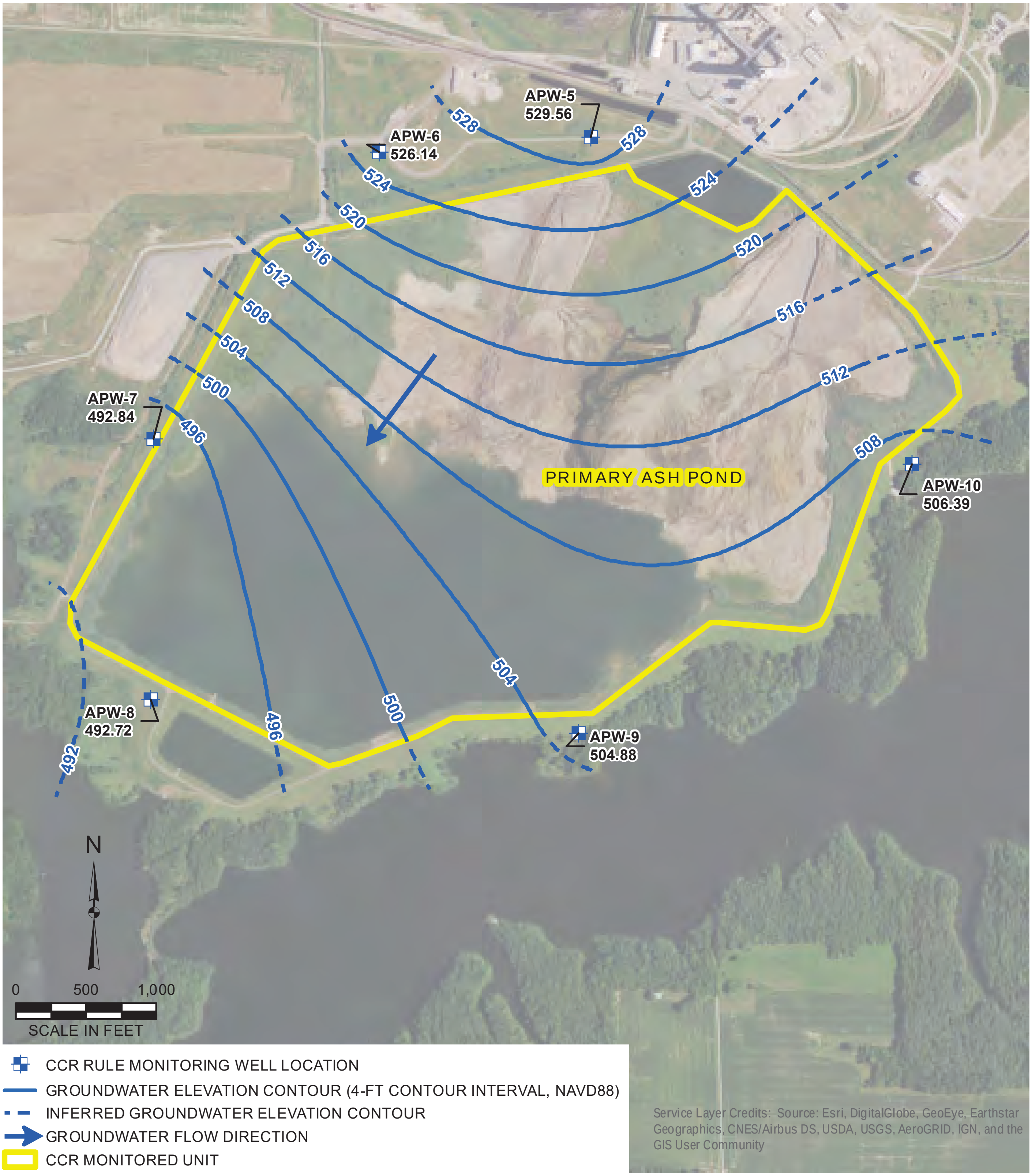

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SDS 1/23/17
REVIEWED BY/DATE:
TBN 1/25/17
APPROVED BY/DATE:
JJW 2/7/17

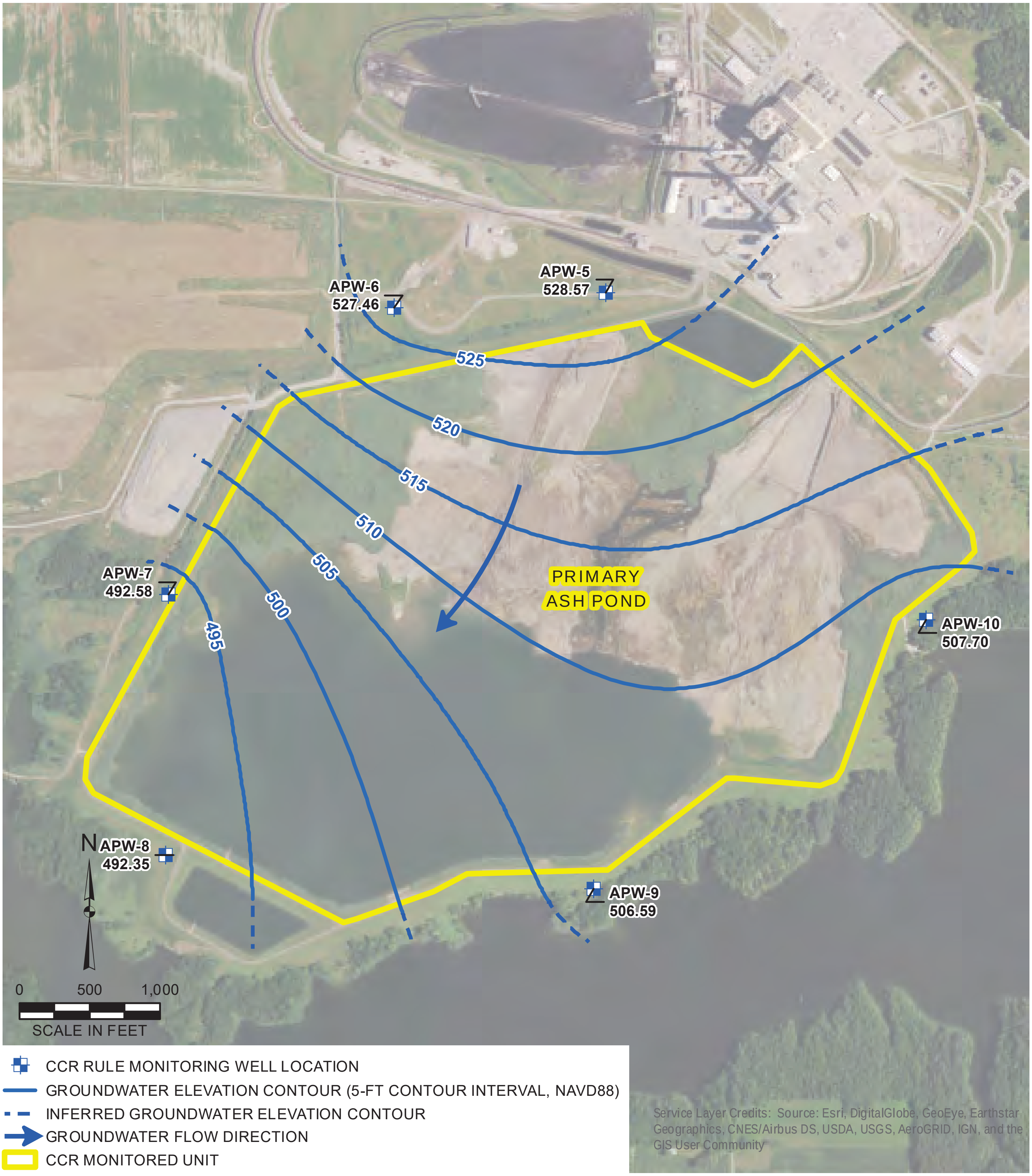
NEWTON PRIMARY ASH POND (UNIT ID: 501)
UPPERMOST AQUIFER UNIT
GROUNDWATER ELEVATION CONTOUR MAP
ROUND 1: DECEMBER 14, 2015

DYNEGY CCR RULE GROUNDWATER MONITORING
NEWTON POWER STATION
NEWTON, ILLINOIS

PROJECT NO: 2285

FIGURE NO: 1

Natural Resource Technology
AN OBG COMPANY



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SDS 1/23/17
REVIEWED BY/DATE:
TBN 1/25/17
APPROVED BY/DATE:
JJW 2/8/17

NEWTON PRIMARY ASH POND (UNIT ID: 501)
UPPERMOST AQUIFER UNIT
GROUNDWATER ELEVATION CONTOUR MAP
ROUND 2: JANUARY 18, 2016

DYNEGY CCR RULE GROUNDWATER MONITORING
NEWTON POWER STATION
NEWTON, ILLINOIS

PROJECT NO: 2285

FIGURE NO: 1

Natural Resource Technology
AN OBG COMPANY

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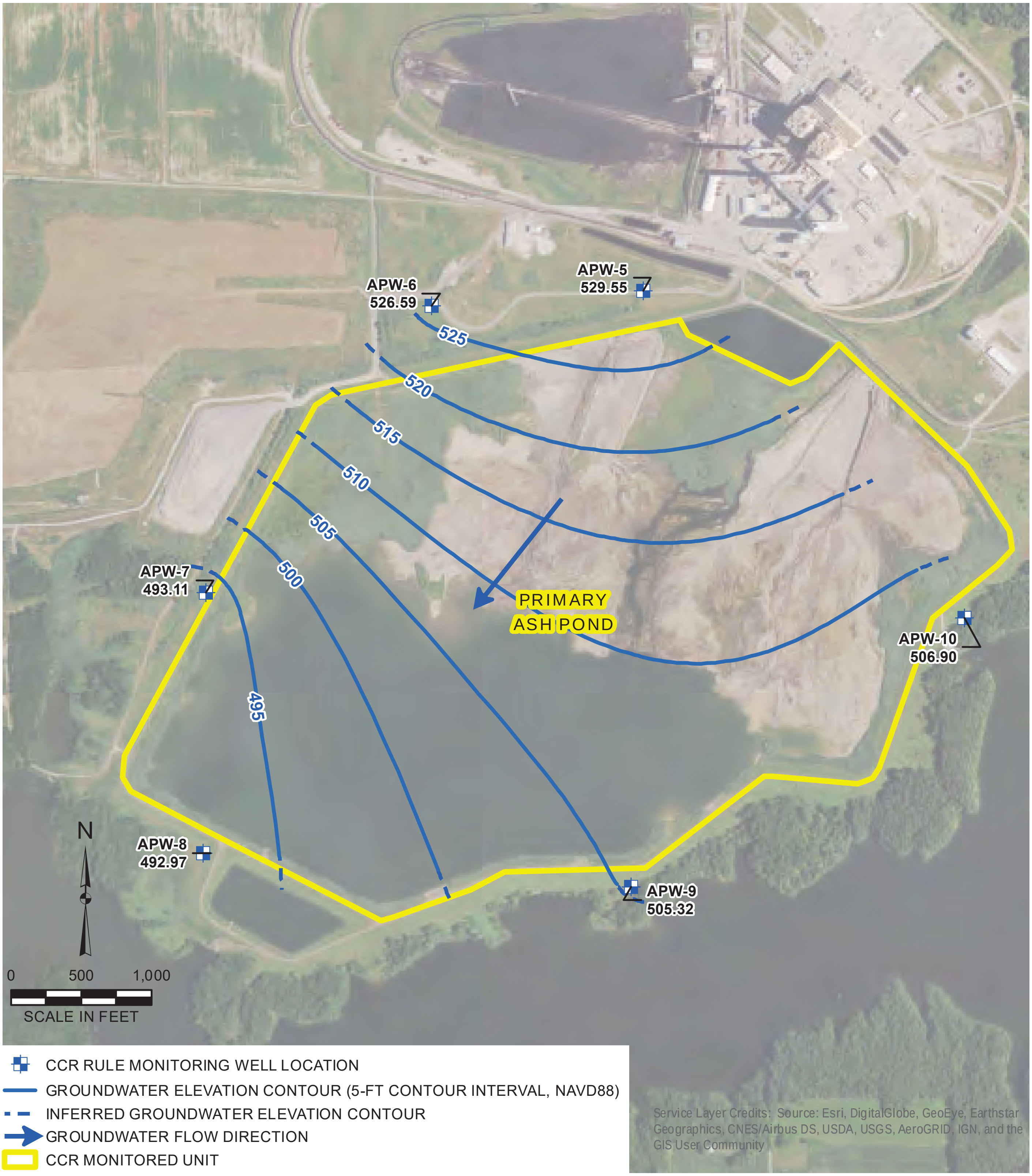

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REVIEWED BY/DATE:
TBN 1/25/17
APPROVED BY/DATE:
JJW 2/8/17

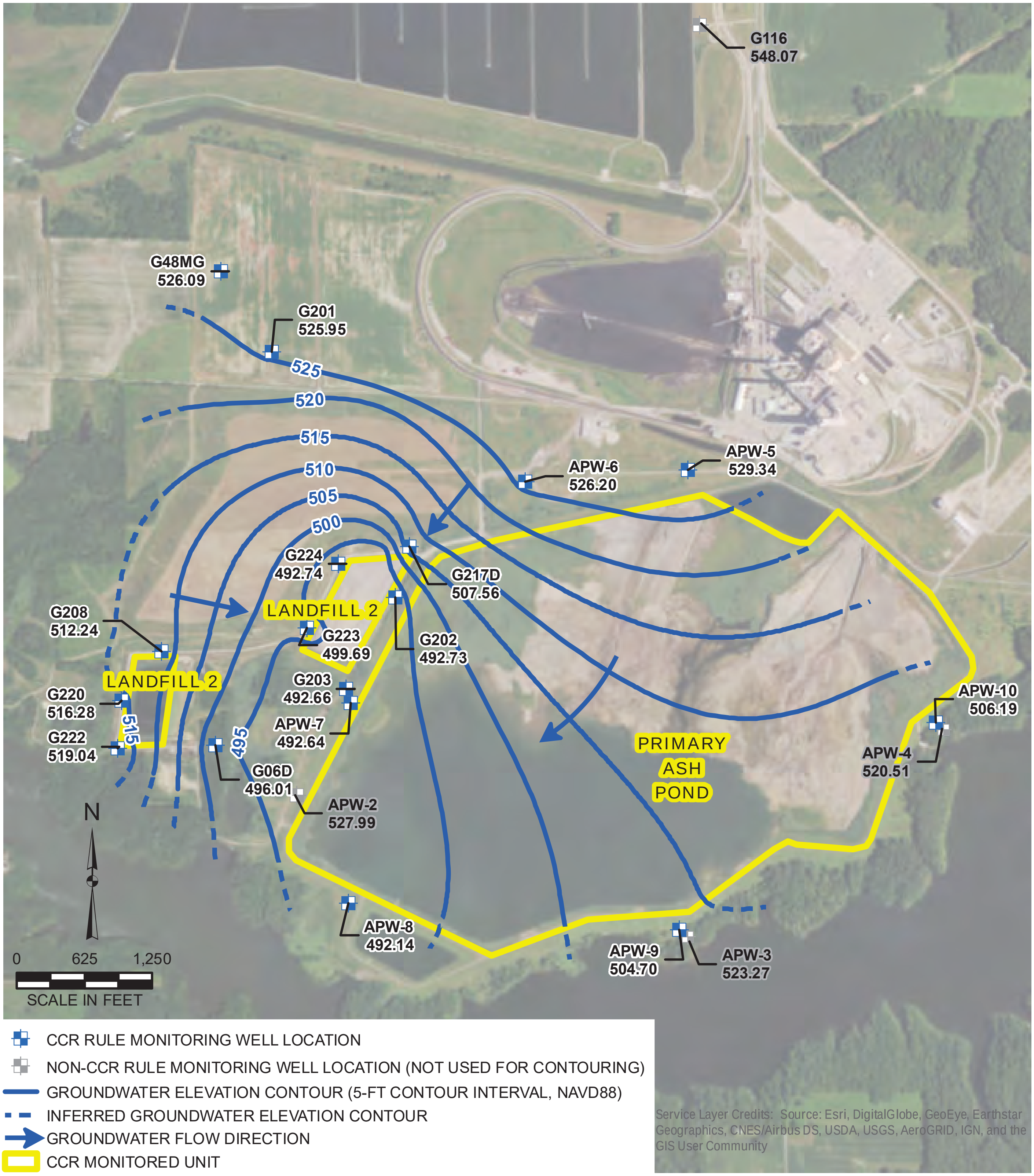
NEWTON PRIMARY ASH POND (UNIT ID: 501)
UPPERMOST AQUIFER UNIT
GROUNDWATER ELEVATION CONTOUR MAP
ROUND 3: APRIL 25, 2016

DYNEGY CCR RULE GROUNDWATER MONITORING
NEWTON POWER STATION
NEWTON, ILLINOIS

PROJECT NO: 2285

FIGURE NO: 1

Natural Resource Technology
AN OBG COMPANY



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REVIEWED BY/DATE:
TBN 1/25/17
APPROVED BY/DATE:
JJW 2/8/17

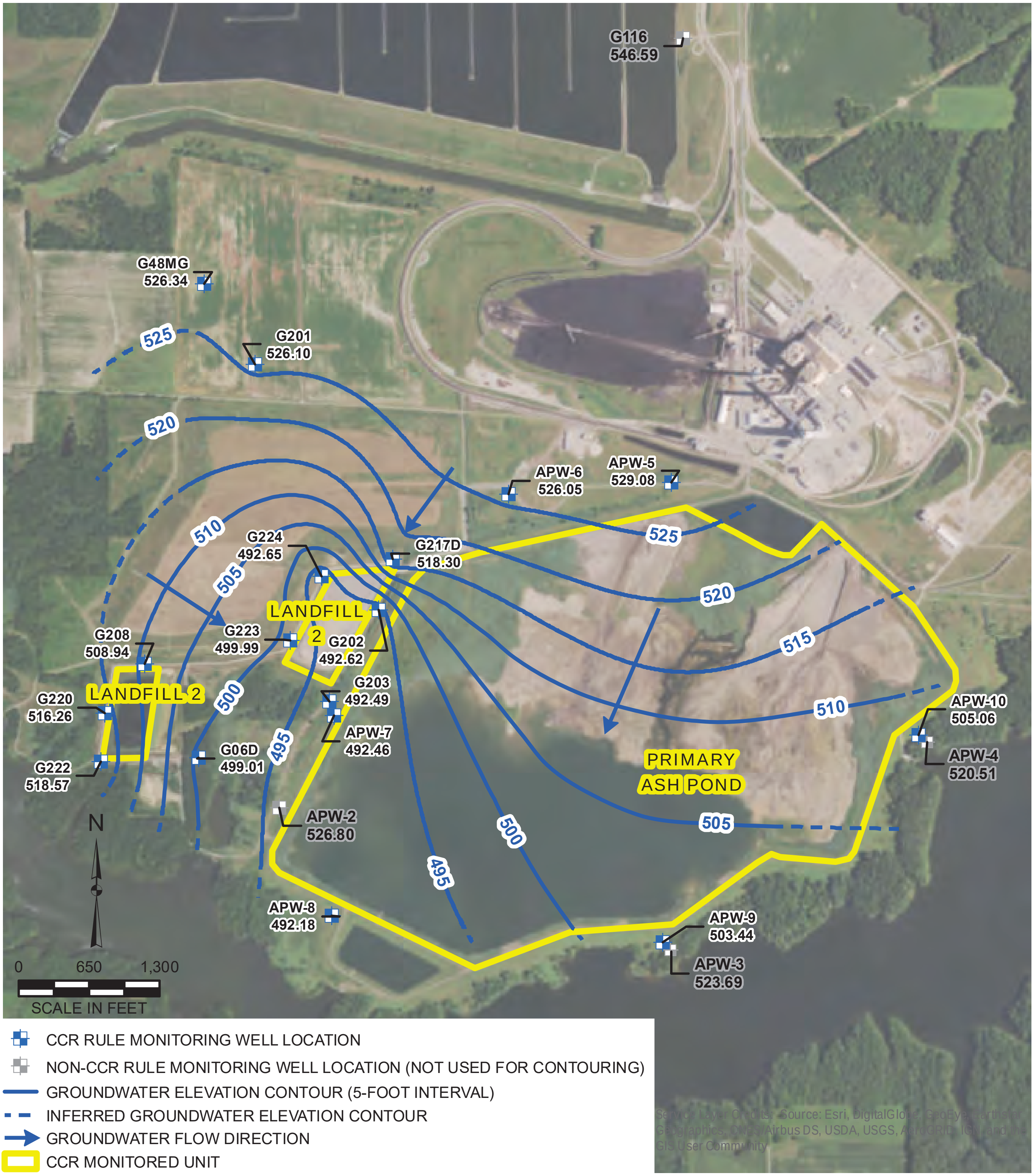
NEWTON PRIMARY ASH POND (UNIT ID: 501) AND NEWTON LANDFILL 2 (UNIT ID: 502)
UPPERMOST AQUIFER UNIT
GROUNDWATER ELEVATION CONTOUR MAP
ROUND 4: JULY 25, 2016

DYNEGY CCR RULE GROUNDWATER MONITORING
NEWTON POWER STATION
NEWTON, ILLINOIS

PROJECT NO: 2285

FIGURE NO: 1

Natural Resource Technology
AN OBG COMPANY



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REVIEWED BY/DATE:
TBN 3/6/17
APPROVED BY/DATE:
JJW 8/30/17

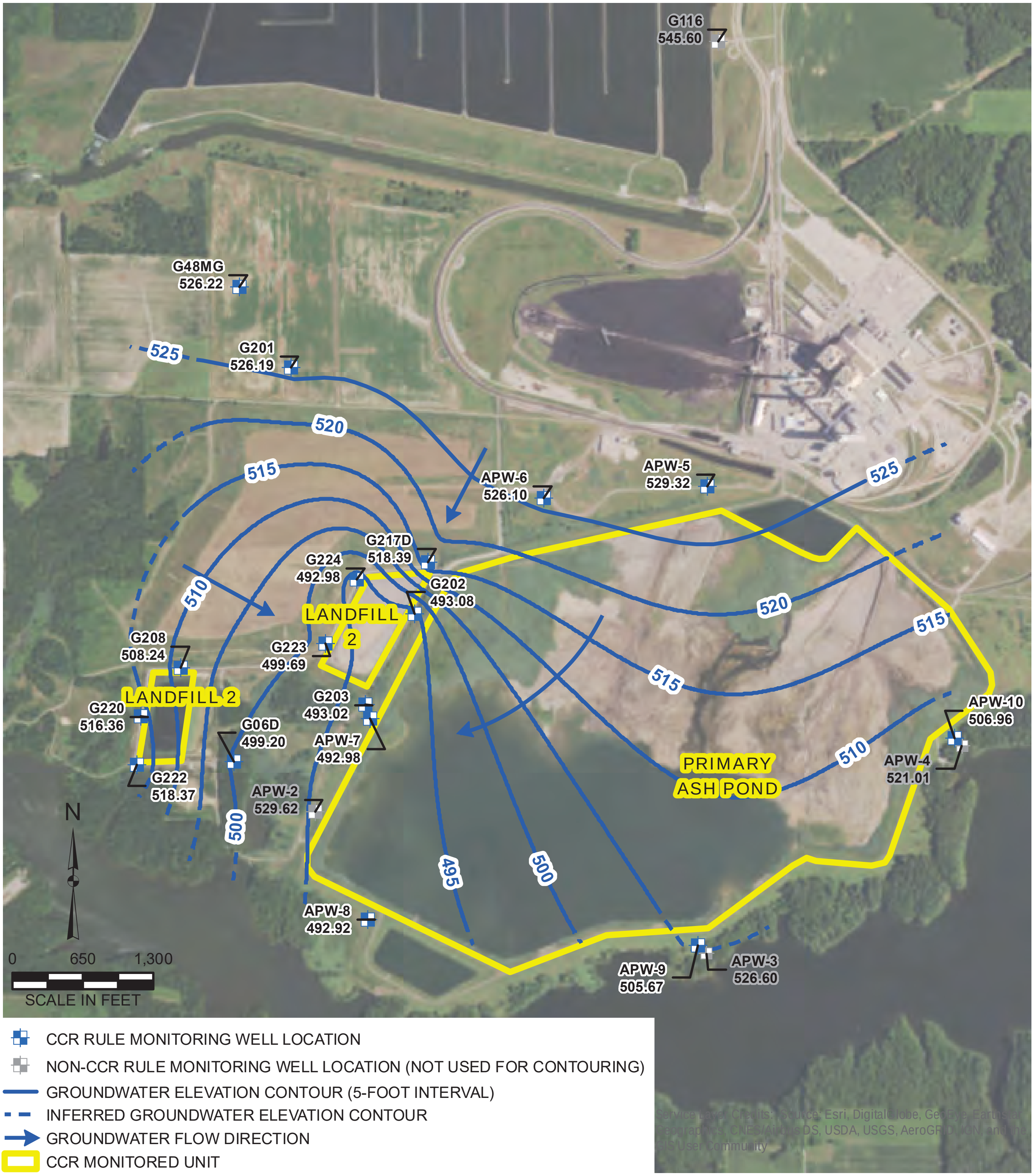
NEWTON PRIMARY ASH POND (UNIT ID: 501) AND LANDFILL 2 (UNIT ID: 502)
UPPERMOST AQUIFER UNIT
GROUNDWATER ELEVATION CONTOUR MAP
ROUND 5: OCTOBER 17, 2016

DYNEGY CCR RULE GROUNDWATER MONITORING
NEWTON POWER STATION
NEWTON, ILLINOIS

PROJECT NO: 2285

FIGURE NO: 1

Natural Resource Technology
AN OBG COMPANY



DRAWN BY/DATE:
SDS 3/6/17
REVIEWED BY/DATE:
TBN 3/6/17
APPROVED BY/DATE:
JJW 8/30/17

NEWTON PRIMARY ASH POND (UNIT ID: 501) AND LANDFILL 2 (UNIT ID: 502)
UPPERMOST AQUIFER UNIT
GROUNDWATER ELEVATION CONTOUR MAP
ROUND 6: JANUARY 16, 2017

DYNEGY CCR RULE GROUNDWATER MONITORING
NEWTON POWER STATION
NEWTON, ILLINOIS

PROJECT NO: 2285

FIGURE NO: 1

Natural Resource Technology
AN OBG COMPANY

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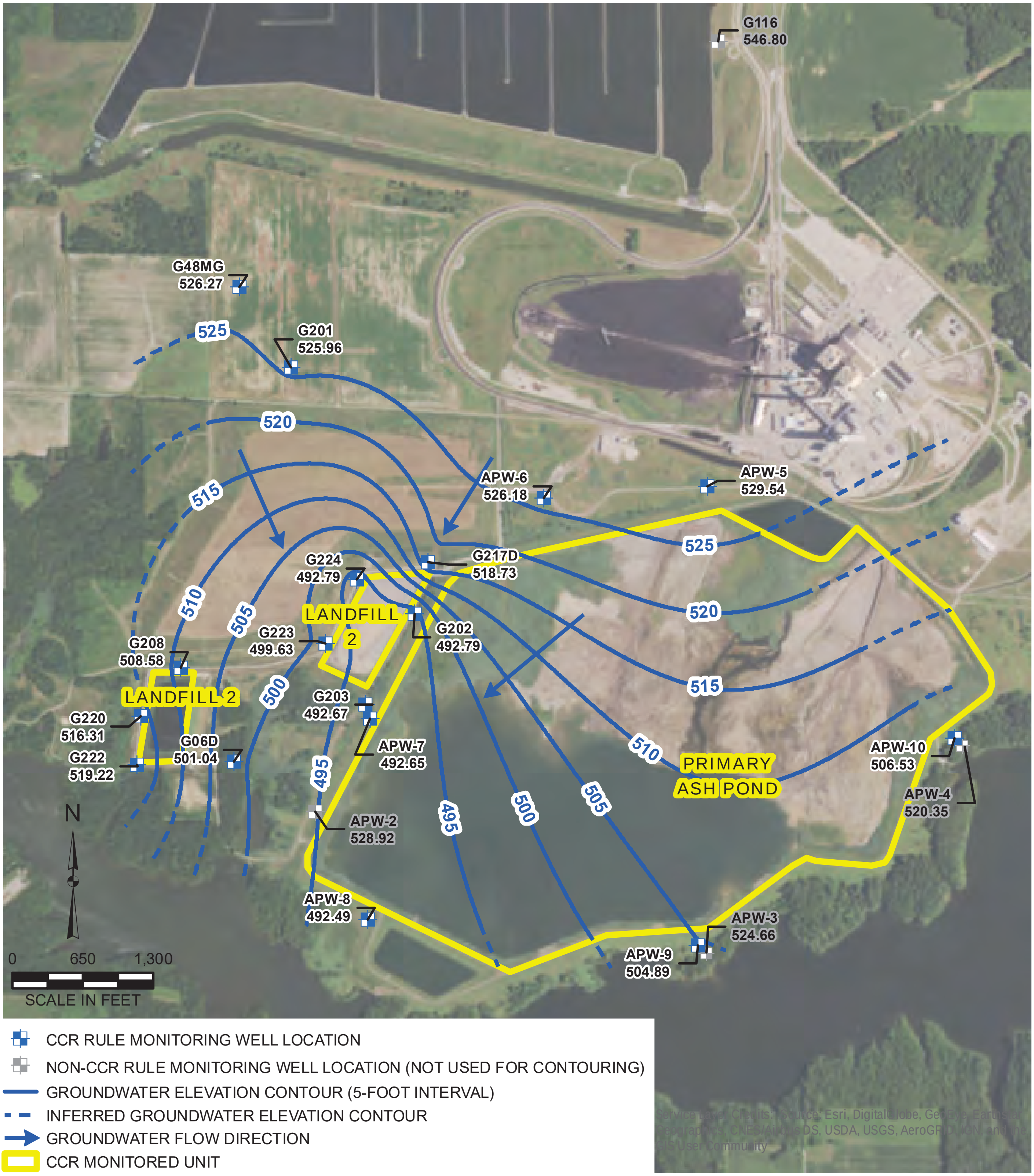

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SDS 7/10/17
REVIEWED BY/DATE:
TBN 7/10/17
APPROVED BY/DATE:
JJW 8/30/17

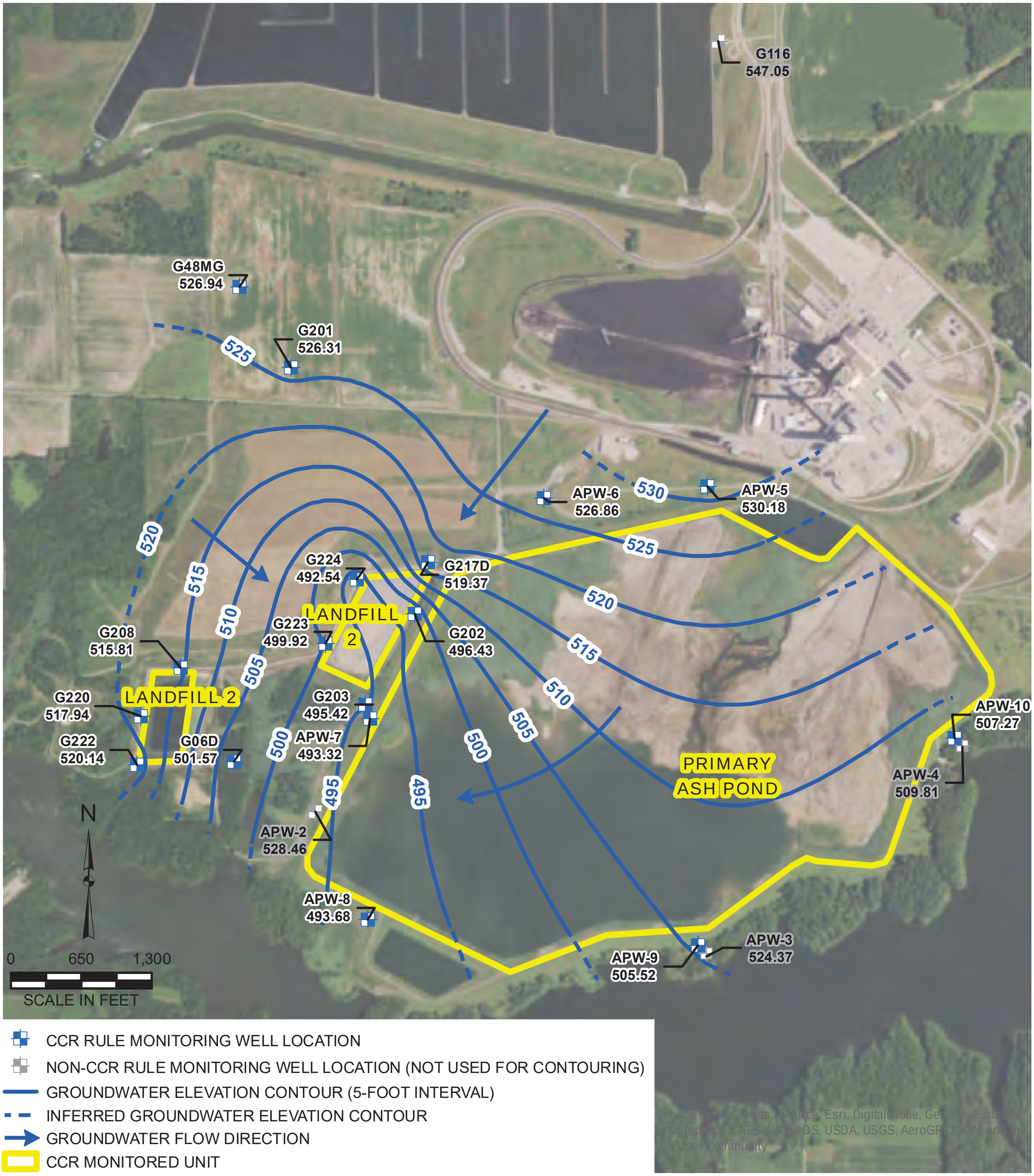
NEWTON PRIMARY ASH POND (UNIT ID: 501) AND LANDFILL 2 (UNIT ID: 502)
UPPERMOST AQUIFER UNIT
GROUNDWATER ELEVATION CONTOUR MAP
ROUND 7: APRIL 17, 2017

DYNEGY CCR RULE GROUNDWATER MONITORING
NEWTON POWER STATION
NEWTON, ILLINOIS

PROJECT NO: 2285

FIGURE NO: 1

Natural Resource Technology
AN OBG COMPANY



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DRAWN BY/DATE: SDS 8/12/17 REVIEWED BY/DATE: TBN 8/12/17 APPROVED BY/DATE: JJW 8/30/17	**NEWTON PRIMARY ASH POND (UNIT ID: 501) AND LANDFILL 2 (UNIT ID: 502)** **UPPERMOST AQUIFER UNIT** **GROUNDWATER ELEVATION CONTOUR MAP** **ROUND 8: JUNE 12, 2017** DYNEGY CCR RULE GROUNDWATER MONITORING NEWTON POWER STATION NEWTON, ILLINOIS	PROJECT NO: 2285 FIGURE NO: 1 Natural Resource Technology AN OBG COMPANY

CCR RULE MONITORING WELL LOCATION

NON-CCR RULE MONITORING WELL LOCATION

GROUNDWATER ELEVATION CONTOUR (5-FOOT CONTOUR INTERVAL, NAVD88)

INFERRED GROUNDWATER ELEVATION CONTOUR

GROUNDWATER FLOW DIRECTION

CCR MONITORED UNIT

NEWTON PRIMARY ASH POND (UNIT ID: 501)
AND LANDFILL 2 (UNIT ID: 502)
GROUNDWATER ELEVATION CONTOUR MAP
NOVEMBER 14, 2017

CCR RULE GROUNDWATER MONITORING
NEWTON POWER STATION
NEWTON, ILLINOIS

0 325 650 1,300
Feet

N

O'BRIEN & GERE ENGINEERS, INC.

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CCR RULE MONITORING WELL LOCATION

NON-CCR RULE MONITORING WELL LOCATION

GROUNDWATER ELEVATION CONTOUR (5-FOOT CONTOUR INTERVAL, NAVD88)

INFERRED GROUNDWATER ELEVATION CONTOUR

GROUNDWATER FLOW

CCR MONITORED UNIT

NEWTON PRIMARY ASH POND (UNIT ID: 501)
AND LANDFILL 2 (UNIT ID: 502)
GROUNDWATER ELEVATION CONTOUR MAP
MAY 17, 2018

CCR RULE GROUNDWATER MONITORING
NEWTON POWER STATION
NEWTON, ILLINOIS

0 325 650 1,300
Feet

N

O'BRIEN & GERE ENGINEERS, INC.

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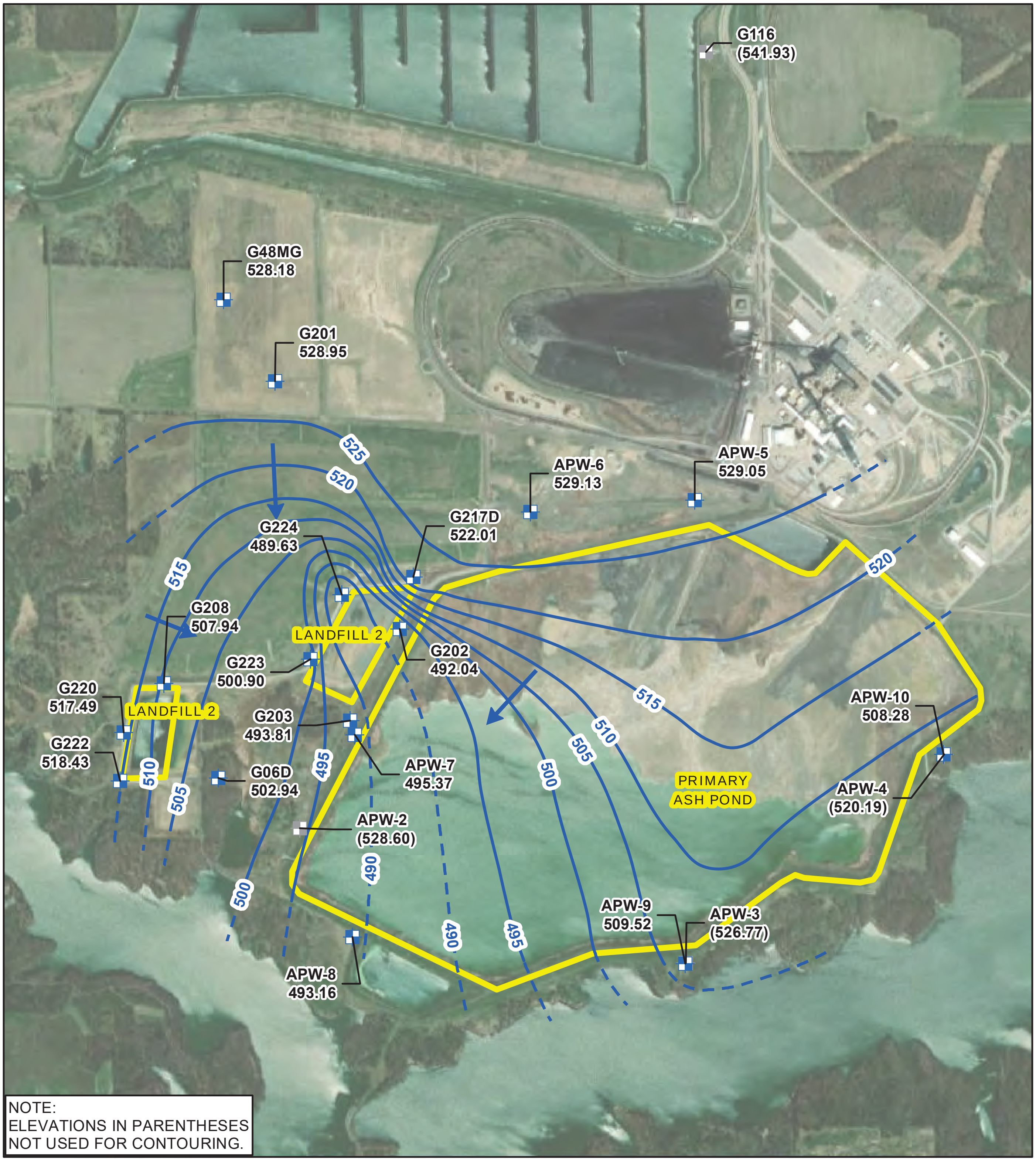

CCR RULE MONITORING WELL LOCATION

NON-CCR RULE MONITORING WELL LOCATION

GROUNDWATER ELEVATION CONTOUR (5-FOOT CONTOUR INTERVAL, NAVD88)

INFERRED GROUNDWATER ELEVATION CONTOUR

GROUNDWATER FLOW

CCR MONITORED UNIT

NEWTON PRIMARY ASH POND (UNIT ID: 501)
AND LANDFILL 2 (UNIT ID: 502)
GROUNDWATER ELEVATION CONTOUR MAP
AUGUST 14, 2018

CCR RULE GROUNDWATER MONITORING
NEWTON POWER STATION
NEWTON, ILLINOIS

0 325 650 1,300
Feet

N

O'BRIEN & GERE ENGINEERS, INC.

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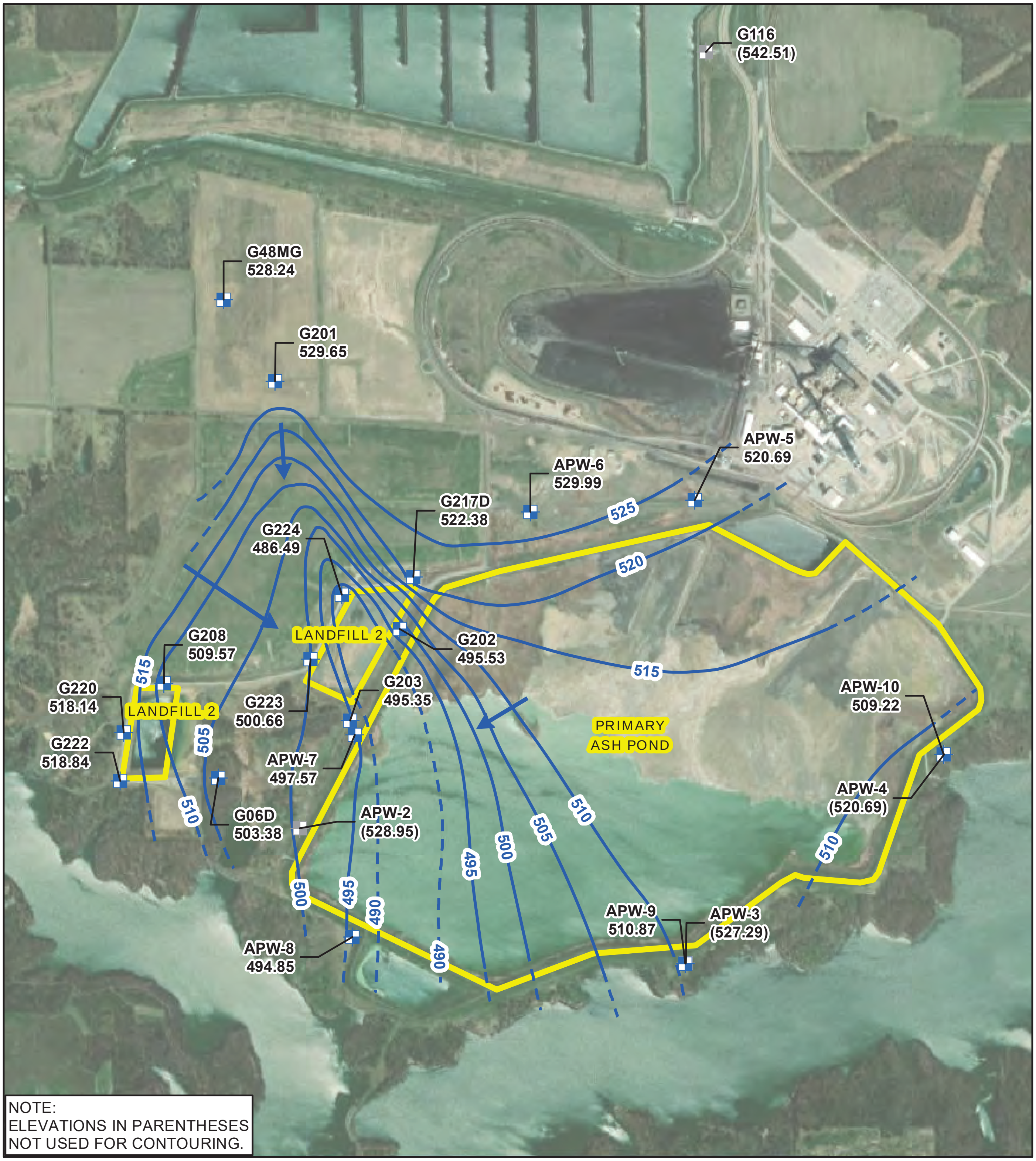

- CCR RULE MONITORING WELL LOCATION
- NON-CCR RULE MONITORING WELL LOCATION
- GROUNDWATER ELEVATION CONTOUR (5-FOOT CONTOUR INTERVAL, NAVD88)
- INFERRED GROUNDWATER ELEVATION CONTOUR
- GROUNDWATER FLOW DIRECTION
- CCR MONITORED UNIT

NEWTON PRIMARY ASH POND (UNIT ID: 501)
AND LANDFILL 2 (UNIT ID: 502)
GROUNDWATER ELEVATION CONTOUR MAP
NOVEMBER 8, 2018

CCR RULE GROUNDWATER MONITORING
NEWTON POWER STATION
NEWTON, ILLINOIS

0 325 650 1,300
Feet

N

O'BRIEN & GERE ENGINEERS, INC.

CCR RULE MONITORING WELL LOCATION

NON-CCR RULE MONITORING WELL LOCATION

GROUNDWATER ELEVATION CONTOUR (5-FOOT CONTOUR INTERVAL, NAVD88)

INFERRED GROUNDWATER ELEVATION CONTOUR

GROUNDWATER FLOW DIRECTION

CCR MONITORED UNIT

NEWTON PRIMARY ASH POND (UNIT ID: 501)
AND LANDFILL 2 (UNIT ID: 502)
GROUNDWATER ELEVATION CONTOUR MAP
FEBRUARY 18, 2019

CCR RULE GROUNDWATER MONITORING
NEWTON POWER STATION
NEWTON, ILLINOIS

0 325 650 1,300
Feet

N

O'BRIEN & GERE ENGINEERS, INC.

Y:\Mapping\Projects\22\2285\MXD\GW_Contours\Round_2019_1Q\R2019_1Q_Newton_GW_Contours.mxd

NOTE:
ELEVATIONS IN PARENTHESES
NOT USED FOR CONTOURING.

- CCR RULE MONITORING WELL LOCATION
- NON-CCR RULE MONITORING WELL LOCATION
- GROUNDWATER ELEVATION CONTOUR (5-FOOT CONTOUR INTERVAL, NAVD88)
- INFERRED GROUNDWATER ELEVATION CONTOUR
- GROUNDWATER FLOW DIRECTION
- CCR MONITORED UNIT

NEWTON PRIMARY ASH POND (UNIT ID: 501)
AND LANDFILL 2 (UNIT ID: 502)
GROUNDWATER ELEVATION CONTOUR MAP
AUGUST 21, 2019

CCR RULE GROUNDWATER MONITORING
NEWTON POWER STATION
NEWTON, ILLINOIS

0 325 650 1,300
Feet

N

O'BRIEN & GERE ENGINEERS, INC.

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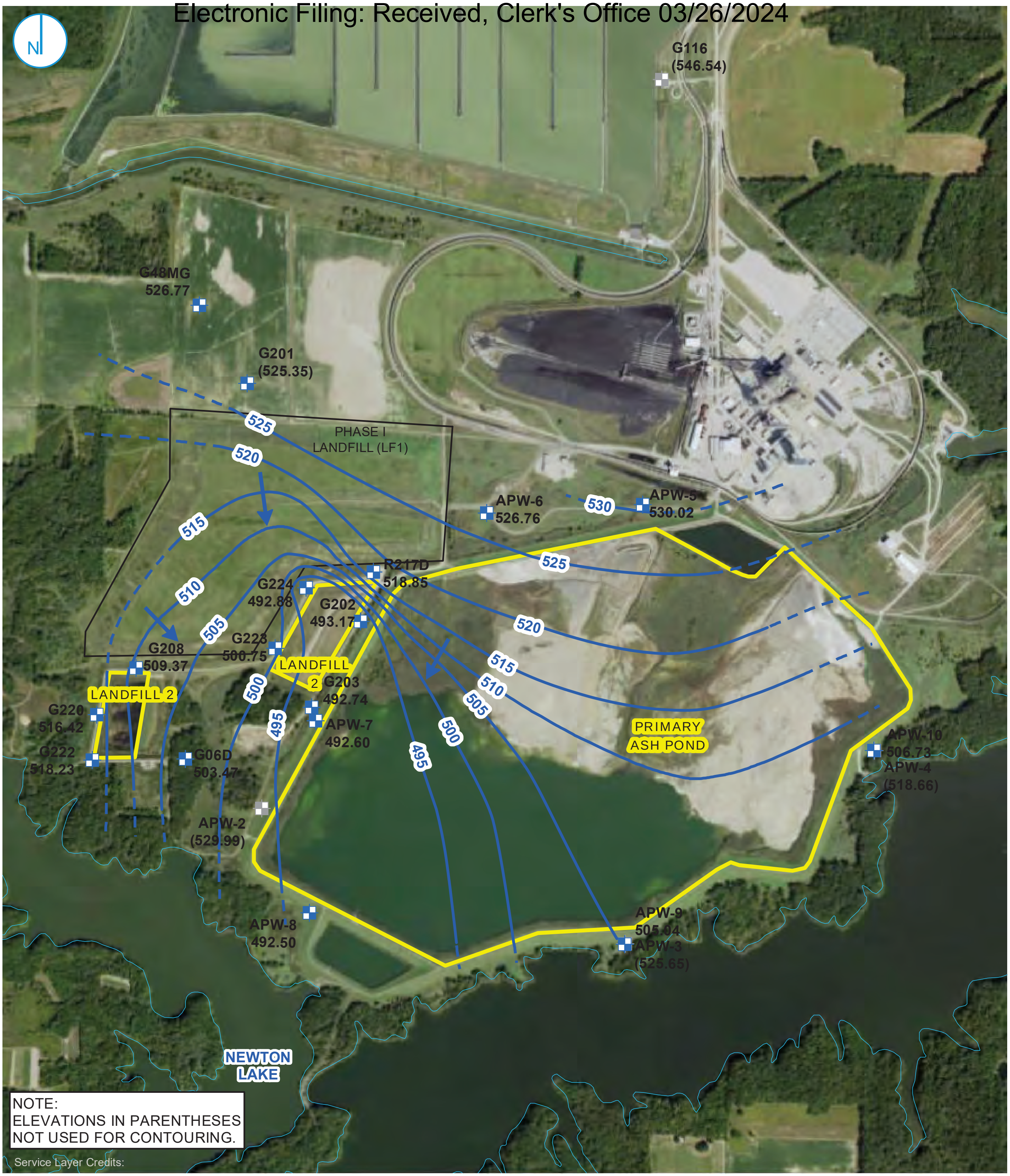
Electronic Filing: Received, Clerk's Office 03/26/2024



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PROJECT: 169000XXXX | DATED: 8/14/2020 | DESIGNER: STOLZSD

CCR RULE MONITORING WELL
NON-CCR RULE MONITORING WELL
GROUNDWATER ELEVATION CONTOUR (5-FT CONTOUR INTERVAL, NAVD88)
INFERRED GROUNDWATER ELEVATION CONTOUR
GROUNDWATER FLOW DIRECTION
SURFACE WATER FEATURE
CCR MONITORED UNIT
NON-CCR UNIT

0 650 1,300 Feet

GROUNDWATER ELEVATION CONTOUR MAP
FEBRUARY 3, 2020

NEWTON PRIMARY ASH POND (UNIT ID: 501) AND LANDFILL 2 (UNIT ID: 502)
NEWTON POWER STATION
NEWTON, ILLINOIS

RAMBOLL US CORPORATION
A RAMBOLL COMPANY

TABLE E-1. GROUNDWATER ELEVATION RESULTS

TABLE E-1. GROUNDWATER ELEVATIONS
HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
NEWTON POWER PLANT
PRIMARY ASH POND
NEWTON, ILLINOIS

Sample Location	Sample Date	Groundwater Elevation (ft NAVD88)
APW02	10/07/2015	524.93
APW02	12/14/2015	528.13
APW02	07/25/2016	527.99
APW02	10/17/2016	526.80
APW02	01/16/2017	529.62
APW02	04/17/2017	528.92
APW02	06/12/2017	528.46
APW02	11/14/2017	528.98
APW02	05/17/2018	529.03
APW02	08/14/2018	528.60
APW02	11/08/2018	528.95
APW02	02/18/2019	528.99
APW02	08/21/2019	528.23
APW02	02/03/2020	529.99
APW02	07/27/2020	529.01
APW02	10/22/2020	528.20
APW02	02/04/2021	530.41
APW02	02/15/2021	529.17
APW02	02/17/2021	529.17
APW02	03/09/2021	529.13
APW02	03/10/2021	529.13
APW02	03/29/2021	529.99
APW02	03/30/2021	529.99
APW02	04/27/2021	528.63
APW02	04/29/2021	529.37
APW02	05/24/2021	528.50
APW02	05/25/2021	528.49
APW02	06/15/2021	528.15
APW02	06/16/2021	528.15
APW02	06/24/2021	527.93
APW02	06/30/2021	526.56
APW02	07/14/2021	528.58
APW02	07/15/2021	528.53
APW02	08/02/2021	528.44
APW03	10/07/2015	520.82
APW03	12/14/2015	525.99
APW03	10/17/2016	523.69
APW03	01/16/2017	526.60
APW03	04/17/2017	524.66
APW03	06/12/2017	524.37
APW03	07/25/2017	523.27
APW03	11/14/2017	526.05
APW03	05/17/2018	526.06
APW03	08/14/2018	526.77
APW03	11/08/2018	527.29

TABLE E-1. GROUNDWATER ELEVATIONS
HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
NEWTON POWER PLANT
PRIMARY ASH POND
NEWTON, ILLINOIS

Sample Location	Sample Date	Groundwater Elevation (ft NAVD88)
APW03	02/18/2019	528.24
APW03	08/21/2019	523.09
APW03	02/03/2020	525.65
APW03	07/27/2020	525.19
APW03	10/22/2020	523.49
APW03	02/04/2021	526.54
APW03	02/15/2021	523.58
APW03	02/18/2021	523.58
APW03	03/09/2021	524.93
APW03	03/10/2021	524.93
APW03	03/29/2021	526.00
APW03	03/31/2021	526.00
APW03	04/27/2021	524.25
APW03	04/29/2021	524.93
APW03	05/25/2021	523.85
APW03	06/15/2021	523.41
APW03	06/17/2021	523.41
APW03	06/24/2021	523.18
APW03	06/30/2021	523.07
APW03	07/14/2021	523.70
APW03	07/15/2021	523.71
APW03	08/02/2021	523.92
APW04	10/07/2015	518.82
APW04	12/14/2015	521.12
APW04	10/17/2016	520.51
APW04	01/16/2017	521.01
APW04	04/17/2017	520.35
APW04	06/12/2017	509.81
APW04	07/25/2017	520.51
APW04	11/14/2017	520.31
APW04	05/17/2018	520.07
APW04	08/14/2018	520.19
APW04	11/08/2018	520.69
APW04	02/18/2019	520.29
APW04	08/21/2019	520.43
APW04	02/03/2020	518.66
APW04	07/27/2020	520.41
APW04	10/22/2020	520.08
APW04	02/04/2021	520.64
APW04	02/15/2021	518.19
APW04	02/18/2021	518.19
APW04	03/09/2021	519.50
APW04	03/11/2021	519.50
APW04	03/29/2021	520.34
APW04	03/31/2021	520.34

TABLE E-1. GROUNDWATER ELEVATIONS
HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
NEWTON POWER PLANT
PRIMARY ASH POND
NEWTON, ILLINOIS

Sample Location	Sample Date	Groundwater Elevation (ft NAVD88)
APW04	04/27/2021	519.87
APW04	04/29/2021	520.51
APW04	05/24/2021	519.72
APW04	05/25/2021	519.73
APW04	06/15/2021	519.68
APW04	06/17/2021	519.71
APW04	06/24/2021	519.64
APW04	06/30/2021	519.69
APW04	07/14/2021	519.99
APW04	07/15/2021	520.02
APW04	08/02/2021	520.00
APW05	12/14/2015	529.56
APW05	01/18/2016	528.57
APW05	04/25/2016	529.55
APW05	07/25/2016	529.34
APW05	10/17/2016	529.08
APW05	01/16/2017	529.32
APW05	04/17/2017	529.54
APW05	06/12/2017	530.18
APW05	11/14/2017	528.57
APW05	05/17/2018	529.06
APW05	08/14/2018	529.05
APW05	11/08/2018	530.19
APW05	02/18/2019	529.07
APW05	08/21/2019	528.03
APW05	02/03/2020	530.02
APW05	06/11/2020	529.71
APW05	07/27/2020	529.77
APW05	10/22/2020	529.54
APW05	02/04/2021	530.11
APW05	02/09/2021	530.11
APW05	02/15/2021	529.83
APW05	02/17/2021	529.83
APW05	03/09/2021	529.61
APW05	03/10/2021	529.61
APW05	03/29/2021	529.68
APW05	03/30/2021	529.68
APW05	04/27/2021	529.73
APW05	04/28/2021	529.72
APW05	05/24/2021	530.82
APW05	05/25/2021	529.51
APW05	06/15/2021	529.42
APW05	06/17/2021	529.43
APW05	06/24/2021	529.38
APW05	06/30/2021	529.38

TABLE E-1. GROUNDWATER ELEVATIONS
HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
NEWTON POWER PLANT
PRIMARY ASH POND
NEWTON, ILLINOIS

Sample Location	Sample Date	Groundwater Elevation (ft NAVD88)
APW05	07/14/2021	529.33
APW05	07/15/2021	529.40
APW05	08/02/2021	529.28
APW05S	02/04/2021	534.37
APW05S	02/15/2021	533.90
APW05S	02/17/2021	533.90
APW05S	03/09/2021	533.71
APW05S	03/10/2021	533.71
APW05S	03/29/2021	533.91
APW05S	04/27/2021	533.56
APW05S	04/29/2021	533.74
APW05S	05/25/2021	533.23
APW05S	06/15/2021	532.54
APW05S	06/17/2021	532.53
APW05S	06/24/2021	531.93
APW05S	06/30/2021	531.68
APW05S	07/14/2021	532.16
APW05S	07/15/2021	532.31
APW06	12/14/2015	526.14
APW06	01/18/2016	527.46
APW06	04/25/2016	526.59
APW06	07/25/2016	526.20
APW06	10/17/2016	526.05
APW06	01/16/2017	526.10
APW06	04/17/2017	526.18
APW06	06/12/2017	526.86
APW06	11/14/2017	525.40
APW06	05/17/2018	526.39
APW06	08/14/2018	529.13
APW06	11/08/2018	529.99
APW06	02/18/2019	530.58
APW06	08/21/2019	529.68
APW06	02/03/2020	526.76
APW06	06/11/2020	526.74
APW06	07/27/2020	526.78
APW06	10/22/2020	526.37
APW06	02/04/2021	526.82
APW06	02/09/2021	526.82
APW06	02/15/2021	526.48
APW06	02/17/2021	526.48
APW06	03/09/2021	526.46
APW06	03/10/2021	526.46
APW06	03/29/2021	526.49
APW06	03/30/2021	526.49
APW06	04/27/2021	526.68

TABLE E-1. GROUNDWATER ELEVATIONS
HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
NEWTON POWER PLANT
PRIMARY ASH POND
NEWTON, ILLINOIS

Sample Location	Sample Date	Groundwater Elevation (ft NAVD88)
APW06	04/29/2021	526.90
APW06	05/24/2021	537.51
APW06	05/25/2021	526.54
APW06	06/15/2021	526.45
APW06	06/16/2021	526.45
APW06	06/24/2021	526.42
APW06	06/30/2021	526.38
APW06	07/14/2021	526.31
APW06	07/15/2021	526.41
APW06	08/02/2021	526.31
APW07	12/14/2015	492.84
APW07	01/18/2016	492.58
APW07	04/25/2016	493.11
APW07	07/25/2016	492.64
APW07	10/17/2016	492.46
APW07	01/16/2017	492.98
APW07	04/17/2017	492.65
APW07	06/12/2017	493.32
APW07	11/14/2017	491.34
APW07	05/17/2018	491.73
APW07	08/14/2018	495.37
APW07	11/08/2018	497.57
APW07	02/18/2019	496.19
APW07	08/21/2019	495.37
APW07	02/03/2020	492.60
APW07	06/11/2020	491.90
APW07	07/27/2020	491.97
APW07	10/22/2020	491.50
APW07	02/04/2021	492.72
APW07	02/10/2021	492.72
APW07	02/15/2021	492.16
APW07	03/09/2021	491.93
APW07	03/29/2021	492.17
APW07	04/27/2021	492.19
APW07	05/24/2021	491.88
APW07	06/15/2021	491.85
APW07	06/24/2021	491.75
APW07	07/14/2021	491.77
APW07	08/02/2021	492.27
APW08	12/14/2015	492.72
APW08	01/18/2016	492.35
APW08	04/25/2016	492.97
APW08	07/25/2016	492.14
APW08	10/17/2016	492.18
APW08	01/16/2017	492.92

TABLE E-1. GROUNDWATER ELEVATIONS
HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
NEWTON POWER PLANT
PRIMARY ASH POND
NEWTON, ILLINOIS

Sample Location	Sample Date	Groundwater Elevation (ft NAVD88)
APW08	04/17/2017	492.49
APW08	06/12/2017	493.68
APW08	11/14/2017	491.77
APW08	05/17/2018	492.22
APW08	08/14/2018	493.16
APW08	11/08/2018	494.85
APW08	02/18/2019	493.91
APW08	08/21/2019	494.77
APW08	02/03/2020	492.50
APW08	06/11/2020	491.65
APW08	07/27/2020	491.82
APW08	10/22/2020	491.28
APW08	02/04/2021	492.46
APW08	02/10/2021	492.46
APW08	02/15/2021	491.90
APW08	03/09/2021	491.72
APW08	03/29/2021	491.93
APW08	04/27/2021	491.98
APW08	05/24/2021	491.68
APW08	06/15/2021	491.64
APW08	06/24/2021	491.56
APW08	07/14/2021	491.61
APW08	08/02/2021	491.59
APW09	12/14/2015	504.88
APW09	01/18/2016	506.59
APW09	04/25/2016	505.32
APW09	07/25/2016	504.70
APW09	10/17/2016	503.44
APW09	01/16/2017	505.67
APW09	04/17/2017	504.89
APW09	06/12/2017	505.52
APW09	11/14/2017	504.77
APW09	05/17/2018	505.34
APW09	08/14/2018	509.52
APW09	11/08/2018	510.87
APW09	02/18/2019	510.75
APW09	08/21/2019	509.43
APW09	02/03/2020	505.04
APW09	06/11/2020	504.64
APW09	07/27/2020	505.31
APW09	10/22/2020	503.83
APW09	02/04/2021	505.69
APW09	02/11/2021	505.69
APW09	02/15/2021	504.93
APW09	03/09/2021	505.10

TABLE E-1. GROUNDWATER ELEVATIONS
HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
NEWTON POWER PLANT
PRIMARY ASH POND
NEWTON, ILLINOIS

Sample Location	Sample Date	Groundwater Elevation (ft NAVD88)
APW09	03/29/2021	505.23
APW09	04/27/2021	504.74
APW09	05/24/2021	504.72
APW09	06/15/2021	504.63
APW09	06/24/2021	504.48
APW09	07/14/2021	505.24
APW09	08/02/2021	504.77
APW10	12/14/2015	506.39
APW10	01/18/2016	507.70
APW10	04/25/2016	506.90
APW10	07/25/2016	506.19
APW10	10/17/2016	505.06
APW10	01/16/2017	506.96
APW10	04/17/2017	506.53
APW10	06/12/2017	507.27
APW10	11/14/2017	506.18
APW10	05/17/2018	506.25
APW10	08/14/2018	508.28
APW10	11/08/2018	509.22
APW10	02/18/2019	509.40
APW10	08/21/2019	508.17
APW10	02/03/2020	506.73
APW10	06/11/2020	506.31
APW10	07/27/2020	506.76
APW10	10/22/2020	505.44
APW10	02/04/2021	507.12
APW10	02/11/2021	507.12
APW10	02/15/2021	506.65
APW10	03/09/2021	506.84
APW10	03/29/2021	506.94
APW10	04/27/2021	506.53
APW10	05/24/2021	506.35
APW10	06/15/2021	506.26
APW10	06/17/2021	506.31
APW10	06/24/2021	506.12
APW10	06/30/2021	506.05
APW10	07/14/2021	506.59
APW10	07/29/2021	506.48
APW10	08/02/2021	506.37
APW11	02/04/2021	514.71
APW11	02/15/2021	514.13
APW11	02/18/2021	514.13
APW11	03/09/2021	514.49
APW11	03/29/2021	514.55
APW11	04/27/2021	487.33

TABLE E-1. GROUNDWATER ELEVATIONS
HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
NEWTON POWER PLANT
PRIMARY ASH POND
NEWTON, ILLINOIS

Sample Location	Sample Date	Groundwater Elevation (ft NAVD88)
APW11	04/28/2021	514.50
APW11	05/24/2021	514.16
APW11	06/15/2021	514.02
APW11	06/16/2021	514.02
APW11	06/24/2021	513.90
APW11	06/30/2021	513.86
APW11	07/14/2021	513.96
APW11	07/15/2021	514.00
APW12	02/04/2021	533.12
APW12	02/15/2021	532.41
APW12	02/17/2021	532.41
APW12	03/09/2021	532.48
APW12	03/29/2021	532.91
APW12	04/27/2021	532.12
APW12	04/28/2021	532.31
APW12	05/24/2021	531.87
APW12	05/25/2021	531.82
APW12	06/15/2021	531.53
APW12	06/16/2021	528.83
APW12	06/24/2021	531.37
APW12	06/30/2021	531.28
APW12	07/14/2021	531.29
APW12	07/15/2021	531.34
APW13	02/04/2021	506.52
APW13	02/15/2021	505.94
APW13	02/22/2021	505.94
APW13	03/09/2021	506.06
APW13	03/10/2021	506.06
APW13	03/29/2021	506.10
APW13	03/31/2021	506.10
APW13	04/27/2021	505.69
APW13	04/29/2021	505.97
APW13	05/24/2021	505.62
APW13	05/25/2021	505.78
APW13	06/15/2021	505.44
APW13	06/17/2021	505.44
APW13	06/24/2021	505.27
APW13	06/30/2021	505.20
APW13	07/14/2021	505.63
APW13	07/15/2021	505.73
APW14	02/04/2021	506.29
APW14	02/15/2021	505.55
APW14	02/22/2021	505.55
APW14	03/09/2021	505.69
APW14	03/10/2021	505.69

TABLE E-1. GROUNDWATER ELEVATIONS
HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
NEWTON POWER PLANT
PRIMARY ASH POND
NEWTON, ILLINOIS

Sample Location	Sample Date	Groundwater Elevation (ft NAVD88)
APW14	03/29/2021	505.76
APW14	03/31/2021	505.76
APW14	04/27/2021	505.29
APW14	04/28/2021	505.37
APW14	05/24/2021	505.30
APW14	05/25/2021	505.41
APW14	06/15/2021	514.14
APW14	06/17/2021	505.16
APW14	06/24/2021	505.00
APW14	06/30/2021	504.93
APW14	07/14/2021	505.62
APW14	07/15/2021	505.63
APW15	02/04/2021	500.60
APW15	02/15/2021	500.54
APW15	02/23/2021	500.54
APW15	03/09/2021	501.19
APW15	03/10/2021	501.19
APW15	03/29/2021	501.88
APW15	03/31/2021	501.88
APW15	04/27/2021	502.40
APW15	04/28/2021	502.44
APW15	05/24/2021	502.69
APW15	06/15/2021	502.71
APW15	06/17/2021	502.77
APW15	06/24/2021	502.75
APW15	06/30/2021	502.76
APW15	07/14/2021	502.81
APW16	02/04/2021	492.13
APW16	02/15/2021	491.48
APW16	02/23/2021	491.48
APW16	03/09/2021	491.41
APW16	03/10/2021	491.41
APW16	03/29/2021	491.62
APW16	03/30/2021	491.62
APW16	04/27/2021	491.49
APW16	04/28/2021	491.49
APW16	05/24/2021	491.29
APW16	06/15/2021	491.23
APW16	06/16/2021	491.23
APW16	06/24/2021	491.17
APW16	06/30/2021	491.06
APW16	07/14/2021	491.20
APW16	07/15/2021	491.21
APW17	02/04/2021	492.56
APW17	02/15/2021	492.02

RAMBOLL

TABLE E-1. GROUNDWATER ELEVATIONS
HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
NEWTON POWER PLANT
PRIMARY ASH POND
NEWTON, ILLINOIS

Sample Location	Sample Date	Groundwater Elevation (ft NAVD88)
APW17	02/23/2021	492.02
APW17	03/09/2021	491.74
APW17	03/10/2021	491.74
APW17	03/29/2021	491.95
APW17	03/30/2021	491.95
APW17	04/27/2021	491.87
APW17	04/29/2021	492.19
APW17	05/24/2021	491.69
APW17	06/15/2021	491.57
APW17	06/16/2021	491.57
APW17	06/24/2021	491.52
APW17	06/30/2021	491.42
APW17	07/14/2021	491.58
APW17	07/15/2021	491.59
APW18	02/04/2021	492.73
APW18	02/15/2021	492.20
APW18	02/23/2021	492.20
APW18	03/09/2021	491.92
APW18	03/10/2021	491.92
APW18	03/29/2021	492.14
APW18	03/30/2021	492.14
APW18	04/27/2021	492.06
APW18	04/29/2021	492.37
APW18	05/24/2021	491.97
APW18	06/15/2021	491.82
APW18	06/16/2021	491.84
APW18	06/24/2021	491.76
APW18	06/30/2021	491.67
APW18	07/14/2021	491.76
APW18	07/15/2021	491.85
G48MG	12/14/2015	526.29
G48MG	01/18/2016	525.50
G48MG	04/25/2016	526.21
G48MG	07/25/2016	526.09
G48MG	10/17/2016	526.34
G48MG	01/16/2017	526.22
G48MG	04/17/2017	526.27
G48MG	06/12/2017	526.94
G48MG	11/14/2017	525.55
G48MG	05/17/2018	527.32
G48MG	08/14/2018	528.18
G48MG	11/08/2018	528.24
G48MG	02/18/2019	528.51
G48MG	08/21/2019	527.63
G48MG	02/03/2020	526.77

TABLE E-1. GROUNDWATER ELEVATIONS
HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
NEWTON POWER PLANT
PRIMARY ASH POND
NEWTON, ILLINOIS

Sample Location	Sample Date	Groundwater Elevation (ft NAVD88)
G48MG	06/11/2020	526.32
G48MG	07/27/2020	526.54
G48MG	10/22/2020	526.31
G48MG	02/04/2021	526.83
G48MG	02/10/2021	526.83
G48MG	02/15/2021	526.30
G48MG	03/09/2021	526.15
G48MG	03/29/2021	526.35
G48MG	04/27/2021	526.56
G48MG	05/24/2021	526.40
G48MG	06/15/2021	526.42
G48MG	06/24/2021	539.15
G48MG	07/14/2021	526.32
G48MG	08/02/2021	526.35
G202	01/14/2015	492.88
G202	04/21/2015	493.71
G202	07/15/2015	494.53
G202	10/06/2015	492.29
G202	12/14/2015	492.94
G202	01/18/2016	496.48
G202	01/20/2016	492.80
G202	04/25/2016	493.23
G202	04/28/2016	493.46
G202	07/25/2016	492.73
G202	07/27/2016	493.28
G202	10/17/2016	492.62
G202	10/19/2016	492.72
G202	01/16/2017	493.08
G202	01/18/2017	493.42
G202	04/17/2017	492.79
G202	04/20/2017	493.45
G202	06/12/2017	496.43
G202	08/02/2017	493.09
G202	11/14/2017	491.83
G202	11/15/2017	492.29
G202	02/22/2018	494.31
G202	05/17/2018	492.39
G202	05/23/2018	492.87
G202	08/14/2018	492.04
G202	08/21/2018	492.55
G202	11/08/2018	495.53
G202	11/14/2018	496.05
G202	02/18/2019	493.21
G202	02/21/2019	496.68
G202	05/21/2019	492.70

TABLE E-1. GROUNDWATER ELEVATIONS
HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
NEWTON POWER PLANT
PRIMARY ASH POND
NEWTON, ILLINOIS

Sample Location	Sample Date	Groundwater Elevation (ft NAVD88)
G202	08/21/2019	491.64
G202	08/22/2019	492.13
G202	02/03/2020	493.17
G202	07/28/2020	492.09
G202	10/22/2020	491.67
G202	02/04/2021	492.90
G202	02/08/2021	492.85
G202	03/09/2021	492.08
G202	03/29/2021	492.47
G202	04/27/2021	492.30
G202	05/24/2021	502.48
G202	06/15/2021	492.01
G202	06/24/2021	491.99
G202	07/14/2021	492.05
G203	01/14/2015	492.91
G203	04/21/2015	493.70
G203	07/15/2015	494.18
G203	10/06/2015	506.02
G203	12/16/2015	492.72
G203	01/18/2016	495.02
G203	01/20/2016	492.74
G203	04/25/2016	493.16
G203	04/28/2016	493.44
G203	07/25/2016	492.66
G203	07/27/2016	493.17
G203	10/17/2016	492.49
G203	10/19/2016	492.64
G203	01/16/2017	493.02
G203	01/19/2017	493.56
G203	04/17/2017	492.67
G203	04/20/2017	493.31
G203	06/12/2017	495.42
G203	08/02/2017	492.96
G203	11/14/2017	490.99
G203	11/15/2017	491.46
G203	02/22/2018	496.37
G203	05/17/2018	492.26
G203	05/23/2018	492.73
G203	08/14/2018	493.81
G203	08/21/2018	494.30
G203	11/08/2018	495.35
G203	11/14/2018	496.00
G203	02/18/2019	494.02
G203	02/21/2019	494.50
G203	05/21/2019	493.10

TABLE E-1. GROUNDWATER ELEVATIONS
HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
NEWTON POWER PLANT
PRIMARY ASH POND
NEWTON, ILLINOIS

Sample Location	Sample Date	Groundwater Elevation (ft NAVD88)
G203	08/21/2019	494.05
G203	08/22/2019	494.54
G203	02/03/2020	492.74
G203	05/21/2020	491.49
G203	07/27/2020	491.99
G203	10/22/2020	491.63
G203	02/04/2021	492.84
G203	02/08/2021	492.73
G203	03/09/2021	492.10
G203	03/29/2021	492.33
G203	05/24/2021	501.18
G203	06/15/2021	491.99
G203	06/24/2021	491.93
G203	07/14/2021	491.92
G203	08/02/2021	491.95
G208	01/14/2015	513.98
G208	04/21/2015	514.82
G208	07/15/2015	514.55
G208	10/06/2015	513.51
G208	12/14/2015	513.41
G208	01/18/2016	514.11
G208	01/19/2016	515.99
G208	04/25/2016	507.69
G208	04/28/2016	508.77
G208	07/25/2016	512.24
G208	07/29/2016	513.14
G208	10/17/2016	508.94
G208	10/25/2016	509.54
G208	01/16/2017	508.24
G208	01/24/2017	509.27
G208	04/17/2017	508.58
G208	04/20/2017	509.15
G208	06/12/2017	515.81
G208	08/03/2017	511.82
G208	11/14/2017	512.07
G208	11/17/2017	512.48
G208	02/22/2018	509.43
G208	05/17/2018	507.59
G208	05/23/2018	508.02
G208	08/14/2018	507.94
G208	08/20/2018	508.43
G208	11/08/2018	509.57
G208	11/13/2018	510.19
G208	02/18/2019	508.19
G208	02/20/2019	508.68

TABLE E-1. GROUNDWATER ELEVATIONS
HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
NEWTON POWER PLANT
PRIMARY ASH POND
NEWTON, ILLINOIS

Sample Location	Sample Date	Groundwater Elevation (ft NAVD88)
G208	05/22/2019	509.50
G208	08/21/2019	508.06
G208	08/22/2019	508.55
G208	02/03/2020	509.37
G208	05/20/2020	510.57
G208	07/27/2020	508.69
G208	10/22/2020	509.96
G208	02/04/2021	509.91
G208	02/09/2021	509.82
G208	02/15/2021	504.88
G208	03/09/2021	528.57
G208	03/29/2021	509.53
G208	04/27/2021	510.25
G208	05/24/2021	510.44
G208	06/15/2021	506.19
G208	06/24/2021	507.44
G208	07/14/2021	508.84
G208	08/02/2021	509.68
G217S	01/14/2015	531.59
G217S	04/21/2015	532.93
G217S	07/14/2015	528.58
G217S	10/07/2015	530.44
G217S	01/20/2016	531.63
G217S	04/26/2016	532.84
G217S	07/26/2016	531.14
G217S	10/19/2016	530.90
G217S	01/18/2017	531.47
G217S	04/18/2017	532.00
G217S	08/02/2017	531.46
G217S	11/28/2017	530.70
G217S	02/21/2018	533.36
G217S	05/23/2018	530.75
G217S	08/22/2018	533.49
G217S	11/16/2018	533.75
G217S	02/21/2019	535.19
G217S	05/23/2019	535.44
G217S	08/23/2019	530.94
G217S	07/27/2020	530.95
G217S	10/22/2020	530.14
G217S	02/04/2021	532.08
G217S	02/15/2021	531.41
G217S	03/09/2021	531.50
G217S	03/29/2021	532.14
G217S	04/27/2021	531.48
G217S	05/24/2021	531.26

TABLE E-1. GROUNDWATER ELEVATIONS
HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
NEWTON POWER PLANT
PRIMARY ASH POND
NEWTON, ILLINOIS

Sample Location	Sample Date	Groundwater Elevation (ft NAVD88)
G217S	06/15/2021	531.16
G217S	06/24/2021	531.48
G217S	07/14/2021	530.77
G217S	08/02/2021	531.18
G217D	12/14/2015	518.26
G217D	01/18/2016	518.86
G217D	04/25/2016	518.70
G217D	07/25/2016	507.56
G217D	10/17/2016	518.30
G217D	01/16/2017	518.39
G217D	04/17/2017	518.73
G217D	06/12/2017	519.37
G222	01/14/2015	518.19
G222	04/21/2015	519.68
G222	07/15/2015	520.13
G222	10/06/2015	518.71
G222	12/14/2015	516.93
G222	01/18/2016	516.75
G222	01/19/2016	520.02
G222	04/25/2016	517.61
G222	04/28/2016	518.78
G222	07/25/2016	519.04
G222	07/28/2016	519.51
G222	10/17/2016	518.57
G222	10/25/2016	518.61
G222	01/16/2017	518.37
G222	01/24/2017	519.07
G222	04/17/2017	519.22
G222	04/25/2017	520.00
G222	06/12/2017	520.14
G222	08/02/2017	519.66
G222	11/14/2017	517.84
G222	11/15/2017	518.18
G222	02/20/2018	519.16
G222	05/17/2018	517.88
G222	05/22/2018	518.34
G222	08/14/2018	518.43
G222	08/16/2018	518.93
G222	11/08/2018	518.84
G222	11/12/2018	519.42
G222	02/18/2019	519.49
G222	02/20/2019	519.98
G222	05/22/2019	520.72
G222	08/21/2019	518.30
G222	02/03/2020	518.23

TABLE E-1. GROUNDWATER ELEVATIONS
HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
NEWTON POWER PLANT
PRIMARY ASH POND
NEWTON, ILLINOIS

Sample Location	Sample Date	Groundwater Elevation (ft NAVD88)
G222	05/20/2020	520.24
G222	07/27/2020	519.20
G222	10/22/2020	518.18
G222	02/04/2021	518.42
G222	02/09/2021	518.33
G222	02/15/2021	517.25
G222	03/09/2021	518.78
G222	03/29/2021	519.17
G222	04/27/2021	519.73
G222	05/24/2021	519.66
G222	06/15/2021	519.44
G222	06/24/2021	519.57
G222	07/14/2021	519.45
G222	08/02/2021	519.09
G223	01/14/2015	499.35
G223	04/21/2015	500.45
G223	07/15/2015	499.77
G223	10/06/2015	500.15
G223	12/14/2015	500.21
G223	01/18/2016	498.87
G223	01/20/2016	499.89
G223	04/25/2016	499.88
G223	04/28/2016	500.33
G223	07/25/2016	499.69
G223	07/28/2016	500.65
G223	10/17/2016	499.99
G223	10/20/2016	500.21
G223	01/16/2017	499.69
G223	01/24/2017	500.40
G223	04/17/2017	499.63
G223	04/26/2017	500.80
G223	06/12/2017	499.92
G223	08/03/2017	500.40
G223	11/14/2017	498.51
G223	11/28/2017	498.95
G223	02/20/2018	502.87
G223	05/17/2018	499.01
G223	05/23/2018	495.64
G223	08/14/2018	500.90
G223	08/21/2018	501.42
G223	11/08/2018	500.66
G223	11/13/2018	501.54
G223	02/18/2019	501.54
G223	02/21/2019	502.05
G223	05/22/2019	504.22

TABLE E-1. GROUNDWATER ELEVATIONS
HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
NEWTON POWER PLANT
PRIMARY ASH POND
NEWTON, ILLINOIS

Sample Location	Sample Date	Groundwater Elevation (ft NAVD88)
G223	08/21/2019	500.29
G223	08/22/2019	500.80
G223	02/03/2020	500.75
G223	05/20/2020	500.97
G223	07/27/2020	500.50
G223	10/22/2020	500.55
G223	02/04/2021	500.95
G223	02/08/2021	500.91
G223	02/15/2021	500.22
G223	03/09/2021	500.22
G223	03/29/2021	500.40
G223	04/27/2021	500.70
G223	05/24/2021	500.60
G223	06/15/2021	500.44
G223	06/24/2021	500.51
G223	07/14/2021	500.40
G223	08/02/2021	500.53
G224	01/14/2015	493.02
G224	04/21/2015	493.99
G224	07/14/2015	492.79
G224	10/06/2015	492.68
G224	12/14/2015	492.96
G224	01/18/2016	492.12
G224	01/21/2016	492.70
G224	04/25/2016	493.24
G224	04/28/2016	493.70
G224	07/25/2016	492.74
G224	07/28/2016	492.41
G224	10/17/2016	492.65
G224	10/20/2016	492.15
G224	01/16/2017	492.98
G224	01/24/2017	493.71
G224	04/17/2017	492.79
G224	04/20/2017	493.55
G224	06/12/2017	492.54
G224	08/02/2017	493.10
G224	11/14/2017	491.90
G224	11/15/2017	492.41
G224	02/20/2018	495.01
G224	05/17/2018	492.11
G224	05/23/2018	492.66
G224	08/14/2018	489.63
G224	08/21/2018	493.21
G224	11/08/2018	486.49
G224	11/15/2018	486.96

TABLE E-1. GROUNDWATER ELEVATIONS
HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
NEWTON POWER PLANT
PRIMARY ASH POND
NEWTON, ILLINOIS

Sample Location	Sample Date	Groundwater Elevation (ft NAVD88)
G224	02/18/2019	492.86
G224	02/21/2019	493.43
G224	05/22/2019	493.43
G224	08/21/2019	491.97
G224	08/22/2019	492.46
G224	02/03/2020	492.88
G224	05/21/2020	492.78
G224	07/27/2020	492.11
G224	10/22/2020	491.63
G224	02/04/2021	492.84
G224	02/09/2021	492.80
G224	02/15/2021	492.16
G224	03/09/2021	492.07
G224	03/29/2021	492.33
G224	04/27/2021	492.31
G224	05/24/2021	492.04
G224	06/15/2021	492.04
G224	06/24/2021	491.99
G224	07/14/2021	491.99
G224	08/02/2021	491.95
R202	05/21/2020	492.85
R202	02/08/2021	493.31
R217D	11/14/2017	517.88
R217D	11/28/2017	518.07
R217D	02/21/2018	521.40
R217D	05/17/2018	517.74
R217D	05/23/2018	517.82
R217D	08/14/2018	522.01
R217D	08/22/2018	522.14
R217D	11/08/2018	522.38
R217D	11/16/2018	522.14
R217D	02/18/2019	523.54
R217D	02/21/2019	523.68
R217D	05/23/2019	527.35
R217D	08/21/2019	518.03
R217D	02/03/2020	518.85
R217D	05/20/2020	519.36
R217D	07/27/2020	518.82
R217D	10/22/2020	518.53
R217D	02/04/2021	518.79
R217D	02/08/2021	518.79
R217D	02/15/2021	518.70
R217D	03/09/2021	518.63
R217D	03/29/2021	518.82
R217D	04/27/2021	518.82

TABLE E-1. GROUNDWATER ELEVATIONS
HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
NEWTON POWER PLANT
PRIMARY ASH POND
NEWTON, ILLINOIS

Sample Location	Sample Date	Groundwater Elevation (ft NAVD88)
R217D	05/24/2021	518.68
R217D	06/15/2021	518.63
R217D	06/24/2021	518.61
R217D	07/14/2021	518.61
R217D	08/02/2021	518.56
XPW01	02/04/2021	546.73
XPW01	02/15/2021	539.56
XPW01	02/17/2021	539.56
XPW01	03/09/2021	539.75
XPW01	03/29/2021	539.85
XPW01	03/30/2021	539.85
XPW01	04/27/2021	539.38
XPW01	04/28/2021	539.31
XPW01	05/24/2021	539.26
XPW01	06/15/2021	539.65
XPW01	06/24/2021	539.35
XPW01	07/14/2021	539.85
XPW02	02/04/2021	546.49
XPW02	02/15/2021	546.49
XPW02	02/17/2021	546.49
XPW02	03/09/2021	545.83
XPW02	03/29/2021	546.69
XPW02	03/30/2021	546.69
XPW02	04/27/2021	545.15
XPW02	04/28/2021	545.14
XPW02	05/24/2021	545.92
XPW02	06/15/2021	545.31
XPW02	06/24/2021	544.91
XPW02	07/14/2021	545.96
XPW03	02/04/2021	544.43
XPW03	02/15/2021	544.13
XPW03	02/17/2021	544.13
XPW03	03/09/2021	544.28
XPW03	03/29/2021	544.16
XPW03	03/30/2021	544.16
XPW03	04/27/2021	543.39
XPW03	04/28/2021	543.43
XPW03	05/24/2021	543.77
XPW03	06/15/2021	543.43
XPW03	06/24/2021	543.31
XPW03	07/14/2021	543.99
XPW04	02/04/2021	542.52
XPW04	02/15/2021	542.21
XPW04	02/17/2021	542.21
XPW04	03/09/2021	542.30

TABLE E-1. GROUNDWATER ELEVATIONS
HYDROGEOLOGIC SITE CHARACTERIZATION REPORT
NEWTON POWER PLANT
PRIMARY ASH POND
NEWTON, ILLINOIS

Sample Location	Sample Date	Groundwater Elevation (ft NAVD88)
XPW04	03/29/2021	542.33
XPW04	04/27/2021	541.98
XPW04	04/28/2021	542.03
XPW04	05/24/2021	542.03
XPW04	06/15/2021	541.91
XPW04	06/24/2021	541.80
XPW04	07/14/2021	542.27
XSG01	02/15/2021	536.17
XSG01	03/09/2021	536.17
XSG01	03/29/2021	536.17
XSG01	07/14/2021	535.40
SG02	02/15/2021	504.42
SG02	03/09/2021	504.84
SG02	03/29/2021	504.72

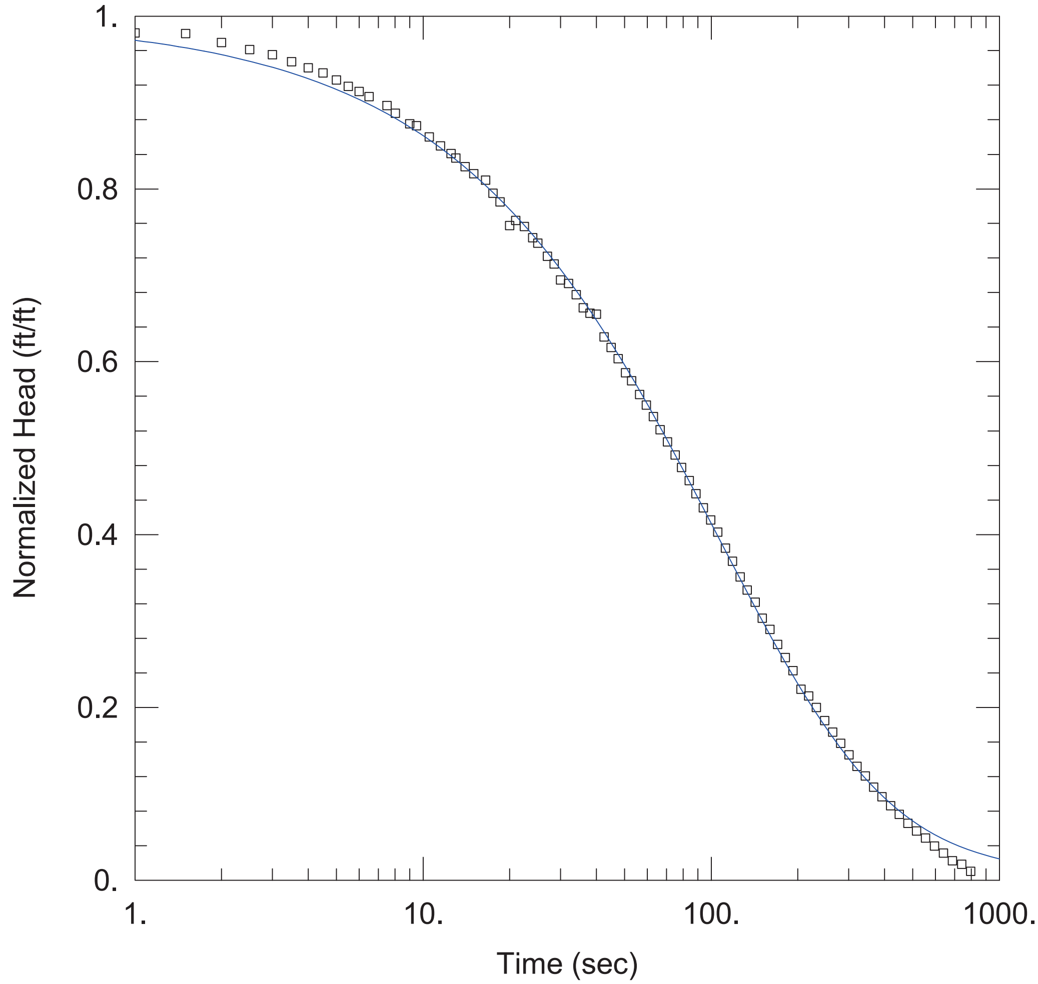
Notes:
ft NAVD88 = feet relative to the North American Vertical Datum 1988, GEOID 12A

generated 10/05/2021, 4:09:16 PM CDT

RAMBOLL

APPENDIX F
HYDRAULIC CONDUCTIVITY TEST DATA

2021 HYDRAULIC CONDUCTIVITY TEST DATA



APW-5S FH1

Data Set: \...\NEW_APW-5S FH1_07202021.aqt
Date: 10/21/21 Time: 14:56:12

PROJECT INFORMATION

Company: Ramboll
Client: IPGC
Project: 1940100499-001
Location: Newton
Test Well: APW-5S
Test Date: 2/16/2021

AQUIFER DATA

Saturated Thickness: 3.2 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (APW-5S)

Initial Displacement: 0.986 ft
Total Well Penetration Depth: 3.2 ft
Casing Radius: 0.08625 ft
Static Water Column Height: 12.6 ft
Screen Length: 3.2 ft
Well Radius: 0.25 ft

SOLUTION

Aquifer Model: Confined
Solution Method: Cooper-Bredehoeft-Papadopulos

T = 0.087 cm^2/sec
S = 0.000403

SOLUTION

Slug Test
Aquifer Model: Confined
Solution Method: Cooper-Bredehoeft-Papadopulos

VISUAL ESTIMATION RESULTS

Estimated Parameters

Parameter	Estimate	
T	0.087	cm^2/sec
S	0.000403	

K = T/b = 0.000892 cm/sec
Ss = S/b = 0.0001259 1/ft

AUTOMATIC ESTIMATION RESULTS

Estimated Parameters

Parameter	Estimate	Std. Error	Approx. C.I.	t-Ratio	
T	0.08962	0.02397	+/- 0.04765	3.739	cm^2/sec

S	0.0003389	0.000496	+/- 0.0009861	0.6832

C.I. is approximate 95% confidence interval for parameter
t-ratio = estimate/std. error
No estimation window

K = T/b = 0.0009188 cm/sec
Ss = S/b = 0.0001059 1/ft

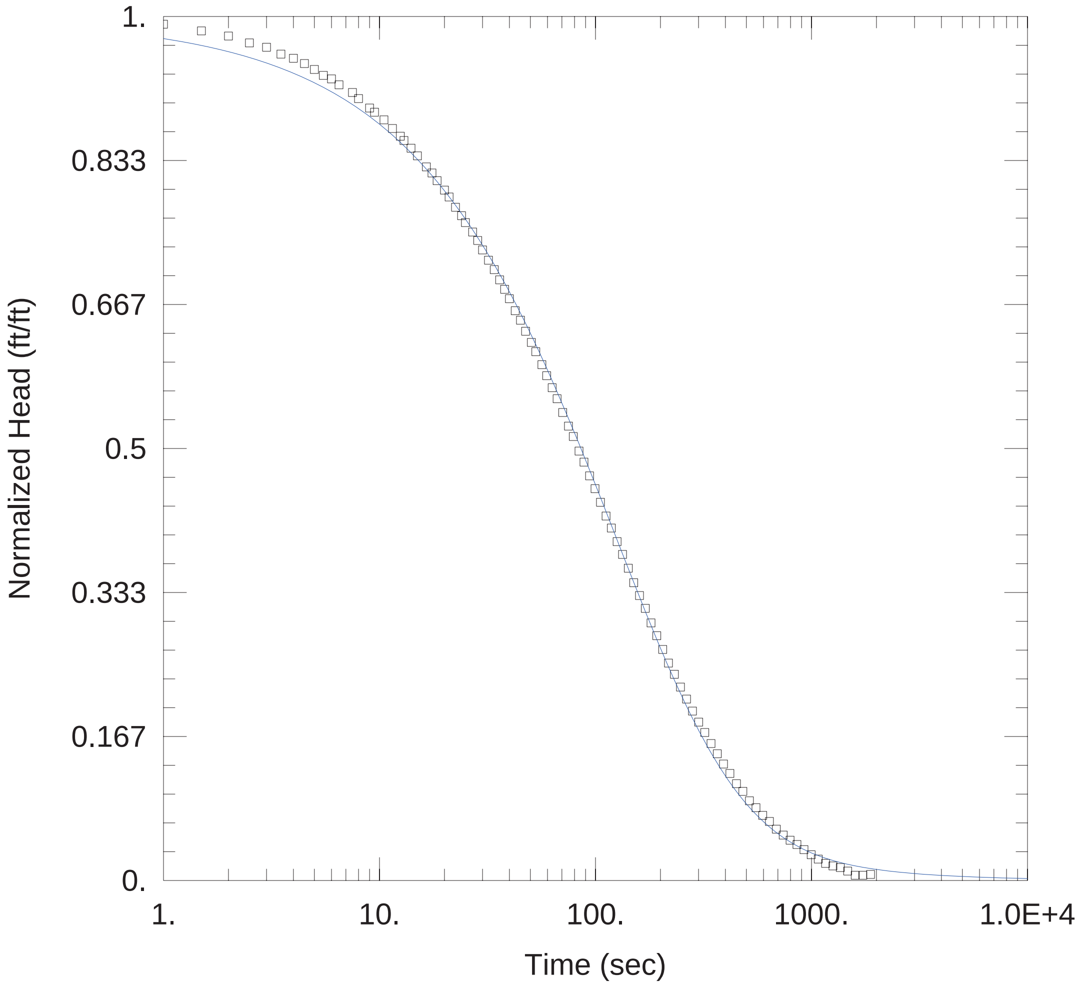
Parameter Correlations

	T	S
T	1.00	-0.97
S	-0.97	1.00

Residual Statistics

for weighted residuals

Sum of Squares ..... 0.9777 ft^2
Variance .... 0.01124 ft^2
Std. Deviation .... 0.106 ft
Mean .... 0.01073 ft
No. of Residuals..... 89
No. of Estimates..... 2



APW-5S FH2

PROJECT INFORMATION

Company: Ramboll
Client: IPGC
Project: 1940100499-001
Location: Newton
Test Well: APW-5S
Test Date: 2/16/2021

AQUIFER DATA

Saturated Thickness: 3.2 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (APW-5S)

Initial Displacement: 1.01 ft
Total Well Penetration Depth: 3.2 ft
Casing Radius: 0.086 ft
Static Water Column Height: 12.6 ft
Screen Length: 3.2 ft
Well Radius: 0.25 ft

SOLUTION

Aquifer Model: Confined
Solution Method: Cooper-Bredehoeft-Papadopulos
T = 0.0718 cm^2/sec
S = 0.000454

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
21.	0.799	419.5	0.125
22.5	0.787	449.5	0.113
24.	0.777	481.5	0.104
25.	0.769	516.5	0.093
27.	0.758	554.	0.085
28.5	0.748	595.	0.076
30.	0.737	639.5	0.069
32.	0.725	687.5	0.06
34.	0.714	739.5	0.053
36.	0.702	796.	0.047
38.	0.691	857.5	0.042
40.	0.68	924.	0.036
42.5	0.666	997.	0.03
45.	0.655	1076.	0.025
47.5	0.642	1162.5	0.02
50.5	0.629	1257.	0.017
53.	0.618	1360.	0.015
56.5	0.603	1472.5	0.011
59.5	0.59	1595.5	0.006
63.	0.576	1730.	0.006
66.5	0.563	1877.5	0.007

SOLUTION

Slug Test
Aquifer Model: Confined
Solution Method: Cooper-Bredehoeft-Papadopulos

VISUAL ESTIMATION RESULTS

Estimated Parameters

Parameter	Estimate	
T	0.0718	cm^2/sec
S	0.000454	

K = T/b = 0.0007361 cm/sec
Ss = S/b = 0.0001419 1/ft

AUTOMATIC ESTIMATION RESULTS

Estimated Parameters

Parameter	Estimate	Std. Error	Approx. C.I.	t-Ratio	
T	0.07177	0.01724	+/- 0.03421	4.163	cm^2/sec
S	0.0004536	0.0005595	+/- 0.00111	0.8107	

C.I. is approximate 95% confidence interval for parameter
t-ratio = estimate/std. error
No estimation window

K = T/b = 0.0007359 cm/sec
Ss = S/b = 0.0001418 1/ft

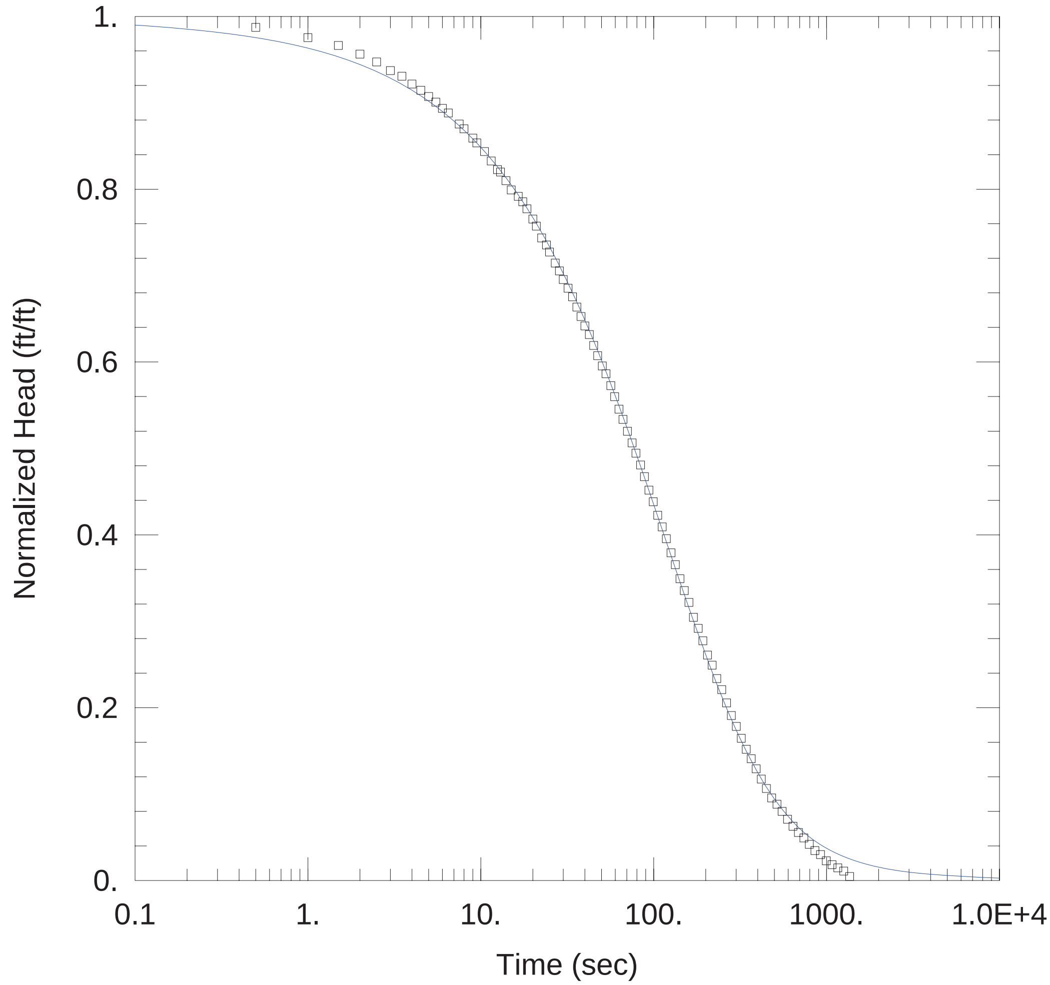
Parameter Correlations

	T	S
T	1.00	-0.97
S	-0.97	1.00

Residual Statistics

for weighted residuals

Sum of Squares . . . . . . 1.028 ft^2
Variance . . . . 0.01049 ft^2



APW-5S RH1

PROJECT INFORMATION

Company: Ramboll
Client: IPGC
Project: 1940100499-001
Location: Newton
Test Well: APW-5S
Test Date: 2/16/2021

AQUIFER DATA

Saturated Thickness: 3.2 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (APW-5S)

Initial Displacement: 1.1 ft
Static Water Column Height: 12.6 ft
Total Well Penetration Depth: 3.2 ft
Screen Length: 3.2 ft
Casing Radius: 0.08625 ft
Well Radius: 0.25 ft

SOLUTION

Aquifer Model: Confined
Solution Method: Cooper-Bredehoeft-Papadopulos

T = 0.0591 cm^2/sec
S = 0.00178

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
20.	0.842	366.5	0.155
21.	0.833	392.	0.142
22.5	0.818	419.5	0.129
24.	0.809	449.5	0.117
25.	0.8	481.5	0.105
27.	0.786	516.5	0.097
28.5	0.776	554.	0.088
30.	0.765	595.	0.078
32.	0.754	639.5	0.069
34.	0.743	687.5	0.061
36.	0.73	739.5	0.054
38.	0.718	796.	0.046
40.	0.706	857.5	0.038
42.5	0.695	924.	0.033
45.	0.681	997.	0.025
47.5	0.668	1076.	0.02
50.5	0.655	1162.5	0.016
53.	0.645	1257.	0.012
56.5	0.63	1360.	0.005
59.5	0.616		

SOLUTION

Slug Test
Aquifer Model: Confined
Solution Method: Cooper-Bredehoeft-Papadopulos

VISUAL ESTIMATION RESULTS

Estimated Parameters

Parameter	Estimate	
T	0.0591	cm^2/sec
S	0.00178	

K = T/b = 0.0006059 cm/sec
Ss = S/b = 0.0005562 1/ft

AUTOMATIC ESTIMATION RESULTS

Estimated Parameters

Parameter	Estimate	Std. Error	Approx. C.I.	t-Ratio	
T	0.05907	0.01974	+/- 0.03919	2.992	cm^2/sec
S	0.001784	0.002265	+/- 0.004496	0.7877	

C.I. is approximate 95% confidence interval for parameter
t-ratio = estimate/std. error
No estimation window

K = T/b = 0.0006056 cm/sec
Ss = S/b = 0.0005575 1/ft

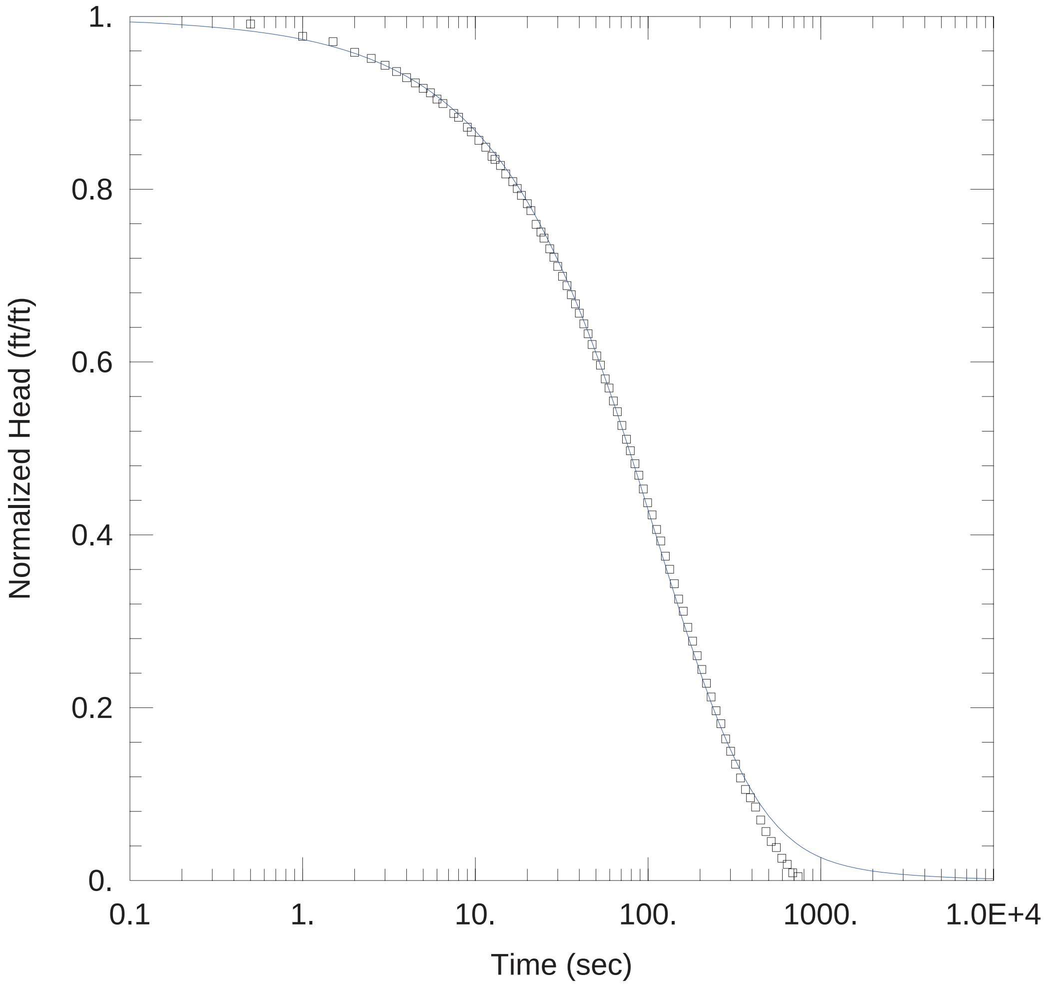
Parameter Correlations

	T	S
T	1.00	-0.96
S	-0.96	1.00

Residual Statistics

for weighted residuals

Sum of Squares . . . . . . 2.725 ft^2
Variance . . . . 0.02869 ft^2
Std. Deviation . . . . 0.1694 ft



APW-5S RH2

PROJECT INFORMATION

Company: Ramboll
Client: IPGC
Project: 1940100499-001
Location: Newton
Test Well: APW-5S
Test Date: 2/16/2021

AQUIFER DATA

Saturated Thickness: 3.2 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (APW-5S)

Initial Displacement: 1.13 ft
Total Well Penetration Depth: 3.2 ft
Casing Radius: 0.08625 ft
Static Water Column Height: 12.6 ft
Screen Length: 3.2 ft
Well Radius: 0.25 ft

SOLUTION

Aquifer Model: Confined
Solution Method: Cooper-Bredehoeft-Papadopulos

T = 0.0825 cm^2/sec
S = 0.000391

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
20.	0.885	281.5	0.185
21.	0.876	300.5	0.169
22.5	0.858	321.	0.152
24.	0.848	343.	0.134
25.	0.84	366.5	0.119
27.	0.826	392.	0.108
28.5	0.815	419.5	0.096
30.	0.803	449.5	0.079
32.	0.79	481.5	0.064
34.	0.778	516.5	0.051
36.	0.766	554.	0.043
38.	0.754	595.	0.029
40.	0.742	639.5	0.021
42.5	0.728	687.5	0.01
45.	0.715	739.5	0.005
47.5	0.701		

SOLUTION

Slug Test
Aquifer Model: Confined
Solution Method: Cooper-Bredehoeft-Papadopulos

VISUAL ESTIMATION RESULTS

Estimated Parameters

Parameter	Estimate	
T	0.0825	cm^2/sec
S	0.000391	

K = T/b = 0.0008458 cm/sec
Ss = S/b = 0.0001222 1/ft

AUTOMATIC ESTIMATION RESULTS

Estimated Parameters

Parameter	Estimate	Std. Error	Approx. C.I.	t-Ratio	
T	0.08245	0.03155	+/- 0.06271	2.614	cm^2/sec
S	0.0003915	0.0007946	+/- 0.00158	0.4927	

C.I. is approximate 95% confidence interval for parameter
t-ratio = estimate/std. error
No estimation window

K = T/b = 0.0008454 cm/sec
Ss = S/b = 0.0001223 1/ft

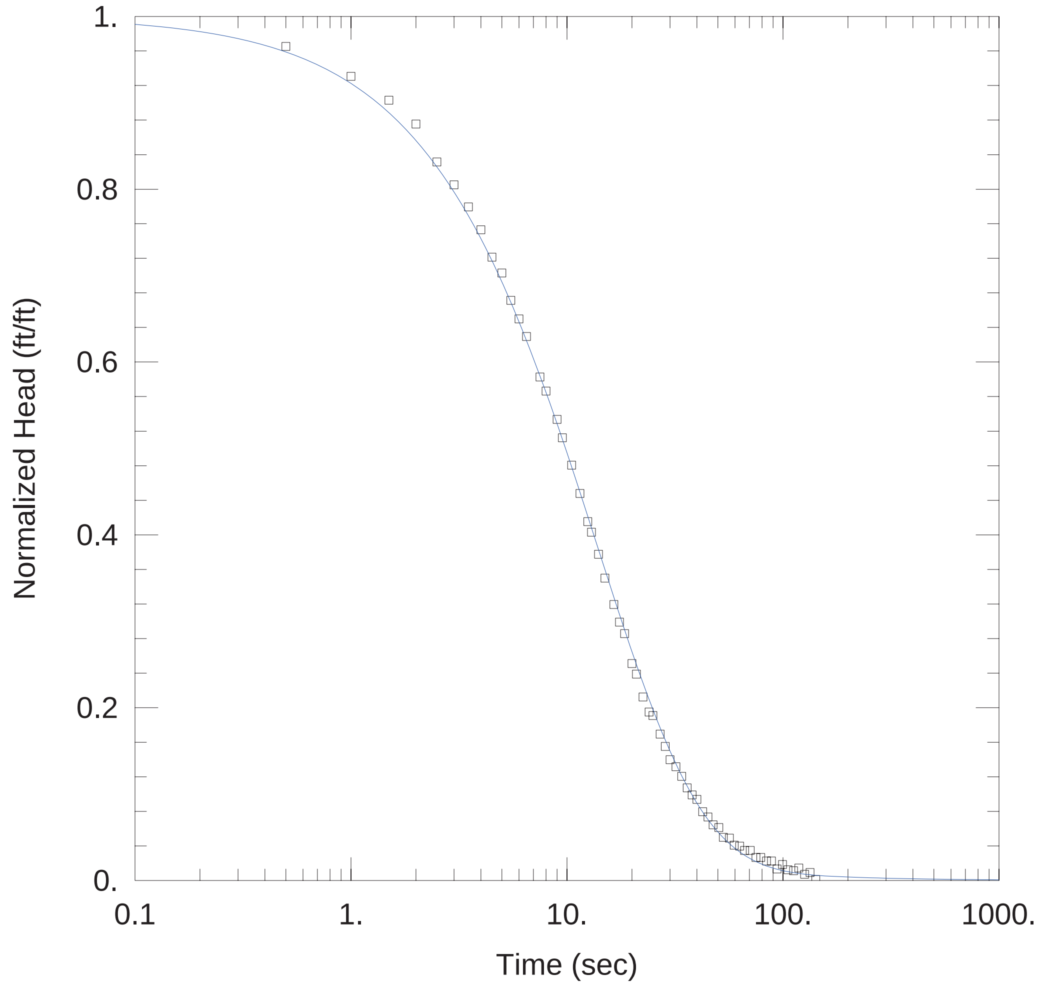
Parameter Correlations

	T	S
T	1.00	-0.97
S	-0.97	1.00

Residual Statistics

for weighted residuals

Sum of Squares . . . . . . 2.682 ft^2
Variance . . . . 0.03083 ft^2
Std. Deviation . . . . 0.1756 ft
Mean . . . . -0.02888 ft
No. of Residuals 89
No. of Estimates 2



APW-11 FH1

PROJECT INFORMATION

Company: Ramboll
Client: IPGC
Project: 1940100499-001
Location: Newton
Test Well: APW-11
Test Date: 3/11/2021

AQUIFER DATA

Saturated Thickness: 9.2 ft

WELL DATA (APW-11)

Initial Displacement: 0.98 ft
Total Well Penetration Depth: 7. ft
Casing Radius: 0.086 ft

Static Water Column Height: 43.37 ft
Screen Length: 5. ft
Well Radius: 0.25 ft

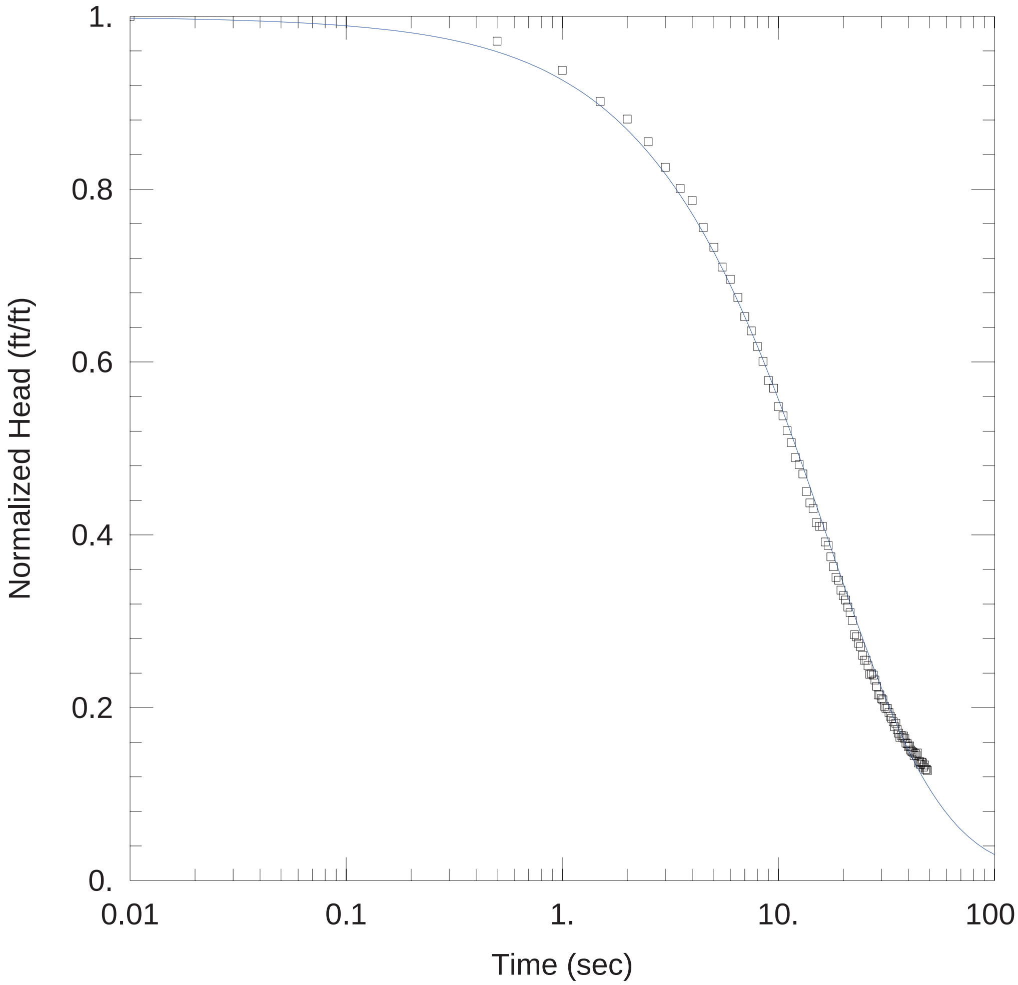
SOLUTION

Aquifer Model: Confined

Kr = 0.0078 cm/sec
Kz/Kr = 1.

Solution Method: KGS Model

Ss = 1.09E-9 ft^{-1}



APW-11 FH02

PROJECT INFORMATION

Company: Ramboll
Client: IPGC
Project: 1940100499-001
Location: Newton
Test Well: APW-11
Test Date: 3/11/2021

AQUIFER DATA

Saturated Thickness: 9.2 ft

WELL DATA (APW-11)

Initial Displacement: 1.22 ft
Total Well Penetration Depth: 7. ft
Casing Radius: 0.086 ft

Static Water Column Height: 43.53 ft
Screen Length: 5. ft
Well Radius: 0.25 ft

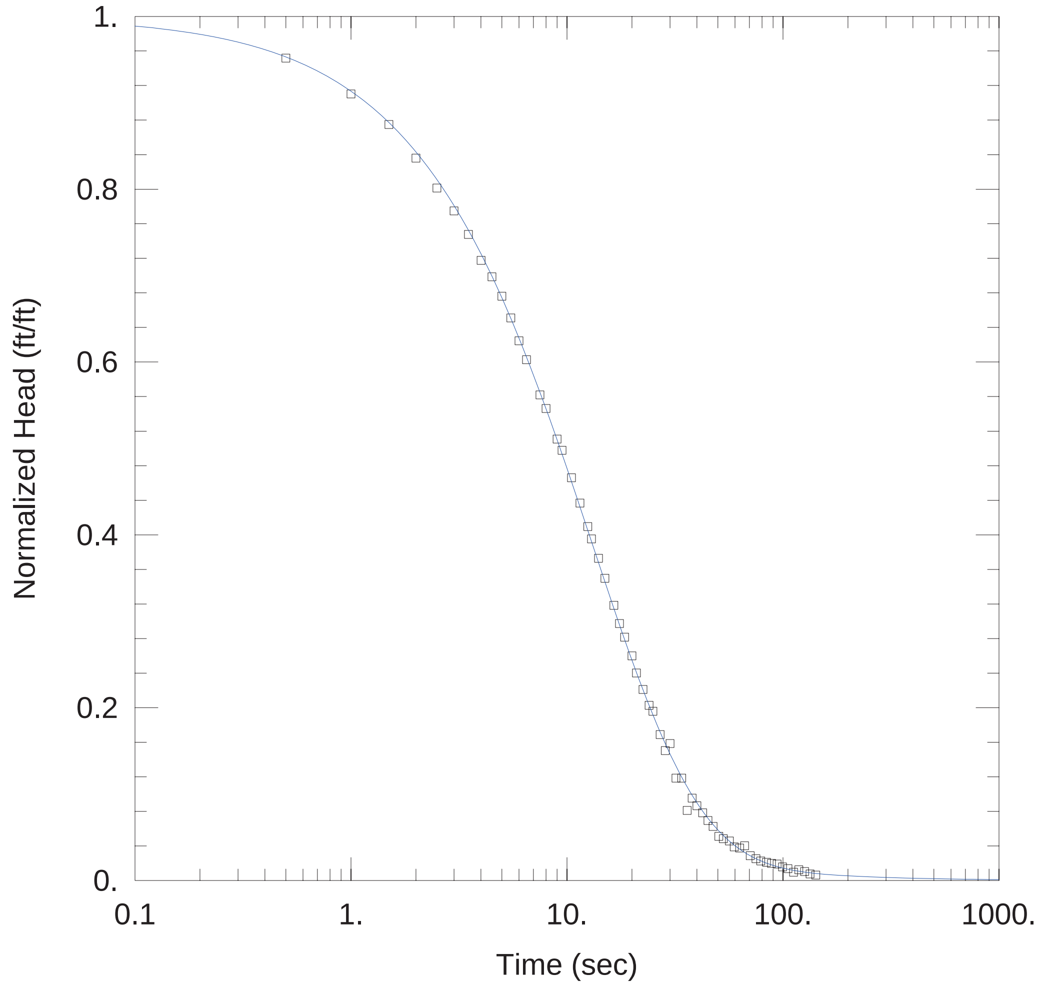
SOLUTION

Aquifer Model: Confined

Kr = 0.00351 cm/sec
Kz/Kr = 1.

Solution Method: KGS Model

Ss = 6.23E-6 ft^{-1}



APW-11 RH01

PROJECT INFORMATION

Company: Ramboll
Client: IPGC
Project: 1940100499-001
Location: Newton
Test Well: APW-11
Test Date: 3/11/2021

AQUIFER DATA

Saturated Thickness: 9.2 ft

WELL DATA (APW-11)

Initial Displacement: 1.47 ft
Total Well Penetration Depth: 7. ft
Casing Radius: 0.086 ft

Static Water Column Height: 43.48 ft
Screen Length: 5. ft
Well Radius: 0.25 ft

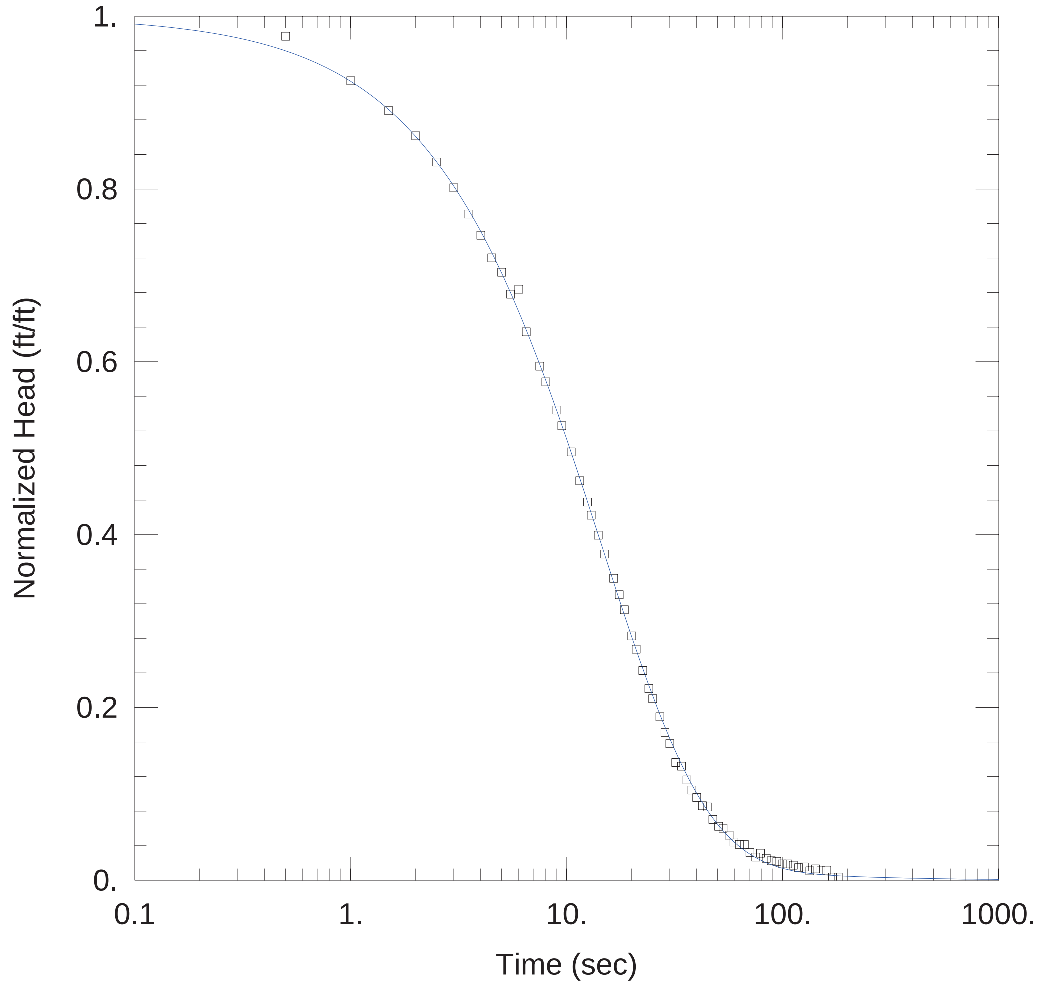
SOLUTION

Aquifer Model: Confined

Kr = 0.00588 cm/sec
Kz/Kr = 1.

Solution Method: KGS Model

Ss = 3.02E-7 ft^{-1}



APW-11 RH02

PROJECT INFORMATION

Company: Ramboll
Client: IPGC
Project: 1940100499-001
Location: Newton
Test Well: APW-11
Test Date: 3/11/2021

AQUIFER DATA

Saturated Thickness: 9.2 ft

WELL DATA (APW-11 RH02)

Initial Displacement: 1.38 ft
Total Well Penetration Depth: 7. ft
Casing Radius: 0.086 ft

Static Water Column Height: 43.53 ft
Screen Length: 5. ft
Well Radius: 0.25 ft

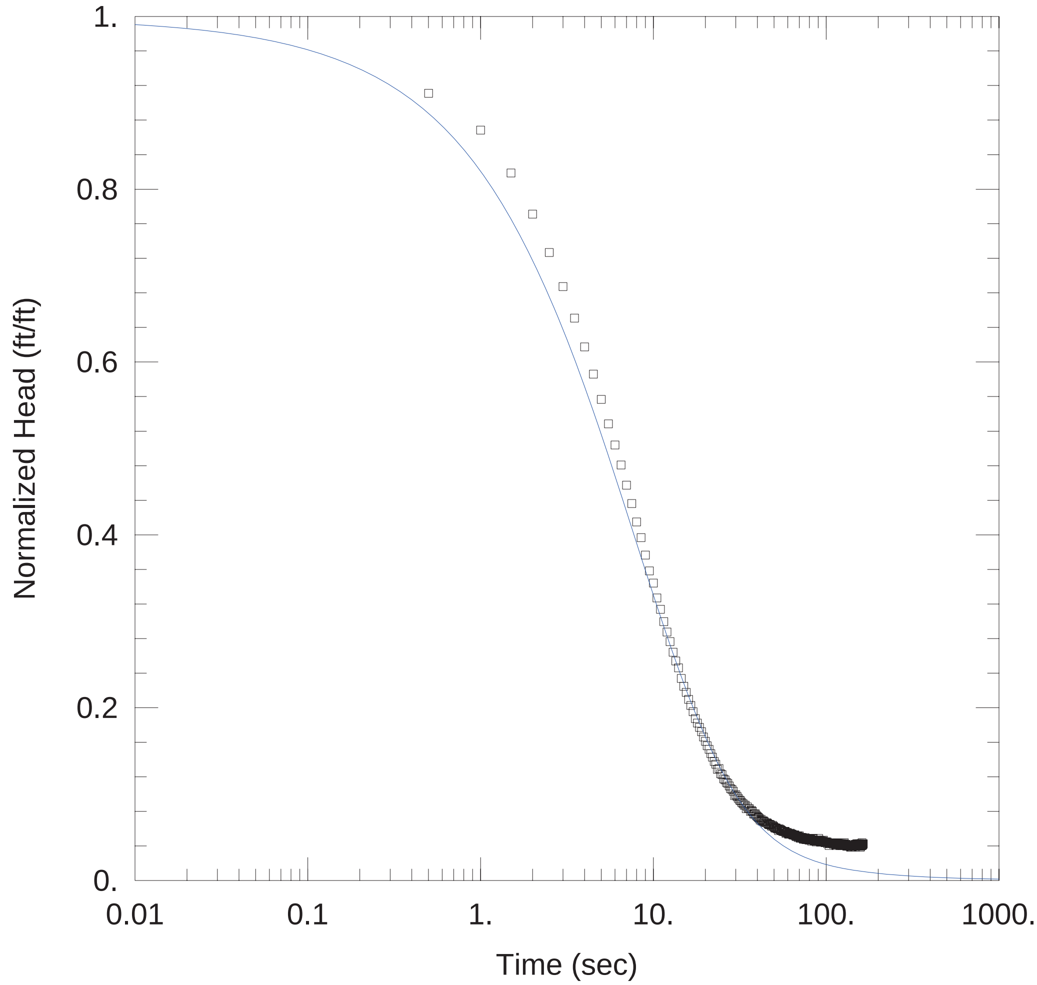
SOLUTION

Aquifer Model: Confined

Kr = 0.00676 cm/sec
Kz/Kr = 1.

Solution Method: KGS Model

Ss = 6.55E-9 ft^{-1}



APW-12 FH1

PROJECT INFORMATION

Company: Ramboll
Client: IPGC
Project: 1940100499-001
Location: Newton
Test Well: APW-12
Test Date: 3/12/2021

AQUIFER DATA

Saturated Thickness: 3.5 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (APW-12)

Initial Displacement: 0.988 ft
Total Well Penetration Depth: 3.5 ft
Casing Radius: 0.086 ft
Static Water Column Height: 19.03 ft
Screen Length: 3.5 ft
Well Radius: 0.25 ft

SOLUTION

Aquifer Model: Confined
Solution Method: Cooper-Bredehoeft-Papadopulos

T = 1.05 cm^2/sec
S = 0.000733

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
75.5	0.049	160.5	0.041
76.	0.047	161.	0.04
76.5	0.047	161.5	0.043
77.	0.047	162.	0.04
77.5	0.048	162.5	0.041
78.	0.047	163.	0.041
78.5	0.047	163.5	0.041
79.	0.047	164.	0.042
79.5	0.046		

SOLUTION

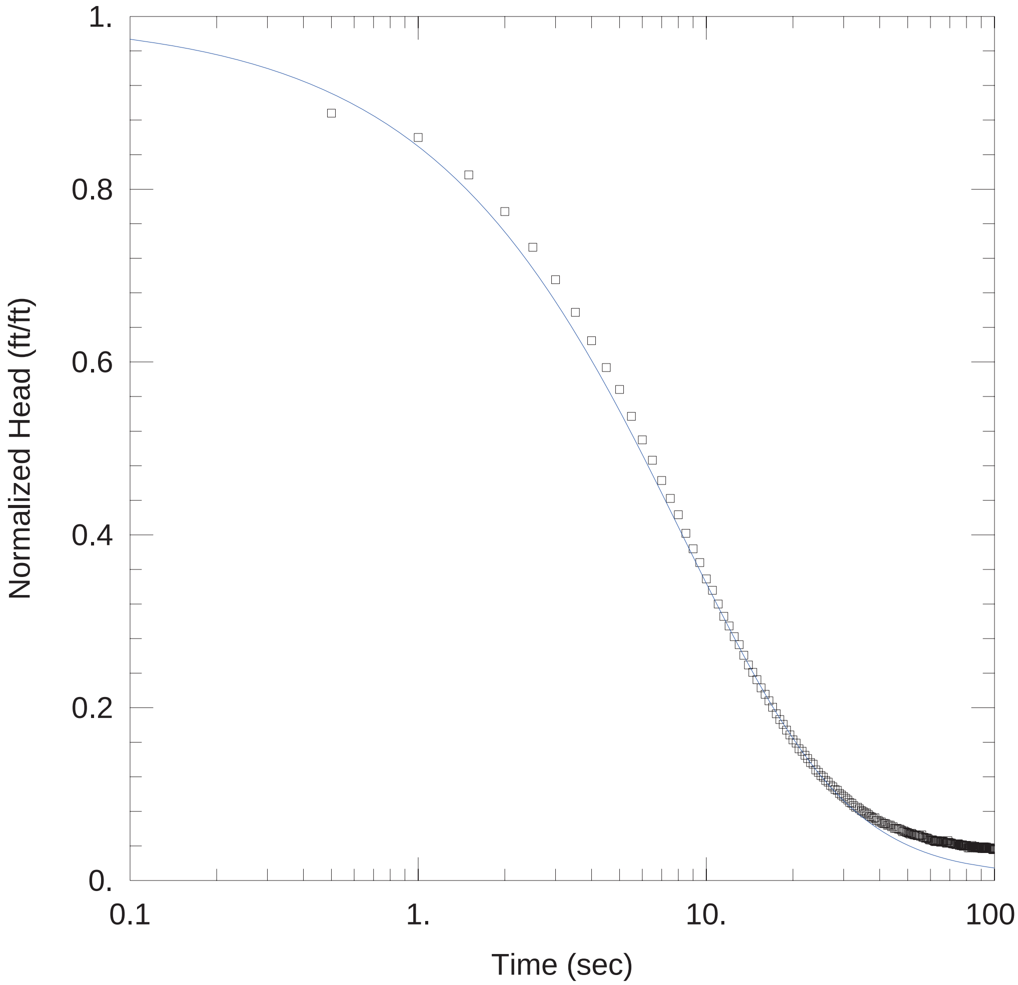
Slug Test
Aquifer Model: Confined
Solution Method: Cooper-Bredehoeft-Papadopulos

VISUAL ESTIMATION RESULTS

Estimated Parameters

Parameter	Estimate	
T	1.05	cm^2/sec
S	0.000733	

K = T/b = 0.009843 cm/sec
Ss = S/b = 0.0002094 1/ft



APW-12 FH02

PROJECT INFORMATION

Company: Ramboll
Client: IPGC
Project: 1940100499-001
Location: Newton
Test Well: APW-12
Test Date: 3/12/2021

AQUIFER DATA

Saturated Thickness: 3.5 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (APW-12)

Initial Displacement: 1.063 ft
Total Well Penetration Depth: 3.5 ft
Casing Radius: 0.08625 ft
Static Water Column Height: 19.06 ft
Screen Length: 3.5 ft
Well Radius: 0.25 ft

SOLUTION

Aquifer Model: Confined
Solution Method: Cooper-Bredehoeft-Papadopulos

T = 1.35 cm^2/sec
S = 0.000108

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
40.	0.072	94.5	0.04
40.5	0.072	95.	0.04
41.	0.07	95.5	0.04
41.5	0.07	96.	0.04
42.	0.07	96.5	0.039
42.5	0.068	97.	0.039
43.	0.068	97.5	0.039
43.5	0.068	98.	0.04
44.	0.066	98.5	0.038
44.5	0.066	99.	0.038
45.	0.064	99.5	0.038
45.5	0.064	100.	0.039
46.	0.064	100.5	0.036
46.5	0.063	101.	0.038

SOLUTION

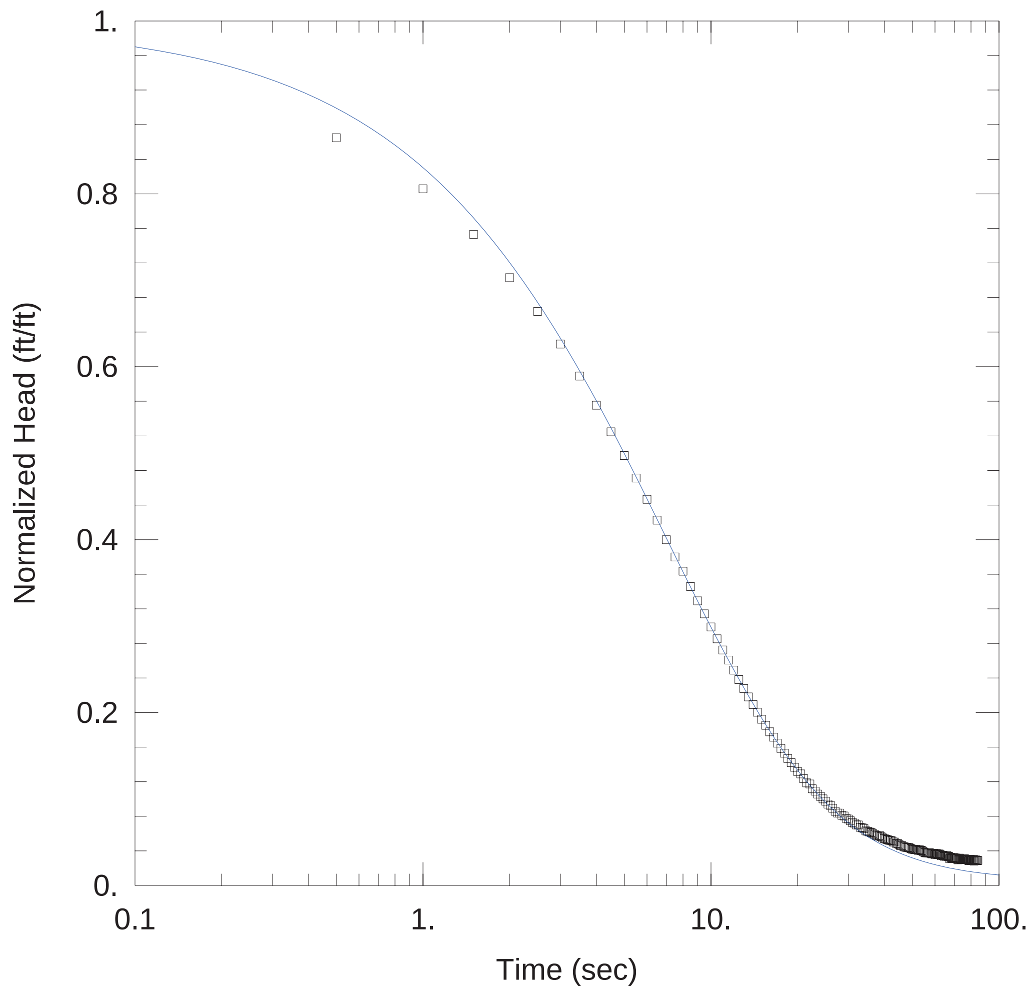
Slug Test
Aquifer Model: Confined
Solution Method: Cooper-Bredehoeft-Papadopulos

VISUAL ESTIMATION RESULTS

Estimated Parameters

Parameter	Estimate	
T	1.35	cm^2/sec
S	0.000108	

K = T/b = 0.01265 cm/sec
Ss = S/b = 3.086E-5 1/ft



APW-12 RH01

PROJECT INFORMATION

Company: Ramboll
Client: IPGC
Project: 1940100499-001
Location: Newton
Test Well: APW-12
Test Date: 3/12/2021

AQUIFER DATA

Saturated Thickness: 3.5 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (APW-12)

Initial Displacement: -1.458 ft
Total Well Penetration Depth: 3.5 ft
Casing Radius: 0.08625 ft
Static Water Column Height: 19.06 ft
Screen Length: 3.5 ft
Well Radius: 0.25 ft

SOLUTION

Aquifer Model: Confined
Solution Method: Cooper-Bredehoeft-Papadopulos

T = 1.57 cm^2/sec
S = 0.000114

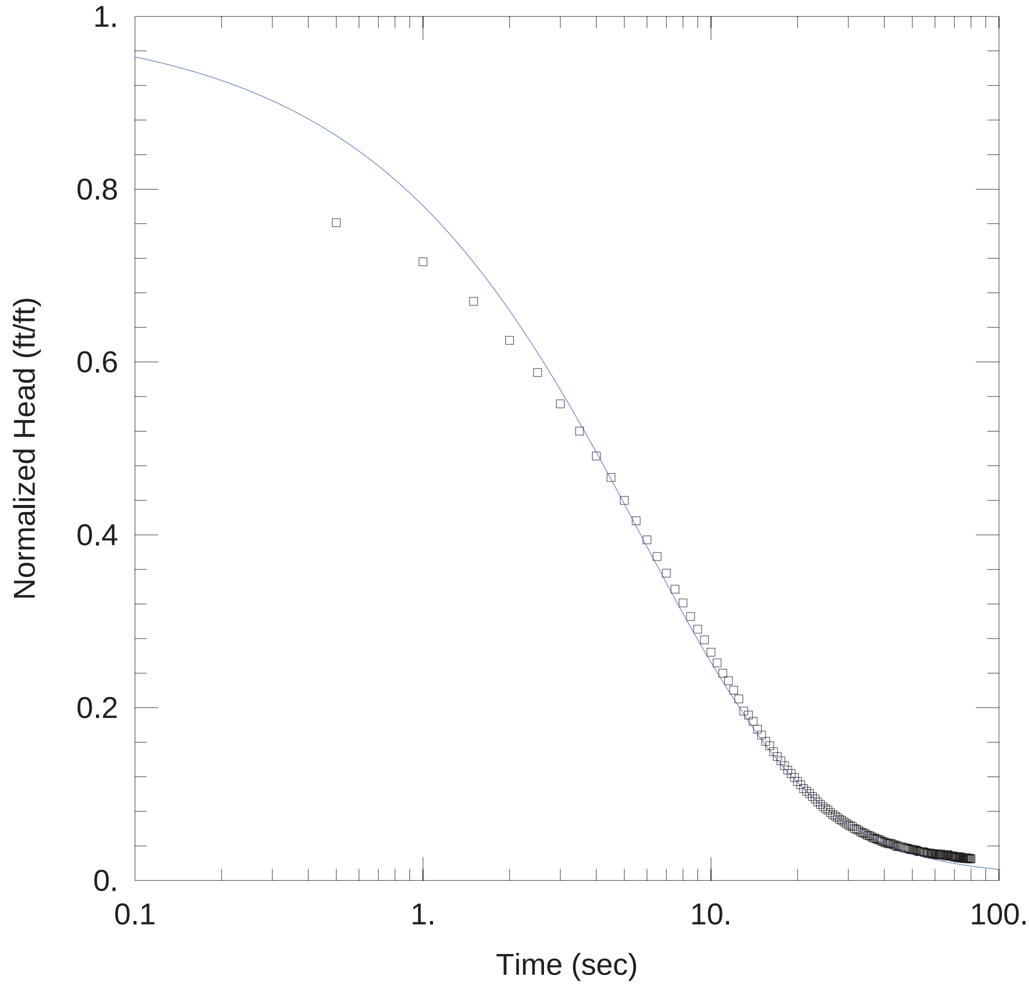
Slug Test
Aquifer Model: Confined
Solution Method: Cooper-Bredehoeft-Papadopulos

VISUAL ESTIMATION RESULTS

Estimated Parameters

Parameter	Estimate	
T	1.57	cm^2/sec
S	0.000114	

K = T/b = 0.01472 cm/sec
Ss = S/b = 3.257E-5 1/ft



APW-12 RH2

PROJECT INFORMATION

Company: Ramboll
Client: IPGC
Project: 1940100499-001
Location: Newton
Test Well: APW-12
Test Date: 3/12/2021

AQUIFER DATA

Saturated Thickness: 3.5 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (APW-12)

Initial Displacement: -1.771 ft
Total Well Penetration Depth: 3.5 ft
Casing Radius: 0.08625 ft
Static Water Column Height: 19.06 ft
Screen Length: 3.5 ft
Well Radius: 0.25 ft

SOLUTION

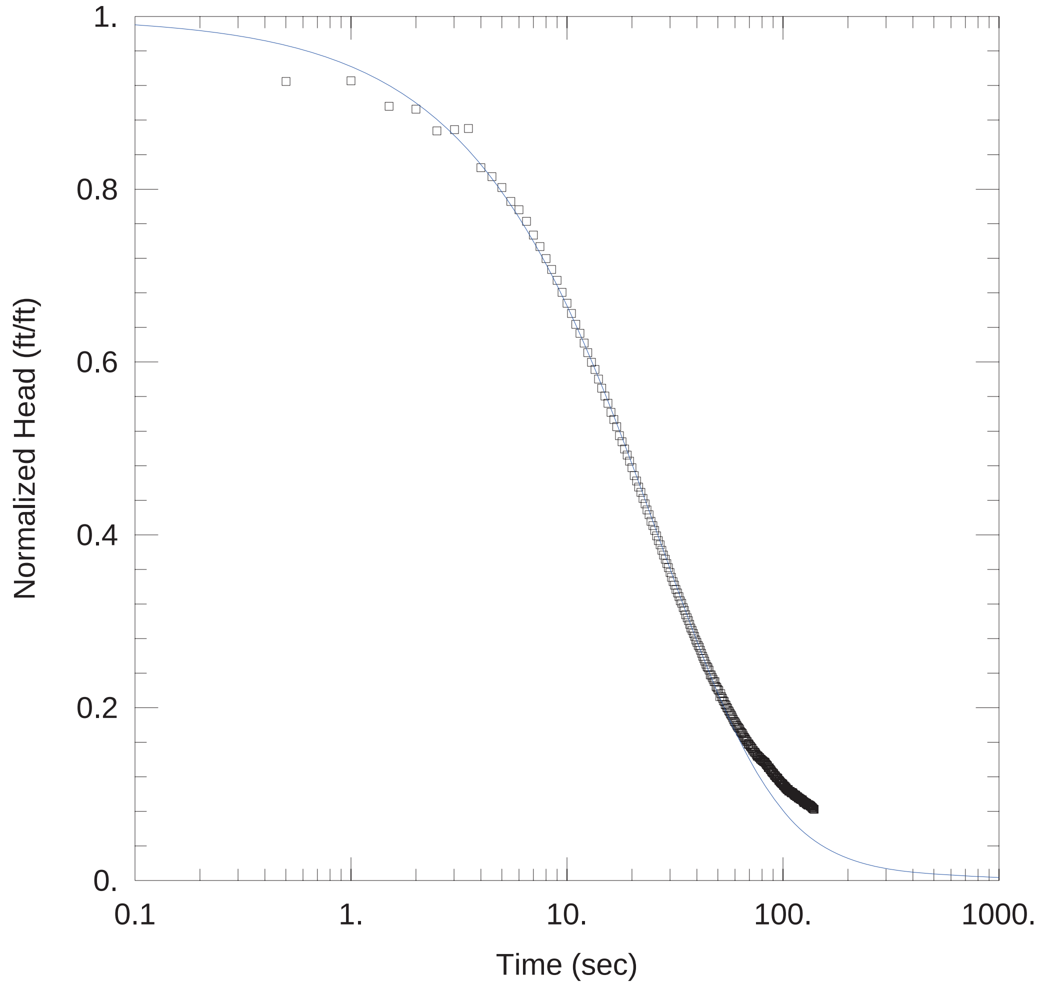
Aquifer Model: Confined
Solution Method: Cooper-Bredehoeft-Papadopulos

T = 1.433 cm^2/sec
S = 0.000733

Estimated Parameters

Parameter	Estimate	
T	1.433	cm^2/sec
S	0.000733	

K = T/b = 0.01343 cm/sec
Ss = S/b = 0.0002094 1/ft



APW-13 FH-01

PROJECT INFORMATION

Company: Ramboll
Client: IPGC
Project: 1940100499-001
Location: Newton
Test Well: APW-13
Test Date: 3/12/2021

AQUIFER DATA

Saturated Thickness: 7.4 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (APW-13)

Initial Displacement: 1.434 ft
Total Well Penetration Depth: 5.9 ft
Casing Radius: 0.08625 ft
Static Water Column Height: 34.23 ft
Screen Length: 5. ft
Well Radius: 0.25 ft

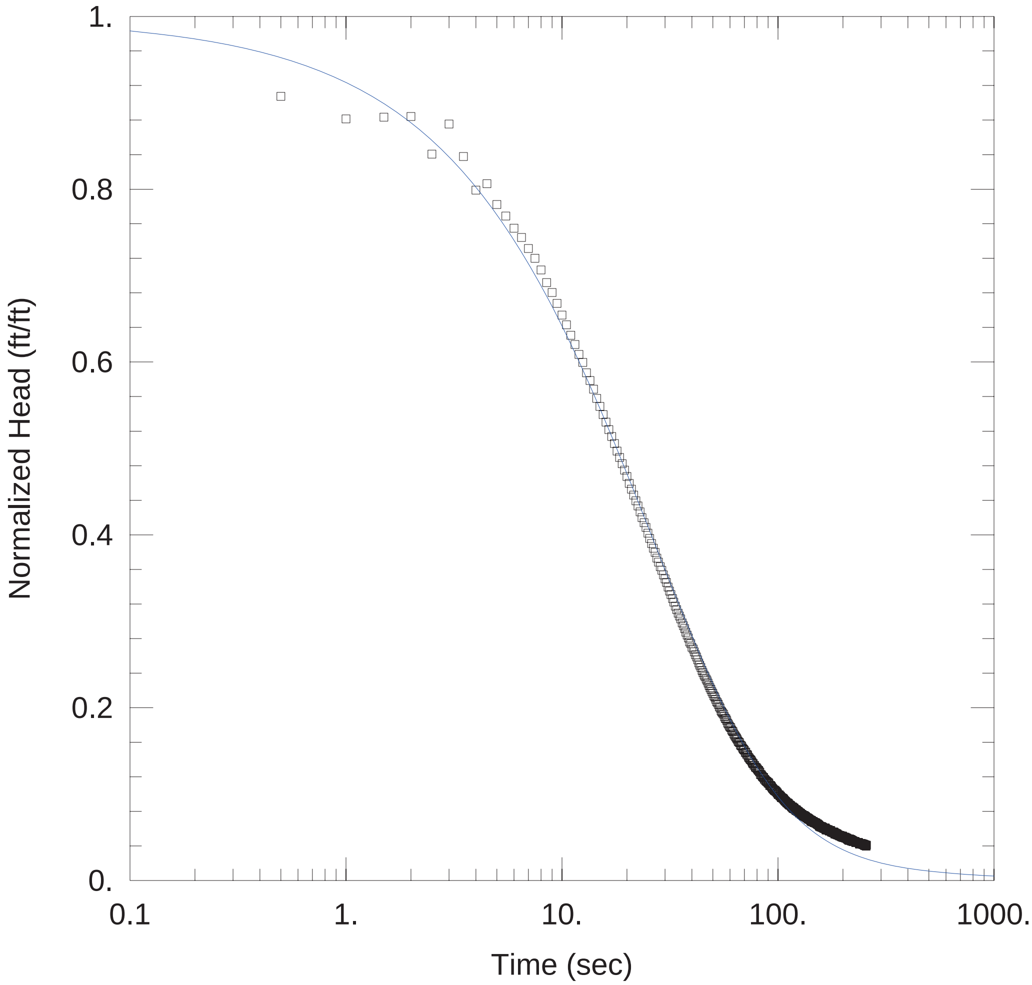
SOLUTION

Aquifer Model: Confined
Solution Method: Cooper-Bredehoeft-Papadopulos

T = 0.475 cm^2/sec
S = 4.47E-5

S	4.47E-5

K = T/b = 0.002106 cm/sec
Ss = S/b = 6.041E-6 1/ft



APW-13 FH02

PROJECT INFORMATION

Company: Ramboll
Client: IPGC
Project: 1940100499-001
Location: Newton
Test Well: APW-13
Test Date: 3/12/2021

AQUIFER DATA

Saturated Thickness: 7.4 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (APW-13)

Initial Displacement: 1.493 ft
Total Well Penetration Depth: 5.9 ft
Casing Radius: 0.086 ft
Static Water Column Height: 34.26 ft
Screen Length: 5. ft
Well Radius: 0.25 ft

SOLUTION

Aquifer Model: Confined
Solution Method: Cooper-Bredehoeft-Papadopulos

T = 0.329 cm^2/sec
S = 0.000562

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
106.	0.141	238.5	0.064
106.5	0.14	239.	0.063
107.	0.139	239.5	0.064
107.5	0.138	240.	0.063
108.	0.137	240.5	0.064
108.5	0.137	241.	0.063
109.	0.136	241.5	0.063
109.5	0.135	242.	0.063
110.	0.134	242.5	0.064
110.5	0.134	243.	0.063
111.	0.134	243.5	0.063
111.5	0.132	244.	0.064
112.	0.133	244.5	0.063
112.5	0.131	245.	0.063
113.	0.13	245.5	0.063
113.5	0.13	246.	0.062
114.	0.13	246.5	0.063
114.5	0.129	247.	0.063
115.	0.129	247.5	0.063
115.5	0.127	248.	0.062
116.	0.127	248.5	0.062
116.5	0.126	249.	0.063
117.	0.127	249.5	0.062
117.5	0.124	250.	0.062
118.	0.125	250.5	0.061
118.5	0.125	251.	0.062
119.	0.125	251.5	0.062
119.5	0.123	252.	0.06
120.	0.123	252.5	0.061
120.5	0.123	253.	0.061
121.	0.121	253.5	0.06
121.5	0.121	254.	0.061
122.	0.122	254.5	0.061
122.5	0.12	255.	0.061
123.	0.12	255.5	0.06
123.5	0.119	256.	0.059
124.	0.119	256.5	0.061
124.5	0.119	257.	0.061

SOLUTION

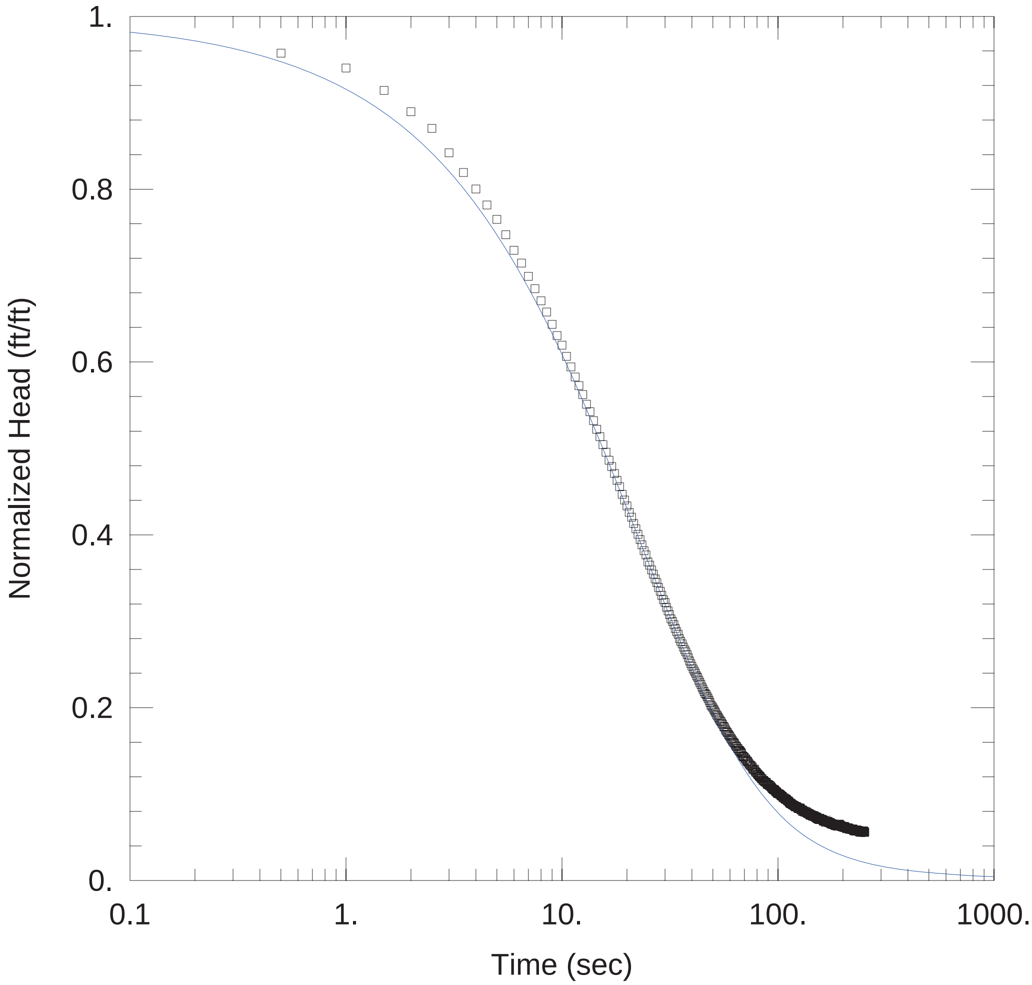
Slug Test
Aquifer Model: Confined
Solution Method: Cooper-Bredehoeft-Papadopulos

VISUAL ESTIMATION RESULTS

Estimated Parameters

Parameter	Estimate	
T	0.329	cm^2/sec
S	0.000562	

K = T/b = 0.001459 cm/sec
Ss = S/b = 7.595E-5 1/ft



APW-13 RH01

PROJECT INFORMATION

Company: Ramboll
Client: IPGC
Project: 1940100499-001
Location: Newton
Test Well: APW-13
Test Date: 3/12/2021

AQUIFER DATA

Saturated Thickness: 7.4 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (APW-13)

Initial Displacement: -1.622 ft
Total Well Penetration Depth: 5.9 ft
Casing Radius: 0.086 ft
Static Water Column Height: 34.22 ft
Screen Length: 5. ft
Well Radius: 0.25 ft

SOLUTION

Aquifer Model: Confined
Solution Method: Cooper-Bredehoeft-Papadopulos

T = 0.384 cm^2/sec
S = 0.000541

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
106.5	-0.155	236.5	-0.093
107.	-0.155	237.	-0.094
107.5	-0.153	237.5	-0.093
108.	-0.153	238.	-0.092
108.5	-0.152	238.5	-0.091
109.	-0.153	239.	-0.092
109.5	-0.152	239.5	-0.092
110.	-0.151	240.	-0.091
110.5	-0.15	240.5	-0.092
111.	-0.149	241.	-0.092
111.5	-0.149	241.5	-0.093
112.	-0.149	242.	-0.092
112.5	-0.147	242.5	-0.09
113.	-0.146	243.	-0.092
113.5	-0.146	243.5	-0.092
114.	-0.144	244.	-0.091
114.5	-0.145	244.5	-0.093
115.	-0.145	245.	-0.091
115.5	-0.144	245.5	-0.093
116.	-0.143	246.	-0.093
116.5	-0.142	246.5	-0.092
117.	-0.142	247.	-0.092
117.5	-0.142	247.5	-0.093
118.	-0.141	248.	-0.092
118.5	-0.141	248.5	-0.092
119.	-0.14	249.	-0.092
119.5	-0.14	249.5	-0.093
120.	-0.138	250.	-0.092
120.5	-0.139	250.5	-0.092
121.	-0.139	251.	-0.091
121.5	-0.139	251.5	-0.09
122.	-0.138	252.	-0.091
122.5	-0.138	252.5	-0.091

SOLUTION

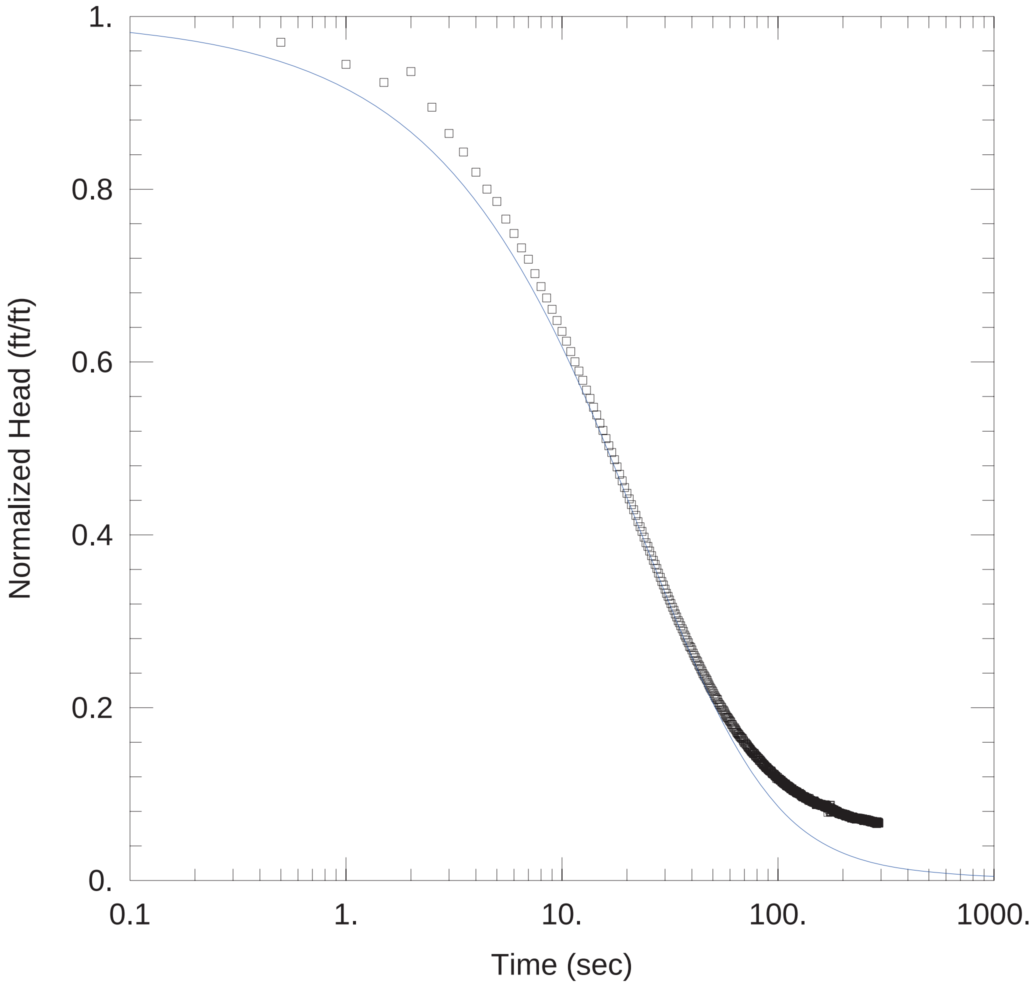
Slug Test
Aquifer Model: Confined
Solution Method: Cooper-Bredehoeft-Papadopulos

VISUAL ESTIMATION RESULTS

Estimated Parameters

Parameter	Estimate	
T	0.384	cm^2/sec
S	0.000541	

K = T/b = 0.001702 cm/sec
Ss = S/b = 7.311E-5 1/ft



APW-13 RH02

PROJECT INFORMATION

Company: Ramboll
Client: IPGC
Project: 1940100499-001
Location: Newton
Test Well: APW-13
Test Date: 3/12/2021

AQUIFER DATA

Saturated Thickness: 7.4 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (APW-13)

Initial Displacement: -1.676 ft
Static Water Column Height: 34.26 ft
Total Well Penetration Depth: 5.9 ft
Screen Length: 5. ft
Casing Radius: 0.086 ft
Well Radius: 0.25 ft

SOLUTION

Aquifer Model: Confined
Solution Method: Cooper-Bredehoeft-Papadopulos

T = 0.353 cm^2/sec
S = 0.000661

Time (sec)	Displacement (ft)	Time (sec)	Displacement (ft)
140.	-0.157	290.5	-0.111
140.5	-0.156	291.	-0.112
141.	-0.155	291.5	-0.113
141.5	-0.155	292.	-0.112
142.	-0.155	292.5	-0.111
142.5	-0.155	293.	-0.112
143.	-0.154	293.5	-0.111
143.5	-0.153		

SOLUTION

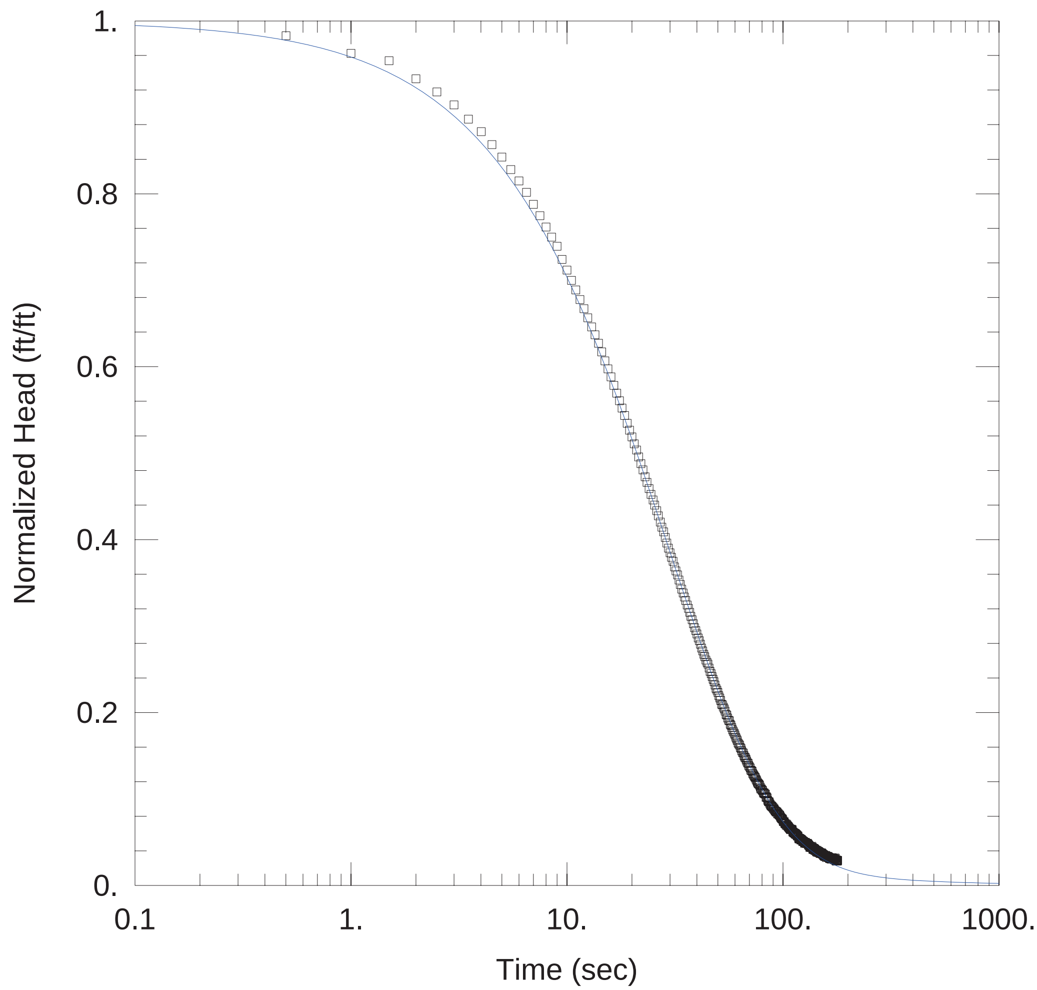
Slug Test
Aquifer Model: Confined
Solution Method: Cooper-Bredehoeft-Papadopulos

VISUAL ESTIMATION RESULTS

Estimated Parameters

Parameter	Estimate	
T	0.353	cm^2/sec
S	0.000661	

K = T/b = 0.001565 cm/sec
Ss = S/b = 8.932E-5 1/ft



APW-14 FH01

PROJECT INFORMATION

Company: Ramboll
Client: IPGC
Project: 1940100499-001
Location: Newton
Test Well: APW-14
Test Date: 3/31/2021

AQUIFER DATA

Saturated Thickness: 6.3 ft

WELL DATA (APW-14)

Initial Displacement: 1.523 ft
Total Well Penetration Depth: 5. ft
Casing Radius: 0.086 ft

Static Water Column Height: 36.72 ft
Screen Length: 5. ft
Well Radius: 0.25 ft

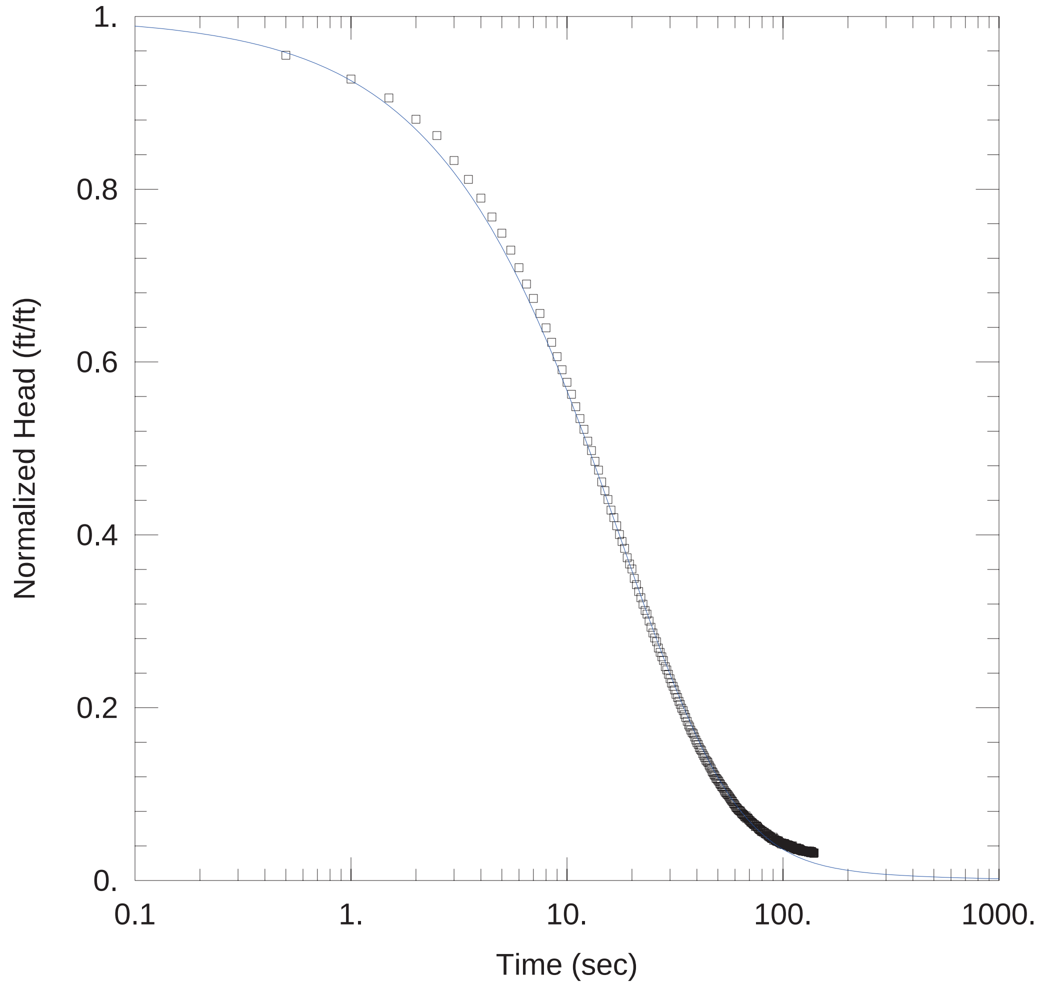
SOLUTION

Aquifer Model: Confined

Solution Method: KGS Model

Kr = 0.00388 cm/sec
Kz/Kr = 1.

Ss = 4.23E-8 ft^{-1}



APW-14 FH02

PROJECT INFORMATION

Company: Ramboll
Client: IPGC
Project: 1940100499-001
Location: Newton
Test Well: APW-14
Test Date: 3/31/2021

AQUIFER DATA

Saturated Thickness: 6.3 ft

WELL DATA (APW-14)

Initial Displacement: 1.379 ft
Total Well Penetration Depth: 5. ft
Casing Radius: 0.086 ft

Static Water Column Height: 36.73 ft
Screen Length: 5. ft
Well Radius: 0.25 ft

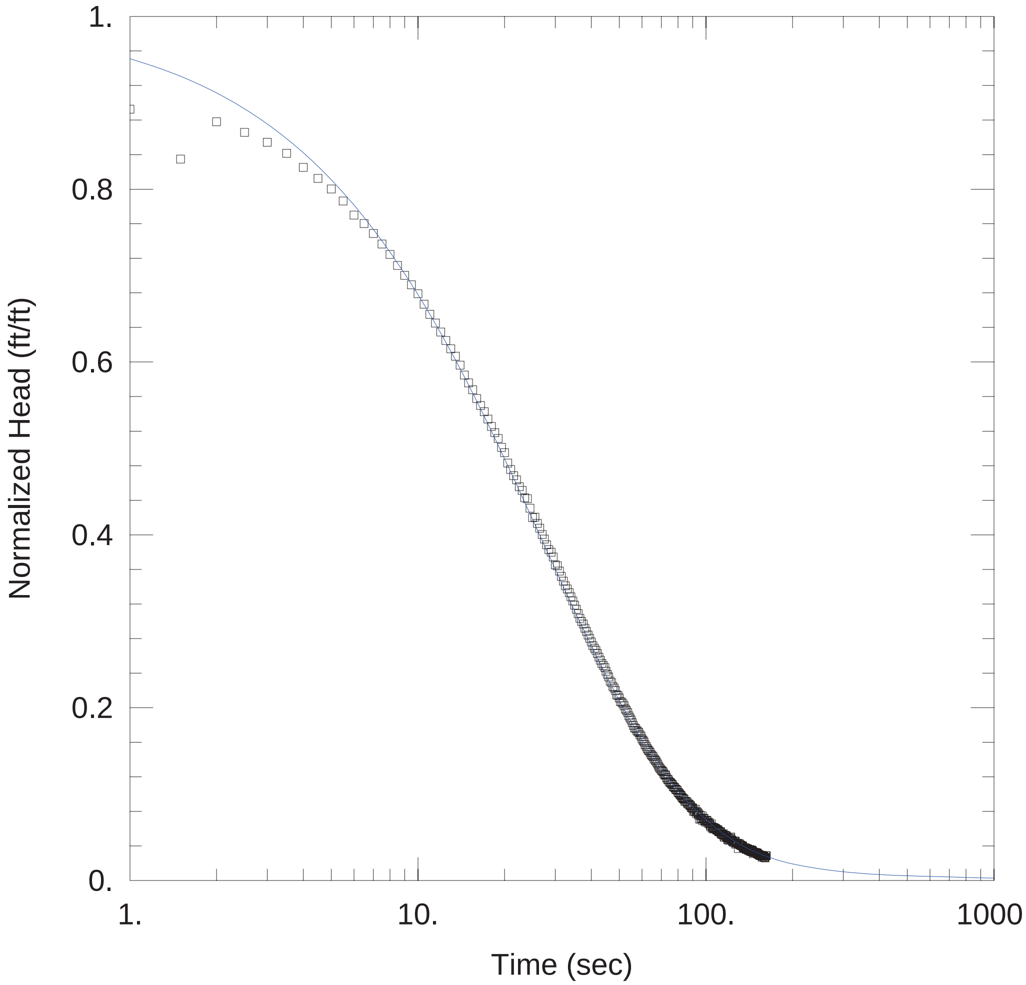
SOLUTION

Aquifer Model: Confined

Kr = 0.00433 cm/sec
Kz/Kr = 1.

Solution Method: KGS Model

Ss = 4.29E-6 ft^{-1}



APW-14 FH3

PROJECT INFORMATION

Company: Ramboll
Client: IPGC
Project: 1940100499-001
Location: Newton
Test Well: APW-14
Test Date: 3/31/2021

AQUIFER DATA

Saturated Thickness: 6.3 ft

WELL DATA (APW-14)

Initial Displacement: 1.648 ft
Total Well Penetration Depth: 5. ft
Casing Radius: 0.086 ft

Static Water Column Height: 36.72 ft
Screen Length: 5. ft
Well Radius: 0.25 ft

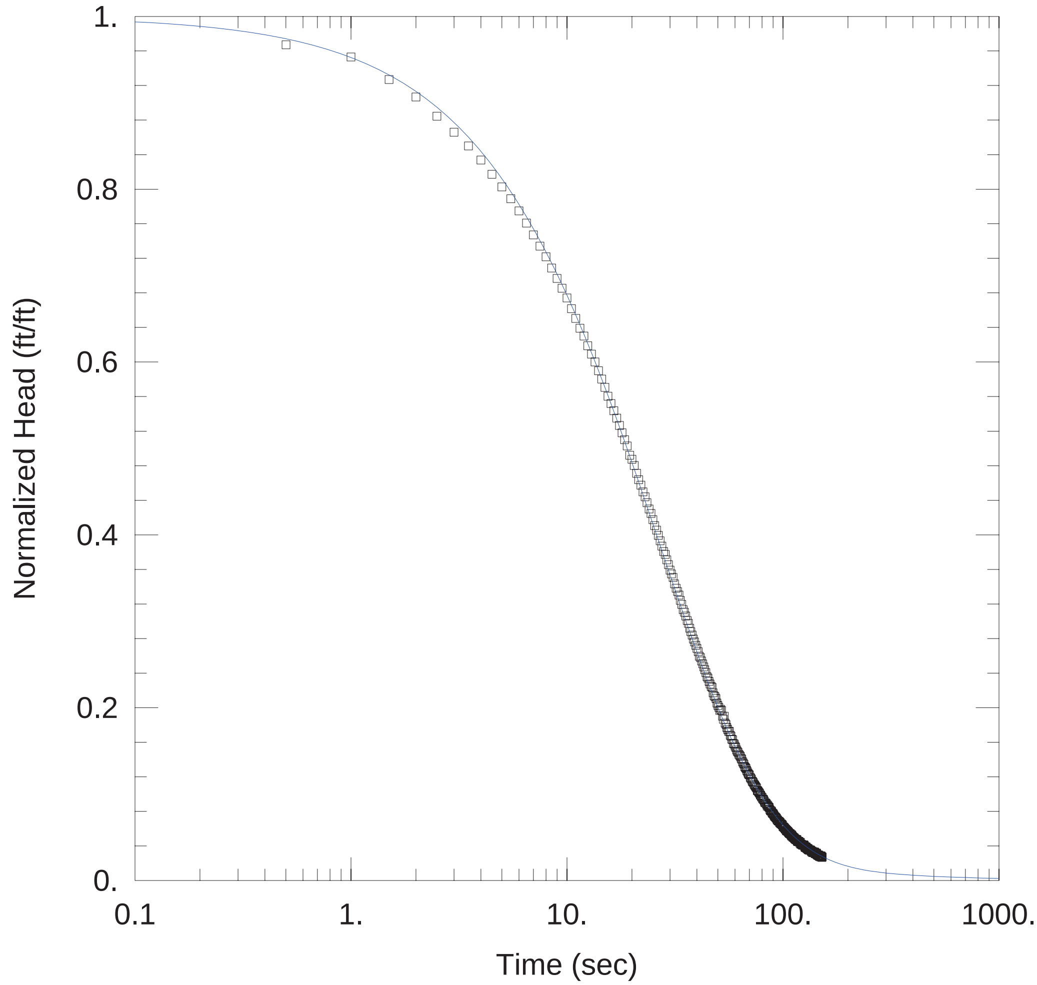
SOLUTION

Aquifer Model: Confined

Solution Method: KGS Model

Kr = 0.00332 cm/sec
Kz/Kr = 1.

Ss = 8.98E-7 ft^{-1}



APW-14 RH1

PROJECT INFORMATION

Company: Ramboll
Client: IPGC
Project: 1940100499-001
Location: Newton
Test Well: APW-14
Test Date: 3/31/2021

AQUIFER DATA

Saturated Thickness: 6.3 ft

WELL DATA (APW-14)

Initial Displacement: -1.768 ft
Total Well Penetration Depth: 5. ft
Casing Radius: 0.086 ft

Static Water Column Height: 36.76 ft
Screen Length: 5. ft
Well Radius: 0.25 ft

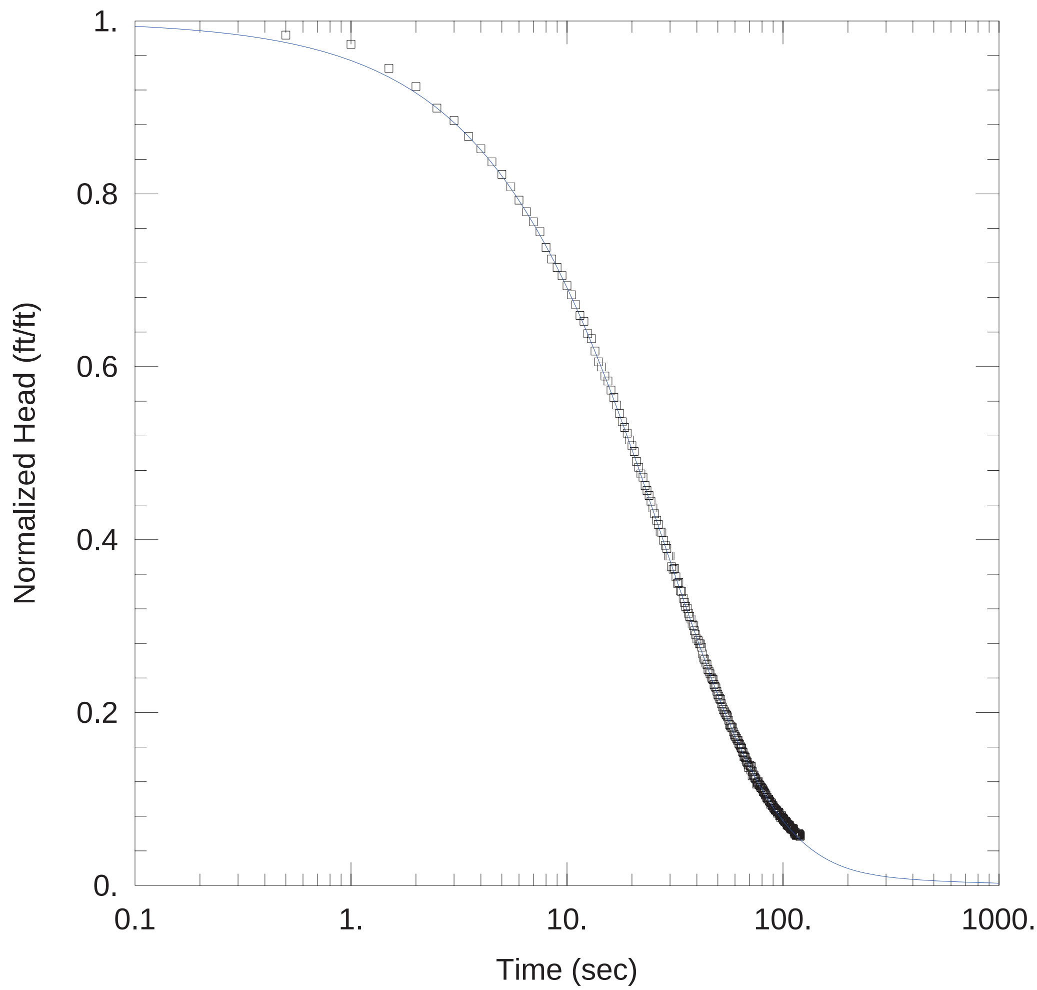
SOLUTION

Aquifer Model: Confined

Kr = 0.00381 cm/sec
Kz/Kr = 1.

Solution Method: KGS Model

Ss = 2.12E-7 ft^{-1}



APW-14 RH2

PROJECT INFORMATION

Company: Ramboll
Client: IPGC
Project: 1940100499-001
Location: Newton
Test Well: APW-14
Test Date: 3/31/2021

AQUIFER DATA

Saturated Thickness: 6.3 ft

WELL DATA (APW-14)

Initial Displacement: -1.042 ft
Total Well Penetration Depth: 5. ft
Casing Radius: 0.086 ft

Static Water Column Height: 36.72 ft
Screen Length: 5. ft
Well Radius: 0.25 ft

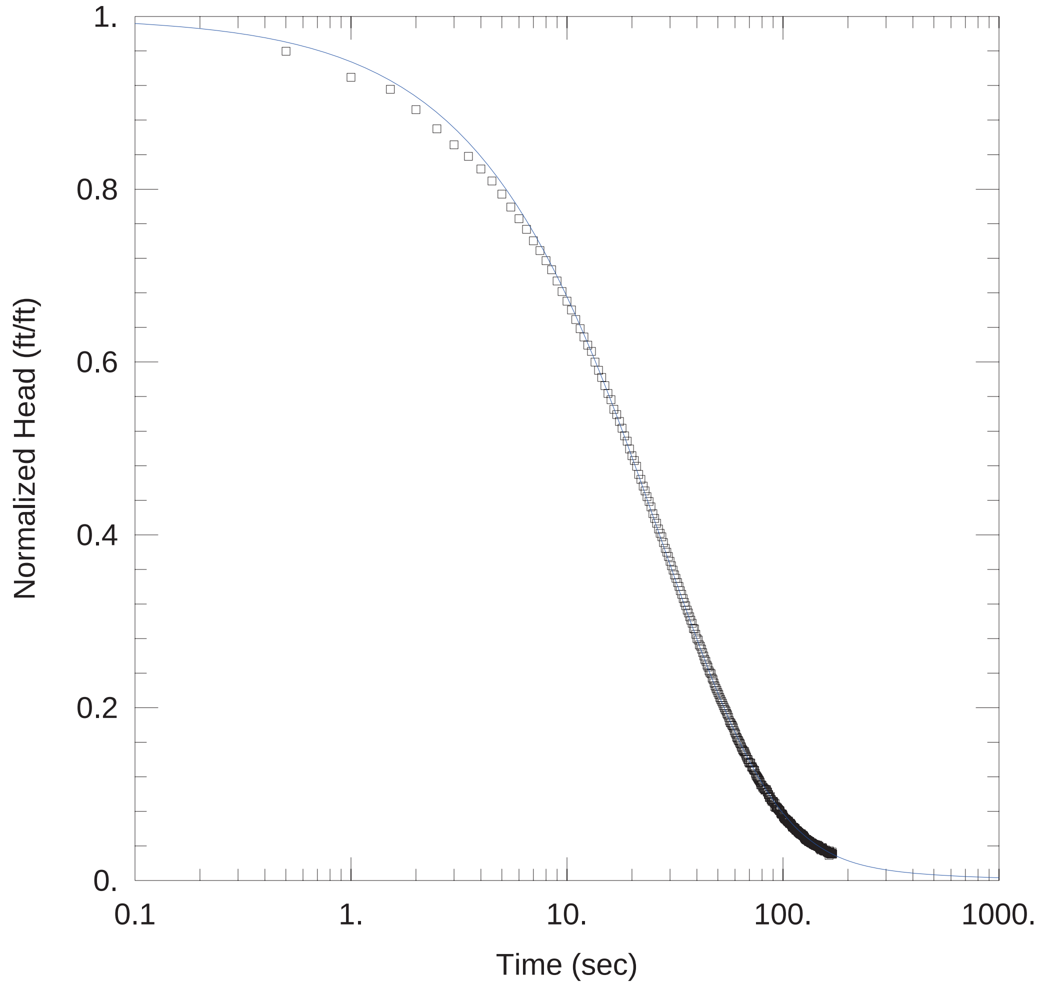
SOLUTION

Aquifer Model: Confined

Solution Method: KGS Model

Kr = 0.00336 cm/sec
Kz/Kr = 1.

Ss = 4.36E-7 ft^{-1}



APW-14 RH3

PROJECT INFORMATION

Company: Ramboll
Client: IPGC
Project: 1940100499-001
Location: Newton
Test Well: APW-14
Test Date: 3/31/2021

AQUIFER DATA

Saturated Thickness: 6.3 ft

WELL DATA (APW-14)

Initial Displacement: -1.79 ft
Total Well Penetration Depth: 5. ft
Casing Radius: 0.08625 ft

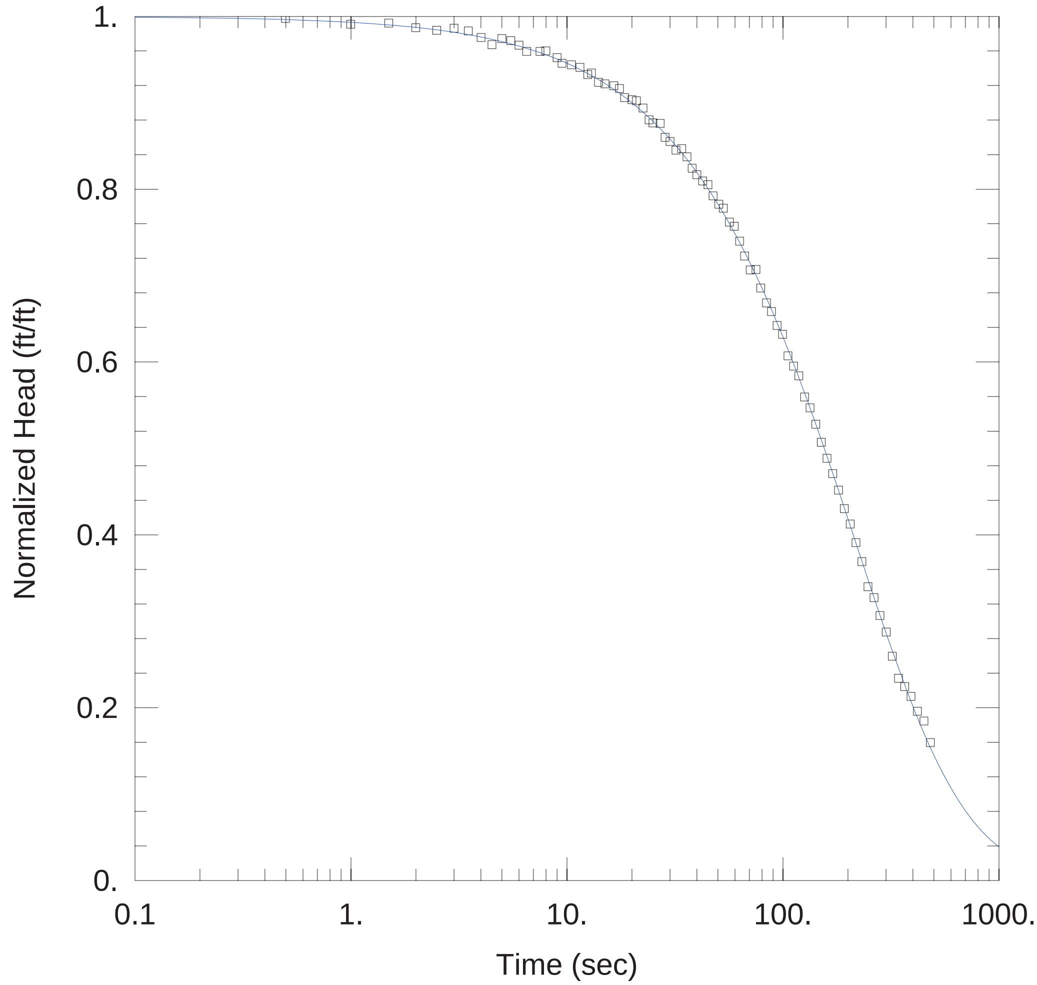
Static Water Column Height: 36.75 ft
Screen Length: 5. ft
Well Radius: 0.25 ft

SOLUTION

Aquifer Model: Confined
Solution Method: KGS Model

Kr = 0.0028 cm/sec
Kz/Kr = 1.

Ss = 4.94E-6 ft^{-1}



APW-15 FH01

PROJECT INFORMATION

Company: Ramboll
Client: IPGC
Project: 1940100499-001
Location: Newton
Test Well: APW-15
Test Date: 3/31/2021

AQUIFER DATA

Saturated Thickness: 7.1 ft

WELL DATA (APW-15)

Initial Displacement: 1.68 ft
Total Well Penetration Depth: 50.5 ft
Casing Radius: 0.086 ft

Static Water Column Height: 82.47 ft
Screen Length: 5. ft
Well Radius: 0.25 ft

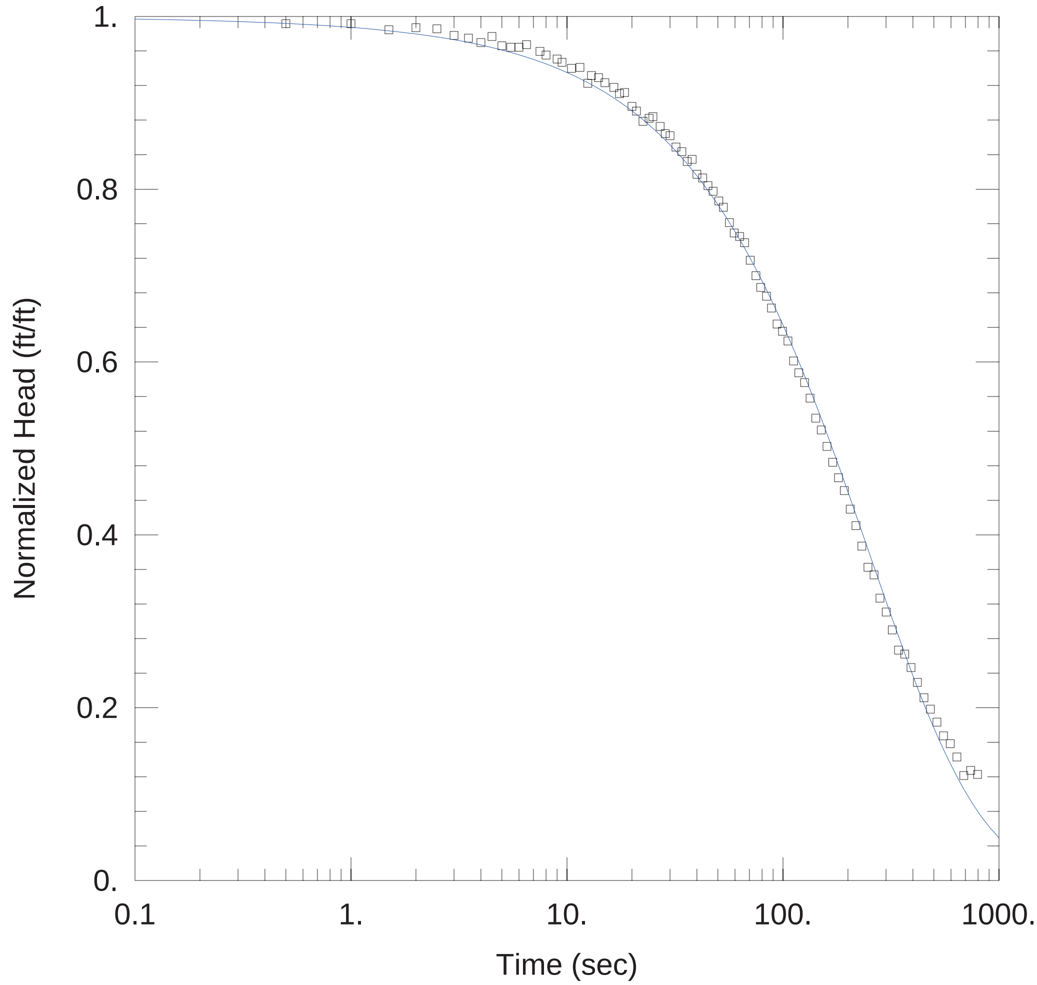
SOLUTION

Aquifer Model: Confined

Kr = 0.000485 cm/sec
Kz/Kr = 1.

Solution Method: KGS Model

Ss = 3.29E-7 ft^{-1}



APW-15 FH2

PROJECT INFORMATION

Company: Ramboll
Client: IPGC
Project: 1940100499-001
Location: Newton
Test Well: APW-15
Test Date: 3/31/2021

AQUIFER DATA

Saturated Thickness: 51.8 ft

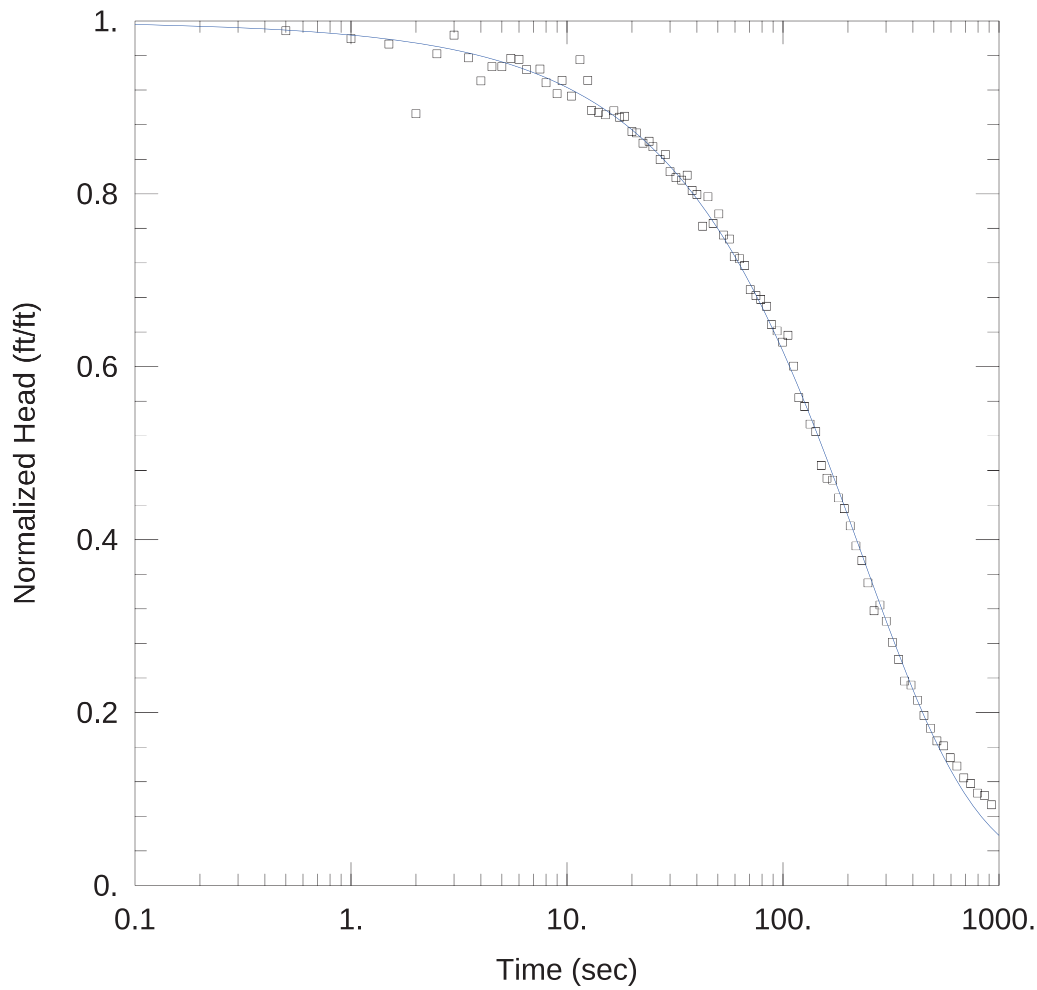
WELL DATA (APW-15)

Initial Displacement: 1.68 ft
Total Well Penetration Depth: 50.5 ft
Casing Radius: 0.086 ft
Static Water Column Height: 82.32 ft
Screen Length: 5. ft
Well Radius: 0.25 ft

SOLUTION

Aquifer Model: Confined
Solution Method: KGS Model

Kr = 0.0002 cm/sec
Kz/Kr = 1.
Ss = 5.25E-5 ft^{-1}



APW-15 RH-01

PROJECT INFORMATION

Company: Ramboll
Client: IPGC
Project: 1940100499-001
Location: Newton
Test Well: APW-15
Test Date: 3/31/2021

AQUIFER DATA

Saturated Thickness: 7.1 ft

WELL DATA (APW-15)

Initial Displacement: 1.76 ft
Total Well Penetration Depth: 50.5 ft
Casing Radius: 0.086 ft

Static Water Column Height: 82.59 ft
Screen Length: 5. ft
Well Radius: 0.25 ft

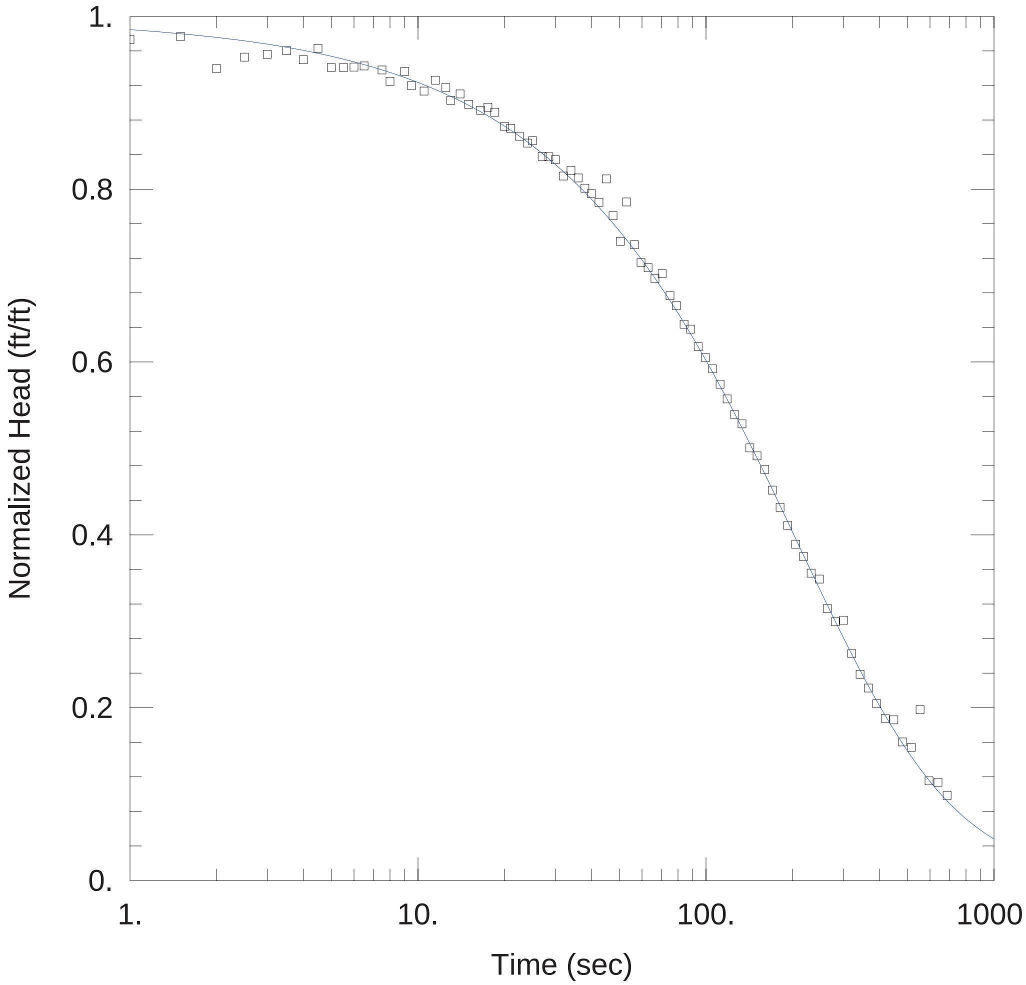
SOLUTION

Aquifer Model: Confined

Kr = 0.000281 cm/sec
Kz/Kr = 1.

Solution Method: KGS Model

Ss = 0.000132 ft^{-1}



APW-15 RH2

PROJECT INFORMATION

Company: Ramboll
Client: IPGC
Project: 1940100499-001
Location: Newton
Test Well: APW-15
Test Date: 3/31/2021

AQUIFER DATA

Saturated Thickness: 7.1 ft

WELL DATA (APW-15)

Initial Displacement: 1.76 ft
Total Well Penetration Depth: 50.5 ft
Casing Radius: 0.086 ft

Static Water Column Height: 82.52 ft
Screen Length: 5. ft
Well Radius: 0.25 ft

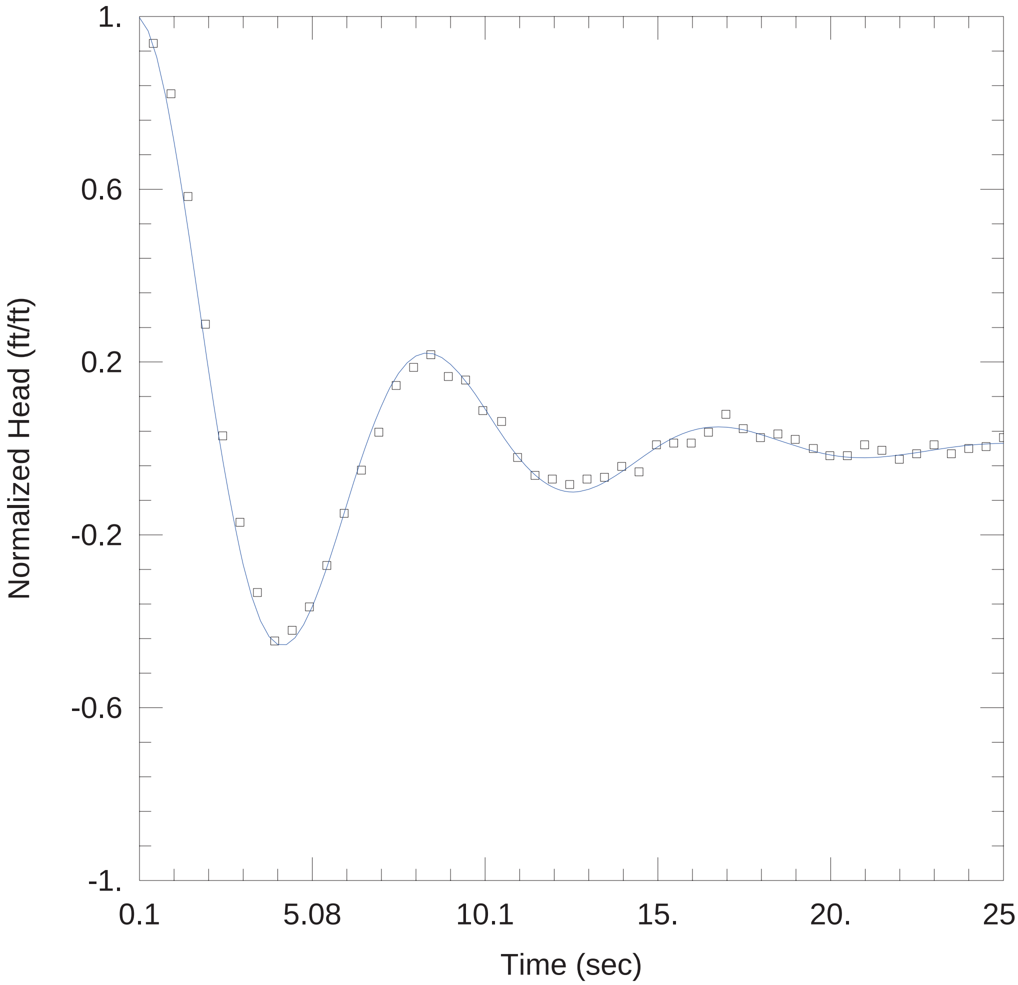
SOLUTION

Aquifer Model: Confined

Kr = 0.00032 cm/sec
Kz/Kr = 1.

Solution Method: KGS Model

Ss = 8.48E-5 ft^{-1}



APW-16 FH01

PROJECT INFORMATION

Company: Ramboll
Client: IPGC
Project: 1940100499-001
Location: Newton
Test Well: APW-16
Test Date: 3/11/2021

AQUIFER DATA

Saturated Thickness: 16.4 ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (APW-16)

Initial Displacement: 0.24 ft
Total Well Penetration Depth: 16.3 ft
Casing Radius: 0.086 ft

Static Water Column Height: 64.37 ft
Screen Length: 5. ft
Well Radius: 0.25 ft

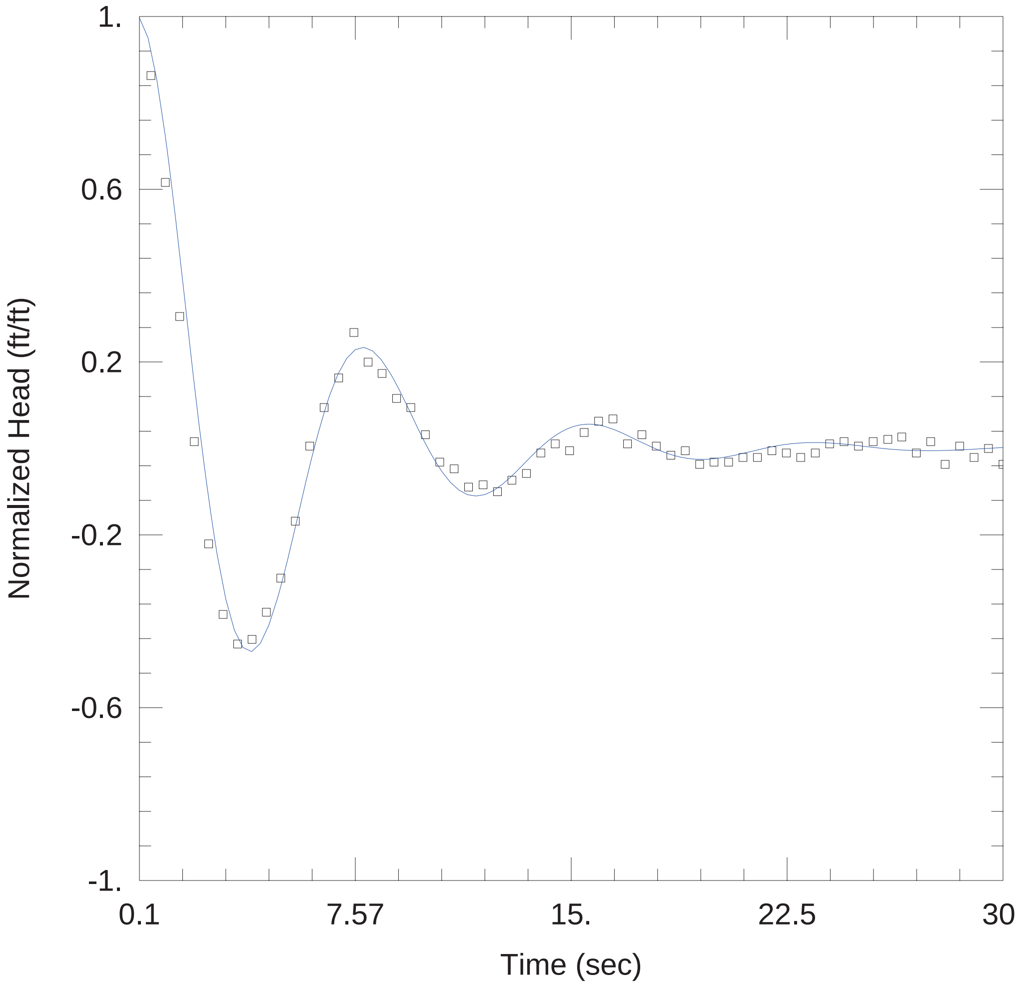
SOLUTION

Aquifer Model: Confined

Solution Method: Butler-Zhan

Kr = 0.124 cm/sec
Kz/Kr = 1.

Ss = 8.12E-7 ft^{-1}
Le = 56.01 ft



APW-16 FH02

PROJECT INFORMATION

Company: Ramboll
Client: IPGC
Project: 1940100499-001
Location: Newton
Test Well: APW-16
Test Date: 3/11/2021

AQUIFER DATA

Saturated Thickness: 16.4 ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (APW-16)

Initial Displacement: 0.19 ft
Total Well Penetration Depth: 16.3 ft
Casing Radius: 0.08625 ft

Static Water Column Height: 64.22 ft
Screen Length: 5. ft
Well Radius: 0.25 ft

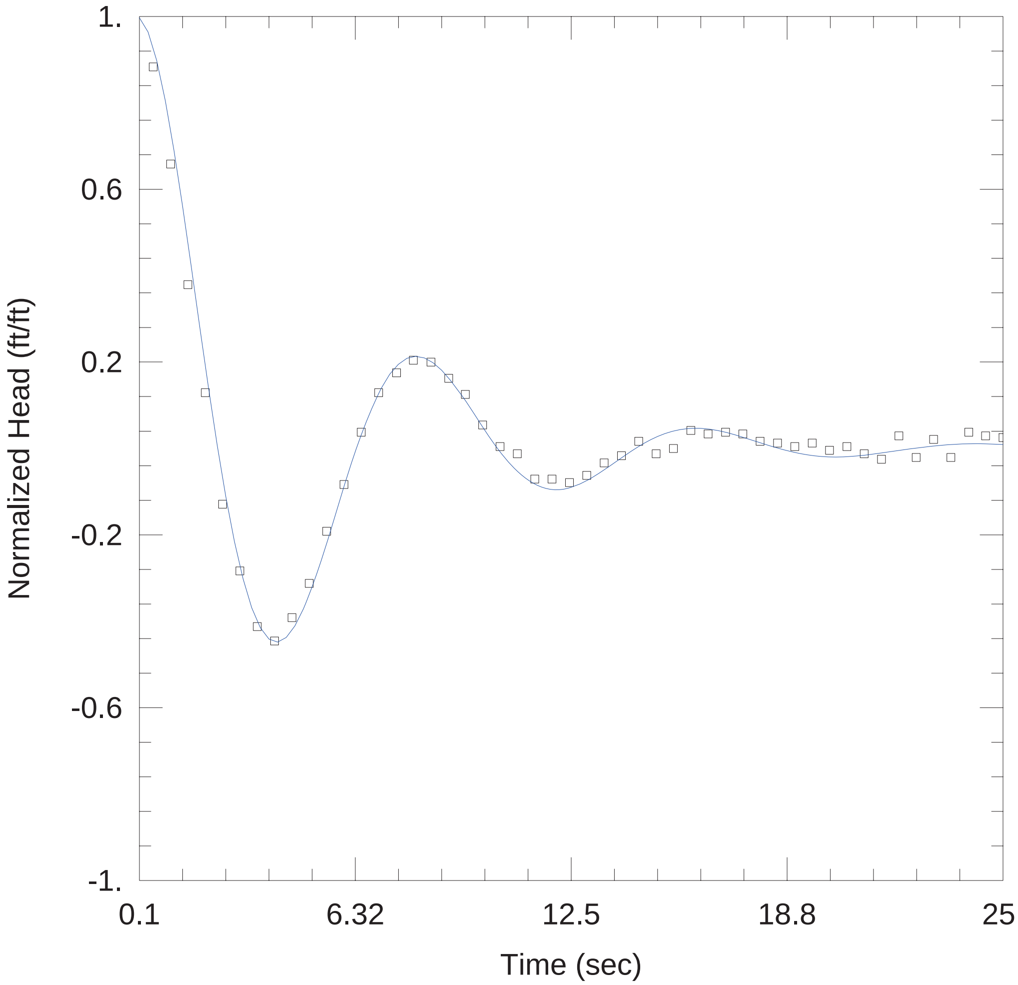
SOLUTION

Aquifer Model: Confined

Solution Method: Butler-Zhan

Kr = 0.141 cm/sec
Kz/Kr = 1.

Ss = 6.55E-7 ft^{-1}
Le = 48.91 ft



APW-16 FH03

PROJECT INFORMATION

Company: Ramboll
Client: IPGC
Project: 1940100499-001
Location: Newton
Test Well: APW-16
Test Date: 3/11/2021

AQUIFER DATA

Saturated Thickness: 16.4 ft
Anisotropy Ratio (Kz/Kr): 1.

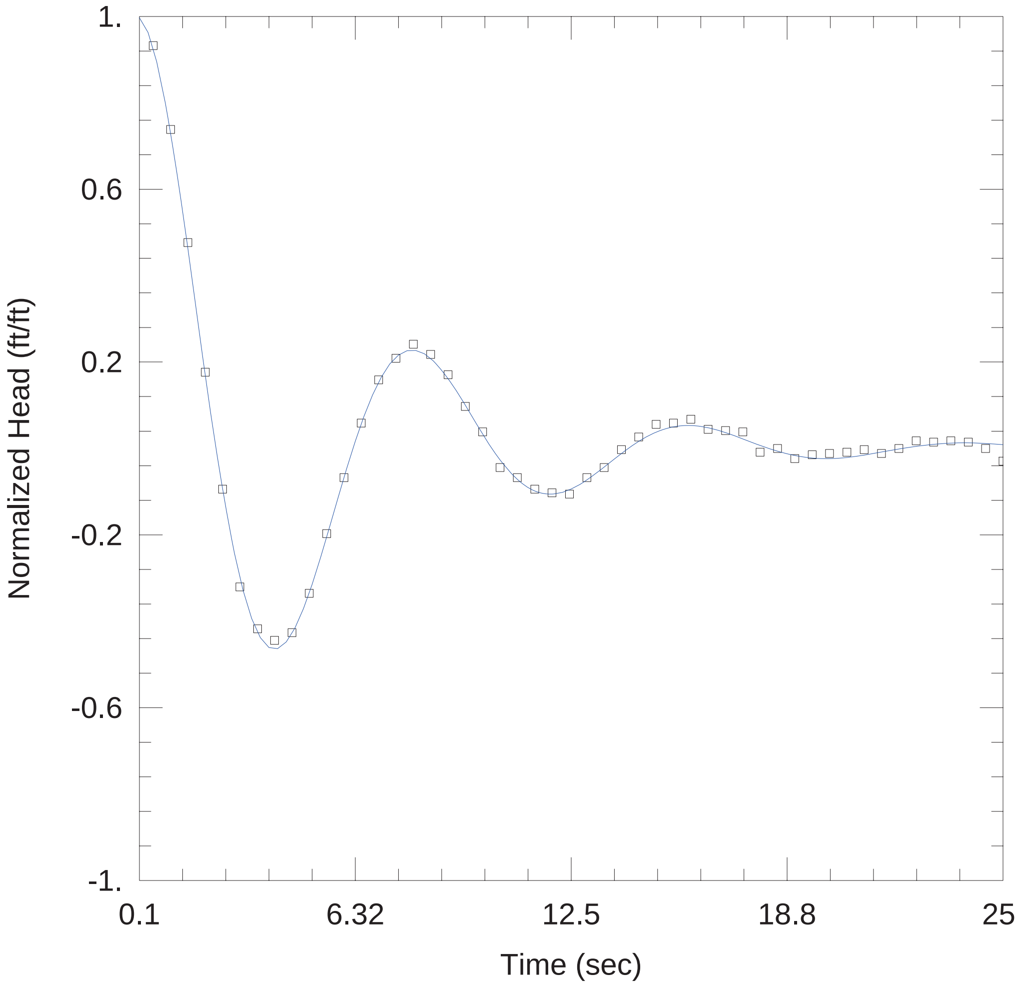
WELL DATA (APW-16)

Initial Displacement: 0.24 ft
Total Well Penetration Depth: 16.3 ft
Casing Radius: 0.086 ft
Static Water Column Height: 64.49 ft
Screen Length: 5. ft
Well Radius: 0.25 ft

SOLUTION

Aquifer Model: Confined
Solution Method: Butler-Zhan

Kr = 0.135 cm/sec
Kz/Kr = 1.
Ss = 1.65E-7 ft^{-1}
Le = 51.68 ft



APW-16 RH01

PROJECT INFORMATION

Company: Ramboll
Client: IPGC
Project: 1940100499-001
Location: Newton
Test Well: APW-16
Test Date: 3/11/2021

AQUIFER DATA

Saturated Thickness: 16.4 ft
Anisotropy Ratio (Kz/Kr): 1.

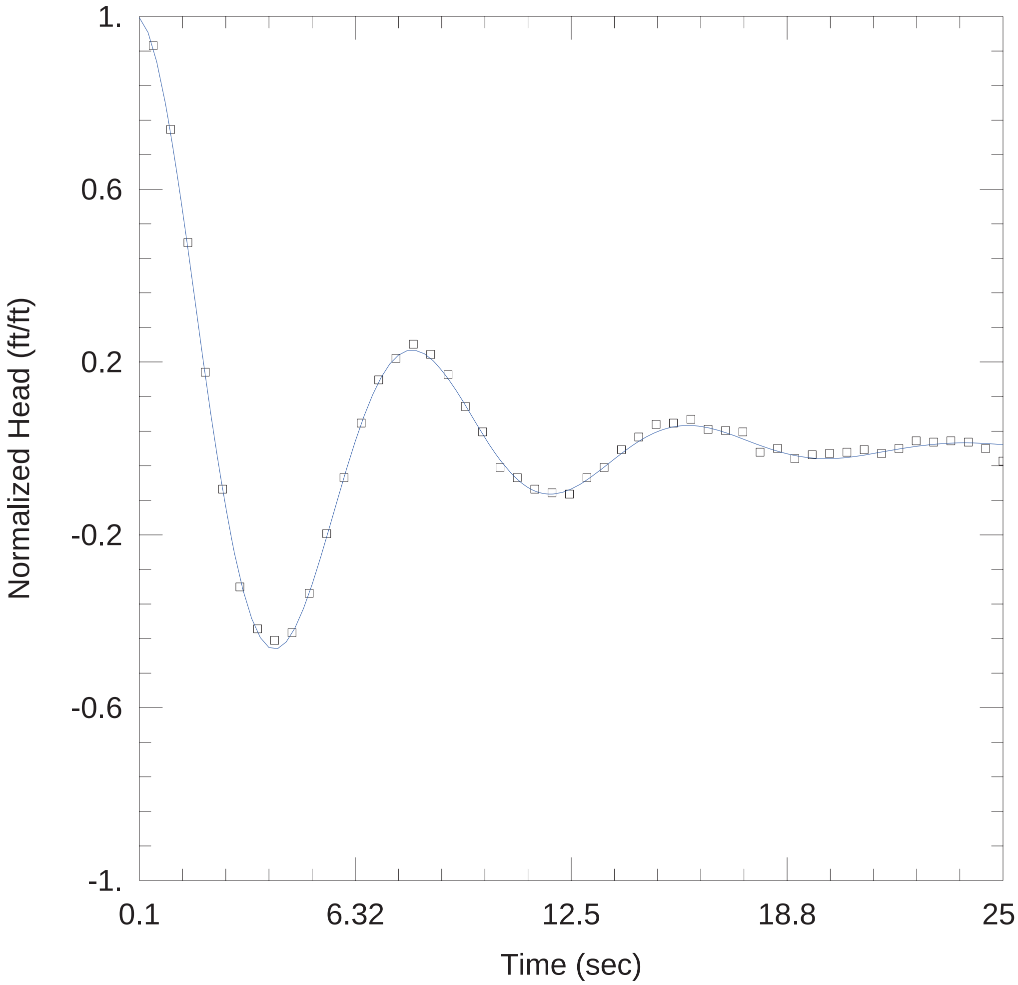
WELL DATA (APW-16)

Initial Displacement: 0.34 ft
Total Well Penetration Depth: 16.3 ft
Casing Radius: 0.086 ft
Static Water Column Height: 64.49 ft
Screen Length: 5. ft
Well Radius: 0.25 ft

SOLUTION

Aquifer Model: Confined
Solution Method: Butler-Zhan

Kr = 0.145 cm/sec
Kz/Kr = 1.
Ss = 1.21E-7 ft^{-1}
Le = 50.37 ft



APW-16 RH01

PROJECT INFORMATION

Company: Ramboll
Client: IPGC
Project: 1940100499-001
Location: Newton
Test Well: APW-16
Test Date: 3/11/2021

AQUIFER DATA

Saturated Thickness: 16.4 ft
Anisotropy Ratio (Kz/Kr): 1.

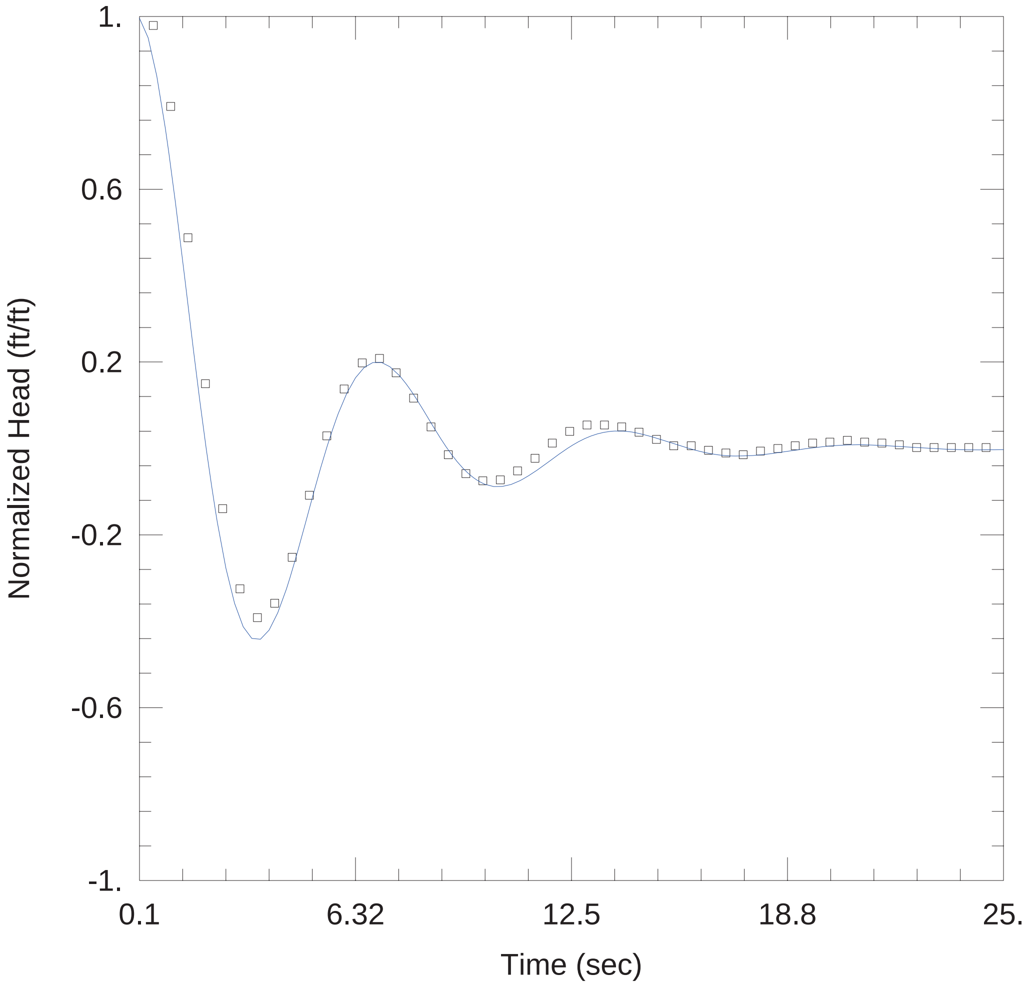
WELL DATA (APW-16)

Initial Displacement: 0.34 ft
Total Well Penetration Depth: 16.3 ft
Casing Radius: 0.086 ft
Static Water Column Height: 64.49 ft
Screen Length: 5. ft
Well Radius: 0.25 ft

SOLUTION

Aquifer Model: Confined
Solution Method: Butler-Zhan

Kr = 0.145 cm/sec
Kz/Kr = 1.
Ss = 1.21E-7 ft^{-1}
Le = 50.37 ft



APW-17 FH01

PROJECT INFORMATION

Company: Ramboll
Client: IPGC
Project: 1940100499-001
Location: Newton
Test Well: APW-17
Test Date: 02/16/2021

AQUIFER DATA

Saturated Thickness: 84.7 ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (APW-17)

Initial Displacement: 0.48 ft
Total Well Penetration Depth: 79.7 ft
Casing Radius: 0.086 ft

Static Water Column Height: 53.93 ft
Screen Length: 5. ft
Well Radius: 0.25 ft

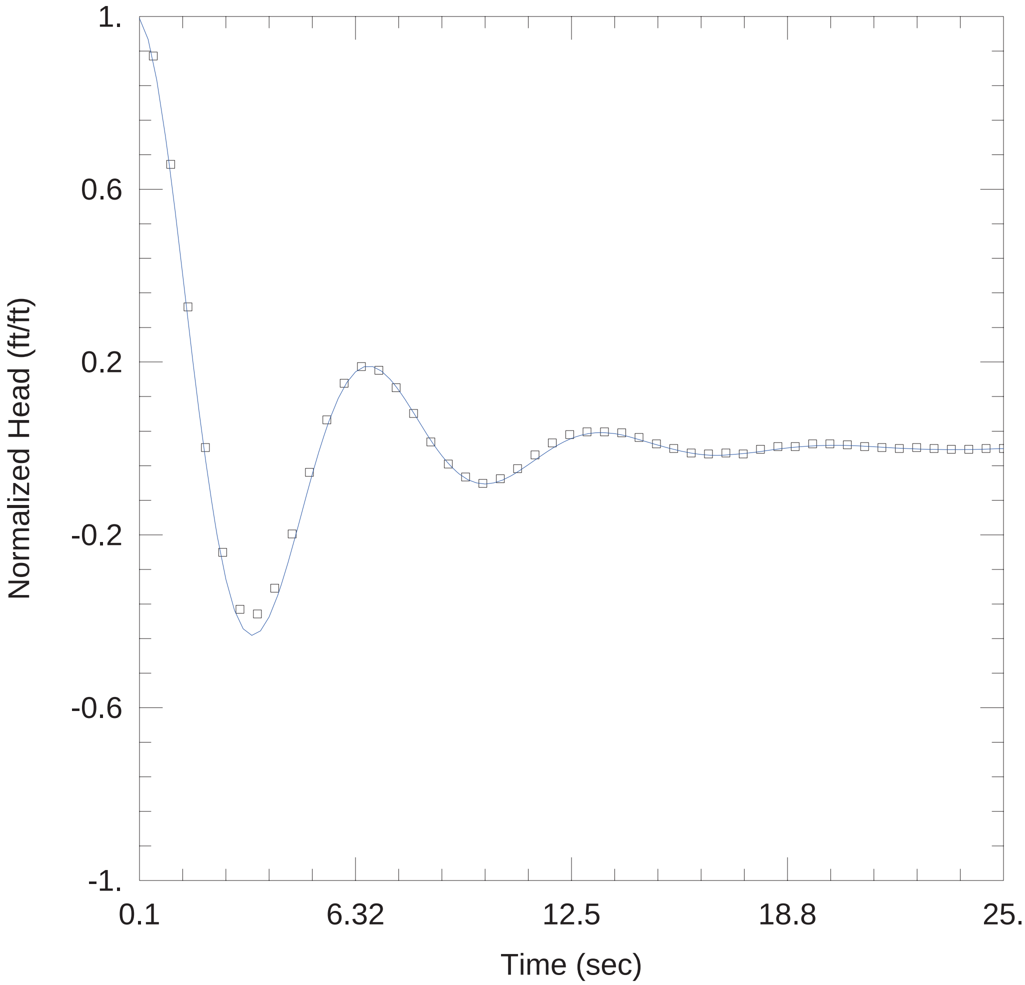
SOLUTION

Aquifer Model: Confined

Kr = 0.113 cm/sec
Kz/Kr = 1.

Solution Method: Butler-Zhan

Ss = 5.88E-7 ft^{-1}
Le = 37.31 ft



APW-17 FH02

PROJECT INFORMATION

Company: Ramboll
Client: IPGC
Project: 1940100499-001
Location: Newton
Test Well: APW-17
Test Date: 02/16/2021

AQUIFER DATA

Saturated Thickness: 84.7 ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (APW-17)

Initial Displacement: 0.47 ft
Total Well Penetration Depth: 79.7 ft
Casing Radius: 0.086 ft

Static Water Column Height: 53.93 ft
Screen Length: 5. ft
Well Radius: 0.25 ft

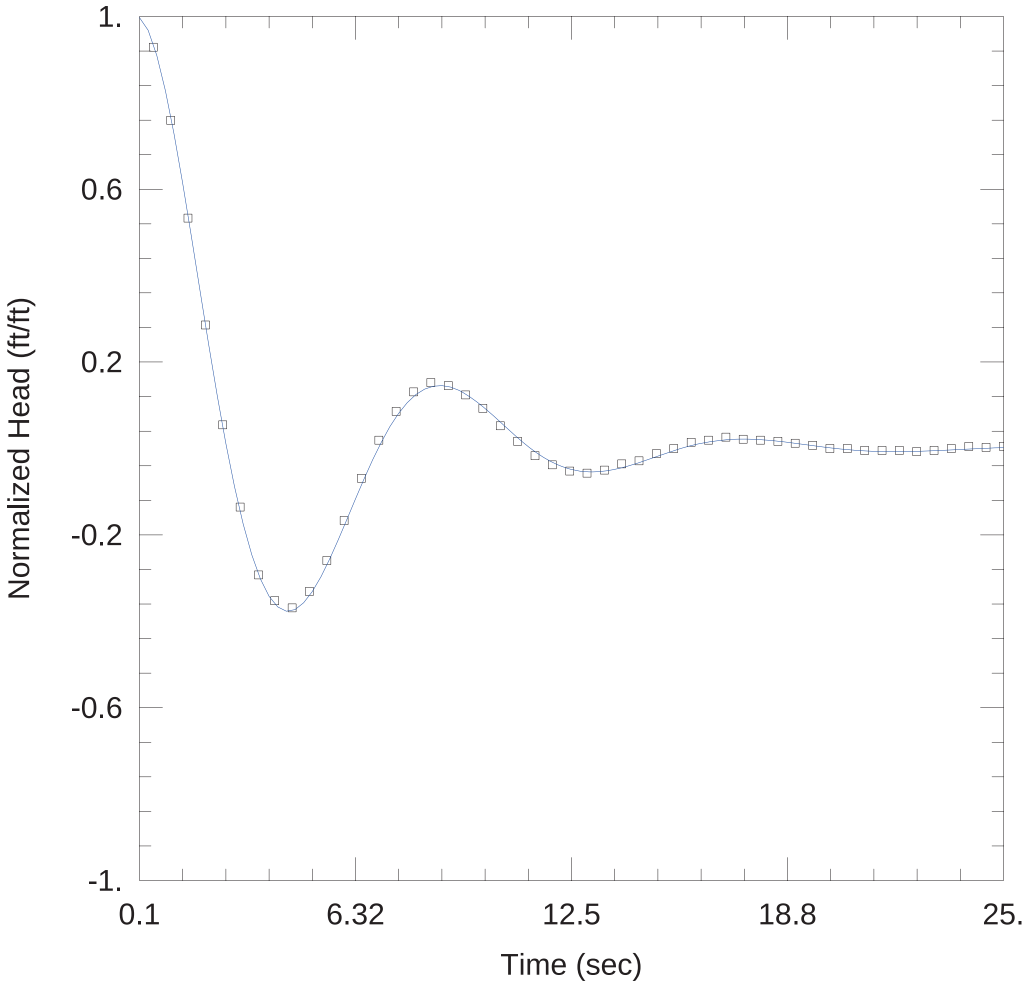
SOLUTION

Aquifer Model: Confined

Solution Method: Butler-Zhan

Kr = 0.115 cm/sec
Kz/Kr = 1.

Ss = 2.88E-7 ft^{-1}
Le = 34.54 ft



APW-17 RH01

PROJECT INFORMATION

Company: Ramboll
Client: IPGC
Project: 1940100499-001
Location: Newton
Test Well: APW-17
Test Date: 02/16/2021

AQUIFER DATA

Saturated Thickness: 84.7 ft
Anisotropy Ratio (Kz/Kr): 1.

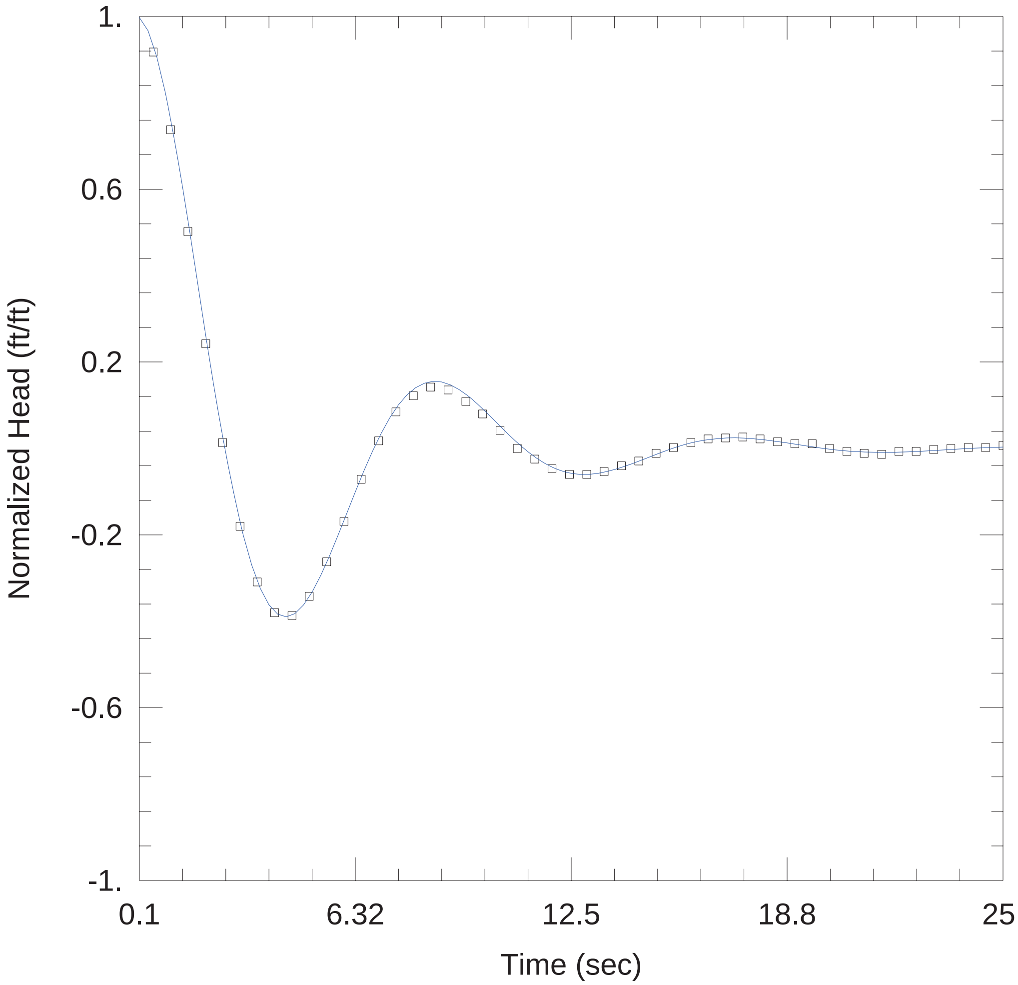
WELL DATA (APW-17)

Initial Displacement: 0.42 ft
Total Well Penetration Depth: 79.7 ft
Casing Radius: 0.086 ft
Static Water Column Height: 53.93 ft
Screen Length: 5. ft
Well Radius: 0.25 ft

SOLUTION

Aquifer Model: Confined
Solution Method: Butler-Zhan

Kr = 0.076 cm/sec
Kz/Kr = 1.
Ss = 2.88E-7 ft^{-1}
Le = 57.77 ft



APW-17 RH02

PROJECT INFORMATION

Company: Ramboll
Client: IPGC
Project: 1940100499-001
Location: Newton
Test Well: APW-17
Test Date: 02/16/2021

AQUIFER DATA

Saturated Thickness: 84.7 ft
Anisotropy Ratio (Kz/Kr): 1.

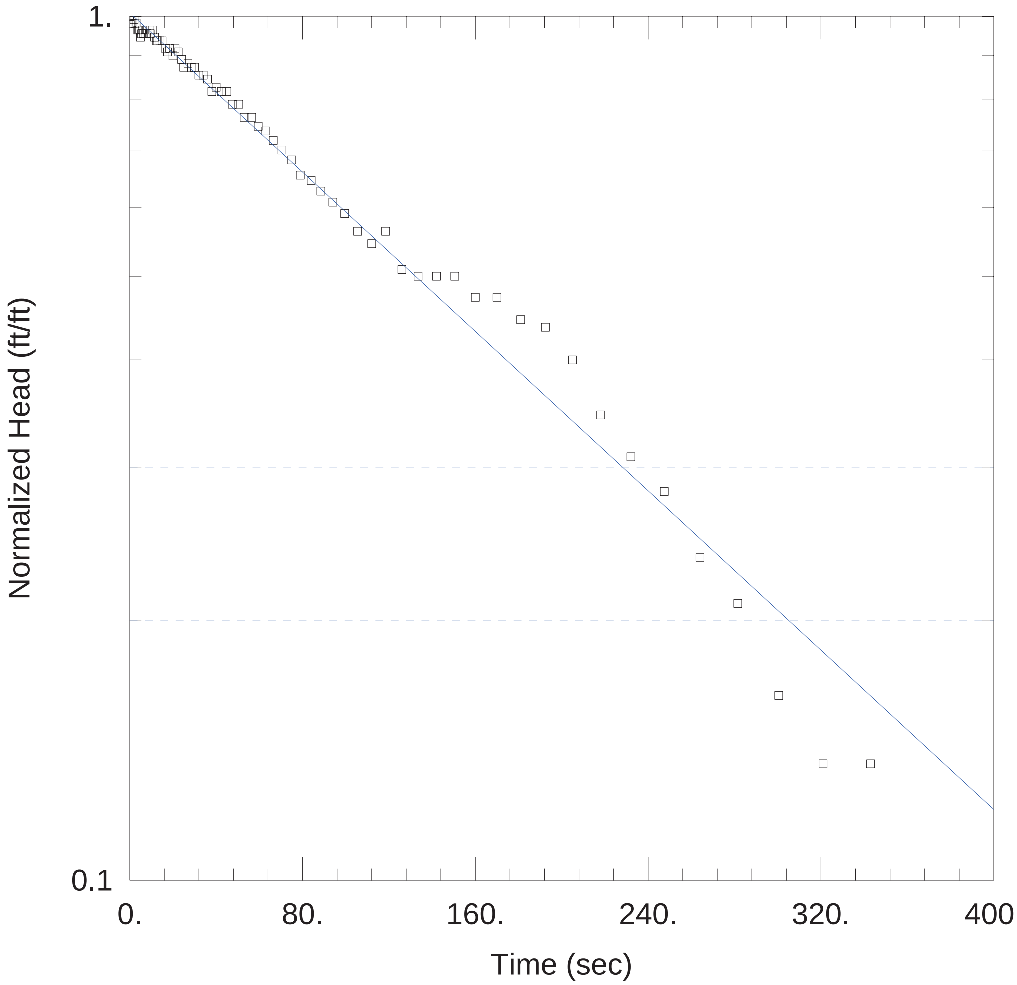
WELL DATA (APW-17)

Initial Displacement: 0.45 ft
Total Well Penetration Depth: 79.7 ft
Casing Radius: 0.086 ft
Static Water Column Height: 53.93 ft
Screen Length: 5. ft
Well Radius: 0.25 ft

SOLUTION

Aquifer Model: Confined
Solution Method: Butler-Zhan

Kr = 0.0796 cm/sec
Kz/Kr = 1.
Ss = 2.88E-7 ft^{-1}
Le = 56.31 ft



APW-18 FH01

PROJECT INFORMATION

Company: Ramboll
Client: IPGC
Project: 1940100499-001
Location: Newton
Test Well: APW-18
Test Date: 2/16/21

AQUIFER DATA

Saturated Thickness: 78.8 ft
Anisotropy Ratio (Kz/Kr): 1.

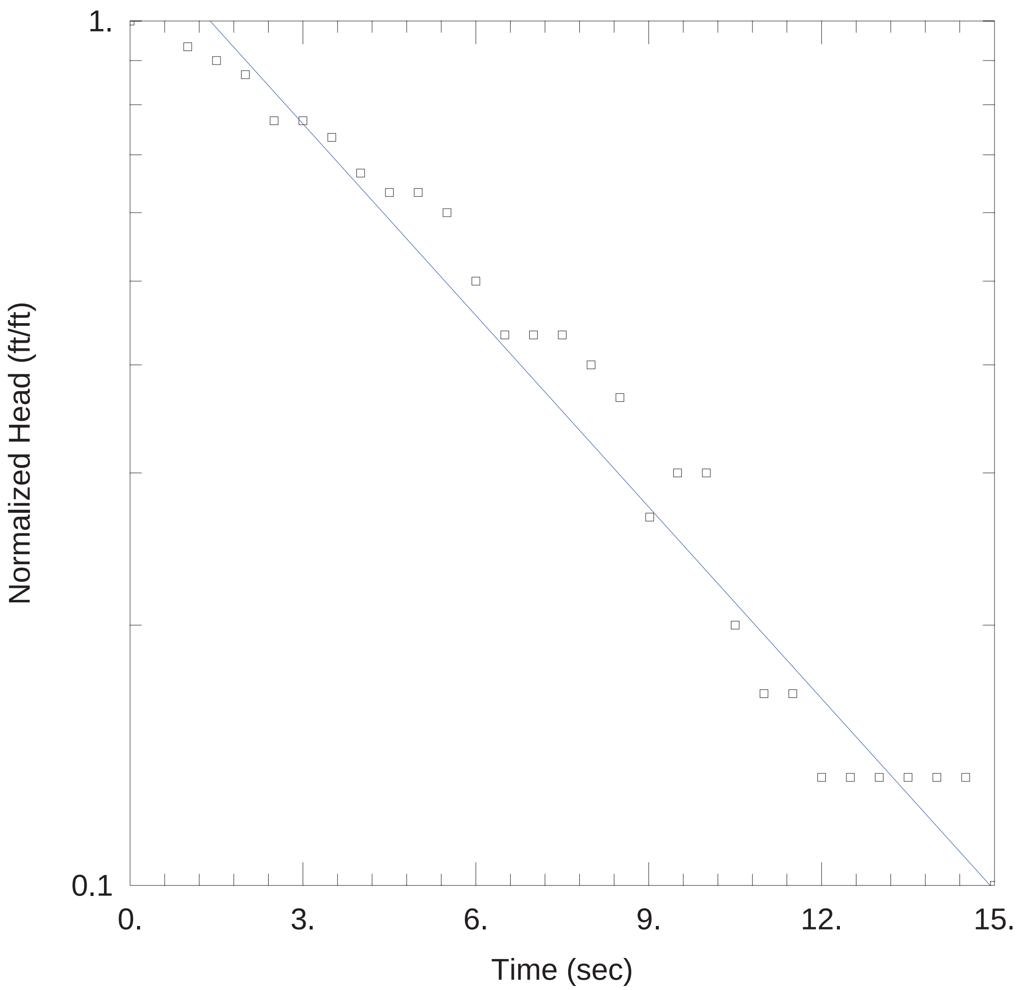
WELL DATA (APW-18)

Initial Displacement: 0.11 ft
Total Well Penetration Depth: 51.1 ft
Casing Radius: 0.086 ft
Static Water Column Height: 31.38 ft
Screen Length: 5. ft
Well Radius: 0.25 ft

SOLUTION

Aquifer Model: Confined
Solution Method: Bouwer-Rice

K = 0.000267 cm/sec
y0 = 0.111 ft



XPW-01 FH01

PROJECT INFORMATION

Company: Ramboll
Client: IPGC
Project: 1940100499-001
Location: Newton
Test Well: XPW-01
Test Date: 3/11/21

AQUIFER DATA

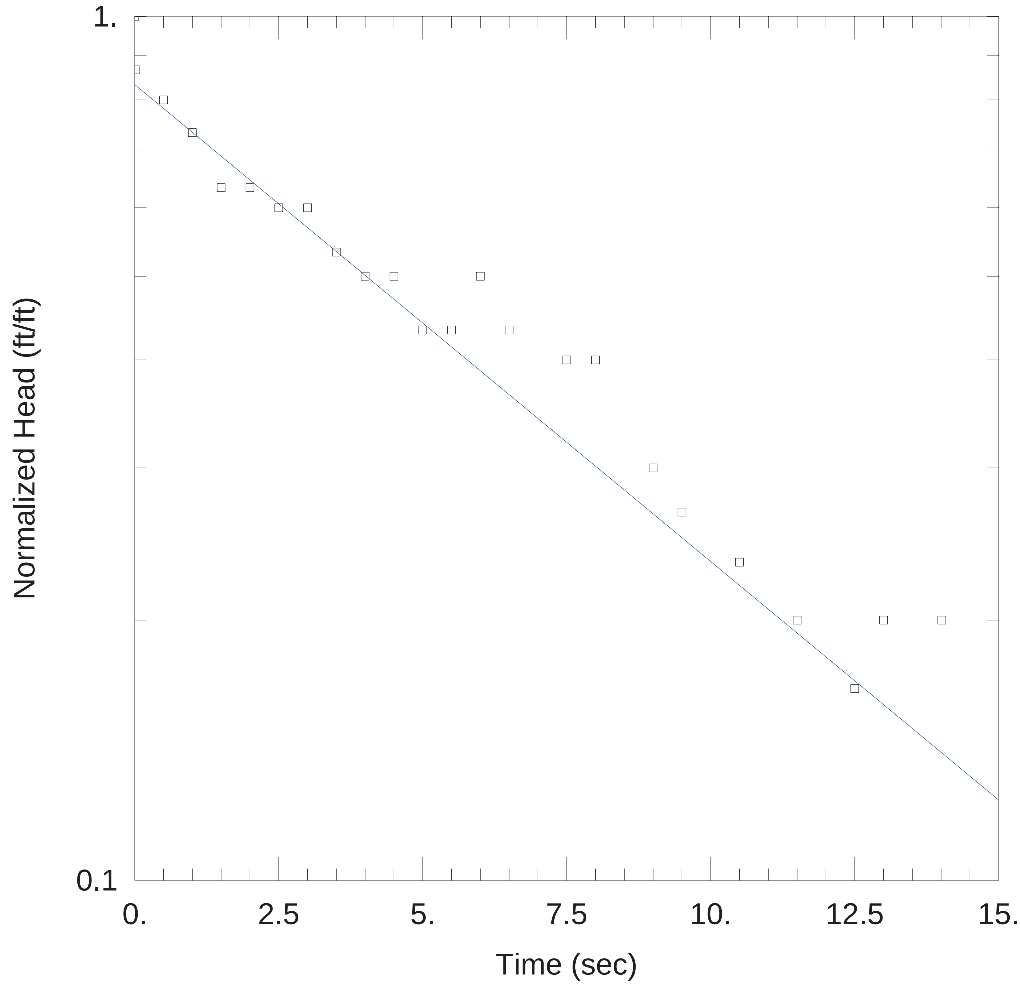
Saturated Thickness: 8. ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (XPW-01)

Initial Displacement: 0.03 ft
Total Well Penetration Depth: 8.033 ft
Casing Radius: 0.086 ft
Static Water Column Height: 8.033 ft
Screen Length: 8.033 ft
Well Radius: 0.25 ft
Gravel Pack Porosity: 0.25

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 0.183 cm/sec
y0 = 0.038 ft



XPW-01 FH-02

PROJECT INFORMATION

Company: Ramboll
Client: IPGC
Project: 1940100499-001
Location: Newton
Test Well: XPW-01
Test Date: 3/11/21

AQUIFER DATA

Saturated Thickness: 8. ft
Anisotropy Ratio (Kz/Kr): 1.

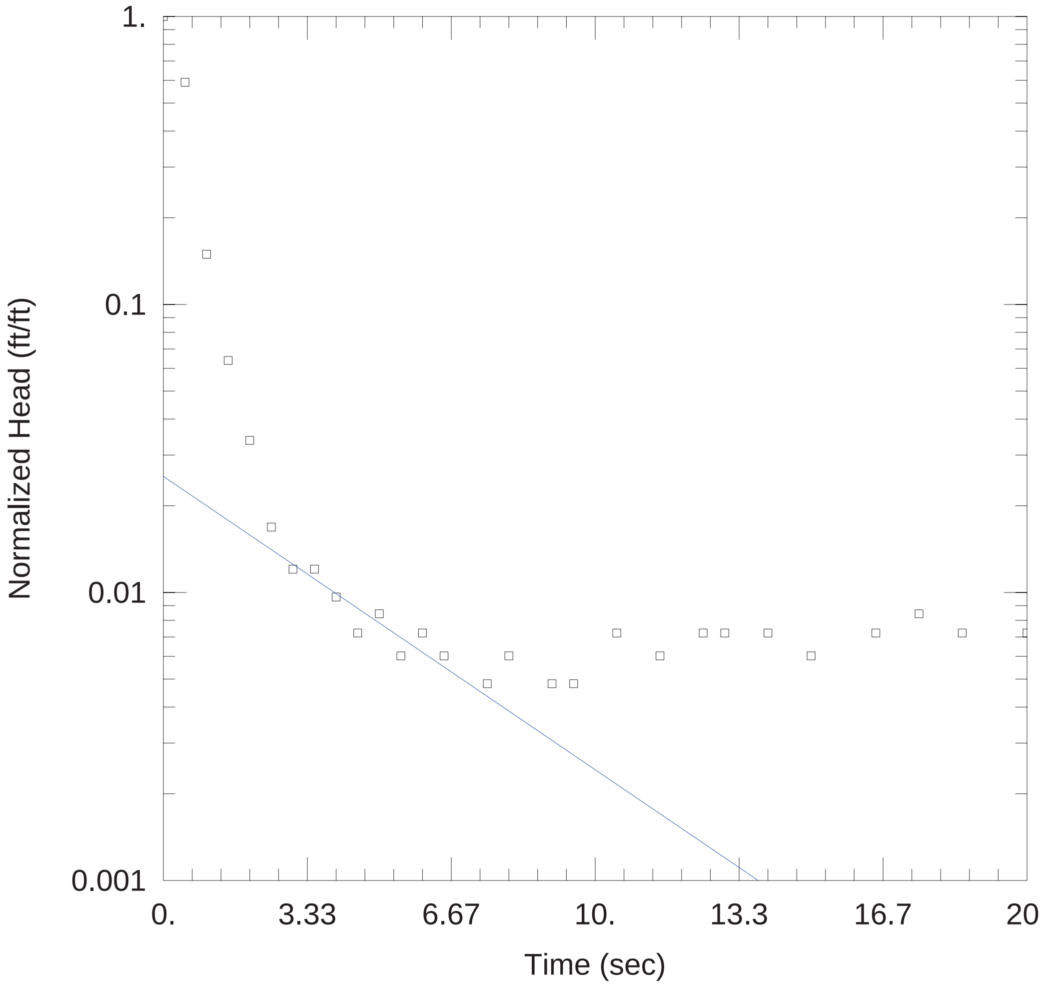
WELL DATA (XPW-01)

Initial Displacement: 0.03 ft
Total Well Penetration Depth: 8.033 ft
Casing Radius: 0.086 ft
Static Water Column Height: 8.033 ft
Screen Length: 8.033 ft
Well Radius: 0.25 ft
Gravel Pack Porosity: 0.25

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

K = 0.0129 cm/sec
y0 = 0.025 ft



XPW-01 RH1

PROJECT INFORMATION

Company: Ramboll
Client: IPGC
Project: 1940100499-001
Location: Newton
Test Well: XPW-01
Test Date: 3/11/21

AQUIFER DATA

Saturated Thickness: 8. ft
Anisotropy Ratio (Kz/Kr): 1.

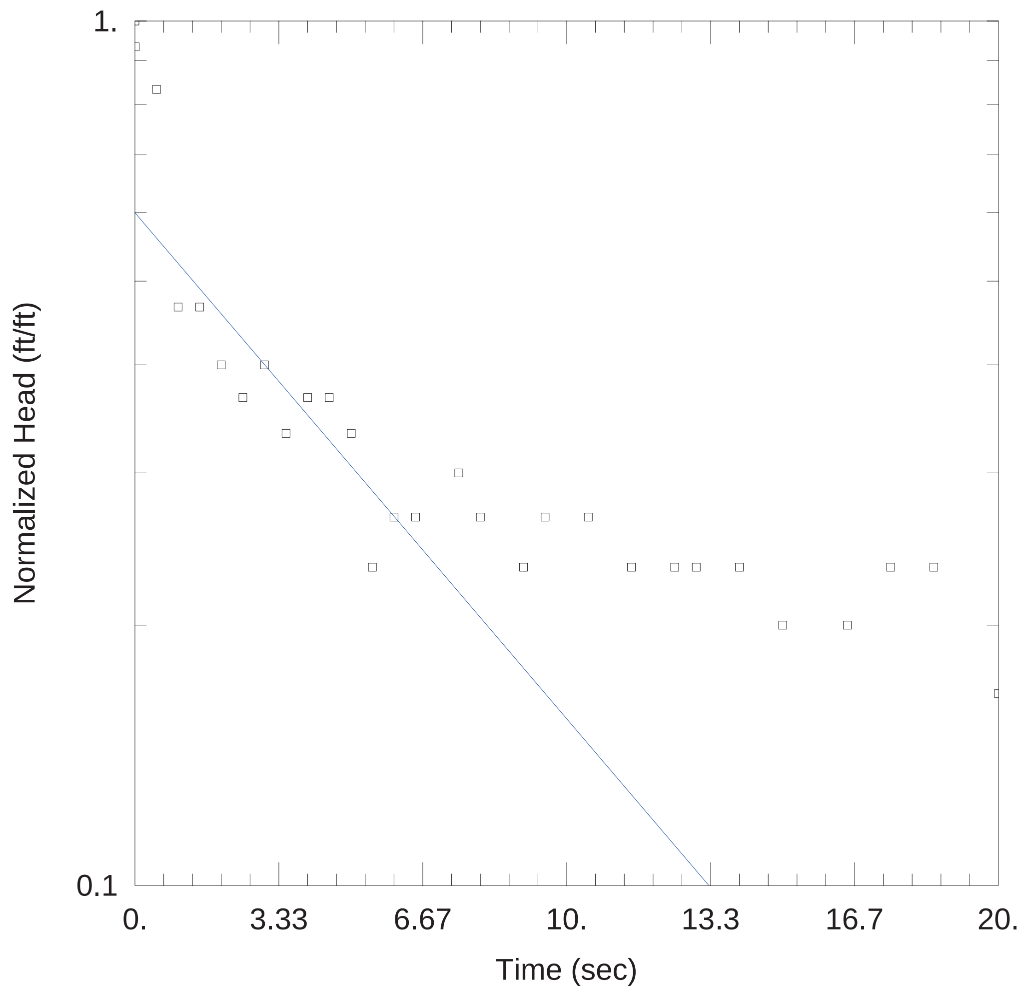
WELL DATA (XPW-01)

Initial Displacement: 0.83 ft
Total Well Penetration Depth: 8.033 ft
Casing Radius: 0.086 ft
Static Water Column Height: 8.033 ft
Screen Length: 8.033 ft
Well Radius: 0.25 ft
Gravel Pack Porosity: 0.25

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

K = 0.0238 cm/sec
y0 = 0.021 ft



XPW-01 RH2

PROJECT INFORMATION

Company: Ramboll
Client: IPGC
Project: 1940100499-001
Location: Newton
Test Well: XPW-01
Test Date: 3/11/21

AQUIFER DATA

Saturated Thickness: 8. ft
Anisotropy Ratio (Kz/Kr): 1.

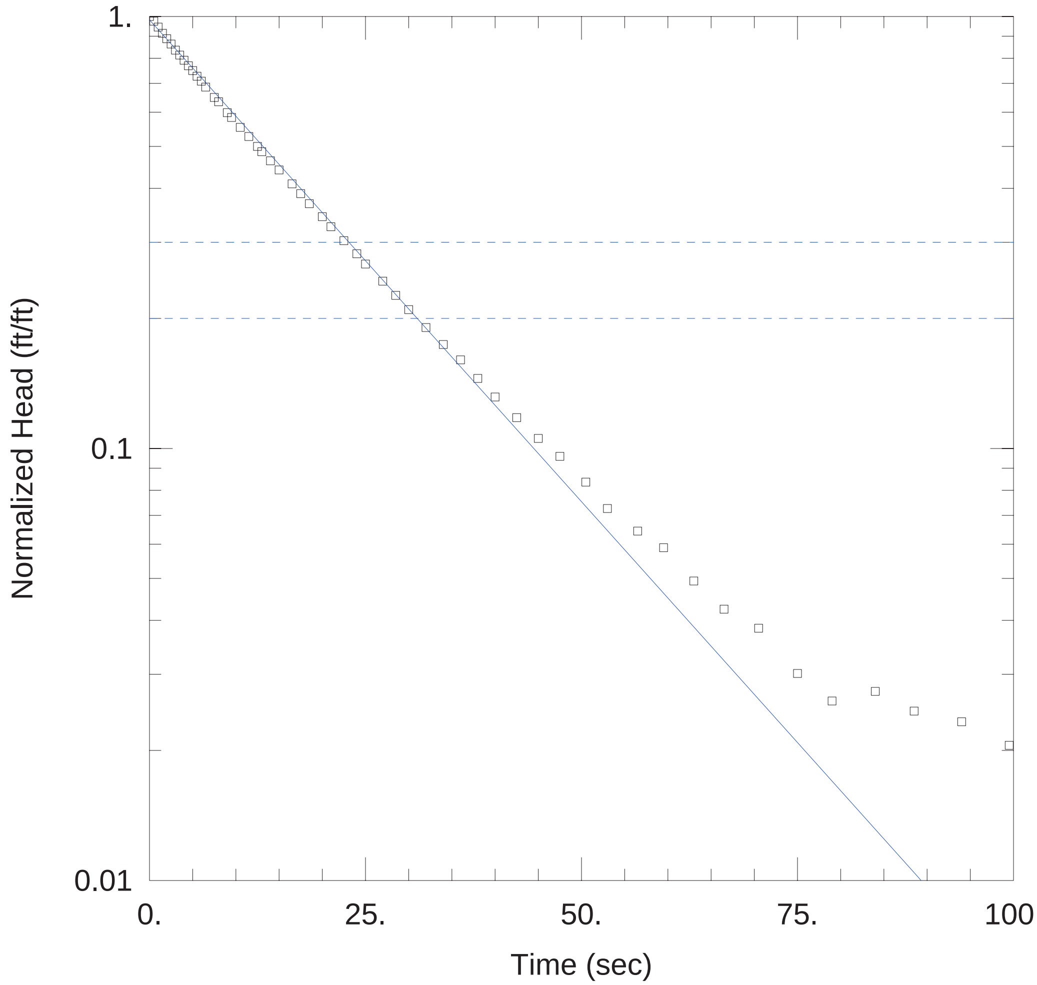
WELL DATA (XPW-01)

Initial Displacement: 0.03 ft
Total Well Penetration Depth: 8.033 ft
Casing Radius: 0.08625 ft
Static Water Column Height: 8.033 ft
Screen Length: 8.033 ft
Well Radius: 0.25 ft
Gravel Pack Porosity: 0.25

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

K = 0.0137 cm/sec
y0 = 0.018 ft



XPW02 FH1

PROJECT INFORMATION

Company: Ramboll
Client: IPGC
Project: 1940100499-001
Location: Newton
Test Well: XPW02
Test Date: 3/11/21

AQUIFER DATA

Saturated Thickness: 7.259 ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (XPW02)

Initial Displacement: 0.73 ft
Total Well Penetration Depth: 7.259 ft
Casing Radius: 0.086 ft

Static Water Column Height: 9.759 ft
Screen Length: 7.259 ft
Well Radius: 0.25 ft
Gravel Pack Porosity: 0.

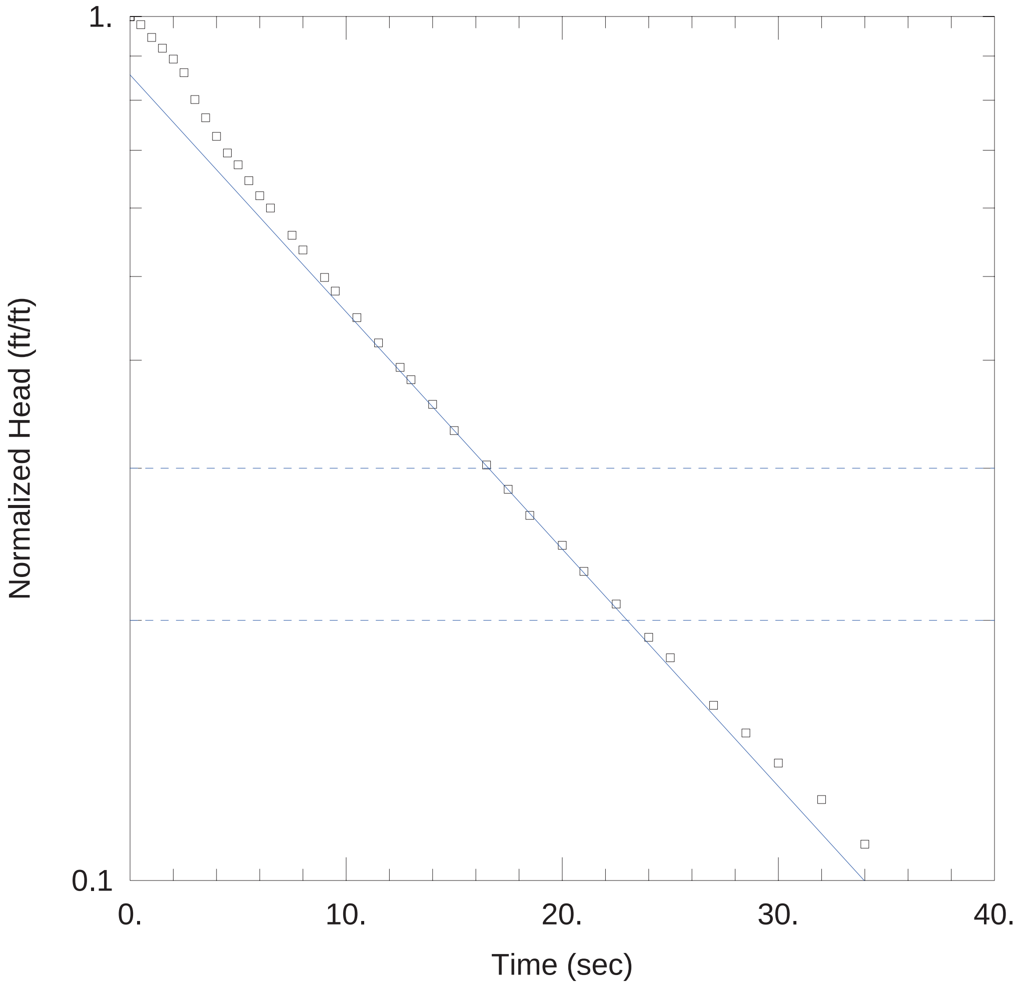
SOLUTION

Aquifer Model: Unconfined

Solution Method: Bouwer-Rice

K = 0.00197 cm/sec

y0 = 0.717 ft



XPW02 FH2

PROJECT INFORMATION

Company: Ramboll
Client: IPGC
Project: 1940100499-001
Location: Newton
Test Well: XPW02
Test Date: 3/11/21

AQUIFER DATA

Saturated Thickness: 7.259 ft
Anisotropy Ratio (Kz/Kr): 1.

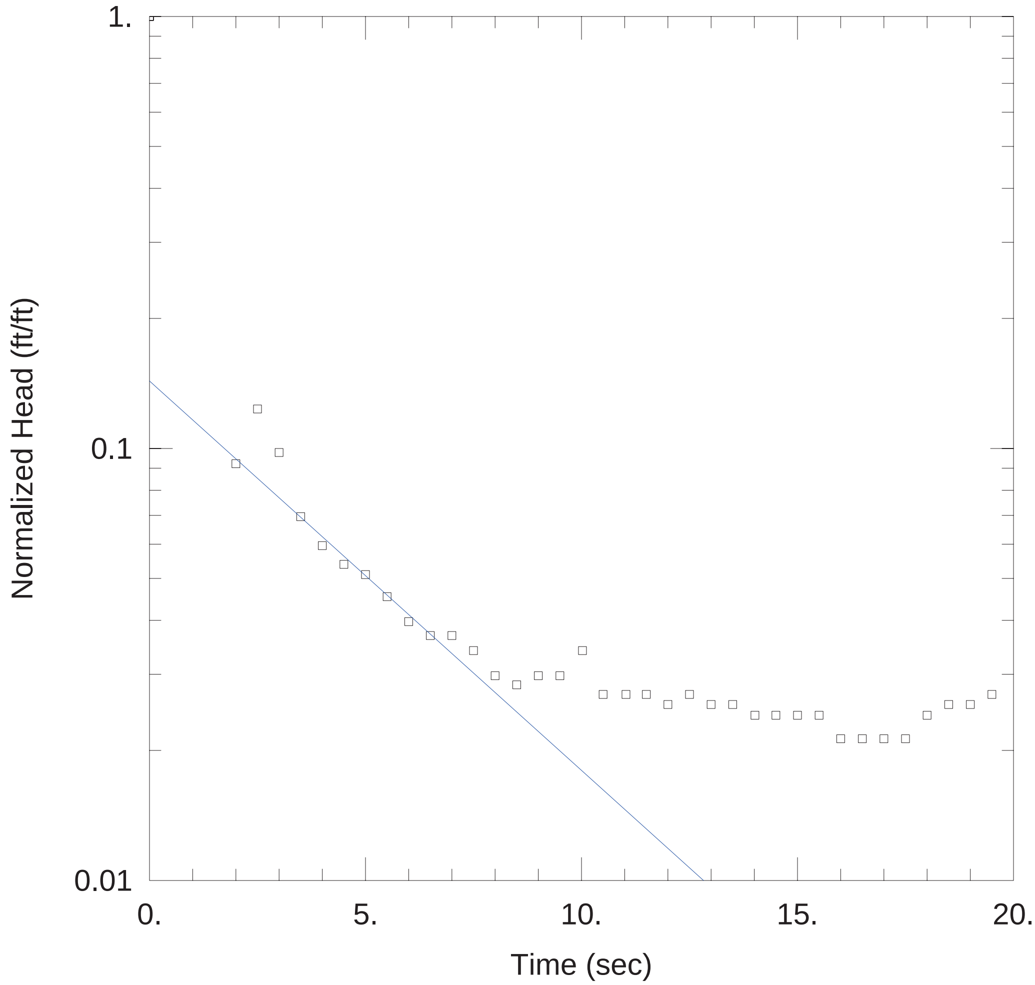
WELL DATA (XPW02)

Initial Displacement: 0.79 ft
Total Well Penetration Depth: 7.259 ft
Casing Radius: 0.086 ft
Static Water Column Height: 9.759 ft
Screen Length: 7.259 ft
Well Radius: 0.25 ft
Gravel Pack Porosity: 0.

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

K = 0.00257 cm/sec
y0 = 0.676 ft



XPW03 FH1

PROJECT INFORMATION

Company: Ramboll
Client: IPGC
Project: 1940100499-001
Location: Newton
Test Well: XPW03
Test Date: 3/31/21

AQUIFER DATA

Saturated Thickness: 7.958 ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (XPW03)

Initial Displacement: 0.705 ft
Total Well Penetration Depth: 4.7 ft
Casing Radius: 0.086 ft

Static Water Column Height: 13.26 ft
Screen Length: 4.7 ft
Well Radius: 0.25 ft
Gravel Pack Porosity: 0.

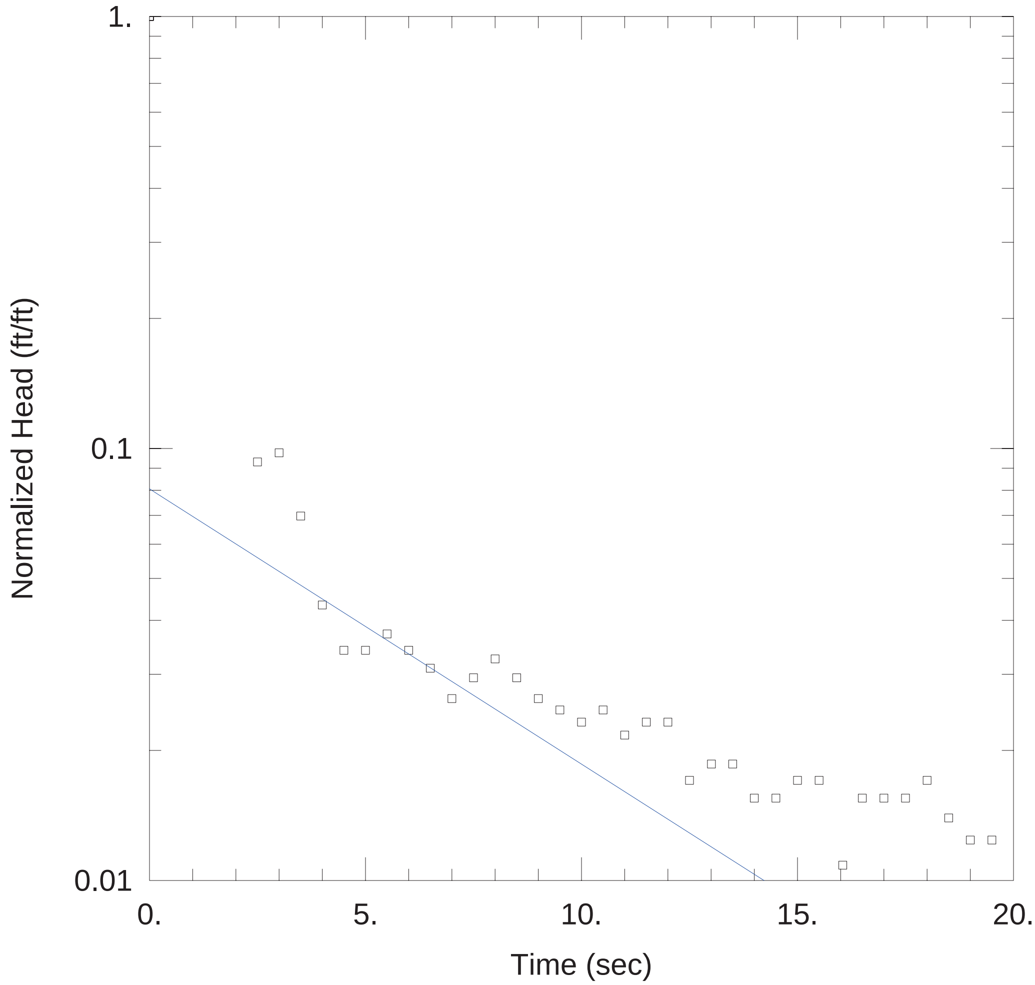
SOLUTION

Aquifer Model: Unconfined

Solution Method: Bouwer-Rice

K = 0.0573 cm/sec

y0 = 0.101 ft



XPW03 FH2

PROJECT INFORMATION

Company: Ramboll
Client: IPGC
Project: 1940100499-001
Location: Newton
Test Well: XPW03
Test Date: 3/31/21

AQUIFER DATA

Saturated Thickness: 7.938 ft
Anisotropy Ratio (Kz/Kr): 1.

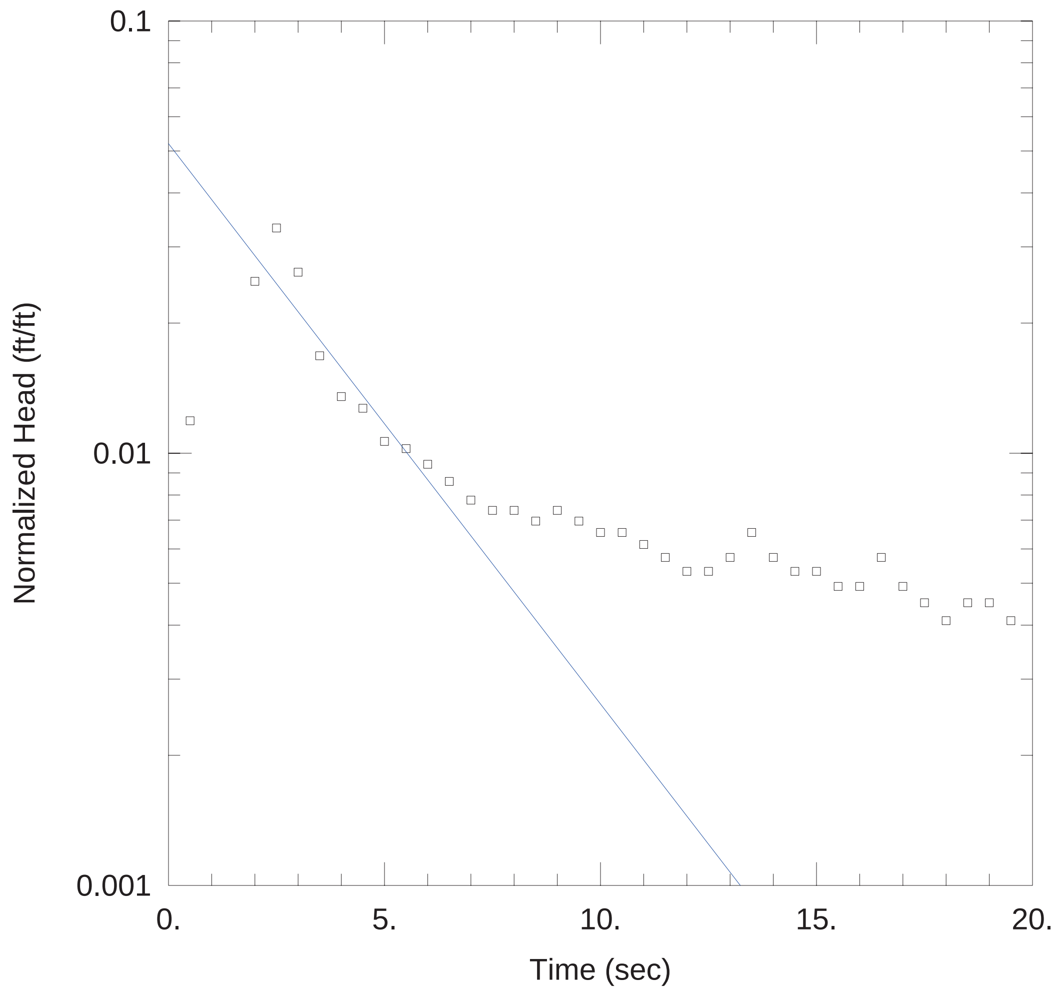
WELL DATA (XPW03)

Initial Displacement: 0.645 ft
Total Well Penetration Depth: 4.7 ft
Casing Radius: 0.086 ft
Static Water Column Height: 13.24 ft
Screen Length: 4.7 ft
Well Radius: 0.25 ft
Gravel Pack Porosity: 0.

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

K = 0.072 cm/sec
y0 = 0.052 ft



XPW03 FH3

PROJECT INFORMATION

Company: Ramboll
Client: IPGC
Project: 1940100499-001
Location: Newton
Test Well: XPW03
Test Date: 3/31/21

AQUIFER DATA

Saturated Thickness: 7.948 ft
Anisotropy Ratio (Kz/Kr): 1.

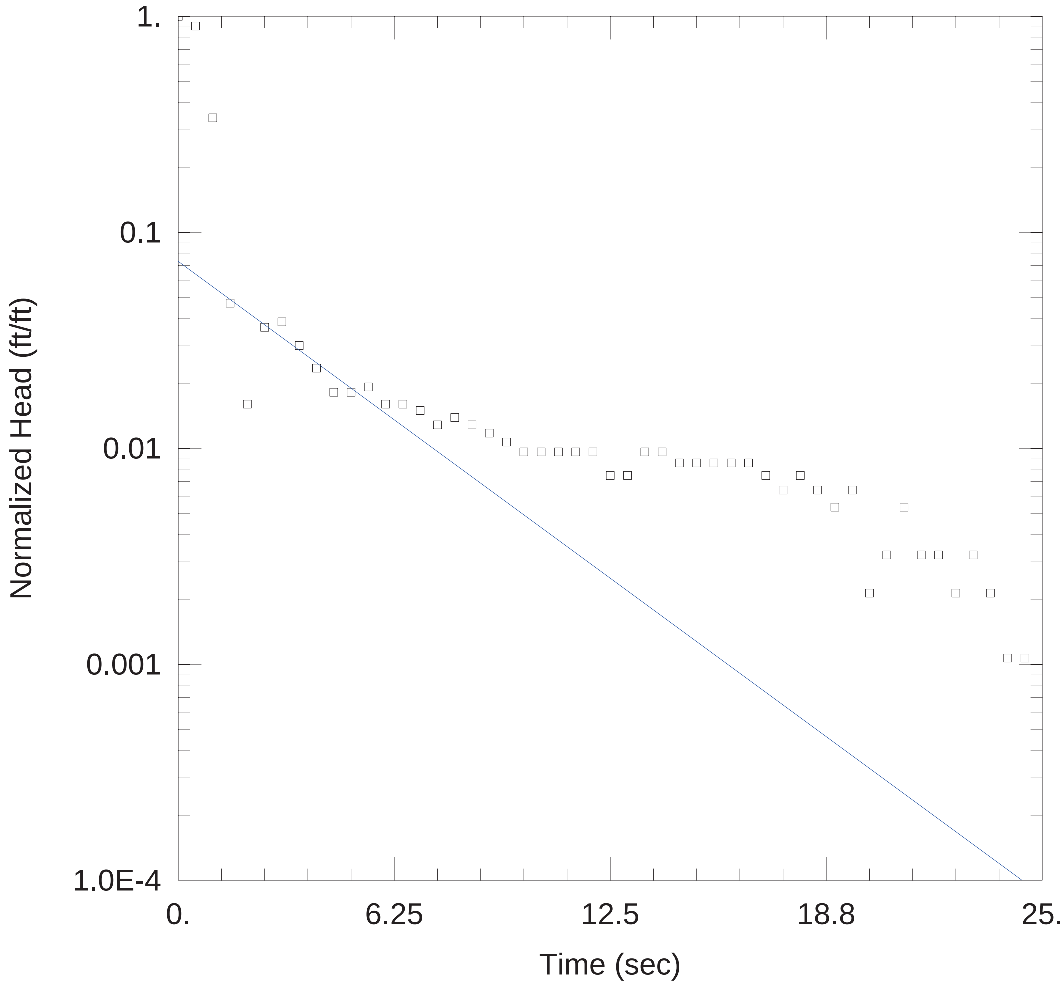
WELL DATA (XPW03)

Initial Displacement: 2.441 ft
Total Well Penetration Depth: 4.7 ft
Casing Radius: 0.086 ft
Static Water Column Height: 13.25 ft
Screen Length: 4.7 ft
Well Radius: 0.25 ft
Gravel Pack Porosity: 0.

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

K = 0.227 cm/sec
y0 = 0.127 ft



XPW03 RH01

PROJECT INFORMATION

Company: Ramboll
Client: IPGC
Project: 1940100499-001
Location: Newton
Test Well: XPW03
Test Date: 3/31/21

AQUIFER DATA

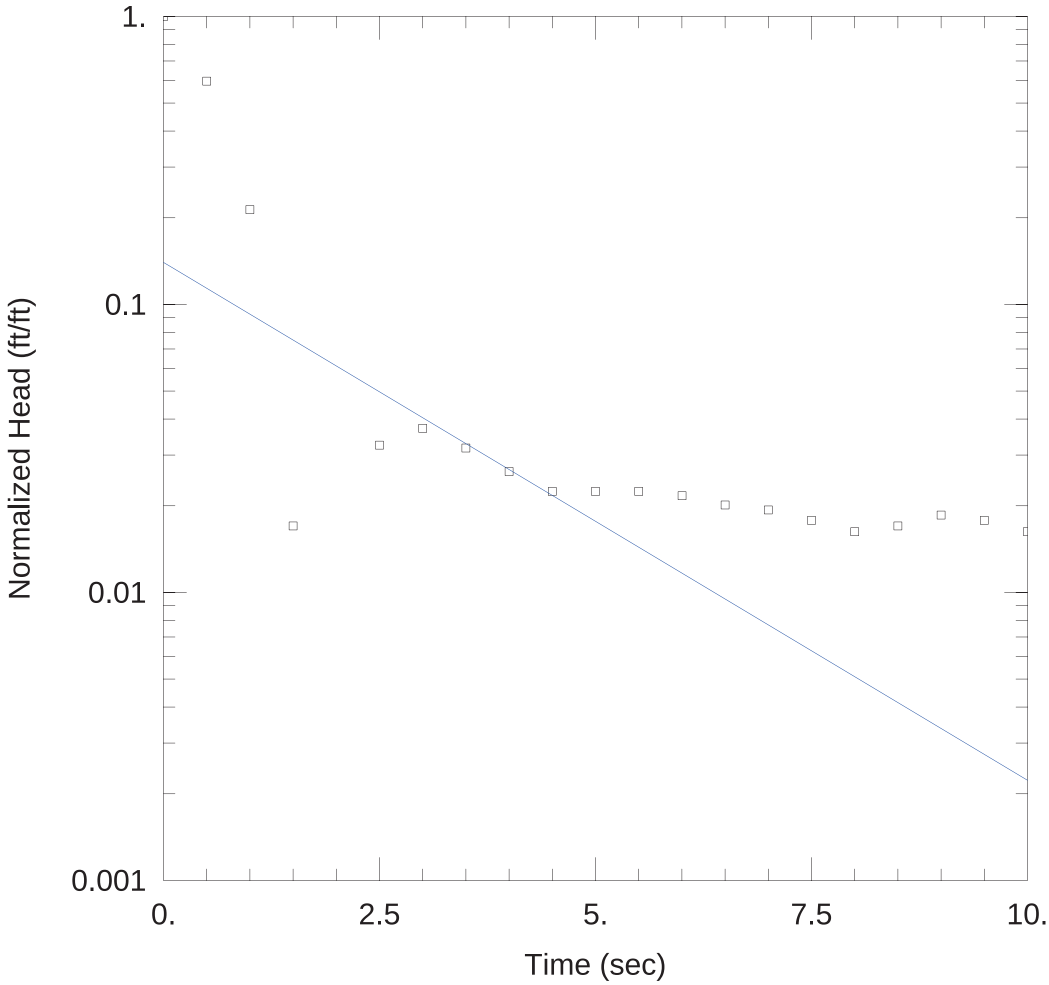
Saturated Thickness: 7.948 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (XPW03)

Initial Displacement: -0.937 ft
Total Well Penetration Depth: 4.7 ft
Casing Radius: 0.086 ft
Static Water Column Height: 13.25 ft
Screen Length: 4.7 ft
Well Radius: 0.25 ft
Gravel Pack Porosity: 0.

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 0.146 cm/sec
y0 = -0.0686 ft



XPW03 RH2

PROJECT INFORMATION

Company: Ramboll
Client: IPGC
Project: 1940100499-001
Location: Newton
Test Well: XPW03
Test Date: 3/31/21

AQUIFER DATA

Saturated Thickness: 7.948 ft
Anisotropy Ratio (Kz/Kr): 1.

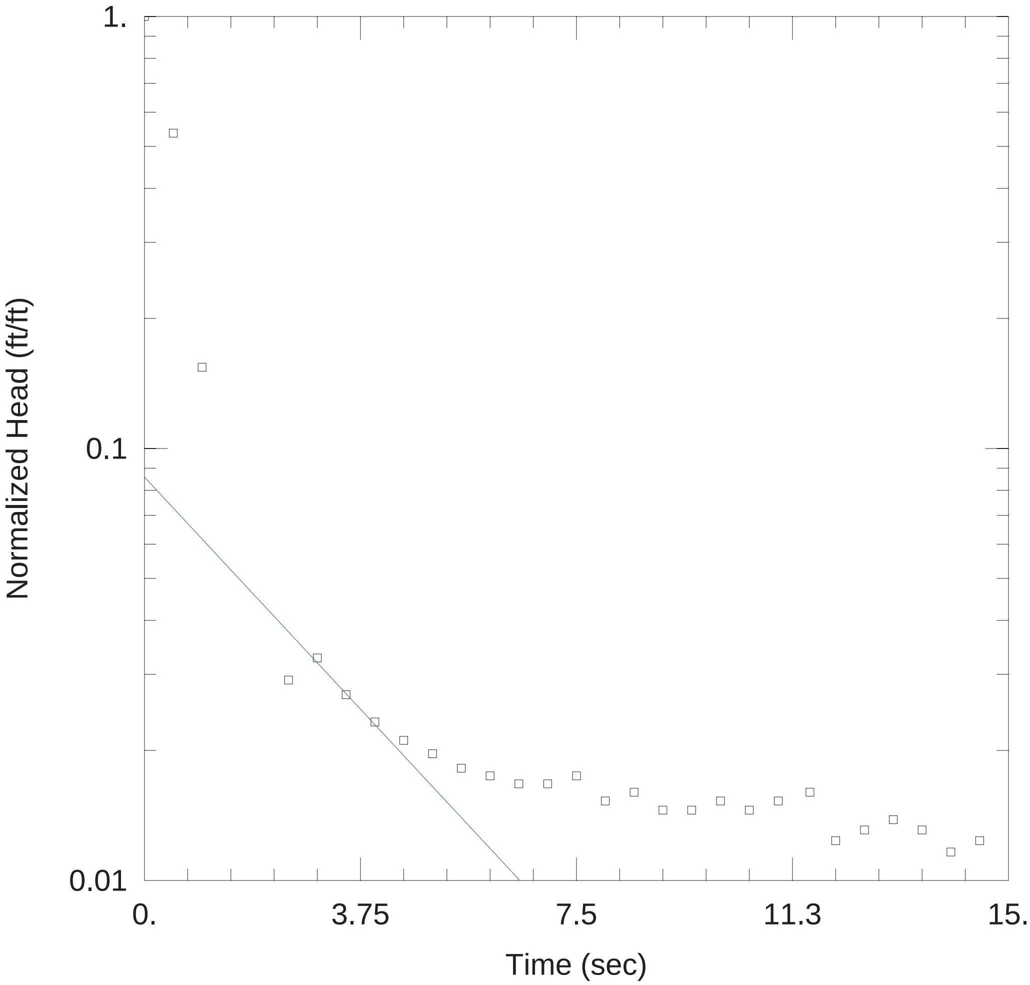
WELL DATA (XPW03)

Initial Displacement: -1.293 ft
Total Well Penetration Depth: 4.7 ft
Casing Radius: 0.086 ft
Static Water Column Height: 13.25 ft
Screen Length: 4.7 ft
Well Radius: 0.25 ft
Gravel Pack Porosity: 0.

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

K = 0.117 cm/sec
y0 = -0.181 ft



XPW03 RH3

PROJECT INFORMATION

Company: Ramboll
Client: IPGC
Project: 1940100499-001
Location: Newton
Test Well: XPW03
Test Date: 3/31/21

AQUIFER DATA

Saturated Thickness: 7.948 ft
Anisotropy Ratio (Kz/Kr): 1.

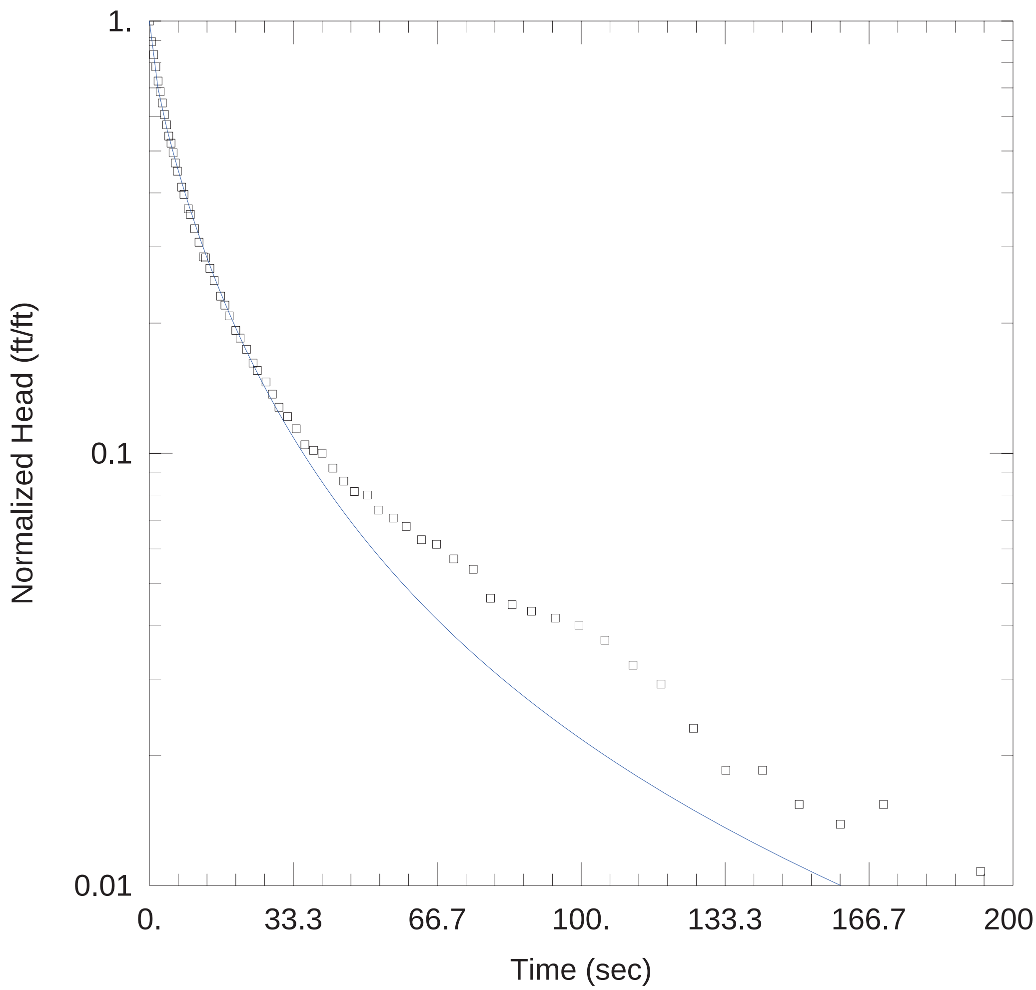
WELL DATA (XPW03)

Initial Displacement: -1.375 ft
Total Well Penetration Depth: 4.7 ft
Casing Radius: 0.086 ft
Static Water Column Height: 13.25 ft
Screen Length: 4.7 ft
Well Radius: 0.25 ft
Gravel Pack Porosity: 0.

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

K = 0.143 cm/sec
y0 = -0.118 ft



XPW04 FH2

PROJECT INFORMATION

Company: Ramboll
Client: IPGC
Project: 1940100499-001
Location: Newton
Test Well: XPW04
Test Date: 3/11/21

AQUIFER DATA

Saturated Thickness: 9.9 ft

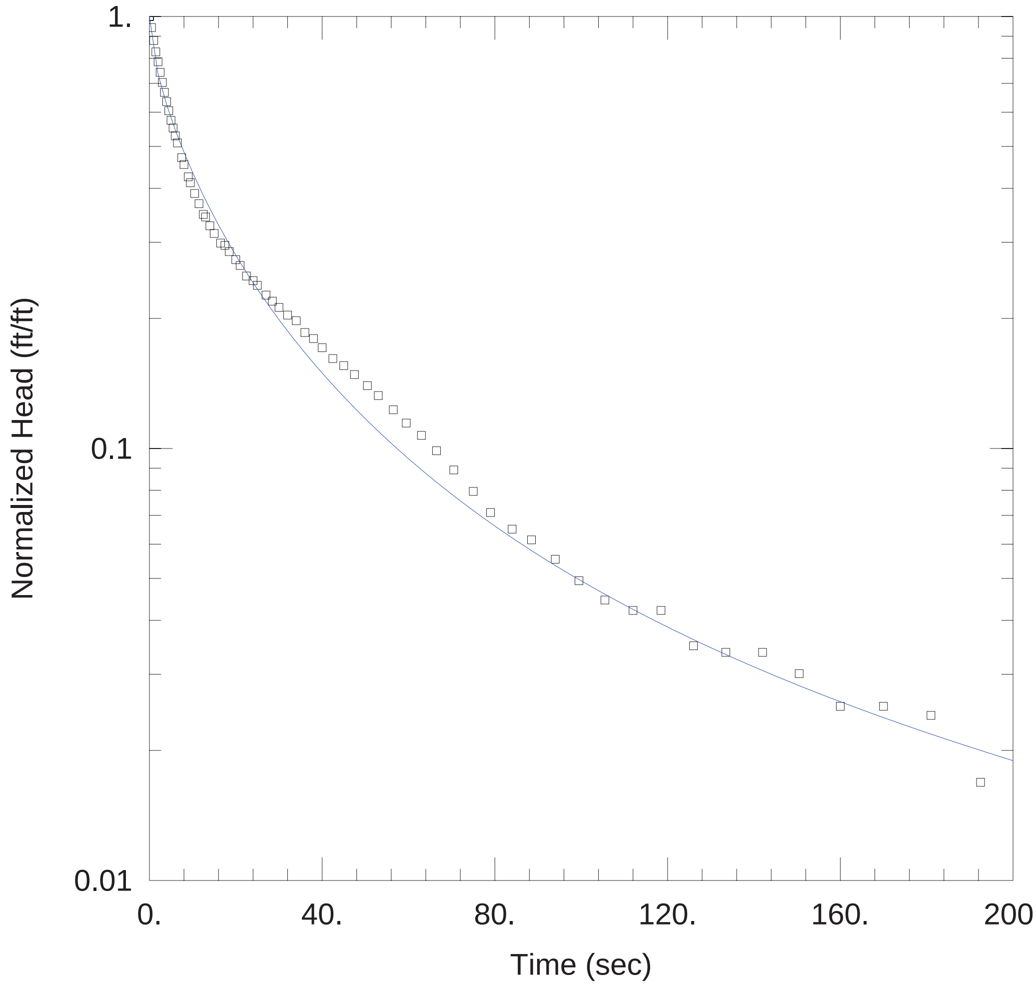
WELL DATA (XPW04)

Initial Displacement: 0.65 ft
Total Well Penetration Depth: 9.9 ft
Casing Radius: 0.086 ft
Static Water Column Height: 10.4 ft
Screen Length: 9.5 ft
Well Radius: 0.25 ft
Gravel Pack Porosity: 0.

SOLUTION

Aquifer Model: Unconfined
Solution Method: KGS Model

Kr = 0.0021 cm/sec
Kz/Kr = 1.
Ss = 0.00051 ft^{-1}



XPW04 RH1

PROJECT INFORMATION

Company: Ramboll
Client: IPGC
Project: 1940100499-001
Location: Newton
Test Well: XPW04
Test Date: 3/11/21

AQUIFER DATA

Saturated Thickness: 9.9 ft

WELL DATA (XPW04)

Initial Displacement: 0.83 ft
Total Well Penetration Depth: 9.9 ft
Casing Radius: 0.086 ft

Static Water Column Height: 10.4 ft
Screen Length: 9.5 ft
Well Radius: 0.25 ft
Gravel Pack Porosity: 0.

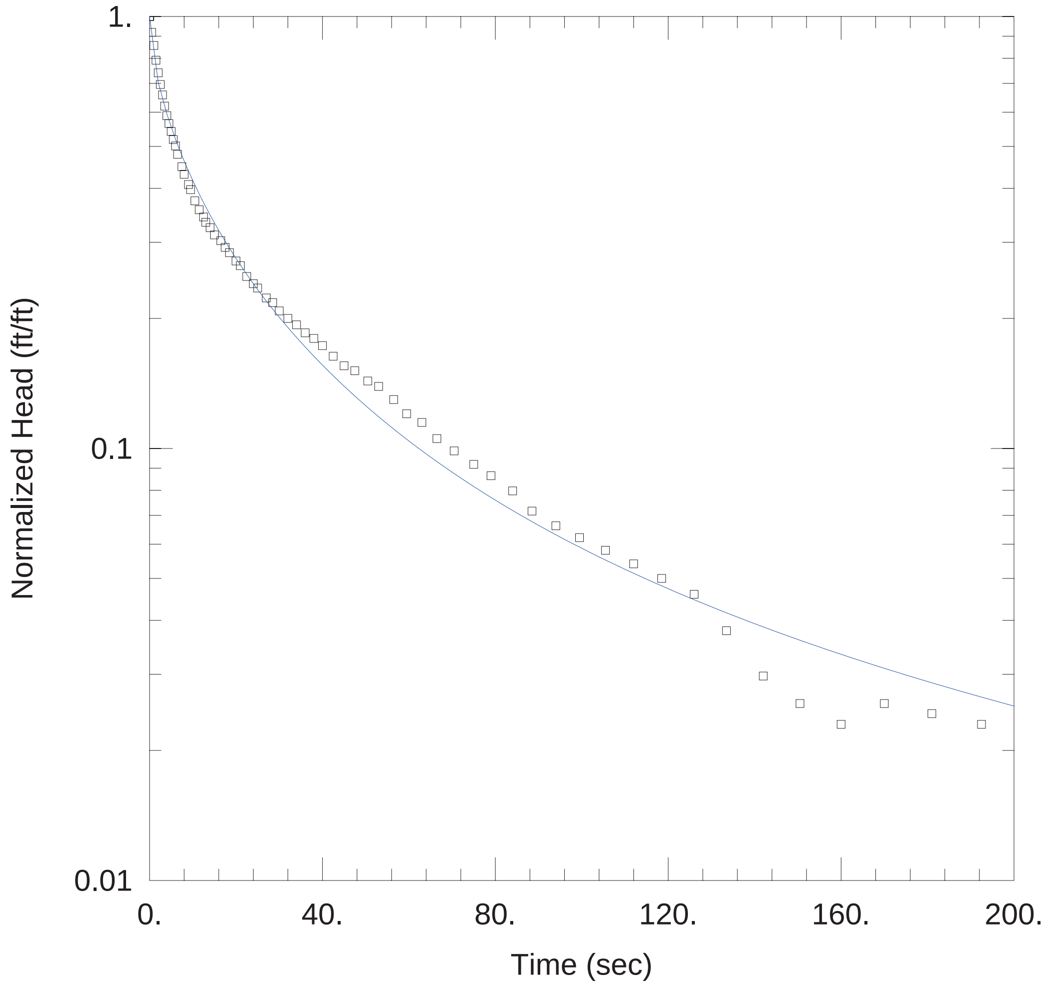
SOLUTION

Aquifer Model: Unconfined

Solution Method: KGS Model

Kr = 0.00122 cm/sec
Kz/Kr = 1.

Ss = 0.00094 ft^{-1}



XPW04 RH2

PROJECT INFORMATION

Company: Ramboll
Client: IPGC
Project: 1940100499-001
Location: Newton
Test Well: XPW04
Test Date: 3/11/21

AQUIFER DATA

Saturated Thickness: 9.9 ft

WELL DATA (XPW04)

Initial Displacement: 0.74 ft
Total Well Penetration Depth: 9.9 ft
Casing Radius: 0.086 ft

Static Water Column Height: 10.4 ft
Screen Length: 9.5 ft
Well Radius: 0.25 ft
Gravel Pack Porosity: 0.

SOLUTION

Aquifer Model: Unconfined

Solution Method: KGS Model

Kr = 0.00101 cm/sec
Kz/Kr = 1.

Ss = 0.0019 ft^{-1}

2017 HYDRAULIC CONDUCTIVITY TEST DATA

Appendix C - Table 1
Newton Power Station
Slug Test Results - Primary Ash Pond Wells (ID 501)
Hydrogeologic Monitoring Plan

Well ID	Slug In 1	Slug In 2	Slug In 3	Slug Out 1	Slug Out 2	Slug Out 3	Slug Out 4	MIN	MAX	GEOMEAN	Solution
APW2		4.41E-05		4.52E-05		3.45E-05		3.45E-05	4.52E-05	4.1E-05	Bouwer-Rice
APW3	8.44E-06			8.61E-06				8.44E-06	8.61E-06	8.5E-06	Bouwer-Rice
APW4	6.66E-06			5.14E-06				5.14E-06	6.66E-06	5.8E-06	Bouwer-Rice
APW5	5.66E-04	1.42E-03		1.54E-04	2.74E-04	2.56E-04		1.54E-04	1.42E-03	3.9E-04	Bouwer-Rice
APW6	1.64E-03	2.18E-03			2.09E-03	1.98E-03		1.64E-03	2.18E-03	2.0E-03	Bouwer-Rice
APW7	2.25E-03				3.24E-03	2.99E-03	2.75E-03	2.25E-03	3.24E-03	2.8E-03	Bouwer-Rice
APW8	6.60E-04	1.31E-03			1.06E-03	7.89E-04		6.60E-04	1.31E-03	9.2E-04	Bouwer-Rice
APW9	3.21E-03	3.28E-03		3.40E-03	3.00E-03			3.00E-03	3.40E-03	3.2E-03	Bouwer-Rice
APW10	5.27E-04	5.49E-04			5.73E-04	5.60E-04		5.27E-04	5.73E-04	5.5E-04	Bouwer-Rice

All slug test (i.e. hydraulic conductivity) results are in centimeters per second

[grey box] Not Applicable

Natural Resource Technology

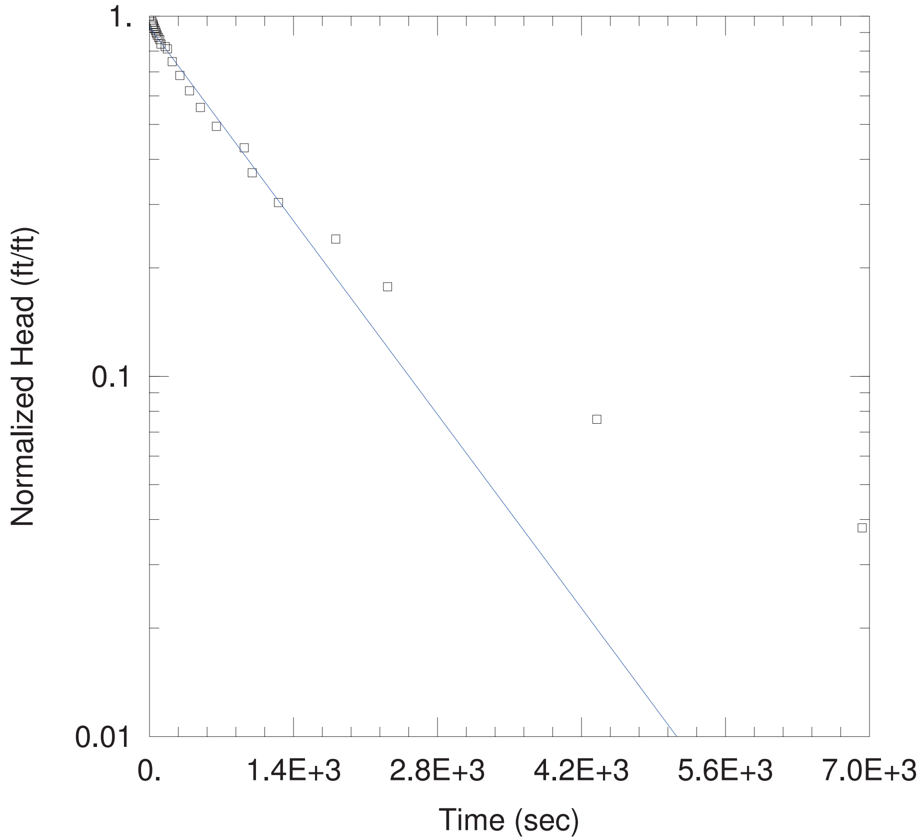
Electronic Filing: Received, Clerk's Office 03/26/2024

Appendix C - Table 2
Newton Power Station
Slug Test Results - Landfill 2 CCR Wells (ID 502)
Hydrogeologic Monitoring Plan

Well ID	Slug In 1	Slug In 2	Slug In 3	Slug Out 1	Slug Out 2	Slug Out 3	MIN	MAX	GEOMEAN	Solution
G06D				3.92E-08			3.92E-08	3.92E-08	3.9E-08	Bouwer-Rice
G202	1.70E-02	1.43E-02			2.87E-02	2.33E-02	1.43E-02	2.87E-02	2.0E-02	Bouwer-Rice
G203	2.53E-02			2.42E-02	3.47E-02		2.42E-02	3.47E-02	2.8E-02	Bouwer-Rice
G208				1.32E-08			1.32E-08	1.32E-08	1.3E-08	Bouwer-Rice
G217D	2.27E-04	2.92E-04				3.03E-04	2.27E-04	3.03E-04	2.7E-04	Bouwer-Rice
G220				3.51E-07			3.51E-07	3.51E-07	3.5E-07	Bouwer-Rice
G222				1.54E-06			1.54E-06	1.54E-06	1.5E-06	Bouwer-Rice
G223	5.19E-05	2.50E-05		1.37E-05	1.79E-05		1.37E-05	5.19E-05	2.4E-05	Bouwer-Rice
G224	5.15E-02	1.90E-02	4.64E-02	4.31E-02		2.97E-02	1.90E-02	5.15E-02	3.6E-02	Bouwer-Rice

All slug test (i.e. hydraulic conductivity) results are in centimeters per second

[grey box] Not Applicable



WELL TEST ANALYSIS

Data Set: P:\...\APW2 SI2.aqt
Date: 10/09/17 Time: 15:04:26

PROJECT INFORMATION

Company: Natural Resource Technology
Client: Dynegy
Project: 2285
Location: Newton Primary Ash Pond
Test Well: APW2
Test Date: 4/6/17

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

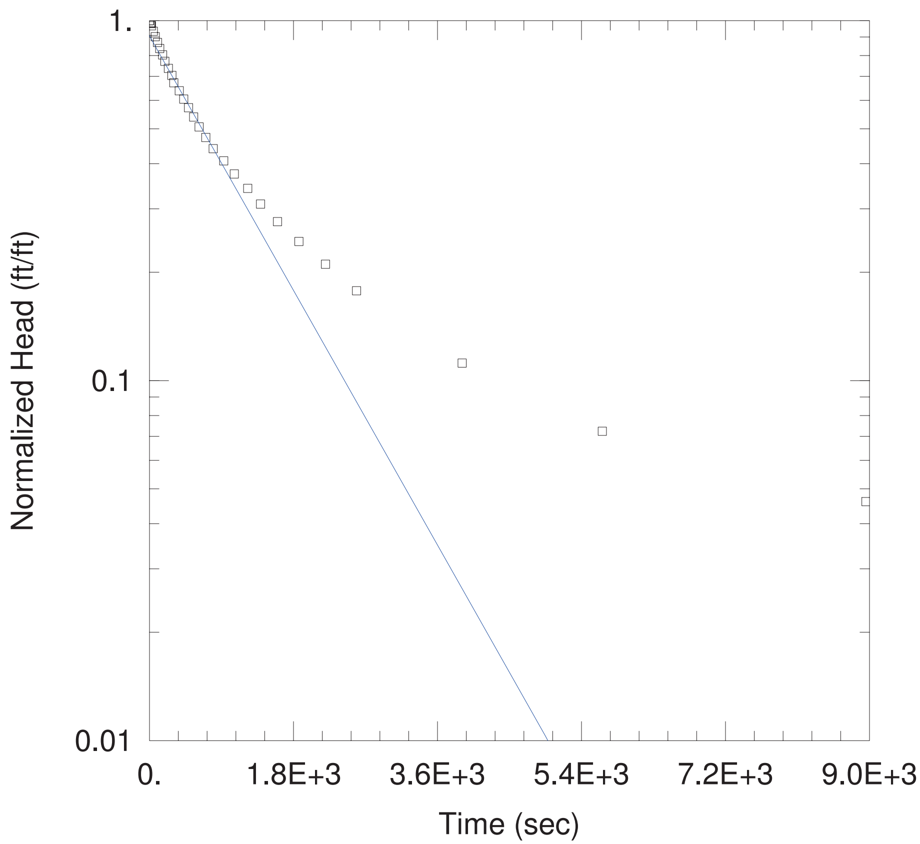
K = 4.414E-5 cm/sec
y0 = 0.7361 ft

AQUIFER DATA

Saturated Thickness: 9. ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (APW2 SI2)

Initial Displacement: 0.79 ft
Total Well Penetration Depth: 6.4 ft
Casing Radius: 0.08333 ft
Static Water Column Height: 9. ft
Screen Length: 3.4 ft
Well Radius: 0.3458 ft



WELL TEST ANALYSIS

Data Set: P:\...\APW2 SO1.aqt
Date: 10/09/17 Time: 15:05:33

PROJECT INFORMATION

Company: Natural Resource Technology
Client: Dynegy
Project: 2285
Location: Newton Primary Ash Pond
Test Well: APW2
Test Date: 4/6/17

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

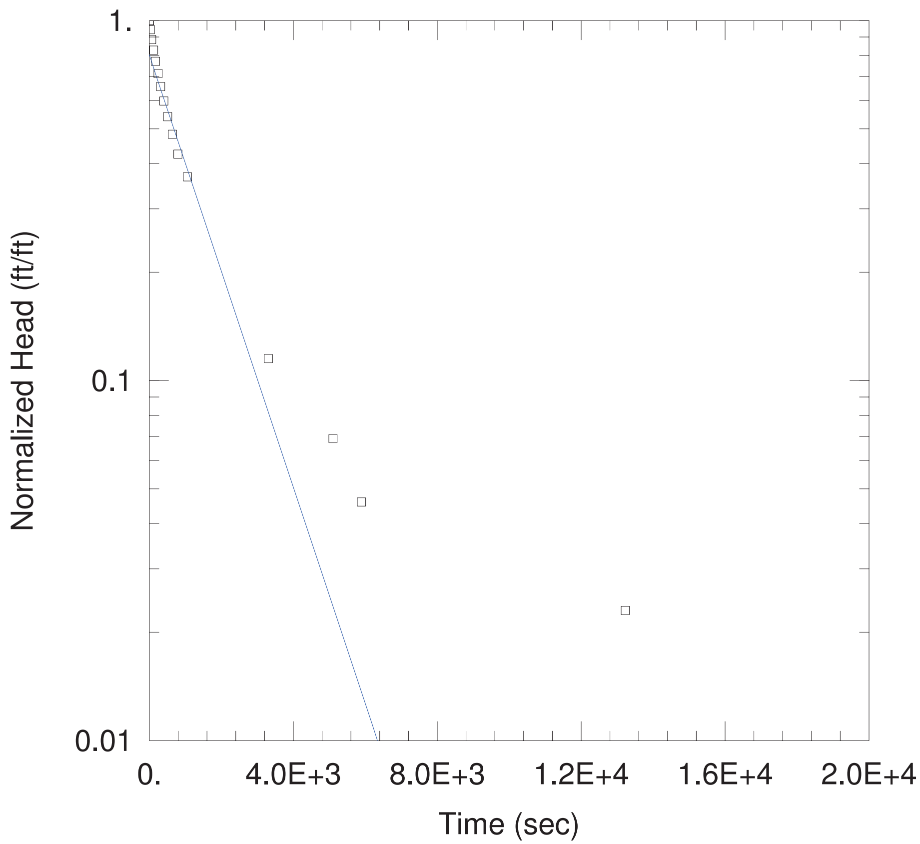
K = 4.517E-5 cm/sec
y0 = 1.38 ft

AQUIFER DATA

Saturated Thickness: 9. ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (APW2 SO1)

Initial Displacement: 1.52 ft
Total Well Penetration Depth: 6.4 ft
Casing Radius: 0.08333 ft
Static Water Column Height: 9. ft
Screen Length: 3.4 ft
Well Radius: 0.3458 ft



WELL TEST ANALYSIS

Data Set: P:\...\APW2 SO3.aqt
Date: 10/09/17 Time: 15:06:23

PROJECT INFORMATION

Company: Natural Resource Technology
Client: Dynegy
Project: 2285
Location: Newton Primary Ash Pond
Test Well: APW2
Test Date: 4/6/17

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

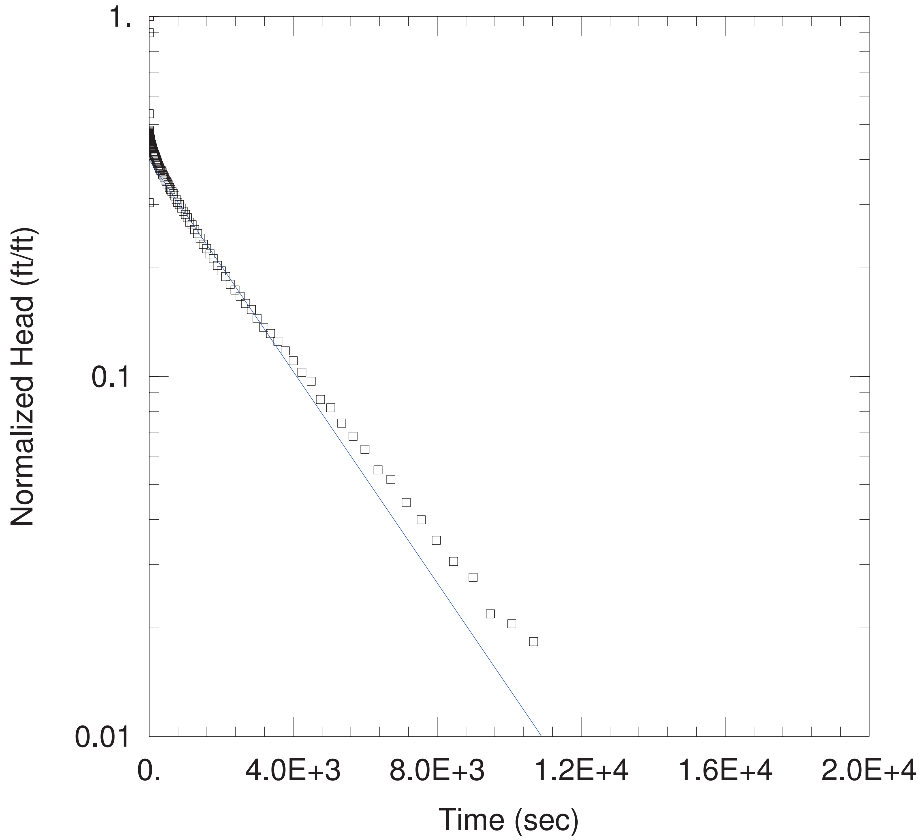
K = 3.449E-5 cm/sec
y0 = 0.698 ft

AQUIFER DATA

Saturated Thickness: 9. ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (APW2 SO3)

Initial Displacement: 0.87 ft
Total Well Penetration Depth: 6.4 ft
Casing Radius: 0.08333 ft
Static Water Column Height: 9. ft
Screen Length: 3.4 ft
Well Radius: 0.3458 ft



WELL TEST ANALYSIS

Data Set: P:\...\APW 3 SI1.aqt
Date: 10/09/17 Time: 15:13:21

PROJECT INFORMATION

Company: Natural Resource Technology
Client: Dynegy
Project: 2285
Location: Newton Primary Ash Pond
Test Well: APW3
Test Date: 4/6/17

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

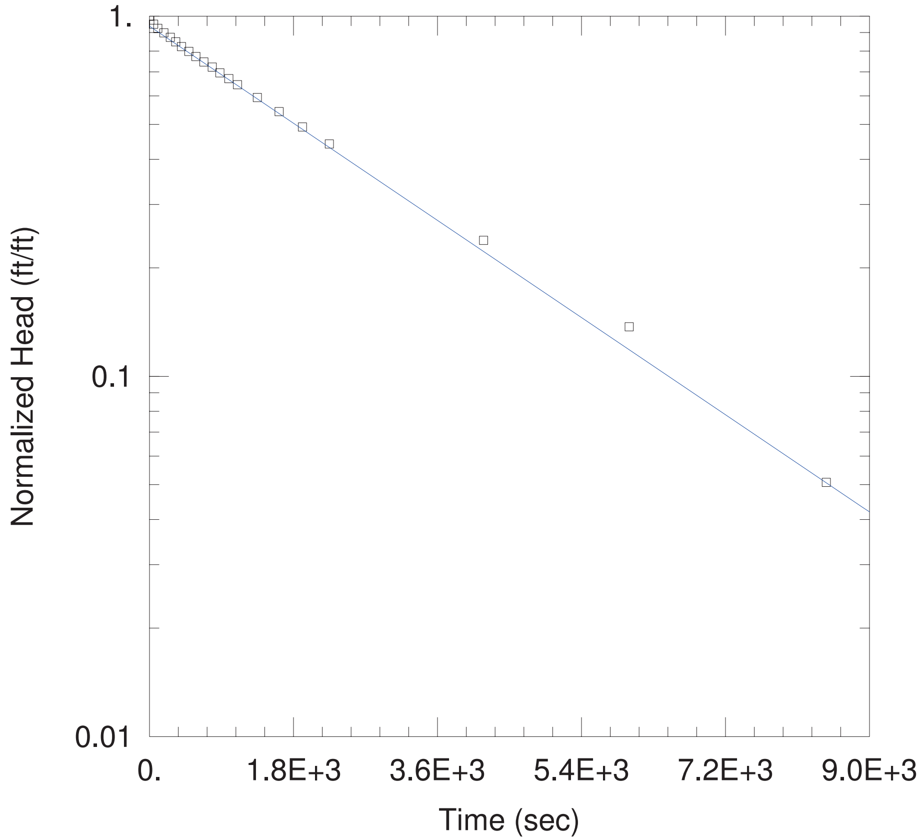
K = 8.437E-6 cm/sec
y0 = 1.458 ft

AQUIFER DATA

Saturated Thickness: 14. ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (APW3 SI1)

Initial Displacement: 3.656 ft
Total Well Penetration Depth: 11.5 ft
Casing Radius: 0.08333 ft
Static Water Column Height: 14. ft
Screen Length: 10. ft
Well Radius: 0.3458 ft



WELL TEST ANALYSIS

Data Set: P:\...\APW 3 SO1.aqt
Date: 10/09/17 Time: 15:08:16

PROJECT INFORMATION

Company: Natural Resource Technology
Client: Dynegy
Project: 2285
Location: Newton Primary Ash Pond
Test Well: APW3
Test Date: 4/6/17

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

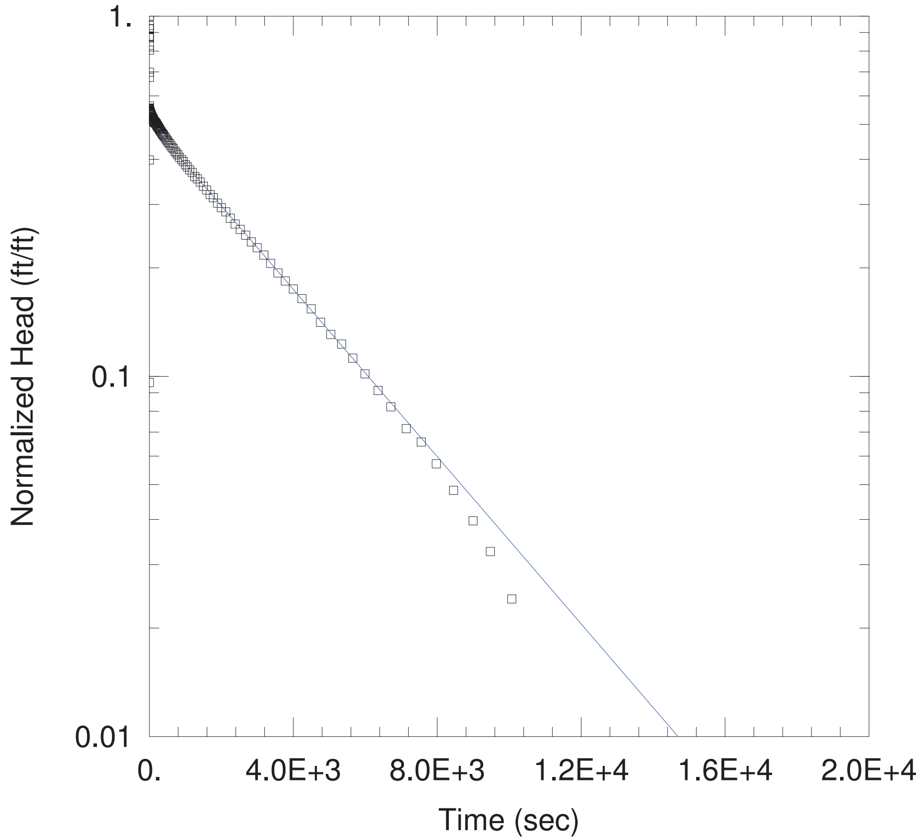
K = 8.611E-6 cm/sec
y0 = 1.848 ft

AQUIFER DATA

Saturated Thickness: 14. ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (APW3 SO1)

Initial Displacement: 1.97 ft
Total Well Penetration Depth: 11.5 ft
Casing Radius: 0.08333 ft
Static Water Column Height: 14. ft
Screen Length: 10. ft
Well Radius: 0.3458 ft



WELL TEST ANALYSIS

Data Set: P:\...\APW 4 SI1.aqt
Date: 10/09/17 Time: 15:15:09

PROJECT INFORMATION

Company: Natural Resource Technology
Client: Dynegy
Project: 2285
Location: Newton Primary Ash Pond
Test Well: APW4
Test Date: 4/6/17

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

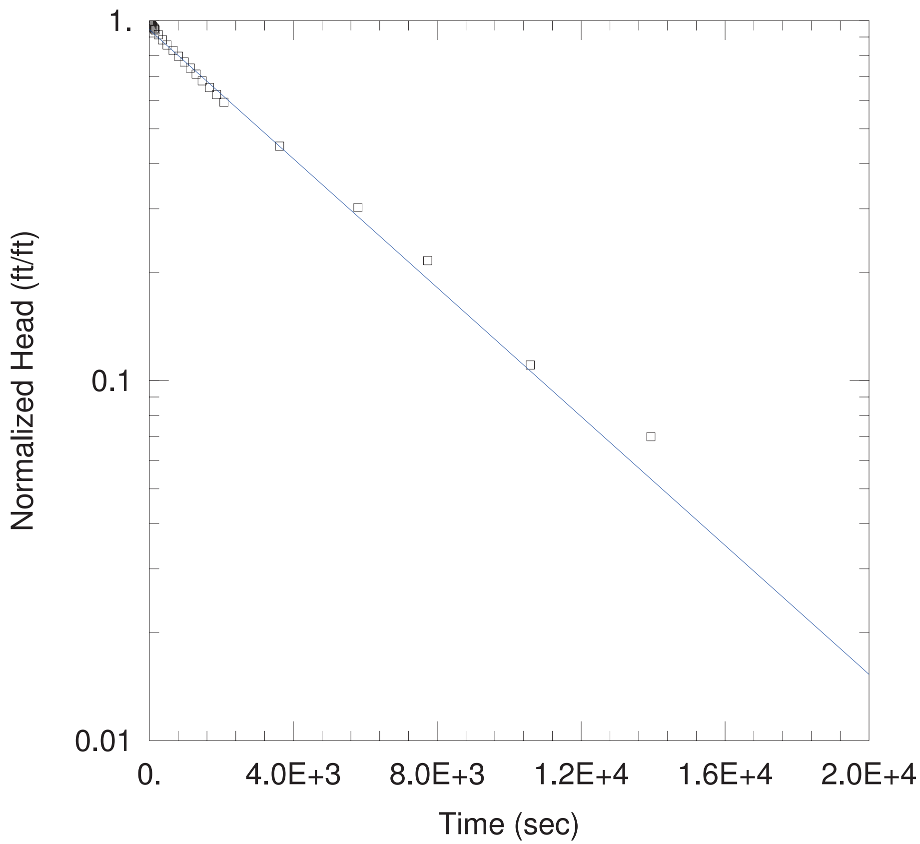
K = 6.66E-6 cm/sec
y0 = 1.37 ft

AQUIFER DATA

Saturated Thickness: 11. ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (APW4 S11)

Initial Displacement: 2.697 ft
Total Well Penetration Depth: 10. ft
Casing Radius: 0.08333 ft
Static Water Column Height: 11. ft
Screen Length: 10. ft
Well Radius: 0.3458 ft



WELL TEST ANALYSIS

Data Set: P:\...\APW 4 SO1.aqt
Date: 10/09/17 Time: 15:15:46

PROJECT INFORMATION

Company: Natural Resource Technology
Client: Dynegy
Project: 2285
Location: Newton Primary Ash Pond
Test Well: APW4
Test Date: 4/6/17

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

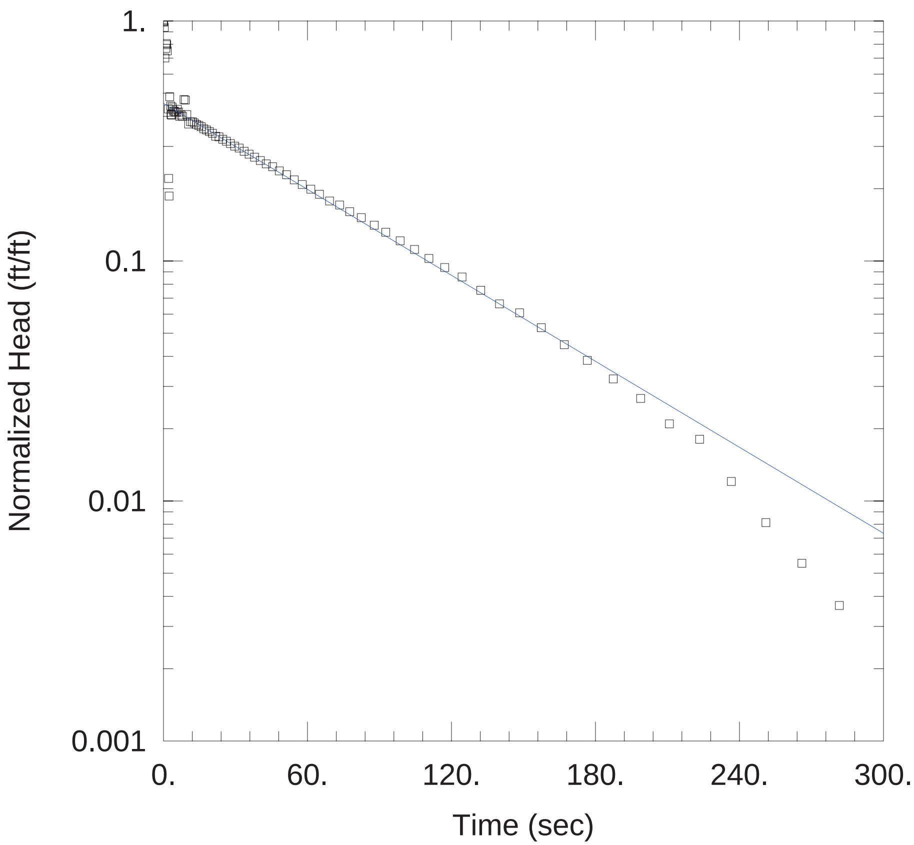
K = 5.137E-6 cm/sec
y0 = 1.622 ft

AQUIFER DATA

Saturated Thickness: 11. ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (APW4 SO1)

Initial Displacement: 1.72 ft
Total Well Penetration Depth: 10. ft
Casing Radius: 0.08333 ft
Static Water Column Height: 11. ft
Screen Length: 10. ft
Well Radius: 0.3458 ft



WELL TEST ANALYSIS

Data Set: P:\...\APW5 SI1.aqt
Date: 06/15/17 Time: 11:53:01

PROJECT INFORMATION

Company: Natural Resource Technology
Client: Dynegy
Project: 2285
Location: Newton Primary Ash Pond
Test Well: APW5
Test Date: 4/6/17

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

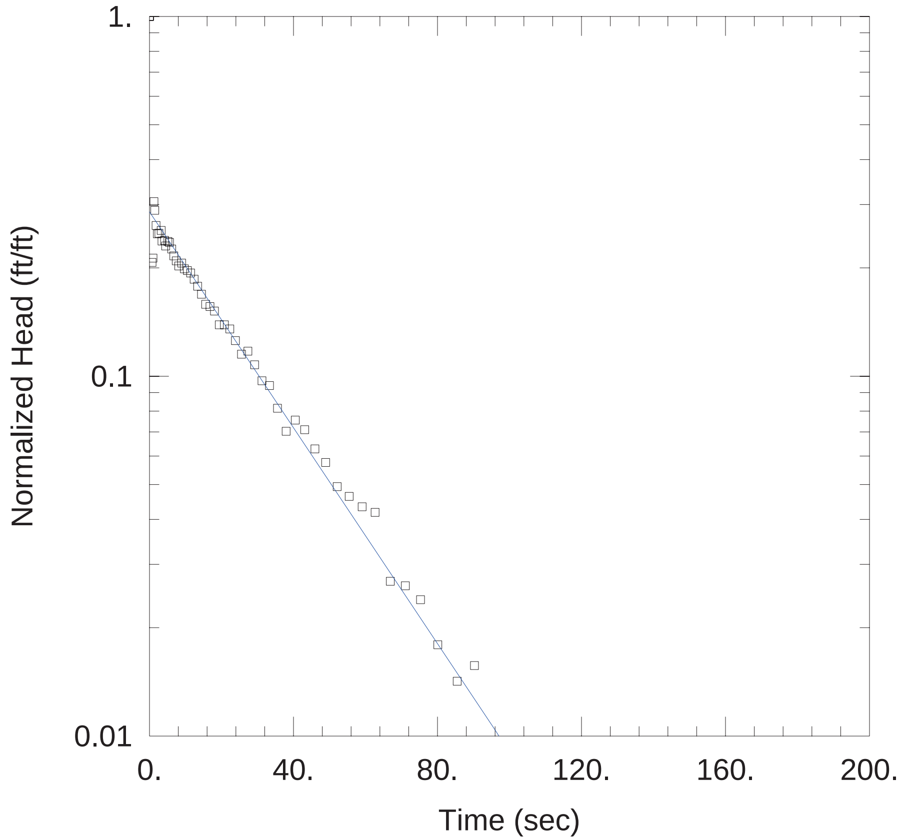
K = 0.0005655 cm/sec
y0 = 1.731 ft

AQUIFER DATA

Saturated Thickness: 8.5 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (APW5 SI1)

Initial Displacement: 3.818 ft
Total Well Penetration Depth: 6.81 ft
Casing Radius: 0.08333 ft
Static Water Column Height: 8.5 ft
Screen Length: 4.68 ft
Well Radius: 0.3458 ft



WELL TEST ANALYSIS

Data Set: P:\...\APW5 SI2.aqt
Date: 05/12/17 Time: 17:23:52

PROJECT INFORMATION

Company: Natural Resource Technology
Client: Dynegy
Project: 2285
Location: Newton Primary Ash Pond
Test Well: APW5
Test Date: 4/6/17

SOLUTION

Aquifer Model: Confined
Solution Method: Bouwer-Rice

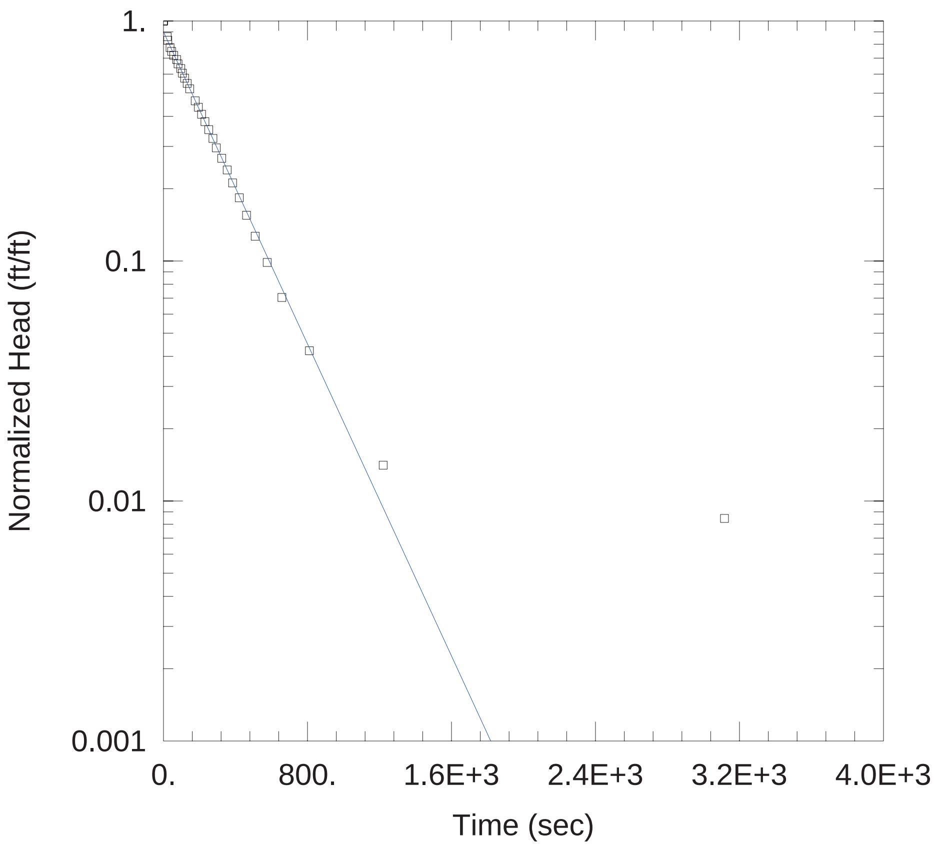
K = 0.001421 cm/sec
y0 = 0.383 ft

AQUIFER DATA

Saturated Thickness: 8.5 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (APW5 SI2)

Initial Displacement: 1.338 ft
Total Well Penetration Depth: 6.81 ft
Casing Radius: 0.08333 ft
Static Water Column Height: 8.5 ft
Screen Length: 4.68 ft
Well Radius: 0.3458 ft



WELL TEST ANALYSIS

Data Set: P:\...\APW5 SO1.aqt
Date: 05/12/17 Time: 17:30:12

PROJECT INFORMATION

Company: Natural Resource Technology
Client: Dynegy
Project: 2285
Location: Newton Primary Ash Pond
Test Well: APW5
Test Date: 4/6/17

SOLUTION

Aquifer Model: Confined
Solution Method: Bouwer-Rice

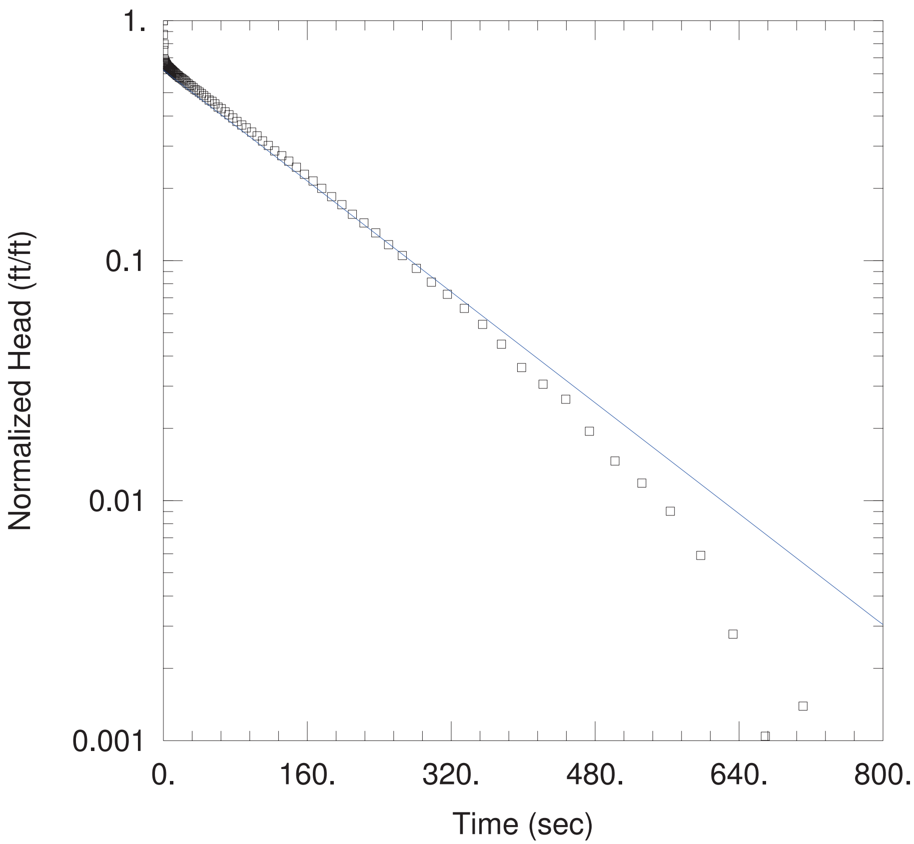
K = 0.0001539 cm/sec
y0 = 3.197 ft

AQUIFER DATA

Saturated Thickness: 8.5 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (APW5 SO1)

Initial Displacement: 3.55 ft
Total Well Penetration Depth: 6.81 ft
Casing Radius: 0.08333 ft
Static Water Column Height: 8.5 ft
Screen Length: 4.68 ft
Well Radius: 0.3458 ft



WELL TEST ANALYSIS

Data Set: P:\...\APW5 SO2.aqt
Date: 10/09/17 Time: 14:59:07

PROJECT INFORMATION

Company: Natural Resource Technology
Client: Dynegy
Project: 2285
Location: Newton Primary Ash Pond
Test Well: APW5
Test Date: 4/6/17

SOLUTION

Aquifer Model: Confined
Solution Method: Bouwer-Rice

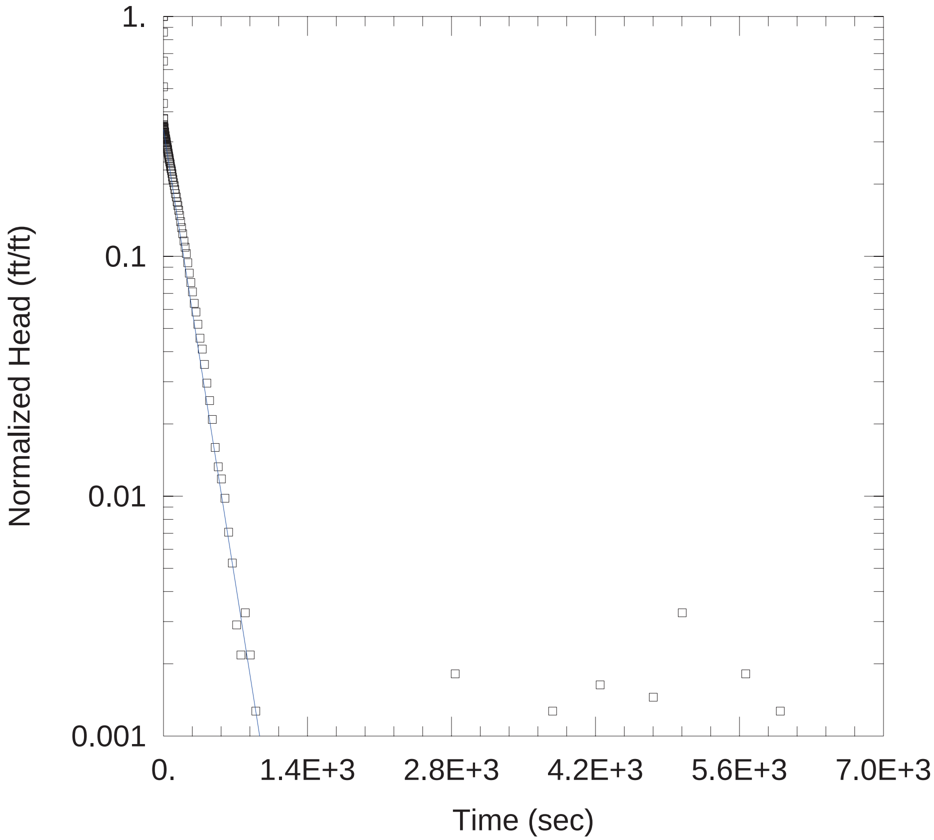
K = 0.0002735 cm/sec
y0 = 1.789 ft

AQUIFER DATA

Saturated Thickness: 8.5 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (APW5 SO2)

Initial Displacement: 2.879 ft
Total Well Penetration Depth: 6.81 ft
Casing Radius: 0.08333 ft
Static Water Column Height: 8.5 ft
Screen Length: 4.68 ft
Well Radius: 0.3458 ft



WELL TEST ANALYSIS

Data Set: P:\...\APW5 SO3.aqt
Date: 06/15/17 Time: 11:57:15

PROJECT INFORMATION

Company: Natural Resource Technology
Client: Dynegy
Project: 2285
Location: Newton Primary Ash Pond
Test Well: APW5
Test Date: 4/6/17

SOLUTION

Aquifer Model: Confined
Solution Method: Bouwer-Rice

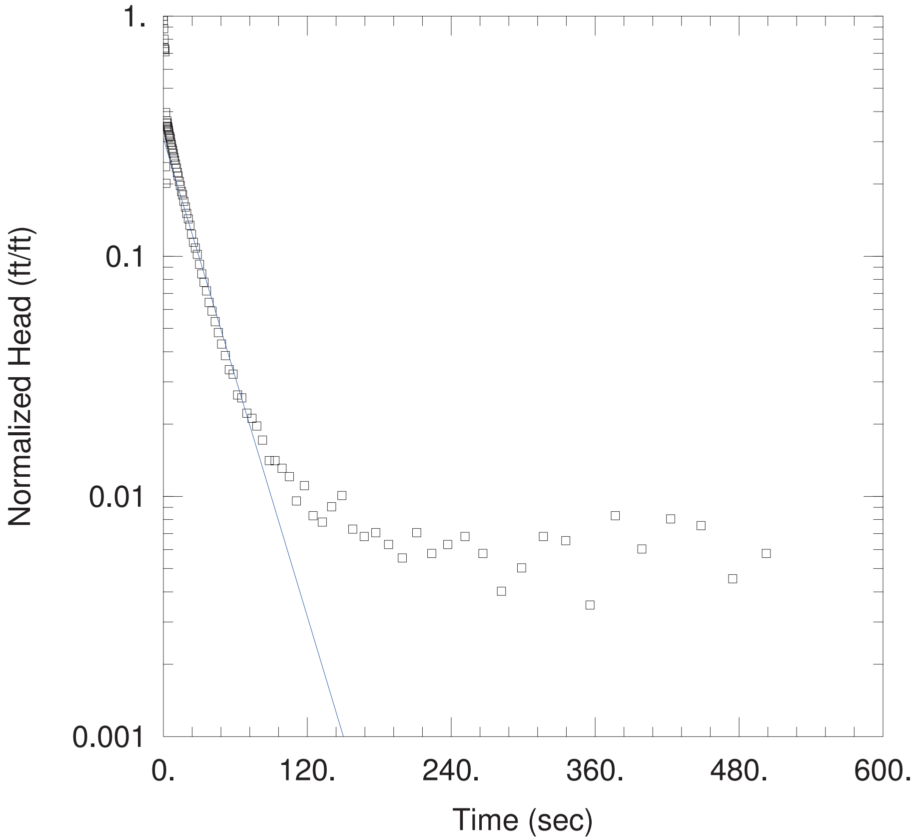
K = 0.0002559 cm/sec
y0 = 1.858 ft

AQUIFER DATA

Saturated Thickness: 8.5 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (APW5 SO3)

Initial Displacement: 5.512 ft
Total Well Penetration Depth: 6.81 ft
Casing Radius: 0.08333 ft
Static Water Column Height: 8.5 ft
Screen Length: 4.68 ft
Well Radius: 0.3458 ft



WELL TEST ANALYSIS

Data Set: P:\...\APW6 SI1.aqt
Date: 10/10/17 Time: 08:43:51

PROJECT INFORMATION

Company: Natural Resource Technology
Client: Dynegy
Project: 2285
Location: Newton Primary Ash Pond
Test Well: APW6
Test Date: 4/6/17

SOLUTION

Aquifer Model: Confined
Solution Method: Bouwer-Rice

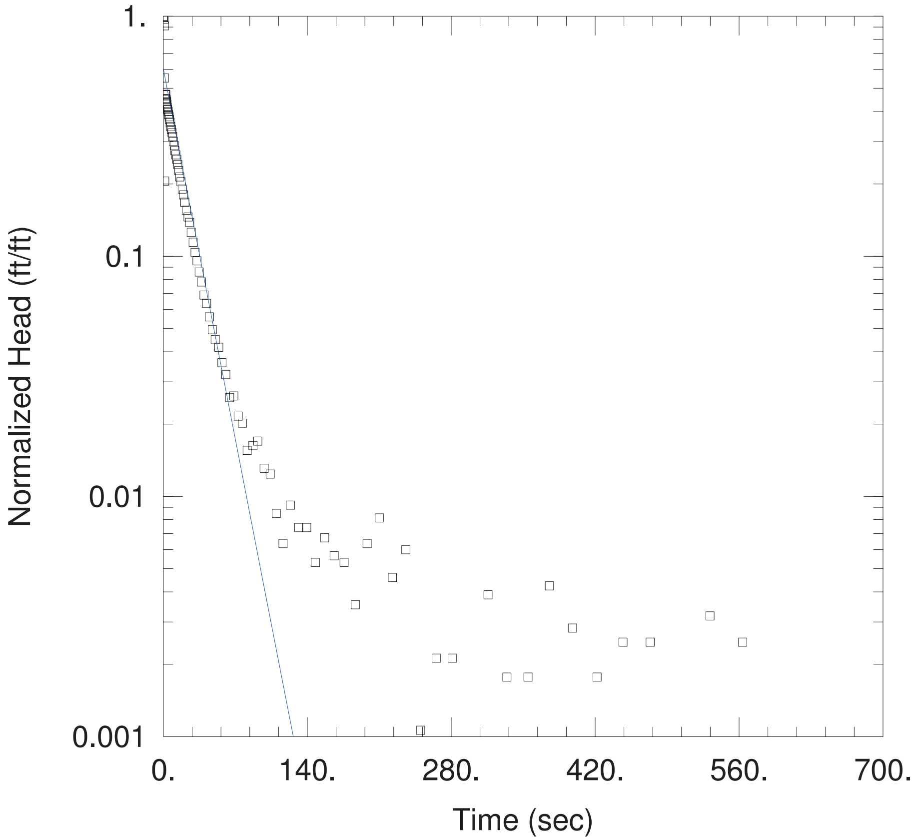
K = 0.001642 cm/sec
y0 = 1.231 ft

AQUIFER DATA

Saturated Thickness: 6.5 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (APW6 SI1)

Initial Displacement: 3.973 ft
Total Well Penetration Depth: 3.3 ft
Casing Radius: 0.08333 ft
Static Water Column Height: 6.5 ft
Screen Length: 3.3 ft
Well Radius: 0.3458 ft



WELL TEST ANALYSIS

Data Set: P:\...\APW6 SI2.aqt
Date: 10/10/17 Time: 08:45:57

PROJECT INFORMATION

Company: Natural Resource Technology
Client: Dynegy
Project: 2285
Location: Newton Primary Ash Pond
Test Well: APW6
Test Date: 4/6/17

SOLUTION

Aquifer Model: Confined
Solution Method: Bouwer-Rice

K = 0.002177 cm/sec
y0 = 1.702 ft

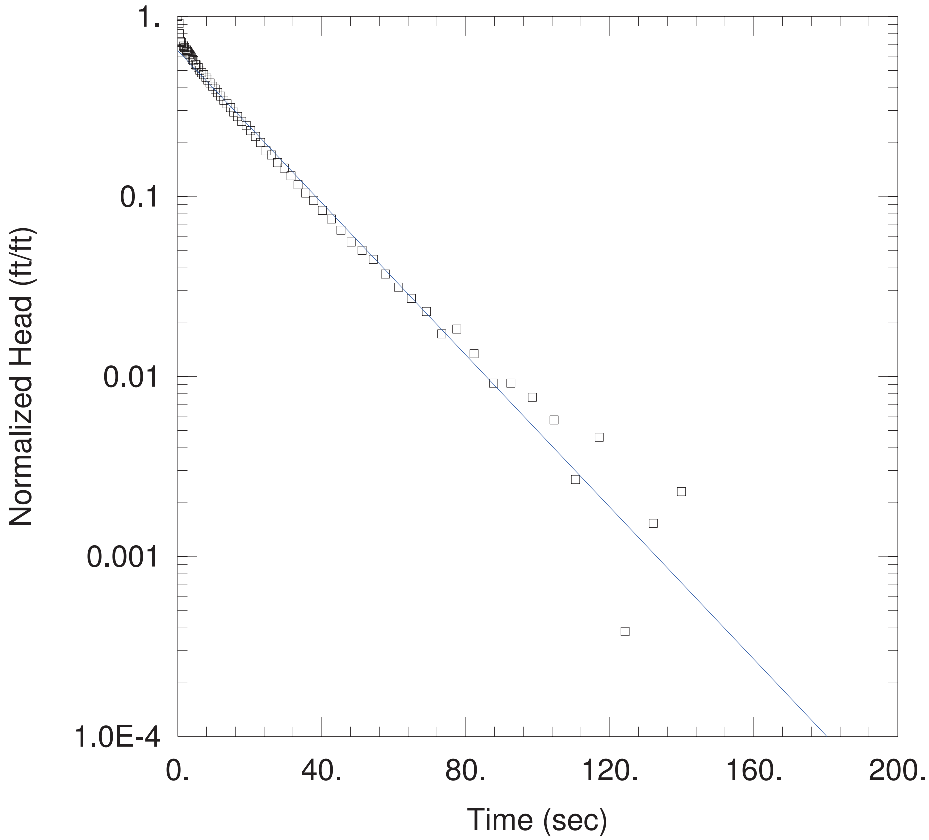
AQUIFER DATA

Saturated Thickness: 6.5 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (APW6 SI2)

Initial Displacement: 2.83 ft
Total Well Penetration Depth: 3.3 ft
Casing Radius: 0.08333 ft

Static Water Column Height: 6.5 ft
Screen Length: 3.3 ft
Well Radius: 0.3458 ft



WELL TEST ANALYSIS

Data Set: P:\...\APW6 SO2.aqt
Date: 10/10/17 Time: 08:48:43

PROJECT INFORMATION

Company: Natural Resource Technology
Client: Dynegy
Project: 2285
Location: Newton Primary Ash Pond
Test Well: APW6
Test Date: 4/6/17

SOLUTION

Aquifer Model: Confined
Solution Method: Bouwer-Rice

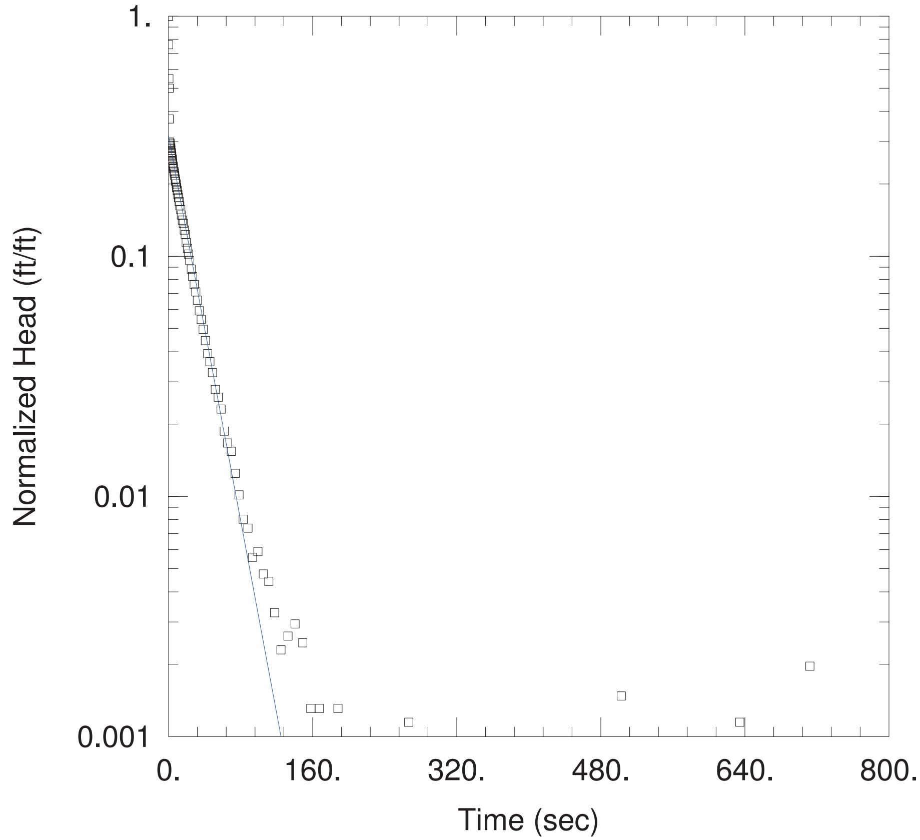
K = 0.002091 cm/sec
y0 = 1.689 ft

AQUIFER DATA

Saturated Thickness: 6.5 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (APW6 SO2)

Initial Displacement: 2.62 ft
Total Well Penetration Depth: 3.3 ft
Casing Radius: 0.08333 ft
Static Water Column Height: 6.5 ft
Screen Length: 3.3 ft
Well Radius: 0.3458 ft



WELL TEST ANALYSIS

Data Set: P:\...\APW6 SO3.aqt
Date: 10/10/17 Time: 08:51:05

PROJECT INFORMATION

Company: Natural Resource Technology
Client: Dynegy
Project: 2285
Location: Newton Primary Ash Pond
Test Well: APW6
Test Date: 4/6/17

SOLUTION

Aquifer Model: Confined
Solution Method: Bouwer-Rice

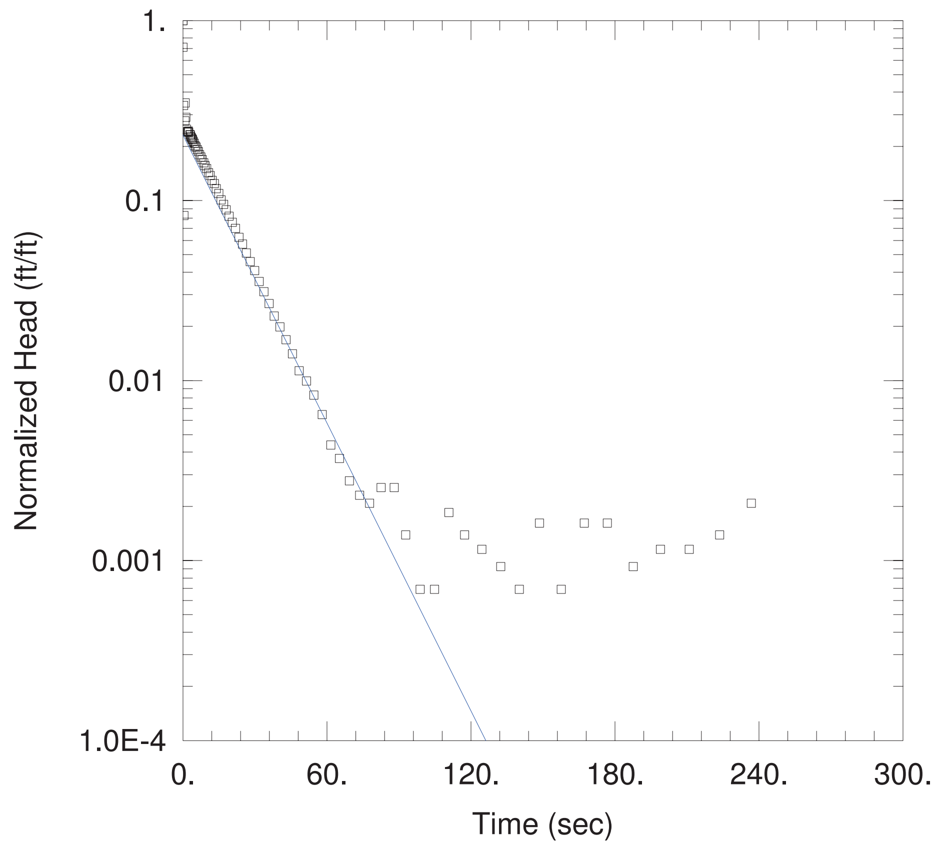
K = 0.001979 cm/sec
y0 = 1.936 ft

AQUIFER DATA

Saturated Thickness: 6.5 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (APW6 SO3)

Initial Displacement: 6.109 ft
Total Well Penetration Depth: 3.3 ft
Casing Radius: 0.08333 ft
Static Water Column Height: 6.5 ft
Screen Length: 3.3 ft
Well Radius: 0.3458 ft



WELL TEST ANALYSIS

Data Set: P:\...\APW7 SI1.aqt
Date: 10/10/17 Time: 09:03:20

PROJECT INFORMATION

Company: Natural Resource Technology
Client: Dynegy
Project: 2285
Location: Newton Primary Ash Pond
Test Well: APW7
Test Date: 4/6/17

SOLUTION

Aquifer Model: Confined
Solution Method: Bouwer-Rice

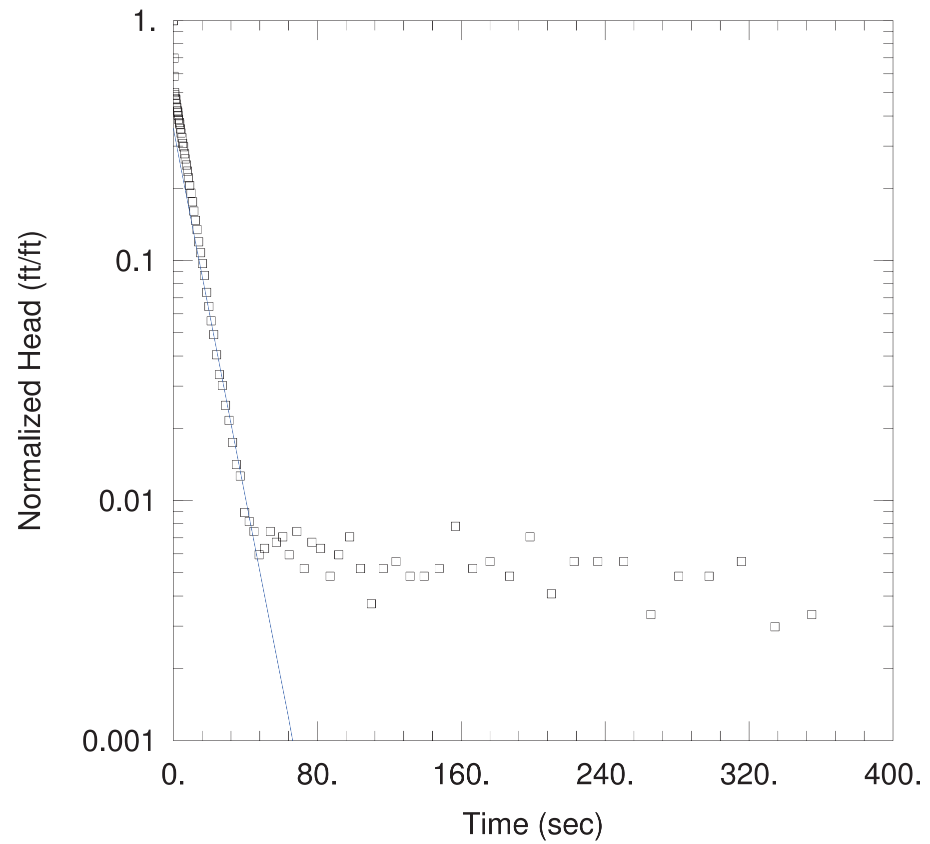
K = 0.00225 cm/sec
y0 = 1.004 ft

AQUIFER DATA

Saturated Thickness: 7.1 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (APW7 SI1)

Initial Displacement: 4.331 ft
Total Well Penetration Depth: 4.8 ft
Casing Radius: 0.08333 ft
Static Water Column Height: 7.1 ft
Screen Length: 4.8 ft
Well Radius: 0.3458 ft



WELL TEST ANALYSIS

Data Set: P:\...\APW7 SO2.aqt
Date: 10/10/17 Time: 09:05:47

PROJECT INFORMATION

Company: Natural Resource Technology
Client: Dynegy
Project: 2285
Location: Newton Primary Ash Pond
Test Well: APW7
Test Date: 4/6/17

SOLUTION

Aquifer Model: Confined
Solution Method: Bouwer-Rice

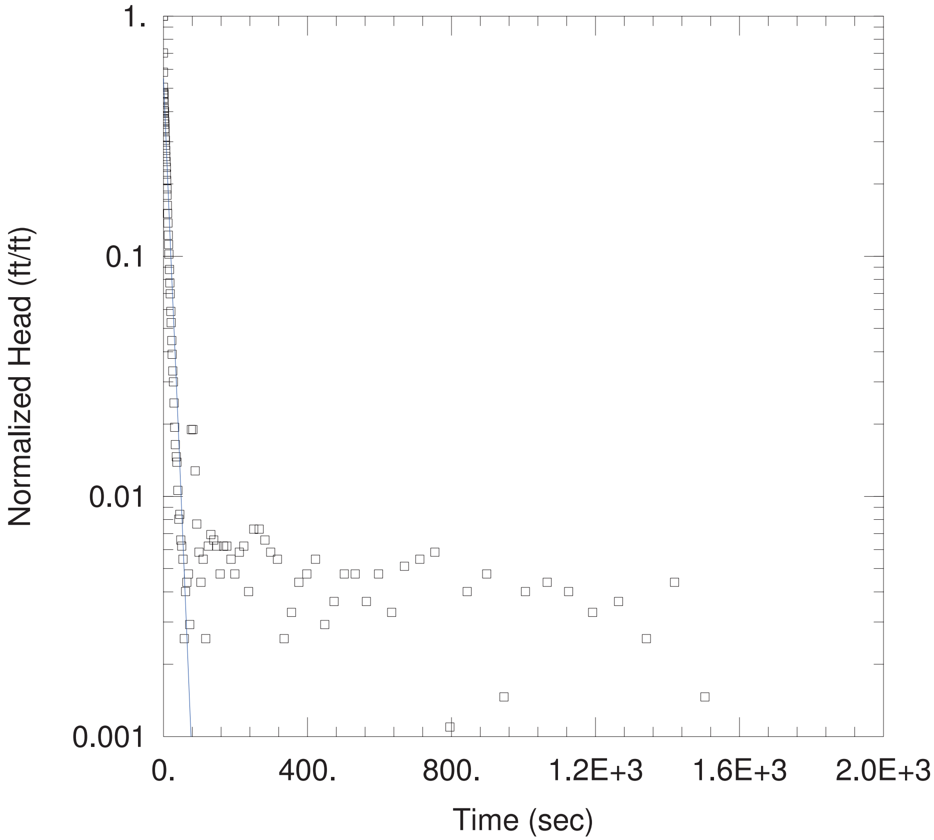
K = 0.003237 cm/sec
y0 = 0.9561 ft

AQUIFER DATA

Saturated Thickness: 7.1 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (APW7 S02)

Initial Displacement: 2.69 ft
Total Well Penetration Depth: 4.8 ft
Casing Radius: 0.08333 ft
Static Water Column Height: 7.1 ft
Screen Length: 4.8 ft
Well Radius: 0.3458 ft



WELL TEST ANALYSIS

Data Set: P:\...\APW7 SO3.aqt
Date: 10/10/17 Time: 09:07:38

PROJECT INFORMATION

Company: Natural Resource Technology
Client: Dynegy
Project: 2285
Location: Newton Primary Ash Pond
Test Well: APW7
Test Date: 4/6/17

SOLUTION

Aquifer Model: Confined
Solution Method: Bouwer-Rice

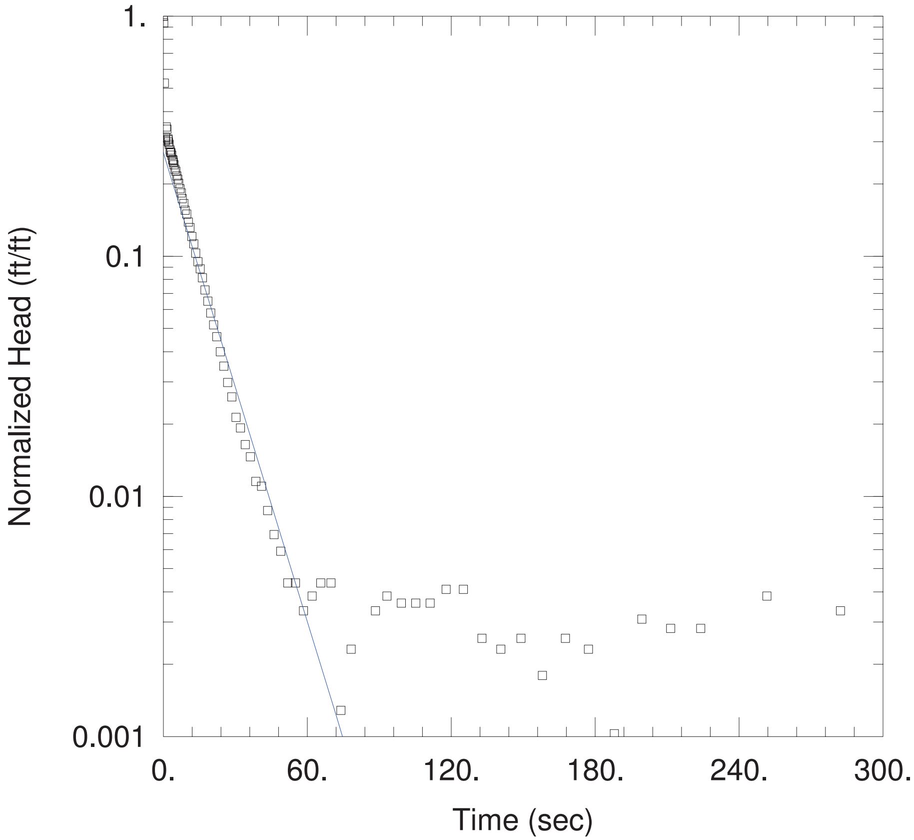
K = 0.002989 cm/sec
y0 = 1.503 ft

AQUIFER DATA

Saturated Thickness: 7.1 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (APW7 S03)

Initial Displacement: 2.738 ft
Total Well Penetration Depth: 4.8 ft
Casing Radius: 0.08333 ft
Static Water Column Height: 7.1 ft
Screen Length: 4.8 ft
Well Radius: 0.3458 ft



WELL TEST ANALYSIS

Data Set: P:\...\APW7 SO4.aqt
Date: 10/10/17 Time: 09:09:26

PROJECT INFORMATION

Company: Natural Resource Technology
Client: Dynegy
Project: 2285
Location: Newton Primary Ash Pond
Test Well: APW7
Test Date: 4/6/17

SOLUTION

Aquifer Model: Confined
Solution Method: Bouwer-Rice

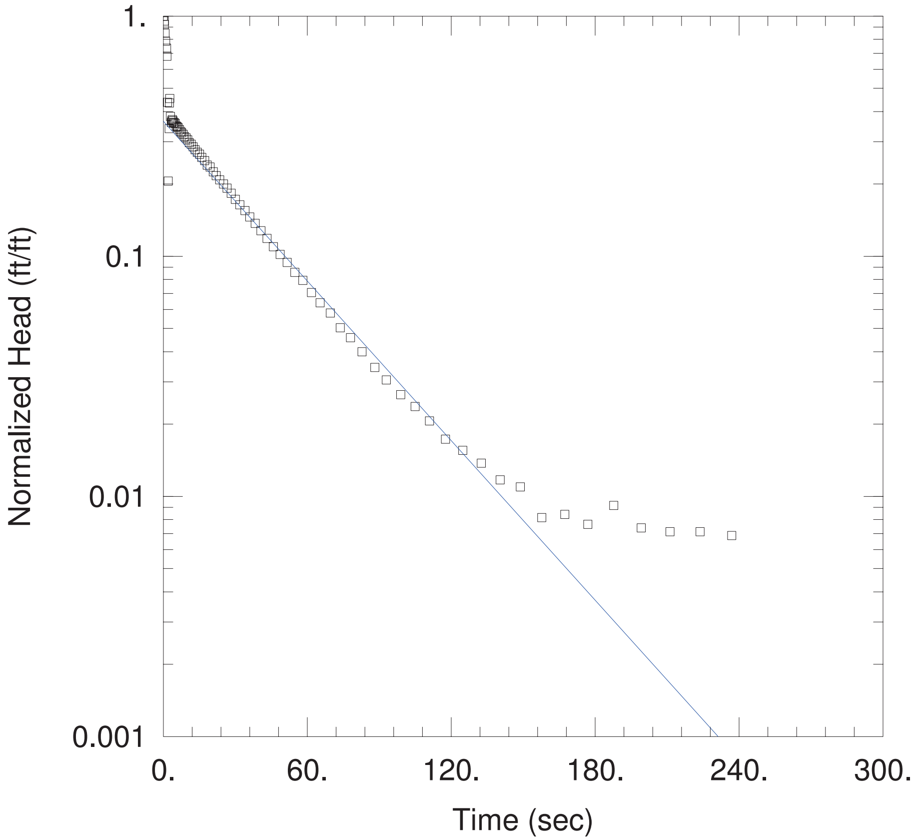
K = 0.002745 cm/sec
y0 = 1.052 ft

AQUIFER DATA

Saturated Thickness: 7.1 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (APW7 SO4)

Initial Displacement: 3.899 ft
Total Well Penetration Depth: 4.8 ft
Casing Radius: 0.08333 ft
Static Water Column Height: 7.1 ft
Screen Length: 4.8 ft
Well Radius: 0.3458 ft



WELL TEST ANALYSIS

Data Set: P:\...\APW8 SI1.aqt
Date: 10/10/17 Time: 09:12:16

PROJECT INFORMATION

Company: Natural Resource Technology
Client: Dynegy
Project: 2285
Location: Newton Primary Ash Pond
Test Well: APW8
Test Date: 4/6/17

SOLUTION

Aquifer Model: Confined
Solution Method: Bouwer-Rice

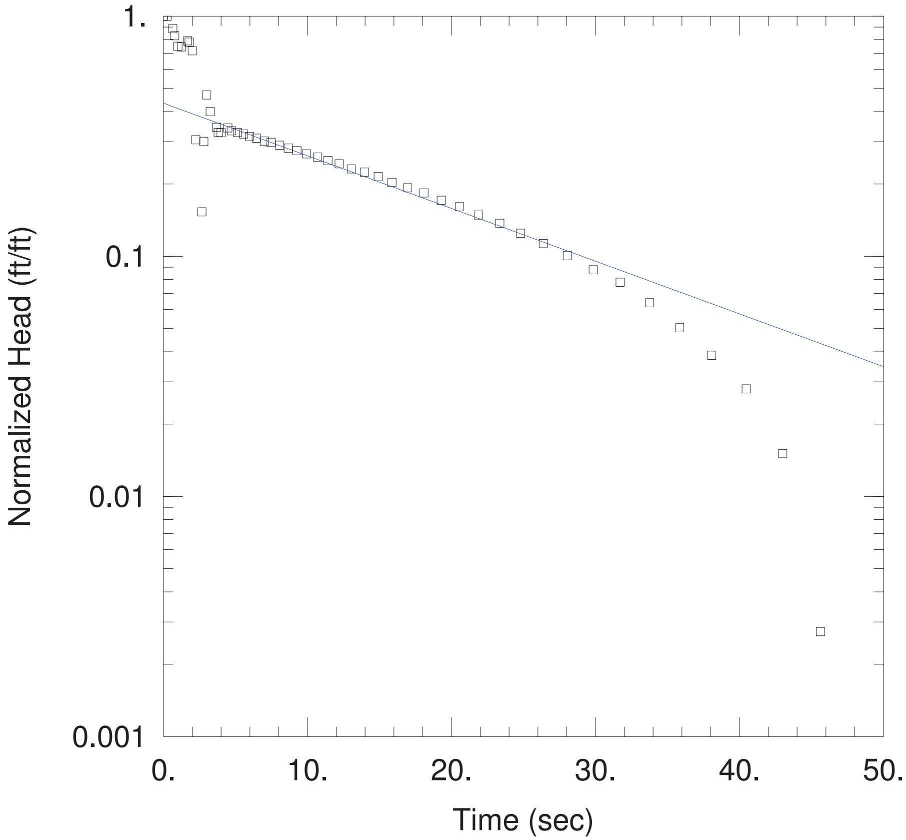
K = 0.0006602 cm/sec
y0 = 1.431 ft

AQUIFER DATA

Saturated Thickness: 16.3 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (APW8 SI1)

Initial Displacement: 3.929 ft
Total Well Penetration Depth: 12.8 ft
Casing Radius: 0.08333 ft
Static Water Column Height: 16.3 ft
Screen Length: 9.7 ft
Well Radius: 0.3458 ft



WELL TEST ANALYSIS

Data Set: P:\...\APW8 SI2.aqt
Date: 10/10/17 Time: 09:39:50

PROJECT INFORMATION

Company: Natural Resource Technology
Client: Dynegy
Project: 2285
Location: Newton Primary Ash Pond
Test Well: APW8
Test Date: 4/6/17

SOLUTION

Aquifer Model: Confined
Solution Method: Bouwer-Rice

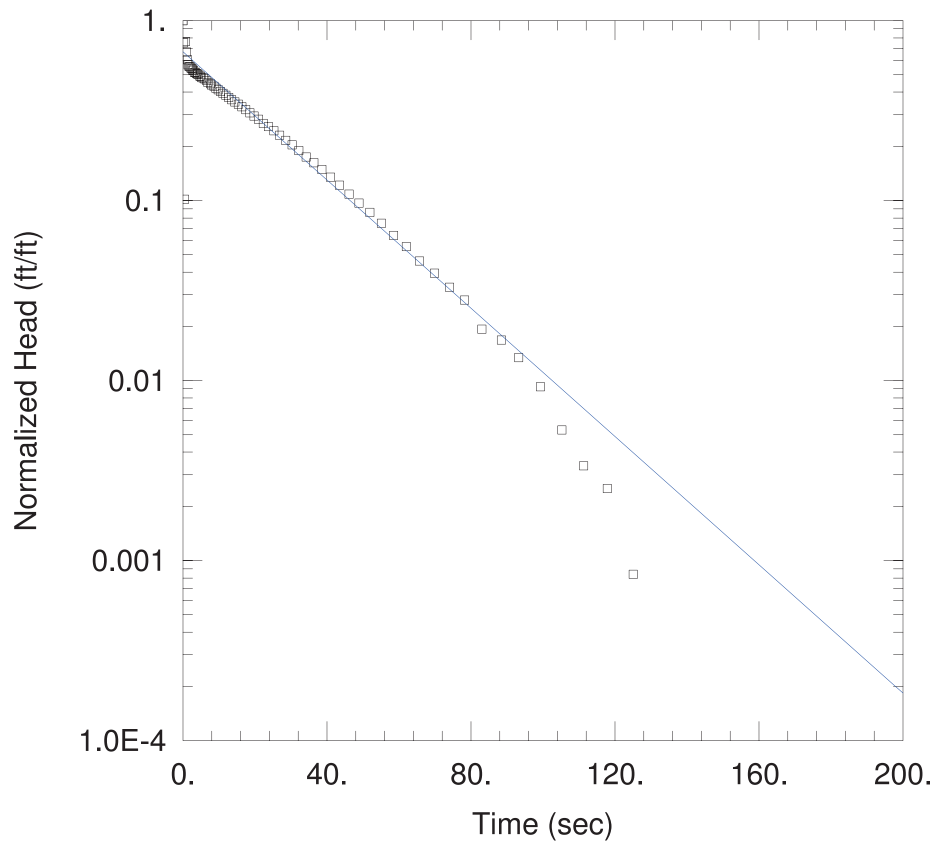
K = 0.001308 cm/sec
y0 = 1.269 ft

AQUIFER DATA

Saturated Thickness: 16.3 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (APW8 SI2)

Initial Displacement: 2.924 ft
Total Well Penetration Depth: 12.8 ft
Casing Radius: 0.08333 ft
Static Water Column Height: 16.3 ft
Screen Length: 9.7 ft
Well Radius: 0.3458 ft



WELL TEST ANALYSIS

Data Set: P:\...\APW8 SO2.aqt
Date: 10/10/17 Time: 09:41:42

PROJECT INFORMATION

Company: Natural Resource Technology
Client: Dynegy
Project: 2285
Location: Newton Primary Ash Pond
Test Well: APW8
Test Date: 4/6/17

SOLUTION

Aquifer Model: Confined
Solution Method: Bouwer-Rice

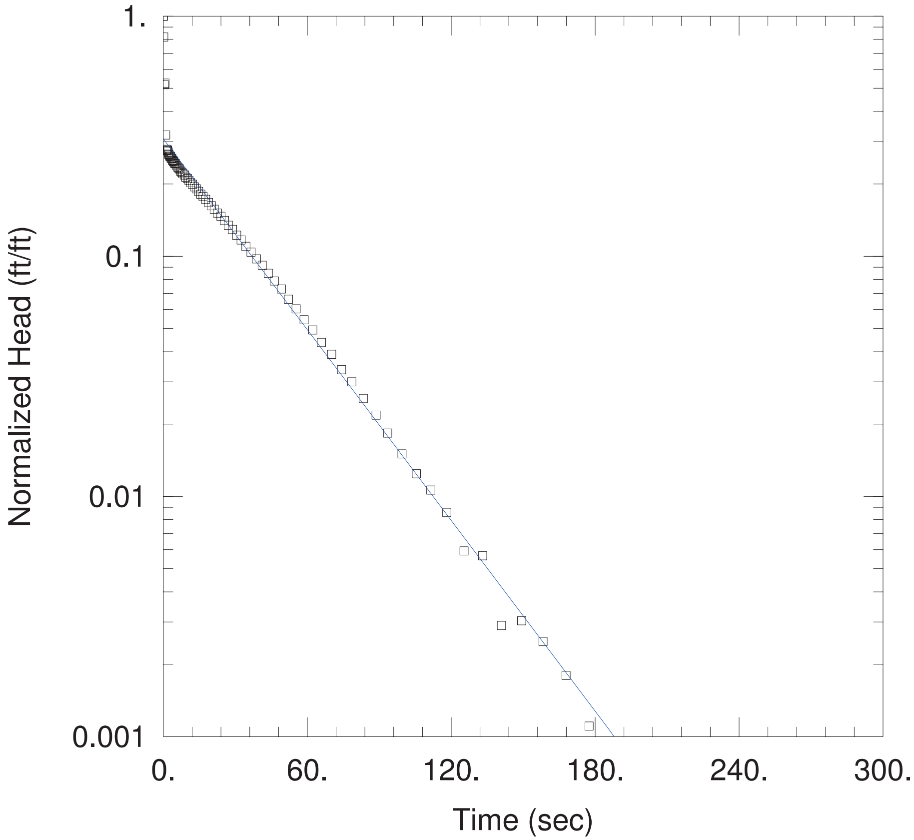
K = 0.001062 cm/sec
y0 = 2.403 ft

AQUIFER DATA

Saturated Thickness: 16.3 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (APW8 SO2)

Initial Displacement: 3.577 ft
Total Well Penetration Depth: 12.8 ft
Casing Radius: 0.08333 ft
Static Water Column Height: 16.3 ft
Screen Length: 9.7 ft
Well Radius: 0.3458 ft



WELL TEST ANALYSIS

Data Set: P:\...\APW8 SO3.aqt
Date: 10/10/17 Time: 09:43:26

PROJECT INFORMATION

Company: Natural Resource Technology
Client: Dynegy
Project: 2285
Location: Newton Primary Ash Pond
Test Well: APW8
Test Date: 4/6/17

SOLUTION

Aquifer Model: Confined
Solution Method: Bouwer-Rice

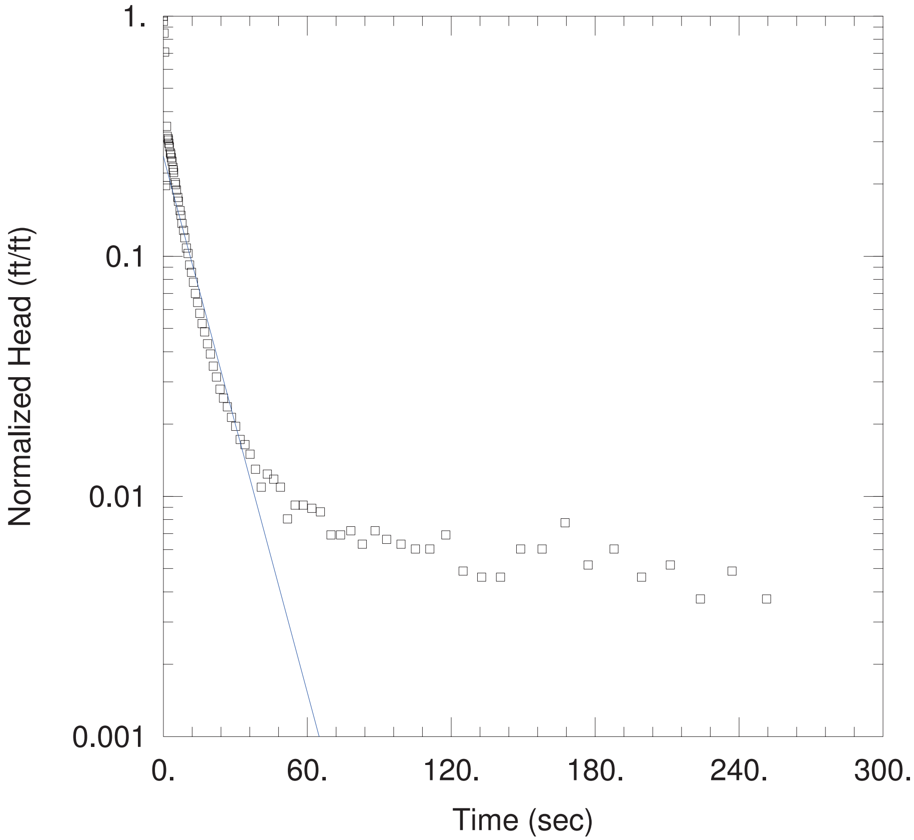
K = 0.0007891 cm/sec
y0 = 2.233 ft

AQUIFER DATA

Saturated Thickness: 16.3 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (APW8 SO3)

Initial Displacement: 7.249 ft
Total Well Penetration Depth: 12.8 ft
Casing Radius: 0.08333 ft
Static Water Column Height: 16.3 ft
Screen Length: 9.7 ft
Well Radius: 0.3458 ft



WELL TEST ANALYSIS

Data Set: P:\...\APW9 SI1.aqt
Date: 10/10/17 Time: 09:48:54

PROJECT INFORMATION

Company: Natural Resource Technology
Client: Dynegy
Project: 2285
Location: Newton Primary Ash Pond
Test Well: APW9
Test Date: 4/7/17

SOLUTION

Aquifer Model: Confined
Solution Method: Bouwer-Rice

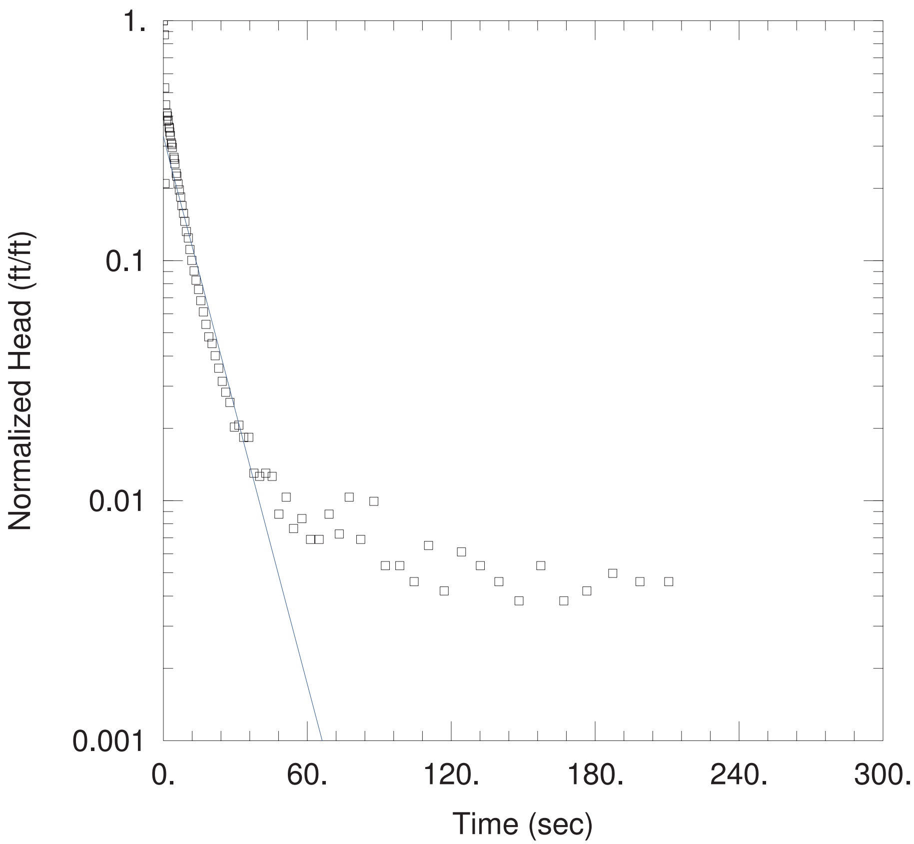
K = 0.00321 cm/sec
y0 = 0.9059 ft

AQUIFER DATA

Saturated Thickness: 6.3 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (APW9 SI1)

Initial Displacement: 3.477 ft
Total Well Penetration Depth: 4.7 ft
Casing Radius: 0.08333 ft
Static Water Column Height: 6.3 ft
Screen Length: 4.7 ft
Well Radius: 0.3458 ft



WELL TEST ANALYSIS

Data Set: P:\...\APW9 SI2.aqt
Date: 10/10/17 Time: 09:50:42

PROJECT INFORMATION

Company: Natural Resource Technology
Client: Dynegy
Project: 2285
Location: Newton Primary Ash Pond
Test Well: APW9
Test Date: 4/7/17

SOLUTION

Aquifer Model: Confined
Solution Method: Bouwer-Rice

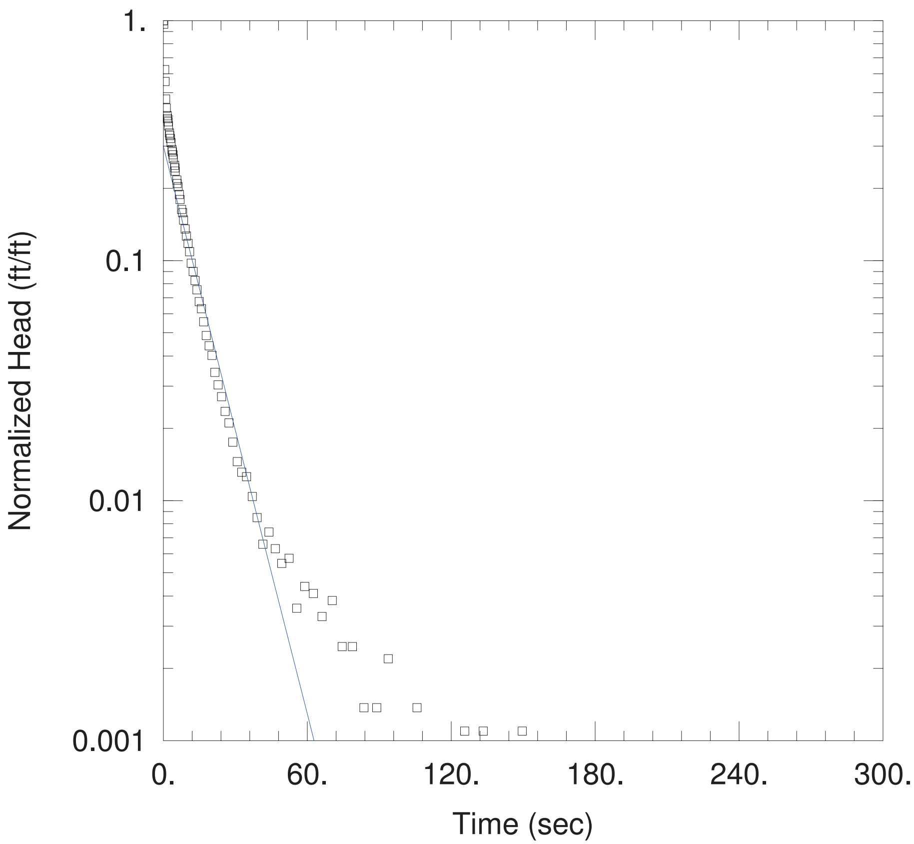
K = 0.003282 cm/sec
y0 = 0.8588 ft

AQUIFER DATA

Saturated Thickness: 6.3 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (APW9 SI2)

Initial Displacement: 2.617 ft
Total Well Penetration Depth: 4.7 ft
Casing Radius: 0.08333 ft
Static Water Column Height: 6.3 ft
Screen Length: 4.7 ft
Well Radius: 0.3458 ft



WELL TEST ANALYSIS

Data Set: P:\...\APW9 SO1.aqt
Date: 10/10/17 Time: 09:52:04

PROJECT INFORMATION

Company: Natural Resource Technology
Client: Dynegy
Project: 2285
Location: Newton Primary Ash Pond
Test Well: APW9
Test Date: 4/7/17

SOLUTION

Aquifer Model: Confined
Solution Method: Bouwer-Rice

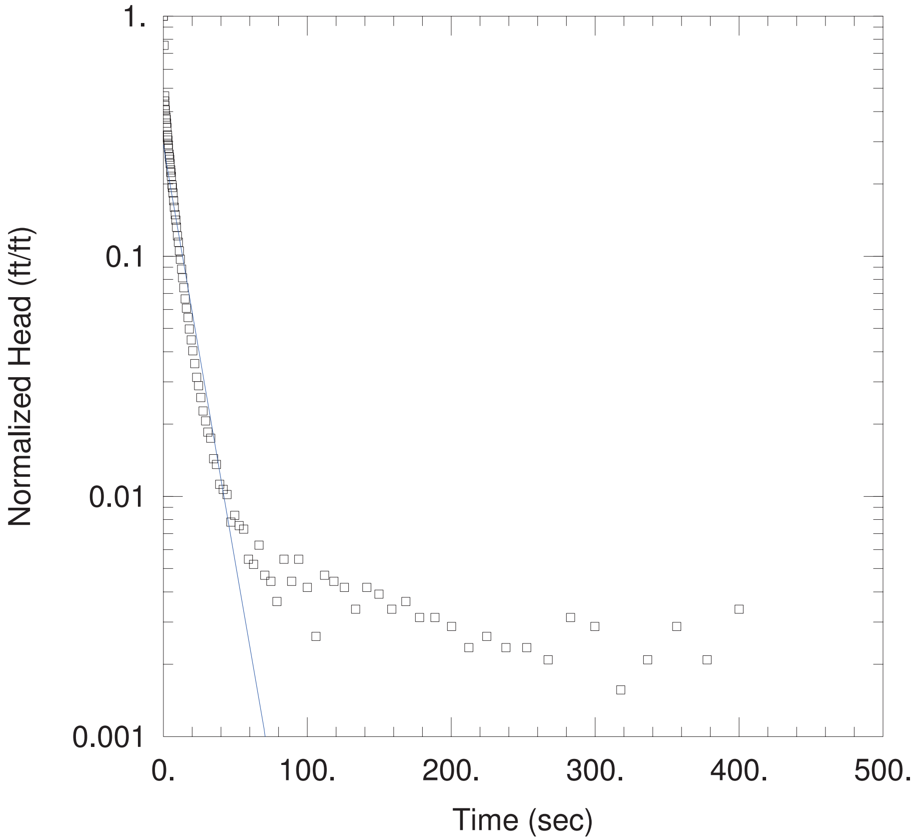
K = 0.003404 cm/sec
y0 = 1.094 ft

AQUIFER DATA

Saturated Thickness: 6.3 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (APW9 SO1)

Initial Displacement: 3.654 ft
Total Well Penetration Depth: 4.7 ft
Casing Radius: 0.08333 ft
Static Water Column Height: 6.3 ft
Screen Length: 4.7 ft
Well Radius: 0.3458 ft



WELL TEST ANALYSIS

Data Set: P:\...\APW9 SO2.aqt
Date: 10/10/17 Time: 09:53:49

PROJECT INFORMATION

Company: Natural Resource Technology
Client: Dynegy
Project: 2285
Location: Newton Primary Ash Pond
Test Well: APW9
Test Date: 4/7/17

SOLUTION

Aquifer Model: Confined
Solution Method: Bouwer-Rice

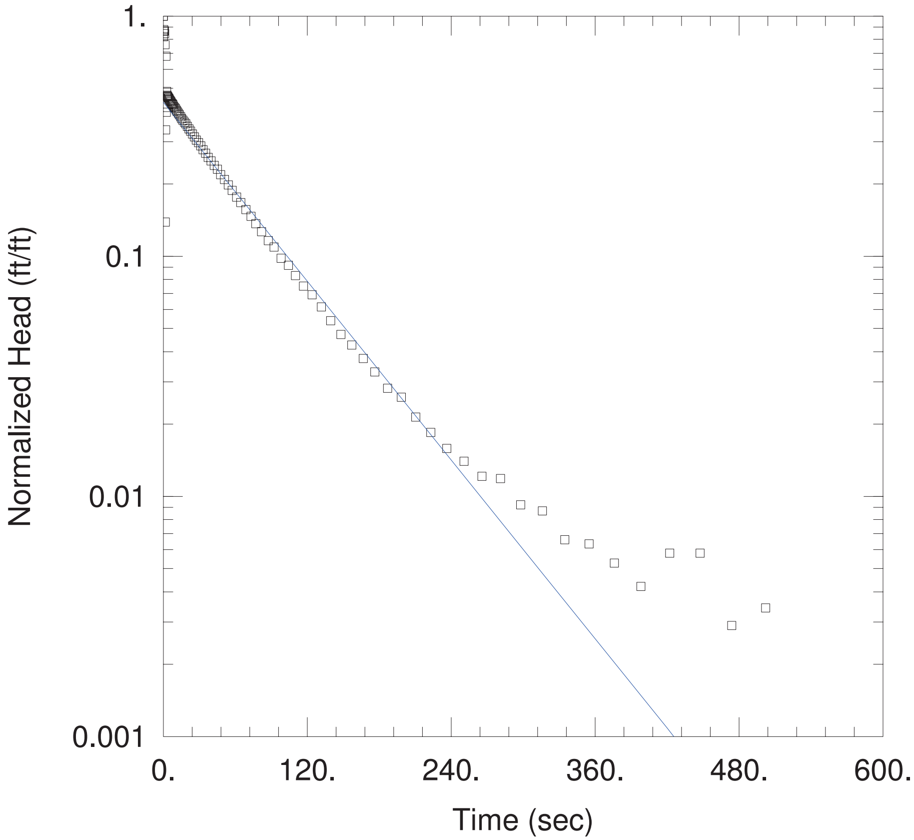
K = 0.003003 cm/sec
y0 = 1.117 ft

AQUIFER DATA

Saturated Thickness: 6.3 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (APW9 SO2)

Initial Displacement: 3.837 ft
Total Well Penetration Depth: 4.7 ft
Casing Radius: 0.08333 ft
Static Water Column Height: 6.3 ft
Screen Length: 4.7 ft
Well Radius: 0.3458 ft



WELL TEST ANALYSIS

Data Set: P:\...\APW10 SI1.aqt
Date: 10/10/17 Time: 09:56:32

PROJECT INFORMATION

Company: Natural Resource Technology
Client: Dynegy
Project: 2285
Location: Newton Primary Ash Pond
Test Well: APW10
Test Date: 4/7/17

SOLUTION

Aquifer Model: Confined
Solution Method: Bouwer-Rice

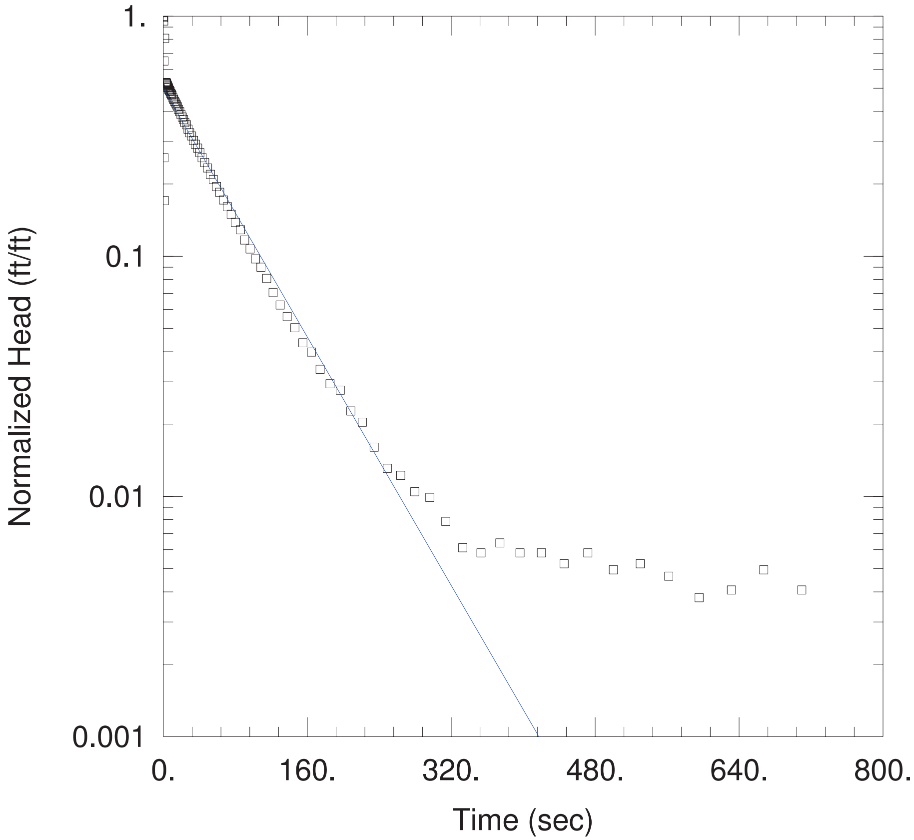
K = 0.0005269 cm/sec
y0 = 1.656 ft

AQUIFER DATA

Saturated Thickness: 6.7 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (APW10 SI1)

Initial Displacement: 3.792 ft
Total Well Penetration Depth: 4.8 ft
Casing Radius: 0.08333 ft
Static Water Column Height: 6.7 ft
Screen Length: 4.8 ft
Well Radius: 0.3458 ft



WELL TEST ANALYSIS

Data Set: P:\...\APW10 SI2.aqt
Date: 10/10/17 Time: 09:59:35

PROJECT INFORMATION

Company: Natural Resource Technology
Client: Dynegy
Project: 2285
Location: Newton Primary Ash Pond
Test Well: APW10
Test Date: 4/7/17

SOLUTION

Aquifer Model: Confined
Solution Method: Bouwer-Rice

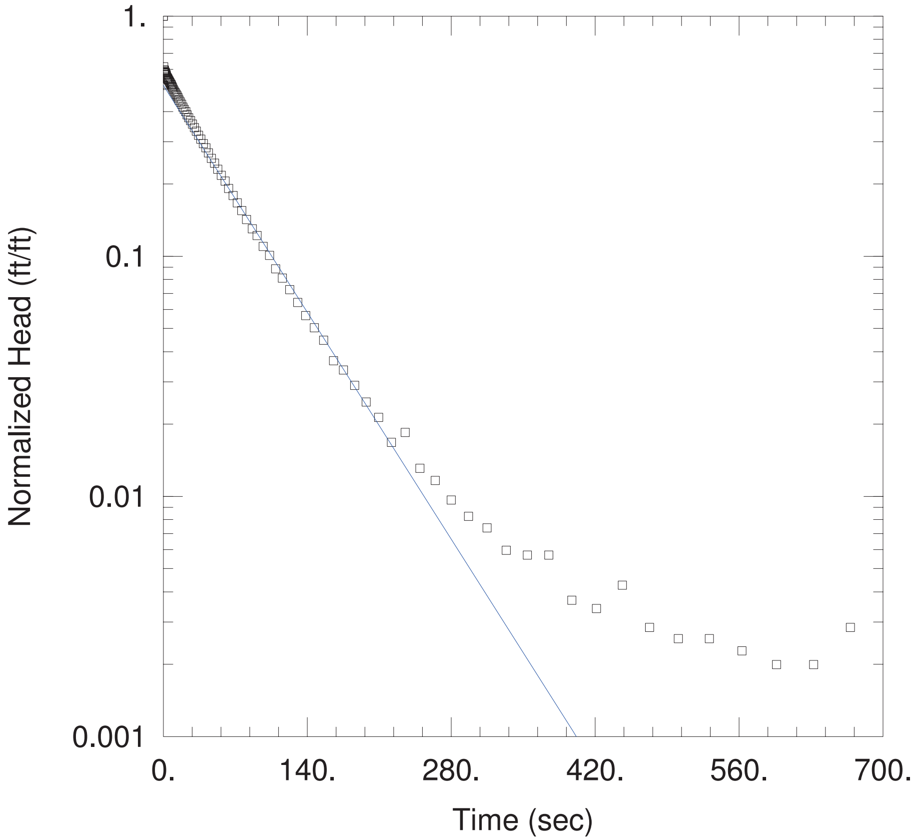
K = 0.0005491 cm/sec
y0 = 1.716 ft

AQUIFER DATA

Saturated Thickness: 6.7 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (APW10 SI2)

Initial Displacement: 3.438 ft
Total Well Penetration Depth: 4.8 ft
Casing Radius: 0.08333 ft
Static Water Column Height: 6.7 ft
Screen Length: 4.8 ft
Well Radius: 0.3458 ft



WELL TEST ANALYSIS

Data Set: P:\...\APW10 SO2.aqt
Date: 10/10/17 Time: 10:01:28

PROJECT INFORMATION

Company: Natural Resource Technology
Client: Dynegy
Project: 2285
Location: Newton Primary Ash Pond
Test Well: APW10
Test Date: 4/7/17

SOLUTION

Aquifer Model: Confined
Solution Method: Bouwer-Rice

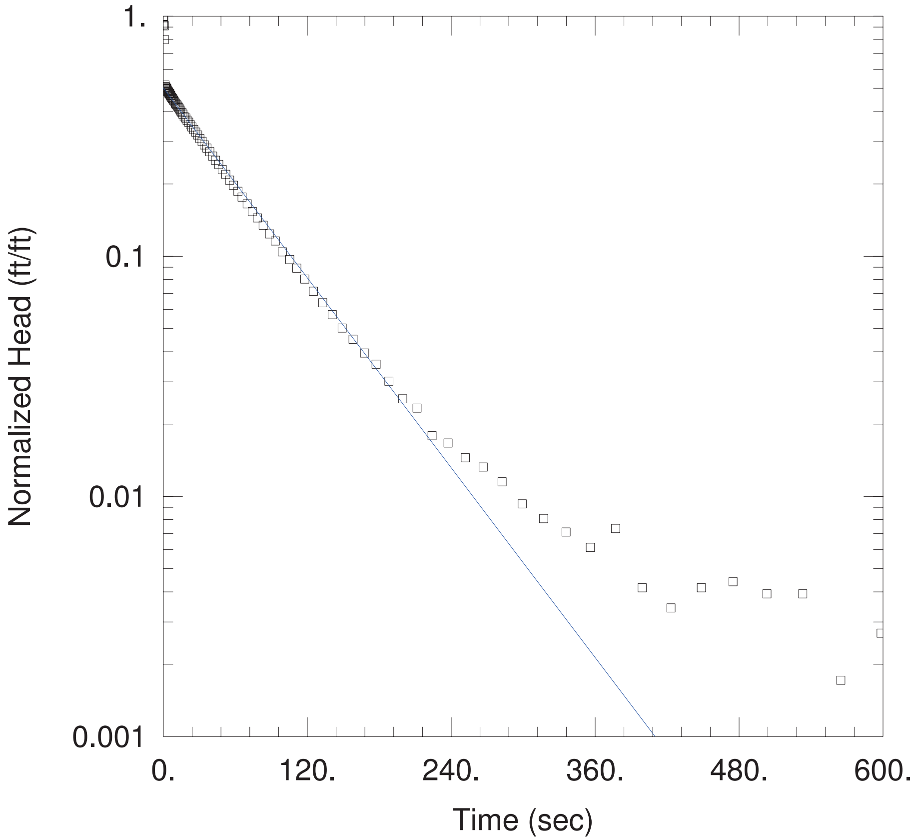
K = 0.0005731 cm/sec
y0 = 1.809 ft

AQUIFER DATA

Saturated Thickness: 6.7 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (APW10 SO2)

Initial Displacement: 3.518 ft
Total Well Penetration Depth: 4.8 ft
Casing Radius: 0.08333 ft
Static Water Column Height: 6.7 ft
Screen Length: 4.8 ft
Well Radius: 0.3458 ft



WELL TEST ANALYSIS

Data Set: P:\...\APW10 SO3.aqt
Date: 10/10/17 Time: 10:09:04

PROJECT INFORMATION

Company: Natural Resource Technology
Client: Dynegy
Project: 2285
Location: Newton Primary Ash Pond
Test Well: APW10
Test Date: 4/7/17

SOLUTION

Aquifer Model: Confined
Solution Method: Bouwer-Rice

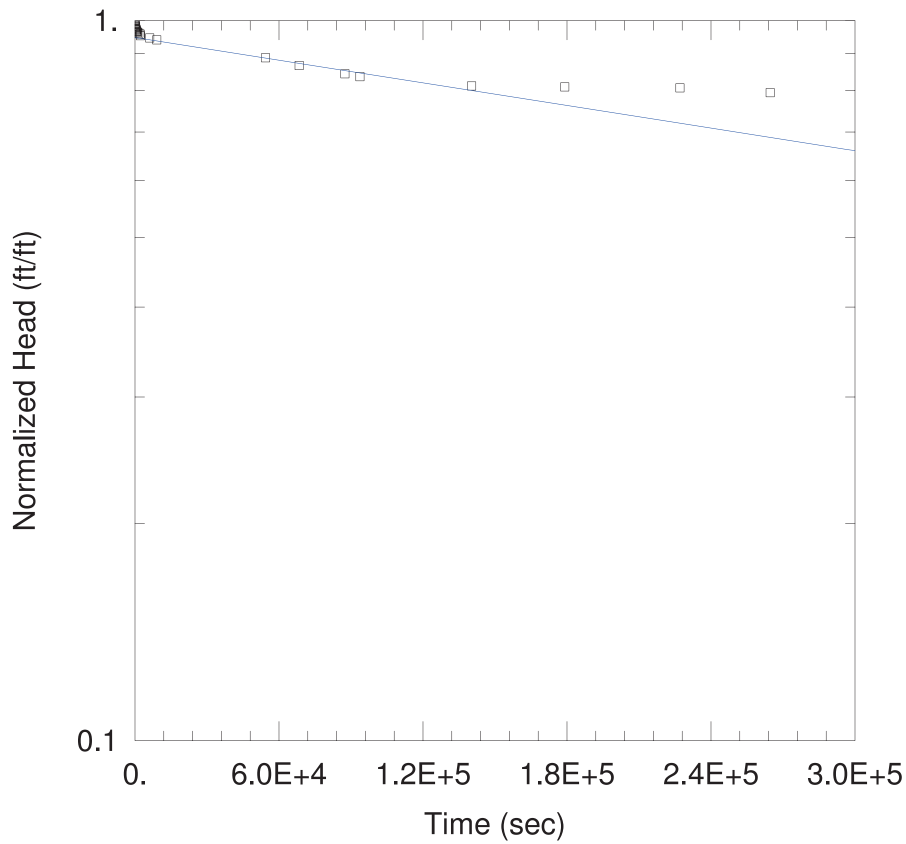
K = 0.0005595 cm/sec
y0 = 2.048 ft

AQUIFER DATA

Saturated Thickness: 6.7 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (APW10 SO2)

Initial Displacement: 4.081 ft
Total Well Penetration Depth: 4.8 ft
Casing Radius: 0.08333 ft
Static Water Column Height: 6.7 ft
Screen Length: 4.8 ft
Well Radius: 0.3458 ft



WELL TEST ANALYSIS

Data Set: P:\...\G06D SO1.aqt
Date: 10/10/17 Time: 10:15:04

PROJECT INFORMATION

Company: Natural Resource Technology
Client: Dynegy
Project: 2285
Location: Newton Landfill
Test Well: G06D
Test Date: 4/4/17

SOLUTION

Aquifer Model: Confined
Solution Method: Bouwer-Rice

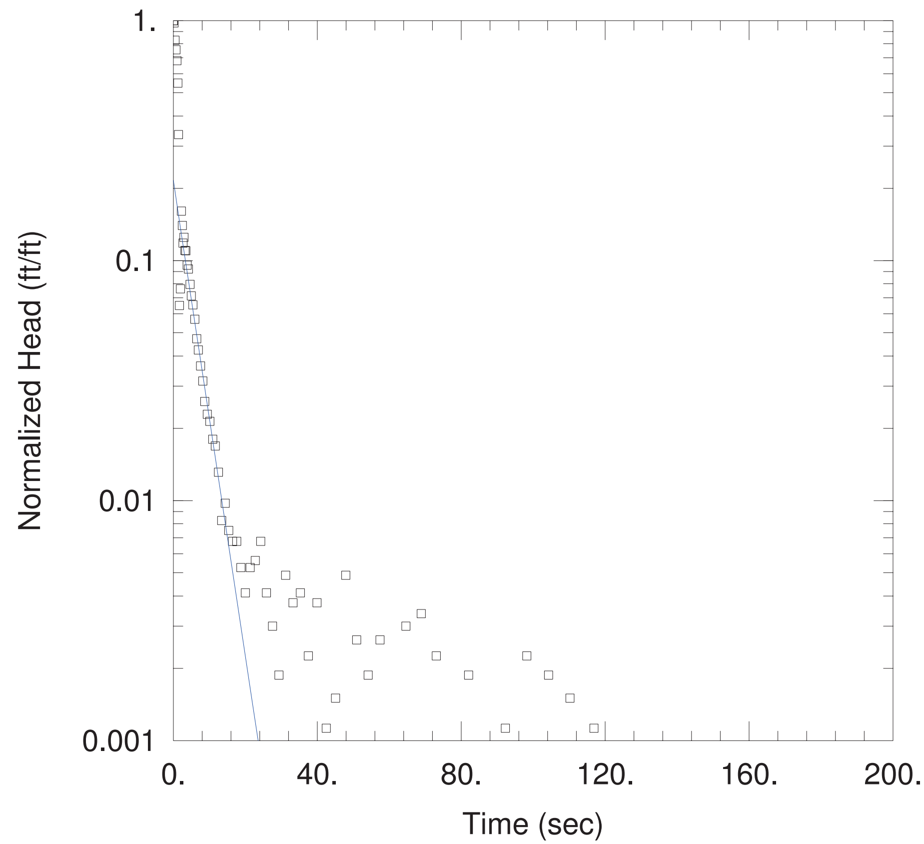
K = 3.917E-8 cm/sec
y0 = 3.807 ft

AQUIFER DATA

Saturated Thickness: 0.4 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (G06D)

Initial Displacement: 4.02 ft
Total Well Penetration Depth: 0.4 ft
Casing Radius: 0.08333 ft
Static Water Column Height: 0.4 ft
Screen Length: 0.4 ft
Well Radius: 0.3458 ft



WELL TEST ANALYSIS

Data Set: P:\...\G202 SI1.aqt
Date: 10/10/17 Time: 10:19:06

PROJECT INFORMATION

Company: Natural Resource Technology
Client: Dynegy
Project: 2285
Location: Newton Landfill
Test Well: G202
Test Date: 4/5/17

SOLUTION

Aquifer Model: Confined
Solution Method: Bouwer-Rice

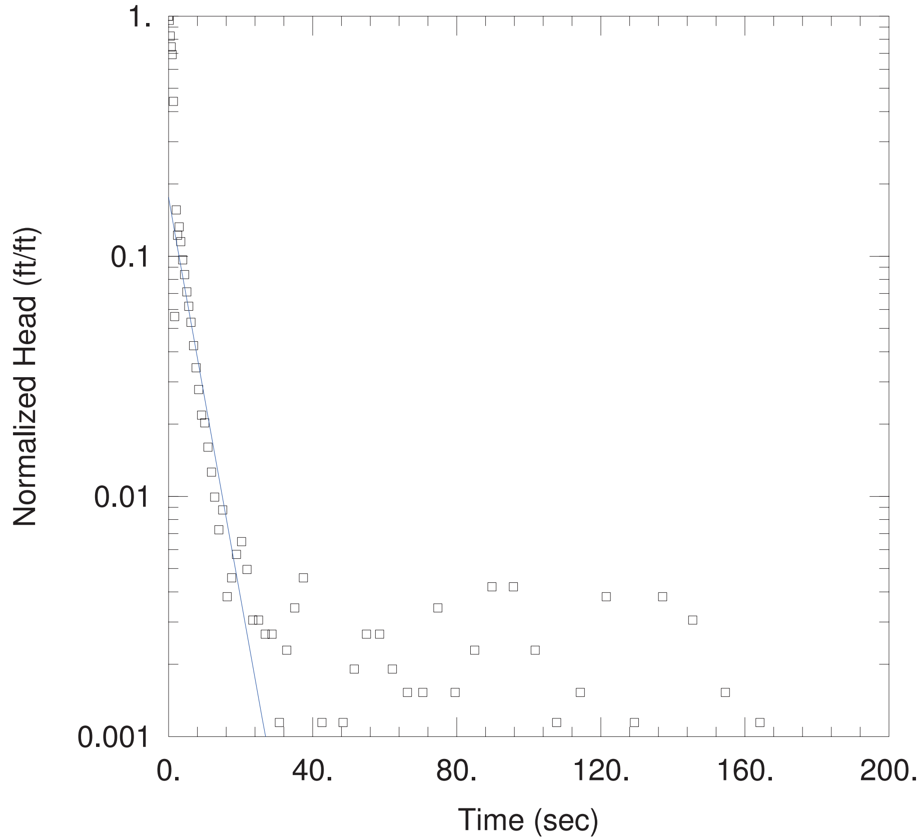
K = 0.01698 cm/sec
y0 = 0.5744 ft

AQUIFER DATA

Saturated Thickness: 0.6 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (G202 SI1)

Initial Displacement: 2.666 ft
Total Well Penetration Depth: 0.6 ft
Casing Radius: 0.08333 ft
Static Water Column Height: 0.6 ft
Screen Length: 0.6 ft
Well Radius: 0.3458 ft



WELL TEST ANALYSIS

Data Set: P:\...\G202 SI2.aqt
Date: 10/10/17 Time: 10:20:26

PROJECT INFORMATION

Company: Natural Resource Technology
Client: Dynegy
Project: 2285
Location: Newton Landfill
Test Well: G202
Test Date: 4/5/17

SOLUTION

Aquifer Model: Confined
Solution Method: Bouwer-Rice

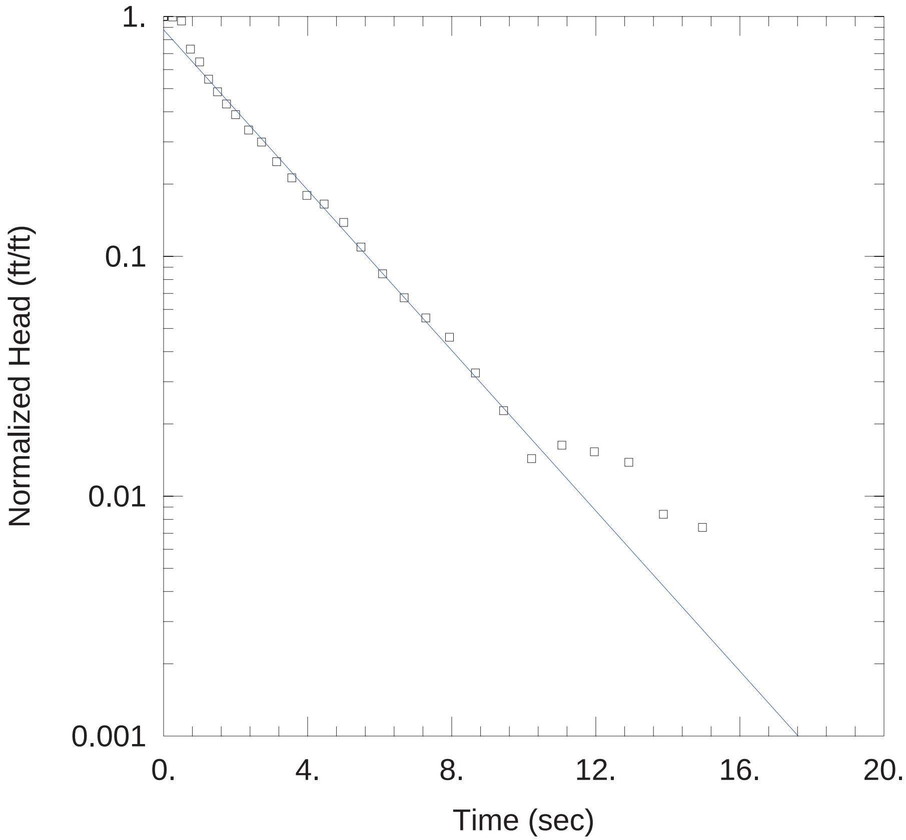
K = 0.0143 cm/sec
y0 = 0.4599 ft

AQUIFER DATA

Saturated Thickness: 0.6 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (G202 SI2)

Initial Displacement: 2.621 ft
Total Well Penetration Depth: 0.6 ft
Casing Radius: 0.08333 ft
Static Water Column Height: 0.6 ft
Screen Length: 0.6 ft
Well Radius: 0.3458 ft



WELL TEST ANALYSIS

Data Set: P:\...\G202 SO2.aqt
Date: 06/15/17 Time: 10:21:12

PROJECT INFORMATION

Company: Natural Resource Technology
Client: Dynegy
Project: 2285
Location: Newton Landfill
Test Well: G202
Test Date: 4/5/17

SOLUTION

Aquifer Model: Confined
Solution Method: Bouwer-Rice

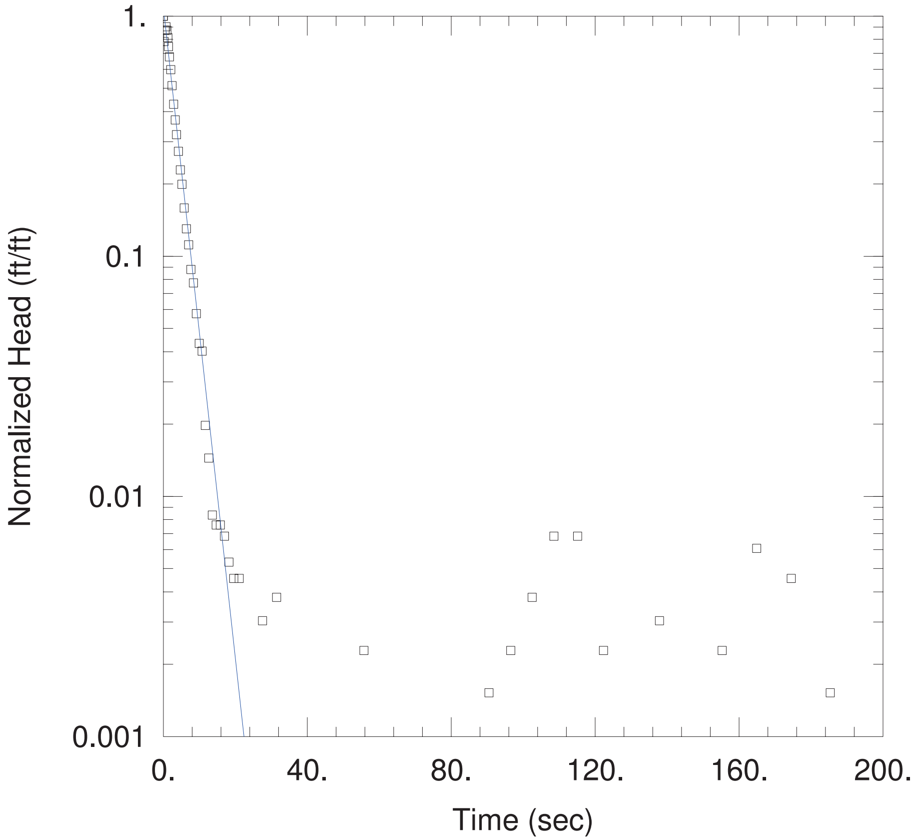
K = 0.02868 cm/sec
y0 = 1.781 ft

AQUIFER DATA

Saturated Thickness: 0.6 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (G202 SO2)

Initial Displacement: 2.024 ft
Total Well Penetration Depth: 0.6 ft
Casing Radius: 0.08333 ft
Static Water Column Height: 0.6 ft
Screen Length: 0.6 ft
Well Radius: 0.3458 ft



WELL TEST ANALYSIS

Data Set: P:\...\G202 SO3.aqt
Date: 10/10/17 Time: 10:21:38

PROJECT INFORMATION

Company: Natural Resource Technology
Client: Dynegy
Project: 2285
Location: Newton Landfill
Test Well: G202
Test Date: 4/5/17

SOLUTION

Aquifer Model: Confined
Solution Method: Bouwer-Rice

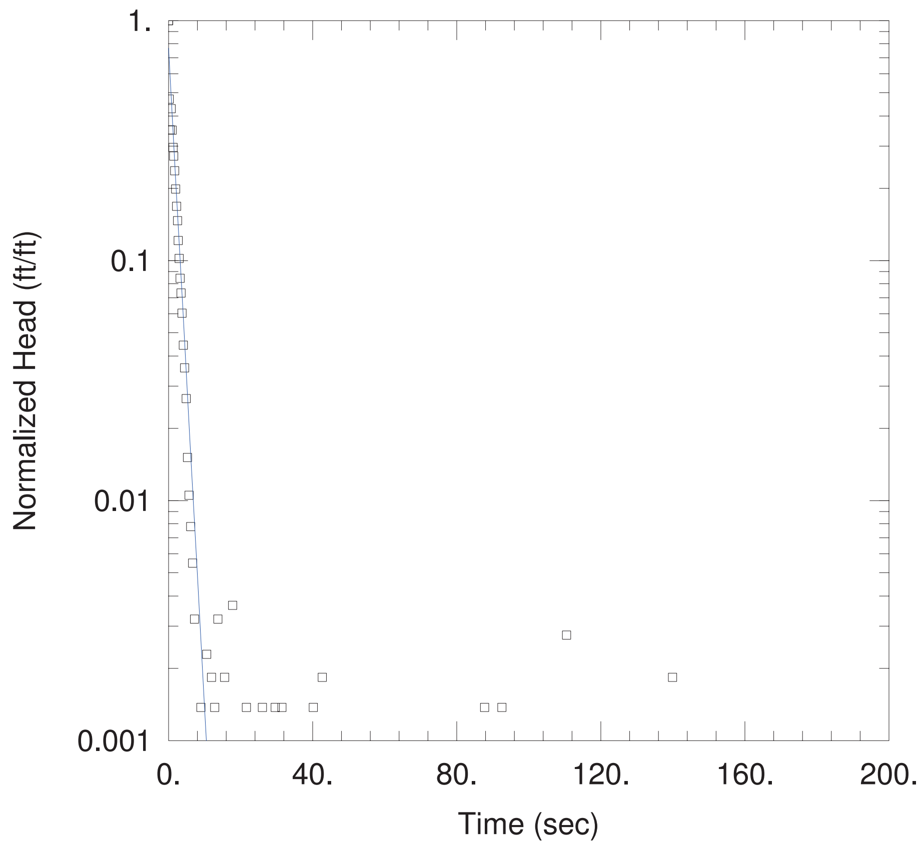
K = 0.02325 cm/sec
y0 = 1.444 ft

AQUIFER DATA

Saturated Thickness: 0.6 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (G202 SO3)

Initial Displacement: 1.317 ft
Total Well Penetration Depth: 0.6 ft
Casing Radius: 0.08333 ft
Static Water Column Height: 0.6 ft
Screen Length: 0.6 ft
Well Radius: 0.3458 ft



WELL TEST ANALYSIS

Data Set: P:\...\G203 SI1.aqt
Date: 10/10/17 Time: 10:24:55

PROJECT INFORMATION

Company: Natural Resource Technology
Client: Dynegy
Project: 2285
Location: Newton Landfill
Test Well: G203
Test Date: 4/4/17

SOLUTION

Aquifer Model: Confined
Solution Method: Bouwer-Rice

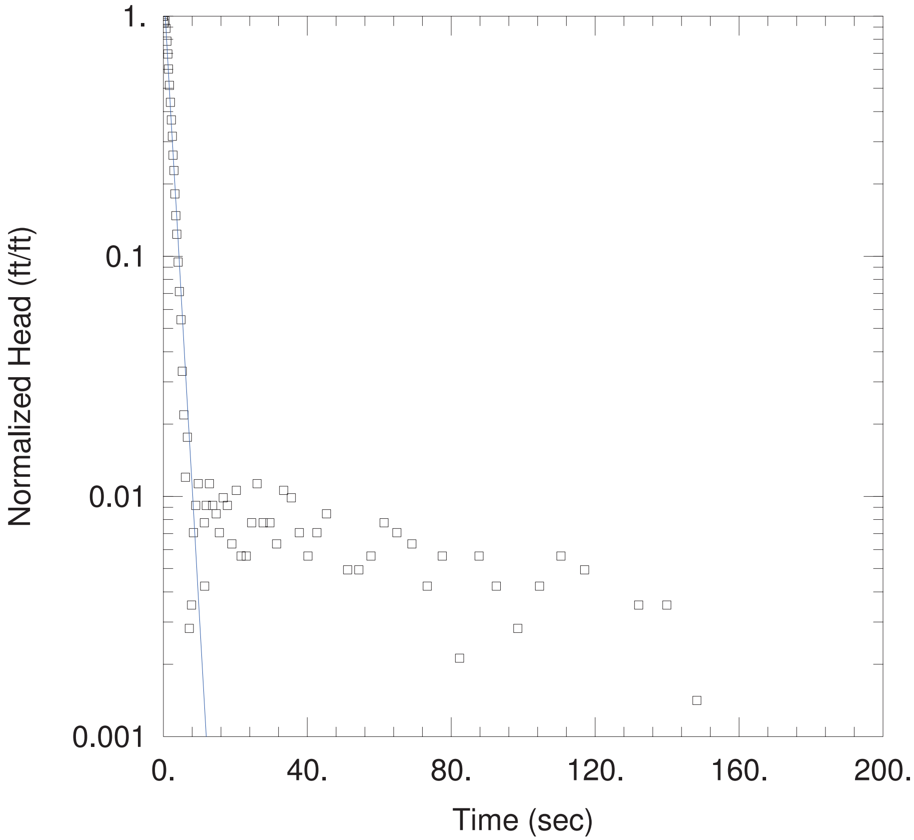
K = 0.02529 cm/sec
y0 = 1.676 ft

AQUIFER DATA

Saturated Thickness: 6.9 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (G203 SI1)

Initial Displacement: 2.184 ft
Total Well Penetration Depth: 3.9 ft
Casing Radius: 0.08333 ft
Static Water Column Height: 6.9 ft
Screen Length: 3.9 ft
Well Radius: 0.3458 ft



WELL TEST ANALYSIS

Data Set: P:\...\G203 SO1.aqt
Date: 10/10/17 Time: 10:28:31

PROJECT INFORMATION

Company: Natural Resource Technology
Client: Dynegy
Project: 2285
Location: Newton Landfill
Test Well: G203
Test Date: 4/4/17

SOLUTION

Aquifer Model: Confined
Solution Method: Bouwer-Rice

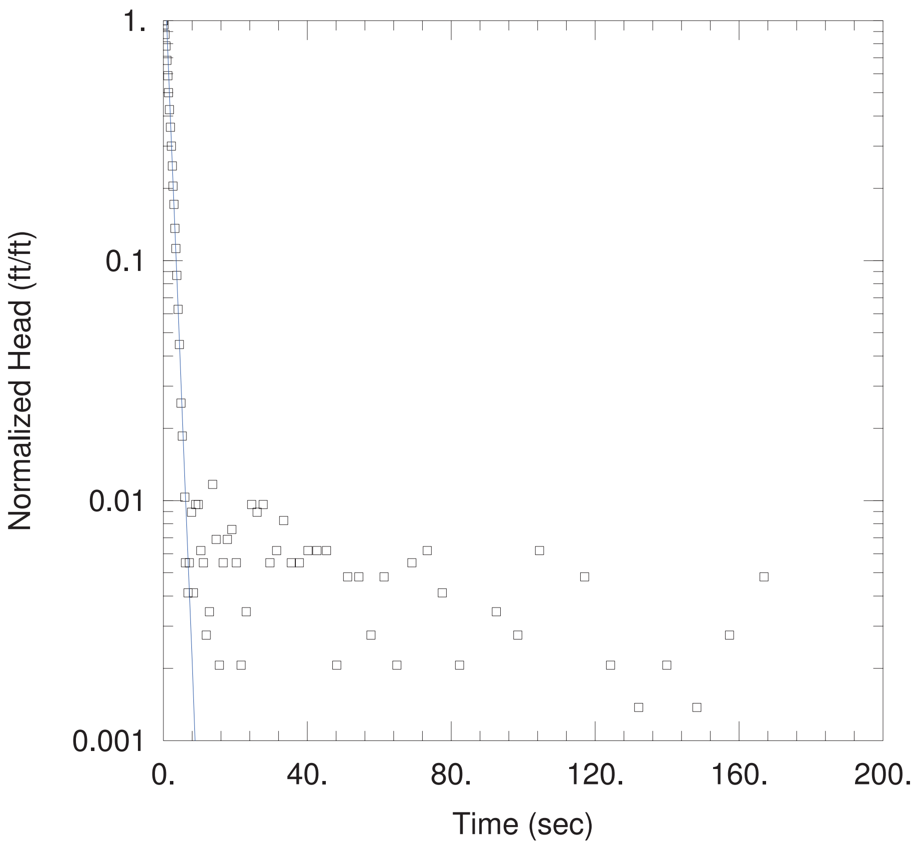
K = 0.02421 cm/sec
y0 = 1.958 ft

AQUIFER DATA

Saturated Thickness: 6.9 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (G203 SO1)

Initial Displacement: 1.418 ft
Total Well Penetration Depth: 3.9 ft
Casing Radius: 0.08333 ft
Static Water Column Height: 6.9 ft
Screen Length: 3.9 ft
Well Radius: 0.3458 ft



WELL TEST ANALYSIS

Data Set: P:\...\G203 SO2.aqt
Date: 10/10/17 Time: 10:30:34

PROJECT INFORMATION

Company: Natural Resource Technology
Client: Dynegy
Project: 2285
Location: Newton Landfill
Test Well: G203
Test Date: 4/4/17

SOLUTION

Aquifer Model: Confined
Solution Method: Bouwer-Rice

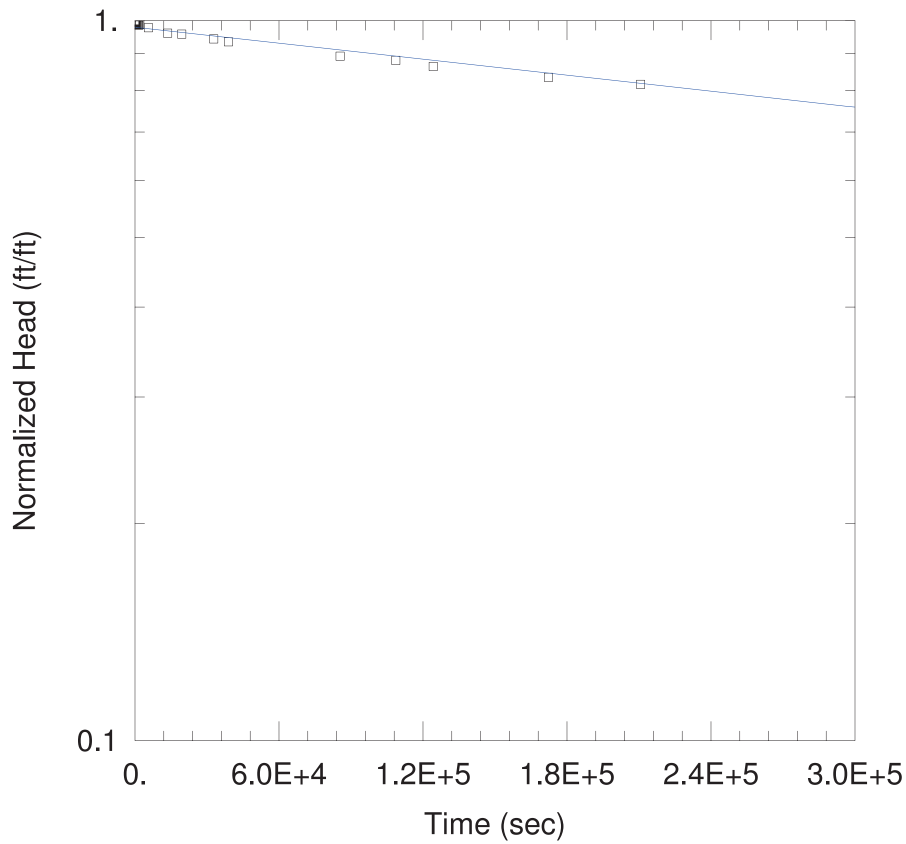
K = 0.03469 cm/sec
y0 = 3.185 ft

AQUIFER DATA

Saturated Thickness: 6.9 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (G203 SO2)

Initial Displacement: 1.454 ft
Total Well Penetration Depth: 3.9 ft
Casing Radius: 0.08333 ft
Static Water Column Height: 6.9 ft
Screen Length: 3.9 ft
Well Radius: 0.3458 ft



WELL TEST ANALYSIS

Data Set: P:\...\G208 SO1.aqt
Date: 10/10/17 Time: 10:33:25

PROJECT INFORMATION

Company: Natural Resource Technology
Client: Dynegy
Project: 2285
Location: Newton Landfill
Test Well: G208
Test Date: 4/4/17

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

K = 1.315E-8 cm/sec
y0 = 10.16 ft

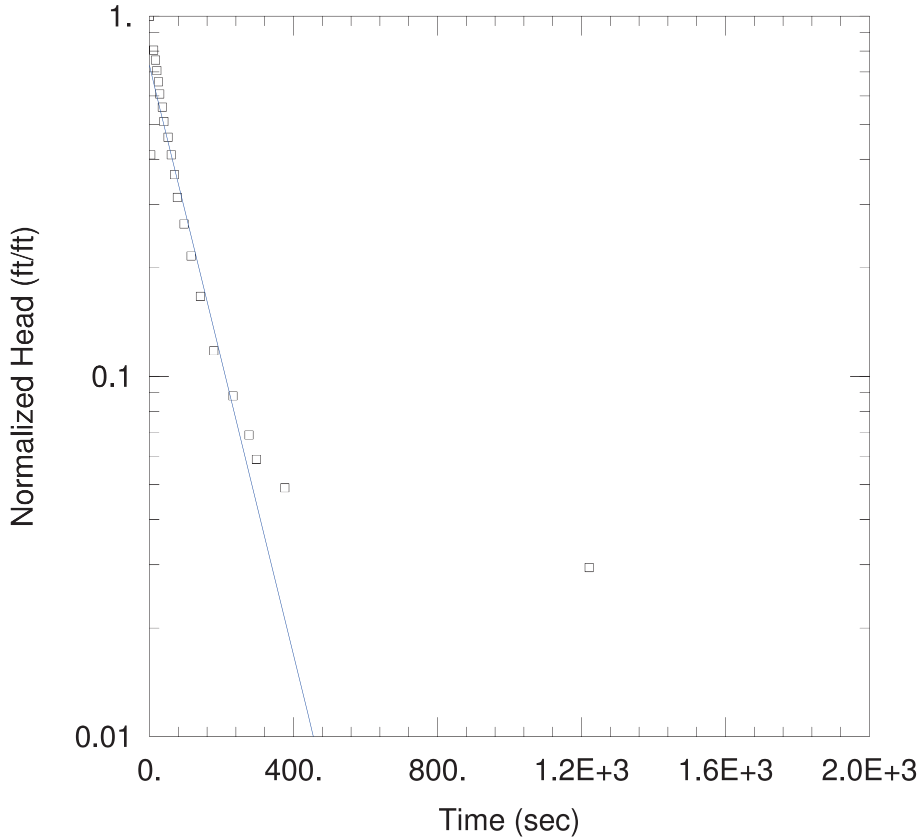
AQUIFER DATA

Saturated Thickness: 22.1 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (G208 SO1)

Initial Displacement: 10.38 ft
Total Well Penetration Depth: 19.8 ft
Casing Radius: 0.08333 ft

Static Water Column Height: 22.1 ft
Screen Length: 19.8 ft
Well Radius: 0.3458 ft



WELL TEST ANALYSIS

Data Set: P:\...\G217D SI1.aqt
Date: 10/10/17 Time: 10:35:45

PROJECT INFORMATION

Company: Natural Resource Technology
Client: Dynegy
Project: 2285
Location: Newton Landfill
Test Well: G217D
Test Date: 4/4/17

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

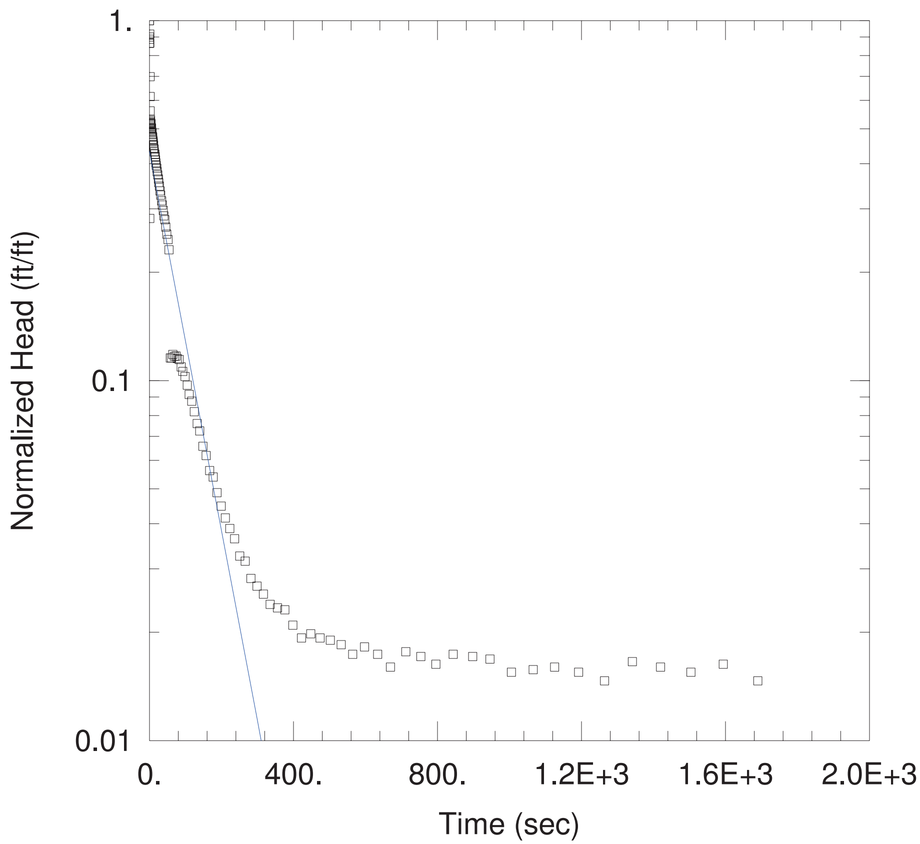
K = 0.0002266 cm/sec
y0 = 0.743 ft

AQUIFER DATA

Saturated Thickness: 13. ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (G217D SI1)

Initial Displacement: 1.02 ft
Total Well Penetration Depth: 10. ft
Casing Radius: 0.08333 ft
Static Water Column Height: 13. ft
Screen Length: 10. ft
Well Radius: 0.3458 ft



WELL TEST ANALYSIS

Data Set: P:\...\G217D SI2.aqt
Date: 10/10/17 Time: 10:38:05

PROJECT INFORMATION

Company: Natural Resource Technology
Client: Dynegy
Project: 2285
Location: Newton Landfill
Test Well: G217D
Test Date: 4/4/17

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

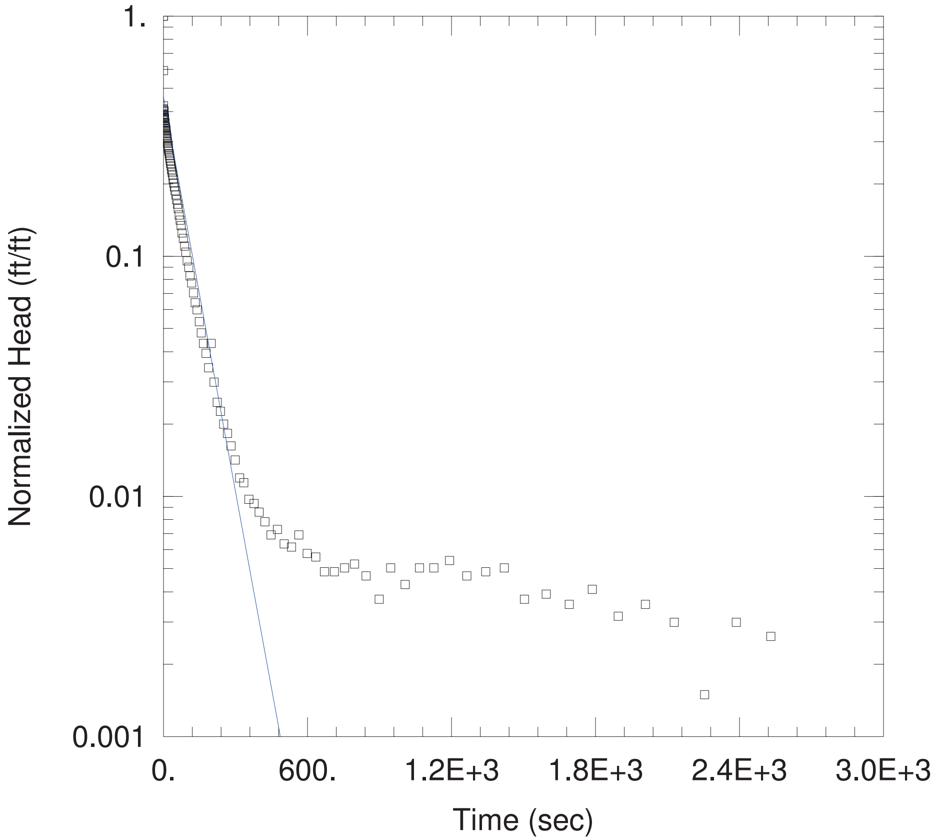
K = 0.0002919 cm/sec
y0 = 1.598 ft

AQUIFER DATA

Saturated Thickness: 13. ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (G217D SI2)

Initial Displacement: 3.685 ft
Total Well Penetration Depth: 10. ft
Casing Radius: 0.08333 ft
Static Water Column Height: 13. ft
Screen Length: 10. ft
Well Radius: 0.3458 ft



WELL TEST ANALYSIS

Data Set: P:\...\G217D SO3.aqt
Date: 10/10/17 Time: 10:40:18

PROJECT INFORMATION

Company: Natural Resource Technology
Client: Dynegy
Project: 2285
Location: Newton Landfill
Test Well: G217D
Test Date: 4/4/17

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

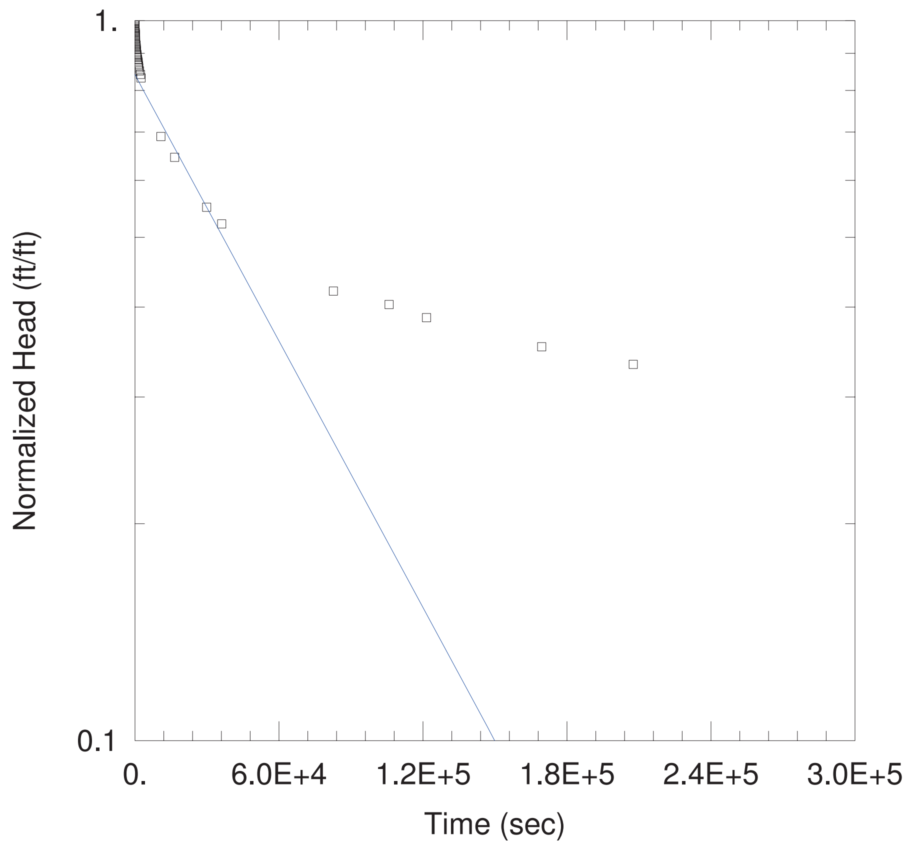
K = 0.0003032 cm/sec
y0 = 2.469 ft

AQUIFER DATA

Saturated Thickness: 13. ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (G217D SO3)

Initial Displacement: 5.362 ft
Total Well Penetration Depth: 10. ft
Casing Radius: 0.08333 ft
Static Water Column Height: 13. ft
Screen Length: 10. ft
Well Radius: 0.3458 ft



WELL TEST ANALYSIS

Data Set: P:\...\G220 SO1.aqt
Date: 10/10/17 Time: 10:42:50

PROJECT INFORMATION

Company: Natural Resource Technology
Client: Dynegy
Project: 2285
Location: Newton Landfill
Test Well: G220
Test Date: 4/4/17

SOLUTION

Aquifer Model: Confined
Solution Method: Bouwer-Rice

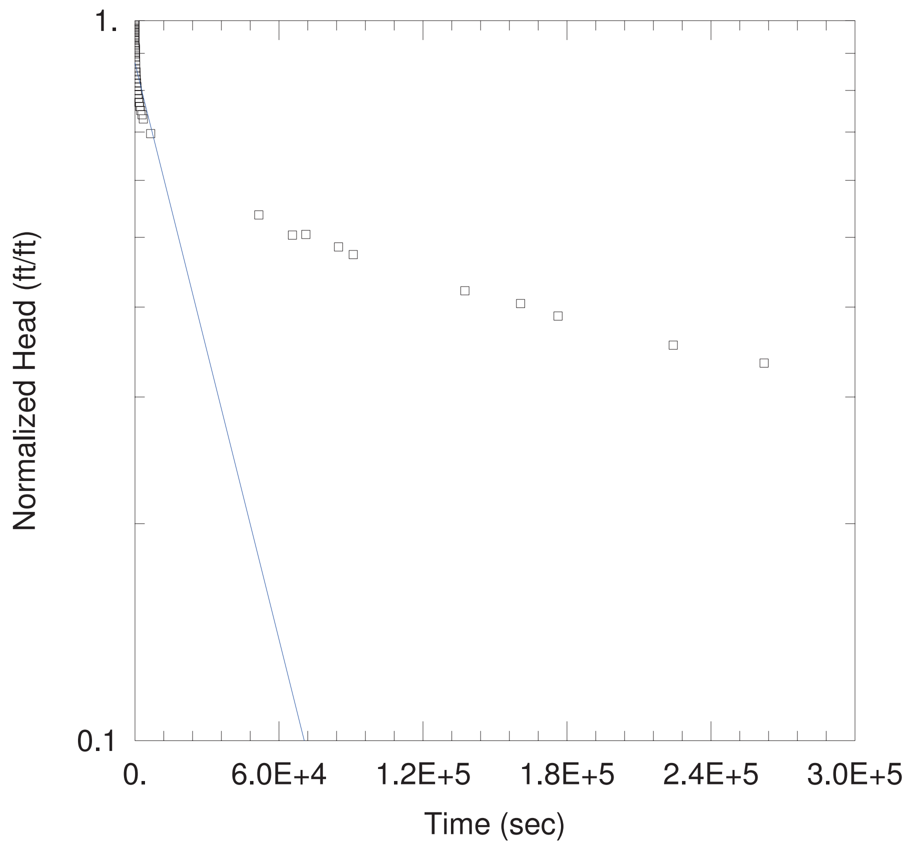
K = 3.513E-7 cm/sec
y0 = 9.098 ft

AQUIFER DATA

Saturated Thickness: 12. ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (G220 SO1)

Initial Displacement: 10.81 ft
Total Well Penetration Depth: 9.7 ft
Casing Radius: 0.08333 ft
Static Water Column Height: 12. ft
Screen Length: 9.7 ft
Well Radius: 0.3458 ft



WELL TEST ANALYSIS

Data Set: P:\...\G222 SO1.aqt
Date: 10/10/17 Time: 10:49:55

PROJECT INFORMATION

Company: Natural Resource Technology
Client: Dynegy
Project: 2285
Location: Newton Landfill
Test Well: G222
Test Date: 4/4/17

SOLUTION

Aquifer Model: Confined
Solution Method: Bouwer-Rice

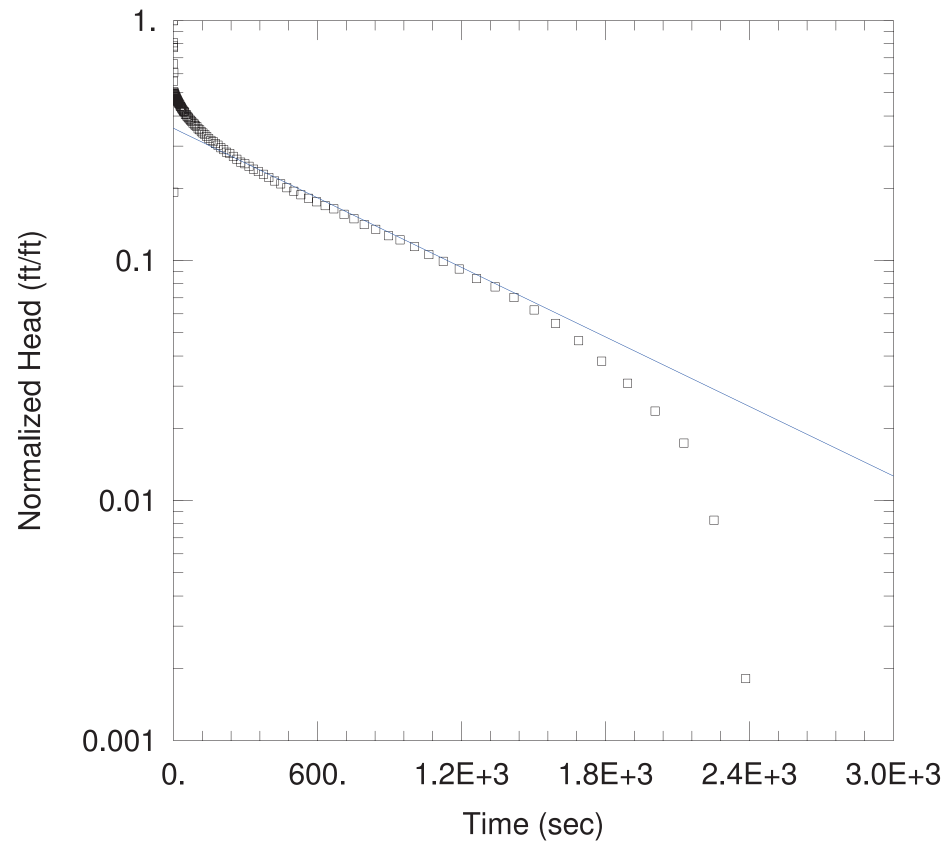
K = 1.541E-6 cm/sec
y0 = 8.832 ft

AQUIFER DATA

Saturated Thickness: 3.5 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (G222 SO1)

Initial Displacement: 10.11 ft
Total Well Penetration Depth: 3.5 ft
Casing Radius: 0.08333 ft
Static Water Column Height: 3.5 ft
Screen Length: 3.5 ft
Well Radius: 0.3458 ft



WELL TEST ANALYSIS

Data Set: P:\...\G223 SI1.aqt
Date: 10/10/17 Time: 10:55:09

PROJECT INFORMATION

Company: Natural Resource Technology
Client: Dynegy
Project: 2285
Location: Newton Landfill
Test Well: G223
Test Date: 4/5/17

SOLUTION

Aquifer Model: Confined
Solution Method: Bouwer-Rice

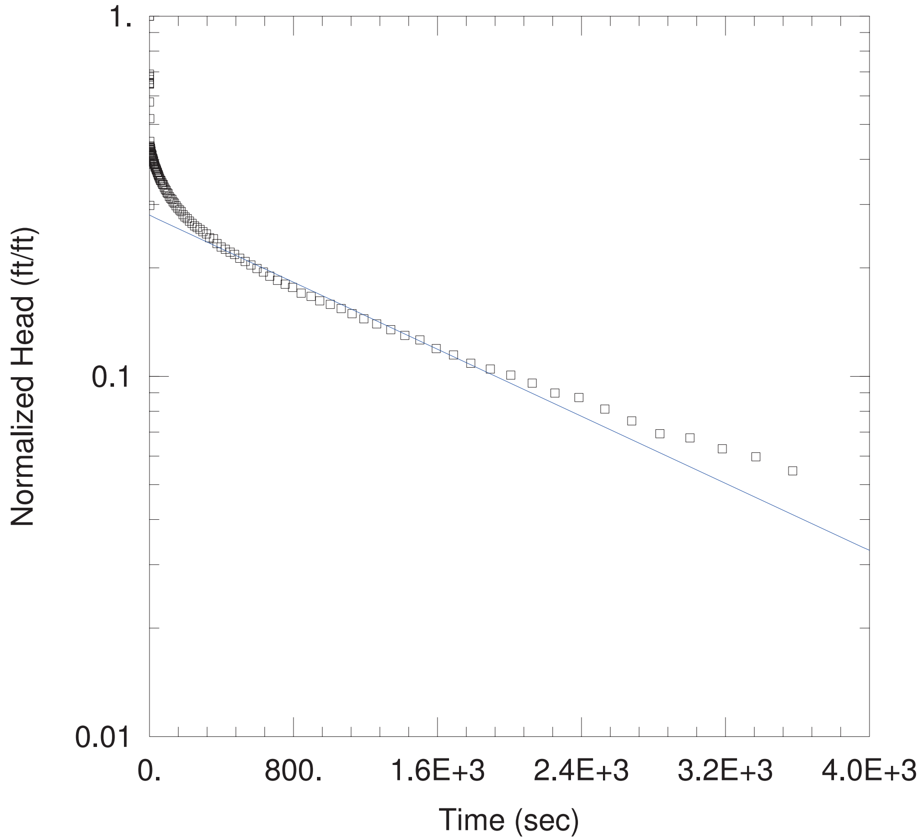
K = 5.19E-5 cm/sec
y0 = 1.374 ft

AQUIFER DATA

Saturated Thickness: 4. ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (G223 SI1)

Initial Displacement: 3.86 ft
Total Well Penetration Depth: 4. ft
Casing Radius: 0.08333 ft
Static Water Column Height: 4. ft
Screen Length: 4. ft
Well Radius: 0.3458 ft



WELL TEST ANALYSIS

Data Set: P:\...\G223 SI2.aqt
Date: 10/10/17 Time: 10:57:35

PROJECT INFORMATION

Company: Natural Resource Technology
Client: Dynegy
Project: 2285
Location: Newton Landfill
Test Well: G223
Test Date: 4/5/17

SOLUTION

Aquifer Model: Confined
Solution Method: Bouwer-Rice

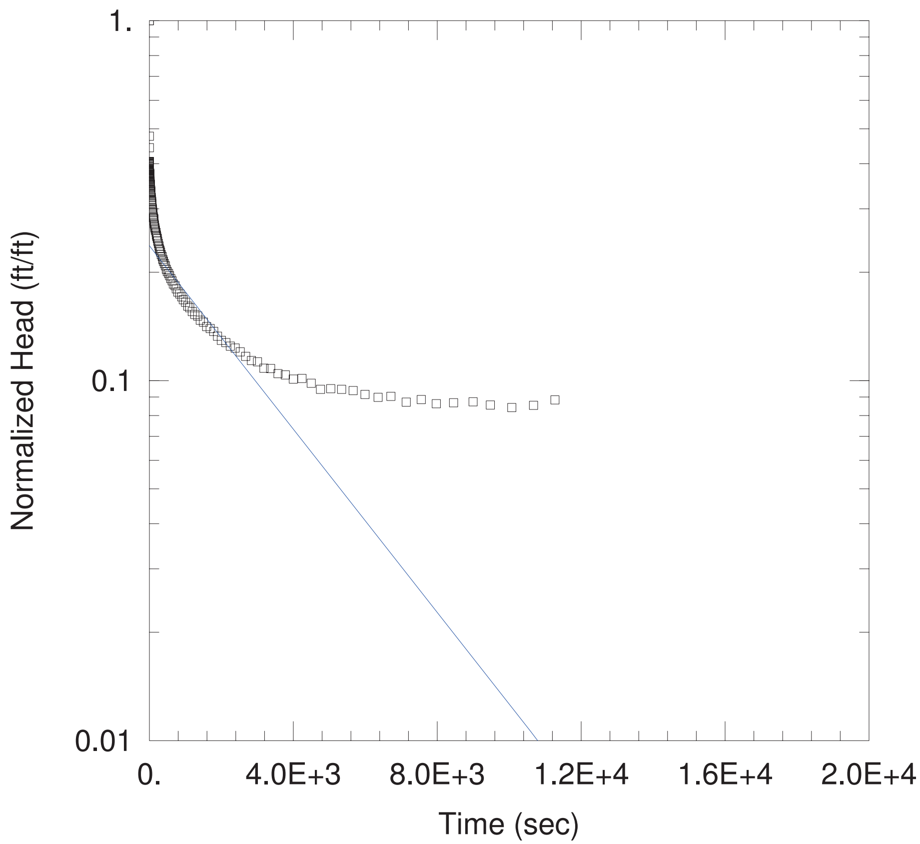
K = 2.5E-5 cm/sec
y0 = 1.251 ft

AQUIFER DATA

Saturated Thickness: 4. ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (G223 SI2)

Initial Displacement: 4.466 ft
Total Well Penetration Depth: 4. ft
Casing Radius: 0.08333 ft
Static Water Column Height: 4. ft
Screen Length: 4. ft
Well Radius: 0.3458 ft



WELL TEST ANALYSIS

Data Set: P:\...\G223 SO1.aqt
Date: 10/10/17 Time: 11:00:37

PROJECT INFORMATION

Company: Natural Resource Technology
Client: Dynegy
Project: 2285
Location: Newton Landfill
Test Well: G223
Test Date: 4/5/17

SOLUTION

Aquifer Model: Confined
Solution Method: Bouwer-Rice

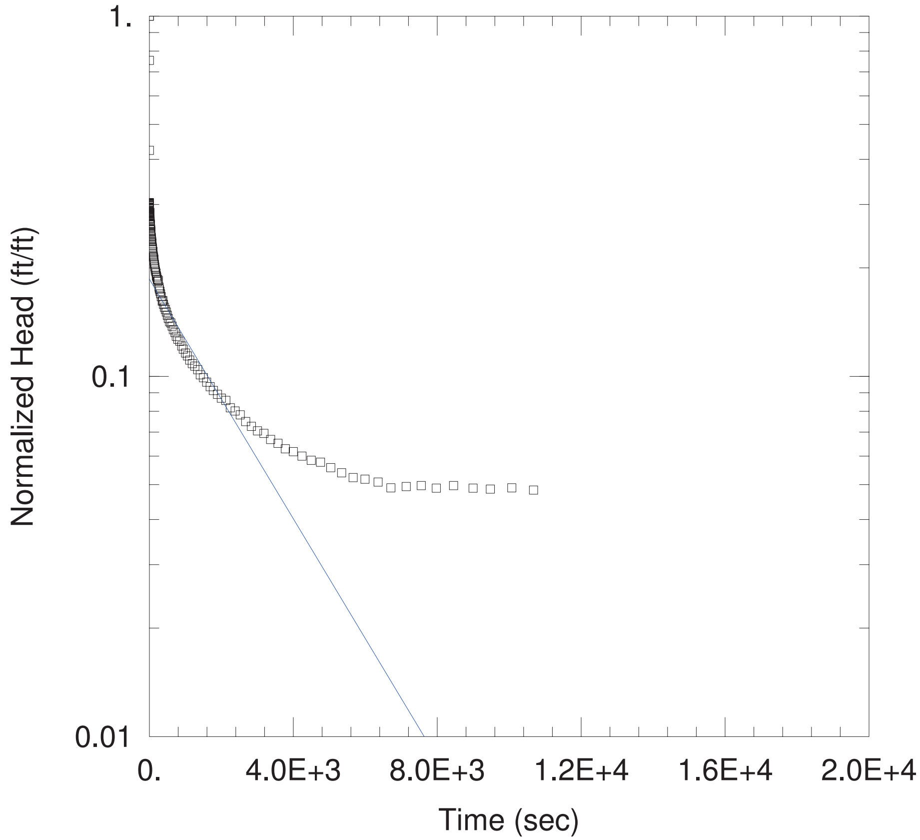
K = 1.368E-5 cm/sec
y0 = 1.281 ft

AQUIFER DATA

Saturated Thickness: 4. ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (G223 SO1)

Initial Displacement: 5.412 ft
Total Well Penetration Depth: 4. ft
Casing Radius: 0.08333 ft
Static Water Column Height: 4. ft
Screen Length: 4. ft
Well Radius: 0.3458 ft



WELL TEST ANALYSIS

Data Set: P:\...\G223 SO2.aqt
Date: 10/10/17 Time: 11:01:58

PROJECT INFORMATION

Company: Natural Resource Technology
Client: Dynegy
Project: 2285
Location: Newton Landfill
Test Well: G223
Test Date: 4/5/17

SOLUTION

Aquifer Model: Confined
Solution Method: Bouwer-Rice

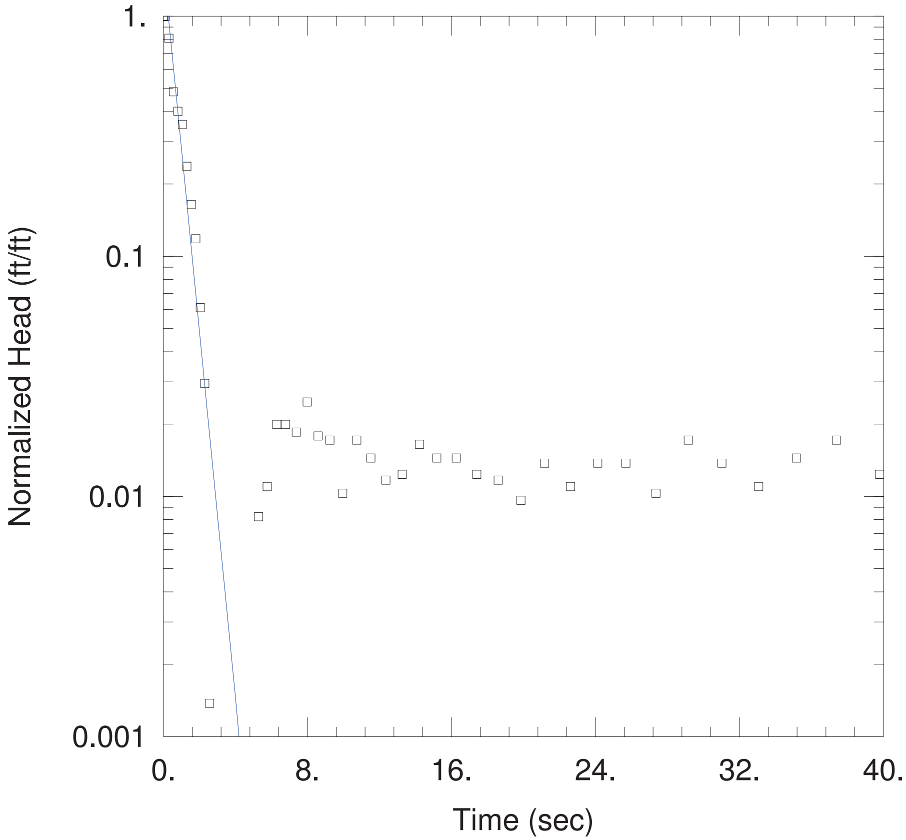
K = 1.786E-5 cm/sec
y0 = 1.359 ft

AQUIFER DATA

Saturated Thickness: 4. ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (G223 SO2)

Initial Displacement: 7.304 ft
Total Well Penetration Depth: 4. ft
Casing Radius: 0.08333 ft
Static Water Column Height: 4. ft
Screen Length: 4. ft
Well Radius: 0.3458 ft



WELL TEST ANALYSIS

Data Set: P:\...\G224 SI1.aqt
Date: 10/10/17 Time: 11:04:28

PROJECT INFORMATION

Company: Natural Resource Technology
Client: Dynegy
Project: 2285
Location: Newton Landfill
Test Well: G224
Test Date: 4/5/17

SOLUTION

Aquifer Model: Confined
Solution Method: Bouwer-Rice

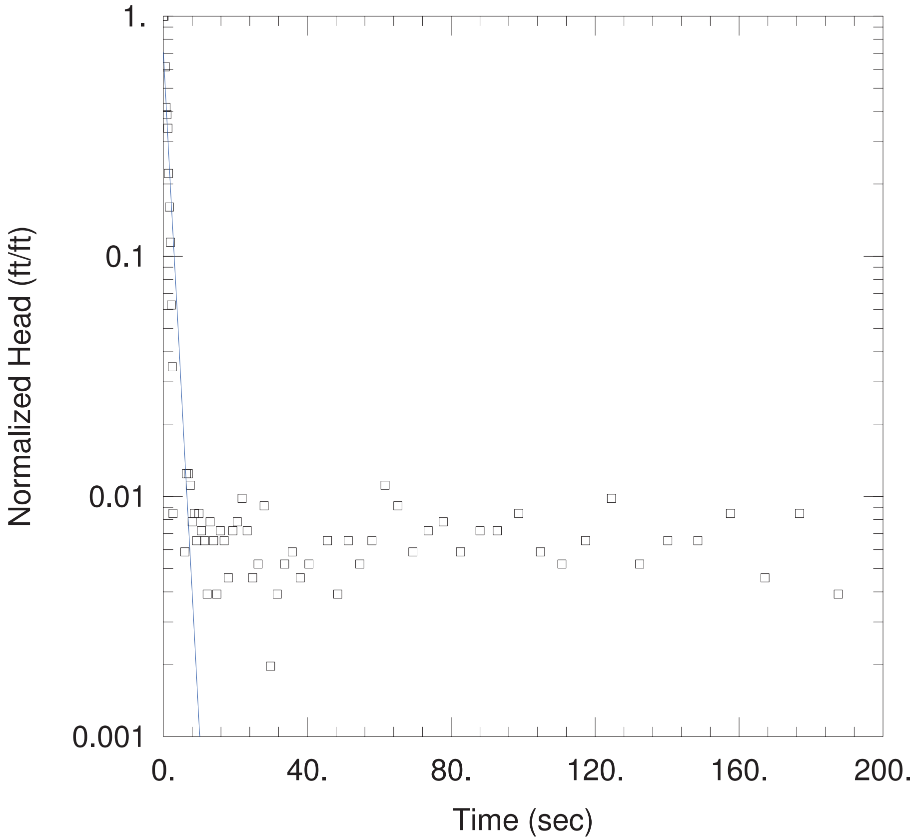
K = 0.05146 cm/sec
y0 = 2.38 ft

AQUIFER DATA

Saturated Thickness: 8.5 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (G224 SI1)

Initial Displacement: 1.457 ft
Total Well Penetration Depth: 8.2 ft
Casing Radius: 0.08333 ft
Static Water Column Height: 8.5 ft
Screen Length: 8.2 ft
Well Radius: 0.3458 ft



WELL TEST ANALYSIS

Data Set: P:\...\G224 SI2.aqt
Date: 10/10/17 Time: 11:06:55

PROJECT INFORMATION

Company: Natural Resource Technology
Client: Dynegy
Project: 2285
Location: Newton Landfill
Test Well: G224
Test Date: 4/5/17

SOLUTION

Aquifer Model: Confined
Solution Method: Bouwer-Rice

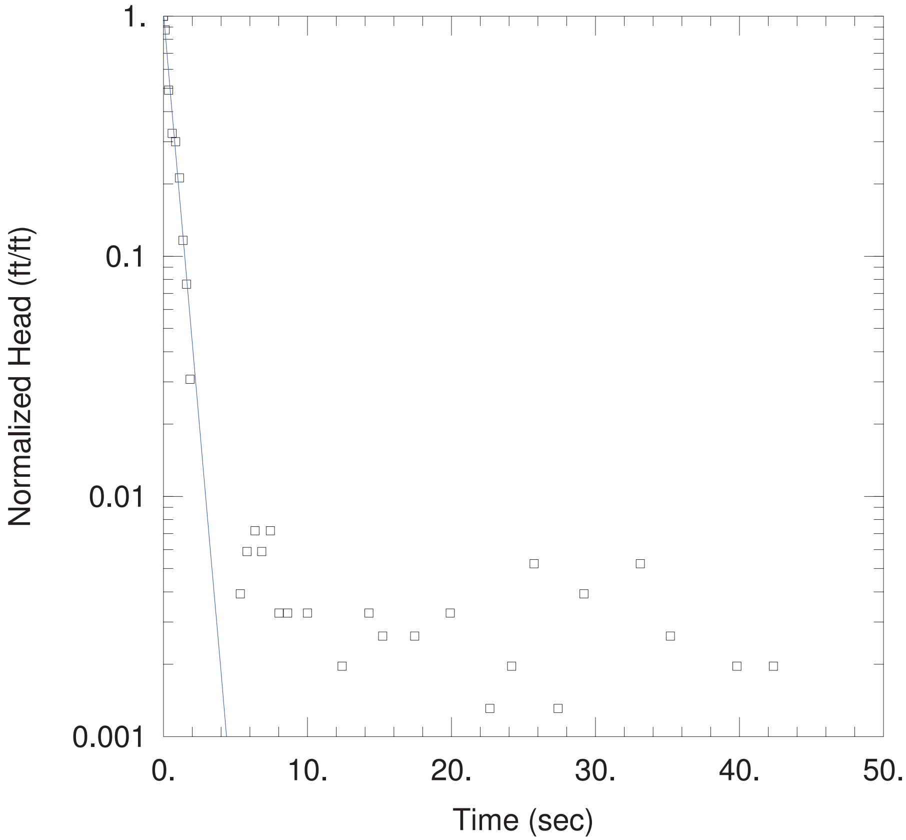
K = 0.01897 cm/sec
y0 = 1.081 ft

AQUIFER DATA

Saturated Thickness: 8.5 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (G224 SI2)

Initial Displacement: 1.531 ft
Total Well Penetration Depth: 8.2 ft
Casing Radius: 0.08333 ft
Static Water Column Height: 8.5 ft
Screen Length: 8.2 ft
Well Radius: 0.3458 ft



WELL TEST ANALYSIS

Data Set: P:\...\G224 SI3.aqt
Date: 10/10/17 Time: 11:08:48

PROJECT INFORMATION

Company: Natural Resource Technology
Client: Dynegy
Project: 2285
Location: Newton Landfill
Test Well: G224
Test Date: 4/5/17

SOLUTION

Aquifer Model: Confined
Solution Method: Bouwer-Rice

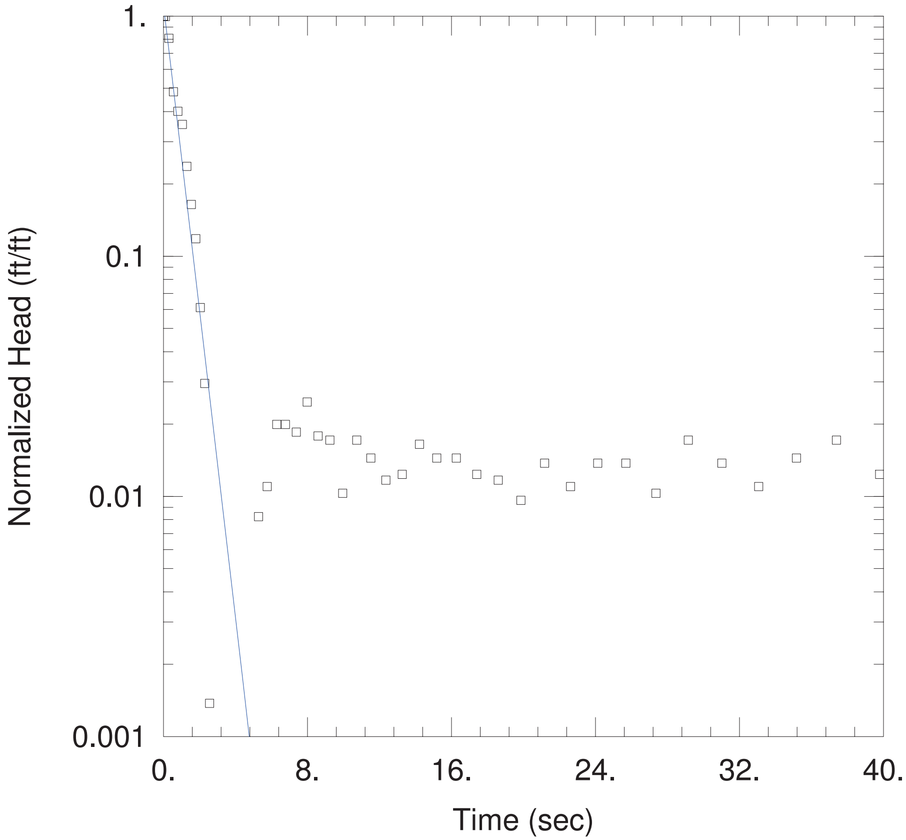
K = 0.04637 cm/sec
y0 = 1.586 ft

AQUIFER DATA

Saturated Thickness: 8.5 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (G224 SI3)

Initial Displacement: 1.529 ft
Total Well Penetration Depth: 8.2 ft
Casing Radius: 0.08333 ft
Static Water Column Height: 8.5 ft
Screen Length: 8.2 ft
Well Radius: 0.3458 ft



WELL TEST ANALYSIS

Data Set: P:\...\G224 SO1.aqt
Date: 10/10/17 Time: 11:10:44

PROJECT INFORMATION

Company: Natural Resource Technology
Client: Dynegy
Project: 2285
Location: Newton Landfill
Test Well: G224
Test Date: 4/5/17

SOLUTION

Aquifer Model: Confined
Solution Method: Bouwer-Rice

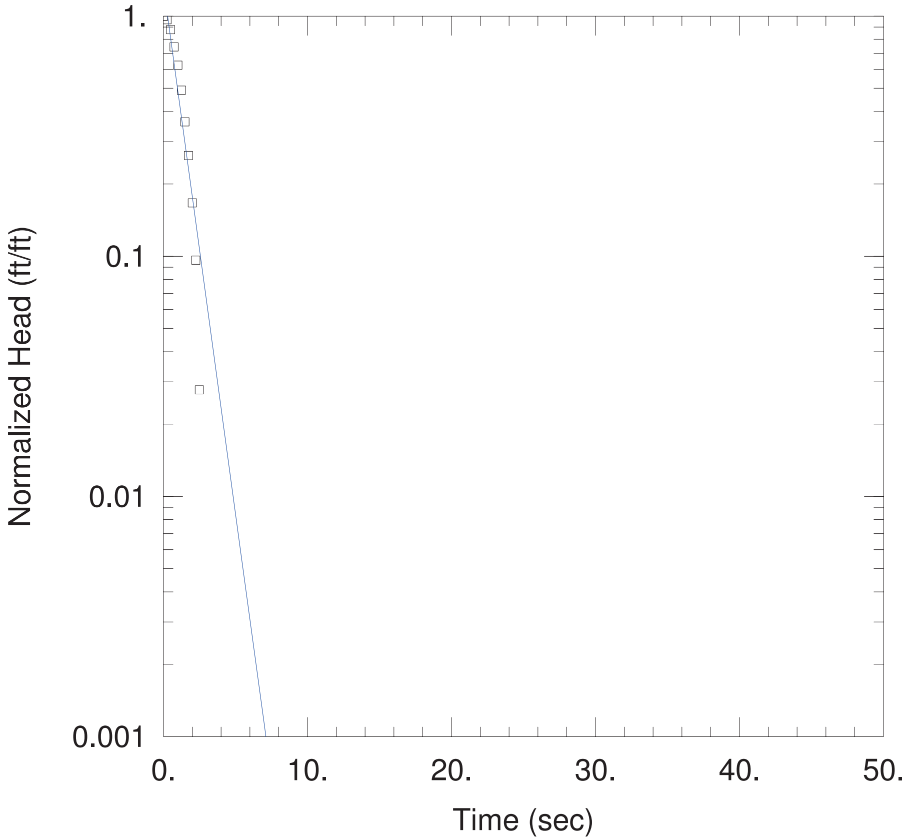
K = 0.04312 cm/sec
y0 = 1.657 ft

AQUIFER DATA

Saturated Thickness: 8.5 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (G224 SI1)

Initial Displacement: 1.457 ft
Total Well Penetration Depth: 8.2 ft
Casing Radius: 0.08333 ft
Static Water Column Height: 8.5 ft
Screen Length: 8.2 ft
Well Radius: 0.3458 ft



WELL TEST ANALYSIS

Data Set: P:\...\G224 SO3.aqt
Date: 10/10/17 Time: 11:12:56

PROJECT INFORMATION

Company: Natural Resource Technology
Client: Dynegy
Project: 2285
Location: Newton Landfill
Test Well: G224
Test Date: 4/5/17

SOLUTION

Aquifer Model: Confined
Solution Method: Bouwer-Rice

K = 0.0297 cm/sec
y0 = 1.264 ft

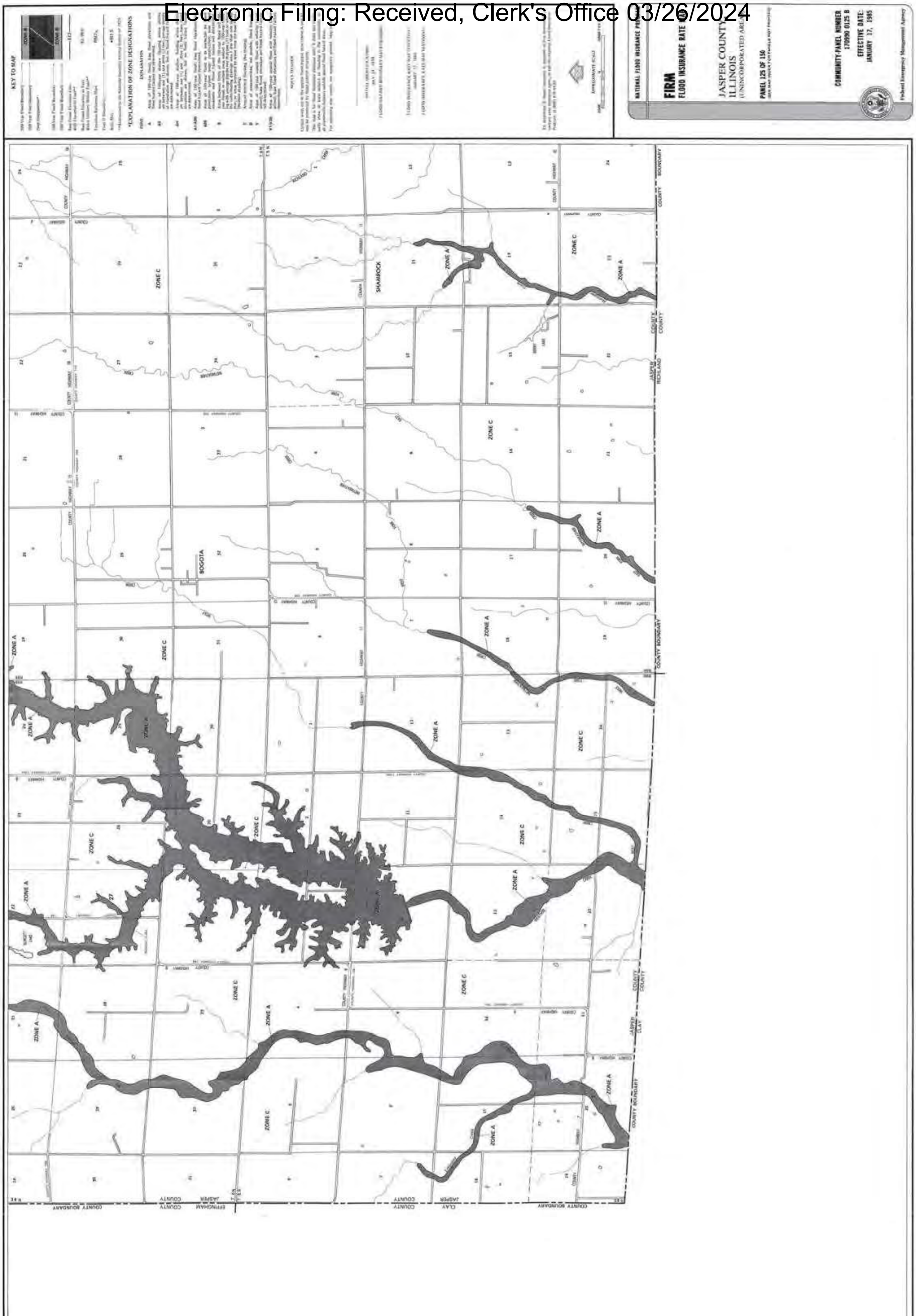
AQUIFER DATA

Saturated Thickness: 8.5 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (G224 SO2)

Initial Displacement: 0.936 ft
Total Well Penetration Depth: 8.2 ft
Casing Radius: 0.08333 ft
Static Water Column Height: 8.5 ft
Screen Length: 8.2 ft
Well Radius: 0.3458 ft

APPENDIX G
FEMA FLOOD HAZARD MAP


KEY TO MAP
EXPLANATION OF ZONE DESIGNATIONS
NATIONAL FLOOD INSURANCE PROGRAM
FIRM
FLOOD INSURANCE RATE MAP
JASPER COUNTY, ILLINOIS
(UNINCORPORATED AREAS)
PANEL 125 OF 150
COMMUNITY-PANEL NUMBER
170990 0125 B
EFFECTIVE DATE:
JANUARY 17, 1985
Federal Emergency Management Agency
ZONE A
ZONE C
SHAMROCK
BOGOTA
COUNTY BOUNDARY
JASPER COUNTY
RICHLAND COUNTY
CLAY COUNTY
EFFINGHAM COUNTY

ATTACHMENT I

Intended for
Illinois Power Generating Company

Date
October 25, 2021

Project No.
1940100806-008

GROUNDWATER MONITORING PLAN
PRIMARY ASH POND
NEWTON POWER PLANT
NEWTON, ILLINOIS

RAMBOLL Bright ideas. Sustainable change.

GROUNDWATER MONITORING PLAN
NEWTON POWER PLANT PRIMARY ASH POND

Project Name	**Newton Power Plant Primary Ash Pond**
Project No.	**1940100806-008**
Recipient	**Illinois Power Generating Company**
Document type	**Groundwater Monitoring Plan**
Revision	**FINAL**
Date	**October 25, 2021**

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Senior Managing Hydrogeologist

Eric J. Tlachac, PE
Senior Managing Engineer

Nathaniel R. Keller
Senior Hydrogeologist

Chase J. Christenson, PG
Hydrogeologist

LICENSED PROFESSIONAL CERTIFICATIONS

35 I.A.C. § 845.630 Groundwater Monitoring Systems (PE)

I, Eric J. Tlachac, a qualified professional engineer in good standing in the State of Illinois, certify that the groundwater monitoring system described in this document (Groundwater Monitoring Plan, Newton Power Plant Primary Ash Pond), has been designed and constructed to meet the requirements of 35 I.A.C. § 845.630. The monitoring system was developed based on information included in the Hydrogeologic Site Characterization Report (Ramboll 2021; included in the Operating Permit to which this Groundwater Monitoring Plan is attached).

____

Eric J. Tlachac
Qualified Professional Engineer
062-063091
Illinois
Date: October 25, 2021

35 I.A.C. § 845.630 Groundwater Monitoring Systems (PG)

I, Brian G. Hennings, a qualified professional geologist in good standing in the State of Illinois, certify that the groundwater monitoring system described in this document (Groundwater Monitoring Plan, Newton Power Plant Primary Ash Pond), has been designed and constructed to meet the requirements of 35 I.A.C. § 845.630. The monitoring system was developed based on information included in the Hydrogeologic Site Characterization Report (Ramboll 2021; included in the Operating Permit to which this Groundwater Monitoring Plan is attached).

____

Brian G. Hennings
Professional Geologist
196.001482
Illinois
Date: October 25, 2021

CONTENTS

TABLES (IN TEXT)

TABLES (ATTACHED)

FIGURES (ATTACHED)

APPENDICES

ACRONYMS AND ABBREVIATIONS

35 I.A.C.	Title 35 of the Illinois Administrative Code
40 C.F.R.	Title 40 of the Code of Federal Regulations
ASD	Alternate Source Demonstration
bgs	below ground surface
CCR	coal combustion residuals
cm/s	centimeters per second
GMP	Groundwater Monitoring Plan
GWPS	Groundwater Protection Standard
HCR	Hydrogeologic Site Characterization Report
ID	identification
IEPA	Illinois Environmental Protection Agency
IPGC	Illinois Power Generating Company
LCU	lower confining unit
LF 1	Phase 1 Landfill
LF 2	Phase 2 Landfill
LVW	low-volume wastewater
NAVD88	North American Vertical Datum of 1988
NID	National Inventory of Dams
No.	Number
NPDES	National Pollutant Discharge Elimination System
NPP	Newton Power Plant
NRT	Natural Resource Technology, Inc.
PAP	Primary Ash Pond
Part 845	Standards for the Disposal of Coal Combustion Residuals in Surface Impoundments: Title 35 of the Illinois Administrative Code § 845
PMP	potential migration pathway
QA/QC	quality assurance/quality control
Ramboll	Ramboll Americas Engineering Solutions, Inc.
RL	Reporting Limit
SI	Surface Impoundment
TDS	total dissolved solids
UA	uppermost aquifer
UCU	upper confining unit
UD	upper drift
USEPA	United States Environmental Protection Agency
WLO	water level only

1. INTRODUCTION

1.1 Overview

In accordance with requirements of the Standards for the Disposal of Coal Combustion Residuals (CCR) in Surface Impoundments (SIs): Title 35 of the Illinois Administrative Code (35 I.A.C.) § 845 (Part 845) (Illinois Environmental Protection Agency [IEPA], April 15, 2021), Ramboll Americas Engineering Solutions, Inc. (Ramboll) has prepared this Groundwater Monitoring Plan (GMP) on behalf of Newton Power Plant (NPP) (**Figure 1-1**), operated by Illinois Power Generating Company (IPGC). This report will apply specifically to the CCR Unit referred to as the Primary Ash Pond (PAP), Vistra identification (ID) number (No.) 501, IEPA ID No. W0798070001-01, and National Inventory of Dams (NID) No. IL50719. This GMP includes Part 845 content requirements specific to 35 I.A.C. § 845.630 (Groundwater Monitoring System), 35 I.A.C. § 845.640 (Groundwater Sampling and Analysis), and 35 I.A.C. § 845.650 (Groundwater Monitoring Program) for the PAP at the NPP.

A checklist which identifies the specific requirements of 35 I.A.C. § 845.630, 35 I.A.C. § 845.640, and 35 I.A.C. § 845.650 is included in **Table 1-1**. The table provides references to sections, tables, and figures included in this document to locate the information that meets specific requirements of 35 I.A.C. § 845.630, 35 I.A.C. § 845.640, and 35 I.A.C. § 845.650.

1.2 Site Location and Background

The NPP is located in Jasper County in the southeastern part of central Illinois, approximately seven miles southwest of the town of Newton (**Figure 1-1**). The NPP operates as a coal-fired power plant with three CCR units present, including the PAP which is the subject of this GMP and two landfills: the Phase 1 Landfill (LF 1) located northwest and west of the PAP, and the Phase 2 Landfill (LF 2) located to the west of the PAP. The PAP is located within Section 26 and the west half of Section 25, Township 6 North, Range 8 East. The PAP is located south of the NPP and surrounded by Newton Lake to the south, east, and west (**Figure 1-2**).

The PAP is an unlined CCR SI used to manage CCR and non-CCR waste streams at the NPP. The PAP was constructed in 1977 and has a design capacity of approximately 9,715 acre-feet. There is also a non-CCR 83.6 acre-feet Secondary Pond located immediately south of the PAP. The PAP has a surface area of 404 acres and the Secondary Pond has an area of 9.3 acres. The PAP currently receives stormwater runoff, bottom ash, fly ash, and low-volume wastewater (LVW) from the plant's two coal-fired boilers. The SI is operated per National Pollutant Discharge Elimination System (NPDES) Permit No. IL0049191, Outfall 001 (located at the Secondary Pond). Areas within the impoundment were excavated during construction for native materials used to build the containment berms.

1.3 Conceptual Model

Significant site investigation has been completed at the NPP to characterize the geology, hydrogeology, and groundwater quality. Based on extensive investigation and monitoring, the PAP has been well characterized and detailed in the Hydrogeologic Site Characterization Report (HCR; included in the Operating Permit to which this Plan is attached). A site conceptual model has been developed and is discussed below.

In addition to the CCR present in the PAP, there are six layers of unlithified material present above the bedrock, which are categorized into the four hydrostratigraphic units below based on stratigraphic relationships and common hydrogeologic characteristics:

- **Upper Drift (UD) / Potential Migration Pathway (PMP):** The UD is composed of the low permeability silts and clays of the Peoria Silt and Sangamon Soil and the sandier soils of the Hagarstown Member(*i.e.,* PMP).
  - **Hagarstown Member / PMP:** The Hagarstown Member consists of discontinuous sandier deposits of the UD, where present, and overlies the Vandalia Till.
- **Upper Confining Unit (UCU):** This unit consists of the low permeability clay and silt of the Vandalia Till Member (Vandalia Till).
- **Uppermost Aquifer:** This unit is composed of the Mulberry Grove Formation, which onsite has been classified as poorly graded sand, silty sand, clayey sand, and gravel.
- **Lower Confining Unit (LCU):** This unit is comprised of low permeability silt and clay of the Smithboro Till Member (Smithboro Till) and the Banner Formation.

Groundwater migrates downward through the UD and UCU into the uppermost aquifer. Groundwater in the uppermost aquifer flows from north to south/southwest and converges near a former drainage feature located west of the PAP (**Figure 1-3**). Groundwater elevations vary seasonally, although generally less than one foot per year. The surface water elevation at Newton Lake (at location SG02) measured between February 15 and March 9, 2021 ranged from 504.42 to 504.84 feet North American Vertical Datum of 1988 (NAVD88). Groundwater elevations in the uppermost aquifer at downgradient wells were observed around 491 feet NAVD88 (approximately 15 feet lower than the Lake elevation). The separation between measured groundwater elevations and Lake elevations (and observed downward vertical gradients) indicates groundwater does not flow into Newton Lake from the uppermost aquifer.

Part 845 parameters were monitored in uppermost aquifer and PMP monitoring wells as part of groundwater quality evaluations performed between 2015 and present. These data were supplemented with installation and sampling of additional locations in 2021. The results indicate that the following parameters were detected at concentrations greater than the applicable 35 I.A.C. § 845.600 groundwater protection standards (GWPSs) and are considered potential exceedances:

- Arsenic at six uppermost aquifer wells, including downgradient wells APW08, APW09, APW15, and APW16 and background wells APW05 and APW06.
- Chloride at upgradient UD well APW05S and downgradient uppermost aquifer well APW15.
- Cobalt at PMP well APW12.
- Fluoride at downgradient uppermost aquifer well APW15 and APW18.
- Lead at downgradient uppermost aquifer wells APW08, APW11, and APW18.
- Lithium at three PMP wells APW02, APW04, and APW12; one upgradient UD well APW05S; and two downgradient uppermost aquifer wells APW13 and APW14.
- pH values below the lower range of the GWPS were observed at four PMP wells APW02, APW03, APW04, APW12; one background UA well APW06; and two downgradient uppermost aquifer wells APW11 and APW13.

- Radium 226 and 228 combined at downgradient uppermost aquifer well APW16.
- Sulfate at three PMP wells APW02, APW04, and APW12; one upgradient UD well APW05S; and one downgradient uppermost aquifer well APW10.
- Thallium at one background well APW06, and two downgradient uppermost aquifer wells APW11 and APW18.
- Total dissolved solids (TDS) at four PMP wells APW02, APW03, APW04, and APW12; and one Upgradient UD well APW05S.

Concentration results for the above parameters were compared directly to 35 I.A.C. § 845.600(a)(1) GWPS, without an evaluation of background concentrations. Evaluation of background groundwater quality has been completed as part of this GMP, and compliance with Part 845 will be determined following the first round of groundwater sampling. The first round of groundwater sampling for compliance will be completed the quarter following issuance of the Operating Permit and in accordance with this GMP.

2. GROUNDWATER MONITORING SYSTEMS

2.1 Existing Monitoring Well Network and Analysis

This GMP is being provided to propose a groundwater monitoring network and monitoring program specific to the PAP that will comply with Part 845. The remaining discussion in this document will include only these networks and monitoring programs that are applicable and specific to the PAP, specifically the IEPA monitoring program, the Title 40 of the Code of Federal Regulations (40 C.F.R.) § 257 network, and the proposed Part 845 monitoring network.

2.1.1 IEPA Monitoring Program

The current IEPA-required groundwater monitoring program associated with the PAP consists of four groundwater monitoring wells, including two background monitoring wells (G116 and APW02) and two compliance monitoring wells (APW03 and APW04) in accordance with the Special Condition No. 19 of the plant's NPDES Permit IL0049191. Groundwater samples are collected quarterly and analyzed for dissolved manganese, dissolved sulfate, dissolved zinc, TDS, and pH. Upon approval of the Operating Permit application (and by extension the GMP), the NPDES monitoring program Special Condition No. 19 will be discontinued following approval of a future NPDES permit modification submittal. The boring logs, well construction forms, and other related monitoring well forms for the well network are included in Appendix C of the HCR (included in the Operating Permit to which this Plan is attached). The well locations are shown on **Figure 2-1**.

2.1.2 40 C.F.R. § 257 Monitoring Program

The 40 C.F.R. § 257 well network for the PAP consists of six monitoring wells screened in the uppermost aquifer, including two background monitoring wells (APW05 and APW06) and four compliance monitoring wells (APW07, APW08, APW09, and APW10). The boring logs, well construction forms, and other related monitoring well forms are available in the Operating Records as required by 40 C.F.R. § 257.91 for each monitored CCR Unit or CCR Multi-Unit, and are included in Appendix C of the HCR (included in the Operating Permit to which this Plan is attached). The well locations are shown on **Figure 2-1**.

Groundwater is being monitored at the PAP in accordance with the Detection Monitoring Program requirements specified in 40 C.F.R. § 257.94. Details of the procedures and techniques used to fulfill the groundwater sampling and analysis program requirements are found in the Sampling and Analysis Plan for the PAP (Natural Resource Technology, Inc. [NRT], 2017).

Groundwater samples are collected semi-annually and analyzed for the field and laboratory parameters from Appendix III of 40 C.F.R. § 257, summarized in **Table A** below.

Table A. 40 C.F.R. § 257 Groundwater Monitoring Program Parameters

Field Parameters[1]		
Groundwater Elevation	pH	
Appendix III Parameters (Total, except TDS)		
Boron	Chloride	Sulfate
Calcium	Fluoride	TDS

[1]Dissolved oxygen, temperature, specific conductance, oxidation/reduction potential, and turbidity are recorded during sample collection.

Results and analysis of groundwater sampling are reported annually by January 31 of the following year and made available on the CCR public website as required by 40 C.F.R. § 257.

2.1.3 Part 845 Well Installation and Monitoring

In 2021, nine additional monitoring wells (APW11, APW12, APW13, APW14, APW15, APW16, APW17, APW18, and APW5S) were installed along the perimeter of the PAP to assess the vertical and horizontal lithology, stratigraphy, chemical properties, and physical properties of geologic layers to a minimum of 100 feet below ground surface (bgs) as specified in 35 I.A.C. § 845.620(b). Additionally, four leachate monitoring wells (XPW01, XPW02, XPW03, and XPW04) were installed within the PAP to characterize CCR materials and leachate.

Prospective Part 845 monitoring wells were sampled for eight rounds between February and August 2021 and the results were used for selection of the PAP Part 845 monitoring well network. Groundwater samples were collected and analyzed for 35 I.A.C. § 845.600 parameters as summarized in **Table B** below.

Table B. Part 845 Groundwater Monitoring Program Parameters

Field Parameters[1]			
pH	Turbidity	Groundwater Elevation	
Metals (Total)			
Antimony	Boron	Cobalt	Molybdenum
Arsenic	Cadmium	Lead	Selenium
Barium	Calcium	Lithium	Thallium
Beryllium	Chromium	Mercury	
Inorganics (Total)			
Fluoride	Sulfate	Chloride	TDS
Other (Total)			
Radium 226 and 228 combined			

[1] Dissolved oxygen, temperature, specific conductance, and oxidation/reduction potential were recorded during sample collection.

Data and results from the Part 845 background monitoring were included in the water quality discussion included in the HCR (included in the Operating Permit to which this Plan is attached). The data collected from background locations during the Part 845 monitoring were used to evaluate and calculate background concentrations for the PAP. The evaluation and discussion are included in **Section 3.2** of this report.

Data collected from the 40 C.F.R. § 257 monitoring network from 2015 to 2020, and from the Part 845 background monitoring were used for selection of the Part 845 monitoring well network proposed in **Section 2.2**.

2.2 Proposed Part 845 Monitoring Well Network

The groundwater monitoring network proposed in this plan will include five monitoring wells screened in the UD (APW02[1], APW03[1], APW04[1], APW05S[1], and APW12[1]), 13 monitoring wells screened in the uppermost aquifer (APW05, APW06, APW07, APW08, APW09, APW10, APW11, APW13, APW14, APW15, APW16, APW17, and APW18), and two temporary water level only surface water staff gages (XSG01 and SG02). The proposed network is summarized in **Table C** on the following page and displayed on **Figure 2-1.** Eighteen wells (two background and 16 compliance) will be used to monitor groundwater concentrations within the hydrostratigraphic units.

The groundwater samples collected from the 18 wells will be used to monitor and evaluate groundwater quality and demonstrate compliance with the groundwater quality standards listed in 35 I.A.C. § 845.600(a). The proposed monitoring wells will yield groundwater samples that represent the quality of downgradient groundwater at the CCR boundary (as required in 35 I.A.C. § 845.630(a)(2)). Monitoring well depths and construction details are listed in **Table 2-1** and summarized in **Table C** on the following page.

[1] Monitoring wells APW02, APW03, APW04, APW05S, and APW12 are wells screened in the UD that have been identified to monitor the PMP.

Table C. Proposed Part 845 Monitoring Well Network

Well ID	Monitored Unit	Well Screen Interval (feet bgs)	Well Type[3]
APW02*	UD	9.7 - 19.7	Compliance
APW03*	UD	9.7 - 19.7	Compliance
APW04*	UD	7.7 - 17.7	Compliance
APW05	UA	62.6 - 67.4	Background
APW05S*	UD	10.0 – 20.0	Compliance
APW06	UA	67.7 - 72.5	Background
APW07	UA	77.9 - 82.7	Compliance
APW08	UA	71.4 - 81.1	Compliance
APW09	UA	56.7 - 61.5	Compliance
APW10	UA	40.7 - 45.5	Compliance
APW11	UA	60.0 - 65.0	Compliance
APW12*	UD	20.0 - 30.0	Compliance
APW13	UA	58.5 - 63.5	Compliance
APW14	UA	50.0 - 55.0	Compliance
APW15	UA	98.0 - 103.0	Compliance
APW16	UA	80.5 - 85.5	Compliance
APW17	UA	87.0 - 92.0	Compliance
APW18	UA	75.0 - 80.0	Compliance
XSG01[1,2]	CCR	NA	WLO
SG02[1,2]	Surface Water	NA	WLO

[1] Surface water level measuring points.
[2] Location is temporary pending implementation of impoundment closure per an approved Construction Permit Application.
[3] Well type refers to the role of the well in the monitoring network.
* Well in the UD that has been identified to monitor the PMP
NA = not applicable
UA = uppermost aquifer
WLO = water level only

2.3 Well Abandonment

No wells are currently proposed for abandonment.

3. APPLICABLE GROUNDWATER QUALITY STANDARDS

3.1 Groundwater Classification

Per 35 I.A.C. § 620.210, groundwater within the uppermost aquifer at the PAP meets the definition of a Class I - Potable Resource Groundwater based on the following criteria:

- Groundwater is located more than 10 feet bgs and within an unconsolidated silty sand and gravel unit which is five feet or more in thickness.
- Field hydraulic conductivity testing identified a geometric mean horizontal hydraulic conductivity of 6.8 x 10^{-3} centimeters per second (cm/s), which exceeds the 1 x 10^{-4} cm/s criterion.
- Groundwater is not downgradient of or underlying previously mined out areas.

Testing of the unconsolidated materials of the Mulberry Grove member averaged 21 percent fines which is greater than the 12 percent fines criterion; however, this was not deemed prohibitive of the Class I Classification.

3.2 Statistical Evaluation of Background Groundwater Data

A Statistical Analysis Plan (**Appendix A**) has been developed to describe procedures that will be used to establish background conditions and implement compliance monitoring as necessary and required by 35 I.A.C. § 845.640 and 35 I.A.C. § 845.650. The Statistical Analysis Plan was prepared in accordance with the requirements of 35 I.A.C. § 845.640(f), with reference to the acceptable statistical procedures provided in United States Environmental Protection Agency's (USEPA) *Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities, Unified Guidance* (*Unified Guidance,* March 2009), and is intended to provide a logical process and framework for conducting the statistical analysis of the data obtained during groundwater monitoring.

In accordance with 35 I.A.C. § 845.640(f)(1), the statistical method chosen for analysis of background groundwater quality was either the tolerance interval or the prediction interval procedure for each constituent listed in 35 I.A.C. § 845.600(a)(1) at this CCR unit per 35 I.A.C. § 845.640(f)(1)(C). A comparison of the statistical background concentrations and groundwater quality standards listed in 35 I.A.C. § 845.600(a)(1) and the resulting GWPSs are summarized in **Table 3-1**.

3.3 Applicable Groundwater Protection Standards

The applicable GWPS will be established in accordance with 35 I.A.C. § 845.600(a)(1) (greater of the background concentration or numerical limit specified in 35 I.A.C. § 845.600(a)(1)). The results of the statistical analysis of background groundwater data (**Table 3-1**) indicate that most background concentrations in the UD and uppermost aquifer are less than the groundwater quality standards listed in 35 I.A.C. § 845.600(a)(1). Therefore, for these parameters the groundwater quality standards listed in 35 I.A.C. § 845.600(a)(1) will be applied to the results from the proposed groundwater monitoring network. The exceptions include arsenic, pH, and radium 226 and 228 combined where the background concentration/measurement is greater (or lower for pH lower limit) than the 35 I.A.C. § 845.600(a)(1) standard. In these instances, the GWPS will be the background concentration/measurement.

Under most circumstances, the GWPS will be compared to the lower confidence limit for the observed concentrations for each constituent in each compliance well. Exceptions are when there are high percentages (greater than 50 percent) of non-detects in compliance well data, for which a future mean (for 50 to 70 percent non-detects) or median (for 70 percent non-detects) will be compared to the GWPS. Consistent with the *Unified Guidance*, the same general statistical method of confidence interval testing against a fixed GWPS is recommended in compliance and corrective action programs. Confidence intervals provide a flexible and statistically accurate method to test how a parameter estimated from a single sample compares to a fixed numerical limit. Confidence intervals explicitly account for variation and uncertainty in the sample data used to construct them.

Evaluation of the applicable standards will occur in conjunction with the analysis of groundwater quality results. Background calculations and the resulting concentrations may be updated as appropriate, in accordance with the Statistical Analysis Plan included in **Appendix A.**

4. GROUNDWATER MONITORING PLAN

The groundwater monitoring plan will monitor and evaluate groundwater quality to demonstrate compliance with the groundwater quality standards included in 40 C.F.R. § 257.94(e), 40 C.F.R. § 257.95(h), and 35 I.A.C. § 845.600(a). The groundwater monitoring program will include sampling and analysis procedures that are consistent and that provide an accurate representation of groundwater quality at the background and compliance wells as required by 35 I.A.C. § 845.630. As discussed in **Section 2,** three monitoring programs specific to the PAP exist: the IEPA-required monitoring program, the 40 C.F.R. § 257 monitoring program, and the proposed Part 845 monitoring program. These networks will continue to be monitored until USEPA approves Part 845. It is expected that upon USEPA approval of Part 845, the 40 C.F.R. § 257 monitoring program and reporting will be eliminated, and the proposed Part 845 monitoring and reporting included in this GMP will replace the current IEPA monitoring program. The Part 845 monitoring and reporting will continue until requirements of Part 845 have been achieved.

4.1 Monitoring Networks and Parameters

4.1.1 IEPA Groundwater Monitoring

The existing IEPA-required monitoring program was discussed in detail in **Section 2.1.1**. Four groundwater monitoring wells, including two background monitoring wells (G116 and APW02) and two compliance monitoring wells (APW03 and APW04), are sampled on a quarterly frequency for the parameters listed Special Condition No. 19 of NPDES Permit No. IL0049191.

4.1.2 40 C.F.R. § 257 Groundwater Monitoring

The existing 40 C.F.R. § 257 monitoring program was discussed in detail in Section **2.1.2**. Six wells (two background and four compliance) are sampled for Appendix III parameters on a semi-annual frequency. No changes are proposed to this monitoring network. Well locations and parameters will continue to be monitored and reported as required by 40 C.F.R. § 257 until USEPA approves Part 845.

4.1.3 Part 845 Groundwater Monitoring

The proposed Part 845 Monitoring Network will consist of two background monitoring wells (APW05, and APW06), 16 compliance monitoring wells (APW02, APW03, APW04, APW05S, APW07, APW08, APW09, APW10, APW11, APW12, APW13, APW14, APW15, APW16, APW17, and APW18) and two temporary water level only surface water staff gages (XSG01 and SG02) to monitor potential impacts from the PAP (**Figure 2-1**). These monitoring wells are screened within the UD (APW02[2], APW03[2], APW04[2], APW05S[2], and APW12[2]) and the uppermost aquifer (APW05, APW06, APW07, APW08, APW09, APW10, APW11, APW13, APW14, APW15, APW16, APW17, APW18) along the perimeter of the PAP. Groundwater samples will be collected and analyzed for the laboratory and field parameters in **Table D** below.

[2] Monitoring wells APW02, APW03, APW04, APW05S, and APW12 are wells screened in the UD that have been identified to monitor the PMP.

Table D. Part 845 Groundwater Monitoring Program Parameters

Field Parameters[1]			
pH	Turbidity	Groundwater Elevation	
Metals (Total)			
Antimony	Boron	Cobalt	Molybdenum
Arsenic	Cadmium	Lead	Selenium
Barium	Calcium	Lithium	Thallium
Beryllium	Chromium	Mercury	
Inorganics (Total)			
Fluoride	Sulfate	Chloride	TDS
Other (Total)			
Radium 226 and 228 combined			

[1] Dissolved oxygen, temperature, specific conductance, and oxidation/reduction potential will be recorded during sample collection.

All parameters listed above were sampled a minimum of eight times by October 18, 2021 to establish background groundwater quality in accordance with 35 I.A.C. § 845.650 (b)(1)(A). Discussion of background groundwater quality is included in **Section 3.2**.

4.2 Sampling Schedule

Groundwater sampling for the Part 845 monitoring well network will initially be performed quarterly according to the following schedule:

Table E. Part 845 Sampling Schedule

Frequency	Duration
Monthly (groundwater elevations only)	Begins: the quarter following approval of this plan and issuance of the Operating Permit.
	Ends: Following the 30-year post closure care period and following IEPA approval of documentation that groundwater concentrations are below standards in 35 I.A.C. § 845.600 and concentrations exceeding background are not increasing and meet requirements in 35 I.A.C. § 845.780 (c)(2)(B)(i) and (ii).
Quarterly (groundwater quality)	Begins: the quarter following approval of this plan and issuance of the Operating Permit.
	Ends: Following the 30-year post closure care period and following IEPA approval of documentation that groundwater concentrations are below standards in 35 I.A.C. § 845.600 and concentrations exceeding background are not increasing and meet requirements in 35 I.A.C. § 845.780 (c)(2)(B)(i) and (ii), or upon IEPA approval of an alternate schedule as allowed by 35 I.A.C. § 845.650(b)(4).
Semi-annual (groundwater quality)	Begins: Following 5 years of quarterly groundwater monitoring and IEPA approval of a demonstration that groundwater concentrations are below standards in 35 I.A.C. § 845.600 and not exhibiting statistically-significant increasing trends, monitoring effectiveness is not compromised by a semi-annual schedule, and sufficient data has been collected to characterize groundwater.
	Ends: Following detection of a statistically-significant increasing trend in groundwater concentrations or an exceedance of the standards in 35 I.A.C. § 845.600 (quarterly monitoring shall be resumed in these circumstances), or following the 30-year post closure care period and following IEPA approval of documentation that groundwater concentrations

	are below standards in 35 I.A.C. § 845.600 and concentrations exceeding background are not increasing and meet requirements in 35 I.A.C. § 845.780 (c)(2)(B)(i) and (ii).

4.3 Groundwater Sample Collection

Groundwater sampling procedures have been developed and the collection of groundwater samples is being implemented to meet the requirements of 35 I.A.C. § 845.640. In addition to groundwater well samples, quality assurance samples will be collected as described in **Section 4.5** (**Table 4-1**).

4.4 Laboratory Analysis

Laboratory analysis will be performed consistent with the requirements of 35 I.A.C. § 845.640(j) by a state-certified laboratory using methods approved by IEPA and USEPA. Laboratory methods may be modified based on laboratory equipment availability or procedures, but the Reporting Limit (RL) for all parameters analyzed, regardless of method, will be lower than the applicable groundwater quality standard. RLs for the applicable parameters are summarized in **Table 4-2**. Concentrations lower than the RL will be reported as less than the RL.

4.5 Quality Assurance Program

Consistent with the requirements of 35 I.A.C. § 845.640(a)(5), the sampling and analysis program includes procedures and techniques for quality assurance/quality control (QA/QC). Additional quality assurance samples to be collected will include the following:

- Field duplicates will be collected at a frequency of one per group of ten or fewer investigative water samples.
- One equipment blank sample will be collected and analyzed for each day of sampling. If dedicated sampling equipment is used, then equipment blank samples will not be collected.
- The duplicate and equipment blank quality assurance samples will be supplemented by the laboratory QA/QC program, which typically includes:
  - Regular generation of instrument calibration curves to assure instrument reliability
  - Laboratory control samples and/or quality control check standards that have been spiked, and analyses to monitor the performance of the analytical method
  - Matrix spike/matrix spike duplicate analyses to determine percent recoveries and relative percent differences for each of the parameters detected
  - Analysis of replicate samples to check the precision of the instrumentation and/or methodology employed for all analytical methods
  - Analysis of method blanks to assure that the system is free of contamination

Water quality meters used to measure pH and turbidity will be calibrated according to manufacturer’s specifications. At a minimum, it is recommended that calibration of pH occur daily prior to sampling and checked for accuracy at the end of each day. Unusual or suspect pH measurements during sampling events will be flagged, evaluated, and additional calibration may be performed throughout the sampling events. Turbidity meters will be checked daily, prior to and following sampling. Unusual measurements or erratic meter performance will be flagged and evaluated for overall effects on the data prior to reporting.

4.6 Groundwater Monitoring System Maintenance Plan

Consistent with the requirements of 35 I.A.C. § 845.630(e)(2), maintenance will be performed as needed to assure that the monitoring wells provide representative groundwater samples. Monitoring wells will be inspected during each groundwater sampling event; inspections will consist of the following:

- Visual inspection, clearing of vegetation, replacement of markers, and painting of protective casings as needed to assure that monitoring wells are clearly marked and accessible
- Visual inspection and repair or replacement of well aprons as needed to assure that they are intact, drain water away from the well, and have not heaved
- Visual inspection and repair or replacement of protective casings as needed to assure that they are undamaged, and that locks are present and functional
- Checks to assure that well caps are intact and vented, unless in flood-prone areas in which case caps will not be vented
- Annual measurement of monitoring well depths to determine the degree of siltation within the wells. Wells will be redeveloped as needed to remove siltation from the screened interval if it impedes flow of water into the well
- Checks to assure that wells are clear of internal obstructions, and flow freely

If maintenance of a monitoring well cannot address an identified deficiency, a replacement well will be installed.

4.7 Statistical Analysis

Statistical analysis will be consistent with procedures listed in 35 I.A.C. § 845.640(f). A Statistical Analysis Plan, provided in **Appendix A**, has been developed to summarize the statistical procedures that will be used to evaluate the groundwater results.

4.8 Data Reporting

Data reporting for the 40 C.F.R. § 257 monitoring well network will be consistent with recordkeeping, notification, and internet posting requirements described in 40 C.F.R. § 257.105 through 257.107.

Groundwater monitoring and analysis completed in accordance with the Part 845 monitoring under an approved monitoring program will be reported to IEPA within 60 days after completion of sampling and the data placed in the facility's operating record as required by 35 I.A.C. § 845.610(b)(3)(D). Within 14 days of posting to the operating record, information will be posted to the publicly accessible internet site "Illinois CCR Rule Compliance Data and Information" as required by 35 I.A.C. § 845.810(d). Information will also be submitted to IEPA annually by January 31 as required by 35 I.A.C. § 845.550, for data collected the preceding year. The report will include the status of the groundwater monitoring and any required corrective action plan for the PAP in addition to other requirements detailed in 35 I.A.C. § 845.610(e).

4.9 Compliance with Applicable On-site Groundwater Protection Standards

In accordance with 35 I.A.C. § 845.600(a)(1), the groundwater protection standard at the waste boundary will be the higher of either the 35 I.A.C. § 845.600 standard or the concentration determined by background groundwater monitoring.

As provided in 35 I.A.C. § 845.780(c)(2), at the end of the 30-year post-closure care period, groundwater monitoring will continue to be conducted in post-closure care until the groundwater results show the concentrations are:

- Below the GWPS in 35 I.A.C. § 845.600(a)(1); and
- Not increasing for those constituents over background, using the statistical procedures and performance standards in 35 I.A.C. § 845.640(f) and (g), provided that:
  - Concentrations have been reduced to the maximum extent feasible; and
  - Concentrations are protective of human health and the environment.

Following detection of an exceedance of the GWPS, an Alternate Source Demonstration (ASD) will be evaluated as described in **Section 4.10**.

4.10 Alternate Source Demonstrations

As allowed in 35 I.A.C. § 845.650(e), following detection of an exceedance of the GWPS, an ASD will be evaluated and, if completed, submitted to IEPA within 60 days. The ASD will provide lines of evidence that a source other than the PAP caused the contamination and the PAP did not contribute to the contamination, or that the exceedance of the GWPS resulted from error in sampling, analysis, statistical evaluation, natural variation in groundwater quality, or a change in the potentiometric surface and groundwater flow direction.

The ASD will include information and analysis that supports the conclusions and a certification of accuracy by a qualified professional engineer. Once the ASD is approved by IEPA, the Part 845 groundwater monitoring will continue as defined in **Section 4.1.3**.

If an ASD is not completed and submitted, or IEPA does not approve the ASD, a notification of the exceedance will be provided to IEPA and placed in the operating record. Additional actions will also be completed as required by 35 I.A.C § 845.650(d)(1) through (3); including, initiation of an assessment of corrective measures under 35 I.A.C § 845.660. As allowed in 35 I.A.C § 845.650(e)(7) a petition for review of IEPA's non-concurrence under 35 I.A.C. § 105 may also be filed.

4.11 Assessment of Corrective Measures and Corrective Action

As described in 35 I.A.C. § 845.660, if the ASD summarized in **Section 4.10** has not been approved by IEPA, an assessment of corrective measures will be initiated within 90 days of the detection of a result exceeding 35 I.A.C. § 845.600 standards (*i.e.,* receipt of laboratory data). The assessment of corrective measures will include at least the following (35 I.A.C. § 845.660 (c)):

- The performance, reliability, ease of implementation, and potential impacts of appropriate potential remedies, including safety impacts, cross-media impacts, and control of exposure to any residual contamination;
- The time required to begin and complete the corrective action plan; and
- The institutional requirements, such as State or local permit requirements or other environmental or public health requirements that may substantially affect implementation of the corrective action plan.

Within one year of completing the assessment of corrective measures, a corrective action plan will be developed to identify the selected remedy in accordance with 35 I.A.C. § 845.670. If closure of the CCR Unit is required, a closure alternatives analysis will be completed as specified in 35 I.A.C. § 845.710. The analysis and selected alternative will be submitted to IEPA in a Closure Plan as specified by 35 I.A.C. § 845.720. Groundwater monitoring proposed in this Addendum will continue as specified until the post closure care period has expired and IEPA has approved termination of post-closure care.

5. REFERENCES

Illinois Environmental Protection Agency, 2021. Standards for the Disposal of Coal Combustion Residuals in Surface Impoundments: Title 35 of the Illinois Administrative Code § 845, April 15, 2021.

Natural Resource Technology, Inc. (NRT), 2017. Sampling and Analysis Plan, Newton Primary Ash Pond, Newton Power Station, Newton, Illinois, Project No. 2285, Revision 0, October 17, 2017.

Ramboll Americas Engineering Solutions, Inc. (Ramboll), 2021. Hydrogeologic Site Characterization Report, Newton Primary Ash Pond, Newton Power Plant, 6725 North 500th St., Newton, Illinois.

United States Environmental Protection Agency (USEPA), March 2009. Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities – Unified Guidance. Office of Resource Conservation and Recovery, Program Implementation and Information Division, United States Environmental Protection Agency, Washington D.C. EPA/530/R-09/007.

United States Environmental Protection Agency (USEPA), 2015. Title 40 of the Code of Federal Regulations, Part 257.

TABLES

TABLE 1-1. PART 845 REQUIREMENTS CHECKLIST

GROUNDWATER MONITORING PLAN
NEWTON POWER PLANT
PRIMARY ASH POND
NEWTON, ILLINOIS

Part 845 Reference	Part 845 Components	Location of Information in GMP
845.630	**Groundwater Monitoring Systems**	
845.630(a)(2)	Potential contaminant pathways must be monitored.	Sections 2.2 & 4.1.3
845.630(a) 845.630(b) 845.630(c)	At least two upgradient wells and four downgradient wells (min. 1 and 3, but requires additional documentation)	Sections 2.2 & 4.1.3 Table 2-1 Figure 2-1
845.630(a) 845.630(b) 845.630(c)	Downgradient Well Density	Figure 2-1
845.630(a)(2)	Downgradient wells at waste boundary	Figure 2-1
845.640	**Groundwater Sampling and Analysis Requirements**	
845.640(a)	Consistent sampling and analysis procedures	Section 4 Tables 4-1 & 4-2
845.640(b)	Methods are appropriate	Section 4 Tables 4-1 & 4-2
845.640(c)	Groundwater elevations must be measured in each well prior to purging, each time groundwater is sampled.	Section 4.3
845.640 (d)(e)(f)(g)(h)	Establishment of background and application of statistical methods	Sections 3 & 4.7 Appendix A
845.640(i)	Analyze total recoverable metals	Section 4.1.3
845.640(j)	Analyze groundwater samples using a certified laboratory	Section 4.4

TABLE 1-1. PART 845 REQUIREMENTS CHECKLIST

GROUNDWATER MONITORING PLAN
NEWTON POWER PLANT
PRIMARY ASH POND
NEWTON, ILLINOIS

Part 845 Reference	Part 845 Components	Location of Information in GMP
845.650	**Groundwater Monitoring Program**	
845.650(a)	Must include monitoring for all constituents with a groundwater protection standard in Section 845.600(a), calcium, and turbidity	Section 4.1.3
845.650(b)(c)	Groundwater Monitoring Frequency	Sections 4.1.3 & 4.2
845.650(d)(e)	Exceedances of the groundwater protection standard	Sections 4.9, 4.10 & 4.11
845.650(b)(2) 845.650(b)(3)	Staff gauge/ piezometer to monitor head in impoundment	Sections 2.2 & 4.1.3 Figure 2-1 (XSG01)
NA	Staff gauge/ piezometer to monitor head of neighboring surface water body	Sections 2.2 & 4.1.3 Figure 2-1 (SG02)

[O: CJC 08/25/21; C: LDC 09/09/21]

Notes:
GMP = Groundwater Monitoring Plan
NA = Not Applicable

RAMBOLL

TABLE 2-1. MONITORING WELL LOCATIONS AND CONSTRUCTION DETAILS
GROUNDWATER MONITORING PLAN
NEWTON POWER PLANT
PRIMARY ASH POND
NEWTON, ILLINOIS

Well Number	Type	HSU	Date Constructed	Top of PVC Elevation (ft)	Measuring Point Elevation (ft)	Measuring Point Description	Ground Elevation (ft)	Screen Top Depth (ft BGS)	Screen Bottom Depth (ft BGS)	Screen Top Elevation (ft)	Screen Bottom Elevation (ft)	Well Depth (ft BGS)	Bottom of Boring Elevation (ft)	Screen Length (ft)	Screen Diameter (inches)	Latitude (Decimal Degrees)	Longitude (Decimal Degrees)
APW02	C	UD	06/19/2010	533.61	533.61	Top of Riser	529.90	9.70	19.70	520.20	510.20	20.00	509.90	10	2	38.925918	-88.293907
APW03	C	UD	06/18/2010	532.41	532.41	Top of Riser	528.37	9.70	19.70	518.67	508.67	20.00	508.40	10	2	38.922322	-88.281567
APW04	C	UD	06/19/2010	525.06	525.06	Top of Riser	521.45	7.70	17.70	513.75	503.75	18.00	503.50	10	2	38.927444	-88.273113
APW05	B	UA	10/22/2015	544.07	544.07	Top of Riser	541.08	62.64	67.44	478.44	473.64	67.84	473.10	4.8	2	38.933958	-88.280983
APW05S	C	UD	01/19/2021	543.94	543.94	Top of PVC	541.05	10.00	20.00	531.05	521.05	20.00	518.10	10	2	38.933958	-88.281033
APW06	B	UA	10/21/2015	546.07	546.07	Top of Riser	542.89	67.67	72.48	475.22	470.41	72.88	468.90	4.8	2	38.933746	-88.286276
APW07	C	UA	11/05/2015	538.37	538.37	Top of Riser	535.72	77.89	82.70	457.83	453.02	83.10	452.60	4.8	2	38.928233	-88.292076
APW08	C	UA	10/28/2015	528.97	528.97	Top of Riser	526.26	71.40	81.06	454.86	445.20	81.53	444.30	9.7	2	38.923154	-88.292286
APW09	C	UA	11/03/2015	531.52	531.52	Top of Riser	528.33	56.66	61.46	471.67	466.87	61.85	466.30	4.8	2	38.922319	-88.281585
APW10	C	UA	11/06/2015	524.25	524.25	Top of Riser	521.49	40.74	45.54	480.75	475.95	45.94	475.60	4.8	2	38.927435	-88.273127
APW11	C	UA	01/23/2021	538.63	538.63	Top of PVC	536.05	60.00	65.00	476.05	471.05	65.00	436.10	5	2	38.932811	-88.27545
APW12	C	UD	02/21/2021	546.29	546.29	Top of PVC	543.33	20.00	30.00	523.33	513.33	30.00	456.30	10	2	38.92975	-88.272058
APW13	C	UA	01/22/2021	537.99	537.99	Top of PVC	535.16	58.50	63.50	476.66	471.66	63.50	445.20	5	2	38.92566	-88.274416
APW14	C	UA	01/23/2021	526.29	526.29	Top of PVC	523.85	50.00	55.00	473.85	468.85	55.00	428.90	5	2	38.924057	-88.277994
APW15	C	UA	01/22/2021	524.69	524.69	Top of PVC	522.06	98.00	103.00	424.06	419.06	103.00	412.10	5	2	38.921593	-88.285226
APW16	C	UA	01/20/2021	531.18	531.18	Top of PVC	529.16	80.50	85.50	448.66	443.66	85.50	419.20	5	2	38.920317	-88.291291
APW17	C	UA	01/22/2021	532.52	532.52	Top of PVC	529.84	87.00	92.00	442.84	437.84	92.00	429.80	5	2	38.925916	-88.293928
APW18	C	UA	01/21/2021	543.27	543.27	Top of PVC	540.55	75.00	80.00	465.55	460.55	80.00	433.60	5	2	38.930979	-88.290122
XSG01	WLO	CCR	--	--	536.17	Staff gauge	--	--	--	--	--	--	--	--	--	38.923218	-88.29067
SG02	WLO	SW	--	--	506.89	Staff gauge	--	--	--	--	--	--	--	--	--	38.921234	-88.292057

TABLE 2-1. MONITORING WELL LOCATIONS AND CONSTRUCTION DETAILS
GROUNDWATER MONITORING PLAN
NEWTON POWER PLANT
PRIMARY ASH POND
NEWTON, ILLINOIS

Well Number	Type	HSU	Date Constructed	Top of PVC Elevation (ft)	Measuring Point Elevation (ft)	Measuring Point Description	Ground Elevation (ft)	Screen Top Depth (ft BGS)	Screen Bottom Depth (ft BGS)	Screen Top Elevation (ft)	Screen Bottom Elevation (ft)	Well Depth (ft BGS)	Bottom of Boring Elevation (ft)	Screen Length (ft)	Screen Diameter (inches)	Latitude (Decimal Degrees)	Longitude (Decimal Degrees)

Notes:
All elevation data are presented relative to the North American Vertical Datum 1988 (NAVD88), GEOID 12A
Type refers to the role of the well in the monitoring network: background (B), compliance (C), or water level measurements only (WLO)
WLO wells are temporary pending implementation of impoundment closure per an approved Construction Permit application
-- = data not available
BGS = below ground surface
CCR = Coal Combustion Residual
ft = foot or feet
HSU = Hydrostratigraphic Unit
PVC = polyvinyl chloride
SW = surface water
UA = uppermost aquifer
UD = upper drift

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TABLE 3-1. BACKGROUND GROUNDWATER QUALITY AND STANDARDS
GROUNDWATER MONITORING PLAN
NEWTON POWER PLANT
PRIMARY ASH POND
NEWTON, ILLINOIS

Parameter	Background Concentration	845 Limit	Groundwater Protection Standard	Unit
Antimony, total	0.003	0.006	0.006	mg/L
Arsenic, total	0.059	0.010	0.059	mg/L
Barium, total	0.3	2.0	2.0	mg/L
Beryllium, total	0.001	0.004	0.004	mg/L
Boron, total	0.26	2	2	mg/L
Cadmium, total	0.001	0.005	0.005	mg/L
Chloride, total	52	200	200	mg/L
Chromium, total	0.011	0.1	0.1	mg/L
Cobalt, total	0.0043	0.006	0.006	mg/L
Fluoride, total	0.633	4.0	4.0	mg/L
Lead, total	0.0074	0.0075	0.0075	mg/L
Lithium, total	0.03	0.04	0.04	mg/L
Mercury, total	0.0002	0.002	0.002	mg/L
Molybdenum, total	0.018	0.1	0.1	mg/L
pH (field)	7.8 / 6.4	9.0 / 6.5	9.0 / 6.4	SU
Radium 226 and 228 combined	6.9	5	6.9	pCi/L
Selenium, total	0.001	0.05	0.05	mg/L
Sulfate, total	36	400	400	mg/L
Thallium, total	0.001	0.002	0.002	mg/L
Total Dissolved Solids	628	1200	1200	mg/L

Notes:
For pH, the values presented are the upper / lower limits
Groundwater protection standards for calcium and turbidity do not apply per 35 I.A.C. § 845.600(b)
mg/L = milligrams per liter
SU = standard units
pCi/L = picocuries per liter

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RAMBOLL

TABLE 4-1. SAMPLING AND ANALYSIS SUMMARY
GROUNDWATER MONITORING PLAN
NEWTON POWER PLANT
PRIMARY ASH POND
NEWTON, ILLINOIS

Parameter	Analytical Method [1]	Number of Samples	Field Duplicates [2]	Field Blanks [3]	Equipment Blanks [3]	MS/MSD [4]	Total	Container Type	Minimum Volume [5]	Preservation (Cool to 4 °C for all samples)	Sample Hold Time from Collection Date
Metals											
Metals [6]	6020, Li - EPA 200.7	18	2	0	0	1	21	plastic	600 mL	HNO_3 to pH<2	6 months
Mercury	7470A or 6020	18	2	0	0	1	21	plastic	400 mL	HNO_3 to pH<2	28 days
Inorganic Parameters											
Fluoride	9214 or EPA 300	18	2	0	0	1	21	plastic	300 mL	Cool to 4 °C	28 days
Chloride	9251 or EPA 300	18	2	0	0	1	21	plastic	100 mL	Cool to 4 °C	28 days
Sulfate	9036 or EPA 300	18	2	0	0	1	21	plastic	50 mL	Cool to 4 °C	28 days
Total Dissolved Solids	SM 2540 C	18	2	0	0	1	21	plastic	200 mL	Cool to 4 °C	7 days
Radium											
Radium 226	9315 or EPA 903	18	0	0	0	0	18	plastic	1000 mL	HNO_3 to pH<2	6 months
Radium 228	9320 or EPA 904	18	0	0	0	0	18	plastic	1000 mL	HNO_3 to pH<2	6 months
Field Parameters											
pH	SM 4500-H+ B	18	NA	NA	NA	NA	18	flow-through cell	NA	none	immediately
Dissolved Oxygen [8]	SM 4500-O/405.1	18	NA	NA	NA	NA	18	flow-through cell	NA	none	immediately
Temperature [8]	SM 2550	18	NA	NA	NA	NA	18	flow-through cell	NA	none	immediately
Oxidation/Reduction Potential [8]	SM 2580 B	18	NA	NA	NA	NA	18	flow-through cell	NA	none	immediately
Specific Conductance [8]	SM 2510 B	18	NA	NA	NA	NA	18	flow-through cell	NA	none	immediately
Turbidity [7]	SM 2130 B	18	NA	NA	NA	NA	18	flow-through cell or hand-held turbidity meter	NA	none	immediately

[O: CJC 08/25/21; C: LDC 09/09/21]

Notes:

[1] Analytical method numbers are from SW-846 unless otherwise indicated. Analytical methods may be updated with more recent versions as appropriate.
[2] Field duplicates will be collected at a frequency of one per group of 10 or fewer investigative water samples. Field duplicates will not be collected for radium analysis.
[3] Field blanks will be collected at the discretion of the project manager; Equipment blanks will be collected at a rate of 1 per sampling event if non-dedicated equipment is used.
[4] Matrix Spike/Matrix Spike Duplicate (MS/MSD) samples will be collected at a frequency of one per group of 20 or fewer investigative water samples per CCR unit/multi-unit. Additional volume to be determined by laboratory.
[5] Sample volume is estimated and will be determined by the laboratory.
[6] Metals = antimony, arsenic, barium, beryllium, boron, cadmium, calcium, chromium, cobalt, lead, lithium, molybdenum, selenium, thallium. Metals may be analyzed via ICP/ ICP-MS USEPA methods 6010 or 6020 depending on laboratory instrument availability.
[7] If turbidity exceeds 10 NTUs, a duplicate sample filtered through a .45 micron filter may be collected for metals analysis in addition to the unfiltered sample. Both samples would be submitted for analysis.
[8] Parameter collected for quality assurance and quality control for field sampling purposes only; not required to be collected or reported under Part 845; collection of parameter may be discontinued without notification.

< = less than
°C = degrees Celsius
HNO_3 = nitric acid
mL = milliliter
NA = not applicable
NTU = nephelometric turbidity unit

RAMBOLL

TABLE 4-2. DETECTION AND REPORTING LIMITS FOR PART 845 PARAMETERS
GROUNDWATER MONITORING PLAN
NEWTON POWER PLANT
PRIMARY ASH POND
NEWTON, ILLINOIS

Constituent	CAS	Unit	Analytical Methods [1]	USEPA MCL [2]	35 I.A.C. § 845.600	RL [4, 5]	MDL [5]
Metals							
Antimony	7440-36-0	mg/L	6020	0.006	0.006	0.003	0.00036
Arsenic	7440-38-2	mg/L	6020	0.01	0.01	0.001	0.00013
Barium	7440-39-3	mg/L	6020	2	2	0.001	0.00028
Beryllium	7440-41-7	mg/L	6020	0.004	0.004	0.001	0.000017
Boron	7440-42-8	mg/L	6020	NS	2	0.01	0.0023
Cadmium	7440-43-9	mg/L	6020	0.005	0.005	0.001	0.000042
Calcium	7440-70-2	mg/L	6020	NS	NS	0.15	0.15
Chromium	7440-47-3	mg/L	6020	0.1	0.1	0.004	0.00027
Cobalt	7440-48-4	mg/L	6020	0.006	0.006	0.002	0.000017
Lead	7439-92-1	mg/L	6020	0.015	0.0075	0.001	0.000025
Lithium	7439-93-2	mg/L	6020 or EPA 200.7	0.04	0.04	0.02	0.0001
Mercury	7439-97-6	mg/L	6020 or 7470A	0.002	0.002	0.0002	0.000078
Molybdenum	7439-98-7	mg/L	6020	0.1	0.1	0.001	0.000063
Selenium	7782-49-2	mg/L	6020	0.05	0.05	0.001	0.00032
Thallium	7440-28-0	mg/L	6020	0.002	0.002	0.001	0.000062
Inorganics							
Fluoride	7681	mg/L	9214 or EPA 300	4	4	0.25	0.065
Chloride	16887-00-6	mg/L	9251 or EPA 300	250 [3]	200	1	0.15
Sulfate	18785-72-3	mg/L	9036 or EPA 300	250 [3]	400	1	0.24
Total Dissolved Solids	10052	mg/L	SM 2540C	500 [3]	1200	17	--
Other							
Radium 226 and 228 combined	7440-14-4	pCi/L	9315/9320 or EPA 903/904	5	5	-- [6]	-- [7]
Field							
pH	NA	SU	SM 4500-H+ B	NS	6.5-9.0	NA	NA
Oxidation/Reduction Potential	NA	mV	SM 2580 B	NS	NS	NA	NA
Dissolved Oxygen	NA	mg/L	SM 4500-O/405.1	NS	NS	NA	NA
Temperature	NA	^{o}C	SM 2550	NS	NS	NA	NA
Specific Conductivity	NA	µS/cm	SM 2510 B	NS	NS	NA	NA
Turbidity	NA	NTU	SM 2130 B	NS	NS	NA	NA

[O: CJC 08/25/21; C: LDC 09/09/21]

TABLE 4-2. DETECTION AND REPORTING LIMITS FOR PART 845 PARAMETERS
GROUNDWATER MONITORING PLAN
NEWTON POWER PLANT
PRIMARY ASH POND
NEWTON, ILLINOIS

Notes:

[1] Analytical method numbers are from SW-846 unless otherwise indicated. Metals will be analyzed via Method 6020 or 6010 depending on laboratory equipment availability. Selected method will ensure reporting limits (RL) are below Title 35 of the Illinois Administrative Code (35 I.A.C.) § 845.600 groundwater protection standards.
[2] USEPA MCL = United States Environmental Protection Agency Maximum Contaminant Level.
[3] USEPA SMCL = United States Environmental Protection Agency Secondary Maximum Contaminant Level.
[4] RLs will be less than the 35 I.A.C. § 845.600 groundwater protection standards.
[5] RLs and method detection limits (MDL) will vary depending on the laboratory performing the work.
[6] All radium results will be reported (values may be positive or negative) and will include uncertainty and the calculated MDC.
[7] Laboratories calculate a minimum detectable concentration (MDC) based on the sample.
°C = degrees Celsius
µS/cm = microSiemens per centimeter
CAS = Chemical Abstract Number
MDL = Method detection limit as established by the laboratory
mg/L = milligrams per liter
mV = millivolts
NS = No standard
NTU = nephelometric turbidity unit
pCi/L = picoCuries per liter
RL = Reporting limit as established by the laboratory
SM = Standard Methods for the Examination of Water and Wastewater
SU = standard units

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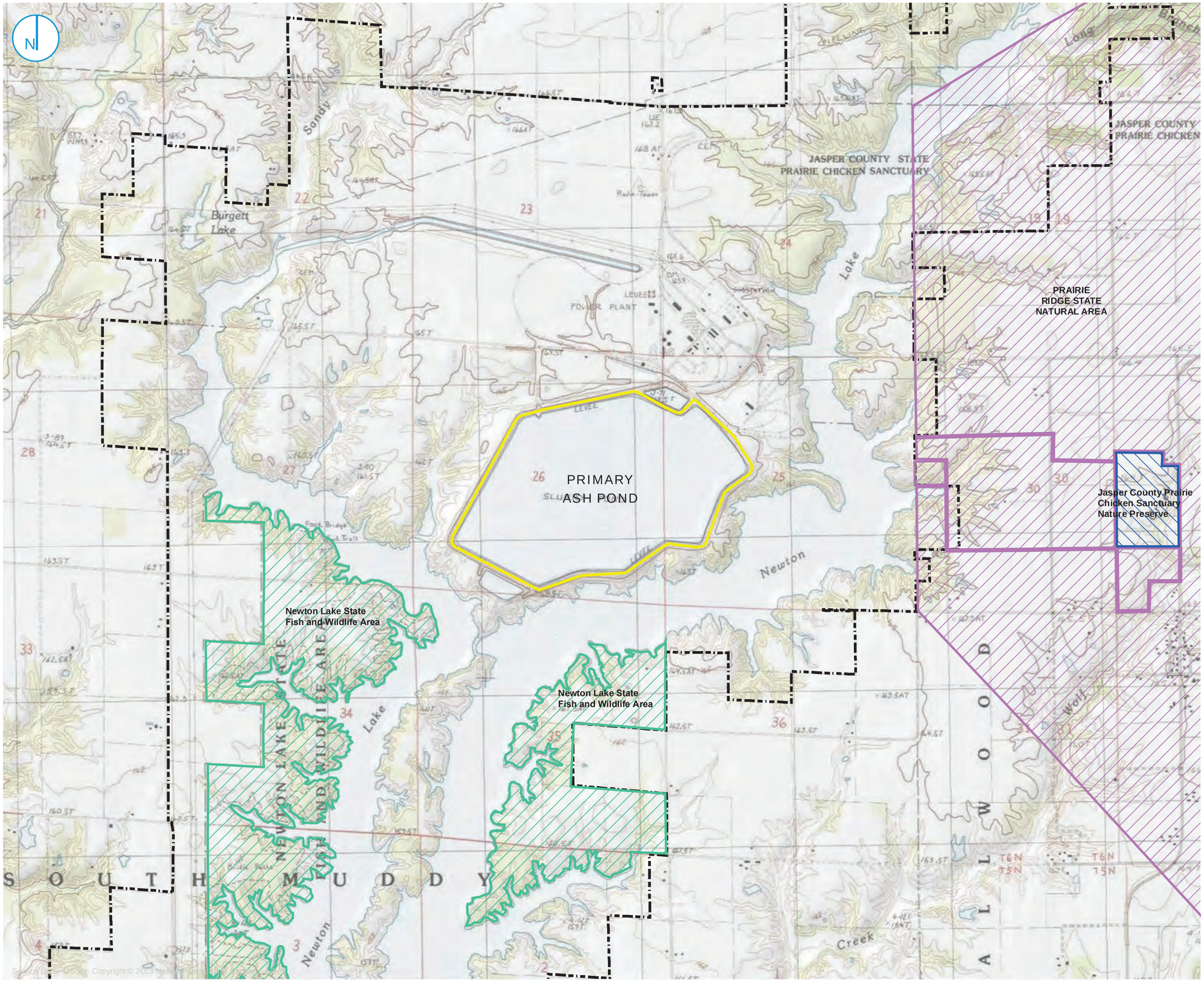
FIGURES

Electronic Filing: Received, Clerk's Office 03/26/2024

R001274



PART 845 REGULATED UNIT FACILITY BOUNDARY
JASPER COUNTY PRAIRIE CHICKEN SANCTUARY NATURE PRESERVE
NEWTON LAKE STATE FISH AND WILDLIFE AREA
PRAIRIE RIDGE STATE NATURAL AREA
PROPERTY BOUNDARY

0 1,000 2,000 Feet

SITE LOCATION MAP

GROUNDWATER MONITORING PLAN
PRIMARY ASH POND
NEWTON POWER PLANT
NEWTON, ILLINOIS

FIGURE 1-1

RAMBOLL AMERICAS
ENGINEERING SOLUTIONS, INC.

RAMBOLL

PROJECT: 169000XXXX | DATED: 10/20/2021 | DESIGNER: STOLZSD

Y:\Mapping\Projects\22\2285\MXD\845_Operating_Permit\Newton\GMP\Figure 1-1_Site Location Map.mxd

R001275

PART 845 REGULATED UNIT FACILITY BOUNDARY
SITE FEATURE
PROPERTY BOUNDARY

0 500 1,000 Feet

SITE MAP

GROUNDWATER MONITORING PLAN
PRIMARY ASH POND
NEWTON POWER PLANT
NEWTON, ILLINOIS

FIGURE 1-2

RAMBOLL AMERICAS
ENGINEERING SOLUTIONS, INC.

RAMBOLL

Y:\Mapping\Projects\22\2285\MXD\845_Operating_Permit\Newton\GMP\Figure 1-2_Site Map.mxd

PROJECT: 169000XXXX | DATED: 10/19/2021 | DESIGNER: STOLZSD

BACKGROUND WELL
MONITORING WELL
SOURCE SAMPLE LOCATION
STAFF GAGE
GROUNDWATER ELEVATION CONTOUR (5-FT CONTOUR INTERVAL, NAVD88)
INFERRED GROUNDWATER ELEVATION CONTOUR
GROUNDWATER FLOW DIRECTION
PART 845 REGULATED UNIT (SUBJECT UNIT)
SITE FEATURE

NOTES:

1. ELEVATIONS IN PARENTHESIS WERE NOT USED FOR CONTOURING.
2. NM = NOT MEASURED
3. ELEVATION CONTOURS SHOWN IN FEET, NORTH AMERICAN VERTICAL DATUM OF 1988

UPPERMOST AQUIFER GROUNDWATER ELEVATION CONTOURS APRIL 27, 2021

GROUNDWATER MONITORING PLAN
PRIMARY ASH POND
NEWTON POWER PLANT
NEWTON, ILLINOIS

FIGURE 1-3

RAMBOLL AMERICAS ENGINEERING SOLUTIONS, INC.

RAMBOLL

Y:\Mapping\Projects\22\2285\MXD\845_Operating_Permit\Newton\GMP\Figure 1-3_GWE_Contours_20210427.mxd

PROJECT: 169000XXXX | DATED: 10/20/2021 | DESIGNER: STOLZSD

COMPLIANCE WELL
BACKGROUND WELL
STAFF GAUGE
PART 845 REGULATED UNIT (SUBJECT UNIT)
SITE FEATURE
PROPERTY BOUNDARY

0 500 1,000 Feet

PROPOSED MONITORING WELL NETWORK

GROUNDWATER MONITORING PLAN
PRIMARY ASH POND
NEWTON POWER PLANT
NEWTON, ILLINOIS

FIGURE 2-1

RAMBOLL AMERICAS ENGINEERING SOLUTIONS, INC.

RAMBOLL

PROJECT: 169000XXXX | DATED: 10/20/2021 | DESIGNER: STOLZSD

Y:\Mapping\Projects\22\2285\MXD\845_Operating_Permit\Newton\GMP\Figure 2-1_Proposed Monitoring Well Network.mxd

APPENDIX A
STATISTICAL ANALYSIS PLAN

Prepared for
Illinois Power Generating Company

Date
October 25, 2021

Project No.
1940100806-008

STATISTICAL ANALYSIS PLAN

PRIMARY ASH POND
NEWTON POWER PLANT
NEWTON, ILLINOIS

RAMBOLL Bright ideas. Sustainable change.

STATISTICAL ANALYSIS PLAN
NEWTON POWER PLANT PRIMARY ASH POND

Project Name	**Newton Power Plant Primary Ash Pond**
Project No.	**1940100806-008**
Recipient	**Illinois Power Generating Company**
Document Type	**Statistical Analysis Plan**
Version	**FINAL**
Date	**October 25, 2021**

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Brian G. Hennings, PG
Senior Managing Hydrogeologist

Eric J. Tlachac, PE
Senior Managing Engineer

Rachel A. Banoff, EIT
Project Statistician

LICENSED PROFESSIONAL CERTIFICATIONS

This certification is based on the description of the statistical methods selected to evaluate groundwater as presented in the following Statistical Analysis Plan; Newton Power Plant Primary Ash Pond. The procedures described in the plan will be used to establish background conditions and implement compliance monitoring as necessary and required by 35 I.A.C. § 845.640 and 35 I.A.C. § 845.650. The Statistical Analysis Plan was prepared in accordance with the requirements of 35 I.A.C. § 845.640(f), with reference to the acceptable statistical procedures provided in the United States Environmental Protection Agency (USEPA)'s *Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities, Unified Guidance* (*Unified Guidance,* March 2009), and is intended to provide a logical process and framework for conducting the statistical analysis of the data obtained during groundwater monitoring. In accordance with 35 I.A.C. § 845.640(f)(1), the statistical method chosen for analysis of background groundwater quality will be either the tolerance interval or the prediction interval procedure for each constituent listed in 35 I.A.C. § 845.600(a)(1) at this CCR unit per 35 I.A.C. § 845.640(f)(1)(C). Groundwater Protection Standards (GWPS) will be established in accordance with 35 I.A.C. § 845.600(a) (greater of the background concentration or numerical limit specified in 35 I.A.C. § 845.600(a)(1)). The GWPS will be compared to the lower confidence limit for the observed concentrations for each constituent in each compliance well. Consistent with the *Unified Guidance*, the same general statistical method of confidence interval testing against a fixed GWPS is recommended in compliance and corrective action programs. Confidence intervals provide a flexible and statistically accurate method to test how a parameter estimated from a single sample compares to a fixed numerical limit. Confidence intervals explicitly account for variation and uncertainty in the sample data used to construct them.

Description of the statistical methods chosen for analysis of groundwater monitoring data and application of these methods for determining exceedances of the GWPS identified in 35 I.A.C. § 845.600(a) is provided in this Statistical Analysis Plan.

35 I.A.C. § 845.640 Statistical Analysis (PE)

I, Eric J. Tlachac, a qualified professional engineer in good standing in the State of Illinois, certify that the statistical methods summarized above and described in this document (Statistical Analysis Plan; Newton Power Plant Primary Ash Pond) are appropriate for evaluating the groundwater monitoring data collected as described in the attached document and are in substantial compliance with 35 I.A.C. § 845.640.

Eric J. Tlachac
____
Eric J. Tlachac
Qualified Professional Engineer
062-063091
Illinois
Date: October 25, 2021

LICENSED PROFESSIONAL ENGINEER
ERIC J. TLACHAC
062-063091
STATE OF ILLINOIS

35 I.A.C. § 845.640 Statistical Analysis (PG)

I, Brian G. Hennings, a qualified professional geologist in good standing in the State of Illinois, certify that the statistical methods described in this document (Statistical Analysis Plan; Newton Power Plant Primary Ash Pond) are appropriate for evaluating the groundwater monitoring data collected as described in the attached document and are in substantial compliance with 35 I.A.C. § 845.640.

____
Brian G. Hennings
Professional Geologist
196.001482
Illinois
Date: October 25, 2021

LICENSED PROFESSIONAL GEOLOGIST
BRIAN G. HENNINGS
196.001482
ILLINOIS

35 I.A.C. § 845.640 Statistical Analysis

I, Rachel A. Banoff, a qualified professional, certify that the statistical methods described in this document (Statistical Analysis Plan; Newton Power Plant Primary Ash Pond), are appropriate for evaluating the groundwater monitoring data collected as described in the attached document and are in substantial compliance with 35 I.A.C. § 845.640.

____
Rachel A. Banoff, EIT
Project Statistician
Date: October 25, 2021

CONTENTS

TABLES (IN TEXT)

ACRONYMS AND ABBREVIATIONS

§	Section
35 I.A.C.	Title 35 of the Illinois Administrative Code
ANOVA	analysis of variance
CCR	coal combustion residuals
COC	constituents of concern
GWPS	groundwater protection standard
IEPA	Illinois Environmental Protection Agency
LCL	lower confidence limit
LTL	lower tolerance limit
MSE	mean squared error
P	probability
Part 845	Residuals in Surface Impoundments: Title 35 of the Illinois Administrative Code § 845
RCRA	Resource Conservation and Recovery Act
RL	reporting limit
ROS	regression on order statistics
SI	surface impoundment
SSI	statistically significant increase
SWFPR	site-wide false positive rate
Unified Guidance	*Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities, Unified Guidance* (USEPA, 2009)
UPL	upper prediction limit
USEPA	United States Environmental Protection Agency
UTL	upper tolerance limit

1. INTRODUCTION

In April 2021, the Illinois Environmental Protection Agency (IEPA) issued a final rule for the regulation and management of Coal Combustion Residuals (CCR) in surface impoundments (SIs) under the Standards for the Disposal of CCR in Surface Impoundments: Title 35 of the Illinois Administrative Code (35 I.A.C.) § 845 (Part 845). Facilities regulated under Part 845 are required to develop and sample a groundwater monitoring well network to evaluate whether impounded CCR materials are impacting downgradient groundwater quality. The groundwater quality evaluation must include selection and certification by a qualified professional engineer of the statistical procedures to be used. The procedures described in the evaluation will be used to establish background conditions and implement compliance and corrective action monitoring as necessary and required by 35 I.A.C. § 845.640 and 35 I.A.C. § 845.650. This Statistical Analysis Plan was prepared in accordance with the requirements of 35 I.A.C. § 845.640(f), with reference to the acceptable statistical procedures provided in United States Environmental Protection Agency's (USEPA's) *Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities, Unified Guidance* (*Unified Guidance*) (March 2009).

This Statistical Analysis Plan does not include procedures for groundwater sample collection and analysis, as these activities are conducted in accordance with the Sampling and Analysis Plan prepared for each CCR unit in accordance with 35 I.A.C. § 845.640. This Statistical Analysis Plan will be used as the primary reference for evaluating groundwater quality during operation and post-closure care.

1.1 Statistical Analysis Objectives

This Statistical Analysis Plan is intended to provide a logical process and framework for conducting the statistical analyses of data obtained during groundwater monitoring conducted in accordance with the Sampling and Analysis Plan for each CCR unit. The Statistical Analysis Plan will enable a qualified professional engineer to certify that the selected statistical methods are appropriate for evaluating the groundwater monitoring data for the applicable CCR unit(s).

1.2 Statistical Analysis Plan Approach

The main sections of this Statistical Analysis Plan should be viewed as a "generic" outline of statistical methods utilized for each CCR unit and constituent required to be monitored. The statistical analysis of the groundwater monitoring data, however, will be conducted on an individual-constituent or well basis, and may involve the use of appropriate statistical procedures depending on multiple factors such as detection frequency and normality distributions.

The CCR Rule outlines two phases of groundwater monitoring:

- Background Monitoring in accordance with 35 I.A.C. § 845.650(b)(1)
- Compliance Monitoring in accordance with 35 I.A.C. § 845.650

Each phase of the groundwater monitoring program requires specific statistical procedures to accomplish the intended purpose. During the background monitoring phase, background groundwater quality will be established utilizing upgradient and background wells and downgradient groundwater quality data will be collected to facilitate statistics in subsequent phases. Compliance Monitoring is then initiated through the evaluation of the downgradient groundwater monitoring data for exceedances of the groundwater protection standard (GWPS) established by Part 845 (concentration specified in 35 I.A.C. § 845.600 or an IEPA-approved background concentration). The developed statistical analysis plan will be implemented for each monitoring phase and in accordance with the statistical procedures.

2. BACKGROUND MONITORING AND DATA PREPARATION

The background and compliance monitoring wells were sampled and analyzed for constituents, as listed in Part 845 (antimony, arsenic, barium, beryllium, boron, cadmium, calcium, chloride, chromium, cobalt, fluoride, lead, lithium, mercury, molybdenum, pH, radium 226 and 228 combined, selenium, sulfate, thallium, total dissolved solids, and turbidity), during the baseline phase of the groundwater monitoring program.

The background monitoring well(s) were placed upgradient of the CCR unit, or at an alternative background location, where they are not affected by potential leakage from the CCR unit. Compliance monitoring wells were placed at the waste boundary of the CCR unit, along the same groundwater flow path. As 35 I.A.C. § 845.630(a) specifies, the location of these wells ensures that background accurately represents the quality of unaffected groundwater, while compliance wells accurately represent groundwater quality at the waste boundary and monitor all potential contaminant pathways.

As required by 35 I.A.C. § 845.650(a)(1), eight sampling events were completed within 180 days of April 21, 2021. As outlined, groundwater sampling procedures included sampling of the background and compliance wells using low-flow sampling methods, collection of one field quality control sample per event, and groundwater samples were not field filtered before laboratory analysis of total recoverable metals.

Following completion of the eight sampling events, background groundwater quality was established for Part 845 constituents. Groundwater monitoring will be conducted quarterly for at least the first five years. In accordance with 35 I.A.C. § 845.650(b)(4), after the first five years, a request to reduce the monitoring frequency to semiannual may be submitted to IEPA if all of the following can be demonstrated:

- Groundwater monitoring effectiveness will not be compromised by the reduced frequency
- Sufficient data has been collected to characterize groundwater
- Monitoring to date does not show any statistically significant increasing trends
- The concentrations of monitored constituents at the compliance monitoring wells are below the applicable GWPSs established in 35 I.A.C. § 845.600

The following subsections outline the statistical tests and procedures (methods) that will be utilized to evaluate data collected for each constituent in both background and compliance wells for Background and Compliance Monitoring. When necessary and contingent upon equivalent statistical power, an alternative test not included in this Statistical Analysis Plan may be chosen due to site-specific data requirements.

2.1 Sample Independence

Independence of sample results is a major assumption for most statistical analyses. To ensure physical independence of groundwater sampling results, the minimum time between sampling events must be longer than the time required for groundwater to move through the monitoring well. The sampling schedules for both the baseline and compliance monitoring periods are specified in 35 I.A.C. § 845.650(b) and may conflict with the statistical assumption of independence of sample results.

2.2 Non-Detect Data Processing

The reporting limit (RL) will be used as the lower level for the reporting of non-detected groundwater quality data. For all summary statistics (box plots, timeseries, etc.), the RL will be substituted for concentrations reported below the RL, including non-detects. With professional judgement, analytical results between the RL and the method detection limit, *i.e.,* estimated values, typically identified with a “J” flag, may be utilized if provided by the laboratory.

For all statistical test procedures:

- If the frequency of non-detect data are less than or equal to 15 percent, half of the RL will be substituted for these data
- If the non-detect frequency is between 15 percent and 50 percent, either the Kaplan-Meier or robust regression on order statistics (ROS) will be used to estimate the mean and standard deviation adjusted for the presence of left-censored values
- If the non-detect frequency is greater than 50 percent, a non-parametric test will be used
- If only one background result is detected that value will be used as the non-parametric upper prediction limit (UPL)

2.3 Testing for Normality

Many statistical analyses assume that sample data are normally distributed (parametric). However, environmental data are frequently not normally distributed (nonparametric). 35 I.A.C. § 845.640(g) requires the knowledge of the background data distribution for comparison to compliance results. The *Unified Guidance* document recommends the Shapiro-Wilk normality test for sample sizes of 50 or less, and the Shapiro-Francia normality test for sample sizes greater than 50.

When possible, transformation of datasets to achieve normal distributions is preferred.

2.4 Testing for Outliers

Part 845 constituents will be screened for the existence of outliers using a method described by the *Unified Guidance*. Outliers are extreme data points that may represent an anomaly or erroneous data point. To test for outliers, one or more of the following outlier tests will be utilized:

- Dixon’s test, for well-constituent pairs with less than 25 samples, assumes normally distributed data.
- Rosner’s test, for well-constituent pairs with more than 20 samples, assumes normally distributed data.
- Grubb’s test for well-constituent pairs with seven or more samples, assumes normally distributed data.
- Time series, box-whisker plots, and probability plots provide visual tools to identify potential outliers, and evaluation of seasonal, spatial, or temporal variability for both normally and non-normally distributed data.

Data quality control, groundwater geochemistry, and sampling procedures will be evaluated as potential sources of error leading to an outlier result. The outlier tests cannot be used alone to determine whether a value is a true outlier that should be excluded from future statistical analysis. Corroborating evidence needed to exclude values includes a discrete data reporting or analytical error, or potential laboratory bias. Absent corroborating evidence, the flagged values are considered true, but extreme, values in the data set. Professional judgement will be used to exclude extreme outliers from further statistical analyses. Outliers will be retained in the database.

With professional judgement, a confirmatory sample may be collected to allow for the distinction between an outlier and a true representation of groundwater quality at the monitoring point. If re-sampling is conducted, this sample will be collected within 90 days following outlier identification. If the confirmatory sample indicates the original result as an outlier, it will be reported as such.

2.5 Trend Analysis

Statistical analyses supporting the lack of trend are a fundamental step to confirm the assumption that groundwater quality values are stationary or constant over time at a CCR unit. These analyses allow for evaluation of variation in the background and compliance data for each constituent over time. A statistically significant increasing trend in background data could indicate an existing release from the CCR unit or alternate source, requiring further investigation. In addition, statistically significant trending background data can result in increased standard deviation and, therefore, greater prediction or control limits. Consequently, the increased prediction or control limit will have less power or ability to identify a release from the CCR unit.

A linear regression, coupled with a t-test for slope significance at a 95 percent confidence level (0.05 significance level), may be used on datasets for each constituent with few non-detects and a normally distributed variance of the mean to evaluate time trends. The Theil-Sen trend line, coupled with the Mann-Kendall test for slope significance at a 95 percent confidence level (0.05 significance level), will be used for datasets with frequent non-detects or non-normal variance. Similarly, trend analyses could also be used on compliance data to evaluate a possible release from the CCR unit.

2.6 Spatial Variation

Spatial trends and/or variation between background wells could indicate an existing release from a CCR unit. If the spatial variability is not due to an existing release, intrawell comparisons in compliance wells may be used to account for spatial variability and monitor for a future release. However, the CCR unit being monitored was placed into service prior to the start of groundwater monitoring and it is unknown whether a previous release has occurred. Accordingly, intrawell comparisons in compliance wells cannot be used to determine the occurrence of a future release. Interwell comparisons between compliance wells and background wells will be used.

2.7 Temporal Variation

Time series plots can be used to identify temporal dependence. Potentially significant temporal components of variability can be identified by graphing single constituent data from multiple wells together on a time series plot. With temporal dependence, the time series plot as a pattern of parallel traces, in which the individual wells will tend to rise and fall together across the sequence of sampling dates. Time series plots can be helpful by plotting multiple constituents over time for the same well, or averaging values for each constituent across wells on each sampling event and then plotting the averages over time. In either case, the plots can signify whether the general concentration pattern over time is simultaneously observed for different constituents. If so, it may indicate that a group of constituents is highly correlated in groundwater or that the same artifacts of sampling and/or lab analysis impacted the results of several monitoring parameters.

Hydrologic factors such as drought, recharge patterns or regular (*e.g.,* seasonal) water table fluctuations may be responsible for the temporal variation. In these cases, it may be useful to test for the presence of a significant temporal effect by first constructing a parallel time series plot and then running a formal one-way analysis of variance (ANOVA) (α = 0.05) for temporal effects. A one-way ANOVA for temporal effects considers multiple well data sets for individual sampling events or seasons as the relevant statistical factor. If event-specific analytical differences or seasonality appear to be an important temporal factor, the one-way ANOVA for temporal effects can be used to formally identify seasonality, parallel trends, or changes in lab performance that affect other temporal effects. The one-way ANOVA for temporal effects assumes that the data groups are normally distributed with constant variance. It is also assumed that for each of a series of background wells, measurements are collected at each well on sampling events or dates common to all the wells. Results of the ANOVA can also be used to create temporally stationary residuals, where the temporal effect has been 'subtracted from' the original measurements. These stationary residuals may be used to replace the original data in subsequent statistical testing.

If the data cannot be normalized, a similar test for a temporal or seasonal effect can be performed using the Kruskal-Wallis test (α = 0.05). Each sampling event should be treated as a separate 'well,' while each well is treated as a separate 'sampling event.' In this case, no residuals can be computed since the Kruskal-Wallis test employs ranks of the data rather than the measurements themselves.

Where both spatial and temporal variation occur, two-way ANOVA can be considered where both well location and sampling event/season are treated as statistical factors. This procedure is described in Davis (1994).

2.8 Updating Background

Updating the background dataset periodically by adding recent results to an existing background dataset can improve the statistical power and accuracy of the statistical analysis, especially for non-parametric prediction intervals. The *Unified Guidance* recommends updating statistical limits (background) when at least four to eight new measurements (every 1 to 2 years under a quarterly monitoring program), are available for comparison to historical data. Professional judgement will be used to evaluate whether any background data appear to be affected by a release and need to be excluded from a background update. A t-test for equal means (if normal data distribution) or appropriate non-parametric test (if non-normal data distribution) such as a Mann-Whitney (or Wilcoxon) rank-sum or box-whisker plots, will be conducted to evaluate whether the two groups of background sample populations are statistically different prior to updating any background datasets. A 0.05 significance level will be utilized when evaluating the two populations, with the null hypothesis that they are equivalent. In addition, time series graphs or other trend evaluation statistics will be conducted on the new background dataset to verify the absence of a release or changing groundwater quality. If the tests indicate that there are no statistical differences between the two background populations, the new data will be combined with the existing dataset. If the two populations are found to be different, the data will be reviewed to evaluate the cause of the difference. If the differences appear to be caused by a release (if the new data are significantly higher, or lower for pH), then the previous background dataset may continue to be used. Furthermore, verified outliers will not be added to an existing background dataset. In accordance with the *Unified Guidance*, continual background updates will not be conducted due to the lack of sufficient samples for a statistical comparison.

3. COMPLIANCE MONITORING

Compliance monitoring is designed to monitor groundwater for evidence of a release by comparing Part 845 constituents in compliance wells to both background concentrations and the GWPS. Compliance Monitoring will begin the 1st quarter following approval of this Groundwater Monitoring Plan and issuance of the Operating Permit. The selected Compliance Monitoring statistical method used to compare compliance groundwater quality data for each constituent to the GWPS will provide for adequate statistical power, error levels and individual test false positive rates, and be appropriate for the distribution and detection frequency of the background dataset. Statistical power is the ability of a statistical test to detect a true exceedance.

In accordance with 35 I.A.C. § 845.610(b)(3)(D), compliance monitoring statistical analyses will be completed and submitted to IEPA within 60 days after completion of sampling.

3.1 GWPS Establishment and Exceedance Determination

In accordance with 35 I.A.C. § 845.600(a), the GWPS will be the constituent concentrations specified in 35 I.A.C. § 845.600(a)(1) except for when the background concentration is greater, or no concentration is specified (*i.e.,* for calcium and turbidity), in which case the GWPS will be the background concentration. The GWPS based on background concentration will be calculated using a parametric upper tolerance limit (UTL), a parametric UPL for a future mean, or a non-parametric UPL for a future median.

Statistical calculations that will be utilized in Compliance Monitoring procedures are summarized in **Table A** below and listed in **Sections 3.1.1** through **3.1.7**. Depending on the distribution of the data and the percentage of non-detects, it may be more appropriate to use a parametric model over a non-parametric model. As necessary, other techniques as mentioned in the *Unified Guidance* and/or new methods will be implemented.

Table A. Statistical Calculations Used in Compliance Monitoring Procedures

Compliance Monitoring						
Significant Trend?	Background Data			Compliance Data		
	Percent Non-Detects	Distribution	GWPS Determination	Percent Non-Detects	Distribution	Method to Determine Exceedance
No	0 ≤ 50	Normal	35 I.A.C § 845.600(a)(1) constituent concentration or The Upper Tolerance Limit	≤75	Normal	Parametric Lower Confidence Limit around a Normal Mean
				≤75	Log-Normal	Parametric Lower Confidence Limit around a Lognormal Geometric Mean
				NA	Non-Normal	Non-Parametric Lower Confidence Limit around a Median
				>75	Unknown/ Cannot be determined	
	50 ≤ 70	Normal	The Upper Prediction Limit for a Future Mean	NA	NA	Future mean
	>70	Non-Normal	Upper Prediction Limit for a Future Median	NA	NA	Future median
	100	Non-Normal	Double Quantification Rule	NA	NA	Individual Retesting Values
Yes	0 ≤ 50	Normal	UCL of Confidence Band around Linear Regression	≤75	Residuals after subtracting trend are normal, equal variance	Lower Limit from Confidence Band around Linear Regression
	50 ≤ 100	Non-Normal	UCL of Confidence Band around Thiel-Sen trend line	≤75	Residuals not normal	Lower Limit from Confidence Band around Thiel-Sen

3.1.1 The Upper Tolerance Limit

The UTL will be used to calculate the GWPS when pooled background data are normally distributed, with a non-detect frequency of 50 percent or less. When non-detect frequency is 15 percent or less, half the RL will be substituted for non-detects. The *Unified Guidance* recommends 95 percent confidence level and 95 percent coverage (95/95 tolerance interval).

- When non-detect frequency is 15 percent or less, half the RL will be substituted for non-detects (simple substitution), and the normal mean and standard deviation will be calculated.

- The Kaplan-Meier or the ROS method will be used when the detection frequency is between 15 percent and 50 percent. The Kaplan-Meier method assesses the linearity of a censored probability plot to determine whether the background sample can be approximately normalized. If so, then the Kaplan-Meier method will be used to compute estimates of the mean and standard deviation adjusted for the presence of left-censored values. The Kaplan-Meier or ROS estimate of the mean and standard deviation will be substituted for the sample mean and standard deviation.
- If background normality cannot be achieved, non-parametric UTLs will not be calculated until a minimum of 60 background samples have been collected (to achieve 95 percent coverage).

The parametric UTL on a future mean will be calculated from the background dataset as follows:

$$UTL = \overline{x} + \kappa\,(n, \gamma, \alpha - 1) \cdot s$$

$\overline{x}$ = background sample mean

s = background sample standard deviation

$\kappa\,(n, \gamma, \alpha - 1)$ = one-sided normal tolerance factor based on the chosen coverage (γ) and confidence level (α -1) and the size of the background dataset (n). Values are tabulated in Table 17-3 in Appendix D of the *Unified Guidance*. If exact values are not provided, then κ values can be estimated by linear interpolation.

If the UTL is constructed on the logarithms of original observations to achieve normality, where $\overline{y}$ and s_y are the log-mean and log-standard deviation, the limit will be exponentiated for back-transformation to the concentration scale as follows:

$$UTL = \exp\left[\overline{y} + \kappa\,(n, \gamma, \alpha - 1) \cdot s_y\right]$$

$\overline{y}$ = background sample log-mean

s_y = background sample log-standard deviation

When the GWPS is based on the 35 I.A.C. § 845.600(a)(1) constituent concentrations or a UTL derived from the background dataset, an exceedance in compliance wells relative to the GWPS will be evaluated using confidence intervals. A confidence interval defines the upper and lower bound of the true mean of a constituent concentration in groundwater within a specified confidence range.

- Non-detects in compliance data will be handled similarly to upgradient analyses, with half the RL substituted for non-detects when the frequency is 15 percent or less.
- The Kaplan-Meier, or the ROS method, will be used when the detection frequency is between 15 percent and 50 percent to compute estimates of the mean and standard deviation adjusted for the presence of left-censored values. These estimates will then be substituted for the sample mean and standard deviation.

Once the GWPS is established for background data using the UTL, either parametric or non-parametric confidence intervals will be computed for each constituent in compliance wells to identify GWPS exceedances.

3.1.2 Parametric Confidence Intervals around a Mean

If compliance data are approximately normal, one-sided parametric confidence intervals around a sample mean will be constructed for each constituent and well pair. The lower confidence limit (LCL) will be calculated as:

$$LCL_{1-\alpha} = \overline{x} - t_{1-\alpha,n-1} \cdot \frac{s}{\sqrt{n}}$$

$\overline{x}$ = compliance sample mean

s = compliance sample standard deviation

n = compliance sample size

$t_{1-\alpha,n-1}$ = obtained from a Student's t-table with (n–1) degrees of freedom (Table 16-1 in Appendix D of the *Unified Guidance*)

The chosen t value will aim to achieve both a low false-positive rate, and high statistical power. Minimum α values are tabulated in Table 22-2 of Appendix D of the *Unified Guidance*. The selected minimum α value, from which the t value will be derived, will have at least 80 percent power (1-β = 0.8) when the underlying mean concentration is twice the GWPS.

If compliance data are distributed lognormally, the LCL will be computed around the lognormal geometric mean as:

$$LCL_{1-\alpha} = \exp\left(\overline{y} - t_{1-\alpha,n-1} \cdot \frac{s_y}{\sqrt{n}}\right)$$

$\overline{y}$ = compliance sample log-mean

s_y = compliance sample log-standard deviation

3.1.3 Non-Parametric Confidence Intervals around a Median

Non-parametric confidence intervals around the median will be computed if the compliance data contain greater than 50 percent non-detects or are not normally distributed. The mathematical algorithm used to construct non-parametric confidence intervals is based on the probability (*P*) that any randomly selected measurement in a sample of n concentration measurements will be less than an unknown *P* x 100th percentile of interest (where *P* is between 0 and 1). Then the probability that the measurement will exceed the *P* x 100th percentile is (1–*P*). The number of sample values falling below the *P* x 100th percentile out of a set of n should follow a binomial distribution with parameters n and success probability *P*, where 'success' is defined as the event that a sample measurement is below the *P* x 100th percentile. The probability that the interval formed by a given pair of order statistics will contain the percentile of interest will then be determined by a cumulative binomial distribution *Bin(x;n,p)*, representing the probability of *x* or fewer successes occurring in *n* trials with success probability p. *P* will be set to 0.50 for an interval around the median.

The sample size n will be ordered from least to greatest. Given *P* = 0.50, candidate interval endpoints will be chosen by ordered data values with ranks close to the product of (n+1) x 0.50. If the result of (n+1) x 0.50 is a fraction (for even-numbered sample sizes), the rank values immediately above and below will be selected as possible candidate endpoints. If the result of (n+1) x 0.50 is an integer (for odd-numbered sample sizes), one will be added to and subtracted from the result to get the upper and lower candidate endpoints. The ranks of the endpoints will be denoted L* and U*. For a one-sided LCL, the confidence level associated with endpoint L* will be computed as:

$$1 - \alpha = Bin(L^* - 1; n, 0.50) = \sum_{x=L^*}^{n} \binom{n}{x} \left(\frac{1}{2}\right)^n$$

If the candidate endpoint(s) do not achieve the desired confidence level, new candidate endpoints (L*–1) and (U*+1) and achieved confidence levels will be calculated. If one candidate endpoint equals the data minimum or maximum, only the rank of the other endpoint will be changed. Achievable confidence levels are tabulated using these equations in Table 21-11 in Appendix D of the *Unified Guidance*.

Both parametric and non-parametric confidence limits will then be compared to the GWPS. The CCR unit is considered to be in compliance if the LCL is equal to or lower than the GWPS for all detected constituents at all compliance monitoring wells. A GWPS exceedance is determined if the LCL exceeds the GWPS.

3.1.4 The Upper Prediction Limit for a Future Mean

The parametric UPL for a future mean will be used to calculate the GWPS if the pooled background data contain 50 to 70 percent non-detects and normality can be achieved. The Kaplan-Meier or ROS methods will be used to estimate the mean and standard deviation. The non-parametric UPL for a future median will be calculated as the GWPS if background samples cannot be normalized or contain greater than 70 percent non-detects. The parametric UPL for a future mean will be calculated from the background dataset at follows:

$$UPL_{1-\alpha} = \overline{x} + \kappa s$$

$\overline{x}$ = background sample mean

s = background standard deviation

κ = multiplier based on the order (p) of the future mean to be predicted, the number of compliance wells to be tested (w), the background sample size (n) the number (c) of constituents of concern (COCs), the “1-of-m” retesting scheme, and the evaluation schedule (annual, semi-annual, quarterly). Values are tabulated in 19-5 to 19-9 in Appendix D of the *Unified Guidance*.

The mean of order p will be computed for each well and compared against the UPL. For any compliance point mean that exceeds the limit, p additional resamples may be collected at that well for a 1-of-2 retesting scheme. Resample means will then be compared to the UPL. A GWPS exceedance has been deemed to occur at a compliance well when the initial mean and all resample means exceed the UPL.

3.1.5 The Non-Parametric Upper Prediction Limit for a Future Median

The non-parametric UPL for a future median will be used to calculate the GWPS if the pooled background data contain greater than 70 percent non-detects and normality cannot be achieved. Non-parametric methods assume that the data does not have an underlying distribution. To calculate the non-parametric UPL on a future value, the target per-constituent false positive rate (α_{const}) will be determined as follows:

$$\alpha_{const} = 1 - (1 - \alpha)^{1/c}$$

α = the site-wide false positive rate (SWFPR) of 0.10 recommended by the *Unified Guidance*

c = the number of monitoring constituents

The number of yearly statistical evaluation (nE) will be multiplied by the number of compliance wells (w) to determine the look-up table entry, w*. The background sample size (n) and w* will be used to select an achievable per-constituent false positive rate value in Table 19-24 of Appendix D in the *Unified Guidance*. The chosen achievable per-constituent false positive rate value will determine the type of non-parametric prediction limit (maximum or 2nd highest value in background) and a retesting scheme for a future median. The background data will be sorted in ascending order, and the upper prediction limit will be set to the appropriate order statistic previously determined by the achievable per-constituent false positive rate value in Table 19-24. If all constituent measurements in a background sample are non-detect, the Double Quantification rule will be used. The use of the Double Quantification rule in Compliance Monitoring will only be applicable if the RL is above the 35 I.A.C. § 845.600(a)(1) constituent concentration or a constituent concentration is not specified in § 845.600(a)(1). This scenario is highly unlikely. The constituent will also be removed from calculations identifying the target false positive rate.

Two initial measurements per compliance well will be collected. If both do not exceed the upper prediction limit, a third initial measurement will not be collected since the median of order 3 will also not exceed the limit. If both exceed the prediction limit, a third initial measurement will not be collected since the median will also exceed the limit. If one initial measurement is above and one below the limit, a third initial observation may be collected to determine the position of the median relative to the UPL. Up to three resamples will be collected in order to assess the resample median. In all cases, if two or more of the compliance point observations are non-detect, the median will be set equal to the RL. The median value for each compliance well will be compared to the UPL. For the 1-of-2 retesting scheme, if any compliance point median exceeds the limit, up to three additional resamples will may be collected from that well. The resample median will be computed and compared to the UPL. A GWPS exceedance has been deemed to occur at a compliance well when either the initial median, or both the initial median and resample median exceed the UPL.

If the concentrations of detected constituents are below the established GWPS, Compliance Monitoring will continue.

3.1.6 Parametric Linear Regression and Confidence Band

If the t-test detects a significant trend in the parametric linear regression line using either background or compliance data for a particular constituent, confidence bands accounting for trends will be constructed to account for the trend-induced variation. If this is not accounted for, a wider confidence interval will inevitably be calculated for a given confidence level and sample size (n). A wider confidence interval will result in less statistical power, or ability to demonstrate an exceedance or return to compliance. When a linear trend line has been estimated, a series of confidence intervals is estimated at each point along the trend. This creates a simultaneous confidence band that follows the trend line. As the underlying population mean increases or decreases, the confidence band does also to reflect this change at that point in time.

Linear regression will be used when background or compliance data are approximately normally distributed, with a constant sample variance around the mean, and the frequency of non-detects is low. The linear regression of concentration against sampling date (time) will be computed as follows:

$$\hat{b} = \sum_{i=1}^{n} (t_i - \overline{t}) \cdot x_i / (n-1) \cdot s_t^2$$

x_i = i^{th} concentration value and

t_i = i^{th} sampling date

$\overline{t}$ = sampling mean date

s_t^2 = variance of the sampling dates

This estimate leads to the following regression equation:

$$\hat{x} = \overline{x} + \hat{b} \cdot (\mathrm{t} - \overline{t})$$

$\overline{x}$ = mean concentration level

$\hat{x}$ = estimated mean concentration at time t

The regression residuals will also be computed at each sampling event to ensure uniformity and lack of significant skewness. Regression residuals will be computed at each sampling event as follows:

$$r_i = x_i - \hat{x}_i$$

The estimated variance around the regression line, or mean squared error (MSE) will be computed as follows:

$$s_e^2 = \frac{1}{n-2} \sum_{i=1}^{n} r_i^2$$

The confidence intervals around a linear regression trend line given confidence level (1-α) and a point in time (t_0), will be computed as follows:

$$LCL_{1-\alpha} = \hat{x}_0 - \sqrt{2s_e^2 \cdot F_{1-2\alpha,2,\mathrm{n}-1} \cdot \left[\frac{1}{n} + \frac{\left(t_0 - \overline{t}\right)^2}{(n-1) \cdot s_t^2}\right]}$$

$$UCL_{1-\alpha} = \hat{x}_0 - \sqrt{2s_e^2 \cdot F_{1-2\alpha,2,\mathrm{n}-2} \cdot \left[\frac{1}{n} + \frac{\left(t_0 - \overline{t}\right)^2}{(n-1) \cdot s_t^2}\right]}$$

$\hat{x}_0$ = estimated mean concentration from the regression equation at time t_0

$F_{1-2\alpha,2,\mathrm{n}-2}$ = upper $(1\text{-}2\alpha)^{th}$ percentage point from an F-distribution with 2 and (n-2) degrees of freedom

For background data, the UCL around the linear regression line will be used as the GWPS for the trending constituent. For compliance data, confidence bands around the linear regression line will be compared to the GWPS. The CCR unit is considered to be in compliance if the LCL is equal to or lower than the GWPS for all detected constituents at all compliance wells. A GWPS exceedance is determined when the LCL based on the trend line first exceeds the GWPS.

3.1.7 Non-Parametric Thiel-Sen Trend Line and Confidence Band

If the Mann-Kendall test detects a significant trend in the non-parametric Thiel-Sen line using either background or compliance data for a particular constituent, confidence bands accounting for trends will be constructed to account for the trend-induced variation. The Thiel-Sen trend line will be used as a non-parametric alternative to linear regression when trend residuals cannot be normalized or if there are a higher percentage of non-detects in either background or compliance data. The Thiel-Sen trend line estimates the median concentration over time by combining the median pairwise slope with the median concentration value and the median sample date. To compute the Thiel-Sen line, the data will first be ordered by sampling event x1, x2, xn. All possible distinct pairs of measurements (x_i, x_j) for j > i will be considered and the simple pairwise slope estimate will be computed for each pair as follows:

$$m_{ij} = (x_j - x_i)/(j - i)$$

With a sample size of n, there will be a total of N = n(n-1)/2 pairwise estimates (m_{ij}). If a given observation is a non-detect, half the RL will be substituted. The N pairwise slope estimates (m_{ij}) will be ordered from least to greatest (renamed m(1), m(2),..m(N)). The Thiel-Sen estimate of slope (Q) will be calculated as the median value of the list depending on whether N is even or odd as follows:

$$Q = \begin{cases} m_{([N+1]/2)} \; if \; N \; is \; odd \\ (m_{(N/2)} + m_{([N+2]/2)})/2 \; if \; N \; is \; even \end{cases}$$

The sample concentration magnitude will be ordered from least to greatest, x(1), x(2), to x(n) and the median concentration will be calculated as follows:

$$\tilde{x} = \begin{cases} x_{([n+1]/2)} \; if \; n \; is \; odd \\ (x_{(n/2)} + x_{([n+2]/2)})/2 \; if \; n \; is \; even \end{cases}$$

The median sampling date ($\tilde{t}$) with ordered times (t(1), t(2), to t(n)) will also be determined in this way. The Thiel-Sen trend line will then be computed for an estimate at any time (t) of the expected median concentration (x) as follows:

$$x = \tilde{x} + Q \cdot (\mathrm{t} - \tilde{t}) = (\tilde{x} - Q \cdot \tilde{t}) + Q \cdot \mathrm{t}$$

To construct a confidence band around the Thiel-Sen line, sample pairs (ti, xi) will be formed with a sample date (ti) and the concentration measurement from that date (xi). Bootstrap samples (B) will be formed by repeatedly sampling n pairs at random with replacement from the original sample pairs. This will be repeated 500 times. For each bootstrap sample, a Thiel-Sen trend line will be constructed using the equation above. A series of equally spaced time points (tj) will be identified along the range of sampling dates represented in the original sample, j =1 to m. The Thiel-Sen trend line associated with each bootstrap replicate will be used to compute an estimated concentration ($\hat{x}_j^B$). An LCL will be constructed for the lower α^{th} percentile $\hat{x}_j^{[\alpha]}$ from the distribution of estimated concentrations at each time point (tj). For a UCL, compute the upper (1-α)th percentile, $\hat{x}_j^{[1-\alpha]}$ at each time point (tj).

For background data, the UCL around the Thiel-Sen trend line will be used as the GWPS for the trending constituent. For compliance data, confidence bands around the Thiel-Sen trend line will be compared to the GWPS. The CCR unit is considered to be in compliance if the LCL is equal to or lower than the GWPS for all detected constituents at all compliance wells. A GWPS exceedance is confirmed when the LCL based on the trend line first exceeds the GWPS.

3.2 Determination of Statistically Significant Increases over Background

In accordance with 35 I.A.C. §§ 845.610(b)(3)(B) and 845.640(h), individual monitoring event concentrations for each constituent detected in the compliance monitoring wells during compliance monitoring sampling events will be compared to the background concentration as determined by the methods described above. An exceedance of the background concentration for any constituent measured at any compliance monitoring well, or constituent detection if not detected in the background samples, constitutes a Statistically Significant Increase (SSI). An exception to this method is pH, where two-sided (upper and lower) tolerance limits are established from the distribution of the background groundwater quality data. An exceedance of either the UTL or lower tolerance limit (LTL) would constitute an SSI for pH.

4. REFERENCES

Davis, C.B., 1994. *Environmental Regulatory Statistics.* In GP Patil & CR Rao (Eds.) *Handbook of Statistics, Volume 12: Environmental Statistics*, Chapter 26. New York: Elsevier Science B.V.

United States Environmental Protection Agency (USEPA), 2009. *Statistical Analysis of Groundwater Monitoring Data at RCRA Facilities: Unified Guidance*. EPA 530-R-09-007. March 2009.

Electronic Filing: Received, Clerk's Office 03/26/2024

ATTACHMENT J

October 2021

Memorandum

BURNS McDONNELL

Date: 25 October 2021

Subject: IEPA Part 845 – Slope Maintenance Documentation for Ash Pond at Newton Power Plant

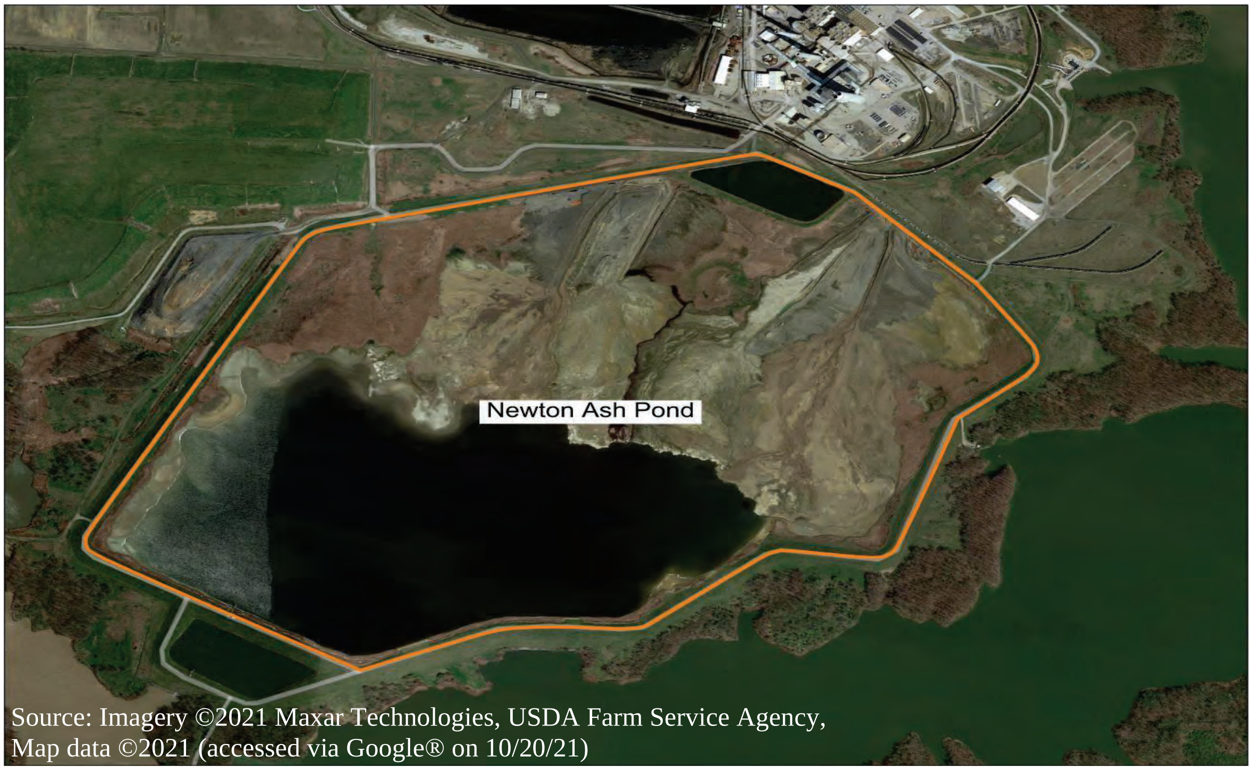
Illinois Power Generating Company operates the coal-fired Newton Power Plant located in Jasper County, Illinois. The Newton Ash Pond is an inactive surface impoundment storing coal combustion residuals (CCR). The requirements for the Newton Ash Pond are found in 35 Ill. Admin. Code Part 845, Standards for the Disposal of Coal Combustion Residuals in Surface Impoundments (Part 845).

Pursuant to Part 845, Section 845.230(d)(2)(F), the initial operating permit application for existing or inactive CCR surface impoundments that have not completed an Agency approved closure before prior to July 30, 2021, must contain documentation that the CCR surface impoundment, if not incised, will be operated, and maintained with one of the forms of slope protection specified in Section 845.430. This statement addresses the requirements of Part 845, Section 845.430 Slope Maintenance, which states:

> Section 845.430: *The slopes and pertinent surrounding areas of the CCR surface impoundment must be designed, constructed, operated, and maintained with one of the forms of slope protection specified in subsection (a) that meets all the performance standards of subsection (b).*
>
> Section 845.430(a): *Slope protection must consist of one of the following: 1) A vegetative cover consisting of grassy vegetation; 2) An engineered cover consisting of a single form or combination of forms of engineered slope protection measures; or 3) A combination of the forms of cover specified in subsections (a)(1) or (a)(2).*
>
> Section 845.430(b): *Any form of cover for slope protection must meet the following performance standards: 1) The cover must be installed and maintained on the slopes and pertinent surrounding areas of the CCR surface impoundment; 2) The cover must provide protection against surface erosion, wave action, and adverse effects of rapid drawdown; 3) The cover must be maintained to allow for the observation of, and access to, the slopes and pertinent surrounding areas during routine and emergency events; 4) Woody vegetation must be removed from the slopes or pertinent surrounding areas. Any removal of woody vegetation with a diameter greater than 1⁄2 inch must be directed by a person familiar with the design and operation of the CCR surface impoundment and in consideration of the complexities of removal of a tree or a shrubbery, who must ensure the removal does not create a risk of destabilizing the CCR surface impoundment or otherwise adversely affect the stability and safety of the CCR surface impoundment or*

> *personnel undertaking the removal; and 5) The height of vegetation must not exceed 12 inches.*

Slope protection, consisting of vegetative cover, was installed on the slopes and pertinent surrounding areas of the Newton Ash Pond, and is inspected, maintained and repaired as needed. Based on observations from weekly inspections conducted in accordance with Section 845.540(a), and the 2020 annual inspections conducted by Hanson Professional Services Inc., the vegetative cover is described to be in good working condition with a maximum vegetation height of 12 inches. The owner's Operations and Maintenance Plan (O&M Plan) provides details for maintaining grass and removing woody vegetation and addressing erosion features on the slopes. Based on a review of the documentation described above, the owner is implementing the O&M Plan, including the completion of repairs and maintenance as needed and when issues are identified during weekly and/or annual inspections. The slope maintenance portion of the O&M Plan and the Annual Inspection performed by Hanson in 2020 are included in Attachment J. The surface impoundment slope protection (vegetative cover) installed and maintained on the slopes and pertinent areas around the slopes is depicted in the aerial photograph provided below.



Source: Imagery ©2021 Maxar Technologies, USDA Farm Service Agency,
Map data ©2021 (accessed via Google® on 10/20/21)

Excerpt from the Newton Operations and Maintenance Manual

1.1 Maintenance Program - The plant's impoundment and flood prevention structures shall be inspected and maintained in a manner to ensure safe and environmentally responsible operations. A regular maintenance program shall be performed and shall consist of the following inspection items:

1. Earth embankments: Walk the crest, side slopes, and downstream toe of the dam concentrating on surface erosion, seepage, cracks, settlement, slumps, slides, and animal burrows. Frequency of inspection: Quarterly.
2. Vegetation: Grass should be a thick vigorous growth to stabilize the earth embankment soils and prevent erosion form occurring. Note the height of the grass, if greater than 1-foot a mowing of the area should be scheduled before the next inspection. There should be NO trees on the earth embankment and none within a minimum of 20 feet of the embankment toe or other structures. Frequency of inspection: Weekly.
3. Pond Outlet Structure: Check for any debris or other obstructions around the concrete inlet which may block or restrict the flow of water. Check for the development of any rusty areas on the concrete, and seepage, cracking, breaking, or spalling of concrete. Check for settlement or cracking in the walkway structure. Frequency of inspection: Monthly.
4. Outlet Pipe Slide Gate: Check the structure for development of any rusty areas on the concrete, and seepage, cracking, breaking, or spalling of concrete. Check the slide gate stem, grease the stem, and operate the slide gate through its full range of motion to ensure proper operation. Check for buildup of debris in the manhole. Frequency of inspection: Quarterly.
5. Pond/Levee Perimeter: Check the perimeter of the embankment and levee for a distance of at least 100 feet from the toe for signs of seepage or boils. Inspection frequency for levee will be determined by Dam Safety Engineer during flood events. Frequency of ash pond embankment inspection: Quarterly for ash pond embankment.
6. Special Inspections – Special inspections of ash pond berms shall be performed after earthquakes, floods, water level exceedance in the ponds, or heavy rainfall events. Inspection and report shall be equal to an annual inspection level of detail. Water level in the pond should be noted after a heavy rainfall. Dam Safety staff shall accompany plant personnel on special inspections. Frequency: As required.

HANSON
Engineering | Architecture | Planning | Allied Services

Hanson Professional Services Inc.
1525 South 6th Street
Springfield, Illinois 62707
(217)788-2450
Fax: (217) 788-5241
www.hanson-inc.com

December 4, 2020

Jason Campbell
Dam Safety Manager
Operations Support
Dynegy Inc.
133 South 4th Street, Suite 306
Springfield, Illinois 62701-1232

RE: Report on Dam Inspections
Dynegy Midwest Generation
6725 N.500th Street
Newton, IL 62448

Dear Mr. Campbell:

The reports prepared for the 2020 inspections of the Newton Lake Dam, Ash Pond, Supplemental Cooling Pond, Landfill, and Butler Pond are attached. Data from the survey and monitoring completed during the past year for the Newton Lake Dam are also attached. Items requiring minor maintenance and observation are noted and summarized below. Please forward a copy of the inspection forms and photographs for permitted dams to the IDNR-OWR as required by your operation permits.

Summary of items requiring observation or maintenance:

Newton Lake Dam

- Repair slab in chute above stilling basin. Fill joint where wall meets slab on west side of chute and observe for deterioration of concrete. Repair joint in slab at stilling basin.
- Remove displaced riprap from outlet channel to allow stilling basin to drain to normal tail water level.
- Observe surface cracking in slab of chute and repair if condition deteriorates.
- Fill holes adjacent/under all concrete ditches.
- Remove woody vegetation growing adjacent to spillway chute and stilling basin.
- Remove woody vegetation in riprap at stilling basin outlet.
- Spray/remove vegetation growing on walls of spillway.
- Extend drain outlet in west ditch past joint.
- Repair drain conduit valve or revise O&M plan to delete references to drain.
- Instruct mowers to avoid driving on paved ditches – mower could fracture concrete ditch where there are voids under ditch.
- Repair damaged piezometer and witness post.

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Ash Pond

- Remove woody vegetation from upstream slope – primary and secondary ponds.
- Repair minor erosion in embankment ditches on south downstream slope.
- Repair slides/bench erosion on interior slopes – primary pond.
- Repair bench erosion on interior slopes – secondary pond.

Supplemental Cooling Pond

- Remove woody vegetation adjacent to spillway.
- Operate gate on a regular schedule.

Butler Pond

- Mow on regular schedule.

Landfill

- Mow on regular schedule.

Please contact me if you have any questions.

Sincerely,

HANSON PROFESSIONAL SERVICES INC.

James P. Knutelski, P.E.
Geotechnical Engineer

Dam Inspection Report

Name of Dam: Newton Power Station Ash Pond — Dam ID No. NA

Permit Number: NA — Class of Dam: II

Location — Section: 25 & 26 — Township: 5N — Range: 8E

Owner:
Name: Dynegy Midwest Generation
Telephone Number (Day): 618-783-0395

Street: 6725 N. 500th Street
Telephone Number (Night): 618-783-0395

City: Newton — Zip Code: 62448 — County: Jasper

Type of Dam: Earth Embankment

Type of Spillway: Drop inlet with conduit outflow

Date(s) Inspected: 29-Oct-20

Weather When Inspected: Cloudy

Temperature When Inspected: 60 F

Pool Elevation When Inspected: 535.9

Tailwater Elevation When Inspected: 504.3

LICENSED PROFESSIONAL ENGINEER
JAMES P. KNUTELSKI
062-054206
OF ILLINOIS

12/4/2020

Professional Engineer's Seal

EXP 11/30/21

Inspection Personnel:

Name	Title
James Knutelski, P.E.	Geotechnical Engineer
Jason Campbell, P.E.	Dynegy Dam Safety Manager
Paul Mauer, P.E.	IDNR-OWR

The Department of Nautural Resources is requesting information that is necessary to accomplish the statutory purpose as outlined under the River, Lakes and Streams Act, 615 ILCS 5. Submittal of this information is REQUIRED. Failure to provide the required information could result in the initiation of non-compliance procedures as outlined in Section 3702.160 of the "Rules for Construction and Maintenance of Dams".

CONDITION CODES

NE -	No evidence of a problem
GC -	Good condition
MM -	Item needing minor maintenance and/or repairs within the year, the safety or integrity of the item is not yet imperiled
IM -	Item needing immediate maintenance to restore or ensure its safety or integrity
EC -	Emergency condition which if not immediately repaired or other appropriate measures taken could lead to failure of the dam
OB -	Condition requires regular observation to ensure that the condition Earth Embankment
NA -	Not applicable to this dam
NI -	Not inspected - list the reason for non-inspection under deficiencies

EARTH EMBANKMENT

ITEM	CONDITION CODE	DEFICIENCIES	RECOMMENDED REMEDIAL MEASURES AND IMPLEMENTATION SCHEDULE
Surface Cracks	NE		
Vertical and Horizontal Alignment of Crest	GC		
Unusual Movement or Cracking At or Beyond Toe	NE		
Sloughing or Erosion of Embankment and Abutment Slopes	MM	Sloughing of upstream slope east of secondary pond and in secondary pond. Minor bench erosion of upstream slope in primary and secondary pond.	Repair erosion on upstream slopes - primary and secondary ponds.
Upstream Face Slope Protection	NA		
Seepage	NE		
Filter and Filter Drains	NA		

EARTH EMBANKMENT
(Continued)

ITEM	CONDITION CODE	DEFICIENCIES	RECOMMENDED REMEDIAL MEASURES AND IMPLEMENTATION SCHEDULE
Animal Damage	NE		
Embankment Drainage Ditches	OB	Minor erosion in ditches - south side of pond.	Repair and/or install slope protection if condition deterioates - no photograph.
Vegetative Cover	MM	Small woody vegetation on upstream slope in primary and secondary ponds where mowing has not been completed - typical for embankment.	Remove woody vegetation from upstream slope.
Erosion	NE		
Other			
Other			
Other			

PRINCIPAL SPILLWAY

X Drop Inlet Spillway ☐ Overflow Spillway Structure ☐ Gated

ITEM	CONDITION CODE	DEFICIENCIES	RECOMMENDED REMEDIAL MEASURES AND IMPLEMENTATION SCHEDULE
Erosion, Spalling, Cavitation	NE		
Structure to Embankment Junction	GC		
Drains	NA		
Seepage Around or Into Structure	NE		
Surface Cracks	NE		
Structural Cracks	NE		

IF THE SPILLWAY IS GATED FILL OUT THE GATES SECTION

PRINCIPAL SPILLWAY
(Continued)

X Drop Inlet Spillway ☐ Overflow Spillway Structure ☐ Gated

ITEM	CONDITION CODE	DEFICIENCIES	RECOMMENDED REMEDIAL MEASURES AND IMPLEMENTATION SCHEDULE
Alignment of Abutment Walls	NA		
Construction Joints	NE		
Filter and Filter Drains	NA		
Trash Racks	NA		
Bridge and Piers	GC		
Differential Settlement	NE		
Other (Debris)			

IF THE SPILLWAY IS GATED FILL OUT THE GATES SECTION

PRINCIPAL SPILLWAY
(Continued)

X Conduit ☐ Gated

ITEM	CONDITION CODE	DEFICIENCIES	RECOMMENDED REMEDIAL MEASURES AND IMPLEMENTATION SCHEDULE
Erosion, Spalling, Cavitation	NE		
Joint Separation	NE		
Seepage Around of Into Conduit	NE		
Surface Cracks	NE		
Structural Cracks	NE		
Trash Racks	NA		
Differential Settlement	NE		
Alignment	GC		
Other (Name)			

IF THE SPILLWAY IS GATED FILL OUT THE GATES SECTION

PRINCIPAL SPILLWAY

X Principal Spillway ☐ Dewatering ☐ Other: ____________

ITEM	CONDITION CODE	DEFICIENCIES	RECOMMENDED REMEDIAL MEASURES AND IMPLEMENTATION SCHEDULE
Gate Sill	GC		
Gate Seals	GC		
Gate and Frame	GC		
Operating Machinery	NA		
Emergency Operating Machinery	NA		
Other (Name)			
Other			

OUTLET WORKS
IF SEPARATE FROM PRINCIPAL SPILLWAY STRUCTURE

ITEM	CONDITION CODE	DEFICIENCIES	RECOMMENDED REMEDIAL MEASURES AND IMPLEMENTATION SCHEDULE
Erosion, Spalling, Cavitation	NA		
Joint Separation	NA		
Seepage Around or Into Conduit	NA		
Intake Structure	NA		
Outlet Structure	NA		
Outlet Channel	NA		
Riprap	NA		
Other (Name)			
Other			

NA to this dam

ENERGY DISSIPATOR

☐ Principal Spillway ☐ Outlet Works

Type: Outlet into secondary pond

ITEM	CONDITION CODE	DEFICIENCIES	RECOMMENDED REMEDIAL MEASURES AND IMPLEMENTATION SCHEDULE
Erosion, Spalling, Cavitation			
Structure to Embankment Junction			
Construction Joints			
Surface Cracks			
Structural Cracks			
Differential Alignment			
Expansion and Contraction Joints			

NA to this dam

EMERGENCY SPILLWAY

☐ Earth Other: Name ____________________

ITEM	CONDITION CODE	DEFICIENCIES	RECOMMENDED REMEDIAL MEASURES AND IMPLEMENTATION SCHEDULE
Erosion			
Weeds, Logs, Other Obstructions			
Side Slope Sloughing			
Vegetation			
Sedimentation			
Riprap			
Settlement of Crest			
Downstream Channel			
Other (Name)			

SUMMARY OF MAINTENANCE DONE AND/OR

REPAIRS MADE SINCE THE LAST INSPECTION

DATE OF PRESENT INSPECTION	29-Oct-2020
DATE OF LAST INSPECTION	3-Oct-2019

1. EARTH EMBANKMENT DAMS
   Mowing completed. Removed gravel from primary pond overflow outlet.

2. CONCRETE MASONRY DAMS
   NA

3. PRINCIPAL SPILLWAY
   None.

4. OUTLET WORKS
   None

5. EMERGENCY SPILLWAY
   NA

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East downstream slope

East crest and upstream slope

North downstream slope

North interior and crest

West upstream slope – remove woody vegetation

West downstream slope

South downstream slope

South upstream slope and crest

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Sloughing & bench erosion of upstream slope –primary pond – repair

Interior of secondary pond

ATTACHMENT K

POST-CLOSURE PLAN FOR EXISTING CCR SURFACE IMPOUNDMENT
40 C.F.R. § 257.104 rule and 35 I.A.C. 845.780
REV 0 – 10/30/2021

SITE INFORMATION

Site Name / Address	Newton Power Plant / 6725 North 500th Street, Newton, IL 62448		
Owner Name / Address	Illinois Power Generating Company / 6555 Sierra Drive Irving, Texas 75039		
CCR Unit	Primary Ash Pond	Closure Method and Final Cover Type	Close In-Place Clayey Soil Cover with Vegetation

POST-CLOSURE PLAN DESCRIPTION

40 C.F.R. § 257.104(c)(1) and 35 I.A.C. 845.780(c)(1) – Length of post-closure care period.	Post-closure care will be conducted for a period of 30 years as required by 40 C.F.R. § 257.104(c)(1) and 35 I.A.C. 845.780(c)(1), except as provided by 40 C.F.R. § 257.104(c)(2) and 35 I.A.C. 845.780(c)(2).
40 C.F.R. § 257.104(c)(2) and 35 I.A.C. 845.780(c)(2) – Circumstances extending the post closure care period.	If at the end of the post-closure care period the CCR unit is operating under assessment monitoring in accordance with §257.95, the post-closure care as described in this plan will continue until returning to detection monitoring in accordance with §257.95. Under 35 I.A.C. 845.780(c)(2), the post-closure care period will be extended until groundwater monitoring data demonstrate that concentrations are below the groundwater protection standards in Section 845.600 and are not increasing for those constituents over background, using the statistical procedures and performance standards in Section 845.640(f) and (g), provided that concentrations have been reduced to the maximum extent feasible and concentrations are protective of human health and the environment.
40 C.F.R. § 257.104(d)(1)(i) and 35 I.A.C. 845.780(d)(1)(A) – A description of the monitoring and maintenance activities required in 40 C.F.R. § 257.104(b) and 35 I.A.C. 845.780(b), and the frequency at which these activities will be performed, to maintain the integrity and effectiveness of the final cover system, maintain the groundwater monitoring system and monitor the groundwater.	Pursuant to § 257.104(b)(1) and 35 I.A.C. 845.780(b)(1), throughout the post-closure care period, periodic visual observations of the final cover system and stormwater management system will be performed at least annually for evidence of settlement, subsidence, erosion, or other damage that may adversely affect the integrity and effectiveness of the final cover system. When practical, visual observations of the final cover will be made concurrent with groundwater monitoring activities. Noted evidence of damage, such as rills, surface cracks and settlement, will be repaired to maintain the integrity and effectiveness of the final cover system. Vegetation will be established and maintained on the final cover system, including storm drainage areas, where appropriate, to provide long-term erosion control. Established vegetation and the slope design of the final cover system will prevent potential erosion and damage that may be caused by run-on and run-off.

	Repair activities may include, but are not limited to, replacing and compacting soil cover, repairing drainage channels that have been eroded, filling in depressions with soil, regrading, and reseeding areas of failed vegetation, as necessary. Pursuant to § 257.104(b)(3) and 35 I.A.C. 845.780(b)(3), the groundwater monitoring system will be maintained, and groundwater will be monitored as required by 40 C.F.R. § 257.90 through 40 C.F.R. § 257.98 and 35 I.A.C. 845.600 through 35 I.A.C. 845.680. Monitoring wells will be inspected during each groundwater sampling event. Monitoring wells and associated instrumentation will be maintained so that they perform to the design specifications throughout the life of the monitoring program. Groundwater monitoring frequency will be at least quarterly, except as provided in 40 C.F.R. § 257.94(d) and 35 I.A.C. 845.650(b)(4).
40 C.F.R. § 257.104(d)(1)(ii) and 35 I.A.C. 845.780(d)(1)(B) – The name, address, telephone number and email address of the person or office to contact about the facility during the post-closure care period.	Illinois Power Generating Company 6555 Sierra Drive Irving, Texas 75039 800.633.4704 ccr@dynegy.com
40 C.F.R. § 257.104(d)(1)(iii) and 35 I.A.C. 845.780(d)(1)(C) – A description of the planned uses of the property during the post-closure period.	The CCR unit is located at an operating electric generation facility. Planned uses of the property during the post-closure period are currentlyunknown, except for post-closure care of the CCR unit. Post-closure use of the property will not disturb the integrity of the final cover system or other components of the containment system, or the function of the monitoring systems unless necessary to comply with the requirements of 40 C.F.R. Part § 257, Subpart D and 35 I.A.C. Part 845. Any other disturbance will be conducted following a demonstration that it will not increase the potential threat to human health or the environment as required by 40 C.F.R. § 257.104(d)(1)(iii) and 35 I.A.C. 845.780 (d)(1)(C). The demonstration will be certified by a qualified professional engineer and submitted to the Illinois Environmental Protection Agency (IEPA). Per 40 C.F.R. § 257.104(d)(1)(iii) notification shall be provided to the State Director that the demonstration has been placed in the operating record and on the owners or operator's publicly accessible internet site. Following closure of the CCR unit, a notation on the deed to the property, or some other instrument that is normally examined during title search, will be recorded in accordance with 40 C.F.R. § 257.102(i) and 35 I.A.C. 845.760(h). The notation will notify potential purchasers of the property that the land has been used as a CCR unit and its use is restricted under the post- closure care requirements in 40 C.F.R. § 257.104(d)(1)(iii) and 35 I.A.C. 845.780(d)(1)(C) or groundwater monitoring requirements per 35 I.A.C. 845.740(b). Within 30 days of recording the deed notation, a notification stating that the notation has been recorded will be submitted to the IEPA and placed in the facility's operating record per 35 I.A.C. 845.760(h)(3). The notification will be placed on the owner or operator's publicly accessible CCR Web site in accordance with 40 C.F.R. § 257.107(i)(9) and 35 I.A.C. 845.810(e) and placed in the facility's operating record as required by 35 I.A.C. 845.800(d)(26) and §257.105(i)(9).

40 C.F.R. § 257.104(d)(3)and 35 I.A.C. 845.780(d)(3) – Amendments to the initial or subsequent written post-closure plan.	Pursuant to 40 C.F.R. § 257.104(d), the initial post closure care plan for the Newton Primary Ash Pond was prepared on October 17, 2016. That plan is being amended pursuant to 40 C.F.R. § 257.104(d)(3)(i). This plan also serves as the initial post-closure care plan, prepared in accordance with 35 I.A.C. 845.780(d). Pursuant to § 257.104(d)(3) and 35 I.A.C. 845.780(d)(3), an operating permit modification application to amend the initial or any subsequent written post-closure care plan developed under 35 I.A.C. 845.780 (d)(1) and § 257.104(d)(1) will be submitted to IEPA. The written post-closure care plan will be amended whenever there is a change in the operation of the CCR surface impoundment that would substantially affect the written post-closure care plan in effect; or unanticipated events necessitate a revision of the written post-closure care plan, after post-closure activities have started. The written post-closure care plan will be amended at least 60 days before a planned change in the operation of the facility or CCR surface impoundment, or within 60 days after an unanticipated event requires the need to revise the existing plan. If the plan is revised after post-closure activities have started, a request to modify the operating permit, including an amended written post-closure care plan, will be submitted to the IEPA within 30 days following the triggering event.
40 C.F.R. § 257.104(d)(4) and 35 I.A.C. 845.780(d)(4) – Qualified professional engineering certification.	Certification by a qualified professional engineer will be appended to this plan and any amendment of this plan.
35 I.A.C. 845.780(e) – Termination of post-closure care	Upon completion of the post-closure period, a request to terminate post-closure care will be submitted to the IEPA. The request will include a certification by a qualified professional engineer verifying that post-closure care has been completed in accordance with the post-closure care plan specified in 35 I.A.C.845.780(d) and the requirements of 35 I.A.C. 845.780.
40 C.F.R. § 257.104(e) and 35 I.A.C. 845.780(f) – Notification of completion of the post-closure care period.	A notification of completion of post-closure care will be prepared and placed in the facility's operating record within 30 days after IEPA approval of the request to terminate post-closure care. The notification will be placed in the facility's operating record in accordance with 35 I.A.C. 845.800(d)(31) and § 257.105(i)(13). The notification will be placed on the owner or operator's publicly accessible CCR Internet site in accordance with the requirements of § 257.107(i)(13) and 35 I.A.C. 845.810(e). The IEPA will be notified when the notification has been placed in the operating record and on the owner or operator's publicly accessible Internet site in accordance with the requirements of § 257.106(i)(13).

Certification Statement 40 C.F.R. § 257.104 (d)(4) and 35 I.A.C. 845.780(d)(4) – Amended/Initial Written Post Closure Plan for a CCR Surface Impoundment

CCR Unit: Dynegy Midwest Generation, LLC; Newton Power Plant; Primary Ash Pond

I, John R. Hesemann, being a Registered Professional Engineer in good standing in the State of Illinois, do hereby certify, to the best of my knowledge, information, and belief, that the information contained in this certification has been prepared in accordance with the accepted practice of engineering. I certify, for the above referenced CCR Unit, that the information contained in the amended/initial written post closure plan, dated October 30, 2021, meets the requirements of 40 C.F.R. § 257.104 and 35 I.A.C.845.780.

John R. Hesemann

Printed Name

10/18/2021

Date

JOHN ROBERT HESEMANN
062-058523
LICENSED PROFESSIONAL ENGINEER OF ILLINOIS

John R. Hesemann

Exp.: 11/30/2021

ATTACHMENT M

October 2021

HISTORY OF POTENTIAL EXCEEDANCES

This presentation of the History of Potential Exceedances, and any corrective action taken to remediate groundwater, is provided to meet the requirements of Title 35 of the Illinois Administrative Code (35 I.A.C.) § 845.230(d)(2)(M) for the Newton Power Plant Primary Ash Pond, Illinois Environmental Protection Agency (IEPA) ID No. W0798070001-01.

Note

Groundwater concentrations from 2015 to 2021 presented in the Hydrogeologic Site Characterization Report (HCR) Table 4-1, and evaluated and summarized in the following tables, are considered potential exceedances because the methodology used to determine them is proposed in the Statistical Analysis Plan (Appendix A to Groundwater Monitoring Plan [GMP]), which has not been reviewed or approved by IEPA at the time of submittal of the 35 I.A.C. § 845 Operating Permit application.

Alternate sources for potential exceedances as allowed by 35 I.A.C. § 845.650(e) have not yet been evaluated. These will be evaluated and presented in future submittals to IEPA as appropriate.

Table 1 summarizes how the potential exceedances were determined. Table 2 is a summary of all potential exceedances.

Background Concentrations

Background monitoring wells identified in the GMP include APW05 and APW06.

For monitoring wells that have been historically monitored in accordance with Title 40, Code of Federal Regulations, Part 257, Subpart D (Standards for the Disposal of Coal Combustion Residuals in Landfills and Surface Impoundments), background concentrations calculated from sampling events in 2015-2017 were compared to the standards identified in 35 I.A.C. § 845.600(a)(1). For constituents with calculated background concentrations in 2015-2017 greater than the standards in 35 I.A.C. § 845.600(a)(1), those calculated background concentrations were used as Groundwater Protection Standards (GWPSs) for comparing to statistical calculation results for each compliance well to determine potential exceedances. Compliance well statistical calculations consider concentrations from all sampling events in 2015-2021.

For all other monitoring wells, either newly constructed in 2021 or existing wells not monitored under Title 40, Code of Federal Regulations, Part 257, Subpart D, background concentrations calculated from the eight sampling events required by 35 I.A.C. § 845.650(b)(1)(A), to be collected within 180 days from April 21, 2021, were compared to the standards identified in 35 I.A.C. § 845.600(a)(1). For constituents with calculated background concentrations greater than the standards in 35 I.A.C. § 845.600(a)(1), those calculated background concentrations were used as GWPSs. Compliance well statistical calculations from that same time period were compared to the GWPSs to determine potential exceedances.

Corrective Action

No corrective actions have been taken to remediate the groundwater.

TABLE 1. DETERMINATION OF POTENTIAL EXCEEDANCES
HISTORY OF POTENTIAL EXCEEDANCES
NEWTON POWER PLANT
PRIMARY ASH POND
NEWTON, ILLINOIS

Sample Location	HSU	Program	Constituent	Result Unit	Sample Date Range	Statistical Calculation	Statistical Result	GWPS	Background	Part 845 Standard	GWPS Source
APW02	UD	845	Antimony, total	mg/L	02/17/2021 - 07/15/2021	All ND - Last	0.003	0.006	0.003	0.006	Standard
APW02	UD	845	Arsenic, total	mg/L	02/17/2021 - 07/15/2021	Most recent sample	0.001	0.059	0.059	0.01	Background
APW02	UD	845	Barium, total	mg/L	02/17/2021 - 07/15/2021	CB around linear reg	0.016	2.0	0.30	2	Standard
APW02	UD	845	Beryllium, total	mg/L	02/17/2021 - 07/15/2021	All ND - Last	0.001	0.004	0.001	0.004	Standard
APW02	UD	845	Boron, total	mg/L	02/17/2021 - 07/15/2021	CI around geomean	0.096	2.0	0.26	2	Standard
APW02	UD	845	Cadmium, total	mg/L	02/17/2021 - 07/15/2021	All ND - Last	0.001	0.005	0.001	0.005	Standard
APW02	UD	845	Chloride, total	mg/L	02/17/2021 - 07/15/2021	CI around mean	98	200	52	200	Standard
APW02	UD	845	Chromium, total	mg/L	02/17/2021 - 07/15/2021	All ND - Last	0.004	0.10	0.011	0.1	Standard
APW02	UD	845	Cobalt, total	mg/L	02/17/2021 - 07/15/2021	All ND - Last	0.002	0.006	0.0043	0.006	Standard
APW02	UD	845	Fluoride, total	mg/L	02/17/2021 - 07/15/2021	All ND - Last	0.25	4.0	0.63	4	Standard
APW02	UD	845	Lead, total	mg/L	02/17/2021 - 07/15/2021	All ND - Last	0.001	0.0075	0.0074	0.0075	Standard
APW02	UD	845	Lithium, total	mg/L	02/17/2021 - 07/15/2021	CB around linear reg	0.092	0.040	0.030	0.04	Standard
APW02	UD	845	Mercury, total	mg/L	02/17/2021 - 07/15/2021	All ND - Last	0.0002	0.002	0.0002	0.002	Standard
APW02	UD	845	Molybdenum, total	mg/L	02/17/2021 - 07/15/2021	CI around median	0.001	0.10	0.018	0.1	Standard
APW02	UD	845	pH (field)	SU	02/17/2021 - 07/15/2021	CI around median	6.6	6.4/9.0	6.4/7.8	6.5/9	Background/Standard
APW02	UD	845	Radium-226 + Radium 228, tot	pCi/L	02/17/2021 - 07/15/2021	CI around mean	0.16	6.9	6.9	5	Background
APW02	UD	845	Selenium, total	mg/L	02/17/2021 - 07/15/2021	All ND - Last	0.001	0.050	0.001	0.05	Standard
APW02	UD	845	Sulfate, total	mg/L	02/17/2021 - 07/15/2021	CI around median	1500	400	36	400	Standard
APW02	UD	845	Thallium, total	mg/L	02/17/2021 - 07/15/2021	All ND - Last	0.001	0.002	0.001	0.002	Standard
APW02	UD	845	Total Dissolved Solids	mg/L	02/17/2021 - 07/15/2021	CI around mean	4890	1200	628	1200	Standard
APW03	UD	845	Antimony, total	mg/L	02/18/2021 - 07/15/2021	All ND - Last	0.003	0.006	0.003	0.006	Standard
APW03	UD	845	Arsenic, total	mg/L	02/18/2021 - 07/15/2021	All ND - Last	0.001	0.059	0.059	0.01	Background
APW03	UD	845	Barium, total	mg/L	02/18/2021 - 07/15/2021	CI around mean	0.062	2.0	0.30	2	Standard
APW03	UD	845	Beryllium, total	mg/L	02/18/2021 - 07/15/2021	All ND - Last	0.001	0.004	0.001	0.004	Standard

RAMBOLL

TABLE 1. DETERMINATION OF POTENTIAL EXCEEDANCES
HISTORY OF POTENTIAL EXCEEDANCES
NEWTON POWER PLANT
PRIMARY ASH POND
NEWTON, ILLINOIS

Sample Location	HSU	Program	Constituent	Result Unit	Sample Date Range	Statistical Calculation	Statistical Result	GWPS	Background	Part 845 Standard	GWPS Source
APW03	UD	845	Boron, total	mg/L	02/18/2021 - 07/15/2021	CI around mean	0.36	2.0	0.26	2	Standard
APW03	UD	845	Cadmium, total	mg/L	02/18/2021 - 07/15/2021	All ND - Last	0.001	0.005	0.001	0.005	Standard
APW03	UD	845	Chloride, total	mg/L	02/18/2021 - 07/15/2021	CI around median	8.0	200	52	200	Standard
APW03	UD	845	Chromium, total	mg/L	02/18/2021 - 07/15/2021	All ND - Last	0.004	0.10	0.011	0.1	Standard
APW03	UD	845	Cobalt, total	mg/L	02/18/2021 - 07/15/2021	All ND - Last	0.002	0.006	0.0043	0.006	Standard
APW03	UD	845	Fluoride, total	mg/L	02/18/2021 - 07/15/2021	CI around median	0.25	4.0	0.63	4	Standard
APW03	UD	845	Lead, total	mg/L	02/18/2021 - 07/15/2021	CI around median	0.001	0.0075	0.0074	0.0075	Standard
APW03	UD	845	Lithium, total	mg/L	02/18/2021 - 07/15/2021	CI around mean	0.018	0.040	0.030	0.04	Standard
APW03	UD	845	Mercury, total	mg/L	02/18/2021 - 07/15/2021	CI around median	0.0002	0.002	0.0002	0.002	Standard
APW03	UD	845	Molybdenum, total	mg/L	02/18/2021 - 07/15/2021	CI around mean	0.00123	0.10	0.018	0.1	Standard
APW03	UD	845	pH (field)	SU	02/18/2021 - 07/15/2021	CI around mean	6.6	6.4/9.0	6.4/7.8	6.5/9	Background/Standard
APW03	UD	845	Radium-226 + Radium 228, tot	pCi/L	02/18/2021 - 07/15/2021	CI around mean	0.058	6.9	6.9	5	Background
APW03	UD	845	Selenium, total	mg/L	02/18/2021 - 07/15/2021	All ND - Last	0.001	0.050	0.001	0.05	Standard
APW03	UD	845	Sulfate, total	mg/L	02/18/2021 - 07/15/2021	CI around mean	164	400	36	400	Standard
APW03	UD	845	Thallium, total	mg/L	02/18/2021 - 07/15/2021	All ND - Last	0.001	0.002	0.001	0.002	Standard
APW03	UD	845	Total Dissolved Solids	mg/L	02/18/2021 - 07/15/2021	CI around mean	623	1200	628	1200	Standard
APW04	UD	845	Antimony, total	mg/L	02/18/2021 - 07/15/2021	All ND - Last	0.003	0.006	0.003	0.006	Standard
APW04	UD	845	Arsenic, total	mg/L	02/18/2021 - 07/15/2021	CI around mean	0.001	0.059	0.059	0.01	Background
APW04	UD	845	Barium, total	mg/L	02/18/2021 - 07/15/2021	CI around mean	0.017	2.0	0.30	2	Standard
APW04	UD	845	Beryllium, total	mg/L	02/18/2021 - 07/15/2021	All ND - Last	0.001	0.004	0.001	0.004	Standard
APW04	UD	845	Boron, total	mg/L	02/18/2021 - 07/15/2021	CI around median	0.023	2.0	0.26	2	Standard
APW04	UD	845	Cadmium, total	mg/L	02/18/2021 - 07/15/2021	All ND - Last	0.001	0.005	0.001	0.005	Standard
APW04	UD	845	Chloride, total	mg/L	02/18/2021 - 07/15/2021	CI around mean	28	200	52	200	Standard
APW04	UD	845	Chromium, total	mg/L	02/18/2021 - 07/15/2021	All ND - Last	0.004	0.10	0.011	0.1	Standard

RAMBOLL

TABLE 1. DETERMINATION OF POTENTIAL EXCEEDANCES
HISTORY OF POTENTIAL EXCEEDANCES
NEWTON POWER PLANT
PRIMARY ASH POND
NEWTON, ILLINOIS

Sample Location	HSU	Program	Constituent	Result Unit	Sample Date Range	Statistical Calculation	Statistical Result	GWPS	Background	Part 845 Standard	GWPS Source
APW04	UD	845	Cobalt, total	mg/L	02/18/2021 - 07/15/2021	All ND - Last	0.002	0.006	0.0043	0.006	Standard
APW04	UD	845	Fluoride, total	mg/L	02/18/2021 - 07/15/2021	All ND - Last	0.25	4.0	0.63	4	Standard
APW04	UD	845	Lead, total	mg/L	02/18/2021 - 07/15/2021	CI around median	0.001	0.0075	0.0074	0.0075	Standard
APW04	UD	845	Lithium, total	mg/L	02/18/2021 - 07/15/2021	CI around mean	0.014	0.040	0.030	0.04	Standard
APW04	UD	845	Mercury, total	mg/L	02/18/2021 - 07/15/2021	CI around median	0.0002	0.002	0.0002	0.002	Standard
APW04	UD	845	Molybdenum, total	mg/L	02/18/2021 - 07/15/2021	All ND - Last	0.001	0.10	0.018	0.1	Standard
APW04	UD	845	pH (field)	SU	02/18/2021 - 07/15/2021	CI around median	6.1	6.4/9.0	6.4/7.8	6.5/9	Background/Standard
APW04	UD	845	Radium-226 + Radium 228, tot	pCi/L	02/18/2021 - 07/15/2021	CI around mean	-0.0682	6.9	6.9	5	Background
APW04	UD	845	Selenium, total	mg/L	02/18/2021 - 07/15/2021	All ND - Last	0.001	0.050	0.001	0.05	Standard
APW04	UD	845	Sulfate, total	mg/L	02/18/2021 - 07/15/2021	CI around mean	887	400	36	400	Standard
APW04	UD	845	Thallium, total	mg/L	02/18/2021 - 07/15/2021	All ND - Last	0.001	0.002	0.001	0.002	Standard
APW04	UD	845	Total Dissolved Solids	mg/L	02/18/2021 - 07/15/2021	CI around mean	1710	1200	628	1200	Standard
APW05S	UD	845	Antimony, total	mg/L	02/17/2021 - 07/15/2021	All ND - Last	0.003	0.006	0.003	0.006	Standard
APW05S	UD	845	Arsenic, total	mg/L	02/17/2021 - 07/15/2021	CI around mean	0.00103	0.059	0.059	0.01	Background
APW05S	UD	845	Barium, total	mg/L	02/17/2021 - 07/15/2021	CI around mean	0.048	2.0	0.30	2	Standard
APW05S	UD	845	Beryllium, total	mg/L	02/17/2021 - 07/15/2021	All ND - Last	0.001	0.004	0.001	0.004	Standard
APW05S	UD	845	Boron, total	mg/L	02/17/2021 - 07/15/2021	CI around median	0.039	2.0	0.26	2	Standard
APW05S	UD	845	Cadmium, total	mg/L	02/17/2021 - 07/15/2021	All ND - Last	0.001	0.005	0.001	0.005	Standard
APW05S	UD	845	Chloride, total	mg/L	02/17/2021 - 07/15/2021	CI around median	180	200	52	200	Standard
APW05S	UD	845	Chromium, total	mg/L	02/17/2021 - 07/15/2021	All ND - Last	0.004	0.10	0.011	0.1	Standard
APW05S	UD	845	Cobalt, total	mg/L	02/17/2021 - 07/15/2021	CI around median	0.002	0.006	0.0043	0.006	Standard
APW05S	UD	845	Fluoride, total	mg/L	02/17/2021 - 07/15/2021	CI around mean	0.35	4.0	0.63	4	Standard
APW05S	UD	845	Lead, total	mg/L	02/17/2021 - 07/15/2021	All ND - Last	0.001	0.0075	0.0074	0.0075	Standard
APW05S	UD	845	Lithium, total	mg/L	02/17/2021 - 07/15/2021	CI around geomean	0.033	0.040	0.030	0.04	Standard

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NEWTON, ILLINOIS

Sample Location	HSU	Program	Constituent	Result Unit	Sample Date Range	Statistical Calculation	Statistical Result	GWPS	Background	Part 845 Standard	GWPS Source
APW05S	UD	845	Mercury, total	mg/L	02/17/2021 - 07/15/2021	All ND - Last	0.0002	0.002	0.0002	0.002	Standard
APW05S	UD	845	Molybdenum, total	mg/L	02/17/2021 - 07/15/2021	CI around geomean	0.00101	0.10	0.018	0.1	Standard
APW05S	UD	845	pH (field)	SU	02/17/2021 - 07/15/2021	CI around mean	6.7	6.4/9.0	6.4/7.8	6.5/9	Background/Standard
APW05S	UD	845	Radium-226 + Radium 228, tot	pCi/L	02/17/2021 - 07/15/2021	CI around geomean	0.13	6.9	6.9	5	Background
APW05S	UD	845	Selenium, total	mg/L	02/17/2021 - 07/15/2021	All ND - Last	0.001	0.050	0.001	0.05	Standard
APW05S	UD	845	Sulfate, total	mg/L	02/17/2021 - 07/15/2021	CI around median	200	400	36	400	Standard
APW05S	UD	845	Thallium, total	mg/L	02/17/2021 - 07/15/2021	All ND - Last	0.001	0.002	0.001	0.002	Standard
APW05S	UD	845	Total Dissolved Solids	mg/L	02/17/2021 - 07/15/2021	CI around mean	3350	1200	628	1200	Standard
APW07	UA	257	Antimony, total	mg/L	12/15/2015 - 06/13/2017	All ND - Last	0.003	0.006	0.003	0.006	Standard
APW07	UA	257	Arsenic, total	mg/L	12/15/2015 - 06/13/2017	CB around linear reg	0.00513	0.027	0.027	0.01	Background
APW07	UA	257	Barium, total	mg/L	12/15/2015 - 06/13/2017	CI around mean	0.39	2.0	0.26	2	Standard
APW07	UA	257	Beryllium, total	mg/L	12/15/2015 - 06/13/2017	All ND - Last	0.001	0.004	0.0025	0.004	Standard
APW07	UA	257	Boron, total	mg/L	12/15/2015 - 02/10/2021	CI around mean	0.070	2.0	0.14	2	Standard
APW07	UA	257	Cadmium, total	mg/L	12/15/2015 - 06/13/2017	All ND - Last	0.001	0.005	0.0017	0.005	Standard
APW07	UA	257	Chloride, total	mg/L	12/15/2015 - 02/10/2021	CI around median	69	200	58	200	Standard
APW07	UA	257	Chromium, total	mg/L	12/15/2015 - 06/13/2017	CI around median	0.004	0.10	0.004	0.1	Standard
APW07	UA	257	Cobalt, total	mg/L	12/15/2015 - 06/13/2017	All ND - Last	0.002	0.006	0.002	0.006	Standard
APW07	UA	257	Fluoride, total	mg/L	12/15/2015 - 02/10/2021	CI around mean	0.38	4.0	0.70	4	Standard
APW07	UA	257	Lead, total	mg/L	12/15/2015 - 06/13/2017	CI around median	0.001	0.0075	0.0025	0.0075	Standard
APW07	UA	257	Lithium, total	mg/L	12/15/2015 - 06/13/2017	All ND - Last	0.010	0.040	0.023	0.04	Standard
APW07	UA	257	Mercury, total	mg/L	12/15/2015 - 06/13/2017	All ND - Last	0.0002	0.002	0.002	0.002	Standard
APW07	UA	257	Molybdenum, total	mg/L	12/15/2015 - 06/13/2017	CB around linear reg	-0.00141	0.10	0.038	0.1	Standard
APW07	UA	257	pH (field)	SU	12/15/2015 - 02/10/2021	CI around mean	7.1	6.5/9.0	6.6/8.0	6.5/9	Standard/Standard
APW07	UA	257	Radium-226 + Radium 228, tot	pCi/L	12/15/2015 - 06/13/2017	CI around mean	1.1	5.0	1.5	5	Standard

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PRIMARY ASH POND
NEWTON, ILLINOIS

Sample Location	HSU	Program	Constituent	Result Unit	Sample Date Range	Statistical Calculation	Statistical Result	GWPS	Background	Part 845 Standard	GWPS Source
APW07	UA	257	Selenium, total	mg/L	12/15/2015 - 06/13/2017	All ND - Last	0.001	0.050	0.006	0.05	Standard
APW07	UA	257	Sulfate, total	mg/L	12/15/2015 - 02/10/2021	CI around geomean	2.2	400	15	400	Standard
APW07	UA	257	Thallium, total	mg/L	12/15/2015 - 06/13/2017	All ND - Last	0.001	0.0025	0.0025	0.002	Background
APW07	UA	257	Total Dissolved Solids	mg/L	12/15/2015 - 02/10/2021	CI around mean	457	1200	1000	1200	Standard
APW08	UA	257	Antimony, total	mg/L	12/15/2015 - 06/13/2017	All ND - Last	0.003	0.006	0.003	0.006	Standard
APW08	UA	257	Arsenic, total	mg/L	12/15/2015 - 06/13/2017	CI around mean	0.011	0.027	0.027	0.01	Background
APW08	UA	257	Barium, total	mg/L	12/15/2015 - 06/13/2017	CB around linear reg	0.34	2.0	0.26	2	Standard
APW08	UA	257	Beryllium, total	mg/L	12/15/2015 - 06/13/2017	All ND - Last	0.001	0.004	0.0025	0.004	Standard
APW08	UA	257	Boron, total	mg/L	12/15/2015 - 02/10/2021	CB around linear reg	0.088	2.0	0.14	2	Standard
APW08	UA	257	Cadmium, total	mg/L	12/15/2015 - 06/13/2017	All ND - Last	0.001	0.005	0.0017	0.005	Standard
APW08	UA	257	Chloride, total	mg/L	12/15/2015 - 02/10/2021	CI around mean	55	200	58	200	Standard
APW08	UA	257	Chromium, total	mg/L	12/15/2015 - 06/13/2017	CI around median	0.004	0.10	0.004	0.1	Standard
APW08	UA	257	Cobalt, total	mg/L	12/15/2015 - 06/13/2017	CI around median	0.002	0.006	0.002	0.006	Standard
APW08	UA	257	Fluoride, total	mg/L	12/15/2015 - 02/10/2021	CB around linear reg	0.17	4.0	0.70	4	Standard
APW08	UA	257	Lead, total	mg/L	12/15/2015 - 06/13/2017	CI around geomean	0.000849	0.0075	0.0025	0.0075	Standard
APW08	UA	257	Lithium, total	mg/L	12/15/2015 - 06/13/2017	CI around mean	0.00917	0.040	0.023	0.04	Standard
APW08	UA	257	Mercury, total	mg/L	12/15/2015 - 06/13/2017	All ND - Last	0.0002	0.002	0.002	0.002	Standard
APW08	UA	257	Molybdenum, total	mg/L	12/15/2015 - 06/13/2017	CI around mean	0.00528	0.10	0.038	0.1	Standard
APW08	UA	257	pH (field)	SU	12/15/2015 - 02/10/2021	CI around mean	7.2	6.5/9.0	6.6/8.0	6.5/9	Standard/Standard
APW08	UA	257	Radium-226 + Radium 228, tot	pCi/L	12/15/2015 - 06/13/2017	CI around mean	0.80	5.0	1.5	5	Standard
APW08	UA	257	Selenium, total	mg/L	12/15/2015 - 06/13/2017	CI around median	0.001	0.050	0.006	0.05	Standard
APW08	UA	257	Sulfate, total	mg/L	12/15/2015 - 02/10/2021	CB around linear reg	44	400	15	400	Standard
APW08	UA	257	Thallium, total	mg/L	12/15/2015 - 06/13/2017	All ND - Last	0.001	0.0025	0.0025	0.002	Background
APW08	UA	257	Total Dissolved Solids	mg/L	12/15/2015 - 02/10/2021	CI around mean	540	1200	1000	1200	Standard

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Sample Location	HSU	Program	Constituent	Result Unit	Sample Date Range	Statistical Calculation	Statistical Result	GWPS	Background	Part 845 Standard	GWPS Source
APW09	UA	257	Antimony, total	mg/L	12/15/2015 - 06/13/2017	All ND - Last	0.003	0.006	0.003	0.006	Standard
APW09	UA	257	Arsenic, total	mg/L	12/15/2015 - 06/13/2017	CI around mean	0.00549	0.027	0.027	0.01	Background
APW09	UA	257	Barium, total	mg/L	12/15/2015 - 06/13/2017	CI around mean	0.20	2.0	0.26	2	Standard
APW09	UA	257	Beryllium, total	mg/L	12/15/2015 - 06/13/2017	All ND - Last	0.001	0.004	0.0025	0.004	Standard
APW09	UA	257	Boron, total	mg/L	12/15/2015 - 02/11/2021	CI around mean	0.065	2.0	0.14	2	Standard
APW09	UA	257	Cadmium, total	mg/L	12/15/2015 - 06/13/2017	All ND - Last	0.001	0.005	0.0017	0.005	Standard
APW09	UA	257	Chloride, total	mg/L	12/15/2015 - 02/11/2021	CI around median	84	200	58	200	Standard
APW09	UA	257	Chromium, total	mg/L	12/15/2015 - 06/13/2017	All ND - Last	0.004	0.10	0.004	0.1	Standard
APW09	UA	257	Cobalt, total	mg/L	12/15/2015 - 06/13/2017	All ND - Last	0.002	0.006	0.002	0.006	Standard
APW09	UA	257	Fluoride, total	mg/L	12/15/2015 - 02/11/2021	CI around mean	0.51	4.0	0.70	4	Standard
APW09	UA	257	Lead, total	mg/L	12/15/2015 - 06/13/2017	CI around median	0.001	0.0075	0.0025	0.0075	Standard
APW09	UA	257	Lithium, total	mg/L	12/15/2015 - 06/13/2017	All ND - Last	0.010	0.040	0.023	0.04	Standard
APW09	UA	257	Mercury, total	mg/L	12/15/2015 - 06/13/2017	CI around median	0.0002	0.002	0.002	0.002	Standard
APW09	UA	257	Molybdenum, total	mg/L	12/15/2015 - 06/13/2017	CI around mean	0.00713	0.10	0.038	0.1	Standard
APW09	UA	257	pH (field)	SU	12/15/2015 - 02/11/2021	CB around T-S line	7.3	6.5/9.0	6.6/8.0	6.5/9	Standard/Standard
APW09	UA	257	Radium-226 + Radium 228, tot	pCi/L	12/15/2015 - 06/13/2017	CI around mean	0.72	5.0	1.5	5	Standard
APW09	UA	257	Selenium, total	mg/L	12/15/2015 - 06/13/2017	All ND - Last	0.001	0.050	0.006	0.05	Standard
APW09	UA	257	Sulfate, total	mg/L	12/15/2015 - 02/11/2021	CI around geomean	2.7	400	15	400	Standard
APW09	UA	257	Thallium, total	mg/L	12/15/2015 - 06/13/2017	All ND - Last	0.001	0.0025	0.0025	0.002	Background
APW09	UA	257	Total Dissolved Solids	mg/L	12/15/2015 - 02/11/2021	CI around mean	508	1200	1000	1200	Standard
APW10	UA	257	Antimony, total	mg/L	12/16/2015 - 07/29/2021	All ND - Last	0.003	0.006	0.003	0.006	Standard
APW10	UA	257	Arsenic, total	mg/L	12/16/2015 - 07/29/2021	CI around mean	0.00476	0.027	0.027	0.01	Background
APW10	UA	257	Barium, total	mg/L	12/16/2015 - 07/29/2021	CB around linear reg	0.016	2.0	0.26	2	Standard
APW10	UA	257	Beryllium, total	mg/L	12/16/2015 - 07/29/2021	All ND - Last	0.001	0.004	0.0025	0.004	Standard

RAMBOLL

TABLE 1. DETERMINATION OF POTENTIAL EXCEEDANCES
HISTORY OF POTENTIAL EXCEEDANCES
NEWTON POWER PLANT
PRIMARY ASH POND
NEWTON, ILLINOIS

Sample Location	HSU	Program	Constituent	Result Unit	Sample Date Range	Statistical Calculation	Statistical Result	GWPS	Background	Part 845 Standard	GWPS Source
APW10	UA	257	Boron, total	mg/L	12/16/2015 - 07/29/2021	CI around mean	0.068	2.0	0.14	2	Standard
APW10	UA	257	Cadmium, total	mg/L	12/16/2015 - 07/29/2021	All ND - Last	0.001	0.005	0.0017	0.005	Standard
APW10	UA	257	Chloride, total	mg/L	12/16/2015 - 07/29/2021	CI around mean	46	200	58	200	Standard
APW10	UA	257	Chromium, total	mg/L	12/16/2015 - 07/29/2021	All ND - Last	0.004	0.10	0.004	0.1	Standard
APW10	UA	257	Cobalt, total	mg/L	12/16/2015 - 07/29/2021	All ND - Last	0.002	0.006	0.002	0.006	Standard
APW10	UA	257	Fluoride, total	mg/L	12/16/2015 - 07/29/2021	CI around mean	0.27	4.0	0.70	4	Standard
APW10	UA	257	Lead, total	mg/L	12/16/2015 - 07/29/2021	All ND - Last	0.001	0.0075	0.0025	0.0075	Standard
APW10	UA	257	Lithium, total	mg/L	12/16/2015 - 07/29/2021	CI around mean	0.022	0.040	0.023	0.04	Standard
APW10	UA	257	Mercury, total	mg/L	12/16/2015 - 07/29/2021	All ND - Last	0.0002	0.002	0.002	0.002	Standard
APW10	UA	257	Molybdenum, total	mg/L	12/16/2015 - 07/29/2021	CB around linear reg	0.00488	0.10	0.038	0.1	Standard
APW10	UA	257	pH (field)	SU	12/16/2015 - 07/29/2021	CI around mean	7.0	6.5/9.0	6.6/8.0	6.5/9	Standard/Standard
APW10	UA	257	Radium-226 + Radium 228, tot	pCi/L	12/16/2015 - 07/29/2021	CI around mean	0.54	5.0	1.5	5	Standard
APW10	UA	257	Selenium, total	mg/L	12/16/2015 - 07/29/2021	All ND - Last	0.001	0.050	0.006	0.05	Standard
APW10	UA	257	Sulfate, total	mg/L	12/16/2015 - 07/29/2021	CI around median	410	400	15	400	Standard
APW10	UA	257	Thallium, total	mg/L	12/16/2015 - 07/29/2021	All ND - Last	0.001	0.0025	0.0025	0.002	Background
APW10	UA	257	Total Dissolved Solids	mg/L	12/16/2015 - 07/29/2021	CI around mean	939	1200	1000	1200	Standard
APW11	UA	845	Antimony, total	mg/L	02/18/2021 - 07/15/2021	All ND - Last	0.003	0.006	0.003	0.006	Standard
APW11	UA	845	Arsenic, total	mg/L	02/18/2021 - 07/15/2021	CI around geomean	0.00152	0.059	0.059	0.01	Background
APW11	UA	845	Barium, total	mg/L	02/18/2021 - 07/15/2021	CB around linear reg	-0.0314	2.0	0.30	2	Standard
APW11	UA	845	Beryllium, total	mg/L	02/18/2021 - 07/15/2021	All ND - Last	0.001	0.004	0.001	0.004	Standard
APW11	UA	845	Boron, total	mg/L	02/18/2021 - 07/15/2021	CI around median	0.062	2.0	0.26	2	Standard
APW11	UA	845	Cadmium, total	mg/L	02/18/2021 - 07/15/2021	All ND - Last	0.001	0.005	0.001	0.005	Standard
APW11	UA	845	Chloride, total	mg/L	02/18/2021 - 07/15/2021	CI around median	26	200	52	200	Standard
APW11	UA	845	Chromium, total	mg/L	02/18/2021 - 07/15/2021	CI around median	0.004	0.10	0.011	0.1	Standard

TABLE 1. DETERMINATION OF POTENTIAL EXCEEDANCES
HISTORY OF POTENTIAL EXCEEDANCES
NEWTON POWER PLANT
PRIMARY ASH POND
NEWTON, ILLINOIS

Sample Location	HSU	Program	Constituent	Result Unit	Sample Date Range	Statistical Calculation	Statistical Result	GWPS	Background	Part 845 Standard	GWPS Source
APW11	UA	845	Cobalt, total	mg/L	02/18/2021 - 07/15/2021	CI around median	0.002	0.006	0.0043	0.006	Standard
APW11	UA	845	Fluoride, total	mg/L	02/18/2021 - 07/15/2021	CI around median	0.25	4.0	0.63	4	Standard
APW11	UA	845	Lead, total	mg/L	02/18/2021 - 07/15/2021	CI around median	0.001	0.0075	0.0074	0.0075	Standard
APW11	UA	845	Lithium, total	mg/L	02/18/2021 - 07/15/2021	CI around mean	0.020	0.040	0.030	0.04	Standard
APW11	UA	845	Mercury, total	mg/L	02/18/2021 - 07/15/2021	CI around median	0.0002	0.002	0.0002	0.002	Standard
APW11	UA	845	Molybdenum, total	mg/L	02/18/2021 - 07/15/2021	CB around linear reg	-0.00109	0.10	0.018	0.1	Standard
APW11	UA	845	pH (field)	SU	02/18/2021 - 07/15/2021	CI around mean	6.5	6.4/9.0	6.4/7.8	6.5/9	Background/Standard
APW11	UA	845	Radium-226 + Radium 228, tot	pCi/L	02/18/2021 - 07/15/2021	CI around mean	0.26	6.9	6.9	5	Background
APW11	UA	845	Selenium, total	mg/L	02/18/2021 - 07/15/2021	CI around median	0.001	0.050	0.001	0.05	Standard
APW11	UA	845	Sulfate, total	mg/L	02/18/2021 - 07/15/2021	CI around median	140	400	36	400	Standard
APW11	UA	845	Thallium, total	mg/L	02/18/2021 - 07/15/2021	CI around median	0.001	0.002	0.001	0.002	Standard
APW11	UA	845	Total Dissolved Solids	mg/L	02/18/2021 - 07/15/2021	CI around mean	797	1200	628	1200	Standard
APW12	UD	845	Antimony, total	mg/L	02/17/2021 - 07/15/2021	All ND - Last	0.003	0.006	0.003	0.006	Standard
APW12	UD	845	Arsenic, total	mg/L	02/17/2021 - 07/15/2021	CI around mean	0.00153	0.059	0.059	0.01	Background
APW12	UD	845	Barium, total	mg/L	02/17/2021 - 07/15/2021	CI around mean	0.034	2.0	0.30	2	Standard
APW12	UD	845	Beryllium, total	mg/L	02/17/2021 - 07/15/2021	All ND - Last	0.001	0.004	0.001	0.004	Standard
APW12	UD	845	Boron, total	mg/L	02/17/2021 - 07/15/2021	CI around mean	0.16	2.0	0.26	2	Standard
APW12	UD	845	Cadmium, total	mg/L	02/17/2021 - 07/15/2021	All ND - Last	0.001	0.005	0.001	0.005	Standard
APW12	UD	845	Chloride, total	mg/L	02/17/2021 - 07/15/2021	CI around mean	21	200	52	200	Standard
APW12	UD	845	Chromium, total	mg/L	02/17/2021 - 07/15/2021	All ND - Last	0.004	0.10	0.011	0.1	Standard
APW12	UD	845	Cobalt, total	mg/L	02/17/2021 - 07/15/2021	CB around linear reg	0.00205	0.006	0.0043	0.006	Standard
APW12	UD	845	Fluoride, total	mg/L	02/17/2021 - 07/15/2021	All ND - Last	0.25	4.0	0.63	4	Standard
APW12	UD	845	Lead, total	mg/L	02/17/2021 - 07/15/2021	All ND - Last	0.001	0.0075	0.0074	0.0075	Standard
APW12	UD	845	Lithium, total	mg/L	02/17/2021 - 07/15/2021	CI around mean	0.024	0.040	0.030	0.04	Standard

TABLE 1. DETERMINATION OF POTENTIAL EXCEEDANCES
HISTORY OF POTENTIAL EXCEEDANCES
NEWTON POWER PLANT
PRIMARY ASH POND
NEWTON, ILLINOIS

Sample Location	HSU	Program	Constituent	Result Unit	Sample Date Range	Statistical Calculation	Statistical Result	GWPS	Background	Part 845 Standard	GWPS Source
APW12	UD	845	Mercury, total	mg/L	02/17/2021 - 07/15/2021	CI around median	0.0002	0.002	0.0002	0.002	Standard
APW12	UD	845	Molybdenum, total	mg/L	02/17/2021 - 07/15/2021	CI around mean	0.000744	0.10	0.018	0.1	Standard
APW12	UD	845	pH (field)	SU	02/17/2021 - 07/15/2021	CI around mean	6.2	6.4/9.0	6.4/7.8	6.5/9	Background/Standard
APW12	UD	845	Radium-226 + Radium 228, tot	pCi/L	02/17/2021 - 07/15/2021	CI around geomean	0.20	6.9	6.9	5	Background
APW12	UD	845	Selenium, total	mg/L	02/17/2021 - 07/15/2021	All ND - Last	0.001	0.050	0.001	0.05	Standard
APW12	UD	845	Sulfate, total	mg/L	02/17/2021 - 07/15/2021	CI around mean	322	400	36	400	Standard
APW12	UD	845	Thallium, total	mg/L	02/17/2021 - 07/15/2021	All ND - Last	0.001	0.002	0.001	0.002	Standard
APW12	UD	845	Total Dissolved Solids	mg/L	02/17/2021 - 07/15/2021	CI around mean	1110	1200	628	1200	Standard
APW13	UA	845	Antimony, total	mg/L	02/22/2021 - 07/15/2021	All ND - Last	0.003	0.006	0.003	0.006	Standard
APW13	UA	845	Arsenic, total	mg/L	02/22/2021 - 07/15/2021	CI around mean	0.00345	0.059	0.059	0.01	Background
APW13	UA	845	Barium, total	mg/L	02/22/2021 - 07/15/2021	CI around mean	0.050	2.0	0.30	2	Standard
APW13	UA	845	Beryllium, total	mg/L	02/22/2021 - 07/15/2021	All ND - Last	0.001	0.004	0.001	0.004	Standard
APW13	UA	845	Boron, total	mg/L	02/22/2021 - 07/15/2021	CI around mean	0.10	2.0	0.26	2	Standard
APW13	UA	845	Cadmium, total	mg/L	02/22/2021 - 07/15/2021	All ND - Last	0.001	0.005	0.001	0.005	Standard
APW13	UA	845	Chloride, total	mg/L	02/22/2021 - 07/15/2021	CI around mean	45	200	52	200	Standard
APW13	UA	845	Chromium, total	mg/L	02/22/2021 - 07/15/2021	All ND - Last	0.004	0.10	0.011	0.1	Standard
APW13	UA	845	Cobalt, total	mg/L	02/22/2021 - 07/15/2021	All ND - Last	0.002	0.006	0.0043	0.006	Standard
APW13	UA	845	Fluoride, total	mg/L	02/22/2021 - 07/15/2021	CI around mean	0.25	4.0	0.63	4	Standard
APW13	UA	845	Lead, total	mg/L	02/22/2021 - 07/15/2021	All ND - Last	0.001	0.0075	0.0074	0.0075	Standard
APW13	UA	845	Lithium, total	mg/L	02/22/2021 - 07/15/2021	CI around mean	0.029	0.040	0.030	0.04	Standard
APW13	UA	845	Mercury, total	mg/L	02/22/2021 - 07/15/2021	All ND - Last	0.0002	0.002	0.0002	0.002	Standard
APW13	UA	845	Molybdenum, total	mg/L	02/22/2021 - 07/15/2021	CB around linear reg	0.00402	0.10	0.018	0.1	Standard
APW13	UA	845	pH (field)	SU	02/22/2021 - 07/15/2021	CI around median	6.4	6.4/9.0	6.4/7.8	6.5/9	Background/Standard
APW13	UA	845	Radium-226 + Radium 228, tot	pCi/L	02/22/2021 - 07/15/2021	CI around mean	0.17	6.9	6.9	5	Background

TABLE 1. DETERMINATION OF POTENTIAL EXCEEDANCES
HISTORY OF POTENTIAL EXCEEDANCES
NEWTON POWER PLANT
PRIMARY ASH POND
NEWTON, ILLINOIS

Sample Location	HSU	Program	Constituent	Result Unit	Sample Date Range	Statistical Calculation	Statistical Result	GWPS	Background	Part 845 Standard	GWPS Source
APW13	UA	845	Selenium, total	mg/L	02/22/2021 - 07/15/2021	All ND - Last	0.001	0.050	0.001	0.05	Standard
APW13	UA	845	Sulfate, total	mg/L	02/22/2021 - 07/15/2021	CI around mean	208	400	36	400	Standard
APW13	UA	845	Thallium, total	mg/L	02/22/2021 - 07/15/2021	All ND - Last	0.001	0.002	0.001	0.002	Standard
APW13	UA	845	Total Dissolved Solids	mg/L	02/22/2021 - 07/15/2021	CI around mean	787	1200	628	1200	Standard
APW14	UA	845	Antimony, total	mg/L	02/22/2021 - 07/15/2021	All ND - Last	0.003	0.006	0.003	0.006	Standard
APW14	UA	845	Arsenic, total	mg/L	02/22/2021 - 07/15/2021	CI around mean	0.00462	0.059	0.059	0.01	Background
APW14	UA	845	Barium, total	mg/L	02/22/2021 - 07/15/2021	CB around linear reg	0.046	2.0	0.30	2	Standard
APW14	UA	845	Beryllium, total	mg/L	02/22/2021 - 07/15/2021	All ND - Last	0.001	0.004	0.001	0.004	Standard
APW14	UA	845	Boron, total	mg/L	02/22/2021 - 07/15/2021	CI around mean	0.092	2.0	0.26	2	Standard
APW14	UA	845	Cadmium, total	mg/L	02/22/2021 - 07/15/2021	All ND - Last	0.001	0.005	0.001	0.005	Standard
APW14	UA	845	Chloride, total	mg/L	02/22/2021 - 07/15/2021	CI around mean	42	200	52	200	Standard
APW14	UA	845	Chromium, total	mg/L	02/22/2021 - 07/15/2021	CI around median	0.004	0.10	0.011	0.1	Standard
APW14	UA	845	Cobalt, total	mg/L	02/22/2021 - 07/15/2021	CI around median	0.002	0.006	0.0043	0.006	Standard
APW14	UA	845	Fluoride, total	mg/L	02/22/2021 - 07/15/2021	CI around mean	0.26	4.0	0.63	4	Standard
APW14	UA	845	Lead, total	mg/L	02/22/2021 - 07/15/2021	CI around median	0.001	0.0075	0.0074	0.0075	Standard
APW14	UA	845	Lithium, total	mg/L	02/22/2021 - 07/15/2021	CI around mean	0.026	0.040	0.030	0.04	Standard
APW14	UA	845	Mercury, total	mg/L	02/22/2021 - 07/15/2021	All ND - Last	0.0002	0.002	0.0002	0.002	Standard
APW14	UA	845	Molybdenum, total	mg/L	02/22/2021 - 07/15/2021	CB around linear reg	0.000155	0.10	0.018	0.1	Standard
APW14	UA	845	pH (field)	SU	02/22/2021 - 07/15/2021	CI around median	6.5	6.4/9.0	6.4/7.8	6.5/9	Background/Standard
APW14	UA	845	Radium-226 + Radium 228, tot	pCi/L	02/22/2021 - 07/15/2021	CI around mean	0.38	6.9	6.9	5	Background
APW14	UA	845	Selenium, total	mg/L	02/22/2021 - 07/15/2021	All ND - Last	0.001	0.050	0.001	0.05	Standard
APW14	UA	845	Sulfate, total	mg/L	02/22/2021 - 07/15/2021	CI around mean	315	400	36	400	Standard
APW14	UA	845	Thallium, total	mg/L	02/22/2021 - 07/15/2021	All ND - Last	0.001	0.002	0.001	0.002	Standard
APW14	UA	845	Total Dissolved Solids	mg/L	02/22/2021 - 07/15/2021	CI around mean	869	1200	628	1200	Standard

TABLE 1. DETERMINATION OF POTENTIAL EXCEEDANCES
HISTORY OF POTENTIAL EXCEEDANCES
NEWTON POWER PLANT
PRIMARY ASH POND
NEWTON, ILLINOIS

Sample Location	HSU	Program	Constituent	Result Unit	Sample Date Range	Statistical Calculation	Statistical Result	GWPS	Background	Part 845 Standard	GWPS Source
APW15	UA	845	Antimony, total	mg/L	02/23/2021 - 07/14/2021	All ND - Last	0.003	0.006	0.003	0.006	Standard
APW15	UA	845	Arsenic, total	mg/L	02/23/2021 - 07/14/2021	CI around mean	0.016	0.059	0.059	0.01	Background
APW15	UA	845	Barium, total	mg/L	02/23/2021 - 07/14/2021	CI around mean	0.57	2.0	0.30	2	Standard
APW15	UA	845	Beryllium, total	mg/L	02/23/2021 - 07/14/2021	All ND - Last	0.001	0.004	0.001	0.004	Standard
APW15	UA	845	Boron, total	mg/L	02/23/2021 - 07/14/2021	CI around mean	0.13	2.0	0.26	2	Standard
APW15	UA	845	Cadmium, total	mg/L	02/23/2021 - 07/14/2021	All ND - Last	0.001	0.005	0.001	0.005	Standard
APW15	UA	845	Chloride, total	mg/L	02/23/2021 - 07/14/2021	CB around linear reg	120	200	52	200	Standard
APW15	UA	845	Chromium, total	mg/L	02/23/2021 - 07/14/2021	CI around median	0.004	0.10	0.011	0.1	Standard
APW15	UA	845	Cobalt, total	mg/L	02/23/2021 - 07/14/2021	CI around median	0.002	0.006	0.0043	0.006	Standard
APW15	UA	845	Fluoride, total	mg/L	02/23/2021 - 07/14/2021	CB around linear reg	1.2	4.0	0.63	4	Standard
APW15	UA	845	Lead, total	mg/L	02/23/2021 - 07/14/2021	CI around median	0.001	0.0075	0.0074	0.0075	Standard
APW15	UA	845	Lithium, total	mg/L	02/23/2021 - 07/14/2021	CI around median	0.020	0.040	0.030	0.04	Standard
APW15	UA	845	Mercury, total	mg/L	02/23/2021 - 07/14/2021	All ND - Last	0.0002	0.002	0.0002	0.002	Standard
APW15	UA	845	Molybdenum, total	mg/L	02/23/2021 - 07/14/2021	CI around mean	0.00926	0.10	0.018	0.1	Standard
APW15	UA	845	pH (field)	SU	02/23/2021 - 07/14/2021	CI around median	6.5	6.4/9.0	6.4/7.8	6.5/9	Background/Standard
APW15	UA	845	Radium-226 + Radium 228, tot	pCi/L	02/23/2021 - 07/14/2021	CI around mean	1.4	6.9	6.9	5	Background
APW15	UA	845	Selenium, total	mg/L	02/23/2021 - 07/14/2021	All ND - Last	0.001	0.050	0.001	0.05	Standard
APW15	UA	845	Sulfate, total	mg/L	02/23/2021 - 07/14/2021	All ND - Last	1.0	400	36	400	Standard
APW15	UA	845	Thallium, total	mg/L	02/23/2021 - 07/14/2021	All ND - Last	0.001	0.002	0.001	0.002	Standard
APW15	UA	845	Total Dissolved Solids	mg/L	02/23/2021 - 07/14/2021	CI around mean	999	1200	628	1200	Standard
APW16	UA	845	Antimony, total	mg/L	02/23/2021 - 07/15/2021	All ND - Last	0.003	0.006	0.003	0.006	Standard
APW16	UA	845	Arsenic, total	mg/L	02/23/2021 - 07/15/2021	CI around mean	0.007	0.059	0.059	0.01	Background
APW16	UA	845	Barium, total	mg/L	02/23/2021 - 07/15/2021	CB around linear reg	0.51	2.0	0.30	2	Standard
APW16	UA	845	Beryllium, total	mg/L	02/23/2021 - 07/15/2021	All ND - Last	0.001	0.004	0.001	0.004	Standard

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NEWTON POWER PLANT
PRIMARY ASH POND
NEWTON, ILLINOIS

Sample Location	HSU	Program	Constituent	Result Unit	Sample Date Range	Statistical Calculation	Statistical Result	GWPS	Background	Part 845 Standard	GWPS Source
APW16	UA	845	Boron, total	mg/L	02/23/2021 - 07/15/2021	CI around mean	0.12	2.0	0.26	2	Standard
APW16	UA	845	Cadmium, total	mg/L	02/23/2021 - 07/15/2021	All ND - Last	0.001	0.005	0.001	0.005	Standard
APW16	UA	845	Chloride, total	mg/L	02/23/2021 - 07/15/2021	CI around mean	66	200	52	200	Standard
APW16	UA	845	Chromium, total	mg/L	02/23/2021 - 07/15/2021	All ND - Last	0.004	0.10	0.011	0.1	Standard
APW16	UA	845	Cobalt, total	mg/L	02/23/2021 - 07/15/2021	All ND - Last	0.002	0.006	0.0043	0.006	Standard
APW16	UA	845	Fluoride, total	mg/L	02/23/2021 - 07/15/2021	CI around mean	0.60	4.0	0.63	4	Standard
APW16	UA	845	Lead, total	mg/L	02/23/2021 - 07/15/2021	All ND - Last	0.001	0.0075	0.0074	0.0075	Standard
APW16	UA	845	Lithium, total	mg/L	02/23/2021 - 07/15/2021	All ND - Last	0.020	0.040	0.030	0.04	Standard
APW16	UA	845	Mercury, total	mg/L	02/23/2021 - 07/15/2021	All ND - Last	0.0002	0.002	0.0002	0.002	Standard
APW16	UA	845	Molybdenum, total	mg/L	02/23/2021 - 07/15/2021	CB around linear reg	-0.000901	0.10	0.018	0.1	Standard
APW16	UA	845	pH (field)	SU	02/23/2021 - 07/15/2021	CI around mean	7.1	6.4/9.0	6.4/7.8	6.5/9	Background/Standard
APW16	UA	845	Radium-226 + Radium 228, tot	pCi/L	02/23/2021 - 07/15/2021	CI around mean	0.70	6.9	6.9	5	Background
APW16	UA	845	Selenium, total	mg/L	02/23/2021 - 07/15/2021	All ND - Last	0.001	0.050	0.001	0.05	Standard
APW16	UA	845	Sulfate, total	mg/L	02/23/2021 - 07/15/2021	CI around median	1.0	400	36	400	Standard
APW16	UA	845	Thallium, total	mg/L	02/23/2021 - 07/15/2021	All ND - Last	0.001	0.002	0.001	0.002	Standard
APW16	UA	845	Total Dissolved Solids	mg/L	02/23/2021 - 07/15/2021	CI around mean	667	1200	628	1200	Standard
APW17	UA	845	Antimony, total	mg/L	02/23/2021 - 07/15/2021	All ND - Last	0.003	0.006	0.003	0.006	Standard
APW17	UA	845	Arsenic, total	mg/L	02/23/2021 - 07/15/2021	CB around linear reg	0.00404	0.059	0.059	0.01	Background
APW17	UA	845	Barium, total	mg/L	02/23/2021 - 07/15/2021	CI around mean	0.56	2.0	0.30	2	Standard
APW17	UA	845	Beryllium, total	mg/L	02/23/2021 - 07/15/2021	All ND - Last	0.001	0.004	0.001	0.004	Standard
APW17	UA	845	Boron, total	mg/L	02/23/2021 - 07/15/2021	CI around mean	0.084	2.0	0.26	2	Standard
APW17	UA	845	Cadmium, total	mg/L	02/23/2021 - 07/15/2021	All ND - Last	0.001	0.005	0.001	0.005	Standard
APW17	UA	845	Chloride, total	mg/L	02/23/2021 - 07/15/2021	CB around linear reg	14	200	52	200	Standard
APW17	UA	845	Chromium, total	mg/L	02/23/2021 - 07/15/2021	All ND - Last	0.004	0.10	0.011	0.1	Standard

TABLE 1. DETERMINATION OF POTENTIAL EXCEEDANCES
HISTORY OF POTENTIAL EXCEEDANCES
NEWTON POWER PLANT
PRIMARY ASH POND
NEWTON, ILLINOIS

Sample Location	HSU	Program	Constituent	Result Unit	Sample Date Range	Statistical Calculation	Statistical Result	GWPS	Background	Part 845 Standard	GWPS Source
APW17	UA	845	Cobalt, total	mg/L	02/23/2021 - 07/15/2021	All ND - Last	0.002	0.006	0.0043	0.006	Standard
APW17	UA	845	Fluoride, total	mg/L	02/23/2021 - 07/15/2021	CI around mean	0.37	4.0	0.63	4	Standard
APW17	UA	845	Lead, total	mg/L	02/23/2021 - 07/15/2021	All ND - Last	0.001	0.0075	0.0074	0.0075	Standard
APW17	UA	845	Lithium, total	mg/L	02/23/2021 - 07/15/2021	All ND - Last	0.020	0.040	0.030	0.04	Standard
APW17	UA	845	Mercury, total	mg/L	02/23/2021 - 07/15/2021	All ND - Last	0.0002	0.002	0.0002	0.002	Standard
APW17	UA	845	Molybdenum, total	mg/L	02/23/2021 - 07/15/2021	CB around linear reg	0.00247	0.10	0.018	0.1	Standard
APW17	UA	845	pH (field)	SU	02/23/2021 - 07/15/2021	CI around mean	7.2	6.4/9.0	6.4/7.8	6.5/9	Background/Standard
APW17	UA	845	Radium-226 + Radium 228, tot	pCi/L	02/23/2021 - 07/15/2021	CI around mean	0.51	6.9	6.9	5	Background
APW17	UA	845	Selenium, total	mg/L	02/23/2021 - 07/15/2021	All ND - Last	0.001	0.050	0.001	0.05	Standard
APW17	UA	845	Sulfate, total	mg/L	02/23/2021 - 07/15/2021	CI around mean	23	400	36	400	Standard
APW17	UA	845	Thallium, total	mg/L	02/23/2021 - 07/15/2021	All ND - Last	0.001	0.002	0.001	0.002	Standard
APW17	UA	845	Total Dissolved Solids	mg/L	02/23/2021 - 07/15/2021	CI around mean	624	1200	628	1200	Standard
APW18	UA	845	Antimony, total	mg/L	02/23/2021 - 07/15/2021	CI around median	0.003	0.006	0.003	0.006	Standard
APW18	UA	845	Arsenic, total	mg/L	02/23/2021 - 07/15/2021	CI around mean	0.000977	0.059	0.059	0.01	Background
APW18	UA	845	Barium, total	mg/L	02/23/2021 - 07/15/2021	CI around median	0.18	2.0	0.30	2	Standard
APW18	UA	845	Beryllium, total	mg/L	02/23/2021 - 07/15/2021	CI around median	0.001	0.004	0.001	0.004	Standard
APW18	UA	845	Boron, total	mg/L	02/23/2021 - 07/15/2021	CI around mean	0.10	2.0	0.26	2	Standard
APW18	UA	845	Cadmium, total	mg/L	02/23/2021 - 07/15/2021	CI around median	0.001	0.005	0.001	0.005	Standard
APW18	UA	845	Chloride, total	mg/L	02/23/2021 - 07/15/2021	CB around linear reg	-2.82	200	52	200	Standard
APW18	UA	845	Chromium, total	mg/L	02/23/2021 - 07/15/2021	CI around median	0.004	0.10	0.011	0.1	Standard
APW18	UA	845	Cobalt, total	mg/L	02/23/2021 - 07/15/2021	CI around median	0.002	0.006	0.0043	0.006	Standard
APW18	UA	845	Fluoride, total	mg/L	02/23/2021 - 07/15/2021	CI around mean	0.93	4.0	0.63	4	Standard
APW18	UA	845	Lead, total	mg/L	02/23/2021 - 07/15/2021	CI around mean	0.000336	0.0075	0.0074	0.0075	Standard
APW18	UA	845	Lithium, total	mg/L	02/23/2021 - 07/15/2021	All ND - Last	0.020	0.040	0.030	0.04	Standard

TABLE 1. DETERMINATION OF POTENTIAL EXCEEDANCES
HISTORY OF POTENTIAL EXCEEDANCES
NEWTON POWER PLANT
PRIMARY ASH POND
NEWTON, ILLINOIS

Sample Location	HSU	Program	Constituent	Result Unit	Sample Date Range	Statistical Calculation	Statistical Result	GWPS	Background	Part 845 Standard	GWPS Source
APW18	UA	845	Mercury, total	mg/L	02/23/2021 - 07/15/2021	CI around median	0.0002	0.002	0.0002	0.002	Standard
APW18	UA	845	Molybdenum, total	mg/L	02/23/2021 - 07/15/2021	CB around linear reg	-0.00885	0.10	0.018	0.1	Standard
APW18	UA	845	pH (field)	SU	02/23/2021 - 07/15/2021	CI around mean	7.4	6.4/9.0	6.4/7.8	6.5/9	Background/Standard
APW18	UA	845	Radium-226 + Radium 228, tot	pCi/L	02/23/2021 - 07/15/2021	CI around mean	1.4	6.9	6.9	5	Background
APW18	UA	845	Selenium, total	mg/L	02/23/2021 - 07/15/2021	CI around median	0.001	0.050	0.001	0.05	Standard
APW18	UA	845	Sulfate, total	mg/L	02/23/2021 - 07/15/2021	CI around mean	-1.82	400	36	400	Standard
APW18	UA	845	Thallium, total	mg/L	02/23/2021 - 07/15/2021	CI around median	0.001	0.002	0.001	0.002	Standard
APW18	UA	845	Total Dissolved Solids	mg/L	02/23/2021 - 07/15/2021	CI around mean	483	1200	628	1200	Standard

Notes:
Potential exceedance of GWPS
HSU = hydrostratigraphic unit:
UA = Uppermost Aquifer
UD = Upper Drift
Program = regulatory program data were collected under:
257 = 40 C.F.R. Part 257 Subpart D (Standards for the Disposal of Coal Combustion Residuals in Landfills and Surface Impoundments)
845 = 35 I.A.C. Part 845 (Sampling events completed to assess well locations for inclusion in the Part 845 monitoring well network)
mg/L = milligrams per liter
pCi/L = picoCuries per liter
SU = standard units
Sample Count = number of samples from Sampled Date Range used to calculate the Statistical Result
Statistical Calculation = method used to calculate the statistical result:
All ND - Last = All results were below the reporting limit, and the last determined reporting limit is shown
CB around linear reg = Confidence band around linear regression
CB around T-S line = Confidence band around Thiel-Sen line
CI around geomean = Confidence interval around the geometric mean
CI around mean = Confidence interval around the mean
CI around median = Confidence interval around the median
Most recent sample = Result for the most recently collected sample used due to insufficient data
Statistical Result = calculated in accordance with Statistical Analysis Plan using constituent concentrations observed at monitoring well during all sampling events within the specified date range
For pH, the values presented are the lower / upper limits
GWPS = Groundwater Protection Standard
GWPS Source:
Standard = standard specified in 35 I.A.C. § 845.600(a)(1)
Background = background concentration (see cover page for additional information)
Background = background concentration (see cover page for additional information)

TABLE 2. SUMMARY OF POTENTIAL EXCEEDANCES
HISTORY OF POTENTIAL EXCEEDANCES
NEWTON POWER PLANT
PRIMARY ASH POND
NEWTON, ILLINOIS

Sample Location	HSU	Program	Constituent	Result Unit	Sample Date Range	Statistical Calculation	Statistical Result	GWPS	Background	Part 845 Standard	GWPS Source
APW02	UD	845	Lithium, total	mg/L	02/17/2021 - 07/15/2021	CB around linear reg	0.092	0.040	0.030	0.04	Standard
APW02	UD	845	Sulfate, total	mg/L	02/17/2021 - 07/15/2021	CI around median	1500	400	36	400	Standard
APW02	UD	845	Total Dissolved Solids	mg/L	02/17/2021 - 07/15/2021	CI around mean	4890	1200	628	1200	Standard
APW04	UD	845	pH (field)	SU	02/18/2021 - 07/15/2021	CI around median	6.1	6.4/9.0	6.4/7.8	6.5/9	Background/Standard
APW04	UD	845	Sulfate, total	mg/L	02/18/2021 - 07/15/2021	CI around mean	887	400	36	400	Standard
APW04	UD	845	Total Dissolved Solids	mg/L	02/18/2021 - 07/15/2021	CI around mean	1710	1200	628	1200	Standard
APW05S	UD	845	Total Dissolved Solids	mg/L	02/17/2021 - 07/15/2021	CI around mean	3350	1200	628	1200	Standard
APW10	UA	257	Sulfate, total	mg/L	12/16/2015 - 07/29/2021	CI around median	410	400	15	400	Standard
APW12	UD	845	pH (field)	SU	02/17/2021 - 07/15/2021	CI around mean	6.2	6.4/9.0	6.4/7.8	6.5/9	Background/Standard

Notes:
HSU = hydrostratigraphic unit:
UA = Uppermost Aquifer
UD = Upper Drift
Program = regulatory program data were collected under:
257 = 40 C.F.R. Part 257 Subpart D (Standards for the Disposal of Coal Combustion Residuals in Landfills and Surface Impoundments)
845 = 35 I.A.C. Part 845 (Sampling events completed to assess well locations for inclusion in the Part 845 monitoring well network)
mg/L = milligrams per liter
pCi/L = picoCuries per liter
SU = standard units
Sample Count = number of samples from Sampled Date Range used to calculate the Statistical Result
Statistical Calculation = method used to calculate the statistical result:
CB around linear reg = Confidence band around linear regression
CI around mean = Confidence interval around the mean
CI around median = Confidence interval around the median
Statistical Result = calculated in accordance with Statistical Analysis Plan using constituent concentrations observed at monitoring well during all sampling events within the specified date range
For pH, the values presented are the lower / upper limits
GWPS = Groundwater Protection Standard
GWPS Source:
Standard = standard specified in 35 I.A.C. § 845.600(a)(1)
Background = background concentration (see cover page for additional information)

ATTACHMENT N

October 2021

Certification of Financial Assurance Requirements

On June 17, 2021, Illinois Power Generating Company provided financial assurance in the form of a performance bond to the Illinois Environmental Protection Agency in the amount of $59,772,973 for the Primary Ash Pond at the Newton Power Plant.

I, Matthew A. Goering, Senior Vice President of Illinois Power Generating Company, do hereby certify to the best of my knowledge for the above referenced CCR Unit that the financial assurance instrument satisfies the requirements of 35 I.A.C. Part 845, Subpart I.

Matthew A. Goering
Senior Vice President
Illinois Power Generating Company

ATTACHMENT O

Stantec

Stantec Consulting Services Inc.
1859 Bowles Avenue Suite 250, Fenton MO 63026-1944

October 12, 2016
File: let_006_175666013_certification
Revision 0

Initial Hazard Potential Classification Assessment
EPA Final CCR Rule
Primary Ash Pond
Newton Power Station
Jasper County, Illinois

1.0 PURPOSE

This report documents Stantec's certification of the initial hazard potential classification assessment for the Newton Power Station Primary Ash Pond.

40 CFR 257.73(a)(2) requires the owner or operator of an existing CCR surface impoundment to conduct an initial hazard potential classification assessment and document the hazard potential classification, and the basis for the classification, of the CCR unit as either a high hazard potential CCR surface impoundment, a significant hazard potential CCR surface impoundment, or a low hazard potential CCR surface impoundment.

2.0 FINDINGS

A visual analysis was performed to evaluate potential hazards associated with a failure of the Primary Ash Pond perimeter containment dike. Breach failure scenarios were analyzed at the west, north, northeast, southeast and southwest faces of the embankment. Breach locations were selected based on locations of nearby downstream structures and locations that could be potentially occupied by people. Potential for impacts were evaluated by determining probable breach flow paths using available elevation data and imagery of the impoundment along with the surrounding area.

Analyses indicate that a breach of the west and north embankments have potential to impact Landfill 1 and 2 with discharge eventually reaching the Landfill Stormwater Runoff Pond No. 1 and the western branch of Newton Lake. A breach of the northeast embankment will impact the construction pond, railroad running parallel with the embankment, temporary facilities associated with the power station and the eastern branch of Newton Lake. A breach of the southeast embankment would likely result in CCR and water being discharged into the eastern branch of Newton Lake. A breach of the southwest embankment would result in a discharge of CCR and water into the Secondary Pond and the east and west branches of Newton Lake. Based on the visual analysis of the breach scenarios, it does not appear likely that such an event would result in probable loss of human life. However, it is anticipated that a breach failure at critical locations of the containment dike would result in the release of the stored CCR materials into downstream areas and waterways which could cause environmental damage.

40 CFR 257.53 defines a "significant hazard potential CCR surface impoundment" as a diked surface impoundment where failure or mis-operation results in no probable loss of human life, but can cause economic loss, environmental damage, disruption of lifeline facilities, or impact other concerns.

Based on the results of the analysis summarized above, the Primary Ash Pond was assigned a Significant hazard potential classification per 40 CFR 257.53.

3.0 QUALIFIED PROFESSIONAL ENGINEER CERTIFICATION

I, Matthew Hoy, being a Professional Engineer in good standing in the State of Illinois, do hereby certify, to the best of my knowledge, information, and belief that;

1. the information contained in this report and the underlying data in the operating record was prepared in accordance with the accepted practice of engineering and is accurate as of the date of my signature below; and

2. the initial hazard potential classification assessment for the Newton Power Station Primary Ash Pond was conducted in accordance with the requirements specified in 40 CFR 257.73.

SIGNATURE ______________________ DATE 10/12/2016

ADDRESS: Stantec Consulting Services Inc.
1859 Bowles Avenue Suite 250
Fenton MO 63026-1944

TELEPHONE: (636) 343-3880

LICENSED PROFESSIONAL ENGINEER
MATTHEW A. HOY
062-063141
STATE OF ILLINOIS

Documentation of Initial Hazard Potential Classification Assessment

Primary Ash Pond
Newton Power Station
Jasper County, Illinois

Prepared for:
Dynegy

October 12, 2016

Stantec Consulting Services Inc.
Design with community in mind
www.stantec.com

Table of Contents

Section **Page No.**

List of Appendixes

Executive Summary

This report documents the hazard potential classification assessment for the Primary Ash Pond at the Newton Power Station as required per the CCR Rule in 40 C.F.R. § 257.73- (a)(2). The applicable hazard potential classifications are defined in 40 C.F.R. § 257.53 as follows:

> (1) High hazard potential CCR surface impoundment means a diked surface impoundment where failure or mis-operation will probably cause loss of human life.
>
> (2) Significant hazard potential CCR surface impoundment means a diked surface impoundment where failure or mis-operation results in no probable loss of human life, but can cause economic loss, environmental damage, disruption of lifeline facilities, or impact other concerns.
>
> (3) Low hazard potential CCR surface impoundment means a diked surface impoundment where failure or mis-operation results in no probable loss of human life and low economic and/or environmental losses. Losses are principally limited to the surface impoundment owner's property.

Based on these definitions and the analysis herein, the Primary Ash Pond should be classified as a Significant Hazard potential CCR surface impoundment

This report contains supporting documentation for the hazard potential classification assessment. The hazard potential classification for this CCR unit was determined by a visual assessment conducted by Stantec in August, 2016.

1. Introduction

1.1. Background

The CCR Rule was published in the Federal Register on April 17, 2015. The Rule requires that a hazard potential classification assessment be performed for existing CCR surface impoundments that are not incised. A previously completed assessment may be used in lieu of the initial assessment provided the previous hazard assessment was completed no earlier than April 17, 2013. The applicable hazard potential classifications are defined in the CCR Rule 40 C.F.R. § 257.53 as follows:

High Hazard Potential CCR surface impoundment means a diked surface impoundment where failure or mis-operation will probably cause loss of human life.

Significant Hazard Potential CCR surface impoundment means a diked surface impoundment where failure or mis-operation results in no probable loss of human life, but can cause economic loss, environmental damage, disruption of lifeline facilities, or impact other concerns.

Low Hazard Potential CCR surface impoundment means a diked surface impoundment where failure or mis-operation results in no probable loss of human life and low economic and/or environmental losses. Losses are principally limited to the surface impoundment owner's property.

Dynegy has contracted Stantec Consulting Services Inc. (Stantec) to prepare hazard potential classification assessments for selected impoundments[1].

It was determined that there was no existing available hazard potential classification assessment documentation for the Primary Ash Pond.

1.2. Location

The Newton Power Station is located on the west bank of Newton Lake in South Muddy Township, Jasper County, Illinois. The station is located approximately eight miles southwest of the Town of Newton, Illinois.

The Primary Ash Pond is located south of the power station adjacent to Landfill 1. A site layout and overview map is included as Figure 1 in Appendix A.

2. Source Data

The following information was used to perform the hazard assessment of the Primary Ash Pond:

[1] Dynegy Administrative Services Company (Dynegy) contracted Stantec on behalf of the Newton Power Station owner, Illinois Power Generating Company. Thus, Dynegy is referenced in this report.

- Aerial Imagery (USDA National Aerial Imagery Program 2015)
- Topographic Survey Information for the area around the Primary Ash Pond and Landfill 1 (Weaver Consultants Group for Dynegy, December 2015) – 1 foot contour data and planimetrics
- LiDAR Data (Illinois Height Modernization Program ILHMP 2011) – < 9 cm vertical accuracy

3. Potential Failure Scenarios

3.1. Unit Description

The Primary Ash Pond is a diked earthen impoundment extending over an area of approximately 670 acres. The crest of the impoundment is about 15 foot wide at an approximate elevation of 555.0 feet (unless noted, all elevations are referenced to the North American Vertical Datum of 1988 (NAVD88)) with an average adjacent ground elevation outside of the impoundment of about 530.0 feet. The pond has an operating pool about 268.8 acres in size, which currently has a water surface elevation of about 533.5 feet (the interior base of the pond is partially incised). The Primary Ash Pond discharges to the southwest through a concrete control structure to the Secondary Ash Pond.

The Secondary Ash Pond is a diked earthen impoundment covering about 20.9 acres with an average embankment height of about 10 feet. Water from the Primary Ash Pond discharges into the north side of the Secondary Ash Pond, while water from the Secondary Ash Pond discharges into Newton Lake at the south side of the impoundment.

3.2. Failure Scenarios

The Primary Ash Pond earthen dike is elevated above the adjacent grade by about 20 to 25 feet. The impoundment could potentially fail due to a breach of the embankment at any point along its length; therefore, no areas were excluded from evaluation. The embankment was split into sections, and four failure scenarios were evaluated as summarized below.

3.2.1. Scenario 1: West and North Embankment Failure

A failure of this section of the embankment toward the north would discharge into the low area contained to the north and east by the railroad and the west by Landfill 1. A breach in this area would discharge westward towards Landfill 1 along the ditch located at the toe of the Primary Ash Pond embankment. The flow would split at the northwest corner of the Primary Ash Pond and be routed south on either side of Landfill 2. Once the flow passes Landfill 2, it will partially be captured by the Landfill Stormwater Runoff Pond No. 1, with the remaining flow discharging into the western branch of Newton Lake.

A failure of this section of the embankment to the west would be guided by Landfill 1 and 2. Discharge from this breach would also flow into the Landfill Stormwater Runoff Pond No. 1 and the western branch of Newton Lake.

3.2.2. Scenario 2: Northeast Embankment Failure

A failure of this section of the embankment to the northeast would discharge into the area around the Construction Pond and to the eastern branch of Newton Lake. There is a railroad that runs along the base of the embankment that would be significantly impacted by a failure in this direction. However, any structures that might be impacted by a breach in this direction are believed to be temporary facilities associated with the Newton Power Station.

3.2.3. Scenario 3: Southeast Embankment Failure

A failure of this section of the embankment in the southeast direction would result in CCR and water being discharged into the eastern branch of Newton Lake causing significant environmental impacts.

Theoretically, a breach in this direction could cause the pool level in Newton Lake to rise, with the extent of the rise being dependent on the volume of the breach. Based on approximate calculations, the Primary Ash Pond has a pool area of about 270 acres. If the average depth is about 20 feet, about 5,400 acre-feet of water would be lost during a breach. Newton Lake is approximately 2,720 acres in size. A complete breach of the Primary Ash Pond pool that spreads out over the entirety of Newton Lake would result in a rise of about 2 feet.

In addition, if the average depth of stacked waste over the remaining 400 acres of the pond is about 10 feet, that constitutes another potential 4,000 acre-feet of volume. If it is assumed that only about a third of the solids would be lost during a breach event, the combination of solids and water would result in about 6,800 acre-feet of volume for a rise of about 2.5 feet in Newton Lake. The assumption that 1/3 of the solids volume would be lost is based in part on Stantec’s experience with other CCR surface impoundment failures and is supported by industry literature. Additionally, for breach purposes solid outflow was conservatively assumed to behave the same as liquids.

There does not appear to be any permanent structures or roadways along Newton Lake that would be adversely impacted by a breach related rise to the extent that lives would be placed at risk. There are two recreation areas with parking lots adjacent to the lake within a 1 mile travel distance of the Primary Ash Pond, but these areas are sufficiently elevated above the lake to pose minimal risk to any people that might be present at the time of a breach.

3.2.4. Scenario 4: Southwest Embankment Failure

A failure of the pond in the southwest direction would result in a discharge of water and CCR into the Secondary Pond and the east and west branches of Newton Lake.

Similar to the southeast embankment failure, it is unlikely this scenario would impact any structures or put any lives at risk downstream. However, there would be an environmental impact to Newton Lake.

4. Hazard Classification

Areas of potential impact were identified with results discussed in Section 3.2 of this report. Based on the results from the analysis of the Primary Ash Pond, it is Stantec's opinion that a breach of the Primary Ash Pond would not result in probable loss of human life, but can cause economic loss, environmental damage, disruption of lifeline facilities, or impact other concerns.

Therefore, the Primary Ash Pond fits the definition for Significant Hazard Potential CCR surface impoundments (as defined in the CCR Rule §257.53) (Reference 1).

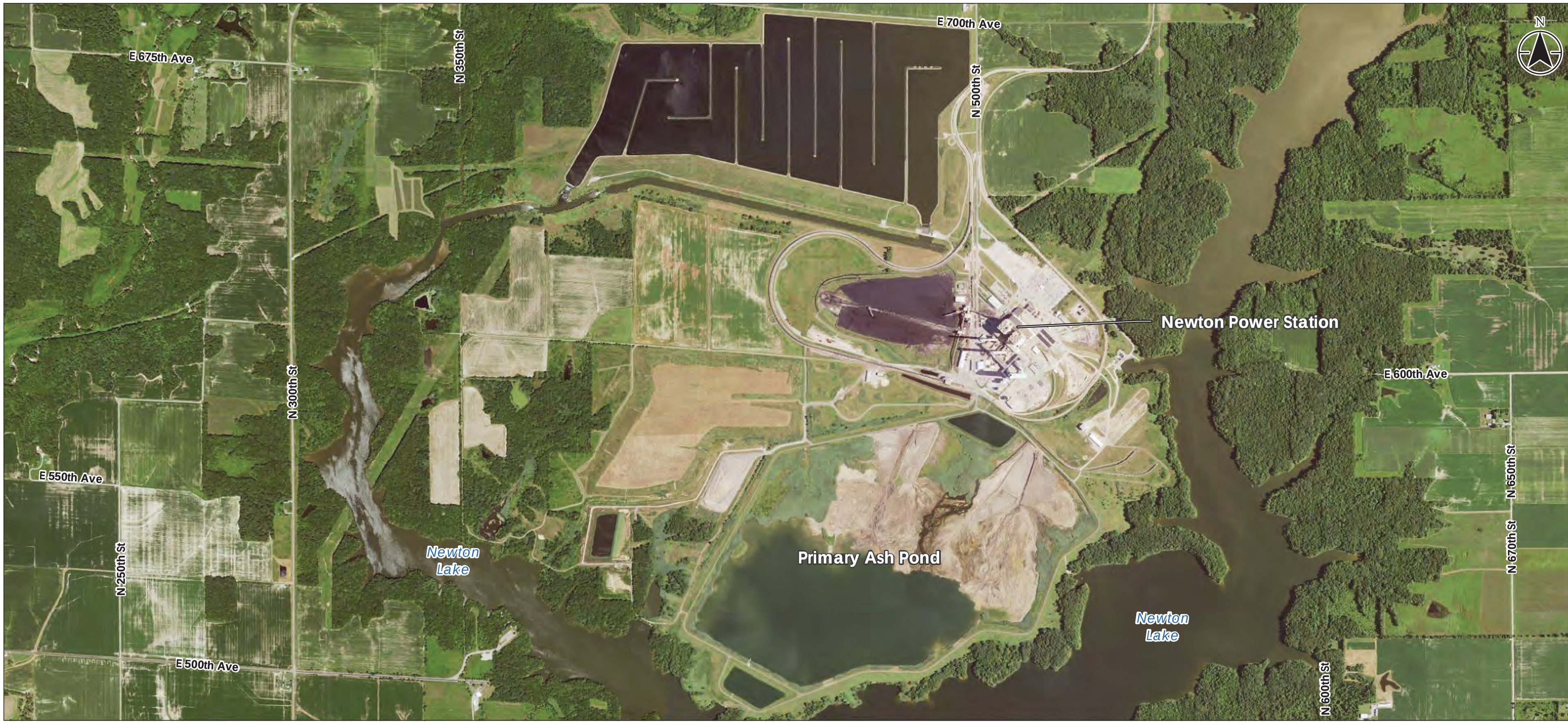
5. References

1. EPA Hazardous and Solid Waste Management System; Disposal of Coal Combustion Residuals from Electric Utilities, 40 CFR § 257 and § 261 (effective April 17, 2015).

2. Newton Power Station; Coal Ash Impoundment Site Assessment Report (April 2011).

Appendix A

Site Overview Figure



0 2,000 Feet
1:24,000 (At original document size of 11x17)

Stantec DYNEGY

Project Location
Latitude: 38.936621
Longitude: -88.277038
Jasper County, Illinois

175605019
Prepared by WSW on 2016-10-05
Technical Review by NS on 2016-10-05
Independent Review by MH on 2016-10-05

Client/Project
Dynegy
Hazard Potential Classification Assessment
Newton Power Station

Figure No.
1

Title
Site Overview Figure
Primary Ash Pond
Newton Power Station

Notes
1. Coordinate System: WGS 1984 Web Mercator Auxiliary Sphere
2. Aerial Source: 2015 NAIP Imagery
3. Impoundment Boundaries Provided by Client (Dated 9/9/2015)

ATTACHMENT P

October 2021

R001362

AECOM

Submitted to
Illinois Power Generating Company
6725 North 500th Street
Newton, IL 62448

Submitted by
AECOM
1001 Highlands Plaza Drive West
Suite 300
St. Louis, MO 63110

October 2016

CCR Rule Report: Initial Structural Stability Assessment

For

Primary Ash Pond

At Newton Power Station

1 Introduction

This Coal Combustion Residual (CCR) Rule Report documents that the Primary Ash Pond at the Illinois Power Generating Company Newton Power Station meets the structural stability assessment requirements specified in 40 Code of Federal Regulations (CFR) §257.73(d). The Primary Ash Pond is located near Newton, Illinois in Jasper County, approximately 0.2 miles southwest of the Newton Power Station. The Primary Ash Pond serves as the wet impoundment basin for CCR produced by the Newton Power Station.

The Primary Ash Pond is an existing CCR surface impoundment as defined by 40 CFR §257.53. The CCR Rule requires that an initial structural stability assessment for an existing CCR surface impoundment be completed by October 17, 2016. In general, the initial structural stability assessment must document that the design, construction, operation, and maintenance of the CCR unit is consistent with recognized and generally accepted good engineering practices.

The owner or operator of the CCR unit must obtain a certification from a qualified professional engineer stating that the initial structural stability assessment was conducted in accordance with the requirements of 40 CFR § 257.73(d). The owner or operator must prepare a periodic structural stability assessment every five years.

2 Initial Structural Stability Assessment

40 CFR §257.73(d)(1)
The owner or operator of the CCR unit must conduct initial and periodic structural stability assessments and document whether the design, construction, operation, and maintenance of the CCR unit is consistent with recognized and generally accepted good engineering practices for the maximum volume of CCR and CCR wastewater which can be impounded therein. The assessment must, at a minimum, document whether the CCR unit has been designed, constructed, operated, and maintained with [the standards in (d)(1)(i)-(vii)].

An initial structural stability assessment has been performed to document that the design, construction, operation and maintenance of the Primary Ash Pond is consistent with recognized and generally accepted good engineering practices and meets the standards in 257.73(d)(1)(i)-(vii). The results of the structural stability assessment are discussed in the following sections. Based on the assessment and its results, the design, construction, operation, and maintenance of the Primary Ash Pond were found to be consistent with recognized and generally accepted good engineering practices.

2.1 Foundations and Abutments (§257.73(d)(1)(i))

CCR unit designed, constructed, operated, and maintained with stable foundations and abutments.

The stability of the foundations was evaluated using soil data from field investigations and reviewing design drawings, operational and maintenance procedures, and conditions observed in the field by AECOM. Additionally, slope stability analyses were performed to evaluate slip surfaces passing through the foundations. The Primary Ash Pond is a ring dike structure and does not have abutments.

The foundation consists of stiff to hard soil, which indicates stable foundations. Slope stability analyses exceed the criteria listed in §257.73(e)(1) for slip surfaces passing through the foundation. The slope stability analyses are discussed in the *CCR Rule Report: Initial Safety Factor Assessment for Primary Ash Pond at Newton Power Station* (October 2016). A review of operational and maintenance procedures as well as current and past performance of the dikes has determined appropriate processes are in place for continued operational performance.

Based on the conditions observed by AECOM, the Primary Ash Pond was designed and constructed with stable foundations. Operational and maintenance procedures are in place to address any issues related to the stability of foundations; therefore, the Primary Ash Pond meets the requirements in §257.73(d)(1)(i).

2.2 Slope Protection (§257.73(d)(1)(ii))

CCR unit designed, constructed, operated, and maintained with adequate slope protection to protect against surface erosion, wave action and adverse effects of sudden drawdown.

The adequacy of slope protection was evaluated by reviewing design drawings, operational and maintenance procedures, and conditions observed in the field by AECOM.

Based on this evaluation, adequate slope protection was designed and constructed at the Primary Ash Pond. No evidence of significant areas of erosion or wave action were observed. The interior and exterior slopes are protected with vegetation. Where the exterior slopes are adjacent to Newton Lake, they are protected with crushed stone erosion protection. Crushed stone erosion protection is also located on the interior slopes in limited areas. Operational and maintenance procedures are in place to repair the vegetation as needed to protect against surface erosion or wave action. Sudden drawdown of the pool in the Primary Ash Pond is not expected to occur due to operational controls associated with lowering the pool level. Therefore, slope protection to protect against the adverse effects of sudden drawdown is not required as sudden drawdown conditions are not expected to occur. Therefore, the Primary Ash Pond meets the requirements in §257.73(d)(1)(ii).

2.3 Dike Compaction (§257.73(d)(1)(iii))

CCR unit designed, constructed, operated, and maintained with dikes mechanically compacted to a density sufficient to withstand the range of loading conditions in the CCR unit.

The density of the dike materials was evaluated using soil data from field investigations and reviewing design drawings, operational and maintenance procedures, and conditions observed in the field by AECOM. Additionally, slope stability analyses were performed to evaluate slip surfaces passing through the dike over the range of expected loading conditions as defined within §257.73(e)(1).

Based on this evaluation, the dike consists of stiff material, with isolated zones of soft, medium stiff, and very stiff material, which is indicative of mechanically compacted dikes. Slope stability analyses exceed the criteria listed in §257.73(e)(1) for slip surfaces passing through the dike; therefore, the original design and construction of the Primary Ash Pond included sufficient dike compaction. The slope stability analyses are discussed in the *CCR Rule Report: Initial Safety Factor Assessment for Primary Ash Pond at Newton Power Station* (October 2016); Operational and maintenance procedures are in place to identify and mitigate deficiencies in order to maintain sufficient density and compaction of the dikes to withstand the range of loading conditions. Therefore, the Primary Ash Pond meets the requirements in §257.73(d)(1)(iii).

2.4 Vegetated Slopes (§257.73(d)(1)(iv))[1]

CCR unit designed, constructed, operated, and maintained with vegetated slopes of dikes and surrounding areas, except for slopes which have an alternate form or forms of slope protection.

The adequacy of slope vegetation was evaluated by reviewing design drawings, operational and maintenance procedures, and conditions observed in the field by AECOM.

Based on this evaluation, the vegetation on the interior and exterior slopes is adequate as no substantial bare or overgrown areas were observed. Crushed stone erosion protection is present on portions of the exterior slopes adjacent to Newton Lake and is used as an alternative form of slope protection, which is adequate as significant areas of erosion were not observed. Therefore, the original design and construction of the Primary Ash Pond included adequate vegetation of the dikes and surrounding areas. Adequate operational and maintenance procedures are in place to regularly manage vegetation growth, including mowing and seeding any bare areas, as evidenced by the conditions observed by AECOM. Therefore, the Primary Ash Pond meets the requirements in §257.73(d)(1)(iv).

[1] As modified by court order issued June 14, 2016, Utility Solid Waste Activities Group v. EPA, D.C. Cir. No. 15-1219 (order granting remand and vacatur of specific regulatory provisions).

2.5 Spillways (§257.73(d)(1)(v))

CCR unit designed, constructed, operated, and maintained with a single spillway or a combination of spillways configured as specified in [paragraph (A) and (B)]:

(A) All spillways must be either:

(1) of non-erodible construction and designed to carry sustained flows; or

(2) earth- or grass-lined and designed to carry short-term, infrequent flows at non-erosive velocities where sustained flows are not expected.

(B) The combined capacity of all spillways must adequately manage flow during and following the peak discharge from a:

(1) Probable maximum flood (PMF) for a high hazard potential CCR surface impoundment; or

(2) 1000-year flood for a significant hazard potential CCR surface impoundment; or

(3) 100-year flood for a low hazard potential CCR surface impoundment.

The spillways were evaluated using design drawings, operational and maintenance procedures, and conditions observed in the field by AECOM. Additionally, hydrologic and hydraulic analyses were completed to evaluate the capacity of the spillway relative to inflow estimated for the 1,000-year flood event for the significant hazard potential Primary Ash Pond. The hazard potential classification assessment was performed by Stantec in 2016 in accordance with §257.73(a)(2).

The spillways are comprised of concrete and sliplined corrugated metal pipes, which are non-erodible materials designed to carry sustained flows. The capacity of the spillway was evaluated using hydrologic and hydraulic analysis performed per §257.82(a). The analysis found that the spillways can adequately manage flow during peak discharge resulting from the 1,000-year storm event without overtopping of the embankments. The hydrologic and hydraulic analyses are discussed in the *CCR Rule Report: Initial Inflow Design Flood Control System Plan for Primary Ash Pond at Newton Power Station* (October 2016). Operational and maintenance procedures are in place to repair any issues with the spillways and remove debris or other obstructions from the spillways, as evidenced by the conditions observed by AECOM. As a result, these procedures are appropriate for maintaining the spillways. Therefore, the Primary Ash Pond meets the requirements in §257.73(d)(1)(v).

2.6 Stability and Structural Integrity of Hydraulic Structures (§257.73(d)(1)(vi))

CCR unit designed, constructed, operated, and maintained with hydraulic structures underlying the base of the CCR unit or passing through the dike of the CCR unit that maintain structural integrity and are free of significant deterioration, deformation, distortion, bedding deficiencies, sedimentation, and debris which may negatively affect the operation of the hydraulic structure.

The stability and structural integrity of the slip-lined corrugated metal pipe (CMP) outflow pipes passing through the dike of the Primary Ash Pond were evaluated using design drawings, operational and maintenance procedures, closed-circuit television (CCTV) pipe inspection, and conditions observed in the field by AECOM. No other hydraulic structures are known to pass through the dike of or underlie the base of the Primary Ash Pond.

The CCTV pipe inspection of the slip-lined CMP outflow pipes covered the complete length of both pipes and found the pipes to be free of significant deterioration, deformation, distortion, bedding deficiencies, sedimentation, and debris that may negatively affect the operation of the hydraulic structure. Operational and maintenance procedures are in place to repair any issues with the spillway and remove debris or other obstructions from the spillways, as evidenced by the conditions observed by AECOM. As a result, these procedures are appropriate for maintaining the spillway. Therefore, the Primary Ash Pond meets the requirements in §257.73(d)(1)(vi).

2.7 Downstream Slope Inundation/Stability (§257.73(d)(1)(vii))

CCR unit designed, constructed, operated, and maintained with, for CCR units with downstream slopes which can be inundated by the pool of an adjacent water body, such as a river, stream or lake, downstream slopes that maintain structural stability during low pool of the adjacent water body or sudden drawdown of the adjacent water body.

The structural stability of the downstream slopes of the Primary Ash Pond was evaluated by comparing the location of the Primary Ash Pond relative to adjacent water bodies using published Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps (FIRM), aerial imagery, conditions observed in the field by AECOM, and sudden drawdown slope stability analyses.

Based on this evaluation, Newton Lake is adjacent to the southern downstream slopes of the Primary Ash Pond. No other rivers, streams, or lakes are adjacent to the downstream slopes of the Primary Ash Pond. Sudden drawdown slope stability analyses were performed at 4 cross sections adjacent to Newton Lake, and considered a drawdown from a normal pool to empty pool condition, thereby evaluating both sudden drawdown and empty and low pool conditions. The resulting factors of safety were found to satisfy the criteria listed in United States Army Corps of Engineers Engineer Manual 1110-2-1902 for drawdown from normal to low pool, as factor of safety criteria for sudden drawdown slope stability is not expressly stated as a requirement of §257.73(d)(1)(vii). Therefore, the Primary Ash Pond meets the requirements listed in §257.73(d)(1)(vii).

3 Certification Statement

CCR Unit: Illinois Power Generating Company; Newton Power Station; Primary Ash Pond

I, Victor A. Modeer, being a Registered Professional Engineer in good standing in the State of Illinois, do hereby certify, to the best of my knowledge, information, and belief that the information contained in this CCR Rule Report, and the underlying data in the operating record, has been prepared in accordance with the accepted practice of engineering. I certify, for the above-referenced CCR Unit, that the initial structural stability assessment dated October 13, 2016 was conducted in accordance with the requirements of 40 CFR § 257.73(d).

VICTOR A MODEER JR

Printed Name

10/13/16

Date

VICTOR ALBERT MODEER JR.
062-043112
REGISTERED
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11/30/17

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ATTACHMENT Q

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Submitted by
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St. Louis, MO 63110

October 2016

CCR Rule Report: Initial Safety Factor Assessment

For

Primary Ash Pond

At Newton Power Station

1 Introduction

This Coal Combustion Residual (CCR) Rule Report documents that the Primary Ash Pond at the Illinois Power Generating Company Newton Power Station meets the safety factor assessment requirements specified in 40 Code of Federal Regulations (CFR) §257.73(e). The Primary Ash Pond is located near Newton, Illinois in Jasper County, approximately 0.2 miles southwest of the Newton Power Station. The Primary Ash Pond serves as the wet impoundment basin for CCR produced by the Newton Power Station.

The Primary Ash Pond is an existing CCR surface impoundment as defined by 40 CFR §257.53. The CCR Rule requires that the initial safety factor assessment for an existing CCR surface impoundment be completed by October 17, 2016.

The owner or operator of the CCR unit must obtain a certification from a qualified professional engineer stating that the initial safety factor assessment meets the requirements of 40 CFR § 257.73(e). The owner or operator must prepare a safety factor assessment every five years.

2 Initial Safety Factor Assessment

40 CFR §257.73(e)(1)
The owner or operator must conduct initial and periodic safety factor assessments for each CCR unit and document whether the calculated factors of safety for each CCR unit achieve the minimum safety factors specified in (e)(1)(i) through (iv) of this section for the critical cross section of the embankment. The critical cross section is the cross section anticipated to be the most susceptible of all cross sections to structural failure based on appropriate engineering considerations, including loading conditions. The safety factor assessments must be supported by appropriate engineering calculations.
(i) The calculated static factor of safety under the long-term, maximum storage pool loading condition must equal or exceed 1.50.
(ii) The calculated static factor of safety under the maximum surcharge pool loading condition must equal or exceed 1.40.
(iii) The calculated seismic factor of safety must equal or exceed 1.00.
(iv) For dikes constructed of soils that have susceptibility to liquefaction, the calculated liquefaction factor of safety must equal or exceed 1.20.

A geotechnical investigation program and stability analyses were performed to evaluate the design, performance, and condition of the earthen dikes of the Primary Ash Pond. The exploration consisted of hollow-stem auger borings, cone penetration testing, piezometer installation and laboratory program including strength, hydraulic conductivity, consolidation, and index testing. Data collected from the geotechnical investigation, available design drawings, construction records, inspection reports, previous engineering investigations, and other pertinent historic documents were utilized to perform the safety factor assessment and geotechnical analyses.

In general, the subsurface conditions at the Primary Ash Pond consist of medium stiff to stiff embankment fill (clay) overlying stiff to hard clay, which in turn overlies very stiff to very hard glacial till. Phreatic water is above the embankment/foundation of the Primary Ash Pond.

Ten (10) representative cross sections were analyzed using limit equilibrium slope stability analysis software to evaluate stability of the perimeter dike system and foundations. The cross sections were located to represent critical surface geometry, subsurface stratigraphy, and phreatic conditions across the site. Each cross section was evaluated for each of the loading conditions stipulated in §257.73(e)(1).

The Soils Susceptible to Liquefaction loading condition, §257.73(e)(1)(iv), was not evaluated because a liquefaction susceptibly evaluation did not find soils susceptible to liquefaction within the Primary Ash Pond dikes. As a result, this loading condition is not applicable to the Primary Ash Pond at the Newton Power Station.

Results of the Initial Safety Factor Assessments for the critical cross-section for each loading condition (i.e., the lowest calculated factor of safety out of the 10 cross sections analyzed for each loading condition) are listed in Table 1.

Table 1 – Summary of Initial Safety Factor Assessments

Loading Conditions	§257.73(e)(1) Subsection	Minimum Factor of Safety	Calculated Factor of Safety
Maximum Storage Pool Loading	(i)	1.50	1.66
Maximum Surcharge Pool Loading	(ii)	1.40	1.66
Seismic	(iii)	1.00	1.07
Soils Susceptible to Liquefaction	(iv)	1.20	Not Applicable

Based on this evaluation, the Primary Ash Pond meets the requirements in §257.73(e)(1).

3 Certification Statement

CCR Unit: Illinois Power Generating Company; Newton Power Station; Primary Ash Pond

I, Victor A. Modeer, being a Registered Professional Engineer in good standing in the State of Illinois, do hereby certify, to the best of my knowledge, information, and belief that the information contained in this CCR Rule Report, and the underlying data in the operating record, has been prepared in accordance with the accepted practice of engineering. I certify, for the above-referenced CCR Unit, that the initial safety factor assessment dated October 13, 2016 meets the requirements of 40 CFR §257.73(e).

VICTOR A MODEER JR.
Printed Name

10/13/16
Date

VICTOR ALBERT MODEER JR.
062-043112
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11/30/17

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ATTACHMENT R

October 2021

AECOM

Submitted to
Illinois Power Generating Company
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Newton, IL 62448

Submitted by
AECOM
1001 Highlands Plaza Drive West
Suite 300
St. Louis, MO 63110

October 2016

CCR Rule Report: Initial Inflow Design Flood Control System Plan

For

Primary Ash Pond

At Newton Power Station

1 Introduction

This Coal Combustion Residual (CCR) Rule Report documents that the initial inflow design flood control system plan for the Primary Ash Pond at the Illinois Power Generating Company Newton Power Station meets the requirements specified in 40 Code of Federal Regulations (CFR) §257.82. The Primary Ash Pond is located near Newton, Illinois in Jasper County, approximately 0.2 miles southwest of the Newton Power Station. The Primary Ash Pond serves as the wet impoundment basin for CCR produced by the Newton Power Station.

The Primary Ash Pond is an existing CCR surface impoundment as defined by 40 CFR §257.53. The CCR Rule requires that the initial inflow design flood control system plan for an existing CCR surface impoundment be prepared by October 17, 2016. The plan must document how the inflow design flood control system has been designed and constructed to meet the requirements of 40 CFR §257.82 and be supported by appropriate engineering calculations.

The owner or operator of the CCR unit must obtain a certification from a qualified professional engineer stating that the inflow design flood control system meets the requirements of 40 CFR §257.82. The owner or operator must prepare an inflow design flood control system plan every five years.

2 Initial Inflow Design Flood Control System Plan

40 CFR §257.82
(a) The owner or operator of an existing … CCR surface impoundment … must design, construct, operate, and maintain an inflow design flood control system as specified in paragraphs (a)(1) and (2) of this section.
(1) The inflow design flood control system must adequately manage flow into the CCR unit during and following the peak discharge of the inflow design flood specified in paragraph (a)(3) of this section.
(2) The inflow design flood control system must adequately manage flow from the CCR unit to collect and control the peak discharge resulting from the inflow design flood specified in paragraph (a)(3) of this section.
(3) The inflow design flood is:
(i) For a high hazard potential CCR surface impoundment, …, the probable maximum flood;
(ii) For a significant hazard potential CCR surface impoundment, …, the 1,000-year flood;
(iii) For a low hazard potential CCR surface impoundment, …, the 100-year flood; or
(iv) For an incised CCR surface impoundment, the 25-year flood.
(b) Discharge from the CCR unit must be handled in accordance with the surface water requirements under §257.3-3.

Analyses completed for the initial inflow design flood control system plan of the Primary Ash Pond are described in the following subsections. Data and analysis results in the following subsections are based on spillway design information shown on design drawings, construction information, topographic surveys, information about operational and maintenance procedures provided by Illinois Power Generating Company, and field measurements collected by AECOM. The analysis approach and results of the hydrologic and hydraulic analyses are presented in the following subsections.

The Primary Ash Pond has a significant hazard potential based on the initial hazard potential classification assessment performed by Stantec in 2016 in accordance with §257.73(a)(2).

2.1 Initial Inflow Design Flood Control Systems (§257.82(a))

An initial inflow design flood control system plan, supported by a hydraulic and hydrologic analysis, was developed for the Primary Ash Pond by evaluating the effects of a 24-hour duration design storm for the 1,000-year Inflow Design Flood (IDF) using a hydrologic HydroCAD (Version 10) computer model and a starting water surface elevation of 534.0 feet. The computer model evaluated the Primary Ash Pond's ability to collect and control the 1,000-year IDF under existing operational and maintenance procedures. Rainfall data for the 1,000-year IDF was obtained from the National Oceanic and Atmospheric Administration (NOAA) Atlas 14. The NOAA Atlas 14 rainfall depth is 9.01 inches.

The HydroCAD model results for the Primary Ash Pond indicate that the CCR unit has sufficient storage capacity and spillway structures to adequately manage (1) flow into the CCR unit during and following the peak discharge of the 1,000-year IDF and (2) flow from the CCR unit to collect and control the peak discharge resulting from the 1,000-year IDF. The peak water surcharge elevation is 534.9 feet during the IDF, and the minimum crest elevation of the Primary Ash Pond dike is 552.7 feet. Therefore, overtopping is not expected.

Based on this evaluation, the Primary Ash Pond meets the requirements in §257.82(a).

2.2 Discharge from the CCR Unit (§257.82(b))

40 CFR §257.82(b) provides that the discharge from the CCR unit must be handled in accordance with the surface water requirements under 40 CFR §257.3-3, which states the following:

(a) For purposes of section 4004(a) of the Act, a facility shall not cause a discharge of pollutants into waters of the United States that is in violation of the requirements of the National Pollutant Discharge Elimination System (NPDES) under section 402 of the Clean Water Act, as amended.

(b) For purposes of section 4004(a) of the Act, a facility shall not cause a discharge of dredged material or fill material to waters of the United States that is in violation of the requirements under section 404 of the Clean Water Act, as amended.

(c) A facility or practice shall not cause non-point source pollution of waters of the United States that violates applicable legal requirements implementing an areawide or Statewide water quality management plan that has been approved by the Administrator under section 208 of the Clean Water Act, as amended.

(d) Definitions of the terms Discharge of dredged material, Point source, Pollutant, Waters of the United States, and Wetlands can be found in the Clean Water Act, as amended, 33 U.S.C. 1251 et seq., and implementing regulations, specifically 33 CFR part 323 (42 FR 37122, July 19, 1977).

The handling of discharge was evaluated by reviewing design drawings, operational and maintenance procedures, conditions observed in the field by AECOM, and the inflow design flood control system plan developed per §257.82(a).

Based on this evaluation, outflow from the Primary Ash Pond is ultimately routed through a NPDES-permitted discharge into Newton Lake. Hydraulic and hydrologic analyses performed as part of the initial inflow design flood control system plan found that the Primary Ash Pond adequately manages outflow during the 1,000-year IDF, as overtopping of the Primary Ash Pond embankments is not expected.

Therefore, discharge of pollutants in violation of the NPDES permit is not expected as all discharge is routed and controlled through the existing spillway system and NPDES-permitted outfall during both normal and IDF conditions. Based on this evaluation, the Primary Ash Pond meets the requirements in §257.82(b).

3 Certification Statement

CCR Unit: Illinois Power Generating Company; Newton Power Station; Primary Ash Pond

I, Victor A. Modeer, being a Registered Professional Engineer in good standing in the State of Illinois, do hereby certify, to the best of my knowledge, information, and belief that the information contained in this CCR Rule Report, and the underlying data in the operating record, has been prepared in accordance with the accepted practice of engineering. I certify, for the above-referenced CCR Unit, that the initial inflow design flood control system plan dated October ____, 2016 meets the requirements of 40 CFR §257.82.

VICTOR A MODEER JR.
Printed Name

10/13/16
Date

VICTOR ALBERT MODEER JR.
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ATTACHMENT S

PART 845 SAFETY AND HEALTH PLAN

NEWTON POWER PLANT PRIMARY ASH POND

CONTENTS

APPENDICES

ACRONYMS & ABBREVIATIONS

%	Percent
§	Section
35 I.A.C.	Title 35 of the Illinois Administrative Code
29 C.F.R.	Title 29 of the Code of Federal Regulations
ACGIH	American Conference of Governmental Industrial Hygienists
CCR	Coal Combustion Residual
HAZWOPER	Hazardous Waste Operations and Emergency Response
ID	identification
IDLH	Immediately Dangerous to Life and Health
IEPA	Illinois Environmental Protection Agency
IPGC	Illinois Power Generating Company
kV	kilovolt
NID	National Inventory of Dams
NIOSH	National Institute for Occupational Safety and Health
No.	number
NPP	Newton Power Plant
OSHA	Occupational Safety and Health Administration
PAP	Primary Ash Pond
Part 845	35 I.A.C. Part 845: Residuals in Surface Impoundments
PEL	Permissible Exposure Level
PFAS	Per- and polyfluoroalkyl substances
PFD	Personal Flotation Device
PNOR	particulates not otherwise recognized
POC	Point of Contact
PPE	personal protective equipment
ppm	parts per million
SDS	Safety Data Sheet
Site	NPP PAP
STEL	Short Term Exposure Limit
TLV	Threshold Limit Value
TWA	time-weighted averages
USCG	United States Coast Guard

REVISION SUMMARY

Revision Date	**Description of Changes** (Section title or number – description)	**Responsible Party** (individual name or title, company / agency name, document reference and date)

PREFACE

Illinois Power Generating Company (IPGC) has prepared this Safety and Health Plan in accordance with requirements set forth in Title 35 of the Illinois Administrative Code (35 I.A.C.) Part 845: Residuals in Surface Impoundments (Part 845), Section (§) 845.530. IPGC assessed health and safety hazards of its coal combustion residual (CCR) surface impoundments to develop and update this Safety and Health Plan.

This document describes the minimum anticipated protective measures necessary for worker health and safety at the Newton Power Plant (NPP) Primary Ash Pond (PAP; Vistra identification [ID] number [No.] 501, Illinois Environmental Protection Agency [IEPA] ID No. W0798070001-01, National Inventory of Dams [NID] No. IL50719), herein referred to as the Site. Employees of IPGC, contract workers, and third-party contractors must read and comply with the contents of this document. The contents of this document are not intended to cover all situations that may arise nor to waive any provisions specified in Federal, State, and local regulations or site owner / contractor health and safety requirements.

Third-party contractors are accountable for the health and safety of their employees. Third-party contractors are required to prepare a Safety and Health Plan that meets the minimum requirements herein. However, no requirements or provisions within this plan shall be construed as an assumption of IPGC of their legal responsibilities as an employer.

This Safety and Health Plan will be reviewed and updated annually, at a minimum. The Safety and Health Plan will also be updated if facility operations change, or a new hazard is identified.

1. INTRODUCTION

This Safety and Health Plan has been developed to outline the requirements to be met by employees of IPGC, contract workers, and third-party contractors while performing any activity to construct, operate, or close the PAP. This Safety and Health Plan has been developed to meet the requirements of 35 I.A.C. § 845.530 and describes the responsibilities, training requirements, protective equipment, and safety procedures necessary to minimize the risk of injury, fires, explosion, chemical spills, material damage incidents, and near misses related to CCR activities. This Safety and Health Plan incorporates by reference the Occupational Safety and Health Administration (OSHA) regulations contained in Title 29 of the Code of Federal Regulations (29 C.F.R.) § 1910 and 29 C.F.R. § 1926.

The requirements and guidelines in this Safety and Health Plan are based on a review of available information and data, and an evaluation of identified on-site hazards. This Safety and Health Plan will be reviewed with persons assigned to work at the PAP and will be available on-site.

1.1 Site Description / History

The NPP is located in Jasper County in the southeastern part of central Illinois, approximately 7 miles southwest of the town of Newton. The PAP is located in Section 26 and the western half of Section 25, Township 6 North, Range 8 East. The PAP is located south of the power plant and situated in a predominantly agricultural area and is surrounded by Newton Lake on the west, south, and east. Beyond the lake is additional agricultural land. The Phase 1 Landfill is located northwest and west of the PAP, and the Phase 2 Landfill is located to the west (Appendix A).

1.2 Facility Personnel

The following table outlines key IPGC personnel with respect to facility operations and health and safety. The Plant Control Room is the first point of contact for plant communication, including emergencies.

Name	Position	Phone Number
Kevin Schafer	Point-of-Contact (POC) / Safety and Environmental Manager	618-783-0394
Security		618-783-0302
Control Room		618-783-0302
James Marshall	Plant Manager	618-783-0351
Plant Shift Supervisor (24/7)		618-783-0344
Terry Hanratty	Chemist and Lab Supervisor	618-783-0388
Matt Ballance	Engineering Manager	618-343-7739 (office) 618-792-7274 (mobile)
Jason Campbell	Dam Safety Manager	271-753-8904 (Springfield) 217-622-3491 (mobile)
Stu Cravens	Senior Technical Expert	217-390-1503 (mobile)
Vic Modeer	Engineering Manager	618-541-0878

1.3 Responsibilities

The following persons have responsibilities associated with communicating and implementing the Safety and Health Plan for the PAP.

1.3.1 IPGC Point of Contact

The IPGC Point of Contact (POC) is a management-level person who is requiring employees, contract workers, or third-party contractors to enter the PAP. The IPGC POC is responsible to communicate Safety and Health Plan information and requirements to employees, contract workers, and third-party contractors, and oversee work performed in the PAP to the extent necessary to confirm implementation of Safety and Health Plan requirements.

1.3.2 IPGC Employees

IPGC employees are directly hired by IPGC. They are required to implement and/or follow Safety and Health Plan requirements as applicable to their work and exercise their “stop work authority” if safety requirements are unclear or unanticipated site conditions or hazards are observed.

1.3.3 Contract Workers

Contract workers are those hired by IPGC through an agency firm. Similar to IPGC employees, contract workers are required to implement and/or follow Safety and Health Plan requirements as applicable to their work and exercise their “stop work authority” if safety requirements are unclear or unanticipated site conditions or hazards are observed.

1.3.4 Third-Party Contractor Employees

Third-party contractor employees work for firms under contract to IPGC. Third-party contractors include prime contractors and all of their lower tier subcontractors. Similar to IPGC employees, third-party contractors are required to implement Safety and Health Plan requirements as applicable to their work and exercise their “stop work authority” if safety requirements are unclear or unanticipated site conditions or hazards are observed.

1.3.5 Third-Party Contractor Safety Competent Person

Third-party contractors will be required to designate a Safety Competent Person. The Safety Competent Person must be in a management position (*e.g.,* superintendent, foreman, etc.) with OSHA 30-hour construction safety certification who may perform other duties, unless IPGC requires a dedicated Safety Competent Person. A Safety Competent Person must be on site at all times when the subcontractor has employees performing work for IPGC and must possess a sound working knowledge of pertinent OSHA regulations, this Safety and Health Plan, and other applicable safety requirements related to the scope of work. Third-party contractors must also designate a backup Safety Competent Person that possesses the same authority and training. The competent person will ensure timely correction of safety deficiencies identified by IPGC. The Safety Competent Person is responsible to ensure Safety and Health Plan requirements have been communicated to lower-tier subcontractors and enforce Safety and Health Plan requirements.

2. SITE ACCESS & CONTROL

This section outlines requirements for ensuring that only authorized personnel and visitors are permitted at the Site.

2.1 Facility Security

Elements of site control include restricting access to the Site to persons until they have met the training requirements outlined in this Safety and Health Plan and have been authorized to do so by NPP POC or their representative.

All personnel must check in with Security upon arriving to the Site and check out upon departure.

Upon arrival to the Site, all IPGC employees, contract workers, and third-party contractors must check in/out at Security. A COVID-19 screening must also be completed per Section 3.8.

2.2 Third-Party Contractor Management

Prior to working at the PAP, all third-party prime contractors must maintain an active registration with ISNetworld and maintain a grade of A or B. Lower tier subcontractors are currently not required to be registered in ISNetworld, but this requirement may change at the discretion of IPGC.

All third-party contactor supervisors must meet with their specified Contract Coordinator/Plant Contact prior to beginning work.

2.3 Third-Party Contractor Safety and Health Plan

Prior to being authorized to conduct work at PAP, third-party contractors must develop and submit a Safety and Health Plan. The third-party contractor's Safety and Health Plan must be specific to the scope of work that they will be performing at the PAP. The third-party contractor's Safety and Health Plan must meet or exceed all the requirements in this Safety and Health Plan, other IPGC requirements, and applicable regulations. All lower tier subcontractors of third-party contractors must meet the requirements in this Safety and Health Plan as well as the requirements outlined in the Safety and Health Plan of the third-party with whom they are contracted.

2.4 Authorized Personnel

At a minimum, authorized personnel who will be granted unescorted access to the project include IPGC employees, contract workers, and third-party contractors that meet the following:

- Reviewed this Safety and Health Plan and other applicable safety planning documentation
- Have completed all the training, medical surveillance, and drug screen and background investigation requirements as outlined in Section 3 of this Safety and Health Plan.
- Have completed the NPP Site Orientation Training

2.5 Visitors

Visitors must be escorted by Authorized Personnel through the PAP if they have not reviewed this Safety and Health Plan or completed the training requirements outlined in Section 3 of this Safety and Health Plan. Visitors may not undertake any activity to construct, operate, or close a CCR surface impoundment.

2.6 Communication

Communication between workers and emergency services must be maintained at all times. Cellular service is not consistently available and cannot be relied upon to summon emergency services. In lieu of using mobile phones, the following will be implemented:

- Hand held radios will be used to communicate to a central location where a landline or reliable cellular service is available.

- Hand held radios will be used to communicate to a central location where a landline or reliable cellular service is available.

3. TRAINING & MEDICAL REQUIREMENTS

Project personnel must be properly trained for the type of work being performed and in accordance with 35 I.A.C. § 845.530, 29 C.F.R. § 1926 and 29 C.F.R. § 1910, and IPGC policies. Additionally, personnel working in areas regulated by the OSHA Hazardous Waste Operations and Emergency Response (HAZWOPER) standards (29 C.F.R. § 1910.120 and 29 C.F.R. § 1926.65) must have current medical surveillance. All employees, contractors, and third-party contractors must complete the following prior to beginning any activity to construct, operate, or close the PAP.

3.1 HAZWOPER Training

35 I.A.C. § 845.530(c)(2)(E) requires that all employees, contract workers, and third-party contractors be trained in accordance with 29 C.F.R. § 1910.120 and 29 C.F.R. § 1926.65. The following training will be completed as required by job function:

- **OSHA 40-Hour Training** per 29 C.F.R. § 1910.120 and 29 C.F.R. § 1926.65, for those personnel who are expected to have extensive contact with contaminated materials and/or may be required to wear a respirator.
- **OSHA 24-Hour Training** per 29 C.F.R. § 1910.120 and 29 C.F.R. § 1926.65, for those personnel who are expected to have minimal contact with contaminated materials and will NOT be required to wear a respirator.
- **OSHA 8-hour Supervisor Training** per 29 C.F.R. § 1910.120 and 29 C.F.R. § 1926.65, for Site Supervisors, Foremen, Superintendents, and others who will be directing and managing site activities.
- **OSHA 8-hour Refresher** per 29 C.F.R. § 1910.120 and 29 C.F.R. § 1926.65, completed within 12 months of initial 40-hour or 24-hour training and annually thereafter.

The following matrix outlines HAZWOPER training requirements based on typical job functions at the PAP. It is not intended to be all inclusive, new job functions must be evaluated per 29 C.F.R. § 1910.120 and 29 C.F.R. § 1926.65.

Training	Job Function
OSHA 40-hour	Ash handlers
OSHA 24-hour	Personnel not required to handle CCR materials
OSHA 8-hour Supervisor Training	Third-Party Contractor Safety Competent Persons
OSHA 8-hour refresher	All personnel

3.2 OSHA Construction Outreach Training

35 I.A.C. § 845.530(c)(2)(E) requires that all employees, contract workers, and third-party contractors complete an OSHA 10-hour or 30-hour construction safety training. These trainings will be completed as follows:

- All employees, contract workers, and third-party contract employees: OSHA 10-hour or 30-hour construction outreach training.
- Supervisors, superintendents, foreman and safety professionals: OSHA 30-hour construction outreach training.

3.3 PAP Safety and Health Plan Review

Pursuant to 35 I.A.C. § 845.530(d)(e), before beginning any activity at the PAP, and annually thereafter, all IPGC employees, contract workers, and third-party contractors must review the content of this HASP. After reviewing this Safety and Health Plan all personnel will understand the following:

- Procedures for using, inspecting, repairing, and replacing facility emergency and monitoring equipment
- Communications or alarm systems outlined in Section 6
- Response to fires and explosions outlined in Section 6
- Response to a spill or release of CCR
- Information about chemical hazards and hazardous materials outlined in Section 5
- The use of engineering controls, administrative controls, and personal protective equipment (PPE) outlined in Section 4

All personnel will acknowledge this HASP by signing the *Safety and Health Plan Acknowledgment Form (Appendix B).*

3.4 Emergency and Monitoring Equipment Training

All IPGC employees, contract workers, and third-party contractors must be aware of how to respond to alarms and other emergencies as outlined in Section 6 of this plan. Individuals may only use facility emergency and monitoring equipment if they have been trained in their use and authorized to do so by the designated POC. Additionally, a written release may need to be completed as required by Vistra Corporate Procedure FFA-POL-0006.

Individual IPGC employees and contract workers may be responsible for using, inspecting, repairing and replacing facility emergency monitoring equipment. These individuals will be trained in accordance with procedures identified by IPGC. These individuals will review and adhere to the manufacturer's instructions, where applicable.

Third-party contractors are responsible for inspecting, repairing, and replacing any owned emergency (*i.e.*, fire extinguishers) and monitoring equipment (*i.e.*, air monitoring equipment). Third-party contractors will maintain procedures for using, inspecting, repairing, and replacing owned emergency and monitoring equipment that is consistent with the manufacturer's requirements. Third-party contractor employees who are responsible for this equipment will be trained in procedures for using, inspecting, and repairing owned equipment by their employer.

3.5 Hazard Communication

All employees, contract workers, and third-party contractors must be trained in chemical hazards (if any) associated with their work in accordance with 29 C.F.R. § 1910.1200. Work tasks performed on the PAP may include exposure to compounds identified in the Hazard Communication section of this Safety and Health Plan and is included as part of the Safety and Health Plan Review outlined in Section 3.3.

3.6 Medical Surveillance

All employees, contract workers, and third-party contractors engaged in operations specified in 29 C.F.R. § 1910.120 and 29 C.F.R. § 1926.65 and meet one of the criteria outlined in 29 C.F.R. § 1910.120(f)(2) and 29 C.F.R. § 1926.65(f)(2) must participate in a medical surveillance program that is administered by their employer. The criteria for participating in a medical surveillance program are:

- All employees who are or may be exposed to hazardous substances at or above the established permissible exposure limit, without regard to the use of respirators, for 30 days or more a year;
- All employees who wear a respirator for 30 days or more a year; or
- All employees who are injured, become ill or develop signs or symptoms due to possible overexposure involving hazardous substances or health hazards from an emergency response or hazardous waste operation.

The medical surveillance program must result in documentation that an individual is cleared to work on sites covered by 29 C.F.R. § 1910.120 and 20 C.F.R. § 1926.65 and is medically fit to wear a respirator when applicable.

3.7 Drug Screen and Background Investigations

IPGC requires that contract worker agencies and third-party contractors are responsible for ensuring that all personnel have completed and passed a drug and alcohol test and background investigation prior to on-site work as described in Appendix C.

3.8 COVID-19 Site Entry Guidelines

All personnel entering Vistra work sites shall review and adhere to the site entry guidelines provided in Appendix D.

3.9 Document Management

IPGC will maintain employee and contract employee training and medical surveillance records. Medical surveillance records are located in the Employee Development Center within the nurse's office. Training records are located in the safety office. Third-party contractors are responsible for maintaining training and medical surveillance documentation for their employees. Third-party contractors will produce documentation upon IPGC request.

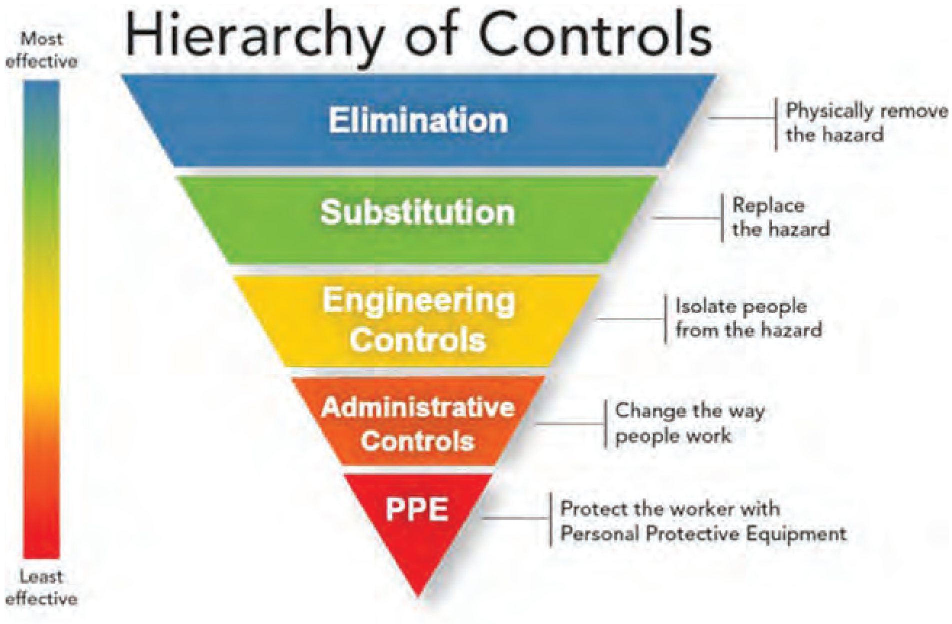
3.10 Industrial Hygiene Sampling Records

Upon receipt of exposure sampling results IPGC and third-party contractors must distribute exposure sampling results to employees within 15 business days unless otherwise required by applicable regulation. All personnel exposure sampling results and records must be maintained by the employee's company for at least 30 years following termination of employment.

4. HAZARD & CONTROLS

The following section outlines general controls for the hazards and controls. Third-party contractors are still responsible for developing a Safety and Health Plan that incorporates requirements of this Safety and Health Plan, other safety requirements for the NPP, as well as the third-party contractor's safety policies and procedures. Safety and Health Plans developed by third-party contractors must be specific to the site and the anticipated work means and methods. Safety and Health Plans that consist of only standard operating procedures or are not otherwise specific to the work performed at the PAP will not be accepted by IPGC.

IPGC requires that a hierarchy of controls be considered when performing work at the PAP. Implement controls that favor elimination, substitution, and engineering over the use of administrative controls and PPE when feasible. See the figure below for additional guidance (courtesy of the National Institute for Occupational Safety and Health [NIOSH]).



4.1 Ash / Unstable Surfaces

Prior to working in or on an ash pond, third-party contractors must notify the facility POC. Work in or on an ash pond may not begin until the facility POC has approved the work. Upon completion of the work, third-party contractors must notify the POC that they have left the ash pond.

Additionally, Security must be notified prior to entering and upon exiting an ash pond.

When working on ash ponds or unstable surfaces the following requirements must be implemented where applicable and feasible. The following table summarizes safety controls for work performed in ash ponds and on unstable surfaces and are aligned to the hierarchy of controls:

Elimination	Substitution	Engineering	Administrative	PPE
Change the work task or work methods so that work on ash ponds is no longer required	Use the lightest available tracked equipment to reduce ground pressure	Use crane mats or other cribbing to support heavy equipment on ash ponds	Traverse compacted paths that have previously been used by heavy equipment	Use a restraint (tethering) system to prevent falls or slips into unstable ash pond surfaces or surface water that represents a drowning hazard

Elimination	Substitution	Engineering	Administrative	PPE
			If an unstable condition exists, complete a Next Level Up Pre-Job Brief prior to accessing the ash pond.	
			Approach the ash pond from the most stable direction	
			Inspect travel paths for recent terrain shifts, particularly following heavy rains or rapid dewatering	
			Working alone on ash ponds is prohibited without pre-approval from the POC.	
			When a drowning hazard exists, implement requirements for working on/near water as outlined in Section 4.4.	
			Implement an emergency response plan with trained responders for falls into (or engulfment by) ash	

4.2 Ash Inhalation / Airborne Exposure

Ash that becomes airborne due to site activities or environmental conditions may result in an exposure to its components as outlined in Section 5.1. IPGC and third-party contractors are responsible for ensuring their respective employees' and contract workers' exposures are below occupational exposure limits. Upon request, third-party contractors must demonstrate to IPGC that exposure control methods are adequate. The following table summarizes airborne exposure controls and is aligned to the hierarchy of controls:

Elimination	Substitution	Engineering	Administrative	PPE
Change the work task or work methods so that work on ash ponds is no longer required	Substitute manual work methods for those that can be completed from the cab of a vehicle	Continually wet work areas to reduce the amount of ash that becomes airborne Equip vehicles and heavy equipment cabs with filters. Clean and change filters as required	Conduct air monitoring or exposure sampling to confirm that airborne exposure is below regulatory limits	If exposure levels are above the PEL, equip employees with respirators appropriate to the level of exposure

4.3 Stuck Vehicles/Equipment

If a vehicle or piece of equipment becomes stuck, a third-party towing or wrecking company who is trained in vehicle extraction must be retained and the IPGC will be notified. Third-party contractors may extract their own vehicle if they have an approved extraction plan and a competent person is on site to implement the extraction. The extraction plan shall be included as part of the third-party contractor's reviewed and approved Safety and Health Plan. The above notifications are still required.

The hazards presented by stuck vehicles/equipment must not be underestimated. While the weight of the stuck equipment can be calculated, it's impossible to precisely calculate the other forces that are pulling against the towing vehicle which requires special training and experience to properly size towing equipment and select towing techniques. This is especially true for "complex" or high-hazard extractions involving equipment stuck at axle depth (or beyond) or sloped surfaces or any area where extraction activities could trigger shifts in the ground surface. No chains shall be used to remove stuck vehicles/equipment.

The following table summarizes safety controls related to stuck vehicles and equipment and are aligned to the hierarchy of controls:

Elimination	Substitution	Engineering	Administrative	PPE
Change the work task or work methods so that work on ash ponds is no longer required	Use the lightest available tracked equipment to reduce ground pressure Substitute tracked equipment for wheeled equipment	Use crane mats or other cribbing to support heavy equipment on ash ponds Lighten the load – Remove materials from stuck vehicles or equipment prior to extraction if possible	Only persons trained in vehicle extraction are permitted to remove stuck vehicles/equipment A professional towing/wrecking service is required Prepare for spills (damage to fuel or hydraulic systems)	All persons involved in removing stuck equipment must wear PPE that includes hard hat, safety boots, safety glasses, high visibility vests, and cut resistant gloves

4.4 Working Near/Over Water

All employees, contract workers, and third-party contractors must wear a United States Coast Guard (USCG) approved personal floatation device (PFD), when within 6 feet of water, over water, and/or wading in water where the danger of drowning exists. The PFD must be properly secured to the wearer, free of all defects including rips, tears, stress, and fading, and be kept clean and free of excessive dirt and oil.

If the possibility of falling into water has been eliminated through the use of guardrails, fall restraint, or other method, the use of a PFD is no longer required.

When performing work on water from a vessel, at least one lifesaving rescue vessel (*e.g.,* a skiff) shall be immediately available at locations where employees are working over, in, on, or adjacent to water where the danger of drowning exists. However, if the water is so shallow that rescuers could simply walk/run into the water body without endangering themselves and/or others or the work was being conducted very close to shore (*e.g.,* the length of the skiff from shore would be greater than the working distance from shore and/or the skiff would foul on the bottom), a skiff would not be required.

The following table summarizes the requirements for working over/near water where a drowning hazard exists and are aligned to the hierarchy of controls:

Elimination	Substitution	Engineering	Administrative	PPE
Change the work task or work methods so that work near a drowning hazard is no longer required		Install guardrails that separate work areas from the drowning hazard	All work to be performed by at least two people where each is equipped with proper safety gear and capable of summoning emergency rescue	All personnel are required to wear suitable PFDs
		Utilize equipment (crowd-control barricades, safety fence, etc.) that will keep personnel at least 6 feet from a drowning hazard	When working on water use of a rescue skiff as outlined above	
			Use of a ring buoy with 90 feet of braided polycarbonate (or equivalent) line	
			Ring buoys must be positioned within 100 feet of work (maximum of 200 feet spacing)	

4.5 Heavy Equipment

All heavy equipment operators must be competent and authorized to operate each piece of heavy equipment. Forklift and telehandler (*e.g.,* Lull, JLG) operators must have a license or certificate that indicates they have passed a written test and "road" test for the equipment they will be operating within the last 3 years. Third-party contractors will provide proof of qualification upon request of IPGC.

Persons working around heavy equipment must implement the “25 Foot Rule.” The 25 Foot Rule requires that persons get the operator’s attention and permission prior to approaching closer than 25 feet to heavy equipment. Persons must walk quickly through blind spots. Loitering in heavy equipment blind spots (especially to the rear) must be avoided.

Temporary fuel storage tanks will be labelled as to their content and be protected from collision by Site vehicles using solid barricades including balusters, chain link fence, or equivalent. Spill kit (55-gallon sorbent capacity contained in an overpack) and one 20-pound Type ABC fire extinguisher will be located within 45 feet of fueling areas. Tanks will be rated for above ground use and will be double walled or have secondary containment in case of a leak. Tanks and dispensing hose will be bonded and grounded. On-site filling of fuel storage tanks will be completed with trucks that have automatic over-flow shutoffs. These trucks will be properly bonded to the storage tank and meet all of the other storage tank requirements. Temporary secondary containment must be provided in the refueling area that includes the storage tank and dispensing hoses.

Elimination	Substitution	Engineering	Administrative	PPE
		Heavy equipment (and vehicles) must be equipped with backup alarms, horns, roll-over protection (when feasible)	Operators must be competent and authorized	Operators must use seatbelts when equipped
		Vehicles and heavy equipment operated at night must have headlights, tail lamps, and reflectors	Forklift operators must have a current license or certificate (within 3 years)	High visibility vests are required when working around heavy equipment
			All vehicles and equipment must be turned off when not in use	
			Operators must inspect equipment daily prior to use	
			Persons working near heavy equipment must follow the “25 Foot Rule” and avoid lingering in blind spots as outlined above	
			Always obey site speed limits – 15 mph unless otherwise posted	

4.6 Overhead Powerlines

All overhead powerlines must be assumed to be energized until confirmed otherwise. The minimum clearance distance for equipment working near energized power lines must be in accordance with the table found in 29 C.F.R. § 1926.1408(h).

The following table summarizes safety controls for work near energized power lines:

Elimination	Substitution	Engineering	Administrative	PPE
Plan to work away from powerlines	Use heavy equipment with shorter booms/attachments to avoid coming close to power lines	Contact the utility owner to deenergize the line	Install signs to warn personnel of overhead powerlines	

Elimination	Substitution	Engineering	Administrative	PPE
		Contact the utility owner to install insulated sleeves over energized lines	Install a non-conductive distance marker to delineate minimum clearance	
			Use a dedicated spotter to ensure equipment does not enter minimum clearance distances	

4.7 Severe Weather

Severe weather conditions include but are not limited to high winds, electrical storms, heavy rain, and tornados can cause hazardous conditions at CCR surface impoundments. The primary control for severe weather is monitoring weather reports prior to beginning work and as work occurs throughout the day. In remote work areas with inconsistent cellular service, a weather radio should be used.

Monitor lightning using a commercially available mobile application if cellular service is available. When lightning is observed within 10 miles of the CCR surface impoundment, or a storm is imminent, take shelter in the nearest solid structure or fully enclosed vehicle. If possible, secure all tools, materials, and equipment prior to the storm arriving. Work may resume 30 minutes after the last lightning strike is observed within 10 miles. The severe weather shelter is located at the Service Building. The shelter location will be reviewed during the Site Orientation Training.

Do not conduct work on a CCR surface impoundment when there is a risk for tornados in the area. If on a CCR surface impoundment and a tornado forms, seek the nearest substantial shelter. The closest tornado shelter to the PAP is the Service Building (shown on Appendix A). If no shelter is available, attempt to evacuate to a shelter using a vehicle. If a tornado forms and you are not in a shelter, take one of the following actions:

- Stay in a vehicle with the seat belt on, keep your head below the windows and cover it with your hands
- If there is an area which is noticeably lower than the work area, lie in that area and cover your head with your hands.

The following table summarizes safety controls related to severe weather:

Elimination	Substitution	Engineering	Administrative	PPE
Plan outdoor tasks on days with low potential for severe weather.			Prior to beginning outdoor work monitor the day's weather.	
			Periodically monitor weather throughout the day. Use a weather app which issues alerts for severe weather and lightning, assuming cell service is available	

Elimination	Substitution	Engineering	Administrative	PPE
			Utilize a weather radio if cellular service is inconsistent	
			Stop all outdoor work and seek shelter when lightning is observed	

4.8 Heat Stress

Heat stress can be a significant hazard, especially for workers wearing protective clothing. Depending on the ambient conditions and the work being performed, heat stress can occur very rapidly, within as little as 15 minutes. Employees, contract workers, and third-party contractors will be instructed in the identification of a heat stress victim, the first-aid treatment procedures for the victim, and in the prevention of heat stress incidents.

Workers will be encouraged to immediately report any heat-related problems that they experience or observe in fellow workers. Any worker exhibiting signs of heat stress and exhaustion should be made to rest in a cool location and drink plenty of water. Emergency help by a medical professional is required immediately for anyone exhibiting symptoms of heat stroke, such as red, dry skin, confusion, delirium, or unconsciousness. Heat stroke is a life-threatening condition that must be treated immediately by competent medical authority.

4.8.1 Heat Stress Prevention

To prevent heat stress, IPGC employees, contract workers, and third-party contractors will implement heat stress prevention measures as outlined in OSHA's Heat Index (below). A summary of these precautions is described below.

Heat Index	Risk Level	Protective Measures
Less than 91°F	Lower (Caution)	Basic heat safety and planning
91°F to 103°F	Moderate	Implement precautions and heighten awareness
103°F to 115°F	High	Additional precautions to protect workers
Greater than 115°F	Very High to Extreme	Triggers even more aggressive protective measures

Know the Symptoms: Some symptoms associated with heat stress are: Employees should be aware of these symptoms with themselves and with their co-workers:

- Elevated heart rate, lack of concentration, difficulty focusing on a task, fatigue
- Irritability and/or sickness

- Cramps, rash, headache
- Loss of desire to drink water
- Fainting
- Skin clammy, moist, and pale (severe heat exhaustion)
- Skin extremely dry and red (heat stroke)

Acclimatize: When high heat stress conditions arise, employees should be exposed to the heat for short work periods followed by longer periods of work. Acclimatization usually takes five (5) days and should be provided for all new employees and employees returning from an absence of two (2) weeks or more. Contact Corporate Health and Safety for proper procedures.

Hydration & Pace of Work: Make sure all employees intake plenty of water throughout the work day (sometimes as much as a quart per worker per hour) and let employees know where the drinking water is located. Adjust your work pace and expectations on how much work can be done during periods of high heat stress. Workers cannot do as much during periods of high heat stress compared with similar periods of low heat stress. After acclimatization, workers may be able to resume a more “normal” work pace as long as fluid intake is adequate.

Work/Rest Periods: If possible, heavy work should be scheduled during the cooler parts of the day (*i.e.,* early morning) and rest periods should be taken in cool areas for longer periods.

Personal Protective Equipment (PPE): Employees using PPE (*i.e.*, Tyvek® suits or other equipment which may retain heat) can be more susceptible to heat stress due to the fact that heat/sweat often cannot escape the suits and/or the equipment. Persons wearing PPE that contributes to heat stress require more hydration, longer rest periods, or a reduced pace of work. Also, more careful monitoring of each person’s health status is required by co-workers and management.

The following table summarizes safety controls for heat related illnesses:

Elimination	Substitution	Engineering	Administrative	PPE
Perform outdoor, strenuous, tasks at cooler times of day/year	Use mechanized equipment in place of manual labor	Install fans or air conditioning units in the work area	Train all personnel to know the signs of heat stress/stroke and how to prevent it	Implement the use of cooling vests or other similar PPE
		Install a canopy to provide shade to work areas	Allow workers to acclimatize to the work environment	
		Provide cool, shaded break areas	Adjust work pace to allow for the effects of heat	
			Implement work/rest periods	

4.9 Cold Stress

The four environmental conditions that cause cold-related stress are low temperatures, high/cool winds (wind chill), dampness, and cold water. One, or any combination of these factors, can cause cold-related hazards. Cold stress, including frostbite and hypothermia, can result in severe health effects. Employees, contract employees, and third-party contractors will be instructed in the identification of a cold stress victim, the first-aid treatment procedures for the victim and in the prevention of heat stress incidents.

A dangerous situation of rapid heat loss may arise for any individual exposed to high winds and cold temperatures. Major risk factors for cold-related stresses include:

- Wearing inadequate or wet clothing thus increasing the effects of cold on the body.
- Taking certain drugs or medications such as alcohol, nicotine, caffeine, and medication thus inhibiting the body's response to the cold and/or impairing judgment.
- Having a cold or certain disease, such as diabetes, heart, vascular and thyroid problems, and thereby increasing susceptibility to the winter elements.
- Lower body-fat composition or other physiological differences. Statistics show that men experience far greater death rates due to cold exposure than women, potentially attributable to participation in risk-taking activities, lower body-fat composition and/or other physiological differences.
- Becoming exhausted or immobilized, especially due to injury or entrapment, thus speeding up the effects of cold weather.

The following table provides the resulting equivalent chill temperature to exposed skin because of increasing wind speeds at decreasing actual temperatures. Personnel shall be aware of predicted weather conditions before beginning site work and stay apprised of changes.

TABLE 2. Cooling Power or Wind on Exposed Flesh Expressed as Equivalent Temperature (under calm conditions)*

Estimated Wind Speed (in mph)	Actual Temperature Reading (°F)											
	50	40	30	20	10	0	−10	−20	−30	−40	−50	−60
	Equivalent Chill Temperature (°F)											
calm	50	40	30	20	10	0	−10	−20	−30	−40	−50	−60
5	48	37	27	16	6	−5	−15	−26	−36	−47	−57	−68
10	40	28	16	4	−9	−24	−33	−46	−58	−70	−83	−95
15	36	22	9	−5	−18	−32	−45	−58	−72	−85	−99	−112
20	32	18	4	−10	−25	−39	−53	−67	−82	−96	−110	−121
25	30	16	0	−15	−29	−44	−59	−74	−88	−104	−118	−133
30	28	13	−2	−18	−33	−48	−63	−79	−94	−109	−125	−140
35	27	11	−4	−20	−35	−51	−67	−82	−98	−113	−129	−145
40	26	10	−6	−21	−37	−53	−69	−85	−100	−116	−132	−148
(Wind speeds greater than 40 mph have little additional effect.)	LITTLE DANGER In < hr with dry skin. Maximum danger of false sense of security				INCREASING DANGER Danger from freezing of exposed flesh within one minute.				GREAT DANGER Flesh may freeze within 30 seconds.			
	Trenchfoot and immersion foot may occur at any point on this chart.											

*Developed by U.S. Army Research Institute of Environmental Medicine, Natick, MA.
Equivalent chilll temperature requiring dry clothing to maintain core body tempearture above 36°C (96.8°F) per cold stress TLV

The following table summarizes safety controls for preventing cold stress:

Elimination	Substitution	Engineering	Administrative	PPE
Perform work during warm parts of the day or warmer parts of the year		Install heaters in enclosed work areas	Train all personnel on the symptoms of cold stress and how to prevent it	All personnel must wear multiple layers of clothing
		Provide a warm break area	Implement work/rest schedule	Utilize hand/foot warmers when required

An additional hazard in cold weather conditions is the increased risk for slips from the accumulation of ice and snow in general work areas, ruts where water is accumulated, and heavy equipment. The following table outlines controls that may be used for preventing slips:

Elimination	Substitution	Engineering	Administrative	PPE
Perform work during warm parts of the day or in areas free of accumulated areas		Clear snow in work areas		Use traction control devices (*i.e.*, YakTrax) on work boots to provide additional traction.
		Apply salt/sand to icy areas		
		Use equipment to access work areas		

4.10 Biological Hazards

The following are biological hazards that may be present at the PAP.

4.10.1 Ticks (Lyme Disease) & Mites

Although Lyme disease has been detected throughout the continental United States, it is prevalent primarily in certain areas in New England, the Mid-Atlantic and the northern Midwest states. Although Lyme disease is the most common tickborne illness, other tickborne illnesses include southern tick-associated rash illness, Rocky Mountain spotted fever, ehrlichiosis, and tularemia. More information on Lyme disease and other tickborne illnesses can be found from the CDC.

Prevention

- Standard field gear (work boots, socks, and light-colored coveralls) provides good protection against tick bites, particularly if the joints are taped. However, even when wearing field gear, the following precautions shall be taken when working in areas that might be infested with ticks:
  - Wear long pants and long-sleeved shirts that fit tightly at the ankles and wrists, tape cuffs if necessary
  - Wear light colored clothing so ticks can be easily spotted
  - Per- and polyfluoroalkyl substances (PFAS)-free tick repellents (DEET and Permethrin) must be used when walking in all overgrown areas. DEET (≥25 percent [%]) must be applied to skin while permethrin must be applied to clothes and allowed to dry. Spray outer clothing, particularly your pant legs and socks, BUT NOT YOUR SKIN, with an insect repellent that contains permethrin. For heavily infested tick areas, wear spun polypropylene coveralls that have been sprayed with permethrin.
  - Inspect clothing frequently
  - Inspect head and body thoroughly when you return from the field, particularly on your lower legs and areas covered with hair
  - When walking in wooded areas, wear a hard hat, and avoid contact with bushes, tall grass, or brush as much as possible

Removal

- Remove any ticks by tugging with tweezers or special tick removal tools
- Do not squeeze or crush the tick
- DO NOT use matches, a lit cigarette, nail polish, or any other type of chemical to "coax" the tick out

Treatment

- Disinfect the area with alcohol or a similar antiseptic after removal

- Notify the Safety Competent Person of the embedded tick
- For several days to several weeks after removal of the tick, look for the signs of the onset of Lyme disease, such as a rash.
- No further treatment is necessary for ticks embedded <48 hours.
- If other signs or symptoms of Lyme are observed (fever/chills, aches, and pains), then notify the Safety Competent Person and seek medical attention

The following table summarizes safety controls to reduce the hazards associated with ticks and mites.

Elimination	Substitution	Engineering	Administrative	PPE
Use mechanical equipment to remove overgrown vegetation		Remove overgrowth and excessive vegetation from walkways and work areas (provide safe access)	Train personnel on tick and mite prevention. Areas of vegetation overgrowth and/or debris piles should be considered "high risk" areas	Wear light-colored long sleeved shirt tucked into pants. Tuck pant legs into socks
			Perform frequent tick checks in the field and a thorough tick check after completing work activities	Apply Permethrin to clothes and DEET (20% or more) to exposed skin
			Call licensed pesticide contractors to remove infestations of bees, wasps, fire ants, etc.	

4.10.2 Insect Bites/Stings

Stinging/biting insects at the PAP include spiders, wasps, and bees. Contact with these insects may result in project personnel experiencing adverse health effects that range from being mildly uncomfortable to being life-threatening. Therefore, insects present a serious hazard to project personnel, and extreme caution must be exercised whenever Site and weather conditions increase the risk of encountering stinging insects. Some of the factors related to stinging insects that increase the degree of risk associated with accidental contact are as follows:

- The nests for these insects are frequently found in remote wooded or grassy areas or equipment staging areas where equipment has not been moved recently.
- Some people are hypersensitive to the toxins injected by a sting, and when stung, experience a violent and immediate allergic reaction resulting in a life-threatening condition known as anaphylactic shock. Anaphylactic shock manifests itself very rapidly and is characterized by extreme swelling of the body, eyes, face, mouth, and respiratory passages.
- The hypersensitivity needed to cause anaphylactic shock, can in some people accumulate over time and exposure, therefore even if someone has been stung previously and not experienced an allergic reaction, there is no guarantee that they will not have an allergic reaction if they are stung again
- Spider bites generally only cause localized reactions such as swelling, pain, and redness. However, bites from a Black Widow or Brown Recluse, or if you are allergic to spiders, can cause symptoms that are more serious.

- ***If a worker knows that they are hypersensitive to bee, wasp, or hornet stings, or other insects, they must inform the Safety Competent Person prior to site work. Persons who have been prescribed epi-pens by their physician must have an epi-pen on the Site.***
- Inspect any clothing or PPE that has been left for a period of time prior to putting it on. Shake out the clothing and inspect the inside of safety shoes/boots prior to putting them on
- Nests in active work areas must be eradicated. Small nests may be handled by Site personnel using consumer-type insecticide. A pest control contractor should be hired to handle large or difficult to reach nests.

The following table outlines safety controls to reduce the risk of hazards associated with stinging/biting insects.

Elimination	Substitution	Engineering	Administrative	PPE
Use mechanical equipment to remove overgrown vegetation		Remove overgrowth and excessive vegetation from walkways and work areas (provide safe access)	Train personnel on stinging/biting insect prevention. Areas of vegetation overgrowth and/or debris piles should be considered "high risk" areas	Wear light-colored long sleeved shirt tucked into pants. Tuck pant legs into socks
		Eradicate nests in the work area as outlined above.	Instruct personnel to inspect/shake out clothing and work boots that have been left for a period of time.	Apply Permethrin to clothes and DEET (20% or more) to exposed skin – NOTE this will not repel bees/wasps
			Instruct employees who are hypersensitive to insect bites/stings to carry their epi-pen while on site	

4.10.3 Venomous Snakes

There are four species of venomous snakes in Illinois, they are:

- Copperhead
- Cottonmouth Water Moccasin
- Timber rattlesnake
- Eastern Massasauga

Generally, these snakes are found in the southern one-third of the state, with the Cottonmouth Water Moccasin found mostly in the southernmost portions of Illinois. Snakes are generally found in tall grass, wood piles, or other covered areas. Snakes are generally not aggressive towards humans, but if they are encountered avoid the snake and do not provoke it. If bitten by a snake that may be venomous seek medical treatment.

The following table outlines safety controls to reduce the hazard associated with venomous snakes.

Elimination	Substitution	Engineering	Administrative	PPE
Use mechanical equipment to remove overgrown vegetation		Remove debris piles, overgrowth and excessive vegetation from walkways and work areas (provide safe access)	Train personnel on the identification of venomous snakes. Areas of vegetation overgrowth and/or debris piles should be considered “high risk” areas	If working in area with snakes cannot be avoided, wear snake chaps
			Instruct personnel to not disturb snakes if they identify one in their work area	
			Use caution when moving staged tools or materials into which snakes may have moved	

4.10.4 Poisonous Plants and Plant Hazards

Poison ivy and poison oak may be present at the Site. Poison ivy thrives in all types of light and usually grows in the form of a trailing vine; however, it can also grow as a bush and can attain heights of 10 feet or more. Poison ivy has pointed leaves that grow in clusters of three. Poison oak resembles poison ivy except that the poison oak leaves are more rounded rather than jagged like poison ivy, and the underside of poison oak leaves are covered with hair.

The skin reaction associated with contacting these plants is caused by the body's allergic reaction to toxins contained in oils produced by the plant. Becoming contaminated with the oils does not require contact with just the leaves. Contamination can be achieved through contact with other parts of the plant such as the branches, stems or berries, or contact with contaminated items such as tools and clothing. The allergic reaction associated with exposure to these plants will generally cause the following signs and symptoms:

Symptoms

- Blistering at the site of contact, usually occurring within 12 to 48 hours after contact and in many cases, persons experience almost immediate irritation.
- Reddening, swelling, itching, and burning at the site of contact.
- Pain, if the reaction is severe.
- Conjunctivitis, asthma, and other allergic reactions if the person is extremely sensitive to the poisonous plant toxin.

Prevention

- The best treatment appears to be removal of the irritating oil before it has had time to cause inflammation by wiping exposed skin with rubbing alcohol followed by washing with soap and water.
- A visual Site inspection and identification of the plants should be completed prior to starting work so that all individuals are aware of the potential exposure. Avoid contact with any poisonous plants on the Site, and keep a steady watch to identify, report, and mark poisonous plants found on the Site.
- Avoid contact with, and wash daily, contaminated tools, equipment, and clothing.
- Barrier creams (Ivy Block®) and orally administered desensitization may prove effective and should be tried to find the best preventive solution.

- Keeping the skin covered as much as possible (*i.e.*, long pants and long-sleeved shirts) in areas where these plants are known to exist will limit much of the potential exposure. PFAS-free spun polypropylene coveralls or Tyvek® may be worn to prevent contact of skin and clothes with poison ivy.

The following table outlines safety controls to mitigate the hazards associated with poisonous plants.

Elimination	Substitution	Engineering	Administrative	PPE
Use mechanical equipment to remove overgrown vegetation		Remove overgrowth and excessive vegetation from walkways and work areas (provide safe access)	Train personnel on the identification of poisonous plants	Wear pants and long sleeves when working in overgrown areas
			Instruct personnel to avoid areas where poisonous plants have been identified	Consider the use of a coverall when working in areas where these plants are present, especially for hypersensitive employees.
			Provide isopropyl alcohol along with soap and water to remove oils from skin, tools, and equipment.	

4.11 Working Alone

As outlined in Section 4.1, working alone while on the PAP must be pre-approved by the POC. Working alone is prohibited for tasks deemed to be high risk by IPGC including, but not limited to, handling highly hazardous chemicals (sulfuric acid), work over/near water, excavation and trenching, hot work (grinding, welding and torch cutting), and elevated work that requires personal fall arrest. Third-party contractors are responsible for identifying potential high-risk tasks in their Safety and Health Plan and requiring that a buddy system be implemented while high risk work is performed. The buddy must be located in a safe area but may perform other tasks that do not prevent observing the person performing high risk work. Working alone may occur on and around other parts of the PAP when there is no drowning hazard or risk of severe injury due to high-risk work.

Elimination	Substitution	Engineering	Administrative	PPE
	Modify work methods by substituting lower hazard methods for high hazard methods	Varies depending on the hazard, but for example, could include installing guardrails (temporary or permanent) which mitigates a fall hazard reducing the risk to levels where working alone may be permitted	Prohibit working alone on ash ponds and for other high hazard tasks without prior approval from the POC	

Elimination	Substitution	Engineering	Administrative	PPE
			Implement a buddy system whenever feasible (required for high hazard work)	
			Implement a worker check-in, emergency alerting, and monitoring system	

5. HAZARD COMMUNICATION

As required by 35 I.A.C. § 845.530, the OSHA HAZWOPER standards (29 C.F.R. § 1910.120 and 29 C.F.R. § 1926.65) and OSHA Hazard Communication Standard, site personnel, subcontractors, and visitors must be informed of chemical hazards associated with their work area. The information in this section is based on:

- Recommendations in the most recent "NIOSH Pocket Guide to Chemical Hazards" by the Department of Health and Human Services, Centers for Disease Control and Prevention, and the NIOSH Pocket Guide.
- Requirements set forth in the OSHA regulations from as defined in Chapter 17 of 29 C.F.R. § 1910.1200(c) for all hazards not otherwise classified.

5.1 Coal Combustion Residuals

Primary exposure to CCR is through inhalation and skin contact. CCR is typically a fine, black, grey, or tan particulate. CCR is comprised of several components. The following table outlines the components of the CCR. The exact percentage of each component will vary based on the type of ash and location at the surface impoundment.

Chemical	Percentage	PEL	IDLH	ACGIH TLV	Symptoms of Exposure & Health Effects
Crystalline Silica	20-60% (total)	0.05 mg/m³ (respirable)	25 mg/m³ (respirable)	0.025 mg/m³ (respirable)	Cough, dyspnoea (breathing difficulty), wheezing; decreased pulmonary function, progressive respiratory symptoms (silicosis); irritation eyes; [potential occupational carcinogen]
Iron oxide	1-10%	5 mg/m³	2500 mg/m³	5 mg/m³	Benign pneumoconiosis with X-ray shadows indistinguishable from fibrotic pneumoconiosis (siderosis)
Calcium oxide	10-30%	5 mg/m³	25 mg/m³	2 mg/m³	irritation eyes, skin, upper respiratory tract; ulcer, perforation nasal septum; pneumonitis; dermatitis
Titanium dioxide	<3%	15 mg/m³	ND	10 mg/m³	Lung fibrosis; [potential occupational carcinogen]
Aluminosilicates	10-60%	15 mg/m³ (PNOR)	ND	10 mg/m³ (PNOR)	irritation eyes, skin, throat, upper respiratory system
Magnesium oxide	2-10%				
Magnesium dioxide	<2%				
Phosphorous pentoxide	≤2%				
Sodium oxide	1-10%				
Potassium oxide	≤1%				
Bromide salt	<0.1%				

Footnotes:

All values are 8-hour time-weighted averages (TWAs) unless otherwise indicated.

- PEL: Permissible Exposure Limit, the concentration an employee may be exposed to for an 8-hour work day for a 40-hour work week for which nearly all employees may be repeatedly exposed without adverse health effects.
- IDLH: IMMEDIATELY Dangerous to Life and Health, contaminant concentration which present the possibility for severe health consequences if exposed to the IDLH concentration without the appropriate personal protective equipment (PPE).
- ACGIH TLV: American Conference of Governmental Industrial Hygienists Threshold Limit Value
- mg/m³ = milligrams per cubic meter of air
- PNOR: Particulates Not Otherwise Regulated
- ND: Not Determined

5.2 Sulfuric Acid

Sulfuric acid is used in the PAP to control pH. Sulfuric acid is a very hazardous corrosive capable of causing immediate chemical burns to eyes and skin as well as damage to the upper respiratory tract and lungs if aerosols are inhaled. Sulfuric acid storage tanks and piping are labelled.

Immediately flush skin and eyes for 15 minutes following contact with sulfuric acid. Personnel working within the vicinity of sulfuric acid must provide a suitable, temporary or permanent, emergency shower and eyewash.

5.3 Safety Data Sheets

Pursuant to 35 I.A.C. § 845.530(b)(3), IPGC will provide Safety Data Sheets (SDSs) to all employees, contract workers, and third-party contractors for the CCR located at the Site. Third-party contractors will provide SDSs to the POC. SDSs are provided in Appendix E.

5.4 Signage

The absence of any of the following signage does not mean that a potential hazard does not exist. Signage will be posted by IPGC, but employees, contract workers, and third-party contractors must remain vigilant for changing site conditions.

To aid in hazard communication and pursuant to 35 I.A.C. § 845.530(f), IPGC will post the following signs at the PAP:

- Signs identifying the hazards of CCR, including dust inhalation when handling CCR.
- Signs identifying unstable CCR areas that make the operation of heavy equipment hazardous.
- Signs identifying the necessary safety measures and necessary precautions, including the proper use of PPE.

The following signs may also be posted at the CCR units to aid in hazard communication:

- Sulfuric acid hazard communication signs or labels on all tanks, drums, or other storage containers. “Sulfuric Acid” labels on piping.
- Overhead electrical lines that may be struck by heavy equipment of vehicles will have signs warning drivers of their presence.

6. EMERGENCY RESPONSE PLAN

This emergency response section details actions to be taken in the event of site emergencies. This section is consistent with the NPP PAP Emergency Action Plan. All personnel on site must be familiar with emergency signals and the content of this section.

6.1 Emergency Phone Numbers & Notifications

Emergency Number	
Site Address	**Emergency Phone Number**
6725 N 500th St Newton, IL	618-783-0344
Control Room/Security	618-783-0302

Medical Treatment	
Local Hospital	**Phone Number**
HSHS St. Anthony's Memorial Hospital 503 N Maple St Effingham, IL 62401	217-342-2121

Incident Notifications		
Title	**Name**	**Contact Number**
Kent Schafer	POC / Safety and Environmental Manager	618-783-0394

6.2 Evacuation Signal

The site-specific evacuation signal will be communicated during the NPP Site Orientation.

Upon hearing an evacuation signal, all personnel will leave the work area and proceed to the muster point.

6.3 Muster Point

The muster point for the PAP is located at the main gate. The muster point is shown in Appendix A. An alternative muster point may be identified based on the location of the work or the type of incident.

6.4 Calls for Emergency Support

In the case of an emergency, site personnel will **618-783-0344**. The Control Room/Security will coordinate the arrival of on-site emergency personnel. The individual calling for emergency support will briefly explain the nature of the emergency and site conditions as follows:

- Indicate his/her name
- Location of emergency
- Description of emergency conditions that may require special rescue equipment, such as confined spaces, excavations, and elevated work platforms
- Potential chemical hazards and recommended PPE

6.5 Fire & Explosion Response Plan

Trained site personnel may respond to incipient stage fires using a 20-pound Type ABC dry chemical fire extinguisher or hose. An incipient stage fire is a fire which is in the initial or beginning stage and which can be controlled or extinguished by portable fire extinguishers, Class II standpipe or small hose systems without the need for protective clothing or breathing apparatus. Personnel shall only attempt to extinguish the fire if it is safe to do so.

A fire that CANNOT be readily extinguished with a fire extinguisher will require evacuation of the work area personnel to Muster Point areas per this Safety and Health Plan. If personal injuries result from any fire or explosion, the procedures outlined in the Personal Injury Response Plan will also be followed.

All fires or explosions must be reported to the contacts outlined in Section 6.1 of this Safety and Health Plan.

6.6 Injury Response Plan

Treatment for minor injuries will be provided on site using available first aid supplies and personnel trained in first aid. All third-party contractors must have at least one individual on site who is trained in first aid, CPR, and AED use. Third-party contractors must provide their own first aid kits and AED. For minor injuries that are not life-threatening but require further medical attention, employees should be treated by occupational physicians at occupational clinics whenever possible. Treatment of minor injuries by emergency room or personal physicians should be avoided. When injured workers are released back to work with restrictions, all subcontractors are expected to accommodate those restrictions.

Emergency medical incidents include puncture wounds to the head, chest, and abdomen, serious head and spinal cord injuries, and loss of consciousness must be treated at the hospital emergency room listed in Section 6.1 of this Safety and Health Plan.

All injuries must be reported to the contacts outlined in Section 6.1 of this Safety and Health Plan.

6.7 Spill Response Plan

In general, IPGC employees, contract workers, and third-party contractors are trained and equipped to handle small spills associated with their work. Third-party contractors must include an approved spill response plan in their Safety and Health Plan. Site personnel will generally respond to spills as follows:

- Stop the leak immediately if it can be done without directly contacting the leaking material.
- Remove or stop all ignition sources (hot work, generators, etc.) that are within 25 feet of any part of the spill.
- On-site personnel should immediately secure the area to prevent unauthorized entry into the spill area.
- Although not likely given the anticipated types of spills, site personnel must immediately initiate evacuation if a spill may cause an explosion, death, or serious injury.
- Site personnel may only respond to incipient stage fires regardless if such fires are associated with a spill.
- PPE for spills to open areas generally requires Modified Level D PPE (poly-coat Tyvek®, nitrile gloves, and boot covers or boot decontamination). Over-boots or boot covers may also be used if persons cleaning the spill would have to walk on spilled materials. Latex gloves are not acceptable and will degrade with exposure to petroleum products.

6.8 CCR Spill or Release Response Plan

Response to minor or incidental spills of CCR will be managed as outlined in the General Spill Response Plan. An incidental release is a release of a hazardous substance which does not pose a significant safety or health hazard to employees in the immediate vicinity or to the employee cleaning it up, nor does it have the potential to become an emergency within a short time frame. Incidental releases are limited in quantity, exposure potential, or toxicity and present minor safety or health hazards to employees in the immediate work area or those assigned to clean them up. An incidental spill may be safely cleaned up by employees who are familiar with CCR. Response to major releases of CCR will be in accordance with the NPP PAP Emergency Action Plan, which can be found on the Luminant CCR website at https://www.luminant.com/ccr/.

6.9 Ash Pond Rescue

Ash ponds may be unstable and represent an engulfment hazard if persons and equipment traverse the surface, berms, or other unstable areas. Special training is required on behalf of emergency responders to retrieve persons and equipment who become trapped in unstable ash. **Untrained persons must not enter unstable areas** in an attempt to conduct rescue because of the significant potential that they will also become victims. Call the NPP emergency number and state that an "ash pond rescue" is required. The NPP emergency contact will notify the designated service to perform the ash pond rescue. On-site personnel should remain on stand-by to support the ash pond rescue team as necessary.

6.10 Incident Reporting

All incidents must be reported to the contacts outlined in Section 6.1 of this Safety and Health Plan. An Incident Report must be completed for all injuries, illnesses, spills, fire, explosion, or property damage. The absence of an injury does not preclude the need to complete an Incident Report as such incidents will be classified as "near miss" or "other." It will include, but is not limited to, the nature of the problem, time, location, and corrective actions taken to prevent recurrence.

APPENDIX A
SITE MAP

PART 845 REGULATED UNIT (SUBJECT UNIT)
OTHER UNIT
PROPERTY BOUNDARY

0 500 1,000 Feet

SITE MAP

PART 845 SAFETY AND HEALTH PLAN
NEWTON POWER PLANT
NEWTON, ILLINOIS

APPENDIX A

RAMBOLL AMERICAS
ENGINEERING SOLUTIONS, INC.

RAMBOLL

R001417

PROJECT: 169000XXXX | DATED: 9/22/2021 | DESIGNER: STOLZSD

Y:\Mapping\Projects\22\2285\MXD\845_Operating_Permit\Newton\Appendix A_NEW Site Map_SnHP.mxd

APPENDIX B
SAFETY AND HEALTH PLAN ACKNOWLEDGMENT FORM

Electronic Filing: Received, Clerk's Office 03/26/2024

SAFETY AND HEALTH PLAN ACKNOWLEDGEMENT FORM

I HEREBY CERTIFY THAT I HAVE READ AND UNDERSTOOD ALL HEALTH AND SAFETY PROCEDURES AS STATED HEREIN:

Name and Affiliation (printed)	Signature	Date

APPENDIX C
DRUG SCREEN POLICIES AND SUPPLEMENTAL TERMS

VISTRA ENERGY

Drug and Background Investigations

Contractor is solely responsible for ensuring that all members of Contractor Project Team have completed and passed all drug and alcohol tests and background investigations required under this Attachment and under Contractor's own programs before assigning such personnel to perform Work. Contractor is also solely responsible for ensuring that such testing and investigations are performed in accordance with all applicable laws.

1. Required Investigations. Except as otherwise required by applicable law, Required Investigations shall consist of all of the following:

   1.1 a 7-panel drug screening;

   1.2 a background investigation that includes a criminal records check in all counties where the applicable person has resided for at least the last seven (7) years;

   1.3 a third-party verification of previous employment and the highest education level completed by the applicable person;

   1.4 a check of the National Sex Offender Registry and Terrorist Watch List (Denied Parties); and

   1.5 a check of Motor Vehicles Record (if work to be performed by the applicable person requires driving as part of the defined duties).

2. Notices to Tested Persons Regarding Background Checks. All background checks will be conducted in compliance with applicable provisions of the Fair Credit Reporting Act.

3. Forms and Testing Organization for Drug Tests. Except for those positions subject to Department of Transportation ("DOT") drug and alcohol testing regulations, all drug testing shall be performed using the Universal Toxicology four part "Non-DOT" Chain of Custody and Request Form with white and blue top page, and shall be conducted by an independent third-party organization.

4. Pass/Fail Standards – Background Checks. A person shall be deemed to have failed the applicable background check if:

   4.1 information is reported through the background check process indicating that such person has failed to disclose or misrepresented information requested at any time about such a person's criminal background history; or

   4.2 such person has ever committed any felony constituting a violent crime, crime against a person, sexual offense or fraud; or

   4.3 such person has committed any other felony, or has been incarcerated for a felony, within ten (10) years prior to the date of such background check (i.e., for these felonies there must be a ten (10) year lapse in time from the later of the commission and the end of any period of incarceration); or

   4.4 such person has committed any misdemeanor that:

      4.4.1 involves violence that is sexually related; or

4.4.2 consists of a DUI that is the second (or more) DUI in the last two (2) years prior to the date of the background check; or

4.4.3 consists of a theft-related offense; provided that there can be no more than one theft by check and it must have been for an amount less that $100; or

4.4.4 consists of any drug-related misdemeanor committed at any time within forty-eight (48) months prior to the date of the background check.

4.4 For purposes of both felonies and misdemeanors, a person is deemed to have committed the applicable offense if he/she is convicted or enters a plea of guilty or nolo contendere for such offense (to include, without limitation, sentences of probation and deferred adjudication).

5. Pass/Fail Standards – Drug Tests. A person shall be deemed to have failed the applicable drug test if any of the following maximum cut-off levels are exceeded, unless there is a legitimate medical explanation for the presence of a tested substance at or above the applicable cut-off level:

5.1 Amphetamines 500ng/mL

5.2 Barbiturates 150ng/mL

5.3 Benzodiazepines 150ng/mL

5.4 Cocaine 150ng/mL

5.5 Marijuana 150ng/mL

5.6 Opiates 2000ng/mL

5.7 Phencyclidine 25ng/mL

For any positions subject to DOT drug and alcohol testing requirements, testing shall be conducted according to the applicable DOT panel and cutoff levels.

6. Other Requirements.

6.1 Background checks and drug tests will be paid for by Contractor without reimbursement by Company.

6.2 Contractor will keep background checks and drug test records while the applicable persons are working pursuant to this Agreement and for three (3) years thereafter.

6.3 Upon request, Contractor will provide a certification to Company that no person required hereunder to pass a background check or drug test has failed such investigation or test. Contractor will not provide the specific results of the background check or drug test of any individual to Company.

6.4 If any person required under this Agreement to pass a background check or drug test fails such check or test, Contractor will not report the specific results of such check or test to Company and will not allow such individual to perform any Work for Company. Although such person may not be assigned to perform any Work for Company, nothing in this Attachment requires Contractor to take any other action with respect to such person's employment with Contractor.

Supplemental Terms for Onsite Services

1. SAFETY

1.1 Contractor agrees that any safety-related assistance or initiatives undertaken by Company will not relieve Contractor while on Company Property from responsibility for the implementation of, and compliance with, safe working practices, as developed from their own experience, or as imposed by law or regulation, and will not in any way, affect the responsibilities resting with Contractor under the provisions of any agreement to which these policies are attached and to meet all safety requirements as specified by the Occupational Safety & Health Administration (OSHA), the Mine Safety Health Administration (MSHA), including the "Mining Contractor Safety Reference Handbook" located at http://www.vistraenergy.com/wp-content/uploads/2016/12/Contractors-Safety-Handbook_Final-MC-08262016.pdf, the Department of Transportation (DOT) and any other applicable state or federal safety and health laws or regulations.

1.2 In the event that a material safety data sheet, warning label, or other documentation concerning the use of hazardous chemicals at any property owned or controlled by Company or any of its affiliates (collectively, "**Company Properties**"), applies to any materials or equipment provided by Contractor as an aspect of the Work, such documentation will be provided by Contractor to Company prior to the commencement of any such Work.

1.3 Contractor will report to Company all accidents involving personal injuries (including death) and damage to property occurring directly or indirectly as a result of the Work performed by Contractor hereunder immediately, but in no event, no later than 24 hours after the occurrence of any such accident. Any accident or incident occurring directly or indirectly as a result of the Work which Contractor must report to a regulatory agency (e.g. OSHA, MSHA, TCEQ) must also be reported to Company immediately following notification to the regulatory agency.

2. SECURITY

2.1 It will be the affirmative duty of Contractor to ensure that Contractor Group assists in carrying out all security measures, to include reporting all information or knowledge of matters adversely affecting security to Company's designated security personnel.

2.2 Company reserves the right to exclude any of Contractor's employees from any Company Property by denial of access, suspension or revocation of access authorization, preemptory expulsion, or by any other means, without notice or cause. Former Company employees, and any of Contractor's employees who previously have been excluded from any Company Property, may be brought onto Company property or facilities only if prior approval from Company is obtained. If Contractor terminates a member of Contractor Group performing Work on Company's premises, Contractor shall inform Company immediately, but in no event, no later than twenty-four (24) hours after such employee is terminated in order for Company to remove access to Company Property for such employee.

2.3 Company measures may also include investigations, whether by Company or law enforcement officials. Contractor agrees to cooperate in such investigations and understands that Company reserves the right to require anyone in Contractor Group to authorize appropriate agencies to release his or her criminal records to Contractor as a condition of either initial or continued permission for access to any Company Property. Investigations may include searches of Contractor Group. Such searches may include searches of facilities assigned to Contractor Group, search of all Company Property areas and property at such Company Property areas, searches of including, but not limited to, offices, lockers, desks, lunch boxes, packages and motor vehicles (regardless of ownership). Without limiting the foregoing, Contractor acknowledges and agrees that all members of Contractor Group, to the extent that Company reasonably determines that such members require security badge access prior to entering onto any Company Property, shall be required to comply with Company's standard security badge requirements, including without limitation a background check to be performed by Company.

3. ISNETWORLD

3.1 Contractor agrees to maintain at Contractor's expense a subscription with ISNetworld (www.ISNetworld.com), Company's safety compliance program or any replacement program therefor, as directed by Company, for the Term of the Agreement. Contractor shall also furnish ISNetworld with any information requested by ISNetworld relating to ISNetworld's evaluation of the Contractor's safety program and practices. As a minimum, requested documents will be related to safety, health, and insurance (i.e., regulatory required training, certifications, safety plans, safe and secure workplace practices, insurance certificates, etc.), OSHA and MSHA injury rates and Experience Modification Rate (EMR).

3.2 Contractor has and during the performance of this Agreement shall continue to report full, complete and accurate information to ISNetworld concerning Contractor's employees.

4. MATERIALS, EQUIPMENT AND LABOR. Contractor will be solely responsible for the proper storage, transportation and disposal of any product or waste, other than sandblasting waste, used or generated in connection with the Work in accordance with all applicable Environmental Laws. Contractor will dispose of all waste materials, other than sandblasting waste, at an off-site disposal facility approved for such waste materials pursuant to applicable Environmental Laws and will complete and sign all waste manifests as the generator of such waste. Company will be responsible for the storage, transportation and disposal of any sandblasting waste generated during the performance of the Work.

5. CONDITIONS AFFECTING WORK

5.1 Contractor will investigate and acquaint itself with the conditions affecting the Work, including but not limited to those related to the transportation, disposal, handling and storage of materials and waste; availability of labor, water, electric power and roads; the uncertainties of weather, river stages or similar physical conditions at the site; the conformation and condition of the ground; and the character of equipment and facilities needed preliminary to and during prosecution of the Work. Contractor has satisfied itself as to the character, quality and quantity of surface and subsurface materials or obstacles to be encountered. Contractor's failure to acquaint itself with any conditions affecting the Work or any available related information will not relieve it from responsibility for properly estimating the difficulty or cost of successfully performing the Work.

5.2 Contractor assumes full responsibility for investigating conditions and determining the existence and magnitude of any hazards to the physical well-being of property of Contractor, the employees, agents, and servants of Contractor, or any other person or entity who is or may become involved in the performance of Work, and any and all other persons in the vicinity of the Work. Contractor will advise all of the above-specified persons or entities of any hazards relating to Work, and will ensure that those persons or entities are advised of and fully understand the nature of the hazards and safety precautions that can be taken to eliminate or minimize dangers relating to the hazards.

5.3 Contractor will provide information to Company regarding hazardous chemicals and/or consumable products that contain constituents listed in 40 CFR 372.65 used at any Company Property. Contractor will report the amount of such material carried on and off the site, the amount actually used and the manner of use. Contractor will provide the maximum quantity of the material stored on site at any one time and if a waste material was collected, where it was disposed of (location name and address). Contractor will provide information on the amount of material used for the previous calendar year by the first of February.

5.4 Contractor will use its best efforts to ensure that the Work is performed so as to minimize any adverse impact upon natural resources and the environment and will use best industry practices in this regard at all times.

5.5 Contractor acknowledges and agrees that all members of Contractor Group performing Work at any Company Generation or Mining Property are required to view Company's "Contractor/Visitor Safety Orientation" video (in the case of Company Generation property), when applicable, and to read and adhere to Company's "Contractor/Visitor Safety Booklet" (in the case of Company Mining property) prior to performing any Work at any Company Generation or Mining Property.

5.6 Contractor will immediately notify Company as soon as Contractor has reason to believe that Contactor, or any employee or other person performing the Work, is not or may not be performing the Work in compliance with applicable Environmental Laws. Contractor will provide Company with written notice to Company of such actual or potential non-compliance within three (3) days following the discovery thereof. Contractor will take immediate steps to ensure compliance with all applicable Environmental Laws and will, if directed by Company, cease all Work until authorized by Company to resume the Work.

5.7 Contractor will report to Company all accidents involving personal injuries (including death) and damage to property occurring directly or indirectly as a result of the Work performed by Contractor hereunder immediately, but in no event, no later than 24 hours after the occurrence of any such accident. Any accident or incident occurring directly or indirectly as a result of the Work which Contractor must report to a regulatory agency (e.g. OSHA, MSHA, TCEQ) must also be reported to Company immediately following notification to the regulatory agency.

6. WORK SITE PERMITS AND LICENSES

6.1 Subject to the following two paragraphs, Contractor will obtain, prior to the commencement of the Work, and provide to Company upon request, all permits, licenses and governmental authorizations, at its sole expense, required for the performance of the Work. Contractor will be solely responsible for maintaining compliance with such permits, licenses and governmental authorizations.

6.2 In the event that a storm water discharge permit is required for the performance of the Work, (i) Contractor will be responsible for filing a Notice of Intent with respect to the Work, in addition to any Notice of Intent that Company may be required to file, and (ii) Contractor will coordinate with

Company in the preparation and execution of a Storm Water Pollution Prevention Plan for the Work Site.

6.3 In the event that the performance of the Work involves the handling or abatement of asbestos-containing materials, Contractor will coordinate with Company in the preparation and filing of all required notification forms.

7. ACCESS. Should Contractor desire access to the Work Site over any land not controlled by Company, it will, at its sole expense, obtain all proper permits or written permission necessary for that access.

8. COMPANY FACILITIES. Contractor will not use Company's sanitary facilities, changehouses, shops, parks, storage buildings, tools, equipment or other facilities unless so directed by Company. Contractor will not discharge, without Company's prior written authorization, any product or waste used or generated in connection with the Work through any (i) Company-permitted outfall, (ii) Company-owned or operated pollution control equipment, or (iii) storm or sanitary sewer located at or in the vicinity of the Work Site. Any request for authorization to discharge will include, at a minimum, either a copy of the Material Safety Data Sheet for the product or a written description of the waste, including a list of the constituents of the waste and the relative concentrations thereof.

9. ENVIRONMENTAL

9.1 In the event that Contractor discovers during the performance of the Work any substance at the Work Site that is not the subject of the Work or has not otherwise been identified by Company for Contractor, which substance Contractor has reason to believe is or may be a Hazardous Substance that (i) has been or may be released or spilled into the soil, surface water, or groundwater or in a building or structure, or (ii) consists of asbestos-containing materials, lead-based paint, batteries, thermostats, lighting equipment, or equipment containing polychlorinated biphenyls, Contractor will immediately stop Work and notify Company of the discovery. Contractor will not resume the Work until receiving authorization from Company to do so.

9.2 The term "Hazardous Substance" means any product, waste, emission or substance defined, listed or designated as a hazardous or toxic substance, hazardous waste, hazardous material or pollutant by or pursuant to any Environmental Law and includes, but is not limited to, any petroleum-based product, substance or waste, including any additives associated therewith, pesticides, fertilizers, solvents, polychlorinated biphenyls, mercury, lead, lead-based paint, asbestos-containing material or explosives.

9.3 Contractor will immediately notify Company in the event of a spill or release of any material which Contractor knows or has reason to believe is a Hazardous Substance, whether onto the ground, into any body of water, a storm or sanitary sewer, or the air, or anywhere on property owned or controlled by Company, including within any building or structure. Contractor will be solely responsible, as may be required by applicable Environmental Laws, for, in consultation with Company, (i) notifying the appropriate governmental agencies of such spill or release caused or permitted by the acts or omissions of Contractor and (ii) for the cleanup and remediation of such spill or release.

10. PROTECTION OF HIGHWAYS AND RAILROADS. Contractor will make suitable arrangements with governmental authorities and railroads for the construction of all structures, whether underneath or over roads, railroads or rights-of-way to protect the public from accident or delay. Contractor will repair, at its

own expense, to the satisfaction of the governmental authorities or other owners, all roads, railroads and bridges that may be damaged by, or given undue wear due to the Work.

11. CLEANING UP

11.1 Contractor will at all times keep the Work Site free of waste materials or rubbish caused by the Work. After completing the Work, Contractor will remove all its waste materials, rubbish, tools, supplies, equipment and surplus materials from and about the Work Site.

11.2 If Contractor fails to keep the Work Site clean or to clean up after completing the Work, Company may do so and charge all costs of cleaning up to Contractor. Those costs may be deducted from the final payment to Contractor.

12. COLLATERAL WORK. Company and other contractors may be working at the Work Site. Company reserves the right to coordinate the performance of Contractor's Work with the work of others. Contractor will cooperate with and will not delay, impede or otherwise impair the work of others. Company does not guarantee Contractor continuous uninterrupted access to the Work Site, but will provide such access as good construction practices will allow, considering the other activities in the area.

13. ALCOHOLIC BEVERAGES, DRUGS AND WEAPONS. Contractor will inform all members of Contractor Group who may be involved in the performance of any Work of the following Company rules relating to alcoholic beverages, drugs and weapons, with which all personnel are expected to comply:

13.1 Bringing, attempting to bring, possessing, using or being under the influence of intoxicants, drugs, or narcotics while on any Company Property, including but not limited to parking areas, is prohibited. Possessing alcoholic beverages in sealed containers is permitted, however, in designated parking areas.

13.2 Prescription or over-the-counter medications that could affect the performance of safety-sensitive work are allowed on Company Property only if they have been previously cleared by Contractor. Contractor must confirm that the medication and dosage do not impair an individual's ability to perform safety-sensitive work before clearing the individual to perform such work while under the influence of the medication.

13.3 Bringing, attempting to bring, possessing or using firearms, whether classified as legal or illegal, while on any Company Property, including but not limited to buildings, parking areas, recreation facilities, equipment and vehicles, is prohibited, unless otherwise required by applicable law. Use or possession of firearms for specific situations is permitted if approved by function or higher level management of Company.

13.4 Off-the-job involvement with intoxicants, illegal drugs, or illegal narcotics that adversely affects Company's business, to include impairing the individual's ability to perform his job or the public trust in the safe operation of Company, is prohibited.

13.5 Any conduct on any Company Property which is in violation of any state or federal law or regulation is considered a violation of these rules and a breach of any agreement to which these policies are attached.

13.6 In order to enforce these rules, all individuals with access to any Company Property as well as the vehicles, offices, lockers and any personal belongings of such individuals on any Company Property are subject to search by Company and its agents, to include security representatives appointed or employed by Company. Individuals may be required to take a blood, urinalysis or Breathalyzer test, or submit to other recognized investigatory tests or procedures as are deemed appropriate or necessary by Company in the investigation of a violation of these rules.

14. TITLE AND RIGHT. Nothing in the Agreement will vest Contractor with any right of property in materials used after they have been attached to or incorporated into the Work, nor materials for which Contractor has received full or partial payment. All those materials, upon being so attached, incorporated or paid for, will become the property of Company. Any gravel, sand, stone, minerals, timber or other materials excavated, uncovered, developed or obtained in the Work, or on any land belonging to Company may be used, in the performance of the Work, provided such materials meet the requirements of this Agreement. Any objects or natural materials or animals excavated or exposed that may have historical significance or constitute a threatened or endangered species must be brought to the attention of Company.

15. PROTECTION AGAINST LIENS AND ENCUMBRANCES

15.1 Contractor will not at any time permit any lien, attachment or other encumbrance ("Encumbrance") by any person or persons whosoever or by reason of any claim or demand against Contractor to be placed or remain on the property of Company, including, but not limited to, the Work Site upon which Work is being performed or equipment and materials that are being furnished. To prevent an Encumbrance from being placed on the property of Company, Contractor will furnish during the progress of any Work, as requested from time to time, verified statements showing Contractor’s total outstanding indebtedness in connection with the Work.

15.2 If Contractor allows any indebtedness to accrue to subcontractors or others and fails to pay or discharge that indebtedness within five (5) days after demand, then Company may withhold any money due Contractor until that indebtedness is paid or pay the indebtedness and apply that amount against the money due Contractor.

15.3 If Contractor allows any Encumbrances, whether valid or invalid to be placed on the property of Company, any and all claims or demands for payment to Contractor will be denied by Company until the Encumbrance is removed. If the Encumbrance is not removed immediately, Company may pay that claim or demand and deduct the amount paid, together with all related expenses, including attorneys’ fees, from any further payment due Contractor, or at Company’s election, Contractor will, upon demand, reimburse Company for the amount paid and all related expenses. Any payment made in good faith by Company will be binding on Contractor.

16. TERMINATION FOR DEFAULT

16.1 If a petition in bankruptcy should be filed by Contractor, or if Contractor should make a general assignment for the benefit of creditors, or if a receiver should be appointed due to the insolvency of Contractor, or if Contractor should refuse or fail to supply enough properly skilled workmen or proper equipment, materials or services or should fail to make prompt payment to subcontractors, or to pay promptly for materials or labor, or disregard laws, ordinances or the instruction of Company’s Contract Coordinator, or if Contractor should refuse or fail to abide by the SOW Construction Schedule or otherwise violate any provisions of the Agreement or SOW, then Company, upon a determination by Company's Contract Coordinator that sufficient cause exists to justify such action, may, without prejudice to any other right or remedy available to it after giving Contractor seven (7) days' written notice, terminate the Agreement or the SOW and take possession of the Work Site. In the event of such a termination, Company may use all or part of Contractor's equipment and materials and may finish the Work by whatever method Company may deem expedient. In such event, Contractor will not be entitled to receive any further payment hereunder until the Work is finished. If the unpaid balance of the SOW fees will exceed the expense of finishing the Work, including compensation of Company's Contract Coordinator, other Company personnel, third party engineering companies, or other contractors for additional services, such excess will be paid to Contractor. If the expense of finishing the Work will exceed such unpaid balance, Contractor will pay the difference to Company within fifteen (15) days of receiving an invoice for same. The expenses incurred by Company herein, and the damage incurred through Contractor's default, will be determined by Company's Contract Coordinator, in its sole discretion, and such determination will be binding as between the parties.

16.2 In the event of a termination under the provisions of this Section 3, Contractor will transfer and assign to Company, in accordance with Company's instructions, all Work, all construction records, reports, permits, data and information, other materials (including all Company-supplied materials), supplies, Work in progress and other goods for which Contractor is entitled to receive reimbursement hereunder, and any and all plans, drawings, sketches, specifications, and information in connection with the Work, and will take such action as may be necessary to secure Company, at Company's sole election, the rights of Contractor under any or all orders and subcontracts made in connection with the Work.

16.3 In the event that Company so directs or authorizes, Contractor will sell at a price approved by Company, or retain at a mutually agreeable price, any such materials, supplies, Work in progress, or other goods as referred to in the preceding paragraph. In any event, Company will receive any and all records, plans, drawings, data, permits, specifications, sketches, reports, or other information relating to the Work. The proceeds of any such sale or the agreed price will be paid or credited to Company in such manner as Company may direct so as to reduce the amount payable by Company under this Section 3.

Electronic Filing: Received, Clerk's Office 03/26/2024

APPENDIX D
COVID-19 SITE ENTRY GUIDELINES

Electronic Filing: Received, Clerk's Office 03/26/2024

COVID-19 Vistra Site Entry Guidelines – *Effective: June 17, 2021*
These guidelines are applicable to ALL PERSONNEL entering Vistra work sites.

To enter a Vistra work site, each person must answer the following three questions with a "no" answer *and* pass the required temperature testing *unless* they display their Vistra vaccination sticker on their employee badge or hardhat:

Site Entry Questions:

1. In the past 10 days, have you tested positive for COVID-19 or are you currently waiting on test results?

2. In the past 10 days, have you been within six feet of someone, where masks were not worn, who:
    a. has tested positive for COVID-19,
    b. is known to be waiting on test results for COVID-19, or
    c. is under a quarantine order?

3. In the past 10 days, have you or someone who has been within six feet of you where masks were not worn had:
    a. flu-like symptoms,
    b. a deep, dry cough,
    c. recent shortness of breath or difficulty breathing,
    d. new loss of taste or smell, and/or
    e. fever of 100 degrees or above?

Temperature Testing:

You must register a temperature between 96- and 100-degrees Fahrenheit as described in the temperature procedures. (see next page for testing procedures)

- If your temperature is below 96 degrees, retest with a different device.
- If your temperature is 100-degrees Fahrenheit or above, retest on another device preferably an ear thermometer, if your temperature still registers 100-degrees Fahrenheit or above you may not enter the site.

Clearance to enter the site:

- If you have answered **"no"** to all three questions ***and*** passed the temperature test, you may enter the site.
- ***If you have an approved Vistra vaccination sticker, you are cleared to enter the site without the temperature test or answering COVID screening questions.***
- If you passed the temperature test ***and*** answered "Yes" to any of the questions, but have been cleared through VistraTravelerSafety (HR clearance) to enter the Vistra work site for that instance of exposure, testing, or symptoms, you may enter the site.

Anyone *not* cleared to enter the work site must immediately leave the work site and notify their supervisor who will notify HR at VistraTravelerSafety@vistracorp.com for next steps.

Any symptomatic employee, unvaccinated employee exposed to COVID-19 or any employee tested for COVID-19 as described above must be cleared through VistraTravelerSafety prior to returning to work.

Required Temperature Testing Procedures:
All persons entering the site without a Vistra vaccination sticker, who have cleared all questions above, will also submit to temperature testing or self-administer a temperature test as required by the facility management. If a self-administered test is required, then a member of the management team or their designee will witness the testing; however, where that is not practicable, each person must attest that they are only entering the site premises because they have passed the screening questions and temperature test required for entry. Also:

a. Hats may cause false high temperatures and should not be worn for five minutes immediately preceding a forehead temperature test.
b. Each person is responsible for ensuring all self-testing materials and areas touched during testing are sanitized.
c. All personnel should maintain a **distance of at least six feet** from other people during this process or wear required masks.

Temperature Testing Requirements:

1. **All persons entering the site without a Vistra vaccination sticker must register a temperature between 96- and 100-degrees Fahrenheit. Any such person who has a temperature not within that range or who triggers an alarm on a thermal camera** must **retest with a different device**, preferably an **ear thermometer**, if available. If the second test registers a temperature of 100 degrees or above:
   a. That person **may not enter** the Vistra work site and must notify their supervisor, who will notify HR at VistraTravelerSafety@vistracorp.com for next steps.
   b. If there is significant inconsistency between the two tests, repeat another temperature test and use the two closest readings.
2. **Anyone who registers a temperature between 96- and 100-degrees Fahrenheit** may proceed to their work site.
   - **If temperature is below 96 degrees, wait a few minutes and retest with a different device.**

Control rooms and communal areas:

All persons entering the site without a Vistra vaccination sticker should maintain at least six-feet distance from other people as much as possible and should wear face coverings when six-feet distance is not feasible. No one should gather in communal areas (including the temperature-testing area) without a Vistra vaccination sticker. Only operators are allowed in control rooms without plant manager approval.

Vistra Vaccination Sticker protocols:

All persons with a valid Vistra vaccination sticker do not have to socially distance or wear masks while at the site. They will also not be required to quarantine as a part of COVID-19 exposures unless exhibiting COVID-19 symptoms. To be eligible for these protocols, each person must have their approved Vistra vaccination sticker easily visible at all times while at work. If someone who has applied for a Vistra vaccination sticker believes they have specific health conditions that may affect the ability to have a full immune response to the vaccination, please consult your health provider prior to working without a mask.

Any symptomatic employee, unvaccinated employee exposed to COVID-19 or any employee tested for COVID-19 as described above must be cleared through VistraTravelerSafety prior to returning to work.

APPENDIX E
SAFETY DATA SHEETS

DYNEGY

Safety Data Sheet

Section 1
Identification of the Substance and of the Supplier

1.1 Product Identifier

Product Name/Identification:	ASTM Bottom Ash
Synonyms:	Ash; Ashes; Ash residues; Ashes, residues, bottom; Bottom ash; Bottom ash residues; Coal Fly Ash; Pozzolan; Waste solids.
Formula:	UVCB Substance

1.2 Relevant Identified Uses of the Substance or Mixture and Uses Advices Against

Relevant Identified Uses:	Component of wallboard, concrete, roofing material, bricks, cement kiln feed.
Uses Advised Against:	None known.

1.3 Details of the Supplier of the SDS

Manufacturer/Supplier:	Dynegy, Inc.
Street Address:	601 Travis Street, Suite 1400
City, State and Zip Code:	Houston, TX 77002
Customer Service Telephone:	800-633-4704

Section 2
Hazards Identification

2.1 Classification of the Substance

GHS Classification(s) according to OSHA Hazard Communication Standard (29 CFR 1910.1200):

- Eye Irritant, Category 2A
- STOT-SE, Category 3 (Respiratory Irritation)
- Carcinogen, Category 1A
- STOT-RE, Category 1 (Lungs)
- Toxic to Reproduction, Category 2

2.2 Label Elements

Labelling according to 29 CFR 1910.1200 Appendices A, B and C*	
Hazard Pictogram(s):	
Signal word:	**DANGER**
Hazard Statement(s):	*Causes serious eye irritation.* *May cause respiratory irritation.* *May cause damage to lungs after repeated/prolonged exposure via inhalation.* *May cause cancer of the lung.* *Suspected of damaging fertility or the unborn child.*
Precautionary Statement(s):	*Obtain special instructions before use.* *Do not handle until all safety precautions have been read and understood.* *Avoid breathing dust.* *Wash thoroughly after handling.* *Do not eat drink or smoke when using this product.* *Wear protective gloves/protective clothing/eye protection/face protection.* *Use outdoors or in a well-ventilated area.* *If exposed or concerned: Get medical advice/attention.* *Store in a secure area.* *Dispose of product in accordance with local/national regulations.*

** Fly ash and other coal combustion products (CCPs) are UVCB substances (unknown or variable composition or biological). Various CCPs, noted as ashes/ash residuals; Ashes, residues, bottom; Bottom ash; Bottom ash residues; Waste solids, ashes under TSCA are defined as: "The residuum from the burning of a combination of carbonaceous materials. The following elements may be present as oxides: aluminum, calcium, iron, magnesium, nickel, phosphorus, potassium, silicon, sulfur, titanium, and vanadium." Ashes including fly ash and fluidized bed combustion ash are identified by CAS number 68131-74-8. The exact composition of the ash is dependent on the fuel source and flue additives composed of many constituents. The classification of the final substance is dependent on the presence of specific identified oxides as well as other trace elements.*

2.3 Other Hazards

Listed Carcinogens:

-Respirable Crystalline Silica

IARC: [Yes] **NTP:** [Yes] **OSHA:** [Yes] **Other:** **(ACGIH)** [Yes]

Section 3
Composition/Information on Ingredients

Substance	*CAS No.*	*Percentage (%)*	*GHS Classification*
Crystalline Silica	*14808-60-7*	*20 - 40%*	*Repeat Dose STOT, Category 1* *Carcinogen, Category 1A*
Silica, crystalline respirable (RCS)	*14808-60-7*	***See Footnote 1***	*Repeat Dose STOT, Category 1* *Carcinogen. Category 1A*
Aluminosilicates[2]	***Various, see Footnote 2***	*10 - 60%*	*Single Exposure STOT, Category 3*
Calcium oxide (CaO)	*1305-78-8*	*10 - 30%*	*Skin Irritant, Category 2* *Eye Irritant, Category 1* *Single Exposure STOT, Category 3*
Iron oxide	*1309-37-1*	*1 - 10%*	*Not Classified*
Manganese dioxide (MnO_2)	*1313-13-9*	*<2%*	*Skin Irritant, Category 2* *Eye Irritant, Category 2B*
Magnesium oxide	*1309-48-4*	*2 - 10%*	*Not Classified*
Phosphorus pentoxide (P_2O_5)	*1314-56-3*	*≤2%*	*Skin Irritant, Category 2* *Eye Irritant, Category 2B*
Sodium oxide	*1313-59-3*	*1 - 10%*	*Not Classified*
Potassium oxide (K_2O)	*12136-45-7*	*≤1%*	*Skin Irritant Category 2* *Eye Irritant Category 2B*
Titanium dioxide (TiO_2)	*13463-67-7*	*<3%*	*Not Classified*
Bromide salt (calcium)	*7789-41-5*	***See Footnote 3***	*Toxic to Reproduction Category 2*

[1] *The percentage of respirable crystalline silica has not been determined. Therefore, a GHS classification of Carcinogen 1A has been assigned.*

[2] *Aluminosilicates (CAS# 1327-36-2) may be in the form of mullite (CAS# 1302-93-8); aluminosilicate glass; pozzolans (CAS# 71243-67-9); or calcium aluminosilicates such as tricalcium aluminate (C3A), or calcium sulfoaluminate (C4A3S). The form is dependent on the source of the coal and or the process used to create the CCP. Pulverized coal combustion would be more likely to create high levels of pozzolans. Aluminosilicates may have inclusions of calcium, titanium, iron, potassium, phosphorus, magnesium and other metal oxides.*

[3] *Analytical data are not available to demonstrate that the concentration of bromide salt is <0.1%; therefore, a GHS classification of Toxic to Reproduction Category 2 has been assigned.*

Section 4
First Aid Measures

4.1 Description of First Aid Measures

Inhalation:	If product is inhaled and irritation of the nose or coughing occurs, remove person to fresh air. Get medical advice/attention if respiratory symptoms persist.
Skin Contact:	If skin exposure occurs, wash with soap and water.
Eye Contact:	If product gets into the eye, rinse copiously with water for several minutes. Remove contact lenses, if present and easy to do. Seek medical attention/advice if irritation occurs or persists.
Ingestion:	No specific first aid measures are required.

4.2 Most Important Health Effects, Both Acute and Delayed

Acute Effects: Direct exposure may cause respiratory irritation, eye irritation and skin irritation. The product dust can dry and irritate the skin and cause dermatitis and can irritate eyes and skin through mechanical abrasion.

Chronic Effects: Chronic exposure may cause lung damage from repeated exposure. Prolonged inhalation of respirable crystalline silica above certain concentrations may cause lung diseases, including silicosis and lung cancer. Repeated exposure to dusts containing inorganic bromide salts may affect fertility and/or result in effects to the unborn child.

4.3 Indication of Any Immediate Medical Attention and Special Treatment Needed

Seek first aid or call a doctor or Poison Control Center if contact with eyes occurs and irritation remains after rinsing. Get medical advice if inhalation occurs and respiratory symptoms persist.

Section 5
Firefighting Measures

5.1 Extinguishing Media

Suitable Extinguishing Media:	Product is not flammable. Use extinguishing media appropriate for surrounding fire.
Unsuitable Extinguishing Media:	Not applicable, the product is not flammable.

5.2 Special Hazards Arising from the Substance or Mixture

Hazardous Combustion Products:	None known.

5.3 Advice for Firefighters

Special Protective Equipment and Precautions for Firefighters:	As with any fire, wear self-contained breathing apparatus (NIOSH approved or equivalent) and full protective gear.

Section 6
Accidental Release Measures

6.1 Personal Precautions, Protective Equipment and Emergency Procedures

Personal precautions/Protective Equipment:	See Section 8.2.2 Individual Protective Measures. For concentrations exceeding Occupational Exposure Levels (OELs), use a self-contained breathing apparatus (SCBA).
Emergency procedures:	Use scooping, water spraying/flushing/misting or ventilated vacuum cleaning systems to clean up spills. Do not use pressurized air.

6.2 Environmental Precautions

Environmental precautions:	Prevent contamination of drains or waterways and dispose according to local and national regulations.

6.3 Methods and Material for Containment and Cleaning Up

Methods and materials for containment and cleaning up:	Do not use brooms or compressed air to clean surfaces. Use dust collection vacuum and extraction systems. Large spills of dry product should be removed by a vacuum system. Dampened material should be removed by mechanical means and recycled or disposed of according to local and national regulations.

See Sections 8 and 13 for additional information on exposure controls and disposal.

Section 7
Handling and Storage

7.1 Precautions for Safe Handling

Practice good housekeeping. Use adequate exhaust ventilation, dust collection and/or water mist to maintain airborne dust concentrations below permissible exposure limits (note: respirable crystalline silica dust may be in the air without a visible dust cloud).

Do not permit dust to collect on walls, floors, sills, ledges, machinery, or equipment. Maintain and test ventilation and dust collection equipment. In cases of insufficient ventilation, wear a NIOSH approved respirator for silica dust when handling or disposing dust from this product. Avoid contact with skin and eyes. Wash or vacuum clothing that has become dusty. Avoid eating, smoking, or drinking while handling the material.

7.2 Conditions for Safe Storage, Including any Incompatibilities

Minimize dust produced during loading and unloading.

Section 8
Exposure Controls/Personal Protection

8.1 Control Parameters

OCCUPATIONAL EXPOSURE LIMITS					
SUBSTANCE		**OSHA PEL** TWA (mg/m^3)	**NIOSH REL** TWA (mg/m^3)	**ACGIH TLV** TWA (mg/m^3)	**CA - OSHA PEL** (mg/m^3)
Calcium oxide		5	2	2	2
Particulates Not Otherwise Regulated	Total	15	15	10	10
	Respirable	5	5	3	5
Respirable Crystalline Silica	Respirable	0.05	0.05	0.025	0.05
Manganese dioxide (as manganese compounds)	Total	5 (Ceiling)	1 3 (STEL)	0.1	0.2
	Respirable	-	-	0.02	-

8.2 Exposure Controls

8.2.1 Engineering Controls

Provide ventilation to maintain the ambient workplace atmosphere below the occupational exposure limit(s). Use general and local exhaust ventilation and dust collection systems as necessary to minimize exposure.

8.2.2 Personal Protective Equipment (PPE)

Respiratory protection:	Wear a NIOSH approved particulate respirator if exposure to airborne particulates is unavoidable and where occupational exposure limits may be exceeded. If airborne exposures are anticipated to exceed applicable PELs or TLVs, a self-contained breathing apparatus or airline respirator is recommended.
Eye and face protection:	If eye contact is possible, wear protective glasses with side shields. Avoid contact lenses.
Hand and skin protection:	Wear gloves and protective clothing. Wash hands with soap and water after contact with material.

Section 9
Physical and Chemical Properties

9.1 Information on Basic Physical and Chemical Properties

Property: Value	Property: Value
Appearance (physical state, color, etc.): Fine tan/ gray particulate	**Upper/lower flammability or explosive limits:** Not applicable
Odor: Odorless[1]	**Vapor Pressure (Pa):** Not applicable
Odor threshold: Not applicable	**Vapor Density:** Not applicable
pH (25 °C) (in water): 8 - 11	**Specific gravity or relative density:** 2.2 – 2.9
Melting point/freezing point (°C): Not applicable	**Water Solubility:** Slight
Initial boiling point and boiling range (°C): Not applicable	**Partition coefficient: n-octane/water:** Not determined
Flash point (°C): Not determined	**Auto ignition temperature (°C):** Not applicable
Evaporation rate: Not applicable	**Decomposition temperature (°C):** Not determined
Flammability (solid, gas): Not combustible	**Viscosity:** Not applicable

[1] The use of urea or aqueous ammonia injected into the flue gas to reduce nitrogen oxides (NOx) emissions may result in the presence of ammonium sulfate or ammonium bisulfate in the ash at less than 0.1%. When ash containing these substances becomes wet under high pH (>9), free ammonia gas may be released resulting in objectionable/nuisance ammonia odor and potential exposure to ammonia gas especially in confined spaces.

Section 10
Stability and Reactivity

10.1 Reactivity:	The material is an inert, inorganic material primarily composed of elemental oxides.
10.2 Chemical stability:	The material is stable under normal use conditions.
10.3 Possibility of hazardous reactions:	The material is a relatively stable, inert material; however, when ash containing ammonia becomes wet under high pH (>9), free ammonia gas may be released resulting in an objectionable/nuisance ammonia odor and potential exposure to ammonia gas especially in confined spaces. Polymerization will not occur.
10.4 Conditions to avoid:	Product can become airborne in moderate winds. Dry material should be stored in silos. Materials stored out of doors should be covered or maintained in a damp condition.
10.5 Incompatible materials:	None known.
10. 6 Hazardous decomposition products:	None known.

Section 11
Toxicological Information

11.1 Information on Toxicological Effects

Endpoint	Data
Acute oral toxicity	LD50 > 2000 mg/kg
Acute dermal toxicity	LD50 > 2000 mg/kg
Acute inhalation toxicity	LD50 > 5.0 mg/L
Skin corrosion/irritation	Does not meet the classification criteria but may cause slight skin irritation. Product dust can dry the skin which can result in irritation.
Eye damage/irritation	Causes serious eye irritation. Positive scores for conjunctiva irritation and chemosis in 2/3 animals based on average of 24, 48 and 72-hour scores with irritation clearing within 21 days; no corneal or iritis effects observed.
Respiratory/skin sensitization	Not a respiratory or dermal sensitizer.
Germ cell mutagenicity	Not mutagenic in in-vitro and in-vivo assays with or without metabolic activation.
Carcinogenicity	Not available. Respirable crystalline silica has been identified as a carcinogen by OSHA, NTP, ACGIH and IARC.
Reproductive toxicity	No developmental toxicity was observed in available animal studies. Reproductive studies on CCPs showed either no reproductive effects, or some effects on male and female reproductive organs and parameters but without a clear dose response. Inorganic bromide salts have been shown to have adverse effects on reproductive parameters in some animal studies.
STOT-SE	CCPs when present as a nuisance dust may result in respiratory irritation.
STOT-RE	In a 180-day inhalation study with fly ash dust, no effects were observed at the highest dose tested. NOEC = 4.2 mg/m^3; it is not possible to assess the level at which toxicologically significant effects may occur. Repeated inhalation exposures to high levels of respirable crystalline silica may result in lung damage (i.e., silicosis).
Aspiration Hazard	Not applicable based product form.

Section 12
Ecological Information

12.1 Toxicity

Fly Ash (CAS# 68131-74-8)	
Toxicity to Fish	LC50 > 100 mg/L
Toxicity to Aquatic Invertebrates	Data indicates that the test substance is not toxic to *Daphnia magna* (EC50 undetermined)
Toxicity to Aquatic Algae and Plants	EC50 = 10 mg/L
Calcium oxide CAS# 1305-78-8	
Toxicity to Fish	LC50 = 50.6 mg/L The findings were closely related to the pH of the test solutions; therefore, pH is considered to be the main reason for the effects.
Toxicity to Aquatic Invertebrates	EC50 = 49.1 mg/L The findings were closely related to the pH of the test solutions; therefore, pH is considered to be the main reason for the effects.
Toxicity to Aquatic Algae and Plants	NOEC =48 mg/L @ 72 hours based on $Ca(OH)_2$ The initial pH of the test medium was not directly related to the biologically relevant effects. The formation of precipitates is likely the result of the reaction between CO_2 dissolved in the medium.

12.2 Persistence and Degradability

Not relevant for inorganic materials.

12.3 Bioaccumulative Potential

This material does not contain any compounds that would bioaccumulate up the food chain.

12.4 Mobility in Soil

No data available.

12.5 Results of PBT and vPvB Assessment

This material does not contain any compounds classified as “persistent, bioaccumulative or toxic” nor as “very persistent/very bioaccumulative”.

12.6 Other Adverse Effects

None known.

Section 13
Disposal Considerations

See Sections 7 and 8 above for safe handling and use, including appropriate industrial hygiene practices.

Dispose of all waste product and containers in accordance with federal, state and local regulations.

Section 14
Transport Information

Regulatory entity: U.S. DOT	Shipping Name:	Not Regulated
	Hazard Class:	Not Regulated
	ID Number:	Not Regulated
	Packing Group:	Not Regulated

Section 15
Regulatory Information

15.1 Safety, Health and Environmental Regulations/Legislation Specific for the Mixture

- TSCA Inventory Status

  All components are listed on the TSCA Inventory.

- California Proposition 65

  The following substances are known to the State of California to be carcinogens and/or reproductive toxicants:

  - Respirable crystalline silica
  - Titanium dioxide

- State Right-to-Know (RTK)

Component	CAS	MA[1,2]	NJ[3,4]	PA[5]	RI[6]
Ammonium bisulfate	7803-63-6	No	Yes	No	No
Ammonium sulfate	7783-20-2	Yes	No	Yes	No
Calcium oxide	1305-78-8	Yes	Yes	Yes	No
Iron oxide	1309-37-1	Yes	Yes	Yes	No
Magnesium oxide	1309-48-4	No	Yes	No	No
Phosphorus pentoxide (or phosphorus oxide)	1314-56-3	Yes	Yes	Yes	No
Potassium oxide	12136-45-7	No	Yes	No	No
Silica-crystalline (SiO_2), quartz	14808-60-7	Yes	Yes	Yes	No
Sodium oxide	1313-59-3	No	Yes	No	No
Titanium dioxide	13463-67-7	Yes	Yes	Yes	Yes

[1] Massachusetts Department of Public Health, no date
[2] 189th General Court of The Commonwealth of Massachusetts, no date
[3] New Jersey Department of Health and Senior Services, 2010a
[4] New Jersey Department of Health, 2010b
[5] Pennsylvania Code, 1986
[6] Rhode Island Department of Labor and Training, no date

Section 16
Other Information, Including Date of Preparation or Last Revision

16.1 Indication of Changes

Date of preparation or last revision: February 23, 2018

16.2 Abbreviations and Acronyms

- ACGIH: American Conference of Industrial Hygienists
- CA: California
- CAS: Chemical Abstract Services
- CCP: Coal Combustion Product
- CFR: Code of Federal Regulations
- EPA: Environmental Protection Agency
- GHS: Globally Harmonized System of Classification and Labelling
- IARC: International Agency for Research on Cancer
- LC50: Concentration resulting in the mortality of 50 % of an animal population
- LD50: Dose resulting in the mortality of 50 % of an animal population
- MA: Massachusetts
- NA: Not Applicable
- NJ: New Jersey
- NOEC: No observed effect concentration
- NIOSH: National Institute of Occupational Safety and Health
- NOx: Nitrogen oxides
- NTP: US National Toxicology Program
- OEL: Occupational Exposure Limit
- OSHA: Occupational Safety and Health Administration
- PA: Pennsylvania
- PBT: Persistent, Toxic and Bioaccumulative
- PEL: Permissible exposure limit
- PPE: Personal Protective Equipment
- REL: Recommended exposure limit
- RI: Rhode Island
- RCS: Respirable Crystalline Silica
- RTK: Right-to-Know
- SCBA: Self-contained breathing apparatus
- SDS: Safety Data Sheet
- STEL: Short-term exposure limit
- STOT-RE: Specific target organ toxicity-repeated exposure
- STOT-SE: Specific target organ toxicity-single exposure
- TLV: Threshold limit value
- TSCA: Toxic Substances Control Act
- TWA: Time-weighted average
- UEL: Upper explosive limit
- UVCB: Unknown or Variable Composition/Biological
- U.S.: United States
- U.S. DOT: United States of Department of Transportation

16.3 Other Hazards

Hazardous Materials Identification System (HMIS) Degree of hazard (0= low, 4 = extreme)								
Health:	2*	**Flammability:**	0	**Physical Hazards:**	0	**Personal protection:****		

** Chronic Health Effects*
****** *Appropriate personal protection is defined by the activity to be performed.*
See Section 8 for additional information.

DISCLAIMER:

This SDS has been prepared in accordance with the Hazard Communication Rule 29 CFR 1910.1200. Information herein is based on data considered to be accurate as of date prepared. No warranty or representation, express or implied, is made as to the accuracy or completeness of this data and safety information. No responsibility can be assumed for any damage or injury resulting from abnormal use, failure to adhere to recommended practices, or from any hazards inherent in the nature of the product.

DYNEGY

Safety Data Sheet

Section 1
Identification of the Substance and of the Supplier

1.1 Product Identifier

Product Name/Identification:	ASTM Class C Fly Ash
Synonyms:	Coal Fly Ash, Pozzolan
Formula:	UVCB Substance

1.2 Relevant Identified Uses of the Substance or Mixture and Uses Advices Against

Relevant Identified Uses:	Component of wallboard, concrete, roofing material, bricks, cement kiln feed.
Uses Advised Against:	None known.

1.3 Details of the Supplier of the SDS

Manufacturer/Supplier:	Dynegy, Inc.
Street Address:	601 Travis Street, Suite 1400
City, State and Zip Code:	Houston, TX 77002
Customer Service Telephone:	800-633-4704

Section 2
Hazards Identification

2.1 Classification of the Substance

GHS Classification(s) according to OSHA Hazard Communication Standard (29 CFR 1910.1200):

- Eye Irritant, Category 2A
- STOT-SE, Category 3 (Respiratory Irritation)
- Carcinogen, Category 1A
- STOT-RE, Category 1 (Lungs)
- Toxic to Reproduction, Category 2

2.2 Label Elements

Labelling according to 29 CFR 1910.1200 Appendices A, B and C*	
Hazard Pictogram(s):	
Signal word:	**DANGER**
Hazard Statement(s):	*Causes serious eye irritation.* *May cause damage to lungs after repeated/prolonged exposure via inhalation.* *May cause respiratory irritation.* *May cause cancer of the lung.* *Suspected of damaging fertility or the unborn child.*
Precautionary Statement(s):	*Obtain special instructions before use.* *Do not handle until all safety precautions have been read and understood.* *Avoid breathing dust.* *Wear protective gloves/protective clothing/eye protection/face protection.* *Wash thoroughly after handling.* *Do not eat drink or smoke when using this product.* *Use outdoors or in a well-ventilated area.* *If exposed or concerned: Get medical advice/attention.* *Store in a secure area.* *Dispose of product in accordance with local/national regulations.*

** Fly ash and other coal combustion products (CCPs) are UVCB substances (unknown or variable composition or biological). Various CCPs, noted as ashes/ash residuals; Ashes, residues, bottom; Bottom ash; Bottom ash residues; Waste solids, ashes under TSCA are defined as: "The residuum from the burning of a combination of carbonaceous materials. The following elements may be present as oxides: aluminum, calcium, iron, magnesium, nickel, phosphorus, potassium, silicon, sulfur, titanium, and vanadium." Ashes including fly ash and fluidized bed combustion ash are identified by CAS number 68131-74-8. The exact composition of the ash is dependent on the fuel source and flue additives composed of many constituents. The* *classification of the final substance is dependent on the presence of specific identified oxides as well as other trace elements.*

2.3 Other Hazards

Listed Carcinogens:

-Respirable Crystalline Silica

IARC: [Yes] **NTP:** [Yes] **OSHA:** [Yes] **Other:** **(ACGIH)** [Yes]

Section 3
Composition/Information on Ingredients

Substance	***CAS No.***	***Percentage (%)***	***GHS Classification***
Crystalline Silica	*14808-60-7*	*30 - 60%*	*Repeat Dose STOT, Category 1* *Carcinogen, Category 1A*
Silica, crystalline respirable (RCS)	*14808-60-7*	***See Footnote 1***	*Repeat Dose STOT, Category 1* *Carcinogen, Category 1A*
Aluminosilicates	*71243-67-9* *1327-36-2*	*30 - 60%*	*Single Exposure STOT, Category 3*
Iron oxide	*1309-37-1*	*1 - 10%*	*Not Classified*
Calcium oxide (CaO)	*1305-78-8*	*20 - 30%*	*Skin Irritant, Category 2* *Eye Irritant, Category 1* *Single Exposure STOT, Category 3*
Magnesium oxide	*1309-48-4*	*2 - 10%*	*Not Classified*
Phosphorus pentoxide (P_2O_5)	*1314-56-3*	*≤2%*	*Skin Irritant, Category 2* *Eye Irritant, Category 2B*
Sodium oxide	*1313-59-3*	*1-8%*	*Not Classified*
Potassium oxide (K_2O)	*12136-45-7*	*≤1%*	*Skin Irritant, Category 2* *Eye Irritant, Category 2B*
Titanium dioxide (TiO_2)	*13463-67-7*	*<3%*	*Not Classified*
Bromide salt (calcium)	*7789-41-5*	***See Footnote 2***	*Toxic to Reproduction, Category 2*

Footnote 1: *The percentage of respirable crystalline silica has not been determined. Therefore, a GHS classification of Carcinogen, Category 1A has been assigned.*

Footnote 2: *Analytical data are not available to demonstrate that the concentration of bromide salt is <0.1%; therefore, a GHS classification of Toxic to Reproduction, Category 2 has been assigned.*

Section 4
First Aid Measures

4.1 Description of First Aid Measures

Inhalation:	If product is inhaled and irritation of the nose or coughing occurs, remove person to fresh air. Get medical advice/attention if respiratory symptoms persist.
Skin Contact:	If skin exposure occurs, wash with soap and water.
Eye Contact:	If product gets into the eye, rinse copiously with water for several minutes. Remove contact lenses, if present and easy to do. Seek medical attention/advice if irritation occurs or persists.
Ingestion:	No specific first aid measures are required.

4.2 Most Important Health Effects, Both Acute and Delayed

Acute Effects: Direct exposure may cause respiratory irritation, eye irritation and skin irritation. The product dust can dry and irritate the skin and cause dermatitis and can irritate eyes and skin through mechanical abrasion.

Chronic Effects: Chronic exposure may cause lung damage from repeated exposure. Prolonged inhalation of respirable crystalline silica above certain concentrations may cause lung diseases, including silicosis and lung cancer. Repeated exposure to dusts containing inorganic bromide salts may affect fertility and/or result in effects to the unborn child.

4.3 Indication of Any Immediate Medical Attention and Special Treatment Needed

Seek first aid or call a doctor or Poison Control Center if contact with eyes occurs and irritation remains after rinsing. Get medical advice if inhalation occurs and respiratory symptoms persist.

Section 5
Firefighting Measures

5.1 Extinguishing Media

Suitable Extinguishing Media:	Product is not flammable. Use extinguishing media appropriate for surrounding fire.
Unsuitable Extinguishing Media:	Not applicable, the product is not flammable.

5.2 Special Hazards Arising from the Substance or Mixture

Hazardous Combustion Products:	None known.

5.3 Advice for Firefighters

Special Protective Equipment and Precautions for Firefighters:	As with any fire, wear self-contained breathing apparatus (NIOSH approved or equivalent) and full protective gear.

Section 6
Accidental Release Measures

6.1 Personal Precautions, Protective Equipment and Emergency Procedures

Personal precautions/Protective Equipment:	See Section 8.2.2 Individual Protective Measures. For concentrations exceeding Occupational Exposure Levels (OELs), use a self-contained breathing apparatus (SCBA).
Emergency procedures:	Use scooping, water spraying/flushing/misting or ventilated vacuum cleaning systems to clean up spills. Do not use pressurized air.

6.2 Environmental Precautions

Environmental precautions:	Prevent contamination of drains or waterways and dispose according to local and national regulations.

6.3 Methods and Material for Containment and Cleaning Up

Methods and materials for containment and cleaning up:	Do not use brooms or compressed air to clean surfaces. Use dust collection vacuum and extraction systems. Large spills of dry product should be removed by a vacuum system. Dampened material should be removed by mechanical means and recycled or disposed of according to local and national regulations.

See Sections 8 and 13 for additional information on exposure controls and disposal.

Section 7
Handling and Storage

7.1 Precautions for Safe Handling

Practice good housekeeping. Use adequate exhaust ventilation, dust collection and/or water mist to maintain airborne dust concentrations below permissible exposure limits (note: respirable crystalline silica dust may be in the air without a visible dust cloud).

Do not permit dust to collect on walls, floors, sills, ledges, machinery, or equipment. Maintain and test ventilation and dust collection equipment. In cases of insufficient ventilation, wear a NIOSH approved respirator for silica dust when handling or disposing dust from this product. Avoid contact with skin and eyes. Wash or vacuum clothing that has become dusty. Avoid eating, smoking, or drinking while handling the material.

7.2 Conditions for Safe Storage, Including any Incompatibilities

Minimize dust produced during loading and unloading.

Section 8
Exposure Controls/Personal Protection

8.1 Control Parameters

OCCUPATIONAL EXPOSURE LIMITS					
SUBSTANCE		**OSHA PEL TWA (mg/m^3)**	**NIOSH REL TWA (mg/m^3)**	**ACGIH TLV TWA (mg/m^3)**	**CA - OSHA PEL (mg/m^3)**
Calcium oxide		5	2	2	2
Particulates Not Otherwise Regulated	Total	15	15	10	10
	Respirable	5	5	3	5
Respirable Crystalline Silica	Respirable Crystalline Silica	0.05	0.05	0.025	0.05
Titanium dioxide	Total	15	2.4 (fine) 0.3 (ultrafine)	10	10
Manganese dioxide (as manganese compounds)	Total	5 (Ceiling)	1 3 (STEL)	0.1	0.2
	Respirable	-	-	0.02	-

8.2 Exposure Controls

8.2.1 Engineering Controls

Provide ventilation to maintain the ambient workplace atmosphere below the occupational exposure limit(s). Use general and local exhaust ventilation and dust collection systems as necessary to minimize exposure.

8.2.2 Personal Protective Equipment (PPE)

Respiratory protection:	Wear a NIOSH approved particulate respirator if exposure to airborne particulates is unavoidable and where occupational exposure limits may be exceeded. If airborne exposures are anticipated to exceed applicable PELs or TLVs, a self-contained breathing apparatus or airline respirator is recommended.
Eye and face protection:	If eye contact is possible, wear protective glasses with side shields. Avoid contact lenses.
Hand and skin protection:	Wear gloves and protective clothing. Wash hands with soap and water after contact with material.

Section 9
Physical and Chemical Properties

9.1 Information on Basic Physical and Chemical Properties

Property: Value	Property: Value
Appearance (physical state, color, etc.): Fine tan/ gray particulate	**Upper/lower flammability or explosive limits:** Not applicable
Odor: Odorless[1]	**Vapor Pressure (Pa):** Not applicable
Odor threshold: Not applicable	**Vapor Density:** Not applicable
pH (25 °C) (in water): Not Determined	**Specific gravity or relative density:** 2.2 – 2.9
Melting point/freezing point (°C): Not applicable	**Water Solubility:** Slight
Initial boiling point/boiling range (°C): NA	**Partition coefficient: n-octane/water:** NA
Flash point (°C): Not determined	**Auto ignition temperature (°C):** Not applicable
Evaporation rate: Not applicable	**Decomposition temperature (°C):** Not determined
Flammability (solid, gas): Not combustible	**Viscosity:** Not applicable

[1] The use of urea or aqueous ammonia injected into the flue gas to reduce nitrogen oxides (NOx) emissions may result in the presence of ammonium sulfate or ammonium bisulfate in the ash at less than 0.1%. When ash containing these substances becomes wet under high pH (>9), free ammonia gas may be released resulting in objectionable/nuisance ammonia odor and potential exposure to ammonia gas especially in confined spaces.

Section 10
Stability and Reactivity

10.1 Reactivity:	The material is an inert, inorganic material primarily composed of elemental oxides.
10.2 Chemical stability:	The material is stable under normal use conditions.
10.3 Possibility of hazardous reactions:	The material is a relatively stable, inert material; however, when ash containing ammonia becomes wet under high pH (>9), free ammonia gas may be released resulting in an objectionable/nuisance ammonia odor and potential exposure to ammonia gas especially in confined spaces. Polymerization will not occur.
10.4 Conditions to avoid:	Product can become airborne in moderate winds. Dry material should be stored in silos. Materials stored out of doors should be covered or maintained in a damp condition.
10.5 Incompatible materials:	None known.
10. 6 Hazardous decomposition products:	None known.

Section 11
Toxicological Information

11.1 Information on Toxicological Effects

Endpoint	Data
Acute oral toxicity	LD50 > 2000 mg/kg
Acute dermal toxicity	LD50 > 2000 mg/kg
Acute inhalation toxicity	LD50 > 5.0 mg/L
Skin corrosion/irritation	Does not meet the classification criteria but may cause slight skin irritation. Product dust can dry the skin which can result in irritation.
Eye damage/irritation	Causes serious eye irritation. Positive scores for conjunctiva irritation and chemosis in 2/3 animals based on average of 24, 48 and 72-hour scores with irritation clearing within 21 days; No corneal or iritis effects observed.
Respiratory/skin sensitization	Not a respiratory or dermal sensitizer.
Germ cell mutagenicity	Not mutagenic in in-vitro and in-vivo assays with or without metabolic activation.
Carcinogenicity	Not available. Respirable crystalline silica has been identified as a carcinogen by OSHA, NTP, ACGIH and IARC.
Reproductive toxicity	No developmental toxicity was observed in available animal studies. Reproductive studies on CCPs showed either no reproductive effects, or some effects on male and female reproductive organs and parameters but without a clear dose response. Inorganic bromide salts have been shown to have adverse effects on reproductive parameters in some animal studies.
STOT-SE	CCPs when present as a nuisance dust may result in respiratory irritation.
STOT-RE	In a 180-day inhalation study with fly ash dust, no effects were observed at the highest dose tested. NOEC = 4.2 mg/m^3; it is not possible to assess the level at which toxicologically significant effects may occur. Repeated inhalation exposures to high levels of respirable crystalline silica may result in lung damage (i.e., silicosis).
Aspiration Hazard	Not applicable based product form.

Section 12
Ecological Information

12.1 Toxicity

Fly Ash C (CAS# 68131-74-8)	
Toxicity to Fish	LC50 > 100 mg/L
Toxicity to Aquatic Invertebrates	Data indicates that the test substance is not toxic to *Daphnia magna* (EC50 undetermined).
Toxicity to Aquatic Algae and Plants	EC50 = 10 mg/L

Calcium oxide CAS# 1305-78-8	
Toxicity to Fish	LC50 = 50.6 mg/L The findings were closely related to the pH of the test solutions; therefore, pH is considered to be the main reason for the effects.
Toxicity to Aquatic Invertebrates	EC50 = 49.1 mg/L The findings were closely related to the pH of the test solutions; therefore, pH is considered to be the main reason for the effects.
Toxicity to Aquatic Algae and Plants	NOEC =48 mg/L @ 72 hours based on $Ca(OH)_2$ The initial pH of the test medium was not directly related to the biologically relevant effects. The formation of precipitates is likely the result of the reaction between CO_2 dissolved in the medium.

12.2 Persistence and Degradability

Not relevant for inorganic materials.

12.3 Bioaccumulative Potential

This material does not contain any compounds that would bioaccumulate up the food chain.

12.4 Mobility in Soil

No data available.

12.5 Results of PBT and vPvB Assessment

This material does not contain any compounds classified as “persistent, bioaccumulative or toxic” nor as “very persistent/very bioaccumulative”.

12.6 Other Adverse Effects

None known.

Section 13

Disposal Considerations

See Sections 7 and 8 above for safe handling and use, including appropriate industrial hygiene practices.

Dispose of all waste product and containers in accordance with federal, state and local regulations.

Section 14
Transport Information

Regulatory entity: U.S. DOT	Shipping Name:	Not Regulated
	Hazard Class:	Not Regulated
	ID Number:	Not Regulated
	Packing Group:	Not Regulated

Section 15
Regulatory Information

15.1 Safety, Health and Environmental Regulations/Legislation Specific for the Mixture

- TSCA Inventory Status

  All components are listed on the TSCA Inventory.

- California Proposition 65.

  The following substances are known to the State of California to be carcinogens and/or reproductive toxicants:

  - Respirable crystalline silica

- State Right-to-Know (RTK)

Component	CAS	MA[1,2]	NJ[3,4]	PA[5]	RI[6]
Ammonium bisulfate	7803-63-6	No	Yes	No	No
Ammonium sulfate	7783-20-2	Yes	No	Yes	No
Calcium oxide	1305-78-8	Yes	Yes	Yes	No
Iron oxide	1309-37-1	Yes	Yes	Yes	No
Magnesium oxide	1309-48-4	No	Yes	No	No
Manganese oxide-as manganese compounds	1313-13-9; Various	No	No	Yes	Yes
Phosphorus pentoxide (or phosphorus oxide)	1314-56-3	Yes	Yes	Yes	No
Potassium oxide	12136-45-7	No	Yes	No	No
Silica-crystalline (SiO2), quartz	14808-60-7	Yes	Yes	Yes	No
Sodium oxide	1313-59-3	No	Yes	No	No
Titanium dioxide	13463-67-7	Yes	Yes	Yes	Yes

[1] Massachusetts Department of Public Health, no date
[2] 189th General Court of The Commonwealth of Massachusetts, no date
[3] New Jersey Department of Health and Senior Services, 2010a
[4] New Jersey Department of Health, 2010b
[5] Pennsylvania Code, 1986
[6] Rhode Island Department of Labor and Training, no date

Section 16
Other Information, Including Date of Preparation or Last Revision

16.1 Indication of Changes

Date of preparation or last revision: February 23, 2018

16.2 Abbreviations and Acronyms

- ACGIH: American Conference of Industrial Hygienists
- CA: California
- CAS: Chemical Abstract Services
- CCP: Coal Combustion Product
- CFR: Code of Federal Regulations
- EPA: Environmental Protection Agency

- GHS: Globally Harmonized System of Classification and Labelling
- IARC: International Agency for Research on Cancer
- LC50: Concentration resulting in the mortality of 50 % of an animal population
- LD50: Dose resulting in the mortality of 50 % of an animal population
- MA: Massachusetts
- NA: Not Applicable
- NJ: New Jersey
- NOEC: No observed effect concentration
- NIOSH: National Institute of Occupational Safety and Health
- NOx: Nitrogen oxides
- NTP: US National Toxicology Program
- OEL: Occupational Exposure Limit
- OSHA: Occupational Safety and Health Administration
- PA: Pennsylvania
- PBT: Persistent, Toxic and Bioaccumulative
- PEL: Permissible exposure limit
- PPE: Personal Protective Equipment
- REL: Recommended exposure limit
- RI: Rhode Island
- RCS: Respirable Crystalline Silica
- RTK: Right-to-Know
- SCBA: Self-contained breathing apparatus
- SDS: Safety Data Sheet
- STEL: Short-term exposure limit
- STOT-RE: Specific target organ toxicity-repeated exposure
- STOT-SE: Specific target organ toxicity-single exposure
- TLV: Threshold limit value
- TSCA: Toxic Substances Control Act
- TWA: Time-weighted average
- UEL: Upper explosive limit
- UVCB: Unknown or Variable Composition/Biological
- U.S.: United States
- U.S. DOT: United States of Department of Transportation

16.3 Other Hazards

Hazardous Materials Identification System (HMIS) Degree of hazard (0= low, 4 = extreme)								
Health:	2*	**Flammability:**	0	**Physical Hazards:**	0	**Personal protection:****		

** Chronic Health Effects*
******** *Appropriate personal protection is defined by the activity to be performed.*
See Section 8 for additional information.

DISCLAIMER:

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ATTACHMENT T

Luminant

Phil Morris
Illinois Power Generating Company
Luminant
1500 Eastport Plaza Drive
Collinsville, IL 62234

May 19, 2021

Mr. Darin LeCrone, P.E.
Manager, Industrial Unit
Bureau of Water, Division of Water Pollution Control, Permits Section
Illinois Environmental Protection Agency
1021 North Grand Avenue, East
Springfield, IL 62794-9276

Re: CCR Surface Impoundment Category Designation and Justification for Illinois Power Generating Company

Dear Mr. LeCrone:

Pursuant to 35 I.A.C. 845.700(c), Illinois Power Generating Company submits the information necessary to categorize the CCR surface impoundments located at the Newton Power Plant and the now retired Coffeen Power Plant. The following parameters were used in assessing and justifying each assigned category.

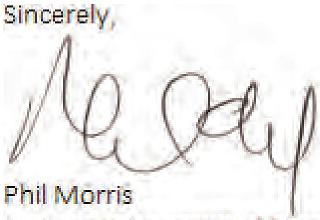
- Category 1 – *Impacts to existing potable water supply well or impacts to groundwater quality within the setback of an existing potable water supply well.*
  - This review includes an assessment of potable water wells within 2,500 feet of CCR surface impoundments to determine whether any potential impacts are occurring within the setback zone of any community water supply well established under the Illinois Groundwater Protection Act.
  - This information was developed during the Part 845 rulemaking and is summarized in Attachment 1, Table 2: Impacts to Potable Water Supply.
- Category 2 – *Imminent threat to human health or the environment or have been designated by IEPA under (g)(5)*
  - The surface impoundments at Newton and Coffeen Power Plants do not pose an imminent threat to human health or the environment. There are no known conditions at or around the facility where someone or something may be exposed to contaminant concentrations reasonably expected to cause harm
- Category 3 – *Located in areas of environmental justice ("EJ") concern*
  - EJ areas were evaluated using the EJ mapping link from IEPA's webpage located at https://www2.illinois.gov/epa/topics/environmental-justice. Per the IEPA mapping tool, the EJ Status thresholds were determined as twice the state averages for Minority and Low Income consistent with 35 IAC 845.700(g)(6).
  - An EJ map denoting the facilities with impoundments is located in Attachment 2.

- Category 4-7
  - Category 4 - Inactive CCR surface impoundments that have an exceedance of the groundwater protection standards in Section 845.600
  - Category 5 - Existing CCR surface impoundments that have exceedances of the groundwater protection standards in Section 845.600
  - Category 6 - Inactive CCR surface impoundments that are in compliance with the groundwater protection standards in Section 845.600.
  - Category 7 – Existing CCR surface impoundments that are in compliance with the groundwater protection standards in Section 845.600

Based on the information above, category designations have been assigned. The category designations for each CCR impoundment are shown in Attachment 1, Table 1: Category Designations.

If you have any questions regarding this submittal, please contact Phil Morris at 618-343-7794 or phil.morris@vistracorp.com.

Sincerely,



Phil Morris
Senior Environmental Director

Attachments

Attachment 1

Table 1: Category Designation

Facility	Pond Description	Classifications	Potable Water Supply Impacts (Category 1)	Human Health or Environment Threat (Category 2)	Located within Environmental Justice Areas[1] (Category 3)	Standards Exceedances[2] (Categories 4,5,6,7)	Impoundment Category 845.700(g)
Coffeen	Ash Pond 1	Inactive	No	No	No	Yes	5
	GMF Pond	Inactive	No	No	No	Yes	5
	GMF Recycle Pond	Inactive	No	No	No	Yes	5
Newton	Primary Ash Pond	Existing	No	No	No	Yes	5

[1] See Attachment 2 Environmental Justice Area Map

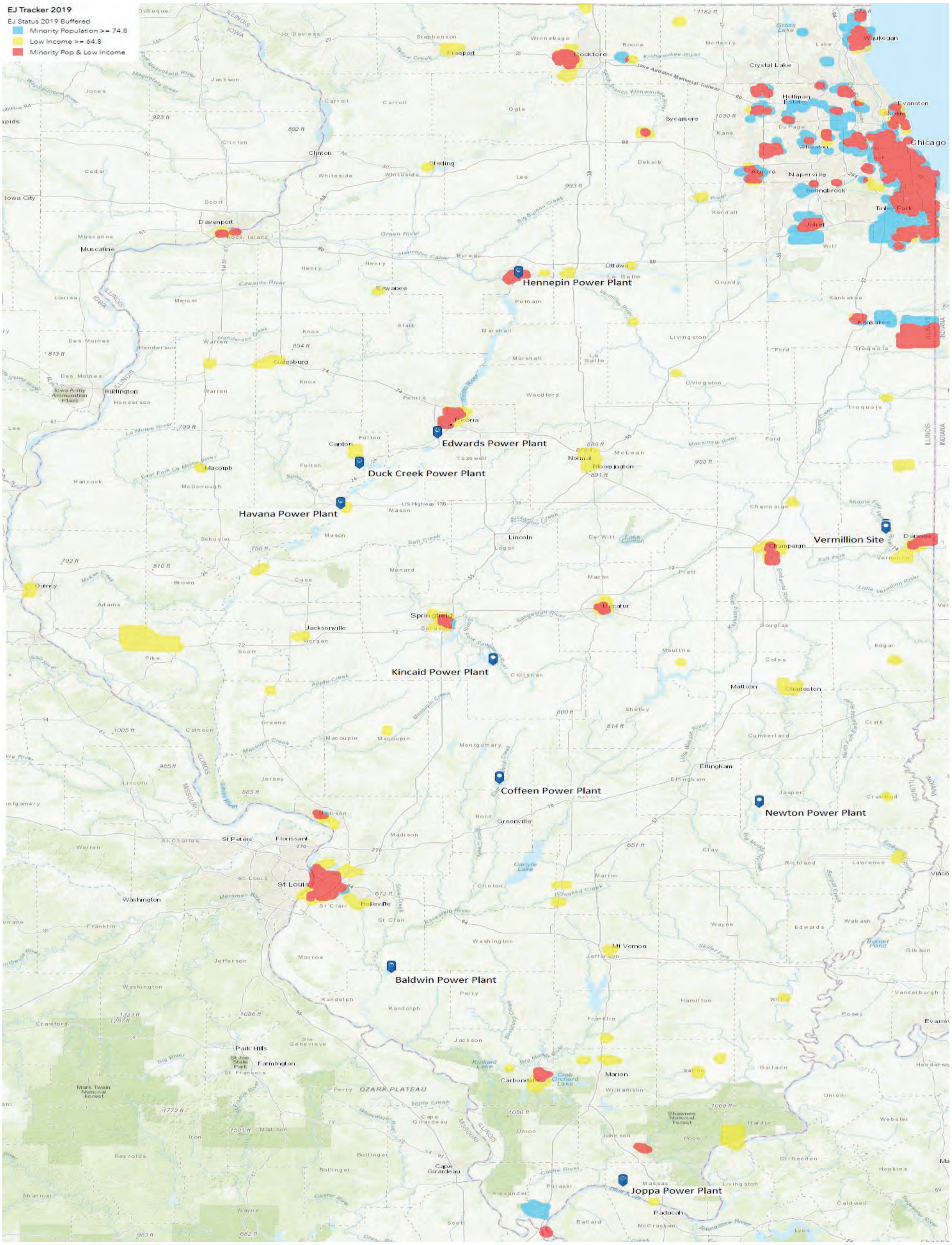
[2] Ground water analyses for purposes of categories 4-7, assumptions have been made based on current groundwater data. However, since sampling and analysis is ongoing and subject to IEPA review and approval, IPGC reserves the right to update its category designations for Categories 4-7.

Table 2: Impacts to Potable Water Supply[1]

Site Name	Private and Semi-Private Wells	Non-Community Water Supply (CWS) Wells	Non-CWS Surface Water Intakes	Community Water Supply Wells	CWS Surface Water Intakes
Coffeen	**Present, but not at risk** Thirty-four (34) water wells were identified; however, they are unlikely to be at risk because of their hydrogeologic location relative to the power plant, they are abandoned, or they do not appear to be used for potable purposes. None of the off-site wells are located in a downgradient direction.	**Present, but not at risk** Three (3) non-CWS wells were identified; however, they are unlikely to be at risk because of their hydrogeologic location relative to the power plant and/or their inactive status.	Absent	Absent	Absent
Newton	**Present, but not at risk** Twenty-four (24) water wells were identified; however, they are unlikely to be at risk because of their hydrogeologic location relative to the power plant, they are abandoned, and/or they are unlikely to be present based on the mapped location. None of the offsite wells are located in a downgradient direction.	Absent	Absent	Absent	Absent

[1] Ramboll, WELL/WATER SUPPLY SURVEY AND EVALUATION COAL-FIRED POWER PLANTS IN ILLINOIS (September 24, 2020), filed with the Illinois Pollution Control Board in R2020-019.

Attachment 2: EJ Mapping Denoting Facilities with Impoundments



ATTACHMENT U

Geosyntec consultants

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Chesterfield, MO 63005
PH 636-812-0800
www.geosyntec.com

October 11, 2021

Illinois Power Generating Company
6725 North 500th Street
Newton, Illinois, 62448

Subject: **USEPA CCR Rule and IEPA Part 845 Rule Applicability Cross-Reference**
2021 USEPA CCR Rule Periodic Certification Report
Primary Ash Pond, Newton Power Plant, Newton, Illinois

At the request of Illinois Power Generating Company (IPGC), Geosyntec Consultants (Geosyntec) has prepared this letter to document how the attached 2021 United States Environmental Protection Agency (USEPA) CCR Rule Periodic Certification Report (Report) was prepared in accordance with both the Federal USEPA CCR Rule[1] and the state-specific Illinois Environmental Protection Agency (IEPA) Part 845 Rule[2]. Specific sections of the report and the applicable sections of the USEPA CCR Rule and Illinois Part 845 Rule are cross-referenced in **Table 1**. A certification from a Qualified Professional Engineer for each of the CCR Rule sections listed in **Table 1** is provided in Section 10 of the attached Report. This certification statement is also applicable to each section of the Part 845 Rule listed in **Table 1.**

Table 1 – USEPA CCR Rule and Illinois Part 845 Rule Cross-Reference

Report Section	USEPA CCR Rule		Illinois Part 845 Rule	
3	§257.73 (a)(2)	Hazard Potential Classification	845.440	Hazard Potential Classification Assessment[3]
4	§257.73 (c)(1)	History of Construction	845.220(a)	Design and Construction Plans (Construction History)
5	§257.73 (d)(1)	Structural Stability Assessment	845.450 (a) and (c)	Structural Stability Assessment
6	§257.73 (e)(1)	Safety Factor Assessment	845.460 (a-b)	Safety Factor Assessment
7	§257.82 (a)(1-3)	Adequacy of Inflow Design Control System Plan	845.510(a), (c)(1), (c)(3)	Hydrologic and Hydraulic Capacity Requirements / Inflow Design Flood Control System Plan
	§257.82 (b)	Discharge from CCR Unit	845.510(b)	Discharge from CCR Surface Impoundment

[1] United Stated Environmental Protection Agency, 2015. *40 CFR Parts 257 and 261, Hazardous and Solid Waste Management System, Disposal of Coal Combustion Residuals from Electric Utilities, Final Rule.*
[2] State of Illinois, Joint Committee on Administrative Rule, Administrative Code (2021). *Title 35: Environmental Protection, Subtitle G: Waste Disposal, Chapter I: Pollution Control Board, Subchapter j: Coal Combustion Waste Surface Impoundment, Part 845 Standards for the Disposal of Coal Combustion Residuals in Surface Impoundments.*
[3] "Significant" and "High" hazard, per the CCR Rule[1], are equivalent to Class II and Class I hazard potential, respectively, per Part 845[2].

CLOSING

This letter has been prepared to demonstrate that the content and Qualified Professional Engineer Certification of the 2021 Periodic USEPA CCR Rule Certification Report fulfills the corresponding requirements of Part 845 of Illinois Administrative Code listed in **Table 1**.

Sincerely,

Panos Andonyadis, P.E.
Senior Engineer

John Seymour, P.E.
Senior Principal

2021 USEPA CCR RULE PERIODIC CERTIFICATION REPORT §257.73(a)(2), (c), (d[1]), (e) and §257.82 PRIMARY ASH POND Newton Power Plant Newton, Illinois

Submitted to

Illinois Power Generating Company

6725 North 500th Street
Newton, Illinois 62448

Submitted by

Geosyntec consultants

engineers | scientists | innovators

1 McBride and Son Center Drive, Suite 202
Chesterfield, Missouri 63005

October 11, 2021

[1] Except for §257.73(d)(1)(vi).

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EXECUTIVE SUMMARY

This Periodic United States Environmental Protection Agency (USEPA) Coal Combustion Residuals (CCR) Rule [1] certification report (Periodic Certification Report) for the Primary Ash Pond (PAP) [2] at the Newton Power Plant (NPP), also known as Newton Power Station, has been prepared in accordance with Rule 40, Code of Federal Regulations (CFR) §257, herein referred to as the "CCR Rule" [1]. The CCR Rule requires that initial certifications for existing CCR surface impoundment, completed in 2016 and subsequently posted on Illinois Power Generating Company (IPGC) CCR Website ([2], [3], [4], [5], [6]) be updated on a five-year basis.

The initial certification reports developed in 2016 and 2017 ([2], [3], [4], [5], [6]) were independently reviewed by Geosyntec. Additionally, field observations, interviews with power plant staff, updated engineering analyses, and evaluations were performed to compare conditions in 2021 at the PAP relative to the 2016 and 2017 initial certifications. These tasks identified that updates are not required for the Initial Hazard Potential Classification. However, due to changes at the site and technical review comments, updates were required and were performed for the:

- History of Construction Report,
- Initial Structural Stability Assessment,
- Initial Safety Factor Assessment, and
- Initial Inflow Design Flood Control System Plan.

Geosyntec's evaluations of the initial certification reports and updated analyses identified that the PAP meets all requirements for hazard potential classification, history of construction reporting, structural stability, safety factor assessment, and hydrologic and hydraulic control, with the exception of the structural integrity of hydraulic structures (§257.73(d)(1)(vi)), which was certified by others. **Table 1** provides a summary of the initial 2016 certifications and the updated 2021 periodic certifications.

[2] The PAP is also referred to as ID Number W0798070001-01, Primary Ash Pond by the Illinois Environmental Protection Agency (IEPA); CCR unit ID 401 by EEI; and IL50719 within the National Inventory of Dams (NID) maintained by the Illinois Department of Natural Resources (IDNR). Within this document it is referred to as the PAP.

Table 1 – Periodic Certification Summary

	CCR Rule Reference	Requirement Summary	2016 Initial Certification		2021 Periodic Certification	
			Requirement Met?	Comments	Requirement Met?	Comments
Hazard Potential Classification						
3	§257.73(a)(2)	Document hazard potential classification	Yes	Impoundment was determined to have Significant hazard potential classification [2].	Yes	Updates were not determined to be necessary. Geosyntec recommends retaining the Significant hazard potential classification.
History of Construction						
4	§257.73(c)(1)	Compile a history of construction	Yes	History of Construction report was prepared for the PAP [3].	Yes	A letter listing updates to the History of Construction report is provided in **Attachment C**.
Structural Stability Assessment						
5	§257.73(d)(1)(i)	Stable foundations and abutments	Yes	Foundations were found to be stable. Abutments are not present [7].	Yes	Foundations and abutments were found to be stable after performing updated slope stability analyses.
	§257.73(d)(1)(ii)	Adequate slope protection	Yes	Slope protection is adequate [7].	Yes	No changes were identified that may affect this requirement.
	§257.73(d)(1)(iii)	Sufficiency of embankment compaction	Yes	Embankment compaction is sufficient for expected ranges in loading conditions [7].	Yes	Dike compaction was found to be sufficient after performing updated slope stability analyses.
	§257.73(d)(1)(iv)	Presence and condition of slope vegetation	Yes	Vegetation is present on interior and exterior slopes and is maintained. [7].	Yes	No changes were identified that may affect this requirement.
	§257.73(d)(1)(v)(A) and (B)	Adequacy of spillway design and management	Yes	Spillways are adequately designed and constructed and adequately manage flow during 1,000-year flood [7].	Yes	Spillways were found to be adequately designed and constructed and are expected to adequately manage flow during the 1,000-year flood, after performing updated hydrologic and hydraulic analyses.
	§257.73(d)(1)(vi)	Structural integrity of hydraulic structures	Yes	Hydraulic structures passing through the embankment were inspected and found to maintain structural integrity [7].	Periodic certification of §257.73(d)(1)(vi) was independently completed by Luminant in 2020 [8].	
	§257.73(d)(1)(vii)	Stability of downstream slopes inundated by water body.	Yes	Downstream slopes adjacent to Newton Lake and the Secondary Pond are expected to remain stable during inundation [7].	Yes	Downstream slopes were found to be stable after performing updated sudden drawdown slope stability analyses.
Safety Factor Assessment						
6	§257.73(e)(1)(i)	Maximum storage pool safety factor must be at least 1.50	Yes	Safety factors were calculated to be 1.66 and higher [5].	Yes	Safety factors from updated slope stability analyses were calculated to be 1.66 and higher.
	§257.73(e)(1)(ii)	Maximum surcharge pool safety factor must be at least 1.40	Yes	Safety factors were calculated to be 1.66 and higher [5].	Yes	Safety factors from updated slope stability analyses were calculated to be 1.66 and higher.
	§257.73(e)(1)(iii)	Seismic safety factor must be at least 1.00	Yes	Safety factors were calculated to be 1.07 and higher [5].	Yes	Safety factors from updated slope stability analyses were calculated to be 1.07 and higher.
	§257.73(e)(1)(iv)	For embankment construction of soils that have susceptible to liquefaction, safety factor must be at least 1.20	Not Applicable	Embankment soils were not susceptible to liquefaction [5].	Not Applicable	No changes were identified that may affect this requirement.
Inflow Design Flood Control System Plan						
8	§257.82(a)(1), (2), (3)	Adequacy of inflow design control system plan.	Yes	Flood control system adequately managed inflow and peak discharge during the 1,000-year, 24-hour, Inflow Design Flood [7].	Yes	The flood control system was found to adequately manage inflow and peak discharge during the 1,000-year, 24-hour, Inflow Design Flood, after performing updated hydrologic and hydraulic analyses.
	§257.82(b)	Discharge from CCR Unit	Yes	Discharge from the CCR Unit is routed through a NPDES-permitted outfall during both normal and 1,000-year, 24-hour Inflow Design Flood conditions [6].	Yes	Discharge from the CCR Unit is routed through a NPDES-permitted outfall during both normal and 1,000-year, 24-hour Inflow Design Flood conditions, after performing updated hydrologic and hydraulic analyses.

SECTION 1

INTRODUCTION AND BACKGROUND

This Periodic United States Environmental Protection Agency (USEPA) Coal Combustion Residual (CCR) Rule [1] Certification Report was prepared by Geosyntec Consultants (Geosyntec) for Illinois Power Generating Company (IPGC) to document the periodic certification of the Primary Ash Pond (PAP) at the Newton Power Plant (NPP), also known as the Newton Power Station, located at 6725 N 500th Street, Newton, Illinois, 62448. The location of NPP is provided in **Figure 1**, and a site plan showing the location of the PAP and landfill, among other closed and open CCR units and non-CCR surface impoundments, is provided in **Figure 2**.

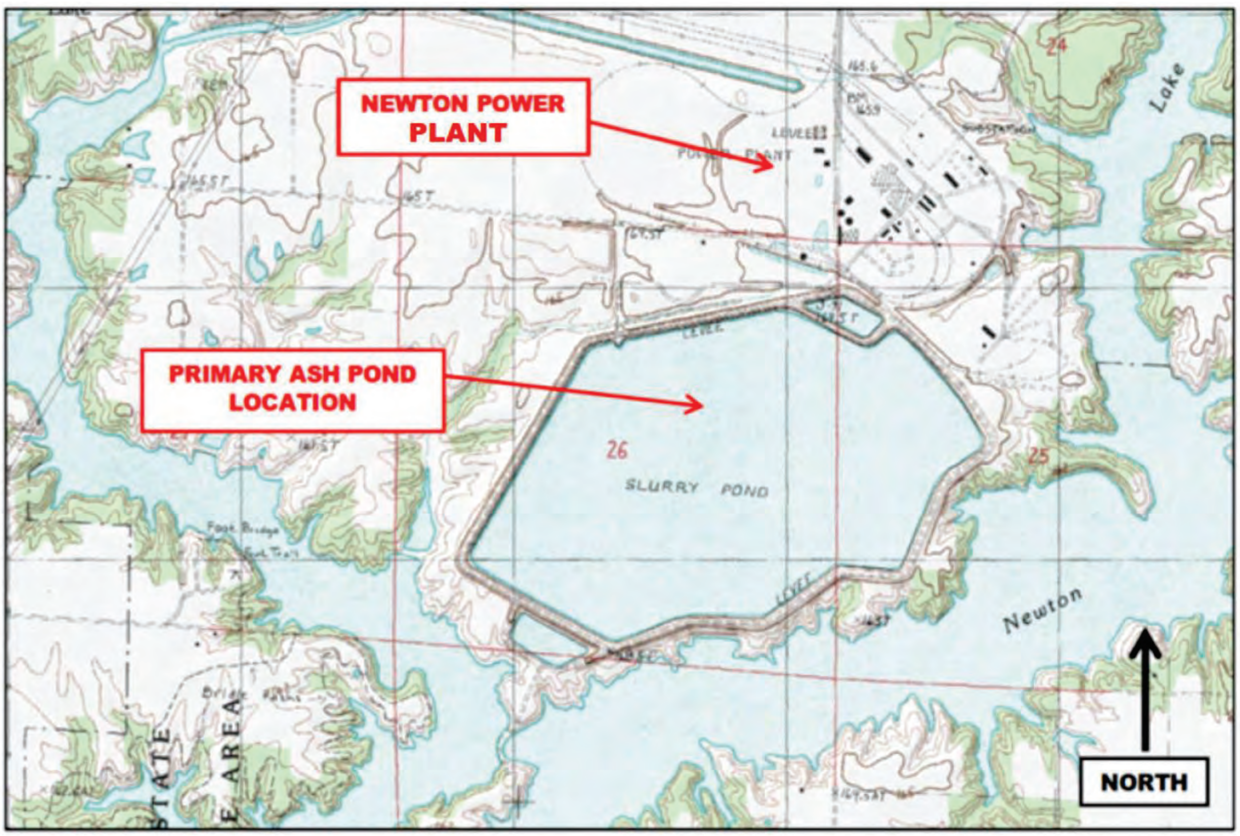

Figure 1 – Site Location Map (from AECOM, 2016)

Figure 2 – Site Plan

1.1 PAP Description

The PAP is utilized for managing CCR materials generated by NPP. The PAP has a Significant hazard potential, based on the initial hazard potential classification assessment performed by Stantec in 2016 in accordance with §257.73(a)(2) [2].

The PAP receives fly ash, bottom ash, and other miscellaneous non-CCR process waters produced by NPP. Bottom ash is sluiced from the north perimeter of the PAP on either side of the Secondary Settlement Pond, which is a non-CCR basin included within the footprint of the Primary Ash Pond. The outfall structure in the PAP discharges through the perimeter embankment into the Secondary Pond, which is a non-CCR basin that ultimately discharges into Newton Lake via a National Pollutant Discharge Elimination System (NPDES)-permitted outfall.

Two adjacent spillway structures are present at the PAP: the principal spillway structure and the secondary spillway structure. Only the principal structure is used to control outflow during both normal operational and flood conditions. The spillway structures are both identical square concrete riser structures, with inflow controlled by a series of stoplogs. Inflow into the structures is transmitted to the Secondary Pond through 30-inch diameter corrugated metal pipes that have been slip lined and now have an inside diameter of 28 inches. The principal spillway structure is located at a lower elevation than the secondary spillway structure, with a top of weir box elevation of 537 feet and a pipe invert elevation of 512.5 feet (presumed to be NGVD29 datum based on the date of the design drawings). The secondary spillway structure is located directly upslope from the primary structure and has a top of weir box elevation of 555 feet, which is the design crest elevation of the earthen embankment, and a pipe invert elevation of 533 feet. The 28-inch diameter slip lined outlet pipes from both structures converge within the earthen embankment into a single 28-inch slip lined outlet pipe that discharges into the Secondary Pond. The purpose of the secondary spillway structure is to be a supplemental spillway for the Primary Ash Pond under conditions where the pool level is significantly increased above the current normal pool to allow for additional storage volume [7].

The surface area of the impoundment is approximately 400 acres, and the embankment is a continuous structure (a ring embankment), which has a total perimeter length of approximately 3.2 miles and a maximum height above the exterior grade of 72 feet where the downstream toe of the embankment is underneath the normal pool level of the downstream Newton Lake. Typical embankment heights range from 14 to 42 feet. The embankment was constructed as a homogenous earthen structure with well-compacted clayey fill. Portions of the south embankment directly adjacent to Newton Lake include crushed stone near the waterline for erosion protection. The upstream and downstream slope orientations are typically 3H:1V (horizontal to vertical) but range from about 2.5H:1V to 3.4H:1V. Embankment crest widths range from approximately 12 to 50 feet, and the crest is covered with a gravel access road [7].

The pool elevation of the pond is controlled by the configuration of the outflow structure and plant process inflows. At the time of the periodic survey, was approximately[3] 535.5 feet. Crest elevations range from approximately 553 to 555 feet, and the minimum crest elevation is 552.7 feet [7].

Initial certifications for the PAP for Hazard Potential Classification (§257.73(a)(2)), History of Construction (§257.73(c)), Structural Stability Assessment (§257.73(d)), Safety Factor Assessment (§257.73(e)(1)), and Inflow Design Flood Control System Plan (§257.82) were completed by Stantec and AECOM in 2016 and 2017 and subsequently posted to IPGC's CCR Website ([2], [3], [4], [5], [6]).

[3] All elevations are in the North American Vertical Datum of 1988 (NAVD88), unless otherwise noted.

1.2 Report Objectives

These following objectives are associated with this report:

- Compare site conditions from 2015/2016 to site conditions in 2020/2021, and evaluate if updates are required to the:
    - §257.73(a)(2) Hazard Potential Classification [2];
    - §257.73(c) History of Construction [3];
    - §257.73(d) Structural Stability Assessment [4];
    - §257.73(e) Safety Factor Assessment [5], and/or
    - §257.82 Inflow Design Flood Control System Plan [6].
- Independently review the Hazard Potential Classification ([2], [9]), Structural Stability Assessment ([4], [7]), Safety Factor Assessment ([5], [7]), and Inflow Design Flood Control System Plan ([6], [7]) reports to determine if updates may be required based on technical considerations.
    - The History of Construction report [3] was not independently reviewed for technical considerations, as this report contained historical information primarily developed prior to promulgation of the CCR Rule [1] for the CCR units at NPP, and did not include calculations or other information used to certify performance and/or integrity of the impoundments under §257.73(a)(2)-(3), §257.73(c)-(e), or §257.82.
- If updates are required, they will be performed and documented within this report.
- Confirm that the PAP meets all of the requirements associated with §257.73(a)(2), (c), (d), (e), and §257.82, or, if the PAP does not meet all requirements, provide recommendations for compliance with these sections of the CCR Rule [1].

SECTION 2

COMPARISON OF 2015/16 AND 2020/21 SITE CONDITIONS

2.1 Overview

This section describes the comparison of conditions at the PAP between the start of the initial CCR certification program in 2015 and subsequent collection of periodic certification site data in 2020 and 2021.

2.2 Review of Annual Inspection Reports

Annual onsite inspections for the PAP were performed between 2016 and 2020 ([10], [11], [12], [13], [14] and, [15]) and were certified by a licensed professional engineer in accordance with §257.83(b). Each inspection report stated the following information, relative to the previous inspection:

- A statement that no changes in geometry of the impounding structure were observed since the previous inspection.
- Information on maximum recorded instrumentation readings and water levels.
- Approximate volumes of impounded water and CCR at the time of inspection.
- A statement that no appearances of actual or potential structural weakness or other disruptive conditions were observed.
- A statement that no other changes which may have affected the stability or operation of the impounding structure were observed.

In summary, the reports did not indicate any significant changes to the PAP between 2015 and 2020.

2.3 Review of Instrumentation Data

Twelve piezometers are present at the PAP and were monitored monthly between August 5, 2015 and April 29, 2021 [16]. Geosyntec reviewed the piezometer data to evaluate if significant fluctuations, partially increases in phreatic levels, may have occurred between development of the initial structural stability and factor of safety certifications [7], [4], [5]) and April 29, 2021. Available piezometer readings are plotted in **Attachment A**.

In summary, the peak measured groundwater levels for several piezometers were up to 10 ft higher than the phreatic conditions considered during the initial certification. These changes could impact the results of the factor of safety analyses required for the structural stability and factor of safety certifications ([7], [4], [5]). Specifically, up to four cross sections were identified with significant changes in phreatic conditions.

2.4 Comparison of 2015 to 2020 Surveys

Surveys conducted at the site by Weaver Consultants (Weaver) in 2015 [17] and IngenAE, LLC (IngenAE) in 2020 [18] were compared within AutoCAD Civil3D 2021 software. This comparison quantified changes in the volume of CCR placed within the PAP and considered volumetric changes above and below the starting water surface elevation (SWSE) used for the 2016 §257.82 inflow design flood control plan hydraulic analysis [7]. Potential changes to embankment geometry were also evaluated. This comparison is presented in side-by-side views of each survey in **Drawing 1**, and a plan view isopach map denoting changes in ground surface elevation in **Drawing 2**. A summary of the water elevations and changes in CCR volumes is provided in **Table 2**.

Table 2 – 2015 and 2020 Survey Comparison

Initial Surveyed Pool Elevation (ft)	534.0
Periodic Surveyed Pool Elevation (ft)	535.5
Initial §257.82 Starting Water Surface Elevation (SWSE) (ft)	534.0
Total Change in CCR Volume (CY)	98,711 (fill)
Change in CCR Volume Above SWSE (CY)	185,376 (fill)
Change in CCR Volume Below SWSE (CY)	-86,913 (cut)

The comparison indicated that approximately 98,711 CY of CCR was placed in the PAP between the initial and periodic survey, thereby leading to a potential for the peak water surface elevation (PWSE) to increase during the inflow design 1,000-year flood event. Also, the measured water surface elevation for the periodic survey is higher than the water levels estimated for both normal and a 1,000-yr flood events event in the initial certifications (**Section 7**).

No significant changes to embankment geometry appeared to have occurred between the initial and periodic surveys, as shown on the isopach. However, along the northern embankments there appears to be material stockpiled upstream of the embankments which would have increased the loading on the embankments. It is further noted that there are two areas along the southern embankment that appear to be cut and apparently excavated since the initial survey. Such excavation is not known to have occurred and it is likely this apparent cut is a byproduct of survey discrepancy between the initial and periodic bathymetric surveys.

2.5 Comparison of 2015 to 2020 Aerial Photography

Aerial photographs of the PAP collected by Weaver in 2015 [17] and IngenAE in 2020 [18] were compared to visually evaluate if potential site changes (i.e., changes to the embankment, outlet structures, limits of CCR, other appurtenances) may have occurred. A comparison of these aerial photographs is provided in **Drawing 3**, and the following changes were identified:

- A few mounds of new earth built up along the northern embankments; and
- No clear change in the ash delta or shoreline was observed; and
- It appears the water level of the impounded pond may have been higher in 2015.

2.6 Comparison of Initial and Periodic Site Visits

An initial site visit to the PAP was conducted by AECOM in 2015 and documented with a Site Visit Summary and corresponding photographs [19]. A site visit was conducted by Geosyntec on May 21, 2021, with Panos Andonyadis, P.E., conducting the site visit. The site visit was intended to evaluate potential changes at the site since 2015 (i.e., modification to the embankment, outlet structures or other appurtenances, limits of CCR, maintenance programs, repairs), in addition to performing visual observations of the PAP to evaluate if the structural stability requirements (§257.73(d)) were still met. The site visit included walking the perimeter of the PAP, visually observing conditions, recording filed notes, and collecting photographs. The site visit is documented in a photographic log provided in **Attachment B**. A summary of significant findings from the periodic site visit is provided below:

- The perimeter embankments appear to be structurally stable as no signs of structural or foundation instability were observed
- No new development was observed in the vicinity of the PAP, although the observation was limited to the portions of the vicinity visible form the crest of the PAP dike.
- No significant changes were observed since the previous certification.

2.7 Interview with Power Plant Staff

An interview with Ken Schafer of the NPP was conducted by Panos Andonyadis of Geosyntec on May 21, 2021. Mr. Schafer was employed at NPP between 2015 and 2021, The interview included a discussion of potential changes that that may have occurred at the PAP since development of the initial certifications ([2], [3], [4], [5], [6], [7]) in 2015 and 2016. between 2015 and 2020. A summary of the interview is provided below.

- Were any construction projects completed for the PAP between 2015 and 2021, and, if so, are design drawings and/or details available?

  - No repairs were performed since the initial certification.

- Were there any changes to the purpose of the PAP between 2015 and 2021?
  - No, the impoundment continues to receive sluiced ash, sluiced bottom ash, and plant waste water.

- Were there any changes to the to the instrumentation program and/or physical instruments for the PAP between 2015 and 2021?
  - No.

- Are area-capacity curves for the PAP available?
  - No area-capacity curves have been developed.

- Were there any changes to spillways and/or diversion features for the PAP completed between 2015 and 2021?
  - No changes to the spillway were made.

- Were there any changes to construction specifications, surveillance, maintenance, and repair procedures for the PAP between 2015 and 2021?
  - No changes were made.

- Were there any instances of embankment and/or structural instability for the PAP between 2015 and 2021?
  - A repair of a slough was performed on the upstream side of the southernmost embankment. The damage appears to have been caused by wave related erosion and is limited to the area of a previous repair.

SECTION 3

HAZARD POTENTIAL CLASSIFICATION - §257.73(a)(2)

3.1 Overview of 2016 Initial Hazard Potential Classification

The Initial Hazard Potential Classification (Initial HPC) was prepared by Stantec Consulting Services, Inc. (Stantec) in 2016 ([2], [9]), following the requirements of §257.73(a)(2). The Initial HPC included the following information:

- Performing a visual analysis to evaluate potential hazards associated with a failure of the PAP perimeter embankment, along all sides of the PAP.
- Evaluation of potential breach flow paths were evaluated using elevation data and aerial imagery to evaluate potential impacts to downstream structures, infrastructure, frequently occupied facilities/areas, and waterways [2].
- While a breach map is not included in the Initial HPC, it is included within the §257.73(a)(3) Initial Emergency Action Plan prepared by Stantec [20].

The visual analysis indicated that none of the breach scenarios appeared to impact occupied structures, although a breach of the east embankment could impact an infrequently-used gravel site access road and a breach of the north, northeast or east embankment could impact a nearby railroad. The Initial HPC concluded that none of breach scenarios considered would be likely to result in a probable loss of human life, although the breach could cause CCR to be released into the Newton Lake, thereby causing environmental damage. The Initial HPC therefore recommended a “Significant” hazard potential classification for the PAP [2].

3.2 Review of Initial HPC

Geosyntec performed a review of the Initial HPC ([2], [9]) in terms of technical approach, input parameters, assessment of the results, and applicable requirements of the CCR Rule [1]. No significant technical issues were noted within the technical review, although a detailed review (e.g., check) of the calculations was not performed.

3.3 Summary of Site Changes Affecting the Initial HPC

Geosyntec did not identify any changes at the site that may affect the HPC. No new structures, infrastructure, frequently occupied facilities/areas, or waterways were present in the probable breach area indicated in the Initial EmAP [20], although Geosyntec’s evaluation of new structures was limited to visual observations completed from the dike crest during the site visit and a review of available aerial imagery provided by IngenAE in 2020 [18]. Additionally, no significant changes to the topography in the probable breach were identified.

3.4 Periodic HPC

Geosyntec recommends retaining the "Significant" hazard potential classification for the PAP, per §257.73(A)(2), based on the lack of site changes potentially affecting the Initial HPC occurring since the initial HPC was developed, as described in **Section 3.2**. Updates to the Initial HPC reports ([2], [9]) are not recommended at this time.

SECTION 4

HISTORY OF CONSTRUCTION REPORT - §257.73(c)

4.1 Overview of Initial HoC

The Initial History of Construction report (Initial HoC) was prepared by AECOM in 2016 [3], following the requirements of §257.73(c), and included information on the PAP. The Initial HoC included the following information for each CCR surface impoundment:

- The name and address of the owner/operator,
- Location maps,
- Statements of purpose,
- The names and size of the surrounding watershed,
- A description of the foundation and abutment materials,
- A description of the embankment materials,
- Approximate dates and stages of construction,
- A list of available design and engineering drawings,
- A summary of instrumentation,
- A statement that area-capacity curves are not available,
- Information on spillway structures,
- A statement that the constructions specifications are not available,
- Inspection and surveillance plans,
- Information on operational and maintenance procedures, and
- A statement of observed historical structural instability that occurred at the PAP.

4.2 Summary of Site Affecting the Initial HoC

Several significant changes were identified at the site that occurred after development of the initial HoC report [3] and are described below:

- A state identification number (ID) of W0798070001-01 was assigned to the PAP by the Illinois Environmental Protection Agency (IEPA).

- Revised area-capacity curves and spillway design calculations for the PAP were prepared as part of the updated periodic Inflow Design Flood Control System Plan, as described in **Section 7.3**.

A letter documenting changes to the HoC report is provided in **Attachment C**.

SECTION 5

STRUCTURAL STABILITY ASSESSMENT - §257.73(d)

5.1 Overview of Initial SSA

The Initial Structural Stability Assessment (Initial SSA) was prepared by AECOM in 2016 ([4], [7]) following the requirements of §257.73(d)(1), and included the following evaluations:

- Stability of embankment foundations, embankment abutments, slope protection, embankment compaction, and slope vegetation,
- Spillway stability including capacity, structural stability and integrity;
- Stability and structural integrity of hydraulic structures; and
- Downstream slope stability under sudden drawdown conditions for a downstream water body.

The Initial SSA concluded that the PAP met all structural stability requirements for §257.73(d)(1)(i)-(vii).

A periodic certification of the structural stability and structural integrity of hydraulic outfall structures (§257.73(d)(1)(vi)) was performed by Luminant in 2020 [8]. This certification independently determined that the criteria was met due to the condition of the spillway pipes and the soil types within the embankment. Therefore, the review and certification of §257.73(d)(1)(vi) was not included within the scope of this report.

The Initial SSA referenced the results of the Initial Structural Factor Assessment (Initial SFA) ([5], [7]), to demonstrate stability of the stability of foundations and abutments (§257.73(d)(1)(i)) and sufficiency of dike compaction (§257.73(d)(1)(iii)) portions of the SSA criteria. This included stating that slope stability analyses for slip surfaces passing through the foundation met or exceeded the criteria listed in §257.73(e)(1), for the stability of foundations and abutments. For the sufficiency of dike compaction, this included stating that slope stability analyses for slip surfaces passing through the dike also met or exceeded the §257.73(e)(1) criteria.

Additionally, the Initial SSA included a sudden drawdown slope stability analysis to evaluate the effect of a drawdown event in the adjacent Newton Lake from the 100-year flood pool to an empty-pool condition, as required by §257.73(3)(1)(vii) for CCR units where the downstream slopes are inundated by an adjacent water body. The minimum acceptable factor of safety for this loading condition was assumed to be 1.3 based on US Army Corps of Engineers guidance [21].

5.2 Review of Initial SSA

Geosyntec performed a review of the Initial SSA ([4], [7]) in terms of technical approach, calculation input parameters and methodology, recommendations, and completeness. The review included the following tasks:

- Reviewing photographs collected in 2015 and used to demonstrate compliance with §257.73(d)(1)(i)-(vii).
- Reviewing geotechnical calculations used to demonstrate the stability of foundations, per §257.73(d)(1)(i), sufficiency of embankment compaction, per §257.73(d)(1)(iii), and downstream slope inundation/stability, per §257.73(d)(1)(vii), in terms of supporting geotechnical investigation and testing data, input parameters, analysis methodology, selection of critical cross-sections, and loading conditions.
- Reviewing completeness and technical approach of closed-circuit television (CCTV) inspections used to evaluate the stability of hydraulic structures, per §257.73(d)(1)(vi).

No significant technical issues were noted within the technical review, although a detailed review (e.g., check) of the calculations was not performed.

5.3 Summary of Site Changes Affecting the Initial SSA

Several changes at the site that occurred after development of the Initial SSA were identified. These changes required updates to the Initial SSA and are described below:

- The Initial SSA utilized the results of the Initial Inflow Design Flood Control System Plan (IDF) to demonstrate compliance with the adequacy of spillway design and management (§257.73(d)(1)(v)(A)-(B)). The Initial IDF was subsequently updated to develop a Periodic IDF, based on site changes, as discussed in **Section 7**.
- The Initial SSA utilized the slope stability analysis results of the Initial Safety Factor Assessment (SFA) as part of the compliance demonstration for the stability of foundations and abutments (§257.73(d)(1)(i)) and sufficiency of dike compaction (§257.73(d)(1)(iii)) as discussed in **Section 5.1**. The Initial SSA also utilized sudden drawdown slope stability analyses performed using the same cross-sections and input data as the Initial SFA to demonstrate compliance with downstream slope inundation/stability (§257.73(d)(1)(vii). The Initial SFA slope stability analyses, including the sudden drawdown analyses, were subsequently updated to develop a Periodic SFA, based on site changes, as discussed in **Section 6.4**.

5.4 Periodic SSA

The Periodic SFA (**Section 6.4**) indicates that foundations and abutments are stable and dike compaction is sufficient for expected ranges in loading conditions, as slope stability factors of safety were found to meet or exceed the requirements of §257.73(e)(1), including for static maximums storage pool conditions and post-earthquake (i.e., liquefaction) loading conditions considering seismically-induced strength loss in the foundation soils. Therefore, the requirements of §257.73(d)(1)(i) and §257.73(d)(1)(iii) are met for the Periodic SSA.

The Periodic IDF (**Section 7.4**) indicates that spillways are adequately designed and constructed to adequately manage flow during the PMF flood, as the spillways can adequately manage flow during peak discharge from the PMP storm event without overtopping of the embankments. Therefore, the requirements of §257.73(d)(1)(v)(A)-(B) are met for the Periodic SSA.

Certification of §257.73(d)(1)(vi) was independently performed by Luminant [8] and is not included within the scope of this report.

SECTION 6

SAFETY FACTOR ASSESSMENT - §257.73(e)(1)

6.1 Overview of Initial SFA

The Initial Safety Factor Assessment (Initial SFA) was prepared by AECOM in 2016 [7], following the requirements of §257.73(e)(1). The Initial SFA included the following information:

- A geotechnical investigation program with in-situ and laboratory testing;
- An assessment of the potential for liquefaction in the embankment and foundation soils;
- The development of ten slope stability cross-sections for limit equilibrium stability analysis utilizing GeoStudio SLOPE/W software; and
- The analysis of all cross-sections for maximum storage pool, maximum surcharge pool, and seismic loading conditions.

The Initial SFA concluded that the PAP met all safety factor requirements, per §257.73(e), as all calculated safety factors were equal to or higher than the minimum required values.

6.2 Review of Initial SFA

Geosyntec performed a review of the Initial SFA ([5], [7]) in terms of technical approach, calculation input parameters and methodology, recommendations, and completeness. The review included the following tasks:

- Reviewing geotechnical calculations used to demonstrate the acceptable safety factors, per §257.73(e)(1), in terms of:
    - Completeness and adequacy of supporting geotechnical investigation and testing data;
    - Completeness and approach of liquefaction triggering assessments;
    - Input parameters, analysis methodology, selection of critical cross-sections, and loading conditions utilized for slope stability analyses; and
    - Phreatic conditions based on piezometric data, as discussed in **Section 2.3**.

No significant technical issues were noted within the technical review, although a detailed review (e.g., check) of the calculations was not performed.

6.3 Summary of Site Changes Affecting the Initial SFA

Several changes at the site that occurred after development of the Initial SFA were identified. These changes required updates to the Initial SFA and are described below:

- The groundwater levels measured since 2015 (**Section 2.3**) appear to be up to 10 ft higher than the phreatic surface modeled for the perimeter embankments during the Initial SFA ([5], [7]). Therefore, the phreatic surface needed to be updated to reflect the critical levels observed since 2015.

- The Periodic IDF (**Section 7.4)** found that the normal pool elevation within the PAP increased from 534.0 to 537.0 ft, resulting in 3.0 ft more water loading on the embankment dikes than was considered in the Initial SFA for the maximum storage pool, seismic loading conditions (§257.73(e)(1)(i) and (iii)), and sudden drawdown loading condition (§257.73(d)(1)(ii)). Peak water surface elevations during the IDF also increased from 534.9 to 538.2 ft, resulting in 3.3 ft more water loading on the embankment dikes than was considered in the Initial SFA for the maximum surcharge pool loading conditions (§257.73(e)(1)(i)).

6.4 Periodic SFA

Geosyntec revised existing slope stability analyses associated with the Initial SFA ([5], [7]) for the ten cross- sections of PAP to account for the increase in normal and peak pool loadings, and phreatic level changes as described in **Section 2.3** and **Section 7.4**. This included revising the slope stability analyses evaluating sudden drawdown conditions in the cross-sections adjacent to the downstream water body that were utilized as part of the Initial SSA (**Section 6.2**). The following approach and input data were used to revise the analyses:

- Water levels in the PAP for the maximum storage pool, seismic slope stability analysis, and sudden drawdown loading conditions were increased to El. 537.0 ft, based on the Periodic IDF (**Section 7.4)**.

- Water levels in the PAP for the maximum surcharge pool slope stability analysis loading conditions were increased to El. 538.2 ft, based on the Periodic IDF (**Section 7.4)**.

- According to updated groundwater level monitoring plot (**Section 2.3**), the phreatic level in the location of related piezometers increased for all the loading conditions from El. 534 to El. 538 ft in cross-section “E”, from El. 537 to El. 539 ft in cross-section “F”, from El. 535 to El. 544 ft in cross-section “G”, and from El. 535 to El. 541 ft in cross-section “K”.

- All other analysis input data and settings from the Initial SFA ([5], [7]), were utilized, including, but not limited to, subsurface stratigraphy and soil strengths, phreatic conditions, ground surface geometry, software package and version, slip surface search routines and methods, and input data for the seismic analyses.

Factors of safety from the Periodic SFA are summarized in **Table 3** and confirm that the PAP meets the requirements of §257.73(e)(1). Slope stability analysis output associated with the Initial SFA is provided in **Attachment D**.

Table 3 – Factors of Safety from Periodic SFA

	Structural Stability Assessment (§257.73(d)) and Safety Factor Assessment (§257.73(e))				Structural Stability Assessment (§257.73(d))
Cross-Section	**Maximum Storage Pool §257.73(e)(1)(i) Minimum Required = 1.50**	**Maximum Surcharge Pool[1] §257.73(e)(1)(ii) Minimum Required = 1.40**	**Seismic §257.73(e)(1)(iii) Minimum Required = 1.00**	**Dike Liquefaction §257.73(e)(1)(iv) Minimum Required = 1.20**	**Sudden Drawdown §257.73(d)(1)(ii) Minimum Required = 1.30**
A	1.82	1.82	1.26	N/A	N/A
B	1.81	1.81	1.07*	N/A	1.59*
C	1.67	1.67	1.11	N/A	1.67
D	1.76	1.76	1.23	N/A	1.76
E	2.18	2.18	1.91	N/A	N/A
F	1.93	1.93	1.45	N/A	N/A
G	1.98	1.98	1.46	N/A	N/A
H	1.81	1.81	1.36	N/A	N/A
I	1.66*	1.66*	1.43	N/A	1.61
K	1.73	1.74	1.17	N/A	1.73

Notes:
*Indicates critical cross-section (i.e., lowest calculated factor of safety out of the ten cross-sections analyzed)
N/A – Loading condition is not applicable.

SECTION 7

INFLOW DESIGN FLOOD CONTROL SYSTEM PLAN - §257.82

7.1 Overview of 2016 Inflow Design Flood Control System Plan

The Initial Inflow Design Flood Control System Plan (Initial IDF) was prepared by AECOM in 2016 [7], following the requirements of §257.82. The Initial IDF included the following information:

- A hydraulic and hydrologic analysis, performed for the 1,000-year design flood event because of the hazard potential classification of "Significant", which corresponded to 9.01 inches of rainfall over a 24-hour period.
- The Initial IDF utilized a HydroCAD Version 10 model to evaluate spillway flows and pool level increases during the design flood, with a starting water surface elevation of 534.0 ft.

The Initial IDF concluded that the PAP met the requirements of §257.82, as the peak water surface estimated by the HydroCAD model was elevation 534.9 ft, relative to a minimum PAP embankment crest elevation of 552.7 ft. Therefore, overtopping was not expected. The Initial IDF also evaluated the potential for discharge from the CCR unit and determined that discharge from the PAP during normal and inflow design flood conditions was expected to be routed through the existing spillway and NPDES-permitted outfall.

7.2 Review of Initial IDF

Geosyntec performed a review of the Initial IDF ([6], [7]) in terms of technical approach, calculation input parameters and methodology, recommendations, and completeness. The review included the following tasks:

- Reviewing the return interval used vs. the hazard potential classification.
- Reviewing the rainfall depth and distribution for appropriateness.
- Performing a high-level review of the inputs to the hydrological modeling.
- Reviewing the hydrologic model parameters for spillway parameters, starting pool elevation, and storage vs. the reference data.
- Reviewing the overall Initial IDF vs. the applicable requirements of the CCR Rule

Several review comments were identified during review of the Initial IDF. The comments are described below:

- The Initial IDF utilized the National Resource Conservation Service (NRCS) Type II rainfall distribution type [22]. Geosyntec recommend utilizing the Huff 3rd Quartile distribution for areas less than 10 square miles [23] for the reasons listed below.
  - Huff 3rd Quartile distribution was determined to be a more appropriate representation of a 1,000-year, 24-hour storm event per the Illinois State Water Survey (ISWS) Circular 173 [24] which developed standardized rainfall distributions from compiled rainfall data at sites throughout Illinois.
  - Illinois Department of Natural Resources, Office of Water Resources (IDNR-OWR) [25] recommends use of the Huff Quartile distributions in Circular 173 when using frequency events to determine the spillway design flood inflow hydrograph, "*The suggested method to distribute this rainfall is described in the ISWS publication, Circular 173, "Time Distributions of Heavy Rainstorms in Illinois"*.
- The process inflows (ash sluice and wastewater) included within the hydrologic and hydraulic analysis file were daily averages which are less than the maximum pump rate (i.e., worst-case scenario).

7.3 Summary of Site Changes Affecting the Initial IDF

Two changes at the site that occurred after development of the Initial IDF were identified. These changes required updates to the Initial IDF and are described below:

- Approximately 98,700 CY of CRR were placed above the SWSE utilized for the Initial IDF certification, thereby altering the stage-storage curve for the PAP relative to the Initial IDF.
- The operative water level of the impoundment is higher, thereby altering the SWSE for the PAP relative to the Initial IDF.

7.4 Periodic IDF

Geosyntec revised the HydroCAD model associated with the Initial IDF to account for the revised rainfall distribution type, cessation of process flows, and additional CCR placement, as described in **Sections 7.2** and **7.3**. The following approach and input data were used for the revised analyses and are referenced in **Attachment E** as appropriate:

- Stage-storage (i.e., area-capacity) curves for the PAP were updated based on the 2020 site survey [18].

  - A revised stage-volume curves for the PAP and Secondary Pond were prepared based on measuring the storage volume of the ponds at every one-foot increment of depth from an elevation at the bottom of the ponds (495 ft PAP; 505 ft Secondary Pond) to the perimeter dike embankment's approximate minimum crest elevation (552 ft PAP; 532 ft Secondary Pond). This analysis identified an overall increase of 129,070 CY (80 ac-ft) of storage volume at the PAP and an overall decrease of 14,520 CY (9 ac-ft) of storage volume at the Secondary Pond from 2016 to 2021.

- The SWSE within the PAP was updated from 534.0 ft to 537.0 ft as this is the invert of the pond outlet structure. The 2020 site survey showed a water surface elevation (WSE) of 535.5 ft; however, the greater elevation of the outlet invert and the surveyed WSE was used as the SWSE to provide conservatism in the model.

- The SWSE within the Secondary Pond was updated from 520.0 ft to 519.9 ft to reflect the 2020 site survey. The primary outlet invert elevation from the Secondary Pond is 505 ft; however, the greater elevation of the outlet invert and the surveyed WSE was used as the SWSE to provide conservatism in the model.

- Updated the inflows from the Ash Sluice from 3.88 cfs for 14 hours per day to 13.37 cfs for 14 hours per day for the duration of the modeled simulation. This more accurately reflects the full load operation of the pumps described in the Initial Full Certification Report (two pumps at 3,000 gpm each, operating 14 hours/day under full load).

- Wastewater inflows were updated from 11.64 cfs for 24 hours per day to 23.39 cfs for 12 hours per day for the duration of the modeled simulation. This more accurately reflects the full load operation of the pumps described in the Initial Full Certification Report (five pumps at 2,100 gpm each, operating 60 pump hours/day).

- The time of concentration (ToC) was updated for drainage areas to the PAP and Secondary Pond from 16.7 minutes (PAP) and 5 minutes (Secondary Pond) to 6 minutes to reflect direct run-on inflow in accordance with TR-20 [22].

- The primary outlet structure from the PAP was updated to reflect the description in the Initial Full Certification Report with no noted changes to the outlet structures.

  - The outlet invert elevation was updated from 512.0 ft to 512.18 ft to reflect the described invert elevation of 512.5 ft using the NGVD29 datum. This was converted to the NAVD88 datum to be consistent with the vertical datum used for the IDF HydroCAD model.

  - Added a weir box riser structure by routing a 28-inch diameter horizontal orifice to the existing outlet culvert. The invert of the riser was set to 537.0 ft. The dimensions of the riser structure were not available; therefore, the riser structure was sized in the model to be consistent with the downstream culvert; this was assumed to be a conservatively restrictive outlet.

- The routing method for the model was updated to more accurately account for routing between the ponds and Lake Newton. The Reach Routing Method was updated from “Storage Indication+ Translation” to “Dynamic Storage Indication”. The Pond Routing Method was updated from “Storage – Indication” to “Dynamic Storage Indication”.

- The tailwater conditions of the PAP and Secondary Pond were changed from fixed elevations to “Automated” to more accurately account for routing between the ponds.

- Lake Newton was changed to be represented by a link instead of a pond, which allowed a fixed water surface of 504.33 ft (based on 2020 survey of outlet invert elevation).

- The outlet invert elevation of the culvert outlet from the Secondary Pond was updated to 504.33 ft to reflect the 2020 site survey.

- All other input data and settings from the Initial IDF HydroCAD model were utilized, including, but not limited to software package and version, runoff method, rainfall depth, analysis time span and analysis time step.

The results of the Updated IDF are summarized in **Table 4** and confirm that the PAP meets the requirements of §257.82(a)-(b), as the peak water surface elevation does not exceed the minimum perimeter dike crest elevations. Additionally, all discharge from the PAP is routed through the existing spillway system to the NPDES-permitted outfall, during both normal and IDF conditions. Updated area-capacity curves and HydroCAD model output is provided in **Attachment E**.

Table 4- Water Levels from Periodic IDF

	Primary Ash Pond		
Analysis	**Starting Water Surface Elevation (ft)**	**Peak Water Surface Elevation (ft)**	**Minimum Dike Crest Elevation (ft)**
Initial IDF	534.0	534.9	552.0
Updated Periodic IDF	537.0	538.2	552.0
Initial to Periodic Change[1]	+3.0	+3.3	

Notes:
[1]Postive change indicates increase in the WSE relative to the Initial IDF, negative change indicates decrease in the WSE, relative to the Initial IDF.

SECTION 8

CONCLUSIONS

The PAP at NPP was evaluated relative to the USEPA CCR Rule periodic assessment requirements for:

- Hazard potential classification (§257.73(a)(2)),
- History of Construction reporting (§257.73(d)),
- Structural stability assessment (§257.73(d)), with the exception of §257.73(d)(1)(vi) that was independently certified by Luminant [8];
- Safety factor assessment (§257.73(e)), and
- Inflow design flood control system planning (§257.82).

Based on the evaluations presented herein, the referenced requirements are satisfied.

SECTION 9

CERTIFICATION STATEMENT

CCR Unit: Illinois Power Generating Company, Newton Power Plant, Primary Ash Pond

I, Panos Andonyadis, being a Registered Professional Engineer in good standing in the State of Illinois, do hereby certify, to the best of my knowledge, information, and belief that the information contained in this 2021 USEPA CCR Rule Periodic Certification Report, has been prepared in accordance with the accepted practice of engineering. I certify, for the above-referenced CCR Unit, that the periodic assessment of the hazard potential classification, history of construction report, structural stability, safety factors, and inflow design flood control system planning, dated October 2021, were conducted in accordance with the requirements of 40 CFR §257.73(a)(2), (c), (d), (e), and §257.82, with the exception of §257.73(d)(1)(vi)) that was independently certified by others.

Panos Andonyadis

OCTOBER 11, 2021

Date

SECTION 10

REFERENCES

[1] United States Environmental Protection Agency, 40 CFR Parts 257 and 261; Hazardous and Solid Waste Management System; Disposal of Coal Combustion Residuals from Electric Utilities; Final Rule, 2015.

[2] Stantec Consulting Services Inc., "Initial Hazard Potetnial Classificaiton Assessment, EPA Final CCR Rule, Primary Ash Pond, Newton Power Station, Jasper County, Illinois," Fenton, MO, October 12, 2016.

[3] AECOM, "History of Construction, USEPA Final CCR Rule, Newton Power Station, Newton, Illinois," October 2016.

[4] AECOM, "CCR Rule Report: Initial Structural Stability Assessment For Primary Ash Pond At Newton Power Station," St. Louis, MO, October 2016.

[5] AECOM, "CCR Rule Report: Initial Safety Factor Assessment For Primary Ash Pond At Newton Power Station," St. Louis, MO, October 2016.

[6] AECOM, "CCR Rule Report: Initial Inflow Design Flood Control System Plan For Primary Ash Pond At Newton Power Station," St. Louis, MO, October 2016.

[7] AECOM, "CCR Certification Report: Initial Structural Stability Assessment, Initial Safety Factor Assessment, and Initial Inflow Design Flood Control System Plan for Primary Ash Pond at Newton Power Station," St. Louis, MO, October 2016.

[8] V. Modeer, "Primary Ash Pond Structural Stability Assessment, Illinois Power Resrouces Generationg, LLC, Newton Power Station," Luminant, October 1, 2020.

[9] Stantec Consulting Services, Inc., "Documentation of Initial Hazard Potential Classificaiton Assessment, Primary Ash Pond, Newton Power Station, Jasper County, Illinois," October 12, 2016.

[10] J. Knutelski and J. Campbell, *Annual CCR Surface Impoundment Inspection Report (per 40 CFR 257.83(b)(2)), Newton Power Station, Primary Ash Pond*, January 18, 2016.

[11] J. Knutelski and J. Campbell, *Annual CCR Surface Impoundment Inspection Report (per 40 CFR 257.83(b)(2)), Newton Power Station, Primary Ash Pond*, January 18, 2017.

[12] J. Knutelski and J. Campbell, *Annual CCR Surface Impoundment Inspection Report (per 40 CFR 257.83(b)(2)), Newton Power Station, Primary Ash Pond*, February 7, 2018.

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[14] Knutelski, James, *Annual Inspection by a Qualified Professional Engineer, 40 CFR §257.83(b), Newton Power Station, Primary Ash Pond*, January 10, 2020.

[15] James Knutelski, *Annual Inspection by a Qualified Professional Engineer, 40 CFR §257.83(b), Newton Power Station, Primary Ash Pond*, January 06, 2021.

[16] Geocyntec Consultants Inc., "Newton Piezo Measurements_20160121," Geocyntec Consultants Inc., Chesterfield, MO, 2021.

[17] Weaver Consultants Group, "Dynegy, Collinsville, IL, 2015 - Newton Topography," Collinsville, IL, December 2015.

[18] IngenAE, "Luminant, Dynegy Midwest Generation, LLC, Newton Power Station, December 2020 Topography," Earth City, Missouri, March 12, 2021.

[19] AECOM, "Draft CCR Unit Initial Site Visit Summary, Dynegy CCR Compliance Program," June 24, 2015.

[20] Stantec Consulting Services Inc, "Illinois Power Generating Company, Newton Power Station, City of Newton, Jasper County, IL, Emergency Action Plan, Primary Ash Pond (NID # IL50719)," Fenton, MO, April 13, 2017.

[21] U.S. Army Corps of Engineers, "Slope Stability, EM 1110-2-1902," October 31, 2003.

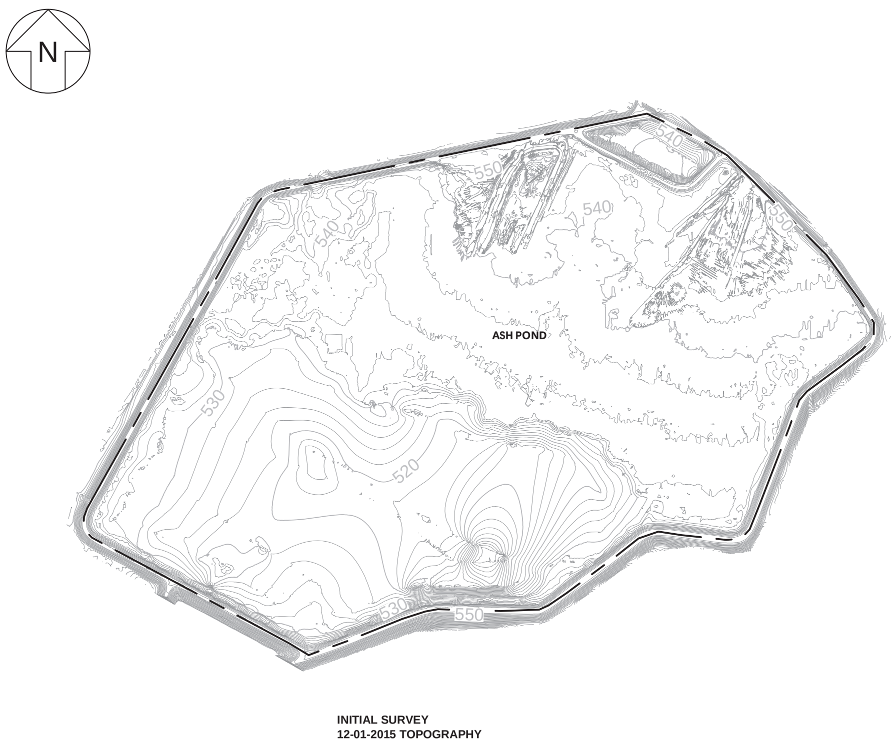
[22] Natural Resources Conservation Service, Conservation Engineering Division, "Urban Hydrology for Small Watersheds (TR-55)," United States Department of Agriculture, June 1985.

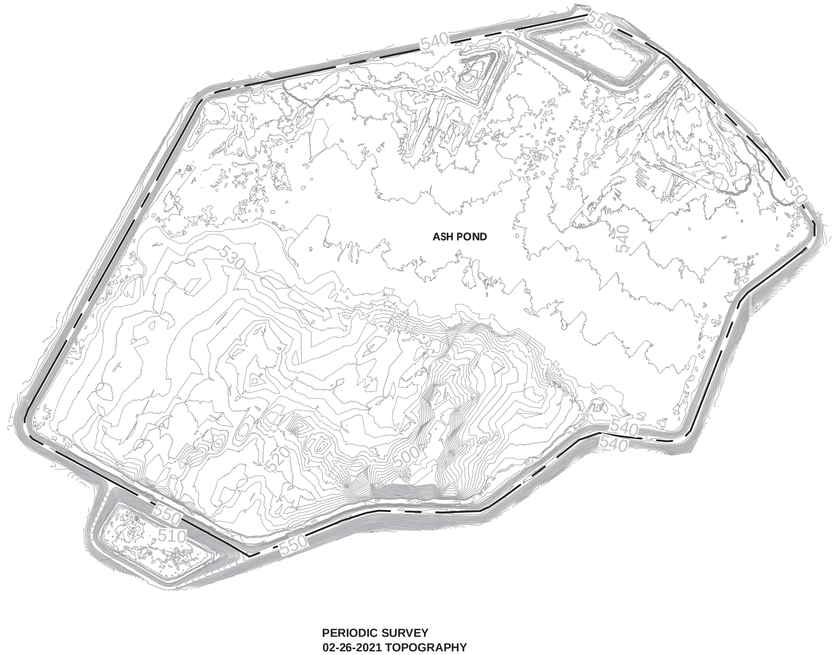
[23] F. A. Huff and J. R. Angel, "Frequency Distributions and Hydroclimatic Characteristics of Heavy Rainstorms in Illinois," State Water Survey Division, Department of Energy and Natural Resoruces, State of Illinois, Champaign, Illinois, 1989.

[24] F. A. Huff, "Time Distributions of Heavy Rainstorms in Illinois," State Water Survey, Department of Energy and Natural Resoruces, State of Illinois, Champaign, Illinois, 1990.

[25] Office of Natural Resources, "Procedural Guidelines for Preparation of Technical Data to be included in Applications for Permits for Construction and Maintenance of Dams," Department of Natural Resoruces, State of Illinois, Springfield, Illinois, Undated.

DRAWINGS





NOTES:

1. THE INITIAL SURVEY WAS TAKEN FROM THE DRAWING PACKAGE TITLED "DYNEGY, COLLINSVILLE, ILLINOIS, 2015 - NEWTON TOPOGRAPHY", PREPARED BY WEAVER CONSULTANTS GROUP, DATED DECEMBER 1, 2015.
2. THE PERIODIC SURVEY WAS TAKEN FROM THE DRAWING PACKAGE TITLED "LUMINANT, ILLINOIS POWER GENERATING COMPANY, NEWTON POWER STATION, DECEMBER 2020 TOPOGRAPHY", PREPARED BY INGENAE, DATED FEBRUARY 26, 2021.
3. ALL SURVEY DATA WAS COLLECTED IN THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88) AND NORTH AMERICAN DATUM OF 1983 (NAD83) FOR VERTICAL AND HORIZONTAL COORDINATES, RESPECTIVELY.

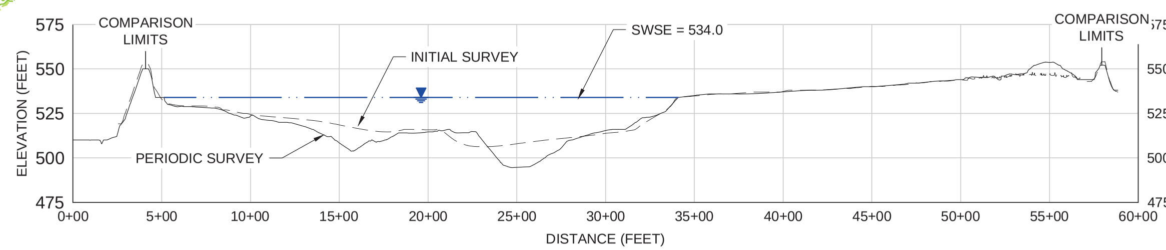
INITIAL TO PERIODIC SURVEY COMPARISON ASH POND NEWTON POWER PLANT NEWTON, ILLINOIS	
Geosyntec consultants	DRAWING 1
GLP8027.08 / MAY 2021	

ISOPACH CONTOUR KEY		
COLOR	MIN ELEV	MAX ELEV
	-17	-10
	-10	-8
	-8	-6
	-6	-4
	-4	-2
	-2	0
	0	2
	2	4
	4	6
	6	8
	8	10
	10	26

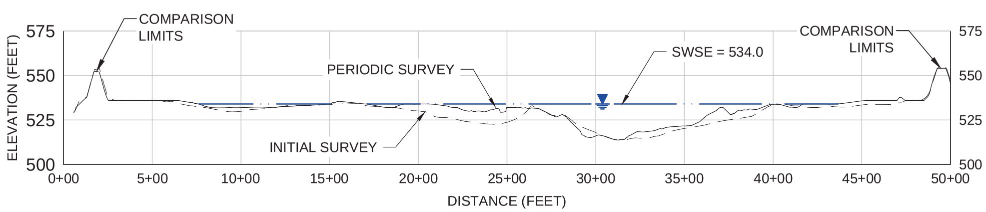
INITIAL TO PERIODIC SURVEY COMPARISON SUMMARY			
SURFACE IMPOUNDMENT	CUT	FILL	NET (CU. YD.)
ASH POND	467,675	566,386	98,711(FILL)
ABOVE SWSE	144,793	330,169	185,376 (FILL)
BELOW SWSE	322,591	235,677	86,913 (CUT)

NOTES:

1. THE INITIAL SURVEY WAS TAKEN FROM THE DRAWING PACKAGE TITLED "DYNEGY, COLLINSVILLE, ILLINOIS, 2015 - NEWTON TOPOGRAPHY", PREPARED BY WEAVER CONSULTANTS GROUP, DATED DECEMBER 1, 2015.
2. THE PERIODIC SURVEY WAS TAKEN FROM THE DRAWING PACKAGE TITLED "LUMINANT, ILLINOIS POWER GENERATING COMPANY, NEWTON POWER STATION, DECEMBER 2020 TOPOGRAPHY", PREPARED BY INGENAE, DATED FEBRUARY 26, 2021.
3. ALL SURVEY DATA WAS COLLECTED IN THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88) AND NORTH AMERICAN DATUM OF 1983 (NAD83) FOR VERTICAL AND HORIZONTAL COORDINATES, RESPECTIVELY.
4. THE STARTING WATER SURFACE ELEVATION (SWSE) OF THE PRIMARY ASH POND IS EL. 534.0 FT, AS NOTED IN THE REPORT TITLED "CCR CERTIFICATION REPORT: INITIAL STRUCTURAL STABILITY ASSESSMENT, INITIAL SAFETY FACTOR ASSESSMENT, AND INITIAL INFLOW DESIGN FLOOD CONTROL SYSTEM PLAN FOR PRIMARY ASH POND AT NEWTON POWER STATION", PREPARED BY AECOM, DATED OCTOBER, 2016.



SECTION A



SECTION B

0 700
HORZ: SCALE IN FEET

0 70
VERT: SCALE IN FEET

SURVEY COMPARISON ISOPACH
NEWTON POWER PLANT
NEWTON, ILLINOIS

Geosyntec consultants

GLP8027.08 | MAY 2021

DRAWING 2

P:\CADD\PROJECTS\V\VISTRA PONDS\NEWTON\ISOPACH - Last Saved by: KHanavec on 5/17/21

INITIAL AERIAL
12-01-2015 IMAGERY

PERIODIC AERIAL
02-26-2021 IMAGERY

0 1,000
SCALE IN FEET

NOTES:

1. THE INITIAL IMAGERY WAS TAKEN FROM THE DRAWING PACKAGE TITLED "DYNEGY, COLLINSVILLE, ILLINOIS, 2015 - NEWTON TOPOGRAPHY", PREPARED BY WEAVER CONSULTANTS GROUP, DATED DECEMBER 1, 2015.
2. THE PERIODIC IMAGERY WAS TAKEN FROM THE DRAWING PACKAGE TITLED "LUMINANT, ILLINOIS POWER GENERATING COMPANY, NEWTON POWER STATION, DECEMBER 2020 TOPOGRAPHY", PREPARED BY INGENAE, DATED FEBRUARY 26, 2021.

INITIAL TO PERIODIC AERIAL IMAGERY COMPARISON
ASH POND
NEWTON POWER PLANT
NEWTON, ILLINOIS

Geosyntec consultants

GLP8027.08 | MAY 2021

DRAWING 3

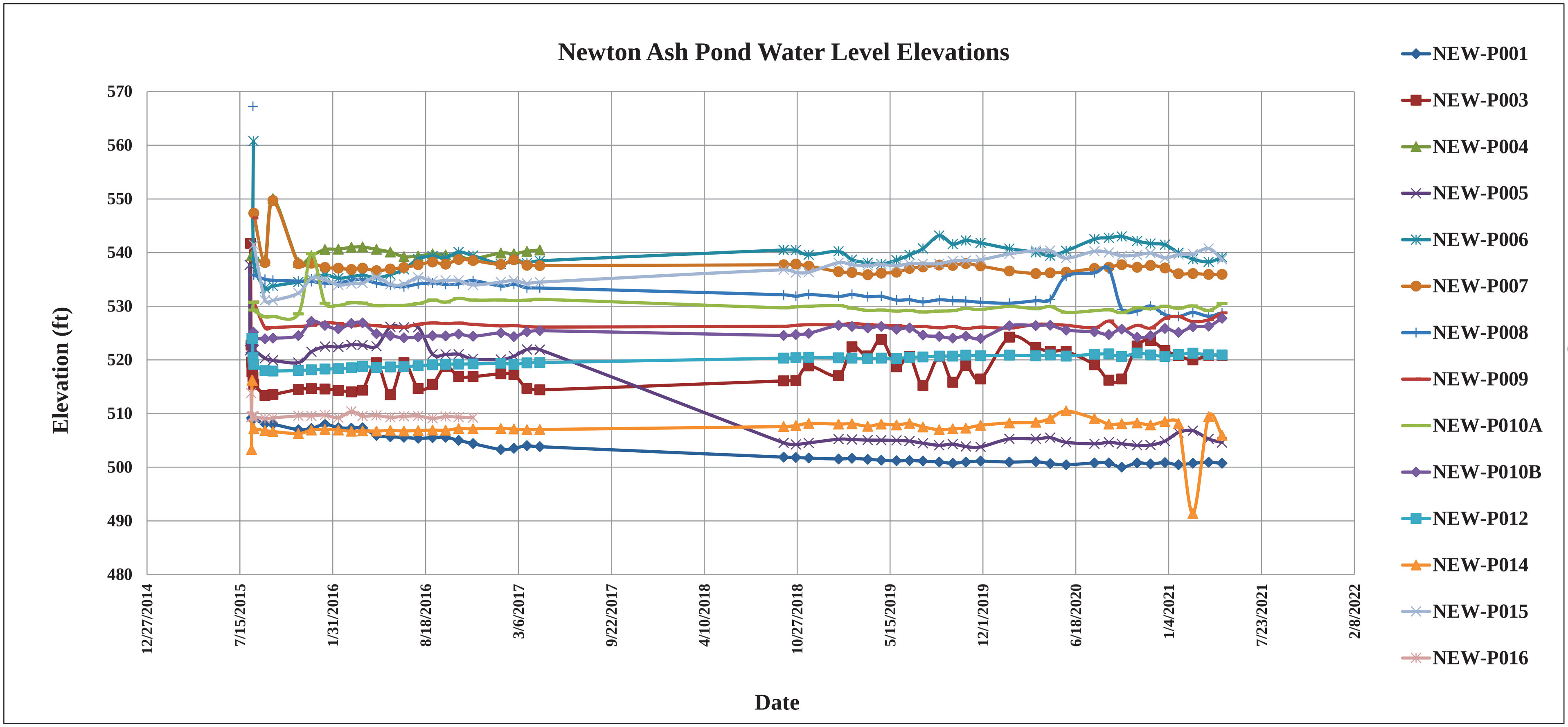
P:\CADD\PROJECTS\V\VISTRA PONDS\NEWTON\GLP802708F02 - Last Saved by: KHanavec on 5/24/21

R001507

ATTACHMENTS

Attachment A

PAP Piezometer Data Plots



NOTES:
1. Piezometer data was taken from the spreadsheet titled "Newton Piezo Measurements_20160121", provided by the Newton Power Station.

PIEZOMETER DATA PERIODIC CERTIFICATION NEWTON POWER PLANT NEWTON, ILLINOIS		
Geosyntec consultants		Figure 1
GLP8027	6/2/2021	

Attachment B

PAP Site Visit Photolog

GEOSYNTEC CONSULTANTS
Photographic Record

Site Owner: Illinois Power Generating Company	**Project Number:** GLP8027
CCR Unit: Primary Ash Pond	**Site:** Newton Power Plant

Photo: 01	
Date: 5/21/2021	
Direction Facing: NW	
Comments: Photo of the ash pond from the east embankment. Example of vegetative coverage and phragmites within the ash basin.	

Photo: 02	
Date: 5/21/2021	
Direction Facing: NE	
Comments: Example of vegetative coverage for the downstream slope along the northeast embankment.	

GEOSYNTEC CONSULTANTS
Photographic Record

Geosyntec consultants

Site Owner: Illinois Power Generating Company	**Project Number:** GLP8027
CCR Unit: Primary Ash Pond	**Site:** Newton Power Plant

Photo: 03 **Date:** 5/21/2021 **Direction Facing:** W **Comments:** Photo taken from the east embankment. Example of vegetative cover along the upstream slope of the embankment.	
Photo: 04 **Date:** 5/21/2021 **Direction Facing:** SW **Comments:** Photo taken from the east embankment. Example of vegetative cover along the downstream slope of the embankment.	

GEOSYNTEC CONSULTANTS
Photographic Record

Site Owner: Illinois Power Generating Company	**Project Number:** GLP8027
CCR Unit: Primary Ash Pond	**Site:** Newton Power Plant

Photo: 05 **Date:** 5/21/2021 **Direction Facing:** E **Comments:** Example of the vegetative cover of the upstream side of the embankment and within the ash basin. Some tree growth and phragmite growth within the ash basin.	
Photo: 06 **Date:** 5/21/2021 **Direction Facing:** E **Comments:** Tallest downstream slope along the south embankment and Newton Lake. Complete vegetative cover with no signs of instability or evidence of rapid draw down.	

GEOSYNTEC CONSULTANTS **Photographic Record**	Geosyntec consultants
Site Owner: Illinois Power Generating Company	**Project Number:** GLP8027
CCR Unit: Primary Ash Pond	**Site:** Newton Power Plant

Photo: 07 **Date:** 5/21/2021 **Direction Facing:** E **Comments:** Upstream side of southern embankment. Example of vegetative cover. No signs of instability and erosion.	
Photo: 08 **Date:** 5/21/2021 **Direction Facing:** W **Comments:** Wave damage erosion observed along the downstream side of the southern embankment. At present this does not appear to be a stability concern for the embankment.	

GEOSYNTEC CONSULTANTS
Photographic Record

Site Owner: Illinois Power Generating Company	**Project Number:** GLP8027
CCR Unit: Primary Ash Pond	**Site:** Newton Power Plant

Photo: 09

Date: 5/21/2021

Direction Facing: E

Comments: Downstream side of the southern embankment. Good vegetative cover, no tree growth or signs of erosion or instability.

Photo: 10

Date: 5/21/2021

Direction Facing: NW

Comments: Upstream side of the southwest embankment. Good vegetative cover, no tree growth or signs of erosion or instability.

GEOSYNTEC CONSULTANTS
Photographic Record

Site Owner: Illinois Power Generating Company	**Project Number:** GLP8027
CCR Unit: Primary Ash Pond	**Site:** Newton Power Plant

Photo: 11

Date: 5/21/2021

Direction Facing: N

Comments: Discharge point for the secondary Pond outlet pipe.

Photo: 12

Date: 5/21/2021

Direction Facing: N

Comments: Secondary pond downstream side embankments. Good vegetative cover, no tree growth or signs of erosion or instability.

<table>
<tr><td colspan="2">GEOSYNTEC CONSULTANTS
Photographic Record</td></tr>
<tr><td>Site Owner: Illinois Power Generating Company</td><td>Project Number: GLP8027</td></tr>
<tr><td>CCR Unit: Primary Ash Pond</td><td>Site: Newton Power Plant</td></tr>
<tr><td>Photo: 13
Date: 5/21/2021
Direction Facing: NE
Comments: Primary ash pond discharge structure. No signs of erosion along the structure and no signs of deterioration or damage of the structure.</td><td></td></tr>
<tr><td>Photo: 14
Date: 5/21/2021
Direction Facing: N
Comments: Downstream side of the western embankment. Good vegetative cover, no tree growth or signs of erosion or instability. Some vegetative growth observed on the embankment crest.</td><td></td></tr>
</table>

GEOSYNTEC CONSULTANTS **Photographic Record**	
Site Owner: Illinois Power Generating Company	**Project Number:** GLP8027
CCR Unit: Primary Ash Pond	**Site:** Newton Power Plant

Photo: 15

Date: 5/21/2021

Direction Facing: W

Comments: Some erosion along the access ramp on the western embankment. Geosyntec recommended regrading the ramp as part of regular maintenance.

Photo: 16

Date: 5/21/2021

Direction Facing: N

Comments: Downstream side of the western embankment. Good vegetative cover, no tree growth or signs of erosion or instability.

GEOSYNTEC CONSULTANTS **Photographic Record**	Geosyntec consultants
Site Owner: Illinois Power Generating Company	**Project Number:** GLP8027
CCR Unit: Primary Ash Pond	**Site:** Newton Power Plant

Photo: 17	
Date: 5/21/2021	
Direction Facing: S	
Comments: Sluice discharge west of the Secondary Settlement Pond. Discharge channel and sluiced ash flow to the southwest.	

Photo: 18	
Date: 5/21/2021	
Direction Facing: S	
Comments: Secondary Settlement Pond. Breach with Primary Ash Pond is visible. Phragmite growth observed along the separation berm between Primary Ash Pond and Secondary Settlement Pond.	

GEOSYNTEC CONSULTANTS
Photographic Record

Site Owner: Illinois Power Generating Company | **Project Number:** GLP8027

CCR Unit: Primary Ash Pond | **Site:** Newton Power Plant

Photo: 19

Date: 5/21/2021

Direction Facing: NW

Comments: Downstream side of the northeastern embankment. Good vegetative cover, no tree growth or signs of erosion or instability.

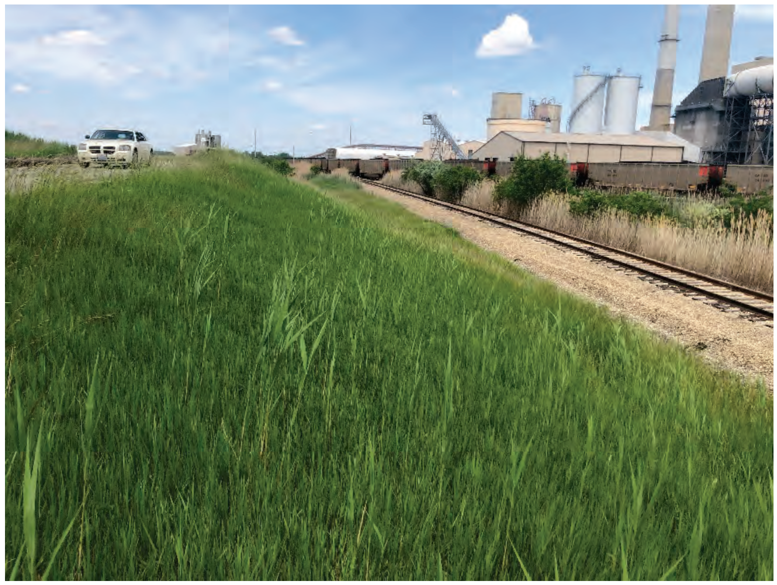


Photo: 20

Date: 5/21/2021

Direction Facing: S

Comments: Erosion and poor vegetative cover underneath the sluice pipe racks along the northern embankment. Geosyntec recommended reseeding or applying erosion protective features on the side slope as part of regular maintenance.

Attachment C

Periodic History of Construction Report Update Letter

Geosyntec consultants

1 McBride and Son Center Drive, Suite 202
Chesterfield, MO 63005
PH 636-812-0800
www.geosyntec.com

October 2021

Illinois Power Generating Company
6725 North 500th Street
Newton, Illinois 62448

Subject: Periodic History of Construction Report Update Letter
USEPA Final CCR Rule, 40 CFR §257.73(c)
Newton Power Plant
Newton, Illinois

At the request of Illinois Power Generating Company (IPGC), Geosyntec Consultants (Geosyntec) has prepared this Letter to documents updates to the Initial History of Construction (HoC) report for the Newton Power Plant (NPP), also known as the Newton Power Station (NEW). The Initial HoC report was prepared by AECOM in October of 2016 [1] in accordance with 40 Code of Federal Regulations (CFR) §257.73(c) of the United States Environmental Protection Agency (USEPA) Coal Combustion Residuals Rule, known as the CCR Rule [2]. This letter also includes information required by Section 845.220(a)(1)(B) (Design and Construction Plans) of the state-specific Illinois Environmental Protection Agency (IEPA) Part 845 CCR Rule [3] that is not expressly required by §257.73(c).

BACKGROUND

The CCR Rule required that, by October 17, 2016, Initial HoC reports to be compiled for existing CCR surface impoundments with: (1) a height of five feet or more and a storage volume of 20 acre-feet or more, or (2) a height of 20 feet or more. The Initial HoC report was required to contain, to the extent feasible, the information specified in 40 CFR §257.73(c)(1)(i)-(xii). The Initial HoC report for NEW, which included the existing CCR surface impoundment, the Primary Ash Pond (PAP), was prepared and subsequently posted to IPGC's CCR Website prior to October 17, 2016.

The CCR Rule requires that Initial HoC to be updated if there is a significant change to any information complied in the Initial HoC report, as listed below:

§ 257.73(c)(2): If there is a significant change to any information complied under paragraph (c)(1) of this section, the owner or operator of the CCR unit must update the relevant information and place it in the facility's operating record as required by § 257.105(f)(9).

IPGC retained Geosyntec to review the Initial HoC report, review reasonably and readily available information for the PAP generated since the Initial HoC report was prepared, and perform a site visit to NEW to evaluate if significant changes may have occurred since the Initial HoC report was prepared. This Letter contains the results of Geosyntec's evaluation and documents significant changes that have occurred at the PAP and NPP, as they pertain the requirements of §257.73(c)(1)(i)-(xii)

UPDATES TO HISTORY OF CONSTRUCTION REPORT

Geosyntec's evaluation for the NPP PAP determined that no known significant changes requiring updates to the information in the Initial HoC report pertaining to §257.73(c)(1)(ii)-(vi), (viii), (ix), (xi), and (xii) of the CCR Rule had occurred since the Initial HoC report was developed.

However, Geosyntec's evaluation determined that significant changes at the NEW PAP pertaining to §257.73(c)(1)(i), (vii), and (x) of the CCR Rule had occurred since the Initial HoC report had been developed. Additionally, information how long the CCR surface impoundments have been operating and the types of CCR in the surface impoundments, as required by Section 845.220(a)(1)(B) of the Part 845 Rule were not included in the Initial HoC report, as this information is not required by the CCR Rule. Each change and the subsequent updates to the Initial HoC report is described within this section.

Section 845.220(a)(1)(B): A statement of … how long the CCR surface impoundment has been in operation, and the types of CCR that have been placed in the surface impoundment.

<u>*Primary Ash Pond*</u>
The PAP was in operation from 1977 until today, for a total of approximately 44 years [1].

CCR placed in the PAP has included bottom ash and economizer ash, in addition to other non-CCR plant process wastewater [1].

§ 257.73(c)(1)(i): The name and address of the person(s) owning or operating the CCR unit; the name associated with the CCR unit; and the identification number of the CCR unit if one has been assigned by the state.

A state identification numbers (IDs) for the PAP was assigned by the Illinois Environmental Protection Agency (IEPA). The ID is listed in **Table 1**.

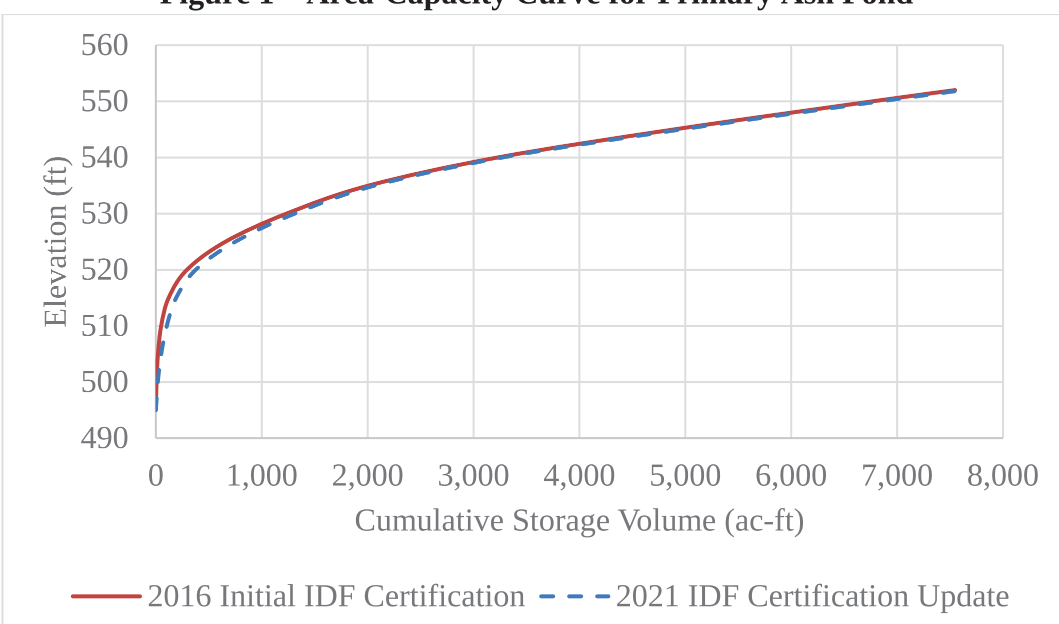
Table 1 – IEPA ID Numbers

CCR Surface Impoundment	State ID
Primary Ash Pond (PAP)	W0798070001-01

§ 257.73(c)(1)(vii): At a scale that details engineering structures and appurtenances relevant to the design, construction, operation, and maintenance of the CCR unit, detailed dimensional drawings of the CCR unit, including a plan view and cross sections of the length and width of the CCR unit, showing all zones, foundation improvements, drainage provisions, spillways diversion ditches, outlets, instrument locations, and slope protection, in addition to the normal operating pool surface elevation and the maximum pool surface elevation following peak discharge from the inflow design flood, the expected maximum depth of CCR within the CCR surface impoundment, and any identifiable natural or manmade features that could adversely affect operation of the CCR unit due to malfunction or mis-operation.

Updated area-capacity curves were prepared for the PAP in 2021. These curves are provided in **Figures 1**.

Figure 1 – Area-Capacity Curve for Primary Ash Pond



§ 257.73(c)(1)(x): A description of each spillway and diversion design features and capacities and calculations used in their determination.

Updated discharge capacity calculations for the existing spillways were prepared in 2021 using HydroCAD 10 modeling software. The calculations indicate that the PAP has sufficient storage capacity and will not overtop the embankments during the Probable Maximum Precipitation (PMP), 24-hour, storm event. The results of the calculations are provided in **Table 2**.

Table 2 – Results of Updated Discharge Capacity Calculations

	Primary Ash Pond
Approximate Berm Minimum Elevation[1], ft	553.0
Starting Water Surface Elevation[1] (SWSE), ft	537.0
Peak Water Surface Elevation[1] (PWSE), ft	538.2
Time to Peak, hr	24.0
Surface Area[2], ac	272.0
Storage[3], ac-ft	281.1

Notes:
[1]Elevations are based on the NAVD88 datum
[2] Surface Area is defined as the water surface area at the PWSE
[3]Storage is defined as the volume between the SWSE and PWSE

CLOSING

This letter has been prepared to document Geosyntec's evaluation of changes that have occurred at the PAP at the NEW since the Initial HoC was developed, based on reasonably and readily available information provided by IPGC, observed by Geosyntec during the site visit, or generated by Geosyntec as part of subsequent calculations.

Sincerely,

Panos Andonyadis, P.E.
Senior Engineer

John Seymour, P.E.
Senior Principal

REFERENCES

[1] AECOM, "History of Construction, USEPA Final CCR Rule, 40 CFR § 257.73(c), Newton Power Station, Newton, Illinois," October 2016.

[2] United Stated Environmental Protection Agency, "40 CFR Parts 257 and 261, Hazardous and Solid Waste Management System, Disposal of Coal Combustion Residuals from Electric Utilities, Final Rule, 2015," 2015.

[3] Illinois Environmental Protection Agency, "35 Ill. Adm. Code Part 845, Standards for the Disposal of Coal Combustion Residuals in Surface Impoundments," Springfield, IL, 2021.

Attachment D

Periodic Structural Stability and Safety Factor Assessment Analyses

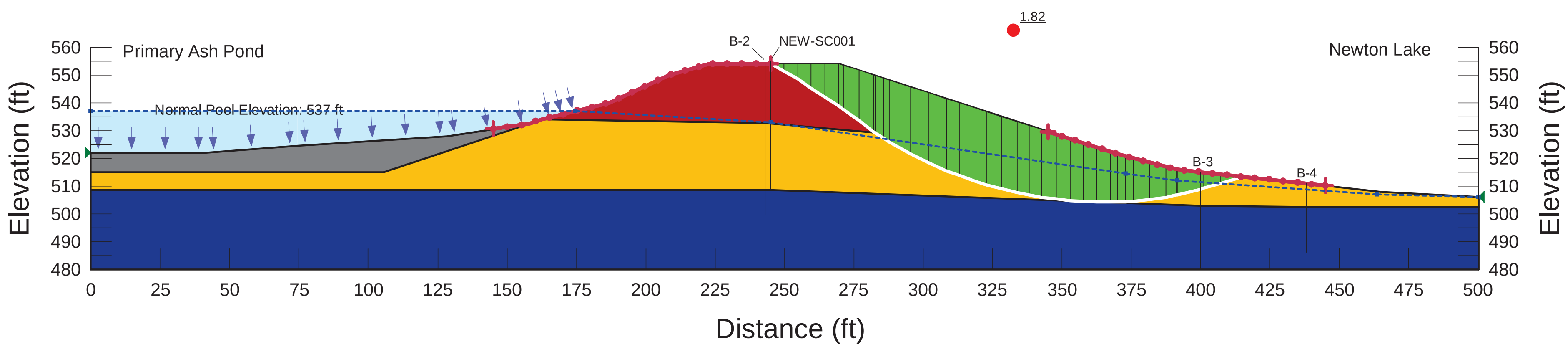
Project Name: Newton Primary Ash Pond Stability Analysis-Section A

Analysis: Long Term (Drained)

Calculated By: MJN Date: 6/17/2016
Checked By: VMCh Date: 6/20/2016
Modified By: PK Date: 9/01/2021
Checked By:ZJF Date: 9/08/2021

Name: Upper Clay (Drained) Model: Mohr-Coulomb Unit Weight: 130 pcf Cohesion': 0 psf Phi': 29 °
Name: Ash (Drained) Model: Mohr-Coulomb Unit Weight: 90 pcf Cohesion': 0 psf Phi': 30 °
Name: Lower Clay (Drained) Model: Mohr-Coulomb Unit Weight: 130 pcf Cohesion': 3,700 psf Phi': 33 °
Name: Embankment Fill (Drained) Model: Mohr-Coulomb Unit Weight: 130 pcf Cohesion': 0 psf Phi': 31 °

Materials
- Upper Clay (Drained)
- Ash (Drained)
- Lower Clay (Drained)
- Embankment Fill (Drained)



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Project Name: Newton Primary Ash Pond Stability Analysis-Section A

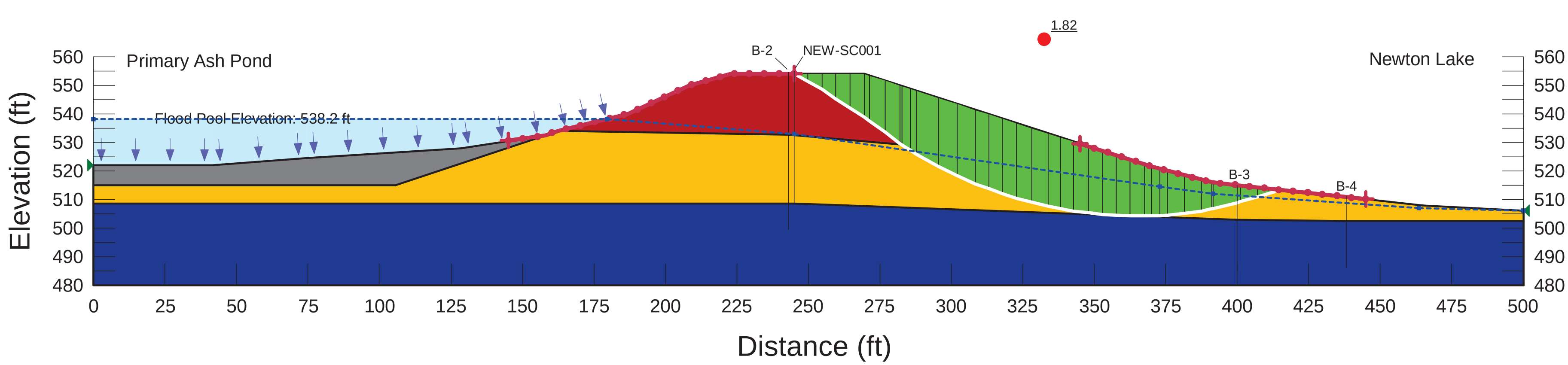
Analysis: Surcharge (Drained)

Calculated By: MJN Date: 6/17/2016
Checked By: VMCh Date: 6/20/2016
Modified By: PK Date: 9/01/2021
Checked By:ZJF Date: 9/08/2021

Name: Upper Clay (Drained) Model: Mohr-Coulomb Unit Weight: 130 pcf Cohesion': 0 psf Phi': 29 °
Name: Ash (Drained) Model: Mohr-Coulomb Unit Weight: 90 pcf Cohesion': 0 psf Phi': 30 °
Name: Lower Clay (Drained) Model: Mohr-Coulomb Unit Weight: 130 pcf Cohesion': 3,700 psf Phi': 33 °
Name: Embankment Fill (Drained) Model: Mohr-Coulomb Unit Weight: 130 pcf Cohesion': 0 psf Phi': 31 °

Materials
- Upper Clay (Drained)
- Ash (Drained)
- Lower Clay (Drained)
- Embankment Fill (Drained)

Borings B-2, B-3, and B-4 are from Geotechnology, 2011



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Calculated By: MJN Date: 6/17/2016
Checked By: VMCh Date: 6/20/2016
Modified By: PK Date: 9/01/2021
Checked By:ZJF Date: 9/08/2021

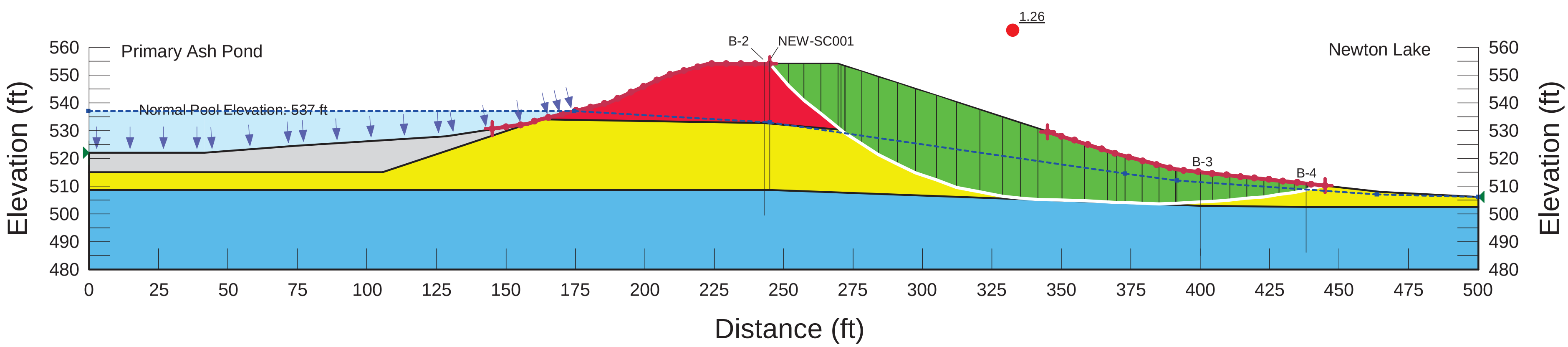
Project Name: Newton Primary Ash Pond Stability Analysis-Section A

Analysis: Pseudostatic (Undrained)

Horizontal Seismic Coefficient = 0.153g

Name: Upper Clay (Undrained) Model: Shear/Normal Fn. Unit Weight: 130 pcf Strength Function: Upper Clay (Undrained)
Name: Embankment Fill (Undrained) Model: Shear/Normal Fn. Unit Weight: 130 pcf Strength Function: Embankment Fill (Undrained)
Name: Lower Clay (Undrained) Model: Mohr-Coulomb Unit Weight: 130 pcf Cohesion': 5,000 psf Phi': 0 °
Name: Ash (Undrained) Model: S=f(overburden) Unit Weight: 90 pcf Tau/Sigma Ratio: 0.05 Minimum Strength: 0 psf

Materials
- Upper Clay (Undrained)
- Embankment Fill (Undrained)
- Lower Clay (Undrained)
- Ash (Undrained)



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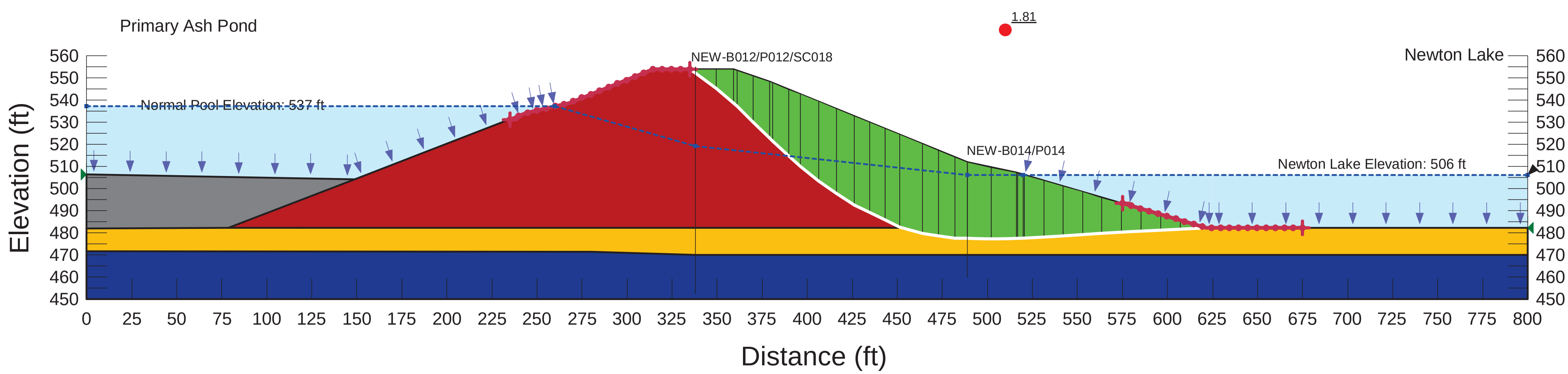
Project Name: Newton Primary Ash Pond Stability Analysis-Section B

Analysis: Long Term (Drained)

Calculated By: MJN Date: 6/17/2016
Checked By: VMCh Date: 6/20/2016
Modified By: PK Date: 9/01/2021
Checked By:ZJF Date: 9/08/2021

Name: Upper Clay (Drained) Model: Mohr-Coulomb Unit Weight: 130 pcf Cohesion': 0 psf Phi': 29 °
Name: Ash (Drained) Model: Mohr-Coulomb Unit Weight: 90 pcf Cohesion': 0 psf Phi': 30 °
Name: Lower Clay (Drained) Model: Mohr-Coulomb Unit Weight: 130 pcf Cohesion': 3,700 psf Phi': 33 °
Name: Embankment Fill (Drained) Model: Mohr-Coulomb Unit Weight: 130 pcf Cohesion': 0 psf Phi': 31 °

Materials
- Upper Clay (Drained)
- Ash (Drained)
- Lower Clay (Drained)
- Embankment Fill (Drained)



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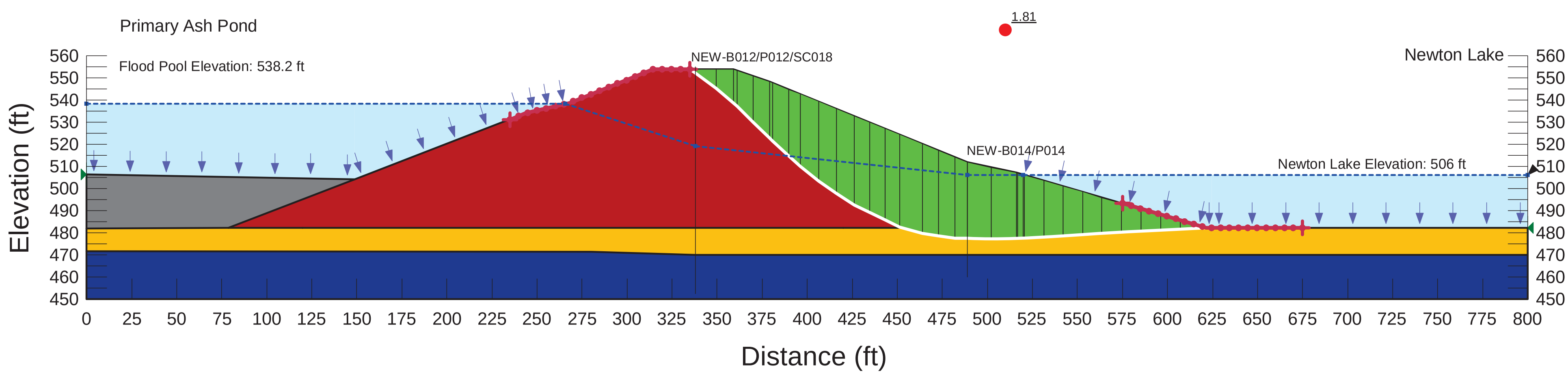
Project Name: Newton Primary Ash Pond Stability Analysis-Section B

Analysis: Surcharge (Drained)

Calculated By: MJN Date: 6/17/2016
Checked By: VMCh Date: 6/20/2016
Modified By: PK Date: 9/01/2021
Checked By:ZJF Date: 9/08/2021

Name: Upper Clay (Drained) Model: Mohr-Coulomb Unit Weight: 130 pcf Cohesion': 0 psf Phi': 29 °
Name: Ash (Drained) Model: Mohr-Coulomb Unit Weight: 90 pcf Cohesion': 0 psf Phi': 30 °
Name: Lower Clay (Drained) Model: Mohr-Coulomb Unit Weight: 130 pcf Cohesion': 3,700 psf Phi': 33 °
Name: Embankment Fill (Drained) Model: Mohr-Coulomb Unit Weight: 130 pcf Cohesion': 0 psf Phi': 31 °

Materials
- Upper Clay (Drained)
- Ash (Drained)
- Lower Clay (Drained)
- Embankment Fill (Drained)



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Project Name: Newton Primary Ash Pond Stability Analysis-Section B

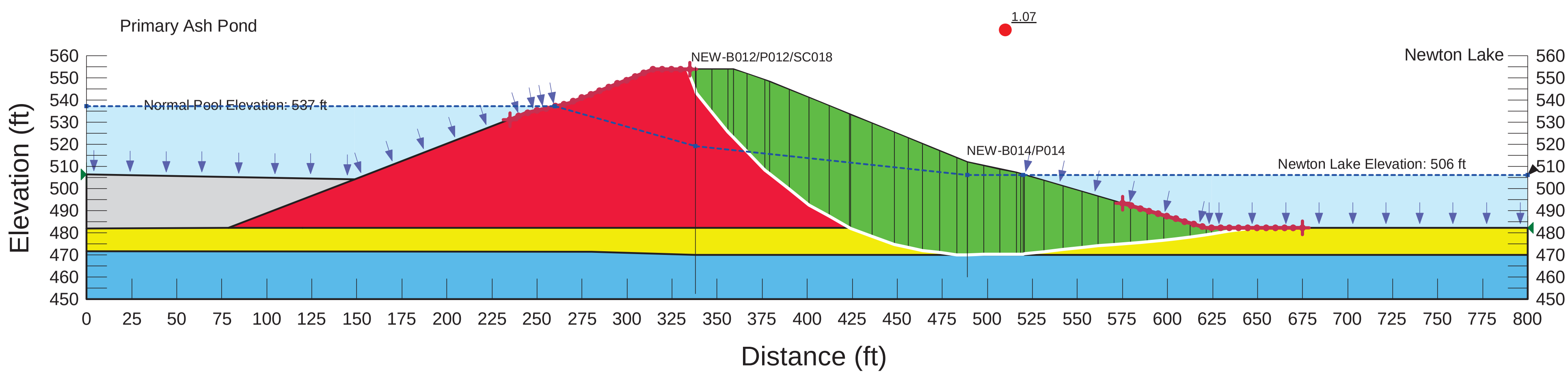
Analysis: Pseudostatic (Undrained)

Horizontal Seismic Coefficient = 0.153g

Calculated By: MJN Date: 6/17/2016
Checked By: VMCh Date: 6/20/2016
Modified By: PK Date: 9/01/2021
Checked By:ZJF Date: 9/08/2021

Name: Upper Clay (Undrained) Model: Shear/Normal Fn. Unit Weight: 130 pcf Strength Function: Upper Clay (Undrained)
Name: Embankment Fill (Undrained) Model: Shear/Normal Fn. Unit Weight: 130 pcf Strength Function: Embankment Fill (Undrained)
Name: Lower Clay (Undrained) Model: Mohr-Coulomb Unit Weight: 130 pcf Cohesion': 5,000 psf Phi': 0 °
Name: Ash (Undrained) Model: S=f(overburden) Unit Weight: 90 pcf Tau/Sigma Ratio: 0.05 Minimum Strength: 0 psf

Materials
- Upper Clay (Undrained)
- Embankment Fill (Undrained)
- Lower Clay (Undrained)
- Ash (Undrained)



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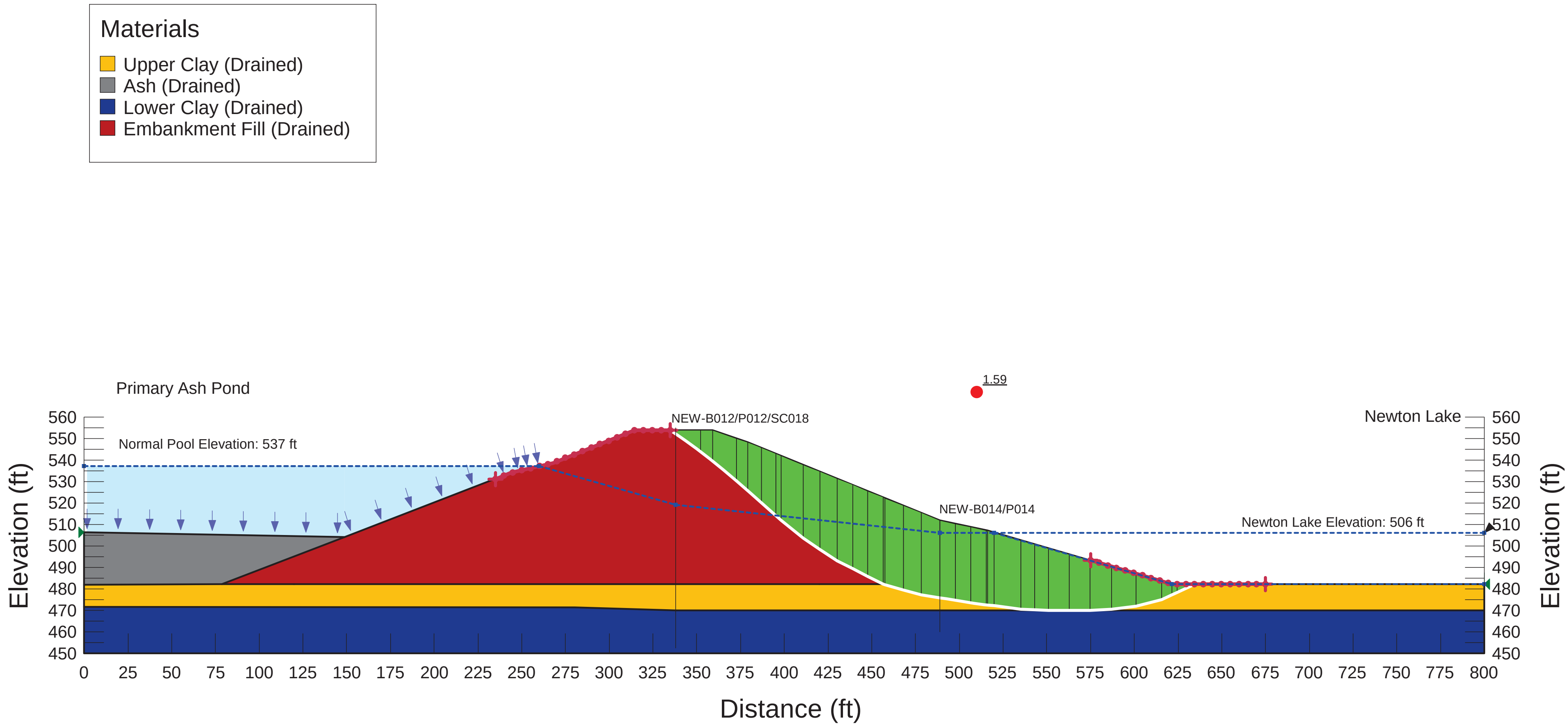
R001534

Project Name: Newton Primary Ash Pond Stability Analysis-Section B

Analysis: Sudden Drawdown

Calculated By: MJN Date: 6/17/2016
Checked By: VMCh Date: 6/20/2016
Modified By: PK Date: 9/01/2021
Checked By:ZJF Date: 9/08/2021

Name: Upper Clay (Drained) Model: Mohr-Coulomb Unit Weight: 130 pcf Cohesion': 0 psf Phi': 29 ° Cohesion R: 470 psf Phi R: 22 ° Piezometric Line After Drawdown: 2
Name: Ash (Drained) Model: Mohr-Coulomb Unit Weight: 90 pcf Cohesion': 0 psf Phi': 30 ° Cohesion R: 0 psf Phi R: 0 ° Piezometric Line After Drawdown: 2
Name: Lower Clay (Drained) Model: Mohr-Coulomb Unit Weight: 130 pcf Cohesion': 3,700 psf Phi': 33 ° Cohesion R: 0 psf Phi R: 0 ° Piezometric Line After Drawdown: 2
Name: Embankment Fill (Drained) Model: Mohr-Coulomb Unit Weight: 130 pcf Cohesion': 0 psf Phi': 31 ° Cohesion R: 500 psf Phi R: 22 ° Piezometric Line After Drawdown: 2



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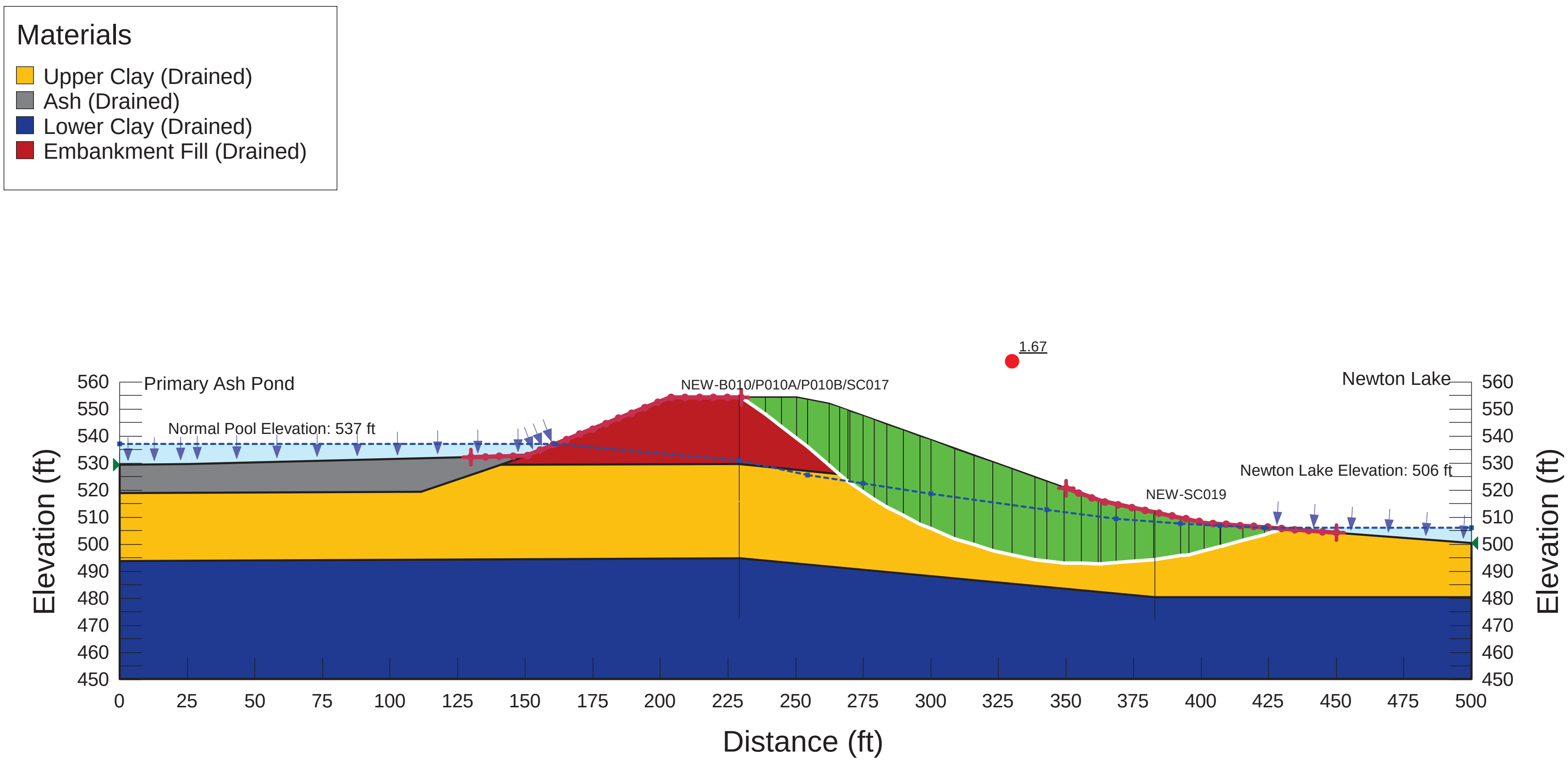
Project Name: Newton Primary Ash Pond Stability Analysis-Section C

Analysis: Long Term (Drained)

Calculated By: MJN Date: 6/20/2016
Checked By: VMCh Date: 6/20/2016
Modified By: PK Date:9/01/2021
Checked By:ZJF Date: 9/08/2021

Name: Upper Clay (Drained) Model: Mohr-Coulomb Unit Weight: 130 pcf Cohesion': 0 psf Phi': 29 °
Name: Ash (Drained) Model: Mohr-Coulomb Unit Weight: 90 pcf Cohesion': 0 psf Phi': 30 °
Name: Lower Clay (Drained) Model: Mohr-Coulomb Unit Weight: 130 pcf Cohesion': 3,700 psf Phi': 33 °
Name: Embankment Fill (Drained) Model: Mohr-Coulomb Unit Weight: 130 pcf Cohesion': 0 psf Phi': 31 °



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Project Name: Newton Primary Ash Pond Stability Analysis-Section C

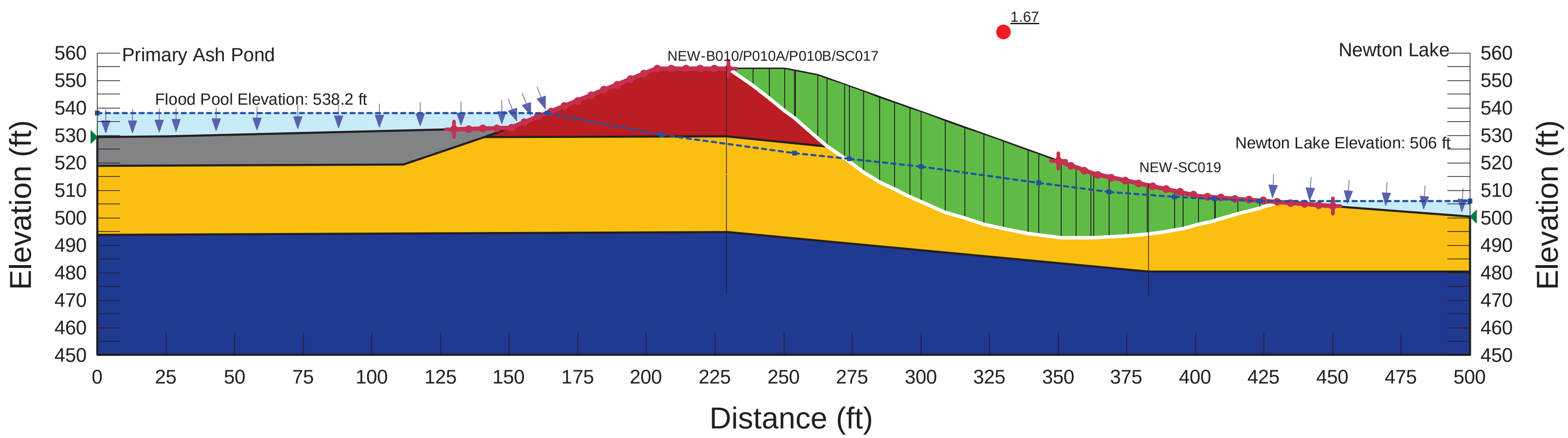
Analysis: Surcharge (Drained)

Calculated By: MJN Date: 6/20/2016
Checked By: VMCh Date: 6/20/2016
Modified By: PK Date:9/01/2021
Checked By:ZJF Date: 9/08/2021

Name: Upper Clay (Drained) Model: Mohr-Coulomb Unit Weight: 130 pcf Cohesion': 0 psf Phi': 29 °
Name: Ash (Drained) Model: Mohr-Coulomb Unit Weight: 90 pcf Cohesion': 0 psf Phi': 30 °
Name: Lower Clay (Drained) Model: Mohr-Coulomb Unit Weight: 130 pcf Cohesion': 3,700 psf Phi': 33 °
Name: Embankment Fill (Drained) Model: Mohr-Coulomb Unit Weight: 130 pcf Cohesion': 0 psf Phi': 31 °

Materials

- Upper Clay (Drained)
- Ash (Drained)
- Lower Clay (Drained)
- Embankment Fill (Drained)



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R001538

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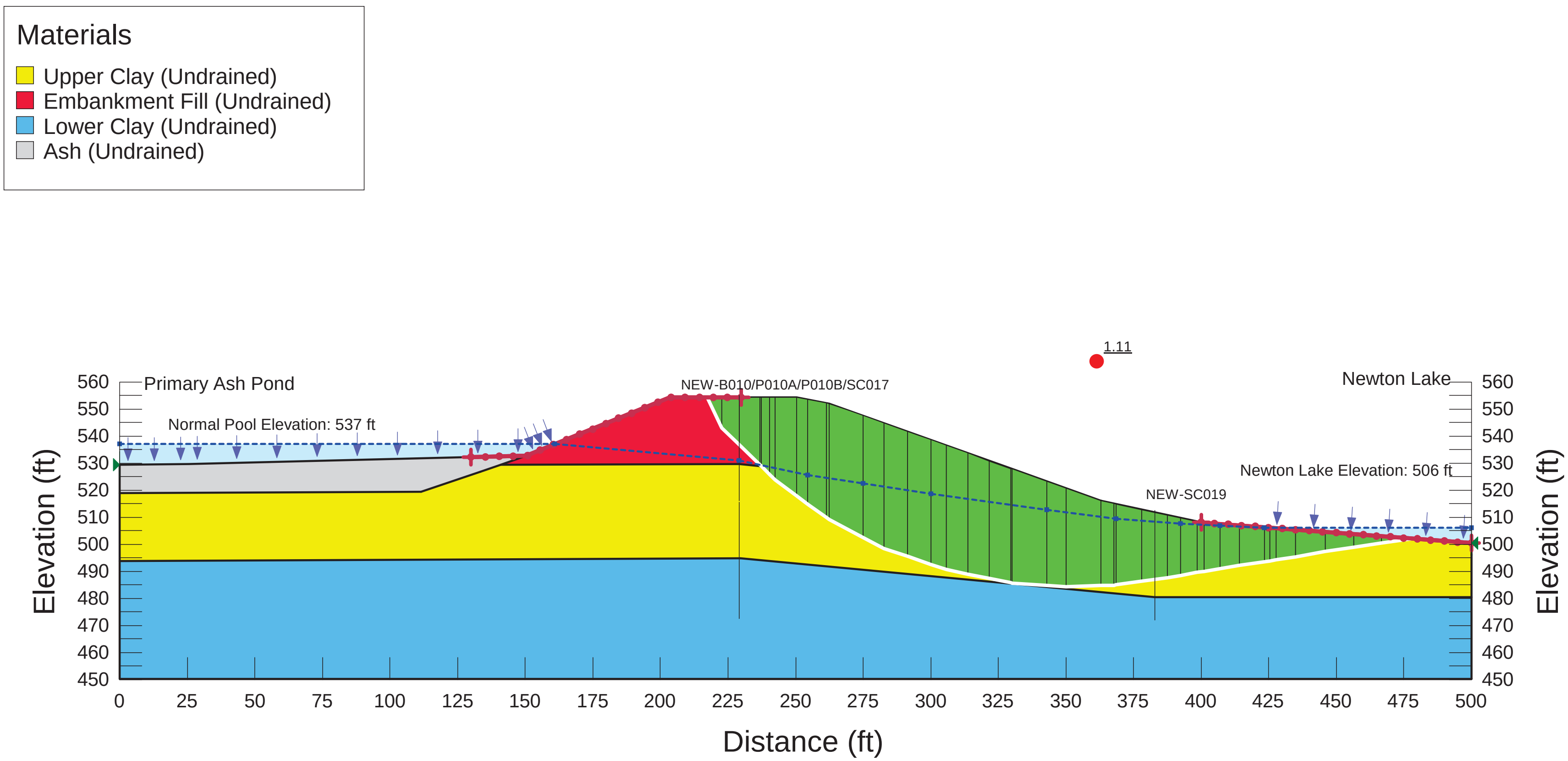
Project Name: Newton Primary Ash Pond Stability Analysis-Section C

Calculated By: MJN Date: 6/20/2016
Checked By: VMCh Date: 6/20/2016
Modified By: PK Date:9/01/2021
Checked By:ZJF Date: 9/08/2021

Analysis: Pseudostatic (Undrained)

Horizontal Seismic Coefficient = 0.153g

Name: Upper Clay (Undrained) Model: Shear/Normal Fn. Unit Weight: 130 pcf Strength Function: Upper Clay (Undrained)
Name: Embankment Fill (Undrained) Model: Shear/Normal Fn. Unit Weight: 130 pcf Strength Function: Embankment Fill (Undrained)
Name: Lower Clay (Undrained) Model: Mohr-Coulomb Unit Weight: 130 pcf Cohesion': 5,000 psf Phi': 0 °
Name: Ash (Undrained) Model: S=f(overburden) Unit Weight: 90 pcf Tau/Sigma Ratio: 0.05 Minimum Strength: 0 psf



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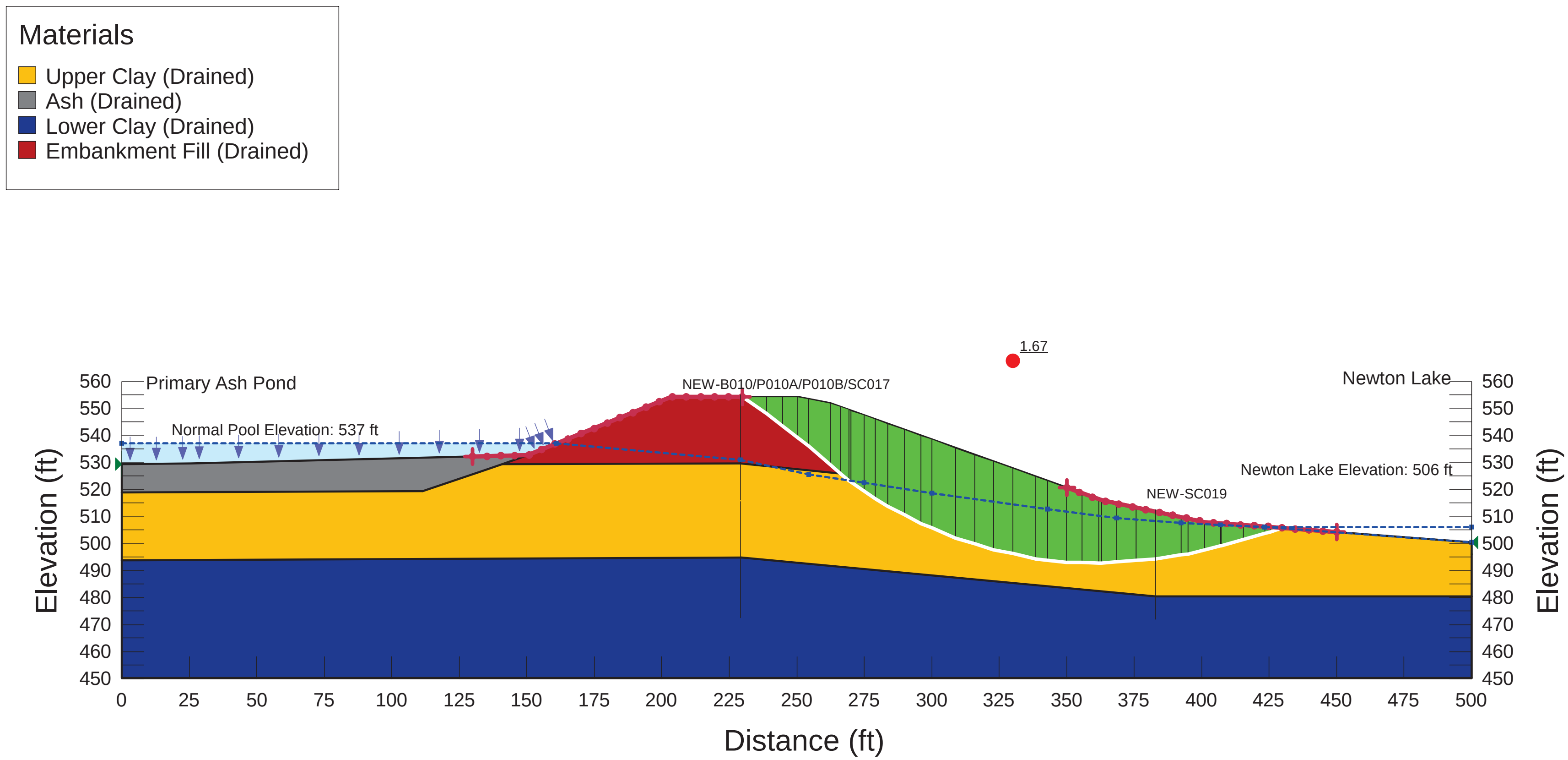
Project Name: Newton Primary Ash Pond Stability Analysis-Section C

Analysis: Sudden Drawdown

Calculated By: MJN Date: 6/20/2016
Checked By: VMCh Date: 6/20/2016
Modified By: PK Date:9/01/2021
Checked By:ZJF Date: 9/08/2021

Name: Upper Clay (Drained) Model: Mohr-Coulomb Unit Weight: 130 pcf Cohesion': 0 psf Phi': 29 ° Cohesion R: 470 psf Phi R: 22 ° Piezometric Line After Drawdown: 2
Name: Ash (Drained) Model: Mohr-Coulomb Unit Weight: 90 pcf Cohesion': 0 psf Phi': 30 ° Cohesion R: 0 psf Phi R: 0 ° Piezometric Line After Drawdown: 2
Name: Lower Clay (Drained) Model: Mohr-Coulomb Unit Weight: 130 pcf Cohesion': 3,700 psf Phi': 33 ° Cohesion R: 0 psf Phi R: 0 ° Piezometric Line After Drawdown: 2
Name: Embankment Fill (Drained) Model: Mohr-Coulomb Unit Weight: 130 pcf Cohesion': 0 psf Phi': 31 ° Cohesion R: 500 psf Phi R: 22 ° Piezometric Line After Drawdown: 2



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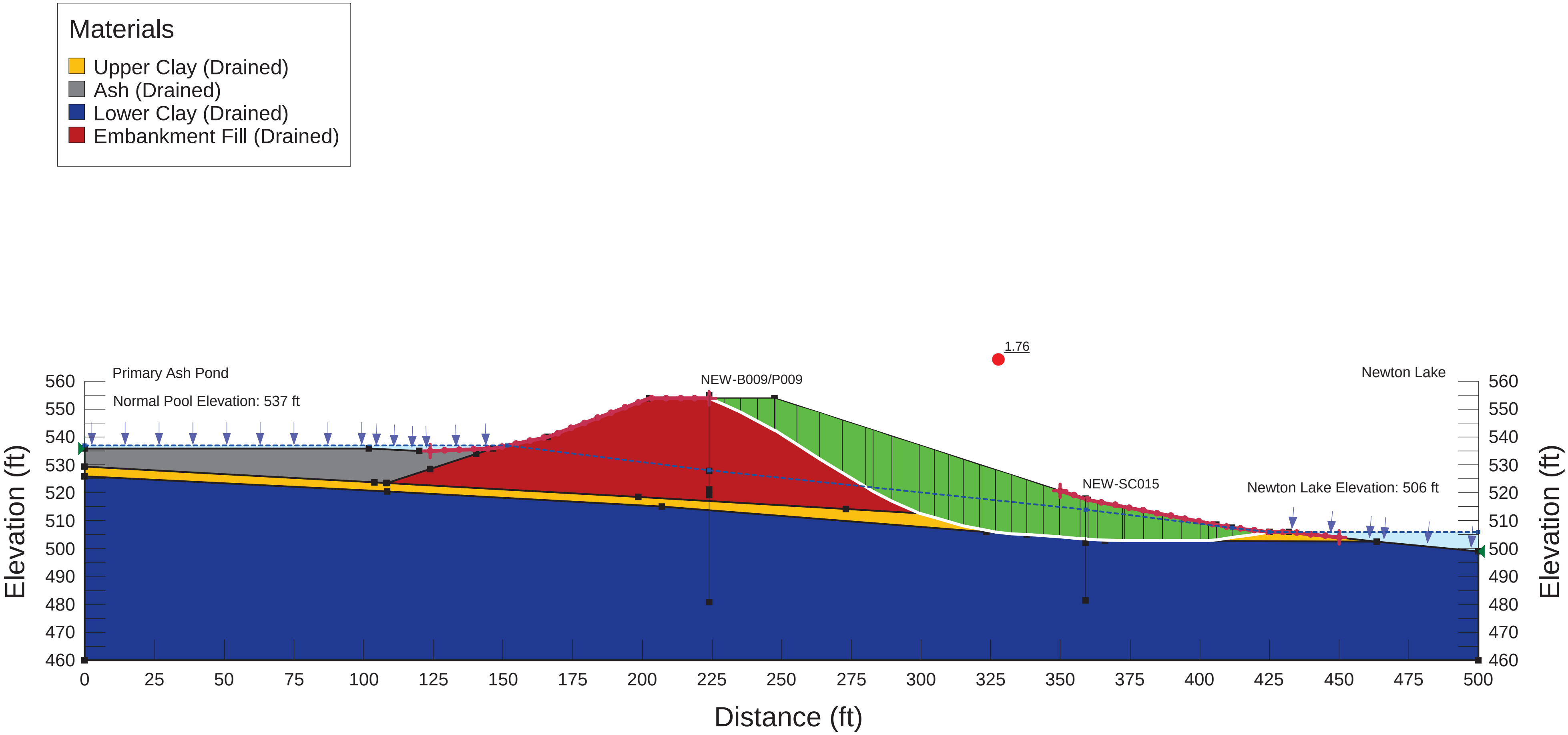
Electronic Filing: Received, Clerk's Office 03/26/2024

Project Name: Newton Primary Ash Pond Stability Analysis-Section D

Analysis: Long Term (Drained)

Calculated By: MJN Date: 6/20/2016
Checked By: VMCh Date: 6/20/2016
Modified By: PK Date:9/01/2021
Checked By:ZJF Date: 9/08/2021

Name: Upper Clay (Drained) Model: Mohr-Coulomb Unit Weight: 130 pcf Cohesion': 0 psf Phi': 29 °
Name: Ash (Drained) Model: Mohr-Coulomb Unit Weight: 90 pcf Cohesion': 0 psf Phi': 30 °
Name: Lower Clay (Drained) Model: Mohr-Coulomb Unit Weight: 130 pcf Cohesion': 3,700 psf Phi': 33 °
Name: Embankment Fill (Drained) Model: Mohr-Coulomb Unit Weight: 130 pcf Cohesion': 0 psf Phi': 31 °



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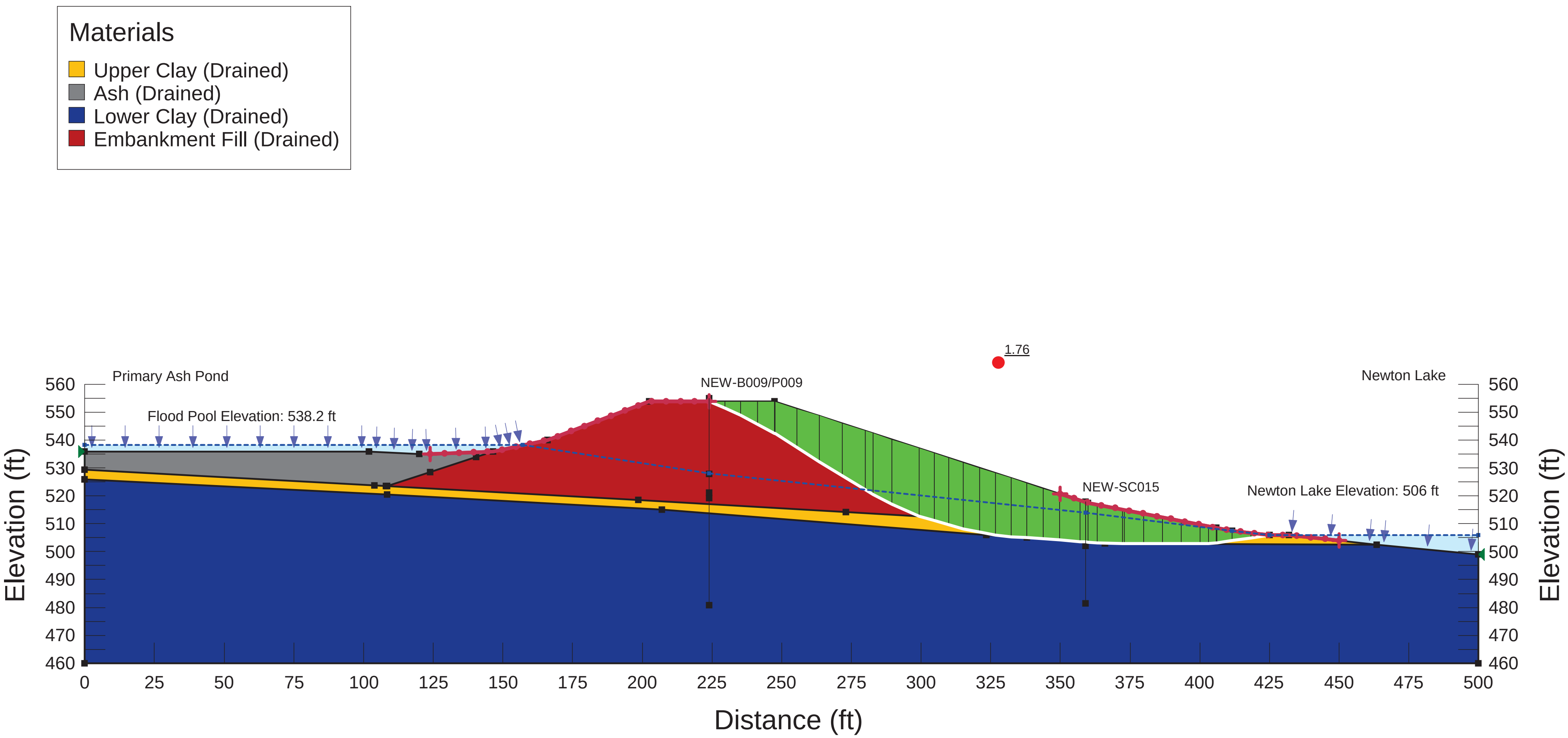
Electronic Filing: Received, Clerk's Office 03/26/2024

Project Name: Newton Primary Ash Pond Stability Analysis-Section D

Analysis: Surcharge (Drained)

Calculated By: MJN Date: 6/20/2016
Checked By: VMCh Date: 6/20/2016
Modified By: PK Date:9/01/2021
Checked By:ZJF Date: 9/08/2021

Name: Upper Clay (Drained) Model: Mohr-Coulomb Unit Weight: 130 pcf Cohesion': 0 psf Phi': 29 °
Name: Ash (Drained) Model: Mohr-Coulomb Unit Weight: 90 pcf Cohesion': 0 psf Phi': 30 °
Name: Lower Clay (Drained) Model: Mohr-Coulomb Unit Weight: 130 pcf Cohesion': 3,700 psf Phi': 33 °
Name: Embankment Fill (Drained) Model: Mohr-Coulomb Unit Weight: 130 pcf Cohesion': 0 psf Phi': 31 °



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Project Name: Newton Primary Ash Pond Stability Analysis-Section D

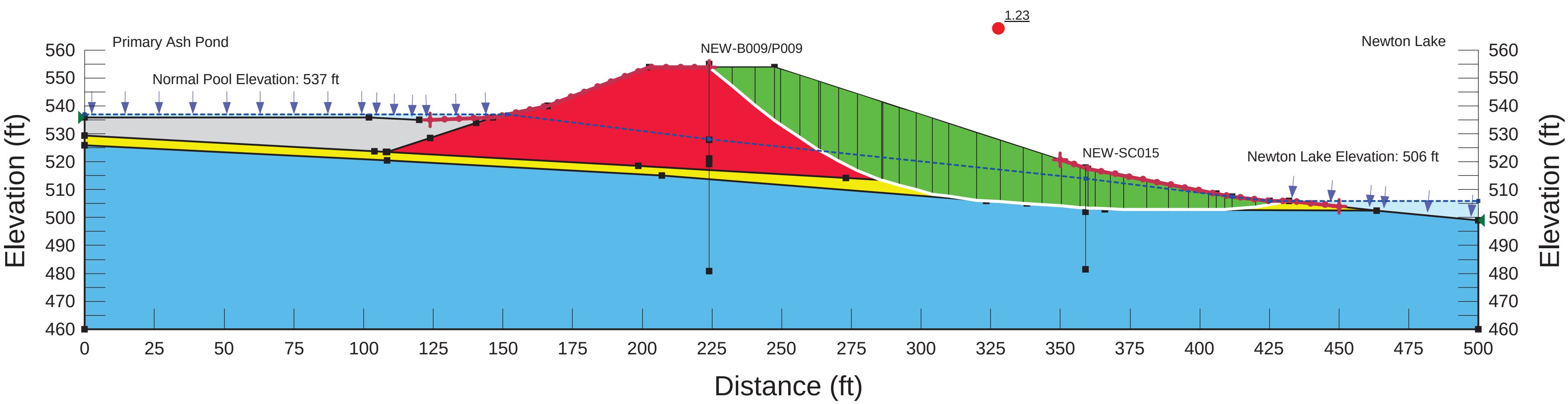
Calculated By: MJN Date: 6/20/2016
Checked By: VMCh Date: 6/20/2016
Modified By: PK Date:9/01/2021
Checked By:ZJF Date: 9/08/2021

Analysis: Pseudostatic (Undrained)

Horizontal Seismic Coefficient = 0.153g

Name: Upper Clay (Undrained) Model: Shear/Normal Fn. Unit Weight: 130 pcf Strength Function: Upper Clay (Undrained)
Name: Embankment Fill (Undrained) Model: Shear/Normal Fn. Unit Weight: 130 pcf Strength Function: Embankment Fill (Undrained)
Name: Lower Clay (Undrained) Model: Mohr-Coulomb Unit Weight: 130 pcf Cohesion': 5,000 psf Phi': 0 °
Name: Ash (Undrained) Model: S=f(overburden) Unit Weight: 90 pcf Tau/Sigma Ratio: 0.05 Minimum Strength: 0 psf

Materials
- Upper Clay (Undrained)
- Embankment Fill (Undrained)
- Lower Clay (Undrained)
- Ash (Undrained)



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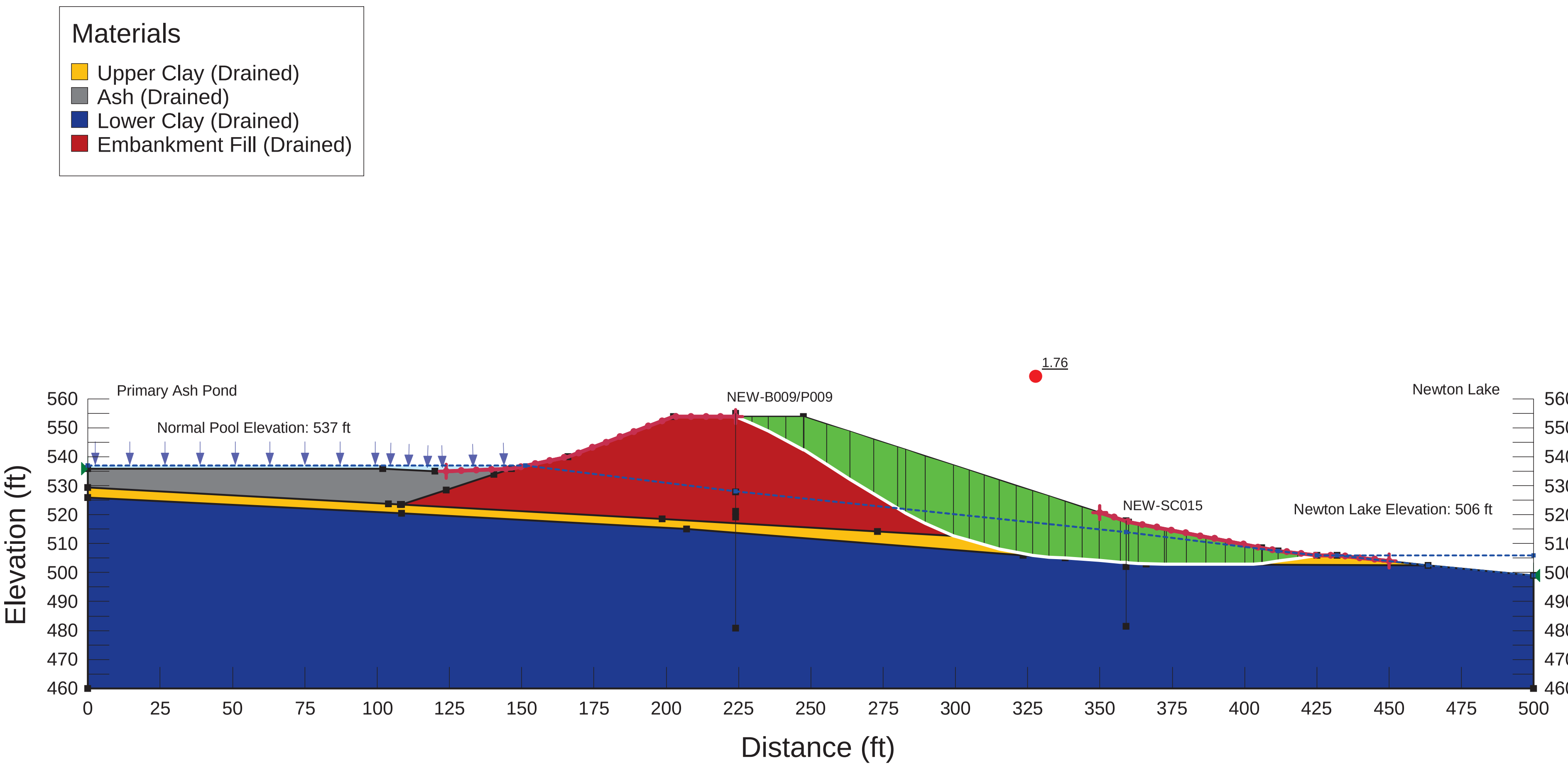
Project Name: **Newton Primary Ash Pond Stability Analysis-Section D**

Analysis: Sudden Drawdown

Calculated By: MJN Date: 6/20/2016
Checked By: VMCh Date: 6/20/2016
Modified By: PK Date:9/01/2021
Checked By:ZJF Date: 9/08/2021

Name: Upper Clay (Drained) Model: Mohr-Coulomb Unit Weight: 130 pcf Cohesion': 0 psf Phi': 29 ° Cohesion R: 470 psf Phi R: 22 ° Piezometric Line After Drawdown: 2
Name: Ash (Drained) Model: Mohr-Coulomb Unit Weight: 90 pcf Cohesion': 0 psf Phi': 30 ° Cohesion R: 0 psf Phi R: 0 ° Piezometric Line After Drawdown: 2
Name: Lower Clay (Drained) Model: Mohr-Coulomb Unit Weight: 130 pcf Cohesion': 3,700 psf Phi': 33 ° Cohesion R: 0 psf Phi R: 0 ° Piezometric Line After Drawdown: 2
Name: Embankment Fill (Drained) Model: Mohr-Coulomb Unit Weight: 130 pcf Cohesion': 0 psf Phi': 31 ° Cohesion R: 500 psf Phi R: 22 ° Piezometric Line After Drawdown: 2



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Project Name: Newton Primary Ash Pond Stability Analysis-Section E

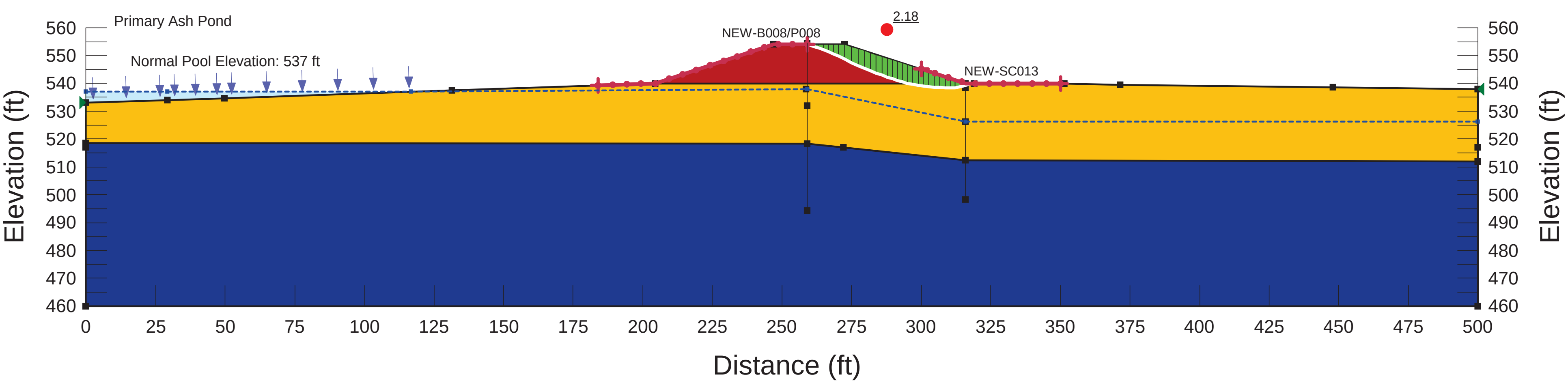
Analysis: Long Term (Drained)

Calculated By: MJN Date: 6/20/2016
Checked By: VMCh Date: 6/20/2016
Modified By: PK Date:9/01/2021
Checked By:ZJF Date: 9/08/2021

Name: Upper Clay (Drained) Model: Mohr-Coulomb Unit Weight: 130 pcf Cohesion': 0 psf Phi': 29 °
Name: Lower Clay (Drained) Model: Mohr-Coulomb Unit Weight: 130 pcf Cohesion': 3,700 psf Phi': 33 °
Name: Embankment Fill (Drained) Model: Mohr-Coulomb Unit Weight: 130 pcf Cohesion': 0 psf Phi': 31 °

Materials

- Upper Clay (Drained)
- Lower Clay (Drained)
- Embankment Fill (Drained)



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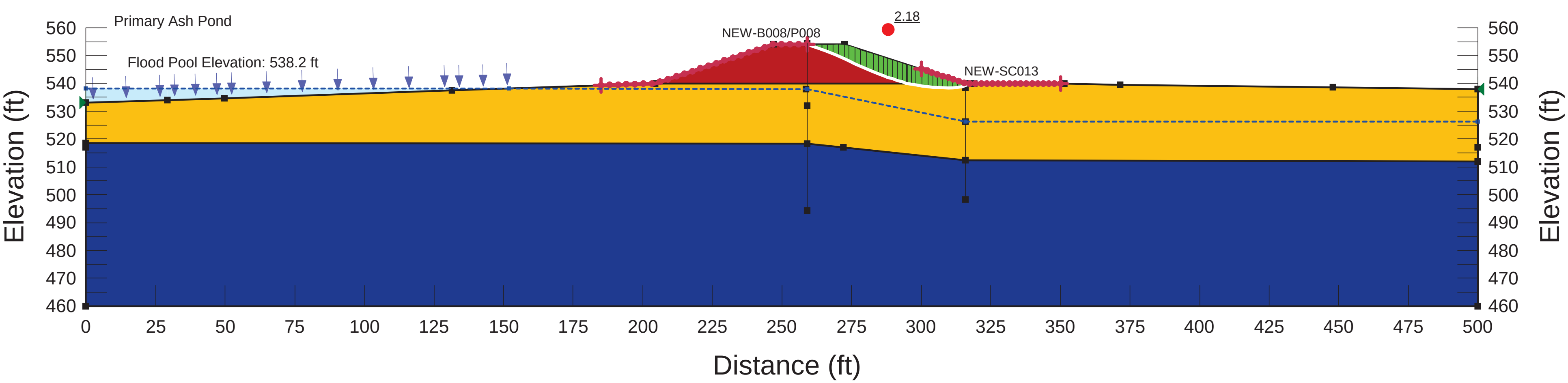
Project Name: Newton Primary Ash Pond Stability Analysis-Section E

Analysis: Surcharge (Drained)

Calculated By: MJN Date: 6/20/2016
Checked By: VMCh Date: 6/20/2016
Modified By: PK Date:9/01/2021
Checked By:ZJF Date: 9/08/2021

Name: Upper Clay (Drained) Model: Mohr-Coulomb Unit Weight: 130 pcf Cohesion': 0 psf Phi': 29 °
Name: Lower Clay (Drained) Model: Mohr-Coulomb Unit Weight: 130 pcf Cohesion': 3,700 psf Phi': 33 °
Name: Embankment Fill (Drained) Model: Mohr-Coulomb Unit Weight: 130 pcf Cohesion': 0 psf Phi': 31 °

Materials
- Upper Clay (Drained)
- Lower Clay (Drained)
- Embankment Fill (Drained)



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Project Name: **Newton Primary Ash Pond Stability Analysis-Section E**

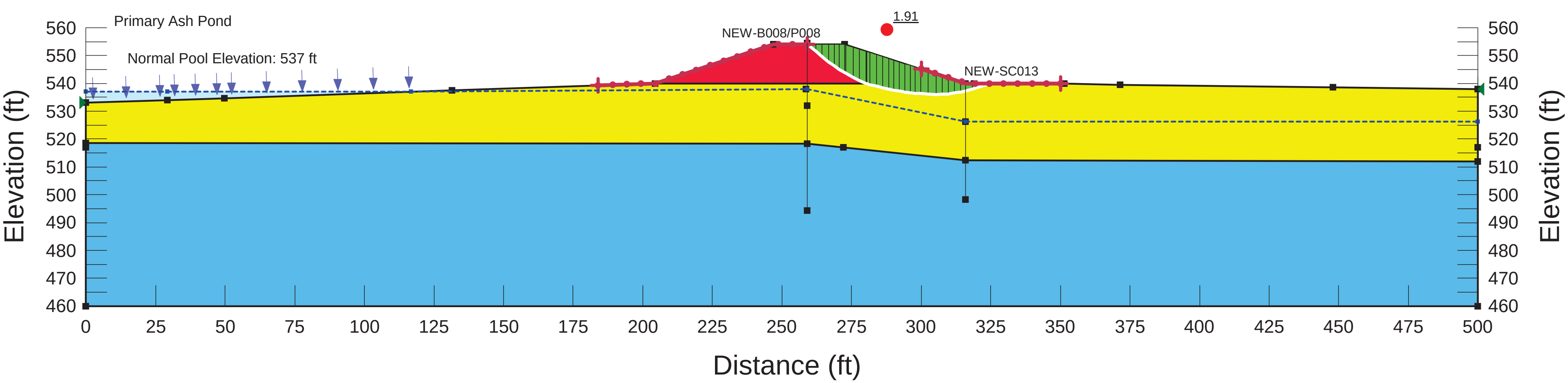
Analysis: Pseudostatic (Undrained)

Calculated By: MJN Date: 6/20/2016
Checked By: VMCh Date: 6/20/2016
Modified By: PK Date:9/01/2021
Checked By:ZJF Date: 9/08/2021

Horizontal Seismic Coefficient = 0.153g

Name: Upper Clay (Undrained) Model: Shear/Normal Fn. Unit Weight: 130 pcf Strength Function: Upper Clay (Undrained)
Name: Embankment Fill (Undrained) Model: Shear/Normal Fn. Unit Weight: 130 pcf Strength Function: Embankment Fill (Undrained)
Name: Lower Clay (Undrained) Model: Mohr-Coulomb Unit Weight: 130 pcf Cohesion': 5,000 psf Phi': 0 °

Materials
- Upper Clay (Undrained)
- Embankment Fill (Undrained)
- Lower Clay (Undrained)



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Electronic Filing: Received, Clerk's Office 03/26/2024

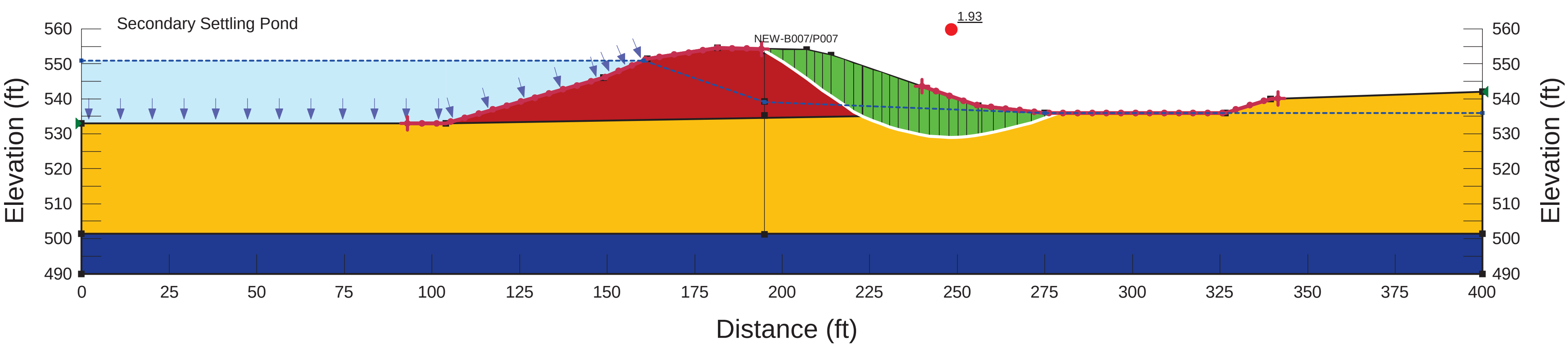
Project Name: Newton Primary Ash Pond Stability Analysis-Section F

Analysis: Long Term (Drained)

Calculated By: ZJF Date: 5/23/2016
Checked By: VMCh Date: 6/16/2016
Modified By: PK Date:9/01/2021
Checked By:ZJF Date: 9/08/2021

Name: Upper Clay (Drained) Model: Mohr-Coulomb Unit Weight: 130 pcf Cohesion': 0 psf Phi': 29 °
Name: Lower Clay (Drained) Model: Mohr-Coulomb Unit Weight: 130 pcf Cohesion': 3,700 psf Phi': 33 °
Name: Embankment Fill (Drained) Model: Mohr-Coulomb Unit Weight: 130 pcf Cohesion': 0 psf Phi': 31 °

Materials
- Upper Clay (Drained)
- Lower Clay (Drained)
- Embankment Fill (Drained)



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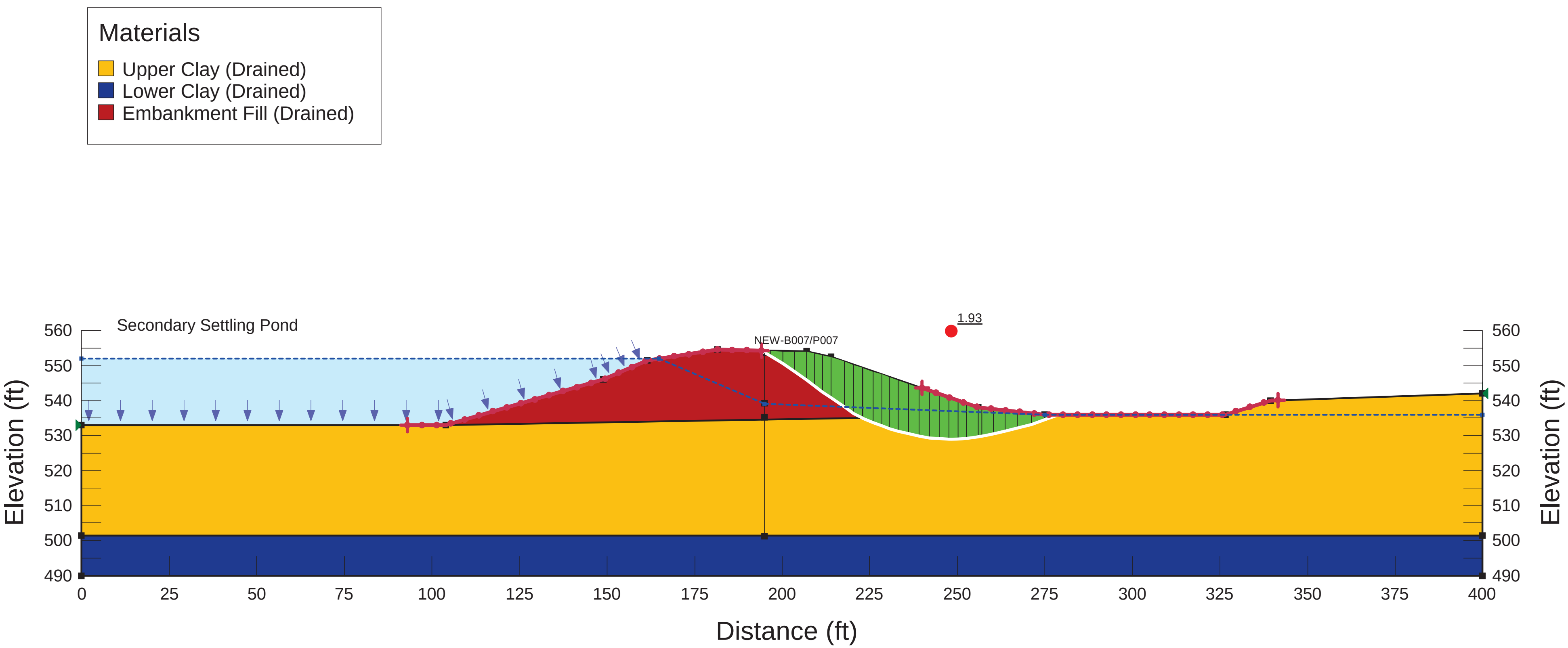
Project Name: **Newton Primary Ash Pond Stability Analysis-Section F**

Analysis: Surcharge (Drained)

Calculated By: ZJF Date: 5/23/2016
Checked By: VMCh Date: 6/16/2016
Modified By: PK Date:9/01/2021
Checked By:ZJF Date: 9/08/2021

Name: Upper Clay (Drained) Model: Mohr-Coulomb Unit Weight: 130 pcf Cohesion': 0 psf Phi': 29 °
Name: Lower Clay (Drained) Model: Mohr-Coulomb Unit Weight: 130 pcf Cohesion': 3,700 psf Phi': 33 °
Name: Embankment Fill (Drained) Model: Mohr-Coulomb Unit Weight: 130 pcf Cohesion': 0 psf Phi': 31 °



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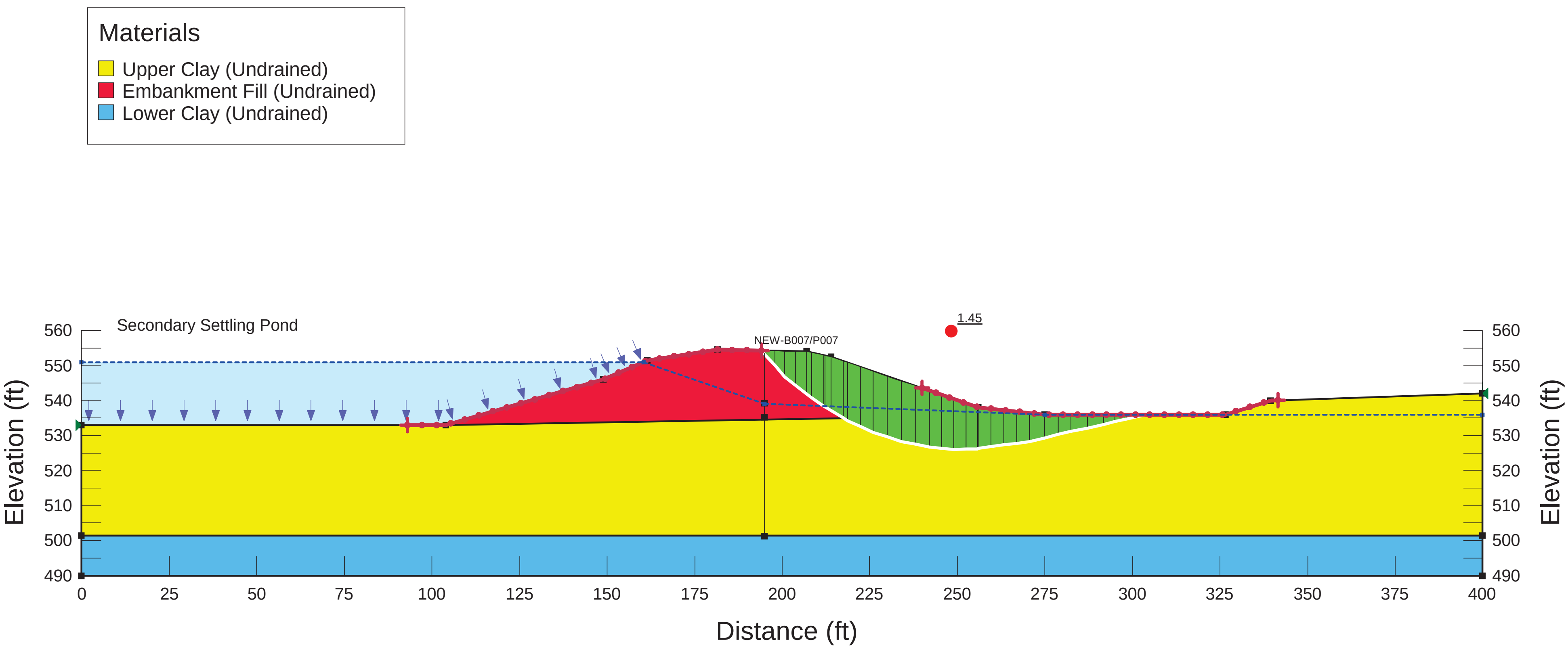
Project Name: **Newton Primary Ash Pond Stability Analysis-Section F**

Analysis: Pseudostatic (Undrained)

Calculated By: ZJF Date: 5/23/2016
Checked By: VMCh Date: 6/16/2016
Modified By: PK Date:9/01/2021
Checked By:ZJF Date: 9/08/2021

Horizontal Seismic Coefficient = 0.153 g

Name: Upper Clay (Undrained) Model: Shear/Normal Fn. Unit Weight: 130 pcf Strength Function: Upper Clay (Undrained)
Name: Embankment Fill (Undrained) Model: Shear/Normal Fn. Unit Weight: 130 pcf Strength Function: Embankment Fill (Undrained)
Name: Lower Clay (Undrained) Model: Mohr-Coulomb Unit Weight: 130 pcf Cohesion': 5,000 psf Phi': 0 °



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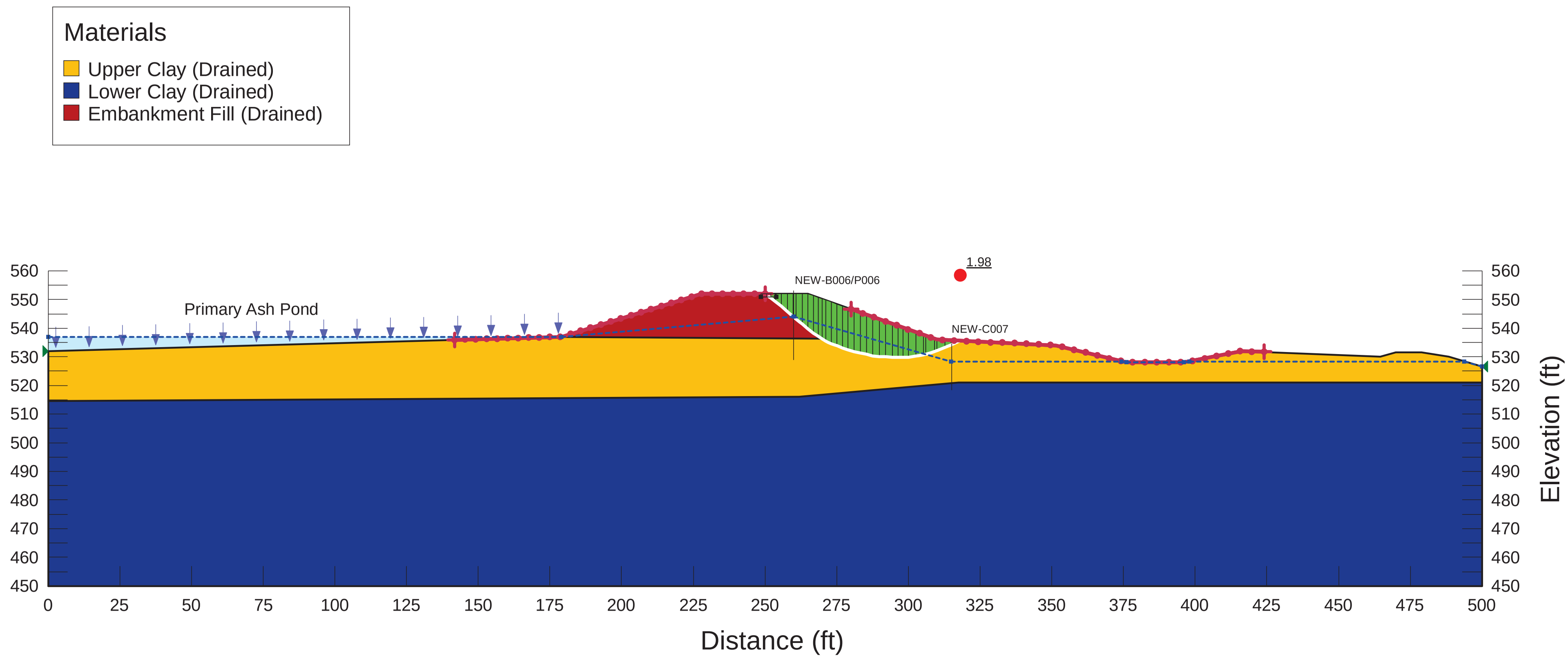
Project Name: Newton Primary Ash Pond Stability Analysis-Section G

Analysis: Long Term (Drained)

Calculated By: ZJF Date: 5/23/16
Checked By: VMCh Date: 06/20/16
Modified By: PK Date:9/01/21
Checked By:ZJF Date: 9/08/21

Name: Upper Clay (Drained) Model: Mohr-Coulomb Unit Weight: 130 pcf Cohesion': 0 psf Phi': 29 °
Name: Lower Clay (Drained) Model: Mohr-Coulomb Unit Weight: 130 pcf Cohesion': 3,700 psf Phi': 33 °
Name: Embankment Fill (Drained) Model: Mohr-Coulomb Unit Weight: 130 pcf Cohesion': 0 psf Phi': 31 °



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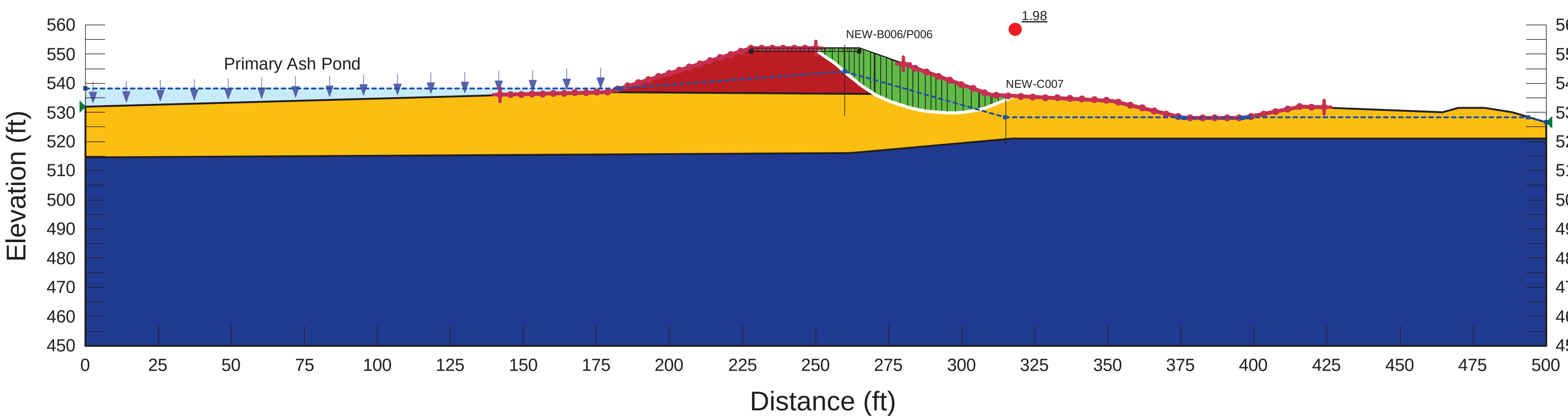
Project Name: Newton Primary Ash Pond Stability Analysis-Section G

Analysis: Surcharge (Drained)

Calculated By: ZJF	Date: 5/23/16
Checked By: VMCh	Date: 06/20/16
Modified By: PK	Date:9/01/21
Checked By:ZJF	Date: 9/08/21

Name: Upper Clay (Drained) Model: Mohr-Coulomb Unit Weight: 130 pcf Cohesion': 0 psf Phi': 29 °
Name: Lower Clay (Drained) Model: Mohr-Coulomb Unit Weight: 130 pcf Cohesion': 3,700 psf Phi': 33 °
Name: Embankment Fill (Drained) Model: Mohr-Coulomb Unit Weight: 130 pcf Cohesion': 0 psf Phi': 31 °

Materials
- Upper Clay (Drained)
- Lower Clay (Drained)
- Embankment Fill (Drained)



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R001552

Project Name: Newton Primary Ash Pond Stability Analysis-Section G

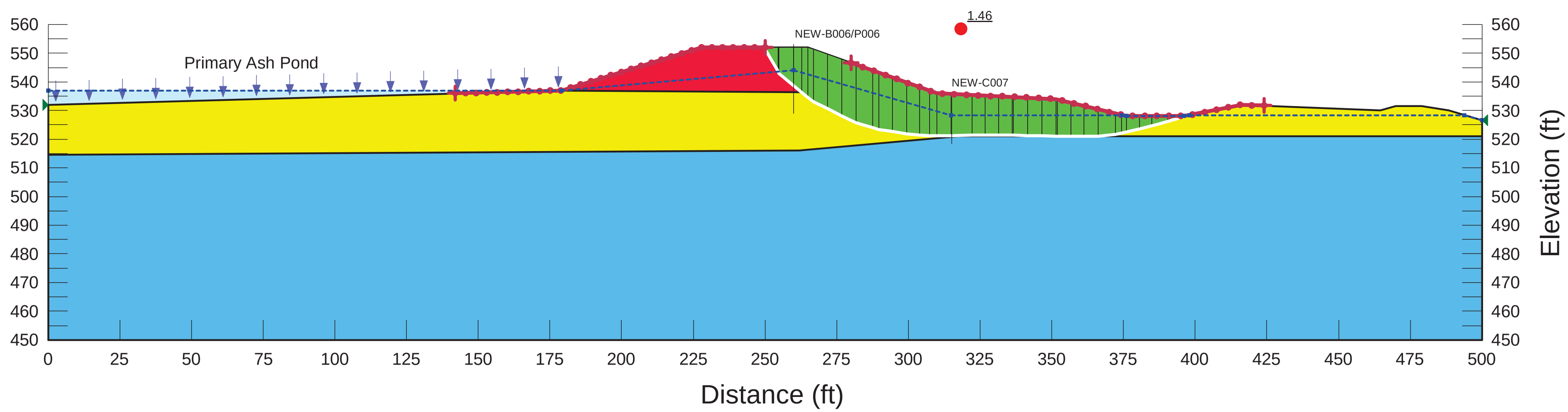
Analysis: Pseudostatic (Undrained)

Calculated By: ZJF Date: 5/23/16
Checked By: VMCh Date: 06/20/16
Modified By: PK Date:9/01/21
Checked By:ZJF Date: 9/08/21

Horizontal Seismic Coefficient = 0.153 g

Name: Upper Clay (Undrained) Model: Shear/Normal Fn. Unit Weight: 130 pcf Strength Function: Upper Clay (Undrained)
Name: Embankment Fill (Undrained) Model: Shear/Normal Fn. Unit Weight: 130 pcf Strength Function: Embankment Fill (Undrained)
Name: Lower Clay (Undrained) Model: Mohr-Coulomb Unit Weight: 130 pcf Cohesion': 5,000 psf Phi': 0 °

Materials
- Upper Clay (Undrained)
- Embankment Fill (Undrained)
- Lower Clay (Undrained)



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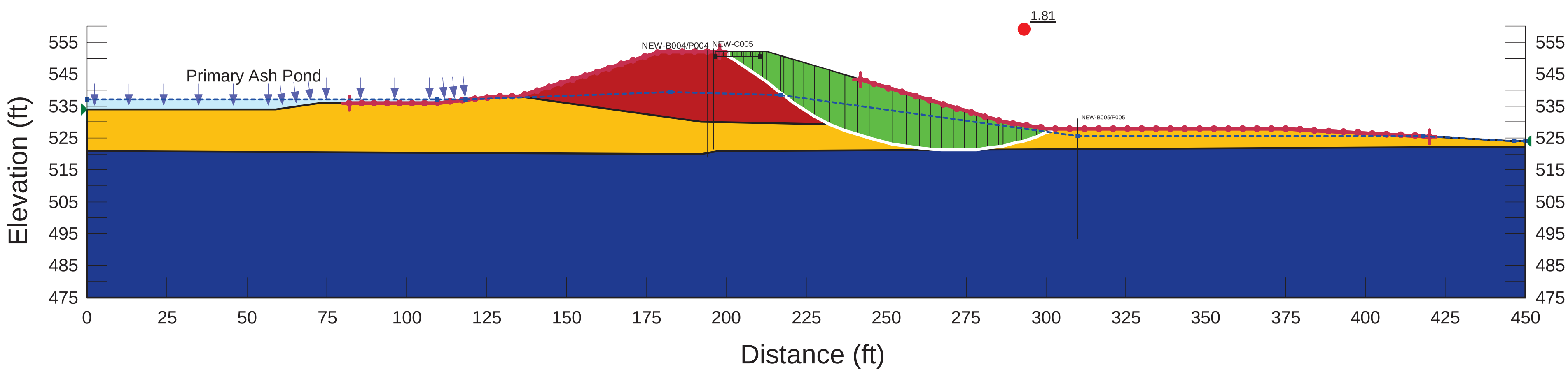
Project Name: Newton Primary Ash Pond Stability Analysis-Section H

Analysis: Long Term (Drained)

Calculated By: ZJF Date: 5/23/16
Checked By: VMCh Date: 6/20/16
Modified By: PK Date:9/01/21
Checked By:ZJF Date: 9/08/21

Name: Upper Clay (Drained) Model: Mohr-Coulomb Unit Weight: 130 pcf Cohesion': 0 psf Phi': 29 °
Name: Lower Clay (Drained) Model: Mohr-Coulomb Unit Weight: 130 pcf Cohesion': 3,700 psf Phi': 33 °
Name: Embankment Fill (Drained) Model: Mohr-Coulomb Unit Weight: 130 pcf Cohesion': 0 psf Phi': 31 °

Materials
- Upper Clay (Drained)
- Lower Clay (Drained)
- Embankment Fill (Drained)



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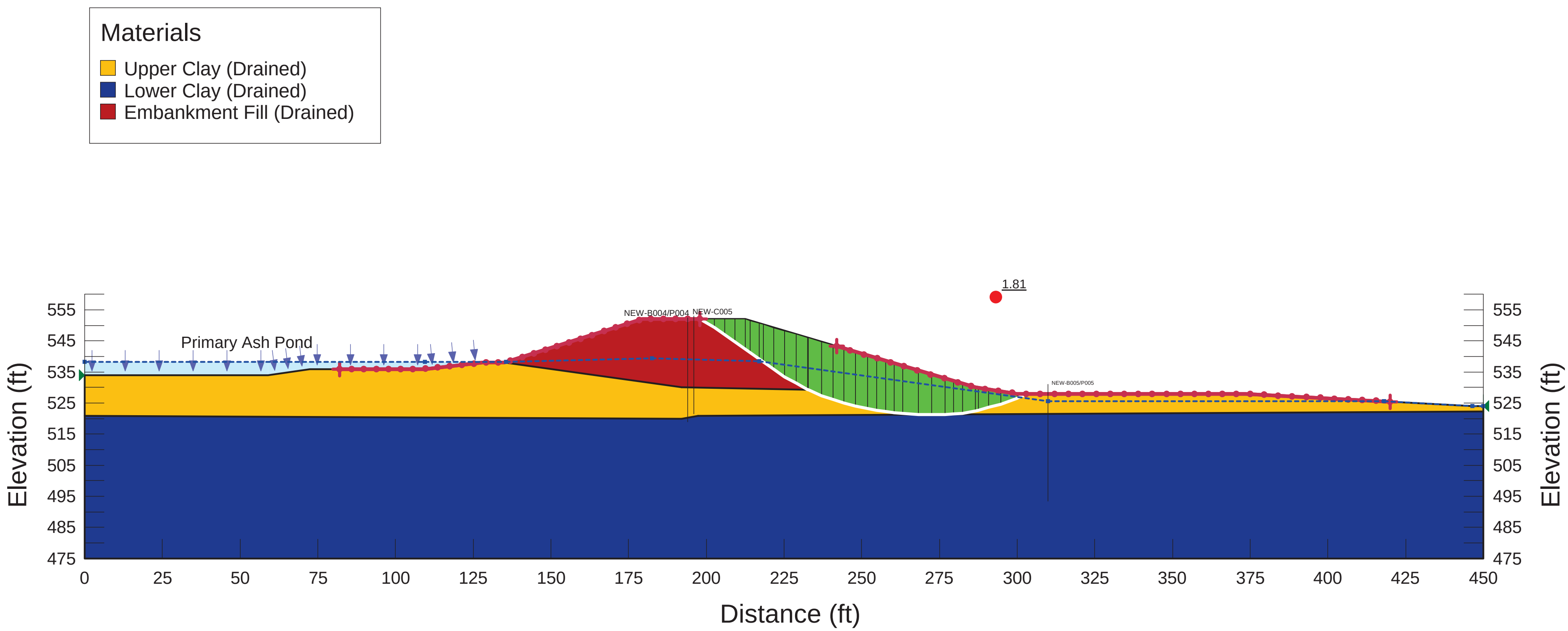
Project Name: Newton Primary Ash Pond Stability Analysis-Section H

Analysis: Surcharge (Drained)

Calculated By: ZJF Date: 5/23/16
Checked By: VMCh Date: 6/20/16
Modified By: PK Date:9/01/21
Checked By:ZJF Date: 9/08/21

Name: Upper Clay (Drained) Model: Mohr-Coulomb Unit Weight: 130 pcf Cohesion': 0 psf Phi': 29 °
Name: Lower Clay (Drained) Model: Mohr-Coulomb Unit Weight: 130 pcf Cohesion': 3,700 psf Phi': 33 °
Name: Embankment Fill (Drained) Model: Mohr-Coulomb Unit Weight: 130 pcf Cohesion': 0 psf Phi': 31 °



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Project Name: **Newton Primary Ash Pond Stability Analysis-Section H**

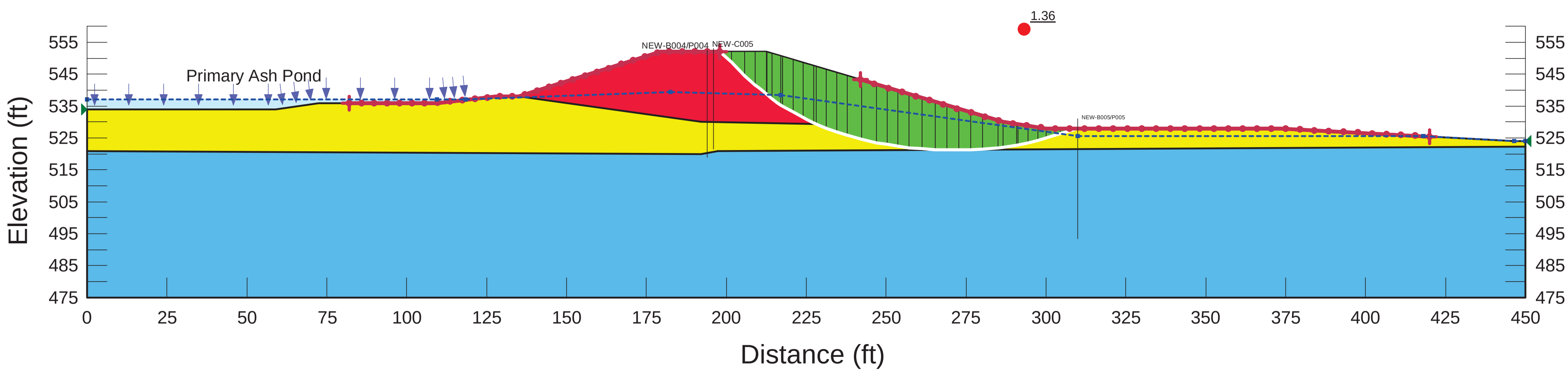
Analysis: Pseudostatic (Undrained)

Calculated By: ZJF Date: 5/23/16
Checked By: VMCh Date: 6/20/16
Modified By: PK Date:9/01/21
Checked By:ZJF Date: 9/08/21

Horizontal Seismic Coefficient = 0.153 g

Name: Upper Clay (Undrained) Model: Shear/Normal Fn. Unit Weight: 130 pcf Strength Function: Upper Clay (Undrained)
Name: Embankment Fill (Undrained) Model: Shear/Normal Fn. Unit Weight: 130 pcf Strength Function: Embankment Fill (Undrained)
Name: Lower Clay (Undrained) Model: Mohr-Coulomb Unit Weight: 130 pcf Cohesion': 5,000 psf Phi': 0 °

Materials
- Upper Clay (Undrained)
- Embankment Fill (Undrained)
- Lower Clay (Undrained)



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Project Name: **Newton Primary Ash Pond Stability Analysis-Section I**

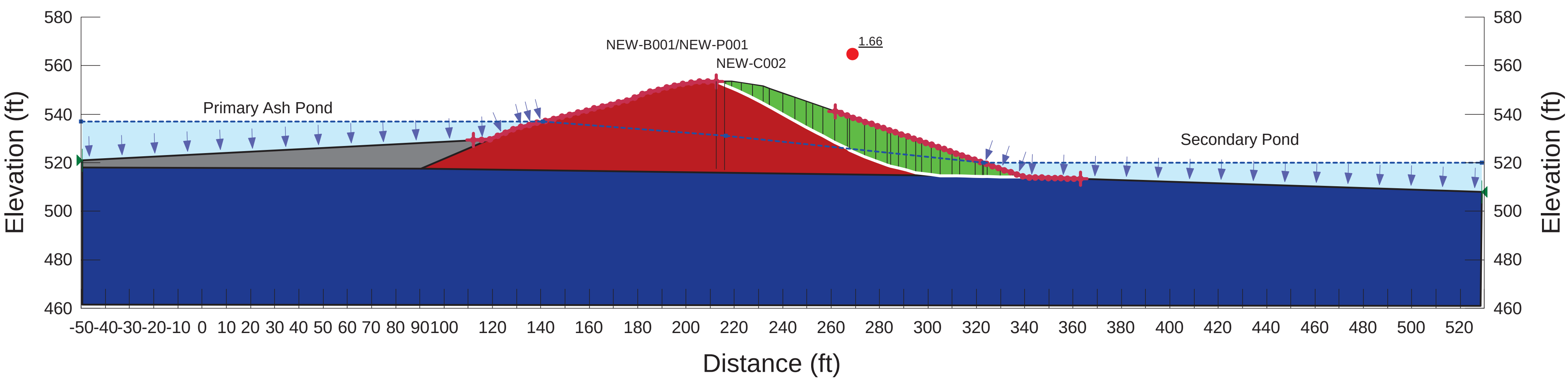
Analysis: Long Term (Drained)

Calculated By: NDS Date: 5/25/16
Checked By: VMCh Date: 6/20/16
Modified By: PK Date:9/01/21
Checked By:ZJF Date: 9/08/21

Name: Ash (Drained) Model: Mohr-Coulomb Unit Weight: 90 pcf Cohesion': 0 psf Phi': 30 °
Name: Lower Clay (Drained) Model: Mohr-Coulomb Unit Weight: 130 pcf Cohesion': 3,700 psf Phi': 33 °
Name: Embankment Fill (Drained) Model: Mohr-Coulomb Unit Weight: 130 pcf Cohesion': 0 psf Phi': 31 °

Materials

- Ash (Drained)
- Lower Clay (Drained)
- Embankment Fill (Drained)



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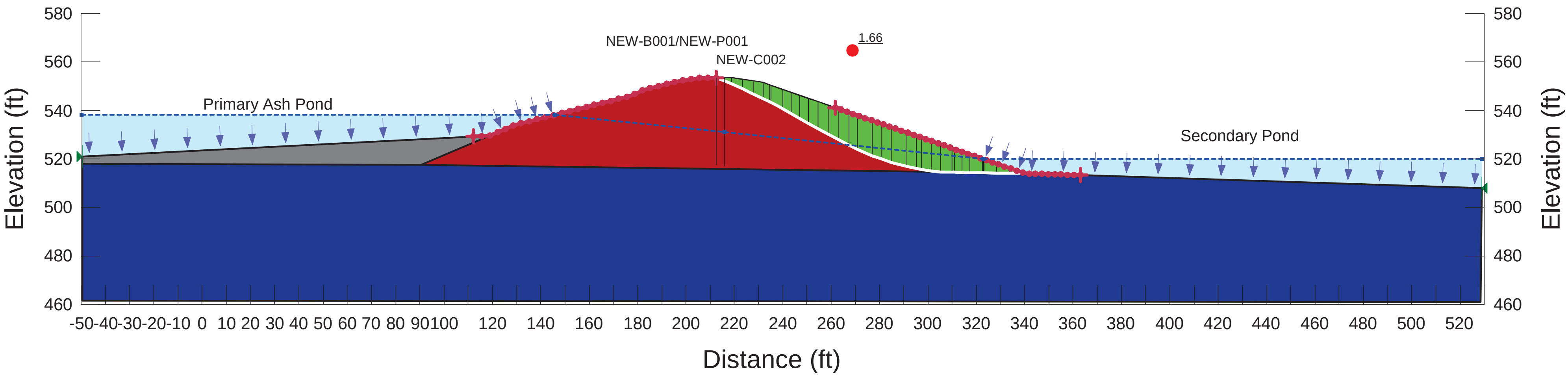
Project Name: **Newton Primary Ash Pond Stability Analysis-Section I**

Analysis: Surcharge (Drained)

Calculated By: NDS Date: 5/25/16
Checked By: VMCh Date: 6/20/16
Modified By: PK Date:9/01/21
Checked By:ZJF Date: 9/08/21

Name: Ash (Drained) Model: Mohr-Coulomb Unit Weight: 90 pcf Cohesion': 0 psf Phi': 30 °
Name: Lower Clay (Drained) Model: Mohr-Coulomb Unit Weight: 130 pcf Cohesion': 3,700 psf Phi': 33 °
Name: Embankment Fill (Drained) Model: Mohr-Coulomb Unit Weight: 130 pcf Cohesion': 0 psf Phi': 31 °

Materials
- Ash (Drained)
- Lower Clay (Drained)
- Embankment Fill (Drained)



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Electronic Filing: Received, Clerk's Office 03/26/2024

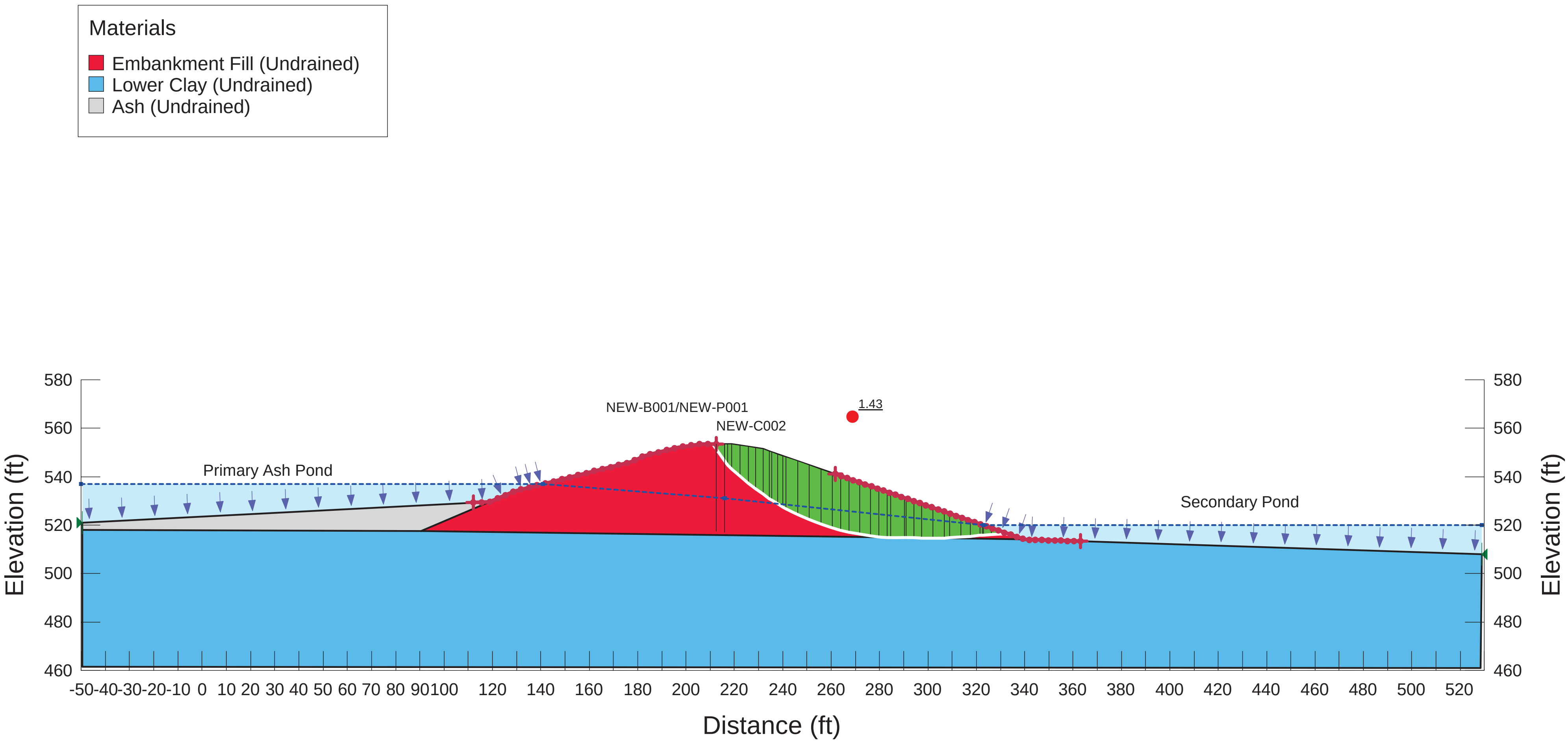
Project Name: Newton Primary Ash Pond Stability Analysis-Section I

Calculated By: NDS Date: 5/25/16
Checked By: VMCh Date: 6/20/16
Modified By: PK Date:9/01/21
Checked By:ZJF Date: 9/08/21

Analysis: Pseudostatic (Undrained)

Horizontal Seismic Coefficient = 0.153 g

Name: Embankment Fill (Undrained) Model: Shear/Normal Fn. Unit Weight: 130 pcf Strength Function: Embankment Fill (Undrained)
Name: Lower Clay (Undrained) Model: Mohr-Coulomb Unit Weight: 130 pcf Cohesion': 5,000 psf Phi': 0 °
Name: Ash (Undrained) Model: S=f(overburden) Unit Weight: 90 pcf Tau/Sigma Ratio: 0.05 Minimum Strength: 0 psf



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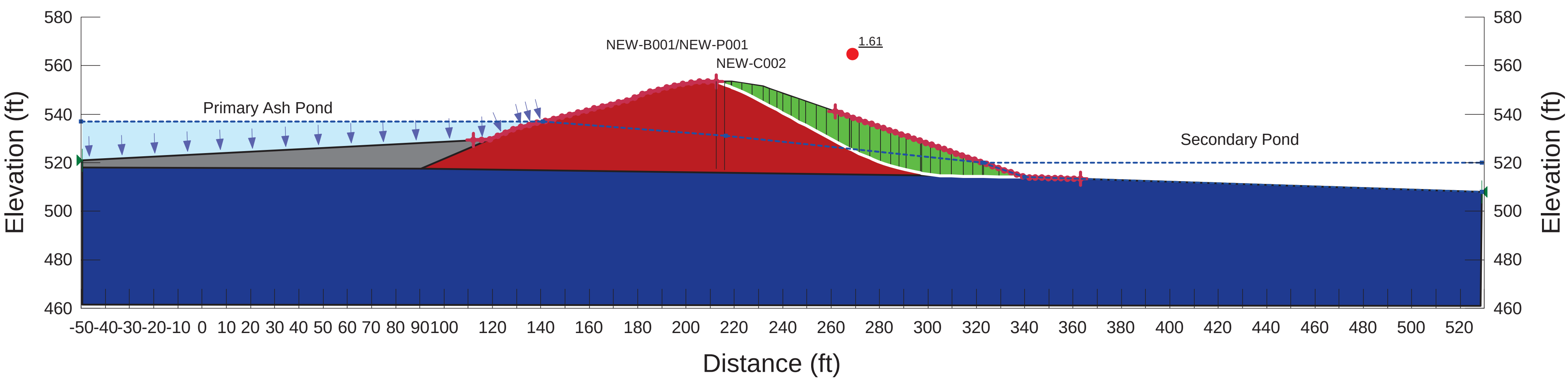
Project Name: Newton Primary Ash Pond Stability Analysis-Section I

Analysis: Sudden Drawdown

Calculated By: NDS Date: 5/25/16
Checked By: VMCh Date: 6/20/16
Modified By: PK Date:9/01/21
Checked By:ZJF Date: 9/08/21

Name: Ash (Drained) Model: Mohr-Coulomb Unit Weight: 90 pcf Cohesion': 0 psf Phi': 30 ° Cohesion R: 0 psf Phi R: 0 ° Piezometric Line After Drawdown: 2
Name: Lower Clay (Drained) Model: Mohr-Coulomb Unit Weight: 130 pcf Cohesion': 3,700 psf Phi': 33 ° Cohesion R: 0 psf Phi R: 0 ° Piezometric Line After Drawdown: 2
Name: Embankment Fill (Drained) Model: Mohr-Coulomb Unit Weight: 130 pcf Cohesion': 0 psf Phi': 31 ° Cohesion R: 500 psf Phi R: 22 ° Piezometric Line After Drawdown: 2

Materials
- Ash (Drained)
- Lower Clay (Drained)
- Embankment Fill (Drained)



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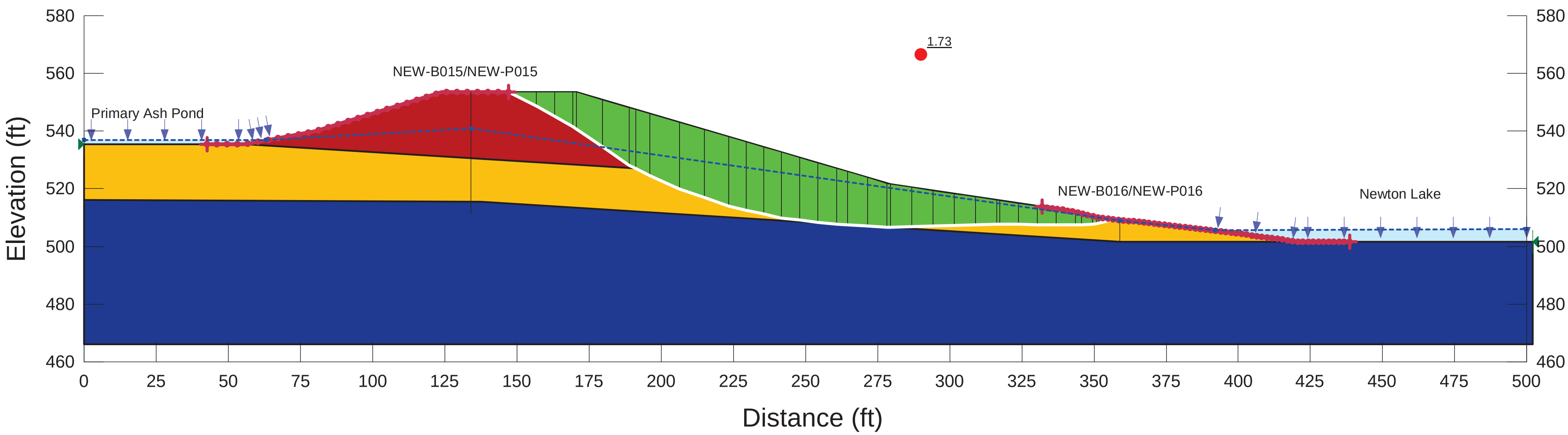
Project Name: Newton Primary Ash Pond Stability Analysis-Section K

Analysis: Long Term (Drained)

Calculated By: NDS Date: 5/31/16
Checked By: VMCh Date: 6/20/16
Modified By: PK Date:9/01/21
Checked By:ZJF Date: 9/08/21

Name: Upper Clay (Drained) Model: Mohr-Coulomb Unit Weight: 130 pcf Cohesion': 0 psf Phi': 29 °
Name: Lower Clay (Drained) Model: Mohr-Coulomb Unit Weight: 130 pcf Cohesion': 3,700 psf Phi': 33 °
Name: Embankment Fill (Drained) Model: Mohr-Coulomb Unit Weight: 130 pcf Cohesion': 0 psf Phi': 31 °

Materials
- Upper Clay (Drained)
- Lower Clay (Drained)
- Embankment Fill (Drained)



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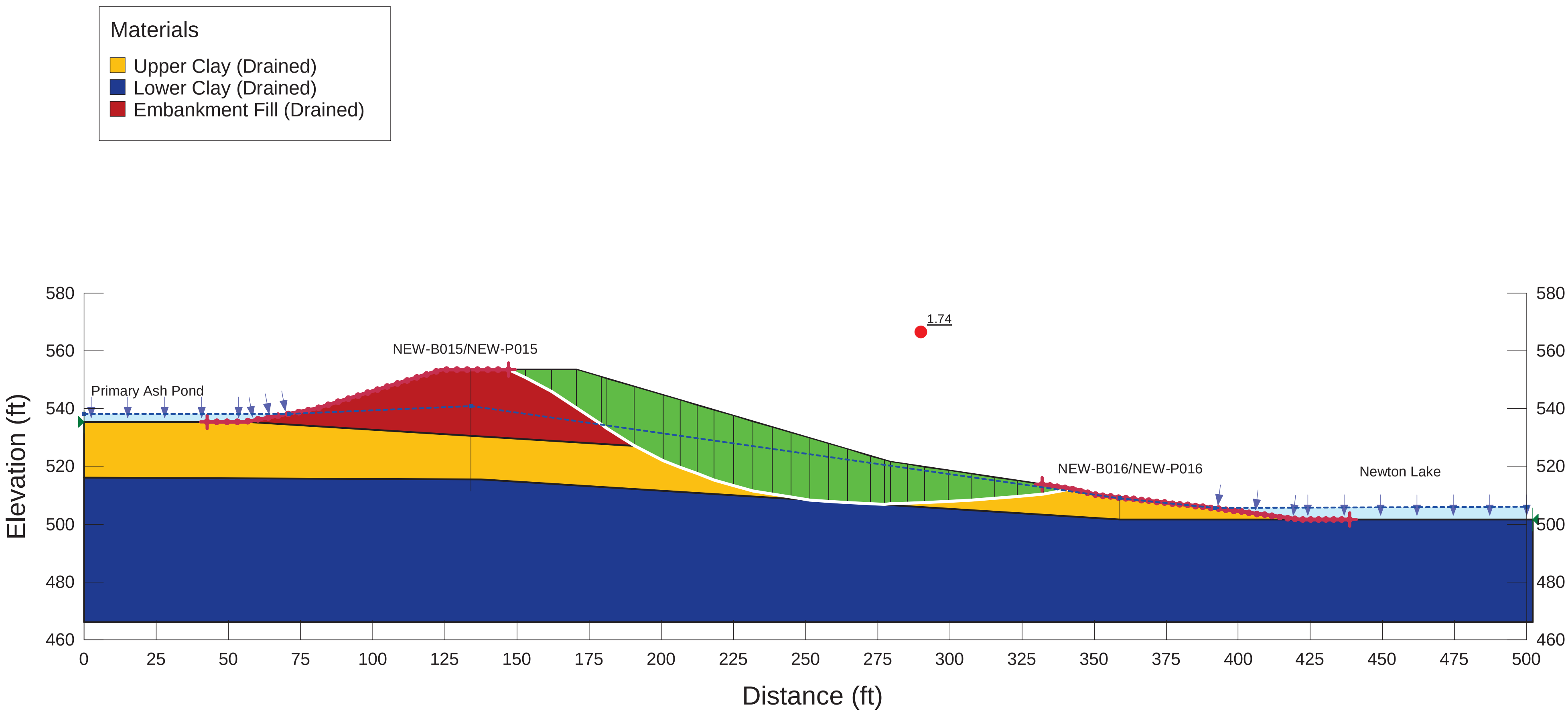
Project Name: Newton Primary Ash Pond Stability Analysis-Section K

Analysis: Surcharge (Drained)

Calculated By: NDS Date: 5/31/16
Checked By: VMCh Date: 6/20/16
Modified By: PK Date:9/01/21
Checked By:ZJF Date: 9/08/21

Name: Upper Clay (Drained) Model: Mohr-Coulomb Unit Weight: 130 pcf Cohesion': 0 psf Phi': 29 °
Name: Lower Clay (Drained) Model: Mohr-Coulomb Unit Weight: 130 pcf Cohesion': 3,700 psf Phi': 33 °
Name: Embankment Fill (Drained) Model: Mohr-Coulomb Unit Weight: 130 pcf Cohesion': 0 psf Phi': 31 °



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R001561

Project Name: Newton Primary Ash Pond Stability Analysis-Section K

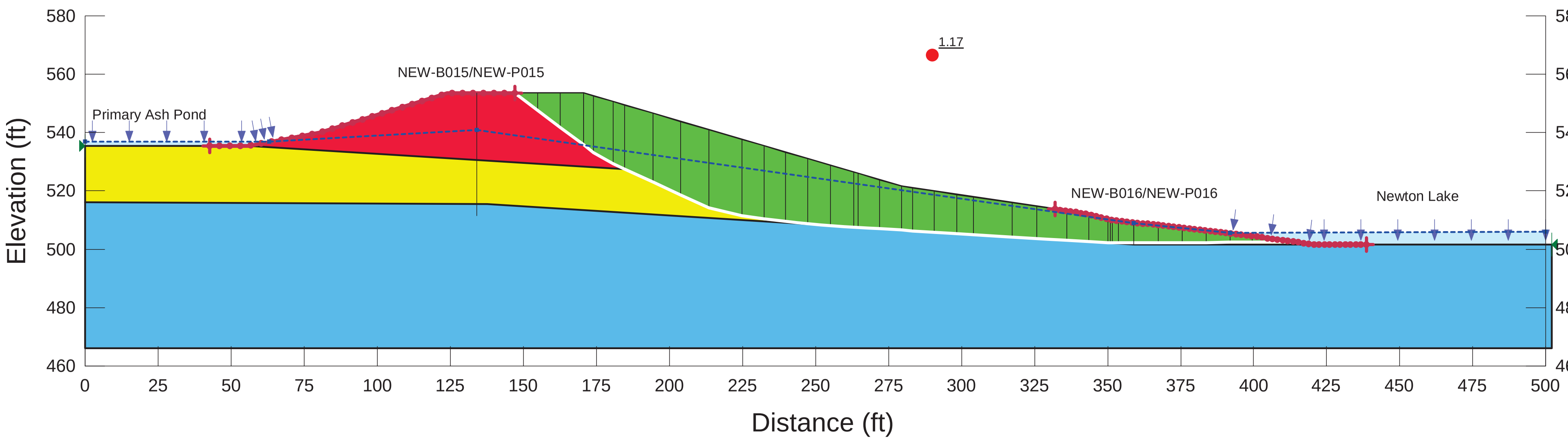
Analysis: Pseudostatic (Undrained)

Calculated By: NDS Date: 5/31/16
Checked By: VMCh Date: 6/20/16
Modified By: PK Date:9/01/21
Checked By:ZJF Date: 9/08/21

Horizontal Seismic Coefficient = 0.153 g

Name: Upper Clay (Undrained) Model: Shear/Normal Fn. Unit Weight: 130 pcf Strength Function: Upper Clay (Undrained)
Name: Embankment Fill (Undrained) Model: Shear/Normal Fn. Unit Weight: 130 pcf Strength Function: Embankment Fill (Undrained)
Name: Lower Clay (Undrained) Model: Undrained (Phi=0) Unit Weight: 130 pcf Cohesion': 5,000 psf

Materials
- Upper Clay (Undrained)
- Embankment Fill (Undrained)
- Lower Clay (Undrained)



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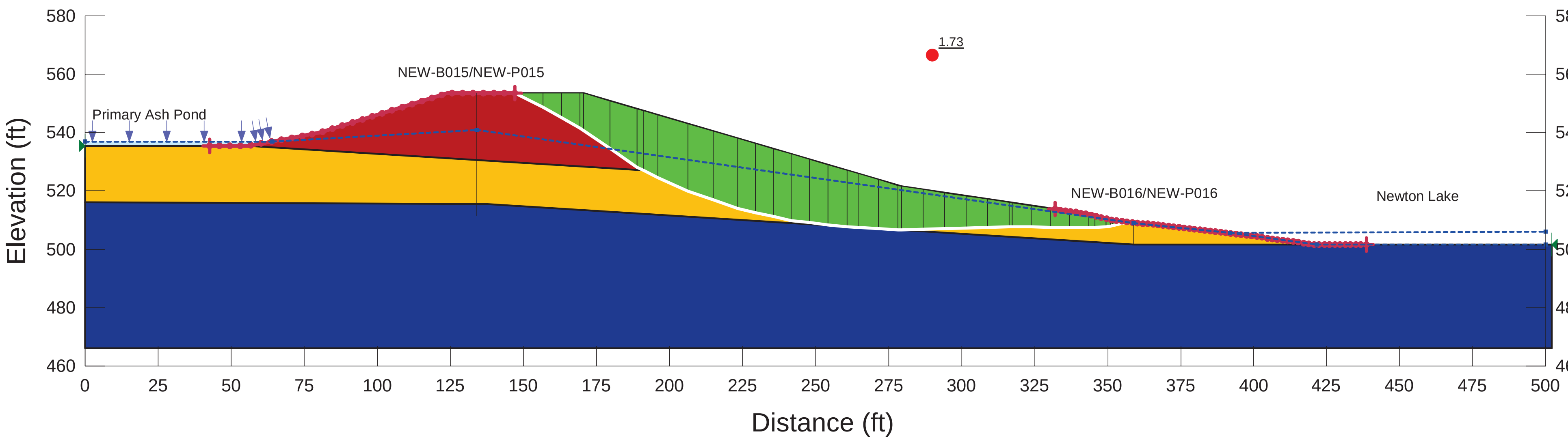
Project Name: Newton Primary Ash Pond Stability Analysis-Section K

Analysis: Sudden Drawdown

Calculated By: NDS Date: 5/31/16
Checked By: VMCh Date: 6/20/16
Modified By: PK Date:9/01/21
Checked By:ZJF Date: 9/08/21

Name: Upper Clay (Drained) Model: Mohr-Coulomb Unit Weight: 130 pcf Cohesion': 0 psf Phi': 29 ° Cohesion R: 470 psf Phi R: 22 ° Piezometric Line After Drawdown: 2
Name: Lower Clay (Drained) Model: Mohr-Coulomb Unit Weight: 130 pcf Cohesion': 3,700 psf Phi': 33 ° Cohesion R: 0 psf Phi R: 0 ° Piezometric Line After Drawdown: 2
Name: Embankment Fill (Drained) Model: Mohr-Coulomb Unit Weight: 130 pcf Cohesion': 0 psf Phi': 31 ° Cohesion R: 500 psf Phi R: 22 ° Piezometric Line After Drawdown: 2

Materials
- Upper Clay (Drained)
- Lower Clay (Drained)
- Embankment Fill (Drained)



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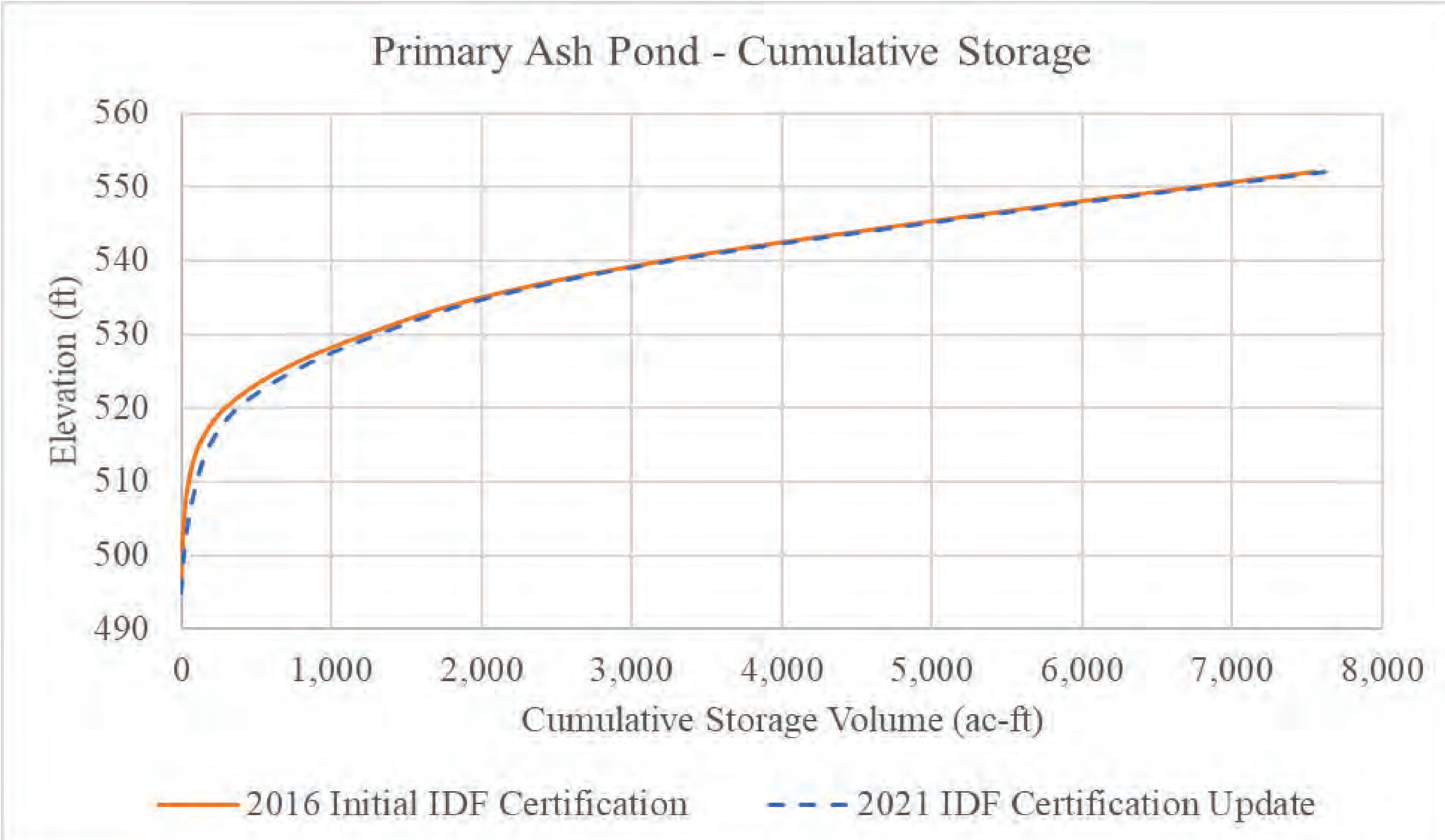
Attachment E

Periodic Inflow Design Flood Control System Plan Analyses

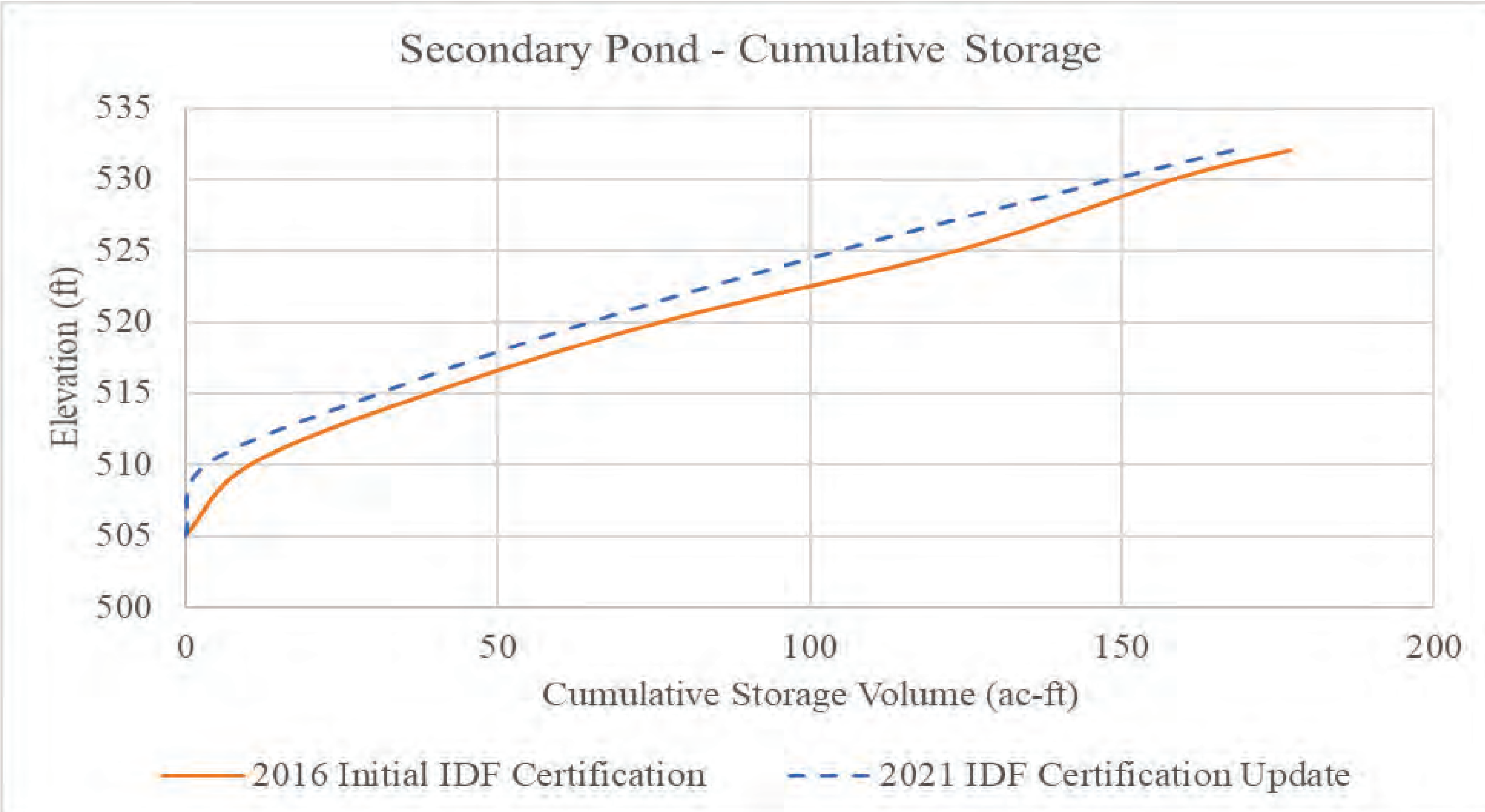


PRIMARY ASH POND CUMULATIVE STORAGE
PERIODIC CERTIFICATION
NEWTON POWER PLANT
NEWTON, ILLINOIS

Geosyntec consultants

Figure E-1

GLP8027 | 9/10/2021

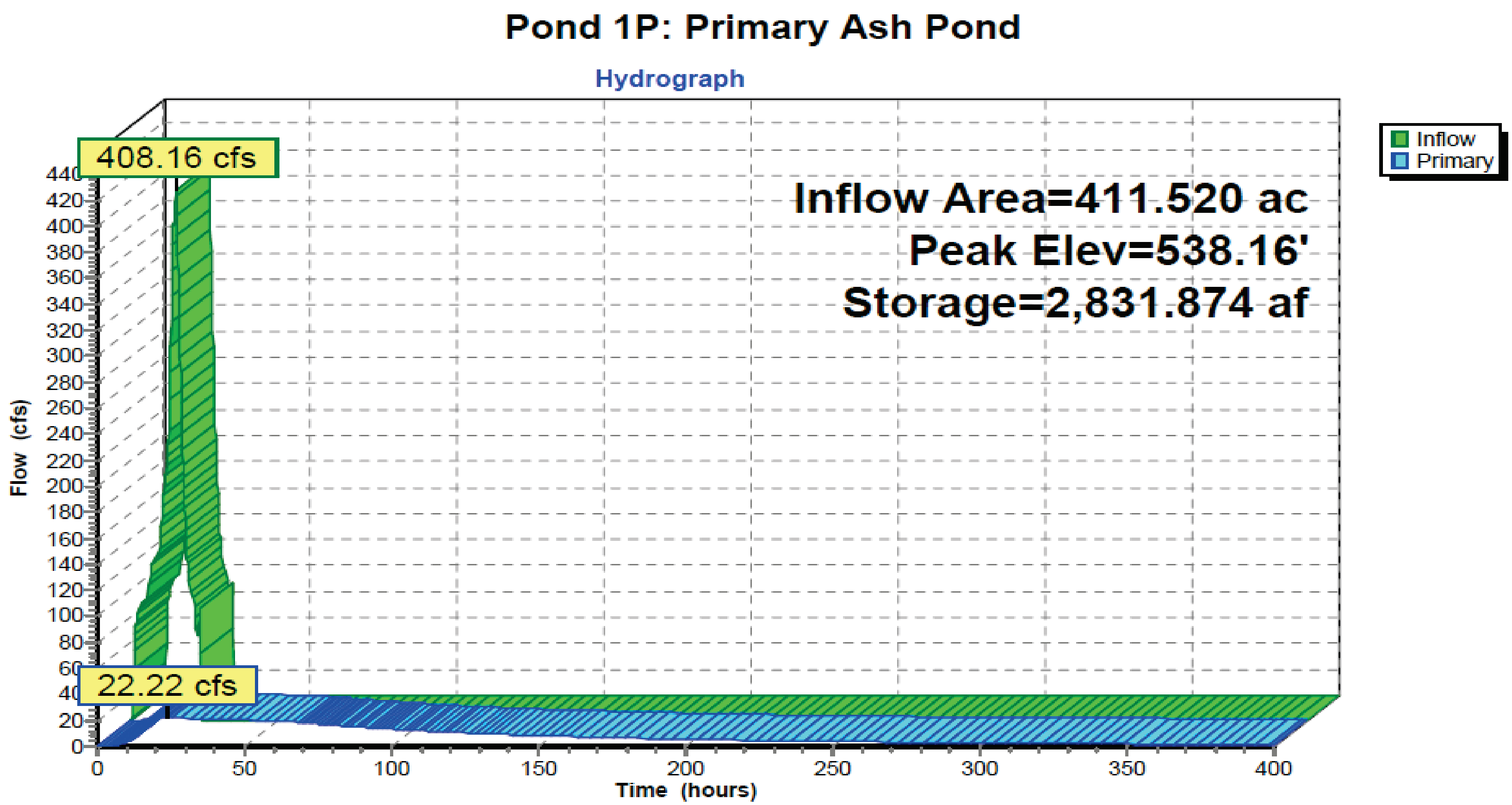


SECONDARY POND CUMULATIVE STORAGE
PERIODIC CERTIFICATION
NEWTON POWER PLANT
NEWTON, ILLINOIS

Geosyntec consultants

Figure E-2

GLP8027 | 9/10/2021



AP1 IDF HYDROGRAPH PERIODIC CERTIFICATION NEWTON POWER PLANT NEWTON, ILLINOIS		
Geosyntec consultants		Figure E-3
GLP8027	9/10/2021	

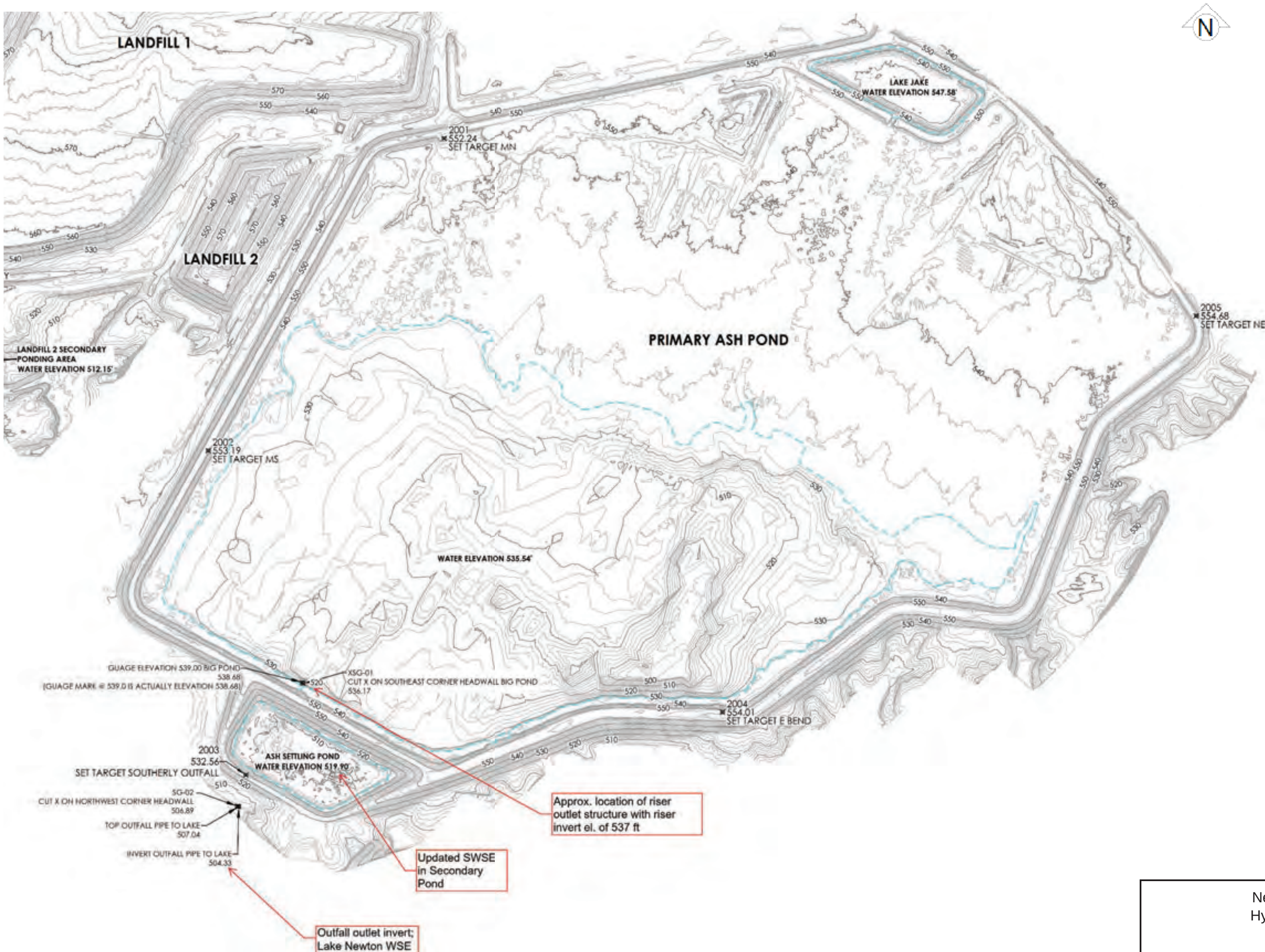
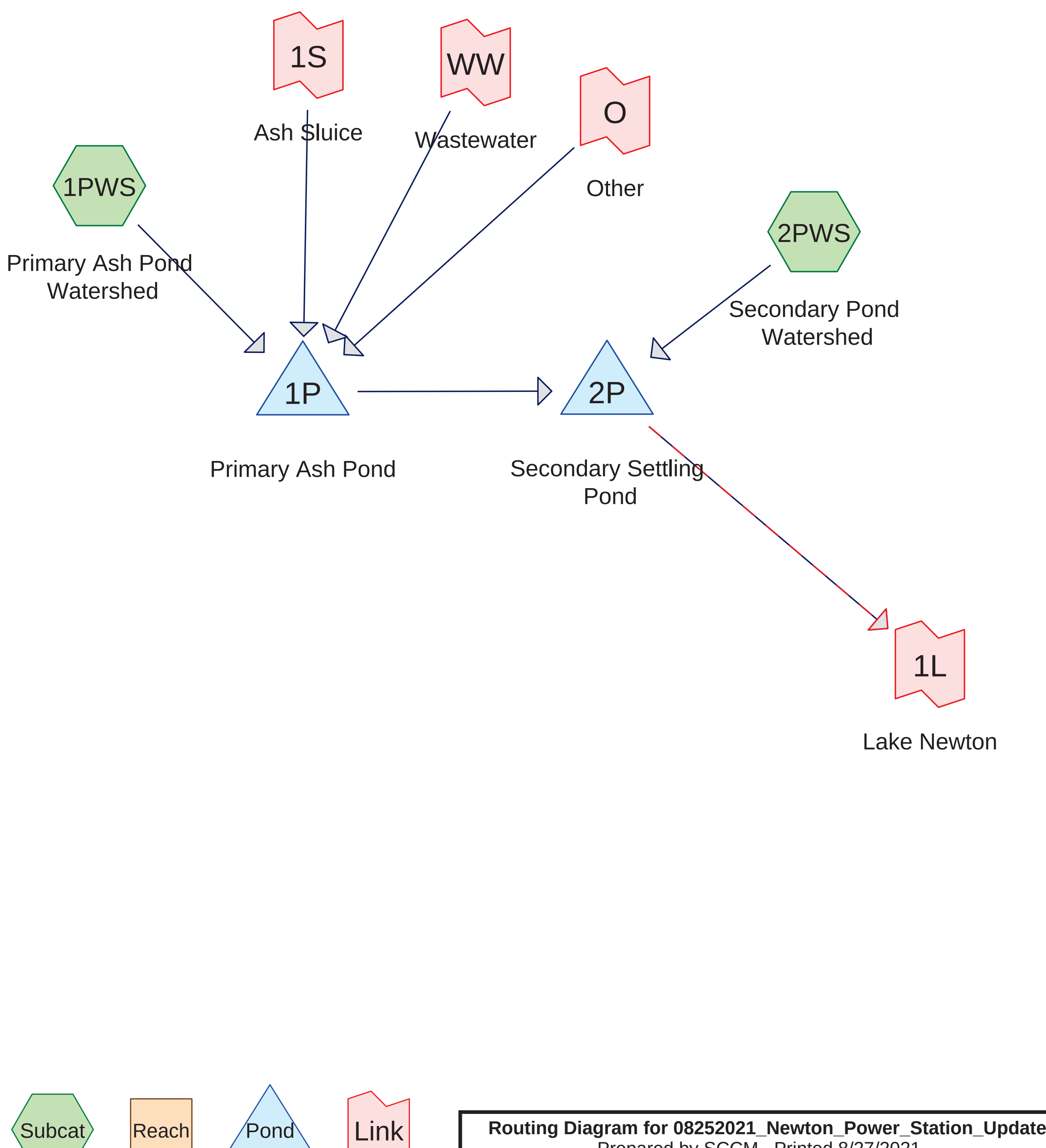


Figure based on IngenAE 2020 Site Topo

DRAFT - NOT FOR CONSTRUCTION - NOT TO SCALE - ATTORNEY-CLIENT PRIVILEGED & CONFIDENTIAL

Newton Power Plant Hydrologic Workmap		
Geosyntec consultants		Figure
GLP8027	September 2021	E-4



Routing Diagram for 08252021_Newton_Power_Station_Update
Prepared by SCCM, Printed 8/27/2021
HydroCAD® 10.00-26 s/n 07657 © 2020 HydroCAD Software Solutions LLC

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
423.520	98	(1PWS, 2PWS)
423.520	**98**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
0.000	HSG C	
0.000	HSG D	
423.520	Other	1PWS, 2PWS
423.520		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.000	0.000	0.000	423.520	423.520		1PWS, 2PWS
0.000	**0.000**	**0.000**	**0.000**	**423.520**	**423.520**	**TOTAL AREA**	

Pipe Listing (all nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Diam/Width (inches)	Height (inches)	Inside-Fill (inches)
1	1P	512.18	508.00	220.0	0.0190	0.013	28.0	0.0	0.0
2	2P	505.00	504.33	226.0	0.0030	0.013	28.0	0.0	0.0

Time span=0.00-400.00 hrs, dt=0.15 hrs, 2668 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 1PWS: Primary Ash Runoff Area=411.520 ac 100.00% Impervious Runoff Depth=8.77"
Tc=6.0 min CN=98 Runoff=408.16 cfs 300.740 af

Subcatchment 2PWS: Secondary Pond Runoff Area=12.000 ac 100.00% Impervious Runoff Depth=8.77"
Tc=6.0 min CN=98 Runoff=11.90 cfs 8.770 af

Pond 1P: Primary Ash Pond Peak Elev=538.16' Storage=2,831.874 af Inflow=408.16 cfs 300.740 af
Outflow=22.22 cfs 260.432 af

Pond 2P: Secondary Settling Pond Peak Elev=519.90' Storage=64.320 af Inflow=28.79 cfs 269.202 af
Primary=61.56 cfs 333.516 af Secondary=0.00 cfs 0.000 af Outflow=61.56 cfs 333.516 af

Link 1L: Lake Newton Inflow=61.56 cfs 333.516 af
Primary=61.56 cfs 333.516 af

Link 1S: Ash Sluice Manual Hydrograph above 13.37 cfs below 13.37 cfs Inflow=13.37 cfs 171.338 af
Primary=0.00 cfs 0.000 af Secondary=13.37 cfs 171.338 af

Link O: Other Manual Hydrograph above 1.54 cfs below 1.54 cfs Inflow=1.54 cfs 50.935 af
Primary=0.00 cfs 0.000 af Secondary=1.54 cfs 50.935 af

Link WW: Wastewater Manual Hydrograph above 23.39 cfs below 23.39 cfs Inflow=23.39 cfs 201.231 af
Primary=0.00 cfs 0.000 af Secondary=23.39 cfs 201.231 af

Total Runoff Area = 423.520 ac Runoff Volume = 309.510 af Average Runoff Depth = 8.77"
0.00% Pervious = 0.000 ac 100.00% Impervious = 423.520 ac

Summary for Subcatchment 1PWS: Primary Ash Pond Watershed

[49] Hint: Tc<2dt may require smaller dt

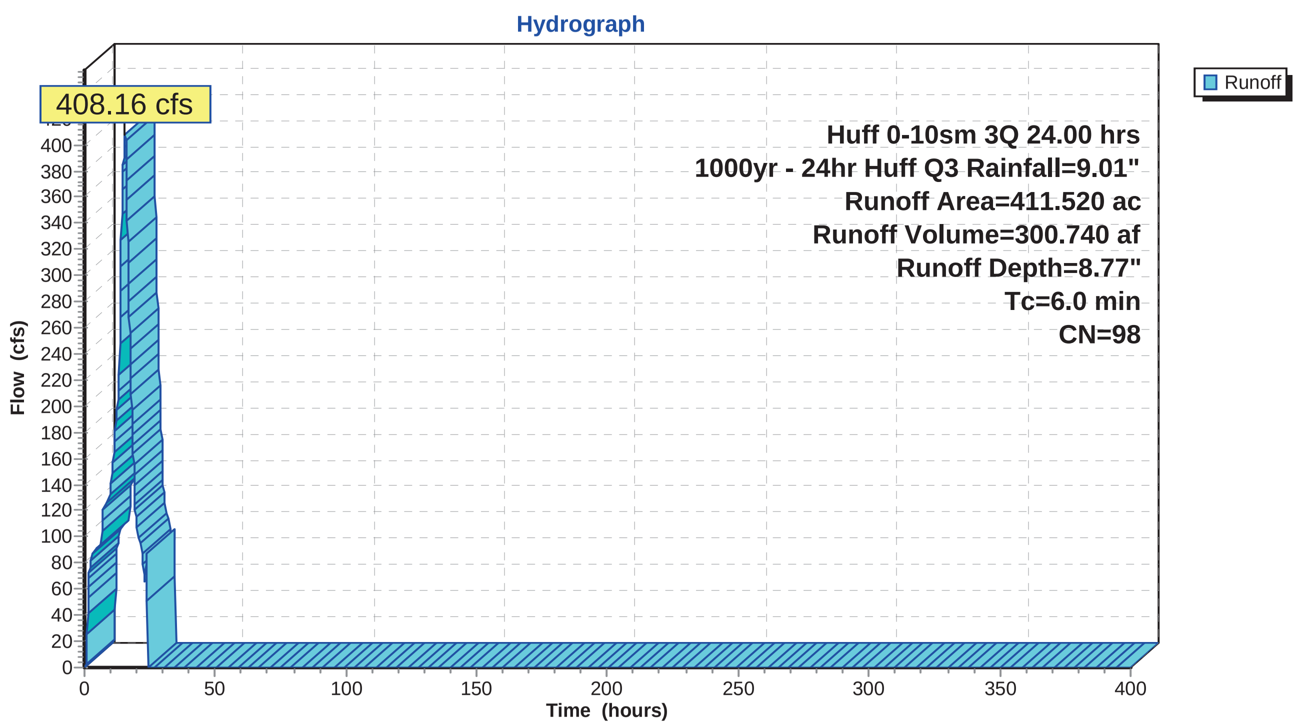
Runoff = 408.16 cfs @ 15.60 hrs, Volume= 300.740 af, Depth= 8.77"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-400.05 hrs, dt= 0.15 hrs
Huff 0-10sm 3Q 24.00 hrs 1000yr - 24hr Huff Q3 Rainfall=9.01"

	Area (ac)	CN	Description
*	411.520	98	
	411.520		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 1PWS: Primary Ash Pond Watershed



Summary for Subcatchment 2PWS: Secondary Pond Watershed

[49] Hint: Tc<2dt may require smaller dt

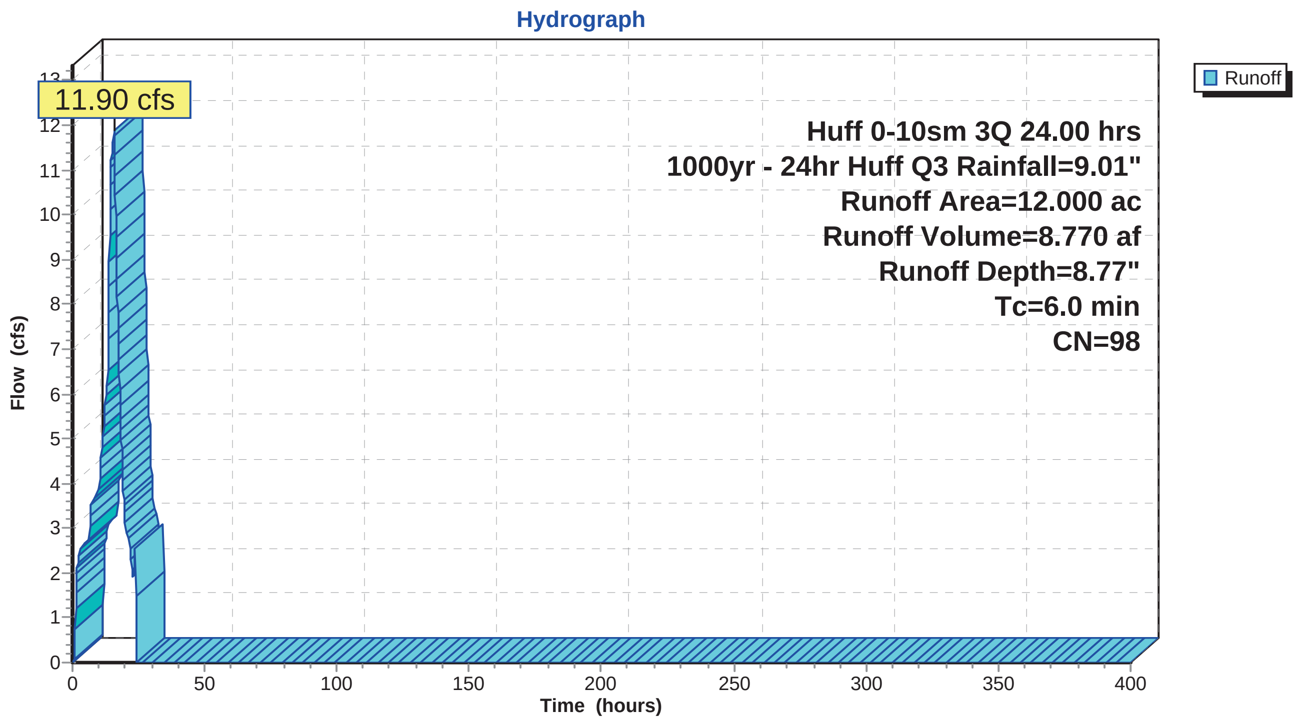
Runoff = 11.90 cfs @ 15.60 hrs, Volume= 8.770 af, Depth= 8.77"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-400.05 hrs, dt= 0.15 hrs
Huff 0-10sm 3Q 24.00 hrs 1000yr - 24hr Huff Q3 Rainfall=9.01"

	Area (ac)	CN	Description
*	12.000	98	
	12.000		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					**Direct Entry,**

Subcatchment 2PWS: Secondary Pond Watershed



Summary for Pond 1P: Primary Ash Pond

Inflow Area = 411.520 ac,100.00% Impervious, Inflow Depth = 8.77" for 1000yr - 24hr Huff Q3 event
Inflow = 408.16 cfs @ 15.60 hrs, Volume= 300.740 af
Outflow = 22.22 cfs @ 24.18 hrs, Volume= 260.432 af, Atten= 95%, Lag= 514.8 min
Primary = 22.22 cfs @ 24.18 hrs, Volume= 260.432 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-400.05 hrs, dt= 0.15 hrs
Starting Elev= 537.00' Surf.Area= 0.000 ac Storage= 2,550.800 af
Peak Elev= 538.16' @ 24.18 hrs Surf.Area= 0.000 ac Storage= 2,831.874 af (281.074 af above start)

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= 6,560.9 min (7,370.8 - 809.8)

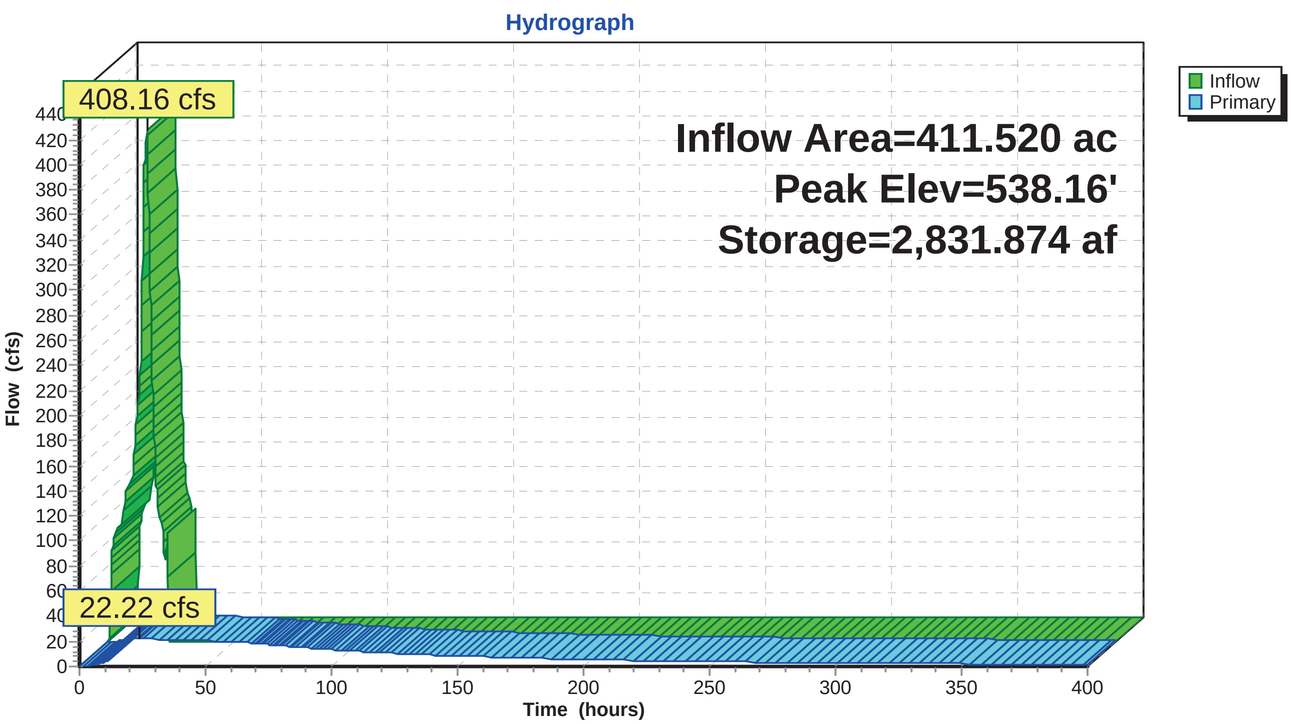
Volume	Invert	Avail.Storage	Storage Description
#1	495.00'	7,623.000 af	**Custom Stage Data** Listed below

Elevation (feet)	Cum.Store (acre-feet)
495.00	0.000
500.00	18.000
505.00	51.000
510.00	104.000
515.00	192.000
520.00	377.000
525.00	752.000
530.00	1,312.000
535.00	2,068.000
540.00	3,275.000
545.00	4,965.000
550.00	6,842.000
551.00	7,231.000
552.00	7,623.000

Device	Routing	Invert	Outlet Devices
#1	Primary	512.18'	**28.0" Round Culvert** L= 220.0' Ke= 0.820 Inlet / Outlet Invert= 512.18' / 508.00' S= 0.0190 '/' Cc= 0.900 n= 0.013, Flow Area= 4.28 sf
#2	Device 1	537.00'	**28.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=22.22 cfs @ 24.18 hrs HW=538.16' TW=510.37' (Dynamic Tailwater)
└─**1=Culvert** (Passes 22.22 cfs of 84.54 cfs potential flow)
  └─**2=Orifice/Grate** (Orifice Controls 22.22 cfs @ 5.20 fps)

Pond 1P: Primary Ash Pond



Summary for Pond 2P: Secondary Settling Pond

Inflow Area = 423.520 ac,100.00% Impervious, Inflow Depth > 7.63" for 1000yr - 24hr Huff Q3 event
Inflow = 28.79 cfs @ 16.35 hrs, Volume= 269.202 af
Outflow = 61.56 cfs @ 0.00 hrs, Volume= 333.516 af, Atten= 0%, Lag= 0.0 min
Primary = 61.56 cfs @ 0.00 hrs, Volume= 333.516 af
Secondary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-400.05 hrs, dt= 0.15 hrs
Starting Elev= 519.90' Surf.Area= 0.000 ac Storage= 64.320 af
Peak Elev= 519.90' @ 0.00 hrs Surf.Area= 0.000 ac Storage= 64.320 af

Plug-Flow detention time= 67.0 min calculated for 269.095 af (100% of inflow)
Center-of-Mass det. time= (not calculated: outflow precedes inflow)

Volume	Invert	Avail.Storage	Storage Description
#1	505.00'	168.000 af	**Custom Stage Data** Listed below

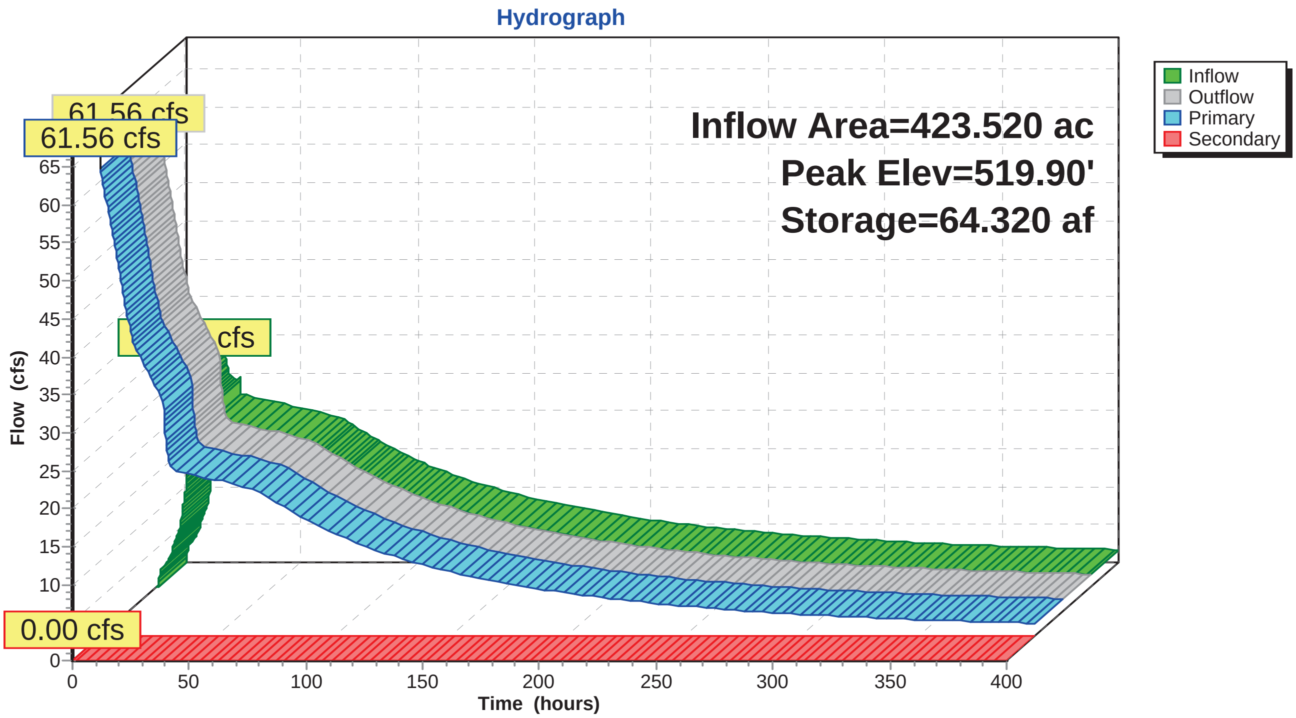
Elevation (feet)	Cum.Store (acre-feet)
505.00	0.000
510.00	3.000
515.00	31.000
520.00	65.000
525.00	105.000
530.00	149.000
531.00	158.000
532.00	168.000

Device	Routing	Invert	Outlet Devices
#1	Primary	505.00'	**28.0" Round Culvert** L= 226.0' Ke= 0.820 Inlet / Outlet Invert= 505.00' / 504.33' S= 0.0030 '/' Cc= 0.900 n= 0.013, Flow Area= 4.28 sf
#2	Secondary	528.50'	**5.0' long Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 Coef. (English) 2.65 2.65 2.65 2.65 2.65 2.65 2.65 2.65 2.65

Primary OutFlow Max=61.56 cfs @ 0.00 hrs HW=519.90' TW=504.33' (Dynamic Tailwater)
└─**1=Culvert** (Barrel Controls 61.56 cfs @ 14.40 fps)

Secondary OutFlow Max=0.00 cfs @ 0.00 hrs HW=519.90' TW=504.33' (Dynamic Tailwater)
└─**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Pond 2P: Secondary Settling Pond



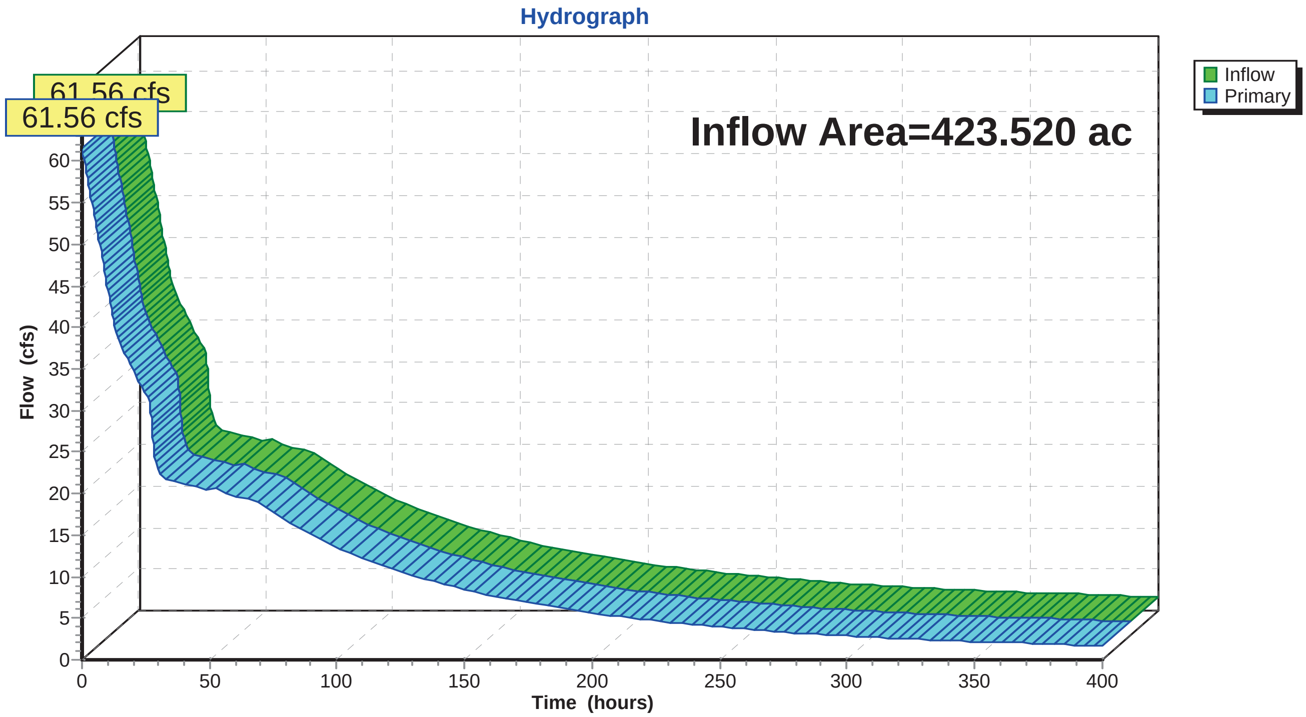
Summary for Link 1L: Lake Newton

Inflow Area = 423.520 ac,100.00% Impervious, Inflow Depth > 9.45" for 1000yr - 24hr Huff Q3 event
Inflow = 61.56 cfs @ 0.00 hrs, Volume= 333.516 af
Primary = 61.56 cfs @ 0.00 hrs, Volume= 333.516 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-400.05 hrs, dt= 0.15 hrs

Fixed water surface Elevation= 504.33'

Link 1L: Lake Newton



Summary for Link 1S: Ash Sluice

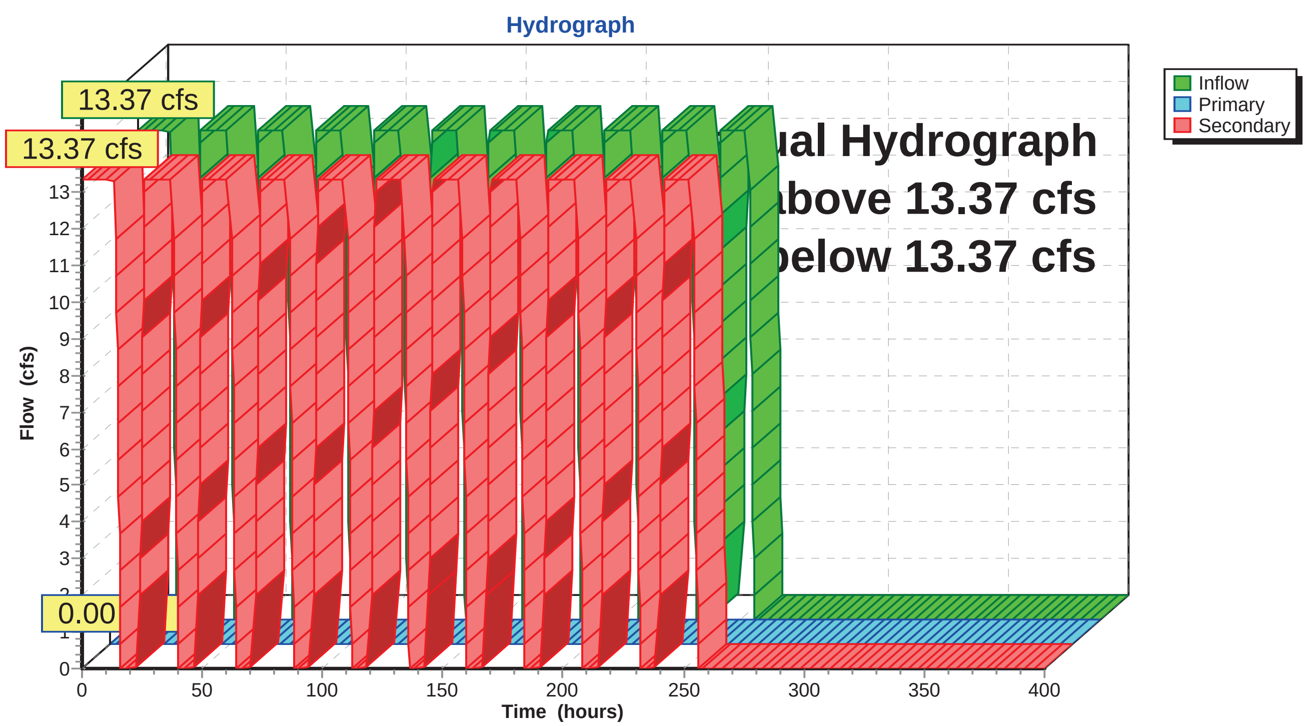
Inflow = 13.37 cfs @ 0.00 hrs, Volume= 171.338 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Secondary = 13.37 cfs @ 0.00 hrs, Volume= 171.338 af

Primary outflow = Inflow above 13.37 cfs below 13.37 cfs, Time Span= 0.00-400.05 hrs, dt= 0.15 hrs

132 Point manual hydrograph, To= 0.00 hrs, dt= 2.00 hrs, cfs =

13.37	13.37	13.37	13.37	13.37	13.37	13.37	13.37	0.00	0.00
0.00	0.00	0.00	13.37	13.37	13.37	13.37	13.37	13.37	13.37
0.00	0.00	0.00	0.00	0.00	13.37	13.37	13.37	13.37	13.37
13.37	13.37	0.00	0.00	0.00	0.00	0.00	13.37	13.37	13.37
13.37	13.37	13.37	13.37	0.00	0.00	0.00	0.00	0.00	13.37
13.37	13.37	13.37	13.37	13.37	13.37	0.00	0.00	0.00	0.00
0.00	13.37	13.37	13.37	13.37	13.37	13.37	13.37	0.00	0.00
0.00	0.00	0.00	13.37	13.37	13.37	13.37	13.37	13.37	13.37
0.00	0.00	0.00	0.00	0.00	13.37	13.37	13.37	13.37	13.37
13.37	13.37	0.00	0.00	0.00	0.00	0.00	13.37	13.37	13.37
13.37	13.37	13.37	13.37	0.00	0.00	0.00	0.00	0.00	13.37
13.37	13.37	13.37	13.37	13.37	13.37	0.00	0.00	0.00	0.00
0.00	13.37	13.37	13.37	13.37	13.37	13.37	13.37	0.00	0.00
0.00	0.00								

Link 1S: Ash Sluice



Summary for Link O: Other

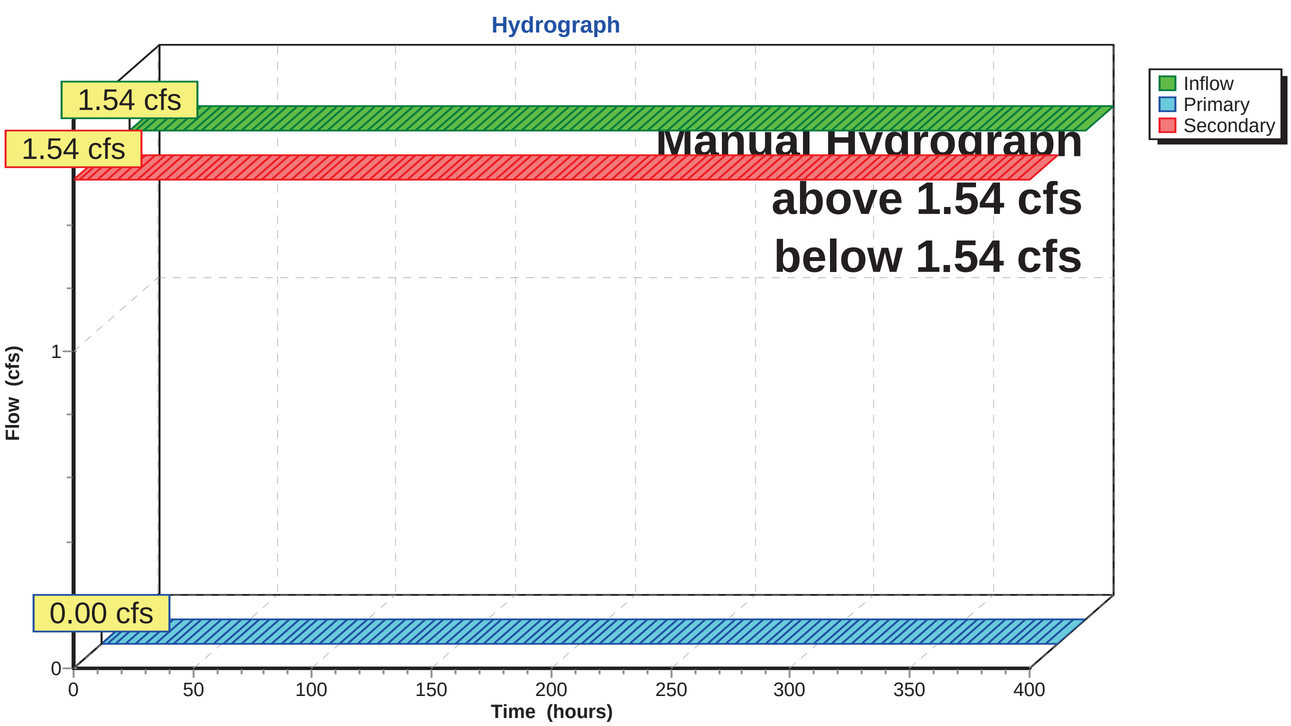
Inflow = 1.54 cfs @ 0.00 hrs, Volume= 50.935 af
Primary = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Secondary = 1.54 cfs @ 0.00 hrs, Volume= 50.935 af

Primary outflow = Inflow above 1.54 cfs below 1.54 cfs, Time Span= 0.00-400.05 hrs, dt= 0.15 hrs

126 Point manual hydrograph, To= 0.00 hrs, dt= 5.00 hrs, cfs =

1.54	1.54	1.54	1.54	1.54	1.54	1.54	1.54	1.54	1.54
1.54	1.54	1.54	1.54	1.54	1.54	1.54	1.54	1.54	1.54
1.54	1.54	1.54	1.54	1.54	1.54	1.54	1.54	1.54	1.54
1.54	1.54	1.54	1.54	1.54	1.54	1.54	1.54	1.54	1.54
1.54	1.54	1.54	1.54	1.54	1.54	1.54	1.54	1.54	1.54
1.54	1.54	1.54	1.54	1.54	1.54	1.54	1.54	1.54	1.54
1.54	1.54	1.54	1.54	1.54	1.54	1.54	1.54	1.54	1.54
1.54	1.54	1.54	1.54	1.54	1.54	1.54	1.54	1.54	1.54
1.54	1.54	1.54	1.54	1.54	1.54	1.54	1.54	1.54	1.54
1.54	1.54	1.54	1.54	1.54	1.54	1.54	1.54	1.54	1.54
1.54	1.54	1.54	1.54	1.54	1.54	1.54	1.54	1.54	1.54
1.54	1.54	1.54	1.54	1.54	1.54	1.54	1.54	1.54	1.54
1.54	1.54	1.54	1.54	1.54	1.54				

Link O: Other



Summary for Link WW: Wastewater

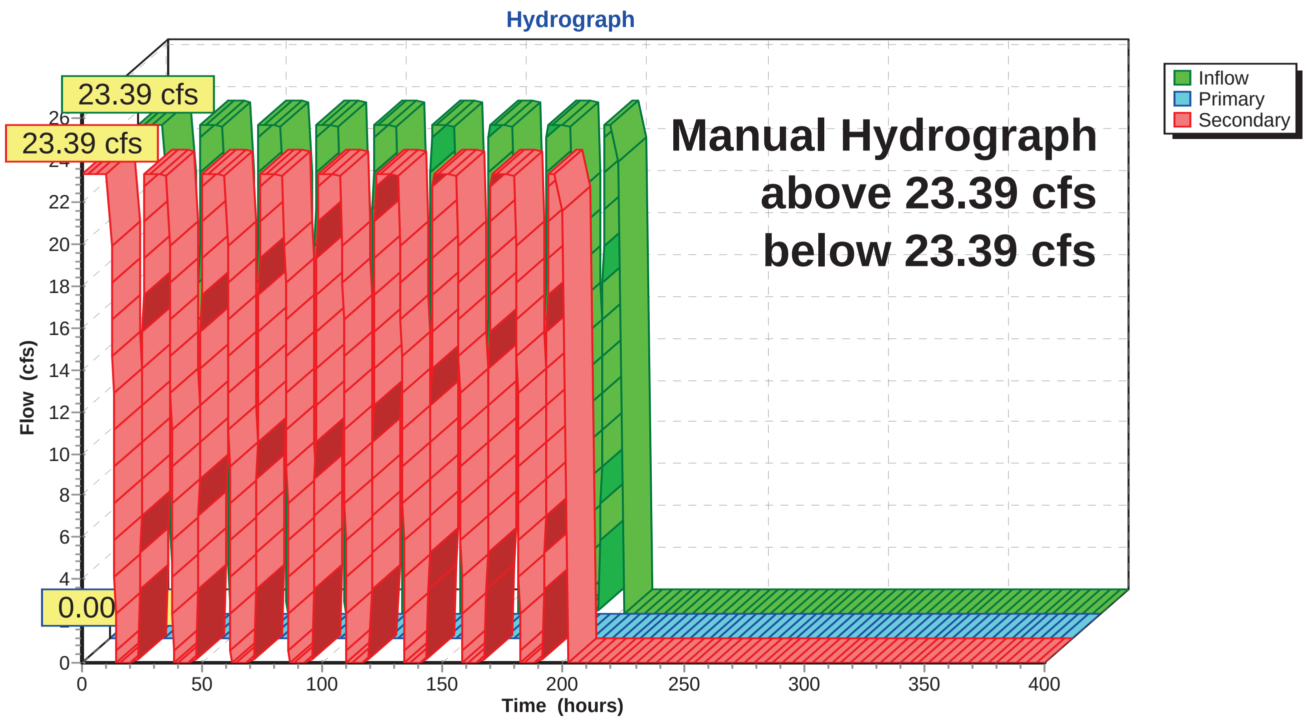
Inflow =	23.39 cfs @	0.00 hrs,	Volume=	201.231 af
Primary =	0.00 cfs @	0.00 hrs,	Volume=	0.000 af, Atten= 100%, Lag= 0.0 min
Secondary =	23.39 cfs @	0.00 hrs,	Volume=	201.231 af

Primary outflow = Inflow above 23.39 cfs below 23.39 cfs, Time Span= 0.00-400.05 hrs, dt= 0.15 hrs

101 Point manual hydrograph, To= 0.00 hrs, dt= 2.00 hrs, cfs =

23.39	23.39	23.39	23.39	23.39	23.39	23.39	0.00	0.00	0.00
0.00	0.00	0.00	23.39	23.39	23.39	23.39	23.39	23.39	0.00
0.00	0.00	0.00	0.00	0.00	23.39	23.39	23.39	23.39	23.39
23.39	0.00	0.00	0.00	0.00	0.00	0.00	23.39	23.39	23.39
23.39	23.39	23.39	0.00	0.00	0.00	0.00	0.00	0.00	23.39
23.39	23.39	23.39	23.39	23.39	0.00	0.00	0.00	0.00	0.00
0.00	23.39	23.39	23.39	23.39	23.39	23.39	0.00	0.00	0.00
0.00	0.00	0.00	23.39	23.39	23.39	23.39	23.39	23.39	0.00
0.00	0.00	0.00	0.00	0.00	23.39	23.39	23.39	23.39	23.39
23.39	0.00	0.00	0.00	0.00	0.00	0.00	23.39	23.39	23.39
23.39									

Link WW: Wastewater



Luminant

Office Memorandum

Date: October 1, 2021

To: Cynthia Vodopivec

cc: Charles Koudelka

From: Vic Modeer

Subject: Illinois Power Generating Company
Newton Power Station

BACKGROUND

The October 2016 certified "CCR Certification Report: Initial Structural Stability Assessment, Initial Safety Factor Assessment, and Initial Inflow Design Flood Control System Plan, Ash Pond at Newton Power Station" (CCR Certification Report)" prepared by AECOM describes the outlets at the Primary Ash Pond. There are two interconnected hydraulic structures that pass through the dike of the Primary Ash Pond. The Primary Ash Pond contains two concrete, stop-log weir box structures that discharge to the Secondary Pond. Weir box 1-A is located at the bottom of the embankment and is connected to the lower 30-inch diameter (dia.) cured-in-place pipe (CIPP). Weir Box 1-B is located approximately halfway up the embankment is connected to the upper 30-inch dia. CIPP. Both discharge pipes were originally 30-inch dia. corrugated metal pipe (CMP) and were lined in 2008 (see section § 257.73(c)(1)(xii) below for further information). The lower discharge pipe from weir box 1A passes through the embankment between the Primary Ash Pond and Secondary Pond. The upper discharge pipe from weir box 1B connects to the lower discharge pipe within the embankment. No other hydraulic structures pass through the dike of or underlie the base of the Primary Ash Pond.

Pipe Inspections and Structural Stability Statements. AECOM's 2016 report was certified that the pipe system met the requirements of §257.73(d)(1)(vi). The inspected pipes were free of significant deterioration, deformation, distortion, bedding deficiencies, sedimentation, and debris.

The following paragraph is from section 3.6 of the October 2016 CCR Certification Report:

"Both sliplined CMP pipes were inspected on October 30, 2015, using CCTV inspection equipment. The inspection found that the outlet structures are free of significant deterioration, deformation, distortion, bedding deficiencies, sedimentation, and debris accumulation that may negatively affect the hydraulic operation of the structure. Based on these evaluations, the Primary Ash Pond meets the requirements in §257.73(d)(1)(vi).."

EVALUATION

2021 Pipe Inspection.

The August 5, 2021 inspection was performed by Vic Modeer when the upper the lower 30-inch diameter (dia.) cured-in-place pipe (CIPP) was not discharging, and the lower 30-inch dia. cured-in-place pipe (CIPP) was flowing full. The visual inspection of the upper the lower 30-inch dia. pipe did not show any deficiencies in the concrete riser drop inlet structure, outlet conduit or the pipe. The lower concrete riser drop inlet structure did not visually show any structural deficiency. The weekly monitoring of the flow into the lower 30-inch diameter pipe and into the secondary pond has been consistent with the plant operation, i.e., the inflow volume is approximately equivalent to the outflow during periods of no rain. The inflow into the pipe and outflow did not visually reveal any flow related issues.

The possibility of a structural failure was further evaluated by visually monitoring the ground surface above and around the pipe centerline for a loss of soil or sinkhole. This type of loss of ground is described in the following: (*Kumar, G., Cecchin, I., Thomé, A. and Reddy, K.R., "Failure of Coal Ash Containment Facilities: Causes, Impacts, Remediation, and Lessons Learned;" 5th International Conference on Forensic Geotechnical Engineering, ISSMGE, 2016*). There was no loss of ground or sinkhole indicating a loss of ground due to a pipe failure. In addition, the likelihood of a seepage failure though piping of water and soil from around the pipe was visually inspected. The soil type around the pipe is a medium to high plastic clay (CCR Certification Report) that are "much less likely" to be susceptible to piping in an engineered embankment less than 30 feet in height. (*Foster, M., Fell, R. and Spannagle, M., 2000. A method for assessing the relative likelihood of failure of embankment dams by piping. Canadian Geotechnical Journal, 37(5), pp.1025-1061*).

Based on these evaluations, the Primary Ash Pond meets the requirements in §257.73(d)(1)(vi). Please let me know if you have any questions.

Sincerely,

Vic Modeer, PE, D.GE
(IL, MO, IN, KY, OH, LA)
Consulting Engineer

October 2021

DOCUMENT 11

Region 4 **U.S. Environmental Protection Agency** **Laboratory Services & Applied Science Division** **Athens, Georgia**	
Operating Procedure	
Title: Pore Water Sampling	ID: LSASDPROC-513-R5
Issuing Authority: Field Services Branch Supervisor	
Effective Date: April 22, 2023	Review Due Date: May 12, 2024
Method Reference: N/A	SOP Author: Mel Parsons

Purpose

The purpose of this operating procedure is to describe the methods and considerations to be used when obtaining a pore water sample from soil or sediment.

Scope/Application

This document describes procedures generic to all pore water sampling methods to be used by field personnel when collecting and handling samples in the field. On the occasion that Laboratory Services and Applied Science Division (LSASD) personnel determine that any of the procedures described in this section are inappropriate, inadequate or impractical and that another procedure must be used to obtain a pore water sample, the variant procedure will be documented in the field logbook, along with a description of the circumstances requiring its use. Mention of trade names or commercial products in this operating procedure does not constitute endorsement or recommendation for use.

TABLE OF CONTENTS

1 General Information

1.1 Documentation/Verification

This procedure was prepared by persons deemed technically competent by LSASD management, based on their knowledge, skills and abilities and has been tested in practice and reviewed in print by a subject matter expert. The official copy of this procedure resides on the LSASD local area network (LAN). The Document Control Coordinator is responsible for ensuring the most recent version of the procedure is placed on the LAN and for maintaining records of review conducted prior to its issuance.

1.2 General Precautions

1.2.1 Safety

Proper safety precautions must be observed when collecting pore water samples. Refer to the LSASD Safety, Health and Environmental Management Program Procedures and Policy Manual (most recent version) and any pertinent site-specific Health and Safety Plans (HASP) for guidelines on safety precautions. These guidelines, however, should only be used to complement the judgment of an experienced professional. When using this procedure, minimize exposure to potential health hazards through the use of protective clothing, eye wear and gloves. Address chemicals that pose specific toxicity or safety concerns and follow any other relevant requirements, as appropriate.

1.2.2 Procedural Precautions

The following precautions should be considered when collecting pore water samples:

- Special care must be taken not to contaminate samples. This includes storing samples in a secure location to preclude conditions which could alter the properties of the sample. Samples shall be custody sealed during long-term storage or shipment.

- Collected samples are in the custody of the sampler or sample custodian until the samples are relinquished to another party.

- If samples are transported by the sampler, they will remain under his/her custody or be secured until they are relinquished.

- Shipped samples shall conform to all U.S. Department of Transportation (DOT) rules of shipment found in Title 49 of the Code of Federal Regulations (49 CFR parts 171 to 179), and/or International Air Transportation Association (IATA) hazardous materials shipping requirements found in the current edition of IATA’s Dangerous Goods Regulations.

- Documentation of field sampling is done in a bound logbook. Chain-of-custody documents shall be filled out and remain with the samples until custody is relinquished.

- All shipping documents, such as bills of lading, will be retained by the project leader and stored in a secure place.

1.2.3 Records

Information generated or obtained by LSASD personnel will be organized and accounted for in accordance with LSASD records management procedures found in LSASD Operating Procedure for Control of Records, LSASDPROC-002 (most recent version). Field notes, recorded in a bound field logbook, will be generated, as well as chain-of-custody documentation, in accordance with LSASD Operating Procedure for Logbooks, LSASDPROC-010 (most recent version), and LSASD Operating Procedure for Sample and Evidence Management, LSASDPROC-005 (most recent version).

2 Sampling Methodology

2.1 General

The pore water sampling techniques and equipment described in this procedure are designed to minimize effects on the chemical and physical integrity of the sample. If the procedures in this section are followed, a representative sample of the pore water should be obtained.

2.2 Collection Considerations

The physical location of the investigator when collecting a sample may dictate the equipment to be used. Wading is the preferred method for reaching the sampling location, particularly if the stream has a noticeable current (i.e., is not impounded). However, wading may disrupt bottom sediments causing biased results; therefore, the sampler should enter the area downstream of the sampling location and collect the sample facing upstream. If the stream is too deep to wade, the pore water sample may be collected from a platform such as a boat or by SCUBA diving. If sampling from a boat or in water deeper than the length of the sampler, extensions may be utilized. If SCUBA diving, all diving activity must be conducted in accordance with EPA’s Diving Safety Manual, current version.

2.3 Summary of Procedure

Pore water is collected using a pore water extracting device (Figure 1). The most common type used by LSASD is the PushPoint™ sampler (M.H.E. Products 2003), made out of stainless-steel tubing. The sampling end of the pore water device is inserted into the sediment to the desired depth, and pore water is extracted using a syringe or peristaltic pump. The device is suitable for use only in fine-grained material (no gravel or cobble). Other similar devices may be used providing that the integrity of the sample is maintained, and no ambient surface water is allowed in contact with the sample.

2.4 Sampling Equipment

A PushPoint™ or similar sampler typically consists of a pointed tubular stainless-steel tube with a screened zone at one end and a sampling port at the other. The pointed end with the screened zone consists of a series of very fine interlaced machined slots to allow pore water to enter the sampler.

A removable guard rod adds rigidity to the sampler during sediment insertion. The length of the screened zone will depend on the site-specific study design. Depending on the data quality objectives (DQO) of the study, filters may be placed over the screened zone if additional screening is needed. Pore water is collected through the opposite end of the device by connecting flexible tubing and using a syringe or peristaltic pump to extract the sample. Teflon® tubing is the preferred tubing to be used for collecting pore water samples. However, other tubing may be used, depending upon the DQOs for the specific application.

There are many modifications that can be incorporated into the procedure to satisfy data quality objectives for a specific application. The procedures discussed in the following sections provide guidance on the basic operation of pore water sampling devices and issues to consider when collecting pore water.

An alternative system is available in LSASD inventory for use in soft sediments in water deeper than wading depth. A well screen and short riser approximately ¾" in diameter are threaded to fasten to the bottom of a custom flange. Internal threads on the screen accept a tubing adapter. The accompanying rimmed flange has a coupling with both top and bottom threads. The well screen is screwed into the bottom of the flange and Teflon® tubing is attached to the tubing adapter threaded into the well screen. For deployment, the tubing is then inserted through a PVC pipe or well casing which is then screwed into the upper threads of the flange. The entire assembly can be deployed in water up to ten feet of depth from a well anchored boat.

2.5 Pore Water Sampler Deployment Considerations

It is critical in the collection of pore water to avoid surface water intrusion. Water will flow in a path of least resistance. If space is created around the sides of the sampling end of the pore water device during deployment, surface water may flow down the outside of the device to the screened area and into the intended sample. Therefore, the pore water device should be used with a sampling flange (Figure 2), especially when collecting pore water near the sediment-surface water interface. If pore water is collected from deep in sediments, a flange may not be necessary. When inserted though the flange, the body of the pore water device should form a watertight seal to eliminate surface water intrusion during sample collection. Flanges should include an outer vertical cutting ring to enhance sealing. Flange systems can be augmented by flexible plastic sheeting of appropriate material. The sheeting can be weighted to conform to a stream bottom by objects obtained from other areas of the stream away from the sampling location. Several of the flanges in LSASD inventory have a threaded nut and washer to facilitate sealing the flange to a polyethylene sheet.

The flange can be made of any material that will not cross contaminate the intended sample. If both inorganic and organic analyses are required, the flange should be made of inert material such as stainless steel or Teflon®. The size of the flange depends on the volume of pore water to be collected. If large volumes of pore water are to be collected, use a large flange size. A useful estimate can be made for planning by taking the required water volume, tripling it to assume 33% porosity, and then calculating the dimensions of a cylinder of this volume, based upon the penetration depth of the sampler. The flange should cover at least this estimated volume. If it is not practical to use a large flange, then multiple devices may be deployed, and smaller volumes can be collected from several devices for a composite sample. If multiple devices are deployed, they should be spaced an appropriate distance apart so they will not interfere with one another.

In general, the volume of pore water that can be collected at a given location is limited. Collecting large volumes of pore water will ultimately result in the collection of water from the overlying water body. Often, minimum required volumes must be negotiated with the laboratory to limit the volumes withdrawn.

Where significant differences in parameters such as pH or conductivity exist between the surface water and pore water, a check can be made at the end of sampling to assess whether surface water intrusion has occurred by measuring the pore water parameters at the beginning and conclusion of sampling. Fluorescent dye tracing can also be used for this purpose.

2.6 Pore Water Collection

The flange is first placed at the desired sampling point with the push-point removed to allow any water to escape from under the flange. The flange rim should be carefully worked into the soil or sediment until the flange is flush with the surface. The pore water device should then be inserted through the compression adapter on the flange and into the soil or sediment as carefully as possible (Figure 2). When the sampler is inserted to the desired depth, the compression adapter should be tightened. The push-point's guard rod can then be withdrawn. Do not reinsert the guard rod into the sampler for any reason until the sampler has been cleaned (particles rolled between the two metal surfaces will lock the parts together and permanently damage the sampler.)

When deploying the pore water device, care must be taken not to disturb the sampling area. If the sampler is wading, the sampler should lean out and insert the pore water device as far as possible away from where the sampler is standing to reduce potential effects of the sampler on the integrity of the pore water sample. Depth of penetration of the pore water device depends on the objectives of the specific investigation.

After the pore water device has been successfully deployed, attach the sample tubing to the sampling port of the pore water device. Short pieces of Silastic® tubing can be used to splice Teflon® sample tubing to a push-point sampler, taking care to butt the tubing to the sampler at the center of the splice. Then attach the other end of the tubing to a sample withdrawing device, such as a syringe or a peristaltic pump (according to LSASD Operating Procedure for Pump Operation, LSASDPROC-203). Before collecting a pore water sample, be sure to purge out all air and surface water from the pore water sampler and sample tubing with the appropriate amount of pore water. This step can be accomplished by calculating the volume of the sampler and attached tubing and pumping this volume plus an additional 10 percent of pore water through the sampler and tubing prior to collecting the sample. If utilizing a syringe for collection, a three-way valve with a side syringe must be utilized for the surface water purge in order not to cross contaminate the sampling syringe.

2.6.1 Peristaltic Pump/Vacuum Jar Collection

The peristaltic pump/vacuum jug can be used for sample collection of organic or inorganic samples because it allows for the sample to be collected without coming in contact with the pump head tubing, maintaining the integrity of the sample. This is accomplished by placing a Teflon® transfer cap assembly onto the neck of a pre-cleaned standard 1-liter amber glass container (Figure 3). Teflon® tubing (¼-inch O.D.) connects the container to both the pump and the sample source. The pump creates a vacuum in the container, thereby drawing the sample into the container without it coming into contact with the pump head tubing.

Because the sample is exposed to a vacuum and is agitated as it enters the vacuum jug, this method cannot be used for collection of samples for volatile organic compounds. An alternative method for collecting volatile organics involves filling the Teflon® tubing with sample by running the pump for a short period of time. Once the tubing is full of water, the tubing is removed from the pore water sampler and, then pinched off at the pump in order to maintain the vacuum while it is being disconnected from the pump head tubing. The water is then allowed to carefully drain, by gravity, into the sample vials. Alternatively, without disconnecting the tubing from the pump head, the contained sample can be pushed out of the tubing, into the sample vials, by reversing the peristaltic pump at very low speed. Great care must still be taken with this method in order not to agitate the sample during the transfer process or to transfer water that has been in contact with the Silastic® tubing into the vials.

Because pore water is typically collected from an anaerobic environment, it is preferable, especially when collecting samples for nutrient analysis, to maintain the integrity of the sample by minimizing exposure to air. This can be accomplished by purging the sample container with an inert gas such as nitrogen or argon prior to sampling. In addition, if analyzing for nutrients or metals, the container can be pre-preserved in order to minimize exposure of the sample to ambient conditions.

An alternative, when collecting samples for metals, nutrients, or other sample analyses not affected by Silastic® tubing and when exposure to air is not a concern, is to collect the sample directly from the discharge of the pump head tubing after an adequate purge has been demonstrated. When collecting samples in this manner, there are several considerations of which to be aware. The pump head tubing (Silastic®, etc.) must be changed after each sample and a rinsate blank must be collected from a representative piece of the pump head tubing (only one blank per investigation). Also, precautions must be taken to ensure that the end of the discharge tubing is not allowed to touch the ground or other surface to ensure the integrity of samples collected in this manner.

2.6.2 Syringe

An alternative to using the pump and vacuum container is to use a syringe as the mechanism to draw the pore water through the sampling device. The tubing from the sampling port of the pore water device can be directly attached to a syringe with a three-way valve and a side syringe and the pore water sample can be manually withdrawn. The valve is first switched to the side syringe, which is used for purging air and any ambient surface water in the system prior to sampling. The volume to be purged is determined by the length and diameter of the sampling device and attached tubing. Once the sampler has been purged, the valve is switched to the sampling syringe and the sample is drawn into the syringe. The syringe can be used as the final sample container or the pore water can be transferred to another container, depending on project objectives and analytical requirements. This is the best method to use if the sample is to be collected underwater by SCUBA diving.

2.7 Quality Control

If possible, a control or background sample should be collected from a location not affected by the possible contaminants of concern and submitted with the other samples. In streams or other bodies of moving water, the control sample should be collected upstream of the sampled area. For impounded bodies of water, particularly small lakes or ponds, it may be difficult or inappropriate to obtain an unbiased control from the same body of water from which the samples are collected. In these cases, it may be appropriate to collect a background sample from a similar impoundment located near the sampled body of water if there is a reasonable certainty that the background location has not been impacted. Equipment blanks should be collected if equipment is field cleaned and reused on-site or, if necessary, to document that low- level contaminants were not introduced by pumps, bailers or other sampling equipment.

2.8 Specific Sampling Equipment Quality Assurance Techniques

All equipment used to collect pore water samples shall be cleaned as outlined in the LSASD Operating Procedure for Field Equipment Cleaning and Decontamination, LSASDPROC-205 (most recent version) or LSASD Operating Procedure for Field Equipment Cleaning and Decontamination at the FEC, LSASDPROC-206 (most recent version) and repaired, if necessary, before being stored at the conclusion of field studies. Cleaning procedures utilized in the field or field repairs shall be thoroughly documented in field records.

3 Special Sampling Considerations

3.1 Volatile Organic Compounds (VOC)

Pore water samples for VOC analysis must be collected in 40 ml glass vials with Teflon® septa. The vial may be either preserved with concentrated hydrochloric acid or they may be unpreserved. Preserved samples have a two-week holding time, whereas, unpreserved samples have only a seven day holding time. During most sampling events, preserved vials are used due to their extended holding time. In some situations, however, it may be necessary to use unpreserved vials. For example, if the surface water sample contains a high concentration of dissolved calcium carbonate, there may be an effervescent reaction between the hydrochloric acid and the water, producing large numbers of fine bubbles. This will render the sample unacceptable. In this case, unpreserved vials should be used, and arrangements must be confirmed with the laboratory to ensure that they can accept the unpreserved vials and meet the shorter sample holding times.

Samples for VOC analysis must be collected using either stainless steel or Teflon® equipment. Samples should be collected with as little agitation or disturbance as possible. The vial should be filled so that there is a meniscus at the top of the vial and absolutely no bubbles or headspace should be present in the vial after it is capped. After the cap is securely tightened, the vial should be inverted and tapped on the palm of one hand to see if any undetected bubbles are dislodged. If a bubble or bubbles are present, the vial should be refilled. Care should be taken not to flush any preservative out of the vial during topping off. If, after attempting to refill and cap the vial, bubbles are still present, a new vial should be obtained, and the sample should be re-collected.

3.2 Dissolved Metals Sample Collection

If a dissolved metals pore water sample is to be collected, an in-line filtration should be used. The use of disposable, high-capacity filter cartridges (barrel-type) or membrane filters in an in-line filter apparatus is preferred. The high-capacity, barrel-type filter is preferred due to the higher surface area associated with this configuration.

Potential differences could result from variations in filtration procedures used to process water samples for the determination of trace element concentrations. A number of factors associated with filtration can substantially alter "dissolved" trace element concentrations; these include filter pore size, filter type, filter diameter, filtration method, volume of sample processed, suspended sediment concentration, suspended sediment grain-size distribution, concentration of colloids and colloidally-associated trace elements, and concentration of organic matter. Therefore, consistency is critical in the comparison of short-term and long-term results. Further guidance on filtration may be obtained from Section 4.7.3 of the LSASD Groundwater Sampling Procedure (LSASDPROC-301).

3.3 Special Precautions for Pore Water Sampling

- A clean pair of new, non-powdered, disposable latex gloves will be worn each time a different location is sampled, and the gloves should be donned prior to handling sampling equipment. The gloves should not come in contact with the media being sampled and should be changed any time during sample collection when their cleanliness is compromised.
- All background or control samples shall be collected and placed in separate ice chests or shipping containers. Sample collection activities shall proceed progressively from the least suspected contaminated area to the most suspected contaminated area. Samples of waste or highly contaminated media must not be placed in the same ice chest as environmental (i.e., containing low contaminant levels) or background samples.
- If possible, one member of the field sampling team should take all the notes and photographs, fill out tags, etc., while the other members collect the samples.
- Samplers must use new, verified, certified clean disposable equipment, or pre-cleaned non-disposable equipment. Non-disposable equipment should be pre-cleaned according to procedures contained in LSASD Operating Procedure for Field Equipment Cleaning and Decontamination (LSASDPROC-205), for collection of samples for trace metals or organic compound analyses.

3.4 Sample Handling and Preservation Requirements

- Pore water will typically be collected using a peristaltic pump and placed directly into sampling containers. In some cases, a syringe may be used to collect the pore water and then either left in the syringe as the sample container or transferred into an appropriate container.
- During sample collection, if transferring the sample from a collection device, make sure that the device does not come in contact with the sample containers.
- Place the sample into appropriate, labeled containers. Samples collected for VOC analysis must not have any headspace (see Section 3.1).
- All samples requiring preservation must be preserved as soon as practically possible, soon after sample collection. If pre-preserved VOA vials are used, these will be preserved with concentrated hydrochloric acid prior to departure for the field investigation. For all other chemical preservatives, LSASD will use the appropriate chemical preservative generally stored in an individual single-use vial as described in the LSASD Operating Procedure for Field Sampling Quality Control (LSASDPROC-011). The adequacy of sample preservation will be checked after the addition of the preservative for all samples, except for the samples collected for VOC analysis. If it is determined that a sample is not acceptably preserved, additional preservative should be added to achieve adequate preservation. Preservation requirements for surface water samples are found in

the USEPA Laboratory Services Branch *Laboratory Operations and Quality Assurance Manual* (LOQAM).

Figure 1. Pore Water Sampling Device

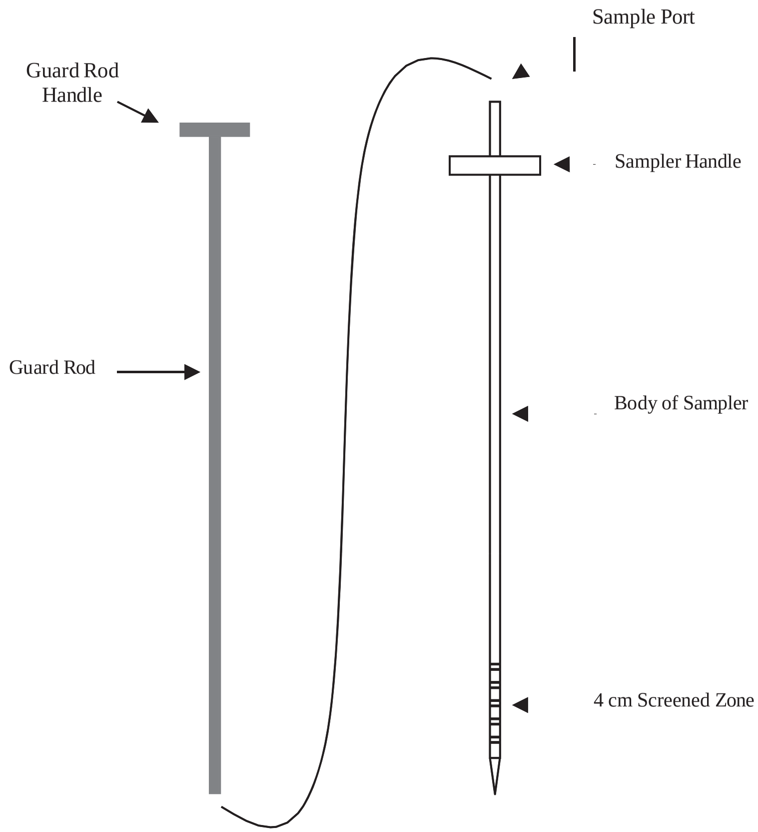


Figure 1A. Disassembled Device

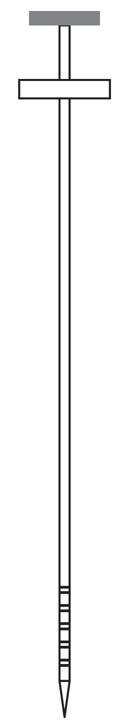


Figure 1B. Assembled Device

Actual length and width of device will vary, depending on sampling needs and site conditions.
Note: cm = centimeter

Figure 2. Pore Water Sampler Deployment Using a Sampling Flange

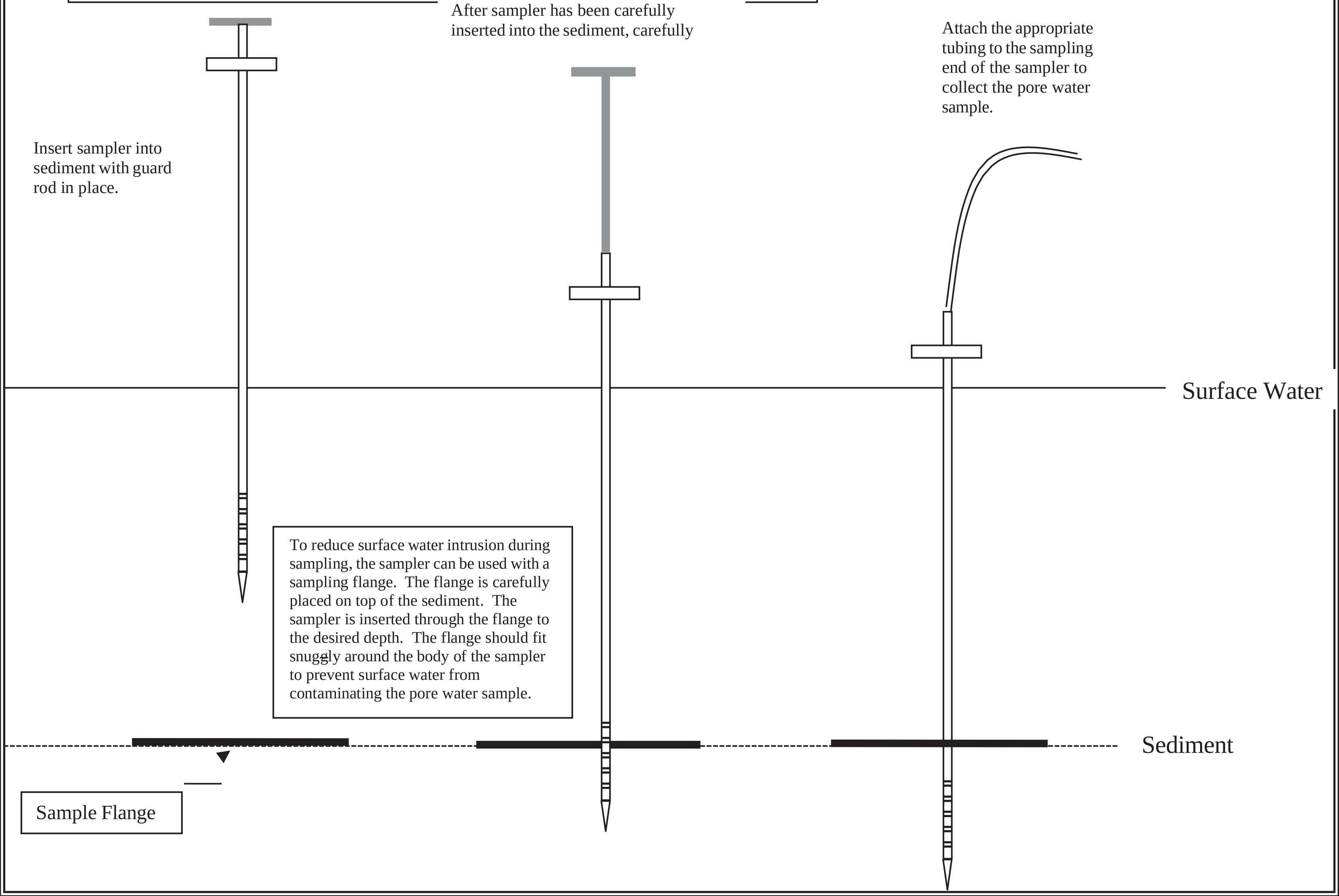
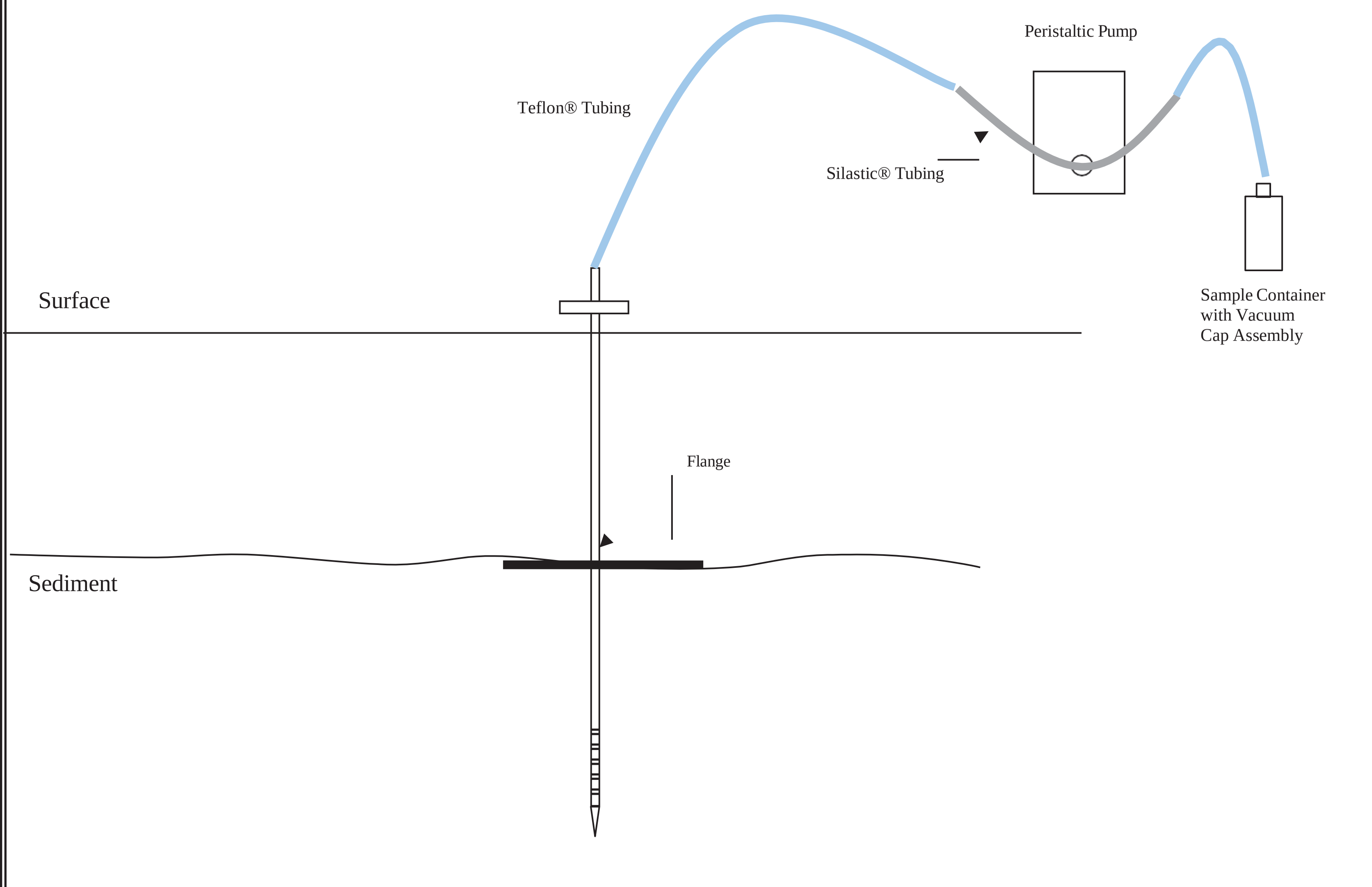


Figure 3. Pore Water Sampler Deployment Using a Peristaltic Pump to Sample



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Revision History

The top row of this table shows the most recent changes to this controlled document. For previous revision history information, archived versions of this document are maintained by the LSASD Document Control Coordinator on the LSASD local area network (LAN).

History	Effective Date
Replaced Chief with Supervisor; General formatting revisions.	April 22, 2023
LSASDPROC-513-R4, Pore Water Sampling, *replaces SESDPROC-513-R3.* Laboratory Services and Applied Science Division replaces Science and Ecosystem Support Division **Title Page:** Changed the Field Quality Manager from Hunter Johnson to Stacie Masters. **General:** Corrected typographical, grammatical, and/or editorial errors. Added language to clarify some procedures.	May 13, 2020
SESDPROC-513-R3, Pore Water Sampling, replaces SESDPROC-513-R2. **General:** Corrected any typographical, grammatical, and/or editorial errors. **Title Page:** Changed the Field Quality Manager from Bobby Lewis to Hunter Johnson. Updated cover page to represent SESD reorganization. John Deatrick was not listed as the Supervisor of the Field Services Branch	December 16, 2016
SESDPROC-513-R2, Pore Water Sampling, *replaces SESDPROC-513-R1.*	February 28, 2013
SESDPROC-513-R1, Pore Water Sampling, *replaces SESDPROC-513-R0.*	January 29, 2013
SESDPROC-513-R0, Pore Water Sampling, *Original Issue*	February 05, 2007

Electronic Filing: Received, Clerk's Office 03/26/2024

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Illinois Power Generating Company
1500 Eastport Plaza Drive
Collinsville, IL 62234

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BOW/WPC/PERMIT SECTION

October 6, 2023
Illinois Environmental Protection Agency
DWPC – Permits MC#15
Attn: 35 I.A.C. § 845.610 Quarterly Report Submittal
1021 North Grand Avenue East
P.O. Box 19276
Springfield, IL 62794-9276

Re: Newton Power Plant Primary Ash Pond; IEPA ID # W0798070001-01

Dear Mr. LeCrone:

In accordance with Title 35 of the Illinois Administrative Code (35 I.A.C.) Section (§) 845.650(e), Illinois Power Generating Company (IPGC) is submitting this Alternative Source Demonstration (ASD) for exceedances observed from the Quarter 2 2023 sampling event at the Newton Power Plant Primary Ash Pond, identified by Illinois Environmental Protection Agency (IEPA) ID No. W0798070001-01.

This ASD is being submitted within 60 days from the date of determination of an exceedance of a groundwater protection standard (GWPS) for constituents listed in 35 I.A.C. § 845.600. As required by 35 I.A.C. § 845.650 (e)(1), the ASD was placed on the facility's website within 24 hours of submittal to the agency.

One hard copy is provided with this submittal.

Sincerely,

Phil Morris, PE
Senior Director, Environmental

Enclosures
Alternate Source Demonstration, Quarter 2 2023, Primary Ash Pond Newton Power Plant, Newton Illinois

R001606

Intended for
Illinois Power Generating Company

Date
October 6, 2023

Project No.
1940103649-013

35 I.A.C. § 845.650(E): ALTERNATIVE SOURCE DEMONSTRATION

PRIMARY ASH POND
NEWTON POWER PLANT
NEWTON, ILLINOIS
IEPA ID: W0798070001-1

RAMBOLL Bright ideas. Sustainable change.

CERTIFICATIONS

I, Anne Frances Ackerman, a qualified professional engineer in good standing in the State of Illinois, certify that the information in this report is accurate as of the date of my signature below. The content of this report is not to be used other than for its intended purpose and meaning, or for extrapolations beyond the interpretations contained herein.

Anne Frances Ackerman
Qualified Professional Engineer
062-060586
Illinois
Ramboll Americas Engineering Solutions, Inc.
Date: October 6, 2023

I, Brian G. Hennings, a professional geologist in good standing in the State of Illinois, certify that the information in this report is accurate as of the date of my signature below. The content of this report is not to be used other than for its intended purpose and meaning, or for extrapolations beyond the interpretations contained herein.

Brian G. Hennings
Professional Geologist
196-001482
Illinois
Ramboll Americas Engineering Solutions, Inc.
Date: October 6, 2023

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CONTENTS

TABLES (IN TEXT)

FIGURES (ATTACHED)

APPENDICES

ACRONYMS AND ABBREVIATIONS

35 I.A.C.	Title 35 of the Illinois Administrative Code
ASD	Alternative Source Demonstration
bgs	below ground surface
CCR	coal combustion residuals
cm/s	centimeters per second
E001	Event 1
GWPS	groundwater protection standard
LCU	lower confining unit
LF2	Landfill 2
LOE(s)	Line(s) of evidence
M-K	Mann-Kendall
mg/L	milligrams per liter
NAVD88	North American Vertical Datum of 1988
NPDES	National Pollutant Discharge Elimination System
NPP	Newton Power Plant
NRT/OBG	Natural Resource Technology, an OBG Company
PAP	Primary Ash Pond
PMP	primary migration pathway
Ramboll	Ramboll Americas Engineering Solutions, Inc.
Rapps	Rapps Engineering and Applied Science
TDS	total dissolved solids
UA	uppermost aquifer
UCU	upper confining unit
UD	upper drift
UTL	Upper Tolerance Limit

1. INTRODUCTION

Under Title 35 of the Illinois Administrative Code (35 I.A.C.) § 845.650(e), within 60 days from the date of determination of an exceedance of a groundwater protection standard (GWPS) for constituents listed in 35 I.A.C. § 845.600, an owner or operator of a coal combustion residuals (CCR) surface impoundment may complete a written demonstration that a source other than the CCR surface impoundment caused the contamination and the CCR surface impoundment did not contribute to the contamination, or that the exceedance of the GWPS resulted from error in sampling, analysis, statistical evaluation, natural variation in groundwater quality, or a change in the potentiometric surface and groundwater flow direction (Alternative Source Demonstration [ASD]).

This ASD has been prepared on behalf of Illinois Power Generating Company, by Ramboll Americas Engineering Solutions, Inc (Ramboll), to provide pertinent information pursuant to 35 I.A.C. § 845.650(e) for the Newton Power Plant (NPP) Primary Ash Pond (PAP) located near Newton, Illinois.

The most recent quarterly sampling event (Event 1 [E001]) was completed on April 28, 2023, and analytical data were received on June 8, 2023. In accordance with 35 I.A.C. § 845.610(b)(3)(C), comparison of statistically derived values with the GWPSs described in 35 I.A.C. § 845.600 to determine exceedances of the GWPS was completed by August 7, 2023, within 60 days of receipt of the analytical data (Ramboll, 2023). The statistical determination identified the following GWPS exceedances at compliance groundwater monitoring wells:

- Chloride at well APW15
- Lithium at well APW02
- Sulfate at wells APW02, APW04, APW05S, and APW10
- Total dissolved solids (TDS) at wells APW02, APW04, and APW05S

Pursuant to 35 I.A.C. § 845.650(e), the lines of evidence (LOEs) presented in **Section 3** demonstrate that sources other than the PAP were the cause of the chloride GWPS exceedance listed above. This ASD was completed by October 6, 2023, within 60 days of determination of the exceedances (August 7, 2023), as required by 35 I.A.C. § 845.650(e).

Lithium, sulfate, and TDS exceedances will be addressed in accordance with 35 I.A.C. § 845.660.

2. BACKGROUND

2.1 Site Location and Description

The NPP is located in Jasper County in the southeastern part of central Illinois, approximately 7 miles southwest of the town of Newton. The plant is located on the north side of Newton Lake. The area is bounded by Newton Lake and agricultural land to the west, south, and east, and agricultural land to the north. Beyond the lake is additional agricultural land.

2.2 Description of Primary Ash Pond CCR Unit

The NPP's sole CCR surface impoundment, the PAP, was constructed in 1977 and has a design capacity of approximately 9,715 acre-feet. The PAP has a surface area of 400 acres and a height of approximately 71 feet above grade. The PAP currently receives bottom ash, fly ash, and low-volume wastewater from the plant's two coal-fired boilers, and is operated per National Pollutant Discharge Elimination System (NPDES) Permit IL0049191, Outfall 001. The PAP was not excavated during construction, except for native borrow materials used to build the containment berms.

2.3 Geology and Hydrogeology

2.3.1 Site Hydrogeology

The information used to describe the hydrogeology is based on the local geology obtained from published sources, hydrogeologic investigation data, and boring data collected during site investigations conducted from 1997 to 2021 (Natural Resource Technology, an OBG Company [NRT/OBG], 2017; Ramboll, 2021a).

Quaternary deposits in the Newton area consist mainly of diamictons and outwash deposits that were deposited during Illinoian and Pre-Illinoian glaciations (Lineback, 1979; Willman et al., 1975). The unconsolidated deposits include the following units (beginning at the ground surface):

- **Upper Drift (UD)/ Potential Migration Pathway (PMP):** The upper drift is composed of the low permeability silts and clays of the Peoria Silt and Sangamon Soil and the sandier soils of the Hagarstown Member. The hydraulic conductivity of this unit, calculated from field hydraulic test data from monitoring wells screened between 8 and 36 feet below ground surface (bgs), was observed to range from 2.4×10^{-6} to 6.1×10^{-5} centimeters per second (cm/s) with a geometric mean of 1.3×10^{-5} cm/s (Rapps Engineering and Applied Science [Rapps], 1997).
  - **Hagarstown Member/PMP**: The Hagarstown Member consists of the discontinuous, sandier deposits of the UD where present and overlies the Vandalia Till. Results of field hydraulic conductivity tests in wells screened within the Hagarstown PMP (APW05S and APW12) ranged from 6.1×10^{-4} to 1.5×10^{-2} cm/s, with a geometric mean hydraulic conductivity of 3.1×10^{-3} cm/s (Ramboll, 2021a).
- **Upper Confining Unit (UCU)**: The UCU consists of a thick package of the low permeability clay and silt of the Vandalia Till Member. This unit is a laterally continuous layer between the base of the upper drift and the top of the uppermost aquifer (UA). The hydraulic conductivity of this unit was observed to range from 6.3×10^{-9} to 2.1×10^{-8} cm/s with a geometric mean of 1.1×10^{-8} cm/s (Rapps, 1997).

- **Uppermost Aquifer (UA):** The UA is composed of the Mulberry Grove Member, which has been classified as poorly graded sand, silty sand, clayey sand, and gravel. The top of the UA is highest in elevation in the north and east portions of the unit and slopes downward toward APW15. The top of unit elevations range from approximately 482 feet (APW05 and APW10) to 425 feet (APW15) North American Vertical Datum of 1988 (NAVD88). Field hydraulic conductivity tests conducted in 2021 at monitoring wells screened in the UA ranged from 2.0 x 10^{-4} to 1.5 x 10^{-1} cm/s with a geometric mean hydraulic conductivity of 6.8 x 10^{-3} cm/s. The highest conductivities are measured in APW15, APW16, and APW17 (Ramboll, 2021a).
- **Lower Confining Unit (LCU):** The LCU is comprised of low permeability silt and clay of the Smithboro Till Member and the Banner Formation. The hydraulic conductivity of this unit was observed to be 1.4 x 10^{-7} cm/s (Rapps, 1997).
- **Bedrock Unit:** Shale bedrock of the Pennsylvanian-age Mattoon Formation (Willman et al., 1967) was encountered at the NPP during recent and historical investigations. Based on boring logs, the bedrock surface elevation at the NPP ranges from 408 feet NAVD88 (B141) (**Appendix A**) to 445 feet NAVD88 (APW13) (Ramboll, 2021a). Bedrock was not encountered at APW15, which was advanced to approximately 412 feet NAVD88 (Ramboll, 2021a). This indicates that APW15, which is screened within the UA from 424 to 419 feet NAVD88, is located in close proximity to the bedrock surface.

2.3.2 Regional Bedrock Geology

Regional investigations of the Illinois Basin have identified bedrock (specifically brines within the bedrock formations) as a source of chloride in groundwater (Kelley et al, 2012; Panno et al, 2018). Studies by Cartwright (1970) and Siegel (1989) indicate that groundwater migrates toward the center of the Illinois Basin and discharges upward through overlying confining units. The "Saline groundwater and brines can be brought near or to the land surface by natural conditions, such as migrating up prominent fractures and/or faults in bedrock, or by anthropogenic activities, such as exploration for and exploitation of petroleum. The mixing of upward-migrating saline groundwater with fresh groundwater from shallow aquifers can make groundwater from private wells undrinkable and can present a very expensive problem for municipalities (Panno and Hackley, 2010). "A saline spring was identified in Clay County (Kelley et al, 2012) approximately 10 miles south of the NPP and is adjacent to the Clay City Anticline which runs north into Jasper County and east of the NPP. Concentrations of chloride in groundwater collected from the Pennsylvanian shale in Jasper County range from 100 to 5,000 milligrams per liter (mg/L) (Panno et al, 2017).

2.3.3 Water Table Elevation and Groundwater Flow Direction

Groundwater elevations in the UA (referenced to NAVD88) across the PAP ranged from approximately 491 to 530 feet during E001 (**Figure 1**). Depth to groundwater measurements used to generate the groundwater elevation contours shown on **Figure 1** were collected on April 24, 2023. Groundwater flow in the UA beneath the eastern portion of the PAP is generally to the south, with flow direction diverging to the southwest beneath the western portion of the PAP, toward Landfill 2 (LF2), where groundwater flow in the area is converging along the major axis of LF2 Cells 1 and 2.

2.4 Groundwater and PAP Monitoring

The monitoring system for the PAP is shown on **Figure 1** and consists of two background monitoring wells (APW05 and APW06), 16 compliance monitoring wells (APW02, APW03, APW04, APW05S, APW07, APW08, APW09, APW10, APW11, APW12, APW13, APW14, APW15, APW16, APW17, and APW18), and two temporary water level only surface water staff gages (XSG01 and SG02) to monitor potential impacts from the PAP (Ramboll, 2021b). These monitoring wells are screened within the UD (APW02, APW03, APW04, APW05S, and APW12) and the UA (APW05, APW06, APW07, APW08, APW09, APW10, APW11, APW13, APW14, APW15, APW16, APW17, and APW18) along the perimeter of the PAP. Porewater samples are collected from locations XPW01 and XPW02 on the northern side of the PAP, and from XPW03 and XPW04 on the northeastern side of the PAP (**Figure 1**).

3. ALTERNATIVE SOURCE DEMONSTRATION: LINES OF EVIDENCE

As allowed by 35 I.A.C. § 845.650(e), this ASD demonstrates that sources other than the PAP (the CCR unit) caused the chloride exceedance at APW15. LOEs supporting this ASD include the following:

1. The PAP is separated from the UA at APW15 by a thick layer of low permeability glacial till (UCU).
2. Concentrations of primary CCR indicators in APW15 do not exceed background limits and are not increasing.
3. Concentrations of chloride at APW15 are greater than source concentrations.

These LOEs are described and supported in greater detail below.

3.1 LOE #1: The PAP is Separated from the UA at APW15 by a Thick Layer of Low Permeability Glacial Till (UCU)

Based on the boring log for monitoring well APW15, the top elevation of the UA is 424.9 feet NAVD88 (Ramboll, 2021a), which corresponds to 97.2 feet bgs on the boring log. At this location, the UA is overlain by the UCU, a low permeability (6.3×10^{-9} to 2.1×10^{-8} cm/s) glacial till. The bottom of the PAP, as presented in drawing S-69, is situated within the UCU, generally consistent with ground surface topography at the time the PAP was constructed (AECOM, 2022). The estimated bottom elevation of CCR presented on profile B-B' of sheet 00C302 (HDR, 2022), which bisects the axis of a former drainage feature, is 485 feet and has been interpreted to be the minimum base of ash elevation across the PAP. Thus, separation between the UA and the base of ash is approximately 60 feet, which represents the thickness of the low permeability glacial till that comprises the UCU. Based upon these observations, there is no complete pathway for transport of CCR constituents to APW15, and the PAP is not the source of the chloride exceedance at that well. **Appendix B** includes the boring log for APW15, drawing S-69, and sheet 00C302 to support this LOE.

3.2 LOE #2: Concentrations of Primary CCR Indicators in APW15 Do Not Exceed Background Limits and are Not Increasing

Boron and sulfate can be indicators of CCR impacts to groundwater due to their leachability from CCR and mobility in groundwater. Porewater in the NPP PAP is elevated in both boron and sulfate, indicating that these parameters are site-specific key indicators for CCR. If the groundwater in APW15 had been impacted by CCR from the unit, boron and sulfate concentrations would be expected to be elevated above their respective background Upper Tolerance Limits (UTLs). The UTL is an upper bound on background concentrations calculated for the purpose of comparing compliance measurements to background.

Mann-Kendall (M-K) trend analysis tests were performed to determine whether there are trends in the boron and sulfate concentrations in each well. If groundwater downgradient of the PAP was being affected by CCR but boron and sulfate did not yet exceed background concentrations, boron and sulfate concentrations would be expected to be increasing. No trends in boron or sulfate concentrations were identified by the M-K tests in compliance well APW15.

The concentration of boron in compliance well APW15 (0.13 mg/L) is less than the boron UTL (0.26 mg/L) and the concentration of sulfate in APW15 (0.40 mg/L) is also less than the sulfate UTL (35.84 mg/L), and the lack of increasing trends in boron and sulfate concentrations at monitoring well APW15 indicate that this well has not been affected by CCR impacts from the NPP PAP (Ramboll 2021b; Ramboll 2023). Analytical data to support this LOE are included in **Appendix C**.

3.3 LOE #3: Concentrations of Chloride at APW15 are Greater than Source Concentrations

Table A below provides summary statistics for chloride in APW15 and PAP porewater collected from XPW01, XPW02, XPW03, and XPW04.

Table A. Summary Statistics for Chloride in APW15 and PAP Porewater (February 2021 to April 2023)

Sample Location	Chloride (mg/L)		
	Minimum	Maximum	Median
Composite Porewater[1]	8.1	62.0	12.5
APW15	130	270	235

[1] Composite Porewater includes summary statistics of data collected at porewater locations XPW01, XPW02, XPW03, and XPW04

The following observations can be made from **Table A**:

- Concentrations of chloride in compliance monitoring well APW15 ranged from 130 mg/L to 270 mg/L, with a median chloride concentration of 235 mg/L.
- Concentrations of chloride within PAP porewater ranged from 8.1 mg/L to 62.0 mg/L, with a median chloride concentration of 12.5 mg/L.
- The median chloride concentration observed in porewater is an order of magnitude lower than the median chloride concentrations observed in compliance monitoring well APW15.
- The maximum observed chloride concentration in compliance monitoring well APW15 is approximately four times the concentration observed in porewater.

Analytical data to support the summary statistics presented in **Table A** are included in **Appendix C**. If the PAP was the source of chloride in downgradient groundwater, chloride concentrations in PAP porewater would be expected to be greater than the groundwater concentrations. However, the median chloride concentration observed in compliance groundwater monitoring well APW15 is greater than the median chloride concentrations observed porewater, indicating that chloride concentrations are not related to the PAP.

4. CONCLUSIONS

Based on the three LOEs presented below and described in the previous section, it has been demonstrated that the GWPS exceedance of chloride at APW15 is not due to the PAP but is from a source other than the CCR unit.

1. The PAP is separated from the UA at APW15 by a thick layer of low permeability glacial till (UCU).
2. Concentrations of primary CCR indicators in APW15 do not exceed background limits and are not increasing.
3. Concentrations of chloride at APW15 are greater than source concentrations.

Given the preponderance of evidence demonstrating that the PAP is not the source of elevated chloride in groundwater compliance well APW15, regional literature was reviewed to identify an alternative source. Based on the literature discussed in **Section 2.3.2**, elevated chloride concentrations (ranging 100 to 5,000 mg/L) are present in bedrock at concentrations above those detected in APW15. The UA was encountered at the lowest elevation onsite at APW15 (~425 feet NAVD88), and the screened elevation of this well (424 to 419 feet NAVD88) indicates that it is in close proximity to the bedrock surface, which is known to range between 408 and 445 feet NAVD88 at the NPP. Upward migration of chloride-containing groundwater from the shale bedrock into the overlying unlithified materials above the bedrock valley has the potential to impact groundwater within the UA.

Based on the review of regional literature and site-specific bedrock conditions, chloride concentrations in bedrock groundwater are a likely source of chloride observed in APW15 for the following reasons:

- Chloride is present in Pennsylvanian shale in Jasper County at concentrations ranging from 100 to 5,000 mg/L.
- Upward vertical hydraulic gradients and fractures near geologic features provide conduits for these chloride-rich waters to migrate. The Clay City Anticline is present east of the PAP and a saline spring has been mapped adjacent to this anticline approximately 10 miles south of the PAP in Clay County.
- Well APW15 is located in close proximity to bedrock and screened at a lower elevation than other wells monitoring the UA which could explain why this is the only affected well. The screened interval is estimated to be 10 to 15 feet lower than the top of bedrock in adjacent wells. The high hydraulic conductivity of the UA relative to the low hydraulic conductivity of underlying bedrock (Mehnert et al, 1990) at this location provides a potential pathway for interaction with upward-migrating chloride-containing bedrock groundwater.

This information serves as the written ASD prepared in accordance with 35 I.A.C. § 845.650(e), demonstrating that the chloride exceedance observed at APW15 during the E001 sampling event was not due to the PAP. Therefore, assessment of corrective measures is not required for chloride at the PAP.

Lithium, sulfate, and TDS exceedances will be addressed in accordance with 35 I.A.C. § 845.660.

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Figures

COMPLIANCE MONITORING WELL
BACKGROUND MONITORING WELL
MONITORING WELL
PORE WATER WELL
LEACHATE WELL
STAFF GAGE, CCR UNIT
STAFF GAGE, LAKE
GROUNDWATER ELEVATION CONTOUR (5-FT CONTOUR INTERVAL, NAVD88)
INFERRED GROUNDWATER ELEVATION
GROUNDWATER FLOW DIRECTION
REGULATED UNIT (SUBJECT UNIT)
SITE FEATURE

NOTES:
1. ELEVATIONS IN PARENTHESES WERE NOT USED FOR CONTOURING.
2. ELEVATION CONTOURS SHOWN IN FEET, NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88)

0 400 800 Feet

SAMPLING LOCATIONS AND POTENTIOMETRIC SURFACE MAP APRIL 24, 2023

ALTERNATIVE SOURCE DEMONSTRATION
PRIMARY ASH POND
NEWTON POWER PLANT
NEWTON, ILLINOIS

FIGURE 1

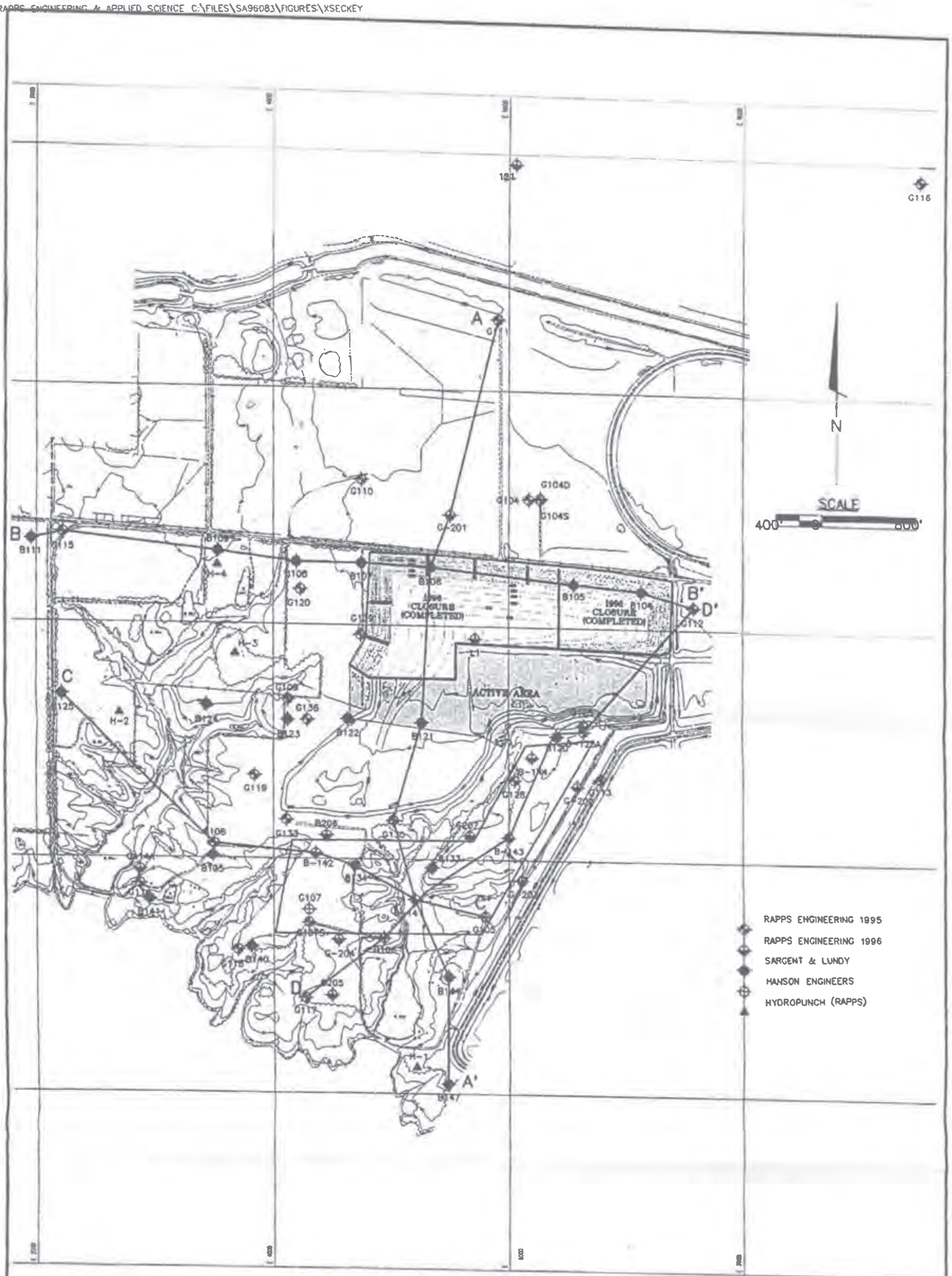
RAMBOLL AMERICAS ENGINEERING SOLUTIONS, INC.

RAMBOLL

Appendix A

Soil Boring B141 Location and Boring Log

RAPPS ENGINEERING & APPLIED SCIENCE C:\FILES\SA96083\FIGURES\XSECKEY



RAPPS
ENGINEERING & APPLIED SCIENCE
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1601 BROADWAY • MT. VERNON, IL 62864 • (618) 244-2611

FIGURE 3-2
CROSS SECTION
KEY
NEWTON POWER STATION LANDFILL
CENTRAL ILLINOIS PUBLIC SERVICE
NEWTON, ILLINOIS

RAYMOND
CONCRETE PILE DIVISION

To SARGENT & LUNDY — Date FEBRUARY 14, 1974 Job No. [illegible]

Location of Borings [illegible]TON, ILLINOIS — PROPOSED POWER PLANT EXPANSION

All borings are plotted to a scale of 1" = 8'. ft. using ELEVATIONS AS FURNISHED as a fixed datum.

No. 141

GROUND SURFACE

ELEV. 524.5' — 0.0'
LIGHT GREY SILTY TOP SOIL — 0.5'

BROWN CLAYEY SILT — 20 — 0

FINE SAND & SMALL TO MEDIUM GRAVEL — 11.3' – 11.5'
BROWN CLAYEY SANDY SILT — 43 — 14.5'
BROWN SANDY SILT — 15.0'

BROWN COMPACT SANDY CLAYEY SILT TR. GRAVEL — 60/6 — 44

SMALL TO MED. GRAVEL & SAND — 27.0' – 27.9'
BROWN SANDY SILTY CLAY TR. GRAVEL — 36
SMALL TO MED. GRAVEL & SAND — 32.0' – 33.1'
BROWN SANDY SILTY CLAY — 34 — 34.4'

38

GREY SANDY — 47

CLAYEY SILT — 55

TR. GRAVEL — 47

35

Elevations: 525, 520, 515, 510, 505, 500, 495, 490, 485, 480, 475, 470, 465

No. 142

GROUND SURFACE

ELEV. 534.8' — 0
GREY SILTY TOP SOIL — 0.

BROWN & GREY SILTY CLAY — 6 — 14

FINE SAND & GRAVEL — 11 – 11
BROWN & GREY SILTY CLAY — 22 — 16.
SAND & GRAVEL — 18.
BROWN COMPACT FINE SAND — 60/9 — 22.
FINE TO COURSE SAND & MED. TO LARGE GRAVEL — 60/11 — 25.

60

GREY COMPACT SANDY CLAYEY SILT TR. GRAVEL SOME SAND SEAMS — 60/11 — 38 — 39 — 48.

43

BROWN & GREY SANDY SILTY CLAY TR. GRAVEL — 51 — 56.
GREY COMPACT SANDY CLAYEY SILT TR. GRAVEL — 57.
FINE SAND & SMALL TO MED. GRAVEL SEAM — 58. — 41

43

GREY COMPACT — 44

6? .3'
SAND & SMALL TO MED. GRAVEL 60/9 69.0'
5. LIGHT GREY SANDY CLAYEY SILT TR. GRAVEL 37
74.0'
450 60/8 41
COMPACT SANDY SILT 8
445 TR. GRAVEL & CLAY 60/7 37
GREY SANDY SILTY CLAY TR. GRAVEL
83.0'
440 21 34
SAND & GRAVEL 9. 9
435 GREY SILTY 25 36
GREY SILTY CLAY TR. GRAVEL
430 CLAY TR. SAND 24 30 106 108
SAND & GRAVEL
425 & GRAVEL 20 29
GREY SANDY SILTY
(TR. WOOD) 23 26
CLAY TR. GRAVEL
415 21 24 120

BORING ADVANCED BY AUGER TO 20.0'.
WATER ENCOUNTERED @ 16.0'.
WATER LEVEL @ 10.0' 24 HRS. AFTER COMPLETION.
USED 20.0' OF BX CASING.

410 60/11 114.0'
BLACK SILTY SAND & WOOD
60/1 116.0'
SHALE OR BOULDER
BORING ADVANCED BY AUGER.
WATER ENCOUNTERED @ 15.0'.
405 WATER LEVEL @ 12.0' 24 HRS. AFTER COMPLETION.
USED 20.0' OF BX CASING.

FIGURES IN RIGHT HAND COLUMN SHOWN AS FRACTIONS
NUMERATOR - NUMBER OF BLOWS
DENOMINATOR - PENETRATION (IN INCHES)

Classifications are made by visual inspection.

Water levels (WL). Figure indicates time of reading (hours) after completion of boring. Water levels indicated are those observed when borings were made, or as noted. Porosity of the soil strata, variations of rainfall, site topography, etc., may cause changes in these levels.

Figures in right hand column indicate number of blows required to drive 2" O.D. sampling pipe one foot, using 140-lb. weight falling 30 inches.

Total Footage 230.0'
Foreman A. NEWBERRY
Classification by FOREMAN
Sheet of

Appendix B

Supporting Materials for LOE#1

RAMBOLL

SOIL BORING LOG INFORMATION

Facility/Project Name: Newton Power Station	License/Permit/Monitoring Number	Boring Number: APW15	
Boring Drilled By: Name of crew chief (first, last) and Firm: Adam Jochimsen, Cascade Drilling	Date Drilling Started: 1/21/2021	Date Drilling Completed: 1/22/2021	Drilling Method: Mini Sonic
Common Well Name: APW15	Final Static Water Level: Feet (NAVD88)	Surface Elevation: 522.06 Feet (NAVD88)	Borehole Diameter: 6.0 inches

Local Grid Origin ☐ (estimated: ☐) or Boring Location ☒

State Plane 821,107.90N, 997,938.87 E (E)/W

1/4 of 1/4 of Section 26, T 6 N, R 8 E

Lat 38° 55' 17.71"

Long -88° 17' 6.79"

Local Grid Location: Feet ☐N ☐S; Feet ☐E ☐W

Facility ID | County: Jasper | State: IL | Civil Town/City/ or Village: Newton

Sample Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	USCS	Graphic Log	Well Diagram	PID 10.6 eV Lamp	Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
1 CS	60 54		0	0 - 6.3' **FILL, LEAN CLAY:** CL, brown (10YR 5/3), silt (15-25%) sand (0-5%), stiff, no dilatancy, low toughness, medium plasticity, moist.	(FILL) CL				1.75					CS= Core Sample
			3						1.75					
2 CS	60 40		5											
			6.3	6.3 - 20' **LEAN CLAY:** CL, dark gray (10YR 4/1), silt (15-25%) sand (0-5%), gravel (0-5%), organic material (0-5%), very stiff to stiff, no dilatancy, medium toughness, medium plasticity, moist.	CL				2.25					
			9						4					
3 CS	60 50		10											
			11						1					

I hereby certify that the information on this form is true and correct to the best of my knowledge.

Signature [signature]

Firm Ramboll
234 W. Florida Street, Milwaukee, WI 53204
Tel: (414) 837-3607
Fax: (414) 837-3608

RAMBOLL

SOIL BORING LOG INFORMATION SUPPLEMENT

Boring Number APW15

Sample: Number and Type	Sample: Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	USCS	Graphic Log	Well Diagram	PID 10.6 eV Lamp	Compressive Strength (tsf)	Soil Properties: Moisture Content	Soil Properties: Liquid Limit	Soil Properties: Plasticity Index	Soil Properties: P 200	RQD/ Comments
			12–13	6.3 - 20' **LEAN CLAY:** CL, dark gray (10YR 4/1), silt (15-25%) sand (0-5%), gravel (0-5%), organic material (0-5%), very stiff to stiff, no dilatancy, medium toughness, medium plasticity, moist. *(continued)*					2.5					
4 CS	60 54		15						1.5					
			16		CL									
			17						2.25					
			19	19.2' brown (10YR 4/3), yellowish brown (10YR 5/6) mottling (10-15%), stiff.					2.5					
5 SH	24 23		20	20 - 22' **LEAN CLAY:** CL.	CL					18.5	33	23	59.2	SH= Shelby Tube
6 CS	96 96		22	22 - 23.5' **LEAN CLAY:** CL, brown (10YR 4/3), yellowish brown (10YR 5/6) mottling (10-15%), stiff, no dilatancy, medium toughness, medium plasticity, moist.	CL				1.25					
			23						1					
			23.5	23.5 - 26.7' **SANDY LEAN CLAY:** s(CL), brown (10YR 5/3), gray (10YR 5/1) mottling (5-10%), stiff, slow dilatancy, low toughness, medium plasticity, moist.	s(CL)				3.75					
			26.7	26.7 - 39.2' **LEAN CLAY:** CL, brown (10YR 5/3), yellowish brown (10YR 5/6) mottling (10-15%), gray (10YR 5/1) mottling (5-10%), sand (5-10%), gravel (0-5%), cobbles (0-5%), very stiff to hard, no dilatancy, medium toughness, medium plasticity, dry to moist.	CL				4.5					
			29						4.5					
6 CS	60 49		30	30' hard, dry.										
			31						4.5					
			32											

RAMBOLL SOIL BORING LOG INFORMATION SUPPLEMENT

Boring Number APW15

Sample Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	USCS	PID 10.6 eV Lamp	Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
			33	26.7 - 39.2' **LEAN CLAY:** CL, brown (10YR 5/3), yellowish brown (10YR 5/6) mottling (10-15%), gray (10YR 5/1) mottling (5-10%), sand (5-10%), gravel (0-5%), cobbles (0-5%), very stiff to hard, no dilatancy, medium toughness, medium plasticity, dry to moist. *(continued)*			4.5					
			34									
7 CS	60 49		35				4.5					
			36		CL							
			37				4.5					
			38									
			39				4.5					
8 CS	60 60		40	39.2 - 52.5' **LEAN CLAY:** CL, dark gray (10YR 4/1), no mottling, organic material (0-5%), sand (5-10%), gravel (0-5%), cobbles (0-5%), hard, no dilatancy, medium toughness, medium plasticity, dry, silt stringers 1mm to 3mm diameter fracture planes.								
			41				4.5					
			42									
			43				4.5					
			44									
9 CS	60 60		45				4.5					
			46		CL							
			47				4.5					
			48									
			49				4.5					
10 CS	60 60		50									
			51				4.5					
			52									

RAMBOLL

SOIL BORING LOG INFORMATION SUPPLEMENT

Boring Number APW15

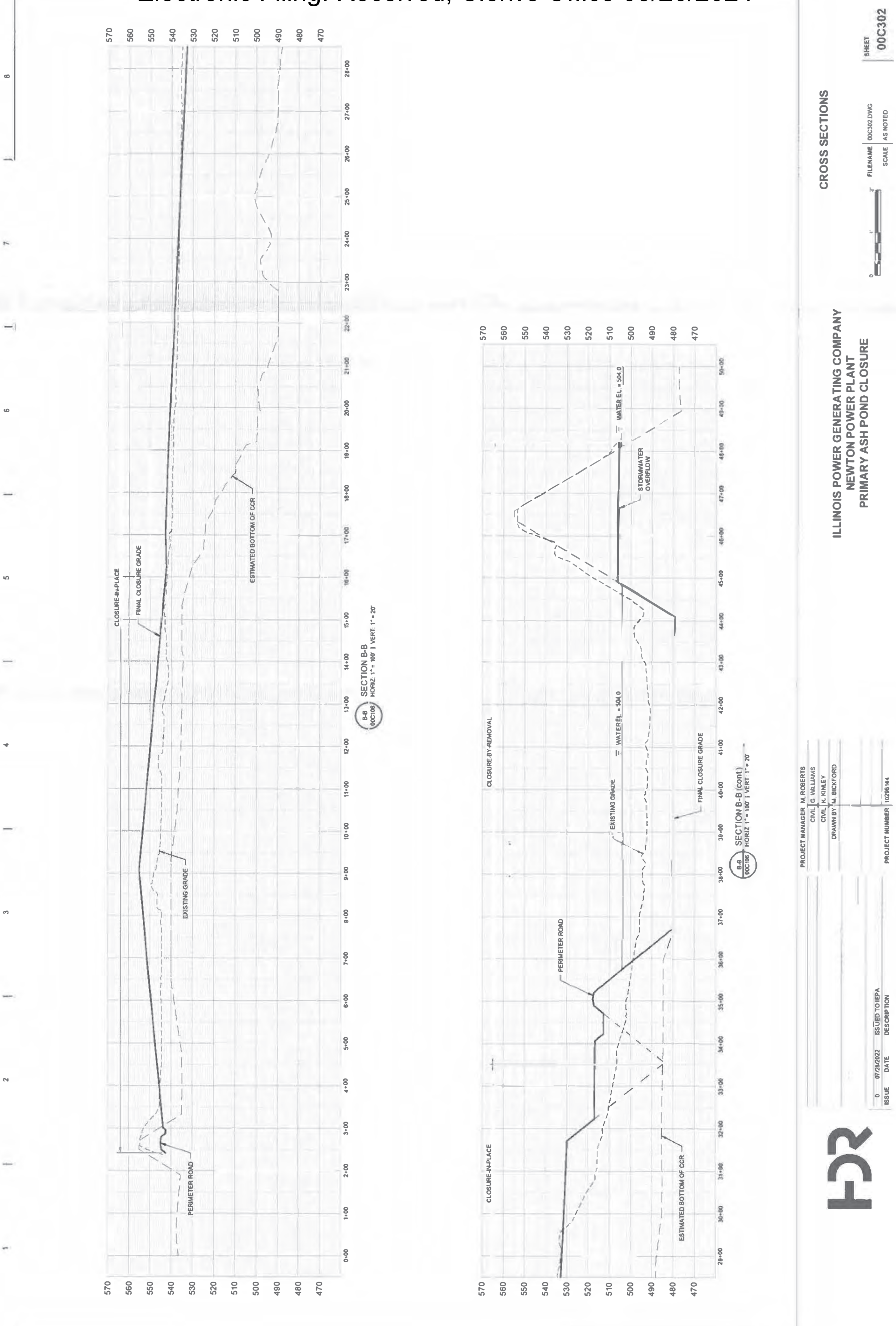
Sample Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	USCS	Graphic Log	Well Diagram	PID 10.6 eV Lamp	Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
			53	52.5 - 61.4' **SILT:** ML, dark gray (10YR 4/1), clay (15-25%), hard, no dilatancy, medium toughness, non-plastic, dry.	ML				4.5					
11 CS	60 57		55						4.5					
			57						4.5					
			59						4.5					
12 CS	60 52		61						4.5					
			62	61.4 - 97.2' **LEAN CLAY:** CL, dark gray (10YR 4/1), silt (15-25%), sand (0-10%), gravel (0-5%), organic material (0-5%), stiff to very stiff, no dilatancy, medium toughness, medium plasticity, moist to dry.	CL									
			63						2.75					
13 CS	60 60		65						2.75					
			67						2.25					
			69						2					
14 CS	60 60		71						2.5					

Sample Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	U S C S	Graphic Log	Well Diagram	PID 10.6 eV Lamp	Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
			73	61.4 - 97.2' **LEAN CLAY:** CL, dark gray (10YR 4/1), silt (15-25%), sand (0-10%), gravel (0-5%), organic material (0-5%), stiff to very stiff, no dilatancy, medium toughness, medium plasticity, moist to dry. *(continued)*					2.5					
15 CS	60 53		75						2					
			77						2.5					
			79						2.25					
16 CS	60 60		80											
			81						2.25					
			82		CL									
			83						4.5					
			84	83.8' - 83.9' layer of silty sand, moist.										
17 CS	60 60		85	85' - 85.4' later of silty sand, moist.					2.75					
			87						2.5					
			89						2.75					
18 CS	60 60		90											
			91						2.5					
			92											

Boring Number APW15

Sample Number and Type	Length Att. & Recovered (in)	Blow Counts	Depth In Feet	Soil/Rock Description And Geologic Origin For Each Major Unit	USCS	Compressive Strength (tsf)	Moisture Content	Liquid Limit	Plasticity Index	P 200	RQD/ Comments
			93	61.4 - 97.2' LEAN CLAY: CL, dark gray (10YR 4/1), silt (15-25%), sand (0-10%), gravel (0-5%), organic material (0-5%), stiff to very stiff, no dilatancy, medium toughness, medium plasticity, moist to dry. *(continued)*	CL	2.75					
19 CS	60 60		95								
			97.2	97.2 - 100' POORLY-GRADED SAND WITH SILT: SP-SM, dark gray (10YR 4/1), subrounded to rounded, medium to fine sand, loose, wet.	SP-SM						
20 SH	24 24		100	100 - 102' SILTY SAND: SM.	SM		12.1	15	3	45.8	
21 CS	36 36		102	102 - 104.3' SANDY SILT: s(ML), gray (10YR 5/1), firm, slow dilatancy, low toughness, non-plastic, wet.	s(ML)	1					
			104.3	104.3 - 105' LEAN CLAY: CL, dark gray (10YR 4/1), sand (5-10%), gravel (0-5%), organic material (0-5%), stiff to very stiff, no dilatancy, medium toughness, medium plasticity, moist.	CL						
22 MC	24 24		105	105 - 107' LEAN CLAY: CL.	CL		19.1	29	16	76.2	MC= Modified California Sample
23 CS	36 36		107	107 - 110' LEAN CLAY: CL, dark gray (10YR 4/1), sand (5-10%), gravel (0-5%), organic material (0-5%), stiff to very stiff, no dilatancy, medium toughness, medium plasticity, moist.	CL	2.25					
			109			2.5					
			110	110' End of Boring.							


ASH POND & SO_2 DISPOSAL POND
NEWTON POWER STATION UNIT 1
CENTRAL ILL. PUBLIC SERVICE CO.
NEWTON, ILLINOIS
SARGENT & LUNDY
S-69
REFERENCE DRAWINGS
S-19 SITE CONTOURS AND DEVELOPMENT PLAN SHEET 4.
GRADING AND DRAINAGE PLAN, PLANT AREA SHEET 2.
GRADING AND DRAINAGE PLAN, PLANT AREA SHEET 3.
WEIR BOX STRUCTURES AT PRIMARY AND SECONDARY SETTLING PONDS.
S-70 ASH POND DIKE PROFILE DETAILS & SECTION
GRADING & DRAINAGE PLAN- PLANT AREA- SHT.
NOTES
NORTH


CROSS SECTIONS
SHEET 00C302
FILENAME 00C302.DWG
SCALE AS NOTED
ILLINOIS POWER GENERATING COMPANY
NEWTON POWER PLANT
PRIMARY ASH POND CLOSURE
SECTION B-B
HORIZ: 1" = 100' | VERT: 1" = 20'
SECTION B-B (cont.)
CLOSURE-IN-PLACE
CLOSURE-BY-REMOVAL
FINAL CLOSURE GRADE
EXISTING GRADE
ESTIMATED BOTTOM OF CCR
PERIMETER ROAD
WATER EL. = 504.0
STORMWATER OVERFLOW
PROJECT MANAGER M. ROBERTS
CIVIL G. WILLIAMS
CIVIL K. KINLEY
DRAWN BY M. BICKFORD
PROJECT NUMBER 10298144
ISSUE DATE DESCRIPTION
0 07/28/2022 ISSUED TO IEPA

Appendix C

Supplemental Analytical Data

APPENDIX C.
SUPPORTING GROUNDWATER ANALYTICAL DATA
35 I.A.C. § 845: ALTERNATIVE SOURCE DEMONSTRATION
NEWTON POWER PLANT
PRIMARY ASH POND
NEWTON, IL

Well ID	Well Type	Date	Parameter	Result	Unit
APW15	Compliance	02/23/2021	Boron, total	0.140	mg/L
APW15	Compliance	03/10/2021	Boron, total	0.130	mg/L
APW15	Compliance	03/31/2021	Boron, total	0.160	mg/L
APW15	Compliance	04/28/2021	Boron, total	0.130	mg/L
APW15	Compliance	05/24/2021	Boron, total	0.150	mg/L
APW15	Compliance	06/17/2021	Boron, total	0.130	mg/L
APW15	Compliance	06/30/2021	Boron, total	0.130	mg/L
APW15	Compliance	07/14/2021	Boron, total	0.160	mg/L
APW15	Compliance	03/14/2023	Boron, total	0.180	mg/L
APW15	Compliance	04/26/2023	Boron, total	0.130	mg/L
APW15	Compliance	02/23/2021	Chloride, total	260	mg/L
APW15	Compliance	03/10/2021	Chloride, total	250	mg/L
APW15	Compliance	03/31/2021	Chloride, total	240	mg/L
APW15	Compliance	04/28/2021	Chloride, total	230	mg/L
APW15	Compliance	05/24/2021	Chloride, total	230	mg/L
APW15	Compliance	06/17/2021	Chloride, total	240	mg/L
APW15	Compliance	06/30/2021	Chloride, total	230	mg/L
APW15	Compliance	07/14/2021	Chloride, total	130	mg/L
APW15	Compliance	03/14/2023	Chloride, total	230	mg/L
APW15	Compliance	04/26/2023	Chloride, total	270	mg/L
APW15	Compliance	02/23/2021	Sulfate, total	1 U	mg/L
APW15	Compliance	03/10/2021	Sulfate, total	1 U	mg/L
APW15	Compliance	03/31/2021	Sulfate, total	1 U	mg/L
APW15	Compliance	04/28/2021	Sulfate, total	1 U	mg/L
APW15	Compliance	05/24/2021	Sulfate, total	1 U	mg/L
APW15	Compliance	06/17/2021	Sulfate, total	1 U	mg/L
APW15	Compliance	06/30/2021	Sulfate, total	1 U	mg/L
APW15	Compliance	07/14/2021	Sulfate, total	1 U	mg/L
APW15	Compliance	03/14/2023	Sulfate, total	0.6 J	mg/L
APW15	Compliance	04/26/2023	Sulfate, total	0.4 J	mg/L
XPW01	Porewater	02/17/2021	Boron, total	9.50	mg/L
XPW01	Porewater	03/09/2021	Boron, total	11.0	mg/L
XPW01	Porewater	03/30/2021	Boron, total	9.90	mg/L
XPW01	Porewater	04/28/2021	Boron, total	10.0	mg/L
XPW01	Porewater	07/14/2021	Boron, total	12.0	mg/L
XPW01	Porewater	02/23/2022	Boron, total	12.0	mg/L
XPW01	Porewater	08/15/2022	Boron, total	13.0	mg/L
XPW01	Porewater	02/01/2023	Boron, total	15.0	mg/L
XPW01	Porewater	04/27/2023	Boron, total	14.0	mg/L
XPW01	Porewater	02/17/2021	Chloride, total	49.0	mg/L
XPW01	Porewater	03/09/2021	Chloride, total	38.0	mg/L
XPW01	Porewater	03/30/2021	Chloride, total	32.0	mg/L
XPW01	Porewater	04/28/2021	Chloride, total	33.0	mg/L
XPW01	Porewater	07/14/2021	Chloride, total	27.0	mg/L
XPW01	Porewater	02/23/2022	Chloride, total	25.0	mg/L
XPW01	Porewater	06/14/2022	Chloride, total	14.0	mg/L

APPENDIX C.
SUPPORTING GROUNDWATER ANALYTICAL DATA
35 I.A.C. § 845: ALTERNATIVE SOURCE DEMONSTRATION
NEWTON POWER PLANT
PRIMARY ASH POND
NEWTON, IL

Well ID	Well Type	Date	Parameter	Result	Unit
XPW01	Porewater	08/15/2022	Chloride, total	11.0	mg/L
XPW01	Porewater	02/01/2023	Chloride, total	9.70	mg/L
XPW01	Porewater	04/27/2023	Chloride, total	8.10	mg/L
XPW01	Porewater	02/17/2021	Sulfate, total	19,000	mg/L
XPW01	Porewater	03/09/2021	Sulfate, total	14,000	mg/L
XPW01	Porewater	03/30/2021	Sulfate, total	19,000	mg/L
XPW01	Porewater	04/28/2021	Sulfate, total	12,000	mg/L
XPW01	Porewater	07/14/2021	Sulfate, total	11,000	mg/L
XPW01	Porewater	02/23/2022	Sulfate, total	9,300	mg/L
XPW01	Porewater	06/14/2022	Sulfate, total	6,100	mg/L
XPW01	Porewater	08/15/2022	Sulfate, total	5,900	mg/L
XPW01	Porewater	02/01/2023	Sulfate, total	4,200	mg/L
XPW01	Porewater	04/27/2023	Sulfate, total	2,900	mg/L
XPW02	Porewater	02/17/2021	Boron, total	2.30	mg/L
XPW02	Porewater	03/09/2021	Boron, total	2.50	mg/L
XPW02	Porewater	03/30/2021	Boron, total	2.40	mg/L
XPW02	Porewater	04/28/2021	Boron, total	2.60	mg/L
XPW02	Porewater	07/14/2021	Boron, total	2.50	mg/L
XPW02	Porewater	02/23/2022	Boron, total	2.40	mg/L
XPW02	Porewater	08/15/2022	Boron, total	2.40	mg/L
XPW02	Porewater	02/01/2023	Boron, total	2.30	mg/L
XPW02	Porewater	04/27/2023	Boron, total	2.30	mg/L
XPW02	Porewater	02/17/2021	Chloride, total	10.0	mg/L
XPW02	Porewater	03/09/2021	Chloride, total	9.60	mg/L
XPW02	Porewater	03/30/2021	Chloride, total	9.90	mg/L
XPW02	Porewater	04/28/2021	Chloride, total	9.70	mg/L
XPW02	Porewater	07/14/2021	Chloride, total	10.0	mg/L
XPW02	Porewater	02/23/2022	Chloride, total	12.0	mg/L
XPW02	Porewater	06/14/2022	Chloride, total	8.60	mg/L
XPW02	Porewater	08/15/2022	Chloride, total	8.90	mg/L
XPW02	Porewater	02/01/2023	Chloride, total	8.40 B	mg/L
XPW02	Porewater	04/27/2023	Chloride, total	8.80	mg/L
XPW02	Porewater	02/17/2021	Sulfate, total	160	mg/L
XPW02	Porewater	03/09/2021	Sulfate, total	150	mg/L
XPW02	Porewater	03/30/2021	Sulfate, total	160	mg/L
XPW02	Porewater	04/28/2021	Sulfate, total	190	mg/L
XPW02	Porewater	07/14/2021	Sulfate, total	160	mg/L
XPW02	Porewater	02/23/2022	Sulfate, total	210	mg/L
XPW02	Porewater	06/14/2022	Sulfate, total	170	mg/L
XPW02	Porewater	08/15/2022	Sulfate, total	160	mg/L
XPW02	Porewater	02/01/2023	Sulfate, total	150	mg/L
XPW02	Porewater	04/27/2023	Sulfate, total	150	mg/L
XPW03	Porewater	02/17/2021	Boron, total	1.30	mg/L
XPW03	Porewater	03/09/2021	Boron, total	1.20	mg/L
XPW03	Porewater	03/30/2021	Boron, total	0.840	mg/L
XPW03	Porewater	04/28/2021	Boron, total	1.20	mg/L

APPENDIX C.
SUPPORTING GROUNDWATER ANALYTICAL DATA
35 I.A.C. § 845: ALTERNATIVE SOURCE DEMONSTRATION
NEWTON POWER PLANT
PRIMARY ASH POND
NEWTON, IL

Well ID	Well Type	Date	Parameter	Result	Unit
XPW03	Porewater	07/14/2021	Boron, total	1.30	mg/L
XPW03	Porewater	02/23/2022	Boron, total	1.70	mg/L
XPW03	Porewater	08/16/2022	Boron, total	1.40	mg/L
XPW03	Porewater	02/02/2023	Boron, total	1.70	mg/L
XPW03	Porewater	04/27/2023	Boron, total	1.80	mg/L
XPW03	Porewater	02/17/2021	Chloride, total	14.0	mg/L
XPW03	Porewater	03/09/2021	Chloride, total	9.20	mg/L
XPW03	Porewater	03/30/2021	Chloride, total	13.0	mg/L
XPW03	Porewater	04/28/2021	Chloride, total	11.0	mg/L
XPW03	Porewater	07/14/2021	Chloride, total	11.0	mg/L
XPW03	Porewater	02/23/2022	Chloride, total	13.0	mg/L
XPW03	Porewater	06/15/2022	Chloride, total	11.0	mg/L
XPW03	Porewater	08/16/2022	Chloride, total	11.0	mg/L
XPW03	Porewater	02/02/2023	Chloride, total	9.60	mg/L
XPW03	Porewater	04/27/2023	Chloride, total	9.70	mg/L
XPW03	Porewater	02/17/2021	Sulfate, total	92.0	mg/L
XPW03	Porewater	03/09/2021	Sulfate, total	93.0	mg/L
XPW03	Porewater	03/30/2021	Sulfate, total	94.0	mg/L
XPW03	Porewater	04/28/2021	Sulfate, total	96.0	mg/L
XPW03	Porewater	07/14/2021	Sulfate, total	120	mg/L
XPW03	Porewater	02/23/2022	Sulfate, total	130	mg/L
XPW03	Porewater	06/15/2022	Sulfate, total	150	mg/L
XPW03	Porewater	08/16/2022	Sulfate, total	180	mg/L
XPW03	Porewater	02/02/2023	Sulfate, total	98.0	mg/L
XPW03	Porewater	04/27/2023	Sulfate, total	120	mg/L
XPW04	Porewater	02/17/2021	Boron, total	2.50	mg/L
XPW04	Porewater	03/09/2021	Boron, total	2.40	mg/L
XPW04	Porewater	03/29/2021	Boron, total	2.10	mg/L
XPW04	Porewater	04/28/2021	Boron, total	2.80	mg/L
XPW04	Porewater	07/14/2021	Boron, total	2.30	mg/L
XPW04	Porewater	02/23/2022	Boron, total	2.20	mg/L
XPW04	Porewater	08/16/2022	Boron, total	3.70	mg/L
XPW04	Porewater	02/01/2023	Boron, total	3.50	mg/L
XPW04	Porewater	04/28/2023	Boron, total	4.00	mg/L
XPW04	Porewater	02/17/2021	Chloride, total	62.0	mg/L
XPW04	Porewater	03/09/2021	Chloride, total	34.0	mg/L
XPW04	Porewater	03/29/2021	Chloride, total	31.0	mg/L
XPW04	Porewater	04/28/2021	Chloride, total	37.0	mg/L
XPW04	Porewater	07/14/2021	Chloride, total	34.0	mg/L
XPW04	Porewater	02/23/2022	Chloride, total	30.0	mg/L
XPW04	Porewater	06/15/2022	Chloride, total	50.0	mg/L
XPW04	Porewater	08/16/2022	Chloride, total	54.0	mg/L
XPW04	Porewater	02/01/2023	Chloride, total	46.0	mg/L
XPW04	Porewater	04/28/2023	Chloride, total	59.0	mg/L
XPW04	Porewater	02/17/2021	Sulfate, total	2,200	mg/L
XPW04	Porewater	03/09/2021	Sulfate, total	1,400	mg/L

APPENDIX C.
SUPPORTING GROUNDWATER ANALYTICAL DATA
35 I.A.C. § 845: ALTERNATIVE SOURCE DEMONSTRATION
NEWTON POWER PLANT
PRIMARY ASH POND
NEWTON, IL

Well ID	Well Type	Date	Parameter	Result	Unit
XPW04	Porewater	03/29/2021	Sulfate, total	600	mg/L
XPW04	Porewater	04/28/2021	Sulfate, total	3,800	mg/L
XPW04	Porewater	07/14/2021	Sulfate, total	1,600	mg/L
XPW04	Porewater	02/23/2022	Sulfate, total	1,800	mg/L
XPW04	Porewater	06/15/2022	Sulfate, total	7,500	mg/L
XPW04	Porewater	08/16/2022	Sulfate, total	4,000	mg/L
XPW04	Porewater	02/01/2023	Sulfate, total	6,200	mg/L
XPW04	Porewater	04/28/2023	Sulfate, total	9,500	mg/L

Notes:
mg/L = milligrams per liter
B = The analyte was found in sample and in associated method blank.
J = The result is an estimated quantity. The associated numerical value is the approximate concentration of the analyte in the sample.
U = The analyte was analyzed for, but was not detected above the level of the adjusted detection limit or quantitation limit, as appropriate.

DOCUMENT
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Rees, Jeromy

From: Seif, Josiah
Sent: Wednesday, October 11, 2023 2:58 PM
To: Mullenax, Heather; Bierwagen, Justin; Hunt, Lauren
Cc: Dunaway, Lynn; Summers, Michael; LeCrone, Darin
Subject: 2023 Qtr. 2 ASD Exceedance letter - Newton Primary Ash Pond - #W0798070001-01

Hard copy of the **2023 Qtr. 2 Alternate Source Demonstration(ASD) Exceedance letter - Newton Primary Ash Pond #W0798070001-01**, has been received, scanned to the N:Drive, and hard copy placed in the Impoundment. If you have any questions, please let me know.

Thank you,

Josiah M. Seif
Josiah M. Seif
CCR Office Coordinator
Bureau of Water
Illinois Environmental Protection Agency
217-782-0610
Josiah.Seif@illinois.gov