


DRILLING LOG		DIVISION North Atlantic Division		INSTALLATION North Atlantic - Philadelphia		SHEET 1 OF 1 SHEETS	
1. PROJECT Delaware River Channel Deepening Study				10. SIZE AND TYPE OF BIT Roller Bit & NXM Bit			
2. LOCATION (Coordinates or Station) Delaware River N 348,834.5 E 224,069.9				11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MLW			
3. DRILLING AGENCY Warren George Inc				12. MANUFACTURER'S DESIGNATION OF DRILL Barge Mounted Mobile B-61			
4. HOLE NO. (As shown on drawing title and file number) CB-254				13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN : DISTURBED : UNDISTURBED			
5. NAME OF DRILLER Mike McCarthy				14. TOTAL NUMBER CORE BOXES			
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.				15. ELEVATION GROUND WATER			
7. THICKNESS OF OVERBURDEN 0.6'				16. DATE HOLE : STARTED : COMPLETED 8-8-1996 8-8-1996			
8. DEPTH DRILLED INTO ROCK 8.9'				17. ELEVATION TOP OF HOLE -43.4			
9. TOTAL DEPTH OF HOLE 9.5 ft.				18. TOTAL CORE RECOVERY FOR BORING 8.2 ft			
				19. SIGNATURE OF INSPECTOR S. Krajnik			
ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g	BLOW COUNT PER 0.5' h
-43.4	0.0		SAND & GRAVEL	No Recovery	-		
-44	1		GNEISS, Hornblende-Plagioclase with minor amounts of Quartzite & Biotite, gray-black, hard, dense, fine-grained, has somewhat salt & pepper appearance, lamination varies from 45 degrees to 60 degrees, most breaks are essentially horizontal and are MBs	86.5%	R-1	6min/ft; Natural fractures noted in depth column numerous mechanical fractures also present and attributed to drilling operations	
-45	2						
-46	3						
-47	4						
-48	5						
-49	6						
-50	7						
-51	8						
-52	9						
			Bottom of Hole @ -52.9 below MLW				

DRILLING LOG		DIVISION North Atlantic Division		INSTALLATION North Atlantic - Philadelphia		SHEET 1 OF 1 SHEETS	
1. PROJECT Delaware River Channel Deepening Study				10. SIZE AND TYPE OF BIT Roller Bit & NXM Bit			
2. LOCATION (Coordinates or Station) Delaware River N 349,091.4 E 224,613.5				11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MLW			
3. DRILLING AGENCY Warren George Inc				12. MANUFACTURER'S DESIGNATION OF DRILL Barge Mounted Mobile B-61			
4. HOLE NO. (As shown on drawing title and file number) CB-255				13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN DISTURBED UNDISTURBED			
5. NAME OF DRILLER Mike McCarthy				14. TOTAL NUMBER CORE BOXES			
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.				15. ELEVATION GROUND WATER			
7. THICKNESS OF OVERBURDEN 2.7'				16. DATE HOLE STARTED 8-9-1996 COMPLETED 8-9-1996			
8. DEPTH DRILLED INTO ROCK 10.5'				17. ELEVATION TOP OF HOLE -41.6			
9. TOTAL DEPTH OF HOLE 13.2 ft.				18. TOTAL CORE RECOVERY FOR BORING 9.3 ft			
				19. SIGNATURE OF INSPECTOR S. Krajnik			
ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g	BLOW COUNT PER 0.5' h
-41.6	0.0		SILT	No Recovery	-	Natural fractures noted in depth column numerous mechanical fractures also present and attributed to drilling operations	
-42	1						
-43	2		SAND & GRAVEL				
-44	3						
-45	4		GNEISS, Hornblende-Plagioclase, Hard, Dense, Dark Gray to Black (hard, slightly weathered, moderately fractured)	88.6%	R-1		
-46	5					Coreloss zone -46.7' to -47.7'	
-47	6						
-48	7						
-49	8						
-50	9						
-51	10						
-52	11						
-53	12						
-54	13						
			Bottom of Hole @ -54.8 below MLW				

DRILLING LOG		DIVISION North Atlantic Division		INSTALLATION North Atlantic - Philadelphia		SHEET OF 1 SHEETS	
1. PROJECT Delaware River Channel Deepening Study				10. SIZE AND TYPE OF BIT NXM Bit			
2. LOCATION (Coordinates or Station) Deleware River N 348,939.0 E 225,062.0				11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MLW			
3. DRILLING AGENCY Warren George Inc				12. MANUFACTURER'S DESIGNATION OF DRILL Mobile B-61 Barge Mtd			
4. HOLE NO. (As shown on drawing title and file number) CB-256				13. TOTAL NO. OF OVERBURDEN : DISTURBED : UNDISTURBED SAMPLES TAKEN : : :			
5. NAME OF DRILLER Mike McCarthy				14. TOTAL NUMBER CORE BOXES			
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.				15. ELEVATION GROUND WATER			
7. THICKNESS OF OVERBURDEN -				16. DATE HOLE : STARTED : COMPLETED 8-8-1996 8-8-1996			
8. DEPTH DRILLED INTO ROCK -				17. ELEVATION TOP OF HOLE -47.2			
9. TOTAL DEPTH OF HOLE 0.0 ft.				18. TOTAL CORE RECOVERY FOR BORING ft			
				19. SIGNATURE OF INSPECTOR S. Krajnik			
ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	CORE RECOV- ERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g	BLOW COUNT PER 0.5' h
						This boring was not completed because initial probing indicated that the existing river bottom was below the proposed dredging elevation.	

DRILLING LOG		DIVISION North Atlantic Division		INSTALLATION North Atlantic - Philadelphia		SHEET OF 1 SHEETS	
1. PROJECT Delaware River Channel Deepening Study				10. SIZE AND TYPE OF BIT Roller Bit			
2. LOCATION (Coordinates or Station) Delaware River N 352,462.8 E 229,475.9				11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MLW			
3. DRILLING AGENCY Warren George Inc				12. MANUFACTURER'S DESIGNATION OF DRILL Barge Mounted Mobile B-61			
4. HOLE NO. (As shown on drawing title and file number) CB-257				13. TOTAL NO. OF OVERBURDEN : DISTURBED : UNDISTURBED SAMPLES TAKEN			
5. NAME OF DRILLER Mike McCarthy				14. TOTAL NUMBER CORE BOXES			
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.				15. ELEVATION GROUND WATER			
7. THICKNESS OF OVERBURDEN 5.7'				16. DATE HOLE : STARTED : COMPLETED 8-12-1996 8-12-1996			
8. DEPTH DRILLED INTO ROCK 2.4'				17. ELEVATION TOP OF HOLE -41.3			
9. TOTAL DEPTH OF HOLE 8.1 ft.				18. TOTAL CORE RECOVERY FOR BORING 0.0 ft			
				19. SIGNATURE OF INSPECTOR S. Krajnik			
ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	CORE RECOV- ERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g	BLOW COUNT PER 0.5' h
-41.3	0.0		SAND & GRAVEL or Friable Bedrock, bouncy drilling	No Recovery	-	4min for 4.3', 4min for 3,8'	
-42	1						
-43	2						
-44	3						
-45	4						
-46	5						
-47	6						
-48	7						
-49	8		Cuttings for last 2' indicate fine grained sand & mica w/some black mineral either biotite or hornblende, Rock may be @ -45.0' but more probably @ -47.0' (Not confirmed, if present then weathered)				
			Bottom of Hole @ -49.4 Below MLW				
			NOTE: Boring CB-256 was not drilled.				

DRILLING LOG		DIVISION North Atlantic Division		INSTALLATION North Atlantic - Philadelphia		SHEET OF 1 SHEETS	
1. PROJECT Delaware River Channel Deepening Study				10. SIZE AND TYPE OF BIT NXM Bit			
2. LOCATION (Coordinates or Station) Delaware River N 359,658.0 E 241,024.0				11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MLW			
3. DRILLING AGENCY Warren George Inc				12. MANUFACTURER'S DESIGNATION OF DRILL Mobile B-61 Barge Mtd			
4. HOLE NO. (As shown on drawing title and file number) CB-258				13. TOTAL NO. OF OVERBURDEN : DISTURBED : UNDISTURBED SAMPLES TAKEN : : :			
5. NAME OF DRILLER Mike McCarthy				14. TOTAL NUMBER CORE BOXES			
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.				15. ELEVATION GROUND WATER			
7. THICKNESS OF OVERBURDEN -				16. DATE HOLE : STARTED : COMPLETED 8-8-1996 8-8-1996			
8. DEPTH DRILLED INTO ROCK -				17. ELEVATION TOP OF HOLE -47.1			
9. TOTAL DEPTH OF HOLE 0.0 ft.				18. TOTAL CORE RECOVERY FOR BORING ft			
				19. SIGNATURE OF INSPECTOR S. Krajnik			
ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	CORE RECOV- ERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g	BLOW COUNT PER 0.5' h
						This boring was not completed because initial probing indicated that the existing river bottom was below the proposed dredging elevation.	

DRILLING LOG		DIVISION North Atlantic Division		INSTALLATION North Atlantic - Philadelphia		SHEET 1 OF 1 SHEETS	
1. PROJECT Delaware River Channel Deepening Study				10. SIZE AND TYPE OF BIT Roller Bit			
2. LOCATION (Coordinates or Station) Delaware River N 360,125.5 E 241,901.8				11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MLW			
3. DRILLING AGENCY Warren George Inc				12. MANUFACTURER'S DESIGNATION OF DRILL Barge Mounted Mobile B-61			
4. HOLE NO. (As shown on drawing title and file number) CB-259				13. TOTAL NO. OF OVERBURDEN : DISTURBED : UNDISTURBED SAMPLES TAKEN			
5. NAME OF DRILLER Mike McCarthy				14. TOTAL NUMBER CORE BOXES			
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.				15. ELEVATION GROUND WATER			
7. THICKNESS OF OVERBURDEN -				16. DATE HOLE : STARTED : COMPLETED 8-12-1996 8-12-1996			
8. DEPTH DRILLED INTO ROCK -				17. ELEVATION TOP OF HOLE -45.3			
9. TOTAL DEPTH OF HOLE 2.7 ft.				18. TOTAL CORE RECOVERY FOR BORING 0.0 ft			
				19. SIGNATURE OF INSPECTOR S. Krajnik			
ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	CORE RECOV- ERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g	BLOW COUNT PER 0.5' h
-45.3	0.0		SAND & GRAVEL	No Recovery	-	5" casing sunk to -45.8 under its own weight. Drilling resistance very irregular	
-46	1						
-47	2						
-48			Bottom of Hole @ -48.0 below MLW				
NOTE: Boring CB-258 was not drilled.							

DRILLING LOG		DIVISION North Atlantic Division		INSTALLATION North Atlantic - Philadelphia		SHEET OF 1 SHEETS	
1. PROJECT Delaware River Channel Deepening Study				10. SIZE AND TYPE OF BIT Roller Bit & NXM Bit			
2. LOCATION (Coordinates or Station) Delaware River N 359,832.4 E 242,631.8				11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MLW			
3. DRILLING AGENCY Warren George Inc				12. MANUFACTURER'S DESIGNATION OF DRILL Barge Mounted Mobile B-61			
4. HOLE NO. (As shown on drawing title and file number) CB-260				13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN DISTURBED UNDISTURBED			
5. NAME OF DRILLER Mike McCarthy				14. TOTAL NUMBER CORE BOXES			
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED <input type="checkbox"/> DEG. FROM VERT.				15. ELEVATION GROUND WATER			
7. THICKNESS OF OVERBURDEN 2.3'				16. DATE HOLE STARTED 8-12-1996 COMPLETED 8-12-1996			
8. DEPTH DRILLED INTO ROCK 8.0'				17. ELEVATION TOP OF HOLE -44.7			
9. TOTAL DEPTH OF HOLE 10.3 ft.				18. TOTAL CORE RECOVERY FOR BORING 3.0 ft			
				19. SIGNATURE OF INSPECTOR S. Krajnik			

ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g	BLOW COUNT PER 0.5' h
-44.7	0.0		SILT	No Recovery	-	Drill String sunk to -45.6 under its own weight	
-45							
-46	1		SAND & GRAVEL	No Recovery	-	0.6ft/min	
-47	2		SANDSTONE, Quartzite, Gravel	16.1%	R-1	Drilling was smooth, thought to be rock, switched to NXM bit, probably on cobble Quartzite which drilled through friable gneiss to -52.4	
-48	3		Friable GNEISS; few broken pieces in bottom of bit, moderately to highly weathered fracturing unknown			3min 10s - 1st foot 2min - 2nd foot 1.5min - 3rd foot 1.5min - 4th foot 3min 15s - 5th foot 4min 25s - 1.2 feet	
-49	4					Extensive core loss attributed to rock quality	
-50	5						
-51	6						
-52	7						
-53	8		GNEISS, Hornblende-Plagioclase, hard, brittle, lineation varies from 60 degrees to almost vertical, longest piece 0.3'	69%	R-2	Natural fractures noted in depth column numerous mechanical fractures also present and attributed to drilling operations	
-54	9		GNEISS, longest piece 0.8'	84.6%	R-3		
-55	10		0.2' left in hole				
			Bottom of Hole @ -55.0 below MLW				

DRILLING LOG		DIVISION North Atlantic Division		INSTALLATION North Atlantic – Philadelphia		SHEET OF 1 SHEETS	
1. PROJECT Delaware River Channel Deepening Study				10. SIZE AND TYPE OF BIT NXM Bit			
2. LOCATION (Coordinates or Station) Deleware River N 360,544.0 E 242,420.0				11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MLW			
3. DRILLING AGENCY Warren George Inc				12. MANUFACTURER'S DESIGNATION OF DRILL Mobile B-61 Barge Mtd			
4. HOLE NO. (As shown on drawing title and file number) CB-261				13. TOTAL NO. OF OVERBURDEN : DISTURBED : UNDISTURBED SAMPLES TAKEN : : :			
5. NAME OF DRILLER Mike McCarthy				14. TOTAL NUMBER CORE BOXES			
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.				15. ELEVATION GROUND WATER			
7. THICKNESS OF OVERBURDEN —				16. DATE HOLE : STARTED : COMPLETED 8-8-1996 8-8-1996			
8. DEPTH DRILLED INTO ROCK —				17. ELEVATION TOP OF HOLE -50.3			
9. TOTAL DEPTH OF HOLE 0.0 ft.				18. TOTAL CORE RECOVERY FOR BORING ft			
				19. SIGNATURE OF INSPECTOR S. Krajnik			
ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	CORE RECOV- ERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g	BLOW COUNT PER 0.5' h
						This boring was not completed because initial probing indicated that the existing river bottom was below the proposed dredging elevation.	

DRILLING LOG		DIVISION North Atlantic Division		INSTALLATION North Atlantic - Philadelphia		SHEET OF 1 SHEETS	
1. PROJECT Delaware River Channel Deepening Study				10. SIZE AND TYPE OF BIT NXM Bit			
2. LOCATION (Coordinates or Station) Delaware River N 360,059.8 E 242,993.9				11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MLW			
3. DRILLING AGENCY Warren George Inc				12. MANUFACTURER'S DESIGNATION OF DRILL Barge Mounted Mobile B-61			
4. HOLE NO. (As shown on drawing title and file number) CB-262				13. TOTAL NO. OF OVERBURDEN : DISTURBED : UNDISTURBED SAMPLES TAKEN			
5. NAME OF DRILLER Mike McCarthy				14. TOTAL NUMBER CORE BOXES			
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.				15. ELEVATION GROUND WATER			
7. THICKNESS OF OVERBURDEN 1.8'				16. DATE HOLE : STARTED : COMPLETED 8-7-1996 8-7-1996			
8. DEPTH DRILLED INTO ROCK 8.5'				17. ELEVATION TOP OF HOLE -44.7			
9. TOTAL DEPTH OF HOLE 9.3 ft.				18. TOTAL CORE RECOVERY FOR BORING 7.4 ft			
				19. SIGNATURE OF INSPECTOR S. Krajnik			
ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g	BLOW COUNT PER 0.5' h
-44.7	0.0		SILT	No Recovery	-		
-45							
-46	1		SAND & GRAVEL, possibly friable and weathered Gneiss	71.4%	R-1	2min for -45.7 to -46.7 2min for -46.7 to -47.7 4min for -47.7 to -48.7 9min for -48.7 to -49.7 20min for -49.7 to -51.0	
-47	2		GNEISS-Quartzite-Biotite, hard, dense, limeation horizontal to 15 degrees from -46.5 to -47.5, essentially horizontal to -48.8; 15 degrees from -48.8 to -51.0				
-48	3						
-49	4						
-50	5		GNEISS, limeation 45 degrees from -51.0 to -52.7, tight fold @ -52.8 with limeation dip direction reversed 180 degrees, dip at 45 degrees to bottom of hole, along closely spaced parallel planes	96.6%	R-2	Natural fractures noted in depth column numerous mechanical fractures also present and attributed to drilling operations	
-51	6						
-52	7		increase in Quartzite fraction with depth from -47.5 and especially @ -52.6, most fractures are mechanical breaks longest piece is 0.6', 0.1' left in hole				
-53	8						
-54	9						
			Bottom of Hole @ -54.0 below MLW				
			NOTE: Boring CB-261 was not drilled.				

DRILLING LOG		DIVISION North Atlantic Division		INSTALLATION North Atlantic - Philadelphia		SHEET 1 OF 1 SHEETS	
1. PROJECT Delaware River Channel Deepening Study				10. SIZE AND TYPE OF BIT NXM Bit			
2. LOCATION (Coordinates or Station) Delaware River N 361,019.6 E 243,184.2				11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MLW			
3. DRILLING AGENCY Warren George Inc				12. MANUFACTURER'S DESIGNATION OF DRILL Barge Mounted Mobile B-61			
4. HOLE NO. (As shown on drawing title and file number) CB-263				13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN : DISTURBED : UNDISTURBED			
5. NAME OF DRILLER Mike McCarthy				14. TOTAL NUMBER CORE BOXES			
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.				15. ELEVATION GROUND WATER			
7. THICKNESS OF OVERBURDEN 6.0'				16. DATE HOLE : STARTED : COMPLETED 8-7-1996 8-7-1996			
8. DEPTH DRILLED INTO ROCK 4.5'				17. ELEVATION TOP OF HOLE -47.3			
9. TOTAL DEPTH OF HOLE 10.5 ft.				18. TOTAL CORE RECOVERY FOR BORING 2.0 ft			
				19. SIGNATURE OF INSPECTOR S. Krajnik			
ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g	BLOW COUNT PER 0.5' h
-47.3	0.0		SILT	No Recovery	-	Natural fractures noted in depth column numerous mechanical fractures also present and attributed to drilling operations	
-48	1						
-49	2						
-50	3						
-51	4						
-52	5		SAND & GRAVEL				
-53	6						
-54	7		GNEISS-Biotite, Plagioclase with scattered muscovite mica and green chloritic zones, very soft, saprolitic can be shaved with knife, limeation of mineral somewhat contorted and varies from 45 degrees to vertical dip, fresh appearance, no stains, longest piece 0.3', slightly to moderately weathered, highly fractured	19%	R-1	Rock loss from -53.3 to -55.8	
-55	8						
-56	9						
-57	10						
			Bottom of Hole @ -57.8 below MLW				

DRILLING LOG		DIVISION North Atlantic Division		INSTALLATION North Atlantic - Philadelphia		SHEET 1 OF 1 SHEETS	
1. PROJECT Delaware River Channel Deepening Study				10. SIZE AND TYPE OF BIT Roller Bit & NXM Bit			
2. LOCATION (Coordinates or Station) Delaware River N 361,406.0 E 243,779.6				11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MLW			
3. DRILLING AGENCY Warren George Inc				12. MANUFACTURER'S DESIGNATION OF DRILL Barge Mounted Mobile B-61			
4. HOLE NO. (As shown on drawing title and file number) CB-264				13. TOTAL NO. OF OVERBURDEN : DISTURBED : UNDISTURBED SAMPLES TAKEN			
5. NAME OF DRILLER Mike McCarthy				14. TOTAL NUMBER CORE BOXES			
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.				15. ELEVATION GROUND WATER			
7. THICKNESS OF OVERBURDEN 3.2'				16. DATE HOLE : STARTED : COMPLETED 8-6-1996 8-6-1996			
8. DEPTH DRILLED INTO ROCK 3.8'				17. ELEVATION TOP OF HOLE -47.8			
9. TOTAL DEPTH OF HOLE 7.0 ft.				18. TOTAL CORE RECOVERY FOR BORING 2.0 ft			
				19. SIGNATURE OF INSPECTOR S. Krajnik			
ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g	BLOW COUNT PER 0.5' h
-47.8 -48	0.0		SAND & GRAVEL to -51.0 then weathered or fractured GNEISS as indicated by cuttings in return water to -52.4	No Recovery	-	1min for first 3.2' 6min for next 1.4' Roller-Bit drilling to -52.4'	
-49	1						
-50	2						
-51	3						
-52	4		QUARTZITE-Biotite-Gneiss with Plagioclase and scattered pyrites crystals, hard, dense, vertical irregular fractures as noted with gray clay infilling, longest piece 1.5', 0.3' left in hole (hard, slightly weathered, moderately to highly fractured)	83%	R-1	10 min for last 2.4'	
-53	5						
-54	6						
	7		Bottom of Hole @ -54.8 Below MLW				


DRILLING LOG		DIVISION North Atlantic Division		INSTALLATION North Atlantic - Philadelphia		SHEET OF 1 SHEETS		
1. PROJECT Delaware River Channel Deepening Study				10. SIZE AND TYPE OF BIT Roller Bit & NXM Bit				
2. LOCATION (Coordinates or Station) Delaware River N 361,925.3 E 244,558.7				11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MLW				
3. DRILLING AGENCY Warren George Inc				12. MANUFACTURER'S DESIGNATION OF DRILL Barge Mounted Mobile B-61				
4. HOLE NO. (As shown on drawing title and file number) CB-265				13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN DISTURBED UNDISTURBED				
5. NAME OF DRILLER Mike McCarthy				14. TOTAL NUMBER CORE BOXES				
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.				15. ELEVATION GROUND WATER				
7. THICKNESS OF OVERBURDEN 2.0'				16. DATE HOLE STARTED 7-25-1996 COMPLETED 7-25-1996				
8. DEPTH DRILLED INTO ROCK 10.0'				17. ELEVATION TOP OF HOLE -45.5				
9. TOTAL DEPTH OF HOLE 12.0 ft.				18. TOTAL CORE RECOVERY FOR BORING 3.0 ft				
				19. SIGNATURE OF INSPECTOR S. Krajnik				
ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g	BLOW COUNT PER 0.5' h	
-45.5	0.0		Unconsolidated SAND & GRAVEL, bouncy drilling	No Recovery	-	5min for first 2.0'		
-46	1		Metasedimentary QUARTZITE-Gneiss with Hornblende & Biotite, dark minerals, rock is light gray quartz with dark bands, bedding trace or lineation ⑩ 70 degrees, hard, dense but highly fractured due to drilling, all fractures are fresh breaks due to drilling, longest piece 0.6'	33%	R-1	45 min for last 10.0'	<p>Natural fractures noted in depth column numerous mechanical fractures also present and attributed to drilling operations</p> <p>Core loss anticipated between -47.5 and -54.5; recovered core had extensive mechanical breaks between -54.5 and -57.5</p>	
-47	2							
-48	3							
-49	4							
-50	5							
-51	6							
-52	7							
-53	8							
-54	9							
-55	10							
-56	11							
-57	12		Bottom of hole ⑩ -57.5 below MLW					

DRILLING LOG		DIVISION North Atlantic Division		INSTALLATION North Atlantic - Philadelphia		SHEET 1 OF 1 SHEETS	
1. PROJECT Delaware River Channel Deepening Study				10. SIZE AND TYPE OF BIT Roller Bit & NXM Bit			
2. LOCATION (Coordinates or Station) Delaware River N 362,409.5 E 245,239.9				11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MLW			
3. DRILLING AGENCY Warren George Inc				12. MANUFACTURER'S DESIGNATION OF DRILL Barge Mounted Mobile B-61			
4. HOLE NO. (As shown on drawing title and file number) CB-266				13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN DISTURBED UNDISTURBED			
5. NAME OF DRILLER Mike McCarthy				14. TOTAL NUMBER CORE BOXES			
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.				15. ELEVATION GROUND WATER			
7. THICKNESS OF OVERBURDEN 4.6'				16. DATE HOLE STARTED 7-25-1996 COMPLETED 7-25-1996			
8. DEPTH DRILLED INTO ROCK 7.5'				17. ELEVATION TOP OF HOLE -45.4			
9. TOTAL DEPTH OF HOLE 12.1 ft.				18. TOTAL CORE RECOVERY FOR BORING ff			
				19. SIGNATURE OF INSPECTOR S. Krajnik			
ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g	BLOW COUNT PER 0.5' h
-45.4	0.0		SAND & GRAVEL, irregular drilling	No Recovery	-	10min for 4.6'	
-46	1						
-47	2						
-48	3						
-49	4		Quartzitic GNEISS, light gray, hard, dense with minor amounts of Hornblende and some very fine mica flakes, mostly fragmental recovery, most fractures are fresh due to drilling, slightly brown iron stain at top of core, longest piece 0.4' (hard, moderately weathered)	22.6%	R-1	25 min for 7.5'	
-50	5						
-51	6						
-52	7						
-53	8						
-54	9						
-55	10						
-56	11						
-57	12	Bottom of Hole @ -57.5 below MLW					

DRILLING LOG		DIVISION North Atlantic Division		INSTALLATION North Atlantic - Philadelphia		SHEET 1 OF 1 SHEETS	
1. PROJECT Delaware River Channel Deepening Study				10. SIZE AND TYPE OF BIT NXM Bit			
2. LOCATION (Coordinates or Station) Delaware River N 362,791.1 E 245,737.8				11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MLW			
3. DRILLING AGENCY Warren George Inc				12. MANUFACTURER'S DESIGNATION OF DRILL Mobile B-61 Barge Mtd			
4. HOLE NO. (As shown on drawing title and file number) CB-267				13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN DISTURBED : UNDISTURBED :			
5. NAME OF DRILLER Mike McCarthy				14. TOTAL NUMBER CORE BOXES			
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.				15. ELEVATION GROUND WATER			
7. THICKNESS OF OVERBURDEN 14.6				16. DATE HOLE STARTED : 7-25-1996 COMPLETED : 7-25-1996			
8. DEPTH DRILLED INTO ROCK 0.7'				17. ELEVATION TOP OF HOLE -42.6			
9. TOTAL DEPTH OF HOLE 15.3 ft.				18. TOTAL CORE RECOVERY FOR BORING ft			
				19. SIGNATURE OF INSPECTOR S. Krajnik			
ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g	BLOW COUNT PER 0.5' h
-42.6	0.0		Soft SILT				
-43	1						
-44	2						
-45	3						
-46	4						
-47	5		Unconsolidated SAND & GRAVEL, rapid drilling	7.2%	R-1	Hot, Cloudy; Pay 11.0'; bedrock from -54.9 to -55.1 estimated to be friable, weathered and was washed away; 47 min for 11.0'	
-48	6						
-49	7						
-50	8						
-51	9						
-52	10						
-53	11						
-54	12						
-55	13						
-56	14		Medium to dark gray GNEISS-Quartz-Hornblende, very hard, dense, lamination almost vertical, very slightly weathered with brown staining, some very fine mica noted, fragmental recovery, longest piece 0.2'				
-57	15		Bottom of Hole @ -56.9 below MLW				

DRILLING LOG		DIVISION North Atlantic Division		INSTALLATION North Atlantic - Philadelphia		SHEET 1 OF 1 SHEETS		
1. PROJECT Delaware River Channel Deepening Study				10. SIZE AND TYPE OF BIT NXM Bit				
2. LOCATION (Coordinates or Station) Delaware River N 362,520.7 E 246,354.6				11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MLW				
3. DRILLING AGENCY Warren George Inc				12. MANUFACTURER'S DESIGNATION OF DRILL Barge Mounted Mobile B-61				
4. HOLE NO. (As shown on drawing title and file number) CB-268				13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN DISTURBED UNDISTURBED				
5. NAME OF DRILLER Mike McCarthy				14. TOTAL NUMBER CORE BOXES				
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.				15. ELEVATION GROUND WATER				
7. THICKNESS OF OVERBURDEN 4.0'				16. DATE HOLE STARTED 8-6-1996 COMPLETED 8-6-1996				
8. DEPTH DRILLED INTO ROCK 8.1'				17. ELEVATION TOP OF HOLE -43.6				
9. TOTAL DEPTH OF HOLE 12.1 ft.				18. TOTAL CORE RECOVERY FOR BORING ff				
				19. SIGNATURE OF INSPECTOR S. Krajnik				
ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g	BLOW COUNT PER 0.5' h	
-43.6	0.0		SAND & GRAVEL (anticipated to extend to a depth of -47.6	12.1%	R-1			
-44	1							
-45	2							
-46	3							
-47	4							
-48	5			QUARTZITE, large pieces of Quartzite gravel was jammed in bit and it reamed out the boring, no rock recovery, only three pieces of Quartzite gravel recovered				
-49	6							
-50	7							
-51	8							
-52	9							
-53	10							
-54	11							
-55	12							
			Bottom of Hole @ -55.7 below MLW					

DRILLING LOG		DIVISION North Atlantic Division		INSTALLATION North Atlantic - Philadelphia		SHEET 1 OF 1 SHEETS	
1. PROJECT Delaware River Channel Deepening Study				10. SIZE AND TYPE OF BIT Roller Bit			
2. LOCATION (Coordinates or Station) Delaware River N 363,336.0 E 246,300.9				11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MLW			
3. DRILLING AGENCY Warren George Inc				12. MANUFACTURER'S DESIGNATION OF DRILL Barge Mounted Mobile B-61			
4. HOLE NO. (As shown on drawing title and file number) CB-269				13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN : DISTURBED : UNDISTURBED			
5. NAME OF DRILLER Mike McCarthy				14. TOTAL NUMBER CORE BOXES			
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.				15. ELEVATION GROUND WATER			
7. THICKNESS OF OVERBURDEN 10.0'				16. DATE HOLE : STARTED : COMPLETED 7-25-1996 7-25-1996			
8. DEPTH DRILLED INTO ROCK -				17. ELEVATION TOP OF HOLE -45.2			
9. TOTAL DEPTH OF HOLE 10.0 ft.				18. TOTAL CORE RECOVERY FOR BORING 0.0 ft			
				19. SIGNATURE OF INSPECTOR S. Krajnik			
ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g	BLOW COUNT PER 0.5' h
-45.2	0.0		SAND & GRAVEL Irregular penetration resistance	No Recovery	-	Drill Time 12min	
-46	1						
-47	2						
-48	3						
-49	4						
-50	5						
-51	6						
-52	7						
-53	8						
-54	9						
-55	10		Bottom of Hole @ -55.2 below MLW				

DRILLING LOG		DIVISION North Atlantic Division		INSTALLATION North Atlantic - Philadelphia		SHEET 1 OF 1 SHEETS	
1. PROJECT Delaware River Channel Deepening Study				10. SIZE AND TYPE OF BIT NXM Bit			
2. LOCATION (Coordinates or Station) Delaware River N 364,360.2 E 248,388.9				11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MLW			
3. DRILLING AGENCY Warren George Inc				12. MANUFACTURER'S DESIGNATION OF DRILL Barge Mounted Mobile B-61			
4. HOLE NO. (As shown on drawing title and file number) CB-270				13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN : DISTURBED : UNDISTURBED			
5. NAME OF DRILLER Mike McCarthy				14. TOTAL NUMBER CORE BOXES			
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.				15. ELEVATION GROUND WATER			
7. THICKNESS OF OVERBURDEN -				16. DATE HOLE : STARTED : COMPLETED 7-30-1996 7-30-1996			
8. DEPTH DRILLED INTO ROCK 8.7'				17. ELEVATION TOP OF HOLE -44.4			
9. TOTAL DEPTH OF HOLE 8.7 ft.				18. TOTAL CORE RECOVERY FOR BORING 1.2 ft			
				19. SIGNATURE OF INSPECTOR S. Krajnik			
ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g	BLOW COUNT PER 0.5' h
-44.4	0.0		Weathered GNEISS, friable, washes away in drilling with wobbly drill string,	13%	R-1	Flood Tide with Swift Current; Bent 4" casing & sheared one piece partially at joint; Prevented drilling hole to -55.0 Drilled fairly rapidly to -51.9 with no recovery	
-45	1						
-46	2						
-47	3						
-48	4						Coreloss zone -44.4' to -51.8'
-49	5						
-50	6						
-51	7						
-52	8		At -51.8' becomes hard QUARTZITE, very hard, dense, badly fractured due to drilling, few standard fracture surfaces, longest piece 0.35'			Natural fractures noted in depth column numerous mechanical fractures also present and attributed to drilling operations	
-53			Bottom of Hole @ -53.1 below MLW				

DRILLING LOG		DIVISION North Atlantic Division		INSTALLATION North Atlantic - Philadelphia		SHEET OF 1 SHEETS	
1. PROJECT Delaware River Channel Deepening Study				10. SIZE AND TYPE OF BIT Roller Bit & NXM Bit			
2. LOCATION (Coordinates or Station) Delaware River N 365,946.5 E 249,592.1				11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MLW			
3. DRILLING AGENCY Warren George Inc				12. MANUFACTURER'S DESIGNATION OF DRILL Barge Mounted Mobile B-61			
4. HOLE NO. (As shown on drawing title and file number) CB-271				13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN DISTURBED UNDISTURBED			
5. NAME OF DRILLER Mike McCarthy				14. TOTAL NUMBER CORE BOXES			
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED <input type="checkbox"/> DEG. FROM VERT.				15. ELEVATION GROUND WATER			
7. THICKNESS OF OVERBURDEN 10.6'				16. DATE HOLE STARTED 7-26-1996 COMPLETED 7-26-1996			
8. DEPTH DRILLED INTO ROCK 1.6'				17. ELEVATION TOP OF HOLE -45.5			
9. TOTAL DEPTH OF HOLE 12.2 ft.				18. TOTAL CORE RECOVERY FOR BORING 1.6 ft			
				19. SIGNATURE OF INSPECTOR S. Krajnik			
ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g	BLOW COUNT PER 0.5' h
-45.5	0.0		SAND & GRAVEL, rapid drilling	No Recovery	-	20min for first 10.6' using roller-bit	
-46	1						
-47	2						
-48	3						
-49	4						
-50	5						
-51	6						
-52	7						
-53	8						
-54	9						
-55	10					Natural fractures noted in depth column numerous mechanical fractures also present and attributed to drilling operations	
-56	11		Light gray Quartzitic GNEISS with bands of Hornblende (dark gray), very hard, dense, slightly iron stained at top & locally, muscovite & pyrite noted, metasedimentary fractures are MBs at top	100%	R-1	Lineation inclined 70°	
-57	12		Bottom of Hole @ -57.7 below MLW				



DRILLING LOG		DIVISION North Atlantic Division		INSTALLATION North Atlantic - Philadelphia		SHEET OF 1 SHEETS	
1. PROJECT Delaware River Channel Deepening Study				10. SIZE AND TYPE OF BIT Roller Bit & NXM Bit			
2. LOCATION (Coordinates or Station) Delaware River N 365,828.7 E 249,963.0				11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MLW			
3. DRILLING AGENCY Warren George Inc				12. MANUFACTURER'S DESIGNATION OF DRILL Barge Mounted Mobile B-61			
4. HOLE NO. (As shown on drawing title and file number) CB-272				13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN DISTURBED UNDISTURBED			
5. NAME OF DRILLER John Klinger				14. TOTAL NUMBER CORE BOXES			
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.				15. ELEVATION GROUND WATER			
7. THICKNESS OF OVERBURDEN -				16. DATE HOLE STARTED 7-27-1996 COMPLETED 7-27-1996			
8. DEPTH DRILLED INTO ROCK 12.0'				17. ELEVATION TOP OF HOLE -44.0			
9. TOTAL DEPTH OF HOLE 12.0 ft.				18. TOTAL CORE RECOVERY FOR BORING 9.8 ft			
				19. SIGNATURE OF INSPECTOR S. Krajnik			
ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g	BLOW COUNT PER 0.5' h
-44.0	0.0		Weathered GNEISS, soft, very rapid drilling	No Recovery	-	3min for first 2.0'	
-45	1						
-46	2						
-47	3	MB	GNEISS-Quartz-Biotite, gray-black, massive, very hard, dense, lineation varies from vertical to 8 degrees at -49.0 back to vertical at -51.0 and 80 degrees at -54.0, minor amounts of muscovite mica appears locally, moderately fractured to highly fractured between -49.0 to -50.0, all fractures are MBs due to drilling, fractures are predominately horizontal to 10 degrees, longest piece 1.1'	98%	R-1	0.2' Coreloss at top 41 min for last 10.0'	
-48	4	MBs				Natural fractures noted in depth column numerous mechanical fractures also present and attributed to drilling operations	
-49	5	MB					
-50	6	MBs					
-51	7	MB					
-52	8	MB					
-53	9	MB					
-54	10	MB					
-55	11	MB					
-56	12		Bottom of Hole @ -56.0 below MLW				

DRILLING LOG		DIVISION North Atlantic Division		INSTALLATION North Atlantic - Philadelphia		SHEET 1 OF 1 SHEETS	
1. PROJECT Delaware River Channel Deepening Study				10. SIZE AND TYPE OF BIT NXM Bit			
2. LOCATION (Coordinates or Station) Delaware River N 366,051.7 E 250,079.2				11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MLW			
3. DRILLING AGENCY Warren George Inc				12. MANUFACTURER'S DESIGNATION OF DRILL Barge Mounted Mobile B-61			
4. HOLE NO. (As shown on drawing title and file number) CB-273				13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN : DISTURBED : UNDISTURBED			
5. NAME OF DRILLER Mike McCarthy				14. TOTAL NUMBER CORE BOXES			
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.				15. ELEVATION GROUND WATER			
7. THICKNESS OF OVERBURDEN -				16. DATE HOLE : STARTED : COMPLETED 7-26-1996 7-26-1996			
8. DEPTH DRILLED INTO ROCK 10.3'				17. ELEVATION TOP OF HOLE -44.6			
9. TOTAL DEPTH OF HOLE 10.3 ft.				18. TOTAL CORE RECOVERY FOR BORING 4.5 ft			
				19. SIGNATURE OF INSPECTOR S. Krajnik			
ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g	BLOW COUNT PER 0.5' h
-44.6	0.0		GNEISS-Quartz-Biotite, metasedimentary dip 60 degrees to 75 degrees to vertical, gray, very dense, hard, highly fractured due to wobbly drilling, some fractures lightly stained locally, brown iron stained. Bedding trace dips from vertical at -52.0 to 60 degrees at -54.0, most fractures are MBs due to drilling, longest piece 0.6'	43.7%	R-1	Coreloss in top of run probably weathered and friable and was washed away due to wobbly drilling string; 50 min for 10.3' Natural fractures noted in depth column numerous mechanical fractures also present and attributed to drilling operations	
-45	1						
-46	2						
-47	3						
-48	4						
-49	5						
-50	6						
-51	7						
-52	8						
-53	9						
-54	10		Bottom of Hole @ -54.9 Below MLW				



DRILLING LOG		DIVISION North Atlantic Division		INSTALLATION North Atlantic - Philadelphia		SHEET 1 OF 1 SHEETS	
1. PROJECT Delaware River Channel Deepening Study				10. SIZE AND TYPE OF BIT NXM Bit			
2. LOCATION (Coordinates or Station) Delaware River N 366,325.0 E 250,470.0				11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MLW			
3. DRILLING AGENCY Warren George Inc				12. MANUFACTURER'S DESIGNATION OF DRILL Barge Mounted Mobile B-61			
4. HOLE NO. (As shown on drawing title and file number) CB-274				13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN : DISTURBED : UNDISTURBED			
5. NAME OF DRILLER John Klinger				14. TOTAL NUMBER CORE BOXES			
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.				15. ELEVATION GROUND WATER			
7. THICKNESS OF OVERBURDEN -				16. DATE HOLE : STARTED : COMPLETED 7-27-1996 7-27-1996			
8. DEPTH DRILLED INTO ROCK 12.0'				17. ELEVATION TOP OF HOLE -43.2			
9. TOTAL DEPTH OF HOLE 12.0 ft.				18. TOTAL CORE RECOVERY FOR BORING 7.2 ft			
				19. SIGNATURE OF INSPECTOR S. Krajnik			
ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g	BLOW COUNT PER 0.5' h
-43.2	0.0		Predominately GNEISS-Biotite-Quartz, soft, weathered with brown iron stains, friable due to large amount of biotite mica and minor amount of muscovite mica, longest piece 3.0"	26%	R-1	1min/ft drillrate	
-44	1						
-45	2						
-46	3						
-47	4						
-48	5						
-49	6						
-50	7						
-51	8						
-52	9						
-53	10		GNEISS, same to 50.8', badly fractured	84%	R-2	Coreloss between -48.2 and -50.8; 35 min for last 7.0'	
-54	11		At -50.8 becomes massive QUARTZ-Biotite, hard, dense, 45 degree joints @ -52.5 to 52.8, 75 degree joints @ -54.5 to -55.2, lineation generally vertical, longest piece 1.9'			Natural fractures noted in depth column numerous mechanical fractures also present and attributed to drilling operations	
-55	12		Bottom of Hole @ -55.2 below MLW				

DRILLING LOG		DIVISION North Atlantic Division		INSTALLATION North Atlantic - Philadelphia		SHEET 1 OF 1 SHEETS	
1. PROJECT Delaware River Channel Deepening Study				10. SIZE AND TYPE OF BIT NXM Bit			
2. LOCATION (Coordinates or Station) Delaware River N 366,806.7 E 250,817.4				11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MLW			
3. DRILLING AGENCY Warren George Inc				12. MANUFACTURER'S DESIGNATION OF DRILL Barge Mounted Mobile B-61			
4. HOLE NO. (As shown on drawing title and file number) CB-275				13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN : DISTURBED : UNDISTURBED			
5. NAME OF DRILLER Mike McCarthy				14. TOTAL NUMBER CORE BOXES			
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.				15. ELEVATION GROUND WATER			
7. THICKNESS OF OVERBURDEN -				16. DATE HOLE : STARTED : COMPLETED 7-30-1996 7-30-1996			
8. DEPTH DRILLED INTO ROCK 10.5'				17. ELEVATION TOP OF HOLE -44.5			
9. TOTAL DEPTH OF HOLE 10.5 ft.				18. TOTAL CORE RECOVERY FOR BORING 7.5 ft			
				19. SIGNATURE OF INSPECTOR S. Krajnik			
ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g	BLOW COUNT PER 0.5' h
-44.5	0.0		Probably friable GNEISS, badly weathered, washed away, drilled fairly rapidly	71%	R-1	35min for 10.5'	
-45	1					Coreloss zone -44.5' to -47.3'	
-46	2		GNEISS-Quartz-Biotite, fragmental from -47.4 to -47.8, hard, dense, lineation from 45 degrees to 60 degrees between -48.0 and -49.0 becomes vertical to -55.0, slightly weathered fractures at -47.8 and at -50.2			Incipient fractures 45° and 60° between -48.0' and -49.0'	
-47	3						
-48	4	MB					
-49	5	MB				Natural fractures noted in depth column numerous mechanical fractures also present and attributed to drilling operations	
-50	6						
-51	7	MB					
-52	8						
-53	9						
-54	10		At -53.2, brown iron stains for several inches on either side of fractures 45 degree to 60 degree fractures are incipient. Longest piece 2.4'				
-55			Bottom of Hole @ -55.0 Below MLW				


DRILLING LOG		DIVISION North Atlantic Division		INSTALLATION North Atlantic - Philadelphia		SHEET OF 1 SHEETS	
1. PROJECT Delaware River Channel Deepening Study				10. SIZE AND TYPE OF BIT NXM Bit			
2. LOCATION (Coordinates or Station) Delaware River N 367,284.5 E 252,295.6				11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MLW			
3. DRILLING AGENCY Warren George Inc				12. MANUFACTURER'S DESIGNATION OF DRILL Barge Mounted Mobile B-61			
4. HOLE NO. (As shown on drawing title and file number) CB-276				13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN : DISTURBED : UNDISTURBED			
5. NAME OF DRILLER Mike McCarthy				14. TOTAL NUMBER CORE BOXES			
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.				15. ELEVATION GROUND WATER			
7. THICKNESS OF OVERBURDEN 0.7'				16. DATE HOLE : STARTED : COMPLETED 7-29-1996 7-29-1996			
8. DEPTH DRILLED INTO ROCK 9.2'				17. ELEVATION TOP OF HOLE -44.0			
9. TOTAL DEPTH OF HOLE 9.9 ft.				18. TOTAL CORE RECOVERY FOR BORING 8.2 ft			
				19. SIGNATURE OF INSPECTOR S. Krajnik			
ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g	BLOW COUNT PER 0.5' h
-44.0	0.0		SAND & GRAVEL	74%	R-1	0.7 coreloss -44.0' to -44.7'	
-45	1		Gray-Black GNEISS-Quartz-Biotite, minor amounts of muscovite mica, hard, dense, most fractures are MBs due to drilling, lineation predominately vertical but varies in places. vertical fractures from -45.1 to -45.3, irregular fractures 60 degrees between -46.4 and -46.8, longest piece 2.7'	100%	R-2	Natural fractures noted in depth column numerous mechanical fractures also present and attributed to drilling operations	
-46	2						
-47	3						
-48	4						
-49	5						
-50	6						
-51	7						
-52	8						
-53	9						
			Bottom of Hole @ -53.9 below MLW				











DRILLING LOG		DIVISION North Atlantic Division		INSTALLATION North Atlantic - Philadelphia		SHEET 1 OF 1 SHEETS	
1. PROJECT Delaware River Channel Deepening Study				10. SIZE AND TYPE OF BIT NXM Bit			
2. LOCATION (Coordinates or Station) Delaware River N 367,909.1 E 252,249.2				11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MLW			
3. DRILLING AGENCY Warren George Inc				12. MANUFACTURER'S DESIGNATION OF DRILL Barge Mounted Mobile B-61			
4. HOLE NO. (As shown on drawing title and file number) CB-277				13. TOTAL NO. OF OVERBURDEN : DISTURBED : UNDISTURBED SAMPLES TAKEN			
5. NAME OF DRILLER Mike McCarthy				14. TOTAL NUMBER CORE BOXES			
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.				15. ELEVATION GROUND WATER			
7. THICKNESS OF OVERBURDEN 8.2'				16. DATE HOLE : STARTED : COMPLETED 7-29-1996 7-29-1996			
8. DEPTH DRILLED INTO ROCK 1.6'				17. ELEVATION TOP OF HOLE -45.2			
9. TOTAL DEPTH OF HOLE 10.0 ft.				18. TOTAL CORE RECOVERY FOR BORING 1.8 ft			
				19. SIGNATURE OF INSPECTOR S. Krajnik			
ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g	BLOW COUNT PER 0.5' h
-45.2	0.0		SAND & GRAVEL, rapid drilling, Quartz gravel at top of run	18%	R-1	Coreloss from -45.2 to -53.4 5 min for 1st 5' run 23 min for 2nd 5' run Irregular drilling for 7 feet to -52.2 indicated sand & gravel then friable gneiss to -53.6	
-46	1						
-47	2						
-48	3						
-49	4						
-50	5						
-51	6						
-52	7						
-53	8		Metasedimentary GNEISS-Quartz-Biotite with traces of muscovite, lineation trace 60 degree dip, badly weathered with fragmental recovery from -54.7 to -54.9, longest piece 0.4', fragmental at bottom (MB)			Natural fractures noted in depth column numerous mechanical fractures also present and attributed to drilling operations	
-54	9						
-55	10						
			Bottom of Hole @ -55.2 below MLW				

DRILLING LOG		DIVISION North Atlantic Division		INSTALLATION North Atlantic - Philadelphia		SHEET 1 OF 1 SHEETS	
1. PROJECT Delaware River Channel Deepening Study				10. SIZE AND TYPE OF BIT NXM Bit			
2. LOCATION (Coordinates or Station) Delaware River N 368,025.1 E 253,294.9				11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MLW			
3. DRILLING AGENCY Warren George Inc				12. MANUFACTURER'S DESIGNATION OF DRILL Barge Mounted Mobile B-61			
4. HOLE NO. (As shown on drawing title and file number) CB-278				13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN : DISTURBED : UNDISTURBED			
5. NAME OF DRILLER Mike McCarthy				14. TOTAL NUMBER CORE BOXES			
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.				15. ELEVATION GROUND WATER			
7. THICKNESS OF OVERBURDEN 0.2'				16. DATE HOLE : STARTED : COMPLETED 8-1-1996 8-1-1996			
8. DEPTH DRILLED INTO ROCK 9.8'				17. ELEVATION TOP OF HOLE -43.7			
9. TOTAL DEPTH OF HOLE 10.0 ft.				18. TOTAL CORE RECOVERY FOR BORING 9.8 ft			
				19. SIGNATURE OF INSPECTOR S. Krajnik			
ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g	BLOW COUNT PER 0.5' h
-43.7	0.0		Quartzitic SANDSTONE*, minor amounts of Hornblende grains and Biotite and muscovite mica, hard, dense, moderately fractured with staining in fractures, most fractures essentially horizontal, faint trace of mineral, lineation almost vertical, longest piece 0.6'	92%	R-1	14min for 3.4'	
-44	1						
-45	2						
-46	3						
-47	4		Quartzitic SANDSTONE*, same as above to -49.8, moderately fractured with light staining, essentially horizontal fractures, an increase in muscovite mica	100%	R-2	*Sandstone appearance of metamorphic rock	
-48	5						
-49	6		At -49.8 is somewhat contorted and with an increase in Biotite and muscovite, some red hematite noted, lineation of minerals is varies and vertical, hard, dense, fractures rather easily from -49.8 to -51.8 and -53.0 to -53.7 where mica minerals are abundant, longest piece 1.1'			Natural fractures noted in depth column numerous mechanical fractures also present and attributed to drilling operations	
-50	7						
-51	8						
-52	9						
-53	10		Bottom of Hole @ -53.7 below MLW				

DRILLING LOG		DIVISION North Atlantic Division		INSTALLATION North Atlantic - Philadelphia		SHEET 1 OF 1 SHEETS	
1. PROJECT Delaware River Channel Deepening Study				10. SIZE AND TYPE OF BIT NXM Bit			
2. LOCATION (Coordinates or Station) Delaware River N 368,491.0 E 253,424.0				11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MLW			
3. DRILLING AGENCY Warren George Inc				12. MANUFACTURER'S DESIGNATION OF DRILL Barge Mounted Mobile B-61			
4. HOLE NO. (As shown on drawing title and file number) CB-279				13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN DISTURBED : UNDISTURBED :			
5. NAME OF DRILLER Mike McCarthy				14. TOTAL NUMBER CORE BOXES			
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.				15. ELEVATION GROUND WATER			
7. THICKNESS OF OVERBURDEN 3.0'				16. DATE HOLE STARTED : 8-1-1996 COMPLETED : 8-1-1996			
8. DEPTH DRILLED INTO ROCK 11.1'				17. ELEVATION TOP OF HOLE -43.7			
9. TOTAL DEPTH OF HOLE 14.1 ft.				18. TOTAL CORE RECOVERY FOR BORING 11.3 ft			
				19. SIGNATURE OF INSPECTOR S. Krajnik			
ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g	BLOW COUNT PER 0.5' h
-43.74	0.0		SAND & GRAVEL, piece of gray green Quartzite jammed in bit	0.066%	R-1	1min/ft drillrate	
-45	1					Coreloss zone -43.7' to -46.4'	
-46	2						
-47	3						
-48	4		Metasedimentary Quartzitic GNEISS with black Hornblende, salt and pepper appearance, muscovite mica present throughout as minor mineral locally more prevalent, light gray, hard, dense, partly weathered joints at -48.2 and -49.0 to -49.6, lineation or bedding trace not apparent, rock is badly fractured due to drilling most breaks are MBs, many like poker chips, weathered vertical fracture irregular from -48.8 to 49.6, fresh vertical irregular fractures from -50.0 to -50.4, longest piece 0.5'	100%	R-2	12 min for 3.7'	
-49	5						
-50	6						
-51	7						
-52	8						
-53	9						
-54	10						
-55	11						
-56	12						
-57	13						
	14						
			Bottom of Hole @ -57.8 below MLW				
















DRILLING LOG		DIVISION North Atlantic Division		INSTALLATION North Atlantic - Philadelphia		SHEET 1 OF 1 SHEETS	
1. PROJECT Delaware River Channel Deepening Study				10. SIZE AND TYPE OF BIT NXM Bit			
2. LOCATION (Coordinates or Station) Delaware River N 369,694.0 E 253,334.0				11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MLW			
3. DRILLING AGENCY Warren George Inc				12. MANUFACTURER'S DESIGNATION OF DRILL Barge Mounted Mobile B-61			
4. HOLE NO. (As shown on drawing title and file number) CB-280				13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN : DISTURBED : UNDISTURBED			
5. NAME OF DRILLER Mike McCarthy				14. TOTAL NUMBER CORE BOXES			
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.				15. ELEVATION GROUND WATER			
7. THICKNESS OF OVERBURDEN -				16. DATE HOLE : STARTED : COMPLETED 8-2-1996 8-2-1996			
8. DEPTH DRILLED INTO ROCK 10.3'				17. ELEVATION TOP OF HOLE -44.7			
9. TOTAL DEPTH OF HOLE 10.3 ft.				18. TOTAL CORE RECOVERY FOR BORING ff			
				19. SIGNATURE OF INSPECTOR S. Krajnik			
ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g	BLOW COUNT PER 0.5' h
-44.7 -45 -46 -47 -48 -49 -50 -51 -52 -53 -54 -55	0.0 1 2 3 4 5 6 7 8 9 10		Light gray metasedimentary GNEISS-Quartz-Hornblende with muscovite mica, few pieces of Quartz gravel at top, salt & pepper appearance, relatively soft and friable at top, saprolitic, rock became harder with depth @ -47.5, rock is badly fractured predominantly due to drilling, all breaks are MBs. Longest piece 1.1'	80.5%	R-1	5min for 1st 5' run, 14 min for remainder; 2' core loss due to washing away -44.7' to -46.7' Natural fractures noted in depth column numerous mechanical fractures also present and attributed to drilling operations	
			Bottom of Hole @ -55.0 below MLW				

DRILLING LOG		DIVISION North Atlantic Division		INSTALLATION North Atlantic - Philadelphia		SHEET 1 OF 1 SHEETS	
1. PROJECT Delaware River Channel Deepening Study				10. SIZE AND TYPE OF BIT NXM Bit			
2. LOCATION (Coordinates or Station) Delaware River N 369,002.1 E 253,850.6				11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MLW			
3. DRILLING AGENCY Warren George Inc				12. MANUFACTURER'S DESIGNATION OF DRILL Barge Mounted Mobile B-61			
4. HOLE NO. (As shown on drawing title and file number) CB-281				13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN : DISTURBED : UNDISTURBED			
5. NAME OF DRILLER Mike McCarthy				14. TOTAL NUMBER CORE BOXES			
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.				15. ELEVATION GROUND WATER			
7. THICKNESS OF OVERBURDEN 0.4'				16. DATE HOLE : STARTED : COMPLETED 8-2-1996 8-2-1996			
8. DEPTH DRILLED INTO ROCK 10.4'				17. ELEVATION TOP OF HOLE -44.2			
9. TOTAL DEPTH OF HOLE 10.8 ft.				18. TOTAL CORE RECOVERY FOR BORING 0.4 ft			
				19. SIGNATURE OF INSPECTOR S. Krajnik			
ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g	BLOW COUNT PER 0.5' h
-44.2	0.0		Metasedimentary Quartzitic GNEISS 0.4' recovery consisting of three pieces of Quartzite gravel, gravel jammed in bit and acted as a reamer and reamed out apparently soft, micaceous Quartz rock, probably saprolitic near top of the hole	3.7%	R-1	1min/ft drillrate for first 10' 3min for last 0.8' Coreloss zone -44.6' to -55.0'	
-45	1						
-46	2						
-47	3						
-48	4						
-49	5						
-50	6						
-51	7						
-52	8						
-53	9						
-54	10						
-55			Bottom of Hole @ -55.0 below MLW				

DRILLING LOG		DIVISION North Atlantic Division		INSTALLATION North Atlantic - Philadelphia		SHEET 1 OF 1 SHEETS	
1. PROJECT Delaware River Channel Deepening Study				10. SIZE AND TYPE OF BIT NXM Bit			
2. LOCATION (Coordinates or Station) Delaware River N 369,843.3 E 255,527.6				11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MLW			
3. DRILLING AGENCY Warren George Inc				12. MANUFACTURER'S DESIGNATION OF DRILL Barge Mounted Mobile B-61			
4. HOLE NO. (As shown on drawing title and file number) CB-282				13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN : DISTURBED : UNDISTURBED			
5. NAME OF DRILLER Mike McCarthy				14. TOTAL NUMBER CORE BOXES			
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.				15. ELEVATION GROUND WATER			
7. THICKNESS OF OVERBURDEN -				16. DATE HOLE : STARTED : COMPLETED 8-2-1996 8-2-1996			
8. DEPTH DRILLED INTO ROCK 9.3'				17. ELEVATION TOP OF HOLE -44.1			
9. TOTAL DEPTH OF HOLE 9.3 ft.				18. TOTAL CORE RECOVERY FOR BORING 7.7 ft			
				19. SIGNATURE OF INSPECTOR S. Krajnik			
ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g	BLOW COUNT PER 0.5' h
-44.1	0.0		SAND & GRAVEL, possibly friable rock, washed away due to drilling	79.4%	R-1	1.6' coreloss @ top of run from -44.1 to -45.7; 2min/ft drill rate; Pump stalling	
-45	1		GNEISS-Quartz-Biotite with minor amounts of muscovite mica, hard, dense, badly fractured in places due to drilling, lamination of minerals at 45 degrees, some standard fractures are essentially horizontal with many MBs, few fracture are 30 degrees to 45 degrees, slightly weathered in joints @ -46.5, -48.3, -48.8, 49.4 to -49.5, -50.6, -50.7, -53.1 (Largest rock fragment 0.8')			Natural fractures noted in depth column numerous mechanical fractures also present and attributed to drilling operations	
-46	2						
-47	3						
-48	4						
-49	5						
-50	6						
-51	7						
-52	8						
-53	9						
			Bottom of Hole @ -53.4 below MLW				

DRILLING LOG		DIVISION North Atlantic Division		INSTALLATION North Atlantic - Philadelphia		SHEET 1 OF 1 SHEETS	
1. PROJECT Delaware River Channel Deepening Study				10. SIZE AND TYPE OF BIT NXM Bit			
2. LOCATION (Coordinates or Station) Delaware River N 370,753.0 E 257,907.4				11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MLW			
3. DRILLING AGENCY Warren George Inc				12. MANUFACTURER'S DESIGNATION OF DRILL Barge Mounted Mobile B-61			
4. HOLE NO. (As shown on drawing title and file number) CB-283				13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN DISTURBED UNDISTURBED			
5. NAME OF DRILLER John Klinger				14. TOTAL NUMBER CORE BOXES			
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.				15. ELEVATION GROUND WATER			
7. THICKNESS OF OVERBURDEN 1.6'				16. DATE HOLE STARTED 8-3-1996 COMPLETED 8-3-1996			
8. DEPTH DRILLED INTO ROCK 9.8'				17. ELEVATION TOP OF HOLE -44.4			
9. TOTAL DEPTH OF HOLE 11.4 ft.				18. TOTAL CORE RECOVERY FOR BORING 11.1 ft			
				19. SIGNATURE OF INSPECTOR S. Krajnik			
ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g	BLOW COUNT PER 0.5' h
-44.4	0.0		CLAY, 1.6' thick, dark gray	100%	R-1	20 min for first 5.8'	
-45	1						
-46	2		GNEISS, gray black medley of Hornblende, Quartz, Biotite, very hard, dense, moderately fractured ranging between 0.2' and 0.8' long, very slightly weathered in joints, lineation @ approximately 60 degrees with most natural fractures parallel to lineation, longest piece 0.8', 0.3' left in hole				
-47	3						
-48	4						
-49	5						
-50	6						
-51	7			94.6%	R-2	36 min for last 5.6'	
-52	8					Natural fractures noted in depth column numerous mechanical fractures also present and attributed to drilling operations	
-53	9						
-54	10						
-55	11						
			Bottom of Hole @ -55.8 below MLW				

DRILLING LOG		DIVISION North Atlantic Division		INSTALLATION North Atlantic - Philadelphia		SHEET 1 OF 1 SHEETS	
1. PROJECT Delaware River Channel Deepening Study				10. SIZE AND TYPE OF BIT NXM Bit			
2. LOCATION (Coordinates or Station) Delaware River N 371,297.0 E 259,167.4				11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MLW			
3. DRILLING AGENCY Warren George Inc				12. MANUFACTURER'S DESIGNATION OF DRILL Barge Mounted Mobile B-61			
4. HOLE NO. (As shown on drawing title and file number) CB-284				13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN : DISTURBED : UNDISTURBED			
5. NAME OF DRILLER John Klinger				14. TOTAL NUMBER CORE BOXES			
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.				15. ELEVATION GROUND WATER			
7. THICKNESS OF OVERBURDEN -				16. DATE HOLE : STARTED : COMPLETED 8-3-1996 8-3-1996			
8. DEPTH DRILLED INTO ROCK 10.0'				17. ELEVATION TOP OF HOLE -45.0			
9. TOTAL DEPTH OF HOLE 10.0 ft.				18. TOTAL CORE RECOVERY FOR BORING 0.4 ft			
				19. SIGNATURE OF INSPECTOR S. Krajnik			
ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g	BLOW COUNT PER 0.5' h
-45.0	0.0		GNEISS, Quartz-Hornblende, medium gray, soft, slightly weathered, fine grained	4%	R-1	2 min for first 4.8'	
-46	1					10 min for last 5.2'	
-47	2					Coreloss zone -45.0' to -54.6'	
-48	3					Drilling very rapid indicating soft/weak rock material (very low recovery)	
-49	4						
-50	5						
-51	6						
-52	7						
-53	8						
-54	9						
-55	10		Bottom of Hole @ -55.0 Below MLW				

DRILLING LOG		DIVISION North Atlantic Division		INSTALLATION North Atlantic - Philadelphia		SHEET 1 OF 1 SHEETS	
1. PROJECT Delaware River Channel Deepening Study				10. SIZE AND TYPE OF BIT NXM Bit			
2. LOCATION (Coordinates or Station) Delaware River N 370,927.4 E 259,698.2				11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MLW			
3. DRILLING AGENCY Warren George Inc				12. MANUFACTURER'S DESIGNATION OF DRILL Barge Mounted Mobile B-61			
4. HOLE NO. (As shown on drawing title and file number) CB-285				13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN DISTURBED UNDISTURBED			
5. NAME OF DRILLER Mike McCarthy				14. TOTAL NUMBER CORE BOXES			
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.				15. ELEVATION GROUND WATER			
7. THICKNESS OF OVERBURDEN 5.1'				16. DATE HOLE STARTED 8-5-1996 COMPLETED 8-5-1996			
8. DEPTH DRILLED INTO ROCK 6.1'				17. ELEVATION TOP OF HOLE -45.9			
9. TOTAL DEPTH OF HOLE 11.2 ft.				18. TOTAL CORE RECOVERY FOR BORING 6.0 ft			
				19. SIGNATURE OF INSPECTOR S. Krajnik			
ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g	BLOW COUNT PER 0.5' h
-45.946	0.0		SAND & GRAVEL, possibly weathered Gneiss	53.5%	R-1	1min/ft drill rate for 1st 3.0' 18 min for next 2.0' 40 min for last 6.2' Coreloss from -45.9 to -51.0	
-47	1						
-48	2						
-49	3						
-50	4						
-51	5						
-51	5						
-51	5						
-51	5						
-52	6		GNEISS, Quartz-Hornblende, scattered Pyrite, very hard, dense, coarse grained, most fractures are essentially horizontal, fractured pieces range from 0.1' to 1.2' long			Natural fractures noted in depth column numerous mechanical fractures also present and attributed to drilling operations	
-53	7						
-54	8						
-55	9						
-56	10						
-57	11						
			Bottom of Hole @ 57.1 below MLW				

DRILLING LOG		DIVISION North Atlantic Division		INSTALLATION North Atlantic - Philadelphia		SHEET 1 OF 1 SHEETS	
1. PROJECT Delaware River Channel Deepening Study				10. SIZE AND TYPE OF BIT NXM Bit			
2. LOCATION (Coordinates or Station) Delaware River N 371,302.5 E 259,967.0				11. DATUM FOR ELEVATION SHOWN (TBM or MSL) MLW			
3. DRILLING AGENCY Warren George Inc				12. MANUFACTURER'S DESIGNATION OF DRILL Barge Mounted Mobile B-61			
4. HOLE NO. (As shown on drawing title and file number) CB-286				13. TOTAL NO. OF OVERBURDEN SAMPLES TAKEN DISTURBED UNDISTURBED			
5. NAME OF DRILLER Mike McCarthy				14. TOTAL NUMBER CORE BOXES			
6. DIRECTION OF HOLE <input checked="" type="checkbox"/> VERTICAL <input type="checkbox"/> INCLINED --- DEG. FROM VERT.				15. ELEVATION GROUND WATER			
7. THICKNESS OF OVERBURDEN 1.6'				16. DATE HOLE STARTED 8-5-1996 COMPLETED 8-5-1996			
8. DEPTH DRILLED INTO ROCK 8.6'				17. ELEVATION TOP OF HOLE -44.4			
9. TOTAL DEPTH OF HOLE 10.2 ft.				18. TOTAL CORE RECOVERY FOR BORING 8.4 ft			
				19. SIGNATURE OF INSPECTOR S. Krajnik			
ELEVATION a	DEPTH b	LEGEND c	CLASSIFICATION OF MATERIALS (Description) d	CORE RECOVERY e	BOX OR SAMPLE NO. f	REMARKS (Drilling time, water loss, depth weathering, etc., if significant) g	BLOW COUNT PER 0.5' h
-44.4	0.0		SAND & GRAVEL, possibly weathered Gneiss	82.3%	R-1	2min/ft for 1st 2.0' 12 min for 2nd 2.0' 62 min for last 6.2' 1.6' coreloss from -44.4 to -46.0	
-45	1		GNEISS, coarse grained Quartz-Biotite, minor amounts of Plagioclase, and scattered fine Pyrite, very hard, dense, most fractures are essentially horizontal and due to drilling, rock becomes fine grained from -52.6 to -54.6, most fractures range from 0.1' to 0.4', 0.2' left in hole				
-46	2						
-47	3						
-48	4						
-49	5						
-50	6						
-51	7						
-52	8						
-53	9						
-54	10						
			Bottom of Hole @ -54.6 below MLW				