349E+5	2.621
6330.	7.018	1.35E+5	2.615
6450.	7.019	1.351E+5	2.608
6570.	7.009	1.352E+5	2.607
6690.	7.008	1.353E+5	2.605
6810.	6.999	1.355E+5	2.603
6930.	6.996	1.356E+5	2.598
7050.	6.989	1.357E+5	2.594
7170.	6.984	1.358E+5	2.591
7290.	6.98	1.359E+5	2.591
7410.	6.981	1.361E+5	2.589
7530.	6.969	1.362E+5	2.585
7650.	6.967	1.363E+5	2.579
7770.	6.961	1.364E+5	2.579
7890.	6.954	1.365E+5	2.575
8010.	6.947	1.367E+5	2.564
8130.	6.946	1.368E+5	2.567

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
8250.	6.944	1.369E+5	2.561
8370.	6.938	1.37E+5	2.556
8490.	6.931	1.371E+5	2.556
8610.	6.927	1.373E+5	2.554
8730.	6.923	1.374E+5	2.55
8850.	6.916	1.375E+5	2.546
8970.	6.913	1.376E+5	2.54
9090.	6.905	1.377E+5	2.541
9210.	6.901	1.379E+5	2.54
9330.	6.897	1.38E+5	2.531
9450.	6.889	1.381E+5	2.53
9570.	6.888	1.382E+5	2.525
9690.	6.883	1.383E+5	2.525
9810.	6.872	1.385E+5	2.521
9930.	6.872	1.386E+5	2.518
1.005E+4	6.864	1.387E+5	2.515
1.017E+4	6.861	1.388E+5	2.512
1.029E+4	6.857	1.389E+5	2.51
1.041E+4	6.849	1.391E+5	2.508
1.053E+4	6.842	1.392E+5	2.502
1.065E+4	6.842	1.393E+5	2.499
1.077E+4	6.833	1.394E+5	2.499
1.089E+4	6.832	1.395E+5	2.488
1.101E+4	6.826	1.397E+5	2.493
1.113E+4	6.822	1.398E+5	2.488
1.125E+4	6.814	1.399E+5	2.488
1.137E+4	6.813	1.4E+5	2.476
1.149E+4	6.804	1.401E+5	2.477
1.161E+4	6.8	1.403E+5	2.476
1.173E+4	6.798	1.404E+5	2.465
1.185E+4	6.792	1.405E+5	2.47
1.197E+4	6.787	1.406E+5	2.466
1.209E+4	6.782	1.407E+5	2.46
1.221E+4	6.776	1.409E+5	2.46
1.233E+4	6.771	1.41E+5	2.453
1.245E+4	6.771	1.411E+5	2.448
1.257E+4	6.766	1.412E+5	2.444
1.269E+4	6.759	1.413E+5	2.446
1.281E+4	6.752	1.415E+5	2.439
1.293E+4	6.746	1.416E+5	2.438
1.305E+4	6.744	1.417E+5	2.439
1.317E+4	6.74	1.418E+5	2.431
1.329E+4	6.727	1.419E+5	2.431
1.341E+4	6.731	1.421E+5	2.429
1.353E+4	6.722	1.422E+5	2.423
1.365E+4	6.719	1.423E+5	2.418
1.377E+4	6.709	1.424E+5	2.414
1.389E+4	6.709	1.425E+5	2.41
1.401E+4	6.703	1.427E+5	2.409
1.413E+4	6.702	1.428E+5	2.407
1.425E+4	6.694	1.429E+5	2.407
1.437E+4	6.692	1.43E+5	2.4
1.449E+4	6.685	1.431E+5	2.394
1.461E+4	6.68	1.433E+5	2.396
1.473E+4	6.678	1.434E+5	2.389
1.485E+4	6.669	1.435E+5	2.384
1.497E+4	6.662	1.436E+5	2.387
1.509E+4	6.66	1.437E+5	2.382
1.521E+4	6.653	1.439E+5	2.379
1.533E+4	6.652	1.44E+5	2.372
1.545E+4	6.649	1.441E+5	2.368
1.557E+4	6.642	1.442E+5	2.366
1.569E+4	6.636	1.443E+5	2.367
1.581E+4	6.63	1.445E+5	2.362
1.593E+4	6.623	1.446E+5	2.358
1.605E+4	6.62	1.447E+5	2.354

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
1.617E+4	6.614	1.448E+5	2.349
1.629E+4	6.611	1.449E+5	2.347
1.641E+4	6.608	1.451E+5	2.348
1.653E+4	6.604	1.452E+5	2.342
1.665E+4	6.595	1.453E+5	2.337
1.677E+4	6.592	1.454E+5	2.338
1.689E+4	6.588	1.455E+5	2.332
1.701E+4	6.584	1.457E+5	2.331
1.713E+4	6.58	1.458E+5	2.331
1.725E+4	6.571	1.459E+5	2.323
1.737E+4	6.564	1.46E+5	2.32
1.749E+4	6.561	1.461E+5	2.317
1.761E+4	6.556	1.463E+5	2.318
1.773E+4	6.553	1.464E+5	2.312
1.785E+4	6.549	1.465E+5	2.305
1.797E+4	6.544	1.466E+5	2.302
1.809E+4	6.54	1.467E+5	2.299
1.821E+4	6.534	1.469E+5	2.293
1.833E+4	6.528	1.47E+5	2.291
1.845E+4	6.524	1.471E+5	2.291
1.857E+4	6.521	1.472E+5	2.289
1.869E+4	6.52	1.473E+5	2.284
1.881E+4	6.509	1.475E+5	2.282
1.893E+4	6.507	1.476E+5	2.278
1.905E+4	6.503	1.477E+5	2.273
1.917E+4	6.497	1.478E+5	2.273
1.929E+4	6.49	1.479E+5	2.27
1.941E+4	6.486	1.481E+5	2.265
1.953E+4	6.482	1.482E+5	2.264
1.965E+4	6.475	1.483E+5	2.261
1.977E+4	6.473	1.484E+5	2.258
1.989E+4	6.472	1.485E+5	2.25
2.001E+4	6.466	1.487E+5	2.25
2.013E+4	6.461	1.488E+5	2.246
2.025E+4	6.452	1.489E+5	2.244
2.037E+4	6.449	1.49E+5	2.242
2.049E+4	6.443	1.491E+5	2.238
2.061E+4	6.441	1.493E+5	2.236
2.073E+4	6.432	1.494E+5	2.231
2.085E+4	6.434	1.495E+5	2.228
2.097E+4	6.426	1.496E+5	2.224
2.109E+4	6.422	1.497E+5	2.223
2.121E+4	6.412	1.499E+5	2.216
2.133E+4	6.415	1.5E+5	2.214
2.145E+4	6.41	1.501E+5	2.211
2.157E+4	6.403	1.502E+5	2.207
2.169E+4	6.403	1.503E+5	2.206
2.181E+4	6.394	1.505E+5	2.203
2.193E+4	6.392	1.506E+5	2.2
2.205E+4	6.387	1.507E+5	2.194
2.217E+4	6.379	1.508E+5	2.192
2.229E+4	6.376	1.509E+5	2.185
2.241E+4	6.37	1.511E+5	2.187
2.253E+4	6.365	1.512E+5	2.183
2.265E+4	6.363	1.513E+5	2.178
2.277E+4	6.357	1.514E+5	2.174
2.289E+4	6.352	1.515E+5	2.171
2.301E+4	6.349	1.517E+5	2.171
2.313E+4	6.341	1.518E+5	2.169
2.325E+4	6.34	1.519E+5	2.161
2.337E+4	6.332	1.52E+5	2.16
2.349E+4	6.331	1.521E+5	2.155
2.361E+4	6.324	1.523E+5	2.154
2.373E+4	6.321	1.524E+5	2.146
2.385E+4	6.316	1.525E+5	2.148
2.397E+4	6.311	1.526E+5	2.142

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
2.409E+4	6.304	1.527E+5	2.146
2.421E+4	6.3	1.529E+5	2.142
2.433E+4	6.295	1.53E+5	2.135
2.445E+4	6.287	1.531E+5	2.133
2.457E+4	6.286	1.532E+5	2.129
2.469E+4	6.28	1.533E+5	2.127
2.481E+4	6.276	1.535E+5	2.123
2.493E+4	6.273	1.536E+5	2.121
2.505E+4	6.269	1.537E+5	2.117
2.517E+4	6.261	1.538E+5	2.11
2.529E+4	6.259	1.539E+5	2.111
2.541E+4	6.253	1.541E+5	2.109
2.553E+4	6.25	1.542E+5	2.107
2.565E+4	6.245	1.543E+5	2.1
2.577E+4	6.24	1.544E+5	2.1
2.589E+4	6.232	1.545E+5	2.099
2.601E+4	6.225	1.547E+5	2.093
2.613E+4	6.225	1.548E+5	2.089
2.625E+4	6.223	1.549E+5	2.09
2.637E+4	6.215	1.55E+5	2.086
2.649E+4	6.212	1.551E+5	2.078
2.661E+4	6.202	1.553E+5	2.076
2.673E+4	6.198	1.554E+5	2.073
2.685E+4	6.193	1.555E+5	2.071
2.697E+4	6.187	1.556E+5	2.068
2.709E+4	6.185	1.557E+5	2.067
2.721E+4	6.175	1.559E+5	2.063
2.733E+4	6.175	1.56E+5	2.059
2.745E+4	6.172	1.561E+5	2.052
2.757E+4	6.167	1.562E+5	2.048
2.769E+4	6.159	1.563E+5	2.05
2.781E+4	6.16	1.565E+5	2.049
2.793E+4	6.155	1.566E+5	2.041
2.805E+4	6.149	1.567E+5	2.037
2.817E+4	6.144	1.568E+5	2.037
2.829E+4	6.141	1.569E+5	2.033
2.841E+4	6.135	1.571E+5	2.031
2.853E+4	6.132	1.572E+5	2.028
2.865E+4	6.125	1.573E+5	2.023
2.877E+4	6.119	1.574E+5	2.021
2.889E+4	6.116	1.575E+5	2.018
2.901E+4	6.112	1.577E+5	2.012
2.913E+4	6.106	1.578E+5	2.012
2.925E+4	6.103	1.579E+5	2.007
2.937E+4	6.1	1.58E+5	2.009
2.949E+4	6.095	1.581E+5	2.004
2.961E+4	6.09	1.583E+5	1.998
2.973E+4	6.083	1.584E+5	1.998
2.985E+4	6.082	1.585E+5	1.989
2.997E+4	6.075	1.586E+5	1.988
3.009E+4	6.071	1.587E+5	1.987
3.021E+4	6.064	1.589E+5	1.979
3.033E+4	6.062	1.59E+5	1.979
3.045E+4	6.058	1.591E+5	1.981
3.057E+4	6.05	1.592E+5	1.975
3.069E+4	6.046	1.593E+5	1.97
3.081E+4	6.047	1.595E+5	1.966
3.093E+4	6.04	1.596E+5	1.968
3.105E+4	6.032	1.597E+5	1.963
3.117E+4	6.025	1.598E+5	1.958
3.129E+4	6.028	1.599E+5	1.954
3.141E+4	6.021	1.601E+5	1.952
3.153E+4	6.017	1.602E+5	1.947
3.165E+4	6.011	1.603E+5	1.947
3.177E+4	6.007	1.604E+5	1.941
3.189E+4	6.002	1.605E+5	1.935

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
3.201E+4	5.998	1.607E+5	1.937
3.213E+4	5.993	1.608E+5	1.928
3.225E+4	5.989	1.609E+5	1.93
3.237E+4	5.984	1.61E+5	1.924
3.249E+4	5.975	1.611E+5	1.927
3.261E+4	5.969	1.613E+5	1.922
3.273E+4	5.967	1.614E+5	1.918
3.285E+4	5.964	1.615E+5	1.915
3.297E+4	5.954	1.616E+5	1.912
3.309E+4	5.955	1.617E+5	1.908
3.321E+4	5.952	1.619E+5	1.905
3.333E+4	5.943	1.62E+5	1.899
3.345E+4	5.94	1.621E+5	1.9
3.357E+4	5.937	1.622E+5	1.896
3.369E+4	5.933	1.623E+5	1.896
3.381E+4	5.926	1.625E+5	1.894
3.393E+4	5.921	1.626E+5	1.889
3.405E+4	5.916	1.627E+5	1.878
3.417E+4	5.917	1.628E+5	1.881
3.429E+4	5.91	1.629E+5	1.877
3.441E+4	5.904	1.631E+5	1.871
3.453E+4	5.9	1.632E+5	1.876
3.465E+4	5.896	1.633E+5	1.869
3.477E+4	5.893	1.634E+5	1.867
3.489E+4	5.886	1.635E+5	1.862
3.501E+4	5.881	1.637E+5	1.859
3.513E+4	5.88	1.638E+5	1.861
3.525E+4	5.869	1.639E+5	1.851
3.537E+4	5.87	1.64E+5	1.851
3.549E+4	5.866	1.641E+5	1.848
3.561E+4	5.857	1.643E+5	1.845
3.573E+4	5.85	1.644E+5	1.834
3.585E+4	5.849	1.645E+5	1.832
3.597E+4	5.843	1.646E+5	1.832
3.609E+4	5.838	1.647E+5	1.824
3.621E+4	5.837	1.649E+5	1.828
3.633E+4	5.831	1.65E+5	1.826
3.645E+4	5.828	1.651E+5	1.819
3.657E+4	5.818	1.652E+5	1.82
3.669E+4	5.819	1.653E+5	1.817
3.681E+4	5.81	1.655E+5	1.81
3.693E+4	5.81	1.656E+5	1.809
3.705E+4	5.802	1.657E+5	1.807
3.717E+4	5.798	1.658E+5	1.807
3.729E+4	5.791	1.659E+5	1.8
3.741E+4	5.787	1.661E+5	1.795
3.753E+4	5.782	1.662E+5	1.798
3.765E+4	5.779	1.663E+5	1.792
3.777E+4	5.774	1.664E+5	1.789
3.789E+4	5.771	1.665E+5	1.783
3.801E+4	5.764	1.667E+5	1.78
3.813E+4	5.759	1.668E+5	1.782
3.825E+4	5.757	1.669E+5	1.776
3.837E+4	5.751	1.67E+5	1.775
3.849E+4	5.747	1.671E+5	1.771
3.861E+4	5.742	1.673E+5	1.769
3.873E+4	5.74	1.674E+5	1.763
3.885E+4	5.732	1.675E+5	1.766
3.897E+4	5.729	1.676E+5	1.759
3.909E+4	5.722	1.677E+5	1.75
3.921E+4	5.721	1.679E+5	1.751
3.933E+4	5.716	1.68E+5	1.744
3.945E+4	5.713	1.681E+5	1.745
3.957E+4	5.705	1.682E+5	1.741
3.969E+4	5.701	1.683E+5	1.744
3.981E+4	5.697	1.685E+5	1.736

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
3.993E+4	5.697	1.686E+5	1.731
4.005E+4	5.689	1.687E+5	1.73
4.017E+4	5.683	1.688E+5	1.724
4.029E+4	5.678	1.689E+5	1.723
4.041E+4	5.677	1.691E+5	1.721
4.053E+4	5.671	1.692E+5	1.715
4.065E+4	5.664	1.693E+5	1.715
4.077E+4	5.662	1.694E+5	1.711
4.089E+4	5.655	1.695E+5	1.708
4.101E+4	5.65	1.697E+5	1.706
4.113E+4	5.646	1.698E+5	1.698
4.125E+4	5.642	1.699E+5	1.694
4.137E+4	5.638	1.7E+5	1.697
4.149E+4	5.635	1.701E+5	1.693
4.161E+4	5.629	1.703E+5	1.689
4.173E+4	5.622	1.704E+5	1.688
4.185E+4	5.619	1.705E+5	1.686
4.197E+4	5.618	1.706E+5	1.681
4.209E+4	5.612	1.707E+5	1.68
4.221E+4	5.605	1.709E+5	1.674
4.233E+4	5.6	1.71E+5	1.671
4.245E+4	5.597	1.711E+5	1.666
4.257E+4	5.593	1.712E+5	1.665
4.269E+4	5.586	1.713E+5	1.661
4.281E+4	5.579	1.715E+5	1.662
4.293E+4	5.577	1.716E+5	1.66
4.305E+4	5.573	1.717E+5	1.655
4.317E+4	5.567	1.718E+5	1.645
4.329E+4	5.56	1.719E+5	1.645
4.341E+4	5.559	1.721E+5	1.642
4.353E+4	5.552	1.722E+5	1.642
4.365E+4	5.551	1.723E+5	1.641
4.377E+4	5.55	1.724E+5	1.636
4.389E+4	5.54	1.725E+5	1.631
4.401E+4	5.537	1.727E+5	1.627
4.413E+4	5.536	1.728E+5	1.627
4.425E+4	5.528	1.729E+5	1.624
4.437E+4	5.525	1.73E+5	1.62
4.449E+4	5.524	1.731E+5	1.614
4.461E+4	5.516	1.733E+5	1.615
4.473E+4	5.514	1.734E+5	1.605
4.485E+4	5.508	1.735E+5	1.607
4.497E+4	5.503	1.736E+5	1.602
4.509E+4	5.501	1.737E+5	1.599
4.521E+4	5.496	1.739E+5	1.601
4.533E+4	5.486	1.74E+5	1.595
4.545E+4	5.485	1.741E+5	1.586
4.557E+4	5.479	1.742E+5	1.586
4.569E+4	5.475	1.743E+5	1.584
4.581E+4	5.475	1.745E+5	1.581
4.593E+4	5.464	1.746E+5	1.577
4.605E+4	5.463	1.747E+5	1.569
4.617E+4	5.457	1.748E+5	1.573
4.629E+4	5.452	1.749E+5	1.573
4.641E+4	5.449	1.751E+5	1.562
4.653E+4	5.447	1.752E+5	1.559
4.665E+4	5.44	1.753E+5	1.559
4.677E+4	5.435	1.754E+5	1.56
4.689E+4	5.431	1.755E+5	1.556
4.701E+4	5.429	1.757E+5	1.552
4.713E+4	5.425	1.758E+5	1.547
4.725E+4	5.416	1.759E+5	1.54
4.737E+4	5.417	1.76E+5	1.542
4.749E+4	5.41	1.761E+5	1.534
4.761E+4	5.404	1.763E+5	1.538
4.773E+4	5.403	1.764E+5	1.537

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
4.785E+4	5.399	1.765E+5	1.53
4.797E+4	5.392	1.766E+5	1.524
4.809E+4	5.387	1.767E+5	1.528
4.821E+4	5.384	1.769E+5	1.523
4.833E+4	5.382	1.77E+5	1.517
4.845E+4	5.379	1.771E+5	1.516
4.857E+4	5.374	1.772E+5	1.508
4.869E+4	5.367	1.773E+5	1.509
4.881E+4	5.364	1.775E+5	1.508
4.893E+4	5.357	1.776E+5	1.5
4.905E+4	5.356	1.777E+5	1.499
4.917E+4	5.348	1.778E+5	1.494
4.929E+4	5.344	1.779E+5	1.493
4.941E+4	5.339	1.781E+5	1.488
4.953E+4	5.336	1.782E+5	1.489
4.965E+4	5.333	1.783E+5	1.485
4.977E+4	5.327	1.784E+5	1.484
4.989E+4	5.322	1.785E+5	1.484
5.001E+4	5.32	1.787E+5	1.48
5.013E+4	5.315	1.788E+5	1.474
5.025E+4	5.311	1.789E+5	1.473
5.037E+4	5.307	1.79E+5	1.469
5.049E+4	5.302	1.791E+5	1.47
5.061E+4	5.295	1.793E+5	1.464
5.073E+4	5.293	1.794E+5	1.462
5.085E+4	5.29	1.795E+5	1.458
5.097E+4	5.283	1.796E+5	1.458
5.109E+4	5.279	1.797E+5	1.449
5.121E+4	5.273	1.799E+5	1.451
5.133E+4	5.269	1.8E+5	1.45
5.145E+4	5.266	1.801E+5	1.443
5.157E+4	5.261	1.802E+5	1.443
5.169E+4	5.257	1.803E+5	1.442
5.181E+4	5.25	1.805E+5	1.437
5.193E+4	5.249	1.806E+5	1.434
5.205E+4	5.246	1.807E+5	1.433
5.217E+4	5.237	1.808E+5	1.429
5.229E+4	5.239	1.809E+5	1.422
5.241E+4	5.229	1.811E+5	1.423
5.253E+4	5.227	1.812E+5	1.421
5.265E+4	5.223	1.813E+5	1.416
5.277E+4	5.218	1.814E+5	1.412
5.289E+4	5.215	1.815E+5	1.407
5.301E+4	5.208	1.817E+5	1.408
5.313E+4	5.207	1.818E+5	1.408
5.325E+4	5.199	1.819E+5	1.401
5.337E+4	5.199	1.82E+5	1.398
5.349E+4	5.193	1.821E+5	1.396
5.361E+4	5.193	1.823E+5	1.391
5.373E+4	5.19	1.824E+5	1.39
5.385E+4	5.177	1.825E+5	1.388
5.397E+4	5.176	1.826E+5	1.384
5.409E+4	5.175	1.827E+5	1.381
5.421E+4	5.163	1.829E+5	1.378
5.433E+4	5.163	1.83E+5	1.377
5.445E+4	5.162	1.831E+5	1.375
5.457E+4	5.154	1.832E+5	1.371
5.469E+4	5.152	1.833E+5	1.37
5.481E+4	5.148	1.835E+5	1.364
5.493E+4	5.145	1.836E+5	1.36
5.505E+4	5.136	1.837E+5	1.355
5.517E+4	5.132	1.838E+5	1.355
5.529E+4	5.126	1.839E+5	1.358
5.541E+4	5.125	1.841E+5	1.346
5.553E+4	5.122	1.842E+5	1.35
5.565E+4	5.117	1.843E+5	1.345

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
5.577E+4	5.109	1.844E+5	1.346
5.589E+4	5.11	1.845E+5	1.341
5.601E+4	5.105	1.847E+5	1.337
5.613E+4	5.102	1.848E+5	1.332
5.625E+4	5.096	1.849E+5	1.332
5.637E+4	5.093	1.85E+5	1.328
5.649E+4	5.087	1.851E+5	1.328
5.661E+4	5.083	1.853E+5	1.319
5.673E+4	5.08	1.854E+5	1.318
5.685E+4	5.078	1.855E+5	1.312
5.697E+4	5.076	1.856E+5	1.312
5.709E+4	5.066	1.857E+5	1.309
5.721E+4	5.059	1.859E+5	1.31
5.733E+4	5.059	1.86E+5	1.306
5.745E+4	5.055	1.861E+5	1.304
5.757E+4	5.051	1.862E+5	1.3
5.769E+4	5.048	1.863E+5	1.298
5.781E+4	5.041	1.865E+5	1.296
5.793E+4	5.036	1.866E+5	1.293
5.805E+4	5.033	1.867E+5	1.291
5.817E+4	5.028	1.868E+5	1.285
5.829E+4	5.025	1.869E+5	1.285
5.841E+4	5.022	1.871E+5	1.285
5.853E+4	5.017	1.872E+5	1.276
5.865E+4	5.015	1.873E+5	1.277
5.877E+4	5.01	1.874E+5	1.275
5.889E+4	5.005	1.875E+5	1.272
5.901E+4	4.999	1.877E+5	1.265
5.913E+4	4.999	1.878E+5	1.266
5.925E+4	4.994	1.879E+5	1.262
5.937E+4	4.988	1.88E+5	1.259
5.949E+4	4.984	1.881E+5	1.26
5.961E+4	4.979	1.883E+5	1.256
5.973E+4	4.978	1.884E+5	1.249
5.985E+4	4.969	1.885E+5	1.252
5.997E+4	4.964	1.886E+5	1.245
6.009E+4	4.962	1.887E+5	1.24
6.021E+4	4.959	1.889E+5	1.239
6.033E+4	4.955	1.89E+5	1.24
6.045E+4	4.953	1.891E+5	1.234
6.057E+4	4.946	1.892E+5	1.232
6.069E+4	4.944	1.893E+5	1.226
6.081E+4	4.937	1.895E+5	1.228
6.093E+4	4.936	1.896E+5	1.225
6.105E+4	4.93	1.897E+5	1.222
6.117E+4	4.929	1.898E+5	1.219
6.129E+4	4.919	1.899E+5	1.219
6.141E+4	4.916	1.901E+5	1.214
6.153E+4	4.913	1.902E+5	1.212
6.165E+4	4.91	1.903E+5	1.21
6.177E+4	4.906	1.904E+5	1.201
6.189E+4	4.898	1.905E+5	1.199
6.201E+4	4.899	1.907E+5	1.202
6.213E+4	4.895	1.908E+5	1.193
6.225E+4	4.89	1.909E+5	1.194
6.237E+4	4.885	1.91E+5	1.188
6.249E+4	4.881	1.911E+5	1.186
6.261E+4	4.874	1.913E+5	1.186
6.273E+4	4.874	1.914E+5	1.183
6.285E+4	4.871	1.915E+5	1.181
6.297E+4	4.864	1.916E+5	1.179
6.309E+4	4.859	1.917E+5	1.177
6.321E+4	4.855	1.919E+5	1.173
6.333E+4	4.85	1.92E+5	1.17
6.345E+4	4.848	1.921E+5	1.165
6.357E+4	4.844	1.922E+5	1.162

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
6.369E+4	4.842	1.923E+5	1.163
6.381E+4	4.836	1.925E+5	1.158
6.393E+4	4.835	1.926E+5	1.153
6.405E+4	4.829	1.927E+5	1.153
6.417E+4	4.823	1.928E+5	1.147
6.429E+4	4.82	1.929E+5	1.15
6.441E+4	4.814	1.931E+5	1.146
6.453E+4	4.811	1.932E+5	1.14
6.465E+4	4.805	1.933E+5	1.139
6.477E+4	4.798	1.934E+5	1.137
6.489E+4	4.797	1.935E+5	1.137
6.501E+4	4.795	1.937E+5	1.132
6.513E+4	4.785	1.938E+5	1.13
6.525E+4	4.783	1.939E+5	1.129
6.537E+4	4.782	1.94E+5	1.12
6.549E+4	4.781	1.941E+5	1.117
6.561E+4	4.775	1.943E+5	1.116
6.573E+4	4.768	1.944E+5	1.116
6.585E+4	4.763	1.945E+5	1.112
6.597E+4	4.755	1.946E+5	1.112
6.609E+4	4.755	1.947E+5	1.106
6.621E+4	4.746	1.949E+5	1.106
6.633E+4	4.748	1.95E+5	1.1
6.645E+4	4.744	1.951E+5	1.101
6.657E+4	4.741	1.952E+5	1.092
6.669E+4	4.736	1.953E+5	1.092
6.681E+4	4.731	1.955E+5	1.091
6.693E+4	4.723	1.956E+5	1.092
6.705E+4	4.726	1.957E+5	1.087
6.717E+4	4.722	1.958E+5	1.081
6.729E+4	4.711	1.959E+5	1.079
6.741E+4	4.711	1.961E+5	1.086
6.753E+4	4.706	1.962E+5	1.075
6.765E+4	4.702	1.963E+5	1.07
6.777E+4	4.697	1.964E+5	1.077
6.789E+4	4.696	1.965E+5	1.07
6.801E+4	4.688	1.967E+5	1.065
6.813E+4	4.683	1.968E+5	1.064
6.825E+4	4.681	1.969E+5	1.06
6.837E+4	4.679	1.97E+5	1.059
6.849E+4	4.673	1.971E+5	1.058
6.861E+4	4.674	1.973E+5	1.05
6.873E+4	4.667	1.974E+5	1.052
6.885E+4	4.663	1.975E+5	1.047
6.897E+4	4.655	1.976E+5	1.043
6.909E+4	4.654	1.977E+5	1.043
6.921E+4	4.65	1.979E+5	1.037
6.933E+4	4.644	1.98E+5	1.037
6.945E+4	4.642	1.981E+5	1.037
6.957E+4	4.637	1.982E+5	1.03
6.969E+4	4.632	1.983E+5	1.027
6.981E+4	4.628	1.985E+5	1.021
6.993E+4	4.625	1.986E+5	1.023
7.005E+4	4.616	1.987E+5	1.022
7.017E+4	4.614	1.988E+5	1.019
7.029E+4	4.613	1.989E+5	1.015
7.041E+4	4.606	1.991E+5	1.012
7.053E+4	4.606	1.992E+5	1.011
7.065E+4	4.6	1.993E+5	1.005
7.077E+4	4.594	1.994E+5	1.003
7.089E+4	4.593	1.995E+5	0.999
7.101E+4	4.584	1.997E+5	0.999
7.113E+4	4.583	1.998E+5	0.997
7.125E+4	4.582	1.999E+5	0.996
7.137E+4	4.573	2.0E+5	0.992
7.149E+4	4.566	2.001E+5	0.99

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
7.161E+4	4.567	2.003E+5	0.986
7.173E+4	4.564	2.004E+5	0.981
7.185E+4	4.559	2.005E+5	0.979
7.197E+4	4.557	2.006E+5	0.976
7.209E+4	4.546	2.007E+5	0.975
7.221E+4	4.546	2.009E+5	0.972
7.233E+4	4.543	2.01E+5	0.97
7.245E+4	4.539	2.011E+5	0.97
7.257E+4	4.532	2.012E+5	0.961
7.269E+4	4.529	2.013E+5	0.961
7.281E+4	4.523	2.015E+5	0.962
7.293E+4	4.521	2.016E+5	0.958
7.305E+4	4.518	2.017E+5	0.956
7.317E+4	4.514	2.018E+5	0.957
7.329E+4	4.508	2.019E+5	0.955
7.341E+4	4.507	2.021E+5	0.944
7.353E+4	4.506	2.022E+5	0.947
7.365E+4	4.497	2.023E+5	0.945
7.377E+4	4.49	2.024E+5	0.937
7.389E+4	4.489	2.025E+5	0.938
7.401E+4	4.483	2.027E+5	0.936
7.413E+4	4.484	2.028E+5	0.933
7.425E+4	4.478	2.029E+5	0.927
7.437E+4	4.474	2.03E+5	0.924
7.449E+4	4.47	2.031E+5	0.921
7.461E+4	4.463	2.033E+5	0.921
7.473E+4	4.462	2.034E+5	0.919
7.485E+4	4.454	2.035E+5	0.911
7.497E+4	4.45	2.036E+5	0.917
7.509E+4	4.449	2.037E+5	0.906
7.521E+4	4.445	2.039E+5	0.905
7.533E+4	4.44	2.04E+5	0.899
7.545E+4	4.439	2.041E+5	0.899
7.557E+4	4.431	2.042E+5	0.893
7.569E+4	4.425	2.043E+5	0.895
7.581E+4	4.424	2.045E+5	0.893
7.593E+4	4.422	2.046E+5	0.892
7.605E+4	4.415	2.047E+5	0.887
7.617E+4	4.411	2.048E+5	0.883
7.629E+4	4.404	2.049E+5	0.883
7.641E+4	4.402	2.051E+5	0.874
7.653E+4	4.396	2.052E+5	0.875
7.665E+4	4.397	2.053E+5	0.879
7.677E+4	4.393	2.054E+5	0.87
7.689E+4	4.387	2.055E+5	0.864
7.701E+4	4.381	2.057E+5	0.864
7.713E+4	4.379	2.058E+5	0.86
7.725E+4	4.368	2.059E+5	0.857
7.737E+4	4.369	2.06E+5	0.855
7.749E+4	4.366	2.061E+5	0.857
7.761E+4	4.36	2.063E+5	0.848
7.773E+4	4.358	2.064E+5	0.853
7.785E+4	4.353	2.065E+5	0.852
7.797E+4	4.351	2.066E+5	0.839
7.809E+4	4.345	2.067E+5	0.843
7.821E+4	4.339	2.069E+5	0.839
7.833E+4	4.341	2.07E+5	0.832
7.845E+4	4.334	2.071E+5	0.833
7.857E+4	4.327	2.072E+5	0.83
7.869E+4	4.325	2.073E+5	0.823
7.881E+4	4.32	2.075E+5	0.826
7.893E+4	4.317	2.076E+5	0.821
7.905E+4	4.311	2.077E+5	0.817
7.917E+4	4.305	2.078E+5	0.812
7.929E+4	4.308	2.079E+5	0.811
7.941E+4	4.303	2.081E+5	0.806

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
7.953E+4	4.293	2.082E+5	0.806
7.965E+4	4.29	2.083E+5	0.803
7.977E+4	4.287	2.084E+5	0.805
7.989E+4	4.287	2.085E+5	0.798
8.001E+4	4.283	2.087E+5	0.793
8.013E+4	4.276	2.088E+5	0.794
8.025E+4	4.272	2.089E+5	0.793
8.037E+4	4.27	2.09E+5	0.788
8.049E+4	4.258	2.091E+5	0.788
8.061E+4	4.257	2.093E+5	0.781
8.073E+4	4.258	2.094E+5	0.778
8.085E+4	4.254	2.095E+5	0.775
8.097E+4	4.25	2.096E+5	0.769
8.109E+4	4.244	2.097E+5	0.772
8.121E+4	4.236	2.099E+5	0.764
8.133E+4	4.236	2.1E+5	0.766
8.145E+4	4.233	2.101E+5	0.762
8.157E+4	4.23	2.102E+5	0.76
8.169E+4	4.222	2.103E+5	0.755
8.181E+4	4.221	2.105E+5	0.755
8.193E+4	4.216	2.106E+5	0.753
8.205E+4	4.215	2.107E+5	0.75
8.217E+4	4.21	2.108E+5	0.742
8.229E+4	4.204	2.109E+5	0.74
8.241E+4	4.199	2.111E+5	0.745
8.253E+4	4.2	2.112E+5	0.738
8.265E+4	4.189	2.113E+5	0.734
8.277E+4	4.188	2.114E+5	0.733
8.289E+4	4.188	2.115E+5	0.729
8.301E+4	4.18	2.117E+5	0.729
8.313E+4	4.178	2.118E+5	0.725
8.325E+4	4.17	2.119E+5	0.719
8.337E+4	4.167	2.12E+5	0.719
8.349E+4	4.163	2.121E+5	0.718
8.361E+4	4.159	2.123E+5	0.715
8.373E+4	4.157	2.124E+5	0.711
8.385E+4	4.152	2.125E+5	0.705
8.397E+4	4.15	2.126E+5	0.708
8.409E+4	4.145	2.127E+5	0.703
8.421E+4	4.14	2.129E+5	0.698
8.433E+4	4.134	2.13E+5	0.697
8.445E+4	4.13	2.131E+5	0.696
8.457E+4	4.127	2.132E+5	0.694
8.469E+4	4.121	2.133E+5	0.687
8.481E+4	4.118	2.135E+5	0.687
8.493E+4	4.114	2.136E+5	0.685
8.505E+4	4.11	2.137E+5	0.681
8.517E+4	4.104	2.138E+5	0.675
8.529E+4	4.104	2.139E+5	0.679
8.541E+4	4.099	2.141E+5	0.674
8.553E+4	4.095	2.142E+5	0.67
8.565E+4	4.091	2.143E+5	0.668
8.577E+4	4.084	2.144E+5	0.665
8.589E+4	4.086	2.145E+5	0.66
8.601E+4	4.078	2.147E+5	0.66
8.613E+4	4.072	2.148E+5	0.654
8.625E+4	4.07	2.149E+5	0.656
8.637E+4	4.062	2.15E+5	0.651
8.649E+4	4.064	2.151E+5	0.651
8.661E+4	4.06	2.153E+5	0.646
8.673E+4	4.052	2.154E+5	0.645
8.685E+4	4.051	2.155E+5	0.636
8.697E+4	4.05	2.156E+5	0.641
8.709E+4	4.047	2.157E+5	0.635
8.721E+4	4.037	2.159E+5	0.634
8.733E+4	4.034	2.16E+5	0.629

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
8.745E+4	4.031	2.161E+5	0.625
8.757E+4	4.026	2.162E+5	0.629
8.769E+4	4.023	2.163E+5	0.623
8.781E+4	4.025	2.165E+5	0.618
8.793E+4	4.016	2.166E+5	0.614
8.805E+4	4.011	2.167E+5	0.614
8.817E+4	4.005	2.168E+5	0.615
8.829E+4	4.004	2.169E+5	0.613
8.841E+4	4.	2.171E+5	0.605
8.853E+4	3.993	2.172E+5	0.607
8.865E+4	3.988	2.173E+5	0.603
8.877E+4	3.988	2.174E+5	0.598
8.889E+4	3.983	2.175E+5	0.597
8.901E+4	3.981	2.177E+5	0.596
8.913E+4	3.978	2.178E+5	0.594
8.925E+4	3.971	2.179E+5	0.588
8.937E+4	3.969	2.18E+5	0.587
8.949E+4	3.964	2.181E+5	0.583
8.961E+4	3.957	2.183E+5	0.582
8.973E+4	3.959	2.184E+5	0.578
8.985E+4	3.952	2.185E+5	0.577
8.997E+4	3.951	2.186E+5	0.575
9.009E+4	3.941	2.187E+5	0.57
9.021E+4	3.94	2.189E+5	0.566
9.033E+4	3.933	2.19E+5	0.566
9.045E+4	3.93	2.191E+5	0.566
9.057E+4	3.928	2.192E+5	0.558
9.069E+4	3.923	2.193E+5	0.556
9.081E+4	3.923	2.195E+5	0.555
9.093E+4	3.916	2.196E+5	0.552
9.105E+4	3.915	2.197E+5	0.552
9.117E+4	3.908	2.198E+5	0.547
9.129E+4	3.902	2.199E+5	0.543
9.141E+4	3.9	2.201E+5	0.542
9.153E+4	3.895	2.202E+5	0.541
9.165E+4	3.893	2.203E+5	0.536
9.177E+4	3.891	2.204E+5	0.533
9.189E+4	3.887	2.205E+5	0.533
9.201E+4	3.879	2.207E+5	0.531
9.213E+4	3.877	2.208E+5	0.526
9.225E+4	3.87	2.209E+5	0.524
9.237E+4	3.869	2.21E+5	0.523
9.249E+4	3.864	2.211E+5	0.522
9.261E+4	3.862	2.213E+5	0.517
9.273E+4	3.858	2.214E+5	0.512
9.285E+4	3.852	2.215E+5	0.511
9.297E+4	3.855	2.216E+5	0.508
9.309E+4	3.846	2.217E+5	0.507
9.321E+4	3.844	2.219E+5	0.503
9.333E+4	3.837	2.22E+5	0.502
9.345E+4	3.836	2.221E+5	0.499
9.357E+4	3.831	2.222E+5	0.497
9.369E+4	3.828	2.223E+5	0.493
9.381E+4	3.825	2.225E+5	0.493
9.393E+4	3.819	2.226E+5	0.485
9.405E+4	3.813	2.227E+5	0.483
9.417E+4	3.81	2.228E+5	0.487
9.429E+4	3.806	2.229E+5	0.481
9.441E+4	3.802	2.231E+5	0.477
9.453E+4	3.799	2.232E+5	0.473
9.465E+4	3.794	2.233E+5	0.475
9.477E+4	3.789	2.234E+5	0.47
9.489E+4	3.788	2.235E+5	0.468
9.501E+4	3.783	2.237E+5	0.466
9.513E+4	3.78	2.238E+5	0.466
9.525E+4	3.778	2.239E+5	0.461

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
9.537E+4	3.773	2.24E+5	0.457
9.549E+4	3.769	2.241E+5	0.455
9.561E+4	3.765	2.243E+5	0.456
9.573E+4	3.76	2.244E+5	0.448
9.585E+4	3.759	2.245E+5	0.451
9.597E+4	3.757	2.246E+5	0.445
9.609E+4	3.749	2.247E+5	0.447
9.621E+4	3.745	2.249E+5	0.442
9.633E+4	3.742	2.25E+5	0.44
9.645E+4	3.739	2.251E+5	0.434
9.657E+4	3.735	2.252E+5	0.43
9.669E+4	3.73	2.253E+5	0.433
9.681E+4	3.728	2.255E+5	0.43
9.693E+4	3.724	2.256E+5	0.427
9.705E+4	3.722	2.257E+5	0.426
9.717E+4	3.717	2.258E+5	0.423
9.729E+4	3.713	2.259E+5	0.42
9.741E+4	3.709	2.261E+5	0.42
9.753E+4	3.702	2.262E+5	0.414
9.765E+4	3.704	2.263E+5	0.412
9.777E+4	3.693	2.264E+5	0.406
9.789E+4	3.694	2.265E+5	0.401
9.801E+4	3.693	2.267E+5	0.404
9.813E+4	3.682	2.268E+5	0.4
9.825E+4	3.682	2.269E+5	0.402
9.837E+4	3.681	2.27E+5	0.398
9.849E+4	3.676	2.271E+5	0.393
9.861E+4	3.671	2.273E+5	0.393
9.873E+4	3.665	2.274E+5	0.389
9.885E+4	3.66	2.275E+5	0.386
9.897E+4	3.659	2.276E+5	0.383
9.909E+4	3.66	2.277E+5	0.38
9.921E+4	3.653	2.279E+5	0.38
9.933E+4	3.652	2.28E+5	0.372
9.945E+4	3.645	2.281E+5	0.374
9.957E+4	3.644	2.282E+5	0.37
9.969E+4	3.637	2.283E+5	0.369
9.981E+4	3.634	2.285E+5	0.372
9.993E+4	3.632	2.286E+5	0.366
1.001E+5	3.629	2.287E+5	0.363
1.002E+5	3.624	2.288E+5	0.361
1.003E+5	3.62	2.289E+5	0.357
1.004E+5	3.621	2.291E+5	0.357
1.005E+5	3.612	2.292E+5	0.352
1.007E+5	3.607	2.293E+5	0.349
1.008E+5	3.606	2.294E+5	0.347
1.009E+5	3.607	2.295E+5	0.348
1.01E+5	3.594	2.297E+5	0.344
1.011E+5	3.596	2.298E+5	0.344
1.013E+5	3.588	2.299E+5	0.339
1.014E+5	3.591	2.3E+5	0.333
1.015E+5	3.583	2.301E+5	0.333
1.016E+5	3.579	2.303E+5	0.333
1.017E+5	3.573	2.304E+5	0.331
1.019E+5	3.572	2.305E+5	0.321
1.02E+5	3.568	2.306E+5	0.319
1.021E+5	3.566	2.307E+5	0.324
1.022E+5	3.562	2.309E+5	0.318
1.023E+5	3.559	2.31E+5	0.315
1.025E+5	3.55	2.311E+5	0.31
1.026E+5	3.553	2.312E+5	0.312
1.027E+5	3.545	2.313E+5	0.311
1.028E+5	3.541	2.315E+5	0.307
1.029E+5	3.537	2.316E+5	0.303
1.031E+5	3.535	2.317E+5	0.296
1.032E+5	3.531	2.318E+5	0.298

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
1.033E+5	3.529	2.319E+5	0.293
1.034E+5	3.526	2.321E+5	0.291
1.035E+5	3.519	2.322E+5	0.287
1.037E+5	3.521	2.323E+5	0.287
1.038E+5	3.516	2.324E+5	0.281
1.039E+5	3.509	2.325E+5	0.282
1.04E+5	3.506	2.327E+5	0.281
1.041E+5	3.5	2.328E+5	0.277
1.043E+5	3.501	2.329E+5	0.275
1.044E+5	3.495	2.33E+5	0.273
1.045E+5	3.492	2.331E+5	0.268
1.046E+5	3.485	2.333E+5	0.269
1.047E+5	3.486	2.334E+5	0.266
1.049E+5	3.482	2.335E+5	0.264
1.05E+5	3.482	2.336E+5	0.259
1.051E+5	3.473	2.337E+5	0.26
1.052E+5	3.473	2.339E+5	0.26
1.053E+5	3.47	2.34E+5	0.255
1.055E+5	3.464	2.341E+5	0.251
1.056E+5	3.46	2.342E+5	0.248
1.057E+5	3.461	2.343E+5	0.246
1.058E+5	3.455	2.345E+5	0.245
1.059E+5	3.456	2.346E+5	0.239
1.061E+5	3.455	2.347E+5	0.237
1.062E+5	3.446	2.348E+5	0.238
1.063E+5	3.439	2.349E+5	0.233
1.064E+5	3.438	2.351E+5	0.232
1.065E+5	3.44	2.352E+5	0.229
1.067E+5	3.431	2.353E+5	0.225
1.068E+5	3.432	2.354E+5	0.224
1.069E+5	3.428	2.355E+5	0.222
1.07E+5	3.425	2.357E+5	0.219
1.071E+5	3.422	2.358E+5	0.216
1.073E+5	3.419	2.359E+5	0.215
1.074E+5	3.416	2.36E+5	0.206
1.075E+5	3.41	2.361E+5	0.208
1.076E+5	3.408	2.363E+5	0.209
1.077E+5	3.404	2.364E+5	0.203
1.079E+5	3.403	2.365E+5	0.201
1.08E+5	3.399	2.366E+5	0.196
1.081E+5	3.39	2.367E+5	0.194
1.082E+5	3.388	2.369E+5	0.193
1.083E+5	3.389	2.37E+5	0.189
1.085E+5	3.385	2.371E+5	0.189
1.086E+5	3.381	2.372E+5	0.184
1.087E+5	3.377	2.373E+5	0.182
1.088E+5	3.374	2.375E+5	0.174
1.089E+5	3.367	2.376E+5	0.178
1.091E+5	3.365	2.377E+5	0.174
1.092E+5	3.36	2.378E+5	0.175
1.093E+5	3.362	2.379E+5	0.172
1.094E+5	3.355	2.381E+5	0.171
1.095E+5	3.346	2.382E+5	0.168
1.097E+5	3.344	2.383E+5	0.169
1.098E+5	3.34	2.384E+5	0.162
1.099E+5	3.336	2.385E+5	0.158
1.1E+5	3.331	2.387E+5	0.159
1.101E+5	3.336	2.388E+5	0.152
1.103E+5	3.329	2.389E+5	0.15
1.104E+5	3.324	2.39E+5	0.148
1.105E+5	3.328	2.391E+5	0.145
1.106E+5	3.315	2.393E+5	0.145
1.107E+5	3.318	2.394E+5	0.143
1.109E+5	3.313	2.395E+5	0.143
1.11E+5	3.31	2.396E+5	0.136
1.111E+5	3.306	2.397E+5	0.136

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
1.112E+5	3.301	2.399E+5	0.133
1.113E+5	3.292	2.4E+5	0.131
1.115E+5	3.294	2.401E+5	0.126
1.116E+5	3.29	2.402E+5	0.128
1.117E+5	3.285	2.403E+5	0.12
1.118E+5	3.279	2.405E+5	0.12
1.119E+5	3.275	2.406E+5	0.12
1.121E+5	3.27	2.407E+5	0.116
1.122E+5	3.27	2.408E+5	0.113
1.123E+5	3.268	2.409E+5	0.111
1.124E+5	3.267	2.411E+5	0.108
1.125E+5	3.255	2.412E+5	0.103
1.127E+5	3.255	2.413E+5	0.105
1.128E+5	3.251	2.414E+5	0.098
1.129E+5	3.247	2.415E+5	0.1
1.13E+5	3.242	2.417E+5	0.1
1.131E+5	3.243	2.418E+5	0.093
1.133E+5	3.237	2.419E+5	0.091
1.134E+5	3.236	2.42E+5	0.088
1.135E+5	3.23	2.421E+5	0.085
1.136E+5	3.228	2.423E+5	0.085
1.137E+5	3.227	2.424E+5	0.081
1.139E+5	3.216	2.425E+5	0.08
1.14E+5	3.217	2.426E+5	0.079
1.141E+5	3.212	2.427E+5	0.072
1.142E+5	3.212	2.429E+5	0.072
1.143E+5	3.209	2.43E+5	0.071
1.145E+5	3.203	2.431E+5	0.064
1.146E+5	3.196	2.432E+5	0.061
1.147E+5	3.197	2.433E+5	0.062
1.148E+5	3.194	2.435E+5	0.064
1.149E+5	3.189	2.436E+5	0.061
1.151E+5	3.183	2.437E+5	0.058
1.152E+5	3.186	2.438E+5	0.053
1.153E+5	3.182	2.439E+5	0.048
1.154E+5	3.175	2.441E+5	0.047
1.155E+5	3.169	2.442E+5	0.047
1.157E+5	3.172	2.443E+5	0.041
1.158E+5	3.163	2.444E+5	0.038
1.159E+5	3.159	2.445E+5	0.038
1.16E+5	3.158	2.447E+5	0.039
1.161E+5	3.155	2.448E+5	0.035
1.163E+5	3.146	2.449E+5	0.037
1.164E+5	3.152	2.45E+5	0.032
1.165E+5	3.146	2.451E+5	0.03
1.166E+5	3.141	2.453E+5	0.025
1.167E+5	3.137	2.454E+5	0.027
1.169E+5	3.134	2.455E+5	0.02
1.17E+5	3.128	2.456E+5	0.019
1.171E+5	3.124	2.457E+5	0.017
1.172E+5	3.122	2.459E+5	0.013
1.173E+5	3.117	2.46E+5	0.01
1.175E+5	3.115	2.461E+5	0.004
1.176E+5	3.114	2.462E+5	0.
1.177E+5	3.112		

SOLUTION

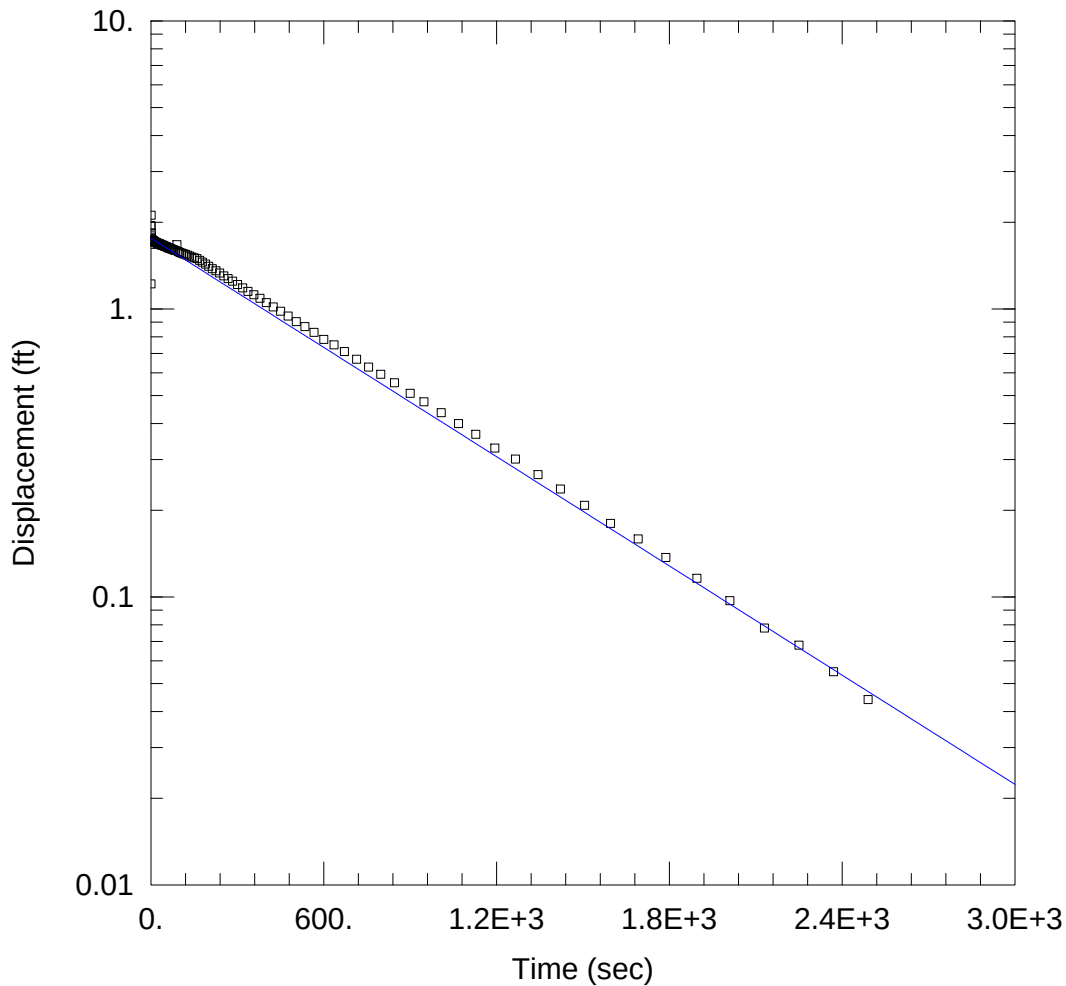
Slug Test
 Aquifer Model: Unconfined
 Solution Method: Bouwer-Rice
 ln(Re/rw): 3.692

VISUAL ESTIMATION RESULTSEstimated Parameters

Parameter	Estimate	
K	0.001593	ft/day
y0	7.568	ft

K = 5.618E-7 cm/sec

T = K*b = 0.1593 ft²/day (0.001712 sq. cm/sec)



PZ-23S RISING

Data Set: G:\...\PZ-23S Rising.aqt
 Date: 09/19/16

Time: 15:29:33

PROJECT INFORMATION

Company: Golder Associates
 Client: Southern Company Services
 Project: 1660939
 Location: Plant Branch
 Test Well: PZ-23S Rising
 Test Date: 08/15/16

AQUIFER DATA

Saturated Thickness: 100. ft Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (PZ-23S Rising)

Initial Displacement: <u>1.943</u> ft	Static Water Column Height: <u>7.65</u> ft
Total Well Penetration Depth: <u>10.</u> ft	Screen Length: <u>10.</u> ft
Casing Radius: <u>0.08333</u> ft	Well Radius: <u>0.08333</u> ft
	Gravel Pack Porosity: <u>0.15</u>

SOLUTION

Aquifer Model: <u>Unconfined</u>	Solution Method: <u>Bouwer-Rice</u>
K = <u>0.1208</u> ft/day	y0 = <u>1.76</u> ft

Data Set: G:\Projects\Southern Company Services\Confidential Plant Branch Drilling\Slug Test Data\August 2016\Q
 Title: PZ-23S Rising
 Date: 09/19/16
 Time: 15:29:17

PROJECT INFORMATION

Company: Golder Associates
 Client: Southern Company Services
 Project: 1660939
 Location: Plant Branch
 Test Date: 08/15/16
 Test Well: PZ-23S Rising

AQUIFER DATA

Saturated Thickness: 100. ft
 Anisotropy Ratio (Kz/Kr): 1.

SLUG TEST WELL DATA

Test Well: PZ-23S Rising

X Location: 0. ft
 Y Location: 0. ft

Initial Displacement: 1.943 ft
 Static Water Column Height: 7.65 ft
 Casing Radius: 0.08333 ft
 Well Radius: 0.08333 ft
 Well Skin Radius: 0.25 ft
 Screen Length: 10. ft
 Total Well Penetration Depth: 10. ft
 Corrected Casing Radius (Bouwer-Rice Method): 0.07725 ft
 Gravel Pack Porosity: 0.15

No. of Observations: 130

Observation Data			
<u>Time (sec)</u>	<u>Displacement (ft)</u>	<u>Time (sec)</u>	<u>Displacement (ft)</u>
0.	1.943	63.6	1.627
0.25	1.221	67.2	1.624
0.5	1.675	71.4	1.615
0.75	2.114	75.6	1.608
1.	1.724	79.8	1.602
1.481	1.838	84.6	1.597
1.701	1.763	90.	1.672
1.921	1.794	94.8	1.582
2.14	1.761	100.8	1.57
2.558	1.751	106.8	1.561
2.778	1.734	112.8	1.554
3.025	1.735	119.4	1.548
3.244	1.736	126.6	1.537
3.464	1.734	134.4	1.526
3.683	1.736	142.2	1.515
3.903	1.732	150.6	1.504
4.122	1.732	159.6	1.495
4.341	1.726	169.2	1.475
4.56	1.728	178.8	1.454
4.779	1.728	189.6	1.431
4.999	1.725	201.	1.406
5.25	1.727	213.	1.379
5.5	1.728	225.6	1.356
5.75	1.728	238.8	1.333
6.	1.726	253.2	1.302
6.36	1.726	268.2	1.275
6.72	1.725	283.8	1.248

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
7.14	1.724	300.6	1.216
7.56	1.718	318.6	1.183
7.98	1.724	337.2	1.151
8.461	1.72	357.6	1.12
9.	1.716	378.6	1.089
9.48	1.715	400.8	1.052
10.08	1.714	424.8	1.016
10.68	1.713	450.	0.981
11.28	1.716	476.4	0.945
11.94	1.712	504.6	0.903
12.66	1.711	534.6	0.868
13.44	1.706	566.4	0.829
14.22	1.707	600.	0.784
15.06	1.704	636.	0.75
15.96	1.702	672.	0.711
16.92	1.699	714.	0.669
17.88	1.701	756.	0.628
18.96	1.699	798.	0.593
20.1	1.699	846.	0.554
21.3	1.695	900.	0.509
22.56	1.691	948.	0.476
23.88	1.686	1008.	0.436
25.32	1.682	1068.	0.4
26.82	1.686	1128.	0.367
28.38	1.683	1194.	0.329
30.06	1.683	1266.	0.301
31.86	1.677	1344.	0.266
33.72	1.671	1422.	0.237
35.76	1.671	1506.	0.208
37.86	1.665	1596.	0.18
40.08	1.664	1692.	0.159
42.48	1.663	1788.	0.137
45.	1.657	1896.	0.116
47.64	1.651	2010.	0.097
50.46	1.647	2130.	0.078
53.46	1.643	2250.	0.068
56.64	1.637	2370.	0.055
60.	1.629	2490.	0.044

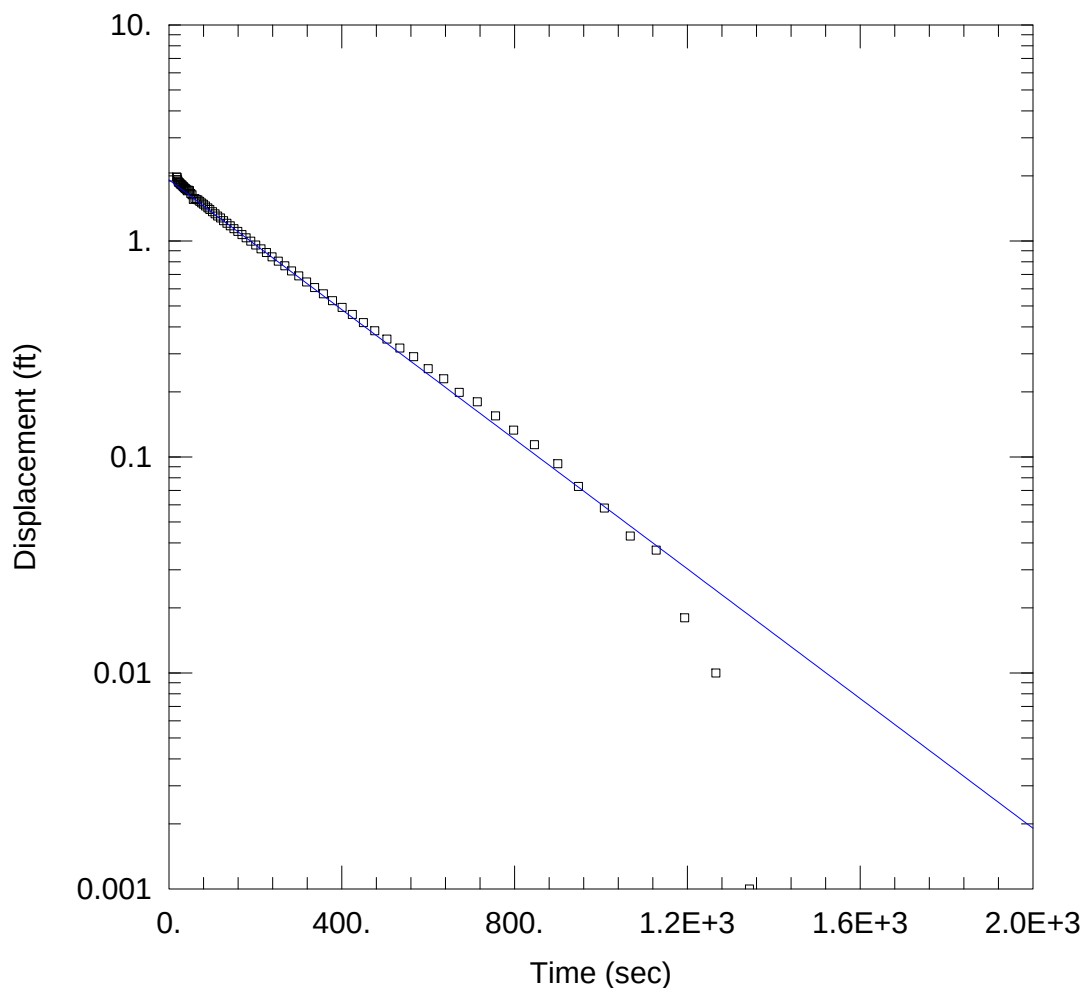
SOLUTION

Slug Test
 Aquifer Model: Unconfined
 Solution Method: Bouwer-Rice
 $\ln(R_e/r_w)$: 3.22

VISUAL ESTIMATION RESULTSEstimated Parameters

Parameter	Estimate	
K	0.1208	ft/day
y0	1.76	ft

$K = 4.262E-5$ cm/sec
 $T = K \cdot b = 12.08$ ft²/day (0.1299 sq. cm/sec)



PZ-24S FALLING

Data Set: G:\...\PZ-24S Falling.aqt

Date: 09/19/16

Time: 15:30:46

PROJECT INFORMATION

Company: Golder Associates

Client: Southern Company Services

Project: 1660939

Location: Plant Branch

Test Well: PZ-24S Falling

Test Date: 08/16/16

AQUIFER DATA

Saturated Thickness: 35. ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (PZ-24S Falling)

Initial Displacement: 1.977 ft

Static Water Column Height: 26.98 ft

Total Well Penetration Depth: 26.98 ft

Screen Length: 10. ft

Casing Radius: 0.08333 ft

Well Radius: 0.08333 ft

Gravel Pack Porosity: 0.15

SOLUTION

Aquifer Model: Unconfined

Solution Method: Bouwer-Rice

K = 0.3406 ft/day

y0 = 1.915 ft

Data Set: G:\Projects\Southern Company Services\Confidential Plant Branch Drilling\Slug Test Data\August 2016\Q
 Title: PZ-24S Falling
 Date: 09/19/16
 Time: 15:30:27

PROJECT INFORMATION

Company: Golder Associates
 Client: Southern Company Services
 Project: 1660939
 Location: Plant Branch
 Test Date: 08/16/16
 Test Well: PZ-24S Falling

AQUIFER DATA

Saturated Thickness: 35. ft
 Anisotropy Ratio (Kz/Kr): 1.

SLUG TEST WELL DATA

Test Well: PZ-24S Falling

X Location: 0. ft
 Y Location: 0. ft

Initial Displacement: 1.977 ft
 Static Water Column Height: 26.98 ft
 Casing Radius: 0.08333 ft
 Well Radius: 0.08333 ft
 Well Skin Radius: 0.25 ft
 Screen Length: 10. ft
 Total Well Penetration Depth: 26.98 ft
 Corrected Casing Radius (Bouwer-Rice Method): 0.07725 ft
 Gravel Pack Porosity: 0.15

No. of Observations: 76

Observation Data			
<u>Time (sec)</u>	<u>Displacement (ft)</u>	<u>Time (sec)</u>	<u>Displacement (ft)</u>
17.88	1.977	159.6	1.106
18.97	1.97	169.2	1.07
20.1	1.921	178.8	1.034
21.3	1.888	189.6	0.998
22.56	1.868	201.	0.958
23.88	1.863	213.	0.919
25.32	1.849	225.6	0.884
26.82	1.834	238.8	0.844
28.38	1.822	253.2	0.806
30.06	1.814	268.2	0.767
31.86	1.794	283.8	0.726
33.72	1.781	300.6	0.689
35.76	1.762	318.6	0.646
37.86	1.748	337.2	0.608
40.08	1.732	357.6	0.569
42.48	1.708	378.6	0.529
45.	1.72	400.8	0.492
47.64	1.711	424.8	0.457
50.46	1.657	450.	0.419
53.46	1.636	476.4	0.384
56.64	1.557	504.6	0.351
60.	1.569	534.6	0.319
63.6	1.558	566.4	0.291
67.2	1.549	600.	0.256
71.4	1.526	636.	0.23
75.6	1.5	672.	0.199
79.8	1.479	714.	0.18

<u>Time (sec)</u>	<u>Displacement (ft)</u>	<u>Time (sec)</u>	<u>Displacement (ft)</u>
84.6	1.451	756.	0.155
90.	1.422	798.	0.133
94.8	1.398	846.	0.114
100.8	1.365	900.	0.093
106.8	1.335	948.	0.073
112.8	1.304	1008.	0.058
119.4	1.277	1068.	0.043
126.6	1.241	1128.	0.037
134.4	1.208	1194.	0.018
142.2	1.175	1266.	0.01
150.6	1.14	1344.	0.001

SOLUTION

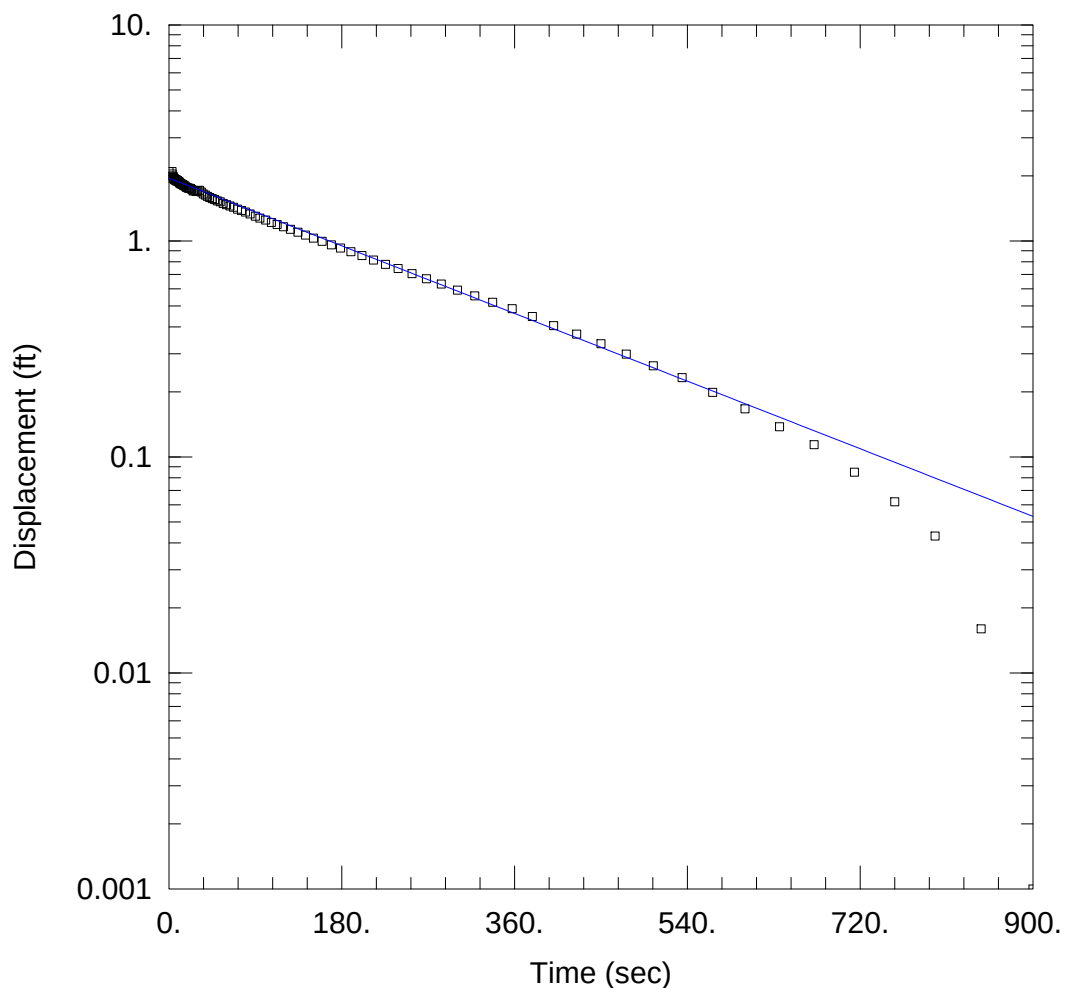
Slug Test
 Aquifer Model: Unconfined
 Solution Method: Bouwer-Rice
 $\ln(R_e/r_w)$: 3.824

VISUAL ESTIMATION RESULTSEstimated Parameters

<u>Parameter</u>	<u>Estimate</u>	
K	0.3406	ft/day
y ₀	1.915	ft

$K = 0.0001202$ cm/sec

$T = K \cdot b = 11.92$ ft²/day (0.1282 sq. cm/sec)



PZ-24S RISING

Data Set: G:\...\PZ-24S Rising.aqt

Date: 09/19/16

Time: 11:41:47

PROJECT INFORMATION

Company: Golder Associates

Client: Southern Company Services

Project: 1660939

Location: Plant Branch

Test Well: PZ-24S Rising

Test Date: 08/16/16

AQUIFER DATA

Saturated Thickness: 35. ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (PZ-24S Rising)

Initial Displacement: 2.096 ft

Static Water Column Height: 26.95 ft

Total Well Penetration Depth: 26.95 ft

Screen Length: 10. ft

Casing Radius: 0.08333 ft

Well Radius: 0.08333 ft

Gravel Pack Porosity: 0.15

SOLUTION

Aquifer Model: Unconfined

Solution Method: Bouwer-Rice

K = 0.3948 ft/day

y0 = 1.951 ft

Data Set: G:\Projects\Southern Company Services\Confidential Plant Branch Drilling\Slug Test Data\August 2016\Q
 Title: PZ-24S Rising
 Date: 09/19/16
 Time: 11:40:55

PROJECT INFORMATION

Company: Golder Associates
 Client: Southern Company Services
 Project: 1660939
 Location: Plant Branch
 Test Date: 08/16/16
 Test Well: PZ-24S Rising

AQUIFER DATA

Saturated Thickness: 35. ft
 Anisotropy Ratio (Kz/Kr): 1.

SLUG TEST WELL DATA

Test Well: PZ-24S Rising

X Location: 0. ft
 Y Location: 0. ft

Initial Displacement: 2.096 ft
 Static Water Column Height: 26.95 ft
 Casing Radius: 0.08333 ft
 Well Radius: 0.08333 ft
 Well Skin Radius: 0.25 ft
 Screen Length: 10. ft
 Total Well Penetration Depth: 26.95 ft
 Corrected Casing Radius (Bouwer-Rice Method): 0.07725 ft
 Gravel Pack Porosity: 0.15

No. of Observations: 100

Observation Data			
<u>Time (sec)</u>	<u>Displacement (ft)</u>	<u>Time (sec)</u>	<u>Displacement (ft)</u>
3.201	2.096	53.46	1.517
3.425	2.041	56.64	1.492
3.647	1.954	60.	1.471
3.868	1.955	63.6	1.452
4.091	1.996	67.2	1.431
4.314	1.995	71.4	1.403
4.536	1.968	75.6	1.384
4.758	1.951	79.8	1.36
5.234	1.948	84.6	1.334
5.455	1.938	90.	1.302
5.675	1.935	94.8	1.275
5.895	1.93	100.8	1.25
6.197	1.918	106.8	1.218
6.42	1.923	112.8	1.192
6.721	1.916	119.4	1.163
7.141	1.914	126.6	1.132
7.561	1.91	134.4	1.098
7.981	1.902	142.2	1.064
8.461	1.894	150.6	1.031
9.001	1.905	159.6	0.995
9.481	1.89	169.2	0.959
10.08	1.879	178.8	0.927
10.68	1.875	189.6	0.892
11.28	1.854	201.	0.856
11.94	1.849	213.	0.816
12.66	1.838	225.6	0.779
13.44	1.831	238.8	0.745

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
14.22	1.824	253.2	0.705
15.06	1.812	268.2	0.668
15.96	1.804	283.8	0.631
16.92	1.792	300.6	0.592
18.06	1.773	318.6	0.557
19.11	1.766	337.2	0.52
20.1	1.755	357.6	0.486
21.3	1.755	378.6	0.447
22.56	1.747	400.8	0.405
23.88	1.728	424.8	0.37
25.32	1.705	450.	0.334
26.82	1.707	476.4	0.299
28.38	1.692	504.6	0.264
30.06	1.71	534.6	0.233
31.86	1.715	566.4	0.199
33.72	1.683	600.	0.167
35.76	1.649	636.	0.138
37.86	1.629	672.	0.114
40.08	1.608	714.	0.085
42.48	1.588	756.	0.062
45.	1.571	798.	0.043
47.64	1.553	846.	0.016
50.46	1.534	900.	0.001

SOLUTION

Slug Test

Aquifer Model: Unconfined

Solution Method: Bouwer-Rice

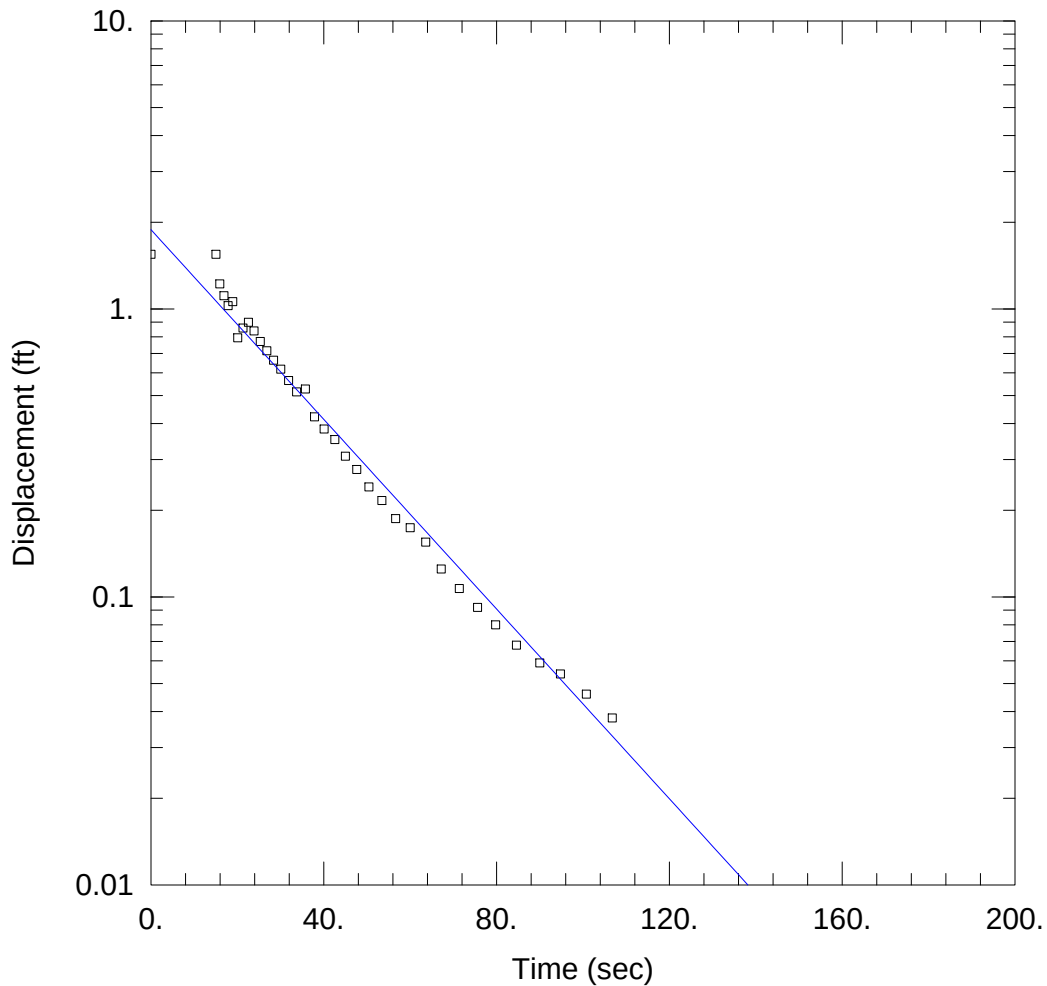
ln(Re/rw): 3.823

VISUAL ESTIMATION RESULTSEstimated Parameters

Parameter	Estimate	
K	0.3948	ft/day
y0	1.951	ft

K = 0.0001393 cm/sec

T = K*b = 13.82 ft²/day (0.1486 sq. cm/sec)



PZ-25I FALLING

Data Set: G:\...\PZ-25I Falling.aqt

Date: 09/19/16

Time: 13:02:15

PROJECT INFORMATION

Company: Golder Associates

Client: Southern Company Services

Project: 1660939

Location: Plant Branch

Test Well: PZ-25I Falling

Test Date: 08/16/16

AQUIFER DATA

Saturated Thickness: 100. ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (PZ-25I Falling)

Initial Displacement: 1.547 ft

Static Water Column Height: 11.57 ft

Total Well Penetration Depth: 11.57 ft

Screen Length: 10. ft

Casing Radius: 0.08333 ft

Well Radius: 0.08333 ft

Gravel Pack Porosity: 0.15

SOLUTION

Aquifer Model: Unconfined

Solution Method: Bouwer-Rice

K = 3.217 ft/day

y0 = 1.884 ft

Data Set: G:\Projects\Southern Company Services\Confidential Plant Branch Drilling\Slug Test Data\August 2016\Q
 Title: PZ-25I Falling
 Date: 09/19/16
 Time: 13:02:00

PROJECT INFORMATION

Company: Golder Associates
 Client: Southern Company Services
 Project: 1660939
 Location: Plant Branch
 Test Date: 08/16/16
 Test Well: PZ-25I Falling

AQUIFER DATA

Saturated Thickness: 100. ft
 Anisotropy Ratio (Kz/Kr): 1.

SLUG TEST WELL DATA

Test Well: PZ-25I Falling

X Location: 0. ft
 Y Location: 0. ft

Initial Displacement: 1.547 ft
 Static Water Column Height: 11.57 ft
 Casing Radius: 0.08333 ft
 Well Radius: 0.08333 ft
 Well Skin Radius: 0.25 ft
 Screen Length: 10. ft
 Total Well Penetration Depth: 11.57 ft
 Corrected Casing Radius (Bouwer-Rice Method): 0.07725 ft
 Gravel Pack Porosity: 0.15

No. of Observations: 35

Observation Data			
<u>Time (sec)</u>	<u>Displacement (ft)</u>	<u>Time (sec)</u>	<u>Displacement (ft)</u>
15.06	1.547	42.56	0.352
15.96	1.222	45.	0.308
16.92	1.112	47.64	0.277
17.88	1.027	50.46	0.241
18.96	1.06	53.46	0.216
20.1	0.794	56.64	0.187
21.3	0.858	60.	0.174
22.56	0.899	63.6	0.155
23.88	0.839	67.2	0.125
25.32	0.771	71.4	0.107
26.82	0.716	75.6	0.092
28.38	0.664	79.8	0.08
30.06	0.618	84.6	0.068
31.86	0.564	90.	0.059
33.72	0.515	94.8	0.054
35.76	0.527	100.8	0.046
37.86	0.422	106.8	0.038
40.08	0.383		

SOLUTION

Slug Test
 Aquifer Model: Unconfined
 Solution Method: Bouwer-Rice
 ln(Re/rw): 3.292

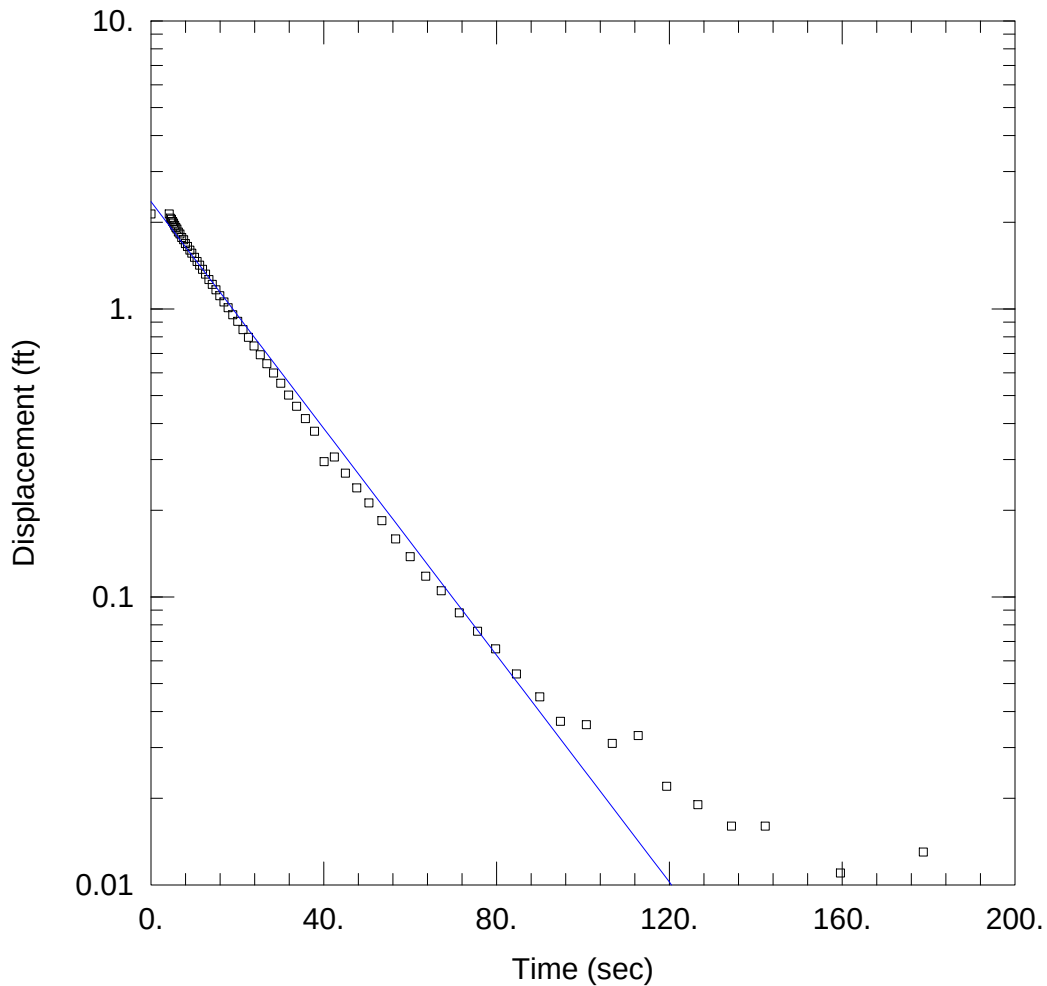
VISUAL ESTIMATION RESULTS

Estimated Parameters

<u>Parameter</u>	<u>Estimate</u>	
K	3.217	ft/day
y0	1.884	ft

K = 0.001135 cm/sec

T = K*b = 321.7 ft²/day (3.459 sq. cm/sec)



PZ-25I RISING

Data Set: G:\...\PZ-25I Rising.aqt

Date: 09/19/16

Time: 13:04:06

PROJECT INFORMATION

Company: Golder Associates

Client: Southern Company Services

Project: 1660939

Location: Plant Branch

Test Well: PZ-25I Rising

Test Date: 08/16/16

AQUIFER DATA

Saturated Thickness: 100. ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (PZ-25I Rising)

Initial Displacement: 2.136 ft

Static Water Column Height: 11.57 ft

Total Well Penetration Depth: 11.57 ft

Screen Length: 10. ft

Casing Radius: 0.08333 ft

Well Radius: 0.08333 ft

Gravel Pack Porosity: 0.15

SOLUTION

Aquifer Model: Unconfined

Solution Method: Bouwer-Rice

K = 3.846 ft/day

y0 = 2.357 ft

Data Set: G:\Projects\Southern Company Services\Confidential Plant Branch Drilling\Slug Test Data\August 2016\Q
 Title: PZ-25I Rising
 Date: 09/19/16
 Time: 13:04:22

PROJECT INFORMATION

Company: Golder Associates
 Client: Southern Company Services
 Project: 1660939
 Location: Plant Branch
 Test Date: 08/16/16
 Test Well: PZ-25I Rising

AQUIFER DATA

Saturated Thickness: 100. ft
 Anisotropy Ratio (Kz/Kr): 1.

SLUG TEST WELL DATA

Test Well: PZ-25I Rising

X Location: 0. ft
 Y Location: 0. ft

Initial Displacement: 2.136 ft
 Static Water Column Height: 11.57 ft
 Casing Radius: 0.08333 ft
 Well Radius: 0.08333 ft
 Well Skin Radius: 0.25 ft
 Screen Length: 10. ft
 Total Well Penetration Depth: 11.57 ft
 Corrected Casing Radius (Bouwer-Rice Method): 0.07725 ft
 Gravel Pack Porosity: 0.15

No. of Observations: 66

Observation Data			
<u>Time (sec)</u>	<u>Displacement (ft)</u>	<u>Time (sec)</u>	<u>Displacement (ft)</u>
4.251	2.136	26.82	0.645
4.501	2.068	28.38	0.599
4.751	2.049	30.06	0.552
5.001	2.012	31.86	0.502
5.251	1.986	33.72	0.459
5.501	1.95	35.76	0.416
5.751	1.919	37.86	0.376
6.001	1.894	40.08	0.295
6.361	1.849	42.48	0.306
6.721	1.821	45.	0.269
7.141	1.771	47.64	0.239
7.561	1.738	50.46	0.212
7.981	1.687	53.46	0.184
8.461	1.648	56.64	0.159
9.001	1.601	60.	0.138
9.481	1.561	63.6	0.118
10.08	1.51	67.2	0.105
10.68	1.461	71.4	0.088
11.28	1.419	75.6	0.076
11.94	1.373	79.8	0.066
12.66	1.321	84.6	0.054
13.44	1.264	90.	0.045
14.22	1.217	94.8	0.037
15.06	1.165	100.8	0.036
15.96	1.112	106.8	0.031
16.92	1.057	112.8	0.033
17.88	1.009	119.4	0.022

<u>Time (sec)</u>	<u>Displacement (ft)</u>	<u>Time (sec)</u>	<u>Displacement (ft)</u>
18.96	0.954	126.6	0.019
20.1	0.906	134.4	0.016
21.3	0.847	142.2	0.016
22.56	0.797	159.6	0.011
23.88	0.744	178.8	0.013
25.32	0.693	189.6	0.

SOLUTION

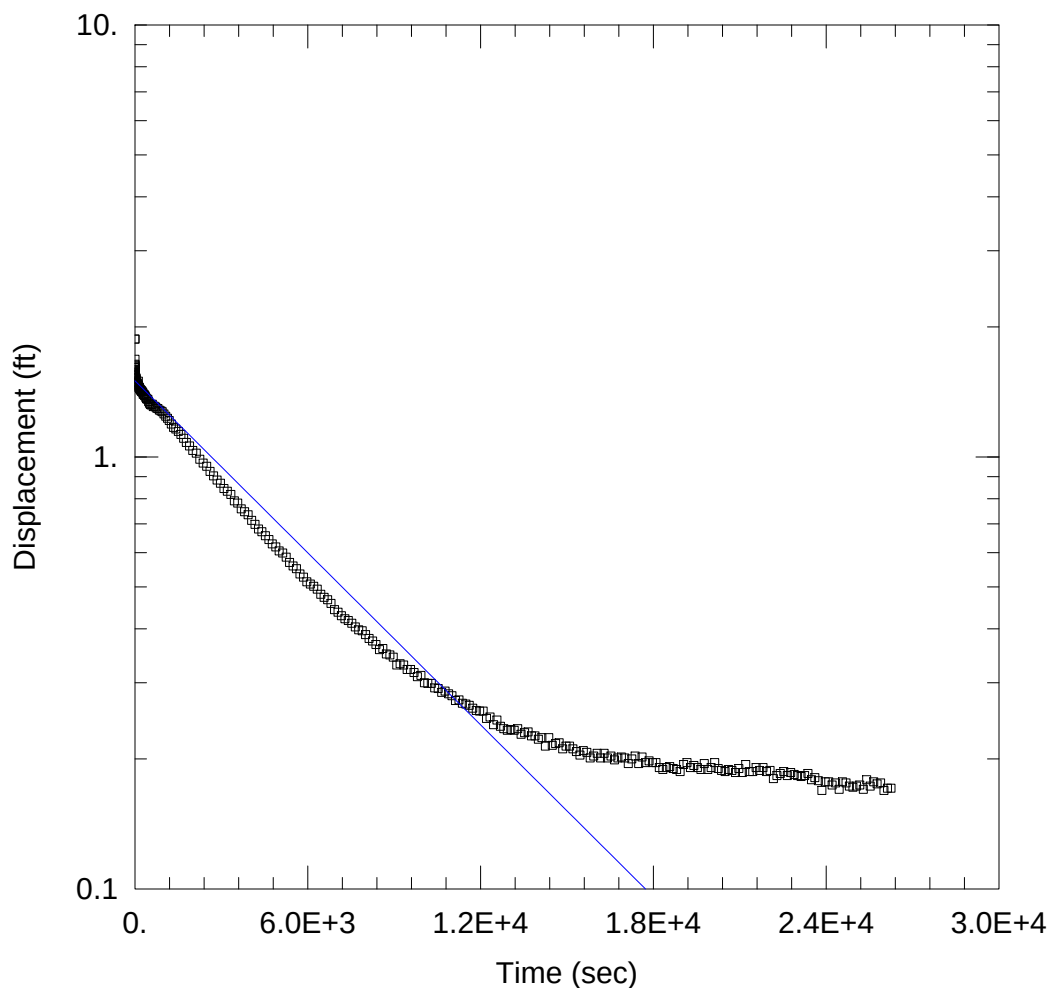
Slug Test
 Aquifer Model: Unconfined
 Solution Method: Bouwer-Rice
 $\ln(Re/rw)$: 3.292

VISUAL ESTIMATION RESULTSEstimated Parameters

<u>Parameter</u>	<u>Estimate</u>	
K	3.846	ft/day
y0	2.357	ft

$K = 0.001357 \text{ cm/sec}$

$T = K \cdot b = 384.6 \text{ ft}^2/\text{day} \text{ (4.136 sq. cm/sec)}$



PZ-26I RISING

Data Set: G:\...\PZ-26I Rising.aqt

Date: 09/19/16

Time: 13:13:06

PROJECT INFORMATION

Company: Golder Associates

Client: Southern Company Services

Project: 1660939

Location: Plant Branch

Test Well: PZ-26I Rising

Test Date: 08/15/16

AQUIFER DATA

Saturated Thickness: 100. ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (PZ-26I Rising)

Initial Displacement: 1.874 ft

Static Water Column Height: 7.84 ft

Total Well Penetration Depth: 10. ft

Screen Length: 10. ft

Casing Radius: 0.08333 ft

Well Radius: 0.08333 ft

Gravel Pack Porosity: 0.15

SOLUTION

Aquifer Model: Unconfined

Solution Method: Bouwer-Rice

K = 0.01268 ft/day

y0 = 1.5 ft

Data Set: G:\Projects\Southern Company Services\Confidential Plant Branch Drilling\Slug Test Data\August 2016\Q
 Title: PZ-26I Rising
 Date: 09/19/16
 Time: 13:12:41

PROJECT INFORMATION

Company: Golder Associates
 Client: Southern Company Services
 Project: 1660939
 Location: Plant Branch
 Test Date: 08/15/16
 Test Well: PZ-26I Rising

AQUIFER DATA

Saturated Thickness: 100. ft
 Anisotropy Ratio (Kz/Kr): 1.

SLUG TEST WELL DATA

Test Well: PZ-26I Rising

X Location: 0. ft
 Y Location: 0. ft

Initial Displacement: 1.874 ft
 Static Water Column Height: 7.84 ft
 Casing Radius: 0.08333 ft
 Well Radius: 0.08333 ft
 Well Skin Radius: 0.25 ft
 Screen Length: 10. ft
 Total Well Penetration Depth: 10. ft
 Corrected Casing Radius (Bouwer-Rice Method): 0.07725 ft
 Gravel Pack Porosity: 0.15

No. of Observations: 315

Observation Data			
Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
3.251	1.874	7530.	0.412
3.501	1.639	7650.	0.404
3.751	1.683	7770.	0.398
4.001	1.625	7890.	0.396
4.251	1.632	8010.	0.388
4.501	1.612	8130.	0.38
4.751	1.616	8250.	0.375
5.001	1.609	8370.	0.368
5.251	1.597	8490.	0.358
5.501	1.593	8610.	0.36
5.751	1.59	8730.	0.35
6.001	1.579	8850.	0.348
6.361	1.571	8970.	0.344
6.721	1.586	9090.	0.33
7.141	1.573	9210.	0.332
7.561	1.566	9330.	0.33
7.981	1.574	9450.	0.322
8.461	1.565	9570.	0.322
9.001	1.555	9690.	0.317
9.481	1.561	9810.	0.31
10.08	1.548	9930.	0.312
10.68	1.55	1.005E+4	0.3
11.28	1.556	1.017E+4	0.299
11.94	1.548	1.029E+4	0.299
12.66	1.547	1.041E+4	0.292
13.44	1.536	1.053E+4	0.291
14.22	1.548	1.065E+4	0.285

<u>Time (sec)</u>	<u>Displacement (ft)</u>	<u>Time (sec)</u>	<u>Displacement (ft)</u>
15.06	1.545	1.077E+4	0.287
15.96	1.554	1.089E+4	0.283
16.92	1.541	1.101E+4	0.28
17.88	1.533	1.113E+4	0.273
18.96	1.531	1.125E+4	0.274
20.1	1.528	1.137E+4	0.269
21.3	1.537	1.149E+4	0.268
22.56	1.528	1.161E+4	0.266
23.88	1.525	1.173E+4	0.262
25.32	1.521	1.185E+4	0.259
26.82	1.52	1.197E+4	0.258
28.38	1.522	1.209E+4	0.258
30.06	1.525	1.221E+4	0.248
31.86	1.516	1.233E+4	0.25
33.72	1.516	1.245E+4	0.24
35.76	1.509	1.257E+4	0.246
37.86	1.503	1.269E+4	0.238
40.08	1.501	1.281E+4	0.235
42.48	1.497	1.293E+4	0.233
45.	1.491	1.305E+4	0.234
47.64	1.494	1.317E+4	0.233
50.46	1.492	1.329E+4	0.235
53.46	1.487	1.341E+4	0.228
56.64	1.49	1.353E+4	0.23
60.	1.485	1.365E+4	0.231
63.6	1.484	1.377E+4	0.226
67.2	1.485	1.389E+4	0.226
71.4	1.478	1.401E+4	0.222
75.6	1.474	1.413E+4	0.224
79.8	1.477	1.425E+4	0.214
84.6	1.474	1.437E+4	0.224
90.	1.474	1.449E+4	0.215
94.8	1.474	1.461E+4	0.217
100.8	1.463	1.473E+4	0.218
106.8	1.462	1.485E+4	0.211
112.8	1.466	1.497E+4	0.214
119.4	1.498	1.509E+4	0.214
126.6	1.453	1.521E+4	0.211
134.4	1.451	1.533E+4	0.208
142.2	1.449	1.545E+4	0.204
150.6	1.45	1.557E+4	0.209
159.6	1.441	1.569E+4	0.207
169.2	1.439	1.581E+4	0.201
178.8	1.432	1.593E+4	0.203
189.6	1.43	1.605E+4	0.206
201.	1.427	1.617E+4	0.201
213.	1.427	1.629E+4	0.206
225.6	1.418	1.641E+4	0.201
238.8	1.421	1.653E+4	0.203
253.2	1.413	1.665E+4	0.199
268.2	1.412	1.677E+4	0.201
283.8	1.396	1.689E+4	0.202
300.6	1.399	1.701E+4	0.201
318.6	1.395	1.713E+4	0.195
337.2	1.387	1.725E+4	0.2
357.6	1.383	1.737E+4	0.203
378.6	1.372	1.749E+4	0.195
400.8	1.364	1.761E+4	0.202
424.8	1.362	1.773E+4	0.196
450.	1.358	1.785E+4	0.198
476.4	1.344	1.797E+4	0.196
504.6	1.331	1.809E+4	0.196
534.6	1.322	1.821E+4	0.191
566.4	1.319	1.833E+4	0.189
600.	1.325	1.845E+4	0.191
636.	1.308	1.857E+4	0.192

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
672.	1.311	1.869E+4	0.19
714.	1.305	1.881E+4	0.189
756.	1.297	1.893E+4	0.187
798.	1.294	1.905E+4	0.194
846.	1.283	1.917E+4	0.196
900.	1.278	1.929E+4	0.191
948.	1.272	1.941E+4	0.193
1008.	1.257	1.953E+4	0.191
1068.	1.242	1.965E+4	0.189
1128.	1.229	1.977E+4	0.195
1194.	1.214	1.989E+4	0.189
1266.	1.192	2.001E+4	0.191
1344.	1.17	2.013E+4	0.196
1422.	1.16	2.025E+4	0.19
1506.	1.146	2.037E+4	0.188
1596.	1.127	2.049E+4	0.187
1692.	1.104	2.061E+4	0.189
1788.	1.08	2.073E+4	0.188
1896.	1.06	2.085E+4	0.186
2010.	1.035	2.097E+4	0.19
2130.	1.02	2.109E+4	0.186
2250.	0.988	2.121E+4	0.194
2370.	0.968	2.133E+4	0.187
2490.	0.951	2.145E+4	0.187
2610.	0.926	2.157E+4	0.191
2730.	0.904	2.169E+4	0.188
2850.	0.884	2.181E+4	0.191
2970.	0.869	2.193E+4	0.187
3090.	0.845	2.205E+4	0.188
3210.	0.833	2.217E+4	0.18
3330.	0.819	2.229E+4	0.183
3450.	0.791	2.241E+4	0.185
3570.	0.782	2.253E+4	0.187
3690.	0.758	2.265E+4	0.183
3810.	0.747	2.277E+4	0.186
3930.	0.735	2.289E+4	0.184
4050.	0.713	2.301E+4	0.183
4170.	0.698	2.313E+4	0.182
4290.	0.681	2.325E+4	0.183
4410.	0.671	2.337E+4	0.185
4530.	0.657	2.349E+4	0.179
4650.	0.644	2.361E+4	0.181
4770.	0.629	2.373E+4	0.178
4890.	0.619	2.385E+4	0.169
5010.	0.606	2.397E+4	0.177
5130.	0.599	2.409E+4	0.177
5250.	0.586	2.421E+4	0.174
5370.	0.57	2.433E+4	0.176
5490.	0.559	2.445E+4	0.17
5610.	0.551	2.457E+4	0.177
5730.	0.536	2.469E+4	0.176
5850.	0.527	2.481E+4	0.173
5970.	0.514	2.493E+4	0.172
6090.	0.508	2.505E+4	0.173
6210.	0.502	2.517E+4	0.174
6330.	0.494	2.529E+4	0.17
6450.	0.481	2.541E+4	0.179
6570.	0.473	2.553E+4	0.173
6690.	0.467	2.565E+4	0.177
6810.	0.458	2.577E+4	0.175
6930.	0.443	2.589E+4	0.176
7050.	0.437	2.601E+4	0.169
7170.	0.429	2.613E+4	0.171
7290.	0.422	2.625E+4	0.171
7410.	0.418		

SOLUTION

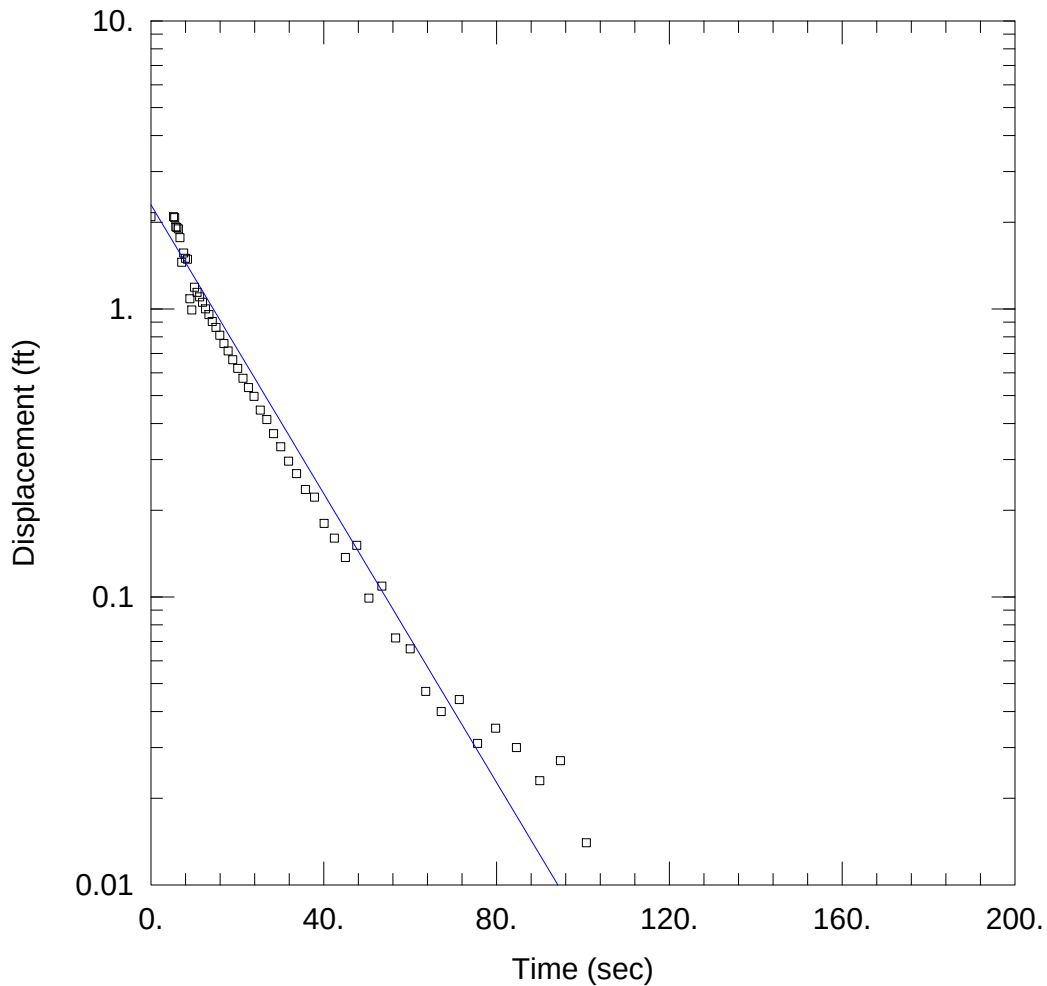
Slug Test
Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
 $\ln(R_e/r_w)$: 3.22

VISUAL ESTIMATION RESULTSEstimated Parameters

<u>Parameter</u>	<u>Estimate</u>	
K	0.01268	ft/day
y0	1.5	ft

$K = 4.474\text{E-}6$ cm/sec

$T = K \cdot b = 1.268$ ft²/day (0.01364 sq. cm/sec)



PZ-27S FALLING

Data Set: G:\...\PZ-27S Falling.aqt

Date: 09/19/16

Time: 13:15:41

PROJECT INFORMATION

Company: Golder Associates

Client: Southern Company Services

Project: 1660939

Location: Plant Branch

Test Well: PZ-27S Falling

Test Date: 08/16/16

AQUIFER DATA

Saturated Thickness: 19.07 ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (PZ-27S Falling)

Initial Displacement: 2.09 ft

Static Water Column Height: 19.07 ft

Total Well Penetration Depth: 19.07 ft

Screen Length: 10. ft

Casing Radius: 0.08333 ft

Well Radius: 0.08333 ft

Gravel Pack Porosity: 0.15

SOLUTION

Aquifer Model: Unconfined

Solution Method: Bouwer-Rice

K = 6.109 ft/day

y0 = 2.297 ft

Data Set: G:\Projects\Southern Company Services\Confidential Plant Branch Drilling\Slug Test Data\August 2016\VC
 Title: PZ-27S Falling
 Date: 09/19/16
 Time: 13:15:03

PROJECT INFORMATION

Company: Golder Associates
 Client: Southern Company Services
 Project: 1660939
 Location: Plant Branch
 Test Date: 08/16/16
 Test Well: PZ-27S Falling

AQUIFER DATA

Saturated Thickness: 19.07 ft
 Anisotropy Ratio (Kz/Kr): 1.

SLUG TEST WELL DATA

Test Well: PZ-27S Falling

X Location: 0. ft
 Y Location: 0. ft

Initial Displacement: 2.09 ft
 Static Water Column Height: 19.07 ft
 Casing Radius: 0.08333 ft
 Well Radius: 0.08333 ft
 Well Skin Radius: 0.25 ft
 Screen Length: 10. ft
 Total Well Penetration Depth: 19.07 ft
 Corrected Casing Radius (Bouwer-Rice Method): 0.07725 ft
 Gravel Pack Porosity: 0.15

No. of Observations: 53

Observation Data			
Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
5.251	2.09	23.88	0.497
5.501	2.075	25.32	0.445
5.751	1.926	26.82	0.413
6.001	1.919	28.38	0.369
6.361	1.896	30.06	0.332
6.721	1.769	31.86	0.296
7.141	1.451	33.72	0.268
7.561	1.563	35.76	0.236
7.98	1.5	37.86	0.222
8.461	1.487	40.08	0.18
9.	1.085	42.48	0.16
9.48	0.992	45.	0.137
10.08	1.19	47.64	0.151
10.68	1.141	50.46	0.099
11.28	1.102	53.46	0.109
11.94	1.055	56.64	0.072
12.66	1.001	60.	0.066
13.44	0.956	63.6	0.047
14.22	0.905	67.2	0.04
15.06	0.863	71.4	0.044
15.96	0.81	75.6	0.031
16.92	0.758	79.8	0.035
17.88	0.715	84.6	0.03
18.96	0.666	90.	0.023
20.1	0.622	94.8	0.027
21.3	0.574	100.8	0.014
22.56	0.533		

SOLUTION

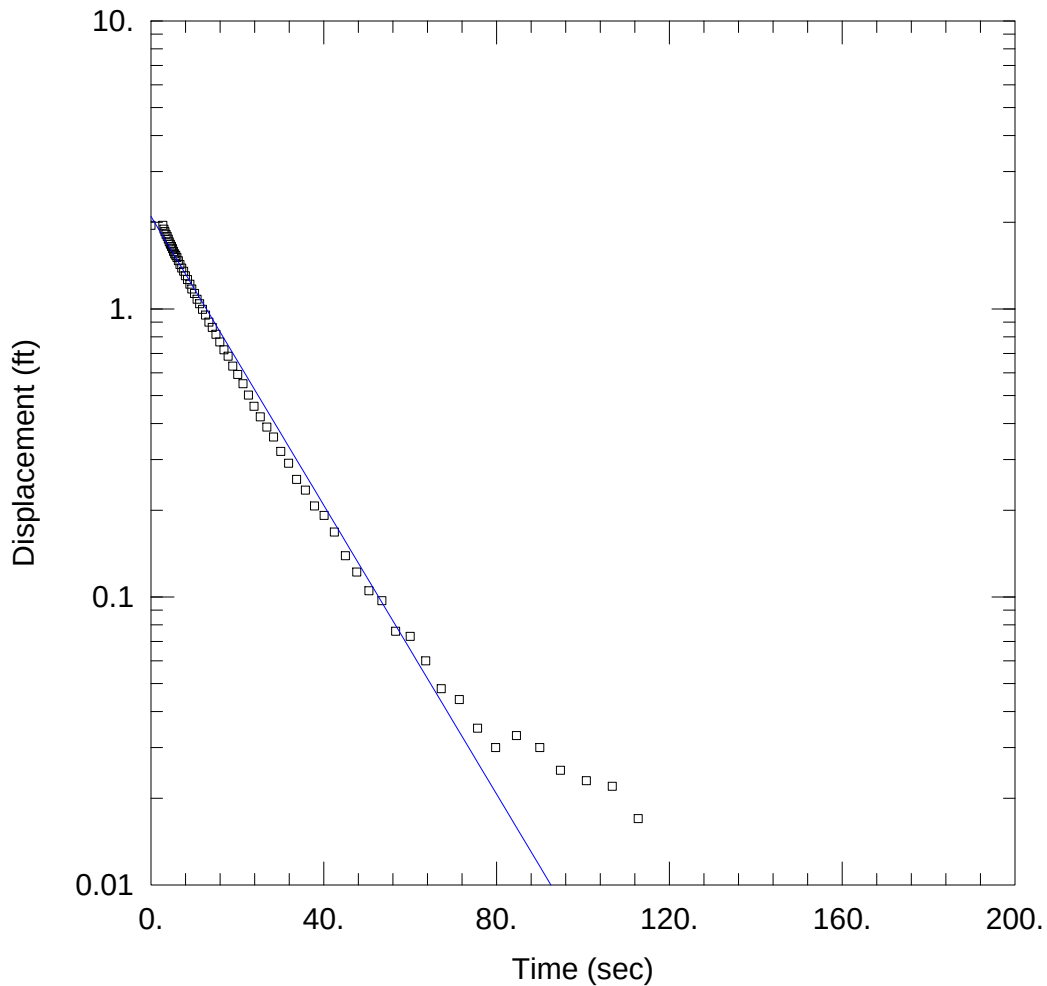
Slug Test
Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
 $\ln(R_e/r_w)$: 4.105

VISUAL ESTIMATION RESULTSEstimated Parameters

<u>Parameter</u>	<u>Estimate</u>	
K	6.109	ft/day
y0	2.297	ft

$K = 0.002155$ cm/sec

$T = K \cdot b = 116.5$ ft²/day (1.253 sq. cm/sec)



PZ-27S RISING

Data Set: G:\...\PZ-27S Rising.aqt

Date: 09/19/16

Time: 13:19:06

PROJECT INFORMATION

Company: Golder Associates

Client: Southern Company Services

Project: 1660939

Location: Plant Branch

Test Well: PZ-27S Rising

Test Date: 08/16/16

AQUIFER DATA

Saturated Thickness: 19.05 ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (C-GWC-1 Rising)

Initial Displacement: 1.952 ft

Static Water Column Height: 19.05 ft

Total Well Penetration Depth: 19.05 ft

Screen Length: 10. ft

Casing Radius: 0.08333 ft

Well Radius: 0.08333 ft

Gravel Pack Porosity: 0.15

SOLUTION

Aquifer Model: Unconfined

Solution Method: Bouwer-Rice

K = 6.109 ft/day

y0 = 2.095 ft

Data Set: G:\Projects\Southern Company Services\Confidential Plant Branch Drilling\Slug Test Data\August 2016\Q
 Title: PZ-27S Rising
 Date: 09/19/16
 Time: 13:17:30

PROJECT INFORMATION

Company: Golder Associates
 Client: Southern Company Services
 Project: 1660939
 Location: Plant Branch
 Test Date: 08/16/16
 Test Well: PZ-27S Rising

AQUIFER DATA

Saturated Thickness: 19.05 ft
 Anisotropy Ratio (Kz/Kr): 1.

SLUG TEST WELL DATA

Test Well: C-GWC-1 Rising

X Location: 0. ft
 Y Location: 0. ft

Initial Displacement: 1.952 ft
 Static Water Column Height: 19.05 ft
 Casing Radius: 0.08333 ft
 Well Radius: 0.08333 ft
 Well Skin Radius: 0.25 ft
 Screen Length: 10. ft
 Total Well Penetration Depth: 19.05 ft
 Corrected Casing Radius (Bouwer-Rice Method): 0.07725 ft
 Gravel Pack Porosity: 0.15

No. of Observations: 65

Observation Data			
<u>Time (sec)</u>	<u>Displacement (ft)</u>	<u>Time (sec)</u>	<u>Displacement (ft)</u>
2.75	1.952	18.96	0.633
3.	1.891	20.1	0.592
3.25	1.855	21.3	0.55
3.5	1.816	22.56	0.502
3.75	1.786	23.88	0.459
4.	1.747	25.32	0.422
4.25	1.711	26.82	0.389
4.5	1.677	28.38	0.359
4.75	1.647	30.06	0.32
5.	1.619	31.86	0.291
5.25	1.583	33.72	0.256
5.5	1.553	35.76	0.235
5.75	1.535	37.86	0.207
6.	1.508	40.08	0.192
6.36	1.47	42.48	0.168
6.72	1.427	45.	0.139
7.14	1.387	47.64	0.122
7.56	1.351	50.46	0.105
7.98	1.304	53.46	0.097
8.46	1.265	56.64	0.076
9.	1.218	60.	0.073
9.48	1.173	63.6	0.06
10.08	1.131	67.2	0.048
10.68	1.081	71.4	0.044
11.28	1.042	75.6	0.035
11.94	0.997	79.8	0.03
12.66	0.952	84.6	0.033

<u>Time (sec)</u>	<u>Displacement (ft)</u>	<u>Time (sec)</u>	<u>Displacement (ft)</u>
13.44	0.9	90.	0.03
14.22	0.863	94.8	0.025
15.06	0.816	100.8	0.023
15.96	0.768	106.8	0.022
16.92	0.721	112.8	0.017
17.88	0.685		

SOLUTION

Slug Test

Aquifer Model: Unconfined

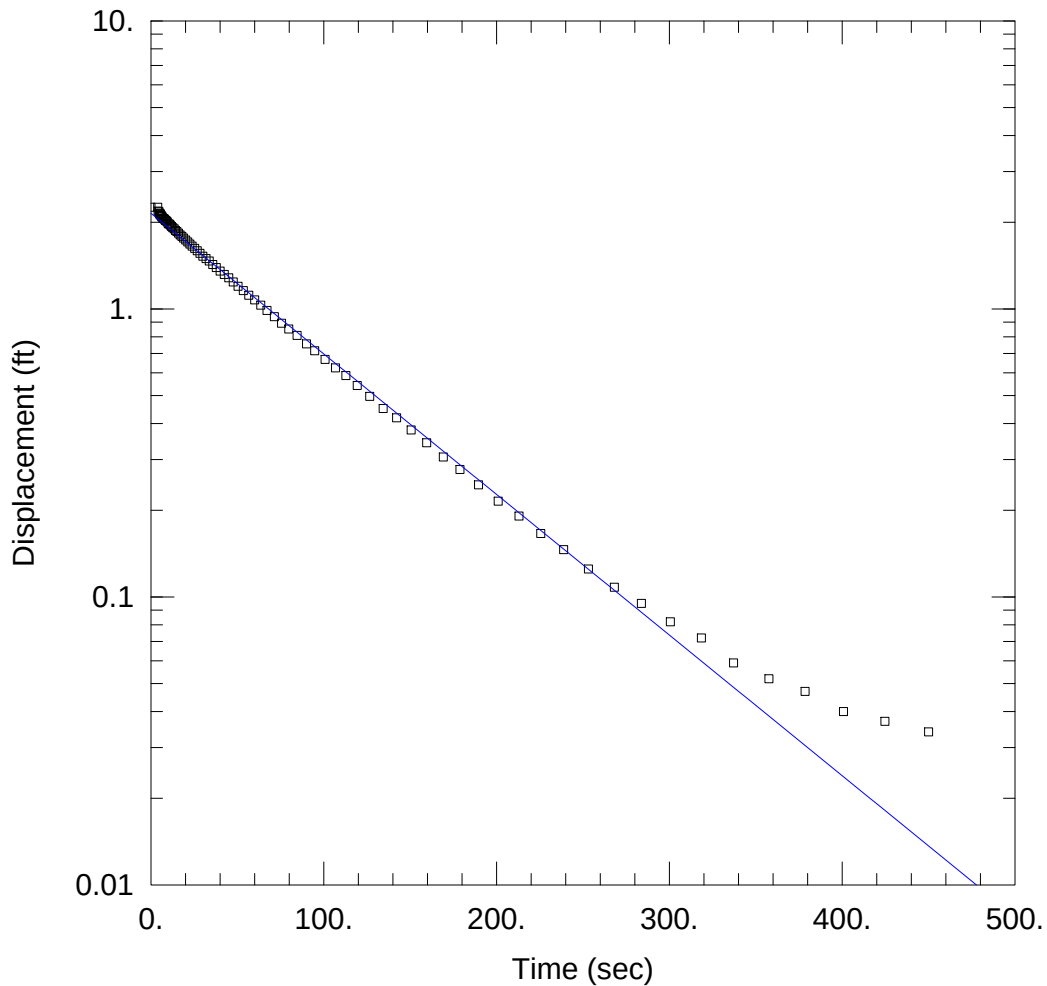
Solution Method: Bouwer-Rice

 $\ln(R_e/r_w)$: 4.105VISUAL ESTIMATION RESULTSEstimated Parameters

<u>Parameter</u>	<u>Estimate</u>	
K	6.109	ft/day
y0	2.095	ft

K = 0.002155 cm/sec

T = K*b = 116.4 ft²/day (1.251 sq. cm/sec)



PZ-28I RISING

Data Set: G:\...\PZ-28I Rising.aqt

Date: 09/19/16

Time: 14:09:59

PROJECT INFORMATION

Company: Golder Associates

Client: Southern Company Services

Project: 1660939

Location: Plant Branch

Test Well: PZ-28I Rising

Test Date: 08/16/16

AQUIFER DATA

Saturated Thickness: 100. ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (PZ-28I Rising)

Initial Displacement: 2.254 ft

Static Water Column Height: 9.29 ft

Total Well Penetration Depth: 10. ft

Screen Length: 10. ft

Casing Radius: 0.08333 ft

Well Radius: 0.08333 ft

Gravel Pack Porosity: 0.15

SOLUTION

Aquifer Model: Unconfined

Solution Method: Bouwer-Rice

K = 0.9329 ft/day

y0 = 2.148 ft

Data Set: G:\Projects\Southern Company Services\Confidential Plant Branch Drilling\Slug Test Data\August 2016\Q
 Title: PZ-28I Rising
 Date: 09/19/16
 Time: 14:10:22

PROJECT INFORMATION

Company: Golder Associates
 Client: Southern Company Services
 Project: 1660939
 Location: Plant Branch
 Test Date: 08/16/16
 Test Well: PZ-28I Rising

AQUIFER DATA

Saturated Thickness: 100. ft
 Anisotropy Ratio (Kz/Kr): 1.

SLUG TEST WELL DATA

Test Well: PZ-28I Rising

X Location: 0. ft
 Y Location: 0. ft

Initial Displacement: 2.254 ft
 Static Water Column Height: 9.29 ft
 Casing Radius: 0.08333 ft
 Well Radius: 0.08333 ft
 Well Skin Radius: 0.25 ft
 Screen Length: 10. ft
 Total Well Penetration Depth: 10. ft
 Corrected Casing Radius (Bouwer-Rice Method): 0.07725 ft
 Gravel Pack Porosity: 0.15

No. of Observations: 85

Observation Data			
<u>Time (sec)</u>	<u>Displacement (ft)</u>	<u>Time (sec)</u>	<u>Displacement (ft)</u>
3.94	2.254	42.48	1.317
4.161	2.187	45.	1.282
4.656	2.176	47.64	1.241
4.876	2.15	50.46	1.199
5.096	2.131	53.46	1.158
5.319	2.137	56.64	1.115
5.542	2.134	60.	1.075
5.764	2.111	63.6	1.031
5.986	2.105	67.2	0.988
6.209	2.096	71.4	0.94
6.434	2.088	75.6	0.892
6.926	2.067	79.8	0.852
7.148	2.061	84.6	0.809
7.56	2.059	90.	0.756
7.98	2.042	94.8	0.716
8.46	2.028	100.8	0.668
9.	2.019	106.8	0.624
9.48	2.004	112.8	0.587
10.08	1.975	119.4	0.542
10.68	1.972	126.6	0.497
11.28	1.954	134.4	0.451
11.94	1.934	142.2	0.419
12.66	1.913	150.6	0.38
13.44	1.896	159.6	0.343
14.22	1.874	169.2	0.306
15.06	1.856	178.8	0.277
15.96	1.833	189.6	0.245

<u>Time (sec)</u>	<u>Displacement (ft)</u>	<u>Time (sec)</u>	<u>Displacement (ft)</u>
16.92	1.808	201.	0.215
17.88	1.786	213.	0.191
18.96	1.762	225.6	0.166
20.1	1.734	238.8	0.146
21.3	1.707	253.2	0.125
22.56	1.679	268.2	0.108
23.88	1.652	283.8	0.095
25.32	1.623	300.6	0.082
26.82	1.591	318.6	0.072
28.38	1.56	337.2	0.059
30.06	1.525	357.6	0.052
31.86	1.496	378.6	0.047
33.72	1.466	400.8	0.04
35.76	1.427	424.8	0.037
37.86	1.392	450.	0.034
40.08	1.354		

SOLUTION

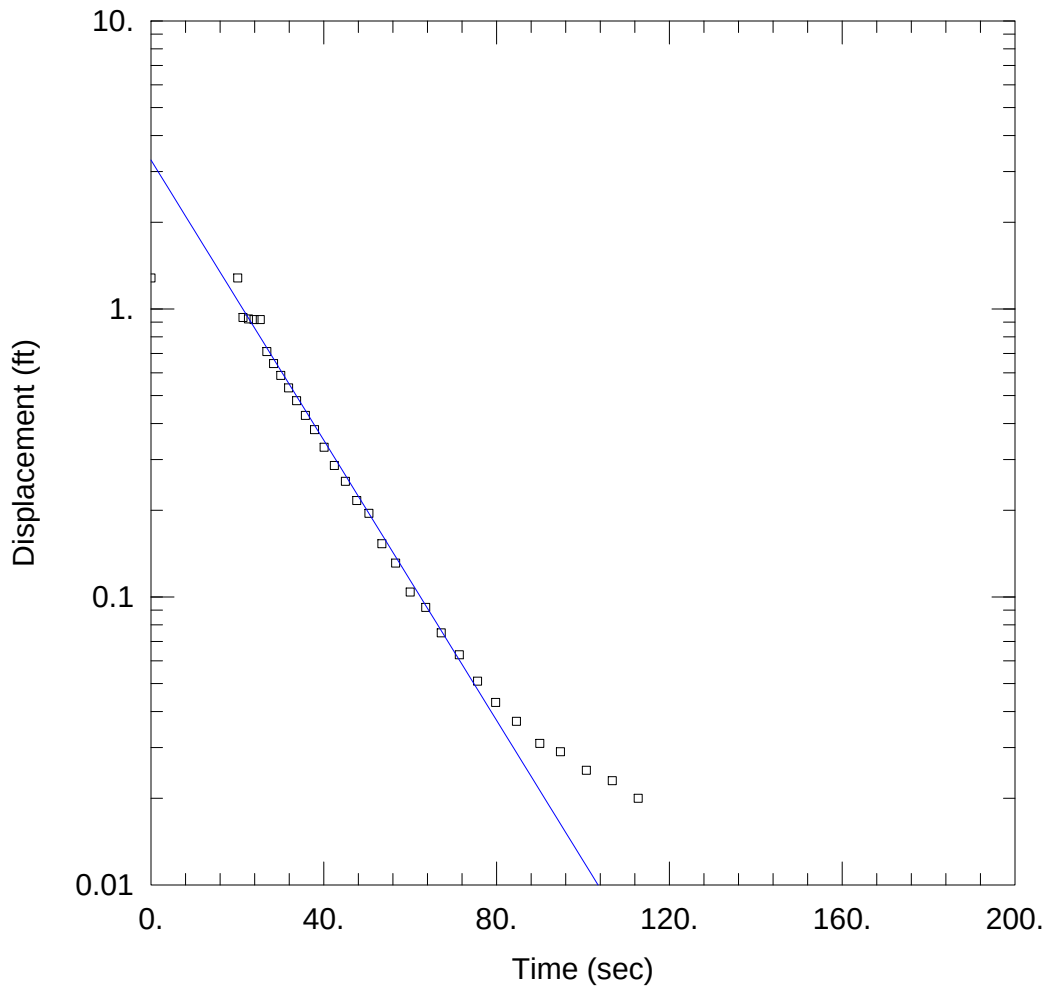
Slug Test
 Aquifer Model: Unconfined
 Solution Method: Bouwer-Rice
 $\ln(R_e/r_w)$: 3.22

VISUAL ESTIMATION RESULTSEstimated Parameters

<u>Parameter</u>	<u>Estimate</u>	
K	0.9329	ft/day
y ₀	2.148	ft

$K = 0.0003291$ cm/sec

$T = K \cdot b = 93.29$ ft²/day (1.003 sq. cm/sec)



PZ-29I FALLING

Data Set: G:\...\PZ-29I Falling.aqt

Date: 09/19/16

Time: 14:14:17

PROJECT INFORMATION

Company: Golder Associates

Client: Southern Company Services

Project: 1660939

Location: Plant Branch

Test Well: PZ-29I Falling

Test Date: 08/16/16

AQUIFER DATA

Saturated Thickness: 100. ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (PZ-29I Falling)

Initial Displacement: 1.281 ft

Static Water Column Height: 9.74 ft

Total Well Penetration Depth: 10.24 ft

Screen Length: 10. ft

Casing Radius: 0.08333 ft

Well Radius: 0.08333 ft

Gravel Pack Porosity: 0.15

SOLUTION

Aquifer Model: Unconfined

Solution Method: Bouwer-Rice

K = 4.665 ft/day

y0 = 3.287 ft

Data Set: G:\Projects\Southern Company Services\Confidential Plant Branch Drilling\Slug Test Data\August 2016\Q
 Title: PZ-29I Falling
 Date: 09/19/16
 Time: 14:14:31

PROJECT INFORMATION

Company: Golder Associates
 Client: Southern Company Services
 Project: 1660939
 Location: Plant Branch
 Test Date: 08/16/16
 Test Well: PZ-29I Falling

AQUIFER DATA

Saturated Thickness: 100. ft
 Anisotropy Ratio (Kz/Kr): 1.

SLUG TEST WELL DATA

Test Well: PZ-29I Falling

X Location: 0. ft
 Y Location: 0. ft

Initial Displacement: 1.281 ft
 Static Water Column Height: 9.74 ft
 Casing Radius: 0.08333 ft
 Well Radius: 0.08333 ft
 Well Skin Radius: 0.25 ft
 Screen Length: 10. ft
 Total Well Penetration Depth: 10.24 ft
 Corrected Casing Radius (Bouwer-Rice Method): 0.07725 ft
 Gravel Pack Porosity: 0.15

No. of Observations: 31

Observation Data			
<u>Time (sec)</u>	<u>Displacement (ft)</u>	<u>Time (sec)</u>	<u>Displacement (ft)</u>
20.1	1.281	50.46	0.195
21.3	0.934	53.46	0.153
22.56	0.923	56.64	0.131
23.88	0.918	60.	0.104
25.32	0.918	63.6	0.092
26.82	0.711	67.2	0.075
28.38	0.646	71.4	0.063
30.06	0.588	75.6	0.051
31.86	0.532	79.8	0.043
33.72	0.48	84.6	0.037
35.76	0.427	90.	0.031
37.86	0.381	94.8	0.029
40.08	0.331	100.8	0.025
42.48	0.286	106.8	0.023
45.	0.252	112.8	0.02
47.64	0.216		

SOLUTION

Slug Test
 Aquifer Model: Unconfined
 Solution Method: Bouwer-Rice
 ln(Re/rw): 3.231

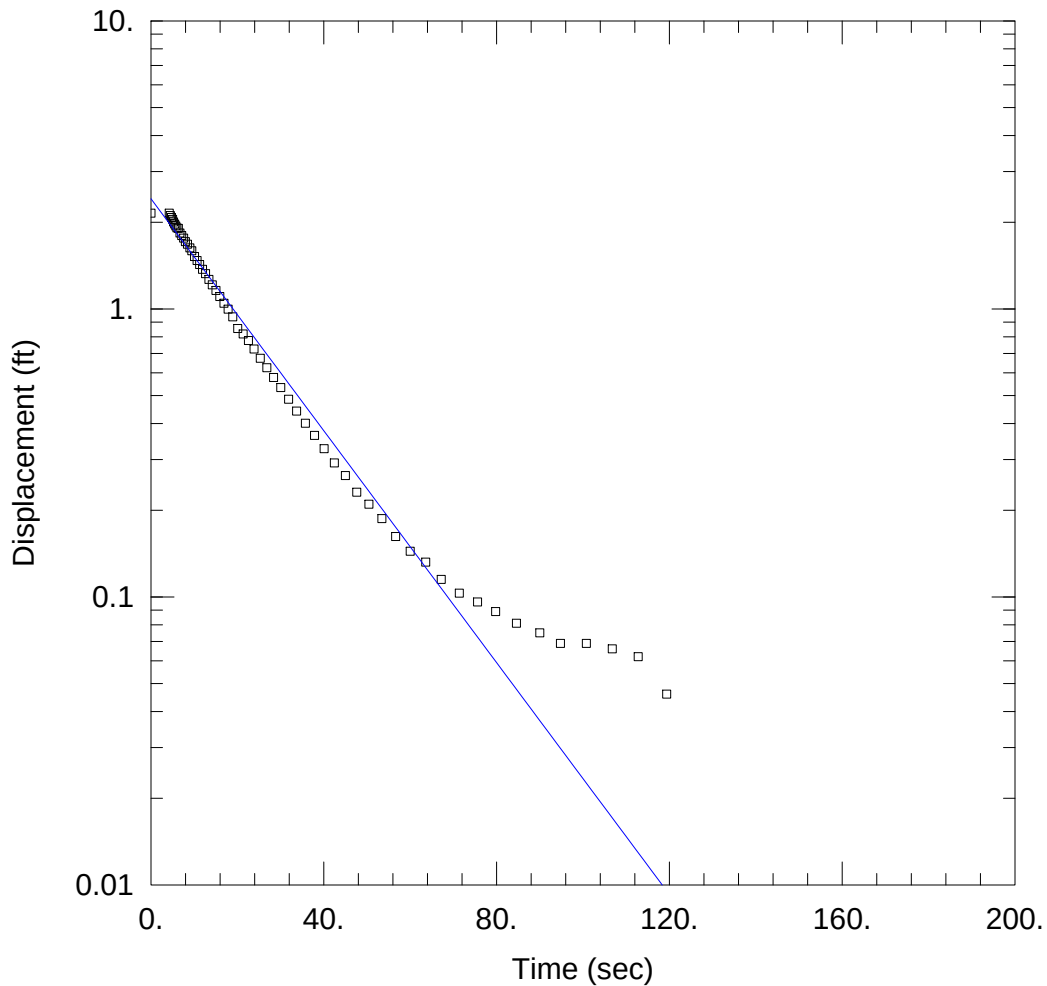
VISUAL ESTIMATION RESULTS

Estimated Parameters

Parameter	Estimate	
K	4.665	ft/day
y0	3.287	ft

K = 0.001646 cm/sec

T = K*b = 466.5 ft²/day (5.016 sq. cm/sec)



PZ-29I RISING

Data Set: G:\...\PZ-29I Rising.aqt

Date: 09/19/16

Time: 14:17:53

PROJECT INFORMATION

Company: Golder Associates

Client: Southern Company Services

Project: 1660939

Location: Plant Branch

Test Well: PZ-29I Rising

Test Date: 08/16/16

AQUIFER DATA

Saturated Thickness: 100. ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (PZ-29I Rising)

Initial Displacement: 2.151 ft

Static Water Column Height: 9.74 ft

Total Well Penetration Depth: 10.24 ft

Screen Length: 10. ft

Casing Radius: 0.08333 ft

Well Radius: 0.08333 ft

Gravel Pack Porosity: 0.15

SOLUTION

Aquifer Model: Unconfined

Solution Method: Bouwer-Rice

K = 3.861 ft/day

y0 = 2.412 ft

Data Set: G:\Projects\Southern Company Services\Confidential Plant Branch Drilling\Slug Test Data\August 2016\Q
 Title: PZ-29I Rising
 Date: 09/19/16
 Time: 14:18:25

PROJECT INFORMATION

Company: Golder Associates
 Client: Southern Company Services
 Project: 1660939
 Location: Plant Branch
 Test Date: 08/16/16
 Test Well: PZ-29I Rising

AQUIFER DATA

Saturated Thickness: 100. ft
 Anisotropy Ratio (Kz/Kr): 1.

SLUG TEST WELL DATA

Test Well: PZ-29I Rising

X Location: 0. ft
 Y Location: 0. ft

Initial Displacement: 2.151 ft
 Static Water Column Height: 9.74 ft
 Casing Radius: 0.08333 ft
 Well Radius: 0.08333 ft
 Well Skin Radius: 0.25 ft
 Screen Length: 10. ft
 Total Well Penetration Depth: 10.24 ft
 Corrected Casing Radius (Bouwer-Rice Method): 0.07725 ft
 Gravel Pack Porosity: 0.15

No. of Observations: 60

Observation Data			
<u>Time (sec)</u>	<u>Displacement (ft)</u>	<u>Time (sec)</u>	<u>Displacement (ft)</u>
4.25	2.151	22.56	0.777
4.5	2.11	23.88	0.726
4.75	2.078	25.32	0.674
5.	2.045	26.82	0.625
5.251	2.004	28.38	0.578
5.501	1.97	30.06	0.533
5.751	1.94	31.86	0.486
6.001	1.912	33.72	0.442
6.361	1.904	35.76	0.401
6.721	1.835	37.86	0.364
7.141	1.797	40.08	0.327
7.56	1.762	42.48	0.292
7.98	1.712	45.	0.264
8.461	1.678	47.64	0.231
9.	1.629	50.46	0.21
9.48	1.591	53.46	0.187
10.08	1.52	56.64	0.162
10.68	1.472	60.	0.144
11.28	1.426	63.6	0.132
11.94	1.372	67.2	0.115
12.66	1.326	71.4	0.103
13.44	1.267	75.6	0.096
14.22	1.212	79.8	0.089
15.06	1.159	84.6	0.081
15.96	1.104	90.	0.075
16.92	1.047	94.8	0.069
17.88	0.998	100.8	0.069

<u>Time (sec)</u>	<u>Displacement (ft)</u>	<u>Time (sec)</u>	<u>Displacement (ft)</u>
18.96	0.939	106.8	0.066
20.1	0.855	112.8	0.062
21.35	0.819	119.4	0.046

SOLUTION

Slug Test

Aquifer Model: Unconfined

Solution Method: Bouwer-Rice

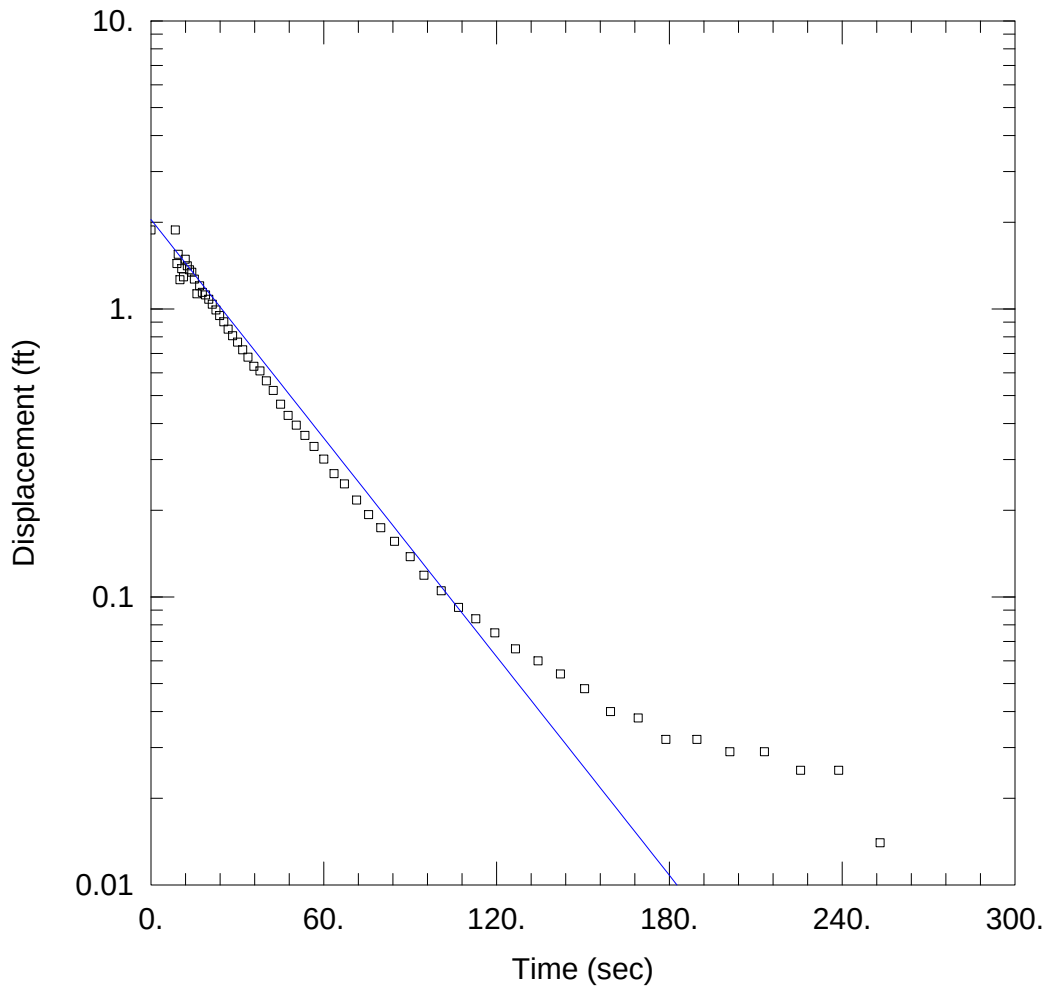
ln(Re/rw): 3.231

VISUAL ESTIMATION RESULTSEstimated Parameters

<u>Parameter</u>	<u>Estimate</u>	
K	3.861	ft/day
y0	2.412	ft

K = 0.001362 cm/sec

T = K*b = 386.1 ft²/day (4.152 sq. cm/sec)



PZ-30I FALLING

Data Set: G:\...\PZ-30I Falling.aqt

Date: 09/19/16

Time: 14:21:41

PROJECT INFORMATION

Company: Golder Associates

Client: Southern Company Services

Project: 1660939

Location: Plant Branch

Test Well: PZ-30I Falling

Test Date: 08/15/16

AQUIFER DATA

Saturated Thickness: 100. ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (PZ-30I Falling)

Initial Displacement: 1.879 ft

Static Water Column Height: 15.45 ft

Total Well Penetration Depth: 15.95 ft

Screen Length: 10. ft

Casing Radius: 0.08333 ft

Well Radius: 0.08333 ft

Gravel Pack Porosity: 0.15

SOLUTION

Aquifer Model: Unconfined

Solution Method: Bouwer-Rice

K = 2.587 ft/day

y0 = 2.043 ft

Data Set: G:\Projects\Southern Company Services\Confidential Plant Branch Drilling\Slug Test Data\August 2016\Q
 Title: PZ-30I Falling
 Date: 09/19/16
 Time: 14:22:22

PROJECT INFORMATION

Company: Golder Associates
 Client: Southern Company Services
 Project: 1660939
 Location: Plant Branch
 Test Date: 08/15/16
 Test Well: PZ-30I Falling

AQUIFER DATA

Saturated Thickness: 100. ft
 Anisotropy Ratio (Kz/Kr): 1.

SLUG TEST WELL DATA

Test Well: PZ-30I Falling

X Location: 0. ft
 Y Location: 0. ft

Initial Displacement: 1.879 ft
 Static Water Column Height: 15.45 ft
 Casing Radius: 0.08333 ft
 Well Radius: 0.08333 ft
 Well Skin Radius: 0.25 ft
 Screen Length: 10. ft
 Total Well Penetration Depth: 15.95 ft
 Corrected Casing Radius (Bouwer-Rice Method): 0.07725 ft
 Gravel Pack Porosity: 0.15

No. of Observations: 60

Observation Data			
Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
8.46	1.879	47.64	0.427
9.	1.437	50.46	0.395
9.48	1.548	53.46	0.364
10.08	1.263	56.64	0.333
10.68	1.379	60.	0.301
11.28	1.293	63.6	0.268
11.94	1.487	67.2	0.247
12.66	1.412	71.4	0.217
13.44	1.368	75.6	0.193
14.22	1.342	79.8	0.174
15.06	1.27	84.6	0.156
15.96	1.129	90.	0.138
16.92	1.203	94.8	0.119
17.88	1.141	100.8	0.105
18.96	1.119	106.8	0.092
20.1	1.08	112.8	0.084
21.3	1.038	119.4	0.075
22.56	0.992	126.6	0.066
23.88	0.948	134.4	0.06
25.32	0.902	142.2	0.054
26.82	0.851	150.6	0.048
28.38	0.807	159.6	0.04
30.06	0.767	169.2	0.038
31.86	0.721	178.8	0.032
33.72	0.68	189.6	0.032
35.76	0.632	201.	0.029
37.86	0.609	213.	0.029

<u>Time (sec)</u>	<u>Displacement (ft)</u>	<u>Time (sec)</u>	<u>Displacement (ft)</u>
40.08	0.563	225.6	0.025
42.48	0.521	238.8	0.025
45.	0.467	253.2	0.014

SOLUTION

Slug Test

Aquifer Model: Unconfined

Solution Method: Bouwer-Rice

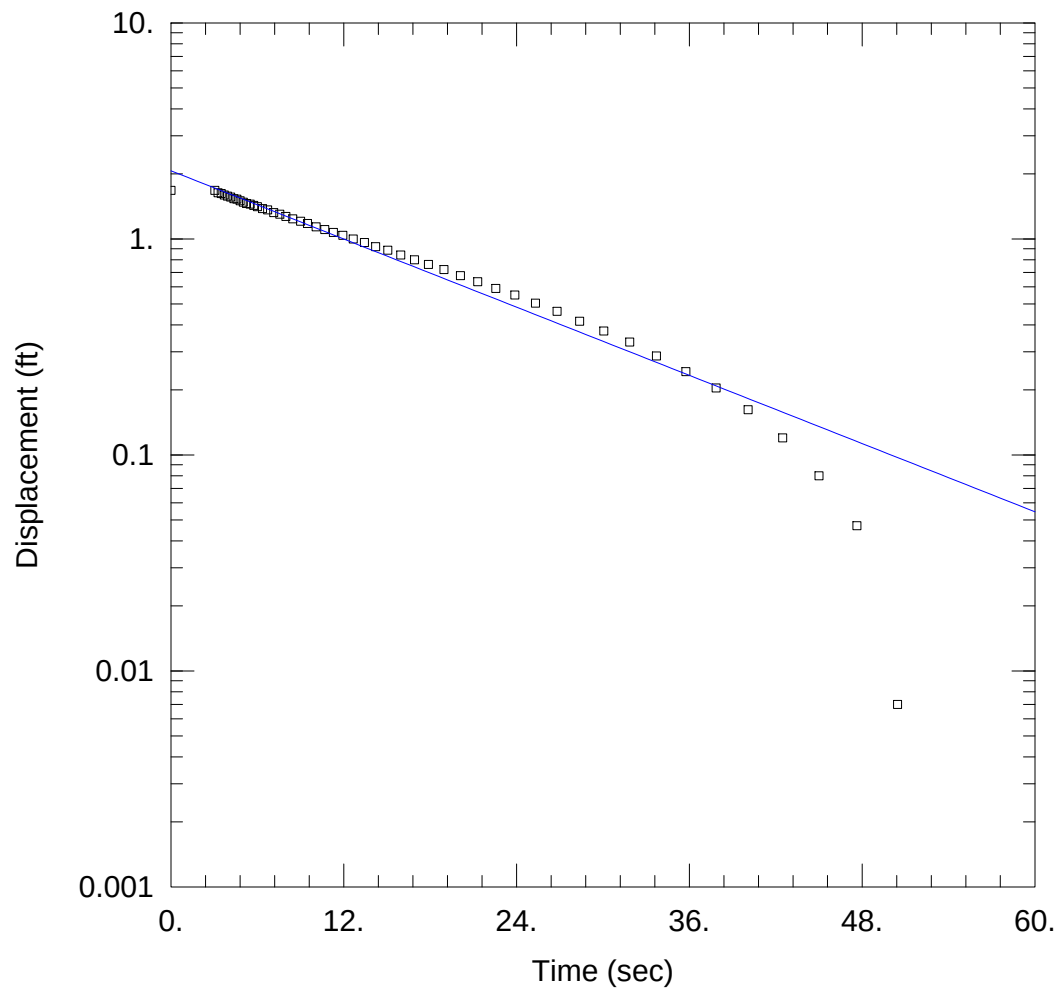
ln(Re/rw): 3.446

VISUAL ESTIMATION RESULTSEstimated Parameters

<u>Parameter</u>	<u>Estimate</u>	
K	2.587	ft/day
y0	2.043	ft

K = 0.0009128 cm/sec

T = K*b = 258.7 ft²/day (2.782 sq. cm/sec)



PZ-30I RISING

Data Set: G:\...\PZ-30I Rising.aqt

Date: 09/19/16

Time: 14:23:53

PROJECT INFORMATION

Company: Golder Associates

Client: Southern Company Services

Project: 1660939

Location: Plant Branch

Test Well: PZ-30I Rising

Test Date: 08/15/16

AQUIFER DATA

Saturated Thickness: 100. ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (PZ-30I Rising)

Initial Displacement: 1.678 ft

Static Water Column Height: 15.45 ft

Total Well Penetration Depth: 15.45 ft

Screen Length: 9.5 ft

Casing Radius: 0.08333 ft

Well Radius: 0.08333 ft

Gravel Pack Porosity: 0.15

SOLUTION

Aquifer Model: Unconfined

Solution Method: Bouwer-Rice

K = 5.607 ft/day

y0 = 2.067 ft

Data Set: G:\Projects\Southern Company Services\Confidential Plant Branch Drilling\Slug Test Data\August 2016\VC
 Title: PZ-30I Rising
 Date: 09/19/16
 Time: 14:24:11

PROJECT INFORMATION

Company: Golder Associates
 Client: Southern Company Services
 Project: 1660939
 Location: Plant Branch
 Test Date: 08/15/16
 Test Well: PZ-30I Rising

AQUIFER DATA

Saturated Thickness: 100. ft
 Anisotropy Ratio (Kz/Kr): 1.

SLUG TEST WELL DATA

Test Well: PZ-30I Rising

X Location: 0. ft
 Y Location: 0. ft

Initial Displacement: 1.678 ft
 Static Water Column Height: 15.45 ft
 Casing Radius: 0.08333 ft
 Well Radius: 0.08333 ft
 Well Skin Radius: 0.25 ft
 Screen Length: 9.5 ft
 Total Well Penetration Depth: 15.45 ft
 Corrected Casing Radius (Bouwer-Rice Method): 0.07725 ft
 Gravel Pack Porosity: 0.15

No. of Observations: 51

Observation Data			
Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
3.049	1.678	12.66	0.999
3.269	1.637	13.44	0.963
3.489	1.621	14.22	0.92
3.709	1.598	15.06	0.887
3.929	1.579	15.96	0.843
4.148	1.561	16.92	0.8
4.367	1.536	17.88	0.762
4.586	1.528	18.96	0.721
4.805	1.502	20.1	0.676
5.024	1.48	21.3	0.634
5.251	1.458	22.56	0.59
5.501	1.448	23.88	0.55
5.751	1.429	25.32	0.504
6.001	1.41	26.82	0.462
6.361	1.382	28.38	0.416
6.721	1.362	30.06	0.375
7.141	1.324	31.86	0.333
7.561	1.302	33.72	0.287
7.981	1.271	35.76	0.243
8.461	1.239	37.86	0.204
9.001	1.207	40.08	0.162
9.481	1.178	42.48	0.12
10.08	1.138	45.	0.08
10.68	1.105	47.64	0.047
11.28	1.071	50.46	0.007
11.94	1.039		

SOLUTION

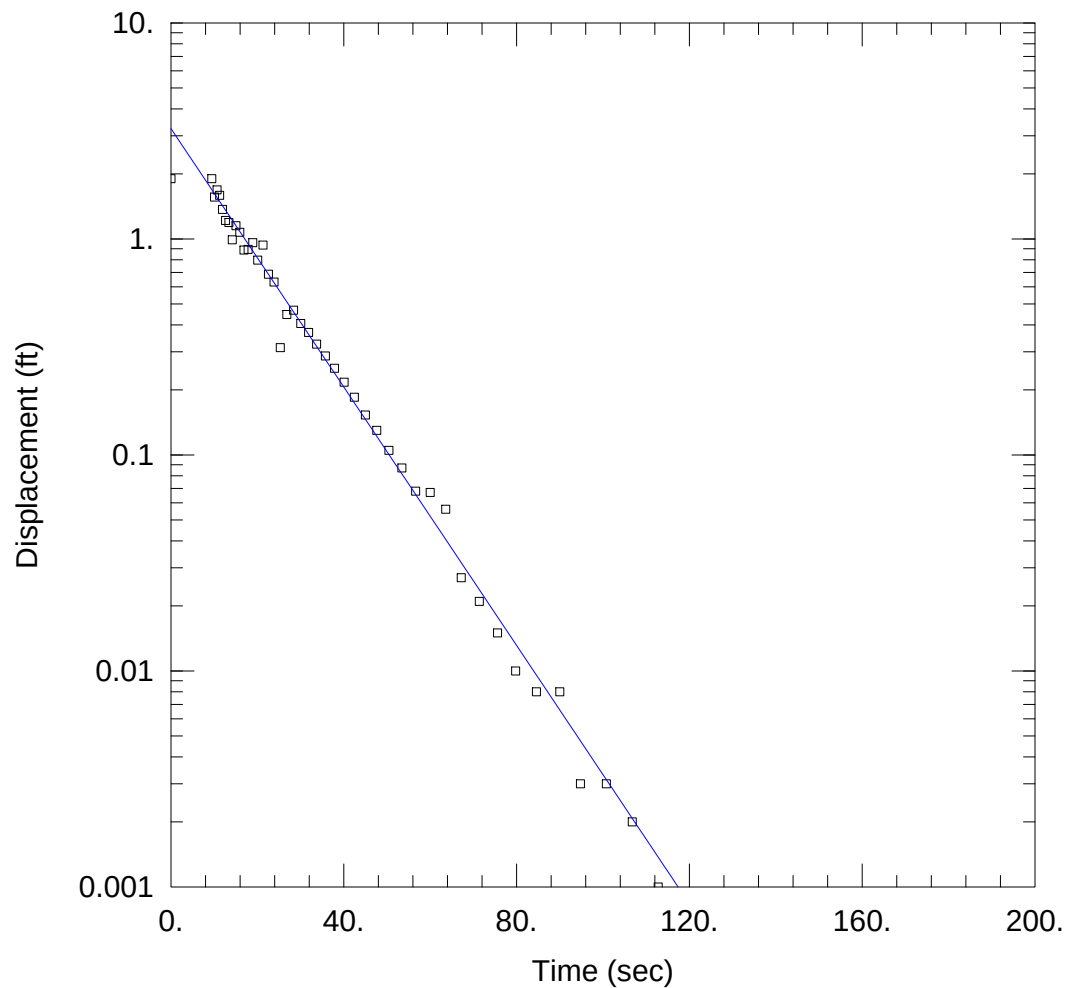
Slug Test
Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
 $\ln(R_e/r_w)$: 3.41

VISUAL ESTIMATION RESULTSEstimated Parameters

<u>Parameter</u>	<u>Estimate</u>	
K	5.607	ft/day
y0	2.067	ft

$K = 0.001978$ cm/sec

$T = K \cdot b = 560.7$ ft²/day (6.029 sq. cm/sec)



PZ-31S FALLING

Data Set: G:\...\PZ-31S Falling.aqt

Date: 09/19/16

Time: 14:25:55

PROJECT INFORMATION

Company: Golder Associates

Client: Southern Company Services

Project: 1660939

Location: Plant Branch

Test Well: PZ-31S Falling

Test Date: 08/15/16

AQUIFER DATA

Saturated Thickness: 100. ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (PZ-31S Falling)

Initial Displacement: 1.901 ft

Static Water Column Height: 15.14 ft

Total Well Penetration Depth: 15.64 ft

Screen Length: 10. ft

Casing Radius: 0.08333 ft

Well Radius: 0.08333 ft

Gravel Pack Porosity: 0.15

SOLUTION

Aquifer Model: Unconfined

Solution Method: Bouwer-Rice

K = 6.101 ft/day

y0 = 3.24 ft

Data Set: G:\Projects\Southern Company Services\Confidential Plant Branch Drilling\Slug Test Data\August 2016\Q
 Title: PZ-31S Falling
 Date: 09/19/16
 Time: 14:26:34

PROJECT INFORMATION

Company: Golder Associates
 Client: Southern Company Services
 Project: 1660939
 Location: Plant Branch
 Test Date: 08/15/16
 Test Well: PZ-31S Falling

AQUIFER DATA

Saturated Thickness: 100. ft
 Anisotropy Ratio (Kz/Kr): 1.

SLUG TEST WELL DATA

Test Well: PZ-31S Falling

X Location: 0. ft
 Y Location: 0. ft

Initial Displacement: 1.901 ft
 Static Water Column Height: 15.14 ft
 Casing Radius: 0.08333 ft
 Well Radius: 0.08333 ft
 Well Skin Radius: 0.25 ft
 Screen Length: 10. ft
 Total Well Penetration Depth: 15.64 ft
 Corrected Casing Radius (Bouwer-Rice Method): 0.07725 ft
 Gravel Pack Porosity: 0.15

No. of Observations: 44

Observation Data			
Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
9.48	1.901	33.72	0.326
10.08	1.561	35.76	0.287
10.68	1.688	37.86	0.252
11.28	1.592	40.08	0.217
11.94	1.37	42.48	0.185
12.66	1.217	45.	0.153
13.44	1.191	47.64	0.13
14.22	0.99	50.46	0.105
15.06	1.152	53.46	0.087
15.96	1.074	56.64	0.068
16.92	0.888	60.	0.067
17.88	0.895	63.6	0.056
18.96	0.96	67.2	0.027
20.1	0.798	71.4	0.021
21.3	0.937	75.6	0.015
22.56	0.686	79.8	0.01
23.88	0.632	84.6	0.008
25.32	0.314	90.	0.008
26.82	0.447	94.8	0.003
28.38	0.468	100.8	0.003
30.06	0.406	106.8	0.002
31.86	0.369	112.8	0.001

SOLUTION

Slug Test
 Aquifer Model: Unconfined

Solution Method: Bouwer-Rice
 $\ln(R_e/r_w)$: 3.437

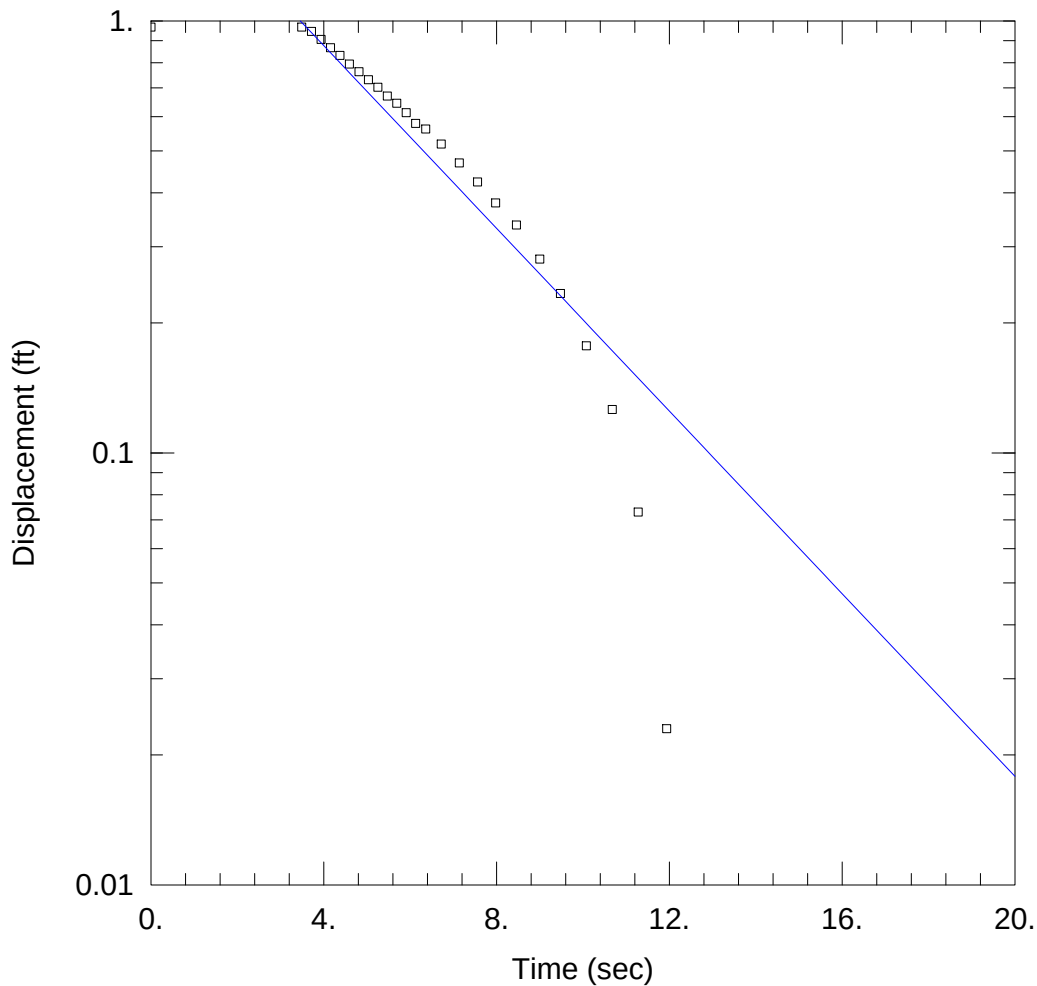
VISUAL ESTIMATION RESULTS

Estimated Parameters

<u>Parameter</u>	<u>Estimate</u>	
K	6.101	ft/day
y0	3.24	ft

$K = 0.002152$ cm/sec

$T = K \cdot b = 610.1$ ft²/day (6.56 sq. cm/sec)



PZ-31S RISING

Data Set: G:\...\PZ-31S Rising.aqt
 Date: 09/19/16

Time: 14:28:41

PROJECT INFORMATION

Company: Golder Associates
 Client: Southern Company Services
 Project: 1660939
 Location: Plant Branch
 Test Well: PZ-31S Rising
 Test Date: 08/15/16

AQUIFER DATA

Saturated Thickness: 100. ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (PZ-31S Rising)

Initial Displacement: 0.968 ft
 Total Well Penetration Depth: 15.64 ft
 Casing Radius: 0.08333 ft

Static Water Column Height: 15.14 ft
 Screen Length: 10. ft
 Well Radius: 0.08333 ft
 Gravel Pack Porosity: 0.15

SOLUTION

Aquifer Model: Unconfined
 K = 21.56 ft/day

Solution Method: Bouwer-Rice
 y0 = 2.32 ft

Data Set: G:\Projects\Southern Company Services\Confidential Plant Branch Drilling\Slug Test Data\August 2016\Q
 Title: PZ-31S Rising
 Date: 09/20/16
 Time: 15:33:42

PROJECT INFORMATION

Company: Golder Associates
 Client: Southern Company Services
 Project: 1660939
 Location: Plant Branch
 Test Date: 08/15/16
 Test Well: PZ-31S Rising

AQUIFER DATA

Saturated Thickness: 100. ft
 Anisotropy Ratio (Kz/Kr): 1.

SLUG TEST WELL DATA

Test Well: PZ-31S Rising

X Location: 0. ft
 Y Location: 0. ft

Initial Displacement: 0.968 ft
 Static Water Column Height: 15.14 ft
 Casing Radius: 0.08333 ft
 Well Radius: 0.08333 ft
 Well Skin Radius: 0.25 ft
 Screen Length: 10. ft
 Total Well Penetration Depth: 15.64 ft
 Corrected Casing Radius (Bouwer-Rice Method): 0.07725 ft
 Gravel Pack Porosity: 0.15

No. of Observations: 25

Observation Data			
Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
3.492	0.968	6.36	0.562
3.716	0.946	6.72	0.519
3.938	0.906	7.14	0.469
4.157	0.867	7.56	0.424
4.376	0.832	7.98	0.379
4.596	0.795	8.46	0.337
4.815	0.763	9.	0.281
5.034	0.731	9.48	0.234
5.253	0.702	10.08	0.177
5.472	0.67	10.68	0.126
5.691	0.645	11.28	0.073
5.91	0.613	11.94	0.023
6.129	0.579		

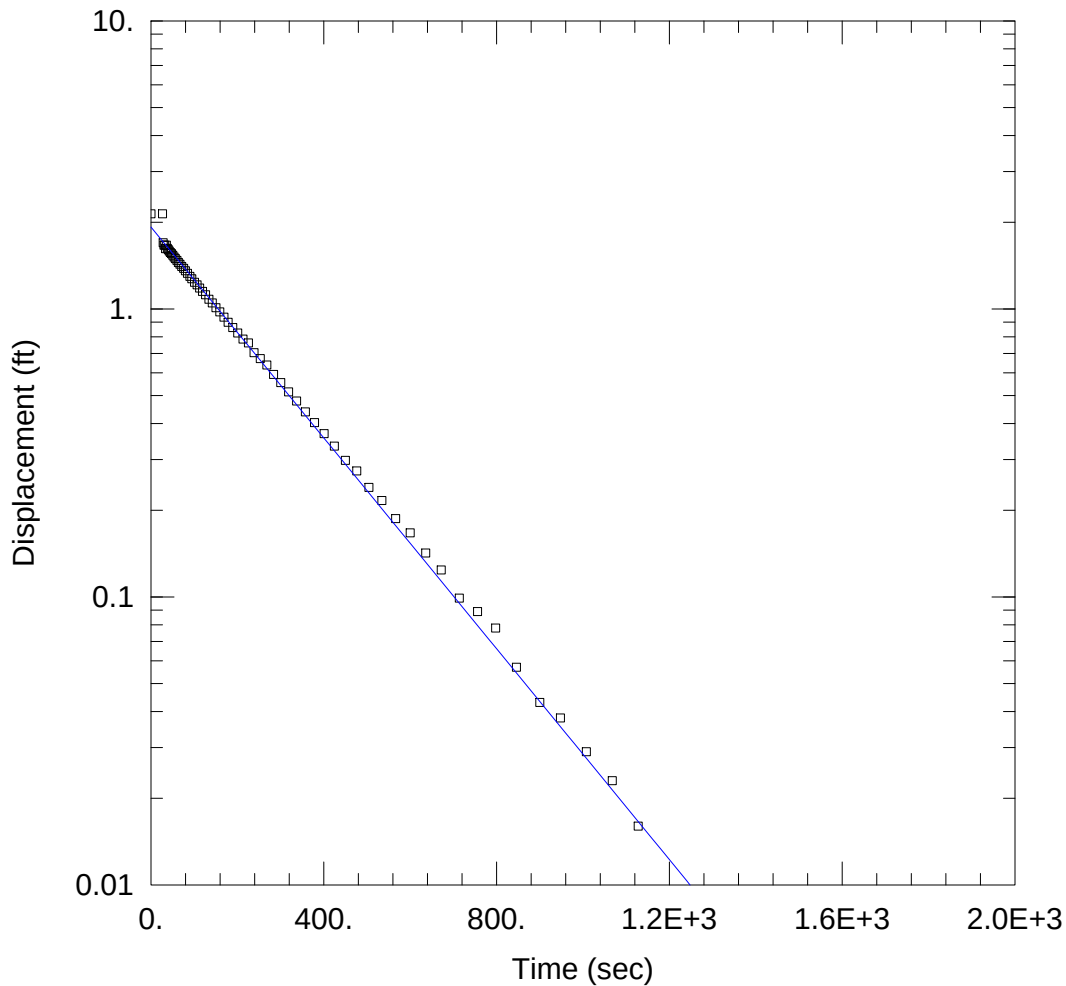
SOLUTION

Slug Test
 Aquifer Model: Unconfined
 Solution Method: Bouwer-Rice
 ln(Re/rw): 3.437

VISUAL ESTIMATION RESULTS

Estimated Parameters

Parameter	Estimate	
K	0.007606	cm/sec



PZ-32S FALLING

Data Set: G:\...\PZ-32S Falling.aqt

Date: 09/19/16

Time: 14:31:25

PROJECT INFORMATION

Company: Golder Associates

Client: Southern Company Services

Project: 1660939

Location: Plant Branch

Test Well: PZ-32S Falling

Test Date: 08/16/16

AQUIFER DATA

Saturated Thickness: 20. ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (PZ-32S Falling)

Initial Displacement: 2.139 ft

Static Water Column Height: 10.5 ft

Total Well Penetration Depth: 10.5 ft

Screen Length: 9.5 ft

Casing Radius: 0.08333 ft

Well Radius: 0.08333 ft

Gravel Pack Porosity: 0.15

SOLUTION

Aquifer Model: Unconfined

Solution Method: Bouwer-Rice

K = 0.3795 ft/day

y0 = 1.925 ft

Data Set: G:\Projects\Southern Company Services\Confidential Plant Branch Drilling\Slug Test Data\August 2016\VC
 Title: PZ-32S Falling
 Date: 09/19/16
 Time: 14:31:50

PROJECT INFORMATION

Company: Golder Associates
 Client: Southern Company Services
 Project: 1660939
 Location: Plant Branch
 Test Date: 08/16/16
 Test Well: PZ-32S Falling

AQUIFER DATA

Saturated Thickness: 20. ft
 Anisotropy Ratio (Kz/Kr): 1.

SLUG TEST WELL DATA

Test Well: PZ-32S Falling

X Location: 0. ft
 Y Location: 0. ft

Initial Displacement: 2.139 ft
 Static Water Column Height: 10.5 ft
 Casing Radius: 0.08333 ft
 Well Radius: 0.08333 ft
 Well Skin Radius: 0.25 ft
 Screen Length: 9.5 ft
 Total Well Penetration Depth: 10.5 ft
 Corrected Casing Radius (Bouwer-Rice Method): 0.07725 ft
 Gravel Pack Porosity: 0.15

No. of Observations: 66

Observation Data			
<u>Time (sec)</u>	<u>Displacement (ft)</u>	<u>Time (sec)</u>	<u>Displacement (ft)</u>
26.82	2.139	178.8	0.899
28.38	1.698	189.6	0.861
30.06	1.664	201.	0.825
31.86	1.664	213.	0.786
33.72	1.619	225.6	0.762
35.76	1.664	238.8	0.705
37.86	1.622	253.2	0.672
40.08	1.606	268.2	0.639
42.48	1.587	283.8	0.592
45.	1.569	300.6	0.555
47.64	1.555	318.6	0.515
50.46	1.536	337.2	0.479
53.46	1.515	357.6	0.439
56.64	1.496	378.6	0.403
60.	1.474	400.8	0.369
63.6	1.45	424.8	0.334
67.2	1.43	450.	0.298
71.4	1.404	476.4	0.274
75.6	1.383	504.6	0.24
79.8	1.356	534.6	0.216
84.6	1.329	566.4	0.187
90.	1.298	600.	0.167
94.8	1.272	636.	0.142
100.8	1.238	672.	0.124
106.8	1.212	714.	0.099
112.8	1.182	756.	0.089
119.4	1.151	798.	0.078

<u>Time (sec)</u>	<u>Displacement (ft)</u>	<u>Time (sec)</u>	<u>Displacement (ft)</u>
126.6	1.12	846.	0.057
134.4	1.08	900.	0.043
142.2	1.049	948.	0.038
150.6	1.01	1008.	0.029
159.6	0.976	1068.	0.023
169.2	0.936	1128.	0.016

SOLUTION

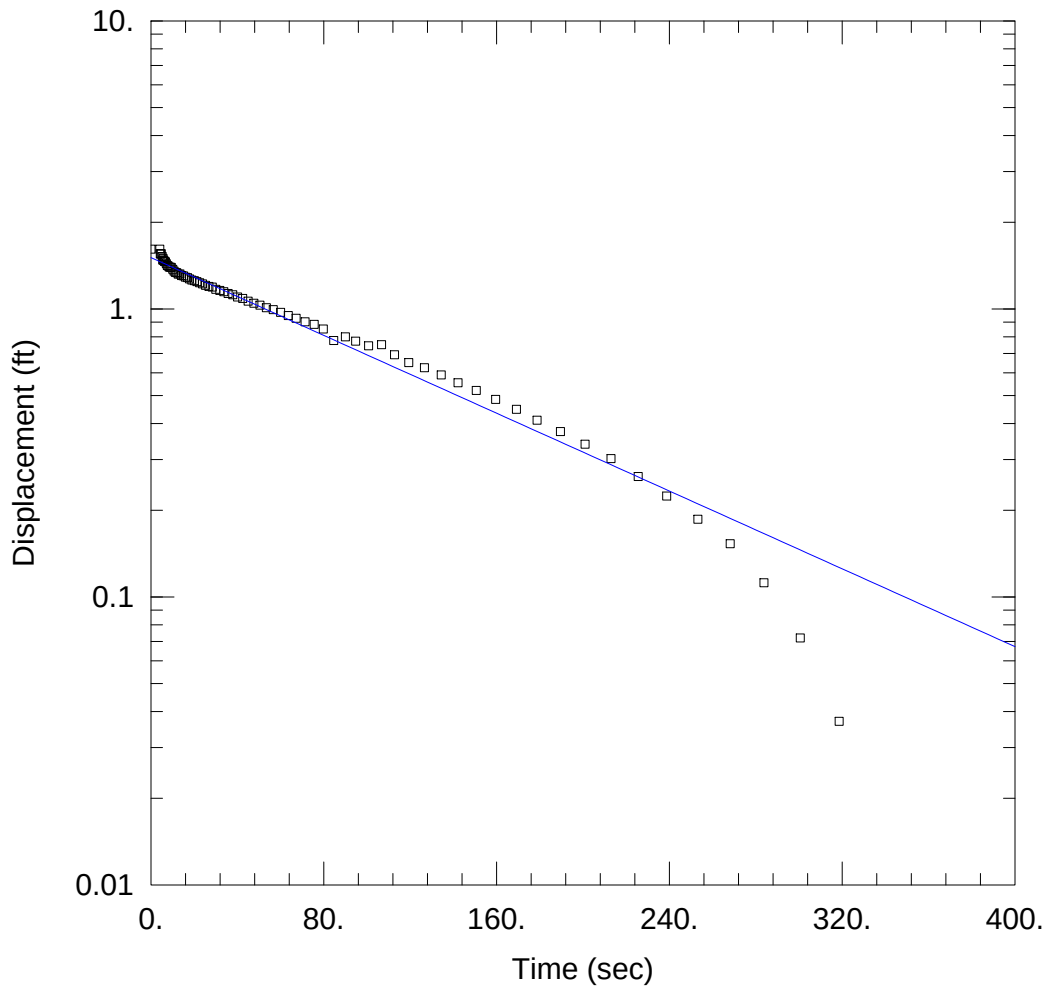
Slug Test
 Aquifer Model: Unconfined
 Solution Method: Bouwer-Rice
 $\ln(R_e/r_w)$: 3.318

VISUAL ESTIMATION RESULTSEstimated Parameters

<u>Parameter</u>	<u>Estimate</u>	
K	0.3795	ft/day
y ₀	1.925	ft

$K = 0.0001339$ cm/sec

$T = K \cdot b = 7.59$ ft²/day (0.08161 sq. cm/sec)



PZ-32S RISING

Data Set: G:\...\PZ-32S Rising.aqt

Date: 09/19/16

Time: 14:33:30

PROJECT INFORMATION

Company: Golder Associates

Client: Southern Company Services

Project: 1660939

Location: Plant Branch

Test Well: PZ-32S Rising

Test Date: 08/16/16

AQUIFER DATA

Saturated Thickness: 20. ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (PZ-32S Rising)

Initial Displacement: 1.612 ft

Static Water Column Height: 10.5 ft

Total Well Penetration Depth: 11. ft

Screen Length: 10. ft

Casing Radius: 0.08333 ft

Well Radius: 0.08333 ft

Gravel Pack Porosity: 0.15

SOLUTION

Aquifer Model: Unconfined

Solution Method: Bouwer-Rice

K = 0.6744 ft/day

y0 = 1.507 ft

Data Set: G:\Projects\Southern Company Services\Confidential Plant Branch Drilling\Slug Test Data\August 2016\VC
 Title: PZ-32S Rising
 Date: 09/19/16
 Time: 14:33:47

PROJECT INFORMATION

Company: Golder Associates
 Client: Southern Company Services
 Project: 1660939
 Location: Plant Branch
 Test Date: 08/16/16
 Test Well: PZ-32S Rising

AQUIFER DATA

Saturated Thickness: 20. ft
 Anisotropy Ratio (Kz/Kr): 1.

SLUG TEST WELL DATA

Test Well: PZ-32S Rising

X Location: 0. ft
 Y Location: 0. ft

Initial Displacement: 1.612 ft
 Static Water Column Height: 10.5 ft
 Casing Radius: 0.08333 ft
 Well Radius: 0.08333 ft
 Well Skin Radius: 0.25 ft
 Screen Length: 10. ft
 Total Well Penetration Depth: 11. ft
 Corrected Casing Radius (Bouwer-Rice Method): 0.07725 ft
 Gravel Pack Porosity: 0.15

No. of Observations: 78

Observation Data			
<u>Time (sec)</u>	<u>Displacement (ft)</u>	<u>Time (sec)</u>	<u>Displacement (ft)</u>
4.09	1.612	35.76	1.131
4.312	1.552	37.86	1.12
4.535	1.552	40.08	1.1
4.757	1.555	42.48	1.088
5.234	1.52	45.	1.064
5.455	1.478	47.64	1.046
5.675	1.496	50.46	1.03
5.896	1.474	53.46	1.01
6.118	1.469	56.64	0.994
6.36	1.462	60.	0.973
6.72	1.458	63.6	0.948
7.14	1.435	67.2	0.928
7.56	1.415	71.4	0.902
7.98	1.41	75.6	0.884
8.46	1.397	79.8	0.852
9.	1.396	84.6	0.777
9.48	1.393	90.	0.8
10.08	1.373	94.8	0.773
10.68	1.354	100.8	0.745
11.28	1.34	106.8	0.751
11.94	1.336	112.8	0.693
12.66	1.321	119.4	0.651
13.44	1.323	126.6	0.625
14.22	1.306	134.4	0.59
15.06	1.302	142.2	0.554
15.96	1.289	150.6	0.521
16.92	1.284	159.6	0.485

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
17.88	1.271	169.2	0.448
18.96	1.26	178.8	0.411
20.1	1.254	189.6	0.375
21.3	1.243	201.	0.339
22.56	1.232	213.	0.302
23.88	1.221	225.6	0.262
25.32	1.208	238.8	0.224
26.82	1.197	253.2	0.186
28.38	1.191	268.2	0.153
30.06	1.169	283.8	0.112
31.86	1.159	300.6	0.072
33.72	1.147	318.6	0.037

SOLUTION

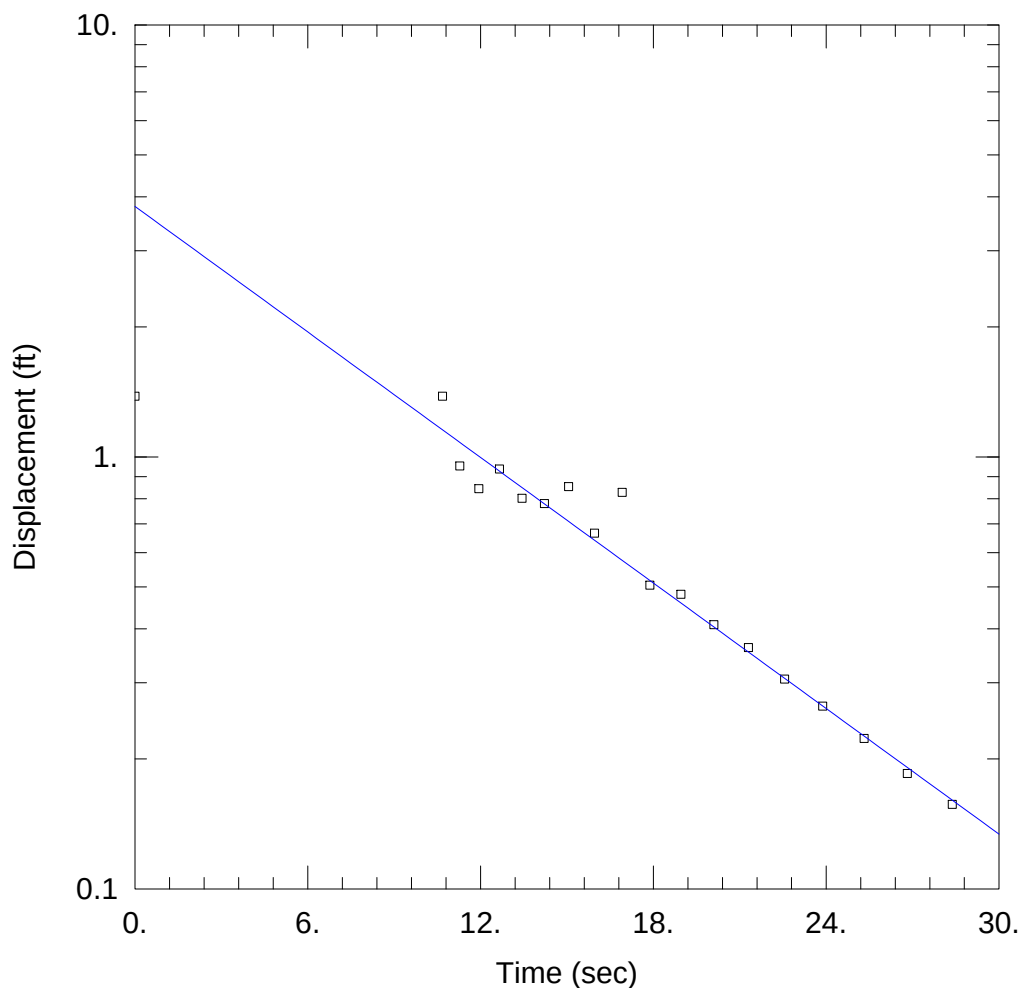
Slug Test
 Aquifer Model: Unconfined
 Solution Method: Bouwer-Rice
 $\ln(R_e/r_w)$: 3.364

VISUAL ESTIMATION RESULTSEstimated Parameters

Parameter	Estimate	
K	0.6744	ft/day
y ₀	1.507	ft

$K = 0.0002379$ cm/sec

$T = K \cdot b = 13.49$ ft²/day (0.145 sq. cm/sec)



PZ-33S FALLING

Data Set: G:\...\PZ-33S Falling.aqt

Date: 09/19/16

Time: 14:35:44

PROJECT INFORMATION

Company: Golder Associates

Client: Southern Company Services

Project: 1660939

Location: Plant Branch

Test Well: PZ-33S Falling

Test Date: 08/16/16

AQUIFER DATA

Saturated Thickness: 17.92 ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (PZ-33S Falling)

Initial Displacement: 1.382 ft

Static Water Column Height: 17.5 ft

Total Well Penetration Depth: 18. ft

Screen Length: 10. ft

Casing Radius: 0.08333 ft

Well Radius: 0.08333 ft

Gravel Pack Porosity: 0.15

SOLUTION

Aquifer Model: Unconfined

Solution Method: Bouwer-Rice

K = 11.7 ft/day

y0 = 3.801 ft

Data Set: G:\Projects\Southern Company Services\Confidential Plant Branch Drilling\Slug Test Data\August 2016\VC
 Title: PZ-33S Falling
 Date: 09/19/16
 Time: 14:35:59

PROJECT INFORMATION

Company: Golder Associates
 Client: Southern Company Services
 Project: 1660939
 Location: Plant Branch
 Test Date: 08/16/16
 Test Well: PZ-33S Falling

AQUIFER DATA

Saturated Thickness: 17.92 ft
 Anisotropy Ratio (Kz/Kr): 1.

SLUG TEST WELL DATA

Test Well: PZ-33S Falling

X Location: 0. ft
 Y Location: 0. ft

Initial Displacement: 1.382 ft
 Static Water Column Height: 17.5 ft
 Casing Radius: 0.08333 ft
 Well Radius: 0.08333 ft
 Well Skin Radius: 0.25 ft
 Screen Length: 10. ft
 Total Well Penetration Depth: 18. ft
 Corrected Casing Radius (Bouwer-Rice Method): 0.07725 ft
 Gravel Pack Porosity: 0.15

No. of Observations: 18

Observation Data			
Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
10.68	1.382	17.88	0.505
11.28	0.953	18.96	0.481
11.94	0.844	20.1	0.409
12.66	0.938	21.3	0.362
13.44	0.802	22.56	0.306
14.22	0.78	23.88	0.265
15.06	0.854	25.32	0.223
15.96	0.666	26.82	0.185
16.92	0.828	28.38	0.157

SOLUTION

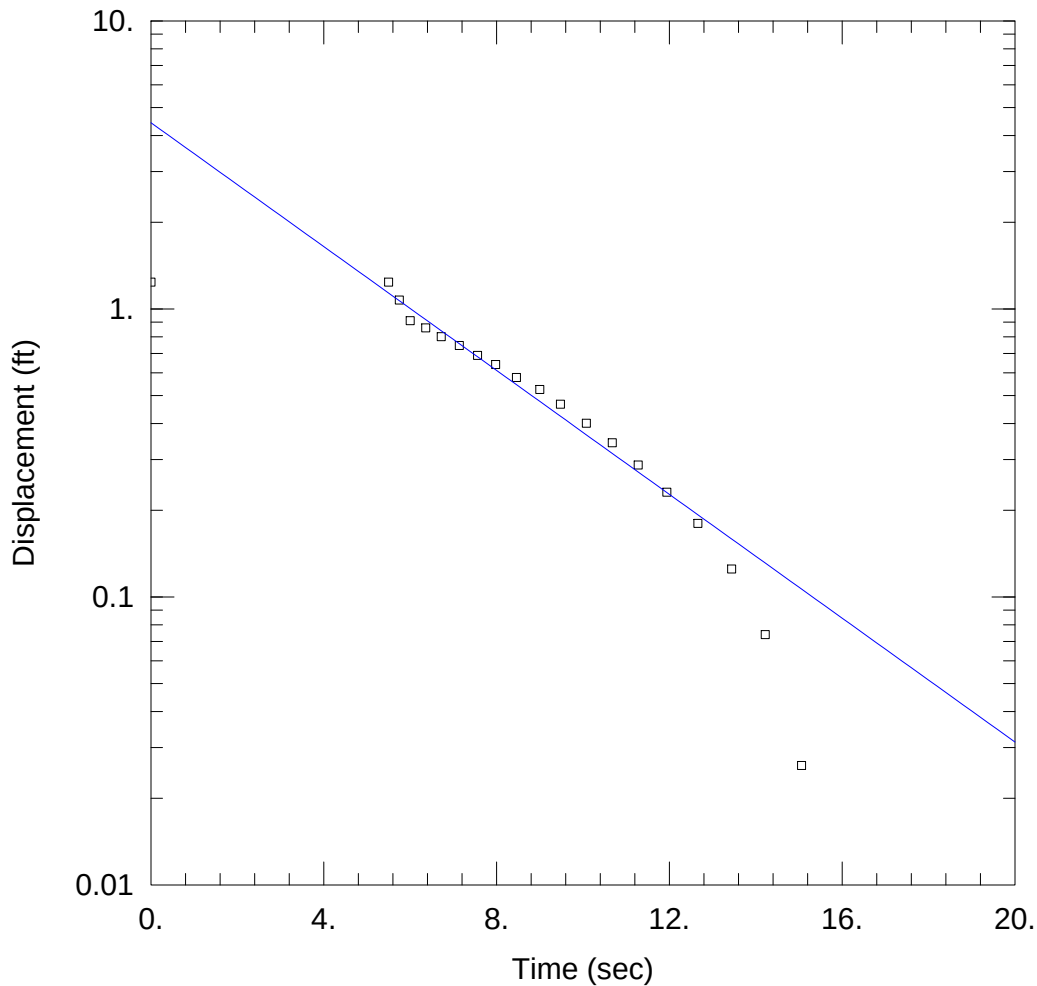
Slug Test
 Aquifer Model: Unconfined
 Solution Method: Bouwer-Rice
 $\ln(R_e/r_w)$: 4.069

VISUAL ESTIMATION RESULTS

Estimated Parameters

Parameter	Estimate	
K	11.7	ft/day
y0	3.801	ft

K = 0.004127 cm/sec
 T = K*b = 209.6 ft²/day (2.254 sq. cm/sec)



PZ-33S RISING

Data Set: G:\...\PZ-33S Rising.aqt
Date: 09/19/16

Time: 14:38:05

PROJECT INFORMATION

Company: Golder Associates
Client: Southern Company Services
Project: 1660939
Location: Plant Branch
Test Well: PZ-33S Rising
Test Date: 08/16/16

AQUIFER DATA

Saturated Thickness: 17.92 ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (PZ-33S Falling)

Initial Displacement: 1.239 ft
Total Well Penetration Depth: 18. ft
Casing Radius: 0.08333 ft

Static Water Column Height: 17.5 ft
Screen Length: 10. ft
Well Radius: 0.08333 ft
Gravel Pack Porosity: 0.15

SOLUTION

Aquifer Model: Unconfined
K = 25.96 ft/day

Solution Method: Bouwer-Rice
 y_0 = 4.43 ft

Data Set: G:\Projects\Southern Company Services\Confidential Plant Branch Drilling\Slug Test Data\August 2016\VC
 Title: PZ-33S Rising
 Date: 09/19/16
 Time: 14:38:22

PROJECT INFORMATION

Company: Golder Associates
 Client: Southern Company Services
 Project: 1660939
 Location: Plant Branch
 Test Date: 08/16/16
 Test Well: PZ-33S Rising

AQUIFER DATA

Saturated Thickness: 17.92 ft
 Anisotropy Ratio (Kz/Kr): 1.

SLUG TEST WELL DATA

Test Well: PZ-33S Falling

X Location: 0. ft
 Y Location: 0. ft

Initial Displacement: 1.239 ft
 Static Water Column Height: 17.5 ft
 Casing Radius: 0.08333 ft
 Well Radius: 0.08333 ft
 Well Skin Radius: 0.25 ft
 Screen Length: 10. ft
 Total Well Penetration Depth: 18. ft
 Corrected Casing Radius (Bouwer-Rice Method): 0.07725 ft
 Gravel Pack Porosity: 0.15

No. of Observations: 19

Observation Data			
Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
5.501	1.239	9.48	0.467
5.751	1.074	10.08	0.401
6.001	0.91	10.68	0.343
6.36	0.859	11.28	0.287
6.721	0.801	11.94	0.231
7.14	0.747	12.66	0.18
7.56	0.69	13.44	0.125
7.98	0.641	14.22	0.074
8.461	0.578	15.06	0.026
9.	0.525		

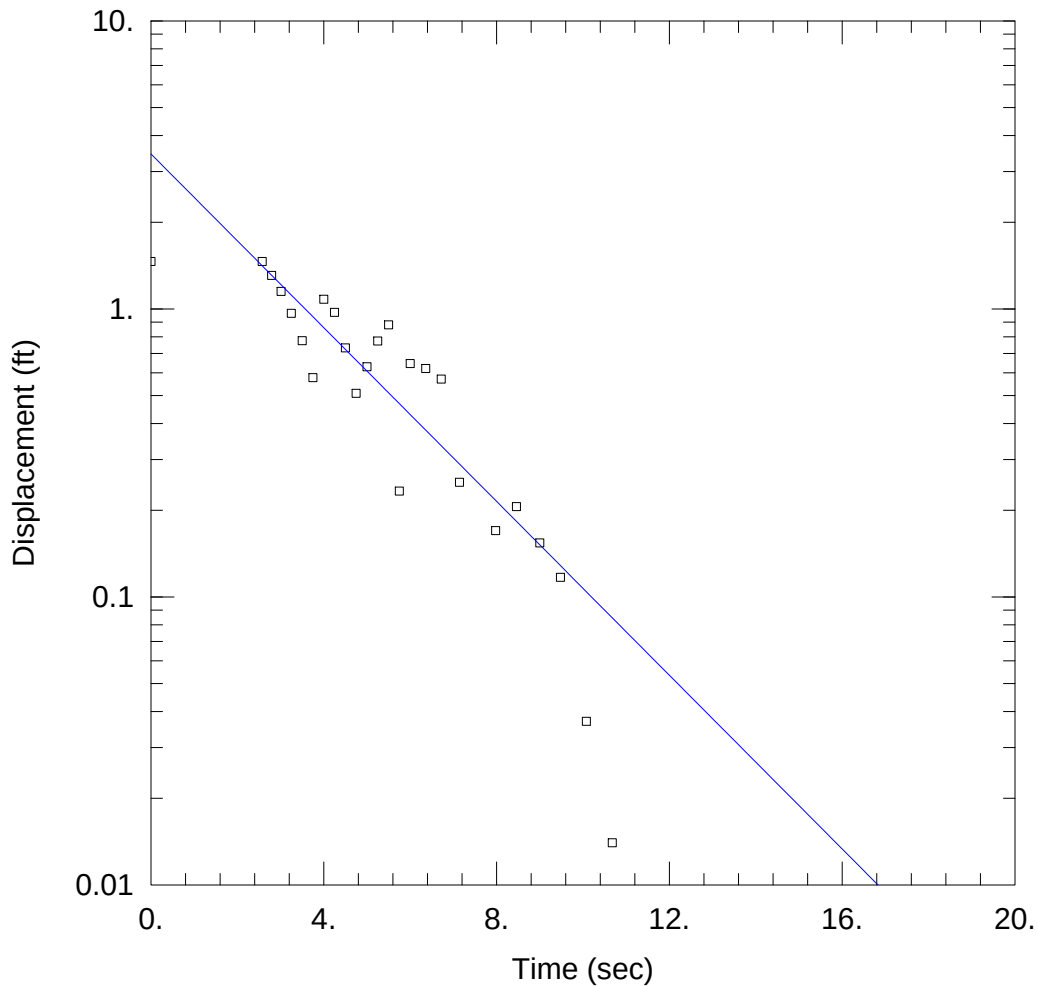
SOLUTION

Slug Test
 Aquifer Model: Unconfined
 Solution Method: Bouwer-Rice
 ln(Re/rw): 4.069

VISUAL ESTIMATION RESULTSEstimated Parameters

Parameter	Estimate	
K	25.96	ft/day
y0	4.43	ft

K = 0.009159 cm/sec



PZ-34S FALLING

Data Set: G:\...\PZ-34S Falling.aqt

Date: 09/19/16

Time: 14:40:31

PROJECT INFORMATION

Company: Golder Associates

Client: Southern Company Services

Project: 1660939

Location: Plant Branch

Test Well: PZ-34S Falling

Test Date: 08/15/16

AQUIFER DATA

Saturated Thickness: 25. ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (PZ-34S Falling)

Initial Displacement: 1.462 ft

Static Water Column Height: 20.78 ft

Total Well Penetration Depth: 20.28 ft

Screen Length: 10. ft

Casing Radius: 0.08333 ft

Well Radius: 0.08333 ft

Gravel Pack Porosity: 0.15

SOLUTION

Aquifer Model: Unconfined

Solution Method: Bouwer-Rice

K = 33.42 ft/day

y0 = 3.452 ft

Data Set: G:\Projects\Southern Company Services\Confidential Plant Branch Drilling\Slug Test Data\August 2016\Q
 Title: PZ-34S Falling
 Date: 09/20/16
 Time: 15:54:11

PROJECT INFORMATION

Company: Golder Associates
 Client: Southern Company Services
 Project: 1660939
 Location: Plant Branch
 Test Date: 08/15/16
 Test Well: PZ-34S Falling

AQUIFER DATA

Saturated Thickness: 25. ft
 Anisotropy Ratio (Kz/Kr): 1.

SLUG TEST WELL DATA

Test Well: PZ-34S Falling

X Location: 0. ft
 Y Location: 0. ft

Initial Displacement: 1.462 ft
 Static Water Column Height: 20.78 ft
 Casing Radius: 0.08333 ft
 Well Radius: 0.08333 ft
 Well Skin Radius: 0.25 ft
 Screen Length: 10. ft
 Total Well Penetration Depth: 20.28 ft
 Corrected Casing Radius (Bouwer-Rice Method): 0.07725 ft
 Gravel Pack Porosity: 0.15

No. of Observations: 25

Observation Data			
Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
2.576	1.462	5.751	0.233
2.794	1.308	6.001	0.646
3.013	1.151	6.36	0.621
3.251	0.965	6.721	0.571
3.501	0.776	7.141	0.25
3.751	0.577	7.561	-0.107
4.001	1.081	7.981	0.17
4.251	0.973	8.461	0.206
4.501	0.732	9.001	0.154
4.751	0.509	9.481	0.117
5.001	0.63	10.08	0.037
5.251	0.774	10.68	0.014
5.501	0.881		

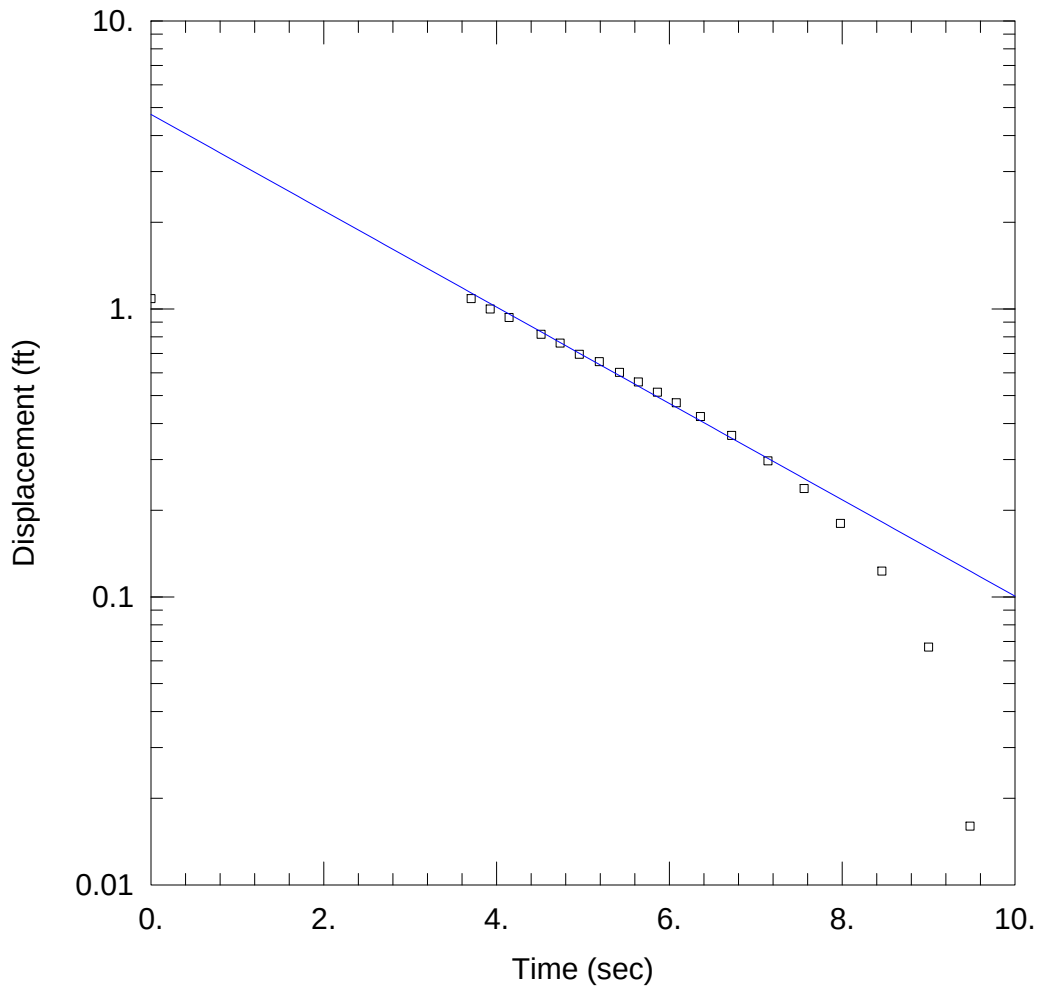
SOLUTION

Slug Test
 Aquifer Model: Unconfined
 Solution Method: Bouwer-Rice
 ln(Re/rw): 3.734

VISUAL ESTIMATION RESULTS

Estimated Parameters

Parameter	Estimate	
K	0.01179	cm/sec



PZ-34S RISING

Data Set: G:\...\PZ-34S Rising.aqt
Date: 09/19/16

Time: 14:42:24

PROJECT INFORMATION

Company: Golder Associates
Client: Southern Company Services
Project: 1660939
Location: Plant Branch
Test Well: PZ-34S Rising
Test Date: 08/15/16

AQUIFER DATA

Saturated Thickness: 25. ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (PZ-34S Rising)

Initial Displacement: 1.086 ft
Total Well Penetration Depth: 20.28 ft
Casing Radius: 0.08333 ft

Static Water Column Height: 20.78 ft
Screen Length: 10. ft
Well Radius: 0.08333 ft
Gravel Pack Porosity: 0.15

SOLUTION

Aquifer Model: Unconfined
K = 37.07 ft/day

Solution Method: Bouwer-Rice
y0 = 4.736 ft

Data Set: G:\Projects\Southern Company Services\Confidential Plant Branch Drilling\Slug Test Data\August 2016\Q
 Title: PZ-34S Rising
 Date: 09/19/16
 Time: 14:42:38

PROJECT INFORMATION

Company: Golder Associates
 Client: Southern Company Services
 Project: 1660939
 Location: Plant Branch
 Test Date: 08/15/16
 Test Well: PZ-34S Rising

AQUIFER DATA

Saturated Thickness: 25. ft
 Anisotropy Ratio (Kz/Kr): 1.

SLUG TEST WELL DATA

Test Well: PZ-34S Rising

X Location: 0. ft
 Y Location: 0. ft

Initial Displacement: 1.086 ft
 Static Water Column Height: 20.78 ft
 Casing Radius: 0.08333 ft
 Well Radius: 0.08333 ft
 Well Skin Radius: 0.25 ft
 Screen Length: 10. ft
 Total Well Penetration Depth: 20.28 ft
 Corrected Casing Radius (Bouwer-Rice Method): 0.07725 ft
 Gravel Pack Porosity: 0.15

No. of Observations: 19

Observation Data			
Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
3.707	1.086	6.081	0.472
3.926	0.999	6.361	0.423
4.146	0.934	6.721	0.364
4.515	0.817	7.141	0.297
4.736	0.761	7.561	0.238
4.958	0.696	7.981	0.18
5.189	0.656	8.461	0.123
5.423	0.602	9.001	0.067
5.642	0.558	9.481	0.016
5.862	0.514		

SOLUTION

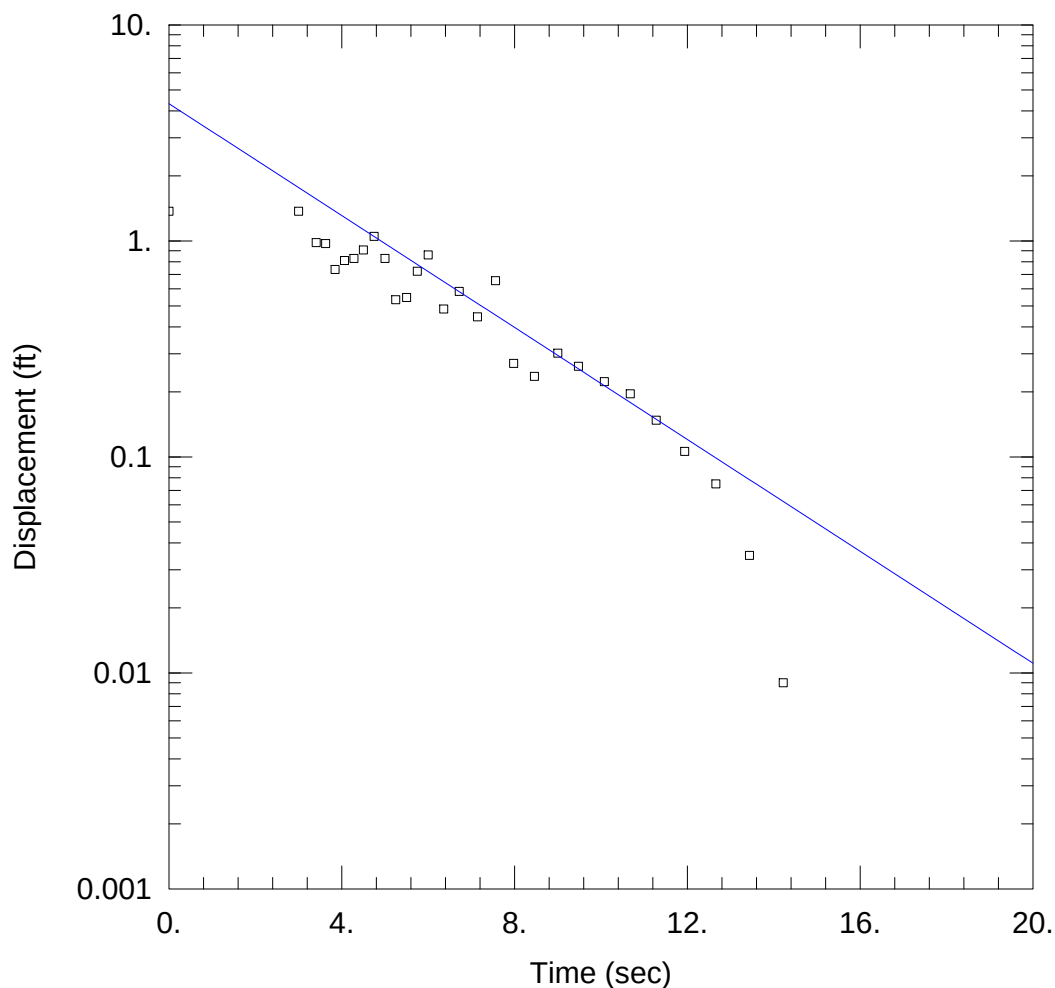
Slug Test
 Aquifer Model: Unconfined
 Solution Method: Bouwer-Rice
 $\ln(R_e/r_w)$: 3.734

VISUAL ESTIMATION RESULTS

Estimated Parameters

Parameter	Estimate	
K	37.07	ft/day
y ₀	4.736	ft

K = 0.01308 cm/sec



PZ-35S FALLING

Data Set: G:\...\PZ-35S Falling.aqt

Date: 09/19/16

Time: 14:59:39

PROJECT INFORMATION

Company: Golder Associates

Client: Southern Company Services

Project: 1660939

Location: Plant Branch

Test Well: PZ-35S Falling

Test Date: 08/15/16

AQUIFER DATA

Saturated Thickness: 30. ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (PZ-35S Falling)

Initial Displacement: 1.371 ft

Static Water Column Height: 24.41 ft

Total Well Penetration Depth: 24.91 ft

Screen Length: 10. ft

Casing Radius: 0.08333 ft

Well Radius: 0.08333 ft

Gravel Pack Porosity: 0.15

SOLUTION

Aquifer Model: Unconfined

Solution Method: Bouwer-Rice

K = 29.44 ft/day

y0 = 4.319 ft

Data Set: G:\Projects\Southern Company Services\Confidential Plant Branch Drilling\Slug Test Data\August 2016\Q
 Title: PZ-35S Falling
 Date: 09/19/16
 Time: 15:00:00

PROJECT INFORMATION

Company: Golder Associates
 Client: Southern Company Services
 Project: 1660939
 Location: Plant Branch
 Test Date: 08/15/16
 Test Well: PZ-35S Falling

AQUIFER DATA

Saturated Thickness: 30. ft
 Anisotropy Ratio (Kz/Kr): 1.

SLUG TEST WELL DATA

Test Well: PZ-35S Falling

X Location: 0. ft
 Y Location: 0. ft

Initial Displacement: 1.371 ft
 Static Water Column Height: 24.41 ft
 Casing Radius: 0.08333 ft
 Well Radius: 0.08333 ft
 Well Skin Radius: 0.25 ft
 Screen Length: 10. ft
 Total Well Penetration Depth: 24.91 ft
 Corrected Casing Radius (Bouwer-Rice Method): 0.07725 ft
 Gravel Pack Porosity: 0.15

No. of Observations: 28

Observation Data			
Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
3.	1.371	6.721	0.584
3.408	0.982	7.141	0.445
3.628	0.973	7.56	0.654
3.847	0.737	7.98	0.271
4.066	0.812	8.461	0.236
4.284	0.829	9.001	0.302
4.503	0.908	9.481	0.263
4.751	1.049	10.08	0.223
5.001	0.83	10.68	0.196
5.251	0.534	11.28	0.148
5.501	0.547	11.94	0.106
5.751	0.724	12.66	0.075
6.001	0.861	13.44	0.035
6.361	0.484	14.22	0.009

SOLUTION

Slug Test
 Aquifer Model: Unconfined
 Solution Method: Bouwer-Rice
 ln(Re/rw): 3.83

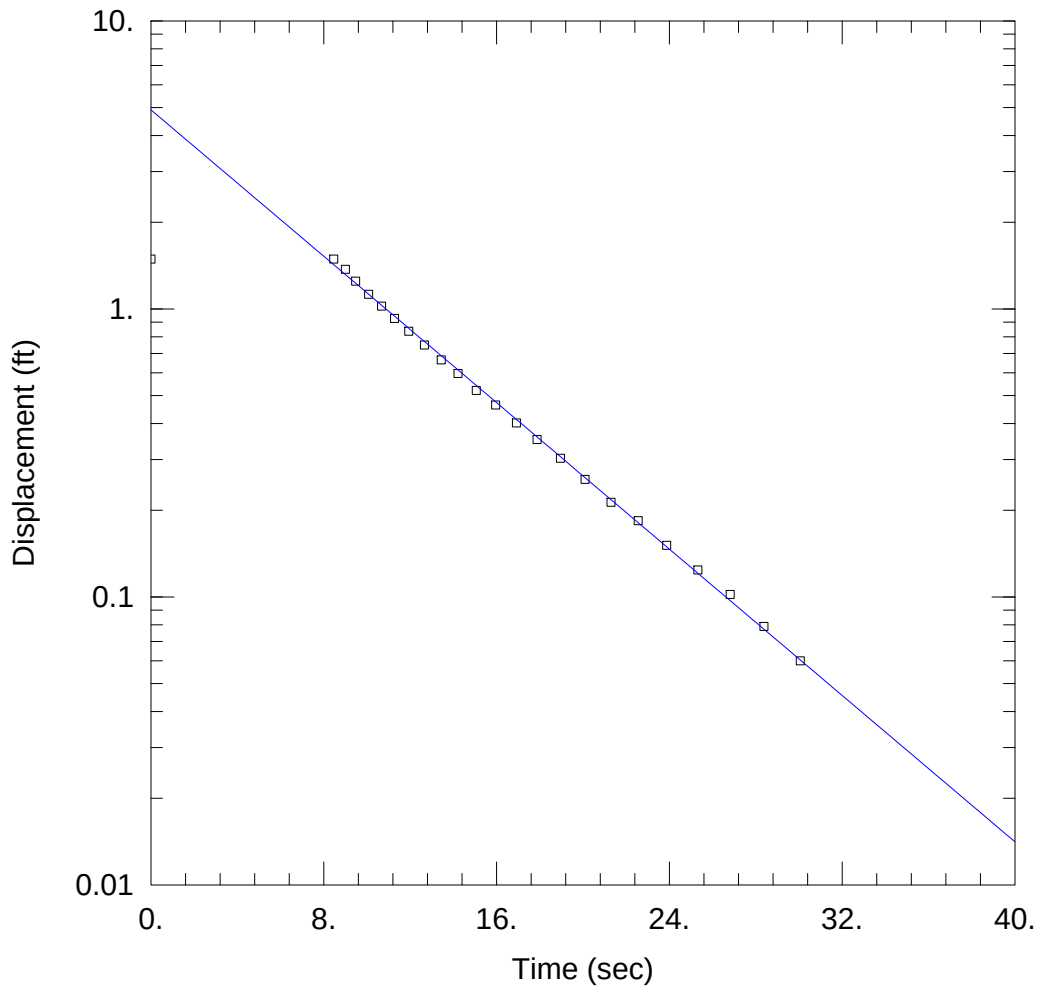
VISUAL ESTIMATION RESULTSEstimated Parameters

Parameter	Estimate
-----------	----------

K	29.44	ft/day
y0	4.319	ft

K = 0.01039 cm/sec

T = K*b = 883.3 ft²/day (9.498 sq. cm/sec)



PZ-35S RISING

Data Set: G:\...\PZ-35S Rising.aqt

Date: 09/19/16

Time: 15:01:48

PROJECT INFORMATION

Company: Golder Associates

Client: Southern Company Services

Project: 1660939

Location: Plant Branch

Test Well: PZ-35S Rising

Test Date: 08/15/16

AQUIFER DATA

Saturated Thickness: 30. ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (PZ-35S Rising)

Initial Displacement: 1.49 ft

Static Water Column Height: 24.41 ft

Total Well Penetration Depth: 24.91 ft

Screen Length: 10. ft

Casing Radius: 0.08333 ft

Well Radius: 0.08333 ft

Gravel Pack Porosity: 0.15

SOLUTION

Aquifer Model: Unconfined

Solution Method: Bouwer-Rice

K = 14.44 ft/day

y0 = 4.909 ft

Data Set: G:\Projects\Southern Company Services\Confidential Plant Branch Drilling\Slug Test Data\August 2016\Q
 Title: PZ-35S Rising
 Date: 09/20/16
 Time: 15:55:14

PROJECT INFORMATION

Company: Golder Associates
 Client: Southern Company Services
 Project: 1660939
 Location: Plant Branch
 Test Date: 08/15/16
 Test Well: PZ-35S Rising

AQUIFER DATA

Saturated Thickness: 30. ft
 Anisotropy Ratio (Kz/Kr): 1.

SLUG TEST WELL DATA

Test Well: PZ-35S Rising

X Location: 0. ft
 Y Location: 0. ft

Initial Displacement: 1.49 ft
 Static Water Column Height: 24.41 ft
 Casing Radius: 0.08333 ft
 Well Radius: 0.08333 ft
 Well Skin Radius: 0.25 ft
 Screen Length: 10. ft
 Total Well Penetration Depth: 24.91 ft
 Corrected Casing Radius (Bouwer-Rice Method): 0.07725 ft
 Gravel Pack Porosity: 0.15

No. of Observations: 23

Observation Data			
Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
8.46	1.49	16.92	0.402
9.	1.373	17.88	0.352
9.48	1.248	18.96	0.303
10.08	1.124	20.1	0.256
10.68	1.022	21.3	0.213
11.28	0.927	22.56	0.184
11.94	0.837	23.88	0.151
12.66	0.749	25.32	0.124
13.44	0.665	26.82	0.102
14.22	0.597	28.38	0.079
15.06	0.521	30.06	0.06
15.96	0.464		

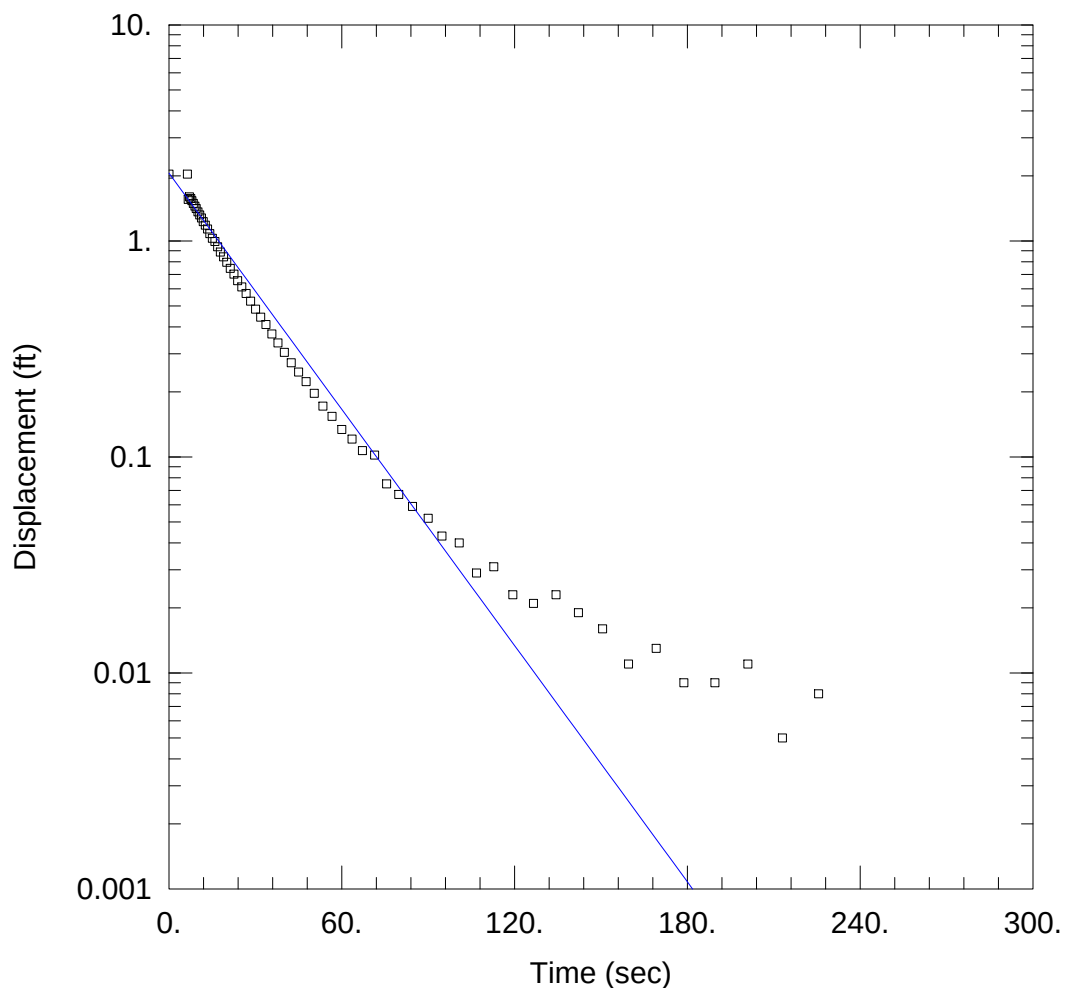
SOLUTION

Slug Test
 Aquifer Model: Unconfined
 Solution Method: Bouwer-Rice
 ln(Re/rw): 3.83

VISUAL ESTIMATION RESULTS

Estimated Parameters

Parameter	Estimate	
K	0.005095	cm/sec
y0	4.909	ft



PZ-36S FALLING

Data Set: G:\...\PZ-36S Falling.aqt

Date: 09/19/16

Time: 15:04:26

PROJECT INFORMATION

Company: Golder Associates

Client: Southern Company Services

Project: 1660939

Location: Plant Branch

Test Well: PZ-36S Falling

Test Date: 08/16/16

AQUIFER DATA

Saturated Thickness: 35. ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (PZ-36S Falling)

Initial Displacement: 2.038 ft

Static Water Column Height: 25.51 ft

Total Well Penetration Depth: 26.01 ft

Screen Length: 10. ft

Casing Radius: 0.08333 ft

Well Radius: 0.08333 ft

Gravel Pack Porosity: 0.15

SOLUTION

Aquifer Model: Unconfined

Solution Method: Bouwer-Rice

K = 4.106 ft/day

y0 = 2.059 ft

Data Set: G:\Projects\Southern Company Services\Confidential Plant Branch Drilling\Slug Test Data\August 2016\Q
 Title: PZ-36S Falling
 Date: 09/19/16
 Time: 15:04:45

PROJECT INFORMATION

Company: Golder Associates
 Client: Southern Company Services
 Project: 1660939
 Location: Plant Branch
 Test Date: 08/16/16
 Test Well: PZ-36S Falling

AQUIFER DATA

Saturated Thickness: 35. ft
 Anisotropy Ratio (Kz/Kr): 1.

SLUG TEST WELL DATA

Test Well: PZ-36S Falling

X Location: 0. ft
 Y Location: 0. ft

Initial Displacement: 2.038 ft
 Static Water Column Height: 25.51 ft
 Casing Radius: 0.08333 ft
 Well Radius: 0.08333 ft
 Well Skin Radius: 0.25 ft
 Screen Length: 10. ft
 Total Well Penetration Depth: 26.01 ft
 Corrected Casing Radius (Bouwer-Rice Method): 0.07725 ft
 Gravel Pack Porosity: 0.15

No. of Observations: 64

Observation Data			
Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
6.39	2.038	40.08	0.305
6.721	1.557	42.48	0.273
7.141	1.601	45.	0.247
7.561	1.572	47.64	0.223
7.981	1.535	50.46	0.197
8.461	1.491	53.46	0.172
9.001	1.45	56.64	0.154
9.481	1.412	60.	0.134
10.08	1.363	63.6	0.121
10.69	1.319	67.2	0.107
11.28	1.277	71.4	0.102
11.94	1.228	75.6	0.075
12.66	1.183	79.8	0.067
13.44	1.135	84.6	0.059
14.22	1.081	90.	0.052
15.06	1.029	94.8	0.043
15.96	0.994	100.8	0.04
16.92	0.94	106.8	0.029
17.88	0.888	112.8	0.031
18.96	0.844	119.4	0.023
20.1	0.796	126.6	0.021
21.3	0.747	134.4	0.023
22.56	0.702	142.2	0.019
23.88	0.654	150.6	0.016
25.32	0.612	159.6	0.011
26.82	0.571	169.2	0.013
28.38	0.526	178.8	0.009

<u>Time (sec)</u>	<u>Displacement (ft)</u>	<u>Time (sec)</u>	<u>Displacement (ft)</u>
30.06	0.483	189.6	0.009
31.86	0.444	201.	0.011
33.72	0.41	213.	0.005
35.76	0.371	225.6	0.008
37.86	0.337	238.8	0.

SOLUTION

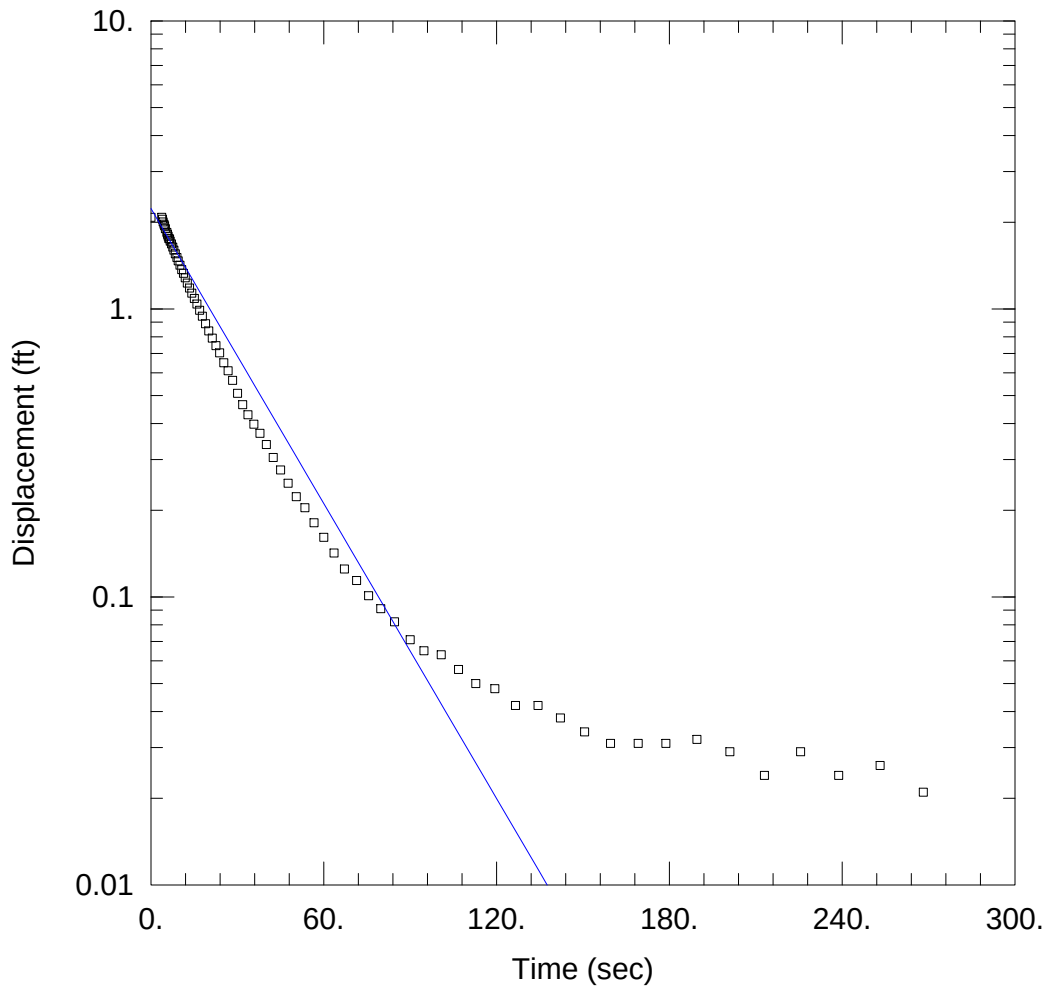
Slug Test
 Aquifer Model: Unconfined
 Solution Method: Bouwer-Rice
 $\ln(R_e/r_w)$: 3.795

VISUAL ESTIMATION RESULTSEstimated Parameters

<u>Parameter</u>	<u>Estimate</u>	
K	4.106	ft/day
y0	2.059	ft

$K = 0.001449$ cm/sec

$T = K \cdot b = 143.7$ ft²/day (1.545 sq. cm/sec)



PZ-36S RISING

Data Set: G:\...\PZ-36S Rising.aqt
 Date: 09/19/16

Time: 15:08:13

PROJECT INFORMATION

Company: Golder Associates
 Client: Southern Company Services
 Project: 1660939
 Location: Plant Branch
 Test Well: PZ-36S Rising
 Test Date: 08/16/16

AQUIFER DATA

Saturated Thickness: 35. ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (PZ-36S Rising)

Initial Displacement: 2.081 ft
 Total Well Penetration Depth: 26.05 ft
 Casing Radius: 0.08333 ft

Static Water Column Height: 25.55 ft
 Screen Length: 10. ft
 Well Radius: 0.08333 ft
 Gravel Pack Porosity: 0.15

SOLUTION

Aquifer Model: Unconfined
 K = 3.847 ft/day

Solution Method: Bouwer-Rice
 y0 = 2.23 ft

Data Set: G:\Projects\Southern Company Services\Confidential Plant Branch Drilling\Slug Test Data\August 2016\Q
 Title: PZ-36S Rising
 Date: 09/19/16
 Time: 15:08:29

PROJECT INFORMATION

Company: Golder Associates
 Client: Southern Company Services
 Project: 1660939
 Location: Plant Branch
 Test Date: 08/16/16
 Test Well: PZ-36S Rising

AQUIFER DATA

Saturated Thickness: 35. ft
 Anisotropy Ratio (Kz/Kr): 1.

SLUG TEST WELL DATA

Test Well: PZ-36S Rising

X Location: 0. ft
 Y Location: 0. ft

Initial Displacement: 2.081 ft
 Static Water Column Height: 25.55 ft
 Casing Radius: 0.08333 ft
 Well Radius: 0.08333 ft
 Well Skin Radius: 0.25 ft
 Screen Length: 10. ft
 Total Well Penetration Depth: 26.05 ft
 Corrected Casing Radius (Bouwer-Rice Method): 0.07725 ft
 Gravel Pack Porosity: 0.15

No. of Observations: 76

Observation Data			
<u>Time (sec)</u>	<u>Displacement (ft)</u>	<u>Time (sec)</u>	<u>Displacement (ft)</u>
3.749	2.081	31.86	0.465
4.	2.048	33.72	0.429
4.25	2.005	35.76	0.398
4.5	1.968	37.86	0.37
4.75	1.943	40.08	0.338
5.	1.899	42.48	0.305
5.522	1.845	45.	0.276
5.742	1.816	47.64	0.248
5.962	1.789	50.46	0.223
6.182	1.757	53.46	0.204
6.452	1.751	56.64	0.181
6.72	1.72	60.	0.161
7.14	1.682	63.6	0.142
7.56	1.64	67.2	0.125
7.98	1.6	71.4	0.114
8.46	1.554	75.6	0.101
9.	1.508	79.8	0.091
9.48	1.468	84.6	0.082
10.08	1.418	90.	0.071
10.68	1.369	94.8	0.065
11.28	1.329	100.8	0.063
11.94	1.283	106.8	0.056
12.66	1.229	112.8	0.05
13.44	1.182	119.4	0.048
14.22	1.135	126.6	0.042
15.06	1.087	134.4	0.042
15.96	1.04	142.2	0.038

<u>Time (sec)</u>	<u>Displacement (ft)</u>	<u>Time (sec)</u>	<u>Displacement (ft)</u>
16.92	0.989	150.6	0.034
17.88	0.943	159.6	0.031
18.96	0.888	169.2	0.031
20.1	0.839	178.8	0.031
21.3	0.792	189.6	0.032
22.56	0.746	201.	0.029
23.88	0.704	213.	0.024
25.32	0.65	225.6	0.029
26.82	0.61	238.8	0.024
28.38	0.565	253.2	0.026
30.06	0.509	268.2	0.021

SOLUTION

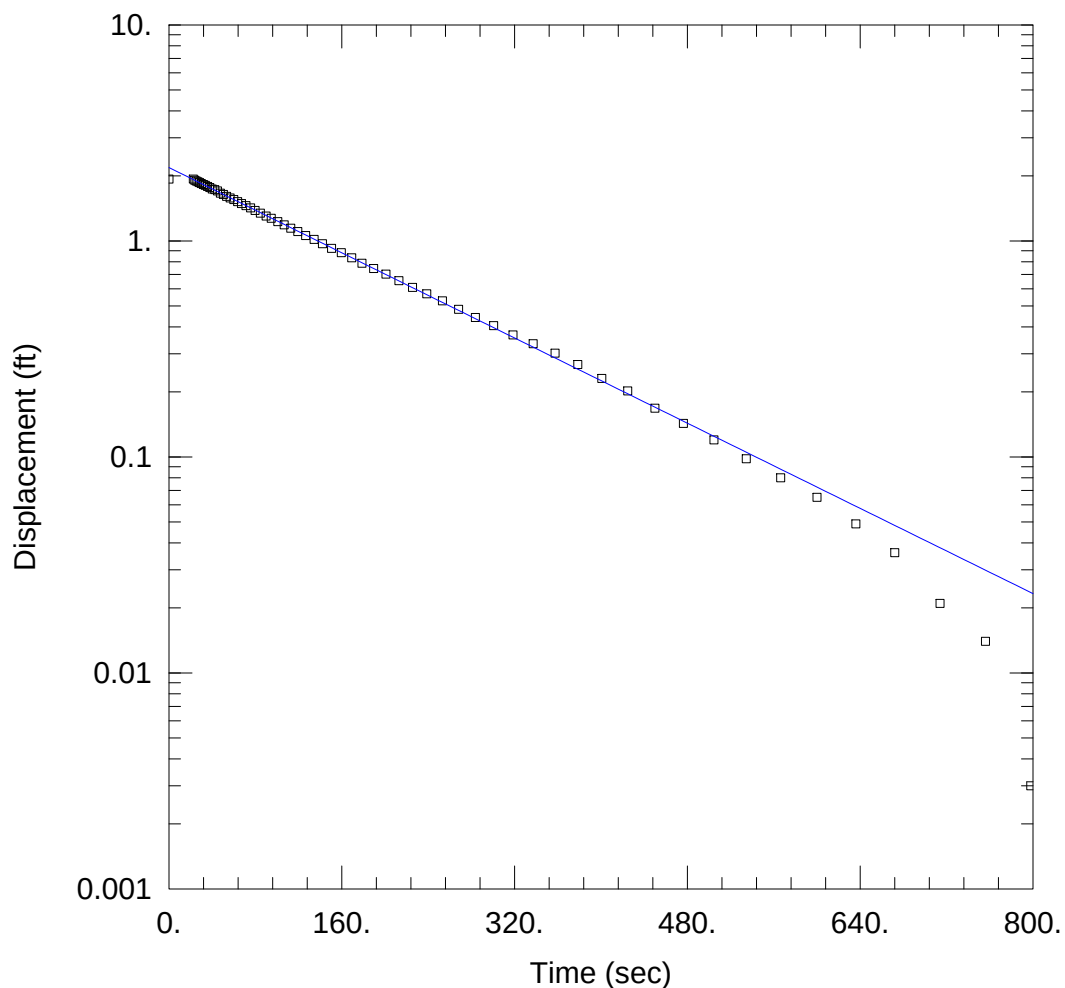
Slug Test
 Aquifer Model: Unconfined
 Solution Method: Bouwer-Rice
 $\ln(R_e/r_w)$: 3.797

VISUAL ESTIMATION RESULTSEstimated Parameters

<u>Parameter</u>	<u>Estimate</u>	
K	3.847	ft/day
y0	2.23	ft

$K = 0.001357$ cm/sec

$T = K \cdot b = 134.6$ ft²/day (1.448 sq. cm/sec)



PZ-37S FALLING

Data Set: G:\...\PZ-37S Falling.aqt

Date: 09/19/16

Time: 15:09:59

PROJECT INFORMATION

Company: Golder Associates

Client: Southern Company Services

Project: 1660939

Location: Plant Branch

Test Well: PZ-37S Falling

Test Date: 08/16/16

AQUIFER DATA

Saturated Thickness: 25. ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (PZ-37S Falling)

Initial Displacement: 1.932 ft

Static Water Column Height: 16.95 ft

Total Well Penetration Depth: 16.95 ft

Screen Length: 10. ft

Casing Radius: 0.08333 ft

Well Radius: 0.08333 ft

Gravel Pack Porosity: 0.15

SOLUTION

Aquifer Model: Unconfined

Solution Method: Bouwer-Rice

K = 0.5261 ft/day

y0 = 2.185 ft

Data Set: G:\Projects\Southern Company Services\Confidential Plant Branch Drilling\Slug Test Data\August 2016\Q
 Title: PZ-37S Falling
 Date: 09/19/16
 Time: 15:10:20

PROJECT INFORMATION

Company: Golder Associates
 Client: Southern Company Services
 Project: 1660939
 Location: Plant Branch
 Test Date: 08/16/16
 Test Well: PZ-37S Falling

AQUIFER DATA

Saturated Thickness: 25. ft
 Anisotropy Ratio (Kz/Kr): 1.

SLUG TEST WELL DATA

Test Well: PZ-37S Falling

X Location: 0. ft
 Y Location: 0. ft

Initial Displacement: 1.932 ft
 Static Water Column Height: 16.95 ft
 Casing Radius: 0.08333 ft
 Well Radius: 0.08333 ft
 Well Skin Radius: 0.25 ft
 Screen Length: 10. ft
 Total Well Penetration Depth: 16.95 ft
 Corrected Casing Radius (Bouwer-Rice Method): 0.07725 ft
 Gravel Pack Porosity: 0.15

No. of Observations: 63

Observation Data			
<u>Time (sec)</u>	<u>Displacement (ft)</u>	<u>Time (sec)</u>	<u>Displacement (ft)</u>
22.56	1.932	142.2	0.97
23.88	1.91	150.6	0.924
25.32	1.894	159.6	0.882
26.82	1.879	169.2	0.836
28.38	1.861	178.8	0.788
30.06	1.842	189.6	0.745
31.86	1.823	201.	0.702
33.72	1.808	213.	0.655
35.76	1.786	225.6	0.609
37.86	1.767	238.8	0.569
40.08	1.74	253.2	0.528
42.48	1.726	268.2	0.482
45.	1.705	283.8	0.442
47.64	1.663	300.6	0.405
50.46	1.641	318.6	0.367
53.46	1.607	337.2	0.334
56.64	1.581	357.6	0.302
60.	1.553	378.6	0.268
63.6	1.52	400.8	0.231
67.2	1.49	424.8	0.202
71.4	1.457	450.	0.168
75.6	1.421	476.4	0.143
79.8	1.385	504.6	0.12
84.6	1.344	534.6	0.098
90.	1.303	566.4	0.08
94.8	1.272	600.	0.065
100.8	1.229	636.	0.049

<u>Time (sec)</u>	<u>Displacement (ft)</u>	<u>Time (sec)</u>	<u>Displacement (ft)</u>
106.8	1.187	672.	0.036
112.8	1.146	714.	0.021
119.4	1.105	756.	0.014
126.6	1.059	798.	0.003
134.4	1.016		

SOLUTION

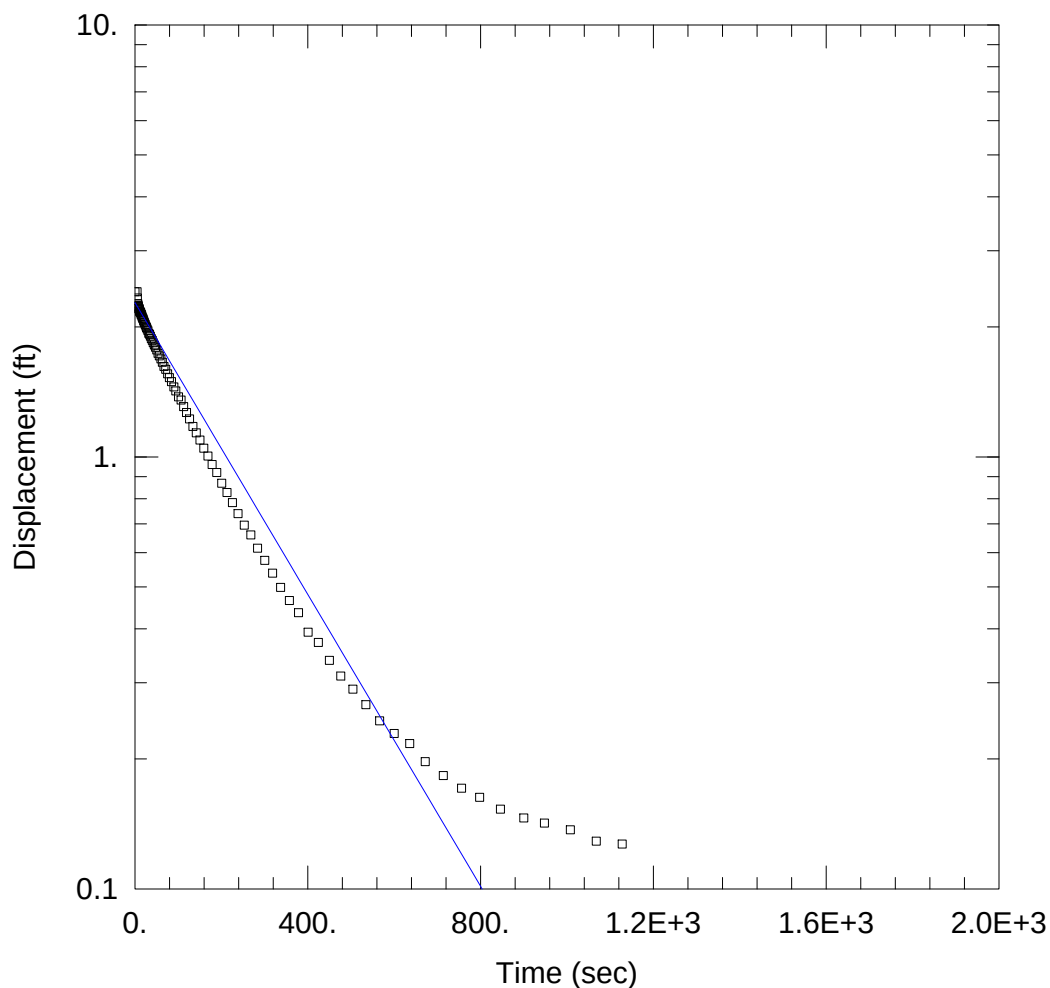
Slug Test
 Aquifer Model: Unconfined
 Solution Method: Bouwer-Rice
 $\ln(R_e/r_w)$: 3.595

VISUAL ESTIMATION RESULTSEstimated Parameters

<u>Parameter</u>	<u>Estimate</u>	
K	0.5261	ft/day
y0	2.185	ft

$K = 0.0001856$ cm/sec

$T = K \cdot b = 13.15$ ft²/day (0.1414 sq. cm/sec)



PZ-37S RISING

Data Set: G:\...\PZ-37S Rising.aqt

Date: 09/19/16

Time: 15:12:56

PROJECT INFORMATION

Company: Golder Associates

Client: Southern Company Services

Project: 1660939

Location: Plant Branch

Test Well: PZ-37S Rising

Test Date: 08/16/16

AQUIFER DATA

Saturated Thickness: 25. ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (PZ-37S Rising)

Initial Displacement: 2.412 ft

Static Water Column Height: 16.95 ft

Total Well Penetration Depth: 16.95 ft

Screen Length: 10. ft

Casing Radius: 0.08333 ft

Well Radius: 0.08333 ft

Gravel Pack Porosity: 0.15

SOLUTION

Aquifer Model: Unconfined

Solution Method: Bouwer-Rice

K = 0.3604 ft/day

y0 = 2.277 ft

Data Set: G:\Projects\Southern Company Services\Confidential Plant Branch Drilling\Slug Test Data\August 2016\VC
 Title: PZ-37S Rising
 Date: 09/19/16
 Time: 15:13:14

PROJECT INFORMATION

Company: Golder Associates
 Client: Southern Company Services
 Project: 1660939
 Location: Plant Branch
 Test Date: 08/16/16
 Test Well: PZ-37S Rising

AQUIFER DATA

Saturated Thickness: 25. ft
 Anisotropy Ratio (Kz/Kr): 1.

SLUG TEST WELL DATA

Test Well: PZ-37S Rising

X Location: 0. ft
 Y Location: 0. ft

Initial Displacement: 2.412 ft
 Static Water Column Height: 16.95 ft
 Casing Radius: 0.08333 ft
 Well Radius: 0.08333 ft
 Well Skin Radius: 0.25 ft
 Screen Length: 10. ft
 Total Well Penetration Depth: 16.95 ft
 Corrected Casing Radius (Bouwer-Rice Method): 0.07725 ft
 Gravel Pack Porosity: 0.15

No. of Observations: 96

Observation Data			
Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
5.	2.412	75.6	1.558
5.25	2.211	79.8	1.526
5.5	2.227	84.6	1.494
5.75	2.334	90.	1.452
6.	2.231	94.8	1.421
6.36	2.264	100.8	1.377
6.72	2.239	106.8	1.354
7.14	2.247	112.8	1.308
7.56	2.221	119.4	1.267
7.98	2.23	126.6	1.224
8.46	2.211	134.4	1.176
9.	2.207	142.2	1.137
9.48	2.205	150.6	1.094
10.08	2.194	159.6	1.048
10.68	2.182	169.2	1.005
11.28	2.168	178.8	0.96
11.94	2.165	189.6	0.92
12.66	2.164	201.	0.869
13.44	2.155	213.	0.827
14.22	2.139	225.6	0.784
15.06	2.135	238.8	0.739
15.96	2.121	253.2	0.695
16.92	2.106	268.2	0.66
17.88	2.093	283.8	0.615
18.96	2.084	300.6	0.576
20.1	2.067	318.6	0.538
21.3	2.053	337.2	0.499

<u>Time (sec)</u>	<u>Displacement (ft)</u>	<u>Time (sec)</u>	<u>Displacement (ft)</u>
22.56	2.043	357.6	0.465
23.88	2.025	378.6	0.436
25.32	2.008	400.8	0.393
26.82	1.992	424.8	0.372
28.38	1.977	450.	0.338
30.06	1.959	476.4	0.311
32.1	1.933	504.6	0.29
33.72	1.922	534.6	0.267
35.76	1.903	566.4	0.245
37.86	1.879	600.	0.229
40.08	1.861	636.	0.217
42.48	1.838	672.	0.197
45.	1.816	714.	0.183
47.64	1.794	756.	0.171
50.46	1.768	798.	0.163
53.46	1.737	846.	0.153
56.64	1.713	900.	0.146
60.	1.686	948.	0.142
63.6	1.656	1008.	0.137
67.2	1.62	1068.	0.129
71.4	1.595	1128.	0.127

SOLUTION

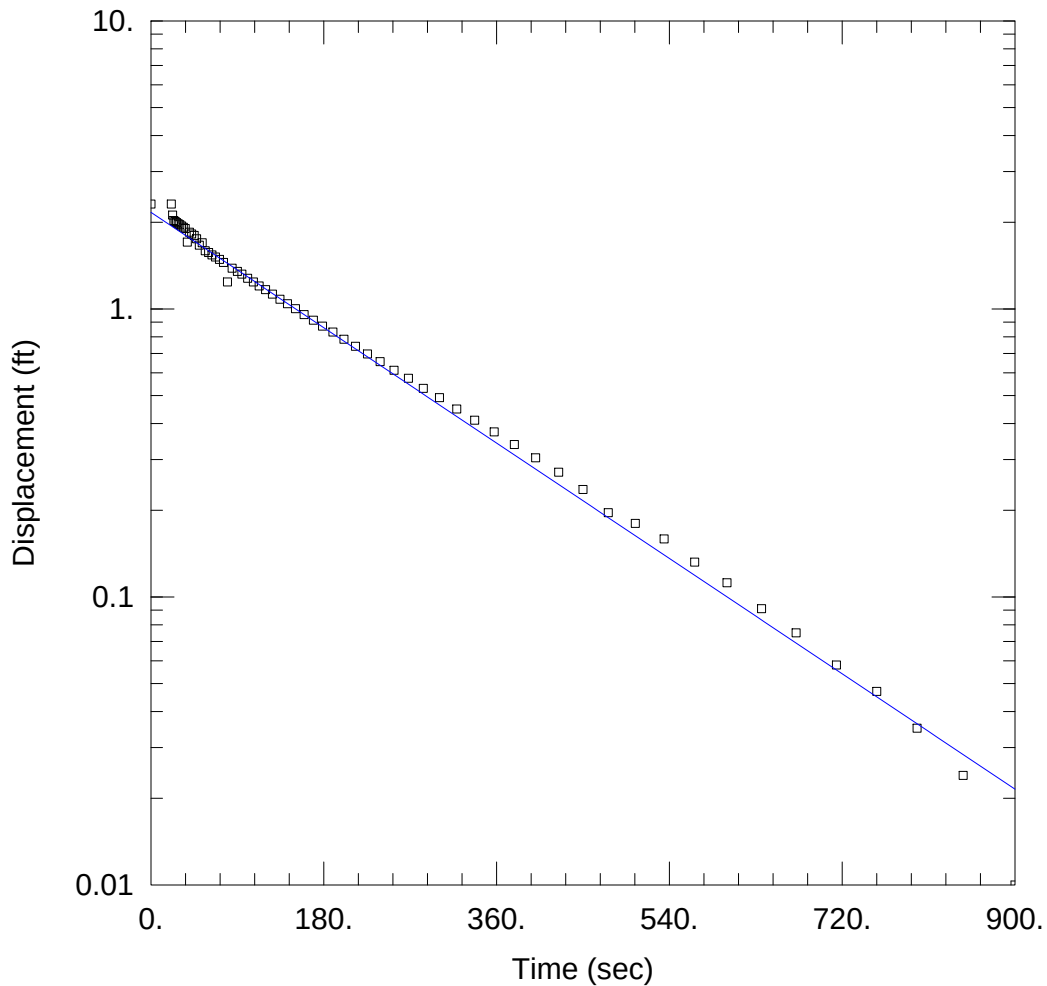
Slug Test
 Aquifer Model: Unconfined
 Solution Method: Bouwer-Rice
 $\ln(R_e/r_w)$: 3.595

VISUAL ESTIMATION RESULTSEstimated Parameters

<u>Parameter</u>	<u>Estimate</u>	
K	0.3604	ft/day
y ₀	2.277	ft

$K = 0.0001271$ cm/sec

$T = K \cdot b = 9.01$ ft²/day (0.09688 sq. cm/sec)



PZ-38S FALLING

Data Set: G:\...\PZ-38S Falling.aqt

Date: 09/19/16

Time: 15:16:17

PROJECT INFORMATION

Company: Golder Associates

Client: Southern Company Services

Project: 1660939

Location: Plant Branch

Test Well: PZ-38S Rising

Test Date: 08/16/16

AQUIFER DATA

Saturated Thickness: 25. ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (PZ-38S Falling)

Initial Displacement: 2.314 ft

Static Water Column Height: 17.33 ft

Total Well Penetration Depth: 17.83 ft

Screen Length: 10. ft

Casing Radius: 0.08333 ft

Well Radius: 0.08333 ft

Gravel Pack Porosity: 0.15

SOLUTION

Aquifer Model: Unconfined

Solution Method: Bouwer-Rice

K = 0.4796 ft/day

y0 = 2.164 ft

Data Set: G:\Projects\Southern Company Services\Confidential Plant Branch Drilling\Slug Test Data\August 2016\Q
 Title: PZ-38S Falling
 Date: 09/19/16
 Time: 15:16:31

PROJECT INFORMATION

Company: Golder Associates
 Client: Southern Company Services
 Project: 1660939
 Location: Plant Branch
 Test Date: 08/16/16
 Test Well: PZ-38S Rising

AQUIFER DATA

Saturated Thickness: 25. ft
 Anisotropy Ratio (Kz/Kr): 1.

SLUG TEST WELL DATA

Test Well: PZ-38S Falling

X Location: 0. ft
 Y Location: 0. ft

Initial Displacement: 2.314 ft
 Static Water Column Height: 17.33 ft
 Casing Radius: 0.08333 ft
 Well Radius: 0.08333 ft
 Well Skin Radius: 0.25 ft
 Screen Length: 10. ft
 Total Well Penetration Depth: 17.83 ft
 Corrected Casing Radius (Bouwer-Rice Method): 0.07725 ft
 Gravel Pack Porosity: 0.15

No. of Observations: 66

Observation Data			
<u>Time (sec)</u>	<u>Displacement (ft)</u>	<u>Time (sec)</u>	<u>Displacement (ft)</u>
21.3	2.314	142.2	1.043
22.56	2.118	150.6	1.002
23.88	2.027	159.6	0.956
25.32	2.012	169.2	0.914
26.82	1.995	178.8	0.871
28.38	1.977	189.6	0.831
30.06	1.961	201.	0.785
31.86	1.94	213.	0.742
33.72	1.921	225.6	0.698
35.76	1.902	238.8	0.656
37.86	1.706	253.2	0.612
40.08	1.846	268.2	0.574
42.48	1.821	283.8	0.53
45.	1.8	300.6	0.492
47.64	1.753	318.6	0.449
50.46	1.665	337.2	0.411
53.46	1.697	357.6	0.374
56.64	1.593	378.6	0.338
60.	1.57	400.8	0.304
63.6	1.54	424.8	0.271
67.2	1.515	450.	0.236
71.4	1.486	476.4	0.196
75.6	1.45	504.6	0.18
79.8	1.24	534.6	0.159
84.6	1.384	566.4	0.132
90.	1.35	600.	0.112
94.8	1.32	636.	0.091

<u>Time (sec)</u>	<u>Displacement (ft)</u>	<u>Time (sec)</u>	<u>Displacement (ft)</u>
100.8	1.278	672.	0.075
106.8	1.24	714.	0.058
112.8	1.201	756.	0.047
119.4	1.166	798.	0.035
126.6	1.126	846.	0.024
134.4	1.081	900.	0.01

SOLUTION

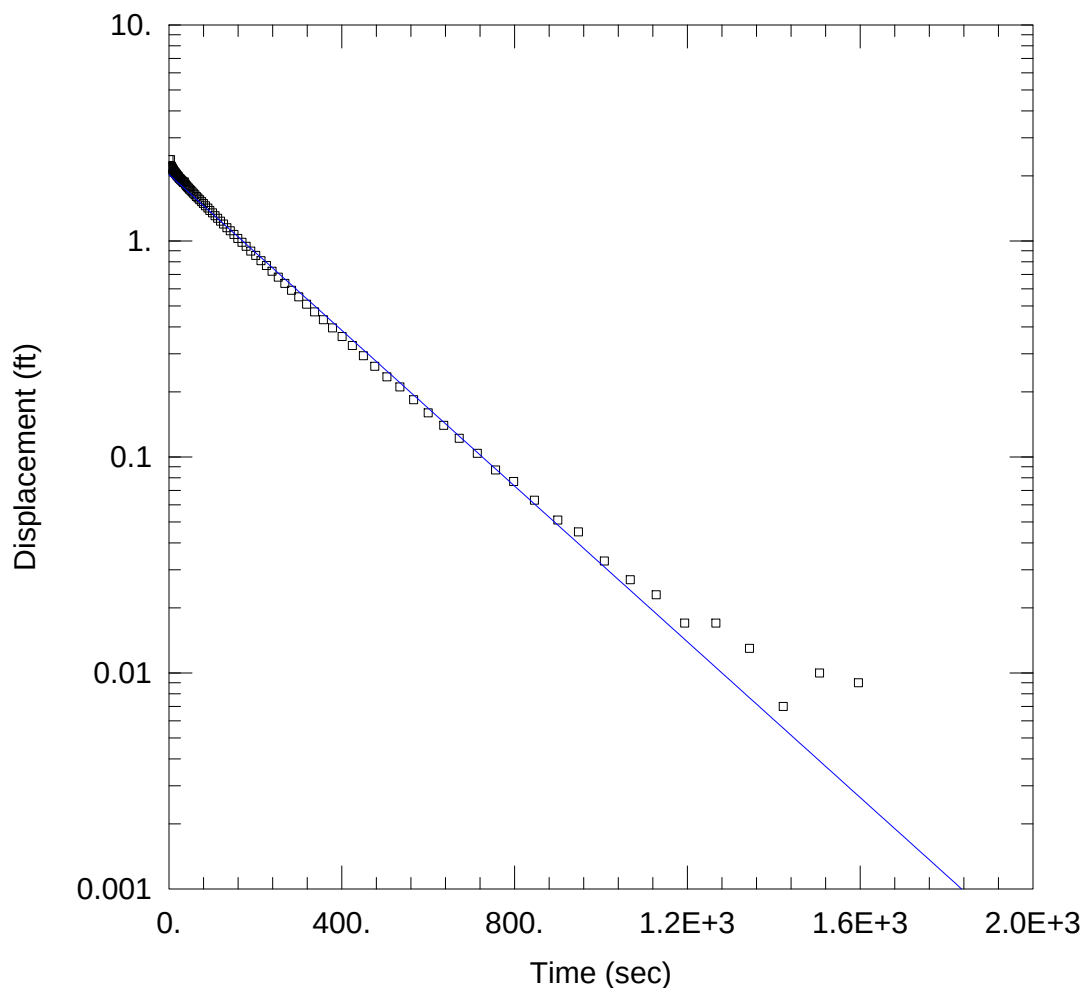
Slug Test
 Aquifer Model: Unconfined
 Solution Method: Bouwer-Rice
 $\ln(R_e/r_w)$: 3.631

VISUAL ESTIMATION RESULTSEstimated Parameters

<u>Parameter</u>	<u>Estimate</u>	
K	0.4796	ft/day
y ₀	2.164	ft

$K = 0.0001692$ cm/sec

$T = K \cdot b = 11.99$ ft²/day (0.1289 sq. cm/sec)



PZ-38S RISING

Data Set: G:\...\PZ-38S Rising.aqt

Date: 09/19/16

Time: 15:18:10

PROJECT INFORMATION

Company: Golder Associates

Client: Southern Company Services

Project: 1660939

Location: Plant Branch

Test Well: PZ-38S Rising

Test Date: 08/16/16

AQUIFER DATA

Saturated Thickness: 25. ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (PZ-38S Rising)

Initial Displacement: 2.381 ft

Static Water Column Height: 17.35 ft

Total Well Penetration Depth: 17.85 ft

Screen Length: 10. ft

Casing Radius: 0.08333 ft

Well Radius: 0.08333 ft

Gravel Pack Porosity: 0.15

SOLUTION

Aquifer Model: Unconfined

Solution Method: Bouwer-Rice

K = 0.3885 ft/day

y0 = 2.028 ft

Data Set: G:\Projects\Southern Company Services\Confidential Plant Branch Drilling\Slug Test Data\August 2016\Q
 Title: PZ-38S Rising
 Date: 09/19/16
 Time: 15:18:25

PROJECT INFORMATION

Company: Golder Associates
 Client: Southern Company Services
 Project: 1660939
 Location: Plant Branch
 Test Date: 08/16/16
 Test Well: PZ-38S Rising

AQUIFER DATA

Saturated Thickness: 25. ft
 Anisotropy Ratio (Kz/Kr): 1.

SLUG TEST WELL DATA

Test Well: PZ-38S Rising

X Location: 0. ft
 Y Location: 0. ft

Initial Displacement: 2.381 ft
 Static Water Column Height: 17.35 ft
 Casing Radius: 0.08333 ft
 Well Radius: 0.08333 ft
 Well Skin Radius: 0.25 ft
 Screen Length: 10. ft
 Total Well Penetration Depth: 17.85 ft
 Corrected Casing Radius (Bouwer-Rice Method): 0.07725 ft
 Gravel Pack Porosity: 0.15

No. of Observations: 108

Observation Data			
<u>Time (sec)</u>	<u>Displacement (ft)</u>	<u>Time (sec)</u>	<u>Displacement (ft)</u>
3.501	2.381	75.6	1.52
3.751	2.22	79.8	1.489
4.001	2.234	84.6	1.455
4.251	2.227	90.	1.42
4.501	2.209	94.8	1.384
4.751	2.211	100.8	1.348
5.001	2.206	106.8	1.309
5.251	2.199	112.8	1.273
5.501	2.196	119.4	1.235
5.751	2.195	126.6	1.197
6.001	2.18	134.4	1.152
6.361	2.186	142.2	1.115
6.721	2.178	150.6	1.072
7.141	2.171	159.6	1.027
7.561	2.161	169.2	0.986
7.981	2.156	178.8	0.944
8.461	2.15	189.6	0.897
9.001	2.14	201.	0.857
9.481	2.133	213.	0.81
10.08	2.123	225.6	0.769
10.68	2.111	238.8	0.724
11.28	2.1	253.2	0.679
11.94	2.095	268.2	0.636
12.66	2.087	283.8	0.591
13.44	2.076	300.6	0.551
14.22	2.069	318.6	0.509
15.06	2.057	337.2	0.469

<u>Time (sec)</u>	<u>Displacement (ft)</u>	<u>Time (sec)</u>	<u>Displacement (ft)</u>
15.96	2.047	357.6	0.432
16.92	2.034	378.6	0.396
17.88	2.024	400.8	0.361
18.96	1.999	424.8	0.328
20.1	1.999	450.	0.294
21.3	1.99	476.4	0.263
22.56	1.972	504.6	0.235
23.88	1.95	534.6	0.211
25.32	1.944	566.4	0.184
26.82	1.93	600.	0.16
28.38	1.914	636.	0.14
30.06	1.899	672.	0.122
31.86	1.882	714.	0.104
33.72	1.863	756.	0.087
35.76	1.875	798.	0.077
37.86	1.83	846.	0.063
40.08	1.805	900.	0.051
42.48	1.782	948.	0.045
45.	1.76	1008.	0.033
47.64	1.736	1068.	0.027
50.46	1.715	1128.	0.023
53.46	1.69	1194.	0.017
56.64	1.663	1266.	0.017
60.	1.637	1344.	0.013
63.6	1.606	1422.	0.007
67.2	1.581	1506.	0.01
71.4	1.551	1596.	0.009

SOLUTION

Slug Test
 Aquifer Model: Unconfined
 Solution Method: Bouwer-Rice
 $\ln(R_e/r_w)$: 3.632

VISUAL ESTIMATION RESULTSEstimated Parameters

<u>Parameter</u>	<u>Estimate</u>	
K	0.3885	ft/day
y ₀	2.028	ft

$K = 0.0001371$ cm/sec

$T = K \cdot b = 9.713$ ft²/day (0.1044 sq. cm/sec)