APPENDIX B

BORING LOGS (CD)

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TMP-01						
		4-inch core		Drilled by Vernon Scott		
01/26/15 @ 10:10 to 15:00						
Drilled Interval		Recovery	Depths		Description	Notes
Top	Bottom		Top	Bottom		
0.0	7.0	5.4	0.0	4.7	Silt with some Gravel, 10YR7.2 (light gray), moderately soft, nonplastic, and moist. Gravel is rounded chert, 10YR7/6 (yellow), loose, and wet	
			4.7	7.0	Silt, 10YR7/1 (light gray) mottled with 10YR6/4 (light yellowish brown), soft, nonplastic, and moist	
7.0	17.0	12.4	7.0	8.6	Silt as above	
			8.6	14.3	Silt, 10YR7/3 (very pale brown) with light mottling and occasional blebs of 10YR2/1 (black) (manganese?), soft, nonplastic, and moist	
			14.3	17.0	Silt, 10YR7/1 (light gray) heavily mottled with 10YR5/2 (grayish brown), soft to moderately soft, nonplastic, and moist	
17.0	27.0	11.9	17.0	17.8	Silt as above	
			17.8	22.8	Silt, 10YR7/1 (light gray) mottled with 10YR7/3 (very pale	
			22.8	23.5	Very fine Sand, 10YR7/4 (very pale brown), poorly graded, medium dense, and moist. Sand is quartz	
			23.5	24.2	Gap graded Sand with Gravel, 10YR7/4 (very pale brown), loose, and moist: 40% very fine, quartz sand; 30% very course, subangular, chert sand; and 30% subrounded to rounded chert gravel with no patina (white)	
			24.2	26.2	Silt with some Gravel, 10YR7/3 (very pale brown), moderately stiff, nonplastic, and moist. Gravel is rounded chert with light brown patina, 0.3 to 0.8 inch diameter	
			26.2	27.0	Very fine Sand with some Gravel, 10YR7/2 (light gray), friable, nonplastic, and dry. Sand is quartz. Gravel is rounded chert with light brown patina, 0.3 to 0.6 inch diameter	
27.0	37.0	9.3	27.0	28.1	Very fine Sand with some Gravel as above	
			28.1	29.8	Silt, 10YR7/1 (light gray) mottled with 10YR7/8 (yellow), moderately soft, nonplastic, and moist	
			29.8	32.3	Sandy Silt with little Gravel, 10YR7/3 (very pale brown), soft, nonplastic, and moist. Sand is very fine quartz. Gravel is rounded chert with light brown patina, 0.2 to 0.3 inch diameter	
			32.3	37.0	Very fine Sand with little Gravel, 10YR7/6 (yellow), loose, and slightly moist. Sand is quartz. Gravel is subrounded chert with no patina (white), 0.2 to 0.3 inch diameter	
37.0	47.0	13.6	37.0	38.9	Gap graded Sand with Gravel, 10YR6/3 (pale brown), loose, and wet: 35% very fine, quartz sand; 25% course to very course, subrounded, chert sand without patina (white); and 40% subrounded to rounded chert gravel with brown patina, 0.5 to 0.6 inch diameter	
			38.9	39.4	Very fine Sand, 10YR7/6 (yellow), loose, and moist. Sand is quartz	
			39.4	40.3	Sand with Gravel as 37.0 to 38.9 ft	
			40.3	41.6	Very fine Sand with little Gravel, 10YR7/4) very pale brown), loose, and moist. Sand is quartz. Gravel is rounded chert with brown patina, 0.7 to 0.9 inch diameter	
			41.6	45.9	Clayey Silt, 10YR7/3 (very pale brown), soft, slightly plastic, and moist	
			45.9	47.0	Very fine Sand with little Gravel, 10YR8/1 (white) mottled with 10YR7/8 (yellow), loose to moderately dense, and moist. Sand is quartz. Gravel is rounded chert without patina (white), 0.3 to 0.4 inch diameter	
47.0	57.0	9.6	47.0	48.1	Very fine Sand with little Gravel as above	
			48.1	51.6	Clayey Silt, 10YR7/2 (light gray) with 10YR6/6 (brownish yellow) mottling, soft, moderately plastic and moist	
			51.6	55.2	Fine Sand, 10YR7/4 (very pale brown), loose and moist. Sand is quartz	
			55.2	56.6	Silty, fine Sand with little Gravel, 10YR7/2 (light gray), medium dense, and moist. Sand is quartz. Gravel is subangular chert with black patina, 1.0 to 2.2 inch diameter	
			56.6	57.0	Silt, 10YR7/2 (light gray), soft, nonplastic, and moist	

TMP-01						
		4-inch core		Drilled by Vernon Scott		
01/26/15 @ 10:10 to 15:00						
Drilled Interval		Recovery	Depths		Description	Notes
Top	Bottom		Top	Bottom		
57.0	67.0	11.3	57.0	58.9	Silty fine Sand with little Gravel, 10YR7/2 (light gray) with 10YR7/6 (yellow) laminations, medium dense, and moist. Sand is quartz. Gravel is subangular chert with no patina (white), 0.2 to 1.5 inch diameter	
			58.9	60.5	Gap graded Sand with Gravel, 10YR7/4 (very pale brown), loose, and moist: 35% fine quartz sand; 20% course to very course, subrounded, chert sand; and 45% subangular to subrounded chert gravel, 0.4 to 1.0 inch diameter	Top of RGA at 58.9 ft
			60.5	61.2	Silty fine Sand with Gravel, 10YR7/2 (light gray), loose, and moist. Sand is quartz. Gravel is subangular chert without iron patina (white), 0.7 to 1.0 inch diameter	
			61.2	67.0	Gravelly Sand, 10YR7/2 (light gray), loose, and moist. 30% very fine quartz sand, 25% coarse to very coarse, subangular chert sand, 45% subangular to subrounded chert (with and without brown patina), 0.4 to 1.0 inch diameter	
67.0	77.0	10.7	67.0	76.1	Sandy Gravel, 10YR7/4 (very pale brown), loose, and moist. 55% gravel, subangular to subrounded chert with brown patina, 0.3 to 1.2 inch diameter with occasional 2.0 inch cobble. Sand is gap graded: 20% fine quartz sand and 25% coarse to very coarse, subrounded to subangular chert	
			76.1	77.0	Gravelly Sand, 7.5YR6/4 (light brown), loose, and moist. Sand is gap graded: 30% fine quartz sand and 25% coarse to very coarse, subrounded chert. Gravel is subrounded to subangular chert with brown patina, 0.3 to 0.8 inch diameter	
77.0	87.0	11	77.0	87.0	Sandy Gravel, 7.5YR6/6 (reddish yellow), loose, and moist. 55% subrounded to subangular chert gravel with brown patina, 0.3 to 1.5 inch diameter; 25% coarse to very coarse, subangular to subrounded, chert sand; and 20% fine quartz sand	
87.0	97.0	11.6	87.0	93.0	Sandy gravel as above but with few larger cobbles, 2.5 to 3.0 inch diameter	Base of RGA at 93.0 ft
			93.0	93.6	Very fine Sand, 7.5YR7/3 (pink) laminated with 7.5YR7/1 (light gray), medium dense/soft, and moist	
			93.6	93.8	Clayey Silt, 7.5YR6/2 (gray) with 5YR5/8 (yellowish red) laminations, soft, slightly plastic, and moist	
			93.8	94.3	Very fine Sand, 10YR7/8 (yellow), medium dense/soft, and moist	
			94.3	96.3	Interlaminated Clayey Silt, 10YR6/1 (gray), soft, and moist AND very fine Sand, 10YR7/6 (yellow) grading down to 10YR8/1 (white), medium dense/soft, and moist	
			96.3	97.0	Very fine Sand, 10YR8/2 (very pale brown), loose, and moist	
TD = 97.0 ft						

UNIFORM KENTUCKY WELL CONSTRUCTION RECORD

Use this form only to report installation of monitoring or water wells.
Original copy must be submitted to Division of Water within 60 days of completion.
See instructions on reverse of form.
Record must be typed or neatly printed or it will be returned to the driller as unacceptable.
One copy to Division of Water, one copy to owner, one copy to driller's files.

Attach Well Identification Number (AKGWA) Label Here
Water wells: yellow labels
Monitoring wells: blue labels

1. Kentucky Well ID (AKGWA) Number

2. Owner well ID# SIW-01S

4. Owner name: Paducah Gaseous Diffusion Plant
5. Owner address: 5600 Hobbs Rd.
6. City: West Paducah 7. State: KY 8. Zip: 42053

If site name and address differ from owner name and address:
9. Site name
10. Site address
11. City 12. State: KY 13. Zip

3. Attachments
Required
1. Site plan or sketch map [x]
2. Well location
On topographic map, OR
Obtained by GPS unit
Conditionally Required
3. Well diagram (monitoring well) [x]
4. Coliform analysis (if applicable) [ ]
5. Signed Variance (if applicable) [ ]
Optional
6. Other laboratory analysis report [ ]

14. Agency Interest (AI) Number: 3059
15. Facility type: CERCLA, RCRA, Solid Waste, UST, Drinking Water, Mining
ID Number: KY8-890-008-982

16. Owner phone: (270) 441-6000 17. Site phone: (270) 441-6000

23. Install start date: Jan 30 2015 (Month Day Year)
24. Install end date: Jan 30 2015

18. USGS topo map: Heath
19. County: Mccracken
20. Physiographic Region: Blue Grass, Ohio River Alluvium, E. Coal Field, W. Coal Field, Miss. Plateau, Jackson Purchase
21. Surface elevation (ft): 380.00
22. Elevation determined by: GPS, Map, Survey, Prior report, Prior well log

Please report depths in feet below ground surface, not as relative elevations.
25. Total depth: 71.00
26. Depth to bedrock
27. Static water level
28. Casing height above surface (in)

29. Well use: Agriculture, Commercial, Domestic, Industrial, Monitoring / Remed, Public, Geothermal, Heat pump, HVAC, Injection, Mining, Unused
NOTE: CODE REQUIRED for well uses on left. Select a code from the dropdown menu.

30. Drilling method: Auger – HS, Auger – SS, Auger – bucket, Auger – hand, Cable tool, Core, Driven Casing, Excavation, Combined – HS auger and air rotary, Combined – other (specify): Jet wash, Push/probe, Rotary – air, Rotary – mud, Rotary – reverse, Sand point, Sonic, Unknown

31. Well status: Active, Inactive, Unsuitable for intended use
32. Wellhead: Flush, Well cap, Locking, Sanitary seal
33. Well development method: Surging, Jetting, Pumping, Backwashing, Bailing, Compressed air, Combination of methods (specify)

WATER WELLS ONLY

34. Estimated well yield: gpm, gph, gpd
35. Well service: #of people served
36. Disinfectant amount: oz, qt, cups, lb, gal
37. Type: Bleach, Hypo-chlorite
38. Pitless adapter installed: Yes, No
39. Pump installed: Submersible, Jet, Bailer or bucket, Turbine, Hand, No pump
40. Depth to intake (ft)
41. Apparent quality and odor
APPEARANCE: Clear, Cloudy, Muddy, Turbid
ODOR: none, slight, mod., high — Iron, Sulfur, Salt

46. Well completion: Casing and screens

From depth (feet)	To depth (feet)	Borehole diameter (inches)	Casing diam (in) ID	Casing diam (in) OD	Casing type	Screen slot size
0.00	66.20	12.75		3.00	Steel (galvanized)	
66.20	70.90	12.75		3.00	Stainless steel screen	0.01

47. Annulus fill and seal

From depth (feet)	To depth (feet)	Material
97.0	84.0	Sand
84.0	75.0	grout
75.0	62.0	Sand
62.0	1.0	grout
1.0	0.0	concrete

48. Lithologic log (if more space is needed, continue on separate page)

From depth (ft)	To depth (ft)	Description (include any show of water and indicate apparent quality)
0.00	58.90	UCRS
58.90	93.00	RGA
93.00	~~96.00~~ 97.00	McNairy Formation 3/3/15
		Fixed error AR

49. Sketch map [x]

COLIFORM TEST

42. Coliform test type: fecal, fecal and total
43. Coliform test results: 0 or <1.0, TNTC, Confluent, or # colonies per 100 mL
44. Date sampled (Month Day Year)
45. Date analyzed

50. Comments
Annular fill and seal is per the attached construction drawing. This is the shallower of two nested wells in a single 12.75" borehole, wellhead will be attached to a boiler for steam injection

Latitude
Longitude
Lat/Long Method: INT, GPS, SUR, REP

51. Affirmation: The work described above was done under my supervision, and this report is true and correct to the best of my knowledge.
Note: the driller is not responsible for natural groundwater quality or quantity encountered while drilling or completing this well.

Signature of certified driller: [signature] Date signed: Feb 10 2015
Certification number: 0411 - 0549 - 00 Drilling company: Cascade Drilling LP

Date Received

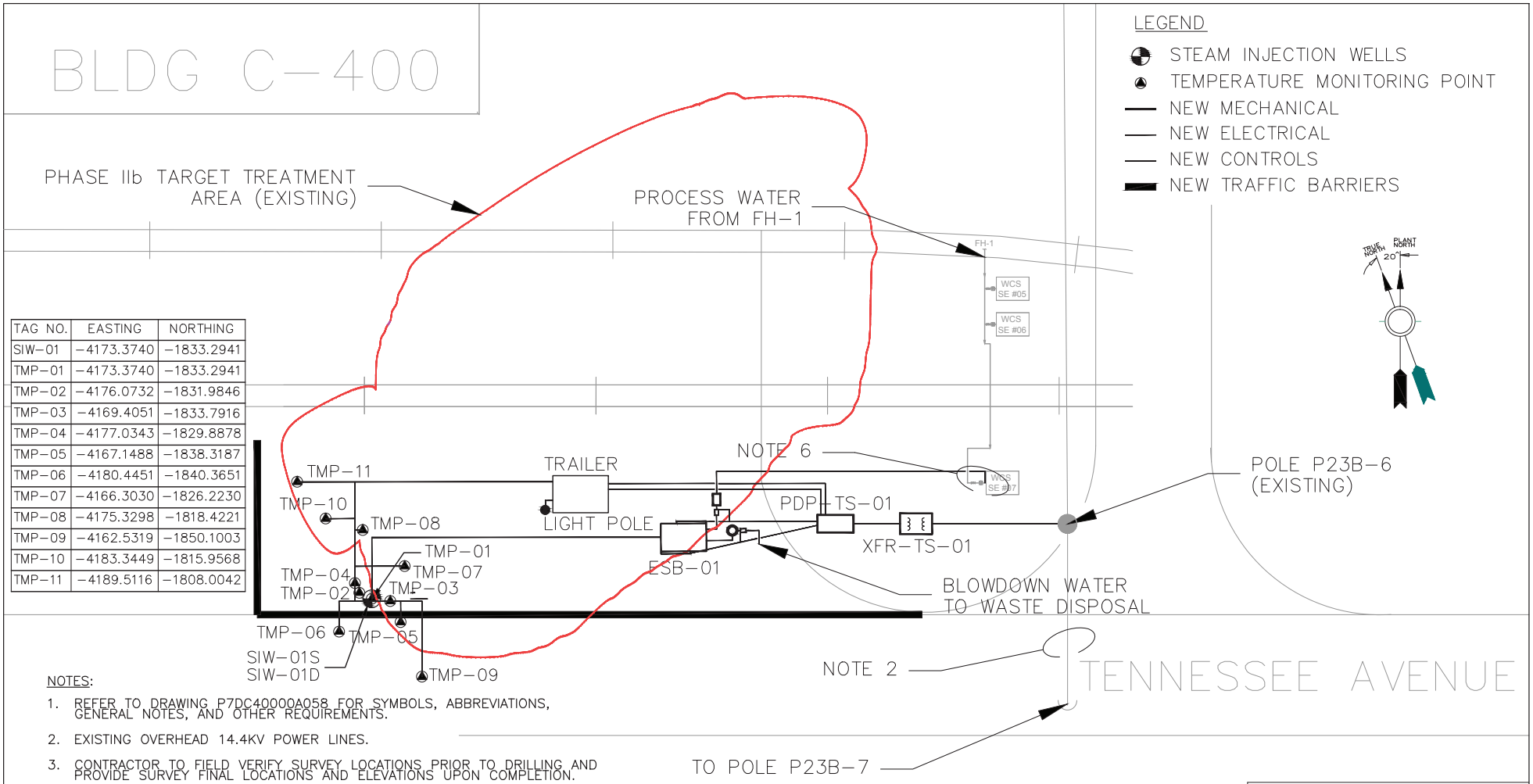
rev 02/29/2012

2. Owner Well ID#
Owner well ID # denotes the site designation for the well, e.g. "MW-06."

15. Facility type & ID number
If the well is located at any of the listed facility types, please note the historic site ID # in the spaces provided. This information is vital for other programs that may need to locate the well record in the database.

25. Well use
If well use falls under any of the following General Use designations with a corresponding Specific Use, you must include the corresponding Use Code:

WELL USE CODES		
GENERAL USE	SPECIFIC USE	USE CODE
Agriculture	Agriculture - Dairy Operation	01
Agriculture	Agriculture - Feed Pen Operation	02
Agriculture	Agriculture - Fish And Game Propagation	03
Agriculture	Agriculture - General	04
Agriculture	Agriculture - Horse Farm	05
Agriculture	Agriculture - Irrigation	06
Agriculture	Agriculture - Livestock Watering	07
Agriculture	Agriculture - Poultry And Egg Operation	08
Commercial	Commercial	01
Commercial	Commercial - Irrigation	02
Commercial	Dewatering Well - Construction	03
Domestic	Domestic - Multiple Domestic Households	01
Domestic	Domestic - Single Household	02
Industrial	Industrial - General	01
Industrial	Industrial - Manufacturing	02
Industrial	Industrial - Petroleum Processing Plant	03
Monitoring & Remediation	Monitoring Well - Ambient Monitoring	01
Monitoring & Remediation	Monitoring Well - Compliance	02
Monitoring & Remediation	Monitoring Well - Military Installation	03
Monitoring & Remediation	Monitoring Well - Water Level Monitoring Only	04
Monitoring & Remediation	Remediation	05
Public	Public - Community	01
Public	Public - Exploration	02
Public	Public - Non-transient, Non-community	03
Public	Public - Transient, Non-community	04
Public	Public - Unregulated	05
Geothermal	(general use)	-
Heat pump	(general use)	-
HVAC	(general use)	-
Injection	(general use)	-
Mining	(general use)	-
Unused	(general use)	-



TAG NO.	EASTING	NORTHING
SIW-01	-4173.3740	-1833.2941
TMP-01	-4173.3740	-1833.2941
TMP-02	-4176.0732	-1831.9846
TMP-03	-4169.4051	-1833.7916
TMP-04	-4177.0343	-1829.8878
TMP-05	-4167.1488	-1838.3187
TMP-06	-4180.4451	-1840.3651
TMP-07	-4166.3030	-1826.2230
TMP-08	-4175.3298	-1818.4221
TMP-09	-4162.5319	-1850.1003
TMP-10	-4183.3449	-1815.9568
TMP-11	-4189.5116	-1808.0042

NOTES:

1. REFER TO DRAWING P7DC40000A058 FOR SYMBOLS, ABBREVIATIONS, GENERAL NOTES, AND OTHER REQUIREMENTS.
2. EXISTING OVERHEAD 14.4KV POWER LINES.
3. CONTRACTOR TO FIELD VERIFY SURVEY LOCATIONS PRIOR TO DRILLING AND PROVIDE SURVEY FINAL LOCATIONS AND ELEVATIONS UPON COMPLETION.
4. REFER TO DRAWING C7DC40000A028 FOR WELL AND TMP DETAILS.
5. CONNECT XFR-TS-01 TO EXISTING 14.4KV POWER LINE AT POLE P23B-6.
6. CONNECT ESB-01 FEEDWATER TO EXISTING PROCESS WATER LINE SUPPLIED FROM FIRE HYDRANT FH-1.
7. ROUTINGS AND LOCATIONS ARE DIAGRAMMATIC. INSTALL AS NEEDED TO MAXIMIZE EFFICIENCY.
8. INSTALL ALL PIPING AND CONDUITS NORTH OF JERSEY BARRIERS ABOVEGROUND. PIPING SHALL BE INSTALLED ON PIPE SUPPORTS. CONDUITS CAN LAY DIRECTLY ON GROUND.
9. ROUTE WIRING FROM TMP-05, TMP-06, AND TMP-09 UNDERGROUND TO NORTH OF NEW JERSEY BARRIERS.
10. INSTALL JERSEY TYPE CONCRETE BARRIERS (MINIMUM 40" HEIGHT) ALONG AND NORTH OF TENNESSEE AVENUE AS SHOWN TO PREVENT VEHICULAR ACCESS INTO EQUIPMENT AREA.

LPE

STATE OF KENTUCKY ERIN L. SURINAK LICENSED PROFESSIONAL ENGINEER

Expires 06-30-16

DATE

PROFESSIONAL SEAL

REV.	DATE	DESCRIPTION	DRAWN BY	DRAFT CHK	PROJ ENGR	LEAD ENGR	CONF CTRL/ NUCL SFTY	FAC MGR	EATS MGR
0	5/30/14	ISSUED FOR CONSTRUCTION	JE	JE	CRE	CRE			

DRAWING REVISIONS

U.S. DEPARTMENT OF ENERGY
DOE PORTSMOUTH/PADUCAH PROJECT OFFICE
PADUCAH GASEOUS DIFFUSION PLANT

LATA Environmental Services of Kentucky, LLC
managed for the DEPARTMENT OF ENERGY under U.S. GOVERNMENT contract DE-AC30-10CC40020
Paducah, Kentucky

Environmental Resources Management
1218 3rd AVENUE, SEATTLE WASHINGTON
(425) 462-8591

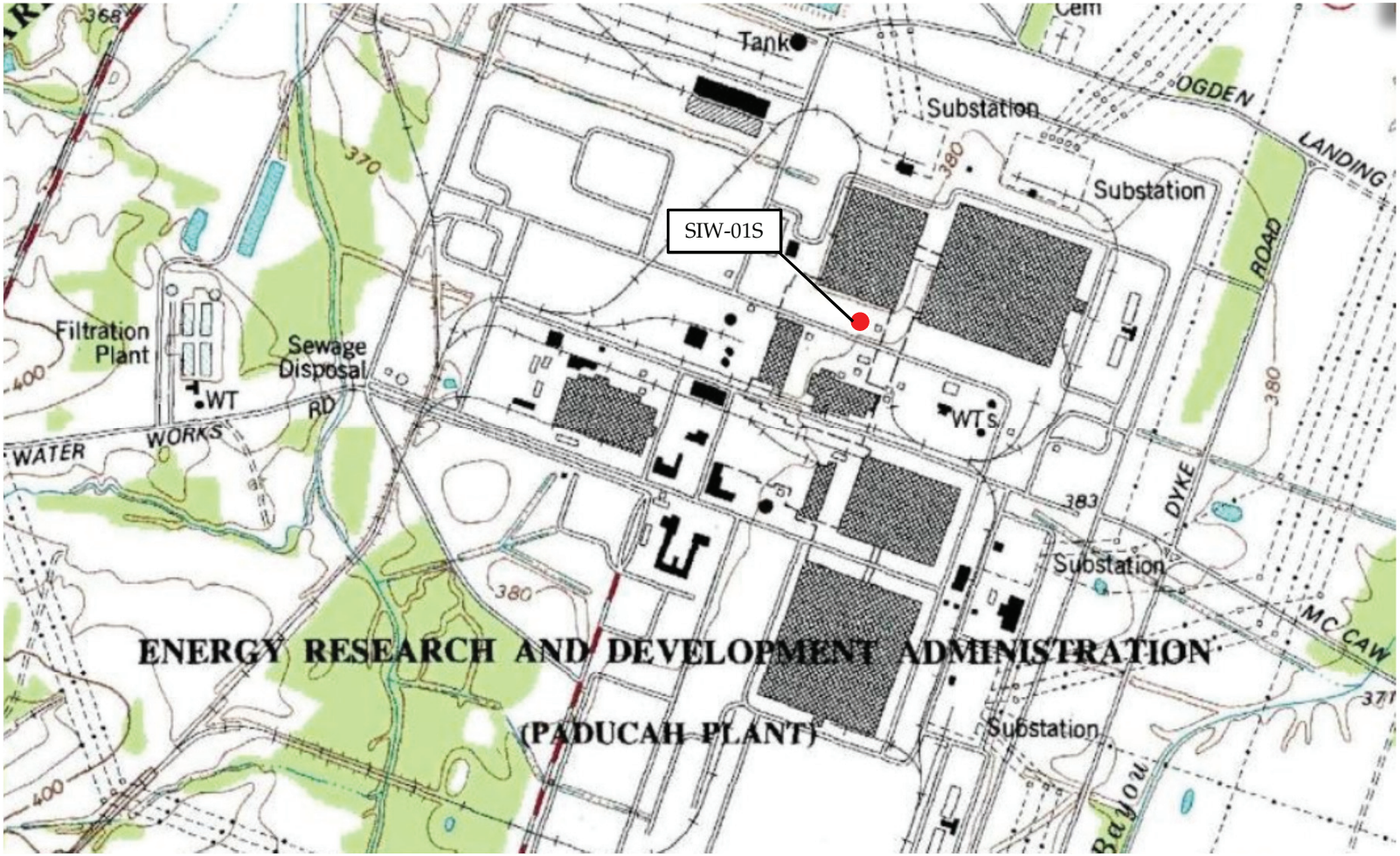
DOE CONTRACT NO. DE-AC30-10CC40020

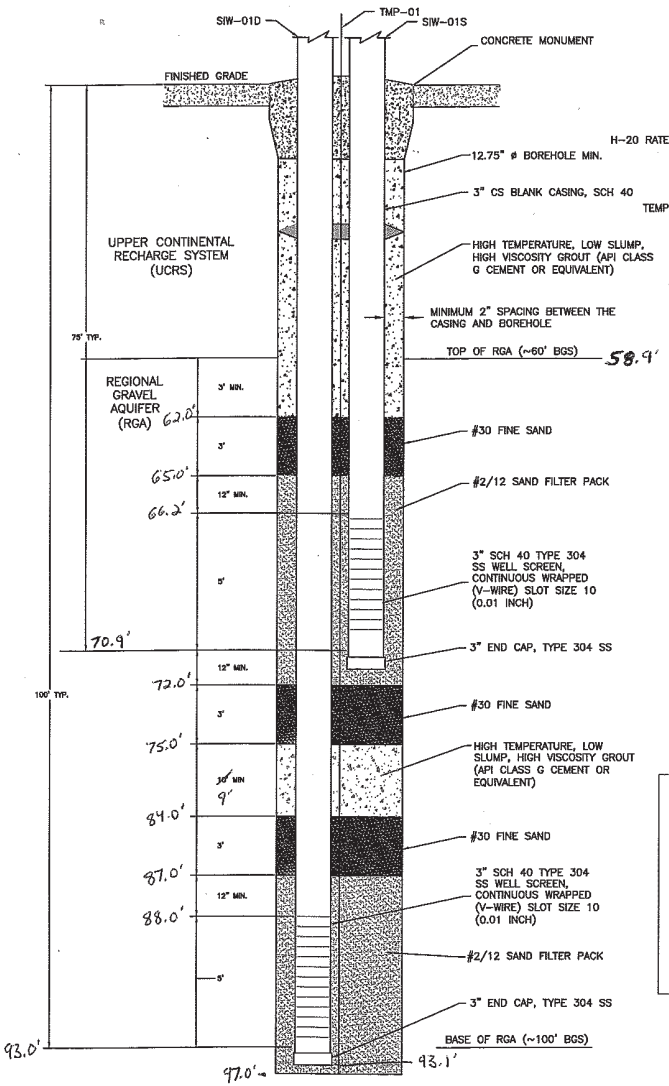
PROJECT NAME:
C-400 STEAM INJECTION TREATABILITY STUDY

TITLE:
TREATABILITY STUDY SITE PLAN

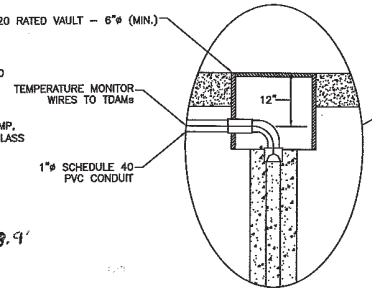
CAD FILE NAME	BUILDING	PLANT	CLASS
A027_SITE PLAN.DWG	C-400	PGDP	U

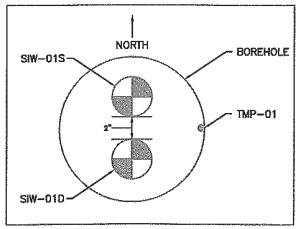
SCALE:	DRAWING NUMBER	REV
AS SHOWN	C7DC40000A027	0


SIW-01S
Tank
Substation
Substation
OGDEN
LANDING
ROAD
Filtration Plant
Sewage Disposal
WT
RD
WATER
WORKS
WTs
DYKE
Substation
MC CAW
Substation
Bayou
370
380
383
400
ENERGY RESEARCH AND DEVELOPMENT ADMINISTRATION
(PADUCAH PLANT)

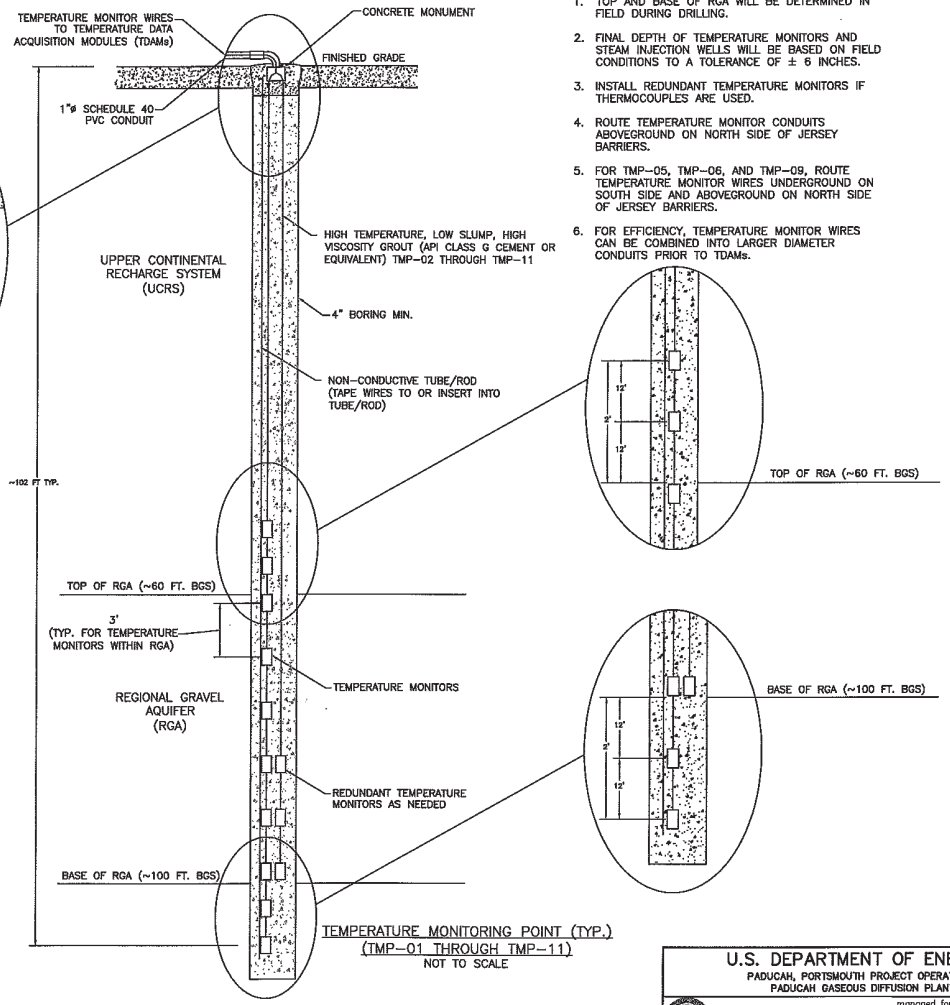


NESTED STEAM INJECTION WELL (TYP.)
(SIW-01S, SIW-01D)
NOT TO SCALE





PLAN VIEW
SIW-01S, SIW-01D
NOT TO SCALE



TEMPERATURE MONITORING POINT (TYP.)
(TMP-01 THROUGH TMP-11)
NOT TO SCALE

NOTES:
1. TOP AND BASE OF RGA WILL BE DETERMINED IN FIELD DURING DRILLING.
2. FINAL DEPTH OF TEMPERATURE MONITORS AND STEAM INJECTION WELLS WILL BE BASED ON FIELD CONDITIONS TO A TOLERANCE OF ± 6 INCHES.
3. INSTALL REDUNDANT TEMPERATURE MONITORS IF THERMOCOUPLES ARE USED.
4. ROUTE TEMPERATURE MONITOR CONDUITS ABOVEGROUND ON NORTH SIDE OF JERSEY BARRIERS.
5. FOR TMP-05, TMP-06, AND TMP-09, ROUTE TEMPERATURE MONITOR WIRES UNDERGROUND ON SOUTH SIDE AND ABOVEGROUND ON NORTH SIDE OF JERSEY BARRIERS.
6. FOR EFFICIENCY, TEMPERATURE MONITOR WIRES CAN BE COMBINED INTO LARGER DIAMETER CONDUITS PRIOR TO TDAMs.

LPE

STATE OF KENTUCKY — ERIN L. BURIAK — LICENSED PROFESSIONAL ENGINEER

Expires 06-30-16

DATE
PROFESSIONAL SEAL

REV.	DATE	DESCRIPTION	DRAWN BY	DRAFT CHK	PROJ ENGR	LEAD ENGR	CONF CTRL/ NUCL SFTY	FAC MGR	E&TS MGR
0	5/30/14	ISSUED FOR CONSTRUCTION	JE	JE	CRE	CRE			

DRAWING REVISIONS

U.S. DEPARTMENT OF ENERGY
PADUCAH, PORTSMOUTH PROJECT OPERATIONS, PADUCAH GASEOUS DIFFUSION PLANT

LATA Environmental Services of Kentucky, LLC — managed for the DEPARTMENT O ENERGY under U.S. GOVERNMENT contract DE-AC30-10CC40020, Paducah, Kentucky

Environmental Resources Management
1218 3rd AVENUE, SEATTLE WASHINGTON
(425) 462-8591

DOE CONTRACT NO. DE-AC30-10CC40020

PROJECT NAME:
C-400 STEAM INJECTION TREATABILITY STUDY

TITLE:
TREATABILITY STUDY
STEAM INJECTION WELLS AND
TEMPERATURE MONITORING POINTS

CAD FILENAME	BUILDING	PLANT	CLA
A028_SIW & TMP DETAILS.DWG	C-400	PGDP	L

SCALE:	DRAWING NUMBER	RE
N.T.S.	C7DC40000A028	C

TMP-01						
		4-inch core		Drilled by Vernon Scott		
01/26/15 @ 10:10 to 15:00						
Drilled Interval		Recovery	Depths		Description	Notes
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0.0	7.0	5.4	0.0	4.7	Silt with some Gravel, 10YR7.2 (light gray), moderately soft, nonplastic, and moist. Gravel is rounded chert, 10YR7/6 (yellow), loose, and wet	
			4.7	7.0	Silt, 10YR7/1 (light gray) mottled with 10YR6/4 (light yellowish brown), soft, nonplastic, and moist	
7.0	17.0	12.4	7.0	8.6	Silt as above	
			8.6	14.3	Silt, 10YR7/3 (very pale brown) with light mottling and occasional blebs of 10YR2/1 (black) (manganese?), soft, nonplastic, and moist	
			14.3	17.0	Silt, 10YR7/1 (light gray) heavily mottled with 10YR5/2 (grayish brown), soft to moderately soft, nonplastic, and moist	
17.0	27.0	11.9	17.0	17.8	Silt as above	
			17.8	22.8	Silt, 10YR7/1 (light gray) mottled with 10YR7/3 (very pale	
			22.8	23.5	Very fine Sand, 10YR7/4 (very pale brown), poorly graded, medium dense, and moist. Sand is quartz	
			23.5	24.2	Gap graded Sand with Gravel, 10YR7/4 (very pale brown), loose, and moist: 40% very fine, quartz sand; 30% very course, subangular, chert sand; and 30% subrounded to rounded chert gravel with no patina (white)	
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			26.2	27.0	Very fine Sand with some Gravel, 10YR7/2 (light gray), friable, nonplastic, and dry. Sand is quartz. Gravel is rounded chert with light brown patina, 0.3 to 0.6 inch diameter	
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			28.1	29.8	Silt, 10YR7/1 (light gray) mottled with 10YR7/8 (yellow), moderately soft, nonplastic, and moist	
			29.8	32.3	Sandy Silt with little Gravel, 10YR7/3 (very pale brown), soft, nonplastic, and moist. Sand is very fine quartz. Gravel is rounded chert with light brown patina, 0.2 to 0.3 inch diameter	
			32.3	37.0	Very fine Sand with little Gravel, 10YR7/6 (yellow), loose, and slightly moist. Sand is quartz. Gravel is subrounded chert with no patina (white), 0.2 to 0.3 inch diameter	
37.0	47.0	13.6	37.0	38.9	Gap graded Sand with Gravel, 10YR6/3 (pale brown), loose, and wet: 35% very fine, quartz sand; 25% course to very course, subrounded, chert sand without patina (white); and 40% subrounded to rounded chert gravel with brown patina, 0.5 to 0.6 inch diameter	
			38.9	39.4	Very fine Sand, 10YR7/6 (yellow), loose, and moist. Sand is quartz	
			39.4	40.3	Sand with Gravel as 37.0 to 38.9 ft	
			40.3	41.6	Very fine Sand with little Gravel, 10YR7/4) very pale brown), loose, and moist. Sand is quartz. Gravel is rounded chert with brown patina, 0.7 to 0.9 inch diameter	
			41.6	45.9	Clayey Silt, 10YR7/3 (very pale brown), soft, slightly plastic, and moist	
			45.9	47.0	Very fine Sand with little Gravel, 10YR8/1 (white) mottled with 10YR7/8 (yellow), loose to moderately dense, and moist. Sand is quartz. Gravel is rounded chert without patina (white), 0.3 to 0.4 inch diameter	
47.0	57.0	9.6	47.0	48.1	Very fine Sand with little Gravel as above	
			48.1	51.6	Clayey Silt, 10YR7/2 (light gray) with 10YR6/6 (brownish yellow) mottling, soft, moderately plastic and moist	
			51.6	55.2	Fine Sand, 10YR7/4 (very pale brown), loose and moist. Sand is quartz	
			55.2	56.6	Silty, fine Sand with little Gravel, 10YR7/2 (light gray), medium dense, and moist. Sand is quartz. Gravel is subangular chert with black patina, 1.0 to 2.2 inch diameter	
			56.6	57.0	Silt, 10YR7/2 (light gray), soft, nonplastic, and moist	

TMP-01						
		4-inch core		Drilled by Vernon Scott		
01/26/15 @ 10:10 to 15:00						
Drilled Interval		Recovery	Depths		Description	Notes
Top	Bottom		Top	Bottom		
57.0	67.0	11.3	57.0	58.9	Silty fine Sand with little Gravel, 10YR7/2 (light gray) with 10YR7/6 (yellow) laminations, medium dense, and moist. Sand is quartz. Gravel is subangular chert with no patina (white), 0.2 to 1.5 inch diameter	
			58.9	60.5	Gap graded Sand with Gravel, 10YR7/4 (very pale brown), loose, and moist: 35% fine quartz sand; 20% course to very course, subrounded, chert sand; and 45% subangular to subrounded chert gravel, 0.4 to 1.0 inch diameter	Top of RGA at 58.9 ft
			60.5	61.2	Silty fine Sand with Gravel, 10YR7/2 (light gray), loose, and moist. Sand is quartz. Gravel is subangular chert without iron patina (white), 0.7 to 1.0 inch diameter	
			61.2	67.0	Gravelly Sand, 10YR7/2 (light gray), loose, and moist. 30% very fine quartz sand, 25% coarse to very coarse, subangular chert sand, 45% subangular to subrounded chert (with and without brown patina), 0.4 to 1.0 inch diameter	
67.0	77.0	10.7	67.0	76.1	Sandy Gravel, 10YR7/4 (very pale brown), loose, and moist. 55% gravel, subangular to subrounded chert with brown patina, 0.3 to 1.2 inch diameter with occasional 2.0 inch cobble. Sand is gap graded: 20% fine quartz sand and 25% coarse to very coarse, subrounded to subangular chert	
			76.1	77.0	Gravelly Sand, 7.5YR6/4 (light brown), loose, and moist. Sand is gap graded: 30% fine quartz sand and 25% coarse to very coarse, subrounded chert. Gravel is subrounded to subangular chert with brown patina, 0.3 to 0.8 inch diameter	
77.0	87.0	11	77.0	87.0	Sandy Gravel, 7.5YR6/6 (reddish yellow), loose, and moist. 55% subrounded to subangular chert gravel with brown patina, 0.3 to 1.5 inch diameter; 25% coarse to very coarse, subangular to subrounded, chert sand; and 20% fine quartz sand	
87.0	97.0	11.6	87.0	93.0	Sandy gravel as above but with few larger cobbles, 2.5 to 3.0 inch diameter	Base of RGA at 93.0 ft
			93.0	93.6	Very fine Sand, 7.5YR7/3 (pink) laminated with 7.5YR7/1 (light gray), medium dense/soft, and moist	
			93.6	93.8	Clayey Silt, 7.5YR6/2 (gray) with 5YR5/8 (yellowish red) laminations, soft, slightly plastic, and moist	
			93.8	94.3	Very fine Sand, 10YR7/8 (yellow), medium dense/soft, and moist	
			94.3	96.3	Interlaminated Clayey Silt, 10YR6/1 (gray), soft, and moist AND very fine Sand, 10YR7/6 (yellow) grading down to 10YR8/1 (white), medium dense/soft, and moist	
			96.3	97.0	Very fine Sand, 10YR8/2 (very pale brown), loose, and moist	
TD = 97.0 ft						

UNIFORM KENTUCKY WELL CONSTRUCTION RECORD

Use this form only to report installation of monitoring or water wells.
Original copy must be submitted to Division of Water within 60 days of completion.
See instructions on reverse of form.
Record must be typed or neatly printed or it will be returned to the driller as unacceptable.
One copy to Division of Water, one copy to owner, one copy to driller's files.

Attach Well Identification Number (AKGWA) Label Here
Water wells: yellow labels
Monitoring wells: blue labels

4. Owner name: Paducah Gaseous Diffusion Plant
5. Owner address: 5600 Hobbs Rd.
6. City: West Paducah 7. State: KY 8. Zip: 42053

If site name and address differ from owner name and address:
9. Site name
10. Site address
11. City 12. State: KY 13. Zip

1. Kentucky Well ID (AKGWA) Number
2. Owner well ID#: SIW-01D

3. Attachments
Required
1. Site plan or sketch map [x]
2. Well location
On topographic map, OR
Obtained by GPS unit
Conditionally Required
3. Well diagram (monitoring well) [x]
4. Coliform analysis (if applicable) [ ]
5. Signed Variance (if applicable) [ ]
Optional
6. Other laboratory analysis report [ ]

14. Agency Interest (AI) Number: 3059
15. Facility type & ID Number: (•) CERCLA ( ) RCRA ( ) Solid Waste ( ) UST ( ) Drinking Water ( ) Mining
ID Number: KY8-890-008-982

16. Owner phone: (270) 441-6000 17. Site phone: (270) 441-6000

23. Install start date: Jan 26 2015 (Month Day Year)
24. Install end date: Jan 29 2015

18. USGS topo map: Heath
19. County: Mccracken
21. Surface elevation (ft): 380.00

20. Physiographic Region: ( ) Blue Grass ( ) E. Coal Field ( ) Miss. Plateau ( ) Ohio River Alluvium ( ) W. Coal Field (•) Jackson Purchase
22. Elevation determined by: ( ) GPS (•) Map ( ) Prior report ( ) Survey ( ) Prior well log

Please report depths in feet below ground surface, not as relative elevations.
25. Total depth: 93.10
26. Depth to bedrock
27. Static water level
28. Casing height above surface (in)

29. Well use: ( ) Agriculture ( ) Commercial ( ) Domestic ( ) Industrial ( ) Monitoring / Remed Remediation ( ) Public ( ) Geothermal ( ) Heat pump ( ) HVAC (•) Injection ( ) Mining ( ) Unused
NOTE: CODE REQUIRED for well uses on left. Select a code from the dropdown menu.

30. Drilling method: ( ) Auger – HS ( ) Auger – SS ( ) Auger – bucket ( ) Auger – hand ( ) Cable tool ( ) Core ( ) Driven Casing ( ) Excavation ( ) Combined – HS auger and air rotary ( ) Combined – other (specify): ( ) Jet wash ( ) Push/probe ( ) Rotary – air ( ) Rotary – mud ( ) Rotary – reverse ( ) Sand point (•) Sonic ( ) Unknown

31. Well status: (•) Active ( ) Inactive ( ) Unsuitable for intended use
32. Wellhead: ( ) Flush (•) Well cap ( ) Locking ( ) Sanitary seal
33. Well development method: ( ) Surging ( ) Jetting ( ) Pumping ( ) Backwashing ( ) Bailing ( ) Compressed air ( ) Combination of methods (specify)

WATER WELLS ONLY

34. Estimated well yield: ( ) gpm ( ) gph ( ) gpd
35. Well service: #of people served
36. Disinfectant amount: ( ) oz ( ) qt ( ) cups ( ) lb ( ) gal
37. Type: ( ) Bleach ( ) Hypo-chlorite
38. Pitless adapter installed: ( ) Yes ( ) No
39. Pump installed: ( ) Submersible ( ) Jet ( ) Bailer or bucket ( ) Turbine ( ) Hand ( ) No pump
40. Depth to intake (ft)
41. Apparent quality and odor
APPEARANCE: ( ) Clear ( ) Cloudy ( ) Muddy ( ) Turbid
ODOR: none, slight, mod., high — Iron, Sulfur, Salt

46. Well completion: Casing and screens

From depth (feet)	To depth (feet)	Borehole diameter (inches)	Casing diam (in) ID	Casing diam (in) OD	Casing type	Screen slot size
0.00	88.00	12.75		3.00	Steel (galvanized)	
88.00	93.00	12.75		3.00	Stainless steel screen	0.01

47. Annulus fill and seal

From depth (feet)	To depth (feet)	Material
97.0	84.0	Sand
84.0	75.0	grout
75.0	62.0	sand
62.0	1.0	grout
1.0	0.0	concrete

48. Lithologic log (if more space is needed, continue on separate page)

From depth (ft)	To depth (ft)	Description (indicate any zones of water and indicate apparent quality)
0.00	58.90	UCRS
58.90	93.00	RGA
93.00	~~96.00~~ 97.00	McNairy Formation
		3/3/15 Fixed error AR

49. Sketch map [x]

COLIFORM TEST

42. Coliform test type: ( ) fecal ( ) fecal and total
43. Coliform test results: ( ) 0 or <1.0 ( ) TNTC ( ) Confluent
or # colonies per 100 mL
44. Date sampled (Month Day Year)
45. Date analyzed

50. Comments
Annulus fill and seal is per the attached construction drawing. This is the deeper of two nested wells in a single 12.75" borehole, wellhead will be attached to a boiler piping for steam injection

Latitude
Longitude
Lat/Long Method: ( ) INT ( ) GPS ( ) SUR ( ) REP
Date Received

51. Affirmation: The work described above was done under my supervision, and this report is true and correct to the best of my knowledge.
Note: the driller is not responsible for natural groundwater quality or quantity encountered while drilling or completing this well.

Signature of certified driller: [signature] Date signed: Feb 10 2015
Certification number: 0411 - 0549 - 00 Drilling company: Cascade Drilling LP

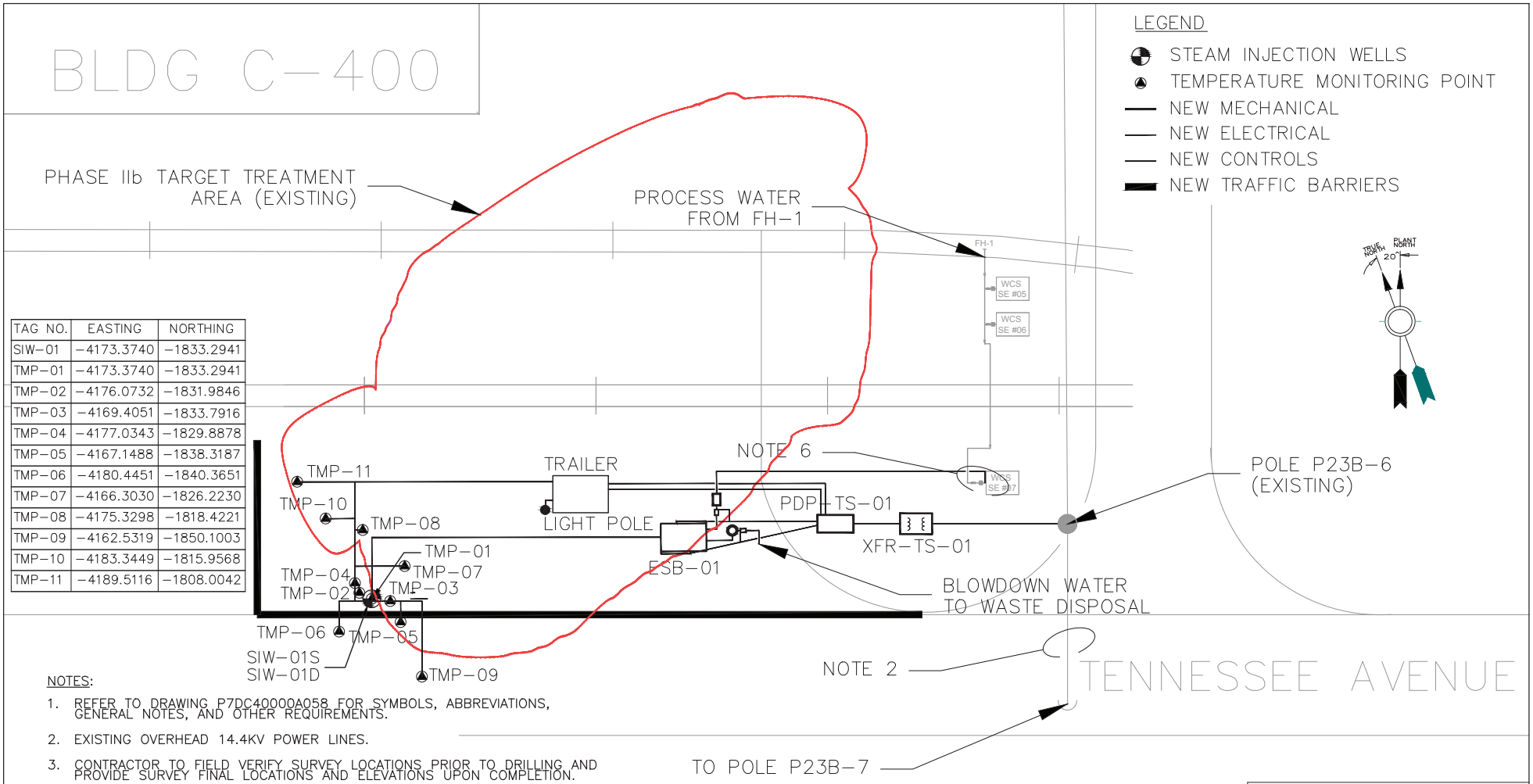
rev 02/29/2012

2. Owner Well ID#
Owner well ID # denotes the site designation for the well, e.g. "MW-06."

15. Facility type & ID number
If the well is located at any of the listed facility types, please note the historic site ID # in the spaces provided. This information is vital for other programs that may need to locate the well record in the database.

25. Well use
If well use falls under any of the following General Use designations with a corresponding Specific Use, you must include the corresponding Use Code:

WELL USE CODES		
GENERAL USE	SPECIFIC USE	USE CODE
Agriculture	Agriculture - Dairy Operation	01
Agriculture	Agriculture - Feed Pen Operation	02
Agriculture	Agriculture - Fish And Game Propagation	03
Agriculture	Agriculture - General	04
Agriculture	Agriculture - Horse Farm	05
Agriculture	Agriculture - Irrigation	06
Agriculture	Agriculture - Livestock Watering	07
Agriculture	Agriculture - Poultry And Egg Operation	08
Commercial	Commercial	01
Commercial	Commercial - Irrigation	02
Commercial	Dewatering Well - Construction	03
Domestic	Domestic - Multiple Domestic Households	01
Domestic	Domestic - Single Household	02
Industrial	Industrial - General	01
Industrial	Industrial - Manufacturing	02
Industrial	Industrial - Petroleum Processing Plant	03
Monitoring & Remediation	Monitoring Well - Ambient Monitoring	01
Monitoring & Remediation	Monitoring Well - Compliance	02
Monitoring & Remediation	Monitoring Well - Military Installation	03
Monitoring & Remediation	Monitoring Well - Water Level Monitoring Only	04
Monitoring & Remediation	Remediation	05
Public	Public - Community	01
Public	Public - Exploration	02
Public	Public - Non-transient, Non-community	03
Public	Public - Transient, Non-community	04
Public	Public - Unregulated	05
Geothermal	(general use)	-
Heat pump	(general use)	-
HVAC	(general use)	-
Injection	(general use)	-
Mining	(general use)	-
Unused	(general use)	-



TAG NO.	EASTING	NORTHING
SIW-01	-4173.3740	-1833.2941
TMP-01	-4173.3740	-1833.2941
TMP-02	-4176.0732	-1831.9846
TMP-03	-4169.4051	-1833.7916
TMP-04	-4177.0343	-1829.8878
TMP-05	-4167.1488	-1838.3187
TMP-06	-4180.4451	-1840.3651
TMP-07	-4166.3030	-1826.2230
TMP-08	-4175.3298	-1818.4221
TMP-09	-4162.5319	-1850.1003
TMP-10	-4183.3449	-1815.9568
TMP-11	-4189.5116	-1808.0042

NOTES:

1. REFER TO DRAWING P7DC40000A058 FOR SYMBOLS, ABBREVIATIONS, GENERAL NOTES, AND OTHER REQUIREMENTS.
2. EXISTING OVERHEAD 14.4KV POWER LINES.
3. CONTRACTOR TO FIELD VERIFY SURVEY LOCATIONS PRIOR TO DRILLING AND PROVIDE SURVEY FINAL LOCATIONS AND ELEVATIONS UPON COMPLETION.
4. REFER TO DRAWING C7DC40000A028 FOR WELL AND TMP DETAILS.
5. CONNECT XFR-TS-01 TO EXISTING 14.4KV POWER LINE AT POLE P23B-6.
6. CONNECT ESB-01 FEEDWATER TO EXISTING PROCESS WATER LINE SUPPLIED FROM FIRE HYDRANT FH-1.
7. ROUTINGS AND LOCATIONS ARE DIAGRAMMATIC. INSTALL AS NEEDED TO MAXIMIZE EFFICIENCY.
8. INSTALL ALL PIPING AND CONDUITS NORTH OF JERSEY BARRIERS ABOVEGROUND. PIPING SHALL BE INSTALLED ON PIPE SUPPORTS. CONDUITS CAN LAY DIRECTLY ON GROUND.
9. ROUTE WIRING FROM TMP-05, TMP-06, AND TMP-09 UNDERGROUND TO NORTH OF NEW JERSEY BARRIERS.
10. INSTALL JERSEY TYPE CONCRETE BARRIERS (MINIMUM 40" HEIGHT) ALONG AND NORTH OF TENNESSEE AVENUE AS SHOWN TO PREVENT VEHICULAR ACCESS INTO EQUIPMENT AREA.

LPE

STATE OF KENTUCKY ERIN L. SURINAK LICENSED PROFESSIONAL ENGINEER

Expires 06-30-16

DATE

PROFESSIONAL SEAL

REV.	DATE	DESCRIPTION	DRAWN BY	DRAFT CHK	PROJ ENGR	LEAD ENGR	CONF CTRL/ NUCL SFTY	FAC MGR	EATS MGR
0	5/30/14	ISSUED FOR CONSTRUCTION	JE	JE	CRE	CRE			

DRAWING REVISIONS

U.S. DEPARTMENT OF ENERGY
DOE PORTSMOUTH/PADUCAH PROJECT OFFICE
PADUCAH GASEOUS DIFFUSION PLANT

LATA Environmental Services of Kentucky, LLC
managed for the DEPARTMENT OF ENERGY under U.S. GOVERNMENT contract DE-AC30-10CC40020
Paducah, Kentucky

Environmental Resources Management
1218 3rd AVENUE, SEATTLE WASHINGTON
(425) 462-8591

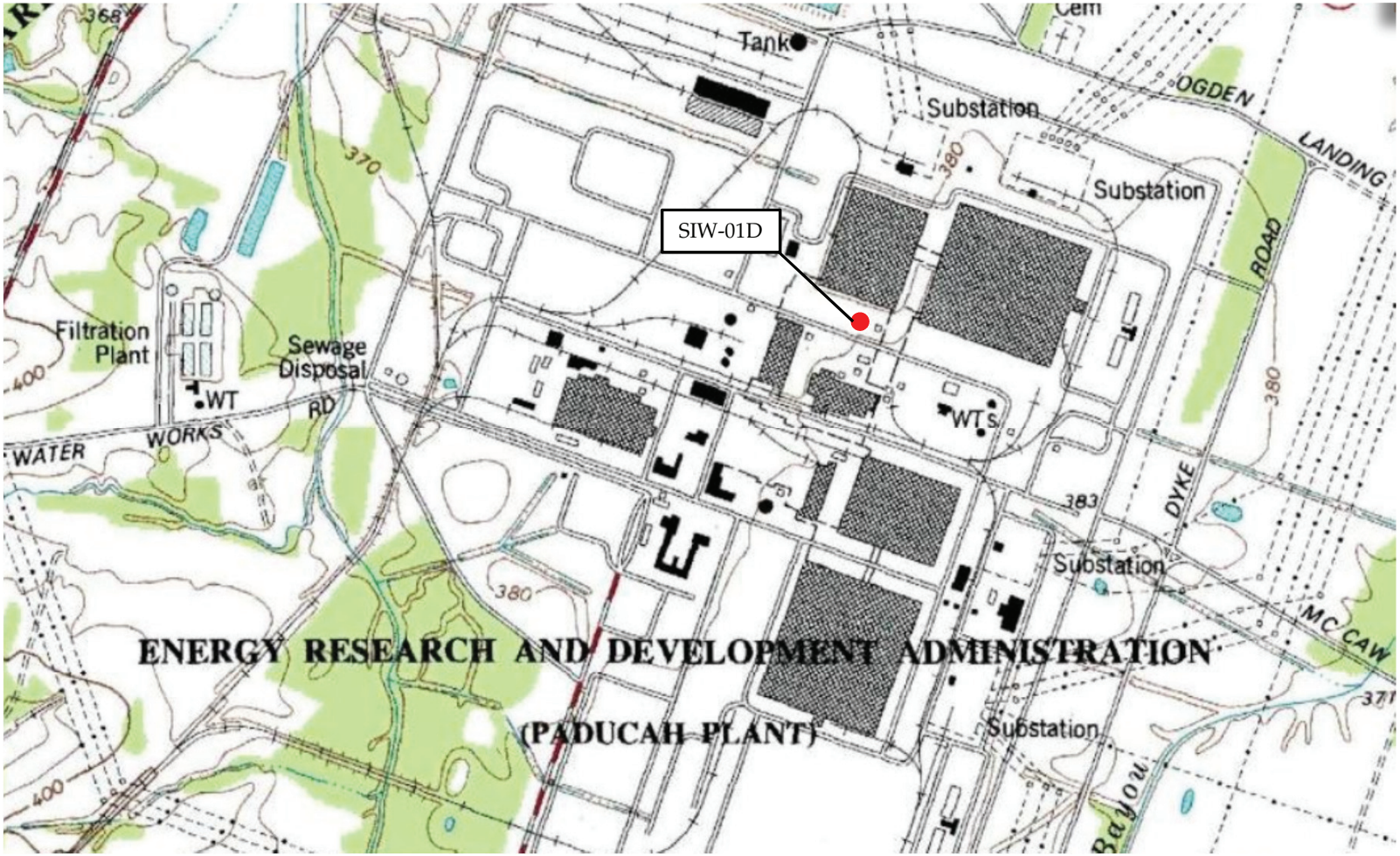
DOE CONTRACT NO. DE-AC30-10CC40020

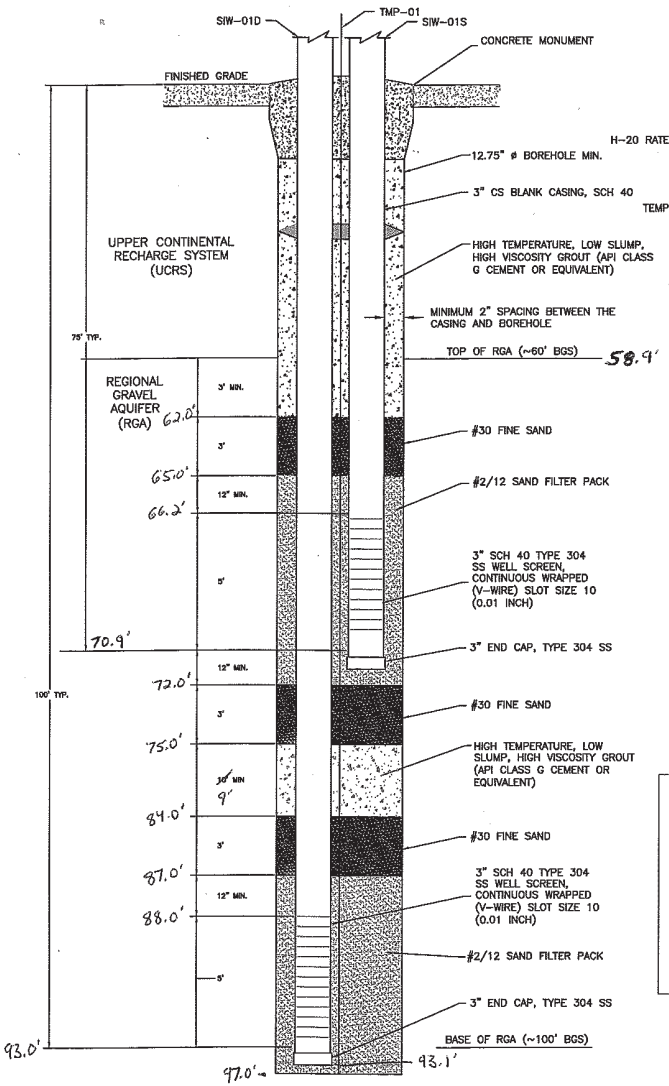
PROJECT NAME:
C-400 STEAM INJECTION TREATABILITY STUDY

TITLE:
TREATABILITY STUDY SITE PLAN

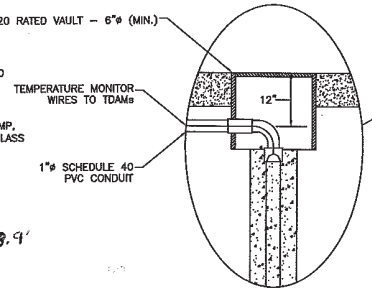
CAD FILE NAME	BUILDING	PLANT	CLASS
A027_SITE PLAN.DWG	C-400	PGDP	U

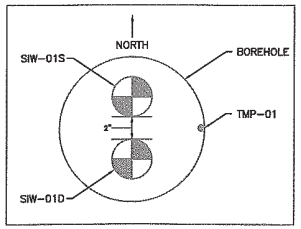
SCALE:	DRAWING NUMBER	REV
AS SHOWN	C7DC40000A027	0


SIW-01D
Tank
Substation
Substation
OGDEN
LANDING
ROAD
Filtration Plant
Sewage Disposal
WT
RD
WATER
WORKS
WTs
DYKE
Substation
MC CAW
Substation
Bayou
370
380
383
400
ENERGY RESEARCH AND DEVELOPMENT ADMINISTRATION
(PADUCAH PLANT)

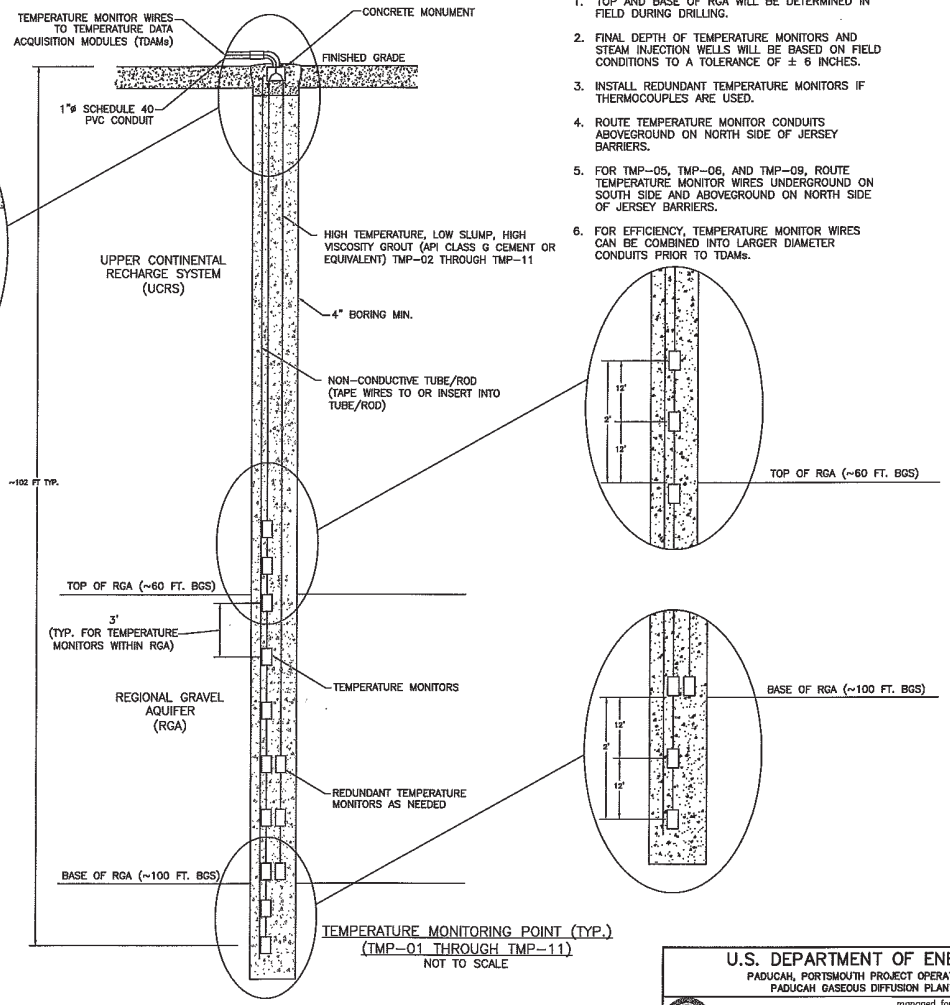


NESTED STEAM INJECTION WELL (TYP.)
(SIW-01S, SIW-01D)
NOT TO SCALE





PLAN VIEW
SIW-01S, SIW-01D
NOT TO SCALE



TEMPERATURE MONITORING POINT (TYP.)
(TMP-01 THROUGH TMP-11)
NOT TO SCALE

NOTES:
1. TOP AND BASE OF RGA WILL BE DETERMINED IN FIELD DURING DRILLING.
2. FINAL DEPTH OF TEMPERATURE MONITORS AND STEAM INJECTION WELLS WILL BE BASED ON FIELD CONDITIONS TO A TOLERANCE OF ± 6 INCHES.
3. INSTALL REDUNDANT TEMPERATURE MONITORS IF THERMOCOUPLES ARE USED.
4. ROUTE TEMPERATURE MONITOR CONDUITS ABOVEGROUND ON NORTH SIDE OF JERSEY BARRIERS.
5. FOR TMP-05, TMP-06, AND TMP-09, ROUTE TEMPERATURE MONITOR WIRES UNDERGROUND ON SOUTH SIDE AND ABOVEGROUND ON NORTH SIDE OF JERSEY BARRIERS.
6. FOR EFFICIENCY, TEMPERATURE MONITOR WIRES CAN BE COMBINED INTO LARGER DIAMETER CONDUITS PRIOR TO TDAMs.

LPE

STATE OF KENTUCKY — ERIN L. BURIAK — LICENSED PROFESSIONAL ENGINEER

Expires 06-30-16

DATE
PROFESSIONAL SEAL

REV.	DATE	DESCRIPTION	DRAWN BY	DRAFT CHK	PROJ ENGR	LEAD ENGR	CONF CTRL/ NUCL SFTY	FAC MGR	E&TS MGR
0	5/30/14	ISSUED FOR CONSTRUCTION	JE	JE	CRE	CRE			

DRAWING REVISIONS

U.S. DEPARTMENT OF ENERGY
PADUCAH, PORTSMOUTH PROJECT OPERATIONS, PADUCAH GASEOUS DIFFUSION PLANT

LATA Environmental Services of Kentucky, LLC — managed for the DEPARTMENT O ENERGY under U.S. GOVERNMENT contract DE-AC30-10CC40020, Paducah, Kentucky

Environmental Resources Management
1218 3rd AVENUE, SEATTLE WASHINGTON
(425) 462-8591

DOE CONTRACT NO. DE-AC30-10CC40020

PROJECT NAME:
C-400 STEAM INJECTION TREATABILITY STUDY

TITLE:
TREATABILITY STUDY
STEAM INJECTION WELLS AND
TEMPERATURE MONITORING POINTS

CAD FILENAME	BUILDING	PLANT	CLA
A028_SIW & TMP DETAILS.DWG	C-400	PGDP	L

SCALE:	DRAWING NUMBER	RE
N.T.S.	C7DC40000A028	C

TMP-01						
		4-inch core		Drilled by Vernon Scott		
01/26/15 @ 10:10 to 15:00						
Drilled Interval		Recovery	Depths		Description	Notes
Top	Bottom		Top	Bottom		
0.0	7.0	5.4	0.0	4.7	Silt with some Gravel, 10YR7.2 (light gray), moderately soft, nonplastic, and moist. Gravel is rounded chert, 10YR7/6 (yellow), loose, and wet	
			4.7	7.0	Silt, 10YR7/1 (light gray) mottled with 10YR6/4 (light yellowish brown), soft, nonplastic, and moist	
7.0	17.0	12.4	7.0	8.6	Silt as above	
			8.6	14.3	Silt, 10YR7/3 (very pale brown) with light mottling and occasional blebs of 10YR2/1 (black) (manganese?), soft, nonplastic, and moist	
			14.3	17.0	Silt, 10YR7/1 (light gray) heavily mottled with 10YR5/2 (grayish brown), soft to moderately soft, nonplastic, and moist	
17.0	27.0	11.9	17.0	17.8	Silt as above	
			17.8	22.8	Silt, 10YR7/1 (light gray) mottled with 10YR7/3 (very pale	
			22.8	23.5	Very fine Sand, 10YR7/4 (very pale brown), poorly graded, medium dense, and moist. Sand is quartz	
			23.5	24.2	Gap graded Sand with Gravel, 10YR7/4 (very pale brown), loose, and moist: 40% very fine, quartz sand; 30% very course, subangular, chert sand; and 30% subrounded to rounded chert gravel with no patina (white)	
			24.2	26.2	Silt with some Gravel, 10YR7/3 (very pale brown), moderately stiff, nonplastic, and moist. Gravel is rounded chert with light brown patina, 0.3 to 0.8 inch diameter	
			26.2	27.0	Very fine Sand with some Gravel, 10YR7/2 (light gray), friable, nonplastic, and dry. Sand is quartz. Gravel is rounded chert with light brown patina, 0.3 to 0.6 inch diameter	
27.0	37.0	9.3	27.0	28.1	Very fine Sand with some Gravel as above	
			28.1	29.8	Silt, 10YR7/1 (light gray) mottled with 10YR7/8 (yellow), moderately soft, nonplastic, and moist	
			29.8	32.3	Sandy Silt with little Gravel, 10YR7/3 (very pale brown), soft, nonplastic, and moist. Sand is very fine quartz. Gravel is rounded chert with light brown patina, 0.2 to 0.3 inch diameter	
			32.3	37.0	Very fine Sand with little Gravel, 10YR7/6 (yellow), loose, and slightly moist. Sand is quartz. Gravel is subrounded chert with no patina (white), 0.2 to 0.3 inch diameter	
37.0	47.0	13.6	37.0	38.9	Gap graded Sand with Gravel, 10YR6/3 (pale brown), loose, and wet: 35% very fine, quartz sand; 25% course to very course, subrounded, chert sand without patina (white); and 40% subrounded to rounded chert gravel with brown patina, 0.5 to 0.6 inch diameter	
			38.9	39.4	Very fine Sand, 10YR7/6 (yellow), loose, and moist. Sand is quartz	
			39.4	40.3	Sand with Gravel as 37.0 to 38.9 ft	
			40.3	41.6	Very fine Sand with little Gravel, 10YR7/4) very pale brown), loose, and moist. Sand is quartz. Gravel is rounded chert with brown patina, 0.7 to 0.9 inch diameter	
			41.6	45.9	Clayey Silt, 10YR7/3 (very pale brown), soft, slightly plastic, and moist	
			45.9	47.0	Very fine Sand with little Gravel, 10YR8/1 (white) mottled with 10YR7/8 (yellow), loose to moderately dense, and moist. Sand is quartz. Gravel is rounded chert without patina (white), 0.3 to 0.4 inch diameter	
47.0	57.0	9.6	47.0	48.1	Very fine Sand with little Gravel as above	
			48.1	51.6	Clayey Silt, 10YR7/2 (light gray) with 10YR6/6 (brownish yellow) mottling, soft, moderately plastic and moist	
			51.6	55.2	Fine Sand, 10YR7/4 (very pale brown), loose and moist. Sand is quartz	
			55.2	56.6	Silty, fine Sand with little Gravel, 10YR7/2 (light gray), medium dense, and moist. Sand is quartz. Gravel is subangular chert with black patina, 1.0 to 2.2 inch diameter	
			56.6	57.0	Silt, 10YR7/2 (light gray), soft, nonplastic, and moist	

TMP-01						
		4-inch core		Drilled by Vernon Scott		
01/26/15 @ 10:10 to 15:00						
Drilled Interval		Recovery	Depths		Description	Notes
Top	Bottom		Top	Bottom		
57.0	67.0	11.3	57.0	58.9	Silty fine Sand with little Gravel, 10YR7/2 (light gray) with 10YR7/6 (yellow) laminations, medium dense, and moist. Sand is quartz. Gravel is subangular chert with no patina (white), 0.2 to 1.5 inch diameter	
			58.9	60.5	Gap graded Sand with Gravel, 10YR7/4 (very pale brown), loose, and moist: 35% fine quartz sand; 20% course to very course, subrounded, chert sand; and 45% subangular to subrounded chert gravel, 0.4 to 1.0 inch diameter	Top of RGA at 58.9 ft
			60.5	61.2	Silty fine Sand with Gravel, 10YR7/2 (light gray), loose, and moist. Sand is quartz. Gravel is subangular chert without iron patina (white), 0.7 to 1.0 inch diameter	
			61.2	67.0	Gravelly Sand, 10YR7/2 (light gray), loose, and moist. 30% very fine quartz sand, 25% coarse to very coarse, subangular chert sand, 45% subangular to subrounded chert (with and without brown patina), 0.4 to 1.0 inch diameter	
67.0	77.0	10.7	67.0	76.1	Sandy Gravel, 10YR7/4 (very pale brown), loose, and moist. 55% gravel, subangular to subrounded chert with brown patina, 0.3 to 1.2 inch diameter with occasional 2.0 inch cobble. Sand is gap graded: 20% fine quartz sand and 25% coarse to very coarse, subrounded to subangular chert	
			76.1	77.0	Gravelly Sand, 7.5YR6/4 (light brown), loose, and moist. Sand is gap graded: 30% fine quartz sand and 25% coarse to very coarse, subrounded chert. Gravel is subrounded to subangular chert with brown patina, 0.3 to 0.8 inch diameter	
77.0	87.0	11	77.0	87.0	Sandy Gravel, 7.5YR6/6 (reddish yellow), loose, and moist. 55% subrounded to subangular chert gravel with brown patina, 0.3 to 1.5 inch diameter; 25% coarse to very coarse, subangular to subrounded, chert sand; and 20% fine quartz sand	
87.0	97.0	11.6	87.0	93.0	Sandy gravel as above but with few larger cobbles, 2.5 to 3.0 inch diameter	Base of RGA at 93.0 ft
			93.0	93.6	Very fine Sand, 7.5YR7/3 (pink) laminated with 7.5YR7/1 (light gray), medium dense/soft, and moist	
			93.6	93.8	Clayey Silt, 7.5YR6/2 (gray) with 5YR5/8 (yellowish red) laminations, soft, slightly plastic, and moist	
			93.8	94.3	Very fine Sand, 10YR7/8 (yellow), medium dense/soft, and moist	
			94.3	96.3	Interlaminated Clayey Silt, 10YR6/1 (gray), soft, and moist AND very fine Sand, 10YR7/6 (yellow) grading down to 10YR8/1 (white), medium dense/soft, and moist	
			96.3	97.0	Very fine Sand, 10YR8/2 (very pale brown), loose, and moist	
TD = 97.0 ft						

UNIFORM KENTUCKY WELL CONSTRUCTION RECORD

Use this form only to report installation of monitoring or water wells.
Original copy must be submitted to Division of Water within 60 days of completion.
See instructions on reverse of form.
Record must be typed or neatly printed or it will be returned to the driller as unacceptable.
One copy to Division of Water, one copy to owner, one copy to driller's files.

Attach Well Identification Number (AKGWA) Label Here
Water wells: yellow labels
Monitoring wells: blue labels

4. Owner name: Paducah Gaseous Diffusion Plant
5. Owner address: 5600 Hobbs Rd
6. City: West Paducah 7. State: KY 8. Zip: 42053

If site name and address differ from owner name and address:
9. Site name
10. Site address
11. City 12. State: KY 13. Zip

1. Kentucky Well ID (AKGWA) Number
2. Owner well ID#: TMP-01

3. Attachments
Required
1. Site plan or sketch map ☒
2. Well location
On topographic map, OR ☐
Obtained by GPS unit ☐
Conditionally Required
3. Well diagram (monitoring well) ☒
4. Coliform analysis (if applicable) ☐
5. Signed Variance (if applicable) ☐
Optional
6. Other laboratory analysis report ☐

14. Agency Interest (AI) Number: 3059
15. Facility type & ID Number: ◉ CERCLA ○ RCRA ○ Solid Waste ○ UST ○ Drinking Water ○ Mining
ID Number: KY8-890-008-982

16. Owner phone: (270) 441-6000 17. Site phone: (270) 441-6000

18. USGS topo map: Heath
19. County: Mccracken
20. Physiographic Region: ○ Blue Grass ○ E. Coal Field ○ Miss. Plateau ○ Ohio River Alluvium ○ W. Coal Field ◉ Jackson Purchase
21. Surface elevation (ft): 380.00
22. Elevation determined by: ○ GPS ◉ Map ○ Survey ○ Prior report ○ Prior well log

23. Install start date: Jan (Month) 26 (Day) 2015 (Year)
24. Install end date: Jan (Month) 30 (Day) 2015 (Year)

Please report depths in feet below ground surface, not as relative elevations.
25. Total depth: ~~98.00~~ 97.00 3/3/15 Fixed error AR
26. Depth to bedrock
27. Static water level
28. Casing height above surface (in)

29. Well use
○ Agriculture ○ Commercial ○ Domestic ○ Industrial ◉ Monitoring / Remed ○ Public ○ Geothermal ○ Heat pump ○ HVAC ○ Injection ○ Mining ○ Unused
NOTE: CODE REQUIRED for well uses on left. Select a code from the dropdown menu.

30. Drilling method
○ Auger – HS ○ Auger – SS ○ Auger – bucket ○ Auger – hand ○ Cable tool ○ Core ○ Driven Casing ○ Excavation ○ Combined – HS auger and air rotary ○ Combined – other (specify): ○ Jet wash ○ Push/probe ○ Rotary – air ○ Rotary – mud ○ Rotary – reverse ○ Sand point ◉ Sonic ○ Unknown

31. Well status
◉ Active ○ Inactive ○ Unsuitable for intended use

32. Wellhead
○ Flush ◉ Well cap ○ Locking ○ Sanitary seal

33. Well development method
○ Surging ○ Jetting ○ Pumping ○ Backwashing ○ Bailing ○ Compressed air ○ Combination of methods (specify)

WATER WELLS ONLY

34. Estimated well yield: ○ gpm ○ gph ○ gpd
35. Well service: #of people served
36. Disinfectant amount: ○ oz ○ qt ○ cups ○ lb ○ gal
37. Type: ○ Bleach ○ Hypo-chlorite
38. Pitless adapter installed: ○ Yes ○ No
39. Pump installed: ○ Submersible ○ Jet ○ Bailer or bucket ○ Turbine ○ Hand ○ No pump
40. Depth to intake (ft)
41. Apparent quality and odor
APPEARANCE: ○ Clear ○ Cloudy ○ Muddy ○ Turbid
ODOR: none / slight / mod. / high — ○ Iron ○ Sulfur ○ Salt

46. Well completion: Casing and screens

From depth (feet)	To depth (feet)	Borehole diameter (inches)	Casing diam (in) ID	Casing diam (in) OD	Casing type	Screen slot size

47. Annulus fill and seal

From depth (feet)	To depth (feet)	Material
97.0	84.0	sand
84.0	75.0	grout
75.0	62.0	Sand
62.0	1.0	grout
1.0	0.0	concrete

48. Lithologic log (if more space is needed, continue on separate page)

From depth (ft)	To depth (ft)	Description
0.00	58.90	UCRS
58.90	93.00	RGA
93.00	~~96.00~~ 97.00	McNairy Formation

3/3/15 Fixed error AR

49. Sketch map ☑

COLIFORM TEST
42. Coliform test type: ○ fecal ○ fecal and total
43. Coliform test results: ○ 0 or <1.0 ○ TNTC ○ Confluent or # colonies per 100 mL
44. Date sampled (Month Day Year)
45. Date analyzed

50. Comments
Annular fill is per the attached engineering drawing, TC installation depths: 95.0, 94.0, 93.0 (dup), 90.0(dup), 87.0(dup), 84.0, 81.0, 78.0, 75.0, 72.0, 69.0, 66.0, 63.0, 60.0, 59.0, 58.0, 57.0

Latitude
Longitude
Lat/Long Method: ○ INT ○ GPS ○ SUR ○ REP
Date Received

51. Affirmation: The work described above was done under my supervision, and this report is true and correct to the best of my knowledge.
Note: the driller is not responsible for natural groundwater quality or quantity encountered while drilling or completing this well.

Signature of certified driller: [signature] Date signed: Feb 10 2015
Certification number: 0411 - 0549 - 00 Drilling company: Cascade Drilling LP

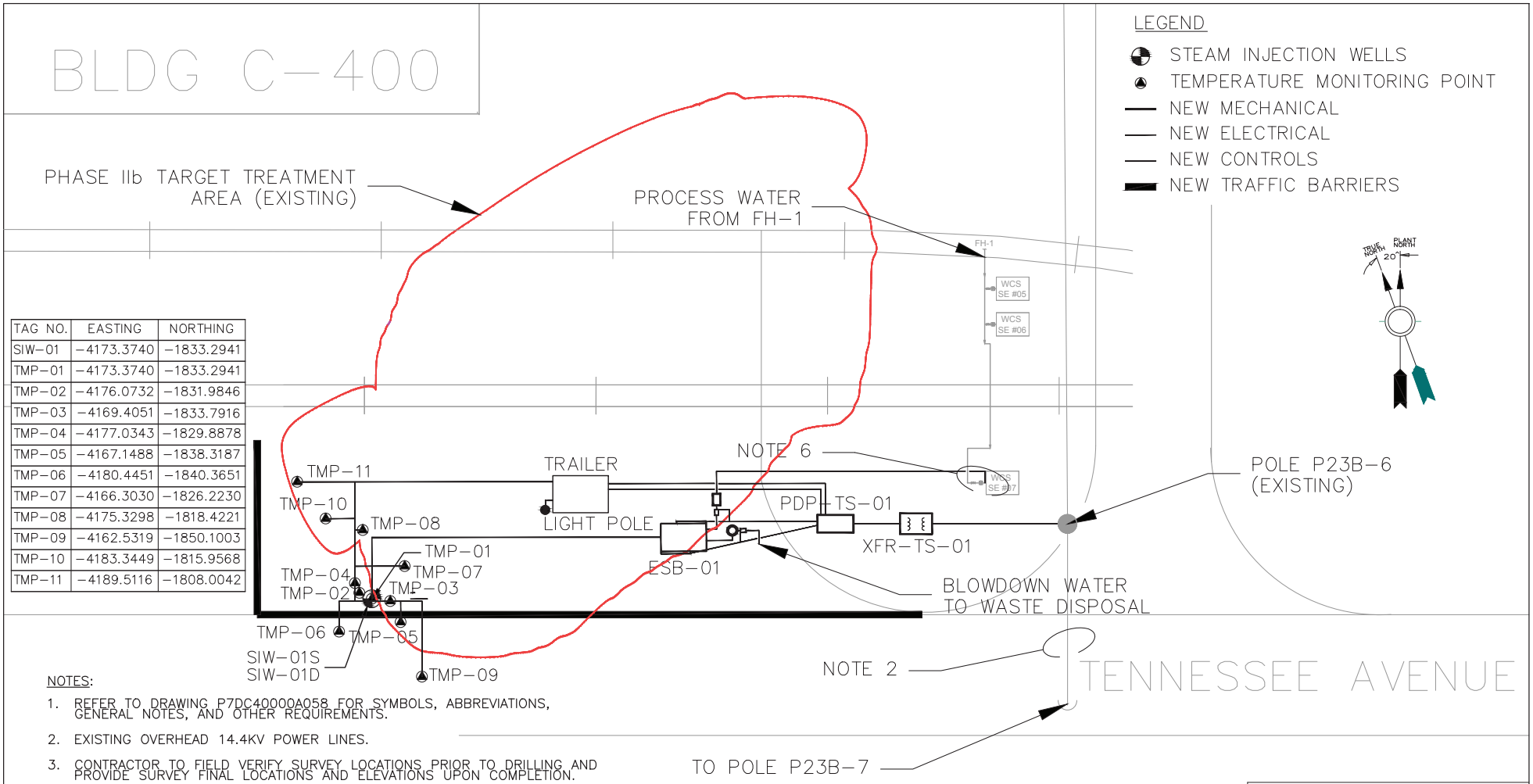
rev 02/29/2012

2. Owner Well ID#
Owner well ID # denotes the site designation for the well, e.g. "MW-06."

15. Facility type & ID number
If the well is located at any of the listed facility types, please note the historic site ID # in the spaces provided. This information is vital for other programs that may need to locate the well record in the database.

25. Well use
If well use falls under any of the following General Use designations with a corresponding Specific Use, you must include the corresponding Use Code:

WELL USE CODES		
GENERAL USE	SPECIFIC USE	USE CODE
Agriculture	Agriculture - Dairy Operation	01
Agriculture	Agriculture - Feed Pen Operation	02
Agriculture	Agriculture - Fish And Game Propagation	03
Agriculture	Agriculture - General	04
Agriculture	Agriculture - Horse Farm	05
Agriculture	Agriculture - Irrigation	06
Agriculture	Agriculture - Livestock Watering	07
Agriculture	Agriculture - Poultry And Egg Operation	08
Commercial	Commercial	01
Commercial	Commercial - Irrigation	02
Commercial	Dewatering Well - Construction	03
Domestic	Domestic - Multiple Domestic Households	01
Domestic	Domestic - Single Household	02
Industrial	Industrial - General	01
Industrial	Industrial - Manufacturing	02
Industrial	Industrial - Petroleum Processing Plant	03
Monitoring & Remediation	Monitoring Well - Ambient Monitoring	01
Monitoring & Remediation	Monitoring Well - Compliance	02
Monitoring & Remediation	Monitoring Well - Military Installation	03
Monitoring & Remediation	Monitoring Well - Water Level Monitoring Only	04
Monitoring & Remediation	Remediation	05
Public	Public - Community	01
Public	Public - Exploration	02
Public	Public - Non-transient, Non-community	03
Public	Public - Transient, Non-community	04
Public	Public - Unregulated	05
Geothermal	(general use)	-
Heat pump	(general use)	-
HVAC	(general use)	-
Injection	(general use)	-
Mining	(general use)	-
Unused	(general use)	-



TAG NO.	EASTING	NORTHING
SIW-01	-4173.3740	-1833.2941
TMP-01	-4173.3740	-1833.2941
TMP-02	-4176.0732	-1831.9846
TMP-03	-4169.4051	-1833.7916
TMP-04	-4177.0343	-1829.8878
TMP-05	-4167.1488	-1838.3187
TMP-06	-4180.4451	-1840.3651
TMP-07	-4166.3030	-1826.2230
TMP-08	-4175.3298	-1818.4221
TMP-09	-4162.5319	-1850.1003
TMP-10	-4183.3449	-1815.9568
TMP-11	-4189.5116	-1808.0042

NOTES:

1. REFER TO DRAWING P7DC40000A058 FOR SYMBOLS, ABBREVIATIONS, GENERAL NOTES, AND OTHER REQUIREMENTS.
2. EXISTING OVERHEAD 14.4KV POWER LINES.
3. CONTRACTOR TO FIELD VERIFY SURVEY LOCATIONS PRIOR TO DRILLING AND PROVIDE SURVEY FINAL LOCATIONS AND ELEVATIONS UPON COMPLETION.
4. REFER TO DRAWING C7DC40000A028 FOR WELL AND TMP DETAILS.
5. CONNECT XFR-TS-01 TO EXISTING 14.4KV POWER LINE AT POLE P23B-6.
6. CONNECT ESB-01 FEEDWATER TO EXISTING PROCESS WATER LINE SUPPLIED FROM FIRE HYDRANT FH-1.
7. ROUTINGS AND LOCATIONS ARE DIAGRAMMATIC. INSTALL AS NEEDED TO MAXIMIZE EFFICIENCY.
8. INSTALL ALL PIPING AND CONDUITS NORTH OF JERSEY BARRIERS ABOVEGROUND. PIPING SHALL BE INSTALLED ON PIPE SUPPORTS. CONDUITS CAN LAY DIRECTLY ON GROUND.
9. ROUTE WIRING FROM TMP-05, TMP-06, AND TMP-09 UNDERGROUND TO NORTH OF NEW JERSEY BARRIERS.
10. INSTALL JERSEY TYPE CONCRETE BARRIERS (MINIMUM 40" HEIGHT) ALONG AND NORTH OF TENNESSEE AVENUE AS SHOWN TO PREVENT VEHICULAR ACCESS INTO EQUIPMENT AREA.

LPE

STATE OF KENTUCKY ERIN L. SURINAK LICENSED PROFESSIONAL ENGINEER

Expires 06-30-16

DATE

PROFESSIONAL SEAL

REV.	DATE	DESCRIPTION	DRAWN BY	DRAFT CHK	PROJ ENGR	LEAD ENGR	CONF CTRL/ NUCL SFTY	FAC MGR	EATS MGR
0	5/30/14	ISSUED FOR CONSTRUCTION	JE	JE	CRE	CRE			

DRAWING REVISIONS

U.S. DEPARTMENT OF ENERGY
DOE PORTSMOUTH/PADUCAH PROJECT OFFICE
PADUCAH GASEOUS DIFFUSION PLANT

LATA Environmental Services of Kentucky, LLC
managed for the DEPARTMENT OF ENERGY under U.S. GOVERNMENT contract DE-AC30-10CC40020
Paducah, Kentucky

Environmental Resources Management
1218 3rd AVENUE, SEATTLE WASHINGTON
(425) 462-8591

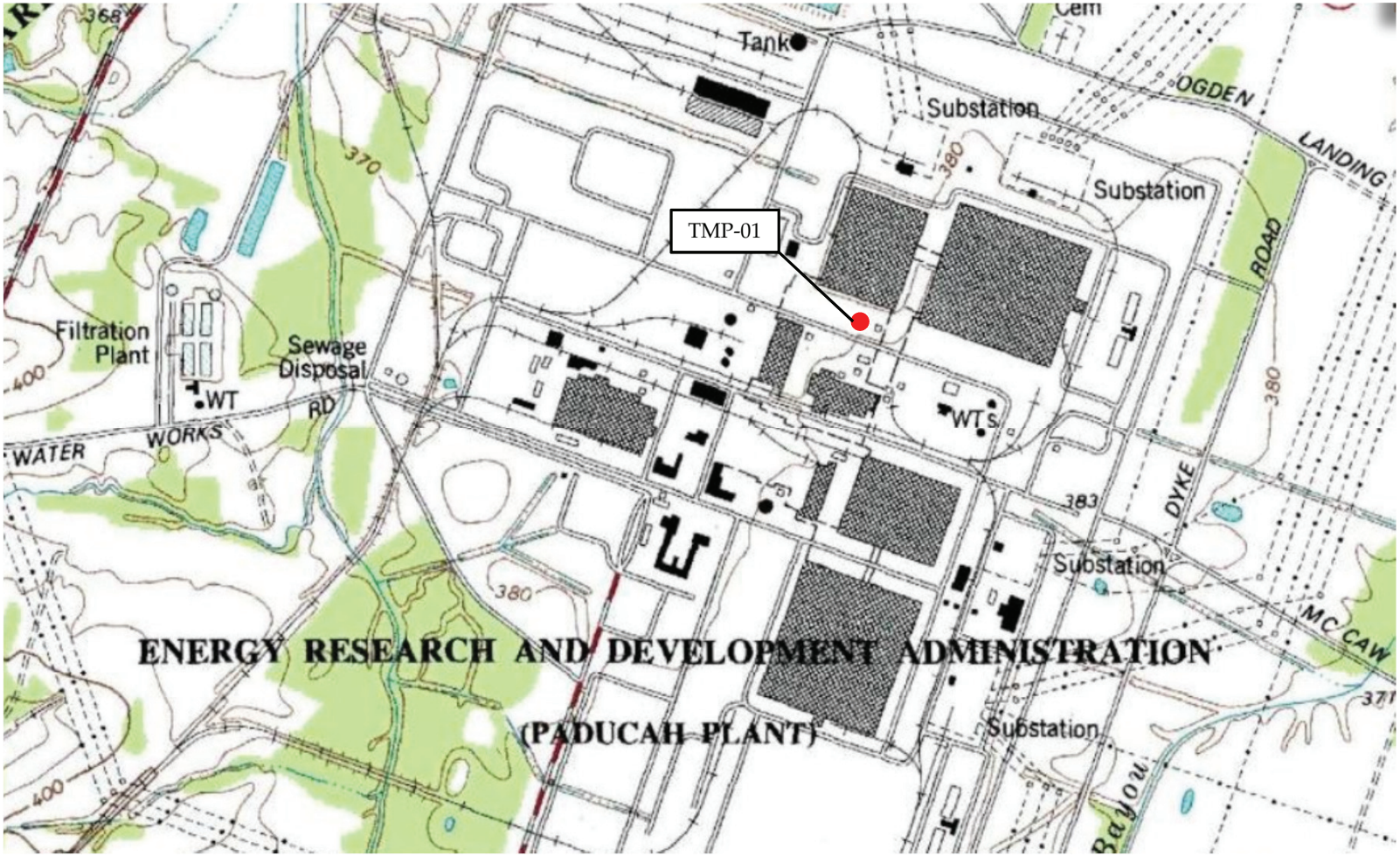
DOE CONTRACT NO. DE-AC30-10CC40020

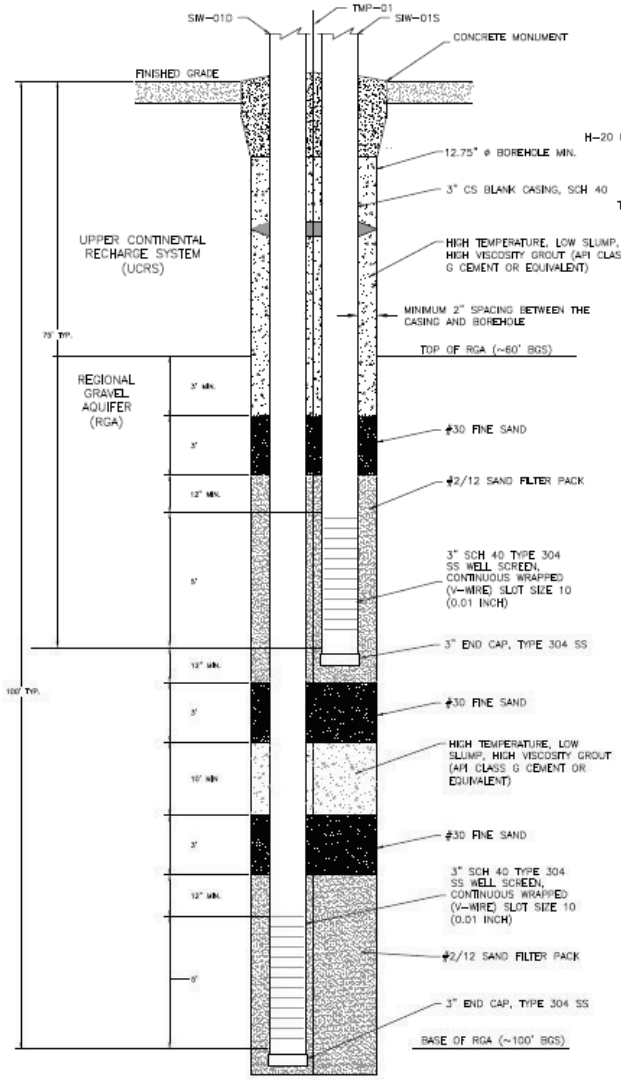
PROJECT NAME:
C-400 STEAM INJECTION TREATABILITY STUDY

TITLE:
TREATABILITY STUDY SITE PLAN

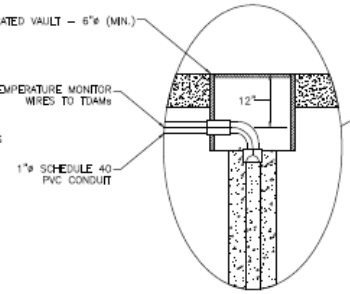
CAD FILE NAME	BUILDING	PLANT	CLASS
A027_SITE PLAN.DWG	C-400	PGDP	U

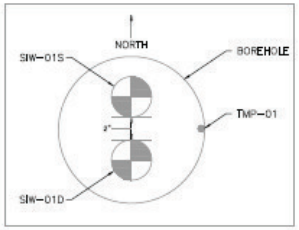
SCALE:	DRAWING NUMBER	REV
AS SHOWN	C7DC40000A027	0


TMP-01
Tank
Substation
Substation
OGDEN
LANDING
ROAD
Filtration Plant
Sewage Disposal
WT
RD
WATER
WORKS
WTs
DYKE
Substation
MC CAW
Substation
Bayou
ENERGY RESEARCH AND DEVELOPMENT ADMINISTRATION
(PADUCAH PLANT)



NESTED STEAM INJECTION WELL (TYP.)
(SIW-01S, SIW-01D)
NOT TO SCALE

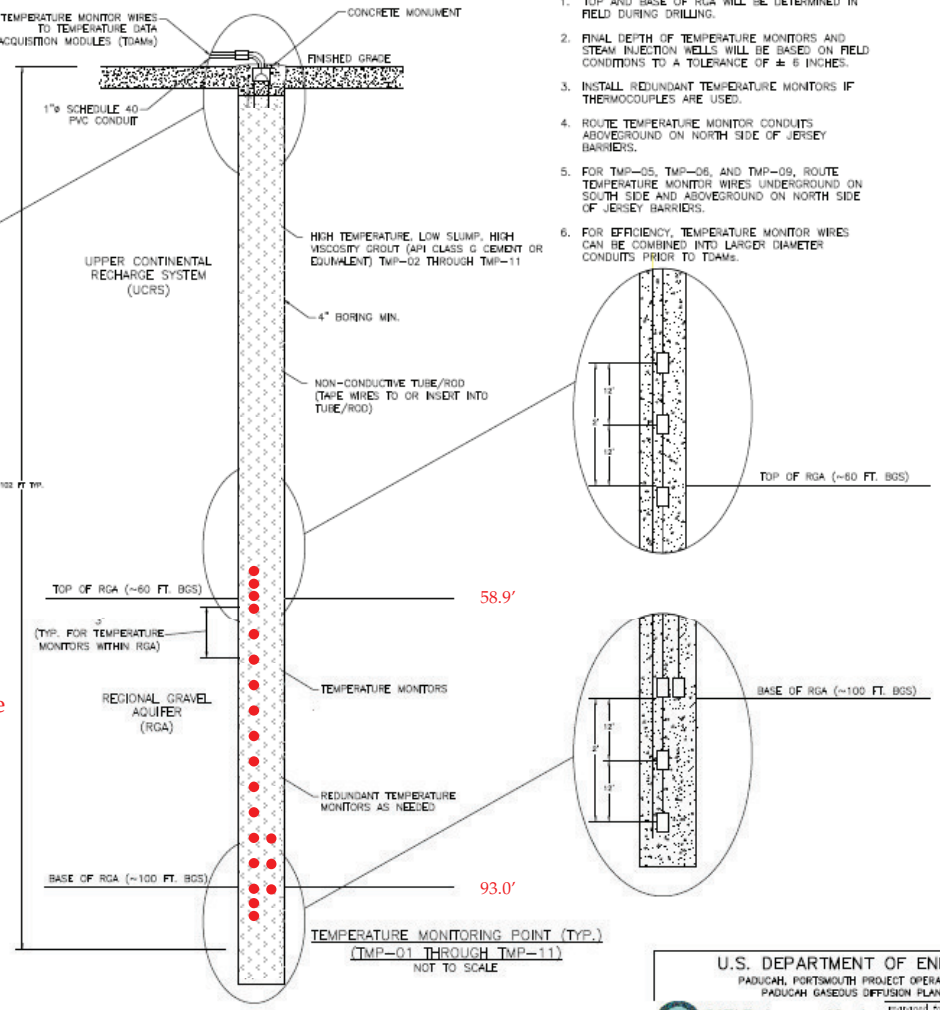




PLAN VIEW
SIW-01S, SIW-01D
NOT TO SCALE

See Page 1, Box 50 for thermocouple depth detail

TMP-01



TEMPERATURE MONITORING POINT (TYP.)
(TMP-01 THROUGH TMP-11)
NOT TO SCALE

NOTES:
1. TOP AND BASE OF RGA WILL BE DETERMINED IN FIELD DURING DRILLING.
2. FINAL DEPTH OF TEMPERATURE MONITORS AND STEAM INJECTION WELLS WILL BE BASED ON FIELD CONDITIONS TO A TOLERANCE OF ± 6 INCHES.
3. INSTALL REDUNDANT TEMPERATURE MONITORS IF THERMOCOUPLES ARE USED.
4. ROUTE TEMPERATURE MONITOR CONDUITS ABOVEGROUND ON NORTH SIDE OF JERSEY BARRIERS.
5. FOR TMP-05, TMP-06, AND TMP-09, ROUTE TEMPERATURE MONITOR WIRES UNDERGROUND ON SOUTH SIDE AND ABOVEGROUND ON NORTH SIDE OF JERSEY BARRIERS.
6. FOR EFFICIENCY, TEMPERATURE MONITOR WIRES CAN BE COMBINED INTO LARGER DIAMETER CONDUITS PRIOR TO TDAMs.

U.S. DEPARTMENT OF ENERGY
PADUCAH, PORTSMOUTH PROJECT OPERATIONS, PADUCAH GASEOUS DIFFUSION PLANT

LATA Environmental Services of Kentucky, LLC
managed for the DEPARTMENT OF ENERGY under U.S. GOVERNMENT contract DE-AC30-10CC40020
Paducah, Kentucky

Environmental Resources Management
1218 3rd AVENUE, SEATTLE WASHINGTON
(425) 462-8591

DOE CONTRACT NO. DE-AC30-10CC40020

PROJECT NAME:
C-400 STEAM INJECTION TREATABILITY STUDY

TITLE:
TREATABILITY STUDY
STEAM INJECTION WELLS AND
TEMPERATURE MONITORING POINTS

CAD FILENAME	BUILDING	PLANT	CLASS
A028_SIW & TMP DETAILS.DWG	C-400	PGDP	U

SCALE	DRAWING NUMBER	REV
N.T.S.	C7DC40000A028	0

LPE

STATE OF KENTUCKY ERIN I. SURINAK LICENSED PROFESSIONAL ENGINEER

Expires 06-30-16

DATE
PROFESSIONAL SEAL

REV	DATE	DESCRIPTION	DRAWN BY	DSGN BY	PROJ MGR	LEAD ENGR	CONF CTRL	PM MGR	DEPT MGR
0	5/30/14	ISSUED FOR CONSTRUCTION	JE	JE	CRE	CRE			

DRAWING REVISIONS

TMP-02						
		4-inch core		Drilled by Vernon Scott		
02/10/15 @ 07:49 to 09:55						
Drilled Interval		Recovery	Depths		Description	Notes
Top	Bottom		Top	Bottom		
47.0	57.0	12.8	47.0	53.1	Silty Clay with Sand, 10YR7/2 (light gray) with 10YR6/6 (brownish yellow) and 7.5YR6/8 (reddish yellow) mottling, soft, nonplastic, and moist. Sand is very fine grained	
			53.1	53.6	Silty Clay with Sand as above but with some Gravel. Gravel is rounded chert with white patina, 0.2 to 0.5 inch diameter	
			53.6	57.0	Silty Clay with Sand, 10YR7/2 (light gray) with 10YR6/6 (brownish yellow) and 7.5YR6/8 (reddish yellow) mottling, soft to medium stiff, nonplastic, and moist. Sand is very fine grained	
57.0	67.0	11.3	57.0	59.2	Silty Clay with Sand as above	
			59.2	60.5	Silty Clay with Sand and Gravel, 10YR7/2 (light gray) with 10YR6/6 (brownish yellow) and 7.5YR6/8 (reddish yellow) mottling and with some 10YR7/4 (very pale brown) mottling, soft, nonplastic, and moist. Sand is very fine grained. Gravel is subangular to subrounded chert (some with white patina), 0.2 to 1.5 inch diameter	Top of RGA at 59.2 ft
			60.5	67.0	Gap graded Sand with Gravel, 10YR6/6 (brownish yellow) with 10YR7/4 (very pale brown), loose, and moist. Sand is very coarse grained. Gravel is subangular to subrounded chert with some white patina, 0.2 to 1.5 inch diameter	
67.0	77.0	8.6	67.0	77.0	Gap graded Sand with Gravel as above but with 7.5YR8/1 (white) and 7.5YR7/3 (pink) mottling in intervals of chert with brown patina	
77.0	87.0	8.3	77.0	87.0	Gap graded Sand with Gravel as above but with intervals of rounded chert (only) with no patina, most to very moist	
87.0	97.0	10.3	87.0	92.7	Gap graded Sand with Gravel as above with occasional cobbles of chert with brown patina, up to 2.5 inch diameter	Base of RGA at 92.7 ft
			92.7	93.7	Sand with Silty Clay, 10YR7/2 (light gray) with 7.5YR6/6 (reddish yellow) mottling, medium dense to soft, and moist. Sand is very fine grained	
			93.7	94.1	Sand, 7.5YR6/6 (reddish yellow), limonite stained, medium dense to soft, and moist. Sand is fine grained	
			94.1	96.2	Sand with Silty Clay as at 92.7 to 93.7 ft	
			96.2	97.0	Sand, 10YR7/2 (light gray) with 7.5YR6/6 (reddish yellow) mottling, medium dense to soft, and moist. Sand is fine grained.	
TD = 97.0 ft						

UNIFORM KENTUCKY WELL CONSTRUCTION RECORD

Use this form only to report installation of monitoring or water wells.
Original copy must be submitted to Division of Water within 60 days of completion.
See instructions on reverse of form.
Record must be typed or neatly printed or it will be returned to the driller as unacceptable.
One copy to Division of Water, one copy to owner, one copy to driller's files.

Attach Well Identification Number (AKGWA) Label Here
Water wells: yellow labels
Monitoring wells: blue labels

4. Owner name: Paducah Gaseous Diffusion Plant
5. Owner address: 5600 Hobbs Rd
6. City: West Paducah
7. State: KY
8. Zip: 42053

If site name and address differ from owner name and address:
9. Site name:
10. Site address:
11. City:
12. State: KY
13. Zip:

1. Kentucky Well ID (AKGWA) Number:
2. Owner well ID#: TMP-02

3. Attachments
Required
1. Site plan or sketch map [x]
2. Well location
On topographic map, OR
Obtained by GPS unit
Conditionally Required
3. Well diagram (monitoring well) [x]
4. Coliform analysis (if applicable) [ ]
5. Signed Variance (if applicable) [ ]
Optional
6. Other laboratory analysis report [ ]

14. Agency Interest (AI) Number: 3059
15. Facility type & ID Number: (•) CERCLA ( ) RCRA ( ) Solid Waste ( ) UST ( ) Drinking Water ( ) Mining
ID Number: KY8-890-008-982

16. Owner phone: (270) 441-6000
17. Site phone: (270) 441-6000

23. Install start date: Feb 10 2015 (Month Day Year)
24. Install end date: Feb 10 2015

18. USGS topo map: Heath
19. County: Mccracken
20. Physiographic Region: ( ) Blue Grass ( ) Ohio River Alluvium ( ) E. Coal Field ( ) W. Coal Field ( ) Miss. Plateau (•) Jackson Purchase
21. Surface elevation (ft): 380.00
22. Elevation determined by: ( ) GPS (•) Map ( ) Prior report ( ) Survey ( ) Prior well log

Please report depths in feet below ground surface, not as relative elevations.
25. Total depth: 97.00
26. Depth to bedrock:
27. Static water level:
28. Casing height above surface (in):

29. Well use: ( ) Agriculture ( ) Commercial ( ) Domestic ( ) Industrial (•) Monitoring / Remed Remediation ( ) Public ( ) Geothermal ( ) Heat pump ( ) HVAC ( ) Injection ( ) Mining ( ) Unused
NOTE: CODE REQUIRED for well uses on left. Select a code from the dropdown menu.

30. Drilling method: ( ) Auger – HS ( ) Auger – SS ( ) Auger – bucket ( ) Auger – hand ( ) Cable tool ( ) Core ( ) Driven Casing ( ) Excavation ( ) Combined – HS auger and air rotary ( ) Combined – other (specify): ( ) Jet wash ( ) Push/probe ( ) Rotary – air ( ) Rotary – mud ( ) Rotary – reverse ( ) Sand point (•) Sonic ( ) Unknown

31. Well status: (•) Active ( ) Inactive ( ) Unsuitable for intended use
32. Wellhead: ( ) Flush (•) Well cap ( ) Locking ( ) Sanitary seal
33. Well development method: ( ) Surging ( ) Jetting ( ) Pumping ( ) Backwashing ( ) Bailing ( ) Compressed air ( ) Combination of methods (specify)

WATER WELLS ONLY

34. Estimated well yield: ( ) gpm ( ) gph ( ) gpd
35. Well service: #of people served
36. Disinfectant amount: ( ) oz ( ) qt ( ) cups ( ) lb ( ) gal
37. Type: ( ) Bleach ( ) Hypo-chlorite
38. Pitless adapter installed: ( ) Yes ( ) No
39. Pump installed: ( ) Submersible ( ) Jet ( ) Bailer or bucket ( ) Turbine ( ) Hand ( ) No pump
40. Depth to intake (ft):
41. Apparent quality and odor

APPEARANCE	ODOR none	slight	mod.	high
( ) Clear				
( ) Cloudy				
( ) Muddy	( ) Iron			
( ) Turbid	( ) Sulfur			
	( ) Salt			

46. Well completion: Casing and screens

From depth (feet)	To depth (feet)	Borehole diameter (inches)	Casing diam (in) ID	Casing diam (in) OD	Casing type	Screen slot size

47. Annulus fill and seal

From depth (feet)	To depth (feet)	Material (NOTE for WATER WELLS only: Bentonite (clay, shale or bentonite only) is used unless otherwise specify completion)
97.00	0.00	

48. Lithologic log (if more space is needed, continue on separate page)

From depth (ft)	To depth (ft)	Description (include any show of water and indicate apparent quality)
0.00	59.20	UCRS
59.20	92.70	RGA
92.70	97.00	McNairy Formation

49. Sketch map [x]

COLIFORM TEST

42. Coliform test type: ( ) fecal ( ) fecal and total
43. Coliform test results: ( ) 0 or <1.0 ( ) TNTC ( ) Confluent
or # colonies per 100 mL
44. Date sampled (Month Day Year)
45. Date analyzed

50. Comments
Borehole grout is Class H cement and silica flour, TC installation depths: 94.7, 93.7, 92.7(dup), 89.7(dup), 86.7(dup), 83.7, 80.7, 77.7, 74.7, 71.7, 68.7, 65.7, 62.7, 59.7, 59.2, 58.2, 58.2 (replicate is unconnected but in the borehole), 57.2

Latitude:
Longitude:
Lat/Long Method: ( ) INT ( ) GPS ( ) SUR ( ) REP
Date Received:

51. Affirmation: The work described above was done under my supervision, and this report is true and correct to the best of my knowledge.
Note: the driller is not responsible for natural groundwater quality or quantity encountered while drilling or completing this well.

Signature of certified driller: [signature]
Date signed: Feb 10 2015
Certification number: 0411 - 0549 - 00
Drilling company: Cascade Drilling LP

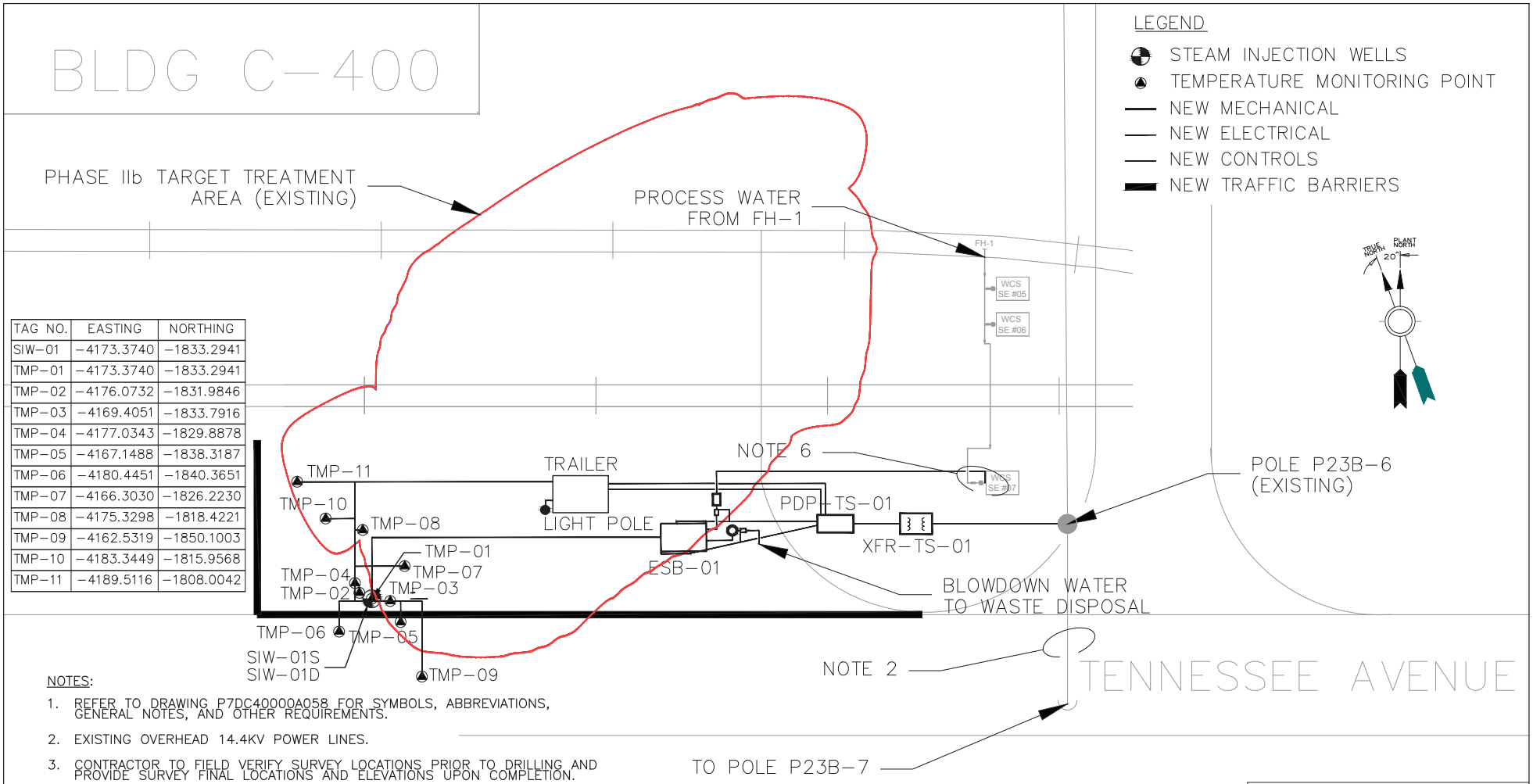
rev 02/29/2012

2. Owner Well ID#
Owner well ID # denotes the site designation for the well, e.g. "MW-06."

15. Facility type & ID number
If the well is located at any of the listed facility types, please note the historic site ID # in the spaces provided. This information is vital for other programs that may need to locate the well record in the database.

25. Well use
If well use falls under any of the following General Use designations with a corresponding Specific Use, you must include the corresponding Use Code:

WELL USE CODES		
GENERAL USE	SPECIFIC USE	USE CODE
Agriculture	Agriculture - Dairy Operation	01
Agriculture	Agriculture - Feed Pen Operation	02
Agriculture	Agriculture - Fish And Game Propagation	03
Agriculture	Agriculture - General	04
Agriculture	Agriculture - Horse Farm	05
Agriculture	Agriculture - Irrigation	06
Agriculture	Agriculture - Livestock Watering	07
Agriculture	Agriculture - Poultry And Egg Operation	08
Commercial	Commercial	01
Commercial	Commercial - Irrigation	02
Commercial	Dewatering Well - Construction	03
Domestic	Domestic - Multiple Domestic Households	01
Domestic	Domestic - Single Household	02
Industrial	Industrial - General	01
Industrial	Industrial - Manufacturing	02
Industrial	Industrial - Petroleum Processing Plant	03
Monitoring & Remediation	Monitoring Well - Ambient Monitoring	01
Monitoring & Remediation	Monitoring Well - Compliance	02
Monitoring & Remediation	Monitoring Well - Military Installation	03
Monitoring & Remediation	Monitoring Well - Water Level Monitoring Only	04
Monitoring & Remediation	Remediation	05
Public	Public - Community	01
Public	Public - Exploration	02
Public	Public - Non-transient, Non-community	03
Public	Public - Transient, Non-community	04
Public	Public - Unregulated	05
Geothermal	(general use)	-
Heat pump	(general use)	-
HVAC	(general use)	-
Injection	(general use)	-
Mining	(general use)	-
Unused	(general use)	-



TAG NO.	EASTING	NORTHING
SIW-01	-4173.3740	-1833.2941
TMP-01	-4173.3740	-1833.2941
TMP-02	-4176.0732	-1831.9846
TMP-03	-4169.4051	-1833.7916
TMP-04	-4177.0343	-1829.8878
TMP-05	-4167.1488	-1838.3187
TMP-06	-4180.4451	-1840.3651
TMP-07	-4166.3030	-1826.2230
TMP-08	-4175.3298	-1818.4221
TMP-09	-4162.5319	-1850.1003
TMP-10	-4183.3449	-1815.9568
TMP-11	-4189.5116	-1808.0042

NOTES:

1. REFER TO DRAWING P7DC40000A058 FOR SYMBOLS, ABBREVIATIONS, GENERAL NOTES, AND OTHER REQUIREMENTS.
2. EXISTING OVERHEAD 14.4KV POWER LINES.
3. CONTRACTOR TO FIELD VERIFY SURVEY LOCATIONS PRIOR TO DRILLING AND PROVIDE SURVEY FINAL LOCATIONS AND ELEVATIONS UPON COMPLETION.
4. REFER TO DRAWING C7DC40000A028 FOR WELL AND TMP DETAILS.
5. CONNECT XFR-TS-01 TO EXISTING 14.4KV POWER LINE AT POLE P23B-6.
6. CONNECT ESB-01 FEEDWATER TO EXISTING PROCESS WATER LINE SUPPLIED FROM FIRE HYDRANT FH-1.
7. ROUTINGS AND LOCATIONS ARE DIAGRAMMATIC. INSTALL AS NEEDED TO MAXIMIZE EFFICIENCY.
8. INSTALL ALL PIPING AND CONDUITS NORTH OF JERSEY BARRIERS ABOVEGROUND. PIPING SHALL BE INSTALLED ON PIPE SUPPORTS. CONDUITS CAN LAY DIRECTLY ON GROUND.
9. ROUTE WIRING FROM TMP-05, TMP-06, AND TMP-09 UNDERGROUND TO NORTH OF NEW JERSEY BARRIERS.
10. INSTALL JERSEY TYPE CONCRETE BARRIERS (MINIMUM 40" HEIGHT) ALONG AND NORTH OF TENNESSEE AVENUE AS SHOWN TO PREVENT VEHICULAR ACCESS INTO EQUIPMENT AREA.

LPE

STATE OF KENTUCKY ERIN L. SURINAK LICENSED PROFESSIONAL ENGINEER

Expires 06-30-16

DATE

PROFESSIONAL SEAL

REV.	DATE	DESCRIPTION	DRAWN BY	DRAFT CHK	PROJ ENGR	LEAD ENGR	CONF CTRL/ NUCL SFTY	FAC MGR	EATS MGR
0	5/30/14	ISSUED FOR CONSTRUCTION	JE	JE	CRE	CRE			

DRAWING REVISIONS

U.S. DEPARTMENT OF ENERGY
DOE PORTSMOUTH/PADUCAH PROJECT OFFICE
PADUCAH GASEOUS DIFFUSION PLANT

LATA Environmental Services of Kentucky, LLC
managed for the DEPARTMENT OF ENERGY under U.S. GOVERNMENT contract DE-AC30-10CC40020
Paducah, Kentucky

Environmental Resources Management
1218 3rd AVENUE, SEATTLE WASHINGTON
(425) 462-8591

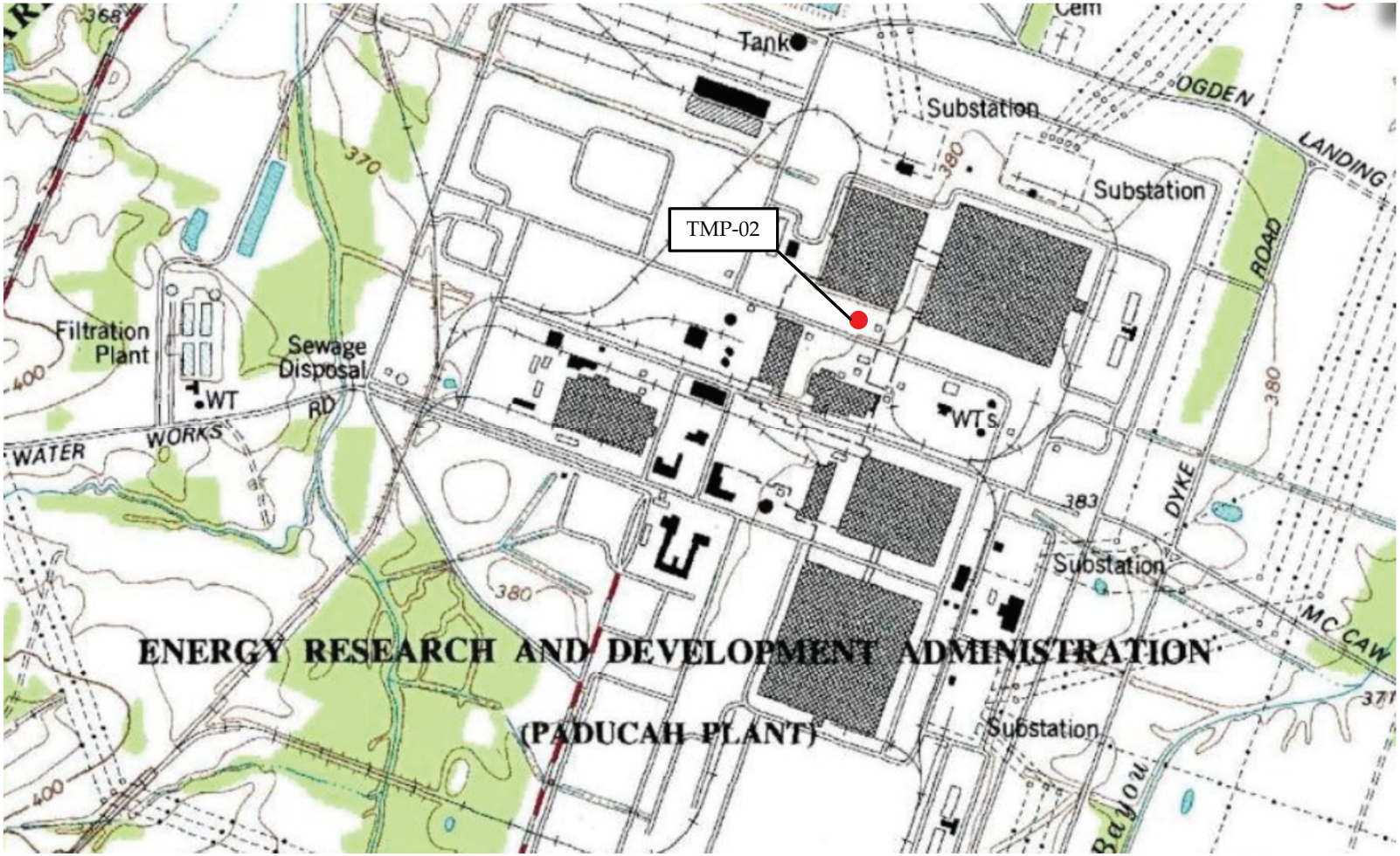
DOE CONTRACT NO. DE-AC30-10CC40020

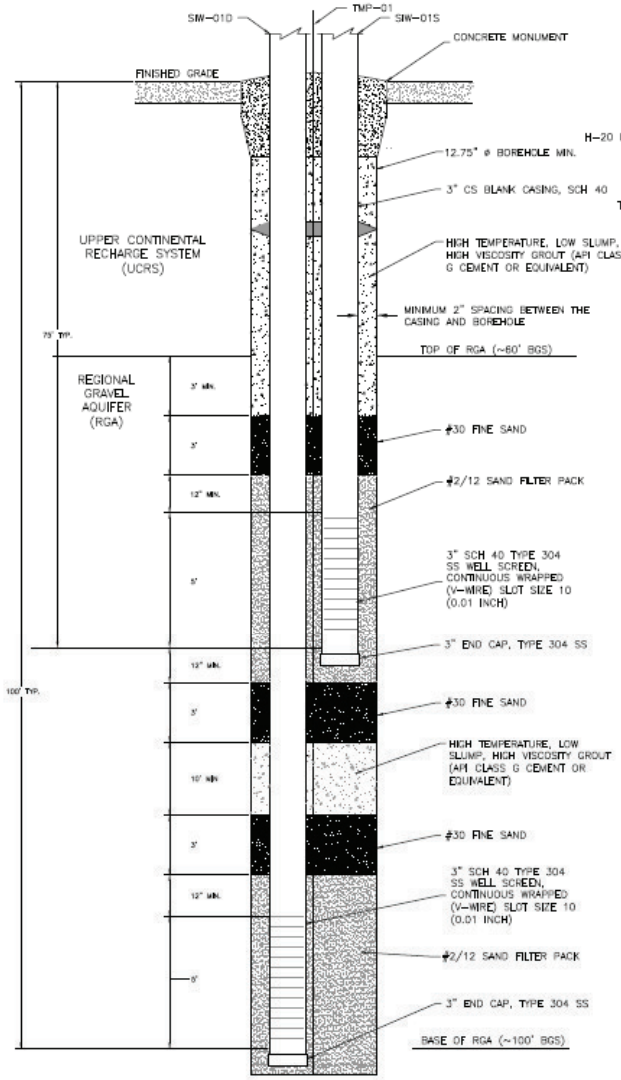
PROJECT NAME:
C-400 STEAM INJECTION TREATABILITY STUDY

TITLE:
TREATABILITY STUDY SITE PLAN

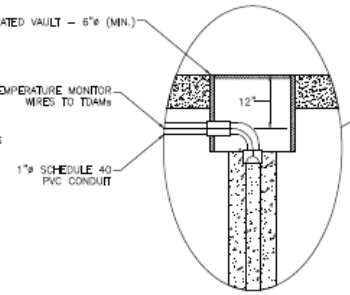
CAD FILE NAME	BUILDING	PLANT	CLASS
A027_SITE PLAN.DWG	C-400	PGDP	U

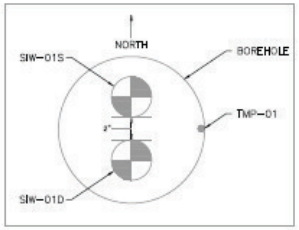
SCALE:	DRAWING NUMBER	REV
AS SHOWN	C7DC40000A027	0


TMP-02
Tank
Substation
Substation
OGDEN
LANDING
ROAD
Filtration Plant
Sewage Disposal
WT
RD
WATER
WORKS
WTs
DYKE
Substation
MC CAW
Substation
Bayou
370
380
400
383
371
ENERGY RESEARCH AND DEVELOPMENT ADMINISTRATION
(PADUCAH PLANT)



NESTED STEAM INJECTION WELL (TYP.)
(SIW-01S, SIW-01D)
NOT TO SCALE

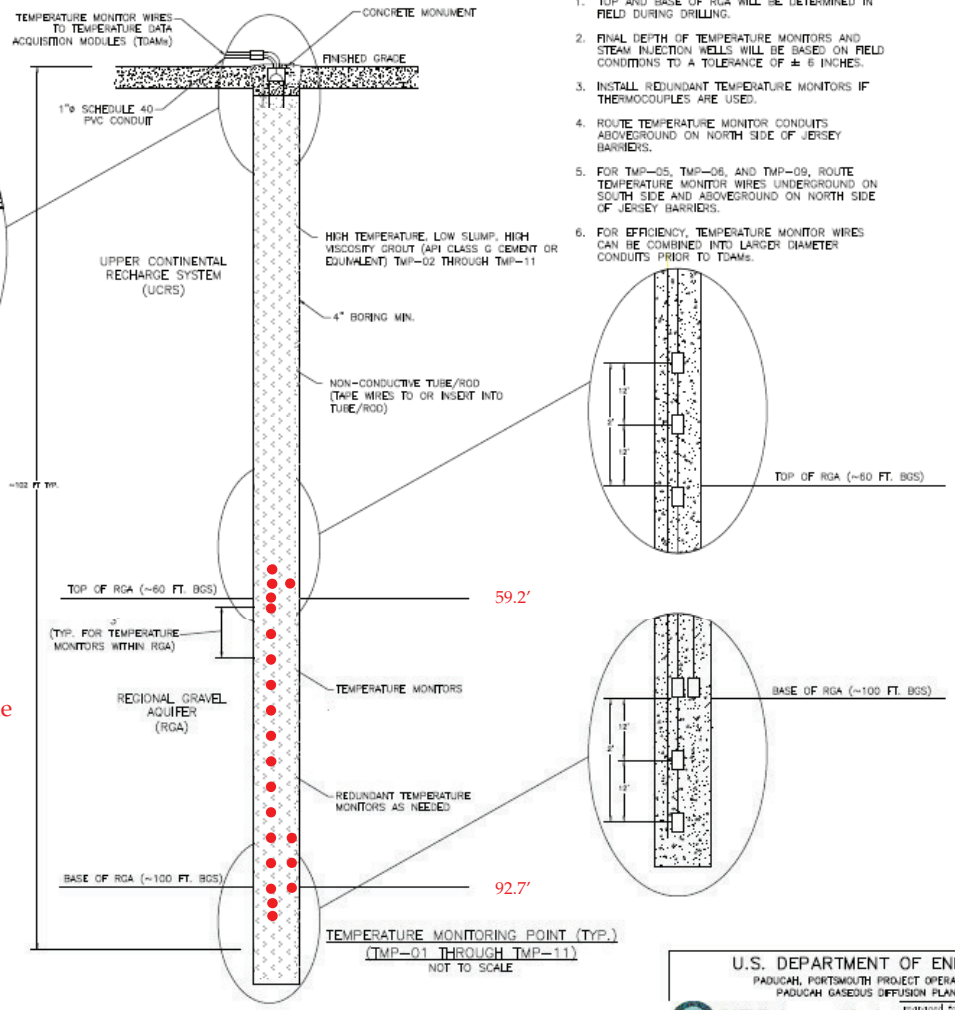




PLAN VIEW
SIW-01S, SIW-01D
NOT TO SCALE

See Page 1, Box 50 for thermocouple depth detail

TMP-02



NOTES:
1. TOP AND BASE OF RGA WILL BE DETERMINED IN FIELD DURING DRILLING.
2. FINAL DEPTH OF TEMPERATURE MONITORS AND STEAM INJECTION WELLS WILL BE BASED ON FIELD CONDITIONS TO A TOLERANCE OF ± 6 INCHES.
3. INSTALL REDUNDANT TEMPERATURE MONITORS IF THERMOCOUPLES ARE USED.
4. ROUTE TEMPERATURE MONITOR CONDUITS ABOVEGROUND ON NORTH SIDE OF JERSEY BARRIERS.
5. FOR TMP-05, TMP-06, AND TMP-09, ROUTE TEMPERATURE MONITOR WIRES UNDERGROUND ON SOUTH SIDE AND ABOVEGROUND ON NORTH SIDE OF JERSEY BARRIERS.
6. FOR EFFICIENCY, TEMPERATURE MONITOR WIRES CAN BE COMBINED INTO LARGER DIAMETER CONDUITS PRIOR TO TDAMs.

U.S. DEPARTMENT OF ENERGY
PADUCAH, PORTSMOUTH PROJECT OPERATIONS, PADUCAH GASEOUS DIFFUSION PLANT
LATA Environmental Services of Kentucky, LLC — managed for the DEPARTMENT OF ENERGY under U.S. GOVERNMENT contract DE-AC30-10CC40020 Paducah, Kentucky

Environmental Resources Management
1218 3rd AVENUE, SEATTLE WASHINGTON
(425) 462-8591

DOE CONTRACT NO. DE-AC30-10CC40020

PROJECT NAME: C-400 STEAM INJECTION TREATABILITY STUDY

TITLE: TREATABILITY STUDY STEAM INJECTION WELLS AND TEMPERATURE MONITORING POINTS

CAD FILENAME	BUILDING	PLANT	CLASS
A028_SIW & TMP DETAILS.DWG	C-400	PGDP	U

SCALE	DRAWING NUMBER	REV
N.T.S.	C7DC40000A028	0

LPE

ERIN I. SURINAK — STATE OF KENTUCKY — LICENSED PROFESSIONAL ENGINEER
Expires 06-30-16

REV	DATE	DESCRIPTION	DRAWN BY	CHKD BY	PROJ ENGR	LEAD ENGR	CONF ENGR	PROJ MGR	DIV MGR
0	5/30/14	ISSUED FOR CONSTRUCTION	JE	JE	CRE	CRE			

DATE
PROFESSIONAL SEAL
DRAWING REVISIONS

TMP-03						
		4-inch core		Drilled by Vernon Scott		
02/09/15 @ 08:15 to 10:25						
Drilled Interval		Recovery	Depths		Description	Notes
Top	Bottom		Top	Bottom		
47.0	57.0	8.8	47.0	57.0	Silty Clay with Sand and little Gravel 10YR7/2 (light gray) with 10YR6/6 (brownish yellow) and 7.5YR6/8 (reddish yellow) mottling, soft, nonplastic, and moist. Sand is very fine grained. Gravel is rounded chert with white patina, 0.2 to 1.5 inch diameter	
57.0	67.0	11.0	57.0	58.8	Silty Clay with Sand and little Gravel as above	
			58.8	65.5	Gap graded Sand with Gravel, 10YR6/6 (brownish yellow) with 10YR7/4 (very pale brown) mottling, loose, and moist. Sand is very coarse grained. Gravel is subangular to subrounded chert with some white patina, 0.2 to 2.0 inch diameter	Top of RGA at 58.8 ft
			65.5	67.0	Gap graded Sand with Gravel as above but with 10YR7/2 (light gray) mottling	
67.0	77.0	10.8	67.0	77.0	Gap graded Sand (70%) with Gravel (30%) as above, well graded, and very loose. Gravel is 7.5YR8/1 (white) mottled with 7.5YR7/3 (pink) but with some intervals of brown patina	
77.0	87.0	10.4	77.0	87.0	Well graded Sandy Gravel, 10YR6/6 (brownish yellow) mottled with 10YR7/4 (very pale brown), loose, and moist. Gravel is subangular to subrounded chert, 0.2 to 1.2 inch diameter with occasional 2.0 inch diameter cobbles. Sand is medium to coarse grained	
87.0	97.0	11.0	87.0	92.8	Welly graded Sandy Gravel as above	78.9 - 79.9 ft: wet
			92.8	97.0	Sand in Silty clay, 10YR7/2 (light gray) with 7.5YR6/6 (reddish yellow) mottling, medium hard to dense but with some soft, and moist	Base of RGA at 92.8 ft
TD = 97.0 ft						

UNIFORM KENTUCKY WELL CONSTRUCTION RECORD

Use this form only to report installation of monitoring or water wells.
Original copy must be submitted to Division of Water within 60 days of completion.
See instructions on reverse of form.
Record must be typed or neatly printed or it will be returned to the driller as unacceptable.
One copy to Division of Water, one copy to owner, one copy to driller's files.

Attach Well Identification Number (AKGWA) Label Here
Water wells: yellow labels
Monitoring wells: blue labels

1. Kentucky Well ID (AKGWA) Number: -

2. Owner well ID#: TMP-03

4. Owner name: Paducah Gaseous Diffusion Plant
5. Owner address: 5600 Hobbs Rd
6. City: West Paducah
7. State: KY
8. Zip: 42053

If site name and address differ from owner name and address:
9. Site name:
10. Site address:
11. City:
12. State: KY
13. Zip:

3. Attachments
Required
1. Site plan or sketch map [x]
2. Well location
On topographic map, OR
Obtained by GPS unit
Conditionally Required
3. Well diagram (monitoring well) [x]
4. Coliform analysis (if applicable) [ ]
5. Signed Variance (if applicable) [ ]
Optional
6. Other laboratory analysis report [ ]

14. Agency Interest (AI) Number: 3059
15. Facility type & ID Number: (•) CERCLA ( ) Solid Waste ( ) Drinking Water ( ) RCRA ( ) UST ( ) Mining
ID Number: KY8-890-008-982

16. Owner phone: (270) 441-6000
17. Site phone: (270) 441-6000

18. USGS topo map: Heath
19. County: Mccracken
20. Physiographic Region: ( ) Blue Grass ( ) Ohio River Alluvium ( ) E. Coal Field ( ) W. Coal Field ( ) Miss. Plateau (•) Jackson Purchase
21. Surface elevation (ft): 380.00
22. Elevation determined by: ( ) GPS (•) Map ( ) Prior report ( ) Survey ( ) Prior well log

23. Install start date: Feb 09 2015 (Month Day Year)
24. Install end date: Feb 09 2015

Please report depths in feet below ground surface, not as relative elevations.
25. Total depth: 97.00
26. Depth to bedrock:
27. Static water level:
28. Casing height above surface (in):

29. Well use: ( ) Agriculture ( ) Commercial ( ) Domestic ( ) Industrial (•) Monitoring / Remed ( ) Public ( ) Geothermal ( ) Heat pump ( ) HVAC ( ) Injection ( ) Mining ( ) Unused
Remediation
NOTE: CODE REQUIRED for well uses on left. Select a code from the dropdown menu.

30. Drilling method: ( ) Auger – HS ( ) Auger – SS ( ) Auger – bucket ( ) Auger – hand ( ) Cable tool ( ) Core ( ) Driven Casing ( ) Excavation ( ) Combined – HS auger and air rotary ( ) Combined – other (specify): ( ) Jet wash ( ) Push/probe ( ) Rotary – air ( ) Rotary – mud ( ) Rotary – reverse ( ) Sand point (•) Sonic ( ) Unknown

31. Well status: (•) Active ( ) Inactive ( ) Unsuitable for intended use
32. Wellhead: ( ) Flush (•) Well cap ( ) Locking ( ) Sanitary seal
33. Well development method: ( ) Surging ( ) Jetting ( ) Pumping ( ) Backwashing ( ) Bailing ( ) Compressed air ( ) Combination of methods (specify):

WATER WELLS ONLY

34. Estimated well yield: ( ) gpm ( ) gph ( ) gpd
35. Well service: #of people served
36. Disinfectant amount: ( ) oz ( ) qt ( ) cups ( ) lb ( ) gal
37. Type: ( ) Bleach ( ) Hypo-chlorite
38. Pitless adapter installed: ( ) Yes ( ) No
39. Pump installed: ( ) Submersible ( ) Jet ( ) Bailer or bucket ( ) Turbine ( ) Hand ( ) No pump
40. Depth to intake (ft):
41. Apparent quality and odor

APPEARANCE	ODOR none	slight	mod.	high
( ) Clear				
( ) Cloudy				
( ) Muddy				
( ) Turbid				

Iron
Sulfur
Salt

46. Well completion: Casing and screens

From depth (feet)	To depth (feet)	Borehole diameter (inches)	Casing diam (in) ID	Casing diam (in) OD	Casing type	Screen slot size

47. Annulus fill and seal

From depth (feet)	To depth (feet)	Material
97.00	0.00	

48. Lithologic log (if more space is needed, continue on separate page)

From depth (ft)	To depth (ft)	Description (include any show of water and indicate apparent quality)
0.00	58.80	UCRS
58.80	92.80	RGA
92.80	97.00	McNairy Formation

49. Sketch map [x]

COLIFORM TEST

42. Coliform test type: ( ) fecal ( ) fecal and total
43. Coliform test results: ( ) 0 or <1.0 ( ) TNTC ( ) Confluent
or # colonies per 100 mL
44. Date sampled: Month Day Year
45. Date analyzed:

50. Comments
Borehole grout is Class H cement and silica flour mix, TC installation depths: 94.8, 93.8, 92.8 (dup), 89.8(dup), 86.8(dup), 83.8, 80.8, 77.8, 74.8, 71.8, 68.8, 65.8, 62.8, 59.8, 58.8, 57.8, 56.8

Latitude:
Longitude:

51. Affirmation: The work described above was done under my supervision, and this report is true and correct to the best of my knowledge.
Note: the driller is not responsible for natural groundwater quality or quantity encountered while drilling or completing this well.

Signature of certified driller:
Date signed: Feb 10 2015

Certification number: 0411 - 0549 - 00
Drilling company: Cascade Drilling LP

Lat/Long Method: ( ) INT ( ) GPS ( ) SUR ( ) REP
Date Received:

rev 02/29/2012

2. Owner Well ID#
Owner well ID # denotes the site designation for the well, e.g. "MW-06."

15. Facility type & ID number
If the well is located at any of the listed facility types, please note the historic site ID # in the spaces provided. This information is vital for other programs that may need to locate the well record in the database.

25. Well use
If well use falls under any of the following General Use designations with a corresponding Specific Use, you must include the corresponding Use Code:

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Agriculture	Agriculture - Feed Pen Operation	02
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Agriculture	Agriculture - General	04
Agriculture	Agriculture - Horse Farm	05
Agriculture	Agriculture - Irrigation	06
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Agriculture	Agriculture - Poultry And Egg Operation	08
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Commercial	Commercial - Irrigation	02
Commercial	Dewatering Well - Construction	03
Domestic	Domestic - Multiple Domestic Households	01
Domestic	Domestic - Single Household	02
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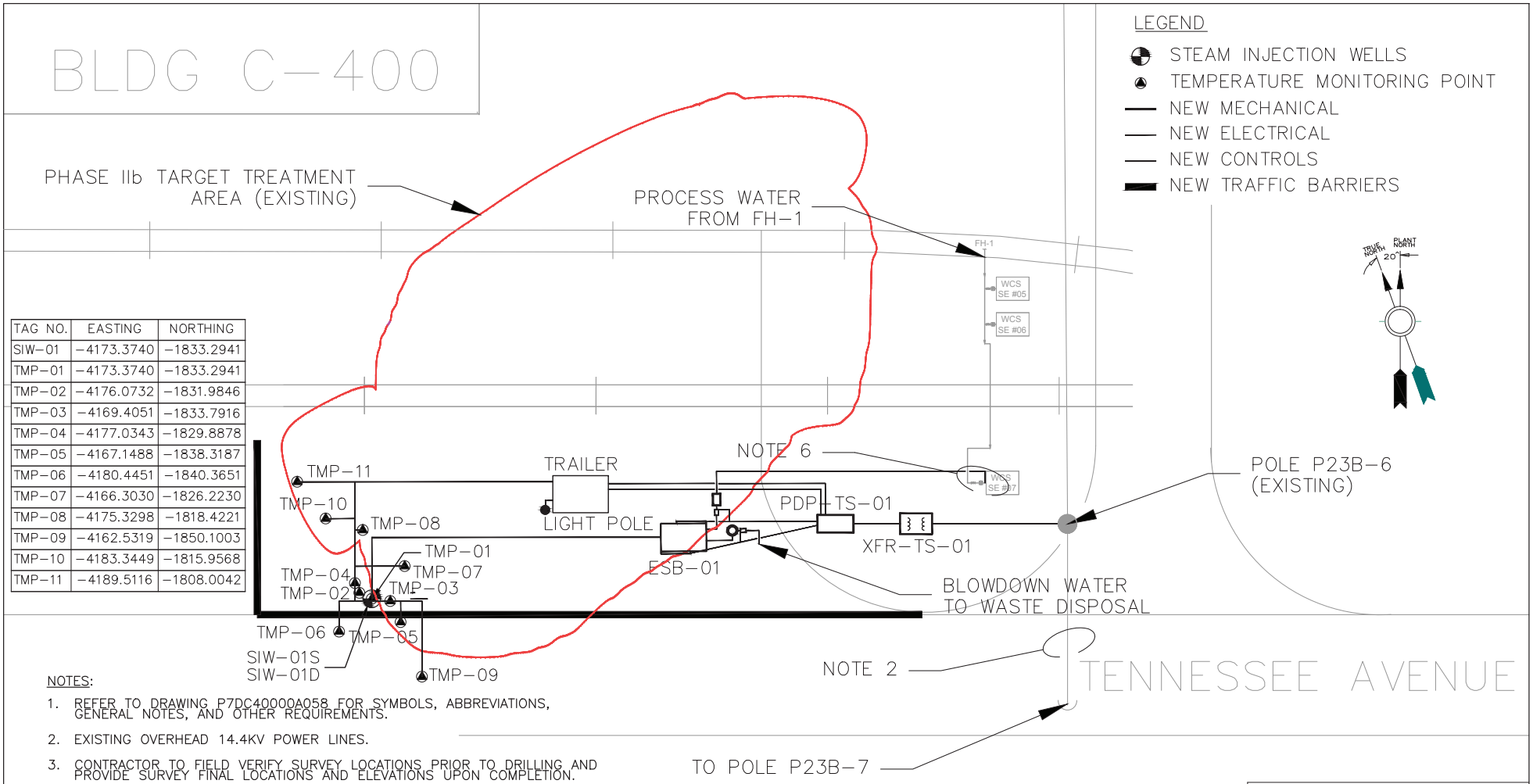
Industrial	Industrial - Manufacturing	02
Industrial	Industrial - Petroleum Processing Plant	03
Monitoring & Remediation	Monitoring Well - Ambient Monitoring	01
Monitoring & Remediation	Monitoring Well - Compliance	02
Monitoring & Remediation	Monitoring Well - Military Installation	03
Monitoring & Remediation	Monitoring Well - Water Level Monitoring Only	04
Monitoring & Remediation	Remediation	05
Public	Public - Community	01
Public	Public - Exploration	02
Public	Public - Non-transient, Non-community	03
Public	Public - Transient, Non-community	04
Public	Public - Unregulated	05
Geothermal	(general use)	-
Heat pump	(general use)	-
HVAC	(general use)	-
Injection	(general use)	-
Mining	(general use)	-
Unused	(general use)	-



TAG NO.	EASTING	NORTHING
SIW-01	-4173.3740	-1833.2941
TMP-01	-4173.3740	-1833.2941
TMP-02	-4176.0732	-1831.9846
TMP-03	-4169.4051	-1833.7916
TMP-04	-4177.0343	-1829.8878
TMP-05	-4167.1488	-1838.3187
TMP-06	-4180.4451	-1840.3651
TMP-07	-4166.3030	-1826.2230
TMP-08	-4175.3298	-1818.4221
TMP-09	-4162.5319	-1850.1003
TMP-10	-4183.3449	-1815.9568
TMP-11	-4189.5116	-1808.0042

NOTES:

1. REFER TO DRAWING P7DC40000A058 FOR SYMBOLS, ABBREVIATIONS, GENERAL NOTES, AND OTHER REQUIREMENTS.
2. EXISTING OVERHEAD 14.4KV POWER LINES.
3. CONTRACTOR TO FIELD VERIFY SURVEY LOCATIONS PRIOR TO DRILLING AND PROVIDE SURVEY FINAL LOCATIONS AND ELEVATIONS UPON COMPLETION.
4. REFER TO DRAWING C7DC40000A028 FOR WELL AND TMP DETAILS.
5. CONNECT XFR-TS-01 TO EXISTING 14.4KV POWER LINE AT POLE P23B-6.
6. CONNECT ESB-01 FEEDWATER TO EXISTING PROCESS WATER LINE SUPPLIED FROM FIRE HYDRANT FH-1.
7. ROUTINGS AND LOCATIONS ARE DIAGRAMMATIC. INSTALL AS NEEDED TO MAXIMIZE EFFICIENCY.
8. INSTALL ALL PIPING AND CONDUITS NORTH OF JERSEY BARRIERS ABOVEGROUND. PIPING SHALL BE INSTALLED ON PIPE SUPPORTS. CONDUITS CAN LAY DIRECTLY ON GROUND.
9. ROUTE WIRING FROM TMP-05, TMP-06, AND TMP-09 UNDERGROUND TO NORTH OF NEW JERSEY BARRIERS.
10. INSTALL JERSEY TYPE CONCRETE BARRIERS (MINIMUM 40" HEIGHT) ALONG AND NORTH OF TENNESSEE AVENUE AS SHOWN TO PREVENT VEHICULAR ACCESS INTO EQUIPMENT AREA.

LPE

STATE OF KENTUCKY ERIN L. SURINAK LICENSED PROFESSIONAL ENGINEER

Expires 06-30-16

DATE

PROFESSIONAL SEAL

REV.	DATE	DESCRIPTION	DRAWN BY	DRAFT CHK	PROJ ENGR	LEAD ENGR	CONF CTRL/ NUCL SFTY	FAC MGR	EATS MGR
0	5/30/14	ISSUED FOR CONSTRUCTION	JE	JE	CRE	CRE			

DRAWING REVISIONS

U.S. DEPARTMENT OF ENERGY
DOE PORTSMOUTH/PADUCAH PROJECT OFFICE
PADUCAH GASEOUS DIFFUSION PLANT

LATA Environmental Services of Kentucky, LLC
managed for the DEPARTMENT OF ENERGY under U.S. GOVERNMENT contract DE-AC30-10CC40020
Paducah, Kentucky

Environmental Resources Management
1218 3rd AVENUE, SEATTLE WASHINGTON
(425) 462-8591

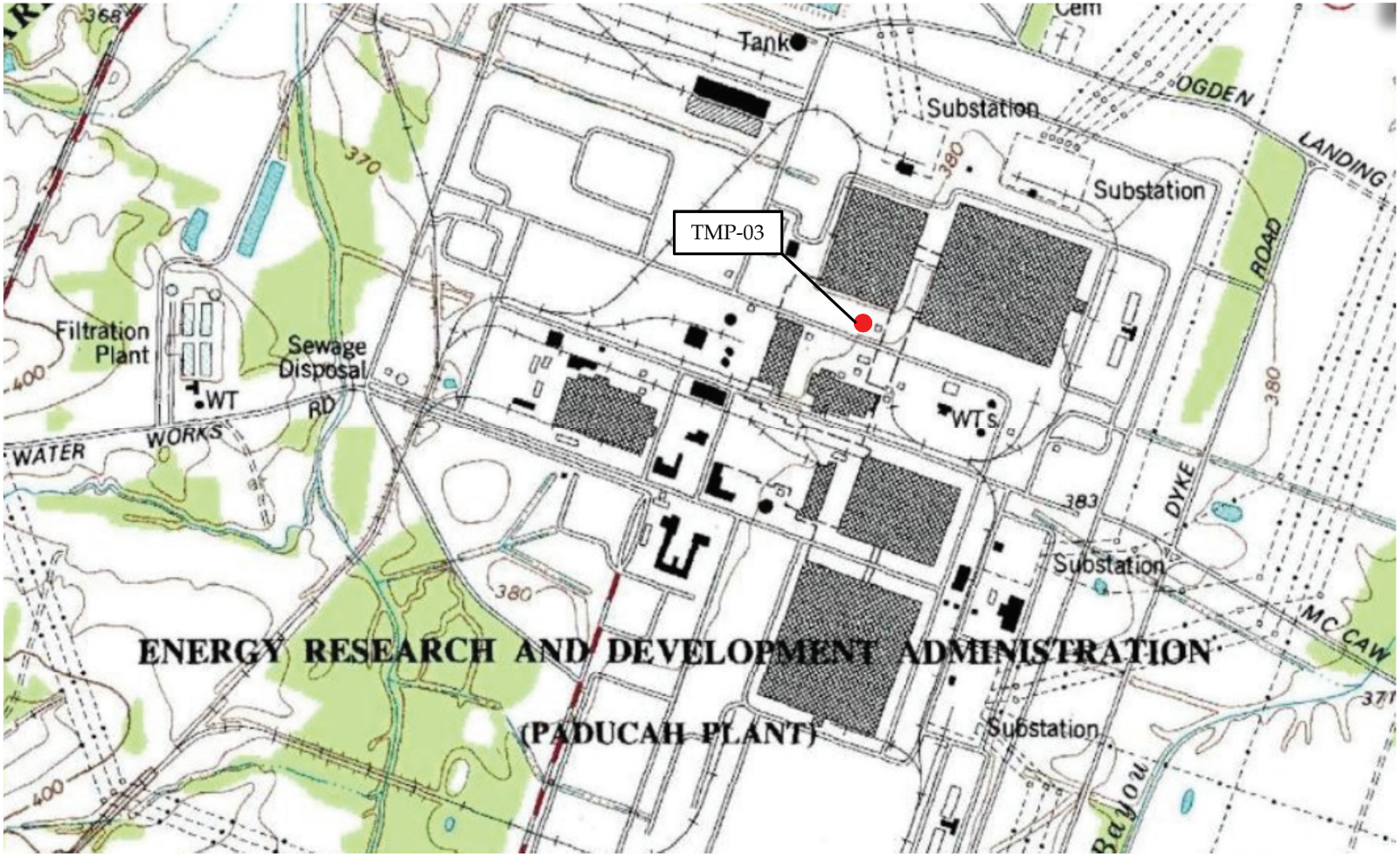
DOE CONTRACT NO. DE-AC30-10CC40020

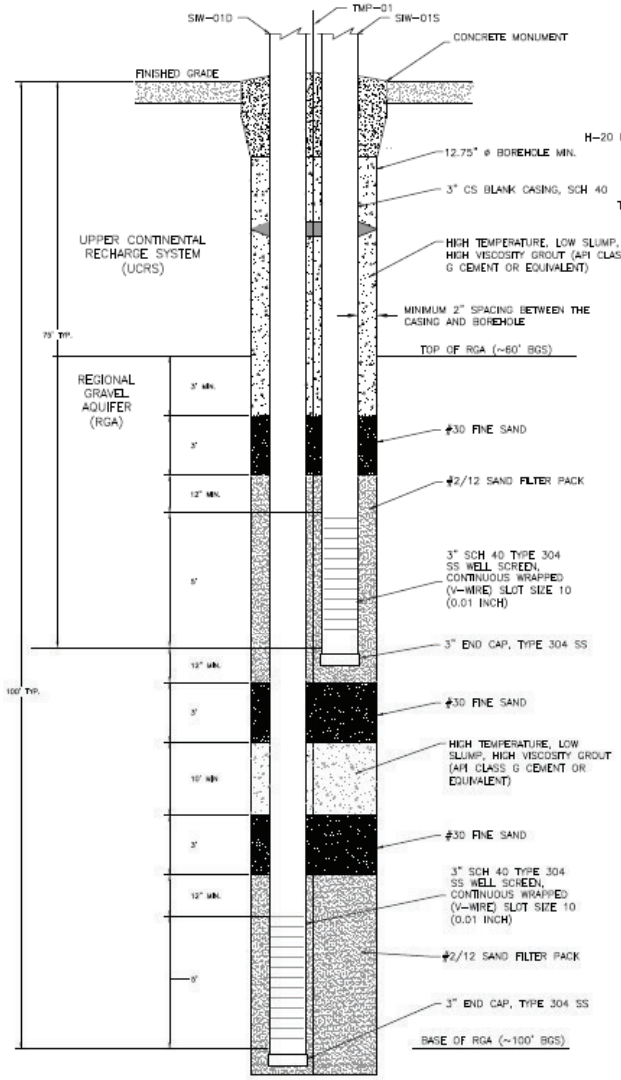
PROJECT NAME:
C-400 STEAM INJECTION TREATABILITY STUDY

TITLE:
TREATABILITY STUDY SITE PLAN

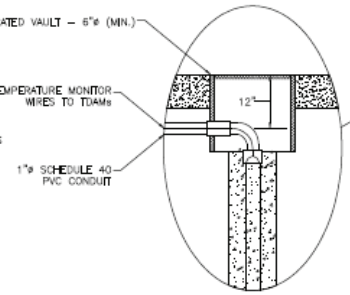
CAD FILE NAME	BUILDING	PLANT	CLASS
A027_SITE PLAN.DWG	C-400	PGDP	U

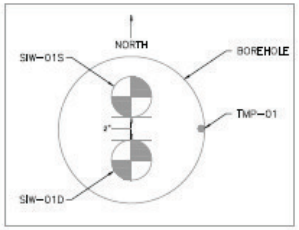
SCALE:	DRAWING NUMBER	REV
AS SHOWN	C7DC40000A027	0


TMP-03
Tank
Substation
Substation
OGDEN
LANDING
ROAD
Filtration Plant
Sewage Disposal
WT
RD
WATER
WORKS
WTs
DYKE
Substation
MC CAW
Substation
Bayou
370
380
383
400
ENERGY RESEARCH AND DEVELOPMENT ADMINISTRATION
(PADUCAH PLANT)



NESTED STEAM INJECTION WELL (TYP.)
(SIW-01S, SIW-01D)
NOT TO SCALE

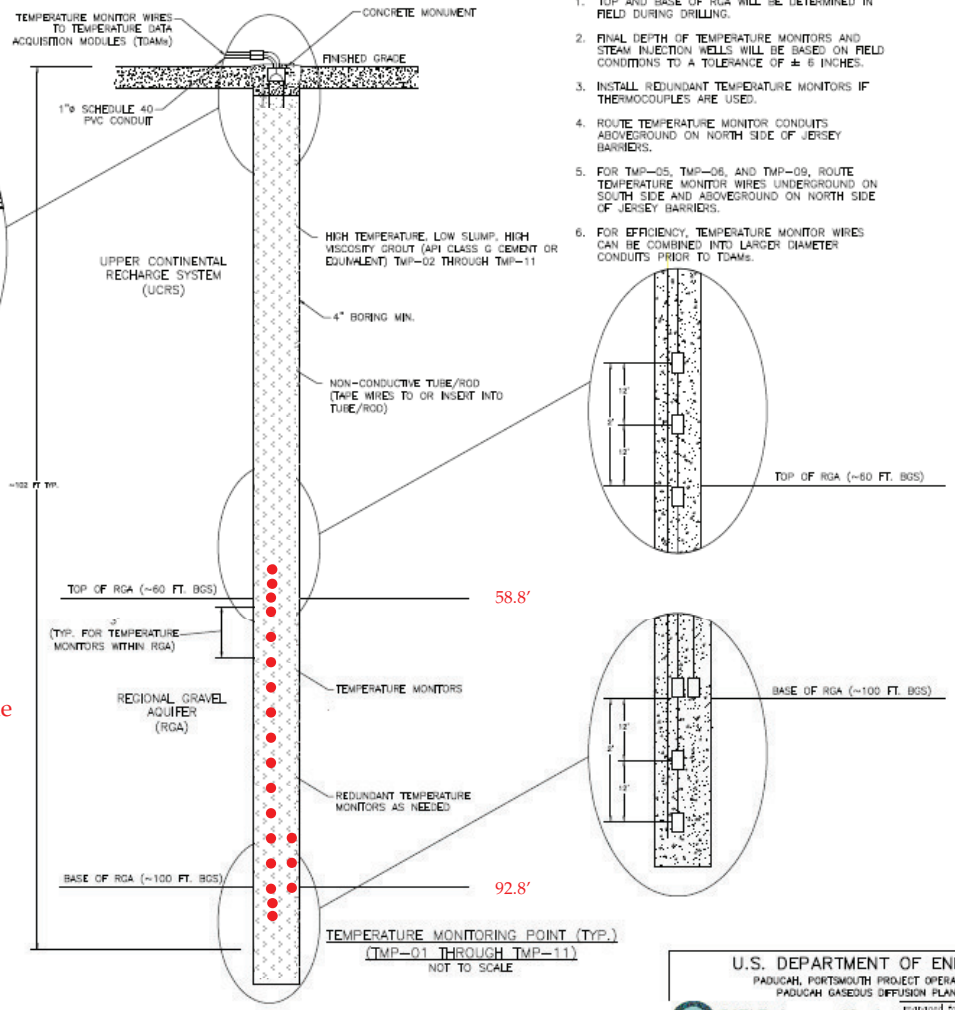




PLAN VIEW
SIW-01S, SIW-01D
NOT TO SCALE

See Page 1, Box 50 for thermocouple depth detail

TMP-03



TEMPERATURE MONITORING POINT (TYP.)
(TMP-01 THROUGH TMP-11)
NOT TO SCALE

NOTES:
1. TOP AND BASE OF RGA WILL BE DETERMINED IN FIELD DURING DRILLING.
2. FINAL DEPTH OF TEMPERATURE MONITORS AND STEAM INJECTION WELLS WILL BE BASED ON FIELD CONDITIONS TO A TOLERANCE OF ± 6 INCHES.
3. INSTALL REDUNDANT TEMPERATURE MONITORS IF THERMOCOUPLES ARE USED.
4. ROUTE TEMPERATURE MONITOR CONDUITS ABOVEGROUND ON NORTH SIDE OF JERSEY BARRIERS.
5. FOR TMP-05, TMP-06, AND TMP-09, ROUTE TEMPERATURE MONITOR WIRES UNDERGROUND ON SOUTH SIDE AND ABOVEGROUND ON NORTH SIDE OF JERSEY BARRIERS.
6. FOR EFFICIENCY, TEMPERATURE MONITOR WIRES CAN BE COMBINED INTO LARGER DIAMETER CONDUITS PRIOR TO TDAMs.

U.S. DEPARTMENT OF ENERGY
PADUCAH, PORTSMOUTH PROJECT OPERATIONS, PADUCAH GASEOUS DIFFUSION PLANT
LATA Environmental Services of Kentucky, LLC
managed for the DEPARTMENT OF ENERGY under U.S. GOVERNMENT contract DE-AC30-10CC40020
Paducah, Kentucky

Environmental Resources Management
1218 3rd AVENUE, SEATTLE WASHINGTON
(425) 462-8591

DOE CONTRACT NO. DE-AC30-10CC40020

PROJECT NAME: C-400 STEAM INJECTION TREATABILITY STUDY

TITLE: TREATABILITY STUDY STEAM INJECTION WELLS AND TEMPERATURE MONITORING POINTS

CAD FILENAME	BUILDING	PLANT	CLASS
A028_SIW & TMP DETAILS.DWG	C-400	PGDP	U

SCALE	DRAWING NUMBER	REV
N.T.S.	C7DC40000A028	0

LPE

STATE OF KENTUCKY ERIN I. SURINAK LICENSED PROFESSIONAL ENGINEER
Expires 06-30-16

DATE
PROFESSIONAL SEAL

REV	DATE	DESCRIPTION	DRAWN BY	CHKD BY	PROJ ENGR	LEAD ENGR	CONF CTRL	PM	ENVIR ENGR
0	5/30/14	ISSUED FOR CONSTRUCTION	JE	JE	CRE	CRE			

DRAWING REVISIONS

TMP-04						
		4-inch core		Drilled by Vernon Scott		
02/24/15 @ 9:50 to 14:00						
Drilled Interval		Recovery	Depths		Description	Notes
Top	Bottom		Top	Bottom		
47.0	57.0	12.7	47.0	57.0	Silty Clay with Sand, 10YR7/2 (light gray) mottled with 10YR6/6 (brownish yellow) and 7.5YR6/8 (reddish yellow), soft, nonplastic, and moist. Sand is very fine grained	Trace gravel up to 1.5 inch diameter
57.0	67.0	11.5	57.0	58.7	Silty Clay with Sand as above	
			58.7	67.0	Gap Graded Sand with Gravel, 10YR6/6 (brownish yellow) mottled with 10YR7/4 (very pale brown), loose, and moist. Sand is very coarse grained. Gravel is subangular to subrounded chert (some without patina/white), 0.2 to 1.5 inch diameter with trace larger gravel up to 2 inch diameter cobbles	Top of RGA at 58.7 ft
67.0	77.0	10.0	67.0	68.8	Gap Graded Sand with Gravel as above	
			68.8	69.9	Gap Graded Sand with Gravel as above but with predominant 10YR7/2 (light gray) mottling	
			69.9	77.0	Gap Graded Sand with Gravel as 67.0 to 68.8 ft but with 7.5YR6/8 (reddish yellow) mottling	Intervals of wet throughout
77.0	87.0	10.5	77.0	87.0	Gap Graded Sand with Gravel, 10YR6/6 (brownish yellow) mottled with 10YR7/4 (very pale brown), loose, and moist. Sand is very coarse grained. Gravel is subangular to subrounded chert (little without patina/white), 0.2 to 1.5 inch diameter with trace larger gravel up to 2 inch diameter cobbles	
87.0	97.0	10.0	87.0	92.6	Gap Graded Sand with Gravel as above but with little 5YR5/8 (red) patina (hematite staining)	Base of RGA at 92.6 ft
			92.6	95.5	Sand in Silty Clay, 10YR6/1 (gray) and 10YR7/2 (light gray) with 7.5YR6/6 (reddish yellow) mottling, and moist. Sand is very fine grained and moderately hard to dense. Silty clay is soft	
			95.5	97.0	Sand, 7.5YR6/6 (reddish yellow) (hematite staining), moderately soft, and moist. Sand is fine grained	
TD = 97.0 ft						

UNIFORM KENTUCKY WELL CONSTRUCTION RECORD

Use this form only to report installation of monitoring or water wells.
Original copy must be submitted to Division of Water within 60 days of completion.
See instructions on reverse of form.
Record must be typed or neatly printed or it will be returned to the driller as unacceptable.
One copy to Division of Water, one copy to owner, one copy to driller's files.

Attach Well Identification Number (AKGWA) Label Here
Water wells: yellow labels
Monitoring wells: blue labels

1. Kentucky Well ID (AKGWA) Number

2. Owner well ID# TMP-04

4. Owner name: Paducah Gaseous Diffusion Plant
5. Owner address: 5600 Hobbs Rd.
6. City: West Paducah 7. State: KY 8. Zip: 42053

If site name and address differ from owner name and address:
9. Site name
10. Site address
11. City 12. State: KY 13. Zip

3. Attachments
Required
1. Site plan or sketch map [x]
2. Well location
On topographic map, OR
Obtained by GPS unit
Conditionally Required
3. Well diagram (monitoring well) [x]
4. Coliform analysis (if applicable) [ ]
5. Signed Variance (if applicable) [ ]
Optional
6. Other laboratory analysis report [ ]

14. Agency Interest (AI) Number: 3059
15. Facility type & ID Number: (•) CERCLA ( ) RCRA ( ) Solid Waste ( ) UST ( ) Drinking Water ( ) Mining
KY8-890-008-982

16. Owner phone: (270) 441-6000 17. Site phone: (270) 441-6000

23. Install start date: Feb (Month) 24 (Day) 2015 (Year)
24. Install end date: Feb 25 2015

18. USGS topo map: Heath
19. County: Mccracken
21. Surface elevation (ft): 380.00
20. Physiographic Region: ( ) Blue Grass ( ) E. Coal Field ( ) Miss. Plateau ( ) Ohio River Alluvium ( ) W. Coal Field (•) Jackson Purchase
22. Elevation determined by: ( ) GPS (•) Map ( ) Prior report ( ) Survey ( ) Prior well log

Please report depths in feet below ground surface, not as relative elevations.
25. Total depth: 97.00
26. Depth to bedrock
27. Static water level
28. Casing height above surface (in)

29. Well use
( ) Agriculture ( ) Geothermal
( ) Commercial ( ) Heat pump
( ) Domestic ( ) HVAC
( ) Industrial (•) Injection
( ) Monitoring / Remed Remediation ( ) Mining
( ) Public ( ) Unused
NOTE: CODE REQUIRED for well uses on left. Select a code from the dropdown menu.

30. Drilling method
( ) Auger – HS ( ) Jet wash
( ) Auger – SS ( ) Push/probe
( ) Auger – bucket ( ) Rotary – air
( ) Auger – hand ( ) Rotary – mud
( ) Cable tool ( ) Rotary – reverse
( ) Core ( ) Sand point
( ) Driven Casing (•) Sonic
( ) Excavation ( ) Unknown
( ) Combined – HS auger and air rotary
( ) Combined – other (specify):

31. Well status
(•) Active ( ) Inactive
( ) Unsuitable for intended use

32. Wellhead
( ) Flush (•) Well cap
( ) Locking ( ) Sanitary seal

33. Well development method
( ) Surging ( ) Jetting
( ) Pumping ( ) Backwashing
( ) Bailing ( ) Compressed air
( ) Combination of methods (specify)

WATER WELLS ONLY

34. Estimated well yield ( ) gpm ( ) gph ( ) gpd
35. Well service #of people served
36. Disinfectant amount ( ) oz ( ) qt ( ) cups ( ) lb ( ) gal
37. Type ( ) Bleach ( ) Hypo-chlorite
38. Pitless adapter installed ( ) Yes ( ) No
39. Pump installed: ( ) Submersible ( ) Jet ( ) Bailer or bucket ( ) Turbine ( ) Hand ( ) No pump
40. Depth to intake (ft)
41. Apparent quality and odor
APPEARANCE: ( ) Clear ( ) Cloudy ( ) Muddy ( ) Turbid
ODOR: none / slight / mod. / high
( ) Iron ( ) Sulfur ( ) Salt

46. Well completion: Casing and screens

From depth (feet)	To depth (feet)	Borehole diameter (inches)	Casing diam (in) ID	Casing diam (in) OD	Casing type	Screen slot size

47. Annulus fill and seal

From depth (feet)	To depth (feet)	Material (NOTE for WATER WELLS only: If cuttings (clay, shale or limestone only) are used, you must specify composition.)
97.00	0.00	

48. Lithologic log (if more space is needed, continue on separate page)

From depth (ft)	To depth (ft)	Description (include any show of water and indicate apparent quality)
0.00	58.70	UCRS
58.70	92.60	RGA
92.60	97.00	McNairy Formation

49. Sketch map [x]

COLIFORM TEST

42. Coliform test type ( ) fecal ( ) fecal and total
43. Coliform test results ( ) 0 or <1.0 ( ) TNTC ( ) Confluent
or # colonies per 100 mL
44. Date sampled Month Day Year
45. Date analyzed

50. Comments
Borehole grout is Class H cement and silica flour mixture, TC installation depths: 94.6, 93.6, 92.6 (dup), 89.6 (dup), 86.6 (dup), 83.6, 80.6, 77.6, 74.6, 71.6, 68.6, 65.6, 62.6, 59.6, 58.7, 57.7, 56.7

Latitude
Longitude
Lat/Long Method ( ) INT ( ) GPS ( ) SUR ( ) REP
Date Received

51. Affirmation: The work described above was done under my supervision, and this report is true and correct to the best of my knowledge.
Note: the driller is not responsible for natural groundwater quality or quantity encountered while drilling or completing this well.

Signature of certified driller: [signature] Date signed: Feb 25 2015
Certification number: 0411 - 0549 - 00 Drilling company: Cascade Drilling LP

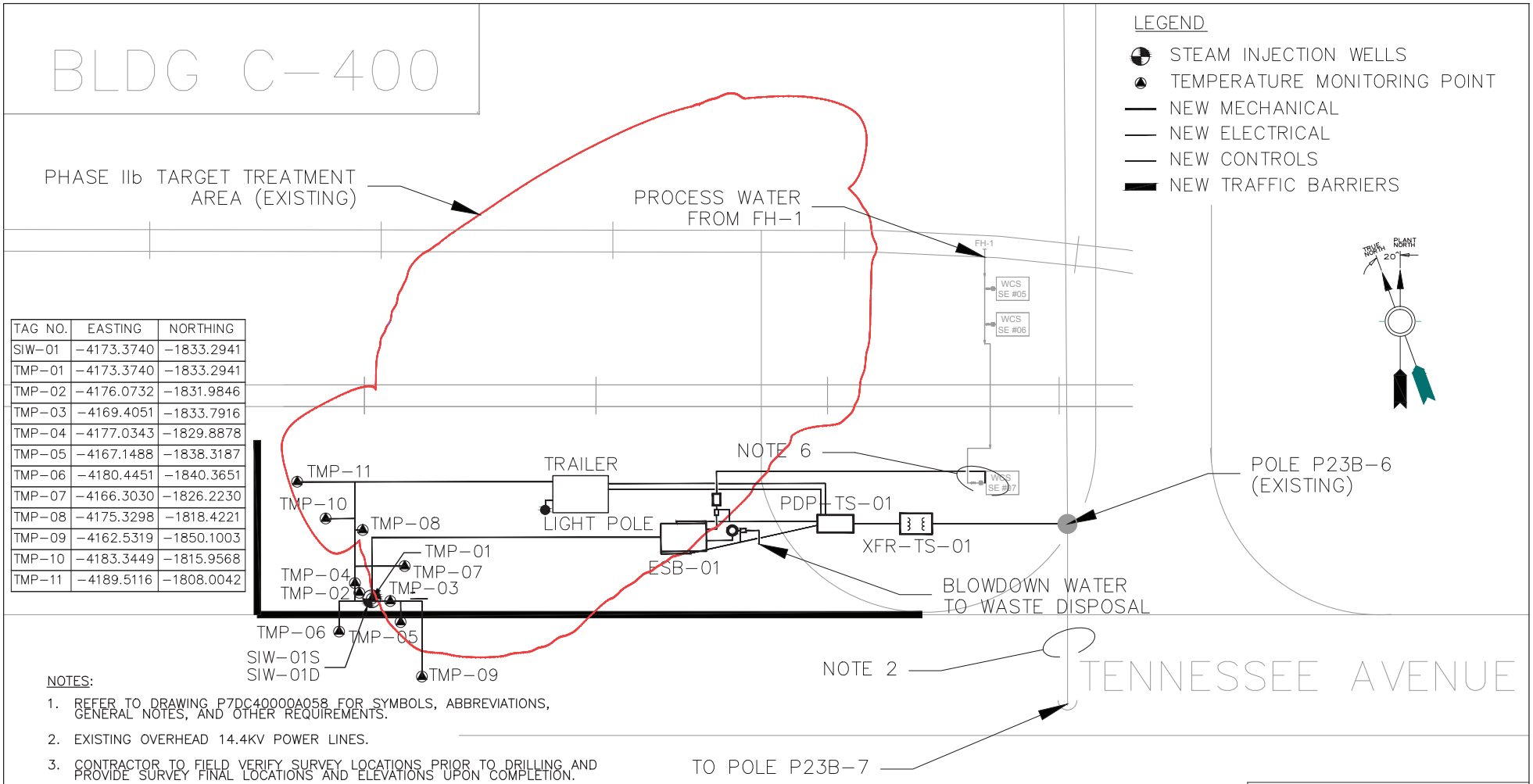
rev 02/29/2012

2. Owner Well ID#
Owner well ID # denotes the site designation for the well, e.g. "MW-06."

15. Facility type & ID number
If the well is located at any of the listed facility types, please note the historic site ID # in the spaces provided. This information is vital for other programs that may need to locate the well record in the database.

25. Well use
If well use falls under any of the following General Use designations with a corresponding Specific Use, you must include the corresponding Use Code:

WELL USE CODES		
GENERAL USE	SPECIFIC USE	USE CODE
Agriculture	Agriculture - Dairy Operation	01
Agriculture	Agriculture - Feed Pen Operation	02
Agriculture	Agriculture - Fish And Game Propagation	03
Agriculture	Agriculture - General	04
Agriculture	Agriculture - Horse Farm	05
Agriculture	Agriculture - Irrigation	06
Agriculture	Agriculture - Livestock Watering	07
Agriculture	Agriculture - Poultry And Egg Operation	08
Commercial	Commercial	01
Commercial	Commercial - Irrigation	02
Commercial	Dewatering Well - Construction	03
Domestic	Domestic - Multiple Domestic Households	01
Domestic	Domestic - Single Household	02
Industrial	Industrial - General	01
Industrial	Industrial - Manufacturing	02
Industrial	Industrial - Petroleum Processing Plant	03
Monitoring & Remediation	Monitoring Well - Ambient Monitoring	01
Monitoring & Remediation	Monitoring Well - Compliance	02
Monitoring & Remediation	Monitoring Well - Military Installation	03
Monitoring & Remediation	Monitoring Well - Water Level Monitoring Only	04
Monitoring & Remediation	Remediation	05
Public	Public - Community	01
Public	Public - Exploration	02
Public	Public - Non-transient, Non-community	03
Public	Public - Transient, Non-community	04
Public	Public - Unregulated	05
Geothermal	(general use)	-
Heat pump	(general use)	-
HVAC	(general use)	-
Injection	(general use)	-
Mining	(general use)	-
Unused	(general use)	-



TAG NO.	EASTING	NORTHING
SIW-01	-4173.3740	-1833.2941
TMP-01	-4173.3740	-1833.2941
TMP-02	-4176.0732	-1831.9846
TMP-03	-4169.4051	-1833.7916
TMP-04	-4177.0343	-1829.8878
TMP-05	-4167.1488	-1838.3187
TMP-06	-4180.4451	-1840.3651
TMP-07	-4166.3030	-1826.2230
TMP-08	-4175.3298	-1818.4221
TMP-09	-4162.5319	-1850.1003
TMP-10	-4183.3449	-1815.9568
TMP-11	-4189.5116	-1808.0042

NOTES:

1. REFER TO DRAWING P7DC40000A058 FOR SYMBOLS, ABBREVIATIONS, GENERAL NOTES, AND OTHER REQUIREMENTS.
2. EXISTING OVERHEAD 14.4KV POWER LINES.
3. CONTRACTOR TO FIELD VERIFY SURVEY LOCATIONS PRIOR TO DRILLING AND PROVIDE SURVEY FINAL LOCATIONS AND ELEVATIONS UPON COMPLETION.
4. REFER TO DRAWING C7DC40000A028 FOR WELL AND TMP DETAILS.
5. CONNECT XFR-TS-01 TO EXISTING 14.4KV POWER LINE AT POLE P23B-6.
6. CONNECT ESB-01 FEEDWATER TO EXISTING PROCESS WATER LINE SUPPLIED FROM FIRE HYDRANT FH-1.
7. ROUTINGS AND LOCATIONS ARE DIAGRAMMATIC. INSTALL AS NEEDED TO MAXIMIZE EFFICIENCY.
8. INSTALL ALL PIPING AND CONDUITS NORTH OF JERSEY BARRIERS ABOVEGROUND. PIPING SHALL BE INSTALLED ON PIPE SUPPORTS. CONDUITS CAN LAY DIRECTLY ON GROUND.
9. ROUTE WIRING FROM TMP-05, TMP-06, AND TMP-09 UNDERGROUND TO NORTH OF NEW JERSEY BARRIERS.
10. INSTALL JERSEY TYPE CONCRETE BARRIERS (MINIMUM 40" HEIGHT) ALONG AND NORTH OF TENNESSEE AVENUE AS SHOWN TO PREVENT VEHICULAR ACCESS INTO EQUIPMENT AREA.

LPE

STATE OF KENTUCKY ERIN L. SURINAK LICENSED PROFESSIONAL ENGINEER

Expires 06-30-16

DATE

PROFESSIONAL SEAL

REV.	DATE	DESCRIPTION	DRAWN BY	DRAFT CHK	PROJ ENGR	LEAD ENGR	CONF CTRL/ NUCL SFTY	FAC MGR	EATS MGR
0	5/30/14	ISSUED FOR CONSTRUCTION	JE	JE	CRE	CRE			

DRAWING REVISIONS

U.S. DEPARTMENT OF ENERGY
DOE PORTSMOUTH/PADUCAH PROJECT OFFICE
PADUCAH GASEOUS DIFFUSION PLANT

LATA Environmental Services of Kentucky, LLC
managed for the DEPARTMENT OF ENERGY under U.S. GOVERNMENT contract DE-AC30-10CC40020
Paducah, Kentucky

Environmental Resources Management
1218 3rd AVENUE, SEATTLE WASHINGTON
(425) 462-8591

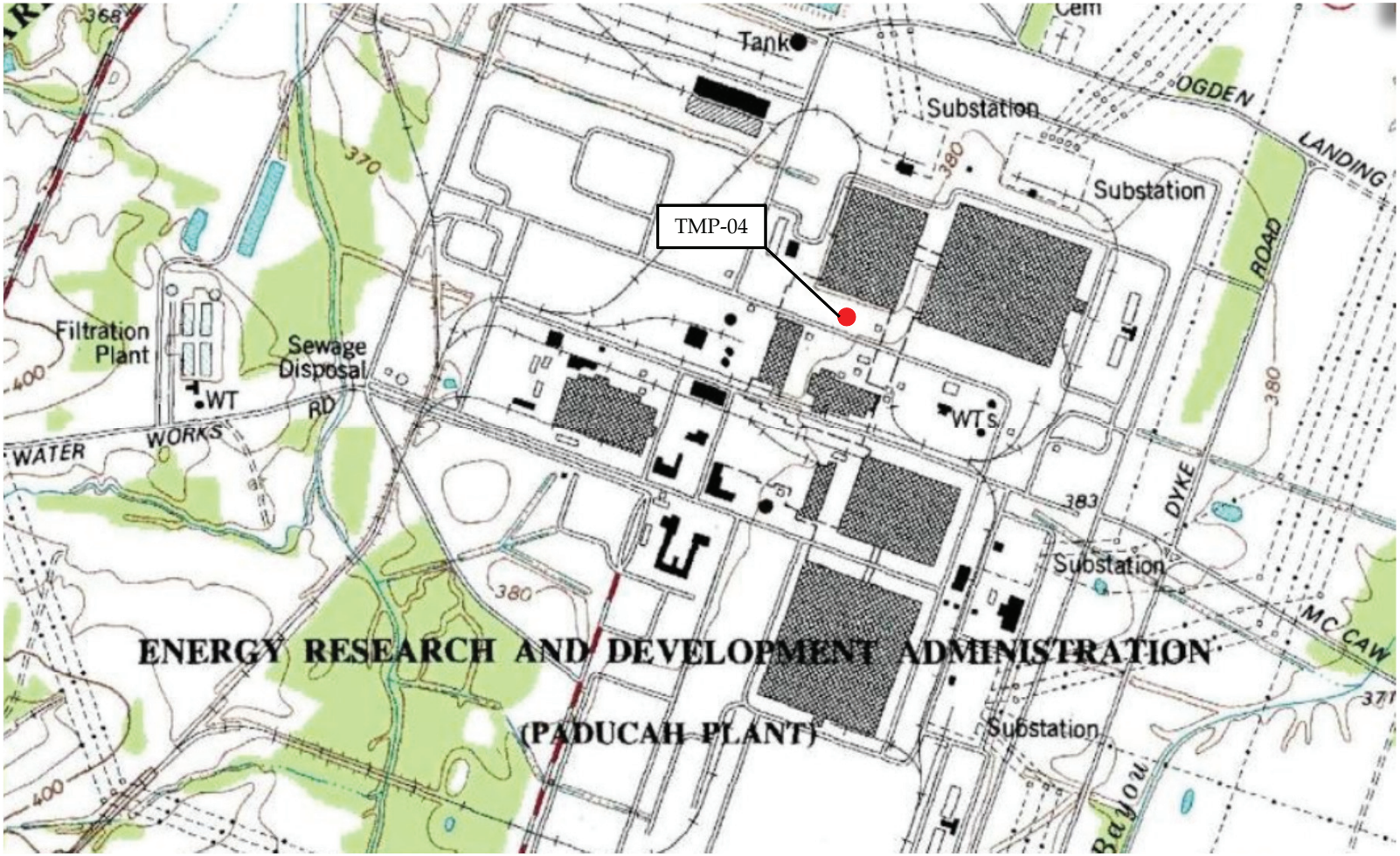
DOE CONTRACT NO. DE-AC30-10CC40020

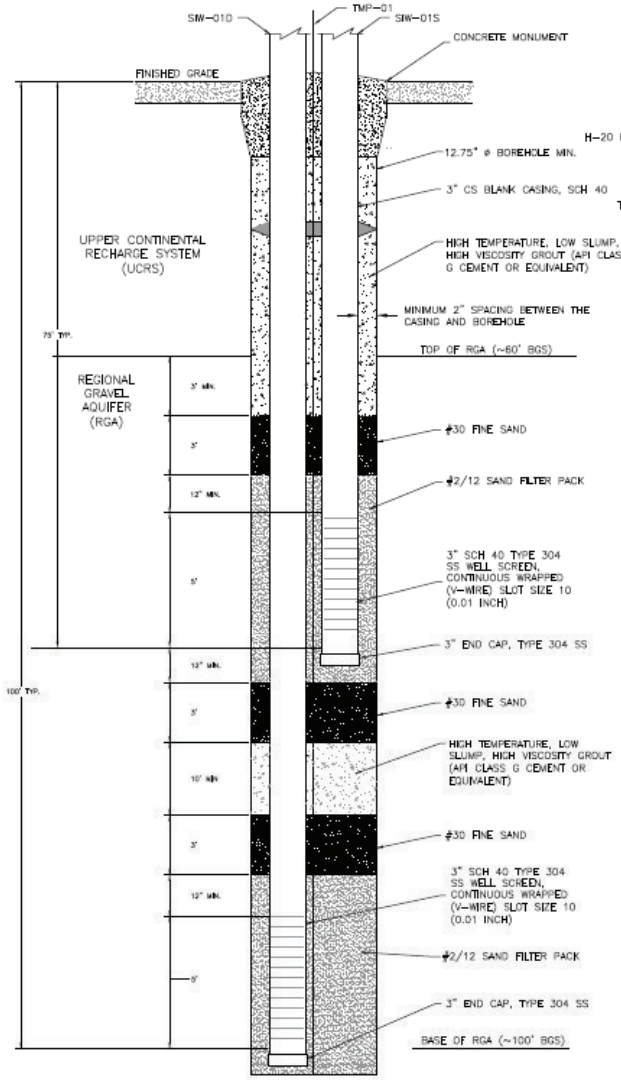
PROJECT NAME:
C-400 STEAM INJECTION TREATABILITY STUDY

TITLE:
TREATABILITY STUDY SITE PLAN

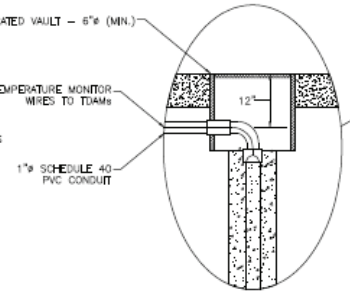
CAD FILE NAME	BUILDING	PLANT	CLASS
A027_SITE PLAN.DWG	C-400	PGDP	U

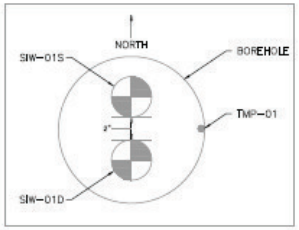
SCALE:	DRAWING NUMBER	REV
AS SHOWN	C7DC40000A027	0


TMP-04
Tank
Substation
Substation
OGDEN
LANDING
ROAD
Filtration Plant
Sewage Disposal
WT
RD
WATER
WORKS
WTs
DYKE
Substation
MC CAW
Substation
Bayou
ENERGY RESEARCH AND DEVELOPMENT ADMINISTRATION
(PADUCAH PLANT)



NESTED STEAM INJECTION WELL (TYP.)
(SIW-01S, SIW-01D)
NOT TO SCALE

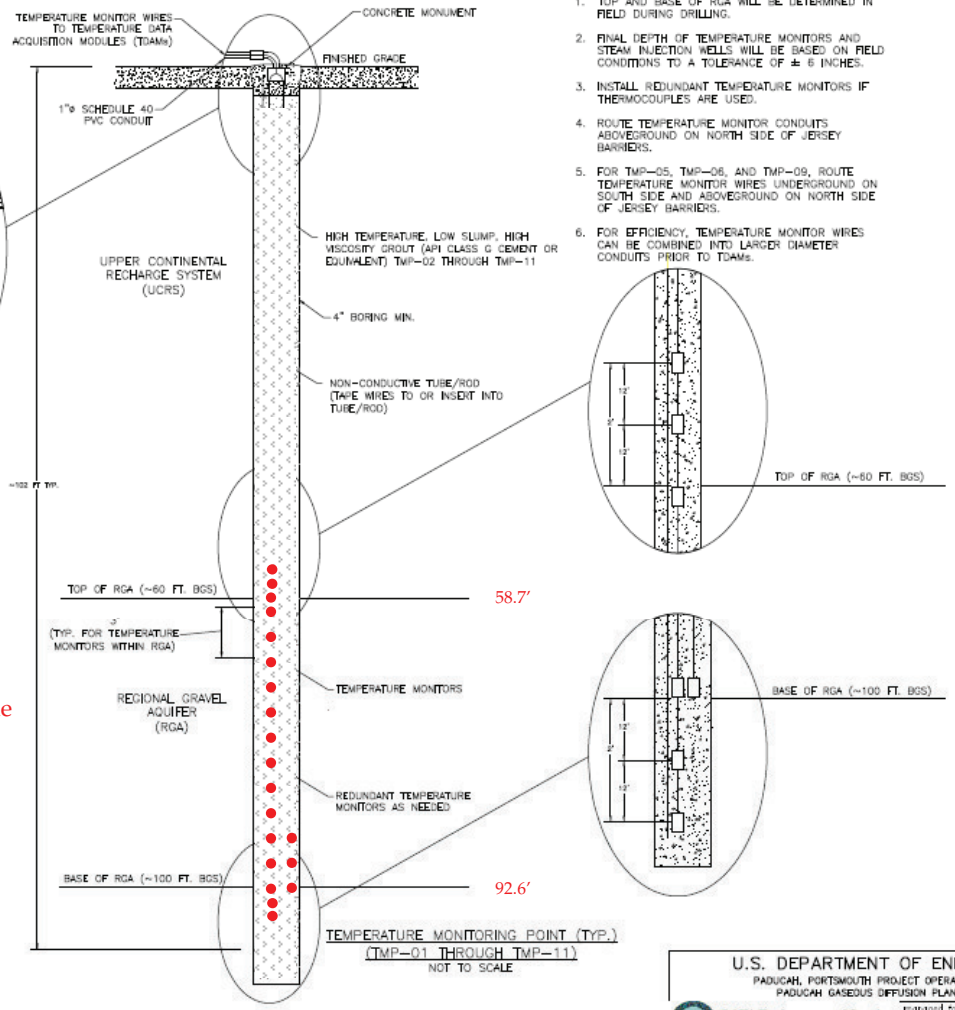




PLAN VIEW
SIW-01S, SIW-01D
NOT TO SCALE

See Page 1, Box 50 for thermocouple depth detail

TMP-04



TEMPERATURE MONITORING POINT (TYP.)
(TMP-01 THROUGH TMP-11)
NOT TO SCALE

NOTES:
1. TOP AND BASE OF RGA WILL BE DETERMINED IN FIELD DURING DRILLING.
2. FINAL DEPTH OF TEMPERATURE MONITORS AND STEAM INJECTION WELLS WILL BE BASED ON FIELD CONDITIONS TO A TOLERANCE OF ± 6 INCHES.
3. INSTALL REDUNDANT TEMPERATURE MONITORS IF THERMOCOUPLES ARE USED.
4. ROUTE TEMPERATURE MONITOR CONDUITS ABOVEGROUND ON NORTH SIDE OF JERSEY BARRIERS.
5. FOR TMP-05, TMP-06, AND TMP-09, ROUTE TEMPERATURE MONITOR WIRES UNDERGROUND ON SOUTH SIDE AND ABOVEGROUND ON NORTH SIDE OF JERSEY BARRIERS.
6. FOR EFFICIENCY, TEMPERATURE MONITOR WIRES CAN BE COMBINED INTO LARGER DIAMETER CONDUITS PRIOR TO TDAMs.

U.S. DEPARTMENT OF ENERGY
PADUCAH, PORTSMOUTH PROJECT OPERATIONS, PADUCAH GASEOUS DIFFUSION PLANT
LATA Environmental Services of Kentucky, LLC
managed for the DEPARTMENT OF ENERGY under U.S. GOVERNMENT contract DE-AC30-10CC40020 Paducah, Kentucky

Environmental Resources Management
1218 3rd AVENUE, SEATTLE WASHINGTON
(425) 462-8591

DOE CONTRACT NO. DE-AC30-10CC40020

PROJECT NAME: C-400 STEAM INJECTION TREATABILITY STUDY

TITLE: TREATABILITY STUDY STEAM INJECTION WELLS AND TEMPERATURE MONITORING POINTS

CAD FILENAME	BUILDING	PLANT	CLASS
A028_SIW & TMP DETAILS.DWG	C-400	PGDP	U

SCALE	DRAWING NUMBER	REV
N.T.S.	C7DC40000A028	0

LPE

STATE OF KENTUCKY ERIN I. SURINAK LICENSED PROFESSIONAL ENGINEER
Expires 06-30-16

DATE
PROFESSIONAL SEAL

REV	DATE	DESCRIPTION	DRAWN BY	CHKD BY	PROJ ENGR	LEAD ENGR	CONF ENGR	PM	DOE REP
0	5/30/14	ISSUED FOR CONSTRUCTION	JE	JE	CRE	CRE			

DRAWING REVISIONS

TMP-05						
		4-inch core		Drilled by Vernon Scott		
02/04/15 @ 13:00 to 14:45						
Drilled Interval		Recovery	Depths		Description	Notes
Top	Bottom		Top	Bottom		
47.0	57.0	11.6	47.0	47.9	Silt Clay with Sand and little Gravel, 10YR7/2 (light gray) with	
			47.9	54.8	Sand with little Gravel, 10YR7/4 (very pale brown), loose, and moist. Sand is fine quartz	
			54.8	57.0	Silty Sand, 10YR7/2 (light gray) mottled with 10YR6/6 (brownish yellow), loose, and moist. Sand if very fine grained	
57.0	67.0	12.3	57.0	58.9	Silty Sand as above	
			58.9	67.0	Gap graded Sand with Gravel, 10YR7/4 (very pale brown), loose, and moist. Sand is very coarse grained. Gravel is subangular chert with no patina, 0.2 to 1.5 inch diameter	Top of RGA at 58.9 ft
67.0	77.0	11.4	67.0	68.5	Sand with Gravel as above, very loose, and moist	
			68.5	77.0	Sandy Gravel, 10YR7/4 (very pale brown), loose, and moist. Gravel (55%) is subangular to subrounded chert with brown patina, 0.2 to 2.0 inch diameter, with occasional 2.5 to 3.0 inch cobbles. Sand is gap graded: (20%) fine quartz sand and (25%) coarse to very coarse, subangular to subrounded chert	
77.0	87.0	11.3	77.0	79.7	Sandy Gravel as above but 10YR8/6 (reddish yellow)	
			79.7	81.1	Sandy Gravel, 10YR7/4 (very pale brown), loose, and moist. Gravel is subangular to subrounded chert with brown patina, 0.2 to 2.0 inch diameter	
			81.1	84.1	Sandy Gravel	
			84.1	84.4	Sandy Gravel, 10YR8/6 (reddish yellow), loose, and moist. Gravel (55%) is subangular to subrounded chert with brown patina, 0.2 to 2.0 inch diameter, with occasional 2.5 to 3.0 inch cobbles. Sand is gap graded: (20%) fine quartz sand and (25%) coarse to very coarse, subangular to subrounded chert	
			84.4	87.0	Sandy Gravel, 10YR7/4 (very pale brown), loose and moist. Gravel is subangular to subrounded chert with brown patina, 0.2 to 1.5 inch diameter	
87.0	97.0	11.0	87.0	92.9	Sandy Gravel, 10YR8/6 (reddish yellow), loose, and moist. Gravel (55%) is subangular to subrounded chert with brown patina, 0.2 to 2.0 inch diameter, with occasional 2.5 to 3.0 inch cobbles. Sand is gap graded: (20%) fine quartz sand and (25%) coarse to very coarse, subangular to subrounded chert	Base of RGA at 92.9 ft
			92.9	96.1	Interlaminated Clayey Silt, 10YR6/1 (gray), medium soft to soft, and moist AND Sand, 10YR7/6 (yellow) GRADING DOWN to 10YR8/1 (white), medium dense to soft, and moist. Sand is very fine grained	
			96.1	97.0	Sand, 7.5YR6/6 (reddish yellow) with some 10YR7/2 (light gray) mottling. Sand is very fine grained	
TD = 97.0 ft						

UNIFORM KENTUCKY WELL CONSTRUCTION RECORD

Use this form only to report installation of monitoring or water wells.
Original copy must be submitted to Division of Water within 60 days of completion.
See instructions on reverse of form.
Record must be typed or neatly printed or it will be returned to the driller as unacceptable.
One copy to Division of Water, one copy to owner, one copy to driller's files.

Attach Well Identification Number (AKGWA) Label Here
Water wells: yellow labels
Monitoring wells: blue labels

1. Kentucky Well ID (AKGWA) Number: -

2. Owner well ID#: TMP-05

4. Owner name: Paducah Gaseou Diffusion Plant
5. Owner address: 5600 Hobbs Rd.
6. City: West Paducah
7. State: KY
8. Zip: 42053

If site name and address differ from owner name and address:
9. Site name:
10. Site address:
11. City:
12. State: KY
13. Zip:

3. Attachments
Required
1. Site plan or sketch map [x]
2. Well location
On topographic map, OR
Obtained by GPS unit
Conditionally Required
3. Well diagram (monitoring well) [x]
4. Coliform analysis (if applicable) [ ]
5. Signed Variance (if applicable) [ ]
Optional
6. Other laboratory analysis report [ ]

14. Agency Interest (AI) Number: 3059
15. Facility type & ID Number: (•) CERCLA ( ) Solid Waste ( ) Drinking Water ( ) RCRA ( ) UST ( ) Mining — KY8-890-008-982

16. Owner phone: (270) 441-6000
17. Site phone: (270) 441-6000

23. Install start date: Feb (Month) 04 (Day) 2015 (Year)
24. Install end date: Feb (Month) 05 (Day) 2015 (Year)

18. USGS topo map: Heath
19. County: Mccracken
20. Physiographic Region: ( ) Blue Grass ( ) Ohio River Alluvium ( ) E. Coal Field ( ) W. Coal Field ( ) Miss. Plateau (•) Jackson Purchase
21. Surface elevation (ft): 380.00
22. Elevation determined by: ( ) GPS (•) Map ( ) Prior report ( ) Survey ( ) Prior well log

Please report depths in feet below ground surface, not as relative elevations.
25. Total depth: 97.00
26. Depth to bedrock:
27. Static water level:
28. Casing height above surface (in):

29. Well use: ( ) Agriculture ( ) Geothermal ( ) Commercial ( ) Heat pump ( ) Domestic ( ) HVAC ( ) Industrial ( ) Injection (•) Monitoring / Remed Remediation ( ) Mining ( ) Public ( ) Unused
NOTE: CODE REQUIRED for well uses on left. Select a code from the dropdown menu.

30. Drilling method: ( ) Auger – HS ( ) Jet wash ( ) Auger – SS ( ) Push/probe ( ) Auger – bucket ( ) Rotary – air ( ) Auger – hand ( ) Rotary – mud ( ) Cable tool ( ) Rotary – reverse ( ) Core ( ) Sand point ( ) Driven Casing (•) Sonic ( ) Excavation ( ) Unknown ( ) Combined – HS auger and air rotary ( ) Combined – other (specify):

31. Well status: (•) Active ( ) Inactive ( ) Unsuitable for intended use
32. Wellhead: ( ) Flush (•) Well cap ( ) Locking ( ) Sanitary seal
33. Well development method: ( ) Surging ( ) Jetting ( ) Pumping ( ) Backwashing ( ) Bailing ( ) Compressed air ( ) Combination of methods (specify):

WATER WELLS ONLY
34. Estimated well yield: ( ) gpm ( ) gph ( ) gpd
35. Well service: #of people served
36. Disinfectant amount: ( ) oz ( ) qt ( ) cups ( ) lb ( ) gal
37. Type: ( ) Bleach ( ) Hypo-chlorite
38. Pitless adapter installed: ( ) Yes ( ) No
39. Pump installed: ( ) Submersible ( ) Jet ( ) Bailer or bucket ( ) Turbine ( ) Hand ( ) No pump
40. Depth to intake (ft):
41. Apparent quality and odor

APPEARANCE	ODOR none	slight	mod.	high	
( ) Clear					
( ) Cloudy	( )	( )	( )	( )	Iron
( ) Muddy	( )	( )	( )	( )	Sulfur
( ) Turbid	( )	( )	( )	( )	Salt

COLIFORM TEST
42. Coliform test type: ( ) fecal ( ) fecal and total
43. Coliform test results: ( ) 0 or <1.0 ( ) TNTC ( ) Confluent or # colonies per 100 mL
44. Date sampled: Month Day Year
45. Date analyzed:

46. Well completion: Casing and screens

From depth (feet)	To depth (feet)	Borehole diameter (inches)	Casing diam (in) ID	Casing diam (in) OD	Casing type	Screen slot size

47. Annulus fill and seal

From depth (feet)	To depth (feet)	Material (NOTE for WATER WELLS only: If cuttings (clay, shale or limestone only) are used, you must specify composition.)
97.00	0.00	

48. Lithologic log (if more space is needed, continue on separate page)

From depth (ft)	To depth (ft)	Description (include any show of water and indicate apparent quality)
0.00	58.90	UCRS
58.90	92.90	RGA
92.90	97.00	McNairy Formation

49. Sketch map [x]

50. Comments
Borehole grout is Class H cement and silica flour mix, TC installation depths: 94.9, 93.9, 92.9 (dup), 89.9(dup), 86.9(dup), 83.9, 80.9, 77.9, 74.9, 71.9, 68.9, 65.9, 62.9, 59.9, 58.9, 57.9, 56.9, 56.9 (replicate is unconnected but in the borehole)

Latitude:
Longitude:
Lat/Long Method: ( ) INT ( ) GPS ( ) SUR ( ) REP
Date Received:

51. Affirmation: The work described above was done under my supervision, and this report is true and correct to the best of my knowledge.
Note: the driller is not responsible for natural groundwater quality or quantity encountered while drilling or completing this well.

Signature of certified driller: [signature]
Date signed: Feb 10 2015
Certification number: 0411 - 0549 - 00
Drilling company: Cascade Drilling LP

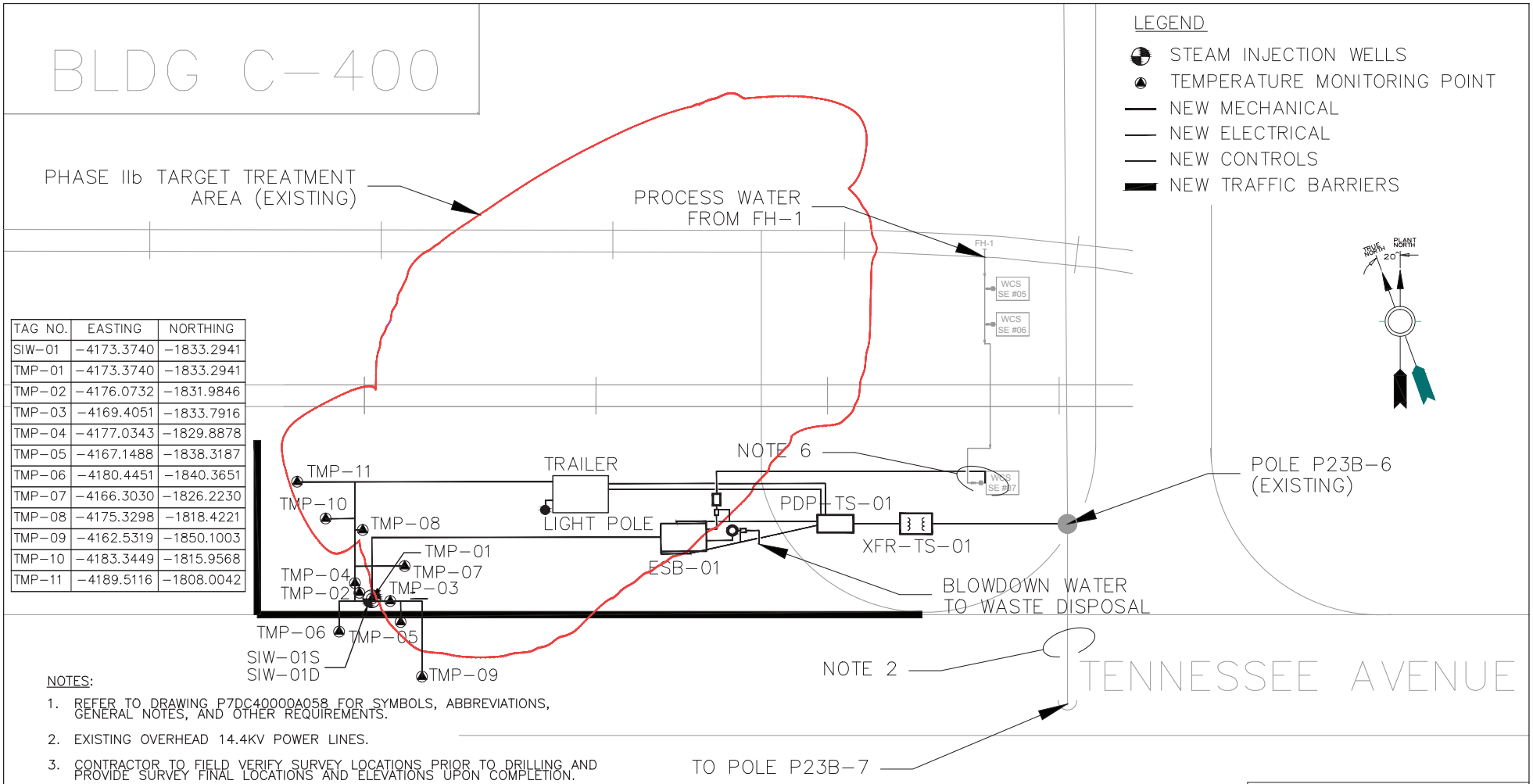
rev 02/29/2012

2. Owner Well ID#
Owner well ID # denotes the site designation for the well, e.g. "MW-06."

15. Facility type & ID number
If the well is located at any of the listed facility types, please note the historic site ID # in the spaces provided. This information is vital for other programs that may need to locate the well record in the database.

25. Well use
If well use falls under any of the following General Use designations with a corresponding Specific Use, you must include the corresponding Use Code:

WELL USE CODES		
GENERAL USE	SPECIFIC USE	USE CODE
Agriculture	Agriculture - Dairy Operation	01
Agriculture	Agriculture - Feed Pen Operation	02
Agriculture	Agriculture - Fish And Game Propagation	03
Agriculture	Agriculture - General	04
Agriculture	Agriculture - Horse Farm	05
Agriculture	Agriculture - Irrigation	06
Agriculture	Agriculture - Livestock Watering	07
Agriculture	Agriculture - Poultry And Egg Operation	08
Commercial	Commercial	01
Commercial	Commercial - Irrigation	02
Commercial	Dewatering Well - Construction	03
Domestic	Domestic - Multiple Domestic Households	01
Domestic	Domestic - Single Household	02
Industrial	Industrial - General	01
Industrial	Industrial - Manufacturing	02
Industrial	Industrial - Petroleum Processing Plant	03
Monitoring & Remediation	Monitoring Well - Ambient Monitoring	01
Monitoring & Remediation	Monitoring Well - Compliance	02
Monitoring & Remediation	Monitoring Well - Military Installation	03
Monitoring & Remediation	Monitoring Well - Water Level Monitoring Only	04
Monitoring & Remediation	Remediation	05
Public	Public - Community	01
Public	Public - Exploration	02
Public	Public - Non-transient, Non-community	03
Public	Public - Transient, Non-community	04
Public	Public - Unregulated	05
Geothermal	(general use)	-
Heat pump	(general use)	-
HVAC	(general use)	-
Injection	(general use)	-
Mining	(general use)	-
Unused	(general use)	-



TAG NO.	EASTING	NORTHING
SIW-01	-4173.3740	-1833.2941
TMP-01	-4173.3740	-1833.2941
TMP-02	-4176.0732	-1831.9846
TMP-03	-4169.4051	-1833.7916
TMP-04	-4177.0343	-1829.8878
TMP-05	-4167.1488	-1838.3187
TMP-06	-4180.4451	-1840.3651
TMP-07	-4166.3030	-1826.2230
TMP-08	-4175.3298	-1818.4221
TMP-09	-4162.5319	-1850.1003
TMP-10	-4183.3449	-1815.9568
TMP-11	-4189.5116	-1808.0042

NOTES:

1. REFER TO DRAWING P7DC40000A058 FOR SYMBOLS, ABBREVIATIONS, GENERAL NOTES, AND OTHER REQUIREMENTS.
2. EXISTING OVERHEAD 14.4KV POWER LINES.
3. CONTRACTOR TO FIELD VERIFY SURVEY LOCATIONS PRIOR TO DRILLING AND PROVIDE SURVEY FINAL LOCATIONS AND ELEVATIONS UPON COMPLETION.
4. REFER TO DRAWING C7DC40000A028 FOR WELL AND TMP DETAILS.
5. CONNECT XFR-TS-01 TO EXISTING 14.4KV POWER LINE AT POLE P23B-6.
6. CONNECT ESB-01 FEEDWATER TO EXISTING PROCESS WATER LINE SUPPLIED FROM FIRE HYDRANT FH-1.
7. ROUTINGS AND LOCATIONS ARE DIAGRAMMATIC. INSTALL AS NEEDED TO MAXIMIZE EFFICIENCY.
8. INSTALL ALL PIPING AND CONDUITS NORTH OF JERSEY BARRIERS ABOVEGROUND. PIPING SHALL BE INSTALLED ON PIPE SUPPORTS. CONDUITS CAN LAY DIRECTLY ON GROUND.
9. ROUTE WIRING FROM TMP-05, TMP-06, AND TMP-09 UNDERGROUND TO NORTH OF NEW JERSEY BARRIERS.
10. INSTALL JERSEY TYPE CONCRETE BARRIERS (MINIMUM 40" HEIGHT) ALONG AND NORTH OF TENNESSEE AVENUE AS SHOWN TO PREVENT VEHICULAR ACCESS INTO EQUIPMENT AREA.

LPE

STATE OF KENTUCKY ERIN L. SURINAK LICENSED PROFESSIONAL ENGINEER

Expires 06-30-16

DATE

PROFESSIONAL SEAL

REV.	DATE	DESCRIPTION	DRAWN BY	DRAFT CHK	PROJ ENGR	LEAD ENGR	CONF CTRL/ NUCL SFTY	FAC MGR	EATS MGR
0	5/30/14	ISSUED FOR CONSTRUCTION	JE	JE	CRE	CRE			

DRAWING REVISIONS

U.S. DEPARTMENT OF ENERGY
DOE PORTSMOUTH/PADUCAH PROJECT OFFICE
PADUCAH GASEOUS DIFFUSION PLANT

LATA Environmental Services of Kentucky, LLC
managed for the DEPARTMENT OF ENERGY under U.S. GOVERNMENT contract DE-AC30-10CC40020
Paducah, Kentucky

Environmental Resources Management
1218 3rd AVENUE, SEATTLE WASHINGTON
(425) 462-8591

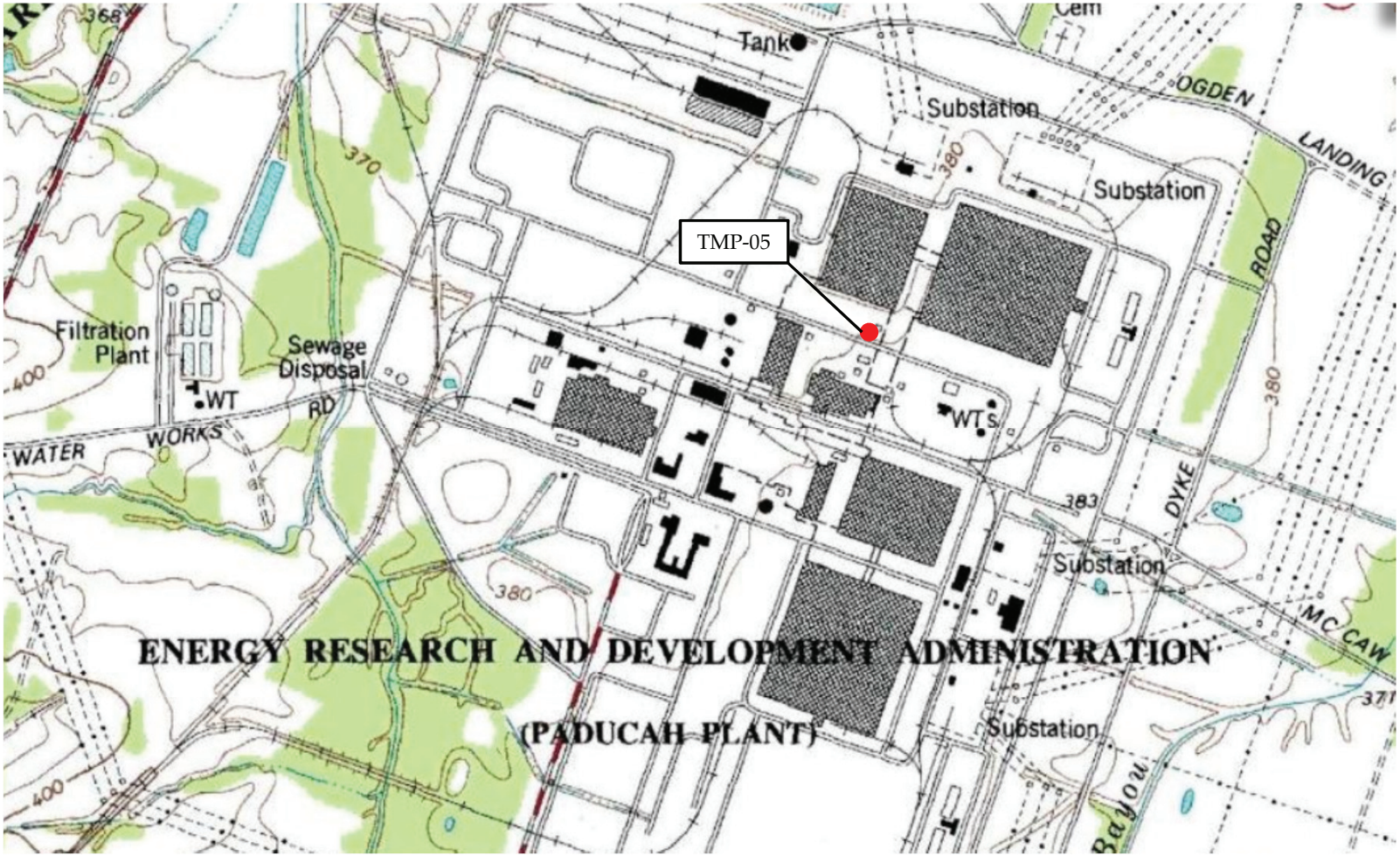
DOE CONTRACT NO. DE-AC30-10CC40020

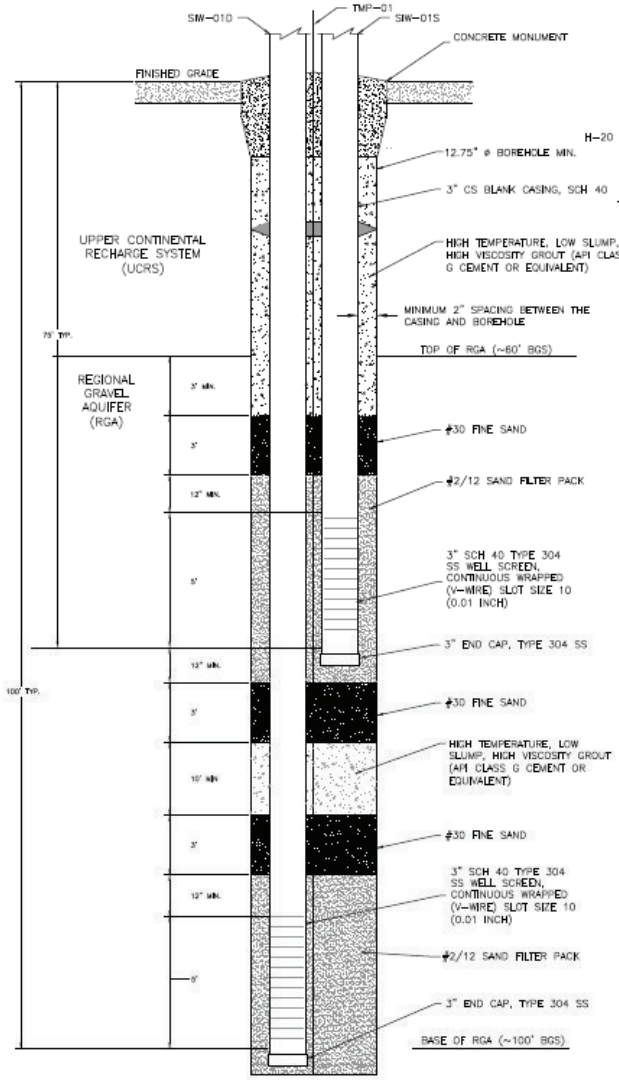
PROJECT NAME:
C-400 STEAM INJECTION TREATABILITY STUDY

TITLE:
TREATABILITY STUDY SITE PLAN

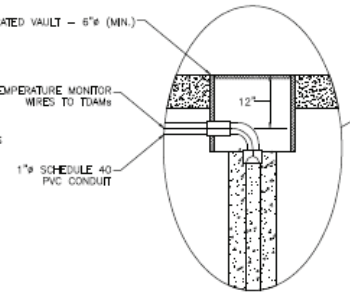
CAD FILE NAME	BUILDING	PLANT	CLASS
A027_SITE PLAN.DWG	C-400	PGDP	U

SCALE:	DRAWING NUMBER	REV
AS SHOWN	C7DC40000A027	0

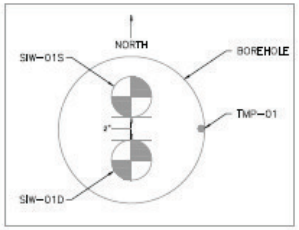

TMP-05
Tank
Substation
Substation
OGDEN
LANDING
ROAD
Filtration Plant
Sewage Disposal
WT
RD
WATER
WORKS
WTs
DYKE
Substation
MC CAW
Substation
Bayou
370
380
383
400
ENERGY RESEARCH AND DEVELOPMENT ADMINISTRATION
(PADUCAH PLANT)



NESTED STEAM INJECTION WELL (TYP.)
(SIW-01S, SIW-01D)
NOT TO SCALE



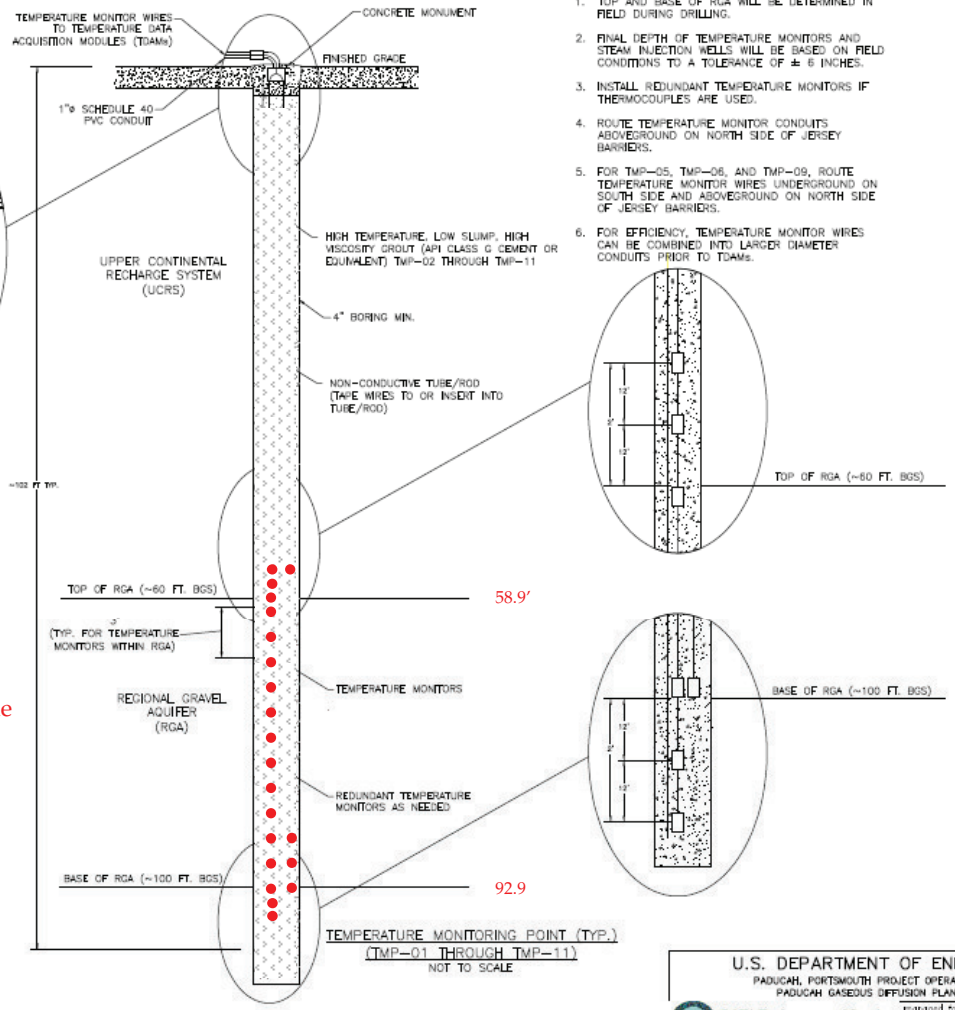
TMP-05
TMP-06
TMP-09



PLAN VIEW
SIW-01S, SIW-01D
NOT TO SCALE

See Page 1, Box 50 for thermocouple depth detail

TMP-05



TEMPERATURE MONITORING POINT (TYP.)
(TMP-01 THROUGH TMP-11)
NOT TO SCALE

NOTES:
1. TOP AND BASE OF RGA WILL BE DETERMINED IN FIELD DURING DRILLING.
2. FINAL DEPTH OF TEMPERATURE MONITORS AND STEAM INJECTION WELLS WILL BE BASED ON FIELD CONDITIONS TO A TOLERANCE OF ± 6 INCHES.
3. INSTALL REDUNDANT TEMPERATURE MONITORS IF THERMOCOUPLES ARE USED.
4. ROUTE TEMPERATURE MONITOR CONDUITS ABOVEGROUND ON NORTH SIDE OF JERSEY BARRIERS.
5. FOR TMP-05, TMP-06, AND TMP-09, ROUTE TEMPERATURE MONITOR WIRES UNDERGROUND ON SOUTH SIDE AND ABOVEGROUND ON NORTH SIDE OF JERSEY BARRIERS.
6. FOR EFFICIENCY, TEMPERATURE MONITOR WIRES CAN BE COMBINED INTO LARGER DIAMETER CONDUITS PRIOR TO TDAMs.

U.S. DEPARTMENT OF ENERGY
PADUCAH, PORTSMOUTH PROJECT OPERATIONS, PADUCAH GASEOUS DIFFUSION PLANT
LATA Environmental Services of Kentucky, LLC
managed for the DEPARTMENT OF ENERGY under U.S. GOVERNMENT contract DE-AC30-10CC40020
Paducah, Kentucky

Environmental Resources Management
1218 3rd AVENUE, SEATTLE WASHINGTON
(425) 462-8591

DOE CONTRACT NO. DE-AC30-10CC40020

PROJECT NAME: C-400 STEAM INJECTION TREATABILITY STUDY

TITLE: TREATABILITY STUDY STEAM INJECTION WELLS AND TEMPERATURE MONITORING POINTS

CAD FILENAME	BUILDING	PLANT	CLASS
A028_SIW & TMP DETAILS.DWG	C-400	PGDP	U

SCALE	DRAWING NUMBER	REV
N.T.S.	C7DC40000A028	0

LPE

ERIN I. SURINAK, STATE OF KENTUCKY, LICENSED PROFESSIONAL ENGINEER

Expires 06-30-16

PROFESSIONAL SEAL

REV	DATE	DESCRIPTION	DRAWN BY	CHKD BY	PROJ ENGR	LEAD ENGR	CONF ENGR	PROJ MGR	DEPT MGR
0	5/30/14	ISSUED FOR CONSTRUCTION	JE	JE	CRE	CRE			

DATE

DRAWING REVISIONS

TMP-06						
		4-inch core		Drilled by Vernon Scott		
02/06/15 @ 06:45 to 09:15						
Drilled Interval		Recovery	Depths		Description	Notes
Top	Bottom		Top	Bottom		
47.0	57.0	11.7	47.0	57.0	Silty Clay with Sand and little Gravel, 10&R7/2 (light gray) mottled with 10YR6/6 (brownish yellow) and 7.5YR6/8 (reddish yellow) mottling, soft, non plastic and moist to wet. Sand is very fine grained. Gravel is rounded chert with white patina, 0.2 to 1.5 inch diameter	
57.0	67.0	12.3	57.0	59.4	Silty Clay with Sand and little Gravel as above	
			59.4	67.0	Gap graded Sand with Gravel, 10YR6/6 (brownish yellow) with 10YR7/4 (very pale brown) mottling, loose, and moist. Sand is very coarse grained. Gravel is subangular to subrounded chert (some with patina), 0.2 to 2.0 inch diameter	Top of RGA at 59.4 ft
67.0	77.0	11.5	67.0	77.0	Gap graded Sand with Gravel as above, 80% sand and 20% gravel, very loose. Gravel is 7.5YR8/1 (white) with trace (<5%) 7.5YR7/3 (pink)	
77.0	87.0	10.3	77.0	78.9	Gap graded Sand with Gravel as above	
			78.9	87.0	Sand with Gravel, 10YR6/6 (brownish yellow) mottled with 10YR7/4 (very pale brown), well graded, loose, and moist. Sand is medium to coarse grained. Gravel is subangular to subrounded chert with no patina, 0.2 to 1.5 inch diameter	
87.0	97.0	10.5	87.0	93.7	Sand with Gravel as above	Base of RGA at 93.7 ft
			93.7	96.5	Interlaminated Clay, 10YR6/1 (gray), medium soft, and most AND Sand, 10YR7/6 (yellow) with 10YR8/1 (white) mottling, mostly medium to dense but some soft, and moist. Sand is very fine grained	
			96.5	97.0	Sand, 7.5YR6/6 (reddish yellow) with 10YR7/2 (light gray) mottling, non plastic, hard to loose, and moist. Sand is very fine grained	
TD = 97.0 ft						

UNIFORM KENTUCKY WELL CONSTRUCTION RECORD

Use this form only to report installation of monitoring or water wells.
Original copy must be submitted to Division of Water within 60 days of completion.
See instructions on reverse of form.
Record must be typed or neatly printed or it will be returned to the driller as unacceptable.
One copy to Division of Water, one copy to owner, one copy to driller's files.

Attach Well Identification Number (AKGWA) Label Here
Water wells: yellow labels
Monitoring wells: blue labels

1. Kentucky Well ID (AKGWA) Number: •

2. Owner well ID#: TMP-06

4. Owner name: Paducah Gaseous Diffusion Plant
5. Owner address: 5600 Hobbs Rd.
6. City: West Paducah
7. State: KY
8. Zip: 42053

If site name and address differ from owner name and address:
9. Site name:
10. Site address:
11. City:
12. State: KY
13. Zip:

3. Attachments
Required
1. Site plan or sketch map ☒
2. Well location
On topographic map, OR ○
Obtained by GPS unit ○
Conditionally Required
3. Well diagram (monitoring well) ☒
4. Coliform analysis (if applicable) ☐
5. Signed Variance (if applicable) ☐
Optional
6. Other laboratory analysis report ☐

14. Agency Interest (AI) Number: 3059
15. Facility type & ID Number: ○ CERCLA ○ Solid Waste ○ Drinking Water ○ RCRA ○ UST ○ Mining
ID Number: KY8-890-008-982

16. Owner phone: (270) 441-6000
17. Site phone: (270) 441-6000

23. Install start date: Feb 05 2015 (Month Day Year)
24. Install end date: Feb 06 2015

18. USGS topo map: Heath
19. County: Mccracken
20. Physiographic Region: ○ Blue Grass ○ Ohio River Alluvium ○ E. Coal Field ○ W. Coal Field ○ Miss. Plateau ○ Jackson Purchase
21. Surface elevation (ft): 380.00
22. Elevation determined by: ○ GPS ○ Map ○ Prior report ○ Survey ○ Prior well log

Please report depths in feet below ground surface, not as relative elevations.
25. Total depth: 97.00
26. Depth to bedrock:
27. Static water level:
28. Casing height above surface (in):

29. Well use: ○ Agriculture ○ Commercial ○ Domestic ○ Industrial ○ Monitoring / Remed ○ Public ○ Geothermal ○ Heat pump ○ HVAC ○ Injection ○ Mining ○ Unused
NOTE: CODE REQUIRED for well uses on left. Select a code from the dropdown menu.

30. Drilling method: ○ Auger – HS ○ Auger – SS ○ Auger – bucket ○ Auger – hand ○ Cable tool ○ Core ○ Driven Casing ○ Excavation ○ Combined – HS auger and air rotary ○ Combined – other (specify): ○ Jet wash ○ Push/probe ○ Rotary – air ○ Rotary – mud ○ Rotary – reverse ○ Sand point ○ Sonic ○ Unknown

31. Well status: ○ Active ○ Inactive ○ Unsuitable for intended use

32. Wellhead: ○ Flush ○ Well cap ○ Locking ○ Sanitary seal

33. Well development method: ○ Surging ○ Jetting ○ Pumping ○ Backwashing ○ Bailing ○ Compressed air ○ Combination of methods (specify)

WATER WELLS ONLY

34. Estimated well yield: ○ gpm ○ gph ○ gpd
35. Well service: #of people served
36. Disinfectant amount: ○ oz ○ qt ○ cups ○ lb ○ gal
37. Type: ○ Bleach ○ Hypo-chlorite
38. Pitless adapter installed: ○ Yes ○ No
39. Pump installed: ○ Submersible ○ Jet ○ Bailer or bucket ○ Turbine ○ Hand ○ No pump
40. Depth to intake (ft):
41. Apparent quality and odor
APPEARANCE: ○ Clear ○ Cloudy ○ Muddy ○ Turbid
ODOR: none, slight, mod., high
○ Iron ○ Sulfur ○ Salt

46. Well completion: Casing and screens

From depth (feet)	To depth (feet)	Borehole diameter (inches)	Casing diam (in) ID	Casing diam (in) OD	Casing type	Screen slot size

47. Annulus fill and seal

From depth (feet)	To depth (feet)	Material
97.00	0.00	

48. Lithologic log (if more space is needed, continue on separate page)

From depth (ft)	To depth (ft)	Description (include any show of water and indicate apparent quality)
0.00	59.80	UCRS
59.80	93.30	RGA
93.30	97.00	McNairy Formation

49. Sketch map ☒

COLIFORM TEST
42. Coliform test type: ○ fecal ○ fecal and total
43. Coliform test results: ○ 0 or <1.0 ○ TNTC ○ Confluent
or # colonies per 100 mL
44. Date sampled (Month Day Year)
45. Date analyzed

50. Comments
Borehole grout is Class H cement and silica flour mix, TC installation depths: 95.3, 94.3, 93.3 (dup), 90.3(dup), 87.3(dup), 84.3, 81.3, 78.3, 75.3, 72.3, 69.3, 66.3, 60.3, 59.8, 58.8, 57.8, 57.8 (replicate is unconnected but in the borehole)

Latitude:
Longitude:
Lat/Long Method: ○ INT ○ GPS ○ SUR ○ REP
Date Received:

51. Affirmation: The work described above was done under my supervision, and this report is true and correct to the best of my knowledge.
Note: the driller is not responsible for natural groundwater quality or quantity encountered while drilling or completing this well.

Signature of certified driller: [signature]
Date signed: Feb 10 2015
Certification number: 0411 - 0549 - 00
Drilling company: Cascade Drilling LP

rev 02/29/2012

2. Owner Well ID#
Owner well ID # denotes the site designation for the well, e.g. "MW-06."

15. Facility type & ID number
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If well use falls under any of the following General Use designations with a corresponding Specific Use, you must include the corresponding Use Code:

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Monitoring & Remediation	Monitoring Well - Military Installation	03
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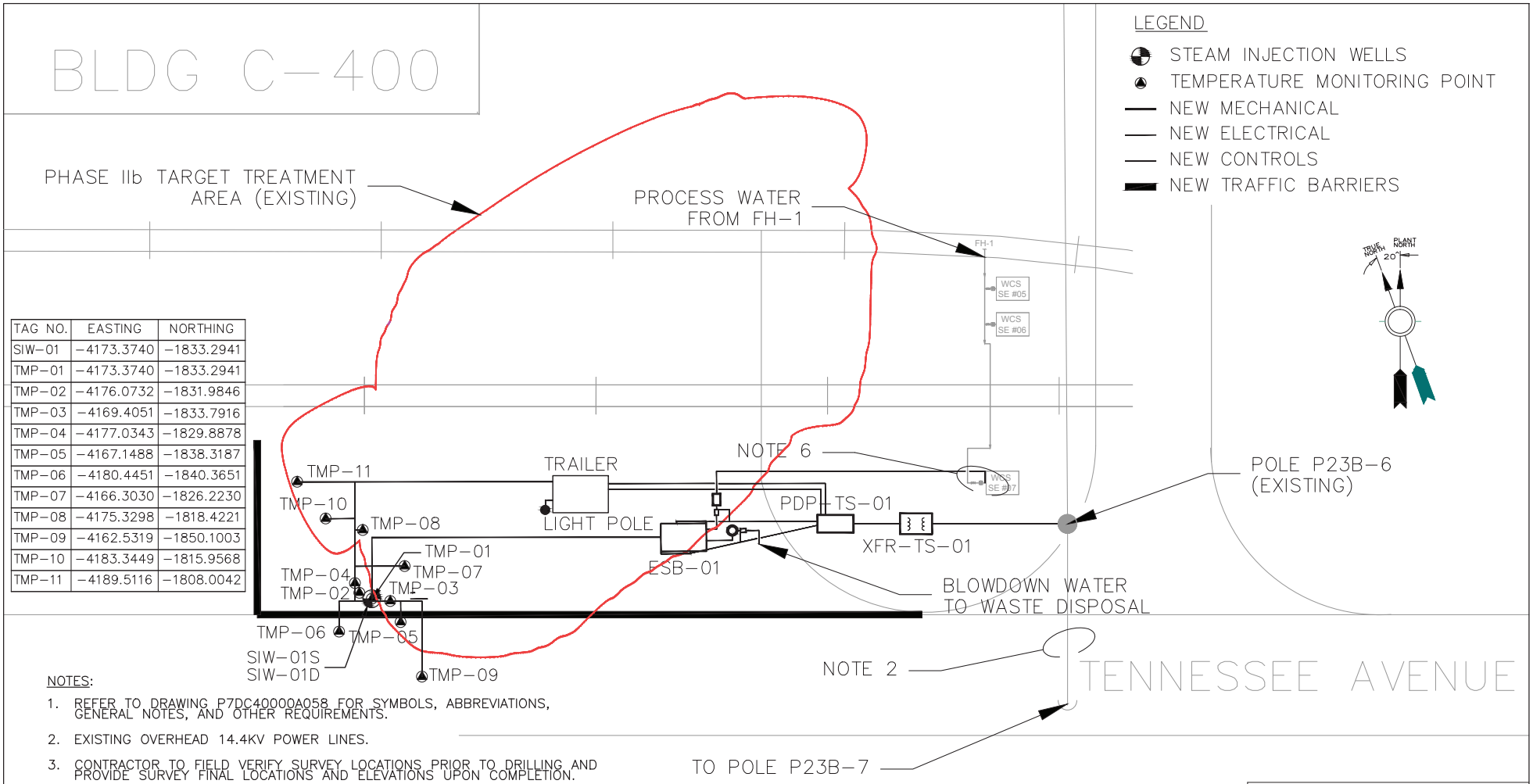
Public	Public - Exploration	02
Public	Public - Non-transient, Non-community	03
Public	Public - Transient, Non-community	04
Public	Public - Unregulated	05
Geothermal	(general use)	-
Heat pump	(general use)	-
HVAC	(general use)	-
Injection	(general use)	-
Mining	(general use)	-
Unused	(general use)	-



TAG NO.	EASTING	NORTHING
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TMP-07	-4166.3030	-1826.2230
TMP-08	-4175.3298	-1818.4221
TMP-09	-4162.5319	-1850.1003
TMP-10	-4183.3449	-1815.9568
TMP-11	-4189.5116	-1808.0042

NOTES:

1. REFER TO DRAWING P7DC40000A058 FOR SYMBOLS, ABBREVIATIONS, GENERAL NOTES, AND OTHER REQUIREMENTS.
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3. CONTRACTOR TO FIELD VERIFY SURVEY LOCATIONS PRIOR TO DRILLING AND PROVIDE SURVEY FINAL LOCATIONS AND ELEVATIONS UPON COMPLETION.
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6. CONNECT ESB-01 FEEDWATER TO EXISTING PROCESS WATER LINE SUPPLIED FROM FIRE HYDRANT FH-1.
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9. ROUTE WIRING FROM TMP-05, TMP-06, AND TMP-09 UNDERGROUND TO NORTH OF NEW JERSEY BARRIERS.
10. INSTALL JERSEY TYPE CONCRETE BARRIERS (MINIMUM 40" HEIGHT) ALONG AND NORTH OF TENNESSEE AVENUE AS SHOWN TO PREVENT VEHICULAR ACCESS INTO EQUIPMENT AREA.

LPE

STATE OF KENTUCKY ERIN L. SURINAK LICENSED PROFESSIONAL ENGINEER

Expires 06-30-16

DATE

PROFESSIONAL SEAL

REV.	DATE	DESCRIPTION	DRAWN BY	DRAFT CHK	PROJ ENGR	LEAD ENGR	CONF CTRL/ NUCL SFTY	FAC MGR	EATS MGR
0	5/30/14	ISSUED FOR CONSTRUCTION	JE	JE	CRE	CRE			

DRAWING REVISIONS

U.S. DEPARTMENT OF ENERGY
DOE PORTSMOUTH/PADUCAH PROJECT OFFICE
PADUCAH GASEOUS DIFFUSION PLANT

LATA Environmental Services of Kentucky, LLC
managed for the DEPARTMENT OF ENERGY under U.S. GOVERNMENT contract DE-AC30-10CC40020
Paducah, Kentucky

Environmental Resources Management
1218 3rd AVENUE, SEATTLE WASHINGTON
(425) 462-8591

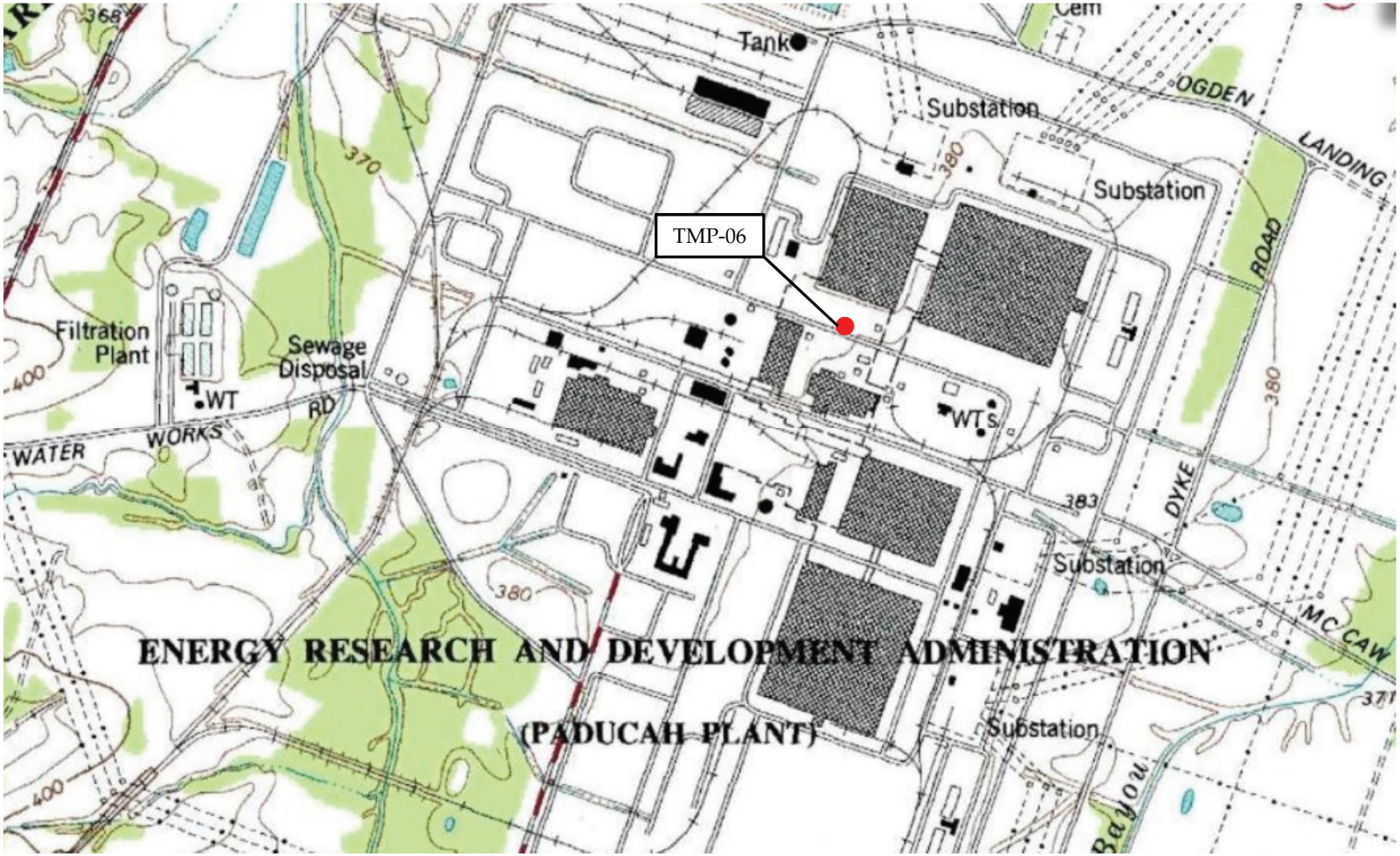
DOE CONTRACT NO. DE-AC30-10CC40020

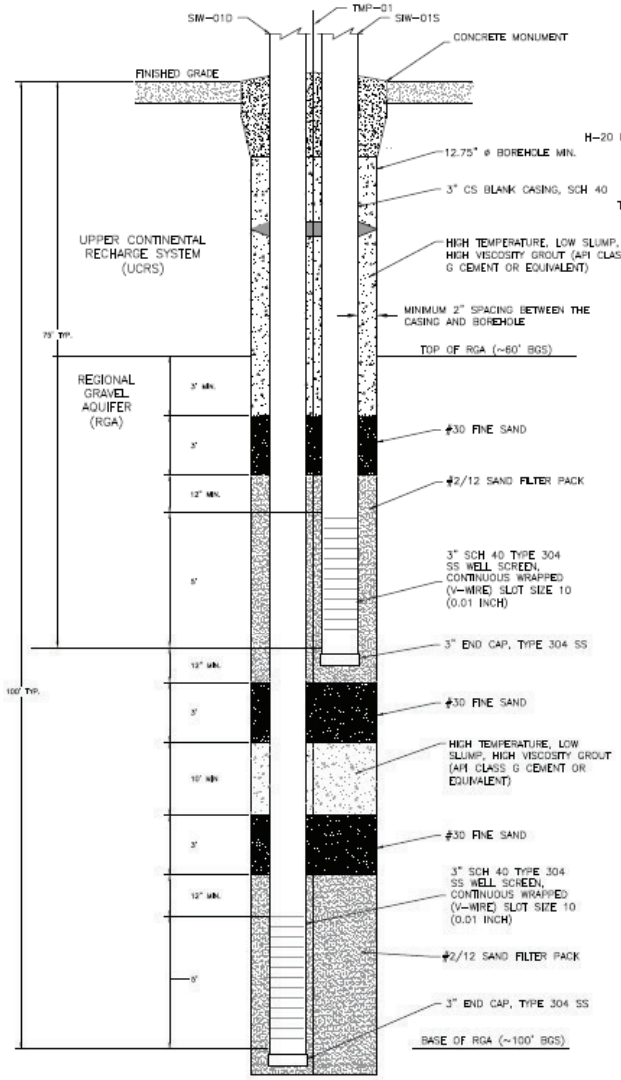
PROJECT NAME:
C-400 STEAM INJECTION TREATABILITY STUDY

TITLE:
TREATABILITY STUDY SITE PLAN

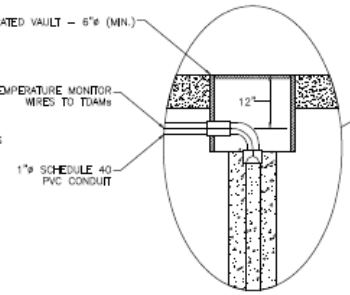
CAD FILE NAME	BUILDING	PLANT	CLASS
A027_SITE PLAN.DWG	C-400	PGDP	U

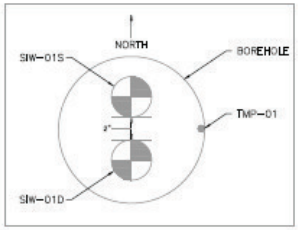
SCALE:	DRAWING NUMBER	REV
AS SHOWN	C7DC40000A027	0


TMP-06
Tank
Substation
Substation
OGDEN
LANDING
ROAD
Filtration Plant
Sewage Disposal
WT
RD
WATER
WORKS
WTs
DYKE
Substation
MC CAW
Substation
Bayou
370
380
383
400
ENERGY RESEARCH AND DEVELOPMENT ADMINISTRATION
(PADUCAH PLANT)



NESTED STEAM INJECTION WELL (TYP.)
(SIW-01S, SIW-01D)
NOT TO SCALE

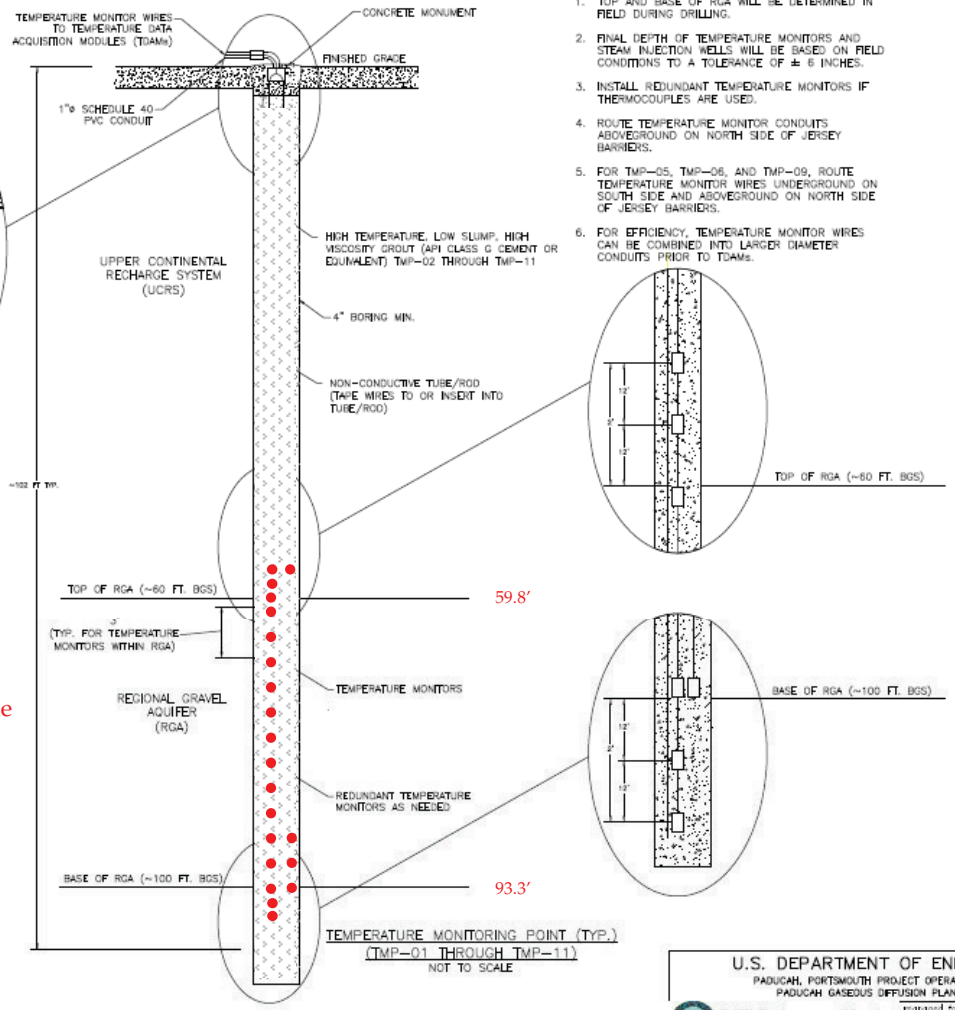




PLAN VIEW
SIW-01S, SIW-01D
NOT TO SCALE

See Page 1, Box 50 for thermocouple depth detail

TMP-06



TEMPERATURE MONITORING POINT (TYP.)
(TMP-01 THROUGH TMP-11)
NOT TO SCALE

NOTES:
1. TOP AND BASE OF RGA WILL BE DETERMINED IN FIELD DURING DRILLING.
2. FINAL DEPTH OF TEMPERATURE MONITORS AND STEAM INJECTION WELLS WILL BE BASED ON FIELD CONDITIONS TO A TOLERANCE OF ± 6 INCHES.
3. INSTALL REDUNDANT TEMPERATURE MONITORS IF THERMOCOUPLES ARE USED.
4. ROUTE TEMPERATURE MONITOR CONDUITS ABOVEGROUND ON NORTH SIDE OF JERSEY BARRIERS.
5. FOR TMP-05, TMP-06, AND TMP-09, ROUTE TEMPERATURE MONITOR WIRES UNDERGROUND ON SOUTH SIDE AND ABOVEGROUND ON NORTH SIDE OF JERSEY BARRIERS.
6. FOR EFFICIENCY, TEMPERATURE MONITOR WIRES CAN BE COMBINED INTO LARGER DIAMETER CONDUITS PRIOR TO TDAMs.

U.S. DEPARTMENT OF ENERGY
PADUCAH, PORTSMOUTH PROJECT OPERATIONS, PADUCAH GASEOUS DIFFUSION PLANT
LATA Environmental Services of Kentucky, LLC
managed for the DEPARTMENT OF ENERGY under U.S. GOVERNMENT contract DE-AC30-10CC40020
Paducah, Kentucky

Environmental Resources Management
1218 3rd AVENUE, SEATTLE WASHINGTON
(425) 462-8591

DOE CONTRACT NO. DE-AC30-10CC40020

PROJECT NAME: C-400 STEAM INJECTION TREATABILITY STUDY

TITLE: TREATABILITY STUDY STEAM INJECTION WELLS AND TEMPERATURE MONITORING POINTS

CAD FILENAME	BUILDING	PLANT	CLASS
A028_SIW & TMP DETAILS.DWG	C-400	PGDP	U

SCALE	DRAWING NUMBER	REV
N.T.S.	C7DC40000A028	0

LPE

STATE OF KENTUCKY ERIN I. SURINAK LICENSED PROFESSIONAL ENGINEER

Expires 06-30-16

DATE
PROFESSIONAL SEAL

REV	DATE	DESCRIPTION	DRAWN BY	CHKD BY	PROJ ENGR	LEAD ENGR	CONF ITAL	PROJ MGR	DEPT MGR
0	5/30/14	ISSUED FOR CONSTRUCTION	JE	JE	CRE	CRE			

DRAWING REVISIONS

TMP-07						
		4-inch core		Drilled by Vernon Scott		
02/25/15 @ 13:12 to 14:50						
Drilled Interval		Recovery	Depths		Description	Notes
Top	Bottom		Top	Bottom		
47.0	57.0	12.8	47.0	48.9	Slough: Silty Gravel, 10YR7/2 (light gray), loose, and moist	
			48.9	54.1	Slightly Sandy Silt, 10YR7/2 (light gray), soft, slightly plastic, and moist. Sand is very fine grained quartz	
			54.1	55.7	Sand, 7.5YR8/4 (pink), loose, and moist. Sand is fine grained quartz	
			55.7	57.0	Sandy Silt, 7.5YR8/3 (pink), soft, nonplastic, and moist. Sand is very fine grained quartz	
57.0	67.0	11.5	57.0	58.7	Sandy Silt as above but with trace subangular chert gravel without iron patina, 0.3 to 0.6 inch diameter	
			58.7	60.8	Gap Graded Sand with Gravel, 7.5YR8/6 (reddish yellow), loose, and moist. Sand is fine quartz grains (50%) and coarse, rounded chert grains (20%). Gravel (30%) is subrounded to rounded chert without iron patina, 0.3 to 0.8 inch diameter.	Top of RGA at 58.7 ft Black (10YR2/1) staining (manganese) at 59.1 to 59.3 ft
			60.8	61.5	Sand with Gravel, 10YR8/2 (very pale brown), moderately dense, and moist. Sand is fine grained quartz. Gravel is subrounded chert without iron patina, 0.5 to 1.0 inch diameter	
			61.5	67.0	Gap Graded Sand with Gravel, 10YR7/2 (light gray), loose, and moist. Sand is fine quartz grains (40%) and coarse to very coarse, subangular to subrounded chert grains with iron patina (20%). Gravel (40%) is subrounded to rounded chert with iron patina, 0.3 to 1.0 inch diameter.	
67.0	77.0	10.4	67.0	68.0	Gap Graded Sand with Gravel as above but gravel diameter ranges up to 2.0 inches	
			68.0	77.0	Gap Graded Sand with Gravel as above but colored 7.5YR8/4 (pink) GRADING DOWN TO 7.5YR7/6 (reddish yellow)	
77.0	87.0	9.6	77.0	87.0	Gap Graded Sand with Gravel, 7.5YR6/6 (reddish yellow), loose, and moist. Sand is fine quartz grains (35%) and coarse to very coarse, subangular to subrounded, chert grains (30%). Gravel (35%) is subrounded to subangular chert with iron patina, 0.3 to 2.0 inch diameter	
87.0	97.0	10.2	87.0	93.4	Gap Graded Sand with Gravel as above but colored 10YR7/6 (yellow). Some hematite staining/cementation apparent at 92.7 ft	Smaller gravel tends to be subangular. Larger gravel tends to be subrounded
			93.4	95.6	Interbedded Clay and Sand, 7.5YR7/2 (pinkish gray) and 7.5YR6/1 (gray) with some 7.5YR8/6 (reddish yellow) laminations, moderately soft, slightly to moderately plastic, and moist. Sand is very fine grained quartz(?)	Base of RGA at 93.4 ft
TD = 97.0 ft						

UNIFORM KENTUCKY WELL CONSTRUCTION RECORD

Use this form only to report installation of monitoring or water wells.
Original copy must be submitted to Division of Water within 60 days of completion.
See instructions on reverse of form.
Record must be typed or neatly printed or it will be returned to the driller as unacceptable.
One copy to Division of Water, one copy to owner, one copy to driller's files.

Attach Well Identification Number (AKGWA) Label Here
Water wells: yellow labels
Monitoring wells: blue labels

1. Kentucky Well ID (AKGWA) Number: -

2. Owner well ID#: TMP-07

4. Owner name: Paducah Gaseous Diffusion Plant
5. Owner address: 5600 Hobbs Rd.
6. City: West Paducah 7. State: KY 8. Zip: 42053

If site name and address differ from owner name and address:
9. Site name
10. Site address
11. City 12. State: KY 13. Zip

3. Attachments
Required
1. Site plan or sketch map [x]
2. Well location
On topographic map, OR
Obtained by GPS unit
Conditionally Required
3. Well diagram (monitoring well) [x]
4. Coliform analysis (if applicable) [ ]
5. Signed Variance (if applicable) [ ]
Optional
6. Other laboratory analysis report [ ]

14. Agency Interest (AI) Number: 3059
15. Facility type & ID Number: CERCLA / Solid Waste / Drinking Water / RCRA / UST / Mining — KY8-890-008-982

16. Owner phone: (270) 441-6000 17. Site phone: (270) 441-6000

23. Install start date: Feb 25 2015 (Month Day Year)
24. Install end date: Feb 26 2015

18. USGS topo map: Heath
19. County: Mccracken
20. Physiographic Region: Blue Grass / Ohio River Alluvium / E. Coal Field / W. Coal Field / Miss. Plateau / Jackson Purchase
21. Surface elevation (ft): 380.00
22. Elevation determined by: GPS / Map / Prior report / Survey / Prior well log

Please report depths in feet below ground surface, not as relative elevations.
25. Total depth: 97.00
26. Depth to bedrock
27. Static water level
28. Casing height above surface (in)

29. Well use: Agriculture / Geothermal / Commercial / Heat pump / Domestic / HVAC / Industrial / Injection / Monitoring / Remed / Mining / Public / Unused
NOTE: CODE REQUIRED for well uses on left. Select a code from the dropdown menu.

30. Drilling method: Auger – HS / Jet wash / Auger – SS / Push/probe / Auger – bucket / Rotary – air / Auger – hand / Rotary – mud / Cable tool / Rotary – reverse / Core / Sand point / Driven Casing / Sonic / Excavation / Unknown / Combined – HS auger and air rotary / Combined – other (specify):

31. Well status: Active / Inactive / Unsuitable for intended use
32. Wellhead: Flush / Well cap / Locking / Sanitary seal
33. Well development method: Surging / Jetting / Pumping / Backwashing / Bailing / Compressed air / Combination of methods (specify)

WATER WELLS ONLY

34. Estimated well yield: gpm / gph / gpd
35. Well service: #of people served
36. Disinfectant amount: oz / qt / cups / lb / gal
37. Type: Bleach / Hypo-chlorite
38. Pitless adapter installed: Yes / No
39. Pump installed: Submersible / Jet / Bailer or bucket / Turbine / Hand / No pump
40. Depth to intake (ft)
41. Apparent quality and odor
APPEARANCE: Clear / Cloudy / Muddy / Turbid
ODOR: none / slight / mod. / high
Iron / Sulfur / Salt

46. Well completion: Casing and screens

From depth (feet)	To depth (feet)	Borehole diameter (inches)	Casing diam (in) ID	Casing diam (in) OD	Casing type	Screen slot size

47. Annulus fill and seal

From depth (feet)	To depth (feet)	Material (NOTE for WATER WELLS only: If cuttings (clay, shale or limestone only) are used, you must specify composition.)
97.00	0.00	

48. Lithologic log (if more space is needed, continue on separate page)

From depth (ft)	To depth (ft)	Description (include any show of water and indicate apparent quality)
0.00	58.70	UCRS
58.70	93.40	RGA
93.40	97.00	McNairy Formation

49. Sketch map [x]

COLIFORM TEST

42. Coliform test type: fecal / fecal and total
43. Coliform test results: 0 or <1.0 / TNTC / Confluent
or # colonies per 100 mL
44. Date sampled (Month Day Year)
45. Date analyzed

50. Comments
Borehole grout is Class H cement/silica flour mix, TC installation depths: 95.4, 94.4, 93.4(dup), 90.4(dup), 87.4(dup), 84.4, 81.4, 78.4, 75.4, 72.4, 69.4, 66.4, 63.4, 60.4, 58.7, 57.7, 56.7

Latitude
Longitude
Lat/Long Method: INT / GPS / SUR / REP
Date Received

51. Affirmation: The work described above was done under my supervision, and this report is true and correct to the best of my knowledge.
Note: the driller is not responsible for natural groundwater quality or quantity encountered while drilling or completing this well.

Signature of certified driller: [signature] Date signed: Feb 26 2015
Certification number: 0411 - 0549 - 00 Drilling company: Cascade Drilling LP

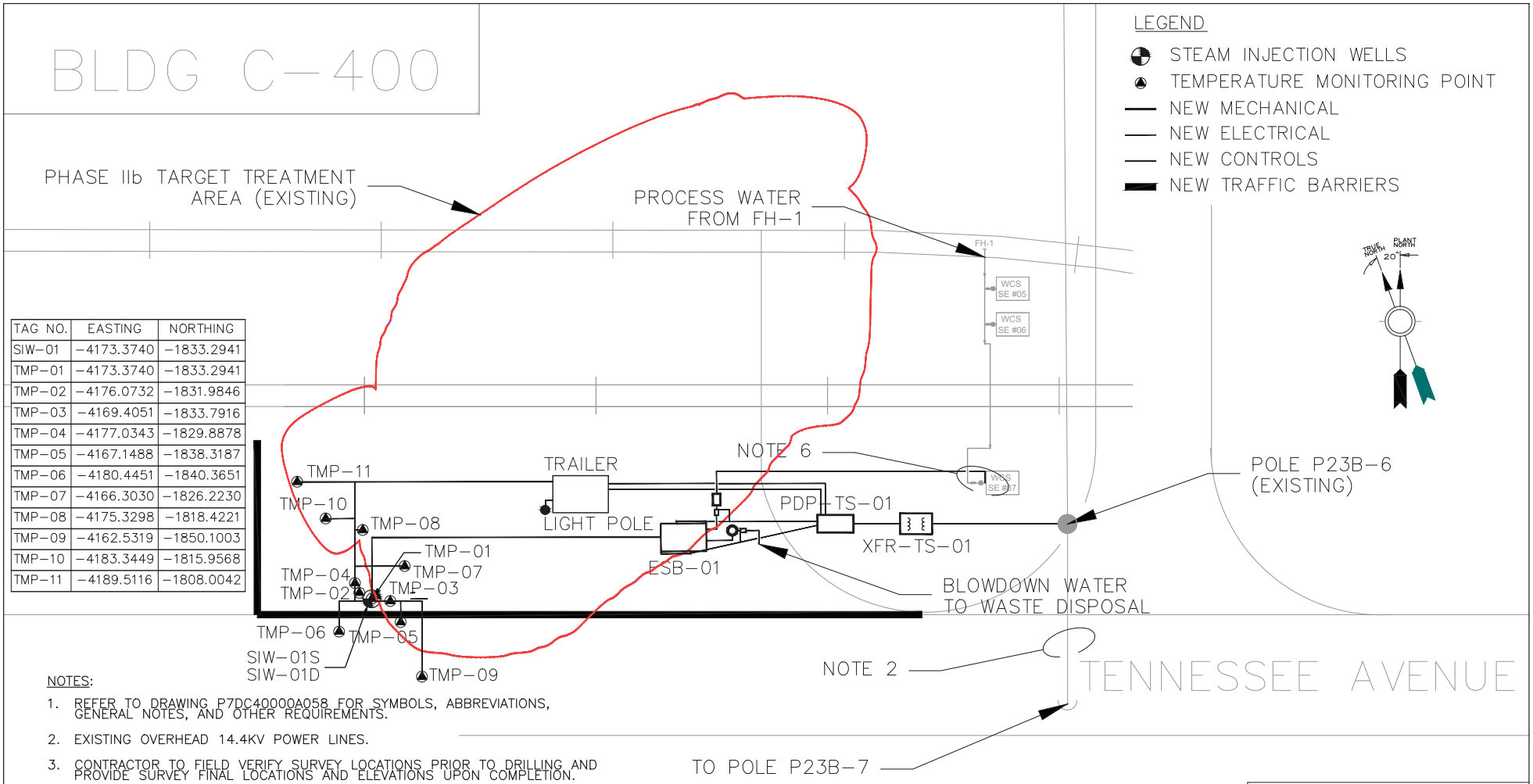
rev 02/29/2012

2. Owner Well ID#
Owner well ID # denotes the site designation for the well, e.g. "MW-06."

15. Facility type & ID number
If the well is located at any of the listed facility types, please note the historic site ID # in the spaces provided. This information is vital for other programs that may need to locate the well record in the database.

25. Well use
If well use falls under any of the following General Use designations with a corresponding Specific Use, you must include the corresponding Use Code:

WELL USE CODES		
GENERAL USE	SPECIFIC USE	USE CODE
Agriculture	Agriculture - Dairy Operation	01
Agriculture	Agriculture - Feed Pen Operation	02
Agriculture	Agriculture - Fish And Game Propagation	03
Agriculture	Agriculture - General	04
Agriculture	Agriculture - Horse Farm	05
Agriculture	Agriculture - Irrigation	06
Agriculture	Agriculture - Livestock Watering	07
Agriculture	Agriculture - Poultry And Egg Operation	08
Commercial	Commercial	01
Commercial	Commercial - Irrigation	02
Commercial	Dewatering Well - Construction	03
Domestic	Domestic - Multiple Domestic Households	01
Domestic	Domestic - Single Household	02
Industrial	Industrial - General	01
Industrial	Industrial - Manufacturing	02
Industrial	Industrial - Petroleum Processing Plant	03
Monitoring & Remediation	Monitoring Well - Ambient Monitoring	01
Monitoring & Remediation	Monitoring Well - Compliance	02
Monitoring & Remediation	Monitoring Well - Military Installation	03
Monitoring & Remediation	Monitoring Well - Water Level Monitoring Only	04
Monitoring & Remediation	Remediation	05
Public	Public - Community	01
Public	Public - Exploration	02
Public	Public - Non-transient, Non-community	03
Public	Public - Transient, Non-community	04
Public	Public - Unregulated	05
Geothermal	(general use)	-
Heat pump	(general use)	-
HVAC	(general use)	-
Injection	(general use)	-
Mining	(general use)	-
Unused	(general use)	-



TAG NO.	EASTING	NORTHING
SIW-01	-4173.3740	-1833.2941
TMP-01	-4173.3740	-1833.2941
TMP-02	-4176.0732	-1831.9846
TMP-03	-4169.4051	-1833.7916
TMP-04	-4177.0343	-1829.8878
TMP-05	-4167.1488	-1838.3187
TMP-06	-4180.4451	-1840.3651
TMP-07	-4166.3030	-1826.2230
TMP-08	-4175.3298	-1818.4221
TMP-09	-4162.5319	-1850.1003
TMP-10	-4183.3449	-1815.9568
TMP-11	-4189.5116	-1808.0042

NOTES:

1. REFER TO DRAWING P7DC40000A058 FOR SYMBOLS, ABBREVIATIONS, GENERAL NOTES, AND OTHER REQUIREMENTS.
2. EXISTING OVERHEAD 14.4KV POWER LINES.
3. CONTRACTOR TO FIELD VERIFY SURVEY LOCATIONS PRIOR TO DRILLING AND PROVIDE SURVEY FINAL LOCATIONS AND ELEVATIONS UPON COMPLETION.
4. REFER TO DRAWING C7DC40000A028 FOR WELL AND TMP DETAILS.
5. CONNECT XFR-TS-01 TO EXISTING 14.4KV POWER LINE AT POLE P23B-6.
6. CONNECT ESB-01 FEEDWATER TO EXISTING PROCESS WATER LINE SUPPLIED FROM FIRE HYDRANT FH-1.
7. ROUTINGS AND LOCATIONS ARE DIAGRAMMATIC. INSTALL AS NEEDED TO MAXIMIZE EFFICIENCY.
8. INSTALL ALL PIPING AND CONDUITS NORTH OF JERSEY BARRIERS ABOVEGROUND. PIPING SHALL BE INSTALLED ON PIPE SUPPORTS. CONDUITS CAN LAY DIRECTLY ON GROUND.
9. ROUTE WIRING FROM TMP-05, TMP-06, AND TMP-09 UNDERGROUND TO NORTH OF NEW JERSEY BARRIERS.
10. INSTALL JERSEY TYPE CONCRETE BARRIERS (MINIMUM 40" HEIGHT) ALONG AND NORTH OF TENNESSEE AVENUE AS SHOWN TO PREVENT VEHICULAR ACCESS INTO EQUIPMENT AREA.

LPE

STATE OF KENTUCKY ERIN L. SURINAK LICENSED PROFESSIONAL ENGINEER

Expires 06-30-16

DATE

PROFESSIONAL SEAL

REV.	DATE	DESCRIPTION	DRAWN BY	DRAFT CHK	PROJ ENGR	LEAD ENGR	CONF CTRL/ NUCL SFTY	FAC MGR	EATS MGR
0	5/30/14	ISSUED FOR CONSTRUCTION	JE	JE	CRE	CRE			

DRAWING REVISIONS

U.S. DEPARTMENT OF ENERGY
DOE PORTSMOUTH/PADUCAH PROJECT OFFICE
PADUCAH GASEOUS DIFFUSION PLANT

LATA Environmental Services of Kentucky, LLC
managed for the DEPARTMENT OF ENERGY under U.S. GOVERNMENT contract DE-AC30-10CC40020
Paducah, Kentucky

Environmental Resources Management
1218 3rd AVENUE, SEATTLE WASHINGTON
(425) 462-8591

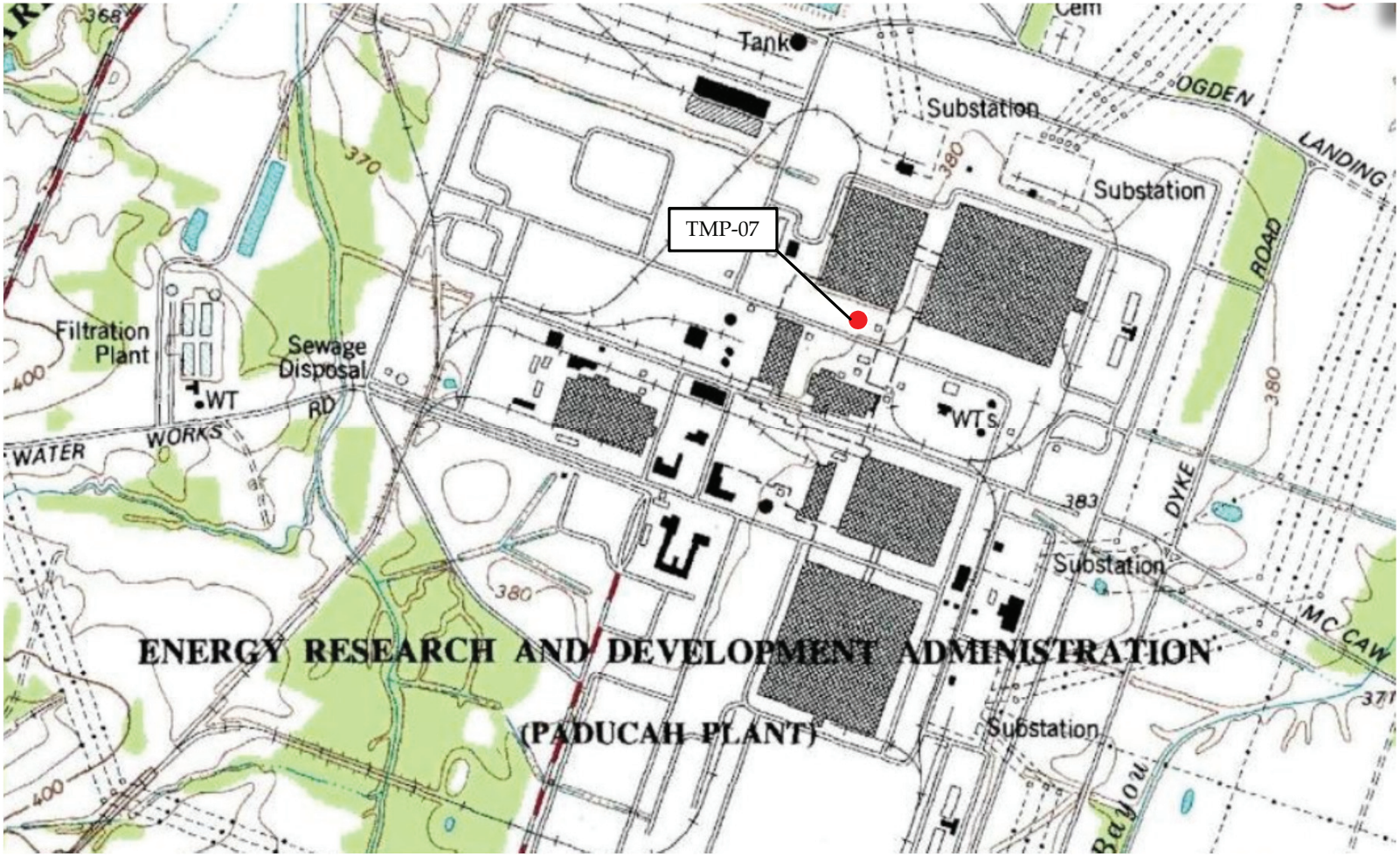
DOE CONTRACT NO. DE-AC30-10CC40020

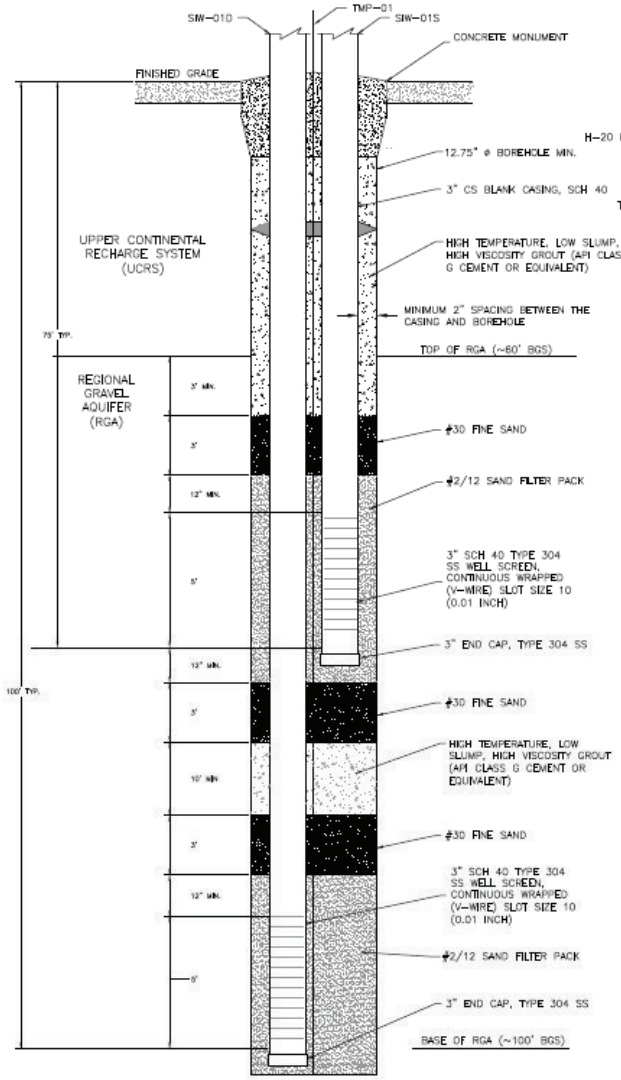
PROJECT NAME:
C-400 STEAM INJECTION TREATABILITY STUDY

TITLE:
TREATABILITY STUDY SITE PLAN

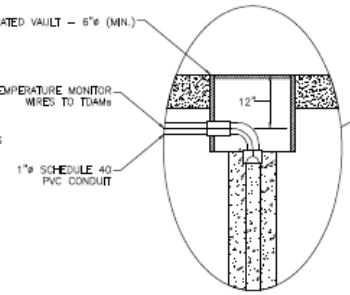
CAD FILE NAME	BUILDING	PLANT	CLASS
A027_SITE PLAN.DWG	C-400	PGDP	U

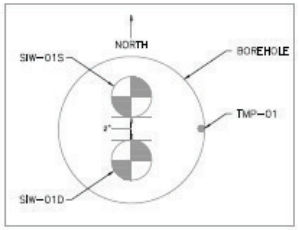
SCALE:	DRAWING NUMBER	REV
AS SHOWN	C7DC40000A027	0


TMP-07
Tank
Substation
Substation
OGDEN
LANDING
ROAD
Filtration Plant
Sewage Disposal
WT
RD
WATER
WORKS
WTs
DYKE
Substation
MC CAW
Substation
Bayou
370
380
383
400
ENERGY RESEARCH AND DEVELOPMENT ADMINISTRATION
(PADUCAH PLANT)



NESTED STEAM INJECTION WELL (TYP.)
(SIW-01S, SIW-01D)
NOT TO SCALE

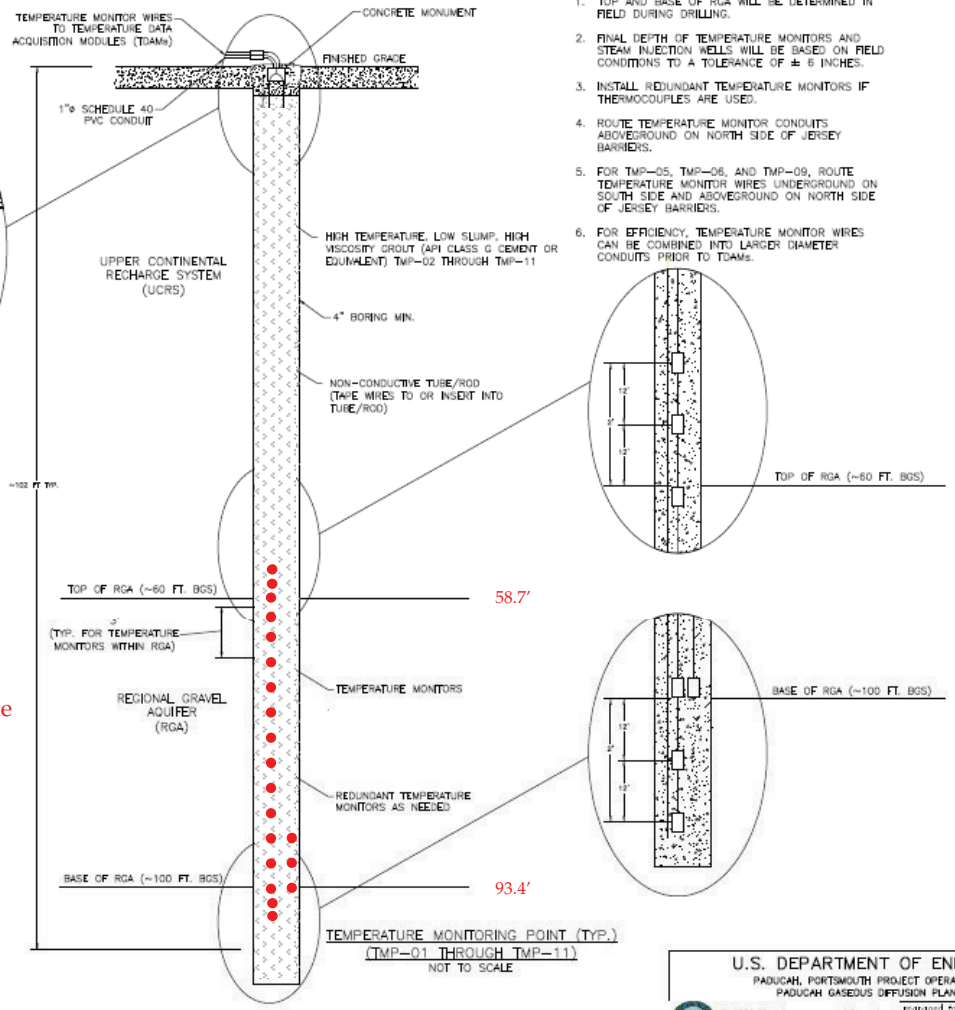




PLAN VIEW
SIW-01S, SIW-01D
NOT TO SCALE

See Page 1, Box 50 for thermocouple depth detail

TMP-07



NOTES:
1. TOP AND BASE OF RGA WILL BE DETERMINED IN FIELD DURING DRILLING.
2. FINAL DEPTH OF TEMPERATURE MONITORS AND STEAM INJECTION WELLS WILL BE BASED ON FIELD CONDITIONS TO A TOLERANCE OF ± 6 INCHES.
3. INSTALL REDUNDANT TEMPERATURE MONITORS IF THERMOCOUPLES ARE USED.
4. ROUTE TEMPERATURE MONITOR CONDUITS ABOVEGROUND ON NORTH SIDE OF JERSEY BARRIERS.
5. FOR TMP-05, TMP-06, AND TMP-09, ROUTE TEMPERATURE MONITOR WIRES UNDERGROUND ON SOUTH SIDE AND ABOVEGROUND ON NORTH SIDE OF JERSEY BARRIERS.
6. FOR EFFICIENCY, TEMPERATURE MONITOR WIRES CAN BE COMBINED INTO LARGER DIAMETER CONDUITS PRIOR TO TDAMs.

U.S. DEPARTMENT OF ENERGY
PADUCAH, PORTSMOUTH PROJECT OPERATIONS, PADUCAH GASEOUS DIFFUSION PLANT
LATA Environmental Services of Kentucky, LLC
managed for the DEPARTMENT OF ENERGY under U.S. GOVERNMENT contract DE-AC30-10CC40020
Paducah, Kentucky

Environmental Resources Management
1218 3rd AVENUE, SEATTLE WASHINGTON
(425) 462-8591

DOE CONTRACT NO. DE-AC30-10CC40020

PROJECT NAME: C-400 STEAM INJECTION TREATABILITY STUDY

TITLE: TREATABILITY STUDY STEAM INJECTION WELLS AND TEMPERATURE MONITORING POINTS

CAD FILENAME	BUILDING	PLANT	CLASS
A028_SIW & TMP DETAILS.DWG	C-400	PGDP	U

SCALE	DRAWING NUMBER	REV
N.T.S.	C7DC40000A028	0

LPE

ERIN I. SURINAK, STATE OF KENTUCKY, LICENSED PROFESSIONAL ENGINEER

Expires 06-30-16

DATE
PROFESSIONAL SEAL

REV	DATE	DESCRIPTION	DRAWN BY	CHKD BY	PROJ ENGR	LEAD ENGR	CONF ENGR	PROJ MGR	DIST MGR
0	5/30/14	ISSUED FOR CONSTRUCTION	JE	JE	CRE	CRE			

DRAWING REVISIONS

TMP-08						
		4-inch core		Drilled by Vernon Scott		
02/26/15 @ 10:00 to 13:20						
Drilled Interval		Recovery	Depths		Description	Notes
Top	Bottom		Top	Bottom		
47.0	57.0	11.8	47.0	47.5	Slough: Gravelly Silt, 10YR7/4 (very pale brown), soft, nonplastic, and wet	
			47.5	51.2	Silt, 10YR7/3 (very pale brown), soft to moderately soft, nonplastic, and moist	
			51.2	55.0	Sand, 10YR7/2 (light gray), loose, and moist. Sand is fine grained quartz and massive (no bedding features)	
			55.0	57.0	Silt with little Sand, 10YR7/1 (light gray) with 10YR7/3 (very pale brown) mottling, soft, nonplastic, and moist.	Intervals of gravel at 55.0 to 55.3 ft and 56.8 to 57.0 ft. Gravel is subangular to subrounded chert without iron patina, 0.5 to 1.8 inches in diameter
57.0	67.0	10.9	57.0	58.4	Sand, 10YR7/4 (very pale brown) mottled with 10YR7/1 (light gray), moderately dense, and moist. Sand is fine grained quartz	
			58.4	59.6	Sand with Gravel, 10YR7/3 (very pale brown), loose, and moist. Sand is fine quartz grains (60%) and coarse, subangular chert grains (20%). Gravel is subangular chert without iron patina (20%)	Top of RGA at 58.4 ft
			59.6	60.7	Gap graded Sand with Gravel, 10YR7/4 (very pale brown), loose to moderately dense, and moist. Sand is fine quartz grains (30%) and coarse to very coarse, subangular to subrounded chert grains (30%). Gravel is subrounded to subangular chert with iron patina, 0.3 to 2.0 inch diameter (40%)	
			60.7	67.0	Gap graded Sandy Gravel, 10YR7/6 (yellow), loose, and moist. Gravel is subrounded to subangular chert with iron patina, 0.3 to 2.0 inch diameter (50%). Sand is coarse to very coarse, subrounded to subangular chert grains (30%) and fine quartz grains (20%)	
67.0	77.0	10.3	67.0	71.1	Gap graded Sandy Gravel as above	
			71.1	77.0	Gap graded Sand and Gravel, 7.5YR6/6 (reddish yellow), loose, and moist. Sand is coarse to very coarse, subangular chert grains (30%) and fine quartz grains (20%). Gravel is subangular to subrounded chert with iron patina, 0.3 to 2.0 inch diameter (50%)	
77.0	87.0	9.9	77.0	86.1	Gap graded Sand and Gravel as above	Interval of 10YR2/1 (black) staining (manganese) at 83.7 to 84.0 ft
			86.1	87.0	Gravelly Sand, 10YR6/6 (brownish yellow), loose, and moist. Sand is coarse, subangular chert grains (40%) and fine quartz grains (20%). Gravel is subrounded chert with iron patina, 0.3 to 0.6 inch diameter (40%)	
87.0	97.0	10.7	87.0	92.5	Gap graded Sand and Gravel, 10YR6/6 (brownish yellow), loose, and moist. Sand is fine quartz grains (30%) and coarse, subrounded chert grains (30%). Gravel is subrounded chert with iron patina, 0.3 to 2.0 inch diameter (40%)	
			92.5	94.6	Sandy Gravel, 7.5YR7/6 (reddish yellow), loose, and moist. Gravel is subrounded chert with iron patina, 0.3 to 3.0 inch diameter (55%). Sand is fine quartz grains (30%) and coarse, subrounded to subangular chert grains (15%)	Base of RGA at 94.6 ft
			94.6	96.1	Interbedded Clay and Sand, 5YR7/1 (light gray) and 5YR6/1 (gray) with 10YR7/8 (yellow) sand interbeds, soft, moderately plastic, and moist. Sand is very fine grained quartz(?)	
			96.1	97.0	Sand, 10YR8/2 (very pale brown), loose, and moist. Sand is very fine grained quartz(?)	
TD = 97.0 ft						

UNIFORM KENTUCKY WELL CONSTRUCTION RECORD

Use this form only to report installation of monitoring or water wells.
Original copy must be submitted to Division of Water within 60 days of completion.
See instructions on reverse of form.
Record must be typed or neatly printed or it will be returned to the driller as unacceptable.
One copy to Division of Water, one copy to owner, one copy to driller's files.

Attach Well Identification Number (AKGWA) Label Here
Water wells: yellow labels
Monitoring wells: blue labels

1. Kentucky Well ID (AKGWA) Number: •

2. Owner well ID#: TMP-08

4. Owner name: Paducah Gaseous Diffusion Plant
5. Owner address: 5600 Hobbs Rd.
6. City: West Paducah 7. State: KY 8. Zip: 42053

If site name and address differ from owner name and address:
9. Site name
10. Site address
11. City 12. State: KY 13. Zip

3. Attachments
Required
1. Site plan or sketch map ☒
2. Well location
On topographic map, OR ○
Obtained by GPS unit ○
Conditionally Required
3. Well diagram (monitoring well) ☒
4. Coliform analysis (if applicable) ☐
5. Signed Variance (if applicable) ☐
Optional
6. Other laboratory analysis report ☐

14. Agency Interest (AI) Number: 3059
15. Facility type & ID Number: ○ CERCLA ○ Solid Waste ○ Drinking Water ○ RCRA ○ UST ○ Mining
KY8-890-008-982

16. Owner phone: (270) 441-6000 17. Site phone: (270) 441-6000

18. USGS topo map: Heath
19. County: Mccracken
20. Physiographic Region: ○ Blue Grass ○ Ohio River Alluvium ○ E. Coal Field ○ W. Coal Field ○ Miss. Plateau ● Jackson Purchase
21. Surface elevation (ft): 380.00
22. Elevation determined by: ○ GPS ● Map ○ Prior report ○ Survey ○ Prior well log

23. Install start date: Feb (Month) 26 (Day) 2015 (Year)
24. Install end date: Feb 27 2015

Please report depths in feet below ground surface, not as relative elevations.
25. Total depth: 97.00
26. Depth to bedrock
27. Static water level
28. Casing height above surface (in)

29. Well use
○ Agriculture ○ Geothermal
○ Commercial ○ Heat pump
○ Domestic ○ HVAC
○ Industrial ○ Injection
● Monitoring / Remed Remediation ○ Mining
○ Public ○ Unused

NOTE: CODE REQUIRED for well uses on left. Select a code from the dropdown menu.

30. Drilling method
○ Auger – HS ○ Jet wash
○ Auger – SS ○ Push/probe
○ Auger – bucket ○ Rotary – air
○ Auger – hand ○ Rotary – mud
○ Cable tool ○ Rotary – reverse
○ Core ○ Sand point
○ Driven Casing ● Sonic
○ Excavation ○ Unknown
○ Combined – HS auger and air rotary
○ Combined – other (specify):

31. Well status
● Active ○ Inactive
○ Unsuitable for intended use

32. Wellhead
○ Flush ● Well cap
○ Locking ○ Sanitary seal

33. Well development method
○ Surging ○ Jetting
○ Pumping ○ Backwashing
○ Bailing ○ Compressed air
○ Combination of methods (specify)

WATER WELLS ONLY

34. Estimated well yield ○ gpm ○ gph ○ gpd
35. Well service #of people served
36. Disinfectant amount ○ oz ○ qt ○ cups ○ lb ○ gal
37. Type ○ Bleach ○ Hypo-chlorite
38. Pitless adapter installed ○ Yes ○ No
39. Pump installed: ○ Submersible ○ Jet ○ Bailer or bucket ○ Turbine ○ Hand ○ No pump
40. Depth to intake (ft)
41. Apparent quality and odor

APPEARANCE	ODOR none	slight	mod.	high
○ Clear				
○ Cloudy				
○ Muddy	○ Iron			
○ Turbid	○ Sulfur			
	○ Salt			

COLIFORM TEST
42. Coliform test type ○ fecal ○ fecal and total
43. Coliform test results ○ 0 or <1.0 ○ TNTC ○ Confluent
or # colonies per 100 mL
44. Date sampled (Month Day Year)
45. Date analyzed

46. Well completion: Casing and screens

From depth (feet)	To depth (feet)	Borehole diameter (inches)	Casing diam (in) ID	Casing diam (in) OD	Casing type	Screen slot size

47. Annulus fill and seal

From depth (feet)	To depth (feet)	Material (NOTE for WATER WELLS only: including clay, shale or limestone wall, should not be included, you must specify completion)
97.00	0.00	

48. Lithologic log (if more space is needed, continue on separate page)

From depth (ft)	To depth (ft)	Description (include any show of water and indicate apparent quality)
0.00	58.40	UCRS
58.40	94.60	RGA
94.60	97.00	McNairy Formation

49. Sketch map ☑

50. Comments
Borehole grout is Class H cement and silica flour mix, TC installation depths: 96.6, 95.6, 94.6 (dup), 91.6(dup), 88.6(dup), 85.6, 82.6, 79.6, 76.6, 73.6, 70.6, 67.6, 64.6, 61.6, 58.6, 58.4, 57.4, 56.4

Latitude
Longitude
Lat/Long Method ○ INT ○ GPS ○ SUR ○ REP
Date Received

51. Affirmation: The work described above was done under my supervision, and this report is true and correct to the best of my knowledge.
Note: the driller is not responsible for natural groundwater quality or quantity encountered while drilling or completing this well.

Signature of certified driller: [signature] Date signed: Feb 27 2015
Certification number: 0411 - 0549 - 00 Drilling company: Cascade Drilling LP

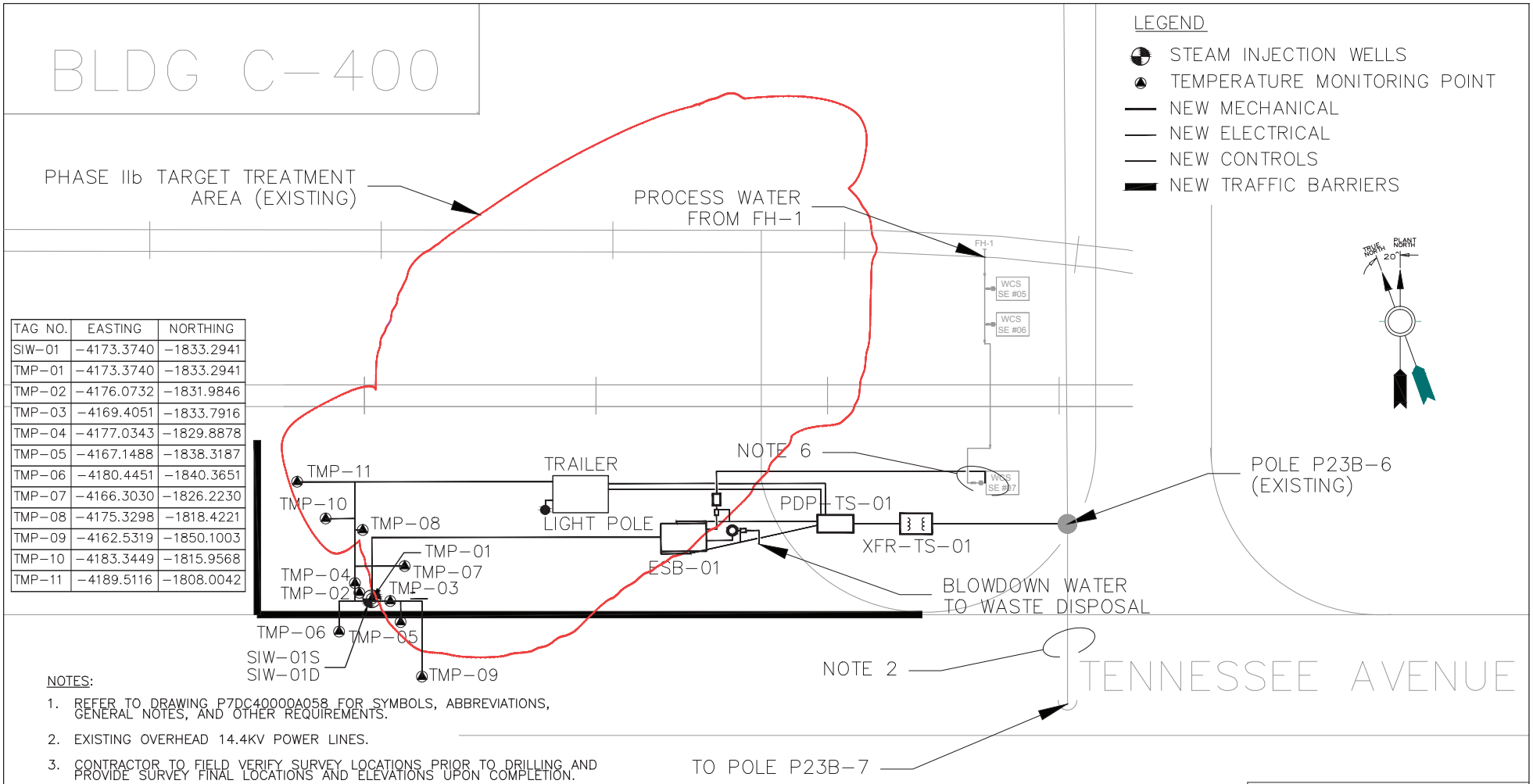
rev 02/29/2012

2. Owner Well ID#
Owner well ID # denotes the site designation for the well, e.g. "MW-06."

15. Facility type & ID number
If the well is located at any of the listed facility types, please note the historic site ID # in the spaces provided. This information is vital for other programs that may need to locate the well record in the database.

25. Well use
If well use falls under any of the following General Use designations with a corresponding Specific Use, you must include the corresponding Use Code:

WELL USE CODES		
GENERAL USE	SPECIFIC USE	USE CODE
Agriculture	Agriculture - Dairy Operation	01
Agriculture	Agriculture - Feed Pen Operation	02
Agriculture	Agriculture - Fish And Game Propagation	03
Agriculture	Agriculture - General	04
Agriculture	Agriculture - Horse Farm	05
Agriculture	Agriculture - Irrigation	06
Agriculture	Agriculture - Livestock Watering	07
Agriculture	Agriculture - Poultry And Egg Operation	08
Commercial	Commercial	01
Commercial	Commercial - Irrigation	02
Commercial	Dewatering Well - Construction	03
Domestic	Domestic - Multiple Domestic Households	01
Domestic	Domestic - Single Household	02
Industrial	Industrial - General	01
Industrial	Industrial - Manufacturing	02
Industrial	Industrial - Petroleum Processing Plant	03
Monitoring & Remediation	Monitoring Well - Ambient Monitoring	01
Monitoring & Remediation	Monitoring Well - Compliance	02
Monitoring & Remediation	Monitoring Well - Military Installation	03
Monitoring & Remediation	Monitoring Well - Water Level Monitoring Only	04
Monitoring & Remediation	Remediation	05
Public	Public - Community	01
Public	Public - Exploration	02
Public	Public - Non-transient, Non-community	03
Public	Public - Transient, Non-community	04
Public	Public - Unregulated	05
Geothermal	(general use)	-
Heat pump	(general use)	-
HVAC	(general use)	-
Injection	(general use)	-
Mining	(general use)	-
Unused	(general use)	-



TAG NO.	EASTING	NORTHING
SIW-01	-4173.3740	-1833.2941
TMP-01	-4173.3740	-1833.2941
TMP-02	-4176.0732	-1831.9846
TMP-03	-4169.4051	-1833.7916
TMP-04	-4177.0343	-1829.8878
TMP-05	-4167.1488	-1838.3187
TMP-06	-4180.4451	-1840.3651
TMP-07	-4166.3030	-1826.2230
TMP-08	-4175.3298	-1818.4221
TMP-09	-4162.5319	-1850.1003
TMP-10	-4183.3449	-1815.9568
TMP-11	-4189.5116	-1808.0042

NOTES:

1. REFER TO DRAWING P7DC40000A058 FOR SYMBOLS, ABBREVIATIONS, GENERAL NOTES, AND OTHER REQUIREMENTS.
2. EXISTING OVERHEAD 14.4KV POWER LINES.
3. CONTRACTOR TO FIELD VERIFY SURVEY LOCATIONS PRIOR TO DRILLING AND PROVIDE SURVEY FINAL LOCATIONS AND ELEVATIONS UPON COMPLETION.
4. REFER TO DRAWING C7DC40000A028 FOR WELL AND TMP DETAILS.
5. CONNECT XFR-TS-01 TO EXISTING 14.4KV POWER LINE AT POLE P23B-6.
6. CONNECT ESB-01 FEEDWATER TO EXISTING PROCESS WATER LINE SUPPLIED FROM FIRE HYDRANT FH-1.
7. ROUTINGS AND LOCATIONS ARE DIAGRAMMATIC. INSTALL AS NEEDED TO MAXIMIZE EFFICIENCY.
8. INSTALL ALL PIPING AND CONDUITS NORTH OF JERSEY BARRIERS ABOVEGROUND. PIPING SHALL BE INSTALLED ON PIPE SUPPORTS. CONDUITS CAN LAY DIRECTLY ON GROUND.
9. ROUTE WIRING FROM TMP-05, TMP-06, AND TMP-09 UNDERGROUND TO NORTH OF NEW JERSEY BARRIERS.
10. INSTALL JERSEY TYPE CONCRETE BARRIERS (MINIMUM 40" HEIGHT) ALONG AND NORTH OF TENNESSEE AVENUE AS SHOWN TO PREVENT VEHICULAR ACCESS INTO EQUIPMENT AREA.

LPE

STATE OF KENTUCKY ERIN L. SURINAK LICENSED PROFESSIONAL ENGINEER

Expires 06-30-16

DATE

PROFESSIONAL SEAL

REV.	DATE	DESCRIPTION	DRAWN BY	DRAFT CHK	PROJ ENGR	LEAD ENGR	CONF CTRL/ NUCL SFTY	FAC MGR	EATS MGR
0	5/30/14	ISSUED FOR CONSTRUCTION	JE	JE	CRE	CRE			

DRAWING REVISIONS

U.S. DEPARTMENT OF ENERGY
DOE PORTSMOUTH/PADUCAH PROJECT OFFICE
PADUCAH GASEOUS DIFFUSION PLANT

LATA Environmental Services of Kentucky, LLC
managed for the DEPARTMENT OF ENERGY under U.S. GOVERNMENT contract DE-AC30-10CC40020
Paducah, Kentucky

Environmental Resources Management
1218 3rd AVENUE, SEATTLE WASHINGTON
(425) 462-8591

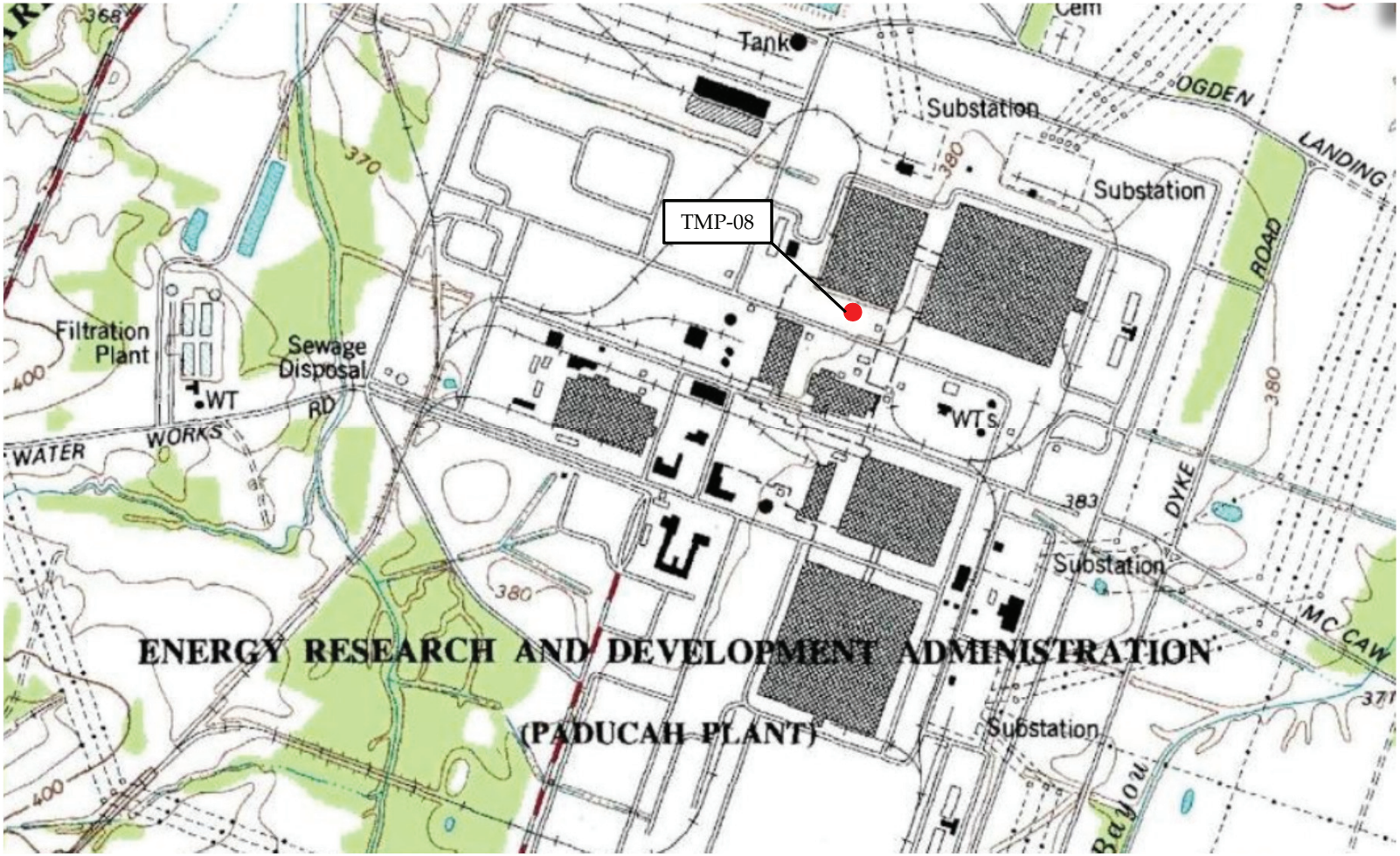
DOE CONTRACT NO. DE-AC30-10CC40020

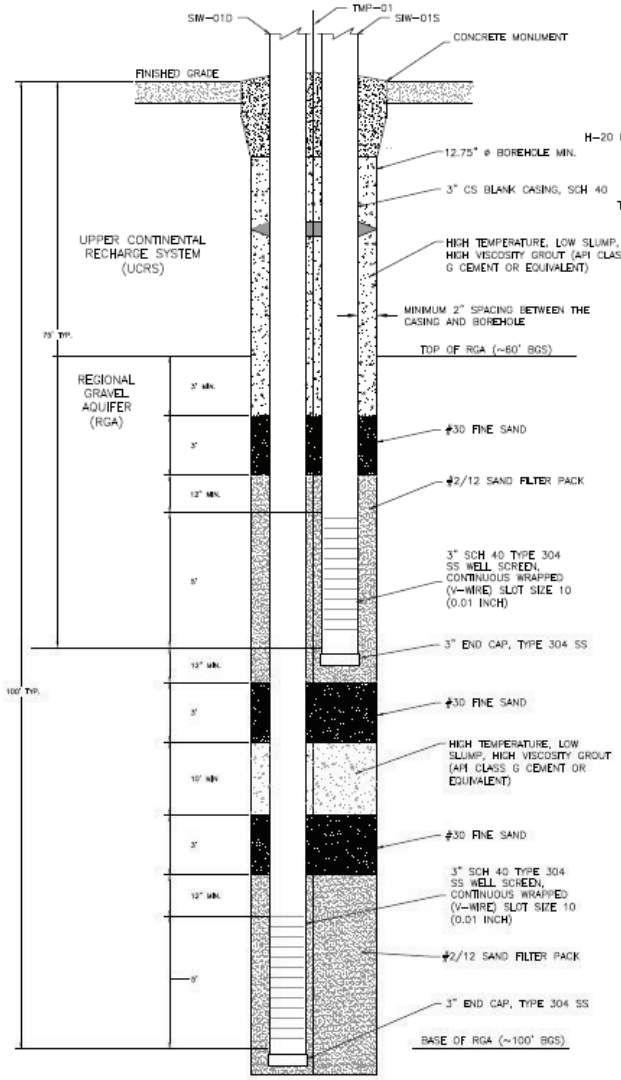
PROJECT NAME:
C-400 STEAM INJECTION TREATABILITY STUDY

TITLE:
TREATABILITY STUDY SITE PLAN

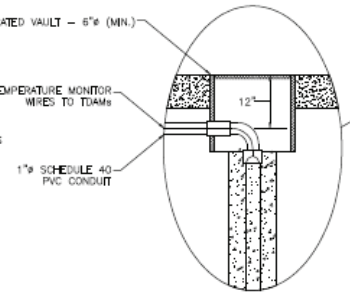
CAD FILE NAME	BUILDING	PLANT	CLASS
A027_SITE PLAN.DWG	C-400	PGDP	U

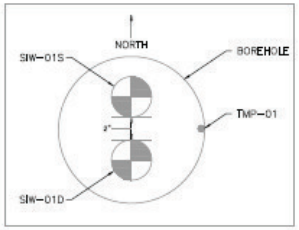
SCALE:	DRAWING NUMBER	REV
AS SHOWN	C7DC40000A027	0


TMP-08
Tank
Substation
Substation
OGDEN
LANDING
ROAD
Filtration Plant
Sewage Disposal
WT
RD
WATER
WORKS
WTs
DYKE
Substation
MC CAW
Substation
Bayou
370
380
383
400
ENERGY RESEARCH AND DEVELOPMENT ADMINISTRATION
(PADUCAH PLANT)



NESTED STEAM INJECTION WELL (TYP.)
(SIW-01S, SIW-01D)
NOT TO SCALE

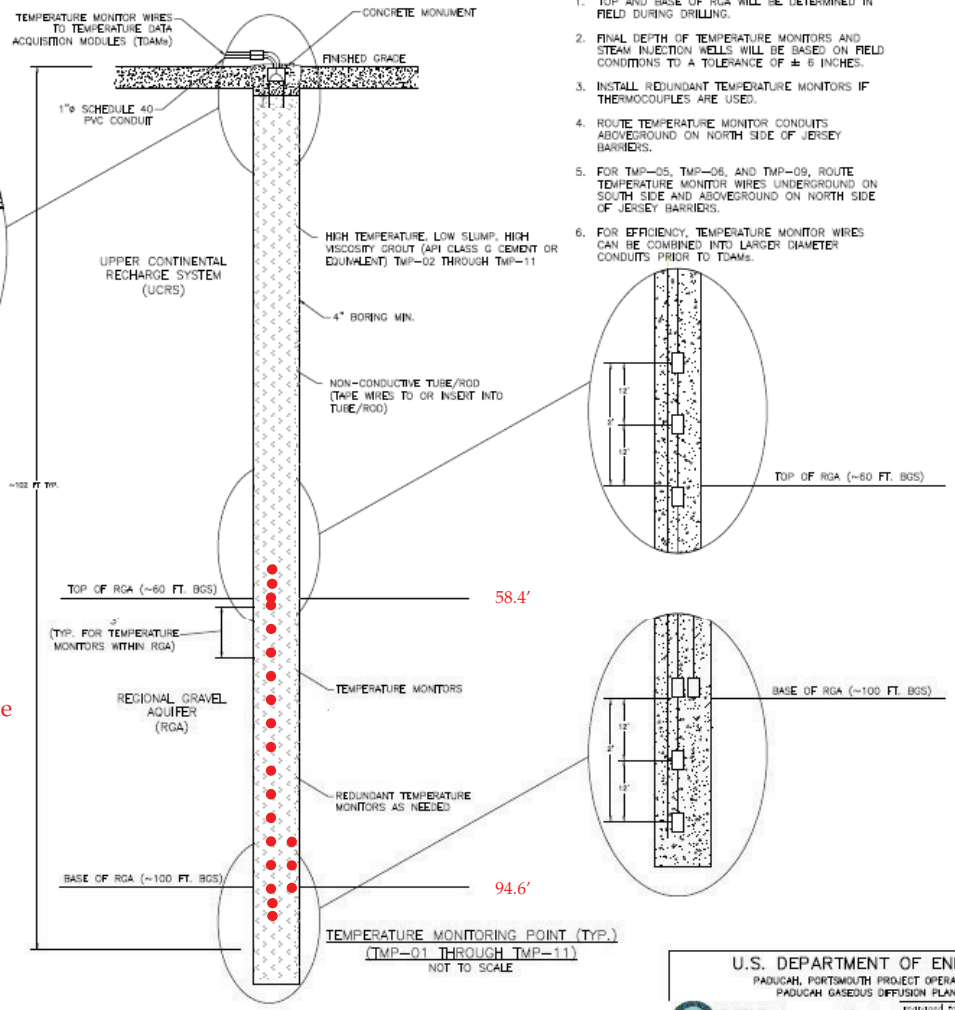




PLAN VIEW
SIW-01S, SIW-01D
NOT TO SCALE

See Page 1, Box 50 for thermocouple depth detail

TMP-08



NOTES:
1. TOP AND BASE OF RGA WILL BE DETERMINED IN FIELD DURING DRILLING.
2. FINAL DEPTH OF TEMPERATURE MONITORS AND STEAM INJECTION WELLS WILL BE BASED ON FIELD CONDITIONS TO A TOLERANCE OF ± 6 INCHES.
3. INSTALL REDUNDANT TEMPERATURE MONITORS IF THERMOCOUPLES ARE USED.
4. ROUTE TEMPERATURE MONITOR CONDUITS ABOVEGROUND ON NORTH SIDE OF JERSEY BARRIERS.
5. FOR TMP-05, TMP-06, AND TMP-09, ROUTE TEMPERATURE MONITOR WIRES UNDERGROUND ON SOUTH SIDE AND ABOVEGROUND ON NORTH SIDE OF JERSEY BARRIERS.
6. FOR EFFICIENCY, TEMPERATURE MONITOR WIRES CAN BE COMBINED INTO LARGER DIAMETER CONDUITS PRIOR TO TDAMs.

U.S. DEPARTMENT OF ENERGY
PADUCAH, PORTSMOUTH PROJECT OPERATIONS, PADUCAH GASEOUS DIFFUSION PLANT
LATA Environmental Services of Kentucky, LLC
managed for the DEPARTMENT OF ENERGY under U.S. GOVERNMENT contract DE-AC30-10CC40020
Paducah, Kentucky

Environmental Resources Management
1218 3rd AVENUE, SEATTLE WASHINGTON
(425) 462-8591

DOE CONTRACT NO. DE-AC30-10CC40020

PROJECT NAME: C-400 STEAM INJECTION TREATABILITY STUDY

TITLE: TREATABILITY STUDY STEAM INJECTION WELLS AND TEMPERATURE MONITORING POINTS

REV	DATE	DESCRIPTION	DRAWN BY	CHKD BY	PROJ ENGR	LEAD ENGR	CONF ENGR	PROJ MGR	ENGR MGR
0	5/30/14	ISSUED FOR CONSTRUCTION	JE	JE	CRE	CRE			

DRAWING REVISIONS

LPE
ERIN I. SURINAK, STATE OF KENTUCKY, LICENSED PROFESSIONAL ENGINEER
Expires 06-30-16
DATE
PROFESSIONAL SEAL

CAD FILENAME	BUILDING	PLANT	CLASS
A028_SIW & TMP DETAILS.DWG	C-400	PGDP	U

SCALE	DRAWING NUMBER	REV
N.T.S.	C7DC40000A028	0

TMP-09						
		4-inch core		Drilled by Vernon Scott		
02/03/15 @ 12:09 to 15:00						
Drilled Interval		Recovery	Depths		Description	Notes
Top	Bottom		Top	Bottom		
0.0	7.0	4.5	0.0	2.3	Silt, 7.5YR6/2 (pinkish gray), stiff, and dry	Trace limestone gravel, 0.5 inch diameter
			2.3	5.4	Silt, 1 GLEY 7/1 (light gray) with slight mottling by 7.5YR5/1 (gray), very stiff to medium stiff, and dry	
			5.4	7.0	Silt, 7.5YR7/1 (light gray), soft to firm, and slightly moist to moist	Trace of dark brown organics
7.0	17.0	11.5	7.0	9.4	Silt, 7.5YR7/2 (pinkish gray) mottled with dark brown organic inclusions, soft to firm, and slightly moist	
			9.4	11.0	Silt, 7.5YR6/6 (reddish yellow), stiff to slightly soft, and moist	
			11.0	15.5	Silt, 7.5YR6/6 (reddish yellow) with trace of dark brown organic inclusions, soft, and moist	Organic inclusions are more pronounced 14.2 to 15.5 ft
			15.5	17.0	Silt, 7.5YR4/2 (brown) heavily mottled with 7.5YR7/8 (reddish yellow), very stiff, and dry	
17.0	27.0	12.4	17.0	19.3	Silt as above GRADING DOWN to Sandy Silt. Sand is medium to coarse grained	
			19.3	23.7	Clayey Silt, slightly Sandy, 7.5YR7/1 (light gray) with 7.5YR6/8 (reddish yellow) mottling, stiff, and dry to slightly moist	
			23.7	24.3	Clayey Silt, slightly Sandy, with Gravel (30%), 7.5YR7/1 (light gray) with 7.5YR6/8 (reddish yellow) mottling, stiff, and moist. Gravel is subrounded chert, 0.5 to 1.0 inch diameter	
			24.3	27.0	Very Silty Sand, 7.5YR5/8 (strong brown), slightly loose, and slightly moist. Sand is very coarse grained, 0.1 to 0.3 inch diameter	
27.0	37.0	10.0	27.0	29.9	Silty Sand, 10YR7/2 (light gray) with Sand blebs (10%), 7.5YR5/8 (strong brown), semi-loose, and slightly moist. Sand is fine grained	
			29.9	32.5	Sandy Silt, 7.5YR7/7 (strong brown) mottled with 7.5YR7/1 (light gray), stiff, nonplastic to slightly plastic, and slightly moist. Sand is fine grained	
			32.5	35.7	Sand with little Silt, 7.5YR7/8 (reddish yellow), slightly loose to loose, and slightly moist	
			35.7	37.0	Sand with some Silt, 10YR7/2 (light gray), slightly firm, and moist to slightly moist	
37.0	47.0	11.7	37.0	40.2	Sand (80%) and Gravel (20%), 7.5YR7/1 (light gray) mottled with 7.5YR7/8 (reddish yellow), loose, and wet. Sand ranges from fine to coarse grains. Gravel ranges from 0.5 to 1.0 inch diameter	
			40.2	41.8	Sand, 7.5YR7/1 (light gray), loose, and wet.	5% coarse sand
			41.8	47.0	Silty and Clayey Sand, banded 7.5YR7/1 (light gray) and 7.5YR6/8 (reddish yellow), soft, plastic, and very moist	
47.0	57.0	10.3	47.0	47.8	Sand, 7.5YR7/1 (light gray), loose, and wet. Sand is fine	
			47.8	53.0	Sandy Silt, 7.5YR7/1 (light gray) with sections mottled by reddish yellow (7.5YR6/8), soft, plastic, and wet	
			53.0	57.0	Sand with little Silt, 10YR7/4 (very pale brown), loose, and wet	55.0 to 55.5 ft: Gravel lens, 0.5 to 1.5 inch diameter gravel
57.0	67.0	11.6	57.0	59.7	Sand with little Silt as above	
			59.7	60.7	Sand (75%) and Gravel (25%), 10YR6/8 (yellowish brown), loose, and wet	Top of RGA at 59.7 ft
			60.7	61.6	Gravelly Sand, 10YR6/8 (yellowish brown), loose, and wet	
			61.6	67.0	Gravel and Sand, 10YR6/8 (yellowish brown), loose, and wet. Gravel is subrounded chert, 0.5 to 3.5 inch diameter. Sand ranges from fine to coarse grained	
67.0	77.0	10.6	67.0	77.0	Gravel and Sand as above	Some gravel >3.5 inch diameter
77.0	87.0	7.9	77.0	79.4	Gravel and Sand as above	
			79.4	80.7	Sand with little Gravel, 10YR6/8 (yellowish brown), loose, and wet. Sand ranges from medium to coarse grained	
			80.7	87.0	Gravel (60%) and Sand (40%), 10YR6/8 (yellowish brown), loose, and wet. Gravel is subrounded to angular chert. Sand ranges from fine to coarse grained	
87.0	97.0	10.3	87.0	93.0	Gravel and Sand as above	Base of RGA at 93.0 ft
			93.0	95.3	Interbedded Silt and Sand, fine lamina of 7.5YR7/1 (light gray), 5YR6/1 (gray), and 7.5YR6/8 (yellowish red), soft to firm, and moist to slightly moist	

TMP-09						
		4-inch core		Drilled by Vernon Scott		
02/03/15 @ 12:09 to 15:00						
Drilled Interval		Recovery	Depths		Description	Notes
Top	Bottom		Top	Bottom		
			95.3	96.2	Sand with little Silt, 7.5YR8/2 (pinkish white) to 7.5YR6/8 (reddish yellow), loose, and wet	
			96.2	97.0	Interbedded Silt and Sand as 93.0 to 95.3 ft	
TD = 97.0 ft						

UNIFORM KENTUCKY WELL CONSTRUCTION RECORD

Use this form only to report installation of monitoring or water wells.
Original copy must be submitted to Division of Water within 60 days of completion.
See instructions on reverse of form.
Record must be typed or neatly printed or it will be returned to the driller as unacceptable.
One copy to Division of Water, one copy to owner, one copy to driller's files.

Attach Well Identification Number (AKGWA) Label Here
Water wells: yellow labels
Monitoring wells: blue labels

1. Kentucky Well ID (AKGWA) Number

2. Owner well ID#: TMP-09

4. Owner name: Paducah Gaseous Diffusion Plant
5. Owner address: 5600 Hobbs Rd.
6. City: West Paducah
7. State: KY
8. Zip: 42053

If site name and address differ from owner name and address:
9. Site name
10. Site address
11. City
12. State: KY
13. Zip

3. Attachments
Required
1. Site plan or sketch map [x]
2. Well location
On topographic map, OR
Obtained by GPS unit
Conditionally Required
3. Well diagram (monitoring well) [x]
4. Coliform analysis (if applicable) [ ]
5. Signed Variance (if applicable) [ ]
Optional
6. Other laboratory analysis report [ ]

14. Agency Interest (AI) Number: 3059
15. Facility type & ID Number: (•) CERCLA ( ) RCRA ( ) Solid Waste ( ) UST ( ) Drinking Water ( ) Mining
KY8-890-008-982

16. Owner phone: (270) 441-6000
17. Site phone: (270) 441-6000

23. Install start date: Feb 03 2015 (Month Day Year)
24. Install end date: Feb 04 2015

18. USGS topo map: Heath
19. County: Mccracken
20. Physiographic Region: ( ) Blue Grass ( ) E. Coal Field ( ) Miss. Plateau ( ) Ohio River Alluvium ( ) W. Coal Field (•) Jackson Purchase
21. Surface elevation (ft): 380.00
22. Elevation determined by: ( ) GPS (•) Map ( ) Prior report ( ) Survey ( ) Prior well log

Please report depths in feet below ground surface, not as relative elevations.
25. Total depth: 97.00
26. Depth to bedrock
27. Static water level
28. Casing height above surface (in)

29. Well use: ( ) Agriculture ( ) Commercial ( ) Domestic ( ) Industrial (•) Monitoring / Remed ( ) Public ( ) Geothermal ( ) Heat pump ( ) HVAC ( ) Injection ( ) Mining ( ) Unused
NOTE: CODE REQUIRED for well uses on left. Select a code from the dropdown menu.

30. Drilling method: ( ) Auger – HS ( ) Auger – SS ( ) Auger – bucket ( ) Auger – hand ( ) Cable tool ( ) Core ( ) Driven Casing ( ) Excavation ( ) Combined – HS auger and air rotary ( ) Combined – other (specify): ( ) Jet wash ( ) Push/probe ( ) Rotary – air ( ) Rotary – mud ( ) Rotary – reverse ( ) Sand point (•) Sonic ( ) Unknown

31. Well status: (•) Active ( ) Inactive ( ) Unsuitable for intended use
32. Wellhead: ( ) Flush (•) Well cap ( ) Locking ( ) Sanitary seal
33. Well development method: ( ) Surging ( ) Jetting ( ) Pumping ( ) Backwashing ( ) Bailing ( ) Compressed air ( ) Combination of methods (specify):

WATER WELLS ONLY

34. Estimated well yield: ( ) gpm ( ) gph ( ) gpd
35. Well service: #of people served
36. Disinfectant amount: ( ) oz ( ) qt ( ) cups ( ) lb ( ) gal
37. Type: ( ) Bleach ( ) Hypo-chlorite
38. Pitless adapter installed: ( ) Yes ( ) No
39. Pump installed: ( ) Submersible ( ) Jet ( ) Bailer or bucket ( ) Turbine ( ) Hand ( ) No pump
40. Depth to intake (ft)
41. Apparent quality and odor
APPEARANCE: ( ) Clear ( ) Cloudy ( ) Muddy ( ) Turbid
ODOR (none, slight, mod., high): Iron, Sulfur, Salt

46. Well completion: Casing and screens

From depth (feet)	To depth (feet)	Borehole diameter (inches)	Casing diam (in) ID	Casing diam (in) OD	Casing type	Screen slot size

47. Annulus fill and seal

From depth (feet)	To depth (feet)	Material (NOTE for WATER WELLS only: If a sample (clay, shale or limestone only) is used, you must specify composition.)
97.00	0.00	

48. Lithologic log (if more space is needed, continue on separate page)

From depth (ft)	To depth (ft)	Description (include any show of water and indicate apparent quality)
0.00	59.70	UCRS
59.70	93.00	RGA
93.00	97.00	McNairy Formation

49. Sketch map [x]

COLIFORM TEST

42. Coliform test type: ( ) fecal ( ) fecal and total
43. Coliform test results: ( ) 0 or <1.0 ( ) TNTC ( ) Confluent
or # colonies per 100 mL
44. Date sampled (Month Day Year)
45. Date analyzed

50. Comments
Borehole grout is Class H cement and silica flour mix, TC installation depths: 95.0, 94.0, 93.0 (dup), 90.0(dup), 87.0(dup), 84.0, 81.0, 78.0, 75.0, 72.0, 69.0, 66.0, 63.0, 60.0, 59.7, 58.7, 57.7

Latitude
Longitude
Lat/Long Method: ( ) INT ( ) GPS ( ) SUR ( ) REP
Date Received

51. Affirmation: The work described above was done under my supervision, and this report is true and correct to the best of my knowledge.
Note: the driller is not responsible for natural groundwater quality or quantity encountered while drilling or completing this well.

Signature of certified driller: [signature]
Date signed: Feb 10 2015
Certification number: 0411 - 5490 - 00
Drilling company: Cascade Drilling LP

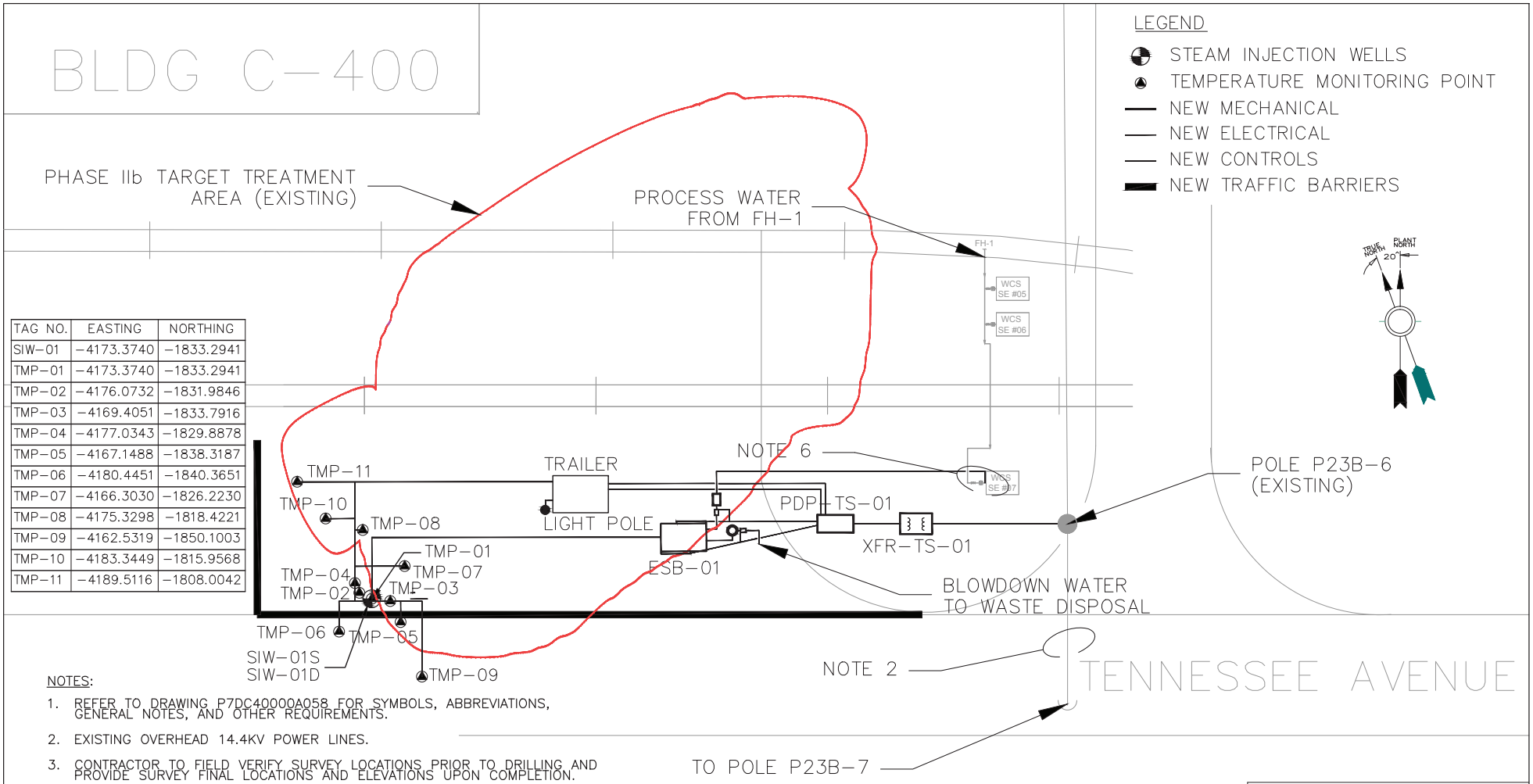
rev 02/29/2012

2. Owner Well ID#
Owner well ID # denotes the site designation for the well, e.g. "MW-06."

15. Facility type & ID number
If the well is located at any of the listed facility types, please note the historic site ID # in the spaces provided. This information is vital for other programs that may need to locate the well record in the database.

25. Well use
If well use falls under any of the following General Use designations with a corresponding Specific Use, you must include the corresponding Use Code:

WELL USE CODES		
GENERAL USE	SPECIFIC USE	USE CODE
Agriculture	Agriculture - Dairy Operation	01
Agriculture	Agriculture - Feed Pen Operation	02
Agriculture	Agriculture - Fish And Game Propagation	03
Agriculture	Agriculture - General	04
Agriculture	Agriculture - Horse Farm	05
Agriculture	Agriculture - Irrigation	06
Agriculture	Agriculture - Livestock Watering	07
Agriculture	Agriculture - Poultry And Egg Operation	08
Commercial	Commercial	01
Commercial	Commercial - Irrigation	02
Commercial	Dewatering Well - Construction	03
Domestic	Domestic - Multiple Domestic Households	01
Domestic	Domestic - Single Household	02
Industrial	Industrial - General	01
Industrial	Industrial - Manufacturing	02
Industrial	Industrial - Petroleum Processing Plant	03
Monitoring & Remediation	Monitoring Well - Ambient Monitoring	01
Monitoring & Remediation	Monitoring Well - Compliance	02
Monitoring & Remediation	Monitoring Well - Military Installation	03
Monitoring & Remediation	Monitoring Well - Water Level Monitoring Only	04
Monitoring & Remediation	Remediation	05
Public	Public - Community	01
Public	Public - Exploration	02
Public	Public - Non-transient, Non-community	03
Public	Public - Transient, Non-community	04
Public	Public - Unregulated	05
Geothermal	(general use)	-
Heat pump	(general use)	-
HVAC	(general use)	-
Injection	(general use)	-
Mining	(general use)	-
Unused	(general use)	-



TAG NO.	EASTING	NORTHING
SIW-01	-4173.3740	-1833.2941
TMP-01	-4173.3740	-1833.2941
TMP-02	-4176.0732	-1831.9846
TMP-03	-4169.4051	-1833.7916
TMP-04	-4177.0343	-1829.8878
TMP-05	-4167.1488	-1838.3187
TMP-06	-4180.4451	-1840.3651
TMP-07	-4166.3030	-1826.2230
TMP-08	-4175.3298	-1818.4221
TMP-09	-4162.5319	-1850.1003
TMP-10	-4183.3449	-1815.9568
TMP-11	-4189.5116	-1808.0042

NOTES:

1. REFER TO DRAWING P7DC40000A058 FOR SYMBOLS, ABBREVIATIONS, GENERAL NOTES, AND OTHER REQUIREMENTS.
2. EXISTING OVERHEAD 14.4KV POWER LINES.
3. CONTRACTOR TO FIELD VERIFY SURVEY LOCATIONS PRIOR TO DRILLING AND PROVIDE SURVEY FINAL LOCATIONS AND ELEVATIONS UPON COMPLETION.
4. REFER TO DRAWING C7DC40000A028 FOR WELL AND TMP DETAILS.
5. CONNECT XFR-TS-01 TO EXISTING 14.4KV POWER LINE AT POLE P23B-6.
6. CONNECT ESB-01 FEEDWATER TO EXISTING PROCESS WATER LINE SUPPLIED FROM FIRE HYDRANT FH-1.
7. ROUTINGS AND LOCATIONS ARE DIAGRAMMATIC. INSTALL AS NEEDED TO MAXIMIZE EFFICIENCY.
8. INSTALL ALL PIPING AND CONDUITS NORTH OF JERSEY BARRIERS ABOVEGROUND. PIPING SHALL BE INSTALLED ON PIPE SUPPORTS. CONDUITS CAN LAY DIRECTLY ON GROUND.
9. ROUTE WIRING FROM TMP-05, TMP-06, AND TMP-09 UNDERGROUND TO NORTH OF NEW JERSEY BARRIERS.
10. INSTALL JERSEY TYPE CONCRETE BARRIERS (MINIMUM 40" HEIGHT) ALONG AND NORTH OF TENNESSEE AVENUE AS SHOWN TO PREVENT VEHICULAR ACCESS INTO EQUIPMENT AREA.

LPE

STATE OF KENTUCKY ERIN L. SURINAK LICENSED PROFESSIONAL ENGINEER

Expires 06-30-16

DATE

PROFESSIONAL SEAL

REV.	DATE	DESCRIPTION	DRAWN BY	DRAFT CHK	PROJ ENGR	LEAD ENGR	CONF CTRL/ NUCL SFTY	FAC MGR	EATS MGR
0	5/30/14	ISSUED FOR CONSTRUCTION	JE	JE	CRE	CRE			

DRAWING REVISIONS

U.S. DEPARTMENT OF ENERGY
DOE PORTSMOUTH/PADUCAH PROJECT OFFICE
PADUCAH GASEOUS DIFFUSION PLANT

LATA Environmental Services of Kentucky, LLC
managed for the DEPARTMENT OF ENERGY under U.S. GOVERNMENT contract DE-AC30-10CC40020
Paducah, Kentucky

Environmental Resources Management
1218 3rd AVENUE, SEATTLE WASHINGTON
(425) 462-8591

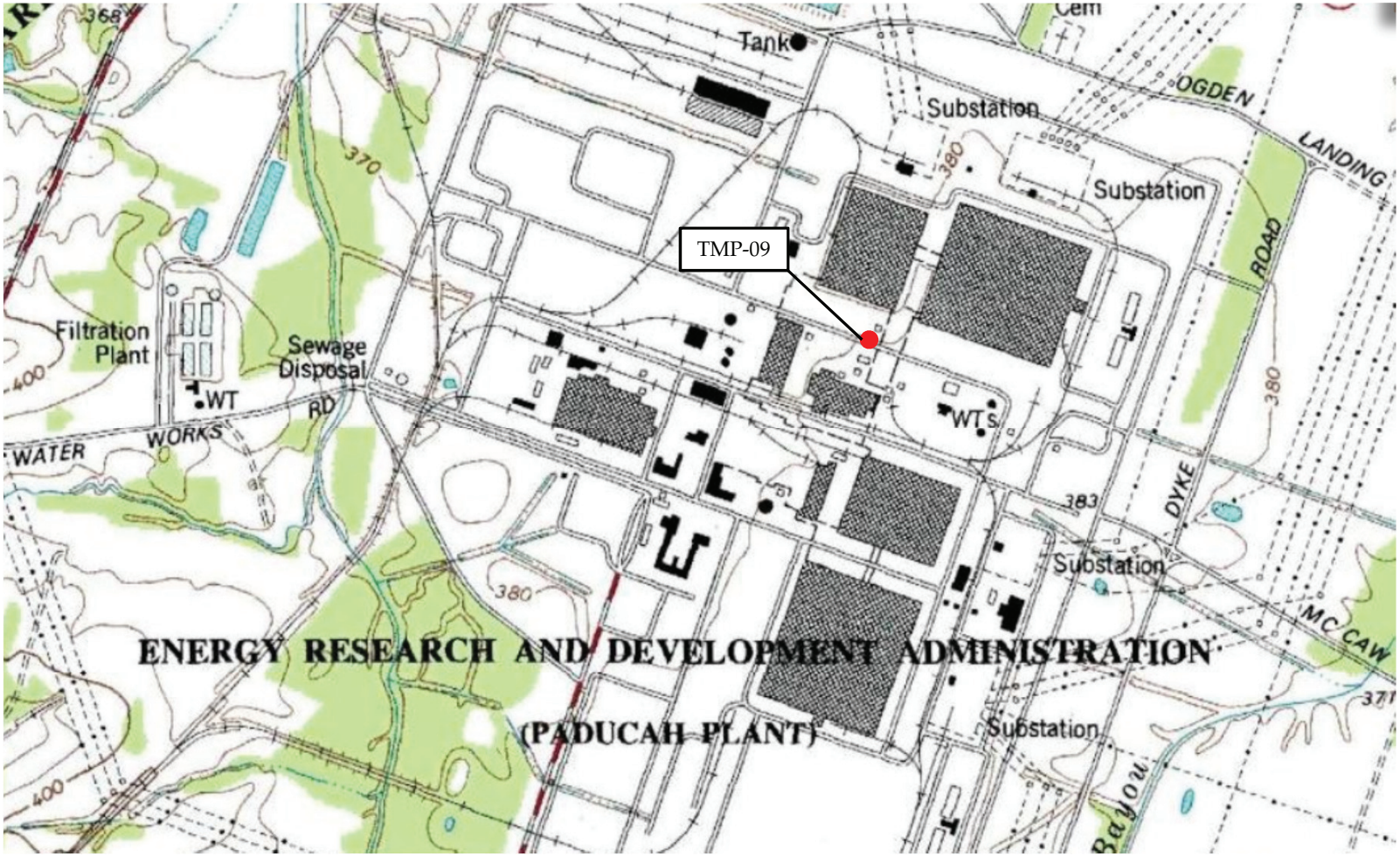
DOE CONTRACT NO. DE-AC30-10CC40020

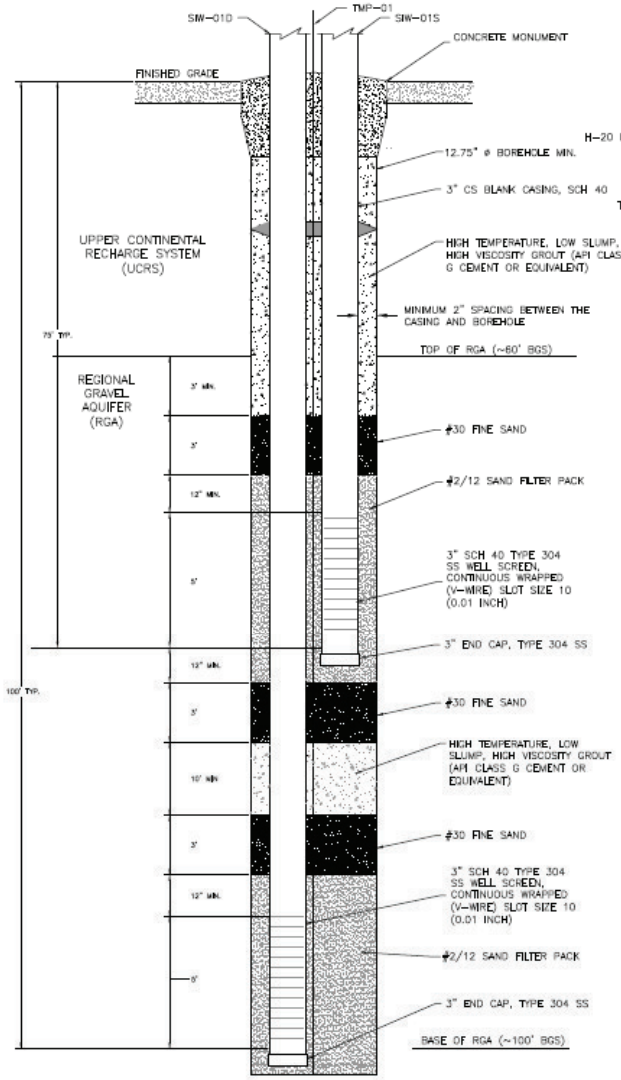
PROJECT NAME:
C-400 STEAM INJECTION TREATABILITY STUDY

TITLE:
TREATABILITY STUDY SITE PLAN

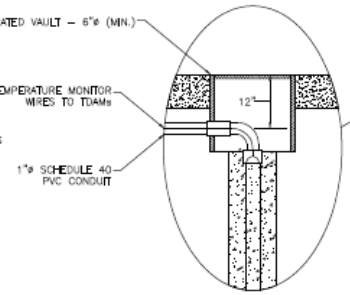
CAD FILE NAME	BUILDING	PLANT	CLASS
A027_SITE PLAN.DWG	C-400	PGDP	U

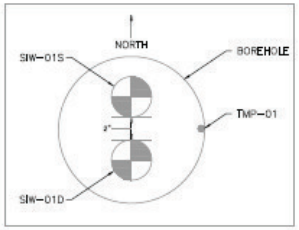
SCALE:	DRAWING NUMBER	REV
AS SHOWN	C7DC40000A027	0


TMP-09
Tank
Substation
Substation
OGDEN
LANDING
ROAD
Filtration Plant
Sewage Disposal
WT
RD
WATER
WORKS
WTs
DYKE
Substation
MC CAW
Substation
Bayou
370
380
400
383
371
ENERGY RESEARCH AND DEVELOPMENT ADMINISTRATION
(PADUCAH PLANT)



NESTED STEAM INJECTION WELL (TYP.)
(SIW-01S, SIW-01D)
NOT TO SCALE

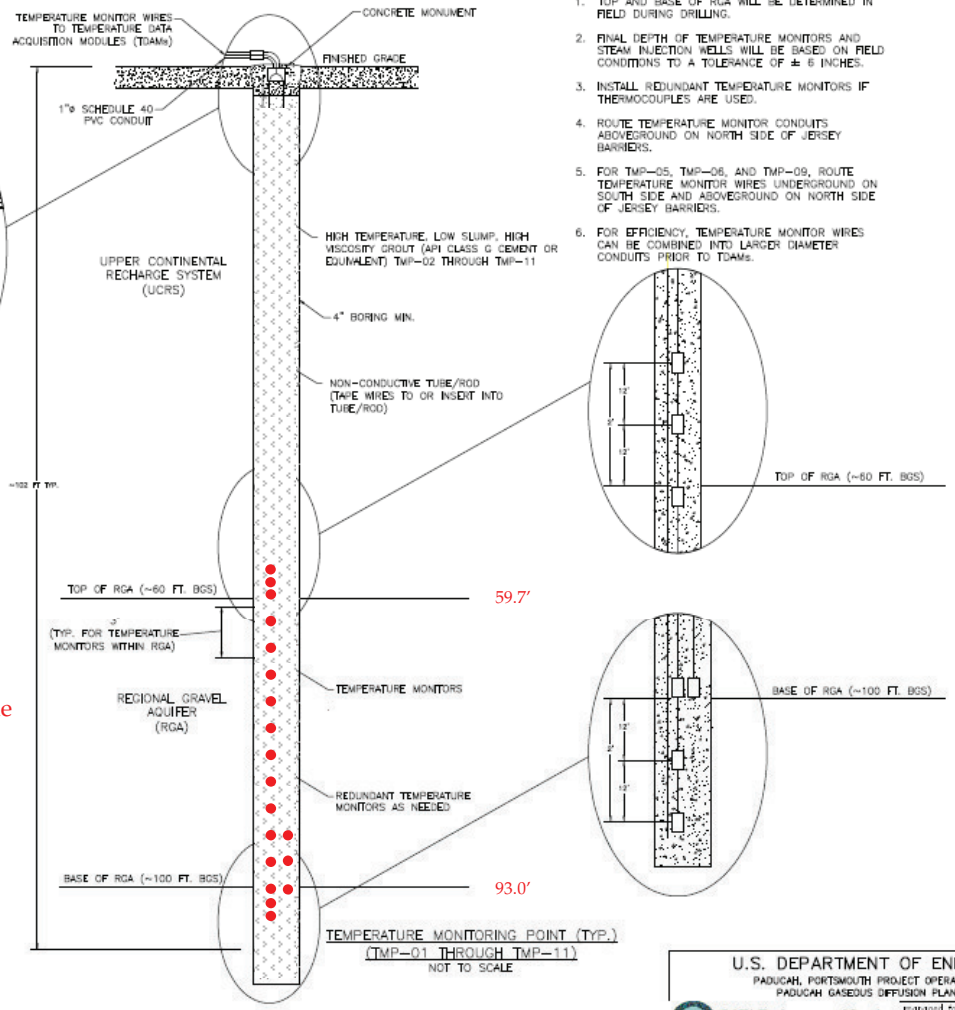




PLAN VIEW
SIW-01S, SIW-01D
NOT TO SCALE

See Page 1, Box 50 for thermocouple depth detail

TMP-09



TEMPERATURE MONITORING POINT (TYP.)
(TMP-01 THROUGH TMP-11)
NOT TO SCALE

NOTES:
1. TOP AND BASE OF RGA WILL BE DETERMINED IN FIELD DURING DRILLING.
2. FINAL DEPTH OF TEMPERATURE MONITORS AND STEAM INJECTION WELLS WILL BE BASED ON FIELD CONDITIONS TO A TOLERANCE OF ± 6 INCHES.
3. INSTALL REDUNDANT TEMPERATURE MONITORS IF THERMOCOUPLES ARE USED.
4. ROUTE TEMPERATURE MONITOR CONDUITS ABOVEGROUND ON NORTH SIDE OF JERSEY BARRIERS.
5. FOR TMP-05, TMP-06, AND TMP-09, ROUTE TEMPERATURE MONITOR WIRES UNDERGROUND ON SOUTH SIDE AND ABOVEGROUND ON NORTH SIDE OF JERSEY BARRIERS.
6. FOR EFFICIENCY, TEMPERATURE MONITOR WIRES CAN BE COMBINED INTO LARGER DIAMETER CONDUITS PRIOR TO TDAMs.

U.S. DEPARTMENT OF ENERGY
PADUCAH, PORTSMOUTH PROJECT OPERATIONS, PADUCAH GASEOUS DIFFUSION PLANT
LATA Environmental Services of Kentucky, LLC
managed for the DEPARTMENT OF ENERGY under U.S. GOVERNMENT contract DE-AC30-10CC40020
Paducah, Kentucky

Environmental Resources Management
1218 3rd AVENUE, SEATTLE WASHINGTON
(425) 462-8591

DOE CONTRACT NO. DE-AC30-10CC40020

PROJECT NAME: C-400 STEAM INJECTION TREATABILITY STUDY

TITLE: TREATABILITY STUDY STEAM INJECTION WELLS AND TEMPERATURE MONITORING POINTS

CAD FILENAME	BUILDING	PLANT	CLASS
A028_SIW & TMP DETAILS.DWG	C-400	PGDP	U

SCALE	DRAWING NUMBER	REV
N.T.S.	C7DC40000A028	0

LPE

ERIN I. SURINAK, STATE OF KENTUCKY, LICENSED PROFESSIONAL ENGINEER

Expires 06-30-16

PROFESSIONAL SEAL

REV	DATE	DESCRIPTION	DRAWN BY	CHKD BY	PROJ ENGR	LEAD ENGR	CONF ENGR	PROJ MGR	DIST MGR
0	5/30/14	ISSUED FOR CONSTRUCTION	JE	JE	CRE	CRE			

DATE

DRAWING REVISIONS

TMP-10						
		4-inch core		Drilled by Vernon Scott		
02/02/15 @ 09:15 to 12:45						
Drilled Interval		Recovery	Depths		Description	Notes
Top	Bottom		Top	Bottom		
0.0	7.0	1.9	0.0	5.0	No recovery	
			5.0	6.0	Silt, slightly Gravelly, 7.5YR7/6 (reddish yellow), medium dense, and moist. Gravel is rounded	
			6.0	7.0	Silt with little Gravel, GLEY 6/1, soft, and slightly moist	
7.0	17.0	11.6	7.0	8.5	Silt as above	Trace organics
			8.5	11.0	Silt, 7.5YR7/1 (light gray) with some 7.5YR6/6 (reddish yellow) mottling, soft to medium dense, and moist.	
			11.0	13.1	Silt as above but with more pronounced mottling	
			13.1	15.7	Silt, 7.5YR6/3 (light brown), soft, and slightly moist	
			15.7	17.0	Silt, 7.5YR6/3 (light brown) with 7.5YR6/6 (reddish yellow) heavy mottling, slightly moist	
17.0	27.0	11.5	17.0	23.7	Slightly Clayey Silt, 7.5YR6/3 (light brown) mottled with 7.5YR6/6 (reddish yellow), slightly moist	Inclusions of fine sand, trace to little. Trace gravel, white, and angular
			23.7	24.3	Very Sandy Silt with Sand lens interbeds, 7.5YR6/3 (light brown) , dry, and stiff. Sand is fine grained	
			24.3	27.0	Silt with Sand, 7.5YR6/6 (reddish yellow), loose to firm, and slightly moist. Sand ranges from fine to course grains	Trace gravel
27.0	37.0	11.5	27.0	33.0	Very Sandy Silt, 7.5YR7/1 (light gray) with distorted lamina of 7.5YR6/8 (reddish yellow), soft, and slightly moist	Slightly gravelly at top
			33.0	35.2	Clayey and Silty Sand, 10YR7/4 (pale brown) mottled with 7.5YR6/8 (reddish yellow), soft, and slightly moist. Sand ranges from fine to coarse grains	
			35.2	37.0	Sand, well graded, 7.5YR7/8 (reddish yellow), loose, and slightly moist. Sand ranges from fine to coarse grains	
37.0	47.0	11.2	37.0	42.6	Sand with little Gravel, 7.5YR7/8 (reddish yellow) mottled with 7.5YR7/1 (light gray), loose, and moist to very moist. Sand ranges from medium to coarse grains	
			42.6	44.3	Clay, very Sandy in sections, 7.5YR7/1 (light gray) mottled with 7.5YR6/8 (reddish yellow), stiff, and slightly moist	Bottom 0.33 ft are soft and very wet
			44.3	47.0	Very Sandy Clay, 10YR7/3 (very pale brown) with 7.5YR6/6 (reddish yellow) lamina, firm, medium plasticity, and slightly moist to moist. Sand is fine grained	
47.0	57.0	10.6	47.0	50.0	Very Sandy Clay as above	
			50.0	54.5	Sand with Silt and Clay10YR7/3 (very pale brown) mottled with 7.5YR8/8 (reddish yellow), loose, and moist	
			54.5	56.2	Silty Sand, 7.5YR8/8 (reddish yellow) to 7.5YR7/1 (light gray), soft, and moist	2.0-inch chert gravel
			56.2	57.0	Silty Sand, 7.5YR6/8 (reddish yellow), stiff, and dry. Sand is fine grained	Random 1-to-3-inch gravel
57.0	67.0	10.9	57.0	59.5	Silty Sand with some Gravel, 7.5YR6/8 (reddish yellow) with 7.5YR7/1 (light gray) mottling, loose to firm, and moist	
			59.5	67.0	Sand and Gravel, 7.5YR8/6 (reddish yellow) to 10YR7/3 (very pale brown). Sand is fine to coarse grained. Gravel is 0.5-to-3.0-inch chert.	Top of RGA at 59.5 ft
67.0	77.0	11.1	67.0	77.0	Gravel and Sand, 7.5YR6/8 (reddish yellow) to 10YR7/2 (light gray), loose, and wet. Gravel ranges from 0.5 to 3.5 inch diameter. Sand ranges from fine to coarse grains	
77.0	87.0	11.0	77.0	83.0	Gravel and Sand as above	
			83.0	83.7	Sand with some Gravel, 5YR5/8 (yellowish red), loose, and wet. Sand is medium grained. Gravel ranges from 0.5 to 1.0 inch diameter	
			83.7	87.0	Gravel and Sand, 5YR5/8 (yellowish red), loose, and wet. Gravel ranges from 0.5 to 2.0 inch diameter. Sand ranges from fine to coarse grains	
87.0	97.0	10.0	87.0	93.5	Gravel and Sand as above	Base of RGA at 93.5 ft
			93.5	96.5	Clayey Silt with micro lamina of Sand, multi-colored bands of 7.5YR6/8 (reddish yellow), 7.5YR6/1 (gray), and 5YR6/4 (light reddish brown). Sand is very fine grained	
			96.5	97.0	Sand with Clay lenses, 10YR7/2 (light gray) with 5YR7/6 (reddish yellow) mottling, loose, and wet. Sand is fine grained	

TMP-10						
		4-inch core		Drilled by Vernon Scott		
02/02/15 @ 09:15 to 12:45						
Drilled Interval		Recovery	Depths		Description	Notes
Top	Bottom		Top	Bottom		
TD = 97.0 ft						

UNIFORM KENTUCKY WELL CONSTRUCTION RECORD

Use this form only to report installation of monitoring or water wells.
Original copy must be submitted to Division of Water within 60 days of completion.
See instructions on reverse of form.
Record must be typed or neatly printed or it will be returned to the driller as unacceptable.
One copy to Division of Water, one copy to owner, one copy to driller's files.

Attach Well Identification Number (AKGWA) Label Here
Water wells: yellow labels
Monitoring wells: blue labels

4. Owner name: Paducah Gaseous Diffusion Plant
5. Owner address: 5600 Hobbs Rd.
6. City: West Paducah 7. State: KY 8. Zip: 42053

If site name and address differ from owner name and address:
9. Site name
10. Site address
11. City 12. State: KY 13. Zip

1. Kentucky Well ID (AKGWA) Number
2. Owner well ID#: TMP-10

3. Attachments
Required
1. Site plan or sketch map ☒
2. Well location
On topographic map, OR ☐
Obtained by GPS unit ☐
Conditionally Required
3. Well diagram (monitoring well) ☒
4. Coliform analysis (if applicable) ☐
5. Signed Variance (if applicable) ☐
Optional
6. Other laboratory analysis report ☐

14. Agency Interest (AI) Number: 3059
15. Facility type & ID Number: ☐ CERCLA ☐ RCRA ☐ Solid Waste ☐ UST ☐ Drinking Water ☐ Mining
KY8-890-008-982

16. Owner phone: (270) 441-6000 17. Site phone: (270) 441-6000

23. Install start date: Feb 02 2015 (Month Day Year)
24. Install end date: Feb 03 2015

18. USGS topo map: Heath
19. County: Mccracken
20. Physiographic Region: ☐ Blue Grass ☐ E. Coal Field ☐ Miss. Plateau ☐ Ohio River Alluvium ☐ W. Coal Field ☒ Jackson Purchase
21. Surface elevation (ft): 380.00
22. Elevation determined by: ☐ GPS ☒ Map ☐ Prior report ☐ Survey ☐ Prior well log

Please report depths in feet below ground surface, not as relative elevations.
25. Total depth: ~~97.50~~ 97.00 3/3/15 Fixed error AR
26. Depth to bedrock
27. Static water level
28. Casing height above surface (in)

29. Well use: ☐ Agriculture ☐ Commercial ☐ Domestic ☐ Industrial ☒ Monitoring / Remed (Remediation) ☐ Public ☐ Geothermal ☐ Heat pump ☐ HVAC ☐ Injection ☐ Mining ☐ Unused
NOTE: CODE REQUIRED for well uses on left. Select a code from the dropdown menu.

30. Drilling method: ☐ Auger – HS ☐ Auger – SS ☐ Auger – bucket ☐ Auger – hand ☐ Cable tool ☐ Core ☐ Driven Casing ☐ Excavation ☐ Combined – HS auger and air rotary ☐ Combined – other (specify): ☐ Jet wash ☐ Push/probe ☐ Rotary – air ☐ Rotary – mud ☐ Rotary – reverse ☐ Sand point ☒ Sonic ☐ Unknown

31. Well status: ☒ Active ☐ Inactive ☐ Unsuitable for intended use
32. Wellhead: ☐ Flush ☒ Well cap ☐ Locking ☐ Sanitary seal
33. Well development method: ☐ Surging ☐ Jetting ☐ Pumping ☐ Backwashing ☐ Bailing ☐ Compressed air ☐ Combination of methods (specify)

WATER WELLS ONLY
34. Estimated well yield: ☐ gpm ☐ gph ☐ gpd
35. Well service: #of people served
36. Disinfectant amount: ☐ oz ☐ ql ☐ cups ☐ lb ☐ gal
37. Type: ☐ Bleach ☐ Hypo-chlorite
38. Pitless adapter installed: ☐ Yes ☐ No
39. Pump installed: ☐ Submersible ☐ Jet ☐ Bailer or bucket ☐ Turbine ☐ Hand ☐ No pump
40. Depth to intake (ft)
41. Apparent quality and odor
APPEARANCE: ☐ Clear ☐ Cloudy ☐ Muddy ☐ Turbid
ODOR (none, slight, mod., high): ☐ Iron ☐ Sulfur ☐ Salt
COLIFORM TEST
42. Coliform test type: ☐ fecal ☐ fecal and total
43. Coliform test results: ☐ 0 or <1.0 ☐ TNTC ☐ Confluent or # colonies per 100 mL
44. Date sampled (Month Day Year)
45. Date analyzed

46. Well completion: Casing and screens

From depth (feet)	To depth (feet)	Borehole diameter (inches)	Casing diam (in) ID	Casing diam (in) OD	Casing type	Screen slot size

47. Annulus fill and seal

From depth (feet)	To depth (feet)	Material
~~97.50~~ 97.00	0.00	3/3/15 Fixed error AR

48. Lithologic log (if more space is needed, continue on separate page)

From depth (ft)	To depth (ft)	Description (include any shows of water or indicate approved quality)
0.00	59.90	UCRS
59.90	93.50	RGA
93.50	~~97.50~~ 97.00	McNairy Formation 3/3/15 Fixed error AR

49. Sketch map ☒

50. Comments
Borehole grout is Class H cement and silica flour mix, TC installation depths: 95.5, 94.5, 93.5 (dup), 90.5(dup), 87.5(dup), 84.5, 81.5, 78.5, 75.5, 72.5, 69.5, 66.5, 63.5, 60.5, 60.0, 59.0, 58.0

Latitude
Longitude
Lat/Long Method: ☐ INT ☐ GPS ☐ SUR ☐ REP
Date Received

51. Affirmation: The work described above was done under my supervision, and this report is true and correct to the best of my knowledge.
Note: the driller is not responsible for natural groundwater quality or quantity encountered while drilling or completing this well.

Signature of certified driller: [signature] Date signed: Feb 10 2015
Certification number: 0411 - 0549 - 00 Drilling company: Cascade Drilling LP

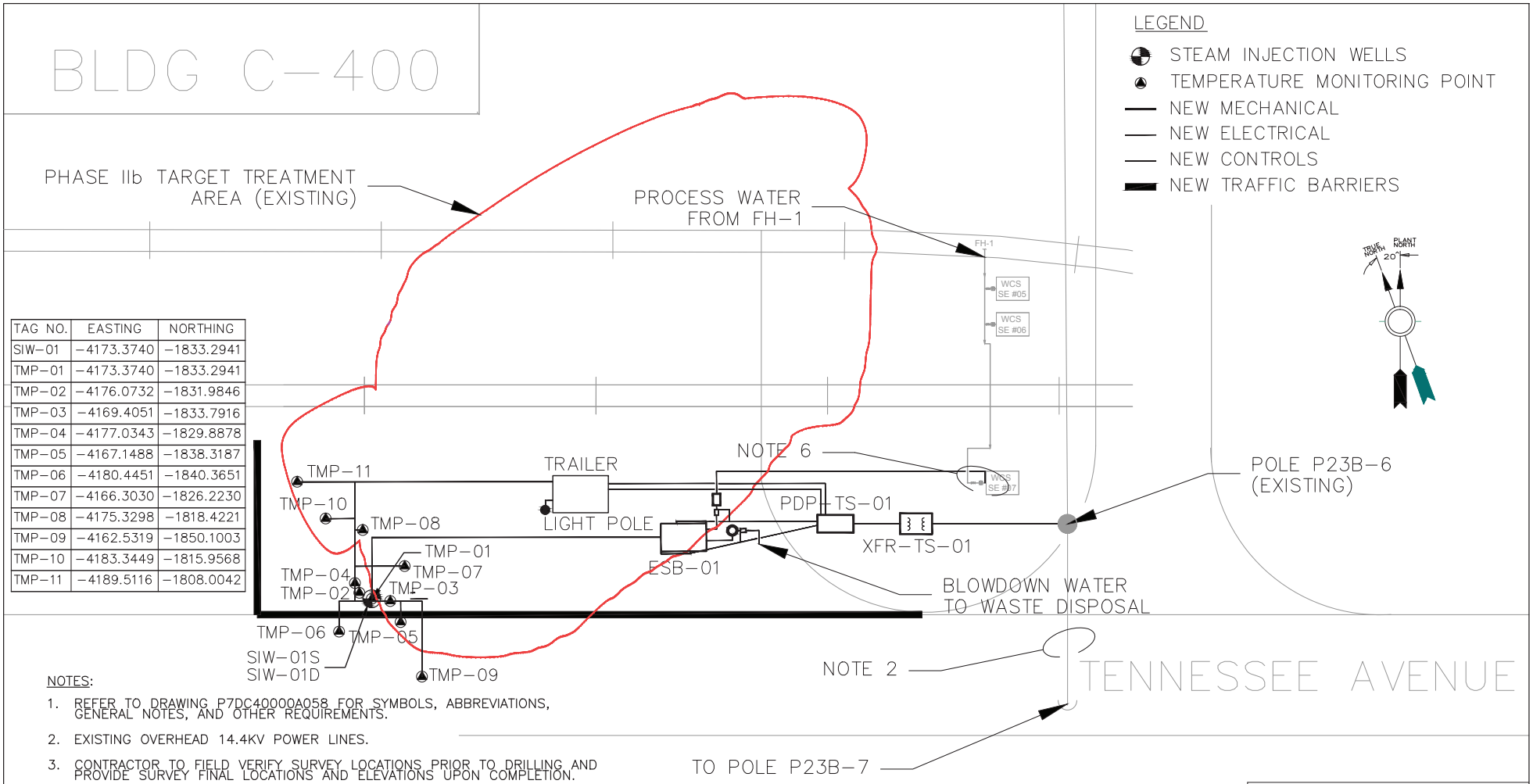
rev 02/29/2012

2. Owner Well ID#
Owner well ID # denotes the site designation for the well, e.g. "MW-06."

15. Facility type & ID number
If the well is located at any of the listed facility types, please note the historic site ID # in the spaces provided. This information is vital for other programs that may need to locate the well record in the database.

25. Well use
If well use falls under any of the following General Use designations with a corresponding Specific Use, you must include the corresponding Use Code:

WELL USE CODES		
GENERAL USE	SPECIFIC USE	USE CODE
Agriculture	Agriculture - Dairy Operation	01
Agriculture	Agriculture - Feed Pen Operation	02
Agriculture	Agriculture - Fish And Game Propagation	03
Agriculture	Agriculture - General	04
Agriculture	Agriculture - Horse Farm	05
Agriculture	Agriculture - Irrigation	06
Agriculture	Agriculture - Livestock Watering	07
Agriculture	Agriculture - Poultry And Egg Operation	08
Commercial	Commercial	01
Commercial	Commercial - Irrigation	02
Commercial	Dewatering Well - Construction	03
Domestic	Domestic - Multiple Domestic Households	01
Domestic	Domestic - Single Household	02
Industrial	Industrial - General	01
Industrial	Industrial - Manufacturing	02
Industrial	Industrial - Petroleum Processing Plant	03
Monitoring & Remediation	Monitoring Well - Ambient Monitoring	01
Monitoring & Remediation	Monitoring Well - Compliance	02
Monitoring & Remediation	Monitoring Well - Military Installation	03
Monitoring & Remediation	Monitoring Well - Water Level Monitoring Only	04
Monitoring & Remediation	Remediation	05
Public	Public - Community	01
Public	Public - Exploration	02
Public	Public - Non-transient, Non-community	03
Public	Public - Transient, Non-community	04
Public	Public - Unregulated	05
Geothermal	(general use)	-
Heat pump	(general use)	-
HVAC	(general use)	-
Injection	(general use)	-
Mining	(general use)	-
Unused	(general use)	-



TAG NO.	EASTING	NORTHING
SIW-01	-4173.3740	-1833.2941
TMP-01	-4173.3740	-1833.2941
TMP-02	-4176.0732	-1831.9846
TMP-03	-4169.4051	-1833.7916
TMP-04	-4177.0343	-1829.8878
TMP-05	-4167.1488	-1838.3187
TMP-06	-4180.4451	-1840.3651
TMP-07	-4166.3030	-1826.2230
TMP-08	-4175.3298	-1818.4221
TMP-09	-4162.5319	-1850.1003
TMP-10	-4183.3449	-1815.9568
TMP-11	-4189.5116	-1808.0042

NOTES:

1. REFER TO DRAWING P7DC40000A058 FOR SYMBOLS, ABBREVIATIONS, GENERAL NOTES, AND OTHER REQUIREMENTS.
2. EXISTING OVERHEAD 14.4KV POWER LINES.
3. CONTRACTOR TO FIELD VERIFY SURVEY LOCATIONS PRIOR TO DRILLING AND PROVIDE SURVEY FINAL LOCATIONS AND ELEVATIONS UPON COMPLETION.
4. REFER TO DRAWING C7DC40000A028 FOR WELL AND TMP DETAILS.
5. CONNECT XFR-TS-01 TO EXISTING 14.4KV POWER LINE AT POLE P23B-6.
6. CONNECT ESB-01 FEEDWATER TO EXISTING PROCESS WATER LINE SUPPLIED FROM FIRE HYDRANT FH-1.
7. ROUTINGS AND LOCATIONS ARE DIAGRAMMATIC. INSTALL AS NEEDED TO MAXIMIZE EFFICIENCY.
8. INSTALL ALL PIPING AND CONDUITS NORTH OF JERSEY BARRIERS ABOVEGROUND. PIPING SHALL BE INSTALLED ON PIPE SUPPORTS. CONDUITS CAN LAY DIRECTLY ON GROUND.
9. ROUTE WIRING FROM TMP-05, TMP-06, AND TMP-09 UNDERGROUND TO NORTH OF NEW JERSEY BARRIERS.
10. INSTALL JERSEY TYPE CONCRETE BARRIERS (MINIMUM 40" HEIGHT) ALONG AND NORTH OF TENNESSEE AVENUE AS SHOWN TO PREVENT VEHICULAR ACCESS INTO EQUIPMENT AREA.

LPE

STATE OF KENTUCKY ERIN L. SURINAK LICENSED PROFESSIONAL ENGINEER

Expires 06-30-16

DATE

PROFESSIONAL SEAL

REV.	DATE	DESCRIPTION	DRAWN BY	DRAFT CHK	PROJ ENGR	LEAD ENGR	CONF CTRL/ NUCL SFTY	FAC MGR	EATS MGR
0	5/30/14	ISSUED FOR CONSTRUCTION	JE	JE	CRE	CRE			

DRAWING REVISIONS

U.S. DEPARTMENT OF ENERGY
DOE PORTSMOUTH/PADUCAH PROJECT OFFICE
PADUCAH GASEOUS DIFFUSION PLANT

LATA Environmental Services of Kentucky, LLC
managed for the DEPARTMENT OF ENERGY under U.S. GOVERNMENT contract DE-AC30-10CC40020
Paducah, Kentucky

Environmental Resources Management
1218 3rd AVENUE, SEATTLE WASHINGTON
(425) 462-8591

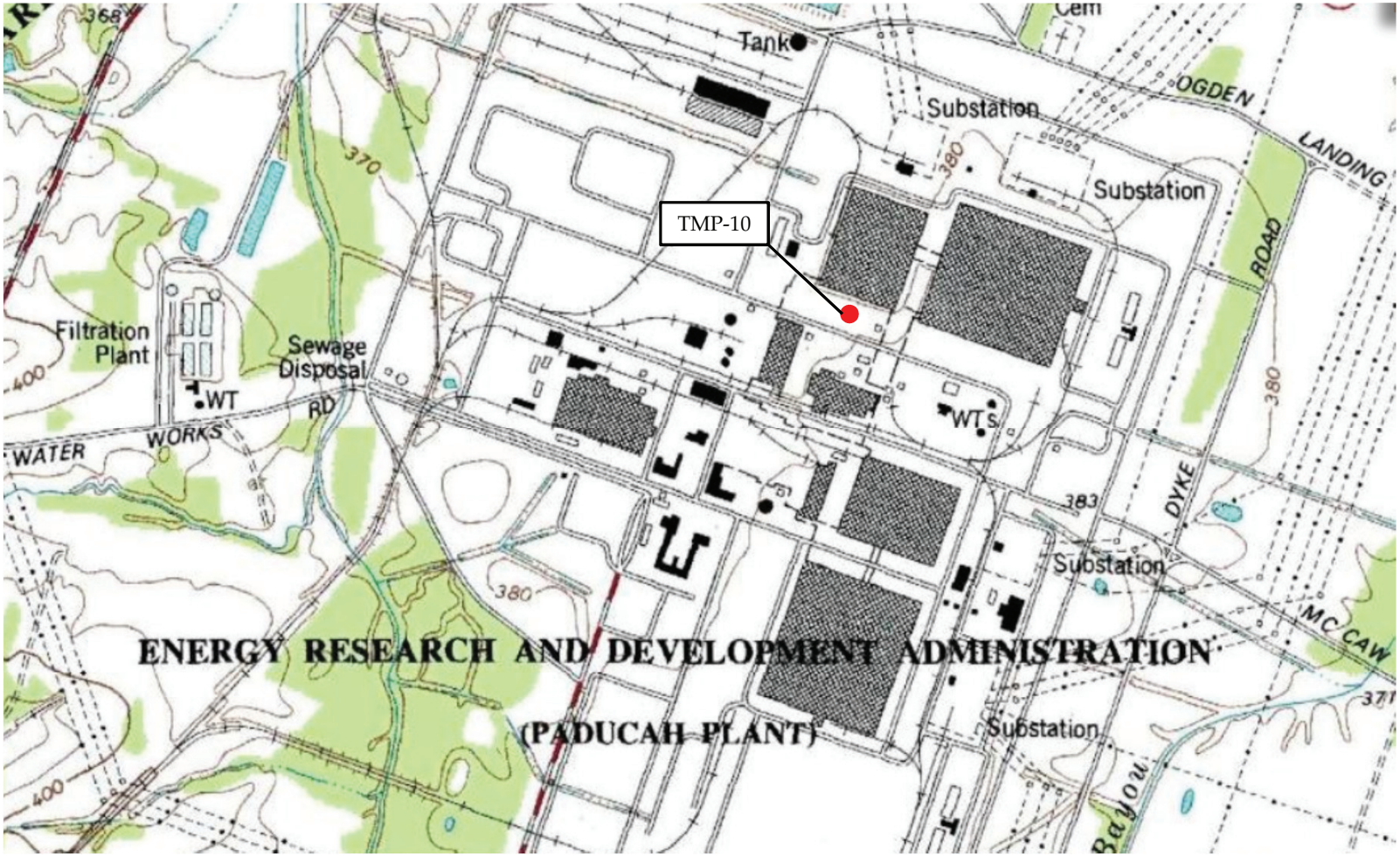
DOE CONTRACT NO. DE-AC30-10CC40020

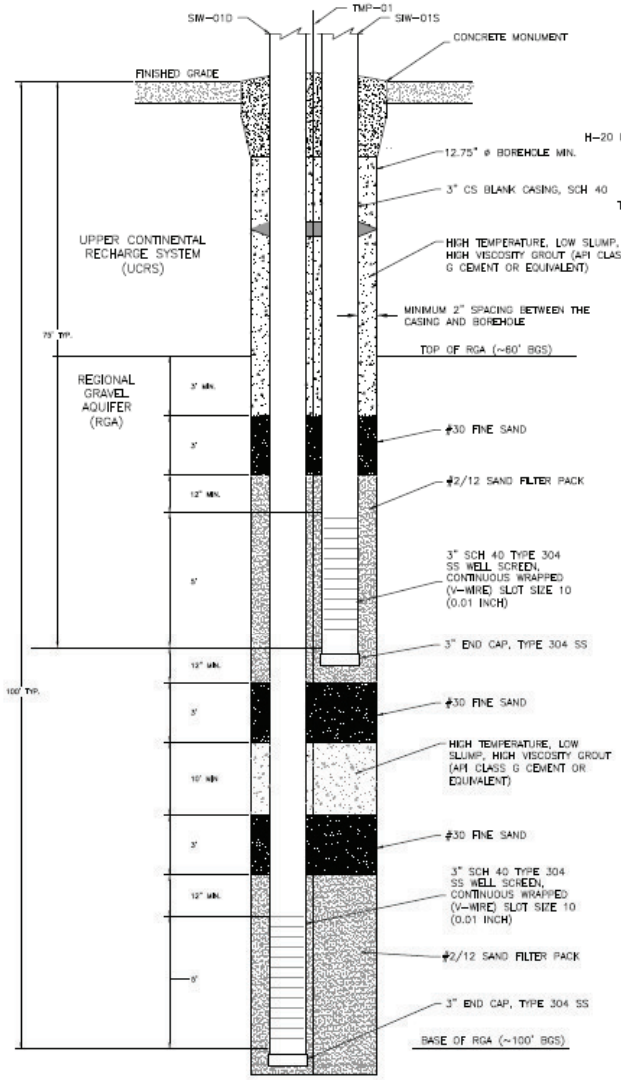
PROJECT NAME:
C-400 STEAM INJECTION TREATABILITY STUDY

TITLE:
TREATABILITY STUDY SITE PLAN

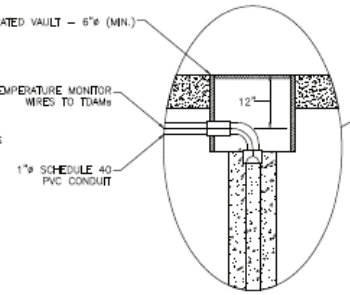
CAD FILE NAME	BUILDING	PLANT	CLASS
A027_SITE PLAN.DWG	C-400	PGDP	U

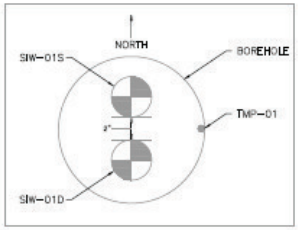
SCALE:	DRAWING NUMBER	REV
AS SHOWN	C7DC40000A027	0


TMP-10
Tank
Substation
Substation
OGDEN
LANDING
ROAD
Filtration Plant
Sewage Disposal
WT
RD
WATER
WORKS
WTs
DYKE
Substation
MC CAW
Substation
Bayou
370
380
383
400
ENERGY RESEARCH AND DEVELOPMENT ADMINISTRATION
(PADUCAH PLANT)



NESTED STEAM INJECTION WELL (TYP.)
(SIW-01S, SIW-01D)
NOT TO SCALE

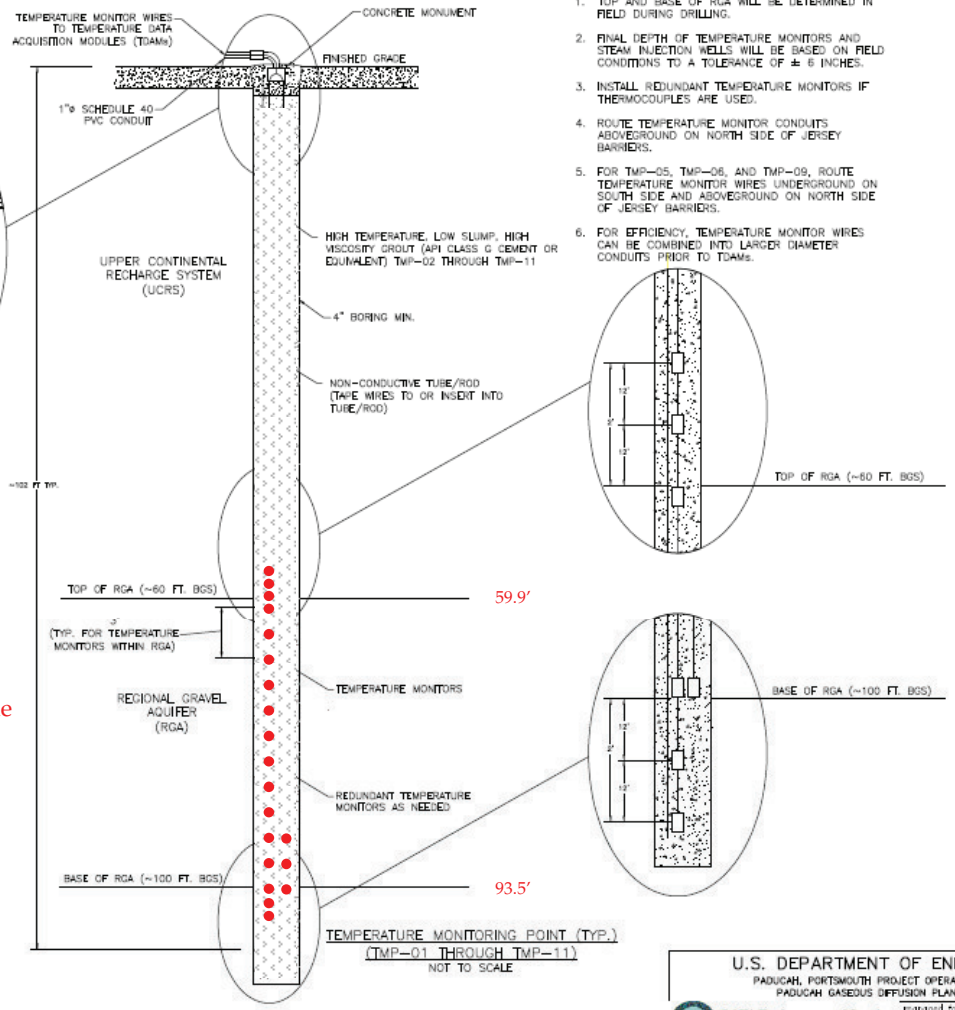




PLAN VIEW
SIW-01S, SIW-01D
NOT TO SCALE

See Page 1, Box 50 for thermocouple depth detail

TMP-10



TEMPERATURE MONITORING POINT (TYP.)
(TMP-01 THROUGH TMP-11)
NOT TO SCALE

NOTES:
1. TOP AND BASE OF RGA WILL BE DETERMINED IN FIELD DURING DRILLING.
2. FINAL DEPTH OF TEMPERATURE MONITORS AND STEAM INJECTION WELLS WILL BE BASED ON FIELD CONDITIONS TO A TOLERANCE OF ± 6 INCHES.
3. INSTALL REDUNDANT TEMPERATURE MONITORS IF THERMOCOUPLES ARE USED.
4. ROUTE TEMPERATURE MONITOR CONDUITS ABOVEGROUND ON NORTH SIDE OF JERSEY BARRIERS.
5. FOR TMP-05, TMP-06, AND TMP-09, ROUTE TEMPERATURE MONITOR WIRES UNDERGROUND ON SOUTH SIDE AND ABOVEGROUND ON NORTH SIDE OF JERSEY BARRIERS.
6. FOR EFFICIENCY, TEMPERATURE MONITOR WIRES CAN BE COMBINED INTO LARGER DIAMETER CONDUITS PRIOR TO TDAMs.

U.S. DEPARTMENT OF ENERGY
PADUCAH, PORTSMOUTH PROJECT OPERATIONS, PADUCAH GASEOUS DIFFUSION PLANT
LATA Environmental Services of Kentucky, LLC
managed for the DEPARTMENT OF ENERGY under U.S. GOVERNMENT contract DE-AC30-10CC40020
Paducah, Kentucky

Environmental Resources Management
1218 3rd AVENUE, SEATTLE WASHINGTON
(425) 462-8591

DOE CONTRACT NO. DE-AC30-10CC40020

PROJECT NAME: C-400 STEAM INJECTION TREATABILITY STUDY

TITLE: TREATABILITY STUDY STEAM INJECTION WELLS AND TEMPERATURE MONITORING POINTS

CAD FILENAME	BUILDING	PLANT	CLASS
A028_SIW & TMP DETAILS.DWG	C-400	PGDP	U

SCALE	DRAWING NUMBER	REV
N.T.S.	C7DC40000A028	0

LPE

STATE OF KENTUCKY ERIN I. SURINAK LICENSED PROFESSIONAL ENGINEER
Expires 06-30-16

PROFESSIONAL SEAL

REV	DATE	DESCRIPTION	DRAWN BY	CHKD BY	PROJ ENGR	LEAD ENGR	CONF ENGR	PROJ MGR	DIV MGR
0	5/30/14	ISSUED FOR CONSTRUCTION	JE	JE	CRE	CRE			

DRAWING REVISIONS

TMP-11						
		4-inch core		Drilled by Vernon Scott		
02/10/15 @ 13:05 to 15:20						
Drilled Interval		Recovery	Depths		Description	Notes
Top	Bottom		Top	Bottom		
47.0	57.0	12.8	47.0	57.0	Silty Clay with Sand, 10YR7/2 (light gray) with 10YR6/6 (brownish yellow) and 7.5YR6/8 (reddish yellow) mottling, soft, nonplastic, and moist. Sand is very fine grained	
57.0	67.0	12.3	57.0	59.0	Silty Clay with Sand as above	
			59.0	67.0	Gap graded Sand with Gravel, 10YR6/6 (brownish yellow) with 10YR7/4 (very pale brown) mottling, loose, and moist. Sand is very coarse grained. Gravel is subangular to subrounded chert with some white patina, 0.2 to 1.5 inch diameter and occasional 2 inch diameter cobble	Top of RGA at 59.0 ft
67.0	77.0	10.5	67.0	68.9	Gap graded Sand with Gravel as above	
			68.9	70.0	Gap graded Sand with Gravel as above but with prominent 10YR2/1 (black) mottling	
			70.0	77.0	Gap graded Sand with Gravel as at 67.0 to 68.9 ft but with 7.5YR6/8 (reddish yellow) mottling	Intervals of moist to wet throughout
77.0	87.0	10.2	77.0	87.0	Gap graded Sand with Gravel, 10YR6/6 (brownish yellow) with 7.5YR6/8 (reddish yellow) and 10YR7/4 (very pale brown) mottling, loose, and moist. Sand is very coarse grained. Gravel is subangular to subrounded chert (little with white patina), 0.2 to 1.2 inch diameter and occasional 2 inch diameter cobble	
87.0	97.0	9.4	87.0	92.6	Gap graded Sand with Gravel as above	Base of RGA at 92.6 ft
			92.6	93.4	Sand, 7.5YR6/6 (reddish yellow), hematite stained, soft, and moist. Sand is fine grained.	
			93.4	97.0	Interlaminated Silty Clay, 10YR6/1 (gray) with 10YR7/2 (light gray) mottling AND Sand, 7.5YR6/6 (reddish yellow); soft, and moist. Sand is very fine grained	
TD = 97.0 ft						

UNIFORM KENTUCKY WELL CONSTRUCTION RECORD

Use this form only to report installation of monitoring or water wells.
Original copy must be submitted to Division of Water within 60 days of completion.
See instructions on reverse of form.
Record must be typed or neatly printed or it will be returned to the driller as unacceptable.
One copy to Division of Water, one copy to owner, one copy to driller's files.

Attach Well Identification Number (AKGWA) Label Here
Water wells: yellow labels
Monitoring wells: blue labels

1. Kentucky Well ID (AKGWA) Number

2. Owner well ID#: TMP-11

4. Owner name: Paducah Gaseous Diffusion Plant
5. Owner address: 5600 Hobbs Rd
6. City: West Paducah
7. State: KY
8. Zip: 42053

If site name and address differ from owner name and address:
9. Site name
10. Site address
11. City
12. State: KY
13. Zip

3. Attachments
Required
1. Site plan or sketch map [x]
2. Well location
On topographic map, OR
Obtained by GPS unit
Conditionally Required
3. Well diagram (monitoring well) [x]
4. Coliform analysis (if applicable) [ ]
5. Signed Variance (if applicable) [ ]
Optional
6. Other laboratory analysis report [ ]

14. Agency Interest (AI) Number: 3059
15. Facility type & ID Number: (•) CERCLA ( ) Solid Waste ( ) Drinking Water ( ) RCRA ( ) UST ( ) Mining
KY8-890-008-982

16. Owner phone: (270) 441-6000
17. Site phone: (270) 441-6000

23. Install start date: Feb 10 2015 (Month Day Year)
24. Install end date: Feb 11 2015

18. USGS topo map: Heath
19. County: Mccracken
20. Physiographic Region: ( ) Blue Grass ( ) Ohio River Alluvium ( ) E. Coal Field ( ) W. Coal Field ( ) Miss. Plateau (•) Jackson Purchase
21. Surface elevation (ft): 380.00
22. Elevation determined by: ( ) GPS (•) Map ( ) Prior report ( ) Survey ( ) Prior well log

Please report depths in feet below ground surface, not as relative elevations.
25. Total depth: 97.00
26. Depth to bedrock
27. Static water level
28. Casing height above surface (in)

29. Well use: ( ) Agriculture ( ) Commercial ( ) Domestic ( ) Industrial (•) Monitoring / Remed ( ) Public ( ) Geothermal ( ) Heat pump ( ) HVAC ( ) Injection ( ) Mining ( ) Unused
Remediation
NOTE: CODE REQUIRED for well uses on left. Select a code from the dropdown menu.

30. Drilling method: ( ) Auger – HS ( ) Auger – SS ( ) Auger – bucket ( ) Auger – hand ( ) Cable tool ( ) Core ( ) Driven Casing ( ) Excavation ( ) Combined – HS auger and air rotary ( ) Combined – other (specify): ( ) Jet wash ( ) Push/probe ( ) Rotary – air ( ) Rotary – mud ( ) Rotary – reverse ( ) Sand point (•) Sonic ( ) Unknown

31. Well status: (•) Active ( ) Inactive ( ) Unsuitable for intended use
32. Wellhead: ( ) Flush (•) Well cap ( ) Locking ( ) Sanitary seal
33. Well development method: ( ) Surging ( ) Jetting ( ) Pumping ( ) Backwashing ( ) Bailing ( ) Compressed air ( ) Combination of methods (specify)

WATER WELLS ONLY

34. Estimated well yield: ( ) gpm ( ) gph ( ) gpd
35. Well service: #of people served
36. Disinfectant amount: ( ) oz ( ) qt ( ) cups ( ) lb ( ) gal
37. Type: ( ) Bleach ( ) Hypo-chlorite
38. Pitless adapter installed: ( ) Yes ( ) No
39. Pump installed: ( ) Submersible ( ) Jet ( ) Bailer or bucket ( ) Turbine ( ) Hand ( ) No pump
40. Depth to intake (ft)
41. Apparent quality and odor
APPEARANCE: ( ) Clear ( ) Cloudy ( ) Muddy ( ) Turbid
ODOR: none / slight / mod. / high — Iron, Sulfur, Salt

46. Well completion: Casing and screens

From depth (feet)	To depth (feet)	Borehole diameter (inches)	Casing diam (in) ID	Casing diam (in) OD	Casing type	Screen slot size

47. Annulus fill and seal

From depth (feet)	To depth (feet)	Material
97.00	0.00	

48. Lithologic log (if more space is needed, continue on separate page)

From depth (ft)	To depth (ft)	Description (include any show of water and indicate apparent quality)
0.00	59.00	UCRS
59.00	92.60	RGA
92.60	97.00	McNairy Formation

49. Sketch map [x]

COLIFORM TEST

42. Coliform test type: ( ) fecal ( ) fecal and total
43. Coliform test results: ( ) 0 or <1.0 ( ) TNTC ( ) Confluent
or # colonies per 100 mL
44. Date sampled (Month Day Year)
45. Date analyzed

50. Comments
Borehole grout is Class H cement and silica flour mix, TC installation depths: 94.6, 93.6, 92.6 (dup), 89.6(dup), 86.6(dup), 83.6, 80.6, 77.6, 74.6, 71.6, 68.6, 65.6, 62.6, 59.6, 59.0, 58.0, 57.0, 57.0 (replicate is unconnected but in the borehole)

Latitude
Longitude
Lat/Long Method: ( ) INT ( ) GPS ( ) SUR ( ) REP
Date Received

51. Affirmation: The work described above was done under my supervision, and this report is true and correct to the best of my knowledge.
Note: the driller is not responsible for natural groundwater quality or quantity encountered while drilling or completing this well.

Signature of certified driller: [signature]
Date signed: Feb 11 2015
Certification number: 0411 - 0549 - 00
Drilling company: Cascade Drilling LP

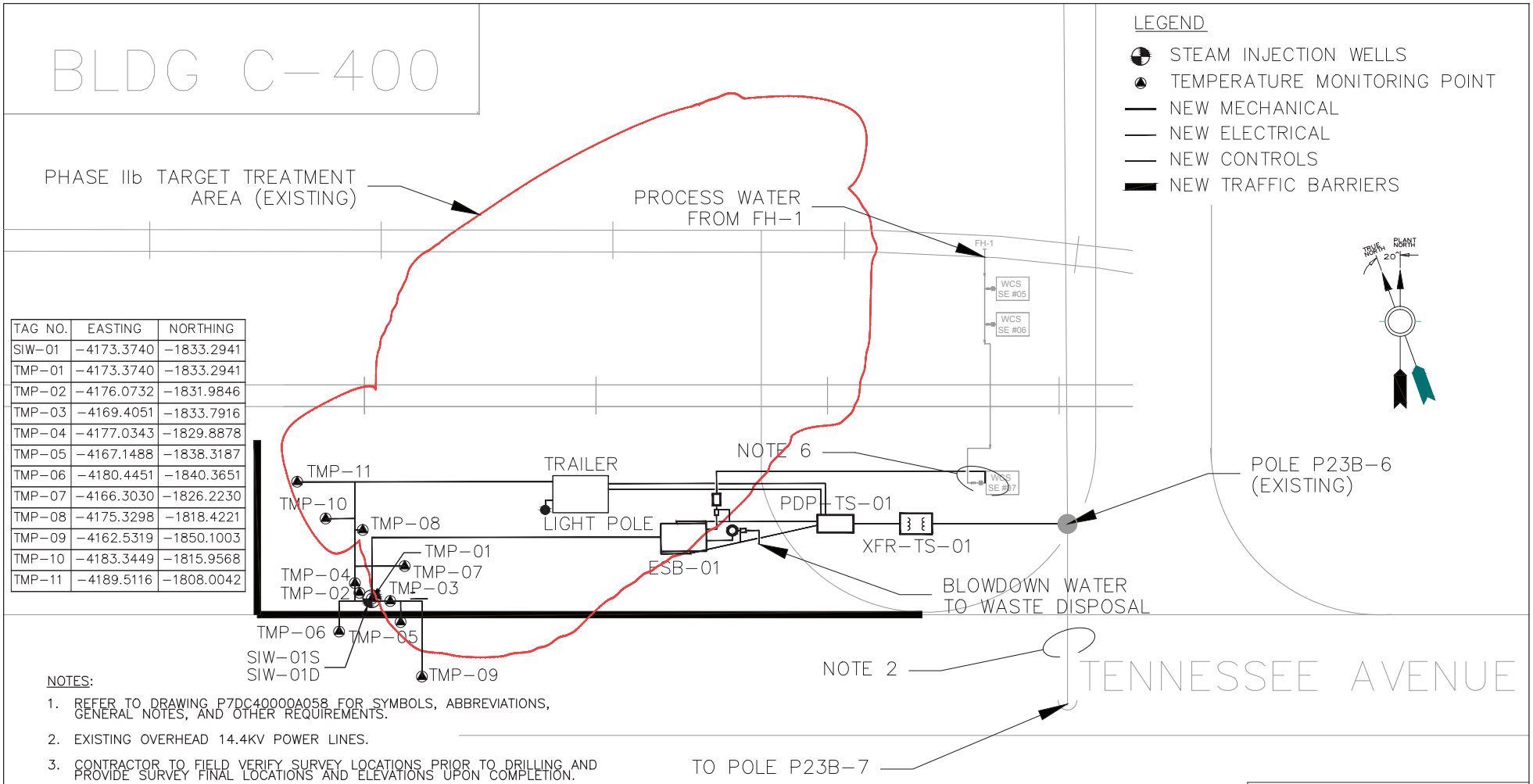
rev 02/29/2012

2. Owner Well ID#
Owner well ID # denotes the site designation for the well, e.g. "MW-06."

15. Facility type & ID number
If the well is located at any of the listed facility types, please note the historic site ID # in the spaces provided. This information is vital for other programs that may need to locate the well record in the database.

25. Well use
If well use falls under any of the following General Use designations with a corresponding Specific Use, you must include the corresponding Use Code:

WELL USE CODES		
GENERAL USE	SPECIFIC USE	USE CODE
Agriculture	Agriculture - Dairy Operation	01
Agriculture	Agriculture - Feed Pen Operation	02
Agriculture	Agriculture - Fish And Game Propagation	03
Agriculture	Agriculture - General	04
Agriculture	Agriculture - Horse Farm	05
Agriculture	Agriculture - Irrigation	06
Agriculture	Agriculture - Livestock Watering	07
Agriculture	Agriculture - Poultry And Egg Operation	08
Commercial	Commercial	01
Commercial	Commercial - Irrigation	02
Commercial	Dewatering Well - Construction	03
Domestic	Domestic - Multiple Domestic Households	01
Domestic	Domestic - Single Household	02
Industrial	Industrial - General	01
Industrial	Industrial - Manufacturing	02
Industrial	Industrial - Petroleum Processing Plant	03
Monitoring & Remediation	Monitoring Well - Ambient Monitoring	01
Monitoring & Remediation	Monitoring Well - Compliance	02
Monitoring & Remediation	Monitoring Well - Military Installation	03
Monitoring & Remediation	Monitoring Well - Water Level Monitoring Only	04
Monitoring & Remediation	Remediation	05
Public	Public - Community	01
Public	Public - Exploration	02
Public	Public - Non-transient, Non-community	03
Public	Public - Transient, Non-community	04
Public	Public - Unregulated	05
Geothermal	(general use)	-
Heat pump	(general use)	-
HVAC	(general use)	-
Injection	(general use)	-
Mining	(general use)	-
Unused	(general use)	-



TAG NO.	EASTING	NORTHING
SIW-01	-4173.3740	-1833.2941
TMP-01	-4173.3740	-1833.2941
TMP-02	-4176.0732	-1831.9846
TMP-03	-4169.4051	-1833.7916
TMP-04	-4177.0343	-1829.8878
TMP-05	-4167.1488	-1838.3187
TMP-06	-4180.4451	-1840.3651
TMP-07	-4166.3030	-1826.2230
TMP-08	-4175.3298	-1818.4221
TMP-09	-4162.5319	-1850.1003
TMP-10	-4183.3449	-1815.9568
TMP-11	-4189.5116	-1808.0042

NOTES:

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LPE

STATE OF KENTUCKY ERIN L. SURINAK LICENSED PROFESSIONAL ENGINEER

Expires 06-30-16

DATE

PROFESSIONAL SEAL

REV.	DATE	DESCRIPTION	DRAWN BY	DRAFT CHK	PROJ ENGR	LEAD ENGR	CONF CTRL/ NUCL SFTY	FAC MGR	EATS MGR
0	5/30/14	ISSUED FOR CONSTRUCTION	JE	JE	CRE	CRE			

DRAWING REVISIONS

U.S. DEPARTMENT OF ENERGY
DOE PORTSMOUTH/PADUCAH PROJECT OFFICE
PADUCAH GASEOUS DIFFUSION PLANT

LATA Environmental Services of Kentucky, LLC
managed for the DEPARTMENT OF ENERGY under U.S. GOVERNMENT contract DE-AC30-10CC40020
Paducah, Kentucky

Environmental Resources Management
1218 3rd AVENUE, SEATTLE WASHINGTON
(425) 462-8591

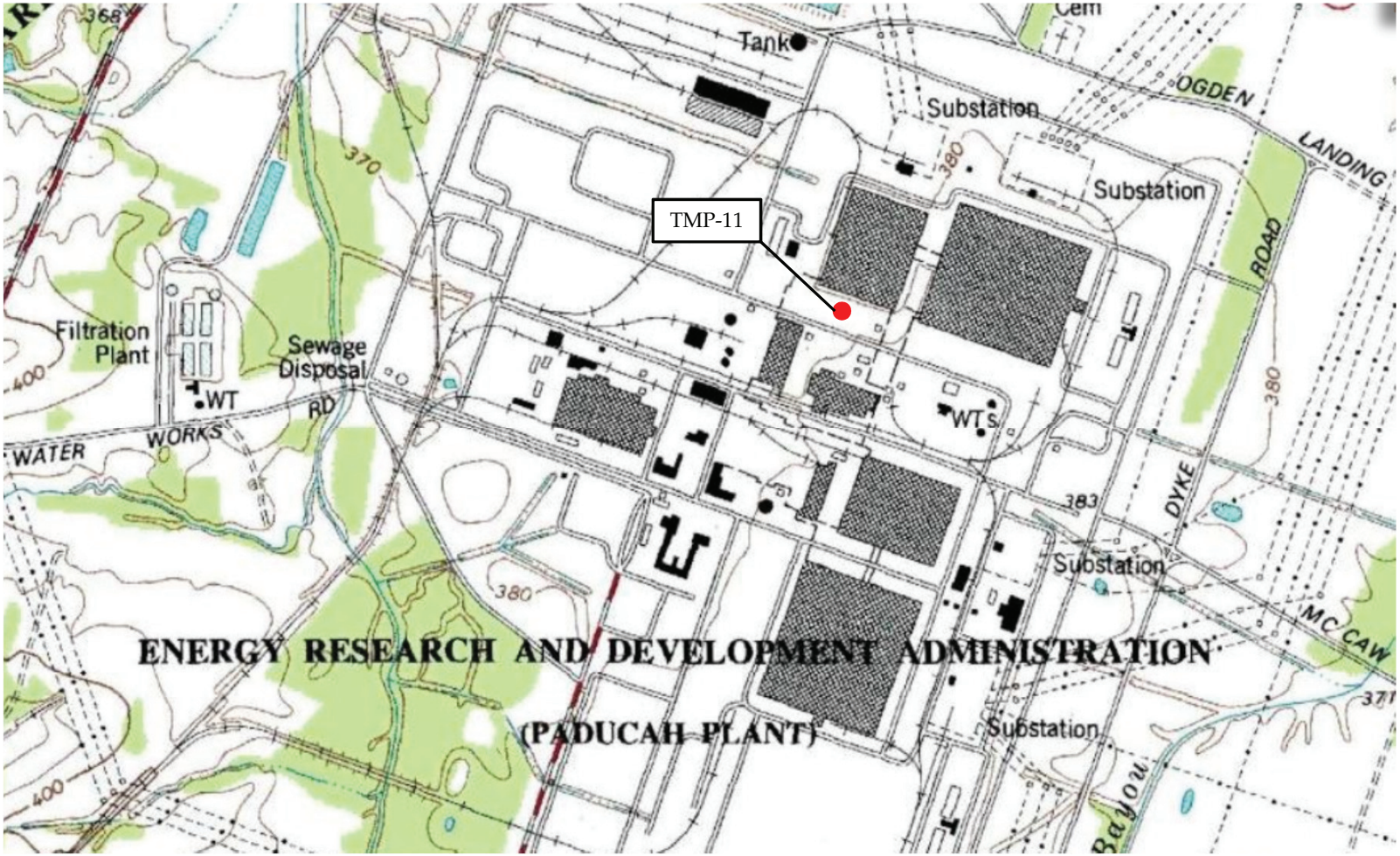
DOE CONTRACT NO. DE-AC30-10CC40020

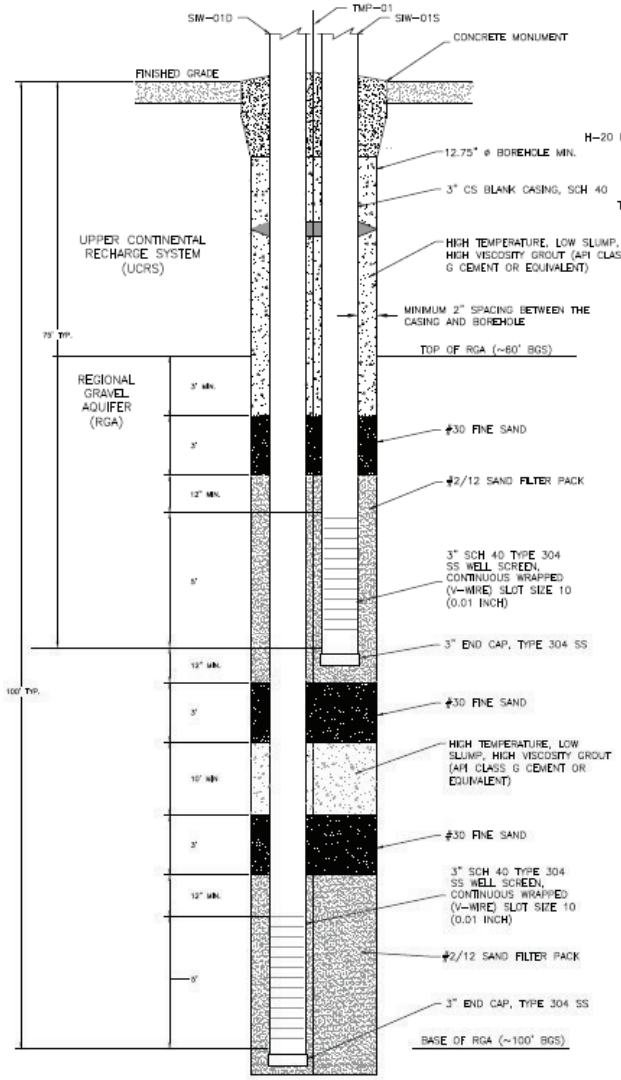
PROJECT NAME:
C-400 STEAM INJECTION TREATABILITY STUDY

TITLE:
TREATABILITY STUDY SITE PLAN

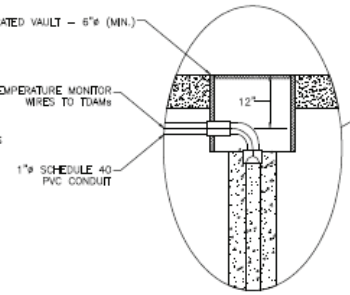
CAD FILE NAME	BUILDING	PLANT	CLASS
A027_SITE PLAN.DWG	C-400	PGDP	U

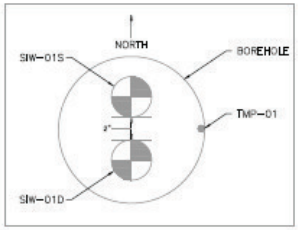
SCALE:	DRAWING NUMBER	REV
AS SHOWN	C7DC40000A027	0


TMP-11
Tank
Substation
Substation
OGDEN
LANDING
ROAD
Filtration Plant
Sewage Disposal
WT
RD
WATER
WORKS
WTs
DYKE
Substation
MC CAW
Substation
Bayou
ENERGY RESEARCH AND DEVELOPMENT ADMINISTRATION
(PADUCAH PLANT)



NESTED STEAM INJECTION WELL (TYP.)
(SIW-01S, SIW-01D)
NOT TO SCALE

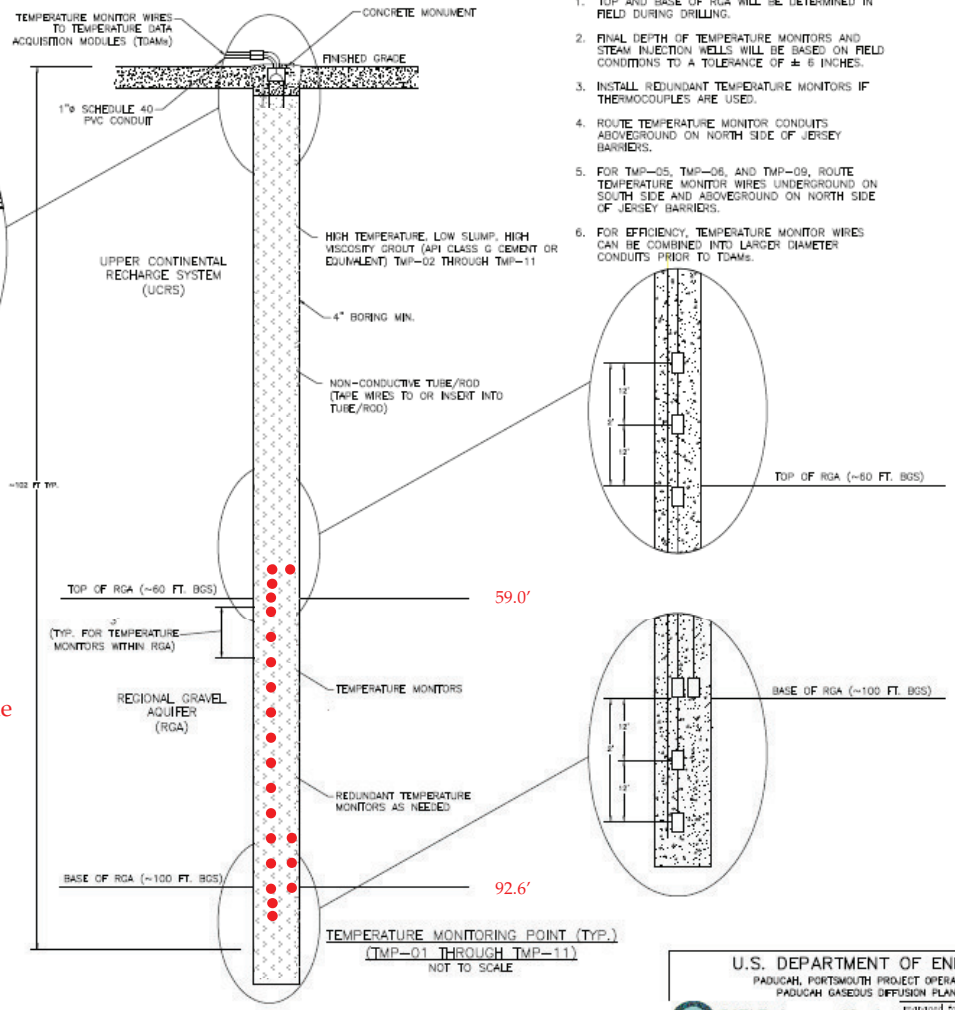




PLAN VIEW
SIW-01S, SIW-01D
NOT TO SCALE

See Page 1, Box 50 for thermocouple depth detail

TMP-11



TEMPERATURE MONITORING POINT (TYP.)
(TMP-01 THROUGH TMP-11)
NOT TO SCALE

NOTES:
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U.S. DEPARTMENT OF ENERGY
PADUCAH, PORTSMOUTH PROJECT OPERATIONS, PADUCAH GASEOUS DIFFUSION PLANT
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Paducah, Kentucky

Environmental Resources Management
1218 3rd AVENUE, SEATTLE WASHINGTON
(425) 462-8591

DOE CONTRACT NO. DE-AC30-10CC40020

PROJECT NAME: C-400 STEAM INJECTION TREATABILITY STUDY

TITLE: TREATABILITY STUDY STEAM INJECTION WELLS AND TEMPERATURE MONITORING POINTS

CAD FILENAME	BUILDING	PLANT	CLASS
A028_SIW & TMP DETAILS.DWG	C-400	PGDP	U

SCALE	DRAWING NUMBER	REV
N.T.S.	C7DC40000A028	0

LPE

STATE OF KENTUCKY ERIN I. SURINAK LICENSED PROFESSIONAL ENGINEER

Expires 06-30-16

DATE
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REV	DATE	DESCRIPTION	DRAWN BY	CHKD BY	PROJ ENGR	LEAD ENGR	CONF CTRL	PROJ MGR	DIV MGR
0	5/30/14	ISSUED FOR CONSTRUCTION	JE	JE	CRE	CRE			

DRAWING REVISIONS