ATTACHMENT 5C

Logs and Photographs of Geotechnical Test Pits

HALEY & ALDRICH

TEST PIT LOG

Test Pit No. **PDTP-01**

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PROJECT	OU-1 REMEDIATION, NYSDEC SITE #3-60-022	H&A FILE NO.	28612-111
LOCATION	1 RIVER STREET, HASTINGS-ON-HUDSON, NEW YORK	PROJECT MGR.	BRYAN SWEENEY
CLIENT	ATLANTIC RICHFIELD	FIELD REP	TIM ERICKSON
CONTRACTOR	AQUIFER DRILLING	DATE	11/9/2005
EQUIPMENT	JOHN DEERE STEEL TANK EXCAVATOR MODEL 160C LC	WEATHER	50 DEG, CLOUDY

Ground El.	3.41 ft.	Location	See Plan.	Groundwater depths/entry rates (in./min.):
El. Datum	NAVD88			Approx. 2 to 3 gpm at 4.0 ft

Depth (ft.)	Sample ID	Stratum Change Depth (ft.)	Visual Identification (density/consistency, color, GROUP NAME & SYMBOL, % oversized, maximum particle size, structure, odor, moisture, optional descriptions,	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines	Field Test Dilatancy	Field Test Toughness	Field Test Plasticity	Field Test Strength
		0.3	- ASPHALT PARKING LOT -										
		0.7	100% 3/4" diameter gravel sub-base for parking lot										
		1.5	- SUB BASE -										
2			Concrete pad present from 0.7 - 1.5 ft. Pad has a top layer that is 6 in. thick containing #3 bar (3/8" dia.). Bottom layer of pad is 3 in. thick containing #7 Bar (7/8" thick). - CONCRETE PAD -										
4			Brown, coarse to fine SAND, some silt and gravel, mps 24 in. (concrete), no structure, no odor, wet. 40% brick with 10% concrete, 10% cable and wire, traces of glass, wood, petroleum. Sheen seen on wet soil from 4 ft.	10	15	10	15	30	20				
6			- FILL-										
		6.5	Bottom of Exploration at 6.5 ft										

Notes:

Pile and horizontal cribbing system encountered starting at 1.9 ft. Vertical wood piles are 18 in. diameter at 5 ft centers (E to W), located in northern portion of test pit. A 12-in. square wood cribbing system appears to have been attached to the vertical pile at a depth of 3.4 ft. A horizontal 12-in. square wood beam is also present in the western side of the pit at depth 3.2 ft. The visible heave in the parking lot (located 14 ft east of the chain link fence) appears to be due to north/south trending 12 in. square cribbing system at a depth of 3.5 ft.

Using 3-in. trash pump, dewatered pit for 15 mins. Water level dropped from 2.7 ft to 5.2 ft bgs. Approx. 2000 gallons was pumped. Sidewalls remained stable during pumping. Water level returned to pre-pumping level after approx. 15 mins.

Samples taken include: one 5-gallon sample saturated soil; two 5-gallon samples water; one water sample for analytical analysis.

Obstructions:
Concrete slab; wood piles and cribbing

Remarks:
A minirae PID was used during excavation.
Maximum reading was 0.8 ppm.

Field Tests

Dilatancy:	R - Rapid S - Slow N- None
Toughness:	L - Low M - Medium H - High
Plasticity:	N - Nonplastic L - Low M - Medium H - High
Dry Strength:	N - None L - Low M - Medium H - High V - Very High

Standing water in completed pit:
at depth 2.9 ft.
measured after 0.5 hrs. elapsed

Boulders:

Diameter (in.)	Number		Approx. vol. (cu. ft.)
12 to 24	3	=	5
over 24	0	=	0

Test Pit Dimensions (ft.):
Pit Depth 6.5
Pit Length X Width 15.7 x 11.2

NOTE: Soil identifications based on visual/manual methods of the Modified Burmister system as practiced by Haley & Aldrich

Form #3008

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TEST PIT LOG

Test Pit No. **PDTP-02**

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PROJECT	OU-1 REMEDIATION, NYSDEC SITE #3-60-022	H&A FILE NO.	28612-111
LOCATION	1 RIVER STREET, HASTINGS-ON-HUDSON, NEW YORK	PROJECT MGR.	BRYAN SWEENEY
CLIENT	ATLANTIC RICHFIELD	FIELD REP	TIM ERICKSON
CONTRACTOR	AQUIFER DRILLING	DATE	11/3/2005
EQUIPMENT	JOHN DEERE STEEL TANK EXCAVATOR MODEL 160C LC	WEATHER	40 DEG, SUNNY

Ground El.	4.51 ft.	Location	See Plan	Groundwater depths/entry rates (in./min.):
El. Datum	NAVD88			Approx. 10 gpm at 4.2 ft

Depth (ft.)	Sample ID	Stratum Change Depth (ft.)	Visual Identification (density/consistency, color, GROUP NAME & SYMBOL, % oversized, maximum particle size, structure, odor, moisture, optional descriptions,	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines	Field Test Dilatancy	Field Test Toughness	Field Test Plasticity	Field Test Strength
		1.3	100%, 1.5-in. diameter crushed gravel										
3			Brown and black, medium to fine SAND, some silt and gravel, trace coarse sand and cobbles, no boulders, trace wire, concrete, brick, glass, porcelain, furnace brick	15	10	5	20	25	25				
			- FILL -										
		4.9	Gray, well-sorted, fine GRAVEL, little coarse gravel and medium to fine sand, trace silt and coarse sand, water present at 4.2 ft. 30% concrete debris (dust & gravel), traces of brick, wire, clay pipe. Stratum change denoted by gravel and gray soil color, trace glass.	10	55	5	10	15	5				
6			- FILL -										
			Occasional bottles encountered in fill.										
9													
12													
		13											
			Bottom of Exploration at 13.0 ft										

Notes:

Samples taken include: two 5-gallon samples of water, two 5-gallon samples of saturated soil.

Using 3-in. trash pump, dewatered pit for 12 minutes. Water level dropped from 4.7 to 6.2 ft bgs. Approx. 1250 gallons were pumped. Sidewalls remained stable during pumping. Water level did not drop lower than 6.2 ft after 10 minutes of continuous pumping - gravel layer appears to be recharging the pit.

On extreme eastern portion of test pit, encountered 8-10 in. thick concrete slab reinforced with #5 bars, at depth 1.7 ft.

Minimum footprint of slab is estimated 13 ft E/W, 10.5 ft N/S.

Obstructions:
Concrete slab

Remarks:
A minirae PID was used during excavation.
Maximum reading was 2.7 ppm.

Field Tests

Dilatancy:	R - Rapid S - Slow N- None
Toughness:	L - Low M - Medium H - High
Plasticity:	N - Nonplastic L - Low M - Medium H - High
Dry Strength:	N - None L - Low M - Medium H - High V - Very High

Standing water in completed pit:
at depth 4.7 ft.
measured after 0.5 hrs. elapsed

Boulders:

Diameter (in.)	Number		Approx. vol. (cu. ft.)
12 to 24	1	=	2
over 24	0	=	0

Test Pit Dimensions (ft.):
Pit Depth 13.0
Pit Length X Width 14.5 (E/W) x 4.7 (N/S

NOTE: Soil identifications based on visual/manual methods of the Modified Burmister system as practiced by Haley & Aldrich

Form #3008

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TEST PIT LOG

Test Pit No. **PDTP-03**

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PROJECT	OU-1 REMEDIATION, NYSDEC SITE #3-60-022	H&A FILE NO.	28612-111
LOCATION	1 RIVER STREET, HASTINGS-ON-HUDSON, NEW YORK	PROJECT MGR.	BRYAN SWEENEY
CLIENT	ATLANTIC RICHFIELD	FIELD REP	TIM ERICKSON
CONTRACTOR	AQUIFER DRILLING	DATE	11/2/2005
EQUIPMENT	JOHN DEERE STEEL TANK EXCAVATOR MODEL 160C LC	WEATHER	55 DEG, SUNNY

Ground El.	5.43 ft.	Location	See Plan	Groundwater depths/entry rates (in./min.):
El. Datum	NAVD88			Approx. 15 gpm at 4.3 ft

Depth (ft.)	Sample ID	Stratum Change Depth (ft.)	Visual Identification (density/consistency, color, GROUP NAME & SYMBOL, % oversized, maximum particle size, structure, odor, moisture, optional descriptions,	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines	Field Test Dilatancy	Field Test Toughness	Field Test Plasticity	Field Test Strength
		1.5	Material from 0.0 - 1.5 ft is 100% 1.5 in. diam. GRAVEL, with occasional pieces of asphalt ranging in size from 3 in. to 18 in.										
2		2.7	Brown, fine SAND, little coarse to medium sand, some gravel, trace silt, no structure, slight petroleum odor. - FILL -	15	10	10	15	45	5				
4		4.5	Green and olive-gray, fine SAND, little coarse to medium sand, some gravel. 25% boulders, 10% cobbles, mps 24 in., no structure, slight petroleum odor, wet, 30% debris including brick, glass, wire, concrete - FILL - No voids or obstructions from 0-4.5	15	15	10	20	35	5				
6		6	100% COPPER WIRE										
8		9.7	Dark brown, coarse to fine SAND, some gravel, little silt, 35% boulders, 10% cobbles, mps 30 in., no structure, slight sheen on water at 4.5 ft, slight petroleum odor, wet at 4.5 ft. 50% debris including glass, wood, brick, concrete. -FILL-	15	15	10	25	20	15				
10		11	Gray and brown, fine GRAVEL, some coarse to fine sand, little coarse gravel, trace silt, 5% cobbles, mps 5 in., no structure, slight petroleum odor, wet. Diminishing amount of debris with increasing depth - FILL -	15	50	5	15	10	5				
12			Bottom of Exploration at 11 ft										

Notes:

Potential pile cap encountered in SW corner of pit. Concrete retaining wall trending E-W present in northern portion of pit. Boulders become present at 4.5 ft.

Two 5-gallon samples of water were obtained.

Obstructions:
Boulders, wire, old foundation units

Remarks:
A minirae PID was used during excavation.
Maximum reading was 4.7 ppm.

Field Tests

Dilatancy:	R - Rapid S - Slow N - None
Toughness:	L - Low M - Medium H - High
Plasticity:	N - Nonplastic L - Low M - Medium H - High
Dry Strength:	N - None L - Low M - Medium H - High V - Very High

Standing water in completed pit:
at depth 4.9 ft.
measured after 0.5 hrs. elapsed

Boulders:

Diameter (in.)	Number		Approx. vol. (cu. ft.)
12 to 24	17	=	25
over 24	3	=	12

Test Pit Dimensions (ft.):
Pit Depth 11.0
Pit Length X Width 14(N/S) x 9.7(E/W)

NOTE: Soil identifications based on visual/manual methods of the Modified Burmister system as practiced by Haley & Aldrich

Form #3008

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TEST PIT LOG

Test Pit No. **PDTP-04**

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PROJECT	OU-1 REMEDIATION, NYSDEC SITE #3-60-022	H&A FILE NO.	28612-111
LOCATION	1 RIVER STREET, HASTINGS-ON-HUDSON, NEW YORK	PROJECT MGR.	BRYAN SWEENEY
CLIENT	ATLANTIC RICHFIELD	FIELD REP	TIM ERICKSON
CONTRACTOR	AQUIFER DRILLING	DATE	11/9/2005
EQUIPMENT	JOHN DEERE STEEL TANK EXCAVATOR MODEL 160C LC	WEATHER	40 DEG, PARTLY SUNNY

Ground El.	6.05 ft.	Location	See Plan	Groundwater depths/entry rates (in./min.):
El. Datum	NAVD88			Approx. 2 gpm at 5.8 ft (entering from north end)

Depth (ft.)	Sample ID	Stratum Change Depth (ft.)	Visual Identification (density/consistency, color, GROUP NAME & SYMBOL, % oversized, maximum particle size, structure, odor, moisture, optional descriptions,	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines	Field Test Dilatancy	Field Test Toughness	Field Test Plasticity	Field Test Strength
		0.3	- ASPHALT PARKING LOT -										
		1	Gray-brown, medium to fine SAND, some gravel and silt, trace coarse sand, mps 1.5 in., no structure, no odor, dry, trace asphalt. - FILL -	20	15	5	15	25	20				
		1.2											
		1.6	- ASPHALT PARKING LOT - (original)										
2			- ASPHALT BRICKS - Consists of layer of horizontal 4 in. x 10 in. bricks. (a possible floor to an old building).										
		2.6	- BRICKS - Consists of 10-20% silty sand, 90% brick and brick fragments.										
		3.7	Gray-brown and black, medium to fine SAND, some silt and gravel, trace coarse sand, mps 1.5 in., no odor, wet. Alternating 2-3 in. layers of gray-brown and black soil indicates possible presence of organics, water, or contamination. - FILL -	10	10	5	15	25	35				
4													
6			Red-brown, SILT, some medium to fine sand, little gravel, mps 1.0 in., slightly cohesive, no odor, wet at 5.8 ft, traces of brick and brick dust. Brick dust is a pasty material below 5.8 ft. - FILL -	5	5		10	15	65				
8													
		9.5											
10			Bottom of Exploration at 9.5 ft										

Notes:

Past depth 8.2 ft, constant cave-in observed from 2.5 ft on north and south sides of test pit. Dewatering of pit not attempted due to unstable sides.

One 5-gallon sample of saturated soil was obtained.

Obstructions:
None

Remarks:
A minirae PID was used during excavation.
Maximum reading was 3.8 ppm.

Field Tests

Dilatancy:	R - Rapid S - Slow N- None
Toughness:	L - Low M - Medium H - High
Plasticity:	N - Nonplastic L - Low M - Medium H - High
Dry Strength:	N - None L - Low M - Medium H - High V - Very High

Standing water in completed pit:
at depth 5.7 ft.
measured after 0.2 hrs. elapsed

Boulders:

Diameter (in.)	Number		Approx. vol. (cu. ft.)
12 to 24	0	=	0
over 24	0	=	0

Test Pit Dimensions (ft.):
Pit Depth 9.5
Pit Length X Width 12.6E/W x 5.2N/S

NOTE: Soil identifications based on visual/manual methods of the Modified Burmister system as practiced by Haley & Aldrich

Form #3008

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TEST PIT LOG

Test Pit No. **PDTP-05**

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PROJECT	OU-1 REMEDIATION, NYSDEC SITE #3-60-022	H&A FILE NO.	28612-111
LOCATION	1 RIVER STREET, HASTINGS-ON-HUDSON, NEW YORK	PROJECT MGR.	BRYAN SWEENEY
CLIENT	ATLANTIC RICHFIELD	FIELD REP	TIM ERICKSON
CONTRACTOR	AQUIFER DRILLING	DATE	11/8/2005
EQUIPMENT	JOHN DEERE STEEL TANK EXCAVATOR MODEL 160C LC	WEATHER	60 DEG, PARTLY CLOUDY

Ground El.	7.17 ft.	Location	See Plan	Groundwater depths/entry rates (in./min.):
El. Datum	NAVD88			Approx. 3 gpm at 4.7 ft (entering from the east)

Depth (ft.)	Sample ID	Stratum Change Depth (ft.)	Visual Identification (density/consistency, color, GROUP NAME & SYMBOL, % oversized, maximum particle size, structure, odor, moisture, optional descriptions,	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines	Field Test Dilatancy	Field Test Toughness	Field Test Plasticity	Field Test Strength
		0.3-0.5	- CONCRETE -										
			Concrete slab varies in thickness from 0.3 - 0.5 ft, no rebar visible										
			Dark brown and black, coarse to fine SAND, some gravel and silt,										
2			5-10% cobbles, mps 6 in., no structure, no odor, moist. 25-35% of slag, ash,										
			glass, concrete, brick. - FILL -										
			Encountered a 1.5 ft x 5 ft x 2 ft wide piece of concrete sitting vertically in										
			the SE corner of the test pit.										
4			Encountered slab present throughout entire bottom of pit at 5.2 ft.										
			Slab appears to be comprised of granite blocks placed together side by side.										
		5.9											
6			Bottom of Exploration at 5.9 ft due to refusal on granite blocks										

Notes:

One 5-gallon sample of saturated soil was obtained.

Test pit does not cave in or collapse from 0.0-5.2 ft.

Dewatering of pit not attempted due to the very small amount of water above granite blocks upon completion.

Obstructions:
Granite slab, concrete

Remarks:
A minirae PID was used during excavation.
Maximum reading was 3.1 ppm.

Field Tests

Dilatancy:	R - Rapid S - Slow N- None
Toughness:	L - Low M - Medium H - High
Plasticity:	N - Nonplastic L - Low M - Medium H - High
Dry Strength:	N - None L - Low M - Medium H - High V - Very High

Standing water in completed pit:
at depth 5.6 ft.
measured after 0.2 hrs. elapsed

Boulders:

Diameter (in.)	Number		Approx. vol. (cu. ft.)
12 to 24	0	=	0
over 24	0	=	0

Test Pit Dimensions (ft.):
Pit Depth 5.9
Pit Length X Width 13.5x9.6

NOTE: Soil identifications based on visual/manual methods of the Modified Burmister system as practiced by Haley & Aldrich

Form #3008

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TEST PIT LOG

Test Pit No. **PDTP-06**

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PROJECT	OU-1 REMEDIATION, NYSDEC SITE #3-60-022	H&A FILE NO.	28612-111
LOCATION	1 RIVER STREET, HASTINGS-ON-HUDSON, NEW YORK	PROJECT MGR.	BRYAN SWEENEY
CLIENT	ATLANTIC RICHFIELD	FIELD REP	TIM ERICKSON
CONTRACTOR	AQUIFER DRILLING	DATE	11/8/2005
EQUIPMENT	JOHN DEERE STEEL TANK EXCAVATOR MODEL 160C LC	WEATHER	50 DEG, SUNNY

Ground El.	3.86 ft.	Location	See Plan	Groundwater depths/entry rates (in./min.):
El. Datum	NAVD88			Approx. 10 gpm at 4.2 ft

Depth (ft.)	Sample ID	Stratum Change Depth (ft.)	Visual Identification (density/consistency, color, GROUP NAME & SYMBOL, % oversized, maximum particle size, structure, odor, moisture, optional descriptions,	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines	Field Test Dilatancy	Field Test Toughness	Field Test Plasticity	Field Test Strength
		0.3	- ASPHALT SURFACE -										
		0.7	Gravel sub-base present from 0.3-0.7 ft, containing 100% 1.5-in. gravel										
			- SUB-BASE FILL -										
3			Yellow brown, coarse to fine SAND, some silt and gravel, 15% cobbles, mps 10 in., no structure, no odor, wet at 4.2 ft. 50% debris including brick (30%), concrete, wood, rebar. Wood has a creosote coating. Influx of water observed at 5.6 ft due to presence of an old utility corridor (presumed), water entering pit from southeast and east side. - FILL -										
6													
		7.5											
9			Brown and black, coarse to fine SAND, some silt and gravel, mps 6 in. (brick), no structure, creosote odor, wet. 25% ash, trace slag, concrete, 15% brick, trace glass bottles, shells at 10 ft. -FILL -										
12													
		13											
			Bottom of Exploration at 13 ft										

Notes:

Test pit has a tendency to collapse near the old utility corridor in the E-SE portion of pit from 3.7-7.5 ft depth. Actual pipe not visible but pathway for water exists (approx. 15 in. diam)

Water pumping started with test pit depth at 13.0 ft, water level at 3.7 ft. Using 3-in. trash pump, dewatered for 14 minutes. Water level was drawn down 2.3 ft to a depth of 6.0 ft. Removed approx. 3500 gallons of water. Time for water level to recover to pre-pumping level was approximatley 42 mins. Completed test pit has a very slight sheen on the surface. One 5-gallon bucket of saturated soil was obtained for testing

Obstructions:

Remarks:

A minirae PID was used during excavation.

Maximum reading was 1.5 ppm.

Field Tests

Dilatancy:	R - Rapid S - Slow N - None
Toughness:	L - Low M - Medium H - High
Plasticity:	N - Nonplastic L - Low M - Medium H - High
Dry Strength:	N - None L - Low M - Medium H - High V - Very High

Standing water in completed pit:

at depth 3.7 ft.

measured after 0.5 hrs. elapsed

Boulders:

Diameter (in.)	Number		Approx. vol. (cu. ft.)
12 to 24	0	=	0
over 24	0	=	0

Test Pit Dimensions (ft.):

Pit Depth 13.0

Pit Length X Width 14.2 x 6.7

NOTE: Soil identifications based on visual/manual methods of the Modified Burmister system as practiced by Haley & Aldrich

Form #3008

HALEY & ALDRICH

TEST PIT LOG

Test Pit No. **PDTP-07**

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PROJECT	OU-1 REMEDIATION, NYSDEC SITE #3-60-022	H&A FILE NO.	28612-111
LOCATION	1 RIVER STREET, HASTINGS-ON-HUDSON, NEW YORK	PROJECT MGR.	BRYAN SWEENEY
CLIENT	ATLANTIC RICHFIELD	FIELD REP	TIM ERICKSON
CONTRACTOR	AQUIFER DRILLING	DATE	11/10/2005
EQUIPMENT	JOHN DEERE STEEL TANK EXCAVATOR MODEL 160C LC	WEATHER	50 DEG, CLOUDY AND WINDY

Ground El.	3.96 ft.	Location	See Plan	Groundwater depths/entry rates (in./min.):
El. Datum	NAVD88			Approx. 25 gpm at 6.2 ft (river influence)

Depth (ft.)	Sample ID	Stratum Change Depth (ft.)	Visual Identification (density/consistency, color, GROUP NAME & SYMBOL, % oversized, maximum particle size, structure, odor, moisture, optional descriptions,	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines	Field Test Dilatancy	Field Test Toughness	Field Test Plasticity	Field Test Strength
		1.1	100% 1.5-in. diam. GRAVEL - FILL -										
3			Dark brown, medium to fine SAND, some silt and gravel, trace coarse sand, 5% boulders, 15% cobbles, mps 15 in., no structure, slight organic odor, wet. 35% debris including wire, metal pipes, brick, concrete, wood, bottles. A square (15 in.) pile observed in the SE of the test pit at a depth 3.2 ft	15	10	5	15	35	20				
6			- RIPRAP FILL -										
9		9.6											
			Bottom of Exploration at 9.6 ft										

Notes:

Test pit could not be excavated deeper than 9.6 ft due to constant influx of river water creating an unstable pit. Rip-rap & boulder layer is at least 9.6 ft deep.

No voids visible from 0 to 9.6 ft and pit did not collapse until the water table was encountered at 9.6 ft.

Obstructions:
Boulders, wood pile

Remarks:
A minirae PID was used during excavation.
Maximum reading was 0.4 ppm.

Field Tests

Dilatancy:	R - Rapid S - Slow N- None
Toughness:	L - Low M - Medium H - High
Plasticity:	N - Nonplastic L - Low M - Medium H - High
Dry Strength:	N - None L - Low M - Medium H - High V - Very High

Standing water in completed pit:
at depth 6.4 ft.
measured after 0.1 hrs. elapsed

Boulders:

Diameter (in.)	Number		Approx. vol. (cu. ft.)
12 to 24	2	=	5
over 24	0	=	0

Test Pit Dimensions (ft.):
Pit Depth 9.6
Pit Length X Width 11.7E/W x 8.4 N/S

NOTE: Soil identifications based on visual/manual methods of the Modified Burmister system as practiced by Haley & Aldrich

Form #3008

HALEY & ALDRICH

TEST PIT LOG

Test Pit No. **PDTP-08**

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PROJECT	OU-1 REMEDIATION, NYSDEC SITE #3-60-022	H&A FILE NO.	28612-111
LOCATION	1 RIVER STREET, HASTINGS-ON-HUDSON, NEW YORK	PROJECT MGR.	BRYAN SWEENEY
CLIENT	ATLANTIC RICHFIELD	FIELD REP	TIM ERICKSON
CONTRACTOR	AQUIFER DRILLING	DATE	11/10/2005
EQUIPMENT	JOHN DEERE STEEL TANK EXCAVATOR MODEL 160C LC	WEATHER	50 DEG, SUNNY

Ground El.	3.31 ft.	Location	See Plan	Groundwater depths/entry rates (in./min.):
El. Datum	NAVD88			Approx. 25 gpm at 3.2 ft, entering from the west

Depth (ft.)	Sample ID	Stratum Change Depth (ft.)	Visual Identification (density/consistency, color, GROUP NAME & SYMBOL, % oversized, maximum particle size, structure, odor, moisture, optional descriptions,	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines	Field Test Dilatancy	Field Test Toughness	Field Test Plasticity	Field Test Strength
		0.7	100% 1.5-in. diam. GRAVEL from 0.0 -0.7 ft - FILL -										
2			Dark brown, coarse to fine SAND, some silt and gravel, 30% boulders, 10% cobbles, mps 3.5 ft, no structure, moderate to strong fuel odor, wet at 3.2 ft. 25% debris including bricks, copper pipes, concrete, rope. Fuel-like substance present on water surface and on soil from 3.2-5.5 ft. - RIPRAP FILL -										
4		5.5											
6			Bottom of Exploration at 5.5 ft										

Notes:

Test pit was not excavated further than 5.5 ft due to fuel contamination and proximity of pit to the river.

Rip-rap was present in test pit from 0.7 - 5.5' with very minor voids present (less than 2 in. diameter)

Obstructions: Boulders

Remarks:
A minirae PID was used during excavation.
Maximum reading was 4.5 ppm.

Field Tests

Dilatancy:	R - Rapid S - Slow N - None
Toughness:	L - Low M - Medium H - High
Plasticity:	N - Nonplastic L - Low M - Medium H - High
Dry Strength:	N - None L - Low M - Medium H - High V - Very High

Standing water in completed pit:
at depth 3.2 ft.
measured after 0.1 hrs. elapsed

Boulders:

Diameter (in.)	Number		Approx. vol. (cu. ft.)
12 to 24	12	=	15.0
over 24	3	=	25.0

Test Pit Dimensions (ft.):
Pit Depth 5.5
Pit Length X Width 11.1x6.5

NOTE: Soil identifications based on visual/manual methods of the Modified Burmister system as practiced by Haley & Aldrich

Form #3008

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TEST PIT LOG

Test Pit No. **PDTP-09**

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PROJECT	OU-1 REMEDIATION, NYSDEC SITE #3-60-022	H&A FILE NO.	28612-111
LOCATION	1 RIVER STREET, HASTINGS-ON-HUDSON, NEW YORK	PROJECT MGR.	BRYAN SWEENEY
CLIENT	ATLANTIC RICHFIELD	FIELD REP	TIM ERICKSON
CONTRACTOR	AQUIFER DRILLING	DATE	11/10/2005
EQUIPMENT	JOHN DEERE STEEL TANK EXCAVATOR MODEL 160C LC	WEATHER	50 DEG, P. SUNNY

Ground El.	3.46 ft.	Location	See Plan	Groundwater depths/entry rates (in./min.):
El. Datum	NAVD88			Approx. 30 gpm at 2.9 ft, entering from the west (river side)

Depth (ft.)	Sample ID	Stratum Change Depth (ft.)	Visual Identification (density/consistency, color, GROUP NAME & SYMBOL, % oversized, maximum particle size, structure, odor, moisture, optional descriptions,	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines	Field Test Dilatancy	Field Test Toughness	Field Test Plasticity	Field Test Strength
		0.4	100% 1.5-in. diam. GRAVEL - FILL -										
2		2.6	Brown and dark brown, coarse to fine SAND, some gravel, little silt, 10% boulders, 25% cobbles, mps 3 ft, no structure, creosote and petroleum odor, wet at 2.9 ft. 20% debris including brick, concrete, wood and wood piles, wire and glass. - RIPRAP FILL -	15	10	10	15	35	15				
4			Similar to above except no boulders/riprap. - FILL -										
6		5.9	Bottom of Exploration at 5.9 ft										

Notes:

Excavation terminated at 5.9 ft due to a large amount of water inflow, which continuously collapsed the test pit.

Rip-rap present from 0.4 to 2.6 ft - no rip-rap observed below 2.6 ft.

15-in. square wood piles observed attached to horizontal 12-in. square wood beams. The wood members appear to be part of a buried wharf system.

Obstructions:
Boulders, wood piles/ abandoned wharf structure

Remarks: None
A minirae PID was used during excavation.
Maximum reading was 6.2 ppm.

Field Tests

Dilatancy:	R - Rapid S - Slow N- None
Toughness:	L - Low M - Medium H - High
Plasticity:	N - Nonplastic L - Low M - Medium H - High
Dry Strength:	N - None L - Low M - Medium H - High V - Very High

Standing water in completed pit:
at depth 2.9 ft.
measured after 0.1 hrs. elapsed

Boulders:

Diameter (in.)	Number		Approx. vol. (cu. ft.)
12 to 24	6		10
over 24	1	=	10

Test Pit Dimensions (ft.):
Pit Depth 5.9
Pit Length X Width 10.5 x 7.2

NOTE: Soil identifications based on visual/manual methods of the Modified Burmister system as practiced by Haley & Aldrich

Form #3008

HALEY & ALDRICH

TEST PIT LOG

Test Pit No. **PDTP-10**

Page 1 of 1

PROJECT	OU-1 REMEDIATION, NYSDEC SITE #3-60-022	H&A FILE NO.	28612-111
LOCATION	1 RIVER STREET, HASTINGS-ON-HUDSON, NEW YORK	PROJECT MGR.	BRYAN SWEENEY
CLIENT	ATLANTIC RICHFIELD	FIELD REP	TIM ERICKSON
CONTRACTOR	AQUIFER DRILLING	DATE	11/11/2005
EQUIPMENT	JOHN DEERE STEEL TANK EXCAVATOR MODEL 160C LC	WEATHER	40 DEG, WINDY AND SUNNY

Ground El.	4.03 ft.	Location	See Plan	Groundwater depths/entry rates (in./min.):
El. Datum	NAVD88			Approx. 1-2 gpm at 6.9 ft, entering from west

Depth (ft.)	Sample ID	Stratum Change Depth (ft.)	Visual Identification (density/consistency, color, GROUP NAME & SYMBOL, % oversized, maximum particle size, structure, odor, moisture, optional descriptions,	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines	Field Test Dilatancy	Field Test Toughness	Field Test Plasticity	Field Test Strength
			100% 1.5-in. diam. GRAVEL - FILL -										
		1.9											
2			Dark brown, coarse to fine SAND, some gravel, little silt, 5% boulders, 10% cobbles, mps 18 in., no structure, strong creosote and petroleum odor, wet at 6.9 ft. 20-25% debris including concrete, brick, wood, copper pipe, steel cans. Fuel oil-like substance present at 7.5 ft. Wood pile system encountered approx. 1.5 ft west of building #53 slab at a depth of 3 ft, horizontal cross members present at 3 ft and 6.5 ft, coated with creosote. Foundation slab for building #53 is 2.5 ft thick. - FILL -	15	10	10	15	35	15				
4													
6													
8													
		8.5	Bottom of Exploration at 8.5 ft										

Obstructions:
Boulders, wood piles/ old foundation system

Remarks:
A minirae PID was used during excavation.
Maximum reading was 14.6 ppm.

Field Tests

Dilatancy:	R - Rapid S - Slow N- None
Toughness:	L - Low M - Medium H - High
Plasticity:	N - Nonplastic L - Low M - Medium H - High
Dry Strength:	N - None L - Low M - Medium H - High V - Very High

Standing water in completed pit:
at depth 7.7 ft.
measured after 0.5 hrs. elapsed

Boulders:

Diameter (in.)	Number		Approx. vol. (cu. ft.)
12 to 24	4	=	6
over 24	0	=	0

Test Pit Dimensions (ft.):
Pit Depth 8.5
Pit Length X Width 11N/S x 5.6E/W

NOTE: Soil identifications based on visual/manual methods of the Modified Burmister system as practiced by Haley & Aldrich

Form #3008

OU-1 Remediation, 1 River Street
Hastings-on-Hudson, New York
November 2005

Test Pit PDTP-1

Test Pit PDTP-1

OU-1 Remediation, 1 River Street
Hastings-on-Hudson, New York
November 2005

Test Pit PDTP-1

Test Pit PDTP-1

OU-1 Remediation, 1 River Street
Hastings-on-Hudson, New York
November 2005

Test Pit PDTP-1

Test Pit PDTP-1

OU-1 Remediation, 1 River Street
Hastings-on-Hudson, New York
November 2005

Test Pit PDTP-1

Test Pit PDTP-1

OU-1 Remediation, 1 River Street
Hastings-on-Hudson, New York
November 2005

Test Pit PDTP-1

OU-1 Remediation, 1 River Street
Hastings-on-Hudson, New York
November 2005

Test Pit PDTP-2

OU-1 Remediation, 1 River Street
Hastings-on-Hudson, New York
November 2005

Test Pit PDTP-3

Test Pit PDTP-3

OU-1 Remediation, 1 River Street
Hastings-on-Hudson, New York
November 2005

Test Pit PDTP-3

Test Pit PDTP-3

OU-1 Remediation, 1 River Street
Hastings-on-Hudson, New York
November 2005

Test Pit PDTP-3

Test Pit PDTP-3

OU-1 Remediation, 1 River Street
Hastings-on-Hudson, New York
November 2005

Test Pit PDTP-4

Test Pit PDTP-4

OU-1 Remediation, 1 River Street
Hastings-on-Hudson, New York
November 2005

Test Pit PDTP-4 Spoils

Test Pit PDTP-4

OU-1 Remediation, 1 River Street
Hastings-on-Hudson, New York
November 2005

Test Pit PDTP-5

Test Pit PDTP-5

OU-1 Remediation, 1 River Street
Hastings-on-Hudson, New York
November 2005

Test Pit PDTP-5

Test Pit PDTP-5

OU-1 Remediation, 1 River Street
Hastings-on-Hudson, New York
November 2005

Test Pit PDTP-5

OU-1 Remediation, 1 River Street
Hastings-on-Hudson, New York
November 2005

Test Pit PDTP-6

Test Pit PDTP-6

OU-1 Remediation, 1 River Street
Hastings-on-Hudson, New York
November 2005

Test Pit PDTP-7

Test Pit PDTP-7

OU-1 Remediation, 1 River Street
Hastings-on-Hudson, New York
November 2005

Test Pit PDTP-8

Test Pit PDTP-8

OU-1 Remediation, 1 River Street
Hastings-on-Hudson, New York
November 2005

Test Pit PDTP-8

OU-1 Remediation, 1 River Street
Hastings-on-Hudson, New York
November 2005

Test Pit PDTP-9

OU-1 Remediation, 1 River Street
Hastings-on-Hudson, New York
November 2005

Test Pit PDTP-10

Test Pit PDTP-10

ATTACHMENT 5D

Results of Geotechnical Laboratory Testing

Atterberg Limits

Advance Testing

3348 Route 208, Campbell Hall, NY 10916
Phone: 845-496-1600 Fax: 845-496-1398
42 Day Farm Road, West Stockbridge, MA 01266
Phone/Fax: 413-232-8566

Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Material:	092205-1400	**Project #:**	050584
Source:	PDGEO-1 U1, 35-37'	**ATC Lab No.:**	05-0856
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/3/2005	**Sampled By:**	H&A
Date Tested:	10/13/05	**Tested By:**	c.smith

REPORT OF ATTERBERG LIMITS TEST RESULTS

TEST METHOD: ASTM D4318; LL Method B

Lab Number:	05-0856	**Specification**
Liquid Limit:	33	
Plastic Limit:	23	
Plasticity Index:	10	

Notes: Values shown are percent moisture.
Customary.procedure is to round results to the nearest whole number.

Comments:

Report Reviewed By: _____

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Phone/Fax: 413-232-8566

Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Material:	092205-1355	**Project #:**	050584
Source:	PDGEO-1, U-3, 52-54'	**ATC Lab No.:**	05-0858
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	9/26/2005	**Sampled By:**	H&A
Date Tested:	10/13/05	**Tested By:**	C. Smith

REPORT OF ATTERBERG LIMITS TEST RESULTS

TEST METHOD: ASTM D4318; LL Method B

Lab Number:	05-0858	**Specification**
Liquid Limit:	27	
Plastic Limit:	18	
Plasticity Index:	9	

Notes: Values shown are percent moisture.
Customary procedure is to round results to the nearest whole number.

Comments:

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Phone/Fax: 413-232-8566

Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Material:	092205-1110	**Project #:**	050584
Source:	PDGEO-4, U-1, 36-38'	**ATC Lab No.:**	05-0859
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	9/28/2005	**Sampled By:**	H&A
Date Tested:	10/13/05	**Tested By:**	C. Smith

REPORT OF ATTERBERG LIMITS TEST RESULTS

TEST METHOD: ASTM D4318; LL Method B

Lab Number:	05-0859	**Specification**
Liquid Limit:	35	
Plastic Limit:	22	
Plasticity Index:	13	

Notes: Values shown are percent moisture.
Customary procedure is to round results to the nearest whole number.

Comments:

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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Material:	100305-1005	**Project #:**	050584
Source:	PDGEO4, 44'-46'	**ATC Lab No.:**	05-0925
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/8/2005	**Sampled By:**	Client
Date Tested:	11/18/05	**Tested By:**	C. Smith

REPORT OF ATTERBERG LIMITS TEST RESULTS

TEST METHOD: ASTM D4318; LL Method B

	Lab Number: 05-0925	Specification
Liquid Limit:	26	
Plastic Limit:	18	
Plasticity Index:	8	

Notes: Values shown are percent moisture.
Customary procedure is to round results to the nearest whole number.

Comments:

Report Reviewed By: _____

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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Material:	28'-30'	**Project #:**	050584
Source:	PDGE05-101905-1615	**ATC Lab No.:**	05-1009
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/19/2005	**Sampled By:**	Client
Date Tested:	12/21/05	**Tested By:**	M. Kennedy

REPORT OF ATTERBERG LIMITS TEST RESULTS

TEST METHOD: ASTM D4318; LL Method B

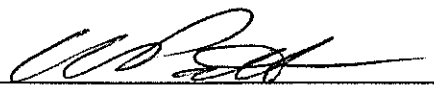
Lab Number:	05-1009	**Specification**
Liquid Limit:	40	
Plastic Limit:	27	
Plasticity Index:	13	

Notes: Values shown are percent moisture.
Customary procedure is to round results to the nearest whole number.

Estimated % of sample retained on the #40 sieve.

Comments:

No specifications available at time of testing.

Report Reviewed By: 

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Phone/Fax: 413-232-8566

Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Material:	30'-31'	**Project #:**	050584
Source:	PDGE06-101805-1425	**ATC Lab No.:**	05-1001
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/18/2005	**Sampled By:**	Client
Date Tested:	1/3/06	**Tested By:**	C. Smith

REPORT OF ATTERBERG LIMITS TEST RESULTS

TEST METHOD: ASTM D4318; LL Method B

Lab Number:	05-1001	**Specification**
Liquid Limit:	41	
Plastic Limit:	27	
Plasticity Index:	14	

Notes: Values shown are percent moisture.
Customary procedure is to round results to the nearest whole number.

Comments:

Report Reviewed By: D. O'Dell

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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Material:	28'-30'	**Project #:**	050584
Source:	PDGE07-101905-1100	**ATC Lab No.:**	05-1007
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/19/2005	**Sampled By:**	Client
Date Tested:	1/20/06	**Tested By:**	B. Jobity

REPORT OF ATTERBERG LIMITS TEST RESULTS

TEST METHOD: ASTM D4318; LL Method B

Lab Number:	05-1007	**Specification**
Liquid Limit:	47	
Plastic Limit:	28	
Plasticity Index:	19	

Notes: Values shown are percent moisture.
Customary procedure is to round results to the nearest whole number.

Comments:

Report Reviewed By: _____

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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Material:	100505-0815	**Project #:**	050584
Source:	PDGO9, 35'-37'	**ATC Lab No.:**	05-0926
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/5/2005	**Sampled By:**	Client
Date Tested:	11/18/05	**Tested By:**	C. Smith

REPORT OF ATTERBERG LIMITS TEST RESULTS

TEST METHOD: ASTM D4318; LL Method B

Lab Number:	05-0926	**Specification**
Liquid Limit:	51	
Plastic Limit:	29	
Plasticity Index:	22	

Notes: Values shown are percent moisture.
Customary procedure is to round results to the nearest whole number.

Comments:

Report Reviewed By: _____

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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Material:	100605-1035	**Project #:**	050584
Source:	PDGEO9, 46'-48'	**ATC Lab No.:**	05-0928
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/6/2005	**Sampled By:**	Client
Date Tested:	10/27/05	**Tested By:**	C. Smith

REPORT OF ATTERBERG LIMITS TEST RESULTS

TEST METHOD: ASTM D4318; LL Method B

Lab Number:	05-0928	**Specification**
Liquid Limit:	36	
Plastic Limit:	22	
Plasticity Index:	14	

Notes: Values shown are percent moisture.
Customary procedure is to round results to the nearest whole number.

Comments:

Report Reviewed By: D. O'Dell

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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Material:	100605-1300	**Project #:**	050584
Source:	PDGEO9, 54'-56'	**ATC Lab No.:**	05-0930
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/6/2005	**Sampled By:**	Client
Date Tested:	11/9/05	**Tested By:**	C. Smith

REPORT OF ATTERBERG LIMITS TEST RESULTS

TEST METHOD: ASTM D4318; LL Method B

Lab Number:	05-0930	**Specification**
Liquid Limit:	29	
Plastic Limit:	21	
Plasticity Index:	8	

Notes: Values shown are percent moisture.
Customary procedure is to round results to the nearest whole number.

Comments:

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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Material:	35'-37'	**Project #:**	050584
Source:	PDGE011-110105-1445	**ATC Lab No.:**	05-1166
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	11/1/2005	**Sampled By:**	Client
Date Tested:	1/20/06	**Tested By:**	B. Jobity

REPORT OF ATTERBERG LIMITS TEST RESULTS

TEST METHOD: ASTM D4318; LL Method B

Lab Number:	05-1166	**Specification**
Liquid Limit:	50	
Plastic Limit:	32	
Plasticity Index:	18	

Notes: Values shown are percent moisture.
Customary procedure is to round results to the nearest whole number.

Comments:

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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Material:	43'-45'	**Project #:**	050584
Source:	PDGE011-110105-1530	**ATC Lab No.:**	05-1168
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	11/1/2005	**Sampled By:**	Client
Date Tested:	1/10/06	**Tested By:**	C. Smith

REPORT OF ATTERBERG LIMITS TEST RESULTS

TEST METHOD: ASTM D4318; LL Method B

Lab Number:	05-1168	**Specification**
Liquid Limit:	46	
Plastic Limit:	29	
Plasticity Index:	17	

Notes: Values shown are percent moisture.
Customary procedure is to round results to the nearest whole number.

Comments:

Report Reviewed By: _____

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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Material:	101305-1140	**Project #:**	050584
Source:	PDGEO13, 44'-46'	**ATC Lab No.:**	05-0918
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/13/2005	**Sampled By:**	Client
Date Tested:	11/18/05	**Tested By:**	C. Smith

REPORT OF ATTERBERG LIMITS TEST RESULTS

TEST METHOD: ASTM D4318; LL Method A

Lab Number:	05-0918	**Specification**
Liquid Limit:	34	
Plastic Limit:	20	
Plasticity Index:	14	

Notes: Values shown are percent moisture.
Customary procedure is to round results to the nearest whole number.

Comments:

Report Reviewed By: _____

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Phone/Fax: 413-232-8566

Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Material:	101405-0840	**Project #:**	050584
Source:	PDGEO13, 58'-60'	**ATC Lab No.:**	05-0920
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/14/2005	**Sampled By:**	Client
Date Tested:	11/22/05	**Tested By:**	C. Smith

REPORT OF ATTERBERG LIMITS TEST RESULTS

TEST METHOD: ASTM D4318; LL Method B

Lab Number:	05-0920	**Specification**
Liquid Limit:	34	
Plastic Limit:	20	
Plasticity Index:	14	

Notes: Values shown are percent moisture.
Customary procedure is to round results to the nearest whole number.

Comments:

Report Reviewed By: _____

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Phone/Fax: 413-232-8566

Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Material:	092205-1100	**Project #:**	050584
Source:	PDGEO-16, U1, 38-40'	**ATC Lab No.:**	05-0860
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	9/30/2005	**Sampled By:**	H&A
Date Tested:	10/19/05	**Tested By:**	C. Smith

REPORT OF ATTERBERG LIMITS TEST RESULTS

TEST METHOD: ASTM D4318; LL Method B

Lab Number:	05-0860	**Specification**
Liquid Limit:	51	
Plastic Limit:	28	
Plasticity Index:	23	

Notes: Values shown are percent moisture.
Customary procedure is to round results to the nearest whole number.

Comments:

Report Reviewed By: D. O'Dell

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Phone/Fax: 413-232-8566

Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Material:	100505-1345	**Project #:**	050584
Source:	PDGEO17, 42'-44'	**ATC Lab No.:**	05-0922
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/5/2005	**Sampled By:**	Client
Date Tested:	11/9/05	**Tested By:**	C. Smith

REPORT OF ATTERBERG LIMITS TEST RESULTS

TEST METHOD: ASTM D4318; LL Method B

Lab Number:	05-0922	**Specification**
Liquid Limit:	60	
Plastic Limit:	33	
Plasticity Index:	27	

Notes: Values shown are percent moisture.
Customary procedure is to round results to the nearest whole number.

Comments:

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Phone/Fax: 413-232-8566

Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Material:	100505-1130	**Project #:**	050584
Source:	PDGEO17, 54'-56'	**ATC Lab No.:**	05-0924
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/6/2005	**Sampled By:**	Client
Date Tested:	11/2/05	**Tested By:**	B. Jobity

REPORT OF ATTERBERG LIMITS TEST RESULTS

TEST METHOD: ASTM D4318; LL Method B

Lab Number:	05-0924	**Specification**
Liquid Limit:	28	
Plastic Limit:	21	
Plasticity Index:	7	

Notes: Values shown are percent moisture.
Customary procedure is to round results to the nearest whole number.

Comments:

D. O'Dell

Report Reviewed By: _____

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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Material:	35'-37'	**Project #:**	050584
Source:	PDGE19-101905-1045	**ATC Lab No.:**	05-1004
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/19/2005	**Sampled By:**	Client
Date Tested:	1/3/06	**Tested By:**	C. Smith

REPORT OF ATTERBERG LIMITS TEST RESULTS

TEST METHOD: ASTM D4318; LL Method B

Lab Number:	05-1004	**Specification**
Liquid Limit:	41	
Plastic Limit:	24	
Plasticity Index:	17	

Notes: Values shown are percent moisture.
Customary procedure is to round results to the nearest whole number.

Comments:

Report Reviewed By: D. O'Dell

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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Material:	45'-47'	**Project #:**	050584
Source:	PDGE19-101905-1230	**ATC Lab No.:**	05-1006
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/19/2005	**Sampled By:**	Client
Date Tested:	1/3/06	**Tested By:**	C. Smith

REPORT OF ATTERBERG LIMITS TEST RESULTS

TEST METHOD: ASTM D4318; LL Method B

Lab Number:	05-1006	**Specification**
Liquid Limit:	40	
Plastic Limit:	24	
Plasticity Index:	16	

Notes: Values shown are percent moisture.
Customary procedure is to round results to the nearest whole number.

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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Material:	101305-1145	**Project #:**	050584
Source:	PDGEO20, 42'-44'	**ATC Lab No.:**	05-0921
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/13/2005	**Sampled By:**	Client
Date Tested:	11/20/05	**Tested By:**	C. Smith

REPORT OF ATTERBERG LIMITS TEST RESULTS

TEST METHOD: ASTM D4318; LL Method B

Lab Number:	05-0921	**Specification**
Liquid Limit:	43	
Plastic Limit:	24	
Plasticity Index:	19	

Notes: Values shown are percent moisture.
Customary procedure is to round results to the nearest whole number.

Comments:

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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Material:	25'-27'	**Project #:**	050584
Source:	PDGEO021-103105-1330	**ATC Lab No.:**	05-1152
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/31/2005	**Sampled By:**	Client
Date Tested:	1/20/06	**Tested By:**	B. Jobity

REPORT OF ATTERBERG LIMITS TEST RESULTS

TEST METHOD: ASTM D4318; LL Method B

Lab Number:	05-1152	**Specification**
Liquid Limit:	62	
Plastic Limit:	32	
Plasticity Index:	30	

Notes: Values shown are percent moisture.
Customary procedure is to round results to the nearest whole number.

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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Material:	34'-36'	**Project #:**	050584
Source:	PDGE021-110205-1540	**ATC Lab No.:**	05-1161
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	11/2/2005	**Sampled By:**	Client
Date Tested:	1/20/06	**Tested By:**	B. Jobity

REPORT OF ATTERBERG LIMITS TEST RESULTS

TEST METHOD: ASTM D4318; LL Method B

Lab Number:	05-1161	**Specification**
Liquid Limit:	34	
Plastic Limit:	23	
Plasticity Index:	11	

Notes: Values shown are percent moisture.
Customary procedure is to round results to the nearest whole number.

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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Material:	42'-44'	**Project #:**	050584
Source:	PDGE021-110205-1430	**ATC Lab No.:**	05-1163
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	11/2/2005	**Sampled By:**	Client
Date Tested:	1/22/06	**Tested By:**	C. Smith

REPORT OF ATTERBERG LIMITS TEST RESULTS

TEST METHOD: ASTM D4318; LL Method B

Lab Number:	05-1163	**Specification**
Liquid Limit:	32	
Plastic Limit:	23	
Plasticity Index:	9	

Notes: Values shown are percent moisture.
Customary procedure is to round results to the nearest whole number.

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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Material:	61'-63'	**Project #:**	050584
Source:	PDGE021-110305-1015	**ATC Lab No.:**	05-1165
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	11/3/2005	**Sampled By:**	Client
Date Tested:	1/20/06	**Tested By:**	B. Jobity

REPORT OF ATTERBERG LIMITS TEST RESULTS

TEST METHOD: ASTM D4318; LL Method B

Lab Number:	05-1165	**Specification**
Liquid Limit:	38	
Plastic Limit:	21	
Plasticity Index:	17	

Notes: Values shown are percent moisture.
Customary procedure is to round results to the nearest whole number.

Comments:

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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Material:	34'-36'	**Project #:**	050584
Source:	PDGE22-102705-1110	**ATC Lab No.:**	05-1016
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/24/2005	**Sampled By:**	Client
Date Tested:	1/10/06	**Tested By:**	B. Jobity

REPORT OF ATTERBERG LIMITS TEST RESULTS

TEST METHOD: ASTM D4318; LL Method B

Lab Number:	05-1016	**Specification**
Liquid Limit:	58	
Plastic Limit:	32	
Plasticity Index:	26	

Notes: Values shown are percent moisture.
Customary procedure is to round results to the nearest whole number.

Comments:

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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Material:	24'-26'	**Project #:**	050584
Source:	PDGE23-102405-1540	**ATC Lab No.:**	05-1014
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/24/2005	**Sampled By:**	Client
Date Tested:	12/21/05	**Tested By:**	M. Kennedy

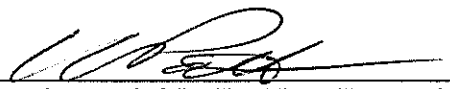
REPORT OF ATTERBERG LIMITS TEST RESULTS

TEST METHOD: ASTM D4318; LL Method B

Lab Number:	05-1014	**Specification**
Liquid Limit:	70	
Plastic Limit:	42	
Plasticity Index:	28	

Notes: Values shown are percent moisture.
Customary procedure is to round results to the nearest whole number.

Comments:

Report Reviewed By: 

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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Material:	35'-37'	**Project #:**	050584
Source:	PDGE23-102805-1020	**ATC Lab No.:**	05-1018
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/28/2005	**Sampled By:**	Client
Date Tested:	1/10/06	**Tested By:**	C. Smith

REPORT OF ATTERBERG LIMITS TEST RESULTS

TEST METHOD: ASTM D4318; LL Method B

Lab Number:	05-1018	**Specification**	
Liquid Limit:	48		Air-dry Sample
Plastic Limit:	30		
Plasticity Index:	18		

Lab Number:	05-1018-1	**Specification**	
Liquid Limit:	40		Oven-dry Sample
Plastic Limit:	28		
Plasticity Index:	12		

The ratio of the oven dry Liquid Limit value to the air dry value was >0.75. The ratio was 0.83. The soil therefore is classified as Inorganic, per ASTM D2487 (USCS).

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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Material:	42-44 ft	**Project #:**	050584
Source:	PDGEO24A-103105-1100	**ATC Lab No.:**	05-1156
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/31/2005	**Sampled By:**	Client
Date Tested:	1/20/06	**Tested By:**	B. Jobity

REPORT OF ATTERBERG LIMITS TEST RESULTS

TEST METHOD: ASTM D4318; LL Method B

Lab Number:	05-1156	**Specification**
Liquid Limit:	30	
Plastic Limit:	21	
Plasticity Index:	9	

Notes: Values shown are percent moisture.
Customary procedure is to round results to the nearest whole number.

Comments:

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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Material:	54'-56'	**Project #:**	050584
Source:	PDGE024A-103105-1300	**ATC Lab No.:**	05-1158
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/31/2005	**Sampled By:**	Client
Date Tested:	1/20/06	**Tested By:**	B. Jobity

REPORT OF ATTERBERG LIMITS TEST RESULTS

TEST METHOD: ASTM D4318; LL Method B

Lab Number:	05-1158	**Specification**
Liquid Limit:	37	
Plastic Limit:	22	
Plasticity Index:	15	

Notes: Values shown are percent moisture.
Customary procedure is to round results to the nearest whole number.

Comments:

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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Material:	74'-76'	**Project #:**	050584
Source:	PDGE024A-110205-1045	**ATC Lab No.:**	05-1160
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	11/2/2005	**Sampled By:**	Client
Date Tested:	1/20/06	**Tested By:**	B. Jobity

REPORT OF ATTERBERG LIMITS TEST RESULTS

TEST METHOD: ASTM D4318; LL Method B

Lab Number:	05-1160	**Specification**
Liquid Limit:	25	
Plastic Limit:	19	
Plasticity Index:	6	

Notes: Values shown are percent moisture.
Customary procedure is to round results to the nearest whole number.

Comments:

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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Material:	101105-0920	**Project #:**	050584
Source:	PDGEO28, 50'-52'	**ATC Lab No.:**	05-0916
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/11/2005	**Sampled By:**	Client
Date Tested:	11/20/05	**Tested By:**	C. Smith

REPORT OF ATTERBERG LIMITS TEST RESULTS

TEST METHOD: ASTM D4318; LL Method B

Lab Number:	05-0916	**Specification**
Liquid Limit:	30	
Plastic Limit:	20	
Plasticity Index:	10	

Notes: Values shown are percent moisture.
Customary procedure is to round results to the nearest whole number.

Comments:

Report Reviewed By: D. O'Dell

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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Material:	101005-1315	**Project #:**	050584
Source:	PDGEO28, 37'-39'	**ATC Lab No.:**	05-0931
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/10/2005	**Sampled By:**	Client
Date Tested:	11/22/05	**Tested By:**	C. Smith

REPORT OF ATTERBERG LIMITS TEST RESULTS

TEST METHOD: ASTM D4318; LL Method B

Lab Number:	05-0931	**Specification**
Liquid Limit:	44	
Plastic Limit:	27	
Plasticity Index:	17	

Notes: Values shown are percent moisture.
Customary procedure is to round results to the nearest whole number.

Comments:

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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Material:	45'-47'	**Project #:**	050584
Source:	PDGE029-102505-0245	**ATC Lab No.:**	05-1155
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/25/2005	**Sampled By:**	Client
Date Tested:	1/22/06	**Tested By:**	C. Smith

REPORT OF ATTERBERG LIMITS TEST RESULTS

TEST METHOD: ASTM D4318; LL Method B

Lab Number:	05-1155	**Specification**
Liquid Limit:	52	
Plastic Limit:	38	
Plasticity Index:	14	

Notes: Values shown are percent moisture.
Customary procedure is to round results to the nearest whole number.

Comments:

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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Material:	32'-34'	**Project #:**	050584
Source:	PDGE30-101805-1445	**ATC Lab No.:**	05-1002
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/18/2005	**Sampled By:**	Client
Date Tested:	1/3/06	**Tested By:**	C. Smith

REPORT OF ATTERBERG LIMITS TEST RESULTS

TEST METHOD: ASTM D4318; LL Method B

Lab Number:	05-1002	**Specification**	
Liquid Limit:	36		AIR-DRY SAMPLE
Plastic Limit:	22		
Plasticity Index:	14		

Lab Number:	05-1002-1	**Specification**	
Liquid Limit:	38		OVEN-DRY SAMPLE
Plastic Limit:	22		
Plasticity Index:	16		

Oven drying of the sample did not result in a reduction in the Liquid Limit value. The soil therefore is classified as Inorganic, per ASTM D2487 (USCS)

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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Material:	20-22'	**Project #:**	050584
Source:	PDGE31-102005-1115	**ATC Lab No.:**	05-1011
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/20/2005	**Sampled By:**	Client
Date Tested:	1/10/06	**Tested By:**	C. Smith

REPORT OF ATTERBERG LIMITS TEST RESULTS

TEST METHOD: ASTM D4318; LL Method B

Lab Number:	05-1011	**Specification**	
Liquid Limit:	64		Air-dry Sample
Plastic Limit:	36		
Plasticity Index:	28		

Lab Number:	05-1011-1	**Specification**	
Liquid Limit:	54		Oven-dry Sample
Plastic Limit:	34		
Plasticity Index:	20		

The ratio of the oven dry Liquid Limit value to the air dry value was >0.75. The ratio was 0.84. The soil therefore is classified as Inorganic, per ASTM D2487 (USCS).

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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Material:	30'-32'	**Project #:**	050584
Source:	PDGE31-102005-1415	**ATC Lab No.:**	05-1013-1
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/20/2005	**Sampled By:**	Client
Date Tested:	1/10/06	**Tested By:**	B. Jobity

REPORT OF ATTERBERG LIMITS TEST RESULTS

TEST METHOD: None; LL Method B

Lab Number:	05-1013-1	**Specification**	
Liquid Limit:	45		Air-Dry Sample
Plastic Limit:	27		
Plasticity Index:	18		

Lab Number:	05-1013	**Specification**	
Liquid Limit:	41		Oven-Dry Sample
Plastic Limit:	25		
Plasticity Index:	16		

The ratio of the oven dry Liquid Limit value to the air dry value was >0.75. The ratio was 0.91. The soil therefore is classified as Inorganic, per ASTM D2487 (USCS).

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Moisture Content

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Phone/Fax: 413-232-8566

Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Material:	65-67	**Project Number:**	050584
Source:	PDGE01-102705-0835	**Lab Number:**	05-1066
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/27/2005	**Sampled By:**	Client
Date Tested:	1/3/2006	**Tested By:**	C. Smith

Report of Natural Moisture Content of Soil and Rock

Test Method: ASTM D2216

Wet Weight (g):	217.3
Dry Weight (g):	191.4
% Nat. Moisture:	**13.5**

Specification:

Comments:

Report Reviewed By: _____

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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Material:	70-72	**Project Number:**	050584
Source:	PDGE01-102705-0845	**Lab Number:**	05-1067
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/27/2005	**Sampled By:**	Client
Date Tested:	1/3/2006	**Tested By:**	C. Smith

Report of Natural Moisture Content of Soil and Rock

Test Method: ASTM D2216

Wet Weight (g):	230.7
Dry Weight (g):	210.9
% Nat. Moisture:	**9.4**

Specification:

Comments:

Report Reviewed By: _____

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Phone/Fax: 413-232-8566

Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Material:	10-12 ft	**Project Number:**	050584
Source:	PDGE01-102105-1530	**Lab Number:**	05-1065
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/21/2005	**Sampled By:**	Client
Date Tested:	12/1/2005	**Tested By:**	C. Smith

Report of Natural Moisture Content of Soil and Rock

Test Method: ASTM D2216

Wet Weight (g):	202.0
Dry Weight (g):	149.3
% Nat. Moisture:	**35.3**

Specification:

Comments:

Report Reviewed By: _____

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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Material:	5-7 ft	**Project Number:**	050584
Source:	PDGE01-102105-1518	**Lab Number:**	05-1064
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/21/2005	**Sampled By:**	Client
Date Tested:	12/1/2005	**Tested By:**	C. Smith

Report of Natural Moisture Content of Soil and Rock

Test Method: ASTM D2216

Wet Weight (g):	234.0
Dry Weight (g):	187.3
% Nat. Moisture:	**24.9**

Specification:

Comments:

Report Reviewed By: _____

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Phone: 413-232-4040 Fax: 413-232-4141

Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Material:	092205-1400	**Project Number:**	050584
Source:	PDGEO-1 U1, 35-37'	**Lab Number:**	05-0856
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/3/2005	**Sampled By:**	H&A
Date Tested:	10/10/2005	**Tested By:**	C. Smith

Report of Natural Moisture Content of Soil and Rock

Test Method: ASTM D2216

Wet Weight (g):	442.4
Dry Weight (g):	292.3
% Nat. Moisture:	**51.4**

Specification:

Comments:

Report Reviewed By:

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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Material:	092205-1355	**Project Number:**	050584
Source:	PDGEO-1, U-3, 52-54'	**Lab Number:**	05-0858
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	9/26/2005	**Sampled By:**	H&A
Date Tested:	10/13/2005	**Tested By:**	C. Smith

Report of Natural Moisture Content of Soil and Rock

Test Method: ASTM D2216

Wet Weight (g):	380.5
Dry Weight (g):	257.9
% Nat. Moisture:	**47.5**

Specification:

Comments:

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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Material:	15-17	**Project Number:**	050584
Source:	PDGE04-092805-0845	**Lab Number:**	05-1068
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	9/28/2005	**Sampled By:**	Client
Date Tested:	1/3/2006	**Tested By:**	C. Smith

Report of Natural Moisture Content of Soil and Rock

Test Method: ASTM D2216

Wet Weight (g):	160.6
Dry Weight (g):	106.8
% Nat. Moisture:	**50.4**

Specification:

Comments:

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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Material:	46-48	**Project Number:**	050584
Source:	PDGE04-103005-1015	**Lab Number:**	05-1069
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/3/2005	**Sampled By:**	Client
Date Tested:	1/9/2006	**Tested By:**	C Smith

Report of Natural Moisture Content of Soil and Rock

Test Method: ASTM D2216

Wet Weight (g):	477.5
Dry Weight (g):	352.9
% Nat. Moisture:	**35.3**

Comments:

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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Material:	70-72	**Project Number:**	050584
Source:	PDGE04-100305-1420	**Lab Number:**	05-1043
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/3/2005	**Sampled By:**	Client
Date Tested:	11/29/2005	**Tested By:**	C. Smith

Report of Natural Moisture Content of Soil and Rock

Test Method: ASTM D2216

Wet Weight (g):	462.2
Dry Weight (g):	387.2
% Nat. Moisture:	**19.4**

Specification:

Comments:

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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Material:	75-77	**Project Number:**	050584
Source:	PDGE04-100405-0900	**Lab Number:**	05-1044
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/4/2005	**Sampled By:**	Client
Date Tested:	12/15/2005	**Tested By:**	C Smith

Report of Natural Moisture Content of Soil and Rock

Test Method: ASTM D2216

Wet Weight (g):	309.5
Dry Weight (g):	269.9
% Nat. Moisture:	**14.7**

Specification:

Comments:

No specifications available at time of testing.

Report Reviewed By:

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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Material:	092205-1110	**Project Number:**	050584
Source:	PDGEO-4, U-1, 36-38'	**Lab Number:**	05-0859
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	9/28/2005	**Sampled By:**	H&A
Date Tested:	10/10/2005	**Tested By:**	C. Smith

Report of Natural Moisture Content of Soil and Rock

Test Method: ASTM D2216

Wet Weight (g):	192.2
Dry Weight (g):	131.5
% Nat. Moisture:	**46.2**

Specification:

Comments:

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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Material:	100305-1005	**Project Number:**	050584
Source:	PDGEO4, 44'-46'	**Lab Number:**	05-0925
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/8/2005	**Sampled By:**	Client
Date Tested:	11/15/2005	**Tested By:**	C. Smith

Report of Natural Moisture Content of Soil and Rock

Test Method: ASTM D2216

Wet Weight (g):	528.5
Dry Weight (g):	384.7
% Nat. Moisture:	**37.4**

Comments: 'Average' material from Shelby tube. Sample ranged from silt to silty sand with abundant shell fragments.

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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Material:	28'-30'	**Project Number:**	050584
Source:	PDGE05-101905-1615	**Lab Number:**	05-1009
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/19/2005	**Sampled By:**	Client
Date Tested:	11/28/2005	**Tested By:**	C. Smith

Report of Natural Moisture Content of Soil and Rock

Test Method: ASTM D2216

Wet Weight (g):	211.0
Dry Weight (g):	138.2
% Nat. Moisture:	**52.7**

Specification:

Comments:

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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Material:	33'-35'	**Project Number:**	050584
Source:	PDGE05-101905-1645	**Lab Number:**	05-1010-1
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/19/2005	**Sampled By:**	Client
Date Tested:	11/23/2005	**Tested By:**	C Smith

Report of Natural Moisture Content of Soil and Rock

Test Method: ASTM D2216

Wet Weight (g):	337.7
Dry Weight (g):	223.6
% Nat. Moisture:	**51.0**

Specification:

Comments:

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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Material:	4-6 ft	**Project Number:**	050584
Source:	PDGE06-101805-1030	**Lab Number:**	05-1079
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/18/2005	**Sampled By:**	Client
Date Tested:	1/9/2006	**Tested By:**	B Jobity

Report of Natural Moisture Content of Soil and Rock

Test Method: ASTM D2216

Wet Weight (g):	274.9
Dry Weight (g):	216.8
% Nat. Moisture:	**26.8**

Comments:

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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Material:	30'-31'	**Project Number:**	050584
Source:	PDGE06-101805-1425	**Lab Number:**	05-1001
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/18/2005	**Sampled By:**	Client
Date Tested:	11/28/2005	**Tested By:**	C. Smith

Report of Natural Moisture Content of Soil and Rock

Test Method: ASTM D2216

Wet Weight (g):	370.1
Dry Weight (g):	263.5
% Nat. Moisture:	**40.5**

Specification:

Comments:

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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Material:	28'-30'	**Project Number:**	050584
Source:	PDGE07-101905-1100	**Lab Number:**	05-1007
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/19/2005	**Sampled By:**	Client
Date Tested:	11/28/2005	**Tested By:**	C. Smith

Report of Natural Moisture Content of Soil and Rock

Test Method: ASTM D2216

Wet Weight (g):	642.1
Dry Weight (g):	413.0
% Nat. Moisture:	**55.5**

Specification:

Comments:

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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Material:	33'-35'	**Project Number:**	050584
Source:	PDGE07-101905-1205	**Lab Number:**	05-1008
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/19/2005	**Sampled By:**	Client
Date Tested:	11/17/2005	**Tested By:**	C. Smith

Report of Natural Moisture Content of Soil and Rock

Test Method: ASTM D2216

Wet Weight (g):	350.7
Dry Weight (g):	216.4
% Nat. Moisture:	**62.1**

Specification:

Comments:

No specifications available at time of testing.

Report Reviewed By: _____

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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Material:	60-62	**Project Number:**	050584
Source:	PDGE09-100605-1320	**Lab Number:**	05-1055
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/6/2005	**Sampled By:**	Client
Date Tested:	12/28/2005	**Tested By:**	C. Smith

Report of Natural Moisture Content of Soil and Rock

Test Method: ASTM D2216

Wet Weight (g):	602.6
Dry Weight (g):	493.4
% Nat. Moisture:	**22.1**

Specification:

Comments:

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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Material:	68-70	**Project Number:**	050584
Source:	PDGE09-100705-0935	**Lab Number:**	05-1056
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/7/2005	**Sampled By:**	Client
Date Tested:	11/25/2005	**Tested By:**	C. Smith

Report of Natural Moisture Content of Soil and Rock

Test Method: ASTM D2216

Wet Weight (g):	561.7
Dry Weight (g):	452.5
% Nat. Moisture:	**24.1**

Specification:

Comments:

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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Material:	100505-0815	**Project Number:**	050584
Source:	PDGO9, 35'-37'	**Lab Number:**	05-0926
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/5/2005	**Sampled By:**	Client
Date Tested:	11/10/2005	**Tested By:**	C. Smith

Report of Natural Moisture Content of Soil and Rock

Test Method: ASTM D2216

Wet Weight (g):	380.9
Dry Weight (g):	239.7
% Nat. Moisture:	**58.9**

Specification:

Comments:

No specifications available at time of testing.

Report Reviewed By:

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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Material:	100505-0900	**Project Number:**	050584
Source:	PDGEO9, 40'-42'	**Lab Number:**	05-0927
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/5/2005	**Sampled By:**	Client
Date Tested:	11/14/2005	**Tested By:**	C. Smith

Report of Natural Moisture Content of Soil and Rock

Test Method: ASTM D2216

Wet Weight (g):	485.7
Dry Weight (g):	312.5
% Nat. Moisture:	**55.4**

Specification:

Comments:

No specifications available at time of testing.

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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Material:	100605-1035	**Project Number:**	050584
Source:	PDGEO9, 46-48ft	**Lab Number:**	05-0928
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/18/2005	**Sampled By:**	Client
Date Tested:	10/21/2005	**Tested By:**	C. Smith

Report of Natural Moisture Content of Soil and Rock

Test Method: ASTM D2216

Wet Weight (g):	315.3
Dry Weight (g):	218.9
% Nat. Moisture:	**44.0**

Specification:

Comments: Revised 12/8/05 - Source ID added.

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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Material:	100605-1115	**Project Number:**	050584
Source:	PDGEO9, 50'-52'	**Lab Number:**	05-0929
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/6/2005	**Sampled By:**	Client
Date Tested:	11/14/2005	**Tested By:**	C. Smith

Report of Natural Moisture Content of Soil and Rock

Test Method: ASTM D2216

Wet Weight (g):	595.2
Dry Weight (g):	403.5
% Nat. Moisture:	**47.5**

Specification:

Comments:

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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Material:	100605-1300	**Project Number:**	050584
Source:	PDGEO9, 54'-56'	**Lab Number:**	05-0930
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/6/2005	**Sampled By:**	Client
Date Tested:	11/4/2005	**Tested By:**	C. Smith

Report of Natural Moisture Content of Soil and Rock

Test Method: ASTM D2216

Wet Weight (g):	592.7
Dry Weight (g):	431.0
% Nat. Moisture:	**37.5**

Specification:

Comments:

No specifications available at time of testing.

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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Material:	35'-37'	**Project Number:**	050584
Source:	PDGE011-110105-1445	**Lab Number:**	05-1166
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	11/1/2005	**Sampled By:**	Client
Date Tested:	1/9/2006	**Tested By:**	C. Smith

Report of Natural Moisture Content of Soil and Rock

Test Method: ASTM D2216

Wet Weight (g):	441.7
Dry Weight (g):	277.6
% Nat. Moisture:	**59.1**

Specification:

Comments:

D. O'Dell

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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Material:	40-42'	**Project Number:**	050584
Source:	PDGE011-110105-1515	**Lab Number:**	05-1167
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	11/1/2005	**Sampled By:**	Client
Date Tested:	1/6/2006	**Tested By:**	B. Jobity

Report of Natural Moisture Content of Soil and Rock

Test Method: ASTM D2216

Wet Weight (g):	246.7
Dry Weight (g):	156.6
% Nat. Moisture:	**57.5**

Comments:

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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Material:	43'-45'	**Project Number:**	050584
Source:	PDGE011-110105-1530	**Lab Number:**	05-1168
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	11/1/2005	**Sampled By:**	Client
Date Tested:	12/30/2005	**Tested By:**	C. Smith

Report of Natural Moisture Content of Soil and Rock

Test Method: ASTM D2216

Wet Weight (g):	468.9
Dry Weight (g):	294.6
% Nat. Moisture:	**59.2**

Specification:

Comments:

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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Material:	51-53	**Project Number:**	050584
Source:	PDGE13-101305-1320	**Lab Number:**	05-1059
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/13/2005	**Sampled By:**	Client
Date Tested:	12/15/2005	**Tested By:**	C Smith

Report of Natural Moisture Content of Soil and Rock

Test Method: ASTM D2216

Wet Weight (g):	385.4
Dry Weight (g):	310.3
% Nat. Moisture:	**24.2**

Specification:

Comments:

No specifications available at time of testing.

Report Reviewed By: _____

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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Material:	70-72	**Project Number:**	050584
Source:	PDGE13-101405-1100	**Lab Number:**	05-1060
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/14/2005	**Sampled By:**	Client
Date Tested:	12/28/2005	**Tested By:**	C. Smith

Report of Natural Moisture Content of Soil and Rock

Test Method: ASTM D2216

Wet Weight (g):	427.8
Dry Weight (g):	384.2
% Nat. Moisture:	**11.3**

Specification:

Comments:

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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Material:	101405-0840	**Project Number:**	050584
Source:	PDGEO13, 58'-60'	**Lab Number:**	05-0920
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/14/2005	**Sampled By:**	Client
Date Tested:	11/12/2005	**Tested By:**	C. Smith

Report of Natural Moisture Content of Soil and Rock

Test Method: ASTM D2216

Wet Weight (g):	841.4
Dry Weight (g):	572.8
% Nat. Moisture:	**46.9**

Specification:

Comments:

No specifications available at time of testing.

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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Material:	101305-1315	**Project Number:**	050584
Source:	PDGEO13, 49'-51'	**Lab Number:**	05-0919
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/13/2005	**Sampled By:**	Client
Date Tested:	11/3/2005	**Tested By:**	C. Smith

Report of Natural Moisture Content of Soil and Rock

Test Method: ASTM D2216

Wet Weight (g):	504.4
Dry Weight (g):	319.3
% Nat. Moisture:	**58.0**

Specification:

Comments:

D. O'Dell

Report Reviewed By:

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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Material:	101305-1140	**Project Number:**	050584
Source:	PDGEO13, 44'-46'	**Lab Number:**	05-0918
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/13/2005	**Sampled By:**	Client
Date Tested:	11/14/2005	**Tested By:**	C. Smith

Report of Natural Moisture Content of Soil and Rock

Test Method: ASTM D2216

Wet Weight (g):	280.5
Dry Weight (g):	193.1
% Nat. Moisture:	**45.3**

Specification:

Comments:

No specifications available at time of testing.

Report Reviewed By: _____

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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Material:	33-35	**Project Number:**	050584
Source:	PDGE15-101405-1045	**Lab Number:**	05-1053
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/14/2005	**Sampled By:**	Client
Date Tested:	1/4/2006	**Tested By:**	C. Smith

Report of Natural Moisture Content of Soil and Rock

Test Method: ASTM D2216

Wet Weight (g):	340.4
Dry Weight (g):	208.6
% Nat. Moisture:	**63.2**

Specification:

Comments:

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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Material:	38-40	**Project Number:**	050584
Source:	PDGE15-101405-1100	**Lab Number:**	05-1054
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/14/2005	**Sampled By:**	Client
Date Tested:	12/15/2005	**Tested By:**	C Smith

Report of Natural Moisture Content of Soil and Rock

Test Method: ASTM D2216

Wet Weight (g):	369.7
Dry Weight (g):	290.2
% Nat. Moisture:	**27.4**

Specification:

Comments:

No specifications available at time of testing.

Report Reviewed By: _____

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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Material:	10-12 ft	**Project Number:**	050584
Source:	PDGE16-093005-0830	**Lab Number:**	05-1080
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	9/30/2005	**Sampled By:**	Client
Date Tested:	12/20/2005	**Tested By:**	C. Smith

Report of Natural Moisture Content of Soil and Rock

Test Method: ASTM D2216

Wet Weight (g):	210.4
Dry Weight (g):	178.1
% Nat. Moisture:	**18.1**

Specification:

Comments:

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Phone: 413-232-4040 Fax: 413-232-4141

Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Material:	092205-1100	**Project Number:**	050584
Source:	PDGEO-16, U1, 38-40'	**Lab Number:**	05-0860
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	9/30/2005	**Sampled By:**	H&A
Date Tested:	10/17/2005	**Tested By:**	C. Smith

Report of Natural Moisture Content of Soil and Rock

Test Method: ASTM D2216

Wet Weight (g):	464.4
Dry Weight (g):	297.2
% Nat. Moisture:	**56.3**

Specification:

Comments:

Report Reviewed By: D. O'Dell

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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Material:	100505-1345	**Project Number:**	050584
Source:	PDGEO17, 42'-44'	**Lab Number:**	05-0922
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/5/2005	**Sampled By:**	Client
Date Tested:	11/7/2005	**Tested By:**	C Smith

Report of Natural Moisture Content of Soil and Rock

Test Method: AASHTO T265

Wet Weight (g):	422.2
Dry Weight (g):	256.0
% Nat. Moisture:	**64.9**

Specification:

Comments:

No specifications available at time of testing.

Report Reviewed By: _____

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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Material:	100505-1430	**Project Number:**	050584
Source:	PDGEO17, 48'-50'	**Lab Number:**	05-0923
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/5/2005	**Sampled By:**	Client
Date Tested:	11/1/2005	**Tested By:**	C. Smith

Report of Natural Moisture Content of Soil and Rock

Test Method: ASTM D2216

Wet Weight (g):	406.8
Dry Weight (g):	291.6
% Nat. Moisture:	**39.5**

Specification:

Comments:

Report Reviewed By: D. O'Dell

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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Material:	5-7 ft	**Project Number:**	050584
Source:	PDGEO17-100305-1030	**Lab Number:**	05-1040
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/3/2005	**Sampled By:**	Client
Date Tested:	12/1/2005	**Tested By:**	C. Smith

Report of Natural Moisture Content of Soil and Rock

Test Method: ASTM D2216

Wet Weight (g):	327.2
Dry Weight (g):	298.8
% Nat. Moisture:	**9.5**

Specification:

Comments: Revised 1/6/05 - Sample ID ('Source') corrected.

Report Reviewed By: _____

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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Material:	60-62	**Project Number:**	050584
Source:	PDGE17-100505-1430	**Lab Number:**	05-1041
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/5/2005	**Sampled By:**	Client
Date Tested:	12/15/2005	**Tested By:**	C Smith

Report of Natural Moisture Content of Soil and Rock

Test Method: ASTM D2216

Wet Weight (g):	272.4
Dry Weight (g):	240.5
% Nat. Moisture:	**13.3**

Specification:

Comments:

No specifications available at time of testing.

Report Reviewed By: _____

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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Material:	70-72	**Project Number:**	050584
Source:	PDGE17-100605-1130	**Lab Number:**	05-1042
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/6/2005	**Sampled By:**	Client
Date Tested:	12/15/2005	**Tested By:**	C Smith

Report of Natural Moisture Content of Soil and Rock

Test Method: ASTM D2216

Wet Weight (g):	191.6
Dry Weight (g):	174.7
% Nat. Moisture:	**9.7**

Specification:

Comments:

No specifications available at time of testing.

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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Material:	100505-1130	**Project Number:**	050584
Source:	PDGEO17, 54'-56'	**Lab Number:**	05-0924
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/6/2005	**Sampled By:**	Client
Date Tested:	10/31/2005	**Tested By:**	C. Smith

Report of Natural Moisture Content of Soil and Rock

Test Method: ASTM D2216

Wet Weight (g):	438.1
Dry Weight (g):	288.1
% Nat. Moisture:	**52.1**

Comments:

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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Material:	15-17	**Project Number:**	050584
Source:	PDGE18-102005-1625	**Lab Number:**	05-1061
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/20/2005	**Sampled By:**	Client
Date Tested:	12/1/2005	**Tested By:**	C. Smith

Report of Natural Moisture Content of Soil and Rock

Test Method: ASTM D2216

Wet Weight (g):	240.6
Dry Weight (g):	163.7
% Nat. Moisture:	**47.0**

Specification:

Comments:

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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Material:	45-47	**Project Number:**	050584
Source:	PDGE18-102405-0845	**Lab Number:**	05-1062
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/24/2005	**Sampled By:**	Client
Date Tested:	1/3/2006	**Tested By:**	C. Smith

Report of Natural Moisture Content of Soil and Rock

Test Method: ASTM D2216

Wet Weight (g):	282.6
Dry Weight (g):	219.3
% Nat. Moisture:	**28.9**

Specification:

Comments:

Report Reviewed By: _____

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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Material:	35'-37'	**Project Number:**	050584
Source:	PDGE19-101905-1045	**Lab Number:**	05-1004
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/19/2005	**Sampled By:**	Client
Date Tested:	12/15/2005	**Tested By:**	C. Smith

Report of Natural Moisture Content of Soil and Rock

Test Method: ASTM D2216

Wet Weight (g):	344.1
Dry Weight (g):	216.6
% Nat. Moisture:	**58.9**

Specification:

Comments:

Report Reviewed By: D. O'Dell

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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Material:	45'-47'	**Project Number:**	050584
Source:	PDGE19-101905-1230	**Lab Number:**	05-1006
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/19/2005	**Sampled By:**	Client
Date Tested:	12/12/2005	**Tested By:**	C. Smith

Report of Natural Moisture Content of Soil and Rock

Test Method: ASTM D2216

Wet Weight (g):	387.7
Dry Weight (g):	255.6
% Nat. Moisture:	**51.7**

Specification:

Comments:

Report Reviewed By: D. O'Dell

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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Material:	10-12 ft	**Project Number:**	050584
Source:	PDGEO19-101905-0945	**Lab Number:**	05-1033
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/19/2005	**Sampled By:**	Client
Date Tested:	11/22/2005	**Tested By:**	C. Smith

Report of Natural Moisture Content of Soil and Rock

Test Method: ASTM D2216

Wet Weight (g):	110.2
Dry Weight (g):	76.3
% Nat. Moisture:	**44.4**

Specification:

Comments: Revised 12/8/05 - Sample depth corrected

Report Reviewed By: _____

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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Material:	62-64	**Project Number:**	050584
Source:	PDGE20-101705-0900	**Lab Number:**	05-1036
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/17/2005	**Sampled By:**	Client
Date Tested:	11/25/2005	**Tested By:**	C. Smith

Report of Natural Moisture Content of Soil and Rock

Test Method: ASTM D2216

Wet Weight (g):	489.7
Dry Weight (g):	399.3
% Nat. Moisture:	**22.6**

Specification:

Comments:

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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Material:	25-27	**Project Number:**	050584
Source:	PDGE20-101305-1015	**Lab Number:**	05-1035
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/13/2005	**Sampled By:**	Client
Date Tested:	11/23/2005	**Tested By:**	B. Jobity

Report of Natural Moisture Content of Soil and Rock

Test Method: ASTM D2216

Wet Weight (g):	264.4
Dry Weight (g):	198.0
% Nat. Moisture:	**33.5**

Specification:

Comments:

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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Material:	14-16	**Project Number:**	050584
Source:	PDGE20-101305-0930	**Lab Number:**	05-1034
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/13/2005	**Sampled By:**	Client
Date Tested:	11/22/2005	**Tested By:**	B. Jobity

Report of Natural Moisture Content of Soil and Rock

Test Method: ASTM D2216

Wet Weight (g):	236.6
Dry Weight (g):	175.1
% Nat. Moisture:	**35.1**

Specification:

Comments:

Report Reviewed By: _____

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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Material:	101305-1145	**Project Number:**	050584
Source:	PDGEO20, 42'-44'	**Lab Number:**	05-0921
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/13/2005	**Sampled By:**	Client
Date Tested:	11/11/2005	**Tested By:**	C. Smith

Report of Natural Moisture Content of Soil and Rock

Test Method: ASTM D2216

Wet Weight (g):	409.1
Dry Weight (g):	258.9
% Nat. Moisture:	**58.0**

Specification:

Comments:

Report Reviewed By: _____

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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Material:	34'-36'	**Project Number:**	050584
Source:	PDGE021-110205-1540	**Lab Number:**	05-1161
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	11/2/2005	**Sampled By:**	Client
Date Tested:	1/16/2006	**Tested By:**	C. Smith

Report of Natural Moisture Content of Soil and Rock

Test Method: ASTM D2216

Wet Weight (g):	503.6
Dry Weight (g):	313.2
% Nat. Moisture:	**60.8**

Specification:

Comments:

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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Material:	37'-39'	**Project Number:**	050584
Source:	PDGE021-110205-1400	**Lab Number:**	05-1162
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	11/2/2005	**Sampled By:**	Client
Date Tested:	1/18/2006	**Tested By:**	C. Smith

Report of Natural Moisture Content of Soil and Rock

Test Method: ASTM D2216

Wet Weight (g):	212.5
Dry Weight (g):	134.0
% Nat. Moisture:	**58.6**

Comments:

Report Reviewed By: _____

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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Material:	42'-44'	**Project Number:**	050584
Source:	PDGE021-110205-1430	**Lab Number:**	05-1163
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	11/2/2005	**Sampled By:**	Client
Date Tested:	1/18/2006	**Tested By:**	C. Smith

Report of Natural Moisture Content of Soil and Rock

Test Method: ASTM D2216

Wet Weight (g):	416.9
Dry Weight (g):	304.5
% Nat. Moisture:	**36.9**

Comments:

Report Reviewed By: _____

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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Material:	45'-47'	**Project Number:**	050584
Source:	PDGE021-110205-1445	**Lab Number:**	05-1164
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	11/2/2005	**Sampled By:**	Client
Date Tested:	12/27/2005	**Tested By:**	B Jobity

Report of Natural Moisture Content of Soil and Rock

Test Method: ASTM D2216

	Bottom	Middle	Top
Wet Weight (g):	127.5	131.8	324.9
Dry Weight (g):	98.8	82.3	233.6
% Nat. Moisture:	**29.0**	**60.1**	**39.1**

Specification:

Comments: Bottom portion of sample was sandy, with silt and small shells. Middle portion of sample was fine-grained. Top portion was fine-grained soil interlayered with more granular soil.

Report Reviewed By: _____

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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Material:	61'-63'	**Project Number:**	050584
Source:	PDGE021-110305-1015	**Lab Number:**	05-1165
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	11/3/2005	**Sampled By:**	Client
Date Tested:	1/13/2006	**Tested By:**	C. Smith

Report of Natural Moisture Content of Soil and Rock

Test Method: ASTM D2216

Wet Weight (g):	557.9
Dry Weight (g):	368.1
% Nat. Moisture:	**51.6**

Comments:

Report Reviewed By: _____

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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Material:	25'-27'	**Project Number:**	050584
Source:	PDGE021-103105-1330	**Lab Number:**	05-1152
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/31/2005	**Sampled By:**	Client
Date Tested:	1/10/2006	**Tested By:**	C. Smith

Report of Natural Moisture Content of Soil and Rock

Test Method: ASTM D2216

Wet Weight (g):	267.1
Dry Weight (g):	157.9
% Nat. Moisture:	**69.2**

Specification:

Comments:

Report Reviewed By: _____

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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Material:	28'-30'	**Project Number:**	050584
Source:	PDGE021-103105-1345	**Lab Number:**	05-1153
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/31/2005	**Sampled By:**	Client
Date Tested:	1/18/2006	**Tested By:**	C. Smith

Report of Natural Moisture Content of Soil and Rock

Test Method: ASTM D2216

Wet Weight (g):	219.1
Dry Weight (g):	129.9
% Nat. Moisture:	**68.7**

Comments:

Report Reviewed By: _____

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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Material:	54-56	**Project Number:**	050584
Source:	PDGE21-110305-0845	**Lab Number:**	05-1038
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	11/3/2005	**Sampled By:**	Client
Date Tested:	11/28/2005	**Tested By:**	C. Smith

Report of Natural Moisture Content of Soil and Rock

Test Method: ASTM D2216

Wet Weight (g):	367.7
Dry Weight (g):	300.8
% Nat. Moisture:	**22.2**

Specification:

Comments:

D. O'Dell

Report Reviewed By:

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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Material:	65-70	**Project Number:**	050584
Source:	PDGE21-110305-1130	**Lab Number:**	05-1039
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	11/3/2005	**Sampled By:**	Client
Date Tested:	11/23/2005	**Tested By:**	C. Smith

Report of Natural Moisture Content of Soil and Rock

Test Method: ASTM D2216

Wet Weight (g):	388.1
Dry Weight (g):	341.1
% Nat. Moisture:	**13.8**

Specification:

Comments:

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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Material:	34'-36'	**Project Number:**	050584
Source:	PDGE22-102705-1110	**Lab Number:**	05-1016
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/24/2005	**Sampled By:**	Client
Date Tested:	12/15/2005	**Tested By:**	C. Smith

Report of Natural Moisture Content of Soil and Rock

Test Method: ASTM D2216

Wet Weight (g):	175.2
Dry Weight (g):	108.3
% Nat. Moisture:	**61.8**

Specification:

Comments:

No specifications available at time of testing.

Report Reviewed By: _____

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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Material:	28'-30'	**Project Number:**	050584
Source:	PDGE22-102705-1025	**Lab Number:**	05-1015
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/24/2005	**Sampled By:**	Client
Date Tested:	12/15/2005	**Tested By:**	B. Jobity

Report of Natural Moisture Content of Soil and Rock

Test Method: ASTM D2216

Wet Weight (g):	288.5
Dry Weight (g):	186.7
% Nat. Moisture:	**54.5**

Specification:

Comments:

Report Reviewed By: _____

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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Material:	5-7 ft	**Project Number:**	050584
Source:	PDGE22-102005-1335	**Lab Number:**	05-1057
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/20/2005	**Sampled By:**	Client
Date Tested:	12/13/2005	**Tested By:**	C Smith

Report of Natural Moisture Content of Soil and Rock

Test Method: ASTM D2216

Wet Weight (g):	592.0
Dry Weight (g):	518.7
% Nat. Moisture:	**14.1**

Specification:

Comments:

No specifications available at time of testing.

Report Reviewed By: _____

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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Material:	5-7 ft	**Project Number:**	050584
Source:	PDGE23-102405-1430	**Lab Number:**	05-1058
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/24/2005	**Sampled By:**	Client
Date Tested:	12/1/2005	**Tested By:**	C. Smith

Report of Natural Moisture Content of Soil and Rock

Test Method: ASTM D2216

Wet Weight (g):	286.2
Dry Weight (g):	236.3
% Nat. Moisture:	**21.1**

Specification:

Comments:

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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Material:	24'-26'	**Project Number:**	050584
Source:	PDGE23-102405-1540	**Lab Number:**	05-1014
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/24/2005	**Sampled By:**	Client
Date Tested:	12/16/2005	**Tested By:**	B. Jobity

Report of Natural Moisture Content of Soil and Rock

Test Method: ASTM D2216

Wet Weight (g):	294.9
Dry Weight (g):	180.0
% Nat. Moisture:	**63.8**

Specification:

Comments:

No specifications available at time of testing.

Report Reviewed By: _____

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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Material:	35'-37'	**Project Number:**	050584
Source:	PDGE23-102805-1020	**Lab Number:**	05-1018
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/28/2005	**Sampled By:**	Client
Date Tested:	12/6/2005	**Tested By:**	C. Smith

Report of Natural Moisture Content of Soil and Rock

Test Method: ASTM D2216

Wet Weight (g):	307.9
Dry Weight (g):	186.9
% Nat. Moisture:	**64.7**

Specification:

Comments:

Report Reviewed By: D. O'Dell

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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Material:	8-10 ft	**Project Number:**	050584
Source:	PDGE24-102405-0915	**Lab Number:**	05-1037
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/24/2005	**Sampled By:**	Client
Date Tested:	11/26/2005	**Tested By:**	B. Jobity

Report of Natural Moisture Content of Soil and Rock

Test Method: ASTM D2216

Wet Weight (g):	160.0
Dry Weight (g):	119.7
% Nat. Moisture:	**33.7**

Specification:

Comments:

Report Reviewed By: _____

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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Material:	77-79	**Project Number:**	050584
Source:	PDGE24-103105-1130	**Lab Number:**	05-1032-1
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/31/2005	**Sampled By:**	Client
Date Tested:	11/22/2005	**Tested By:**	C. Smith

Report of Natural Moisture Content of Soil and Rock

Test Method: ASTM D2216

Wet Weight (g):	425.3
Dry Weight (g):	307.9
% Nat. Moisture:	**38.1**

Specification:

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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Material:	42-44 ft	**Project Number:**	050584
Source:	PDGEO24A-103105-1100	**Lab Number:**	05-1156
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/31/2005	**Sampled By:**	Client
Date Tested:	1/13/2006	**Tested By:**	C. Smith

Report of Natural Moisture Content of Soil and Rock

Test Method: ASTM D2216

Wet Weight (g):	316.6
Dry Weight (g):	202.1
% Nat. Moisture:	**56.7**

Comments: Revised 1/19/06 - Sample depth corrected.

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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Material:	48'-50'	**Project Number:**	050584
Source:	PDGE024A-103105-1130	**Lab Number:**	05-1157
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/31/2005	**Sampled By:**	Client
Date Tested:	1/20/2006	**Tested By:**	C. Smith

Report of Natural Moisture Content of Soil and Rock

Test Method: ASTM D2216

Wet Weight (g):	331.1
Dry Weight (g):	224.3
% Nat. Moisture:	**47.6**

Comments:

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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Material:	54'-56'	**Project Number:**	050584
Source:	PDGE024A-103105-1300	**Lab Number:**	05-1158
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/31/2005	**Sampled By:**	Client
Date Tested:	1/9/2006	**Tested By:**	C. Smith

Report of Natural Moisture Content of Soil and Rock

Test Method: ASTM D2216

Wet Weight (g):	317.7
Dry Weight (g):	224.3
% Nat. Moisture:	**41.6**

Specification:

Comments:

B. O'Dell

Report Reviewed By: _____

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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Material:	71'-73'	**Project Number:**	050584
Source:	PDGE024A-110205-1015	**Lab Number:**	05-1159
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	11/2/2005	**Sampled By:**	Client
Date Tested:	1/20/2006	**Tested By:**	C. Smith

Report of Natural Moisture Content of Soil and Rock

Test Method: ASTM D2216

Wet Weight (g):	608.4
Dry Weight (g):	462.8
% Nat. Moisture:	**31.5**

Comments:

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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Material:	74'-76'	**Project Number:**	050584
Source:	PDGE024A-110205-1045	**Lab Number:**	05-1160
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	11/2/2005	**Sampled By:**	Client
Date Tested:	1/16/2006	**Tested By:**	C. Smith

Report of Natural Moisture Content of Soil and Rock

Test Method: ASTM D2216

Wet Weight (g):	286.7
Dry Weight (g):	209.2
% Nat. Moisture:	**37.0**

Specification:

Comments:

Report Reviewed By:

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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Material:	8-10 ft	**Project Number:**	050584
Source:	PDGE25-102605-1015	**Lab Number:**	05-1031
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/26/2005	**Sampled By:**	Client
Date Tested:	11/22/2005	**Tested By:**	C. Smith

Report of Natural Moisture Content of Soil and Rock

Test Method: ASTM D2216

Wet Weight (g):	487.6
Dry Weight (g):	415.0
% Nat. Moisture:	**17.5**

Specification:

Comments:

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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Material:	21-23	**Project Number:**	050584
Source:	PDGE26-101705-1315	**Lab Number:**	05-1085
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/17/2005	**Sampled By:**	Client
Date Tested:	12/1/2005	**Tested By:**	C. Smith

Report of Natural Moisture Content of Soil and Rock

Test Method: ASTM D2216

Wet Weight (g):	199.3
Dry Weight (g):	147.2
% Nat. Moisture:	**35.4**

Specification:

Comments:

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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Material:	25-27	**Project Number:**	050584
Source:	PDGE26-101705-1415	**Lab Number:**	05-1086
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/17/2005	**Sampled By:**	Client
Date Tested:	12/1/2005	**Tested By:**	C. Smith

Report of Natural Moisture Content of Soil and Rock

Test Method: ASTM D2216

Wet Weight (g):	209.4
Dry Weight (g):	163.7
% Nat. Moisture:	**27.9**

Specification:

Comments:

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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Material:	11-13 ft	**Project Number:**	050584
Source:	PDGE26-101705-1015	**Lab Number:**	05-1049
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/17/2005	**Sampled By:**	Client
Date Tested:	12/1/2005	**Tested By:**	C. Smith

Report of Natural Moisture Content of Soil and Rock

Test Method: ASTM D2216

Wet Weight (g):	175.6
Dry Weight (g):	122.8
% Nat. Moisture:	**43.0**

Specification:

Comments:

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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Material:	15-17	**Project Number:**	050584
Source:	PDGE26-101705-1100	**Lab Number:**	05-1050
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/17/2005	**Sampled By:**	Client
Date Tested:	12/15/2005	**Tested By:**	C Smith

Report of Natural Moisture Content of Soil and Rock

Test Method: ASTM D2216

Wet Weight (g):	191.7
Dry Weight (g):	142.1
% Nat. Moisture:	**34.9**

Specification:

Comments:

No specifications available at time of testing.

Report Reviewed By: _____

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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Material:	17-19	**Project Number:**	050584
Source:	PDGE26-101705-1130	**Lab Number:**	05-1051
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/17/2005	**Sampled By:**	Client
Date Tested:	12/1/2005	**Tested By:**	C. Smith

Report of Natural Moisture Content of Soil and Rock

Test Method: ASTM D2216

Wet Weight (g):	282.5
Dry Weight (g):	224.7
% Nat. Moisture:	**25.7**

Specification:

Comments:

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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Material:	29-31	**Project Number:**	050584
Source:	PDGE26-101705-1500	**Lab Number:**	05-1052
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/17/2005	**Sampled By:**	Client
Date Tested:	12/1/2005	**Tested By:**	C. Smith

Report of Natural Moisture Content of Soil and Rock

Test Method: ASTM D2216

Wet Weight (g):	252.3
Dry Weight (g):	173.4
% Nat. Moisture:	**45.5**

Specification:

Comments:

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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Material:	5-7 ft	**Project Number:**	050584
Source:	PDGE27-101005-1515	**Lab Number:**	05-1074
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/10/2005	**Sampled By:**	Client
Date Tested:	12/1/2005	**Tested By:**	C. Smith

Report of Natural Moisture Content of Soil and Rock

Test Method: ASTM D2216

Wet Weight (g):	171.0
Dry Weight (g):	137.8
% Nat. Moisture:	**24.1**

Specification:

Comments:

Report Reviewed By: _____

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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Material:	13-15	**Project Number:**	050584
Source:	PDGE27-101005-1530	**Lab Number:**	05-1075
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/10/2005	**Sampled By:**	Client
Date Tested:	12/1/2005	**Tested By:**	C. Smith

Report of Natural Moisture Content of Soil and Rock

Test Method: ASTM D2216

Wet Weight (g):	241.1
Dry Weight (g):	177.7
% Nat. Moisture:	**35.7**

Specification:

Comments:

Report Reviewed By:

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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Material:	21-23	**Project Number:**	050584
Source:	PDGE27-101005-1600	**Lab Number:**	05-1076
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/10/2005	**Sampled By:**	Client
Date Tested:	12/1/2005	**Tested By:**	C. Smith

Report of Natural Moisture Content of Soil and Rock

Test Method: ASTM D2216

Wet Weight (g):	156.2
Dry Weight (g):	119.4
% Nat. Moisture:	**30.8**

Specification:

Comments:

Report Reviewed By: _____

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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Material:	23-25	**Project Number:**	050584
Source:	PDGE27-101005-1605	**Lab Number:**	05-1077
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/10/2005	**Sampled By:**	Client
Date Tested:	12/1/2005	**Tested By:**	C. Smith

Report of Natural Moisture Content of Soil and Rock

Test Method: ASTM D2216

Wet Weight (g):	155.3
Dry Weight (g):	119.6
% Nat. Moisture:	**29.8**

Specification:

Comments:

Report Reviewed By: _____

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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Material:	29-31	**Project Number:**	050584
Source:	PDGE27-101005-1630	**Lab Number:**	05-1078
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/10/2005	**Sampled By:**	Client
Date Tested:	12/20/2005	**Tested By:**	C. Smith

Report of Natural Moisture Content of Soil and Rock

Test Method: ASTM D2216

Wet Weight (g):	260.6
Dry Weight (g):	192.0
% Nat. Moisture:	**35.7**

Specification:

Comments:

Report Reviewed By: _____

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Phone/Fax: 413-232-8566

Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Material:	17-19	**Project Number:**	050584
Source:	PDGE28-101005-0950	**Lab Number:**	05-1070
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/10/2005	**Sampled By:**	Client
Date Tested:	12/1/2005	**Tested By:**	C. Smith

Report of Natural Moisture Content of Soil and Rock

Test Method: ASTM D2216

Wet Weight (g):	141.9
Dry Weight (g):	99.7
% Nat. Moisture:	**42.3**

Specification:

Comments:

Report Reviewed By: _____

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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Material:	20-22	**Project Number:**	050584
Source:	PDGE28-101005-1010	**Lab Number:**	05-1071
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/10/2005	**Sampled By:**	Client
Date Tested:	12/1/2005	**Tested By:**	C. Smith

Report of Natural Moisture Content of Soil and Rock

Test Method: ASTM D2216

Wet Weight (g):	289.0
Dry Weight (g):	210.8
% Nat. Moisture:	**37.1**

Specification:

Comments:

Report Reviewed By: _____

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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Material:	27-29	**Project Number:**	050584
Source:	PDGE28-101005-1035	**Lab Number:**	05-1072
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/10/2005	**Sampled By:**	Client
Date Tested:	12/1/2005	**Tested By:**	C. Smith

Report of Natural Moisture Content of Soil and Rock

Test Method: ASTM D2216

Wet Weight (g):	151.3
Dry Weight (g):	102.7
% Nat. Moisture:	**47.3**

Specification:

Comments:

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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Material:	69-71	**Project Number:**	050584
Source:	PDGEO28-101105-1050	**Lab Number:**	05-1073
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/10/2005	**Sampled By:**	Client
Date Tested:	1/9/2006	**Tested By:**	B Jobity

Report of Natural Moisture Content of Soil and Rock

Test Method: ASTM D2216

Wet Weight (g):	225.7
Dry Weight (g):	185.9
% Nat. Moisture:	**21.4**

Comments: Revised 1/19/06 - Sample depth corrected.

Report Reviewed By: _____

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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Material:	101005-1315	**Project Number:**	050584
Source:	PDGEO28, 37'-39'	**Lab Number:**	05-0931
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/10/2005	**Sampled By:**	Client
Date Tested:	11/9/2005	**Tested By:**	C. Smith

Report of Natural Moisture Content of Soil and Rock

Test Method: ASTM D2216

Wet Weight (g):	502.2
Dry Weight (g):	317.4
% Nat. Moisture:	**58.2**

Specification:

Comments:

Report Reviewed By:

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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Material:	101005-1340	**Project Number:**	050584
Source:	PDGEO28, 41'-43'	**Lab Number:**	05-0932
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/10/2005	**Sampled By:**	Client
Date Tested:	11/5/2005	**Tested By:**	C. Smith

Report of Natural Moisture Content of Soil and Rock

Test Method: ASTM D2216

Wet Weight (g):	467.8
Dry Weight (g):	296.7
% Nat. Moisture:	**57.7**

Specification:

Comments:

Report Reviewed By:

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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Material:	101105-0920	**Project Number:**	050584
Source:	PDGEO28, 50'-52'	**Lab Number:**	05-0916
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/11/2005	**Sampled By:**	Client
Date Tested:	11/9/2005	**Tested By:**	C. Smith

Report of Natural Moisture Content of Soil and Rock

Test Method: ASTM D2216

Wet Weight (g):	578.6
Dry Weight (g):	430.0
% Nat. Moisture:	**34.6**

Specification:

Comments:

Report Reviewed By: _____

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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Material:	101105-1020	**Project Number:**	050584
Source:	PDGEO28, 57'-59'	**Lab Number:**	05-0917
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/11/2005	**Sampled By:**	Client
Date Tested:	11/7/2005	**Tested By:**	C Smith

Report of Natural Moisture Content of Soil and Rock

Test Method: AASHTO T265

Wet Weight (g):	555.9
Dry Weight (g):	379.7
% Nat. Moisture:	**46.4**

Specification:

Comments:

No specifications available at time of testing.

Report Reviewed By: _____

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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Material:	5-7 ft	**Project Number:**	050584
Source:	PDGE29-102105-0800	**Lab Number:**	05-1081
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/21/2005	**Sampled By:**	Client
Date Tested:	12/1/2005	**Tested By:**	C. Smith

Report of Natural Moisture Content of Soil and Rock

Test Method: ASTM D2216

Wet Weight (g):	305.6
Dry Weight (g):	249.4
% Nat. Moisture:	**22.5**

Specification:

Comments:

Report Reviewed By: _____

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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Material:	9-11 ft	**Project Number:**	050584
Source:	PDGE29-102105-0815	**Lab Number:**	05-1082
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/21/2005	**Sampled By:**	Client
Date Tested:	12/1/2005	**Tested By:**	C. Smith

Report of Natural Moisture Content of Soil and Rock

Test Method: ASTM D2216

Wet Weight (g):	217.1
Dry Weight (g):	163.2
% Nat. Moisture:	**33.0**

Specification:

Comments:

Report Reviewed By: _____

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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Material:	42'-44'	**Project Number:**	050584
Source:	PDGE029-102105-1100	**Lab Number:**	05-1154
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/21/2005	**Sampled By:**	Client
Date Tested:	1/17/2006	**Tested By:**	C. Smith

Report of Natural Moisture Content of Soil and Rock

Test Method: ASTM D2216

Wet Weight (g):	439.8
Dry Weight (g):	294.8
% Nat. Moisture:	**49.2**

Comments:

Report Reviewed By: _____

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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Material:	45'-47'	**Project Number:**	050584
Source:	PDGE029-102505-0245	**Lab Number:**	05-1155
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/25/2005	**Sampled By:**	Client
Date Tested:	1/17/2006	**Tested By:**	C. Smith

Report of Natural Moisture Content of Soil and Rock

Test Method: ASTM D2216

Wet Weight (g):	342.0
Dry Weight (g):	207.1
% Nat. Moisture:	**65.1**

Comments:

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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Material:	13-15	**Project Number:**	050584
Source:	PDGE29-102105-0850	**Lab Number:**	05-1083
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/21/2005	**Sampled By:**	Client
Date Tested:	12/1/2005	**Tested By:**	C. Smith

Report of Natural Moisture Content of Soil and Rock

Test Method: ASTM D2216

Wet Weight (g):	249.5
Dry Weight (g):	200.1
% Nat. Moisture:	**24.7**

Specification:

Comments:

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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Material:	17-19	**Project Number:**	050584
Source:	PDGE29-102105-0910	**Lab Number:**	05-1084
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/21/2005	**Sampled By:**	Client
Date Tested:	12/1/2005	**Tested By:**	C. Smith

Report of Natural Moisture Content of Soil and Rock

Test Method: ASTM D2216

Wet Weight (g):	196.8
Dry Weight (g):	149.3
% Nat. Moisture:	**31.8**

Specification:

Comments:

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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Material:	25-27	**Project Number:**	050584
Source:	PDGE29-102105-0950	**Lab Number:**	05-1063
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/21/2005	**Sampled By:**	Client
Date Tested:	12/1/2005	**Tested By:**	C. Smith

Report of Natural Moisture Content of Soil and Rock

Test Method: ASTM D2216

Wet Weight (g):	182.6
Dry Weight (g):	142.4
% Nat. Moisture:	**28.2**

Specification:

Comments:

Report Reviewed By: _____

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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Material:	21-23	**Project Number:**	050584
Source:	PDGE29-102105-0930	**Lab Number:**	05-1045
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/21/2005	**Sampled By:**	Client
Date Tested:	12/1/2005	**Tested By:**	C. Smith

Report of Natural Moisture Content of Soil and Rock

Test Method: ASTM D2216

Wet Weight (g):	143.6
Dry Weight (g):	113.6
% Nat. Moisture:	**26.4**

Specification:

Comments:

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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Material:	29-31	**Project Number:**	050584
Source:	PDGE29-102105-1010	**Lab Number:**	05-1046
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/21/2005	**Sampled By:**	Client
Date Tested:	12/1/2005	**Tested By:**	C. Smith

Report of Natural Moisture Content of Soil and Rock

Test Method: ASTM D2216

Wet Weight (g):	199.6
Dry Weight (g):	151.6
% Nat. Moisture:	**31.7**

Specification:

Comments:

Report Reviewed By: _____

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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Material:	33-35	**Project Number:**	050584
Source:	PDGE29-102105-1030	**Lab Number:**	05-1047
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/21/2005	**Sampled By:**	Client
Date Tested:	12/1/2005	**Tested By:**	C. Smith

Report of Natural Moisture Content of Soil and Rock

Test Method: ASTM D2216

Wet Weight (g):	151.6
Dry Weight (g):	123.6
% Nat. Moisture:	**22.7**

Specification:

Comments:

Report Reviewed By: _____

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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Material:	35-37	**Project Number:**	050584
Source:	PDGE29-102105-1040	**Lab Number:**	05-1048
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/21/2005	**Sampled By:**	Client
Date Tested:	11/28/2005	**Tested By:**	C. Smith

Report of Natural Moisture Content of Soil and Rock

Test Method: ASTM D2216

Wet Weight (g):	215.3
Dry Weight (g):	178.1
% Nat. Moisture:	**20.9**

Specification:

Comments:

Report Reviewed By: D. O'Dell

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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Material:	12-14 ft	**Project Number:**	050584
Source:	PDGE30-101805-1000	**Lab Number:**	05-1028
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/18/2005	**Sampled By:**	Client
Date Tested:	11/4/2005	**Tested By:**	C. Smith

Report of Natural Moisture Content of Soil and Rock

Test Method: ASTM D2216

Wet Weight (g):	372.1
Dry Weight (g):	225.2
% Nat. Moisture:	**65.2**

Specification:

Comments:

Report Reviewed By: _____

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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Material:	17-19	**Project Number:**	050584
Source:	PDGE30-101805-1030	**Lab Number:**	05-1029
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/18/2005	**Sampled By:**	Client
Date Tested:	11/4/2005	**Tested By:**	C. Smith

Report of Natural Moisture Content of Soil and Rock

Test Method: ASTM D2216

Wet Weight (g):	275.0
Dry Weight (g):	152.9
% Nat. Moisture:	**79.9**

Specification:

Comments:

No specifications available at time of testing.

Report Reviewed By: _____

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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Material:	27-29	**Project Number:**	050584
Source:	PDGE30-101805-1145	**Lab Number:**	05-1030
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/18/2005	**Sampled By:**	Client
Date Tested:	11/22/2005	**Tested By:**	C. Smith

Report of Natural Moisture Content of Soil and Rock

Test Method: ASTM D2216

Wet Weight (g):	301.7
Dry Weight (g):	173.0
% Nat. Moisture:	**74.4**

Specification:

Comments:

Report Reviewed By: _____

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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Material:	32'-34'	**Project Number:**	050584
Source:	PDGE30-101805-1445	**Lab Number:**	05-1002
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/18/2005	**Sampled By:**	Client
Date Tested:	12/8/2005	**Tested By:**	C. Smith

Report of Natural Moisture Content of Soil and Rock

Test Method: ASTM D2216

Wet Weight (g):	312.7
Dry Weight (g):	191.2
% Nat. Moisture:	**63.5**

Specification:

Comments:

Report Reviewed By: D. O'Dell

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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Material:	39'-41'	**Project Number:**	050584
Source:	PDGE30-101805-1551	**Lab Number:**	05-1003
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/18/2005	**Sampled By:**	Client
Date Tested:	11/30/2005	**Tested By:**	C. Smith

Report of Natural Moisture Content of Soil and Rock

Test Method: AASHTO T255 / ASTM C566

Wet Weight (g):	436.6
Dry Weight (g):	275.0
% Nat. Moisture:	**58.8**

Specification:

Comments:

Report Reviewed By: D. O'Dell

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Phone/Fax: 413-232-8566

Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Material:	20-22'	**Project Number:**	050584
Source:	PDGE31-102005-1115	**Lab Number:**	05-1011
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/20/2005	**Sampled By:**	Client
Date Tested:	12/15/2005	**Tested By:**	C. Smith

Report of Natural Moisture Content of Soil and Rock

Test Method: ASTM D2216

Wet Weight (g):	360.5
Dry Weight (g):	202.4
% Nat. Moisture:	**78.1**

Specification:

Comments:

D. O'Dell

Report Reviewed By:

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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Material:	25'-27'	**Project Number:**	050584
Source:	PDGE31-102005-1330	**Lab Number:**	05-1012-1
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/20/2005	**Sampled By:**	Client
Date Tested:	11/29/2005	**Tested By:**	C Smith

Report of Natural Moisture Content of Soil and Rock

Test Method: ASTM D2216

Wet Weight (g):	347.6
Dry Weight (g):	192.7
% Nat. Moisture:	**80.4**

Specification:

Comments:

No specifications available at time of testing.

Report Reviewed By: _____

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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Material:	30'-32'	**Project Number:**	050584
Source:	PDGE31-102005-1415	**Lab Number:**	05-1013
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/20/2005	**Sampled By:**	Client
Date Tested:	12/12/2005	**Tested By:**	C. Smith

Report of Natural Moisture Content of Soil and Rock

Test Method: ASTM D2216

Wet Weight (g):	244.1
Dry Weight (g):	144.2
% Nat. Moisture:	**69.3**

Specification:

Comments:

Report Reviewed By: D. O'Dell

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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Material:	5-7 ft	**Project Number:**	050584
Source:	PDGEO31-102005-0930	**Lab Number:**	05-1087
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/20/2005	**Sampled By:**	Client
Date Tested:	1/9/2006	**Tested By:**	B Jobity

Report of Natural Moisture Content of Soil and Rock

Test Method: ASTM D2216

Wet Weight (g):	200.1
Dry Weight (g):	136.5
% Nat. Moisture:	**46.6**

Comments: Revised 1/19/06 - Sample ID Corrected.

Report Reviewed By: _____

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Grain Size Analysis

Advance Testing

3348 Route 208, Campbell Hall, NY 10916
Phone: 845-496-1600 Fax: 845-496-1398
42 Day Farm Road, West Stockbridge, MA 01266
Phone/Fax: 413-232-8566

Client:	**ENSR Remediation and Const.**	**Project:**	BP Hastings-on-Hudson
Material:	5-7 ft	**Project Number:**	050584
Source:	PDGE01-102105-1518	**Lab Number:**	05-1064-1
Date Sampled:	10/21/2005	**Sampled By:**	Client
Date Tested:	12/15/2005	**Tested By:**	E.Hall

GRADATION (SIEVE ANALYSIS) OF SOIL OR AGGREGATE

Test Method(s): ASTM D422, C136, C117; AASHTO T11, T27, T88

Lab Number	Sample Type	Sampling Location	Specification
05-1064-1	5-7 ft	In-Place	

Sieve Size		%	%	Spec. %
mm	Inches	Retain	Passing	Pass
100.0 mm	4"	0.0	100.0	
75.0 mm	3"	0.0	100.0	
62.5 mm	2 1/2"	0.0	100.0	
50.0 mm	2"	0.0	100.0	
37.5 mm	1 1/2"	0.0	100.0	
25.0 mm	1"	16.0	84.0	
19.0 mm	3/4"	11.2	72.8	
12.5 mm	1/2"	8.0	64.8	
6.32 mm	1/4"	11.9	52.9	
4.75 mm	#4	3.5	49.4	
2.00 mm	#10	11.7	37.7	
0.850 mm	#20	9.1	28.6	
0.600 mm	#30	3.5	25.1	
0.425 mm	#40	4.2	20.9	
0.180 mm	#80	9.0	11.9	
0.075 mm	#200	4.7	7.2	
Pan		7.2		

Comments: Minus #200 by wash-sieve method.

Report Reviewed By:

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42 Day Farm Road, West Stockbridge, MA 01266
Phone/Fax: 413-232-8566

Client:	**ENSR Remediation and Const.**	**Project:**	BP Hastings-on-Hudson
Material:	10-12 ft	**Project Number:**	050584
Source:	PDGE01-102105-1530	**Lab Number:**	05-1065-1
Date Sampled:	10/21/2005	**Sampled By:**	Client
Date Tested:	12/15/2005	**Tested By:**	E. Hall

GRADATION (SIEVE ANALYSIS) OF SOIL OR AGGREGATE

Test Method(s): ASTM D422, C136, C117; AASHTO T11, T27, T88

Lab Number	Sample Type	Sampling Location	Specification
05-1065-1	10-12 ft	In-Place	

Sieve Size		%	%	Spec. %
mm	Inches	Retain	Passing	Pass
100.0 mm	4"	0.0	100.0	
75.0 mm	3"	0.0	100.0	
62.5 mm	2 1/2"	0.0	100.0	
50.0 mm	2"	0.0	100.0	
37.5 mm	1 1/2"	0.0	100.0	
25.0 mm	1"	8.3	91.7	
19.0 mm	3/4"	0.0	91.7	
12.5 mm	1/2"	4.8	86.9	
6.32 mm	1/4"	15.7	71.2	
4.75 mm	#4	5.2	66.0	
2.00 mm	#10	17.1	48.9	
0.850 mm	#20	15.9	33.0	
0.600 mm	#30	6.2	26.8	
0.425 mm	#40	6.2	20.6	
0.180 mm	#80	11.3	9.3	
0.075 mm	#200	5.2	4.1	
Pan		4.1		

Comments: Minus #200 by wash-sieve method.

Report Reviewed By: D. O'Dell

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Phone/Fax: 413-232-8566

Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Item:	65-67	**Project Number:**	050584
Source:	PDGE01-102705-0835	**Lab Number:**	05-1066
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/27/2005	**Sampled By:**	Client
Date Tested:	1/4/2006-01/06/2006	**Tested By:**	B. Jobity

PARTICLE SIZE ANALYSIS BY SIEVE AND HYDROMETER METHOD

Test Method: ASTM D422

Sieve Size	Particle Diameter, mm	Percent Passing	Specification
1/2"	25	100	
3/8"	9.50	54.9	
#4	4.75	51.6	
#10	2.00	47.2	
#40	0.425	42.1	
#200	0.075	24.2	
Hydrometer Analysis Results	0.050	20.1	
	0.020	13.3	
	0.010	10.4	
	0.005	7.3	
	0.002	4.4	

SOIL SPECIFIC GRAVITY: 2.51 (As reported separately, or estimated.)

DISPERSION METHOD: Mechanical, 1 min.

SAND & GRAVEL PARTICLES:

Notes: Additional sieve analysis results may be reported separately.

Comments:

REPORT REVIEWED BY: _____

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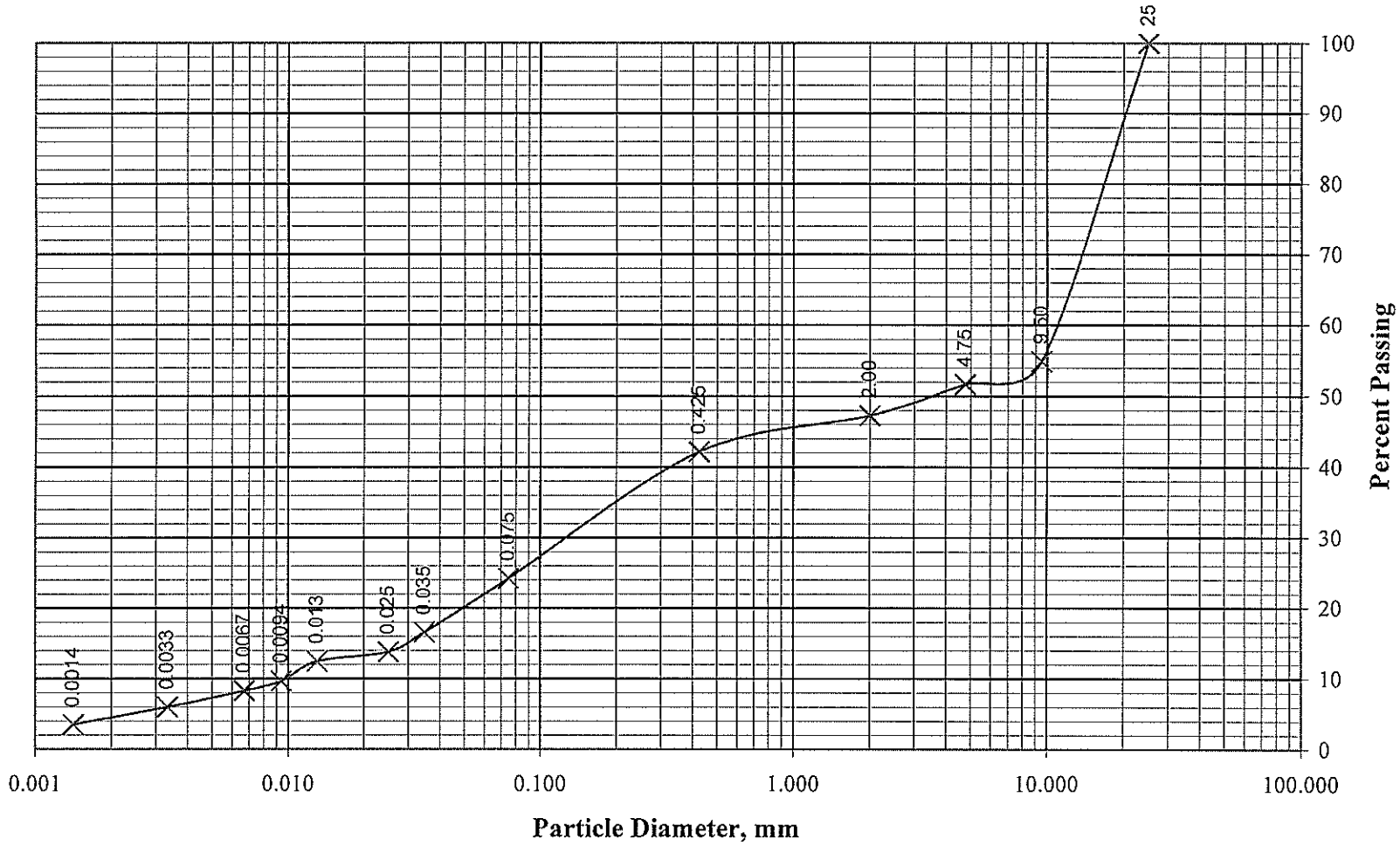
Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Item:	65-67	**Project Number:**	050584
Source:	PDGE01-102705-0835	**Lab Number:**	05-1066
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/27/2005	**Sampled By:**	Client
Date Tested:	1/4/2006-01/06/2006	**Tested By:**	B. Jobity



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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Item:	70-72	**Project Number:**	050584
Source:	PDGE01-102705-0845	**Lab Number:**	05-1067
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/27/2005	**Sampled By:**	Client
Date Tested:	1/4/2006-01/06/2006	**Tested By:**	B. Jobity

PARTICLE SIZE ANALYSIS BY SIEVE AND HYDROMETER METHOD

Test Method: ASTM D422

Sieve Size	Particle Diameter, mm	Percent Passing	Specification
1/2"	25	100	
3/8"	9.50	43.5	
#4	4.75	38.9	
#10	2.00	33.3	
#40	0.425	26.7	
#200	0.075	17.2	
Hydrometer Analysis Results	0.050	15.0	
	0.020	10.0	
	0.010	7.8	
	0.005	5.8	
	0.002	4.1	

SOIL SPECIFIC GRAVITY: 2.51 (As reported separately, or estimated.)

DISPERSION METHOD: Mechanical, 1 min.

SAND & GRAVEL PARTICLES:

Notes: Additional sieve analysis results may be reported separately.

Comments:

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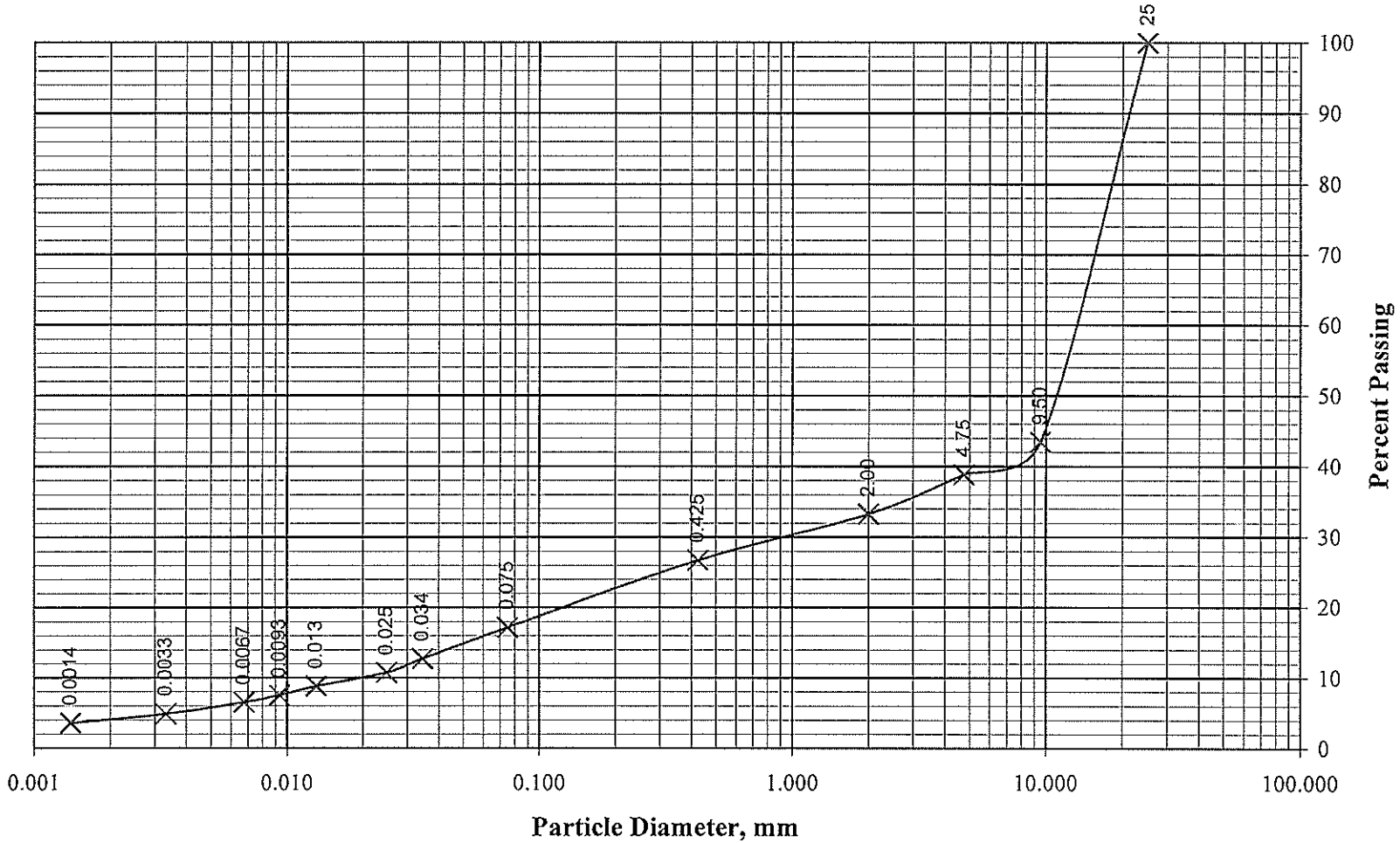
Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Item:	70-72	**Project Number:**	050584
Source:	PDGE01-102705-0845	**Lab Number:**	05-1067
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/27/2005	**Sampled By:**	Client
Date Tested:	1/4/2006-01/06/2006	**Tested By:**	B. Jobity



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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Item:	092205-1400	**Project Number:**	050584
Source:	PDGEO-1 U1, 35-37'	**Lab Number:**	05-0856
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/3/2005	**Sampled By:**	H&A
Date Tested:	10/19/2005-10/20/2005	**Tested By:**	C. Smith

PARTICLE SIZE ANALYSIS BY SIEVE AND HYDROMETER METHOD

Test Method: ASTM D422

Sieve Size	Particle Diameter, mm	Percent Passing	Specification
3/8"	9.50	100.0	
#4	4.75	100.0	
#10	2.00	100.0	
#40	0.425	99.9	
#200	0.075	92.2	
Hydrometer Analysis Results	0.050	79.5	
	0.020	47.0	
	0.010	34.6	
	0.005	23.8	
	0.002	14.4	

SOIL SPECIFIC GRAVITY: 2.51 (As reported separately, or estimated.)
DISPERSION METHOD: Mechanical, 1 min.
SAND & GRAVEL PARTICLES: Hard surable particles.

Notes: Additional sieve analysis results may be reported separately.

Comments:

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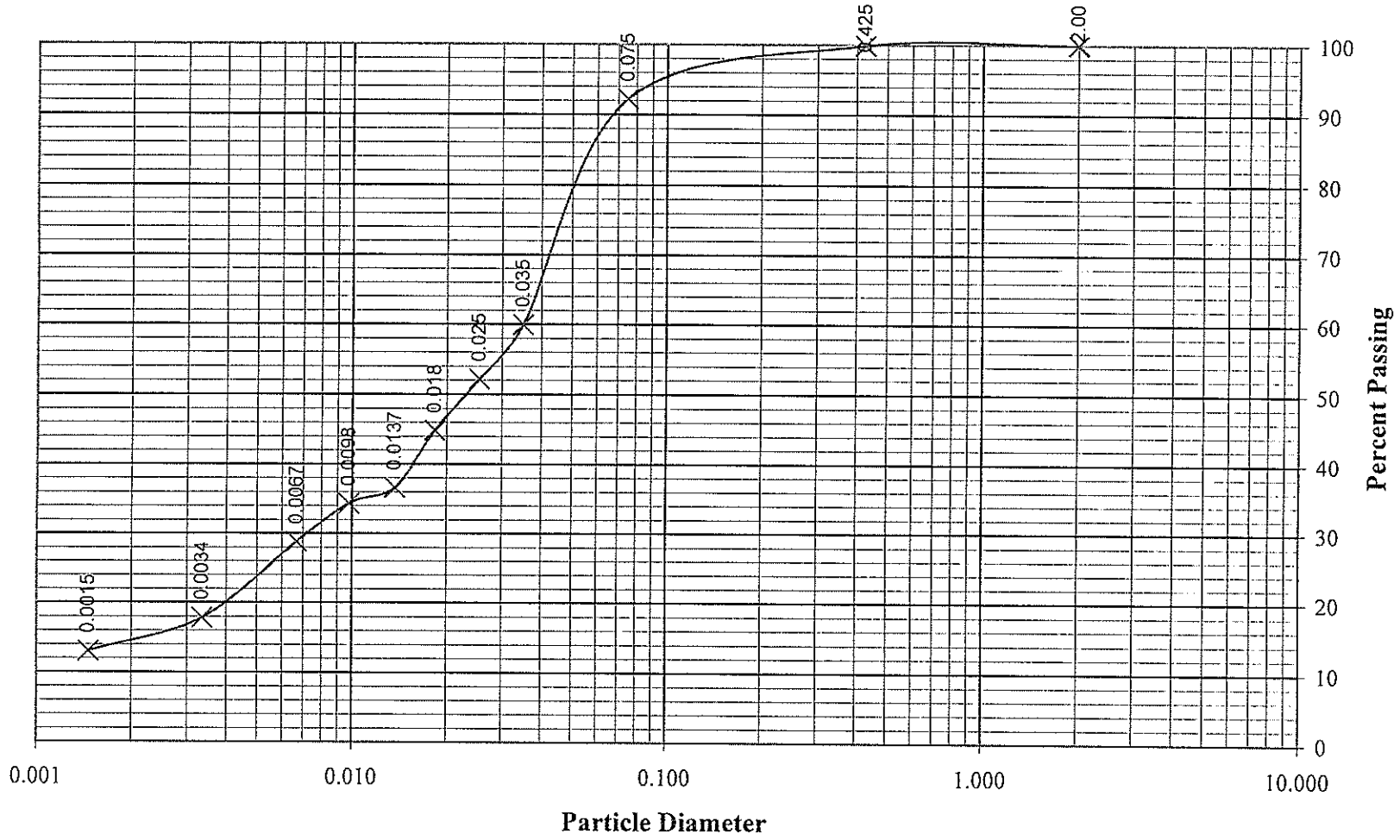
Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Item:	092205-1400	**Project Number:**	050584
Source:	PDGEO-1 U1, 35-37'	**Lab Number:**	05-0856
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/3/2005	**Sampled By:**	H&A
Date Tested:	10/19/2005-10/20/2005	**Tested By:**	C. Smith



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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Item:	092205-1355	**Project Number:**	050584
Source:	PDGEO-1, U-3, 52-54'	**Lab Number:**	05-0858
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	9/26/2005	**Sampled By:**	H&A
Date Tested:	10/19/2005-10/20/2005	**Tested By:**	C. Smith

PARTICLE SIZE ANALYSIS BY SIEVE AND HYDROMETER METHOD

Test Method: ASTM D422

Sieve Size	Particle Diameter, mm	Percent Passing	Specification
3/8"	9.50	92.1	
#4	4.75	91.9	
#10	2.00	91.0	
#40	0.425	90.0	
#200	0.075	78.8	
Hydrometer Analysis Results	0.050	66.1	
	0.020	37.7	
	0.010	30.4	
	0.005	21.0	
	0.002	15.2	

SOIL SPECIFIC GRAVITY: 2.51 (As reported separately, or estimated.)

DISPERSION METHOD: Mechanical, 1 min.

SAND & GRAVEL PARTICLES: Hard, durable particles

Notes: Additional sieve analysis results may be reported separately.

Comments:

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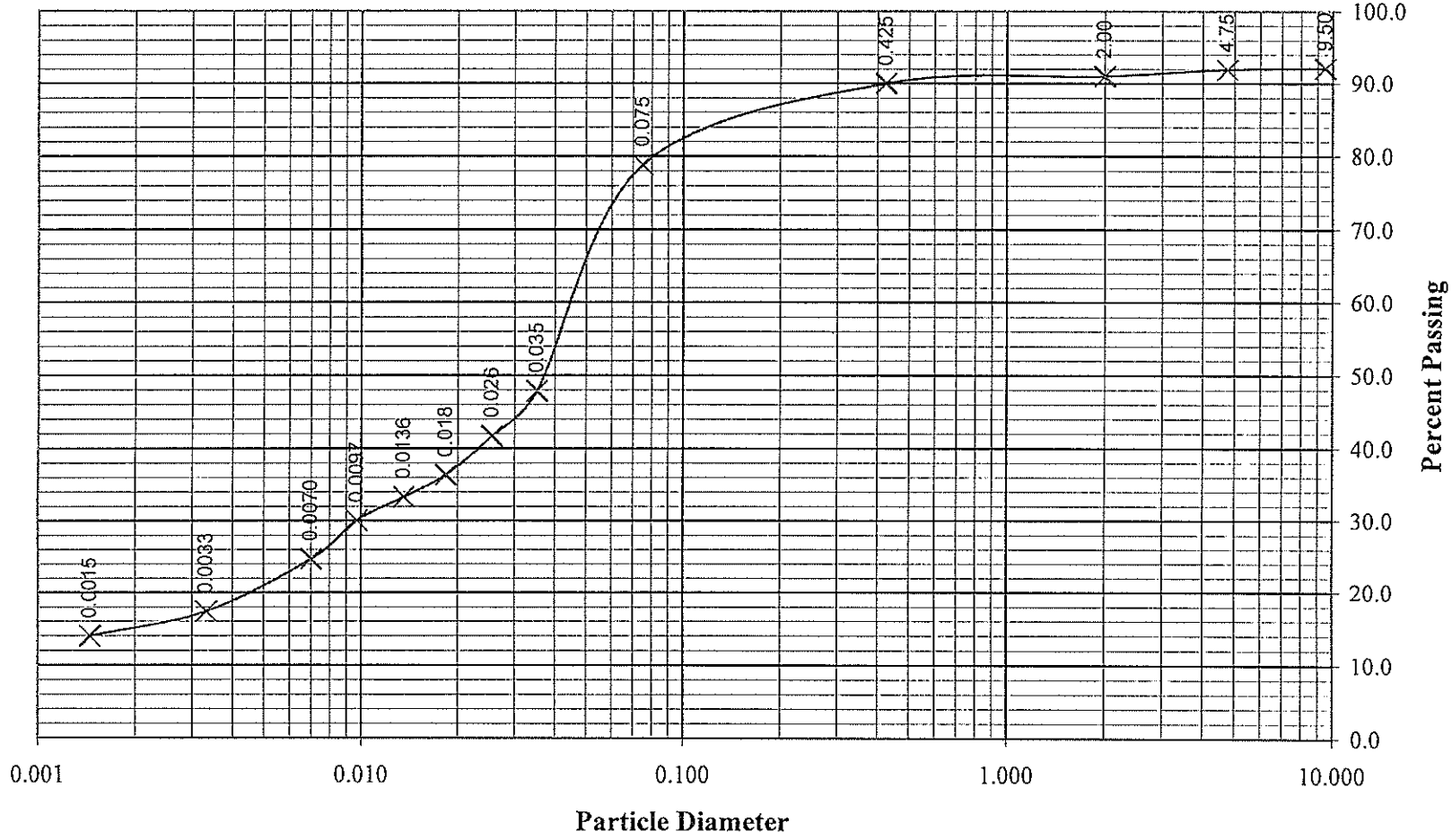
Phone/Fax: 413-232-8566

Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Item:	092205-1355	**Project Number:**	050584
Source:	PDGEO-1, U-3, 52-54'	**Lab Number:**	05-0858
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	9/26/2005	**Sampled By:**	H&A
Date Tested:	10/19/2005-10/20/2005	**Tested By:**	C. Smith



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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Item:	15-17	**Project Number:**	050584
Source:	PDGE04-092805-0845	**Lab Number:**	05-1068
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	9/28/2005	**Sampled By:**	Client
Date Tested:	1/4/2006-01/06/2006	**Tested By:**	B. Jobity

PARTICLE SIZE ANALYSIS BY SIEVE AND HYDROMETER METHOD

Test Method: ASTM D422

Sieve Size	Particle Diameter, mm	Percent Passing	Specification
1"	25	100	
3/8"	9.50	94.4	
#4	4.75	73.5	
#10	2.00	54.8	
#40	0.425	32.8	
#200	0.075	14.4	
Hydrometer Analysis Results	0.050	11.8	
	0.020	8.4	
	0.010	5.8	
	0.005	3.9	
	0.002	2.6	

SOIL SPECIFIC GRAVITY: 2.51 (As reported separately, or estimated.)

DISPERSION METHOD: Mechanical, 1 min.

SAND & GRAVEL PARTICLES:

Notes: Additional sieve analysis results may be reported separately.

Comments:

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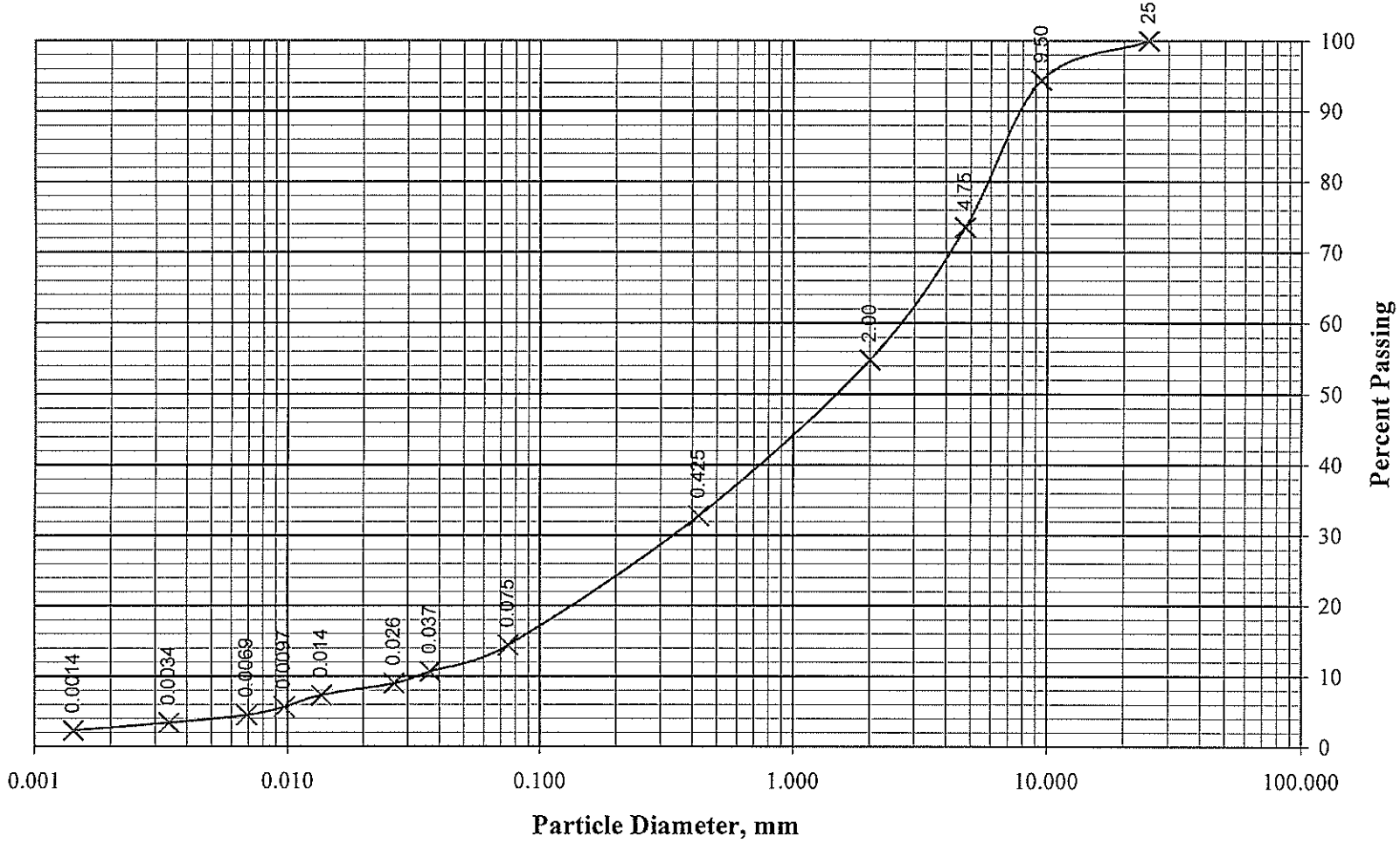
Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Item:	15-17	**Project Number:**	050584
Source:	PDGE04-092805-0845	**Lab Number:**	05-1068
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	9/28/2005	**Sampled By:**	Client
Date Tested:	1/4/2006-01/06/2006	**Tested By:**	B. Jobity



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Phone/Fax: 413-232-8566

Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Item:	46-48	**Project Number:**	050584
Source:	PDGE04-103005-1015	**Lab Number:**	05-1069
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/3/2005	**Sampled By:**	Client
Date Tested:	1/10/2006-01/11/2006	**Tested By:**	B. Jobity

PARTICLE SIZE ANALYSIS BY SIEVE AND HYDROMETER METHOD

Test Method: ASTM D422

Sieve Size	Particle Diameter, mm	Percent Passing	Specification
3/8"	9.50	100.0	
#4	4.75	99.8	
#10	2.00	98.9	
#40	0.425	87.1	
#200	0.075	66.4	
Hydrometer Analysis Results	0.050	57.5	
	0.020	34.8	
	0.010	26.1	
	0.005	19.3	
	0.002	12.0	

SOIL SPECIFIC GRAVITY: 2.51 (As reported separately, or estimated.)

DISPERSION METHOD: Mechanical, 1 min.

SAND & GRAVEL PARTICLES:

Notes: Additional sieve analysis results may be reported separately.

Comments:

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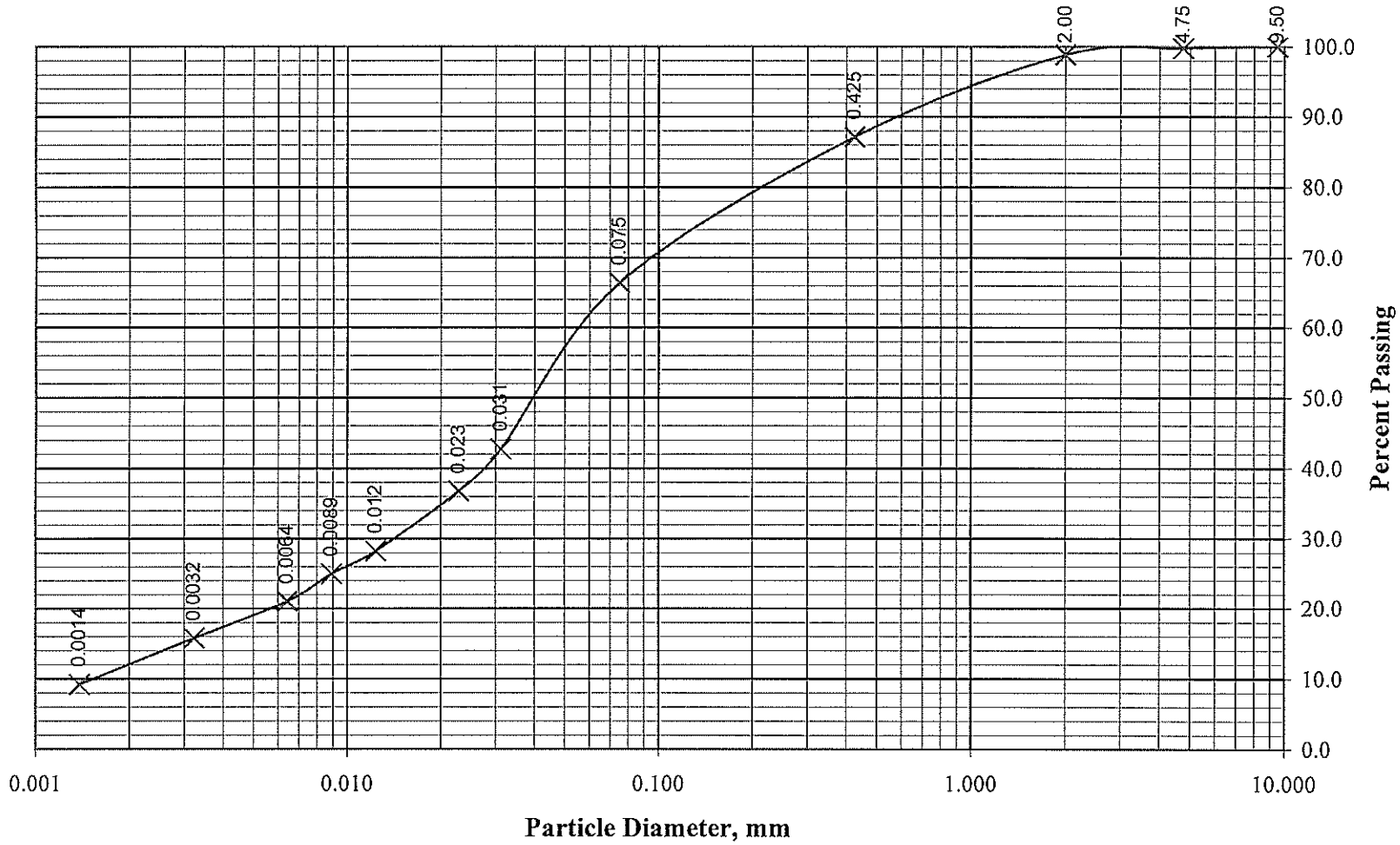
Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Item:	46-48	**Project Number:**	050584
Source:	PDGE04-103005-1015	**Lab Number:**	05-1069
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/3/2005	**Sampled By:**	Client
Date Tested:	1/10/2006-01/11/2006	**Tested By:**	B. Jobity



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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Item:	70-72	**Project Number:**	050584
Source:	PDGE04-100305-1420	**Lab Number:**	05-1043
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/3/2005	**Sampled By:**	Client
Date Tested:	11/26/2005-11/29/2005	**Tested By:**	C. Smith

PARTICLE SIZE ANALYSIS BY SIEVE AND HYDROMETER METHOD

Test Method: ASTM D422

Sieve Size	Particle Diameter, mm	Percent Passing	Specification
1"	25.0	100.0	
3/4"	19.0	84.5	
1/2"	12.5	79.9	
3/8"	9.5	77.6	
#4	4.75	71.6	
#10	2.00	57.0	
#40	0.425	40.2	
#200	0.075	23.2	
Hydrometer Analysis Results	0.050	19.7	
	0.020	12.1	
	0.010	9.1	
	0.005	7.4	
	0.002	7.3	

SOIL SPECIFIC GRAVITY: 2.51 (As reported separately, or estimated.)

DISPERSION METHOD: Mechanical, 1 min.

SAND & GRAVEL PARTICLES:

Notes: Additional sieve analysis results may be reported separately.

Comments:

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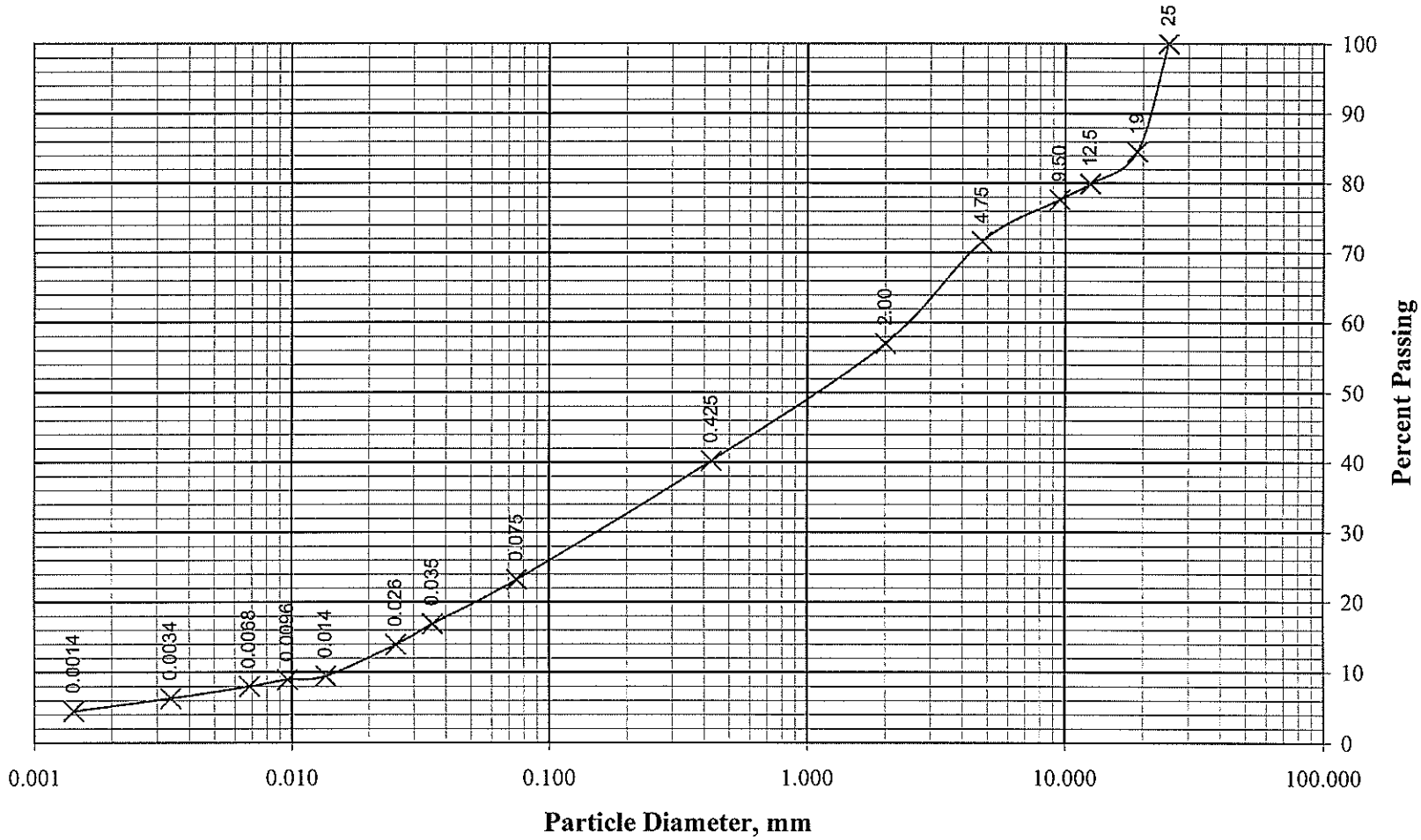
Phone/Fax: 413-232-8566

Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Item:	70-72	**Project Number:**	050584
Source:	PDGE04-100305-1420	**Lab Number:**	05-1043
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/3/2005	**Sampled By:**	Client
Date Tested:	11/26/2005-11/29/2005	**Tested By:**	C. Smith



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Phone/Fax: 413-232-8566

Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Item:	75-77	**Project Number:**	050584
Source:	PDGE04-100405-0900	**Lab Number:**	05-1044
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/4/2005	**Sampled By:**	Client
Date Tested:	12/14/2005-12/15/2005	**Tested By:**	C. Smith

PARTICLE SIZE ANALYSIS BY SIEVE AND HYDROMETER METHOD

Test Method: ASTM D422

Sieve Size	Particle Diameter, mm	Percent Passing	Specification
1"	25.00	100.0	
3/4"	19.00	93.7	
1/2"	12.50	86.4	
3/8"	9.50	84.7	
#4	4.75	76.8	
#10	2.00	70.0	
#40	0.425	54.4	
#200	0.075	12.4	
Hydrometer Analysis Results	0.050	8.0	
	0.020	6.0	
	0.010	4.0	
	0.005	2.0	
	0.002	1.0	

SOIL SPECIFIC GRAVITY: 2.51 (As reported separately, or estimated.)

DISPERSION METHOD: Mechanical, 1 min.

SAND & GRAVEL PARTICLES:

Notes: Additional sieve analysis results may be reported separately.

Comments:

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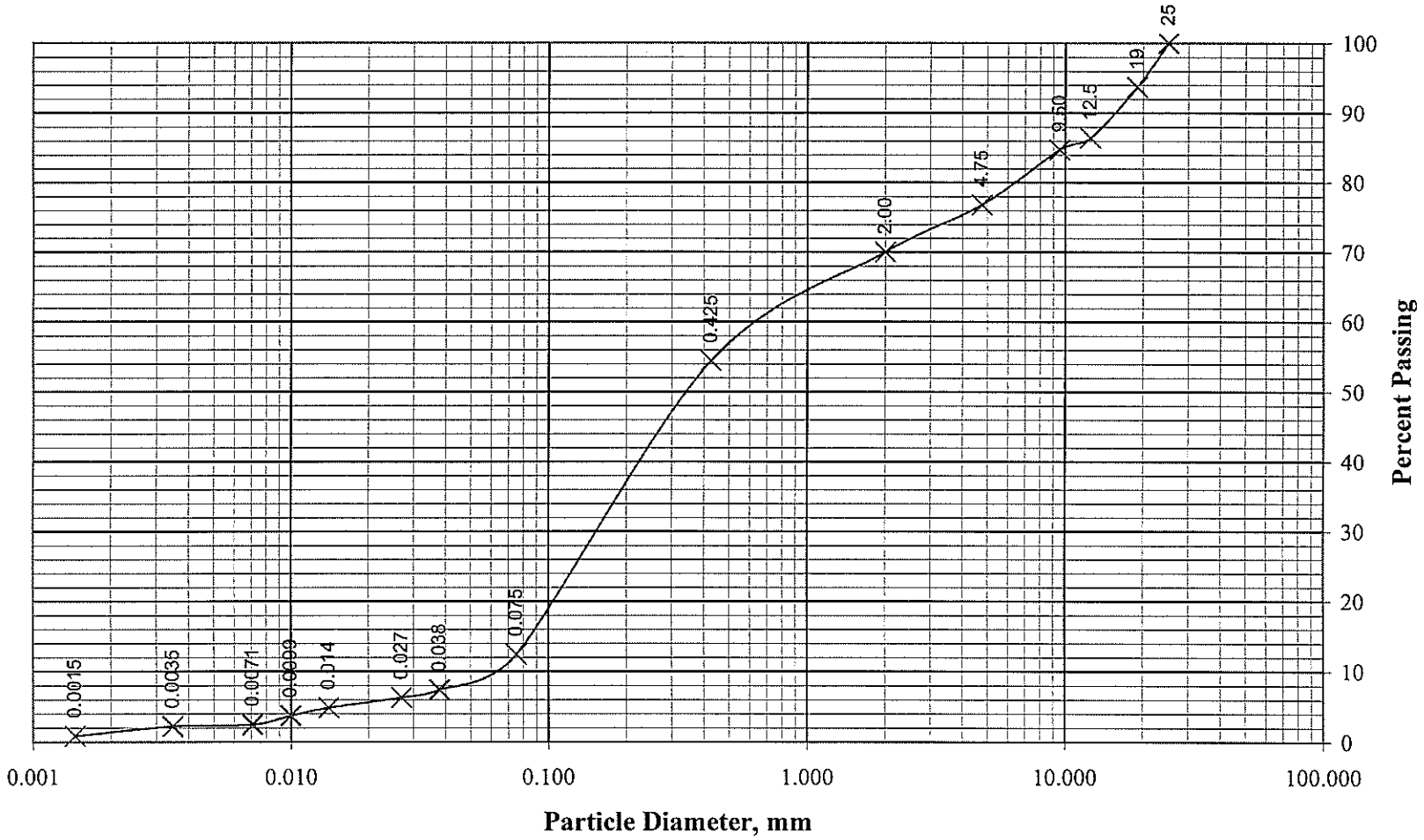
Phone/Fax: 413-232-8566

Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Item:	75-77	**Project Number:**	050584
Source:	PDGE04-100405-0900	**Lab Number:**	05-1044
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/4/2005	**Sampled By:**	Client
Date Tested:	12/14/2005-12/15/2005	**Tested By:**	C. Smith



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42 Day Farm Road, West Stockbridge, MA 01266
Phone/Fax: 413-232-8566

Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Item:	092205-1110	**Project Number:**	050584
Source:	PDGEO-4, U-1, 36-38'	**Lab Number:**	05-0859
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	9/28/2005	**Sampled By:**	H&A
Date Tested:	10/19/2005-10/20/2005	**Tested By:**	C. Smith

PARTICLE SIZE ANALYSIS BY SIEVE AND HYDROMETER METHOD

Test Method: ASTM D422

Sieve Size	Particle Diameter, mm	Percent Passing	Specification
3/8"	9.50	100.0	
#4	4.75	100.0	
#10	2.00	99.9	
#40	0.425	99.0	
#200	0.075	90.6	
Hydrometer Analysis Results	0.050	78.0	
	0.020	47.8	
	0.010	30.7	
	0.005	21.0	
	0.002	13.8	

SOIL SPECIFIC GRAVITY: 2.51 (As reported separately, or estimated.)
DISPERSION METHOD: Mechanical, 1 min.
SAND & GRAVEL PARTICLES: Hard durable particles

Notes: Additional sieve analysis results may be reported separately.

Comments:

No specifications available at time of testing.

REPORT REVIEWED BY: _____

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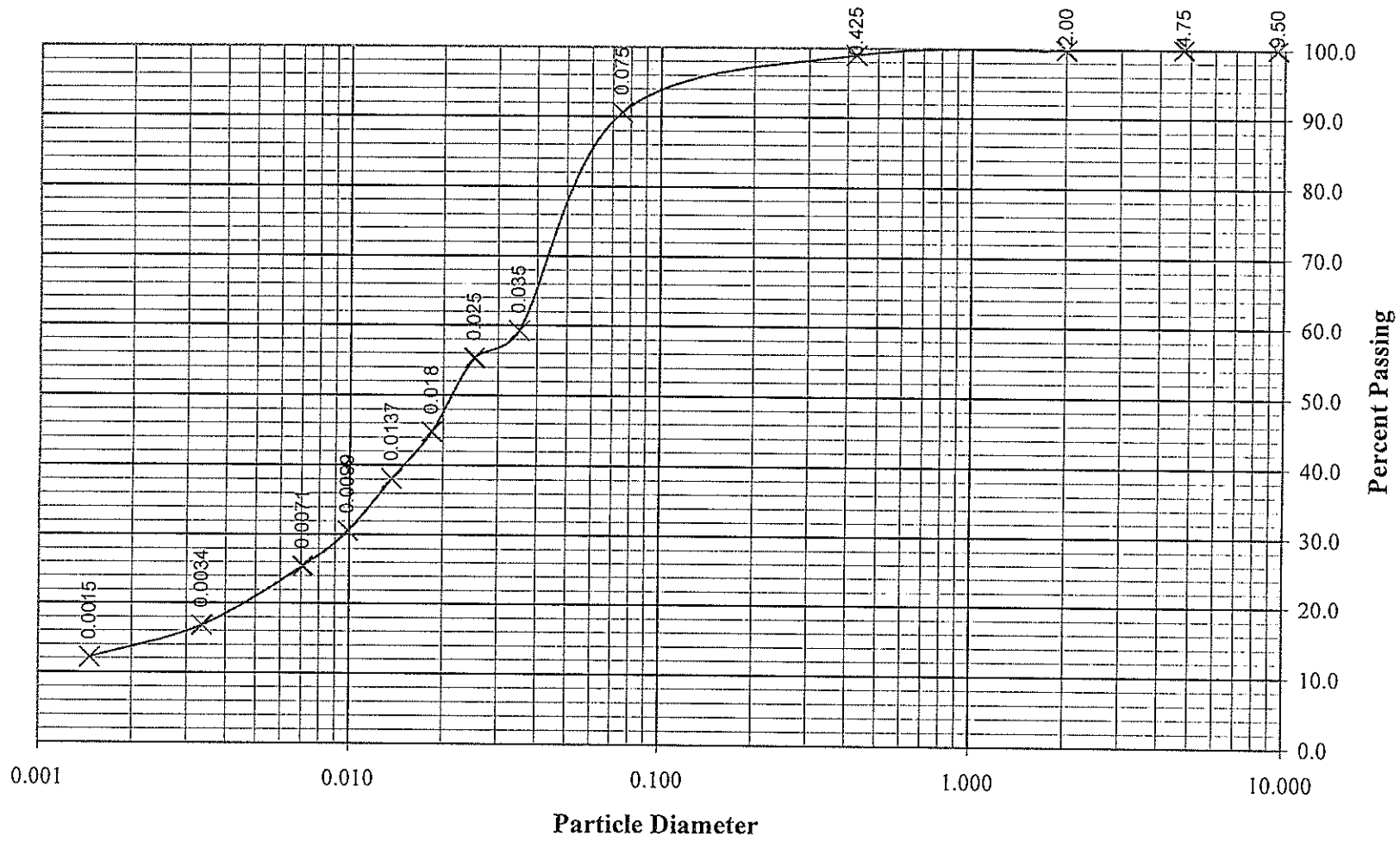
Phone/Fax: 413-232-8566

Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Item:	092205-1110	**Project Number:**	050584
Source:	PDGEO-4, U-1, 36-38'	**Lab Number:**	05-0859
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	9/28/2005	**Sampled By:**	H&A
Date Tested:	10/19/2005-10/20/2005	**Tested By:**	C. Smith



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Phone/Fax: 413-232-8566

Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Item:	28'-30'	**Project Number:**	050584
Source:	PDGE05-101905-1615	**Lab Number:**	05-1009
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/19/2005	**Sampled By:**	Client
Date Tested:	12/22/2005-12/23/2005	**Tested By:**	B. Jobity

PARTICLE SIZE ANALYSIS BY SIEVE AND HYDROMETER METHOD

Test Method: None

Sieve Size	Particle Diameter, mm	Percent Passing	Specification
3/4"	19.0	100.0	
3/8"	9.50	95.0	
#4	4.75	93.6	
#10	2.00	93.1	
#40	0.425	92.6	
#200	0.075	86.8	
Hydrometer Analysis Results	0.050	78.7	
	0.020	50.8	
	0.010	35.8	
	0.005	25.7	
	0.002	15.8	

SOIL SPECIFIC GRAVITY: 2.51 (As reported separately, or estimated.)

DISPERSION METHOD: Mechanical, 1 min.

SAND & GRAVEL PARTICLES: Sand, shell fragments

Notes: Additional sieve analysis results may be reported separately.

Comments:

REPORT REVIEWED BY: _____

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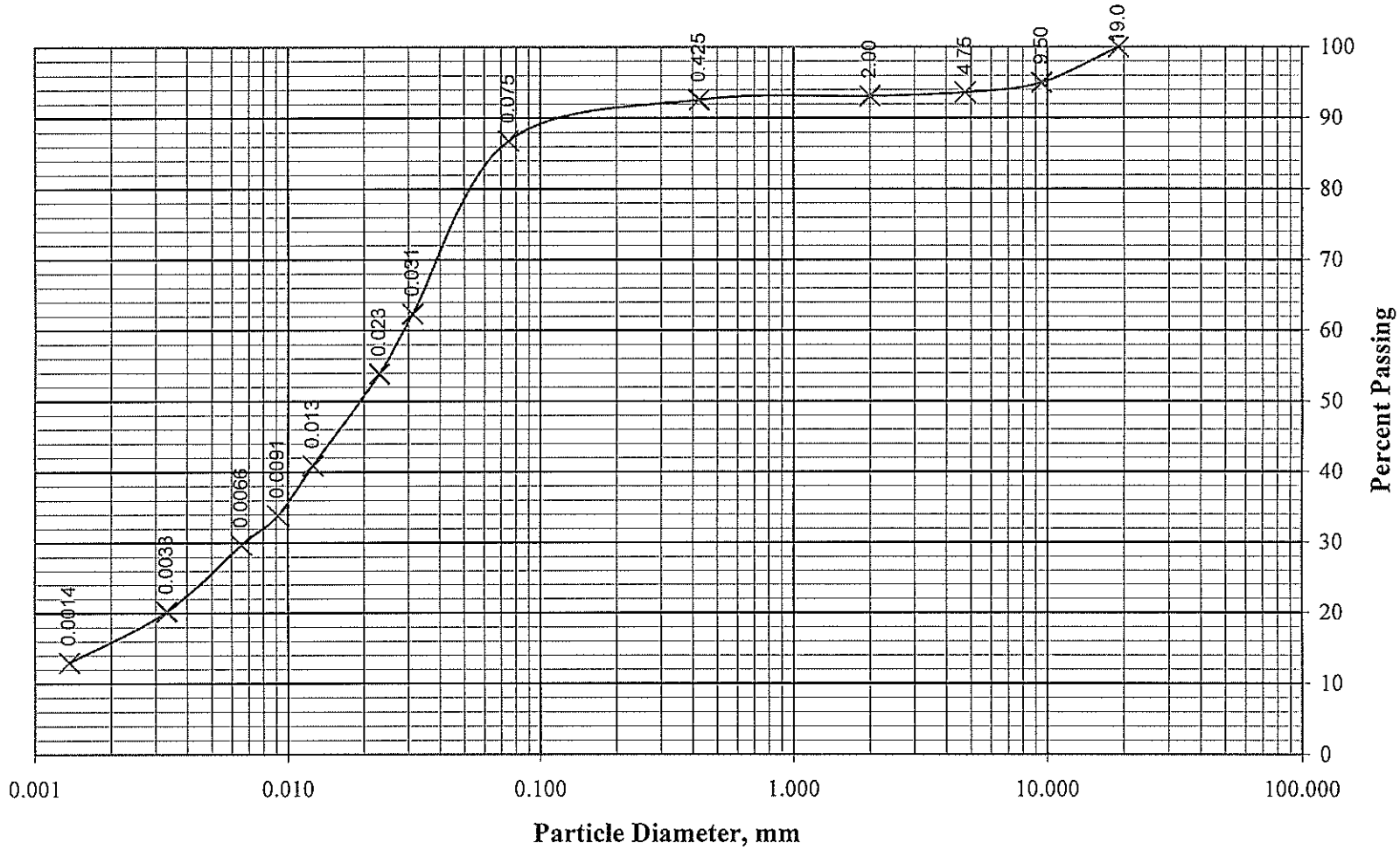
Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Item:	28'-30'	**Project Number:**	050584
Source:	PDGE05-101905-1615	**Lab Number:**	05-1009
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/19/2005	**Sampled By:**	Client
Date Tested:	12/22/2005-12/23/2005	**Tested By:**	B. Jobity



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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Item:	4-6 ft	**Project Number:**	050584
Source:	PDGE06-101805-1030	**Lab Number:**	05-1079
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/18/2005	**Sampled By:**	Client
Date Tested:	1/10/2006-01/11/2006	**Tested By:**	B. Jobity

PARTICLE SIZE ANALYSIS BY SIEVE AND HYDROMETER METHOD

Test Method: ASTM D422

Sieve Size	Particle Diameter, mm	Percent Passing	Specification
1"	25	100.0	
3/4"	19.5	88.8	
3/8"	9.50	78.6	
#4	4.75	64.5	
#10	2.00	49.4	
#40	0.425	27.9	
#200	0.075	12.2	
Hydrometer Analysis Results	0.050	10.9	
	0.020	6.0	
	0.010	4.3	
	0.005	2.7	
	0.002	1.7	

SOIL SPECIFIC GRAVITY: 2.51 (As reported separately, or estimated.)

DISPERSION METHOD: Mechanical, 1 min.

SAND & GRAVEL PARTICLES:

Notes: Additional sieve analysis results may be reported separately.

Comments:

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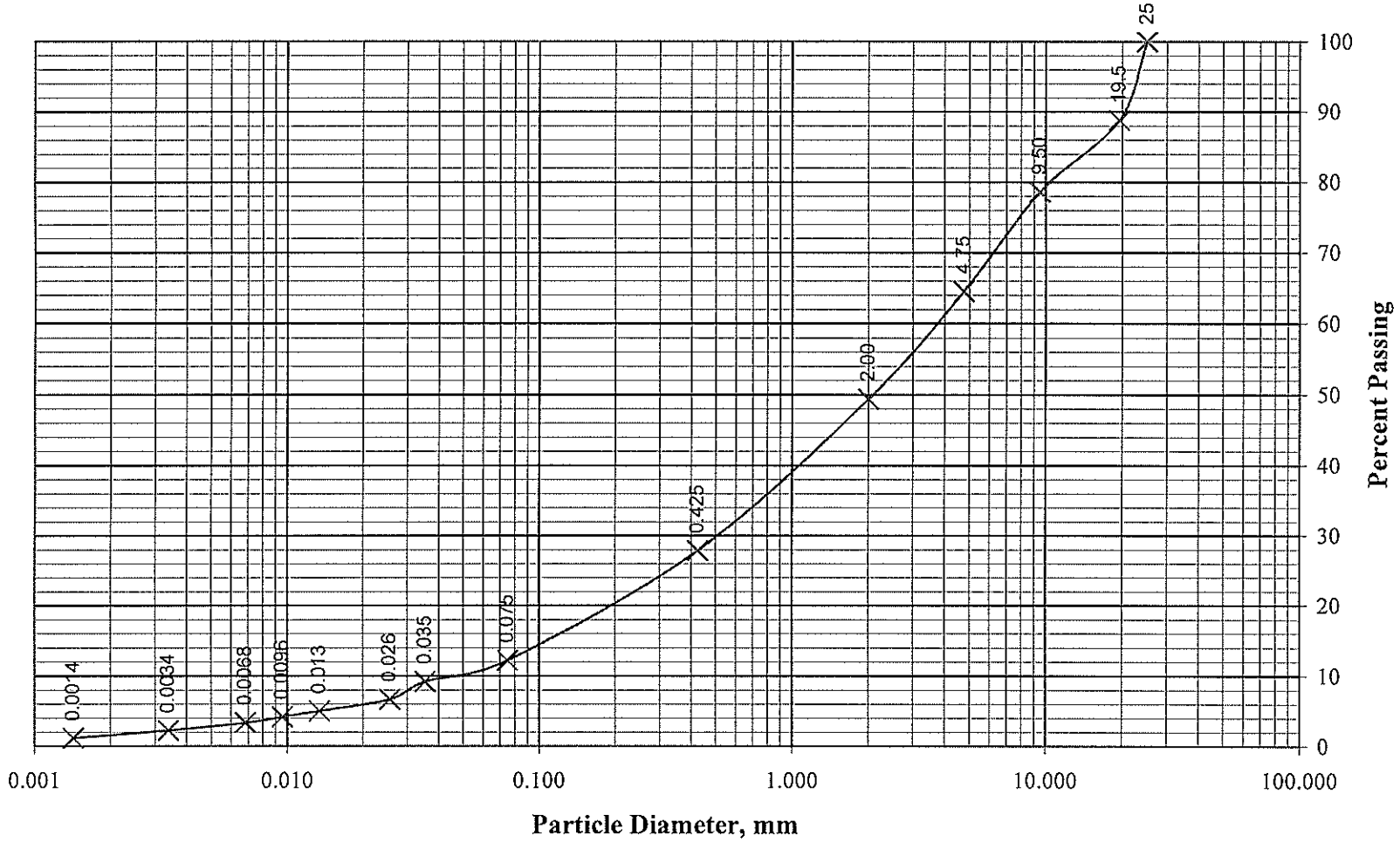
Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Item:	4-6 ft	**Project Number:**	050584
Source:	PDGE06-101805-1030	**Lab Number:**	05-1079
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/18/2005	**Sampled By:**	Client
Date Tested:	1/10/2006-01/11/2006	**Tested By:**	B. Jobity



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Phone/Fax: 413-232-8566

Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Item:	30'-31'	**Project Number:**	050584
Source:	PDGE06-101805-1425	**Lab Number:**	05-1001
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/18/2005	**Sampled By:**	Client
Date Tested:	12/22/2005-12/23/2005	**Tested By:**	B. Jobity

PARTICLE SIZE ANALYSIS BY SIEVE AND HYDROMETER METHOD

Test Method: ASTM D422

Sieve Size	Particle Diameter, mm	Percent Passing	Specification
3/4"	19.0	100.0	
3/8"	9.50	76.5	
#4	4.75	63.6	
#10	2.00	48.6	
#40	0.425	41.5	
#200	0.075	35.1	
Hydrometer Analysis Results	0.050	32.5	
	0.020	23.9	
	0.010	14.7	
	0.005	9.6	
	0.002	6.1	

SOIL SPECIFIC GRAVITY: 2.51 (As reported separately, or estimated.)

DISPERSION METHOD: Mechanical, 1 min.

SAND & GRAVEL PARTICLES: Sand, shell fragments.

Notes: Additional sieve analysis results may be reported separately.

Comments:

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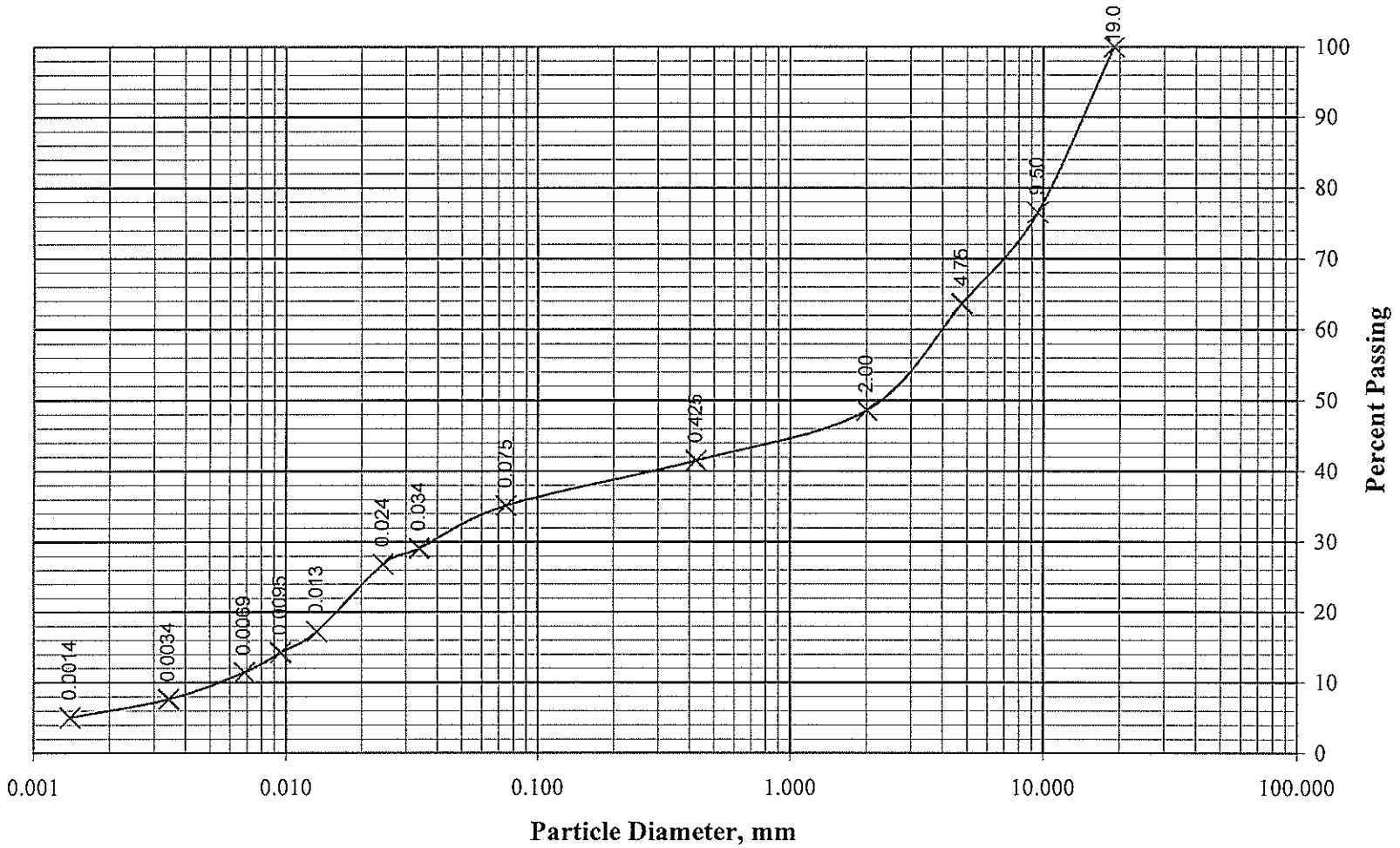
Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Item:	30'-31'	**Project Number:**	050584
Source:	PDGE06-101805-1425	**Lab Number:**	05-1001
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/18/2005	**Sampled By:**	Client
Date Tested:	12/22/2005-12/23/2005	**Tested By:**	B. Jobity



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Phone/Fax: 413-232-8566

Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Item:	33'-35'	**Project Number:**	050584
Source:	PDGE07-101905-1205	**Lab Number:**	05-1008
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/19/2005	**Sampled By:**	Client
Date Tested:	11/25/2005-11/26/2005	**Tested By:**	C. Smith

PARTICLE SIZE ANALYSIS BY SIEVE AND HYDROMETER METHOD

Test Method: ASTM D422

Sieve Size	Particle Diameter, mm	Percent Passing	Specification
3/8"	9.50	100.0	
#4	4.75	100.0	
#10	2.00	100.0	
#40	0.425	99.9	
#200	0.075	94.3	
Hydrometer Analysis Results	0.050	86.8	
	0.020	56.9	
	0.010	38.8	
	0.005	26.9	
	0.002	16.4	

SOIL SPECIFIC GRAVITY: 2.51 (As reported separately, or estimated.)

DISPERSION METHOD: Mechanical, 1 min.

SAND & GRAVEL PARTICLES:

Notes: Additional sieve analysis results may be reported separately.

Comments:

REPORT REVIEWED BY: D. O'Dell

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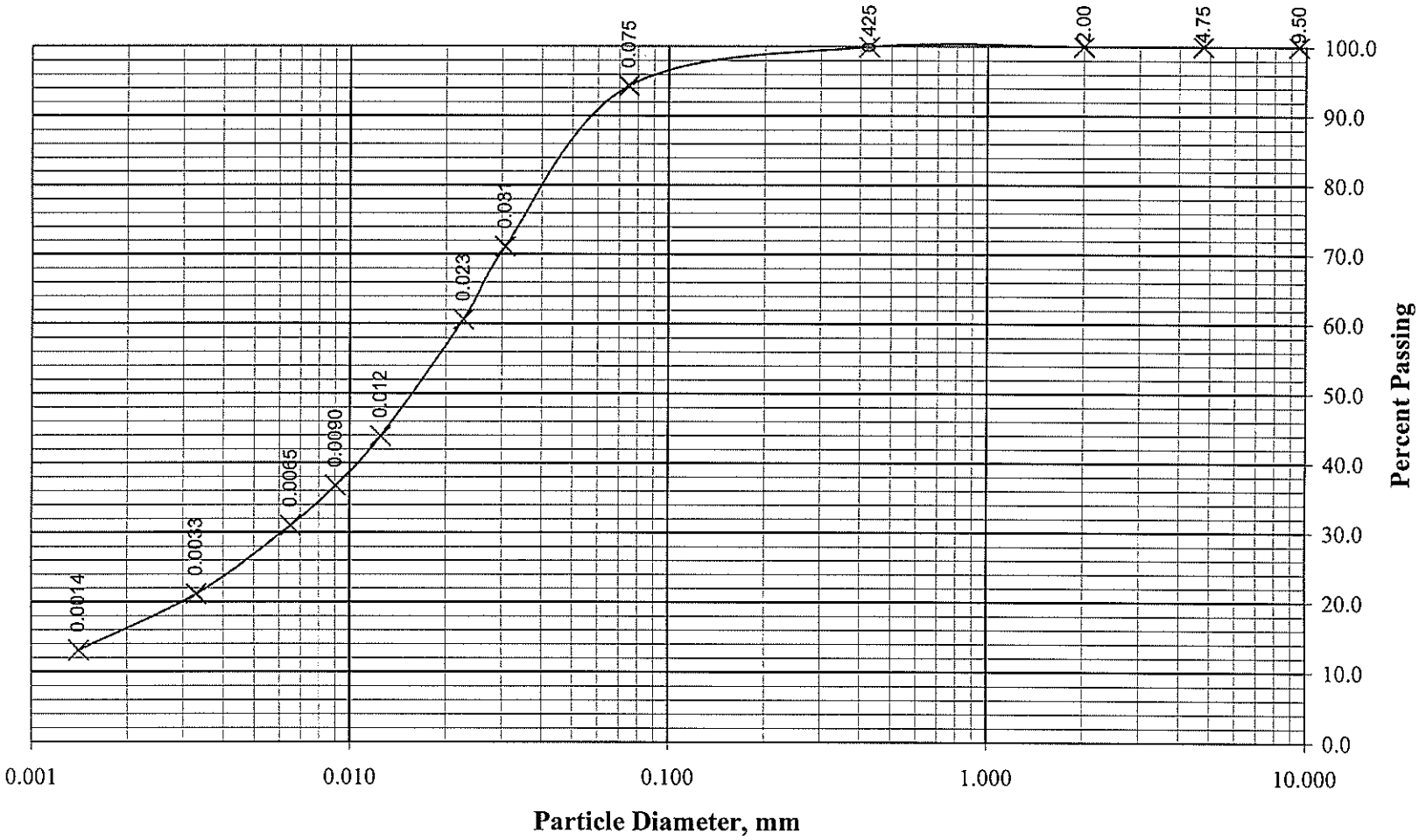
Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Item:	33'-35'	**Project Number:**	050584
Source:	PDGE07-101905-1205	**Lab Number:**	05-1008
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/19/2005	**Sampled By:**	Client
Date Tested:	11/25/2005-11/26/2005	**Tested By:**	C. Smith



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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Item:	60-62	**Project Number:**	050584
Source:	PDGE09-100605-1320	**Lab Number:**	05-1055
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/6/2005	**Sampled By:**	Client
Date Tested:	12/29/2005-12/30/2005	**Tested By:**	M. Kennedy

PARTICLE SIZE ANALYSIS BY SIEVE AND HYDROMETER METHOD

Test Method: ASTM D422

Sieve Size	Particle Diameter, mm	Percent Passing	Specification
3/8"	9.50	83.7	
#4	4.75	78.2	
#10	2.00	71.6	
#40	0.425	51.8	
#200	0.075	20.0	
Hydrometer Analysis Results	0.050	16.3	
	0.020	12.3	
	0.010	9.6	
	0.005	6.9	
	0.002	4.4	

SOIL SPECIFIC GRAVITY: 2.51 (As reported separately, or estimated.)

DISPERSION METHOD: Mechanical, 1 min.

SAND & GRAVEL PARTICLES:

Notes: Additional sieve analysis results may be reported separately.

Comments:

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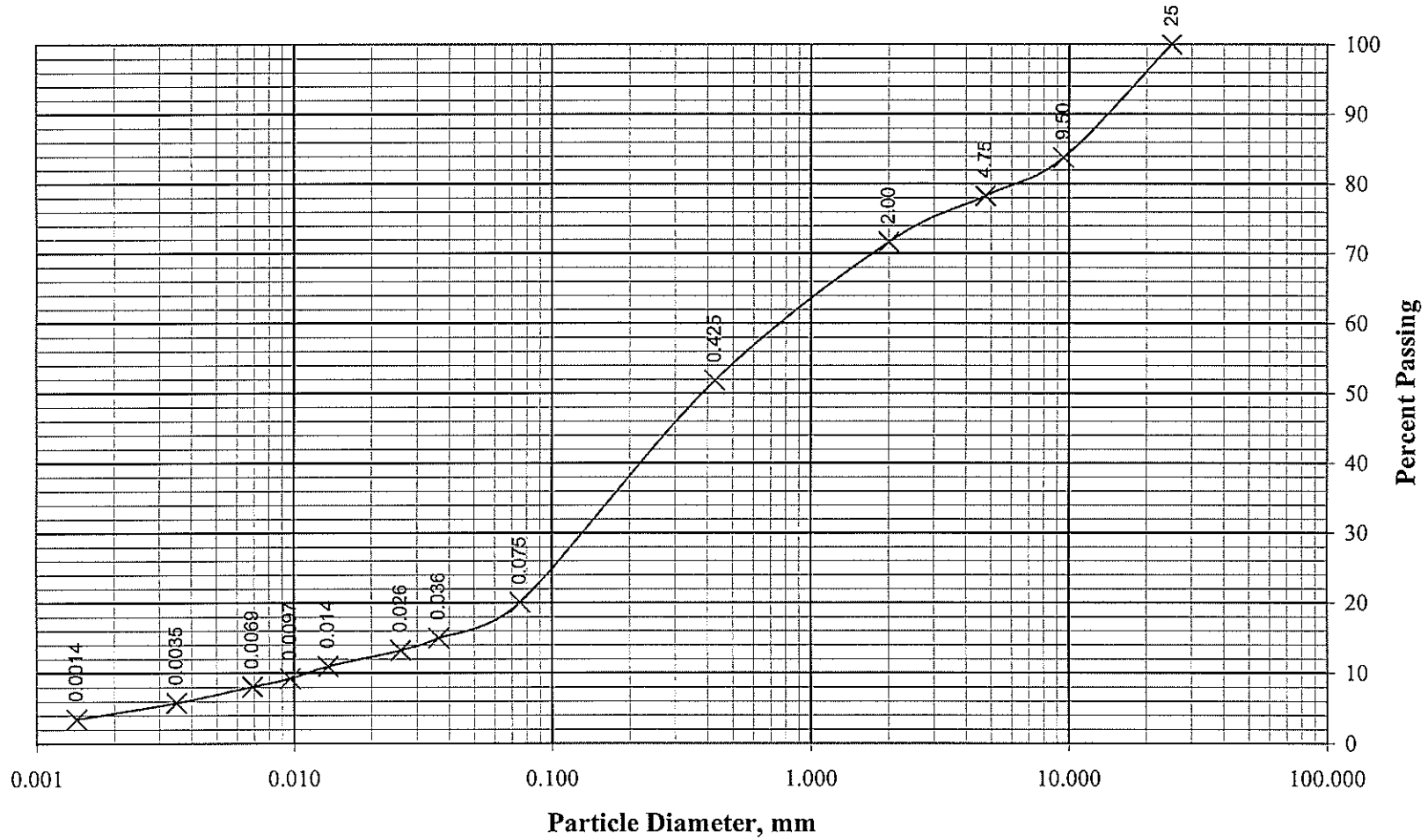
Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Item:	60-62	**Project Number:**	050584
Source:	PDGE09-100605-1320	**Lab Number:**	05-1055
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/6/2005	**Sampled By:**	Client
Date Tested:	12/29/2005-12/30/2005	**Tested By:**	M. Kennedy



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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Item:	68-70	**Project Number:**	050584
Source:	PDGE09-100705-0935	**Lab Number:**	05-1056
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/7/2005	**Sampled By:**	Client
Date Tested:	11/25/2005-11/26/2005	**Tested By:**	C. Smith

PARTICLE SIZE ANALYSIS BY SIEVE AND HYDROMETER METHOD

Test Method: ASTM D422

Sieve Size	Particle Diameter, mm	Percent Passing	Specification
3/8"	9.50	100.0	
#4	4.75	100.0	
#10	2.00	99.9	
#40	0.425	97.8	
#200	0.075	66.6	
Hydrometer Analysis Results	0.050	58.3	
	0.020	37.5	
	0.010	24.4	
	0.005	15.6	
	0.002	7.7	

SOIL SPECIFIC GRAVITY: 2.51 (As reported separately, or estimated.)

DISPERSION METHOD: Mechanical, 1 min.

SAND & GRAVEL PARTICLES:

Notes: Additional sieve analysis results may be reported separately.

Comments:

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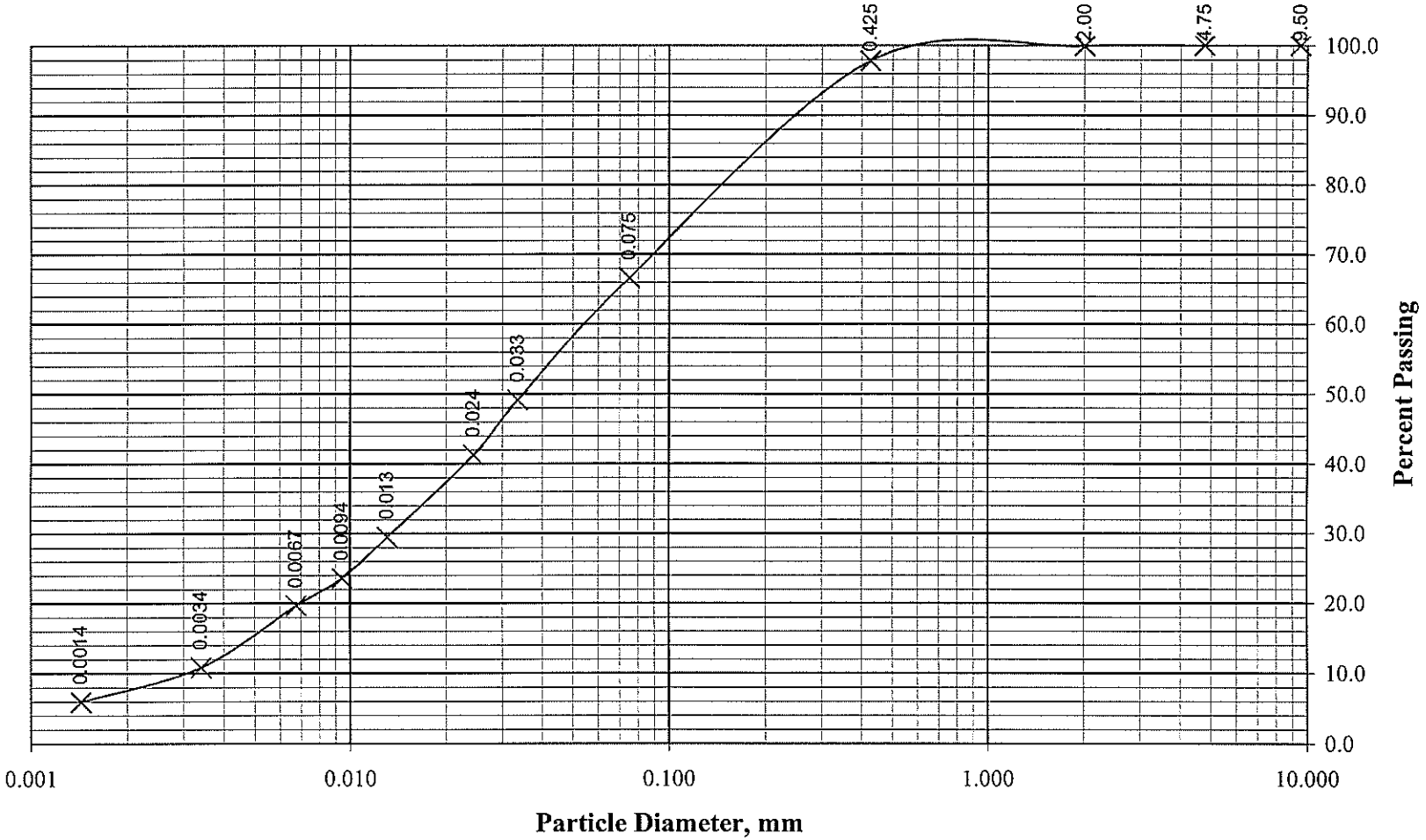
Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Item:	68-70	**Project Number:**	050584
Source:	PDGE09-100705-0935	**Lab Number:**	05-1056
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/7/2005	**Sampled By:**	Client
Date Tested:	11/25/2005-11/26/2005	**Tested By:**	C. Smith



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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Item:	100505-0815	**Project Number:**	050584
Source:	PDGO9, 35'-37'	**Lab Number:**	05-0926
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/5/2005	**Sampled By:**	Client
Date Tested:	11/17/2005-11/18/2005	**Tested By:**	C. Smith

PARTICLE SIZE ANALYSIS BY SIEVE AND HYDROMETER METHOD

Test Method: ASTM D422

Sieve Size	Particle Diameter, mm	Percent Passing	Specification
3/8"	9.50	99.0	
#4	4.75	98.4	
#10	2.00	97.6	
#40	0.425	96.0	
#200	0.075	89.9	
Hydrometer Analysis Results	0.050	82.0	
	0.020	66.0	
	0.010	40.0	
	0.005	28.0	
	0.002	21.0	

SOIL SPECIFIC GRAVITY: 2.51 (As reported separately, or estimated.)

DISPERSION METHOD: Mechanical, 1 min.

SAND & GRAVEL PARTICLES: Sand and shell fragments

Notes: Additional sieve analysis results may be reported separately.

Comments:

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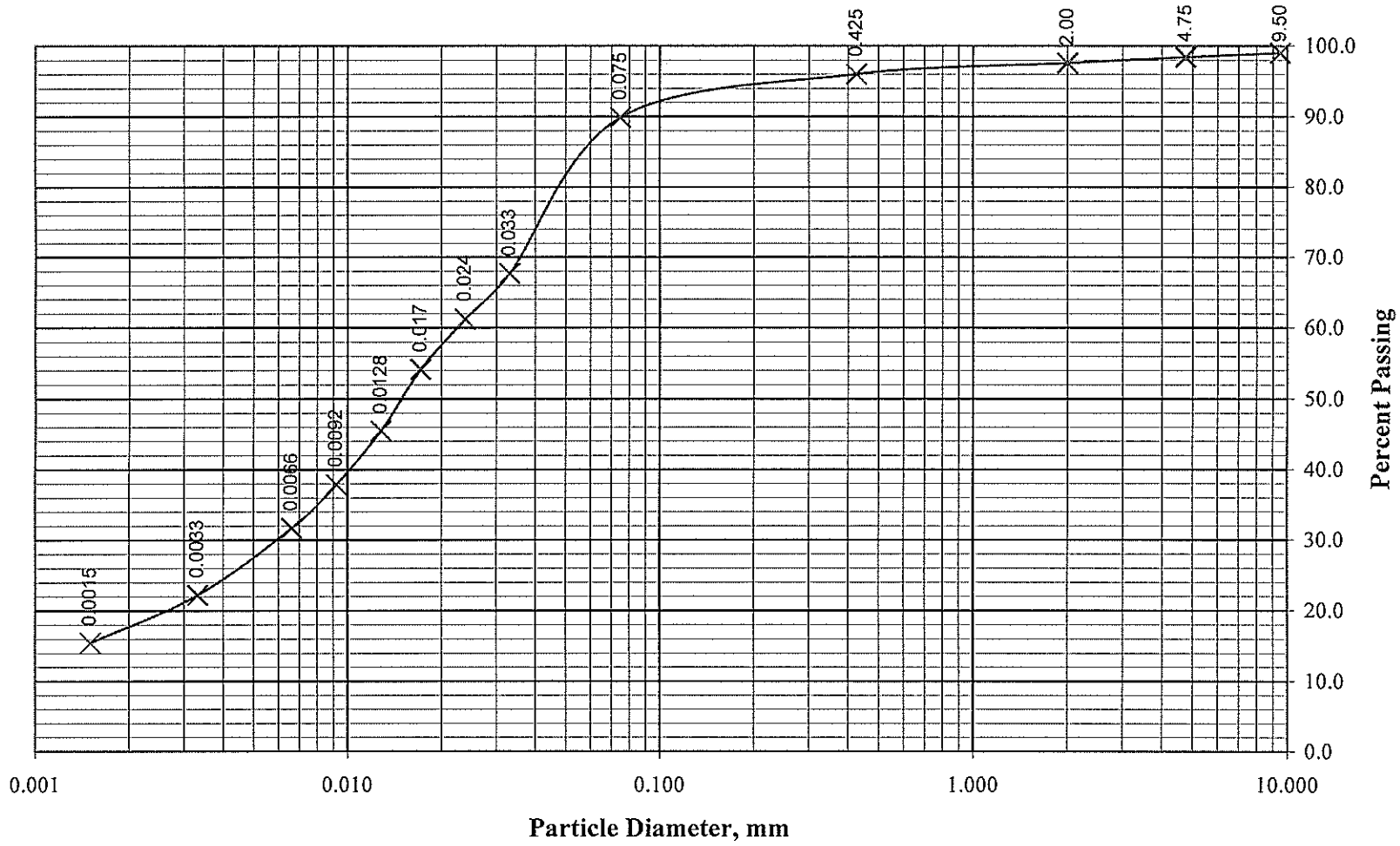
Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Item:	100505-0815	**Project Number:**	050584
Source:	PDGO9, 35'-37'	**Lab Number:**	05-0926
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/5/2005	**Sampled By:**	Client
Date Tested:	11/17/2005-11/18/2005	**Tested By:**	C. Smith



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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Item:	100605-1035	**Project Number:**	050584
Source:	PDGEO9, 46'-48'	**Lab Number:**	05-0928
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/6/2005	**Sampled By:**	Client
Date Tested:	10/26/2005-10/27/2005	**Tested By:**	MK/B. Jobity

PARTICLE SIZE ANALYSIS BY SIEVE AND HYDROMETER METHOD

Test Method: ASTM D422

Sieve Size	Particle Diameter, mm	Percent Passing	Specification
3/8"	9.50	100.0	
#4	4.75	100.0	
#10	2.00	99.6	
#40	0.425	96.5	
#200	0.075	84.1	
Hydrometer Analysis Results	0.050	76.2	
	0.020	53.0	
	0.010	38.2	
	0.005	24.9	
	0.002	16.1	

SOIL SPECIFIC GRAVITY: 2.51 (As reported separately, or estimated.)

DISPERSION METHOD: Mechanical, 1 min.

SAND & GRAVEL PARTICLES: Hard durable particles

Notes: Additional sieve analysis results may be reported separately.

Comments:

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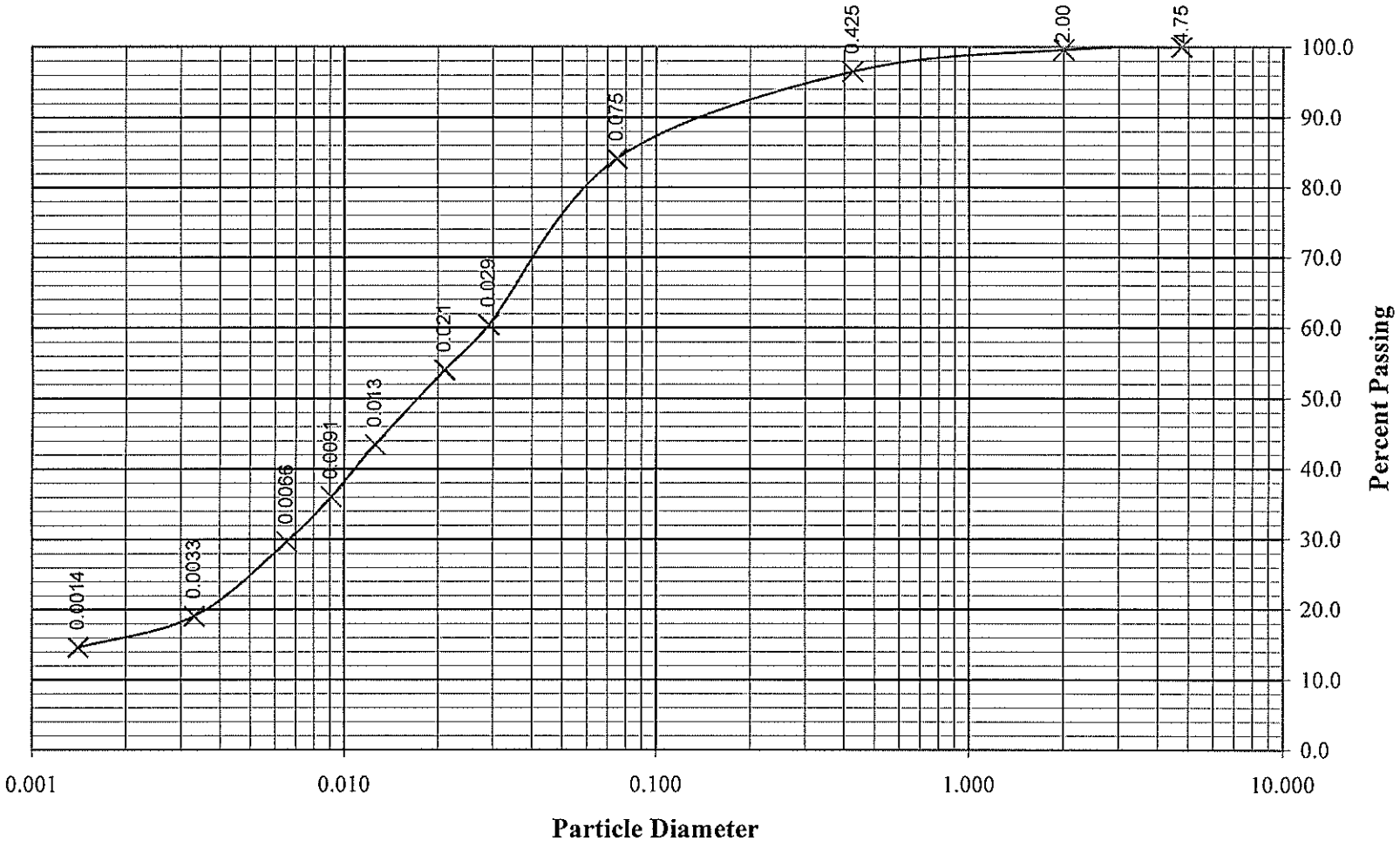
Phone/Fax: 413-232-8566

Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Item:	100605-1035	**Project Number:**	050584
Source:	PDGEO9, 46'-48'	**Lab Number:**	05-0928
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/6/2005	**Sampled By:**	Client
Date Tested:	10/26/2005-10/27/2005	**Tested By:**	MK/B. Jobity



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Phone/Fax: 413-232-8566

Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Item:	100605-1300	**Project Number:**	050584
Source:	PDGEO9, 54'-56'	**Lab Number:**	05-0930
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/6/2005	**Sampled By:**	Client
Date Tested:	11/9/2005-11/10/2005	**Tested By:**	C. Smith

PARTICLE SIZE ANALYSIS BY SIEVE AND HYDROMETER METHOD

Test Method: ASTM D422

Sieve Size	Particle Diameter, mm	Percent Passing	Specification
3/8"	9.50	100.0	
#4	4.75	100.0	
#10	2.00	99.7	
#40	0.425	96.7	
#200	0.075	82.7	
Hydrometer Analysis Results	0.050	69.0	
	0.020	38.8	
	0.010	31.7	
	0.005	24.2	
	0.002	12.5	

SOIL SPECIFIC GRAVITY: 2.51 (As reported separately, or estimated.)

DISPERSION METHOD: Mechanical, 1 min.

SAND & GRAVEL PARTICLES: Subrounded sand, trace shell fragments

Notes: Additional sieve analysis results may be reported separately.

Comments:

No specifications available at time of testing.

REPORT REVIEWED BY: _____

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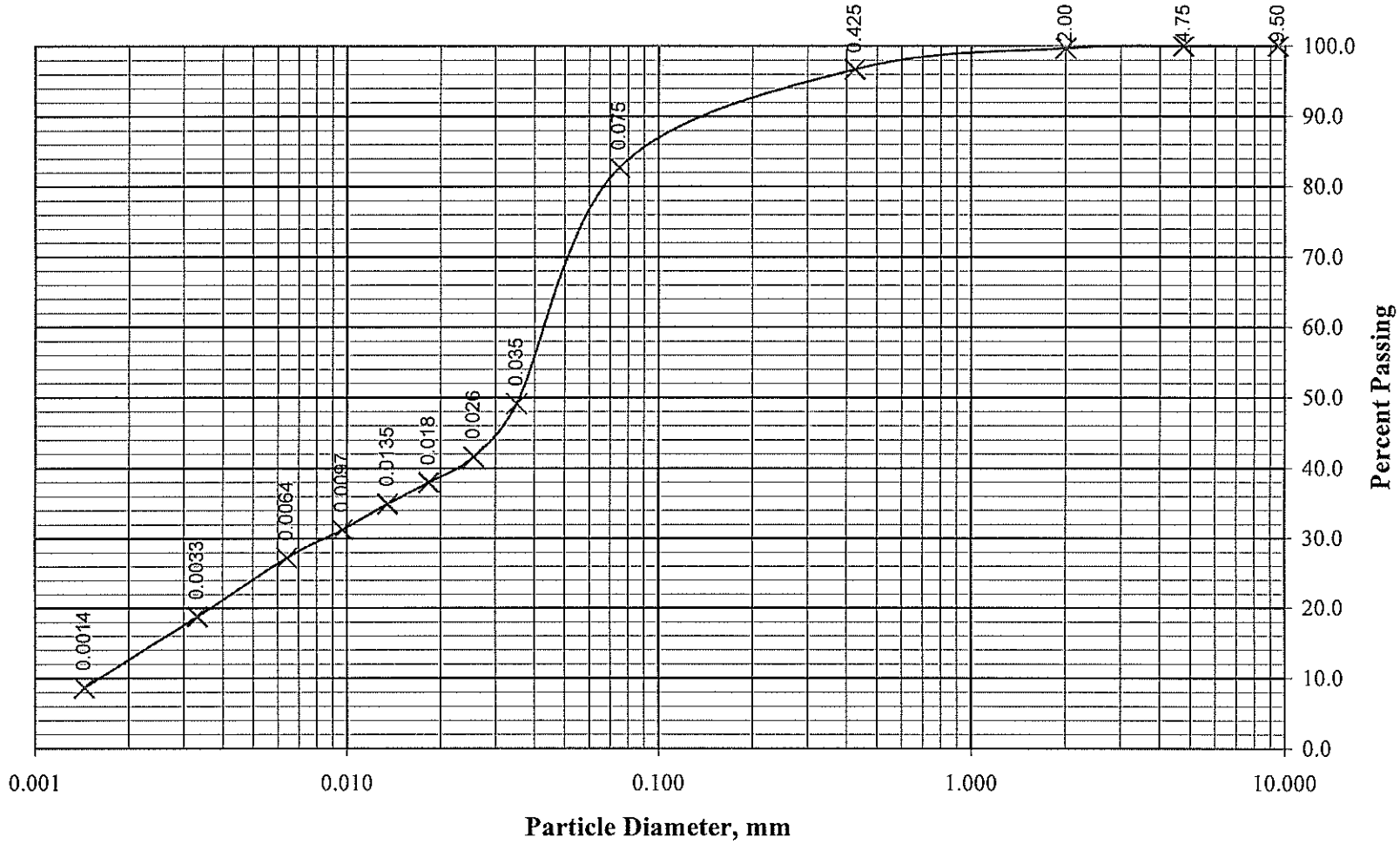
42 Day Farm Road, West Stockbridge, MA 01266
Phone/Fax: 413-232-8566

Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Item:	100605-1300	**Project Number:**	050584
Source:	PDGEO9, 54'-56'	**Lab Number:**	05-0930
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/6/2005	**Sampled By:**	Client
Date Tested:	11/9/2005-11/10/2005	**Tested By:**	C. Smith



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Phone/Fax: 413-232-8566

Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Item:	35'-37'	**Project Number:**	050584
Source:	PDGE011-110105-1445	**Lab Number:**	05-1166
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	11/1/2005	**Sampled By:**	Client
Date Tested:	1/16/2006-01/17/2006	**Tested By:**	B. Jobity

PARTICLE SIZE ANALYSIS BY SIEVE AND HYDROMETER METHOD

Test Method: ASTM D422

Sieve Size	Particle Diameter, mm	Percent Passing	Specification
1"	25	100.0	
3/4"	19	94.1	
1/2"	12.5	92.8	
3/8"	9.50	87.4	
#4	4.75	80.7	
#10	2.00	77.2	
#40	0.425	72.5	
#200	0.075	65.7	
Hydrometer Analysis Results	0.050	59.6	
	0.020	39.5	
	0.010	27.9	
	0.005	18.3	
	0.002	11.1	

SOIL SPECIFIC GRAVITY: 2.51 (As reported separately, or estimated.)

DISPERSION METHOD: Mechanical, 1 min.

SAND & GRAVEL PARTICLES: Sand, shell fragments

Notes: Additional sieve analysis results may be reported separately.

Comments:

REPORT REVIEWED BY: _____

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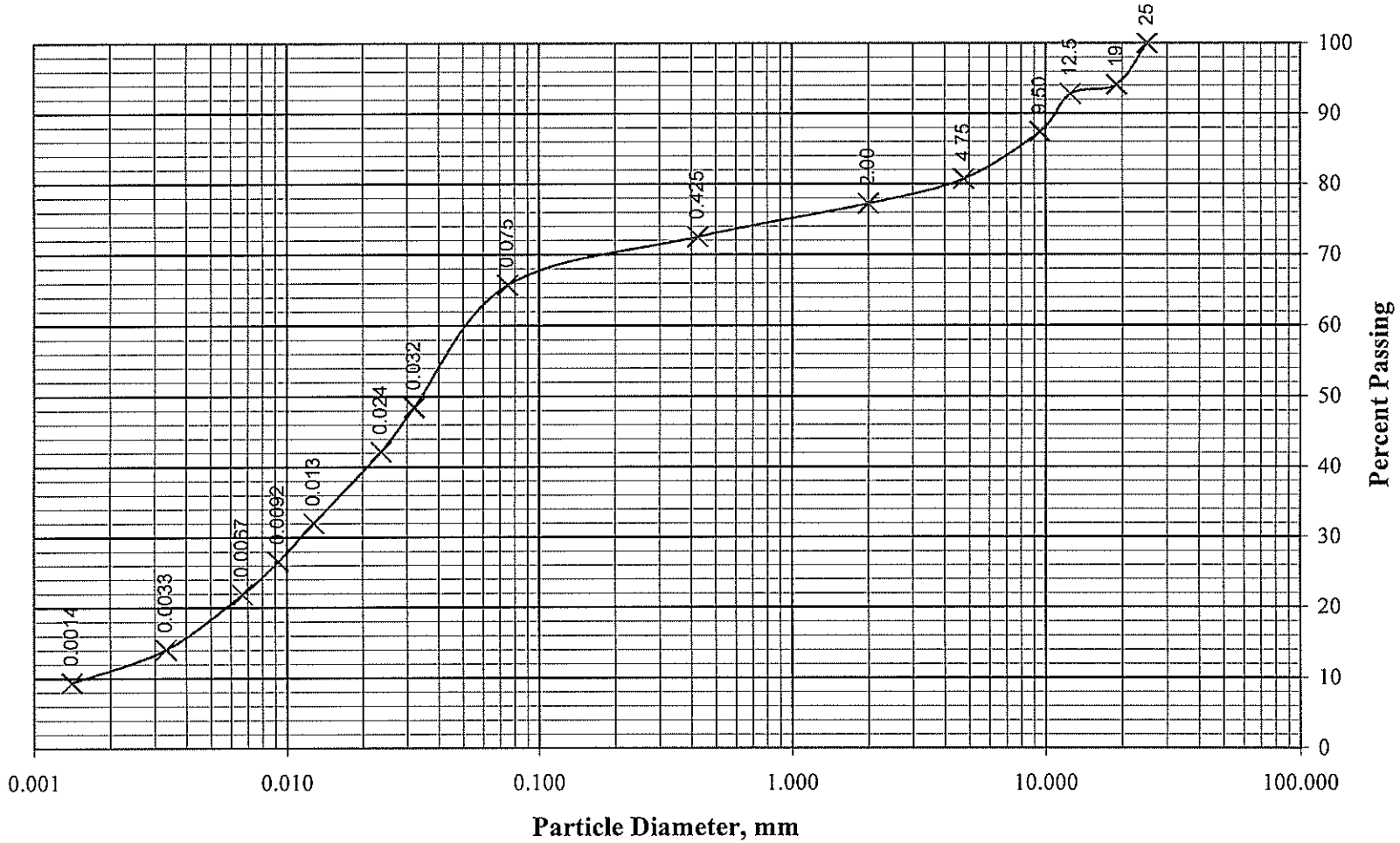
Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Item:	35'-37'	**Project Number:**	050584
Source:	PDGE011-110105-1445	**Lab Number:**	05-1166
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	11/1/2005	**Sampled By:**	Client
Date Tested:	1/16/2006-01/17/2006	**Tested By:**	B. Jobity



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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Item:	43'-45'	**Project Number:**	050584
Source:	PDGE011-110105-1530	**Lab Number:**	05-1168
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	11/1/2005	**Sampled By:**	Client
Date Tested:	1/5/2006-01/06/2006	**Tested By:**	B. Jobity

PARTICLE SIZE ANALYSIS BY SIEVE AND HYDROMETER METHOD

Test Method: ASTM D422

Sieve Size	Particle Diameter, mm	Percent Passing	Specification
3/8"	9.50	100.0	
#4	4.75	99.7	
#10	2.00	99.4	
#40	0.425	98.7	
#200	0.075	92.6	
Hydrometer Analysis Results	0.050	85.2	
	0.020	57.8	
	0.010	40.7	
	0.005	28.3	
	0.002	14.2	

SOIL SPECIFIC GRAVITY: 2.51 (As reported separately, or estimated.)

DISPERSION METHOD: Mechanical, 1 min.

SAND & GRAVEL PARTICLES:

Notes: Additional sieve analysis results may be reported separately.

Comments:

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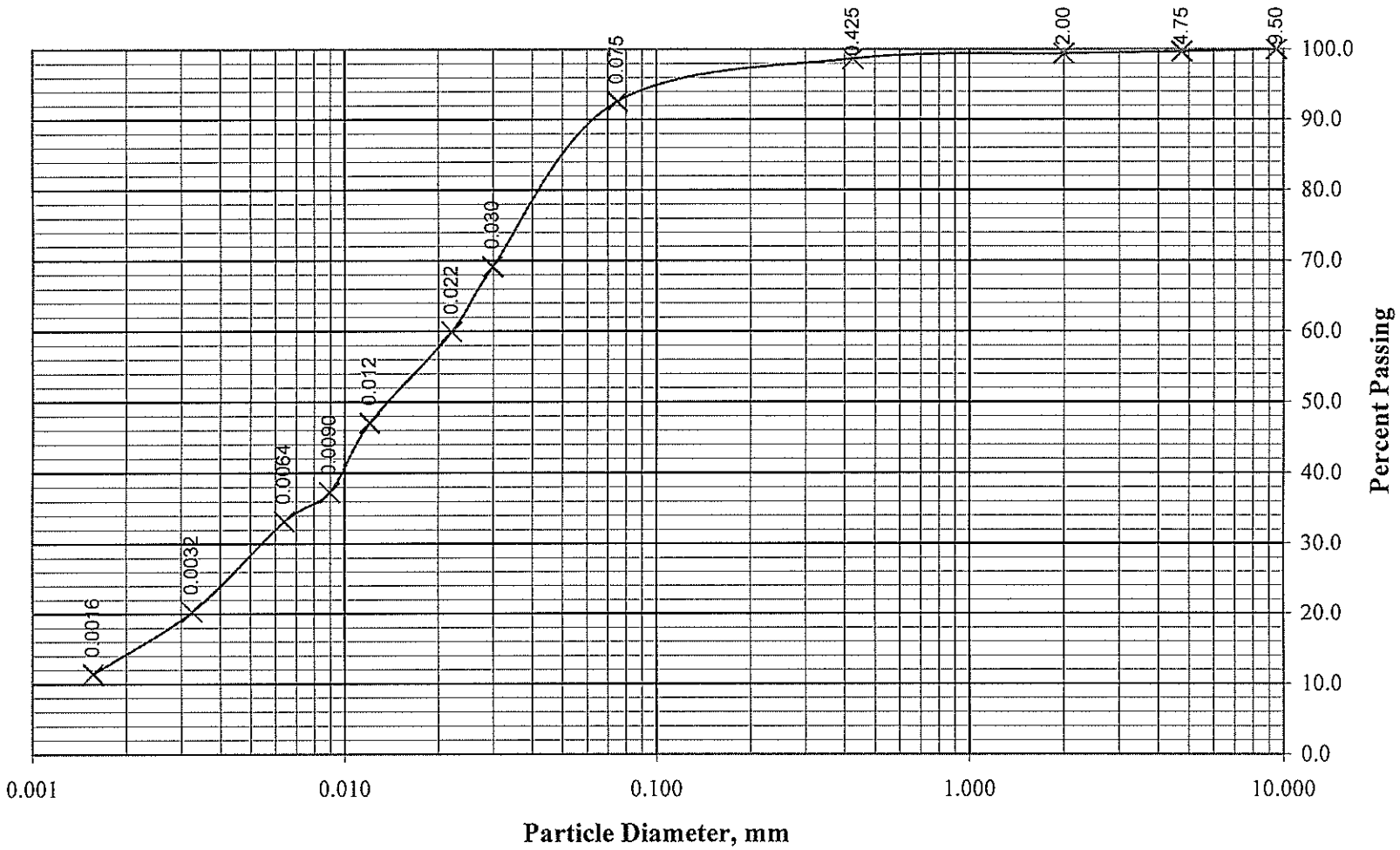
Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Item:	43'-45'	**Project Number:**	050584
Source:	PDGE011-110105-1530	**Lab Number:**	05-1168
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	11/1/2005	**Sampled By:**	Client
Date Tested:	1/5/2006-01/06/2006	**Tested By:**	B. Jobity



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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Item:	101305-1140	**Project Number:**	050584
Source:	PDGEO13, 44'-46'	**Lab Number:**	05-0918
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/13/2005	**Sampled By:**	Client
Date Tested:	11/22/2005-11/23/2005	**Tested By:**	C. Smith

PARTICLE SIZE ANALYSIS BY SIEVE AND HYDROMETER METHOD

Test Method: ASTM D422

Sieve Size	Particle Diameter, mm	Percent Passing	Specification
1/2"	12.5	100	
3/8"	9.50	83.9	
#4	4.75	81.5	
#10	2.00	77.8	
#40	0.425	58.5	
#200	0.075	45.6	
Hydrometer Analysis Results	0.050	41.5	
	0.020	32.8	
	0.010	26.0	
	0.005	17.8	
	0.002	10.7	

SOIL SPECIFIC GRAVITY: 2.51 (As reported separately, or estimated.)

DISPERSION METHOD: Mechanical, 1 min.

SAND & GRAVEL PARTICLES:

Notes: Additional sieve analysis results may be reported separately.

Comments:

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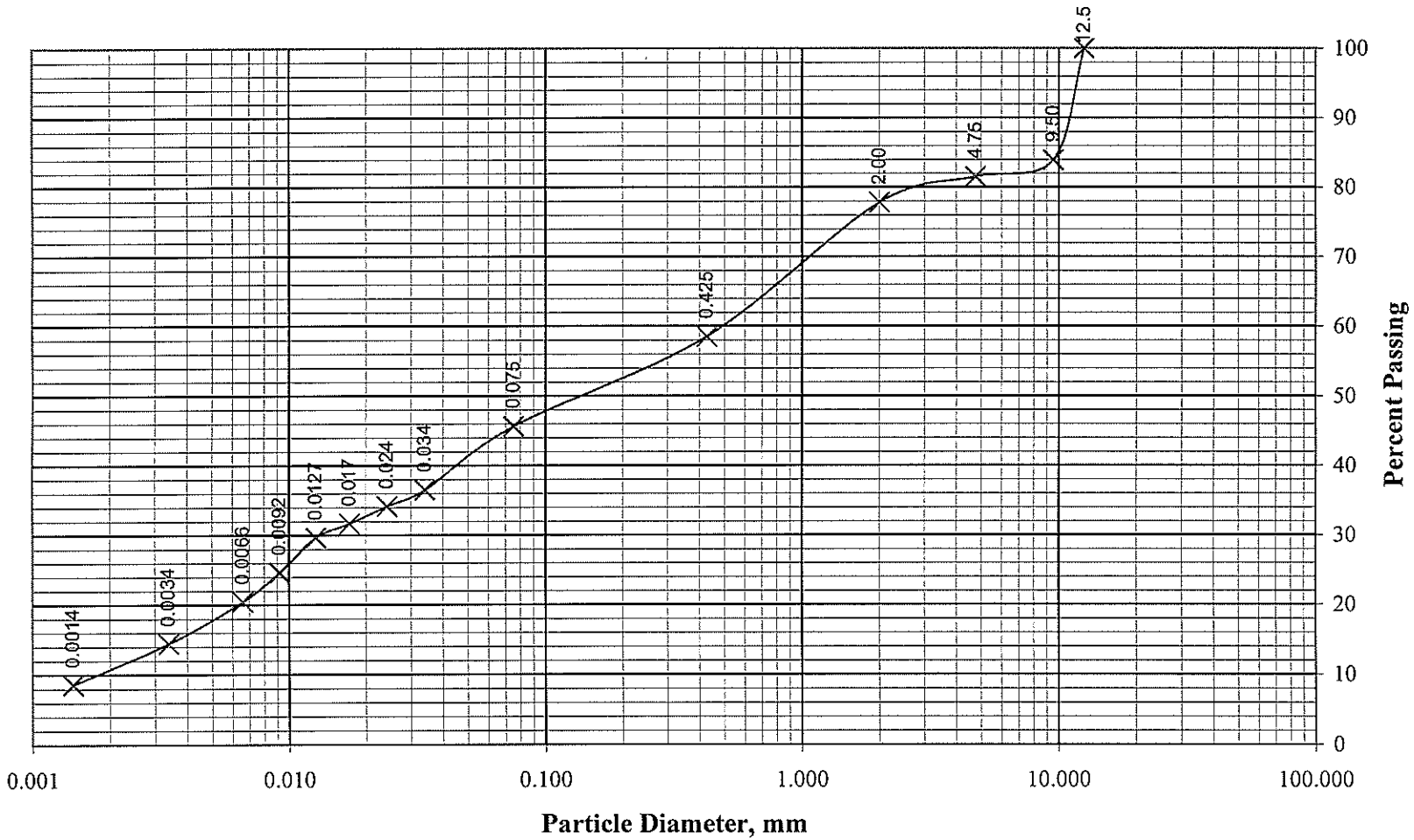
Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Item:	101305-1140	**Project Number:**	050584
Source:	PDGEO13, 44'-46'	**Lab Number:**	05-0918
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/13/2005	**Sampled By:**	Client
Date Tested:	11/22/2005-11/23/2005	**Tested By:**	C. Smith



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Phone/Fax: 413-232-8566

Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Item:	101405-0840	**Project Number:**	050584
Source:	PDGEO13, 58'-60'	**Lab Number:**	05-0920
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/14/2005	**Sampled By:**	Client
Date Tested:	11/17/2005-11/18/2005	**Tested By:**	C. Smith

PARTICLE SIZE ANALYSIS BY SIEVE AND HYDROMETER METHOD

Test Method: ASTM D422

Sieve Size	Particle Diameter, mm	Percent Passing	Specification
3/8"	9.50	98.8	
#4	4.75	95.3	
#10	2.00	91.9	
#40	0.425	77.3	
#200	0.075	54.2	
Hydrometer Analysis Results	0.050	48.0	
	0.020	40.0	
	0.010	31.0	
	0.005	21.0	
	0.002	15.0	

SOIL SPECIFIC GRAVITY: 2.51 (As reported separately, or estimated.)

DISPERSION METHOD: Mechanical, 1 min.

SAND & GRAVEL PARTICLES: Sand, shell fragments

Notes: Additional sieve analysis results may be reported separately.

Comments:

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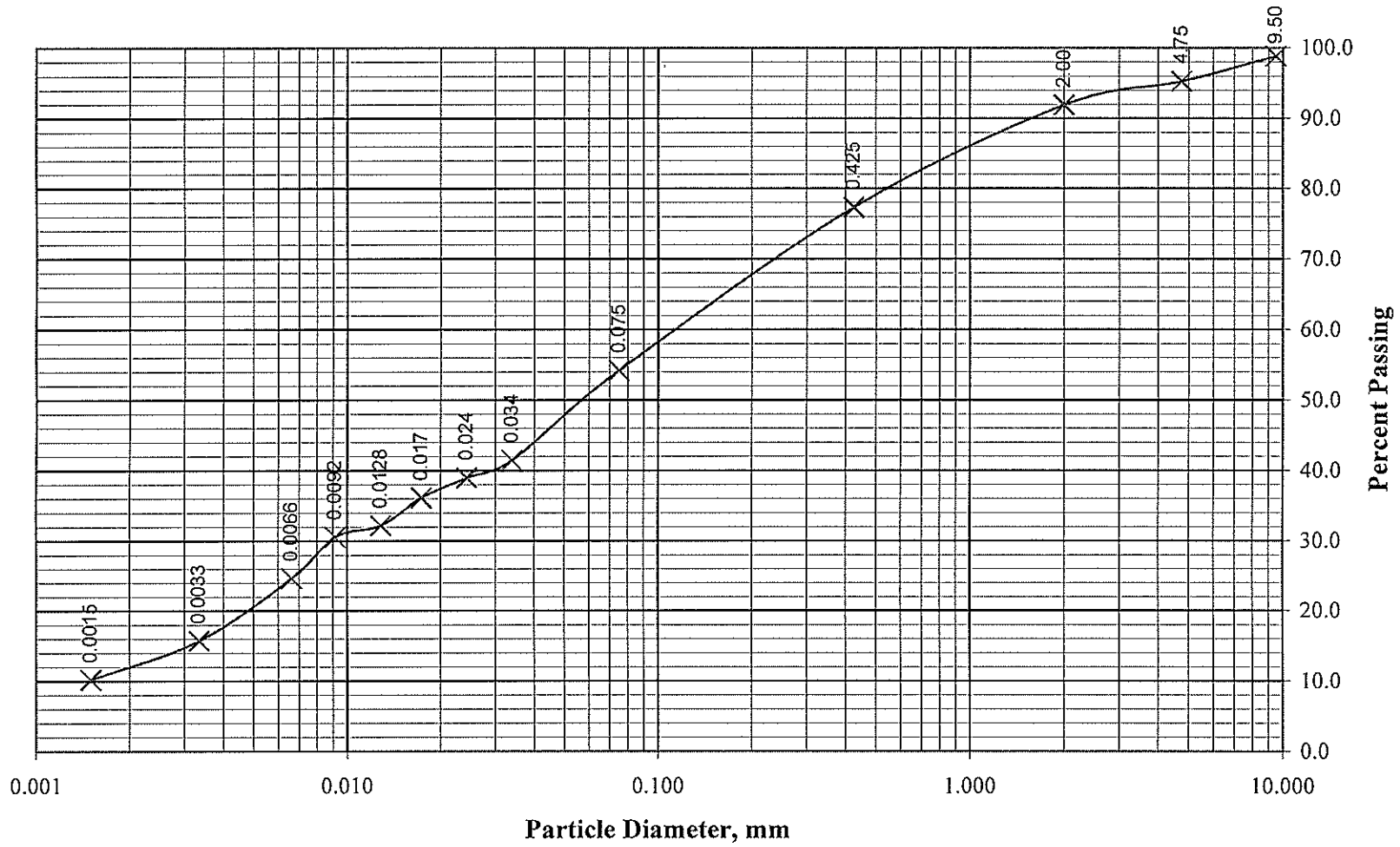
Phone/Fax: 413-232-8566

Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Item:	101405-0840	**Project Number:**	050584
Source:	PDGEO13, 58'-60'	**Lab Number:**	05-0920
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/14/2005	**Sampled By:**	Client
Date Tested:	11/17/2005-11/18/2005	**Tested By:**	C. Smith



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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Item:	51-53	**Project Number:**	050584
Source:	PDGE13-101305-1320	**Lab Number:**	05-1059
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/13/2005	**Sampled By:**	Client
Date Tested:	12/14/2005-12/15/2005	**Tested By:**	C. Smith

PARTICLE SIZE ANALYSIS BY SIEVE AND HYDROMETER METHOD

Test Method: ASTM D422

Sieve Size	Particle Diameter, mm	Percent Passing	Specification
3/4"	19.0	100.0	
1/2"	12.5	97.0	
3/8"	9.50	94.2	
#4	4.75	91.1	
#10	2.00	83.4	
#40	0.425	46.5	
#200	0.075	10.3	
Hydrometer Analysis Results	0.050	10.0	
	0.020	8.2	
	0.010	6.3	
	0.005	4.1	
	0.002	2.3	

SOIL SPECIFIC GRAVITY: 2.51 (As reported separately, or estimated.)

DISPERSION METHOD: Mechanical, 1 min.

SAND & GRAVEL PARTICLES: Sand and shell fragments

Notes: Additional sieve analysis results may be reported separately.

Comments:

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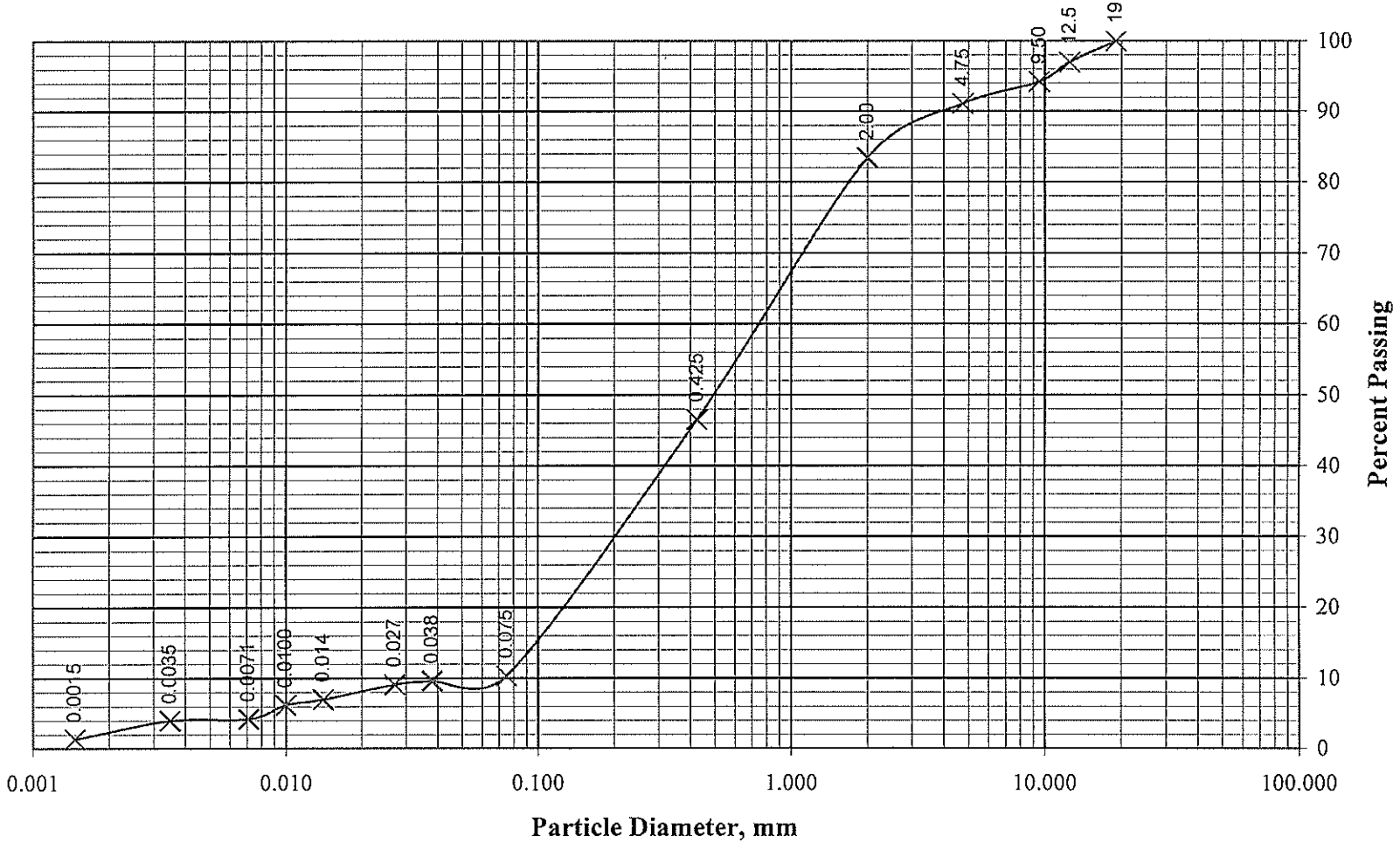
Phone/Fax: 413-232-8566

Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Item:	51-53	**Project Number:**	050584
Source:	PDGE13-101305-1320	**Lab Number:**	05-1059
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/13/2005	**Sampled By:**	Client
Date Tested:	12/14/2005-12/15/2005	**Tested By:**	C. Smith



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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Item:	70-72	**Project Number:**	050584
Source:	PDGE13-101405-1100	**Lab Number:**	05-1060
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/14/2005	**Sampled By:**	Client
Date Tested:	12/29/2005-12/30/2005	**Tested By:**	M. Kennedy

PARTICLE SIZE ANALYSIS BY SIEVE AND HYDROMETER METHOD

Test Method: ASTM D422

Sieve Size	Particle Diameter, mm	Percent Passing	Specification
3/8"	9.50	81.0	
#4	4.75	69.8	
#10	2.00	58.6	
#40	0.425	34.9	
#200	0.075	9.7	
Hydrometer Analysis Results	0.050	6.3	
	0.020	3.4	
	0.010	2.2	
	0.005	1.3	
	0.002	0.7	

SOIL SPECIFIC GRAVITY: 2.51 (As reported separately, or estimated.)

DISPERSION METHOD: Mechanical, 1 min.

SAND & GRAVEL PARTICLES:

Notes: Additional sieve analysis results may be reported separately.

Comments:

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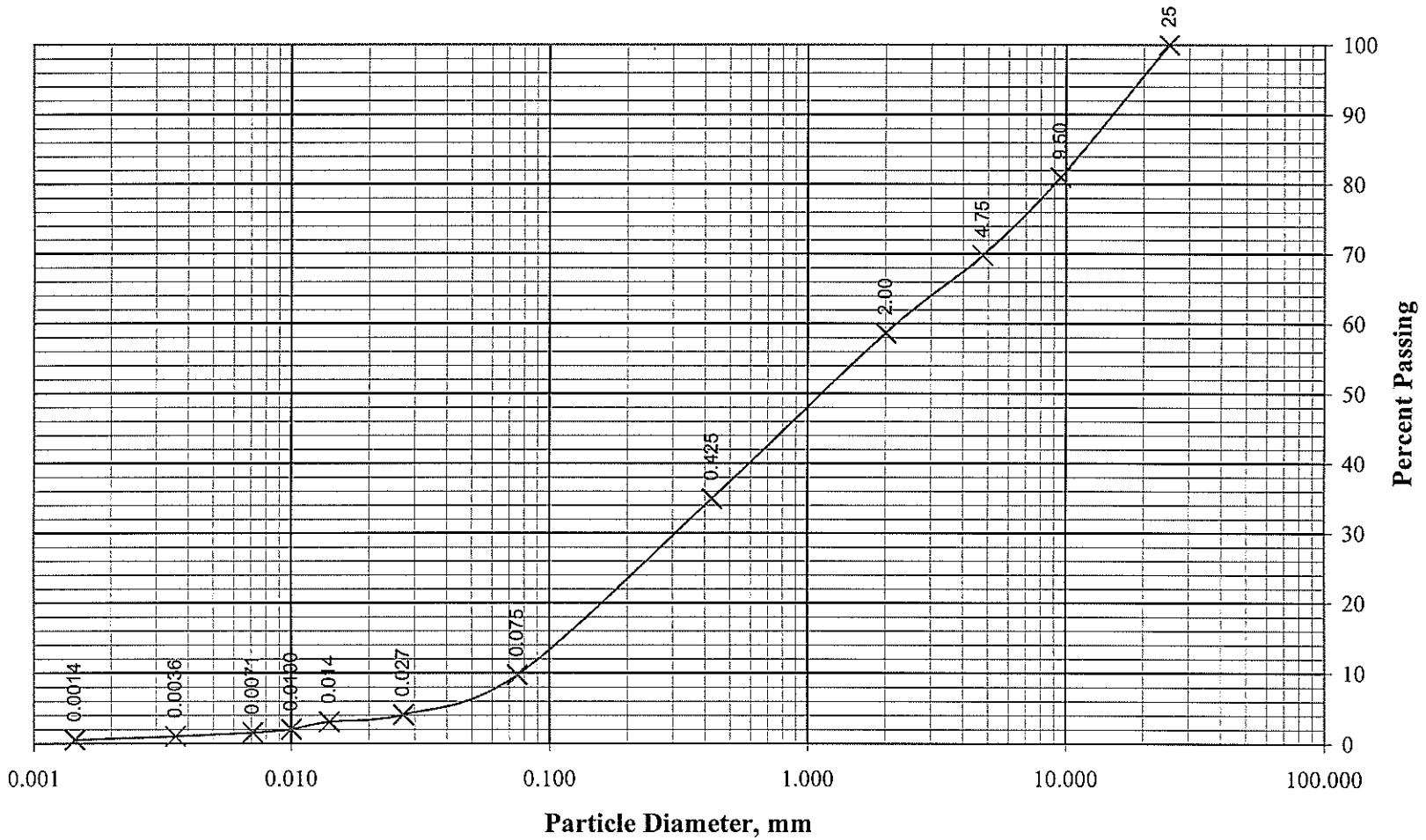
Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Item:	70-72	**Project Number:**	050584
Source:	PDGE13-101405-1100	**Lab Number:**	05-1060
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/14/2005	**Sampled By:**	Client
Date Tested:	12/29/2005-12/30/2005	**Tested By:**	M. Kennedy



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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Item:	33-35	**Project Number:**	050584
Source:	PDGE15-101405-1045	**Lab Number:**	05-1053
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/14/2005	**Sampled By:**	Client
Date Tested:	1/5/2006-01/06/2006	**Tested By:**	B. Jobity

PARTICLE SIZE ANALYSIS BY SIEVE AND HYDROMETER METHOD

Test Method: ASTM D422

Sieve Size	Particle Diameter, mm	Percent Passing	Specification
3/8"	9.50	100.0	
#4	4.75	99.4	
#10	2.00	99.2	
#40	0.425	98.0	
#200	0.075	89.0	
Hydrometer Analysis Results	0.050	84.0	
	0.020	66.0	
	0.010	47.7	
	0.005	30.5	
	0.002	16.1	

SOIL SPECIFIC GRAVITY: 2.51 (As reported separately, or estimated.)

DISPERSION METHOD: Mechanical, 1 min.

SAND & GRAVEL PARTICLES:

Notes: Additional sieve analysis results may be reported separately.

Comments:

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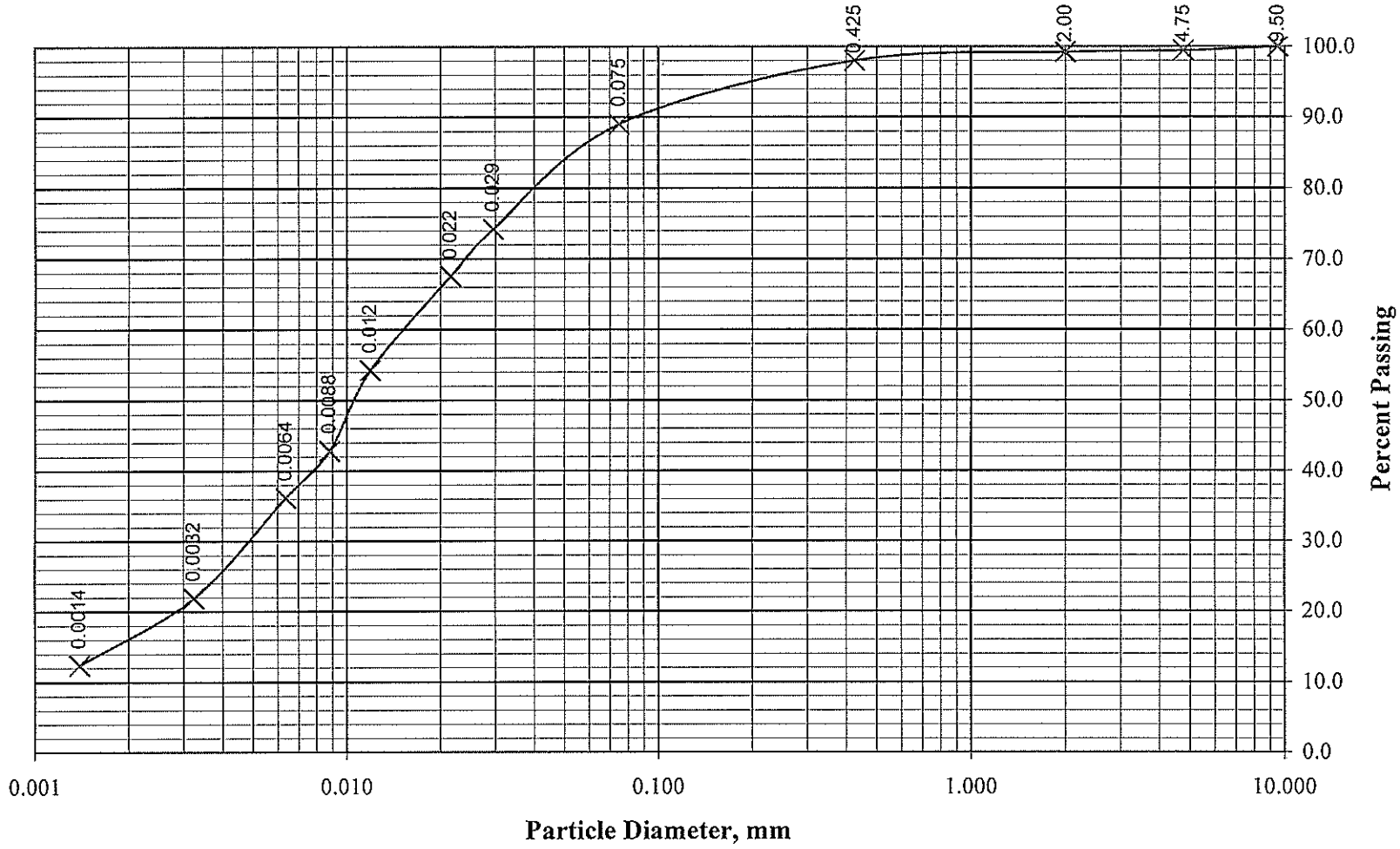
Phone/Fax: 413-232-8566

Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Item:	33-35	**Project Number:**	050584
Source:	PDGE15-101405-1045	**Lab Number:**	05-1053
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/14/2005	**Sampled By:**	Client
Date Tested:	1/5/2006-01/06/2006	**Tested By:**	B. Jobity



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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Item:	38-40	**Project Number:**	050584
Source:	PDGE15-101405-1100	**Lab Number:**	05-1054
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/14/2005	**Sampled By:**	Client
Date Tested:	12/13/2005-12/14/2005	**Tested By:**	C. Smith

PARTICLE SIZE ANALYSIS BY SIEVE AND HYDROMETER METHOD

Test Method: ASTM D422

Sieve Size	Particle Diameter, mm	Percent Passing	Specification
1"	25.00	100.0	
3/4"	19.00	94.1	
1/2"	12.50	88.6	
3/8"	9.50	85.5	
#4	4.75	78.8	
#10	2.00	68.3	
#40	0.425	42.6	
#200	0.075	24.2	
Hydrometer Analysis Results	0.050	20.0	
	0.020	15.0	
	0.010	12.0	
	0.005	8.0	
	0.002	6.0	

SOIL SPECIFIC GRAVITY: 2.51 (As reported separately, or estimated.)

DISPERSION METHOD: Mechanical, 1 min.

SAND & GRAVEL PARTICLES:

Notes: Additional sieve analysis results may be reported separately.

Comments:

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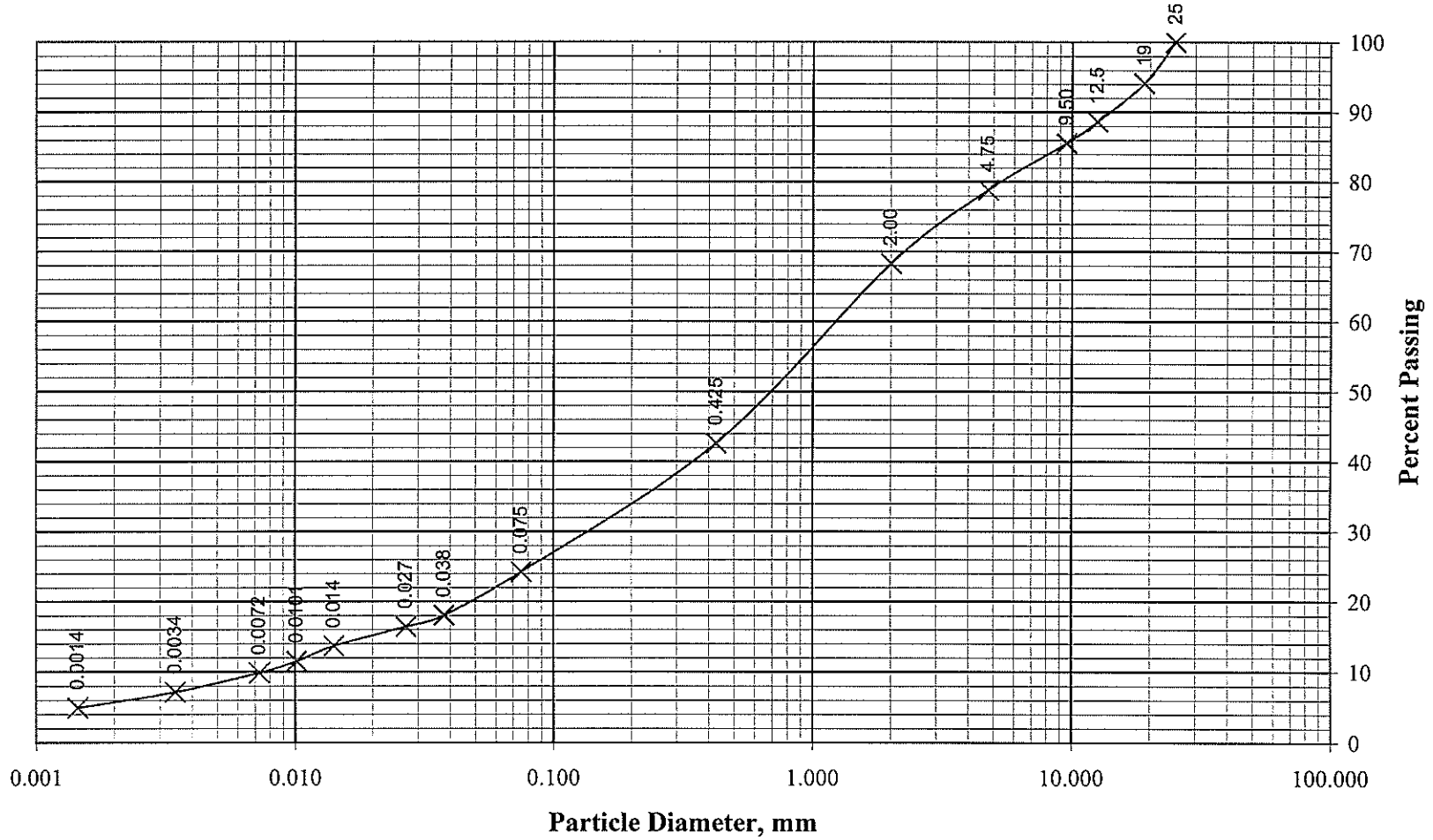
Phone/Fax: 413-232-8566

Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Item:	38-40	**Project Number:**	050584
Source:	PDGE15-101405-1100	**Lab Number:**	05-1054
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/14/2005	**Sampled By:**	Client
Date Tested:	12/13/2005-12/14/2005	**Tested By:**	C. Smith



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Phone/Fax: 413-232-8566

Client:	**ENSR Remediation and Const.**	**Project:**	BP Hastings-on-Hudson
Material:	10-12 ft	**Project Number:**	050584
Source:	PDGE16-093005-0830	**Lab Number:**	05-1080-1
Date Sampled:	9/30/2005	**Sampled By:**	Client
Date Tested:	12/15/2005	**Tested By:**	E.hall

GRADATION (SIEVE ANALYSIS) OF SOIL OR AGGREGATE

Test Method(s): ASTM D422, C136, C117; AASHTO T11, T27, T88

Lab Number	Sample Type	Sampling Location	Specification
05-1080-1	10-12 ft	In-Place	

Sieve Size		%	%	Spec. %
mm	Inches	Retain	Passing	Pass
100.0 mm	4"	0.0	100.0	
75.0 mm	3"	0.0	100.0	
62.5 mm	2 1/2"	0.0	100.0	
50.0 mm	2"	0.0	100.0	
37.5 mm	1 1/2"	0.0	100.0	
25.0 mm	1"	0.0	100.0	
19.0 mm	3/4"	23.3	76.7	
12.5 mm	1/2"	7.0	69.7	
6.32 mm	1/4"	19.9	49.8	
4.75 mm	#4	1.5	48.3	
2.00 mm	#10	15.3	33.0	
0.850 mm	#20	11.4	21.6	
0.600 mm	#30	3.0	18.6	
0.425 mm	#40	2.9	15.7	
0.180 mm	#80	6.4	9.3	
0.075 mm	#200	4.2	5.1	
Pan		5.1		

Comments: Minus #200 by wash-sieve method.

Report Reviewed By:

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3348 Route 208, Campbell Hall, NY 10916
Phone: 845-496-1600 Fax: 845-496-1398
42 Day Farm Road, West Stockbridge, MA 01266
Phone/Fax: 413-232-8566

Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Item:	092205-1100	**Project Number:**	050584
Source:	PDGEO-16, U1, 38-40'	**Lab Number:**	05-0860
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	9/30/2005	**Sampled By:**	H&A
Date Tested:	10/19/2005-10/20/2005	**Tested By:**	C. Smith

PARTICLE SIZE ANALYSIS BY SIEVE AND HYDROMETER METHOD

Test Method: ASTM D422

Sieve Size	Particle Diameter, mm	Percent Passing	Specification
3/8"	9.50	99.1	
#4	4.75	98.2	
#10	2.00	97.1	
#40	0.425	95.6	
#200	0.075	88.8	
Hydrometer Analysis Results	0.050	77.2	
	0.020	50.7	
	0.010	37.7	
	0.005	27.4	
	0.002	20.3	

SOIL SPECIFIC GRAVITY: 2.51 (As reported separately, or estimated.)

DISPERSION METHOD: Mechanical, 1 min.

SAND & GRAVEL PARTICLES:

Notes: Additional sieve analysis results may be reported separately.

Comments:

No specifications available at time of testing.

REPORT REVIEWED BY: _____

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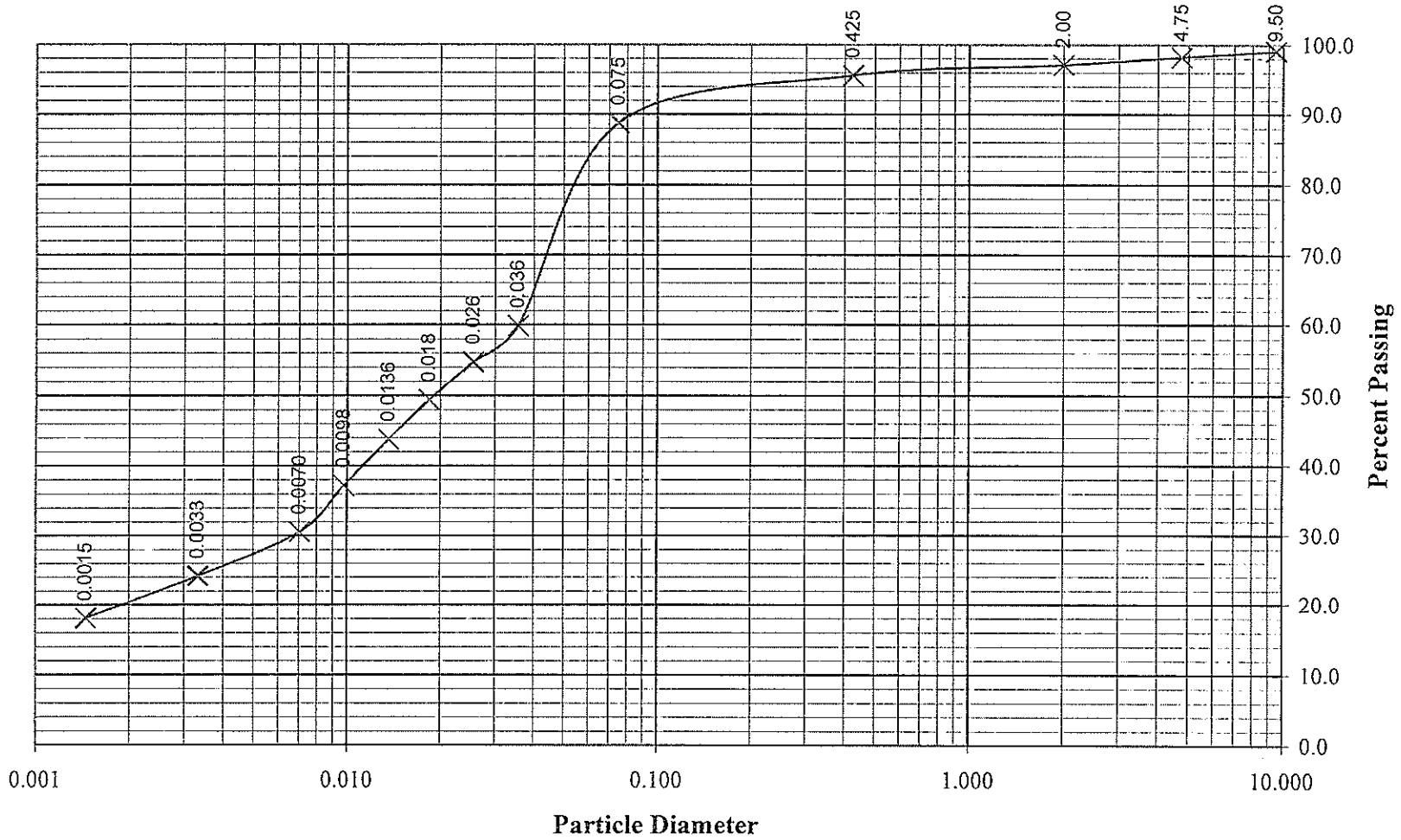
42 Day Farm Road, West Stockbridge, MA 01266
Phone/Fax: 413-232-8566

Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Item:	092205-1100	**Project Number:**	050584
Source:	PDGEO-16, UI, 38-40'	**Lab Number:**	05-0860
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	9/30/2005	**Sampled By:**	H&A
Date Tested:	10/19/2005-10/20/2005	**Tested By:**	C. Smith



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Client:	**ENSR Remediation and Const.**	**Project:**	BP Hastings-on-Hudson
Material:	5-7 ft	**Project Number:**	050584
Source:	PDGEO17-100305-1030	**Lab Number:**	05-1040-1
Date Sampled:	10/3/2005	**Sampled By:**	Client
Date Tested:	12/15/2005	**Tested By:**	E.Hall

GRADATION (SIEVE ANALYSIS) OF SOIL OR AGGREGATE

Test Method(s): ASTM D422, C136, C117; AASHTO T11, T27, T88

Lab Number	Sample Type	Sampling Location	Specification
05-1040-1	5-7 ft	In-Place	

Sieve Size		%	%	Spec. %
mm	Inches	Retain	Passing	Pass
100.0 mm	4"	0.0	100.0	
75.0 mm	3"	0.0	100.0	
62.5 mm	2 1/2"	0.0	100.0	
50.0 mm	2"	0.0	100.0	
37.5 mm	1 1/2"	17.3	82.7	
25.0 mm	1"	24.7	58.0	
19.0 mm	3/4"	8.2	49.8	
12.5 mm	1/2"	13.2	36.6	
6.32 mm	1/4"	11.3	25.3	
4.75 mm	#4	1.6	23.7	
2.00 mm	#10	5.6	18.1	
0.850 mm	#20	3.7	14.4	
0.600 mm	#30	1.4	13.0	
0.425 mm	#40	1.6	11.4	
0.150 mm	#100	4.5	6.9	
0.075 mm	#200	2.7	4.2	
Pan		4.2		

Comments: Minus #200 by wash-sieve method.
Revised 1/4/06 - Sample ID corrected.

Report Reviewed By:

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Phone/Fax: 413-232-8566

Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Item:	60-62	**Project Number:**	050584
Source:	PDGE17-100505-1430	**Lab Number:**	05-1041
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/5/2005	**Sampled By:**	Client
Date Tested:	12/14/2005-12/15/2005	**Tested By:**	C. Smith

PARTICLE SIZE ANALYSIS BY SIEVE AND HYDROMETER METHOD

Test Method: ASTM D422

Sieve Size	Particle Diameter, mm	Percent Passing	Specification
3/4"	19.00	100.0	
1/2"	12.50	96.3	
3/8"	9.50	92.2	
#4	4.75	82.4	
#10	2.00	74.3	
#40	0.425	47.1	
#200	0.075	8.2	
Hydrometer Analysis Results	0.050	6.0	
	0.020	4.0	
	0.010	3.0	
	0.005	2.0	
	0.002	1.0	

SOIL SPECIFIC GRAVITY: 2.51 (As reported separately, or estimated.)

DISPERSION METHOD: Mechanical, 1 min.

SAND & GRAVEL PARTICLES:

Notes: Additional sieve analysis results may be reported separately.

Comments:

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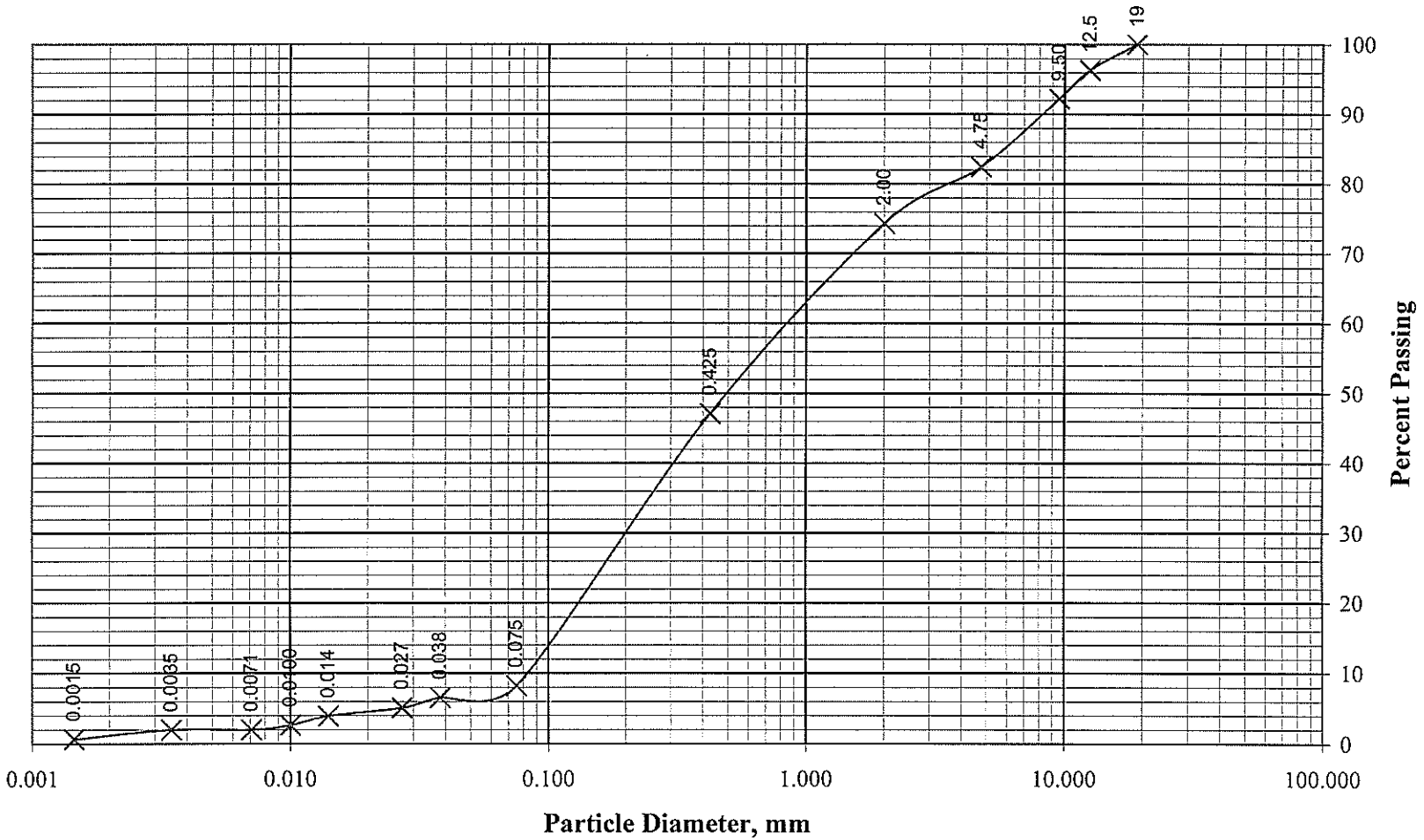
Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Item:	60-62	**Project Number:**	050584
Source:	PDGE17-100505-1430	**Lab Number:**	05-1041
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/5/2005	**Sampled By:**	Client
Date Tested:	12/14/2005-12/15/2005	**Tested By:**	C. Smith



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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Item:	70-72	**Project Number:**	050584
Source:	PDGE17-100605-1130	**Lab Number:**	05-1042
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/6/2005	**Sampled By:**	Client
Date Tested:	12/13/2005-12/14/2005	**Tested By:**	C. Smith

PARTICLE SIZE ANALYSIS BY SIEVE AND HYDROMETER METHOD

Test Method: ASTM D422

Sieve Size	Particle Diameter, mm	Percent Passing	Specification
1"	25.00	100.0	
3/4"	19.00	82.4	
1/2"	12.50	60.9	
3/8"	9.50	53.7	
#4	4.75	42.3	
#10	2.00	33.0	
#40	0.425	19.4	
#200	0.075	7.8	
Hydrometer Analysis Results	0.050	7.0	
	0.020	5.0	
	0.010	4.0	
	0.005	3.0	
	0.002	2.0	

SOIL SPECIFIC GRAVITY: 2.51 (As reported separately, or estimated.)

DISPERSION METHOD: Mechanical, 1 min.

SAND & GRAVEL PARTICLES:

Notes: Additional sieve analysis results may be reported separately.

Comments:

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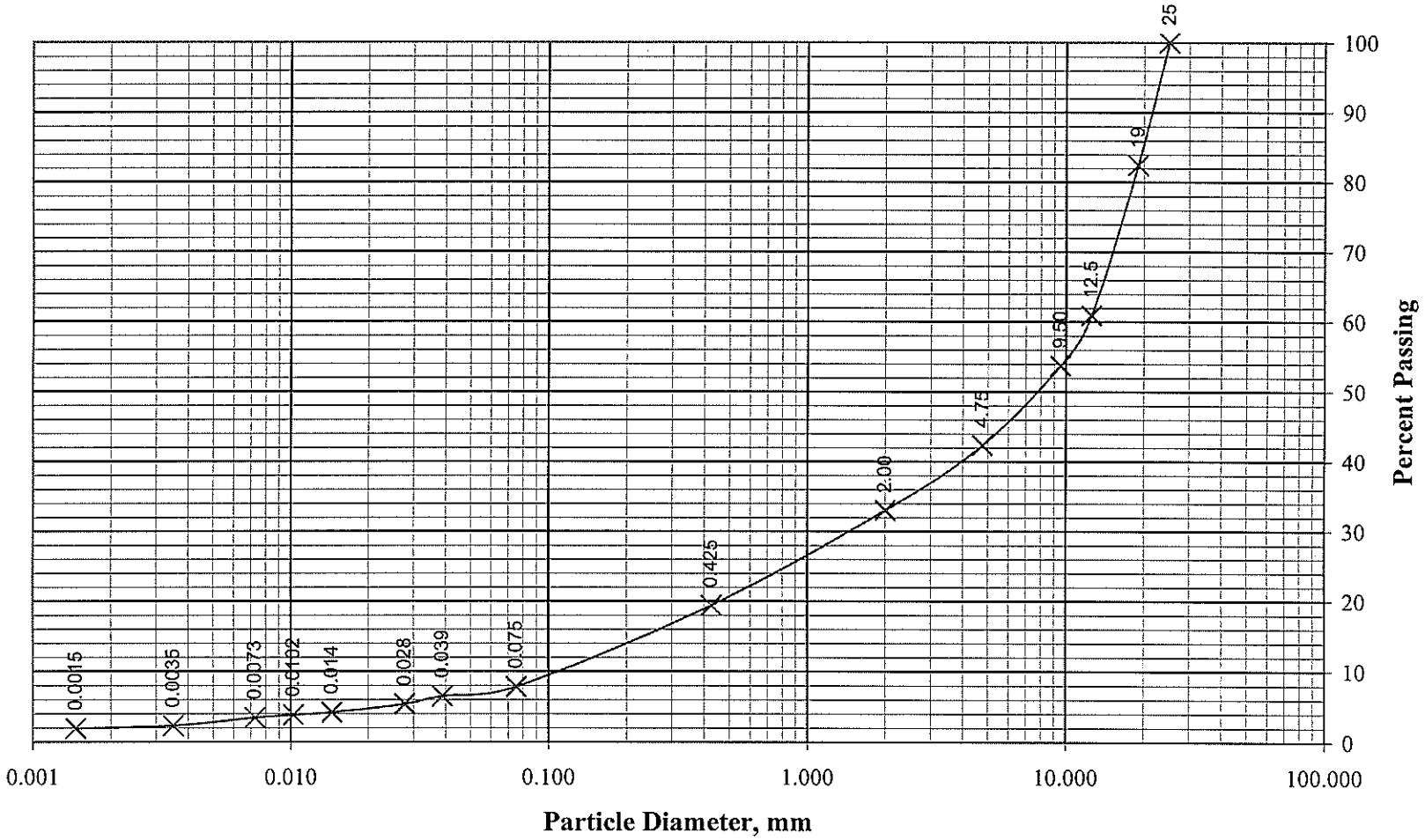
Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Item:	70-72	**Project Number:**	050584
Source:	PDGE17-100605-1130	**Lab Number:**	05-1042
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/6/2005	**Sampled By:**	Client
Date Tested:	12/13/2005-12/14/2005	**Tested By:**	C. Smith



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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Item:	100505-1345	**Project Number:**	050584
Source:	PDGEO17, 42'-44'	**Lab Number:**	05-0922
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/5/2005	**Sampled By:**	Client
Date Tested:	11/9/2005-11/10/2005	**Tested By:**	C. Smith

PARTICLE SIZE ANALYSIS BY SIEVE AND HYDROMETER METHOD

Test Method: ASTM D422

Sieve Size	Particle Diameter, mm	Percent Passing	Specification
3/8"	9.50	97.7	
#4	4.75	97.6	
#10	2.00	97.2	
#40	0.425	96.6	
#200	0.075	92.9	
Hydrometer Analysis Results	0.050	88.2	
	0.020	70.4	
	0.010	51.0	
	0.005	36.5	
	0.002	23.5	

SOIL SPECIFIC GRAVITY: 2.51 (As reported separately, or estimated.)

DISPERSION METHOD: Mechanical, 1 min.

SAND & GRAVEL PARTICLES: Subrounded sand, trace shell fragments

Notes: Additional sieve analysis results may be reported separately.

Comments:

No specifications available at time of testing.

REPORT REVIEWED BY: _____

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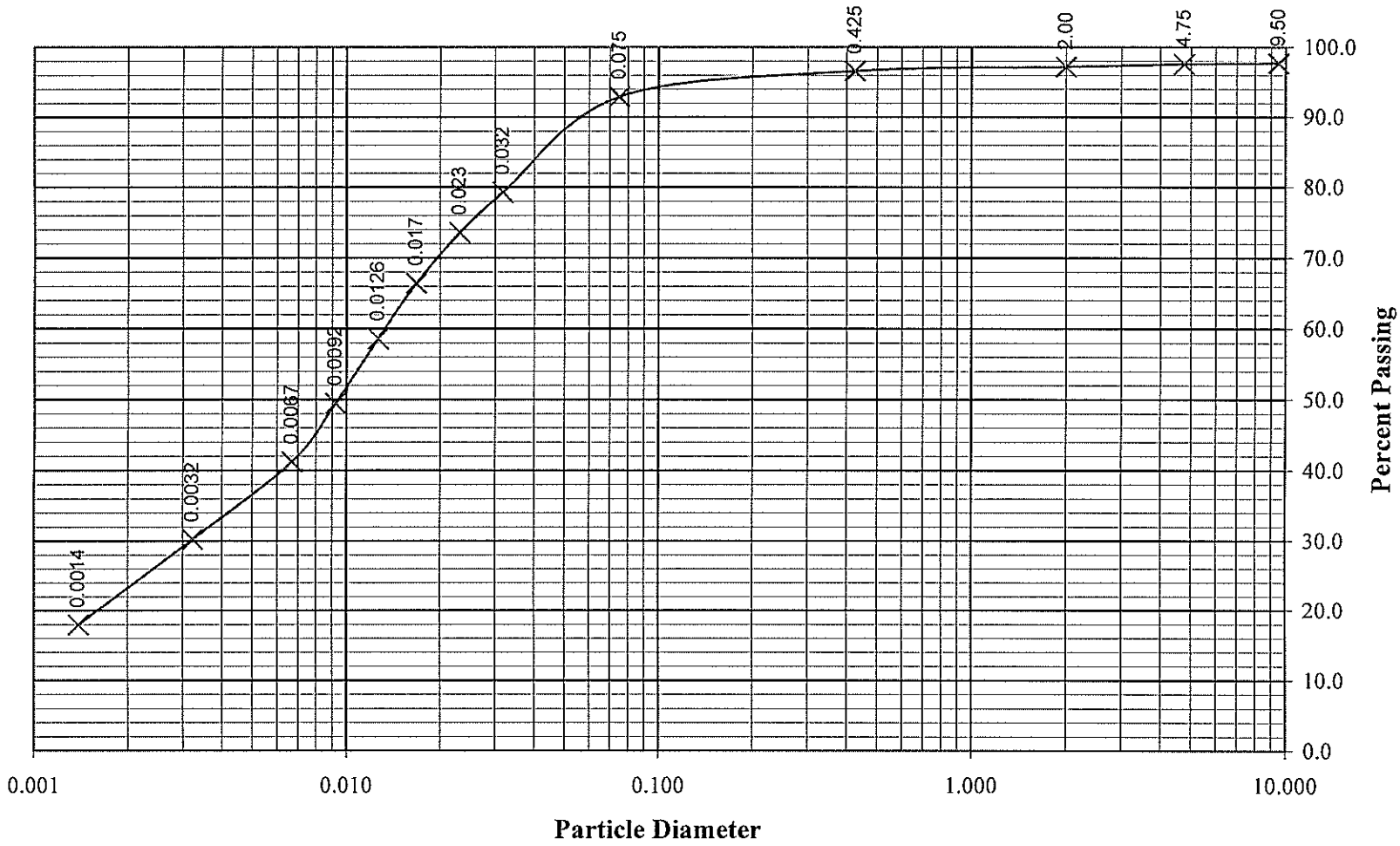
Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Item:	100505-1345	**Project Number:**	050584
Source:	PDGEO17, 42'-44'	**Lab Number:**	05-0922
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/5/2005	**Sampled By:**	Client
Date Tested:	11/9/2005-11/10/2005	**Tested By:**	C. Smith



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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Item:	100505-1130	**Project Number:**	050584
Source:	PDGEO17, 54'-56'	**Lab Number:**	05-0924
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/6/2005	**Sampled By:**	Client
Date Tested:	11/9/2005-11/10/2005	**Tested By:**	C. Smith

PARTICLE SIZE ANALYSIS BY SIEVE AND HYDROMETER METHOD

Test Method: ASTM D422

Sieve Size	Particle Diameter, mm	Percent Passing	Specification
3/8"	9.50	76.2	
#4	4.75	74.6	
#10	2.00	73.3	
#40	0.425	70.6	
#200	0.075	56.9	
Hydrometer Analysis Results	0.050	50.0	
	0.020	36.6	
	0.010	29.8	
	0.005	21.7	
	0.002	11.7	

SOIL SPECIFIC GRAVITY: 2.51 (As reported separately, or estimated.)

DISPERSION METHOD: Mechanical, 1 min.

SAND & GRAVEL PARTICLES: Subrounded sand, trace shell fragments.

Notes: Additional sieve analysis results may be reported separately.

Comments: Sample contained two pieces of 3/4" to 1" gravel, accounting for 23.8% of the sample mass. Large gravel particles were not seen in other parts of the sample prepared for other tests.

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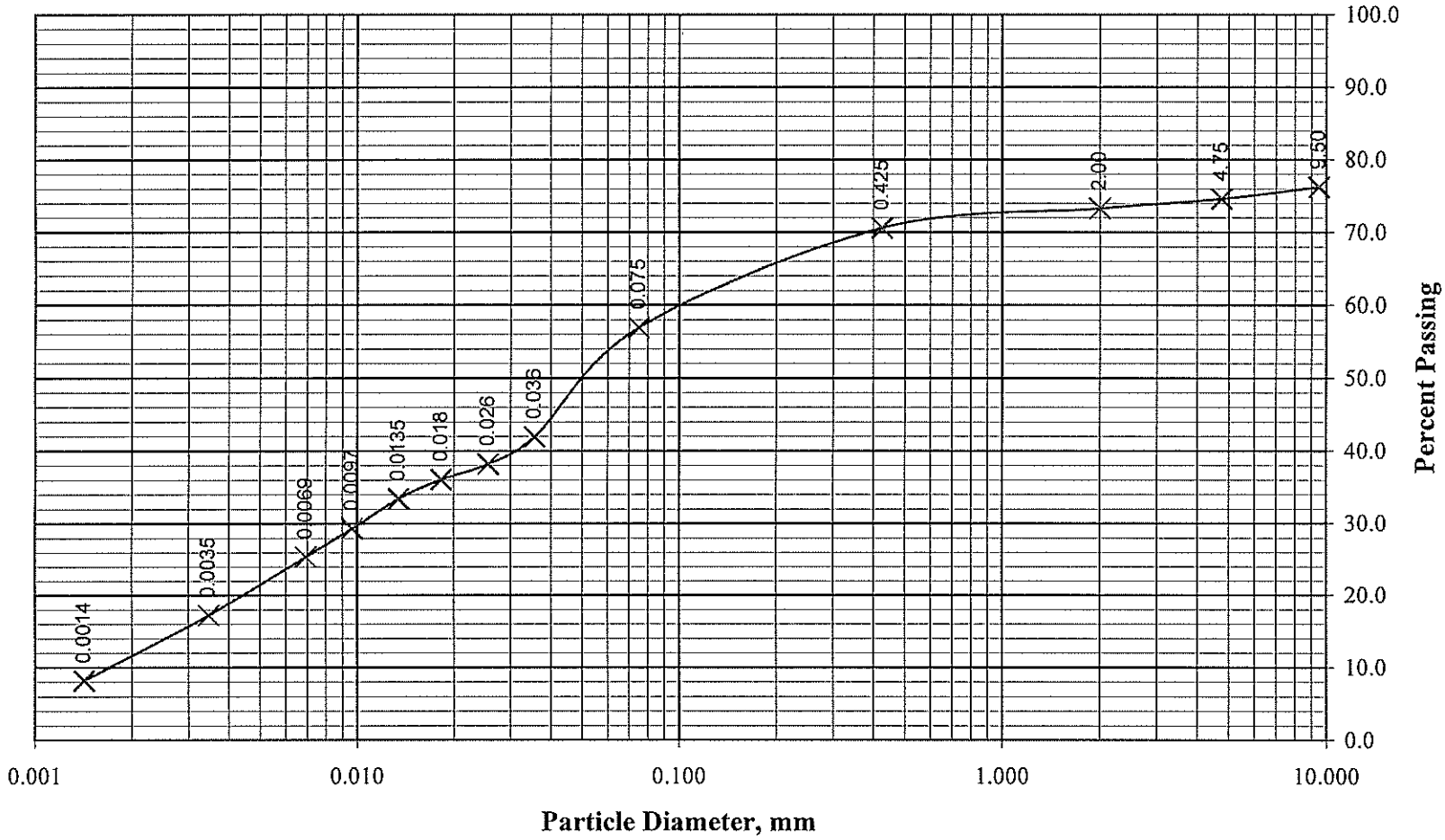
Phone/Fax: 413-232-8566

Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Item:	100505-1130	**Project Number:**	050584
Source:	PDGEO17, 54'-56'	**Lab Number:**	05-0924
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/6/2005	**Sampled By:**	Client
Date Tested:	11/9/2005-11/10/2005	**Tested By:**	C. Smith



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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Item:	15-17	**Project Number:**	050584
Source:	PDGE18-102005-1625	**Lab Number:**	05-1061
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/20/2005	**Sampled By:**	Client
Date Tested:	12/9/2005-12/12/2005	**Tested By:**	C. Smith

PARTICLE SIZE ANALYSIS BY SIEVE AND HYDROMETER METHOD

Test Method: ASTM D422

Sieve Size	Particle Diameter, mm	Percent Passing	Specification
3/4"	19.00	100.0	
1/2"	12.50	96.9	
3/8"	9.50	90.8	
#4	4.75	69.1	
#10	2.00	49.1	
#40	0.425	28.7	
#200	0.075	16.6	
Hydrometer Analysis Results	0.050	16.0	
	0.020	13.0	
	0.010	10.0	
	0.005	8.0	
	0.002	6.0	

SOIL SPECIFIC GRAVITY: 2.51 (As reported separately, or estimated.)

DISPERSION METHOD: Mechanical, 1 min.

SAND & GRAVEL PARTICLES:

Notes: Additional sieve analysis results may be reported separately.

Comments:

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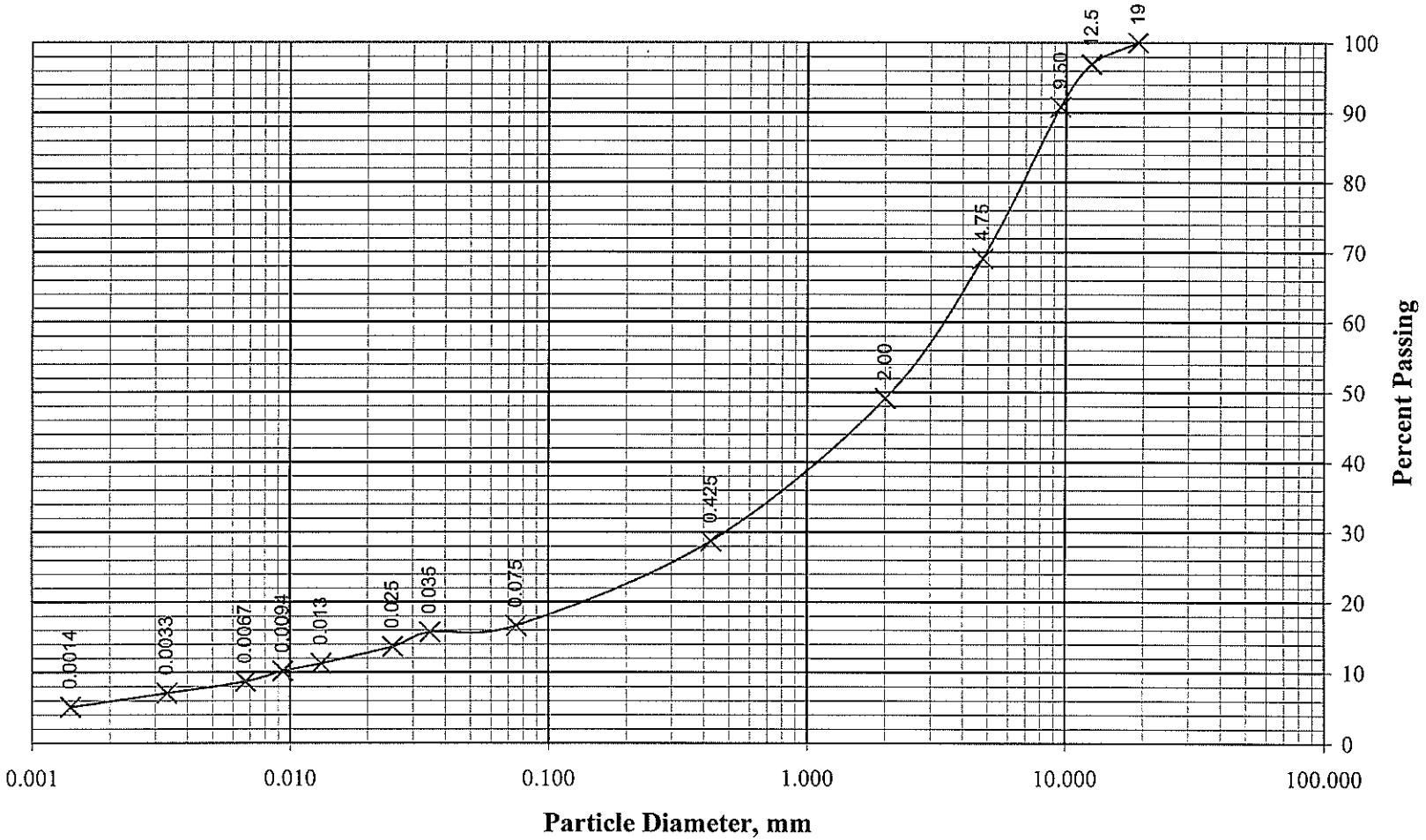
Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Item:	15-17	**Project Number:**	050584
Source:	PDGE18-102005-1625	**Lab Number:**	05-1061
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/20/2005	**Sampled By:**	Client
Date Tested:	12/9/2005-12/12/2005	**Tested By:**	C. Smith



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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Item:	45-47	**Project Number:**	050584
Source:	PDGE18-102405-0845	**Lab Number:**	05-1062
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/24/2005	**Sampled By:**	Client
Date Tested:	1/5/2006-01/06/2006	**Tested By:**	B. Jobity

PARTICLE SIZE ANALYSIS BY SIEVE AND HYDROMETER METHOD

Test Method: ASTM D422

Sieve Size	Particle Diameter, mm	Percent Passing	Specification
1"	25	100	
3/8"	9.50	92.9	
#4	4.75	91.3	
#10	2.00	88.8	
#40	0.425	70.1	
#200	0.075	33.5	
Hydrometer Analysis Results	0.050	27.2	
	0.020	17.8	
	0.010	13.5	
	0.005	6.7	
	0.002	2.9	

SOIL SPECIFIC GRAVITY: 2.51 (As reported separately, or estimated.)

DISPERSION METHOD: Mechanical, 1 min.

SAND & GRAVEL PARTICLES:

Notes: Additional sieve analysis results may be reported separately.

Comments:

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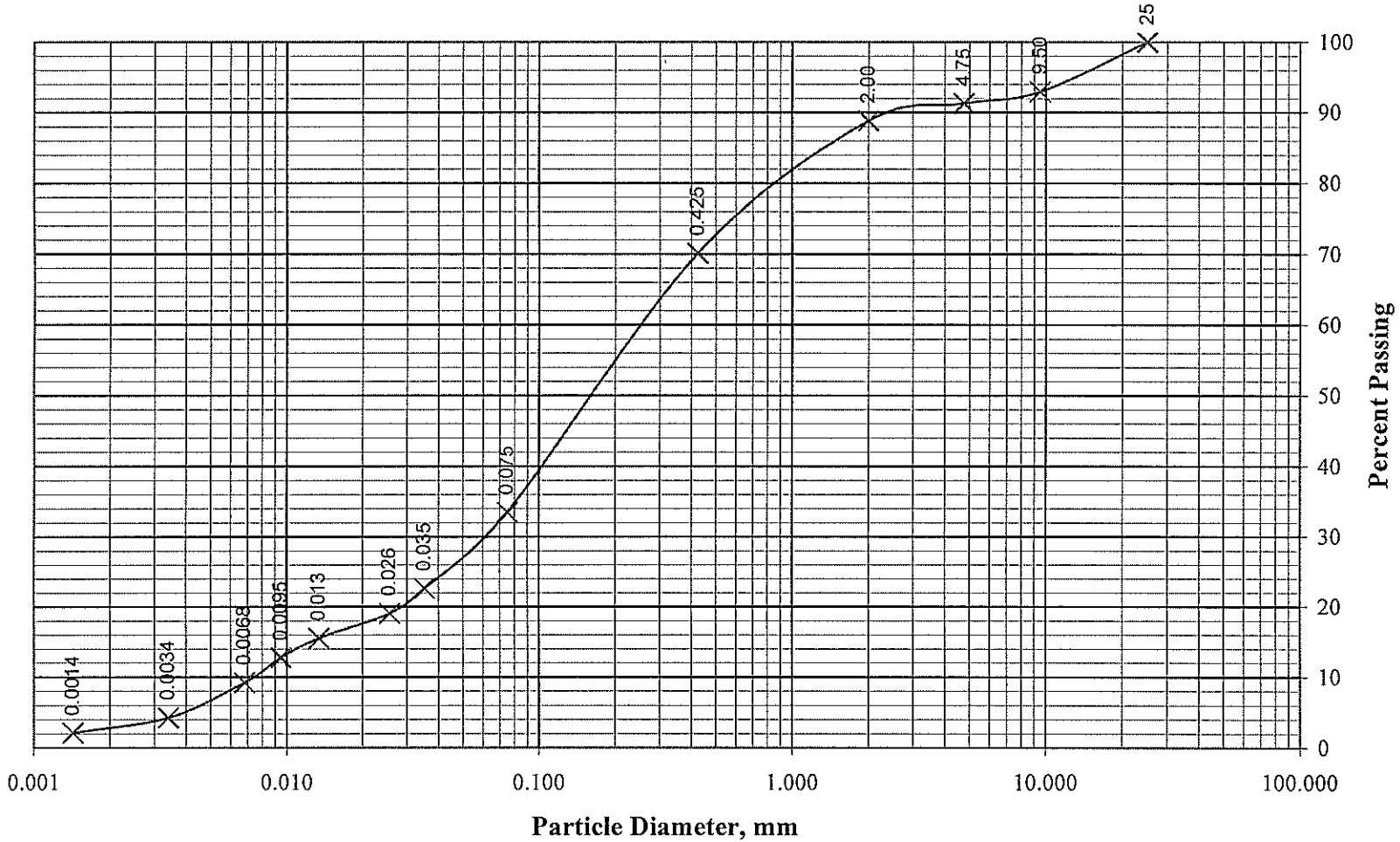
Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Item:	45-47	**Project Number:**	050584
Source:	PDGE18-102405-0845	**Lab Number:**	05-1062
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/24/2005	**Sampled By:**	Client
Date Tested:	1/5/2006-01/06/2006	**Tested By:**	B. Jobity



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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Item:	40'-42'	**Project Number:**	050584
Source:	PDGE19-101905-1115	**Lab Number:**	05-1005
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/19/2005	**Sampled By:**	Client
Date Tested:	12/21/2005-12/22/2005	**Tested By:**	M Kennedy

PARTICLE SIZE ANALYSIS BY SIEVE AND HYDROMETER METHOD

Test Method: ASTM D422

Sieve Size	Particle Diameter, mm	Percent Passing	Specification
3/8"	9.50	100.0	
#4	4.75	100.0	
#10	2.00	99.9	
#40	0.425	99.2	
#200	0.075	90.1	
Hydrometer Analysis Results	0.050	80.8	
	0.020	54.4	
	0.010	40.9	
	0.005	26.3	
	0.002	16.2	

SOIL SPECIFIC GRAVITY: 2.51 (As reported separately, or estimated.)

DISPERSION METHOD: Mechanical, 1 min.

SAND & GRAVEL PARTICLES: Sand, shell fragments

Notes: Additional sieve analysis results may be reported separately.

Comments:

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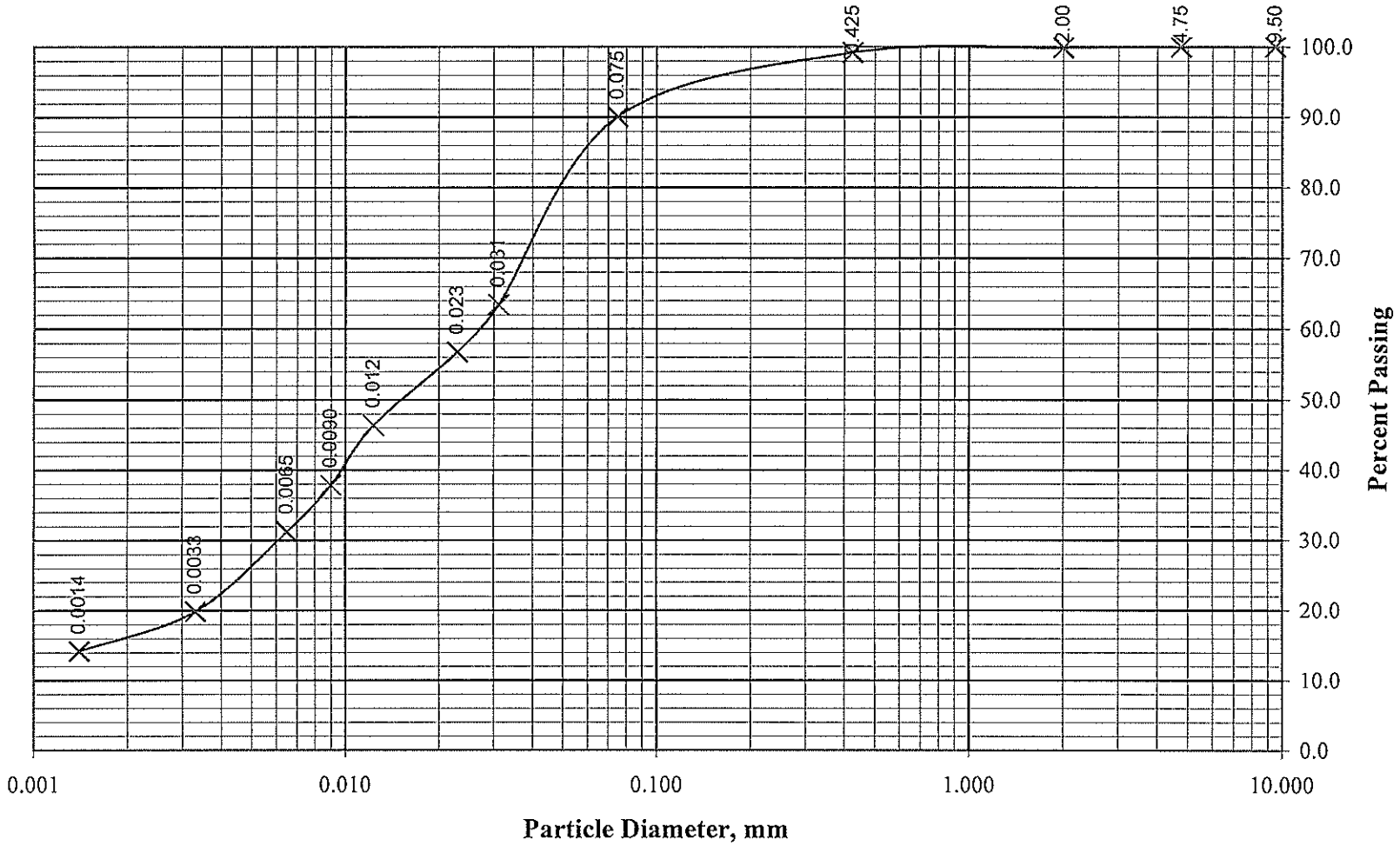
Phone/Fax: 413-232-8566

Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Item:	40'-42'	**Project Number:**	050584
Source:	PDGE19-101905-1115	**Lab Number:**	05-1005
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/19/2005	**Sampled By:**	Client
Date Tested:	12/21/2005-12/22/2005	**Tested By:**	M Kennedy



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Phone/Fax: 413-232-8566

Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Item:	12-14 ft	**Project Number:**	050584
Source:	PDGE19-101905-0945	**Lab Number:**	05-1033
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/19/2005	**Sampled By:**	Client
Date Tested:	11/22/2005-11/23/2005	**Tested By:**	C. Smith

PARTICLE SIZE ANALYSIS BY SIEVE AND HYDROMETER METHOD

Test Method: ASTM D422

Sieve Size	Particle Diameter, mm	Percent Passing	Specification
1"	25	100	
1/2"	12.5	89	
3/8"	9.50	85.6	
#4	4.75	70.9	
#10	2.00	46.7	
#40	0.425	19.8	
#200	0.075	9.2	
Hydrometer Analysis Results	0.050	7.9	
	0.020	7.2	
	0.010	6.6	
	0.005	5.9	
	0.002	4.0	

SOIL SPECIFIC GRAVITY: 2.51 (As reported separately, or estimated.)

DISPERSION METHOD: Mechanical, 1 min.

SAND & GRAVEL PARTICLES:

Notes: Additional sieve analysis results may be reported separately.

Comments:

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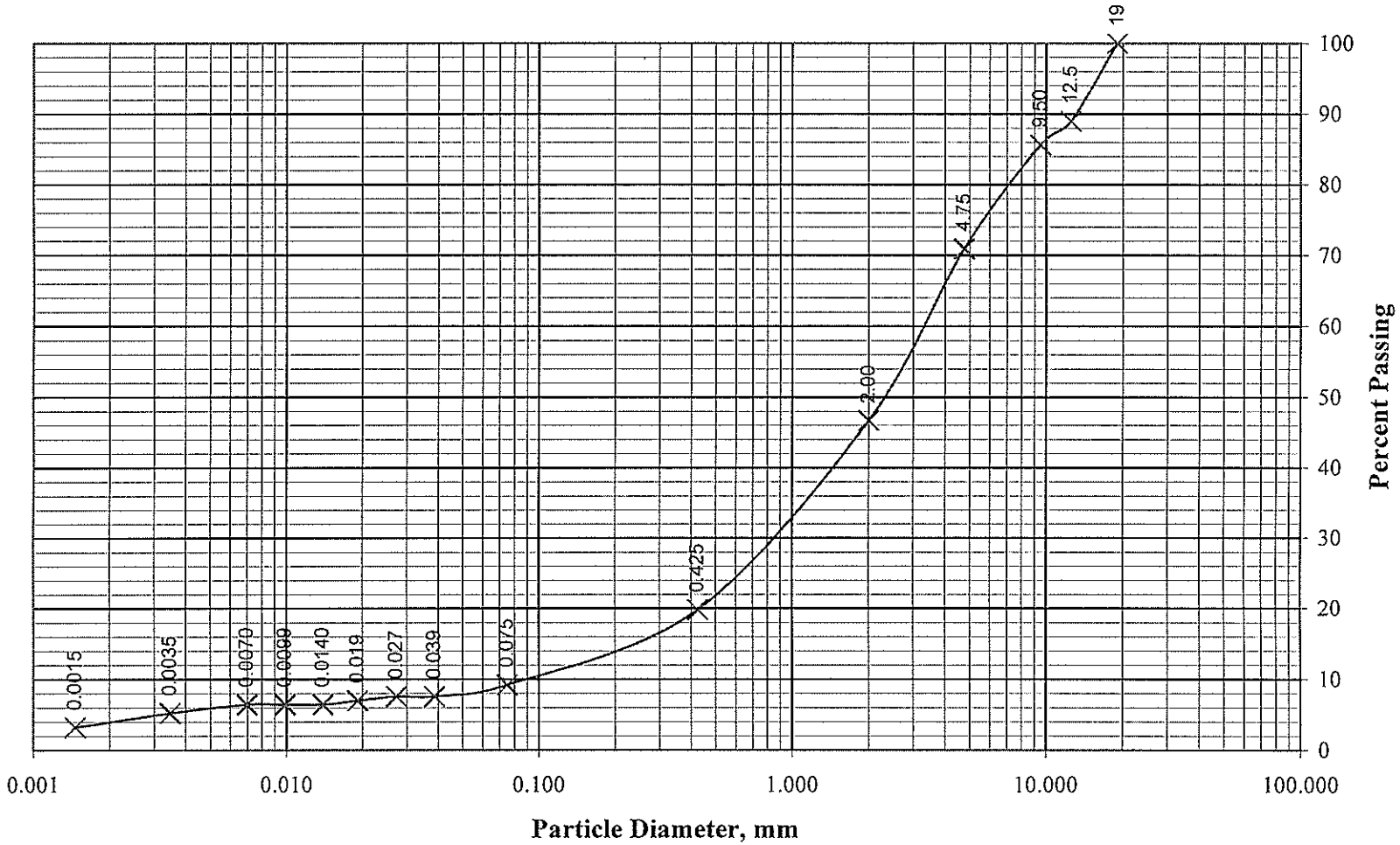
Phone/Fax: 413-232-8566

Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Item:	12-14 ft	**Project Number:**	050584
Source:	PDGE19-101905-0945	**Lab Number:**	05-1033
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/19/2005	**Sampled By:**	Client
Date Tested:	11/22/2005-11/23/2005	**Tested By:**	C. Smith



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42 Day Farm Road, West Stockbridge, MA 01266
Phone/Fax: 413-232-8566

Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Item:	101305-1145	**Project Number:**	050584
Source:	PDGEO20, 42'-44'	**Lab Number:**	05-0921
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/13/2005	**Sampled By:**	Client
Date Tested:	11/17/2005-11/18/2005	**Tested By:**	C. Smith

PARTICLE SIZE ANALYSIS BY SIEVE AND HYDROMETER METHOD

Test Method: ASTM D422

Sieve Size	Particle Diameter, mm	Percent Passing	Specification
3/8"	9.50	100.0	
#4	4.75	100.0	
#10	2.00	100.0	
#40	0.425	98.8	
#200	0.075	89.2	
Hydrometer Analysis Results	0.050	81.0	
	0.020	66.0	
	0.010	44.0	
	0.005	30.0	
	0.002	22.0	

SOIL SPECIFIC GRAVITY: 2.51 (As reported separately, or estimated.)

DISPERSION METHOD: Mechanical, 1 min.

SAND & GRAVEL PARTICLES: Sand, shell fragments

Notes: Additional sieve analysis results may be reported separately.

Comments:

REPORT REVIEWED BY: _____

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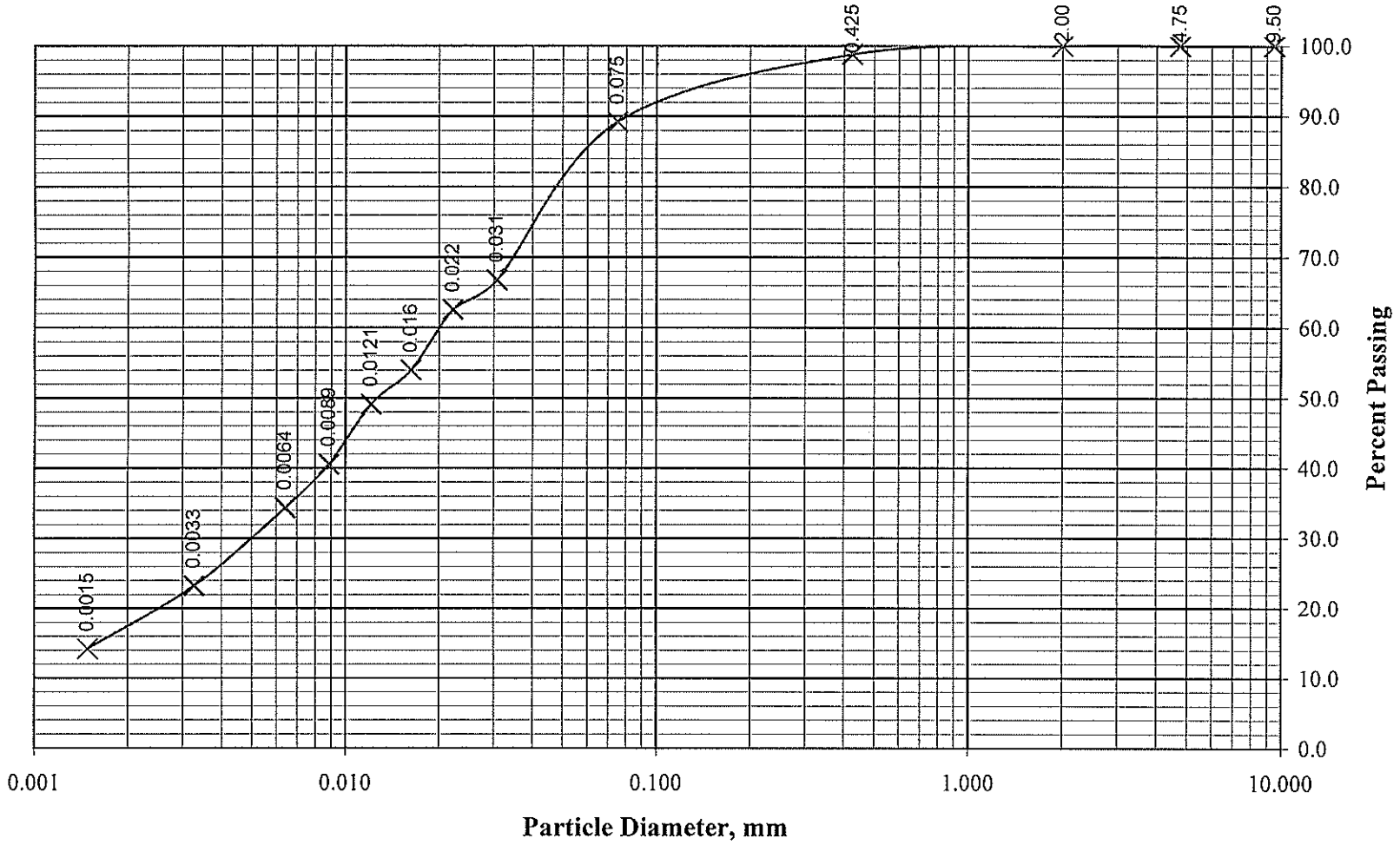
Phone/Fax: 413-232-8566

Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Item:	101305-1145	**Project Number:**	050584
Source:	PDGEO20, 42'-44'	**Lab Number:**	05-0921
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/13/2005	**Sampled By:**	Client
Date Tested:	11/17/2005-11/18/2005	**Tested By:**	C. Smith



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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Item:	14-16	**Project Number:**	050584
Source:	PDGE20-101305-0930	**Lab Number:**	05-1034
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/13/2005	**Sampled By:**	Client
Date Tested:	11/22/2005-11/23/2005	**Tested By:**	C. Smith

PARTICLE SIZE ANALYSIS BY SIEVE AND HYDROMETER METHOD

Test Method: ASTM D422

Sieve Size	Particle Diameter, mm	Percent Passing	Specification
1/2"	12.5	100	
3/8"	9.50	98.3	
#4	4.75	82.8	
#10	2.00	51.6	
#40	0.425	11.8	
#200	0.075	1.5	
Hydrometer Analysis Results	0.050	0.9	
	0.020	0.8	
	0.010	0.2	
	0.005	0.2	
	0.002	0.1	

SOIL SPECIFIC GRAVITY: 2.51 (As reported separately, or estimated.)

DISPERSION METHOD: Mechanical, 1 min.

SAND & GRAVEL PARTICLES:

Notes: Additional sieve analysis results may be reported separately.

Comments:

REPORT REVIEWED BY: _____

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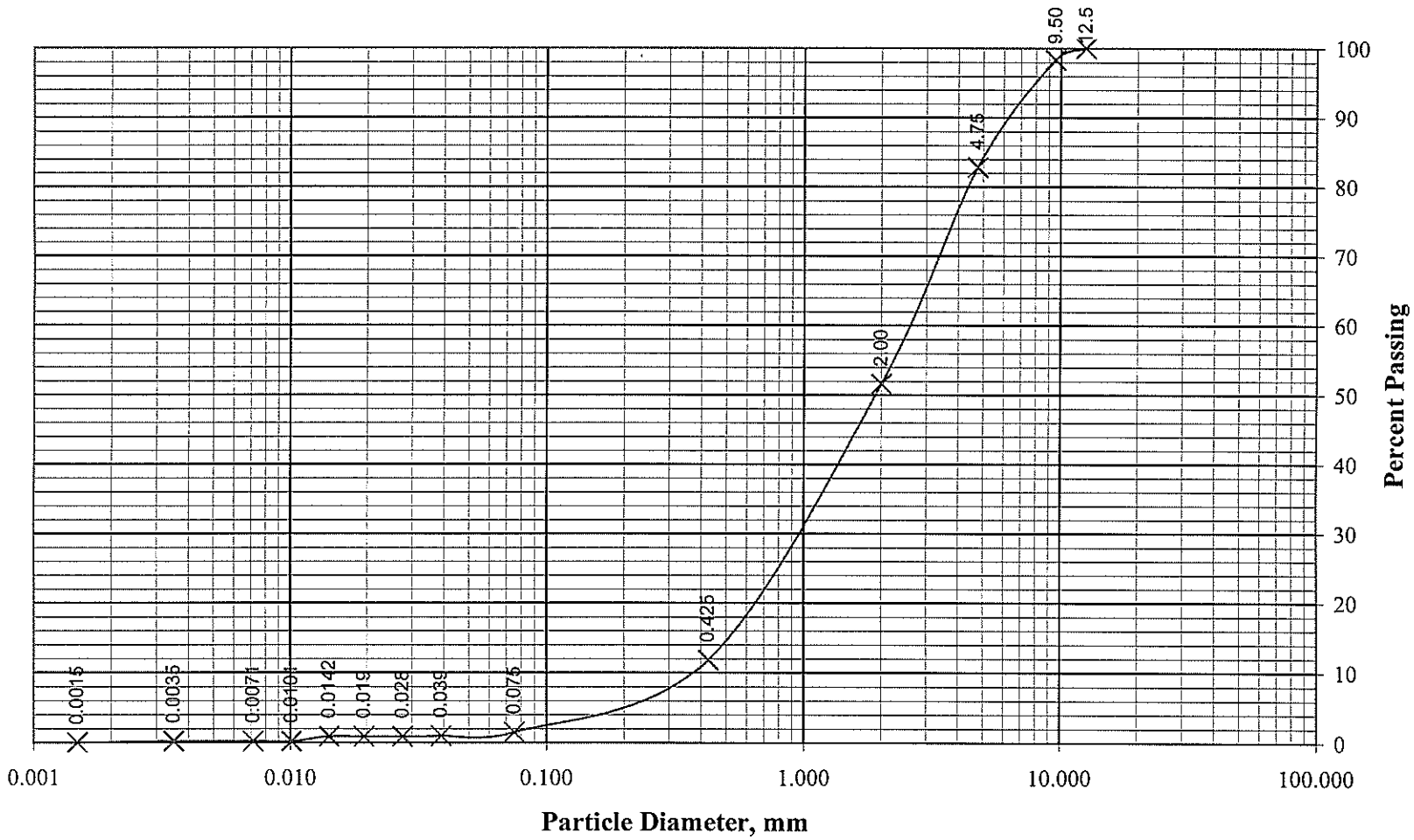
Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Item:	14-16	**Project Number:**	050584
Source:	PDGE20-101305-0930	**Lab Number:**	05-1034
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/13/2005	**Sampled By:**	Client
Date Tested:	11/22/2005-11/23/2005	**Tested By:**	C. Smith



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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Item:	25-27	**Project Number:**	050584
Source:	PDGE20-101305-1015	**Lab Number:**	05-1035
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/13/2005	**Sampled By:**	Client
Date Tested:	11/25/2005-11/26/2005	**Tested By:**	C. Smith

PARTICLE SIZE ANALYSIS BY SIEVE AND HYDROMETER METHOD

Test Method: ASTM D422

Sieve Size	Particle Diameter, mm	Percent Passing	Specification
1"	25	100	
1/2"	12.5	96.5	
3/8"	9.50	92.6	
#4	4.75	68.1	
#10	2.00	36.0	
#40	0.425	12.8	
#200	0.075	5.1	
Hydrometer Analysis Results	0.050	4.3	
	0.020	2.2	
	0.010	1.6	
	0.005	0.5	

SOIL SPECIFIC GRAVITY: 2.51 (As reported separately, or estimated.)

DISPERSION METHOD: Mechanical, 1 min.

SAND & GRAVEL PARTICLES:

Notes: Additional sieve analysis results may be reported separately.

Comments:

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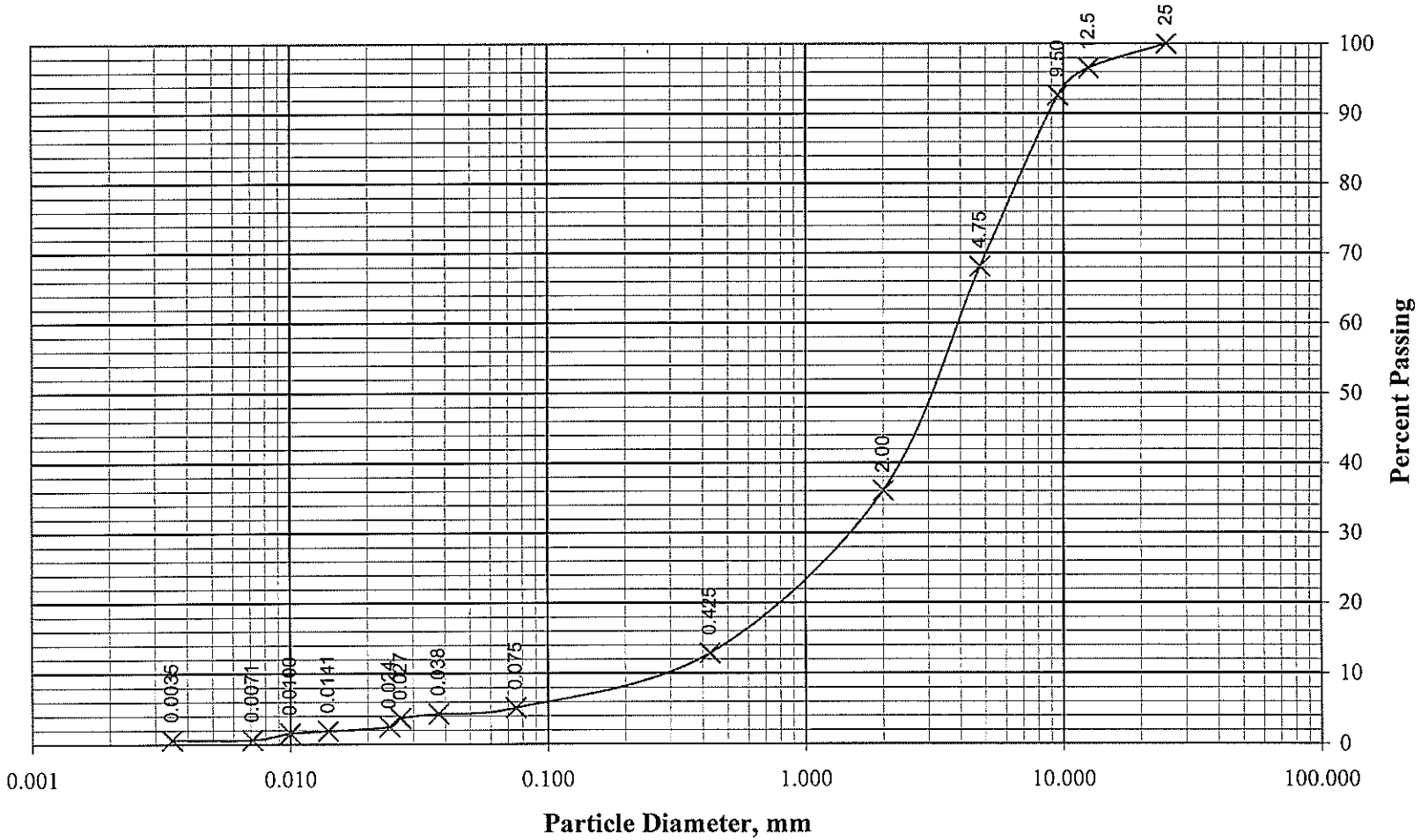
Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Item:	25-27	**Project Number:**	050584
Source:	PDGE20-101305-1015	**Lab Number:**	05-1035
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/13/2005	**Sampled By:**	Client
Date Tested:	11/25/2005-11/26/2005	**Tested By:**	C. Smith



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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Item:	62-64	**Project Number:**	050584
Source:	PDGE20-101705-0900	**Lab Number:**	05-1036
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/17/2005	**Sampled By:**	Client
Date Tested:	11/25/2005-11/26/2005	**Tested By:**	C. Smith

PARTICLE SIZE ANALYSIS BY SIEVE AND HYDROMETER METHOD

Test Method: ASTM D422

Sieve Size	Particle Diameter, mm	Percent Passing	Specification
1/2"	12.5	100	
3/8"	9.50	99.7	
#4	4.75	99.0	
#10	2.00	92.2	
#40	0.425	69.3	
#200	0.075	20.1	
Hydrometer Analysis Results	0.050	16.4	
	0.020	12.8	
	0.010	10.3	
	0.005	6.2	
	0.002	3.7	

SOIL SPECIFIC GRAVITY: 2.51 (As reported separately, or estimated.)

DISPERSION METHOD: Mechanical, 1 min.

SAND & GRAVEL PARTICLES:

Notes: Additional sieve analysis results may be reported separately.

Comments:

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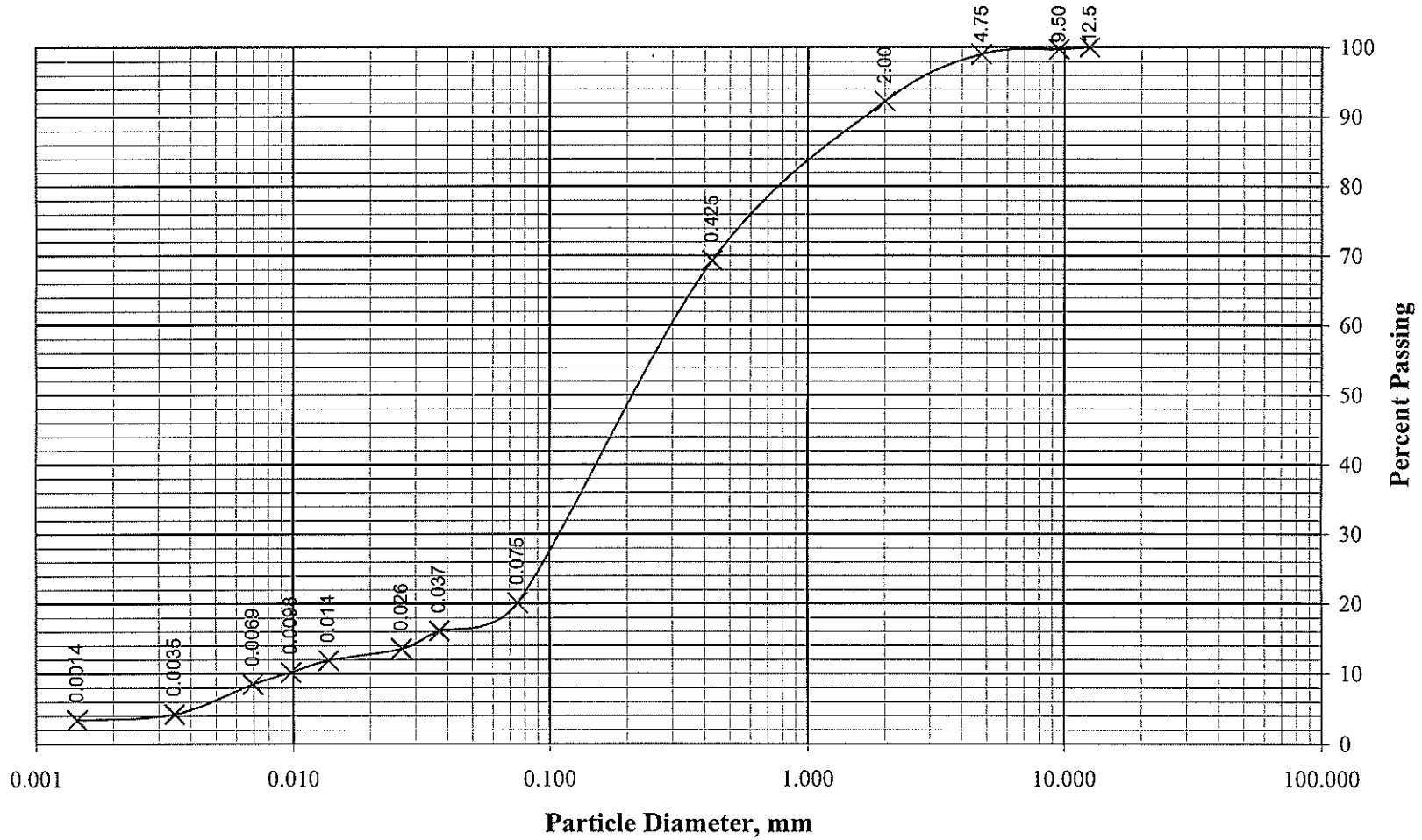
Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Item:	62-64	**Project Number:**	050584
Source:	PDGE20-101705-0900	**Lab Number:**	05-1036
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/17/2005	**Sampled By:**	Client
Date Tested:	11/25/2005-11/26/2005	**Tested By:**	C. Smith



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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Item:	34'-36'	**Project Number:**	050584
Source:	PDGE021-110205-1540	**Lab Number:**	05-1161
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	11/2/2005	**Sampled By:**	Client
Date Tested:	1/19/2006-01/20/2006	**Tested By:**	B. Jobity

PARTICLE SIZE ANALYSIS BY SIEVE AND HYDROMETER METHOD

Test Method: ASTM D422

Sieve Size	Particle Diameter, mm	Percent Passing	Specification
3/8"	9.50	100.0	
#4	4.75	100.0	
#10	2.00	100.0	
#40	0.425	99.5	
#200	0.075	92.3	
Hydrometer Analysis Results	0.050	83.8	
	0.020	59.3	
	0.010	42.8	
	0.005	28.9	
	0.002	18.2	

SOIL SPECIFIC GRAVITY: 2.51 (As reported separately, or estimated.)

DISPERSION METHOD: Mechanical, 1 min.

SAND & GRAVEL PARTICLES:

Notes: Additional sieve analysis results may be reported separately.

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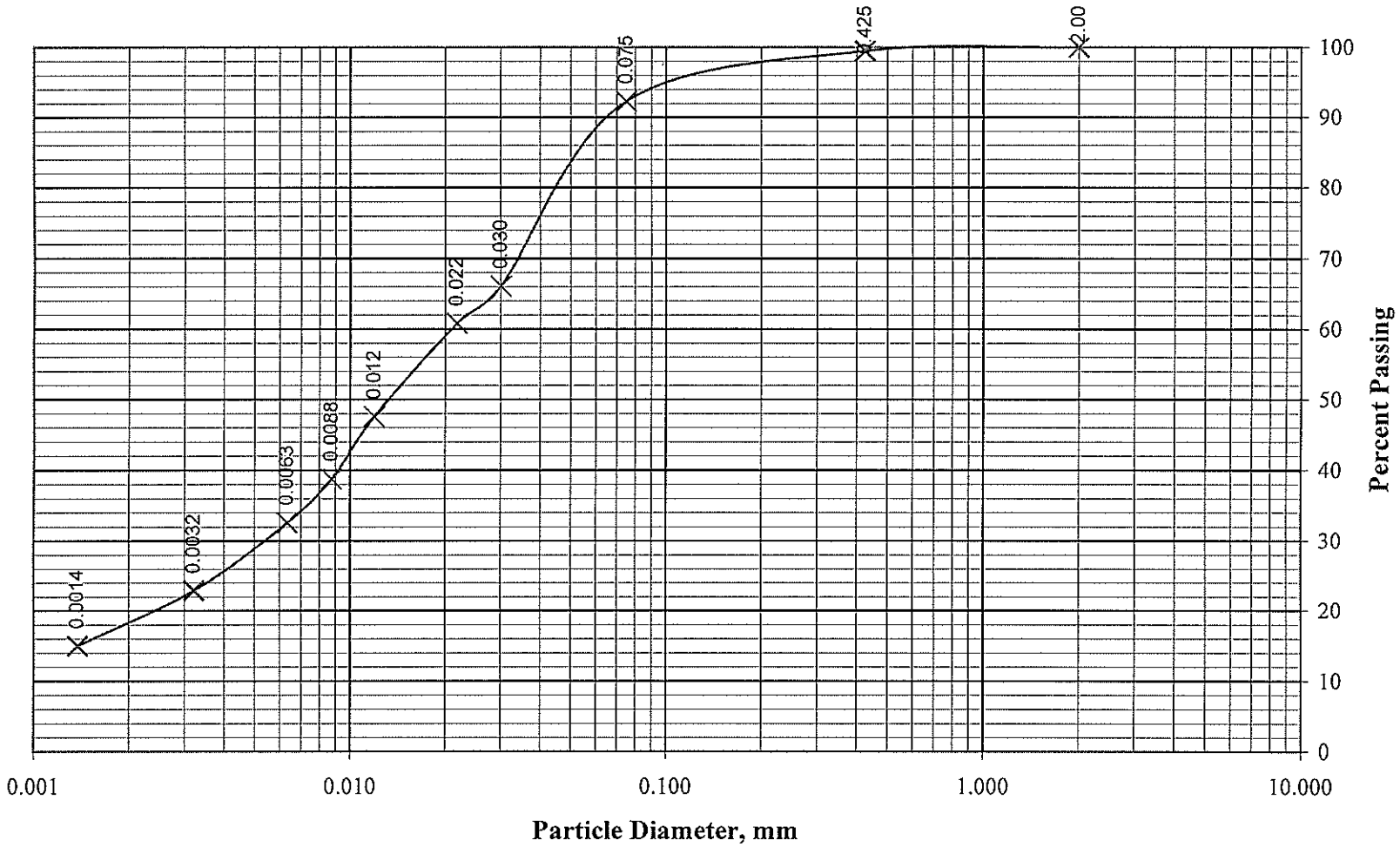
Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Item:	34'-36'	**Project Number:**	050584
Source:	PDGE021-110205-1540	**Lab Number:**	05-1161
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	11/2/2005	**Sampled By:**	Client
Date Tested:	1/19/2006-01/20/2006	**Tested By:**	B. Jobity



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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Item:	42'-44'	**Project Number:**	050584
Source:	PDGE021-110205-1430	**Lab Number:**	05-1163
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	11/2/2005	**Sampled By:**	Client
Date Tested:	1/20/2006-01/21/2006	**Tested By:**	B. Jobity

PARTICLE SIZE ANALYSIS BY SIEVE AND HYDROMETER METHOD

Test Method: ASTM D422

Sieve Size	Particle Diameter, mm	Percent Passing	Specification
3/8"	9.50	100.0	
#4	4.75	100.0	
#10	2.00	100.0	
#40	0.425	98.6	
#200	0.075	92.5	
Hydrometer Analysis Results	0.050	83.7	
	0.020	53.7	
	0.010	44.8	
	0.005	32.6	
	0.002	20.3	

SOIL SPECIFIC GRAVITY: 2.51 (As reported separately, or estimated.)

DISPERSION METHOD: Mechanical, 1 min.

SAND & GRAVEL PARTICLES:

Notes: Additional sieve analysis results may be reported separately.

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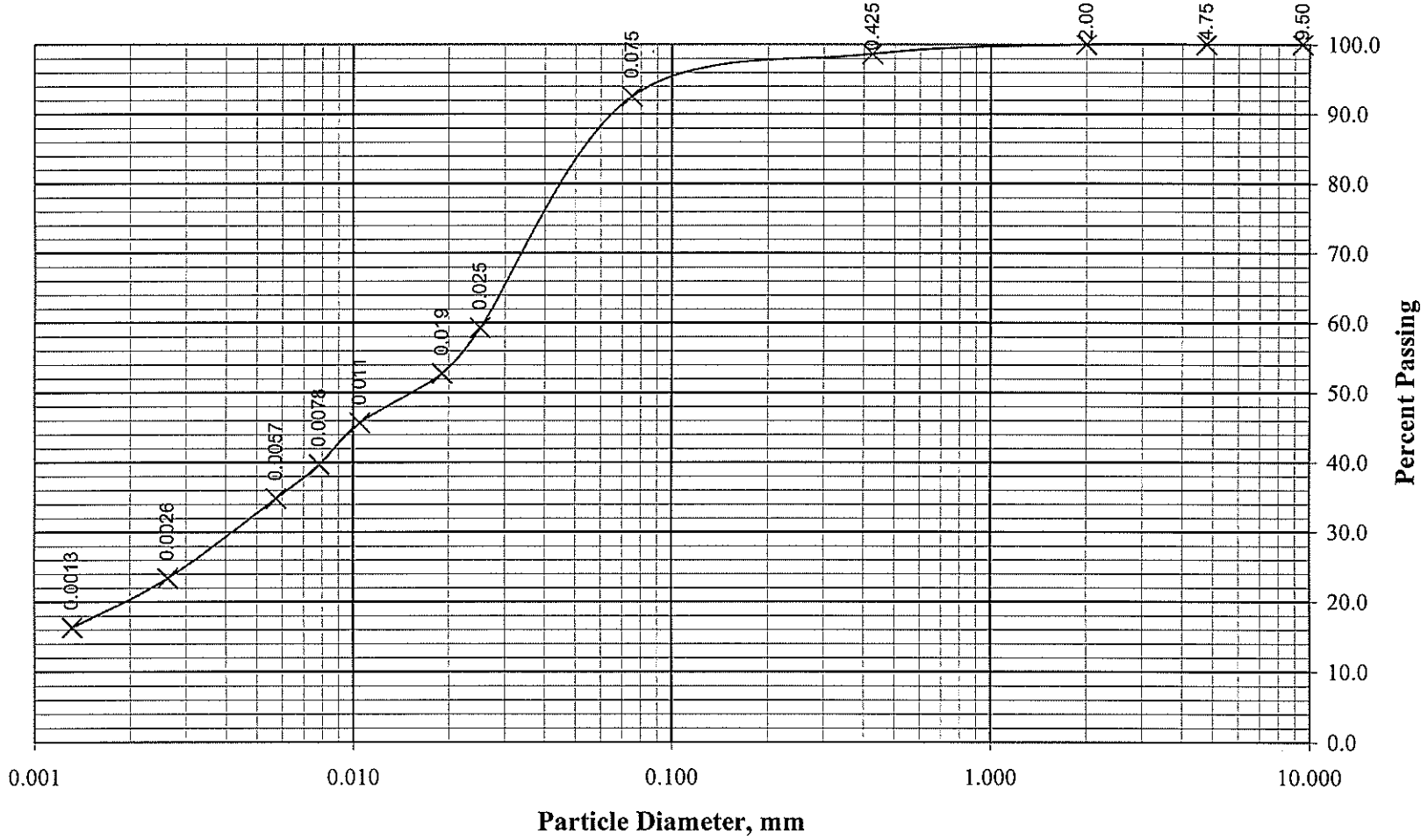
Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Item:	42'-44'	**Project Number:**	050584
Source:	PDGE021-110205-1430	**Lab Number:**	05-1163
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	11/2/2005	**Sampled By:**	Client
Date Tested:	1/20/2006-01/21/2006	**Tested By:**	B. Jobity



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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Item:	61'-63'	**Project Number:**	050584
Source:	PDGE021-110305-1015	**Lab Number:**	05-1165
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	11/3/2005	**Sampled By:**	Client
Date Tested:	1/19/2006-01/20/2006	**Tested By:**	B. Jobity

PARTICLE SIZE ANALYSIS BY SIEVE AND HYDROMETER METHOD

Test Method: ASTM D422

Sieve Size	Particle Diameter, mm	Percent Passing	Specification
3/8"	9.50	100.0	
#4	4.75	100.0	
#10	2.00	100.0	
#40	0.425	99.4	
#200	0.075	89.5	
Hydrometer Analysis Results	0.050	85.0	
	0.020	68.2	
	0.010	56.0	
	0.005	38.5	
	0.002	20.2	

SOIL SPECIFIC GRAVITY: 2.51 (As reported separately, or estimated.)

DISPERSION METHOD: Mechanical, 1 min.

SAND & GRAVEL PARTICLES:

Notes: Additional sieve analysis results may be reported separately.

Comments:

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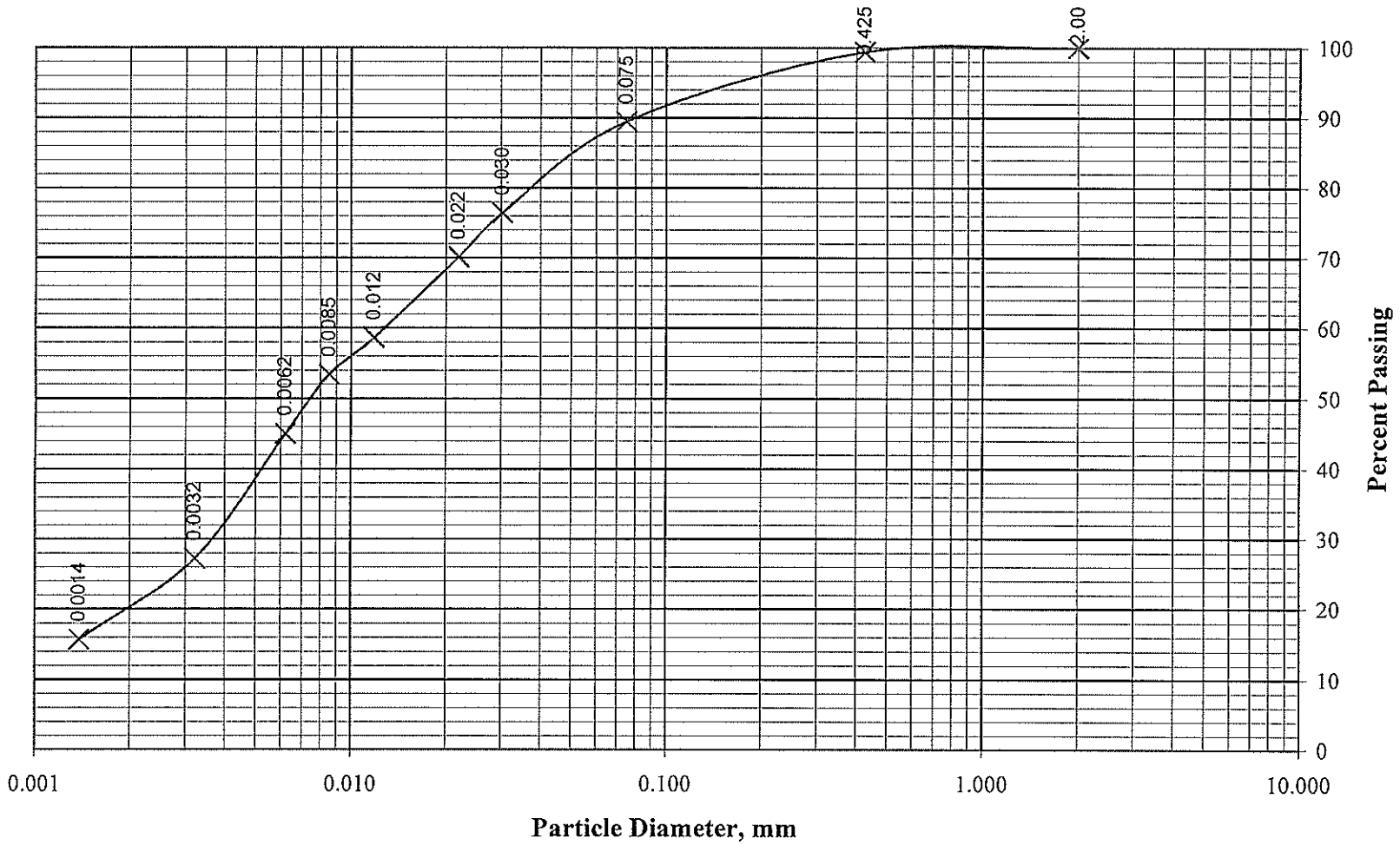
Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Item:	61'-63'	**Project Number:**	050584
Source:	PDGE021-110305-1015	**Lab Number:**	05-1165
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	11/3/2005	**Sampled By:**	Client
Date Tested:	1/19/2006-01/20/2006	**Tested By:**	B. Jobity



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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Item:	25'-27'	**Project Number:**	050584
Source:	PDGEO021-103105-1330	**Lab Number:**	05-1152
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/31/2005	**Sampled By:**	Client
Date Tested:	1/13/2006-01/16/2006	**Tested By:**	C. Smith

PARTICLE SIZE ANALYSIS BY SIEVE AND HYDROMETER METHOD

Test Method: ASTM D422

Sieve Size	Particle Diameter, mm	Percent Passing	Specification
3/8"	9.50	100.0	
#4	4.75	100.0	
#10	2.00	99.9	
#40	0.425	98.3	
#200	0.075	92.2	
Hydrometer Analysis Results	0.050	88.1	
	0.020	68.2	
	0.010	50.5	
	0.005	28.2	
	0.002	18.6	

SOIL SPECIFIC GRAVITY: 2.51 (As reported separately, or estimated.)

DISPERSION METHOD: Mechanical, 1 min.

SAND & GRAVEL PARTICLES:

Notes: Additional sieve analysis results may be reported separately.

Comments:

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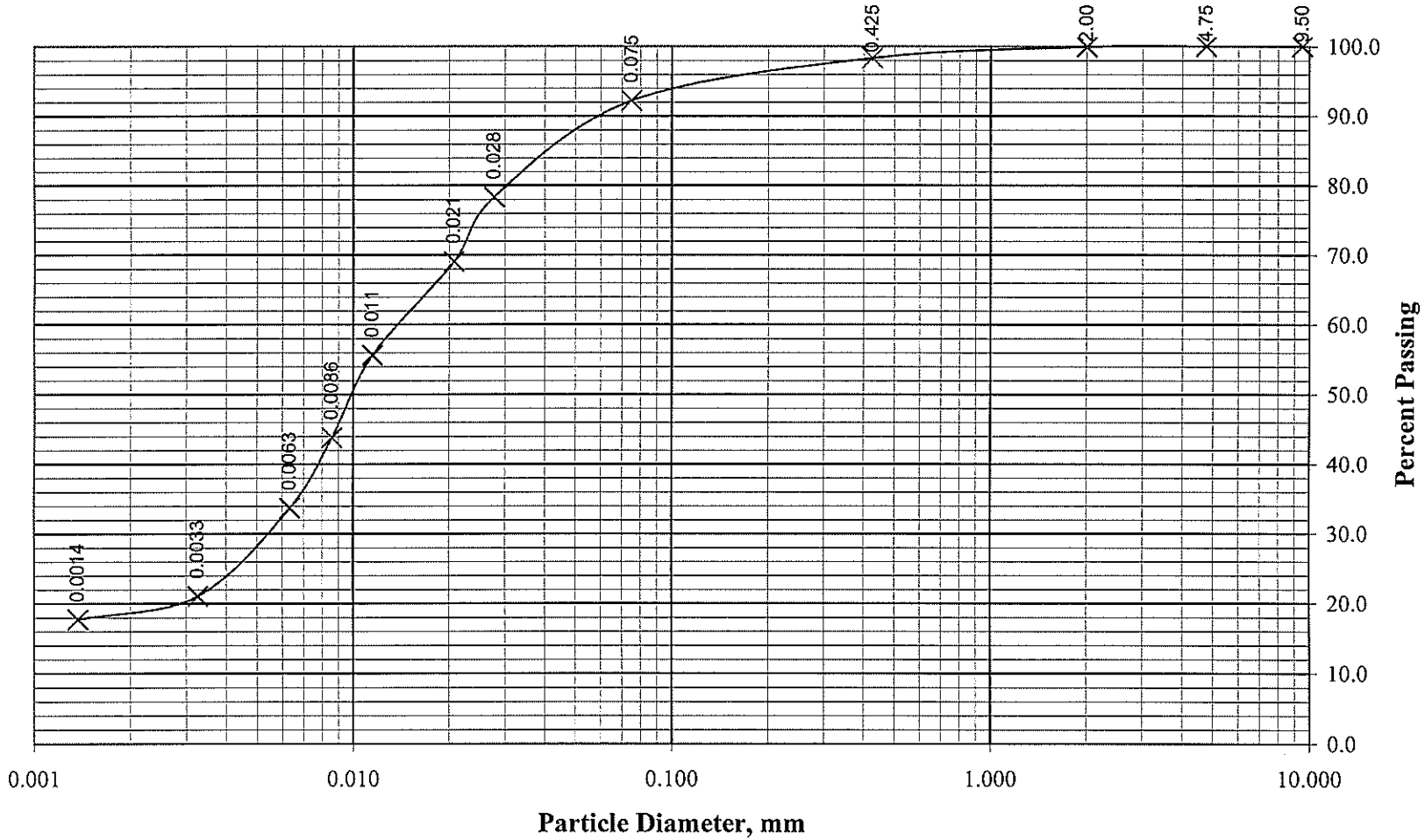
Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Item:	25'-27'	**Project Number:**	050584
Source:	PDGEO021-103105-1330	**Lab Number:**	05-1152
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/31/2005	**Sampled By:**	Client
Date Tested:	1/13/2006-01/16/2006	**Tested By:**	C. Smith



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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Item:	54-56	**Project Number:**	050584
Source:	PDGE21-110305-0845	**Lab Number:**	05-1038
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	11/3/2005	**Sampled By:**	Client
Date Tested:	11/25/2005-11/26/2005	**Tested By:**	C. Smith

PARTICLE SIZE ANALYSIS BY SIEVE AND HYDROMETER METHOD

Test Method: ASTM D422

Sieve Size	Particle Diameter, mm	Percent Passing	Specification
3/4"	19	100	
1/2"	12.5	99.5	
3/8"	9.50	99.5	
#4	4.75	98.1	
#10	2.00	95.5	
#40	0.425	74.2	
#200	0.075	17.1	
Hydrometer Analysis Results	0.050	12.9	
	0.020	9.5	
	0.010	7.3	
	0.005	4.8	
	0.002	2.4	

SOIL SPECIFIC GRAVITY: 2.51 (As reported separately, or estimated.)

DISPERSION METHOD: Mechanical, 1 min.

SAND & GRAVEL PARTICLES:

Notes: Additional sieve analysis results may be reported separately.

Comments:

D. O'Dell

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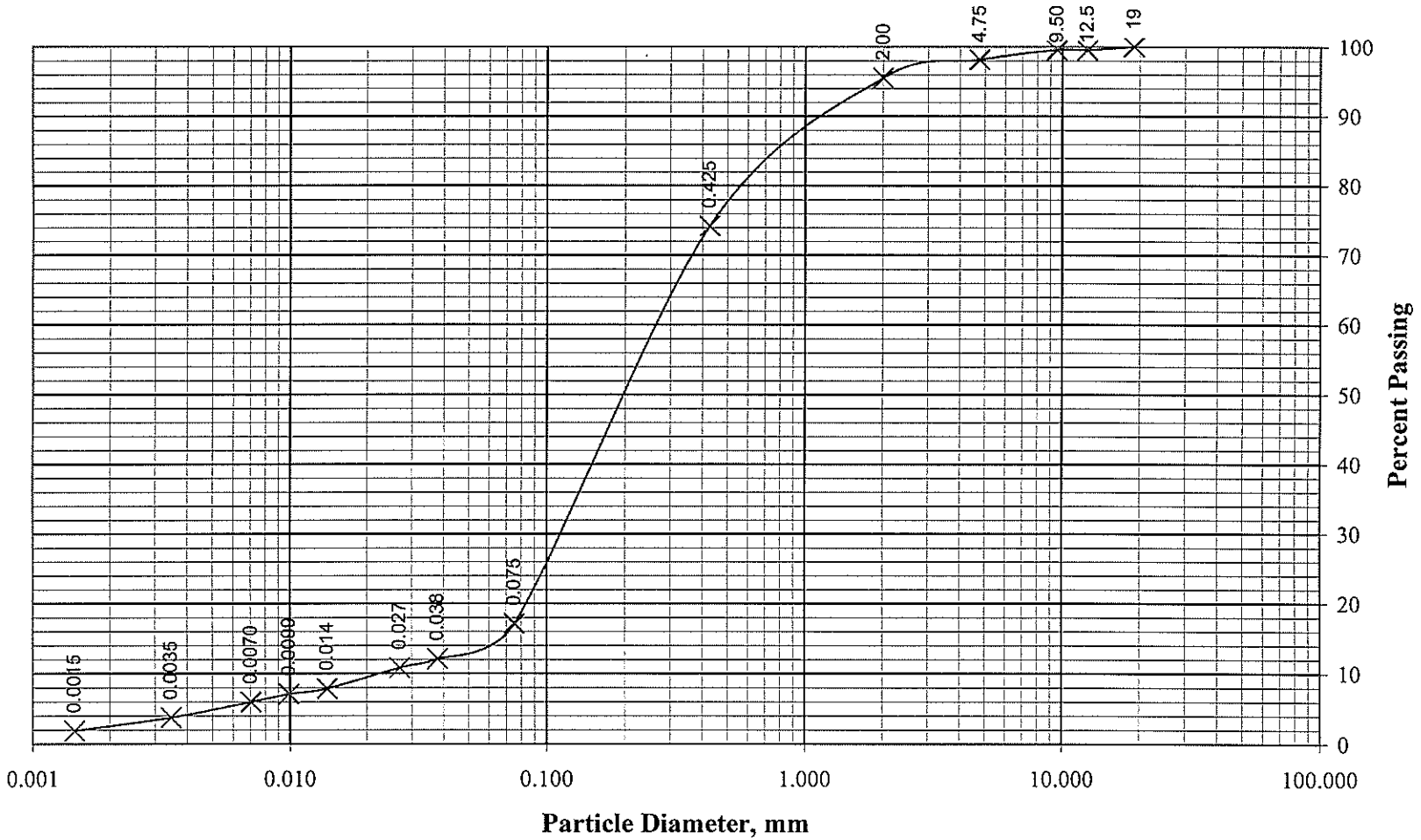
Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Item:	54-56	**Project Number:**	050584
Source:	PDGE21-110305-0845	**Lab Number:**	05-1038
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	11/3/2005	**Sampled By:**	Client
Date Tested:	11/25/2005-11/26/2005	**Tested By:**	C. Smith



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Phone/Fax: 413-232-8566

Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Item:	65-70	**Project Number:**	050584
Source:	PDGE21-110305-1130	**Lab Number:**	05-1039
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	11/3/2005	**Sampled By:**	Client
Date Tested:	11/25/2005-11/26/2005	**Tested By:**	B. Jobity

PARTICLE SIZE ANALYSIS BY SIEVE AND HYDROMETER METHOD

Test Method: ASTM D422

Sieve Size	Particle Diameter, mm	Percent Passing	Specification
1"	25	100	
1/2"	12.5	88.3	
3/8"	9.50	79.0	
#4	4.75	64.0	
#10	2.00	45.3	
#40	0.425	31.6	
#200	0.075	13.4	
Hydrometer Analysis Results	0.050	12.0	
	0.020	8.2	
	0.010	6.3	
	0.005	4.4	
	0.002	3.3	

SOIL SPECIFIC GRAVITY: 2.51 (As reported separately, or estimated.)

DISPERSION METHOD: Mechanical, 1 min.

SAND & GRAVEL PARTICLES:

Notes: Additional sieve analysis results may be reported separately.

Comments:

REPORT REVIEWED BY: _____

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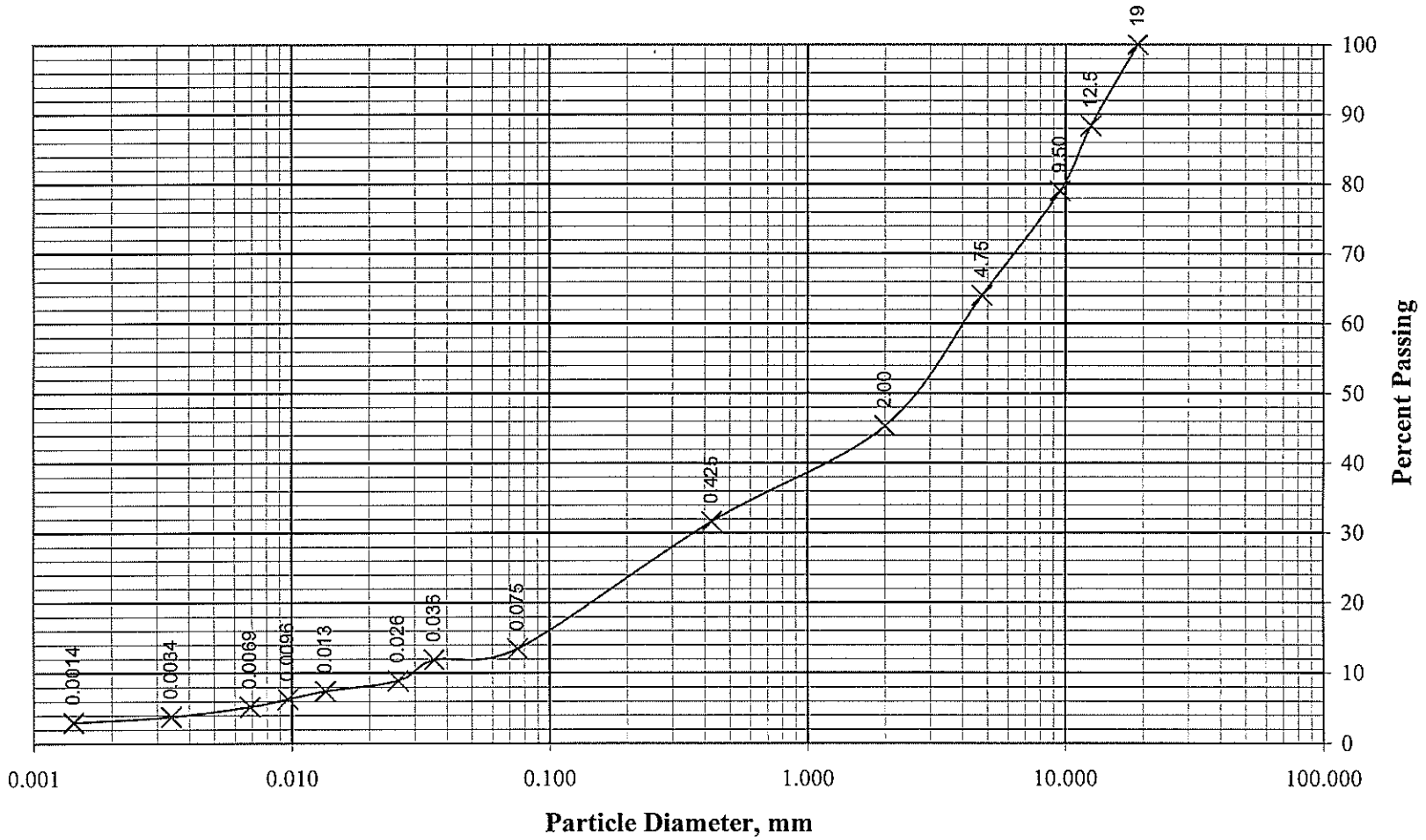
42 Day Farm Road, West Stockbridge, MA 01266
Phone/Fax: 413-232-8566

Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Item:	65-70	**Project Number:**	050584
Source:	PDGE21-110305-1130	**Lab Number:**	05-1039
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	11/3/2005	**Sampled By:**	Client
Date Tested:	11/25/2005-11/26/2005	**Tested By:**	B. Jobity



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IGP

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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Item:	5-7 ft	**Project Number:**	050584
Source:	PDGE22-102005-1335	**Lab Number:**	05-1057
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/20/2005	**Sampled By:**	Client
Date Tested:	12/13/2005-12/14/2005	**Tested By:**	B. Patton

PARTICLE SIZE ANALYSIS BY SIEVE AND HYDROMETER METHOD

Test Method: ASTM D422

Sieve Size	Particle Diameter, mm	Percent Passing	Specification
1 1/2"	37.50	100.0	
1 1/4"	31.50	78.5	
1"	25.00	78.5	
3/4"	19.00	74.3	
1/2"	12.50	66.4	
3/8"	9.50	57.3	
#4	4.75	43.9	
#10	2.00	33.6	
#40	0.425	19.2	
#200	0.075	7.9	
Hydrometer Analysis Results	0.050	6.0	
	0.020	5.0	
	0.010	3.0	
	0.005	2.0	
	0.002	1.0	

SOIL SPECIFIC GRAVITY: 2.51 (As reported separately, or estimated.)

DISPERSION METHOD: Mechanical, 1 min.

SAND & GRAVEL PARTICLES:

Notes: Additional sieve analysis results may be reported separately.

Comments:

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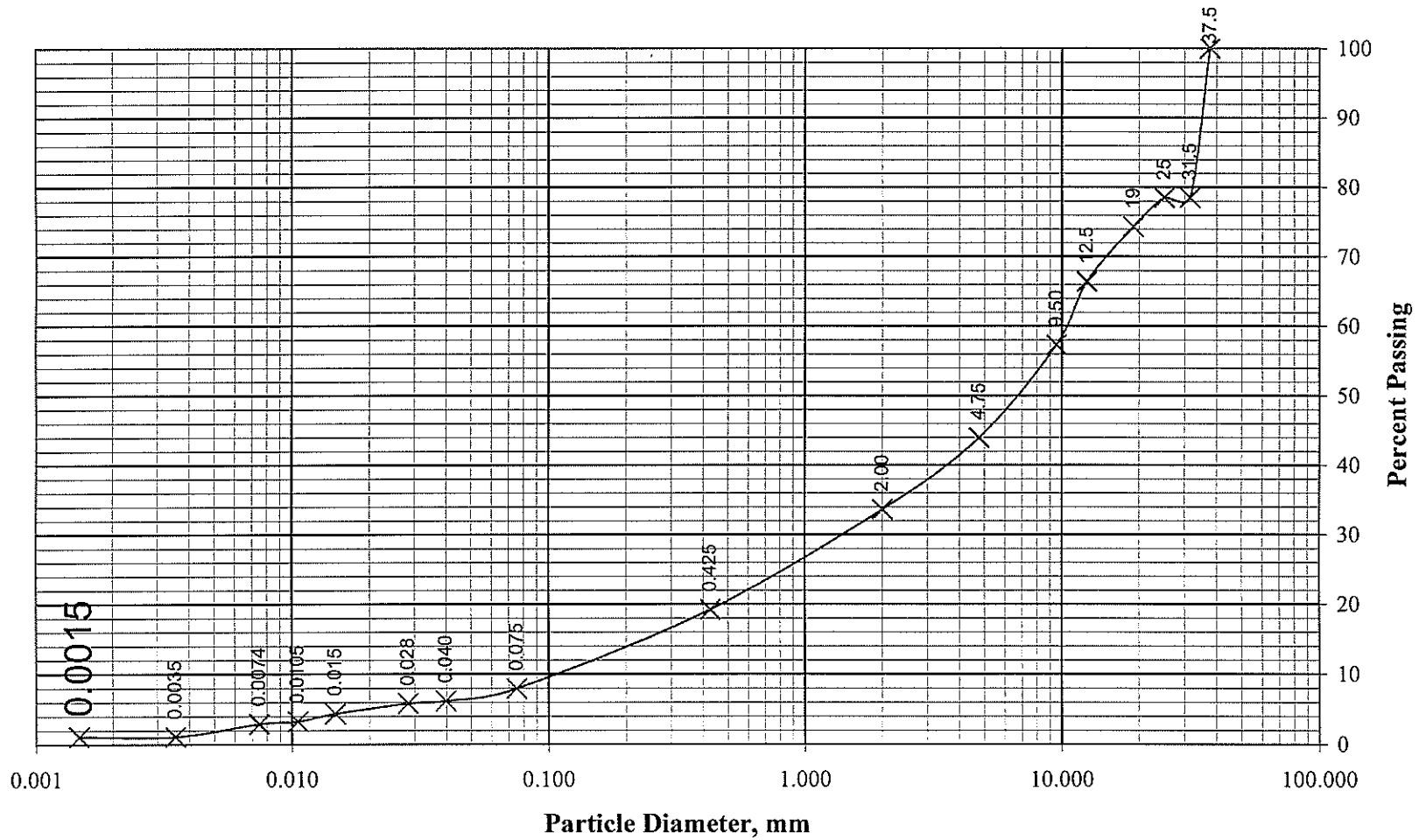
Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Item:	5-7 ft	**Project Number:**	050584
Source:	PDGE22-102005-1335	**Lab Number:**	05-1057
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/20/2005	**Sampled By:**	Client
Date Tested:	12/13/2005-12/14/2005	**Tested By:**	B. Patton



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Phone/Fax: 413-232-8566

Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Item:	34'-36'	**Project Number:**	050584
Source:	PDGE22-102705-1110	**Lab Number:**	05-1016
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/24/2005	**Sampled By:**	Client
Date Tested:	12/28/2005-12/29/2005	**Tested By:**	M. Kennedy

PARTICLE SIZE ANALYSIS BY SIEVE AND HYDROMETER METHOD

Test Method: ASTM D422

Sieve Size	Particle Diameter, mm	Percent Passing	Specification
3/8"	9.50	100.0	
#4	4.75	100.0	
#10	2.00	100.0	
#40	0.425	99.7	
#200	0.075	93.2	
Hydrometer Analysis Results	0.050	86.8	
	0.020	63.0	
	0.010	47.1	
	0.005	29.4	
	0.002	15.6	

SOIL SPECIFIC GRAVITY: 2.51 (As reported separately, or estimated.)

DISPERSION METHOD: Mechanical, 1 min.

SAND & GRAVEL PARTICLES:

Notes: Additional sieve analysis results may be reported separately.

Comments:

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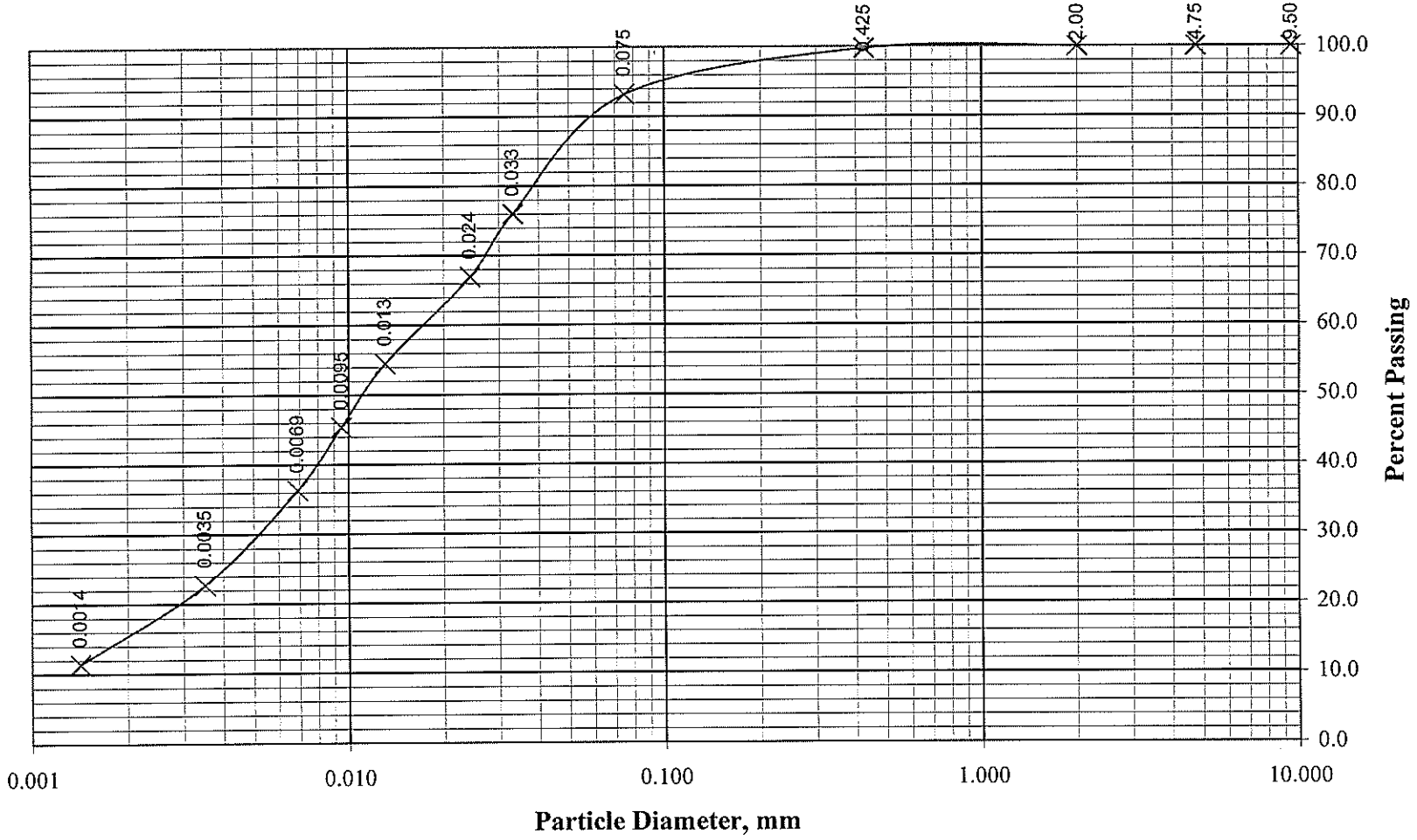
Phone/Fax: 413-232-8566

Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Item:	34'-36'	**Project Number:**	050584
Source:	PDGE22-102705-1110	**Lab Number:**	05-1016
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/24/2005	**Sampled By:**	Client
Date Tested:	12/28/2005-12/29/2005	**Tested By:**	M. Kennedy



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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Item:	5-7 ft	**Project Number:**	050584
Source:	PDGE23-102405-1430	**Lab Number:**	05-1058
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/24/2005	**Sampled By:**	Client
Date Tested:	12/15/2005-12/16/2005	**Tested By:**	C. Smith

PARTICLE SIZE ANALYSIS BY SIEVE AND HYDROMETER METHOD

Test Method: ASTM D422

Sieve Size	Particle Diameter, mm	Percent Passing	Specification
1 1/2"	31.50	100.0	
1"	25.00	81.8	
3/4"	19.00	81.8	
1/2"	12.50	76.1	
3/8"	9.50	74.7	
#4	4.75	62.5	
#10	2.00	48.0	
#40	0.425	29.9	
#200	0.075	15.8	
Hydrometer Analysis Results	0.050	14.0	
	0.020	10.0	
	0.010	7.0	
	0.005	4.5	
	0.002	3.0	

SOIL SPECIFIC GRAVITY: 2.51 (As reported separately, or estimated.)

DISPERSION METHOD: Mechanical, 1 min.

SAND & GRAVEL PARTICLES:

Notes: Additional sieve analysis results may be reported separately.

Comments:

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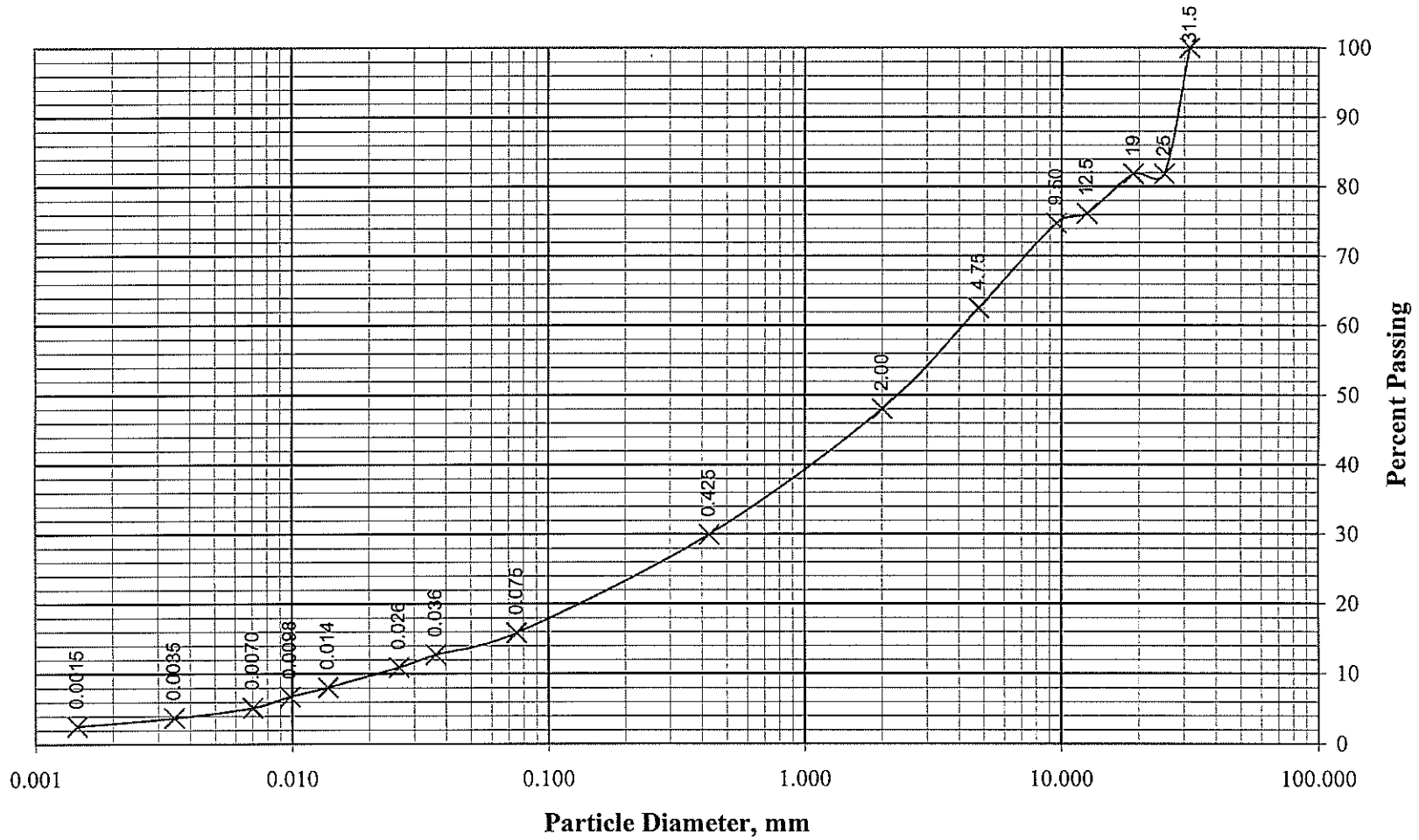
Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Item:	5-7 ft	**Project Number:**	050584
Source:	PDGE23-102405-1430	**Lab Number:**	05-1058
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/24/2005	**Sampled By:**	Client
Date Tested:	12/15/2005-12/16/2005	**Tested By:**	C. Smith



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Phone/Fax: 413-232-8566

Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Item:	24'-26'	**Project Number:**	050584
Source:	PDGE23-102405-1540	**Lab Number:**	05-1014
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/24/2005	**Sampled By:**	Client
Date Tested:	12/21/2005-12/22/2005	**Tested By:**	C Smith

PARTICLE SIZE ANALYSIS BY SIEVE AND HYDROMETER METHOD

Test Method: ASTM D422

Sieve Size	Particle Diameter, mm	Percent Passing	Specification
3/8"	9.50	100.0	
#4	4.75	100.0	
#10	2.00	100.0	
#40	0.425	95.1	
#200	0.075	92.8	
Hydrometer Analysis Results	0.050	89.7	
	0.020	68.7	
	0.010	50.5	
	0.005	32.4	
	0.002	17.6	

SOIL SPECIFIC GRAVITY: 2.51 (As reported separately, or estimated.)

DISPERSION METHOD: Mechanical, 1 min.

SAND & GRAVEL PARTICLES: Sand, shell fragments

Notes: Additional sieve analysis results may be reported separately.

Comments:

No specifications available at time of testing.

REPORT REVIEWED BY: _____

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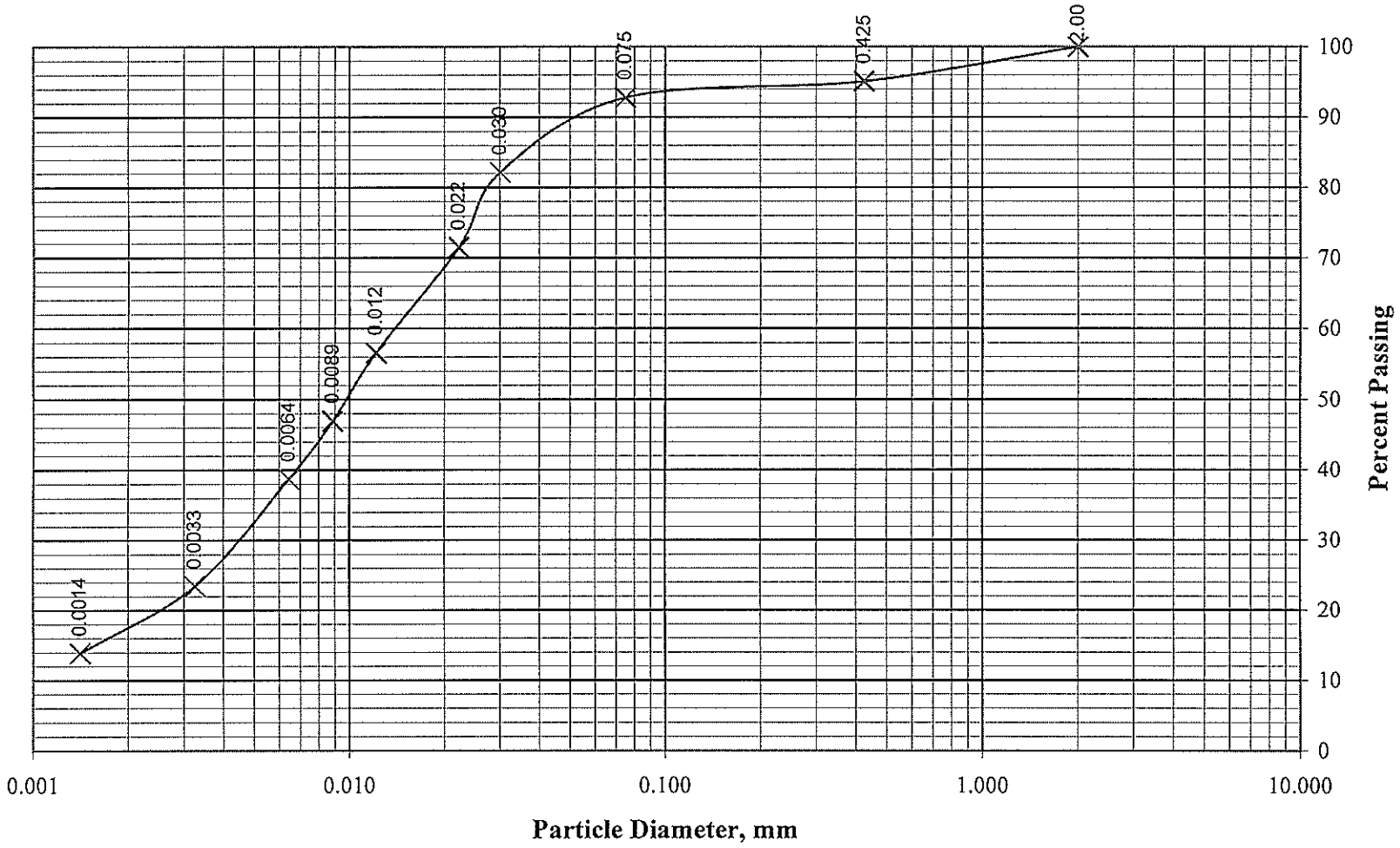
Phone/Fax: 413-232-8566

Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Item:	24'-26'	**Project Number:**	050584
Source:	PDGE23-102405-1540	**Lab Number:**	05-1014
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/24/2005	**Sampled By:**	Client
Date Tested:	12/21/2005-12/22/2005	**Tested By:**	C Smith



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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Item:	35'-37'	**Project Number:**	050584
Source:	PDGE23-102805-1020	**Lab Number:**	05-1018
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/28/2005	**Sampled By:**	Client
Date Tested:	12/28/2005-12/29/05	**Tested By:**	M Kennedy

PARTICLE SIZE ANALYSIS BY SIEVE AND HYDROMETER METHOD

Test Method: ASTM D422

Sieve Size	Particle Diameter, mm	Percent Passing	Specification
3/8"	9.50	100.0	
#4	4.75	99.9	
#10	2.00	99.7	
#40	0.425	99.3	
#200	0.075	94.1	
Hydrometer Analysis Results	0.050	86.9	
	0.020	57.6	
	0.010	39.0	
	0.005	25.4	
	0.002	13.8	

SOIL SPECIFIC GRAVITY: 2.51 (As reported separately, or estimated.)

DISPERSION METHOD: Mechanical, 1 min.

SAND & GRAVEL PARTICLES:

Notes: Additional sieve analysis results may be reported separately.

Comments:

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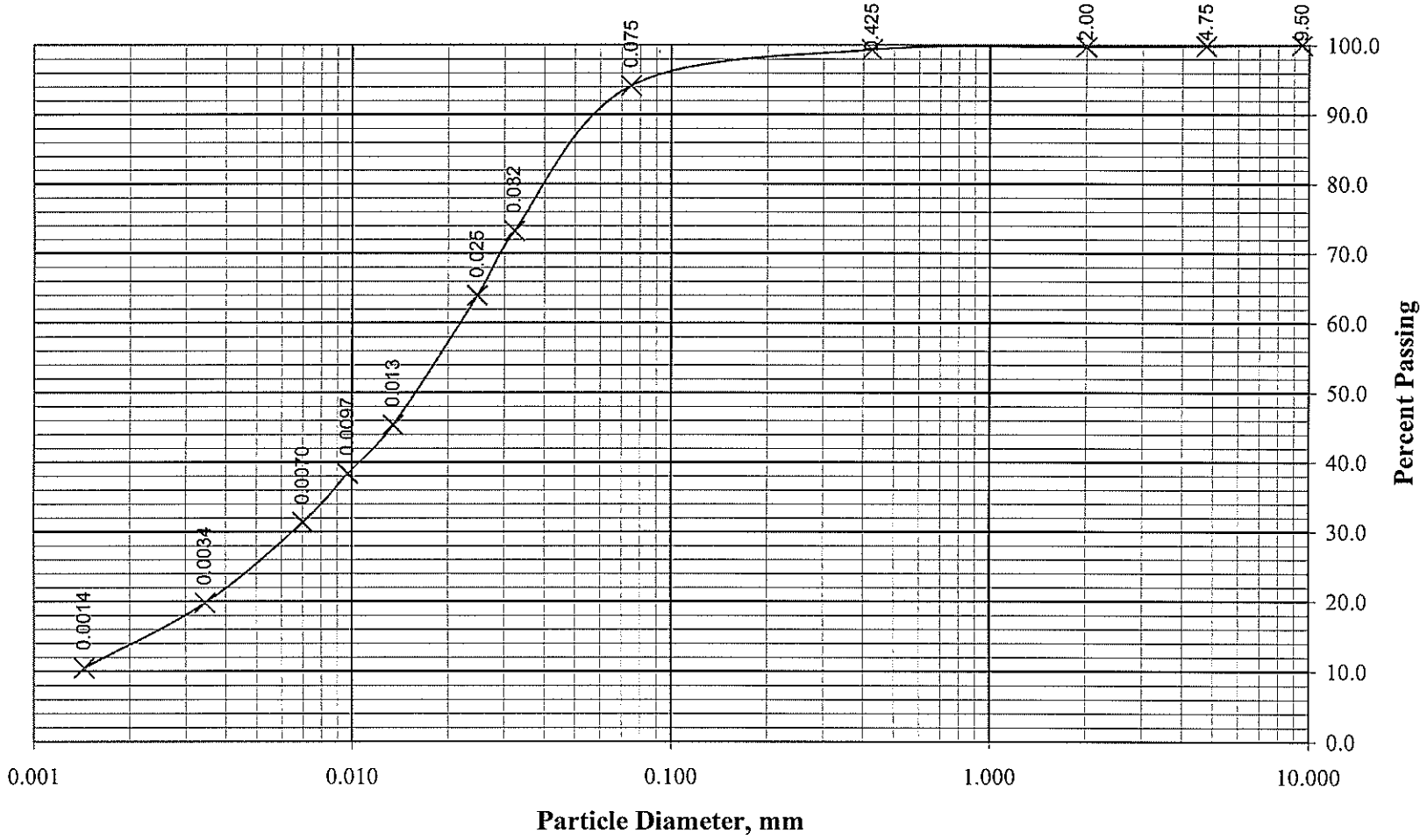
Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Item:	35'-37'	**Project Number:**	050584
Source:	PDGE23-102805-1020	**Lab Number:**	05-1018
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/28/2005	**Sampled By:**	Client
Date Tested:	12/28/2005-12/29/05	**Tested By:**	M Kennedy



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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Item:	8-10 ft	**Project Number:**	050584
Source:	PDGE24-102405-0915	**Lab Number:**	05-1037
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/24/2005	**Sampled By:**	Client
Date Tested:	11/27/2005-11/29/2005	**Tested By:**	B. Jobity

PARTICLE SIZE ANALYSIS BY SIEVE AND HYDROMETER METHOD

Test Method: ASTM D422

Sieve Size	Particle Diameter, mm	Percent Passing	Specification
1"	25	100	
3/4"	19	94.2	
1/2"	12.5	82.1	
3/8"	9.50	80.9	
#4	4.75	63.0	
#10	2.00	44.5	
#40	0.425	24.0	
#200	0.075	10.4	
Hydrometer Analysis Results	0.050	7.9	
	0.020	5.4	
	0.010	4.2	
	0.005	2.5	
	0.002	2.0	

SOIL SPECIFIC GRAVITY: 2.51 (As reported separately, or estimated.)

DISPERSION METHOD: Mechanical, 1 min.

SAND & GRAVEL PARTICLES:

Notes: Additional sieve analysis results may be reported separately.

Comments:

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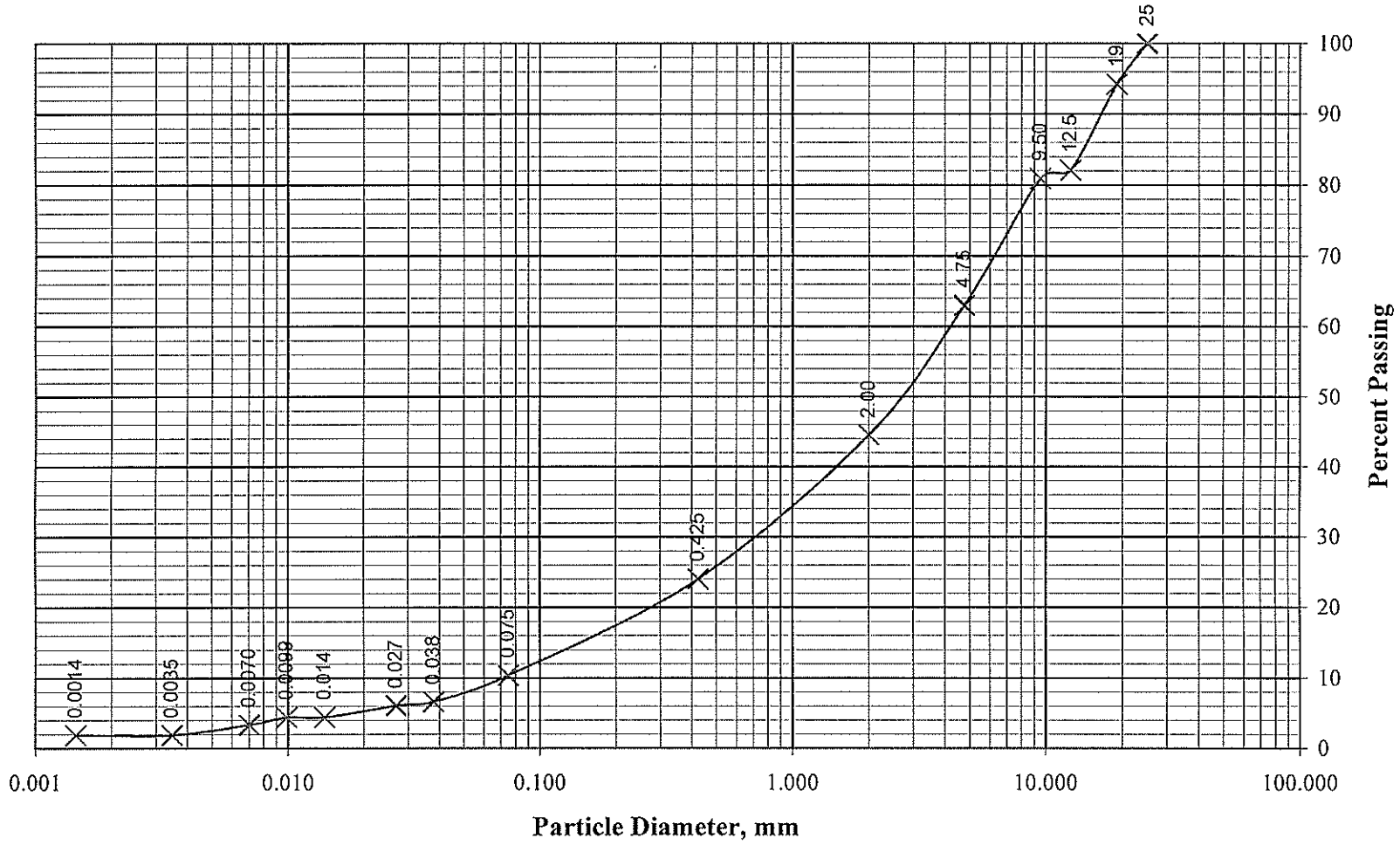
Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Item:	8-10 ft	**Project Number:**	050584
Source:	PDGE24-102405-0915	**Lab Number:**	05-1037
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/24/2005	**Sampled By:**	Client
Date Tested:	11/27/2005-11/29/2005	**Tested By:**	B. Jobity



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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Item:	77-79	**Project Number:**	050584
Source:	PDGE24-103105-1130	**Lab Number:**	05-1032
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/31/2005	**Sampled By:**	Client
Date Tested:	11/22/2005-11/23/2005	**Tested By:**	C. Smith

PARTICLE SIZE ANALYSIS BY SIEVE AND HYDROMETER METHOD

Test Method: ASTM D422

Sieve Size	Particle Diameter, mm	Percent Passing	Specification
1/2"	12.5	100	
3/8"	9.50	96.4	
#4	4.75	95.5	
#10	2.00	94.3	
#40	0.425	91.4	
#200	0.075	72.3	
Hydrometer Analysis Results	0.050	62.4	
	0.020	40.7	
	0.010	34.1	
	0.005	26.8	
	0.002	17.7	

SOIL SPECIFIC GRAVITY: 2.51 (As reported separately, or estimated.)

DISPERSION METHOD: Mechanical, 1 min.

SAND & GRAVEL PARTICLES:

Notes: Additional sieve analysis results may be reported separately.

Comments:

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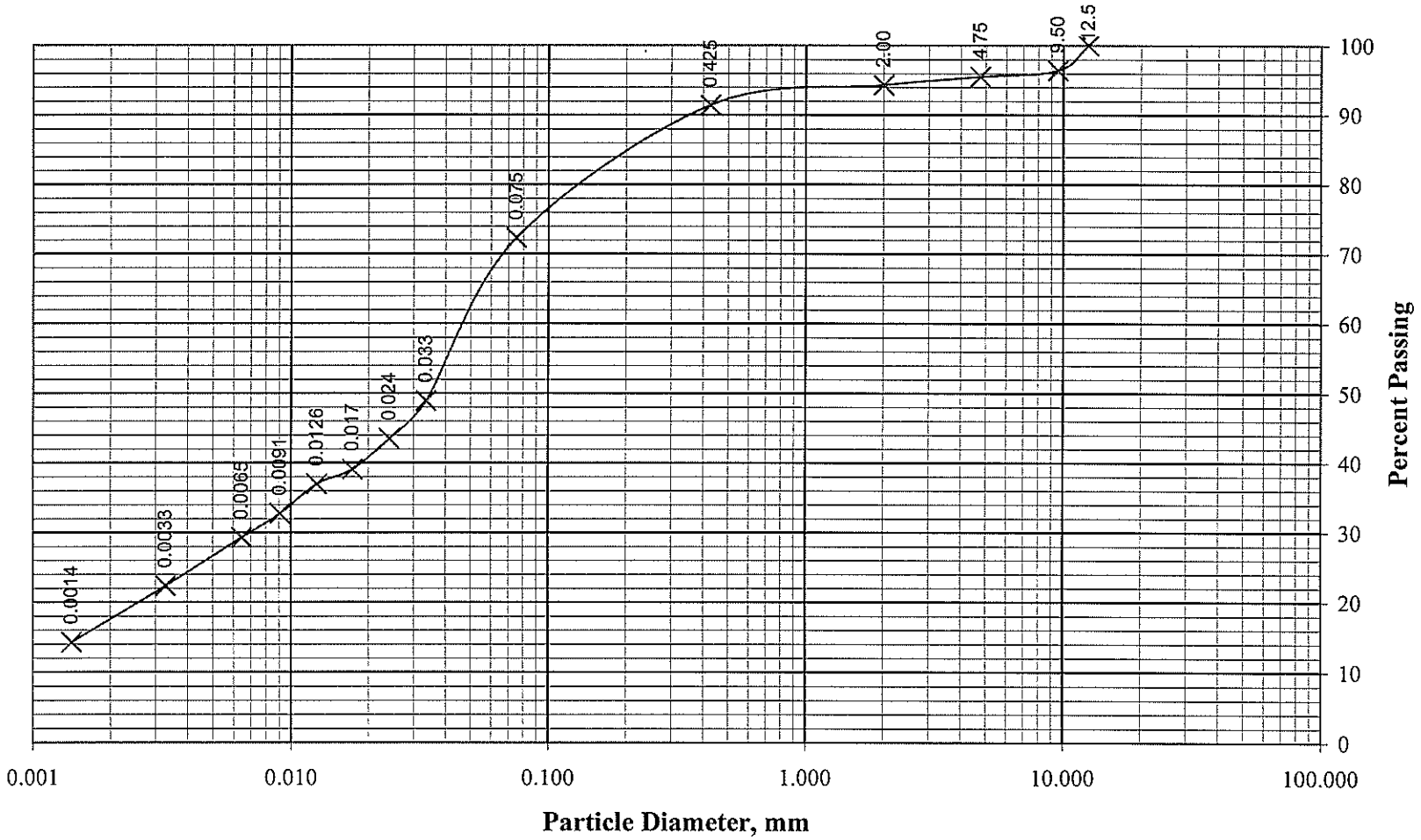
Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Item:	77-79	**Project Number:**	050584
Source:	PDGE24-103105-1130	**Lab Number:**	05-1032
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/31/2005	**Sampled By:**	Client
Date Tested:	11/22/2005-11/23/2005	**Tested By:**	C. Smith



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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Item:	42-44 ft	**Project Number:**	050584
Source:	PDGEO24A-103105-1100	**Lab Number:**	05-1156
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/31/2005	**Sampled By:**	Client
Date Tested:	1/19/2006-01/20/2006	**Tested By:**	B. Jobity

PARTICLE SIZE ANALYSIS BY SIEVE AND HYDROMETER METHOD

Test Method: ASTM D422

Sieve Size	Particle Diameter, mm	Percent Passing	Specification
3/8"	9.50	100.0	
#4	4.75	100.0	
#10	2.00	100.0	
#40	0.425	98.5	
#200	0.075	85.7	
Hydrometer Analysis Results	0.050	80.2	
	0.020	58.4	
	0.010	42.3	
	0.005	26.3	
	0.002	13.3	

SOIL SPECIFIC GRAVITY: 2.51 (As reported separately, or estimated.)

DISPERSION METHOD: Mechanical, 1 min.

SAND & GRAVEL PARTICLES:

Notes: Additional sieve analysis results may be reported separately.

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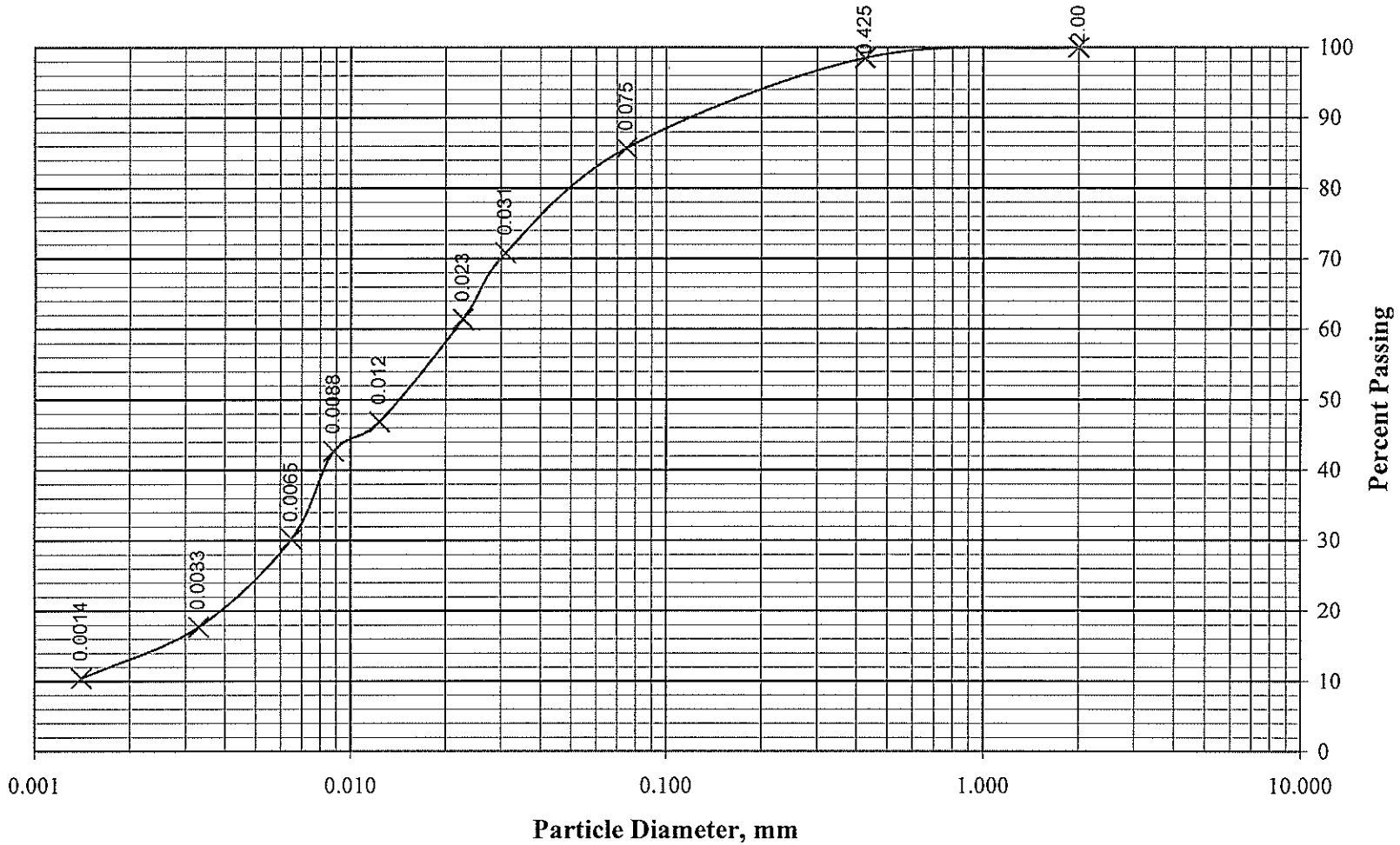
Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Item:	42-44 ft	**Project Number:**	050584
Source:	PDGEO24A-103105-1100	**Lab Number:**	05-1156
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/31/2005	**Sampled By:**	Client
Date Tested:	1/19/2006-01/20/2006	**Tested By:**	B. Jobity



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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Item:	54'-56'	**Project Number:**	050584
Source:	PDGE024A-103105-1300	**Lab Number:**	05-1158
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/31/2005	**Sampled By:**	Client
Date Tested:	1/17/2006-01/18/2006	**Tested By:**	B. Jobity

PARTICLE SIZE ANALYSIS BY SIEVE AND HYDROMETER METHOD

Test Method: ASTM D422

Sieve Size	Particle Diameter, mm	Percent Passing	Specification
3/8"	9.50	100.0	
#4	4.75	100.0	
#10	2.00	99.9	
#40	0.425	99.6	
#200	0.075	94.8	
Hydrometer Analysis Results	0.050	85.5	
	0.020	55.4	
	0.010	44.1	
	0.005	30.8	
	0.002	18.3	

SOIL SPECIFIC GRAVITY: 2.51 (As reported separately, or estimated.)

DISPERSION METHOD: Mechanical, 1 min.

SAND & GRAVEL PARTICLES:

Notes: Additional sieve analysis results may be reported separately.

Comments:

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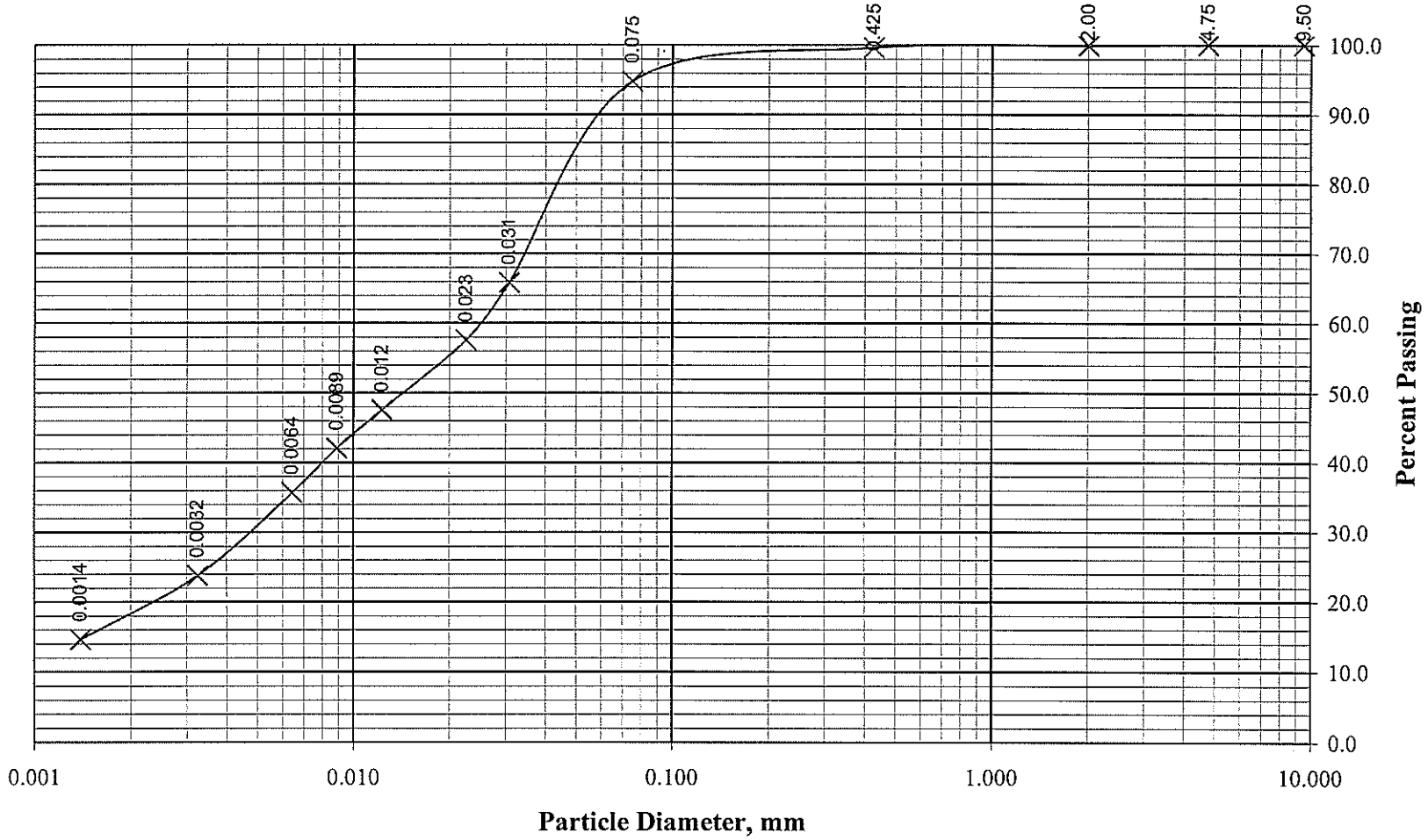
Phone/Fax: 413-232-8566

Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Item:	54'-56'	**Project Number:**	050584
Source:	PDGE024A-103105-1300	**Lab Number:**	05-1158
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/31/2005	**Sampled By:**	Client
Date Tested:	1/17/2006-01/18/2006	**Tested By:**	B. Jobity



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42 Day Farm Road, West Stockbridge, MA 01266
Phone/Fax: 413-232-8566

Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Item:	74'-76'	**Project Number:**	050584
Source:	PDGE024A-110205-1045	**Lab Number:**	05-1160
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	11/2/2005	**Sampled By:**	Client
Date Tested:	1/19/2006-01/20/2006	**Tested By:**	B. Jobity

PARTICLE SIZE ANALYSIS BY SIEVE AND HYDROMETER METHOD

Test Method: ASTM D422

Sieve Size	Particle Diameter, mm	Percent Passing	Specification
3/8"	9.50	100.0	
#4	4.75	100.0	
#10	2.00	99.7	
#40	0.425	93.6	
#200	0.075	55.4	
Hydrometer Analysis Results	0.050	47.4	
	0.020	30.1	
	0.010	25.7	
	0.005	19.7	
	0.002	13.0	

SOIL SPECIFIC GRAVITY: 2.51 (As reported separately, or estimated.)

DISPERSION METHOD: Mechanical, 1 min.

SAND & GRAVEL PARTICLES:

Notes: Additional sieve analysis results may be reported separately.

Comments:

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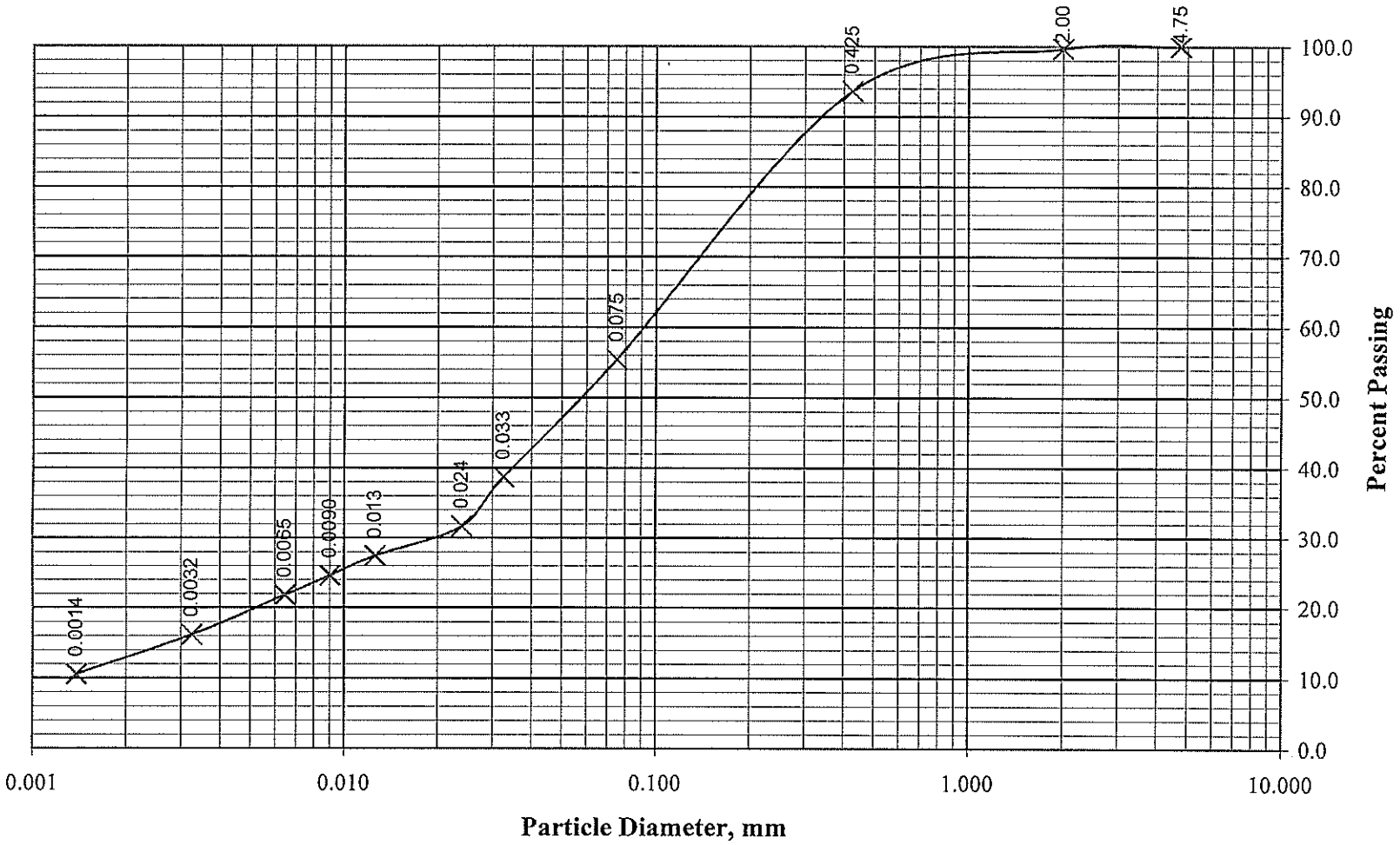
Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Item:	74'-76'	**Project Number:**	050584
Source:	PDGE024A-110205-1045	**Lab Number:**	05-1160
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	11/2/2005	**Sampled By:**	Client
Date Tested:	1/19/2006-01/20/2006	**Tested By:**	B. Jobity



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Phone/Fax: 413-232-8566

Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Item:	8-10 ft	**Project Number:**	050584
Source:	PDGE25-102605-1015	**Lab Number:**	05-1031
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/26/2005	**Sampled By:**	Client
Date Tested:	11/22/2005-11/23/2005	**Tested By:**	C. Smith

PARTICLE SIZE ANALYSIS BY SIEVE AND HYDROMETER METHOD

Test Method: ASTM D422

Sieve Size	Particle Diameter, mm	Percent Passing	Specification
1"	25	100	
3/4"	19	81.4	
1/2"	12.5	69.5	
3/8"	9.50	61.0	
#4	4.75	44.6	
#10	2.00	27.9	
#40	0.425	16.2	
#200	0.075	3.6	
Hydrometer Analysis Results	0.050	2.1	
	0.020	1.5	
	0.010	1.1	
	0.005	0.5	
	0.002	0.4	

SOIL SPECIFIC GRAVITY: 2.51 (As reported separately, or estimated.)
DISPERSION METHOD: Mechanical, 1 min.
SAND & GRAVEL PARTICLES: 0

Notes: Additional sieve analysis results may be reported separately.

Comments:

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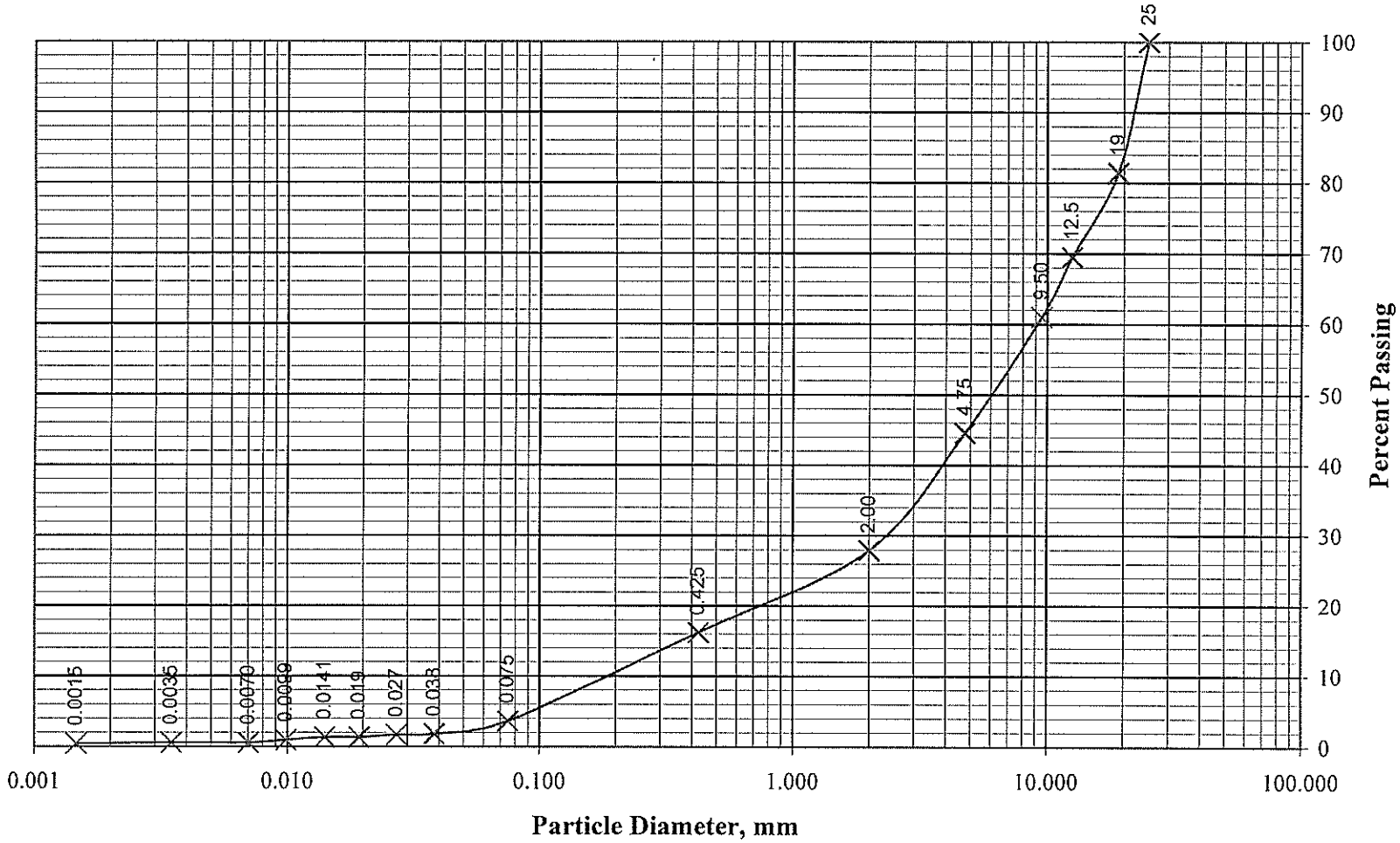
Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Item:	8-10 ft	**Project Number:**	050584
Source:	PDGE25-102605-1015	**Lab Number:**	05-1031
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/26/2005	**Sampled By:**	Client
Date Tested:	11/22/2005-11/23/2005	**Tested By:**	C. Smith



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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Item:	11-13 ft	**Project Number:**	050584
Source:	PDGE26-101705-1015	**Lab Number:**	05-1049
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/17/2005	**Sampled By:**	Client
Date Tested:	12/9/2005-12/12/2005	**Tested By:**	C. Smith

PARTICLE SIZE ANALYSIS BY SIEVE AND HYDROMETER METHOD

Test Method: ASTM D422

Sieve Size	Particle Diameter, mm	Percent Passing	Specification
3/4"	19.00	100.0	
1/2"	12.50	95.6	
3/8"	9.50	89.7	
#4	4.75	72.1	
#10	2.00	51.7	
#40	0.425	30.1	
#200	0.075	14.9	
Hydrometer Analysis Results	0.050	14.0	
	0.020	9.0	
	0.010	6.0	
	0.005	3.0	
	0.002	2.0	

SOIL SPECIFIC GRAVITY: 2.51 (As reported separately, or estimated.)

DISPERSION METHOD: Mechanical, 1 min.

SAND & GRAVEL PARTICLES:

Notes: Additional sieve analysis results may be reported separately.

Comments:

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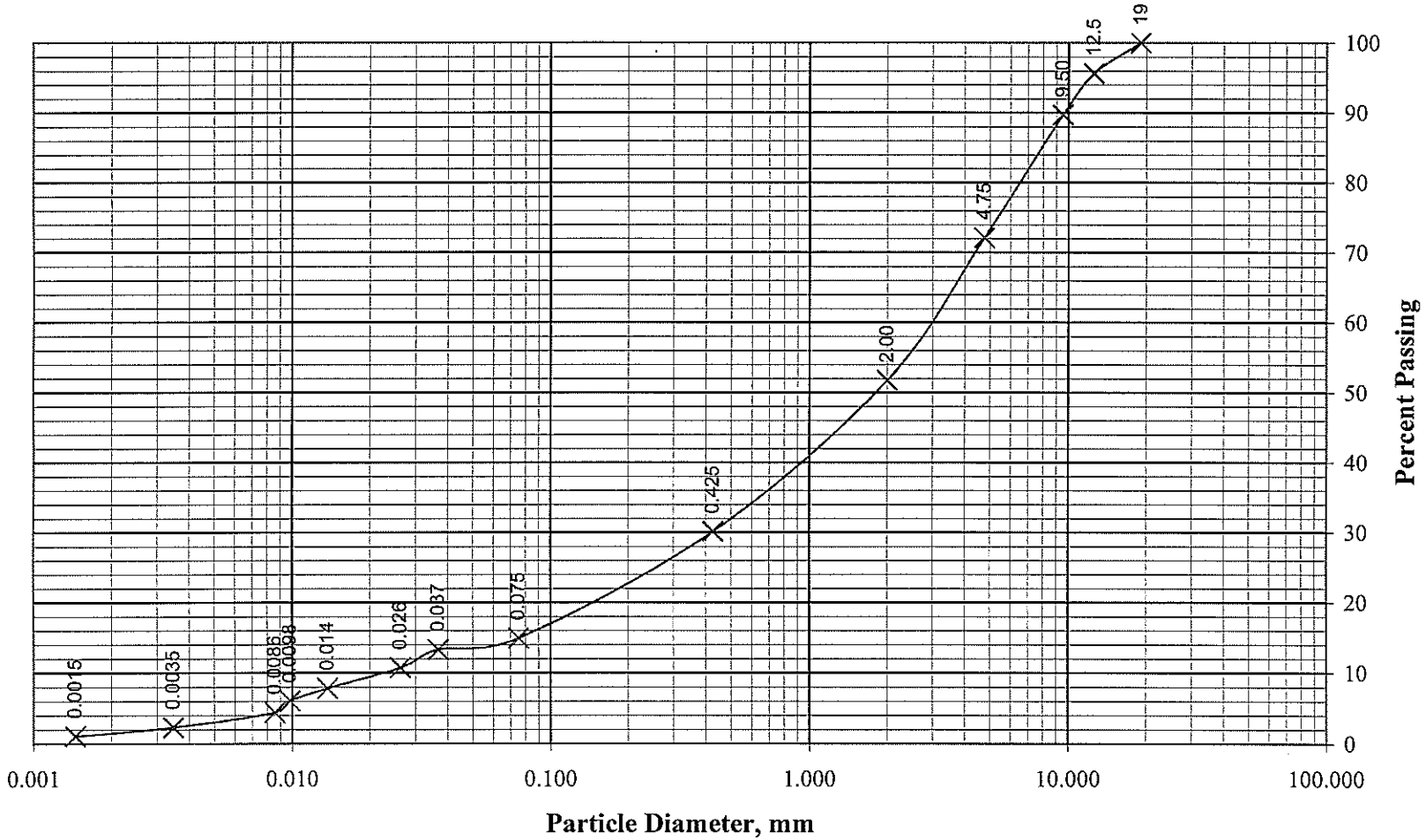
Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Item:	11-13 ft	**Project Number:**	050584
Source:	PDGE26-101705-1015	**Lab Number:**	05-1049
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/17/2005	**Sampled By:**	Client
Date Tested:	12/9/2005-12/12/2005	**Tested By:**	C. Smith



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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Item:	15-17	**Project Number:**	050584
Source:	PDGEO26-101705-1100	**Lab Number:**	05-1050
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/17/2005	**Sampled By:**	Client
Date Tested:	12/13/2005-12/14/2005	**Tested By:**	C. Smith

PARTICLE SIZE ANALYSIS BY SIEVE AND HYDROMETER METHOD

Test Method: ASTM D422

Sieve Size	Particle Diameter, mm	Percent Passing	Specification
3/4"	19.00	100.0	
1/2"	12.50	95.9	
3/8"	9.50	89.5	
#4	4.75	71.6	
#10	2.00	40.9	
#40	0.425	14.2	
#200	0.075	5.8	
Hydrometer Analysis Results	0.050	5.7	
	0.020	4.5	
	0.010	3.0	
	0.005	2.4	
	0.002	1.5	

SOIL SPECIFIC GRAVITY: 2.51 (As reported separately, or estimated.)

DISPERSION METHOD: Mechanical, 1 min.

SAND & GRAVEL PARTICLES:

Notes: Additional sieve analysis results may be reported separately.

Comments: Revised 1/4/06. Corrected percent passing 0.050mm and finer sizes.

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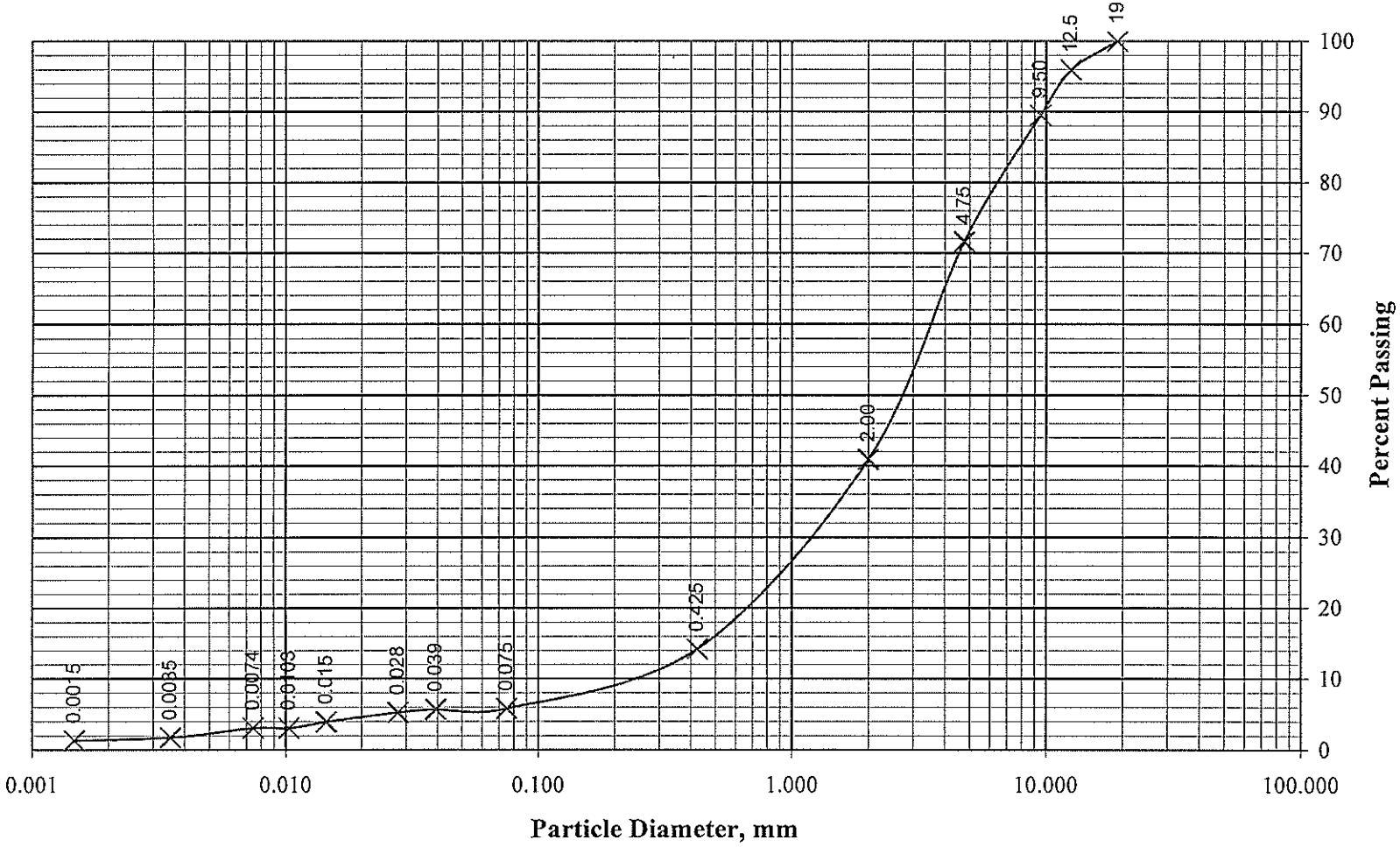
Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Item:	15-17	**Project Number:**	050584
Source:	PDGEO26-101705-1100	**Lab Number:**	05-1050
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/17/2005	**Sampled By:**	Client
Date Tested:	12/13/2005-12/14/2005	**Tested By:**	C. Smith



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Client:	**ENSR Remediation and Const.**	**Project:**	BP Hastings-on-Hudson
Material:	17-19	**Project Number:**	050584
Source:	PDGE26-101705-1130	**Lab Number:**	05-1051-1
Date Sampled:	10/17/2005	**Sampled By:**	Client
Date Tested:	12/15/2005	**Tested By:**	E.Hall

GRADATION (SIEVE ANALYSIS) OF SOIL OR AGGREGATE

Test Method(s): ASTM D422, C136, C117; AASHTO T11, T27, T88

Lab Number	Sample Type	Sampling Location	Specification
05-1051-1	17-19	In-Place	

Sieve Size		%	%	Spec. %
mm	Inches	Retain	Passing	Pass
100.0 mm	4"	0.0	100.0	
75.0 mm	3"	0.0	100.0	
62.5 mm	2 1/2"	0.0	100.0	
50.0 mm	2"	0.0	100.0	
37.5 mm	1 1/2"	0.0	100.0	
25.0 mm	1"	0.0	100.0	
19.0 mm	3/4"	0.0	100.0	
12.5 mm	1/2"	2.8	97.2	
6.32 mm	1/4"	9.2	88.0	
4.75 mm	#4	4.7	83.3	
2.00 mm	#10	21.2	62.1	
0.850 mm	#20	22.8	39.3	
0.600 mm	#30	7.9	31.4	
0.425 mm	#40	6.5	24.9	
0.180 mm	#80	10.9	14.0	
0.075 mm	#200	5.4	8.6	
Pan		8.6		

Comments: Minus #200 by wash-sieve method.

Report Reviewed By:

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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Item:	29-31	**Project Number:**	050584
Source:	PDGE26-101705-1500	**Lab Number:**	05-1052
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/17/2005	**Sampled By:**	Client
Date Tested:	12/9/2005-12/12/2005	**Tested By:**	C. Smith

PARTICLE SIZE ANALYSIS BY SIEVE AND HYDROMETER METHOD

Test Method: ASTM D422

Sieve Size	Particle Diameter, mm	Percent Passing	Specification
1/2"	12.50	100.0	
3/8"	9.50	99.1	
#4	4.75	91.7	
#10	2.00	72.0	
#40	0.425	62.0	
#200	0.075	52.2	
Hydrometer Analysis Results	0.050	49.0	
	0.020	36.0	
	0.010	26.0	
	0.005	20.0	
	0.002	10.0	

SOIL SPECIFIC GRAVITY: 2.51 (As reported separately, or estimated.)

DISPERSION METHOD: Mechanical, 1 min.

SAND & GRAVEL PARTICLES:

Notes: Additional sieve analysis results may be reported separately.

Comments:

REPORT REVIEWED BY: _____

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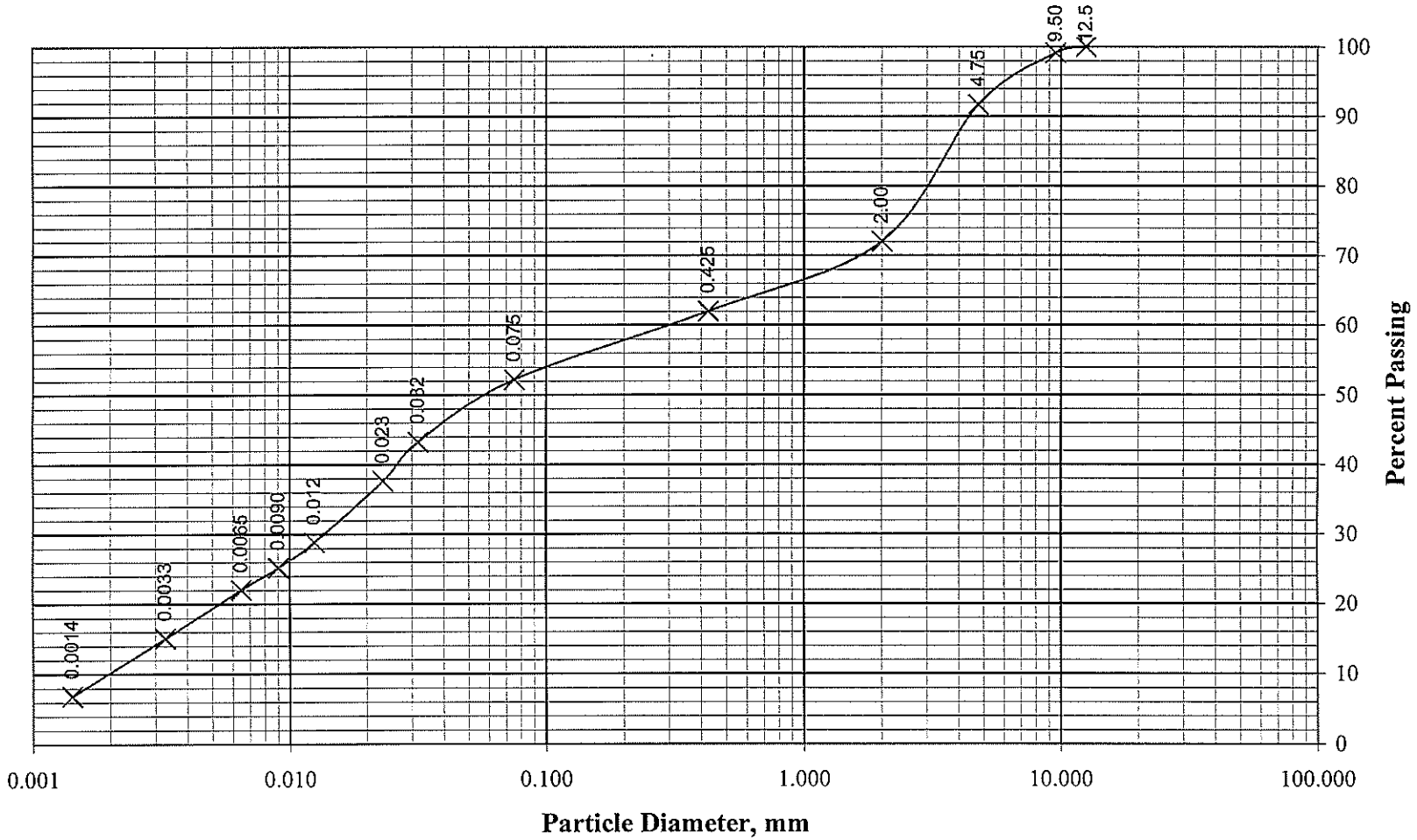
Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Item:	29-31	**Project Number:**	050584
Source:	PDGE26-101705-1500	**Lab Number:**	05-1052
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/17/2005	**Sampled By:**	Client
Date Tested:	12/9/2005-12/12/2005	**Tested By:**	C. Smith



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Client:	**ENSR Remediation and Const.**	**Project:**	BP Hastings-on-Hudson
Material:	21-23	**Project Number:**	050584
Source:	PDGE26-101705-1315	**Lab Number:**	05-1085-1
Date Sampled:	10/17/2005	**Sampled By:**	Client
Date Tested:	12/15/2005	**Tested By:**	E. Hall

GRADATION (SIEVE ANALYSIS) OF SOIL OR AGGREGATE

Test Method(s): ASTM D422, C136, C117; AASHTO T11, T27, T88

Lab Number	Sample Type	Sampling Location	Specification
05-1085-1	21-23	In-Place	

Sieve Size		%	%	Spec. %
mm	Inches	Retain	Passing	Pass
100.0 mm	4"	0.0	100.0	
75.0 mm	3"	0.0	100.0	
62.5 mm	2 1/2"	0.0	100.0	
50.0 mm	2"	0.0	100.0	
37.5 mm	1 1/2"	0.0	100.0	
25.0 mm	1"	0.0	100.0	
19.0 mm	3/4"	0.0	100.0	
12.5 mm	1/2"	1.2	98.8	
6.32 mm	1/4"	5.0	93.8	
4.75 mm	#4	3.9	89.9	
2.00 mm	#10	26.5	63.4	
0.850 mm	#20	28.2	35.2	
0.600 mm	#30	10.4	24.8	
0.425 mm	#40	8.8	16.0	
0.180 mm	#80	11.1	4.9	
0.075 mm	#200	2.3	2.6	
Pan		2.6		

Comments: Minus #200 by wash-sieve method.

Report Reviewed By: D. O'Dell

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Client:	**ENSR Remediation and Const.**	**Project:**	BP Hastings-on-Hudson
Material:	25-27	**Project Number:**	050584
Source:	PDGE26-101705-1415	**Lab Number:**	05-1086-1
Date Sampled:	10/17/2005	**Sampled By:**	Client
Date Tested:	12/15/2005	**Tested By:**	E. Hall

GRADATION (SIEVE ANALYSIS) OF SOIL OR AGGREGATE

Test Method(s): ASTM D422, C136, C117; AASHTO T11, T27, T88

Lab Number	Sample Type	Sampling Location	Specification
05-1086-1	25-27	In-Place	

Sieve Size		%	%	Spec. %
mm	Inches	Retain	Passing	Pass
100.0 mm	4"	0.0	100.0	
75.0 mm	3"	0.0	100.0	
62.5 mm	2 1/2"	0.0	100.0	
50.0 mm	2"	0.0	100.0	
37.5 mm	1 1/2"	0.0	100.0	
25.0 mm	1"	0.0	100.0	
19.0 mm	3/4"	0.0	100.0	
12.5 mm	1/2"	4.6	95.4	
6.32 mm	1/4"	15.9	79.5	
4.75 mm	#4	9.1	70.4	
2.00 mm	#10	30.9	39.5	
0.850 mm	#20	19.4	20.1	
0.600 mm	#30	3.6	16.5	
0.425 mm	#40	3.7	12.8	
0.180 mm	#80	5.6	7.2	
0.075 mm	#200	2.3	4.9	
Pan		4.9		

Comments: Minus #200 by wash-sieve method.

Report Reviewed By: D. O'Dell

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Phone/Fax: 413-232-8566

Client:	**ENSR Remediation and Const.**	**Project:**	BP Hastings-on-Hudson
Material:	5-7 ft	**Project Number:**	050584
Source:	PDGE27-101005-1515	**Lab Number:**	05-1074-1
Date Sampled:	10/10/2005	**Sampled By:**	Client
Date Tested:	12/15/2005	**Tested By:**	E.Hall

GRADATION (SIEVE ANALYSIS) OF SOIL OR AGGREGATE

Test Method(s): ASTM D422, C136, C117; AASHTO T11, T27, T88

Lab Number	Sample Type	Sampling Location	Specification
05-1074-1	5-7 ft	In-Place	

Sieve Size		%	%	Spec. %
mm	Inches	Retain	Passing	Pass
100.0 mm	4"	0.0	100.0	
75.0 mm	3"	0.0	100.0	
62.5 mm	2 1/2"	0.0	100.0	
50.0 mm	2"	0.0	100.0	
37.5 mm	1 1/2"	0.0	100.0	
25.0 mm	1"	16.3	83.7	
19.0 mm	3/4"	0.0	83.7	
12.5 mm	1/2"	5.3	78.4	
6.32 mm	1/4"	17.1	61.3	
4.75 mm	#4	4.4	56.9	
2.00 mm	#10	15.1	41.8	
0.850 mm	#20	10.3	31.5	
0.600 mm	#30	3.7	27.8	
0.425 mm	#40	4.1	23.7	
0.180 mm	#80	9.1	14.6	
0.075 mm	#200	5.9	8.7	
Pan		8.7		

Comments: Minus #200 by wash-sieve method.

Report Reviewed By:

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Phone/Fax: 413-232-8566

Client:	**ENSR Remediation and Const.**	**Project:**	BP Hastings-on-Hudson
Material:	13-15	**Project Number:**	050584
Source:	PDGE27-101005-1530	**Lab Number:**	05-1075-1
Date Sampled:	10/10/2005	**Sampled By:**	Client
Date Tested:	12/15/2005	**Tested By:**	E.hall

GRADATION (SIEVE ANALYSIS) OF SOIL OR AGGREGATE

Test Method(s): ASTM D422, C136, C117; AASHTO T11, T27, T88

Lab Number	Sample Type	Sampling Location	Specification
05-1075-1	13-15	In-Place	

Sieve Size		%	%	Spec. %
mm	Inches	Retain	Passing	Pass
100.0 mm	4"	0.0	100.0	
75.0 mm	3"	0.0	100.0	
62.5 mm	2 1/2"	0.0	100.0	
50.0 mm	2"	0.0	100.0	
37.5 mm	1 1/2"	0.0	100.0	
25.0 mm	1"	0.0	100.0	
19.0 mm	3/4"	0.0	100.0	
12.5 mm	1/2"	0.0	100.0	
6.32 mm	1/4"	6.1	93.9	
4.75 mm	#4	4.4	89.5	
2.00 mm	#10	19.7	69.8	
0.850 mm	#20	25.4	44.4	
0.600 mm	#30	9.9	34.5	
0.425 mm	#40	8.9	25.6	
0.180 mm	#80	15.1	10.5	
0.075 mm	#200	5.9	4.6	
Pan		4.6		

Comments: Minus #200 by wash-sieve method.

Report Reviewed By:

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Phone/Fax: 413-232-8566

Client:	**ENSR Remediation and Const.**	**Project:**	BP Hastings-on-Hudson
Material:	21-23	**Project Number:**	050584
Source:	PDGE27-101005-1600	**Lab Number:**	05-1076-1
Date Sampled:	10/10/2005	**Sampled By:**	Client
Date Tested:	12/15/2005	**Tested By:**	E. Hall

GRADATION (SIEVE ANALYSIS) OF SOIL OR AGGREGATE

Test Method(s): ASTM D422, C136, C117; AASHTO T11, T27, T88

Lab Number	Sample Type	Sampling Location	Specification
05-1076-1	21-23	In-Place	

Sieve Size		%	%	Spec. %
mm	Inches	Retain	Passing	Pass
100.0 mm	4"	0.0	100.0	
75.0 mm	3"	0.0	100.0	
62.5 mm	2 1/2"	0.0	100.0	
50.0 mm	2"	0.0	100.0	
37.5 mm	1 1/2"	0.0	100.0	
25.0 mm	1"	0.0	100.0	
19.0 mm	3/4"	14.7	85.3	
12.5 mm	1/2"	2.5	82.8	
6.32 mm	1/4" f	17.7	65.1	
4.75 mm	#4	7.1	58.0	
2.00 mm	#10	24.0	34.0	
0.850 mm	#20	13.4	20.6	
0.600 mm	#30	3.8	16.8	
0.425 mm	#40	3.2	13.6	
0.180 mm	#80	5.7	7.9	
0.075 mm	#200	3.1	4.8	
Pan		4.8		

Comments: Minus #200 by wash-sieve method.

Report Reviewed By:

Advance Testing
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42 Day Farm Road, West Stockbridge, MA 01266
Phone/Fax: 413-232-8566

Client:	**ENSR Remediation and Const.**	**Project:**	BP Hastings-on-Hudson
Material:	23-25	**Project Number:**	050584
Source:	PDGE27-101005-1605	**Lab Number:**	05-1077-1
Date Sampled:	10/10/2005	**Sampled By:**	Client
Date Tested:	12/15/2005	**Tested By:**	E. Hall

GRADATION (SIEVE ANALYSIS) OF SOIL OR AGGREGATE

Test Method(s): ASTM D422, C136, C117; AASHTO T11, T27, T88

Lab Number	Sample Type	Sampling Location	Specification
05-1077-1	23-25	In-Place	

Sieve Size		%	%	Spec. %
mm	Inches	Retain	Passing	Pass
100.0 mm	4"	0.0	100.0	
75.0 mm	3"	0.0	100.0	
62.5 mm	2 1/2"	0.0	100.0	
50.0 mm	2"	0.0	100.0	
37.5 mm	1 1/2"	0.0	100.0	
25.0 mm	1"	0.0	100.0	
19.0 mm	3/4"	0.0	100.0	
12.5 mm	1/2"	3.3	96.7	
6.32 mm	1/4"	13.7	83.0	
4.75 mm	#4	6.8	76.2	
2.00 mm	#10	29.1	47.1	
0.850 mm	#20	20.1	27.0	
0.600 mm	#30	5.6	21.4	
0.425 mm	#40	4.6	16.8	
0.180 mm	#80	7.5	9.3	
0.075 mm	#200	3.8	5.5	
Pan		5.5		

Comments: Minus #200 by wash-sieve method.

Report Reviewed By: D. O'Dell

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Client:	**ENSR Remediation and Const.**	**Project:**	BP Hastings-on-Hudson
Material:	29-31	**Project Number:**	050584
Source:	PDGE27-101005-1630	**Lab Number:**	05-1078-1
Date Sampled:	10/10/2005	**Sampled By:**	Client
Date Tested:	12/15/2005	**Tested By:**	E.Hall

GRADATION (SIEVE ANALYSIS) OF SOIL OR AGGREGATE

Test Method(s): ASTM D422, C136, C117; AASHTO T11, T27, T88

Lab Number	Sample Type	Sampling Location	Specification
05-1078-1	29-31	In-Place	

Sieve Size		%	%	Spec. %
mm	Inches	Retain	Passing	Pass
100.0 mm	4"	0.0	100.0	
75.0 mm	3"	0.0	100.0	
62.5 mm	2 1/2"	0.0	100.0	
50.0 mm	2"	0.0	100.0	
37.5 mm	1 1/2"	0.0	100.0	
25.0 mm	1"	0.0	100.0	
19.0 mm	3/4"	0.0	100.0	
12.5 mm	1/2"	0.0	100.0	
6.32 mm	1/4"	8.1	91.9	
4.75 mm	#4	4.4	87.5	
2.00 mm	#10	31.0	56.5	
0.850 mm	#20	24.1	32.4	
0.600 mm	#30	5.3	27.1	
0.425 mm	#40	3.7	23.4	
0.180 mm	#80	5.6	17.8	
0.075 mm	#200	4.7	13.1	
Pan		13.1		

Comments: Minus #200 by wash-sieve method.

Report Reviewed By:

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Client:	**ENSR Remediation and Const.**	**Project:**	BP Hastings-on-Hudson
Material:	17-19	**Project Number:**	050584
Source:	PDGE28-101005-0950	**Lab Number:**	05-1070-1
Date Sampled:	10/10/2005	**Sampled By:**	Client
Date Tested:	12/15/2005	**Tested By:**	E. Hall

GRADATION (SIEVE ANALYSIS) OF SOIL OR AGGREGATE

Test Method(s): ASTM D422, C136, C117; AASHTO T11, T27, T88

Lab Number	Sample Type	Sampling Location	Specification
05-1070-1	17-19	In-Place	

Sieve Size		%	%	Spec. %
mm	Inches	Retain	Passing	Pass
100.0 mm	4"	0.0	100.0	
75.0 mm	3"	0.0	100.0	
62.5 mm	2 1/2"	0.0	100.0	
50.0 mm	2"	0.0	100.0	
37.5 mm	1 1/2"	0.0	100.0	
25.0 mm	1"	0.0	100.0	
19.0 mm	3/4"	0.0	100.0	
12.5 mm	1/2"	0.0	100.0	
6.32 mm	1/4"	3.8	96.2	
4.75 mm	#4	2.8	93.4	
2.00 mm	#10	18.3	75.1	
0.850 mm	#20	23.7	51.4	
0.600 mm	#30	12.3	39.1	
0.425 mm	#40	12.0	27.1	
0.180 mm	#80	18.4	8.7	
0.075 mm	#200	3.7	5.0	
Pan		5.0		

Comments: Minus #200 by wash-sieve method.

Report Reviewed By: D. O'Dell

Advance Testing

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Client:	**ENSR Remediation and Const.**	**Project:**	BP Hastings-on-Hudson
Material:	20-22	**Project Number:**	050584
Source:	PDGE28-101005-1010	**Lab Number:**	05-1071-1
Date Sampled:	10/10/2005	**Sampled By:**	Client
Date Tested:	12/15/2005	**Tested By:**	E.Hall

GRADATION (SIEVE ANALYSIS) OF SOIL OR AGGREGATE

Test Method(s): ASTM D422, C136, C117; AASHTO T11, T27, T88

Lab Number	Sample Type	Sampling Location	Specification
05-1071-1	20-22	In-Place	

Sieve Size		%	%	Spec. %
mm	Inches	Retain	Passing	Pass
100.0 mm	4"	0.0	100.0	
75.0 mm	3"	0.0	100.0	
62.5 mm	2 1/2"	0.0	100.0	
50.0 mm	2"	0.0	100.0	
37.5 mm	1 1/2"	0.0	100.0	
25.0 mm	1"	0.0	100.0	
19.0 mm	3/4"	0.0	100.0	
12.5 mm	1/2"	3.1	96.9	
6.32 mm	1/4"	4.4	92.5	
4.75 mm	#4	2.0	90.5	
2.00 mm	#10	14.2	76.3	
0.850 mm	#20	19.9	56.4	
0.600 mm	#30	10.8	45.6	
0.425 mm	#40	11.3	34.3	
0.180 mm	#80	23.5	10.8	
0.075 mm	#200	6.1	4.7	
Pan		4.7		

Comments: Minus #200 by wash-sieve method.

Report Reviewed By:

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Client:	**ENSR Remediation and Const.**	**Project:**	BP Hastings-on-Hudson
Material:	27-29	**Project Number:**	050584
Source:	PDGE28-101005-1035	**Lab Number:**	05-1072-1
Date Sampled:	10/10/2005	**Sampled By:**	Client
Date Tested:	12/15/2005	**Tested By:**	E.Hall

GRADATION (SIEVE ANALYSIS) OF SOIL OR AGGREGATE

Test Method(s): ASTM D422, C136, C117; AASHTO T11, T27, T88

Lab Number	Sample Type	Sampling Location	Specification
05-1072-1	27-29	In-Place	

Sieve Size		%	%	Spec. %
mm	Inches	Retain	Passing	Pass
100.0 mm	4"	0.0	100.0	
75.0 mm	3"	0.0	100.0	
62.5 mm	2 1/2"	0.0	100.0	
50.0 mm	2"	0.0	100.0	
37.5 mm	1 1/2"	0.0	100.0	
25.0 mm	1"	0.0	100.0	
19.0 mm	3/4"	0.0	100.0	
12.5 mm	1/2"	0.0	100.0	
6.32 mm	1/4"	3.5	96.5	
4.75 mm	#4	2.0	94.5	
2.00 mm	#10	17.6	76.9	
0.850 mm	#20	25.0	51.9	
0.600 mm	#30	13.8	38.1	
0.425 mm	#40	14.0	24.1	
0.180 mm	#80	18.2	5.9	
0.075 mm	#200	3.2	2.7	
Pan		2.7		

Comments: Minus #200 by wash-sieve method.

Report Reviewed By:

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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Item:	69-71	**Project Number:**	050584
Source:	PDGEO28-101105-1050	**Lab Number:**	05-1073
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/10/2005	**Sampled By:**	Client
Date Tested:	1/10/2006-01/11/2006	**Tested By:**	B. Jobity

PARTICLE SIZE ANALYSIS BY SIEVE AND HYDROMETER METHOD

Test Method: ASTM D422

Sieve Size	Particle Diameter, mm	Percent Passing	Specification
3/8"	9.50	100.0	
#4	4.75	95.4	
#10	2.00	91.6	
#40	0.425	74.1	
#200	0.075	16.2	
Hydrometer Analysis Results	0.050	12.1	
	0.020	8.1	
	0.010	7.8	
	0.005	6.0	
	0.002	3.7	

SOIL SPECIFIC GRAVITY: 2.51 (As reported separately, or estimated.)

DISPERSION METHOD: Mechanical, 1 min.

SAND & GRAVEL PARTICLES:

Notes: Revised 1/19/06 - Sample depth corrected.

Comments:

REPORT REVIEWED BY: _____

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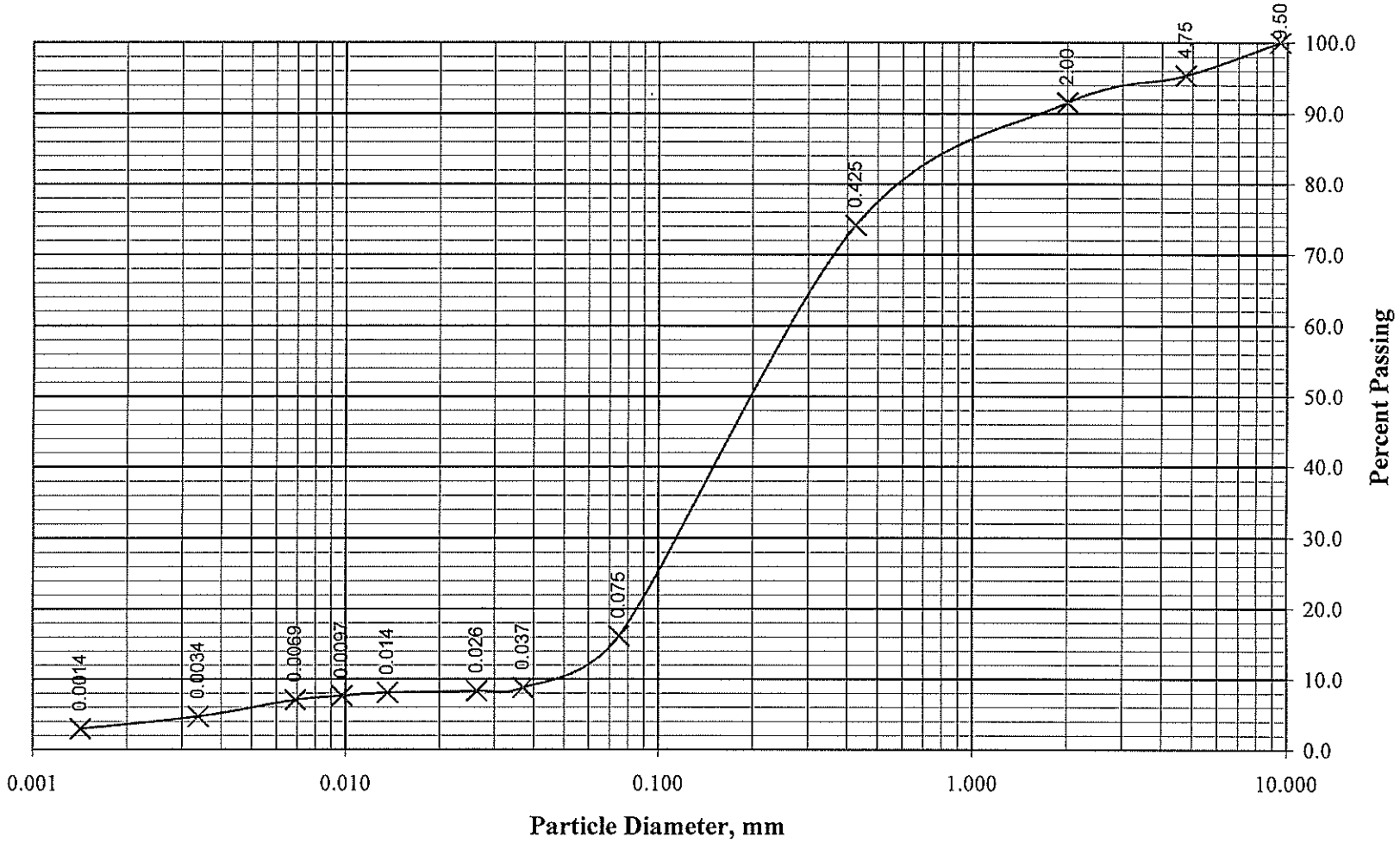
Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Item:	69-71	**Project Number:**	050584
Source:	PDGEO28-101105-1050	**Lab Number:**	05-1073
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/10/2005	**Sampled By:**	Client
Date Tested:	1/10/2006-01/11/2006	**Tested By:**	B. Jobity



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NOTE: Revised 1/19/06 - Sample depth corrected.

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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Item:	101105-0920	**Project Number:**	050584
Source:	PDGEO28, 50'-52'	**Lab Number:**	05-0916
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/11/2005	**Sampled By:**	Client
Date Tested:	11/17/2005-11/18/2005	**Tested By:**	C. Smith

PARTICLE SIZE ANALYSIS BY SIEVE AND HYDROMETER METHOD

Test Method: ASTM D422

Sieve Size	Particle Diameter, mm	Percent Passing	Specification
3/8"	9.50	99.6	
#4	4.75	98.7	
#10	2.00	97.8	
#40	0.425	93.6	
#200	0.075	75.0	
Hydrometer Analysis Results	0.050	67.0	
	0.020	53.0	
	0.010	34.0	
	0.005	23.0	
	0.002	18.0	

SOIL SPECIFIC GRAVITY: 2.51 (As reported separately, or estimated.)

DISPERSION METHOD: Mechanical, 1 min.

SAND & GRAVEL PARTICLES:

Notes: Additional sieve analysis results may be reported separately.

Comments:

REPORT REVIEWED BY: _____

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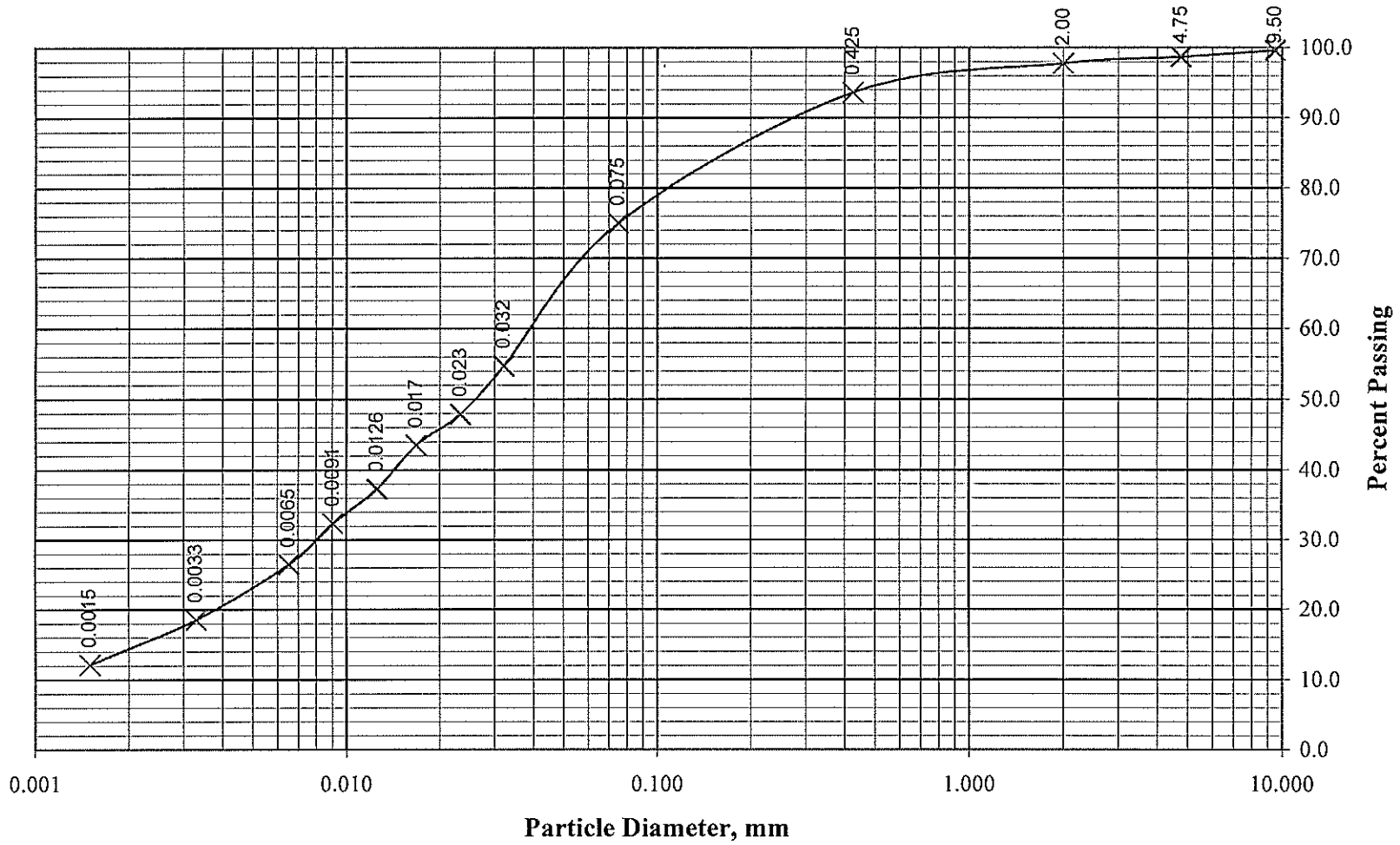
Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Item:	101105-0920	**Project Number:**	050584
Source:	PDGEO28, 50'-52'	**Lab Number:**	05-0916
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/11/2005	**Sampled By:**	Client
Date Tested:	11/17/2005-11/18/2005	**Tested By:**	C. Smith



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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Item:	101005-1315	**Project Number:**	050584
Source:	PDGEO28, 37'-39'	**Lab Number:**	05-0931
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/10/2005	**Sampled By:**	Client
Date Tested:	11/17/2005-11/18/2005	**Tested By:**	C. Smith

PARTICLE SIZE ANALYSIS BY SIEVE AND HYDROMETER METHOD

Test Method: ASTM D422

Sieve Size	Particle Diameter, mm	Percent Passing	Specification
3/8"	9.50	95.5	
#4	4.75	95.1	
#10	2.00	94.9	
#40	0.425	94.5	
#200	0.075	82.3	
Hydrometer Analysis Results	0.050	72.0	
	0.020	54.0	
	0.010	32.0	
	0.005	22.0	
	0.002	16.0	

SOIL SPECIFIC GRAVITY: 2.51 (As reported separately, or estimated.)

DISPERSION METHOD: Mechanical, 1 min.

SAND & GRAVEL PARTICLES: Sand, shell fragments

Notes: Additional sieve analysis results may be reported separately.

Comments:

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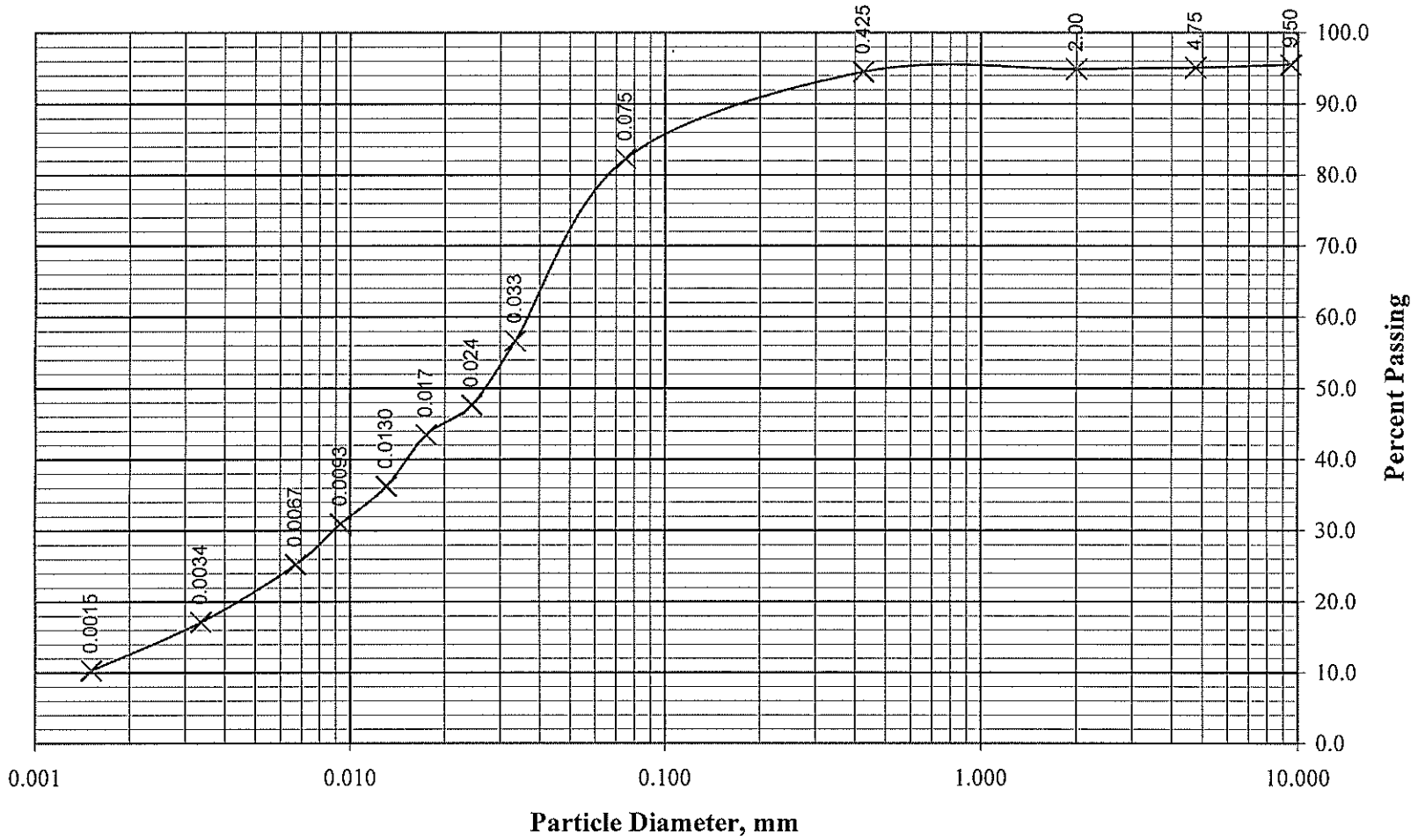
Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Item:	101005-1315	**Project Number:**	050584
Source:	PDGEO28, 37'-39'	**Lab Number:**	05-0931
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/10/2005	**Sampled By:**	Client
Date Tested:	11/17/2005-11/18/2005	**Tested By:**	C. Smith



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Client:	**ENSR Remediation and Const.**	**Project:**	BP Hastings-on-Hudson
Material:	5-7 ft	**Project Number:**	050584
Source:	PDGE29-102105-0800	**Lab Number:**	05-1081-1
Date Sampled:	10/21/2005	**Sampled By:**	Client
Date Tested:	12/15/2005	**Tested By:**	E,Hall

GRADATION (SIEVE ANALYSIS) OF SOIL OR AGGREGATE

Test Method(s): ASTM D422, C136, C117; AASHTO T11, T27, T88

Lab Number	Sample Type	Sampling Location	Specification
05-1081-1	5-7 ft	In-Place	

Sieve Size		%	%	Spec. %
mm	Inches	Retain	Passing	Pass
100.0 mm	4"	0.0	100.0	
75.0 mm	3"	0.0	100.0	
62.5 mm	2 1/2"	0.0	100.0	
50.0 mm	2"	0.0	100.0	
37.5 mm	1 1/2"	0.0	100.0	
25.0 mm	1"	0.0	100.0	
19.0 mm	3/4"	6.7	93.3	
12.5 mm	1/2"	2.0	91.3	
6.32 mm	1/4"	15.1	76.2	
4.75 mm	#4	4.5	71.7	
2.00 mm	#10	16.0	55.7	
0.850 mm	#20	12.5	43.2	
0.600 mm	#30	4.6	38.6	
0.425 mm	#40	4.7	33.9	
0.180 mm	#80	10.5	23.4	
0.075 mm	#200	7.2	16.2	
Pan		16.2		

Comments: Minus #200 by wash-sieve method.

Report Reviewed By:

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Client:	**ENSR Remediation and Const.**	**Project:**	BP Hastings-on-Hudson
Material:	9-11 ft	**Project Number:**	050584
Source:	PDGE29-102105-0815	**Lab Number:**	05-1082-1
Date Sampled:	10/21/2005	**Sampled By:**	Client
Date Tested:	12/15/2005	**Tested By:**	E.hall

GRADATION (SIEVE ANALYSIS) OF SOIL OR AGGREGATE

Test Method(s): ASTM D422, C136, C117; AASHTO T11, T27, T88

Lab Number	Sample Type	Sampling Location	Specification
05-1082-1	9-11 ft	In-Place	

Sieve Size		%	%	Spec. %
mm	Inches	Retain	Passing	Pass
100.0 mm	4"	0.0	100.0	
75.0 mm	3"	0.0	100.0	
62.5 mm	2 1/2"	0.0	100.0	
50.0 mm	2"	0.0	100.0	
37.5 mm	1 1/2"	0.0	100.0	
25.0 mm	1"	0.0	100.0	
19.0 mm	3/4"	3.3	96.7	
12.5 mm	1/2"	4.7	92.0	
6.32 mm	1/4"	15.2	76.8	
4.75 mm	#4	4.5	72.3	
2.00 mm	#10	18.1	54.2	
0.850 mm	#20	13.9	40.3	
0.600 mm	#30	4.8	35.5	
0.425 mm	#40	5.1	30.4	
0.180 mm	#80	10.4	20.0	
0.075 mm	#200	7.4	12.6	
Pan		12.6		

Comments: Minus #200 by wash-sieve method.

Report Reviewed By:

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Phone/Fax: 413-232-8566

Client:	**ENSR Remediation and Const.**	**Project:**	BP Hastings-on-Hudson
Material:	13-15	**Project Number:**	050584
Source:	PDGE29-102105-0850	**Lab Number:**	05-1083-1
Date Sampled:	10/21/2005	**Sampled By:**	Client
Date Tested:	12/15/2005	**Tested By:**	E. Hall

GRADATION (SIEVE ANALYSIS) OF SOIL OR AGGREGATE

Test Method(s): ASTM D422, C136, C117; AASHTO T11, T27, T88

Lab Number	Sample Type	Sampling Location	Specification
05-1083-1	13-15	In-Place	

Sieve Size		%	%	Spec. %
mm	Inches	Retain	Passing	Pass
100.0 mm	4"	0.0	100.0	
75.0 mm	3"	0.0	100.0	
62.5 mm	2 1/2"	0.0	100.0	
50.0 mm	2"	0.0	100.0	
37.5 mm	1 1/2"	0.0	100.0	
25.0 mm	1"	0.0	100.0	
19.0 mm	3/4"	0.0	100.0	
12.5 mm	1/2"	19.9	80.1	
6.32 mm	1/4"	2.4	77.7	
4.75 mm	#4	1.5	76.2	
2.00 mm	#10	14.6	61.6	
0.850 mm	#20	19.4	42.2	
0.600 mm	#30	7.5	34.7	
0.425 mm	#40	7.1	27.6	
0.180 mm	#80	13.5	14.1	
0.075 mm	#200	6.5	7.6	
Pan		7.6		

Comments: Minus #200 by wash-sieve method.

Report Reviewed By:

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Client:	**ENSR Remediation and Const.**	**Project:**	BP Hastings-on-Hudson
Material:	17-19	**Project Number:**	050584
Source:	PDGE29-102105-0910	**Lab Number:**	05-1084-1
Date Sampled:	10/21/2005	**Sampled By:**	Client
Date Tested:	12/15/2005	**Tested By:**	E.Hall

GRADATION (SIEVE ANALYSIS) OF SOIL OR AGGREGATE

Test Method(s): ASTM D422, C136, C117; AASHTO T11, T27, T88

Lab Number	Sample Type	Sampling Location	Specification
05-1084-1	17-19	In-Place	

Sieve Size		%	%	Spec. %
mm	Inches	Retain	Passing	Pass
100.0 mm	4"	0.0	100.0	
75.0 mm	3"	0.0	100.0	
62.5 mm	2 1/2"	0.0	100.0	
50.0 mm	2"	0.0	100.0	
37.5 mm	1 1/2"	0.0	100.0	
25.0 mm	1"	0.0	100.0	
19.0 mm	3/4"	0.0	100.0	
12.5 mm	1/2"	8.8	91.2	
6.32 mm	1/4"	19.2	72.0	
4.75 mm	#4	9.1	62.9	
2.00 mm	#10	27.5	35.4	
0.850 mm	#20	13.0	22.4	
0.600 mm	#30	3.5	18.9	
0.425 mm	#40	3.3	15.6	
0.180 mm	#80	5.8	9.8	
0.075 mm	#200	3.2	6.6	
Pan		6.6		

Comments: Minus #200 by wash-sieve method.

Report Reviewed By:

Advance Testing
3348 Route 208, Campbell Hall, NY 10916
Phone: 845-496-1600 Fax: 845-496-1398
42 Day Farm Road, West Stockbridge, MA 01266
Phone/Fax: 413-232-8566

Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Item:	25-27	**Project Number:**	050584
Source:	PDGEO29-102105-0950	**Lab Number:**	05-1063
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/21/2005	**Sampled By:**	Client
Date Tested:	12/15/2005-12/16/2005	**Tested By:**	C. Smith

PARTICLE SIZE ANALYSIS BY SIEVE AND HYDROMETER METHOD

Test Method: ASTM D422

Sieve Size	Particle Diameter, mm	Percent Passing	Specification
3/8"	9.50	100.0	
#4	4.75	85.0	
#10	2.00	40.6	
#40	0.425	5.2	
#200	0.075	3.0	
Hydrometer Analysis Results	0.050	2.3	
	0.020	2.0	
	0.010	1.7	
	0.005	1.4	
	0.002	1.1	

SOIL SPECIFIC GRAVITY: 2.51 (As reported separately, or estimated.)

DISPERSION METHOD: Mechanical, 1 min.

SAND & GRAVEL PARTICLES: Sand, shell fragments, traces coal and glass

Notes: Additional sieve analysis results may be reported separately.

Comments:

No specifications available at time of testing.

REPORT REVIEWED BY: _____

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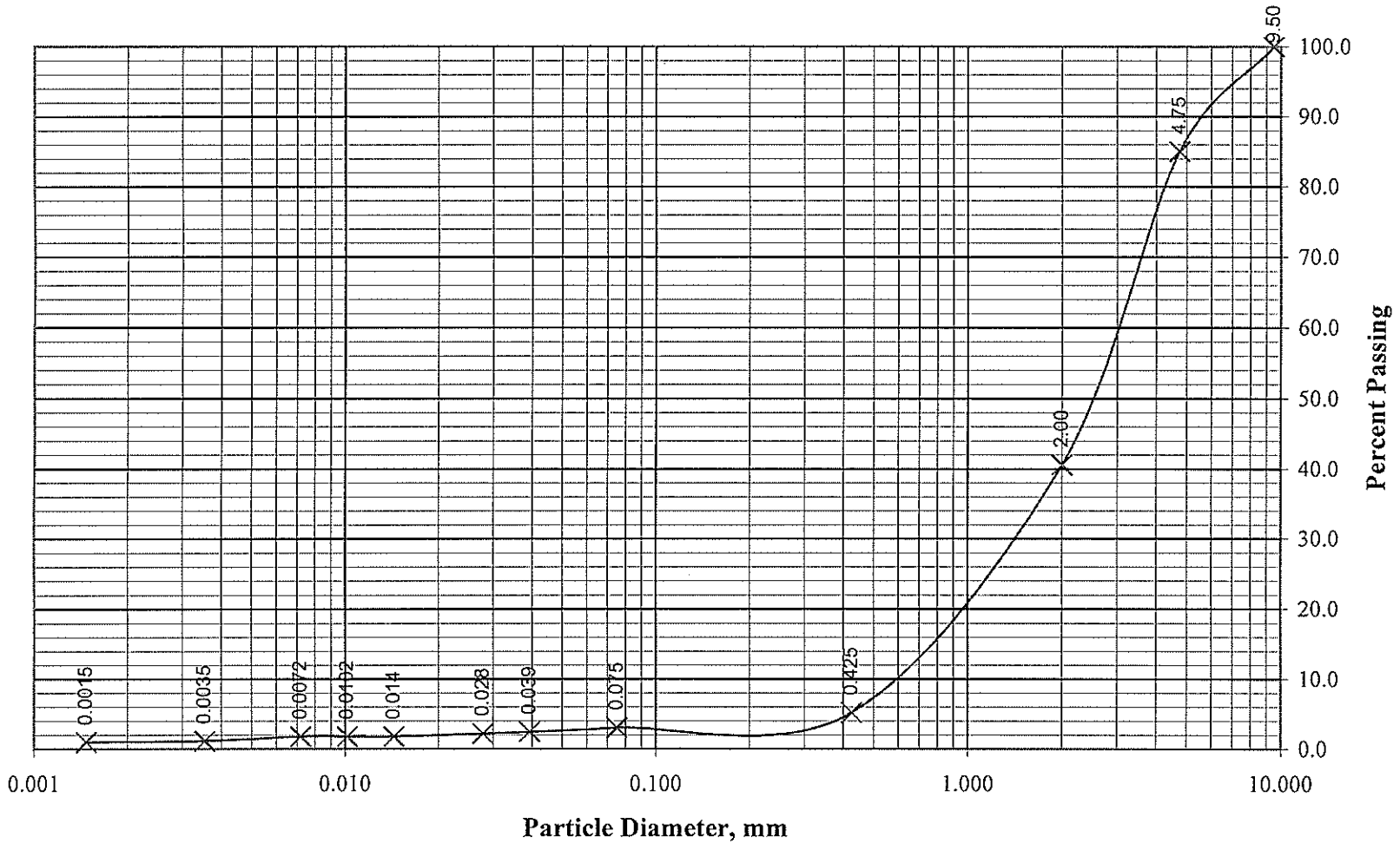
Phone/Fax: 413-232-8566

Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Item:	25-27	**Project Number:**	050584
Source:	PDGEO29-102105-0950	**Lab Number:**	05-1063
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/21/2005	**Sampled By:**	Client
Date Tested:	12/15/2005-12/16/2005	**Tested By:**	C. Smith



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Phone/Fax: 413-232-8566

Client:	**ENSR Remediation and Const.**	**Project:**	BP Hastings-on-Hudson
Material:	21-23	**Project Number:**	050584
Source:	PDGE29-102105-0930	**Lab Number:**	05-1045-1
Date Sampled:	10/21/2005	**Sampled By:**	Client
Date Tested:	12/15/2005	**Tested By:**	E.Hall

GRADATION (SIEVE ANALYSIS) OF SOIL OR AGGREGATE

Test Method(s): ASTM D422, C136, C117; AASHTO T11, T27, T88

Lab Number	Sample Type	Sampling Location	Specification
05-1045-1	21-23	In-Place	

Sieve Size		%	%	Spec. %
mm	Inches	Retain	Passing	Pass
100.0 mm	4"	0.0	100.0	
75.0 mm	3"	0.0	100.0	
62.5 mm	2 1/2"	0.0	100.0	
50.0 mm	2"	0.0	100.0	
37.5 mm	1 1/2"	0.0	100.0	
25.0 mm	1"	0.0	100.0	
19.0 mm	3/4"	8.6	91.4	
12.5 mm	1/2"	3.1	88.3	
6.32 mm	1/4"	6.7	81.6	
4.75 mm	#4	7.0	74.6	
2.00 mm	#10	25.0	49.6	
0.850 mm	#20	20.7	28.9	
0.600 mm	#30	5.5	23.4	
0.425 mm	#40	4.4	19.0	
0.180 mm	#80	7.7	11.3	
0.075 mm	#200	4.2	7.1	
Pan		7.1		

Comments: Minus #200 by wash-sieve method.

Report Reviewed By:

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42 Day Farm Road, West Stockbridge, MA 01266
Phone/Fax: 413-232-8566

Client:	**ENSR Remediation and Const.**	**Project:**	BP Hastings-on-Hudson
Material:	29-31	**Project Number:**	050584
Source:	PDGE29-102105-1010	**Lab Number:**	05-1046-1
Date Sampled:	10/21/2005	**Sampled By:**	Client
Date Tested:	12/15/2005	**Tested By:**	E.Hall

GRADATION (SIEVE ANALYSIS) OF SOIL OR AGGREGATE

Test Method(s): ASTM D422, C136, C117; AASHTO T11, T27, T88

Lab Number	Sample Type	Sampling Location	Specification
05-1046-1	29-31	In-Place	

Sieve Size		%	%	Spec. %
mm	Inches	Retain	Passing	Pass
100.0 mm	4"	0.0	100.0	
75.0 mm	3"	0.0	100.0	
62.5 mm	2 1/2"	0.0	100.0	
50.0 mm	2"	0.0	100.0	
37.5 mm	1 1/2"	0.0	100.0	
25.0 mm	1"	0.0	100.0	
19.0 mm	3/4"	0.0	100.0	
12.5 mm	1/2"	6.9	93.1	
6.32 mm	1/4"	19.1	74.0	
4.75 mm	#4	3.9	70.1	
2.00 mm	#10	18.9	51.2	
0.850 mm	#20	15.0	36.2	
0.600 mm	#30	5.1	31.1	
0.425 mm	#40	4.9	26.2	
0.180 mm	#80	9.7	16.5	
0.075 mm	#200	6.4	10.1	
Pan		10.1		

Comments: Minus #200 by wash-sieve method.

Report Reviewed By:

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Phone/Fax: 413-232-8566

Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Item:	45'-47'	**Project Number:**	050584
Source:	PDGE029-102505-0245	**Lab Number:**	05-1155
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/25/2005	**Sampled By:**	Client
Date Tested:	1/19/2006-01/20/2006	**Tested By:**	B. Jobity

PARTICLE SIZE ANALYSIS BY SIEVE AND HYDROMETER METHOD

Test Method: ASTM D422

Sieve Size	Particle Diameter, mm	Percent Passing	Specification
3/8"	9.50	100.0	
#4	4.75	100.0	
#10	2.00	100.0	
#40	0.425	94.0	
#200	0.075	79.1	
Hydrometer Analysis Results	0.050	72.0	
	0.020	49.7	
	0.010	34.3	
	0.005	21.0	
	0.002	12.7	

SOIL SPECIFIC GRAVITY: 2.51 (As reported separately, or estimated.)

DISPERSION METHOD: Mechanical, 1 min.

SAND & GRAVEL PARTICLES:

Notes: Additional sieve analysis results may be reported separately.

Comments:

REPORT REVIEWED BY: _____

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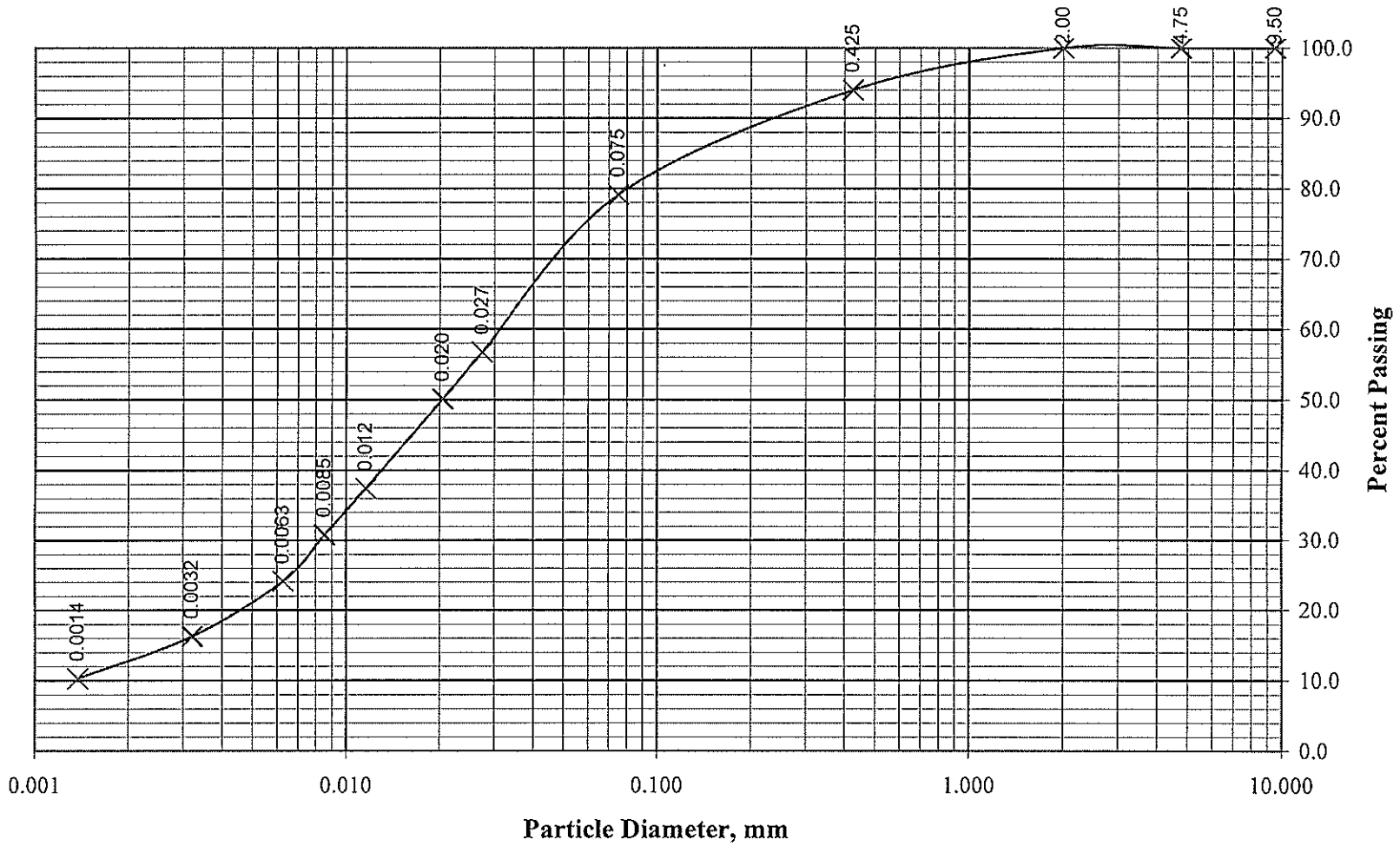
Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Item:	45'-47'	**Project Number:**	050584
Source:	PDGE029-102505-0245	**Lab Number:**	05-1155
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/25/2005	**Sampled By:**	Client
Date Tested:	1/19/2006-01/20/2006	**Tested By:**	B. Jobity



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Phone/Fax: 413-232-8566

Client:	**ENSR Remediation and Const.**	**Project:**	BP Hastings-on-Hudson
Material:	33-35	**Project Number:**	050584
Source:	PDGE29-102105-1030	**Lab Number:**	05-1047-1
Date Sampled:	10/21/2005	**Sampled By:**	Client
Date Tested:	12/15/2005	**Tested By:**	E.Hall

GRADATION (SIEVE ANALYSIS) OF SOIL OR AGGREGATE

Test Method(s): ASTM D422, C136, C117; AASHTO T11, T27, T88

Lab Number	Sample Type	Sampling Location	Specification
05-1047-1	33-35	In-Place	

Sieve Size		%	%	Spec. %
mm	Inches	Retain	Passing	Pass
100.0 mm	4"	0.0	100.0	
75.0 mm	3"	0.0	100.0	
62.5 mm	2 1/2"	0.0	100.0	
50.0 mm	2"	0.0	100.0	
37.5 mm	1 1/2"	0.0	100.0	
25.0 mm	1"	0.0	100.0	
19.0 mm	3/4"	0.0	100.0	
12.5 mm	1/2"	0.0	100.0	
6.32 mm	1/4"	6.3	93.7	
4.75 mm	#4	6.8	86.9	
2.00 mm	#10	32.3	54.6	
0.850 mm	#20	24.0	30.6	
0.600 mm	#30	5.7	24.9	
0.425 mm	#40	4.9	20.0	
0.180 mm	#80	8.6	11.4	
0.075 mm	#200	4.8	6.6	
Pan		6.6		

Comments: Minus #200 by wash-sieve method.

Report Reviewed By:

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Phone/Fax: 413-232-8566

Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Item:	35-37	**Project Number:**	050584
Source:	PDGE29-102105-1040	**Lab Number:**	05-1048
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/21/2005	**Sampled By:**	Client
Date Tested:	11/25/2005-11/26/2005	**Tested By:**	C. Smith

PARTICLE SIZE ANALYSIS BY SIEVE AND HYDROMETER METHOD

Test Method: ASTM D422

Sieve Size	Particle Diameter, mm	Percent Passing	Specification
1/2"	12.5	100	
3/8"	9.50	95.7	
#4	4.75	75.5	
#10	2.00	36.8	
#40	0.425	9.8	
#200	0.075	3.1	
Hydrometer Analysis Results	0.050	2.6	
	0.020	2.3	
	0.010	1.4	
	0.005	0.7	
	0.002	0.3	

SOIL SPECIFIC GRAVITY: 2.51 (As reported separately, or estimated.)

DISPERSION METHOD: Mechanical, 1 min.

SAND & GRAVEL PARTICLES:

Notes: Additional sieve analysis results may be reported separately.

Comments:

REPORT REVIEWED BY: D. O'Dell

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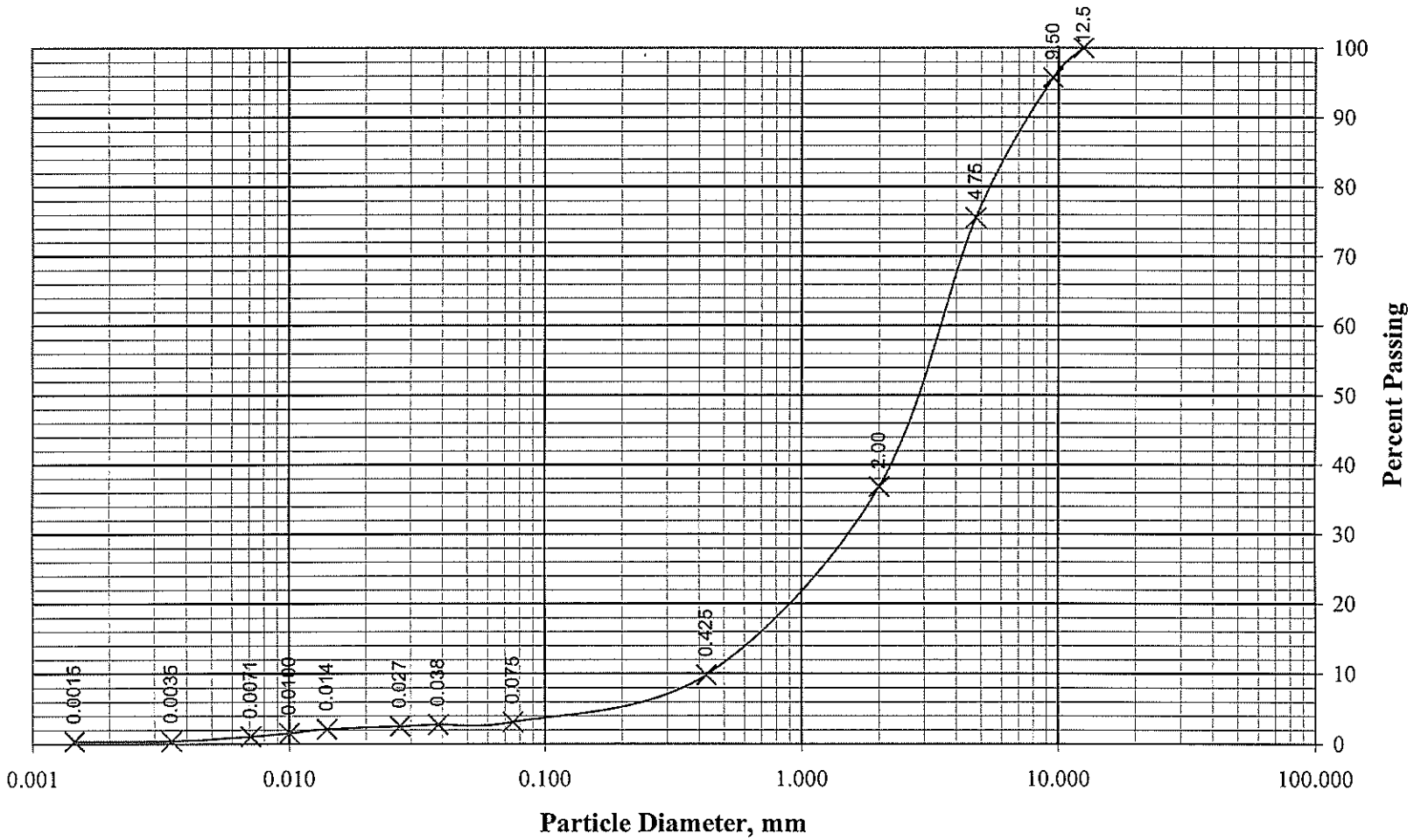
Phone/Fax: 413-232-8566

Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Item:	35-37	**Project Number:**	050584
Source:	PDGE29-102105-1040	**Lab Number:**	05-1048
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/21/2005	**Sampled By:**	Client
Date Tested:	11/25/2005-11/26/2005	**Tested By:**	C. Smith



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Phone/Fax: 413-232-8566

Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Item:	12-14 ft	**Project Number:**	050584
Source:	PDGE30-101805-1000	**Lab Number:**	05-1028
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/18/2005	**Sampled By:**	Client
Date Tested:	11/17/2005-11/18/2005	**Tested By:**	C. Smith

PARTICLE SIZE ANALYSIS BY SIEVE AND HYDROMETER METHOD

Test Method: ASTM D422

Sieve Size	Particle Diameter, mm	Percent Passing	Specification
3/8"	9.50	98.3	
#4	4.75	91.2	
#10	2.00	83.0	
#40	0.425	67.9	
#200	0.075	53.9	
Hydrometer Analysis Results	0.050	50.0	
	0.020	42.0	
	0.010	26.0	
	0.005	15.0	
	0.002	10.0	

SOIL SPECIFIC GRAVITY: 2.51 (As reported separately, or estimated.)

DISPERSION METHOD: Mechanical, 1 min.

SAND & GRAVEL PARTICLES:

Notes: Additional sieve analysis results may be reported separately.

Comments:

REPORT REVIEWED BY: _____

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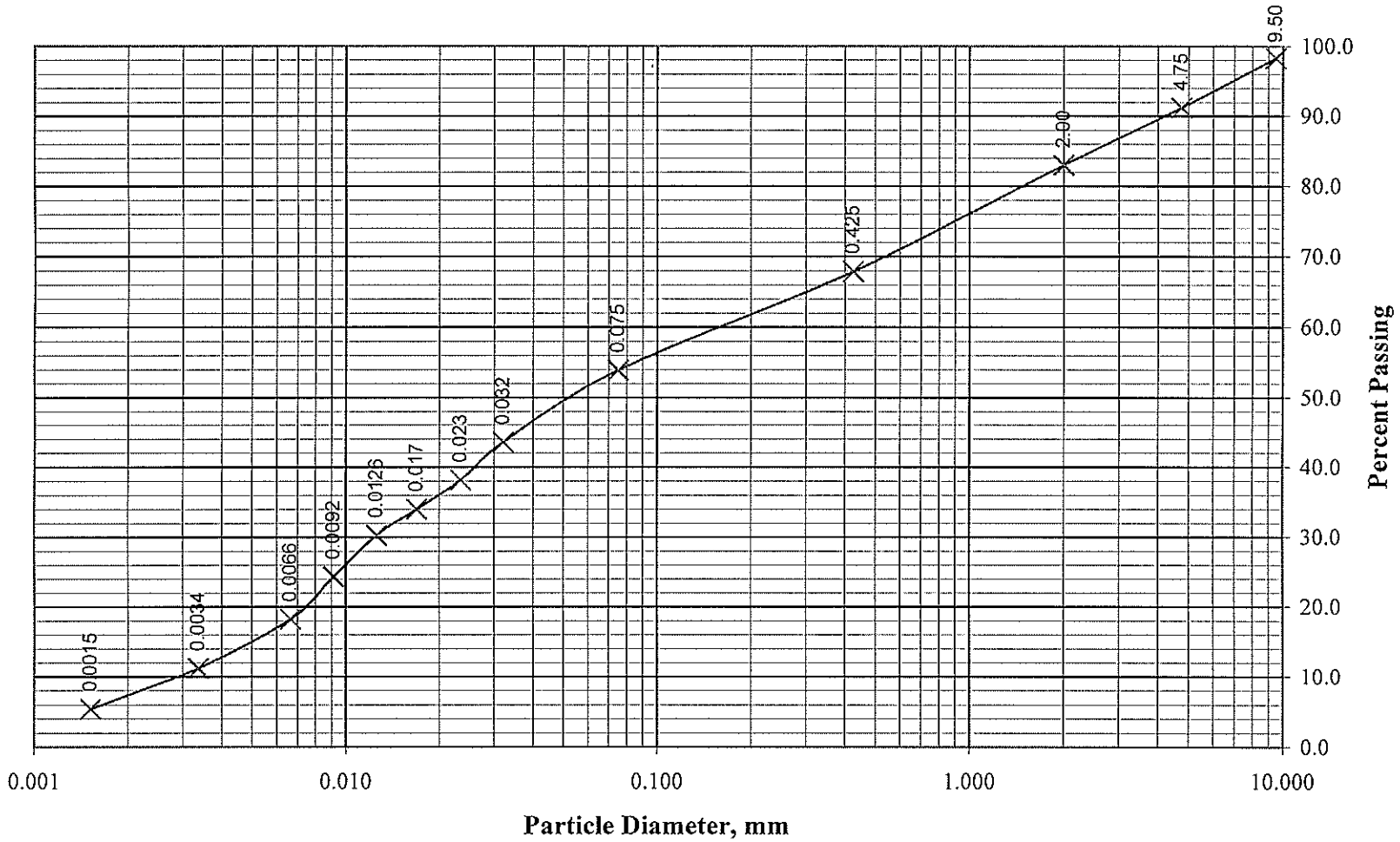
Phone/Fax: 413-232-8566

Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Item:	12-14 ft	**Project Number:**	050584
Source:	PDGE30-101805-1000	**Lab Number:**	05-1028
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/18/2005	**Sampled By:**	Client
Date Tested:	11/17/2005-11/18/2005	**Tested By:**	C. Smith



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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Item:	17-19	**Project Number:**	050584
Source:	PDGE30-101805-1030	**Lab Number:**	05-1029
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/18/2005	**Sampled By:**	Client
Date Tested:	11/17/2005-11/18/2005	**Tested By:**	C. Smith

PARTICLE SIZE ANALYSIS BY SIEVE AND HYDROMETER METHOD

Test Method: ASTM D422

Sieve Size	Particle Diameter, mm	Percent Passing	Specification
3/8"	9.50	100.0	
#4	4.75	99.6	
#10	2.00	99.5	
#40	0.425	99.4	
#200	0.075	94.8	
Hydrometer Analysis Results	0.050	91.0	
	0.020	83.0	
	0.010	59.0	
	0.005	37.0	
	0.002	28.0	

SOIL SPECIFIC GRAVITY: 2.51 (As reported separately, or estimated.)

DISPERSION METHOD: Mechanical, 1 min.

SAND & GRAVEL PARTICLES:

Notes: Additional sieve analysis results may be reported separately.

Comments:

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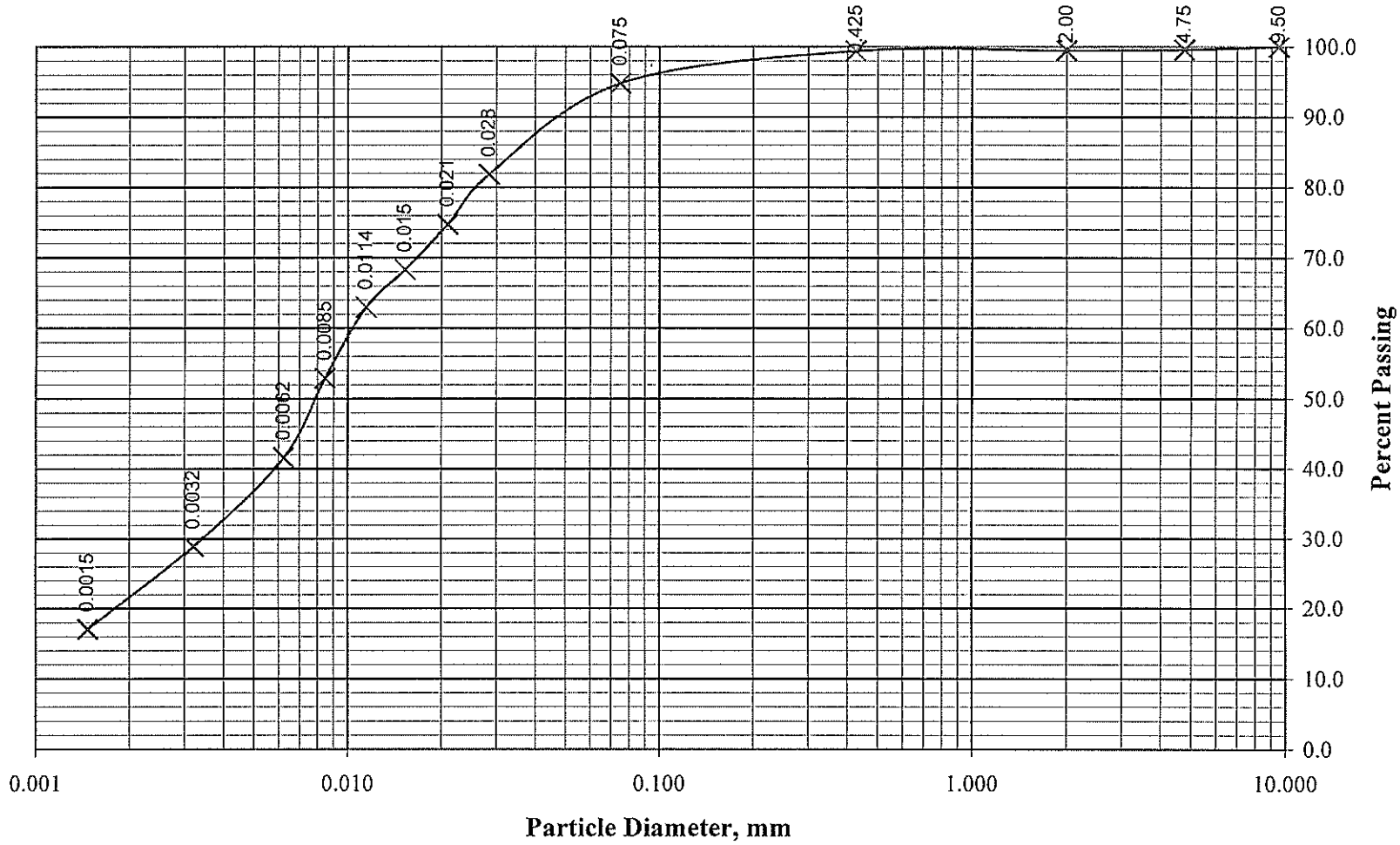
Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Item:	17-19	**Project Number:**	050584
Source:	PDGE30-101805-1030	**Lab Number:**	05-1029
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/18/2005	**Sampled By:**	Client
Date Tested:	11/17/2005-11/18/2005	**Tested By:**	C. Smith



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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Item:	27-29	**Project Number:**	050584
Source:	PDGE30-101805-1145	**Lab Number:**	05-1030
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/18/2005	**Sampled By:**	Client
Date Tested:	11/22/2005-11/23/2005	**Tested By:**	C. Smith

PARTICLE SIZE ANALYSIS BY SIEVE AND HYDROMETER METHOD

Test Method: ASTM D422

Sieve Size	Particle Diameter, mm	Percent Passing	Specification
3/8"	9.50	100.0	
#4	4.75	100.0	
#10	2.00	100.0	
#40	0.425	99.8	
#200	0.075	97.9	
Hydrometer Analysis Results	0.050	93.7	
	0.020	77.3	
	0.010	62.4	
	0.005	44.0	
	0.002	26.3	

SOIL SPECIFIC GRAVITY: 2.51 (As reported separately, or estimated.)

DISPERSION METHOD: Mechanical, 1 min.

SAND & GRAVEL PARTICLES:

Notes: Additional sieve analysis results may be reported separately.

Comments:

REPORT REVIEWED BY: _____

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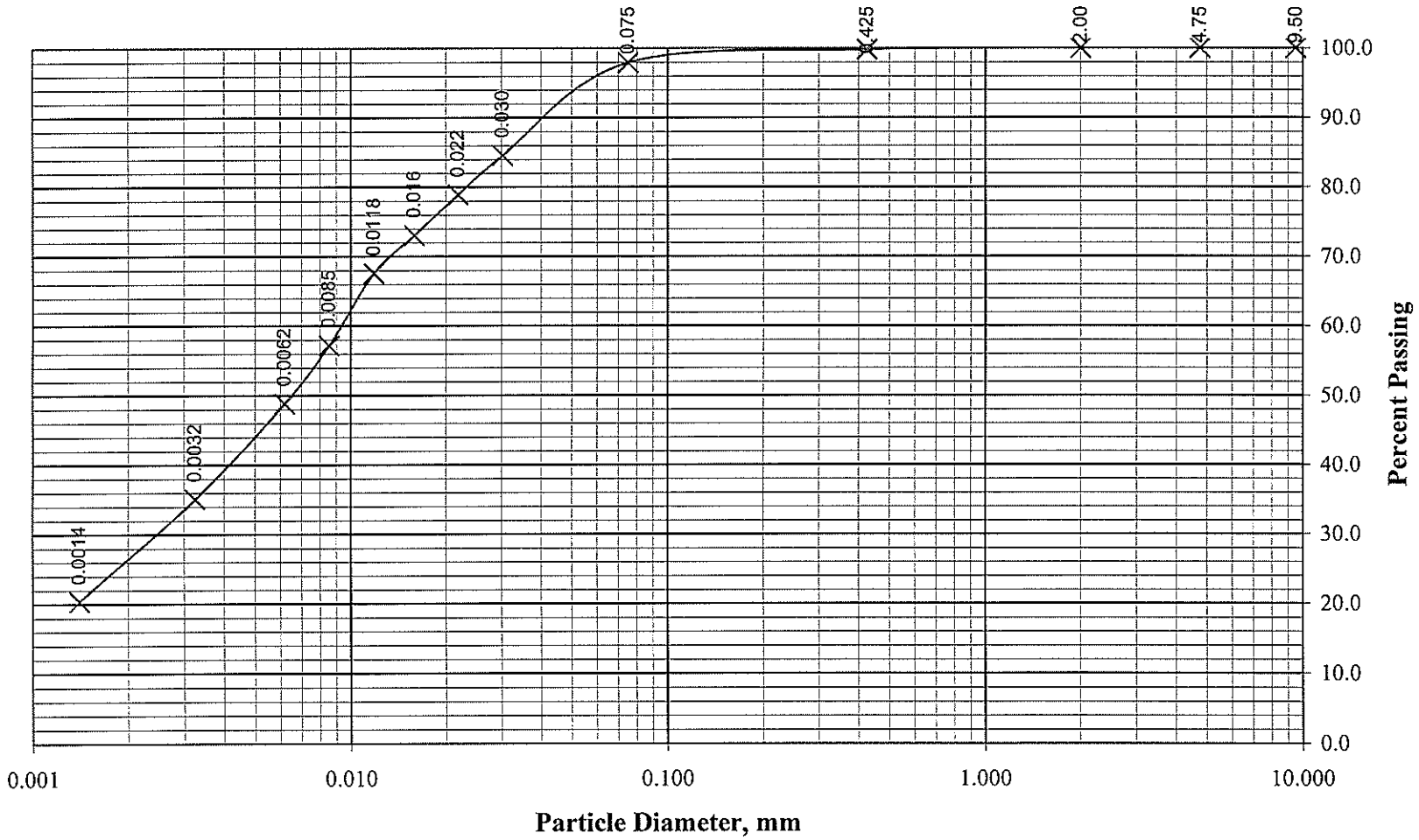
Phone/Fax: 413-232-8566

Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Item:	27-29	**Project Number:**	050584
Source:	PDGE30-101805-1145	**Lab Number:**	05-1030
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/18/2005	**Sampled By:**	Client
Date Tested:	11/22/2005-11/23/2005	**Tested By:**	C. Smith



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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Item:	32'-34'	**Project Number:**	050584
Source:	PDGE30-101805-1445	**Lab Number:**	05-1002
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/18/2005	**Sampled By:**	Client
Date Tested:	12/21/2005-12/22/2005	**Tested By:**	M. Kennedy

PARTICLE SIZE ANALYSIS BY SIEVE AND HYDROMETER METHOD

Test Method: None

Sieve Size	Particle Diameter, mm	Percent Passing	Specification
3/8"	9.50	100.0	
#4	4.75	99.2	
#10	2.00	97.4	
#40	0.425	90.4	
#200	0.075	55.7	
Hydrometer Analysis Results	0.050	49.4	
	0.020	37.6	
	0.010	29.6	
	0.005	19.4	
	0.002	11.6	

SOIL SPECIFIC GRAVITY: 2.51 (As reported separately, or estimated.)

DISPERSION METHOD: Mechanical, 1 min.

SAND & GRAVEL PARTICLES: Sand, shell fragments

Notes: Additional sieve analysis results may be reported separately.

Comments:

REPORT REVIEWED BY: _____

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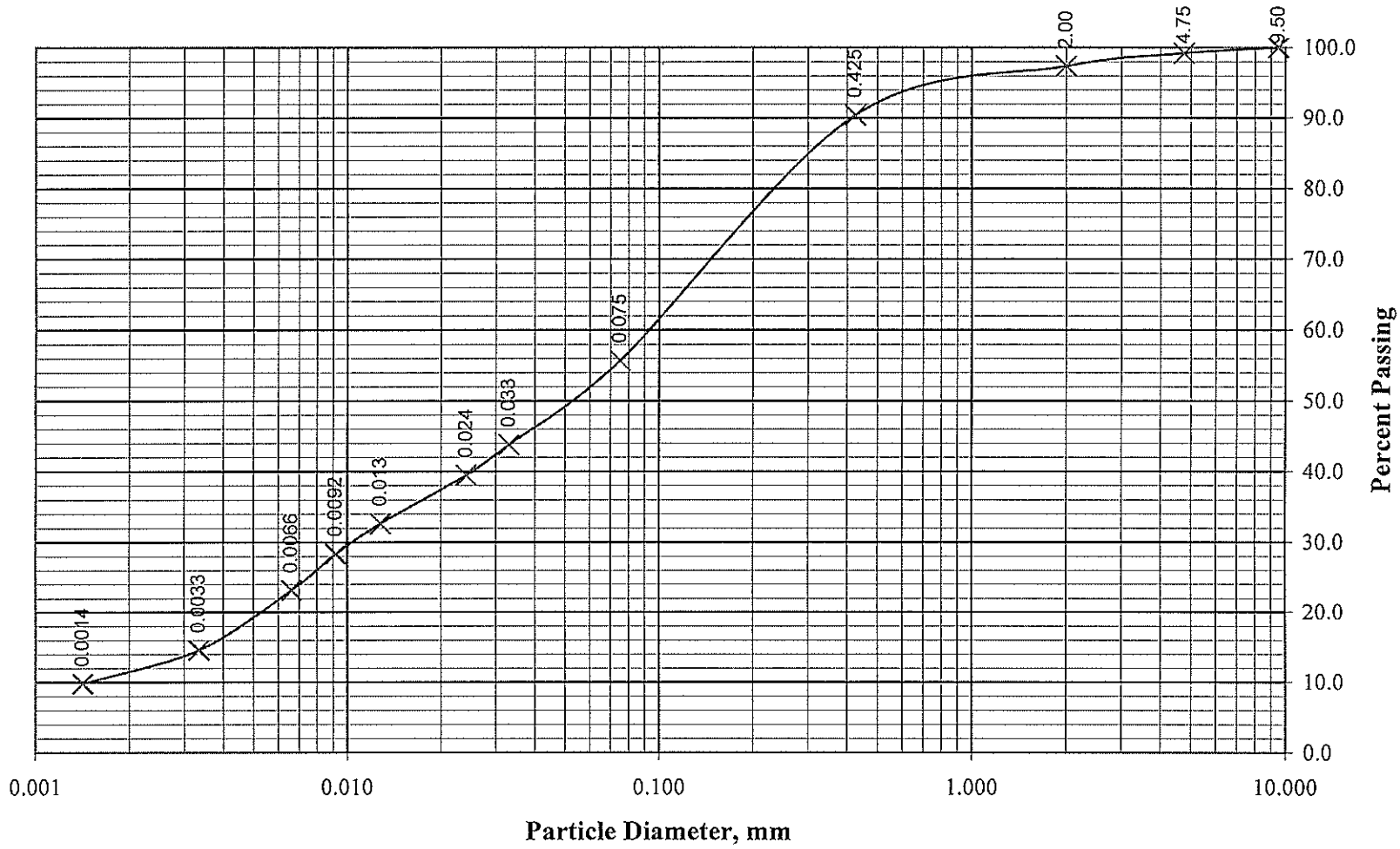
Phone/Fax: 413-232-8566

Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Item:	32'-34'	**Project Number:**	050584
Source:	PDGE30-101805-1445	**Lab Number:**	05-1002
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/18/2005	**Sampled By:**	Client
Date Tested:	12/21/2005-12/22/2005	**Tested By:**	M. Kennedy



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Phone/Fax: 413-232-8566

Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Item:	5-7 ft	**Project Number:**	050584
Source:	PDGEO31-102005-0930	**Lab Number:**	05-1087
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/20/2005	**Sampled By:**	Client
Date Tested:	1/10/2006-01/11/2006	**Tested By:**	B. Jobity

PARTICLE SIZE ANALYSIS BY SIEVE AND HYDROMETER METHOD

Test Method: ASTM D422

Sieve Size	Particle Diameter, mm	Percent Passing	Specification
3/4"	19.5	100.0	
3/8"	9.50	77.2	
#4	4.75	59.6	
#10	2.00	40.3	
#40	0.425	24.2	
#200	0.075	10.5	
Hydrometer Analysis Results	0.050	8.4	
	0.020	6.4	
	0.010	4.3	
	0.005	2.5	
	0.002	1.3	

SOIL SPECIFIC GRAVITY: 2.51 (As reported separately, or estimated.)

DISPERSION METHOD: Mechanical, 1 min.

SAND & GRAVEL PARTICLES:

Notes: Additional sieve analysis results may be reported separately.

Comments: Revised 1/19/06 - Sample ID Corrected

REPORT REVIEWED BY: _____

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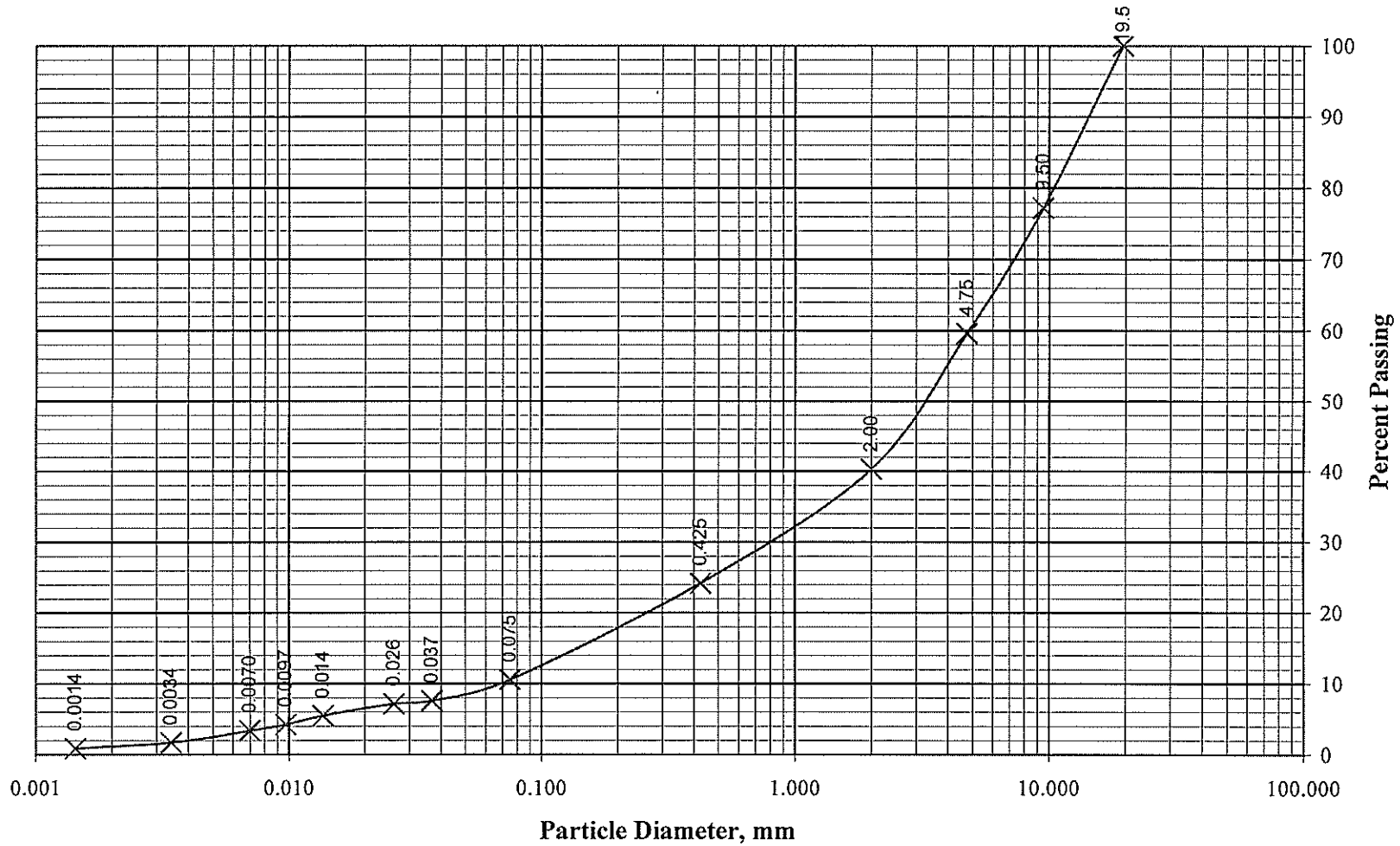
42 Day Farm Road, West Stockbridge, MA 01266
Phone/Fax: 413-232-8566

Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Item:	5-7 ft	**Project Number:**	050584
Source:	PDGEO31-102005-0930	**Lab Number:**	05-1087
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/20/2005	**Sampled By:**	Client
Date Tested:	1/10/2006-01/11/2006	**Tested By:**	B. Jobity



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NOTE: Revised 1/19/06 - Sample ID Corrected

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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Item:	20-22'	**Project Number:**	050584
Source:	PDGE31-102005-1115	**Lab Number:**	05-1011
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/20/2005	**Sampled By:**	Client
Date Tested:	12/28/2005-12/29/2005	**Tested By:**	M. Kennedy

PARTICLE SIZE ANALYSIS BY SIEVE AND HYDROMETER METHOD

Test Method: ASTM D422

Sieve Size	Particle Diameter, mm	Percent Passing	Specification
3/8"	9.50	100.0	
#4	4.75	100.0	
#10	2.00	100.0	
#40	0.425	99.5	
#200	0.075	94.8	
Hydrometer Analysis Results	0.050	90.3	
	0.020	69.9	
	0.010	49.2	
	0.005	33.5	
	0.002	16.2	

SOIL SPECIFIC GRAVITY: 2.51 (As reported separately, or estimated.)

DISPERSION METHOD: Mechanical, 1 min.

SAND & GRAVEL PARTICLES:

Notes: Additional sieve analysis results may be reported separately.

Comments:

REPORT REVIEWED BY: _____

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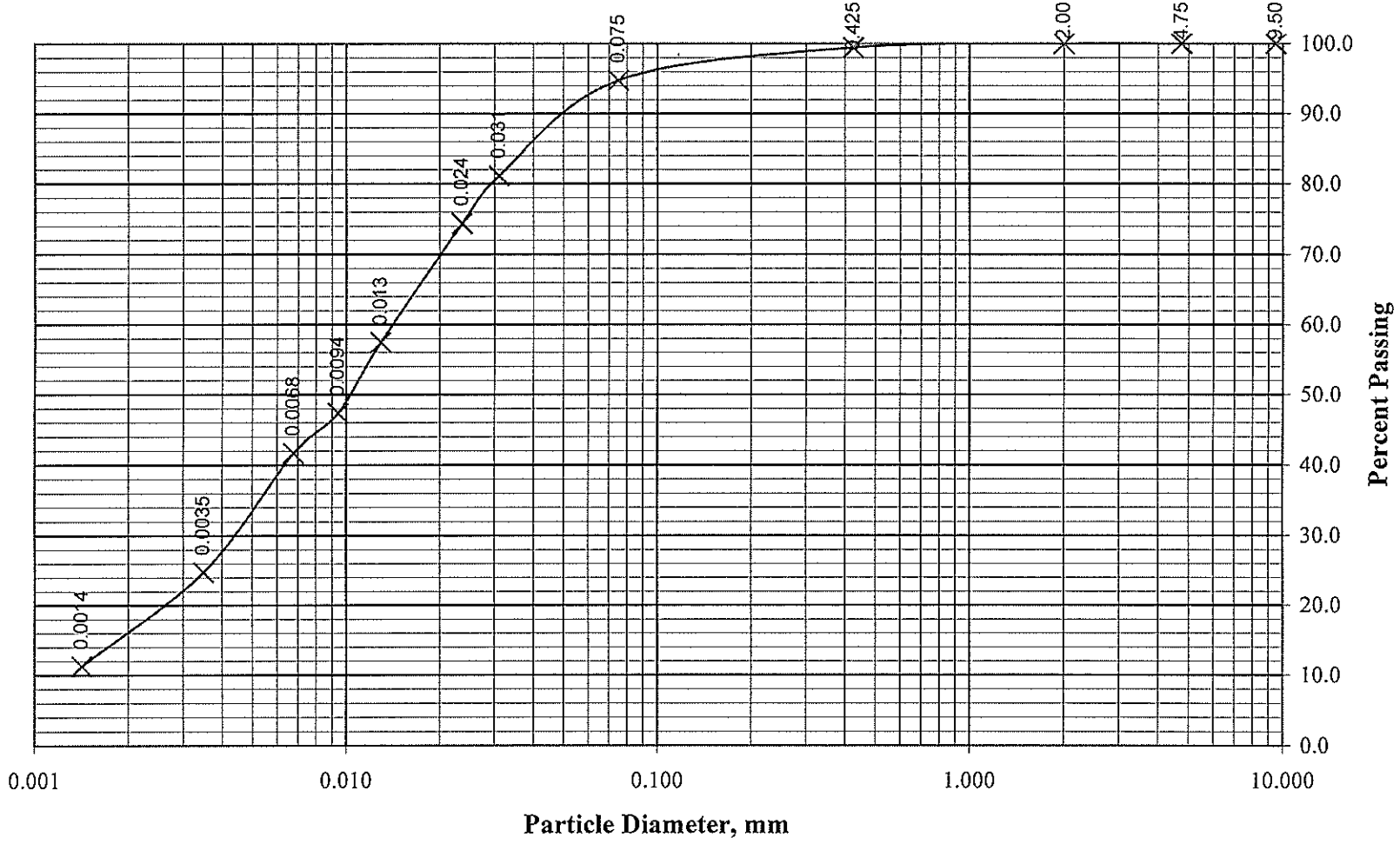
Phone/Fax: 413-232-8566

Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Item:	20-22'	**Project Number:**	050584
Source:	PDGE31-102005-1115	**Lab Number:**	05-1011
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/20/2005	**Sampled By:**	Client
Date Tested:	12/28/2005-12/29/2005	**Tested By:**	M. Kennedy



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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Item:	30'-32'	**Project Number:**	050584
Source:	PDGE31-102005-1415	**Lab Number:**	05-1013
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/20/2005	**Sampled By:**	Client
Date Tested:	12/21/2005-12/22/2005	**Tested By:**	M. Kennedy

PARTICLE SIZE ANALYSIS BY SIEVE AND HYDROMETER METHOD

Test Method: ASTM D422

Sieve Size	Particle Diameter, mm	Percent Passing	Specification
3/8"	9.50	100.0	
#4	4.75	100.0	
#10	2.00	100.0	
#40	0.425	99.6	
#200	0.075	93.2	
Hydrometer Analysis Results	0.050	84.8	
	0.020	53.5	
	0.010	37.5	
	0.005	23.5	
	0.002	15.6	

SOIL SPECIFIC GRAVITY: 2.51 (As reported separately, or estimated.)

DISPERSION METHOD: Mechanical, 1 min.

SAND & GRAVEL PARTICLES:

Notes: Additional sieve analysis results may be reported separately.

Comments:

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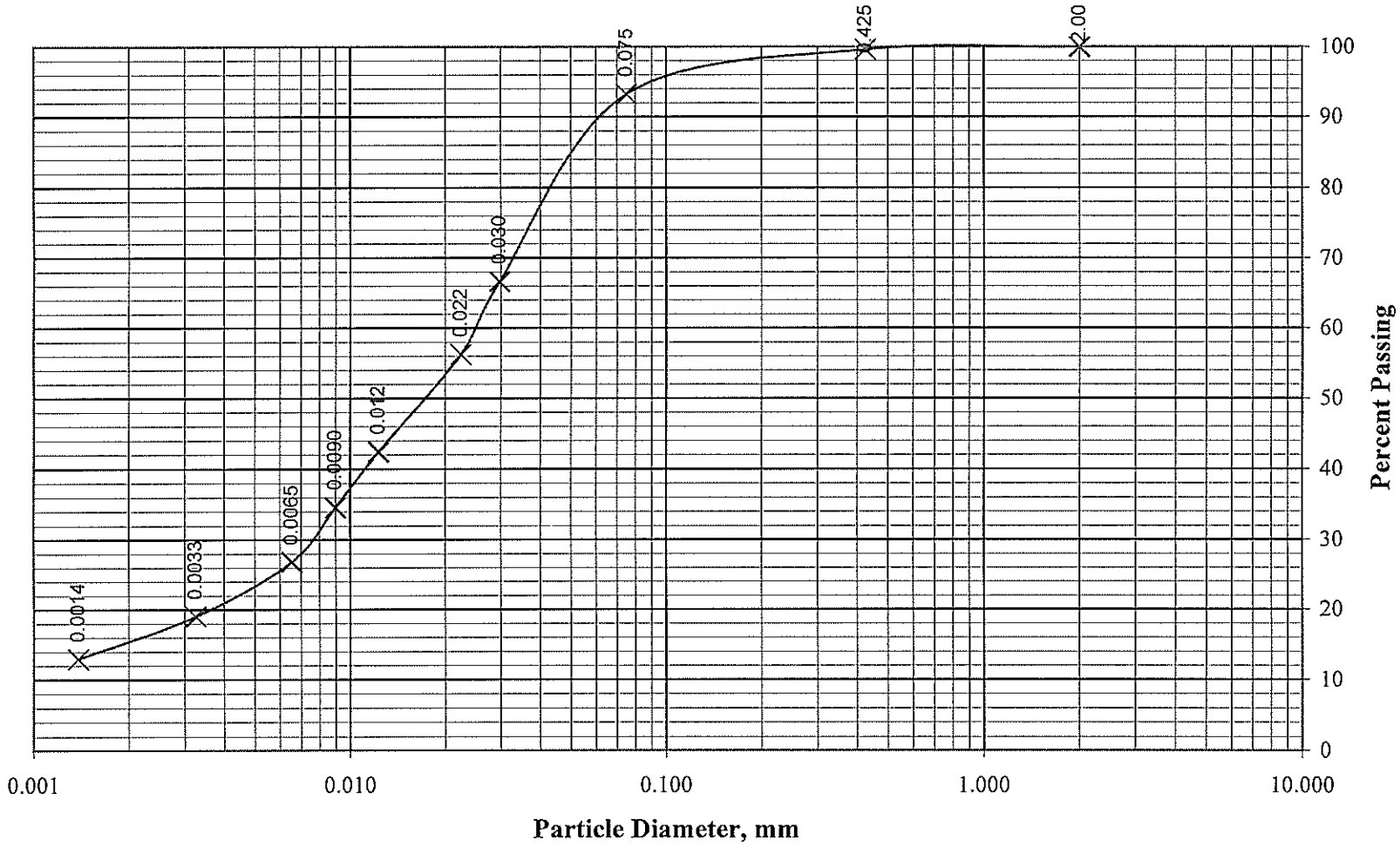
Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Item:	30'-32'	**Project Number:**	050584
Source:	PDGE31-102005-1415	**Lab Number:**	05-1013
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/20/2005	**Sampled By:**	Client
Date Tested:	12/21/2005-12/22/2005	**Tested By:**	M. Kennedy



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Organic Content

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Phone: 413-232-4040 Fax: 413-232-4141

Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Material:	092205-1400	**Project Num:**	050584
Source:	PDGEO-1 U1, 35-37'	**Lab Number:**	05-0856
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/3/2005	**Sampled By:**	H&A
Date Tested:	10/10/2005	**Tested By:**	C. Smith

Report of Organic Content of Soils

Test Method: ASTM D2974 Method C

Ash Content: 95.5 %

Organic Content: 4.5 %

Specification: _____

Comments:

Report Reviewed By: _____

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Phone: 413-232-4040 Fax: 413-232-4141

Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Material:	092205-1355	**Project Num:**	050584
Source:	PDGEO-1, U-3, 52-54'	**Lab Number:**	05-0858
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	9/26/2005	**Sampled By:**	H&A
Date Tested:	10/14/2005	**Tested By:**	C. Smith

Report of Organic Content of Soils

Test Method: ASTM D2974 Method C

Ash Content: 97.0 %

Organic Content: 3.0 %

Specification: _____

Comments:

Report Reviewed By: _____

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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Material:	092205-1110	**Project Num:**	050584
Source:	PDGEO-4, U-1, 36-38'	**Lab Number:**	05-0859
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	9/28/2005	**Sampled By:**	H&A
Date Tested:	C.Smith	**Tested By:**	38639

Report of Organic Content of Soils

Test Method: ASTM D2974 Method C

Ash Content: 95.6 %

Organic Content: 4.4 %

Specification: _____

Comments:

Report Reviewed By: _____

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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Material:	100305-1005	**Project Num:**	050584
Source:	PDGEO4, 44'-46'	**Lab Number:**	05-0925
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/8/2005	**Sampled By:**	Client
Date Tested:	11/17/2005	**Tested By:**	C. Smith

Report of Organic Content of Soils

Test Method: ASTM D2974 Method C

Ash Content: 97.7 %

Organic Content: 2.3 %

Specification: _____

Comments:

No specifications available at time of testing.

Report Reviewed By: _____

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Phone/Fax: 413-232-8566

Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Material:	28'-30'	**Project Num:**	050584
Source:	PDGE05-101905-1615	**Lab Number:**	05-1009
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/19/2005	**Sampled By:**	Client
Date Tested:	12/2/2005	**Tested By:**	C. Smith

Report of Organic Content of Soils

Test Method: ASTM D2974 Method C

Ash Content: 96.2 %

Organic Content: 3.8 %

Specification: _____

Comments:

D. O'Dell

Report Reviewed By: _____

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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Material:	33'-35'	**Project Number:**	050584
Source:	PDGE05-101905-1645	**Lab Number:**	05-1010-1
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/19/2005	**Sampled By:**	Client
Date Tested:	11/23/2005	**Tested By:**	C Smith

Report of Natural Moisture Content of Soil and Rock

Test Method: ASTM D2216

Wet Weight (g):	337.7
Dry Weight (g):	223.6
% Nat. Moisture:	**51.0**

Specification:

Comments:

Report Reviewed By:

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Phone/Fax: 413-232-8566

Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Material:	33'-35'	**Project Num:**	050584
Source:	PDGE07-101905-1205	**Lab Number:**	05-1008
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/19/2005	**Sampled By:**	Client
Date Tested:	12/2/2005	**Tested By:**	C. Smith

Report of Organic Content of Soils

Test Method: ASTM D2974 Method C

Ash Content: 96.2 %

Organic Content: 3.8 %

Specification: _____

Comments:

Report Reviewed By: D. O'Dell

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Phone/Fax: 413-232-8566

Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Material:	100505-0815	**Project Num:**	050584
Source:	PDGEO9, 35'-37'	**Lab Number:**	05-0926-1
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/5/2005	**Sampled By:**	Client
Date Tested:	11/14/2005	**Tested By:**	C. Smith

Report of Organic Content of Soils

Test Method: ASTM D2974 Method C

Ash Content: 94.7 %

Organic Content: 5.3 %

Specification: _____

Comments:

Report Reviewed By: _____

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Phone: 413-232-4040 Fax: 413-232-4141

Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Material:	100605-1035	**Project Num:**	050584
Source:	PDGEO9, 46-48ft	**Lab Number:**	05-0928
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/18/2005	**Sampled By:**	Client
Date Tested:	10/26/2005	**Tested By:**	C. Smith

Report of Organic Content of Soils

Test Method: ASTM D2974 Method C

Ash Content: 96.7 %

Organic Content: 3.3 %

Specification: _____

Comments: Revised 12/8/05 - Source ID added.

Report Reviewed By: _____

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Phone/Fax: 413-232-8566

Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Material:	100605-1300	**Project Num:**	050584
Source:	PDGEO9, 54'-56'	**Lab Number:**	05-0930
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/6/2005	**Sampled By:**	Client
Date Tested:	11/9/2005	**Tested By:**	C. Smith

Report of Organic Content of Soils

Test Method: ASTM D2974 Method C

Ash Content: 97.5 %

Organic Content: 2.5 %

Specification: _____

Comments:

Report Reviewed By: _____

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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Material:	35'-37'	**Project Num:**	050584
Source:	PDGE011-110105-1445	**Lab Number:**	05-1166
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	11/1/2005	**Sampled By:**	Client
Date Tested:	1/11/2006	**Tested By:**	C. Smith

Report of Organic Content of Soils

Test Method: ASTM D2974 Method C

Ash Content: 94.9 %

Organic Content: 5.1 %

Specification: _____

Comments:

D. O'Dell

Report Reviewed By: _____

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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Material:	43'-45'	**Project Num:**	050584
Source:	PDGE011-110105-1530	**Lab Number:**	05-1168
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	11/1/2005	**Sampled By:**	Client
Date Tested:	1/4/2006	**Tested By:**	C. Smith

Report of Organic Content of Soils

Test Method: ASTM D2974 Method C

Ash Content: 95.3 %

Organic Content: 4.7 %

Specification: _____

Comments:

Report Reviewed By: D. O'Dell

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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Material:	101305-1140	**Project Num:**	050584
Source:	PDGEO13, 44'-46'	**Lab Number:**	05-0918
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/13/2005	**Sampled By:**	Client
Date Tested:	11/17/2005	**Tested By:**	C. Smith

Report of Organic Content of Soils

Test Method: ASTM D2974 Method C

Ash Content: 95.0 %

Organic Content: 5.0 %

Specification: _____

Comments:

Report Reviewed By: _____

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Phone/Fax: 413-232-8566

Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Material:	101405-0840	**Project Num:**	050584
Source:	PDGEO13, 58'-60'	**Lab Number:**	05-0920
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/14/2005	**Sampled By:**	Client
Date Tested:	11/14/2005	**Tested By:**	C. Smith

Report of Organic Content of Soils

Test Method: ASTM D2974 Method C

Ash Content: 98.5 %

Organic Content: 1.5 %

Specification: _____

Comments:

No specifications available at time of testing.

Report Reviewed By: _____

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Phone: 413-232-4040 Fax: 413-232-4141

Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Material:	092205-1100	**Project Num:**	050584
Source:	PDGEO-16, U1, 38-40'	**Lab Number:**	05-0860
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	9/30/2005	**Sampled By:**	H&A
Date Tested:	10/17/2005	**Tested By:**	C. Smith

Report of Organic Content of Soils

Test Method: ASTM D2974 Method C

Ash Content: 94.7 %

Organic Content: 5.3 %

Specification: _____

Comments:

Report Reviewed By: D. O'Dell

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Phone: 413-232-4040 Fax: 413-232-4141

Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Material:	100505-1345	**Project Num:**	050584
Source:	PDGEO17, 42'-44'	**Lab Number:**	05-0922
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/5/2005	**Sampled By:**	Client
Date Tested:	11/9/2005	**Tested By:**	C. Smith

Report of Organic Content of Soils

Test Method: ASTM D2974 Method C

Ash Content: 94.3 %

Organic Content: 5.7 %

Comments:

No specifications available at time of testing.

Report Reviewed By:

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Phone/Fax: 413-232-8566

Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Material:	100505-1130	**Project Num:**	050584
Source:	PDGEO17, 54'-56'	**Lab Number:**	05-0924
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/6/2005	**Sampled By:**	Client
Date Tested:	11/1/2005	**Tested By:**	B. Jobity

Report of Organic Content of Soils

Test Method: ASTM D2974 Method C

Ash Content: 97.4 %

Organic Content: 2.6 %

Comments:

Report Reviewed By:

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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Material:	40'-42'	**Project Num:**	050584
Source:	PDGE19-101905-1115	**Lab Number:**	05-1005
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/19/2005	**Sampled By:**	Client
Date Tested:	12/15/2005	**Tested By:**	C. Smith

Report of Organic Content of Soils

Test Method: ASTM D2974 Method C

Ash Content: 96.2 %

Organic Content: 3.8 %

Specification: _____

Comments:

Report Reviewed By: D. O'Dell

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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Material:	101305-1145	**Project Num:**	050584
Source:	PDGEO20, 42'-44'	**Lab Number:**	05-0921
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/13/2005	**Sampled By:**	Client
Date Tested:	11/14/2005	**Tested By:**	C. Smith

Report of Organic Content of Soils

Test Method: ASTM D2974 Method C

Ash Content: 95.4 %

Organic Content: 4.6 %

Specification: _____

Comments:

No specifications available at time of testing.

Report Reviewed By: _____

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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Material:	34'-36'	**Project Num:**	050584
Source:	PDGE021-110205-1540	**Lab Number:**	05-1161
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	11/2/2005	**Sampled By:**	Client
Date Tested:	1/19/2006	**Tested By:**	B. Jobity

Report of Organic Content of Soils

Test Method: ASTM D2974 Method C

Ash Content: 97.1 %

Organic Content: 2.9 %

Specification: _____

Comments:

Report Reviewed By: _____

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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Material:	42'-44'	**Project Num:**	050584
Source:	PDGE021-110205-1430	**Lab Number:**	05-1163
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	11/2/2005	**Sampled By:**	Client
Date Tested:	1/20/2006	**Tested By:**	B. Jobity

Report of Organic Content of Soils

Test Method: ASTM D2974 Method C

Ash Content: 98.0 %

Organic Content: 2.0 %

Specification: _____

Comments:

Report Reviewed By: _____

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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Material:	61'-63'	**Project Num:**	050584
Source:	PDGE021-110305-1015	**Lab Number:**	05-1165
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	11/3/2005	**Sampled By:**	Client
Date Tested:	1/19/2006	**Tested By:**	B. Jobity

Report of Organic Content of Soils

Test Method: ASTM D2974 Method C

Ash Content: 99.0 %

Organic Content: 1.0 %

Specification: _____

Comments:

Report Reviewed By: _____

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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Material:	25'-27'	**Project Num:**	050584
Source:	PDGE021-103105-1330	**Lab Number:**	05-1152
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/31/2005	**Sampled By:**	Client
Date Tested:	1/11/2006	**Tested By:**	C. Smith

Report of Organic Content of Soils

Test Method: ASTM D2974 Method C

Ash Content: 92.9 %

Organic Content: 7.1 %

Specification: _____

Comments:

Report Reviewed By: _____

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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Material:	34'-36'	**Project Num:**	050584
Source:	PDGE22-102705-1110	**Lab Number:**	05-1016
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/24/2005	**Sampled By:**	Client
Date Tested:	12/27/2005	**Tested By:**	C. Smith

Report of Organic Content of Soils

Test Method: ASTM D2974 Method C

Ash Content: 93.9 %

Organic Content: 6.1 %

Specification: _____

Comments:

No specifications available at time of testing.

Report Reviewed By: _____

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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Material:	24'-26'	**Project Num:**	050584
Source:	PDGE23-102405-1540	**Lab Number:**	05-1014
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/24/2005	**Sampled By:**	Client
Date Tested:	12/27/2005	**Tested By:**	csmith

Report of Organic Content of Soils

Test Method: ASTM D2974 Method C

Ash Content: 91.9 %

Organic Content: 8.1 %

Specification: _____

Comments:

No specifications available at time of testing.

Report Reviewed By: _____

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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Material:	35'-37'	**Project Num:**	050584
Source:	PDGE23-102805-1020	**Lab Number:**	05-1018
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/28/2005	**Sampled By:**	Client
Date Tested:	12/8/2005	**Tested By:**	C. Smith

Report of Organic Content of Soils

Test Method: ASTM D2974 Method C

Ash Content: 95.3 %

Organic Content: 4.7 %

Specification: _____

Comments:

Report Reviewed By: D. O'Dell

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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Material:	42-44 ft	**Project Num:**	050584
Source:	PDGEO24A-103105-1100	**Lab Number:**	05-1156
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/31/2005	**Sampled By:**	Client
Date Tested:	1/19/2006	**Tested By:**	B. Jobity

Report of Organic Content of Soils

Test Method: ASTM D2974 Method C

Ash Content: 96.4 %

Organic Content: 3.6 %

Specification: _____

Comments:

Report Reviewed By: D. O'Dell

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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Material:	54'-56'	**Project Num:**	050584
Source:	PDGE024A-103105-1300	**Lab Number:**	05-1158
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/31/2005	**Sampled By:**	Client
Date Tested:	1/11/2006	**Tested By:**	C. Smith

Report of Organic Content of Soils

Test Method: ASTM D2974 Method C

Ash Content: 97.8 %

Organic Content: 2.2 %

Comments:

Report Reviewed By: _____

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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Material:	74'-76'	**Project Num:**	050584
Source:	PDGE024A-110205-1045	**Lab Number:**	05-1160
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	11/2/2005	**Sampled By:**	Client
Date Tested:	1/19/2006	**Tested By:**	B. Jobity

Report of Organic Content of Soils

Test Method: ASTM D2974 Method C

Ash Content: 96.9 %

Organic Content: 3.1 %

Specification: _____

Comments:

Report Reviewed By: _____

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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Material:	101105-0920	**Project Num:**	050584
Source:	PDGEO28, 50'-52'	**Lab Number:**	05-0916
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/11/2005	**Sampled By:**	Client
Date Tested:	11/14/2005	**Tested By:**	C. Smith

Report of Organic Content of Soils

Test Method: ASTM D2974 Method C

Ash Content: 97.5 %

Organic Content: 2.5 %

Specification: _____

Comments:

No specifications available at time of testing.

Report Reviewed By: _____

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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Material:	101005-1315	**Project Num:**	050584
Source:	PDGEO28, 37'-39'	**Lab Number:**	05-0931
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/10/2005	**Sampled By:**	Client
Date Tested:	11/14/2005	**Tested By:**	C. Smith

Report of Organic Content of Soils

Test Method: ASTM D2974 Method C

Ash Content: 95.5 %

Organic Content: 4.5 %

Specification: _____

Comments:

No specifications available at time of testing.

Report Reviewed By: _____

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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Material:	45'-47'	**Project Num:**	050584
Source:	PDGE029-102505-0245	**Lab Number:**	05-1155
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/25/2005	**Sampled By:**	Client
Date Tested:	1/20/2006	**Tested By:**	B. Jobity

Report of Organic Content of Soils

Test Method: ASTM D2974 Method C

Ash Content: 95.2 %

Organic Content: 4.8 %

Comments:

Report Reviewed By: _____

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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Material:	32'-34'	**Project Num:**	050584
Source:	PDGE30-101805-1445	**Lab Number:**	05-1002
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/18/2005	**Sampled By:**	Client
Date Tested:	12/15/2005	**Tested By:**	C. Smith

Report of Organic Content of Soils

Test Method: ASTM D2974 Method C

Ash Content: 95.2 %

Organic Content: 4.8 %

Specification: _____

Comments:

Report Reviewed By: D. O'Dell

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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Material:	20-22'	**Project Num:**	050584
Source:	PDGE31-102005-1115	**Lab Number:**	05-1011
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/20/2005	**Sampled By:**	Client
Date Tested:	12/27/2005	**Tested By:**	C. Smith

Report of Organic Content of Soils

Test Method: ASTM D2974 Method C

Ash Content: 92.8 %

Organic Content: 7.2 %

Specification: _____

Comments:

No specifications available at time of testing.

Report Reviewed By: _____

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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Material:	30'-32'	**Project Num:**	050584
Source:	PDGE31-102005-1415	**Lab Number:**	05-1013
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/20/2005	**Sampled By:**	Client
Date Tested:	12/15/2005	**Tested By:**	C. Smith

Report of Organic Content of Soils

Test Method: ASTM D2974 Method C

Ash Content: 95.6 %

Organic Content: 4.4 %

Specification: _____

Comments:

Report Reviewed By: B. O'Dell

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Specific Gravity

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Client:	ENSR Remediation	**Project:**	BP Hastings-on-Hudson
Material:	092205-1400	**Project Number:**	050584
Source:	PDGEO-1 U1, 35-37'	**Lab Number:**	05-0856-1
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/3/2005	**Sampled By:**	H&A
Date Tested:	10/05/05	**Tested By:**	K Patton

SPECIFIC GRAVITY OF SOIL

Test Method: ASTM D854 Method A

Specific Gravity (20°C): 2.508

Comments:

Report Reviewed By: _____

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Client:	ENSR Remediation	**Project:**	BP Hastings-on-Hudson
Material:	40'-42'	**Project Number:**	050584
Source:	PDGE19-101905-1115	**Lab Number:**	05-1005
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/19/2005	**Sampled By:**	Client
Date Tested:	12/20/05	**Tested By:**	C. Smith

SPECIFIC GRAVITY OF SOIL

Test Method: ASTM D854 Method B

Specific Gravity (20°C): 2.514

Comments:

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Client:	ENSR Remediation	**Project:**	BP Hastings-on-Hudson
Material:	28'-30'	**Project Number:**	050584
Source:	PDGE021-103105-	**Lab Number:**	05-1153
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/31/2005	**Sampled By:**	Client
Date Tested:	01/24/06	**Tested By:**	B. Jobity

SPECIFIC GRAVITY OF SOIL

Test Method: ASTM D854 Method A

Specific Gravity (20°C): 2.346

Comments:

Report Reviewed By: _____

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Client:	ENSR Remediation	**Project:**	BP Hastings-on-Hudson
Material:	35'-37'	**Project Number:**	050584
Source:	PDGE23-102805-1020	**Lab Number:**	05-1018-1
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/28/2005	**Sampled By:**	Client
Date Tested:	12/20/05	**Tested By:**	C Smith

SPECIFIC GRAVITY OF SOIL

Test Method: ASTM D854 Method B

Specific Gravity (20°C): 2.566

Specification:

Comments:

Specifications not at time of testing.

Report Reviewed By:

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Client:	ENSR Remediation	**Project:**	BP Hastings-on-Hudson
Material:	42 - 44 ft	**Project Number:**	050584
Source:	PDGEO24A-103105-	**Lab Number:**	05-1156-1
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/31/2005	**Sampled By:**	Client
Date Tested:	01/19/06	**Tested By:**	B. Jobity

SPECIFIC GRAVITY OF SOIL

Test Method: ASTM D854 Method A

Specific Gravity (20°C): 2.610

Comments: Revised 1/24/06 (Sample depth corrected.)

Report Reviewed By:

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Hydraulic Conductivity

Advance Testing

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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Material:	092205-1400	**Project Number:**	050584
Source:	PDGEO-1 U1, 35-37'	**Lab Number:**	05-0856
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/3/2005	**Sampled By:**	H&A
Date Tested:	10/7/2005	**Tested By:**	C Smith

Report of Triaxial Permeability Test Using Back Pressure

Test Method: ASTM D5084

Sample Preparation Method:
Shelby tube sample. Cut from 4 to 10 inches below top of sample.

Test Sample Dimensions	Before Test	After Test
Height, cm:	15.40	15.30
Diameter, cm:	7.14	7.18
Moisture Content, %:	50.2	52.4
Dry Density, PCF:	66.01	65.72

Permeability Test Conditions	
Type of Water Used:	Tap
Maximum Back Pressure, PSI:	55.5
Hydraulic Gradient:	17.0
Effective Stress, PSI (min):	2.11
Effective Stress, PSI (max):	5.84
Initial Degree of Saturation, %:	91.7
Final Degree of Saturation, %:	95.0

Specific Gravity = 2.51

Permeability Test Results

Coefficient of Permeability @ 20°C (68°F): 5.32E-08 cm/sec

Comments:

Report Reviewed By:

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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Material:	092205-1355	**Project Number:**	050584
Source:	PDGEO-1, U-3, 52-54'	**Lab Number:**	05-0858
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	9/26/2005	**Sampled By:**	H&A
Date Tested:	10/18/2005	**Tested By:**	C. Smith

Report of Triaxial Permeability Test Using Back Pressure

Test Method: ASTM D5084

Sample Preparation Method:
Cut from 4 to 8.5 inches below top of Shelby tube sample.

Test Sample Dimensions	Before Test	After Test
Height, cm:	11.32	11.11
Diameter, cm:	7.19	7.12
Moisture Content, %:	47.5	46.2
Dry Density, PCF:	72.57	74.22

Permeability Test Conditions	
Type of Water Used:	Tap
Maximum Back Pressure, PSI:	55.3
Hydraulic Gradient:	14.0
Effective Stress, PSI (min):	1.95
Effective Stress, PSI (max):	4.21
Initial Degree of Saturation, %:	102.8
Final Degree of Saturation, %:	104.3

Specific Gravity = 2.51

Permeability Test Results

Coefficient of Permeability @ 20°C (68°F): 1.39E-07 cm/sec

Specification:

Comments:

Report Reviewed By:

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Client:	ENSR Remediation and Const	**Project:**	BP Hastings-on-Huds
Item:	PDGEO 4, 44'-46'	**ATC Project #:**	50584
Source:	100305-1005	**ATC Lab #:**	05-0925
Date Sampled:	10/8/2005	**Sampled By:**	Client
Date Tested:	11/15/2005	**Tested By:**	C. Smith

Report of Triaxial Permeability Test Using Back Pressure

Test Method: ASTM D5084

Sample Preparation Method:
Cut from bottom 6 inches of Shelby tube sample. The sample used in this test had a high content of fine to medium sand, small shells and shell fragments, and trace coal, and was not typical of the upper portion of the Shelby tube.

Test Sample Dimensions	Before Test	After Test
Height, cm:	12.25	11.72
Diameter, cm:	7.21	7.16
Moisture Content, %:	22.6	22.4
Dry Density, PCF:	96.31	101.68

Permeability Test Conditions	
Type of Water Used:	Tap Water
Maximum Back Pressure, PSI:	32.0
Hydraulic Gradient:	17.2
Effective Stress, PSI (min):	3.87
Effective Stress, PSI (max):	7.13
Initial Degree of Saturation, %:	90.5
Final Degree of Saturation, %:	103.9

Specific Gravity = 2.51

Permeability Test Results

Coefficient of Permeability @ 20°C (68°F): **9.70E-05** cm/sec

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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Huds
Material:	092205-1110	**Project Number:**	050584
Source:	PDGEO-4, U-1, 36-38'	**Lab Number:**	05-0859
Date Sampled:	9/28/2005	**Sampled By:**	H&A
Date Tested:	10/10-14/2005	**Tested By:**	C Smith

Report of Triaxial Permeability Test Using Back Pressure

Test Method: ASTM D5084

Sample Preparation Method:
Cut from 8 to 14 inches below top of Shelby tube sample.

Test Sample Dimensions	Before Test	After Test
Height, cm:	15.40	15.39
Diameter, cm:	7.20	7.18
Moisture Content, %:	46.2	46.9
Dry Density, PCF:	71.96	72.26

Permeability Test Conditions	
Type of Water Used:	Tap Water
Maximum Back Pressure, PSI:	55.5
Hydraulic Gradient:	10.4
Effective Stress, PSI (min):	2.24
Effective Stress, PSI (max):	4.52
Initial Degree of Saturation, %:	98.5
Final Degree of Saturation, %:	100.7

Specific Gravity = 2.51

Permeability Test Results

Coefficient of Permeability @ 20°C (68°F): **3.26E-07** cm/sec

Report Reviewed By:

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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Material:	33'-35'	**Project Number:**	050584
Source:	PDGE05-101905-1645	**Lab Number:**	05-1010
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/19/2005	**Sampled By:**	Client
Date Tested:	11/23/2005	**Tested By:**	C. Smith

Report of Triaxial Permeability Test Using Back Pressure

Test Method: ASTM D5084

Sample Preparation Method:
Cut from Shelby tube sample.

Test Sample Dimensions	Before Test	After Test
Height, cm:	12.87	12.84
Diameter, cm:	7.12	7.05
Moisture Content, %:	49.2	48.8
Dry Density, PCF:	67.13	68.56

Permeability Test Conditions	
Type of Water Used:	Tap
Maximum Back Pressure, PSI:	21.5
Hydraulic Gradient:	9.0
Effective Stress, PSI (min):	2.5
Effective Stress, PSI (max):	4.14
Initial Degree of Saturation, %:	92.5
Final Degree of Saturation, %:	95.3

Specific Gravity = 2.51

Permeability Test Results

Coefficient of Permeability @ 20°C (68°F): 6.65E-07 cm/sec

Comments: Sample had a shallow groove along one side (entire length), probably caused by the sampler pushing a shell or stone.

Report Reviewed By:

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Phone: 413-232-4040 Fax: 413-232-4141

Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Huds
Item:	PDGEO7, 101905-1205	**ATC Project #:**	50584
Source:	33-35'	**ATC Lab #:**	05-1008
Date Sampled:	10/19/2005	**Sampled By:**	Client
Date Tested:	11/28/2005	**Tested By:**	C. Smith

Report of Triaxial Permeability Test Using Back Pressure

Test Method: ASTM D5084

Sample Preparation Method:
Cut from Shelby tube sample.

Test Sample Dimensions	Before Test	After Test
Height, cm:	11.26	11.09
Diameter, cm:	7.05	7.06
Moisture Content, %:	56.7	52.4
Dry Density, PCF:	68.96	69.62

Permeability Test Conditions	
Type of Water Used:	Tap Water
Maximum Back Pressure, PSI:	25.9
Hydraulic Gradient:	11.8
Effective Stress, PSI (min):	2.96
Effective Stress, PSI (max):	4.91
Initial Degree of Saturation, %:	111.9
Final Degree of Saturation, %:	105.1

Specific Gravity = 2.51

Permeability Test Results

Coefficient of Permeability @ 20^{0}C (68^{0}F): **3.87E-07** cm/sec

Report Reviewed By: _____

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3348 Route 208, Campbell Hall, NY 10916
Phone: 845-496-1600 Fax: 845-496-1398
42 Day Farm Road, West Stockbridge, MA 01266
Phone/ Fax: 413-232-8566

Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Material:	100505-0900	**Project Number:**	050584
Source:	PDGEO9, 40'-42'	**Lab Number:**	05-0927
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/5/2005	**Sampled By:**	Client
Date Tested:	11/15/2005	**Tested By:**	C. Smith

Report of Triaxial Permeability Test Using Back Pressure

Test Method: ASTM D5084

Sample Preparation Method:
Cut from Shelby tube sample

Test Sample Dimensions	Before Test	After Test
Height, cm:	12.57	12.16
Diameter, cm:	7.03	7.03
Moisture Content, %:	55.4	49.7
Dry Density, PCF:	69.79	72.05

Permeability Test Conditions	
Type of Water Used:	Tap
Maximum Back Pressure, PSI:	30.8
Hydraulic Gradient:	26.1
Effective Stress, PSI (min):	2.91
Effective Stress, PSI (max):	7.56
Initial Degree of Saturation, %:	111.7
Final Degree of Saturation, %:	106.2

Specific Gravity = 2.51

Permeability Test Results

Coefficient of Permeability @ 20°C (68°F): 8.51E-08 cm/sec

Comments:

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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Material:	100605-1115	**Project Number:**	050584
Source:	PDGEO9, 50'-52'	**Lab Number:**	05-0929
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/6/2005	**Sampled By:**	Client
Date Tested:	N/A	**Tested By:**	N/A

Report of Triaxial Permeability Test Using Back Pressure

Test Method: ASTM D5084

Sample was too wet to recover a testable sample. The soil was in a flowing condition.

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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Material:	101305-1315	**Project Number:**	050584
Source:	PDGEO13, 49'-51'	**Lab Number:**	05-0919
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/13/2005	**Sampled By:**	Client
Date Tested:	11/3/2005	**Tested By:**	C. SMith

Report of Triaxial Permeability Test Using Back Pressure

Test Method: ASTM D5084

Sample Preparation Method:
Cut from Shelby tube sample. Silty, some fine shell fragment layers.

Test Sample Dimensions	Before Test	After Test
Height, cm:	11.25	11.10
Diameter, cm:	7.24	7.16
Moisture Content, %:	56.6	54.5
Dry Density, PCF:	64.12	67.86

Permeability Test Conditions	
Type of Water Used:	Tap
Maximum Back Pressure, PSI:	38.2
Hydraulic Gradient:	16.3
Effective Stress, PSI (min):	3.16
Effective Stress, PSI (max):	5.75
Initial Degree of Saturation, %:	98.4
Final Degree of Saturation, %:	104.5

Specific Gravity = 2.51

Permeability Test Results

Coefficient of Permeability @ 20°C (68°F): 3.75E-07 cm/sec

Comments:

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Phone/ Fax: 413-232-8566

Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Material:	100505-1345	**Project Number:**	050584
Source:	PDGEO17, 42'-44'	**Lab Number:**	05-0922
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/5/2005	**Sampled By:**	Client
Date Tested:	11/7/2005	**Tested By:**	C. Smith

Report of Triaxial Permeability Test Using Back Pressure

Test Method: ASTM D5084

Sample Preparation Method:
Cut from Shelby tube sample. Sample contained some layers of shell fragments.

Test Sample Dimensions	Before Test	After Test
Height, cm:	12.45	12.23
Diameter, cm:	7.14	7.12
Moisture Content, %:	66.7	65.3
Dry Density, PCF:	59.94	61.15

Permeability Test Conditions	
Type of Water Used:	Tap
Maximum Back Pressure, PSI:	32.5
Hydraulic Gradient:	12.1
Effective Stress, PSI (min):	2.65
Effective Stress, PSI (max):	4.79
Initial Degree of Saturation, %:	103.7
Final Degree of Saturation, %:	104.9

Specific Gravity = 2.51

Permeability Test Results

Coefficient of Permeability @ 20°C (68°F): 2.11E-07 cm/sec

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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Material:	100505-1130	**Project Number:**	050584
Source:	PDGEO17, 54'-56'	**Lab Number:**	05-0924
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/6/2005	**Sampled By:**	Client
Date Tested:	11/2/2005	**Tested By:**	B. Jobity

Report of Triaxial Permeability Test Using Back Pressure

Test Method: ASTM D5084

Sample Preparation Method:
Cut from Shelby tube sample.

Test Sample Dimensions	Before Test	After Test
Height, cm:	10.34	10.28
Diameter, cm:	7.13	7.31
Moisture Content, %:	52.1	45.7
Dry Density, PCF:	73.50	73.77

Permeability Test Conditions	
Type of Water Used:	Tap
Maximum Back Pressure, PSI:	43.4
Hydraulic Gradient:	19.7
Effective Stress, PSI (min):	2.17
Effective Stress, PSI (max):	5.06
Initial Degree of Saturation, %:	115.5
Final Degree of Saturation, %:	102.0

Specific Gravity = 2.51

Permeability Test Results

Coefficient of Permeability @ 20^{0}C (68^{0}F): 5.82E-07 cm/sec

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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Material:	35'-37'	**Project Number:**	050584
Source:	PDGE19-101905-1045	**Lab Number:**	05-1004
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/19/2005	**Sampled By:**	Client
Date Tested:	12/16/2005	**Tested By:**	B. Jobity

Report of Triaxial Permeability Test Using Back Pressure

Test Method: ASTM D5084

Sample Preparation Method:
Cut from Shelby tube sample.

Test Sample Dimensions	Before Test	After Test
Height, cm:	10.48	10.48
Diameter, cm:	7.20	7.18
Moisture Content, %:	46.9	45.5
Dry Density, PCF:	75.20	75.37

Permeability Test Conditions	
Type of Water Used:	Tap water
Maximum Back Pressure, PSI:	28.0
Hydraulic Gradient:	17.1
Effective Stress, PSI (min):	2.33
Effective Stress, PSI (max):	4.88
Initial Degree of Saturation, %:	108.6
Final Degree of Saturation, %:	105.8

Specific Gravity = 2.51

Permeability Test Results

Coefficient of Permeability @ 20°C (68°F): 2.14E-07 cm/sec

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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Material:	40'-42'	**Project Number:**	050584
Source:	PDGE19-101905-1115	**Lab Number:**	05-1005
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/19/2005	**Sampled By:**	Client
Date Tested:	12/8/2005	**Tested By:**	C. Smith

Report of Triaxial Permeability Test Using Back Pressure

Test Method: ASTM D5084

Sample Preparation Method:
Cut from Shelby tube sample.

Test Sample Dimensions	Before Test	After Test
Height, cm:	9.02	9.02
Diameter, cm:	7.20	7.17
Moisture Content, %:	56.8	52.4
Dry Density, PCF:	66.64	68.70

Permeability Test Conditions	
Type of Water Used:	Tap
Maximum Back Pressure, PSI:	33.2
Hydraulic Gradient:	16.8
Effective Stress, PSI (min):	1.97
Effective Stress, PSI (max):	4.12
Initial Degree of Saturation, %:	105.5
Final Degree of Saturation, %:	102.7

Specific Gravity = 2.51

Permeability Test Results

Coefficient of Permeability @ 20°C (68°F): 2.18E-07 cm/sec

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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Material:	45'-47'	**Project Number:**	050584
Source:	PDGE19-101905-1230	**Lab Number:**	05-1006
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/19/2005	**Sampled By:**	Client
Date Tested:	12/15/2005	**Tested By:**	C. Smith

Report of Triaxial Permeability Test Using Back Pressure

Test Method: ASTM D5084

Sample Preparation Method:
Cut from Shelby tube sample, 0.7-1.0 ft from bottom

Test Sample Dimensions	Before Test	After Test
Height, cm:	11.98	11.76
Diameter, cm:	7.10	7.08
Moisture Content, %:	51.7	47.7
Dry Density, PCF:	71.63	74.08

Permeability Test Conditions	
Type of Water Used:	Tap water
Maximum Back Pressure, PSI:	36.9
Hydraulic Gradient:	15.5
Effective Stress, PSI (min):	1.26
Effective Stress, PSI (max):	3.90
Initial Degree of Saturation, %:	109.3
Final Degree of Saturation, %:	107.4

Specific Gravity = 2.51

Permeability Test Results

Coefficient of Permeability @ 20°C (68°F): 4.35E-07 cm/sec

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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Material:	101305-1145	**Project Number:**	050584
Source:	PDGEO20, 42'-44'	**Lab Number:**	05-0921
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/13/2005	**Sampled By:**	Client
Date Tested:	11/14/2005	**Tested By:**	C. Smith

Report of Triaxial Permeability Test Using Back Pressure

Test Method: ASTM D5084

Sample Preparation Method:
Cut from Shelby tube sample.

Test Sample Dimensions	Before Test	After Test
Height, cm:	13.90	13.79
Diameter, cm:	7.18	7.10
Moisture Content, %:	53.8	51.8
Dry Density, PCF:	69.15	71.14

Permeability Test Conditions	
Type of Water Used:	Tap
Maximum Back Pressure, PSI:	32.9
Hydraulic Gradient:	10.6
Effective Stress, PSI (min):	2.67
Effective Stress, PSI (max):	4.76
Initial Degree of Saturation, %:	106.7
Final Degree of Saturation, %:	108.1

Specific Gravity = 2.51

Permeability Test Results

Coefficient of Permeability @ 20°C (68°F): 1.30E-07 cm/sec

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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Material:	34'-36'	**Project Number:**	050584
Source:	PDGE021-110205-1540	**Lab Number:**	05-1161
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	11/2/2005	**Sampled By:**	Client
Date Tested:	1/17/2006	**Tested By:**	C. Smith

Report of Triaxial Permeability Test Using Back Pressure

Test Method: ASTM D5084

Sample Preparation Method:
Cut from Shelby tube sample, 8 to 14 inches below top.

Test Sample Dimensions	Before Test	After Test
Height, cm:	14.12	13.43
Diameter, cm:	7.10	7.12
Moisture Content, %:	60.8	54.6
Dry Density, PCF:	64.95	68.57

Permeability Test Conditions	
Type of Water Used:	Tap
Maximum Back Pressure, PSI:	26.7
Hydraulic Gradient:	11.3
Effective Stress, PSI (min):	2.05
Effective Stress, PSI (max):	4.31
Initial Degree of Saturation, %:	108.0
Final Degree of Saturation, %:	106.6

Specific Gravity = 2.51

Permeability Test Results

Coefficient of Permeability @ 20°C (68°F): 7.13E-07 cm/sec

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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Material:	45'-47'	**Project Number:**	050584
Source:	PDGE021-110205-1445	**Lab Number:**	05-1164
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	11/2/2005	**Sampled By:**	Client
Date Tested:	1/3/2006	**Tested By:**	C. Smith

Report of Triaxial Permeability Test Using Back Pressure

Test Method: ASTM D5084

Sample Preparation Method:
Cut from Shelby tube sample.

Test Sample Dimensions	Before Test	After Test
Height, cm:	12.95	12.39
Diameter, cm:	7.22	7.14
Moisture Content, %:	57.0	55.0
Dry Density, PCF:	63.79	68.13

Permeability Test Conditions	
Type of Water Used:	Tap
Maximum Back Pressure, PSI:	35.3
Hydraulic Gradient:	10.5
Effective Stress, PSI (min):	2.03
Effective Stress, PSI (max):	3.97
Initial Degree of Saturation, %:	98.2
Final Degree of Saturation, %:	106.2

Specific Gravity = 2.51

Permeability Test Results

Coefficient of Permeability @ 20°C (68°F): 8.81E-07 cm/sec

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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Material:	25'-27'	**Project Number:**	050584
Source:	PDGEO021-103105-1330	**Lab Number:**	05-1152
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/31/2005	**Sampled By:**	Client
Date Tested:	1/11/2006	**Tested By:**	C. Smith

Report of Triaxial Permeability Test Using Back Pressure

Test Method: ASTM D5084

Sample Preparation Method:
Cut from Shelby tube sample, 1.0 to 1.5ft from bottom.

Test Sample Dimensions	Before Test	After Test
Height, cm:	12.50	12.41
Diameter, cm:	7.09	7.02
Moisture Content, %:	69.7	66.8
Dry Density, PCF:	59.93	61.41

Permeability Test Conditions	
Type of Water Used:	Tap
Maximum Back Pressure, PSI:	20.2
Hydraulic Gradient:	7.5
Effective Stress, PSI (min):	1.95
Effective Stress, PSI (max):	3.28
Initial Degree of Saturation, %:	108.3
Final Degree of Saturation, %:	108.1

Specific Gravity = 2.51

Permeability Test Results

Coefficient of Permeability @ 20^{0}C (68^{0}F): 2.30E-07 cm/sec

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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Material:	28'-30'	**Project Number:**	050584
Source:	PDGE22-102705-1025	**Lab Number:**	05-1015
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/24/2005	**Sampled By:**	Client
Date Tested:	12/15/2005	**Tested By:**	C Smith

Report of Triaxial Permeability Test Using Back Pressure

Test Method: ASTM D5084

There was insufficient intact material to perform the permeability test on this sample.

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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Material:	34'-36'	**Project Number:**	050584
Source:	PDGE22-102705-1110	**Lab Number:**	05-1016
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/24/2005	**Sampled By:**	Client
Date Tested:	12/20/2005	**Tested By:**	C. Smith

Report of Triaxial Permeability Test Using Back Pressure

Test Method: ASTM D5084

Sample Preparation Method:
Cut from Shelby tube sample

Test Sample Dimensions	Before Test	After Test
Height, cm:	11.34	10.95
Diameter, cm:	7.10	7.07
Moisture Content, %:	59.8	49.9
Dry Density, PCF:	64.89	67.55

Permeability Test Conditions	
Type of Water Used:	Tap water
Maximum Back Pressure, PSI:	26.3
Hydraulic Gradient:	13.8
Effective Stress, PSI (min):	2.07
Effective Stress, PSI (max):	4.29
Initial Degree of Saturation, %:	106.1
Final Degree of Saturation, %:	94.9

Specific Gravity = 2.51

Permeability Test Results

Coefficient of Permeability @ 20°C (68°F): 1.43E-07 cm/sec

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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Material:	24'-26'	**Project Number:**	050584
Source:	PDGE23-102405-1540	**Lab Number:**	05-1014
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/24/2005	**Sampled By:**	Client
Date Tested:	12/20/2005	**Tested By:**	C. Smith

Report of Triaxial Permeability Test Using Back Pressure

Test Method: ASTM D5084

Sample Preparation Method:
Cut from Shelby tube sample.

Test Sample Dimensions	Before Test	After Test
Height, cm:	12.44	12.28
Diameter, cm:	7.18	7.13
Moisture Content, %:	70.1	69.6
Dry Density, PCF:	56.76	58.20

Permeability Test Conditions	
Type of Water Used:	Tap water
Maximum Back Pressure, PSI:	18.1
Hydraulic Gradient:	11.0
Effective Stress, PSI (min):	2.53
Effective Stress, PSI (max):	4.48
Initial Degree of Saturation, %:	99.9
Final Degree of Saturation, %:	103.2

Specific Gravity = 2.51

Permeability Test Results

Coefficient of Permeability @ 20°C (68°F): 1.69E-07 cm/sec

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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Material:	35'-37'	**Project Number:**	050584
Source:	PDGE23-102805-1020	**Lab Number:**	05-1018
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/28/2005	**Sampled By:**	Client
Date Tested:	12/6/2005	**Tested By:**	C. Smith

Report of Triaxial Permeability Test Using Back Pressure

Test Method: ASTM D5084

Sample Preparation Method:
Cut from Shelby tube sample. Stiff silt with some granular layers.

Test Sample Dimensions	Before Test	After Test
Height, cm:	11.08	11.03
Diameter, cm:	7.10	7.02
Moisture Content, %:	64.7	62.2
Dry Density, PCF:	63.10	64.42

Permeability Test Conditions	
Type of Water Used:	Tap
Maximum Back Pressure, PSI:	25.8
Hydraulic Gradient:	17.9
Effective Stress, PSI (min):	2.69
Effective Stress, PSI (max):	5.49
Initial Degree of Saturation, %:	109.5
Final Degree of Saturation, %:	109.0

Specific Gravity = 2.51

Permeability Test Results

Coefficient of Permeability @ 20°C (68°F): 8.35E-07 cm/sec

Comments:

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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Material:	42-44 ft	**Project Number:**	050584
Source:	PDGEO24A-103105-1100	**Lab Number:**	05-1156
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/31/2005	**Sampled By:**	Client
Date Tested:	1/16/2006	**Tested By:**	C. Smith

Report of Triaxial Permeability Test Using Back Pressure

Test Method: ASTM D5084

Sample Preparation Method:
Cut from Shelby tube sample, 4 to 9 in. from bottom

Test Sample Dimensions	Before Test	After Test
Height, cm:	12.68	12.40
Diameter, cm:	7.19	7.20
Moisture Content, %:	60.3	59.5
Dry Density, PCF:	64.23	65.22

Permeability Test Conditions	
Type of Water Used:	Tap
Maximum Back Pressure, PSI:	34.4
Hydraulic Gradient:	12.0
Effective Stress, PSI (min):	1.99
Effective Stress, PSI (max):	4.15
Initial Degree of Saturation, %:	102.4
Final Degree of Saturation, %:	103.7

Specific Gravity = 2.61

Permeability Test Results

Coefficient of Permeability @ 20°C (68°F): 2.77E-07 cm/sec

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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Material:	54'-56'	**Project Number:**	050584
Source:	PDGE024A-103105-1300	**Lab Number:**	05-1158
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/31/2005	**Sampled By:**	Client
Date Tested:	1/10/2006	**Tested By:**	C. Smith

Report of Triaxial Permeability Test Using Back Pressure

Test Method: ASTM D5084

Sample Preparation Method:
Cut from Shelby tube sample.

Test Sample Dimensions	Before Test	After Test
Height, cm:	11.69	11.52
Diameter, cm:	7.13	7.06
Moisture Content, %:	41.6	38.7
Dry Density, PCF:	78.41	78.64

Permeability Test Conditions	
Type of Water Used:	Tap
Maximum Back Pressure, PSI:	43.2
Hydraulic Gradient:	16.4
Effective Stress, PSI (min):	2.36
Effective Stress, PSI (max):	5.08
Initial Degree of Saturation, %:	104.6
Final Degree of Saturation, %:	97.9

Specific Gravity = 2.51

Permeability Test Results

Coefficient of Permeability @ 20^{0}C (68^{0}F): 3.42E-07 cm/sec

Comments:

Report Reviewed By: _____

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Phone: 845-496-1600 Fax: 845-496-1398
42 Day Farm Road, West Stockbridge, MA 01266
Phone/Fax: 413-232-8566

Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Huds
Item:	PDGEO 28, 50'-52'	**ATC Project #:**	50584
Source:	101105-0920	**ATC Lab #:**	05-0916
Date Sampled:	10/11/2005	**Sampled By:**	Client
Date Tested:	11/10/2005	**Tested By:**	C. Smith

Report of Triaxial Permeability Test Using Back Pressure

Test Method: ASTM D5084

Sample Preparation Method:
Cut from Shelby tube sample

Test Sample Dimensions	Before Test	After Test
Height, cm:	13.61	13.39
Diameter, cm:	7.13	7.12
Moisture Content, %:	34.6	33.2
Dry Density, PCF:	84.72	86.36

Permeability Test Conditions	
Type of Water Used:	Tap Water
Maximum Back Pressure, PSI:	46.1
Hydraulic Gradient:	8.3
Effective Stress, PSI (min):	2.89
Effective Stress, PSI (max):	4.49
Initial Degree of Saturation, %:	102.2
Final Degree of Saturation, %:	102.3

Specific Gravity = 2.51

Permeability Test Results

Coefficient of Permeability @ 20°C (68°F): **6.38E-07** cm/sec

Report Reviewed By: _____

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Phone: 413-232-4040 Fax: 413-232-4141

Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Huds
Item:	PDGEO 28, 41'- 43'	**ATC Project #:**	50584
Source:	101005-1340	**ATC Lab #:**	05-0932
Date Sampled:	10/10/2005	**Sampled By:**	Client
Date Tested:	11/6/2005	**Tested By:**	C. Smith

Report of Triaxial Permeability Test Using Back Pressure

Test Method: ASTM D5084

Sample Preparation Method:
Cut from Shelby tube sample.

Test Sample Dimensions	Before Test	After Test
Height, cm:	12.27	12.12
Diameter, cm:	7.15	7.12
Moisture Content, %:	53.1	51.5
Dry Density, PCF:	69.97	71.26

Permeability Test Conditions	
Type of Water Used:	Tap Water
Maximum Back Pressure, PSI:	32.6
Hydraulic Gradient:	10.6
Effective Stress, PSI (min):	3.42
Effective Stress, PSI (max):	5.33
Initial Degree of Saturation, %:	107.5
Final Degree of Saturation, %:	107.8

Specific Gravity = 2.51

Permeability Test Results

Coefficient of Permeability @ 20^{0}C (68^{0}F): **7.53E-06** cm/sec

Report Reviewed By: _____

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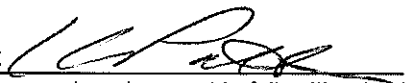
Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Material:	45'-47'	**Project Number:**	050584
Source:	PDGE029-102505-0245	**Lab Number:**	05-1155 DU
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/25/2005	**Sampled By:**	Client
Date Tested:	1/17/2006	**Tested By:**	C Smith

Report of Triaxial Permeability Test Using Back Pressure

Test Method: ASTM D5084

Insufficient quantity of suitable material was recovered from the sampling tube.
No test was performed.

Report Reviewed By: 

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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Material:	32'-34'	**Project Number:**	050584
Source:	PDGEO30-101805-1445	**Lab Number:**	05-1002
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/18/2005	**Sampled By:**	Client
Date Tested:	12/8/2005	**Tested By:**	C. Smith

Report of Triaxial Permeability Test Using Back Pressure

Test Method: ASTM D5084

Sample Preparation Method:
Cut from Shelby tube sample.

Test Sample Dimensions	Before Test	After Test
Height, cm:	11.86	11.57
Diameter, cm:	7.17	7.07
Moisture Content, %:	56.0	49.5
Dry Density, PCF:	67.32	70.66

Permeability Test Conditions	
Type of Water Used:	Tap
Maximum Back Pressure, PSI:	24.6
Hydraulic Gradient:	14.5
Effective Stress, PSI (min):	2.35
Effective Stress, PSI (max):	4.78
Initial Degree of Saturation, %:	105.9
Final Degree of Saturation, %:	102.0

Specific Gravity = 2.51

Permeability Test Results

Coefficient of Permeability @ 20°C (68°F): 2.73E-07 cm/sec

Comments: Sample contained a few large shells.

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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Material:	39'-41'	**Project Number:**	050584
Source:	PDGE30-101805-1551	**Lab Number:**	05-1003
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/18/2005	**Sampled By:**	Client
Date Tested:	12/6/2005	**Tested By:**	C. Smith

Report of Triaxial Permeability Test Using Back Pressure

Test Method: ASTM D5084

Sample Preparation Method:
Cut from Shelby tube sample.

Test Sample Dimensions	Before Test	After Test
Height, cm:	9.94	9.75
Diameter, cm:	6.93	6.88
Moisture Content, %:	58.6	51.3
Dry Density, PCF:	68.59	70.76

Permeability Test Conditions	
Type of Water Used:	Tap
Maximum Back Pressure, PSI:	31.1
Hydraulic Gradient:	8.7
Effective Stress, PSI (min):	1.94
Effective Stress, PSI (max):	3.18
Initial Degree of Saturation, %:	114.5
Final Degree of Saturation, %:	106.0

Specific Gravity = 2.51

Permeability Test Results

Coefficient of Permeability @ 20°C (68°F): 4.37E-07 cm/sec

Comments: Stiff silt, some small shells.

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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Material:	20-22'	**Project Number:**	050584
Source:	PDGE31-102005-1115	**Lab Number:**	05-1011
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/20/2005	**Sampled By:**	Client
Date Tested:	12/14/2005	**Tested By:**	C. Smith

Report of Triaxial Permeability Test Using Back Pressure

Test Method: ASTM D5084

Sample Preparation Method:
Cut from Shelby tube sample

Test Sample Dimensions	Before Test	After Test
Height, cm:	10.49	9.90
Diameter, cm:	7.19	7.04
Moisture Content, %:	78.1	72.3
Dry Density, PCF:	52.28	56.12

Permeability Test Conditions	
Type of Water Used:	Tap water
Maximum Back Pressure, PSI:	15.5
Hydraulic Gradient:	11.3
Effective Stress, PSI (min):	2.05
Effective Stress, PSI (max):	3.73
Initial Degree of Saturation, %:	98.2
Final Degree of Saturation, %:	101.2

Specific Gravity = 2.51

Permeability Test Results

Coefficient of Permeability @ 20^{0}C (68^{0}F): 1.96E-07 cm/sec

Comments:

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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Material:	25'-27'	**Project Number:**	050584
Source:	PDGEO31-102005-1330	**Lab Number:**	05-1012
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/20/2005	**Sampled By:**	Client
Date Tested:	12/6/2005	**Tested By:**	C. Smith

Report of Triaxial Permeability Test Using Back Pressure

Test Method: ASTM D5084

Sample Preparation Method:
Cut from Shelby tube sample

Test Sample Dimensions	Before Test	After Test
Height, cm:	10.93	10.94
Diameter, cm:	7.16	7.05
Moisture Content, %:	78.9	69.4
Dry Density, PCF:	56.57	58.14

Permeability Test Conditions	
Type of Water Used:	Tap
Maximum Back Pressure, PSI:	19.8
Hydraulic Gradient:	11.1
Effective Stress, PSI (min):	1.39
Effective Stress, PSI (max):	3.12
Initial Degree of Saturation, %:	111.9
Final Degree of Saturation, %:	102.8

Specific Gravity = 2.51

Permeability Test Results

Coefficient of Permeability @ 20°C (68°F): 1.04E-07 cm/sec

Comments:

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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Material:	30'-32'	**Project Number:**	050584
Source:	PDGEO31-102005-1415	**Lab Number:**	05-1013
Location:	In-Place	**Item Number:**	No Spec Items
Date Sampled:	10/20/2005	**Sampled By:**	Client
Date Tested:	12/12/2005	**Tested By:**	C. Smith

Report of Triaxial Permeability Test Using Back Pressure

Test Method: ASTM D5084

Sample Preparation Method:
Cut from Shelby tube sample.

Test Sample Dimensions	Before Test	After Test
Height, cm:	11.85	11.46
Diameter, cm:	7.09	7.11
Moisture Content, %:	69.3	60.7
Dry Density, PCF:	61.06	62.48

Permeability Test Conditions	
Type of Water Used:	Tap Water
Maximum Back Pressure, PSI:	23.3
Hydraulic Gradient:	9.4
Effective Stress, PSI (min):	2.39
Effective Stress, PSI (max):	3.97
Initial Degree of Saturation, %:	111.0
Final Degree of Saturation, %:	101.0

Specific Gravity = 2.51

Permeability Test Results

Coefficient of Permeability @ 20^{0}C (68^{0}F): 3.75E-07 cm/sec

Comments:

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One-Dimensional Consolidation

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Phone/Fax: 413-232-8566

Client:	ENSR	**Project:**	BP Hastings-on-Hudson
Item:	092205-1520	**ATC Project #:**	050584
Source:	PDGEO-1, U2, 39-41'	**ATC Lab No.:**	05-0857
Date Sampled:	10/3/2005	**Sampled By:**	Client
Date Tested:	10/5-14/2005	**Tested By:**	C Smith/ K Patton

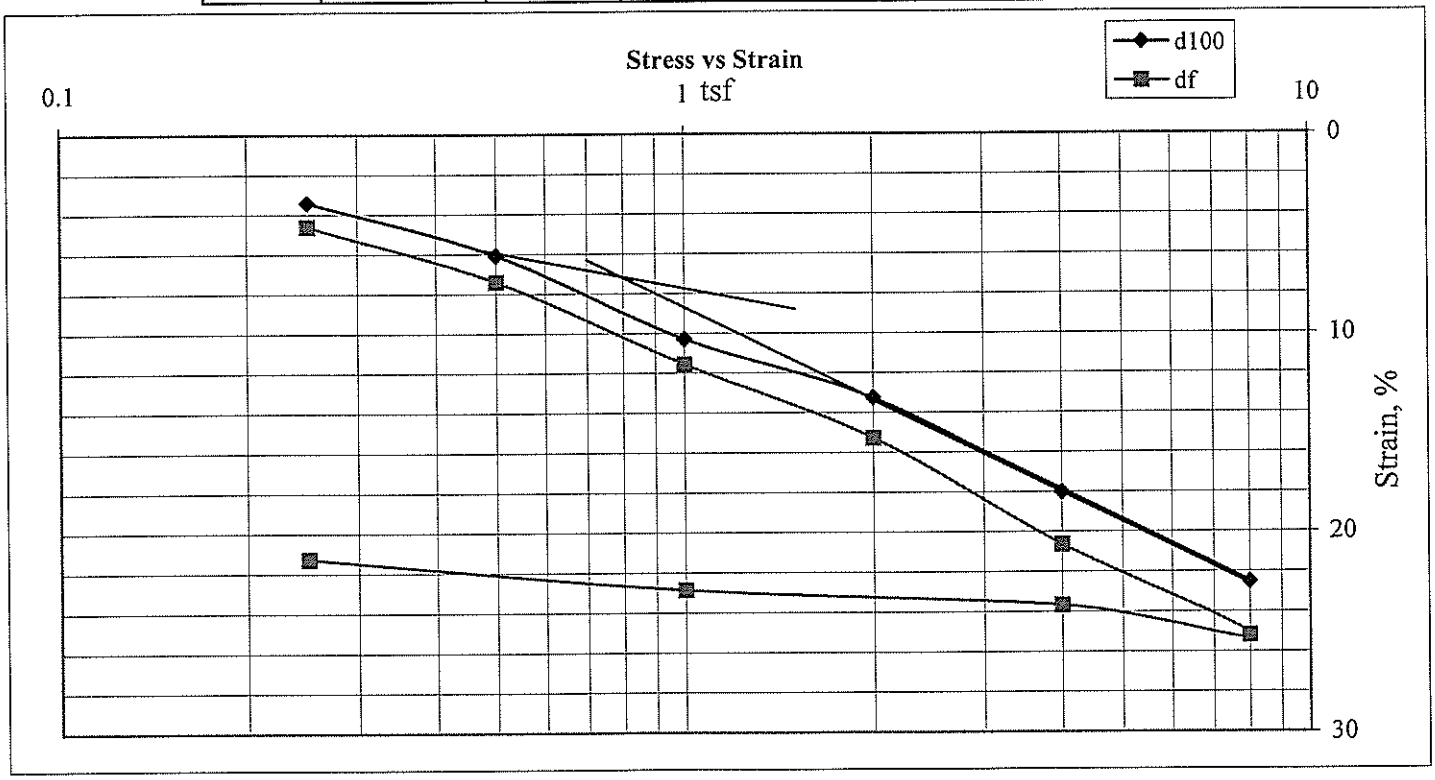
One-Dimensional Consolidation Test of Soil

Test Method: ASTM D2435

Soil Condition	% moisture	Unit Wt, pcf	Void Ratio	% Saturation	Preconsolidation Pressure
Initial	50.84	69.12	1.27	100.8	0.79 tsf
Full Consolidation	25.90	94.64	0.65	99.3	N/A

Test Procedure Method: B | Sample Trimming: Cutting Shoe | Condition: Inundated after seating

Stress, tsf	Duration, minutes	Strain at d100, %	Strain at df, %	Coefficient of Consolidation Cv, in2/min	Coeff. of Secondary Consol., Ca*
0.25	1005	3.41	4.61	0.0817	0.00798
0.5	1436	6.08	7.40	0.0933	0.00737
1	4178	10.29	11.55	0.0508	0.00945
2	1466	13.27	15.29	0.1725	0.00931
4	1448	18.03	20.63	0.1101	0.00901
8	1329	22.51	25.20	0.1229	0.00832
4	120		23.69		
1	194		22.86		
0.25	917		21.27		



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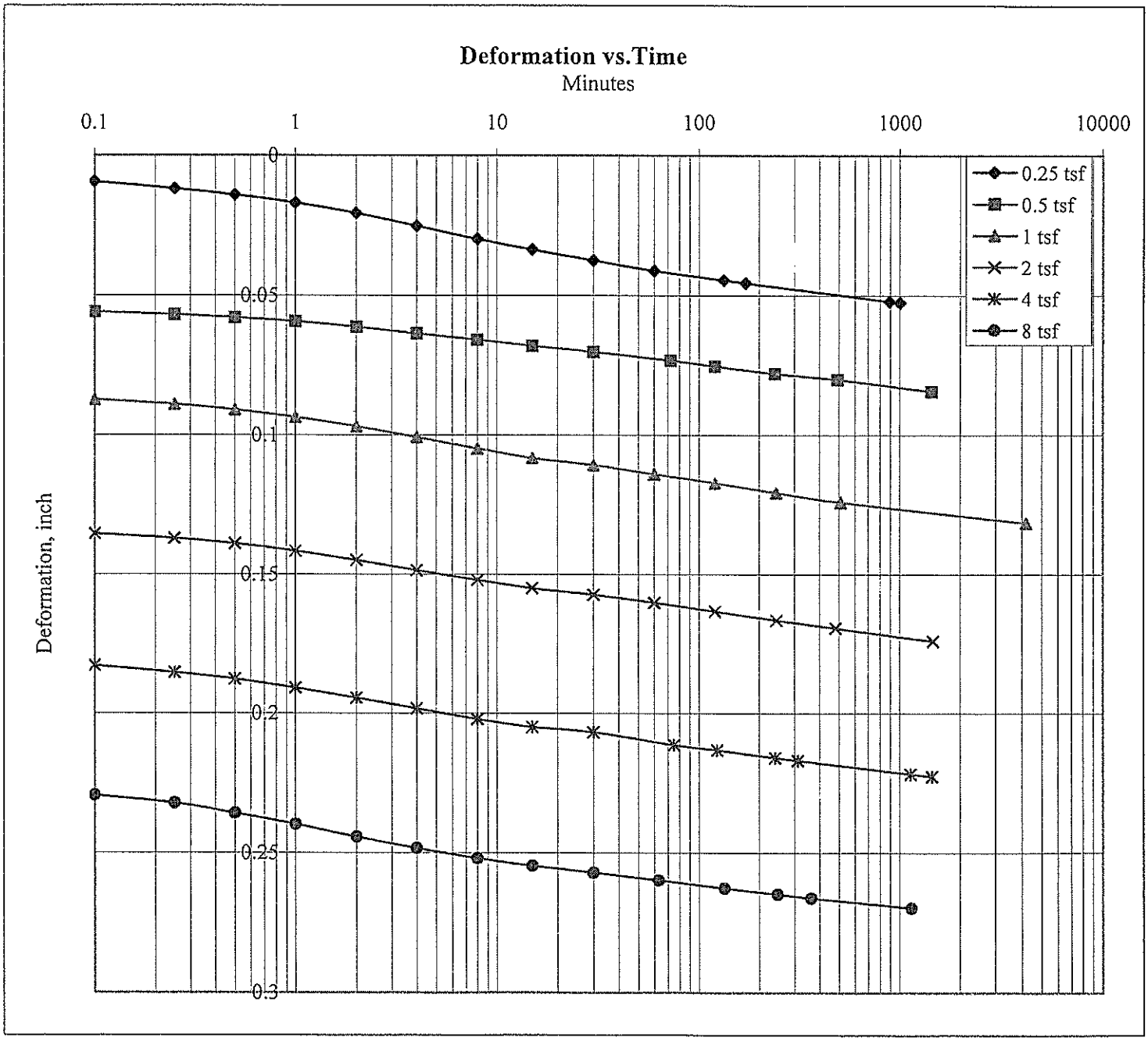
Phone/Fax: 413-232-8566

Client:	ENSR	**Project:**	BP Hastings-on-Hudson
Item:	092205-1520	**ATC Project #:**	050584
Source:	PDGEO-1, U2, 39-41'	**ATC Lab No.:**	05-0857
Date Sampled:	10/3/2005	**Sampled By:**	Client
Date Tested:	10/5-14/2005	**Tested By:**	C Smith/ K Patton

One-Dimensional Consolidation Test of Soil

Test Method: ASTM D2435



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Phone/Fax: 413-232-8566

Client:	ENSR Remediation & Const.	**Project:**	BP Hastings-on-Hudson
Item:	103305-1005	**ATC Project #:**	050584
Source:	PDGEO 4, 44'-46'	**ATC Lab No.:**	05-0925
Date Sampled:	10/8/2005	**Sampled By:**	Client
Date Tested:	12/21/2005	**Tested By:**	C. Smith

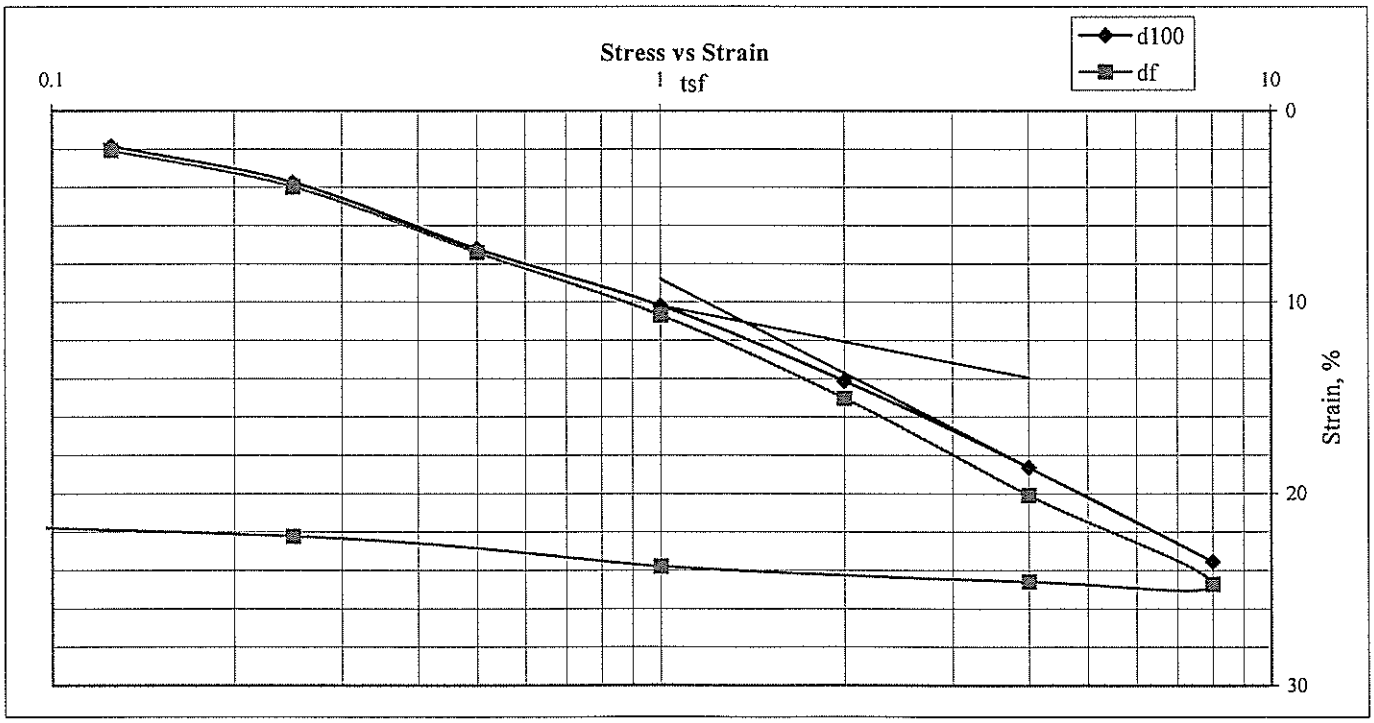
One-Dimensional Consolidation Test of Soil

Test Method: ASTM D2435

Soil Condition	% moisture	Unit Wt, pcf	Void Ratio	% Saturation	Preconsolidation Pressure
Initial	45.18	78.40	1.00	113.54	1.08 tsf
Full Consolidation	31.09	103.88	0.51	153.48	N/A

Test Procedure					
Method:	B	Sample Trimming:	Cutting Shoe	Condition:	Inundated after seating

Stress, tsf	Duration, minutes	Strain at d100, %	Strain at df, %	Coefficient of Consolidation Cv, in2/min	Coeff. of Secondary Consol., Ca*
0.125	4363	1.85	2.07	0.0019	0.0021
0.25	1394	3.75	3.98	0.0064	0.0045
0.5	1433	7.22	7.40	0.0068	0.0037
1	1435	10.20	10.69	0.0165	0.0081
2	1440	14.13	15.02	0.0360	0.0093
4	5776	18.63	20.09	0.0526	0.0068
8	1373	23.55	24.72	0.0463	0.0079
4	120		24.61		
1	60		23.80		
0.25	92		22.22		
0	99		20.11		



d100: 100% Primary Consolidation
df: Deformation at completion of test increment

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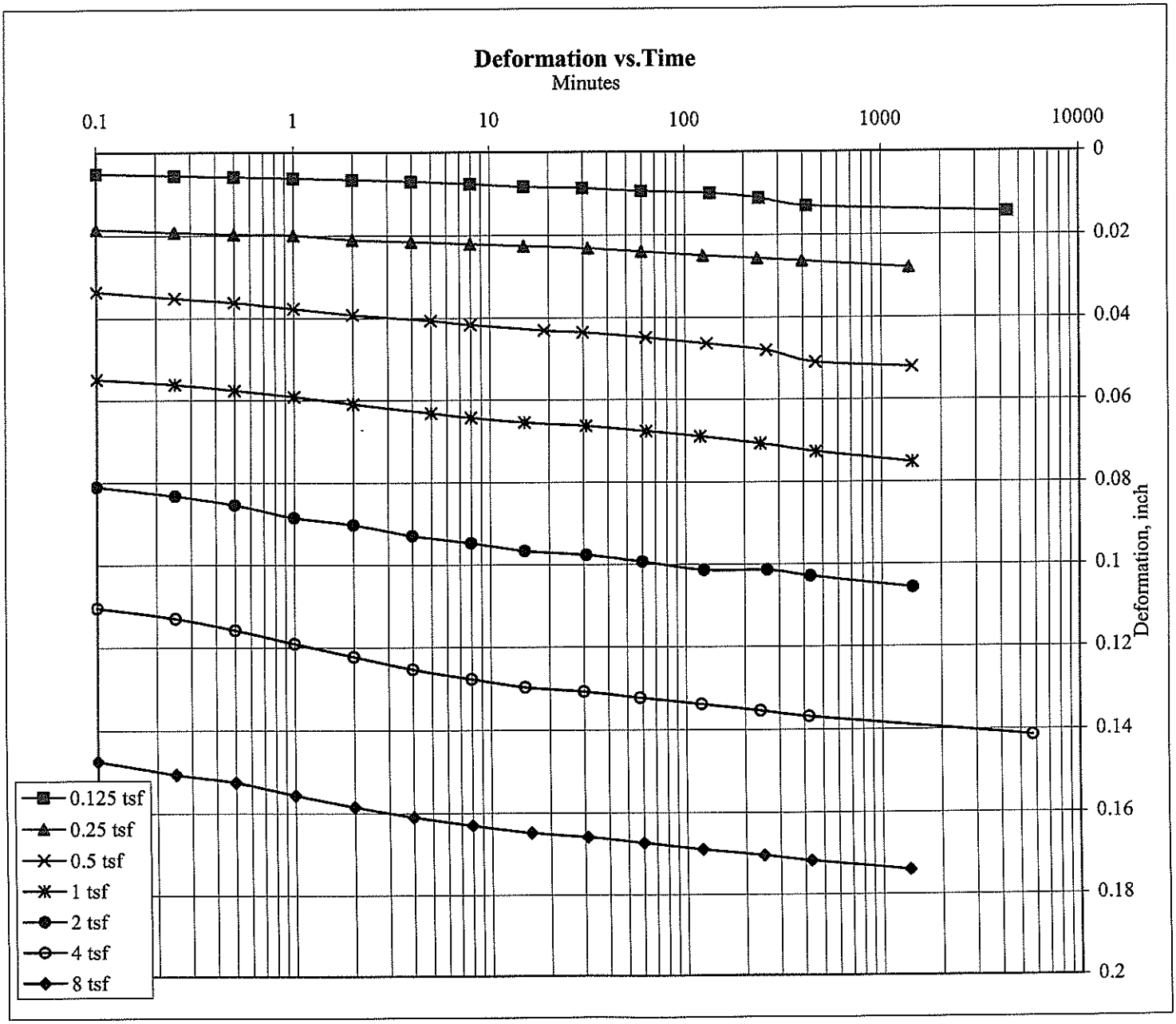
Client:	ENSR Remediation & Const.	**Project:**	BP Hastings-on-Hudson
Item:	103305-1005	**ATC Project #:**	050584
Source:	PDGEO 4, 44'-46'	**ATC Lab No.:**	05-0925
Date Sampled:	10/8/2005	**Sampled By:**	Client
Date Tested:	12/21/2005	**Tested By:**	C. Smith

One-Dimensional Consolidation Test of Soil

Test Method: ASTM D2435



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Client:	ENSR Remediation & Const.	**Project:**	BP Hastings-on-Hudson
Item:	28'-30'	**ATC Project #:**	050584
Source:	PDGEO 5, 101905-1615	**ATC Lab No.:**	05-1009
Date Sampled:	10/19/2005	**Sampled By:**	Client
Date Tested:	1/26/06-2/3/06	**Tested By:**	B. Jobity

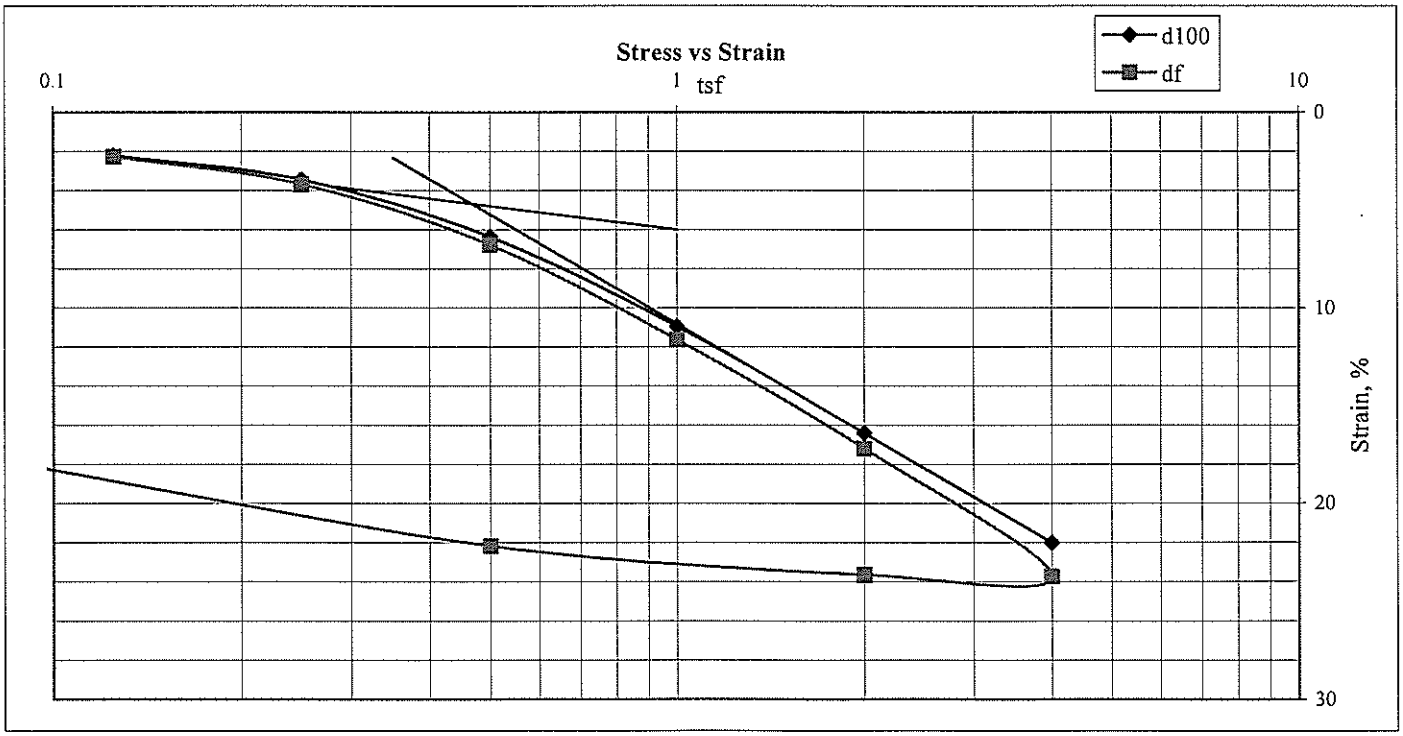
One-Dimensional Consolidation Test of Soil

Test Method: ASTM D2435

Soil Condition	% moisture	Unit Wt, pcf	Void Ratio	% Saturation	Preconsolidation Pressure
Initial	52.47	68.16	1.30	101.38	0.45 tsf
Full Consolidation	31.02	89.19	0.76	102.86	N/A

Test Procedure					
Method:	B	Sample Trimming:	Cutting Shoe	Condition:	Inundated after seating

Stress, tsf	Duration, minutes	Strain at d100, %	Strain at df, %	Coefficient of Consolidation Cv, in2/min	Coeff. of Secondary Consol., Ca*
0.125	1428	2.23	2.27	0.0041	0.0008
0.25	1540	3.45	3.69	0.0040	0.0020
0.5	1440	6.37	6.78	0.0044	0.0048
1	1440	10.95	11.63	0.0061	0.0024
2	1407	16.41	17.20	0.0071	0.0060
4	1411	22.01	23.74	0.0068	0.0129
2	39		23.65		
0.5	150		22.18		
0	186		17.76		



*Ca is dimensionless; equals final slope of consolidation curve divided by 1 plus initial void ratio.
d100: 100% Primary Consolidation
df: Deformation at completion of test increment

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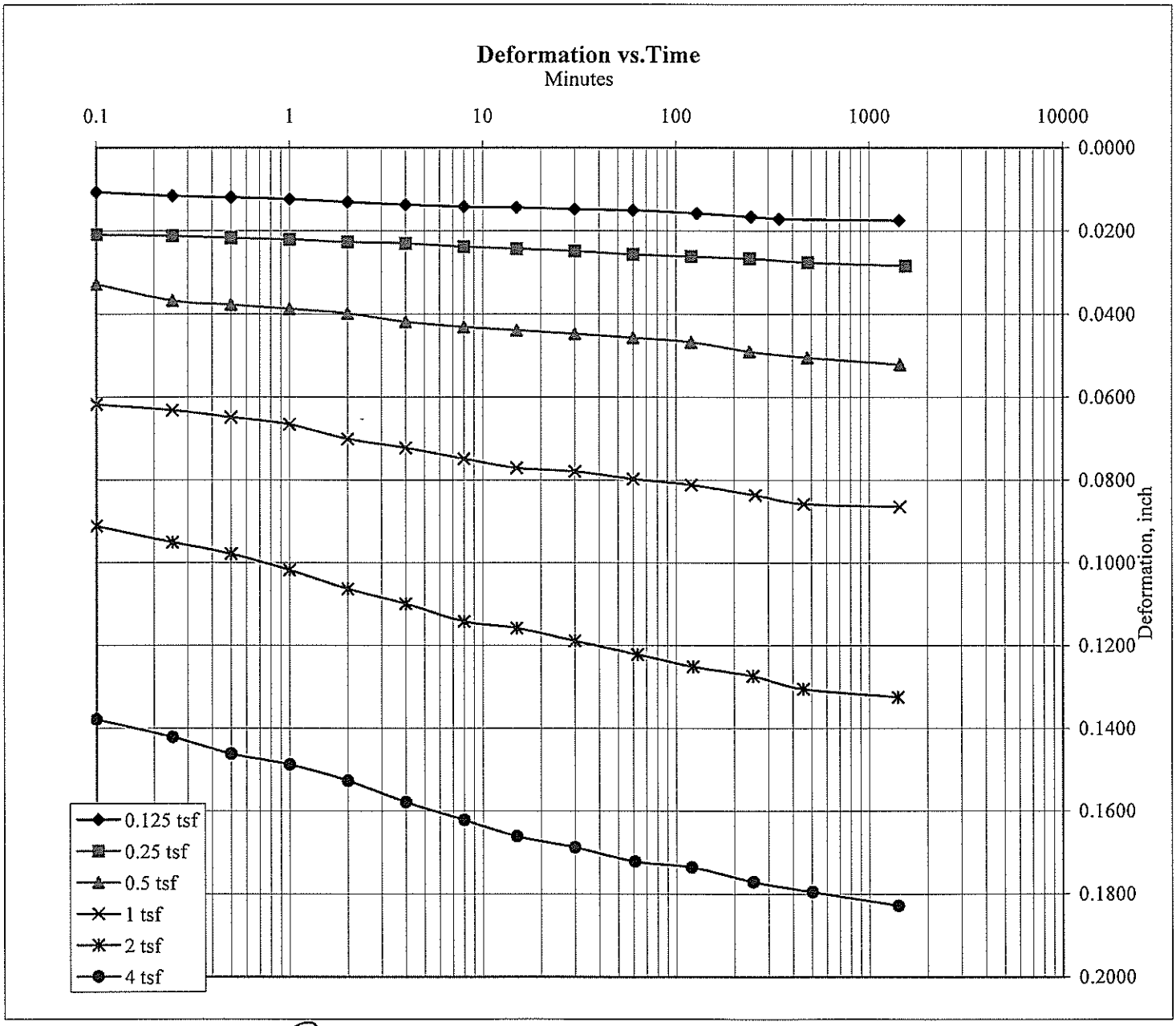
Client:	ENSR Remediation & Const.	**Project:**	BP Hastings-on-Hudson
Item:	28'-30'	**ATC Project #:**	050584
Source:	PDGEO 5, 101905-1615	**ATC Lab No.:**	05-1009
Date Sampled:	10/19/2005	**Sampled By:**	Client
Date Tested:	1/26/06-2/3/06	**Tested By:**	B. Jobity

One-Dimensional Consolidation Test of Soil

Test Method: ASTM D2435



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Client:	ENSR Remediation & Const.	**Project:**	BP Hastings-on-Hudson
Item:	30'-31'	**ATC Project #:**	050584
Source:	PDGEO 6, 101805-1425	**ATC Lab No.:**	05-1001
Date Sampled:	10/18/2005	**Sampled By:**	Client
Date Tested:	1/10/2006	**Tested By:**	C. Smith

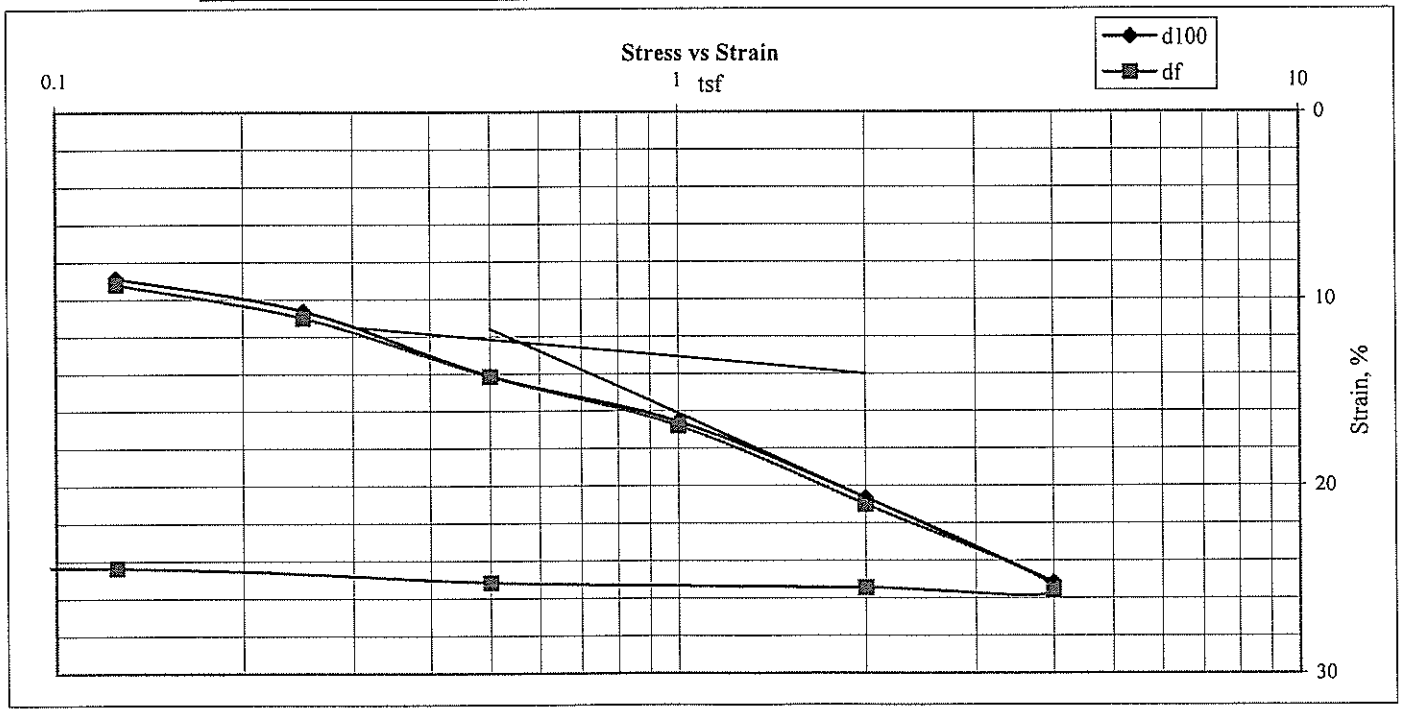
One-Dimensional Consolidation Test of Soil

Test Method: ASTM D2435

Soil Condition	% moisture	Unit Wt, pcf	Void Ratio	% Saturation	Preconsolidation Pressure
Initial	28.59	92.26	0.70	102.77	0.53 tsf
Full Consolidation	11.07	124.04	0.26	105.58	N/A

Test Procedure					
Method:	B	Sample Trimming:	Cutting Shoe	Condition:	Inundated after seating

Stress, tsf	Duration, minutes	Strain at d100, %	Strain at df, %	Coefficient of Consolidation Cv, in2/min	Coeff. of Secondary Consol., Ca*
0.125	1428	8.87	9.20	0.0111	0.0038
0.25	1505	10.63	11.01	0.0154	0.0042
0.5	4256	14.13	14.16	0.0024	0.0006
1	1384	16.58	16.80	0.0119	0.0020
2	1437	20.64	21.00	0.0059	0.0038
4	1436	25.16	25.56	0.0066	0.0042
2	60		25.45		
0.5	60		25.16		
0.125	60		24.38		
0	60		23.72		



NOTE: *Ca is dimensionless; equals final slope of consolidation curve divided by 1 plus initial void ratio.
d100: 100% Primary Consolidation
df: Deformation at completion of test increment
Sample contained abundant shell fragments.

Reviewed by:

Advance Testing

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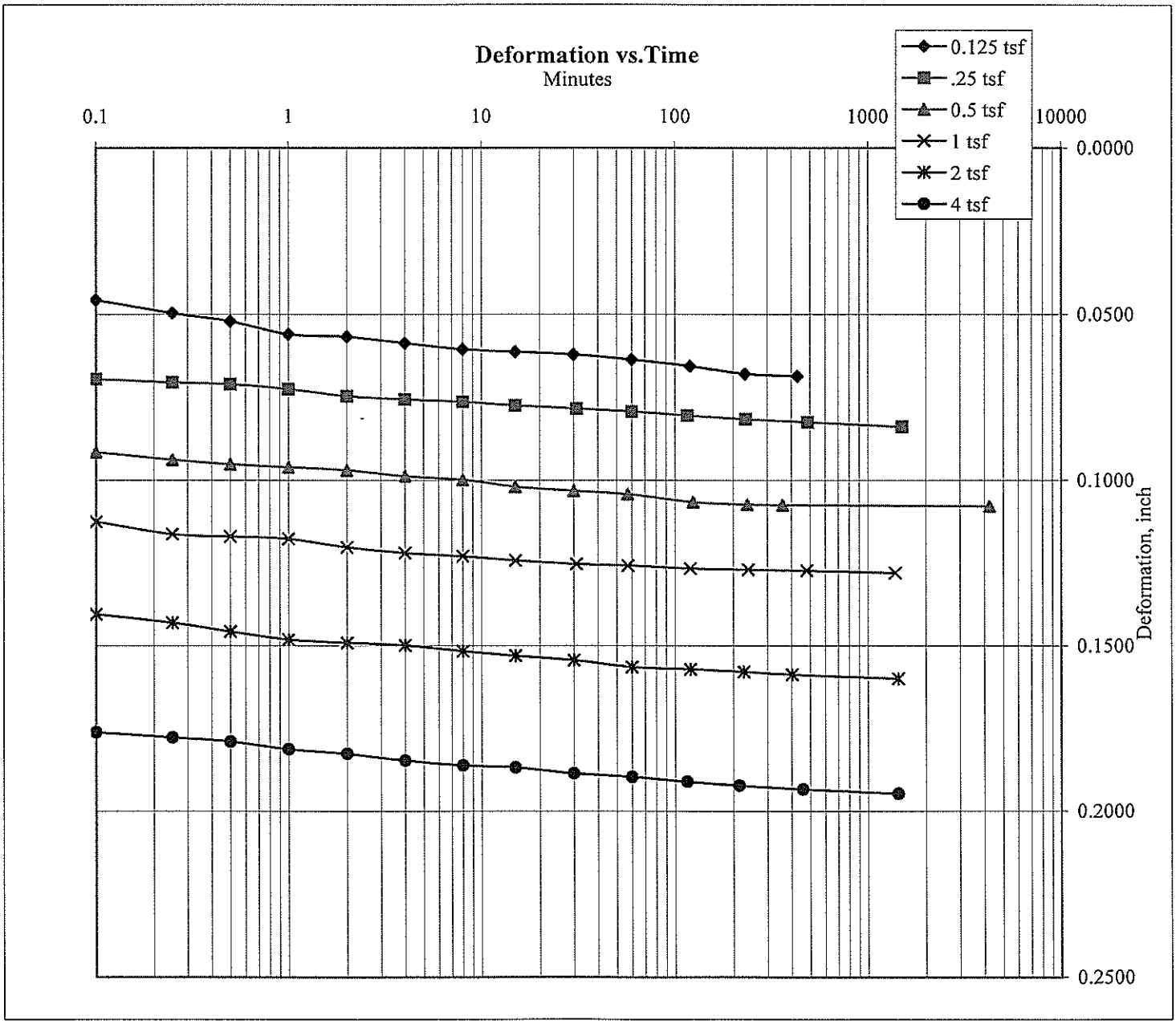
Client:	ENSR Remediation & Const.	**Project:**	BP Hastings-on-Hudson
Item:	30'-31'	**ATC Project #:**	050584
Source:	PDGEO 6, 101805-1425	**ATC Lab No.:**	05-1001
Date Sampled:	10/18/2005	**Sampled By:**	Client
Date Tested:	1/10/2006	**Tested By:**	C. Smith

One-Dimensional Consolidation Test of Soil

Test Method: ASTM D2435



Reviewed by: _____

NOTE: Sample contained abundant shell fragments.

Advance Testing

3348 Route 208, Campbell Hall, NY 10916
Phone: 845-496-1600 Fax: 845-496-1398
42 Day Farm Road, West Stockbridge, MA 01266
Phone/Fax: 413-232-8566

Client:	ENSR Remediation & Const.	**Project:**	BP Hastings-on-Hudson
Item:	28'-30'	**ATC Project #:**	050584
Source:	PDGEO 7, 101905-1100	**ATC Lab No.:**	05-1007
Date Sampled:	10/19/2005	**Sampled By:**	Client
Date Tested:	1/19-26/2006	**Tested By:**	C. Smith

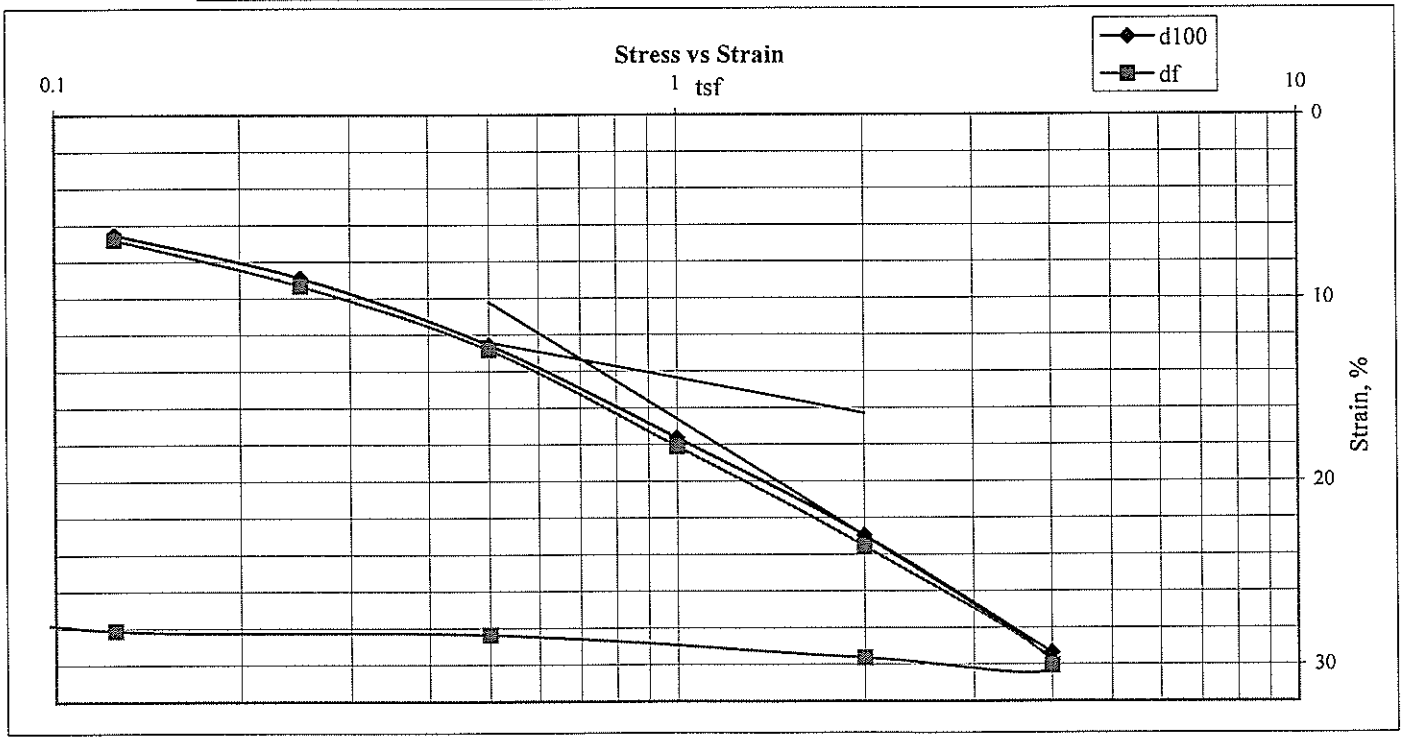
One-Dimensional Consolidation Test of Soil

Test Method: ASTM D2435

Soil Condition	% moisture	Unit Wt, pcf	Void Ratio	% Saturation	Preconsolidation Pressure
Initial	52.83	66.08	1.37	96.70	0.7 tsf
Full Consolidation	26.93	94.59	0.66	102.95	N/A

Test Procedure Method: B | Sample Trimming: Cutting Shoe | Condition: Inundated after seating

Stress, tsf	Duration, minutes	Strain at d100, %	Strain at df, %	Coefficient of Consolidation Cv, in2/min	Coeff. of Secondary Consol., Ca*
0.125	1440	6.53	6.79	0.0273	0.0014
0.25	1434	8.91	9.33	0.0119	0.0034
0.5	1439	12.58	12.82	0.0063	0.0037
1	1399	17.65	18.12	0.0047	0.0055
2	1435	22.98	23.57	0.0047	0.0060
4	1437	29.36	30.07	0.0044	0.0075
2	56		29.65		
0.5	60		28.37		
0.125	58		28.13		
0	57		26.62		



*Ca is dimensionless; equals final slope of consolidation curve divided by 1 plus initial void ratio.
d100: 100% Primary Consolidation
df: Deformation at completion of test increment

Reviewed by:

Advance Testing

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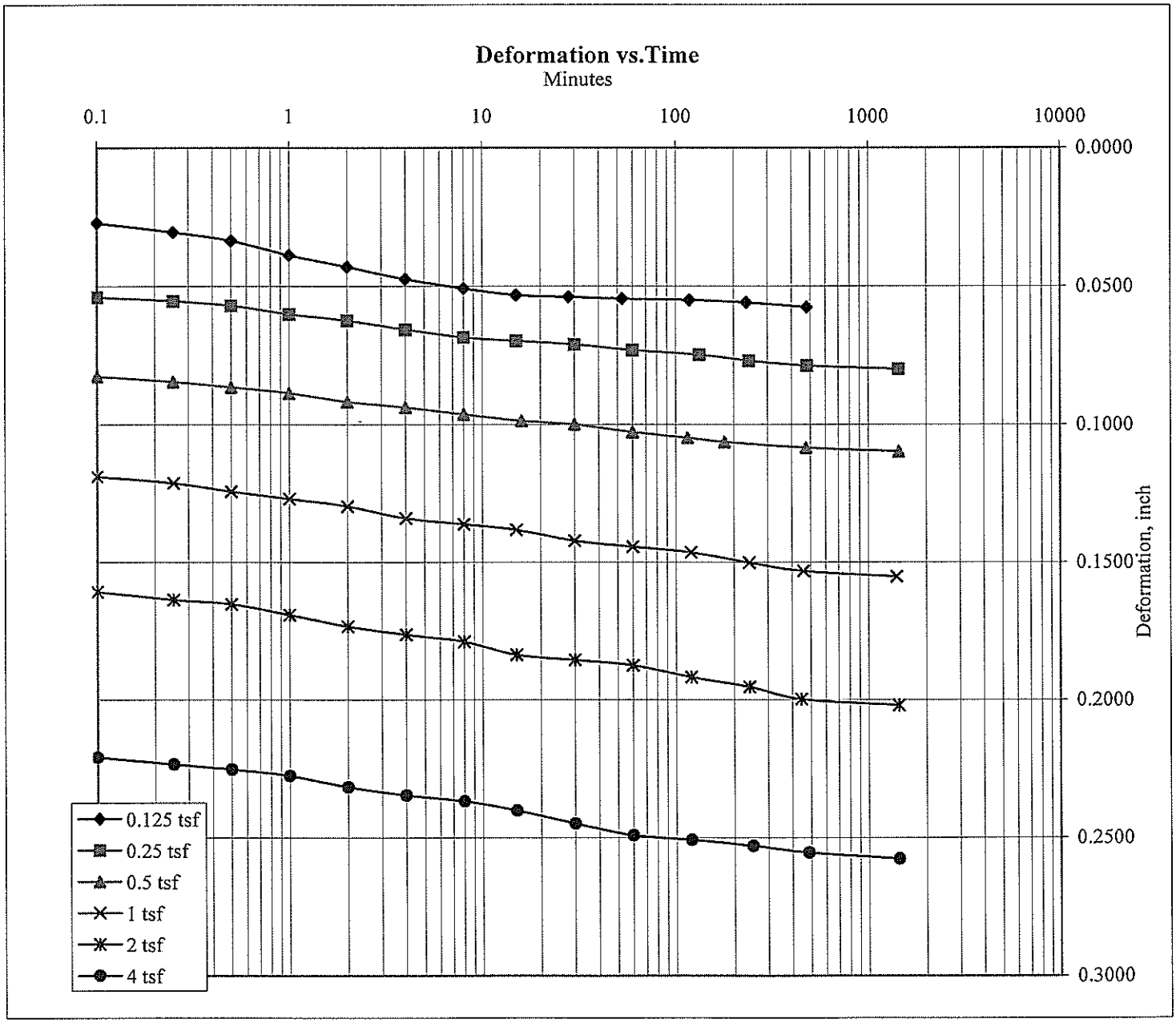
Client:	ENSR Remediation & Const.	**Project:**	BP Hastings-on-Hudson
Item:	28'-30'	**ATC Project #:**	050584
Source:	PDGEO 7, 101905-1100	**ATC Lab No.:**	05-1007
Date Sampled:	10/19/2005	**Sampled By:**	Client
Date Tested:	1/19-26/2006	**Tested By:**	C. Smith

One-Dimensional Consolidation Test of Soil

Test Method: ASTM D2435



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42 Day Farm Road, West Stockbridge, MA 01266
Phone/Fax: 413-232-8566

Client:	ENSR Remediation & Const.	**Project:**	BP Hastings-on-Hudson
Item:	100505-0815	**ATC Project #:**	050584
Source:	PDGEO 9, 35'-37'	**ATC Lab No.:**	05-0926
Date Sampled:	10/5/2005	**Sampled By:**	Client
Date Tested:	12/23/2005	**Tested By:**	C. Smith

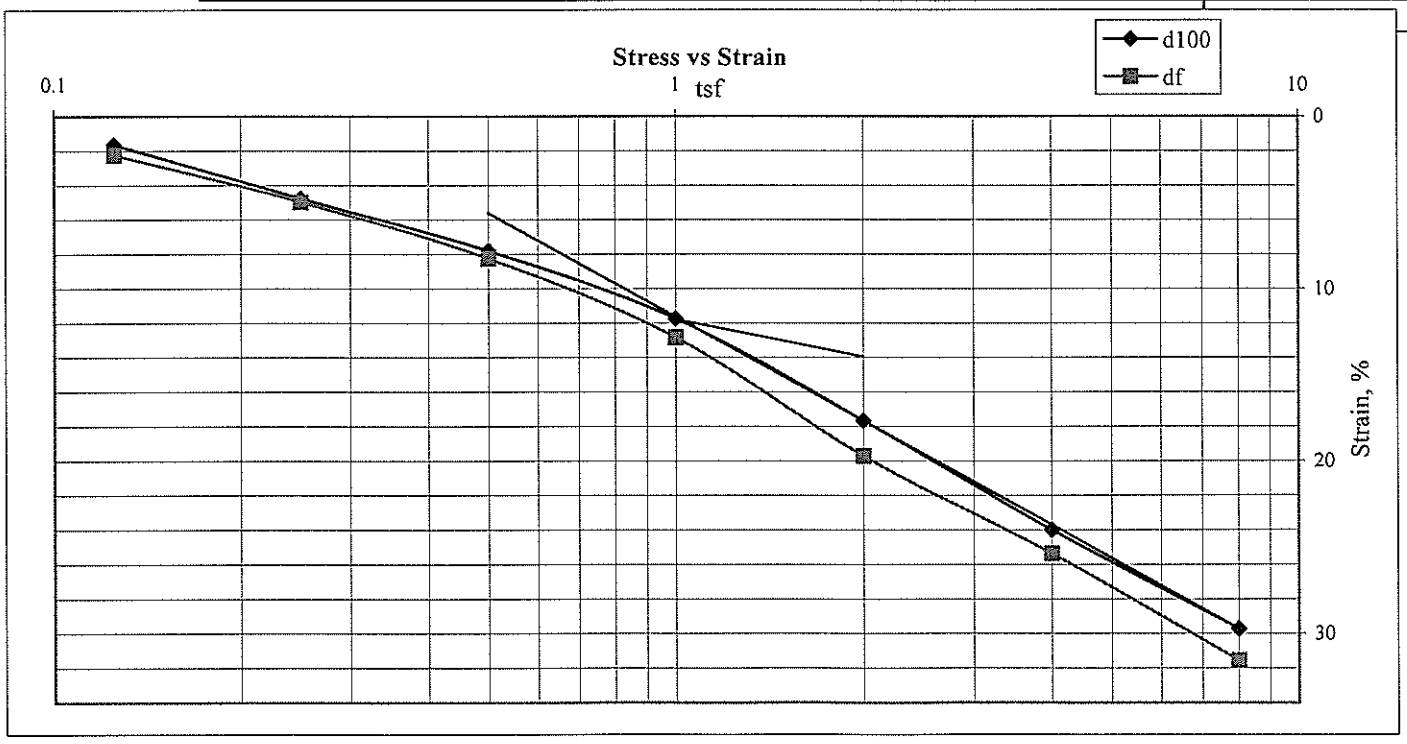
One-Dimensional Consolidation Test of Soil

Test Method: ASTM D2435

Soil Condition	% moisture	Unit Wt, pcf	Void Ratio	% Saturation	Preconsolidation Pressure
Initial	54.61	65.90	1.38	99.48	1.0 tsf
Full Consolidation	29.24	93.16	0.68	107.61	N/A

Test Procedure Method: B | Sample Trimming: Cutting Shoe | Condition: Inundated after seating

Stress, tsf	Duration, minutes	Strain at d100, %	Strain at df, %	Coefficient of Consolidation Cv, in2/min	Coeff. of Secondary Consol., Ca*
0.125		1.66	2.24	0.0556	0.00471
0.25		4.76	4.98	0.0168	0.00321
0.5		7.80	8.26	0.0076	0.00706
1		11.75	12.85	0.0173	0.01151
2		17.67	19.74	0.0255	0.01392
4		24.00	25.37	0.0210	0.01280
8		29.72	31.55	0.0219	0.01300
No rebound measurements for this sample. Sample was disturbed when removing final load increment.					



*Ca is dimensionless; equals final slope of consolidation curve divided by 1 plus initial void ratio.
d100: 100% Primary Consolidation
df: Deformation at completion of test increment

Reviewed by:

Advance Testing

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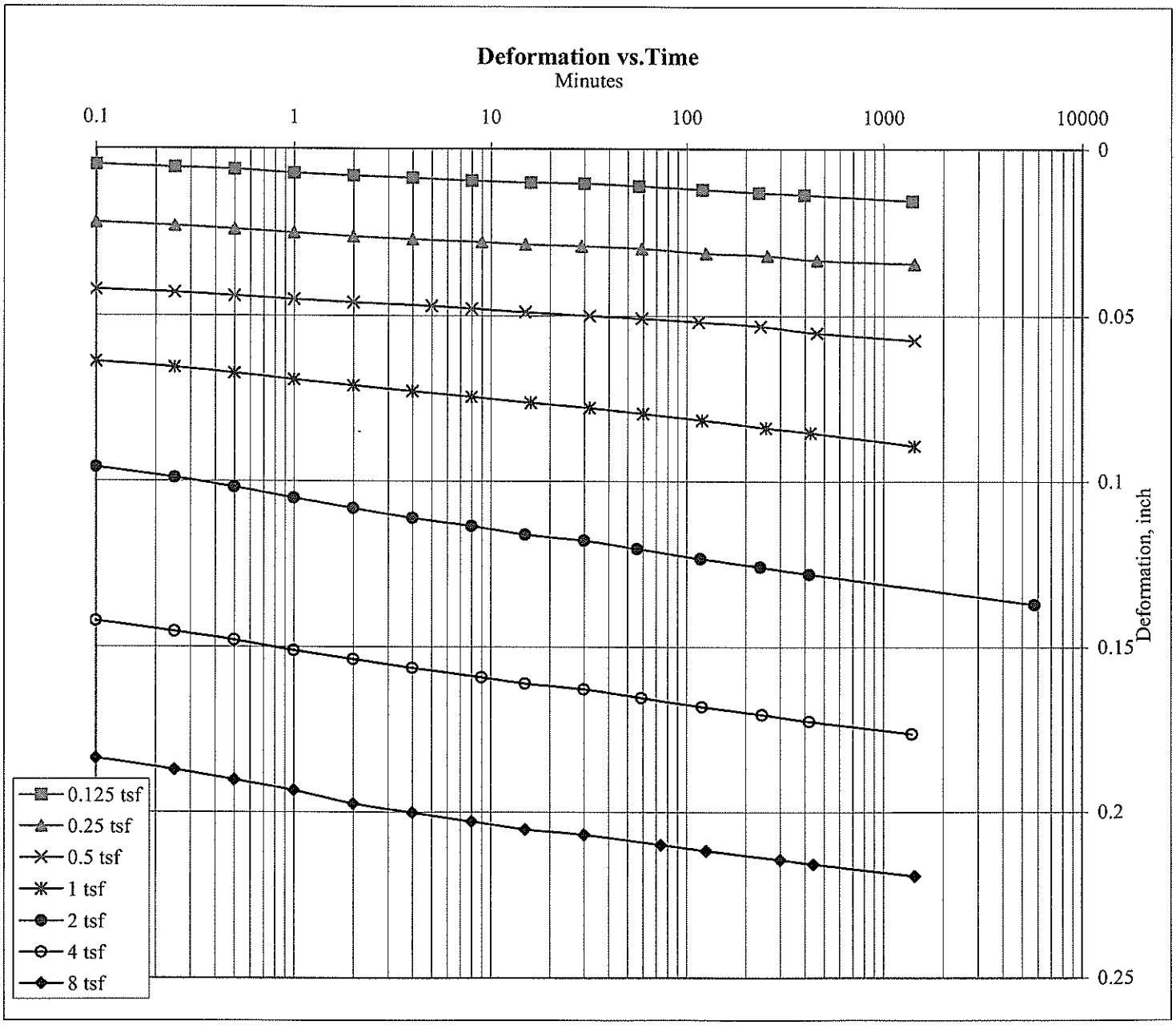
Client:	ENSR Remediation & Const.	**Project:**	BP Hastings-on-Hudson
Item:	100505-0815	**ATC Project #:**	050584
Source:	PDGEO 9, 35'-37'	**ATC Lab No.:**	05-0926
Date Sampled:	10/5/2005	**Sampled By:**	Client
Date Tested:	12/23/2005	**Tested By:**	C. Smith

One-Dimensional Consolidation Test of Soil

Test Method: ASTM D2435



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Phone/Fax: 413-232-8566

Client:	ENSR Remediation & Const.	**Project:**	BP Hastings-on-Hudson
Item:	100505-0900	**ATC Project #:**	050584
Source:	PDGEO 9, 40'-42'	**ATC Lab No.:**	05-0927
Date Sampled:	10/5/2005	**Sampled By:**	Client
Date Tested:	1/6-18/2006	**Tested By:**	C. Smith

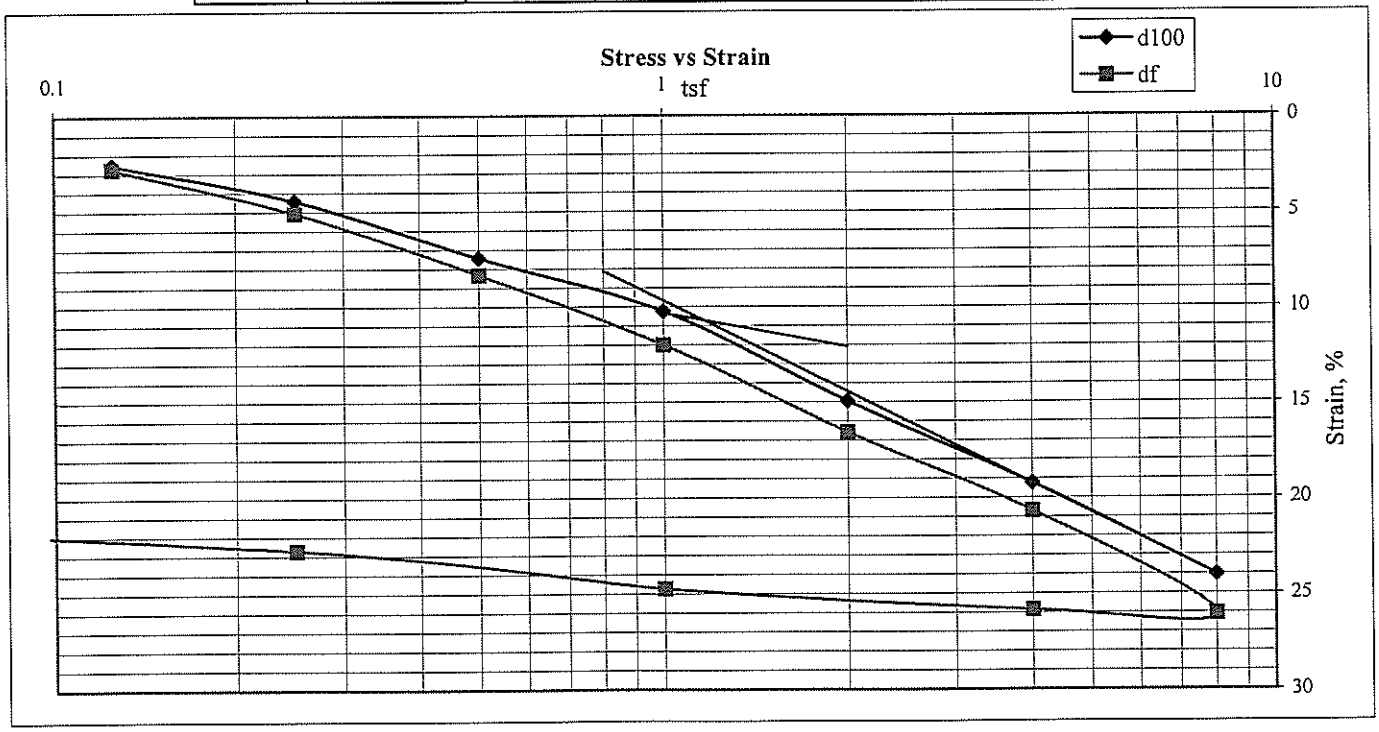
One-Dimensional Consolidation Test of Soil

Test Method: ASTM D2435

Soil Condition	% moisture	Unit Wt, pcf	Void Ratio	% Saturation	Preconsolidation Pressure
Initial	53.17	71.13	1.20	110.94	1.1 tsf
Full Consolidation	37.09	95.40	0.64	144.86	N/A

Test Procedure					
Method:	B	Sample Trimming:	Cutting Shoe	Condition:	Inundated after seating

Stress, tsf	Duration, minutes	Strain at d100, %	Strain at df, %	Coefficient of Consolidation Cv, in2/min	Coeff. of Secondary Consol., Ca*
0.125	1480	2.55	2.76	0.0183	0.0018
0.25	1384	4.42	5.08	0.0349	0.0043
0.5	1436	7.44	8.33	0.0247	0.0090
1	1499	10.25	12.00	0.0772	0.0076
2	4269	14.97	16.59	0.0325	0.0075
4	1443	19.24	20.69	0.0347	0.0098
8	1430	24.03	26.08	0.0617	0.0090
4	60		25.86		
1	54		24.74		
0.25	63		22.72		
0	127		18.86		



*Ca is dimensionless; equals final slope of consolidation curve divided by 1 plus initial void ratio.
d100: 100% Primary Consolidation
df: Deformation at completion of test increment

Reviewed by:

Advance Testing

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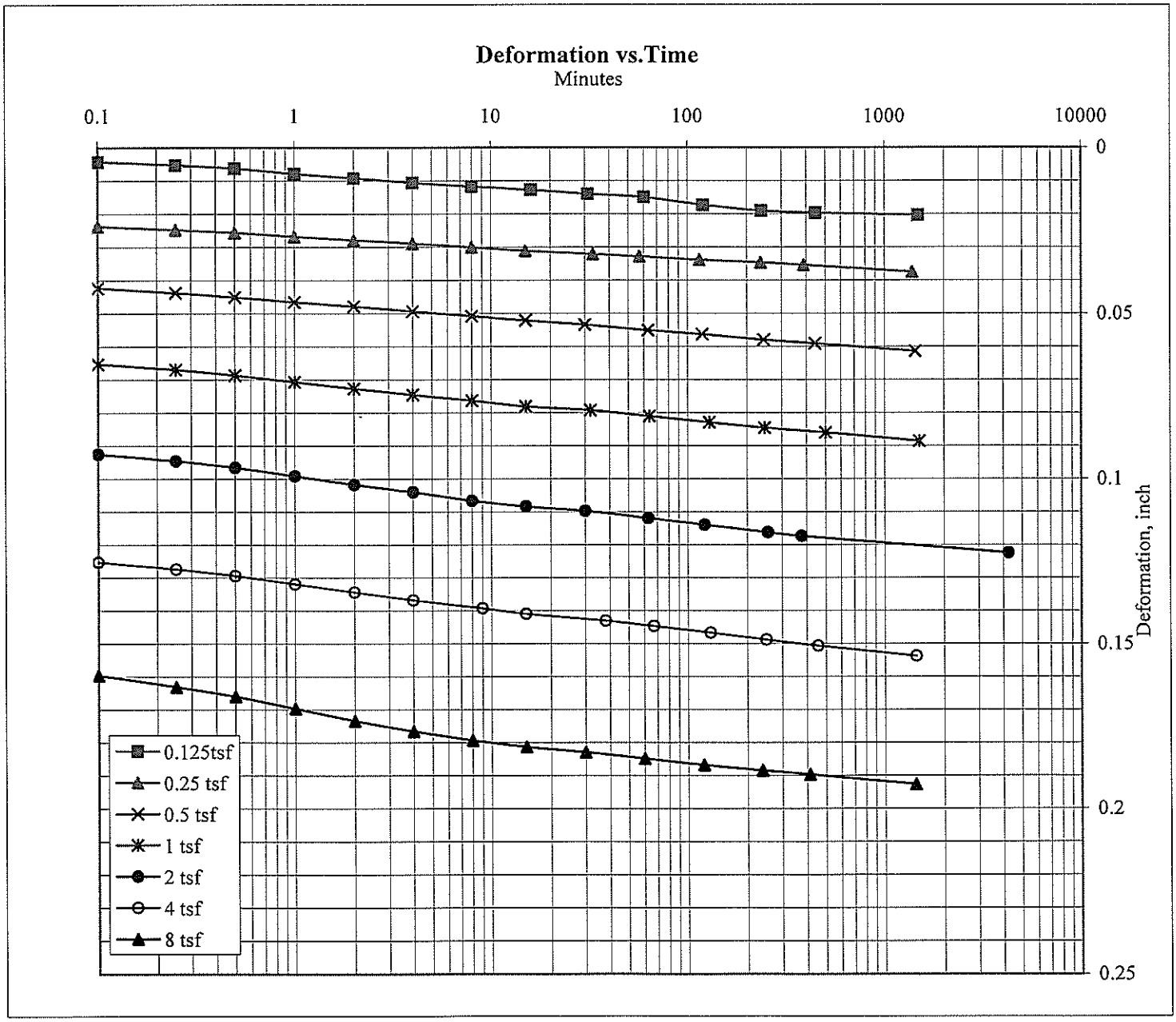
42 Day Farm Road, West Stockbridge, MA 01266
Phone/Fax: 413-232-8566

Client:	ENSR Remediation & Const.	**Project:**	BP Hastings-on-Hudson
Item:	100505-0900	**ATC Project #:**	050584
Source:	PDGEO 9, 40'-42'	**ATC Lab No.:**	05-0927
Date Sampled:	10/5/2005	**Sampled By:**	Client
Date Tested:	1/6-18/2006	**Tested By:**	C. Smith

One-Dimensional Consolidation Test of Soil

Test Method: ASTM D2435



Reviewed by: _____

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Phone/Fax: 413-232-8566

Client:	ENSR Remediation & Const.	**Project:**	BP Hastings-on-Hudson
Item:	100605-1035	**ATC Project #:**	050584
Source:	PDGEO9, 46'-48'	**ATC Lab No.:**	05-0928
Date Sampled:	10/6/2005	**Sampled By:**	Client
Date Tested:	10/25-11/3/05	**Tested By:**	C Smith/B Jobity

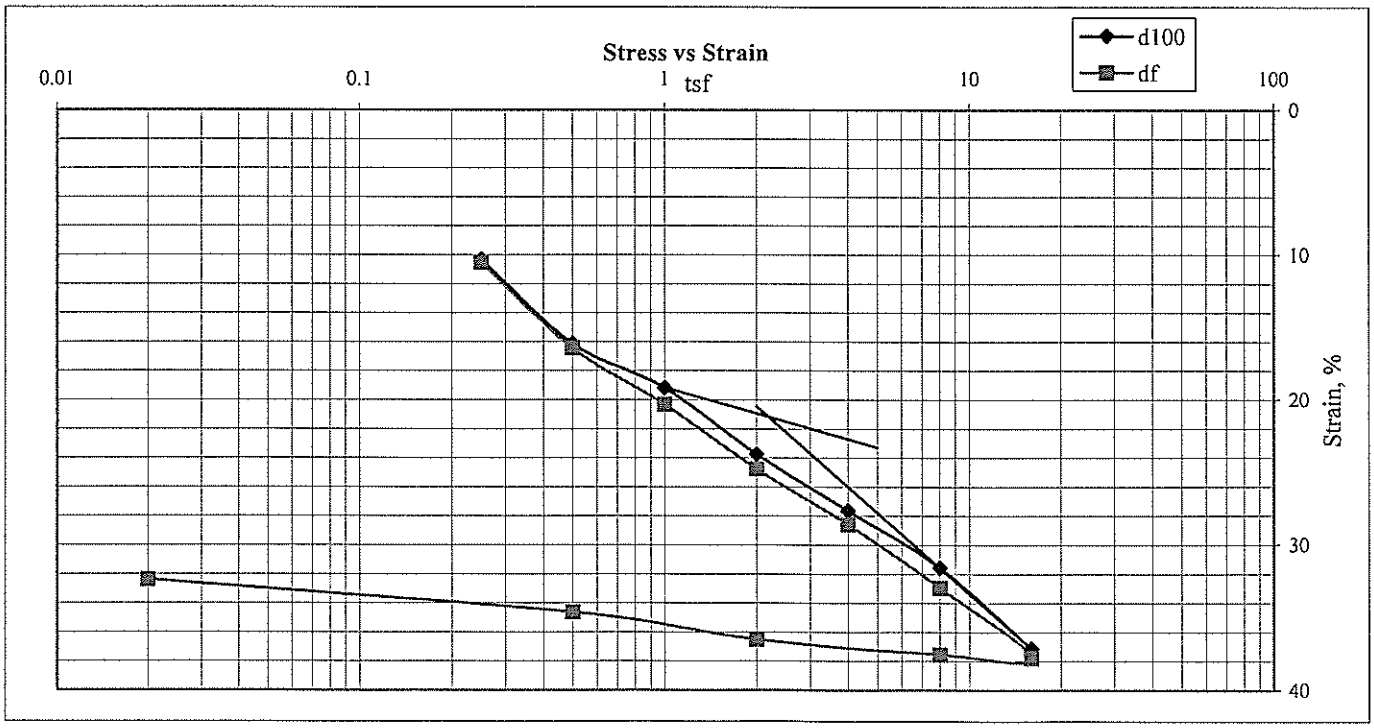
One-Dimensional Consolidation Test of Soil

Test Method: ASTM D2435

Soil Condition	% moisture	Unit Wt, pcf	Void Ratio	% Saturation	Preconsolidation Pressure
Initial	36.32	75.30	1.08	84.33	2.1 tsf
Full Consolidation	12.23	120.74	0.30	103.07	N/A

Test Procedure	Method: B	Sample Trimming: Cutting Shoe	Condition: Inundated after seating

Stress, tsf	Duration, minutes	Strain at d100, %	Strain at df, %	Coefficient of Consolidation Cv, in2/min	Coeff. of Secondary Consol., Ca*
0.25	1375	10.33	10.52	0.0129	0.00094
0.5	1445	16.14	16.44	0.0038	0.00240
1	1440	19.17	20.33	0.0489	0.00305
2	4237	23.76	24.78	0.0234	0.00623
4	1441	27.64	28.59	0.0389	0.00589
8	1443	31.57	32.96	0.0486	0.00864
16	1440	37.13	37.79	0.0227	0.00620
8	15	---	37.55	---	
2	55	---	36.51	---	
0.5	110	---	34.63	---	
0.02	110	---	32.38	---	



*Ca is dimensionless; equals final slope of consolidation curve divided by 1 plus initial void ratio.
d100: 100% Primary Consolidation
df: Deformation at completion of test increment

Reviewed by:

Advance Testing

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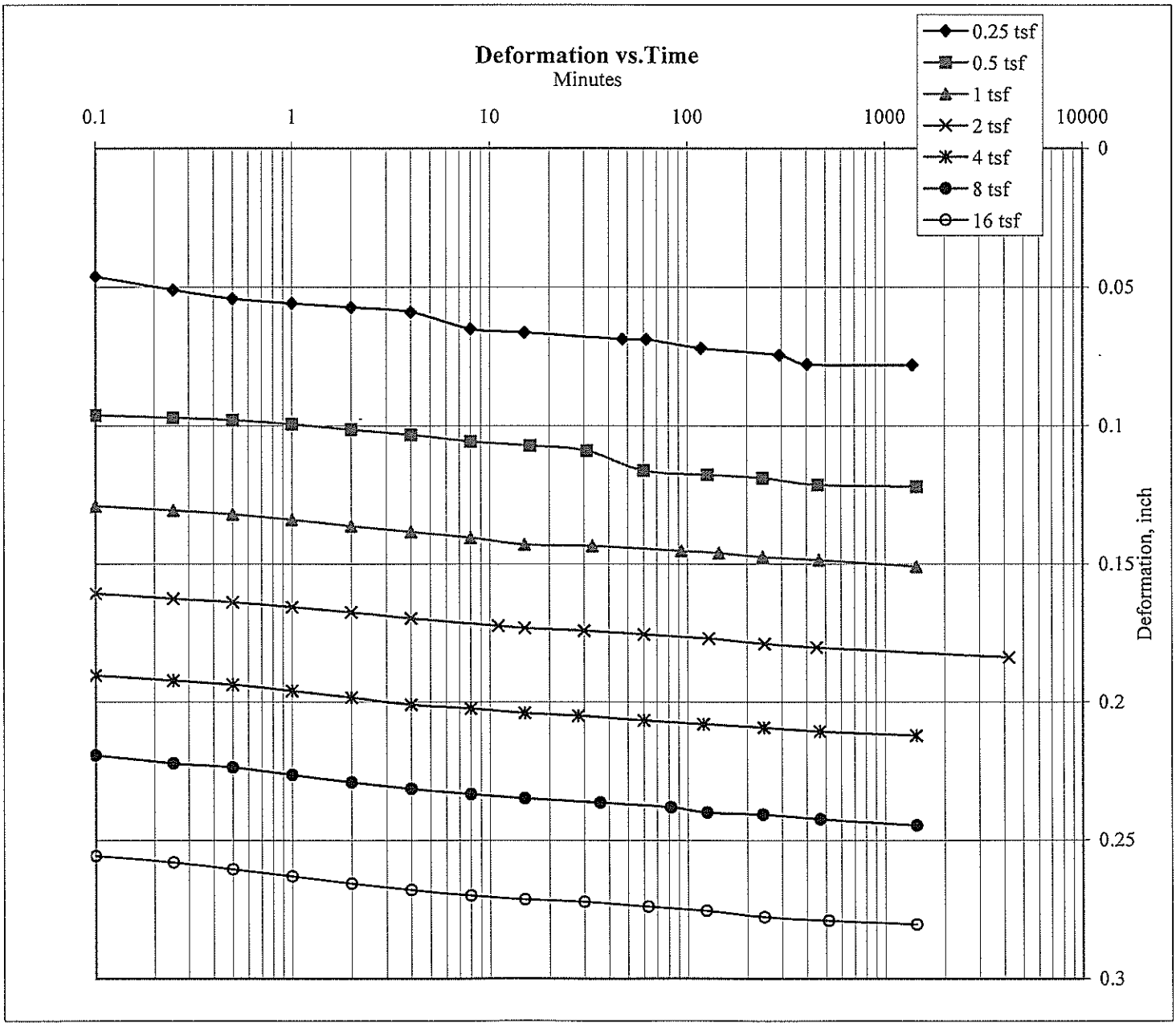
42 Day Farm Road, West Stockbridge, MA 01266
Phone/Fax: 413-232-8566

Client:	ENSR Remediation & Const.	**Project:**	BP Hastings-on-Hudson
Item:	100605-1035	**ATC Project #:**	050584
Source:	PDGEO9, 46'-48'	**ATC Lab No.:**	05-0928
Date Sampled:	10/6/2005	**Sampled By:**	Client
Date Tested:	10/25-11/3/05	**Tested By:**	C Smith/B Jobity

One-Dimensional Consolidation Test of Soil

Test Method: ASTM D2435



Reviewed by:

Advance Testing

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42 Day Farm Road, West Stockbridge, MA 01266
Phone/Fax: 413-232-8566

Client:	ENSR Remediation & Const.	**Project:**	BP Hastings-on-Hudson
Item:	100605-1115	**ATC Project #:**	050584
Source:	PDGEO 9, 50'-52'	**ATC Lab No.:**	05-0929
Date Sampled:	10/6/2005	**Sampled By:**	Client
Date Tested:	11/11/2005	**Tested By:**	C. Smith

One-Dimensional Consolidation Test of Soil

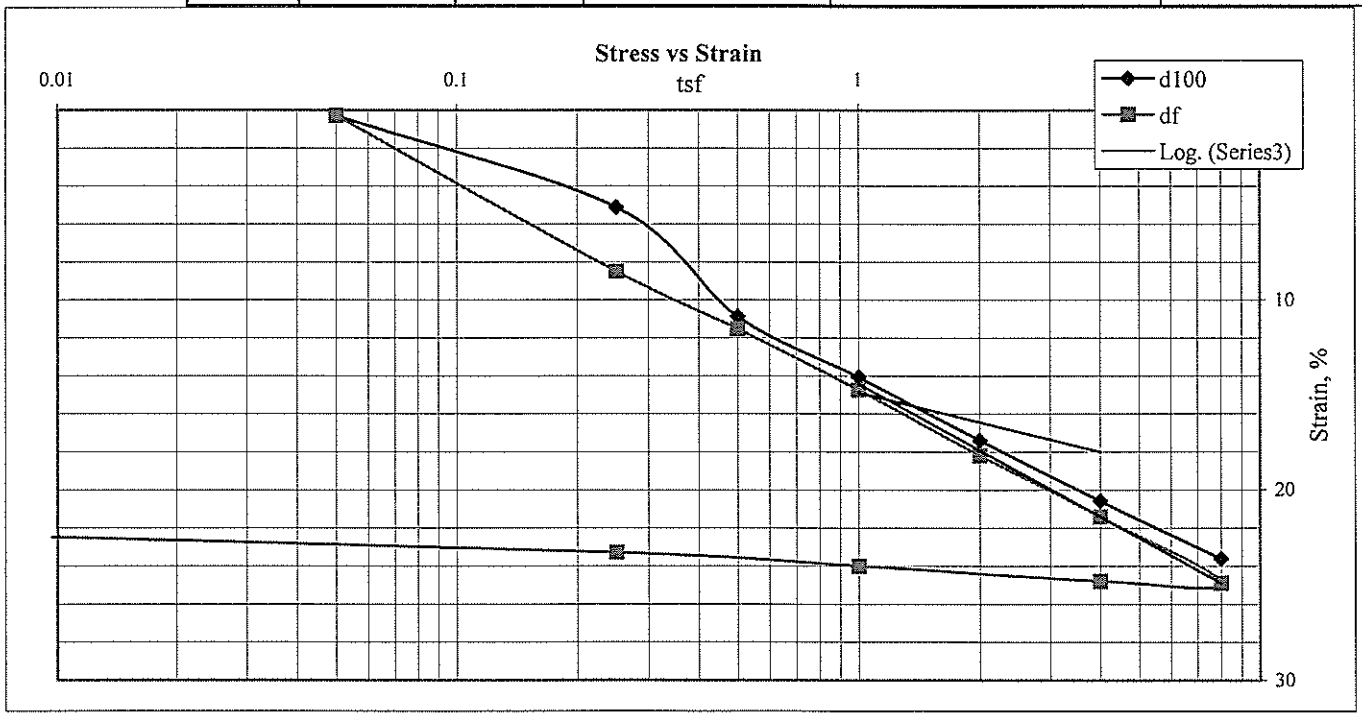
Test Method: ASTM D2435

Soil Condition	% moisture	Unit Wt, pcf	Void Ratio	% Saturation	Preconsolidation Pressure
Initial	51.86	64.33	1.44	90.65	1.1 tsf*
Full Consolidation	34.16	85.65	0.83	103.37	N/A

*Preconsolidation pressure from d100 curve was indeterminate. Value was determined from df curve.

Test Procedure	Method: B	Sample Trimming: Cutting Shoe	Condition: Inundated after seating

Stress, tsf	Duration, minutes	Strain at d100, %	Strain at df, %	Coefficient of Consolidation Cv, in2/min	Coeff. of Secondary Consol., Ca*
0.05	1531	0.28	0.28	0.0015	0.00103
0.25	2740	5.12	8.50	0.1392	0.01291
0.5	1437	10.87	11.53	0.0241	0.00408
1	1420	14.08	14.75	0.0429	0.00524
2	1440	17.39	18.19	0.0695	0.00438
4	1440	20.58	21.41	0.0754	0.00441
8	1500	23.62	24.89	0.0886	0.00688
4	60		24.79		
1	60		24.01		
0.25	60		23.29		
0	120		21.95		



Revised 12/2/05

*Ca is dimensionless; equals final slope of consolidation curve divided by 1 plus initial void ratio.
d100: 100% Primary Consolidation
df: Deformation at completion of test increment

Reviewed by:

Advance Testing
3348 Route 208, Campbell Hall, NY 10916
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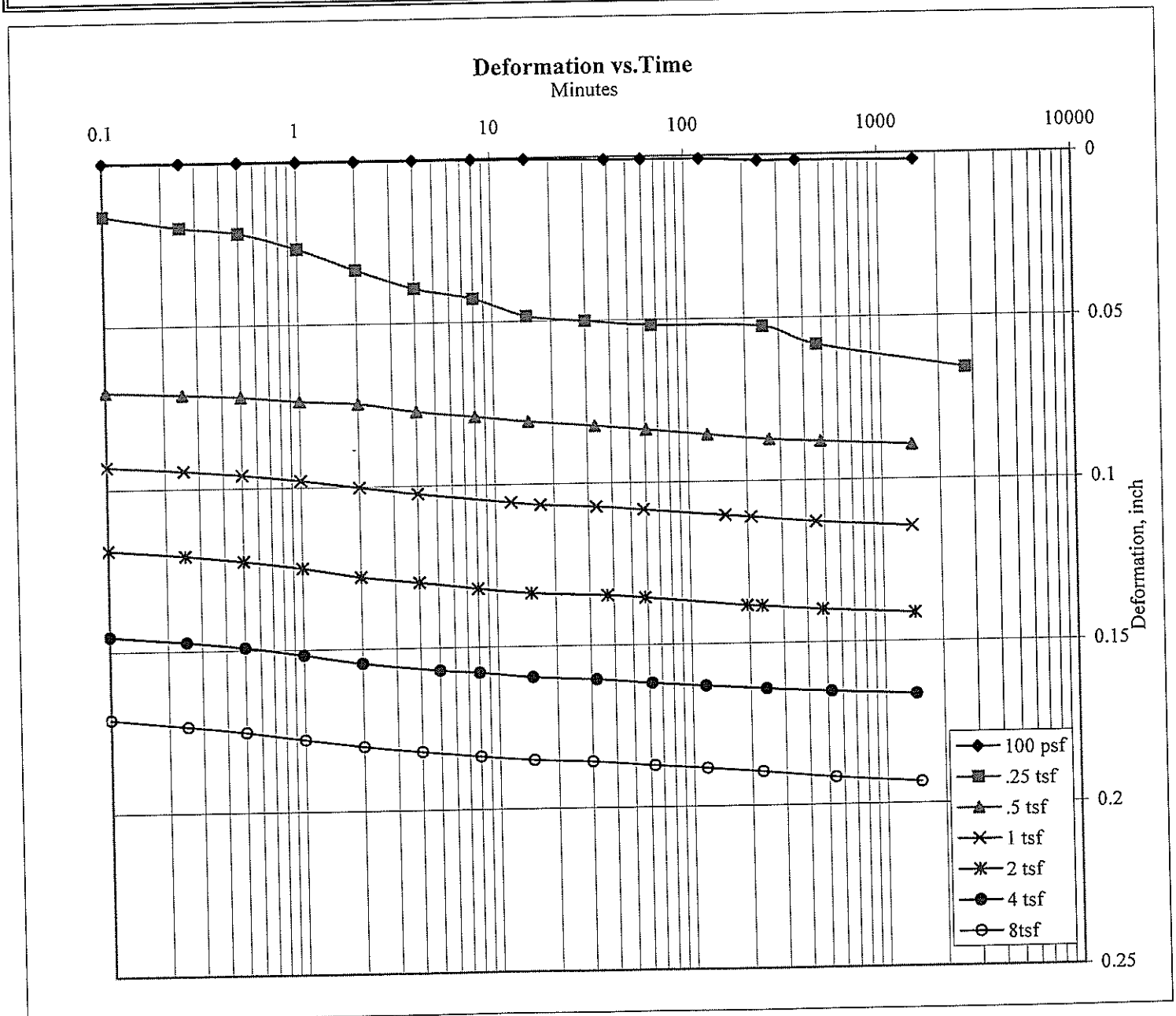
42 Day Farm Road, West Stockbridge, MA 01266
Phone/Fax: 413-232-8566

Client:	ENSR Remediation & Const.	**Project:**	BP Hastings-on-Hudson
Item:	100605-1115	**ATC Project #:**	050584
Source:	PDGEO 9, 50'-52'	**ATC Lab No.:**	05-0929
Date Sampled:	10/6/2005	**Sampled By:**	Client
Date Tested:	11/11/2005	**Tested By:**	C. Smith

One-Dimensional Consolidation Test of Soil

Test Method: ASTM D2435



Reviewed by:

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Client:	ENSR Remediation & Const.	**Project:**	BP Hastings-on-Hudson
Item:	100605-1300	**ATC Project #:**	050584
Source:	PDGEO 9, 54'-56'	**ATC Lab No.:**	05-0930
Date Sampled:	10/6/2005	**Sampled By:**	Client
Date Tested:	1/9/2006	**Tested By:**	C. Smith

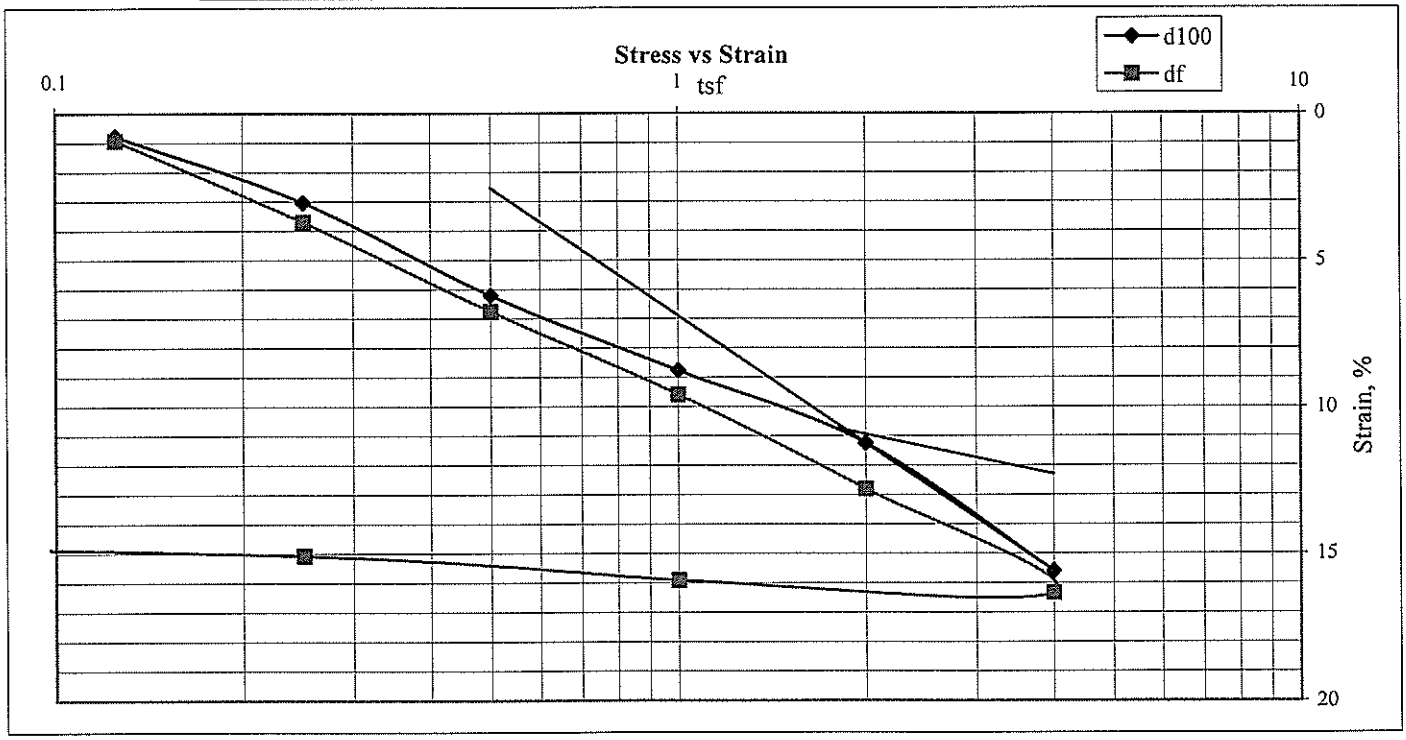
One-Dimensional Consolidation Test of Soil

Test Method: ASTM D2435

Soil Condition	% moisture	Unit Wt, pcf	Void Ratio	% Saturation	Preconsolidation Pressure
Initial	38.67	84.47	0.86	113.52	1.8 tsf
Full Consolidation	28.25	100.82	0.55	127.95	N/A

Test Procedure					
Method:	B	Sample Trimming:	Cutting Shoe	Condition:	Inundated after seating

Stress, tsf	Duration, minutes	Strain at d100, %	Strain at df, %	Coefficient of Consolidation Cv, in2/min	Coeff. of Secondary Consol., Ca*
0.125	1435	0.79	0.92	0.0434	0.0008
0.25	1498	3.04	3.70	0.0559	0.0027
0.5	4268	6.21	6.76	0.0463	0.0024
1	1442	8.78	9.59	0.0628	0.0041
2	1429	11.25	12.81	0.1890	0.0058
4	1440	15.60	16.34	0.0576	0.0043
1	64		15.91		
0.25	60		15.08		
0.001	60		14.02		



*Ca is dimensionless; equals final slope of consolidation curve divided by 1 plus initial void ratio.
d100: 100% Primary Consolidation
df: Deformation at completion of test increment

Reviewed by:

Advance Testing

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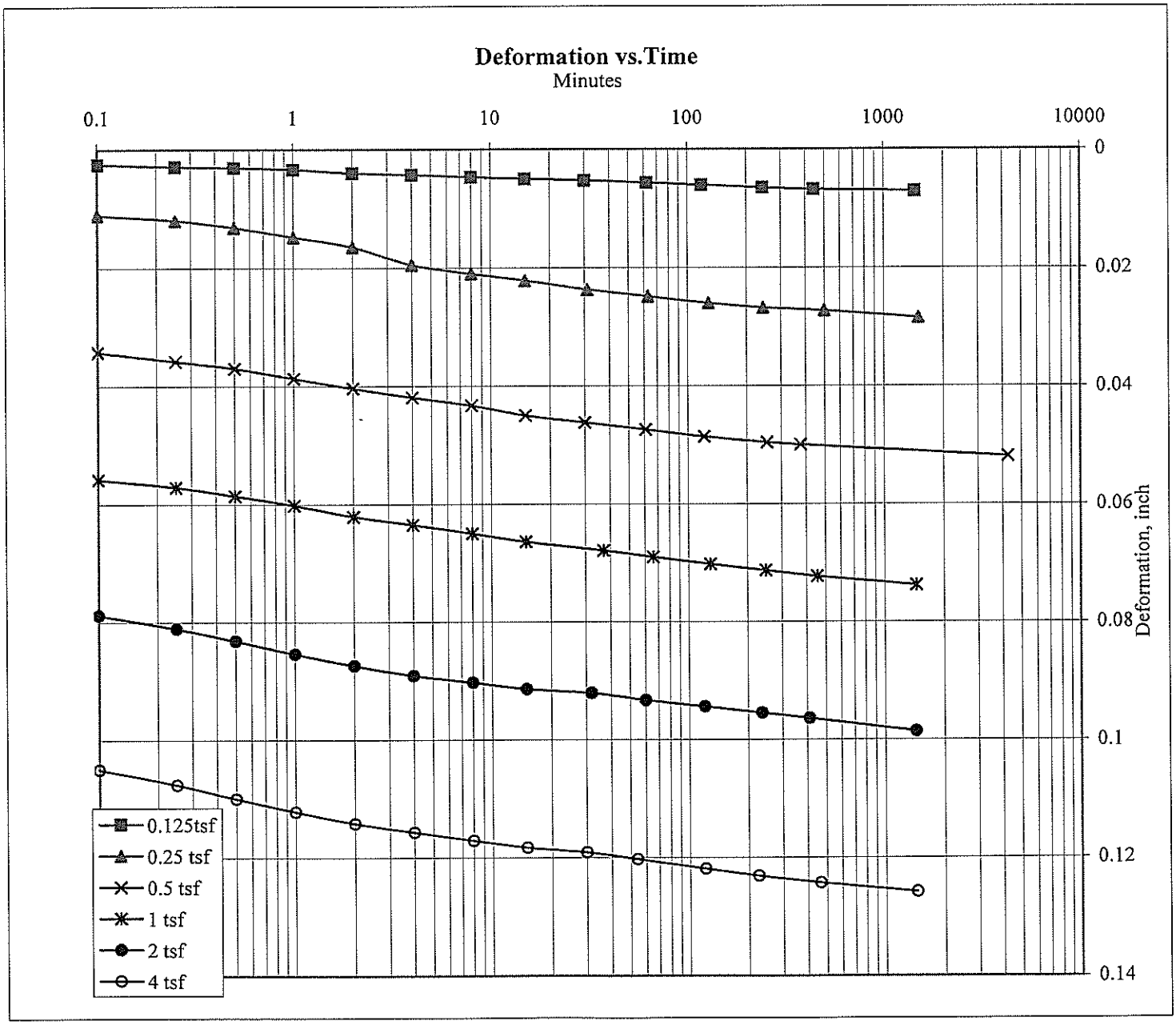
Phone/Fax: 413-232-8566

Client:	ENSR Remediation & Const.	**Project:**	BP Hastings-on-Hudson
Item:	100605-1300	**ATC Project #:**	050584
Source:	PDGEO 9, 54'-56'	**ATC Lab No.:**	05-0930
Date Sampled:	10/6/2005	**Sampled By:**	Client
Date Tested:	1/9/2006	**Tested By:**	C. Smith

One-Dimensional Consolidation Test of Soil

Test Method: ASTM D2435



Reviewed by: _____

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Phone/Fax: 413-232-8566

Client:	ENSR Remediation & Const.	**Project:**	BP Hastings-on-Hudson
Item:	101305-1140	**ATC Project #:**	050584
Source:	PDGEO13, 44'-46'	**ATC Lab No.:**	05-0918
Date Sampled:	10/13/2005	**Sampled By:**	Client
Date Tested:	N/A	**Tested By:**	N/A

One-Dimensional Consolidation Test of Soil

Test Method: ASTM D2435

No test was performed. The portion of the sample reserved for this test contained a large oyster shell that prevented preparation of an acceptable sample.

Reviewed by: _____

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Phone/Fax: 413-232-8566

Client:	ENSR Remediation & Const.	**Project:**	BP Hastings-on-Hudson
Item:	PDGEO 13, 58'-60'	**ATC Project #:**	050584
Source:	101405-0840	**ATC Lab No.:**	05-0920
Date Sampled:	10/14/2005	**Sampled By:**	Client
Date Tested:	12/13-22/2005	**Tested By:**	C. Smith

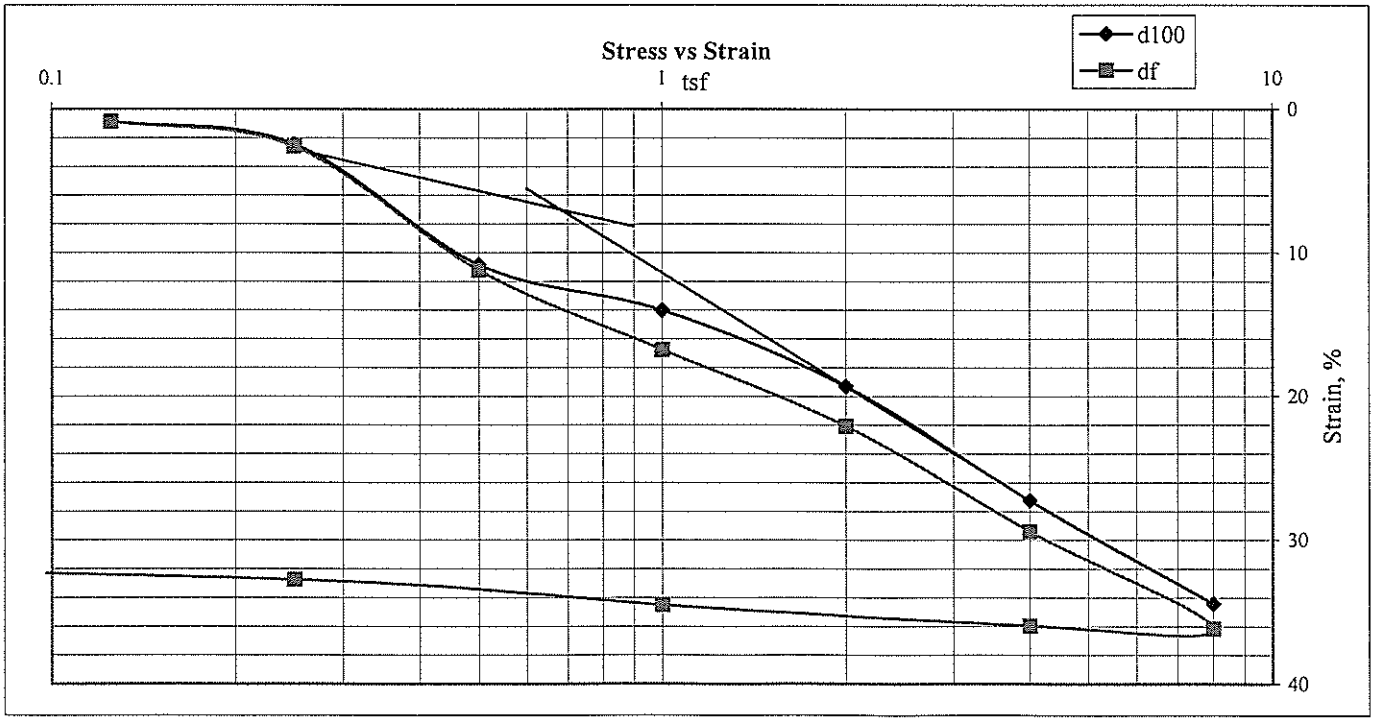
One-Dimensional Consolidation Test of Soil

Test Method: ASTM D2435

Soil Condition	% moisture	Unit Wt, pcf	Void Ratio	% Saturation	Preconsolidation Pressure
Initial	46.34	70.12	1.23	94.19	0.67 tsf
Full Consolidation	25.93	109.10	0.44	149.18	N/A

Test Procedure Method: B | Sample Trimming: Cutting Shoe | Condition: Inundated after seating

Stress, tsf	Duration, minutes	Strain at d100, %	Strain at df, %	Coefficient of Consolidation Cv, in2/min	Coeff. of Secondary Consol., Ca*
0.125	1440	0.87	0.87	0.0096	0.00011
0.25	1494	2.44	2.60	0.0016	0.00308
0.5	1472	10.86	11.23	0.0456	0.00560
1	2790	14.01	16.77	0.1982	0.00896
2	1443	19.32	22.08	0.0857	0.01467
4	1438	27.26	29.39	0.0324	0.01651
8	1433	34.43	36.17	0.0319	0.01482
4	120		35.96		
1	100		34.53		
0.25	92		32.75		
0	74		30.63		



*Ca is dimensionless; equals final slope of consolidation curve divided by 1 plus initial void ratio.
d100: 100% Primary Consolidation
df: Deformation at completion of test increment

Reviewed by:

Advance Testing

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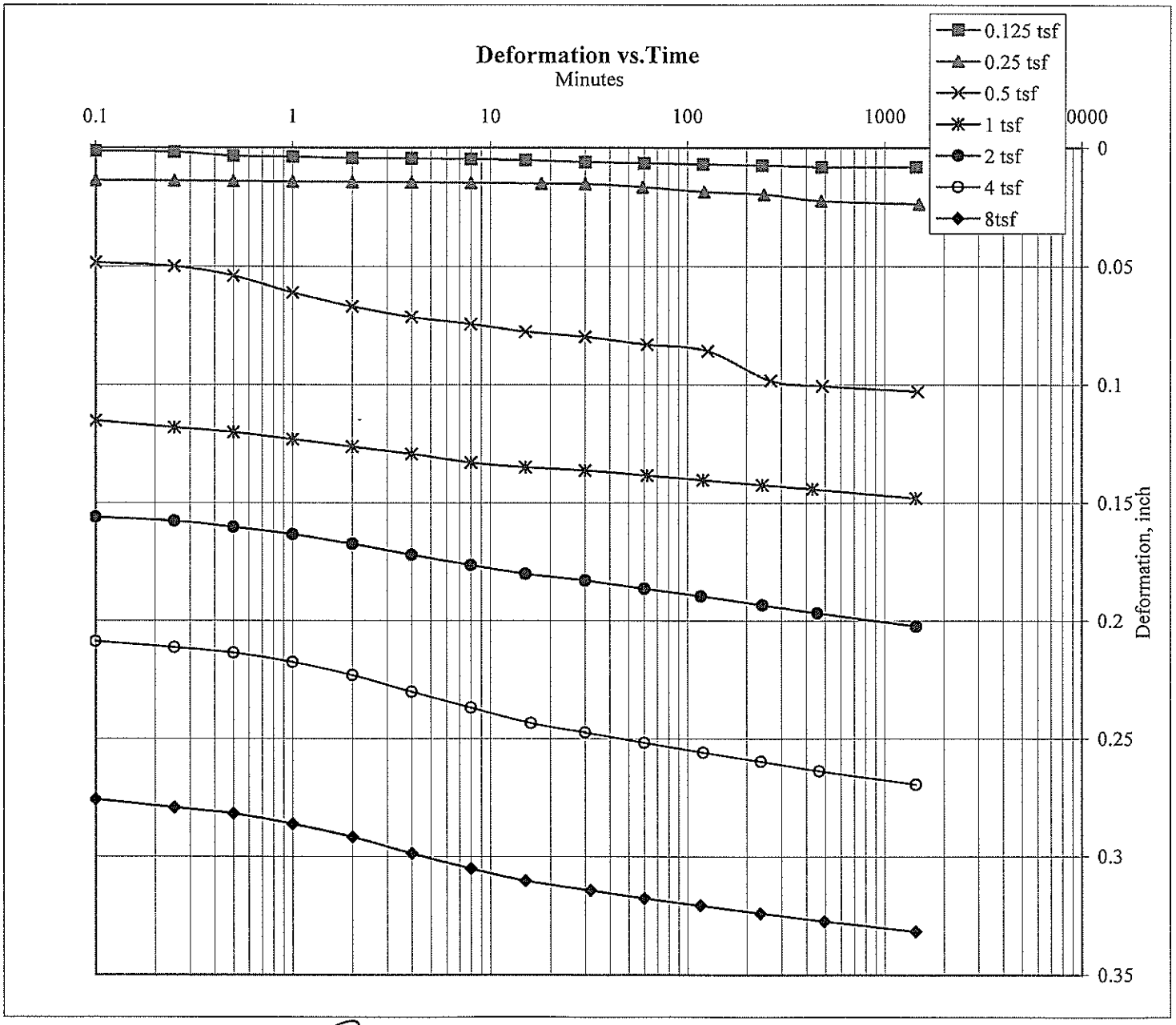
Phone/Fax: 413-232-8566

Client:	ENSR Remediation & Const.	**Project:**	BP Hastings-on-Hudson
Item:	PDGEO 13, 58'-60'	**ATC Project #:**	050584
Source:	101405-0840	**ATC Lab No.:**	05-0920
Date Sampled:	10/14/2005	**Sampled By:**	Client
Date Tested:	12/13-22/2005	**Tested By:**	C. Smith

One-Dimensional Consolidation Test of Soil

Test Method: ASTM D2435



Reviewed by:

Advance Testing

3348 Route 208, Campbell Hall, NY 10916
Phone: 845-496-1600 Fax: 845-496-1398
42 Day Farm Road, West Stockbridge, MA 01266
Phone/Fax: 413-232-8566

Client:	ENSR	**Project:**	BP Hastings-on-Hudson
Item:	092205-1100	**ATC Project #:**	050584
Source:	PDGEO-16, U1, 38-40'	**ATC Lab No.:**	05-0860
Date Sampled:	9/30/2005	**Sampled By:**	Client
Date Tested:	10/14-24/2005	**Tested By:**	C Smith

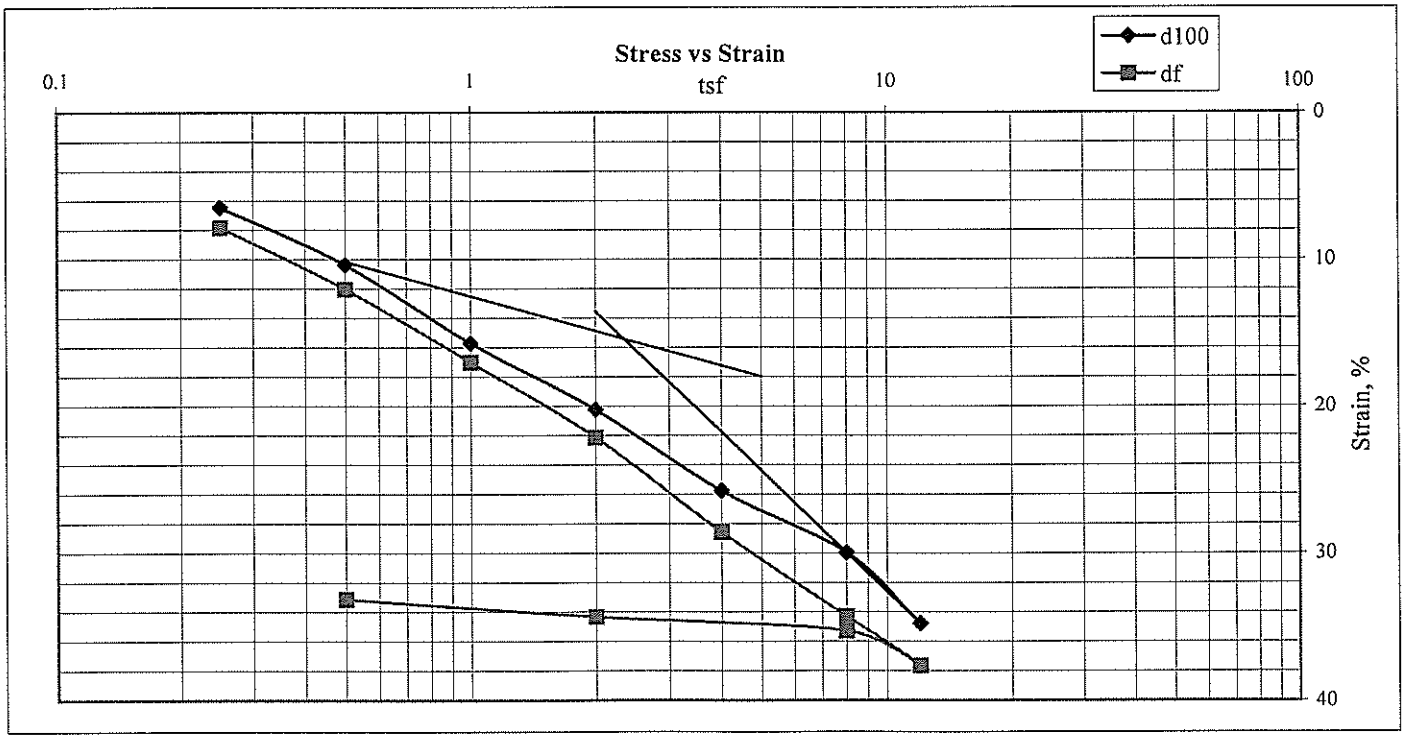
One-Dimensional Consolidation Test of Soil

Test Method: ASTM D2435

Soil Condition	% moisture	Unit Wt, pcf	Void Ratio	% Saturation	Preconsolidation Pressure
Initial	56.88	65.80	1.38	103.35	2.4 tsf
Full Consolidation	28.10	93.02	0.68	103.03	N/A

Test Procedure Method: B | Sample Trimming: Cutting Shoe | Condition: Inundated after seating

Stress, tsf	Duration, minutes	Strain at d100, %	Strain at df, %	Coefficient of Consolidation Cv, in2/min	Coeff. of Secondary Consol., Ca*
0.25	1096	6.47	7.84	0.0042	0.01020
0.5	1436	10.39	12.04	0.0241	0.01144
1	1452	15.72	17.03	0.0206	0.01081
2	1426	20.25	22.15	0.0355	0.01229
4	1440	25.79	28.60	0.0116	0.01089
8	1271	29.97	34.29	0.0980	0.01220
12	2850	34.78	37.64	0.0051	0.01308
8	240		35.30		
2	1175		34.34		
0.5	55		33.15		



*Ca is dimensionless; equals final slope of consolidation curve divided by 1 plus initial void ratio.
d100: 100% Primary Consolidation
df: Deformation at completion of test increment

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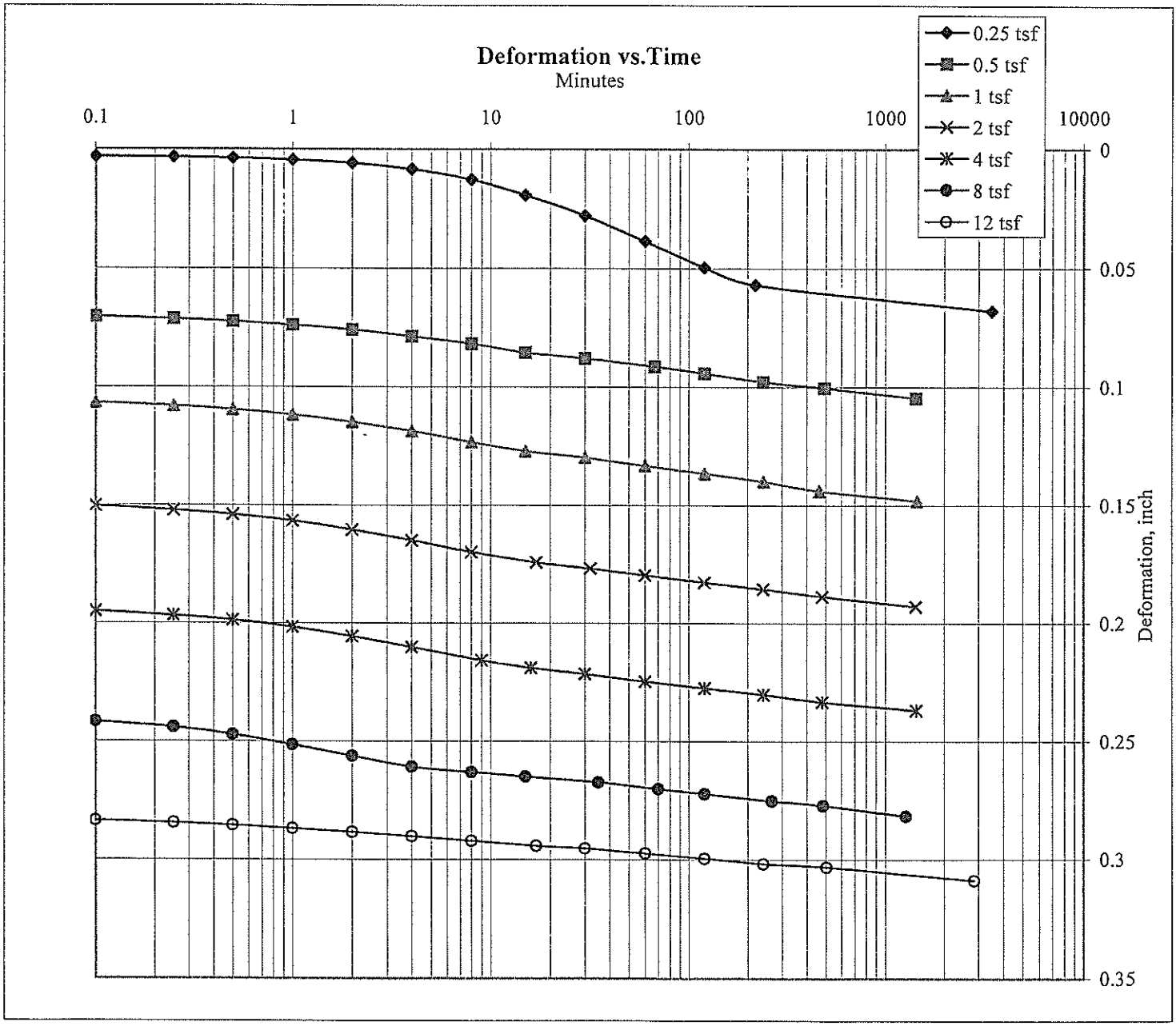
Phone/Fax: 413-232-8566

Client:	ENSR	Project:	BP Hastings-on-Hudson
Item:	092205-1100	ATC Project #:	050584
Source:	PDGEO-16, U1, 38-40'	ATC Lab No.:	05-0860
Date Sampled:	9/30/2005	Sampled By:	Client
Date Tested:	10/14-24/2005	Tested By:	C Smith

One-Dimensional Consolidation Test of Soil

Test Method: ASTM D2435



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Phone/Fax: 413-232-8566

Client:	ENSR Remediation & Const.	**Project:**	BP Hastings-on-Hudson
Item:	100505-1430	**ATC Project #:**	050584
Source:	PDGEO 17	**ATC Lab No.:**	05-0923
Date Sampled:	10/5/2005	**Sampled By:**	Client
Date Tested:	11/3-10/2005	**Tested By:**	C. Smith

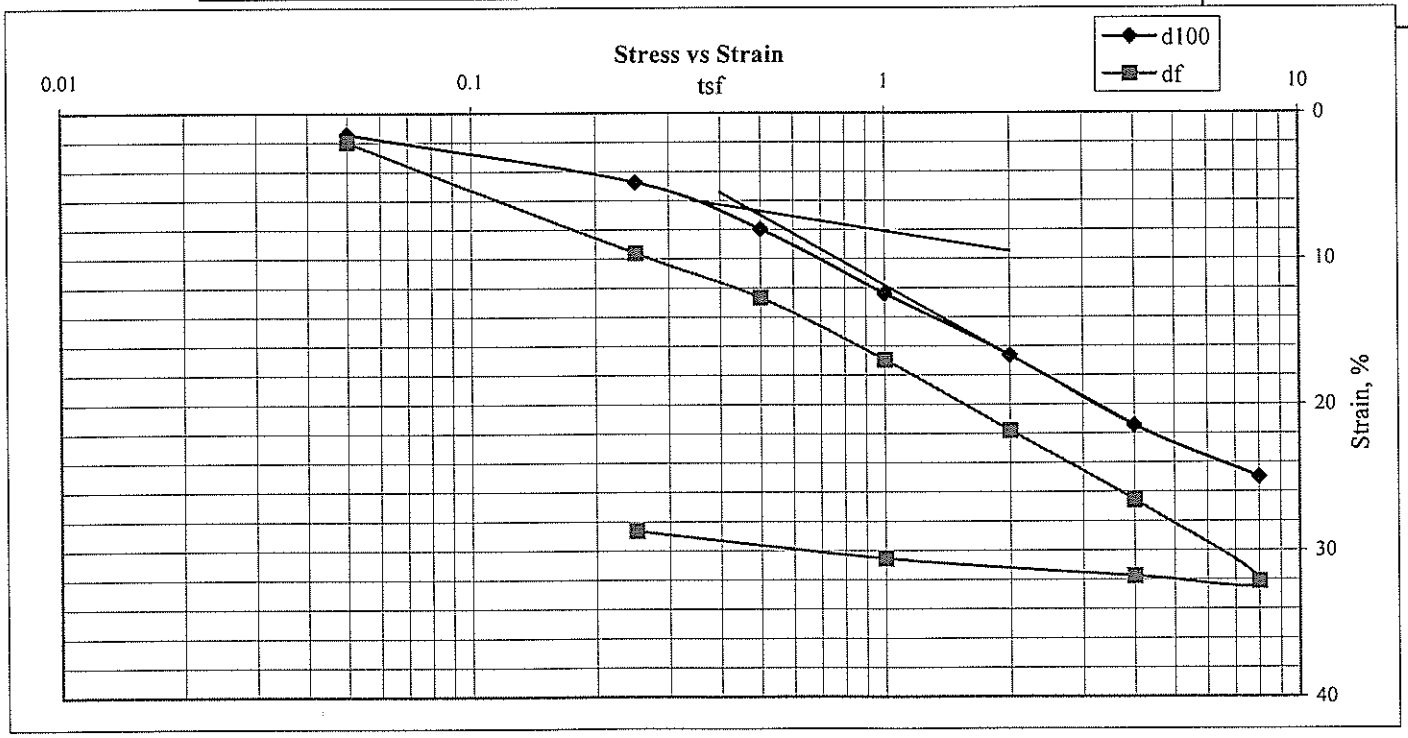
One-Dimensional Consolidation Test of Soil

Test Method: ASTM D2435

Soil Condition	% moisture	Unit Wt, pcf	Void Ratio	% Saturation	Preconsolidation Pressure
Initial	60.95	56.79	1.76	86.95	0.47 tsf
Full Consolidation	37.95	77.39	1.02	92.95	N/A

Test Procedure Method: B | Sample Trimming: Cutting Shoe | Condition: Inundated after seating

Stress, tsf	Duration, minutes	Strain at d100, %	Strain at df, %	Coefficient of Consolidation Cv, in2/min	Coeff. of Secondary Consol., Ca*
0.05	1130	1.44	2.00	0.0048	0.00197
0.25	1172	4.77	9.63	0.0411	0.01569
0.5	1440	7.97	12.70	0.0151	0.00627
1	1406	12.40	16.97	0.0230	0.00980
2	1427	16.64	21.81	0.0178	0.01044
4	1413	21.46	26.59	0.0117	0.00532
8	1468	25.00	32.14	0.0160	0.01039
4	63		31.75		
1	78		30.56		
0.25	128		28.64		



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d100: 100% Primary Consolidation
df: Deformation at completion of test increment

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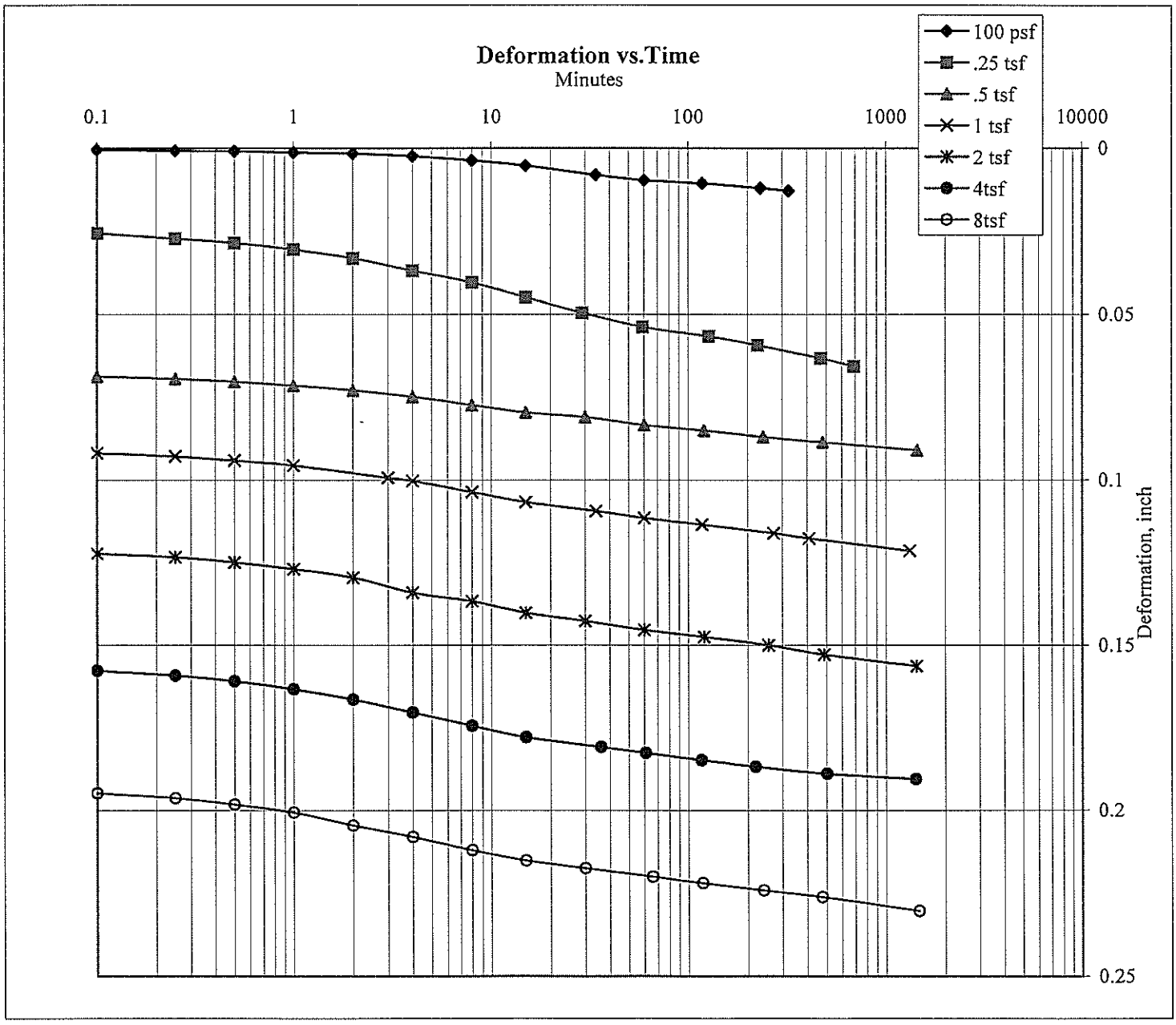
Client:	ENSR Remediation & Const.	**Project:**	BP Hastings-on-Hudson
Item:	100505-1430	**ATC Project #:**	050584
Source:	PDGEO 17	**ATC Lab No.:**	05-0923
Date Sampled:	10/5/2005	**Sampled By:**	Client
Date Tested:	11/3-10/2005	**Tested By:**	C. Smith

One-Dimensional Consolidation Test of Soil

Test Method: ASTM D2435



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Phone/Fax: 413-232-8566

Client:	ENSR Remediation & Const.	**Project:**	BP Hastings-on-Hudson
Item:	35'-37'	**ATC Project #:**	050584
Source:	PDGEO 19, 101905-1045	**ATC Lab No.:**	05-1004
Date Sampled:	10/19/2005	**Sampled By:**	Client
Date Tested:	1/19-27/2006	**Tested By:**	C. Smith

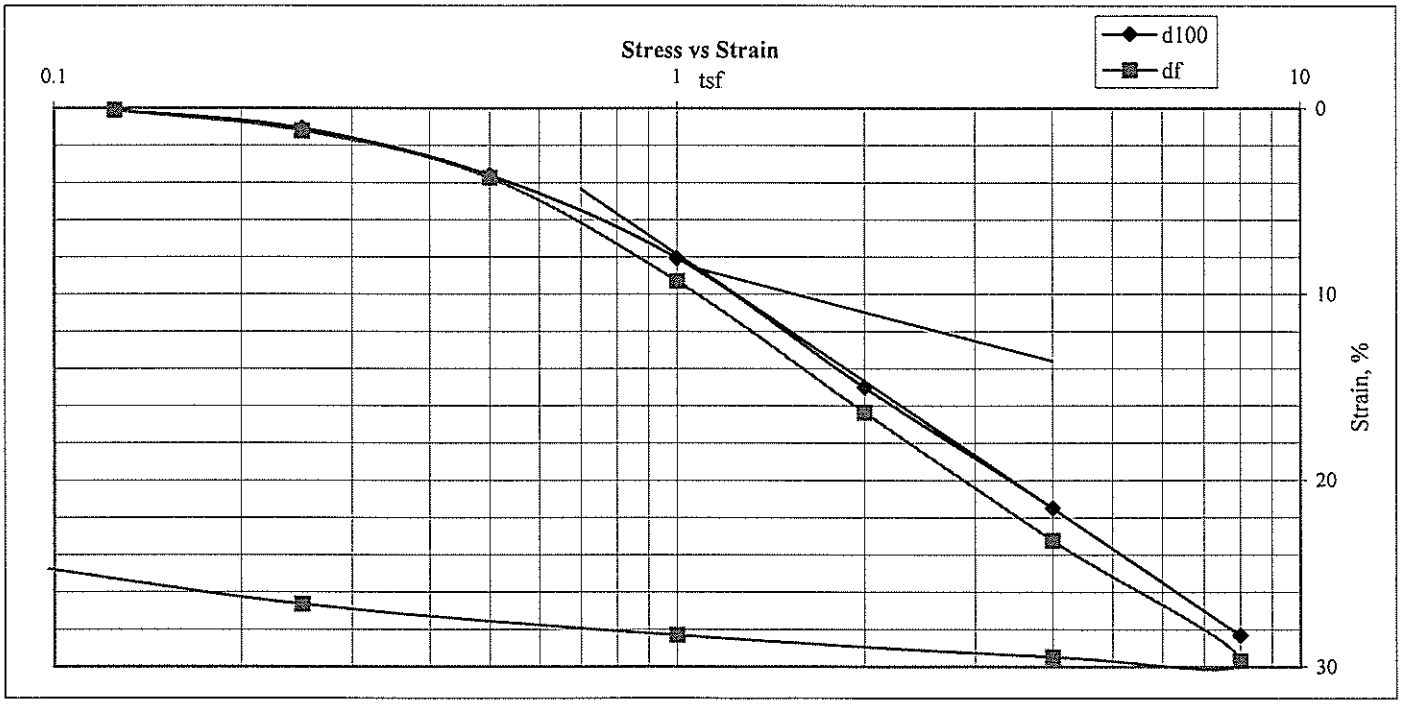
One-Dimensional Consolidation Test of Soil

Test Method: ASTM D2435

Soil Condition	% moisture	Unit Wt, pcf	Void Ratio	% Saturation	Preconsolidation Pressure
Initial	60.36	62.36	1.51	100.16	1.1 tsf
Full Consolidation	33.48	87.94	0.78	107.48	N/A

Test Procedure			
Method: B	Sample Trimming: Cutting Shoe	Condition: Inundated after seating

Stress, tsf	Duration, minutes	Strain at d100, %	Strain at df, %	Coefficient of Consolidation Cv, in2/min	Coeff. of Secondary Consol., Ca*
0.125	1533	0.10	0.12	0.0079	0.0002
0.25	1440	1.08	1.22	0.0010	0.0025
0.5	1396	3.62	3.75	0.0034	0.0022
1	1407	8.07	9.30	0.0086	0.0102
2	1441	15.01	16.36	0.0079	0.0122
4	1440	21.50	23.24	0.0086	0.0106
8	1465	28.31	29.69	0.0103	0.0102
4	64		29.48		
1	72		28.31		
0.25	60		26.65		
0	120		24.34		



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df: Deformation at completion of test increment

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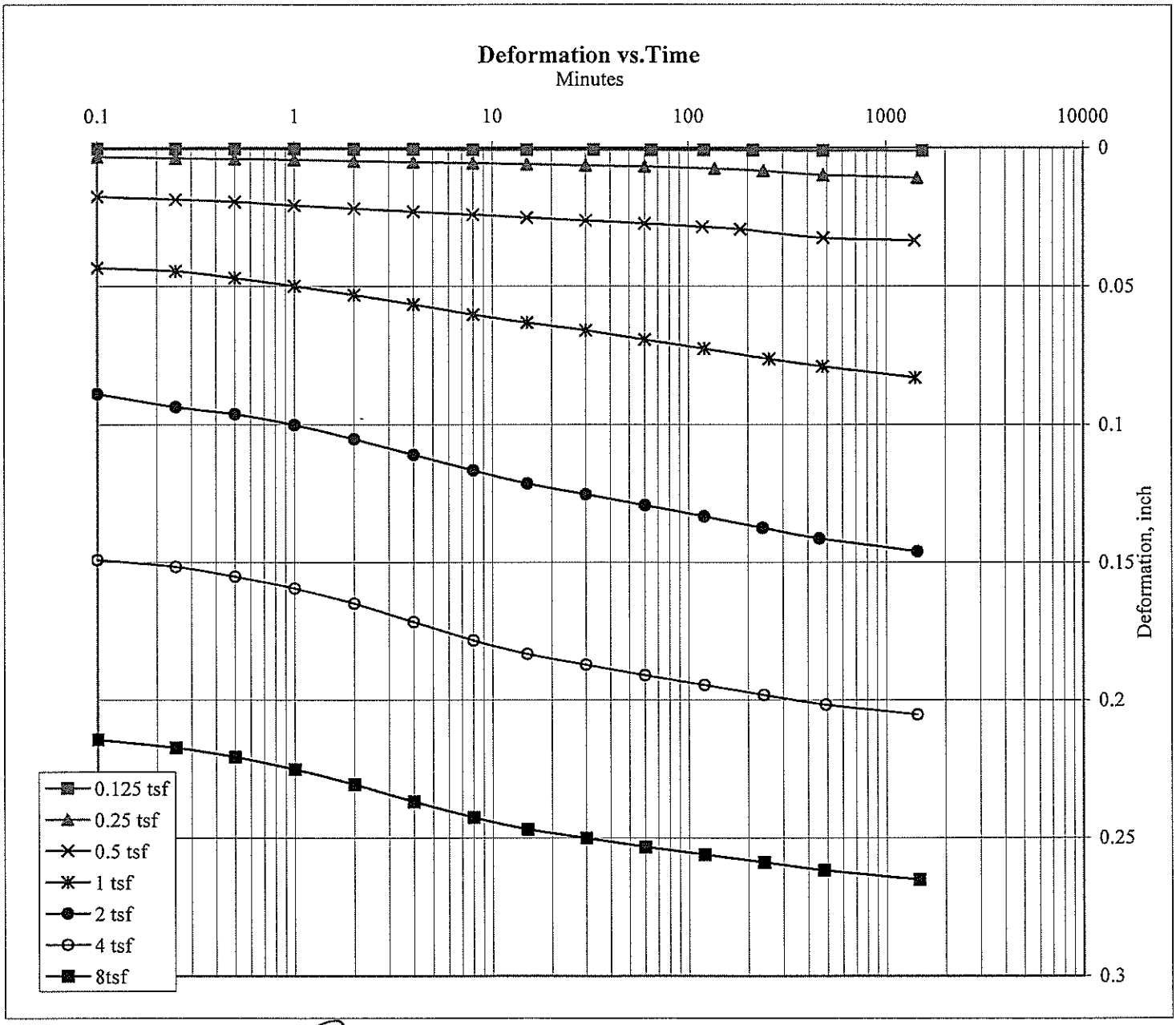
Phone/Fax: 413-232-8566

Client:	ENSR Remediation & Const.	**Project:**	BP Hastings-on-Hudson
Item:	35'-37'	**ATC Project #:**	050584
Source:	PDGEO 19, 101905-1045	**ATC Lab No.:**	05-1004
Date Sampled:	10/19/2005	**Sampled By:**	Client
Date Tested:	1/19-27/2006	**Tested By:**	C. Smith

One-Dimensional Consolidation Test of Soil

Test Method: ASTM D2435



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Phone/Fax: 413-232-8566

Client:	ENSR Remediation & Const.	**Project:**	BP Hastings-on-Hudson
Item:	45'-47'	**ATC Project #:**	050584
Source:	PDGEO 19, 101905-1230	**ATC Lab No.:**	05-1006
Date Sampled:	10/19/2006	**Sampled By:**	Client
Date Tested:	1/19-26/2006	**Tested By:**	C. Smith

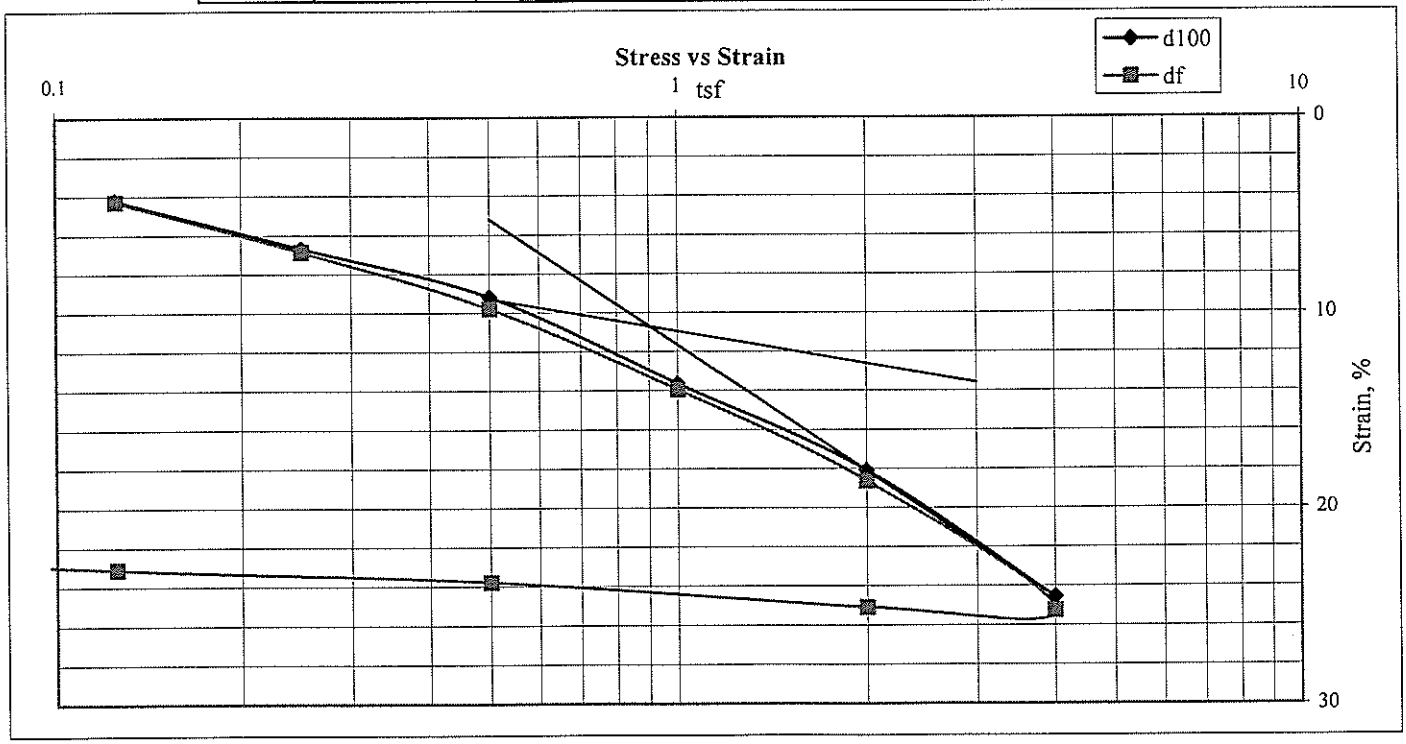
One-Dimensional Consolidation Test of Soil

Test Method: ASTM D2435

Soil Condition	% moisture	Unit Wt, pcf	Void Ratio	% Saturation	Preconsolidation Pressure
Initial	52.90	73.18	1.14	116.34	0.91 tsf
Full Consolidation	49.07	97.88	0.60	204.99	N/A

Test Procedure Method: B | Sample Trimming: Cutting Shoe | Condition: Inundated after seating

Stress, tsf	Duration, minutes	Strain at d100, %	Strain at df, %	Coefficient of Consolidation Cv, in2/min	Coeff. of Secondary Consol., Ca*
0.125	1555	4.24	4.28	0.0054	0.0003
0.25	1434	6.70	6.87	0.0034	0.0018
0.5	1434	9.20	9.81	0.0039	0.0054
1	1392	13.65	13.96	0.0022	0.0030
2	1433	18.11	18.64	0.0032	0.0212
4	1426	24.56	25.26	0.0008	0.0079
2	56		25.08		
0.5	60		23.78		
0.125	58		23.10		
0	60		21.48		



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df: Deformation at completion of test increment

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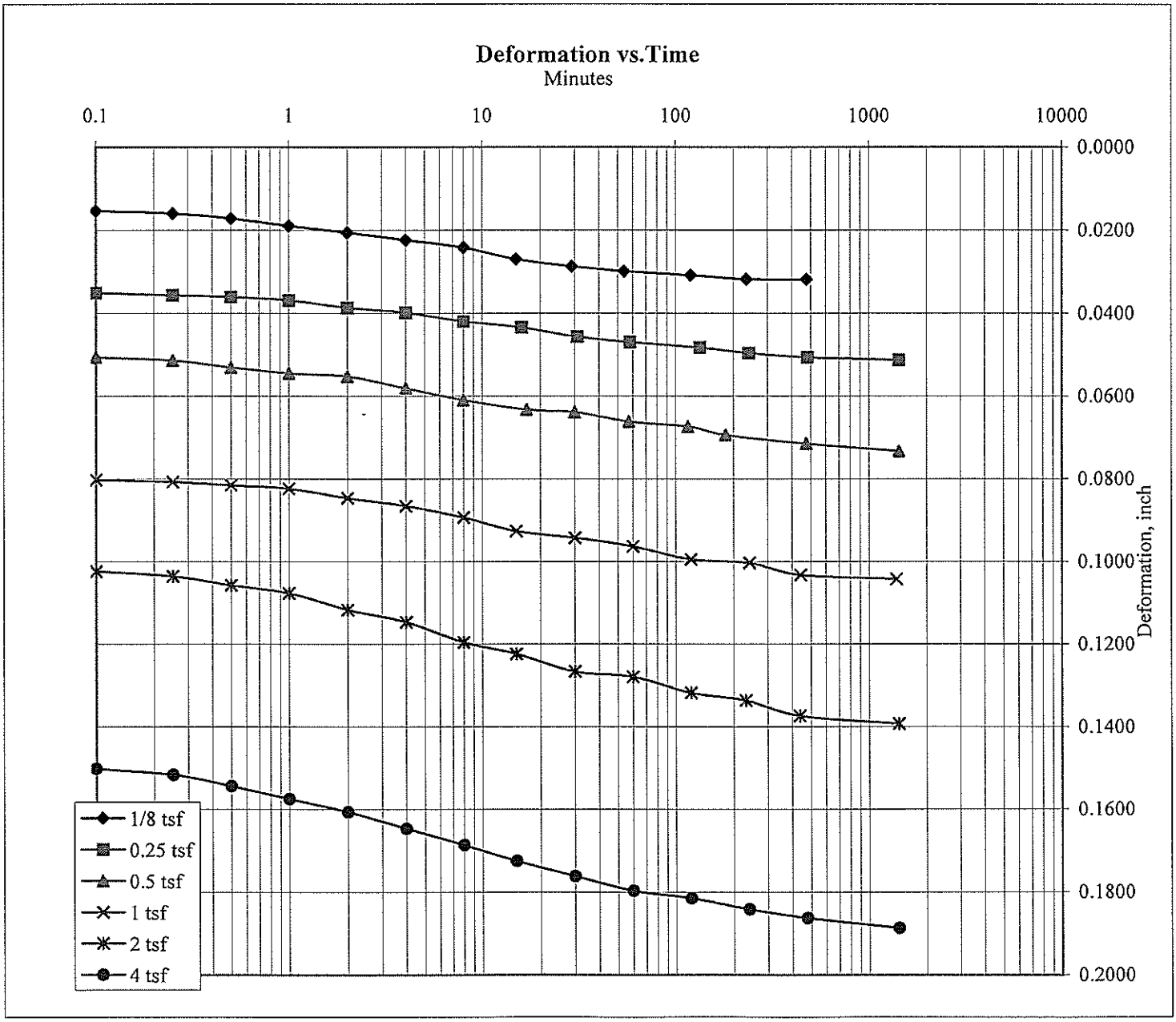
Phone/Fax: 413-232-8566

Client:	ENSR Remediation & Const.	**Project:**	BP Hastings-on-Hudson
Item:	45'-47'	**ATC Project #:**	050584
Source:	PDGEO 19, 101905-1230	**ATC Lab No.:**	05-1006
Date Sampled:	10/19/2006	**Sampled By:**	Client
Date Tested:	1/19-26/2006	**Tested By:**	C. Smith

One-Dimensional Consolidation Test of Soil

Test Method: ASTM D2435



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42 Day Farm Road, West Stockbridge, MA 01266
Phone/Fax: 413-232-8566

Client:	ENSR Remediation & Const.	**Project:**	BP Hastings-on-Hudson
Item:	28'-30'	**ATC Project #:**	050584
Source:	PDGEO 21, 103105-1345	**ATC Lab No.:**	05-1153
Date Sampled:	10/31/2005	**Sampled By:**	Client
Date Tested:	2/2/06-2/09/06	**Tested By:**	K. Patton/C. Smith

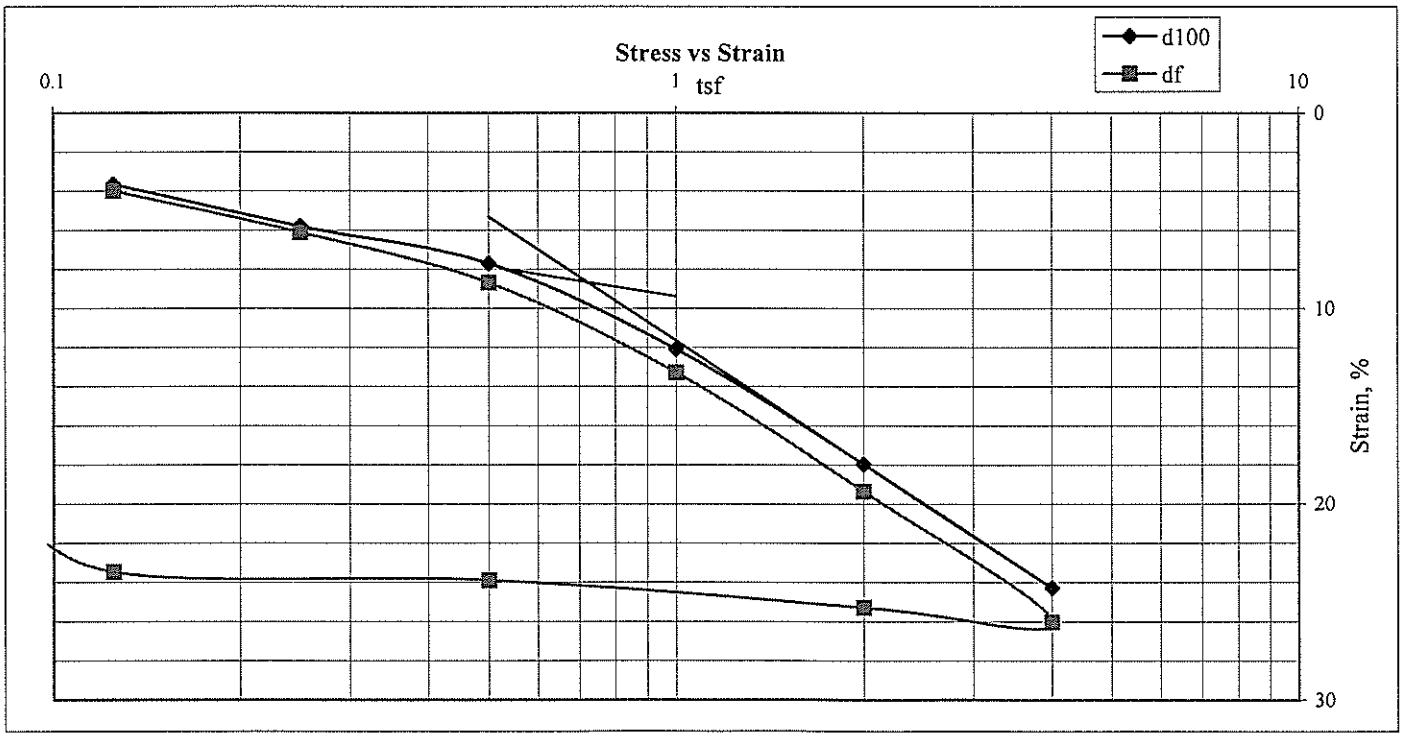
One-Dimensional Consolidation Test of Soil

Test Method: ASTM D2435

Soil Condition	% moisture	Unit Wt, pcf	Void Ratio	% Saturation	Preconsolidation Pressure
Initial	67.52	57.98	1.70	99.53	0.72 tsf
Full Consolidation	43.59	78.56	0.99	110.02	N/A

Test Procedure					
Method: B	Sample Trimming: Cutting Shoe	Condition: Inundated after seating

Stress, tsf	Duration, minutes	Strain at d100, %	Strain at df, %	Coefficient of Consolidation Cv, in2/min	Coeff. of Secondary Consol., Ca*
0.125	993	3.65	4.00	0.0222	0.0019
0.25	1430	5.81	6.12	0.0065	0.0018
0.5	1478	7.71	8.70	0.0098	0.0052
1	1425	12.09	13.28	0.0086	0.0088
2	1440	17.97	19.36	0.0040	0.0115
4	1437	24.29	26.04	0.0044	0.0134
2	15		25.29		
0.5	15		23.89		
0.125	15		23.47		
0	126		19.68		



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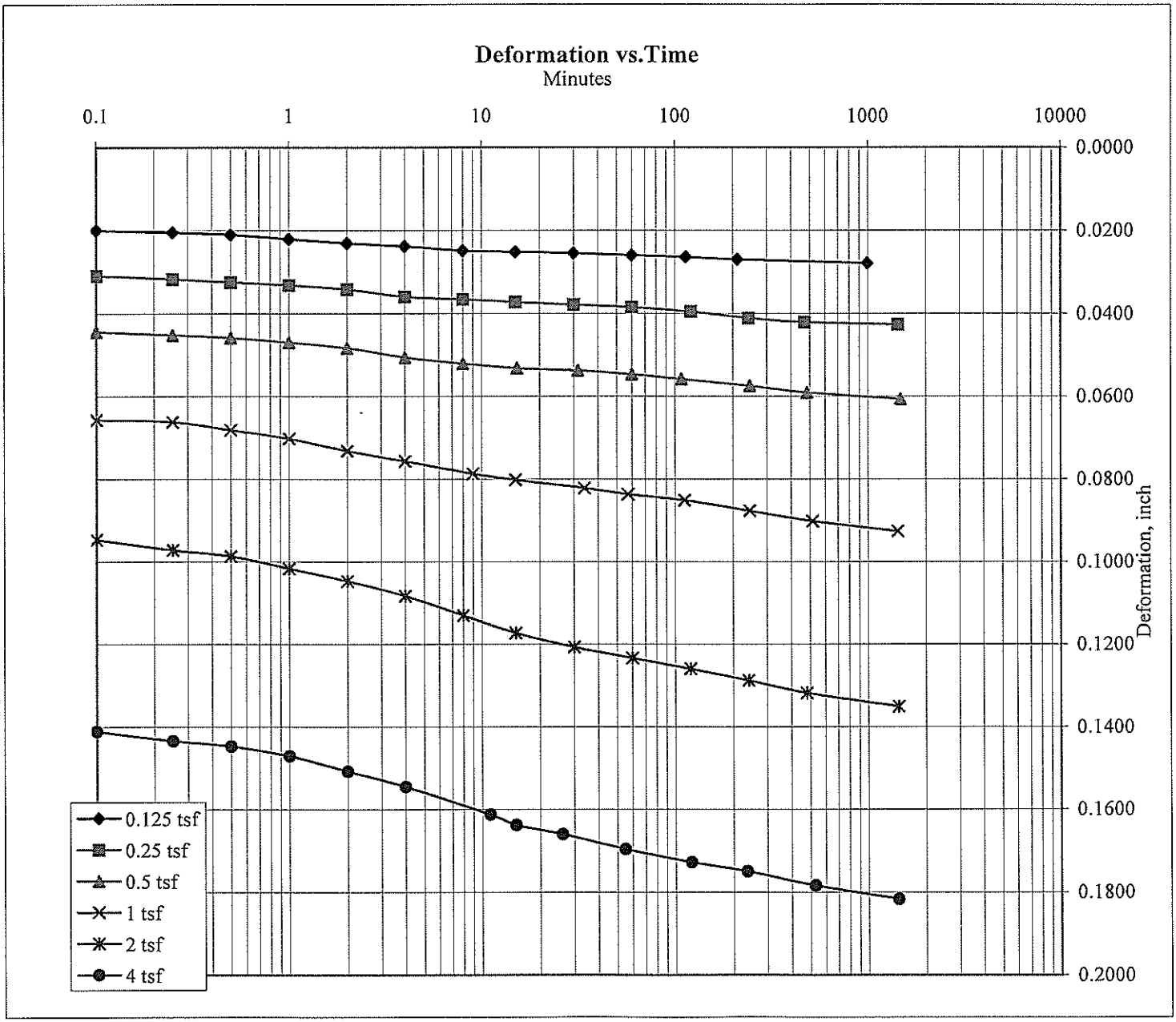
Client:	ENSR Remediation & Const.	**Project:**	BP Hastings-on-Hudson
Item:	28'-30'	**ATC Project #:**	050584
Source:	PDGEO 21, 103105-1345	**ATC Lab No.:**	05-1153
Date Sampled:	10/31/2005	**Sampled By:**	Client
Date Tested:	2/2/06-2/09/06	**Tested By:**	K. Patton/C. Smith

One-Dimensional Consolidation Test of Soil

Test Method: ASTM D2435



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Phone/Fax: 413-232-8566

Client:	ENSR Remediation & Const.	**Project:**	BP Hastings-on-Hudson
Item:	37'-39'	**ATC Project #:**	050584
Source:	PDGEO 21, 110205-1400	**ATC Lab No.:**	05-1162
Date Sampled:	11/2/2006	**Sampled By:**	Client
Date Tested:	2/9/06-2/17/06	**Tested By:**	B. Jobity/C.Smith

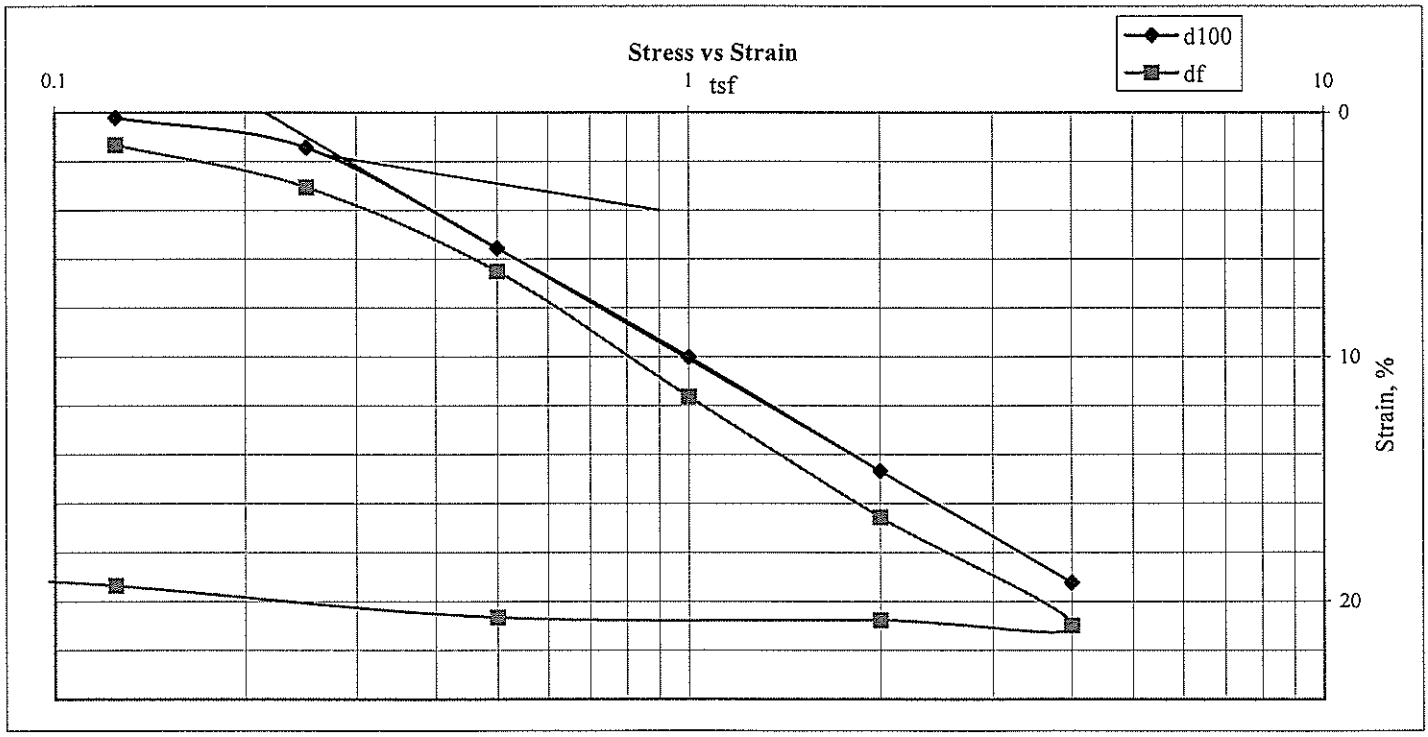
One-Dimensional Consolidation Test of Soil

Test Method: ASTM D2435

Soil Condition	% moisture	Unit Wt, pcf	Void Ratio	% Saturation	Preconsolidation Pressure
Initial	52.87	68.88	1.28	104.09	0.28 tsf
Full Consolidation	36.33	87.10	0.80	114.14	N/A

Test Procedure					
Method: B	Sample Trimming: Cutting Shoe	Condition: Inundated after seating

Stress, tsf	Duration, minutes	Strain at d100, %	Strain at df, %	Coefficient of Consolidation Cv, in2/min	Coeff. of Secondary Consol., Ca*
0.125	1560	0.22	1.34	0.0739	0.0030
0.25	2672	1.44	3.06	0.0832	0.0047
0.5	1469	5.56	6.51	0.0086	0.0070
1	1431	10.02	11.64	0.0197	0.0095
2	1440	14.68	16.57	0.0112	0.0097
4	1405	19.24	20.98	0.0158	0.0086
2	58		20.78		
0.5	73		20.66		
0.125	64		19.37		
0	60		19.06		



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df: Deformation at completion of test increment

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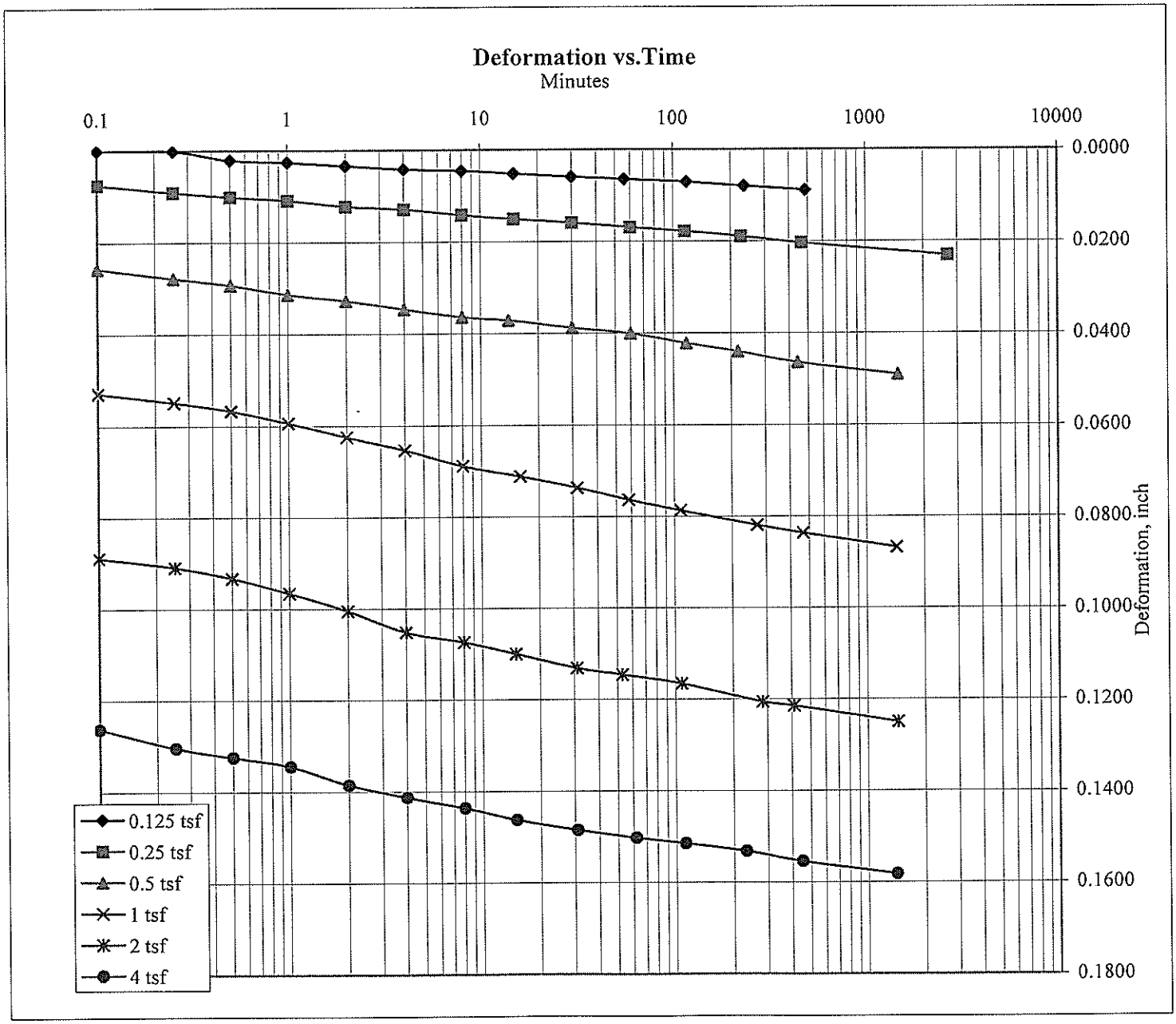
Phone/Fax: 413-232-8566

Client:	ENSR Remediation & Const.	**Project:**	BP Hastings-on-Hudson
Item:	37'-39'	**ATC Project #:**	050584
Source:	PDGEO 21, 110205-1400	**ATC Lab No.:**	05-1162
Date Sampled:	11/2/2006	**Sampled By:**	Client
Date Tested:	2/9/06-2/17/06	**Tested By:**	B. Jobity/C.Smith

One-Dimensional Consolidation Test of Soil

Test Method: ASTM D2435



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Phone/Fax: 413-232-8566

Client:	ENSR Remediation & Const.	**Project:**	BP Hastings-on-Hudson
Item:	42'-44'	**ATC Project #:**	050584
Source:	PDGEO 21, 110205-1430	**ATC Lab No.:**	05-1163
Date Sampled:	11/2/2005	**Sampled By:**	Client
Date Tested:	2/10/06-2/18/06	**Tested By:**	C. Smith/B. Jobity

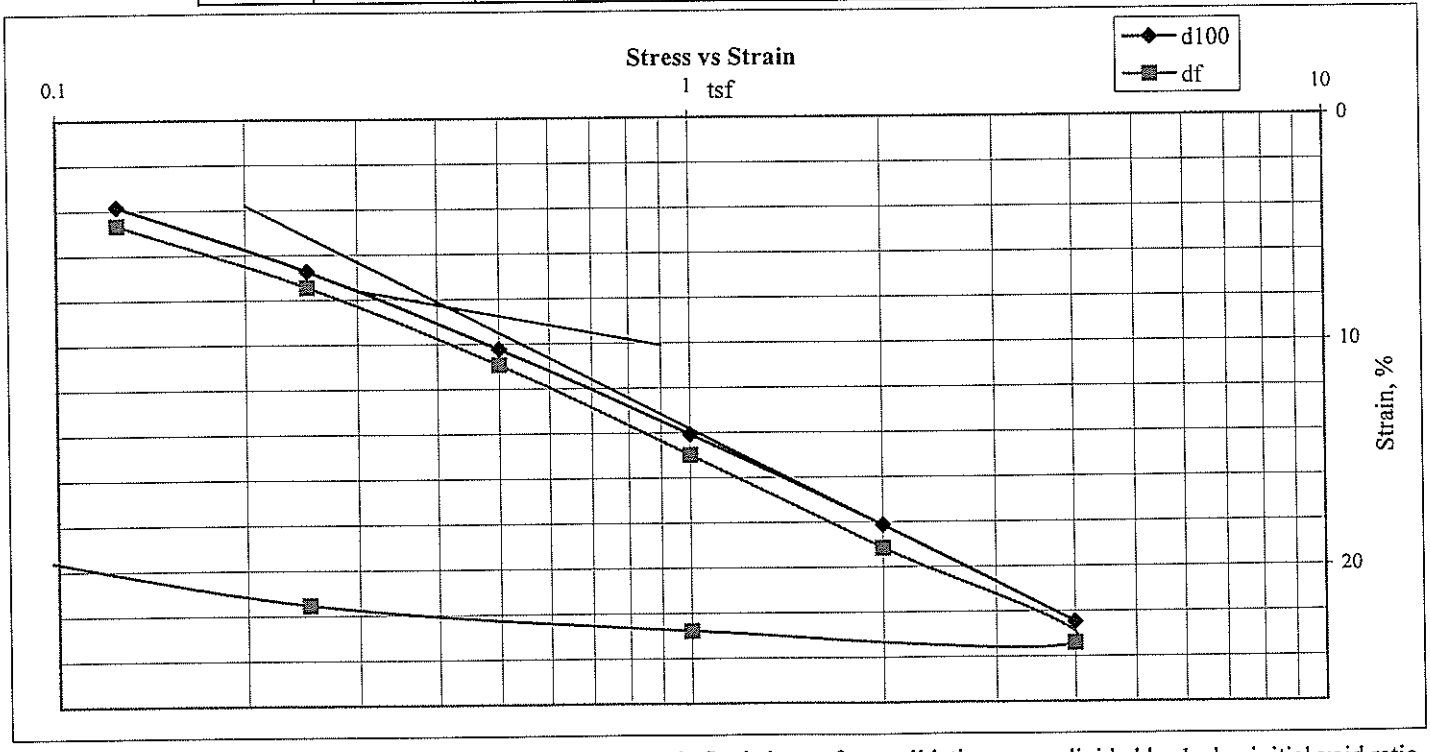
One-Dimensional Consolidation Test of Soil

Test Method: ASTM D2435

Soil Condition	% moisture	Unit Wt, pcf	Void Ratio	% Saturation	Preconsolidation Pressure
Initial	44.45	78.88	0.99	113.10	0.41 tsf
Full Consolidation	24.51	102.83	0.52	117.44	N/A

Test Procedure					
Method: B	Sample Trimming: Cutting Shoe	Condition: Inundated after seating

Stress, tsf	Duration, minutes	Strain at d100, %	Strain at df, %	Coefficient of Consolidation Cv, in2/min	Coeff. of Secondary Consol., Ca*
0.125	2673	3.85	4.66	0.0153	0.0036
0.25	1473	6.73	7.45	0.0074	0.0048
0.5	1428	10.24	10.93	0.0080	0.0046
1	1445	14.06	15.00	0.0096	0.0060
2	1408	18.15	19.16	0.0119	0.0057
4	1612	22.47	23.40	0.0121	0.0051
1	62		22.78		
0.25	59		21.53		
0	60		19.15		



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df: Deformation at completion of test increment

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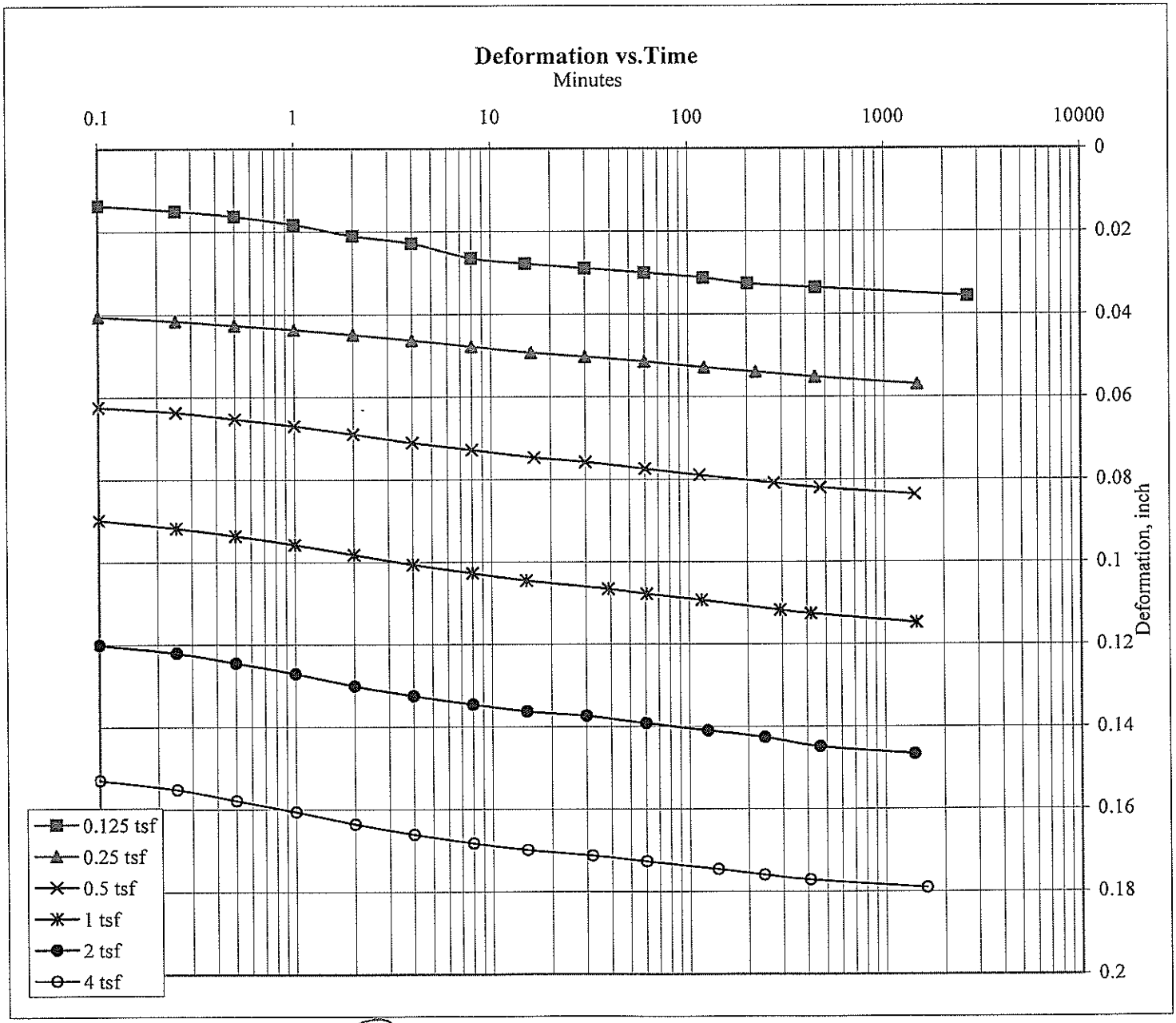
Phone/Fax: 413-232-8566

Client:	ENSR Remediation & Const.	**Project:**	BP Hastings-on-Hudson
Item:	42'-44'	**ATC Project #:**	050584
Source:	PDGEO 21, 110205-1430	**ATC Lab No.:**	05-1163
Date Sampled:	11/2/2005	**Sampled By:**	Client
Date Tested:	2/10/06-2/18/06	**Tested By:**	C. Smith/B. Jobity

One-Dimensional Consolidation Test of Soil

Test Method: ASTM D2435



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Phone/Fax: 413-232-8566

Client:	ENSR Remediation & Const.	**Project:**	BP Hastings-on-Hudson
Item:	61-63'	**ATC Project #:**	050584
Source:	PDGEO21-110305-1015	**ATC Lab No.:**	05-1165
Date Sampled:	11/3/2005	**Sampled By:**	Client
Date Tested:	2/8/2006	**Tested By:**	C Smith

One-Dimensional Consolidation Test of Soil

Test Method: ASTM D2435

The sample could not be tested.

When the sample fraction that was retained for the test was extracted, it was found to consist of small shell fragments and sand. The sample had no cohesion, and fell apart.

Reviewed by:

Advance Testing

3348 Route 208, Campbell Hall, NY 10916
Phone: 845-496-1600 Fax: 845-496-1398
42 Day Farm Road, West Stockbridge, MA 01266
Phone/Fax: 413-232-8566

Client:	ENSR Remediation & Const.	**Project:**	BP Hastings-on-Hudson
Item:	34'-36'	**ATC Project #:**	050584
Source:	PGGEO 22, 102705-1110	**ATC Lab No.:**	05-1016
Date Sampled:	10/24/2005	**Sampled By:**	Client
Date Tested:	2/5/06-2/11/06	**Tested By:**	K. Patton/B. Jobity/ C. Smith

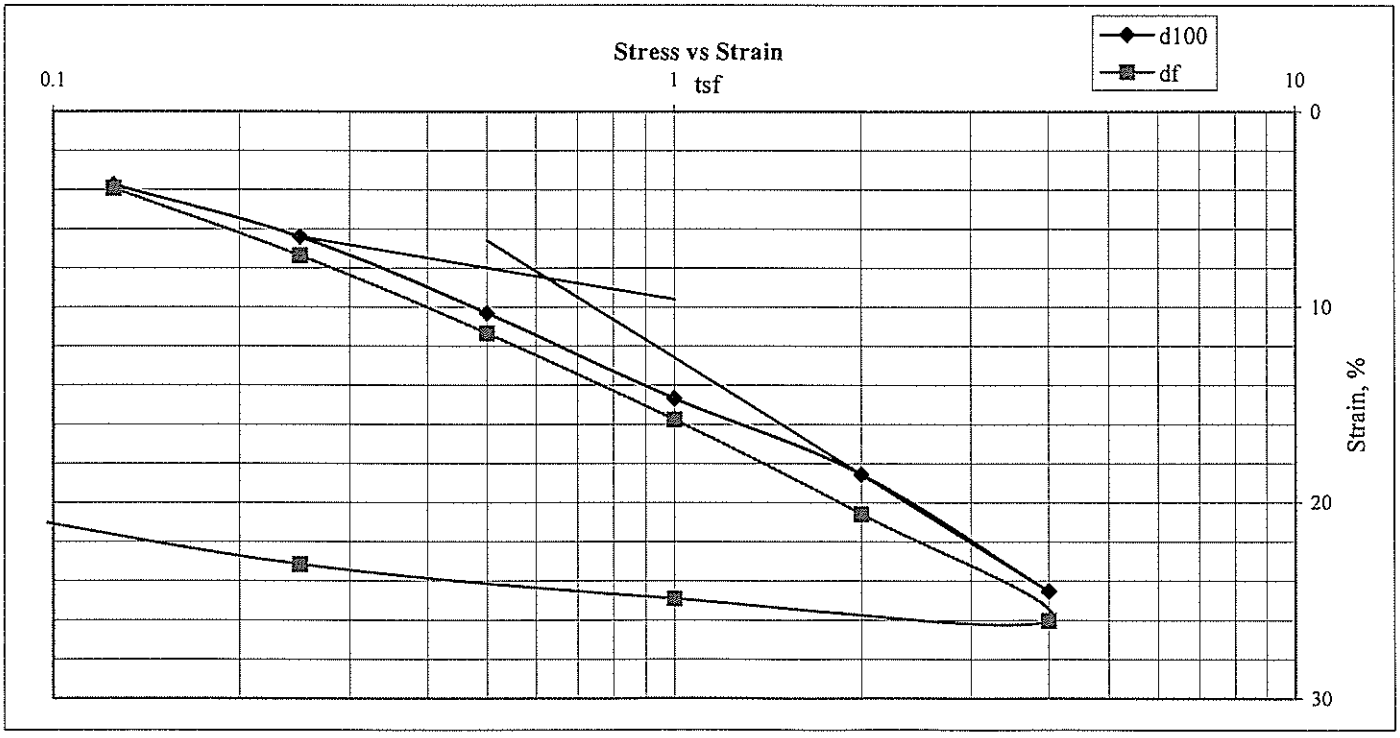
One-Dimensional Consolidation Test of Soil

Test Method: ASTM D2435

Soil Condition	% moisture	Unit Wt, pcf	Void Ratio	% Saturation	Preconsolidation Pressure
Initial	60.94	60.35	1.60	95.79	0.62 tsf
Full Consolidation	40.88	80.94	0.94	109.63	N/A

Test Procedure Method: B | Sample Trimming: Cutting Shoe | Condition: Inundated after seating

Stress, tsf	Duration, minutes	Strain at d100, %	Strain at df, %	Coefficient of Consolidation Cv, in2/min	Coeff. of Secondary Consol., Ca*
0.125	1287	3.75	3.92	0.0018	0.0015
0.25	1427	6.42	7.36	0.0034	0.0063
0.5	1443	10.32	11.35	0.0012	0.0091
1	1445	14.68	15.77	0.0010	0.0133
2	1442	18.56	20.60	0.0030	0.0152
4	1559	24.54	26.04	0.0020	0.0117
1	60		24.91		
0.25	59		23.16		
0.08	110		20.55		



*Ca is dimensionless; equals final slope of consolidation curve divided by 1 plus initial void ratio.
d100: 100% Primary Consolidation
df: Deformation at completion of test increment

Reviewed by:

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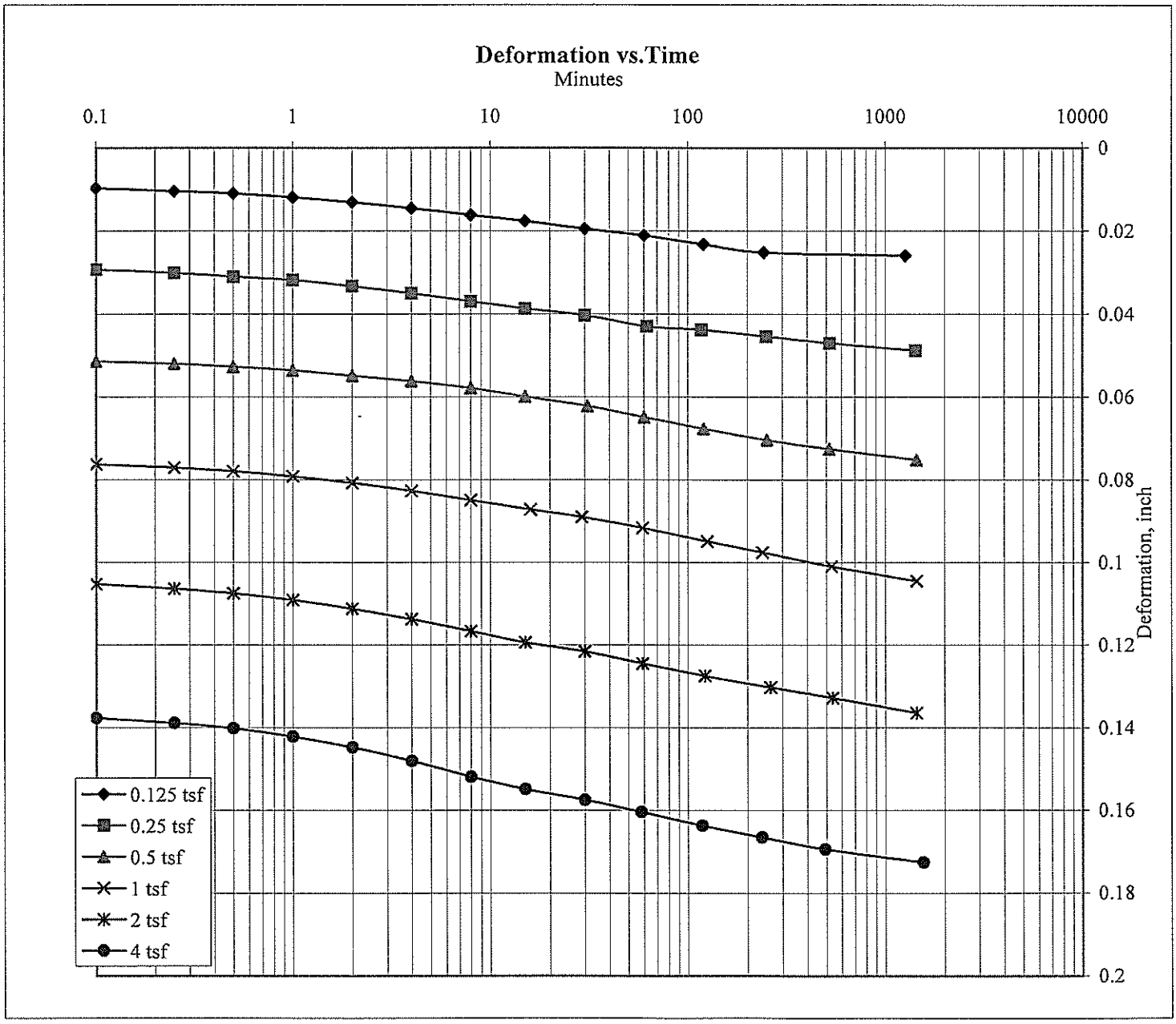
Phone/Fax: 413-232-8566

Client:	ENSR Remediation & Const.	**Project:**	BP Hastings-on-Hudson
Item:	34'-36'	**ATC Project #:**	050584
Source:	PGGEO 22, 102705-1110	**ATC Lab No.:**	05-1016
Date Sampled:	10/24/2005	**Sampled By:**	Client
Date Tested:	2/5/06-2/11/06	**Tested By:**	K. Patton/B. Jobity/ C. Smith

One-Dimensional Consolidation Test of Soil

Test Method: ASTM D2435



Reviewed by:

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42 Day Farm Road, West Stockbridge, MA 01266
Phone/Fax: 413-232-8566

Client:	ENSR Remediation & Const.	**Project:**	BP Hastings-on-Hudson
Item:	24'-26'	**ATC Project #:**	050584
Source:	PDGEO 23, 102405-1540	**ATC Lab No.:**	05-1014
Date Sampled:	10/24/2006	**Sampled By:**	Client
Date Tested:	2/12/06-2/19/06	**Tested By:**	B. Jobity/C. Smith

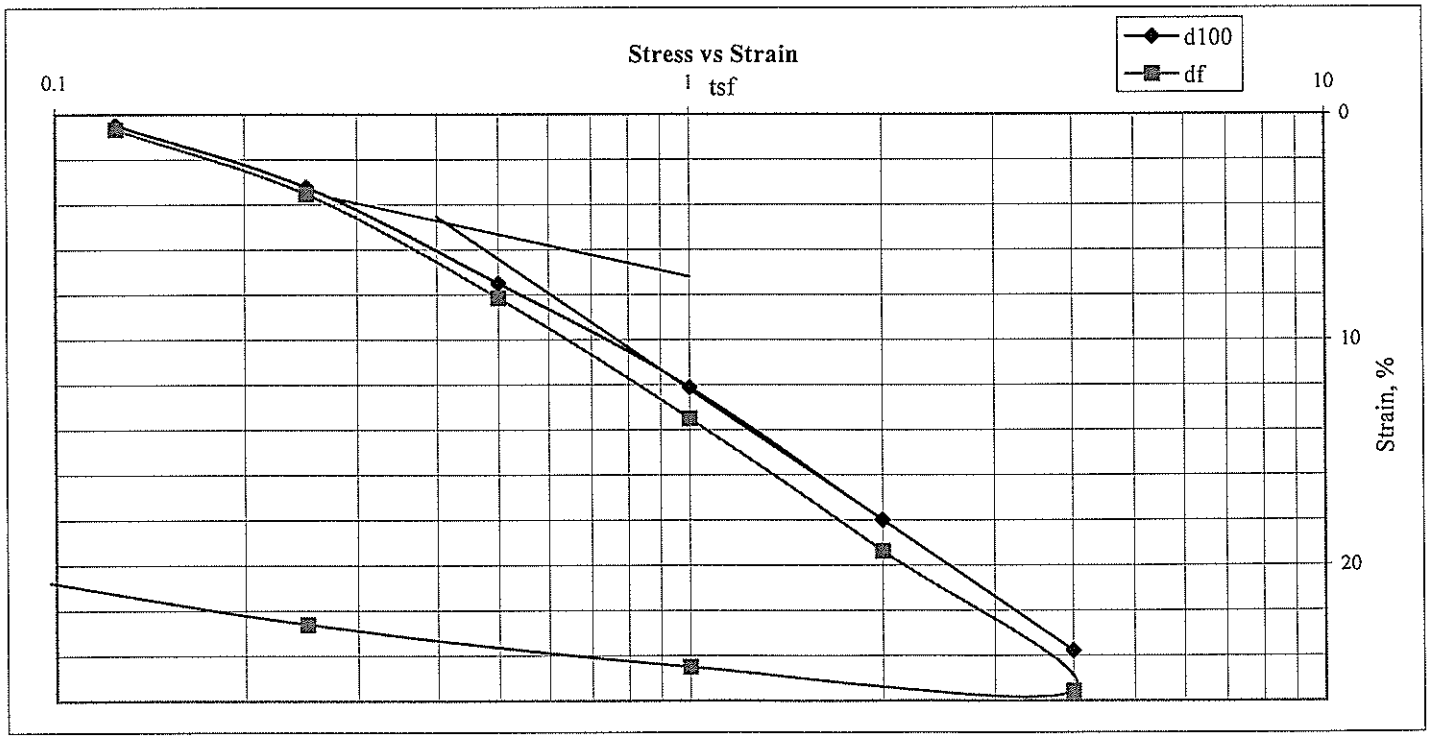
One-Dimensional Consolidation Test of Soil

Test Method: ASTM D2435

Soil Condition	% moisture	Unit Wt, pcf	Void Ratio	% Saturation	Preconsolidation Pressure
Initial	63.67	60.01	1.61	99.17	0.41 tsf
Full Consolidation	40.86	80.59	0.94	108.58	N/A

Test Procedure Method: B | Sample Trimming: Cutting Shoe | Condition: Inundated after seating

Stress, tsf	Duration, minutes	Strain at d100, %	Strain at df, %	Coefficient of Consolidation Cv, in2/min	Coeff. of Secondary Consol., Ca*
0.125	1414	0.48	0.67	0.0078	0.0011
0.25	1430	3.24	3.54	0.0027	0.0058
0.5	1445	7.50	8.15	0.0033	0.0085
1	1408	12.12	13.50	0.0056	0.0107
2	1609	17.99	19.37	0.0049	0.0107
4	1371	23.79	25.58	0.0040	0.0134
1	63		24.51		
0.25	58		22.61		
0.08	59		20.35		



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d100: 100% Primary Consolidation
df: Deformation at completion of test increment

Reviewed by:

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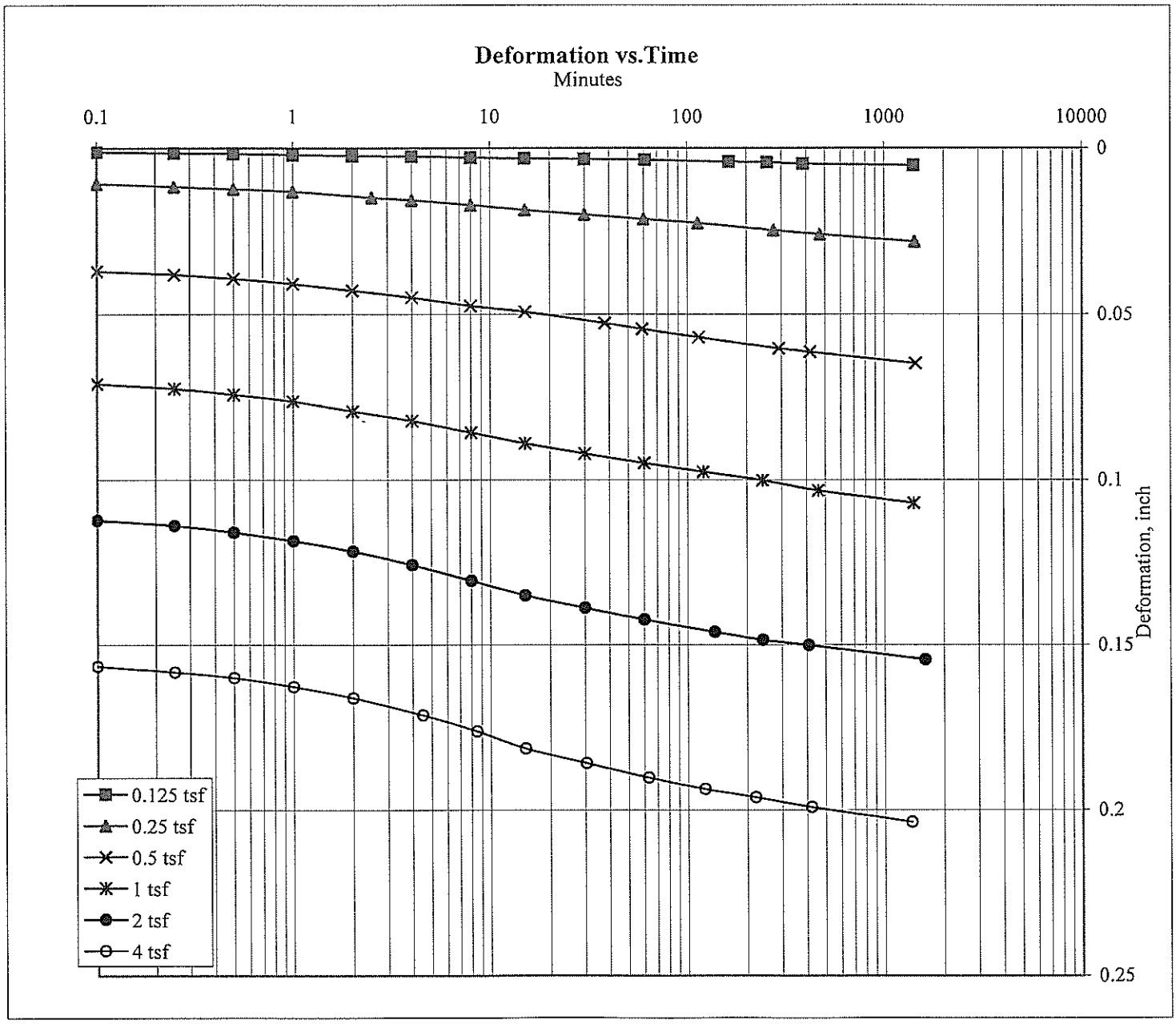
Client:	ENSR Remediation & Const.	**Project:**	BP Hastings-on-Hudson
Item:	24'-26'	**ATC Project #:**	050584
Source:	PDGEO 23, 102405-1540	**ATC Lab No.:**	05-1014
Date Sampled:	10/24/2006	**Sampled By:**	Client
Date Tested:	2/12/06-2/19/06	**Tested By:**	B. Jobity/C. Smith

One-Dimensional Consolidation Test of Soil

Test Method: ASTM D2435



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Phone/Fax: 413-232-8566

Client:	ENSR Remediation & Const.	**Project:**	BP Hastings-on-Hudson
Item:	30'-32'	**ATC Project #:**	050584
Source:	PDGEO 23, 102805-0925	**ATC Lab No.:**	05-1017
Date Sampled:	10/28/2006	**Sampled By:**	Client
Date Tested:	2/2/06-2/9/06	**Tested By:**	K. Patton/ C. Smith

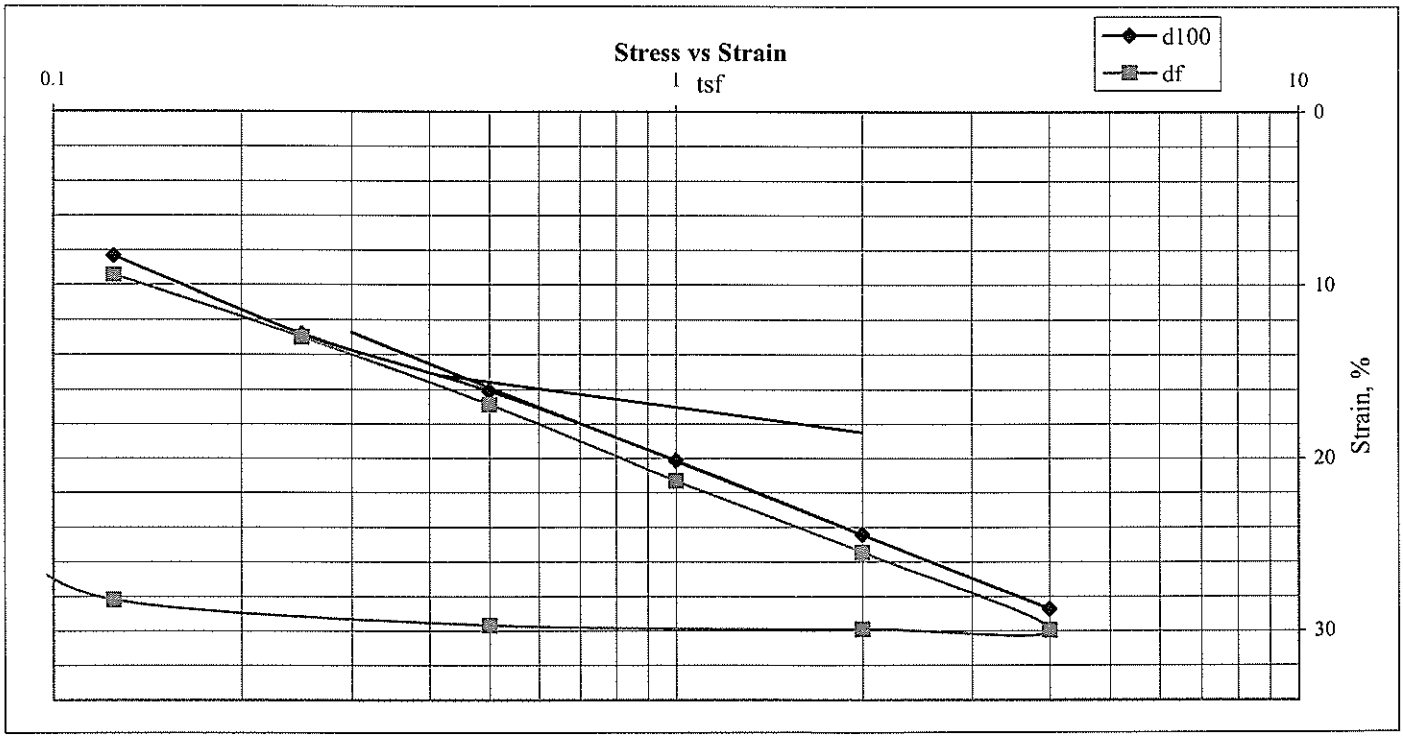
One-Dimensional Consolidation Test of Soil

Test Method: ASTM D2435

Soil Condition	% moisture	Unit Wt, pcf	Void Ratio	% Saturation	Preconsolidation Pressure
Initial	72.45	55.99	1.80	101.12	0.45 tsf
Full Consolidation	44.90	79.87	0.96	117.18	N/A

Test Procedure Method: B | Sample Trimming: Cutting Shoe | Condition: Inundated after seating

Stress, tsf	Duration, minutes	Strain at d100, %	Strain at df, %	Coefficient of Consolidation Cv, in2/min	Coeff. of Secondary Consol., Ca*
0.125	994	8.34	9.45	0.0024	0.0097
0.25	1421	12.82	13.01	0.0008	0.0032
0.5	1473	16.09	16.87	0.0021	0.0062
1	1425	20.13	21.32	0.0040	0.0089
2	1443	24.45	25.46	0.0039	0.0076
4	1436	28.73	29.95	0.0054	0.0096
2	15		29.91		
0.5	15		29.67		
0.125	15		28.20		
0	125		24.72		



Revised 3/1/06

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d100: 100% Primary Consolidation
df: Deformation at completion of test increment

Reviewed by:

Advance Testing

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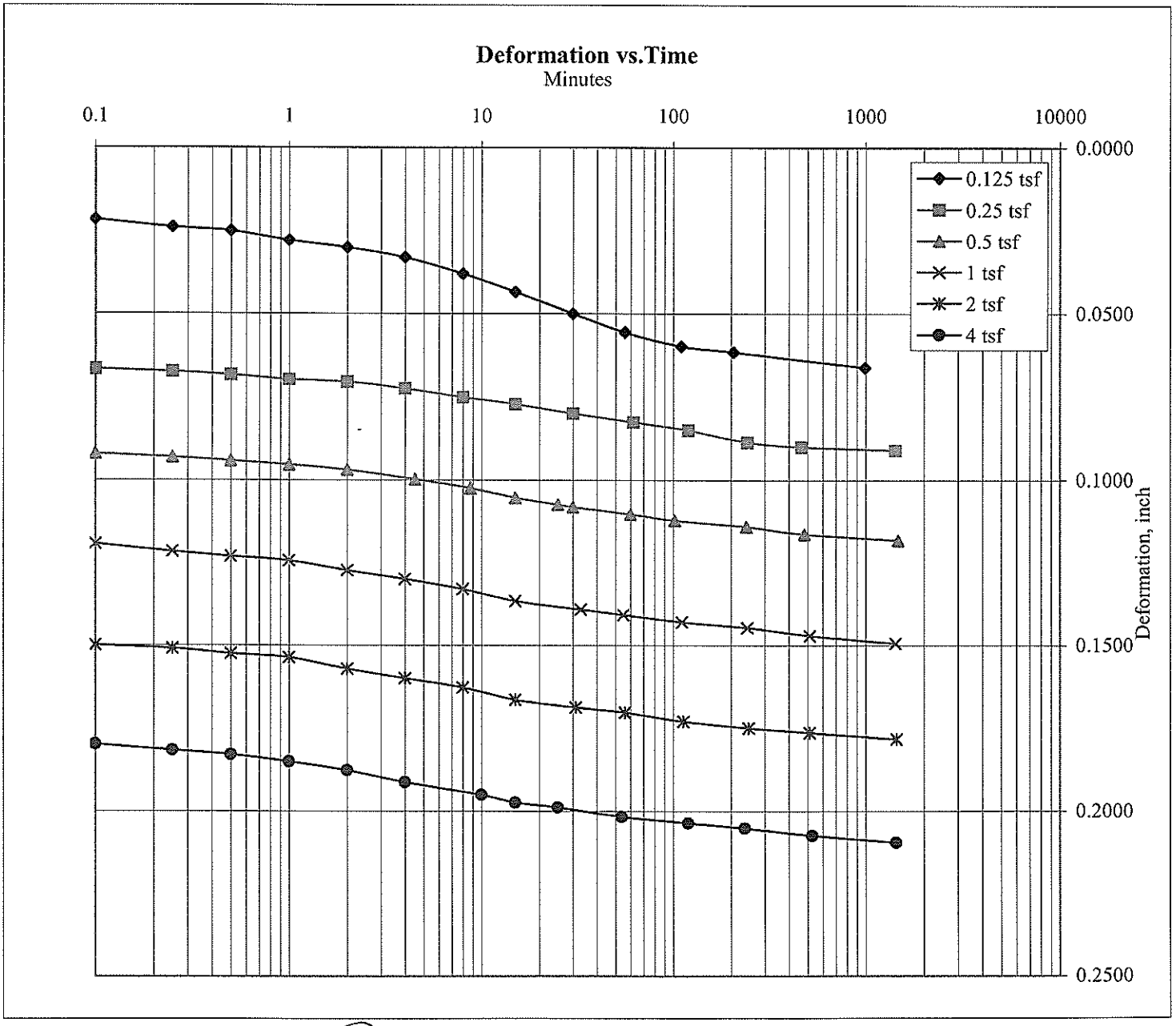
Client:	ENSR Remediation & Const.	**Project:**	BP Hastings-on-Hudson
Item:	30'-32'	**ATC Project #:**	050584
Source:	PDGEO 23, 102805-0925	**ATC Lab No.:**	05-1017
Date Sampled:	10/28/2006	**Sampled By:**	Client
Date Tested:	2/2/06-2/9/06	**Tested By:**	K. Patton/ C. Smith

One-Dimensional Consolidation Test of Soil

Test Method: ASTM D2435



Revised 3/1/06

Reviewed by:

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Client:	ENSR Remediation & Const.	**Project:**	BP Hastings-on-Hudson
Item:	48'-50'	**ATC Project #:**	050584
Source:	PDGEO 24A, 103105-1130	**ATC Lab No.:**	05-1157
Date Sampled:	10/31/2006	**Sampled By:**	Client
Date Tested:	1/28/2006	**Tested By:**	B. Jobity

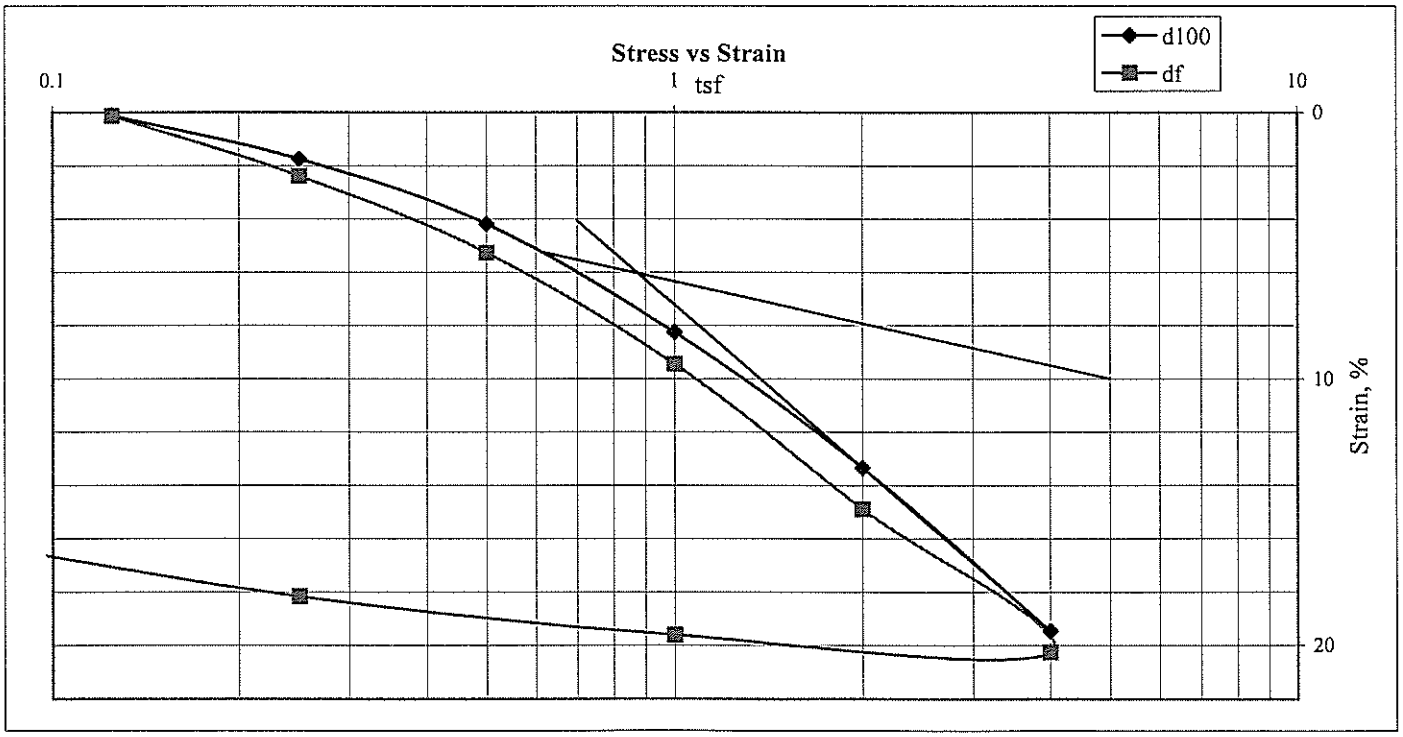
One-Dimensional Consolidation Test of Soil

Test Method: ASTM D2435

Soil Condition	% moisture	Unit Wt, pcf	Void Ratio	% Saturation	Preconsolidation Pressure
Initial	49.18	68.87	1.28	96.79	0.87 tsf
Full Consolidation	33.10	86.33	0.82	101.94	N/A

Test Procedure Method: B | Sample Trimming: Cutting Shoe | Condition: Inundated after seating

Stress, tsf	Duration, minutes	Strain at d100, %	Strain at df, %	Coefficient of Consolidation Cv, in2/min	Coeff. of Secondary Consol., Ca*
0.125	1409	0.12	0.13	0.0003	0.0004
0.25	1453	1.76	2.38	0.0365	0.0030
0.5	1413	4.19	5.28	0.0196	0.0054
1	1400	8.27	9.45	0.0127	0.0070
2	1415	13.34	14.89	0.0120	0.0103
4	1431	19.46	20.25	0.0092	0.0072
1	26		19.61		
0.25	43		18.17		
0.08	22		16.29		



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d100: 100% Primary Consolidation
df: Deformation at completion of test increment

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Advance Testing

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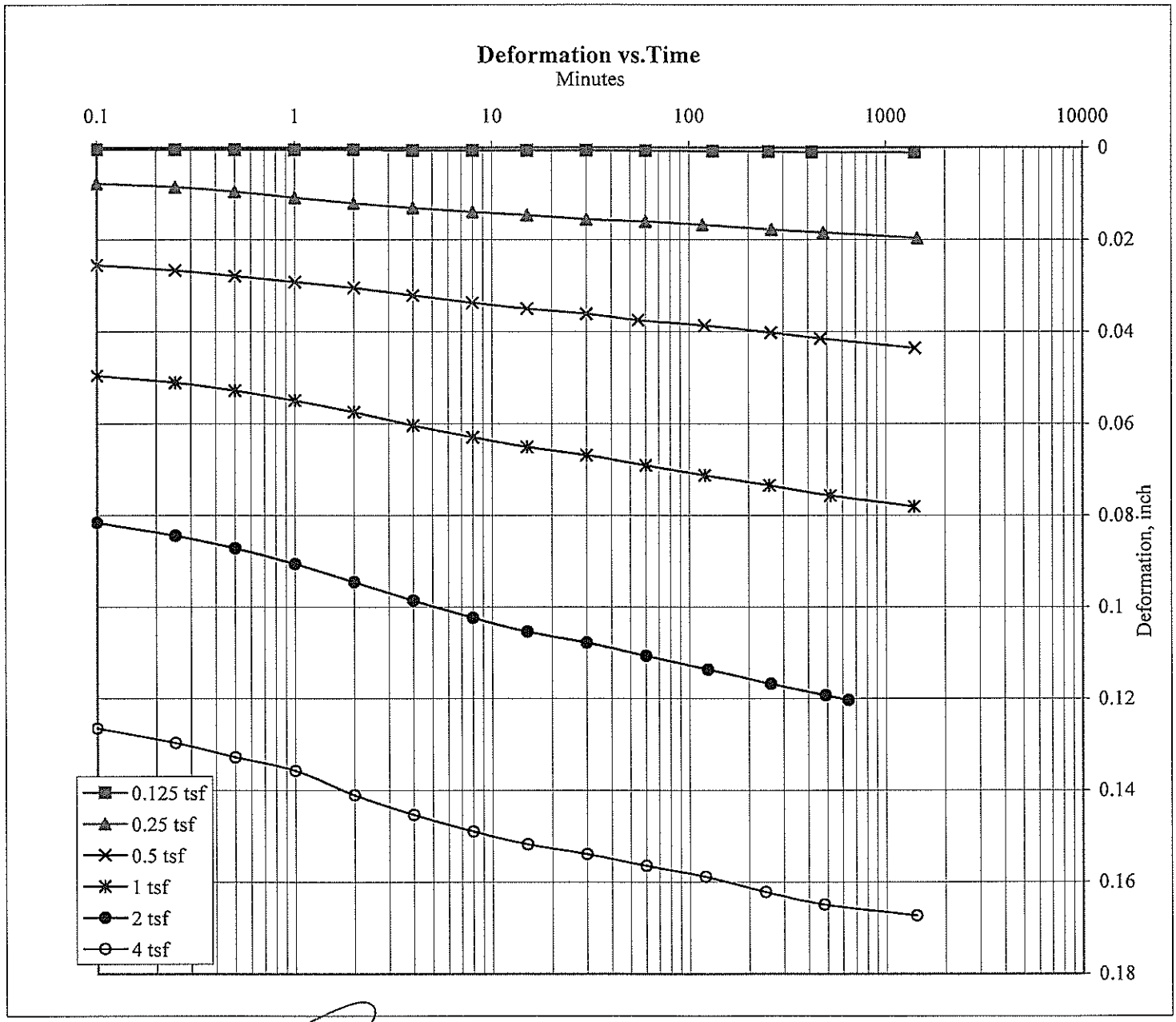
Phone/Fax: 413-232-8566

Client:	ENSR Remediation & Const.	**Project:**	BP Hastings-on-Hudson
Item:	48'-50'	**ATC Project #:**	050584
Source:	PDGEO 24A, 103105-1130	**ATC Lab No.:**	05-1157
Date Sampled:	10/31/2006	**Sampled By:**	Client
Date Tested:	1/28/2006	**Tested By:**	B. Jobity

One-Dimensional Consolidation Test of Soil

Test Method: ASTM D2435



Reviewed by:

Advance Testing

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Phone/Fax: 413-232-8566

Client:	ENSR Remediation & Const.	**Project:**	BP Hastings-on-Hudson
Item:	71-73'	**ATC Project #:**	050584
Source:	PDGEO24A-110205-1015	**ATC Lab No.:**	05-1159
Date Sampled:	11/2/2005	**Sampled By:**	Client
Date Tested:	1/26-2/3/2006	**Tested By:**	B Jobity/K Patton

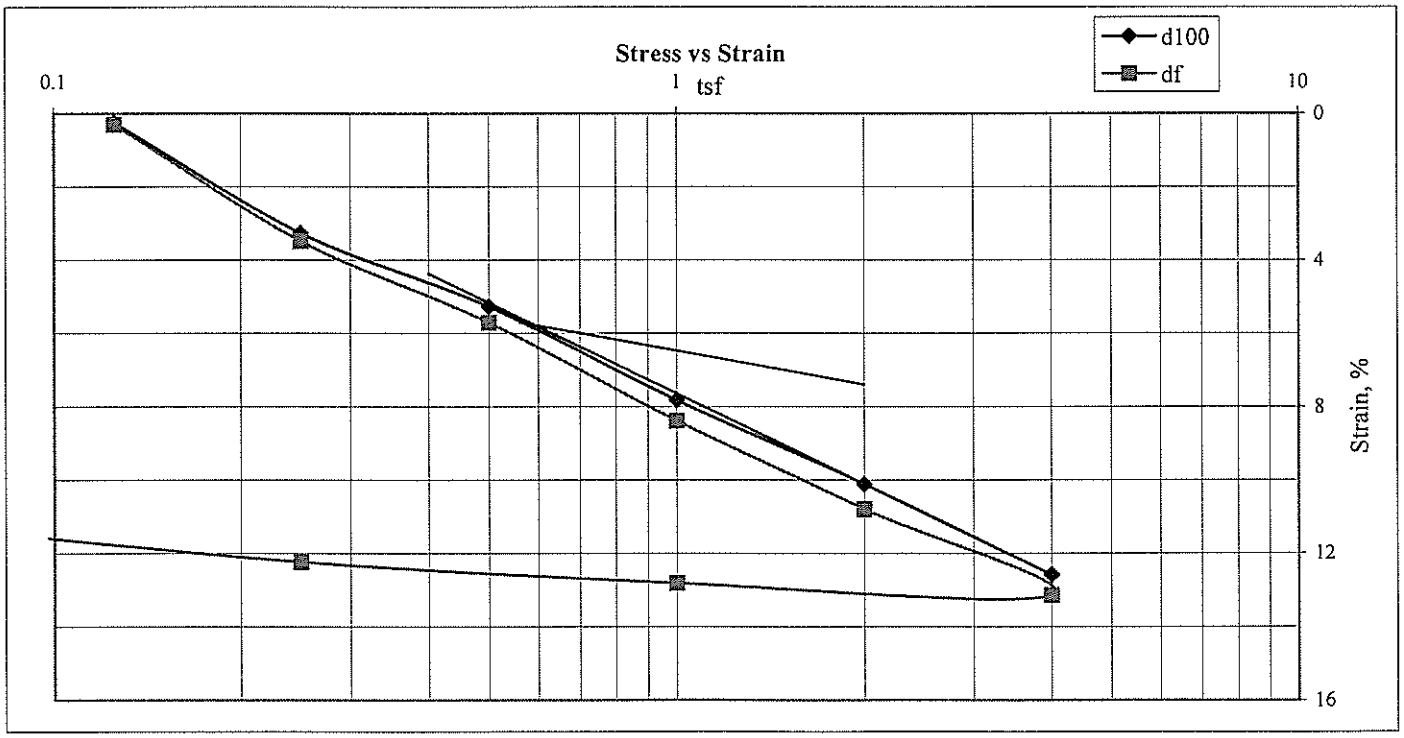
One-Dimensional Consolidation Test of Soil

Test Method: ASTM D2435

Soil Condition	% moisture	Unit Wt, pcf	Void Ratio	% Saturation	Preconsolidation Pressure
Initial	31.67	89.79	0.75	106.67	0.55 tsf
Full Consolidation	22.27	103.37	0.52	108.36	N/A

Test Procedure Method: B | Sample Trimming: Cutting Shoe | Condition: Inundated after seating

Stress, tsf	Duration, minutes	Strain at d100, %	Strain at df, %	Coefficient of Consolidation Cv, in2/min	Coeff. of Secondary Consol., Ca*
0.125	1368	0.25	0.31	0.0025	0.0006
0.25	1562	3.27	3.48	0.0069	0.0013
0.5	1468	5.27	5.71	0.0092	0.0028
1	1453	7.83	8.39	0.0174	0.0032
2	1414	10.12	10.80	0.0249	0.0035
4	1399	12.59	13.15	0.0196	0.0030
1	45		12.82		
0.25	150		12.24		
0	99		11.45		



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d100: 100% Primary Consolidation
df: Deformation at completion of test increment

Reviewed by:

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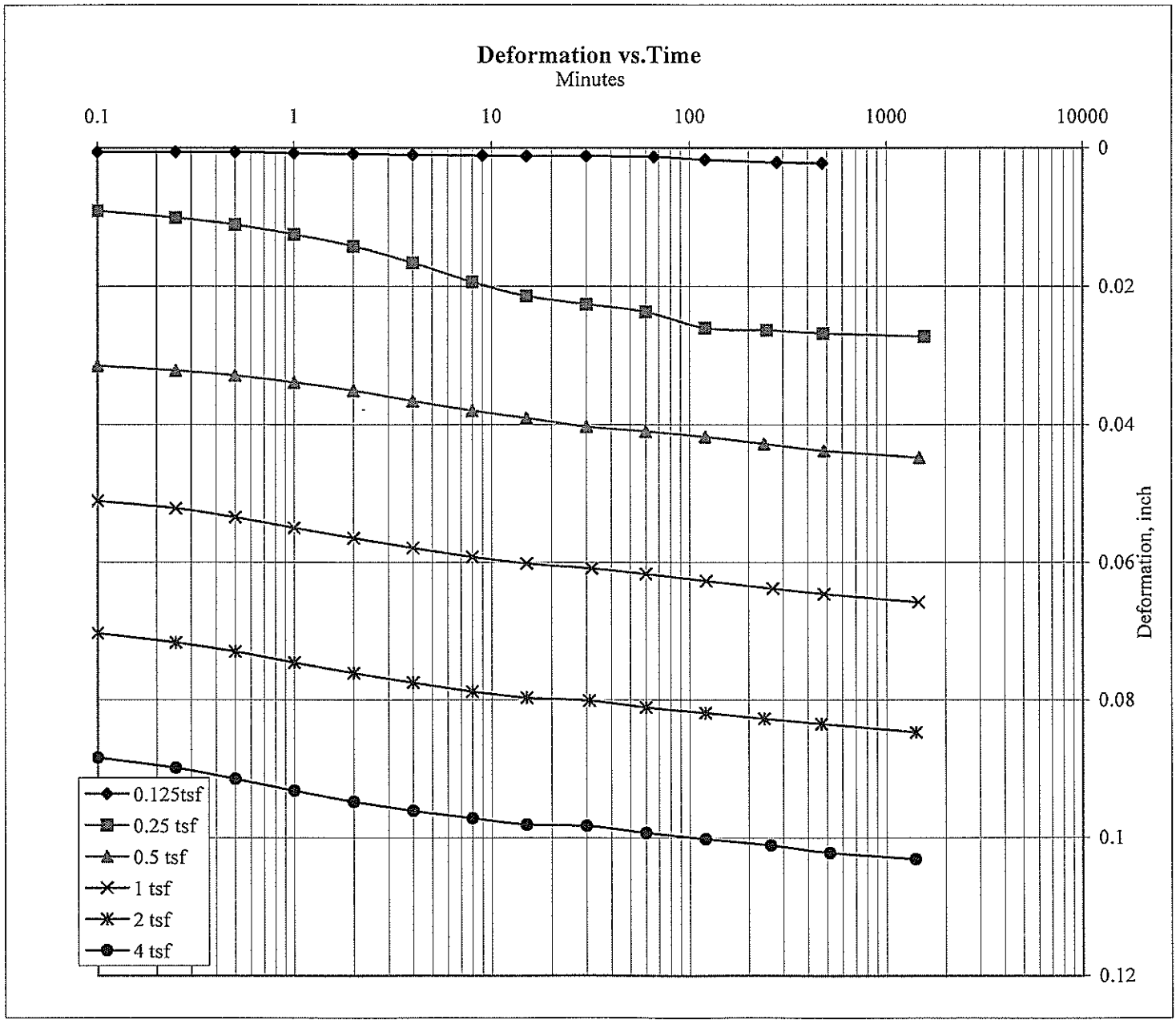
Phone/Fax: 413-232-8566

Client:	ENSR Remediation & Const.	**Project:**	BP Hastings-on-Hudson
Item:	71-73'	**ATC Project #:**	050584
Source:	PDGEO24A-110205-1015	**ATC Lab No.:**	05-1159
Date Sampled:	11/2/2005	**Sampled By:**	Client
Date Tested:	1/26-2/3/2006	**Tested By:**	B Jobity/K Patton

One-Dimensional Consolidation Test of Soil

Test Method: ASTM D2435



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Phone/Fax: 413-232-8566

Client:	ENSR Remediation & Const.	**Project:**	BP Hastings-on-Hudson
Item:	101005-1315	**ATC Project #:**	050584
Source:	PDGEO 28, 37'-39'	**ATC Lab No.:**	05-0931
Date Sampled:	10/10/2005	**Sampled By:**	Client
Date Tested:	11/20/2005	**Tested By:**	C. Smith

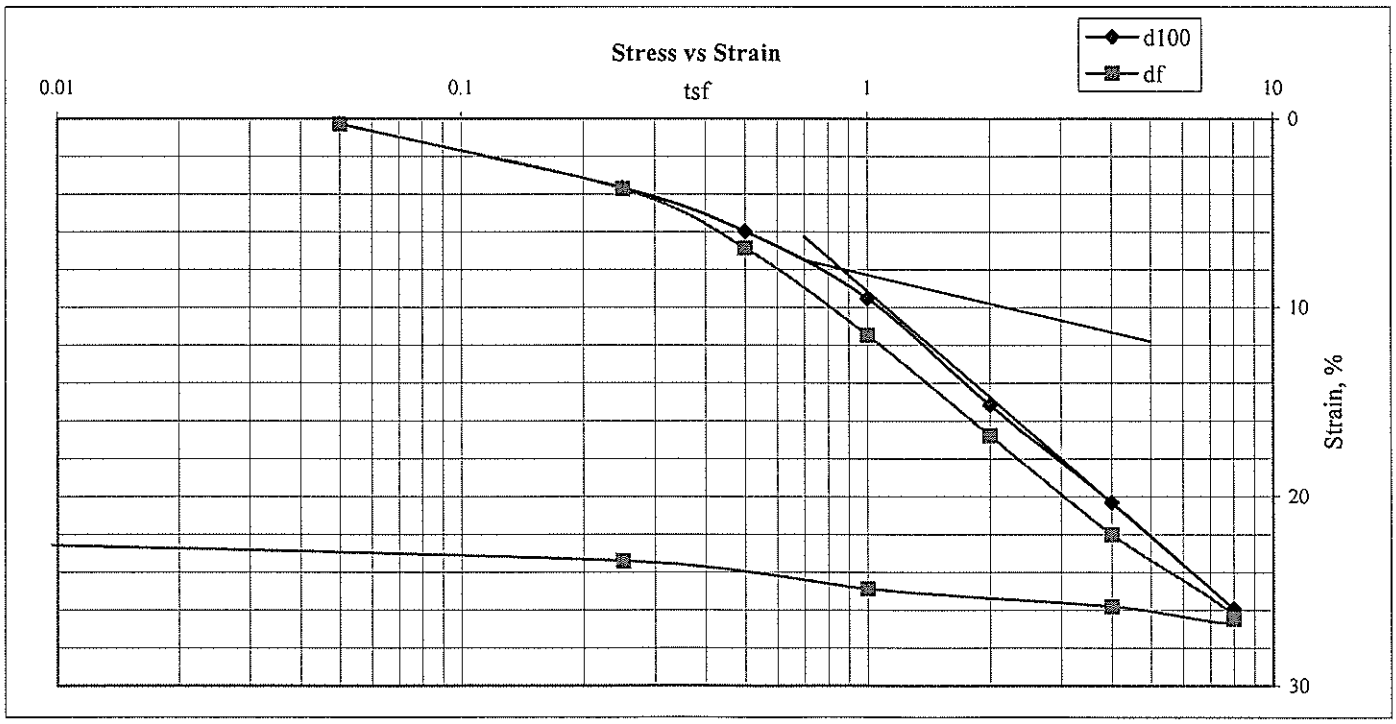
One-Dimensional Consolidation Test of Soil

Test Method: ASTM D2435

Soil Condition	% moisture	Unit Wt, pcf	Void Ratio	% Saturation	Preconsolidation Pressure
Initial	50.59	68.05	1.30	97.48	0.86 tsf
Full Consolidation	29.57	92.54	0.69	107.05	N/A

Test Procedure					
Method:	B	Sample Trimming:	Cutting Shoe	Condition:	Inundated after seating

Stress, tsf	Duration, minutes	Strain at d100, %	Strain at df, %	Coefficient of Consolidation Cv, in2/min	Coeff. of Secondary Consol., Ca*
0.05	3496	0.27	0.29	0.0190	0.00024
0.25	1427	3.68	3.73	0.0180	0.00079
0.5	1440	5.97	6.87	0.0341	0.00668
1	2864	9.52	11.46	0.0680	0.00944
2	4329	15.16	16.76	0.0315	0.00964
4	1444	20.34	22.00	0.0412	0.00946
8	1440	25.93	26.47	0.0211	0.00959
4	60		25.81		
1	138		24.88		
0.25	130		23.41		
0	114		22.11		



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df: Deformation at completion of test increment

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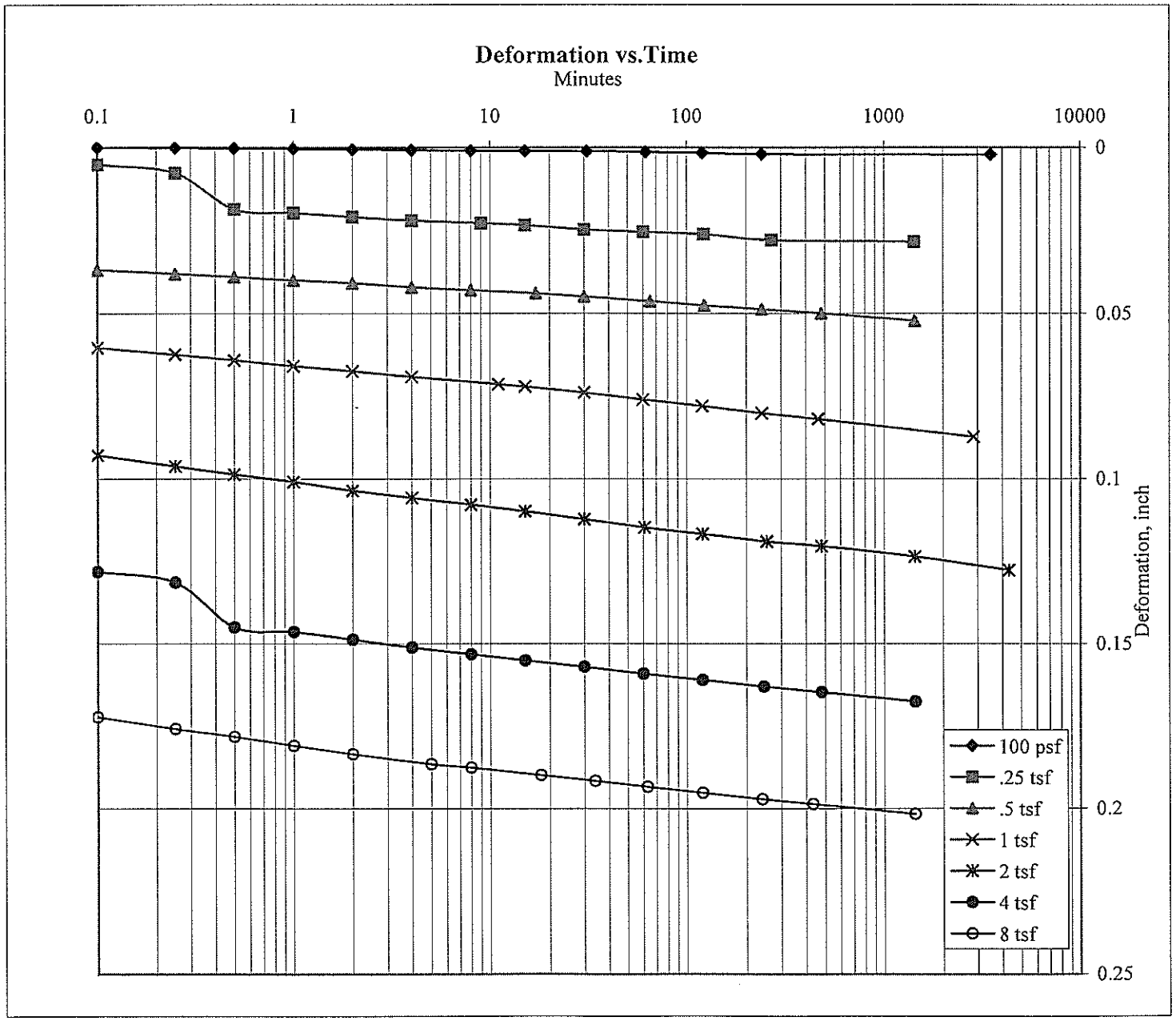
Client:	ENSR Remediation & Const.	**Project:**	BP Hastings-on-Hudson
Item:	101005-1315	**ATC Project #:**	050584
Source:	PDGEO 28, 37'-39'	**ATC Lab No.:**	05-0931
Date Sampled:	10/10/2005	**Sampled By:**	Client
Date Tested:	11/20/2005	**Tested By:**	C. Smith

One-Dimensional Consolidation Test of Soil

Test Method: ASTM D2435



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Phone/Fax: 413-232-8566

Client:	ENSR Remediation & Const.	**Project:**	BP Hastings-on-Hudson
Item:	101005-1340	**ATC Project #:**	050584
Source:	PDGEO 28, 41'-43'	**ATC Lab No.:**	05-0932
Date Sampled:	10/10/2005	**Sampled By:**	Client
Date Tested:	1/10-19/2006	**Tested By:**	C. Smith

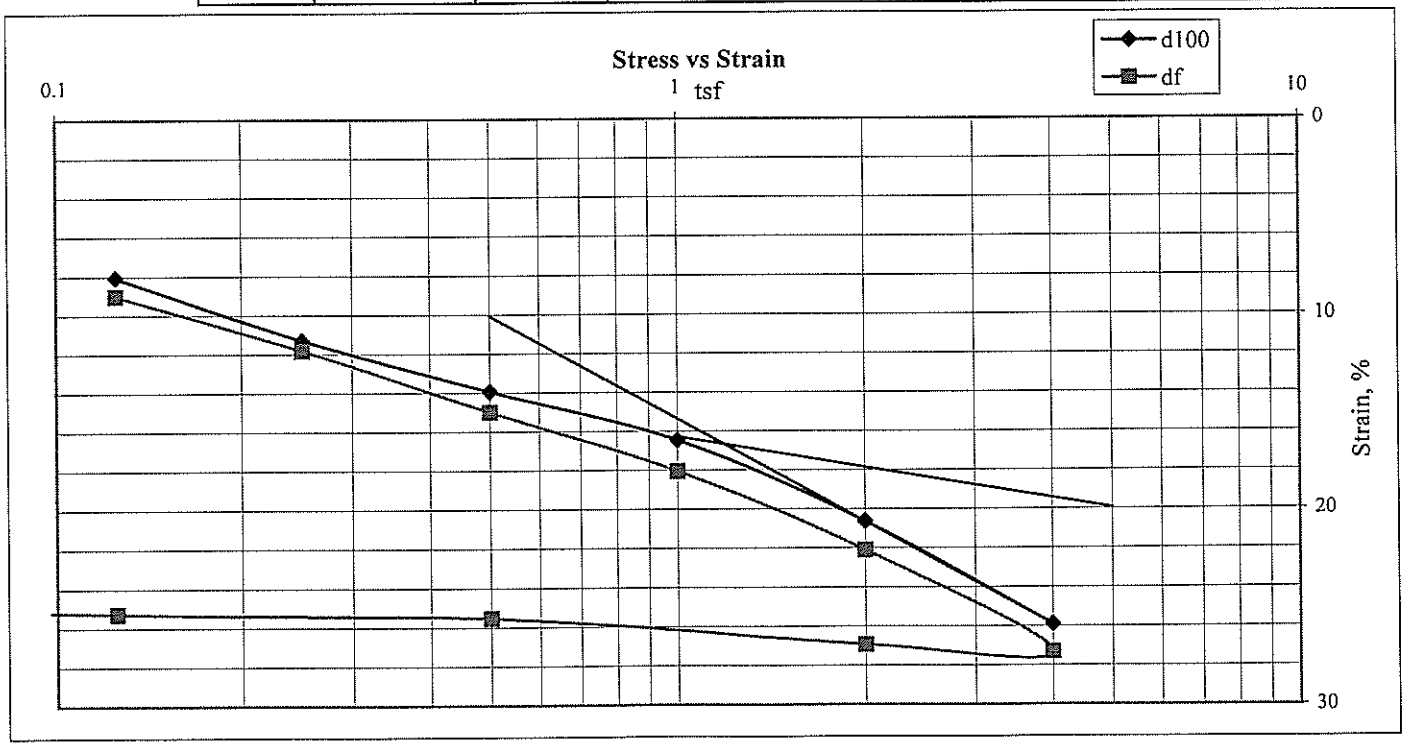
One-Dimensional Consolidation Test of Soil

Test Method: ASTM D2435

Soil Condition	% moisture	Unit Wt, pcf	Void Ratio	% Saturation	Preconsolidation Pressure
Initial	55.85	66.72	1.35	103.93	1.1 tsf
Full Consolidation	29.82	91.81	0.71	105.91	N/A

Test Procedure					
Method:	B	Sample Trimming:	Cutting Shoe	Condition:	Inundated after seating

Stress, tsf	Duration, minutes	Strain at d100, %	Strain at df, %	Coefficient of Consolidation Cv, in2/min	Coeff. of Secondary Consol., Ca*
0.125	1431	8.08	9.02	0.0029	0.0056
0.25	1503	11.30	11.82	0.0034	0.0034
0.5	4255	13.95	15.00	0.0072	0.0055
1	1385	16.46	18.04	0.0167	0.0087
2	1438	20.63	22.11	0.0094	0.0078
4	1437	25.91	27.32	0.0134	0.0042
2	60		26.94		
0.5	60		25.54		
0.125	60		25.29		
0	60		23.76		



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df: Deformation at completion of test increment

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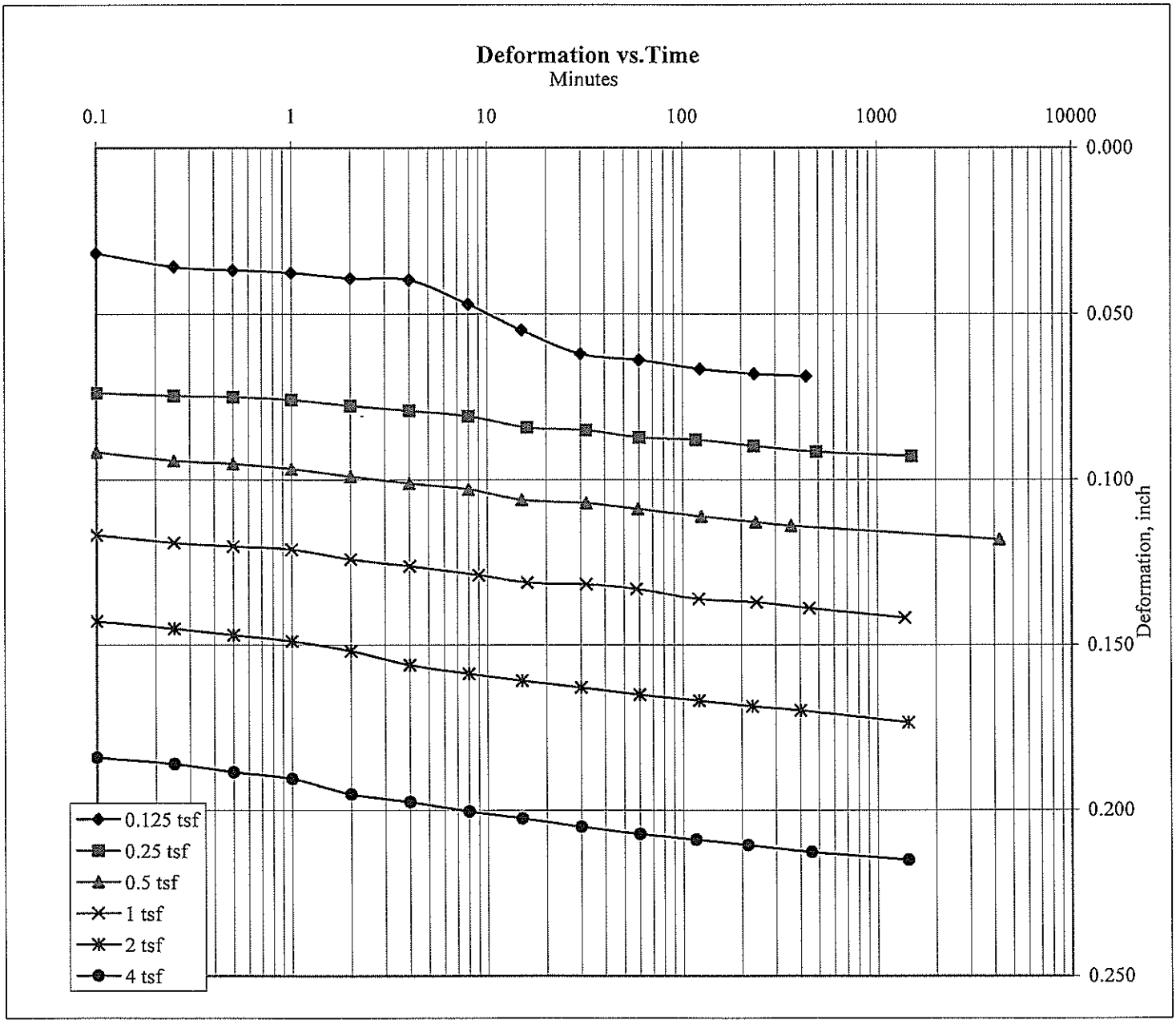
Client:	ENSR Remediation & Const.	**Project:**	BP Hastings-on-Hudson
Item:	101005-1340	**ATC Project #:**	050584
Source:	PDGEO 28, 41'-43'	**ATC Lab No.:**	05-0932
Date Sampled:	10/10/2005	**Sampled By:**	Client
Date Tested:	1/10-19/2006	**Tested By:**	C. Smith

One-Dimensional Consolidation Test of Soil

Test Method: ASTM D2435



Reviewed by: _____

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42 Day Farm Road, West Stockbridge, MA 01266
Phone/Fax: 413-232-8566

Client:	ENSR Remediation & Const.	**Project:**	BP Hastings-on-Hudson
Item:	101105-0920	**ATC Project #:**	050584
Source:	PDGEO 28, 50'-52'	**ATC Lab No.:**	05-0916
Date Sampled:	10/11/2005	**Sampled By:**	Client
Date Tested:	12/1-12/2005	**Tested By:**	C. Smith

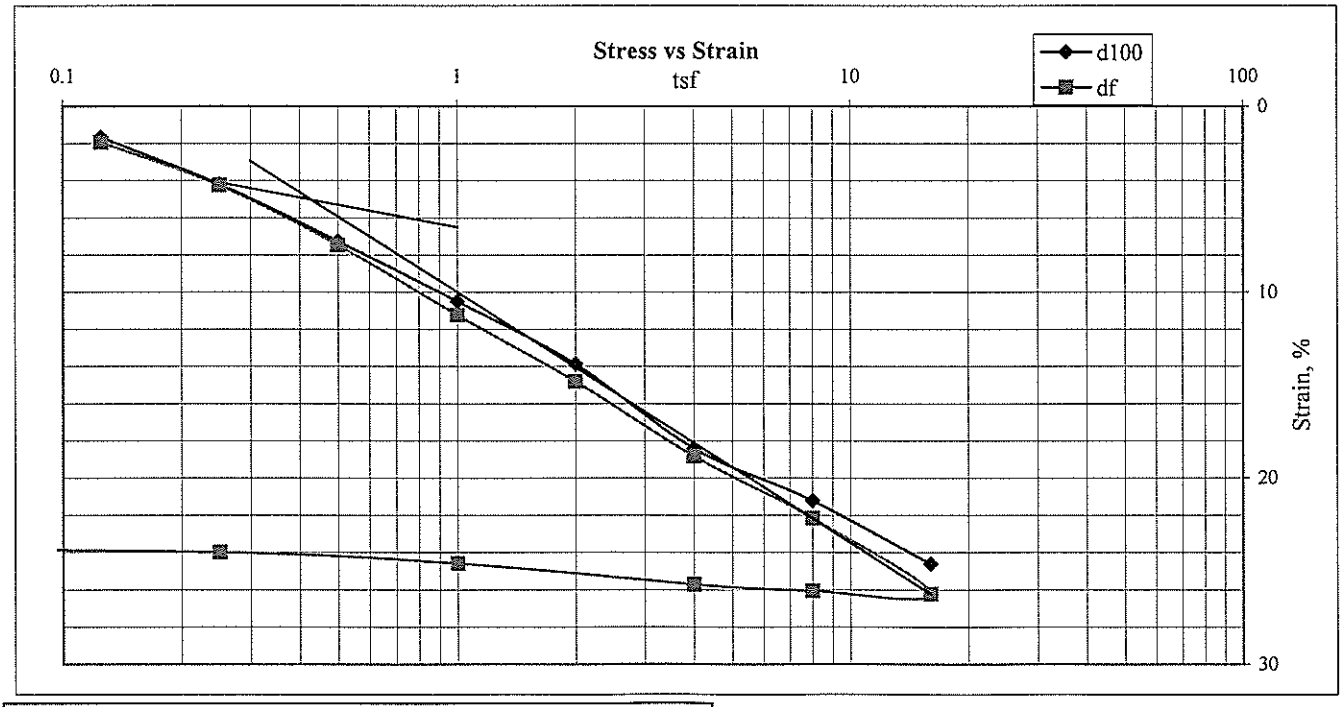
One-Dimensional Consolidation Test of Soil

Test Method: ASTM D2435

Soil Condition	% moisture	Unit Wt, pcf	Void Ratio	% Saturation	Preconsolidation Pressure
Initial	33.05	85.67	0.83	100.05	0.43 tsf*
Full Consolidation	24.09	98.98	0.58	103.67	N/A

Test Procedure					
Method:	B	Sample Trimming:	Cutting Shoe	Condition:	Inundated after seating

Stress, tsf	Duration, minutes	Strain at d100, %	Strain at df, %	Coefficient of Consolidation Cv, in2/min	Coeff. of Secondary Consol., Ca*
0.125	4318	1.67	1.95	0.0010	0.00230
0.25	1396	4.21	4.25	0.0016	0.00026
0.5	1431	7.26	7.48	0.0009	0.00467
1	1464	10.50	11.24	0.0992	0.00456
2	1440	13.87	14.81	0.0759	0.00648
4	1440	18.42	18.82	0.0374	0.00510
8	1395	21.22	22.18	0.0692	0.00535
16	1475	24.62	26.23	0.2315	0.00591
8	60		26.07		
4	60		25.72		
1	60		24.59		
0.25	93		24.00		
0	60		23.47		



*Preconsolidation pressure was not defined by the d100 curve, and was determined from the df curve.

d100: 100% Primary Consolidation
df: Deformation at completion of test increment
*Ca is dimensionless; equals final slope of consolidation curve divided by 1 plus initial void ratio.

Reviewed by:

Advance Testing

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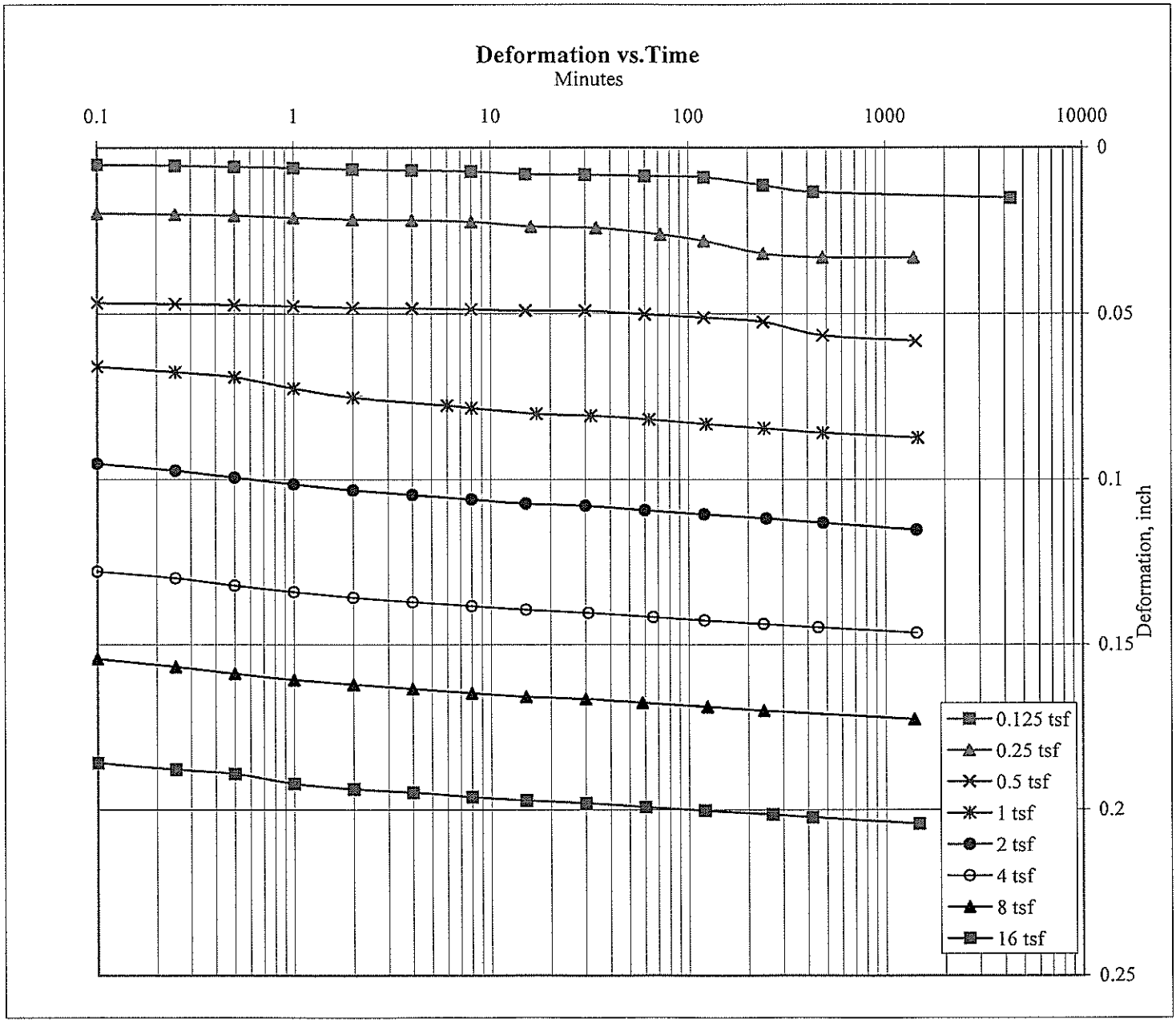
42 Day Farm Road, West Stockbridge, MA 01266
Phone/Fax: 413-232-8566

Client:	ENSR Remediation & Const.	**Project:**	BP Hastings-on-Hudson
Item:	101105-0920	**ATC Project #:**	050584
Source:	PDGEO 28, 50'-52'	**ATC Lab No.:**	05-0916
Date Sampled:	10/11/2005	**Sampled By:**	Client
Date Tested:	12/1-12/2005	**Tested By:**	C. Smith

One-Dimensional Consolidation Test of Soil

Test Method: ASTM D2435



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Phone/Fax: 413-232-8566

Client:	ENSR Remediation & Const.	**Project:**	BP Hastings-on-Hudson
Item:	101105-1020	**ATC Project #:**	050584
Source:	PDGEO 28, 57'-59'	**ATC Lab No.:**	05-0917
Date Sampled:	10/11/2005	**Sampled By:**	Client
Date Tested:	12/5/2005	**Tested By:**	C. Smith/ B. Jobity

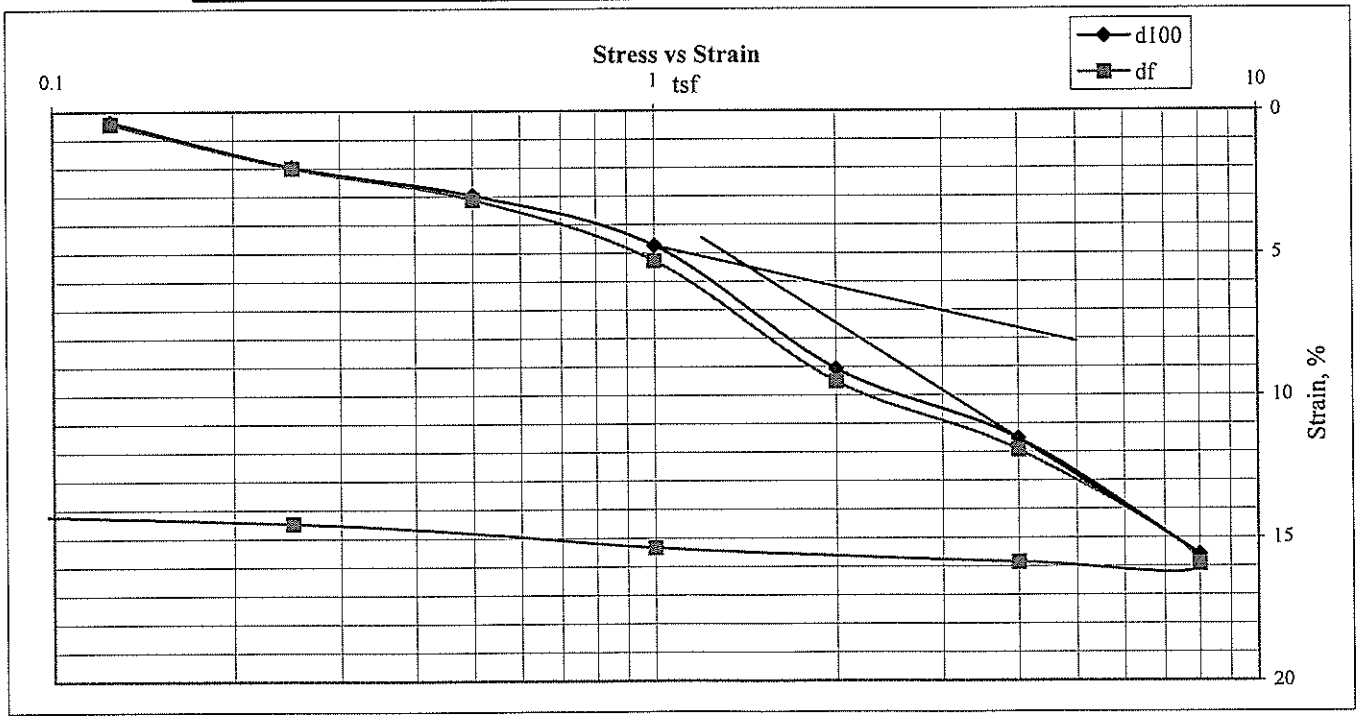
One-Dimensional Consolidation Test of Soil

Test Method: ASTM D2435

Soil Condition	% moisture	Unit Wt, pcf	Void Ratio	% Saturation	Preconsolidation Pressure
Initial	43.16	78.13	1.01	107.72	1.43 tsf
Full Consolidation	36.86	91.99	0.70	131.51	N/A

Test Procedure					
Method:	B	Sample Trimming:	Cutting Shoe	Condition:	Inundated after seating

Stress, tsf	Duration, minutes	Strain at d100, %	Strain at df, %	Coefficient of Consolidation Cv, in2/min	Coeff. of Secondary Consol., Ca*
0.125	1440	0.36	0.43	0.0295	0.00116
0.25	1385	1.97	1.99	0.0043	0.00116
0.5	1440	2.96	3.12	0.0121	0.00204
1	1440	4.74	5.27	0.0417	0.00467
2	2773	9.07	9.52	0.0166	0.00589
4	1445	11.52	11.93	0.0237	0.00500
8	1436	15.59	15.93	0.0288	0.00514
4	57		15.86		
1	122		15.34		
0.25	120		14.48		
0	165		13.14		



*Ca is dimensionless; equals final slope of consolidation curve divided by 1 plus initial void ratio.
d100: 100% Primary Consolidation
df: Deformation at completion of test increment

Reviewed by:

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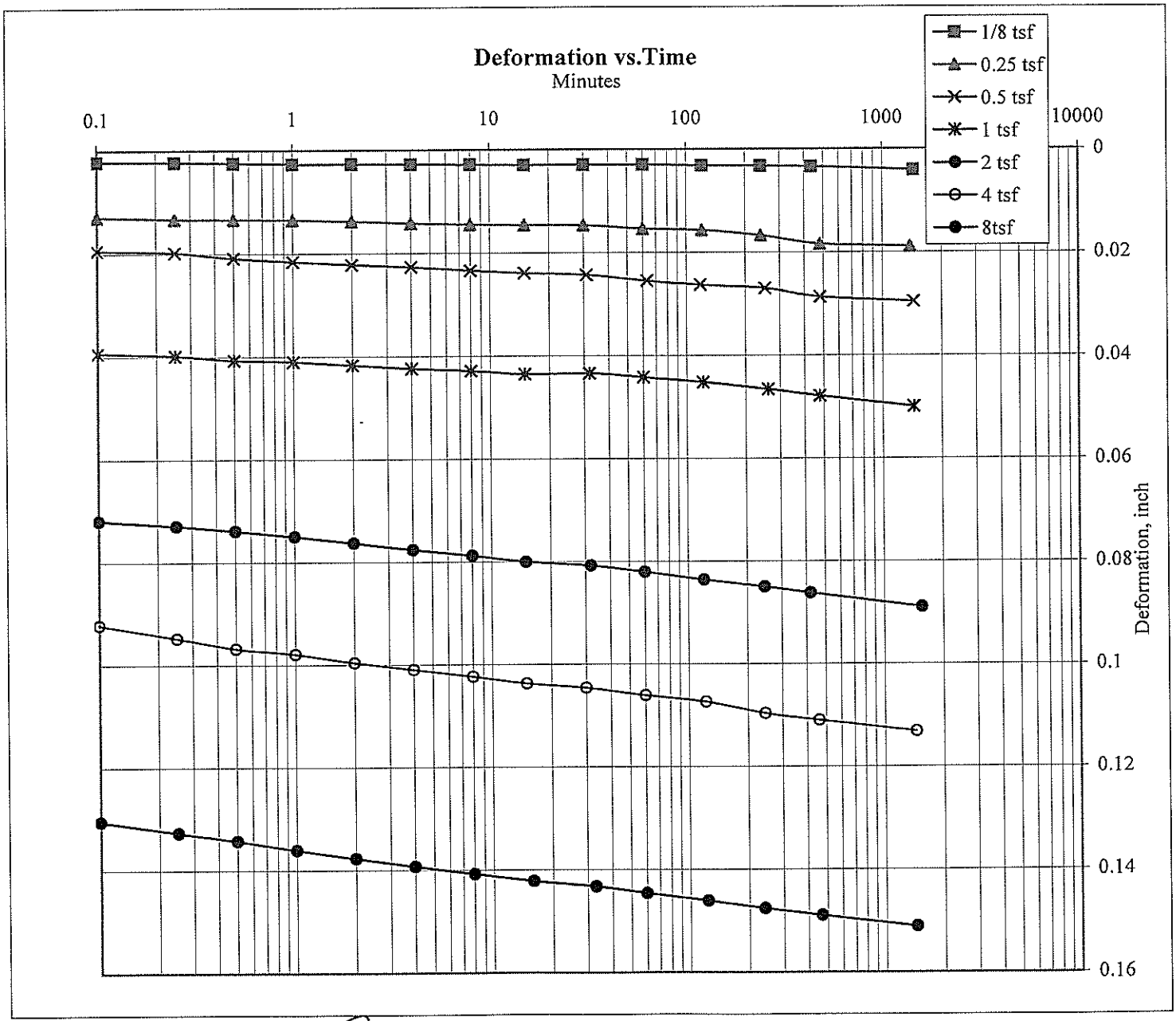
Client:	ENSR Remediation & Const.	**Project:**	BP Hastings-on-Hudson
Item:	101105-1020	**ATC Project #:**	050584
Source:	PDGEO 28, 57'-59'	**ATC Lab No.:**	05-0917
Date Sampled:	10/11/2005	**Sampled By:**	Client
Date Tested:	12/5/2005	**Tested By:**	C. Smith/ B. Jobity

One-Dimensional Consolidation Test of Soil

Test Method: ASTM D2435



Reviewed by: _____

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Phone/Fax: 413-232-8566

Client:	ENSR Remediation & Const.	**Project:**	BP Hastings-on-Hudson
Item:	42'-44'	**ATC Project #:**	050584
Source:	PDGEO29, 102105-1100	**ATC Lab No.:**	05-1154
Date Sampled:	10/2/2005	**Sampled By:**	Client
Date Tested:	2/9/06-2/17/06	**Tested By:**	C. Smith/ B. Jobity

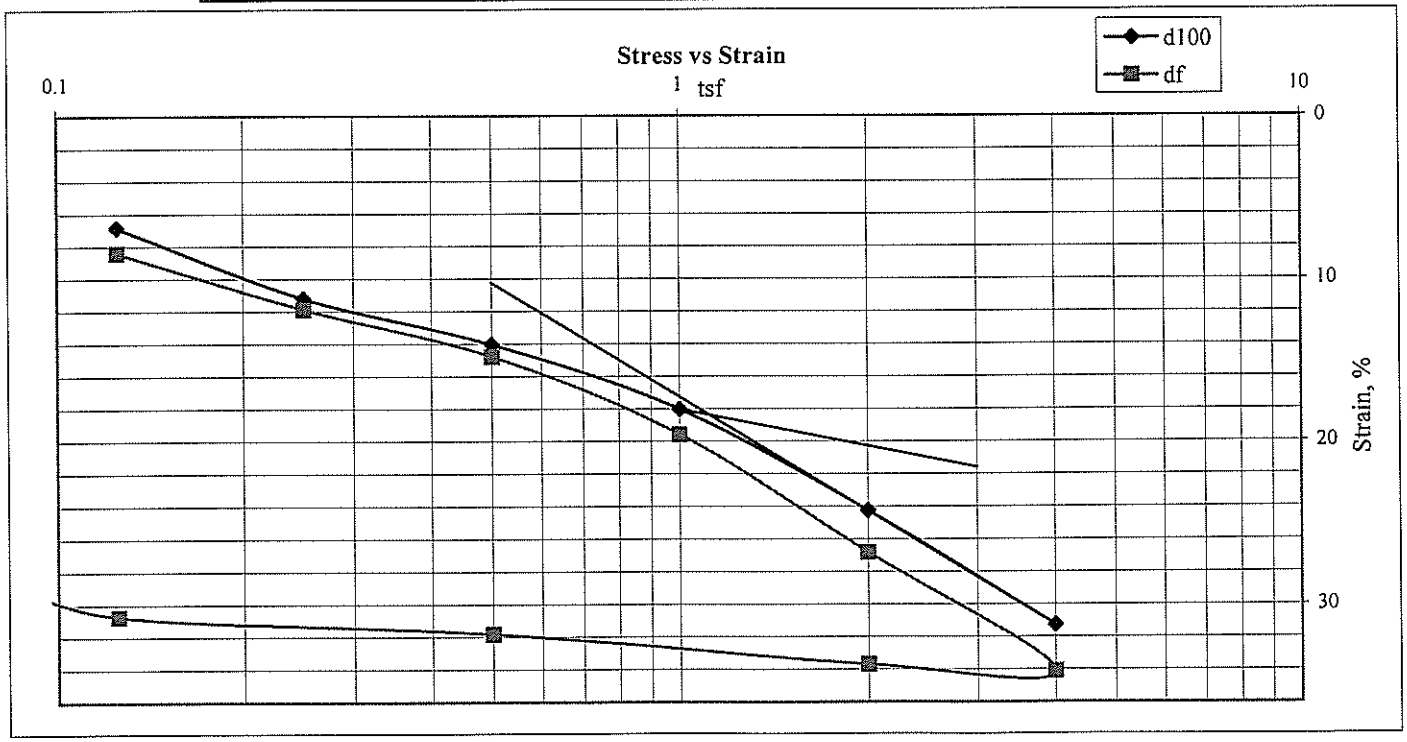
One-Dimensional Consolidation Test of Soil

Test Method: ASTM D2435

Soil Condition	% moisture	Unit Wt, pcf	Void Ratio	% Saturation	Preconsolidation Pressure
Initial	61.15	67.06	1.34	114.83	1.1 tsf
Full Consolidation	28.14	101.58	0.54	130.16	N/A

Test Procedure			
Method: B	Sample Trimming: Cutting Shoe	Condition: Inundated after seating

Stress, tsf	Duration, minutes	Strain at d100, %	Strain at df, %	Coefficient of Consolidation Cv, in2/min	Coeff. of Secondary Consol., Ca*
0.125	1560	6.84	8.41	0.0704	0.0041
0.25	2673	11.21	11.89	0.0052	0.0039
0.5	1470	14.05	14.80	0.0162	0.0045
1	1428	18.03	19.58	0.0119	0.0079
2	1440	24.26	26.82	0.0078	0.0137
4	1405	31.27	34.11	0.0140	0.0153
2	60		33.69		
0.5	75		31.81		
0.125	66		30.73		
0	60		28.37		



*Ca is dimensionless; equals final slope of consolidation curve divided by 1 plus initial void ratio.
d100: 100% Primary Consolidation
df: Deformation at completion of test increment

Reviewed by:

Advance Testing

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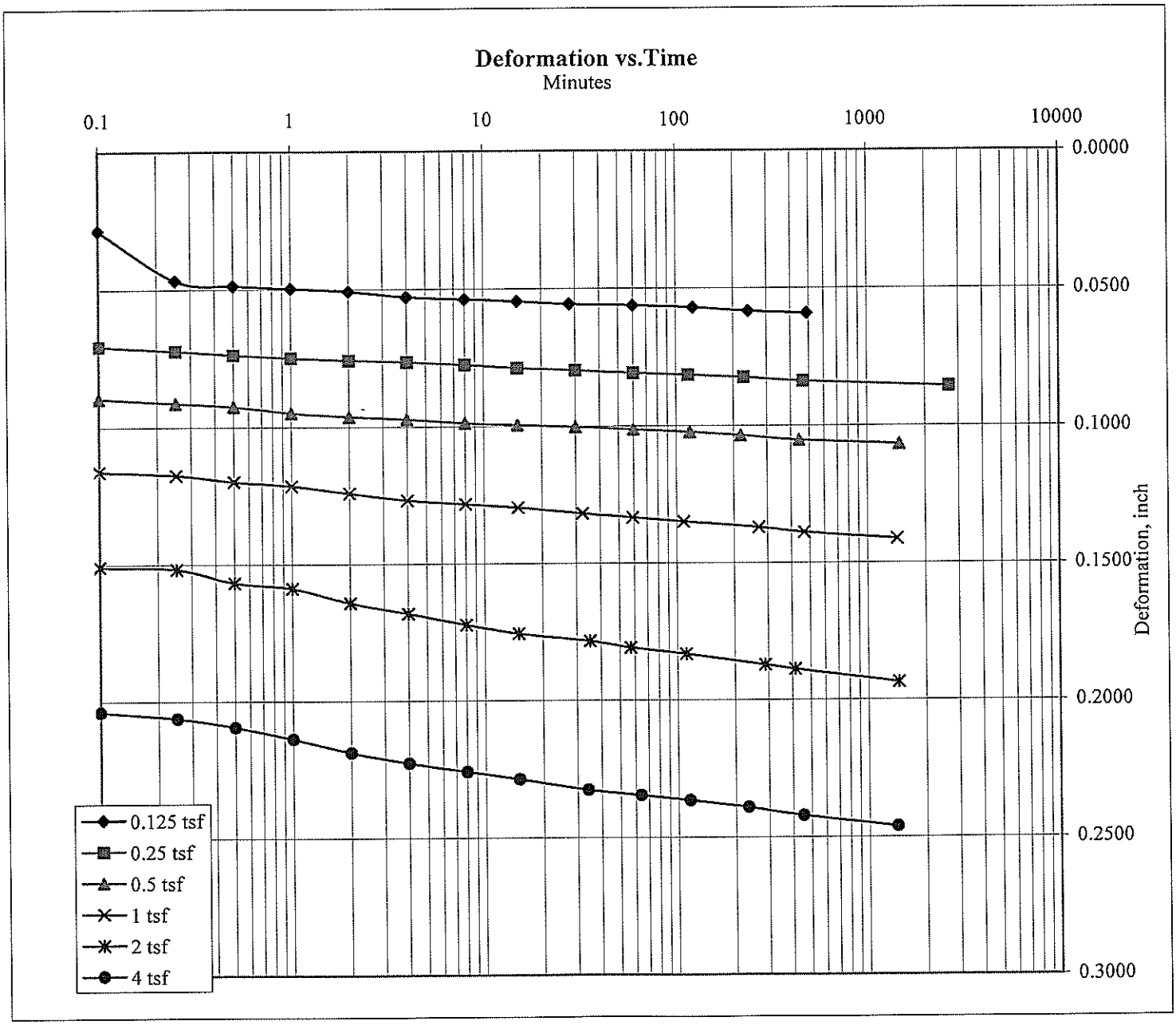
Client:	ENSR Remediation & Const.	**Project:**	BP Hastings-on-Hudson
Item:	42'-44'	**ATC Project #:**	050584
Source:	PDGEO29, 102105-1100	**ATC Lab No.:**	05-1154
Date Sampled:	10/2/2005	**Sampled By:**	Client
Date Tested:	2/9/06-2/17/06	**Tested By:**	C. Smith/ B. Jobity

One-Dimensional Consolidation Test of Soil

Test Method: ASTM D2435



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Phone/Fax: 413-232-8566

Client:	ENSR Remediation & Const.	**Project:**	BP Hastings-on-Hudson
Item:	32'-34'	**ATC Project #:**	050584
Source:	PDGEO 30, 101805-1445	**ATC Lab No.:**	05-1002
Date Sampled:	10/18/2005	**Sampled By:**	Client
Date Tested:	1/18-26/2006	**Tested By:**	C. Smith

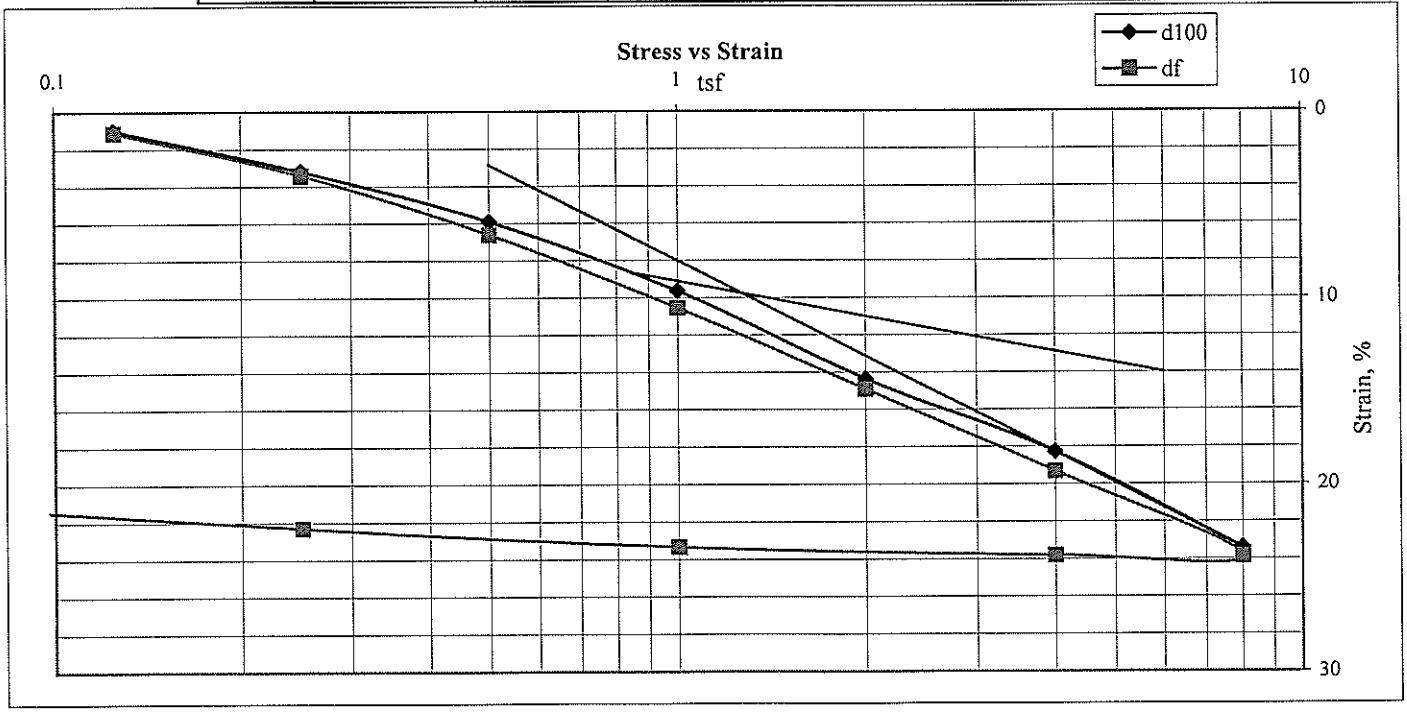
One-Dimensional Consolidation Test of Soil

Test Method: ASTM D2435

Soil Condition	% moisture	Unit Wt, pcf	Void Ratio	% Saturation	Preconsolidation Pressure
Initial	40.48	81.51	0.92	110.15	1.2 tsf
Full Consolidation	22.52	107.07	0.46	121.99	N/A

Test Procedure Method: B | Sample Trimming: Cutting Shoe | Condition: Inundated after seating

Stress, tsf	Duration, minutes	Strain at d100, %	Strain at df, %	Coefficient of Consolidation Cv, in2/min	Coeff. of Secondary Consol., Ca*
0.125	1380	1.02	1.12	0.0398	0.00179
0.25	1563	3.20	3.42	0.0288	0.00426
0.5	1411	5.90	6.62	0.0437	0.00648
1	1394	9.63	10.54	0.0462	0.00889
2	1404	14.36	14.92	0.0279	0.00728
4	1440	18.27	19.32	0.0521	0.00758
8	1440	23.40	23.88	0.0412	0.00586
4	60		23.81		
1	60		23.34		
0.25	60		22.31		
0	60		20.30		



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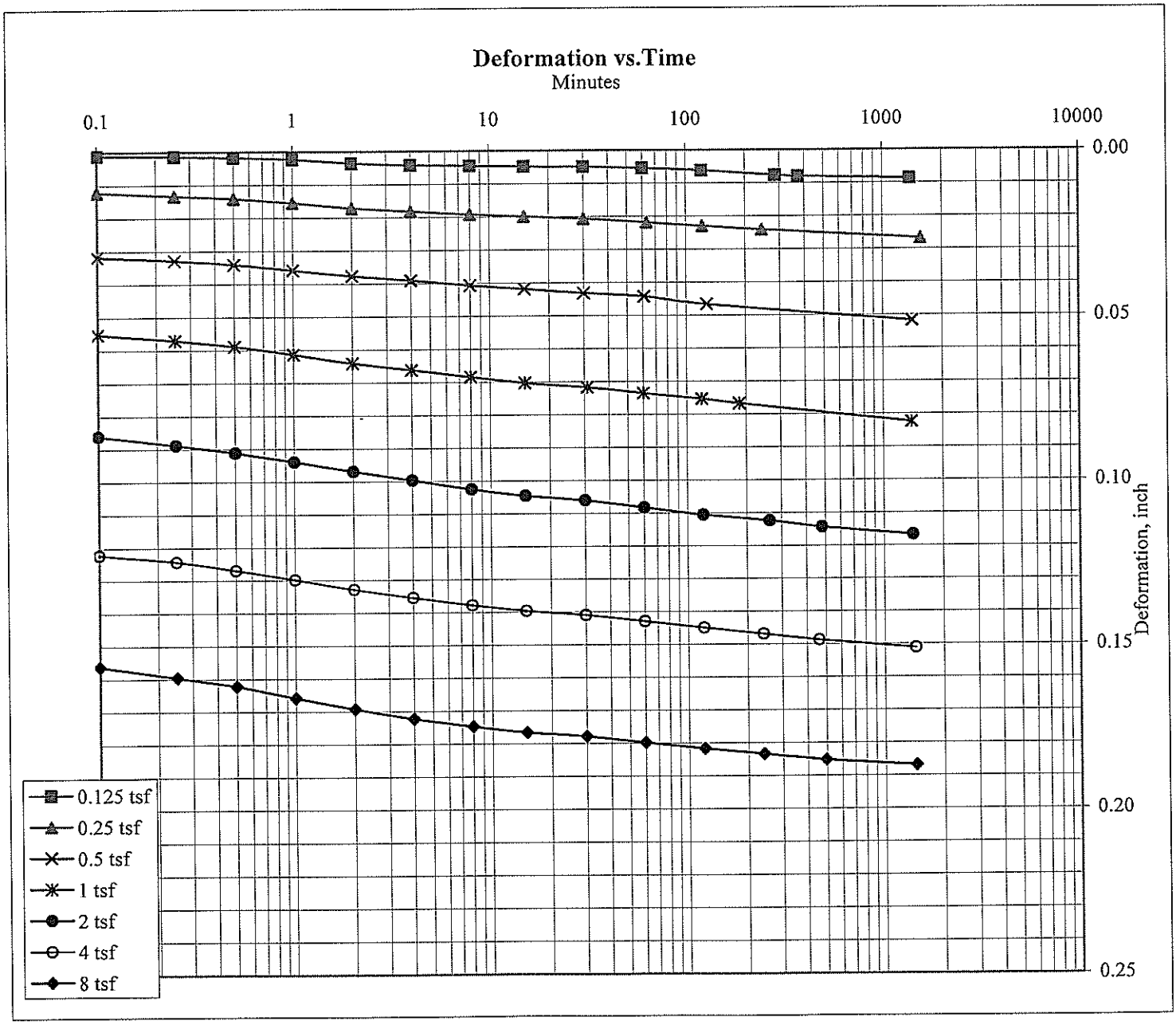
Client:	ENSR Remediation & Const.	**Project:**	BP Hastings-on-Hudson
Item:	32'-34'	**ATC Project #:**	050584
Source:	PDGEO 30, 101805-1445	**ATC Lab No.:**	05-1002
Date Sampled:	10/18/2005	**Sampled By:**	Client
Date Tested:	1/18-26/2006	**Tested By:**	C. Smith

One-Dimensional Consolidation Test of Soil

Test Method: ASTM D2435



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Phone/Fax: 413-232-8566

Client:	ENSR Remediation & Const.	**Project:**	BP Hastings-on-Hudson
Item:	20'-22'	**ATC Project #:**	050584
Source:	PDGEO 31, 102005-1115	**ATC Lab No.:**	05-1011
Date Sampled:	10/20/2006	**Sampled By:**	Client
Date Tested:	2/2-10/2006	**Tested By:**	K. Patton/C. Smith/B. Jobity

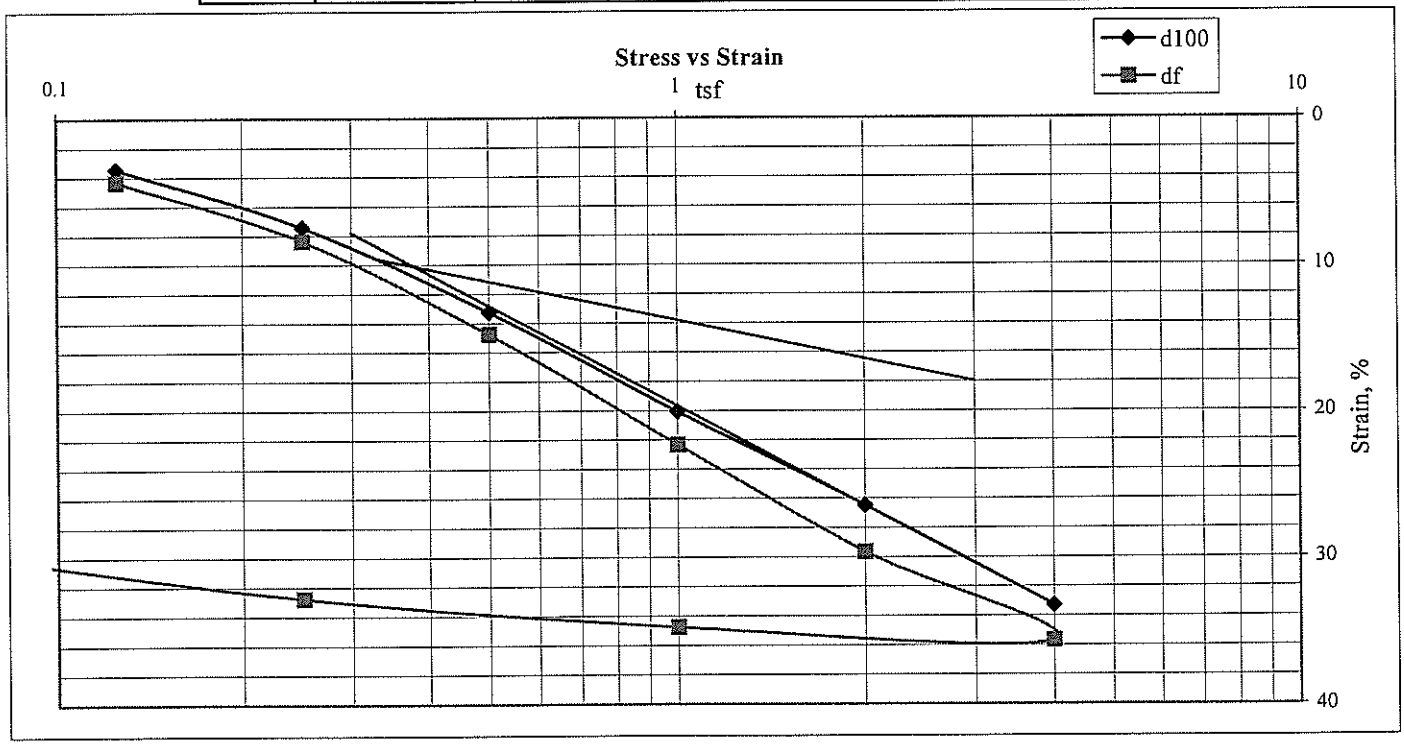
One-Dimensional Consolidation Test of Soil

Test Method: ASTM D2435

Soil Condition	% moisture	Unit Wt, pcf	Void Ratio	% Saturation	Preconsolidation Pressure
Initial	80.44	50.77	2.09	96.77	0.48 tsf
Full Consolidation	50.99	77.57	1.02	125.47	N/A

Test Procedure					
Method: B	Sample Trimming: Cutting Shoe	Condition: Inundated after seating

Stress, tsf	Duration, minutes	Strain at d100, %	Strain at df, %	Coefficient of Consolidation Cv, in2/min	Coeff. of Secondary Consol., Ca*
0.125	993	3.46	4.32	0.0476	0.0047
0.25	1430	7.44	8.39	0.0162	0.0060
0.5	1479	13.26	14.78	0.0183	0.0078
1	1693	20.07	22.32	0.0106	0.0113
2	1446	26.47	29.65	0.0168	0.0161
4	1442	33.29	35.69	0.0157	0.0109
1	60		34.75		
0.25	60		32.78		
0	60		30.08		



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d100: 100% Primary Consolidation
df: Deformation at completion of test increment

Reviewed by: _____

Advance Testing

3348 Route 208, Campbell Hall, NY 10916
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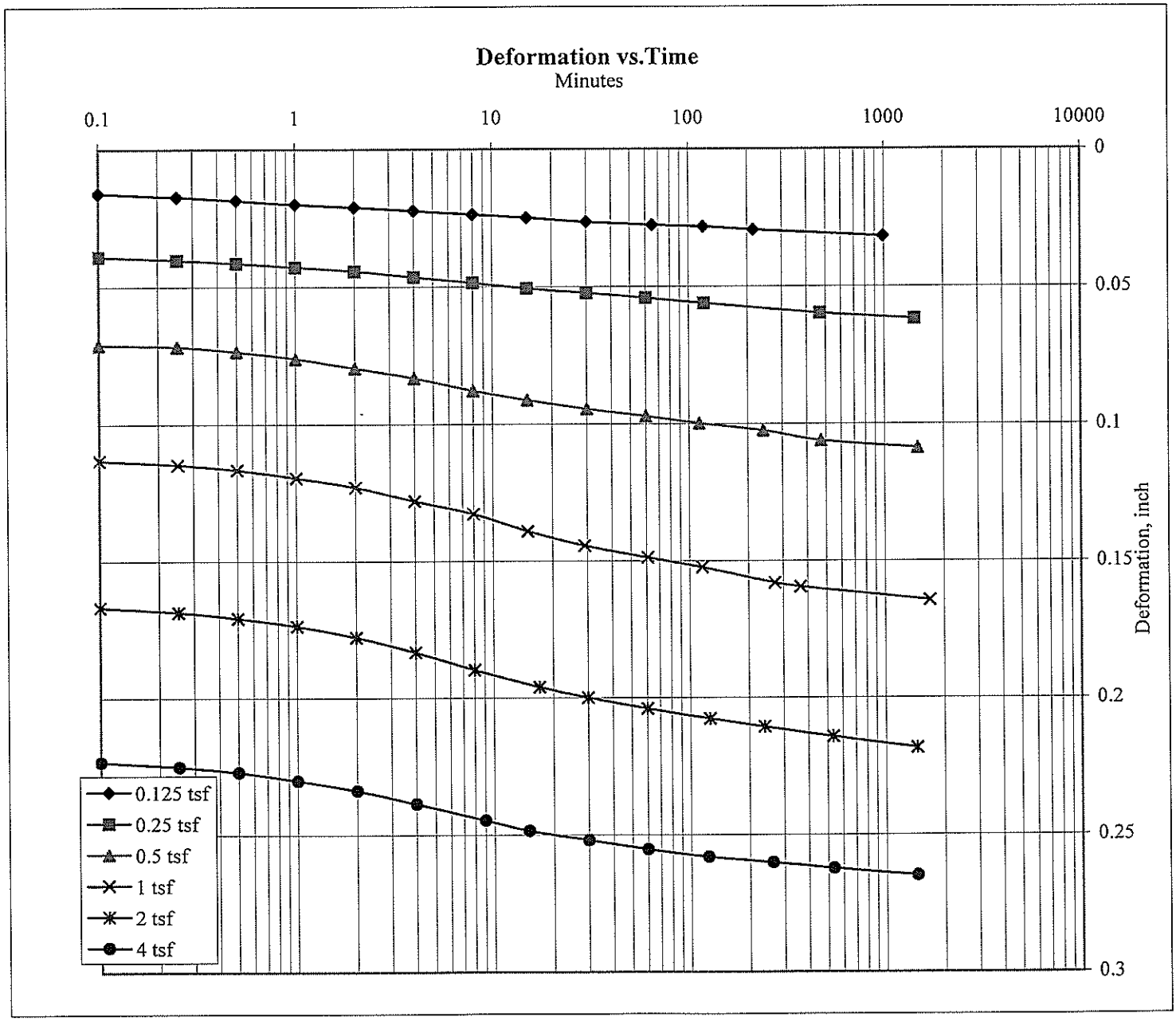
42 Day Farm Road, West Stockbridge, MA 01266
Phone/Fax: 413-232-8566

Client:	ENSR Remediation & Const.	**Project:**	BP Hastings-on-Hudson
Item:	20'-22'	**ATC Project #:**	050584
Source:	PDGEO 31, 102005-1115	**ATC Lab No.:**	05-1011
Date Sampled:	10/20/2006	**Sampled By:**	Client
Date Tested:	2/2-10/2006	**Tested By:**	K. Patton/C. Smith/B. Jobity

One-Dimensional Consolidation Test of Soil

Test Method: ASTM D2435



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Advance Testing

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Phone/Fax: 413-232-8566

Client:	ENSR Remediation & Const.	**Project:**	BP Hastings-on-Hudson
Item:	30-32ft	**ATC Project #:**	050584
Source:	PDGEO31, 102005-1415	**ATC Lab No.:**	05-1013
Date Sampled:	10/20/2005	**Sampled By:**	Client
Date Tested:	1/26-2/3/2006	**Tested By:**	B Jobity

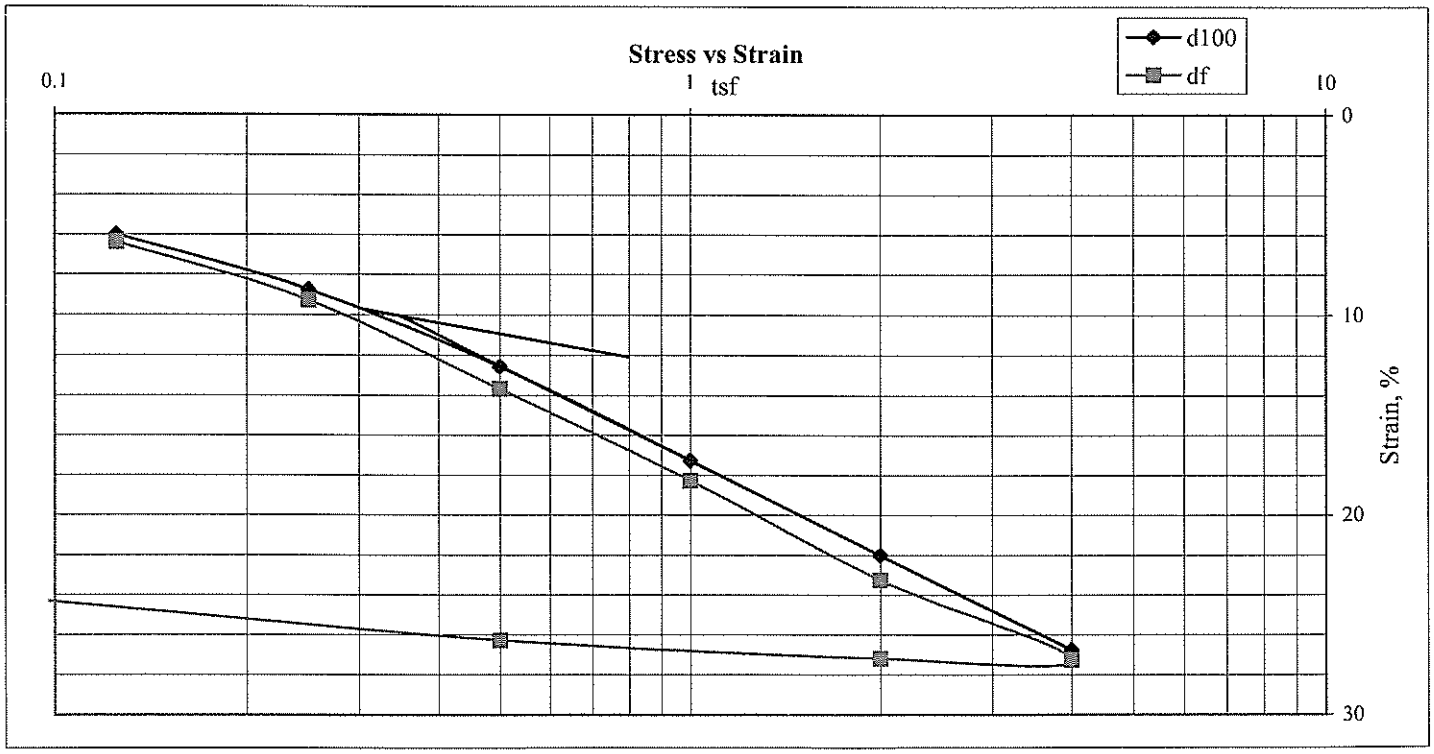
One-Dimensional Consolidation Test of Soil

Test Method: ASTM D2435

Soil Condition	% moisture	Unit Wt, pcf	Void Ratio	% Saturation	Preconsolidation Pressure
Initial	67.43	58.48	1.68	100.76	0.35 tsf
Full Consolidation	43.41	80.68	0.94	115.64	N/A

Test Procedure Method: B | Sample Trimming: Cutting Shoe | Condition: Inundated after seating

Stress, tsf	Duration, minutes	Strain at d100, %	Strain at df, %	Coefficient of Consolidation Cv, in2/min	Coeff. of Secondary Consol., Ca*
0.125	1430	6.00	6.40	0.0063	0.0028
0.25	1532	8.77	9.30	0.0111	0.0045
0.5	1440	12.57	13.69	0.0102	0.0086
1	1440	17.26	18.28	0.0079	0.0091
2	1411	22.02	23.26	0.0172	0.0088
4	1408	26.77	27.28	0.0152	0.0052
2	48		27.21		
0.5	130		26.30		
0	130		24.06		



Revised 3/1/06

*Ca is dimensionless; equals final slope of consolidation curve divided by 1 plus initial void ratio.
d100: 100% Primary Consolidation
df: Deformation at completion of test increment

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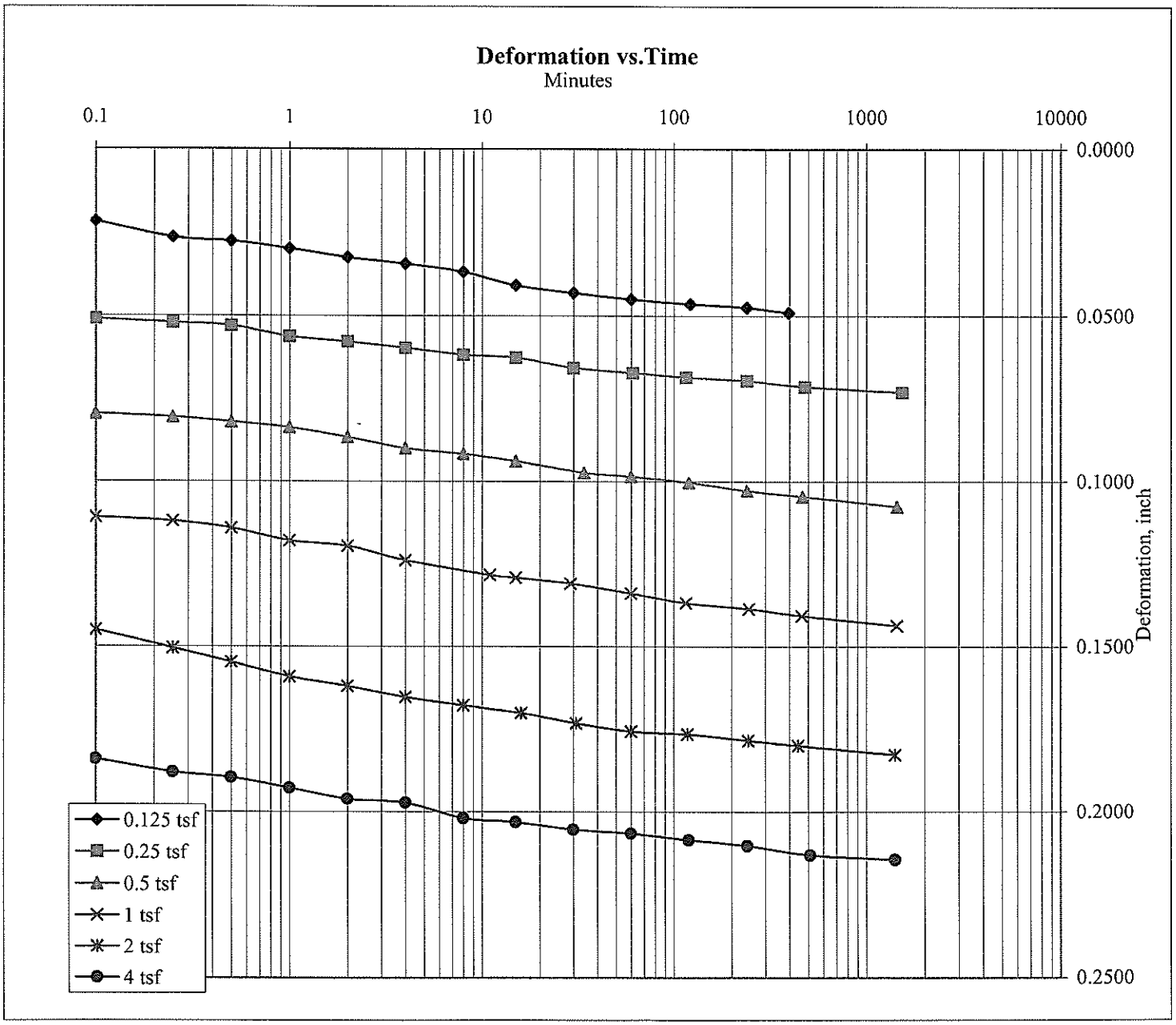
Phone/Fax: 413-232-8566

Client:	ENSR Remediation & Const.	**Project:**	BP Hastings-on-Hudson
Item:	30-32ft	**ATC Project #:**	050584
Source:	PDGEO31, 102005-1415	**ATC Lab No.:**	05-1013
Date Sampled:	10/20/2005	**Sampled By:**	Client
Date Tested:	1/26-2/3/2006	**Tested By:**	B Jobity

One-Dimensional Consolidation Test of Soil

Test Method: ASTM D2435



Revised 3/1/06

Reviewed by: _____

Unconsolidated Undrained Triaxial

Advance Testing
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42 Day Farm Road, West Stockbridge, MA 01266
Phone/Fax: 413-232-8566

Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Item:	PDGEO-1 U1, 35-37'	**Project #:**	05-0856
Source:	092205-1400	**Lab #:**	050584
Date Sampled:	10/3/2005	**Sampled By:**	Client
Date Tested:	10/10/2005	**Tested By:**	C Smith/K Patton

Report of Triaxial Shear Test - Unconsolidated Undrained

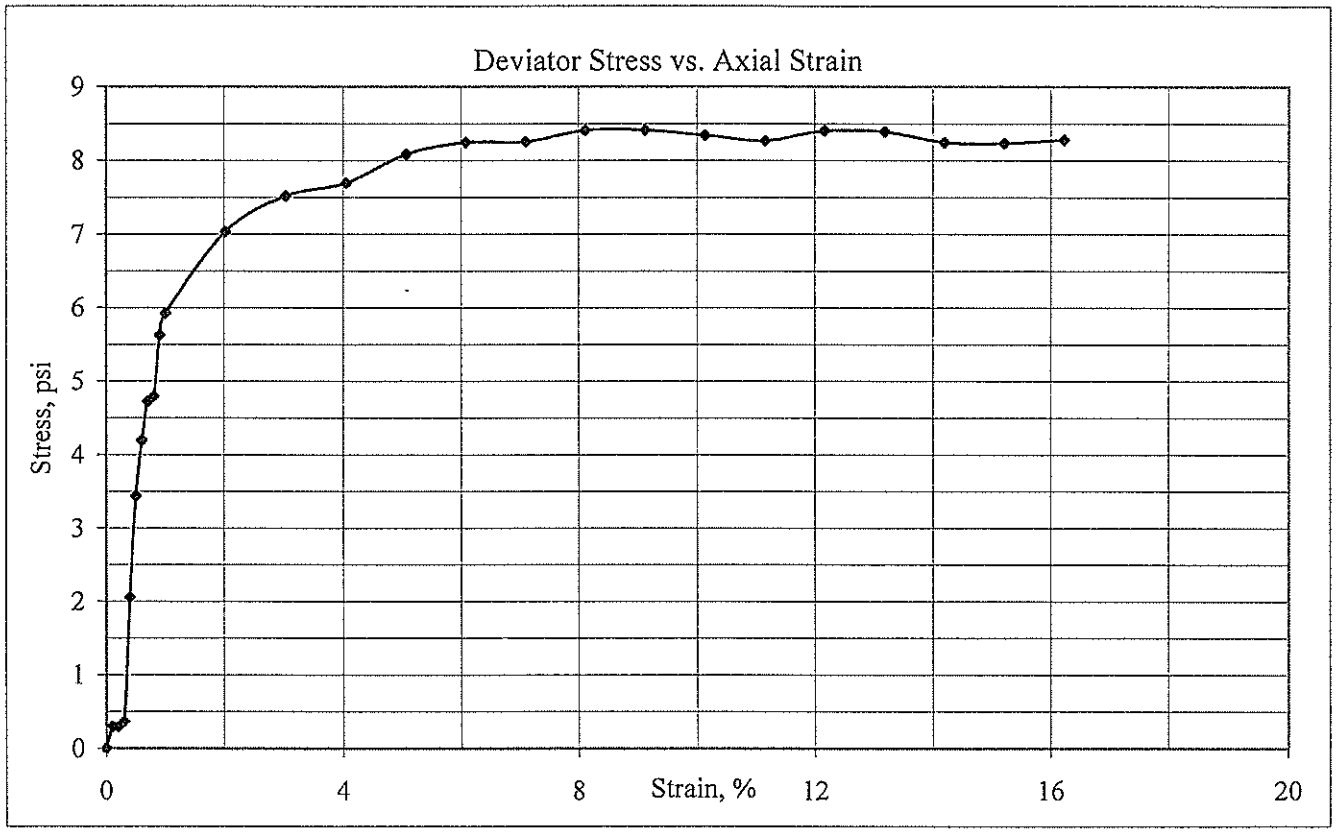
Test Method: ASTM D2850

Specimen Properties	Dry Density, pcf	Void Ratio	% moist.	% Saturation	Height, in.	Diam., in.	X-Sect Area in.2
Initial	66.04	1.37	50.2	91.9	6.077	2.809	6.197

Test Data

Strain Rate %/min.	Strain at Failure, %	Stresses at Failure, psi		Compressive Strength, psi
		Major	Minor	
1.0	8.1	40.3	31.9	8.4

Note: Test data is corrected for membrane effects.



Reviewed by: _____

Advance Testing
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42 Day Farm Road, West Stockbridge, MA 01266
Phone/Fax: 413-232-8566

Client:	ENSR Remediation and Const	**Project:**	BP Hastings-on-Hudson
Item:	092205-1355	**Project #:**	050584
Source:	PDGEO-1, U-3, 52-54'	**Lab #:**	05-0858
Date Sampled:	9/26/2005	**Sampled By:**	Client
Date Tested:	10/20/2005	**Tested By:**	C Smith

Report of Triaxial Shear Test - Unconsolidated Undrained

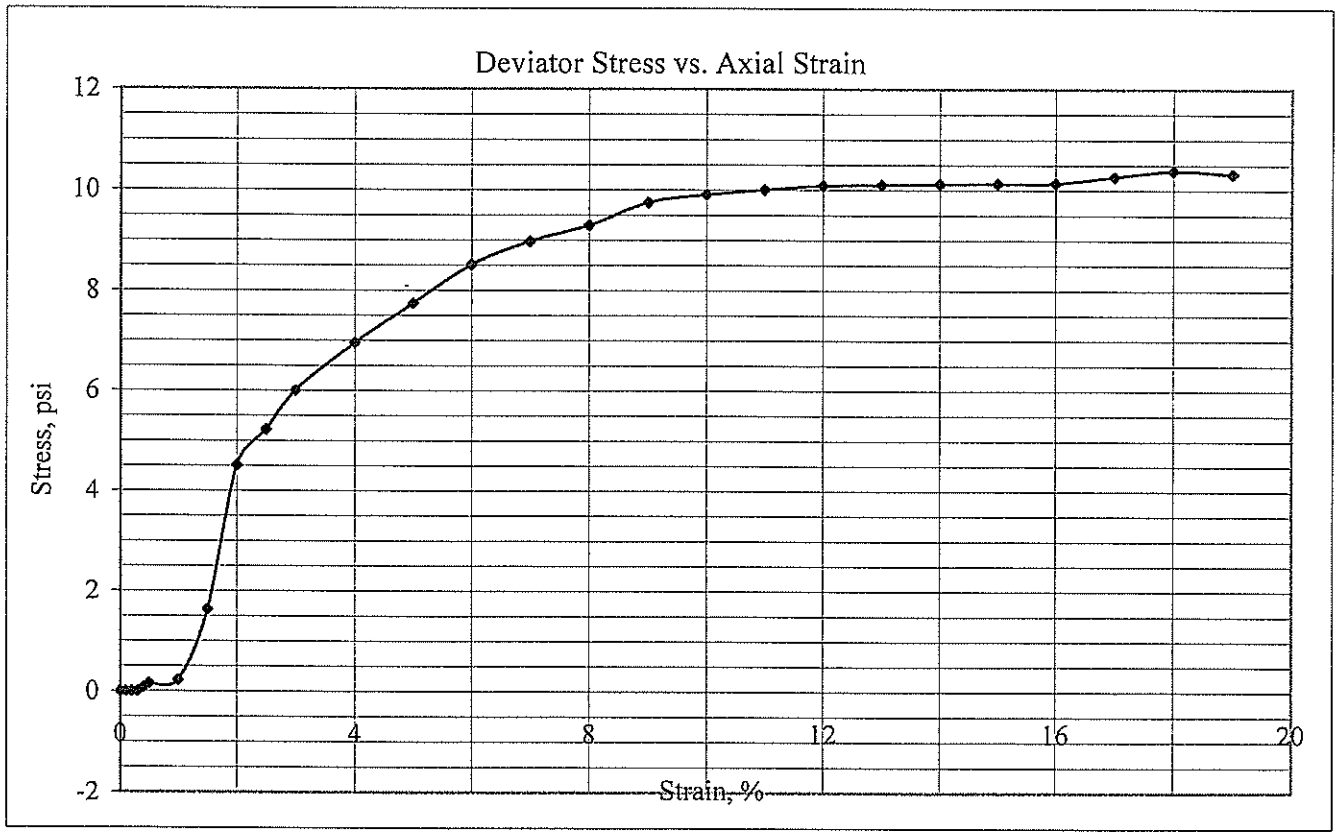
Test Method: ASTM D2850

Specimen Properties	Dry Density, pcf	Void Ratio	% moist.	% Saturation	Height, in.	Diam., in.	X-Sect Area in.2
Initial	72.35	1.17	47.54	102.34	6.10	2.82	6.231

Test Data

Strain Rate %/min.	Strain at Failure, %	Stresses at Failure, psi		Compressive Strength, psi
		Major	Minor	
1.0	15	42.0	31.9	10.1

Note: Test data is corrected for membrane effects.



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42 Day Farm Road, West Stockbridge, MA 01266
Phone/Fax: 413-232-8566

Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Item:	100305-1005	**Project #:**	050584
Source:	PDGEO 4, 44'-46'	**Lab #:**	05-0925
Date Sampled:	10/8/2005	**Sampled By:**	Client
Date Tested:	11/15/2005	**Tested By:**	C. Smith

Report of Triaxial Shear Test - Unconsolidated Undrained

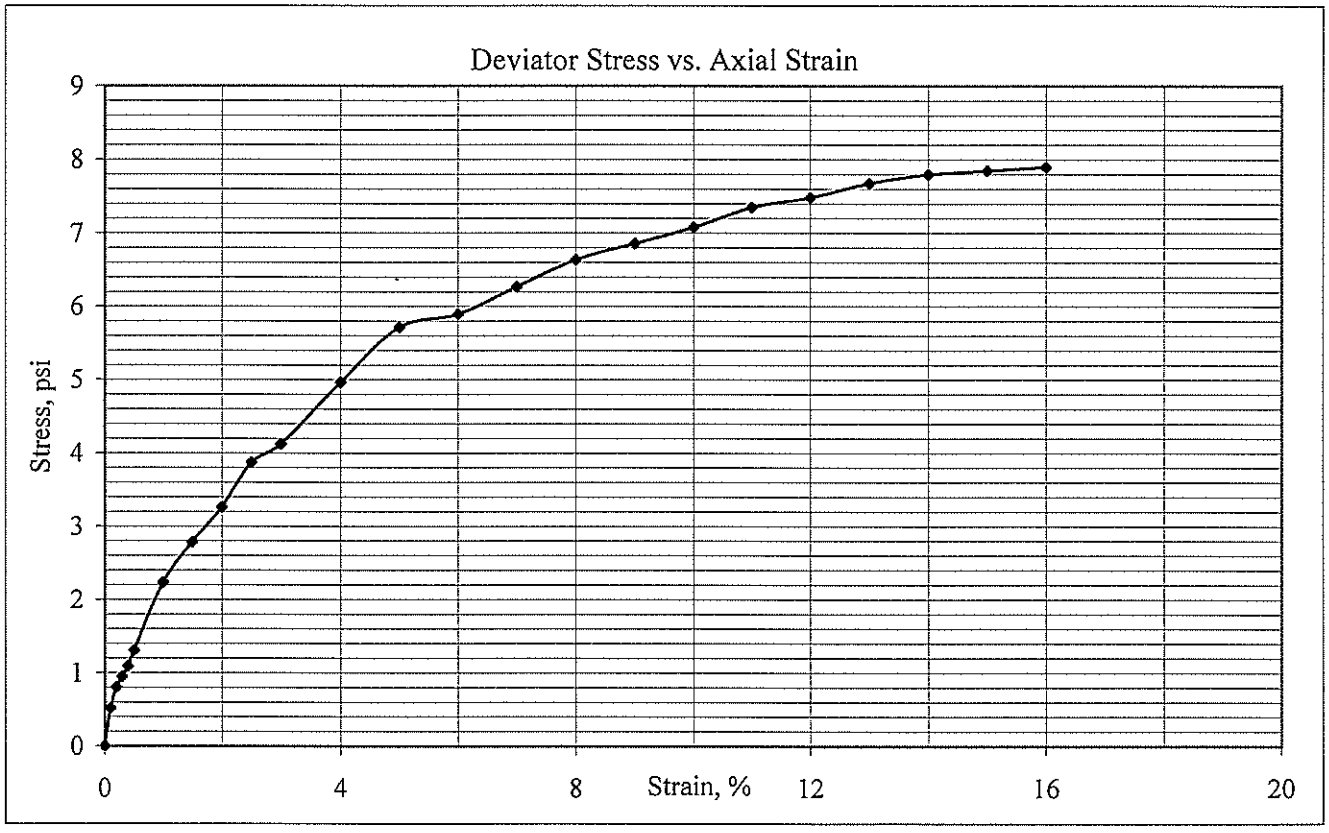
Test Method: ASTM D2850

Specimen Properties	Dry Density, pcf	Void Ratio	% moist.	% Saturation	Height, in.	Diam., in.	X-Sect Area in.2
Initial	78.90	0.99	43.73	111.33	6.12	2.84	6.342

Test Data

Strain Rate %/min.	Strain at Failure, %	Stresses at Failure, psi		Compressive Strength, psi
		Major	Minor	
1.0	15.0	47.2	39.3	7.9

Note: Test data is corrected for membrane effects.



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Phone/Fax: 413-232-8566

Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Item:	28'-30'	**Project #:**	050584
Source:	PDGEO 5-101905-1615	**Lab #:**	05-1009
Date Sampled:	10/19/2005	**Sampled By:**	Client
Date Tested:	11/28/2005	**Tested By:**	C. Smith

Report of Triaxial Shear Test - Unconsolidated Undrained

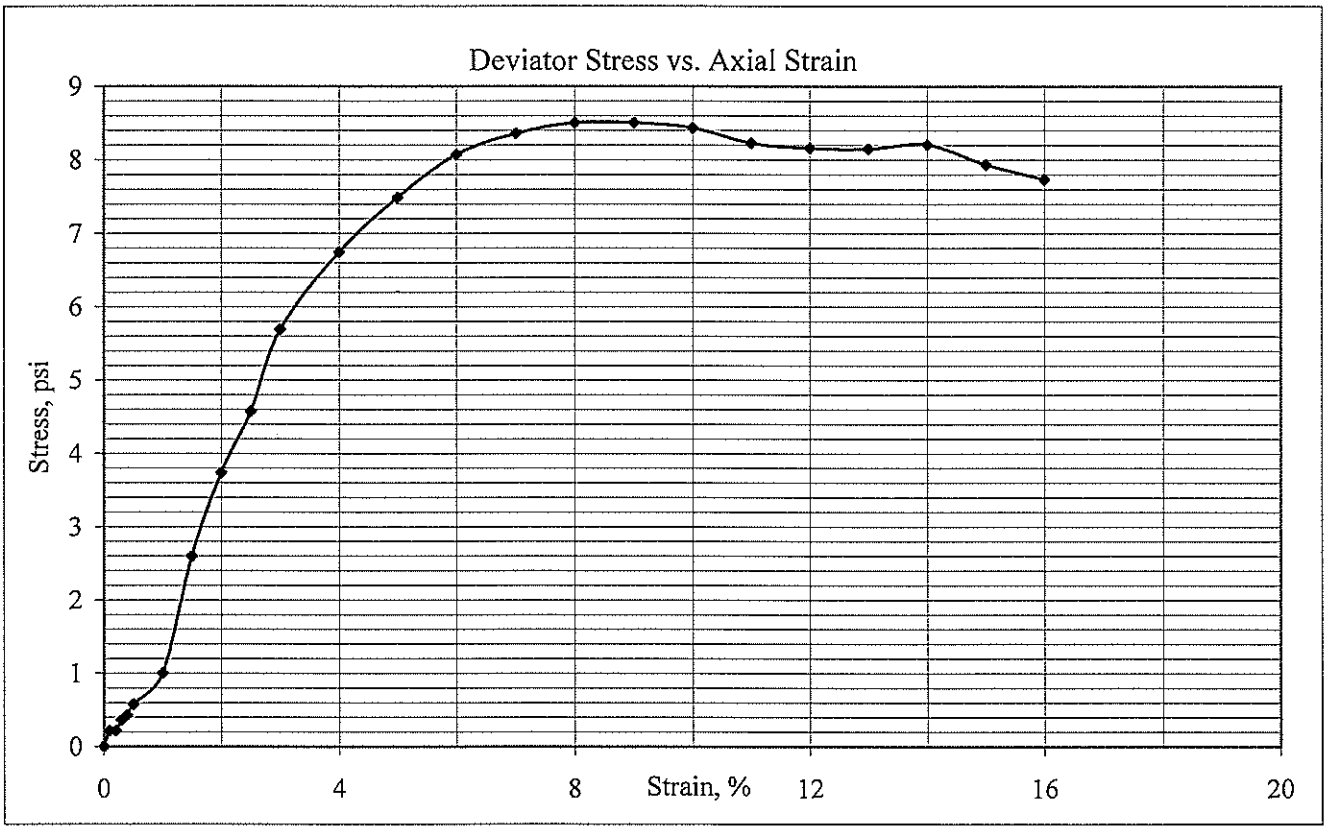
Test Method: ASTM D2850

Specimen Properties	Dry Density, pcf	Void Ratio	% moist.	% Saturation	Height, in.	Diam., in.	X-Sect Area in.2
Initial	68.70	1.28	53.19	104.23	6.24	2.83	6.274

Test Data

Strain Rate %/min.	Strain at Failure, %	Stresses at Failure, psi		Compressive Strength, psi
		Major	Minor	
0.96	8.5	34.2	25.7	8.5

Note: Test data is corrected for membrane effects.



NOTE: Sample contained layers of small to medium size shells.

Reviewed by: _____

Advance Testing

3348 Route 208, Campbell Hall, NY 10916
Phone: 845-496-1600 Fax: 845-496-1398
42 Day Farm Road, West Stockbridge, MA 01266
Phone/Fax: 413-232-8566

Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Item:	28'-30'	**Project #:**	050584
Source:	PDGEO7-101905-1100	**Lab #:**	05-1007
Date Sampled:	10/19/2005	**Sampled By:**	Client
Date Tested:	11/28/2005	**Tested By:**	C. Smith

Report of Triaxial Shear Test - Unconsolidated Undrained

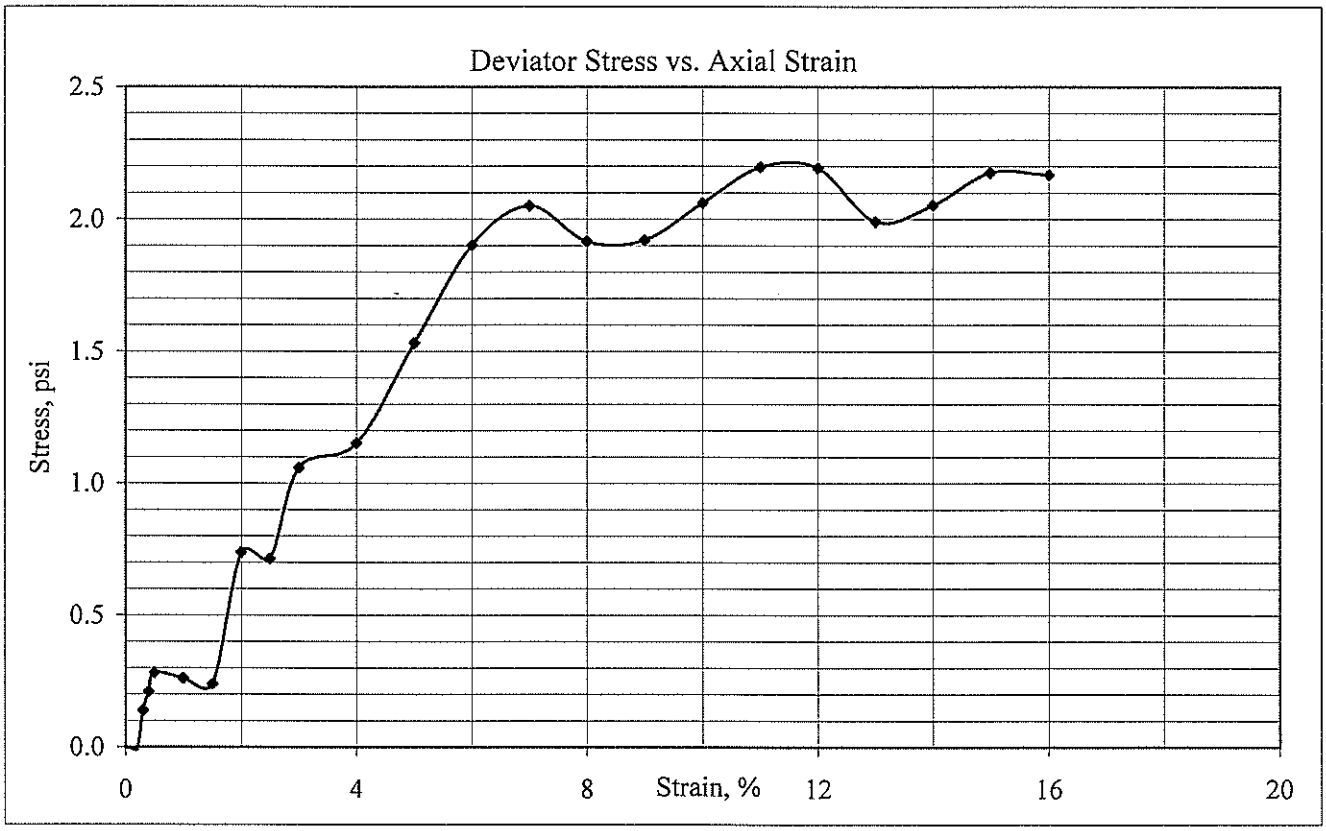
Test Method: ASTM D2850

Specimen Properties	Dry Density, pcf	Void Ratio	% moist.	% Saturation	Height, in.	Diam., in.	X-Sect Area in.2
Initial	67.34	1.33	54.77	103.59	6.46	2.81	6.187

Test Data

Strain Rate %/min.	Strain at Failure, %	Stresses at Failure, psi		Compressive Strength, psi
		Major	Minor	
0.93	7.0	28.6	26.5	2.1

Note: Test data is corrected for membrane effects.



NOTES: Large shells were present throughout the sample. A piece of 3/4-inch gravel was present approximately 1.5 inches above the bottom of the sample, and a 1/2-inch diameter air void was present about 1.5 inches below the top of the sample.

Reviewed by: _____

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Phone/Fax: 413-232-8566

Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Item:	100505-0815	**Project #:**	050584
Source:	PDGEO 9, 35'-37'	**Lab #:**	05-0926
Date Sampled:	10/5/2005	**Sampled By:**	Client
Date Tested:	11/10/2005	**Tested By:**	C. Smith

Report of Triaxial Shear Test - Unconsolidated Undrained

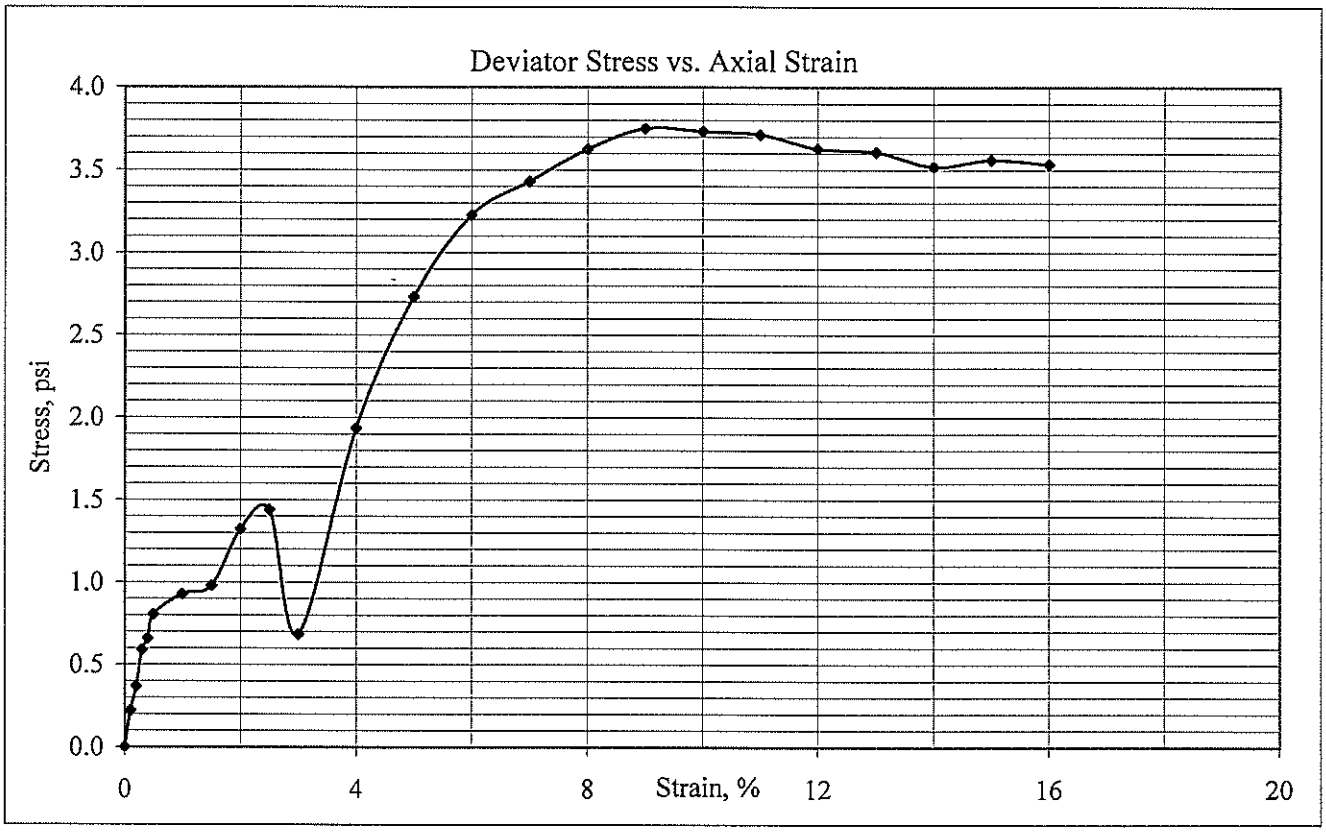
Test Method: ASTM D2850

Specimen Properties	Dry Density, pcf	Void Ratio	% moist.	% Saturation	Height, in.	Diam., in.	X-Sect Area in.2
Initial	65.35	1.40	58.88	105.74	6.01	2.82	6.246

Test Data

Strain Rate %/min.	Strain at Failure, %	Stresses at Failure, psi		Compressive Strength, psi
		Major	Minor	
1.0	9.1	35.3	31.5	3.8

Note: Test data is corrected for membrane effects.



NOTES: The sample contained a few large shells, which may account for the drop in stress that occurred at 3% strain.

Reviewed by: _____

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Phone/Fax: 413-232-8566

Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Item:	100605-1035	**Project #:**	050584
Source:	PDGEO9, 46'-48'	**Lab #:**	05-0928
Date Sampled:	10/6/2005	**Sampled By:**	Client
Date Tested:	10/24/2005	**Tested By:**	C. Smith

Report of Triaxial Shear Test - Unconsolidated Undrained

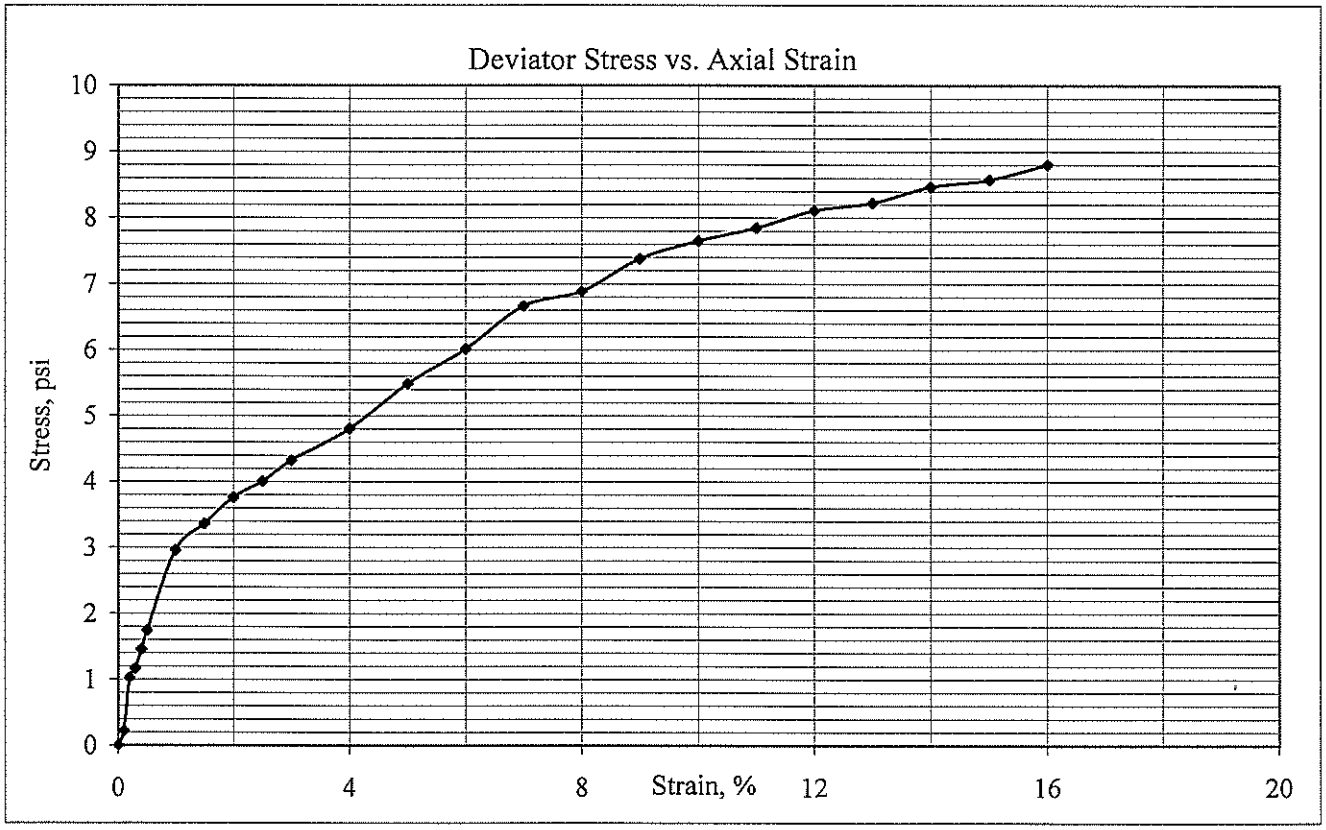
Test Method: ASTM D2850

Specimen Properties	Dry Density, pcf	Void Ratio	% moist.	% Saturation	Height, in.	Diam., in.	X-Sect Area in.2
Initial	76.45	1.05	43.85	104.85	6.10	2.85	6.361

Test Data

Strain Rate %/min.	Strain at Failure, %	Stresses at Failure, psi		Compressive Strength, psi
		Major	Minor	
1.0	15.0	20.9	12.3	8.6

Note: Test data is corrected for membrane effects.



Reviewed by: _____

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Phone/Fax: 413-232-8566

Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Item:	100605-1300	**Project #:**	050584
Source:	PDGEO9, 54'-56'	**Lab #:**	05-0930
Date Sampled:	10/6/2005	**Sampled By:**	Client
Date Tested:	11/5/2005	**Tested By:**	C. Smith

Report of Triaxial Shear Test - Unconsolidated Undrained

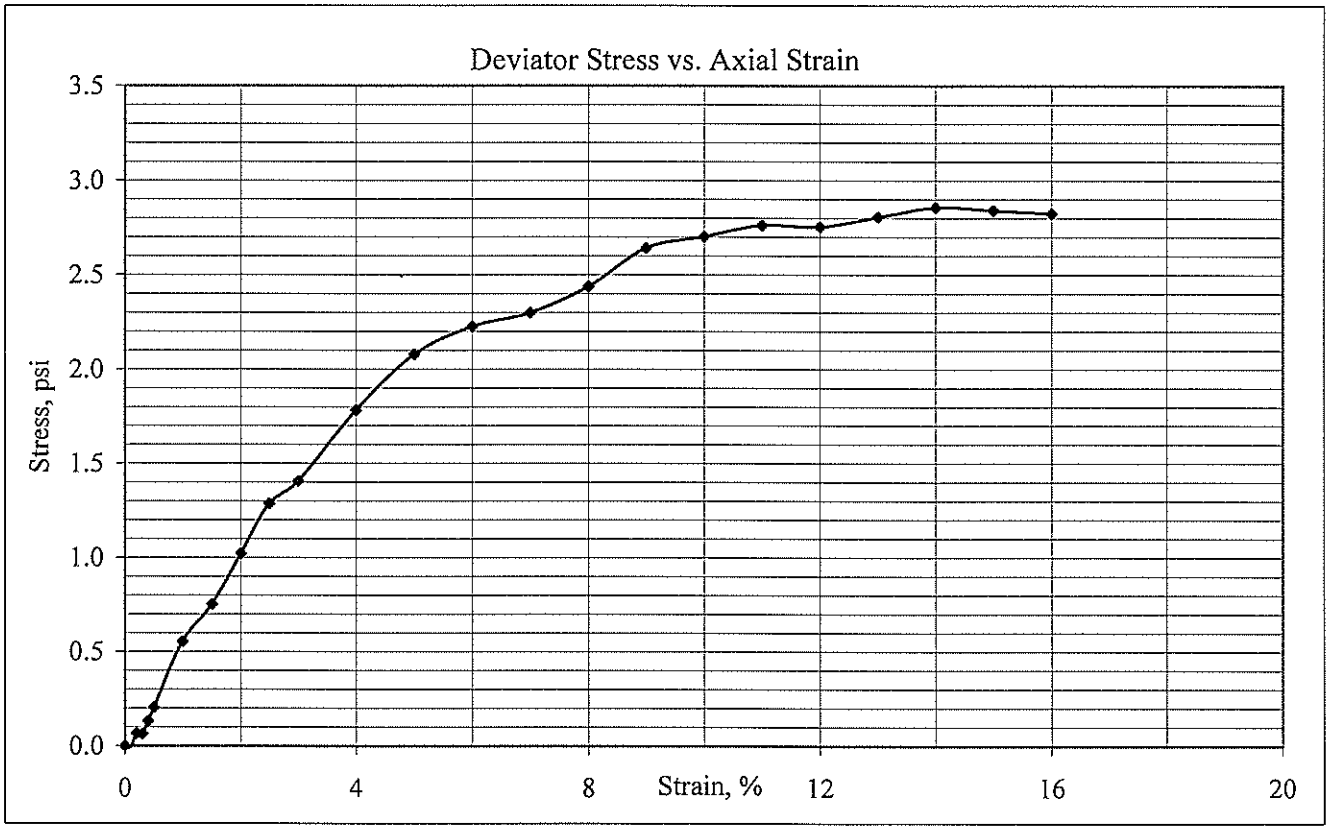
Test Method: ASTM D2850

Specimen Properties	Dry Density, pcf	Void Ratio	% moist.	% Saturation	Height, in.	Diam., in.	X-Sect Area in.2
Initial	83.54	0.88	38.58	110.57	6.47	2.83	6.275

Test Data

Strain Rate %/min.	Strain at Failure, %	Stresses at Failure, psi		Compressive Strength, psi
		Major	Minor	
1.0	11.0	49.6	46.8	2.8

Note: Test data is corrected for membrane effects.



NOTES Sample was very soft, and contained scattered small shell fragments.

Reviewed by: _____

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Phone/Fax: 413-232-8566

Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Item:	40'-42'	**Project #:**	050584
Source:	PDGEO 11, 110105-1515	**Lab #:**	05-1167
Date Sampled:	11/1/2005	**Sampled By:**	Client
Date Tested:	1/9/2006	**Tested By:**	C. Smith

Report of Triaxial Shear Test - Unconsolidated Undrained

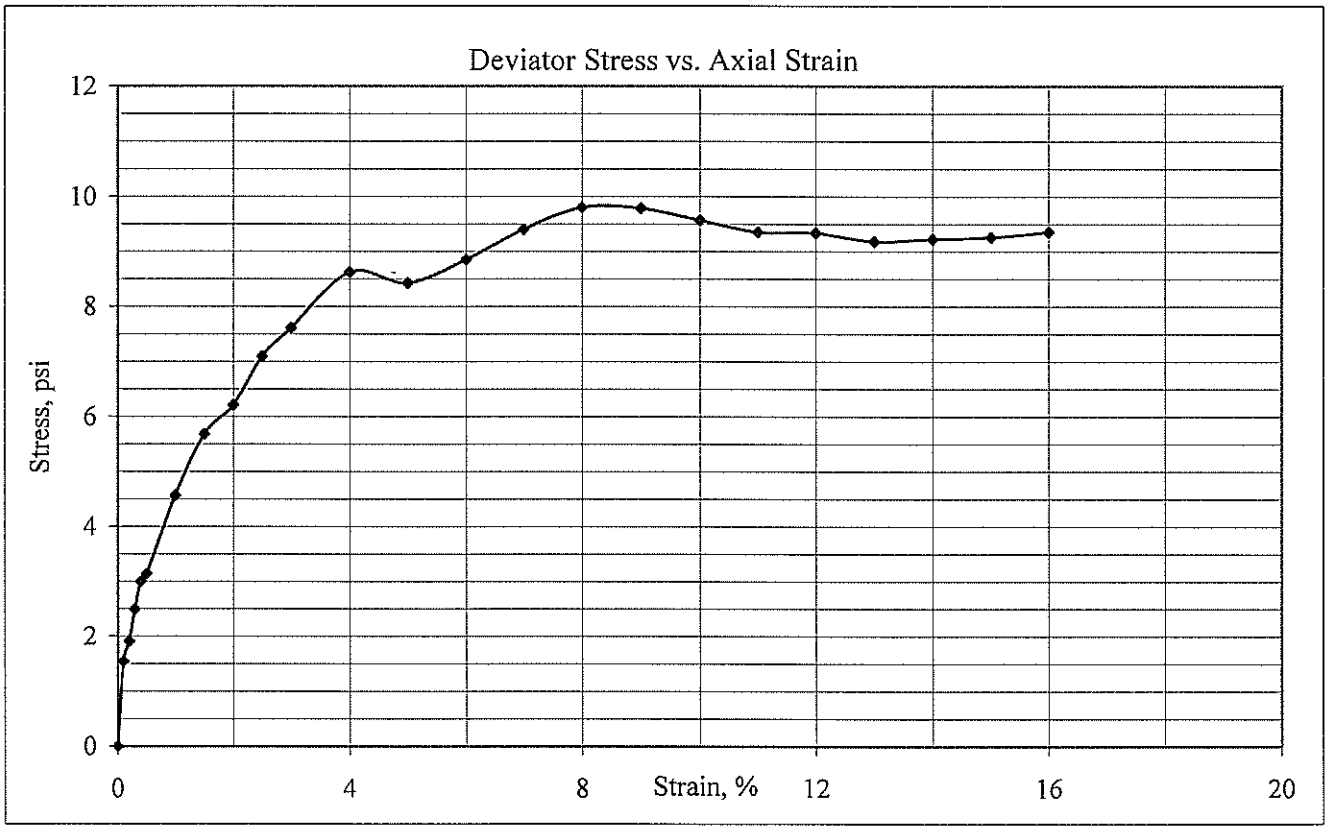
Test Method: ASTM D2850

Specimen Properties	Dry Density, pcf	Void Ratio	% moist.	% Saturation	Height, in.	Diam., in.	X-Sect Area in.2
Initial	62.52	1.51	57.23	95.35	6.25	2.85	6.367

Test Data

Strain Rate %/min.	Strain at Failure, %	Stresses at Failure, psi		Compressive Strength, psi
		Major	Minor	
0.96	8.0	45.6	35.8	9.8

Note: Test data is corrected for membrane effects.



Reviewed by: _____

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Phone/Fax: 413-232-8566

Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Item:	101305-1140	**Project #:**	050584
Source:	PDGEO 13, 44'-46'	**Lab #:**	05-0918
Date Sampled:	10/13/2005	**Sampled By:**	Client
Date Tested:	11/14/2005	**Tested By:**	C. Smith

Report of Triaxial Shear Test - Unconsolidated Undrained

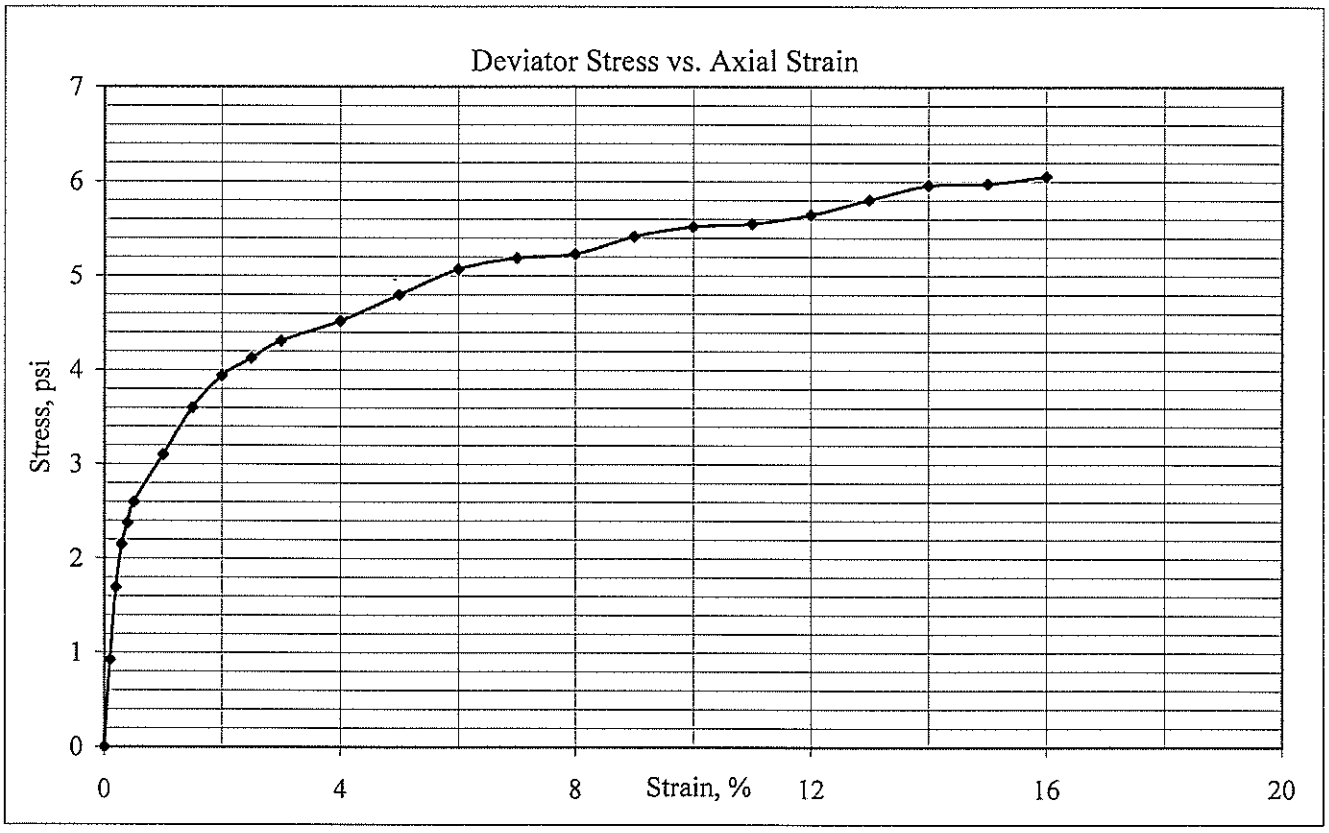
Test Method: ASTM D2850

Specimen Properties	Dry Density, pcf	Void Ratio	% moist.	% Saturation	Height, in.	Diam., in.	X-Sect Area in.2
Initial	71.69	1.19	45.24	95.74	6.08	2.78	6.070

Test Data

Strain Rate %/min.	Strain at Failure, %	Stresses at Failure, psi		Compressive Strength, psi
		Major	Minor	
1.0	14.0	45.2	39.2	6.0

Note: Test data is corrected for membrane effects.



NOTES Sample contained many larger shells and shell fragments. Soil was more granular than typical samples.

Reviewed by: _____

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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Item:	101405-0840	**Project #:**	050584
Source:	PDGEO 13, 58'-60'	**Lab #:**	05-0920
Date Sampled:	10/14/2005	**Sampled By:**	Client
Date Tested:	11/14/2005	**Tested By:**	C. Smith

Report of Triaxial Shear Test - Unconsolidated Undrained

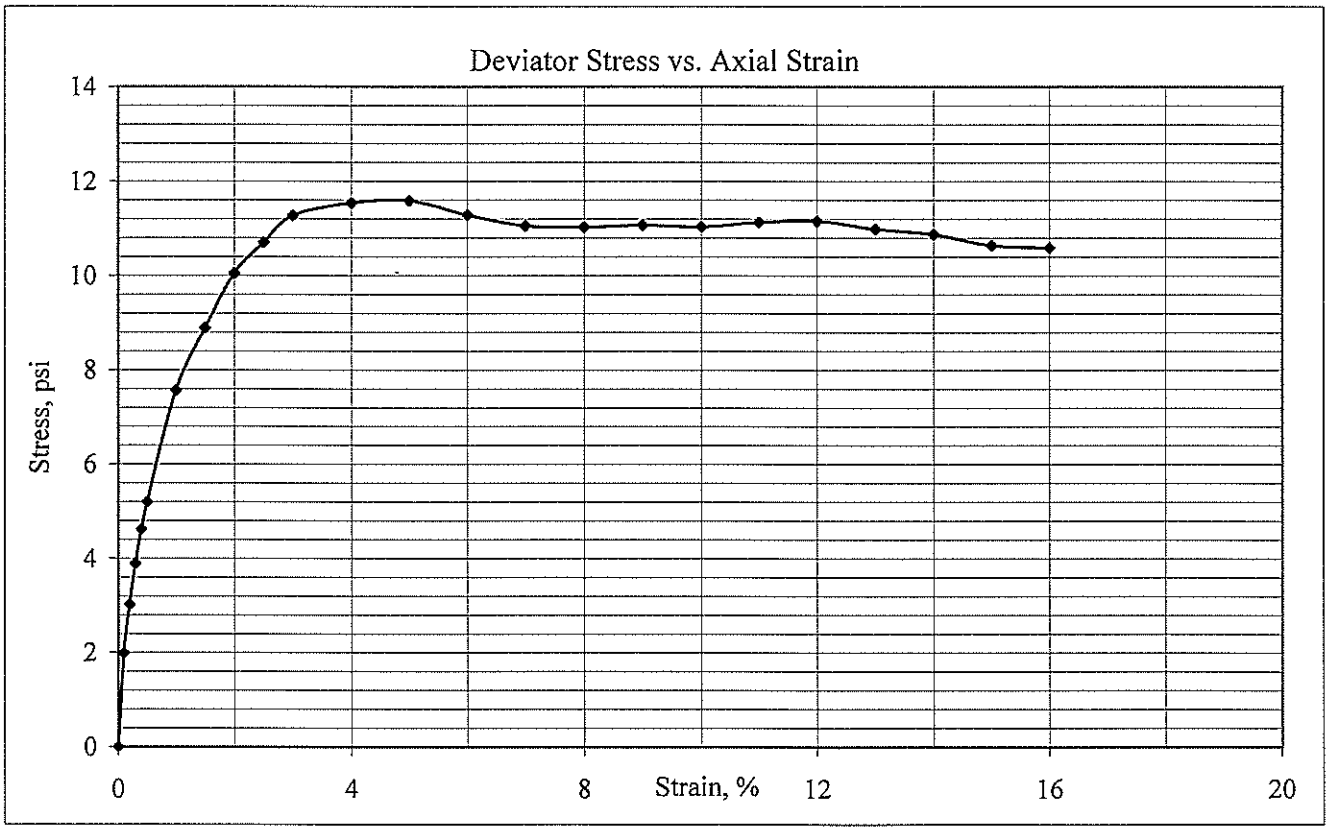
Test Method: ASTM D2850

Specimen Properties	Dry Density, pcf	Void Ratio	% moist.	% Saturation	Height, in.	Diam., in.	X-Sect Area in.2
Initial	72.31	1.17	47.67	102.51	6.02	2.85	6.364

Test Data

Strain Rate %/min.	Strain at Failure, %	Stresses at Failure, psi		Compressive Strength, psi
		Major	Minor	
1.0	4.8	62.0	50.4	11.6

Note: Test data is corrected for membrane effects.



Reviewed by: _____

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Phone/Fax: 413-232-8566

Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Item:	092205-1100	**Project #:**	050584
Source:	PDGEO-16, U1, 38-40'	**Lab #:**	05-0860
Date Sampled:	9/30/2005	**Sampled By:**	Client
Date Tested:	10/14/2005	**Tested By:**	C Smith

Report of Triaxial Shear Test - Unconsolidated Undrained

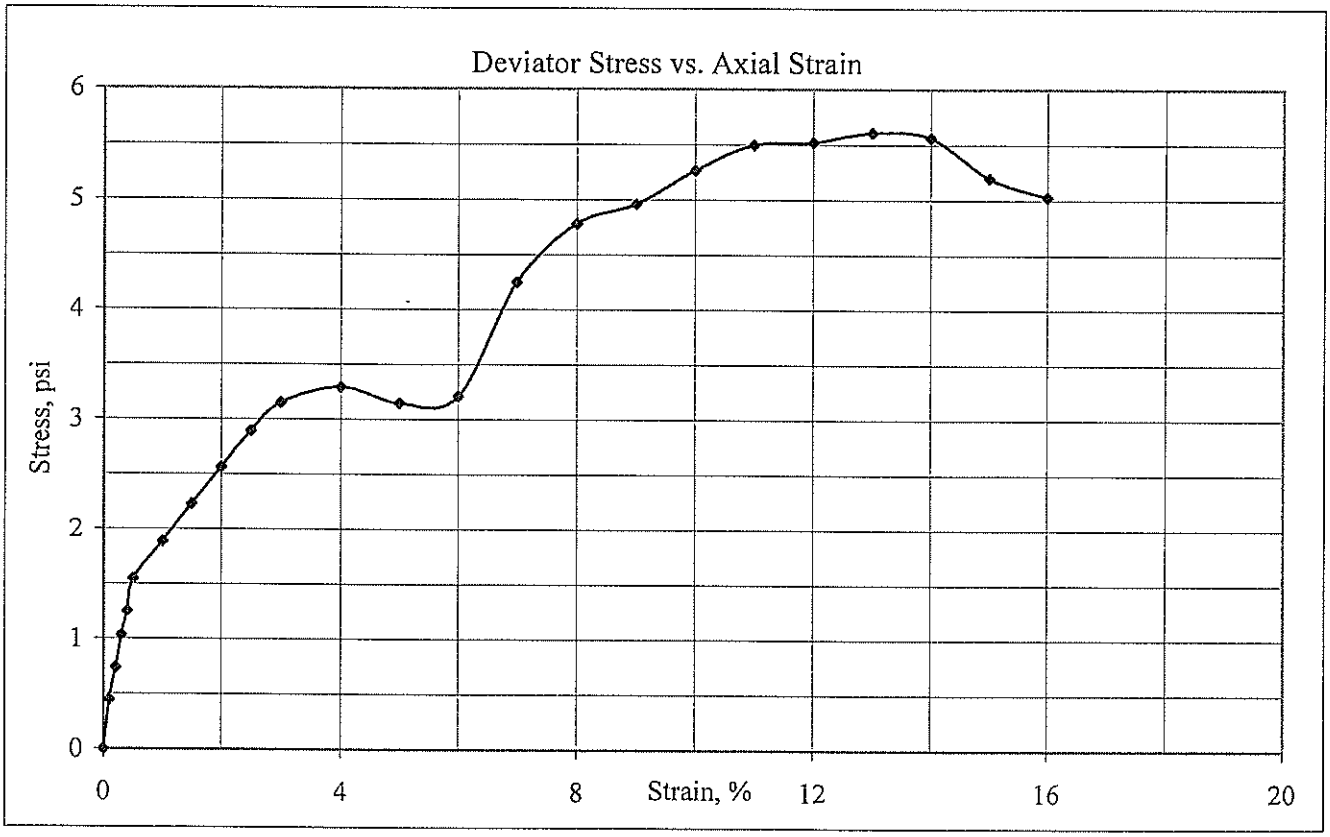
Test Method: ASTM D2850

Specimen Properties	Dry Density, pcf	Void Ratio	% moist.	% Saturation	Height, in.	Diam., in.	X-Sect Area in.2
Initial	65.50	1.39	56.93	102.64	6.11	2.83	6.275

Test Data

Strain Rate %/min.	Strain at Failure, %	Stresses at Failure, psi		Compressive Strength, psi
		Major	Minor	
1.0	13.0	40.2	34.6	5.6

Note: Test data is corrected for membrane effects.



Reviewed by: _____

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Phone/Fax: 413-232-8566

Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Item:	100505-1430	**Project #:**	050584
Source:	PDGEO17 48'-50'	**Lab #:**	05-0923
Date Sampled:	10/5/2005	**Sampled By:**	Client
Date Tested:	11/1/2005	**Tested By:**	B. Jobity

Report of Triaxial Shear Test - Unconsolidated Undrained

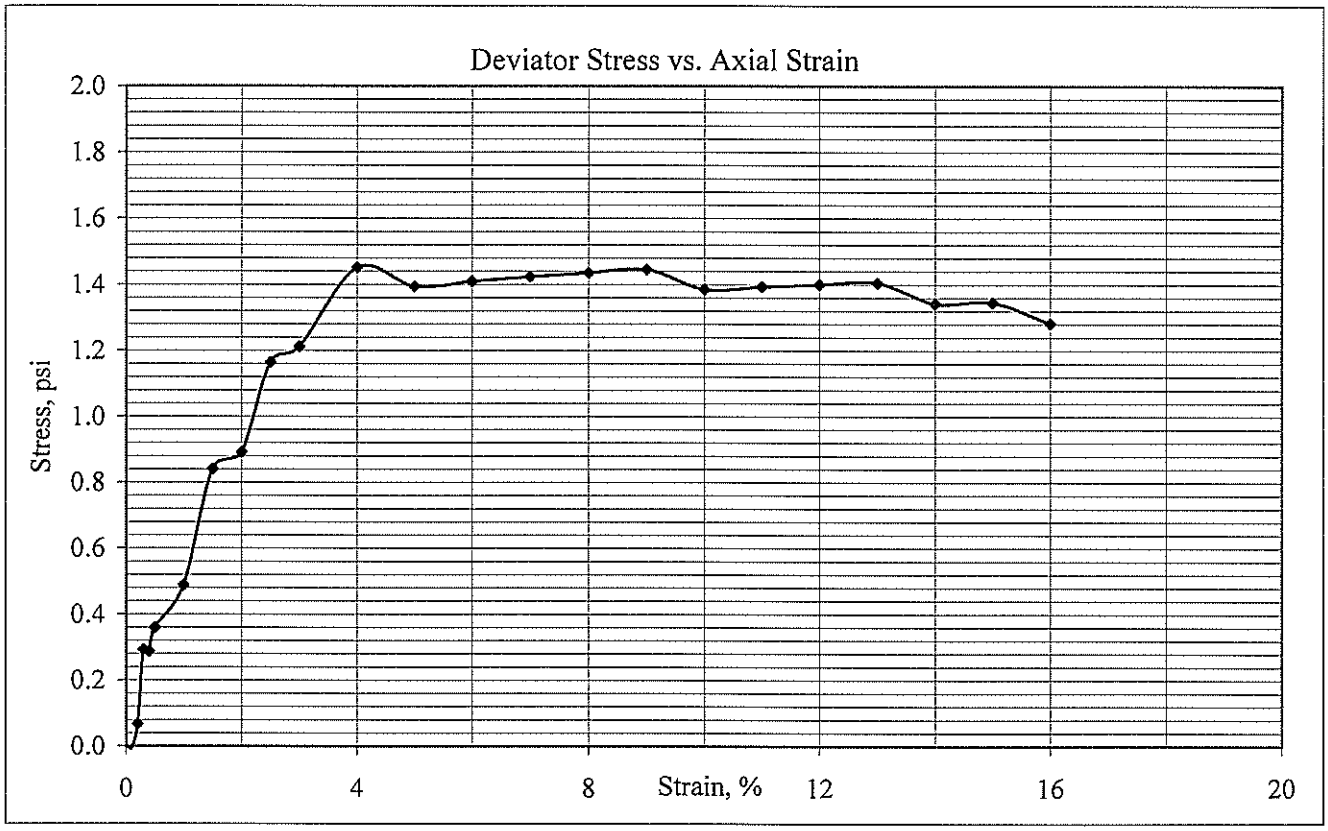
Test Method: ASTM D2850

Specimen Properties	Dry Density, pcf	Void Ratio	% moist.	% Saturation	Height, in.	Diam., in.	X-Sect Area in.2
Initial	70.47	1.22	46.14	94.65	6.51	2.80	6.158

Test Data

Strain Rate %/min.	Strain at Failure, %	Stresses at Failure, psi		Compressive Strength, psi
		Major	Minor	
1.0	4.0	43.25	41.8	1.45

Note: Test data is corrected for membrane effects.



Notes: Sample contained trace small shell fragments.
Sample distorted to one side as load increased approaching failure.

Reviewed by: _____

Advance Testing
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42 Day Farm Road, West Stockbridge, MA 01266
Phone/Fax: 413-232-8566

Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Item:	100505-1130	**Project #:**	050584
Source:	PDGEO17 U3 54'-56'	**Lab #:**	05-0924
Date Sampled:	10/6/2005	**Sampled By:**	Client
Date Tested:	10/31/2005	**Tested By:**	C. Smith

Report of Triaxial Shear Test - Unconsolidated Undrained

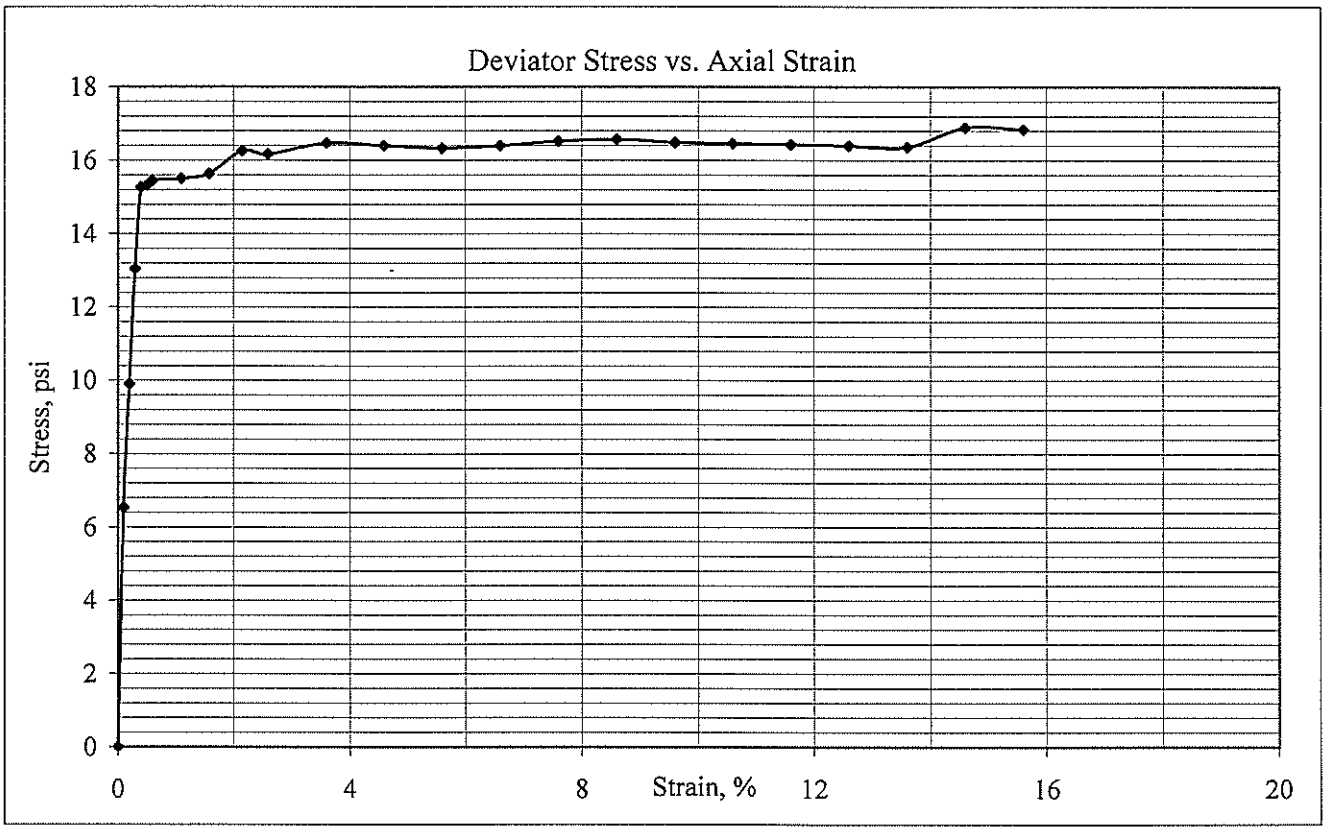
Test Method: ASTM D2850

Specimen Properties	Dry Density, pcf	Void Ratio	% moist.	% Saturation	Height, in.	Diam., in.	X-Sect Area in.2
Initial	75.03	1.09	47.07	108.52	6.34	2.82	6.246

Test Data

Strain Rate %/min.	Strain at Failure, %	Stresses at Failure, psi		Compressive Strength, psi
		Major	Minor	
1.0	0.5	62.1	46.6	15.5

Note: Test data is corrected for membrane effects.



NOTES: Sample had irregular moisture distribution (wet pocket on one side, approx. 15% of cross-sectional area. Sample partially ruptured laterally when strain had reached 0.5%.

Reviewed by: _____

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42 Day Farm Road, West Stockbridge, MA 01266
Phone/Fax: 413-232-8566

Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Item:	35'-37'	**Project #:**	050584
Source:	PDGEO 19, 101905-1045	**Lab #:**	05-1004
Date Sampled:	10/19/2005	**Sampled By:**	Client
Date Tested:	12/16/2005	**Tested By:**	B. Jobity

Report of Triaxial Shear Test - Unconsolidated Undrained

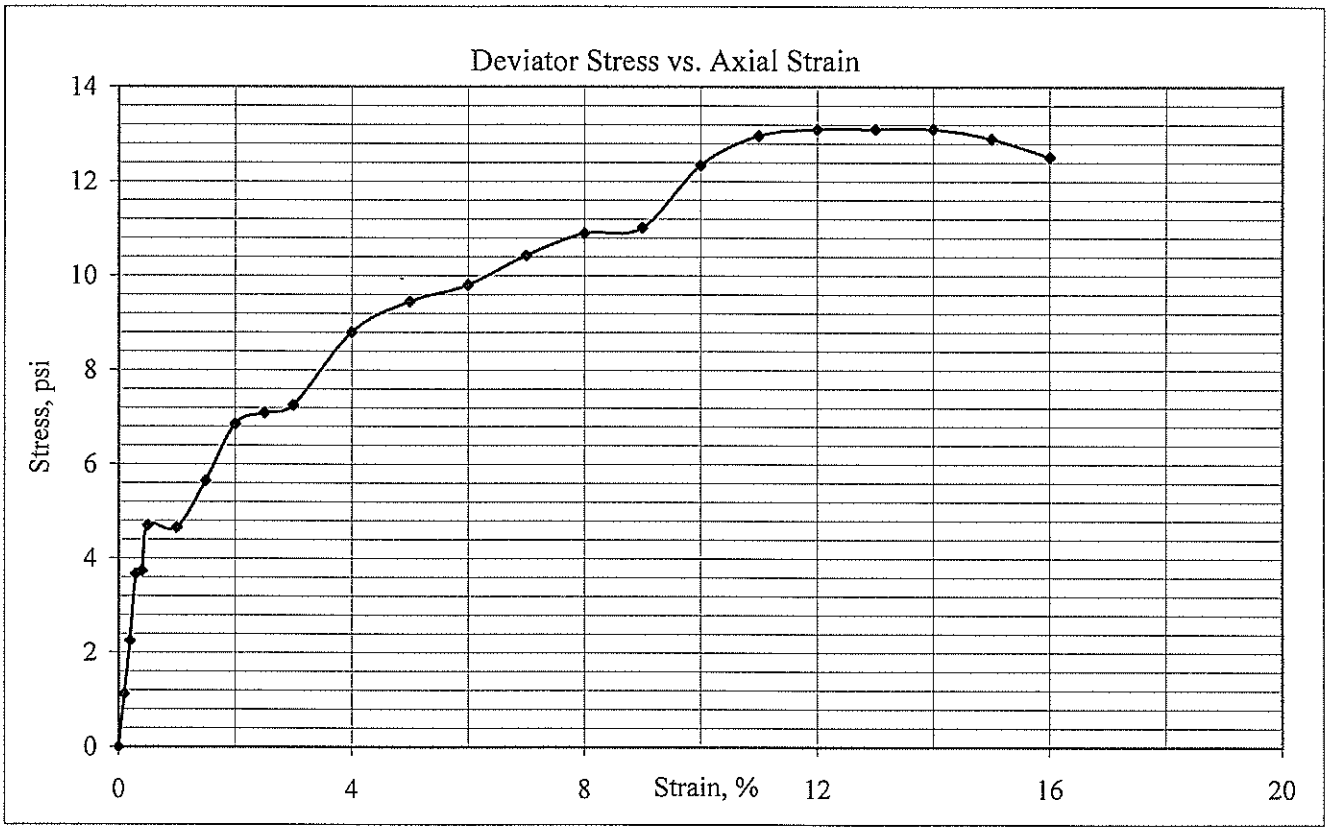
Test Method: ASTM D2850

Specimen Properties	Dry Density, pcf	Void Ratio	% moist.	% Saturation	Height, in.	Diam., in.	X-Sect Area in.2
Initial	67.87	1.31	58.44	112.05	6.09	2.82	6.243

Test Data

Strain Rate %/min.	Strain at Failure, %	Stresses at Failure, psi		Compressive Strength, psi
		Major	Minor	
0.96	12	45.9	32.8	13.1

Note: Test data is corrected for membrane effects.



Reviewed by: _____

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Phone/Fax: 413-232-8566

Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Item:	45'-47'	**Project #:**	050584
Source:	PDGEO 19, 101905-1230	**Lab #:**	05-1006
Date Sampled:	10/19/2005	**Sampled By:**	Client
Date Tested:	12/12/2005	**Tested By:**	C. Smith

Report of Triaxial Shear Test - Unconsolidated Undrained

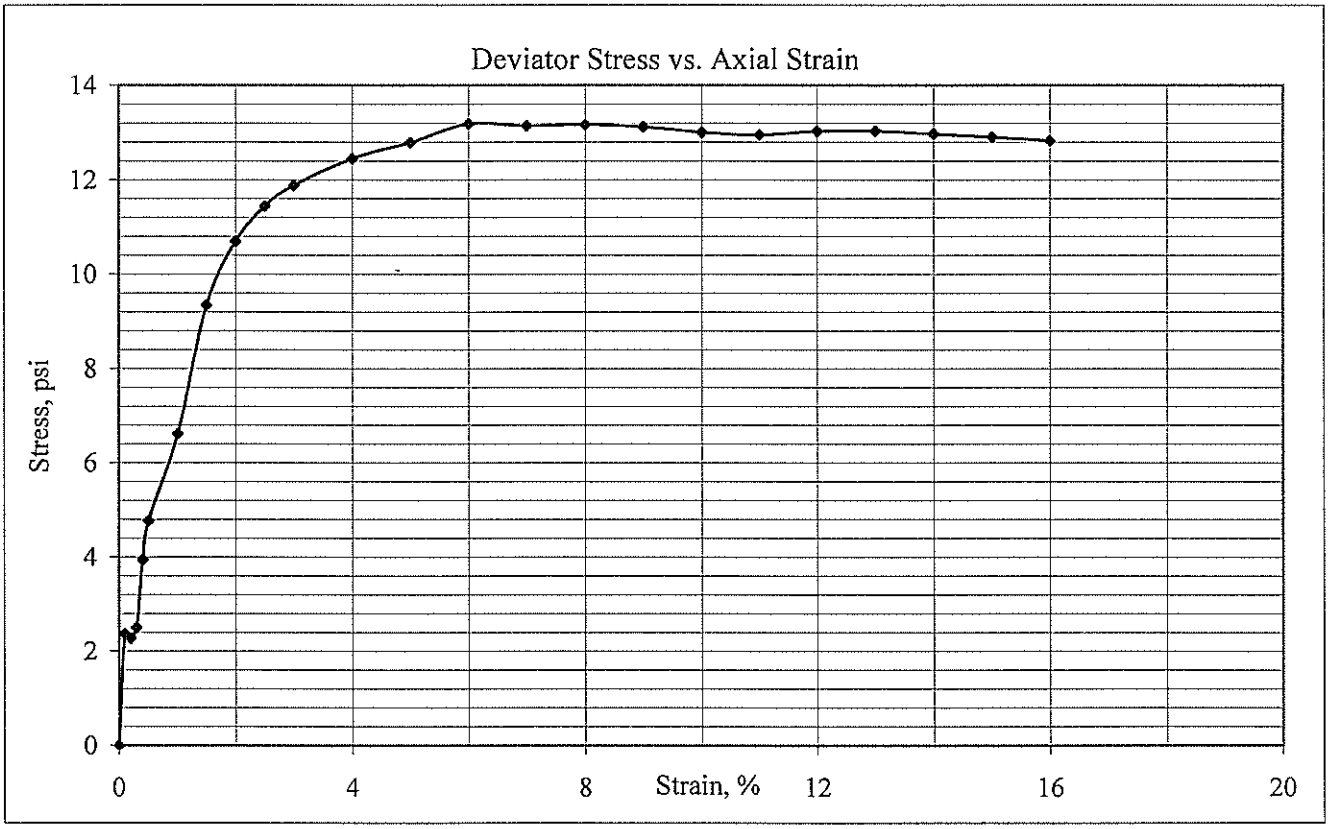
Test Method: ASTM D2850

Specimen Properties	Dry Density, pcf	Void Ratio	% moist.	% Saturation	Height, in.	Diam., in.	X-Sect Area in.2
Initial	76.18	1.06	51.65	122.65	6.05	2.80	6.154

Test Data

Strain Rate %/min.	Strain at Failure, %	Stresses at Failure, psi		Compressive Strength, psi
		Major	Minor	
0.99	6.0	54.0	40.8	13.2

Note: Test data is corrected for membrane effects.



Notes: Sample contained some shells, and small sandy lenses/layers.

Reviewed by: _____

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Phone/Fax: 413-232-8566

Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Item:	101305-1145	**Project #:**	050584
Source:	PDGEO 20, 42'-44'	**Lab #:**	05-0921
Date Sampled:	10/13/2005	**Sampled By:**	Client
Date Tested:	11/12/2005	**Tested By:**	C. Smith

Report of Triaxial Shear Test - Unconsolidated Undrained

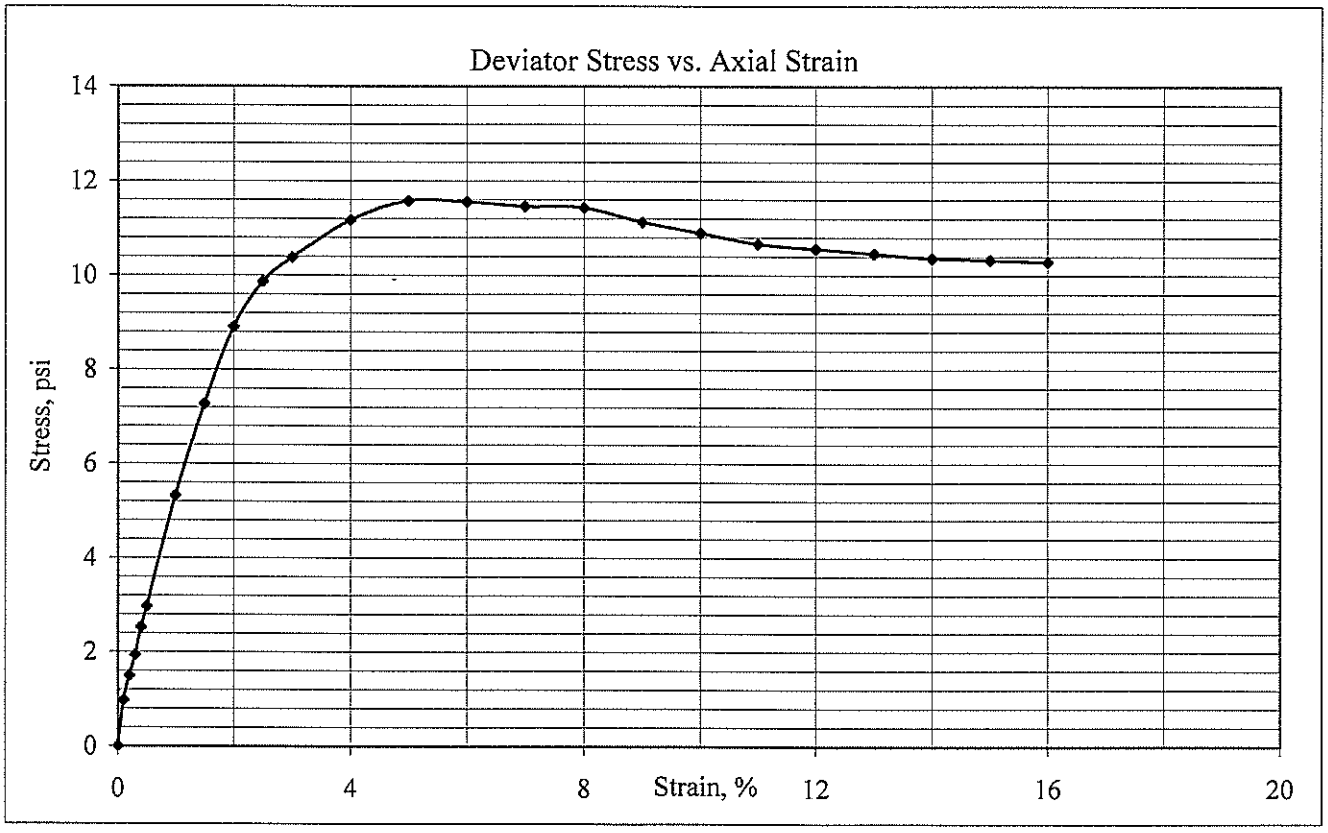
Test Method: ASTM D2850

Specimen Properties	Dry Density, pcf	Void Ratio	% moist.	% Saturation	Height, in.	Diam., in.	X-Sect Area in.2
Initial	67.00	1.34	57.98	108.69	6.15	2.82	6.253

Test Data

Strain Rate %/min.	Strain at Failure, %	Stresses at Failure, psi		Compressive Strength, psi
		Major	Minor	
1.0	5.2	49.2	37.6	11.6

Note: Test data is corrected for membrane effects.



Reviewed by: _____

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Phone/Fax: 413-232-8566

Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Item:	25'-27'	**Project #:**	050584
Source:	PDGEO 21, 103105-1330	**Lab #:**	05-1152
Date Sampled:	10/31/2005	**Sampled By:**	Client
Date Tested:	1/10/2006	**Tested By:**	C. Smith

Report of Triaxial Shear Test - Unconsolidated Undrained

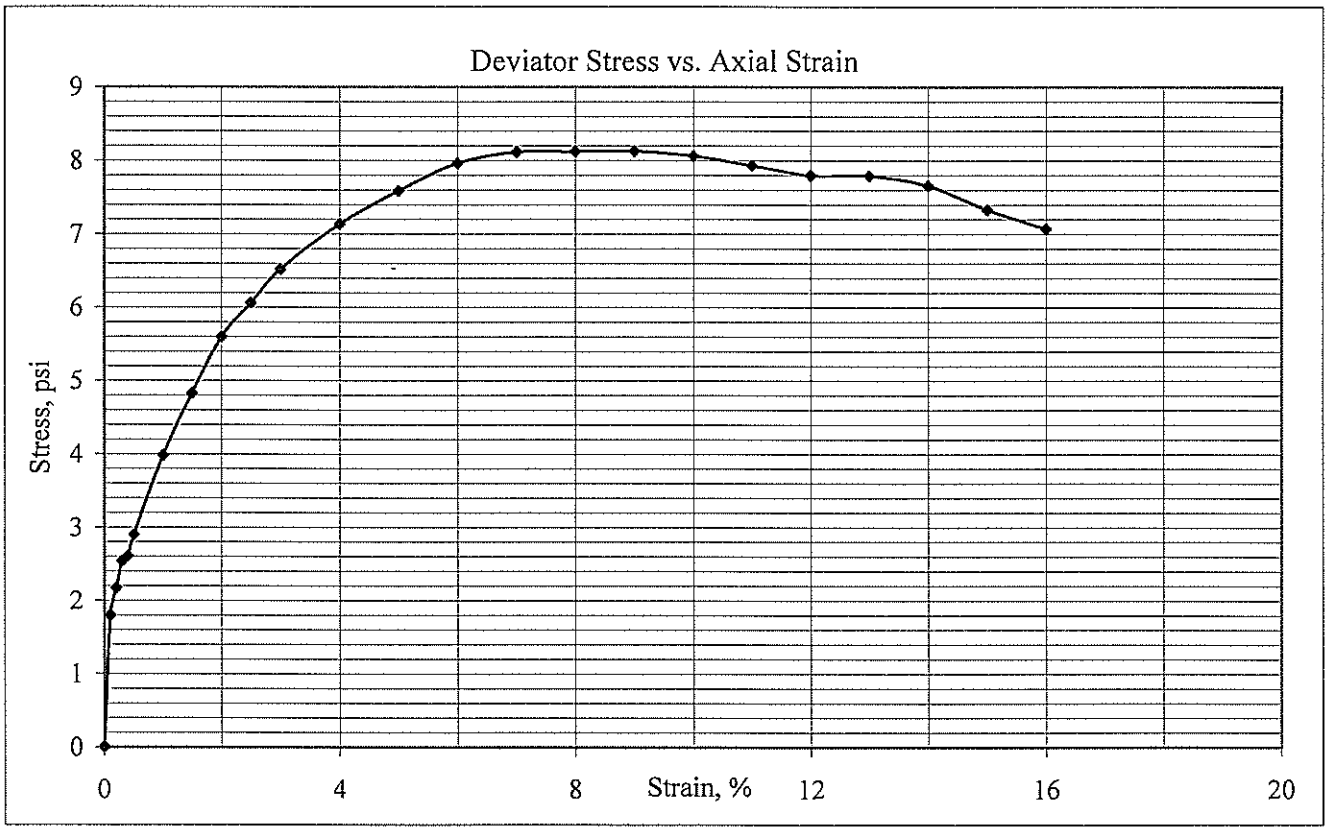
Test Method: ASTM D2850

Specimen Properties	Dry Density, pcf	Void Ratio	% moist.	% Saturation	Height, in.	Diam., in.	X-Sect Area in.2
Initial	54.30	1.89	71.23	94.80	6.67	2.82	6.248

Test Data

Strain Rate %/min.	Strain at Failure, %	Stresses at Failure, psi		Compressive Strength, psi
		Major	Minor	
0.90	7.0	31.2	23.1	8.1

Note: Test data is corrected for membrane effects.



Specimen contained some sandy layers. Sheared diagonally during failure.

Reviewed by: _____

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42 Day Farm Road, West Stockbridge, MA 01266
Phone/Fax: 413-232-8566

Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Item:	37'-39'	**Project #:**	050584
Source:	PDGEO 21, 110205-1400	**Lab #:**	05-1162
Date Sampled:	11/2/2005	**Sampled By:**	Client
Date Tested:	1/18/2006	**Tested By:**	C. Smith

Report of Triaxial Shear Test - Unconsolidated Undrained

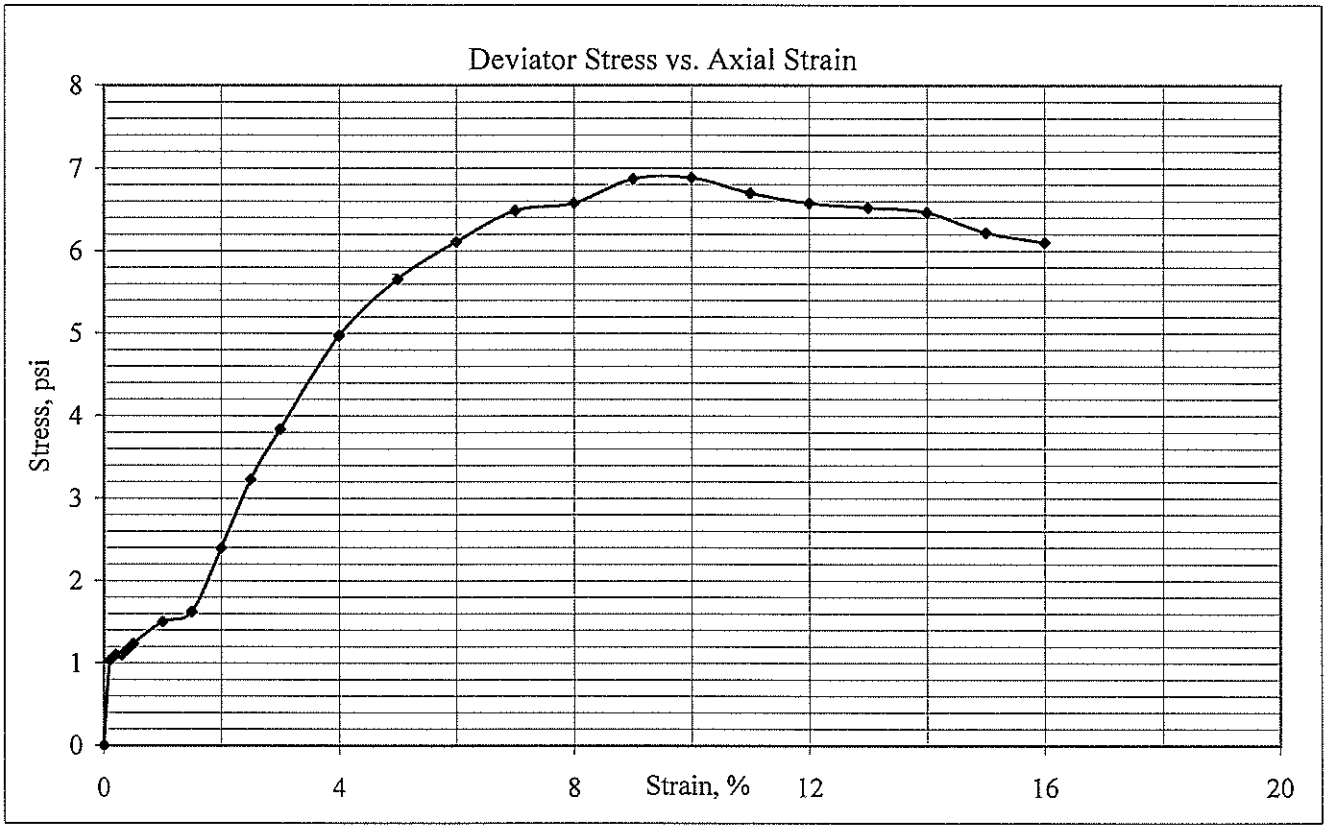
Test Method: ASTM D2850

Specimen Properties	Dry Density, pcf	Void Ratio	% moist.	% Saturation	Height, in.	Diam., in.	X-Sect Area in.2
Initial	59.76	1.62	67.11	103.84	6.07	2.84	6.334

Test Data

Strain Rate %/min.	Strain at Failure, %	Stresses at Failure, psi		Compressive Strength, psi
		Major	Minor	
0.95	9.0	39.7	32.8	6.9

Note: Test data is corrected for membrane effects.



Reviewed by: _____

Advance Testing
3348 Route 208, Campbell Hall, NY 10916
Phone: 845-496-1600 Fax: 845-496-1398
42 Day Farm Road, West Stockbridge, MA 01266
Phone/Fax: 413-232-8566

Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Item:	45'-47'	**Project #:**	050584
Source:	PDGEO 21, 110205-1445	**Lab #:**	05-1164
Date Sampled:	11/2/2005	**Sampled By:**	Client
Date Tested:	12/27/2005	**Tested By:**	C. Smith

Report of Triaxial Shear Test - Unconsolidated Undrained

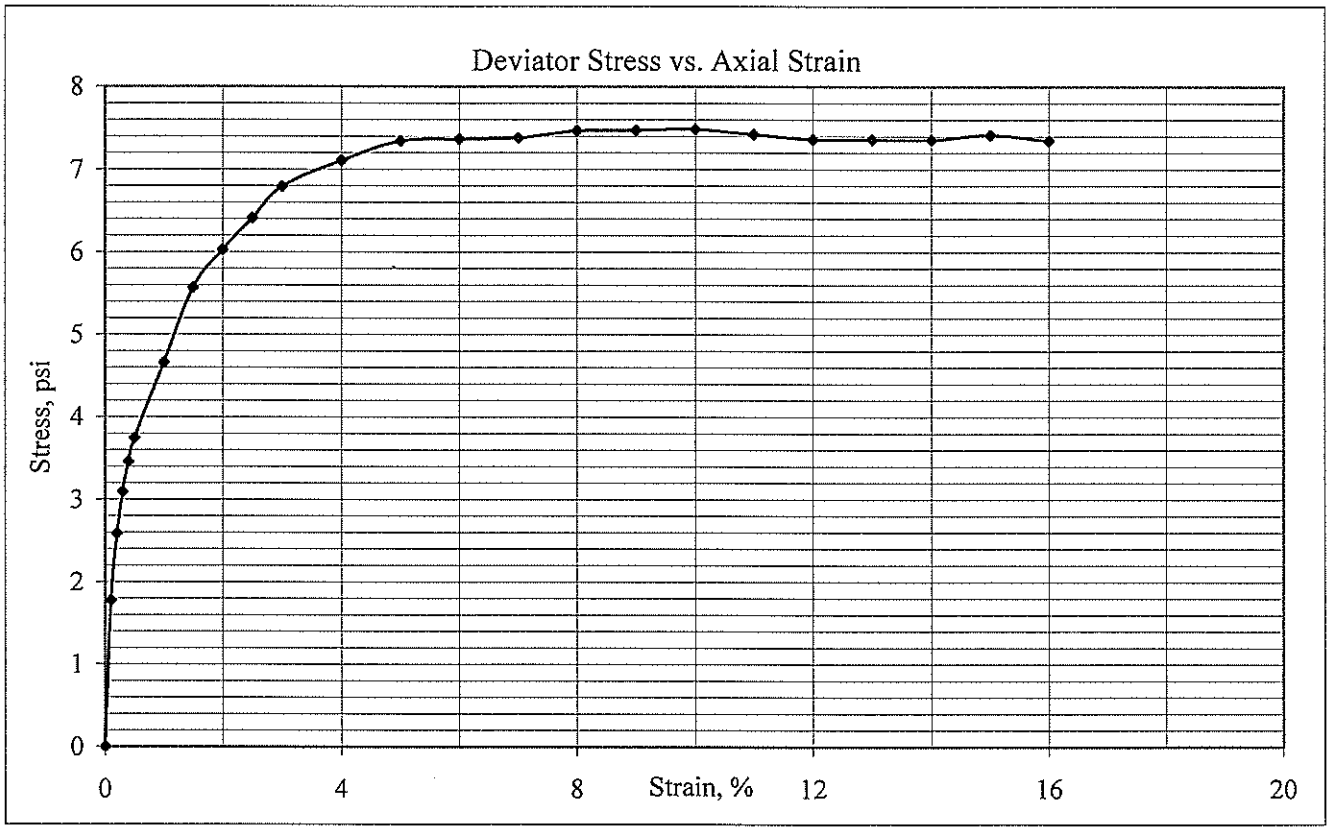
Test Method: ASTM D2850

Specimen Properties	Dry Density, pcf	Void Ratio	% moist.	% Saturation	Height, in.	Diam., in.	X-Sect Area in.2
Initial	77.82	1.01	39.33	97.38	6.90	2.84	6.335

Test Data

Strain Rate %/min.	Strain at Failure, %	Stresses at Failure, psi		Compressive Strength, psi
		Major	Minor	
0.87	5.0	46.5	39.2	7.3

Note: Test data is corrected for membrane effects.



NOTES: Test sample was obtained from approx. 45.2 to 45.8ft section of tube, which was fine soil interlayered with granular soil containing layers of small shells.

Reviewed by: _____

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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Item:	61'-63'	**Project #:**	050584
Source:	PDGEO 21, 110305-1015	**Lab #:**	05-1165
Date Sampled:	11/03/2005	**Sampled By:**	Client
Date Tested:	1/16/2006	**Tested By:**	C Smith

Report of Triaxial Shear Test - Unconsolidated Undrained

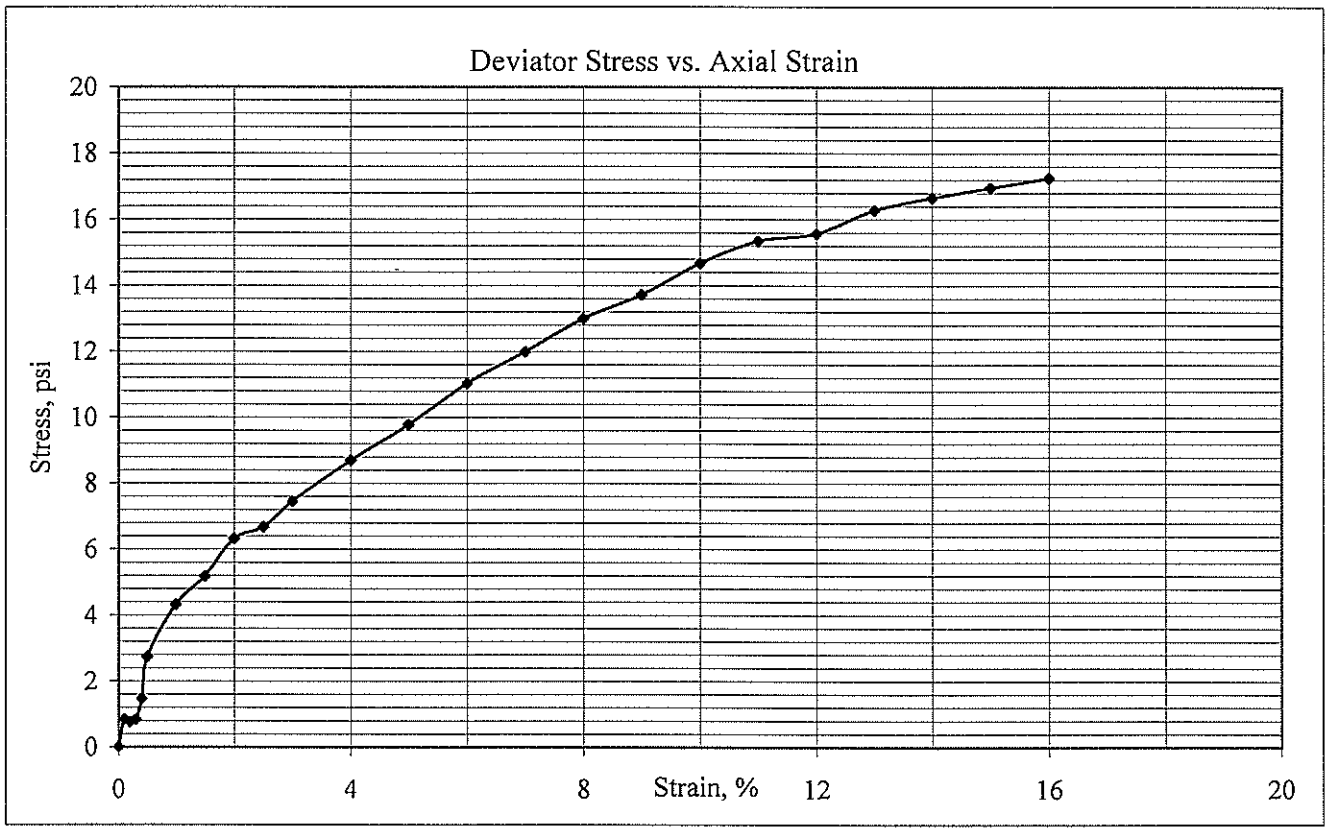
Test Method: ASTM D2850

Specimen Properties	Dry Density, pcf	Void Ratio	% moist.	% Saturation	Height, in.	Diam., in.	X-Sect Area in.2
Initial	99.60	0.57	21.68	94.91	6.18	2.91	6.629

Test Data

Strain Rate %/min.	Strain at Failure, %	Stresses at Failure, psi		Compressive Strength, psi
		Major	Minor	
0.97	15.0	68.9	52.0	16.9

Note: Test data is corrected for membrane effects.



Note: This sample had a granular texture, with abundant shells. Water in the sample appeared to have drained downward during storage of the tube, as this test portion was slightly undersaturated, and material lower in the tube was excessively wet.

Reviewed by: _____

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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Item:	28'-30'	**Project #:**	050584
Source:	PDGEO 22, 102705-1025	**Lab #:**	05-1015
Date Sampled:	10/24/2005	**Sampled By:**	Client
Date Tested:	12/15/2005	**Tested By:**	C. Smith

Report of Triaxial Shear Test - Unconsolidated Undrained

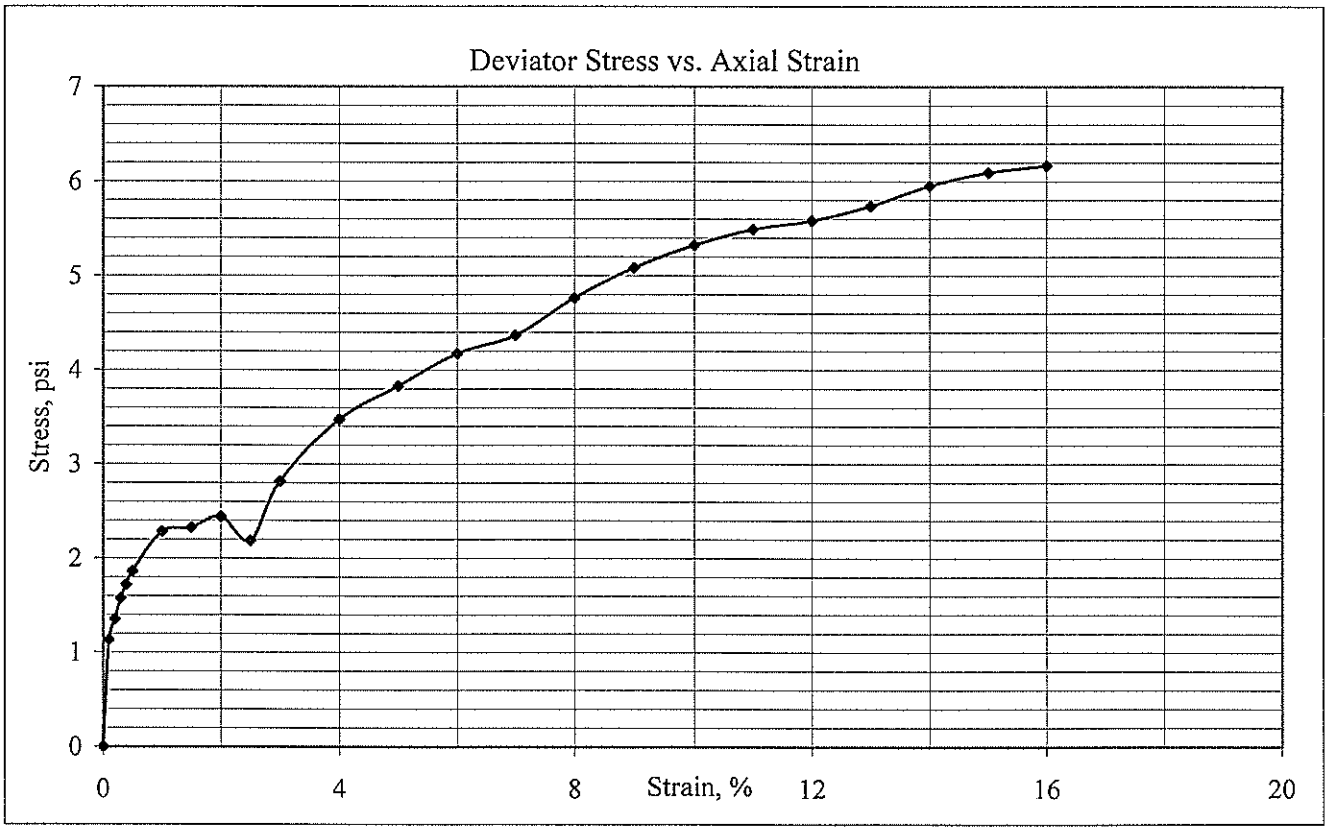
Test Method: ASTM D2850

Specimen Properties	Dry Density, pcf	Void Ratio	% moist.	% Saturation	Height, in.	Diam., in.	X-Sect Area in.2
Initial	63.73	1.46	60.47	104.05	6.78	2.81	6.209

Test Data

Strain Rate %/min.	Strain at Failure, %	Stresses at Failure, psi		Compressive Strength, psi
		Major	Minor	
0.89	15.0	31.7	25.6	6.1

Note: Test data is corrected for membrane effects.



NOTES: Horizontal sandy layer near center of specimen.

Reviewed by: _____

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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Item:	30-32ft	**Project #:**	050584
Source:	PDGEO23-102805-0925	**Lab #:**	05-1017
Date Sampled:	10/28/2005	**Sampled By:**	Client
Date Tested:	11/17/2005	**Tested By:**	C Smith

Report of Triaxial Shear Test - Unconsolidated Undrained

Test Method: ASTM D2850

No test performed.
Insufficient testable sample recovered.

Reviewed by: _____

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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Item:	PDGEO24A-103105-1100	**Project #:**	050584
Source:	45'-47'	**Lab #:**	05-1156
Date Sampled:	11/1/2005	**Sampled By:**	Client
Date Tested:	1/13/2006	**Tested By:**	C. Smith

Report of Triaxial Shear Test - Unconsolidated Undrained

Test Method: ASTM D2850

The sample could not be tested. When extracted, the sample consisted of silt layers of normal consitency, typically 2 to 3 inches thick, alternating with layers of fine shells approximately 1/4 to 1/2 inch thick. The shell layers were very loose (completely free from silt) resulting in the sample falling apart as it was extracted from the tube, or during normal careful handling when trying to set up the test.

Reviewed by: _____

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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Item:	54'-56'	**Project #:**	050584
Source:	PDGEO 24A, 103105-1300	**Lab #:**	05-1158
Date Sampled:	10/31/2005	**Sampled By:**	Client
Date Tested:	1/5/2006	**Tested By:**	B. Jobity

Report of Triaxial Shear Test - Unconsolidated Undrained

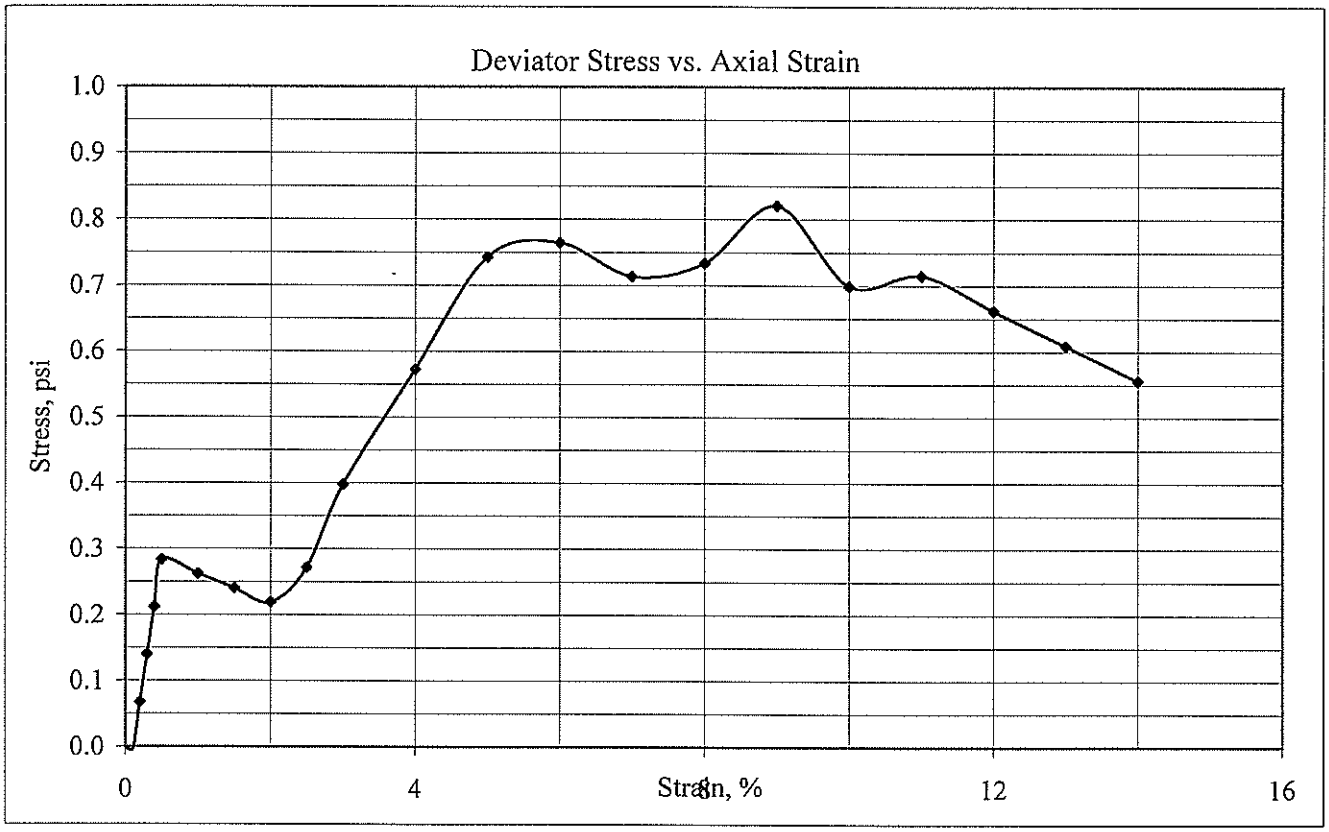
Test Method: ASTM D2850

Specimen Properties	Dry Density, pcf	Void Ratio	% moist.	% Saturation	Height, in.	Diam., in.	X-Sect Area in.2
Initial	69.43	1.26	53.00	105.84	6.02	2.80	6.152

Test Data

Strain Rate %/min.	Strain at Failure, %	Stresses at Failure, psi		Compressive Strength, psi
		Major	Minor	
1.0	5.5	49.6	48.8	0.8

Note: Test data is corrected for membrane effects.



Reviewed by: _____

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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Item:	74'-76'	**Project #:**	050584
Source:	PDGEO 24A, 110205-1045	**Lab #:**	05-1160
Date Sampled:	11/2/2005	**Sampled By:**	Client
Date Tested:	1/16/2006	**Tested By:**	C. Smith

Report of Triaxial Shear Test - Unconsolidated Undrained

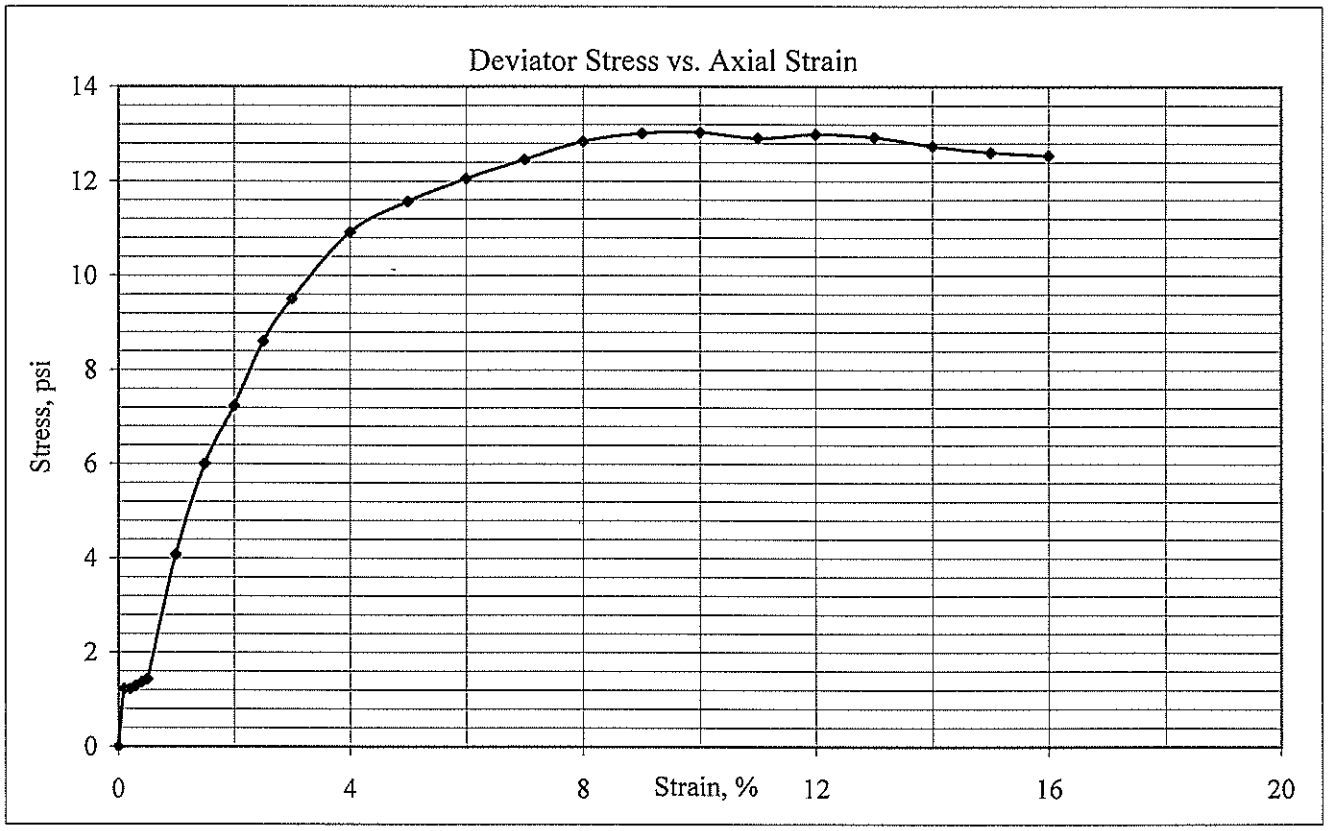
Test Method: ASTM D2850

Specimen Properties	Dry Density, pcf	Void Ratio	% moist.	% Saturation	Height, in.	Diam., in.	X-Sect Area in.2
Initial	91.29	0.72	32.90	115.26	6.38	2.79	6.108

Test Data

Strain Rate %/min.	Strain at Failure, %	Stresses at Failure, psi		Compressive Strength, psi
		Major	Minor	
0.94	9.0	77.8	64.8	13.0

Note: Test data is corrected for membrane effects.



NOTES: Specimen obtained from 1 to 7 inches above bottom of sample tube. There was one piece of coarse gravel present in the top of the test specimen.

Reviewed by: _____

Advance Testing

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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Item:	101105-0920	**Project #:**	050584
Source:	PDGEO 28, 50'-52'	**Lab #:**	05-0916
Date Sampled:	10/11/2005	**Sampled By:**	Client
Date Tested:	11/10/2005	**Tested By:**	C. Smith

Report of Triaxial Shear Test - Unconsolidated Undrained

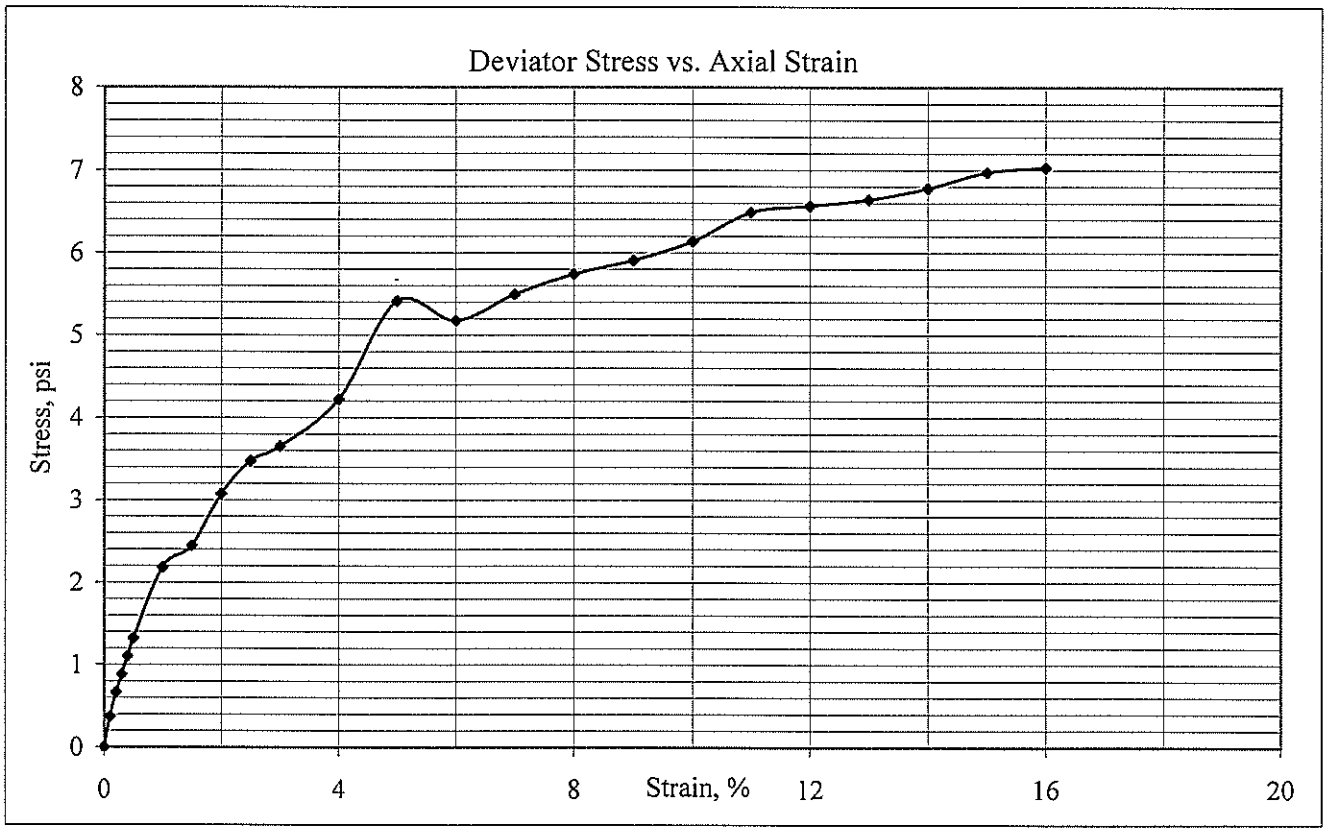
Test Method: ASTM D2850

Specimen Properties	Dry Density, pcf	Void Ratio	% moist.	% Saturation	Height, in.	Diam., in.	X-Sect Area in.2
Initial	86.07	0.82	34.71	106.16	6.72	2.83	6.283

Test Data

Strain Rate %/min.	Strain at Failure, %	Stresses at Failure, psi		Compressive Strength, psi
		Major	Minor	
1.0	15.0	51.7	44.7	7.0

Note: Test data is corrected for membrane effects.



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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Item:	101005-1315	**Project #:**	050584
Source:	PDGEO 28, 37'-39'	**Lab #:**	05-0931
Date Sampled:	10/10/2005	**Sampled By:**	Client
Date Tested:	11/10/2005	**Tested By:**	C. Smith

Report of Triaxial Shear Test - Unconsolidated Undrained

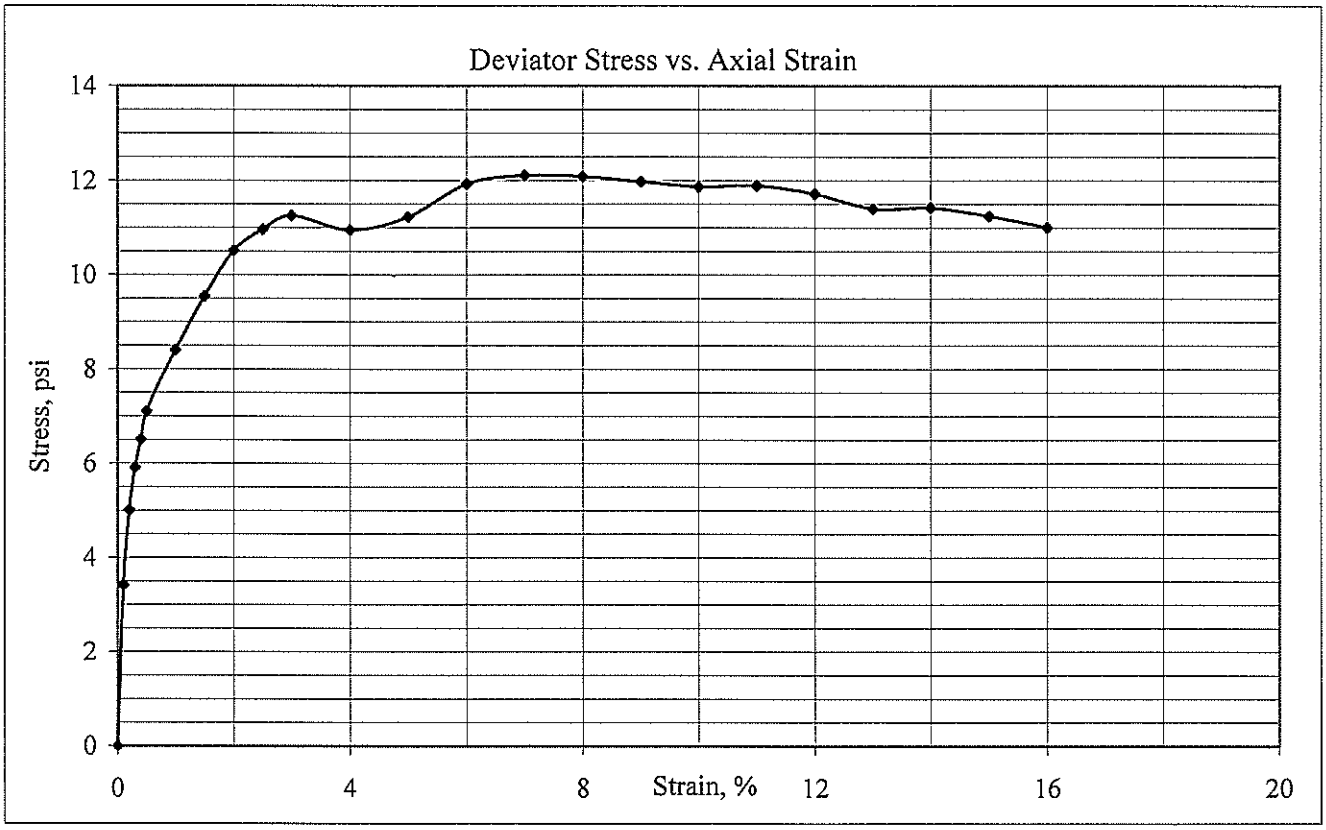
Test Method: ASTM D2850

Specimen Properties	Dry Density, pcf	Void Ratio	% moist.	% Saturation	Height, in.	Diam., in.	X-Sect Area in.2
Initial	67.02	1.34	58.10	109.00	6.34	2.80	6.172

Test Data

Strain Rate %/min.	Strain at Failure, %	Stresses at Failure, psi		Compressive Strength, psi
		Major	Minor	
1.0	7.0	46.4	34.3	12.1

Note: Test data is corrected for membrane effects.



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Phone/Fax: 413-232-8566

Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Item:	45'-47'	**Project #:**	050584
Source:	PDGEO 29, 102505-0245	**Lab #:**	05-1155
Date Sampled:	10/25/2005	**Sampled By:**	Client
Date Tested:	1/18/2006	**Tested By:**	C. Smith

Report of Triaxial Shear Test - Unconsolidated Undrained

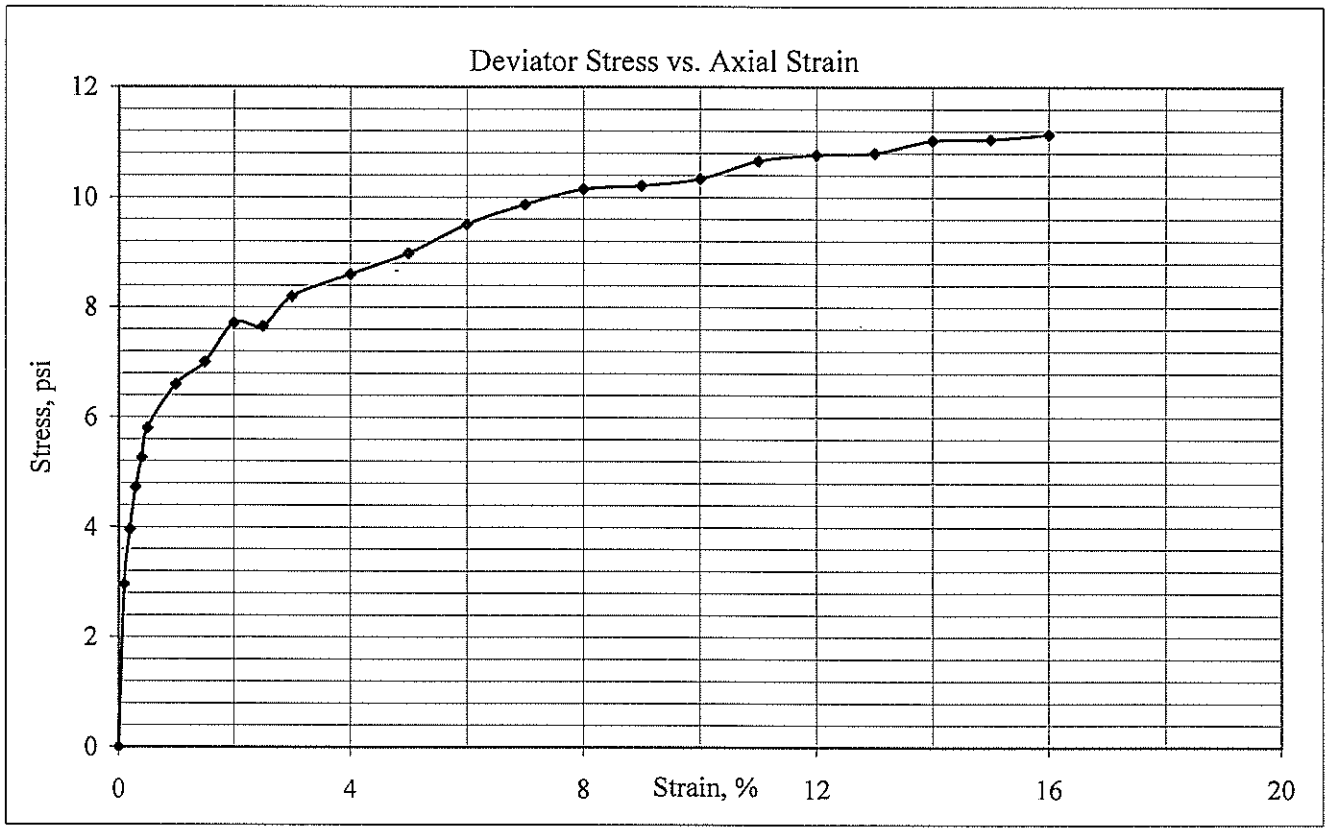
Test Method: ASTM D2850

Specimen Properties	Dry Density, pcf	Void Ratio	% moist.	% Saturation	Height, in.	Diam., in.	X-Sect Area in.2
Initial	60.64	1.58	64.92	102.85	6.38	2.77	6.028

Test Data

Strain Rate %/min.	Strain at Failure, %	Stresses at Failure, psi		Compressive Strength, psi
		Major	Minor	
1.00	12.0	52.1	41.3	10.8

Note: Test data is corrected for membrane effects.



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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Item:	32'-34'	**Project #:**	050584
Source:	PDGEO 30, 101805-1445	**Lab #:**	05-1002
Date Sampled:	10/18/2005	**Sampled By:**	Client
Date Tested:	12/10/2005	**Tested By:**	C. Smith

Report of Triaxial Shear Test - Unconsolidated Undrained

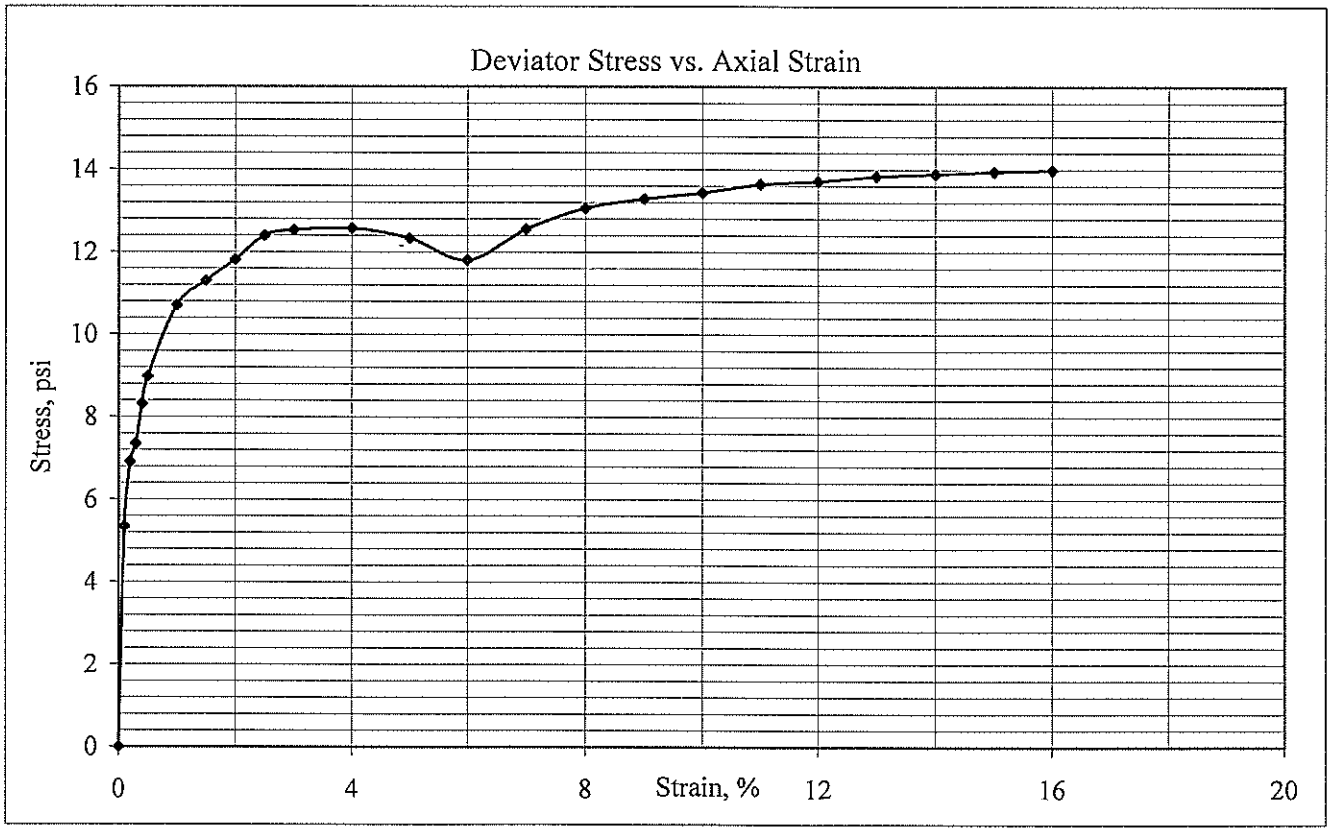
Test Method: ASTM D2850

Specimen Properties	Dry Density, pcf	Void Ratio	% moist.	% Saturation	Height, in.	Diam., in.	X-Sect Area in.2
Initial	60.54	1.59	68.37	108.04	6.00	2.82	6.236

Test Data

Strain Rate %/min.	Strain at Failure, %	Stresses at Failure, psi		Compressive Strength, psi
		Major	Minor	
1.0	3.0	42.1	29.6	12.5

Note: Test data is corrected for membrane effects.



Reviewed by: _____

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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Item:	39'-41'	**Project #:**	050584
Source:	PDGEO 30-101805-1551	**Lab #:**	05-1003
Date Sampled:	10/18/2005	**Sampled By:**	Client
Date Tested:	11/30/2005	**Tested By:**	C. Smith

Report of Triaxial Shear Test - Unconsolidated Undrained

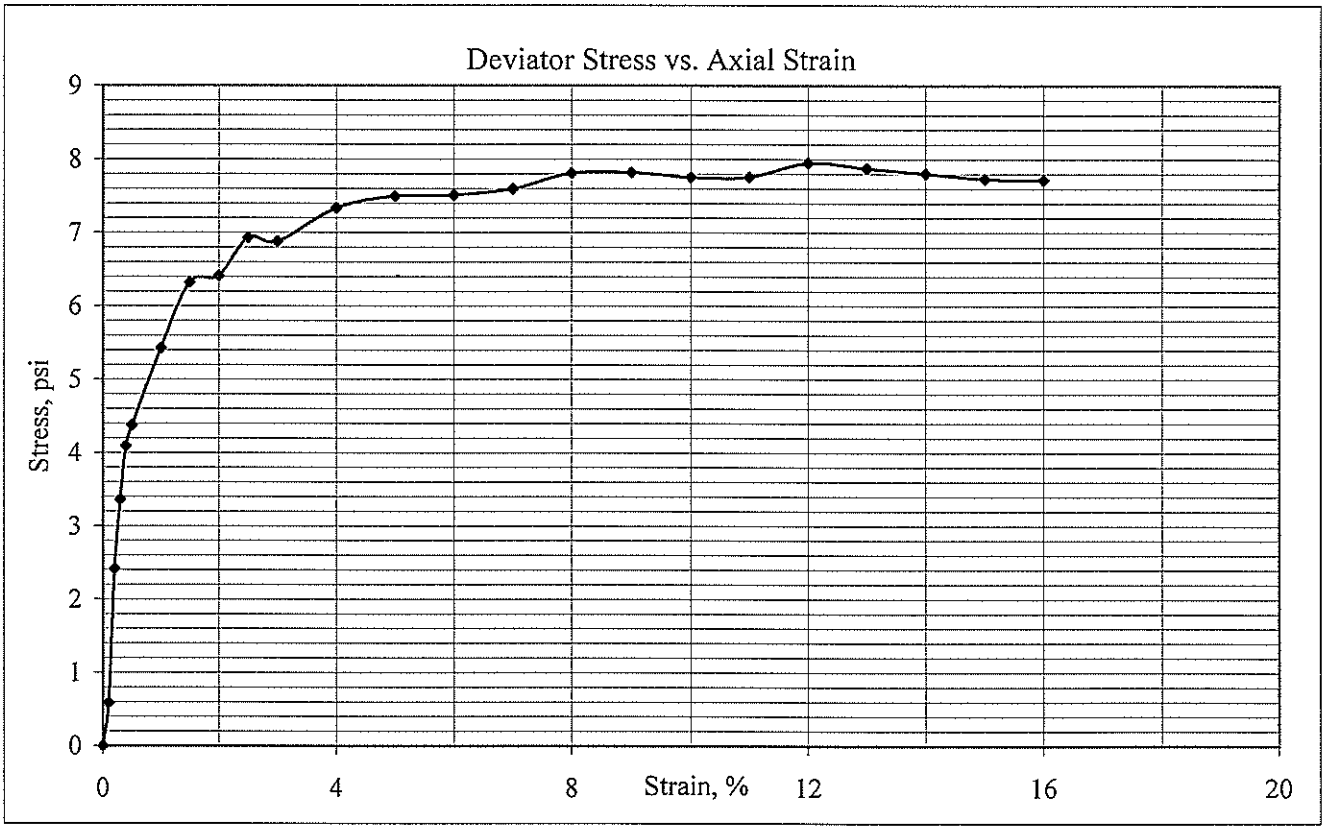
Test Method: ASTM D2850

Specimen Properties	Dry Density, pcf	Void Ratio	% moist.	% Saturation	Height, in.	Diam., in.	X-Sect Area in.2
Initial	60.95	1.57	65.16	104.1	6.22	2.85	6.385

Test Data

Strain Rate %/min.	Strain at Failure, %	Stresses at Failure, psi		Compressive Strength, psi
		Major	Minor	
1.0	5.0	42.7	35.2	7.5

Note: Test data is corrected for membrane effects.



NOTE: There was a layer of shells near the bottom of the sample.

Reviewed by: _____

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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Item:	25'-27'	**Project #:**	050584
Source:	PDGEO 31- 102005-1330	**Lab #:**	05-1012
Date Sampled:	10/20/2005	**Sampled By:**	Client
Date Tested:	11/29/2005	**Tested By:**	C. Smith

Report of Triaxial Shear Test - Unconsolidated Undrained

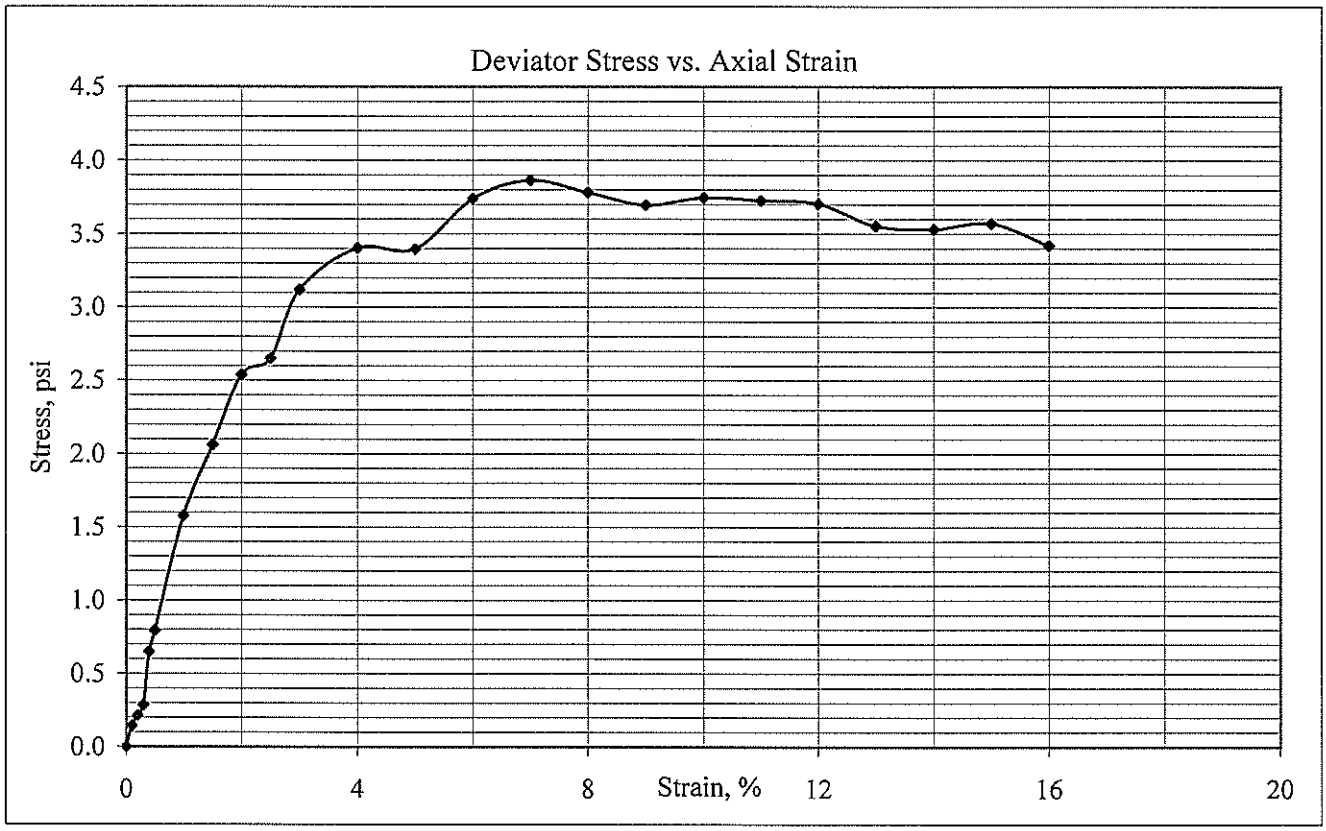
Test Method: ASTM D2850

Specimen Properties	Dry Density, pcf	Void Ratio	% moist.	% Saturation	Height, in.	Diam., in.	X-Sect Area in.2
Initial	51.32	2.05	81.19	99.26	6.09	2.84	6.333

Test Data

Strain Rate %/min.	Strain at Failure, %	Stresses at Failure, psi		Compressive Strength, psi
		Major	Minor	
1.0	7.0	26.8	22.9	3.9

Note: Test data is corrected for membrane effects.



NOTE: Sample was darker in color and contained abundant shells and fine gravel in bottom third.

Reviewed by: _____

Consolidated Undrained Triaxial

Advance Testing
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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Item:	092205-1520	**Project #:**	050584
Source:	PDGEO-1, U2, 39-41'	**Lab #:**	05-0857
Date Sampled:	10/3/2005	**Sampled By:**	Client
Date Tested:	10/19/2005	**Tested By:**	C. Smith

Report of Triaxial Shear Test - Consolidated Undrained

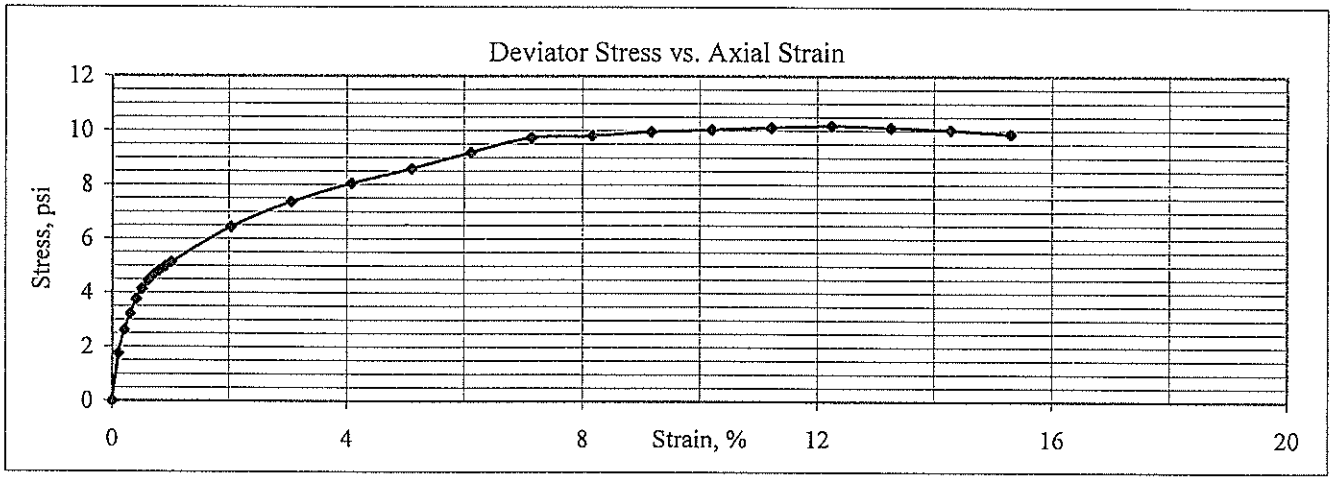
Test Method: ASTM D4767

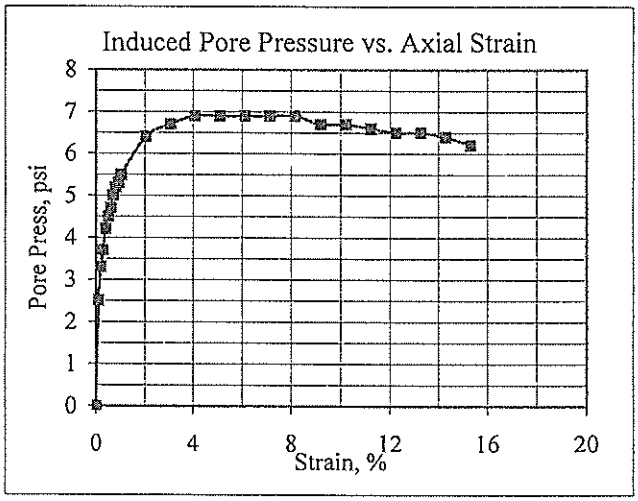
Specimen Properties	Dry Density, pcf	Void Ratio	% moist.	% Saturation	Height, in.	Diam., in.	X-Sect Area in.2
Initial	71.94	1.18	42.4	90.4	6.008	2.822	6.253
After Consolidation	73.41	1.13	44.0	97.4	5.888	2.793	6.128

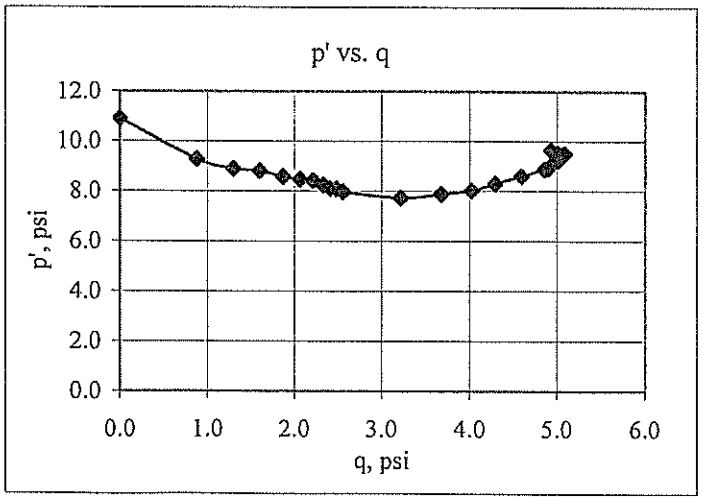
Consolidation	Total Back Pressure, psi	Pore Press. B after Sat.	Eff. Consol. Stress, psi	t50, min
	30.8	0.98	10.9	8.5

Specific Gravity:	2.51
Strain Rate, %/min:	0.01

At Failure	Deviator Stress, psi:	10.18	Axial Strain, %:	12.25







NOTE: Sample contained 1 piece of 7/8-inch gravel.

Reviewed by: _____

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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Item:	092205-1110	**Project #:**	050584
Source:	PDGEO-4, U-1, 36-38'	**Lab #:**	05-0859
Date Sampled:	9/28/2005	**Sampled By:**	Client
Date Tested:	10/14/2005	**Tested By:**	C Smith

Report of Triaxial Shear Test - Consolidated Undrained

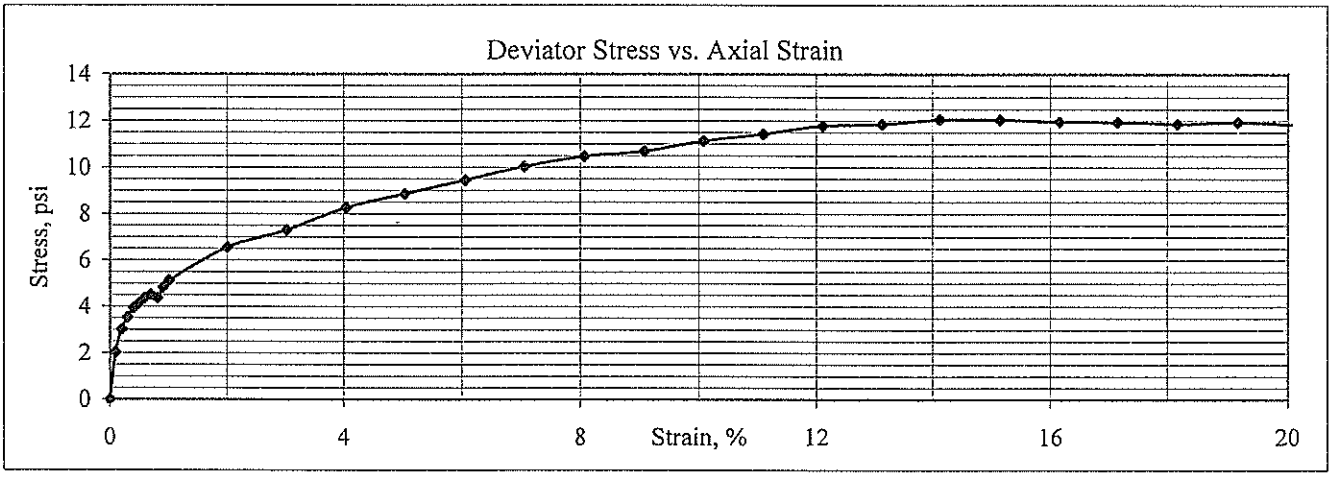
Test Method: ASTM D4767

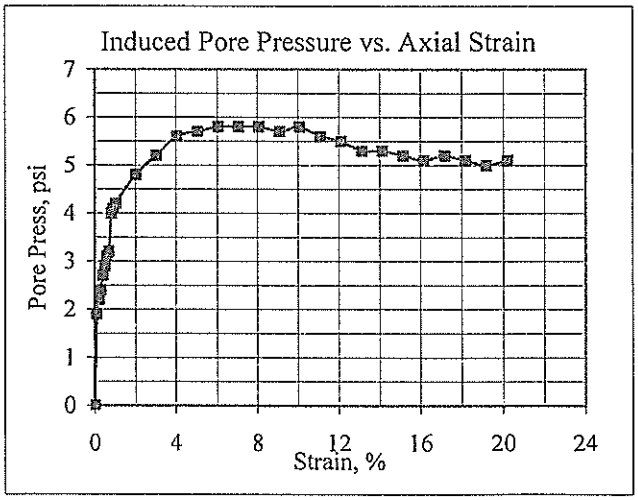
Specimen Properties	Dry Density, pcf	Void Ratio	% moist.	% Saturation	Height, in.	Diam., in.	X-Sect Area in.2
Initial	72.36	1.17	45.73	98.49	6.064	2.830	6.290
After Consolidation	73.69	1.13	43.56	97.07	6.009	2.817	6.233

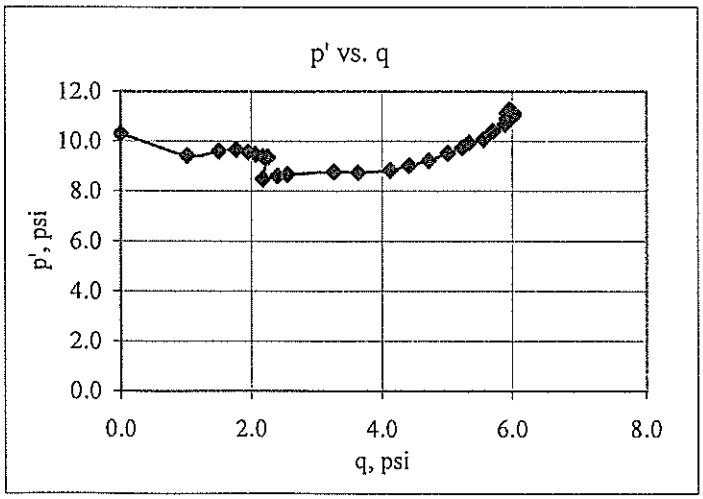
Consolidation	Total Back Pressure, psi	Pore Press. B after Sat.	Eff. Consol. Stress, psi	t50, min
	55.5	1.03	10.3	8.3

Specific Gravity:	2.51
Strain Rate, %/min:	0.05

At Failure	Deviator Stress, psi:	12.1	Axial Strain, %:	14.1







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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Item:	33'-35'	**Project #:**	50584
Source:	PDGEO 5, 101905-1645	**Lab #:**	05-1010
Date Sampled:	10/19/2005	**Sampled By:**	Client
Date Tested:	11/22/2005	**Tested By:**	C. Smith/ B. Jobity

Report of Triaxial Shear Test - Consolidated Undrained

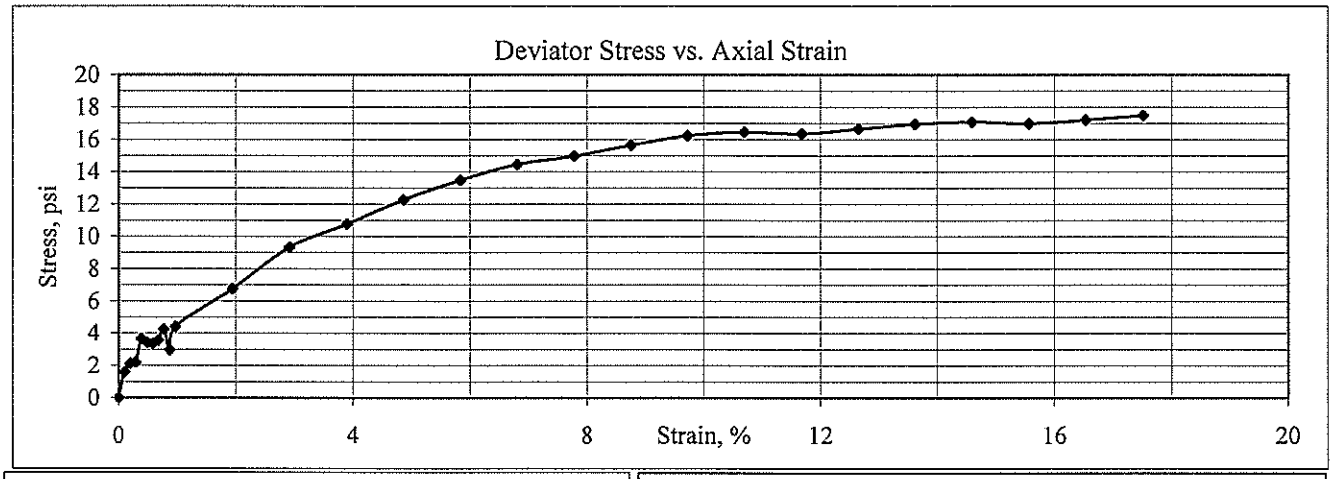
Test Method: ASTM D4767

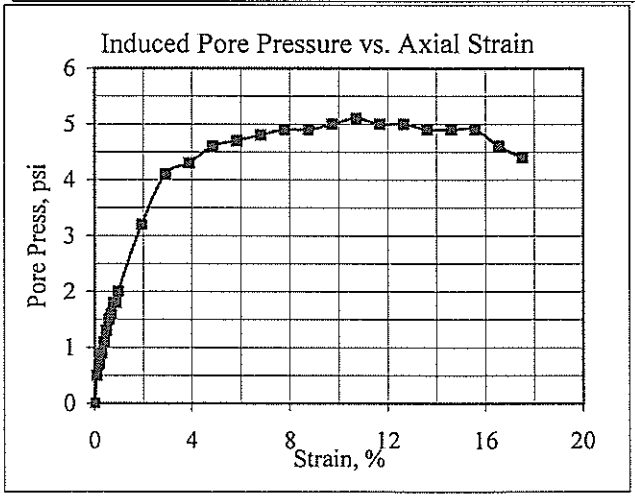
Specimen Properties	Dry Density, pcf	Void Ratio	% moist.	% Saturation	Height, in.	Diam., in.	X-Sect Area in.2
Initial	72.42	1.16	45.61	98.38	6.194	2.810	6.202
After Consolidation	73.06	1.14	45.40	99.53	6.167	2.804	6.175

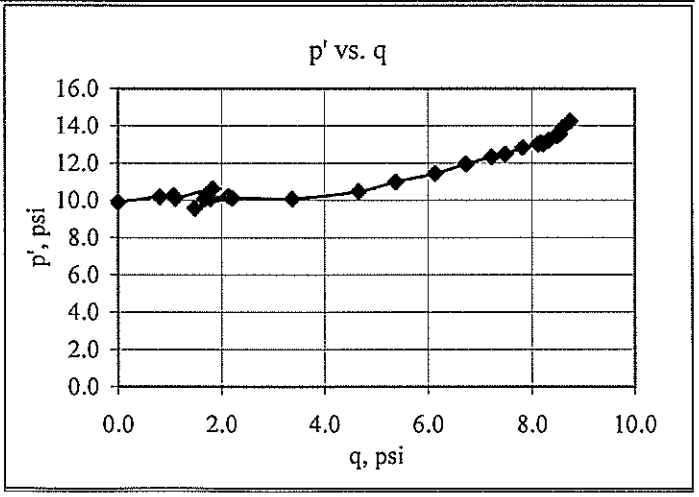
Consolidation	Total Back Pressure, psi	Pore Press. B after Sat.	Eff. Consol. Stress, psi	t50, min
	18.4	0.96	9.9	3

Specific Gravity:	2.51
Strain Rate, %/min:	0.05

At Failure	Deviator Stress, psi:	16.5	Axial Strain, %:	10.7







NOTES: The sample had a shallow groove running its entire length, probably from the sampler pushing a stone or shell. Wood chips were present throughout sample. Sample failed on a diagonal shear plane.

Reviewed by: _____

Advance Testing
3348 Route 208, Campbell Hall, NY 10916
Phone: 845-496-1600 Fax: 845-496-1398
42 Day Farm Road, West Stockbridge, MA 01266
Phone/Fax: 413-232-8566

Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Item:	30'-31'	**Project #:**	50584
Source:	PDGEO 6-101805-1425	**Lab #:**	05-1001
Date Sampled:	10/18/2005	**Sampled By:**	Client
Date Tested:	11/28/2005	**Tested By:**	C. Smith

Report of Triaxial Shear Test - Consolidated Undrained

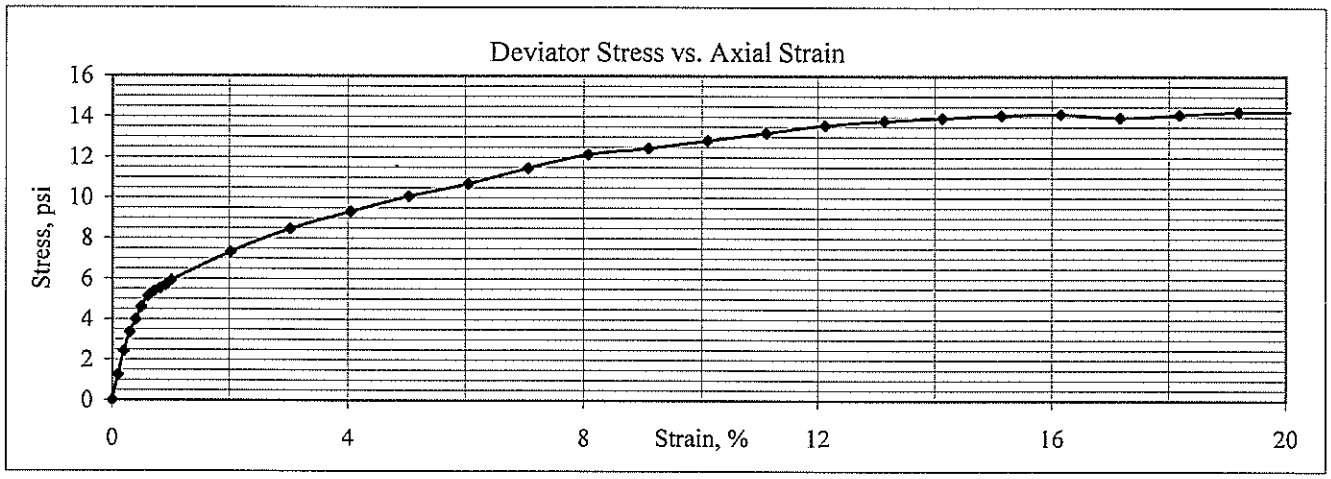
Test Method: ASTM D4767

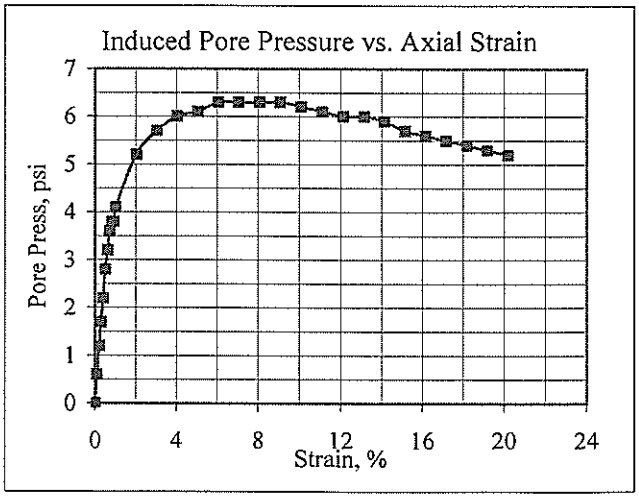
Specimen Properties	Dry Density, pcf	Void Ratio	% moist.	% Saturation	Height, in.	Diam., in.	X-Sect Area in.2
Initial	68.95	1.27	52.94	104.42	6.089	2.785	6.090
After Consolidation	70.31	1.23	47.36	96.75	6.030	2.771	6.031

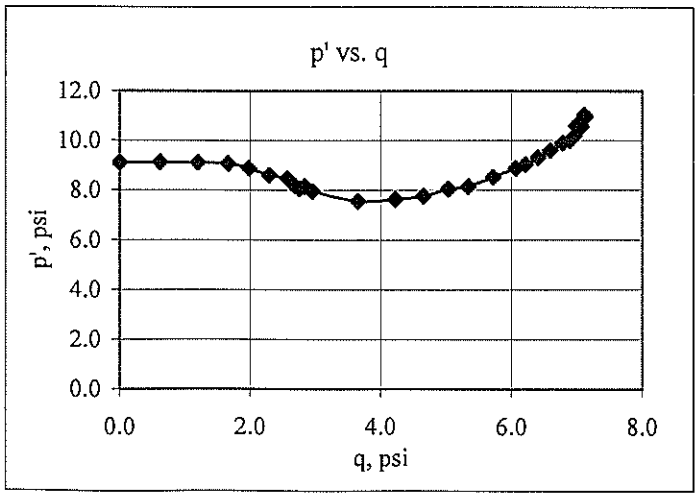
Consolidation	Total Back Pressure, psi	Pore Press. B after Sat.	Eff. Consol. Stress, psi	t50, min
	21.8	0.96	9.1	18

Specific Gravity:	2.51
Strain Rate, %/min:	0.05

At Failure	Deviator Stress, psi:	14.1	Axial Strain, %:	15.0







Reviewed by: _____

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Phone: 845-496-1600 Fax: 845-496-1398
42 Day Farm Road, West Stockbridge, MA 01266
Phone/Fax: 413-232-8566

Client:	ENSR Remediation and Const.	**Project:**	Bp Hastings-on-Hudson
Item:	33'-35'	**Project #:**	50584
Source:	PDGEO 7-101905-1250	**Lab #:**	05-1008
Date Sampled:	10/19/2005	**Sampled By:**	Client
Date Tested:	11/20/2005	**Tested By:**	C. Smith

Report of Triaxial Shear Test - Consolidated Undrained

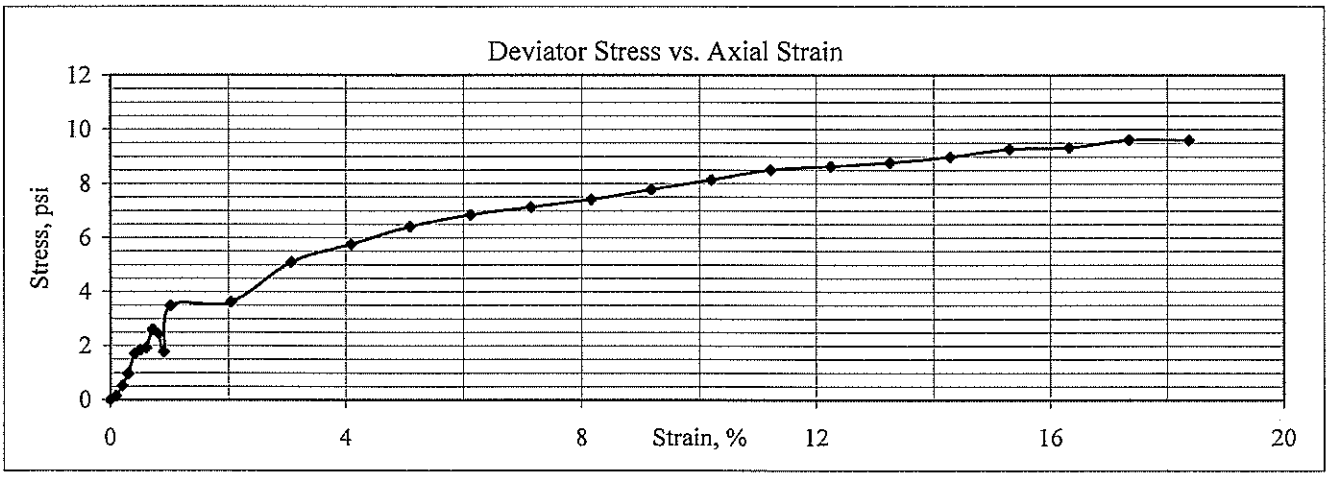
Test Method: ASTM D4767

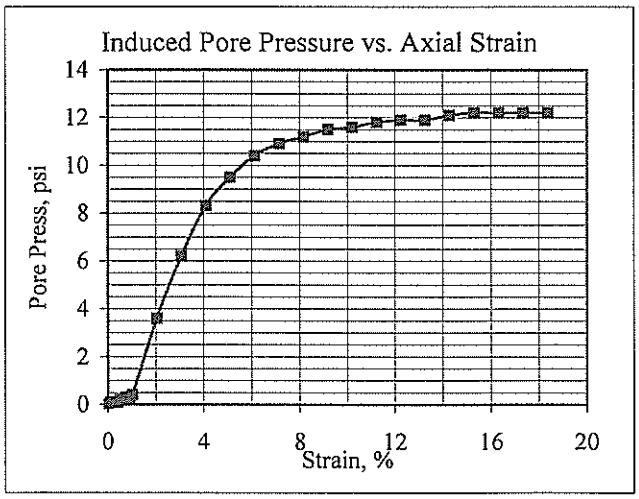
Specimen Properties	Dry Density, pcf	Void Ratio	% moist.	% Saturation	Height, in.	Diam., in.	X-Sect Area in.2
Initial	61.17	1.56	62.02	99.68	6.388	2.870	6.469
After Consolidation	63.70	1.46	58.01	99.73	6.260	2.841	6.340

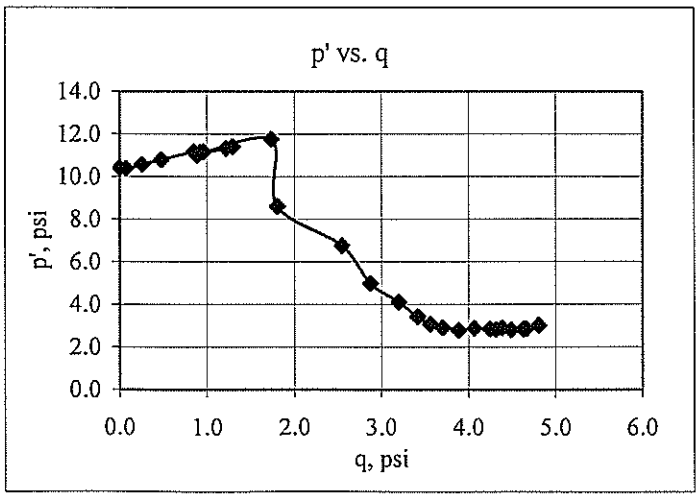
Consolidation	Total Back Pressure, psi	Pore Press. B after Sat.	Eff. Consol. Stress, psi	t50, min
	24.8	0.98	10.4	50

Specific Gravity:	2.51
Strain Rate, %/min:	0.05

At Failure	Deviator Stress, psi:	9.2	Axial Strain, %:	15.0







Revised 2/6/06 - Density data corrected.

Sample contained a few small shells.

Reviewed by: _____

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3348 Route 208, Campbell Hall, NY 10916
Phone: 845-496-1600 Fax: 845-496-1398
42 Day Farm Road, West Stockbridge, MA 01266
Phone/Fax: 413-232-8566

Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Item:	100505-0815	**Project #:**	50584
Source:	PDGEO 9, 35'-37'	**Lab #:**	05-0926
Date Sampled:	10/5/2005	**Sampled By:**	Client
Date Tested:	11/10/2005	**Tested By:**	C. Smith

Report of Triaxial Shear Test - Consolidated Undrained

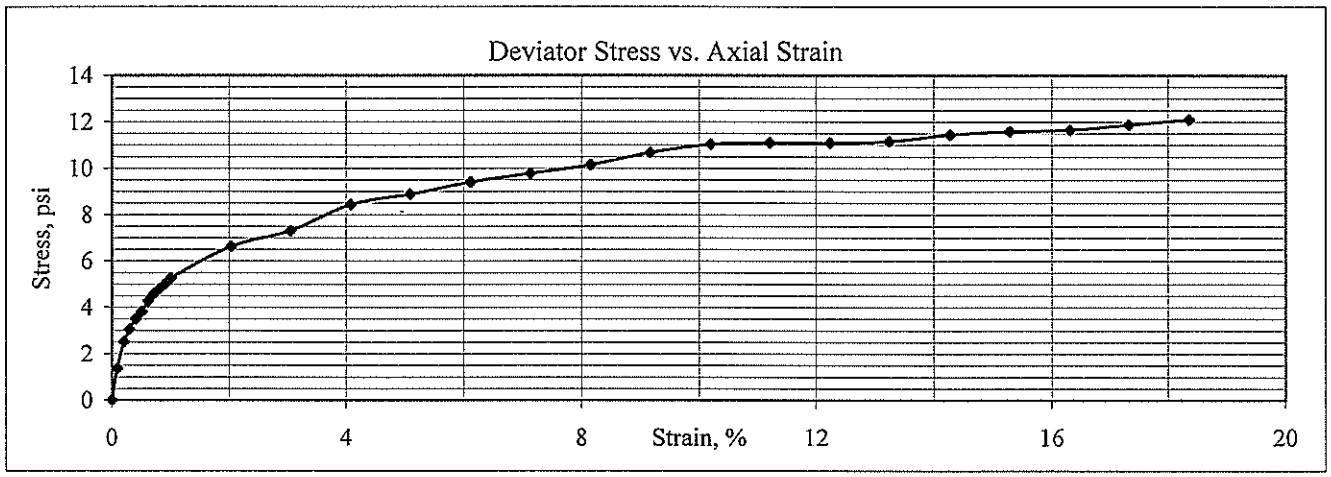
Test Method: ASTM D4767

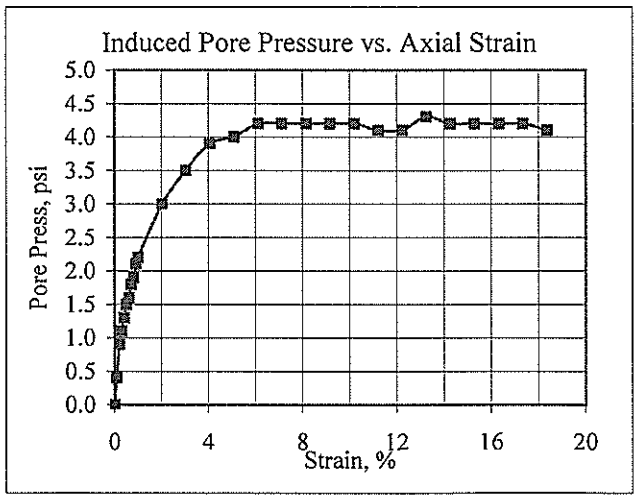
Specimen Properties	Dry Density, pcf	Void Ratio	% moist.	% Saturation	Height, in.	Diam., in.	X-Sect Area in.2
Initial	66.37	1.36	58.88	108.60	6.449	2.827	6.275
After Consolidation	69.02	1.27	49.71	98.23	6.324	2.799	6.154

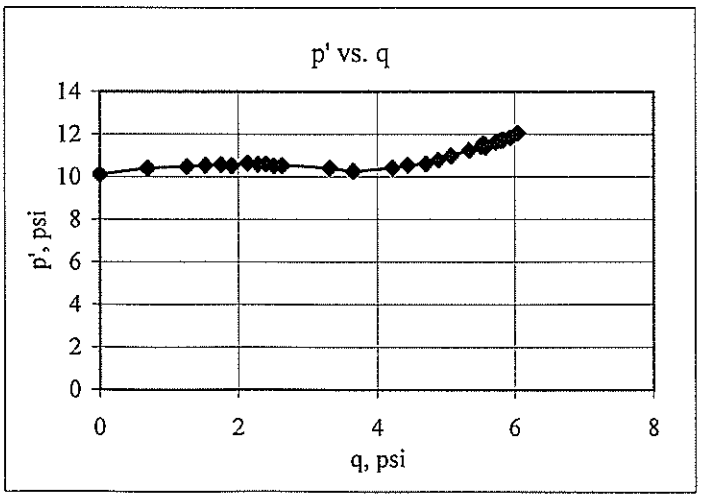
Consolidation	Total Back Pressure, psi	Pore Press. B after Sat.	Eff. Consol. Stress, psi	t50, min
	27.5	0.97	10.1	12

Specific Gravity:	2.51
Strain Rate, %/min:	0.05

At Failure	Deviator Stress, psi:	11.5	Axial Strain, %:	15.0







Reviewed by: _____

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3348 Route 208, Campbell Hall, NY 10916
Phone: 845-496-1600 Fax: 845-496-1398
42 Day Farm Road, West Stockbridge, MA 01266
Phone/Fax: 413-232-8566

Client:	Ensr Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Item:	100605-1035	**Project #:**	50584
Source:	46'-48' PDGEO-9	**Lab #:**	05-0928
Date Sampled:	10/6/2005	**Sampled By:**	Client
Date Tested:	10/26/2005	**Tested By:**	C. Smith

Report of Triaxial Shear Test - Consolidated Undrained

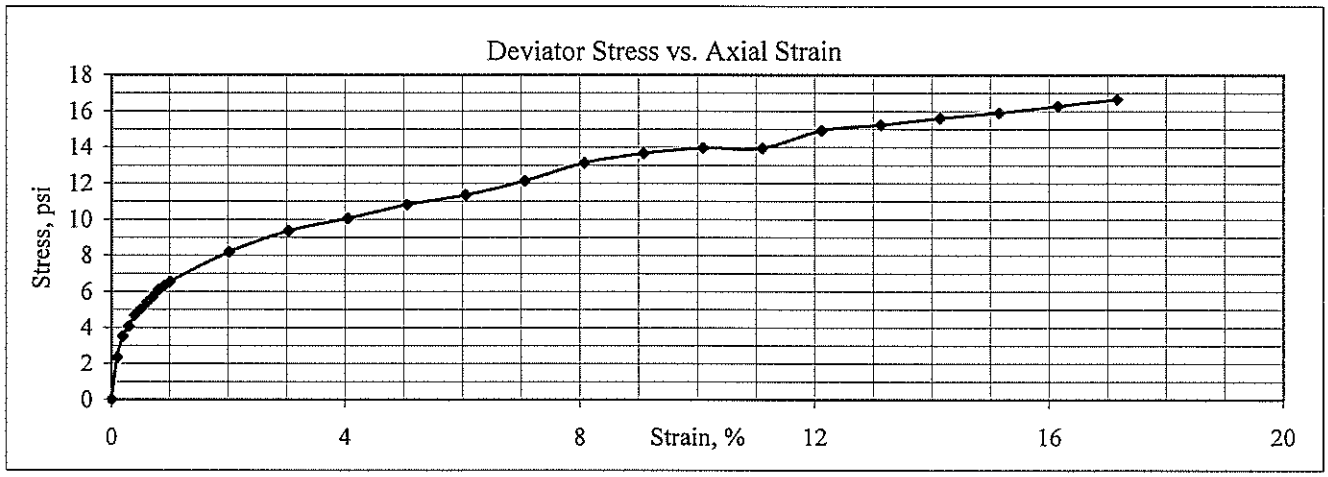
Test Method: ASTM D4767

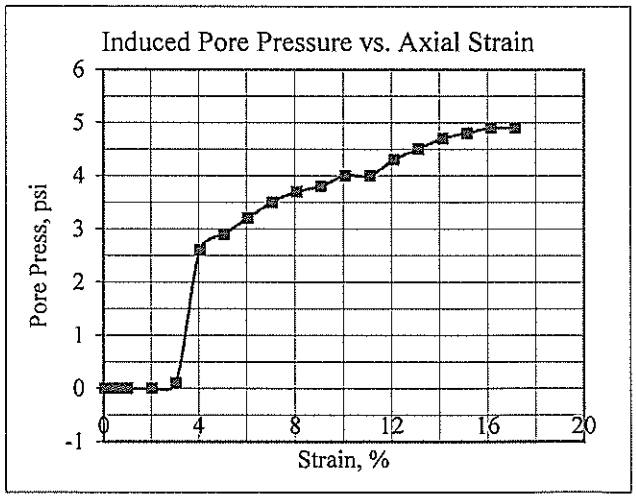
Specimen Properties	Dry Density, pcf	Void Ratio	% moist.	% Saturation	Height, in.	Diam., in.	X-Sect Area in.2
Initial	73.31	1.14	43.85	96.76	6.090	2.780	6.068
After Consolidation	74.75	1.10	43.50	99.59	6.031	2.766	6.009

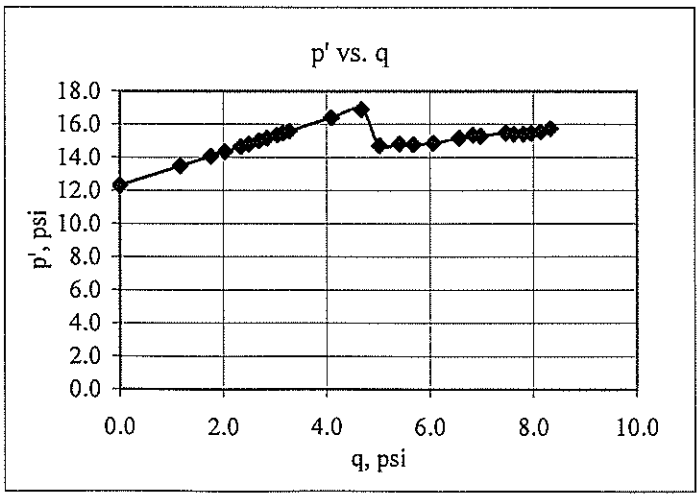
Consolidation	Total Back Pressure, psi	Pore Press. B after Sat.	Eff. Consol. Stress, psi	t50, min
	61.7	0.96	12.3	10

Specific Gravity:	2.51
Strain Rate, %/min:	0.066

At Failure	Deviator Stress, psi:	15.8	Axial Strain, %:	15.0







Reviewed by: _____

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Phone: 845-496-1600 Fax: 845-496-1398
42 Day Farm Road, West Stockbridge, MA 01266
Phone/Fax: 413-232-8566

Client:	ENSR Remediation and Const	**Project:**	BP Hastings-on-Hudson
Item:	100605-1300	**Project #:**	50584
Source:	PDGEO 9, 54'-56'	**Lab #:**	05-0930
Date Sampled:	10/6/2005	**Sampled By:**	Client
Date Tested:	11/5/2005	**Tested By:**	C. Smith

Report of Triaxial Shear Test - Consolidated Undrained

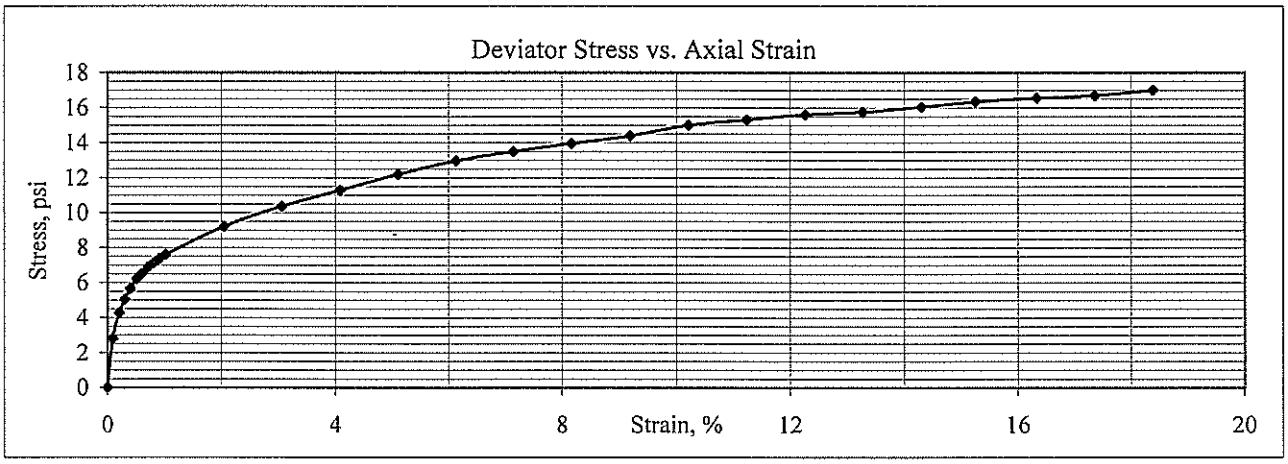
Test Method: ASTM D4767

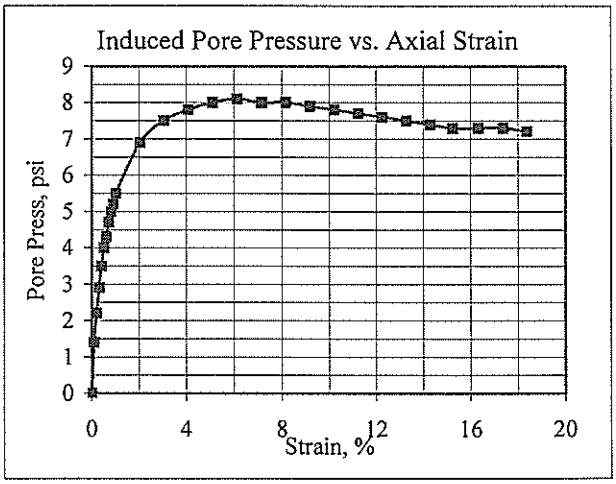
Specimen Properties	Dry Density, pcf	Void Ratio	% moist.	% Saturation	Height, in.	Diam., in.	X-Sect Area in.2
Initial	76.10	1.06	38.58	91.42	6.369	2.805	6.180
After Consolidation	79.28	0.98	34.55	88.79	6.240	2.776	6.054

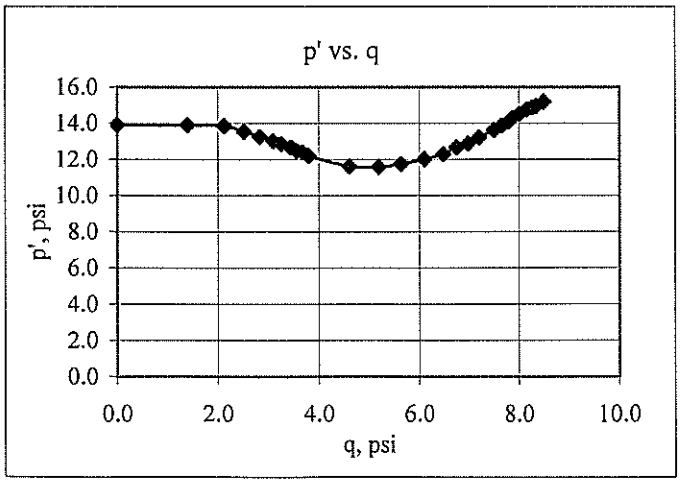
Consolidation	Total Back Pressure, psi	Pore Press. B after Sat.	Eff. Consol. Stress, psi	t50, min
	42.0	1.02	13.9	13

Specific Gravity:	2.51
Strain Rate, %/min:	0.05

At Failure	Deviator Stress, psi:	16.2	Axial Strain, %:	15.0







NOTES: Sample was medium stiff with some scattered soft areas. It contained scattered small shell fragments. Sample deformed unevenly during test.

Reviewed by: _____

Advance Testing
3348 Route 208, Campbell Hall, NY 10916
Phone: 845-496-1600 Fax: 845-496-1398
42 Day Farm Road, West Stockbridge, MA 01266
Phone/Fax: 413-232-8566

Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Item:	35'-37'	**Project #:**	50584
Source:	PDGEO 11, 110105-1445	**Lab #:**	05-1166
Date Sampled:	11/1/2005	**Sampled By:**	Client
Date Tested:	1/10/2006	**Tested By:**	C. Smith

Report of Triaxial Shear Test - Consolidated Undrained

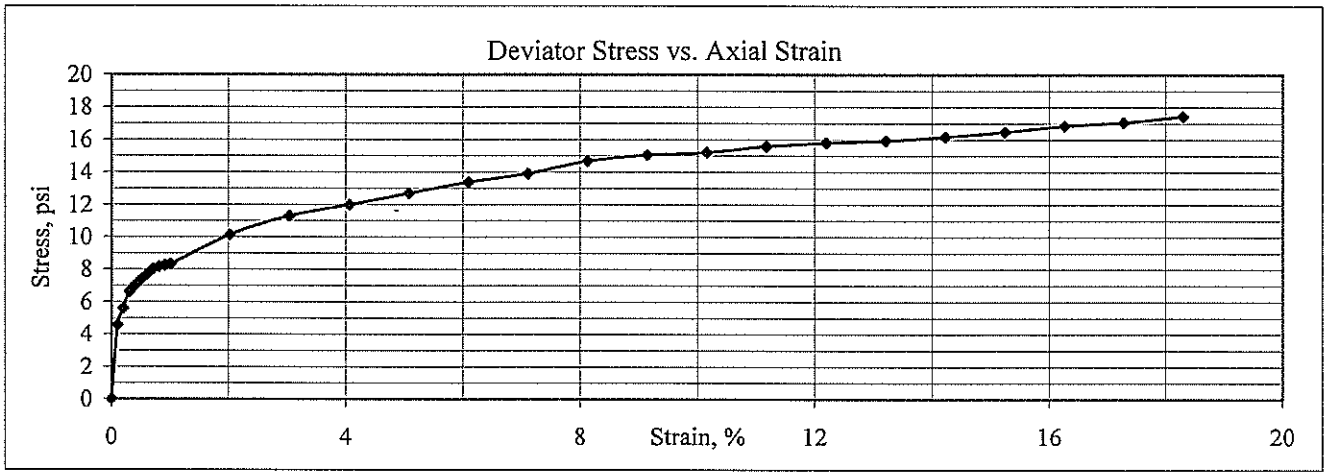
Test Method: ASTM D4767

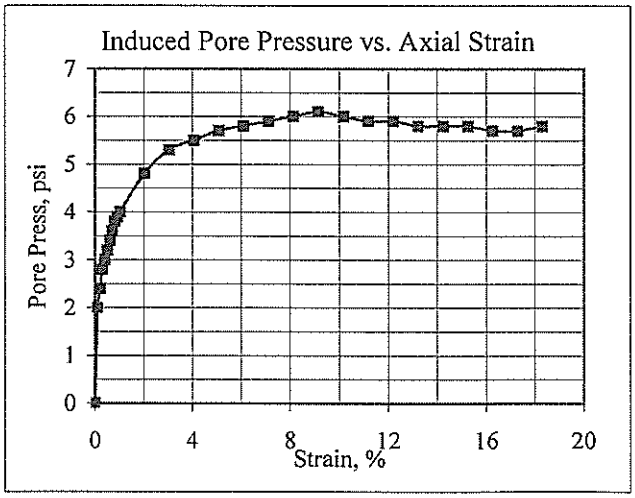
Specimen Properties	Dry Density, pcf	Void Ratio	% moist.	% Saturation	Height, in.	Diam., in.	X-Sect Area in.2
Initial	73.18	1.14	49.28	108.39	6.338	2.782	6.078
After Consolidation	75.69	1.07	40.54	95.07	6.232	2.758	5.976

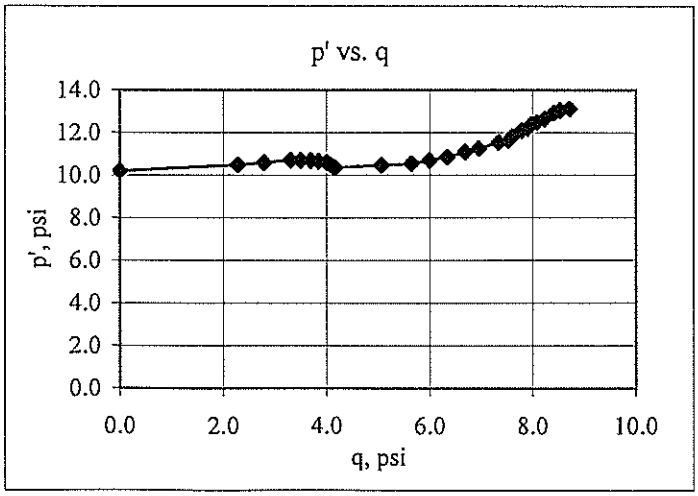
Consolidation	Total Back Pressure, psi	Pore Press. B after Sat.	Eff. Consol. Stress, psi	t50, min
	27.4	0.98	10.2	53

Specific Gravity:	2.51
Strain Rate, %/min:	0.05

At Failure	Deviator Stress, psi:	16.3	Axial Strain, %:	15.0







Reviewed by: _____

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3348 Route 208, Campbell Hall, NY 10916
Phone: 845-496-1600 Fax: 845-496-1398
42 Day Farm Road, West Stockbridge, MA 01266
Phone/Fax: 413-232-8566

Client:	ENSR Remediation and Const.	**Project:**	BP Hasting-on-Hudson
Item:	43'-45'	**Project #:**	50584
Source:	PDGEO 11, 110105-1530	**Lab #:**	05-1168
Date Sampled:	11/1/2005	**Sampled By:**	Client
Date Tested:	1/4/2006	**Tested By:**	C. Smith

Report of Triaxial Shear Test - Consolidated Undrained

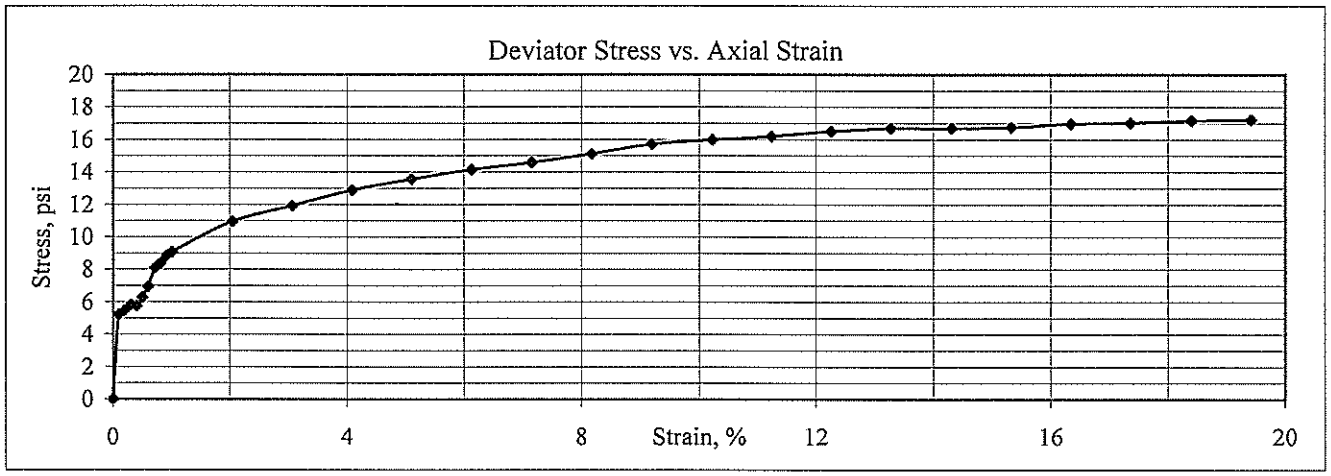
Test Method: ASTM D4767

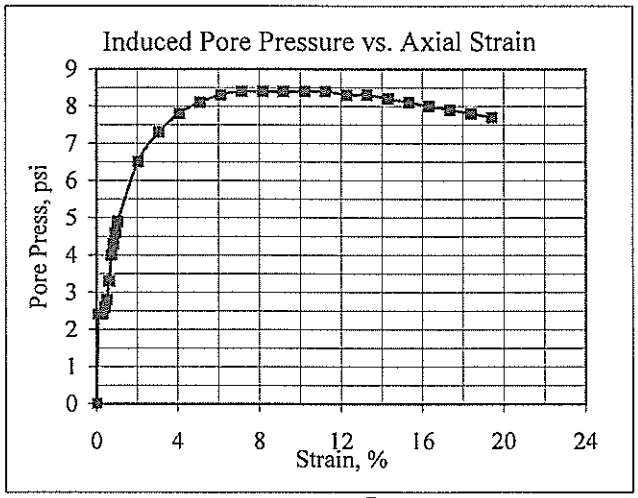
Specimen Properties	Dry Density, pcf	Void Ratio	% moist.	% Saturation	Height, in.	Diam., in.	X-Sect Area in.2
Initial	64.96	1.41	57.23	101.70	6.225	2.843	6.349
After Consolidation	67.82	1.31	49.96	95.69	6.092	2.813	6.213

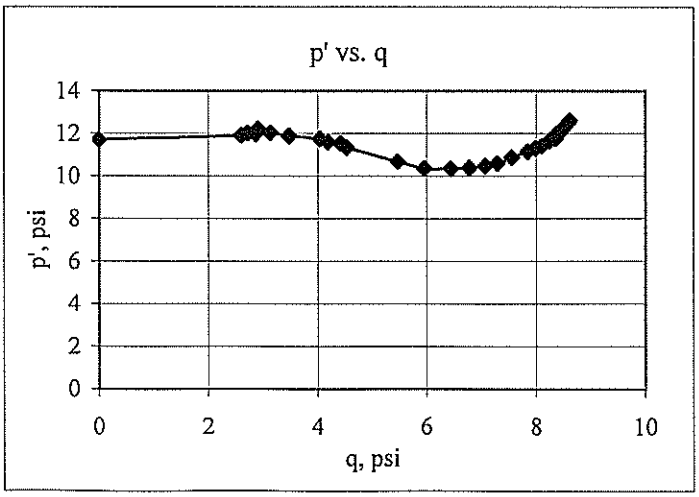
Consolidation	Total Back Pressure, psi	Pore Press. B after Sat.	Eff. Consol. Stress, psi	t50, min
	33.5	1.00	11.7	7

Specific Gravity:	2.51
Strain Rate, %/min:	0.05

At Failure	Deviator Stress, psi:	16.7	Axial Strain, %:	15.0







Reviewed by: _____

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Phone: 845-496-1600 Fax: 845-496-1398
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Phone/Fax: 413-232-8566

Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Item:	101305-1315	**Project #:**	50584
Source:	PDGEO 13, 49'-51'	**Lab #:**	05-0919
Date Sampled:	10/13/2005	**Sampled By:**	Client
Date Tested:	11/4/2005	**Tested By:**	C. Smith

Report of Triaxial Shear Test - Consolidated Undrained

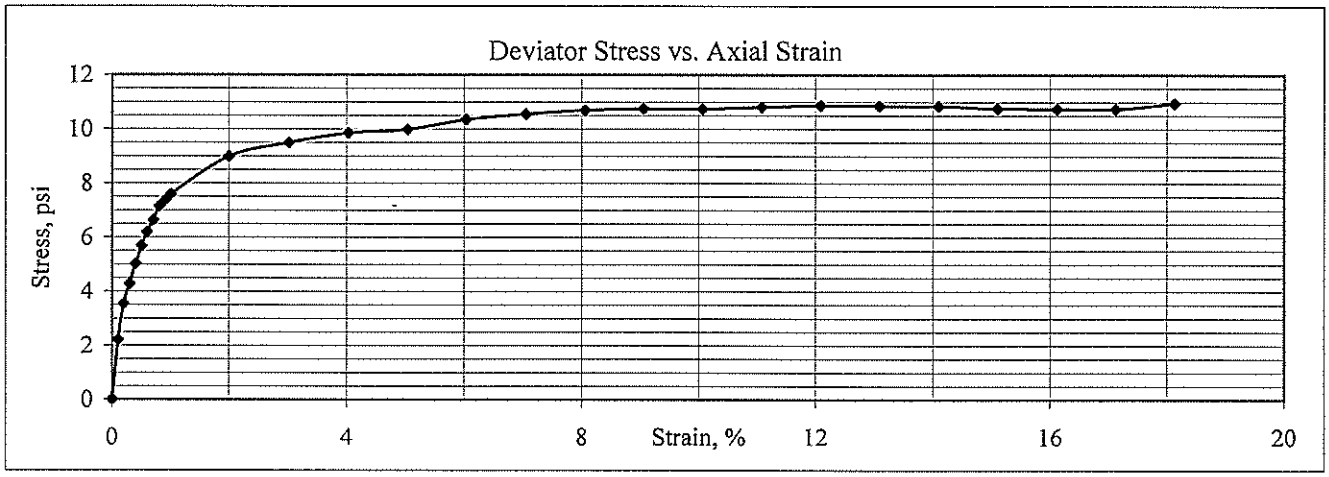
Test Method: ASTM D4767

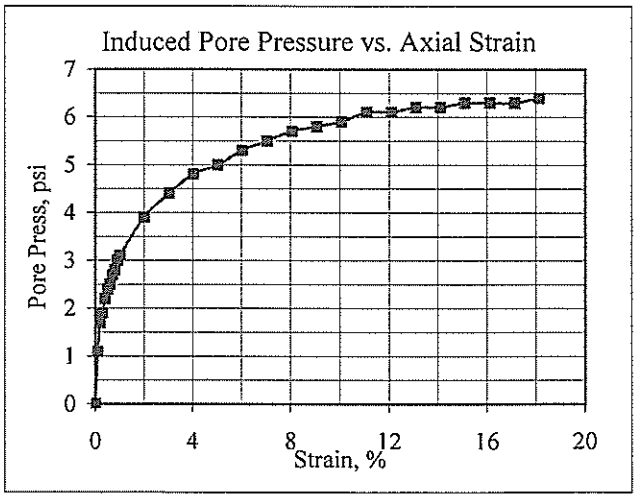
Specimen Properties	Dry Density, pcf	Void Ratio	% moist.	% Saturation	Height, in.	Diam., in.	X-Sect Area in.2
Initial	66.52	1.36	58.53	108.37	6.723	2.858	6.417
After Consolidation	67.50	1.32	53.68	101.97	6.674	2.848	6.370

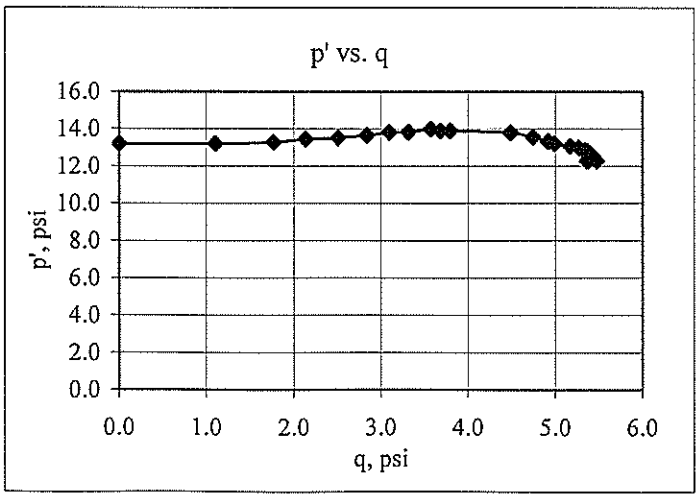
Consolidation	Total Back Pressure, psi	Pore Press. B after Sat.	Eff. Consol. Stress, psi	t50, min
	38.5	0.96	13	3.1

Specific Gravity:	2.51
Strain Rate, %/min:	0.05

At Failure	Deviator Stress, psi:	10.7	Axial Strain, %:	8.0







Note: Silty, some fine shell fragment layers.

Reviewed by: _____

Advance Testing

3348 Route 208, Campbell Hall, NY 10916
Phone: 845-496-1600 Fax: 845-496-1398
42 Day Farm Road, West Stockbridge, MA 01266
Phone/Fax: 413-232-8566

Client:	ENSR Remediation and Const	**Project:**	BP Hastings-on-Hudson
Item:	101405-0840	**Project #:**	50584
Source:	PDGEO 13, 58'-60'	**Lab #:**	05-0920
Date Sampled:	10/14/2005	**Sampled By:**	Client
Date Tested:	11/15/2005	**Tested By:**	C. Smith

Report of Triaxial Shear Test - Consolidated Undrained

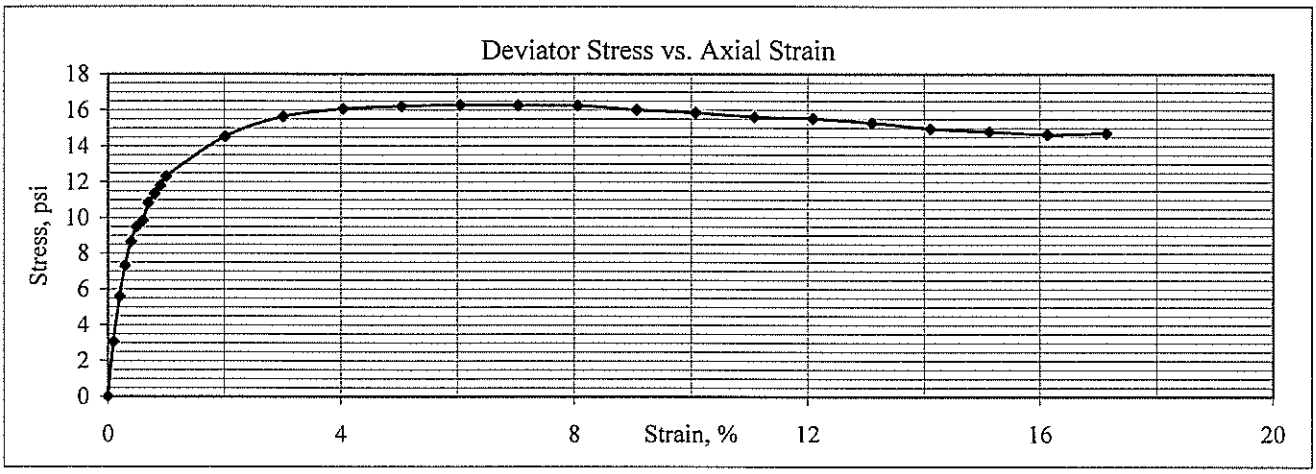
Test Method: ASTM D4767

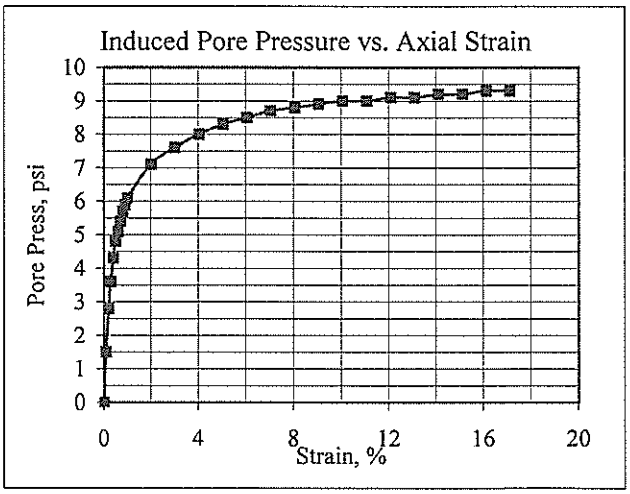
Specimen Properties	Dry Density, pcf	Void Ratio	% moist.	% Saturation	Height, in.	Diam., in.	X-Sect Area in.2
Initial	69.65	1.25	51.40	103.24	6.492	2.843	6.350
After Consolidation	70.76	1.21	48.48	100.20	6.441	2.832	6.300

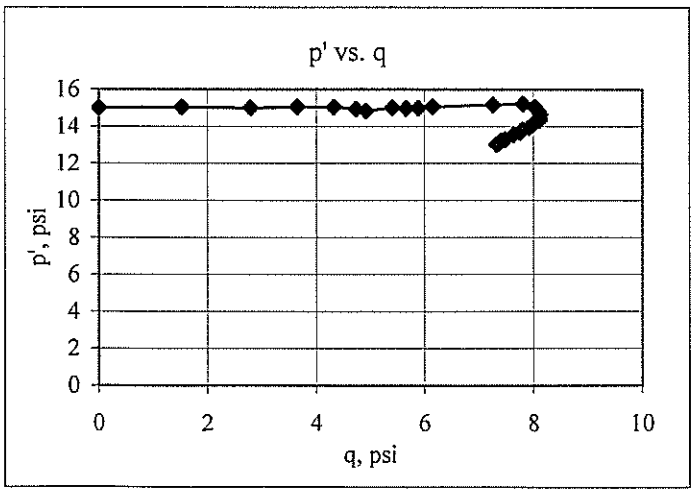
Consolidation	Total Back Pressure, psi	Pore Press. B after Sat.	Eff. Consol. Stress, psi	t50, min
	46.0	0.93	15.0	2

Specific Gravity:	2.51
Strain Rate, %/min:	0.05

At Failure	Deviator Stress, psi:	16.3	Axial Strain, %:	6.0







NOTES: Sample contained many layers of shell fragments and shells, some sand.

Reviewed by: _____

Advance Testing
3348 Route 208, Campbell Hall, NY 10916
Phone: 845-496-1600 Fax: 845-496-1398
42 Day Farm Road, West Stockbridge, MA 01266
Phone/Fax: 413-232-8566

Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Item:	093005-1100	**Project #:**	050584
Source:	PDGEO-16, U-1, 38-40'	**Lab #:**	05-0860
Date Sampled:	9/30/2005	**Sampled By:**	Client
Date Tested:	10/14/2005	**Tested By:**	C Smith

Report of Triaxial Shear Test - Consolidated Undrained

Test Method: ASTM D4767

Insufficient quantity of intact sample was available. Test was not performed.

Reviewed by: _____

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Phone/Fax: 413-232-8566

Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Item:	100505-1345	**Project #:**	50584
Source:	PDGEO 17, 42'-44'	**Lab #:**	05-0922
Date Sampled:	10/5/2005	**Sampled By:**	Client
Date Tested:	11/7/2005	**Tested By:**	C. Smith

Report of Triaxial Shear Test - Consolidated Undrained

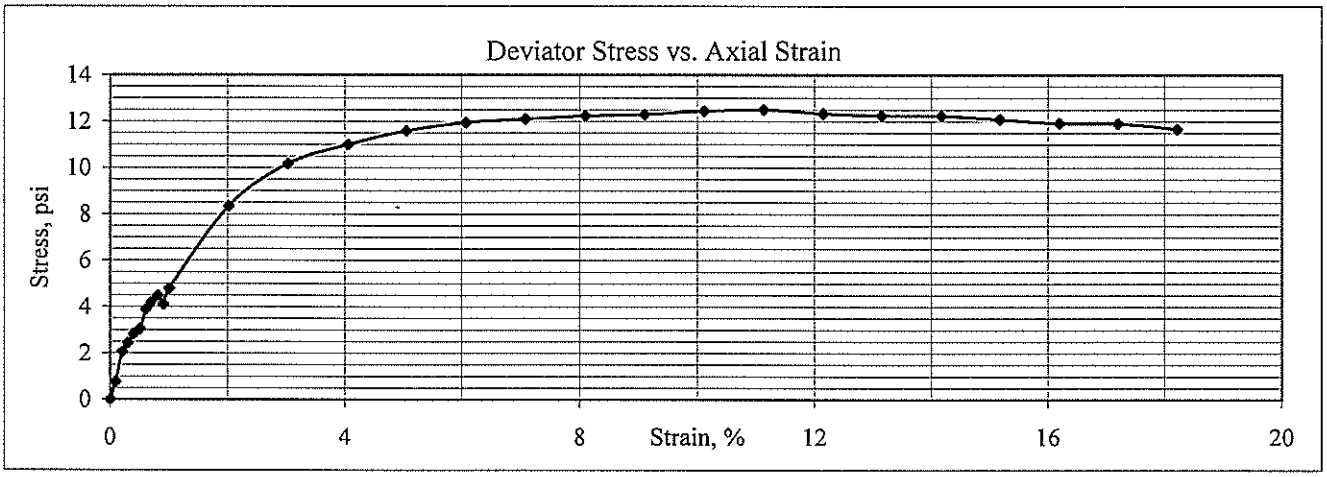
Test Method: ASTM D4767

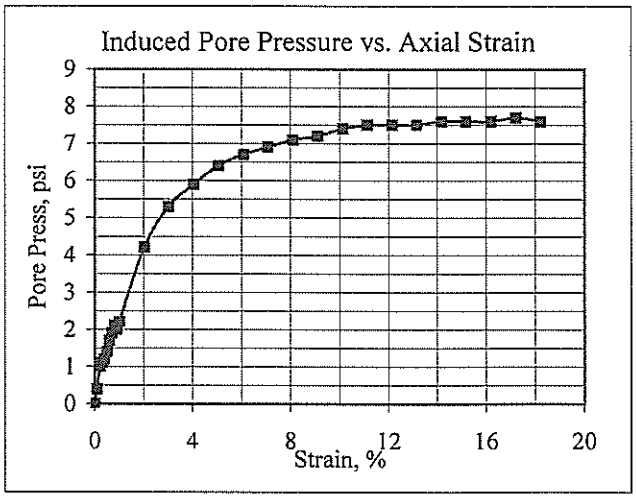
Specimen Properties	Dry Density, pcf	Void Ratio	% moist.	% Saturation	Height, in.	Diam., in.	X-Sect Area in.2
Initial	63.72	1.46	65.51	112.67	6.347	2.822	6.253
After Consolidation	65.27	1.40	63.07	113.01	6.271	2.805	6.178

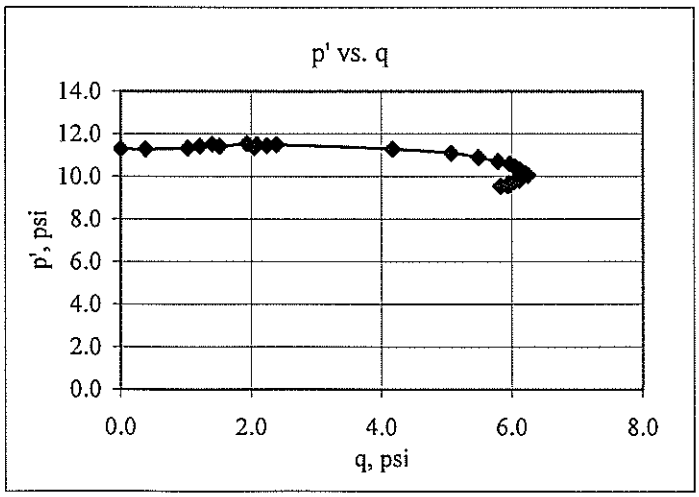
Consolidation	Total Back Pressure, psi	Pore Press. B after Sat.	Eff. Consol. Stress, psi	t50, min
	32.2	0.91	11.3	1

Specific Gravity:	2.51
Strain Rate, %/min:	0.05

At Failure	Deviator Stress, psi:	12.5	Axial Strain, %:	11.1







Reviewed by: _____

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Phone/Fax: 413-232-8566

Client:	ENSR Remediation and Const	**Project:**	BP Hastings-on-Hudson
Item:	100505-1430	**Project #:**	50584
Source:	PDGEO 17, 48'-50'	**Lab #:**	05-0923
Date Sampled:	10/5/2005	**Sampled By:**	Client
Date Tested:	11/4/2005	**Tested By:**	C. Smith

Report of Triaxial Shear Test - Consolidated Undrained

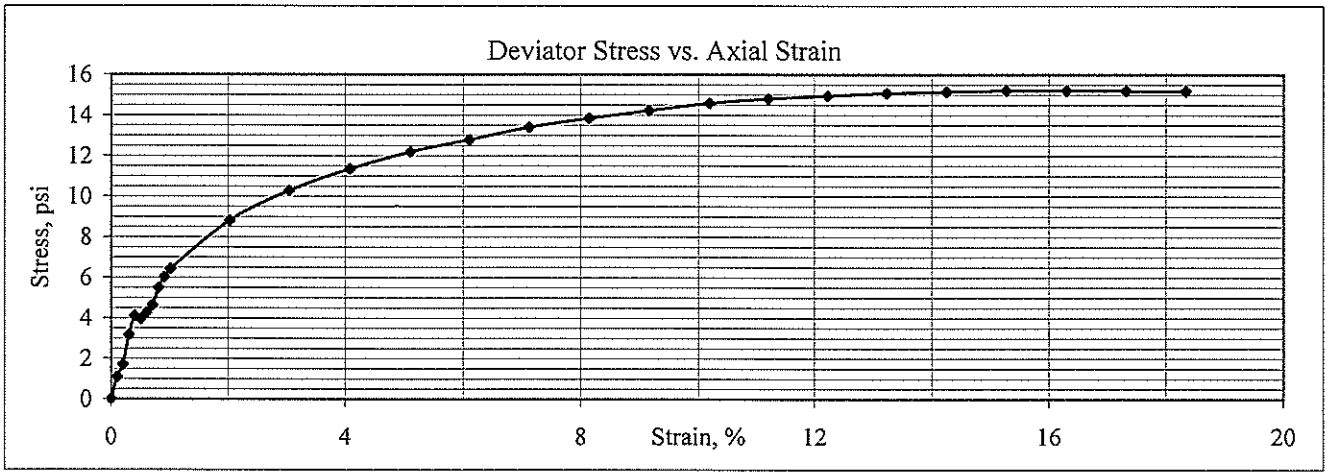
Test Method: ASTM D4767

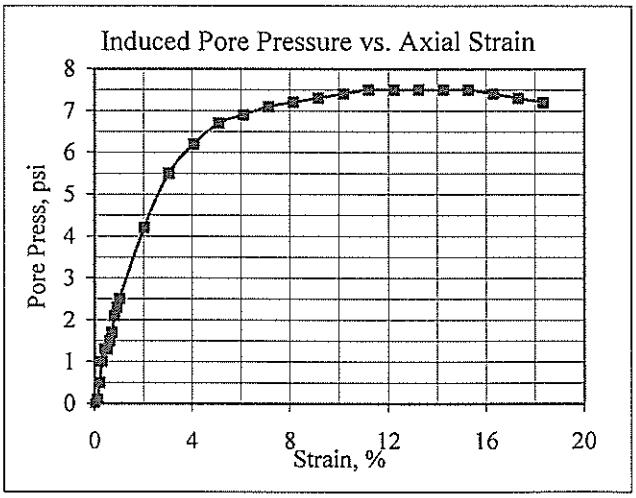
Specimen Properties	Dry Density, pcf	Void Ratio	% moist.	% Saturation	Height, in.	Diam., in.	X-Sect Area in.2
Initial	72.16	1.17	46.14	98.86	6.016	2.805	6.180
After Consolidation	74.85	1.09	44.3	101.59	5.907	2.779	6.068

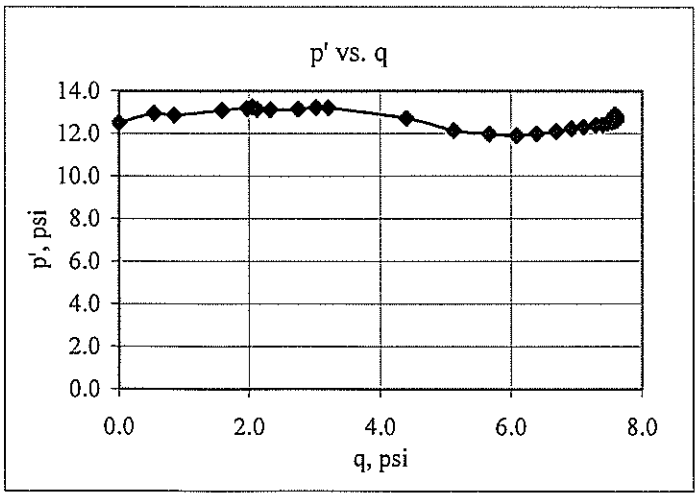
Consolidation	Total Back Pressure, psi	Pore Press. B after Sat.	Eff. Consol. Stress, psi	t50, min
	36.2	0.96	13	4

Specific Gravity:	2.51
Strain Rate, %/min:	0.05

At Failure	Deviator Stress, psi:	15.1	Axial Strain, %:	14.0







Note: Trace small shell fragments.

Reviewed by: _____

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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Item:	40'-42'	**Project #:**	50584
Source:	PDGEO 19, 101905-1115	**Lab #:**	05-1005
Date Sampled:	10/19/2005	**Sampled By:**	Client
Date Tested:	12/10/2005	**Tested By:**	C. Smith

Report of Triaxial Shear Test - Consolidated Undrained

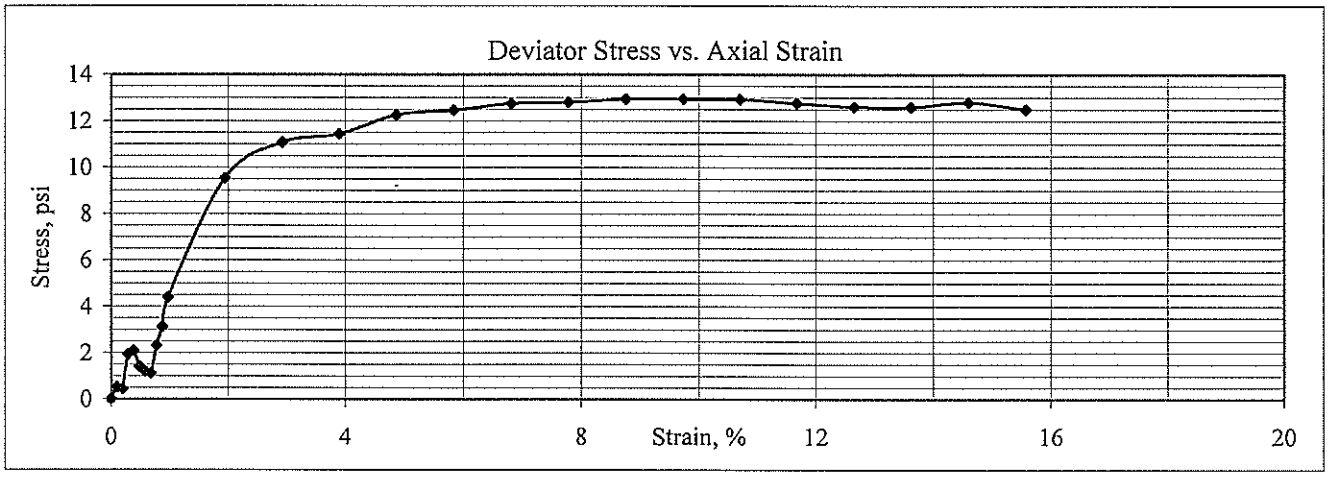
Test Method: ASTM D4767

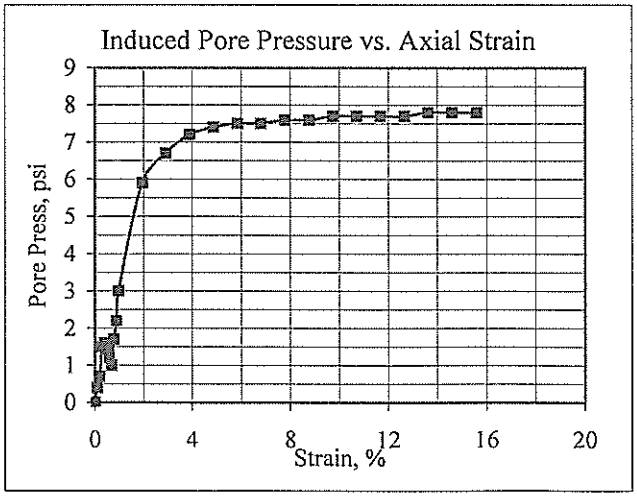
Specimen Properties	Dry Density, pcf	Void Ratio	% moist.	% Saturation	Height, in.	Diam., in.	X-Sect Area in.2
Initial	67.25	1.33	56.81	107.21	6.212	2.844	6.353
After Consolidation	68.33	1.29	52.80	102.47	6.163	2.833	6.303

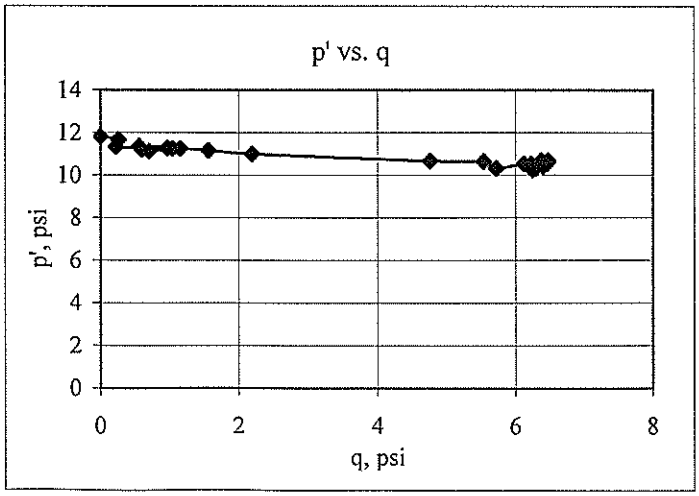
Consolidation	Total Back Pressure, psi	Pore Press. B after Sat.	Eff. Consol. Stress, psi	t50, min
	31.2	0.97	11.8	2

Specific Gravity:	2.51
Strain Rate, %/min:	0.05

At Failure	Deviator Stress, psi:	12.9	Axial Strain, %:	8.8







Reviewed by: _____

Notes: Contained some layers of small shells. Sample sheared during failure.

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Phone/Fax: 413-232-8566

Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Item:	28'-30'	**Project #:**	50584
Source:	PDGEO 21, 103105-1345	**Lab #:**	05-1153
Date Sampled:	10/31/2006	**Sampled By:**	Client
Date Tested:	1/20/2006	**Tested By:**	C. Smith

Report of Triaxial Shear Test - Consolidated Undrained

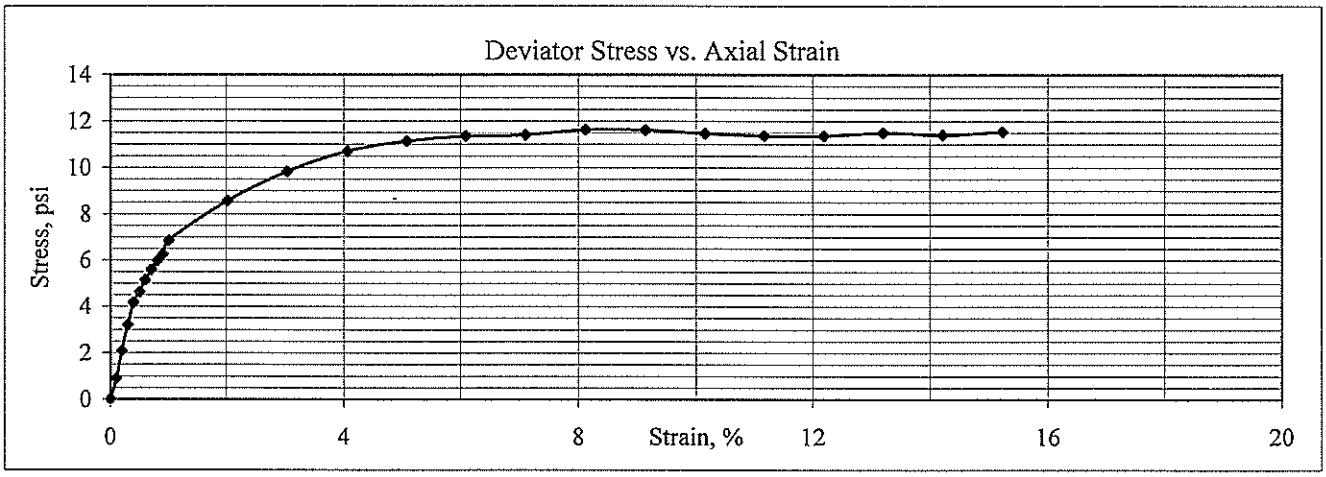
Test Method: ASTM D4767

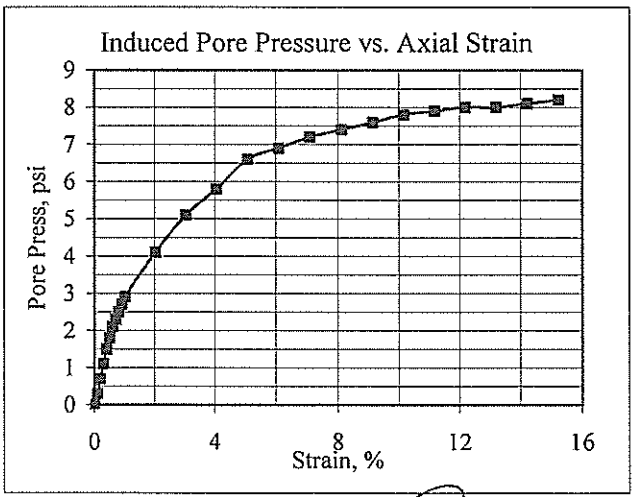
Specimen Properties	Dry Density, pcf	Void Ratio	% moist.	% Saturation	Height, in.	Diam., in.	X-Sect Area in.2
Initial	57.16	1.74	68.26	98.39	6.484	2.854	6.398
After Consolidation	58.97	1.66	62.95	95.34	6.384	2.832	6.299

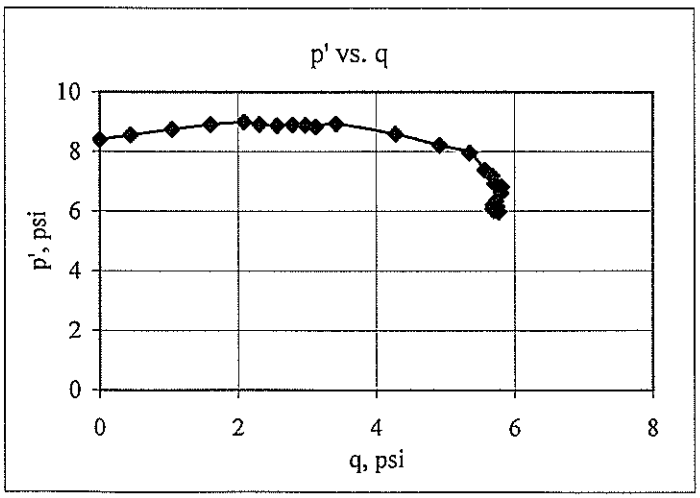
Consolidation	Total Back Pressure, psi	Pore Press. B after Sat.	Eff. Consol. Stress, psi	t50, min
	16.8	0.95	8.4	4

Specific Gravity:	2.51
Strain Rate, %/min:	0.05

At Failure	Deviator Stress, psi:	11.4	Axial Strain, %:	6.1







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Phone/Fax: 413-232-8566

Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Item:	34'-36'	**Project #:**	50584
Source:	PDGEO 21, 110205-1540	**Lab #:**	05-1161
Date Sampled:	11/2/2005	**Sampled By:**	Client
Date Tested:	1/17/2006	**Tested By:**	C. Smith

Report of Triaxial Shear Test - Consolidated Undrained

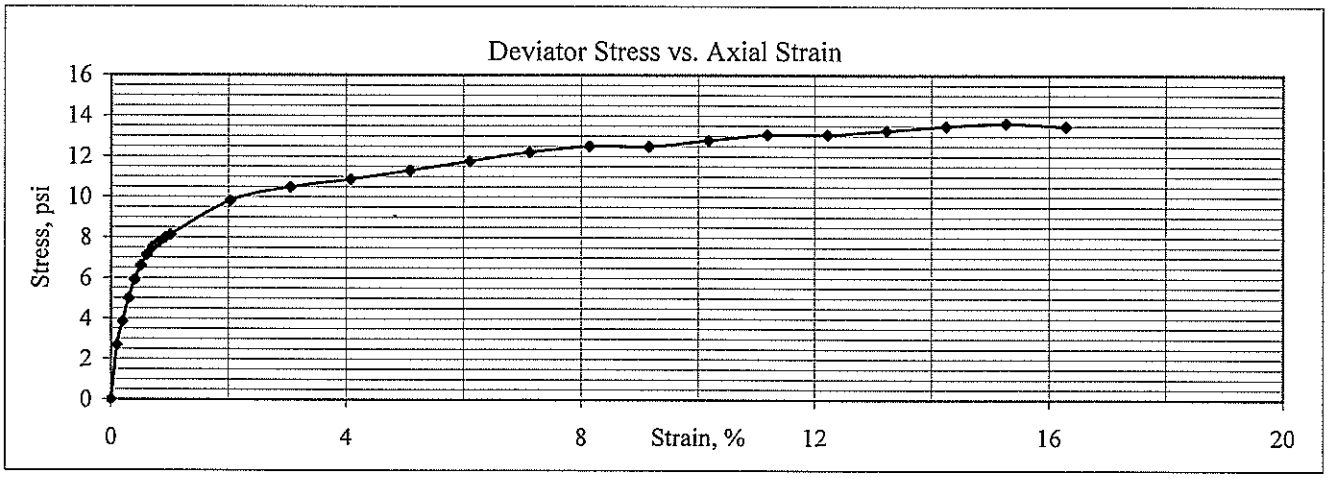
Test Method: ASTM D4767

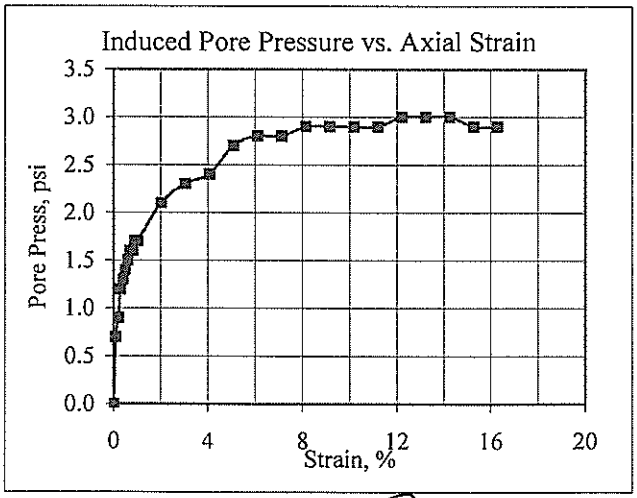
Specimen Properties	Dry Density, pcf	Void Ratio	% moist.	% Saturation	Height, in.	Diam., in.	X-Sect Area in.2
Initial	64.25	1.44	60.50	105.52	6.123	2.817	6.231
After Consolidation	66.58	1.35	54.77	101.56	6.015	2.792	6.121

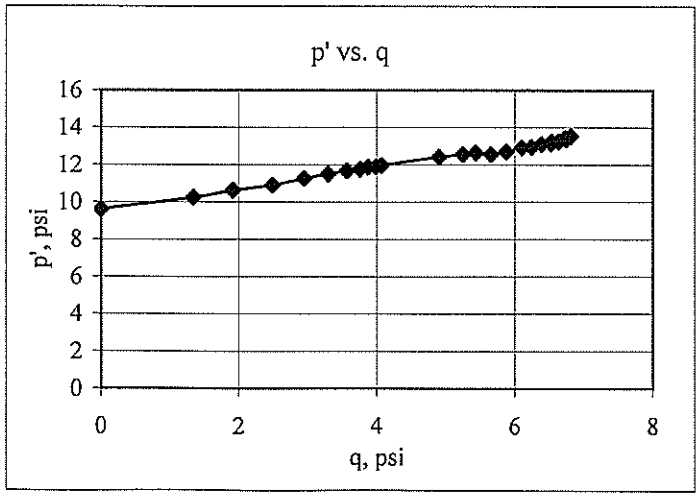
Consolidation	Total Back Pressure, psi	Pore Press. B after Sat.	Eff. Consol. Stress, psi	t50, min
	19.6	0.98	9.6	3.5

Specific Gravity:	2.51
Strain Rate, %/min:	0.05

At Failure	Deviator Stress, psi:	13.6	Axial Strain, %:	15.0







Reviewed by: _____

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Phone: 845-496-1600 Fax: 845-496-1398
42 Day Farm Road, West Stockbridge, MA 01266
Phone/Fax: 413-232-8566

Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Item:	42'-44'	**Project #:**	50584
Source:	PDGEO 21, 110205-1430	**Lab #:**	05-1163
Date Sampled:	11/2/2005	**Sampled By:**	Client
Date Tested:	1/19/2006	**Tested By:**	C. Smith

Report of Triaxial Shear Test - Consolidated Undrained

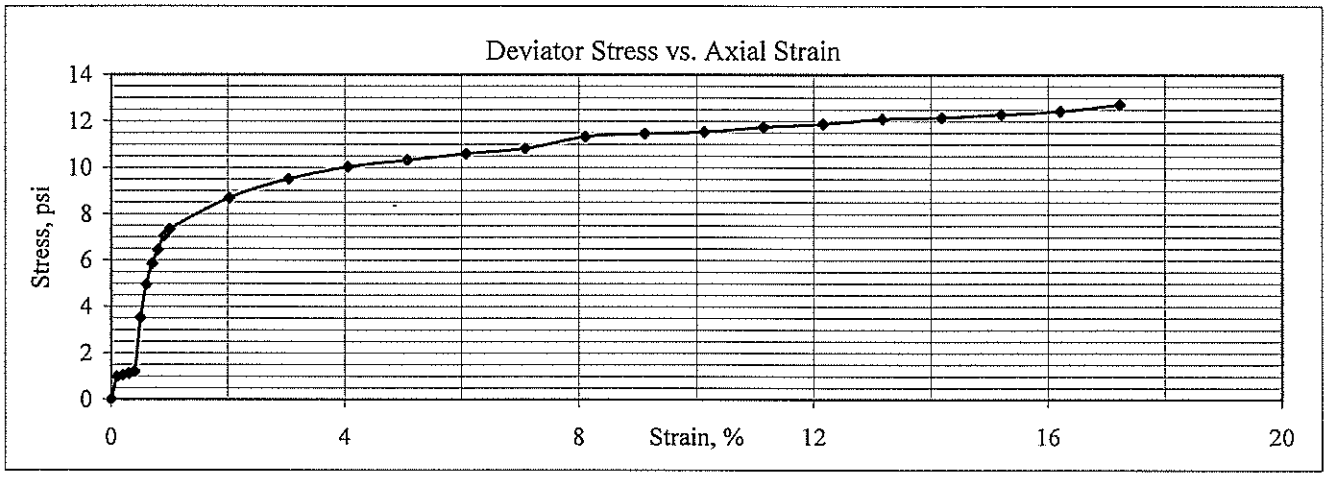
Test Method: ASTM D4767

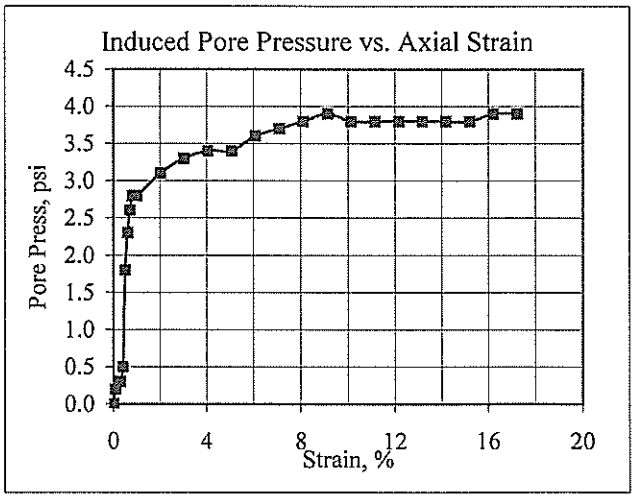
Specimen Properties	Dry Density, pcf	Void Ratio	% moist.	% Saturation	Height, in.	Diam., in.	X-Sect Area in.2
Initial	72.45	1.16	48.08	103.77	6.536	2.842	6.344
After Consolidation	74.41	1.11	41.87	95.03	6.449	2.823	6.259

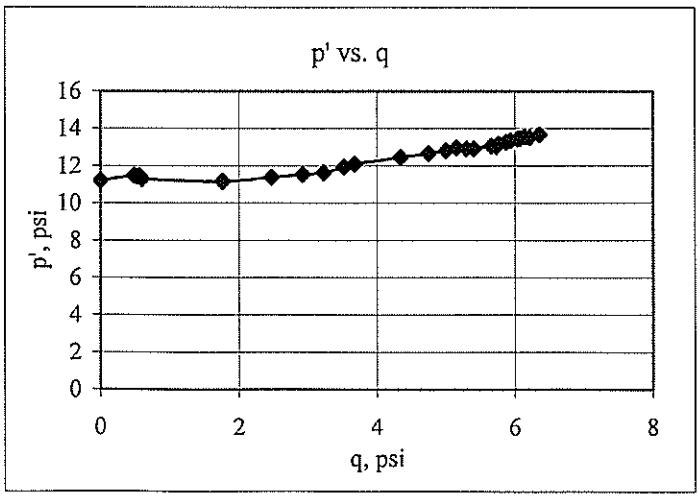
Consolidation	Total Back Pressure, psi	Pore Press. B after Sat.	Eff. Consol. Stress, psi	t50, min
	27.3	0.98	11.2	4

Specific Gravity:	2.51
Strain Rate, %/min:	0.05

At Failure	Deviator Stress, psi:	12.2	Axial Strain, %:	15.0







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Phone/Fax: 413-232-8566

Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Item:	61'-63'	**Project #:**	050584
Source:	PDGEO 21, 110305-1015	**Lab #:**	05-1165
Date Sampled:	11/3/2005	**Sampled By:**	Client
Date Tested:	1/16/2006	**Tested By:**	C. Smith

Report of Triaxial Shear Test - Consolidated Undrained

Test Method: ASTM D4767

A test sample could not be recovered.

The soil was in a very wet, soft condition, and had a somewhat granular texture.

The sample deformed as it was extracted from the sampling tube.

Reviewed by: _____

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Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Item:	34'-36'	**Project #:**	50584
Source:	PDGEO 22, 102705-1110	**Lab #:**	05-1016
Date Sampled:	10/24/2005	**Sampled By:**	Client
Date Tested:	12/23/2005	**Tested By:**	B. Jobity

Report of Triaxial Shear Test - Consolidated Undrained

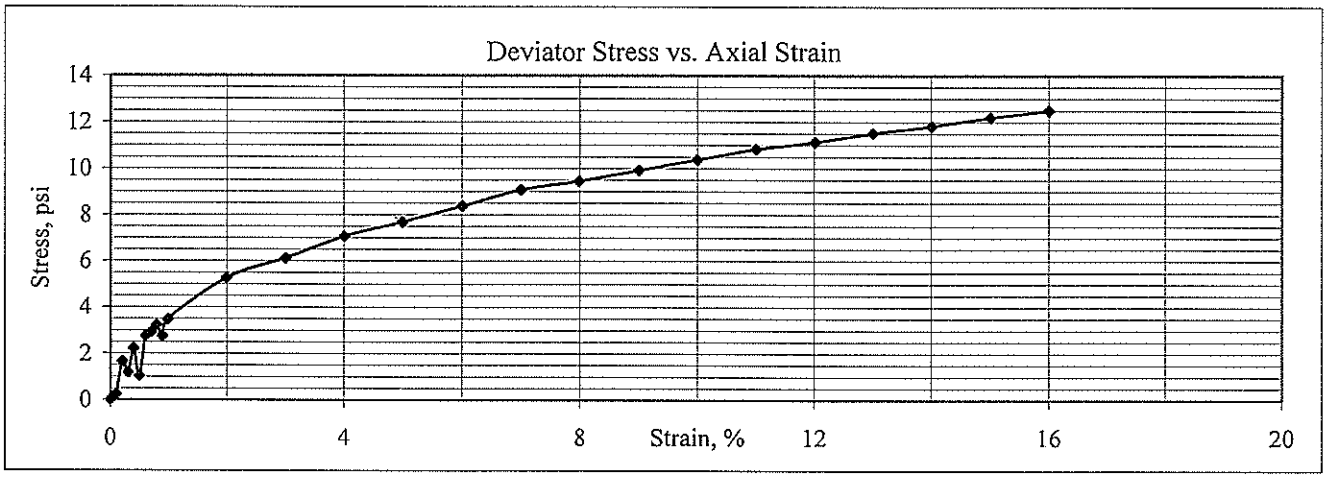
Test Method: ASTM D4767

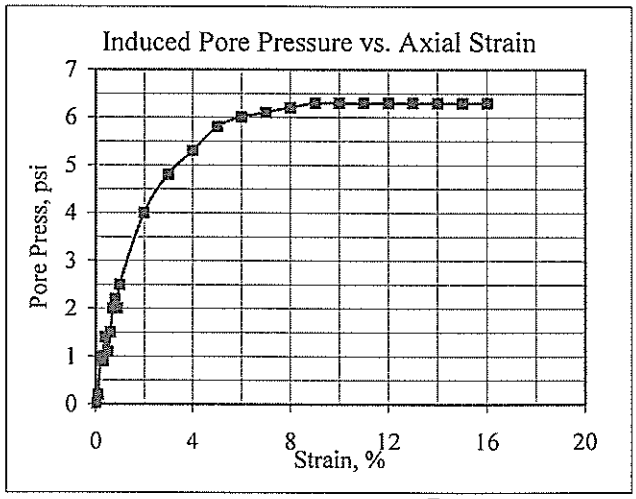
Specimen Properties	Dry Density, pcf	Void Ratio	% moist.	% Saturation	Height, in.	Diam., in.	X-Sect Area in.2
Initial	65.36	1.40	60.92	109.42	6.265	2.757	5.968
After Consolidation	65.49	1.39	54.67	98.52	6.259	2.755	5.963

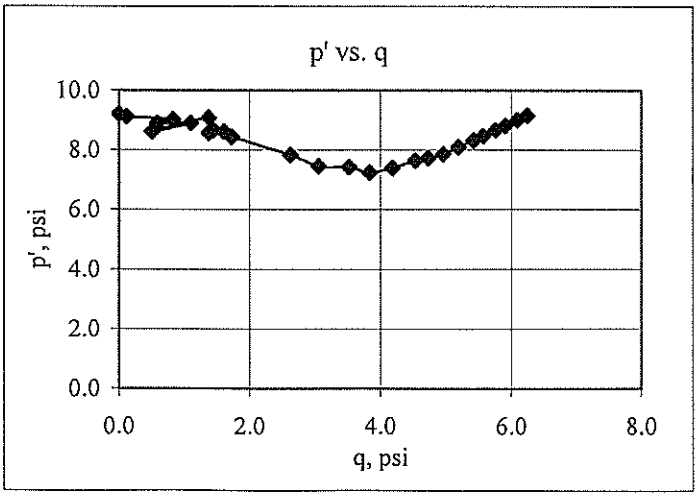
Consolidation	Total Back Pressure, psi	Pore Press. B after Sat.	Eff. Consol. Stress, psi	t50, min
	25.0	0.95	9.2	10

Specific Gravity:	2.51
Strain Rate, %/min:	0.05

At Failure	Deviator Stress, psi:	12.2	Axial Strain, %:	15.0







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Phone/Fax: 413-232-8566

Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Item:	24'-26'	**Project #:**	50584
Source:	PDGEO 23, 102405-1540	**Lab #:**	05-1014
Date Sampled:	10/24/2005	**Sampled By:**	Client
Date Tested:	12/16/2005	**Tested By:**	C. Smith

Report of Triaxial Shear Test - Consolidated Undrained

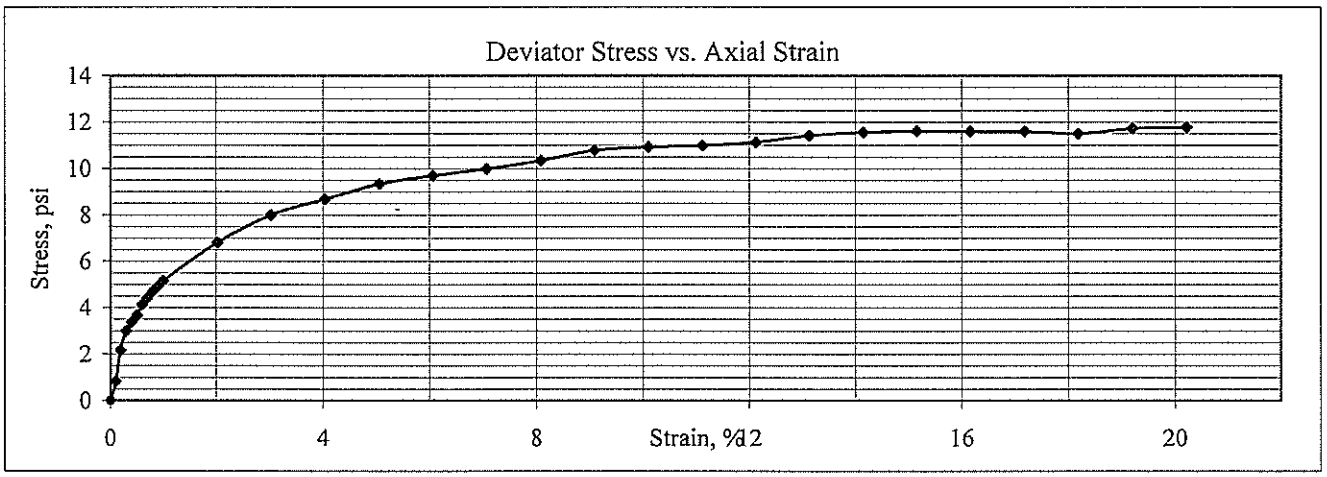
Test Method: ASTM D4767

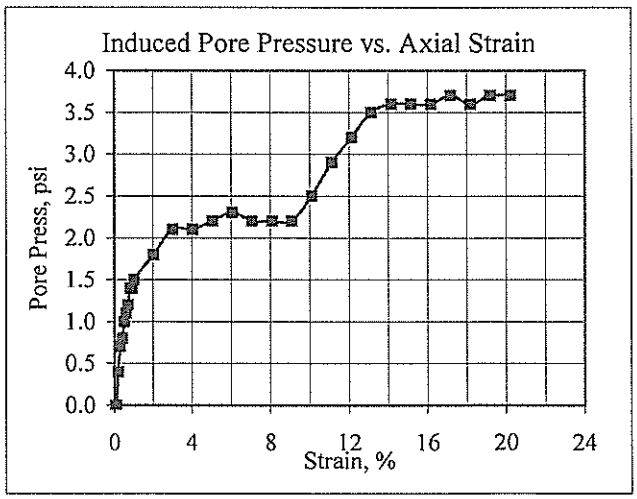
Specimen Properties	Dry Density, pcf	Void Ratio	% moist.	% Saturation	Height, in.	Diam., in.	X-Sect Area in.2
Initial	64.22	1.44	64.21	111.92	6.734	2.839	6.330
After Consolidation	65.62	1.39	60.18	108.81	6.662	2.824	6.263

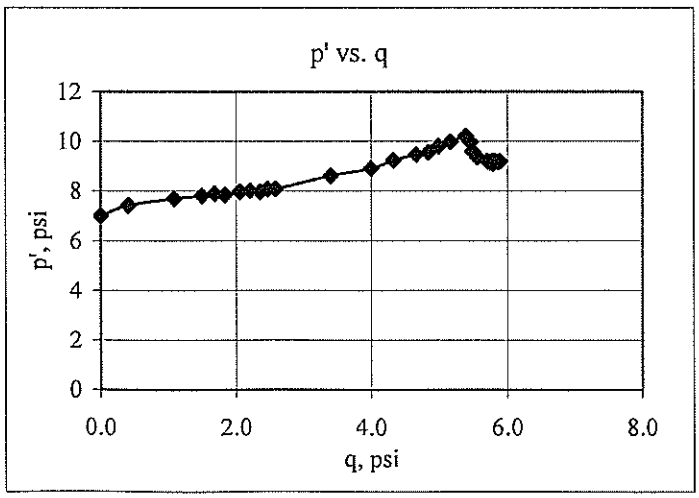
Consolidation	Total Back Pressure, psi	Pore Press. B after Sat.	Eff. Consol. Stress, psi	t50, min
	17.6	0.97	7.0	16

Specific Gravity:	2.51
Strain Rate, %/min:	0.05

At Failure	Deviator Stress, psi:	9.1	Axial Strain, %:	10.8







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Phone/Fax: 413-232-8566

Client:	ENSR Remediation and Const.	**Project:**	BP Hastings on Hudson
Item:	35'-37'	**Project #:**	50584
Source:	PDGEO 23, 102805-1020	**Lab #:**	05-1018
Date Sampled:	10/28/2005	**Sampled By:**	Client
Date Tested:	12/6/2005	**Tested By:**	C. Smith

Report of Triaxial Shear Test - Consolidated Undrained

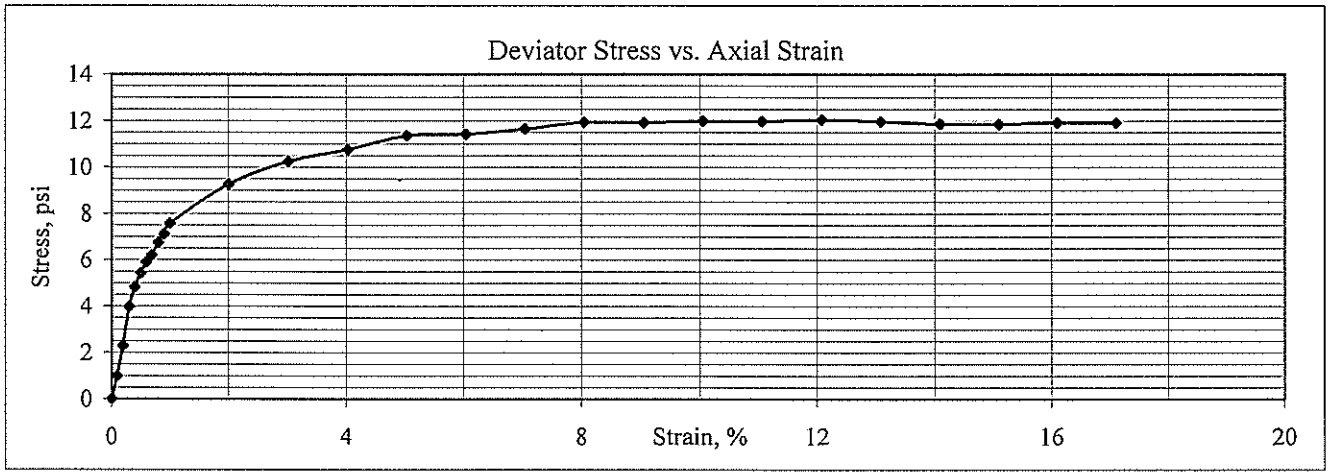
Test Method: ASTM D4767

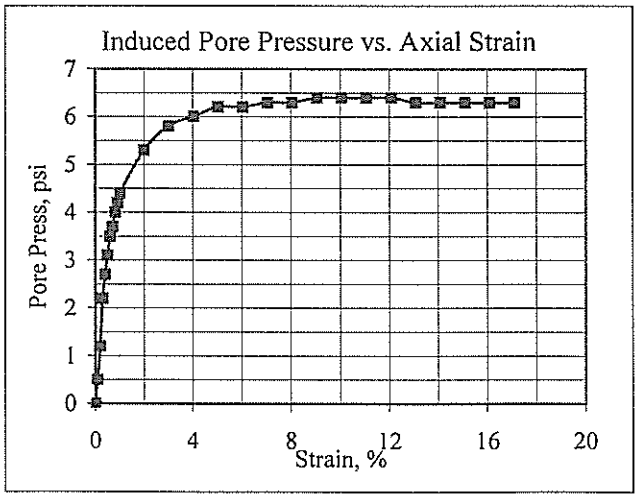
Specimen Properties	Dry Density, pcf	Void Ratio	% moist.	% Saturation	Height, in.	Diam., in.	X-Sect Area in.2
Initial	64.43	1.43	63.67	111.60	6.213	2.804	6.174
After Consolidation	65.25	1.40	57.99	103.86	6.174	2.795	6.136

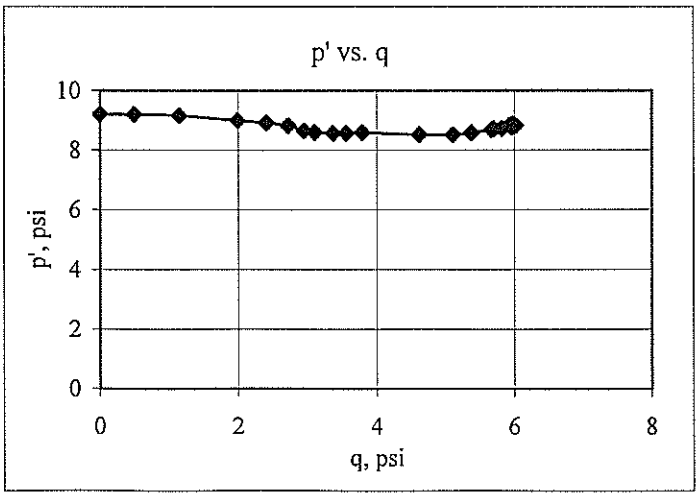
Consolidation	Total Back Pressure, psi	Pore Press. B after Sat.	Eff. Consol. Stress, psi	t50, min
	25.3	0.99	9.2	15

Specific Gravity:	2.51
Strain Rate, %/min:	0.05

At Failure	Deviator Stress, psi:	11.4	Axial Strain, %:	5.0







Reviewed by: _____

Advance Testing
3348 Route 208, Campbell Hall, NY 10916
Phone: 845-496-1600 Fax: 845-496-1398
42 Day Farm Road, West Stockbridge, MA 01266
Phone/Fax: 413-232-8566

Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Item:	48'-50'	**Project #:**	50584
Source:	PDGEO 24A, 103105-1130	**Lab #:**	05-1157
Date Sampled:	10/31/2005	**Sampled By:**	Client
Date Tested:	1/21/2006	**Tested By:**	C. Smith

Report of Triaxial Shear Test - Consolidated Undrained

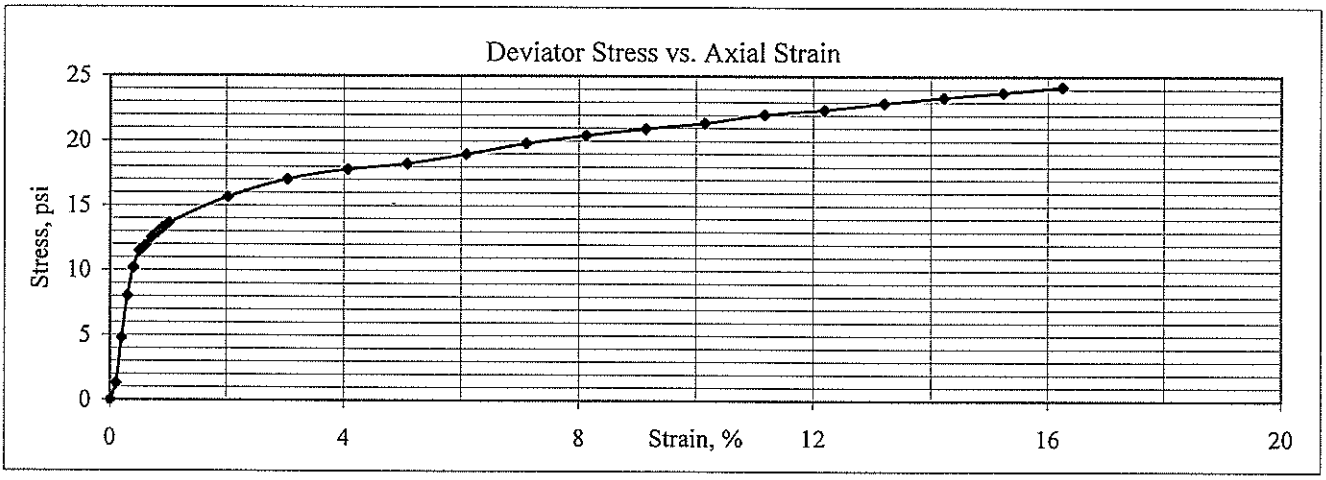
Test Method: ASTM D4767

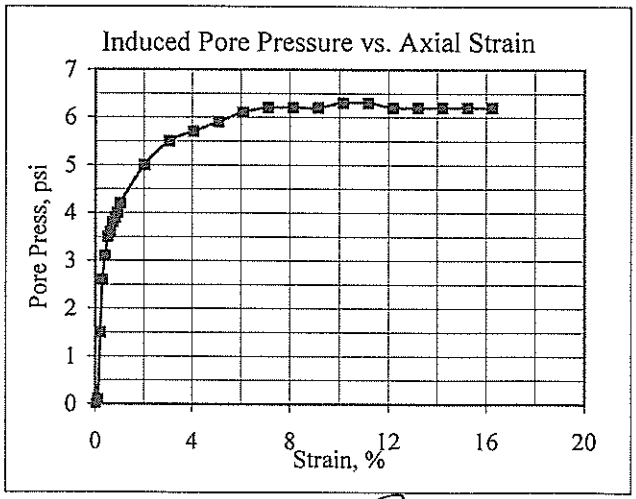
Specimen Properties	Dry Density, pcf	Void Ratio	% moist.	% Saturation	Height, in.	Diam., in.	X-Sect Area in.2
Initial	74.71	1.10	47.56	108.78	6.369	2.807	6.186
After Consolidation	77.09	1.03	38.35	93.21	6.270	2.785	6.090

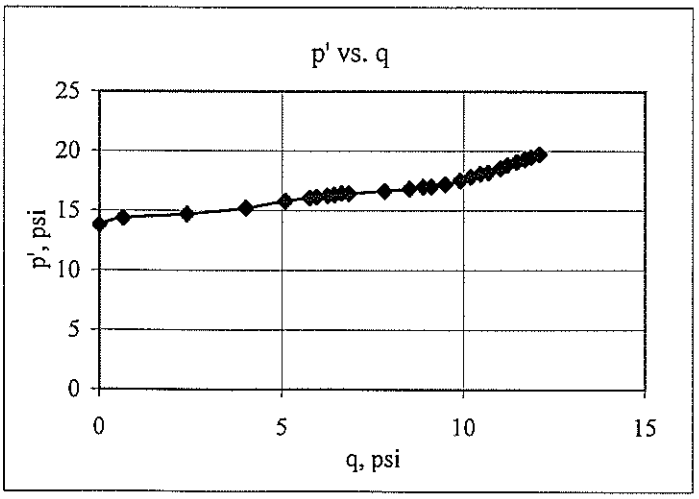
Consolidation	Total Back Pressure, psi	Pore Press. B after Sat.	Eff. Consol. Stress, psi	t50, min
	37.3	0.97	13.8	1

Specific Gravity:	2.51
Strain Rate, %/min:	0.05

At Failure	Deviator Stress, psi:	23.7	Axial Strain, %:	15.0







Reviewed by: _____

Advance Testing
3348 Route 208, Campbell Hall, NY 10916
Phone: 845-496-1600 Fax: 845-496-1398
42 Day Farm Road, West Stockbridge, MA 01266
Phone/Fax: 413-232-8566

Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Item:	71'-73'	**Project #:**	50584
Source:	PDGEO 24A, 110205-1015	**Lab #:**	05-1159
Date Sampled:	11/2/2005	**Sampled By:**	Client
Date Tested:	1/22/2006	**Tested By:**	C. Smith

Report of Triaxial Shear Test - Consolidated Undrained

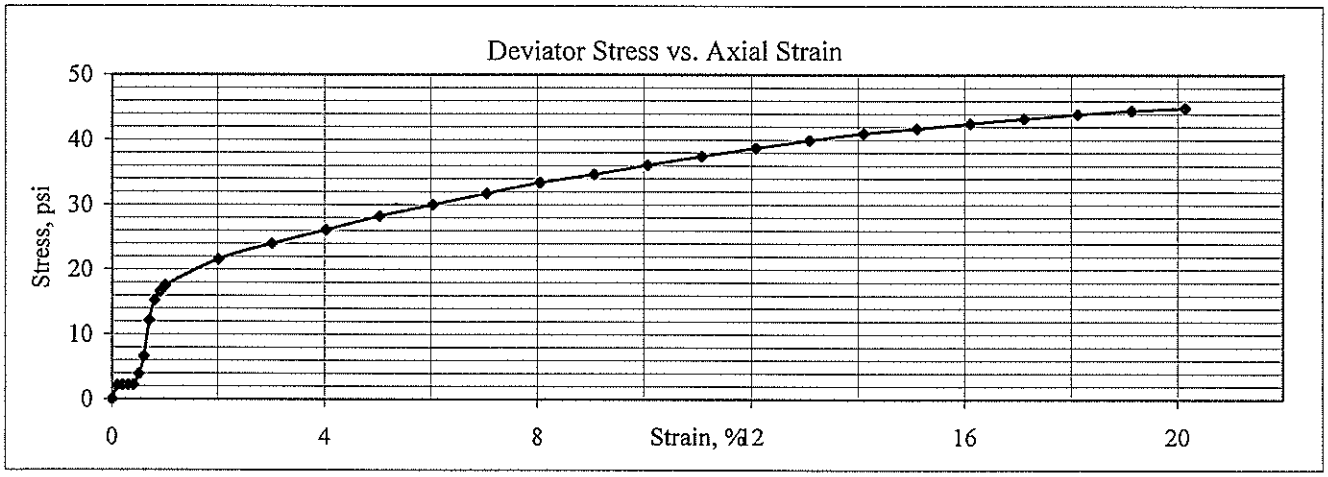
Test Method: ASTM D4767

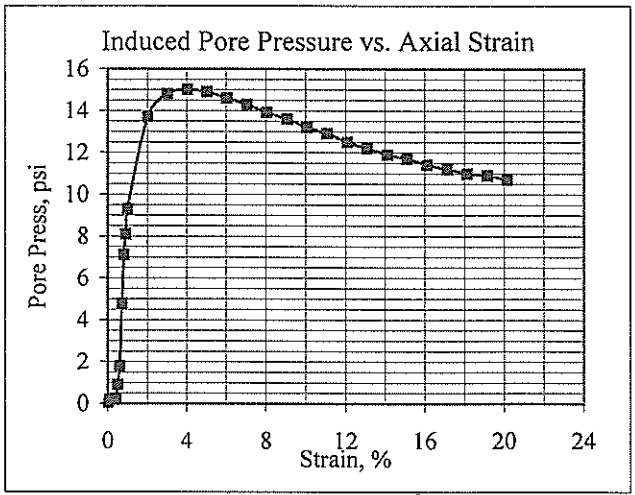
Specimen Properties	Dry Density, pcf	Void Ratio	% moist.	% Saturation	Height, in.	Diam., in.	X-Sect Area in.2
Initial	97.95	0.60	27.82	116.43	6.572	2.802	6.166
After Consolidation	99.34	0.58	24.43	106.18	6.526	2.792	6.123

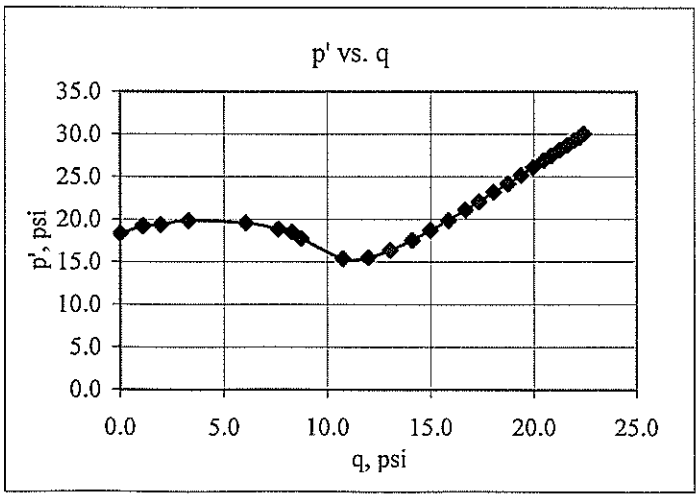
Consolidation	Total Back Pressure, psi	Pore Press. B after Sat.	Eff. Consol. Stress, psi	t50, min
	53.1	0.97	18.3	6

Specific Gravity:	2.51
Strain Rate, %/min:	0.05

At Failure	Deviator Stress, psi:	41.5	Axial Strain, %:	15.0







Reviewed by: _____

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3348 Route 208, Campbell Hall, NY 10916
Phone: 845-496-1600 Fax: 845-496-1398
42 Day Farm Road, West Stockbridge, MA 01266
Phone/Fax: 413-232-8566

Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Item:	74'-76'	**Project #:**	50584
Source:	PDGEO 24A, 110205-1045	**Lab #:**	05-1160
Date Sampled:	11/2/2005	**Sampled By:**	Client
Date Tested:	1/16/2006	**Tested By:**	C. Smith

Report of Triaxial Shear Test - Consolidated Undrained

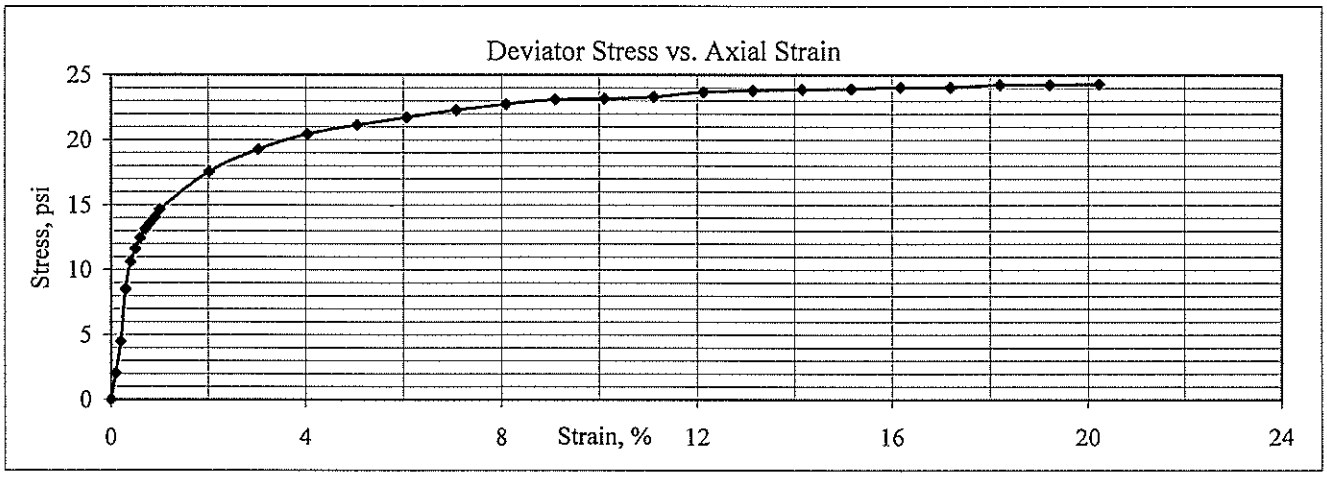
Test Method: ASTM D4767

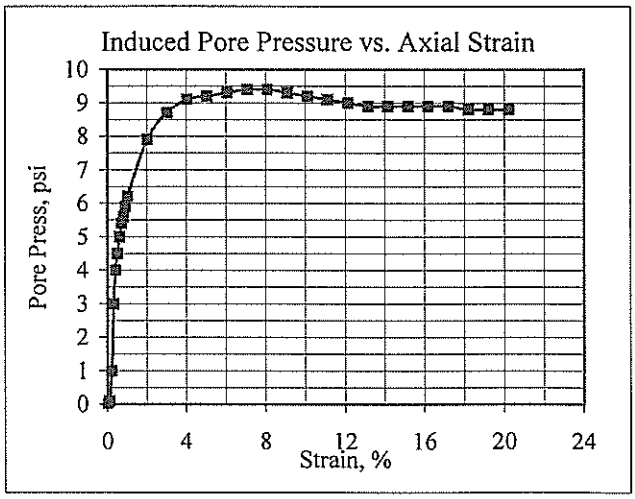
Specimen Properties	Dry Density, pcf	Void Ratio	% moist.	% Saturation	Height, in.	Diam., in.	X-Sect Area in.2
Initial	84.92	0.85	35.99	106.86	6.384	2.822	6.255
After Consolidation	86.84	0.80	31.81	99.25	6.313	2.806	6.186

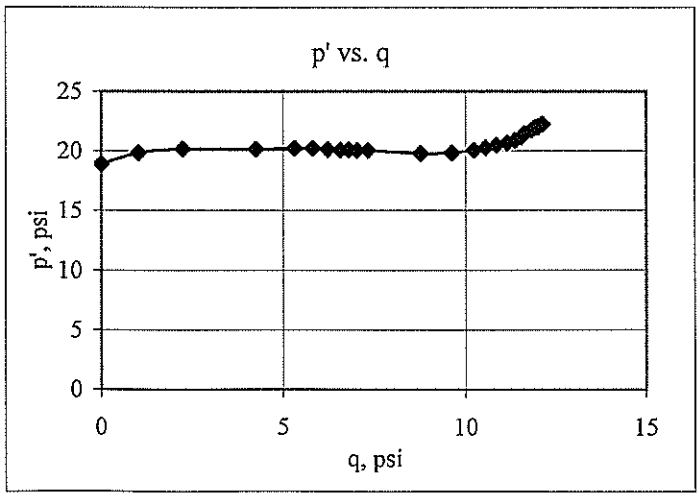
Consolidation	Total Back Pressure, psi	Pore Press. B after Sat.	Eff. Consol. Stress, psi	t50, min
	60.0	1.05	18.9	5

Specific Gravity:	2.51
Strain Rate, %/min:	0.05

At Failure	Deviator Stress, psi:	21.1	Axial Strain, %:	15.0







Reviewed by: _____

Note: Sample contained some shells and wood fragments.

Advance Testing

3348 Route 208, Campbell Hall, NY 10916
Phone: 845-496-1600 Fax: 845-496-1398
42 Day Farm Road, West Stockbridge, MA 01266
Phone/Fax: 413-232-8566

Client:	Ensr Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Item:	101005-1340	**Project #:**	50584
Source:	PDGEO 28, 41'-43'	**Lab #:**	05-0932
Date Sampled:	10/10/2005	**Sampled By:**	Client
Date Tested:	11/5/2005	**Tested By:**	C. Smith

Report of Triaxial Shear Test - Consolidated Undrained

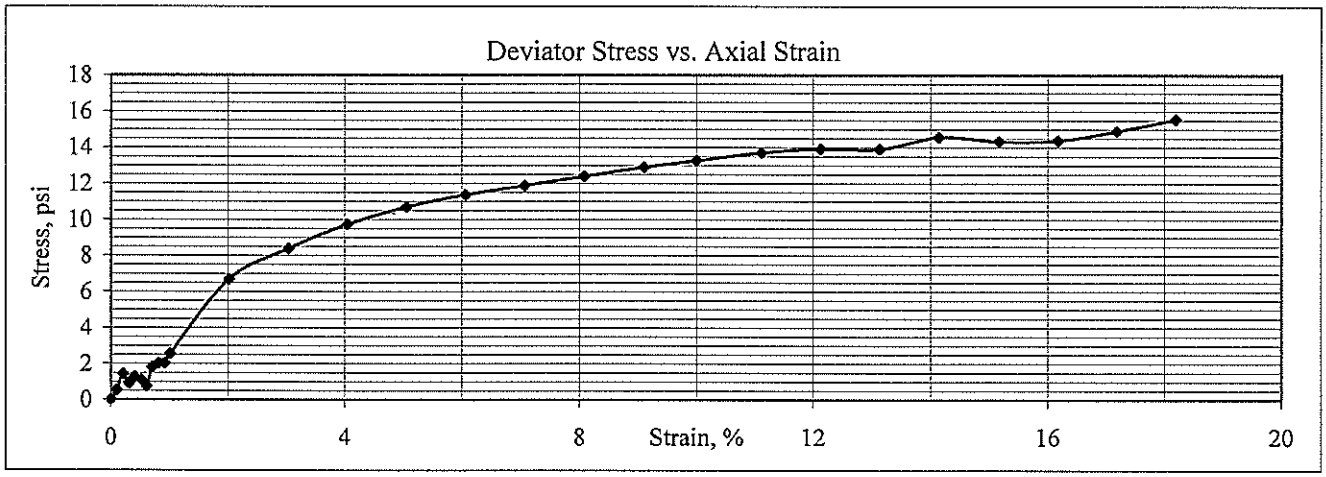
Test Method: ASTM D4767

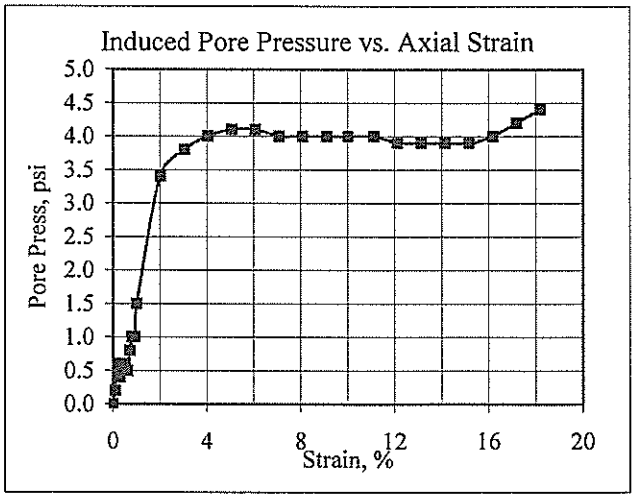
Specimen Properties	Dry Density, pcf	Void Ratio	% moist.	% Saturation	Height, in.	Diam., in.	X-Sect Area in.2
Initial	66.98	1.34	57.44	107.64	6.317	2.837	6.320
After Consolidation	68.43	1.29	52.23	101.62	6.250	2.822	6.253

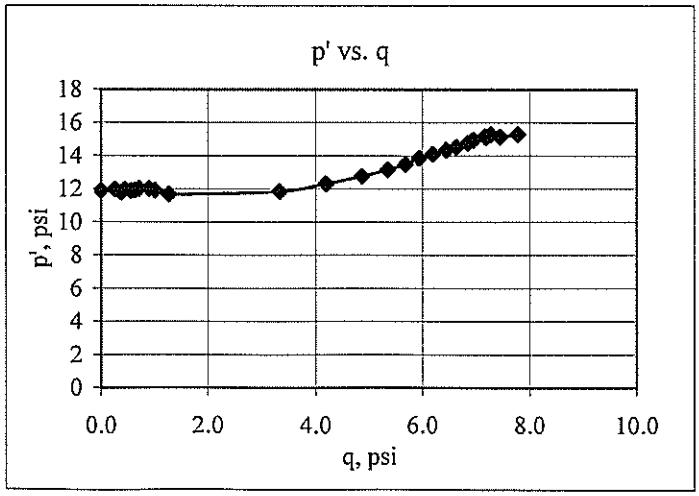
Consolidation	Total Back Pressure, psi	Pore Press. B after Sat.	Eff. Consol. Stress, psi	t50, min
	32.7	0.88	11.9	9

Specific Gravity:	2.51
Strain Rate, %/min:	0.05

At Failure	Deviator Stress, psi:	14.6	Axial Strain, %:	14.1







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3348 Route 208, Campbell Hall, NY 10916
Phone: 845-496-1600 Fax: 845-496-1398
42 Day Farm Road, West Stockbridge, MA 01266
Phone/Fax: 413-232-8566

Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Item:	101105-1020	**Project #:**	50584
Source:	PDGEO 28, 57'-59'	**Lab #:**	05-0917
Date Sampled:	10/11/2005	**Sampled By:**	Client
Date Tested:	11/7/2005	**Tested By:**	C. Smith

Report of Triaxial Shear Test - Consolidated Undrained

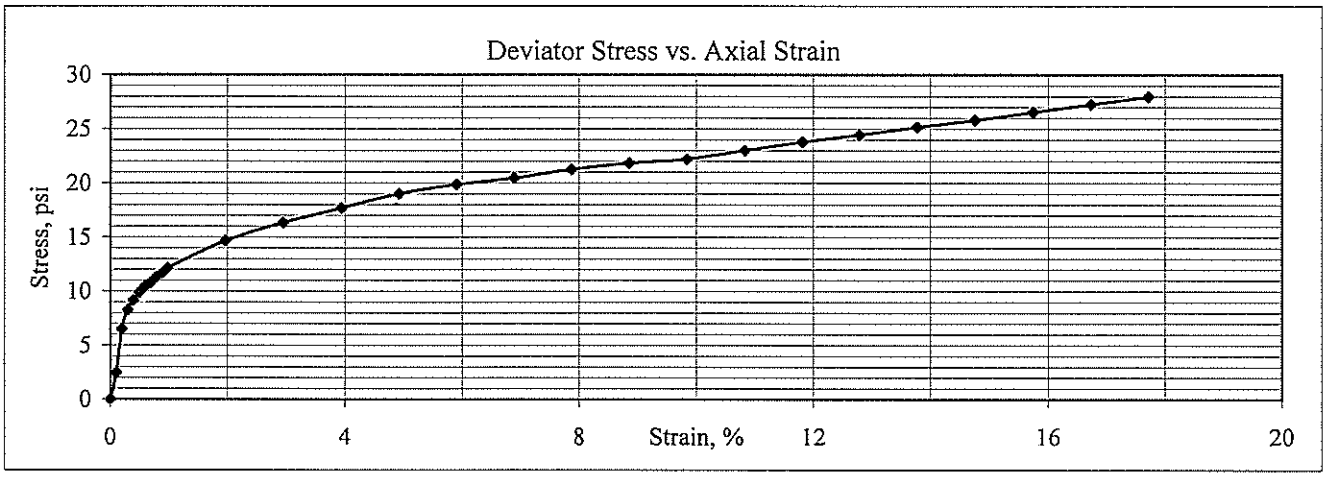
Test Method: ASTM D4767

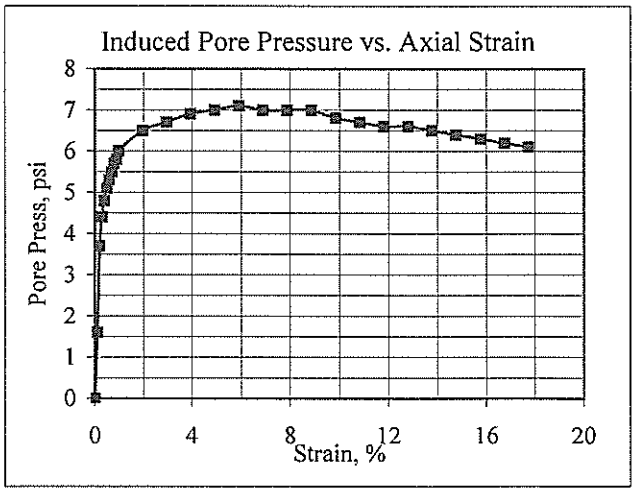
Specimen Properties	Dry Density, pcf	Void Ratio	% moist.	% Saturation	Height, in.	Diam., in.	X-Sect Area in.2
Initial	71.93	1.18	46.61	99.27	6.650	2.845	6.357
After Consolidation	72.94	1.15	45.4	99.26	6.604	2.835	6.313

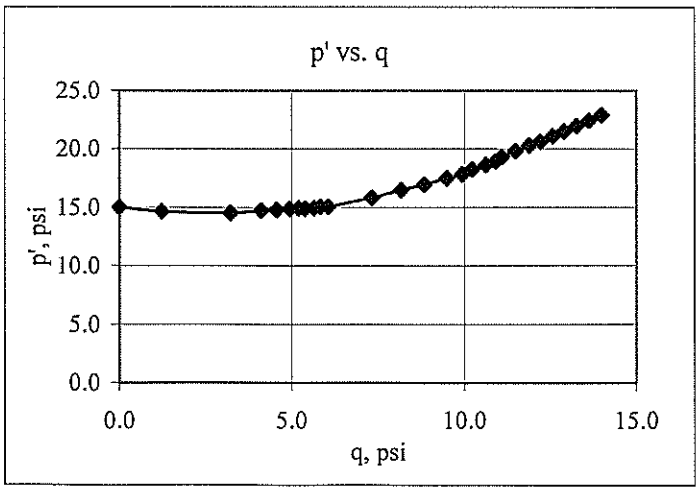
Consolidation	Total Back Pressure, psi	Pore Press. B after Sat.	Eff. Consol. Stress, psi	t50, min
	45.2	0.93	15	2

Specific Gravity:	2.51
Strain Rate, %/min:	0.05

At Failure	Deviator Stress, psi:	26.0	Axial Strain, %:	15.0







Notes: Sandy silt layers throughout sample. Abundant shell fragments.

Advance Testing
3348 Route 208, Campbell Hall, NY 10916
Phone: 845-496-1600 Fax: 845-496-1398
42 Day Farm Road, West Stockbridge, MA 01266
Phone/Fax: 413-232-8566

Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Item:	42'-44'	**Project #:**	50584
Source:	PDGEO 29, 102105-1100	**Lab #:**	05-1154
Date Sampled:	10/21/2005	**Sampled By:**	Client
Date Tested:	1/17/2006	**Tested By:**	C. Smith

Report of Triaxial Shear Test - Consolidated Undrained

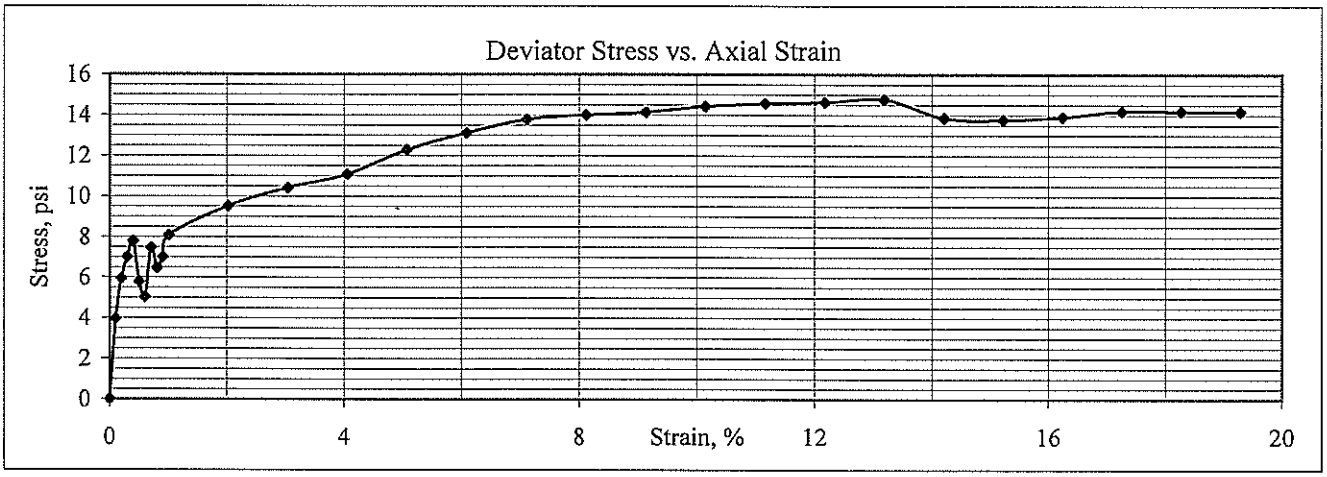
Test Method: ASTM D4767

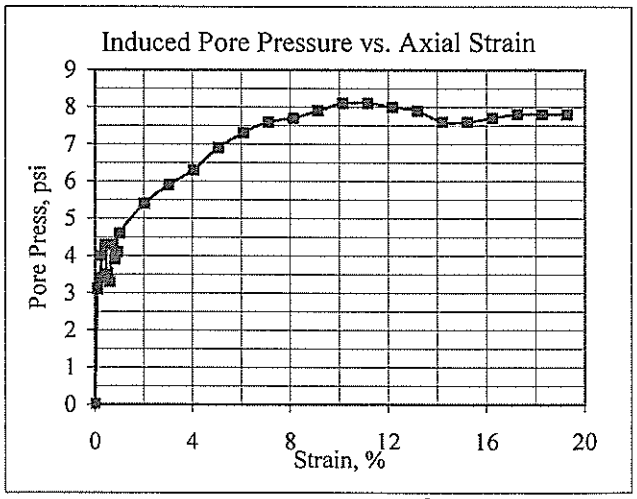
Specimen Properties	Dry Density, pcf	Void Ratio	% moist.	% Saturation	Height, in.	Diam., in.	X-Sect Area in.2
Initial	65.17	1.40	56.47	100.93	5.948	2.823	6.260
After Consolidation	67.15	1.33	51.78	97.45	5.860	2.802	6.167

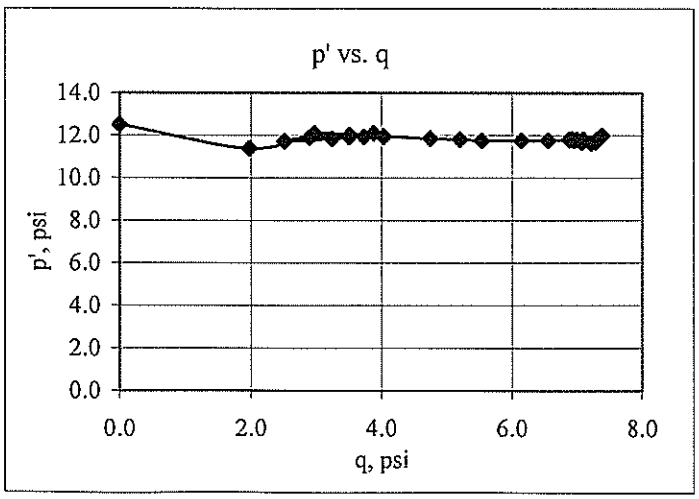
Consolidation	Total Back Pressure, psi	Pore Press. B after Sat.	Eff. Consol. Stress, psi	t50, min
	34.1	0.95	12.5	5

Specific Gravity:	2.51
Strain Rate, %/min:	0.05

At Failure	Deviator Stress, psi:	14.8	Axial Strain, %:	13.2







Reviewed by: _____

Advance Testing
3348 Route 208, Campbell Hall, NY 10916
Phone: 845-496-1600 Fax: 845-496-1398
42 Day Farm Road, West Stockbridge, MA 01266
Phone/Fax: 413-232-8566

Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Item:	39'-41'	**Project #:**	50584
Source:	PDGEO 30, 101805-1551	**Lab #:**	05-1003
Date Sampled:	10/18/2005	**Sampled By:**	Client
Date Tested:	11/30/2005	**Tested By:**	C. Smith

Report of Triaxial Shear Test - Consolidated Undrained

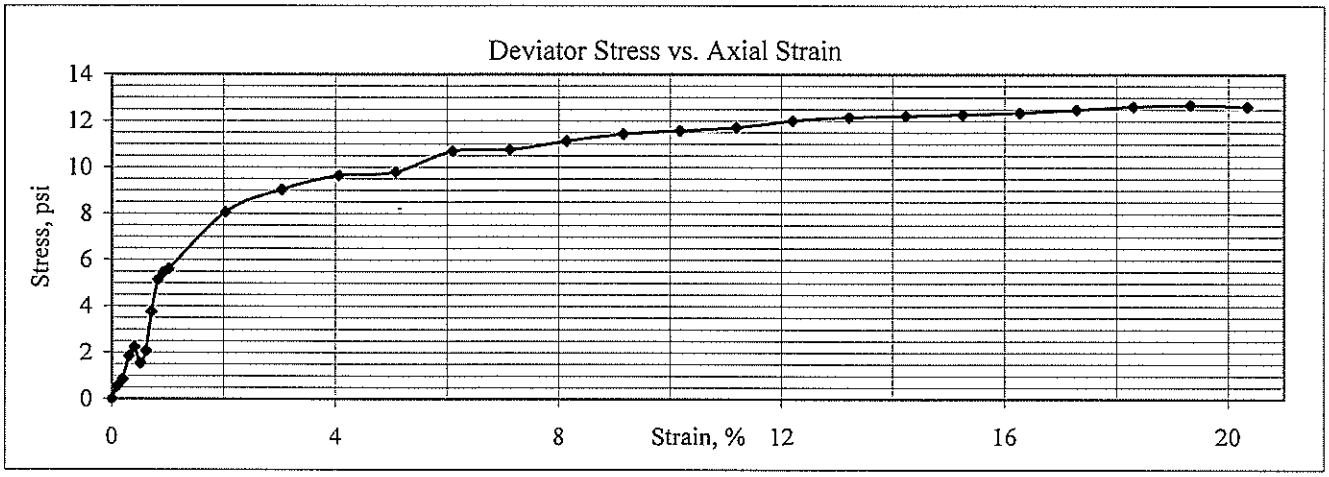
Test Method: ASTM D4767

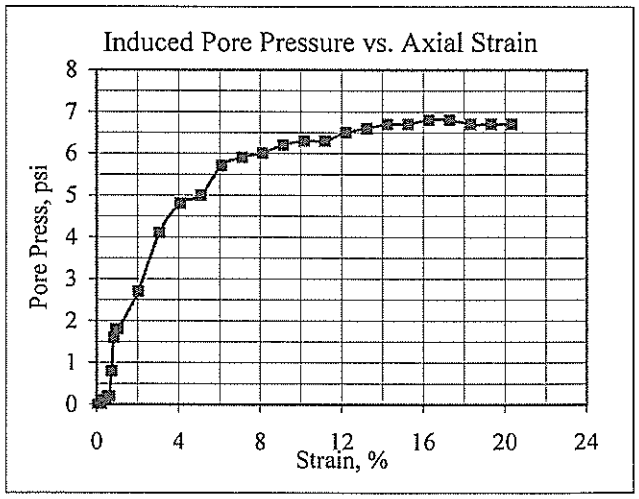
Specimen Properties	Dry Density, pcf	Void Ratio	% moist.	% Saturation	Height, in.	Diam., in.	X-Sect Area in.2
Initial	66.89	1.34	57.66	107.79	6.196	2.813	6.214
After Consolidation	69.08	1.27	54.12	107.10	6.097	2.790	6.115

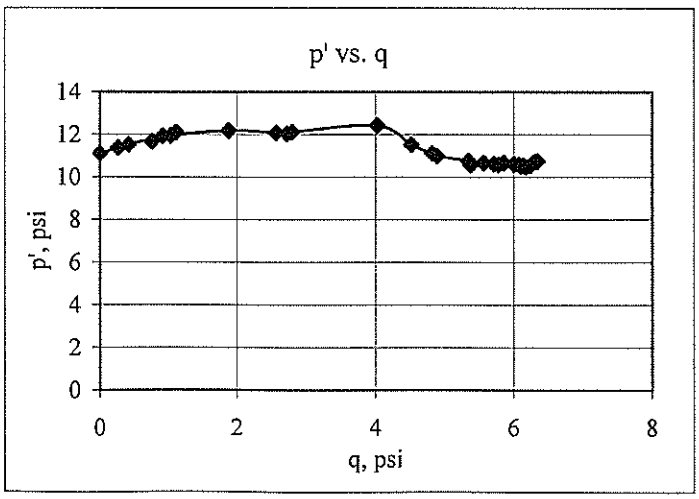
Consolidation	Total Back Pressure, psi	Pore Press. B after Sat.	Eff. Consol. Stress, psi	t50, min
	30.7	0.97	11.1	10

Specific Gravity:	2.51
Strain Rate, %/min:	0.05

At Failure	Deviator Stress, psi:	12.3	Axial Strain, %:	15.0







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Advance Testing
3348 Route 208, Campbell Hall, NY 10916
Phone: 845-496-1600 Fax: 845-496-1398
42 Day Farm Road, West Stockbridge, MA 01266
Phone/Fax: 413-232-8566

Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Item:	20'-22'	**Project #:**	50584
Source:	PDGEO 31, 102005-1115	**Lab #:**	05-1011
Date Sampled:	10/20/2005	**Sampled By:**	Client
Date Tested:	12/15/2005	**Tested By:**	B. Jobity/ C. Smith

Report of Triaxial Shear Test - Consolidated Undrained

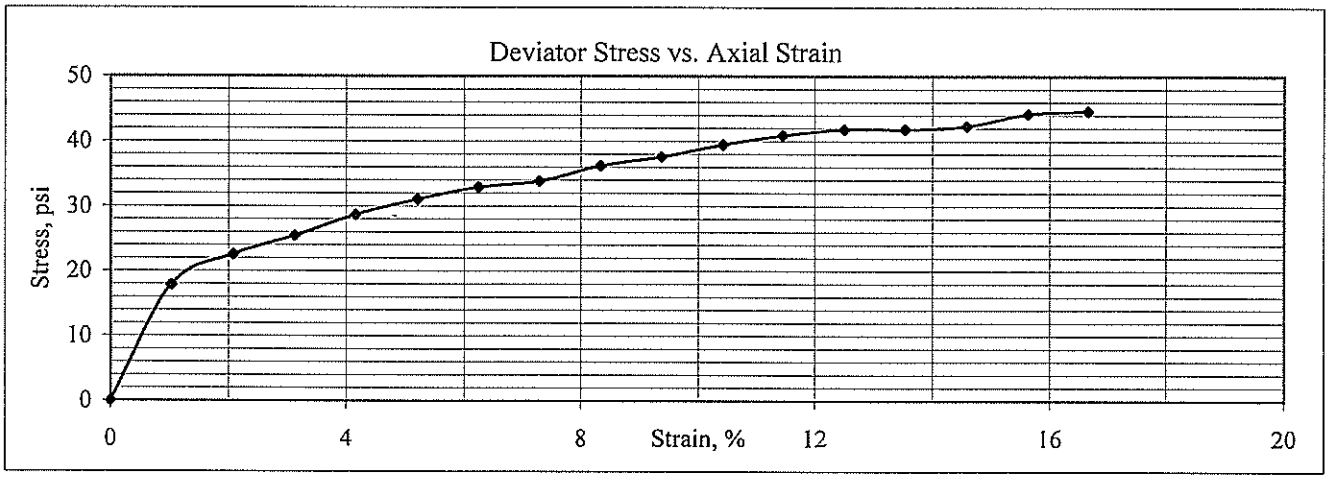
Test Method: ASTM D4767

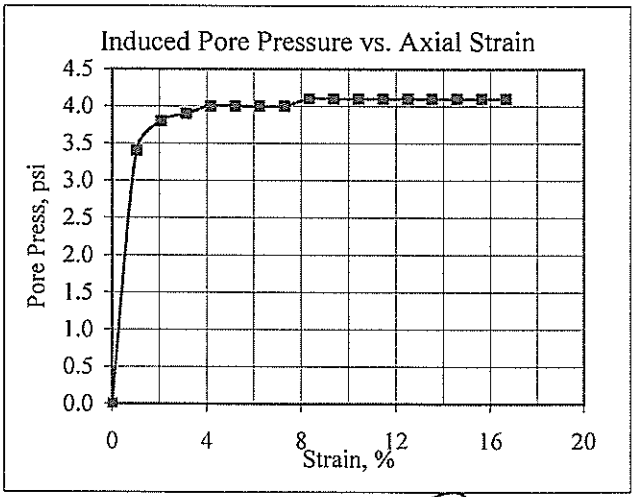
Specimen Properties	Dry Density, pcf	Void Ratio	% moist.	% Saturation	Height, in.	Diam., in.	X-Sect Area in.2
Initial	58.91	1.66	79.00	119.47	6.558	2.845	6.356
After Consolidation	63.94	1.45	64.91	112.29	6.295	2.787	6.101

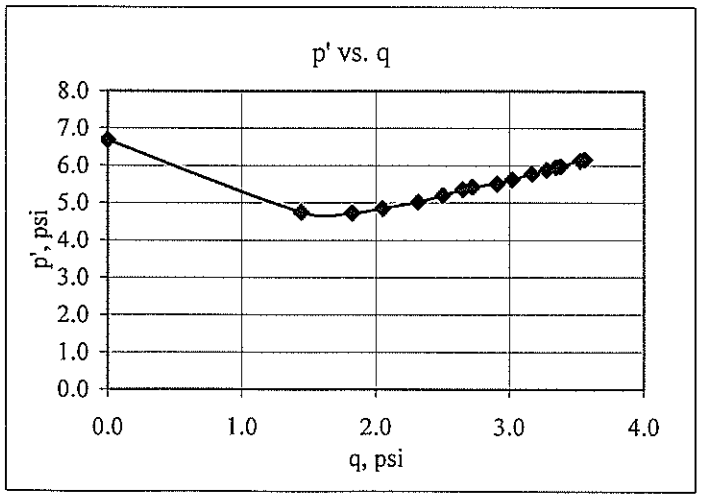
Consolidation	Total Back Pressure, psi	Pore Press. B after Sat.	Eff. Consol. Stress, psi	t50, min
	14.1	0.95	6.7	2.2

Specific Gravity:	2.51
Strain Rate, %/min:	0.05

At Failure	Deviator Stress, psi:	41.8	Axial Strain, %:	12.5







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Advance Testing
3348 Route 208, Campbell Hall, NY 10916
Phone: 845-496-1600 Fax: 845-496-1398
42 Day Farm Road, West Stockbridge, MA 01266
Phone/Fax: 413-232-8566

Client:	ENSR Remediation and Const.	**Project:**	BP Hastings-on-Hudson
Item:	30'-32'	**Project #:**	50584
Source:	PDGEO 31, 102005-1415	**Lab #:**	05-1013
Date Sampled:	10/20/2005	**Sampled By:**	Client
Date Tested:	12/12/2005	**Tested By:**	C. Smith

Report of Triaxial Shear Test - Consolidated Undrained

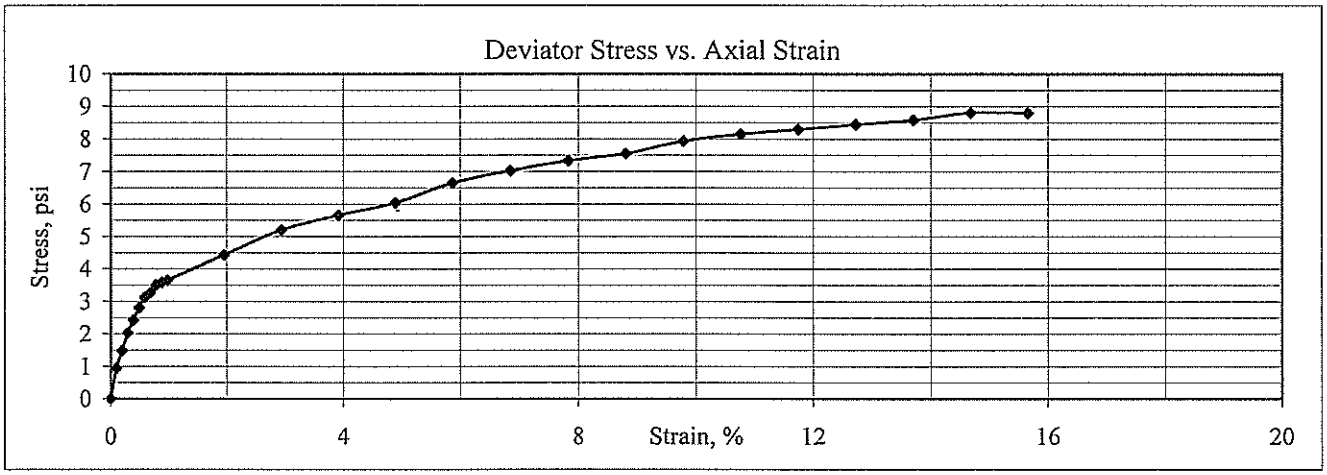
Test Method: ASTM D4767

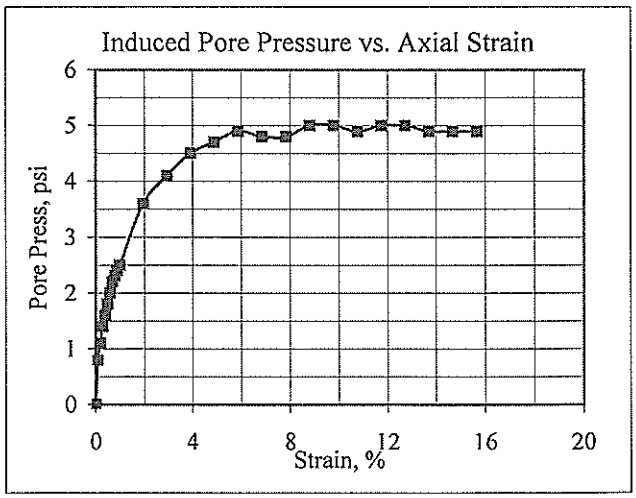
Specimen Properties	Dry Density, pcf	Void Ratio	% moist.	% Saturation	Height, in.	Diam., in.	X-Sect Area in.2
Initial	64.67	1.42	63.07	111.24	6.230	2.794	6.130
After Consolidation	66.82	1.35	55.07	102.76	6.129	2.771	6.030

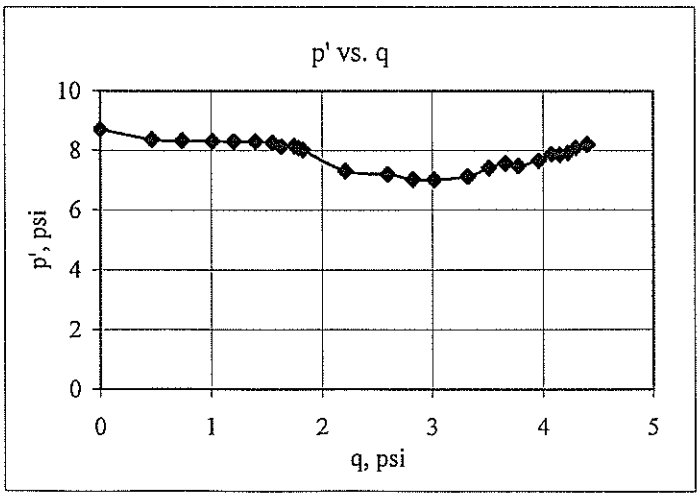
Consolidation	Total Back Pressure, psi	Pore Press. B after Sat.	Eff. Consol. Stress, psi	t50, min
	21.7	0.95	8.7	6

Specific Gravity:	2.51
Strain Rate, %/min:	0.05

At Failure	Deviator Stress, psi:	8.8	Axial Strain, %:	15.0







Reviewed by: _____

ATTACHMENT 6A

Logs of Monitoring Well Installation and Development

OBSERVATION WELL INSTALLATION REPORT

HALEY & ALDRICH

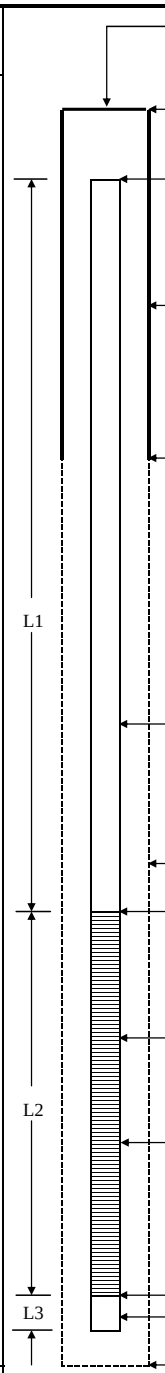
Well No. PDMW-01
Boring No. PDGEO-20

PROJECT	OU-1 REMEDIATION	**H&A FILE NO.**	28612-111
LOCATION	1 RIVER STREET, HASTINGS-ON-HUDSON, NEW YORK	**PROJECT MGR.**	BRYAN SWEENEY
CLIENT	ATLANTIC RICHFIELD	**FIELD REP.**	OWEN LAWLOR
CONTRACTOR	ADT	**DATE INSTALLED**	10/17/2005
DRILLER	JAMES PHILBIN	**WATER LEVEL**	

Ground El. 3.99 ft
El. Datum NAVD88
Location SEE PLAN
☐ **Guard Pipe**
☑ **Roadway Box**

SOIL/ROCK CONDITIONS	BOREHOLE BACKFILL
	CEMENT
FILL	0.7
	FILTER SAND
	5
	BENTONITE SLURRY
	39
	45
	BENTONITE CHIPS
MARINE DEPOSITS	47
	FILTER SAND
	64 **59.3**
	(Bottom of Exploration)

(Numbers refer to depth from ground surface in feet)



Type of protective cover/lock: ROADWAY BOX COVER

Depth of top of roadway box below ground surface: 0.0 ft

Depth of top of riser pipe below ground surface: 0.3 ft

Type of protective casing: ROADWAY BOX
Length: 1.0 ft
Inside Diameter: 8.0 in

Depth of bottom of roadway box: 1.0 ft

Type of Seals	Top of Seal (ft)	Thickness (ft)
Cement	0.0	0.7
Bentonite Slurry	5.0	40.0
Bentonite Chips	45.0	2.0
Permanent Casing	0.0	46.0

Type of riser pipe: Schedule 40 PVC
Inside diameter of riser pipe: 2.0 in
Type of backfill around riser: Bentonite Slurry

Diameter of borehole: 4.0 in

Depth to top of well screen: 49.0 ft

Type of screen: Schedule 40 PVC
Screen gauge or size of openings: 0.10 in
Diameter of screen: 2.0 in
Type of backfill around screen: Filter Sand

Depth of bottom of well screen: 59.0 ft

Bottom of Screen Cap: 0.3 ft

Depth of bottom of borehole: 64.0 ft

(Not to Scale)

48.7 ft	+	10.0 ft	+	0.3 ft	=	59 ft
Riser Pay Length (L1)		Length of screen (L2)		Length of screen cap (L3)		Pay length

COMMENTS:

Form 2007

OBSERVATION WELL INSTALLATION REPORT

HALEY & ALDRICH

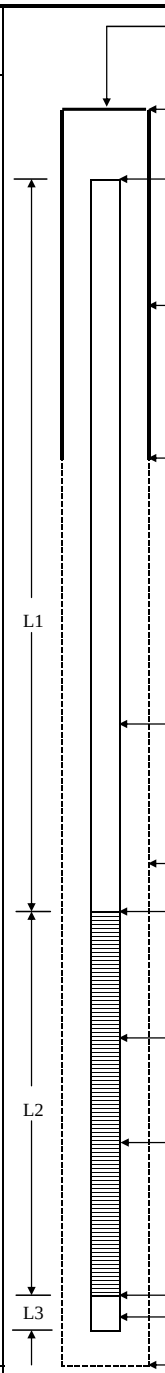
Well No. PDMW-02
Boring No. PDGEO-29

PROJECT	OU-1 REMEDIATION	**H&A FILE NO.**	28612-111
LOCATION	1 RIVER STREET, HASTINGS-ON-HUDSON, NEW YORK	**PROJECT MGR.**	BRYAN SWEENEY
CLIENT	ATLANTIC RICHFIELD	**FIELD REP.**	OWEN LAWLOR
CONTRACTOR	ADT	**DATE INSTALLED**	10/27/2005
DRILLER	JAMES PHILBIN, BRIAN URICK	**WATER LEVEL**	

Ground El. 6.80 ft
El. Datum NAVD88
Location SEE PLAN
☐ **Guard Pipe**
☑ **Roadway Box**

SOIL/ROCK CONDITIONS	BOREHOLE BACKFILL
	CEMENT
	0.7
FILL	
	FILTER SAND
	5
	BENTONITE SLURRY
38.5	
	37.7
	BENTONITE CHIPS
MARINE DEPOSITS	41.7
	FILTER SAND
54	54

(Bottom of Exploration)
(Numbers refer to depth from ground surface in feet)



(Not to Scale)

Type of protective cover/lock: ROADWAY BOX COVER
Depth of top of roadway box below ground surface: 0.0 ft
Depth of top of riser pipe below ground surface: 0.3 ft
Type of protective casing: ROADWAY BOX
Length: 1.0 ft
Inside Diameter: 8.0 in
Depth of bottom of roadway box: 1.0 ft

Type of Seals	Top of Seal (ft)	Thickness (ft)
Cement	0.0	0.7
Bentonite Slurry	5.0	37.0
Bentonite Chips	42.0	2.0
Permanent Casing	0.0	43.5

Type of riser pipe: Schedule 40 PVC
Inside diameter of riser pipe: 2.0 in
Type of backfill around riser: Bentonite Slurry
Diameter of borehole: 4.0 in
Depth to top of well screen: 43.7 ft
Type of screen: Schedule 40 PVC
Screen gauge or size of openings: 0.10 in
Diameter of screen: 2.0 in
Type of backfill around screen: Filter Sand
Depth of bottom of well screen: 53.7 ft
Bottom of Screen Cap: 0.3 ft
Depth of bottom of borehole: 54.0 ft

43.7 ft	+	10.0 ft	+	0.3 ft	=	54 ft
Riser Pay Length (L1)		Length of screen (L2)		Length of screen cap (L3)		Pay length

COMMENTS:

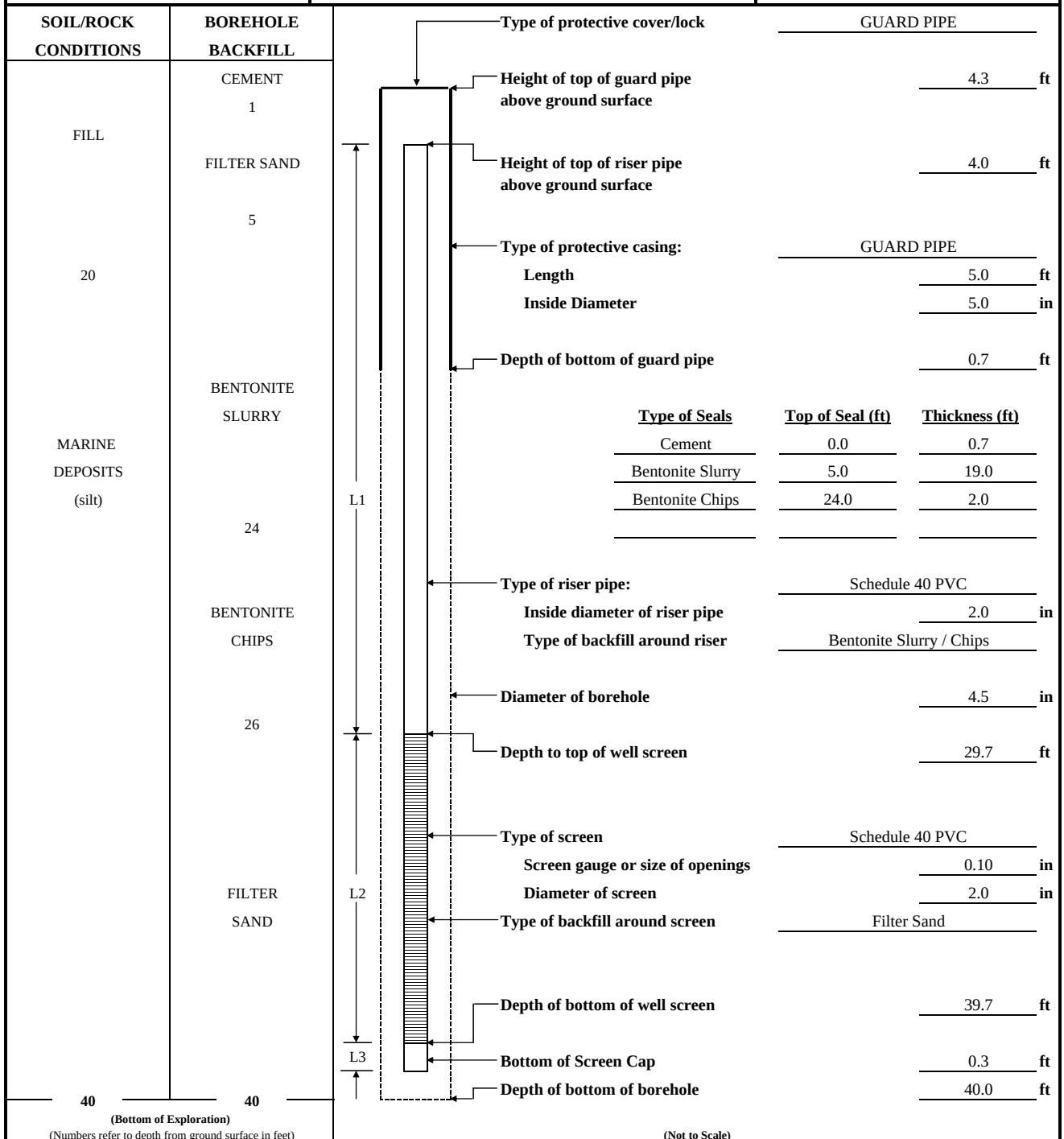
OBSERVATION WELL INSTALLATION REPORT

HALEY & ALDRICH

Well No. PDMW-03
Boring No. PDGEO-23

PROJECT	OU-1 REMEDIATION	**H&A FILE NO.**	28612-111
LOCATION	1 RIVER STREET, HASTINGS-ON-HUDSON, NEW YORK	**PROJECT MGR.**	BRYAN SWEENEY
CLIENT	ATLANTIC RICHFIELD	**FIELD REP.**	JOHN BODE
CONTRACTOR	ADT	**DATE INSTALLED**	10/28/2005
DRILLER	EDDIE SELLMAN	**WATER LEVEL**	

Ground El. 3.40 ft
El. Datum NAVD88
Location SEE PLAN
☑ **Guard Pipe**
☐ **Roadway Box**



Type of protective cover/lock: GUARD PIPE

Height of top of guard pipe above ground surface: 4.3 ft

Height of top of riser pipe above ground surface: 4.0 ft

Type of protective casing: GUARD PIPE
- **Length:** 5.0 ft
- **Inside Diameter:** 5.0 in

Depth of bottom of guard pipe: 0.7 ft

Type of Seals	Top of Seal (ft)	Thickness (ft)
Cement	0.0	0.7
Bentonite Slurry	5.0	19.0
Bentonite Chips	24.0	2.0

Type of riser pipe: Schedule 40 PVC
- **Inside diameter of riser pipe:** 2.0 in
- **Type of backfill around riser:** Bentonite Slurry / Chips

Diameter of borehole: 4.5 in

Depth to top of well screen: 29.7 ft

Type of screen: Schedule 40 PVC
- **Screen gauge or size of openings:** 0.10 in
- **Diameter of screen:** 2.0 in
- **Type of backfill around screen:** Filter Sand

Depth of bottom of well screen: 39.7 ft

Bottom of Screen Cap: 0.3 ft

Depth of bottom of borehole: 40.0 ft

29.7 ft	+	10.0 ft	+	0.3 ft	=	40 ft
Riser Pay Length (L1)		Length of screen (L2)		Length of screen cap (L3)		Pay length

COMMENTS: Filter sand. ANSI/NSF standard 61. Install permanent 4" diameter steel casing to 25.0 ft.

Form 2007

OBSERVATION WELL INSTALLATION REPORT

HALEY & ALDRICH

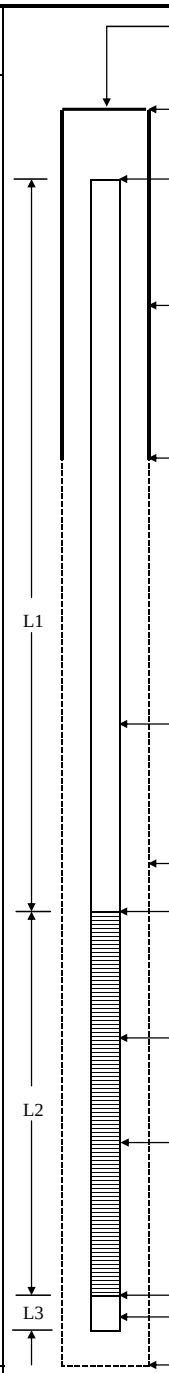
Well No. PDMW-04
Boring No. PDGEO-27

PROJECT	OU-1 REMEDIATION	**H&A FILE NO.**	28612-111
LOCATION	1 RIVER STREET, HASTINGS-ON-HUDSON, NEW YORK	**PROJECT MGR.**	BRYAN SWEENEY
CLIENT	ATLANTIC RICHFIELD	**FIELD REP.**	OWEN LAWLOR
CONTRACTOR	ADT	**DATE INSTALLED**	10/12/2005
DRILLER	JAMES PHILBIN	**WATER LEVEL**	

Ground El. 7.23 ft
El. Datum NAVD88
Location SEE PLAN
☐ **Guard Pipe**
☑ **Roadway Box**

SOIL/ROCK CONDITIONS	BOREHOLE BACKFILL
FILL	CEMENT
	0.7
	FILTER SAND
	5
	BENTONITE
31	SLURRY
	40.7
	BENTONITE CHIPS
	42.7
MARINE DEPOSITS	
	FILTER SAND
55	**55**

(Bottom of Exploration)
(Numbers refer to depth from ground surface in feet)



(Not to Scale)

Type of protective cover/lock	ROADWAY BOX COVER
Depth of top of roadway box below ground surface	0.0 ft
Depth of top of riser pipe below ground surface	0.3 ft
Type of protective casing:	ROADWAY BOX
Length	1.0 ft
Inside Diameter	8.0 in
Depth of bottom of roadway box	1.0 ft

Type of Seals	Top of Seal (ft)	Thickness (ft)
Cement	0.0	0.7
Bentonite Slurry	5.0	36.0
Bentonite Chips	41.0	2.0
Permanent Casing	0.0	40.0

Type of riser pipe:	Schedule 40 PVC
Inside diameter of riser pipe	2.0 in
Type of backfill around riser	Bentonite Slurry
Diameter of borehole	4.0 in
Depth to top of well screen	44.7 ft
Type of screen	Schedule 40 PVC
Screen gauge or size of openings	0.10 in
Diameter of screen	2.0 in
Type of backfill around screen	Filter Sand
Depth of bottom of well screen	54.7 ft
Bottom of Screen Cap	0.3 ft
Depth of bottom of borehole	55.0 ft

44.7 ft	+	10 ft	+	0.3 ft	=	55 ft
Riser Pay Length (L1)		Length of screen (L2)		Length of screen cap (L3)		Pay length

COMMENTS: Permanent 4" diameter steel casing installed to 40.0'. Permanent casing grouted in borehole.

Form 2007

OBSERVATION WELL INSTALLATION REPORT

HALEY & ALDRICH

Well No. PDMW-05

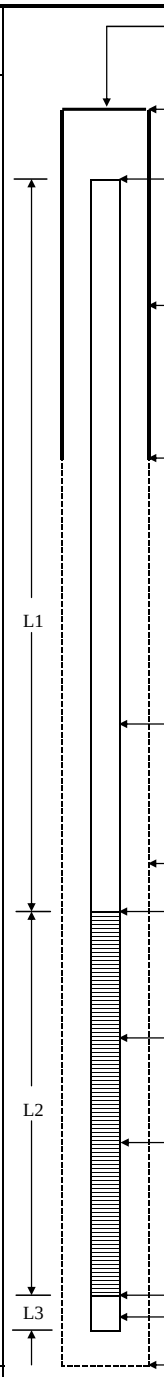
PDGEO-25

PROJECT	OU-1 REMEDIATION	**H&A FILE NO.**	28612-111
LOCATION	1 RIVER STREET, HASTINGS-ON-HUDSON, NEW YORK	**PROJECT MGR.**	BRYAN SWEENEY
CLIENT	ATLANTIC RICHFIELD	**FIELD REP.**	OWEN LAWLOR
CONTRACTOR	ADT	**DATE INSTALLED**	10/28/2005
DRILLER	BRIAN URICK	**WATER LEVEL**	

Ground El. 3.80 ft
El. Datum NAVD88
Location SEE PLAN
☑ **Guard Pipe**
☐ **Roadway Box**

SOIL/ROCK CONDITIONS	BOREHOLE BACKFILL
	CEMENT 0.7
FILL	FILTER SAND 5
	BENTONITE SLURRY 37
	40 BENTONITE CHIPS
MARINE DEPOSITS	42
	FILTER SAND
56 (Bottom of Exploration)	**54**

(Numbers refer to depth from ground surface in feet)



(Not to Scale)

Type of protective cover/lock GUARD PIPE

Height of top of guard pipe above ground surface 3.2 ft

Height of top of riser pipe above ground surface 3.0 ft

Type of protective casing: GUARD PIPE
Length 5.0 ft
Inside Diameter 8.0 in

Depth of bottom of guard pipe 1.0 ft

Type of Seals	Top of Seal (ft)	Thickness (ft)
Cement	0.0	0.7
Bentonite Slurry	5.0	37.0
Bentonite Chips	42.0	2.0
Permanent Casing	0.0	42.0

Type of riser pipe: Schedule 40 PVC
Inside diameter of riser pipe 2.0 in
Type of backfill around riser Bentonite Slurry

Diameter of borehole 4.0 in

Depth to top of well screen 44.0 ft

Type of screen Schedule 40 PVC
Screen gauge or size of openings 0.10 in
Diameter of screen 2.0 in
Type of backfill around screen Filter Sand

Depth of bottom of well screen 54.0 ft

Bottom of Screen Cap 54.3 ft

Depth of bottom of borehole 56.0 ft

44 ft	+	10 ft	+	0.3 ft	=	54.3 ft
Riser Pay Length (L1)		Length of screen (L2)		Length of screen cap (L3)		Pay length

COMMENTS: Permanent 4.0" steel casing installed to 42.0 ft and grouted in place.

Form 2007

OBSERVATION WELL INSTALLATION REPORT

HALEY & ALDRICH

Well No. PDMW-06

Boring No.

PROJECT	OU-1 REMEDIATION	**H&A FILE NO.**	28612-111
LOCATION	1 RIVER STREET, HASTINGS-ON-HUDSON, NEW YORK	**PROJECT MGR.**	BRYAN SWEENEY
CLIENT	ATLANTIC RICHFIELD	**FIELD REP.**	SEAN CLIFFORD
CONTRACTOR	ADT	**DATE INSTALLED**	10/11/2005
DRILLER	EDDIE SELLMAN	**WATER LEVEL**	

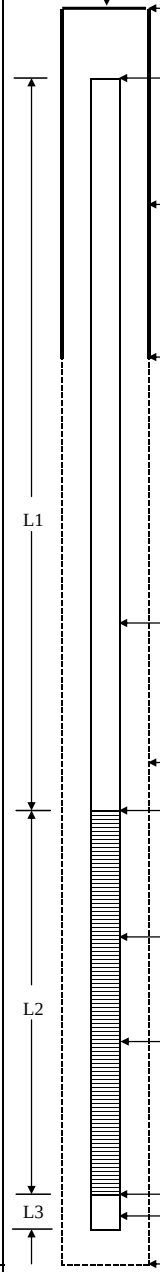
Ground El. 3.79 ft
El. Datum NAVD88

Location SEE PLAN

☑ **Guard Pipe**
☐ **Roadway Box**

SOIL/ROCK CONDITIONS	BOREHOLE BACKFILL
NO SOIL CLASSIFICATION CONDUCTED	*STICK UP*
	0
	CEMENT
	2
	BENTONITE
	3
	FILTER SAND
15	15

(Bottom of Exploration)
(Numbers refer to depth from ground surface in feet)



(Not to Scale)

Type of protective cover/lock: J.PLUG

Height of top of guard pipe above ground surface: 3.0 ft

Height of top of riser pipe above ground surface: 2.75 ft

Type of protective casing: GUARD PIPE
Length: 4.0 ft
Inside Diameter: 4.0 in

Depth of bottom of guard pipe: 1.0 ft

Type of Seals	Top of Seal (ft)	Thickness (ft)
Cement	0.0	2.0
Bentonite	2.0	2.0

Type of riser pipe: PVC
Inside diameter of riser pipe: 2.0 in
Type of backfill around riser: Cement / Bentonite

Diameter of borehole: 8.5 in

Depth to top of well screen: 5.0 ft

Type of screen: PVC
Screen gauge or size of openings: 0.1 in
Diameter of screen: 2.0 in
Type of backfill around screen: Filter Sand

Depth of bottom of well screen: 14.5 ft

Bottom of Screen Cap: 15.0 ft

Depth of bottom of borehole: 15.0 ft

5 ft	+	9.5 ft	+	0.5 ft	=	15 ft
Riser Pay Length (L1)		Length of screen (L2)		Length of screen cap (L3)		Pay length

COMMENTS:

Form 2007

OBSERVATION WELL INSTALLATION REPORT

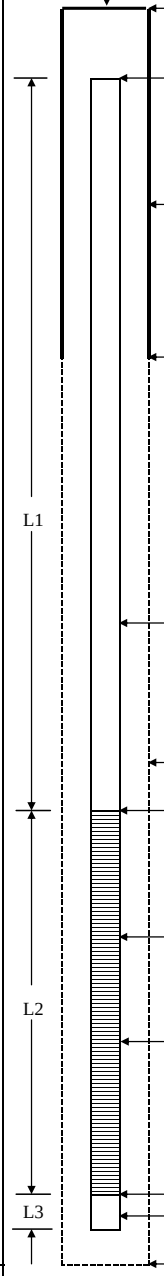
HALEY & ALDRICH

Well No. PDMW-07
Boring No.

PROJECT	OU-1 REMEDIATION	**H&A FILE NO.**	28612-111
LOCATION	1 RIVER STREET, HASTINGS-ON-HUDSON, NEW YORK	**PROJECT MGR.**	BRYAN SWEENEY
CLIENT	ATLANTIC RICHFIELD	**FIELD REP.**	SEAN CLIFFORD
CONTRACTOR	ADT	**DATE INSTALLED**	10/12/2005
DRILLER	EDDIE SELLMAN	**WATER LEVEL**	

Ground El. 2.96 ft
El. Datum NAVD88
Location SEE PLAN
☑ **Guard Pipe**
☐ **Roadway Box**

SOIL/ROCK CONDITIONS	BOREHOLE BACKFILL
NO SOIL CLASSIFICATION CONDUCTED	*STICK - UP*
	CEMENT
	BENTONITE
	SAND



15 (Bottom of Exploration)
(Numbers refer to depth from ground surface in feet)

Type of protective cover/lock J. PLUG
Height of top of guard pipe above ground surface 3.0 ft
Height of top of riser pipe above ground surface 2.75 ft
Type of protective casing: GUARD PIPE
Length 4.0 ft
Inside Diameter 4.0 in
Depth of bottom of guard pipe 1.0 ft

Type of Seals	Top of Seal (ft)	Thickness (ft)
Cement	0.0	2.0
Bentonite	2.0	2.0

Type of riser pipe: PVC
Inside diameter of riser pipe 2.0 in
Type of backfill around riser Cement / Bentonite
Diameter of borehole 8.5 in
Depth to top of well screen 5.0 ft
Type of screen PVC
Screen gauge or size of openings 0.1 in
Diameter of screen 2.0 in
Type of backfill around screen Filter Sand
Depth of bottom of well screen 14.5 ft
Bottom of Screen Cap 15.0 ft
Depth of bottom of borehole 15.0 ft

(Not to Scale)

Riser Pay Length (L1)	+	Length of screen (L2)	+	Length of screen cap (L3)	=	Pay length
5 ft	+	9.5 ft	+	0.5 ft	=	15 ft

COMMENTS:

OBSERVATION WELL INSTALLATION REPORT

HALEY & ALDRICH

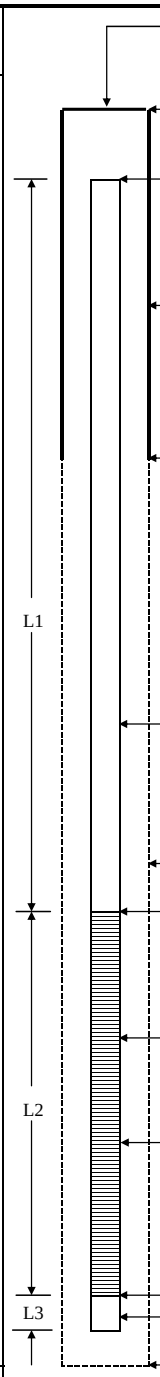
Well No. PDMW-08
Boring No.

PROJECT	OU-1 REMEDIATION	**H&A FILE NO.**	28612-111
LOCATION	1 RIVER STREET, HASTINGS-ON-HUDSON, NEW YORK	**PROJECT MGR.**	BRYAN SWEENEY
CLIENT	ATLANTIC RICHFIELD	**FIELD REP.**	SEAN CLIFFORD
CONTRACTOR	ADT	**DATE INSTALLED**	10/12/2005
DRILLER	EDDIE SELLMAN	**WATER LEVEL**	

Ground El. 3.31 ft
El. Datum NAVD88
Location SEE PLAN
☑ **Guard Pipe**
☐ **Roadway Box**

SOIL/ROCK CONDITIONS	BOREHOLE BACKFILL
NO SOIL CLASSIFICATION CONDUCTED	*STICK UP*
	0
	CEMENT
	2
	BENTONITE
	3
	SAND
15	15

(Bottom of Exploration)
(Numbers refer to depth from ground surface in feet)



(Not to Scale)

Type of protective cover/lock: J PLUG
Height of top of guard pipe/roadway box above ground surface: 3.0 ft
Height of top of riser pipe above ground surface: 2.75 ft
Type of protective casing: GUARD PIPE
Length: 4.0 ft
Inside Diameter: 4.0 in
Depth of bottom of guard pipe: 1.0 ft

Type of Seals	Top of Seal (ft)	Thickness (ft)
Concrete	0.0	2.0
Bentonite Seal	2.0	4.0

Type of riser pipe: PVC
Inside diameter of riser pipe: 2.0 in
Type of backfill around riser: Cement / Bentonite
Diameter of borehole: 8.5 in
Depth to top of well screen: 5.0 ft
Type of screen: PVC
Screen gauge or size of openings: 0.1 in
Diameter of screen: 2.0 in
Type of backfill around screen: Filter Sand
Depth of bottom of well screen: 14.5 ft
Bottom of Screen Cap: 15.0 ft
Depth of bottom of borehole: 15.0 ft

5 ft	+	9.5 ft	+	0.5 ft	=	15 ft	
Riser Pay Length (L1)		Length of screen (L2)		Length of screen cap (L3)		Pay length	

COMMENTS:

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OBSERVATION WELL INSTALLATION REPORT

HALEY & ALDRICH

Well No. PDMW-09
Boring No.

PROJECT	OU-1 REMEDIATION	**H&A FILE NO.**	28612-111
LOCATION	1 RIVER STREET, HASTINGS-ON-HUDSON, NEW YORK	**PROJECT MGR.**	BRYAN SWEENEY
CLIENT	ATLANTIC RICHFIELD	**FIELD REP.**	SEAN CLIFFORD
CONTRACTOR	ADT	**DATE INSTALLED**	10/11/2005
DRILLER	EDDIE SELLMAN	**WATER LEVEL**	

Ground El. 4.69 ft
El. Datum NAVD88
Location SEE PLAN

☐ **Guard Pipe**
☑ **Roadway Box**

SOIL/ROCK CONDITIONS

NO SOIL CLASSIFICATION CONDUCTED

BOREHOLE BACKFILL

CEMENT

2

BENTONITE

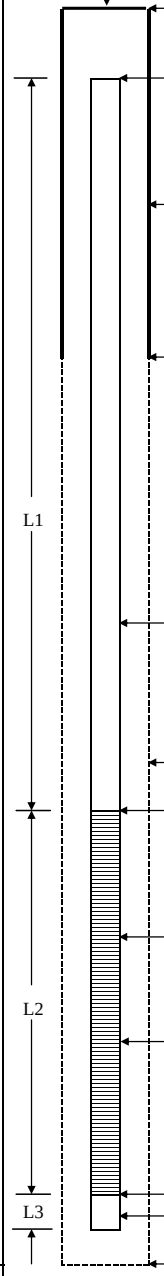
4

FILTER SAND

15

(Bottom of Exploration)

(Numbers refer to depth from ground surface in feet)



Type of protective cover/lock: J PLUG

Depth of top of roadway box below ground surface: 0.0 ft

Depth of top of riser pipe below ground surface: 0.5 ft

Type of protective casing: Roadway Box
Length: 1.0 ft
Inside Diameter: 8.0 in

Depth of bottom of roadway box: 1.0 ft

Type of Seals	Top of Seal (ft)	Thickness (ft)
Cement	0.0	2.0
Bentonite	2.0	2.0

Type of riser pipe: PVC
Inside diameter of riser pipe: 2.0 in
Type of backfill around riser: Cement / Bentonite

Diameter of borehole: 8.5 in

Depth to top of well screen: 5.0 ft

Type of screen: PVC
Screen gauge or size of openings: 0.1 in
Diameter of screen: 2.0 in
Type of backfill around screen: Filter Sand

Depth of bottom of well screen: 14.5 ft

Bottom of Screen Cap: 15.0 ft

Depth of bottom of borehole: 15.0 ft

(Not to Scale)

5 ft	+	9.5 ft	+	0.5 ft	=	15 ft
Riser Pay Length (L1)		Length of screen (L2)		Length of screen cap (L3)		Pay length

COMMENTS:

Form 2007

OBSERVATION WELL INSTALLATION REPORT

HALEY & ALDRICH

Well No. PDMW-10

Boring No.

PROJECT	OU-1 REMEDIATION	**H&A FILE NO.**	28612-111
LOCATION	1 RIVER STREET, HASTINGS-ON-HUDSON, NEW YORK	**PROJECT MGR.**	BRYAN SWEENEY
CLIENT	ATLANTIC RICHFIELD	**FIELD REP.**	SEAN CLIFFORD
CONTRACTOR	ADT	**DATE INSTALLED**	10/11/2005
DRILLER	EDDIE SELLMAN	**WATER LEVEL**	

Ground El. 4.62 ft
El. Datum NAVD88

Location SEE PLAN

☐ **Guard Pipe**
☑ **Roadway Box**

SOIL/ROCK CONDITIONS

NO SOIL CLASSIFICATION CONDUCTED

BOREHOLE BACKFILL

CEMENT

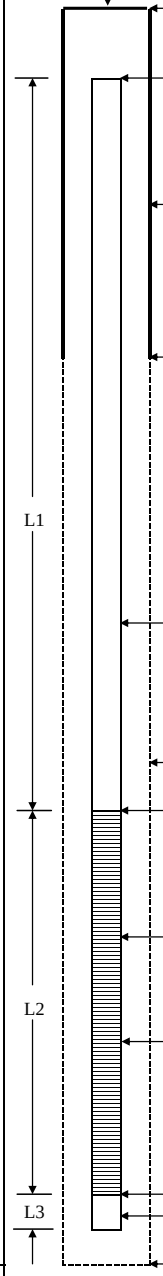
2

BENTONITE

4

FILTER SAND

15 **15**
(Bottom of Exploration)
(Numbers refer to depth from ground surface in feet)



(Not to Scale)

Type of protective cover/lock	J.PLUG
Depth of top of roadway box below ground surface	0.0 ft
Depth of top of riser pipe below ground surface	0.5 ft
Type of protective casing:	ROADWAY BOX
Length	1.0 ft
Inside Diameter	8.0 in
Depth of bottom of roadway box	1.0 ft

Type of Seals	**Top of Seal (ft)**	**Thickness (ft)**
Concrete	0.0	2.0
Bentonite Seal	2.0	2.0

Type of riser pipe:	PVC
Inside diameter of riser pipe	2.0 in
Type of backfill around riser	CEMENT / BENTONITE
Diameter of borehole	8.5 in
Depth to top of well screen	5.0 ft
Type of screen	PVC
Screen gauge or size of openings	0.1 in
Diameter of screen	2.0 in
Type of backfill around screen	FILTER SAND
Depth of bottom of well screen	14.5 ft
Bottom of Screen Cap	15.0 ft
Depth of bottom of borehole	15.0 ft

5 ft	+	9.5 ft	+	0.5 ft	=	15 ft
Riser Pay Length (L1)		Length of screen (L2)		Length of screen cap (L3)		Pay length

COMMENTS:

Form 2007

OBSERVATION WELL INSTALLATION REPORT

HALEY & ALDRICH

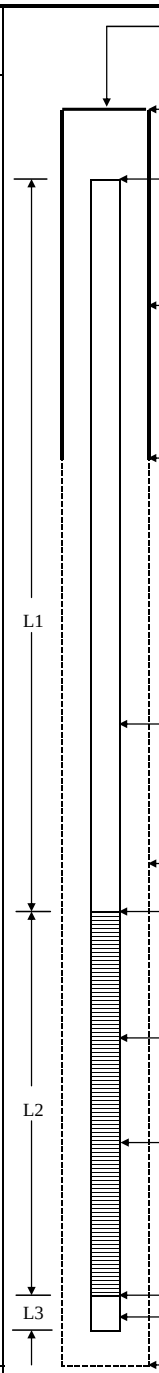
Well No. PDMW-11
Boring No.

PROJECT	OU-1 REMEDIATION	**H&A FILE NO.**	28612-111
LOCATION	1 RIVER STREET, HASTINGS-ON-HUDSON, NEW YORK	**PROJECT MGR.**	BRYAN SWEENEY
CLIENT	ATLANTIC RICHFIELD COMPANY	**FIELD REP.**	SEAN CLIFFORD
CONTRACTOR	ADT	**DATE INSTALLED**	10/11/2005
DRILLER	EDDIE SELLMAN	**WATER LEVEL**	

Ground El. 4.68 ft
El. Datum NAVD88
Location SEE PLAN
☐ **Guard Pipe**
☑ **Roadway Box**

SOIL/ROCK CONDITIONS	BOREHOLE BACKFILL
NO SOIL CLASSIFICATION CONDUCTED	
	CEMENT
	2
	BENTONITE
	4
	FILTER SAND
15	15

(Bottom of Exploration)
(Numbers refer to depth from ground surface in feet)



(Not to Scale)

Type of protective cover/lock	J. PLUG
Depth of top of roadway box below ground surface	0.0 ft
Depth of top of riser pipe below ground surface	0.5 ft
Type of protective casing:	ROADWAY BOX
Length	1.0 ft
Inside Diameter	8.0 in
Depth of bottom of roadway box	1.0 ft

Type of Seals	Top of Seal (ft)	Thickness (ft)
Cement	0.0	2.0
Bentonite Seal	2.0	2.0

Type of riser pipe:	PVC
Inside diameter of riser pipe	2.0 in
Type of backfill around riser	CEMENT / BENTONITE
Diameter of borehole	8.5 in
Depth to top of well screen	5.0 ft
Type of screen	PVC
Screen gauge or size of openings	0.1 in
Diameter of screen	2.0 in
Type of backfill around screen	FILTER SAND
Depth of bottom of well screen	14.5 ft
Bottom of Screen Cap	15.0 ft
Depth of bottom of borehole	15.0 ft

5 ft	+	9.5 ft	+	0.5 ft	=	15 ft	
Riser Pay Length (L1)		Length of screen (L2)		Length of screen cap (L3)		Pay length	

COMMENTS:

OBSERVATION WELL INSTALLATION REPORT

HALEY & ALDRICH

Well No. PDMW-12

Boring No.

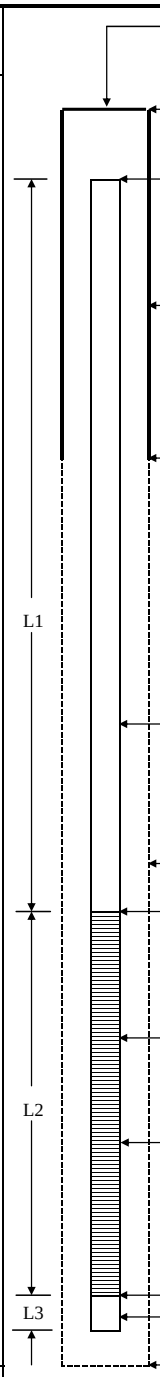
PROJECT	OU-1 REMEDIATION	**H&A FILE NO.**	28612-111
LOCATION	1 RIVER STREET, HASTINGS-ON-HUDSON, NEW YORK	**PROJECT MGR.**	BRYAN SWEENEY
CLIENT	ATLANTIC RICHFIELD	**FIELD REP.**	SEAN CLIFFORD
CONTRACTOR	ADT	**DATE INSTALLED**	10/10/2005
DRILLER	EDDIE SELLMAN	**WATER LEVEL**	

Ground El. 3.82 ft
El. Datum NAVD88
Location SEE PLAN

☐ **Guard Pipe**
☑ **Roadway Box**

SOIL/ROCK CONDITIONS	BOREHOLE BACKFILL
NO SOIL CLASSIFICATION CONDUCTED	
	CEMENT
	2
	BENTONITE
	L1
	4
	FILTER SAND
	L2
	L3
15	15

(Bottom of Exploration)
(Numbers refer to depth from ground surface in feet)



(Not to Scale)

Type of protective cover/lock: J. PLUG

Depth of top of roadway box below ground surface: 0.0 ft

Depth of top of riser pipe below ground surface: 0.5 ft

Type of protective casing: ROADWAY BOX
Length: 1.0 ft
Inside Diameter: 8.0 in

Depth of bottom of roadway box: 1.0 ft

Type of Seals	Top of Seal (ft)	Thickness (ft)
Cement	0.0	2.0
Bentonite Seal	2.0	2.0

Type of riser pipe: PVC
Inside diameter of riser pipe: 2.0 in
Type of backfill around riser: CEMENT / BENTONITE

Diameter of borehole: 8.5 in

Depth to top of well screen: 5.0 ft

Type of screen: PVC
Screen gauge or size of openings: 0.1 in
Diameter of screen: 2.0 in
Type of backfill around screen: FILTER SAND

Depth of bottom of well screen: 14.5 ft

Bottom of Screen Cap: 15.0 ft

Depth of bottom of borehole: 15.0 ft

5 ft	+	9.5 ft	+	0.5 ft	=	15 ft
Riser Pay Length (L1)		Length of screen (L2)		Length of screen cap (L3)		Pay length

COMMENTS:

OBSERVATION WELL INSTALLATION REPORT

HALEY & ALDRICH

Well No. PDMW-13
Boring No.

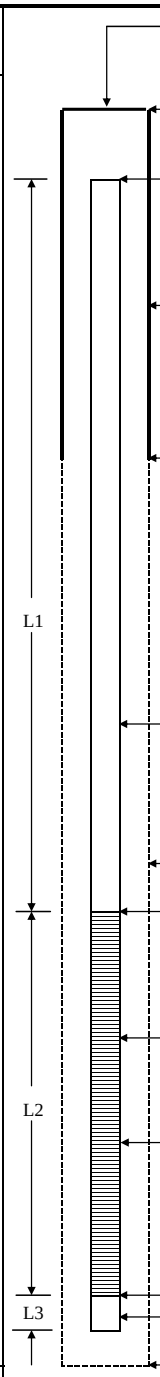
PROJECT	OU-1 REMEDIATION	**H&A FILE NO.**	28612-111
LOCATION	1 RIVER STREET, HASTINGS-ON-HUDSON, NEW YORK	**PROJECT MGR.**	BRYAN SWEENEY
CLIENT	ATLANTIC RICHFIELD	**FIELD REP.**	SEAN CLIFFORD
CONTRACTOR	ADT	**DATE INSTALLED**	10/10/2005
DRILLER	EDDIE SELLMAN	**WATER LEVEL**	

Ground El. 4.01 ft
El. Datum NAVD88
Location SEE PLAN

☐ **Guard Pipe**
☑ **Roadway Box**

SOIL/ROCK CONDITIONS	BOREHOLE BACKFILL
NO SOIL CLASSIFICATION CONDUCTED	
	CEMENT
	2
	BENTONITE
	L1
	4
	FILTER SAND
	L2
	L3
15	15

(Bottom of Exploration)
(Numbers refer to depth from ground surface in feet)



(Not to Scale)

Type of protective cover/lock: J. PLUG
Depth of top of roadway box below ground surface: 0.0 ft
Depth of top of riser pipe below ground surface: 0.5 ft
Type of protective casing: ROADWAY BOX
Length: 1.0 ft
Inside Diameter: 8.0 in
Depth of bottom of roadway box: 1.0 ft

Type of Seals	Top of Seal (ft)	Thickness (ft)
Cement	0.0	2.0
Bentonite Seal	2.0	2.0

Type of riser pipe: PVC
Inside diameter of riser pipe: 2.0 in
Type of backfill around riser: CEMENT / BENTONITE
Diameter of borehole: 8.5 in
Depth to top of well screen: 5.0 ft
Type of screen: PVC
Screen gauge or size of openings: 0.1 in
Diameter of screen: 2.0 in
Type of backfill around screen: FILTER SAND
Depth of bottom of well screen: 14.5 ft
Bottom of Screen Cap: 15.0 ft
Depth of bottom of borehole: 15.0 ft

Riser Pay Length (L1)		Length of screen (L2)		Length of screen cap (L3)		Pay length
5 ft	+	9.5 ft	+	0.5 ft	=	15 ft

COMMENTS:

Form 2007

OBSERVATION WELL INSTALLATION REPORT

HALEY & ALDRICH

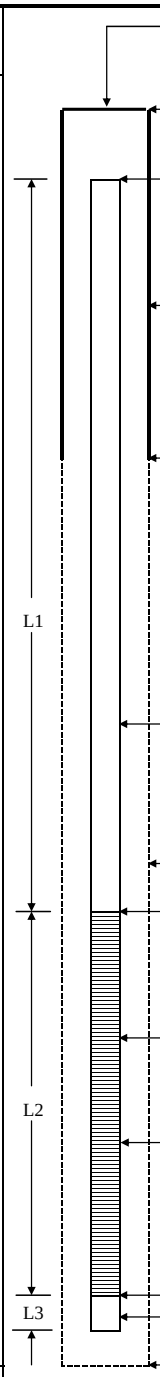
Well No. PDMW-14
Boring No.

PROJECT	OU-1 REMEDIATION	**H&A FILE NO.**	28612-111
LOCATION	1 RIVER STREET, HASTINGS-ON-HUDSON, NEW YORK	**PROJECT MGR.**	BRYAN SWEENEY
CLIENT	ATLANTIC RICHFIELD	**FIELD REP.**	SEAN CLIFFORD
CONTRACTOR	ADT	**DATE INSTALLED**	10/10/2005
DRILLER		**WATER LEVEL**	

Ground El. 4.01 ft
El. Datum NAVD88
Location SEE PLAN
☐ **Guard Pipe**
☑ **Roadway Box**

SOIL/ROCK CONDITIONS	BOREHOLE BACKFILL
NO SOIL CLASSIFICATION CONDUCTED	
	CEMENT
	3
	BENTONITE
	4
	FILTER SAND
15	15

(Bottom of Exploration)
(Numbers refer to depth from ground surface in feet)



Type of protective cover/lock: J. PLUG
Depth of top of roadway box below ground surface: 0.0 ft
Depth of top of riser pipe below ground surface: 0.5 ft
Type of protective casing: ROADWAY BOX
Length: 1.0 ft
Inside Diameter: 8.0 in
Depth of bottom of roadway box: 1.0 ft

Type of Seals	Top of Seal (ft)	Thickness (ft)
Cement	0.0	3.0
Bentonite	3.0	1.0

Type of riser pipe: PVC
Inside diameter of riser pipe: 2.0 in
Type of backfill around riser: Cement / Bentonite
Diameter of borehole: 8.5 in
Depth to top of well screen: 5.0 ft
Type of screen: PVC
Screen gauge or size of openings: 0.1 in
Diameter of screen: 2.0 in
Type of backfill around screen: Filter Sand
Depth of bottom of well screen: 14.5 ft
Bottom of Screen Cap: 15.0 ft
Depth of bottom of borehole: 15.0 ft

(Not to Scale)

5 ft	+	9.5 ft	+	0.5 ft	=	15 ft
Riser Pay Length (L1)		Length of screen (L2)		Length of screen cap (L3)		Pay length

COMMENTS:

Form 2007

OBSERVATION WELL INSTALLATION REPORT

HALEY & ALDRICH

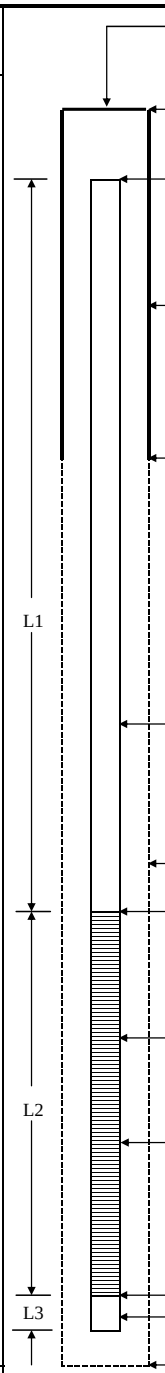
Well No. PDMW-15A
Boring No. PDMW-15A

PROJECT	OU-1 REMEDIATION	**H&A FILE NO.**	28612-111
LOCATION	1 RIVER STREET, HASTINGS-ON-HUDSON, NEW YORK	**PROJECT MGR.**	BRYAN SWEENEY
CLIENT	ATLANTIC RICHFIELD	**FIELD REP.**	JOHN BODE
CONTRACTOR	ADT	**DATE INSTALLED**	10/19/2005
DRILLER	EDDIE SELLMAN	**WATER LEVEL**	

Ground El. 6.11 ft
El. Datum NAVD88
Location SEE PLAN
☐ **Guard Pipe**
☑ **Roadway Box**

SOIL/ROCK CONDITIONS	BOREHOLE BACKFILL
CONCRETE SLABS & STRUCTURES	CEMENT
0.75	
	FILTER SAND
8	2
	BENTONITE CHIPS
FILL	3
	FILTER SAND
15.5	**15.5**
(Bottom of Exploration)	

(Numbers refer to depth from ground surface in feet)



Type of protective cover/lock: Roadway Box Cover / J. Plug

Depth of top of roadway box below ground surface: 0.0 ft

Depth of top of riser pipe below ground surface: 0.3 ft

Type of protective casing: Roadway Box
Length: 1.3 ft
Inside Diameter: 8.0 in

Depth of bottom of roadway box: 1.3 ft

Type of Seals	Top of Seal (ft)	Thickness (ft)
Cement	0.0	0.75
Bentonite Chips	2.0	1.0

Type of riser pipe: Schedule 40 PVC
Inside diameter of riser pipe: 2.0 in
Type of backfill around riser: Bentonite Chips

Diameter of borehole: 8.5 in

Depth to top of well screen: 5.2 ft

Type of screen: Schedule 40 PVC
Screen gauge or size of openings: 0.10 in
Diameter of screen: 2.0 in
Type of backfill around screen: Filter Sand

Depth of bottom of well screen: 15.2 ft

Bottom of Screen Cap: 0.3 ft

Depth of bottom of borehole: 15.5 ft

(Not to Scale)

5.2 ft	+	10 ft	+	0.3 ft	=	15.5 ft
Riser Pay Length (L1)		Length of screen (L2)		Length of screen cap (L3)		Pay length

COMMENTS:

WELL DEVELOPMENT OBSERVATIONS

SITE NAME: OU-1 Remediation, 1 River Street, Hastings-on-Hudson, NY
PROJECT NUMBER: 28612-112

WELL NUMBER: MW-01A
DATE: 10/17/2005
WEATHER: 60's, clear and windy
TIME: 13:00

DEVELOPER: Sean Clifford of Haley & Aldrich
- of -

DESCRIPTION OF WELL

Total Depth: 23.25 ft
Screen Depth: 8.25-23.25 ft
Development Method: Foot Valve
Diameter: 2 in
-
-

GROUNDWATER PURGING

Initial Static Water Level: 2.95 ft

One Well Volume:					3 Volumes
2-inch Casing:	20.30	Feet of Water x 0.16 Gallons/Foot =	3.25	Gallons	9.74
4-inch Casing:	-	Feet of Water x 0.65 Gallons/Foot =	-	Gallons	-
6-inch Casing:	-	Feet of Water x 1.5 Gallons/Foot =	-	Gallons	-

Volume of groundwater purged: 35 Gallons
Purging Device: Foot Valve
Purge Water Disposition (e.g. contained): Initially silty and then became clear. Contained water in 55 gal drum. Well casing is bent at 2 ft below grade and will not allow pump below that level.

FIELD MEASUREMENTS

Time	Temp. (Degrees C)	pH	Conductivity (uS/cm)	Turbidity (NTUs)	Comments
13:00	-	-	-	-	Start with foot valve
15:00	-	-	-	-	Stop

NOTE: Field measurements not taken as development being conducted with watera tubing and a foot valve typically does not yield representative values due to agitation of fine sediment within a well.

WELL DEVELOPMENT OBSERVATIONS

SITE NAME: OU-1 Remediation, 1 River Street, Hastings-on-Hudson, NY
PROJECT NUMBER: 28612-112

WELL NUMBER: MW-02A
DATE: 10/17/2005
WEATHER: 60's, clear and windy
TIME: 9:45

DEVELOPER: Sean Clifford of Haley & Aldrich
- of -

DESCRIPTION OF WELL

Total Depth: 16.0 ft
Diameter: 2 in
Screen Depth: 6.0-16.0 ft
-
Development Method: Foot valve and pump
-

GROUNDWATER PURGING

Initial Static Water Level: 2.77 ft

One Well Volume:					3 Volumes
2-inch Casing:	13.23	Feet of Water x 0.16 Gallons/Foot =	2.12	Gallons	6.36
4-inch Casing:	-	Feet of Water x 0.65 Gallons/Foot =	-	Gallons	-
6-inch Casing:	-	Feet of Water x 1.5 Gallons/Foot =	-	Gallons	-

Volume of groundwater purged: 35 Gallons
Purging Device: Foot valve and Grunfos pump
Purge Water Disposition (e.g. contained): Cleared 5" of silt and sand from bottom of well with foot valve, then developed well with pump. Contained water in 55 gal drum.

FIELD MEASUREMENTS

Time	Temp. (Degrees C)	pH	Conductivity (uS/cm)	Turbidity (NTUs)	Comments
9:45	-	-	-	-	Start with foot valve
10:15	-	-	-	-	Stop with foot valve
11:15	-	-	-	-	Start pump (~ 1 gpm)
11:45	-	-	-	-	Stop pump
-	-	-	-	-	Start with foot valve
12:10	-	-	-	-	Stop with foot valve

NOTE: Field measurements not taken as development being conducted with watera tubing and a foot valve typically does not yield representative values due to agitation of fine sediment within a well.

WELL DEVELOPMENT OBSERVATIONS

SITE NAME: OU-1 Remediation, 1 River Street, Hastings-on-Hudson, NY
PROJECT NUMBER: 28612-112

WELL NUMBER: MW-03A WEATHER: 60's, Sunny
DATE: 11/8/2005 TIME: 11:18

DEVELOPER: J. Bode of Haley & Aldrich
O. Lawlor of Haley & Aldrich

DESCRIPTION OF WELL
Total Depth: 15.0 ft Diameter: 2 in
Screen Depth: 5.0-15.0 ft -
Development Method: DC whale pump -

GROUNDWATER PURGING
Initial Static Water Level: 3.92 ft

One Well Volume:					3 Volumes
2-inch Casing:	11.50	Feet of Water x 0.16 Gallons/Foot =	1.84	Gallons	5.52
4-inch Casing:	-	Feet of Water x 0.65 Gallons/Foot =	-	Gallons	-
6-inch Casing:	-	Feet of Water x 1.5 Gallons/Foot =	-	Gallons	-

Volume of groundwater purged: 6.6 Gallons
Purging Device: DC whale pump
Purge Water Disposition (e.g. contained): 55 gallon drum

FIELD MEASUREMENTS

Time	Temp. (Degrees C)	pH	Conductivity (uS/cm)	Turbidity (NTUs)	Comments
11:27	19.21	7.59	7.57	15.70	0.5 gallons purged
11:32	19.26	7.91	7.55	7.83	2 gallons purged
11:42	19.24	8.06	7.57	3.56	4 gallons purged
11:51	19.19	8.15	7.56	2.94	6.6 gallons purged

WELL DEVELOPMENT OBSERVATIONS

SITE NAME: OU-1 Remediation, 1 River Street, Hastings-on-Hudson, NY
PROJECT NUMBER: 28612-112

WELL NUMBER: MW-05 WEATHER:
DATE: 11/8/2005 TIME: 14:20

DEVELOPER: J. Bode of Haley & Aldrich
O. Lawlor of Haley & Aldrich

DESCRIPTION OF WELL
Total Depth: 19.91 ft Diameter: 2 in
Screen Depth: 3.91-19.91 ft -
Development Method: DC whale pump -

GROUNDWATER PURGING
Initial Static Water Level: 2.42 ft

	One Well Volume:				3 Volumes
2-inch Casing:	17.49	Feet of Water x 0.16 Gallons/Foot =	2.80	Gallons	8.40
4-inch Casing:	-	Feet of Water x 0.65 Gallons/Foot =	-	Gallons	-
6-inch Casing:	-	Feet of Water x 1.5 Gallons/Foot =	-	Gallons	-

Volume of groundwater purged: 8 Gallons
Purging Device: DC whale pump
Purge Water Disposition (e.g. contained): 55 gallon drum

FIELD MEASUREMENTS

Time	Temp. (Degrees C)	pH	Conductivity (uS/cm)	Turbidity (NTUs)	Comments
14:25	16.92	7.04	1.53	11.50	1 gal, light gray color purged
14:34	17.57	6.97	1.81	82.20	3 gallons purged
14:44	17.48	6.99	2.01	7.55	5.5 gallons purged
14:47	17.49	6.99	2.01	5.49	7 gallons purged
14:57	17.40	6.96	2.02	1.83	8 gallons purged

WELL DEVELOPMENT OBSERVATIONS

SITE NAME: OU-1 Remediation, 1 River Street, Hastings-on-Hudson, NY
PROJECT NUMBER: 28612-112

WELL NUMBER: MW-07 WEATHER: 50's, clear and windy
DATE: 10/18/2005 TIME: 8:15

DEVELOPER: Sean Clifford of Haley & Aldrich
- of -

DESCRIPTION OF WELL

Total Depth: 19.75 ft Diameter: 2 in
Screen Depth: 4.75-19.75 ft -
Development Method: Foot valve/pump -

GROUNDWATER PURGING

Initial Static Water Level: 4.85 ft

One Well Volume:					3 Volumes
2-inch Casing:	14.90	Feet of Water x 0.16 Gallons/Foot =	2.38	Gallons	7.15
4-inch Casing:	-	Feet of Water x 0.65 Gallons/Foot =	-	Gallons	-
6-inch Casing:	-	Feet of Water x 1.5 Gallons/Foot =	-	Gallons	-

Volume of groundwater purged: 35 Gallons
Purging Device: Foot valve/ Grunfos pump
Purge Water Disposition (e.g. contained): At first water was silty and then became clear. Contained in 55 gallon drum.

FIELD MEASUREMENTS

Time	Temp. (Degrees C)	pH	Conductivity (uS/cm)	Turbidity (NTUs)	Comments
8:15	-	-	-	-	Start with foot valve
8:30	-	-	-	-	Start with pump
9:00	-	-	-	-	Start with foot valve
9:20	-	-	-	-	Stop

NOTE: Field measurements not taken as development being conducted with watera tubing and a foot valve typically does not yield representative values due to agitation of fine sediment within a well.

WELL DEVELOPMENT OBSERVATIONS

SITE NAME: OU-1 Remediation, 1 River Street, Hastings-on-Hudson, NY
PROJECT NUMBER: 28612-112

WELL NUMBER: MW-09 WEATHER: 60 and sunny
DATE: 11/8/2005 TIME: 9:30

DEVELOPER: J. Bode of Haley & Aldrich
O. Lawlor of Haley & Aldrich

DESCRIPTION OF WELL
Total Depth: 20.2 ft Diameter: 2 in
Screen Depth: 5.2-20.2 ft -
Development Method: DC whale pump -

GROUNDWATER PURGING
Initial Static Water Level: 6.26 ft

One Well Volume:					3 Volumes
2-inch Casing:	13.94	Feet of Water x 0.16 Gallons/Foot =	2.23	Gallons	6.69
4-inch Casing:	-	Feet of Water x 0.65 Gallons/Foot =	-	Gallons	-
6-inch Casing:	-	Feet of Water x 1.5 Gallons/Foot =	-	Gallons	-

Volume of groundwater purged: 6.6 Gallons
Purging Device: DC whale pump
Purge Water Disposition (e.g. contained): 55 gallon drum

FIELD MEASUREMENTS

Time	Temp. (Degrees C)	pH	Conductivity (uS/cm)	Turbidity (NTUs)	Comments
9:49	16.67	6.83	3.29	242	light gray
9:54	17.50	6.83	3.36	45.5	
9:54	17.56	6.85	3.55	12.7	~2.3 gallons purged
10:02	17.59	6.85	3.62	7.39	~3.5 gallons purged
10:06	17.60	6.86	3.68	4.65	~4 gallons removed purged
10:10	17.60	6.86	3.73	3.86	~ 5.5 gallons purged
10:16	17.62	6.86	3.78	3.39	6.6 gallons purged

WELL DEVELOPMENT OBSERVATIONS

SITE NAME: OU-1 Remediation, 1 River Street, Hastings-on-Hudson, NY
PROJECT NUMBER: 28612-112

WELL NUMBER: PDMW-01 WEATHER: 70's, clear
DATE: 10/19/2005 TIME: 9:40

DEVELOPER: S. Clifford of Haley & Aldrich
- of -

DESCRIPTION OF WELL
Total Depth: 60.65 ft Diameter: 2 in
Screen Depth: 49.0-59.0 ft -
Development Method: Foot valve and pump -

GROUNDWATER PURGING
Initial Static Water Level: 2.75 ft

	One Well Volume:				3 Volumes
2-inch Casing:	57.90	Feet of Water x 0.16 Gallons/Foot =	9.26	Gallons	27.79
4-inch Casing:	-	Feet of Water x 0.65 Gallons/Foot =	-	Gallons	-
6-inch Casing:	-	Feet of Water x 1.5 Gallons/Foot =	-	Gallons	-

Volume of groundwater purged: 45 Gallons
Purging Device: Foot valve, Grunfos pump
Purge Water Disposition (e.g. contained): Silty at first then became clear.

FIELD MEASUREMENTS

Time	Temp. (Degrees C)	pH	Conductivity (uS/cm)	Turbidity (NTUs)	Comments
13:20	-	-	-	20	Collected reading on 10/19/05
8:00	-	-	-	16	Collected reading on 10/20/05

WELL DEVELOPMENT OBSERVATIONS

SITE NAME: OU-1 Remediation, 1 River Street, Hastings-on-Hudson, NY
PROJECT NUMBER: 28612-112

WELL NUMBER: PDMW-02 WEATHER: 45 and sunny
DATE: 11/2/2005 TIME: 8:00

DEVELOPER: Tim Erickson of Haley & Aldrich
- of -

DESCRIPTION OF WELL
Total Depth: 54.0 ft below PVC Diameter: 2 in
Screen Depth: 44.0-54.0 ft -
Development Method: DC whale pump, Grunfos pump -

GROUNDWATER PURGING
Initial Static Water Level: 5.47 ft below PVC

	One Well Volume:				3 Volumes
2-inch Casing:	46.29	Feet of Water x 0.16 Gallons/Foot =	7.41	Gallons	22.22
4-inch Casing:	-	Feet of Water x 0.65 Gallons/Foot =	-	Gallons	-
6-inch Casing:	-	Feet of Water x 1.5 Gallons/Foot =	-	Gallons	-

Volume of groundwater purged: 25 Gallons
Purging Device: DC whale pump, Grunfos pump
Purge Water Disposition (e.g. contained): 55 gallon drum

FIELD MEASUREMENTS

Time	Temp. (Degrees C)	pH	Conductivity (uS/cm)	Turbidity (NTUs)	Comments
8:40	16.13	9.75	1.55	>999	
9:00	16.06	9.50	1.64	>11	fluctuating
9:10	16.33	9.33	1.72	577	
9:40	16.25	9.24	1.85	701	

NOTE: Well goes dry after pumping for 15 minutes

WELL DEVELOPMENT OBSERVATIONS

SITE NAME: OU-1 Remediation, 1 River Street, Hastings-on-Hudson, NY
PROJECT NUMBER: 28612-112

WELL NUMBER: PDMW-03 WEATHER: 60's, sunny
DATE: 11/2/2005 TIME: 12:00

DEVELOPER: John Bode of Haley & Aldrich
- of -

DESCRIPTION OF WELL
Total Depth: 44.2 ft below guard pipe Diameter: 2 in
Screen Depth: 30-40 ft bgs --
Development Method: DC whale pump 1.25 in

GROUNDWATER PURGING
Initial Static Water Level: 6.61 ft below guard pipe

	One Well Volume:				3 Volumes
2-inch Casing:	37.59	Feet of Water x 0.16 Gallons/Foot =	6.01	Gallons	18.04
4-inch Casing:	-	Feet of Water x 0.65 Gallons/Foot =	-	Gallons	-
6-inch Casing:	-	Feet of Water x 1.5 Gallons/Foot =	-	Gallons	-

Volume of groundwater purged: 22 Gallons
Purging Device: DC whale pump
Purge Water Disposition (e.g. contained): Contained in drum

FIELD MEASUREMENTS

Time	Temp. (Degrees C)	pH	Conductivity (uS/cm)	Turbidity (NTUs)	Comments
15:25	16.87	7.27	5.313	>999	
15:35	16.94	7.17	5.495	>999	
15:45	17.45	7.14	5.591	>999	
16:04	17.6	7.12	5.583	>999	
16:16	17.5	7.11	5.513	102*	

* 102 turbidity taken when pumping at a low flow rate. At higher pumping rate turbidity is >999.

NOTES: Pumped 15 gallons of water from hole prior to collecting parameters. Able to pump water 35 ft below guard pipe and then water would not recharge fast enough to continue pumping. Cut pumping rate down and started measuring parameters with TSI and HAVIT turbidity meter.

WELL DEVELOPMENT OBSERVATIONS

SITE NAME: OU-1 Remediation, 1 River Street, Hastings-on-Hudson, NY
PROJECT NUMBER: 28612-112

WELL NUMBER: PDMW-04 WEATHER: 60's, clear
DATE: 10/18/05, 10/19/05 TIME: 10:30

DEVELOPER: S. Clifford of Haley & Aldrich
- of -

DESCRIPTION OF WELL
Total Depth: 55 ft Diameter: 2 in
Screen Depth: 45-55 ft -
Development Method: Foot valve and pump -

GROUNDWATER PURGING
Initial Static Water Level: 5.0 ft

One Well Volume:					3 Volumes
2-inch Casing:	50.00	Feet of Water x 0.16 Gallons/Foot =	8.00	Gallons	24.00
4-inch Casing:	-	Feet of Water x 0.65 Gallons/Foot =	-	Gallons	-
6-inch Casing:	-	Feet of Water x 1.5 Gallons/Foot =	-	Gallons	-

Volume of groundwater purged: 75 Gallons
Purging Device: Foot valve/ Grunfos pump
Purge Water Disposition (e.g. contained): Initially silty then became opaque. Contained in 55 gallon drum.

FIELD MEASUREMENTS not measured
10/18/2005

Time	Temp. (Degrees C)	pH	Conductivity (uS/cm)	Turbidity (NTUs)	Comments
10:45	-	-	-	-	Start foot valve
11:15	-	-	-	-	Stop foot valve
12:50	-	-	-	-	Start pump
13:40	-	-	-	-	Stop pump (DTW = 40 ft)
13:55	-	-	-	-	DTW = 16.9 ft
14:21	-	-	-	-	DTW = 10'
14:25	-	-	-	-	Start pump
14:30	-	-	-	-	Stop pump (DTW = 40 ft) - pump rate was 1.0-1.5 gpm
14:32	-	-	-	-	DTW = 30 ft
14:39	-	-	-	-	DTW = 20 ft
15:04	-	-	-	-	DTW = 11 ft
15:05	-	-	-	-	Start pump
15:30	-	-	-	-	Stop pump
15:35	-	-	-	-	Start foot valve
16:00	-	-	-	-	Stop foot valve

* 10/19/05, 8:00~ measured turbidity at 160 NTUs, then pumped additional 25 gallons out, in an attempt to lower turbidity, however water remains opaque.

WELL DEVELOPMENT OBSERVATIONS

SITE NAME: OU-1 Remediation, 1 River Street, Hastings-on-Hudson, NY
PROJECT NUMBER: 28612-112

WELL NUMBER: PDMW-05 WEATHER: 40 and sunny
DATE: 10/31/2005 TIME: 10:00

DEVELOPER: Tim Erickson of Haley & Aldrich
- of -

DESCRIPTION OF WELL
Total Depth: 52.65 ft below PVC Diameter: 2 in
Screen Depth: 44-54 ft -
Development Method: DC whale pump -

GROUNDWATER PURGING
Initial Static Water Level: 5.82 ft below PVC

	One Well Volume:				3 Volumes
2-inch Casing:	46.83	Feet of Water x 0.16 Gallons/Foot =	7.49	Gallons	22.48
4-inch Casing:	-	Feet of Water x 0.65 Gallons/Foot =	-	Gallons	-
6-inch Casing:	-	Feet of Water x 1.5 Gallons/Foot =	-	Gallons	-

Volume of groundwater purged: 25 Gallons
Purging Device: DC whale pump
Purge Water Disposition (e.g. contained): 55 gallon drum

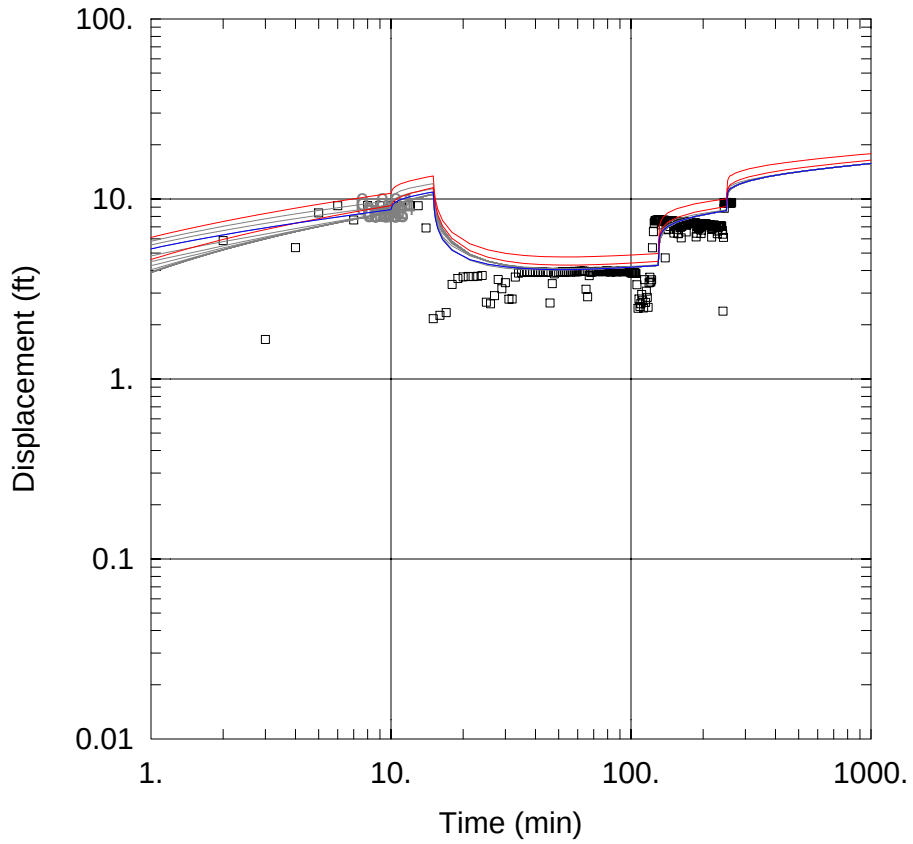
FIELD MEASUREMENTS

Time	Temp. (Degrees C)	pH	Conductivity (uS/cm)	Turbidity (NTUs)	Comments
11:25	18.72	11.57	1.54	>999	
11:40	19.30	10.79	1.03	>999	
11:55	18.39	10.69	0.91	>999	
12:25	18.02	9.65	0.87	>62	fluctuating

ATTACHMENT 6B

Aquifer Test Analyses

Pump Test 1



STEP RATE PUMPING TEST NO. 1

Data Set: G:\...\NEUMAN- MW-3A.aqt
Date: 11/04/05 Time: 07:15:50

PROJECT INFORMATION

Company: HALEY & ALDRICH OF NEW YORK
Client: ATLANTIC-RICHFIELD
Project: 28612-112
Test Location: HASTINGS-ON-HUDSON, NEW YORK
Test Well: MW-3A
Test Date: 24 OCT 05

SOLUTION

Aquifer Model: Unconfined
Solution Method: Neuman

T = 18.86 ft^2/day
S = 0.2165
Sy = 0.47
ß = 0.01

AQUIFER DATA

Saturated Thickness: 11.98 ft

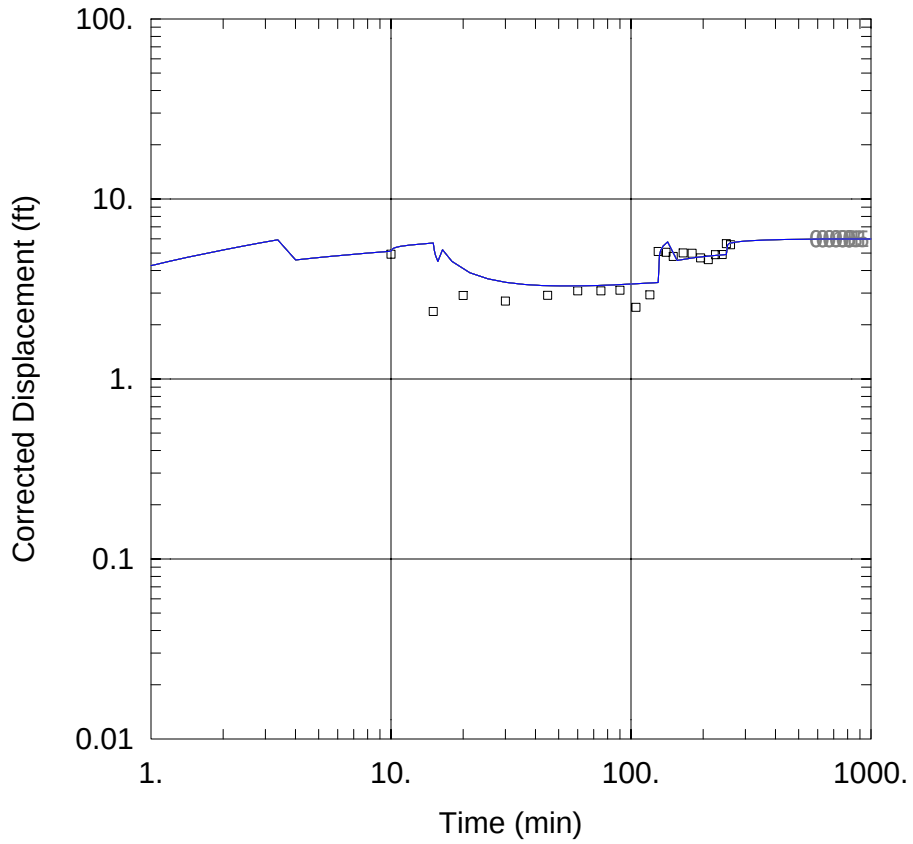
WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
MW-3A	0	0

Observation Wells

Well Name	X (ft)	Y (ft)
▫ MW-3A	0.083	0



STEP RATE PUMPING TEST NO. 1

Data Set: G:\...\THEIS- MANUAL- MW-3A.aqt
Date: 11/07/05 Time: 07:54:48

PROJECT INFORMATION

Company: HALEY & ALDRICH OF NEW YORK
Client: ATLANTIC-RICHFIELD
Project: 28612-112
Test Location: HASTINGS-ON-HUDSON, NEW YORK
Test Well: MW-3A
Test Date: 24 OCT 05

SOLUTION

Aquifer Model: Unconfined
Solution Method: Theis

T = 27.51 ft^2/day
S = 0.3
Kz/Kr = 1.
b = 11.98 ft

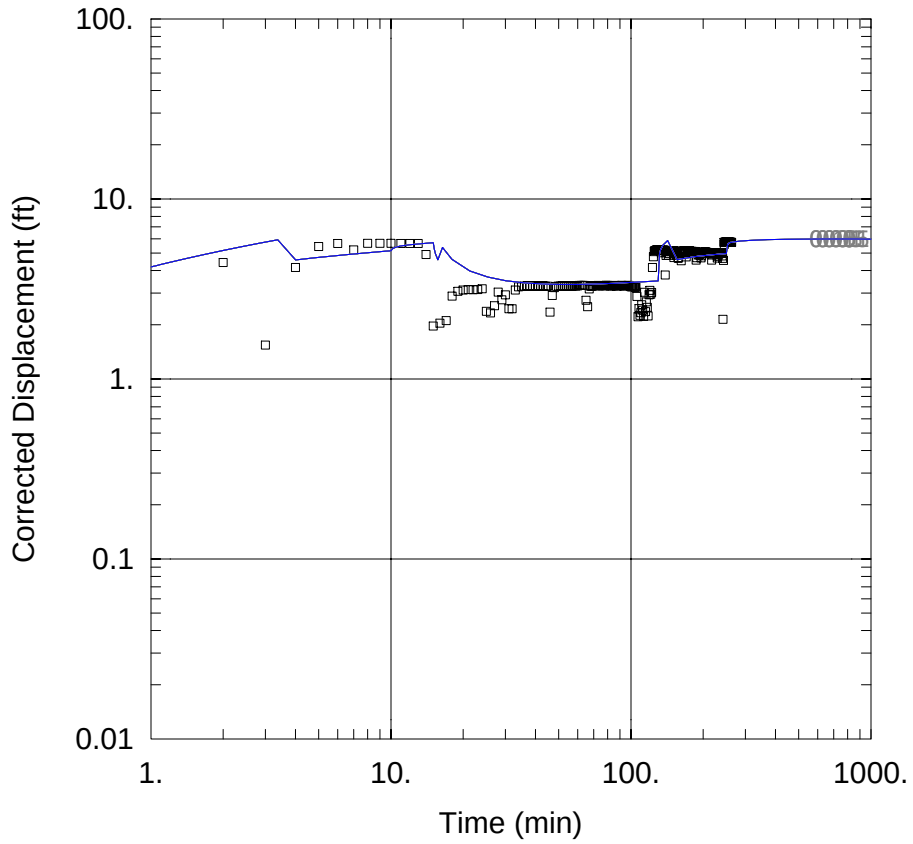
WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
MW-3A	0	0

Observation Wells

Well Name	X (ft)	Y (ft)
MW-3A	0.083	0



STEP RATE PUMPING TEST NO. 1

Data Set: G:\...\THEIS- MW-3A.aqt
Date: 11/04/05 Time: 07:12:41

PROJECT INFORMATION

Company: HALEY & ALDRICH OF NEW YORK
Client: ATLANTIC-RICHFIELD
Project: 28612-112
Test Location: HASTINGS-ON-HUDSON, NEW YORK
Test Well: MW-3A
Test Date: 24 OCT 05

SOLUTION

Aquifer Model: Unconfined
Solution Method: Theis

T = 26.33 ft^2/day
S = 0.3459
Kz/Kr = 1.
b = 11.98 ft

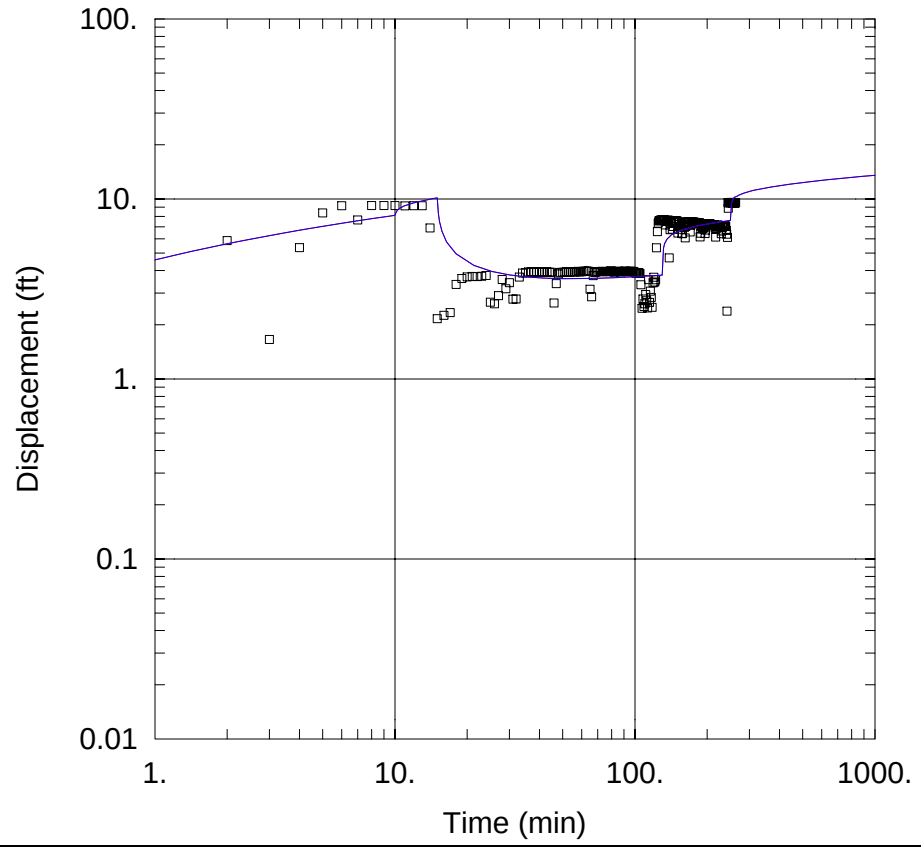
WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
MW-3A	0	0

Observation Wells

Well Name	X (ft)	Y (ft)
▫ MW-3A	0.083	0



STEP RATE PUMPING TEST NO. 1

Data Set: G:\...\THEIS-ST- MW-3A.aqt
Date: 11/04/05 Time: 07:13:40

PROJECT INFORMATION

Company: HALEY & ALDRICH OF NEW YORK
Client: ATLANTIC-RICHFIELD
Project: 28612-112
Test Location: HASTINGS-ON-HUDSON, NEW YORK
Test Well: MW-3A
Test Date: 24 OCT 05

SOLUTION

Aquifer Model: Confined
Solution Method: Theis (Step Test)

T = 24.71 ft^2/day
S = 0.3
Sw = 0.
C = 0. min^2/ft^5
P = 2.

Step Test Model: Jacob-Rorabaugh
Time (t) = 1. min Rate (Q) in cu. ft/min
$s(t) = 13.71Q + 0.Q^{2.}$
W.E. = 100.%

AQUIFER DATA

Saturated Thickness: 11.98 ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA

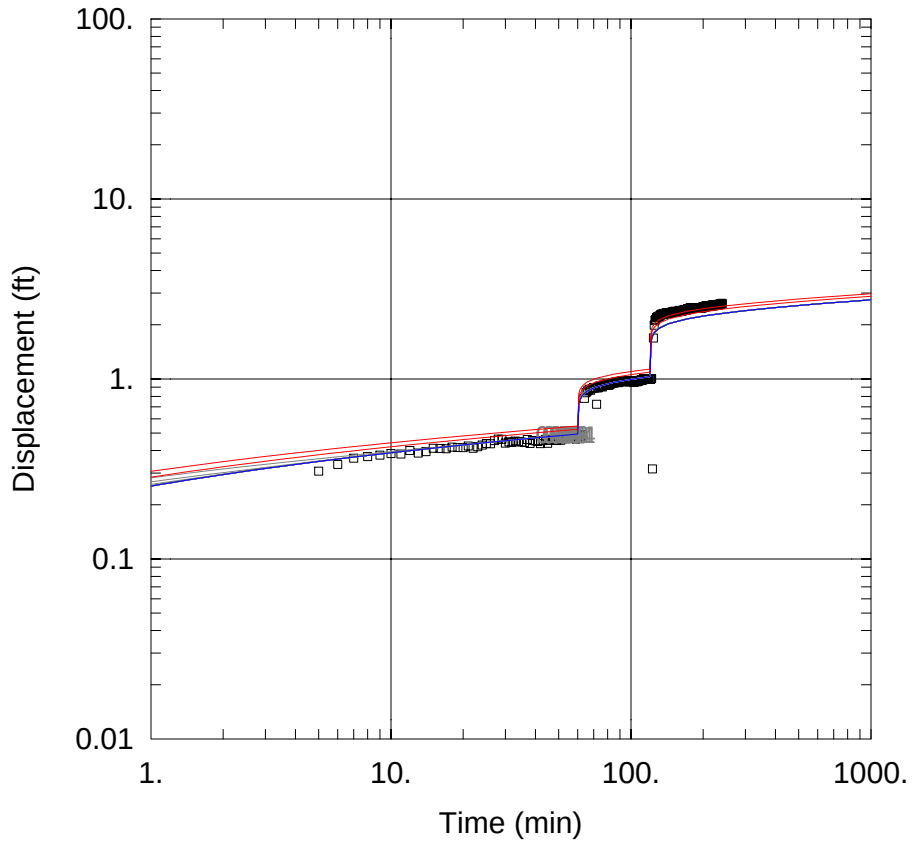
Pumping Wells

Well Name	X (ft)	Y (ft)
MW-3A	0	0

Observation Wells

Well Name	X (ft)	Y (ft)
▫ MW-3A	0.083	0

Pump Test 2



STEP RATE PUMPING TEST NO. 2

Data Set: G:\...\NEUMAN- MW-2A.aqt
Date: 11/04/05 Time: 07:22:29

PROJECT INFORMATION

Company: HALEY & ALDRICH OF NEW YORK
Client: ATLANTIC-RICHFIELD
Project: 28612-112
Test Location: HASTINGS-ON-HUDSON, NEW YORK
Test Well: MW-2A
Test Date: 26 OCT 05

SOLUTION

Aquifer Model: Unconfined
Solution Method: Neuman

T = 260.5 ft^2/day
S = 0.3234
Sy = 0.47
ß = 7.

AQUIFER DATA

Saturated Thickness: 13.65 ft

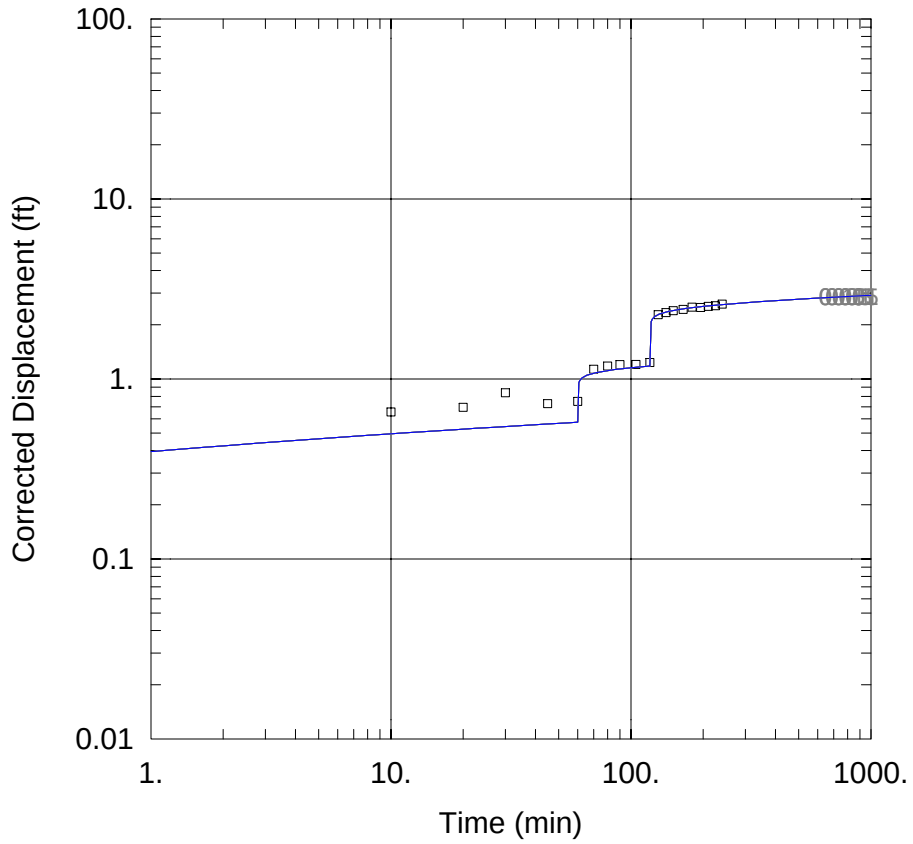
WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
MW-2A	0	0

Observation Wells

Well Name	X (ft)	Y (ft)
▫ MW-2A	0.083	0



STEP RATE PUMPING TEST NO. 2

Data Set: G:\...\THEIS- MANUAL- MW-2A.aqt
Date: 11/07/05 Time: 07:56:56

PROJECT INFORMATION

Company: HALEY & ALDRICH OF NEW YORK
Client: ATLANTIC-RICHFIELD
Project: 28612-112
Test Location: HASTINGS-ON-HUDSON, NEW YORK
Test Well: MW-2A
Test Date: 26 OCT 05

SOLUTION

Aquifer Model: Unconfined
Solution Method: Theis

T = 348.6 ft^2/day
S = 0.01
Kz/Kr = 1.
b = 13.65 ft

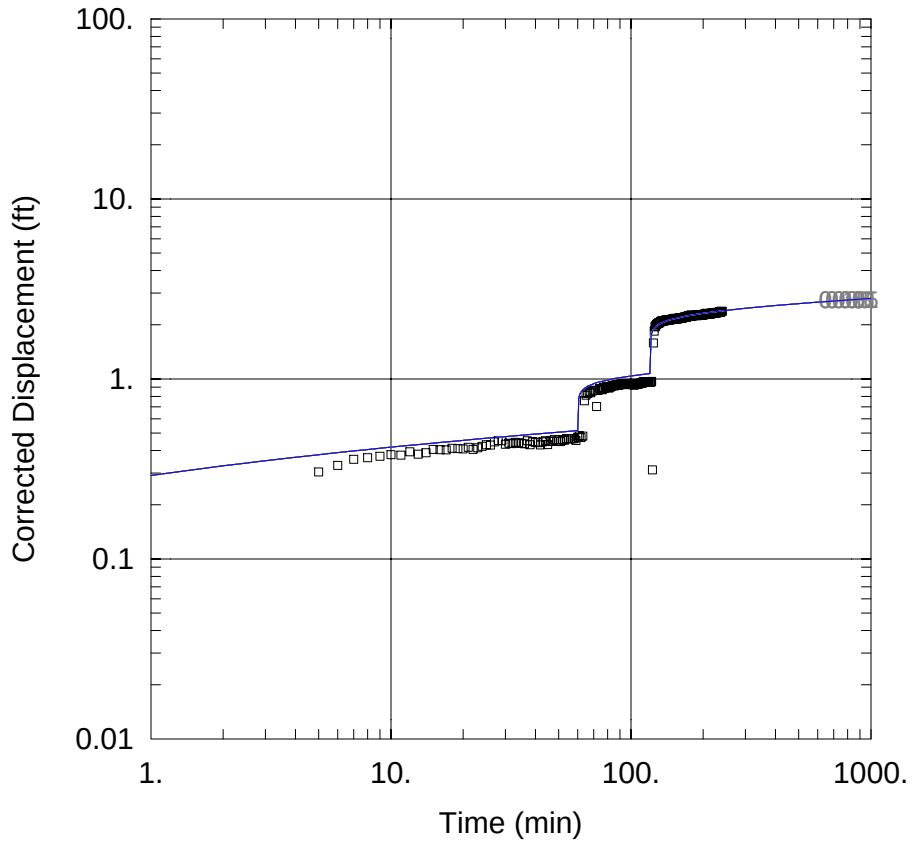
WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
MW-2A	0	0

Observation Wells

Well Name	X (ft)	Y (ft)
▫ MW-2A	0.083	0



STEP RATE PUMPING TEST NO. 2

Data Set: G:\...\THEIS- MW-2A.aqt
Date: 11/04/05 Time: 07:20:39

PROJECT INFORMATION

Company: HALEY & ALDRICH OF NEW YORK
Client: ATLANTIC-RICHFIELD
Project: 28612-112
Test Location: HASTINGS-ON-HUDSON, NEW YORK
Test Well: MW-2A
Test Date: 26 OCT 05

SOLUTION

Aquifer Model: Unconfined
Solution Method: Theis

T = 277.9 ft^2/day
S = 0.3234
Kz/Kr = 1.
b = 13.65 ft

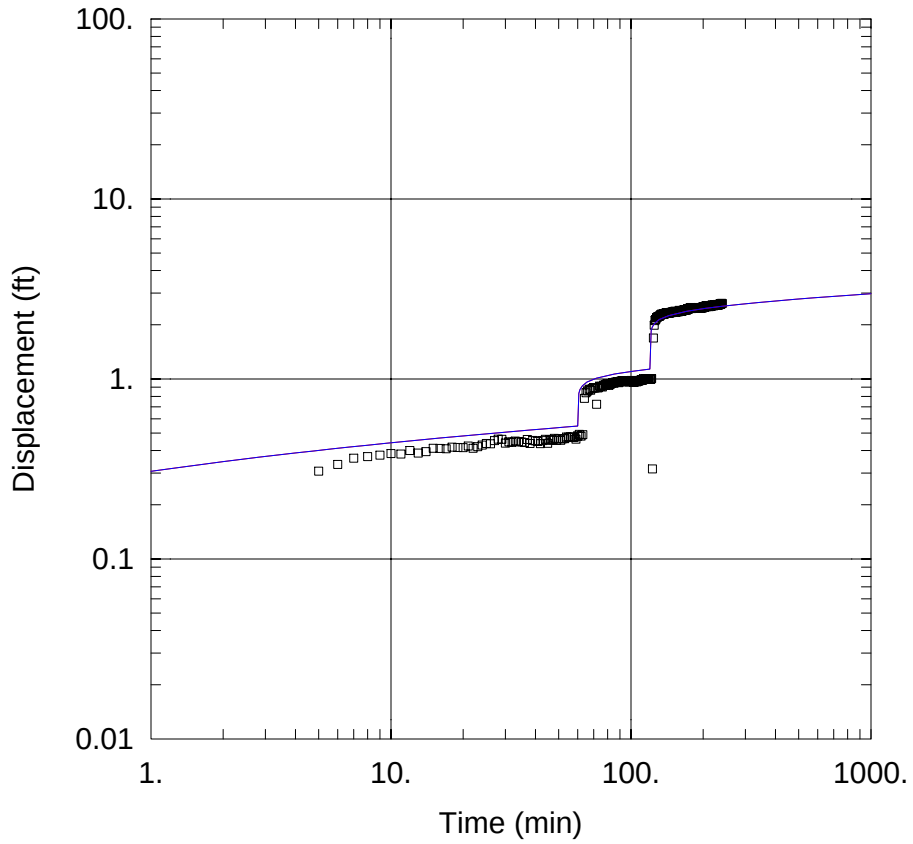
WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
MW-2A	0	0

Observation Wells

Well Name	X (ft)	Y (ft)
▫ MW-2A	0.083	0



STEP RATE PUMPING TEST NO. 2

Data Set: G:\...\THEIS-PT- MW-2A.aqt
Date: 11/04/05 Time: 07:21:34

PROJECT INFORMATION

Company: HALEY & ALDRICH OF NEW YORK
Client: ATLANTIC-RICHFIELD
Project: 28612-112
Test Location: HASTINGS-ON-HUDSON, NEW YORK
Test Well: MW-2A
Test Date: 26 OCT 05

SOLUTION

Aquifer Model: Confined
Solution Method: Theis (Step Test)

T = 260.5 ft^2/day
S = 0.3234
Sw = 0.
C = 0. min^2/ft^5
P = 2.

Step Test Model: Jacob-Rorabaugh
Time (t) = 1. min Rate (Q) in cu. ft/min
$s(t) = 2.292Q + 0.Q^{2.}$
W.E. = 100.%

AQUIFER DATA

Saturated Thickness: 13.65 ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA

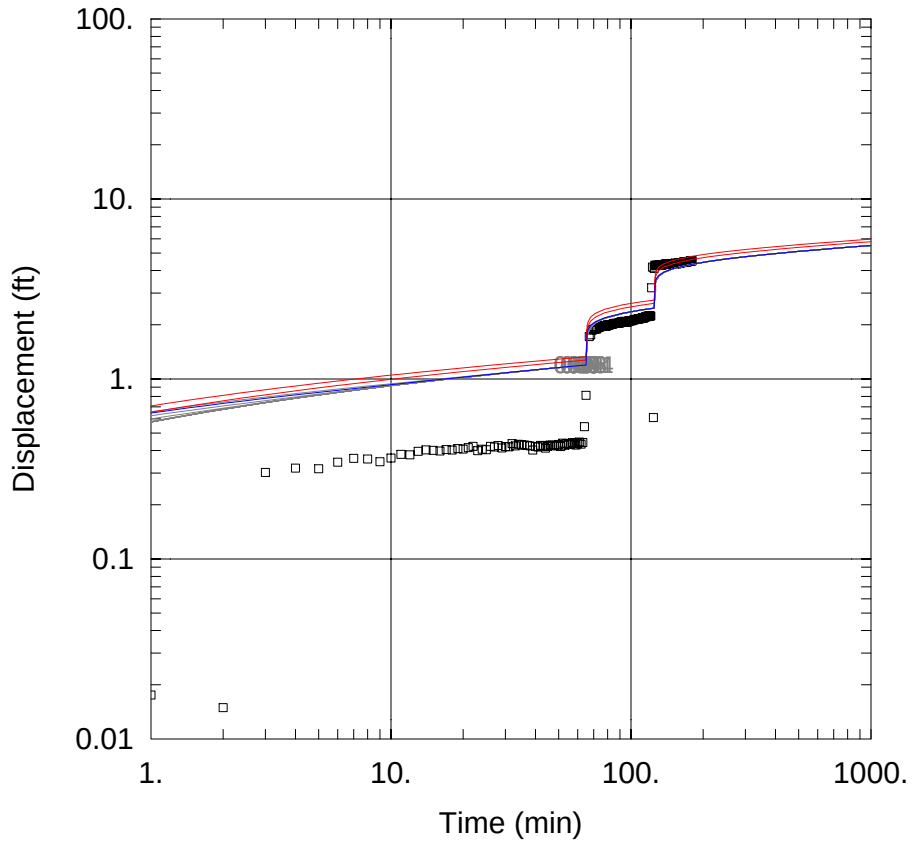
Pumping Wells

Well Name	X (ft)	Y (ft)
MW-2A	0	0

Observation Wells

Well Name	X (ft)	Y (ft)
▫ MW-2A	0.083	0

Pump Test 3



STEP RATE PUMPING TEST NO. 3

Data Set: G:\...\NEUMAN- MW-7.aqt
Date: 11/04/05 Time: 07:35:14

PROJECT INFORMATION

Company: HALEY & ALDRICH OF NEW YORK
Client: ATLANTIC-RICHFIELD
Project: 28612-112
Test Location: HASTINGS-ON-HUDSON, NEW YORK
Test Well: MW-7
Test Date: 27 OCT 05

SOLUTION

Aquifer Model: Unconfined
Solution Method: Neuman

T = 154.6 ft^2/day
S = 0.3
Sy = 0.4339
ß = 0.001666

AQUIFER DATA

Saturated Thickness: 15.35 ft

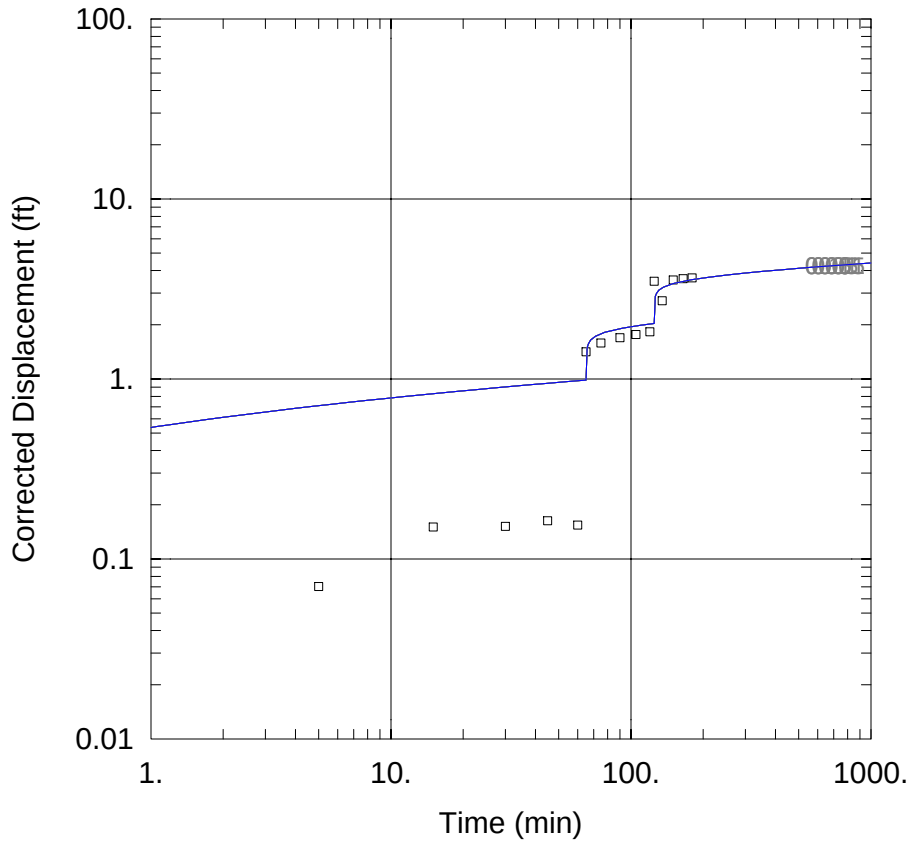
WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
MW-7	0	0

Observation Wells

Well Name	X (ft)	Y (ft)
▫ MW-7	0.083	0



STEP RATE PUMPING TEST NO. 3

Data Set: G:\...\THEIS- MANUAL- MW-7.aqt
Date: 11/07/05 Time: 07:59:17

PROJECT INFORMATION

Company: HALEY & ALDRICH OF NEW YORK
Client: ATLANTIC-RICHFIELD
Project: 28612-112
Test Location: HASTINGS-ON-HUDSON, NEW YORK
Test Well: MW-7
Test Date: 27 OCT 05

SOLUTION

Aquifer Model: Unconfined
Solution Method: Theis

T = 214. ft^2/day
S = 0.3258
Kz/Kr = 1.
b = 15.35 ft

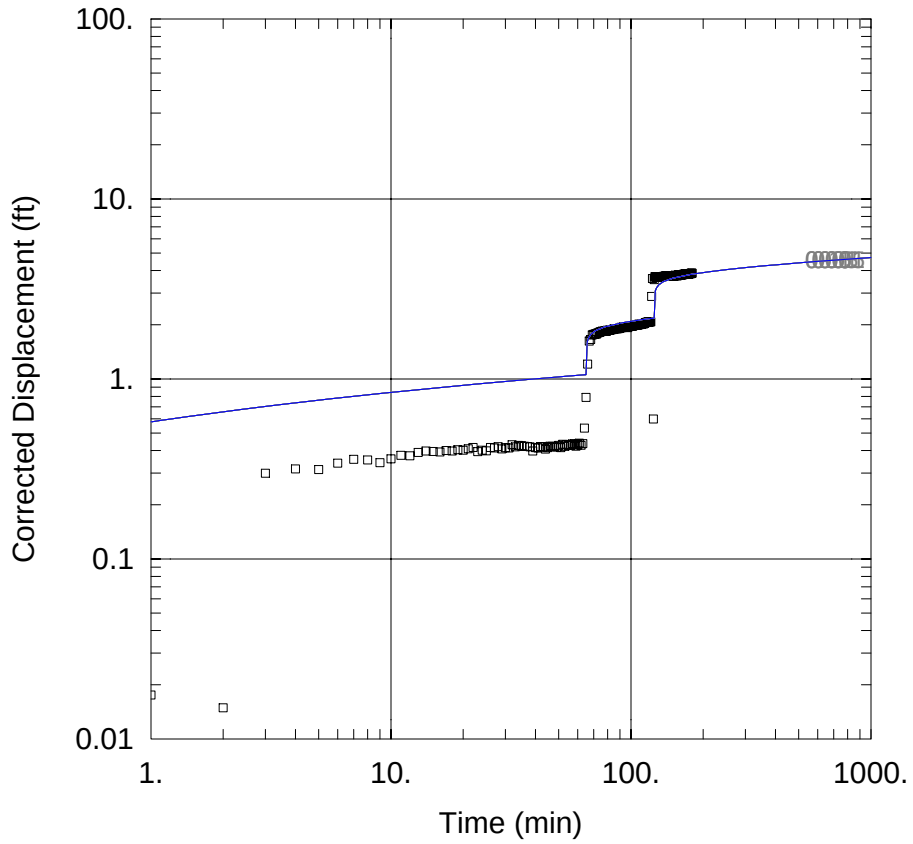
WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
MW-7	0	0

Observation Wells

Well Name	X (ft)	Y (ft)
▫ MW-7	0.083	0



STEP RATE PUMPING TEST NO. 3

Data Set: G:\...\THEIS- MW-7.aqt
Date: 11/04/05 Time: 07:29:55

PROJECT INFORMATION

Company: HALEY & ALDRICH OF NEW YORK
Client: ATLANTIC-RICHFIELD
Project: 28612-112
Test Location: HASTINGS-ON-HUDSON, NEW YORK
Test Well: MW-7
Test Date: 27 OCT 05

SOLUTION

Aquifer Model: Unconfined
Solution Method: Theis

T = 199.9 ft^2/day
S = 0.3
Kz/Kr = 1.
b = 15.35 ft

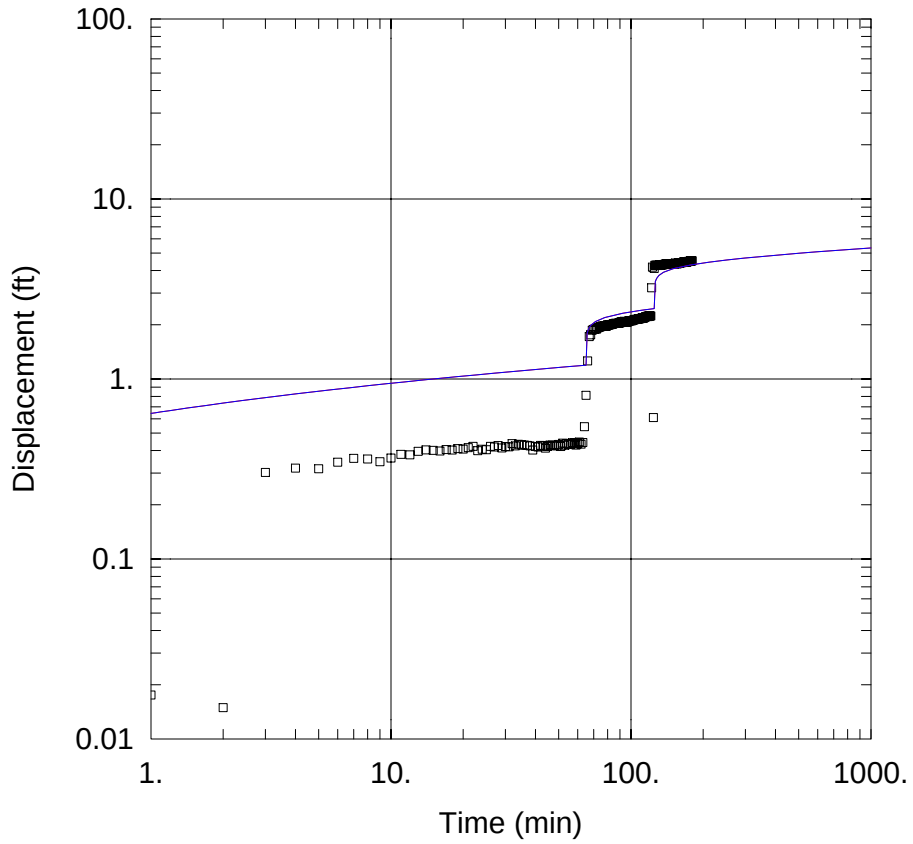
WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
MW-7	0	0

Observation Wells

Well Name	X (ft)	Y (ft)
▫ MW-7	0.083	0



STEP RATE PUMPING TEST NO. 3

Data Set: G:\...\THEIS- PT-MW-7.aqt
Date: 11/04/05 Time: 07:30:56

PROJECT INFORMATION

Company: HALEY & ALDRICH OF NEW YORK
Client: ATLANTIC-RICHFIELD
Project: 28612-112
Test Location: HASTINGS-ON-HUDSON, NEW YORK
Test Well: MW-7
Test Date: 27 OCT 05

SOLUTION

Aquifer Model: Confined
Solution Method: Theis (Step Test)

T = 174.6 ft^2/day
S = 0.3
Sw = 0.
C = 0. min^2/ft^5
P = 2.

Step Test Model: Jacob-Rorabaugh
Time (t) = 1. min Rate (Q) in cu. ft/min
$s(t) = 3.206Q + 0.Q^{2.}$
W.E. = 100.%

AQUIFER DATA

Saturated Thickness: 15.35 ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA

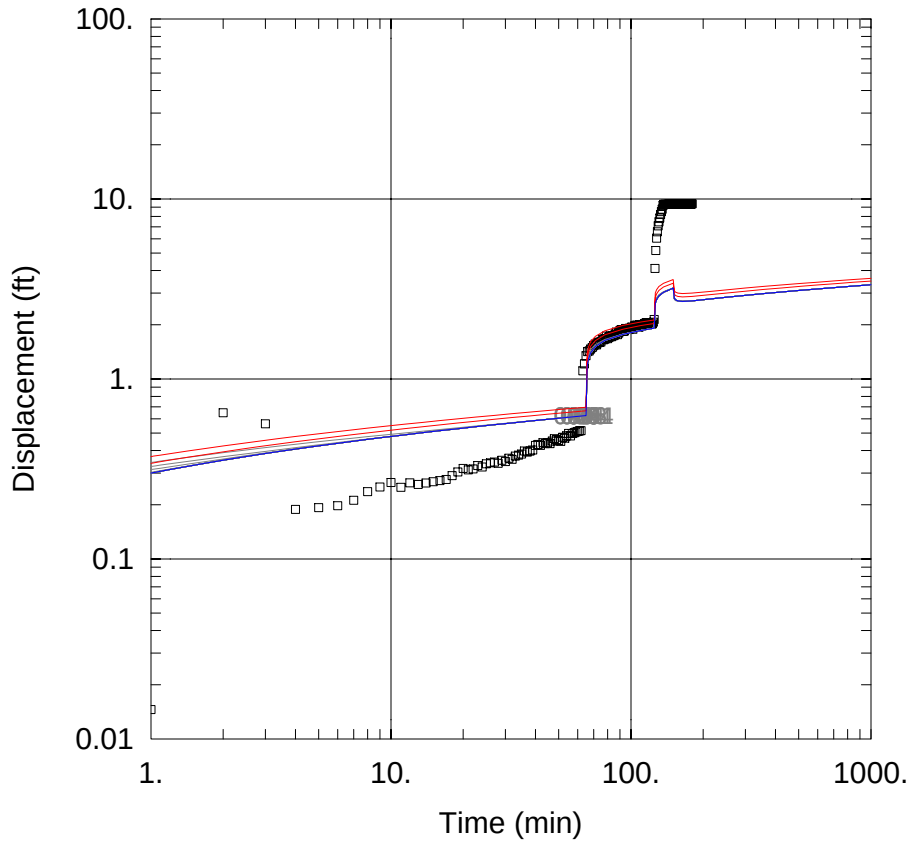
Pumping Wells

Well Name	X (ft)	Y (ft)
MW-7	0	0

Observation Wells

Well Name	X (ft)	Y (ft)
▫ MW-7	0.083	0

Pump Test 4



STEP RATE PUMPING TEST NO. 4

Data Set: G:\...\NEUMAN- PDMW-6.aqt
Date: 11/04/05 Time: 07:39:47

PROJECT INFORMATION

Company: HALEY & ALDRICH OF NEW YORK
Client: ATLANTIC-RICHFIELD
Project: 28612-112
Test Location: HASTINGS-ON-HUDSON, NEW YORK
Test Well: PDMW-6
Test Date: 27 OCT 05

SOLUTION

Aquifer Model: Unconfined
Solution Method: Neuman

T = 196. ft^2/day
S = 0.3899
Sy = 0.5798
ß = 10.

AQUIFER DATA

Saturated Thickness: 12.63 ft

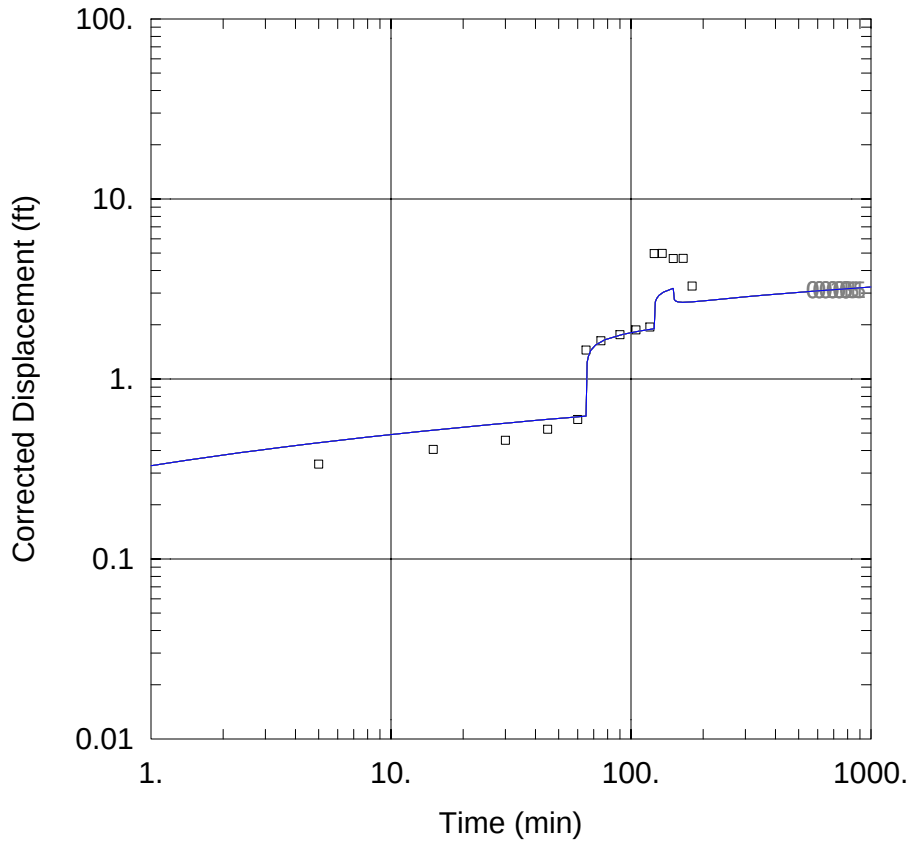
WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
PDMW-6	0	0

Observation Wells

Well Name	X (ft)	Y (ft)
▫ PDMW-6	0.083	0



STEP RATE PUMPING TEST NO. 4

Data Set: G:\...\THEIS- MANUAL-PDMW-6.aqt
Date: 11/07/05 Time: 08:03:23

PROJECT INFORMATION

Company: HALEY & ALDRICH OF NEW YORK
Client: ATLANTIC-RICHFIELD
Project: 28612-112
Test Location: HASTINGS-ON-HUDSON, NEW YORK
Test Well: PDMW-6
Test Date: 27 OCT 05

SOLUTION

Aquifer Model: Unconfined
Solution Method: Theis

T = 218.2 ft^2/day
S = 0.4566
Kz/Kr = 1.
b = 12.63 ft

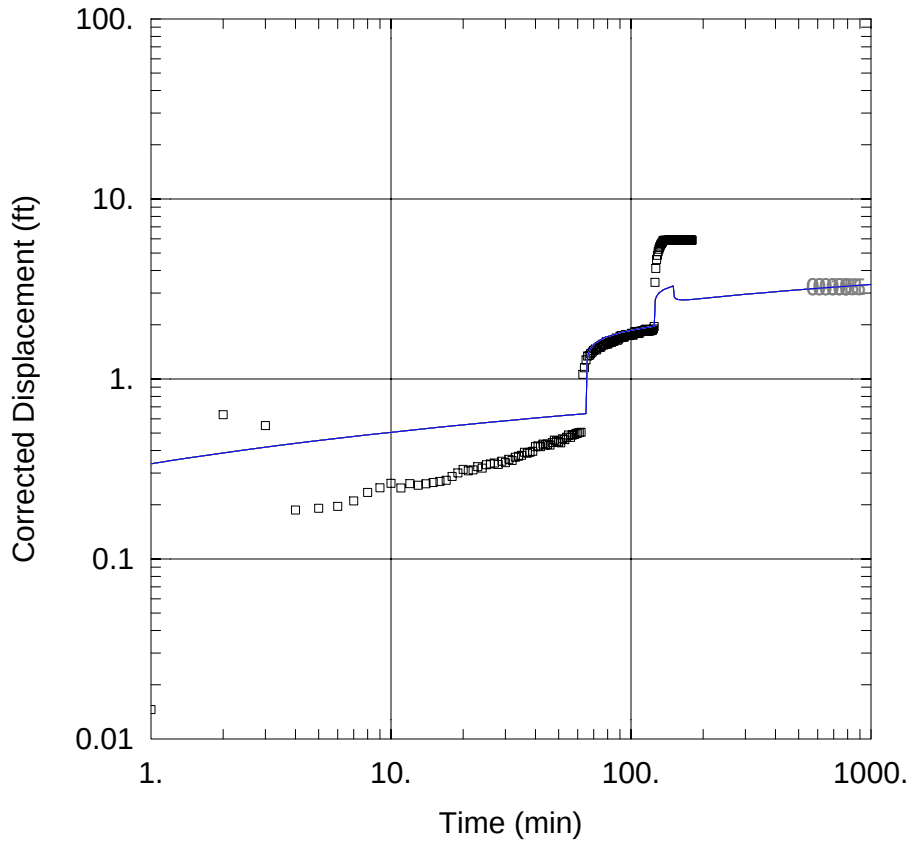
WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
PDMW-6	0	0

Observation Wells

Well Name	X (ft)	Y (ft)
▫ PDMW-6	0.083	0



STEP RATE PUMPING TEST NO. 4

Data Set: G:\...\THEIS- PDMW-6.aqt
Date: 11/04/05 Time: 07:37:52

PROJECT INFORMATION

Company: HALEY & ALDRICH OF NEW YORK
Client: ATLANTIC-RICHFIELD
Project: 28612-112
Test Location: HASTINGS-ON-HUDSON, NEW YORK
Test Well: PDMW-6
Test Date: 27 OCT 05

SOLUTION

Aquifer Model: Unconfined
Solution Method: Theis

T = 210.1 ft^2/day
S = 0.4652
Kz/Kr = 1.
b = 12.63 ft

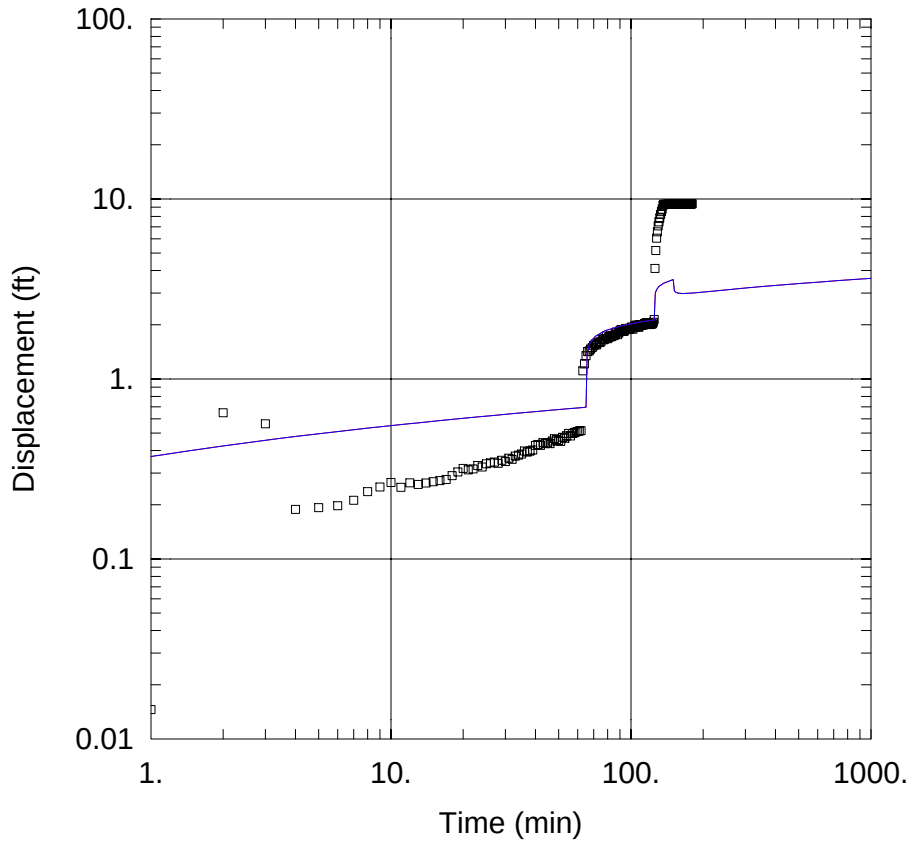
WELL DATA

Pumping Wells

Well Name	X (ft)	Y (ft)
PDMW-6	0	0

Observation Wells

Well Name	X (ft)	Y (ft)
▫ PDMW-6	0.083	0



STEP RATE PUMPING TEST NO. 4

Data Set: G:\...\THEIS-PT- PDMW-6.aqt
Date: 11/04/05 Time: 07:38:52

PROJECT INFORMATION

Company: HALEY & ALDRICH OF NEW YORK
Client: ATLANTIC-RICHFIELD
Project: 28612-112
Test Location: HASTINGS-ON-HUDSON, NEW YORK
Test Well: PDMW-6
Test Date: 27 OCT 05

SOLUTION

Aquifer Model: Confined
Solution Method: Theis (Step Test)

T = 196. ft^2/day
S = 0.3899
Sw = 0.
C = 0. min^2/ft^5
P = 2.

Step Test Model: Jacob-Rorabaugh
Time (t) = 1. min Rate (Q) in cu. ft/min
$s(t) = 2.771Q + 0.Q^{2.}$
W.E. = 100.%

AQUIFER DATA

Saturated Thickness: 12.63 ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA

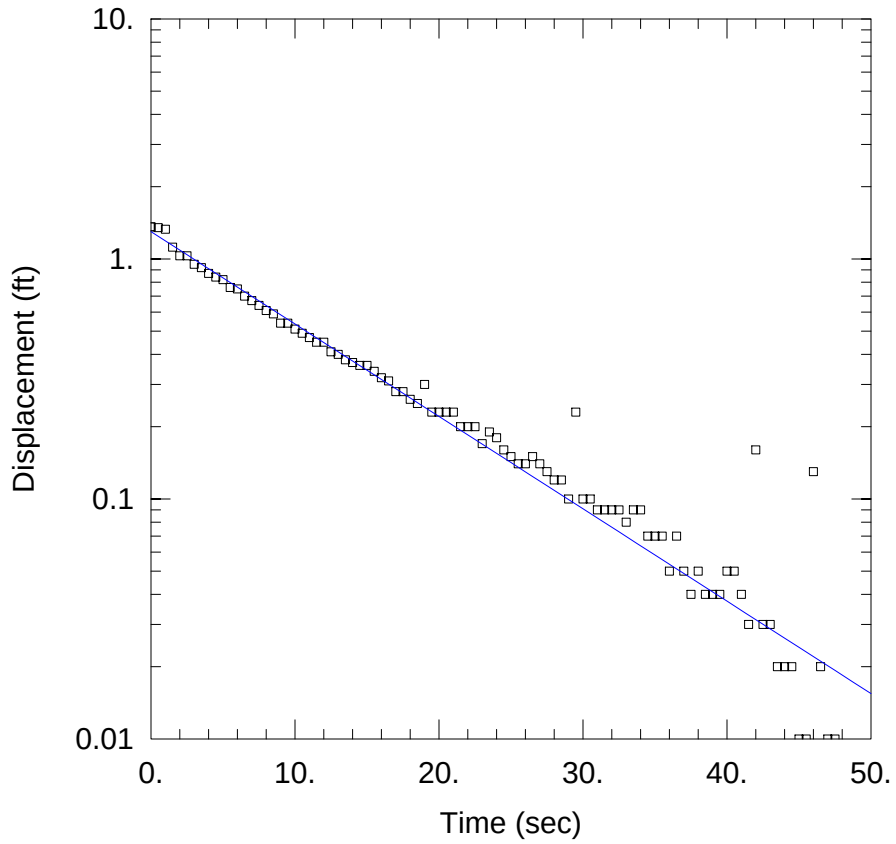
Pumping Wells

Well Name	X (ft)	Y (ft)
PDMW-6	0	0

Observation Wells

Well Name	X (ft)	Y (ft)
▫ PDMW-6	0.083	0

Slug Tests Confined



FALLING HEAD TEST

Data Set: G:\...\PDMW-1 B&R.aqt
Date: 11/17/05 Time: 08:36:40

PROJECT INFORMATION

Company: HALEY & ALDRICH OF NEW YORK
Client: ATLANTIC RICHFIELD
Project: 28612-112
Test Location: HASTINGS-ON-HUDSON, NEW YORK
Test Well: PDMW-1
Test Date: 1 NOV 2005

SOLUTION

Aquifer Model: Confined
Solution Method: Bouwer-Rice

K = 0.006377 cm/sec
y0 = 1.299 ft

AQUIFER DATA

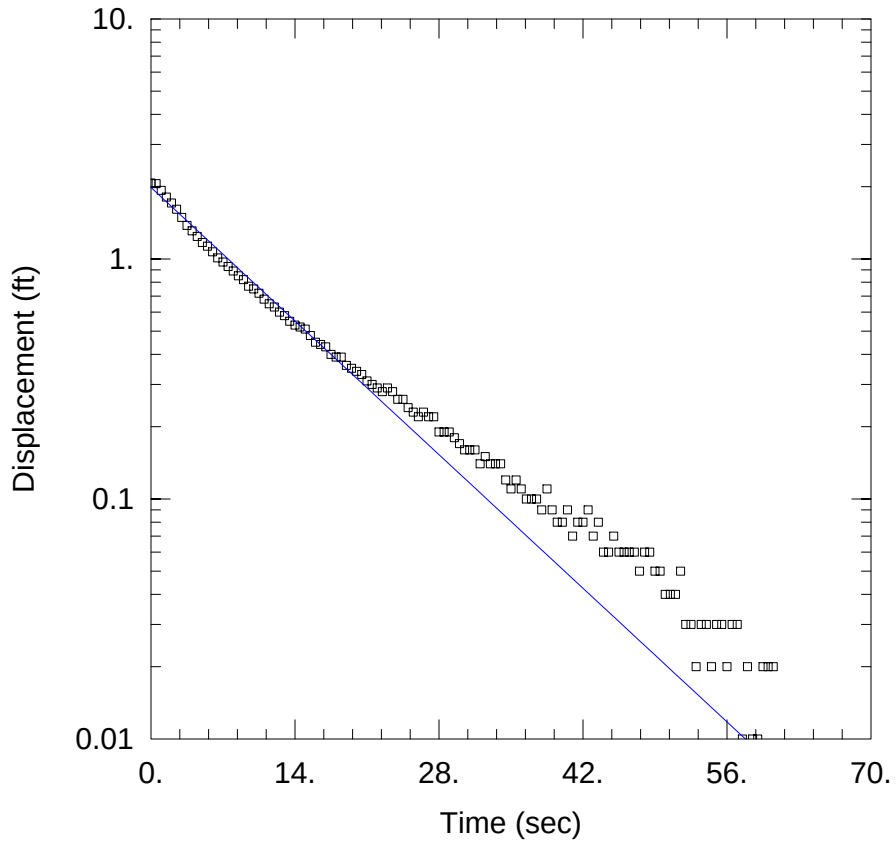
Saturated Thickness: 25. ft

Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (PDMW-1)

Initial Displacement: 1.36 ft
Wellbore Radius: 0.188 ft
Screen Length: 10. ft
Gravel Pack Porosity: 0.3

Casing Radius: 0.083 ft
Well Skin Radius: 0.188 ft
Total Well Penetration Depth: 20. ft



RISING HEAD TEST

Data Set: G:\...\PDMW-1 B&R.aqt
Date: 11/17/05 Time: 08:34:46

PROJECT INFORMATION

Company: HALEY & ALDRICH OF NEW YORK
Client: ATLANTIC RICHFIELD
Project: 28612-112
Test Location: HASTINGS-ON-HUDSON, NEW YORK
Test Well: PDMW-1
Test Date: 1 NOV 2005

SOLUTION

Aquifer Model: Confined
Solution Method: Bouwer-Rice

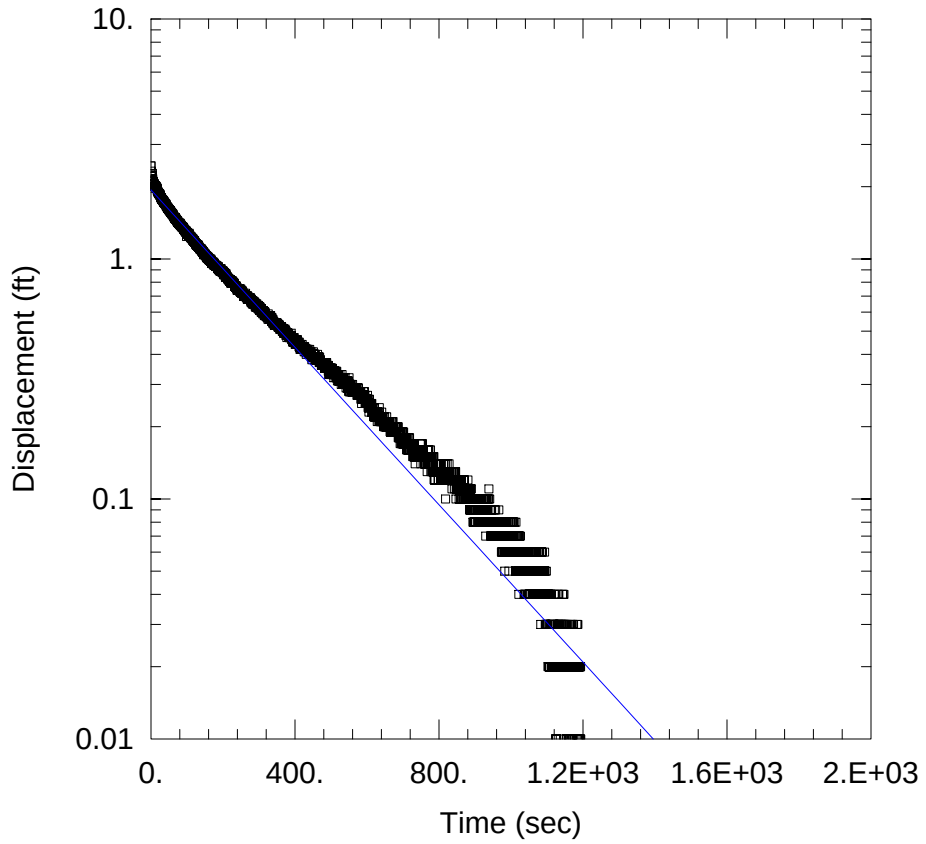
K = 0.006587 cm/sec
y0 = 1.985 ft

AQUIFER DATA

Saturated Thickness: 25. ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (PDMW-1)

Initial Displacement: 2.07 ft
Wellbore Radius: 0.188 ft
Screen Length: 10. ft
Gravel Pack Porosity: 0.3
Casing Radius: 0.083 ft
Well Skin Radius: 0.188 ft
Total Well Penetration Depth: 20. ft



FALLING HEAD TEST

Data Set: G:\...\F-PDMW-5 B&R.aqt
Date: 11/17/05 Time: 09:34:53

PROJECT INFORMATION

Company: HALEY & ALDRICH OF NEW YORK
Client: ATLANTIC RICHFIELD
Project: 28612-112
Test Location: HASTINGS-ON-HUDSON, NEW YORK
Test Well: PDMW-5
Test Date: 1 NOV 2005

SOLUTION

Aquifer Model: Confined
Solution Method: Bouwer-Rice

K = 0.0002718 cm/sec
y0 = 1.939 ft

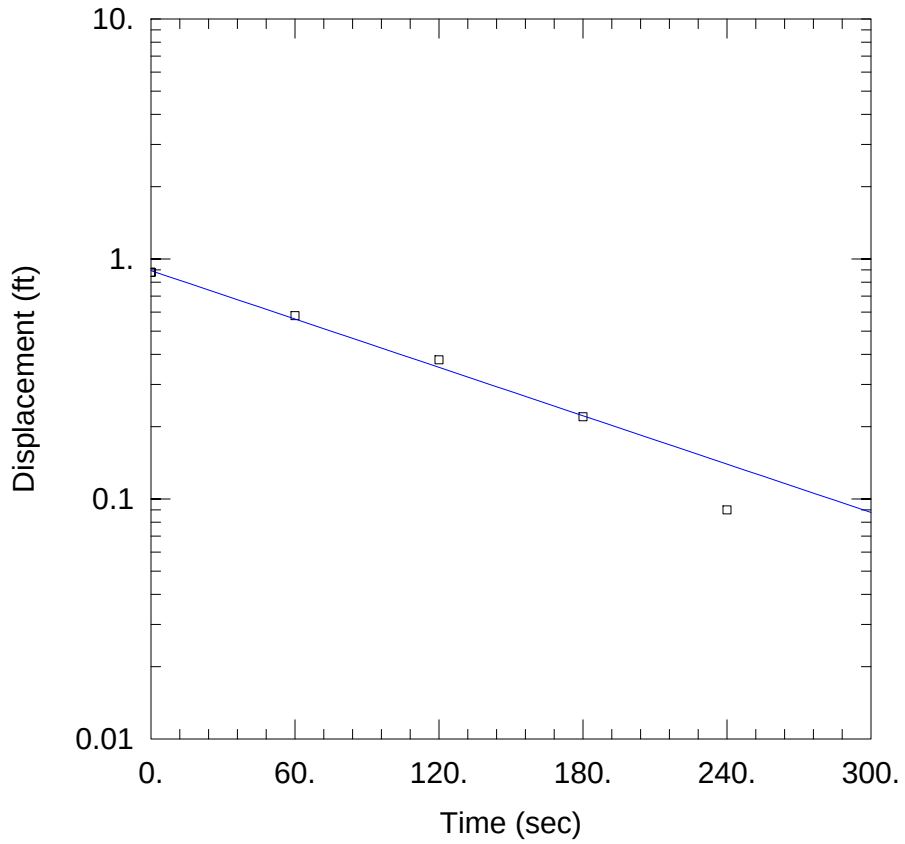
AQUIFER DATA

Saturated Thickness: 19. ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (PDMW-5)

Initial Displacement: 2.44 ft
Wellbore Radius: 0.188 ft
Screen Length: 10. ft
Gravel Pack Porosity: 0.3

Casing Radius: 0.083 ft
Well Skin Radius: 0.188 ft
Total Well Penetration Depth: 17. ft



RISING HEAD TEST

Data Set: G:\...\R-PDMW-4 B&R.aqt
Date: 11/17/05 Time: 09:26:41

PROJECT INFORMATION

Company: HALEY & ALDRICH OF NEW YORK
Client: ATLANTIC RICHFIELD
Project: 28612-112
Test Location: HASTINGS-ON-HUDSON, NEW YORK
Test Well: PDMW-4
Test Date: 28 OCT 2005

SOLUTION

Aquifer Model: Confined
Solution Method: Bouwer-Rice

K = 0.0006526 cm/sec
y0 = 0.8936 ft

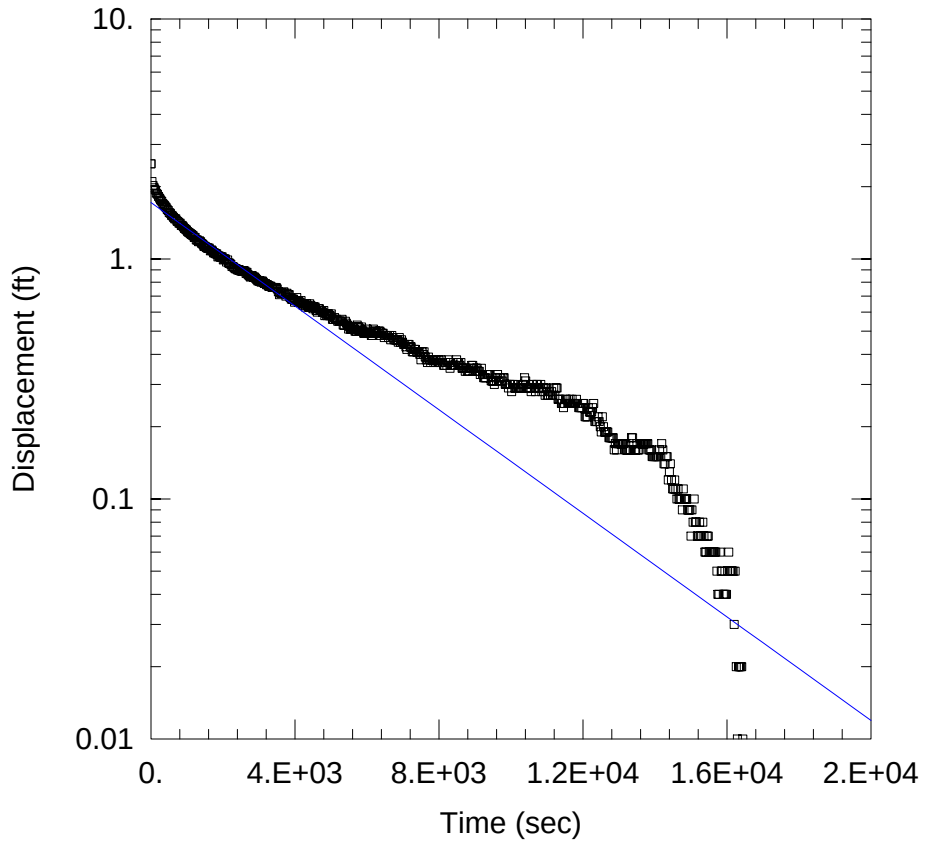
AQUIFER DATA

Saturated Thickness: 24. ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (PDMW-4)

Initial Displacement: 0.88 ft
Wellbore Radius: 0.188 ft
Screen Length: 10. ft
Gravel Pack Porosity: 0.3

Casing Radius: 0.083 ft
Well Skin Radius: 0.188 ft
Total Well Penetration Depth: 24. ft



RISING HEAD TEST NO. 2

Data Set: G:\...\R-PDMW-3 B&R T2.aqt
Date: 11/17/05 Time: 09:24:35

PROJECT INFORMATION

Company: HALEY & ALDRICH OF NEW YORK
Client: ATLANTIC RICHFIELD
Project: 28612-112
Test Location: HASTINGS-ON-HUDSON, NEW YORK
Test Well: PDMW-3
Test Date: 9 NOV 2005

SOLUTION

Aquifer Model: Confined
Solution Method: Bouwer-Rice

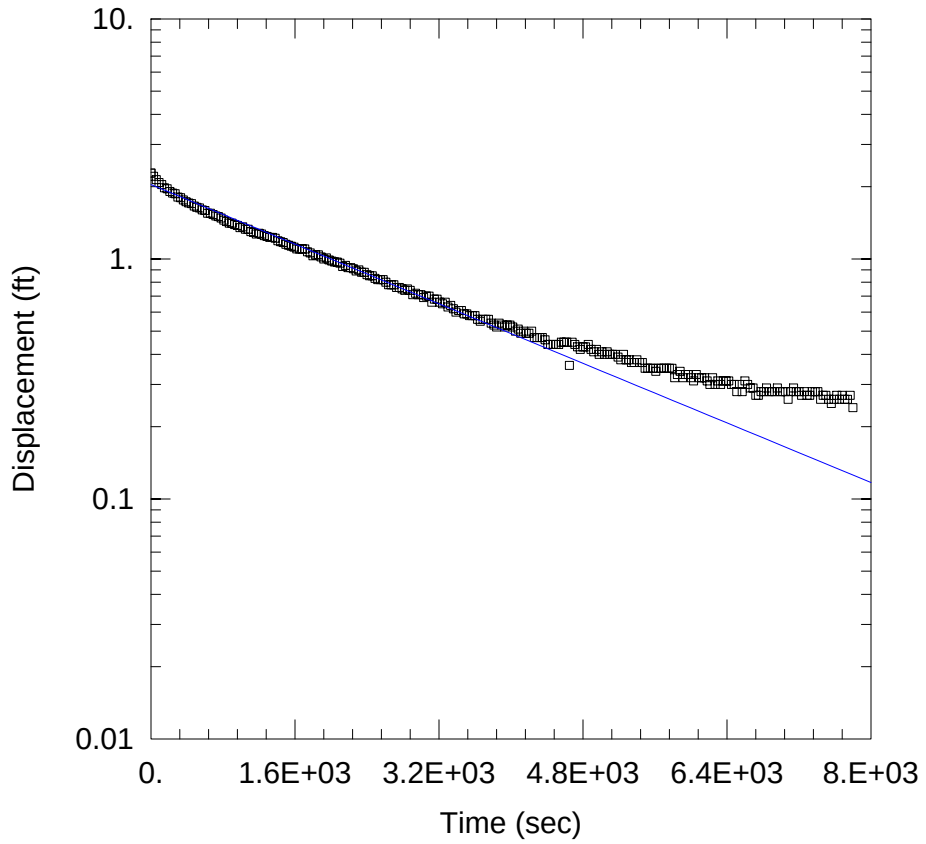
K = 2.032E-05 cm/sec
y0 = 1.719 ft

AQUIFER DATA

Saturated Thickness: 20. ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (PDMW-3)

Initial Displacement: 2.49 ft
Wellbore Radius: 0.188 ft
Screen Length: 10. ft
Gravel Pack Porosity: 0.3
Casing Radius: 0.083 ft
Well Skin Radius: 0.188 ft
Total Well Penetration Depth: 20. ft



FALLING HEAD TEST NO. 2

Data Set: G:\...\F-PDMW-3 B&R T2.aqt
Date: 11/17/05 Time: 09:21:23

PROJECT INFORMATION

Company: HALEY & ALDRICH OF NEW YORK
Client: ATLANTIC RICHFIELD
Project: 28612-112
Test Location: HASTINGS-ON-HUDSON, NEW YORK
Test Well: PDMW-3
Test Date: 9 NOV 2005

SOLUTION

Aquifer Model: Confined
Solution Method: Bouwer-Rice

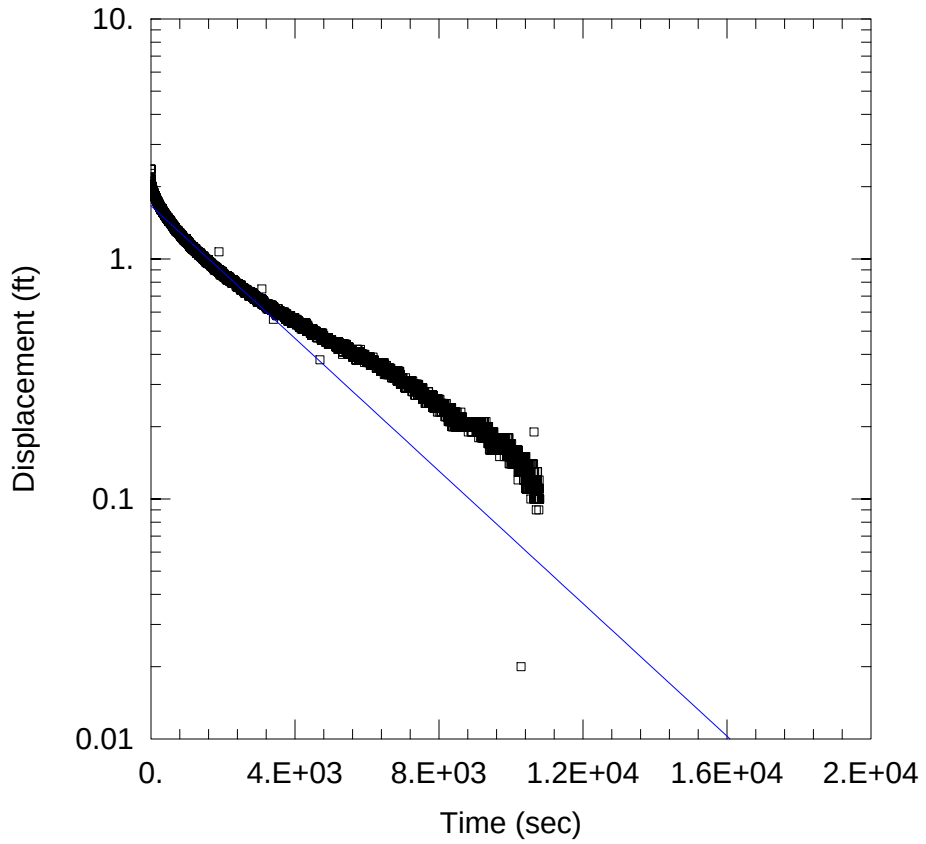
K = 2.922E-05 cm/sec
y0 = 2.04 ft

AQUIFER DATA

Saturated Thickness: 20. ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (PDMW-3)

Initial Displacement: 2.28 ft
Wellbore Radius: 0.188 ft
Screen Length: 10. ft
Gravel Pack Porosity: 0.3
Casing Radius: 0.083 ft
Well Skin Radius: 0.188 ft
Total Well Penetration Depth: 20. ft



RISING HEAD TEST NO. 1

Data Set: G:\...\PDMW-3 B&R T1.aqt
Date: 11/17/05 Time: 09:08:03

PROJECT INFORMATION

Company: HALEY & ALDRICH OF NEW YORK
Client: ATLANTIC RICHFIELD
Project: 28612-112
Test Location: HASTINGS-ON-HUDSON, NEW YORK
Test Well: PDMW-3
Test Date: 8 NOV 2005

SOLUTION

Aquifer Model: Confined
Solution Method: Bouwer-Rice

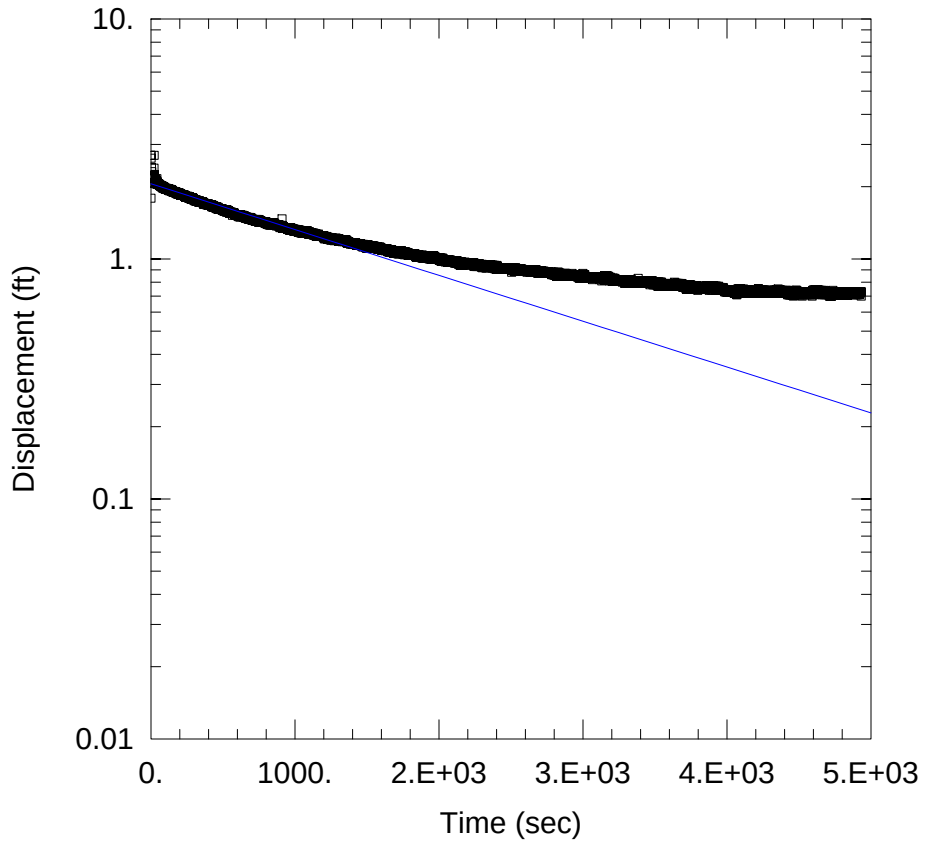
K = 2.601E-05 cm/sec
y0 = 1.666 ft

AQUIFER DATA

Saturated Thickness: 20. ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (PDMW-3)

Initial Displacement: 2.37 ft
Wellbore Radius: 0.188 ft
Screen Length: 10. ft
Gravel Pack Porosity: 0.3
Casing Radius: 0.083 ft
Well Skin Radius: 0.188 ft
Total Well Penetration Depth: 20. ft



FALLING HEAD TEST NO. 1

Data Set: G:\...\PDMW-3 B&R T1.aqt
Date: 11/17/05 Time: 09:06:26

PROJECT INFORMATION

Company: HALEY & ALDRICH OF NEW YORK
Client: ATLANTIC RICHFIELD
Project: 28612-112
Test Location: HASTINGS-ON-HUDSON, NEW YORK
Test Well: PDMW-3
Test Date: 8 NOV 2005

SOLUTION

Aquifer Model: Confined
Solution Method: Bouwer-Rice

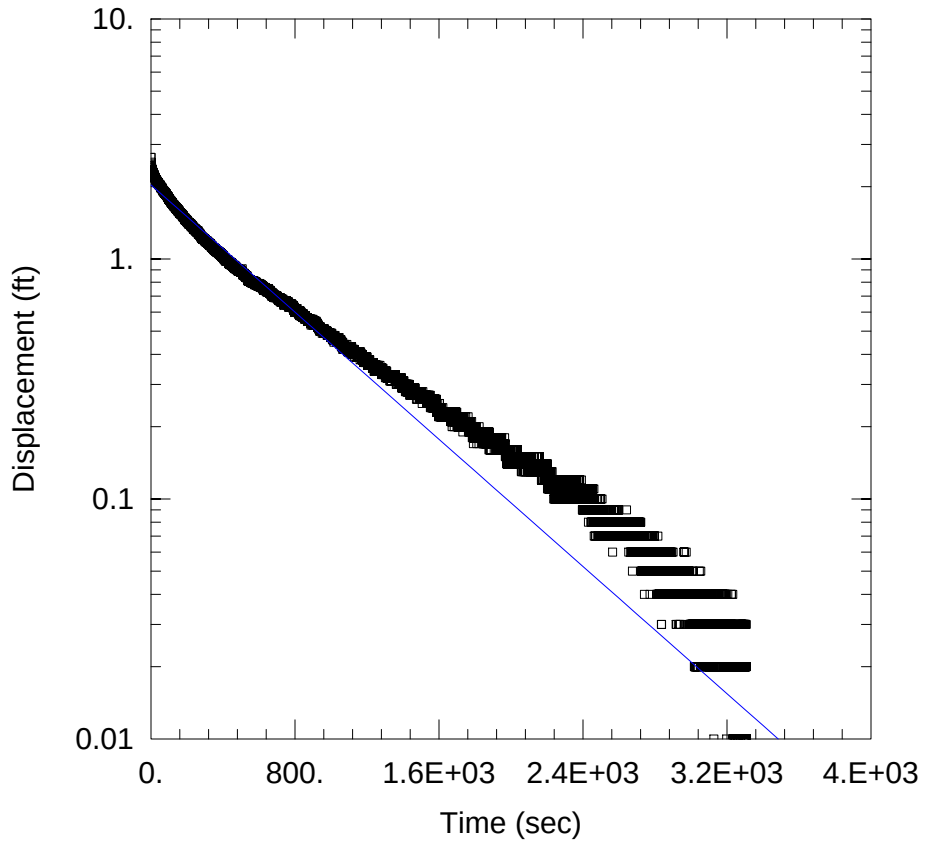
K = 3.596E-05 cm/sec
y0 = 2.057 ft

AQUIFER DATA

Saturated Thickness: 20. ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (PDMW-3)

Initial Displacement: 2.7 ft
Wellbore Radius: 0.188 ft
Screen Length: 10. ft
Gravel Pack Porosity: 0.3
Casing Radius: 0.083 ft
Well Skin Radius: 0.188 ft
Total Well Penetration Depth: 20. ft



RISING HEAD TEST

Data Set: G:\...\PDMW-2 B&R.aqt
Date: 11/17/05 Time: 08:46:30

PROJECT INFORMATION

Company: HALEY & ALDRICH OF NEW YORK
Client: ATLANTIC RICHFIELD
Project: 28612-112
Test Location: HASTINGS-ON-HUDSON, NEW YORK
Test Well: PDMW-2
Test Date: 3 NOV 2005

SOLUTION

Aquifer Model: Confined
Solution Method: Bouwer-Rice

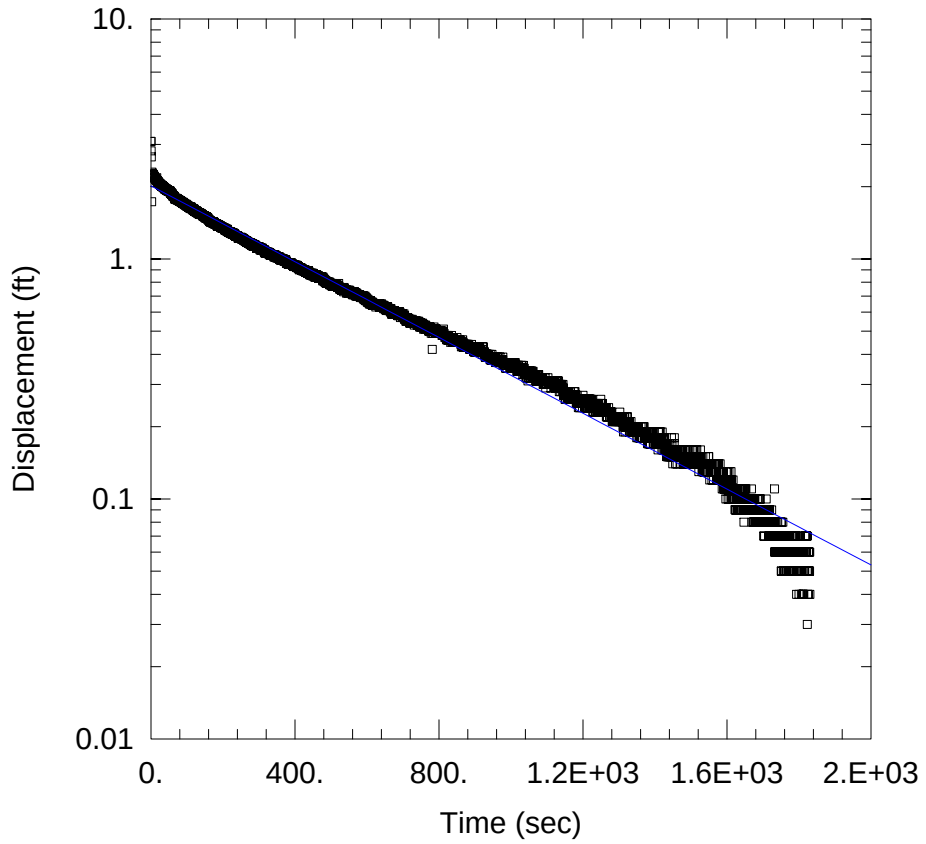
K = 0.0001191 cm/sec
y0 = 2.035 ft

AQUIFER DATA

Saturated Thickness: 15.5 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (PDMW-2)

Initial Displacement: 2.65 ft
Wellbore Radius: 0.188 ft
Screen Length: 10. ft
Gravel Pack Porosity: 0.3
Casing Radius: 0.083 ft
Well Skin Radius: 0.188 ft
Total Well Penetration Depth: 15.5 ft



FALLING HEAD TEST

Data Set: G:\...\PDMW-2 B&R.aqt
Date: 11/17/05 Time: 08:44:38

PROJECT INFORMATION

Company: HALEY & ALDRICH OF NEW YORK
Client: ATLANTIC RICHFIELD
Project: 28612-112
Test Location: HASTINGS-ON-HUDSON, NEW YORK
Test Well: PDMW-2
Test Date: 3 NOV 2005

SOLUTION

Aquifer Model: Confined
Solution Method: Bouwer-Rice

K = 0.000142 cm/sec
y0 = 2.017 ft

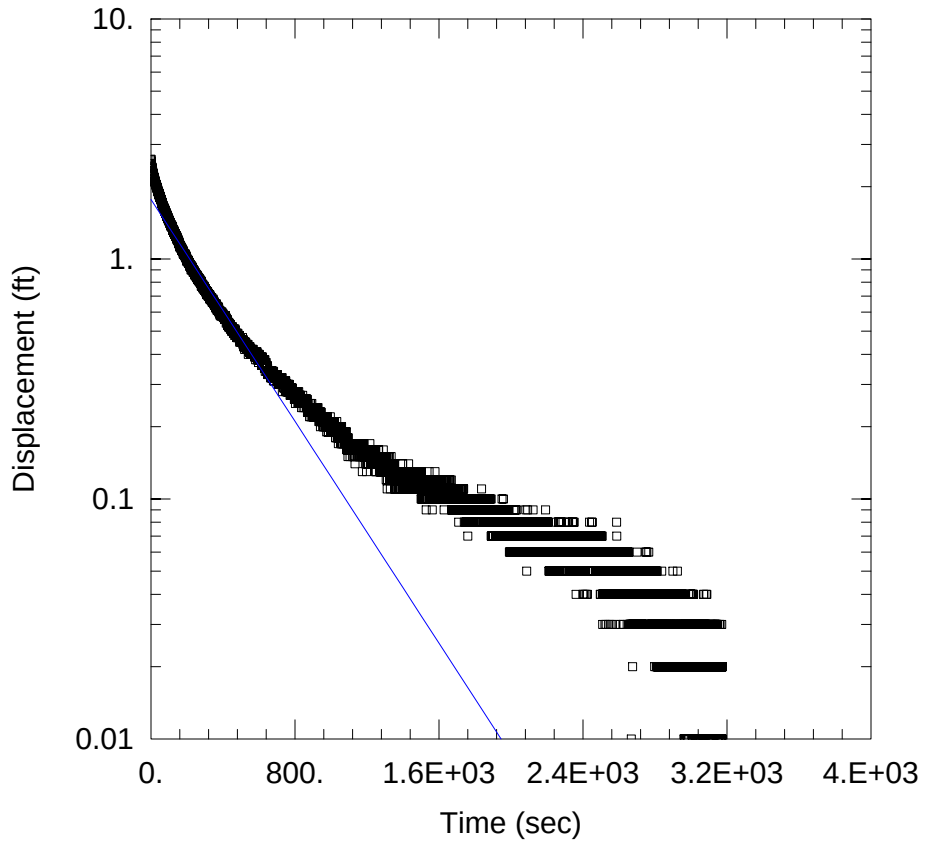
AQUIFER DATA

Saturated Thickness: 15.5 ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (PDMW-2)

Initial Displacement: 3.09 ft
Wellbore Radius: 0.188 ft
Screen Length: 10. ft
Gravel Pack Porosity: 0.3

Casing Radius: 0.083 ft
Well Skin Radius: 0.188 ft
Total Well Penetration Depth: 15.5 ft



RISING HEAD TEST

Data Set: G:\...\R-PDMW-5 B&R.aqt
Date: 11/17/05 Time: 09:37:44

PROJECT INFORMATION

Company: HALEY & ALDRICH OF NEW YORK
Client: ATLANTIC RICHFIELD
Project: 28612-112
Test Location: HASTINGS-ON-HUDSON, NEW YORK
Test Well: PDMW-5
Test Date: 1 NOV 2005

SOLUTION

Aquifer Model: Confined
Solution Method: Bouwer-Rice

K = 0.0001916 cm/sec
y0 = 1.77 ft

AQUIFER DATA

Saturated Thickness: 19. ft
Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (PDMW-5)

Initial Displacement: 2.6 ft
Wellbore Radius: 0.188 ft
Screen Length: 10. ft
Gravel Pack Porosity: 0.3

Casing Radius: 0.083 ft
Well Skin Radius: 0.188 ft
Total Well Penetration Depth: 17. ft

Slug Tests Unconfined

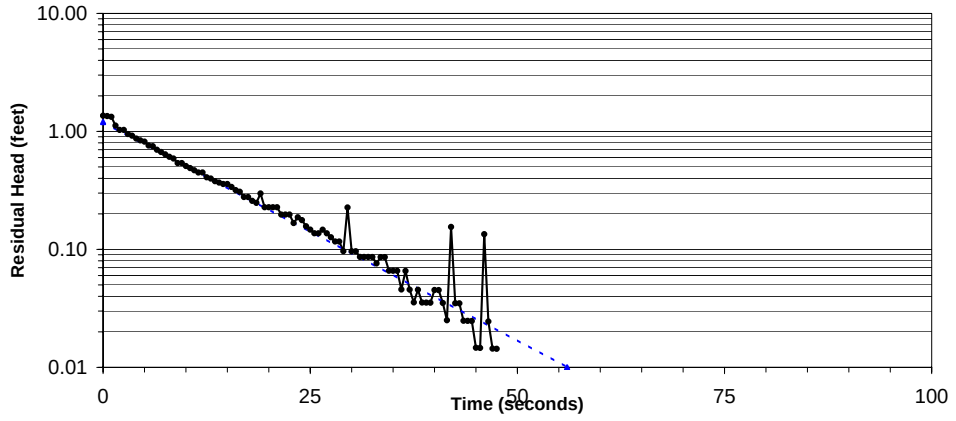
HALEY & ALDRICH OF NEW YORK	**FALLING HEAD TEST SUMMARY**
ONE RIVER STREET	Monitoring Well ID: PDMW-1
HASTINGS-ON-HUDSON, NEW YORK	Test Date: 1-Nov-05
28612-112	H&A Rep.: J. BODE

PDMW-1

Falling Head Permeability Calculation: Bouwer-Rice Method

Well Depth (PVC), in ft.:	59	
Depth to Static (PVC) in ft.:	2.64	
Well Depth-Static (Lw), in ft.:	56.36	
Test Section Radius (rw), in ft.:	0.188	
Nominal Casing Radius (rc), in ft.:	0.083	
Equivalent Casing Radius (rc') in ft:	0.083	(Adjust for water-table wells only)
Nominal Screen Length in ft:	10.0	
Test Length Section (Le), in ft.:	10	
A:	3.164	
B:	0.538	
C:	3.136	
Le/rw:	53.333	
Saturated Thickness (H), in ft.:	61.4	(Water table elev - aquifer bottom elev)
		(Note: H must be > = LW)
For Lw < H - ln(Re/rw):	3.504	
For Lw = H - ln(Re/rw):	3.975	
Yo, in ft.:	1.20	
Yt, in ft.:	0.010	
t, in min.:	0.933	

	(Lw < H)	(Lw = H)
Kh (cm/sec) =	3.17E-03	
Kh (ft/min) =	6.24E-03	
Kh (ft/day) =	8.98E+00	



Elapsed Time (sec)	Residual Head (ft.)
0.0	1.36
0.5	1.35
1.0	1.33
1.5	1.12
2.0	1.03
2.5	1.03
3.0	0.95
3.5	0.92
4.0	0.87
4.5	0.84
5.0	0.82
5.5	0.76
6.0	0.75
6.5	0.70
7.0	0.67
7.5	0.64
8.0	0.61
8.5	0.59
9.0	0.54
9.5	0.54
10.0	0.51
10.5	0.49
11.0	0.47
11.5	0.45
12.0	0.45
12.5	0.41
13.0	0.40
13.5	0.38
14.0	0.37
14.5	0.36
15.0	0.36
15.5	0.34
16.0	0.32
16.5	0.31
17.0	0.28
17.5	0.28
18.0	0.26
18.5	0.25
19.0	0.30
19.5	0.23
20.0	0.23
20.5	0.23
21.0	0.23
21.5	0.20

HALEY & ALDRICH OF NEW YORK
ONE RIVER STREET
HASTINGS-ON-HUDSON, NEW YORK
28612-112

RISING HEAD TEST SUMMARY

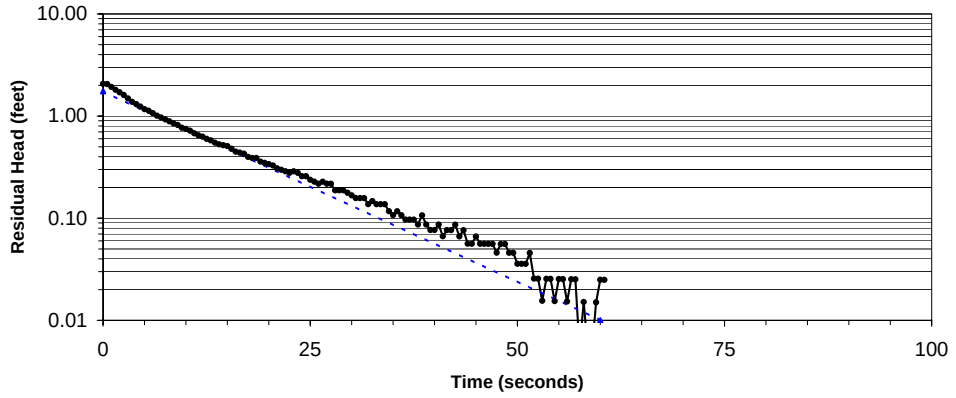
Monitoring Well ID: PDMW-1
Test Date: 1-Nov-05
H&A Rep.: J. BODE

PDMW-1

Rising Head Permeability Calculation: Bouwer-Rice Method

Well Depth (PVC), in ft.:	59	
Depth to Static (PVC) in ft.:	2.64	
Well Depth-Static (Lw), in ft.:	56.36	
Test Section Radius (rw), in ft.:	0.167	
Nominal Casing Radius (rc), in ft.:	0.083	
Equivalent Casing Radius (rc') in ft:	0.083	(Adjust for water-table wells only)
Nominal Screen Length in ft:	10.0	
Test Length Section (Le), in ft.:	10	
A:	3.338	
B:	0.572	
C:	3.405	
Le/rw:	59.880	
Saturated Thickness (H), in ft.:	61.40	(Water table elev - aquifer bottom elev)
		(Note: H must be > = LW)
For Lw < H - ln(Re/rw):	3.607	
For Lw = H - ln(Re/rw):	4.068	
Yo, in ft.:	1.75	
Yt, in ft.:	0.010	
t, in min.:	1.000	

	(Lw < H)	(Lw = H)
Kh (cm/sec) =	3.28E-03	
Kh (ft/min) =	6.46E-03	
Kh (ft/day) =	9.31E+00	



Elapsed Time (sec)	Residual Head (ft.)
0.0	2.07
0.5	2.06
1.0	1.93
1.5	1.81
2.0	1.71
2.5	1.61
3.0	1.49
3.5	1.38
4.0	1.31
4.5	1.24
5.0	1.17
5.5	1.13
6.0	1.07
6.5	1.01
7.0	0.97
7.5	0.93
8.0	0.89
8.5	0.85
9.0	0.82
9.5	0.77
10.0	0.75
10.5	0.72
11.0	0.68
11.5	0.65
12.0	0.63
12.5	0.60
13.0	0.58
13.5	0.55
14.0	0.53
14.5	0.52
15.0	0.51
15.5	0.48
16.0	0.45
16.5	0.44
17.0	0.43
17.5	0.40
18.0	0.39
18.5	0.39
19.0	0.36
19.5	0.35
20.0	0.34
20.5	0.33
21.0	0.31
21.5	0.30

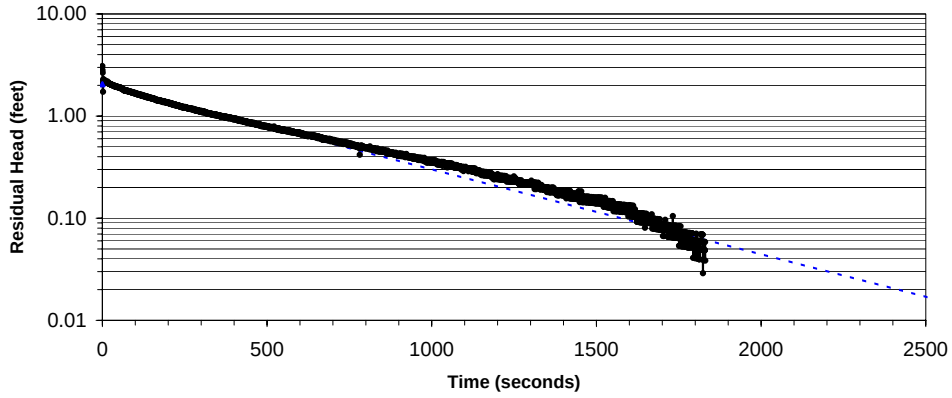
HALEY & ALDRICH OF NEW YORK	**FALLING HEAD TEST SUMMARY**	
ONE RIVER STREET	Monitoring Well ID:	PDMW-2
HASTINGS-ON-HUDSON, NEW YORK	Test Date:	3-Nov-05
28612-112	H&A Rep.:	J. BODE

PDMW-2

Falling Head Permeability Calculation: Bouwer-Rice Method

Well Depth (PVC), in ft.:	54	
Depth to Static (PVC) in ft.:	5.85	
Well Depth-Static (Lw), in ft.:	48.15	
Test Section Radius (rw), in ft.:	0.188	
Nominal Casing Radius (rc), in ft.:	0.083	
Equivalent Casing Radius (rc') in ft:	0.083	(Adjust for water-table wells only)
Nominal Screen Length in ft:	10.0	
Test Length Section (Le), in ft.:	10	
A:	3.164	
B:	0.538	
C:	3.136	
Le/rw:	53.333	
Saturated Thickness (H), in ft.:	48.15	(Water table elev - aquifer bottom elev)
		(Note: H must be > = LW)
For Lw < H - ln(Re/rw):	#NUM!	
For Lw=H - ln(Re/rw):	3.890	
Yo, in ft.:	2.05	
Yt, in ft.:	0.010	
t, in min.:	46.250	

	(Lw < H)	(Lw=H)
Kh (cm/sec) =		7.89E-05
Kh (ft/min) =		1.55E-04
Kh (ft/day) =		2.24E-01



Elapsed Time (sec)	Residual Head (ft.)
0.0	3.09
0.5	2.82
1.0	2.66
1.5	2.08
2.0	1.73
2.5	2.21
3.0	2.30
3.5	2.26
4.0	2.26
4.5	2.27
5.0	2.25
5.5	2.24
6.0	2.24
6.5	2.24
7.0	2.22
7.5	2.23
8.0	2.22
8.5	2.21
9.0	2.19
9.5	2.19
10.0	2.19
10.5	2.19
11.0	2.17
11.5	2.17
12.0	2.15
12.5	2.15
13.0	2.15
13.5	2.14
14.0	2.14
14.5	2.13
15.0	2.14
15.5	2.13
16.0	2.18
16.5	2.12
17.0	2.11
17.5	2.12
18.0	2.09
18.5	2.10
19.0	2.09
19.5	2.10
20.0	2.09
20.5	2.07
21.0	2.09
21.5	2.07

HALEY & ALDRICH OF NEW YORK
ONE RIVER STREET
HASTINGS-ON-HUDSON, NEW YORK
28612-112

RISING HEAD TEST SUMMARY

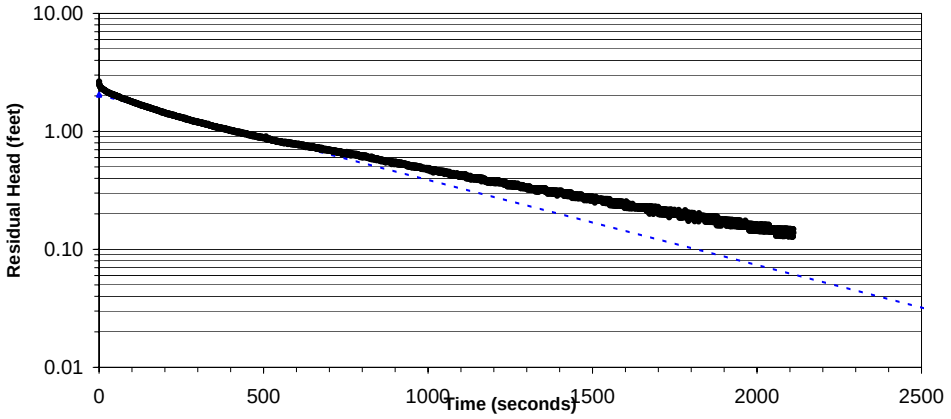
Monitoring Well ID: PDMW-2
Test Date: 3-Nov-05
H&A Rep.: J. BODE

PDMW-2

Rising Head Permeability Calculation: Bouwer-Rice Method

Well Depth (PVC), in ft.:	54	
Depth to Static (PVC) in ft.:	5.42	
Well Depth-Static (Lw), in ft.:	48.58	
Test Section Radius (rw), in ft.:	0.167	
Nominal Casing Radius (rc), in ft.:	0.083	
Equivalent Casing Radius (rc') in ft:	0.083	(Adjust for water-table wells only)
Nominal Screen Length in ft:	10.0	
Test Length Section (Le), in ft.:	10	
A:	3.338	
B:	0.572	
C:	3.405	
Le/rw:	59.880	
Saturated Thickness (H), in ft.:	48.58	(Water table elev - aquifer bottom elev)
		(Note: H must be > = LW)
For Lw < H - ln(Re/rw):	#NUM!	
For Lw=H - ln(Re/rw):	3.988	
Yo, in ft.:	2.05	
Yt, in ft.:	0.010	
t, in min.:	53.333	

	(Lw < H)	(Lw=H)
Kh (cm/sec) =		7.01E-05
Kh (ft/min) =		1.38E-04
Kh (ft/day) =		1.99E-01



Elapsed Time (sec)	Residual Head (ft.)
0.0	2.65
0.5	2.53
1.0	2.49
1.5	2.46
2.0	2.44
2.5	2.42
3.0	2.42
3.5	2.40
4.0	2.40
4.5	2.37
5.0	2.37
5.5	2.35
6.0	2.35
6.5	2.36
7.0	2.34
7.5	2.33
8.0	2.32
8.5	2.33
9.0	2.31
9.5	2.30
10.0	2.29
10.5	2.29
11.0	2.30
11.5	2.30
12.0	2.28
12.5	2.27
13.0	2.27
13.5	2.26
14.0	2.25
14.5	2.26
15.0	2.25
15.5	2.24
16.0	2.25
16.5	2.25
17.0	2.23
17.5	2.23
18.0	2.22
18.5	2.21
19.0	2.21
19.5	2.22
20.0	2.21
20.5	2.21
21.0	2.19
21.5	2.18
22.0	2.18

HALEY & ALDRICH OF NEW YORK
ONE RIVER STREET
HASTINGS-ON-HUDSON, NEW YORK
28612-112

RISING HEAD TEST SUMMARY

Monitoring Well ID: PDMW-4
Test Date: 28-Oct-05
H&A Rep.: S. CLIFFORD

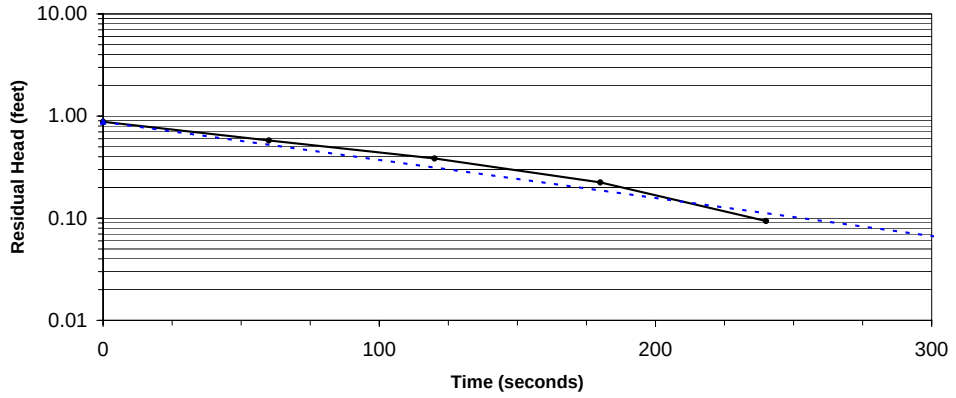
PDMW-4

Rising Head Permeability Calculation: Bouwer-Rice Method

Well Depth (PVC), in ft.:	55	
Depth to Static (PVC) in ft.:	7.9	
Well Depth-Static (Lw), in ft.:	47.1	
Test Section Radius (rw), in ft.:	0.167	
Nominal Casing Radius (rc), in ft.:	0.083	
Equivalent Casing Radius (rc') in ft:	0.083	(Adjust for water-table wells only)
Nominal Screen Length in ft:	10.0	
Test Length Section (Le), in ft.:	10	
A:	3.338	
B:	0.572	
C:	3.405	
Le/rw:	59.880	
Saturated Thickness (H), in ft.:	47.10	(Water table elev - aquifer bottom elev)
		(Note: H must be > = LW)
For Lw < H - ln(Re/rw):	#NUM!	
For Lw=H - ln(Re/rw):	3.971	
Yo, in ft.:	0.88	
Yt, in ft.:	0.010	
t, in min.:	10.833	

	(Lw < H)	(Lw=H)
Kh (cm/sec) =		2.89E-04
Kh (ft/min) =		5.69E-04
Kh (ft/day) =		8.20E-01

Elapsed Time (sec)	Residual Head (ft.)
0.0	0.88
60.0	0.58
120.0	0.38
180.0	0.22
240.0	0.09



HALEY & ALDRICH OF NEW YORK
ONE RIVER STREET
HASTINGS-ON-HUDSON, NEW YORK
28612-112

FALLING HEAD TEST SUMMARY

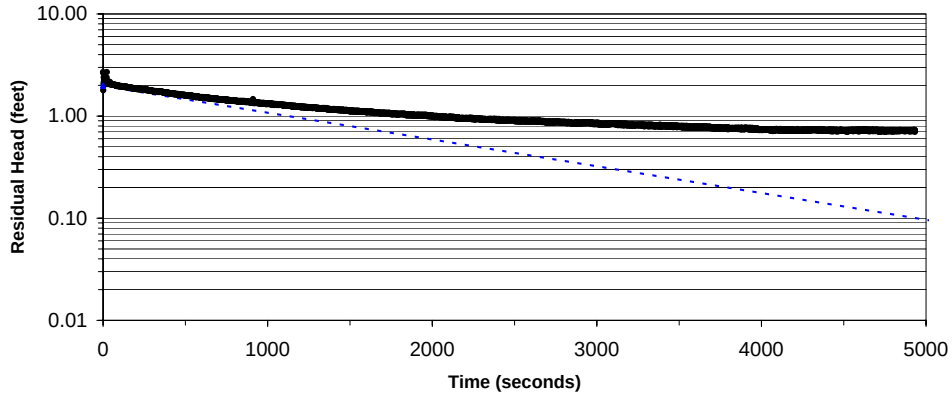
Monitoring Well ID: PDMW-3
Test Date: 8-Nov-05
H&A Rep.: J. BODE

PDMW-3 TEST No. 1

Falling Head Permeability Calculation: Bouwer-Rice Method

Well Depth (PVC), in ft.:	40	
Depth to Static (PVC) in ft.:	6.9	
Well Depth-Static (Lw), in ft.:	33.1	
Test Section Radius (rw), in ft.:	0.188	
Nominal Casing Radius (rc), in ft.:	0.083	
Equivalent Casing Radius (rc') in ft:	0.083	(Adjust for water-table wells only)
Nominal Screen Length in ft:	10.0	
Test Length Section (Le), in ft.:	10	
A:	3.164	
B:	0.538	
C:	3.136	
Le/rw:	53.333	
Saturated Thickness (H), in ft.:	33.1	(Water table elev - aquifer bottom elev)
		(Note: H must be > = LW)
For Lw < H - ln(Re/rw):	#NUM!	
For Lw=H - ln(Re/rw):	3.684	
Yo, in ft.:	1.98	
Yt, in ft.:	0.010	
t, in min.:	236.667	

	(Lw < H)	(Lw=H)
Kh (cm/sec) =		1.45E-05
Kh (ft/min) =		2.86E-05
Kh (ft/day) =		4.11E-02



Elapsed Time (sec)	Residual Head (ft.)
0.0	2.70
1.0	1.79
2.0	2.63
3.0	2.07
4.0	2.40
5.0	2.17
6.0	2.31
7.0	2.21
8.0	2.25
9.0	2.23
10.0	2.23
11.0	2.20
12.0	2.20
13.0	2.21
14.0	2.19
15.0	2.20
16.0	2.19
17.0	2.19
18.0	2.17
19.0	2.17
20.0	2.20
21.0	2.16
22.0	2.39
23.0	2.70
24.0	2.24
25.0	2.18
26.0	2.07
27.0	2.17
28.0	2.06
29.0	2.16
30.0	2.08
31.0	2.12
32.0	2.11
33.0	2.12
34.0	2.11
35.0	2.08
36.0	2.10
37.0	2.10
38.0	2.12
39.0	2.11
40.0	2.05
41.0	2.11
42.0	2.16
43.0	2.05
44.0	2.08

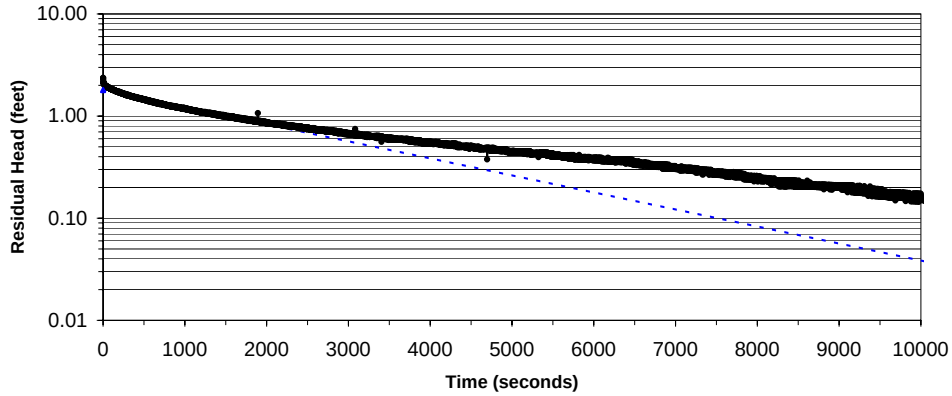
HALEY & ALDRICH OF NEW YORK	**RISING HEAD TEST SUMMARY**	
ONE RIVER STREET	Monitoring Well ID:	PDMW-3
HASTINGS-ON-HUDSON, NEW YORK	Test Date:	8-Nov-05
28612-112	H&A Rep.:	J. BODE

PDMW-3 TEST No. 1

Rising Head Permeability Calculation: Bouwer-Rice Method

Well Depth (PVC), in ft.:	40	
Depth to Static (PVC) in ft.:	6.9	
Well Depth-Static (Lw), in ft.:	33.1	
Test Section Radius (rw), in ft.:	0.167	
Nominal Casing Radius (rc), in ft.:	0.083	
Equivalent Casing Radius (rc') in ft:	0.083	(Adjust for water-table wells only)
Nominal Screen Length in ft:	10.0	
Test Length Section (Le), in ft.:	10	
A:	3.338	
B:	0.572	
C:	3.405	
Le/rw:	59.880	
Saturated Thickness (H), in ft.:	33.10	(Water table elev - aquifer bottom elev)
		(Note: H must be > = LW)
For Lw < H - ln(Re/rw):	#NUM!	
For Lw=H - ln(Re/rw):	3.776	
Yo, in ft.:	1.80	
Yt, in ft.:	0.010	
t, in min.:	225.000	

	(Lw < H)	(Lw=H)
Kh (cm/sec) =		1.54E-05
Kh (ft/min) =		3.02E-05
Kh (ft/day) =		4.35E-02



Elapsed Time (sec)	Residual Head (ft.)
0.0	2.37
1.0	2.36
2.0	2.27
3.0	2.16
4.0	2.15
5.0	2.13
6.0	2.12
7.0	2.10
8.0	2.10
9.0	2.08
10.0	2.06
11.0	2.06
12.0	2.07
13.0	2.05
14.0	2.05
15.0	2.04
16.0	2.03
17.0	2.03
18.0	2.02
19.0	2.01
20.0	2.03
21.0	2.01
22.0	2.00
23.0	2.00
24.0	1.99
25.0	2.00
26.0	1.99
27.0	1.98
28.0	1.98
29.0	1.99
30.0	2.00
31.0	1.98
32.0	1.99
33.0	1.97
34.0	1.98
35.0	1.96
36.0	1.96
37.0	1.96
38.0	1.96
39.0	1.96
40.0	1.96
41.0	1.96
42.0	1.96
43.0	1.94
44.0	1.94

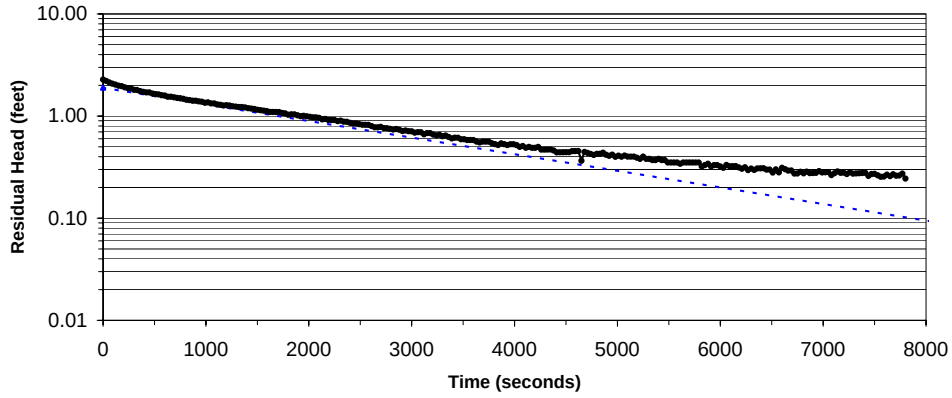
HALEY & ALDRICH OF NEW YORK	**FALLING HEAD TEST SUMMARY**	
ONE RIVER STREET	Monitoring Well ID:	PDMW-3
HASTINGS-ON-HUDSON, NEW YORK	Test Date:	9-Nov-05
28612-112	H&A Rep.:	J. BODE

PDMW-3 TEST No. 2

Falling Head Permeability Calculation: Bouwer-Rice Method

Well Depth (PVC), in ft.:	40	
Depth to Static (PVC) in ft.:	6.72	
Well Depth-Static (Lw), in ft.:	33.28	
Test Section Radius (rw), in ft.:	0.188	
Nominal Casing Radius (rc), in ft.:	0.083	
Equivalent Casing Radius (rc') in ft:	0.083	(Adjust for water-table wells only)
Nominal Screen Length in ft:	10.0	
Test Length Section (Le), in ft.:	10	
A:	3.164	
B:	0.538	
C:	3.136	
Le/rw:	53.333	
Saturated Thickness (H), in ft.:	33.28	(Water table elev - aquifer bottom elev)
		(Note: H must be > = LW)
For Lw < H - ln(Re/rw):	#NUM!	
For Lw=H - ln(Re/rw):	3.687	
Yo, in ft.:	1.90	
Yt, in ft.:	0.010	
t, in min.:	266.667	

	(Lw < H)	(Lw=H)
Kh (cm/sec) =		1.28E-05
Kh (ft/min) =		2.52E-05
Kh (ft/day) =		3.62E-02



Elapsed Time (sec)	Residual Head (ft.)
0.0	2.28
30.0	2.21
60.0	2.14
90.0	2.08
120.0	2.04
150.0	1.98
180.0	1.96
210.0	1.91
240.0	1.88
270.0	1.87
300.0	1.81
330.0	1.80
360.0	1.76
390.0	1.73
420.0	1.71
450.0	1.70
480.0	1.66
510.0	1.64
540.0	1.63
570.0	1.60
600.0	1.59
630.0	1.55
660.0	1.55
690.0	1.53
720.0	1.51
750.0	1.50
780.0	1.48
810.0	1.45
840.0	1.43
870.0	1.41
900.0	1.41
930.0	1.39
960.0	1.38
990.0	1.35
1020.0	1.36
1050.0	1.33
1080.0	1.33
1110.0	1.30
1140.0	1.29
1170.0	1.27
1200.0	1.28
1230.0	1.27
1260.0	1.25
1290.0	1.24

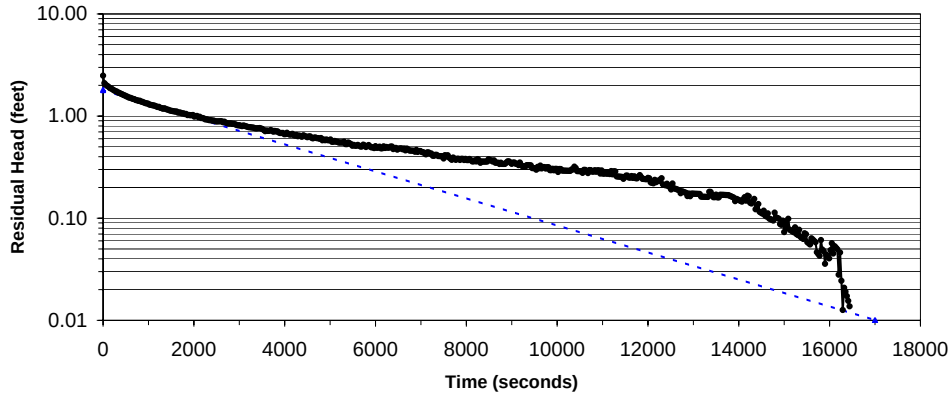
HALEY & ALDRICH OF NEW YORK	**RISING HEAD TEST SUMMARY**	
ONE RIVER STREET	Monitoring Well ID:	PDMW-3
HASTINGS-ON-HUDSON, NEW YORK	Test Date:	9-Nov-05
28612-112	H&A Rep.:	J. BODE

PDMW-3 TEST No. 2

Rising Head Permeability Calculation: Bouwer-Rice Method

Well Depth (PVC), in ft.:	40	
Depth to Static (PVC) in ft.:	6.72	
Well Depth-Static (Lw), in ft.:	33.28	
Test Section Radius (rw), in ft.:	0.167	
Nominal Casing Radius (rc), in ft.:	0.083	
Equivalent Casing Radius (rc') in ft:	0.083	(Adjust for water-table wells only)
Nominal Screen Length in ft:	10.0	
Test Length Section (Le), in ft.:	10	
A:	3.338	
B:	0.572	
C:	3.405	
Le/rw:	59.880	
Saturated Thickness (H), in ft.:	33.28	(Water table elev - aquifer bottom elev)
		(Note: H must be > = LW)
For Lw < H - ln(Re/rw):	#NUM!	
For Lw=H - ln(Re/rw):	3.779	
Yo, in ft.:	1.80	
Yt, in ft.:	0.010	
t, in min.:	283.333	

	(Lw < H)	(Lw=H)
Kh (cm/sec) =		1.22E-05
Kh (ft/min) =		2.40E-05
Kh (ft/day) =		3.46E-02



Elapsed Time (sec)	Residual Head (ft.)
0.0	2.49
30.0	2.10
60.0	2.02
90.0	1.98
120.0	1.94
150.0	1.88
180.0	1.86
210.0	1.82
240.0	1.79
270.0	1.76
300.0	1.74
330.0	1.70
360.0	1.68
390.0	1.66
420.0	1.64
450.0	1.61
480.0	1.59
510.0	1.56
540.0	1.55
570.0	1.52
600.0	1.51
630.0	1.49
660.0	1.47
690.0	1.47
720.0	1.44
750.0	1.43
780.0	1.41
810.0	1.41
840.0	1.38
870.0	1.38
900.0	1.36
930.0	1.34
960.0	1.33
990.0	1.32
1020.0	1.30
1050.0	1.29
1080.0	1.28
1110.0	1.27
1140.0	1.26
1170.0	1.25
1200.0	1.23
1230.0	1.23
1260.0	1.20
1290.0	1.20

HALEY & ALDRICH OF NEW YORK
ONE RIVER STREET
HASTINGS-ON-HUDSON, NEW YORK
28612-112

FALLING HEAD TEST SUMMARY

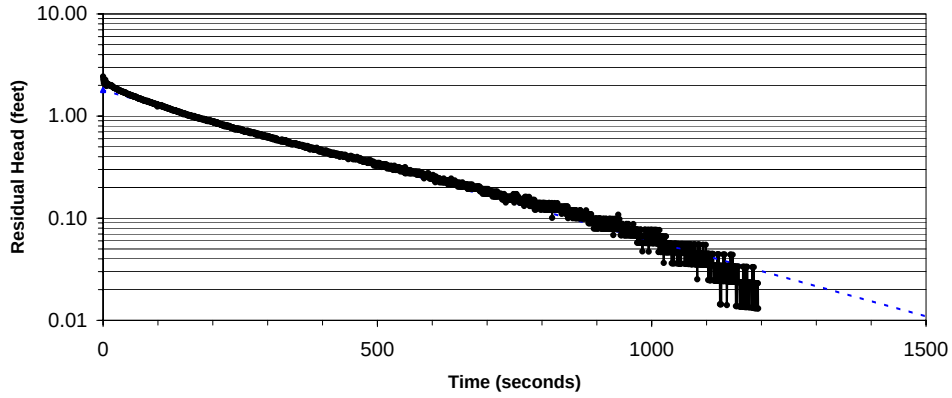
Monitoring Well ID: PDMW-5
Test Date: 1-Nov-05
H&A Rep.: J. BODE

PDMW-5

Falling Head Permeability Calculation: Bouwer-Rice Method

Well Depth (PVC), in ft.:	54	
Depth to Static (PVC) in ft.:	5.74	
Well Depth-Static (Lw), in ft.:	48.26	
Test Section Radius (rw), in ft.:	0.188	
Nominal Casing Radius (rc), in ft.:	0.083	
Equivalent Casing Radius (rc') in ft:	0.083	(Adjust for water-table wells only)
Nominal Screen Length in ft:	10.0	
Test Length Section (Le), in ft.:	10	
A:	3.164	
B:	0.538	
C:	3.136	
Le/rw:	53.333	
Saturated Thickness (H), in ft.:	50.26	(Water table elev - aquifer bottom elev)
		(Note: H must be > = LW)
For Lw < H - ln(Re/rw):	3.554	
For Lw = H - ln(Re/rw):	3.891	
Yo, in ft.:	1.80	
Yt, in ft.:	0.010	
t, in min.:	25.417	

	(Lw < H)	(Lw = H)
Kh (cm/sec) =	1.28E-04	
Kh (ft/min) =	2.52E-04	
Kh (ft/day) =	3.63E-01	



Elapsed Time (sec)	Residual Head (ft.)
0.0	2.44
0.5	2.32
1.0	2.23
1.5	2.11
2.0	2.13
2.5	2.13
3.0	2.21
3.5	2.21
4.0	2.27
4.5	2.13
5.0	2.16
5.5	2.08
6.0	1.97
6.5	2.03
7.0	2.10
7.5	2.07
8.0	2.05
8.5	2.06
9.0	2.05
9.5	2.05
10.0	2.01
10.5	2.01
11.0	2.02
11.5	2.01
12.0	2.01
12.5	2.01
13.0	2.02
13.5	2.00
14.0	1.99
14.5	1.98
15.0	2.00
15.5	1.98
16.0	1.99
16.5	1.97
17.0	1.96
17.5	1.93
18.0	1.92
18.5	1.92
19.0	1.90
19.5	1.90
20.0	1.90
20.5	1.88
21.0	1.89
21.5	1.88
22.0	1.88

HALEY & ALDRICH OF NEW YORK
ONE RIVER STREET
HASTINGS-ON-HUDSON, NEW YORK
28612-112

RISING HEAD TEST SUMMARY

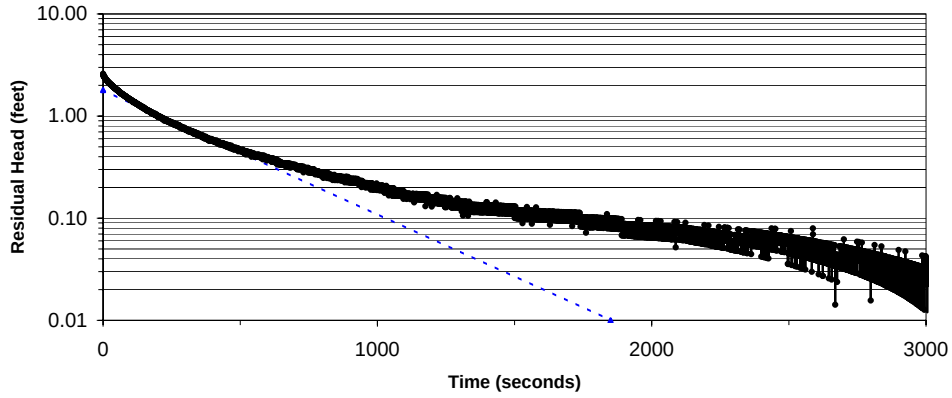
Monitoring Well ID: PDMW-5
Test Date: 1-Nov-05
H&A Rep.: J. BODE

PDMW-5

Rising Head Permeability Calculation: Bouwer-Rice Method

Well Depth (PVC), in ft.:	54	
Depth to Static (PVC) in ft.:	5.82	
Well Depth-Static (Lw), in ft.:	48.18	
Test Section Radius (rw), in ft.:	0.167	
Nominal Casing Radius (rc), in ft.:	0.083	
Equivalent Casing Radius (rc') in ft:	0.083	(Adjust for water-table wells only)
Nominal Screen Length in ft:	10.0	
Test Length Section (Le), in ft.:	10	
A:	3.338	
B:	0.572	
C:	3.405	
Le/rw:	59.880	
Saturated Thickness (H), in ft.:	50.18	(Water table elev - aquifer bottom elev)
		(Note: H must be > = LW)
For Lw < H - ln(Re/rw):	3.654	
For Lw = H - ln(Re/rw):	3.983	
Yo, in ft.:	1.80	
Yt, in ft.:	0.010	
t, in min.:	30.833	

	(Lw < H)	(Lw = H)
Kh (cm/sec) =	1.08E-04	
Kh (ft/min) =	2.14E-04	
Kh (ft/day) =	3.07E-01	



Elapsed Time (sec)	Residual Head (ft.)
0.0	2.60
0.5	2.56
1.0	2.51
1.5	2.49
2.0	2.49
2.5	2.46
3.0	2.45
3.5	2.43
4.0	2.42
4.5	2.41
5.0	2.42
5.5	2.38
6.0	2.38
6.5	2.39
7.0	2.37
7.5	2.34
8.0	2.34
8.5	2.34
9.0	2.32
9.5	2.29
10.0	2.30
10.5	2.27
11.0	2.28
11.5	2.27
12.0	2.26
12.5	2.24
13.0	2.24
13.5	2.25
14.0	2.22
14.5	2.23
15.0	2.21
15.5	2.19
16.0	2.20
16.5	2.18
17.0	2.19
17.5	2.16
18.0	2.16
18.5	2.16
19.0	2.14
19.5	2.14
20.0	2.15
20.5	2.13
21.0	2.14
21.5	2.12

ATTACHMENT 8A

Corrosion Protection Field Investigation Report by CorrPro

May 23, 2006

CORRPRO COMPANIES INC
Preserve and Sustain Global Assets & Infrastructure
610 Brandywine Parkway
West Chester, PA 19380
Tel: (610) 344-7002
Fax: (610) 344-7092
www.corrpro.com

Mr. Damian Siebert, PE
Haley & Aldrich of New York
200 Town Centre Dr., Suite 2
Rochester, NY 14623-4264

SUBJECT: OU-1 Remediations NYSDEC Site #3-60-022
1 River Street
Hastings-on Hudson, New York
Cathodic Protection of Sheet Piling
Pre-Design Investigation Report

REFERENCE: Our Job No. 401349

Dear Mr. Siebert:

Corrpro Companies performed field studies to determine the corrosion protection requirements for a sheet pile wall and associated components to be constructed at the Hasting on Hudson site. The objective is to design a cathodic protection system or systems to protect a new sheet pile wall and its components. The design life of the sheet pile wall is 100 years. This report presents our findings from the field studies.

FINDINGS

Corrpro Companies conducted a field investigation during the week of November 7, 2005 to determine the environmental conditions that will affect corrosion of the sheet piles at the site. This included measuring the soil resistivity within the site at various depths from the surface. The method we used to measure resistivity was the Wenner 4-pin technique in accordance with ASTM G57. Pin spacing's corresponded to the following depths: 5, 10, 15, 20, 30 and 40 feet. We then performed a Barnes layer analysis on the data to determine resistivity values at various layers. Table 1 presents the results of the field soil resistivity testing and the Barnes layer analysis. Appendix A presents information about soil testing techniques and interpretation of the data.

Soil samples were obtained at test pit number PDTP-02 at the north end of the site and test pit number PDTP-06 at the south end of the site. These test pits had been excavated previously by Haley & Aldrich. The soil samples were analyzed in our laboratory for pH, resistivity, chlorides, sulfates, moisture content and sulfate reducing bacteria. Table 2 shows the results of that testing. Opportunities for soil data were limited because of the amount of paving and rubble at the site; however, the on-site testing that was performed and the soil samples provide reasonable data for proceeding.

We also obtained a sample of river water for laboratory testing. Table 2 also shows the results of that testing. The Hudson River is brackish in this area and previous work in this area

indicated that the resistivity was on the order of 100 ohm-cm and chloride levels were on the order of 2,400 to 4,000 mg/l, but both are subject to seasonal river flow conditions.

We conducted cursory tests to assist in determining the cathodic protection current requirements. We used an existing sheet pile retaining wall as the structure being tested and existing fence posts as the temporary groundbed (Figure 1). Table 3 presents the results of the current requirement tests. While the results of these tests do not provide the amount of cathodic protection current that will be needed, they will assist in the determination of that current.

We recommend that the design proceed with a cathodic protection system for the sheet pile wall and associated components. We will be ready to proceed with the design once the location and extent of the work area is defined. We recommend that any fill materials brought onto the site to replace existing soil be tested for corrosiveness if they will be in contact with new steel sheet piling and components.

We appreciate the opportunity to work with you on this project. Please do not hesitate to call us if you have any questions.

Very truly yours,

Walter T. Young

Walter T. Young, P.E.
Principal Engineer

Cc: Christopher Gaule
ENSR International, Inc.
3 Marcus Blvd
Albany, NY 12205

Encl

Table 1. Results of field soil resistivity testing at southwest corner of property.

Spacing ft	Meter Multiplier	Meter Reading, (ohms)	Resistance (ohms)	Conversion Factor	Resistivity (ohm-cm)	Layer Resistivity (ohm-cm)	Layer Range (ft)
5	1	4.7	4.7	191.51	4500	4500	0 - 5.0
10	1	1.0	1	191.51	1915	1216	5.0 - 10
15	1	1.2	1.2	191.51	3447	--	10 - 15
20	1	2.0	2	191.51	7660	--	15 - 20
30	1	0.3	0.3	191.51	1724	676	20 - 30
40	1	0.6	0.6	191.51	4596	--	30 - 40

Table 2. Results of laboratory testing of soil samples and Hudson River water sample.

Sample	pH	Resistivity, (ohm-cm)	Chlorides, (mg/l)	Sulfates, (mg/l)	Sulfate Reducing Bacteria	Moisture, (%)
Soil – H&A test pit at north end	6.0	3,000	40	175	BDL	17.6
Soil – H&A test pit at south end @ top of pit	6.0	19,500	50	100	BDL	10.2
Soil – H&A test pit at south end @ 13 ft depth	6.0	455	155	80	BDL	36.8
Hudson River water*	7.0	438	>700	150	Not applicable	N/A

BDL = below detectable limit
* Water sample obtained on 11-8-05

Table 3. Current requirement test data.

Applied current = 0.96 amperes using 120 ft. of newly installed fence located about 40 feet east of retaining wall as groundbed (see Figure 1)

Test No.	Structure/ Reference electrode location	Structure-to-soil potential, E (mV)		
		E native	E w/Ion	E w/Ioff
	Existing Retaining Wall			
1.1	Southwest Corner	591	2910	590
1.2	20' North	582	2810	580
1.3	40' North	657	2870	660
1.4	60' North	600	2430	600
1.5	80' North	570	2780	640
1.6	100' North	556	2700	580
1.7	120' North	460	2120	460
1.8	140' North	670	2810	670
1.9	160' North	648	2930	680
1.10	180' North	467	2280	500
	20' East of Retaining Wall			
2.1	Southwest Corner	705	3130	710
2.2	20' North	703	2980	700
2.3	40' North	706	2980	710
2.4	60' North	420	2970	420
2.5	80' North	696	2890	690
2.6	100' North	655	2640	660
2.7	120' North	540	2570	540
2.8	140' North	692	2980	690
2.9	160' North	724	3020	730
2.10	180' North	714	3010	720

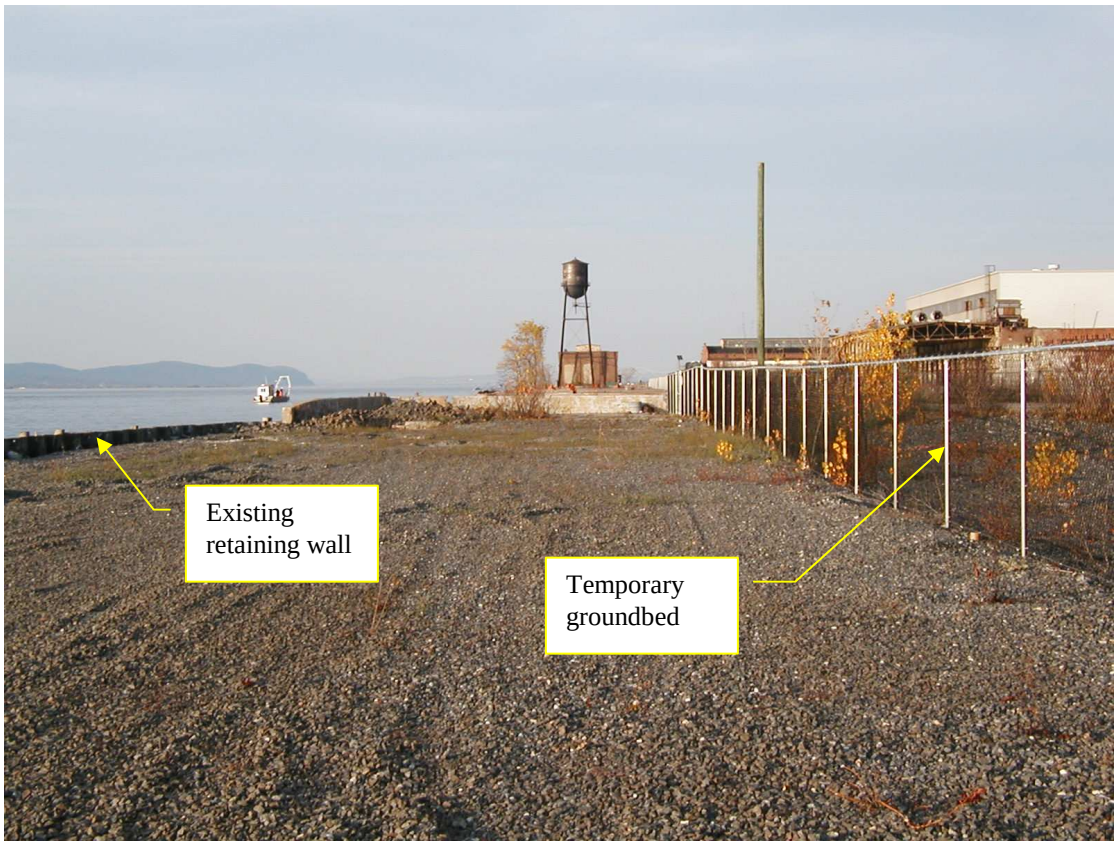


Figure 1. Current requirement test site looking north.

Appendix A

CORRPRO COMPANIES, INC.

SOIL TESTING

METHODS AND MEANING

Testing Procedures

Lab analysis

1. Soil resistivity – Soil resistivity is measured in the laboratory using a soil box in accordance with ASTM Test Method G57 in both its as-received state and after saturating the soil with demineralized water. The resistivity of very small quantities of soil are measured by placing soil in a demineralized water slurry in accordance with AASHTO T288 and measuring the conductivity.[1] Resistivity is then calculated from the conductivity. On-site measurements of soil resistivity are recorded using either a single probe and conductivity bridge or the Wenner four-pin method in accordance with ASTM Standard Method G57. The 4-pin method consists of placing four electrodes in a straight line at equal distances. Current is passed between the outer electrodes while the voltage is measured between the inner electrodes. The average resistivity is measured from the soil surface to a depth equal to the pin spacing.

2. pH – laboratory pH is performed in accordance with ASTM G51 using a combination glass/reference electrode and pH meter. The pH is taken directly in the native soil. Field measurements are taken using either a combination glass/reference electrode and pH meter, pH indicating tabs, or antimony cell and reference electrode.

3. Moisture – laboratory moisture measurements are taken using ASTM D2216. The soil sample is weighed, heated at 150 °F for 12 hours to drive off the moisture, then reweighed and the moisture content calculated.

4. Chloride – water soluble chloride is measured using an endpoint titration with silver nitrate (Hach) on a water extract from the soil.

5. Sulfate – water soluble sulfate is measured using a turbidimetric measurement (Hach) of a barium chloride precipitate

6. Bacteria – sulfate reducing bacteria can be detected in one of three ways. (1) A qualitative determination is made by detecting the evolution of hydrogen sulfide from an acid treated sample. (2) A quantitative measure is made by injecting a water extract of the soil into a nutrient medium. By using a serial dilution, the amount of bacteria present

[1] Our demineralized water is produced by running tap water through four ion exchange columns. The resulting resistivity is about 1,300,000 ohm-cm.

can be measured. Sulfate reducing bacteria and acid producing bacteria are measured in this way. Other bacteria can be detected using similar tests. (3) A quantitative measure of sulfate reducing bacteria can also be obtained by using immunoassay technology. The test employs purified antibodies to detect the enzyme adenosine-5'-phosphosulfonate (APS) reductase.[2]

Interpretation

pH

The pH is the measure of hydrogen ion availability within the soil. For steel, where corrosion is controlled by oxygen reduction, the corrosion rate is independent of pH where the pH is greater than 4 and less than 10. Generally, in an aqueous environment, a pH of less than 5 is considered corrosive whereas a pH greater than 9 inhibits corrosion. Soil pH might affect other alloys differently.

Resistivity

Resistivity is a common parameter for evaluating the corrosiveness of a soil. Resistivity is the inverse of conductivity, and is measured in the units of *ohm-centimeters*. Corrosivity is often an inverse function of resistivity, with low resistivity soils usually more corrosive than high resistivity soils. Although no national standard exists, the classifications in Table 1 are used as a general guide for interpreting soil resistivity measurements for ferrous structures.

Table 1. Soil resistivity classifications

Resistivity (ohm-cm)	**Classification**
Less than 2,000	Very Corrosive
2,000 to 5,000	Corrosive
5,000 to 10,000	Moderately Corrosive
Greater than 10,000	Progressively Less Corrosive

The above classifications do not provide quantitative information about corrosion rates. Definite corrosion rates can not be quantified from soil resistivity alone since there are too many variables, but research work by the National Bureau of Standards can provide estimates.[3] Table 2 provides estimates of corrosion rates for unprotected steel based on resistivity.[4]

The classifications used are valid for structures located in backfill, are usually considered too high for piles driven into natural soil. Piles driven into natural soil corrode at a much lower corrosion rate because the environment lacks oxygen. Piles driven though fill or where the water table fluctuates can suffer higher corrosion rates due to macrocell/galvanic cell corrosion. Galvanic cell corrosion occurs between soil layers when there is a significant difference in the

[2] Method patented by Strategic Diagnostics, Inc.
[3] M. Romanov, *Underground Corrosion*, National Bureau of Standards Circular 579, Washington, DC, April 1957
[4] *Uhlig's Corrosion Handbook*, 2nd Ed., R. Winston Revie, Ed., John Wiley & Sons, NY, 2000, p. 557

characteristics of the layers. Soil composition, pH, moisture content and oxygen content are all factors in this type of corrosion. The amount of corrosion between the fill layer and native soil layer depends on the magnitude of the difference in these values. The pile length located in the fill zone is the cathode in the galvanic corrosion cell and the pile length below the fill is the anode (corrodes). The location of most severe galvanic corrosion will be at the water table where the corrosion cell is most intense. Factors that result in high corrosion rates are low soil resistivity, low pH, high moisture levels (near the water table) and high oxygen levels (found in the fill).

Table 2. Corrosion in soils based on resistivity (*Uhlig's Corrosion Handbook*)

Environmental Factors	General Corrosion Rates, mpy*			Pitting Corrosion rates, mpy*		
	Max.	Min.	Ave.	Max.	Min.	Ave.
Soil Resistivity						
Less than 1,000	2.5	0.7	1.3	12.2	4.3	7.9
1,000 to 5,000	2.3	0.2	0.7	17.1	2.0	5.5
5,000 to 12,000	1.3	0.2	0.7	9.1	2.4	5.5
Greater than 12,000	1.4	0.1	0.6	10.2	1.2	4.3
Drainage						
Very Poor	2.3	1.5	1.8	17.7	6.3	11.0
Poor	1.5	0.4	0.9	9.1	2.0	5.5
Fair	2.5	0.7	0.9	12.2	3.1	6.3
Good	0.9	0.1	0.4	7.1	1.2	4.3

* mpy = mils per year (1 mil = 0.001 inch)

Chlorides

Chloride ions in the soil have an adverse effect on the stability of oxide films that form on metallic structures. These ions form water soluble compounds with the iron and force the steel's surface to remain active. Chloride ions increase the severity of crevice corrosion. Concern for corrosion on direct buried ferrous materials is warranted when chloride ion concentrations exceed 250 ppm.

Sulfates

Sulfate ions have an effect similar to chloride ions on crevice corrosion and support anaerobic sulfate reducing bacterial corrosion. Sulfate concentrations greater than 300 mg/l are corrosive.

Bacteria

Bacteria are naturally found in soils and these can exist under both anaerobic and aerobic conditions. In soils, anaerobic sulfate reducing bacteria (SRB), *Desulfovibrio Desulfuricans*, is a common type of bacteria found in marshy areas, clayey soils and soils with decaying organic matter. This type of bacteria can exist over a wide range of environmental conditions and causes very aggressive pitting and uniform corrosion of steel and ductile iron. Interpretation of the laboratory MIC tests is done using NACE Standard TM0194-94 as follows:

# Positive Vials	Bacteria per ml
1	10
2	100
3	1,000
4	10,000
5	100,000

Moisture Content

The moisture in the soil has a direct bearing on its ability to conduct corrosion currents and is normally reflected in resistivity measurements. Moist soil will diffuse corrosion products and keep anodic sites active. Moisture content of more than 20 percent warrants concern.

Federal Highway Administration Soil Corrosivity Criteria

The Federal Highway Administration (FHWA) reference document FHWA-HI-97-013 recommends the following tests be performed to assess the aggressiveness or corrosiveness of the soil:

1) pH (AASHTO T289)
2) Resistivity (AASHTO T288)
3) Sulfate ion content (AASHTO T290)
4) Chloride ion content (AASHTO T291)

FHWA further states that the following criteria should be utilized to characterize the corrosion potential of the soil:

1) If soil pH < 4.5, the soil is aggressive.
2) If soil resistivity is between 2000 and 5000 ohms/cm, then review sulfate ion content and chloride content. If chloride content is > 100 parts per million (ppm) or a sulfate ion content > 200 ppm, the soil is considered aggressive.
3) If the soil resistivity is > 5000 ohms/cm, the soil is considered non-aggressive.

ATTACHMENT 9A

Laboratory Report by Kemron

1359-A Ellsworth Industrial Boulevard • Atlanta, GA 30318 • TEL 404-636-0928 • FAX 404-636-7162

June 12, 2006

Ms. Kris Carbonneau
ENSR International
2 Technology Park Dr.
Westford, Massachusetts 01888
(978) 589-3377

Re: **Hudson River Dewatering Study**
Final Report Revision 1
KEMRON Project # SE0154

Dear Ms. Carbonneau:

KEMRON Environmental Services, Inc. (KEMRON) is pleased to present the results of the bench-scale treatability study conducted for ENSR. The treatability study was performed on sediment material sampled from a site located on the Hudson River (the Site). Testing was performed by KEMRON's Applied Technologies Group (ATG) located in Atlanta, Georgia. All testing was conducted in general accordance with the cost proposal developed by KEMRON and dated 22 August 2005.

The primary objective of the treatability study is evaluate dewatering techniques capable of reducing free liquid in the site material in order to pass Liquid Release Testing (LRT), and to evaluate the effectiveness of filtration applications at removing PCB containing sediments from liquids removed during dewatering activities. The treatability testing methods and results are summarized in the following sections of this letter report. Note that sampling services were provided during the treatability study; however, analytical data evaluation and presentation were included in the report.

Untreated Waste Characterization

In November 2005, KEMRON received six 5-gallon containers of sediment material from the site. The materials were delivered to KEMRON's Atlanta, Georgia facility by Federal Express. Upon receipt, each distinct site material was sieved through a pan sieve in order to remove debris larger than 0.5 inches in diameter. This particle size reduction is performed to facilitate full-scale treatment applications on a laboratory bench-scale. Table 1, attached to this report, summarizes the quantity of debris removed from each site material. The following is a summary of the information presented in Table 1.

TABLE 1

Container No	As-Received Weight (lbs)	Debris Removed (lbs)	Available Sample (lbs)	Description
1	58	20	38	Brown with angular porous rock, glass
2	44	10	34	Black with angular porous rock, glass
3	58	8	50	Brown with smooth rounded stone
4	43	17	26	Black with angular rock
5	42	7	35	Brown with angular rock, glass, some sticks
6	55	20	35	Brown with angular rock, glass
Composite	300	82	218	Brown saturated sediment

Note that the tables included within this text are summaries of the attached documents. As such, tables within the text may not include all information presented in the attached documents.

Following debris removal, each site material was then composited together and homogenized to better ensure a uniform material for testing. Note that all testing was performed on this master composite material and/or materials developed from treatment of the composite sample. Homogenization was performed by placing the waste material into a large blending chamber and gently mixing with stainless steel utensils. Upon completion of homogenization, the master composite was placed into the original shipping containers and placed into refrigerated storage maintained at a temperature of four degrees Celsius (^{0}C).

Immediately upon completion of homogenization, KEMRON performed untreated characterization testing on the master composite material. Untreated characterization testing was performed to establish a baseline level of characteristics in the sediment and to help ensure that the material exhibits similar properties to those expected at the site. The following tests were performed on aliquots of the master composite sediment in accordance with the referenced test methods:

Parameter	Method
Paint Filter	EPA Method 9095
Moisture / Solids Content	ASTM D2216
Grain Size Distribution	ASTM D422
Atterberg Limits	ASTM D4318

In addition to the above geotechnical testing performed by KEMRON, aliquots of the untreated material were submitted to Severn Trent Laboratories (STL) located in Colchester, Vermont. Note that STL was selected by ENSR to perform all analytical testing for this project. KEMRON's responsibility related to analytical testing was to provide sampling services only. Inclusion and evaluation of the analytical testing in this report is outside the scope of the treatability study per the original agreement.

The results of geotechnical testing performed by KEMRON are presented in Table 2. The following is a summary of the data presented in Table 2:

Data contained on this sheet shall not be disclosed without prior approval from KEMRON Environmental Services, Inc. (Proprietary)

TABLE 2		
TESTING PARAMETER	UNIT	UNTREATED COMPOSITE
Moisture Content	%	43.9
Solids Content	%	69.5
Particle Size Distribution		
Gravel	%	22.8
Sand	%	61.4
Silt	%	11.6
Clay	%	4.2
Atterberg Limits		
Liquid Limit		NL
Plastic Limit		NP
Plasticity Index		NA

Dewatering Evaluations

Dewatering evaluations were performed in order to evaluate methods and parameters for dewatering the site materials. Specifically, KEMRON evaluated gravity drainage and filter press dewatering techniques during this phase of the study. In addition to testing the as-received site material, KEMRON evaluated dewatering applications performed on the untreated composite material which was pretreated with diatomaceous earth (DE), to determine if pretreatment increased the performance of dewatering techniques applied to the site composite.

Gravity Drainage Testing

Gravity drainage testing was performed to evaluate the reduction in moisture content that can be achieved by allowing the site material to gravity drain while stockpiled during field operations. The primary advantages of the gravity drainage dewatering method include low operating cost and ease of operation. In order to simulate the process on the laboratory scale, laboratory testing was performed by allowing a known quantity of the sediment material to drain through a filter medium. Monitoring was performed over a 7-day test duration to evaluate the rate at which water drains from the sample. Additionally, KEMRON performed moisture / solids content testing on the test samples at 3, 5, and 7 days of treatment.

Table 3 summarizes the results of gravity drainage testing performed on the untreated composite material and the DE pretreated composite material. The following is a summary of the data presented in Table 3:

Data contained on this sheet shall not be disclosed without prior approval from KEMRON Environmental Services, Inc. (Proprietary)

TABLE 3			
TESTING PARAMETER	UNIT	RESULTS GD-001	GD-002
Initial Untreated Weight	g	1005.7	1048.2
Conditioner Used		None	5% DE (1)
Initial Moisture Content (ASTM)	%	43.9	43.9
Initial Solids Content	%	69.5	69.5
Final Weight of Cake	g	929.9	1003.8
Effluent	g	27.56	12.05
Moisture Content (ASTM)			
3 Day	%	29.48	36.17
5 Day	%	29.33	35.03
7 Day	%	28.89	42.02
Solids Content			
3 Day	%	77.23	73.44
5 Day	%	77.32	74.06
7 Day	%	77.59	70.41
Paint Filter Test	Pass / Fail	Fail	Fail
Liquid Release Test	Pass / Fail	Fail	Fail

(1) DE – diatomaceous earth

Note that due to the relatively low quantity of effluent removed from the as-received site material, GD-001, and because the addition of conditioner did not improve the test results, GD-002, it was determined that further gravity drainage testing would not be performed. Complete data reports for all testing performed by KEMRON are included as Attachment B.

Filter Press Testing

Filter press testing was performed to evaluate the reduction in moisture content achieved by the application of a positive pressure to the sediment sludge. Bench-scale testing was performed at several different positive pressures using a Baroid filter press apparatus. The Baroid filter press apparatus consists of a material reservoir mounted in a frame, a filtering medium, a means of capturing the filtrate, and attachments for a compressed air-supply line. The filtering medium had a pore size of approximately 24 micrometers (µm). KEMRON performed a total of 4 filter press tests, labeled FP-001 through FP-004.

Filter press testing was performed by placing pre-weighed aliquots of sediment into the reservoir and then introducing pressurized air into the system. Testing was continued under these conditions until pressure breakthrough occurred. Breakthrough was identified as the point at which pressure was released from the apparatus through cracking of the filter cake. Upon release of pressure, testing was terminated and the apparatus was dismantled. The weight of the filter cake and the volume of filtrate were recorded. Aliquots of each filter cake were then sampled for moisture content testing.

Data contained on this sheet shall not be disclosed without prior approval from KEMRON Environmental Services, Inc. (Proprietary)

The results of filter press testing are summarized in Table 4.

TABLE 4

TESTING PARAMETER	UNIT	RESULTS FP-001	FP-002	FP-003	FP-004
Initial Untreated Weight	g	464.22	454.33	455.78	455.1
Initial Moisture Content	%	43.9	43.9	43.9	43.9
Initial Solids Content	%	69.5	69.5	69.5	69.5
Gauge Pressure	lbs/in^2	25	50	75	100
Run Time	min	2.5	2.0	1.5	1.0
Final Weight of Cake	g	400.3	390.8	387.6	378.10
Final Moisture Content	%	33.38	27.77	26.00	24.65
Final Solids Content	%	74.98	78.26	79.37	80.22
Paint Filter Test	Pass / Fail	Fail	Pass	Pass	Pass
Liquid Release Test	Pass / Fail	Fail	Fail	Fail	Pass

Review of the data presented in Table 4 indicate that filter press testing using a positive pressure of 100 psi results in a treated filter cake capable of passing both paint filter and liquid release testing. Additionally, the run time for this treatment was approximately 1 minute indicating that this material is relatively easily treated using full-scale treatment applications similar to filter press testing. Note that due to the successful results from the 100 psi filter press treatment, testing using a pretreatment additive was eliminated from this study.

WATER TREATMENT FILTRATION EVALUATIONS

Filtrate from Dewatering Activities

Based on the results from dewatering evaluations, KEMRON applied filter press treatment at 100 psi to develop a bulk filtrate material for filtration evaluations. Specifically, replicate batches of the site sediment were treated using the filter press application in order to create a sufficient volume of filtrate for additional testing.

Once developed, KEMRON homogenized the filtrate material to ensure the entire quantity of filtrate was similar in nature. Following homogenization, KEMRON performed total dissolved solids (TDS) and total suspended solids (TSS) content testing on the filtrate material. In accordance with EPA test methods 160.0 and 161 TSS and TDS evaluations are typically performed using a filter media with a nominal pore size of 1.1 µm. In order to evaluate the potential effectiveness of filtration applications at reducing groundwater contamination concentrations, TSS and TDS testing were performed using 4 different filter media. The results of TSS and TDS evaluations are presented in Table 5. The following is a summary of the data in Table 5:

Data contained on this sheet shall not be disclosed without prior approval from KEMRON Environmental Services, Inc. (Proprietary)

TABLE 5		
SAMPLE ID	RESULTS (mg/L)	
	TSS	TDS
SE0154-002 (0.45 µm Filter)	12	3,996
SE0154-003 (1.2 µm Filter)	13	3,772
SE0154-004 (5.0 µm Filter)	14	3,855
SE0154-005 (11.0 µm Filter)	18	4,122

Review of the data in Table 5 indicate very similar TSS and TDS concentrations were reported regardless of the filter media used in testing.

In addition to TSS and TDS testing, aliquots of each filtered test material, as well as an aliquot of the unfiltered filtrate material were forwarded to STL laboratories for analytical testing.

Site Groundwater

KEMRON was provided an additional water material for filtration evaluations. This material was identified as site groundwater. Testing of this groundwater followed the testing protocol outlined for the evaluation of the filtrate developed from dewatering activities applied to the site sediment material. The results of TSS and TDS testing performed on the site groundwater are presented in Table 6. The following is a summary of Table 6:

TABLE 6		
SAMPLE ID	RESULTS (mg/L)	
	TSS	TDS
SE0154-007 (0.45 µm Filter	9.7	3,760
SE0154-008 (1.2 µm Filter	24	3,746
SE0154-009 (5.0 µm Filter	8.7	3,719
SE0154-010 (11.0 µm Filter	11	3,695

As seen in the testing of the dewatering filtrate, the results of TSS and TDS testing performed on the site groundwater are very similar regardless of the filter media used. Additionally, the TSS and TDS results are very similar between the dewatering filtrate and the site groundwater. Aliquots of each filtered site groundwater, as well as an unfiltered aliquot, were submitted to STL laboratories for analytical testing.

Data contained on this sheet shall not be disclosed without prior approval from KEMRON Environmental Services, Inc. (Proprietary)

Discussion of Results

The results of dewatering evaluations indicate that gravity drainage treatment performed on a bench-scale produced a cake material with a moisture content of approximately 29%, which failed both paint filter and liquid release testing. Treatment of the site sediment, using a dewatering application at 50 psi positive pressure resulted in a cake material with a moisture content of approximately 28% which is capable of passing paint filter but not liquid release testing. At a positive pressure of 100 psi the treated filter cake exhibits a moisture content of 24.65% and passes both paint filter and liquid release testing.

While KEMRON has identified that the use of a dewatering application utilizing a positive pressure of 50 psi, FP-002, results in a treated material which passes paint filter testing, it would be worthwhile noting that bench-scale gravity drainage treatment, GD-001, produced a treated material with a moisture content less than 4% higher than that in the FP-002 material. KEMRON's experience is that gravity drainage is often more effective in a full-scale application. Additional moisture removal may be realized on a full-scale basis due to overburden pressure created by large stockpiles, evaporation, and tilling or manipulation of the stockpile which is not performed during laboratory testing.

Testing of the filtrate material developed using a positive pressure of 100 psi indicated that filtration using filter media with pore sizes ranging from 0.45 to 11.0 µm resulted in very similar TSS and TDS values. Additionally, groundwater collected from the site exhibited TSS and TDS results very similar to the filtrate developed during the dewatering study.

At this time KEMRON has not reviewed any analytical data developed by STL. As such, KEMRON cannot determine the effectiveness of the testing protocol on reducing concentrations of contaminants in the site materials.

Closure

KEMRON Environmental Services, Inc. appreciates the opportunity to provide ENSR with treatability testing services. If you have any questions, or require additional information, please call either of the undersigned at (404) 636-0928.

Sincerely,
KEMRON Environmental Services, Inc.

Mark Clark
Applied Technologies Group
Project Manager

Kelly Clemons
Applied Technologies Group
Program Manager

Attachments

KEMRON ENVIRONMENTAL SERVICES

Data contained on this sheet shall not be disclosed without prior approval from KEMRON Environmental Services, Inc. (Proprietary)

ATTACHMENT 10A

Corrective Action Request (CAR) Forms

CORRECTIVE ACTION REQUEST

Number: 004 **Date: November 03, 2005**

TO: Mike Alfieri (H&A) & Sean Clifford (H&A)

You are hereby requested to take corrective actions indicated below and as otherwise determined by you (a) to resolve the noted conditions and (b) to prevent it from recurring. Your written response is to be returned to the Project Quality Assurance Manager by November 04, 2005.

Condition: Broken sample jars and samples above temperature requirement were received by laboratory on October 28, 2005.

Reference Documents: Chains-of-Custody from 10/27/05 reviewed. In addition, an email from STL Burlington was sent to B. Aragona and others detailing the condition of the samples received on 10/28/05.

Originator	Date	Approval	Date	Approval	Date
Ban Aragona	11/03/05		11/8/05		

Response

Conveyed to Mike Alfieri and Wayne Hardison that samples were received by the laboratory broken and above temperature requirements. A procedure for sample cooling and shipping was generated to use in the future as a result.

Cause of Condition: Insufficient sample cooling and packaging.

Corrective Action

(A) Resolution:

Field Package was created for field staff to use as reference which includes:

- Sample Chain of Custody illustrating appropriate sample naming,
- Sample Groundwater Purging/Sampling Record,
- A review of sample nomenclature,
- A summary table of field activity describing samples to be collected, sample quantity, analyses, specific instructions for sample collection, and the sample cooling and shipping procedure described below.

Sample cooling and shipping procedure was created:

- Fill one cooler ½ to ¾ full of crushed ice.
- Place collected sample jar inside bubble wrap bag and seal.
- Immerse bubble wrap bag with sample into "crushed ice cooler".
- Once daily sampling is completed, prepare a shipping cooler by lining with ice bags and bubble wrap.
- Remove all samples from "crushed ice cooler" and place into "shipping cooler"

- Seal and prepare "shipping cooler" for shipment.

In addition, a review of shipping and FedEx protocol with field staff was implemented.

(B) Prevention: Maintain crushed ice cooler for sample cooling to appropriate temperature by immersing sample. In addition insure proper sample protection from breakage by placing sample jars in bubble wrap bags and lining the shipping cooler with bubble wrap.

Signature _____ Date 07 November 2005

CA Follow-up

Corrective Action verified by:_____ Date _____

CORRECTIVE ACTION REQUEST

Number: 005 **Date:** November 03, 2005

TO: Tim Erickson (H&A)

You are hereby requested to take corrective actions indicated below and as otherwise determined by you (a) to resolve the noted conditions and (b) to prevent it from recurring. Your written response is to be returned to the Project Quality Assurance Manager by November 04, 2005

Condition: ~~Broken~~ sample jars and samples above temperature requirement were received by laboratory on October 31, 2005.

Reference Documents: Chains-of-Custody from 10/27/05 reviewed.

Ban Aragona	11/03/05		11/8/05		
Originator	Date	Approval	Date	Approval	Date

Response

A procedure for sample cooling and shipping was generated to use in the future.

Cause of Condition: Insufficient sample cooling.

Corrective Action

(A) Resolution:

Field Package was created for field staff to use as reference which includes:

- Sample Chain of Custody illustrating appropriate sample naming,
- Sample Groundwater Purging/Sampling Record,
- A review of sample nomenclature,
- A summary table of field activity describing samples to be collected, sample quantity, analyses, specific instructions for sample collection, and the sample cooling and shipping procedure described below.

In addition, a review of shipping and FedEx protocol with field staff was implemented.

(B) Prevention: Maintain crushed ice cooler for sample cooling to appropriate temperature by immersing sample.

Signature _____ Date 11-7-05

CA Follow-up

Corrective Action verified by: _____ Date _____

CORRECTIVE ACTION REQUEST

Number: 003 **Date: October 19, 2005**

TO: Sean Dolan (ENSR)

You are hereby requested to take corrective actions indicated below and as otherwise determined by you (a) to resolve the noted conditions and (b) to prevent it from recurring. Your written response is to be returned to the Project Quality Assurance Manager by October 20, 2005.

Condition: An insufficient number of QA/QC samples related to the environmental characterization (EC) program have been collected as of October 17, 2005. Approximately 109 EC samples were collected but only 3 sets of QA/QC samples (including MS, MSD, and Field Dup) have been submitted to the laboratory.

Reference Documents: Chains-of-Custodies reviewed include samples collected on the following dates: 9/23/05, 9/26/05, 9/27/05, 9/29/05, 9/28/05, 9/30/05, 10/3/05, 10/4/05, 10/5/05, 10/10/05, 10/11/05, 10/12/05, 10/13/05, and 10/1705.

MS, MSD, and Dups were indicated on the chains for the following dates: 9/27/05, 10/3/05, and 10/11/05.

Heather Budzich	10/19/05		11/5/05		
Originator	Date	Approval	Date	Approval	Date

Response

Conveyed to Sean Dolan that QA/QC samples associated with EC samples should be collected at a frequency of 1 QA/QC sample (including MS, MSD, and Dup) per 20 EC samples or 1 every 5 days which ever occurs first in accordance with Section B5.1 of the QAPP.

Cause of Condition: Getting wrapped up in daily sampling activities and a lack of documentation for keeping track of and predicting when the next set of QA/QC samples should be collected.

Corrective Action

(A) Resolution: It was suggested to Sean Dolan to review the COCs and confirm the "Condition" above. H. Budzich also suggested collecting two or more sets of QA/QC samples from now until the end of the sampling period (possibly October 21, 2005) to increase the overall total number of QA/QC samples collected per EC sample collected. The goal is to have the overall number of QA/QC sample sets = 1 per 20 EC samples collected.

(B) (B) Prevention: Advised Sean Dolan to keep a running daily log of samples collected so it is clear that Sean will collect the 20th sample or that 5 days will have passed since the last QA/QC collection. It is also advised to collect QA/QC samples early on in the "count of 20" rather than wait until the "count of 20" is almost complete.

(B2) Affecte

Signature Date 11/7/05

CA Follow-up

Corrective Action verified by:_____ Date _____

CORRECTIVE ACTION REQUEST FORM

CORRECTIVE ACTION REQUEST

Number 006 **Date:** November 7, 2005

To: Sean Dolan

You are hereby requested to take corrective actions indicated below and as otherwise determined by you (a) to resolve the noted conditions and (b) to prevent it from recurring. Your written response is to be returned to the Project Quality Assurance Manager by _____.

Condition:

Samples were submitted to the lab that were not identified in the SAP and RDWP as being required.

Reference Documents:

Attached memo; attached table; attached email from Heather Budzich

Sean Dolan	10/10/05		11/8/05		
Originator	Date	Approval	Date	Approval	Date

Response

The lab was contacted and requested not to analyze the samples listed.

Cause of Condition:

I lost track of which borings were to be sampled at what intervals.

Corrective Action

(A) Resolution:

A written list of which samples were submitted that were not to be analyzed and their corresponding sample dates and COC#'s was sent to Kris Dusablon at STL.

(B) Prevention:

The sample summary table was reviewed each morning.

(B2) Affected Documents:

COC #11, COC #1682, COC #1684, COC #1685, COC #1686, COC #1691

Signature _____ Date 10/10/05

CA Follow-up

An additional sample (PDSB30F,), will be added to the above referenced tables on 11/7/05, and Kris Dusablon at STL will be notified.

Corrective Action verified by: _____ Date _____

Kris Dusablon @ STL Burlington

Kris,

Below is the list of samples that were submitted but need not be analyzed.

Please do not analyze the following samples;

From 10/10/05, COC # 11,
- PDSB22A
- PDSB22C
- PDSB22E
- PDSB22F

From 10/11/05, COC # 1682
- PDSB28F

From 10/13/05, COC # 001684
- PDSB29F

From 11/7/05, COC #1685
- PDSB30F

From 10/17/05, COC # 001686
- PDSB20A
- PDSB20C
- PDSB20E
- PDSB19C
- PDSB19E
- PDSB19F
- PDSB18A
- PDSB18C
- PDSB18E
- PDSB18F

From 10/18/05, COC # 001691
- PDSB13C
- PDSB13D

From 9/26/05, COC #2
- PDSB16F
- PDSB31F

From 10/12/05, COC #1683
- PDSB27F

From 10/24/05, COC #1696
- PDSB11A
- PDSB11C

Both of the above have since been used as part of a 0'-12' composite for waste characterization analysis.

Total of 24 samples

Date Collected	Client ID	STL ID	ETR Number	Logged In	Extracted	Screened	Analyzed	Write-Up	QC/ Forms
10/10/2005 COC #11	PDSB22A	642282	110334	yes	yes	yes	no	no	no
	PDSB22C	642284	110334	yes	yes	yes	no	no	no
	PDSB22E	642286	110334	yes	yes	yes	no	no	no
	PDSB22F	642287	110334	yes	yes	yes	no	no	no

Date Collected	Client ID	STL ID	ETR Number	Logged In	Extracted	Screened	Analyzed	Write-Up	QC/ Forms
10/11/2005 COC #1682	PDSB28F	642339	110339	yes	yes	yes	no	no	no

Date Collected	Client ID	STL ID	ETR Number	Logged In	Extracted	Screened	Analyzed	Write-Up	QC/ Forms
10/13/2005 COC #001684	PDSB29F	642657	110383	yes	yes	yes	no	no	no

Date Collected	Client ID	STL ID	ETR Number	Logged In	Extracted	Screened	Analyzed	Write-Up	QC/ Forms
10/17/2005 COC #001686	PDSB20A	643243	110486	yes	no	no	no	no	no
	PDSB20C	643245	110486	yes	no	no	no	no	no
	PDSB20E	643247	110486	yes	no	no	no	no	no
	PDSB19C	643250	110486	yes	no	no	no	no	no
	PDSB19E	643252	110486	yes	no	no	no	no	no
	PDSB19F	643253	110486	yes	no	no	no	no	no
	PDSB18A	643254	110486	yes	no	no	no	no	no
	PDSB18C	643256	110486	yes	no	no	no	no	no
	PDSB18E	643258	110486	yes	no	no	no	no	no
	PDSB18F	643259	110486	yes	no	no	no	no	no

Date Collected	Client ID	STL ID	ETR Number	Logged In	Extracted	Screened	Analyzed	Write-Up	QC/ Forms
10/18/2005 COC #001691	PDSB13C	643517	110512	yes	no	no	no	no	no
	PDSB13D	643518	110513	yes	no	no	no	no	no

From: Budzich, Heather [Heather.Budzich@parsons.com]
Sent: Wednesday, October 26, 2005 1:06 PM
To: McKenney, Luke
Cc: D'Hollander, Ray; whardison@haleyaldrich.com; Aragona, Ban; Spann, Laura; Gaulc, Christopher; Rock J. Vitale; Badio, David; Dolan, Sean
Subject: Samples not to analyze

Luke,
This email is regarding our conversation today. I was reviewing the list of samples you sent to STL-Burlington requesting that they do not analyze specific samples. During my review I identified three additional samples that would fall under this category. They include PDSB 16F, PDSB27F, and PDSB 31F. Two additional samples, PDSB 11A and PDSB11C, collected on Monday would also fall into this category. Please refer to Table A1.5 in the SAP (Appendix A of the RDWP) and confirm my conclusion. If you agree, please inform the lab in writing to remove these samples from anlysis. Thank you for your attention to this detail.

Heather Budzich
parsons
290 Elwood Davis Rd
Liverpool, NY 13088
315.451.9560 (p)
315.451.9570 (f)

CORRECTIVE ACTION REQUEST FORM

CORRECTIVE ACTION REQUEST

Number 007 **Date:** November 8, 2005

To: Sean Dolan

You are hereby requested to take corrective actions indicated below and as otherwise determined by you (a) to resolve the noted conditions and (b) to prevent it from recurring. Your written response is to be returned to the Project Quality Assurance Manager by _____.

Condition:

In the case of the waste characterization sampling, the collection rate of one QA/QC samples per 5 days was not satisfied.

Reference Documents:

Waste Char MS-MSD Samples.xls

Originator	Date	Approval	Date	Approval	Date
Sean Dolan	11/8/05		11/14/05		

Response

Sean Dolan noted on several occasions to both Luke McKenney, ENSR (field), and Heather Budzich, Parson's office, that there was insufficient recovery using the 2'x 2" split spoons for MS/MSD samples to be collected in the manner described in the work plan.

Cause of Condition:

There was insufficient recovery for MS/MSD samples to be collected for several of the waste characterization borings. The site conditions were such that typical recovery for a 2' interval was only 1-4" due to very coarse material, voids, and/or loose material. Therefore, it was necessary to utilize the majority (or in some cases all) of the recovered sample for the PCB analysis.

Corrective Action

(A) Resolution:

Kris Dusablon at STL was contacted to see if MS/MSDs could be run from the material submitted. The attached table shows they were able to do this for many of them.

(B) Prevention:

As this phase of the investigation is complete, prevention of this for future work on site may be achieved by using larger diameter spoons, or sampling over larger intervals.

(B2) Affected Documents:

COC #5, COC #9, COC #11, COC #1683, COC #1685, COC #1689, COC #1694, COC #1695, COC #1696, COC #1697,

Signature _____ Date _____

CA Follow-up

Corrective Action verified by: _____ Date _____

ATTACHMENT 10B

Data Usability Reports by ESI

(See enclosed CD)

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E1. INTRODUCTION

E1.1 Purpose and Scope

Following completion of the Pre-Design Investigation (PDI) for Operable Unit No. 1 (OU-1) (refer to Appendix D) additional data gaps were identified that required a supplemental field investigation. The data gaps included delineation of PCBs for defining excavation limits, analyzing metals using the toxicity characteristic leach procedure (TCLP) for waste disposal characterization, and hydrogeological data for assessment of groundwater heads and treatment during excavation dewatering. This report summarizes field investigations performed and presents data collected during the Supplemental Design Investigation (SDI) completed between 20 March and 14 April 2006.

The SDI was performed in general accordance with the following documents:

- Agreement GEM-2005-0020 between Atlantic Richfield Company (AR) and Haley & Aldrich of New York (Haley & Aldrich), Work Release One – Exhibit A, Scope of Work for the Design of Remedial Actions for OU-1 of the former Anaconda Wire and Cable Plant Site (Site), Village of Hastings-on-Hudson, New York, effective 1 August 2005.
- Remedial Design Work Plan (RDWP), Former Anaconda Wire & Cable Plant Site, Operable Unit No. 1, prepared by Parsons for AR and ARCO Environmental Remediation, LLC (AERL), revised date May 2005
- Health, Safety, Security, and Environment (HSSE) Plan for the Pre-Design Investigation of OU-1 at the Former Anaconda Wire and Cable Plant Site, Village of Hastings-on-Hudson, New York, dated 16 September 2005, prepared by ENSR International.

This report is organized into sections corresponding to the major tasks of the SDI: a general description of Existing Site Conditions, Environmental Soil Sampling, Hydrogeological Investigation, and Water Treatability Testing. The final section of the report describes Data Management and Validation

E1.2 Elevation Datum

Elevations in this report are in feet and refer to the North American Vertical Datum of 1988 (NAVD88). Spatial coordinates are in feet and refer to the North American Datum of 1983 (NAD83).

E1.3 Boundary and Topographic Survey

A topographic and plannimetrics survey showing existing surface features was conducted by GEOD Photogrammetric Sciences Survey Technologies using aerial mapping based on photographs taken on 8 December 1995. A more detailed survey consisting of aerial mapping with field verification was completed in May 2005 to establishing the Site boundary lines and Site topography for the PDI and remedial design. The survey was performed by Boswell Engineering, a New York State licensed surveyor.

In addition to Site features, locations of SDI subsurface explorations were surveyed in April 2006.

The survey's horizontal control was tied to the NAD83 datum, and vertical control was tied to the NAVD88 datum.

E2. SITE MANAGEMENT

The Site is located at 1 River Street, adjacent to the Hudson River in the Village of Hastings-on-Hudson, in Westchester County, New York, as shown on Figure E1. A plan of the Site is shown on Figure E2. The Site is approximately 2,400 ft long by 500 ft wide. It is abutted by the Metro North Commuter Railroad to the east; the Hudson Valley Health and Tennis Club to the north; the Hudson River to the west; and the Tappan Terminal site to the south.

E2.1 Health, Safety, Security, and Environment Program

Investigation activities at the Site were performed in accordance with the approved Health, Safety, Security and Environment (HSSE) Plan (ENSR, 2005). As with the PDI, the provisions established in the HSSE Plan were mandatory for all on-Site personnel performing investigation activities as well as any Site visitors. The HSSE Plan was prepared in accordance with Health and Safety requirements set forth by AR and in accordance with the requirements for Hazardous Waste Operations and Emergency Response (HAZWOPER) 29 CFR1910.120 or 29 CFR 1926.65.

The same HSSE protocols were used as during the PDI, including daily toolbox meetings, field office sign-in sheets, Authorization to Work (ATW), Job Safety Analysis (JSA) and Pre-Drilling checklists. See Appendix D for additional detail on these protocols. The HSSE Plan established minimum standards, practices, and procedures related to personnel protection and safety during the investigation activities. The HSSE Plan assigned responsibilities for on-Site personnel; served as a standard during investigation activities; defined the potential hazards and associated risks; described action levels for the use and upgrading and/or downgrading of personal protective equipment; and identified the proper use of work zones.

The SDI HSSE kick-off meeting was conducted 20 March 2006 prior to the start of any work activities. This meeting was held at the Site office on the 2nd floor of Building 72.

The Project Health Safety Security and Environment Coordinator (PHSSEC) was responsible for enforcing the requirements of the HSSE Plan. Throughout the field program the PHSSEC conducted work stoppages in cases where an immediate danger was perceived, as summarized below:

- March 31, 2006 – While drilling at PDSB #117 inside Building 52, excessive diesel fumes required work stoppage for two hours.
- April 4, 2006 – Unguarded Moyno pump on drill rig. Work was stopped for several hours until a wire cage was procured and installed around the pump shaft.

All work was completed with no injuries, illnesses or lost time accidents.

Riverside Management, an existing tenant, was responsible for on-Site security. The majority of the Site is fenced and gated; however, Riverside Management operates an on-Site storage business which requires customers to access the property on a daily basis. All Site visitors associated with the SDI were required to enter the Site through a contractor gate and sign-in at the field trailer adjacent to Building 51. Riverside Management also operates and maintains

Site security cameras as part of a contractual relationship with AR. It is through this relationship that Riverside Management also assisted with other Site activities, such as management of investigation derived waste, discussed below. Data are included in Attachment E7 and will be used in the on-going design of the Community Air Monitoring Plan (CAMP).

E2.1.1 Safety Audits

Periodic audits and task reviews were used to ensure the requirements specified within the HSSE Plan were being met and that work was being completed in a safe manner. During the SDI the following audits, near misses, and observations were completed and entered into the BP Traction System.

- Advanced Safety Audits: 6;
- Opportunity Observation Reports: 24; and
- Near-miss Reports: 6.

E2.2 Meteorological Monitoring

Meteorological data was collected during the SDI. A tripod-mounted meteorological station was erected at a fixed location on the southern portion of the Site, similar to the setup during the PDI. The sensors were mounted on a tripod three meters above ground level, equipped with sensors to measure wind speed, wind direction, sigma theta, temperature and relative humidity on a continuous basis. These parameters were monitored continuously on-Site during all ground intrusive periods and reported as 15-minute averages. Data is included in Attachment E7 and will be used in the on-going design of the Community Air Monitoring Plan (CAMP).

E2.3 Management of Investigation Derived Waste

Investigation derived waste (IDW) generated during the SDI was staged in a temporary drum storage area in Building 22/22C. Many of the drums used during the SDI were drums that were at less-than-capacity at the end of the PDI. Best attempt was made to fill these drums completely during the SDI rather than dispose of them at partial capacity.

Building 22/22C was selected as a temporary drum storage area because the building is enclosed, the floor slab is a relatively impervious, the building is easily accessible, and intrusive work was not scheduled for this area. All drums were staged on wooden pallets to facilitate weekly leak inspections by Parsons and Riverside Management.

Drums were managed consistent with the procedures used during the PDI (refer to Appendix D for details). A total of 110 drums were generated during the SDI. Parsons, as an agent for Atlantic Richfield, coordinated disposal of these drums with Waste Management, Model City, NY. All drums were disposed of as hazardous for lead and toxic for PCBs. Although Parsons was responsible for arranging for disposal of the drums, Atlantic Richfield remained the manifested waste generator.

E3. ENVIRONMENTAL SOIL SAMPLING

Following completion of the PDI, (refer to Appendix D) additional data gaps were identified that required supplemental field work. The data gaps included further horizontal and vertical delineation for PCBs and TCLP metals analysis for waste characterization to facilitate evaluation of disposal options.

Decontamination of drilling and sampling equipment was performed in accordance with the SAP (Appendix A of the RDWP, Parsons 2005). The soil samples were visually examined for field evidence of impacts and physically described using the Burmister soil classification methodology. Samples were placed in laboratory grade glassware, packed on ice, and shipped via overnight courier, with accompanying chain of custody forms, to STL Burlington.

E3.1 Excavation Characterization

Thirty pre-design soil borings (PDSB 100- 130) were advanced in the Southern Area, the interior of Building 52, and the Northern Remainder Area in an effort to further define the horizontal and vertical extent of PCB-contaminated soil to be excavated. Figures E3A and E3B show locations of excavation characterization borings drilled during the SDI. Table E1 provides a breakdown of locations, depths, and areas of concern for excavation characterization borings. Logs of the borings are provided in Attachment E1. For the purposes of the PDSBs, the "zero" depth was defined as the interface between the crushed stone, asphalt, or concrete surface layer and the underlying soil.

A RIGID thin walled corer was used to drill through concrete building slabs and a jackhammer was used to advance through asphalt. A 2-inch hand auger was used to collect soil samples in two foot intervals. Following collection of the sample in each 2 foot interval, an air knife and vac truck was used to pre-clear the location to a width of 4-inches continued to a depth of 5 feet bgs. This sampling procedure was developed by ENSR and approved by Parsons, AR, and ESI during the PDI. In some instances pre-clearing to 5 feet bgs was not possible due to subsurface obstructions. In these situations, borings were advanced with caution.

Once the location was pre-cleared to 5 feet bgs, continuous soil sampling was conducted by collecting split spoons in accordance with the American Society for Testing and Materials (ASTM) D1586-99. The soil samples were analyzed for PCBs using United States Environmental Protection Agency (USEPA) SW846 Method 8082. Quality assurance/quality control (QA/QC) samples were collected in accordance with the Quality Assurance Project Plan (QAPP, Appendix B of the RDWP, Parsons, 2005). Table E1 summarizes the depth intervals sampled. At some locations, deeper samples were not analyzed immediately; instead they were placed on hold, pending analysis of shallower samples at that location. Results of the laboratory testing are summarized in Table E2 and the laboratory report is included in Attachment E2.

E3.2 Disposal Characterization

Soil samples for disposal characterization were collected from ten of the thirty excavation characterization PDSBs. In addition to PCBs, these samples were analyzed for TCLP metals in accordance with the QAPP using USEPA SW846 Method 6010B and 7470A. Table E2 identifies the samples submitted for disposal characterization and Figures E3A and E3B show the locations where the samples were collected. The laboratory reports are included in Attachment E2.

E3.3 Obstructions and Voids Encountered During the SDI

Remnants of the previous Site activities are evident throughout the Site and were encountered to varying degrees during the SDI. The SDI required hand clearing of the boring locations to 5 feet bgs and provided information about obstructions and voids near the surface. In some cases, obstructions were too difficult to penetrate and boring locations were moved. Some obstructions and voids were also encountered at depth. Locations where voids and obstructions were encountered are listed and described in the following subsections.

E3.3.1 Obstructions and Voids - Central Portion of the Site

Obstructions were identified at:

- PDSB 109: Concrete encountered from 2.5 to 3 feet bgs, was cored through and drilling continued at 3 feet bgs.
- PDSB 110: Brick and mortar resembling a sub-grade wall encountered immediately below grade during hand clearing; boring relocated twice, and successfully cleared to 5 feet bgs.

E3.3.2 Obstructions and Voids - Northern Portion of the Site

Voids were identified at:

- PDSB 111: A metal box was encountered at approximately 2 feet bgs; after drilling through metal, a void was encountered from 3.5 feet to 13.5 feet bgs, with depth to water at approximately 6 feet bgs. Several attempts were made at this location to quantify the size of the void, including use of mirrors and a videoscope; however the void was too large to see the sidewall with the instrumentation employed.

E3.3.3 Obstructions and Voids - Interior of Building 52

Obstructions were identified at:

- PDSB 116: Split-spoon refusal was encountered at 6 feet bgs (concrete).
- PDSB 117: Concrete was encountered at 4 feet bgs; an attempt was made to drill through the concrete, but the boring was abandoned after drilling two feet into the concrete obstruction.
- PDSB 118: Split spoon refusal encountered at 6.5 feet bgs (concrete).

- **PDSB 119: Split spoon refusal encountered at 6.25 feet bgs (concrete).**
- **PDSB 130: Concrete was encountered at 2.5 feet bgs and an attempt was made to core through the obstruction; the boring was relocated, and concrete was again encountered, at 1.5 feet bgs. An attempt was made to drill through the obstruction, and the hole was abandoned after drilling 0.5 feet into the concrete (2 feet bgs).**

E4. HYDROGEOLOGICAL INVESTIGATION

To evaluate the hydrogeology of the eastern portion of the Site, a supplemental hydrogeologic investigation was conducted from 20 March to 1 May 2006. The investigation consisted of two tasks:

- **The installation of four well couplets with a deep, double-cased well screened in the Basal Sand hydrostratigraphic unit and a shallow well screened in the Fill unit; and**
- **The electronic monitoring of groundwater elevation trends over a significant time period at select monitoring points.**

The objectives of the tasks were to better evaluate hydraulic gradients at the Site, allow for better Site coverage for groundwater elevation monitoring and groundwater modeling calibration, and to better evaluate responses to tidal changes within the two more permeable hydrostratigraphic units (Fill and Basal Sand hydrostratigraphic units) at the Site.

E4.1 Subsurface Exploration and Monitoring Well Installation

The supplemental subsurface explorations and monitoring well installation program was conducted from 22 March to 12 April 2006. Four well couplets (PDMW-16 shallow (S) and PDMW-16 deep (D); PDMW-17S and PDMW-17D; PDMW-18S and PDMW-18D; and PDMW-19S and PDMW-19D) were installed along the eastern portion of the Site to evaluate hydraulic gradients, to better evaluate groundwater flow and groundwater chemistry into the Site, and to allow for better spatial coverage for groundwater monitoring. The exploration followed the PDI protocols and procedures with the exception that drilling of the deep monitoring wells extended into the Basal Sand hydrostratigraphic unit rather than terminating in the Marine Silt hydrostratigraphic unit. The following observations were made during the exploration program:

- **Bedrock was reached at approximately 30 feet bgs at PDMW-16D. No other SDI exploratory boring reached bedrock. The monitoring well installed was screened in both bedrock and the Basal Sand hydrostratigraphic unit.**
- **Boring locations were moved in several instances due to subsurface obstructions below 4-ft. as well as occurrences of strong petroleum odors or detectable sheen. For example, PDMW-17D was relocated seven times before being located at a suitable setting due to subsurface obstructions and petroleum issues.**
- **All three hydrostratigraphic units (Fill, Marine Silt, and Basal Sand) extend as far east as the four additional monitoring well couplets.**

Exploration and monitoring well installation logs are provided in Attachment E3.
Well development logs are also provided in Attachment E3. Like the exploration program, the groundwater sampling program followed the PDI protocols and procedures as well.

E4.2 Electronic Groundwater Elevation Monitoring

To evaluate the tidal influence at the Site, pressure transducers were installed in select monitoring wells. Leveloggers® by Solinst were installed in monitoring wells MW-01A, MW-01B, MW-03A, MW-03B, MW-07, PDMW-15, MW-13A, MW-14A, MW-14B, MW-15A, MW-15B, PDMW-9, PDMW-10, and PDMW-11 on 20 March 2006. Leveloggers® were installed in monitoring wells PDMW-16S, PDMW-16D, and PDMW-17S on 7 April 2006 and in monitoring wells PDMW-17D, PDMW-18S, PDMW-18D, PDMW-19S, and PDWM-19D on 11 April 2006. The Leveloggers® were removed on 1 May 2006. The rationale behind the selection of the monitoring wells is as follows:

- **Couplets with a monitoring well screened within the Fill and Basal Sand hydrostratigraphic units (MW-01A, MW-01B, MW-03A, MW-03B, MW-14A, MW-14B, MW-15A, MW-15B, PDMW-16S, PDMW-16D, PDMW-17S, PDMW-17D, PDMW-18S, PDMW-18D, PDMW-19S, and PDWM-19D) allow for the evaluation of vertical hydraulic gradients at the Site. MW-13A was originally selected with MW-13B, but due to the presence of LNAPL in MW-13B, a Levelogger® was only installed in MW-13A.**
- **MW-07 and PDMW-15 were selected based on the location of the wells with respect to the distance from the Hudson River.**
- **As groundwater elevation contouring has indicated a hydraulic sink along the storm drain in the vicinity of MW-02, PDMW-9, PDMW-10, and PDMW-11 were selected to evaluate hydraulic head changes along the storm drain line. It was not feasible to install a Levelogger® in MW-02 due to road box damage.**

In addition to the Site electronic data collection, "real-time" 15 minute interval Hudson River stage data was obtained from the USGS website for USGS gauging station USGS 01376304 and was downloaded by Haley & Aldrich during the electronic monitoring period. The electronic data indicates the following:

- **Based on the Levelogger® data, there is a slight lag time response in the Fill hydrostratigraphic unit with tidal flux. The magnitude of elevational change within the Fill hydrostratigraphic unit is a fraction of the change in tidal elevation.**
- **Based on the collected data, there is also a lag time response in the Basal Sand hydrostratigraphic unit with tidal flux. Although the magnitude of head change is not as great as stage change of the Hudson River, in most cases the magnitude of head change is greater than the hydraulic head change of the Fill hydrostratigraphic unit.**
- **The data indicates a Site-wide upward hydraulic gradient.**
- **The collected data also indicates the Basal Sand hydrostratigraphic unit acts as a confined aquifer unit responding to resultant pressure changes of the changing tide (i.e., change in volume and water weight placed on the system).**

E5. WATER TREATABILITY TESTING

E5.1 Introduction

Initial bench scale testing of water treatment alternatives performed during the PDI indicated that filtration alone would not be sufficient to remove the majority of the metals to below anticipated water discharge standards. In addition, PCB analyses during the PDI all provided non-detect results at detection limits that did not meet anticipated discharge limits. Therefore, a supplemental bench scale test was performed to determine:

- The effectiveness of pH adjustment in precipitating the metals to meet anticipated discharge requirements; and
- Actual PCB levels, at lower detection limits.

E5.2 Sampling Collection

Haley & Aldrich collected groundwater samples to be used in bench tests. To simulate the high particulate content expected during construction dewatering, unfiltered samples were collected from groundwater monitoring well MW-10 using a Grundfos submersible pump. Refer to Figure E3A and E3B for monitoring well locations.

E5.3 Bench Testing Procedures and Results

Kemron performed bench tests on groundwater samples received from the Site. Testing was conducted in general accordance with the proposal developed by Kemron dated 14 March 2006. A discussion of the procedures and results of Kemron's testing is provided below. Refer to Attachment E4 for Kemron's laboratory report.

E5.3.1 Sample Preparation

On 23 March 2006, Kemron received three 5-gallon containers of Site groundwater. Upon receipt, the water was placed in refrigerator storage and a temperature of 4ºC was maintained. Once chilled, Kemron homogenized the groundwater to ensure uniform material for testing. Homogenization was performed by placing the contents of all of the containers into a clean 25-gallon overpack container and mixing with stainless steel utensils. After homogenization, the groundwater was placed into the original shipping containers and returned to refrigerated storage.

E5.3.2 Water Treatment Filtration Evaluation

Kemron performed evaluations on the Site groundwater to evaluate changes in the Site water caused by filtration activities. Specifically, Kemron tested the as-received Site groundwater and the groundwater after adjusting to a pH value of 10.0 standard units (S.U.).

A pH of 10.0 was selected based on Haley & Aldrich's research on the solubility of the metal hydroxides. For metals of concern for discharge, the solubility of the metal

hydroxides was less than the discharge limit at a pH of greater than 10.0. Therefore, this pH was selected for the bench testing performed by Kemron.

E5.3.2.1 Water Treatment Filtration Evaluation

Filtration of the as-received homogenized groundwater samples was performed using filter media with nominal pore sizes including 20, 10, 5, 1, 0.5, and 0.1 microns. Filtration was accomplished using a bench-scale vacuum filtration apparatus consisting of a vacuum pump, 1,000 ml glass vacuum flask, and a filter media holder with a reservoir for introducing the groundwater into the filtration system. Samples of untreated and filtered groundwater were sent to STL and analyzed for PCBs and metals.

E5.3.2.2 pH Adjusted Groundwater

Kemron performed filtration activities on the pH adjusted groundwater using filter media with nominal pore sizes including 10, 1.0, and 0.1 micron. For pH adjustment Kemron used a 1 Normal (N) solution of sodium hydroxide. Initially, Kemron performed a titration of a 200 mL aliquot of the Site groundwater with the sodium hydroxide solution. It was determined that 3.6 ml of the base was needed to reach a pH value of 10 S.U. for the 200 ml of sample Kemron then treated a 5 liter (L) aliquot of the as-received Site groundwater with 90 ml of sodium hydroxide. Following approximately 30 minutes of mixing KEMRON tested the pH of the material with a result of exactly 10.0 S.U. Following pH adjustment, Kemron performed filtration activities using the three filter media in accordance with the previously discussed filtration protocol. Samples of the pH-adjusted and filtered groundwater were sent to STL and analyzed for PCBs and metals.

E5.4 Discussion of Results

E5.4.1 Results of Water Filtration Evaluation

E5.4.1.1 Results of Filtration Testing

Analyses of the results of the filtration test have been broken down into two categories.

Results of PCB Analyses:

Two of the six filtered groundwater samples detected PCBs above the Quantitation Limit (QL) of 0.5 µg/L. PCBs were detected in the samples filtered through 10 µm and 1 µm filters at concentrations of 1.20 µg/L and 1.30 µg/L respectively (Table E3). These concentrations exceed the anticipated effluent discharge limit of 0.065 µg/L which is based on communication with NYSDEC personnel and provided in Table E5. pH adjusted samples indicated non-detect values for PCBs in all samples.

It is not known whether PCBs are present at concentrations of less than 0.5 µg/L. Insufficient sample was available at the time of analysis for low level PCB testing. Future testing will require the use of a lower QL at or below the anticipated effluent discharge limit. The results of the pH adjusted groundwater are summarized in Table E4, and laboratory data is provided in Attachment E2.

Results of Metals Analyses:

The filtration of non-pH adjusted groundwater showed similar results to those previously identified in the PDI, with antimony, copper, iron, magnesium, manganese, and sodium exceeding the anticipated effluent discharge limits listed in Table E5. Two of the results are subject to interpretation:

- **Antimony was non-detect at a detection limit higher than the anticipated discharge limit (the laboratory indicated that lower detection limits are normally possible with the method utilized).**
- **Copper was found in the blank samples, as such, these results are questionable.**

In all cases for filtration alone, the size of the filter used did not change whether a filtered sample met or exceeded the anticipated discharge limit. The results of the pH adjusted groundwater are summarized in Table E3, and laboratory data is provided in Attachment E2.

Analysis of the pH adjusted filtered groundwater indicate that additional metals were removed including iron, magnesium and manganese to levels below anticipated discharge limits. Only antimony and copper (discussed above as questionable results) and sodium continued to exceed the anticipated discharge limits.

Sodium concentrations are extremely high in the natural groundwater. This natural occurance of sodium must be reviewed prior to negotiations with the POTW regarding discharge limits, as naturally occurring groundwater exceeds the anticipated discharge standards. Note that none of the contaminants of concern at the Site would increase the concentration of sodium in the groundwater.

While the size of the filter utilized for the filtration of pH-adjusted water did not make a difference in metals meeting or exceeding the discharge standards, additional metals were removed at lower filtration levels, with all heavy metals at non-detect (or also present in the blank) at filtration of 0.1 microns. The results of the pH adjusted groundwater are summarized in Table E4, and laboratory data is provided n Attachment E2.

Summary

The results of the filtration of groundwater and pH adjusted groundwater indicate that by increasing the pH of the water to 10.0 S.U., the concentrations of magnesium and manganese can be reduced to concentrations below the anticipated discharge limits. Filtration of the pH adjusted water with any filter size show to be effective for this application.

Filtration of groundwater alone is not sufficient in removing metals from the subject waters. By adjusting the pH of the water and then filtering it is effective at removing all of the metals with the possible exceptions of copper and sodium.

E6. DATA MANAGEMENT/VALIDATION

The chemical results of the SDI were validated by AR's quality assurance oversight and data management contractor, ESI, in accordance with the QAPP. The chemical analyses were conducted by STL Burlington. Validation procedures, described in the QAPP, included an initial review to verify completeness of laboratory documentation and a quality assurance review that included the assessment of the following:

- **Laboratory holding times;**
- **Analytical methods;**
- **Percent recovery and relative percent difference calculations;**
- **Blank and sample data;**
- **Chain-of-custody forms; and**
- **Laboratory corrective action.**

In addition, as part of the quality oversight, ESI conducted a field audit of environmental sample collection activities on 31 March 2006. The audit was performed to evaluate the field team performance and identify and address corrective measures to be initiated in response to sampling and project management deficiencies during the observation of sampling procedures. As a result of the field audit and general field oversight management, five Corrective Action Request Forms (CARs) were submitted to resolve issues that were occurring in the field that were not in line with the protocols set forth in the QAPP. These CARs are included in Attachment E5.

A summary of the quality assurance review conducted by ESI is included in Attachment E6 of this report.

REFERENCES

1. ENSR International (2005). *Health, Safety, Security, and Environment Plan* for the Pre-Design Investigation of the Operable Unit No. 1 at the Former Anaconda Wire and Cable Plant Site, Village of Hastings-on-Hudson, New York, dated 16 September 2005.

2. ENSR International (2005). *Air Monitoring Workplan* for Pre-Design Field Investigation Services Operable Unit 1, Former Anaconda Wire and Cable Plant Site, Hastings-on-Hudson, NY dated 15 September 2005.

3. Parsons (2005). *Remedial Design Work Plan*, Former Anaconda Wire & Cable Plant Site, Operable Unit No. 1, dated September 2004, Revised May 2005.

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TABLE E1
SUMMARY OF SOIL BORING LOCATIONS AND COLLECTED SAMPLES

OU-1 REMEDIATION
NYSDEC SITE #3-60-022
1 RIVER STREET
HASTINGS-ON-HUDSON, NEW YORK

Area	Soil boring	Depth (bgs)	Sample Intervals (bgs)	Notes	
Southern Area	PDSB-100	14 ft.	10-12 ft, 12-14 ft	Samples submitted for PCB analyses only.	No samples held.[1]
	PDSB-101	14 ft.	10-12 ft, 12-14 ft	Samples submitted for PCB analyses only.	No samples held.[1]
	PDSB-102	14 ft.	6-8 ft, 8-10 ft, 10-12 ft, 12-14 ft	Samples submitted for PCBs and Metals analyses.	Samples 10-12 ft, and 12-14 ft, held pending analytical results from upper intervals.
	PDSB-103	14 ft.	10-12 ft, 12-14 ft	Samples submitted for PCB analyses only.	No samples held.[1]
	PDSB-104	14 ft.	6-8 ft, 8-10 ft, 10-12 ft, 12-14 ft	Samples submitted for PCBs and Metals analyses.	Samples 10-12 ft, and 12-14 ft, held, pending analytical results from upper intervals.
	PDSB-105	14 ft.	10-12 ft, 12-14 ft	Samples submitted for PCB analyses only.	No samples held.[1]
	PDSB-106	14 ft.	2-4 ft, 4-6 ft, 6-8 ft, 8-10ft, 10-12 ft, 12-14 ft.	Samples submitted for PCB analyses only.	Samples 6-8 ft, 8-10 ft, 10-12 ft, and 12-14 ft, held, pending analytical results from upper intervals.
	PDSB-107	14 ft.	6-8 ft, 8-10 ft, 10-12 ft, 12-14 ft	Samples submitted for PCBs and Metals analyses.	Samples 10-12 ft, and 12-14 ft, held, pending analytical results from upper intervals.
Central Area	PDSB-108	6 ft.	2-4 ft, 4-6 ft	Samples submitted for PCB analyses only.	No samples held.[1]
	PDSB-109	6 ft.	2-4 ft, 4-6 ft	Samples submitted for PCB analyses only.	No samples held.[1]
	PDSB-110	14 ft.	6-8 ft, 8-10 ft, 10-12 ft, 12-14 ft	Samples submitted for PCBs and Metals analyses.	Samples 10-12 ft, and 12-14 ft, held, pending analytical results from upper intervals.
Northern Remainder Area	PDSB-111	18 ft.	16-18 ft.	Samples submitted for PCBs and Metals analyses. Void encountered from 4-14 feet. Sample collected from 16-18'.	Sample 16-18' held.
	PDSB-112	14 ft.	6-8 ft, 8-10 ft, 10-12 ft, 12-14 ft	Samples submitted for PCBs and Metals analyses.	All samples analyzed.[2]
	PDSB-113	14 ft.	2-4 ft, 4-6 ft, 6-8 ft, 8-10ft, 10-12 ft, 12-14 ft.	Samples submitted for PCB analyses only.	Samples 6-8 ft, 8-10 ft, 10-12 ft, and 12-14 ft, held, pending analytical results from upper intervals.
	PDSB-114	14 ft.	0-2 ft, 2-4 ft, 4-6 ft, 6-8 ft, 8-10ft, 10-12 ft, 12-14 ft.	Samples submitted for PCB analyses only.	Samples 4-6 ft, 6-8 ft, 8-10 ft, 10-12 ft, and 12-14 ft, held, pending analytical results from upper intervals.
	PDSB-115	14 ft.	0-2 ft, 2-4 ft, 4-6 ft, 6-8 ft, 8-10ft, 10-12 ft, 12-14 ft.	Samples submitted for PCB analyses only.	Samples 4-6 ft, 6-8 ft, 8-10 ft, 10-12 ft, and 12-14 ft, held, pending analytical results from upper intervals.

Area	Soil boring	Depth (bgs)	Sample Intervals (bgs)	Notes	
Inside Building 52	PDSB-116	6 ft.	0-2 ft, 2-4 ft, 4-6 ft.	Samples submitted for PCBs and Metals analyses. Refusal at 6 feet, after three attempts.	All samples analyzed.[2]
	PDSB-117	6 ft.	0-2 ft, 2-4 ft, 4-6 ft.	Samples submitted for PCBs analyses. Refusal at 6 feet, after two attempts.	All samples analyzed.[2]
	PDSB-118	6.5 ft.	0-2 ft, 2-4 ft, 4-6 ft, 6 ft to refusal.	Samples submitted for PCBs analyses. Refusal at 6.5 feet.	All samples analyzed.[2]
	PDSB-119	6.25 ft.	0-2 ft, 2-4 ft, 4-6 ft, 6 ft to refusal.	Samples submitted for PCBs analyses. Refusal at 6.25 feet.	Samples 4-6 ft, held, pending analytical results from upper intervals.
	PDSB-120	14 ft.	0-2 ft, 2-4 ft, 4-6 ft, 6-8 ft, 10-12 ft, 12-14 ft.	Samples submitted for PCBs and Metals analyses. No recovery 8-10'.	Samples 4-6 ft, 6-8 ft, 10-12 ft, and 12-14 ft, held, pending analytical results from upper intervals.
	PDSB-121	14 ft.	0-2 ft, 2-4 ft, 4-6 ft, 6-8 ft, 10-12 ft, 12-14 ft.	Samples submitted for PCB analyses only. No recovery 8-10'.	Samples 4-6 ft, 6-8 ft, 10-12 ft, and 12-14 ft, held, pending analytical results from upper intervals.
	PDSB-122	14 ft.	0-2 ft, 2-4 ft, 4-6 ft, 6-8 ft, 8-10ft, 10-12 ft, 12-14 ft.	Samples submitted for PCB analyses only.	Samples 4-6 ft, 6-8 ft, 8-10 ft, 10-12 ft, and 12-14 ft, held, pending analytical results from upper intervals.
	PDSB-123	14 ft.	0-2 ft, 2-4 ft, 4-6 ft, 6-8 ft, 8-10ft, 10-12 ft, 12-14 ft.	Samples submitted for PCBs and Metals analyses.	Samples 4-6 ft, 6-8 ft, 8-10 ft, 10-12 ft, and 12-14 ft, held, pending analytical results from upper intervals.
	PDSB-124	14 ft.	0-2 ft, 2-4 ft, 4-6 ft, 6-8 ft, 8-10ft, 10-12 ft, 12-14 ft.	Samples submitted for PCB analyses only.	Samples 4-6 ft, 6-8 ft, 8-10 ft, 10-12 ft, and 12-14 ft, held, pending analytical results from upper intervals.
	PDSB-125	14 ft.	0-2 ft, 2-4 ft, 4-6 ft, 6-8 ft, 8-10ft, 10-12 ft, 12-14 ft.	Samples submitted for PCB analyses only.	Samples 4-6 ft, 6-8 ft, 8-10 ft, 10-12 ft, and 12-14 ft, held, pending analytical results from upper intervals.
	PDSB-126	14 ft.	2-4 ft, 4-6 ft, 6-8 ft, 8-10ft, 10-12 ft, 12-14 ft.	Samples submitted for PCB analyses only.	Samples 8-10 ft, 10-12 ft, and 12-14 ft, held, pending analytical results from upper intervals.
	PDSB-127	14 ft.	0-2 ft, 2-4 ft, 4-6 ft, 6-8 ft, 8-10ft, 10-12 ft, 12-14 ft.	Samples submitted for PCBs and Metals analyses.	Samples 4-6 ft, 6-8 ft, 8-10 ft, 10-12 ft, and 12-14 ft, held, pending analytical results from upper intervals.
	PDSB-128	14 ft.	0-2 ft, 2-4 ft, 4-6 ft, 6-8 ft, 8-10ft, 12-14 ft.	Samples submitted for PCB analyses only. No recovery 10-12'.	Samples 4-6 ft, 6-8 ft, 8-10 ft, and 12-14 ft, held, pending analytical results from upper intervals.
	PDSB-129	14 ft.	0-2 ft, 2-4 ft, 4-6 ft, 6-8 ft, 8-10ft, 10-12 ft, 12-14 ft.	Samples submitted for PCB analyses only.	Samples 4-6 ft, 6-8 ft, 8-10 ft, 10-12 ft, and 12-14 ft, held, pending analytical results from upper intervals.
	PDSB-130	4.5 ft.	0-2 ft, 2-4 ft, 4-5 ft.	Samples submitted for PCB analyses only. Refusal at 4.5 feet after two attempts.	Sample 4-5 ft held, pending analytical results from upper intervals.

Notes:
[1] Specific samples were collected and placed on "hold" pending results from upper intervals, in accordance with the approved scope for the Supplementary PDI.
[2] Indicates that selected samples were originally placed on hold, then later released for analysis.

TABLE E2
SUMMARY OF SOIL ANALYTICAL RESULTS
OU-1 REMEDIATION
1 RIVER STREET
HASTINGS-ON HUDSON

Location ID	PDSB-100	PDSB-100	PDSB-101	PDSB-101	PDSB-102	PDSB-102	PDSB-102	PDSB-102	PDSB-103	PDSB-103	PDSB-104	PDSB-104	PDSB-105	PDSB-105	PDSB-105	PDSB-106
Sample Name	PDSB100F	PDSB100G	PDSB101F	PDSB101G	PDSB102D	PDSB102E	PDSB102F	PDSB102G	PDSB103F	PDSB103G	PDSB104D	PDSB104E	PDSB105F	PDSB105G	PDSB105N	PDSB106B
Sample Depth	10 - 12	12 - 14	10 - 12	12 - 14	6 - 8	8 - 10	10 - 12	12 - 14	10 - 12	12 - 14	6 - 8	8 - 10	10 - 12	12 - 14	12 - 14	2 - 4
Date	3/24/2006	3/24/2006	3/24/2006	3/24/2006	3/27/2006	3/27/2006	3/27/2006	3/27/2006	3/27/2006	3/27/2006	3/27/2006	3/27/2006	3/28/2006	3/28/2006	3/28/2006	3/28/2006
Metals (mg/kg)																
Arsenic	-	-	-	-	**9.1 J**	**782 J**	-	-	-	-	**15.7 J**	**10.4 J**	-	-	-	-
Barium	-	-	-	-	**116 J**	**140 J**	-	-	-	-	**229 J**	**123 J**	-	-	-	-
Cadmium	-	-	-	-	0.2 U	**0.55 J**	-	-	-	-	0.08 UJ	0.08 UJ	-	-	-	-
Chromium	-	-	-	-	**12.7 J**	**13.8 J**	-	-	-	-	**184 J**	**120 J**	-	-	-	-
Lead	-	-	-	-	**284 J**	**808 J**	-	-	-	-	**333 J**	**184 J**	-	-	-	-
Lead (ug/l)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mercury	-	-	-	-	**0.24 J**	**0.36 J**	-	-	-	-	**0.58 J**	**0.1 J**	-	-	-	-
Selenium	-	-	-	-	**0.58**	**1**	-	-	-	-	**2.3**	**1.7**	-	-	-	-
Silver	-	-	-	-	**0.32**	**0.43**	-	-	-	-	**1.1**	**0.45**	-	-	-	-
PCBs (ug/kg)																
Aroclor-1016	6 U	6 U	6 U	6 U	6 U	6 U	6 UJ	6 UJ	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U
Aroclor-1221	5.8 U	5.8 U	5.8 U	5.8 U	5.8 U	5.8 U	5.8 UJ	5.8 UJ	5.8 U	5.8 U	5.8 U	5.8 U	5.8 U	5.8 U	5.8 U	5.8 U
Aroclor-1232	3.7 U	3.7 U	3.7 U	3.7 U	3.7 U	3.7 U	3.7 UJ	3.7 UJ	3.7 U	3.7 U	3.7 U	3.7 U	3.7 U	3.7 U	3.7 U	3.7 U
Aroclor-1242	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U	2.1 UJ	2.1 UJ	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U
Aroclor-1248	4.1 U	4.1 U	4.1 U	4.1 U	4.1 U	4.1 U	4.1 UJ	4.1 UJ	4.1 U	4.1 U	4.1 U	4.1 U	4.1 U	4.1 U	4.1 U	4.1 U
Aroclor-1254	5.7 U	5.7 U	5.7 U	5.7 U	5.7 U	5.7 U	**560**	5.7 U	5.7 U	5.7 U	5.7 U	5.7 U	5.7 U	5.7 U	5.7 U	5.7 U
Aroclor-1260	4 U	4 U	4 U	4 U	4 U	4 U	4 U	4 U	4 U	4 U	4 U	4 U	4 U	4 U	4 U	4 U
Aroclor-1262	**5700 J**	**810 J**	U	U	**5800**	**3200**	**3000**	**910**	U	U	U	U	U	U	U	**19000**
Aroclor-1268	**6500 J**	**420 J**	U	U	**2200**	**1000**	**1400**	**420**	U	U	U	U	U	U	U	**7800**
Total Solids (%)																
Total Solids	**77.3**	**79.5**	**82**	**74.7**	**67.2**	**67.4**	**71.4**	**67.7**	**58.3**	**78.9**	**60.4**	**71.7**	**84.3**	**86.7**	**85**	**92.4**

Notes and Abbreviations:

1. Results in bold indicate compound was detected.
2. U - Compound was not detected.
   * MDL shown with non-detects.
   J or B - Estimated result.
   R - Rejected data, unable to verify.
   P -Indicates that the precision between the two analytical columns was outside of the laboratory or method limit.
3. PDSB - Pre-Design Soil Boring
4. PDSS - Pre-Design Surface Sample
5. PDSBW - Pre-Design Soil Boring Waste sample
6. "-" - Not sampled/Not analyzed
7. NA - No available reporting limit

TABLE E2
SUMMARY OF SOIL ANALYTICAL RESULTS
OU-1 REMEDIATION
1 RIVER STREET
HASTINGS-ON HUDSON

Location ID	PDSB-106	PDSB-106	PDSB-106	PDSB-107	PDSB-107	PDSB-108	PDSB-108	PDSB-108	PDSB-108	PDSB-109	PDSB-109	PDSB-110	PDSB-110	PDSB-110	PDSB-111	PDSB-112
Sample Name	PDSB106C	PDSB106D	PDSB106E	PDSB107D	PDSB107E	PDSB108B	PDSB108C	PDSB108M	PDSB108N	PDSB109B	PDSB109C	PDSB110D	PDSB110E	PDSB110N	PDSB111F	PDSB112D
Sample Depth	4 - 6	6 - 8	8 - 10	6 - 8	8 - 10	2 - 4	4 - 6	2 - 4	4 - 6	2 - 4	4 - 6	6 - 8	8 - 10	6 - 8	10 - 12	6 - 8
Date	3/28/2006	3/28/2006	3/28/2006	3/28/2006	3/28/2006	4/7/2006	4/7/2006	4/7/2006	4/7/2006	4/7/2006	4/10/2006	4/10/2006	4/10/2006	4/10/2006	3/29/2006	3/29/2006
Metals (mg/kg)																
Arsenic	-	-	-	**6 J**	**9.8 J**	-	-	-	-	-	-	**10.7**	**13.5**	**14.5**	-	**40.3 J**
Barium	-	-	-	**86.2**	**79.5**	-	-	-	-	-	-	**11.9**	**12**	**16.9**	-	**160 J**
Cadmium	-	-	-	0.16 U	0.098 U	-	-	-	-	-	-	0.08 UJ	0.08 U	0.08 UJ	-	**7.4**
Chromium	-	-	-	**9.8**	**15**	-	-	-	-	-	-	**5.2**	**4.6**	**6.2**	-	**8.7 J**
Lead	-	-	-	**366 J**	**601 J**	-	-	-	-	-	-	**2.5**	**2.7 J**	**3.7**	-	**272 J**
Lead (ug/l)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mercury	-	-	-	**0.71**	**0.8**	-	-	-	-	-	-	0.015 U	0.015 U	0.015 U	-	**0.026 J**
Selenium	-	-	-	**1.1 J**	**1.4 J**	-	-	-	-	-	-	**2.2**	**1.6**	**2.4**	-	**0.72 J**
Silver	-	-	-	**0.52 J**	**0.22 J**	-	-	-	-	-	-	0.22 UJ	0.22 UJ	0.22 UJ	-	**0.39 J**
PCBs (ug/kg)																
Aroclor-1016	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 U	6 UJ	6 UJ	6 UJ	6 UJ	6 U	6 U
Aroclor-1221	5.8 U	5.8 U	5.8 U	5.8 U	5.8 U	5.8 U	5.8 U	5.8 U	5.8 U	5.8 U	5.8 UJ	5.8 UJ	5.8 UJ	5.8 UJ	5.8 U	5.8 U
Aroclor-1232	3.7 U	3.7 U	3.7 U	3.7 U	3.7 U	3.7 U	3.7 U	3.7 U	3.7 U	3.7 U	3.7 UJ	3.7 UJ	3.7 UJ	3.7 UJ	3.7 U	3.7 U
Aroclor-1242	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U	2.1 UJ	2.1 UJ	2.1 UJ	2.1 UJ	2.1 U	2.1 U
Aroclor-1248	4.1 U	4.1 U	4.1 U	4.1 U	4.1 U	4.1 U	4.1 U	4.1 U	4.1 U	4.1 U	4.1 UJ	4.1 UJ	4.1 UJ	4.1 UJ	4.1 U	4.1 U
Aroclor-1254	5.7 U	5.7 U	5.7 U	5.7 U	5.7 U	5.7 U	5.7 U	5.7 U	5.7 U	**66000 J**	**10000**	5.7 U	5.7 UJ	5.7 U	5.7 U	**650 J**
Aroclor-1260	4 U	4 U	4 U	4 U	4 U	4 U	4 U	4 U	4 U	4 U	4 U	4 U	4 UJ	4 U	4 U	4 U
Aroclor-1262	**3600**	**250**	U	U	U	U	**240 J**	**240 J**	**280 J**	**320000 J**	**42000**	U	UJ	U	**17000000 J**	**3400 J**
Aroclor-1268	**1900**	U	U	U	U	U	U	U	U	**150000 J**	U	U	UJ	U	U	**670 J**
Total Solids (%)																
Total Solids	**87.8**	**88**	**86.4**	**64**	**75.8**	**90.5**	**83.7**	**88.9**	**87.7**	**85.5**	**83.2**	**85.1**	**86.3**	**84.3**	**59.1**	**85.3**

Notes and Abbreviations:

1. Results in bold indicate compound was detected.
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   * MDL shown with non-detects.
   J or B - Estimated result.
   R - Rejected data, unable to verify.
   P -Indicates that the precision between the two analytical columns was outside of the laboratory or method limit.
3. PDSB - Pre-Design Soil Boring
4. PDSS - Pre-Design Surface Sample
5. PDSBW - Pre-Design Soil Boring Waste sample
6. "-" - Not sampled/Not analyzed
7. NA - No available reporting limit

TABLE E2
SUMMARY OF SOIL ANALYTICAL RESULTS
OU-1 REMEDIATION
1 RIVER STREET
HASTINGS-ON HUDSON

Location ID	PDSB-112	PDSB-112	PDSB-112	PDSB-112	PDSB-113	PDSB-113	PDSB-114	PDSB-114	PDSB-115	PDSB-115	PDSB-116	PDSB-116	PDSB-116	PDSB-116	PDSB-117	PDSB-117
Sample Name	PDSB112E	PDSB112F	PDSB112G	PDSB112N	PDSB113B	PDSB113C	PDSB114A	PDSB114B	PDSB115A	PDSB115B	PDSB116A	PDSB116B	PDSB116C	PDSB116D	PDSB1170-2	PDSB1172-4
Sample Depth	8 - 10	10 - 12	12 - 14	8 - 10	2 - 4	4 - 6	0 - 2	2 - 4	0 - 2	2 - 4	0 - 2	2 - 4	4 - 6	6 - 8	0 - 2	2 - 4
Date	3/29/2006	3/29/2006	3/29/2006	3/29/2006	3/29/2006	3/29/2006	4/4/2006	4/4/2006	4/4/2006	4/4/2006	4/3/2006	4/4/2006	4/4/2006	4/4/2006	3/29/2006	3/29/2006
Metals (mg/kg)																
Arsenic	**18.5 J**	-	-	**21.9 J**	-	-	-	-	-	-	**8.9 J**	**3.4 J**	-	-	-	-
Barium	**211 J**	-	-	**229 J**	-	-	-	-	-	-	**99.3**	**93.1**	-	-	-	-
Cadmium	**2.9**	-	-	**3.1**	-	-	-	-	-	-	**0.5 J**	**1.3 J**	-	-	-	-
Chromium	**12.9 J**	-	-	**8.6 J**	-	-	-	-	-	-	**44.5 J**	**17.1 J**	-	-	-	-
Lead	**566 J**	-	-	**626 J**	-	-	-	-	-	-	**161**	**115**	-	-	-	-
Lead (ug/l)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mercury	**0.23 J**	-	-	**0.27 J**	-	-	-	-	-	-	**0.25 J**	**2.8 J**	-	-	-	-
Selenium	**0.76 J**	-	-	**1.7 J**	-	-	-	-	-	-	1.6 U	0.42 U	-	-	-	-
Silver	**0.55 J**	-	-	**0.46 J**	-	-	-	-	-	-	**1.3 J**	**0.28 J**	-	-	-	-
PCBs (ug/kg)																
Aroclor-1016	6 U	6 U	6 U	6 U	6 U	6 U	6 UJ	6 U	6 U	6 U	6 U	6 U	2.3 U	2.3 U	6 U	-
Aroclor-1221	5.8 U	5.8 U	5.8 U	5.8 U	5.8 U	5.8 U	5.8 UJ	5.8 U	5.8 U	5.8 U	5.8 U	5.8 U	3.1 U	3.1 U	5.8 U	-
Aroclor-1232	3.7 U	3.7 U	3.7 U	3.7 U	3.7 U	3.7 U	3.7 UJ	3.7 U	3.7 U	3.7 U	3.7 U	3.7 U	1.8 U	1.8 U	3.7 U	-
Aroclor-1242	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U	2.1 UJ	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U	1.9 U	1.9 U	2.1 U	-
Aroclor-1248	4.1 U	4.1 U	4.1 U	4.1 U	4.1 U	4.1 U	4.1 U	4.1 U	4.1 U	4.1 U	4.1 U	4.1 U	3.4 U	3.4 U	4.1 U	-
Aroclor-1254	**620 J**	5.7 U	5.7 U	**370 J**	5.7 U	5.7 U	5.7 U	5.7 U	5.7 U	5.7 U	5.7 U	5.7 U	2.4 U	2.4 U	**310 J**	-
Aroclor-1260	4 U	4 U	4 U	4 U	4 U	4 U	4 U	4 U	4 U	4 U	4 U	4 U	2.8 U	2.8 U	4 U	-
Aroclor-1262	**2300 J**	U	**3700 J**	**2300 J**	**790 J**	**440 J**	U	U	**2100**	**4100**	U	**500000 J**	**1400 J**	**560**	**910 J**	-
Aroclor-1268	**530 J**	U	**1100 J**	**580 J**	U	U	U	U	**720**	U	U	U	**230**	5.1 U	**230 J**	-
Total Solids (%)																
Total Solids	**70.8**	**62.3**	**66.4**	**79.2**	**56.1**	**63.8**	**85.5**	**86.4**	**85.8**	**85.1**	**88.3**	**94**	**79.7**	**79.3**	**80.1**	**82.8**

Notes and Abbreviations:

1. Results in bold indicate compound was detected.
2. U - Compound was not detected.
   * MDL shown with non-detects.
   J or B - Estimated result.
   R - Rejected data, unable to verify.
   P -Indicates that the precision between the two analytical columns was outside of the laboratory or method limit.
3. PDSB - Pre-Design Soil Boring
4. PDSS - Pre-Design Surface Sample
5. PDSBW - Pre-Design Soil Boring Waste sample
6. "-" - Not sampled/Not analyzed
7. NA - No available reporting limit

TABLE E2
SUMMARY OF SOIL ANALYTICAL RESULTS
OU-1 REMEDIATION
1 RIVER STREET
HASTINGS-ON HUDSON

Location ID	PDSB-117	PDSB-117	PDSB-118	PDSB-118	PDSB-118	PDSB-118	PDSB-119	PDSB-119	PDSB-119	PDSB-120	PDSB-120	PDSB-121	PDSB-121	PDSB-122	PDSB-122	PDSB-123
Sample Name	PDSB11724	PDSB117C	PDSB1180-1	PDSB118B	PDSB118C	PDSB118D	PDSB119A	PDSB119B	PDSB119C	PDSB120A	PDSB120B	PDSB121A	PDSB121B	PDSB122A	PDSB122B	PDSB123A
Sample Depth	2 - 4	4 - 6	0 - 1	2 - 4	4 - 6	6 - 8	0 - 2	2 - 4	4 - 6	0 - 2	2 - 4	0 - 2	2 - 4	0 - 2	2 - 4	0 - 2
Date	3/29/2006	3/30/2006	3/29/2006	4/5/2006	4/5/2006	4/5/2006	4/3/2006	4/3/2006	4/3/2006	4/11/2006	4/11/2006	4/11/2006	4/11/2006	4/12/2006	4/12/2006	4/3/2006
Metals (mg/kg)																
Arsenic	-	-	-	-	-	-	-	-	-	**9.9**	**9.4**	-	-	-	-	**7.8 J**
Barium	-	-	-	-	-	-	-	-	-	**195**	**212**	-	-	-	-	**110 J**
Cadmium	-	-	-	-	-	-	-	-	-	**7.9**	**0.73 J**	-	-	-	-	**7.6 J**
Chromium	-	-	-	-	-	-	-	-	-	**60.7**	**427**	-	-	-	-	**50.1**
Lead	-	-	-	-	-	-	-	-	-	**358**	**546**	-	-	-	-	**401 J**
Lead (ug/l)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mercury	-	-	-	-	-	-	-	-	-	**0.68**	**1.6**	-	-	-	-	**0.57**
Selenium	-	-	-	-	-	-	-	-	-	0.64 U	0.75 U	-	-	-	-	**0.36 J**
Silver	-	-	-	-	-	-	-	-	-	**0.48 J**	**0.49 J**	-	-	-	-	0.52 U
PCBs (ug/kg)																
Aroclor-1016	6 U	6 UJ	6 U	6 UJ	6 U	6 UJ	6 U	6 U	6 U	6 UJ	6 UJ	6 UJ	6 UJ	6 UJ	6 UJ	6 U
Aroclor-1221	5.8 U	5.8 UJ	5.8 U	5.8 UJ	5.8 U	5.8 UJ	5.8 U	5.8 U	5.8 U	5.8 UJ	5.8 UJ	5.8 UJ	5.8 UJ	5.8 UJ	5.8 UJ	5.8 U
Aroclor-1232	3.7 U	3.7 UJ	3.7 U	3.7 UJ	3.7 U	3.7 UJ	3.7 U	3.7 U	3.7 U	3.7 UJ	3.7 UJ	3.7 UJ	3.7 UJ	3.7 UJ	3.7 UJ	3.7 U
Aroclor-1242	2.1 U	2.1 UJ	2.1 U	2.1 UJ	2.1 U	2.1 UJ	2.1 U	2.1 U	2.1 U	2.1 UJ	2.1 UJ	2.1 UJ	2.1 UJ	2.1 UJ	2.1 UJ	2.1 U
Aroclor-1248	4.1 U	4.1 U	4.1 U	4.1 U	4.1 U	4.1 U	4.1 U	4.1 U	4.1 U	4.1 UJ	4.1 UJ	4.1 UJ	4.1 UJ	4.1 U	4.1 U	4.1 U
Aroclor-1254	**890 J**	5.7 U	**570 J**	5.7 U	5.7 U	5.7 U	5.7 U	5.7 U	5.7 U	5.7 UJ	5.7 UJ	5.7 UJ	5.7 UJ	5.7 U	5.7 U	5.7 U
Aroclor-1260	4 U	4 U	4 U	4 U	4 U	4 U	4 U	4 U	4 U	4 UJ	4 UJ	4 UJ	4 UJ	4 U	4 U	4 U
Aroclor-1262	**3400 J**	**560000**	**2300 J**	**64000**	**23000**	**190000 J**	**1700**	**380**	**280**	UJ	UJ	**1300 J**	**1400 J**	U	**280**	U
Aroclor-1268	**570 J**	**97000**	**580 J**	**22000**	**13000 J**	**150000 J**	**220**	U	U	UJ	UJ	**970 J**	**1500 J**	U	U	U
Total Solids (%)																
Total Solids	-	**83.6**	**82.9**	**94.5**	**82.3**	**87.3**	**87.9**	**92.3**	**89.6**	**86.9**	**83.2**	**89.5**	**89.5**	**87.2**	**84.2**	**84.2**

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4. PDSS - Pre-Design Surface Sample
5. PDSBW - Pre-Design Soil Boring Waste sample
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7. NA - No available reporting limit

TABLE E2
SUMMARY OF SOIL ANALYTICAL RESULTS
OU-1 REMEDIATION
1 RIVER STREET
HASTINGS-ON HUDSON

Location ID	PDSB-123	PDSB-124	PDSB-124	PDSB-124	PDSB-124	PDSB-125	PDSB-125	PDSB-125	PDSB-125	PDSB-126	PDSB-126	PDSB-126	PDSB-127	PDSB-127	PDSB-128	PDSB-128
Sample Name	PDSB123B	PDSB124A	PDSB124B	PDSB124M	PDSB124N	PDSB125A	PDSB125B	PDSB125C	PDSB125D	PDSB126B	PDSB126C	PDSB126D	PDSB127A	PDSB127B	PDSB128A	PDSB128B
Sample Depth	2 - 4	0 - 2	2 - 4	2 - 4	0 - 2	0 - 2	2 - 4	4 - 6	6 - 8	2 - 4	4 - 6	6 - 8	0 - 2	2 - 4	0 - 2	2 - 4
Date	4/6/2006	4/10/2006	4/10/2006	4/10/2006	4/10/2006	4/3/2006	4/5/2006	4/5/2006	4/5/2006	4/5/2006	4/5/2006	4/5/2006	4/6/2006	4/6/2006	4/11/2006	4/12/2006
Metals (mg/kg)																
Arsenic	**4.6 J**	-	-	-	-	-	-	-	-	-	-	-	**10 J**	**9.8 J**	-	-
Barium	**44.3**	-	-	-	-	-	-	-	-	-	-	-	**180**	**168**	-	-
Cadmium	**0.41 J**	-	-	-	-	-	-	-	-	-	-	-	**1.3 J**	**0.68 J**	-	-
Chromium	**11.3 J**	-	-	-	-	-	-	-	-	-	-	-	**41.8 J**	**39.8 J**	-	-
Lead	**604**	-	-	-	-	-	-	-	-	-	-	-	**191**	**252**	-	-
Lead (ug/l)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Mercury	**0.35 J**	-	-	-	-	-	-	-	-	-	-	-	**0.46 J**	**0.69 J**	-	-
Selenium	0.42 U	-	-	-	-	-	-	-	-	-	-	-	0.39 U	0.69 U	-	-
Silver	**0.57 J**	-	-	-	-	-	-	-	-	-	-	-	**0.54 J**	**0.51 J**	-	-
PCBs (ug/kg)																
Aroclor-1016	6 UJ	6 UJ	6 UJ	6 UJ	6 UJ	6 U	6 UJ	2.3 U	2.3 U	6 UJ	2.3 U	2.3 U	6 UJ	6 UJ	6 UJ	6 UJ
Aroclor-1221	5.8 UJ	5.8 UJ	5.8 UJ	5.8 UJ	5.8 UJ	5.8 U	5.8 UJ	3.1 U	3.1 U	5.8 UJ	3.1 U	3.1 U	5.8 UJ	5.8 UJ	5.8 UJ	5.8 UJ
Aroclor-1232	3.7 UJ	3.7 UJ	3.7 UJ	3.7 UJ	3.7 UJ	3.7 U	3.7 UJ	1.8 U	1.8 U	3.7 UJ	1.8 U	1.8 U	3.7 UJ	3.7 UJ	3.7 UJ	3.7 UJ
Aroclor-1242	2.1 UJ	2.1 UJ	2.1 UJ	2.1 UJ	2.1 UJ	2.1 U	2.1 UJ	1.9 U	1.9 U	2.1 UJ	1.9 U	1.9 U	2.1 UJ	2.1 UJ	2.1 UJ	2.1 UJ
Aroclor-1248	4.1 U	4.1 UJ	4.1 UJ	4.1 UJ	4.1 UJ	4.1 U	4.1 U	3.4 U	3.4 U	4.1 U	3.4 U	3.4 U	4.1 U	4.1 U	4.1 UJ	4.1 U
Aroclor-1254	5.7 U	5.7 U	5.7 U	5.7 U	5.7 U	5.7 U	5.7 U	2.4 U	2.4 U	5.7 U	**440**	2.4 U	5.7 U	5.7 U	5.7 UJ	5.7 U
Aroclor-1260	4 U	4 U	4 U	4 U	4 U	4 U	4 U	2.8 U	2.8 U	4 U	2.8 U	2.8 U	4 U	4 U	4 UJ	4 U
Aroclor-1262	**350**	U	U	**260**	U	U	**66000**	**260**	4 U	**38000**	**2300 J**	**770**	**3500**	**6800**	UJ	U
Aroclor-1268	U	U	U	U	U	U	**12000**	5.1 U	5.1 U	U	**250**	5.1 U	**730**	U	UJ	U
Total Solids (%)																
Total Solids	**93**	**89.5**	**90.4**	**88.7**	**89.1**	**84.2**	**95.9**	**89.7**	**82.7**	**85.6**	**81.1**	**85.5**	**91.4**	**85.6**	**80.7**	**87.5**

Notes and Abbreviations:

1. Results in bold indicate compound was detected.
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   * MDL shown with non-detects.
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4. PDSS - Pre-Design Surface Sample
5. PDSBW - Pre-Design Soil Boring Waste sample
6. "-" - Not sampled/Not analyzed
7. NA - No available reporting limit

TABLE E2
SUMMARY OF SOIL ANALYTICAL RESULTS
OU-1 REMEDIATION
1 RIVER STREET
HASTINGS-ON HUDSON

Location ID	PDSB-129	PDSB-129	PDSB-129	PDSB-130	PDSB-130
Sample Name	PDSB129A	PDSB129B	PDSB129N	PDSB130A	PDSB130B
Sample Depth	0 - 2	2 - 4	0 - 2	0 - 2	2 - 4
Date	4/13/2006	4/13/2006	4/13/2006	4/13/2006	4/13/2006
Metals (mg/kg)					
Arsenic	-	-	-	-	-
Barium	-	-	-	-	-
Cadmium	-	-	-	-	-
Chromium	-	-	-	-	-
Lead	-	-	-	-	-
Lead (ug/l)	-	-	-	-	-
Mercury	-	-	-	-	-
Selenium	-	-	-	-	-
Silver	-	-	-	-	-
PCBs (ug/kg)					
Aroclor-1016	6 U	6 U	6 U	6 U	6 U
Aroclor-1221	5.8 U	5.8 U	5.8 U	5.8 U	5.8 U
Aroclor-1232	3.7 U	3.7 U	3.7 U	3.7 U	3.7 U
Aroclor-1242	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U
Aroclor-1248	4.1 U	4.1 U	4.1 U	4.1 U	4.1 U
Aroclor-1254	5.7 U	5.7 U	5.7 U	5.7 U	5.7 U
Aroclor-1260	4 U	4 U	4 U	4 U	4 U
Aroclor-1262	**710 J**	U	U	**480 J**	U
Aroclor-1268	U	U	U	U	U
Total Solids (%)					
Total Solids	**85.9**	**87**	**87.7**	**85.5**	**93.6**

Notes and Abbreviations:

1. Results in bold indicate compound was detected.
2. U - Compound was not detected.
   * MDL shown with non-detects.
   J or B - Estimated result.
   R - Rejected data, unable to verify.
   P -Indicates that the precision between the two analytical columns was outside of the laboratory or method limit.
3. PDSB - Pre-Design Soil Boring
4. PDSS - Pre-Design Surface Sample
5. PDSBW - Pre-Design Soil Boring Waste sample
6. "-" - Not sampled/Not analyzed
7. NA - No available reporting limit

TABLE E2
SUMMARY OF GROUNDWATER ANALYTICAL RESULTS
OU-1 REMEDIATION
1 RIVER STREET
HASTINGS-ON HUDSON

Location ID	PDMW-10	PDMW-10	PDMW-16D	PDMW-16S	PDMW-17D	PDMW-17D	PDMW-17S	PDMW-18D	PDMW-18S	PDMW-19D	PDMW-19S	PDMW-97	PDMW-97	PDWB1A	PDWB1A
Sample Name	PDMW10-1130	PDMW10-1130F	PDMW-16D	PDMW-16S	PDMW-17D	PDMW-17DN	PDMW-17S	PDMW-18D	PDMW-18S	PDMW-19D	PDMW-19S	PDMW97-1135	PDMW97-1135F	PDWB1A-1200	PDWB1A-1200F
Sample Depth															
Date	3/23/2006	3/23/2006	4/10/2006	4/11/2006	4/11/2006	4/11/2006	4/6/2006	4/12/2006	4/12/2006	4/14/2006	4/14/2006	3/23/2006	3/23/2006	3/23/2006	3/23/2006
Metals (ug/l)															
Aluminum	54.3223 U	-	**729**	54.3223 U	**129**	**76.2**	54.3223 U	**692**	**737**	**1160**	**102**	54.3223 U	-	54.3223 U	-
Aluminum, dissolved	-	54.3223 U	-	-	-	-	-	-	-	-	-	-	54.3223 U	-	54.3223 U
Antimony	9.1497 U	-	3.7 U	9.1497 U	9.1497 U	9.1497 U	6.5 U	3.8 U	9.1497 U	9.1497 U	10.1 U	9.1497 U	-	9.1497 U	-
Antimony, dissolved	-	9.1497 U	-	-	-	-	-	-	-	-	-	-	9.1497 U	-	9.1497 U
Arsenic	5.5933 U	-	5.5933 U	5.5933 U	5.5933 U	**4.7 J**	5.5933 U	5.5933 U	5.5933 U	5.5933 U	**4.9 J**	5.5933 U	-	5.5933 U	-
Arsenic, dissolved	-	5.5933 U	-	-	-	-	-	-	-	-	-	-	5.5933 U	-	5.5933 U
Barium	**665**	-	**358**	**167**	**41.4**	**39**	**107**	**75.4**	**68**	**152**	**159**	**687**	-	**186**	-
Barium, dissolved	-	**732 J**	-	-	-	-	-	-	-	-	-	-	**708 J**	-	**179 J**
Beryllium	0.78 U	-	0.22 U	0.21 U	0.2161 U	0.22 U	0.2161 U	0.2161 U	0.24 U	0.2161 U	0.2161 U	0.77 U	-	0.76 U	-
Beryllium, dissolved	-	0.67 U	-	-	-	-	-	-	-	-	-	-	0.57 U	-	0.78 U
Cadmium	0.6156 UJ	-	0.6156 U	0.6156 U	0.6156 U	0.6156 U	0.6156 U	0.6156 U	0.6156 U	0.6156 U	0.6156 U	0.6156 UJ	-	0.6156 U	-
Cadmium, dissolved	-	0.6156 UJ	-	-	-	-	-	-	-	-	-	-	0.6156 UJ	-	0.6156 U
Calcium	**358000 J**	-	**136000**	**131000**	**84500**	**83700**	**113000**	**113000**	**120000**	**110000**	**130000**	**365000 J**	-	**101000 J**	-
Calcium, dissolved	-	**388000 J**	-	-	-	-	-	-	-	-	-	-	**376000 J**	-	**96700 J**
Chromium	2.3038 U	-	**7**	2.3038 U	2.3038 U	2.3038 U	2.3038 U	**5.9**	**2.5**	**9**	2.3038 U	2.3038 U	-	2.3038 U	-
Chromium, dissolved	-	2.3038 U	-	-	-	-	-	-	-	-	-	-	2.3038 U	-	2.3038 U
Cobalt	2.07 U	-	2.07 U	2.07 U	2.07 U	2.07 U	2.07 U	2.07 U	2.07 U	2.07 U	2.07 U	2.07 U	-	2.07 U	-
Cobalt, dissolved	-	2.07 U	-	-	-	-	-	-	-	-	-	-	2.07 U	-	2.07 U
Copper	9.3 U	-	**3.5**	3.0091 U	3.9 U	3.0091 U	4.9 U	**4.7**	**4**	**4.7**	**7.4**	9.4 U	-	6.7 U	-
Copper, dissolved	-	4.2 U	-	-	-	-	-	-	-	-	-	-	4.8 U	-	5.3 U
Iron	**88300 J**	-	**27100**	**2350**	103 U	**62.5**	**720**	**649**	**4160**	**1710**	**911**	**97100**	-	**25400**	-
Iron, Dissolved	-	**108000 J**	-	-	-	-	-	-	-	-	-	-	**94700**	-	**24700**
Lead	1.7407 U	-	1.7407 U	1.7407 U	1.7407 U	1.7407 U	1.7407 U	1.7407 U	1.7407 U	1.7407 U	**4.3**	4 U	-	1.7407 U	-
Lead, dissolved	-	1.7407 U	-	-	-	-	-	-	-	-	-	-	1.7407 U	-	1.7407 U
Magnesium	**52700 J**	-	**60800**	**62700**	**34800**	**33800**	**37400**	**27400**	**48000**	**38300**	**174000**	**53800 J**	-	**14500 J**	-
Magnesium, dissolved	-	**55900 J**	-	-	-	-	-	-	-	-	-	-	**55400 J**	-	**13900 J**
Manganese	**613 J**	-	**1270**	**902**	**10**	**8.8**	**407**	**18.1**	**466**	**49.6**	**196**	**634 J**	-	**171 J**	-
Manganese, Dissolved	-	**677 J**	-	-	-	-	-	-	-	-	-	-	**657 J**	-	**164 J**
Mercury	0.2 U	-	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	0.2 U	-	0.2 U	-
Mercury, dissolved	-	0.2 U	-	-	-	-	-	-	-	-	-	-	0.2 U	-	0.2 U
Nickel	12.5263 UJ	-	12.5263 U	12.5263 U	12.5263 U	12.5263 U	12.5263 U	12.5263 U	**40.8**	**6.1**	12.5263 U	12.5263 UJ	-	12.5263 U	-
Nickel, dissolved	-	12.5263 UJ	-	-	-	-	-	-	-	-	-	-	12.5263 UJ	-	12.5263 U
Potassium	**26100**	-	**18300**	**17400**	**29800**	**29800**	**11700**	**16600**	**5030**	**10500**	**58000**	**27100**	-	**6590**	-
Potassium, dissolved	-	**28000**	-	-	-	-	-	-	-	-	-	-	**27800**	-	**6240**
Selenium	4.7814 U	-	4.7814 U	4.7814 U	4.7814 U	4.7814 U	4.7814 U	4.7814 U	4.7814 U	4.7814 U	4.7814 U	4.7814 U	-	4.7814 U	-
Selenium, dissolved	-	4.7814 U	-	-	-	-	-	-	-	-	-	-	4.7814 U	-	4.7814 U
Silver	1.5478 U	-	1.5478 U	1.5478 U	1.5478 U	1.5478 U	1.5478 U	1.5478 U	1.5478 U	1.5478 U	1.5478 U	1.5478 U	-	1.5478 U	-
Silver, dissolved	-	1.5478 U	-	-	-	-	-	-	-	-	-	-	1.5478 U	-	1.5478 U
Sodium	**250000**	-	**190000**	**108000**	**91100**	**91400**	**80100**	**83100**	**81200**	**93900**	**1270000**	**258000**	-	**58700**	-
Sodium, dissolved	-	**264000**	-	-	-	-	-	-	-	-	-	-	**238000**	-	**56300**
Thallium	4.4741 U	-	4.4741 UJ	4.4741 UJ	4.4741 UJ	4.4741 UJ	4.4741 UJ	4.4741 UJ	4.4741 UJ	4.4741 UJ	4.4741 UJ	4.4741 U	-	4.4741 U	-
Thallium, dissolved	-	4.4741 U	-	-	-	-	-	-	-	-	-	-	4.4741 U	-	4.4741 U
Vanadium	2.3631 U	-	2.3631 U	2.3631 U	12.4 U	**13.3**	2.3631 U	**14.1**	2.3631 U	**9.5**	**4.5**	2.3631 U	-	2.3631 U	-
Vanadium, dissolved	-	2.3631 U	-	-	-	-	-	-	-	-	-	-	2.3631 U	-	2.3631 U
Zinc	2.6028 U	-	14.4 U	4.5 U	10.2 U	7.5 U	9.9 U	12.9 U	8.3 U	12.1 U	17.5 U	2.6028 U	-	2.6028 U	-
Zinc, dissolved	-	2.6028 U	-	-	-	-	-	-	-	-	-	-	2.6028 U	-	2.6028 U
Miscellaneous (mg/l)															
Total Dissolved Solids	**2860**	-	-	-	-	-	-	-	-	-	-	**2530**	-	**20**	-
Suspended Solids	**58.4**	-	-	-	-	-	-	-	-	-	-	**171**	-	U	-
PCBs (ug/l)															
Aroclor-1016	U	-	U	U	U	U	U	U	U	UJ	UJ	U	-	U	-
Aroclor-1221	U	-	U	U	U	U	U	U	U	UJ	UJ	U	-	U	-
Aroclor-1232	U	-	U	U	U	U	U	U	U	UJ	UJ	U	-	U	-
Aroclor-1242	U	-	U	U	U	U	U	U	U	UJ	UJ	U	-	U	-
Aroclor-1248	U	-	U	U	U	U	U	U	U	U	U	U	-	U	-
Aroclor-1254	U	-	U	U	U	U	U	U	U	U	**0.14 J**	U	-	U	-
Aroclor-1260	U	-	U	U	U	U	U	U	U	U	U	U	-	U	-
Aroclor-1262	**1.7 J**	-	U	U	U	U	**0.04**	U	U	U	**0.37 J**	**1.2 J**	-	**0.37 J**	-
Aroclor-1268	**1**	-	U	U	U	U	U	U	U	U	**0.1 J**	**0.7 J**	-	**0.2 J**	-
Semi-Volatile Organic Compounds (ug/l)															
1,2,4-Trichlorobenzene	-	-	1.6 U	1.6 U	1.6 U	1.6 U	1.6 U	1.6 U	1.6 U	1.6 U	1.6 U	-	-	-	-
1,2-Dichlorobenzene	-	-	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	-	-	-	-
1,3-Dichlorobenzene	-	-	1.4 U	1.4 U	1.4 U	1.4 U	1.4 U	1.4 U	1.4 U	1.4 U	1.4 U	-	-	-	-
1,4-Dichlorobenzene	-	-	1.7 U	1.7 U	1.7 U	1.7 U	1.7 U	1.7 U	1.7 U	1.7 U	1.7 U	-	-	-	-
2,2-oxybis(1-Chloropropane)	-	-	1.7 U	1.7 U	1.7 U	1.7 U	1.7 U	1.7 U	1.7 U	1.7 U	1.7 U	-	-	-	-
2,4,5-Trichlorophenol	-	-	1.4 U	1.4 U	1.4 U	1.4 U	1.4 U	1.4 U	1.4 U	1.4 U	1.4 U	-	-	-	-
2,4,6-Trichlorophenol	-	-	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	-	-	-	-
2,4-Dichlorophenol	-	-	0.89 U	0.89 U	0.89 U	0.89 U	0.89 U	0.89 U	0.89 U	0.89 U	0.89 U	-	-	-	-
2,4-Dimethylphenol	-	-	1.6 U	1.6 U	1.6 U	1.6 U	1.6 U	1.6 U	1.6 U	1.6 U	1.6 U	-	-	-	-
2,4-Dinitrophenol	-	-	8 U	8 U	8 U	8 U	8 UJ	8 U	8 U	8 U	8 U	-	-	-	-
2,4-Dinitrotoluene	-	-	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	-	-	-	-
2,6-Dinitrotoluene	-	-	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U	-	-	-	-
2-Chloronaphthalene	-	-	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U	-	-	-	-
2-Chlorophenol	-	-	0.77 U	0.77 U	0.77 U	0.77 U	0.77 U	0.77 U	0.77 U	0.77 U	0.77 U	-	-	-	-
2-Methyl naphthalene	-	-	2.2 U	2.2 U	2.2 U	2.2 U	2.2 U	2.2 U	2.2 U	2.2 U	2.2 U	-	-	-	-
2-Methylphenol	-	-	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	-	-	-	-
2-Nitroaniline	-	-	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U	-	-	-	-

TABLE E2
SUMMARY OF GROUNDWATER ANALYTICAL RESULTS
OU-1 REMEDIATION
1 RIVER STREET
HASTINGS-ON HUDSON

Location ID	PDMW-10	PDMW-10	PDMW-16D	PDMW-16S	PDMW-17D	PDMW-17D	PDMW-17S	PDMW-18D	PDMW-18S	PDMW-19D	PDMW-19S	PDMW-97	PDMW-97	PDWB1A	PDWB1A
Sample Name	PDMW10-1130	PDMW10-1130F	PDMW-16D	PDMW-16S	PDMW-17D	PDMW-17DN	PDMW-17S	PDMW-18D	PDMW-18S	PDMW-19D	PDMW-19S	PDMW97-1135	PDMW97-1135F	PDWB1A-1200	PDWB1A-1200F
Sample Depth															
Date	3/23/2006	3/23/2006	4/10/2006	4/11/2006	4/11/2006	4/11/2006	4/6/2006	4/12/2006	4/12/2006	4/14/2006	4/14/2006	3/23/2006	3/23/2006	3/23/2006	3/23/2006
2-Nitrophenol	-	-	0.86 U	0.86 U	0.86 U	0.86 U	0.86 U	0.86 U	0.86 U	0.86 U	0.86 U	-	-	-	-
3,3-Dichlorobenzidine	-	-	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	-	-	-	-
3-Nitroaniline	-	-	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U	-	-	-	-
4,6-Dinitro-2-methylphenol	-	-	2.6 U	2.6 U	2.6 U	2.6 U	2.6 U	2.6 U	2.6 U	2.6 U	2.6 U	-	-	-	-
4-Bromophenyl phenyl ether	-	-	1.9 U	1.9 U	1.9 U	1.9 U	1.9 U	1.9 U	1.9 U	1.9 U	1.9 U	-	-	-	-
4-Chloro-3-methylphenol	-	-	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	-	-	-	-
4-Chloroaniline	-	-	4 U	4 U	4 U	4 U	4 U	4 U	4 U	4 U	4 U	-	-	-	-
4-Chlorophenyl phenyl ether	-	-	2.3 U	2.3 U	2.3 U	2.3 U	2.3 U	2.3 U	2.3 U	2.3 U	2.3 U	-	-	-	-
4-Methylphenol	-	-	3.4 U	3.4 U	3.4 U	3.4 U	3.4 U	3.4 U	3.4 U	3.4 U	3.4 U	-	-	-	-
4-Nitroaniline	-	-	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	2.5 U	-	-	-	-
4-Nitrophenol	-	-	8 U	8 U	8 U	8 U	8 U	8 U	8 U	8 U	8 U	-	-	-	-
Acenaphthene	-	-	2.2 U	2.2 U	2.2 U	2.2 U	**1.3 J**	2.2 U	2.2 U	2.2 U	2.2 U	-	-	-	-
Acenaphthylene	-	-	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U	-	-	-	-
Aniline	-	-	4 U	4 U	4 U	4 U	4 U	4 U	4 U	4 U	4 U	-	-	-	-
Anthracene	-	-	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	-	-	-	-
Azobenzene	-	-	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	-	-	-	-
Benzidine	-	-	**5.3 R**	**5.3 R**	**5.3 R**	**5.3 R**	5.3 UJ	**5.3 R**	**5.3 R**	**5.3 R**	5.3 U	-	-	-	-
Benzo(a)anthracene	-	-	1.9 U	1.9 U	1.9 U	1.9 U	1.9 U	1.9 U	1.9 U	1.9 U	1.9 U	-	-	-	-
Benzo(a)pyrene	-	-	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	1.8 U	-	-	-	-
Benzo(b)fluoranthene	-	-	3.9 U	3.9 U	3.9 U	3.9 U	3.9 U	3.9 U	3.9 U	3.9 U	3.9 U	-	-	-	-
Benzo(g,h,i)perylene	-	-	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U	-	-	-	-
Benzo(k)fluoranthene	-	-	2.4 U	2.4 U	2.4 U	2.4 U	2.4 U	2.4 U	2.4 U	2.4 U	2.4 U	-	-	-	-
Benzoic acid	-	-	**13 J**	1.9 UJ	**17 J**	**21 J**	**1.9 R**	**1.9 R**	**1.9 R**	**1.9 R**	**1.9 R**	-	-	-	-
Benzyl alcohol	-	-	4.8 U	4.8 U	4.8 U	4.8 U	4.8 U	4.8 U	4.8 U	4.8 U	4.8 U	-	-	-	-
bis(2-Chloroethoxy)methane	-	-	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	-	-	-	-
bis(2-Chloroethyl)ether	-	-	1.7 U	1.7 U	1.7 U	1.7 U	1.7 U	1.7 U	1.7 U	1.7 U	1.7 U	-	-	-	-
bis(2-Ethylhexyl)phthalate	-	-	**1.2 J**	2.6 U	**7.9 J**	1.8 U	2.6 U	**1.4 J**	2.6 U	2.6 U	1.4 U	-	-	-	-
Butyl benzylphthalate	-	-	1.6 U	1.6 U	1.6 U	1.6 U	1.6 U	1.6 U	1.6 U	1.6 U	1.6 U	-	-	-	-
Carbazole	-	-	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U	-	-	-	-
Chrysene	-	-	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U	1.5 U	-	-	-	-
Dibenzo(a,h)anthracene	-	-	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U	-	-	-	-
Dibenzofuran	-	-	2.3 U	2.3 U	2.3 U	2.3 U	2.3 U	2.3 U	2.3 U	2.3 U	2.3 U	-	-	-	-
Diethyl phthalate	-	-	2.3 U	2.3 U	2.3 U	2.3 U	2.3 U	2.3 U	2.3 U	2.3 U	2.3 U	-	-	-	-
Dimethyl phthalate	-	-	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	-	-	-	-
Di-n-butylphthalate	-	-	2.3 U	2.3 U	2.3 U	2.3 U	2.3 U	2.3 U	2.3 U	2.3 U	2.3 U	-	-	-	-
Di-n-octyl phthalate	-	-	2.6 U	2.6 U	2.6 U	2.6 U	2.6 U	2.6 U	2.6 U	2.6 U	2.6 U	-	-	-	-
Fluoranthene	-	-	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U	-	-	-	-
Fluorene	-	-	2.4 U	2.4 U	2.4 U	2.4 U	**0.79 J**	2.4 U	2.4 U	2.4 U	2.4 U	-	-	-	-
Hexachlorobenzene	-	-	1.3 U	1.3 U	1.3 U	1.3 U	1.3 U	1.3 U	1.3 U	1.3 U	1.3 U	-	-	-	-
Hexachlorobutadiene	-	-	1.9 U	1.9 U	1.9 U	1.9 U	1.9 U	1.9 U	1.9 U	1.9 U	1.9 U	-	-	-	-
Hexachlorocyclopentadiene	-	-	2.2 U	2.2 U	2.2 U	2.2 U	2.2 U	2.2 U	2.2 U	2.2 U	2.2 U	-	-	-	-
Hexachloroethane	-	-	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	2 U	-	-	-	-
Indeno(1,2,3-cd)pyrene	-	-	2.2 U	2.2 U	2.2 U	2.2 U	2.2 U	2.2 U	2.2 U	2.2 U	2.2 U	-	-	-	-
Isophorone	-	-	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	1.1 U	-	-	-	-
Naphthalene	-	-	2.3 U	2.3 U	2.3 U	2.3 U	2.3 U	2.3 U	2.3 U	2.3 U	2.3 U	-	-	-	-
Nitrobenzene	-	-	1.3 U	1.3 U	1.3 U	1.3 U	1.3 U	1.3 U	1.3 U	1.3 U	1.3 U	-	-	-	-
N-Nitrosodimethylamine	-	-	0.63 U	0.63 U	0.63 U	0.63 U	0.63 U	0.63 U	0.63 U	0.63 U	0.63 U	-	-	-	-
N-Nitrosodi-n-propylamine	-	-	1.3 U	1.3 U	1.3 U	1.3 U	1.3 U	1.3 U	1.3 U	1.3 U	1.3 U	-	-	-	-
N-Nitrosodiphenylamine	-	-	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	-	-	-	-
Pentachlorophenol	-	-	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U	2.1 U	-	-	-	-
Phenanthrene	-	-	1.9 U	1.9 U	1.9 U	1.9 U	1.9 U	1.9 U	1.9 U	1.9 U	1.9 U	-	-	-	-
Phenol	-	-	0.87 U	0.87 U	0.87 U	0.87 U	0.87 U	0.87 U	0.87 U	0.87 U	0.87 U	-	-	-	-
Pyrene	-	-	1.9 U	1.9 U	1.9 U	1.9 U	1.9 U	1.9 U	1.9 U	1.9 U	1.9 U	-	-	-	-
Pyridine	-	-	2 U	2 U	2 U	2 U	2 U	**2 R**	**2 R**	2 U	2 U	-	-	-	-
Volatile Organic Compounds (ug/l)															
1,1,1,2-Tetrachloroethane	-	-	0.34 U	0.34 U	0.34 U	0.34 U	0.34 U	0.34 U	0.34 U	0.34 U	0.34 U	-	-	-	-
1,1,1-Trichloroethane	-	-	0.32 U	0.32 U	0.32 U	0.32 U	0.32 U	0.32 U	0.32 U	0.32 U	0.32 U	-	-	-	-
1,1,2,2-Tetrachloroethane	-	-	0.47 U	0.47 U	0.47 U	0.47 U	0.47 U	0.47 U	0.47 U	0.47 U	0.47 U	-	-	-	-
1,1,2-Trichloroethane	-	-	0.37 U	0.37 U	0.37 U	0.37 U	0.37 U	0.37 U	0.37 U	0.37 U	0.37 U	-	-	-	-
1,1-Dichloroethane	-	-	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	-	-	-	-
1,1-Dichloroethene	-	-	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	-	-	-	-
1,1-Dichloropropene	-	-	0.31 U	0.31 U	0.31 U	0.31 U	0.31 U	0.31 U	0.31 U	0.31 U	0.31 U	-	-	-	-
1,2,3-Trichlorobenzene	-	-	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	-	-	-	-
1,2,3-Trichloropropane	-	-	0.31 U	0.31 U	0.31 U	0.31 U	0.31 U	0.31 U	0.31 U	0.31 U	0.31 U	-	-	-	-
1,2,4-Trichlorobenzene	-	-	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	-	-	-	-
1,2,4-Trimethylbenzene	-	-	0.28 U	0.28 U	0.28 U	0.28 U	0.28 U	0.28 U	0.28 U	0.28 U	0.28 U	-	-	-	-
1,2-Dibromo-3-chloropropane (DBCP)	-	-	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	-	-	-	-
1,2-Dibromoethane	-	-	0.34 U	0.34 U	0.34 U	0.34 U	0.34 U	0.34 U	0.34 U	0.34 U	0.34 U	-	-	-	-
1,2-Dichlorobenzene	-	-	0.28 U	0.28 U	0.28 U	0.28 U	0.28 U	0.28 U	0.28 U	0.28 U	0.28 U	-	-	-	-
1,2-Dichloroethane	-	-	0.45 U	0.45 U	0.45 U	0.45 U	0.45 U	0.45 U	0.45 U	0.45 U	0.45 U	-	-	-	-
1,2-Dichloroethene (total)	-	-	0.39 U	0.39 U	0.39 U	0.39 U	0.39 U	0.39 U	0.39 U	0.39 U	0.39 U	-	-	-	-
1,2-Dichloropropane	-	-	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U	-	-	-	-
1,3,5-Trimethylbenzene	-	-	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U	-	-	-	-
1,3-Dichlorobenzene	-	-	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U	0.26 U	-	-	-	-
1,3-Dichloropropane	-	-	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	-	-	-	-
1,4-Dichlorobenzene	-	-	0.28 U	0.28 U	0.28 U	0.28 U	0.28 U	0.28 U	0.28 U	0.28 U	0.28 U	-	-	-	-
1,4-Dioxane	-	-	**21 R**	**21 R**	**21 R**	**21 R**	**21 R**	**21 R**	**21 R**	**21 R**	**21 R**	-	-	-	-
2,2-Dichloropropane	-	-	0.34 U	0.34 U	0.34 U	0.34 U	0.34 U	0.34 U	0.34 U	0.34 U	0.34 U	-	-	-	-
2-Butanone	-	-	1.2 U	1.2 U	1.2 U	**2.6 J**	1.2 U	1.2 U	1.2 U	1.2 U	1.2 U	-	-	-	-
2-Chlor-1,3-Butadiene	-	-	0.42 U	0.42 U	0.42 U	0.42 U	0.42 U	0.42 U	0.42 U	0.42 U	0.42 U	-	-	-	-

TABLE E2
SUMMARY OF GROUNDWATER ANALYTICAL RESULTS
OU-1 REMEDIATION
1 RIVER STREET
HASTINGS-ON HUDSON

Location ID	PDMW-10	PDMW-10	PDMW-16D	PDMW-16S	PDMW-17D	PDMW-17D	PDMW-17S	PDMW-18D	PDMW-18S	PDMW-19D	PDMW-19S	PDMW-97	PDMW-97	PDWB1A	PDWB1A
Sample Name	PDMW10-1130	PDMW10-1130F	PDMW-16D	PDMW-16S	PDMW-17D	PDMW-17DN	PDMW-17S	PDMW-18D	PDMW-18S	PDMW-19D	PDMW-19S	PDMW97-1135	PDMW97-1135F	PDWB1A-1200	PDWB1A-1200F
Sample Depth															
Date	3/23/2006	3/23/2006	4/10/2006	4/11/2006	4/11/2006	4/11/2006	4/6/2006	4/12/2006	4/12/2006	4/14/2006	4/14/2006	3/23/2006	3/23/2006	3/23/2006	3/23/2006
2-Chloroethyl vinyl ether	-	-	**0.39 R**	**0.39 R**	**0.39 R**	**0.39 R**	**0.39 R**	**0.39 R**	**0.39 R**	**0.39 R**	**0.39 R**	-	-	-	-
2-Chlorotoluene	-	-	0.44 U	0.44 U	0.44 U	0.44 U	0.44 U	0.44 U	0.44 U	0.44 U	0.44 U	-	-	-	-
2-Hexanone	-	-	0.59 U	0.59 U	0.59 U	0.59 U	0.59 U	0.59 U	0.59 U	0.59 U	0.59 U	-	-	-	-
4-Chlorotoluene	-	-	0.37 U	0.37 U	0.37 U	0.37 U	0.37 U	0.37 U	0.37 U	0.37 U	0.37 U	-	-	-	-
4-Methyl-2-pentanone	-	-	0.88 U	0.88 U	0.88 U	0.88 U	0.88 U	0.88 U	0.88 U	0.88 U	0.88 U	-	-	-	-
Acetone	-	-	3.1 U	3.1 U	11 U	14 U	**5.1**	5 U	3.1 U	**4.2 J**	3.1 U	-	-	-	-
Acrolein	-	-	**0.87 R**	**0.87 R**	**0.87 R**	**0.87 R**	**0.87 R**	**0.87 R**	**0.87 R**	**0.87 R**	**0.87 R**	-	-	-	-
Acrylonitrile	-	-	0.82 U	0.82 U	0.82 U	0.82 U	0.82 U	0.82 U	0.82 U	0.82 U	0.82 U	-	-	-	-
Allyl chloride	-	-	0.42 U	0.42 U	0.42 U	0.42 U	0.42 U	0.42 U	0.42 U	0.42 U	0.42 U	-	-	-	-
Benzene	-	-	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	-	-	-	-
Benzene, butyl	-	-	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U	-	-	-	-
Bromobenzene	-	-	0.38 U	0.38 U	0.38 U	0.38 U	0.38 U	0.38 U	0.38 U	0.38 U	0.38 U	-	-	-	-
Bromodichloromethane	-	-	0.38 U	0.38 U	0.38 U	0.38 U	0.38 U	0.38 U	0.38 U	0.38 U	0.38 U	-	-	-	-
Bromoform	-	-	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U	-	-	-	-
Bromomethane	-	-	0.38 U	0.38 U	0.38 U	0.38 U	0.38 U	0.38 U	0.38 U	0.38 U	0.38 U	-	-	-	-
Carbon disulfide	-	-	**1.2 J**	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U	0.21 U	-	-	-	-
Carbon tetrachloride	-	-	0.35 U	0.35 U	0.35 U	0.35 U	0.35 U	0.35 U	0.35 U	0.35 U	0.35 U	-	-	-	-
Chlorobenzene	-	-	0.35 U	0.35 U	0.35 U	0.35 U	0.35 U	0.35 U	0.35 U	0.35 U	0.35 U	-	-	-	-
Chlorobromomethane	-	-	0.32 U	0.32 U	0.32 U	0.32 U	0.32 U	0.32 U	0.32 U	0.32 U	0.32 U	-	-	-	-
Chloroethane	-	-	0.37 U	0.37 U	0.37 U	0.37 U	0.37 U	0.37 U	0.37 U	0.37 U	0.37 U	-	-	-	-
Chloroform	-	-	0.39 U	0.39 U	**1.4 J**	**1.6 J**	0.39 U	**1.6 J**	0.39 U	13 U	0.93 U	-	-	-	-
Chloromethane	-	-	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U	-	-	-	-
cis-1,2-Dichloroethene	-	-	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	-	-	-	-
cis-1,3-Dichloropropene	-	-	0.31 U	0.31 U	0.31 U	0.31 U	0.31 U	0.31 U	0.31 U	0.31 U	0.31 U	-	-	-	-
cis-1,4-Dichloro-2-Butene	-	-	0.67 U	0.67 U	0.67 U	0.67 U	0.67 U	0.67 U	0.67 U	0.67 U	0.67 U	-	-	-	-
Cymene	-	-	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U	-	-	-	-
Dibromochloromethane	-	-	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	-	-	-	-
Dibromomethane	-	-	0.32 U	0.32 U	0.32 U	0.32 U	0.32 U	0.32 U	0.32 U	0.32 U	0.32 U	-	-	-	-
Dichlorodifluoromethane (CFC-12)	-	-	0.31 U	0.31 U	0.31 U	0.31 U	0.31 U	0.31 U	0.31 U	0.31 U	0.31 U	-	-	-	-
Ethyl Methacrylate	-	-	0.42 U	0.42 U	0.42 U	0.42 U	0.42 U	0.42 U	0.42 U	0.42 U	0.42 U	-	-	-	-
Ethylbenzene	-	-	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U	-	-	-	-
Hexachlorobutadiene	-	-	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	0.18 U	-	-	-	-
Iodomethane	-	-	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	0.3 U	-	-	-	-
Isobutyl Alcohol	-	-	**21 R**	**21 R**	**21 R**	**21 R**	**21 R**	**21 R**	**21 R**	**21 R**	**21 R**	-	-	-	-
Isopropylbenzene	-	-	0.31 U	0.31 U	0.31 U	0.31 U	0.31 U	0.31 U	0.31 U	0.31 U	0.31 U	-	-	-	-
m/p-Xylene	-	-	0.69 U	0.69 U	0.69 U	0.69 U	0.69 U	0.69 U	0.69 U	0.69 U	0.69 U	-	-	-	-
Methyl Methacrylate	-	-	0.55 U	0.55 U	0.55 U	0.55 U	0.55 U	0.55 U	0.55 U	0.55 U	0.55 U	-	-	-	-
Methyl tert butyl ether (MTBE)	-	-	**11**	**1.9 J**	0.45 U	0.45 U	0.45 U	0.45 U	0.45 U	0.45 U	0.45 U	-	-	-	-
Methylacrylonitrile	-	-	0.41 U	0.41 U	0.41 U	0.41 U	0.41 U	0.41 U	0.41 U	0.41 U	0.41 U	-	-	-	-
Methylene chloride	-	-	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	-	-	-	-
Naphthalene	-	-	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	0.23 U	1.2 U	-	-	-	-
n-Propylbenzene	-	-	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U	-	-	-	-
o-Xylene	-	-	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	0.27 U	-	-	-	-
Propionitrile	-	-	**1.5 R**	**1.5 R**	**1.5 R**	**1.5 R**	**1.5 R**	**1.5 R**	**1.5 R**	**1.5 R**	**1.5 R**	-	-	-	-
sec-Butylbenzene	-	-	0.28 U	0.28 U	0.28 U	0.28 U	0.28 U	0.28 U	0.28 U	0.28 U	0.28 U	-	-	-	-
Styrene	-	-	0.31 U	0.31 U	0.31 U	0.31 U	0.31 U	0.31 U	0.31 U	0.31 U	0.31 U	-	-	-	-
tert-Butylbenzene	-	-	0.34 U	0.34 U	0.34 U	0.34 U	0.34 U	0.34 U	0.34 U	0.34 U	0.34 U	-	-	-	-
Tetrachloroethene	-	-	0.45 U	0.45 U	0.45 U	0.45 U	0.45 U	0.45 U	0.45 U	**3.5 J**	0.45 U	-	-	-	-
Tetrahydrofuran	-	-	4.4 U	4.4 U	4.4 U	4.4 U	4.4 U	4.4 U	4.4 U	4.4 U	4.4 U	-	-	-	-
Toluene	-	-	0.37 U	0.37 U	0.37 U	0.37 U	0.37 U	0.37 U	0.37 U	0.37 U	0.37 U	-	-	-	-
trans-1,2-Dichloroethene	-	-	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	0.5 U	-	-	-	-
trans-1,3-Dichloropropene	-	-	0.42 U	0.42 U	0.42 U	0.42 U	0.42 U	0.42 U	0.42 U	0.42 U	0.42 U	-	-	-	-
trans-1,4-Dichloro-2-butene	-	-	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	0.75 U	-	-	-	-
Trichloroethene	-	-	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U	0.33 U	-	-	-	-
Trichlorofluoromethane (CFC-11)	-	-	0.35 U	0.35 U	0.35 U	0.35 U	0.35 U	0.35 U	0.35 U	0.35 U	0.35 U	-	-	-	-
Trifluorotrichloroethane (Freon 113)	-	-	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U	0.24 U	-	-	-	-
Vinyl acetate	-	-	0.55 U	0.55 U	0.55 U	0.55 U	0.55 U	0.55 U	0.55 U	0.55 U	0.55 U	-	-	-	-
Vinyl chloride	-	-	0.38 U	0.38 U	0.38 U	0.38 U	0.38 U	0.38 U	0.38 U	0.38 U	0.38 U	-	-	-	-
Xylenes (total)	-	-	0.69 U	0.69 U	0.69 U	0.69 U	0.69 U	0.69 U	0.69 U	0.69 U	0.69 U	-	-	-	-

Notes and Abbreviations:

1. Results in bold indicate compound was detected.
2. U - Compound was not detected.
   * MDL shown with non-detects.
   J or B - Estimated result.
   R - Rejected data, unable to verify.
   P- Indicates that the precision between the two analytical columns was outside of the laboratory or method limit.

Table E3
WATER TREATMENT GROUNDWATER ANALYTICAL RESULTS

OU-1 REMEDIATION
NYSDEC SITE #3-60-022
1 RIVER STREET
HASTINGS-ON-HUDSON, NEW YORK

Sample ID	154-001	154-002	154-003	154-004	154-005	154-006	Anticipated
Date Sampled	4/3/2006	4/3/2006	4/3/2006	4/3/2006	4/3/2006	4/3/2006	NYSDEC
Matrix	Water	Water	Water	Water	Water	Water	Effluent
FILTER	20 µm	10 µm	5 µm	1 µm	0.5 µm	0.1 µm	Limits
pH adjust	NO	NO	NO	NO	NO	NO	
PCBs (µg/L)							
PCB-1016 (AROCLOR 1016)	0.48 U	0.50 U	0.48 U	0.48 U	0.48 U	0.48 U	0.065
PCB-1221 (AROCLOR 1221)	0.48 U	0.50 U	0.48 U	0.48 U	0.48 U	0.48 U	0.065
PCB-1232 (AROCLOR 1232)	0.48 U	0.50 U	0.48 U	0.48 U	0.48 U	0.48 U	0.065
PCB-1242 (AROCLOR 1242)	0.48 U	0.50 U	0.48 U	0.48 U	0.48 U	0.48 U	0.065
PCB-1248 (AROCLOR 1248)	0.48 U	0.50 U	0.48 U	0.48 U	0.48 U	0.48 U	0.065
PCB-1254 (AROCLOR 1254)	0.48 U	0.50 U	0.48 U	0.48 U	0.48 U	0.48 U	0.065
PCB-1260 (AROCLOR 1260)	0.48 U	0.50 U	0.48 U	0.48 U	0.48 U	0.48 U	0.065
PCB-1262 (AROCLOR 1262)	0.48 U	0.50 U	0.48 U	1.30	0.48 U	0.48 U	0.065
PCB-1268 (AROCLOR 1268)	0.48 U	1.20 P	0.48 U	3.60 P	0.48 U	0.48 U	0.065
METALS (µg/L)							
Aluminum	60 U	64.8 B	60 U	60 U	60 U	60 U	999
Antimony	7 U	7 U	7 U	7 U	7 U	7 U	3
Arsenic	3.3 U	4.4 B	3.3 U	3.7 B	3.3 U	3.3 U	63
Barium	420	363	421	363	416	385	1000
Beryllium	0.6 B	0.22 B	0.27 B	0.24 B	0.2 U	0.2 U	3
Cadmium	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	0.4 U	10
Calcium	370000	355000	364000	360000	373000	382000	NA
Chromium (Total)	1.3 U	1.5 B	1.8 B	1.3 U	1.3 U	1.3 U	50
Cobalt	4.8 B	3.7 B	3.3 U	3.8 B	3.3 U	3.7 B	5
Copper	5.3 B	10 B	2.9 B	6.7 B	15.5 B	3 B	3.4
Iron	3940	722	143 B	111 B	4020	59.5 U	3994
Lead	2.4 U	2.4 U	2.4 U	2.4 U	2.4 U	2.4 U	20
Magnesium	57000	54800	56300	55500	57500	59100	35000
Manganese	707	657	674	660	710	703	300
Nickel	8.7 B	7.7 B	7.5 B	8.6 B	9.2 B	8.4 B	74
Potassium	27000	26200	27000	26400	26800	27700	NA
Selenium	3.8 B	3.4 U	3.4 U	4.5 B	3.4 U	5.6 B	10
Silver	1.7 B	1.6 U	1.6 U	1.6 U	1.6 U	1.6 U	2.3
Sodium	246000	247000	233000	245000	244000	255000	20000
Thallium	3.5 U	3.5 U	3.5 U	3.9 B	3.5 U	3.5 U	8
Vanadium	3.3 U	3.3 U	3.3 U	3.3 U	3.3 U	3.3 U	14
Zinc	81.4	64.9	64.1	59.7	156	62	999

NOTES:

U - This compound was not detected at or above the associated reporting limit

J - Quantitation is approximate due to limitations identified during the QA review

B - The result reported is less than the reporting limit but greater than the instrument detection limit.

Table E4
ANALYTICAL DATA FOR pH ADJUSTED GROUNDWATER

OU-1 REMEDIATION
NYSDEC SITE #3-60-022
1 RIVER STREET
HASTINGS-ON-HUDSON, NEW YORK

Sample ID	154-007	154-002	154-003	Anticipated
Date Sampled	4/4/2006	4/4/2006	4/3/2006	NYSDEC
Matrix	Water	Water	Water	Effluent
FILTER	10µm	1 µm	0.1 µm	Limits
pH adjust	YES	YES	YES	
PCBs (µg/L)				
PCB-1016 (AROCLOR 1016)	0.49 U	0.48 U	0.48 U	0.065
PCB-1221 (AROCLOR 1221)	0.49 U	0.48 U	0.48 U	0.065
PCB-1232 (AROCLOR 1232)	0.49 U	0.48 U	0.48 U	0.065
PCB-1242 (AROCLOR 1242)	0.49 U	0.48 U	0.48 U	0.065
PCB-1248 (AROCLOR 1248)	0.49 U	0.48 U	0.48 U	0.065
PCB-1254 (AROCLOR 1254)	0.49 U	0.48 U	0.48 U	0.065
PCB-1260 (AROCLOR 1260)	0.49 U	0.48 U	0.48 U	0.065
PCB-1262 (AROCLOR 1262)	0.49 U	0.48 U	0.48 U	0.065
PCB-1268 (AROCLOR 1268)	0.49 U	0.48 U	0.48 U	0.065
METALS (µg/L)				
Alµminum	60 U	60 U	60 U	999
Antimony	**7** U	**7** U	**7** U	3
Arsenic	7.4 B	3.3 U	6.8 B	63
Barium	20.7 B	11.3 B	25.8 B	1000
Beryllium	0.23 B	0.2 U	0.28 B	3
Cadmium	0.4 U	0.4 U	0.4 U	10
Calcium	10900	10200	9200	NA
Chromium (Total)	1.5 B	1.3 U	1.3 U	50
Cobalt	3.3 U	3.3 U	3.3 U	5
Copper	**6.8** B	**3.1** B	**3.6** B	3.4
Iron	201	59.5 U	59.5 U	3994
Lead	2.4 U	2.4 U	2.4 U	20
Magnesium	33900	34900	32500	35000
Manganese	2.5 B	1 U	1 U	300
Nickel	2.2 U	2.2 U	2.2 U	74
Potassium	27600	27900	28000	NA
Selenium	3.4 U	3.4 U	3.7 B	10
Silver	2.2 B	1.6 U	1.6 U	2.3
Sodium	**643000**	**690000**	**672000**	20000
Thallium	3.5 U	3.5 U	3.5 U	8
Vanadium	4.7 B	3.3 U	4.5 B	14
Zinc	7.3 B	6.4 U	6.4 U	999

NOTES:

U - This compound was not detected at or above the associated reporting limit

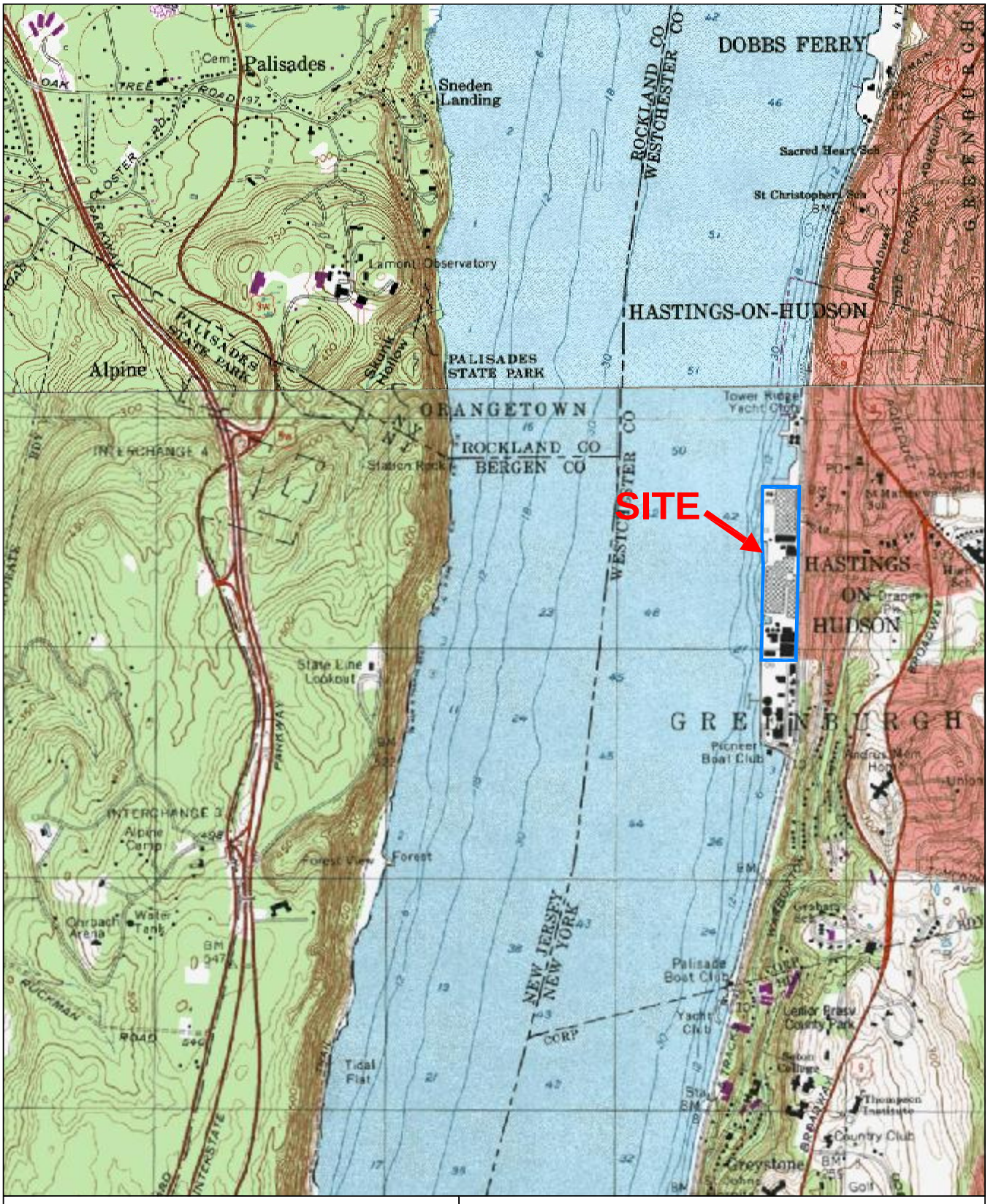
J - Quantitation is approximate due to limitations identified during the QA review

B - The result reported is less than the reporting limit but greater than the instrument detection limit.

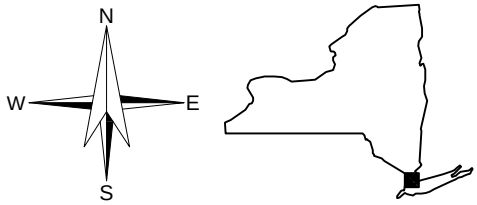
Table E5
ANTICIPATED NYSDEC WATER EFFLUENT LIMITS

OU-1 REMEDIATION
NYSDEC SITE #3-60-022
1 RIVER STREET
HASTINGS-ON-HUDSON, NEW YORK

Analyte	Anticipated NYSDEC Effluent Limit	Reference
PCBs (µg/L)		
PCB-1016 (AROCLOR 1016)	0.065 **	NYSDEC Personnel
PCB-1221 (AROCLOR 1221)	0.065 **	NYSDEC Personnel
PCB-1232 (AROCLOR 1232)	0.065 **	NYSDEC Personnel
PCB-1242 (AROCLOR 1242)	0.065 **	NYSDEC Personnel
PCB-1248 (AROCLOR 1248)	0.065 **	NYSDEC Personnel
PCB-1254 (AROCLOR 1254)	0.065 **	NYSDEC Personnel
PCB-1260 (AROCLOR 1260)	0.065 **	NYSDEC Personnel
PCB-1262 (AROCLOR 1262)	0.065 **	NYSDEC Personnel
PCB-1268 (AROCLOR 1268)	0.065 **	NYSDEC Personnel
METALS (µg/L)		
Aluminum	999	Site No. 5-58-013 Permit
Antimony	3	6 NYCRR 703
Arsenic	63	6 NYCRR 703 (Water Class I)
Barium	1000	6 NYCRR 703
Beryllium	3	TOGS 1.1.1
Cadmium	10	Site No. 5-58-013 Permit
Calcium	NA	6 NYCRR 703
Chromium (Total)	50	6 NYCRR 703
Cobalt	5	6 NYCRR 703
Copper	3.4	6 NYCRR 703 (Water Class I)
Iron	3994	Site No. 5-58-013 Permit
Lead	20	Site No. 5-58-013 Permit
Magnesium	35000	6 NYCRR 703
Manganese	300	6 NYCRR 703
Nickel	74	6 NYCRR 703 (Water Class I)
Potassium	NA	6 NYCRR 703
Selenium	10	6 NYCRR 703
Silver	2.3	6 NYCRR 703
Sodium	20000	6 NYCRR 703
Thallium	8	6 NYCRR 703
Vanadium	14	6 NYCRR 703
Zinc	999	Site No. 5-58-013 Permit
Mercury	0.7	6 NYCRR 703
TSS (mg/L)	10	Site No. 5-58-013 Permit



SITE COORDINATES: 40°59'36"N 73°53'9"W



U.S.G.S. QUADRANGLE: HASTINGS-ON-HUDSON, NEW YORK

HALEY & ALDRICH

OU-1 REMEDIATION
NYSDEC SITE #3-60-022
1 RIVER STREET
HASTINGS-ON-HUDSON, NEW YORK

ENSR | AECOM

PROJECT LOCUS

SCALE: 1:24000
JULY 2006

FIGURE E1

G:\28612_HASTINGS\ACAD\28612-LOCUS.DWG

NOTES:

1. AERIAL PHOTO SOURCE IS NYS GIS CLEARINGHOUSE. THE AERIAL WAS TAKEN IN 2004 AND DOES NOT REPRESENT THE CONDITIONS AT THE TIME OF THE PDI.
2. DATA REFERENCES THE NAD 1983 NEW YORK STATE PLANE SYSTEM IN FEET.

W
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E

0 80 160 320

APPROXIMATE SCALE IN FEET

HALEY & ALDRICH

OU-1 REMEDIATION
NYDEC SITE # 3-60-022
1 RIVER STREET
HASTINGS-ON-HUDSON, NEW YORK

ENSR | AECOM

SITE PLAN

SCALE: AS SHOWN
JULY 2006

FIGURE E2

G:\PROJECT\28612\GIS\FIGURES\28612-116-02.2-SITEPLAN.MXD

MAP REFERENCE:
FOR COMPLETE BOUNDARY INFORMATION REFER TO A MAP ENTITLED: "BOUNDARY AND TOPOGRAPHIC SURVEY, SECTION 10, BLOCK 8, LOTS 89, 91, 93 & 94, AR/AERL, VILLAGE OF HASTINGS ON HUDSON, TOWN OF GREENBURGH, WESTCHESTER COUNTY, NEW YORK, SHEETS 1, 2, 3 & 4, SCALE: 1" = 30 FT" PREPARED BY BOSWELL ENGINEERING, 330 PHILLIPS AVENUE, SOUTH HACKENSACK, NEW JERSEY, ON 05/10/2005, AND REVISED ON 05/23/2005. BOSWELL ENGINEERING HAS FIELD SURVEYED THE EXPLORATION POINTS, CONCRETE SLABS, FENCES AND RIPRAP ALONG NORTHWEST CORNER OF SITE DURING THE MONTHS OF OCTOBER AND NOVEMBER 2005.

W
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HUDSON RIVER

PDSB-100
PDSB-101
PDSB-102
PDSB-103
PDSB-104
PDSB-105
PDSB-106
PDSB-107
PDMW-16S
PDMW-16D
PDMW-17D
PDMW-17S

MOBIL OIL CORPORATION
(formerly of Zinsser & Company, Inc.)

N/F UHLICH COLOR COMPANY, INC.

FORMER BLDG #15

#22A
#79A
#19
#18
#17
#22
#22
#22C

MATCHLINE - SEE FIGURE E3B

PENN CENTRAL RAILROAD - HUDSON DIVISION
(formerly New York Central Railroad Company)

LEGEND:

PDMW-06 — DESIGNATION AND APPROXIMATE LOCATION OF MONITORING WELL INSTALLED DURING SUPPLEMENTAL DESIGN INVESTIGATION

PDSB-105 — DESIGNATION AND APPROXIMATE LOCATION OF SOIL BORINGS INSTALLED DURING SUPPLEMENTAL DESIGN INVESTIGATION

NOTES:

1. WELL LOCATIONS ARE BASED ON SURVEY CONDUCTED BY BOSWELL ENGINEERING IN APRIL 2006.

0 50 100 150 200
SCALE IN FEET

HALEY & ALDRICH

OU-1 REMEDIATION
NYSDEC SITE #3-60-022
1 RIVER STREET
HASTINGS-ON-HUDSON, NEW YORK

ENSR | AECOM

SDI SAMPLING LOCATIONS

SCALE: AS SHOWN
MAY 2006

FIGURE E3A

28612-116 D092
G:\28612_HASTINGS\GLOBAL\CAD\DRAWINGS\28612-SDI-SAMPL-LOCS_R2.DWG

MAP REFERENCE:
FOR COMPLETE BOUNDARY INFORMATION REFER TO A MAP ENTITLED: "BOUNDARY AND TOPOGRAPHIC SURVEY, SECTION 10, BLOCK 8, LOTS 89, 91, 93 & 94, AR/AERL, VILLAGE OF HASTINGS ON HUDSON, TOWN OF GREENBURGH, WESTCHESTER COUNTY, NEW YORK, SHEETS 1, 2, 3 & 4, SCALE: 1" = 30 FT" PREPARED BY BOSWELL ENGINEERING, 330 PHILLIPS AVENUE, SOUTH HACKENSACK, NEW JERSEY, ON 05/10/2005, AND REVISED ON 05/23/2005. BOSWELL ENGINEERING HAS FIELD SURVEYED THE EXPLORATION POINTS, CONCRETE SLABS, FENCES AND RIPRAP ALONG NORTHWEST CORNER OF SITE DURING THE MONTHS OF OCTOBER AND NOVEMBER 2005.

HUDSON RIVER

MATCHLINE - SEE FIGURE E3A

#22A
#79A
#22B
#22
#22
#22C
#57
#51
#51A
#72A
#72
#52

FORMER BLDG #53
FORMER BLDG #52B
FORMER BLDG #52A
FORMER BLDG #54

N/F THE HARBOR AT HASTINGS ASSOCIATES
100 River Street

PDSB-108
PDSB-109
PDSB-110
PDSB-111
PDSB-112
PDSB-113
PDSB-114
PDSB-115
PDSB-116
PDSB-117
PDSB-118
PDSB-119
PDSB-120
PDSB-121
PDSB-122
PDSB-123
PDSB-124
PDSB-125
PDSB-126
PDSB-127
PDSB-128
PDSB-129
PDSB-130
PDMW-18D
PDMW-18S
PDMW-19S
PDMW-19D

RIVER STREET

PENN CENTRAL RAILROAD - HUDSON DIVISION
(formerly New York Central Railroad Company)

LEGEND:

PDMW-06 — DESIGNATION AND APPROXIMATE LOCATION OF MONITORING WELL INSTALLED DURING SUPPLEMENTAL DESIGN INVESTIGATION

PDSB-105 — DESIGNATION AND APPROXIMATE LOCATION OF SOIL BORINGS INSTALLED DURING SUPPLEMENTAL DESIGN INVESTIGATION

NOTES:

1. WELL LOCATIONS ARE BASED ON SURVEY CONDUCTED BY BOSWELL ENGINEERING IN APRIL 2006.

0 50 100 150 200
SCALE IN FEET

HALEY& ALDRICH

OU-1 REMEDIATION
NYSDEC SITE #3-60-022
1 RIVER STREET
HASTINGS-ON-HUDSON, NEW YORK

ENSR | AECOM

SDI SAMPLING LOCATIONS

SCALE: AS SHOWN
MAY 2006

FIGURE E3B

28612-116 D093 (D092)
G:\28612_HASTINGS\GLOBAL\CAD\DRAWINGS\28612-SDI-SAMPL-LOCS_R2.DWG

ATTACHMENT E1

Logs of Environmental Test Borings

TEST BORING REPORT

Boring No. PDSB-100

Project BP Hastings Hastings on Hudson, NY
Client Atlantic Richfield Company
Contractor Warren George, Inc.

File No. 28612-
Sheet No. 1 of 1
Start March 24, 2006
Finish March 24, 2006
Driller
H&A Rep. KDR (ENSR)
Elevation
Datum
Location See Plan

	Casing	Sampler	Barrel	Drilling Equipment and Procedures
Type		S	-	Rig Make & Model: Track mounted DK50RA
Inside Diameter (in.)		1 3/8	-	Bit Type: Roller Bit
Hammer Weight (lb.)		140	-	Drill Mud: None
Hammer Fall (in.)		30	-	Casing:
				Hoist/Hammer: Cat-Head

Depth (ft.)	SPT[1]	Sample No. & Rec. (in.)	Sample Depth (ft.)	Well Diagram	Elev./Depth (ft.)	USCS Symbol	Visual-Manual Identification and Description (Density/consistency, color, GROUP NAME, max. particle size[2], structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines	Field Test Dilatancy	Field Test Toughness	Field Test Plasticity	Field Test Strength
0							No split spoons collected up to 10 feet.										
5																	
10	2 3 4 6	F	10.0 12.0	NO WELL INSTALLED	10.0		Brown black, well graded SAND, trace brick fragments, saturated, no odor. -FILL-										
	2 2 3 2	G	12.0 14.0		12.0		Same as above to 13.75 feet.										
					14.0		Brown black, fine SAND, trace silt, saturated. Bottom of Exploration at 14 feet.										

Water Level Data

Date	Time	Elapsed Time (hr.)	Depth (ft.) to: Bottom of Casing	Bottom of Hole	Water

Sample Identification

O Open End Rod
T Thin Wall Tube
U Undisturbed Sample
S Split Spoon
G Geoprobe

Well Diagram

Riser Pipe
Screen
Filter Sand
Cuttings
Grout
Concrete
Bentonite Seal

Summary

Overburden (lin. ft.) 14
Rock Cored (lin. ft.) NA
Samples

Boring No. PDSB-100

Field Tests: Dilatancy: R-Rapid, S-Slow, N-None
Toughness: L-Low, M-Medium, H-High
Plasticity: N-Nonplastic, L-Low, M-Medium, H-High
Dry Strength: N-None, L-Low, M-Medium, H-High, V-Very High

[1]SPT = Sampler blows per 6 in. [2]Maximum particle size (mm) is determined by direct observation within the limitations of sampler size (in millimeters).

Note: Soil identification based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

USCS_TB4 USCSLIB4.GLB USCSTB+CORE4.GDT G:\28612_-1\GINT\28612-118.GPJ Jul 19, 06

TEST BORING REPORT

Boring No. PDSB-101

Project BP Hastings Hastings on Hudson, NY
Client Atlantic Richfield Company
Contractor Warren George, Inc.

File No. 28612-
Sheet No. 1 of 1
Start March 24, 2006
Finish March 24, 2006
Driller
H&A Rep. KDR (ENSR)
Elevation
Datum
Location See Plan

	Casing	Sampler	Barrel	Drilling Equipment and Procedures
Type		S	-	Rig Make & Model: Track mounted DK50RA
Inside Diameter (in.)		1 3/8	-	Bit Type: Roller Bit
Hammer Weight (lb.)		140	-	Drill Mud: None
Hammer Fall (in.)		30	-	Casing:
				Hoist/Hammer: Cat-Head

Depth (ft.)	SPT[1]	Sample No. & Rec. (in.)	Sample Depth (ft.)	Well Diagram	Elev./Depth (ft.)	USCS Symbol	Visual-Manual Identification and Description (Density/consistency, color, GROUP NAME, max. particle size[2], structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines	Field Test Dilatancy	Field Test Toughness	Field Test Plasticity	Field Test Strength
0							No split spoons collected up to 10 feet.										
5																	
10	4 5 4 4	F 8	10.0 12.0	NO WELL INSTALLED	10.0		Black, well graded SAND, trace wood fragments, saturated, H2S odor. -FILL-										
	5 5 6 5	G 5	12.0 14.0		12.0		Same as above.										
					14.0		Bottom of Exploration at 14 feet.										

Water Level Data

Date	Time	Elapsed Time (hr.)	Depth (ft.) to: Bottom of Casing	Bottom of Hole	Water

Sample Identification

O Open End Rod
T Thin Wall Tube
U Undisturbed Sample
S Split Spoon
G Geoprobe

Well Diagram

Riser Pipe
Screen
Filter Sand
Cuttings
Grout
Concrete
Bentonite Seal

Summary

Overburden (lin. ft.) 14
Rock Cored (lin. ft.) NA
Samples

Boring No. PDSB-101

Field Tests: Dilatancy: R-Rapid, S-Slow, N-None
Toughness: L-Low, M-Medium, H-High
Plasticity: N-Nonplastic, L-Low, M-Medium, H-High
Dry Strength: N-None, L-Low, M-Medium, H-High, V-Very High

[1]SPT = Sampler blows per 6 in. [2]Maximum particle size (mm) is determined by direct observation within the limitations of sampler size (in millimeters).

Note: Soil identification based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

USCS_TB4 USCSLIB4.GLB USCSTB+CORE4.GDT G:\28612_-1\GINT\28612-118.GPJ Jul 19, 06

HALEY & ALDRICH

TEST BORING REPORT

Boring No. PDSB-102

Project BP Hastings Hastings on Hudson, NY
Client Atlantic Richfield Company
Contractor Warren George, Inc.

File No. 28612-
Sheet No. 1 of 1
Start March 27, 2006
Finish March 27, 2006
Driller
H&A Rep. KDR (ENSR)
Elevation
Datum
Location See Plan

	Casing	Sampler	Barrel	Drilling Equipment and Procedures
Type		S	-	Rig Make & Model: Track mounted DK50RA
Inside Diameter (in.)		1 3/8	-	Bit Type: Roller Bit
Hammer Weight (lb.)		140	-	Drill Mud: None
Hammer Fall (in.)		30	-	Casing:
				Hoist/Hammer: Cat-Head

Depth (ft.)	SPT[1]	Sample No. & Rec. (in.)	Sample Depth (ft.)	Well Diagram	Elev./Depth (ft.)	USCS Symbol	Visual-Manual Identification and Description (Density/consistency, color, GROUP NAME, max. particle size[2], structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines	Field Test Dilatancy	Field Test Toughness	Field Test Plasticity	Field Test Strength
0							No split spoons collected up to 6 feet.										
5																	
	9 1 2 1	D 9	6.0 8.0	NO WELL INSTALLED	6.0		Black, well graded SAND, trace coarse sand, trace wood fragments, saturated. -FILL-										
	5 4 5 1	E 18	8.0 10.0		8.0		Same as above.										
10	5 1 1 1	F 8	10.0 12.0		10.0		Same as above.										
	5 4 3 2	G 10	12.0 14.0		12.0		Same as above.										
					14.0		Bottom of Exploration at 14 feet.										

Water Level Data					
Date	Time	Elapsed Time (hr.)	Depth (ft.) to: Bottom of Casing	Bottom of Hole	Water

Sample Identification

O Open End Rod
T Thin Wall Tube
U Undisturbed Sample
S Split Spoon
G Geoprobe

Well Diagram

Riser Pipe
Screen
Filter Sand
Cuttings
Grout
Concrete
Bentonite Seal

Summary

Overburden (lin. ft.) 14
Rock Cored (lin. ft.) NA
Samples

Boring No. PDSB-102

Field Tests: Dilatancy: R-Rapid, S-Slow, N-None
Toughness: L-Low, M-Medium, H-High
Plasticity: N-Nonplastic, L-Low, M-Medium, H-High
Dry Strength: N-None, L-Low, M-Medium, H-High, V-Very High

[1]SPT = Sampler blows per 6 in. [2]Maximum particle size (mm) is determined by direct observation within the limitations of sampler size (in millimeters).

Note: Soil identification based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

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HALEY & ALDRICH

TEST BORING REPORT

Boring No. PDSB-103

Project BP Hastings Hastings on Hudson, NY
Client Atlantic Richfield Company
Contractor Warren George, Inc.

File No. 28612-
Sheet No. 1 of 1
Start March 27, 2006
Finish March 27, 2006
Driller
H&A Rep. KDR (ENSR)
Elevation
Datum
Location See Plan

	Casing	Sampler	Barrel	Drilling Equipment and Procedures
Type		S	-	Rig Make & Model: Track mounted DK50RA
Inside Diameter (in.)		1 3/8	-	Bit Type: Roller Bit
Hammer Weight (lb.)		140	-	Drill Mud: None
Hammer Fall (in.)		30	-	Casing:
				Hoist/Hammer: Cat-Head

Depth (ft.)	SPT[1]	Sample No. & Rec. (in.)	Sample Depth (ft.)	Well Diagram	Elev./Depth (ft.)	USCS Symbol	Visual-Manual Identification and Description (Density/consistency, color, GROUP NAME, max. particle size[2], structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines	Field Test Dilatancy	Field Test Toughness	Field Test Plasticity	Field Test Strength
0							No split spoons collected up to 10 feet.										
5																	
10	2 3 4 5	F 11	10.0 12.0	NO WELL INSTALLED	10.0		Black, well graded SAND with gravel, trace wood fragments, trace silt, saturated. -FILL-										
	4 2 1 2	G 7.5	12.0 14.0		12.0		Dark red brown, fine SAND with some silt, trace coarse gravel, saturated, oil globules on water fraction and on core barrel near the water table.										
					14.0		Bottom of Exploration at 14 feet. Note: Water table at approximately 5 feet.										

Water Level Data					
Date	Time	Elapsed Time (hr.)	Depth (ft.) to: Bottom of Casing	Bottom of Hole	Water

Sample Identification	
O	Open End Rod
T	Thin Wall Tube
U	Undisturbed Sample
S	Split Spoon
G	Geoprobe

Well Diagram	
	Riser Pipe
	Screen
	Filter Sand
	Cuttings
	Grout
	Concrete
	Bentonite Seal

Summary	
Overburden (lin. ft.)	14
Rock Cored (lin. ft.)	NA
Samples	

Boring No. PDSB-103

Field Tests: Dilatancy: R-Rapid, S-Slow, N-None
Toughness: L-Low, M-Medium, H-High
Plasticity: N-Nonplastic, L-Low, M-Medium, H-High
Dry Strength: N-None, L-Low, M-Medium, H-High, V-Very High

[1]SPT = Sampler blows per 6 in. [2]Maximum particle size (mm) is determined by direct observation within the limitations of sampler size (in millimeters).

Note: Soil identification based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

USCS_TB4 USCSLIB4.GLB USCSTB+CORE4.GDT G:\28612_-1\GINT\28612-118.GPJ Jul 19, 06

HALEY & ALDRICH

TEST BORING REPORT

Boring No. PDSB-104

Project BP Hastings Hastings on Hudson, NY
Client Atlantic Richfield Company
Contractor Warren George, Inc.

File No. 28612-
Sheet No. 1 of 1
Start March 27, 2006
Finish March 27, 2006
Driller
H&A Rep. KDR (ENSR)
Elevation
Datum
Location See Plan

	Casing	Sampler	Barrel	Drilling Equipment and Procedures
Type		S	-	Rig Make & Model: Track mounted DK50RA
Inside Diameter (in.)		1 3/8	-	Bit Type: Roller Bit
Hammer Weight (lb.)		140	-	Drill Mud: None
Hammer Fall (in.)		30	-	Casing:
				Hoist/Hammer: Cat-Head

Depth (ft.)	SPT[1]	Sample No. & Rec. (in.)	Sample Depth (ft.)	Well Diagram	Elev./Depth (ft.)	USCS Symbol	Visual-Manual Identification and Description (Density/consistency, color, GROUP NAME, max. particle size[2], structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines	Field Test Dilatancy	Field Test Toughness	Field Test Plasticity	Field Test Strength
0							No split spoons collected up to 6 feet.										
5																	
	4 1 1 1	D 8	6.0 8.0	NO WELL INSTALLED	6.0		Black, well graded SAND and GRAVEL, saturated. -FILL-										
	4 3 2 2	E 5	8.0 10.0		8.0		Same as above.										
10	2 2 3 3	F 0	10.0 12.0		10.0		No sample in spoon, zero recovery.										
	4 2 2 3	G	12.0 14.0		12.0		No sample in first half of spoon (to 13 feet).										
					13.0		Gray black, organic SILT, trace fine gravel, saturated.										
					14.0		Bottom of Exploration at 14 feet. Note: Sample PDSB104G submitted but "held".										

Water Level Data

Date	Time	Elapsed Time (hr.)	Depth (ft.) to: Bottom of Casing	Bottom of Hole	Water

Sample Identification

O Open End Rod
T Thin Wall Tube
U Undisturbed Sample
S Split Spoon
G Geoprobe

Well Diagram

Riser Pipe
Screen
Filter Sand
Cuttings
Grout
Concrete
Bentonite Seal

Summary

Overburden (lin. ft.) 14
Rock Cored (lin. ft.) NA
Samples

Boring No. PDSB-104

Field Tests: Dilatancy: R-Rapid, S-Slow, N-None
Toughness: L-Low, M-Medium, H-High
Plasticity: N-Nonplastic, L-Low, M-Medium, H-High
Dry Strength: N-None, L-Low, M-Medium, H-High, V-Very High

[1]SPT = Sampler blows per 6 in. [2]Maximum particle size (mm) is determined by direct observation within the limitations of sampler size (in millimeters).

Note: Soil identification based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

USCS_TB4 USCSLIB4.GLB USCSTB+CORE4.GDT G:\28612_-1\GINT\28612-118.GPJ Jul 19, 06

TEST BORING REPORT

Boring No. PDSB-105

Project BP Hastings Hastings on Hudson, NY
Client Atlantic Richfield Company
Contractor Warren George, Inc.

File No. 28612-
Sheet No. 1 of 1
Start March 28, 2006
Finish March 28, 2006
Driller
H&A Rep. KDR (ENSR)
Elevation
Datum
Location See Plan

	Casing	Sampler	Barrel	Drilling Equipment and Procedures
Type		S	-	Rig Make & Model: Track mounted DK50RA
Inside Diameter (in.)		1 3/8	-	Bit Type: Roller Bit
Hammer Weight (lb.)		140	-	Drill Mud: None
Hammer Fall (in.)		30	-	Casing:
				Hoist/Hammer: Cat-Head

Depth (ft.)	SPT[1]	Sample No. & Rec. (in.)	Sample Depth (ft.)	Well Diagram	Elev./Depth (ft.)	USCS Symbol	Visual-Manual Identification and Description (Density/consistency, color, GROUP NAME, max. particle size[2], structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines	Field Test Dilatancy	Field Test Toughness	Field Test Plasticity	Field Test Strength
0							No split spoons collected up to 10 feet.										
5																	
10	7 4 3 3	F 15	10.0 12.0	NO WELL INSTALLED	10.0		Dark brown, fine SAND, saturated, strong hydrocarbon odor to 11.5 feet.										
					11.5		Gray, medium SAND, trace fine and coarse sand.										
	6 7 4 50/4	G 24	12.0 14.0		12.0		Gray, medium SAND, strong hydrocarbon odor.										
					14.0		Bottom of Exploration at 14 feet.										

Water Level Data

Date	Time	Elapsed Time (hr.)	Depth (ft.) to: Bottom of Casing	Bottom of Hole	Water

Sample Identification

O Open End Rod
T Thin Wall Tube
U Undisturbed Sample
S Split Spoon
G Geoprobe

Well Diagram

Riser Pipe
Screen
Filter Sand
Cuttings
Grout
Concrete
Bentonite Seal

Summary

Overburden (lin. ft.) 14
Rock Cored (lin. ft.) NA
Samples

Boring No. PDSB-105

Field Tests: Dilatancy: R-Rapid, S-Slow, N-None
Toughness: L-Low, M-Medium, H-High
Plasticity: N-Nonplastic, L-Low, M-Medium, H-High
Dry Strength: N-None, L-Low, M-Medium, H-High, V-Very High

[1]SPT = Sampler blows per 6 in. [2]Maximum particle size (mm) is determined by direct observation within the limitations of sampler size (in millimeters).

Note: Soil identification based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

USCS_TB4 USCSLIB4.GLB USCSTB+CORE4.GDT G:\28612_-1\GINT\28612-118.GPJ Jul 19, 06

HALEY & ALDRICH

TEST BORING REPORT

Boring No. PDSB-106

Project BP Hastings Hastings on Hudson, NY
Client Atlantic Richfield Company
Contractor Warren George, Inc.

File No. 28612-
Sheet No. 1 of 1
Start March 28, 2006
Finish March 28, 2006
Driller
H&A Rep. KDR (ENSR)
Elevation
Datum
Location See Plan

	Casing	Sampler	Barrel	Drilling Equipment and Procedures
Type		S	-	Rig Make & Model: Track mounted DK50RA
Inside Diameter (in.)		1 3/8	-	Bit Type: Roller Bit
Hammer Weight (lb.)		140	-	Drill Mud: None
Hammer Fall (in.)		30	-	Casing:
				Hoist/Hammer: Cat-Head

Depth (ft.)	SPT[1]	Sample No. & Rec. (in.)	Sample Depth (ft.)	Well Diagram	Elev./Depth (ft.)	USCS Symbol	Visual-Manual Identification and Description (Density/consistency, color, GROUP NAME, max. particle size[2], structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines	Field Test Dilatancy	Field Test Toughness	Field Test Plasticity	Field Test Strength
0				NO WELL INSTALLED			No split spoons collected up to 2 feet.										
	10 12 21 16	B 12	2.0 4.0		2.0		Black clinkers, foam bits, trace roots, fine to medium gravel, damp. -FILL-										
5	6 8 17 11	C 18	4.0 6.0		4.0		Same as above up to 4.5 feet. Gray, fine to medium SAND, trace gravel, trace brick fragments. -FILL-										
	10 10 7 4	D 11	6.0 8.0		6.0		Gray, fine to medium SAND, saturated.										
	6 10 10 10	E 18	8.0 10.0		8.0		Same as above, except brown.										
10	5 6 8 17	F 7	10.0 12.0		10.0		Same as above up to 11.5 feet. Fine SAND, some silt, saturated.										
	7 7 9 20	G 17	12.0 14.0		12.0		Dark gray brown, organic SILT, trace coarse gravel.										
					14.0		Bottom of Exploration at 14 feet.										

Water Level Data					
Date	Time	Elapsed Time (hr.)	Depth (ft.) to: Bottom of Casing	Bottom of Hole	Water

Sample Identification	
O	Open End Rod
T	Thin Wall Tube
U	Undisturbed Sample
S	Split Spoon
G	Geoprobe

Well Diagram: Riser Pipe, Screen, Filter Sand, Cuttings, Grout, Concrete, Bentonite Seal

Summary
Overburden (lin. ft.) 14
Rock Cored (lin. ft.) NA
Samples

Boring No. PDSB-106

Field Tests: Dilatancy: R-Rapid, S-Slow, N-None
Toughness: L-Low, M-Medium, H-High
Plasticity: N-Nonplastic, L-Low, M-Medium, H-High
Dry Strength: N-None, L-Low, M-Medium, H-High, V-Very High

[1]SPT = Sampler blows per 6 in. [2]Maximum particle size (mm) is determined by direct observation within the limitations of sampler size (in millimeters).

Note: Soil identification based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

USCS_TB4 USCSLIB4.GLB USCSTB+CORE4.GDT G:\28612_-1\GINT\28612-118.GPJ Jul 19, 06

HALEY & ALDRICH

TEST BORING REPORT

Boring No. PDSB-107

Project BP Hastings Hastings on Hudson, NY
Client Atlantic Richfield Company
Contractor Warren George, Inc.

File No. 28612-
Sheet No. 1 of 1
Start March 28, 2006
Finish March 28, 2006
Driller
H&A Rep. KDR (ENSR)
Elevation
Datum
Location See Plan

	Casing	Sampler	Barrel	Drilling Equipment and Procedures
Type		S	-	Rig Make & Model: Track mounted DK50RA
Inside Diameter (in.)		1 3/8	-	Bit Type: Roller Bit
Hammer Weight (lb.)		140	-	Drill Mud: None
Hammer Fall (in.)		30	-	Casing:
				Hoist/Hammer: Cat-Head

Depth (ft.)	SPT[1]	Sample No. & Rec. (in.)	Sample Depth (ft.)	Well Diagram	Elev./Depth (ft.)	USCS Symbol	Visual-Manual Identification and Description (Density/consistency, color, GROUP NAME, max. particle size[2], structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines	Field Test Dilatancy	Field Test Toughness	Field Test Plasticity	Field Test Strength
0							No split spoons collected up to 6 feet.										
5																	
	4 3 3 3	D 10	6.0 8.0	NO WELL INSTALLED	6.0		Gray brown, well graded SAND and fine GRAVEL, saturated, strong hydrocarbon odor.										
	5 4 2 2	E 18	8.0 10.0		8.0		Black, fine to medium SAND, little coarse gravel, saturated, strong hydrocarbon odor.										
10	3 2 2 1	F 12	10.0 12.0		10.0		Black, well graded SAND and GRAVEL, saturated, strong hydrocarbon odor.										
	3 4 5 1	G 15	12.0 14.0		12.0		Same as above up to 13.5 feet. Dark gray, fine SAND, some silt, trace roots, H2S odor.										
					14.0		Bottom of Exploration at 14 feet.										

Water Level Data

Date	Time	Elapsed Time (hr.)	Depth (ft.) to: Bottom of Casing	Bottom of Hole	Water

Sample Identification

O Open End Rod
T Thin Wall Tube
U Undisturbed Sample
S Split Spoon
G Geoprobe

Well Diagram

Riser Pipe
Screen
Filter Sand
Cuttings
Grout
Concrete
Bentonite Seal

Summary

Overburden (lin. ft.) 14
Rock Cored (lin. ft.) NA
Samples

Boring No. PDSB-107

Field Tests: Dilatancy: R-Rapid, S-Slow, N-None
Toughness: L-Low, M-Medium, H-High
Plasticity: N-Nonplastic, L-Low, M-Medium, H-High
Dry Strength: N-None, L-Low, M-Medium, H-High, V-Very High

[1]SPT = Sampler blows per 6 in. [2]Maximum particle size (mm) is determined by direct observation within the limitations of sampler size (in millimeters).

Note: Soil identification based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

USCS_TB4 USCSLIB4.GLB USCSTB+CORE4.GDT G:\28612_-1\GINT\28612-118.GPJ Jul 19, 06

HALEY & ALDRICH

TEST BORING REPORT

Boring No. PDSB-108

Project BP Hastings Hastings on Hudson, NY
Client Atlantic Richfield Company
Contractor Warren George, Inc.

File No. 28612-
Sheet No. 1 of 1
Start April 7, 2006
Finish April 7, 2006
Driller
H&A Rep. DS/KDR (ENSR)
Elevation
Datum
Location See Plan

	Casing	Sampler	Barrel	Drilling Equipment and Procedures
Type		S	-	Rig Make & Model:
Inside Diameter (in.)		1 3/8	-	Bit Type:
Hammer Weight (lb.)		140	-	Drill Mud:
Hammer Fall (in.)		30	-	Casing:
				Hoist/Hammer:

Depth (ft.)	SPT[1]	Sample No. & Rec. (in.)	Sample Depth (ft.)	Well Diagram	Elev./Depth (ft.)	USCS Symbol	Visual-Manual Identification and Description (Density/consistency, color, GROUP NAME, max. particle size[2], structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines	Field Test Dilatancy	Field Test Toughness	Field Test Plasticity	Field Test Strength
0	NA		0.0 2.0				Black, medium to coarse SAND, some medium to coarse gravel, dry, slight odor. -FILL-										
	9 6 6 6	B 10	2.0 4.0		2.0		Black to brown, fine SAND and GRAVEL fill, little silt, little coarse sand, trace medium to coarse gravel, damp. PID = 5.3 ppm										
5	12 17 34 32	C 5	4.0 6.0		4.0		Medium SAND and GRAVEL fill, little silt, saturated. PID = 0.1 ppm										
				NO WELL INSTALLED	6.0		Bottom of Exploration at 6 feet.										

Water Level Data					
Date	Time	Elapsed Time (hr.)	Depth (ft.) to: Bottom of Casing	Bottom of Hole	Water

Sample Identification	
O	Open End Rod
T	Thin Wall Tube
U	Undisturbed Sample
S	Split Spoon
G	Geoprobe

Well Diagram: Riser Pipe, Screen, Filter Sand, Cuttings, Grout, Concrete, Bentonite Seal

Summary	
Overburden (lin. ft.)	6
Rock Cored (lin. ft.)	NA
Samples	

Boring No. PDSB-108

Field Tests: Dilatancy: R-Rapid, S-Slow, N-None
Toughness: L-Low, M-Medium, H-High
Plasticity: N-Nonplastic, L-Low, M-Medium, H-High
Dry Strength: N-None, L-Low, M-Medium, H-High, V-Very High

[1]SPT = Sampler blows per 6 in. [2]Maximum particle size (mm) is determined by direct observation within the limitations of sampler size (in millimeters).

Note: Soil identification based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

USCS_TB4 USCSLIB4.GLB USCSTB+CORE4.GDT G:\28612_-1\GINT\28612-118.GPJ Jul 19, 06

HALEY & ALDRICH

TEST BORING REPORT

Boring No. PDSB-109

Project BP Hastings Hastings on Hudson, NY
Client Atlantic Richfield Company
Contractor Warren George, Inc.

File No. 28612-
Sheet No. 1 of 1
Start April 7, 2006
Finish April 10, 2006
Driller
H&A Rep. DS/KDR (ENSR)
Elevation Datum
Location See Plan

	Casing	Sampler	Barrel	Drilling Equipment and Procedures
Type		S	-	Rig Make & Model:
Inside Diameter (in.)		1 3/8	-	Bit Type:
Hammer Weight (lb.)		140	-	Drill Mud:
Hammer Fall (in.)		30	-	Casing:
				Hoist/Hammer:

Depth (ft.)	SPT[1]	Sample No. & Rec. (in.)	Sample Depth (ft.)	Well Diagram	Elev./Depth (ft.)	USCS Symbol	Visual-Manual Identification and Description (Density/consistency, color, GROUP NAME, max. particle size[2], structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines	Field Test Dilatancy	Field Test Toughness	Field Test Plasticity	Field Test Strength
0				NO WELL INSTALLED			No split spoons collected up to 2 feet.										
	50/3	B 2	2.0 4.0		2.0		Brown, well graded SAND and GRAVEL fill, wet. -FILL-										
					2.5		Hit concrete at 2.5 feet, drilled thru.										
	7 6 5 10	C 5	4.0 6.0		4.0		Black to brown, medium to coarse SAND and medium to fine gravel fill, saturated, no odor. PID = 0.6 ppm										
5					6.0		Bottom of Exploration at 6 feet.										

Water Level Data					
Date	Time	Elapsed Time (hr.)	Depth (ft.) to: Bottom of Casing	Bottom of Hole	Water

Sample Identification	
O	Open End Rod
T	Thin Wall Tube
U	Undisturbed Sample
S	Split Spoon
G	Geoprobe

Well Diagram: Riser Pipe, Screen, Filter Sand, Cuttings, Grout, Concrete, Bentonite Seal

Summary
Overburden (lin. ft.) 6
Rock Cored (lin. ft.) NA
Samples

Boring No. PDSB-109

Field Tests: Dilatancy: R-Rapid, S-Slow, N-None Plasticity: N-Nonplastic, L-Low, M-Medium, H-High
Toughness: L-Low, M-Medium, H-High Dry Strength: N-None, L-Low, M-Medium, H-High, V-Very High

[1]SPT = Sampler blows per 6 in. [2]Maximum particle size (mm) is determined by direct observation within the limitations of sampler size (in millimeters).

Note: Soil identification based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

USCS_TB4 USCSLIB4.GLB USCSTB+CORE4.GDT G:\28612_~1\GINT\28612-118.GPJ Jul 19, 06

TEST BORING REPORT

Boring No. PDSB-110

Project BP Hastings Hastings on Hudson, NY
Client Atlantic Richfield Company
Contractor Warren George, Inc.

File No. 28612-
Sheet No. 1 of 1
Start April 10, 2006
Finish April 10, 2006
Driller
H&A Rep. DS/KDR (ENSR)
Elevation
Datum
Location See Plan

	Casing	Sampler	Barrel	Drilling Equipment and Procedures
Type		S	-	Rig Make & Model:
Inside Diameter (in.)		1 3/8	-	Bit Type:
Hammer Weight (lb.)		140	-	Drill Mud:
Hammer Fall (in.)		30	-	Casing:
				Hoist/Hammer:

Depth (ft.)	SPT[1]	Sample No. & Rec. (in.)	Sample Depth (ft.)	Well Diagram	Elev./Depth (ft.)	USCS Symbol	Visual-Manual Identification and Description (Density/consistency, color, GROUP NAME, max. particle size[2], structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines	Field Test Dilatancy	Field Test Toughness	Field Test Plasticity	Field Test Strength
0							No split spoons collected up to 6 feet.										
5																	
	6 5 4 6	D 15	6.0 8.0	NO WELL INSTALLED	6.0		Black to brown, medium to coarse SAND and medium GRAVEL, trace silt and clay, saturated, strong hydrocarbon odor, sheen visible. PID = 40 ppm										
	14 23 24 28	E 24	8.0 10.0		8.0		Same as above up to 9.5 feet.										
10					9.5		Brown, medium SAND, trace fine gravel, wet. PID = 1.0 ppm										
	25 28 30 31	F 24	10.0 12.0		10.0		Brown, medium to coarse SAND, trace fine to medium gravel, wet. PID = 1.9 ppm										
		G 24	12.0 14.0		12.0		Same as above.										
					14.0		Bottom of Exploration at 14 feet.										

Water Level Data

Date	Time	Elapsed Time (hr.)	Depth (ft.) to: Bottom of Casing	Bottom of Hole	Water

Sample Identification

O Open End Rod
T Thin Wall Tube
U Undisturbed Sample
S Split Spoon
G Geoprobe

Well Diagram

Riser Pipe
Screen
Filter Sand
Cuttings
Grout
Concrete
Bentonite Seal

Summary

Overburden (lin. ft.) 14
Rock Cored (lin. ft.) NA
Samples

Boring No. PDSB-110

Field Tests: Dilatancy: R-Rapid, S-Slow, N-None
Toughness: L-Low, M-Medium, H-High
Plasticity: N-Nonplastic, L-Low, M-Medium, H-High
Dry Strength: N-None, L-Low, M-Medium, H-High, V-Very High

[1]SPT = Sampler blows per 6 in. [2]Maximum particle size (mm) is determined by direct observation within the limitations of sampler size (in millimeters).

Note: Soil identification based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

USCS_TB4 USCSLIB4.GLB USCSTB+CORE4.GDT G:\28612_-1\GINT\28612-118.GPJ Jul 19, 06

HALEY & ALDRICH

TEST BORING REPORT

Boring No. PDSB-111

Project BP Hastings Hastings on Hudson, NY
Client Atlantic Richfield Company
Contractor Warren George, Inc.

File No. 28612
Sheet No. 1 of 2
Start March 29, 2006
Finish March 29, 2006
Driller
H&A Rep. KDR (ENSR)
Elevation Datum
Location See Plan

	Casing	Sampler	Barrel	Drilling Equipment and Procedures
Type		S	-	Rig Make & Model: Track mounted DK50RA
Inside Diameter (in.)		1 3/8	-	Bit Type: Roller Bit
Hammer Weight (lb.)		140	-	Drill Mud: None
Hammer Fall (in.)		30	-	Casing:
				Hoist/Hammer: Cat-Head

Depth (ft.)	SPT[1]	Sample No. & Rec. (in.)	Sample Depth (ft.)	Well Diagram	Elev./Depth (ft.)	USCS Symbol	Visual-Manual Identification and Description (Density/consistency, color, GROUP NAME, max. particle size[2], structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines	Field Test Dilatancy	Field Test Toughness	Field Test Plasticity	Field Test Strength
0							No split spoons collected up to 10 feet.										
							Void from 3.5 to 13.5 feet.										
5																	
10				NO WELL INSTALLED													
					13.5												
15	1 1 1 1	F 8	16.0 18.0		16.0		Soft, black, SILT, little fine sand, loose, no odor, organic odor.										
							No recovery, 2 attempts.										
20																	

Water Level Data

Date	Time	Elapsed Time (hr.)	Depth (ft.) to: Bottom of Casing	Bottom of Hole	Water

Sample Identification

O Open End Rod
T Thin Wall Tube
U Undisturbed Sample
S Split Spoon
G Geoprobe

Well Diagram

Riser Pipe
Screen
Filter Sand
Cuttings
Grout
Concrete
Bentonite Seal

Summary

Overburden (lin. ft.) 20
Rock Cored (lin. ft.) NA
Samples

Boring No. PDSB-111

Field Tests: Dilatancy: R-Rapid, S-Slow, N-None
Toughness: L-Low, M-Medium, H-High
Plasticity: N-Nonplastic, L-Low, M-Medium, H-High
Dry Strength: N-None, L-Low, M-Medium, H-High, V-Very High

[1]SPT = Sampler blows per 6 in. [2]Maximum particle size (mm) is determined by direct observation within the limitations of sampler size (in millimeters).

Note: Soil identification based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

USCS_TB4 USCSLIB4.GLB USCSTB+CORE4.GDT G:\28612_~1\GINT\28612-118.GPJ Jul 20, 06

HALEY & ALDRICH

TEST BORING REPORT

Boring No. PDSB-111
File No. 28612
Sheet No. 2 of 2

Depth (ft.)	SPT[1]	Sample No. & Rec. (in.)	Sample Depth (ft.)	Well Diagram	Elev./Depth (ft.)	USCS Symbol	Visual-Manual Identification and Description (Density/consistency, color, GROUP NAME, max. particle size[2], structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines	Field Test Dilatancy	Field Test Toughness	Field Test Plasticity	Field Test Strength
20					20.0		Bottom of Exploration at 20 feet.										

[1]SPT = Sampler blows per 6 in. [2]Maximum particle size (mm) is determined by direct observation within the limitations of sampler size.

NOTE: Soil identification based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

USCS_TB4 USCSLIB4.GLB USCSTB+CORE4.GDT G:\28612_~1\GINT\28612-118.GPJ Jul 20, 06

TEST BORING REPORT

Boring No. PDSB-112

Project BP Hastings Hastings on Hudson, NY
Client Atlantic Richfield Company
Contractor Warren George, Inc.

File No. 28612-
Sheet No. 1 of 1
Start March 29, 2006
Finish March 29, 2006
Driller
H&A Rep. KDR (ENSR)
Elevation
Datum
Location See Plan

	Casing	Sampler	Barrel	Drilling Equipment and Procedures
Type		S	-	Rig Make & Model: Track mounted DK50RA
Inside Diameter (in.)		1 3/8	-	Bit Type: Roller Bit
Hammer Weight (lb.)		140	-	Drill Mud: None
Hammer Fall (in.)		30	-	Casing:
				Hoist/Hammer: Cat-Head

Depth (ft.)	SPT[1]	Sample No. & Rec. (in.)	Sample Depth (ft.)	Well Diagram	Elev./Depth (ft.)	USCS Symbol	Visual-Manual Identification and Description (Density/consistency, color, GROUP NAME, max. particle size[2], structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines	Field Test Dilatancy	Field Test Toughness	Field Test Plasticity	Field Test Strength
0							No split spoons collected up to 6 feet.										
5																	
	1 2 2 1	D 7	6.0 8.0	NO WELL INSTALLED	6.0		Brown to black, well graded SAND and GRAVEL, saturated, oil impacts.										
	3 3 4 5	E 12	8.0 10.0		8.0		Black, well graded SAND and GRAVEL, hydrocarbon odor, oil sheen present.										
10	4 4 3 3	F 10	10.0 12.0		10.0		Same as above.										
	3 3 4 5	G 15	12.0 14.0		12.0		Same as above.										
					14.0		Bottom of Exploration at 14 feet.										

Water Level Data

Date	Time	Elapsed Time (hr.)	Depth (ft.) to: Bottom of Casing	Bottom of Hole	Water

Sample Identification

O Open End Rod
T Thin Wall Tube
U Undisturbed Sample
S Split Spoon
G Geoprobe

Well Diagram

Riser Pipe
Screen
Filter Sand
Cuttings
Grout
Concrete
Bentonite Seal

Summary

Overburden (lin. ft.) 14
Rock Cored (lin. ft.) NA
Samples

Boring No. PDSB-112

Field Tests: Dilatancy: R-Rapid, S-Slow, N-None Plasticity: N-Nonplastic, L-Low, M-Medium, H-High
Toughness: L-Low, M-Medium, H-High Dry Strength: N-None, L-Low, M-Medium, H-High, V-Very High

[1]SPT = Sampler blows per 6 in. [2]Maximum particle size (mm) is determined by direct observation within the limitations of sampler size (in millimeters).

Note: Soil identification based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

USCS_TB4 USCSLIB4.GLB USCSTB+CORE4.GDT G:\28612_-1\GINT\28612-118.GPJ Jul 19, 06

HALEY & ALDRICH

TEST BORING REPORT

Boring No. PDSB-113

Project BP Hastings Hastings on Hudson, NY
Client Atlantic Richfield Company
Contractor Warren George, Inc.

File No. 28612-
Sheet No. 1 of 1
Start March 29, 2006
Finish March 29, 2006
Driller
H&A Rep. KDR (ENSR)
Elevation
Datum
Location See Plan

	Casing	Sampler	Barrel	Drilling Equipment and Procedures
Type		S	-	Rig Make & Model: Track mounted DK50RA
Inside Diameter (in.)		1 3/8	-	Bit Type: Roller Bit
Hammer Weight (lb.)		140	-	Drill Mud: None
Hammer Fall (in.)		30	-	Casing:
				Hoist/Hammer: Cat-Head

Depth (ft.)	SPT[1]	Sample No. & Rec. (in.)	Sample Depth (ft.)	Well Diagram	Elev./Depth (ft.)	USCS Symbol	Visual-Manual Identification and Description (Density/consistency, color, GROUP NAME, max. particle size[2], structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines	Field Test Dilatancy	Field Test Toughness	Field Test Plasticity	Field Test Strength
0							No split spoons collected up to 2.5 feet.										
	1 1 1	B 24	2.5 4.0		2.5		Black, very fine SAND, trace coarse sand/fine gravel, saturated, strong musty odor.										
5	2 2 3 2	C 24	4.0 6.0		4.0		Black, fine SAND with some silt, trace fine gravel, saturated, musty odor.										
	6 5 4 3	D 9 HELD	6.0 8.0	NO WELL INSTALLED	6.0		Yellow red, fine to medium SAND, little coarse brick fragments, saturated, musty odor. -FILL-										
	3 3 3 2	E 6 HELD	8.0 10.0		8.0		Fine to medium SAND, little coarse brick fragments, saturated, no odor. -FILL-										
10	3 2 1 2	F 7 HELD	10.0 12.0		10.0		Same as above, except trace wood fragments.										
	2 2 2 2	G 7 HELD	12.0 14.0		12.0		Same as above.										
					14.0		Bottom of Exploration at 14 feet.										

Water Level Data					
Date	Time	Elapsed Time (hr.)	Depth (ft.) to: Bottom of Casing	Bottom of Hole	Water

Sample Identification
O Open End Rod
T Thin Wall Tube
U Undisturbed Sample
S Split Spoon
G Geoprobe

Well Diagram
Riser Pipe
Screen
Filter Sand
Cuttings
Grout
Concrete
Bentonite Seal

Summary
Overburden (lin. ft.) 14
Rock Cored (lin. ft.) NA
Samples
Boring No. PDSB-113

Field Tests: Dilatancy: R-Rapid, S-Slow, N-None
Toughness: L-Low, M-Medium, H-High
Plasticity: N-Nonplastic, L-Low, M-Medium, H-High
Dry Strength: N-None, L-Low, M-Medium, H-High, V-Very High

[1]SPT = Sampler blows per 6 in. [2]Maximum particle size (mm) is determined by direct observation within the limitations of sampler size (in millimeters).

Note: Soil identification based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

USCS_TB4 USCSLIB4.GLB USCSTB+CORE4.GDT G:\28612_~1\GINT\28612-118.GPJ Jul 19, 06

HALEY & ALDRICH

TEST BORING REPORT

Boring No. PDSB-114

Project BP Hastings Hastings on Hudson, NY
Client Atlantic Richfield Company
Contractor Warren George, Inc.

File No. 28612-
Sheet No. 1 of 1
Start April 4, 2006
Finish April 7, 2006
Driller
H&A Rep. DS/KDR (ENSR)
Elevation
Datum
Location See Plan

	Casing	Sampler	Barrel	Drilling Equipment and Procedures
Type		S	-	Rig Make & Model:
Inside Diameter (in.)		1 3/8	-	Bit Type:
Hammer Weight (lb.)		140	-	Drill Mud:
Hammer Fall (in.)		30	-	Casing:
				Hoist/Hammer:

Depth (ft.)	SPT[1]	Sample No. & Rec. (in.)	Sample Depth (ft.)	Well Diagram	Elev./Depth (ft.)	USCS Symbol	Visual-Manual Identification and Description (Density/consistency, color, GROUP NAME, max. particle size[2], structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines	Field Test Dilatancy	Field Test Toughness	Field Test Plasticity	Field Test Strength
0	NA	A	0.0 2.0				Hand augered 0-6 feet. Black, coarse SAND with some fine gravel. PID = 0.1 ppm										
	NA	B	2.0 4.0		2.0		Same as above. PID = 0.9 ppm										
5	NA	C	4.0 6.0		4.0		Same as above.										
	WOH 3 3 3	D 3	6.0 8.0	NO WELL INSTALLED	6.0		Black, fine SAND with some fine gravel, little medium gravel, trace bricks, saturated (soupy), hydrocarbon impacted. PID = 40.2 ppm										
	1 1 1 3	E 6	8.0 10.0		8.0		Fine to medium SAND, wood fragments, little organics, trace peat material, hydrocarbon impacts. PID = 42 ppm										
10	1 12 17 15	F 15	10.0 12.0		10.0		Black, silty fine SAND, large piece of wood, little organics, trace medium gravel, hydrocarbon impacts. PID = 45.5 ppm										
	15 11 14 3	G 24	12.0 14.0		12.0		Black, medium SAND, some coarse sand, trace fine sand, saturated, hydrocarbon impacts, odor and sheen present. PID = 40 ppm										
					14.0		Bottom of Exploration at 14 feet.										

Water Level Data

Date	Time	Elapsed Time (hr.)	Depth (ft.) to: Bottom of Casing	Bottom of Hole	Water

Sample Identification

O Open End Rod
T Thin Wall Tube
U Undisturbed Sample
S Split Spoon
G Geoprobe

Well Diagram

Riser Pipe
Screen
Filter Sand
Cuttings
Grout
Concrete
Bentonite Seal

Summary

Overburden (lin. ft.) 14
Rock Cored (lin. ft.) NA
Samples

Boring No. PDSB-114

Field Tests: Dilatancy: R-Rapid, S-Slow, N-None Plasticity: N-Nonplastic, L-Low, M-Medium, H-High
Toughness: L-Low, M-Medium, H-High Dry Strength: N-None, L-Low, M-Medium, H-High, V-Very High

[1]SPT = Sampler blows per 6 in. [2]Maximum particle size (mm) is determined by direct observation within the limitations of sampler size (in millimeters).

Note: Soil identification based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

USCS_TB4 USCSLIB4.GLB USCSTB+CORE4.GDT G:\28612_~1\GINT\28612-118.GPJ Jul 19, 06

TEST BORING REPORT

Boring No. PDSB-115

Project BP Hastings Hastings on Hudson, NY
Client Atlantic Richfield Company
Contractor Warren George, Inc.

File No. 28612-
Sheet No. 1 of 1
Start April 4, 2006
Finish April 10, 2006
Driller
H&A Rep. DS/KDR (ENSR)
Elevation
Datum
Location See Plan

	Casing	Sampler	Barrel	Drilling Equipment and Procedures
Type		S	-	Rig Make & Model:
Inside Diameter (in.)		1 3/8	-	Bit Type:
Hammer Weight (lb.)		140	-	Drill Mud:
Hammer Fall (in.)		30	-	Casing:
				Hoist/Hammer:

Depth (ft.)	SPT[1]	Sample No. & Rec. (in.)	Sample Depth (ft.)	Well Diagram	Elev./Depth (ft.)	USCS Symbol	Visual-Manual Identification and Description (Density/consistency, color, GROUP NAME, max. particle size[2], structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines	Field Test Dilatancy	Field Test Toughness	Field Test Plasticity	Field Test Strength
0	NA	A	0.0 2.0				Hand auger to 6 feet. PID = 0.2 ppm Medium to coarse SAND, fill with some debris and medium gravel. -FILL-										
	NA	B	2.0 4.0		2.0		Same as above. PID = 0.9 ppm										
5	NA	C	4.0 6.0		4.0		Same as above.										
	9 2 2 12	D 10	6.0 8.0	NO WELL INSTALLED	6.0		Black, coarse SAND, trace clay and silt, trace gravel, saturated. -FILL- PID = 1.3 ppm										
	6 5 6 14	E 10	8.0 10.0		8.0		Same as above, except with hydrocarbon odor.										
10	19 19 20 22	F 14	10.0 12.0		10.0		Black, coarse SAND, trace coarse gravel, saturated. PID = 33.1 ppm										
	19 20 20 19	G 24	12.0 14.0		12.0		Same as above. PID = 27.8 ppm PID = 35.8 ppm										
					14.0		Bottom of Exploration at 14 feet.										

Water Level Data

Date	Time	Elapsed Time (hr.)	Depth (ft.) to: Bottom of Casing	Bottom of Hole	Water

Sample Identification

O Open End Rod
T Thin Wall Tube
U Undisturbed Sample
S Split Spoon
G Geoprobe

Well Diagram

Riser Pipe
Screen
Filter Sand
Cuttings
Grout
Concrete
Bentonite Seal

Summary

Overburden (lin. ft.) 14
Rock Cored (lin. ft.) NA
Samples

Boring No. PDSB-115

Field Tests: Dilatancy: R-Rapid, S-Slow, N-None
Toughness: L-Low, M-Medium, H-High
Plasticity: N-Nonplastic, L-Low, M-Medium, H-High
Dry Strength: N-None, L-Low, M-Medium, H-High, V-Very High

[1]SPT = Sampler blows per 6 in. [2]Maximum particle size (mm) is determined by direct observation within the limitations of sampler size (in millimeters).

Note: Soil identification based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

USCS_TB4 USCSLIB4.GLB USCSTB+CORE4.GDT G:\28612_~1\GINT\28612-118.GPJ Jul 19, 06

HALEY & ALDRICH

TEST BORING REPORT

Boring No. PDSB-116

Project BP Hastings Hastings on Hudson, NY
Client Atlantic Richfield Company
Contractor Warren George, Inc.

File No. 28612-
Sheet No. 1 of 1
Start March 24, 2006
Finish April 4, 2006
Driller
H&A Rep. DS/KDR (ENSR)
Elevation
Datum
Location See Plan

	Casing	Sampler	Barrel	Drilling Equipment and Procedures
Type		S	-	Rig Make & Model:
Inside Diameter (in.)		1 3/8	-	Bit Type:
Hammer Weight (lb.)		140	-	Drill Mud:
Hammer Fall (in.)		30	-	Casing:
				Hoist/Hammer:

Depth (ft.)	SPT[1]	Sample No. & Rec. (in.)	Sample Depth (ft.)	Well Diagram	Elev./Depth (ft.)	USCS Symbol	Visual-Manual Identification and Description (Density/consistency, color, GROUP NAME, max. particle size[2], structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines	Field Test Dilatancy	Field Test Toughness	Field Test Plasticity	Field Test Strength
0	NA	A	0.0 2.0	NO WELL INSTALLED			Hand augered to 2 feet. Medium to coarse angular GRAVEL, trace coarse sand, damp. PID = 7.5 ppm										
	3 7 27 6	B 5	2.0 4.0		2.0	SW	Well graded SAND with medium to coarse gravel, damp, no odor. PID = 1.6 ppm										
5	31 27 20 21	C 12	4.0 6.0		4.0		Fine to medium SAND and brick fragments, little medium to coarse gravel, wet at 6 feet. PID = 193 ppm PID = 39.4 ppm PID = 76.9 ppm										
	~~50/3~~	~~D~~	~~6.0~~ 6.3		6.0		Bottom of Exploration at 6 feet. Note: Concrete slab material at 6 feet.										

Water Level Data

Date	Time	Elapsed Time (hr.)	Depth (ft.) to: Bottom of Casing	Depth (ft.) to: Bottom of Hole	Water

Sample Identification

O Open End Rod
T Thin Wall Tube
U Undisturbed Sample
S Split Spoon
G Geoprobe

Well Diagram

Riser Pipe
Screen
Filter Sand
Cuttings
Grout
Concrete
Bentonite Seal

Summary

Overburden (lin. ft.) 6
Rock Cored (lin. ft.) NA
Samples

Boring No. PDSB-116

Field Tests: Dilatancy: R-Rapid, S-Slow, N-None
Toughness: L-Low, M-Medium, H-High
Plasticity: N-Nonplastic, L-Low, M-Medium, H-High
Dry Strength: N-None, L-Low, M-Medium, H-High, V-Very High

[1]SPT = Sampler blows per 6 in. [2]Maximum particle size (mm) is determined by direct observation within the limitations of sampler size (in millimeters).

Note: Soil identification based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

USCS_TB4 USCSLIB4.GLB USCSTB+CORE4.GDT G:\28612_-1\GINT\28612-118.GPJ Jul 19, 06

HALEY & ALDRICH

TEST BORING REPORT

Boring No. PDSB-117

Project BP Hastings Hastings on Hudson, NY
Client Atlantic Richfield Company
Contractor Warren George, Inc.

File No. 28612-
Sheet No. 1 of 1
Start March 24, 2006
Finish March 31, 2006
Driller
H&A Rep. KDR (ENSR)
Elevation
Datum
Location See Plan

	Casing	Sampler	Barrel	Drilling Equipment and Procedures
Type		S	-	Rig Make & Model: Track mounted DK50RA
Inside Diameter (in.)		1 3/8	-	Bit Type: Roller Bit
Hammer Weight (lb.)		140	-	Drill Mud: None
Hammer Fall (in.)		30	-	Casing:
				Hoist/Hammer: Cat-Head

Depth (ft.)	SPT[1]	Sample No. & Rec. (in.)	Sample Depth (ft.)	Well Diagram	Elev./Depth (ft.)	USCS Symbol	Visual-Manual Identification and Description (Density/consistency, color, GROUP NAME, max. particle size[2], structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines	Field Test Dilatancy	Field Test Toughness	Field Test Plasticity	Field Test Strength
0	NA	A	0.0 2.0	NO WELL INSTALLED			Hand augered to 4 feet. Black fill consisting of coarse SAND, some angular gravel, trace silt, dry. PID = 3.9 ppm -FILL-										
	NA	B	2.0 4.0		2.0		Same as above.										
	NA		4.0 6.0		4.0		Concrete encounterd at about 4 feet, attempt to drill thru. Still in concrete at 6 feet. Boring terminated.										
5					6.0		Bottom of Exploration at 6 feet.										

Water Level Data

Date	Time	Elapsed Time (hr.)	Depth (ft.) to: Bottom of Casing	Bottom of Hole	Water

Sample Identification

O Open End Rod
T Thin Wall Tube
U Undisturbed Sample
S Split Spoon
G Geoprobe

Well Diagram

Riser Pipe
Screen
Filter Sand
Cuttings
Grout
Concrete
Bentonite Seal

Summary

Overburden (lin. ft.) 6
Rock Cored (lin. ft.) NA
Samples

Boring No. PDSB-117

Field Tests: Dilatancy: R-Rapid, S-Slow, N-None Plasticity: N-Nonplastic, L-Low, M-Medium, H-High
Toughness: L-Low, M-Medium, H-High Dry Strength: N-None, L-Low, M-Medium, H-High, V-Very High

[1]SPT = Sampler blows per 6 in. [2]Maximum particle size (mm) is determined by direct observation within the limitations of sampler size (in millimeters).

Note: Soil identification based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

USCS_TB4 USCSLIB4.GLB USCSTB+CORE4.GDT G:\28612_-1\GINT\28612-118.GPJ Jul 19, 06

TEST BORING REPORT

Boring No. PDSB-118

Project BP Hastings Hastings on Hudson, NY
Client Atlantic Richfield Company
Contractor Warren George, Inc.

File No. 28612-
Sheet No. 1 of 1
Start March 29, 2006
Finish April 5, 2006
Driller
H&A Rep. DS/KDR (ENSR)
Elevation
Datum
Location See Plan

	Casing	Sampler	Barrel	Drilling Equipment and Procedures
Type		S	-	Rig Make & Model:
Inside Diameter (in.)		1 3/8	-	Bit Type:
Hammer Weight (lb.)		140	-	Drill Mud:
Hammer Fall (in.)		30	-	Casing:
				Hoist/Hammer:

Depth (ft.)	SPT[1]	Sample No. & Rec. (in.)	Sample Depth (ft.)	Well Diagram	Elev./Depth (ft.)	USCS Symbol	Visual-Manual Identification and Description (Density/consistency, color, GROUP NAME, max. particle size[2], structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines	Field Test Dilatancy	Field Test Toughness	Field Test Plasticity	Field Test Strength
0	NA	A	0.0 1.5	NO WELL INSTALLED			Hand augered to 1.5 feet. Black, medium to coarse SAND and medium to coarse GRAVEL, dump. PID = 600 ppm										
					1.5												
	50/5	B	2.0 4.0				Concrete powder and chunks. PID = 0.6 ppm										
	16 5 5 5	C 10	4.0 6.0		4.0		Concrete powder and chunks from 4-5 feet.										
5					5.0		Black, medium to coarse SAND, little fine gravel, no odor.										
	50/3	D 4	6.0 6.5		6.0		Black, coarse SAND, little fine sand, trace fine gravel, wet at bottom of spoon.										
					6.5		Bottom of Exploration at 6.5 feet. Note: Refusal at 6.5 feet.										

Water Level Data

Date	Time	Elapsed Time (hr.)	Depth (ft.) to: Bottom of Casing	Bottom of Hole	Water

Sample Identification

O Open End Rod
T Thin Wall Tube
U Undisturbed Sample
S Split Spoon
G Geoprobe

Well Diagram

Riser Pipe
Screen
Filter Sand
Cuttings
Grout
Concrete
Bentonite Seal

Summary

Overburden (lin. ft.) 6.5
Rock Cored (lin. ft.) NA
Samples

Boring No. PDSB-118

Field Tests: Dilatancy: R-Rapid, S-Slow, N-None
Toughness: L-Low, M-Medium, H-High
Plasticity: N-Nonplastic, L-Low, M-Medium, H-High
Dry Strength: N-None, L-Low, M-Medium, H-High, V-Very High

[1]SPT = Sampler blows per 6 in. [2]Maximum particle size (mm) is determined by direct observation within the limitations of sampler size (in millimeters).

Note: Soil identification based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

USCS_TB4 USCSLIB4.GLB USCSTB+CORE4.GDT G:\28612_-1\GINT\28612-118.GPJ Jul 19, 06

HALEY & ALDRICH

TEST BORING REPORT

Boring No. PDSB-119

Project BP Hastings Hastings on Hudson, NY
Client Atlantic Richfield Company
Contractor Warren George, Inc.

File No. 28612-
Sheet No. 1 of 1
Start April 3, 2006
Finish
Driller
H&A Rep. DS/KDR (ENSR)
Elevation
Datum
Location See Plan

	Casing	Sampler	Barrel	Drilling Equipment and Procedures
Type		S	-	Rig Make & Model:
Inside Diameter (in.)		1 3/8	-	Bit Type:
Hammer Weight (lb.)		140	-	Drill Mud:
Hammer Fall (in.)		30	-	Casing:
				Hoist/Hammer:

Depth (ft.)	SPT[1]	Sample No. & Rec. (in.)	Sample Depth (ft.)	Well Diagram	Elev./Depth (ft.)	USCS Symbol	Visual-Manual Identification and Description (Density/consistency, color, GROUP NAME, max. particle size[2], structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines	Field Test Dilatancy	Field Test Toughness	Field Test Plasticity	Field Test Strength
0	NA	A	0.0 2.0	NO WELL INSTALLED			Hand augered to 5.5 feet. Black, coarse SAND, some debris and gravel. PID = 1.2 ppm -FILL-										
	NA	B	2.0 4.0		2.0		Same as above. PID = 1.2 ppm										
	NA	C	4.0 5.5		4.0		Same as above. PID = 0.6 ppm										
5	50/3	D	5.5 6.3		6.0	SW	Black, well graded SAND, little medium to coarse gravel. PID = 0.4 ppm Bottom of Exploration at 6.25 feet.										
	4				6.3												

Water Level Data

Date	Time	Elapsed Time (hr.)	Depth (ft.) to: Bottom of Casing	Bottom of Hole	Water

Sample Identification

O Open End Rod
T Thin Wall Tube
U Undisturbed Sample
S Split Spoon
G Geoprobe

Well Diagram

Riser Pipe
Screen
Filter Sand
Cuttings
Grout
Concrete
Bentonite Seal

Summary

Overburden (lin. ft.) 6.25
Rock Cored (lin. ft.) NA
Samples

Boring No. PDSB-119

Field Tests: Dilatancy: R-Rapid, S-Slow, N-None Plasticity: N-Nonplastic, L-Low, M-Medium, H-High
Toughness: L-Low, M-Medium, H-High Dry Strength: N-None, L-Low, M-Medium, H-High, V-Very High

[1]SPT = Sampler blows per 6 in. [2]Maximum particle size (mm) is determined by direct observation within the limitations of sampler size (in millimeters).

Note: Soil identification based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

USCS_TB4 USCSLIB4.GLB USCSTB+CORE4.GDT G:\28612_~1\GINT\28612-118.GPJ Jul 19, 06

HALEY & ALDRICH

TEST BORING REPORT

Boring No. PDSB-120

Project BP Hastings Hastings on Hudson, NY
Client Atlantic Richfield Company
Contractor Warren George, Inc.

File No. 28612-
Sheet No. 1 of 1
Start April 11, 2006
Finish April 12, 2006
Driller
H&A Rep. DS/KDR (ENSR)
Elevation Datum
Location See Plan

	Casing	Sampler	Barrel	Drilling Equipment and Procedures
Type		S	-	Rig Make & Model:
Inside Diameter (in.)		1 3/8	-	Bit Type:
Hammer Weight (lb.)		140	-	Drill Mud:
Hammer Fall (in.)		30	-	Casing:
				Hoist/Hammer:

Depth (ft.)	SPT[1]	Sample No. & Rec. (in.)	Sample Depth (ft.)	Well Diagram	Elev./Depth (ft.)	USCS Symbol	Visual-Manual Identification and Description (Density/consistency, color, GROUP NAME, max. particle size[2], structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines	Field Test Dilatancy	Field Test Toughness	Field Test Plasticity	Field Test Strength
0	NA	A	0.0 2.0	NO WELL INSTALLED			Hand augered to 4 feet. Fine to medium SAND, trace fine to coarse gravel, brick fragments, no odor. PID = 0.2 ppm -FILL-										
	NA	B	2.0 4.0		2.0		Same as above. PID = 0.1 ppm										
5	7 7 7 7	C 16	4.0 6.0		4.0		Silty coarse SAND, fine gravel, some debris, dry. PID = 2.1 ppm -FILL-										
	10 10 25 25	D 6	6.0 8.0		6.0		Same as above, dry. PID = 1.4 ppm										
	16 22 15 40	E 0	8.0 10.0		8.0		No recovery.										
10	10 8 6 7	F 4	10.0 12.0		10.0		Gray, fine to medium SAND with trace silt, wet. PID = 1.2 ppm										
	9 5 5 6	G 24	12.0 14.0		12.0		Brown, fine to medium SAND, some to little clay, trace fine gravel. PID = 1.6 ppm										
					14.0		Bottom of Exploration at 14 feet.										

Water Level Data					
Date	Time	Elapsed Time (hr.)	Depth (ft.) to: Bottom of Casing	Bottom of Hole	Water

Sample Identification	
O	Open End Rod
T	Thin Wall Tube
U	Undisturbed Sample
S	Split Spoon
G	Geoprobe

Well Diagram: Riser Pipe; Screen; Filter Sand; Cuttings; Grout; Concrete; Bentonite Seal

Summary	
Overburden (lin. ft.)	14
Rock Cored (lin. ft.)	NA
Samples	
Boring No.	**PDSB-120**

Field Tests: Dilatancy: R-Rapid, S-Slow, N-None
Toughness: L-Low, M-Medium, H-High
Plasticity: N-Nonplastic, L-Low, M-Medium, H-High
Dry Strength: N-None, L-Low, M-Medium, H-High, V-Very High

[1]SPT = Sampler blows per 6 in. [2]Maximum particle size (mm) is determined by direct observation within the limitations of sampler size (in millimeters).

Note: Soil identification based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

USCS_TB4 USCSLIB4.GLB USCSTB+CORE4.GDT G:\28612_-1\GINT\28612-118.GPJ Jul 19, 06

TEST BORING REPORT

Boring No. PDSB-121

Project BP Hastings Hastings on Hudson, NY
Client Atlantic Richfield Company
Contractor Warren George, Inc.

File No. 28612-
Sheet No. 1 of 1
Start April 11, 2006
Finish April 12, 2006
Driller
H&A Rep. DS/KDR (ENSR)
Elevation
Datum
Location See Plan

	Casing	Sampler	Barrel	Drilling Equipment and Procedures
Type		S	-	Rig Make & Model:
Inside Diameter (in.)		1 3/8	-	Bit Type:
Hammer Weight (lb.)		140	-	Drill Mud:
Hammer Fall (in.)		30	-	Casing:
				Hoist/Hammer:

Depth (ft.)	SPT[1]	Sample No. & Rec. (in.)	Sample Depth (ft.)	Well Diagram	Elev./Depth (ft.)	USCS Symbol	Visual-Manual Identification and Description (Density/consistency, color, GROUP NAME, max. particle size[2], structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines	Field Test Dilatancy	Field Test Toughness	Field Test Plasticity	Field Test Strength
0	NA	A	0.0 2.0				Hand augered to 4 feet. Fine SAND, trace coarse gravel, trace fine gravel, trace wood fragments. -FILL- PID = 0.9 ppm PID = 1.1 ppm PID = 1.3 ppm										
	NA	B	2.0 4.0		2.0		Same as above.										
	4 2 2 2	C 8	4.0 6.0		4.0		Black, coarse SAND, little fine to medium gravel, trace silt, dry. -FILL- PID = 1.0 ppm										
5	6 6 7 11	D 14	6.0 8.0	NO WELL INSTALLED	6.0		Gray, medium to coarse SAND, trace medium to coarse gravel, trace silt, wet. PID = 1.0 ppm										
	10 12 14 12	E 0	8.0 10.0		8.0		No recovery.										
10	12 13 15 15	F 12	10.0 12.0		10.0		Coarse SAND to fine GRAVEL, wet. PID = 1.2 ppm										
	12 12 14 16	G 16	12.0 14.0		12.0		Same as above. PID = 0.7 ppm										
					14.0		Bottom of Exploration at 14 feet.										

Water Level Data

Date	Time	Elapsed Time (hr.)	Depth (ft.) to: Bottom of Casing	Bottom of Hole	Water

Sample Identification

O Open End Rod
T Thin Wall Tube
U Undisturbed Sample
S Split Spoon
G Geoprobe

Well Diagram

Riser Pipe
Screen
Filter Sand
Cuttings
Grout
Concrete
Bentonite Seal

Summary

Overburden (lin. ft.) 14
Rock Cored (lin. ft.) NA
Samples

Boring No. PDSB-121

Field Tests: Dilatancy: R-Rapid, S-Slow, N-None Plasticity: N-Nonplastic, L-Low, M-Medium, H-High
Toughness: L-Low, M-Medium, H-High Dry Strength: N-None, L-Low, M-Medium, H-High, V-Very High

[1]SPT = Sampler blows per 6 in. [2]Maximum particle size (mm) is determined by direct observation within the limitations of sampler size (in millimeters).

Note: Soil identification based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

USCS_TB4 USCSLIB4.GLB USCSTB+CORE4.GDT G:\28612_~1\GINT\28612-118.GPJ Jul 19, 06

HALEY & ALDRICH

TEST BORING REPORT

Boring No. PDSB-122

Project BP Hastings Hastings on Hudson, NY
Client Atlantic Richfield Company
Contractor Warren George, Inc.

File No. 28612-
Sheet No. 1 of 1
Start April 12, 2006
Finish April 12, 2006
Driller
H&A Rep. DS/KDR (ENSR)
Elevation Datum
Location See Plan

	Casing	Sampler	Barrel	Drilling Equipment and Procedures
Type		S	-	Rig Make & Model:
Inside Diameter (in.)		1 3/8	-	Bit Type:
Hammer Weight (lb.)		140	-	Drill Mud:
Hammer Fall (in.)		30	-	Casing:
				Hoist/Hammer:

Depth (ft.)	SPT[1]	Sample No. & Rec. (in.)	Sample Depth (ft.)	Well Diagram	Elev./Depth (ft.)	USCS Symbol	Visual-Manual Identification and Description (Density/consistency, color, GROUP NAME, max. particle size[2], structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines	Field Test Dilatancy	Field Test Toughness	Field Test Plasticity	Field Test Strength
0	NA	A	0.0 2.0	NO WELL INSTALLED			Hand augered to 2 feet. Black, fine SAND, little coarse sand, trace coarse gravel and brick fragments, no odor. PID = 37 ppm -FILL-										
	12 13 10 5	B 8	2.0 4.0		2.0		Same as above. PID = 680 ppm										
5	3 3 10 6	C 8	4.0 6.0		4.0		Same as above, wood fragment in spoon tip. PID = 75.6 ppm										
	9 9 6 5	D 23	6.0 8.0		6.0		Large wood fragment, hydrocarbon odor, wet. PID = 208 ppm PID = 148 ppm PID = 201 ppm										
	18 15 16 16	E 6	8.0 10.0		8.0		Gray to black, well graded SAND, little medium gravel, strong hydrocarbon odor, wood fragments present. PID = 324 ppm										
10	10 10 9 12	F 12	10.0 12.0		10.0		Well graded SAND and GRAVEL fill, trace wood fragments, saturated, hydrocarbon impacts. PID = 200 ppm										
	12 10 10 8	G 24	12.0 14.0		12.0		Same as above, glass fragments present. PID = 200 ppm										
					14.0		Bottom of Exploration at 14 feet.										

Water Level Data					
Date	Time	Elapsed Time (hr.)	Depth (ft.) to: Bottom of Casing	Bottom of Hole	Water

Sample Identification	
O	Open End Rod
T	Thin Wall Tube
U	Undisturbed Sample
S	Split Spoon
G	Geoprobe

Well Diagram: Riser Pipe, Screen, Filter Sand, Cuttings, Grout, Concrete, Bentonite Seal

Summary
Overburden (lin. ft.) 14
Rock Cored (lin. ft.) NA
Samples

Boring No. PDSB-122

Field Tests: Dilatancy: R-Rapid, S-Slow, N-None
Toughness: L-Low, M-Medium, H-High
Plasticity: N-Nonplastic, L-Low, M-Medium, H-High
Dry Strength: N-None, L-Low, M-Medium, H-High, V-Very High

[1]SPT = Sampler blows per 6 in. [2]Maximum particle size (mm) is determined by direct observation within the limitations of sampler size (in millimeters).

Note: Soil identification based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

USCS_TB4 USCSLIB4.GLB USCSTB+CORE4.GDT G:\28612_~1\GINT\28612-118.GPJ Jul 19, 06

HALEY & ALDRICH

TEST BORING REPORT

Boring No. PDSB-123

Project BP Hastings Hastings on Hudson, NY
Client Atlantic Richfield Company
Contractor Warren George, Inc.

File No. 28612-
Sheet No. 1 of 1
Start April 3, 2006
Finish April 6, 2006
Driller
H&A Rep. DS/KDR (ENSR)
Elevation
Datum
Location See Plan

	Casing	Sampler	Barrel	Drilling Equipment and Procedures
Type		S	-	Rig Make & Model:
Inside Diameter (in.)		1 3/8	-	Bit Type:
Hammer Weight (lb.)		140	-	Drill Mud:
Hammer Fall (in.)		30	-	Casing:
				Hoist/Hammer:

Depth (ft.)	SPT[1]	Sample No. & Rec. (in.)	Sample Depth (ft.)	Well Diagram	Elev./Depth (ft.)	USCS Symbol	Visual-Manual Identification and Description (Density/consistency, color, GROUP NAME, max. particle size[2], structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines	Field Test Dilatancy	Field Test Toughness	Field Test Plasticity	Field Test Strength
0	NA	A	0.0 2.0	NO WELL INSTALLED			Hand augered to 2 feet. FILL consisting of coarse SAND and debris. PID = 1.2 ppm -FILL-										
	34 33 18 3	B 7	2.0 4.0		2.0		Gray, well graded SAND, little coarse gravel, damp, no odor. PID = 0.2 ppm										
5	6 3 2 1	C 5	4.0 6.0		4.0		Brown to black, fine SAND, trace silt, no odor. PID = 3.8 ppm										
	1 2 5 7	D 24	6.0 8.0		6.0		Brown, fine SAND, trace silt, saturated, no odor. PID = 9.5 ppm										
	5 5 4 4	E 24	8.0 10.0		8.0		Same as above. PID = 3.8 ppm PID = 1.2 ppm PID = 1.5 ppm PID = 2.1 ppm										
10	3 6 6 6	F 24	10.0 12.0		10.0		Same as above. PID = 2.4 ppm PID = 5.1 ppm PID = 4.3 ppm										
	5 2 10 10	G 24	12.0 14.0		12.0		Same as above.										
					13.0		Medium SAND, saturated, no odor. PID = 5.6 ppm PID = 1.6 ppm										
					14.0		Bottom of Exploration at 14 feet.										

Water Level Data

Date	Time	Elapsed Time (hr.)	Depth (ft.) to: Bottom of Casing	Bottom of Hole	Water

Sample Identification

O Open End Rod
T Thin Wall Tube
U Undisturbed Sample
S Split Spoon
G Geoprobe

Well Diagram

Riser Pipe
Screen
Filter Sand
Cuttings
Grout
Concrete
Bentonite Seal

Summary

Overburden (lin. ft.) 14
Rock Cored (lin. ft.) NA
Samples

Boring No. PDSB-123

Field Tests: Dilatancy: R-Rapid, S-Slow, N-None Plasticity: N-Nonplastic, L-Low, M-Medium, H-High
Toughness: L-Low, M-Medium, H-High Dry Strength: N-None, L-Low, M-Medium, H-High, V-Very High

[1]SPT = Sampler blows per 6 in. [2]Maximum particle size (mm) is determined by direct observation within the limitations of sampler size (in millimeters).

Note: Soil identification based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

USCS_TB4 USCSLIB4.GLB USCSTB+CORE4.GDT G:\28612_~1\GINT\28612-118.GPJ Jul 19, 06

HALEY & ALDRICH

TEST BORING REPORT

Boring No. PDSB-124

Project BP Hastings Hastings on Hudson, NY
Client Atlantic Richfield Company
Contractor Warren George, Inc.

File No. 28612-
Sheet No. 1 of 1
Start April 10, 2006
Finish April 13, 2006
Driller
H&A Rep. DS/KDR (ENSR)
Elevation
Datum
Location See Plan

	Casing	Sampler	Barrel	Drilling Equipment and Procedures
Type		S	-	Rig Make & Model:
Inside Diameter (in.)		1 3/8	-	Bit Type:
Hammer Weight (lb.)		140	-	Drill Mud:
Hammer Fall (in.)		30	-	Casing:
				Hoist/Hammer:

Depth (ft.)	SPT[1]	Sample No. & Rec. (in.)	Sample Depth (ft.)	Well Diagram	Elev./Depth (ft.)	USCS Symbol	Visual-Manual Identification and Description (Density/consistency, color, GROUP NAME, max. particle size[2], structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines	Field Test Dilatancy	Field Test Toughness	Field Test Plasticity	Field Test Strength
0	NA	A	0.0 2.0	NO WELL INSTALLED			Hand augered to 3 feet. Black, coarse SAND, some to little medium to coarse gravel and debris, trace silt, dry.										
	NA	B	2.0 4.0		2.0		Same as above. PID = 1.0 ppm										
	12 6 5 3	C 14	4.0 6.0		4.0		Fine grained/powdery SAND and SILT.										
5					5.0		Coarse SAND, trace clay and silt, hydrocarbon odor. PID = 22 ppm										
	4 5 14 8	D 14	6.0 8.0		6.0		Black, coarse SAND and fine to medium GRAVEL, saturated, hydrocarbon odor, oily sheen. PID = 25 ppm -FILL-										
	7 5 4 5	E 6	8.0 10.0		8.0		Same as above.										
					9.0		Sandy CLAY, saturated, strong odor. PID = 30.4 ppm										
10	4 3 6 8	F 8	10.0 12.0		10.0		Coarse SAND, trace medium gravel, saturated. PID = 28.3 ppm										
	10 6 6 7	G 14	12.0 14.0		12.0		Same as above. PID = 22.8 ppm										
					14.0		Bottom of Exploration at 14 feet.										

Water Level Data

Date	Time	Elapsed Time (hr.)	Depth (ft.) to: Bottom of Casing	Bottom of Hole	Water

Sample Identification

O Open End Rod
T Thin Wall Tube
U Undisturbed Sample
S Split Spoon
G Geoprobe

Well Diagram

Riser Pipe
Screen
Filter Sand
Cuttings
Grout
Concrete
Bentonite Seal

Summary

Overburden (lin. ft.) 14
Rock Cored (lin. ft.) NA
Samples

Boring No. PDSB-124

Field Tests: Dilatancy: R-Rapid, S-Slow, N-None
Toughness: L-Low, M-Medium, H-High
Plasticity: N-Nonplastic, L-Low, M-Medium, H-High
Dry Strength: N-None, L-Low, M-Medium, H-High, V-Very High

[1]SPT = Sampler blows per 6 in. [2]Maximum particle size (mm) is determined by direct observation within the limitations of sampler size (in millimeters).

Note: Soil identification based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

USCS_TB4 USCSLIB4.GLB USCSTB+CORE4.GDT G:\28612_-1\GINT\28612-118.GPJ Jul 19, 06

HALEY & ALDRICH

TEST BORING REPORT

Boring No. PDSB-125

Project BP Hastings Hastings on Hudson, NY
Client Atlantic Richfield Company
Contractor Warren George, Inc.

File No. 28612-
Sheet No. 1 of 1
Start April 3, 2006
Finish April 5, 2006
Driller
H&A Rep. DS/KDR (ENSR)
Elevation
Datum
Location See Plan

	Casing	Sampler	Barrel	Drilling Equipment and Procedures
Type		S	-	Rig Make & Model:
Inside Diameter (in.)		1 3/8	-	Bit Type:
Hammer Weight (lb.)		140	-	Drill Mud:
Hammer Fall (in.)		30	-	Casing:
				Hoist/Hammer:

Depth (ft.)	SPT[1]	Sample No. & Rec. (in.)	Sample Depth (ft.)	Well Diagram	Elev./Depth (ft.)	USCS Symbol	Visual-Manual Identification and Description (Density/consistency, color, GROUP NAME, max. particle size[2], structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines	Field Test Dilatancy	Field Test Toughness	Field Test Plasticity	Field Test Strength
0	NA	A	0.0 2.0	NO WELL INSTALLED			Hand augered up to 2 feet. Black, coarse SAND. PID = 2.5 ppm -FILL-										
	26 27 17 20	B 4	2.0 4.0		2.0		Gray, fine SAND, trace gravel, trace silt, dump, no odor. PID = 33 ppm										
5	20 23 27 18	C 18	4.0 6.0		4.0		Black, medium to coarse SAND, fine to medium gravel, trace coarse gravel, dry. PID = 4.8 ppm PID = 3.2 ppm										
	8 9 6 5	D 5	6.0 8.0		6.0		Gray to black, silty fine SAND, little coarse sand, trace fine to medium gravel, brick fragments, piece of foam, saturated, hydrocarbon odor. PID = 41 ppm										
	4 3 2 4	E 6	8.0 10.0		8.0		Well graded SAND and GRAVEL, saturated, hydrocarbon odor. -FILL- PID = 50.2 ppm										
10	10 9 10 13	F 9	10.0 12.0		10.0		Well graded SAND and GRAVEL, trace coarse gravel, saturated, hydrocarbon odor and sheen. PID = 93.5 ppm -FILL-										
	10 7 8 12	G 22	12.0 14.0		12.0		Same as above PID = 62.5 ppm										
					13.0		Native soil, soft, organic SILT, saturated.										
					14.0		Bottom of Exploration at 14 feet.										

Water Level Data

Date	Time	Elapsed Time (hr.)	Depth (ft.) to: Bottom of Casing	Bottom of Hole	Water

Sample Identification

O Open End Rod
T Thin Wall Tube
U Undisturbed Sample
S Split Spoon
G Geoprobe

Well Diagram

Riser Pipe
Screen
Filter Sand
Cuttings
Grout
Concrete
Bentonite Seal

Summary

Overburden (lin. ft.) 14
Rock Cored (lin. ft.) NA
Samples

Boring No. PDSB-125

Field Tests: Dilatancy: R-Rapid, S-Slow, N-None
Toughness: L-Low, M-Medium, H-High
Plasticity: N-Nonplastic, L-Low, M-Medium, H-High
Dry Strength: N-None, L-Low, M-Medium, H-High, V-Very High

[1]SPT = Sampler blows per 6 in. [2]Maximum particle size (mm) is determined by direct observation within the limitations of sampler size (in millimeters).

Note: Soil identification based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

USCS_TB4 USCSLIB4.GLB USCSTB+CORE4.GDT G:\28612_-1\GINT\28612-118.GPJ Jul 19, 06

HALEY & ALDRICH

TEST BORING REPORT

Boring No. PDSB-126

Project BP Hastings Hastings on Hudson, NY
Client Atlantic Richfield Company
Contractor Warren George, Inc.

File No. 28612-
Sheet No. 1 of 1
Start April 5, 2006
Finish April 5, 2006
Driller
H&A Rep. DS/KDR (ENSR)
Elevation Datum
Location See Plan

	Casing	Sampler	Barrel	Drilling Equipment and Procedures
Type		S	-	Rig Make & Model:
Inside Diameter (in.)		1 3/8	-	Bit Type:
Hammer Weight (lb.)		140	-	Drill Mud:
Hammer Fall (in.)		30	-	Casing:
				Hoist/Hammer:

Depth (ft.)	SPT[1]	Sample No. & Rec. (in.)	Sample Depth (ft.)	Well Diagram	Elev./Depth (ft.)	USCS Symbol	Visual-Manual Identification and Description (Density/consistency, color, GROUP NAME, max. particle size[2], structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines	Field Test Dilatancy	Field Test Toughness	Field Test Plasticity	Field Test Strength
0				NO WELL INSTALLED			No split spoons collected up to 2 feet.										
	10 5 4 6	B 12	2.0 4.0		2.0		Black, fine SAND, trace coarse gravel, no odor. PID = 4.1 ppm										
					3.0		Yellow, fine to medium SAND, damp. PID = 2.1 ppm										
	5 2 2 1	C 8	4.0 6.0		4.0		Gray brown, fine to medium SAND, trace brick and glass fragments, no odor. PID = 2.1 ppm -FILL- PID = 5.2 ppm										
5	2 1 1 1	D 9	6.0 8.0		6.0		Gray to brown, fine to medium SAND, trace brick fragments, saturated. PID = 3.2 ppm PID = 1.5 ppm										
	2 3 4 4	E 8	8.0 10.0		8.0		Fine to medium SAND, some fine gravel, saturated, hydrocarbon odor, sheen. PID = 30.5 ppm PID = 134 ppm										
10	4 2 2 2	F 4	10.0 12.0		10.0		Well graded SAND and GRAVEL, saturated, hydrocarbon odor, sheen. PID = 143 ppm										
	2 1 2 2	G 8	12.0 14.0		12.0		Same as above.										
					14.0		Bottom of Exploration at 14 feet.										

Water Level Data

Date	Time	Elapsed Time (hr.)	Depth (ft.) to: Bottom of Casing	Bottom of Hole	Water

Sample Identification

O Open End Rod
T Thin Wall Tube
U Undisturbed Sample
S Split Spoon
G Geoprobe

Well Diagram

Riser Pipe
Screen
Filter Sand
Cuttings
Grout
Concrete
Bentonite Seal

Summary

Overburden (lin. ft.) 14
Rock Cored (lin. ft.) NA
Samples
Boring No. PDSB-126

Field Tests: Dilatancy: R-Rapid, S-Slow, N-None Plasticity: N-Nonplastic, L-Low, M-Medium, H-High
Toughness: L-Low, M-Medium, H-High Dry Strength: N-None, L-Low, M-Medium, H-High, V-Very High

[1]SPT = Sampler blows per 6 in. [2]Maximum particle size (mm) is determined by direct observation within the limitations of sampler size (in millimeters).

Note: Soil identification based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

USCS_TB4 USCSLIB4.GLB USCSTB+CORE4.GDT G:\28612_-1\GINT\28612-118.GPJ Jul 19, 06

HALEY & ALDRICH

TEST BORING REPORT

Boring No. PDSB-127

Project BP Hastings Hastings on Hudson, NY
Client Atlantic Richfield Company
Contractor Warren George, Inc.

File No. 28612-
Sheet No. 1 of 1
Start April 6, 2006
Finish April 6, 2006
Driller
H&A Rep. DS/KDR (ENSR)
Elevation Datum
Location See Plan

	Casing	Sampler	Barrel	Drilling Equipment and Procedures
Type		S	-	Rig Make & Model:
Inside Diameter (in.)		1 3/8	-	Bit Type:
Hammer Weight (lb.)		140	-	Drill Mud:
Hammer Fall (in.)		30	-	Casing:
				Hoist/Hammer:

Depth (ft.)	SPT[1]	Sample No. & Rec. (in.)	Sample Depth (ft.)	Well Diagram	Elev./Depth (ft.)	USCS Symbol	Visual-Manual Identification and Description (Density/consistency, color, GROUP NAME, max. particle size[2], structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines	Field Test Dilatancy	Field Test Toughness	Field Test Plasticity	Field Test Strength
0	0 14 50 50/1	A 12	0.0 2.0				Brown, fine SAND, little medium sand, trace coarse sand, trace fine gravel, damp, no odor. PID = 82.3 ppm										
	26 20 10 5	B 16	2.0 4.0		2.0		Black, medium to coarse SAND, trace fine brick fragments, trace medium gravel. PID = 79.3 ppm										
	6 4 5 3	C 13	4.0 6.0		4.0		Black, cinder block fill, no odor - same as above. PID = 80.3 ppm										
5	30 34 19 13	D 12	6.0 8.0		6.0		Gray black, well graded SAND, little gravel, trace brick fragments, hydrocarbon impacts. PID = 104 ppm										
	7 5 7 6	E 12	8.0 10.0	NO WELL INSTALLED	8.0		Same as above, hydrocarbon odor. PID = 102.3 ppm										
10	6 4 6 6	F 12	10.0 12.0		10.0		Same as above, except visible black oil. PID = 86.3 ppm										
	5 2 3 3	G 20	12.0 14.0		12.0		Same as above to 13 feet.										
					13.0		Gray to black, organic SILT, hydrocarbon odor. PID = 104 ppm										
					14.0		Bottom of Exploration at 14 feet.										

Water Level Data

Date	Time	Elapsed Time (hr.)	Depth (ft.) to: Bottom of Casing	Bottom of Hole	Water

Sample Identification

O Open End Rod
T Thin Wall Tube
U Undisturbed Sample
S Split Spoon
G Geoprobe

Well Diagram

Riser Pipe
Screen
Filter Sand
Cuttings
Grout
Concrete
Bentonite Seal

Summary

Overburden (lin. ft.) 14
Rock Cored (lin. ft.) NA
Samples

Boring No. PDSB-127

Field Tests: Dilatancy: R-Rapid, S-Slow, N-None Plasticity: N-Nonplastic, L-Low, M-Medium, H-High
Toughness: L-Low, M-Medium, H-High Dry Strength: N-None, L-Low, M-Medium, H-High, V-Very High

[1]SPT = Sampler blows per 6 in. [2]Maximum particle size (mm) is determined by direct observation within the limitations of sampler size (in millimeters).

Note: Soil identification based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

USCS_TB4 USCSLIB4.GLB USCSTB+CORE4.GDT G:\28612_-1\GINT\28612-118.GPJ Jul 19, 06

TEST BORING REPORT

Boring No. PDSB-128

Project BP Hastings Hastings on Hudson, NY
Client Atlantic Richfield Company
Contractor Warren George, Inc.

File No. 28612-
Sheet No. 1 of 1
Start April 11, 2006
Finish April 12, 2006
Driller
H&A Rep. DS/KDR (ENSR)
Elevation
Datum
Location See Plan

	Casing	Sampler	Barrel	Drilling Equipment and Procedures
Type		S	-	Rig Make & Model:
Inside Diameter (in.)		1 3/8	-	Bit Type:
Hammer Weight (lb.)		140	-	Drill Mud:
Hammer Fall (in.)		30	-	Casing:
				Hoist/Hammer:

Depth (ft.)	SPT[1]	Sample No. & Rec. (in.)	Sample Depth (ft.)	Well Diagram	Elev./Depth (ft.)	USCS Symbol	Visual-Manual Identification and Description (Density/consistency, color, GROUP NAME, max. particle size[2], structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines	Field Test Dilatancy	Field Test Toughness	Field Test Plasticity	Field Test Strength
0	NA	A	0.0 2.0	NO WELL INSTALLED			Hand augered to 2 feet. Black, fine to medium SAND, little medium to coarse sand, trace coarse gravel, trace brick fragments, damp. PID = 125 ppm -FILL- PID = 127 ppm PID = 126 ppm										
	12 27 13 10	B 14	2.0 4.0		2.0		Black, coarse SAND, brick dust, some medium gravel, dry, odor present. PID = 73 ppm										
5	12 12 30 50	C 14	4.0 6.0		4.0		Black, coarse SAND with some fine to medium gravel, trace silt, odor present. PID = 57 ppm -FILL-										
	23 10 7 5	D 12	6.0 8.0		6.0		Yellow brown, sandy FILL, debris (brick fragments, glass, fiberglass), damp. PID = 14 ppm -FILL-										
	3 5 3 4	E 12	8.0 10.0		8.0		Same as above, except saturated, hydrocarbon odor, oily appearance. PID = 175 ppm										
10	3 3 2 2	F 0	10.0 12.0		10.0		No recovery.										
	7 7 6 4	G 24	12.0 14.0		12.0		Black, coarse SAND, some fine to medium gravel, damp, odor present. PID = 275 ppm Clayey SAND interval 1-2 inches thick at 13 feet.										
					14.0		Bottom of Exploration at 14 feet.										

Water Level Data

Date	Time	Elapsed Time (hr.)	Depth (ft.) to: Bottom of Casing	Bottom of Hole	Water

Sample Identification

O Open End Rod
T Thin Wall Tube
U Undisturbed Sample
S Split Spoon
G Geoprobe

Well Diagram

Riser Pipe
Screen
Filter Sand
Cuttings
Grout
Concrete
Bentonite Seal

Summary

Overburden (lin. ft.) 14
Rock Cored (lin. ft.) NA
Samples

Boring No. PDSB-128

Field Tests: Dilatancy: R-Rapid, S-Slow, N-None Plasticity: N-Nonplastic, L-Low, M-Medium, H-High
Toughness: L-Low, M-Medium, H-High Dry Strength: N-None, L-Low, M-Medium, H-High, V-Very High

[1]SPT = Sampler blows per 6 in. [2]Maximum particle size (mm) is determined by direct observation within the limitations of sampler size (in millimeters).

Note: Soil identification based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

USCS_TB4 USCSLIB4.GLB USCSTB+CORE4.GDT G:\28612_-1\GINT\28612-118.GPJ Jul 19, 06

HALEY & ALDRICH

TEST BORING REPORT

Boring No. PDSB-129

Project BP Hastings Hastings on Hudson, NY
Client Atlantic Richfield Company
Contractor Warren George, Inc.

File No. 28612-
Sheet No. 1 of 1
Start April 13, 2006
Finish April 13, 2006
Driller
H&A Rep. DS (ENSR)
Elevation
Datum
Location See Plan

	Casing	Sampler	Barrel	Drilling Equipment and Procedures
Type		S	-	Rig Make & Model:
Inside Diameter (in.)		1 3/8	-	Bit Type:
Hammer Weight (lb.)		140	-	Drill Mud:
Hammer Fall (in.)		30	-	Casing:
				Hoist/Hammer:

Depth (ft.)	SPT[1]	Sample No. & Rec. (in.)	Sample Depth (ft.)	Well Diagram	Elev./Depth (ft.)	USCS Symbol	Visual-Manual Identification and Description (Density/consistency, color, GROUP NAME, max. particle size[2], structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines	Field Test Dilatancy	Field Test Toughness	Field Test Plasticity	Field Test Strength
0	NA	A	0.0 2.0	NO WELL INSTALLED			Hand augered to 2 feet. Coarse SAND and medium GRAVEL with trace silt, trace debris. -FILL- PID = ND ppm										
	10 10 7 9	B 16	2.0 4.0		2.0		Same as above. PID = 28.1 ppm										
5	12 9 18 11	C 16	4.0 6.0		4.0		Brown black, coarse SAND, some fine gravel, trace silt, chemical odor. PID = 43.7 ppm										
	9 21 11 7	D 12	6.0 8.0		6.0		Same as above, saturated, hydrocarbon odor, oily sheen. PID = 43.7 ppm										
	6 4 3 3	E 8	8.0 10.0		8.0		Same as above. PID = 30.6 ppm										
10	4 3 3 2	F 8	10.0 12.0		10.0		Same as above.										
	2 3 2 3	G 12	12.0 14.0		12.0		Coarse SAND, some fine gravel, saturated, hydrocarbon odor, oily sheen. PID = 40.3 ppm										
					14.0		Bottom of Exploration at 14 feet.										

Water Level Data

Date	Time	Elapsed Time (hr.)	Depth (ft.) to: Bottom of Casing	Bottom of Hole	Water

Sample Identification

O Open End Rod
T Thin Wall Tube
U Undisturbed Sample
S Split Spoon
G Geoprobe

Well Diagram

Riser Pipe
Screen
Filter Sand
Cuttings
Grout
Concrete
Bentonite Seal

Summary

Overburden (lin. ft.) 14
Rock Cored (lin. ft.) NA
Samples

Boring No. PDSB-129

Field Tests: Dilatancy: R-Rapid, S-Slow, N-None Plasticity: N-Nonplastic, L-Low, M-Medium, H-High
Toughness: L-Low, M-Medium, H-High Dry Strength: N-None, L-Low, M-Medium, H-High, V-Very High

[1]SPT = Sampler blows per 6 in. [2]Maximum particle size (mm) is determined by direct observation within the limitations of sampler size (in millimeters).

Note: Soil identification based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

USCS_TB4 USCSLIB4.GLB USCSTB+CORE4.GDT G:\28612_-1\GINT\28612-118.GPJ Jul 19, 06

HALEY & ALDRICH

TEST BORING REPORT

Boring No. PDSB-130

Project BP Hastings Hastings on Hudson, NY
Client Atlantic Richfield Company
Contractor Warren George, Inc.

File No. 28612-
Sheet No. 1 of 1
Start April 13, 2006
Finish April 13, 2006
Driller
H&A Rep. DS (ENSR)
Elevation
Datum
Location See Plan

	Casing	Sampler	Barrel	Drilling Equipment and Procedures
Type		S	-	Rig Make & Model:
Inside Diameter (in.)		1 3/8	-	Bit Type:
Hammer Weight (lb.)		140	-	Drill Mud:
Hammer Fall (in.)		30	-	Casing:
				Hoist/Hammer:

Depth (ft.)	SPT[1]	Sample No. & Rec. (in.)	Sample Depth (ft.)	Well Diagram	Elev./Depth (ft.)	USCS Symbol	Visual-Manual Identification and Description (Density/consistency, color, GROUP NAME, max. particle size[2], structure, odor, moisture, optional descriptions, geologic interpretation)	Gravel % Coarse	Gravel % Fine	Sand % Coarse	Sand % Medium	Sand % Fine	% Fines	Field Test Dilatancy	Field Test Toughness	Field Test Plasticity	Field Test Strength
0	NA	A	0.0 2.0	NO WELL INSTALLED			Hand augered to 2 feet. Coarse SAND, some fine gravel, trace silt, dry. -FILL- PID = ND ppm										
	17 25 42 40	B	2.0 4.0		2.0		Brown to gray, coarse SAND, some medium to coarse gravel, trace silt, dry.										
	25	C	4.0		4.0		Concrete dust and crushed concrete.										
5	50/2		4.5		4.5		Bottom of Exploration at 4.5 feet. Note: Concrete pad encountered at 4.5-5 feet. Another attempt was made -- concrete encountered at 18 inches below ground surface.										

Water Level Data

Date	Time	Elapsed Time (hr.)	Depth (ft.) to: Bottom of Casing	Bottom of Hole	Water

Sample Identification

O Open End Rod
T Thin Wall Tube
U Undisturbed Sample
S Split Spoon
G Geoprobe

Well Diagram

Riser Pipe
Screen
Filter Sand
Cuttings
Grout
Concrete
Bentonite Seal

Summary

Overburden (lin. ft.) 6
Rock Cored (lin. ft.) NA
Samples
Boring No. PDSB-130

Field Tests: Dilatancy: R-Rapid, S-Slow, N-None Plasticity: N-Nonplastic, L-Low, M-Medium, H-High
Toughness: L-Low, M-Medium, H-High Dry Strength: N-None, L-Low, M-Medium, H-High, V-Very High

[1]SPT = Sampler blows per 6 in. [2]Maximum particle size (mm) is determined by direct observation within the limitations of sampler size (in millimeters).

Note: Soil identification based on visual-manual methods of the USCS as practiced by Haley & Aldrich, Inc.

USCS_TB4 USCSLIB4.GLB USCSTB+CORE4.GDT G:\28612_-1\GINT\28612-118.GPJ Jul 19, 06

ATTACHMENT E2

Environmental Laboratory Reports

(See enclosed CD)

ATTACHMENT E3

Exploration and Well Installation Logs, Well Development Logs

HALEY & ALDRICH

OBSERVATION WELL INSTALLATION REPORT

Well No. PDMW-16D
Boring No. PDMW-16

PROJECT	One River Street	**H&A FILE NO.**	28612-118
LOCATION	Hastings on Hudson, NY	**PROJECT MGR.**	Wayne Hardison
CLIENT	Atlantic Richfield	**FIELD REP.**	John Bode
CONTRACTOR	Warren George, Inc.	**DATE INSTALLED**	4/5/2006
DRILLER	Reynolds Bridgeport	**WATER LEVEL**	

Ground El. _____ ft
El. Datum _____
Location: see plan
☑ **Guard Pipe**
☐ **Roadway Box**

SOIL/ROCK CONDITIONS	BOREHOLE BACKFILL
	Cement 1.0'
Fill 18.5'	
	Cement Grout 21.0'
Marine Deposits	
	Bentonite Chips 25.0'
27.0'	
Marine Deposits (sandier unit) 29.8'	Filter Sand 31.0'
	Bentonite Chips 25.0'
Bedrock	
	Filter Sand
39.0	**39.0**

(Bottom of Exploration)
(Numbers refer to depth from ground surface in feet)

L1 = Riser Pay Length (L1) = 29.40 ft
L2 = Length of screen (L2) = 3.00 ft
L3 = Length of silt trap (L3) = 0 ft

(Not to Scale)

Type of protective cover/lock	Guard Pipe Cover
Height/Depth of top of guard pipe/roadway box above/below ground surface	2.7 ft
Height/Depth of top of riser pipe above/below ground surface	2.4 ft
Type of protective casing:	Guard Pipe
Length	1.1 ft
Inside Diameter	6.0 in
Depth of bottom of guard pipe/roadway box	2.3 ft

Type of Seals	Top of Seal (ft)	Thickness (ft)
Cement	0.0	21.00
Bentonite Chips	21.0	4.0

Type of riser pipe:	Schedule 40 PVC
Inside diameter of riser pipe	2.0 in
Type of backfill around riser	Bentonite chips/Cement grout
Diameter of borehole	5.0 in
Depth to top of well screen	27.0 ft
Type of screen	Schedule 40 PVC
Screen gauge or size of openings	0.010 in
Diameter of screen	2.0 in
Type of backfill around screen	Filter Sand
Depth of bottom of well screen	30.0 ft
Bottom of Silt trap	NA ft
Depth of bottom of borehole	39.0 ft

29.40 ft (Riser Pay Length (L1)) + 3.00 ft (Length of screen (L2)) + 0 ft (Length of silt trap (L3)) = 32.40 ft (Pay length)

COMMENTS: Permanent 5" steel casing installed from ground surface to 24.0'; weather: overcast in the 50s

Form # 3010

HALEY & ALDRICH

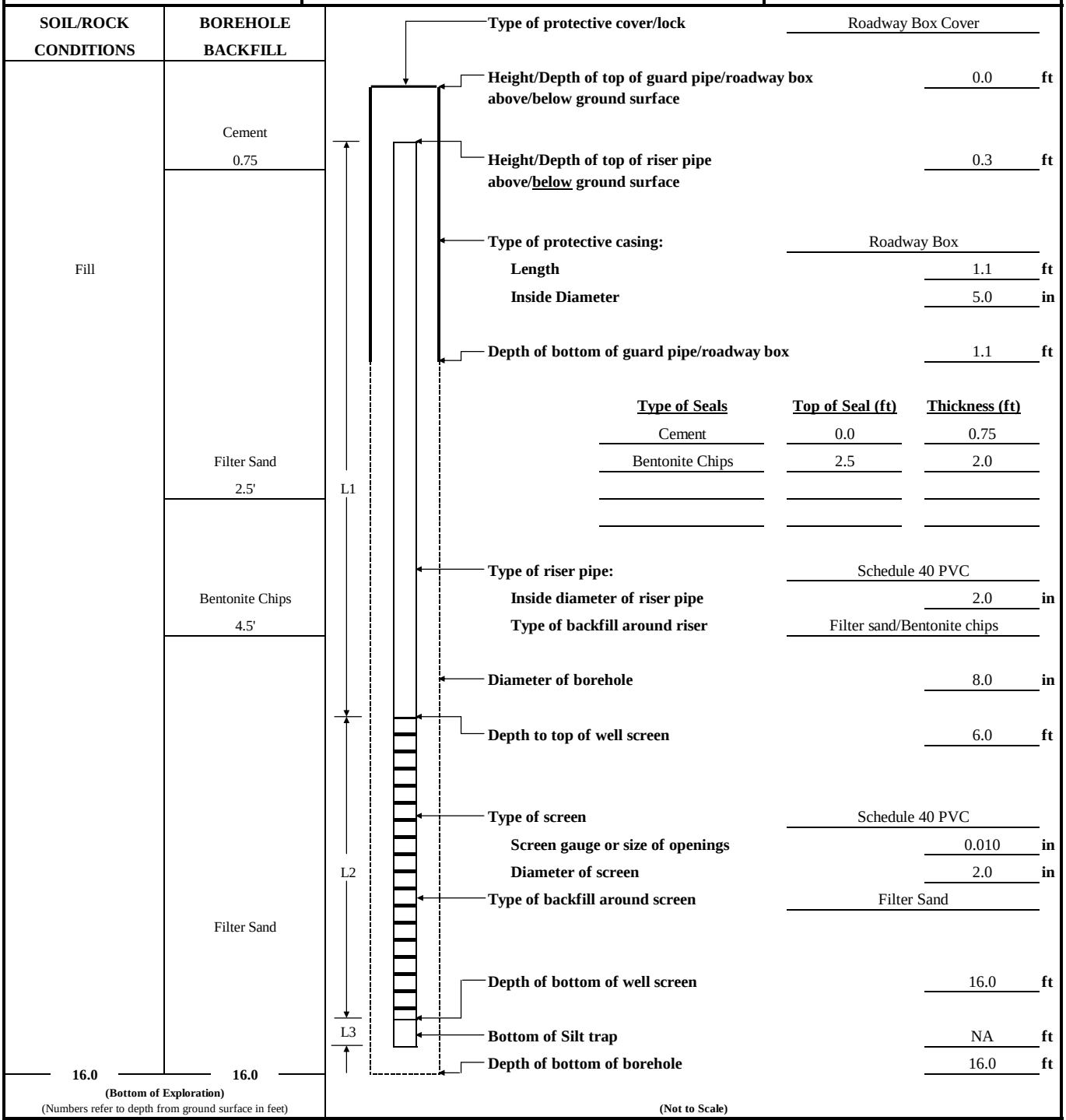
OBSERVATION WELL INSTALLATION REPORT

Well No. PDMW-16S
Boring No. PDMW-16

PROJECT	One River Street	**H&A FILE NO.**	28612-118
LOCATION	Hastings on Hudson, NY	**PROJECT MGR.**	Wayne Hardison
CLIENT	Atlantic Richfield	**FIELD REP.**	John Bode
CONTRACTOR	Warren George, Inc.	**DATE INSTALLED**	3/24/2006
DRILLER	Reynolds Bridgeport	**WATER LEVEL**	

Ground El. _____ ft
El. Datum _____
Location: see plan

☐ **Guard Pipe**
☑ **Roadway Box**



Type of protective cover/lock: Roadway Box Cover

Height/Depth of top of guard pipe/roadway box above/below ground surface: 0.0 ft

Height/Depth of top of riser pipe above/below ground surface: 0.3 ft

Type of protective casing: Roadway Box
- **Length:** 1.1 ft
- **Inside Diameter:** 5.0 in

Depth of bottom of guard pipe/roadway box: 1.1 ft

Type of Seals	Top of Seal (ft)	Thickness (ft)
Cement	0.0	0.75
Bentonite Chips	2.5	2.0

Type of riser pipe: Schedule 40 PVC
- **Inside diameter of riser pipe:** 2.0 in
- **Type of backfill around riser:** Filter sand/Bentonite chips

Diameter of borehole: 8.0 in

Depth to top of well screen: 6.0 ft

Type of screen: Schedule 40 PVC
- **Screen gauge or size of openings:** 0.010 in
- **Diameter of screen:** 2.0 in

Type of backfill around screen: Filter Sand

Depth of bottom of well screen: 16.0 ft

Bottom of Silt trap: NA ft

Depth of bottom of borehole: 16.0 ft

6.00 ft	+	10.00 ft	+	0 ft	=	16.00 ft
Riser Pay Length (L1)		Length of screen (L2)		Length of silt trap (L3)		Pay length

COMMENTS: weather: sunny in the 50s

Form # 3010

HALEY & ALDRICH

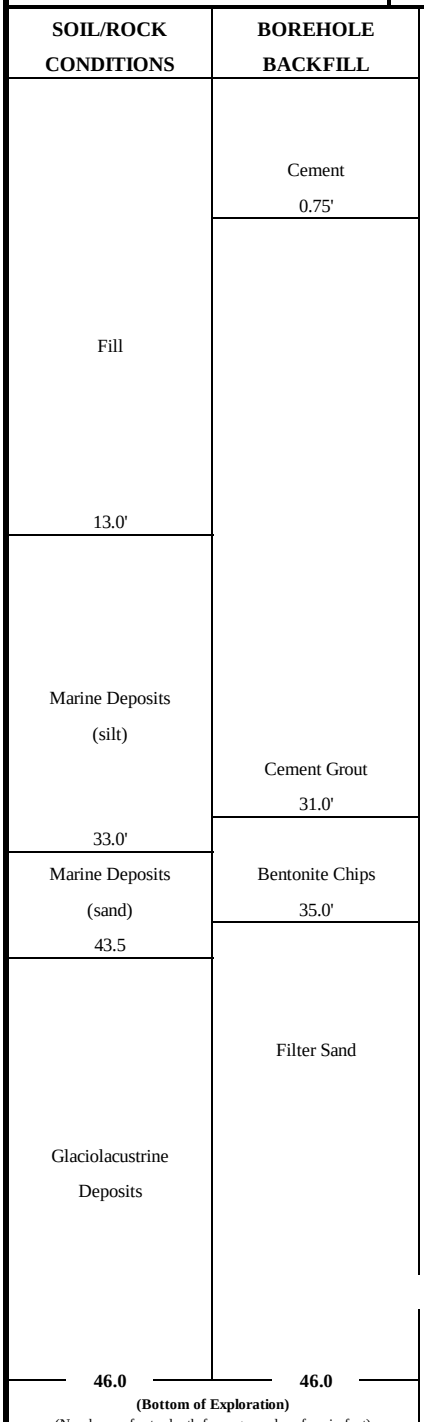
OBSERVATION WELL INSTALLATION REPORT

Well No. PDMW-17D
Boring No. PDMW-17

PROJECT	One River Street	**H&A FILE NO.**	28612-118
LOCATION	Hastings on Hudson, NY	**PROJECT MGR.**	Wayne Hardison
CLIENT	Atlantic Richfield	**FIELD REP.**	John Bode
CONTRACTOR	Warren George, Inc.	**DATE INSTALLED**	4/6/2006
DRILLER	Reynolds Bridgeport	**WATER LEVEL**	

Ground El. _____ ft
El. Datum _____
Location: see plan

☐ **Guard Pipe**
☑ **Roadway Box**



Type of protective cover/lock	Roadway Box
Height/Depth of top of guard pipe/roadway box above/below ground surface	0.0 ft
Height/Depth of top of riser pipe above/below ground surface	0.2 ft
Type of protective casing:	Roadway Box
Length	1.1 ft
Inside Diameter	8.0 in
Depth of bottom of guard pipe/roadway box	1.1 ft

Type of Seals	Top of Seal (ft)	Thickness (ft)
Cement	0.0	0.75
Cement Grout	0.8	30.25
Bentonite Chips	31.0	4.0

Type of riser pipe:	Schedule 40 PVC
Inside diameter of riser pipe	2.0 in
Type of backfill around riser	Bentonite chips/Cement grout
Diameter of borehole	5.0 in
Depth to top of well screen	38.3 ft
Type of screen	Schedule 40 PVC
Screen gauge or size of openings	0.010 in
Diameter of screen	2.0 in
Type of backfill around screen	Filter Sand
Depth of bottom of well screen	43.3 ft
Bottom of Silt trap	NA ft
Depth of bottom of borehole	46.0 ft

38.50 ft	+	5.00 ft	+	0 ft	=	43.50 ft
Riser Pay Length (L1)		Length of screen (L2)		Length of silt trap (L3)		Pay length

COMMENTS: Permanent 5" steel casing installed from ground surface to 20.0'; weather: sunny in the 40s

HALEY & ALDRICH

OBSERVATION WELL INSTALLATION REPORT

Well No. PDMW-17S
Boring No. PDMW-17

PROJECT	One River Street	**H&A FILE NO.**	28612-118
LOCATION	Hastings on Hudson, NY	**PROJECT MGR.**	Wayne Hardison
CLIENT	Atlantic Richfield	**FIELD REP.**	John Bode
CONTRACTOR	Warren George, Inc.	**DATE INSTALLED**	3/27 & 3/28/2006
DRILLER	Reynolds Bridgeport	**WATER LEVEL**	

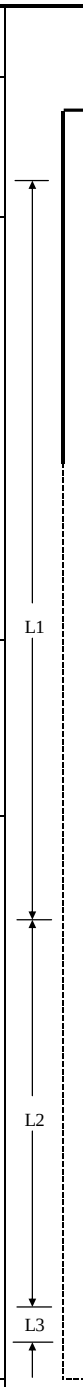
Ground El. _____ ft
El. Datum _____

Location: see plan

☐ **Guard Pipe**
☑ **Roadway Box**

SOIL/ROCK CONDITIONS	BOREHOLE BACKFILL
Fill	Cement 0.75
	Filter Sand 2.0'
	Bentonite Chips 3.0'
	Filter Sand
12.0 (Bottom of Exploration)	12.0

(Numbers refer to depth from ground surface in feet)



(Not to Scale)

Type of protective cover/lock	Roadway Box Cover
Height/Depth of top of guard pipe/roadway box above/below ground surface	0.0 ft
Height/Depth of top of riser pipe above/below ground surface	0.2 ft
Type of protective casing:	Roadway Box
Length	1.1 ft
Inside Diameter	5.0 in
Depth of bottom of guard pipe/roadway box	1.1 ft

Type of Seals	Top of Seal (ft)	Thickness (ft)
Cement	0.0	0.75
Bentonite Chips	2.0	1.0

Type of riser pipe:	Schedule 40 PVC
Inside diameter of riser pipe	2.0 in
Type of backfill around riser	Filter sand/Bentonite chips
Diameter of borehole	8.0 in
Depth to top of well screen	4.0 ft
Type of screen	Schedule 40 PVC
Screen gauge or size of openings	0.010 in
Diameter of screen	2.0 in
Type of backfill around screen	Filter Sand
Depth of bottom of well screen	12.0 ft
Bottom of Silt trap	NA ft
Depth of bottom of borehole	12.0 ft

4.00 ft	+	8.00 ft	+	0 ft	=	12.00 ft
Riser Pay Length (L1)		Length of screen (L2)		Length of silt trap (L3)		Pay length

COMMENTS: noticeable petroleum odor from auger cuttings; weather: sunny in the 50s

Form # 3010

HALEY & ALDRICH

OBSERVATION WELL INSTALLATION REPORT

Well No. PDMW-18D
Boring No. PDMW-18

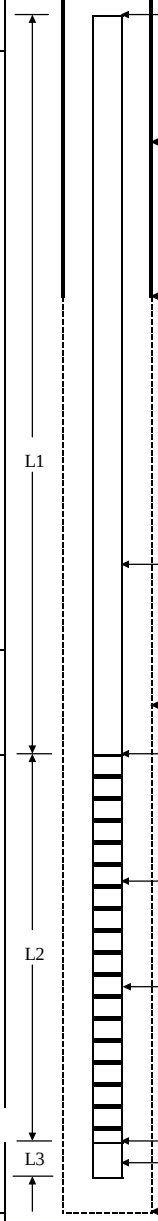
PROJECT	One River Street	**H&A FILE NO.**	28612-118
LOCATION	Hastings on Hudson, NY	**PROJECT MGR.**	Wayne Hardison
CLIENT	Atlantic Richfield	**FIELD REP.**	John Bode
CONTRACTOR	Warren George, Inc.	**DATE INSTALLED**	4/7/2006
DRILLER	Reynolds Bridgeport	**WATER LEVEL**	

Ground El. _____ ft
El. Datum _____
Location: see plan

☐ **Guard Pipe**
☑ **Roadway Box**

SOIL/ROCK CONDITIONS	BOREHOLE BACKFILL
	Cement 0.75'
Fill 19.0'	
Marine Deposits (silt) 27.0'	Cement Grout 26.0'
	Bentonite Chips 30.0'
Marine Deposits (sand) 38.0'	Filter Sand
Glacio Lacustrine Deposits 40.0	40.0

(Bottom of Exploration)
(Numbers refer to depth from ground surface in feet)



(Not to Scale)

Type of protective cover/lock	Roadway Box
Height/Depth of top of guard pipe/roadway box above/below ground surface	0.0 ft
Height/Depth of top of riser pipe above/below ground surface	0.3 ft
Type of protective casing:	Roadway Box
Length	1.1 ft
Inside Diameter	8.0 in
Depth of bottom of guard pipe/roadway box	1.1 ft

Type of Seals	Top of Seal (ft)	Thickness (ft)
Cement	0.0	0.75
Cement Grout	0.75	25.25

Type of riser pipe:	Schedule 40 PVC
Inside diameter of riser pipe	2.0 in
Type of backfill around riser	Bentonite chips/Cement grout
Diameter of borehole	5.0 in
Depth to top of well screen	32.3 ft
Type of screen	Schedule 40 PVC
Screen gauge or size of openings	0.010 in
Diameter of screen	2.0 in
Type of backfill around screen	Filter Sand
Depth of bottom of well screen	37.3 ft
Bottom of Silt trap	NA ft
Depth of bottom of borehole	40.0 ft

32.30 ft	+	5.00 ft	+	0 ft	=	37.30 ft
Riser Pay Length (L1)		Length of screen (L2)		Length of silt trap (L3)		Pay length

COMMENTS: Permanent 5" steel casing installed from ground surface to 25.0'; weather: overcast in the 40s

HALEY & ALDRICH

OBSERVATION WELL INSTALLATION REPORT

Well No. PDMW-18S
Boring No. PDMW-18

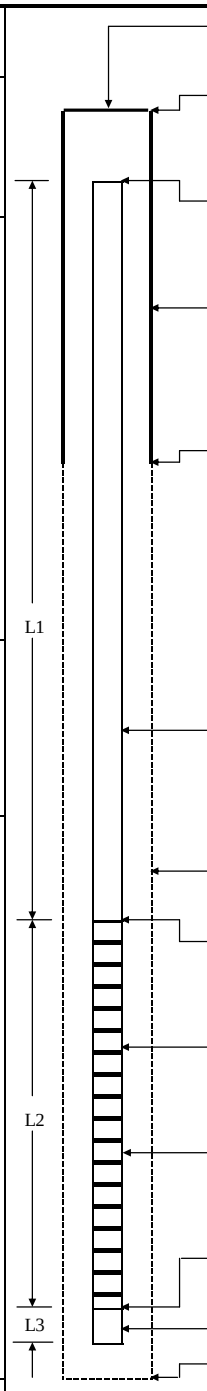
PROJECT	One River Street	**H&A FILE NO.**	28612-118
LOCATION	Hastings on Hudson, NY	**PROJECT MGR.**	Wayne Hardison
CLIENT	Atlantic Richfield	**FIELD REP.**	John Bode
CONTRACTOR	Warren George, Inc.	**DATE INSTALLED**	3/30/2006
DRILLER	Reynolds Bridgeport	**WATER LEVEL**	

Ground El. _____ ft
El. Datum _____
Location: see plan

☐ **Guard Pipe**
☑ **Roadway Box**

SOIL/ROCK CONDITIONS	BOREHOLE BACKFILL
Fill	Cement 0.75
	Filter Sand 1.5'
	Bentonite Chips 2.5'
	Filter Sand
15.0	**15.0**

(Bottom of Exploration)
(Numbers refer to depth from ground surface in feet)



(Not to Scale)

Type of protective cover/lock	Roadway Box Cover
Height/Depth of top of guard pipe/roadway box above/below ground surface	0.0 ft
Height/Depth of top of riser pipe above/below ground surface	0.3 ft
Type of protective casing:	Roadway Box
Length	1.1 ft
Inside Diameter	5.0 in
Depth of bottom of guard pipe/roadway box	1.1 ft

Type of Seals	Top of Seal (ft)	Thickness (ft)
Cement	0.0	0.75
Bentonite Chips	1.5	1.0

Type of riser pipe:	Schedule 40 PVC
Inside diameter of riser pipe	2.0 in
Type of backfill around riser	Filter sand/Bentonite chips
Diameter of borehole	8.0 in
Depth to top of well screen	3.5 ft
Type of screen	Schedule 40 PVC
Screen gauge or size of openings	0.010 in
Diameter of screen	2.0 in
Type of backfill around screen	Filter Sand
Depth of bottom of well screen	13.5 ft
Bottom of Silt trap	NA ft
Depth of bottom of borehole	15.0 ft

3.50 ft	+	10.00 ft	+	0 ft	=	13.50 ft
Riser Pay Length (L1)		Length of screen (L2)		Length of silt trap (L3)		Pay length

COMMENTS: noticeable petroleum odor from auger cuttings; weather: sunny in the 40s

Form # 3010

HALEY & ALDRICH

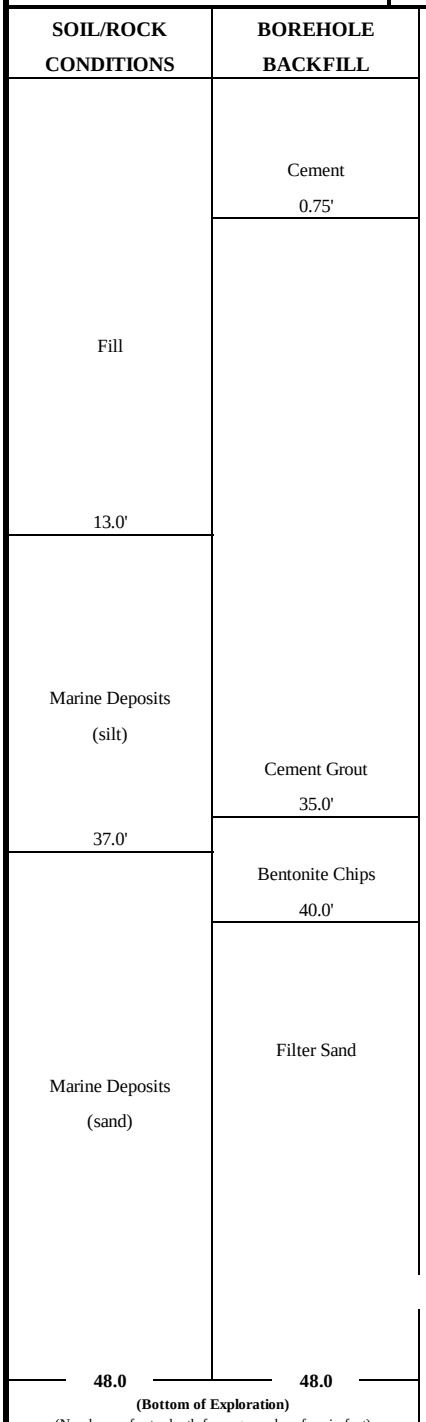
OBSERVATION WELL INSTALLATION REPORT

Well No. PDMW-19D
Boring No. PDMW-19

PROJECT	One River Street	**H&A FILE NO.**	28612-118
LOCATION	Hastings on Hudson, NY	**PROJECT MGR.**	Wayne Hardison
CLIENT	Atlantic Richfield	**FIELD REP.**	John Bode
CONTRACTOR	Warren George, Inc.	**DATE INSTALLED**	4/10 & 4/11/2006
DRILLER	Reynolds Bridgeport	**WATER LEVEL**	

Ground El. _____ ft
El. Datum _____
Location: see plan

☐ **Guard Pipe**
☑ **Roadway Box**



Type of protective cover/lock: Roadway Box

Height/Depth of top of guard pipe/roadway box above/below ground surface: 0.0 ft

Height/Depth of top of riser pipe above/below ground surface: 0.5 ft

Type of protective casing: Roadway Box
Length: 1.1 ft
Inside Diameter: 8.0 in

Depth of bottom of guard pipe/roadway box: 1.1 ft

Type of Seals	Top of Seal (ft)	Thickness (ft)
Cement	0.0	0.75
Cement Grout	0.75	34.25
Bentonite Chips	35.0	5.0

Type of riser pipe: Schedule 40 PVC
Inside diameter of riser pipe: 2.0 in
Type of backfill around riser: Bentonite chips/Cement grout

Diameter of borehole: 5.0 in

Depth to top of well screen: 42.7 ft

Type of screen: Schedule 40 PVC
Screen gauge or size of openings: 0.010 in
Diameter of screen: 2.0 in
Type of backfill around screen: Filter Sand

Depth of bottom of well screen: 47.7 ft

Bottom of Silt trap: NA ft

Depth of bottom of borehole: 48.0 ft

(Not to Scale)

42.70 ft	+	5.00 ft	+	0 ft	=	47.70 ft
Riser Pay Length (L1)		Length of screen (L2)		Length of silt trap (L3)		Pay length

COMMENTS: Permanent 5" steel casing installed from ground surface to 20.0'; weather: sunny in the 50s and 60s

HALEY & ALDRICH

OBSERVATION WELL INSTALLATION REPORT

Well No. PDMW-19S

Boring No. PDMW-19

PROJECT	One River Street	**H&A FILE NO.**	28612-118
LOCATION	Hastings on Hudson, NY	**PROJECT MGR.**	Wayne Hardison
CLIENT	Atlantic Richfield	**FIELD REP.**	John Bode
CONTRACTOR	Warren George, Inc.	**DATE INSTALLED**	4/12/2006
DRILLER	Reynolds Bridgeport	**WATER LEVEL**	

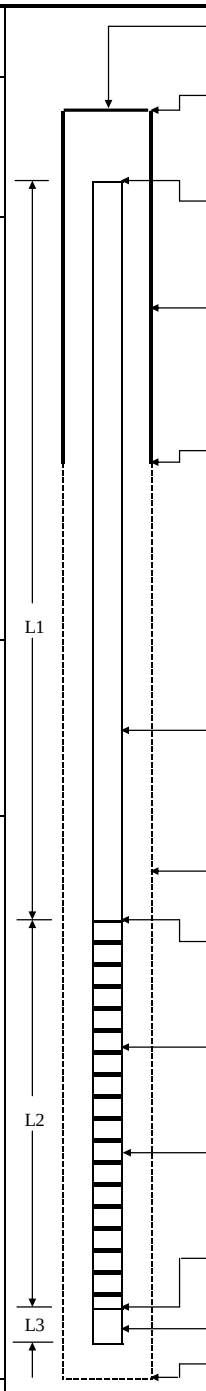
Ground El. _____ ft
El. Datum _____

Location: see plan

☐ **Guard Pipe**
☑ **Roadway Box**

SOIL/ROCK CONDITIONS	BOREHOLE BACKFILL
Fill	Cement 0.75
	Filter Sand 1.5'
	Bentonite Chips 3.0'
	Filter Sand
12.5 (Bottom of Exploration)	12.5

(Numbers refer to depth from ground surface in feet)



(Not to Scale)

Type of protective cover/lock	Roadway Box Cover	
Height/Depth of top of guard pipe/roadway box above/below ground surface	0.0	ft
Height/Depth of top of riser pipe above/below ground surface	0.3	ft
Type of protective casing:	Roadway Box	
Length	1.1	ft
Inside Diameter	5.0	in
Depth of bottom of guard pipe/roadway box	1.1	ft

Type of Seals	Top of Seal (ft)	Thickness (ft)
Cement	0.0	0.75
Bentonite Chips	1.5	1.5

Type of riser pipe:	Schedule 40 PVC	
Inside diameter of riser pipe	2.0	in
Type of backfill around riser	Bentonite chips	
Diameter of borehole	4.5	in
Depth to top of well screen	4.2	ft
Type of screen	Schedule 40 PVC	
Screen gauge or size of openings	0.010	in
Diameter of screen	2.0	in
Type of backfill around screen	Filter Sand	
Depth of bottom of well screen	12.2	ft
Bottom of Silt trap	NA	ft
Depth of bottom of borehole	12.5	ft

4.00 ft	+	8.00 ft	+	0 ft	=	12.00 ft
Riser Pay Length (L1)		Length of screen (L2)		Length of silt trap (L3)		Pay length

COMMENTS: weather: sunny in the 60s

Form # 3010

ATTACHMENT E4

Kemron Laboratory Report

KEMRON
ENVIRONMENTAL SERVICES

1359-A Ellsworth Industrial Boulevard • Atlanta, GA 30318 • TEL 404-636-0928 • FAX 404-636-7162

May 9, 2006

ENSR
6601 Kirkville Road
East Syracuse, New York 13057
(518) 453-6444

Re: Hudson River Phase II Dewatering Study
KEMRON Project # SE0154

Dear Mr. Christopher Gaule:

KEMRON Environmental Services, Inc. (KEMRON) is pleased to present the results of additional bench-scale treatability testing conducted for ENSR under the supervision of Haley & Aldrich. The treatability study was performed on additional groundwater sampled from a site located on the Hudson River (the Site). Testing was performed by KEMRON's Applied Technologies Group (ATG) located in Atlanta, Georgia. All testing was conducted in general accordance with the cost proposal developed by KEMRON and dated 11 March 2006.

The primary objective of the treatability study was to evaluate alterations in the chemical and physical properties of the groundwater when subjected to filtration, specifically the reduction in concentrations of PCBs. The treatability testing methods and results are summarized in the following sections of this letter report. Note that selected analytical and physical testing was performed by Severn Trent Laboratories. As such, the results of these analyses have not been included in this report.

MATERIAL RECEIPT AND HOMOGENIZATION

On March 23, 2006, KEMRON received three 5-gallon containers of groundwater from the site. The groundwater was delivered to KEMRON's Atlanta, Georgia facility by Federal Express. Upon receipt, the water was placed into refrigerated storage, maintained at a temperature of 4 degrees Celsius (^{0}C). Once chilled, KEMRON homogenized the groundwater to ensure uniform material for testing. Homogenization was performed by placing the contents of each container into a clean 25-gallon overpack container and mixing with stainless steel utensils. Upon completion of homogenization, the groundwater was placed into the original shipping containers and returned to refrigerated storage.

FILTRATION EVALUATIONS

KEMRON performed evaluations on the site groundwater to evaluate changes in the site water caused by filtration activities. Specifically, KEMRON tested the as-received site water, and the site water adjusted to a pH value of 10 standard units (s.u.). Filtration of the as-received groundwater was performed using filter media with nominal pore sizes including 20, 10, 5, 1,

0.5, and 0.1 microns. Filtration was accomplished using a bench-scale vacuum filtration apparatus consisting of a vacuum pump, 1,000 milliliter (ml) glass vacuum flask, and a filter media holder with a reservoir for introducing the groundwater into the filtration system.

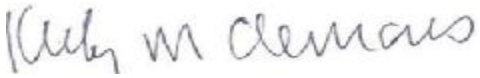
As requested by Haley & Aldrich, KEMRON performed filtration activities on the pH adjusted groundwater using filter media with nominal pore sizes including 10, 1.0, and 0.1 micron. For pH adjustment KEMRON used a 1 Normal (N) solution of sodium hydroxide. Initially, KEMRON performed a titration of a 200 ml aliquot of the site groundwater with the sodium hydroxide solution. It was determined that 3.6 ml of the base was needed to reach a pH value of 10 s.u. KEMRON then treated a 5 liter (L) aliquot of the as-received site groundwater with 90 ml of sodium hydroxide. Following approximately 30 minutes of mixing KEMRON tested the pH of the material with a result of exactly 10.0 s.u. Following pH adjustment, KEMRON performed filtration activities using the three filter media in accordance with the previously discussed filtration protocol.

Following filtration activities aliquots of all filtered materials were submitted to Severn Trent Laboratories for analytical testing. At this time KEMRON has not reviewed any analytical data developed by STL. As such, KEMRON cannot determine the effectiveness of the testing protocol on reducing concentrations of contaminants in the test materials.

CLOSURE

KEMRON Environmental Services, Inc. appreciates the opportunity to provide ENSR with treatability testing services. If you have any questions, or require additional information, please call either of the undersigned at (404) 636-0928.

Sincerely,
KEMRON Environmental Services, Inc.



Chana Gilzenrat
Applied Technologies Group
Project Manager

Kelly Clemons
Applied Technologies Group
Program Manager

Data contained on this sheet shall not be disclosed without prior approval from KEMRON Environmental Services, Inc. (Proprietary)

ATTACHMENT E5

Corrective Action Requests (CARs)

CORRECTIVE ACTION REQUEST

Number: 008 **Date: April 4, 2006**

TO: Chris Gaule (ENSR)

You are hereby requested to take corrective actions indicated below and as otherwise determined by you (a) to resolve the noted conditions and (b) to prevent it from recurring. Your written response is to be returned to the Project Quality Assurance Manager by April 6, 2006.

Condition: Field personnel installing groundwater monitoring wells (MW) are using standard Haley & Aldrich (H&A) field forms for documenting well installation, soil boring conditions, and groundwater sampling information instead of the forms included in the Remedial Design Work Plan (May 2005). Field personnel collecting environmental samples are not using any field report forms to document soil sampling.

Reference Documents: H&A field forms include: Observation Well Installation Report, Groundwater Sampling Record, Sample Identification Key, and Test Boring Report. Similar forms are included in Appendix A of the RDWP and include Figure A5.2 Double Cased Well Construction Log, Figure A5.3 Well Development Observations, Figure A6.1 Soil sampling Record, and Figure A6.2 Groundwater/Purging Sampling Record.

Heather Budzich	4/3/06	Cynthia Cogan	4/6/06		4/7/06
Originator	Date	Approval	Date	Approval	Date

Response

Parsons on-site representative, Rebecca Absolom discussed differences observed between the H&A field forms and Parsons forms with the H&A field geologist, John Bode. Parsons and H&A have come to agreement as to how to resolve noted discrepancies (see Corrective Action below). R. Absolom spoke with ENSR field representative, Karl Reimer, about completing soil sampling records. K. Reimer indicated sample collection information is included in field log book. Parsons has not reviewed field log book to verify if information being recorded includes all information on Figure A6.1.

Cause of Condition: Field team accustomed to using their company's standard field forms and lack of awareness of field forms in the RDWP.

Corrective Action

(A) Resolution:

1. H&A will continue to use their Observation Well Installation Report but will add a note that specifies when the start and end date for the well installation and the weather conditions during installation. The only difference in materials being utilized by H&A compared to the specifications in Figure A5.2 is that the well surface pad is made of concrete instead of gravel.
2. H&A is currently using their Groundwater Sampling Record form to document well development activities. Parsons suggested to H&A to use Figure A5.3 from the RDWP to document well development activities. Use of Figure A5.3 will better differentiate well development activities from groundwater sampling/purging activities.
3. H&A will continue to use their Groundwater Sampling Record but will add a note in the Remarks Section as to the weather conditions on the day of sampling, where the purge water is contained (i.e. drum number), the COC number and the airbill number the samples are being sent under, the method of shipment, and the name of the laboratory the samples are being sent to.
4. H&A will continue to use their Sample Identification Key for keeping track of geotechnical samples

collected but will note the COC number and the airbill number the samples are being sent under, the method of shipment, and the name of the laboratory the samples are being sent to.
5. Parsons will provide ENSR field representative, K Reimer, with copies of Figure A6.1. At a minimum, K. Reimer will review Figure A6.1 to ensure that he is documenting all information specified in Figure A6.1 in his field log book. Ideally, this form should be completed for each soil sample collected.

(B) Prevention: Make sure all personnel are aware of noted discrepancies between H&A's forms and the forms in the RDWP. H&A's forms are acceptable to use so long as the corrective actions identified above are implemented. To prevent lack of awareness all field team members should be briefed on the procedures in the RDWP, specifically the Sampling and Analysis Plan in Appendix A.

(B2) Affected Documents

Signature_____ Date_____

CA Follow-up

Corrective Action verified by: _____ Date 4/7/06.

FIGURE C1

CORRECTIVE ACTION REQUEST FORM

CORRECTIVE ACTION REQUEST

Number 001 011 SAMP 009 (EK) **Date:** March 31, 2006

To: Karl Reimer

You are hereby requested to take corrective actions indicated below and as otherwise determined by you (a) to resolve the noted conditions and (b) to prevent it from recurring. Your written response is to be returned to the Project Quality Assurance Manager by March 31, 2006.

Condition:

Sample Documentation. A review of the field logbook revealed that all of the required sample information was not being recorded. Section A7.5 of the SAP details specific information about each sample that is required to be documented. A CAR should be generated for this finding so that the field crew is made aware of the requirement and records the required information.

Reference Documents:

Field Audit conducted by ESI on March 27th and 28th, 2006

Karl Reimer	03/28/06		4/7/06		
Originator	Date	Approval	Date	Approval	Date

Response

Karl Reimer was informed of the condition and has changed recording procedures in the field book to address this issue.

Cause of Condition:

The field samples information was being recorded on the chain of custody forms but not the field book.

Corrective Action

(A) Resolution:

Upon collecting the sample, the sample information will be promptly recorded in the field log book and then also recorded in associated field record forms (chain of custody, field sampling form, boring log, etc.).

(B) Prevention:

Field personnel will take more time to ensure field log books are filled out completely.

(B2) Affected Documents:

Field Log Book

Signature Karl Reimer Date 04/04/06

CA Follow-up

Corrective Action verified by: _____ Date 4/7/06

FIGURE C.1

CORRECTIVE ACTION REQUEST FORM

CORRECTIVE ACTION REQUEST

Number ~~002~~ ~~012~~ DAM 010 (SK) **Date:** March 31, 2006

To: Karl Reimer

You are hereby requested to take corrective actions indicated below and as otherwise determined by you (a) to resolve the noted conditions and (b) to prevent it from recurring. Your written response is to be returned to the Project Quality Assurance Manager by March 31, 2006.

Condition:

Incomplete chain of custodies (COCs) were sent to the laboratory.

Reference Documents:
Field Audit conducted by ESI on March 27th and 28th, 2006

Karl Reimer	03/28/06		4/7/06		
Originator	Date	Approval	Date	Approval	Date

Response

Karl Reimer was informed of the condition and has corrected filling out the chain of custody forms to address this issue.

Cause of Condition:

Some boxes were not checked, and information such as number of jars and jar type was not recorded on the form.

Corrective Action

(A) Resolution:

Field personnel will review each COC prior to submitting to the lab to ensure all appropriate fields are filled out.

(B) Prevention:

Field personnel will take more time to fill out COCs completely.

(B2) Affected Documents:
COCs submitted during the 24 March through 30 March.

Signature Karl Reimer Date 04/05/06

CA Follow-up

Corrective Action verified by: _____ Date _____

Apr 05 06 08:01a Bill Adams 914-478-5692 p.2

CORRECTIVE ACTION REQUEST FORM

CORRECTIVE ACTION REQUEST

Number ~~001~~ 011 **Date:** March 31, 2006

To: Karl Reimer

You are hereby requested to take corrective actions indicated below and as otherwise determined by you (a) to resolve the noted conditions and (b) to prevent it from recurring. Your written response is to be returned to the Project Quality Assurance Manager by March 31, 2006.

Condition:

Sample Documentation. A review of the field logbook revealed that all of the required sample information was not being recorded. Section A7.5 of the SAP details specific information about each sample that is required to be documented. A CAR should be generated for this finding so that the field crew is made aware of the requirement and records the required information.

Reference Documents:

Field Audit conducted by ESI on March 27th and 28th, 2006

Karl Reimer	03/28/06				
Originator	Date	Approval	Date	Approval	Date

Response

Karl Reimer was informed of the condition and has changed recording procedures in the field book to address this issue.

Cause of Condition:

The field samples information was being recorded on the chain of custody forms but not the field book.

Corrective Action

(A) Resolution:

Upon collecting the sample, the sample information will be promptly recorded in the field log book and then also recorded in associated field record forms (chain of custody, field sampling form, boring log, etc.).

(B) Prevention:

Field personnel will take more time to ensure field log books are filled out completely.

(B2) Affected Documents:

Field Log Book

Signature Karl Reimer Date 04/01/06

CA Follow-up

Corrective Action verified by: _____ Date _____

FIGURE 3.1

CORRECTIVE ACTION REQUEST FORM

CORRECTIVE ACTION REQUEST

Number ~~002~~ 012 BAM **Date:** March 31, 2006

To: Karl Reimer

You are hereby requested to take corrective actions indicated below and as otherwise determined by you (a) to resolve the noted conditions and (b) to prevent it from recurring. Your written response is to be returned to the Project Quality Assurance Manager by March 31, 2006.

Condition:

Incomplete chain of custodies (COCs) were sent to the laboratory.

Reference Documents:
Field Audit conducted by ESI on March 27th and 28th, 2006

Karl Reimer	03/28/06				
Originator	Date	Approval	Date	Approval	Date

Response

Karl Reimer was informed of the condition and has corrected filling out the chain of custody forms to address this issue.

Cause of Condition:

Some boxes were not checked, and information such as number of jars and jar type was not recorded on the form.

Corrective Action

(A) Resolution:

Field personnel will review each COC prior to submitting to the lab to ensure all appropriate fields are filled out.

(B) Prevention:

Field personnel will take more time to fill out COCs completely.

(B2) Affected Documents:
COCs submitted during the 24 March through 30 March.

Signature Karl Reimer Date 04/05/06

CA Follow-up

Corrective Action verified by: _____ Date _____

ATTACHMENT E6

Quality Assurance Review

(See enclosed CD)

ATTACHMENT E7

Meteorological Data

(See enclosed CD)

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F1. INTRODUCTION

F1.1 Purpose and Scope

This report summarizes the laboratory testing program performed for the slurry and soil-bentonite (SB) mixture design for Operable Unit No. 1 (OU-1). The purpose of the testing program was to develop a proposed backfill mix that can achieve an average permeability value suitable for the design intent (less than or equal to $1x10^{-7}$ cm/sec).

The testing was performed in general accordance with the requirements listed in the following documents:

- Agreement GEM-2005-0020 between Atlantic Richfield Company (AR) and Haley & Aldrich of New York (Haley & Aldrich), Work Release One – Exhibit A, Scope of Work for the Design of Remedial Actions for OU-1 of the former Anaconda Wire and Cable Plant Site, Village of Hastings-on-Hudson, New York, effective 1 August 2005.
- Remedial Design Work Plan (RDWP), Former Anaconda Wire & Cable Plant Site, Operable Unit No. 1, prepared by Parsons for AR and ARCO Environmental Remediation, LLC (AERL), revised date May 2005.

The scope of the laboratory program was to perform slurry mix testing to choose a clay additive; prepare and test three SB backfill mixes to choose a SB mixture for design; and perform long-term compatibility testing on the design SB mix to evaluate if the selected backfill mix can achieve a design permeability that meets or is lower than the design permeability.

This report is organized into sections corresponding to the major tasks of the testing program: slurry testing, filter cake testing, and soil-bentonite mix testing.

F1.2 Definition of Terms

Base Soil – refers to the soil that was used to mix the soil-bentonite; was chosen to be representative of soil that would eventually be imported during construction to create the soil-bentonite to backfill the cutoff trench.

Soil-Bentonite – refers to mixture of dry bentonite, slurry, and base soil to represent the backfill that would be placed in the cutoff trench.

F1.3 Materials Selected for Testing

F1.3.1 Bentonite

The product name of the bentonite used in the testing program is NATURALGEL®, manufactured by Wyo-Ben, Inc. of Billings, Wyoming. This Wyoming sodium bentonite is premium, untreated, regular yield, and conforms to API Spec 13A Section 10.

F1.3.2 Base Soil

The base soil used in the testing program was obtained from Tilcon New York, Inc. of West Nyack, New York. The base soil consists of by-products from the Tilcon Haverstraw Quarry.

The advantages to using soil supplied by Tilcon are:

- Tilcon is a well-established fill supplier in the New York City / Westchester County area, and has several quarries in the general vicinity of the project Site.
- The soils provided for use in the testing program will likely be available at the time of construction, since the soils consist of by-products from one of Tilcon's quarries.

The disadvantages to using the Tilcon soil are:

- For a common fill-type soil it is relatively expensive (we received a preliminary quote from Tilcon of $34.25/ton, delivered).
- The fines in the soil have relatively low plasticity, which is not as desirable as high plasticity fines for SB wall applications.

However, high plasticity clayey soils are not widely available in the Site geographic area. This is noted in Goldstick, et al. (2001), which discusses the remedial design of a waterfront site in Irvington, NY, 4 miles north of the 1 River Street Site. The lack of readily available clayey soils was cited as a reason that geosynthetic clay liner (GCL) was substituted for the originally-specified clay cap. Goldstick, et al. note that the cost analysis indicated that GCL was the most economical solution because "the cost of (clayey) soil delivered to the site would be extremely high since there is a scarcity of borrow sources in the area."

The Tilcon base soil consists of 25% surge fines, 50% screenings, and 25% settling pond fines. A sieve test was performed on the base soil in general conformance with ASTM D6913-04. A hydrometer test was also performed in general conformance with ASTM D421-85(2002) and D422-85(2002). The base soil is generally well-graded between the following approximate limits: 100% passing 1 in. and 30% passing the No. 200 sieve.

An Atterberg Limits test was also performed on the base soil in general conformance with ASTM D4318-05. These tests indicated that the minus No. 200 sieve portion of the Tilcon base soil is classified as silty clay (CL-ML), having plastic limit (PL) of 21, and liquid limit (LL) of 26.

The base soil overall is classified as a silty, clayey SAND (SC-SM) in accordance with ASTM D2487-00.

Water content tests were performed on several specimens of the Tilcon base soil in general conformance with ASTM D2216-05. The average as-received water content of the base soil was 13.5%.

Laboratory results for testing performed on the base soil are provided in Attachment F1.

F1.3.3 Water

In this report, the term "Site potable water" refers to water that was collected from a municipal hookup at the Site during the Pre-Design Investigation (PDI) in the fall of 2005. Some additional water was also obtained from the same hookup during the Supplemental Design Investigation (SDI) in the spring of 2006.

"Site groundwater" refers to water that was obtained from test pits (PDTP-1, -2, and -3) excavated in the vicinity of the proposed soil-bentonite wall (as shown in the RDWP), also in fall 2005. Refer to Figure D5.1B of Appendix D (the PDI Report) for locations of the test pits.

F1.4 Limitations

The results presented in this report are only applicable to the test specimens as sampled. This test report shall not be reproduced except in full, without the prior written consent of Haley & Aldrich.

F2. SLURRY INDEX TESTS

The purpose of the slurry tests was to determine if the selected clay additive (bentonite) was appropriate for use for the backfill mix and compatibility testing programs.

Four slurry mixtures were prepared for the test program: 5% and 6% bentonite-water slurry prepared with both Site potable water and Site groundwater. The following index tests were performed on the slurries: pH, unit weight, Marsh funnel viscosity, and temperature. The tests were performed at 3 different hydration times (2, 6, and 24 hours) to determine if the hydration time affected the slurry properties. Filter cake tests were also performed on the 5 and 6% slurry prepared with potable water.

The slurries were mixed with a Hamilton Beach mechanical blender equipped with a single sine-wave impellor, in general accordance with the procedures presented in API Specification 13A.

F2.1 pH

The results of the pH tests are plotted on Figure F1 and summarized in Table F1. The pH was measured using an Oakton pHTestr30 pH meter in accordance with the manufacturer's instructions. The pH for the 5% slurry was approximately 9.2 for the potable water, and 8.7 for the Site groundwater. The pH for the 6% slurry was approximately 9.0 for the potable water, and 8.7 for the Site groundwater. In general, the data indicate that preparing the slurry with Site groundwater produces a slightly lower pH. The change in pH over the 22 hour hydration time for the 4 slurries was less than one-tenth of a pH unit.

F2.2 Unit Weight

Unit weight was measured using a Fann model 140 mud balance device in accordance with the manufacturer's instructions. The results of the unit weight tests are plotted on Figure F2 and summarized in Table F1. The unit weight of the 5% slurry was approximately 64.2 lb/ft^3 (pcf) for the potable water, and 64.4 pcf for the Site groundwater. The unit weight of the 6% slurry was approximately 64.8 pcf for the potable water, and 64.6 pcf for the Site groundwater. In general, the data indicate that preparing the slurry with Site groundwater produced a slight increase in unit weight for the 5% slurry and a slight reduction in unit weight for the 6% slurry. Since the change in unit weight between the same slurry prepared with Site groundwater versus potable water is small and the trend is inconsistent, it is likely that the change is due to the accuracy of the measurement method, rather than reflecting actual differences in the slurry properties.

The data also show that the unit weight for 6% slurry is slightly higher than for 5% slurry, which is consistent with what would be expected, since the slurry with more bentonite is expected to have a higher unit weight.

The change in slurry unit weight with hydration time for the 4 slurries was less than 0.4 pcf. Again, it is likely that this change is within the accuracy of the measurement method, rather than reflecting actual differences in the slurry properties.

F2.3 Marsh Funnel Viscosity

The Marsh funnel viscosity (defined as the time it takes for 1.5 L of slurry to pass through the funnel) was measured using a Marsh funnel device. Marsh funnel viscosity was measured in general conformance with ASTM D6910-04. A higher Marsh funnel viscosity in seconds corresponds to a more viscous slurry.

The results of the tests are plotted on Figure F3 and summarized in Table F1. The Marsh funnel viscosity for the 5% slurry was approximately 35.3 seconds for the potable water, and 32.4 seconds for the Site groundwater. The Marsh funnel viscosity for the 6% slurry was approximately 41.2 seconds for the potable water, and 36.4 seconds for the Site groundwater.

In general, the data indicate that preparing the slurry with Site groundwater produced a reduction in Marsh funnel viscosity of 8% for the 5% slurry and 12% for the 6% slurry. The Marsh funnel viscosity is lower for the 5% slurry than for 6%. The change in Marsh funnel viscosity with hydration time for the 4 slurries was less than 1 second.

F2.4 Temperature

The temperature of the slurries was also measured. The data are plotted on Figure F4 and summarized in Table F1. The data show that the temperature of the slurries generally initially decreased between the 2 and 6 hour measurements, and then increased between the 6 and 24 hour measurements, except for the 5% groundwater slurry, which increased from 2 to 24 hours. The maximum temperature difference in the 24 hour period was less than 1.5 degrees Celsius.

The slurry testing was performed in a room that was not temperature controlled. It is likely that the change in slurry temperature over the 24 hour period corresponds to daily variances in room temperature, rather than an actual change in the slurry.

F2.5 Discussion of Results of Slurry Index Tests

The slurry tests yielded satisfactory index properties for both the 5% and 6% slurries. The effect of hydration time was small.

As indicated above, preparing the slurry with Site groundwater resulted in a rather significant decrease in the Marsh funnel viscosity compared to the same slurry prepared with Site potable water. This is an indication that the constituents in the Site groundwater inhibit the swelling of the double layer of the bentonite mineral, and that it could be more difficult to achieve a side wall filter cake and maintain trench stability with the groundwater slurry compared to the potable water slurry, all other things being equal. For this reason, it was concluded that the Site groundwater should not be used for slurry mixing during construction. Accordingly, the remainder of the testing was performed on slurries mixed with potable water.

F3. FILTER CAKE TESTS

The differential head between slurry in a trench and the surrounding groundwater level creates a driving pressure that acts to force the slurry into the adjacent soil. When the adjacent soil is fine-grained enough, it filters out the bentonite particles from the slurry. The resulting build-up of bentonite particles on the side-walls of a trench is referred to as a filter cake.

The filter cake test setup was designed to model the creation of a filter cake on the side of the slurry-filled trench during construction. The test was generally performed by placing soil in a mold, pouring slurry over the soil, and inducing a slurry head that is representative of the slurry head that would be expected near the bottom of the trench. Formation of a filter cake was considered successful if there was no slurry penetration into the soil.

F3.1 Review of Literature

Laboratory testing performed by Henry et al. (1998) indicated that the D_{15} (the grain diameter corresponding to 15% passing) of soil is a good parameter to use for filter criteria for bentonite-water slurry, and that the coarsest D_{15} needed to allow formation of a filter cake from pure bentonite slurry is approximately 0.4 mm. These tests also indicated that due to the low gel strength of bentonite-water slurry, silt and fine sand particles can become suspended in slurry, and the presence of these particles has the beneficial effect of allowing the D_{15} required for filter cake formation to be more coarse. Based on the testing by Henry et al., for a 70 pcf bentonite-water slurry with suspended silt the required D_{15} was 0.56 mm, and for an 80 pcf bentonite-water slurry with suspended silt and fine sand the D_{15} was 1.05 mm.

F3.2 Choice of Soil Gradation

The soil for the filter cake test was chosen to replicate the gradation of the actual Fill, to the extent practical. This was done by creating a processed soil to approximately represent the gradation of the actual jar samples obtained from the existing Fill in borings near the proposed SB wall alignment, since not enough soil volume was available from actual jar samples from the PDI borings.

Twenty-nine (29) grain size analyses on Fill samples from the vicinity of the proposed SB wall alignment were performed during the PDI. Results for 24 of these tests were available at the time of initiating filter cake testing. The 24 grain size curves are plotted together on Figure F5. The goal for the filter cake test was to choose a grain size distribution representative of the actual Site soil, but at the coarser end of the range (as a sort of worst case condition). To do this, an average gradation of the grain size distributions of the coarser two-thirds of the samples was determined. To further coarsen the “design” soil, the average gradation of the coarser two-thirds of the samples was again averaged into the gradation of the coarsest sample that was tested. This “coarsening” of the “design” soil was done as a reasonably conservative attempt to cover the coarser end of the range of the existing Fill. This resulting gradation is shown as curve A on Figure F6. Using gradation curve A for the “design” soil is a conservative approach considering that only 2 of the 29 field sample grain size curves have a coarser D_{15} size than gradation A. As discussed above, the D_{15} has been shown to be an important parameter in the filter cake formation criteria.

F3.3 Test Setup

The general test setup consisted of a 3-in. diameter Shelby tube permeameter (Karol-Warner model 3815) with 3 in. of soil at approximately 17% water content (representative of field conditions) on the bottom, and 1 in. of slurry on top, connected to ¼-in. I.D. tubing and a slurry tank to obtain the desired height of slurry head (9.4 ft, or approximately 600 psf). A soil filter with D_{15} of approximately 3 mm (fine gravel with some medium to coarse sand) was used at the bottom of the permeameter below the soil to reduce migration of fines from the soil sample. The slurry pressure was applied in one uniform increase over a few seconds time. The inlet line was connected to the top of the sample through a T valve, with the third line being a bleed line. This bleed line was bled after the slurry was poured into the tank but before the slurry pressure was applied to the sample, and at various times during the test to ensure the slurry was not experiencing thixotropic gelling in the tube. The filter cake test was run for approximately 6 hours. During the test, the discharge was observed and measured. At the conclusion of the test, the excess slurry was poured off the soil sample and the top of the sample was observed for presence of a filter cake. The sample was then frozen, extracted from the permeameter, and observed and photographed.

F3.4 Filter Cake Test on 5% Slurry

The test on the 5% slurry was performed with a slurry head of 9.4 ft. No slurry outflow was observed during the test. Approximately 8 mL of water outflow was collected. Upon termination of the test and observation of the sample, slurry appeared to have fully penetrated the sample. There was some bentonite "gel" on top of the soil (approximately 5/16 in. thick, with 1/16 in. on top and approximately ¼ in. penetration into the soil). The consistency of the "gel" on top was described as "pudding-like". Some slurry flowed out the bottom when the gravel filter was removed.

F3.5 Filter Cake Test on 6% Slurry

Due to concern about slurry flowing through the soil sample rather than being filtered at the top of the sample, the gradation of the test soil was modified to be slightly more fine, with $D_{15}=0.24$ mm (rather than $D_{15}=0.5$ mm from the initial test). For this finer base soil (shown as gradation B on Figure F6), approximately 19 of the actual gradation curves for Site Fill samples taken from the vicinity of the proposed SB wall had a finer D_{15}, and 10 had a coarser D_{15}.

The test on 6% slurry was performed with the gradation B soil sample, and with the slurry head at 9.4 ft. During this test there was no slurry outflow from the sample during the test. Approximately 8 mL of water outflow was collected. Observation after freezing and extracting the sample indicated that slurry did not penetrate the sample. The top of the sample was less "pudding-like" than the first sample.

F3.6 Results of Filter Cake Tests

The soil with the slightly finer gradation B ($D_{15}=0.24$ mm) was observed to filter the slurry and a filter cake formed. There was no visible slurry penetration into the sample. As would be expected based on the testing presented in Henry et al. (1998), the coarser soil gradation A used for the first test, with $D_{15}=0.5$ mm, did not filter the slurry, and a filter cake did not form. In the test on soil A, slurry was observed to have fully penetrated the sample.

Gradation B represents the gradation for which approximately one-third of the 29 Site samples obtained from the Fill in the vicinity of the SB wall and analyzed for grain size distribution during the PDI had a coarser D_{15}, and two-thirds of the 29 samples had a finer D_{15}. Based on the literature discussed above, it would be expected that Site soil with D_{15} coarser than 0.4 mm would not promote formation of a filter cake from pure bentonite-water slurry that does not have any suspended soil particles. However, it is well established that soil particles become suspended in slurry during construction (based on evidence that slurry unit weight in the trench is typically 70 to 80 pcf, compared with 64 pcf for pure bentonite-water slurry). The maximum D_{15} size of the 29 soil samples obtained during the PDI was approximately 0.63 mm. Based on the testing described above, it can be expected that the majority of the Site soil in the vicinity of the proposed SB wall would be capable of promoting formation of a filter cake.

Due to the heterogeneous nature of the Miscellaneous Fill, it should be expected that some localized areas would be too coarse for filter cake formation, such as the riprap Fill area near the shoreline in the northwest corner. These areas will likely result in some localized loss of slurry and potential sloughing that would need to be addressed during construction; however, the literature reviewed and tests performed for this study indicate that for the Site soil samples obtained and tested during the PDI, widespread stability problems due to inability to form a filter cake on the trench walls should not be a common concern.

It was assumed that the replacement fill (to be imported to backfill the excavation in this area) would be specified so that the gradation will be consistent with ability to form a filter cake.

The results of the slurry tests indicated that either the 5% or 6% bentonite-water slurry mixed with potable water would be appropriate for use during construction. The remainder of the testing was performed using 5% slurry.

F4. SOIL-BENTONITE MIX TESTING

The purpose of the SB mix testing was to recommend a design SB mixture that meets the project requirements.

Three SB mixtures were tested for grain size analysis with hydrometer, Atterberg limits, unit weight, and permeability with both Site potable water and Site groundwater as permeants. After completion of the initial testing, one SB mixture that produced satisfactory results for the index and short-term permeability testing was chosen. Three long-term permeability tests were performed on this SB mixture with Site groundwater as the permeant to model the long-term condition of the Site groundwater being in contact with the SB.

The procedure for preparing the SB mixture was to mix the Tilcon base soil with a varying amount of dry bentonite, plus 5% bentonite-water slurry to produce a mixture with a slump of approximately 4 in., measured using a standard concrete slump cone. The amount of dry bentonite used for the three mixtures was 0, 2, and 4%.

F4.1 Review of Literature

Hydraulic conductivity is inversely proportional to confining pressure, so that higher confining pressure used for a hydraulic conductivity testing will result in a lower hydraulic conductivity. As such, a literature review was performed to determine an appropriate confining pressure to be used for the SB permeability testing that would be representative of the field condition. The literature generally suggests using the stress that would be expected either at the mid-depth of a SB wall, or at the top of a wall (Filz et al., 2001). However, the stress state in SB walls has been shown to be less than would be calculated based on geostatic stress buildup, or self-weight of the trench backfill. This reduction is believed to be due to arching, or shear stresses along the sidewalls that are thought to act to hold up the soil-bentonite rather than allowing it to consolidate under its self-weight (Evans et al., 1995).

Two theories were used to determine the actual state of stress in a SB wall, Evans et al. (1995) arching theory and Filz (1996) lateral squeezing theory. Figure F7 (from Adams et al., 1997) shows an example of stress state in a hypothetical SB wall calculated using both the arching theory and the lateral squeezing theory. As shown on Figure F7, between a depth of 0 to 40 ft, a reasonable approximation of the stresses between arching theory and lateral squeezing theory is approximately 500 psf. Accordingly, the SB permeability tests for this study were performed using an average mid-sample confining pressure of 500 psf (modified to compensate for pore pressure induced by applied gradient).

F4.2 Grain Size

Grain size analysis testing with hydrometer was performed on the three SB mixtures. Sieve tests were performed in general conformance with ASTM D6913-04. Hydrometer tests were performed in general conformance with ASTM D421-85(2002) and D422-85(2002). The gradation for the three SB mixtures was very similar, with the percent clay for the 0, 2, and 4% added bentonite varying between 6.2, 7.5, and 8.6%, respectively. (Note that the 0% SB mixture has higher percent clay than the Tilcon base soil because it was mixed with slurry to create a slump value consistent with the 2% and 4% mixtures.)

The laboratory data reports are included in Attachment F2.

F4.3 Atterberg Limits

Atterberg Limits testing was performed on the fines from the three SB mixtures in general conformance with ASTM D4318-05. The resulting USCS classification (ASTM D2487-00) for the fines from the SB mixtures was lean clay (CL) for the 0 and 2% added bentonite, and fat clay (CH) for the 4% added bentonite. (As discussed in Section 1.3.2, the USCS classification of the fines from the Tilcon base soil was CL-ML). The LL for the 0, 2, and 4% bentonite mixture was 28, 40, and 56, and the PL was 19, 16 and 15, respectively. The laboratory data reports are included in Attachment F3.

F4.4 Unit Weight

The unit weight of the SB mixtures was determined using the mud balance device. The unit weight for the 0, 2, and 4% added bentonite mixtures was approximately 131, 130, and 118 pcf, with water content of 25%, 32%, and 43%, respectively.

F4.5 Short-Term Hydraulic Conductivity

Hydraulic conductivity testing was performed on the three SB mixtures with a flexible wall permeameter in general conformance with ASTM D5084-03. The SB was first passed through a No. 4 sieve and the test samples were created from the minus No. 4 portion. The diameter of the samples was approximately 3 in. and height was 2.5 in. The applied gradient was approximately 20, which together with the cell pressure resulted in a mid-sample confining stress of approximately 500 psf. Two tests were performed for each of the three SB mixtures, one with potable water and the other with Site groundwater as the permeant. The Site groundwater used for the permeant was filtered to remove any sizeable particles and de-aired before testing.

The results of the hydraulic conductivity (k) testing of the SB mixtures are summarized below. Refer to Figure F8 for a plot of SB hydraulic conductivity versus percent added bentonite, and Attachment F4 for the laboratory data reports.

- 4% bentonite: $k = 1.93 \times 10^{-8}$ cm/sec for potable water, and 3.80×10^{-8} cm/sec for Site groundwater.
- 2% bentonite: $k = 5.63 \times 10^{-8}$ cm/sec with potable water, and 5.97×10^{-8} cm/sec with Site groundwater.
- 0% bentonite: $k = 3.33 \times 10^{-7}$ cm/sec with potable water, and 4.86×10^{-7} cm/sec with Site groundwater.

The lab results show that using Site groundwater as the permeant caused a hydraulic conductivity increase of 46%, 6%, and 97% for the 0, 2, and 4% added bentonite, respectively. This data indicates that the Site groundwater produces an adverse effect on the ability of the bentonite to act as a low-permeability material.

It is somewhat counter-intuitive that the Site groundwater permeant produced a larger increase in the permeability of the 0% bentonite mixture as compared with the 2% bentonite mixture. The low level of increase for the 2% SB test could be explained by the fact that Site water was obtained from several different test pits in the vicinity of the proposed SB wall, and was stored separately rather than being composited. It is possible that water for some of the tests may have had slightly different properties than water for other tests.

For both the 2% and 4% mixtures, the final results for the Site groundwater test were better than the project-required limit of $1x10^{-7}$ cm/sec. The 0% SB mixture did not achieve the project required $1x10^{-7}$ cm/sec. Accordingly, the 2% mixture was used for the long-term compatibility tests.

F4.6 Long-Term Hydraulic Conductivity / Compatibility

Samples of the 2% SB were submitted to GeoTesting Express, Inc. of Boxborough, Massachusetts, for the long-term compatibility testing. The compatibility testing was performed in general accordance with EPA Method 9100 and ASTM D7100-05, using sample dimensions, cell pressure, and gradient generally consistent with the short-term tests described previously. The testing was performed on 3 samples to assess repeatability of results. The permeant was Site groundwater. The results of the tests are presented in Attachment F5.

The test results indicate that the average hydraulic conductivity of the 3 replicate samples ranges from $2.0x10^{-8}$ cm/sec to $2.3x10^{-8}$ cm/sec. Approximately 1 to 1.1 pore volumes of flow has passed through the samples to date, after 49 days of testing.

The test results indicate that the long-term hydraulic conductivity of the SB mixture is lower than the short-term hydraulic conductivity ($2x10^{-8}$ cm/sec versus $6x10^{-8}$ cm/sec). This may result from the water for the long-term tests having somewhat different properties than the water from the short-term tests, as discussed above.

The results of the compatibility tests indicate that the hydraulic conductivity of the SB mixture tested, consisting of the Tilcon base soil plus 2% added dry bentonite plus enough 5% bentonite-water slurry to achieve a slump of 4 in., is slower than the project-required hydraulic conductivity limit of $1x10^{-7}$ cm/sec.

REFERENCES

1. Agreement GEM-2005-0020, Work Release One – Exhibit A, Scope of Work for the Design of Remedial Actions for Operable Unit No. 1 (OU-1) of the Former Anaconda Wire and Cable Plant Site, Village of Hastings-on-Hudson, New York, between Atlantic Richfield Company and Haley & Aldrich of New York, effective date 1 August 2005.

2. ASTM (2005). "D2216-05 Standard Test Methods for Laboratory Determination of Water (Moisture) Content of Soil and Rock by Mass", "D4318-05 Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils", and "D7100-05 Standard Test Method for Hydraulic Conductivity Testing of Soils with Aqueous Solutions."

3. ASTM (2004). "D6910-04 Standard Test Method for Marsh Funnel Viscosity of Clay Construction Slurries" and "D6913-04 Standard Test Methods for Particle-Size Distribution (Gradation) of Soils Using Sieve Analysis".

4. ASTM (2002). "D421-85(2002) and D422-85(2002) Standard Practice for Dry Preparation of Soil Samples for Particle-Size Analysis and Determination of Soil Constants, and Standard Test Method for Particle-Size Analysis of Soils"

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16. Goldstick, J., J. Akins, P. Ciminello, and M. Yavary (2001). "Irvington, NY Brownfield Waterfront Remediation." Proceedings of Ports '01: America's Ports – Gateway to the Global Economy, Norfolk, VA, May 2001.

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18. Parsons (2005). *Remedial Design Work Plan*, Former Anaconda Wire & Cable Plant Site, Operable Unit No. 1, dated September 2004, Revised May 2005.

TABLE F1.
SUMMARY OF SLURRY MIX TESTS

OU-1 Remediation
NYSDEC Site #3-60-022
1 River Street, Hastings-on-Hudson, New York

Hydration Time (hours)	5% slurry with potable water					6% slurry with potable water				
	pH	Unit Weight		temp	Marsh Funnel Visc. (seconds)	pH	Unit Weight		temp	Marsh Funnel Visc. (seconds)
		(lb/gal)	(pcf)	(deg, C)			(lb/gal)	(pcf)	(deg, C)	
2	9.14	8.6	64.33	22.6	35.07	8.97	8.7	65.08	21.3	41.04
6	9.2	8.58	64.18	22	35.33	8.98	8.65	64.70	21.3	40.82
24	9.15	8.58	64.18	22.1	35.46	9.01	8.65	64.70	22.1	41.67

Hydration Time (hours)	5% slurry with groundwater					6% slurry with groundwater				
	pH	Unit Weight		Temp	Marsh Funnel Visc. (seconds)	pH	Unit Weight		temp	Marsh Funnel Visc. (seconds)
		(lb/gal)	(pcf)	(deg, C)			(lb/gal)	(pcf)	(deg, C)	
2	8.74	8.61	64.40	20.1	32.17	8.73	8.62	64.48	22.8	35.97
6	8.73	8.6	64.33	20.5	32.29	8.73	8.62	64.48	21.5	36.76
24	8.67	8.6	64.33	21.4	32.69	8.62	8.65	64.70	22.9	36.54

FIGURE F1. SLURRY pH VERSUS HYDRATION TIME

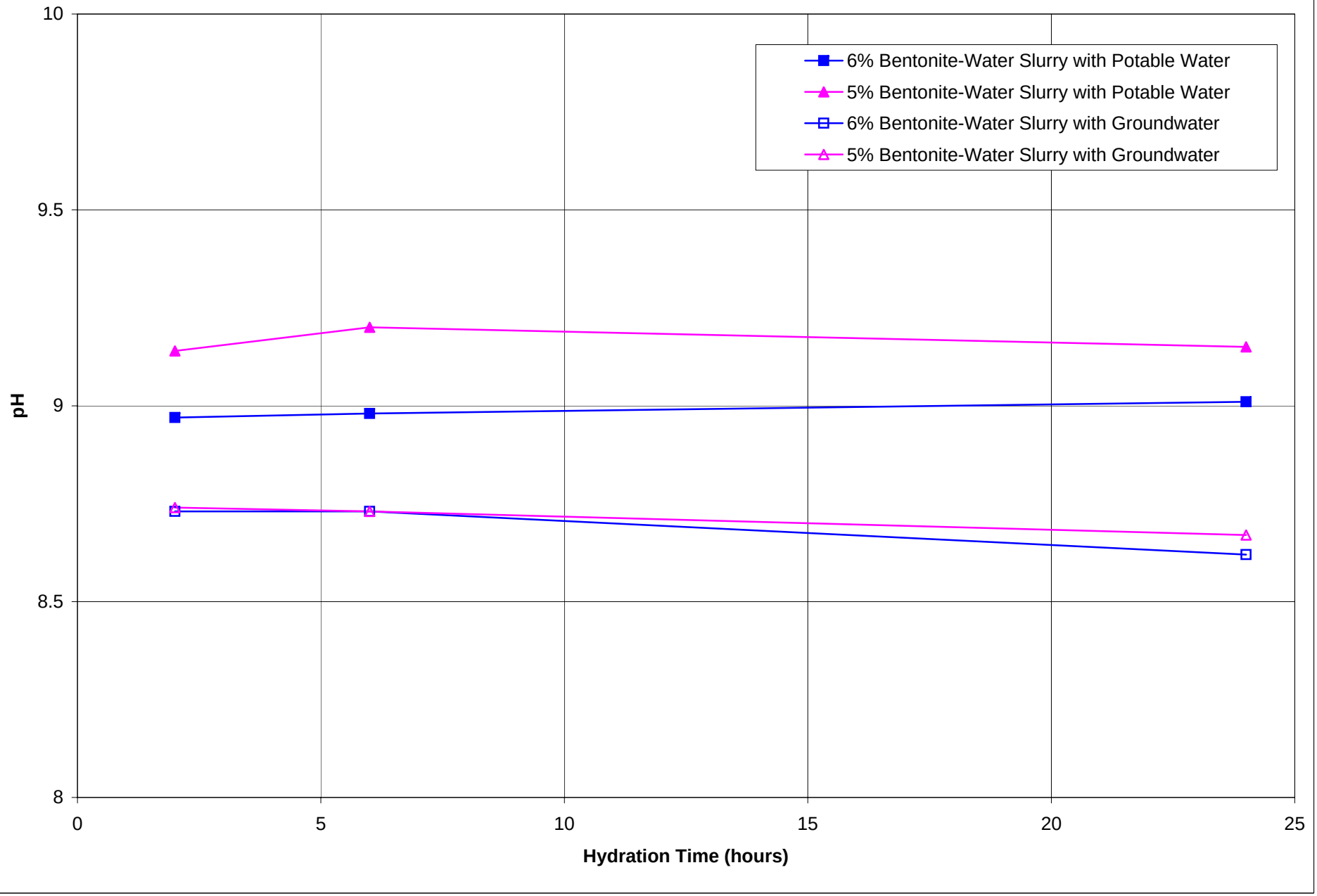


FIGURE F2. SLURRY UNIT WEIGHT VERSUS HYDRATION TIME

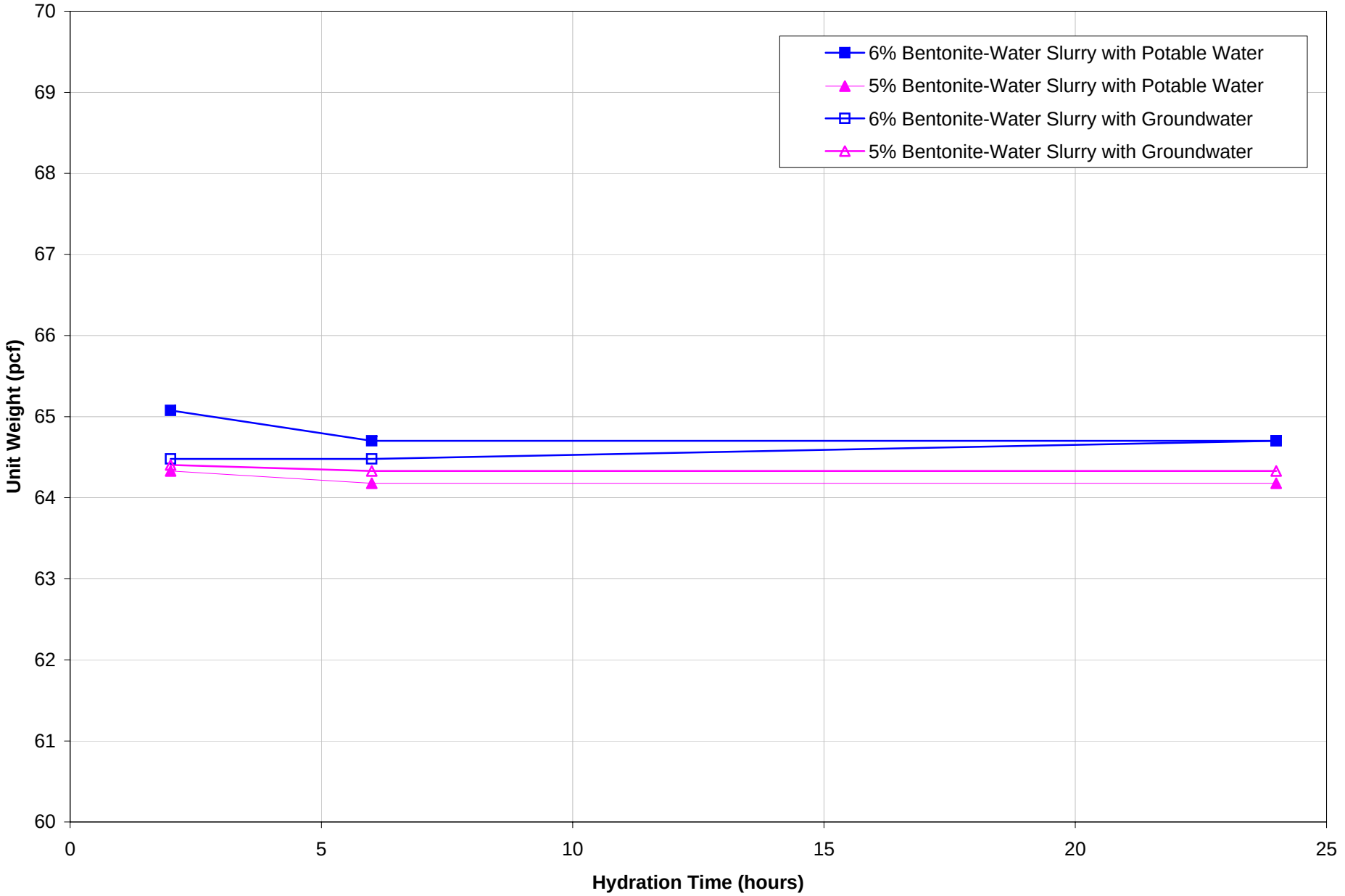


FIGURE F3. SLURRY MARSH FUNNEL VISCOSITY VERSUS HYDRATION TIME

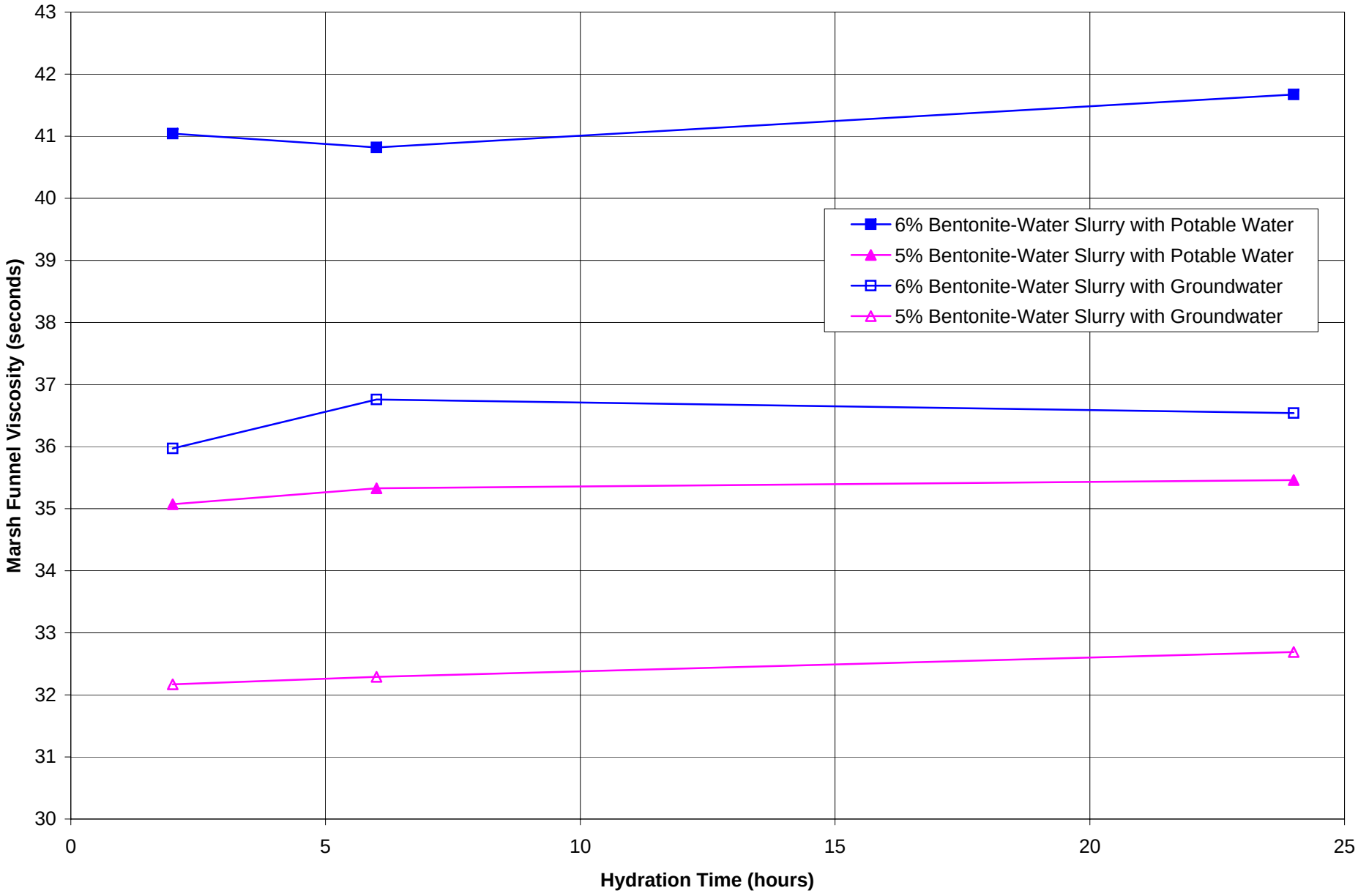


FIGURE F4. SLURRY TEMPERATURE VERSUS HYDRATION TIME

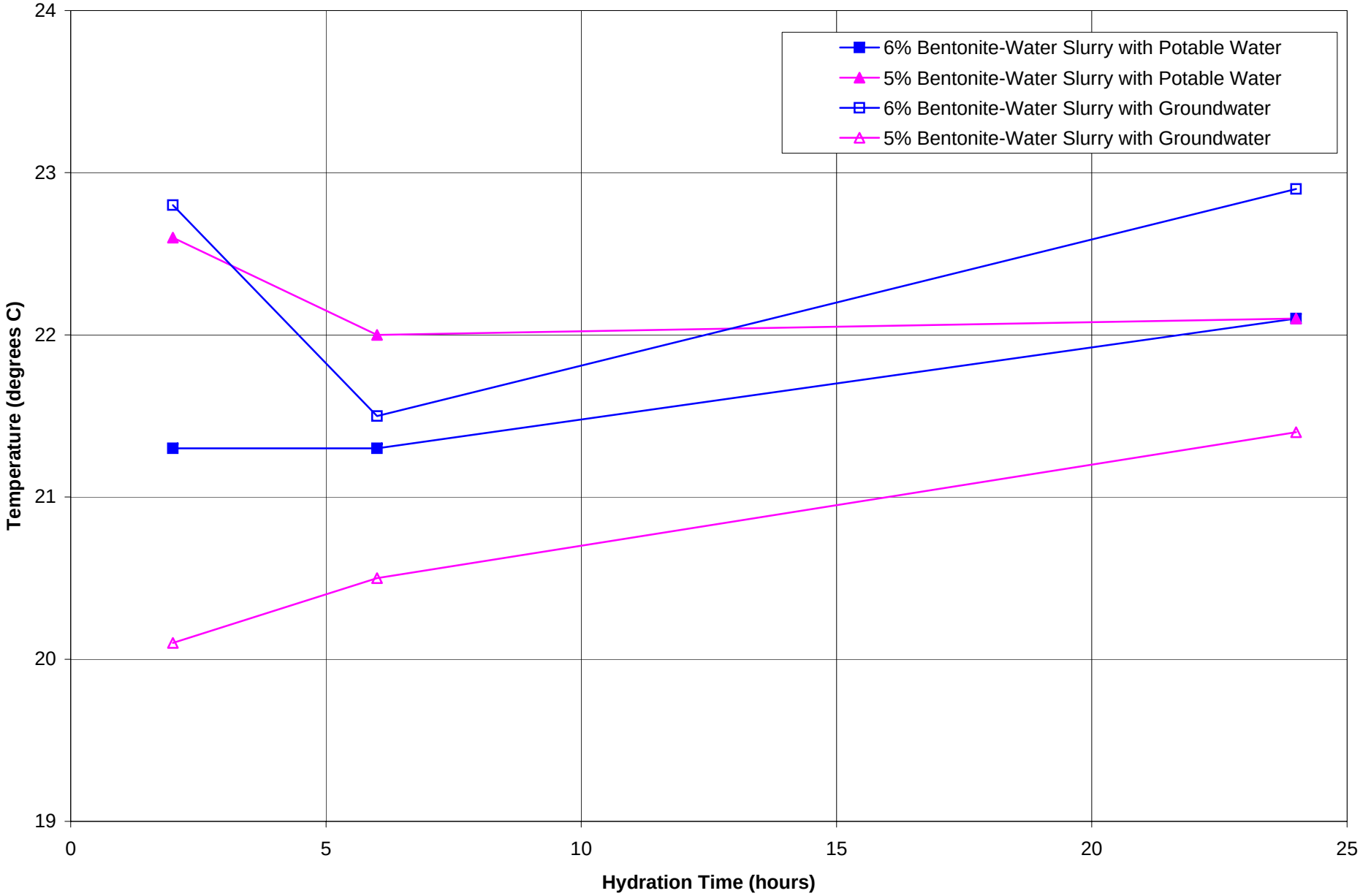


FIGURE F5. GRAIN SIZE PLOTS FOR FILL SAMPLES NEAR PROPOSED SOIL-BENTONITE WALL

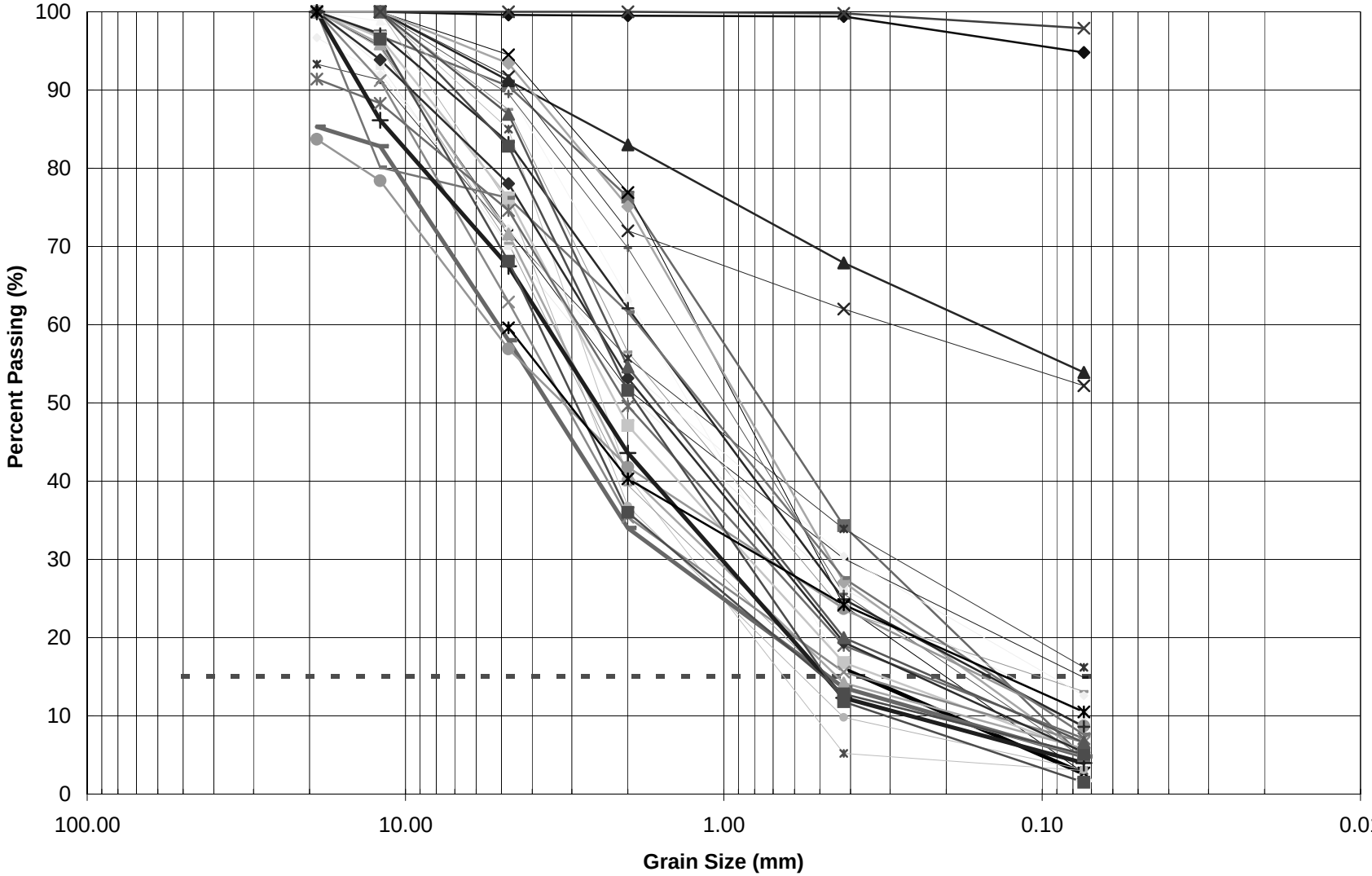


FIGURE F6. GRADATION A AND B

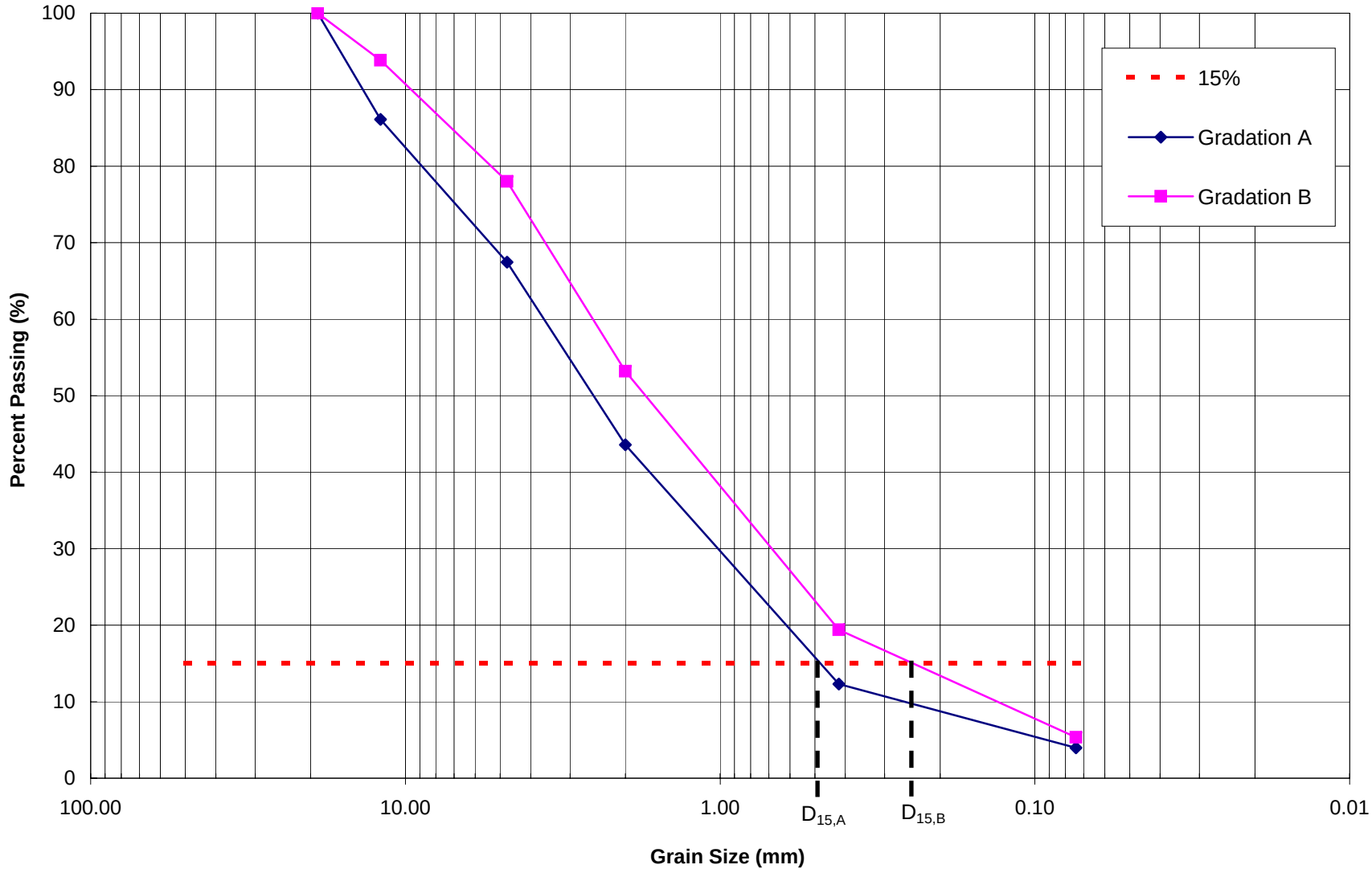


Figure F7. Major Principal Stress versus Depth in Hypothetical Soil-Bentonite Wall From Adams, et al. (1997); after Evans, et al. (1995) and Filz (1996)

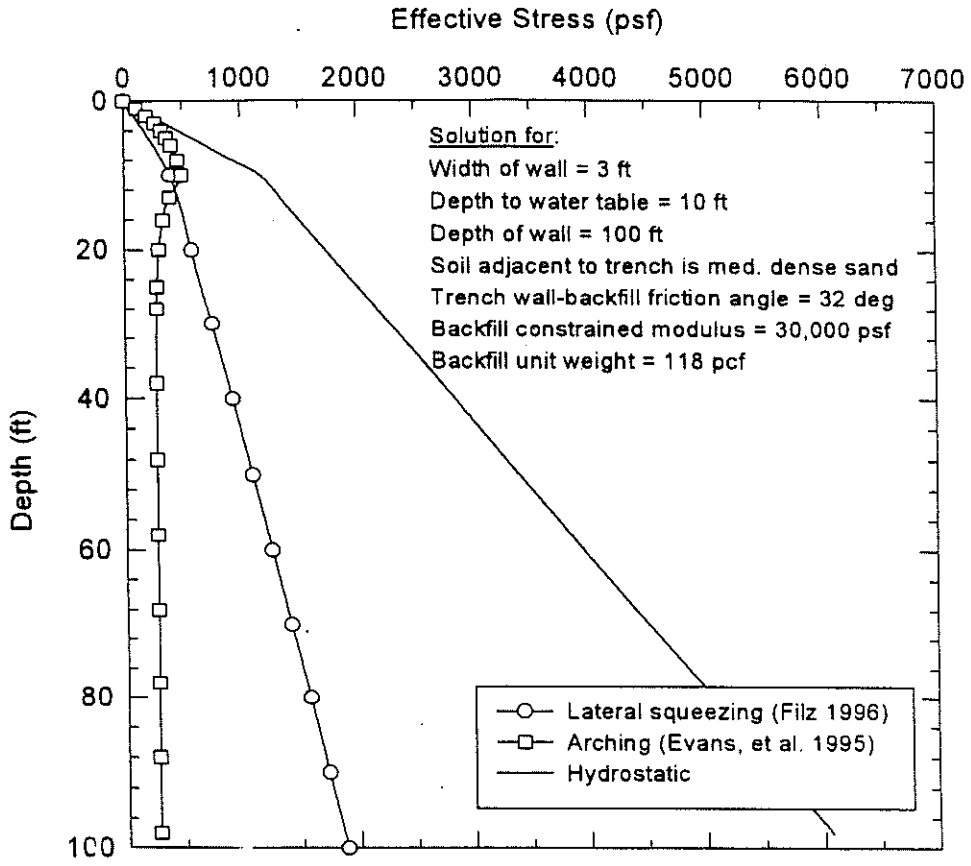
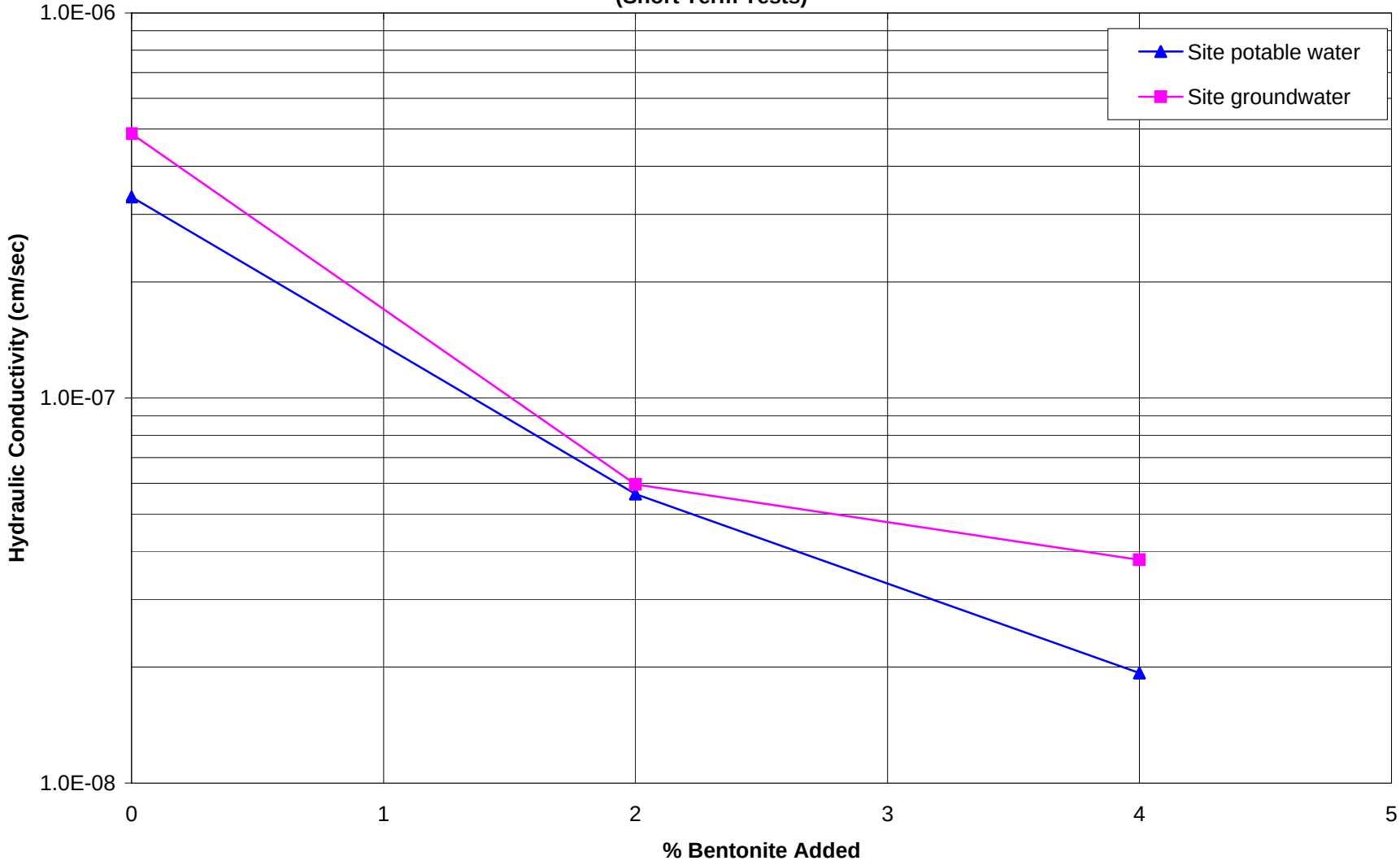
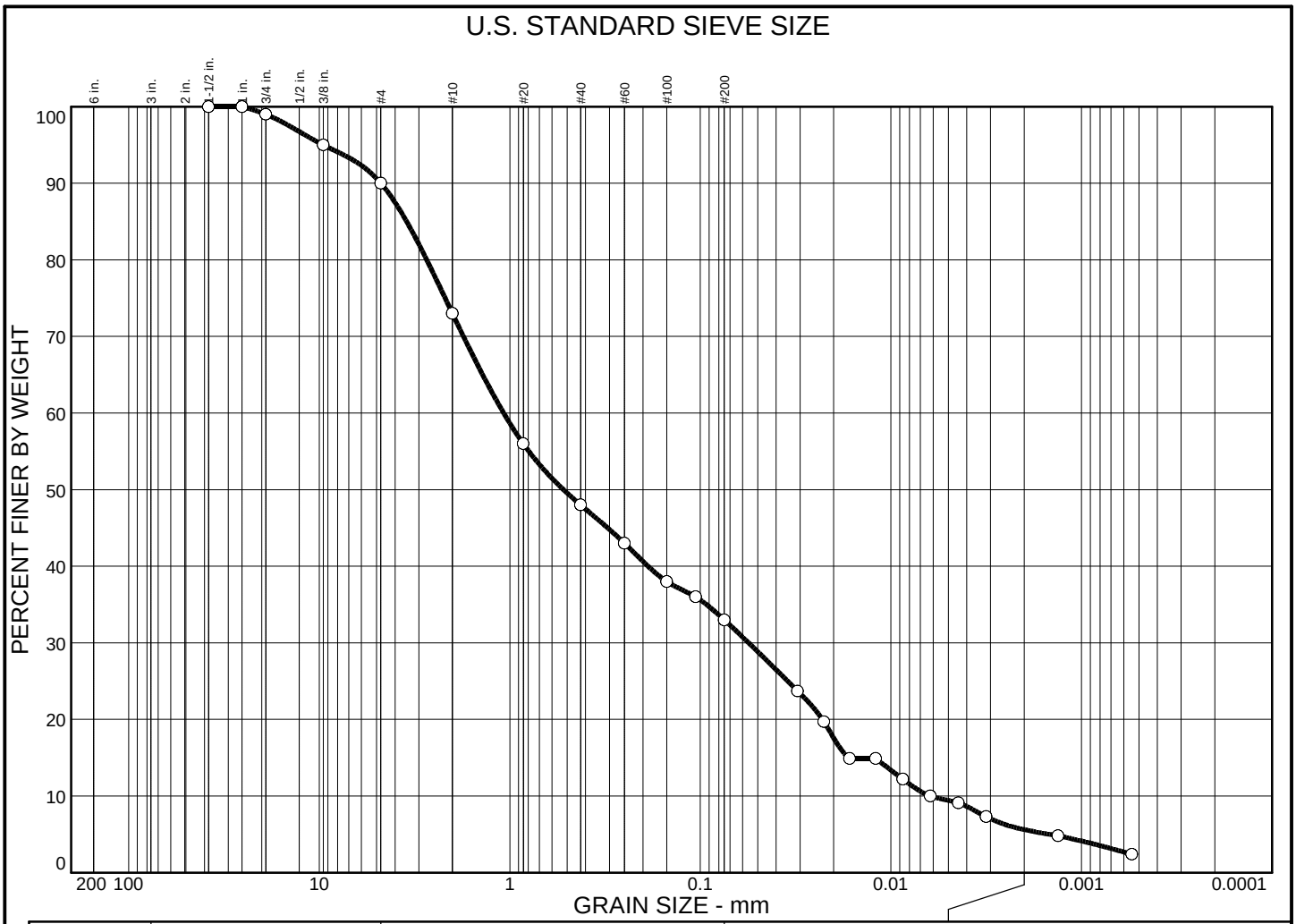


FIGURE F8. SOIL-BENTONITE HYDRAULIC CONDUCTIVITY VERSUS PERCENT ADDED BENTONITE
(Short Term Tests)



ATTACHMENT F1

Laboratory Data for Index Testing Performed on Tilcon Base Soil



	% + 3"	% GRAVEL		% SAND			% FINES	
		CRS.	FINE	CRS.	MEDIUM	FINE	SILT	CLAY
○	0.0	1.0	9.0	17.0	25.0	15.0	27.4	5.6

	Expl. No.	Sample No.	Depth (ft)	Atterberg Limits %			Water Content (%)	C_u	C_c	USCS
				W_L	W_P	I_P				
○		S01		25.8	21.1	4.7	13.5	173.14	0.47	SC-SM

	Sample Description
○	Dark olive gray Silty, clayey sand

Remarks:

○ Source: Tilcon New York, Inc. Proposed Use Base Soil for Soil-Bentonite Testing

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UNDERGROUND ENGINEERING & ENVIRONMENTAL SOLUTIONS

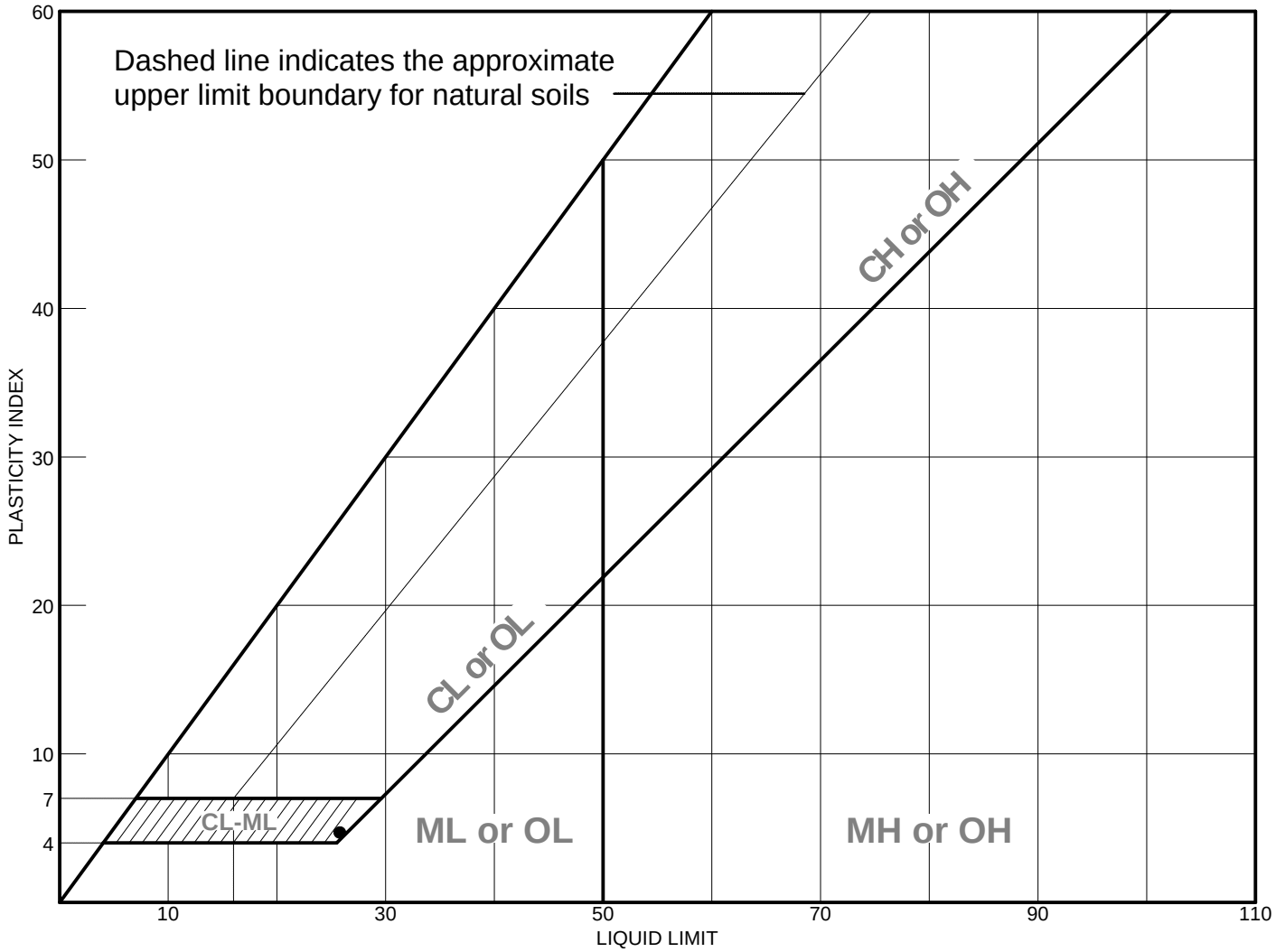
OU-1 Remediation, NYSDEC Site #3-60-022
1 River Street, Hastings-On-Hudson, New York

GRAIN SIZE DISTRIBUTION

DATE: 3/14/2006

FILE NO: 28612-113

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Dark olive gray Silty, clayey sand	25.8	21.1	4.7	48.0	33.0	SC-SM

Project No. 28612-113 **Client:** Atlantic Richfield Company

Project: OU-1 Remediation, NYSDEC Site #3-60-022

1 River Street, Hastings-On-Hudson, New York

● **Source:** **Sample No.:** S01

Remarks:

●

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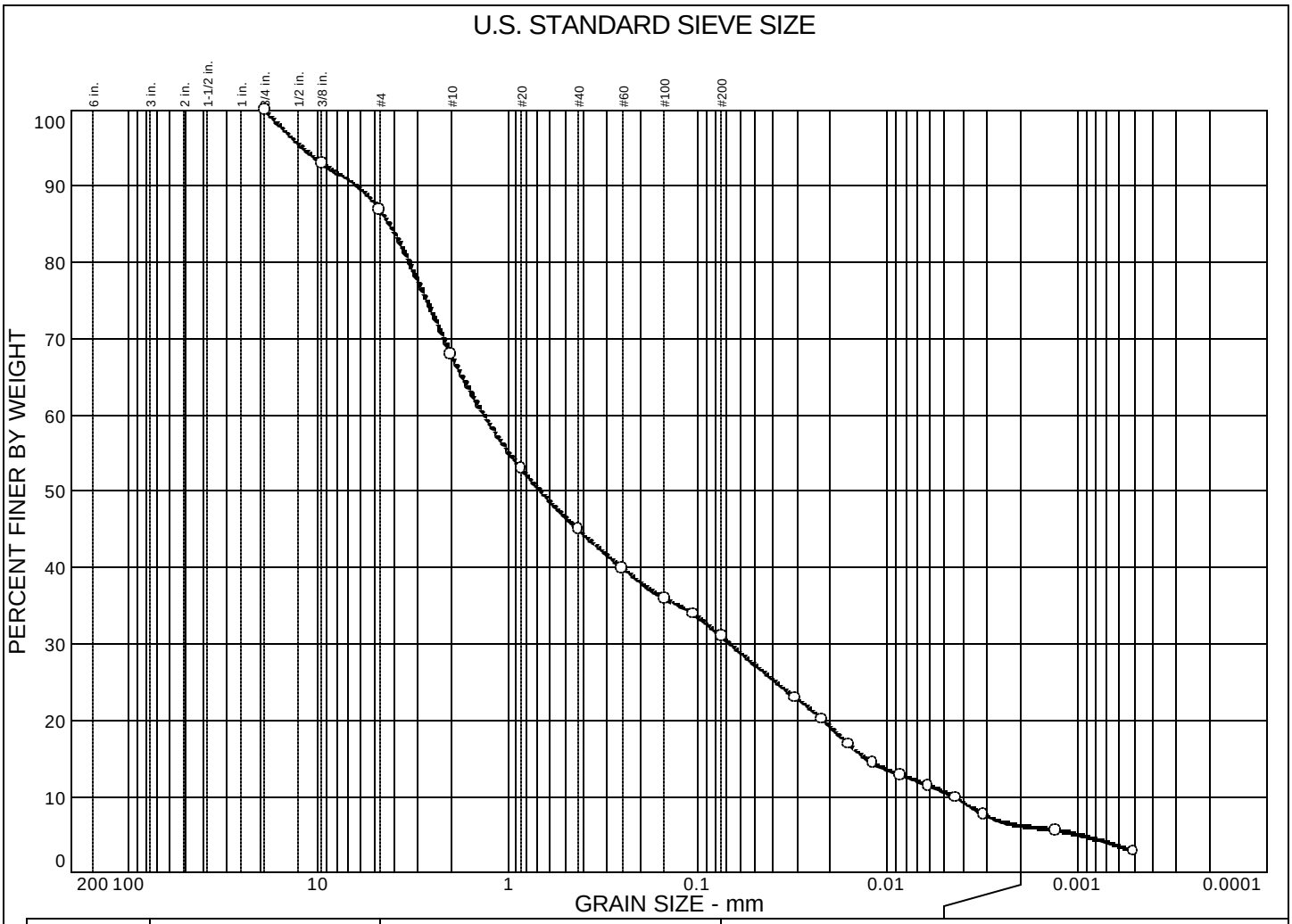
ATTACHMENT F2

Laboratory Data for Grain Size Analysis Testing on Soil-Bentonite



	% + 3"	% GRAVEL		% SAND			% FINES	
		CRS.	FINE	CRS.	MEDIUM	FINE	SILT	CLAY
○	0.0	0.0	13.0	19.0	23.0	14.0	24.8	6.2

	Expl. No.	Sample No.	Depth (ft)	Atterberg Limits %			Water Content (%)	C_u	C_c	USCS
				W_L	W_P	I_P				
○		SBS04		28.0	18.9	9.1	21.2	300.88	0.76	SC

	Sample Description
○	Olive Clayey sand

Remarks:

○ 0% Dry Bentonite, 5% Potable Water Slurry

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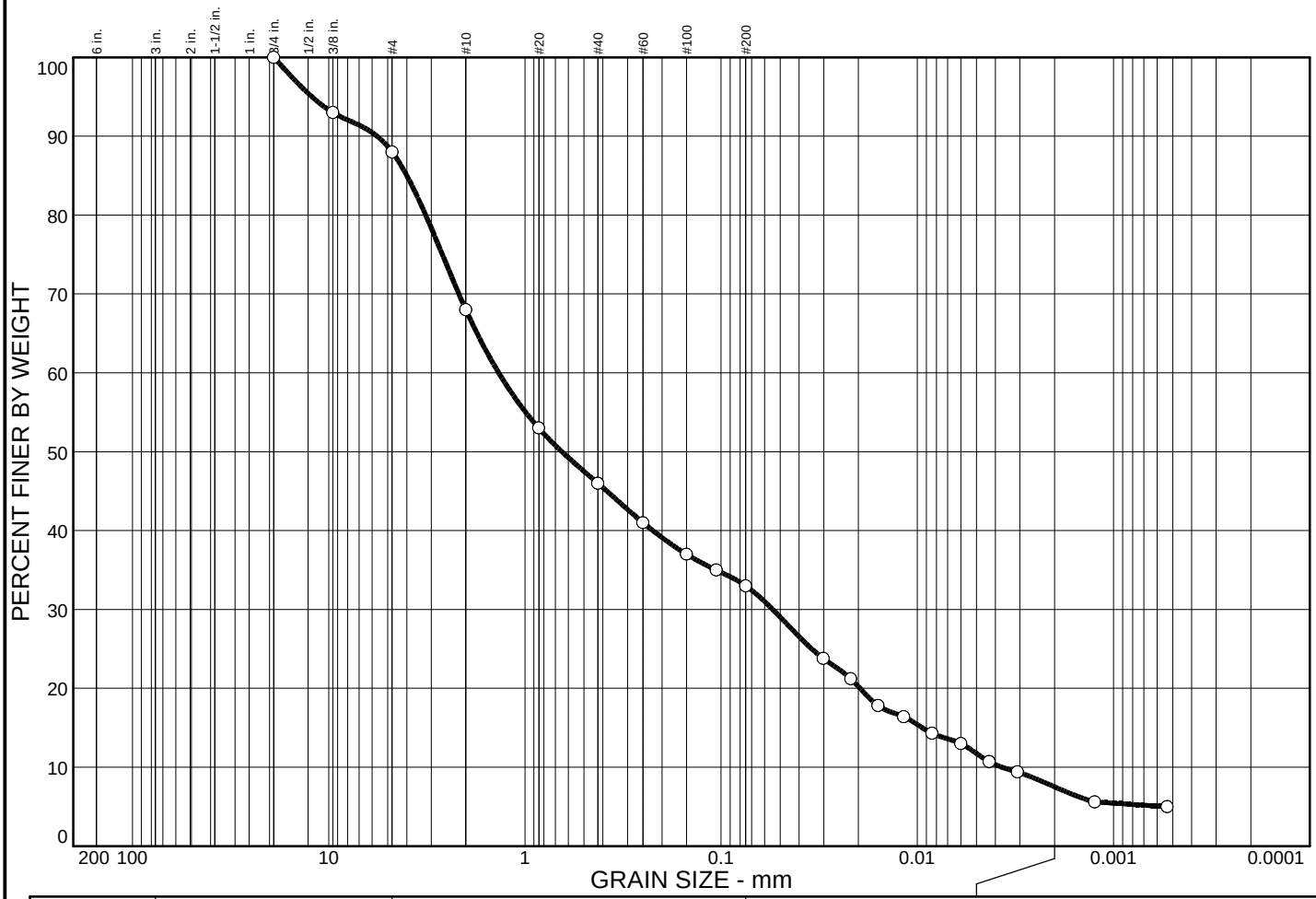
OU-1 Remediation, NYSDEC Site #3-60-022
1 River Street, Hastings-On-Hudson, New York

GRAIN SIZE DISTRIBUTION

DATE: 5/26/2006

FILE NO: 28612-113

U.S. STANDARD SIEVE SIZE



	% + 3"	% GRAVEL		% SAND			% FINES	
		CRS.	FINE	CRS.	MEDIUM	FINE	SILT	CLAY
○	0.0	0.0	12.0	20.0	22.0	13.0	25.5	7.5

	Expl. No.	Sample No.	Depth (ft)	Atterberg Limits %			Water Content (%)	C_u	C_c	USCS
				W_L	W_P	I_P				
○		SBS01		40.3	15.9	24.4	32.2	367.02	0.59	SC

	Sample Description
○	Olive Clayey sand

Remarks:

○ 2% Dry Benonite, 5% Potable Water Slurry

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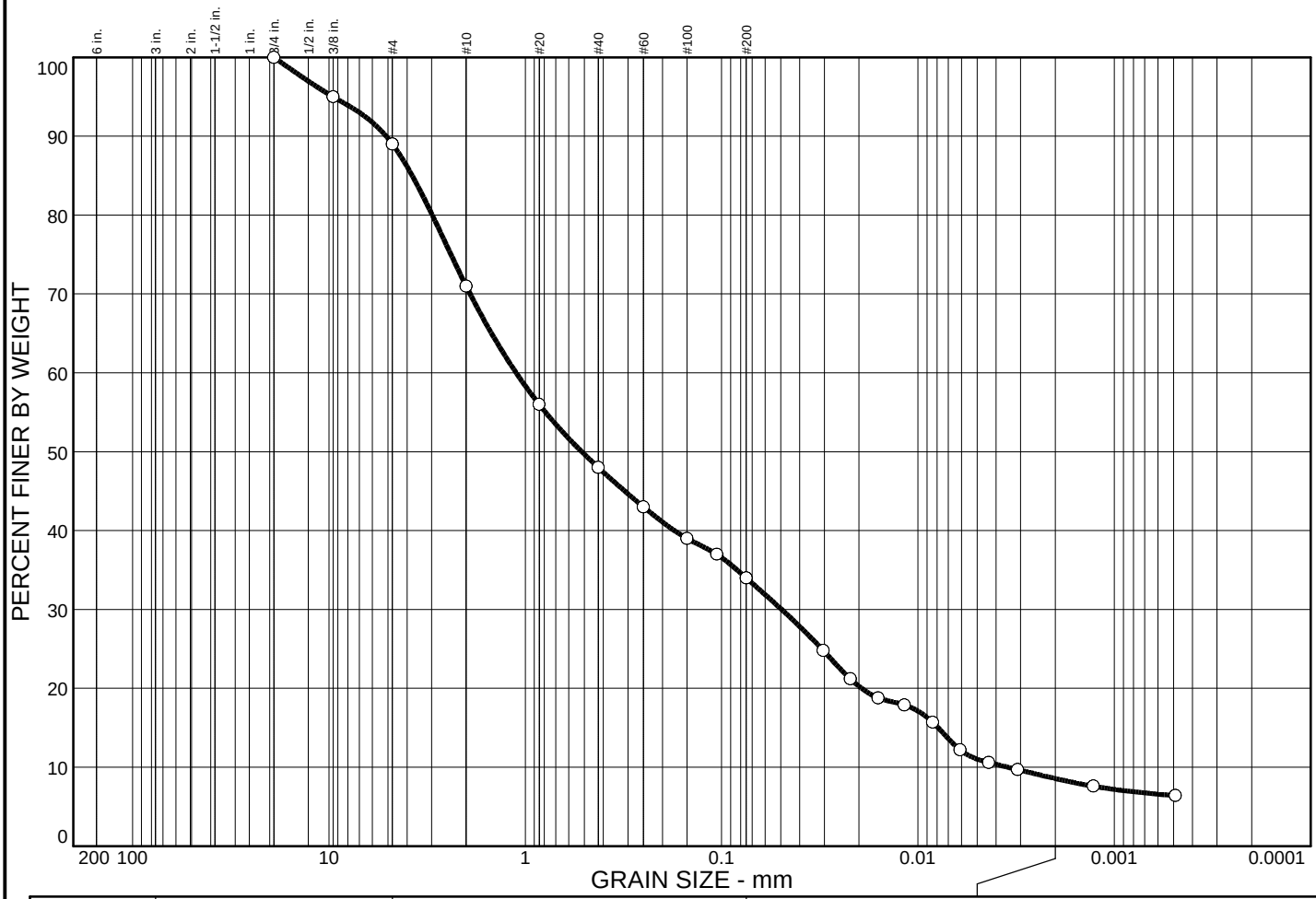
DATE: 5/18/2006

FILE NO: 28612-113



	% + 3"	% GRAVEL		% SAND			% FINES	
		CRS.	FINE	CRS.	MEDIUM	FINE	SILT	CLAY
○	0.0	0.0	11.0	18.0	23.0	14.0	25.4	8.6

	Expl. No.	Sample No.	Depth (ft)	Atterberg Limits %			Water Content (%)	C_u	C_c	USCS
				w_L	w_P	I_P				
○		SBS02		55.9	15.0	40.9	42.8	319.11	0.63	SC

	Sample Description
○	Olive Clayey sand

Remarks:

○ 4% Dry Benonite, 5% potable water slurry

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1 River Street, Hastings-On-Hudson, New York

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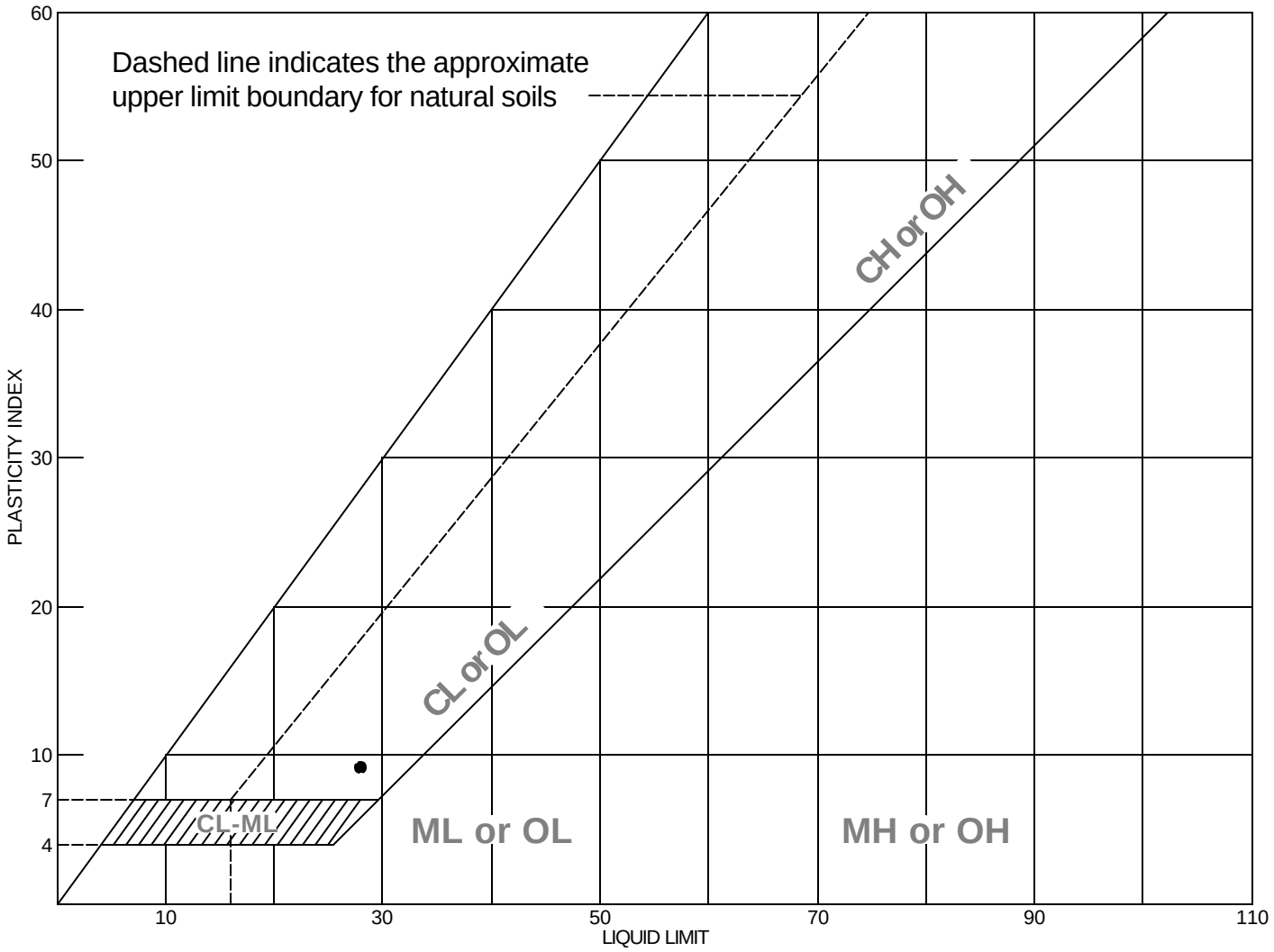
DATE: 5/18/2006

FILE NO: 28612-113

ATTACHMENT F3

Laboratory Data for Atterberg Limits Testing on Soil-Bentonite

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Olive Clayey sand	28.0	18.9	9.1	45.0	31.0	SC

Project No. 28612-113 **Client:** Atlantic Richfield Company

Project: OU-1 Remediation, NYSDEC Site #3-60-022
1 River Street, Hastings-On-Hudson, New York

● **Source:** **Sample No.:** SBS04

Remarks:

● 0% Dry Bentonite, 5% Potable Water Slurry

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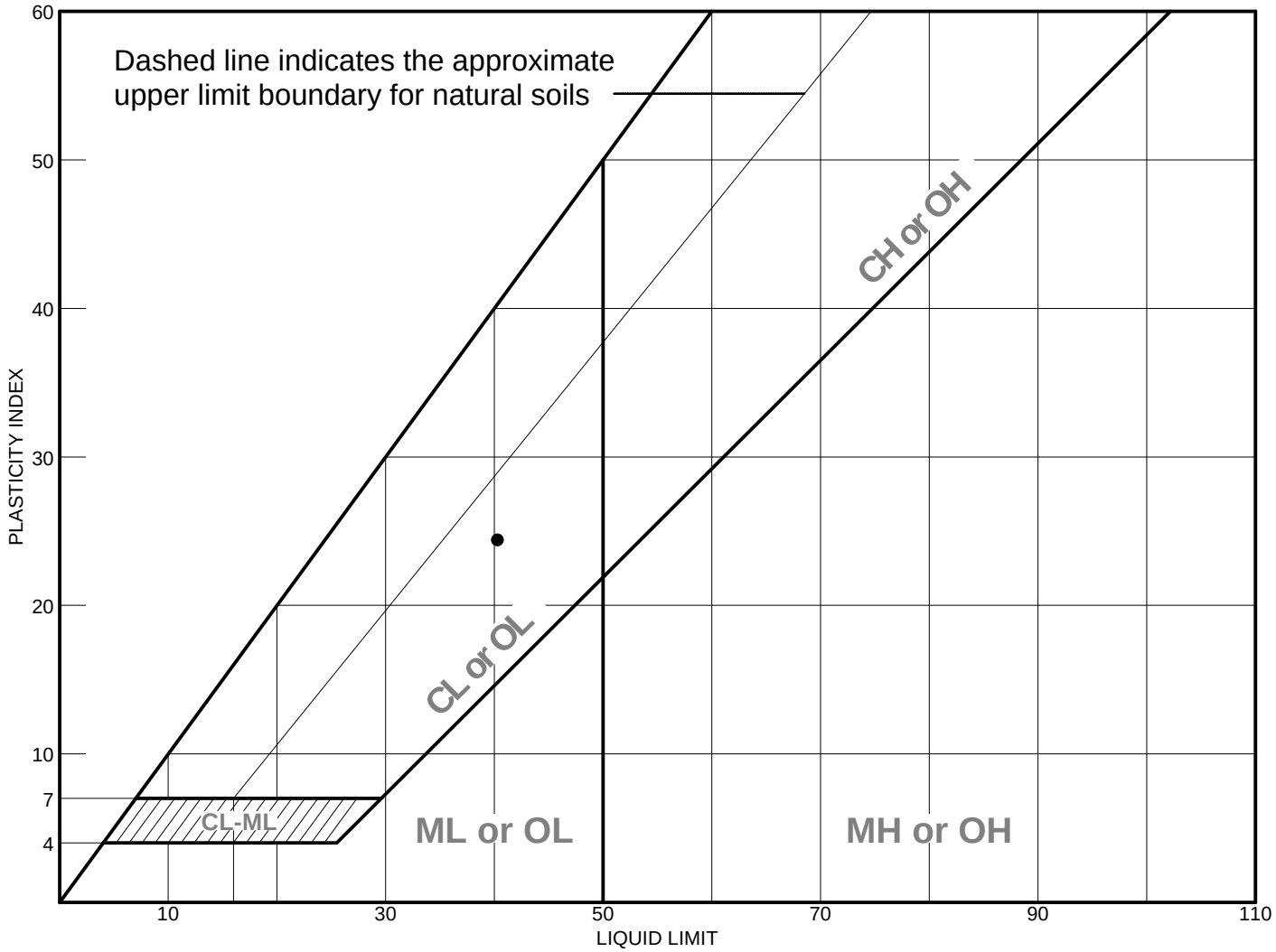
LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Olive Clayey sand	40.3	15.9	24.4	46.0	33.0	SC

Project No. 28612-113 **Client:** Atlantic Richfield Company

Project: OU-1 Remediation, NYSDEC Site #3-60-022

1 River Street, Hastings-On-Hudson, New York

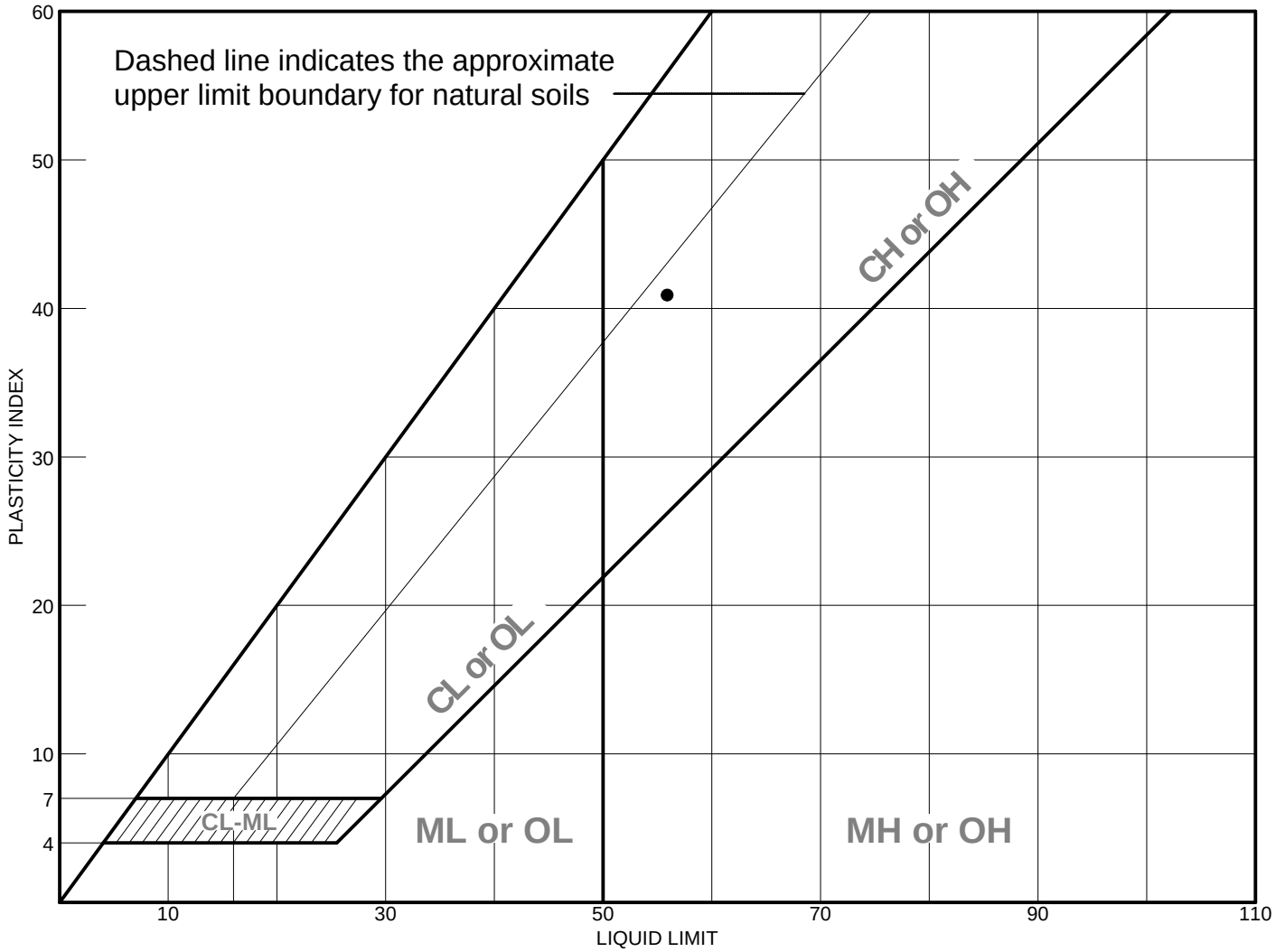
● **Source:** **Sample No.:** SBS01

Remarks:

● 2% Dry Bentonite, 5% Potable Water Slurry

HALEY & ALDRICH, INC.
UNDERGROUND ENGINEERING & ENVIRONMENTAL SOLUTIONS

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Olive Clayey sand	55.9	15.0	40.9	48.0	34.0	SC

Project No. 28612-113 **Client:** Atlantic Richfield Company

Project: OU-1 Remediation, NYSDEC Site #3-60-022

1 River Street, Hastings-On-Hudson, New York

● **Source:** **Sample No.:** SBS02

Remarks:

● 4% Dry Bentonite, 5% potable water slurry

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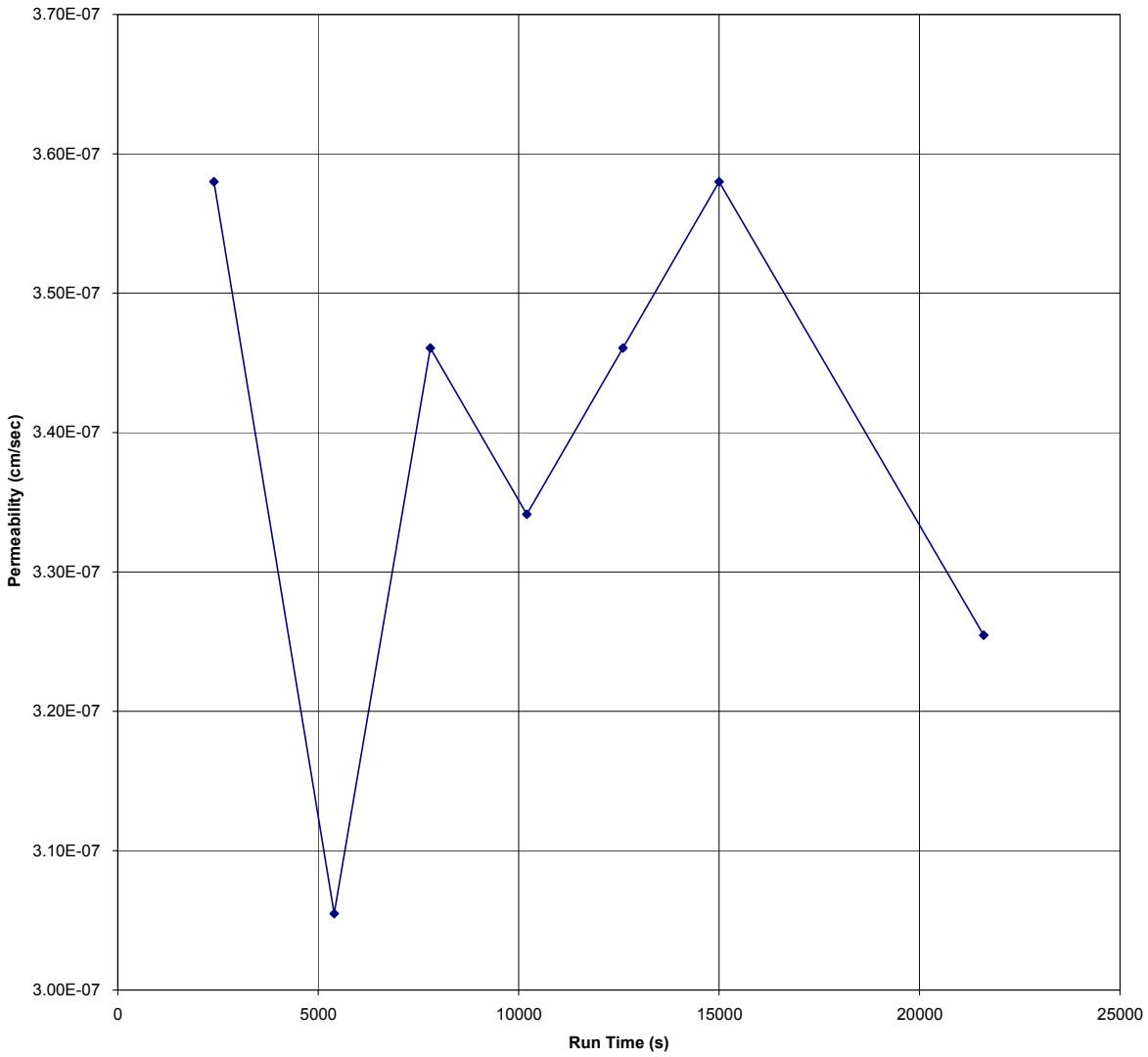
UNDERGROUND ENGINEERING & ENVIRONMENTAL SOLUTIONS

ATTACHMENT F4

Laboratory Data for Short-Term Hydraulic Conductivity Testing on Soil-Bentonite



Exploration No.:
Sample No.: SBS04
Depth (ft):

Specimen Mix: 0% Dry Bentonite, 5% potable water slurry
Permeant Used: Potable Water

Sample Description: Olive clayey sand
SC

Hydraulic Conductivity (cm/s): 3.33E-07

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UNDERGROUND ENGINEERING & ENVIRONMENTAL SOLUTIONS

OU-1 Remediation, NYSDEC Site #3-60-022
1 River Street, Hastings-On-Hudson, New York

Constant Head Hydraulic Conductivity
ASTM D5084

FILE NO. 28612-113

J:\EXCEL\Perm\28612-113\[Perm005a.xls]Report Plot

HALEY & ALDRICH
Geotechnical Laboratory

Permeability Test
Constant Head Hydraulic Conductivity Using a Flexible Wall Permeameter
ASTM D 5084

File No.: 28612-113
Test No.: PERM005
Date: 18-May-06
Tested By: D. Crawford
Checked By: M. Dobday

Project: OU-1 Remediation, NYSDEC Site #3-60-022
1 River Street, Hastings-On-Hudson, New York

Exploration No.:
Sample No.: SBS04
Depth (ft):

Sample Description: Olive clayey sand
SC

Specimen Mix: 0% Dry Bentonite, 5% potable water slurry
Permeant Used: Potable Water

Test Specimen:

Remolded
Compaction Procedure:
Maximum Dry Unit Weight (pcf):
Optimum Water Content (%):
Degree of Compaction (%):

Specimen Soil Preperation: Minus #4 fraction tested.

	Initial	Final
Water Content (%):	24.3%	16.8%
Moist Specimen Mass (g):	491.00	464.07
Dry Specimen Mass (g):	394.98	397.20
Specimen Diameter (cm):	7.436	7.053
Specimen Height (cm):	5.591	5.069
Specimen Area (cm^2):	43.424	39.069
Specimen Volume (cm^3):	242.784	198.024
Dry Unit Weight (pcf):	87.7	125.2

Saturation (B Value) (%): 99.5

Estimated Specific Gravity: 2.700

Constant Head Hydraulic Conductivity Test

TIME INTERVAL	DURATION (sec)	INLET PRESS. (psi)	OUTLET PRESS. (psi)	GRADIENT (del h/del L)	FLOW RATE (cc/sec)	PERMEABILITY (cm/sec)	TOTAL RUN TIME (sec)
1	2400	57.0	55.4	20.1	0.000313	3.58E-07	2400
2	3000	57.0	55.4	20.1	0.000267	3.05E-07	5400
3	2400	57.0	55.4	20.1	0.000302	3.46E-07	7800
4	2400	57.0	55.4	20.1	0.000292	3.34E-07	10200
5	2400	57.0	55.4	20.1	0.000302	3.46E-07	12600
6	2400	57.0	55.4	20.1	0.000313	3.58E-07	15000
7	6600	57.0	55.4	20.1	0.000284	3.25E-07	21600

ASTM REQUIREMENTS FOR COMPLETED TEST:

RUN No.	PERMEABILITY (cm/sec)	RATIO INLET TO OUTLET FLOW cc/sec	ACCEPTABLE FLOW RATIO	AVERAGE PERMEABILITY (cm/sec)	STEADY PERMEABILITY
1	3.58E-07	8.75E-01	YES	3.36E-07	YES
2	3.05E-07	1.00E+00	YES	3.33E-07	YES
3	3.46E-07	1.07E+00	YES	3.46E-07	YES
4	3.34E-07	1.00E+00	YES	3.41E-07	YES
5	3.46E-07	1.07E+00	YES		YES
6	3.58E-07	8.75E-01	YES		
7	3.25E-07	1.03E+00	YES		

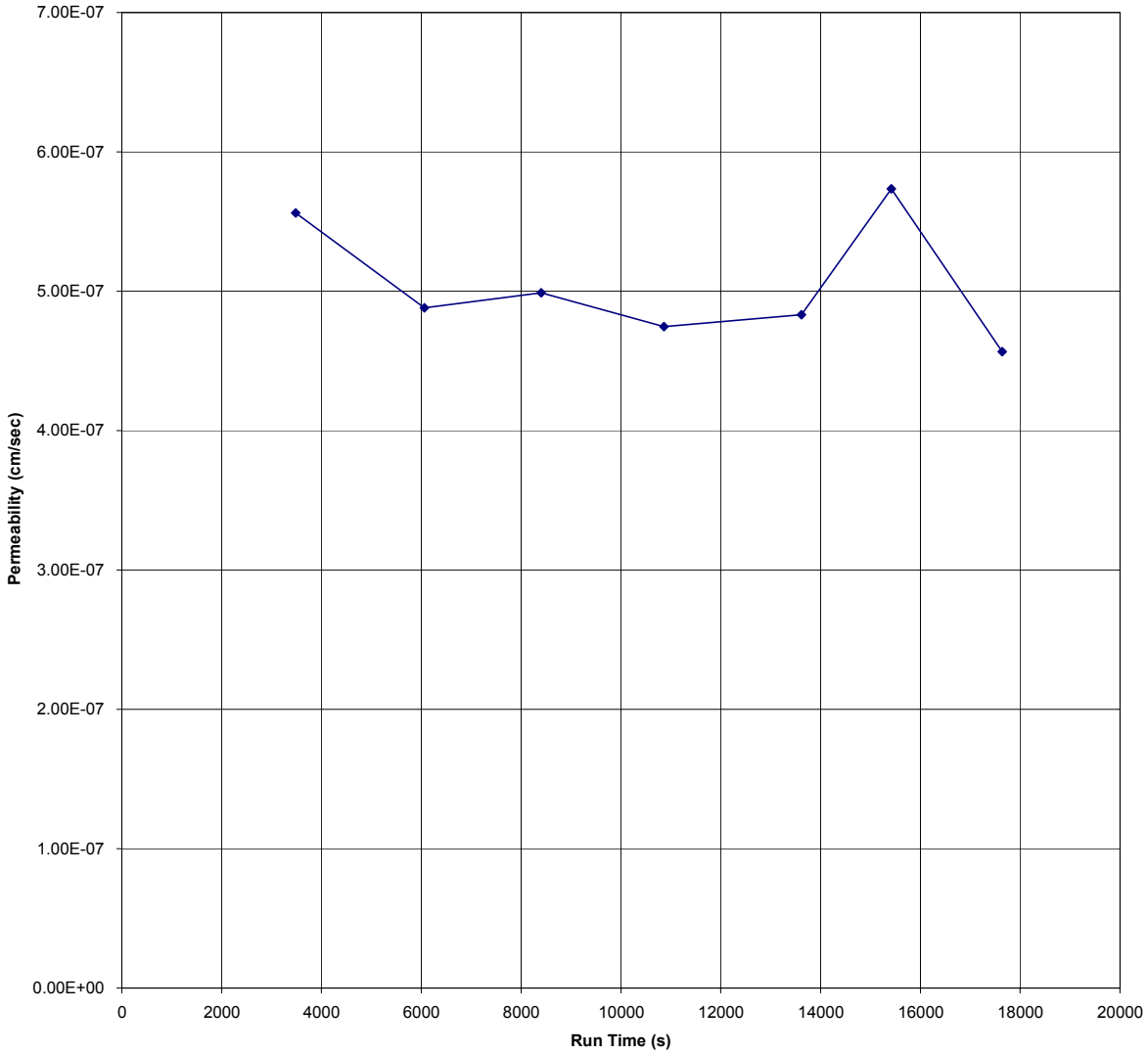
ASTM SPEC:
Continue permeation until 4 values of permeability are obtained in which:

(1) Ratio of outflow to inflow rate is between 0.75 and 1.25.

(2) Four consecutive permeability determinations fall within +/-25 % of the mean permeability value.

(3) Plot of permeability vs. time shows no significant upward or downward trends.

FINAL HYDRAULIC CONDUCTIVITY (cm/sec): **3.33E-07**



Exploration No.:
Sample No.: SBS04
Depth (ft):

Specimen Mix: 0% Dry Bentonite, 5% potable water slurry
Permeant Used: Site Groundwater

Sample Description: Olive clayey sand
SC

Hydraulic Conductivity (cm/s): 4.86E-07

HALEY & ALDRICH
UNDERGROUND ENGINEERING & ENVIRONMENTAL SOLUTIONS

OU-1 Remediation, NYSDEC Site #3-60-022
1 River Street, Hastings-On-Hudson, New York

Constant Head Hydraulic Conductivity
ASTM D5084

FILE NO. 28612-113

J:\EXCEL\Perm\28612-113\[Perm006 Run 2.xls]Report Plot

HALEY & ALDRICH
Geotechnical Laboratory

Permeability Test
Constant Head Hydraulic Conductivity Using a Flexible Wall Permeameter
ASTM D 5084

File No.: 28612-113
Test No.: PERM006
Date: 10-May-06
Tested By: D. Crawford
Checked By: M. Dobday

Project: OU-1 Remediation, NYSDEC Site #3-60-022
1 River Street, Hastings-On-Hudson, New York

Exploration No.: N/A
Sample No.: SBS04
Depth (ft):

Sample Description: Olive clayey sand
SC

Specimen Mix: 0% Dry Bentonite, 5% potable water slurry
Permeant Used: Site Groundwater

Test Specimen:

Remolded
Compaction Procedure:
Maximum Dry Unit Weight (pcf):
Optimum Water Content (%):
Degree of Compaction (%):

Specimen Soil Preperation: Minus #4 fraction tested.

	Initial	Final
Water Content (%):	25.0%	17.5%
Moist Specimen Mass (g):	495.00	460.14
Dry Specimen Mass (g):	396.09	391.73
Specimen Diameter (cm):	7.235	6.953
Specimen Height (cm):	6.858	5.120
Specimen Area (cm^2):	41.108	37.966
Specimen Volume (cm^3):	281.898	194.385
Dry Unit Weight (pcf):	87.7	125.8
Saturation (B Value) (%):	98.6	
Estimated Specific Gravity:	2.700	

Constant Head Hydraulic Conductivity Test

TIME INTERVAL	DURATION (sec)	INLET PRESS. (psi)	OUTLET PRESS. (psi)	GRADIENT (del h/del L)	FLOW RATE (cc/sec)	PERMEABILITY (cm/sec)	TOTAL RUN TIME (sec)
1	3480	57.3	55.4	19.8	0.000453	5.56E-07	3480
2	2580	57.3	55.4	19.8	0.000397	4.88E-07	6060
3	2340	57.3	55.4	19.8	0.000406	4.99E-07	8400
4	2460	57.3	55.4	19.8	0.000386	4.75E-07	10860
5	2760	57.3	55.4	19.8	0.000393	4.83E-07	13620
6	1800	57.3	55.4	19.8	0.000467	5.73E-07	15420
7	2220	57.3	55.4	19.8	0.000372	4.57E-07	17640

ASTM REQUIREMENTS FOR COMPLETED TEST:

RUN No.	PERMEABILITY (cm/sec)	RATIO INLET TO OUTLET FLOW cc/sec	ACCEPTABLE FLOW RATIO	AVERAGE PERMEABILITY (cm/sec)	STEADY PERMEABILITY
1	5.56E-07	1.17E+00	YES	5.04E-07	YES
2	4.88E-07	1.16E+00	YES	4.86E-07	YES
3	4.99E-07	1.11E+00	YES	5.07E-07	YES
4	4.75E-07	1.11E+00	YES	4.97E-07	YES
5	4.83E-07	1.11E+00	YES		YES
6	5.73E-07	1.05E+00	YES		YES
7	4.57E-07	9.41E-01	YES		

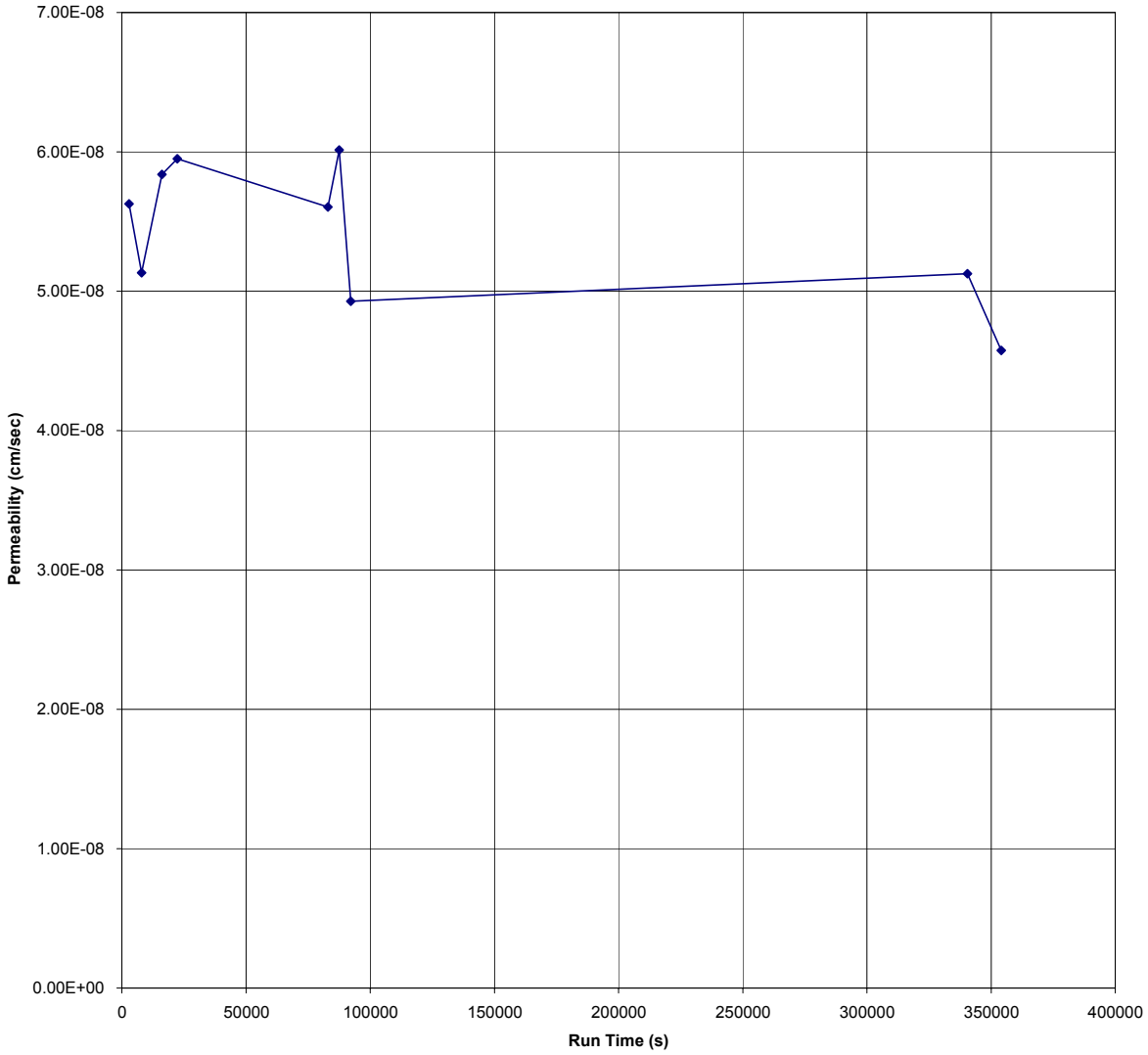
ASTM SPEC:
Continue permeation until 4 values of permeability are obtained in which:

(1) Ratio of outflow to inflow rate is between 0.75 and 1.25.

(2) Four consecutive permeability determinations fall within +/-25 % of the mean permeability value.

(3) Plot of permeability vs. time shows no significant upward or downward trends.

FINAL HYDRAULIC CONDUCTIVITY (cm/sec): **4.86E-07**



Exploration No.:
Sample No.: SBS01
Depth (ft):

Specimen Mix: 2% Dry Bentonite, 5% potable water slurry
Permeant Used: Potable Water

Sample Description: Olive Clayey sand
SC

Hydraulic Conductivity (cm/s): 5.63E-08

HALEY & ALDRICH
UNDERGROUND ENGINEERING & ENVIRONMENTAL SOLUTIONS

OU-1 Remediation, NYSDEC Site #3-60-022
1 River Street, Hastings-On-Hudson, New York

Constant Head Hydraulic Conductivity
ASTM D5084

FILE NO. 28612-113

J:\EXCEL\Perm\28612-113\[Perm001.xls]Data Reduction

HALEY & ALDRICH
Geotechnical Laboratory

Permeability Test
Constant Head Hydraulic Conductivity Using a Flexible Wall Permeameter
ASTM D 5084

File No.: 28612-113
Test No.: PERM001
Date: 6-Apr-06
Tested By: D. Crawford
Checked By: M. Dobday

Project: OU-1 Remediation, NYSDEC Site #3-60-022
1 River Street, Hastings-On-Hudson, New York

Exploration No.:
Sample No.: SBS01
Depth (ft):

Sample Description: Olive Clayey sand
SC

Specimen Mix: 2% Dry Bentonite, 5% potable water slurry
Permeant Used: Potable Water

Test Specimen:

Remolded
Compaction Procedure:
Maximum Dry Unit Weight (pcf):
Optimum Water Content (%):
Degree of Compaction (%):

Specimen Soil Preperation: Minus #4 fraction tested.

	Initial	Final
Water Content (%):	32.2%	24.7%
Moist Specimen Mass (g):	613.13	568.82
Dry Specimen Mass (g):	463.81	456.04
Specimen Diameter (cm):	7.411	7.288
Specimen Height (cm):	7.467	6.633
Specimen Area (cm^2):	43.14	41.716
Specimen Volume (cm^3):	322.107	276.705
Dry Unit Weight (pcf):	89.9	102.9
Saturation (B Value) (%):	97.3	
Estimated Specific Gravity:	2.700	

Constant Head Hydraulic Conductivity Test

TIME INTERVAL	DURATION (sec)	INLET PRESS. (psi)	OUTLET PRESS. (psi)	GRADIENT (del h/del L)	FLOW RATE (cc/sec)	PERMEABILITY (cm/sec)	TOTAL RUN TIME (sec)
1	2880	55.9	53.9	18.6	0.000045	5.63E-08	2880
2	5100	55.9	53.9	18.6	0.000041	5.13E-08	7980
3	8220	55.9	53.9	18.6	0.000047	5.84E-08	16200
4	6180	55.9	53.9	18.6	0.000048	5.95E-08	22380
5	60600	55.9	53.9	18.6	0.000045	5.61E-08	82980
6	4560	55.9	53.9	18.6	0.000048	6.01E-08	87540
7	4680	55.9	53.9	18.6	0.000040	4.93E-08	92220
8	248280	55.9	53.9	18.6	0.000041	5.13E-08	340500
9	13620	55.9	53.9	18.6	0.000037	4.58E-08	354120

ASTM REQUIREMENTS FOR COMPLETED TEST:

RUN No.	PERMEABILITY (cm/sec)	RATIO INLET TO OUTLET FLOW cc/sec	ACCEPTABLE FLOW RATIO	AVERAGE PERMEABILITY (cm/sec)	STEADY PERMEABILITY
1	5.63E-08	8.57E-01	YES	5.64E-08	YES
2	5.13E-08	9.09E-01	YES	5.63E-08	YES
3	5.84E-08	1.08E+00	YES	5.85E-08	YES
4	5.95E-08	1.03E+00	YES	5.62E-08	YES
5	5.61E-08	9.96E-01	YES	5.42E-08	YES
6	6.01E-08	1.10E+00	YES	5.16E-08	YES
7	4.93E-08	1.18E+00	YES		YES
8	5.13E-08	1.03E+00	YES		YES
9	4.58E-08	1.08E+00	YES		YES

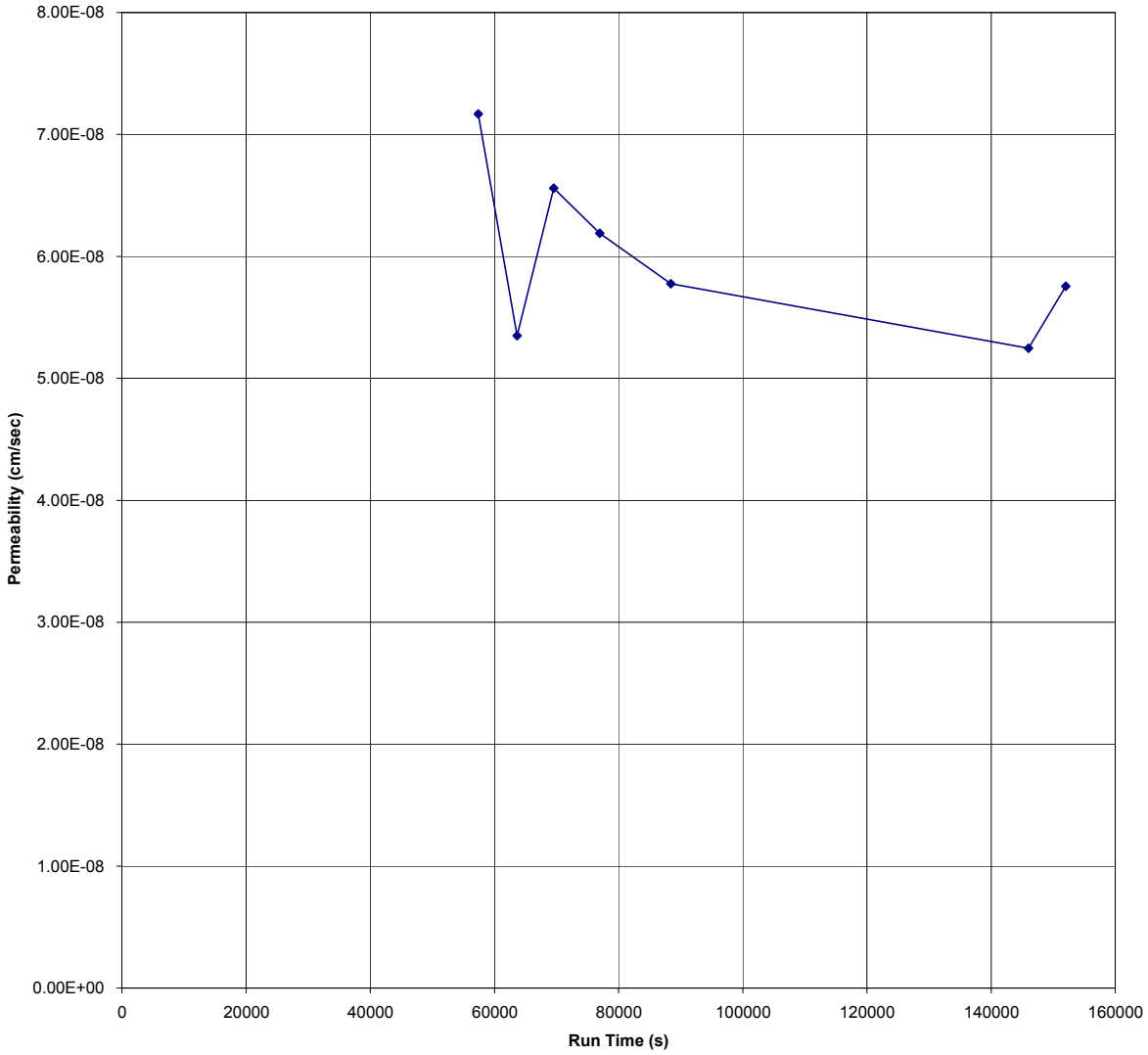
ASTM SPEC:
Continue permeation until 4 values of permeability are obtained in which:

(1) Ratio of outflow to inflow rate is between 0.75 and 1.25.

(2) Four consecutive permeability determinations fall within +/-25 % of the mean permeability value.

(3) Plot of permeability vs. time shows no significant upward or downward trends.

FINAL HYDRAULIC CONDUCTIVITY (cm/sec): **5.63E-08**



Exploration No.:
Sample No.: SBS01
Depth (ft):

Specimen Mix: 2% Dry Bentonite, 5% potable water slurry
Permeant Used: Site Groundwater

Sample Description: Olive Clayey sand
SC

Hydraulic Conductivity (cm/s): 5.97E-08

HALEY & ALDRICH
UNDERGROUND ENGINEERING & ENVIRONMENTAL SOLUTIONS

OU-1 Remediation, NYSDEC Site #3-60-022
1 River Street, Hastings-On-Hudson, New York

Constant Head Hydraulic Conductivity
ASTM D5084

FILE NO. 28612-113

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HALEY & ALDRICH
Geotechnical Laboratory

Permeability Test
Constant Head Hydraulic Conductivity Using a Flexible Wall Permeameter
ASTM D 5084

File No.: 28612-113
Test No.: PERM002
Date: 12-Apr-06
Tested By: D. Crawford
Checked By: M. Dobday

Project: OU-1 Remediation, NYSDEC Site #3-60-022
1 River Street, Hastings-On-Hudson, New York

Exploration No.:
Sample No.: SBS01
Depth (ft):

Sample Description: Olive Clayey sand
SC

Specimen Mix: 2% Dry Bentonite, 5% potable water slurry
Permeant Used: Site Groundwater

Test Specimen:

Remolded
Compaction Procedure:
Maximum Dry Unit Weight (pcf):
Optimum Water Content (%):
Degree of Compaction (%):

Specimen Soil Preperation: Minus #4 fraction tested.

	Initial	Final
Water Content (%):	32.0%	25.3%
Moist Specimen Mass (g):	530.37	499.26
Dry Specimen Mass (g):	401.73	398.49
Specimen Diameter (cm):	7.557	7.095
Specimen Height (cm):	5.913	5.702
Specimen Area (cm^2):	44.857	39.540
Specimen Volume (cm^3):	265.237	225.437
Dry Unit Weight (pcf):	94.6	110.4
Saturation (B Value) (%):	100.1	
Estimated Specific Gravity:	2.700	

Constant Head Hydraulic Conductivity Test

TIME INTERVAL	DURATION (sec)	INLET PRESS. (psi)	OUTLET PRESS. (psi)	GRADIENT (del h/del L)	FLOW RATE (cc/sec)	PERMEABILITY (cm/sec)	TOTAL RUN TIME (sec)
1	57420	45.4	43.8	19.4	0.000062	7.17E-08	57420
2	6240	45.4	43.8	19.4	0.000046	5.35E-08	63660
3	5880	45.4	43.8	19.4	0.000057	6.56E-08	69540
4	7440	45.4	43.8	19.4	0.000054	6.19E-08	76980
5	11460	45.4	43.8	19.4	0.000050	5.78E-08	88440
6	57600	45.4	43.8	19.4	0.000046	5.25E-08	146040
7	6000	45.4	43.8	19.4	0.000050	5.76E-08	152040

ASTM REQUIREMENTS FOR COMPLETED TEST:

RUN No.	PERMEABILITY (cm/sec)	RATIO INLET TO OUTLET FLOW cc/sec	ACCEPTABLE FLOW RATIO	AVERAGE PERMEABILITY (cm/sec)	STEADY PERMEABILITY
1	7.17E-08	1.20E+00	YES	6.32E-08	YES
2	5.35E-08	9.33E-01	YES	5.97E-08	YES
3	6.56E-08	9.14E-01	YES	5.94E-08	YES
4	6.19E-08	1.00E+00	YES	5.74E-08	YES
5	5.78E-08	1.09E+00	YES	4.19E-08	YES
6	5.25E-08	1.02E+00	YES		YES
7	5.76E-08	1.00E+00	YES		YES

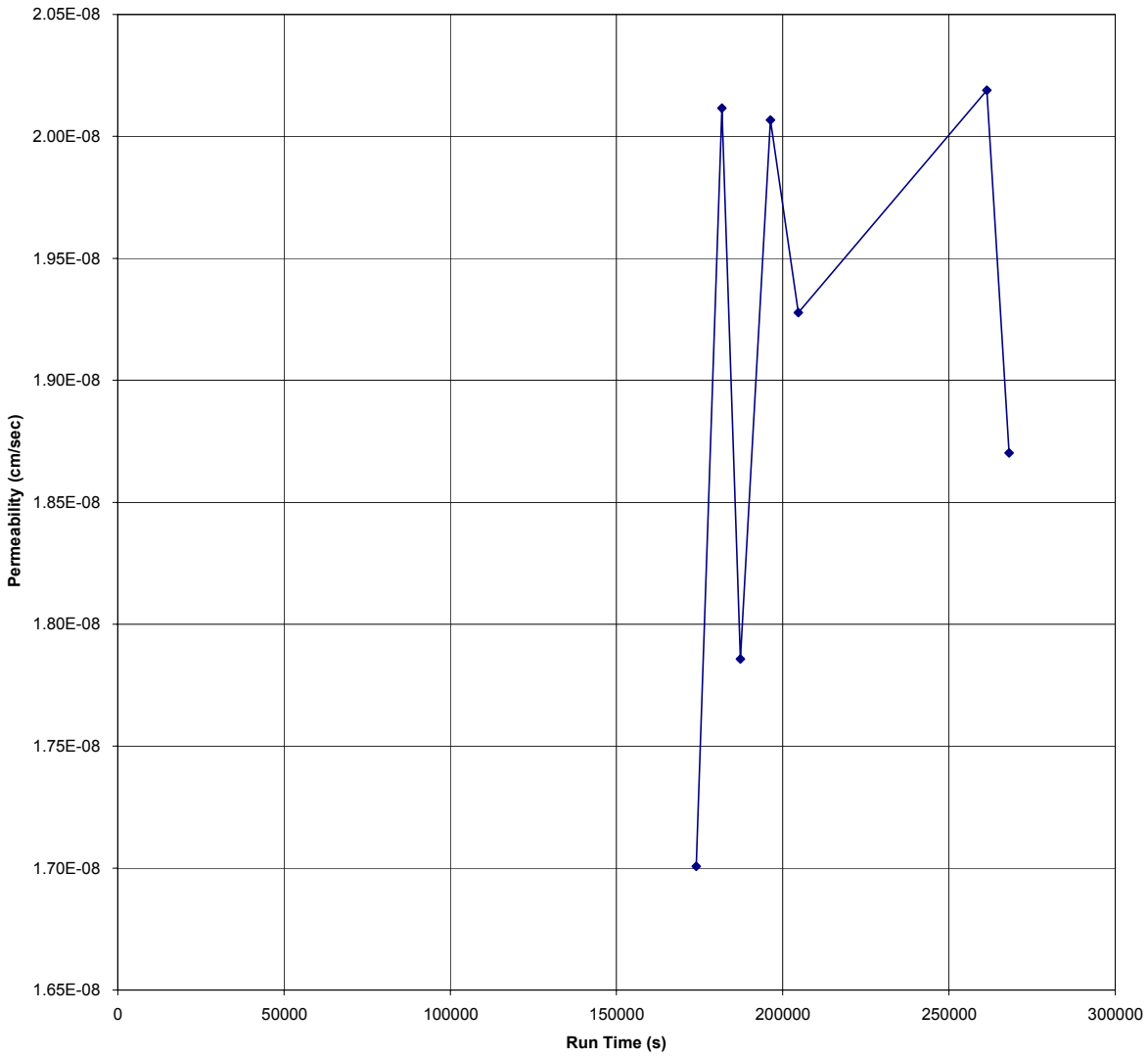
ASTM SPEC:
Continue permeation until 4 values of permeability are obtained in which:

(1) Ratio of outflow to inflow rate is between 0.75 and 1.25.

(2) Four consecutive permeability determinations fall within +/-25 % of the mean permeability value.

(3) Plot of permeability vs. time shows no significant upward or downward trends.

FINAL HYDRAULIC CONDUCTIVITY (cm/sec): **5.97E-08**



Exploration No.:
Sample No.: SBS02
Depth (ft):

Specimen Mix: 4% Dry Bentonite, 5% potable water slurry
Permeant Used: Potable Water

Sample Description: Olive Clayey sand
SC

Hydraulic Conductivity (cm/s): 1.93E-08

HALEY & ALDRICH
UNDERGROUND ENGINEERING & ENVIRONMENTAL SOLUTIONS

OU-1 Remediation, NYSDEC Site #3-60-022
1 River Street, Hastings-On-Hudson, New York

Constant Head Hydraulic Conductivity
ASTM D5084

FILE NO. 28612-113

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HALEY & ALDRICH
Geotechnical Laboratory

Permeability Test
Constant Head Hydraulic Conductivity Using a Flexible Wall Permeameter
ASTM D 5084

File No.: 28612-113
Test No.: PERM003
Date: 20-Apr-06
Tested By: D. Crawford
Checked By: M. Dobday

Project: OU-1 Remediation, NYSDEC Site #3-60-022
1 River Street, Hastings-On-Hudson, New York

Exploration No.:
Sample No.: SBS02
Depth (ft):

Sample Description: Olive Clayey sand
SC

Specimen Mix: 4% Dry Bentonite, 5% potable water slurry
Permeant Used: Potable Water

Test Specimen:

Remolded
Compaction Procedure:
Maximum Dry Unit Weight (pcf):
Optimum Water Content (%):
Degree of Compaction (%):

Specimen Soil Preperation: Minus #4 fraction tested.

	Initial	Final
Water Content (%):	42.8%	29.2%
Moist Specimen Mass (g):	482.00	432.37
Dry Specimen Mass (g):	337.58	334.68
Specimen Diameter (cm):	7.427	6.969
Specimen Height (cm):	6.306	5.425
Specimen Area (cm^2):	43.319	38.144
Specimen Volume (cm^3):	273.169	206.914
Dry Unit Weight (pcf):	83.4	101.0
Saturation (B Value) (%):	96.9	
Estimated Specific Gravity:	2.700	

Constant Head Hydraulic Conductivity Test

TIME INTERVAL	DURATION (sec)	INLET PRESS. (psi)	OUTLET PRESS. (psi)	GRADIENT (del h/del L)	FLOW RATE (cc/sec)	PERMEABILITY (cm/sec)	TOTAL RUN TIME (sec)
1	173940	47.0	45.3	18.5	0.000014	1.70E-08	173940
2	7740	47.0	45.3	18.5	0.000016	2.01E-08	181680
3	5580	47.0	45.3	18.5	0.000014	1.79E-08	187260
4	9000	47.0	45.3	18.5	0.000016	2.01E-08	196260
5	8400	47.0	45.3	18.5	0.000015	1.93E-08	204660
6	56760	47.0	45.3	18.5	0.000016	2.02E-08	261420
7	6660	47.0	45.3	18.5	0.000015	1.87E-08	268080

ASTM REQUIREMENTS FOR COMPLETED TEST:

RUN No.	PERMEABILITY (cm/sec)	RATIO INLET TO OUTLET FLOW cc/sec	ACCEPTABLE FLOW RATIO	AVERAGE PERMEABILITY (cm/sec)	STEADY PERMEABILITY
1	1.70E-08	1.16E+00	YES	1.88E-08	YES
2	2.01E-08	9.23E-01	YES	1.93E-08	YES
3	1.79E-08	1.00E+00	YES	1.93E-08	YES
4	2.01E-08	1.07E+00	YES	1.96E-08	YES
5	1.93E-08	1.00E+00	YES	1.45E-08	YES
6	2.02E-08	1.00E+00	YES		YES
7	1.87E-08	1.00E+00	YES		YES

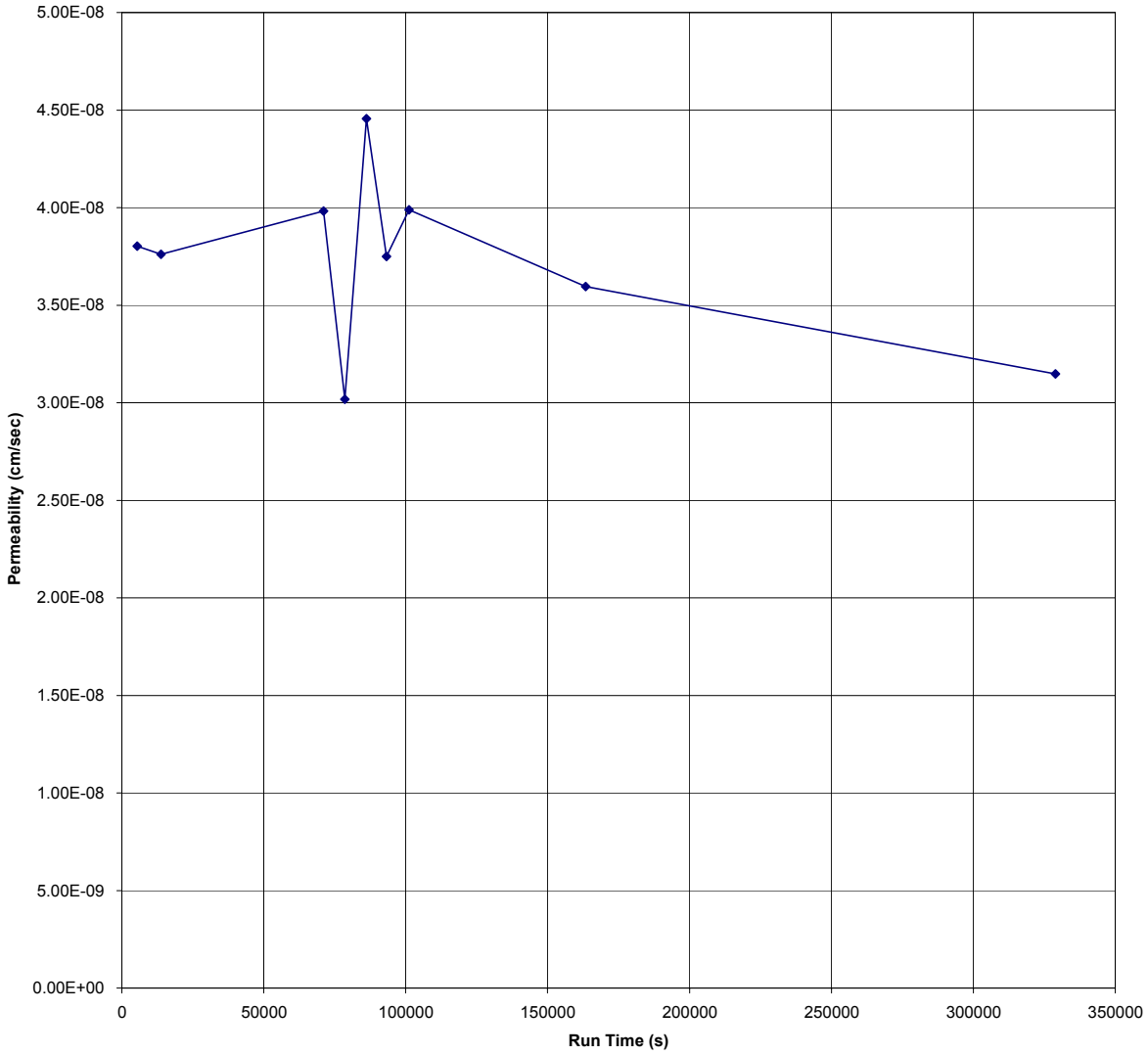
ASTM SPEC:
Continue permeation until 4 values of permeability are obtained in which:

(1) Ratio of outflow to inflow rate is between 0.75 and 1.25.

(2) Four consecutive permeability determinations fall within +/-25 % of the mean permeability value.

(3) Plot of permeability vs. time shows no significant upward or downward trends.

FINAL HYDRAULIC CONDUCTIVITY (cm/sec): **1.93E-08**



Exploration No.:
Sample No.: SBS02
Depth (ft):

Specimen Mix: 4% Dry Bentonite, 5% potable water slurry
Permeant Used: Site Groundwater

Sample Description: Olive Clayey sand
SC

Hydraulic Conductivity (cm/s): 3.80E-08

HALEY & ALDRICH
UNDERGROUND ENGINEERING & ENVIRONMENTAL SOLUTIONS

OU-1 Remediation, NYSDEC Site #3-60-022
1 River Street, Hastings-On-Hudson, New York

Constant Head Hydraulic Conductivity
ASTM D5084

FILE NO. 28612-113

J:\EXCEL\Perm\28612-113\[Perm004.xls]Data Reduction

HALEY & ALDRICH
Geotechnical Laboratory

Permeability Test
Constant Head Hydraulic Conductivity Using a Flexible Wall Permeameter
ASTM D 5084

File No.: 28612-113
Test No.: PERM004
Date: 25-Apr-06
Tested By: D. Crawford
Checked By: M. Dobday

Project: OU-1 Remediation, NYSDEC Site #3-60-022
1 River Street, Hastings-On-Hudson, New York

Exploration No.:
Sample No.: SBS02
Depth (ft):

Sample Description: Olive Clayey sand
SC

Specimen Mix: 4% Dry Bentonite, 5% potable water slurry
Permeant Used: Site Groundwater

Test Specimen:

Remolded
Compaction Procedure:
Maximum Dry Unit Weight (pcf):
Optimum Water Content (%):
Degree of Compaction (%):

Specimen Soil Preperation: Minus #4 fraction tested.

	Initial	Final
Water Content (%):	44.1%	29.2%
Moist Specimen Mass (g):	476.00	425.69
Dry Specimen Mass (g):	330.32	329.36
Specimen Diameter (cm):	7.5417	7.033
Specimen Height (cm):	5.9655	5.235
Specimen Area (cm^2):	44.671	38.852
Specimen Volume (cm^3):	266.48	203.370
Dry Unit Weight (pcf):	77.4	101.1
Saturation (B Value) (%):	99.8	
Estimated Specific Gravity:	2.700	

Constant Head Hydraulic Conductivity Test

TIME INTERVAL	DURATION (sec)	INLET PRESS. (psi)	OUTLET PRESS. (psi)	GRADIENT (del h/del L)	FLOW RATE (cc/sec)	PERMEABILITY (cm/sec)	TOTAL RUN TIME (sec)
1	5400	47.1	45.3	21.3	0.000036	3.80E-08	5400
2	8400	47.1	45.3	21.3	0.000036	3.76E-08	13800
3	57240	47.1	45.3	21.3	0.000038	3.98E-08	71040
4	7500	47.1	45.3	21.3	0.000029	3.02E-08	78540
5	7680	47.1	45.3	21.3	0.000042	4.46E-08	86220
6	7020	47.1	45.3	21.3	0.000036	3.75E-08	93240
7	7920	47.1	45.3	21.3	0.000038	3.99E-08	101160
8	62220	47.1	45.3	21.3	0.000034	3.60E-08	163380
9	165600	47.1	45.3	21.3	0.000030	3.15E-08	328980

ASTM REQUIREMENTS FOR COMPLETED TEST:

RUN No.	PERMEABILITY (cm/sec)	RATIO INLET TO OUTLET FLOW cc/sec	ACCEPTABLE FLOW RATIO	AVERAGE PERMEABILITY (cm/sec)	STEADY PERMEABILITY
1	3.80E-08	8.57E-01	YES	3.64E-08	YES
2	3.76E-08	8.18E-01	YES	3.80E-08	YES
3	3.98E-08	9.86E-01	YES	3.80E-08	YES
4	3.02E-08	8.70E-01	YES	3.80E-08	YES
5	4.46E-08	1.17E+00	YES	3.95E-08	YES
6	3.75E-08	1.00E+00	YES	3.62E-08	YES
7	3.99E-08	1.00E+00	YES		YES
8	3.60E-08	9.77E-01	YES		YES
9	3.15E-08	9.80E-01	YES		YES

ASTM SPEC:
Continue permeation until 4 values of permeability are obtained in which:

(1) Ratio of outflow to inflow rate is between 0.75 and 1.25.

(2) Four consecutive permeability determinations fall within +/-25 % of the mean permeability value.

(3) Plot of permeability vs. time shows no significant upward or downward trends.

FINAL HYDRAULIC CONDUCTIVITY (cm/sec): **3.80E-08**

J:\EXCEL\Perm\28612-113\[Perm004.xls]Data Reduction

ATTACHMENT F5

Laboratory Data for Long-Term Hydraulic Conductivity / Compatibility Testing on Soil-Bentonite

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Client:	Haley & Aldrich		
Project Name:	OU-1 Remediation		
Project Location:	1 River Street, Hastings-on-Hudson, NY		
GTX #:	6665		
Start Date:	5/22/2006	Tested By:	ahh
End Date:	7/21/2006	Checked By:	rmt/jdt
Boring #:	---		
Sample #:	SBS03a		
Depth:	---		
Visual Description:	Wet, olive sandy clay		

Saturated Hydraulic Conductivity and Saturated Leachate Conductivity by EPA method 9100

Sample Type:	remolded bulk sample	Permeant Fluid:	site water
Orientation:	Vertical	Cell #:	4/---/10

Sample Preparation: Test specimens remolded using moderate effort at the as-received moisture content. Trimmings moisture content = 28.7%.

Parameter	Initial	Final
Height, in	1.95	1.95
Diameter, in	3.02	3.02
Area, in^2	7.16	7.16
Volume, in^3	13.97	13.97
Mass, g	452	452
Bulk Density, pcf	123	123
Moisture Content, %	Determined upon completion of test	Determined upon completion of test
Dry Density, pcf	Determined upon completion of test	Determined upon completion of test
Degree of Saturation, %	---	Determined upon completion of test

B COEFFICIENT DETERMINATION

Cell Pressure, psi:	95.1	Pressure Increment, psi:	4.9
Sample Pressure, psi:	91.9	B Coefficient:	0.98

FLOW DATA

Date	Time, sec	Pressure, psi			Gradient	Flow Volume, cc				Temp, °C		R_t	Permeability cm/sec
		Cell	Inlet	Outlet		In	Out	Δ In	Δ Out	Start	End		
6/2	---	90.0	87.7	86.3	19.9	1.00	21.25	---	---	---	---	---	---
6/5	215040	90.0	87.7	86.3	19.9	5.85	13.15	4.85	8.10	20	20	1.000	3.3E-08
6/5	----	90.0	87.7	86.3	19.9	5.85	13.15	---	---	---	---	---	---
6/5	37500	90.0	87.7	86.3	19.9	6.75	12.20	0.90	0.95	20	20	1.000	2.7E-08
6/5	----	90.0	87.7	86.3	19.9	6.75	12.20	---	---	---	---	---	---
6/6	50400	90.0	87.7	86.3	19.9	8.15	11.00	1.40	1.20	20	20	1.000	2.8E-08
6/6	----	90.0	87.7	86.3	19.9	8.15	11.00	---	---	---	---	---	---
6/7	85320	90.0	87.7	86.3	19.9	10.20	8.90	2.05	2.10	20	20	1.000	2.6E-08
6/7	----	90.0	87.7	86.3	19.9	10.20	8.90	---	---	---	---	---	---
6/7	28800	90.0	87.7	86.3	19.9	11.00	8.25	0.80	0.65	20	20	1.000	2.7E-08
6/7	----	90.0	87.7	86.3	19.9	11.00	8.25	---	---	---	---	---	---
6/8	55980	90.0	87.7	86.3	19.9	12.30	7.00	1.30	1.25	20	20	1.000	2.5E-08
6/8	----	90.0	87.7	86.3	19.9	12.30	7.00	---	---	---	---	---	---
6/8	30720	90.0	87.7	86.3	19.9	12.90	6.40	0.60	0.60	20	20	1.000	2.1E-08
6/8	----	90.0	87.7	86.3	19.9	12.90	6.40	---	---	---	---	---	---
6/9	62880	90.0	87.7	86.3	19.9	14.35	5.10	1.45	1.30	20	20	1.000	2.4E-08
6/9	----	90.0	87.7	86.3	19.9	14.35	5.10	---	---	---	---	---	---
6/9	22380	90.0	87.7	86.3	19.9	14.85	4.70	0.50	0.40	20	20	1.000	2.2E-08
6/9	----	90.0	87.7	86.3	19.9	14.85	4.70	---	---	---	---	---	---
6/12	231960	90.0	87.7	86.3	19.9	19.35	0.50	4.50	4.20	20	20	1.000	2.0E-08
6/12	---	90.0	87.7	86.3	19.9	1.00	23.15	---	---	---	---	---	---
6/12	29200	90.0	87.7	86.3	19.9	2.90	22.00	1.90	1.15	20	20	1.000	5.7E-08
6/12	----	90.0	87.7	86.3	19.9	2.90	22.00	---	---	---	---	---	---
6/13	56280	90.0	87.7	86.3	19.9	3.85	20.30	0.95	1.70	20	20	1.000	2.6E-08
6/13	----	90.0	87.7	86.3	19.9	3.85	20.30	---	---	---	---	---	---
6/14	26580	90.0	87.7	86.3	19.9	4.50	19.35	0.65	0.95	20	20	1.000	3.3E-08
6/14	----	90.0	87.7	86.3	19.9	4.50	19.35	---	---	---	---	---	---

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Client:	Haley & Aldrich		
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Project Location:	1 River Street, Hastings-on-Hudson, NY		
GTX #:	6665		
Start Date:	5/22/2006	Tested By:	ahh
End Date:	7/21/2006	Checked By:	rmt/jdt
Boring #:	---		
Sample #:	SBS03a		
Depth:	---		
Visual Description:	Wet, olive sandy clay		

Saturated Hydraulic Conductivity and Saturated Leachate Conductivity by EPA method 9100

6/14	59640	90.0	87.7	86.3	19.9	6.60	17.25	2.10	2.10	20	20	1.000	3.8E-08
6/14	----	90.0	87.7	86.3	19.9	6.60	17.25	---	---	---	---	---	---
6/15	32700	90.0	87.7	86.3	19.9	7.70	16.10	1.10	1.15	20	20	1.000	3.7E-08
6/15	----	90.0	87.7	86.3	19.9	0.05	21.55	---	---	---	---	---	---
6/15	25860	90.0	87.7	86.3	19.9	0.75	20.65	0.70	0.90	20	20	1.000	3.4E-08
6/15	----	90.0	87.7	86.3	19.9	0.75	20.65	---	---	---	---	---	---
6/16	56340	90.0	87.7	86.3	19.9	1.10	18.65	0.35	2.00	20	20	1.000	2.3E-08
6/16	----	90.0	87.7	86.3	19.9	1.10	18.65	---	---	---	---	---	---
6/16	28380	90.0	87.7	86.3	19.9	1.50	17.65	0.40	1.00	20	20	1.000	2.7E-08
6/16	----	90.0	87.7	86.3	19.9	1.50	17.65	---	---	---	---	---	---
6/19	231900	90.0	87.7	86.3	19.9	5.90	10.25	4.40	7.40	20	20	1.000	2.8E-08
6/19	----	90.0	87.7	86.3	19.9	5.90	10.25	---	---	---	---	---	---
6/19	26760	90.0	87.7	86.3	19.9	6.35	9.50	0.45	0.75	20	20	1.000	2.4E-08
6/19	---	90.0	87.7	86.3	19.9	3.50	24.55	---	---	---	---	---	---
6/20	59040	90.0	87.7	86.3	19.9	4.15	22.40	0.65	2.15	20	20	1.000	2.6E-08
6/20	----	90.0	87.7	86.3	19.9	4.15	22.40	---	---	---	---	---	---
6/20	29160	90.0	87.7	86.3	19.9	4.60	21.45	0.45	0.95	20	20	1.000	2.6E-08
6/20	----	90.0	87.7	86.3	19.9	4.60	21.45	---	---	---	---	---	---
6/21	57000	90.0	87.7	86.3	19.9	6.25	19.60	1.65	1.85	20	20	1.000	3.3E-08
6/21	----	90.0	87.7	86.3	19.9	4.00	19.60	---	---	---	---	---	---
6/21	28800	90.0	87.7	86.3	19.9	5.00	18.55	1.00	1.05	20	20	1.000	3.9E-08
6/22	----	90.0	87.7	86.3	19.9	1.00	18.55	---	---	---	---	---	---
6/22	58200	90.0	87.7	86.3	19.9	2.50	16.70	1.50	1.85	20	20	1.000	3.1E-08
6/22	----	90.0	87.7	86.3	19.9	2.50	16.70	---	---	---	---	---	---
6/22	29040	90.0	87.7	86.3	19.9	3.30	15.70	0.80	1.00	20	20	1.000	3.4E-08
6/22	----	90.0	87.7	86.3	19.9	3.30	15.70	---	---	---	---	---	---
6/23	55320	90.0	87.7	86.3	19.9	5.00	14.05	1.70	1.65	20	20	1.000	3.3E-08
6/23	----	90.0	87.7	86.3	19.9	5.00	14.05	---	---	---	---	---	---
6/23	28200	90.0	87.7	86.3	19.9	5.80	13.20	0.80	0.85	20	20	1.000	3.2E-08
6/23	----	90.0	87.7	86.3	19.9	5.80	13.20	---	---	---	---	---	---
6/23	8100	90.0	87.7	86.3	19.9	6.05	12.90	0.25	0.30	20	20	1.000	3.7E-08
6/23	----	90.0	87.7	86.3	19.9	6.05	12.90	---	---	---	---	---	---
6/26	228480	90.0	87.7	86.3	19.9	12.10	6.95	6.05	5.95	20	20	1.000	2.9E-08
6/26	---	90.0	87.7	86.3	19.9	12.10	6.95	---	---	---	---	---	---
6/26	24960	90.0	87.7	86.3	19.9	12.65	6.30	0.55	0.65	20	20	1.000	2.6E-08
6/26	----	90.0	87.7	86.3	19.9	12.65	6.30	---	---	---	---	---	---
6/27	58860	90.0	87.7	86.3	19.9	14.00	5.00	1.35	1.30	20	20	1.000	2.5E-08
6/27	----	90.0	87.7	86.3	19.9	14.00	5.00	---	---	---	---	---	---
6/27	28980	90.0	87.7	86.3	19.9	14.60	4.40	0.60	0.60	20	20	1.000	2.3E-08
6/27	----	90.0	87.7	86.3	19.9	14.60	4.40	---	---	---	---	---	---
6/28	57000	90.0	87.7	86.3	19.9	15.40	3.60	0.80	0.80	20	20	1.000	1.5E-08
6/28	----	90.0	87.7	86.3	19.9	15.40	3.60	---	---	---	---	---	---
6/28	29520	90.0	87.7	86.3	19.9	15.95	2.55	0.55	1.05	20	20	1.000	3.0E-08
6/28	----	90.0	87.7	86.3	19.9	15.95	2.55	---	---	---	---	---	---
6/29	56460	90.0	87.7	86.3	19.9	17.05	1.50	1.10	1.05	20	20	1.000	2.1E-08
6/29	----	90.0	87.7	86.3	19.9	17.05	1.50	---	---	---	---	---	---
6/29	29880	90.0	87.7	86.3	19.9	17.55	0.90	0.50	0.60	20	20	1.000	2.0E-08
6/29	----	90.0	87.7	86.3	19.9	17.55	0.90	---	---	---	---	---	---
6/30	58200	90.0	87.7	86.3	19.9	18.10	0.35	0.55	0.55	20	20	1.000	1.0E-08
6/30	----	90.0	87.7	86.3	19.9	0.50	24.35	---	---	---	---	---	---
7/1	24900	90.0	87.7	86.3	19.9	1.40	23.30	0.90	1.05	20	20	1.000	4.3E-08
7/1	----	90.0	87.7	86.3	19.9	1.40	23.30	---	---	---	---	---	---

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Start Date:	5/22/2006	Tested By:	ahh
End Date:	7/21/2006	Checked By:	rmt/jdt
Boring #:	---		
Sample #:	SBS03a		
Depth:	---		
Visual Description:	Wet, olive sandy clay		

Saturated Hydraulic Conductivity and Saturated Leachate Conductivity by EPA method 9100

7/3	61680	90.0	87.7	86.3	19.9	3.60	21.10	2.20	2.20	20	20	1.000	3.9E-08
7/3	----	90.0	87.7	86.3	19.9	3.60	21.10	---	---	---	---	---	---
7/3	170340	90.0	87.7	86.3	19.9	8.95	15.75	5.35	5.35	20	20	1.000	3.4E-08
7/3	----	90.0	87.7	86.3	19.9	8.95	15.75	---	---	---	---	---	---
7/5	173460	90.0	87.7	86.3	19.9	13.65	11.15	4.70	4.60	20	20	1.000	2.9E-08
7/5	----	90.0	87.7	86.3	19.9	13.65	11.15	---	---	---	---	---	---
7/5	28920	90.0	87.7	86.3	19.9	14.35	10.55	0.70	0.60	20	20	1.000	2.4E-08
7/5	----	90.0	87.7	86.3	19.9	14.35	10.55	---	---	---	---	---	---
7/6	56760	90.0	87.7	86.3	19.9	15.70	9.20	1.35	1.35	20	20	1.000	2.6E-08
7/6	----	90.0	87.7	86.3	19.9	15.70	9.20	---	---	---	---	---	---
7/6	28560	90.0	87.7	86.3	19.9	16.30	8.60	0.60	0.60	20	20	1.000	2.3E-08
7/6	----	90.0	87.7	86.3	19.9	16.30	8.60	---	---	---	---	---	---
7/7	54120	90.0	87.7	86.3	19.9	17.60	7.50	1.30	1.10	20	20	1.000	2.4E-08
7/7	----	90.0	87.7	86.3	19.9	17.60	7.50	---	---	---	---	---	---
7/7	21840	90.0	87.7	86.3	19.9	18.00	7.00	0.40	0.50	20	20	1.000	2.2E-08
7/7	----	90.0	87.7	86.3	19.9	18.00	7.00	---	---	---	---	---	---
7/10	240000	90.0	87.7	86.3	19.9	22.60	2.80	4.60	4.20	20	20	1.000	2.0E-08
7/10	----	90.0	87.7	86.3	19.9	22.60	2.80	---	---	---	---	---	---
7/10	29940	90.0	87.7	86.3	19.9	23.00	2.20	0.40	0.60	20	20	1.000	1.8E-08
7/10	----	90.0	87.7	86.3	19.9	23.00	2.20	---	---	---	---	---	---
7/11	58920	90.0	87.7	86.3	19.9	24.00	1.40	1.00	0.80	20	20	1.000	1.7E-08
7/11	----	90.0	87.7	86.3	19.9	0.50	24.30	---	---	---	---	---	---
7/11	25680	90.0	87.7	86.3	19.9	1.40	23.10	0.90	1.20	20	20	1.000	4.5E-08
7/11	----	90.0	87.7	86.3	19.9	1.40	23.10	---	---	---	---	---	---
7/12	57900	90.0	87.7	86.3	19.9	3.45	21.15	2.05	1.95	20	20	1.000	3.8E-08
7/12	----	90.0	87.7	86.3	19.9	3.45	21.15	---	---	---	---	---	---
7/12	28380	90.0	87.7	86.3	19.9	4.40	20.20	0.95	0.95	20	20	1.000	3.6E-08
7/12	----	90.0	87.7	86.3	19.9	4.40	20.20	---	---	---	---	---	---
7/13	58620	90.0	87.7	86.3	19.9	6.30	18.50	1.90	1.70	20	20	1.000	3.3E-08
7/13	----	90.0	87.7	86.3	19.9	6.30	18.50	---	---	---	---	---	---
7/13	28620	90.0	87.7	86.3	19.9	7.10	17.60	0.80	0.90	20	20	1.000	3.2E-08
7/13	----	90.0	87.7	86.3	19.9	7.10	17.60	---	---	---	---	---	---
7/17	316860	90.0	87.7	86.3	19.9	16.30	8.80	9.20	8.80	20	20	1.000	3.1E-08
7/17	----	90.0	87.7	86.3	19.9	16.30	8.80	---	---	---	---	---	---
7/17	28260	90.0	87.7	86.3	19.9	16.90	8.00	0.60	0.80	20	20	1.000	2.7E-08
7/17	----	90.0	87.7	86.3	19.9	16.90	8.00	---	---	---	---	---	---
7/18	57180	90.0	87.7	86.3	19.9	17.90	6.80	1.00	1.20	20	20	1.000	2.1E-08
7/18	----	90.0	87.7	86.3	19.9	17.90	6.80	---	---	---	---	---	---
7/18	27900	90.0	87.7	86.3	19.9	18.30	6.20	0.40	0.60	20	20	1.000	2.0E-08
7/18	----	90.0	87.7	86.3	19.9	18.30	6.20	---	---	---	---	---	---
7/19	59160	90.0	87.7	86.3	19.9	19.60	5.00	1.30	1.20	20	20	1.000	2.3E-08
7/19	----	90.0	87.7	86.3	19.9	19.60	5.00	---	---	---	---	---	---
7/19	28680	90.0	87.7	86.3	19.9	20.20	4.40	0.60	0.60	20	20	1.000	2.3E-08
7/19	----	90.0	87.7	86.3	19.9	20.20	4.40	---	---	---	---	---	---
7/20	57060	90.0	87.7	86.3	19.9	21.30	3.50	1.10	0.90	20	20	1.000	1.9E-08
7/20	----	90.0	87.7	86.3	19.9	21.30	3.50	---	---	---	---	---	---
7/20	11700	90.0	87.7	86.3	19.9	21.50	3.20	0.20	0.30	20	20	1.000	2.3E-08
7/20	----	90.0	87.7	86.3	19.9	21.50	3.20	---	---	---	---	---	---
7/21	75120	90.0	87.7	86.3	19.9	22.30	2.00	0.80	1.20	20	20	1.000	1.4E-08
7/21	----	90.0	87.7	86.3	19.9	22.30	2.00	---	---	---	---	---	---
7/21	13500	90.0	87.7	86.3	19.9	22.90	1.80	0.60	0.20	20	20	1.000	3.2E-08

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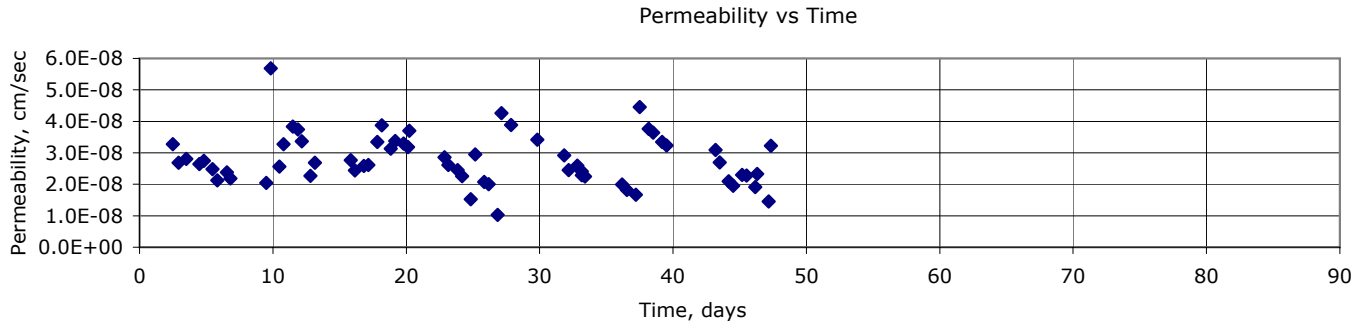
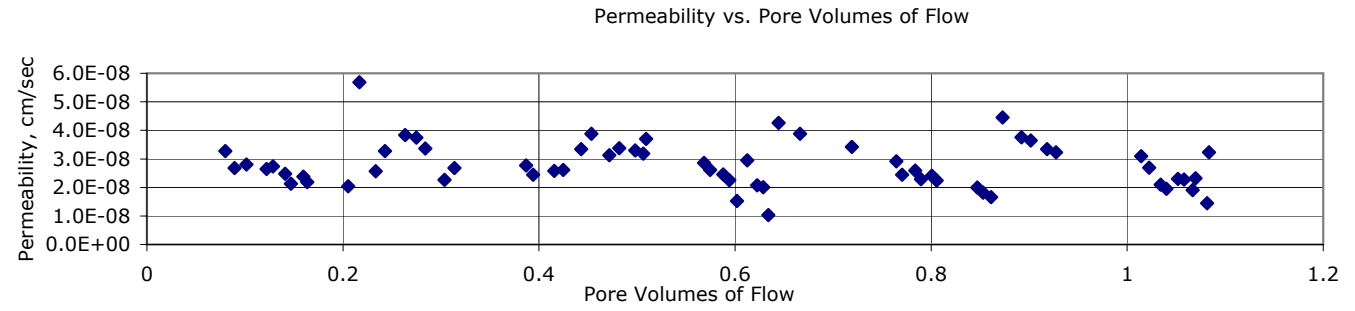
Start Date:	5/22/2006	Tested By:	ahh
End Date:	7/21/2006	Checked By:	rmt/jdt
Boring #:	---		
Sample #:	SBS03a		
Depth:	---		
Visual Description:	Wet, olive sandy clay		

Saturated Hydraulic Conductivity and Saturated Leachate Conductivity by EPA method 9100

PERMEABILITY AT 20° C: 2.3 x 10^{-8} cm/sec (@ 3 psi effective stress)





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Client:	Haley & Aldrich		
Project Name:	OU-1 Remediation		
Project Location:	1 River Street, Hastings-on-Hudson, NY		
GTX #:	6665		
Start Date:	5/22/2006	Tested By:	ahh
End Date:	7/21/2006	Checked By:	rmt/jdt
Boring #:	---		
Sample #:	SBS03b		
Depth:	---		
Visual Description:	Wet, olive sandy clay		

Saturated Hydraulic Conductivity and Saturated Leachate Conductivity by EPA method 9100

Sample Type:	remolded bulk sample	Permeant Fluid:	site water
Orientation:	Vertical	Cell #:	3/---/12

Sample Preparation: Test specimens remolded using moderate effort at the as-received moisture content. Trimmings moisture content = 28.7%.

Parameter	Initial	Final
Height, in	2.06	2.06
Diameter, in	2.97	2.97
Area, in^2	6.93	6.93
Volume, in^3	14.27	14.27
Mass, g	452	452
Bulk Density, pcf	120	120
Moisture Content, %	Determined upon completion of test	Determined upon completion of test
Dry Density, pcf	Determined upon completion of test	Determined upon completion of test
Degree of Saturation, %	---	Determined upon completion of test

B COEFFICIENT DETERMINATION

Cell Pressure, psi:	95.1	Pressure Increment, psi:	4.9
Sample Pressure, psi:	91.9	B Coefficient:	0.98

FLOW DATA

Date	Time, sec	Pressure, psi			Gradient	Flow Volume, cc				Temp, °C			Permeability cm/sec
		Cell	Inlet	Outlet		In	Out	Δ In	Δ Out	Start	End	R_t	
6/2	---	90.0	87.7	86.3	18.8	0.85	23.50	---	---	---	---	---	---
6/5	215040	90.0	87.7	86.3	18.8	7.45	19.25	6.60	4.25	20	20	1.000	3.0E-08
6/5	----	90.0	87.7	86.3	18.8	0.65	24.70	---	---	---	---	---	---
6/5	30420	90.0	87.7	86.3	18.8	1.75	23.75	1.10	0.95	20	20	1.000	4.0E-08
6/5	----	90.0	87.7	86.3	18.8	1.75	23.75	---	---	---	---	---	---
6/6	50580	90.0	87.7	86.3	18.8	3.75	23.70	2.00	0.05	20	20	1.000	2.4E-08
6/6	----	90.0	87.7	86.3	18.8	3.75	23.70	---	---	---	---	---	---
6/7	85320	90.0	87.7	86.3	18.8	7.05	23.40	3.30	0.30	20	20	1.000	2.5E-08
6/7	----	90.0	87.7	86.3	18.8	7.05	23.40	---	---	---	---	---	---
6/7	28740	90.0	87.7	86.3	18.8	8.25	23.35	1.20	0.05	20	20	1.000	2.6E-08
6/7	----	90.0	87.7	86.3	18.8	8.25	23.35	---	---	---	---	---	---
6/8	56040	90.0	87.7	86.3	18.8	10.35	20.85	2.10	2.50	20	20	1.000	4.9E-08
6/8	----	90.0	87.7	86.3	18.8	10.35	20.85	---	---	---	---	---	---
6/8	30660	90.0	87.7	86.3	18.8	11.45	19.60	1.10	1.25	20	20	1.000	4.6E-08
6/8	----	90.0	87.7	86.3	18.8	11.45	19.60	---	---	---	---	---	---
6/9	34860	90.0	87.7	86.3	18.8	13.70	17.10	2.25	2.50	20	20	1.000	8.1E-08
6/9	----	90.0	87.7	86.3	18.8	13.70	17.10	---	---	---	---	---	---
6/9	22140	90.0	87.7	86.3	18.8	14.45	16.25	0.75	0.85	20	20	1.000	4.3E-08
6/9	----	90.0	87.7	86.3	18.8	7.55	16.25	---	---	---	---	---	---
6/12	231960	90.0	87.7	86.3	18.8	12.20	11.70	4.65	4.55	20	20	1.000	2.4E-08
6/12	---	90.0	87.7	86.3	18.8	12.20	11.70	---	---	---	---	---	---
6/12	29280	90.0	87.7	86.3	18.8	12.90	11.00	0.70	0.70	20	20	1.000	2.8E-08
6/13	----	90.0	87.7	86.3	18.8	1.35	23.75	---	---	---	---	---	---
6/13	26220	90.0	87.7	86.3	18.8	3.00	22.40	1.65	1.35	20	20	1.000	6.8E-08
6/13	----	90.0	87.7	86.3	18.8	3.00	22.40	---	---	---	---	---	---
6/14	59580	90.0	87.7	86.3	18.8	5.45	19.25	2.45	3.15	20	20	1.000	5.6E-08
6/14	----	90.0	87.7	86.3	18.8	5.45	19.25	---	---	---	---	---	---
6/14	31560	90.0	87.7	86.3	18.8	6.80	17.70	1.35	1.55	20	20	1.000	5.5E-08
6/14	----	90.0	87.7	86.3	18.8	0.70	23.90	---	---	---	---	---	---

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GTX #:	6665		
Start Date:	5/22/2006	Tested By:	ahh
End Date:	7/21/2006	Checked By:	rmt/jdt
Boring #:	---		
Sample #:	SBS03b		
Depth:	---		
Visual Description:	Wet, olive sandy clay		

Saturated Hydraulic Conductivity and Saturated Leachate Conductivity by EPA method 9100

6/15	58860	90.0	87.7	86.3	18.8	2.60	22.20	1.90	1.70	20	20	1.000	3.6E-08
6/15	----	90.0	87.7	86.3	18.8	2.60	22.20	---	---	---	---	---	---
6/15	25920	90.0	87.7	86.3	18.8	3.25	21.30	0.65	0.90	20	20	1.000	3.6E-08
6/15	----	90.0	87.7	86.3	18.8	3.25	21.30	---	---	---	---	---	---
6/16	56280	90.0	87.7	86.3	18.8	4.75	19.50	1.50	1.80	20	20	1.000	3.5E-08
6/16	----	90.0	87.7	86.3	18.8	4.75	19.50	---	---	---	---	---	---
6/16	28380	90.0	87.7	86.3	18.8	5.40	18.55	0.65	0.95	20	20	1.000	3.4E-08
6/16	----	90.0	87.7	86.3	18.8	5.40	18.55	---	---	---	---	---	---
6/19	231720	90.0	87.7	86.3	18.8	11.00	11.65	5.60	6.90	20	20	1.000	3.2E-08
6/19	----	90.0	87.7	86.3	18.8	11.00	11.65	---	---	---	---	---	---
6/19	26820	90.0	87.7	86.3	18.8	11.55	10.90	0.55	0.75	20	20	1.000	2.9E-08
6/19	---	90.0	87.7	86.3	18.8	1.05	24.65	---	---	---	---	---	---
6/20	58980	90.0	87.7	86.3	18.8	2.80	22.90	1.75	1.75	20	20	1.000	3.5E-08
6/20	----	90.0	87.7	86.3	18.8	2.80	22.90	---	---	---	---	---	---
6/20	29220	90.0	87.7	86.3	18.8	3.60	22.10	0.80	0.80	20	20	1.000	3.3E-08
6/20	----	90.0	87.7	86.3	18.8	3.60	22.10	---	---	---	---	---	---
6/21	57000	90.0	87.7	86.3	18.8	5.15	20.50	1.55	1.60	20	20	1.000	3.3E-08
6/21	----	90.0	87.7	86.3	18.8	5.15	20.50	---	---	---	---	---	---
6/21	28800	90.0	87.7	86.3	18.8	5.95	19.70	0.80	0.80	20	20	1.000	3.3E-08
6/22	----	90.0	87.7	86.3	18.8	5.95	19.70	---	---	---	---	---	---
6/22	58200	90.0	87.7	86.3	18.8	7.45	18.10	1.50	1.60	20	20	1.000	3.2E-08
6/22	----	90.0	87.7	86.3	18.8	7.45	18.10	---	---	---	---	---	---
6/22	29040	90.0	87.7	86.3	18.8	8.15	17.30	0.70	0.80	20	20	1.000	3.1E-08
6/22	----	90.0	87.7	86.3	18.8	8.15	17.30	---	---	---	---	---	---
6/23	55320	90.0	87.7	86.3	18.8	9.55	15.90	1.40	1.40	20	20	1.000	3.0E-08
6/23	----	90.0	87.7	86.3	18.8	9.55	15.90	---	---	---	---	---	---
6/23	28200	90.0	87.7	86.3	18.8	10.25	15.20	0.70	0.70	20	20	1.000	3.0E-08
6/23	----	90.0	87.7	86.3	18.8	10.25	15.20	---	---	---	---	---	---
6/23	7920	90.0	87.7	86.3	18.8	10.45	15.00	0.20	0.20	20	20	1.000	3.0E-08
6/23	----	90.0	87.7	86.3	18.8	10.45	15.00	---	---	---	---	---	---
6/26	228600	90.0	87.7	86.3	18.8	15.55	9.70	5.10	5.30	20	20	1.000	2.7E-08
6/26	---	90.0	87.7	86.3	18.8	15.55	9.70	---	---	---	---	---	---
6/26	25020	90.0	87.7	86.3	18.8	16.00	9.15	0.45	0.55	20	20	1.000	2.4E-08
6/26	----	90.0	87.7	86.3	18.8	16.00	9.15	---	---	---	---	---	---
6/27	58860	90.0	87.7	86.3	18.8	17.15	7.90	1.15	1.25	20	20	1.000	2.4E-08
6/27	----	90.0	87.7	86.3	18.8	17.15	7.90	---	---	---	---	---	---
6/27	28980	90.0	87.7	86.3	18.8	17.70	7.30	0.55	0.60	20	20	1.000	2.4E-08
6/27	----	90.0	87.7	86.3	18.8	17.70	7.30	---	---	---	---	---	---
6/28	57000	90.0	87.7	86.3	18.8	18.80	6.20	1.10	1.10	20	20	1.000	2.3E-08
6/28	----	90.0	87.7	86.3	18.8	18.80	6.20	---	---	---	---	---	---
6/28	29580	90.0	87.7	86.3	18.8	19.35	5.65	0.55	0.55	20	20	1.000	2.2E-08
6/28	----	90.0	87.7	86.3	18.8	19.35	5.65	---	---	---	---	---	---
6/29	56400	90.0	87.7	86.3	18.8	20.40	4.55	1.05	1.10	20	20	1.000	2.3E-08
6/29	----	90.0	87.7	86.3	18.8	20.40	4.55	---	---	---	---	---	---
6/29	29940	90.0	87.7	86.3	18.8	20.90	4.00	0.50	0.55	20	20	1.000	2.1E-08
6/29	----	90.0	87.7	86.3	18.8	20.90	4.00	---	---	---	---	---	---
6/30	58200	90.0	87.7	86.3	18.8	21.90	3.00	1.00	1.00	20	20	1.000	2.0E-08
6/30	----	90.0	87.7	86.3	18.8	0.10	24.65	---	---	---	---	---	---
6/30	54840	90.0	87.7	86.3	18.8	0.95	23.70	0.85	0.95	20	20	1.000	2.0E-08
6/30	----	90.0	87.7	86.3	18.8	0.95	23.70	---	---	---	---	---	---
7/1	61740	90.0	87.7	86.3	18.8	2.65	21.85	1.70	1.85	20	20	1.000	3.4E-08
7/1	----	90.0	87.7	86.3	18.8	2.65	21.85	---	---	---	---	---	---
7/3	170340	90.0	87.7	86.3	18.8	7.00	17.20	4.35	4.65	20	20	1.000	3.1E-08

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Depth:	---		
Visual Description:	Wet, olive sandy clay		

Saturated Hydraulic Conductivity and Saturated Leachate Conductivity by EPA method 9100

7/3	----	90.0	87.7	86.3	18.8	7.00	17.20	---	---	---	---	---	---
7/3	22920	90.0	87.7	86.3	18.8	7.60	16.60	0.60	0.60	20	20	1.000	3.1E-08
7/3	----	90.0	87.7	86.3	18.8	7.60	16.60	---	---	---	---	---	---
7/5	150540	90.0	87.7	86.3	18.8	11.00	13.10	3.40	3.50	20	20	1.000	2.7E-08
7/5	----	90.0	87.7	86.3	18.8	11.00	13.10	---	---	---	---	---	---
7/5	28920	90.0	87.7	86.3	18.8	11.60	12.40	0.60	0.70	20	20	1.000	2.7E-08
7/5	----	90.0	87.7	86.3	18.8	11.60	12.40	---	---	---	---	---	---
7/6	56820	90.0	87.7	86.3	18.8	12.80	11.20	1.20	1.20	20	20	1.000	2.5E-08
7/6	----	90.0	87.7	86.3	18.8	12.80	11.20	---	---	---	---	---	---
7/6	28440	90.0	87.7	86.3	18.8	13.40	10.20	0.60	1.00	20	20	1.000	3.3E-08
7/6	----	90.0	87.7	86.3	18.8	13.40	10.20	---	---	---	---	---	---
7/7	54120	90.0	87.7	86.3	18.8	14.40	9.60	1.00	0.60	20	20	1.000	1.8E-08
7/7	----	90.0	87.7	86.3	18.8	14.40	9.60	---	---	---	---	---	---
7/7	21960	90.0	87.7	86.3	18.8	14.80	9.20	0.40	0.40	20	20	1.000	2.2E-08
7/7	----	90.0	87.7	86.3	18.8	14.80	9.20	---	---	---	---	---	---
7/10	239940	90.0	87.7	86.3	18.8	18.60	5.00	3.80	4.20	20	20	1.000	2.0E-08
7/10	----	90.0	87.7	86.3	18.8	18.60	5.00	---	---	---	---	---	---
7/10	29880	90.0	87.7	86.3	18.8	19.00	4.60	0.40	0.40	20	20	1.000	1.6E-08
7/10	----	90.0	87.7	86.3	18.8	19.00	4.60	---	---	---	---	---	---
7/11	58920	90.0	87.7	86.3	18.8	19.88	3.60	0.88	1.00	20	20	1.000	1.9E-08
7/11	----	90.0	87.7	86.3	18.8	0.50	24.90	---	---	---	---	---	---
7/12	57960	90.0	87.7	86.3	18.8	2.10	22.90	1.60	2.00	20	20	1.000	3.7E-08
7/12	----	90.0	87.7	86.3	18.8	2.10	22.90	---	---	---	---	---	---
7/12	28320	90.0	87.7	86.3	18.8	2.90	22.10	0.80	0.80	20	20	1.000	3.4E-08
7/12	----	90.0	87.7	86.3	18.8	2.90	22.10	---	---	---	---	---	---
7/13	58680	90.0	87.7	86.3	18.8	4.50	20.50	1.60	1.60	20	20	1.000	3.2E-08
7/13	----	90.0	87.7	86.3	18.8	4.50	20.50	---	---	---	---	---	---
7/13	28620	90.0	87.7	86.3	18.8	5.00	19.90	0.50	0.60	20	20	1.000	2.3E-08
7/13	----	90.0	87.7	86.3	18.8	5.00	19.90	---	---	---	---	---	---
7/17	317100	90.0	87.7	86.3	18.8	12.50	12.10	7.50	7.80	20	20	1.000	2.9E-08
7/17	----	90.0	87.7	86.3	18.8	12.50	12.10	---	---	---	---	---	---
7/17	47960	90.0	87.7	86.3	18.8	13.00	11.40	0.50	0.70	20	20	1.000	1.5E-08
7/17	----	90.0	87.7	86.3	18.8	13.00	11.40	---	---	---	---	---	---
7/18	57180	90.0	87.7	86.3	18.8	14.25	10.15	1.25	1.25	20	20	1.000	2.6E-08
7/18	----	90.0	87.7	86.3	18.8	14.25	10.15	---	---	---	---	---	---
7/18	27840	90.0	87.7	86.3	18.8	14.70	9.50	0.45	0.65	20	20	1.000	2.3E-08
7/18	----	90.0	87.7	86.3	18.8	14.70	9.50	---	---	---	---	---	---
7/19	59280	90.0	87.7	86.3	18.8	16.10	8.20	1.40	1.30	20	20	1.000	2.7E-08
7/19	----	90.0	87.7	86.3	18.8	16.10	8.20	---	---	---	---	---	---
7/19	28680	90.0	87.7	86.3	18.8	16.60	7.50	0.50	0.70	20	20	1.000	2.5E-08
7/19	----	90.0	87.7	86.3	18.8	16.60	7.50	---	---	---	---	---	---
7/20	57060	90.0	87.7	86.3	18.8	17.80	6.50	1.20	1.00	20	20	1.000	2.3E-08
7/20	----	90.0	87.7	86.3	18.8	17.80	6.50	---	---	---	---	---	---
7/20	11700	90.0	87.7	86.3	18.8	17.90	6.20	0.10	0.30	20	20	1.000	2.0E-08
7/20	----	90.0	87.7	86.3	18.8	17.90	6.20	---	---	---	---	---	---
7/21	75120	90.0	87.7	86.3	18.8	19.30	4.80	1.40	1.40	20	20	1.000	2.2E-08
7/21	----	90.0	87.7	86.3	18.8	19.30	4.80	---	---	---	---	---	---
7/21	13440	90.0	87.7	86.3	18.8	19.50	4.50	0.20	0.30	20	20	1.000	2.2E-08

PERMEABILITY AT 20° C: 2.2 x 10^{-8} cm/sec (@ 3 psi effective stress)

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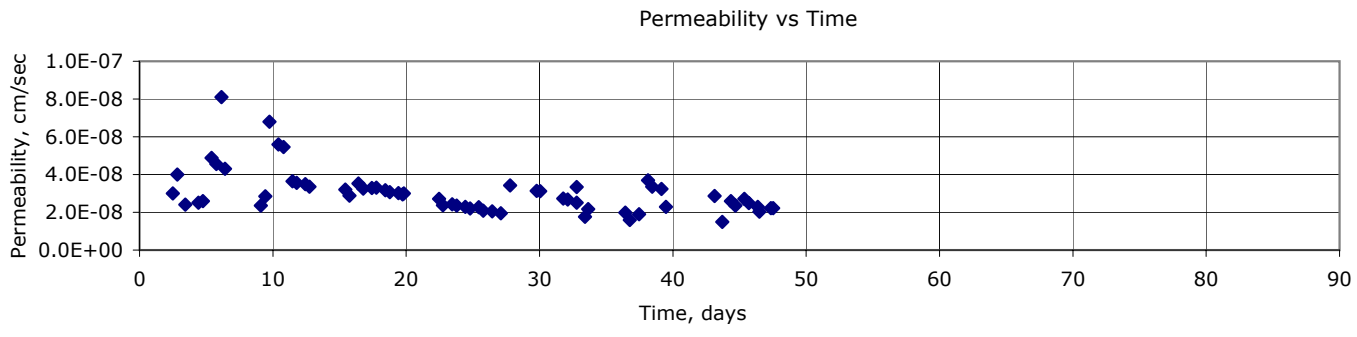
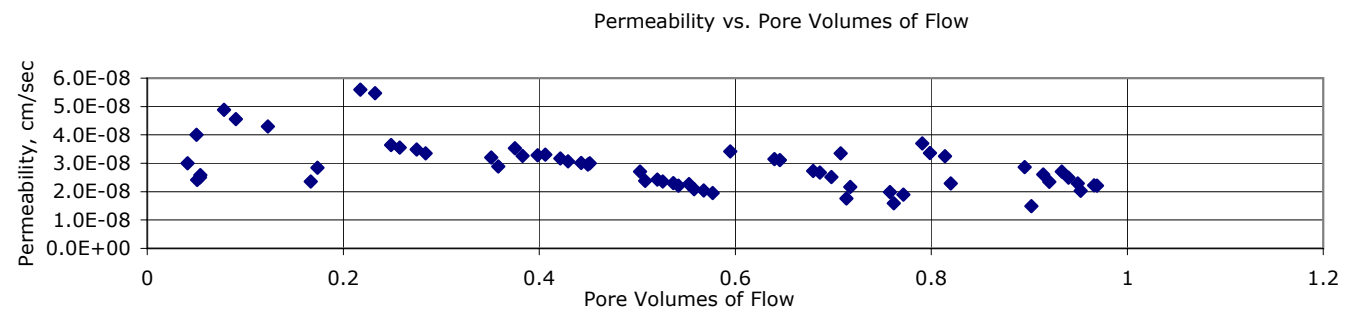
Depth:	---		
Visual Description:	Wet, olive sandy clay		

Saturated Hydraulic Conductivity and Saturated Leachate Conductivity by EPA method 9100





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End Date:	7/21/2006	Checked By:	rmt/jdt
Boring #:	---		
Sample #:	SBS03		
Depth:	---		
Visual Description:	Wet, olive sandy clay		

Saturated Hydraulic Conductivity and Saturated Leachate Conductivity by EPA method 9100

Sample Type:	remolded bulk sample	Permeant Fluid:	site water
Orientation:	Vertical	Cell #:	---/7/3

Sample Preparation: Test specimens remolded using moderate effort at the as-received moisture content. Trimmings moisture content = 28.7%.

Parameter	Initial	Final
Height, in	2.00	2.00
Diameter, in	2.92	2.92
Area, in^2	6.70	6.70
Volume, in^3	13.39	13.39
Mass, g	452	452
Bulk Density, pcf	128	128
Moisture Content, %	Determined upon completion of test	Determined upon completion of test
Dry Density, pcf	Determined upon completion of test	Determined upon completion of test
Degree of Saturation, %	---	Determined upon completion of test

B COEFFICIENT DETERMINATION

Cell Pressure, psi:	95.2	Pressure Increment, psi:	4.8
Sample Pressure, psi:	89.3	B Coefficient:	0.96

FLOW DATA

Date	Time, sec	Pressure, psi			Gradient	Flow Volume, cc				Temp, °C		R_t	Permeability cm/sec
		Cell	Inlet	Outlet		In	Out	Δ In	Δ Out	Start	End		
6/2	---	90.0	87.7	86.3	19.4	1.60	24.30	---	---	---	---	---	---
6/5	214920	90.0	87.7	86.3	19.4	7.35	19.15	5.75	5.15	20	20	1.000	3.0E-08
6/5	----	90.0	87.7	86.3	19.4	7.35	19.15	---	---	---	---	---	---
6/5	37560	90.0	87.7	86.3	19.4	8.15	18.20	0.80	0.95	20	20	1.000	2.8E-08
6/5	----	90.0	87.7	86.3	19.4	8.15	18.20	---	---	---	---	---	---
6/6	50280	90.0	87.7	86.3	19.4	9.40	17.10	1.25	1.10	20	20	1.000	2.8E-08
6/6	----	90.0	87.7	86.3	19.4	9.40	17.10	---	---	---	---	---	---
6/7	85320	90.0	87.7	86.3	19.4	11.30	15.25	1.90	1.85	20	20	1.000	2.6E-08
6/7	----	90.0	87.7	86.3	19.4	11.30	15.25	---	---	---	---	---	---
6/7	28800	90.0	87.7	86.3	19.4	11.90	14.60	0.60	0.65	20	20	1.000	2.6E-08
6/7	----	90.0	87.7	86.3	19.4	11.90	14.60	---	---	---	---	---	---
6/8	56040	90.0	87.7	86.3	19.4	13.10	13.50	1.20	1.10	20	20	1.000	2.5E-08
6/8	----	90.0	87.7	86.3	19.4	13.10	13.50	---	---	---	---	---	---
6/8	30660	90.0	87.7	86.3	19.4	13.70	12.90	0.60	0.60	20	20	1.000	2.3E-08
6/8	----	90.0	87.7	86.3	19.4	13.70	12.90	---	---	---	---	---	---
6/9	62820	90.0	87.7	86.3	19.4	15.00	11.75	1.30	1.15	20	20	1.000	2.3E-08
6/9	----	90.0	87.7	86.3	19.4	15.00	11.75	---	---	---	---	---	---
6/9	22440	90.0	87.7	86.3	19.4	15.40	11.30	0.40	0.45	20	20	1.000	2.3E-08
6/9	----	90.0	87.7	86.3	19.4	15.40	11.30	---	---	---	---	---	---
6/12	231960	90.0	87.7	86.3	19.4	19.45	7.50	4.05	3.80	20	20	1.000	2.0E-08
6/12	---	90.0	87.7	86.3	19.4	19.45	7.50	---	---	---	---	---	---
6/12	29220	90.0	87.7	86.3	19.4	19.90	7.00	0.45	0.50	20	20	1.000	1.9E-08
6/12	----	90.0	87.7	86.3	19.4	1.80	24.25	---	---	---	---	---	---
6/13	82860	90.0	87.7	86.3	19.4	2.95	21.90	1.15	2.35	20	20	1.000	2.5E-08
6/13	----	90.0	87.7	86.3	19.4	2.95	21.90	---	---	---	---	---	---
6/14	59640	90.0	87.7	86.3	19.4	4.80	20.20	1.85	1.70	20	20	1.000	3.6E-08
6/14	----	90.0	87.7	86.3	19.4	4.80	20.20	---	---	---	---	---	---

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Client:	Haley & Aldrich		
Project Name:	OU-1 Remediation		
Project Location:	1 River Street, Hastings-on-Hudson, NY		
GTX #:	6665		
Start Date:	5/22/2006	Tested By:	ahh
End Date:	7/21/2006	Checked By:	rmt/jdt
Boring #:	---		
Sample #:	SBS03		
Depth:	---		
Visual Description:	Wet, olive sandy clay		

Saturated Hydraulic Conductivity and Saturated Leachate Conductivity by EPA method 9100

6/14	32880	90.0	87.7	86.3	19.4	5.70	19.25	0.90	0.95	20	20	1.000	3.4E-08
6/14	----	90.0	87.7	86.3	19.4	0.70	24.35	---	---	---	---	---	---
6/15	57720	90.0	87.7	86.3	19.4	2.50	22.75	1.80	1.60	20	20	1.000	3.5E-08
6/15	----	90.0	87.7	86.3	19.4	2.50	22.75	---	---	---	---	---	---
6/15	25920	90.0	87.7	86.3	19.4	3.20	22.00	0.70	0.75	20	20	1.000	3.3E-08
6/15	----	90.0	87.7	86.3	19.4	3.20	22.00	---	---	---	---	---	---
6/16	56280	90.0	87.7	86.3	19.4	4.75	20.65	1.55	1.35	20	20	1.000	3.1E-08
6/16	----	90.0	87.7	86.3	19.4	4.75	20.65	---	---	---	---	---	---
6/16	28380	90.0	87.7	86.3	19.4	5.35	19.90	0.60	0.75	20	20	1.000	2.8E-08
6/16	----	90.0	87.7	86.3	19.4	5.35	19.90	---	---	---	---	---	---
6/19	232020	90.0	87.7	86.3	19.4	10.75	14.50	5.40	5.40	20	20	1.000	2.8E-08
6/19	----	90.0	87.7	86.3	19.4	10.75	14.50	---	---	---	---	---	---
6/19	23580	90.0	87.7	86.3	19.4	11.15	14.15	0.40	0.35	20	20	1.000	1.9E-08
6/19	---	90.0	87.7	86.3	19.4	1.60	24.40	---	---	---	---	---	---
6/20	59040	90.0	87.7	86.3	19.4	3.40	22.65	1.80	1.75	20	20	1.000	3.6E-08
6/20	----	90.0	87.7	86.3	19.4	3.40	22.65	---	---	---	---	---	---
6/20	29100	90.0	87.7	86.3	19.4	4.20	21.80	0.80	0.85	20	20	1.000	3.4E-08
6/20	----	90.0	87.7	86.3	19.4	4.20	21.80	---	---	---	---	---	---
6/21	57060	90.0	87.7	86.3	19.4	5.80	20.20	1.60	1.60	20	20	1.000	3.3E-08
6/21	----	90.0	87.7	86.3	19.4	5.80	20.20	---	---	---	---	---	---
6/21	28800	90.0	87.7	86.3	19.4	6.55	19.45	0.75	0.75	20	20	1.000	3.1E-08
6/22	----	90.0	87.7	86.3	19.4	6.55	19.45	---	---	---	---	---	---
6/22	58200	90.0	87.7	86.3	19.4	8.10	17.90	1.55	1.55	20	20	1.000	3.2E-08
6/22	----	90.0	87.7	86.3	19.4	8.10	17.90	---	---	---	---	---	---
6/22	29040	90.0	87.7	86.3	19.4	8.80	17.20	0.70	0.70	20	20	1.000	2.9E-08
6/22	----	90.0	87.7	86.3	19.4	8.80	17.20	---	---	---	---	---	---
6/23	55320	90.0	87.7	86.3	19.4	10.20	15.80	1.40	1.40	20	20	1.000	3.0E-08
6/23	----	90.0	87.7	86.3	19.4	10.20	15.80	---	---	---	---	---	---
6/23	28260	90.0	87.7	86.3	19.4	10.80	15.10	0.60	0.70	20	20	1.000	2.7E-08
6/23	----	90.0	87.7	86.3	19.4	10.80	15.10	---	---	---	---	---	---
6/23	8160	90.0	87.7	86.3	19.4	11.00	14.90	0.20	0.20	20	20	1.000	2.9E-08
6/23	----	90.0	87.7	86.3	19.4	11.00	14.90	---	---	---	---	---	---
6/26	228360	90.0	87.7	86.3	19.4	15.85	10.15	4.85	4.75	20	20	1.000	2.5E-08
6/26	---	90.0	87.7	86.3	19.4	15.85	10.15	---	---	---	---	---	---
6/26	24960	90.0	87.7	86.3	19.4	16.30	9.65	0.45	0.50	20	20	1.000	2.3E-08
6/26	----	90.0	87.7	86.3	19.4	16.30	9.65	---	---	---	---	---	---
6/27	58920	90.0	87.7	86.3	19.4	17.40	8.55	1.10	1.10	20	20	1.000	2.2E-08
6/27	----	90.0	87.7	86.3	19.4	17.40	8.55	---	---	---	---	---	---
6/27	28920	90.0	87.7	86.3	19.4	17.90	7.95	0.50	0.60	20	20	1.000	2.3E-08
6/27	----	90.0	87.7	86.3	19.4	17.90	7.95	---	---	---	---	---	---
6/28	56820	90.0	87.7	86.3	19.4	18.90	6.95	1.00	1.00	20	20	1.000	2.1E-08
6/28	----	90.0	87.7	86.3	19.4	18.90	6.95	---	---	---	---	---	---
6/28	29640	90.0	87.7	86.3	19.4	19.40	6.45	0.50	0.50	20	20	1.000	2.0E-08
6/28	----	90.0	87.7	86.3	19.4	19.40	6.45	---	---	---	---	---	---
6/29	56520	90.0	87.7	86.3	19.4	20.40	5.50	1.00	0.95	20	20	1.000	2.1E-08
6/29	----	90.0	87.7	86.3	19.4	20.40	5.50	---	---	---	---	---	---
6/29	29820	90.0	87.7	86.3	19.4	20.85	4.95	0.45	0.55	20	20	1.000	2.0E-08
6/29	----	90.0	87.7	86.3	19.4	20.85	4.95	---	---	---	---	---	---
6/30	58320	90.0	87.7	86.3	19.4	21.80	4.00	0.95	0.95	20	20	1.000	1.9E-08
6/30	----	90.0	87.7	86.3	19.4	0.75	24.40	---	---	---	---	---	---
7/1	61680	90.0	87.7	86.3	19.4	2.60	22.35	1.85	2.05	20	20	1.000	3.8E-08
7/1	----	90.0	87.7	86.3	19.4	2.60	22.35	---	---	---	---	---	---

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Client:	Haley & Aldrich		
Project Name:	OU-1 Remediation		
Project Location:	1 River Street, Hastings-on-Hudson, NY		
GTX #:	6665		
Start Date:	5/22/2006	Tested By:	ahh
End Date:	7/21/2006	Checked By:	rmt/jdt
Boring #:	---		
Sample #:	SBS03		
Depth:	---		
Visual Description:	Wet, olive sandy clay		

Saturated Hydraulic Conductivity and Saturated Leachate Conductivity by EPA method 9100

7/3	170340	90.0	87.7	86.3	19.4	7.05	17.75	4.45	4.60	20	20	1.000	3.2E-08
7/3	----	90.0	87.7	86.3	19.4	7.05	17.75	---	---	---	---	---	---
7/3	23220	90.0	87.7	86.3	19.4	7.50	17.20	0.45	0.55	20	20	1.000	2.6E-08
7/3	----	90.0	87.7	86.3	19.4	7.50	17.20	---	---	---	---	---	---
7/5	150360	90.0	87.7	86.3	19.4	11.10	13.70	3.60	3.50	20	20	1.000	2.8E-08
7/5	----	90.0	87.7	86.3	19.4	11.10	13.70	---	---	---	---	---	---
7/5	28980	90.0	87.7	86.3	19.4	11.70	13.00	0.60	0.70	20	20	1.000	2.7E-08
7/5	----	90.0	87.7	86.3	19.4	11.70	13.00	---	---	---	---	---	---
7/6	56760	90.0	87.7	86.3	19.4	12.90	11.80	1.20	1.20	20	20	1.000	2.5E-08
7/6	----	90.0	87.7	86.3	19.4	12.90	11.80	---	---	---	---	---	---
7/6	28500	90.0	87.7	86.3	19.4	13.50	11.25	0.60	0.55	20	20	1.000	2.4E-08
7/6	----	90.0	87.7	86.3	19.4	13.50	11.25	---	---	---	---	---	---
7/7	54120	90.0	87.7	86.3	19.4	14.75	10.00	1.25	1.25	20	20	1.000	2.8E-08
7/7	----	90.0	87.7	86.3	19.4	14.75	10.00	---	---	---	---	---	---
7/7	21780	90.0	87.7	86.3	19.4	15.15	9.50	0.40	0.50	20	20	1.000	2.5E-08
7/7	----	90.0	87.7	86.3	19.4	15.15	9.50	---	---	---	---	---	---
7/10	240120	90.0	87.7	86.3	19.4	19.70	4.90	4.55	4.60	20	20	1.000	2.3E-08
7/10	----	90.0	87.7	86.3	19.4	19.70	4.90	---	---	---	---	---	---
7/10	29880	90.0	87.7	86.3	19.4	20.20	4.30	0.50	0.60	20	20	1.000	2.2E-08
7/10	----	90.0	87.7	86.3	19.4	20.20	4.30	---	---	---	---	---	---
7/11	58920	90.0	87.7	86.3	19.4	21.20	3.40	1.00	0.90	20	20	1.000	1.9E-08
7/11	----	90.0	87.7	86.3	19.4	0.50	24.70	---	---	---	---	---	---
7/11	25740	90.0	87.7	86.3	19.4	1.40	23.70	0.90	1.00	20	20	1.000	4.4E-08
7/11	----	90.0	87.7	86.3	19.4	1.40	23.70	---	---	---	---	---	---
7/12	57840	90.0	87.7	86.3	19.4	3.10	21.90	1.70	1.80	20	20	1.000	3.6E-08
7/12	----	90.0	87.7	86.3	19.4	3.10	21.90	---	---	---	---	---	---
7/12	28320	90.0	87.7	86.3	19.4	3.90	21.10	0.80	0.80	20	20	1.000	3.4E-08
7/12	----	90.0	87.7	86.3	19.4	3.90	21.10	---	---	---	---	---	---
7/13	58620	90.0	87.7	86.3	19.4	5.55	19.45	1.65	1.65	20	20	1.000	3.4E-08
7/13	----	90.0	87.7	86.3	19.4	5.55	19.45	---	---	---	---	---	---
7/13	28680	90.0	87.7	86.3	19.4	6.35	18.65	0.80	0.80	20	20	1.000	3.3E-08
7/13	----	90.0	87.7	86.3	19.4	6.35	18.65	---	---	---	---	---	---
7/17	316680	90.0	87.7	86.3	19.4	14.85	10.05	8.50	8.60	20	20	1.000	3.2E-08
7/17	----	90.0	87.7	86.3	19.4	14.85	10.05	---	---	---	---	---	---
7/17	28380	90.0	87.7	86.3	19.4	15.40	9.30	0.55	0.75	20	20	1.000	2.7E-08
7/17	----	90.0	87.7	86.3	19.4	15.40	9.30	---	---	---	---	---	---
7/18	57300	90.0	87.7	86.3	19.4	16.75	8.05	1.35	1.25	20	20	1.000	2.7E-08
7/18	----	90.0	87.7	86.3	19.4	16.75	8.05	---	---	---	---	---	---
7/18	27840	90.0	87.7	86.3	19.4	17.30	7.40	0.55	0.65	20	20	1.000	2.6E-08
7/18	----	90.0	87.7	86.3	19.4	17.30	7.40	---	---	---	---	---	---
7/19	59100	90.0	87.7	86.3	19.4	18.60	6.20	1.30	1.20	20	20	1.000	2.5E-08
7/19	----	90.0	87.7	86.3	19.4	18.60	6.20	---	---	---	---	---	---
7/19	28680	90.0	87.7	86.3	19.4	19.10	5.50	0.50	0.70	20	20	1.000	2.5E-08
7/19	----	90.0	87.7	86.3	19.4	19.10	5.50	---	---	---	---	---	---
7/20	57060	90.0	87.7	86.3	19.4	20.30	4.40	1.20	1.10	20	20	1.000	2.4E-08
7/20	----	90.0	87.7	86.3	19.4	20.30	4.40	---	---	---	---	---	---
7/20	11760	90.0	87.7	86.3	19.4	20.50	4.20	0.20	0.20	20	20	1.000	2.0E-08
7/20	----	90.0	87.7	86.3	19.4	20.50	4.20	---	---	---	---	---	---
7/21	75120	90.0	87.7	86.3	19.4	21.90	2.80	1.40	1.40	20	20	1.000	2.2E-08
7/21	----	90.0	87.7	86.3	19.4	21.90	2.80	---	---	---	---	---	---
7/21	13560	90.0	87.7	86.3	19.4	22.10	2.60	0.20	0.20	20	20	1.000	1.8E-08

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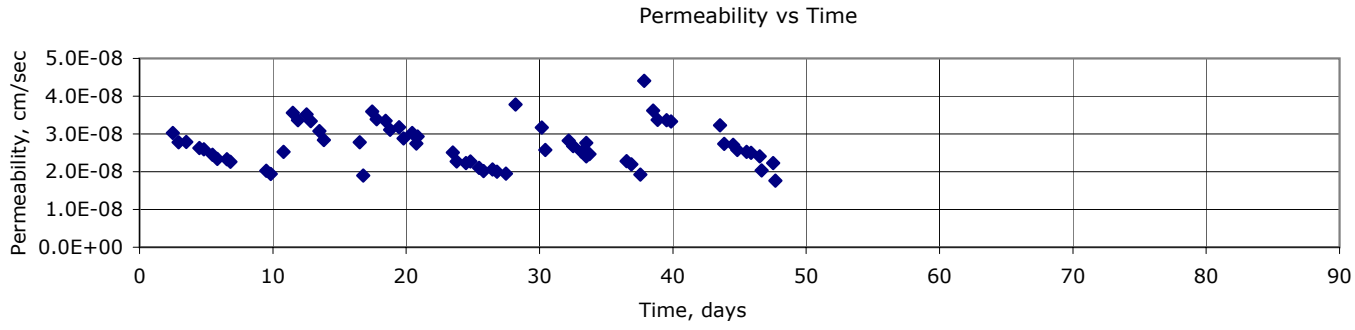
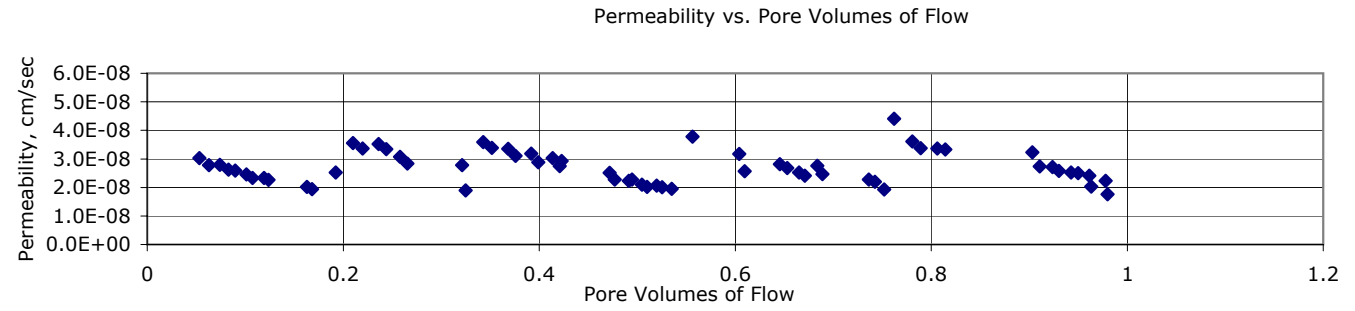
Start Date:	5/22/2006	Tested By:	ahh
End Date:	7/21/2006	Checked By:	rmt/jdt
Boring #:	---		
Sample #:	SBS03		
Depth:	---		
Visual Description:	Wet, olive sandy clay		

Saturated Hydraulic Conductivity and Saturated Leachate Conductivity by EPA method 9100

PERMEABILITY AT 20° C: 2.0 x 10^{-8} cm/sec (@ 3 psi effective stress)





APPENDIX G – REPORT ON HYDROGEOLOGIC CONCEPTUAL MODEL AND GROUNDWATER FLOW MODEL

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APPENDIX G – REPORT ON HYDROGEOLOGIC CONCEPTUAL MODEL AND GROUNDWATER FLOW MODEL

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G.12	MODFLOW-2000 Model Boundaries
G.13	MODFLOW-2000 Model Recharge
G.14	MODFLOW-2000 Calibrated Model

APPENDIX G – REPORT ON HYDROGEOLOGIC CONCEPTUAL MODEL AND GROUNDWATER FLOW MODEL

G1. INTRODUCTION

This report presents the hydrogeologic conceptual model and summarizes the results of groundwater flow modeling activities conducted as part of the Pre-Design Investigation (PDI) for 1 River Street (the Site) located on River Street in Hastings-on-Hudson, Westchester County, New York (Figure G.1). As presented in Appendix D, the site hydrogeologic conceptual model is based on information collected by Haley & Aldrich of New York (Haley & Aldrich) (Shaw and Haley & Aldrich, 2002), from Site project reports and information provided to Haley & Aldrich by Atlantic Richfield (AR) and included reports by Parsons, Golder Associates, Inc. (Golder) (Golder, 1996), IT Corporation (IT) (IT, 2000), Remedial Technologies, Inc. (RETEC) (RETEC, 1993), and Shaw Environmental and Infrastructure, Inc. (Shaw) (Shaw and Haley & Aldrich, 2002). Data gathered from these reports included geologic exploration logs, monitoring well installation reports, and previous hydrogeologic testing (i.e., aquifer pumping tests, rising and falling head tests, and grain size analyses). Haley & Aldrich obtained additional information from the NYSDEC (NYSDEC, 2004), the National Oceanic and Atmospheric Administration (NOAA) (Randall, 1996), and the US Geological Survey (USGS) (Asseltine and Grossman, 1955, Harbaugh et., al, 2000, McDonald and Harbaugh, 1988, Phillips and Hanchar, 1996, Randall, 1996, Reynolds, 1988, and Wall et., al, 1998).

This report presents the hydrogeologic conceptual model and summarizes the results of groundwater flow modeling activities conducted as part of the Pre-Design Investigation at the Site. The objective of the groundwater flow modeling was to simulate the groundwater flow and Site remedial activities to evaluate groundwater quantities generated during remedial construction as well as the estimation of groundwater mounding and upwards vertical hydraulic gradients upgradient of the proposed remedial design. Simulated groundwater yields, simulated groundwater mounding, and simulated upward vertical hydraulic gradients will be used by the project Licensed Professional Engineer in the design of construction dewatering systems with applicable factors of safety. Based on information collected for the hydrogeologic conceptual model, groundwater flow modeling was performed using MODFLOW-2000 (Harbaugh et. al, 2000). The following work was completed during this investigation.

- **Data Review: Available data on surficial and bedrock geology, groundwater elevations, hydraulic conductivity, and aquifer thickness were compiled and reviewed. Sources of data included USGS publications, Haley & Aldrich files, AR, Parsons, Golder, IT, Shaw, RETEC, NYSDEC, USDA, and NOAA.**

- **Conceptual Model: A conceptual model of a hydrogeologic system is the qualitative description of the physical system and is developed from analysis of historical site operation history, regional geology and hydrology, validated results from prior investigations, and field investigation results. It identifies the contaminant locations, the pathways contaminants can take to reach receptors, and the receptors. The model includes detailed descriptions of the site hydrology and geology. A conceptual model of the sub-drainage basin hydrogeology was developed based on the results of work conducted at the Site and the regional data compiled in the data review.**

- **Model Setup: A model grid was established over a base plan extending past the Site proper. The following hydraulic variables were set within the grid:**

  Hydraulic conductivity: A range of hydraulic conductivity zones were established based on site specific data (aquifer testing) and published information on regional surficial geology and aquifer transmissivity.

  Aquifer saturated thickness: Saturated thickness was contoured based on water levels and stratigraphic data, Haley & Aldrich's bottom of the surficial aquifer interpretation and groundwater levels, and hydrogeologic investigation reports by others.

  Groundwater recharge: Ranges were estimated based on published values.

- **Model Calibration: The model was calibrated to existing conditions by adjusting the input parameters (hydraulic conductivity, regional recharge, etc.) until model-predicted groundwater elevations matched actual (observed) groundwater elevations in accordance with recommended criteria. This was performed through manual adjustments of the parameters as well as the use of PEST (Watermark Numerical Computing, 2000), which uses inverse modeling techniques to derive parameter value estimates.**

- **Sensitivity Analysis: The analysis involved repeating model predictions after systematically modifying the model input parameters by a factor of ten and calculating the Root Mean Square (RMS) error of the simulated hydraulic heads and simulated discharge. This was then compared to the calibrated model to determine which model input parameters were the most sensitive to change.**

- **Model Validation: Using the calibrated model, additional monitoring period data was evaluated to determine the accuracy and robustness of the model with changes in hydraulic conditions.**

- **Simulations: After completing the model calibration, model validation, and sensitivity analysis, model simulations were conducted to predict potential groundwater dewatering rates for construction.**

It should be noted that models of this type are best representations of real world conditions and should only be used as a tool during hydrogeologic investigations as a means of interpreting site-specific hydrogeologic control parameters and for formulating ideas of flow dynamics. As this model simplifies a very complex heterogeneous system, the model results could be used as a base model for future groundwater modeling, predictive analyses, as well as for additional remediation system designs. The model was not generated or intended for contaminant fate and transport modeling. If the model is to be used as a base for contaminant fate and transport modeling, additional investigation will be required to further address the heterogeneity of the Fill hydrostratigraphic unit and to more accurately represent the unit in the model.

G2. SITE LOCATION AND HISTORY

The Site is located on approximately twenty-eight acres on the eastern shore of the Hudson River in the Village of Hastings-on-Hudson in Westchester County approximately fifteen miles north of New York City. The Site is bound on the west by the Hudson River, to the north by the Hudson Valley Health and Tennis Club and undeveloped parkland. The Metro North Commuter Railroad Line bounds the Site to the east, and industrial property owned currently by Exxon Mobil Oil Company and the Uhlich Color Company is south of the Site. The Site is covered primarily with former industrial buildings, pavement, and gravel fill (Figure G.2). The following describes the Site history compiled from reports by the NYSDEC (2004), the AR Site Website (http://www.oneriverstreet.com), and IT (2000).

The Site was constructed by placing anthropogenic fill behind a series of bulkheads between the mid-1880s and early 1900s. Although the fill sources are not completely known, it is assumed that the majority of the fill consists of construction debris, soil, ash, and furnace slag. The building foundations were constructed on a network of piles and pile caps.

The Site was occupied by several companies. In 1849, the first major industry to open along what was then the waterfront was the Hudson River Steam Sugar Refinery. The process consisted of unloading Cuban sugar, refining the sugar, and transporting the sugar via ship and rail. The Hudson River Steam Sugar Refinery ended production on December 26, 1875 when the sugar refinery burned and was replaced by Hastings Pavement Company. Producing cable for public utilities, the National Conduit and Cable Company opened at the Site around 1891. Around 1913, the American Brass Company started operations at the Site.

During World War I, Zinsser Chemical produced mustard gas and Hastings Pavement supplied pavers for the US Army and Navy for base construction. The National Conduit and Cable Company reportedly made artillery, weapons, machine gun shells, and bullets. After the war, a predecessor to Anaconda Wire and Cable (AWC) bought part of the Site property in 1919 and eventually merged into AWC. AWC manufactured a variety of wire and cable on site until 1976, including telephone wire, electrical wire, mine-sweeping cable used to detonate underwater mines and television cable.

During World War II, polychlorinated biphenyls (PCB) mixtures were used to make fireproof products for US Navy battleships, including wiring that would not burn if the ship was hit by a torpedo or other enemy fire. After the war, AWC produced electrical and television cable until its close in 1975. A study by Howard P. Hoffman Associates, Inc. presented several alternatives for the Site post-closure including mixed residential/commercial facilities (1976). Atlantic Richfield purchased AWC in 1977, never operated the plant, and then sold the site in 1978. Since 1978, several owners and tenants subsequently occupied the Site property, most notably Harbor at Hastings Associates (HHA). From 1988 to 1992, HHA leased Building 15 to Age Carting for operation as a construction and demolition transfer station. An estimated 150,000 cubic yards of construction and demolition debris was disposed of in Building 15 and elsewhere on the Site. In 1998, ARC's affiliate, AERL, purchased the Site in order to gain control over environmental investigation and remediation efforts.

The southern abutting property was owned by Zinsser and Company (Zinsser), a manufacturer of dyes, pigments and photographic processing chemicals, until 1955 and,

between 1961 and 1971, was operated as a fuel oil storage facility by Tappan Tanker Terminal (TTT). The eastern portion of the old Zinsser site was leased from 1964 to 1975 to the Uhlich Color Company (UCC), who purchased the property in 1975. UCC operations continued until 2000. Mobil Oil Company bought the remaining western portion the Zinsser/TTT property in 1971 and operated the fuel storage facility until 1985.

G3. HYDROGEOLOGIC CONCEPTUAL MODEL

A conceptual model of a hydrogeologic system is the qualitative description of the physical system and is developed from analysis of historical site operation history, regional geology and hydrology, validated results from prior investigations, and field investigation results. The hydrogeology, which is the interrelationship between geologic materials and processes with water, of the region and the Site was evaluated based on soil conditions observed in subsurface explorations, water level and river gauging data, aquifer testing, and review of published information on regional hydrogeology. The purpose of this section is to give insight on the regional and local (site-focused) hydrogeology.

G3.1 Regional Hydrogeology

The following describes the regional hydrogeology in the vicinity of the Site.

G3.1.1 Regional Surficial Geology

The Hudson River Basin is located within the glacial Northeastern United States. As the Pleistocene ice sheets advanced in a south-southeastward direction, soil and rock debris were transported from up-ice regions. Surficial deposits found within Westchester County vary and are the product of the deglaciation processes in the Lower Hudson River Valley. Within Westchester County, there are four predominant surficial deposits including glacial drift deposits (primarily glacial till), glaciolacustrine deposits, alluvial deposits, and marine deposits (Asseltine and Grossman, 1955, Reynolds, 1988, and Golder, 1996). Each is briefly described below and illustrated on Figure G.3.

- Glacial Drift Deposits- Glacial drift is a general term describing a wide range of glacial deposits including glacial till, stratified outwash deposits, and glacial erratics which are usually deposited when the glacier begins to melt.
  - Stratified outwash deposits typically consist of sand and gravel and are aerially confined and thin. These deposits generally grade vertically into lesser permeable units.
  - Glacial erratics are boulders carried by glacial ice and is relatively rare in Westchester County.
  - Glacial Till is the dominant glacial drift deposit in Westchester County. It varies from a few feet (ft) to greater than 100 ft in thickness in some of the deeper valleys. Till is an unstratified deposit with sediments ranging from clay size particulates to cobbles and boulders (Reynolds, 1988 and Asseltine and Grossman, 1955).
- Glaciolacustrine Deposits- Comprised mainly of stratified fine-grained materials (silts and clays), glaciolacustrine deposits are remnants of glacial Lake Hudson which filled the Hudson Valley from the Harbor Hill terminal moraine at the Narrows to approximately the Wallkill moraine

thirty-five miles northwest of Croton Point, New York from approximately 17,000 to 15,000 years before present. Cores from test borings near Tarrytown, New York had varved lacustrine deposits with thicknesses of approximately 110 ft (Reynolds, 1988).

- **Marine Deposits-** As the ice sheet retreated northwards, the waters of the Atlantic Ocean transgressed the Hudson River Valley depositing coarse sands and gravels directly on Glaciolacustrine Deposits which was later overlain by a thick succession of estuary deposits (marine silts). These are the youngest deposits within the Lower Hudson River Valley (Golder, 1996).

- **Alluvial Deposits-** Alluvial deposits are formed from material that has been carried in suspension by a river or stream and dropped as the velocity of the current decreases. River plains and deltas are made entirely of alluvial deposits, but smaller pockets can be found in the beds of upland torrents. Deposits can consist of a whole range of particle sizes, from boulders down through cobbles, pebbles, gravel, sand, silt, and clay. The raw materials are the rocks and soils of upland areas that are loosened by erosion and washed away by overland flow.

G3.1.2 Regional Bedrock Geology

The bedrock of Westchester County is predominantly classified as metamorphic. According to Asseltine and Grossman (1955), seven lithologic units are found within Westchester County. Lithologic units describe the rock types encountered in outcrops or drill core/cuttings on the basis of mineral content, grain size, texture and color of rocks (Bates and Jackson, 1987). These are briefly described below.

- **Schist-** Schist is a metamorphic lithology derived from mica rich rock consisting mainly of schists, schistose gneisses, and amphibolites. Schist covers approximately a third of the county and is found to be dark gray in color, coarse grained, and possessing a high mica content with some garnet. It is typically resistant to weathering and has tight folds. The Manhattan Schist is the primary schist unit of the Manhattan Prong (Asseltine and Grossman, 1955, Reynolds, 1988, Rogers et al., 1989, and Isachen, 2000).

- **Limestone-** Limestone is a chemical sedimentary rock deposited in marine environments. Within Westchester County, limestone typically underlies unconsolidated deposits trending north south (Asseltine and Grossman, 1955). A portion of the limestone encountered has been altered by metamorphism to a coarse textured marble, the Inwood Marble (part of the Manhattan Prong) (Rogers et al., 1989). These carbonate units are found in narrow belts either parallel to or sandwiched between schist and gneiss units (Reynolds, 1988).

- **Gneiss-** Like schist, gneiss covers approximately a third of Westchester County. The principle unit, the Fordham Gneiss, consists of massive to

foliated metamorphic rock and has a banded black and white color with a high biotite content. A secondary unit, the Yonkers Gneiss, is more granitic in content than the Fordham Gneiss. These units are highly resistant to weathering and tend to form ridges where exposed (Asseltine and Grossman, 1955, Rogers et al., 1989, Reynolds, 1988, and Van Diver, 1985).

- Slate- A metamorphosed shale, slate is exclusive to a small area of Northern Westchester County (Asseltine and Grossman, 1955, Rogers et al., 1989).

- Quartzite- Like slate, quartzite, metamorphosed sandstone, is exclusive to a small area of Southeastern Westchester County within the Manhattan Prong. The unit underlies valleys as it is highly erodible (Asseltine and Grossman, 1955, Rogers et al., 1989, and Isachen, 2000).

- Granite- The majority of granite within the county consists of dikes and sills within the country rock. It is believed that granite underlies less than ten percent of the county and is usually found in highland areas due to its resistance to erosion. Granite in Westchester County is typically pink to gray and medium to coarse grained (Asseltine and Grossman, 1955 and Rogers et al., 1989).

- Diorite- Gray in color, diorite is scattered throughout the county and consists, like granite, of mainly dikes and sills (Asseltine and Grossman, 1955, Rogers et al., 1989, and Isachen, 2000).

Across the Hudson River in Rockland County, the Palisade Sill, a sill consisting of diabase (similar to basalt) cuts through sandstone/mudstone/conglomerate deposits which are Late Triassic-Jurassic in age. Commonly called the "Red Beds," the sandstone/mudstone/conglomerate deposits are arkosic, a feldspar rich sedimentary rock type that is typically pink or red in color (Van Diver, 1985, Rogers et al., 1989, and Isachen, 2000) (Figure G.4).

G3.1.3 Regional Groundwater Hydrology

Less than 20 percent (%) of the population within the Hudson River Basin is served by public drinking water supplies obtained from groundwater (Wall et al., 1998). The remaining 80% use surface water as the primary source of drinking water. In comparison to other National Water-Quality Assessment (NAWQA) study sites, groundwater within the Hudson River Basin is similar to the national median with concentrations below or at the median (Wall et al., 1998)

Unconsolidated deposits and bedrock units within Westchester County range in permeability, porosity, secondary porosity, thickness, and potential yields. Sand and gravel deposits, which include glacial outwash and alluvial deposits, supply the highest yields of groundwater in Westchester County at rates ranging up to several hundred gallons per minute (GPM). Water wells situated in Glacial Till deposits tend to yield less than 5 GPM with higher yields occurring in areas of till fracturing

or interbedded sand lenses. Glaciolacustrine deposits do not yield economic quantities of water. Greater than ninety percent of public and domestic wells in Westchester County are seated in bedrock (Asseltine and Grossman, 1955 and Reynolds, 1988). Based on the water well data collected by Asseltine and Grossman (1955), 35% of the wells were seated in schist, 10% of the wells were seated in limestone, 25% of the wells were seated in gneiss, 5% of the wells were seated in granite, and 3% of the wells were seated in diorite. An unpublished Master's Thesis by van der Leeden (1962) indicated that well yields ranged between 0 to 280 GPM, 0 to 365 GPM, and 1 to 450 GPM for the Manhattan Schist, Fordham Gneiss, and Inwood Marble, respectively. These yields are indicative of the secondary porosity, additional weathering and fracturing of the rock, and are not representative of the competent rock matrix. The principal aquifers of the region and a local focus of the water well data collected by Asseltine and Grossman (1955) are found on Figures G.5 and G.6.

G3.1.4 Regional Surface Water Hydrology

The most prominent regional surface water feature is the Hudson River (Figure G.7). The Hudson River Basin is approximately 13,300 square miles (mi2) in area covering portions of New York, Vermont, New Jersey, Massachusetts, and Connecticut. The Hudson River headwaters originate in the Adirondack Plateau in the western portion of Essex County. The flow trends generally north-south with minor turning points and terminates at New York City. The river has been an important commerce channel for non-Native Americans since its "discovery and exploration" in 1609. Prior to 1820 and the construction of the Troy Dam, tidal influences observed in the Hudson River reached as far north as Troy. Currently, these influences only reach as far as the Troy Dam (Rafter, 1905). Throughout the tidal reach, the Hudson River has a mean bed slope of approximately 2x10-4 feet per foot (ft/ft) and has a mean tidal range of approximately 5.5 ft (Shaw, 2002).

The National Water-Quality Assessment (NAWQA) Program evaluations of the Hudson River Basin water quality have indicated several issues. Impacting surface water quality, analyses of stream bottom sediments collected within the basin have indicated elevated concentration levels of metals, PCBs, and polycyclic aromatic hydrocarbons (PAHs) when compared to other national sampling sites and in some instances have exceeded state and federal water-quality standards. The Hudson River south of Hastings-on-Hudson was ranked number one for elevated PAH concentrations in stream sediments out of thirty-three sites analyzed (Wall et al., 1998). Although the use of PCBs has been banned since the 1970's, concentrations are still elevated within the Hudson River Basin. As of 1998, concentrations of PCBs, 1,1,1-Trichloro-2,2-bis(p-chlorophenyl)ethane (DDT), and chlordane exceeded proposed NYSDEC criteria for human health bioaccumulation at the majority of stream sediment sites tested (Wall et al., 1998). Concentrations of dissolved pesticides and other nutrients were found to be less than the national median (Phillips and Hanchar, 1996).

G3.1.5 Regional Aquifer Recharge

As reported in the Mean Annual Runoff, Precipitation, and Evapotranspiration in the Glaciated Northeastern United States (Randall, 1996), the mean annual precipitation for the region is approximately 46 inches (in). The mean annual runoff is approximately 23 in (Randall, 1996) and, based on the annual temperature range, annual evapotranspiration is approximately 22 in (Lyford and Cohen, 1988). Therefore, approximately 1 in of annual precipitation is available for aquifer recharge. Areas contributing recharge to the regional system are dependent on land use with paved or high intensity residential areas contributing less than open green spaces. The remaining recharge to the aquifer systems is attributed to contributions from surface water systems such as the Hudson River. (Figures G.8 and G.9)

G3.1.6 Regional Conceptual Model

Recharge to groundwater enters the regional aquifer systems at higher topographic elevations in non-paved areas and contributes to both the surficial and, when directly exposed, the bedrock aquifers. Within the surficial aquifers, the uplands provide the driving head for the systems as groundwater flow is from the upper topographic elevations towards topographic low discharge points where the river/stream systems are located. The elevation at which recharge is received determines the depth and extent of flow within the aquifer. Higher elevations will produce deeper and longer flowpaths in the aquifers. Deviations in groundwater flow in the surficial and bedrock aquifers are attributed to pumping wells screened in the units.

G3.2 Site Area Hydrogeology

The following describes the local (Site-specific) hydrogeology.

G3.2.1 Surficial Geology

The Site surficial geology is composed of three hydrogeologic units consisting of Fill, Marine Silt (hereon referred to as the Marine Silt Unit), and Sand (hereon referred to as the Basal Sand Unit). The following is a brief description of each unit. Refer to Appendix D of the 50% Design Report for a more detailed description of soil conditions encountered during the PDI.

- Fill - The thickness of the Fill Unit ranges from 10 ft to 20 ft on the eastern Site boundary to approximately 20 ft to 40 ft along the Hudson River. As previously described in the Site History (Section G2), the Site is located on a man made landmass comprised of silt, sand, and gravel mixed with varying amounts of non-soil materials such as wood, brick, concrete with reinforcing bars, ash and cinders, glass, plastic, slag, shells, asphalt, shell fragments, coal, and copper wire.

- Marine Silt Unit - The thickness of the Marine Silt Unit ranges from approximately 10 ft on the eastern Site boundary, to approximately 40 ft, along the Hudson River with pockets of thicknesses as great as 60 ft. Based on Atterberg limits, the Burmister classification of the layer ranges

from SILT & CLAY to CLAY & SILT to silty CLAY, with the majority of the samples falling in the CLAY & SILT range. The Marine Silt is often layered with fine sand (laminations, lenses, partings, or seams) and contains varying amounts of shells.

- Basal Sand Unit- This stratum was generally described as medium dense, gray to red brown, coarse to fine SAND to coarse to fine GRAVEL, with varying amounts of silt. The Basal Sand was generally separated from the overlying Marine Silt by a layer of gravel. Golder (1996) noted that the Basal Sand contained laterally discontinuous red silts, clay laminations, and trace shell fragments.

G3.2.2 Bedrock Geology

Dolph Rotfeld Associates (1976) indicated that the bedrock underlying the Site consists of Yonkers Gneiss which is an intrusive component of the Fordham Gneiss. The Yonkers Gneiss is a highly folded and faulted, pink to grey, coarsely feldspathic granitoid body with a strong gneissic fabric. The top of the bedrock unit ranges from approximately 40 ft below mean sea level (MSL) to 100 ft MSL at the western property boundary (Shaw, 2002). Supplemental investigation of the eastern property boundary by Haley & Aldrich in March and April 2006 indicated a bedrock depth of approximately 30 ft below ground surface at the southeastern portion of the Site at Pre-Design Monitoring Well (PDMW) PDMW-16D.

G3.2.3 Local Aquifer System

The Site is underlain by a surficial aquifer that is predominantly Fill overlying the Marine Silt Unit, which acts as an aquitard. The lowest unconsolidated hydrogeologic unit, the Basal Sand Unit, is confined at the Site. The bedrock aquifer in the area acts as a confined/unconfined unit dependent upon where the bedrock breaches the ground surface and the interconnectiveness of the fracture network. The NYSDEC classified all groundwater in the region as Class GA, fresh groundwater, best used as a source of potable water supply (RETEC, 1993). The following sections describe the Site specific hydrogeology.

G3.2.3.1 Local Aquifer Parameters

As expected, there is a wide range of aquifer parameters available for the three unconsolidated hydrogeologic units. The following briefly describes the reported calculated ranges of aquifer parameters.

- Fill- Due to the unknown nature, origin, and heterogeneity of the Fill Unit, aquifer parameters calculated will vary depending on the testing methodology and analysis methodology employed. For example, Shaw (2002) and the NYSDEC (2004) classified the fill as moderately permeable with a range of hydraulic conductivity between $1x10^{-3}$ centimeters per second (cm/sec) to $1x10^{-5}$ cm/sec. RETEC (1993) estimated the hydraulic conductivity in the range of $1.1x10^{-2}$ to $3.5x10^{-4}$ cm/sec. Two

slug tests conducted at MW-02 and MW-05 by Malcolm Pirnie (1987) resulted in the calculation of hydraulic conductivity values of $8x10^{-5}$ cm/sec and $2x10^{-3}$ cm/sec, respectively. Four step-rate aquifer pumping tests conducted by Haley & Aldrich at PDMW-06, MW-02A, MW-03A, and MW-07 indicate a hydraulic conductivity range of approximately $1x10^{-2}$ to $5x10^{-4}$ cm/sec (Table G.1).

- Marine Silt Unit- The Marine Silt Unit has been characterized in previous investigations as soft, plastic, and of low permeability. Golder (1996) indicated that the unit was not expected to be fractured. IT (2000) collected at the Fill/Marine Silt Unit interface and the Marine Silt Unit at depth. The results of the permeability testing indicated that the Marine Silt Unit had a hydraulic conductivity range of $1x10^{-3}$ cm/sec, at the Fill/Marine Silt Unit interface, and $1x10^{-7}$ cm/sec at depth, based on geotechnical analysis of Shelby tubes collected approximately 10 ft into the unit. Shaw (2002) indicated a hydraulic conductivity range of $1x10^{-5}$ to $1x10^{-7}$ cm/sec and the NYSDEC (2004) reports that the unit has a hydraulic conductivity of $1x10^{-7}$ cm/sec. The Marine Silt Unit was evaluated by Haley & Aldrich via rising head and falling head testing (i.e., slug testing) during the PDI in November 2005. The data indicate a hydraulic conductivity range of approximately $5x10^{-3}$ to $1x10^{-5}$ cm/sec. Additionally, laboratory hydraulic conductivity testing was performed on samples from the Marine Silt during the PDI. The hydraulic conductivity of the samples tested ranged from $5.3x10^{-8}$ cm/sec to $9.7x10^{-5}$ cm/sec (Table G.1). The discrepancy between the field and lab result ranges is attributed to tests being conducted in-situ (field testing) and ex-situ (laboratory testing). Testing of ex-situ samples are typically not as representative as in-situ samples due to sample disturbance during collection and transportation.

- Basal Sand Unit- The Basal Sand Unit, also referred to as the "bearing sands" unit because the unit provides structural support for pile-supported structures at the Site, has a limited data set which consists primarily of the geologic description. The reported calculated geometric means of the hydraulic conductivity for the Basal Sand Unit were approximately $8x10^{-3}$ cm/sec and $3x10^{-3}$ cm/sec when calculated during investigations by Golder (1996) and IT (2000), respectively.

These parameter values are typical of those presented in literature for these types of stratigraphic units and depositional environments (Freeze and Cherry, 1979, Fetter, 1999, and Domenico and Schwartz, 1990).

G3.2.3.2 Local Aquifer Recharge

As reported in Randall (1996), the mean annual precipitation for the region is approximately 46 in. Based on the annual temperature range, annual evapotranspiration is approximately 22 in (Lyford and Cohen, 1988). The mean annual runoff is approximately 23 in (Randall, 1996) for the region. Previous investigations indicate that the Site is approximately 90% covered by asphalt, concrete building slabs, and building structures. Therefore, less than 1 in of annual precipitation that is available for aquifer recharge regionally might be slightly higher at the local scale with the remaining recharge to the systems from local interaction with the Hudson River.

G3.2.3.3 Local Potentiometric Surface and Groundwater Flow Direction

Previous investigations have indicated that groundwater flow in both the Fill and the Basal Sand Unit is towards the Hudson River (i.e., from east to west). Although it is not monitored currently or in the past, Golder (1996) indicated that groundwater flow in bedrock was also towards the Hudson River. The potentiometric surface varies with the tides but it approximately ranges from 2 ft MSL at the eastern property boundary to -1.5 ft Mean Sea Level (MSL) at the western property boundary during low tide. During high tide, the potentiometric surface is elevated at the western boundary to approximately 2 ft MSL creating a trough inland at the furthest extent of the estimated area of tidal influence. Golder (1996) estimated the area of tidal influence to be approximately 120 ft east from the Hudson River shoreline. A supplemental investigation by Haley & Aldrich conducted using Levelogger® pressure transducers by Solinist from 20 March to 1 May 2006 indicated a tidal influence as far east as PDMW-16S, PDMW-17S, PDMW-18S, and MDMW-19S on the eastern Site boundary. These wells were installed by Haley & Aldrich in March and April 2006.

G3.2.3.4 Local Lateral and Vertical Hydraulic Gradients

Hydraulic gradient is the change in total hydraulic head divided by the change in distance in the direction of flow. A positive vertical hydraulic gradient indicates an upward movement of groundwater while a negative vertical hydraulic gradient indicates a downward movement of groundwater. Laterally, a positive lateral hydraulic gradient indicates an outward groundwater flux while a negative hydraulic gradient indicates an inward groundwater flux.

G3.2.3.5 Vertical Hydraulic Gradients

Golder (1996) calculated vertical hydraulic gradients at two locations, MW-01A/B and MW-03A/B. The "A" wells of these couplets are screened in the Fill and the "B" wells are screened in the Basal Sand. The vertical hydraulic gradient was calculated as the change in water

level between the two adjacent wells, divided by the vertical distance between the midpoints of the two screens. A hydraulic gradient of approximately 0.07 ft/ft was calculated at MW-01A/B, and approximately 0.03 ft/ft at MW-03A/B. Golder concluded that the tide has a minimal effect on vertical hydraulic gradients.

Vertical hydraulic gradients were calculated by Haley & Aldrich at the following monitoring points:

- **28 October 2005 dataset - MW-01A/B, MW-03A/B, and MW-13A/B;**
- **9 November 2005 dataset- MW-01A/ B, MW-13A/ B, MW-14A/B, and MW-15A/ B; and**
- **20 February 2006 datasets (High and Low Tide)- MW-01A/B, MW-03A/B, MW-13A/B, MW-14A/B, and MW-15A/B.**

The results of the evaluation indicate the highest upward vertical hydraulic gradient at MW-01A/B, with decreasing upward gradients from more inland well couplets (MW-13A/B and MW-15A/B) to shoreline well couplets (MW-03A/B and MW-14A/B). The results of the gradient calculations are presented on Table 6.1B in Appendix D. The estimated vertical hydraulic gradients are consistent with the gradients calculated by Golder (1996).

The data from both the Golder analyses and the PDI analyses indicate that the Basal Sand hydrostratigraphic unit is under artesian pressure.

G3.2.3.6 Lateral Hydraulic Gradients

Golder (1996) calculated lateral hydraulic gradients based on data from the Hudson River and three monitoring wells that were screened in the Fill hydrostratigraphic unit (MW-01A, MW-02A, and MW-03A). The lateral hydraulic gradient was calculated as the difference in hydraulic head between the well and the river, divided by the lateral distance between the two. Based on the calculated results, Golder (1996) concluded that the tide has a significant influence on the lateral hydraulic gradients. At high tide, the calculated lateral hydraulic gradient ranged from -0.01 ft/ft to -0.05 ft/ft with flow from the Hudson River inland. At low tide, the calculated lateral hydraulic gradients ranged from 0.02 ft/ft to 0.03 ft/ft with flow towards the Hudson River.

Haley & Aldrich used the same well set and the Hudson River to estimate an approximate lateral hydraulic gradient range of -0.005 to 0.005 ft/ft for the 9 November 2005 mid-tide data, 0.01 to 0.04 ft/ft for the 20 February 2006 low tide data, and -0.001 to -0.006 ft/ft for the 20 February 2006 high tide data. The estimated lateral hydraulic gradients are consistent with gradients calculated by Golder (1996) during low tide but are significantly lower during high tide. As the high and low tide stage elevation is variable, the inconsistency between the high tide lateral

hydraulic gradient estimates by Haley & Aldrich and Golder (1996) could be attributed to the Hudson River stage elevation used in the calculation for the time period monitored. Similar to the Golder analyses, the PDI data indicates that the flow direction is toward the river during low tide and convergent during high tide within the Fill hydrostratigraphic unit. The PDI also confirmed a tidal influence within the Fill and the Basal Sand.

G3.2.4 Stream-Aquifer Interaction

The Fill unit is in hydrologic contact with the Hudson River. The Site proper is located on the eastern flood plain (Groundwater Technology, Inc., 1989). This is evident in hydrographs from previous investigations illustrating the relationship between tidal cycles and the cyclic changes in the potentiometric/piezometric head elevation. The Hudson River is approximately one mile wide and approximately 50 ft deep at the Site (RETEC, 1993). The flow contribution, like the hydraulic conductivity values for the Site, also varies. In their 1987 report, Malcolm Pirnie calculated the flow from the Site to the Hudson River to range between 70 gallons per day (GPD) to 2,000 GPD (or 0.05 to 1.4 GPM) while Golder (1996) estimates that the contribution of flow to the Hudson River to be approximately 26,000 GPD (or 18 GPM).

G3.2.5 Site Conceptual Hydrogeologic Model

The local hydrogeologic system is comprised of four distinct hydrogeologic units: the Fill, the Marine Silt Unit, the Basal Sand Unit, and the fractured bedrock. Recharge to groundwater enters the local aquifer systems east of the Site at higher topographic elevations in non-paved areas and contributes to the Fill and Basal Sand hydrogeologic units. The groundwater flow in the Fill is to the west at a lateral hydraulic gradient range between 0.02 ft/ft and 0.03 ft/ft at low tide. Based on previous investigations, estimates indicate an approximate flow from the Site to the Hudson River range between 70 GPD to 26,000 GPD. During high tide, water infiltrating the hydrogeologic units from the Hudson River alters the lateral gradients to the east (ranging from -0.01 ft/ft to -0.05 ft/ft). This infiltration forms a slight trough in the potentiometric surface.

The groundwater flow in the lower hydrogeologic unit, the Basal Sand Unit, is also towards the west. Confined by the Marine Silt Unit which acts as an aquitard, vertical hydraulic gradient calculations by Golder (1996) indicate an upwards gradient. In portions of the Site, the Basal Sand Unit is artesian. IT (2000) indicates that the fractured bedrock is likely to contribute to the upward gradient as the recharge area is higher in elevation and discharges to the Hudson River. The Hudson River is the terminus for groundwater flow and is also a source of recharge to the systems. In the unconsolidated hydrogeologic units, this appears to be tide dependent.

G3.2.6 Site Conceptual Contaminant Fate and Transport

The NYSDEC recognizes three contaminant categories present at the Site which include PCBs, semi-volatile organic compounds (SVOCs), and inorganics (metals). These contaminants are found exclusively in the Fill and groundwater within the Fill. The predominant PCB detected at the Site is Aroclor 1260 with lesser amounts of Aroclor 1254. Metals of concern include copper, lead, and zinc. SVOCs of concern are PAHs such as pyrene, chrysene, anthracene, and flouroanthenes (NYSDEC, 2004). Light Non-Aqueous Phase Liquid (LNAPL) has also been detected at the Site near the water tower and is being removed as part of an interim remedial measure.

Contaminant fate and transport is dependent on several factors including, but not limited to, contaminant chemistry, adhesion to particulates, dispersive properties, groundwater flow direction and velocity, indigenous microbes, exposure to the atmosphere, and hydrogeology of the aquifer. PCBs are denser than water and tend to dive to lower elevations and, in some cases, pool on impermeable or lesser permeable units. SVOCs depending on the concentration will either sink, like PCBs, or move through the aquifer via advective flow. Inorganics tend to move through the aquifer via advective flow unless conditions permit the formation of precipitate.

G4. GROUNDWATER FLOW MODEL

G4.1 Modeling Objectives

The objectives of the modeling investigation were two-fold. The main objective of the groundwater model was to evaluate and mimic observed groundwater patterns present at the Site. The second objective was to evaluate the potential dewatering yield for remedial design construction.

G4.2 Model Conceptualization

The model was discretized into three model layers based on the surficial interfaces of the unconsolidated deposit hydrostratigraphy. The groundwater flow model was designed to be Site focused and extends east of South Side Avenue in the Village of Hastings-on-Hudson. The model is extended past the Site proper on the north and south assuming groundwater flow from east to west. The western portion of the model is bound by the Hudson River and is the primary discharge point for the Site. A simulated flux boundary is used to evaluate flow into the Site area from the east in each of the modeled layers and is also used to evaluate flow out of the Site area towards the west in the bottom two layers. Modeled boundary conditions are discussed further in Section G4.3.1.4.

Areas of recharge and discharge (i.e., wetlands, rivers, and/or streams) within the sub-basin were modeled through the use of packages within MODFLOW-2000 (Harbaugh et. al, 2000). These packages include the General Head Boundary Package, Recharge Package, Horizontal Flow Barrier Package, and the Drain Package and are described in detail in Section G.4.3.1.5.

G4.3 Model Software Selection

Because the focus of the investigation was the evaluation of groundwater flow regimes and the evaluation of remedial design alternatives, a saturated flow, three-dimensional, finite-difference model was deemed adequate. Visual MODFLOW Pro Premium v.4.1 (Waterloo Hydrogeologic, 2006) was selected as the groundwater modeling interface. Arc Map 9.1 (ESRI, 2005) was selected as the pre- and post-processing interface.

G4.3.1 MODFLOW-2000

MODFLOW-2000 (Harbaugh et. al, 2000) is a three-dimensional, finite difference-modeling program which is cell or grid based and calculates flow in three-dimensions using finite difference techniques. The modeler assigns physical and hydraulic boundaries within MODFLOW-2000 (Harbaugh et. al, 2000). Examples of physical boundaries include impermeable layers (i.e., clay deposits), surface water bodies, or man made structures. Examples of hydraulic boundaries include groundwater divides and flow lines.

Several utility "packages" are used to simulate flow into or out of the aquifer. Packages used in the model include General Head Boundary Package, Recharge Package, Horizontal Flow Barrier Package, and the Drain Package. These

simulated stresses influence the model-predicted hydraulic heads (groundwater elevations) and regional water balance. Arc Map 9.1 (ESRI, 2005) and Visual MODFLOW Pro Premium v.4.1 (Waterloo Hydrogeologic, 2006) were used to process model input (user-defined values) and output (model-predicted heads and the water balance).

The model grid covers the Site and extends further in all directions to limit effects of boundary conditions. The parameters applied to the model grid include starting hydraulic head elevations (estimated based on available data), horizontal and vertical hydraulic conductivity, and top and bottom elevations of cells within the model. The model input parameters are described in more detail in the sections that follow.

G4.3.1.1 Model Grid

The model grid consists of 129,300 cells (431 rows, 100 columns, and 3 layers) 10 ft by 10 ft at the Site. The grid spacing is fine at the Site to provide better resolution in an area where more hydrogeologic data are concentrated and for better resolution in areas used in predicting groundwater budgets. The model grid is depicted on Figure G.10.

The model consists of three layers. Layer Type 3 was used to represent the first layer and Layer Type 0 was used to represent the second and third layer. Layer Type 3 assumes transmissivity of the layer varies. It is calculated from the simulated saturated thickness and simulated hydraulic conductivity. The storage coefficient may alternate between confined and unconfined values. Vertical leakage from above is limited if the aquifer becomes desaturated. Layer Type 0 represents a confined aquifer. Layer Type 0 assumes transmissivity and storage coefficients of the layer are constant for the entire simulation (Harbaugh et. al, 2000).

The model is simulated using the Layer Property Flow (LPF) Package which is the default for MODFLOW-2000 (Harbaugh et. al, 2000). With MODFLOW-2000, the layer elevations (top and bottom) are defined as input to the Global Process and the user defines the horizontal and vertical hydraulic conductivity for each layer. MODFLOW-2000 then computes the cell by cell transmissivity using the hydraulic conductivity values and the layer geometry.

G4.3.1.2 Hydraulic Conductivity

Table G.1 lists aquifer testing results for the Site conducted during the PDI by Haley & Aldrich. Hydraulic conductivity values were calculated using rising and falling head permeability testing (slug-testing) at five monitoring points and aquifer pumping data at four monitoring points. Hydrostratigraphic/hydraulic conductivity zones were generated for the model and are depicted on Figure G.11. The parameter values generated by Haley & Aldrich were used as initial zone values during the model generation, but were altered during calibration of the groundwater flow model.

G4.3.1.3 Cell Elevations

Cell elevations are based on ground surface elevation contours provided by the USGS, borings from the previously mentioned reports, Site-specific surveys, geophysical surveys, and outcrops within the sub-drainage basin delineation.

G4.3.1.4 MODFLOW-2000 Boundary Conditions

The following describes the model variables used to represent hydrogeologic boundaries:

- **No- Flow Boundary-** Because the groundwater flow is from the east towards the Hudson River, the north and south boundaries were extended past the Site property line and simulated as no-flow boundaries.

- **Constant Head Cells-** The Hudson River acts as hydrogeologic source and/or sink depending on the tidal stage. To simulate the Hudson River, cells were assigned a constant head flag, which indicates the hydraulic head within the cell does not change during the simulation to simplify the model. (Figure G.12) Because the model was run as a steady state model for simplicity and the Hudson River elevation fluctuates with the tide, the elevation for the constant head cells for the calibrated model (20 February 2006 high tide data collection) and validation models (collected on 9 November 2005, 20 February 2006 at low tide, and 24 May 2006 at mid-tide) was the average stage elevation during the monitoring period. For example, if the groundwater elevation measurements were taken between 11:05 and 13:12, then the average river stage for that time period was used in the model.

- **Drain Package-** Based on collected groundwater elevation data contouring, storm drains and sewer lines at the Site are believed to act as groundwater sinks. To simulate the storm drains and sewer lines, cells were assigned drain nodes with the input parameters of elevation and conductance. Conductances were altered during model calibration. (Figure G.12)

- **General Head Boundary-** The General Head Boundary (GHB) Package was used to simulate flow into the model area. The GHB allows for hydraulic heads to fluctuate and permits flow into or out of the model as hydraulic heads near the GHB decrease or increase, respectively. The flow through the boundary is a product of conductance and the hydraulic head at or near the boundary (McDonald and Harbaugh, 1988). (Figure G.12)

- **Horizontal Flow Barrier- The Horizontal Flow Barrier (HFB) Package was used to simulate bulkheads and sheeting walls at the Site. The HFB restricts hydraulic communication between adjacent cells and is simulated as a conductance value (a product of the barrier thickness and hydraulic conductivity) (Harbaugh et. al, 2000). (Figure G.12)**

G4.3.1.5 MODFLOW-2000 Hydrogeologic System Inputs/Outputs

The following model parameters were used to simulate gains and losses of water within the model.

- **Recharge Package- The Recharge Package is used to simulate precipitation infiltrating the surficial deposits. The recharge values used in the model were assigned over the model grid excluding paved areas and areas of discharge, where recharge is assumed to be negligible. It is typically assumed that surface waters are areas of "rejected recharge," similar to impervious surfaces (Anderson and Woessner, 1992). Figure G.13 depicts the areas of areal recharge applied in the model. This is adjusted during model calibration as recharge and hydraulic conductivity are typically the most sensitive parameters of a groundwater model.**

- **General Head Boundary- The General Head Boundary (GHB) Package was used to simulate flow into and out of the model area. The GHB allows for hydraulic heads to fluctuate and permits flow into or out of the model as hydraulic heads near the GHB decrease or increase, respectively. The flow through the boundary is a product of conductance and the hydraulic head at or near the boundary (McDonald and Harbaugh, 1988).**

To accurately represent the eastern boundary of the Site, the estimated flux entering the Site area was required. The upland recharge area was estimated based on local drainage divides contributing to the modeled area. Following the conceptual model, upland recharge occurs as precipitation falling on upper elevations, gradually infiltrating the surficial layers, and flowing to lower elevations following, in most cases, bedrock trends. The estimated upland recharge area as presented is approximately sixty acres. Calculated by multiplying the annual runoff by the upland recharge areas, the annual contribution to recharge from upland recharge as a flux is approximately 3.78x107 gallons (Figure G.12).

- **Drain Package- As previously mentioned, storm drains and sewer lines at the Site are believed to act as groundwater sinks. To simulate the storm drains and sewer lines, cells were assigned rain nodes with the input parameters of elevation and**

conductance. Conductances were altered during model calibration (Figure G.12).

- **Constant Head Cells-** The Hudson River modeled as constant head cells in which the hydraulic head does not change during the simulation. Similar to GHB cells, the constant head cells can act as either sources or sinks for groundwater depending on surrounding hydraulic heads (Figure G.12). As reported by previous consultants, the published range of outflow from the Site to the Hudson River is approximately 70 to 26,000 GPD.

G4.3.1.6 Steady-State and Transient Groundwater Flow Modeling

Groundwater modeling was conducted using only the steady-state capabilities of MODFLOW-2000 (Harbaugh et. al, 2000) for simplicity. The difference between the two techniques is that transient simulations are needed for time dependent analyses. Transient simulations produce a data set of hydraulic heads for every time step (1 through nTH) while steady-state simulations produce only one hydraulic head data set. For groundwater modeling, steady-state simulations are less complicated in terms of data management.

G4.4 Model Calibration and Validation

The model was calibrated by altering model input parameters until simulated hydraulic heads and simulated flux into the system approached hydraulic heads in the unconfined and leaky confined aquifer and the estimated influx. This was accomplished through manual alterations of the parameters and the use of PEST (Watermark Numerical Computing, 2000). PEST (Watermark Numerical Computing, 2000) is an independent parameter estimation model which utilizes inverse modeling techniques to determine model parameters based on set observations. The model parameters are altered in the program until the objective function (Φ) reaches a minimum value based on observed data. The PEST (Watermark Numerical Computing, 2000) simulation was conducted via MODFLOW-2000 (Harbaugh et. al, 2000). The final calibrated model generates the predicted heads numerically through MODFLOW-2000 (Harbaugh et. al, 2000). Visual MODFLOW Pro Premium v.4.1 (Waterloo Hydrogeologic, 2005) was used to produce the model output including hydraulic head elevation contours.

The steady-state model was calibrated to thirty-five (35) groundwater elevations and the estimated influx to the model and outflux from the Site to the Hudson River collected on 20 February 2006 at high tide. The model was calibrated such that the simulated hydraulic heads were within 3 ft of the observed hydraulic heads. The Root Mean Square (RMS) hydraulic head error of the calibrated model is 1.16 ft. Attachment G1, Plot 1 summarizes the calibrated model hydraulic head error parameters. The influx and outflux simulated was within 10% of the estimated ranges presented in Section 4.3.1.5.

After calibration, the Hudson River stage was altered to represent a different time period to validate the model. The validation process is conducted to evaluate the model predictive capabilities. The model was validated using data collected on 9 November 2005, 20 February

2006 at high tide, and 24 May 2006 at mid-tide. Since the two driving forces of this groundwater model are hydraulic conductivity and the model boundaries, the results of the calibrated model appear valid as the RMS hydraulic head error was less than 2 ft for the three model validation simulations, 0.89 ft, 1.36 ft, and 1.70 ft, respectively. An RMS Error of less than 2 ft is common for locally focused groundwater flow model.

The MODFLOW-2000 (Harbaugh et. al, 2000) steady-state calibrated output is found on Figure G.14.

G4.5 Sensitivity Analysis

A sensitivity analysis was conducted with the use of PEST (Watermark Numerical Computing, 2000) for the model calibration (i.e., how sensitive is the calibration) and manually for the final calibrated model. The manual sensitivity analyses consisted of altering model parameters manually and evaluating the RMS hydraulic head error and influx and outflux of the model. This consisted of an additional eighty-five (85) model runs.

Based on the sensitivities predicted for the calibrated steady-state model, the most sensitive parameters are horizontal and vertical hydraulic conductivity of the simulated Marine Silt hydrostratigraphic zone and drain conductance on hydraulic heads. Horizontal hydraulic conductivity of the Fill hydrostratigraphic zone and drain conductance at higher multiples are found to be sensitive to model influxes and outfluxes. The results of the sensitivity analyses are found in Attachment G2.

G4.6 Predictive Analysis

After completing the model calibration, model validation, and sensitivity analysis, model simulations were conducted to predict potential groundwater dewatering rates for construction. The calibrated model was selected for use in the predictive analysis as high tide conditions would be representative of a worst case scenario for dewatering near the Hudson. Adjustments to the calibrated model included the following to represent the proposed construction conditions:

- Drain nodes within the excavation areas were removed;
- The model was further discretized vertically to better simulate and accommodate proposed sheeting/bulkhead depths;
- Simulation of the proposed sheeting/bulkhead walls using HFBs; and
- For a conservative estimate of dewatering yields, the proposed sheeting/bulkhead walls were simulated at a hydraulic conductivity of $1x10^{-5}$ cm/sec and constant head cells were applied to the areas with the proposed excavation and set to head elevations two feet below the proposed excavation depth.

The model was simulated as steady-state conditions with four scenarios:

- With all excavations areas open, proposed Site-wide sheeting, and dewatering to set hydraulic head elevations;
- With a 50 ft by 50 ft excavation within the largest excavation with proposed Site-wide sheeting and temporary sheeting surrounding the operating dewatering system, and dewatering to set hydraulic head elevations within the operating area;

- **With a 200 ft by 200-ft excavation within the largest excavation with proposed Site-wide sheeting and temporary sheeting surrounding the operating dewatering system, and dewatering to set hydraulic head elevations within the operating area; and**
- **Permanent sheeting simulated at the estimated conductance of the final construction design ($1x10^{-7}$ cm/sec).**

G5. RECOMMENDATIONS AND CONCLUSIONS

Models of this type are best representations of real world conditions and should only be used as a tool during hydrogeologic investigations as a means of interpreting site-specific hydrogeologic control parameters and for formulating ideas of flow dynamics. Based on the groundwater flow simulation models, the following is inferred:

- **Based on information collected for the hydrogeologic conceptual model, groundwater flow modeling was performed using MODFLOW-2000 (Harbaugh et. al, 2000). Based on the groundwater flow model, groundwater flow is generally from east to west with localized deviations due to overburden (fill) heterogeneities and subsurface features, such as storm drains and sewer lines, and tidal stage;**
- **The calibrated model mimics observed conditions at the Site for high, low and average tide conditions;**
- **Model error for hydraulic heads, influx, and outflux are all within reasonable error (i.e., RMS Error less than 2 ft and influx and outflux with 10% of the estimated range);**
- **Parameters of model sensitivity were as expected as hydraulic conductivity, recharge, and boundary conditions (i.e., drain conductance) are typical as each impacts simulated groundwater flow;**
- **Simulating the construction dewatering proposed for the Site using the calibrated (high tide) model with a more conductive sheeting/bulkhead walls was selected as yields predicted would be worst case scenarios;**
- **Simulation of the construction design indicates that dewatering activities could yield a rate of approximately 40,000 GPD. Two additional simulations representing 50 ft by 50 ft and 200 ft by 200 ft excavations with temporary sheeting indicated potential yields of approximately 3,250 GPD and 5,750 GPD, respectively; and**
- **Based on the final simulation results, a French drain system or similar should be considered upgradient of the final construction design to limit groundwater mounding at the Site.**

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TABLE G.1
AQUIFER TESTING ANALYSES SUMMARY
OU-1 REMEDIATION
NYSDEC SITE #3-60-022
1 RIVER STREET
HASTINGS-ON-HUDSON, NEW YORK

TEST	OBSERVATION WELL	METHODOLOGY[1]	TRANSMISSIVITY ($ft.^2$/day)	STORAGE (UNITLESS)	SATURATED THICKNESS (b (ft.))	HORIZONTAL HYDRAULIC CONDUCTIVITY (ft./day)	HORIZONTAL HYDRAULIC CONDUCTIVITY (cm/sec)
STEP TEST No. 1 AT MW-03A	**MW-03A**	NEUMAN[R1]	18.86	2.17E-01	11.98	1.57	5.56E-04
		$THEIS_{UNCONFINED}$[R2]	26.33	3.46E-01		2.20	7.76E-04
		THEIS[R2,3,4]	24.71	3.00E-01		2.06	7.28E-04
		$THEIS_{UNCONFINED-MANUAL}$[R1]	27.51	3.00E-01		2.30	8.11E-04
STEP TEST No. 2 AT MW-02A	**MW-02A**	NEUMAN[R1]	260.50	**3.23E-01**	13.65	19.08	6.74E-03
		$THEIS_{UNCONFINED}$[R2]	277.90	**3.23E-01**		20.36	7.19E-03
		THEIS[R2,3,4]	260.50	**3.23E-01**		19.08	6.74E-03
		$THEIS_{UNCONFINED-MANUAL}$[R1]	348.60	1.00E-02		25.54	9.02E-03
STEP TEST No. 3 AT MW-07	**MW-07**	NEUMAN[R1]	154.60	**4.34E-01**	15.35	10.07	3.56E-03
		$THEIS_{UNCONFINED}$[R2]	199.90	3.00E-01		13.02	4.60E-03
		THEIS[R2,3,4]	174.60	3.00E-01		11.37	4.02E-03
		$THEIS_{UNCONFINED-MANUAL}$[R1]	214.00	**3.26E-01**		13.94	4.92E-03
STEP TEST No. 4 AT PDMW-06	**PDMW-06**	NEUMAN[R1]	196.00	**3.90E-01**	12.63	15.52	5.48E-03
		$THEIS_{UNCONFINED}$[R2]	210.10	**4.65E-01**		16.63	5.87E-03
		THEIS[R2,3,4]	196.00	**3.90E-01**		15.52	5.48E-03
		$THEIS_{UNCONFINED-MANUAL}$[R1]	218.20	**4.57E-01**		17.28	6.10E-03

NOTES:

1. **METHODOLOGIES UTILIZED IN AQUIFER TEST ANALYSIS USING AQTESOLV v.3.0 (HydroSOLVE, 2000)**
2. **RED NUMERIC VALUES: STORAGE VALUE NOT REPRESENTATIVE OF UNCONFINED AQUIFER**
3. **UNCONFINED: UNCONFINED AQUIFER SOLUTION; CONFINED: MANUAL: MANUAL MEASUREMENT DATA USED**
4. **ALL DATA WAS CORRECTED FOR BAROMETRIC PRESSURE, REGIONAL GROUNDWATER TRENDS, AND TIDAL INFLUENCE.**
5. **MW-03A, MW-02A, MW-07, PDMW-06 SCREENED IN FILL HYDROSTRATIGRAPHIC UNIT.**

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1 RIVER STREET
HASTINGS-ON-HUDSON, NEW YORK

OBSERVATION WELL	TEST TYPE	METHODOLOGY[1]	HORIZONTAL HYDRAULIC CONDUCTIVITY (ft./day)	STORAGE (UNITLESS)
PDMW-01	FALLING HEAD	BOUWER & RICE$_{UNCONFINED}$	8.98E+00	3.17E-03
	FALLING HEAD	BOUWER & RICE$_{CONFINED}$	1.81E+01	6.38E-03
	RISING HEAD	BOUWER & RICE$_{UNCONFINED}$	9.31E+00	3.28E-03
	RISING HEAD	BOUWER & RICE$_{CONFINED}$	1.87E+01	6.59E-03
PDMW-02	FALLING HEAD	BOUWER & RICE$_{UNCONFINED}$	2.24E-01	7.89E-05
	FALLING HEAD	BOUWER & RICE$_{CONFINED}$	4.03E-01	1.42E-04
	RISING HEAD	BOUWER & RICE$_{UNCONFINED}$	1.99E-01	7.01E-05
	RISING HEAD	BOUWER & RICE$_{CONFINED}$	3.38E-01	1.19E-04
PDMW-03	FALLING HEAD No. 1	BOUWER & RICE$_{UNCONFINED}$	4.11E-02	1.45E-05
	FALLING HEAD No. 1	BOUWER & RICE$_{CONFINED}$	1.02E-01	3.60E-05
	FALLING HEAD No. 2	BOUWER & RICE$_{UNCONFINED}$	3.62E-02	1.28E-05
	FALLING HEAD No. 2	BOUWER & RICE$_{CONFINED}$	8.28E-02	2.92E-05
	RISING HEAD No.1	BOUWER & RICE$_{UNCONFINED}$	4.35E-02	1.54E-05
	RISING HEAD No.1	BOUWER & RICE$_{CONFINED}$	7.37E-02	2.60E-05
	RISING HEAD No.2	BOUWER & RICE$_{UNCONFINED}$	3.46E-02	1.22E-05
	RISING HEAD No.2	BOUWER & RICE$_{CONFINED}$	5.76E-02	2.03E-05
PDMW-04	RISING HEAD	BOUWER & RICE$_{UNCONFINED}$	8.20E-01	2.89E-04
	RISING HEAD	BOUWER & RICE$_{CONFINED}$	1.85E+00	6.53E-04
PDMW-05	FALLING HEAD	BOUWER & RICE$_{UNCONFINED}$	3.63E-01	1.28E-04
	FALLING HEAD	BOUWER & RICE$_{CONFINED}$	7.71E-01	2.72E-04
	RISING HEAD	BOUWER & RICE$_{UNCONFINED}$	3.07E-01	1.08E-04
	RISING HEAD	BOUWER & RICE$_{CONFINED}$	5.43E-01	1.92E-04

NOTES:

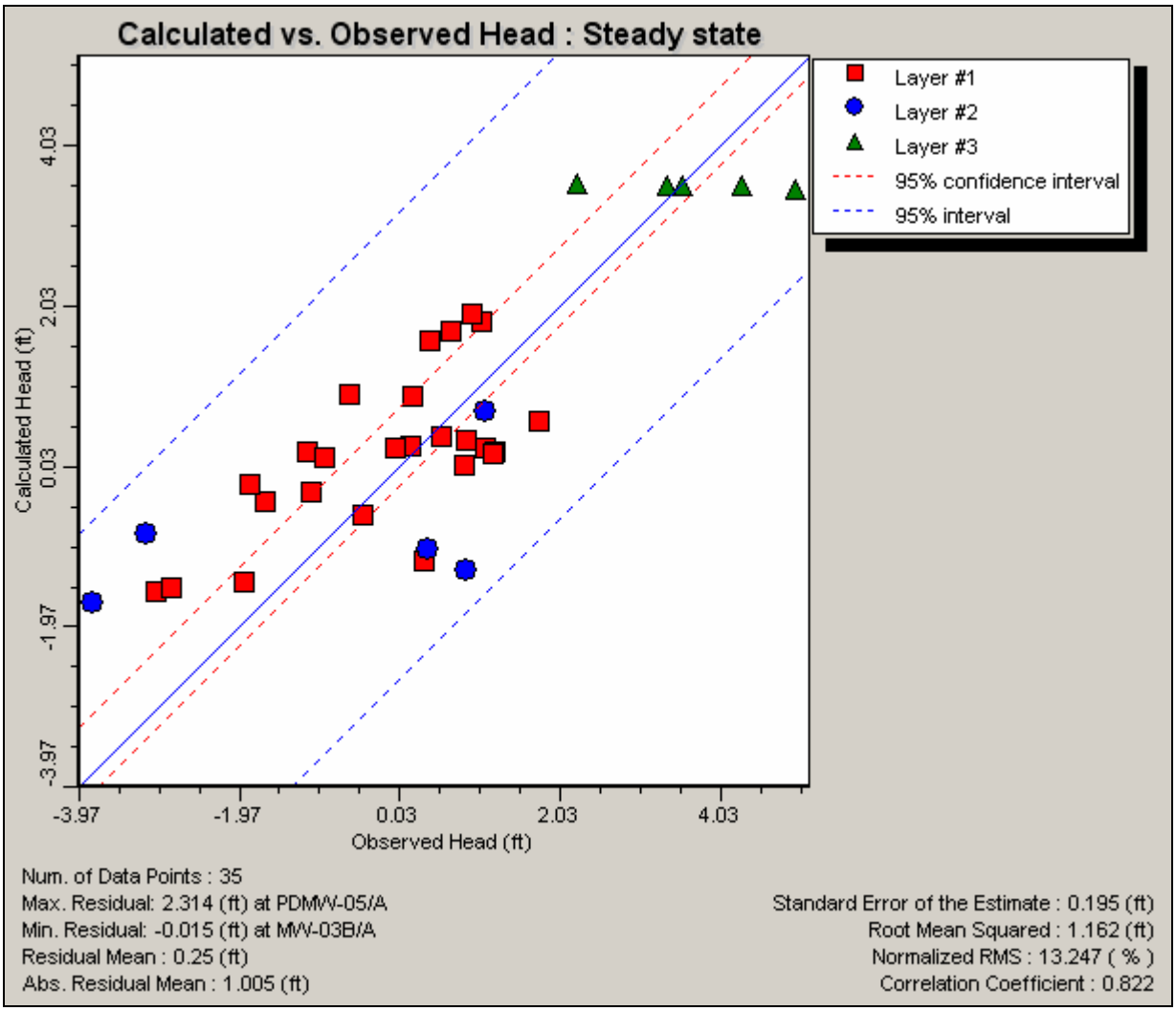
1. **METHODOLOGIES UTILIZED IN AQUIFER TEST ANALYSIS USING AQTESOLV v.3.0 (HydroSOLVE, 2000) AND EXCEL SPREADSHEET CREATED BY HALEY & ALDRICH OF NEW YORK**
2. **ALL DATA WAS CORRECTED FOR BAROMETRIC PRESSURE, REGIONAL GROUNDWATER TRENDS, AND TIDAL INFLUENCE.**
3. **PDMW-01, PDMW-02, PDMW-03, PDMW-04, AND PDMW-05 SCREENED IN MARINE SILT HYDROSTRATIGRAPHIC UNIT.**

REFERENCES:

1. **BOUWER, H. AND R.C. RICE. 1976. A SLUG TEST METHOD FOR DETERMINING HYDRAULIC CONDUCTIVITY OF UNCONFINED AQUIFERS WITH COMPLETELY OR PARTIALLY PENETRATING WELLS. WATER RESOURCE RESEARCH, V. 12, No.3, PG. 423-428**
2. **BOUWER, H. 1989. THE BOUWER AND RICE SLUG TEST- AN UPDATE. GROUND WATER, V. 27, No.3, PG. 304-309.**
3. **HydroSOLVE, Inc. 2002. AQTESOLV v.3.0.**

ATTACHMENT G.1

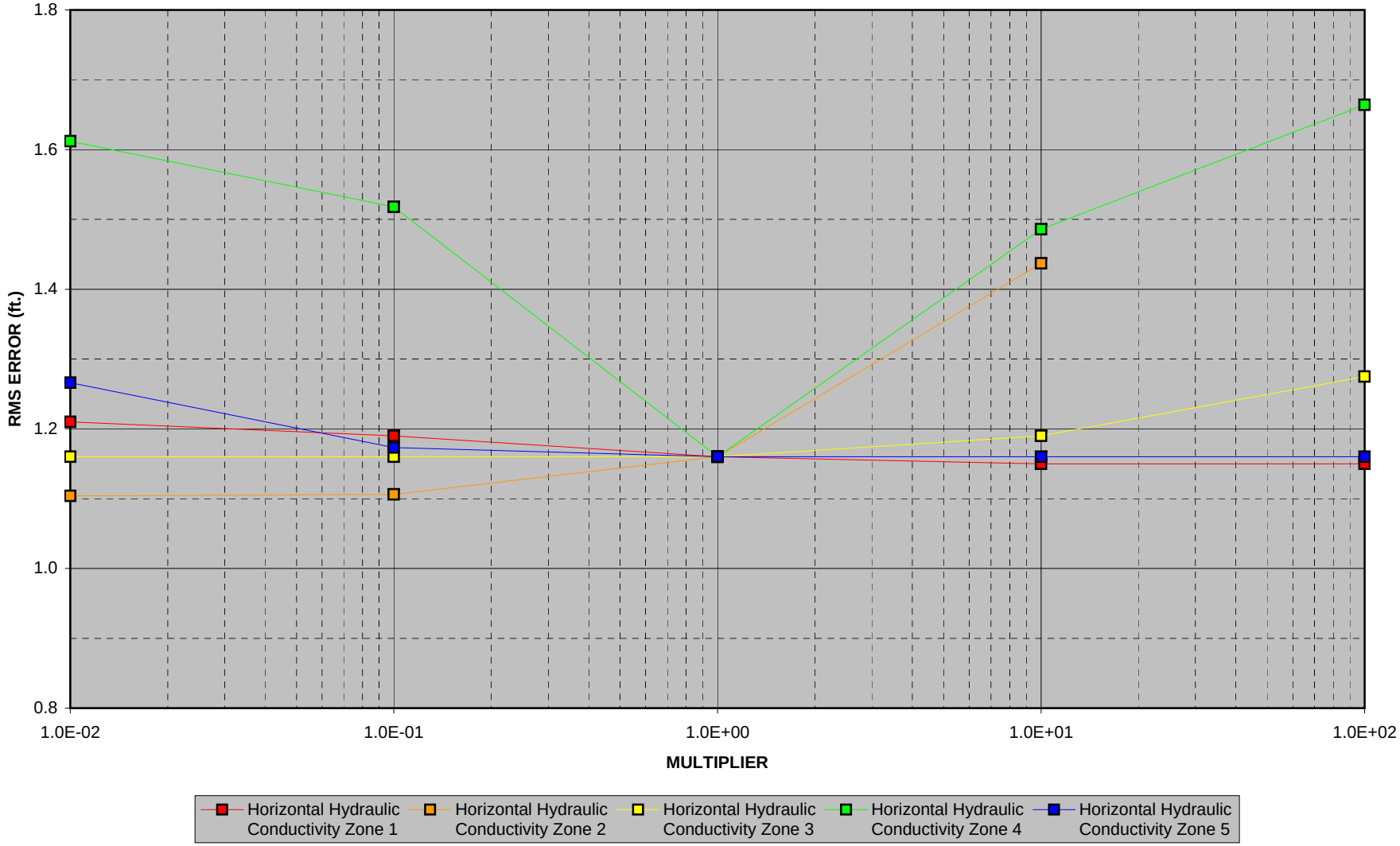
GROUNDWATER MODEL CALIBRATION


Calculated vs. Observed Head : Steady state
Layer #1
Layer #2
Layer #3
95% confidence interval
95% interval
Calculated Head (ft)
4.03
2.03
0.03
-1.97
-3.97
-3.97
-1.97
0.03
2.03
4.03
Observed Head (ft)
Num. of Data Points : 35
Max. Residual: 2.314 (ft) at PDMW-05/A
Min. Residual: -0.015 (ft) at MW-03B/A
Residual Mean : 0.25 (ft)
Abs. Residual Mean : 1.005 (ft)
Standard Error of the Estimate : 0.195 (ft)
Root Mean Squared : 1.162 (ft)
Normalized RMS : 13.247 (%)
Correlation Coefficient : 0.822

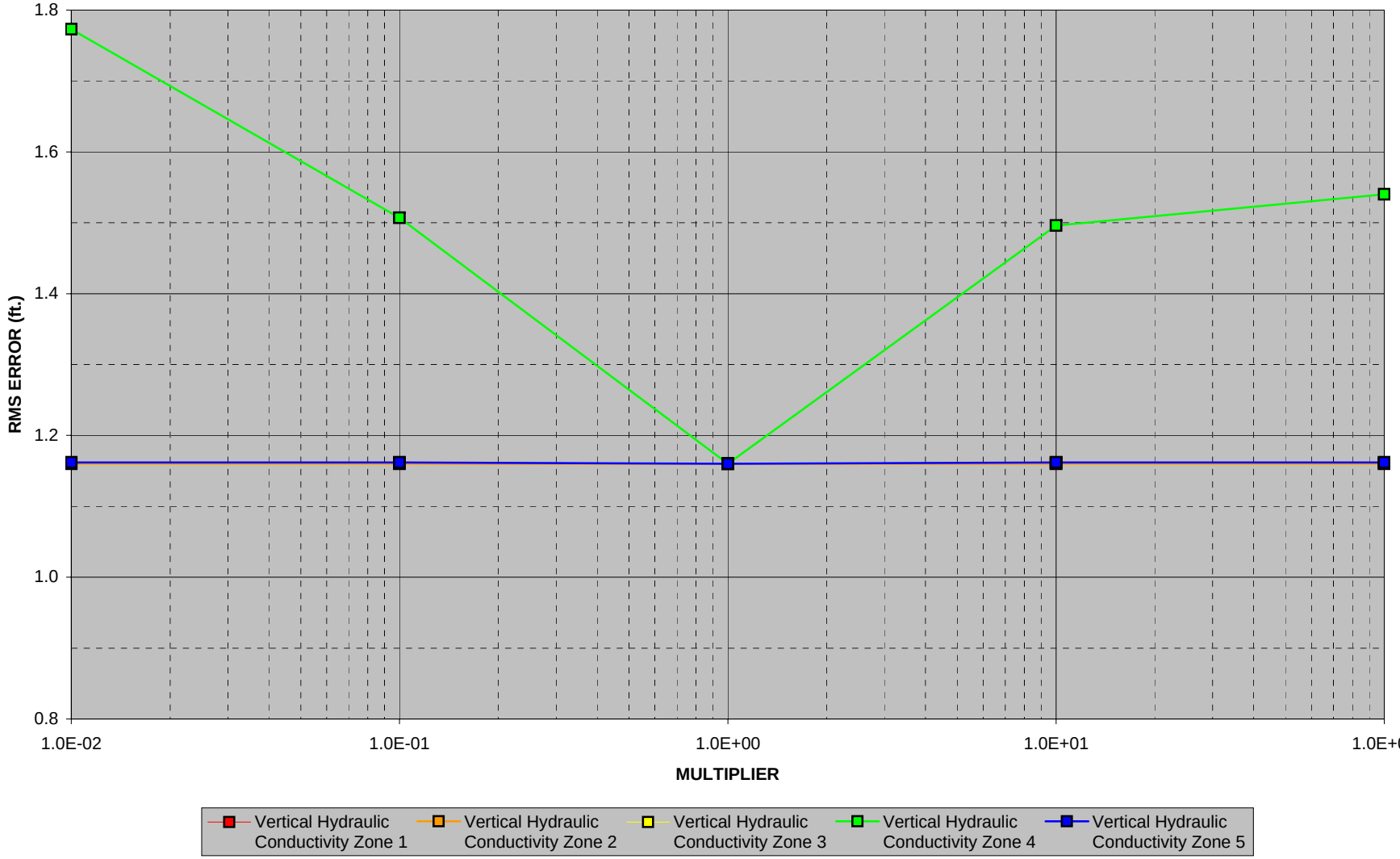
ATTACHMENT G.2

GROUNDWATER MODEL SENSITIVITY ANALYSIS

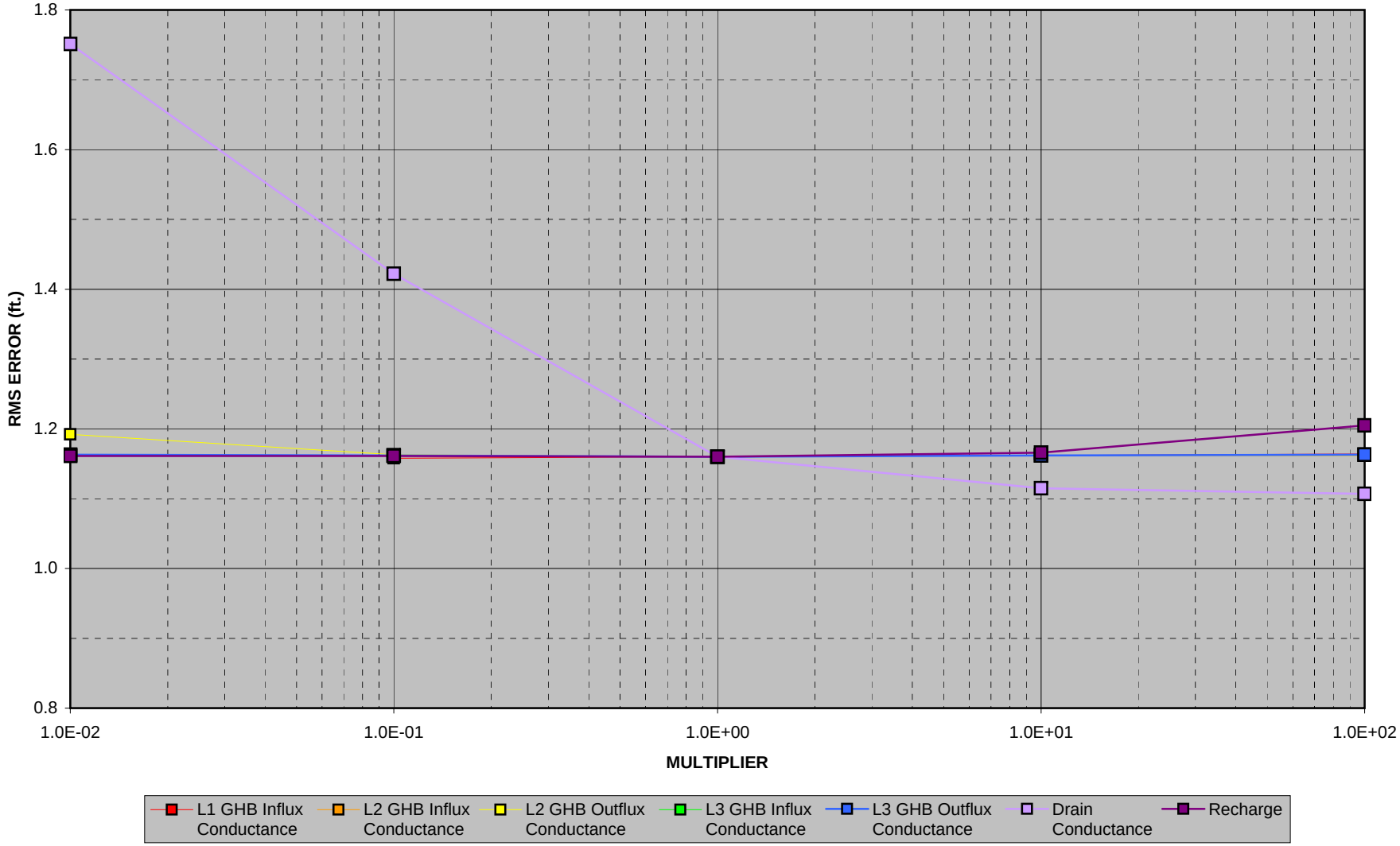
HYDRAULIC HEAD SENSITIVITY ANALYSIS OF HORIZONTAL HYDRAULIC CONDUCTIVITY



HYDRAULIC HEAD SENSITIVITY ANALYSIS OF VERTICAL HYDRAULIC CONDUCTIVITY



HYDRAULIC HEAD SENSITIVITY ANALYSIS
GENERAL PARAMETERS



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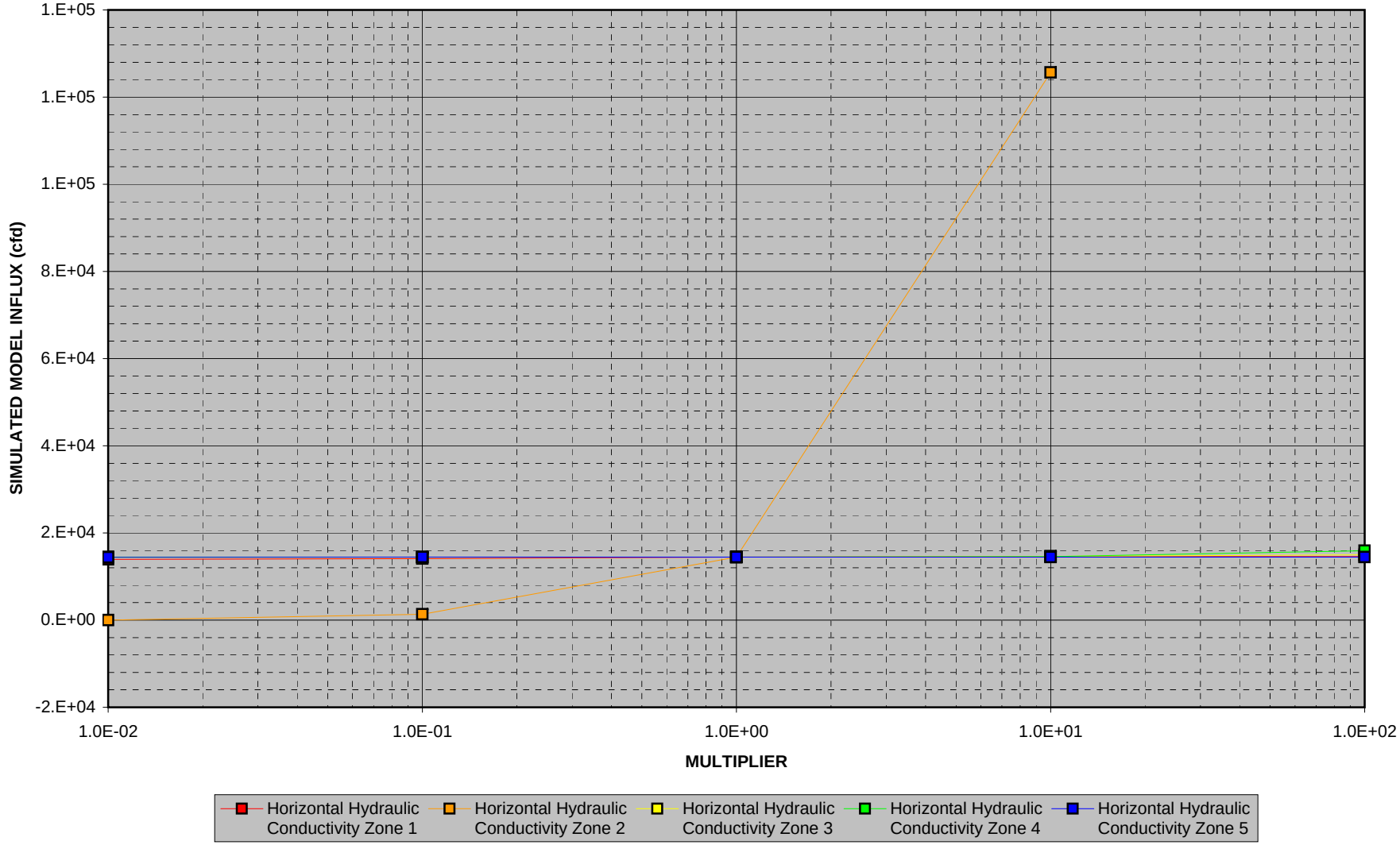
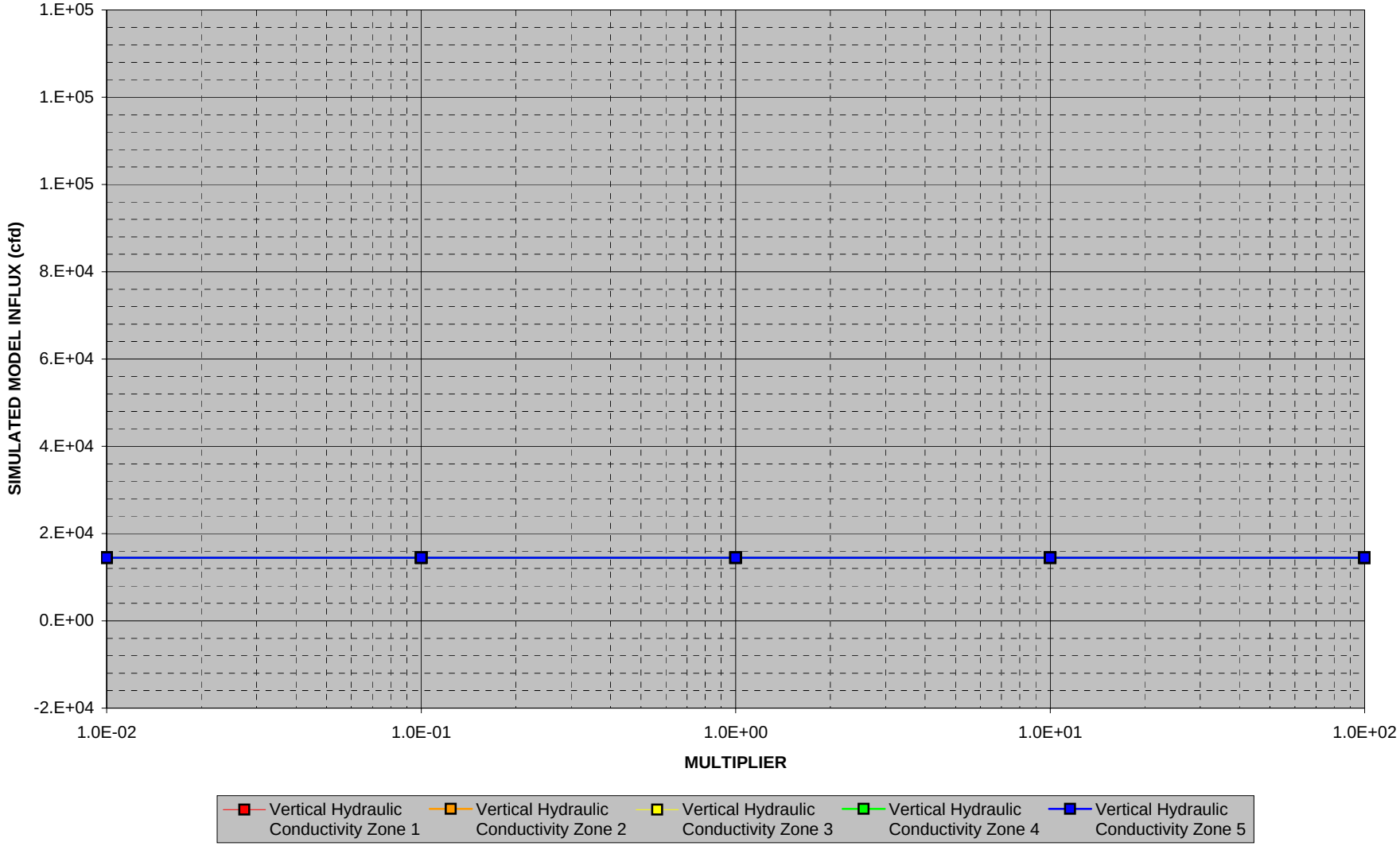
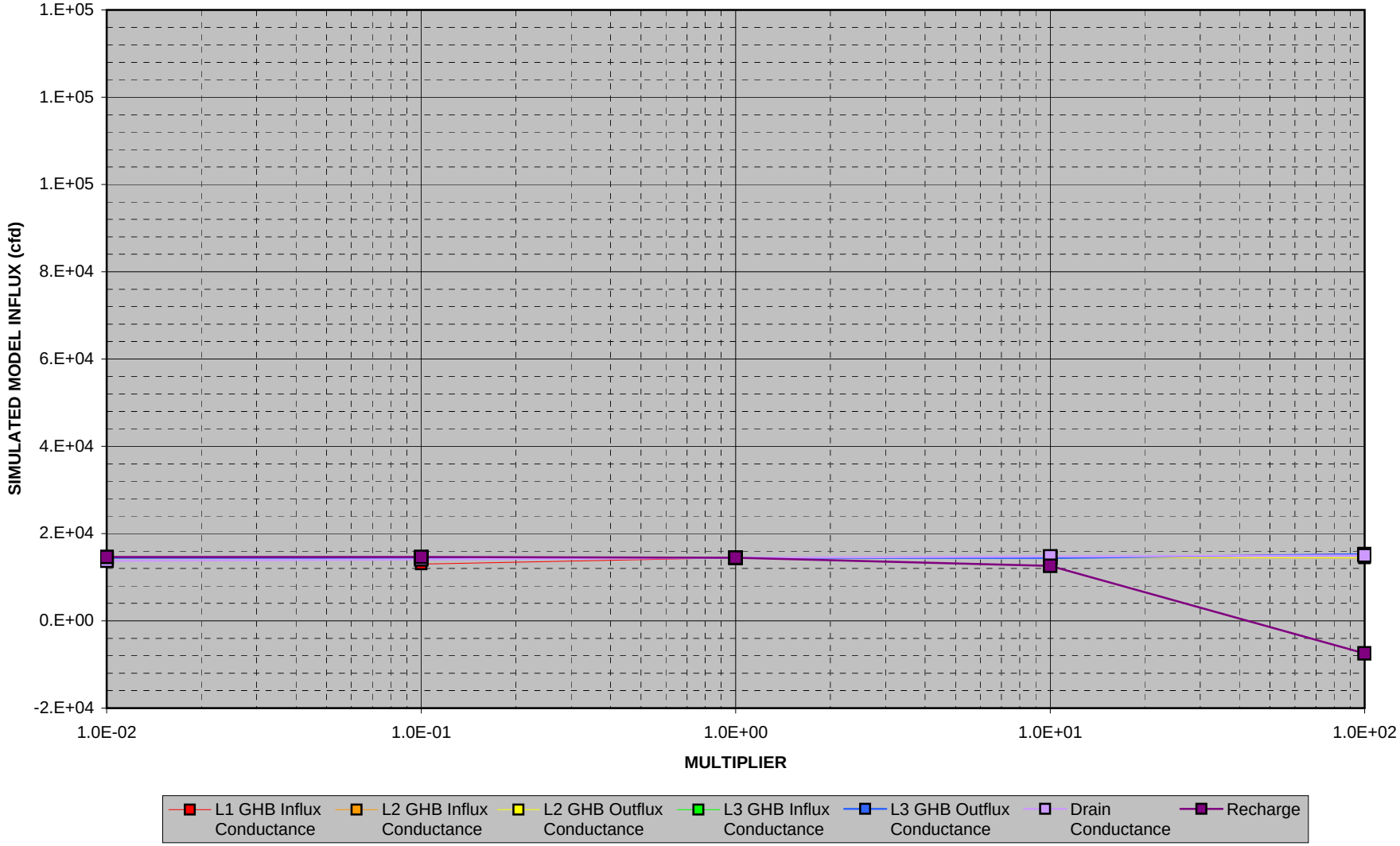


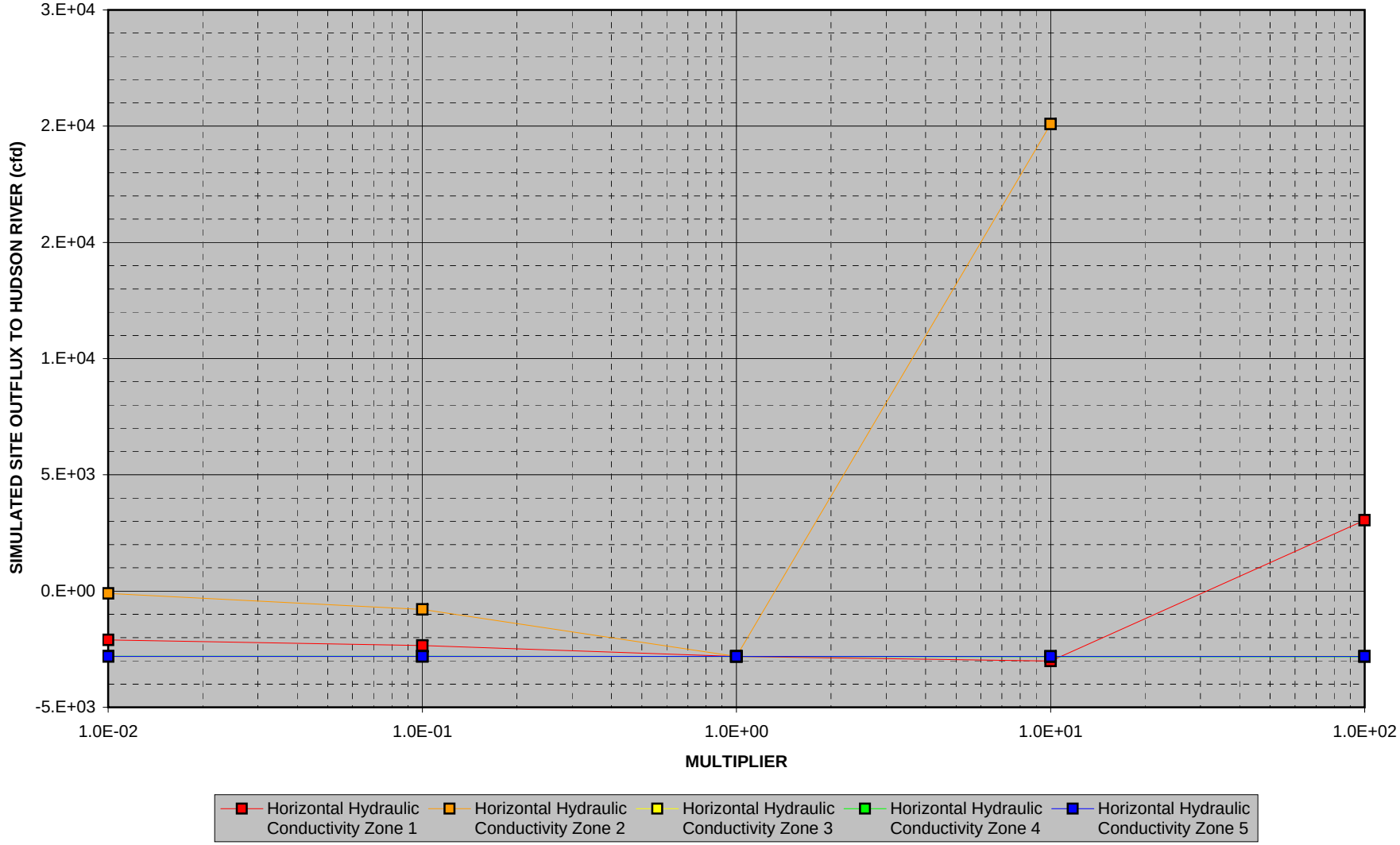
HYDRAULIC HEAD SENSITIVITY ANALYSIS OF VERTICAL HYDRAULIC CONDUCTIVITY



HYDRAULIC HEAD SENSITIVITY ANALYSIS
GENERAL PARAMETERS



HYDRAULIC HEAD SENSITIVITY ANALYSIS OF HORIZONTAL HYDRAULIC CONDUCTIVITY



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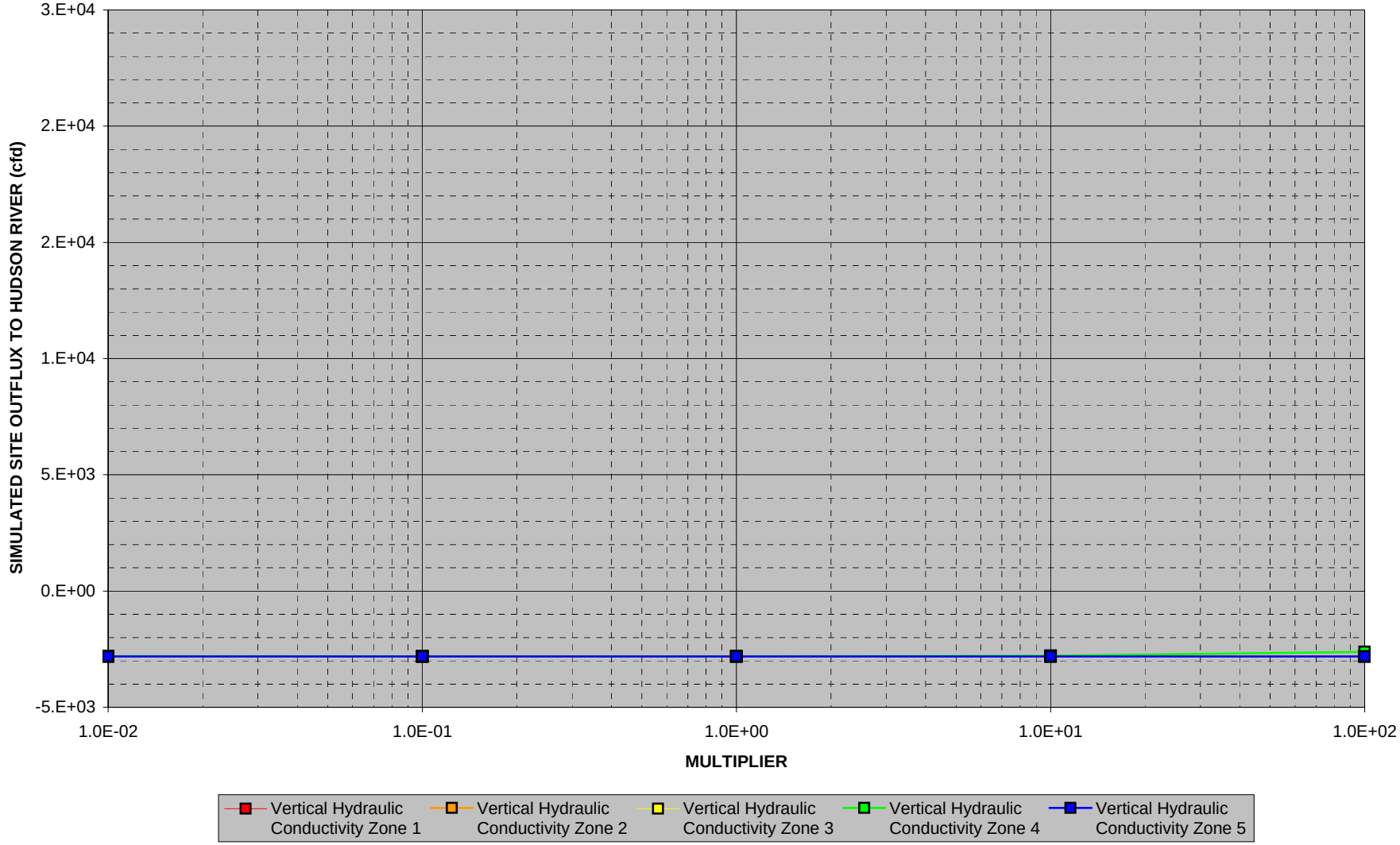
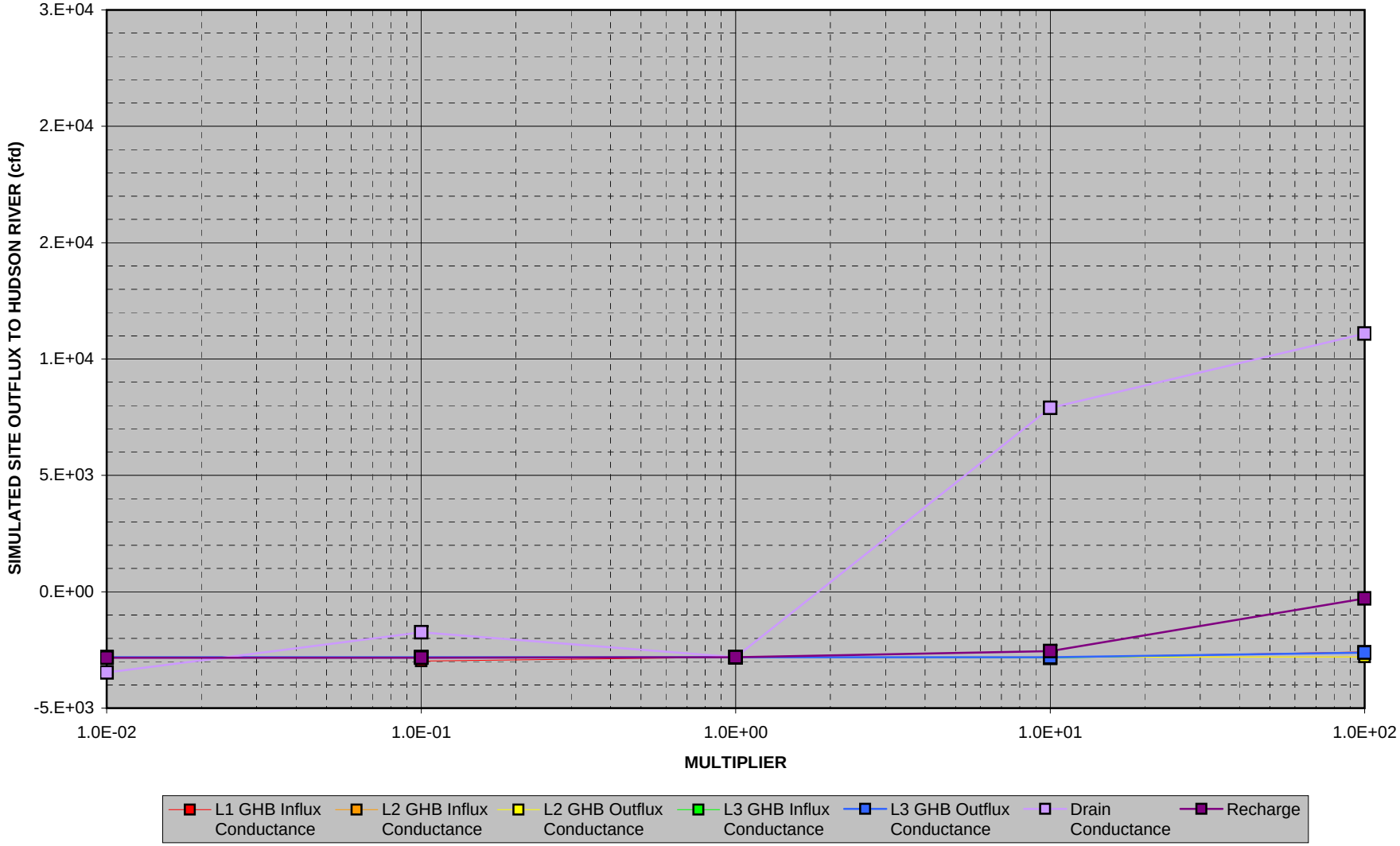


HYDRAULIC HEAD SENSITIVITY ANALYSIS
GENERAL PARAMETERS



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1. INTRODUCTION

This Community Air Monitoring Plan (CAMP) describes the perimeter air monitoring to be conducted during the Remediation Phase at the former Anaconda Wire and Cable Plant site in the Village of Hastings-on-Hudson (HOH), NY. Perimeter air monitoring will be conducted by a third party Air Monitoring (AM) contractor during all ground intrusive activities. In addition, perimeter monitoring will be conducted for one week (five days) prior to ground intrusive activities in order to determine background levels. Monitoring activities are designed to meet the project objectives defined in Section 2.0 of this CAMP and will conform where applicable to the NYSDOH Generic Community Air Monitoring Plan (NYSDOH, June 2000).

This CAMP is not for use in establishing action levels for worker protection. Rather, its intent is to provide a measure of protection for the downwind community (i.e., off-site receptors including residences and businesses, and on-site workers not directly involved with the subject work activities) from potential airborne contaminant releases as a direct result of remedial work activities.

Previous Site investigations on various portions of the site have indicated the presence of polychlorinated biphenyl compounds (PCBs) and lead (Pb). As a means of monitoring air quality during construction, continuous particulate monitoring will be conducted. More specifically, air particulate matter smaller than 10 microns in diameter (PM_{10}) will be monitored to ensure that remedial activities are in compliance with the 24 hour national ambient air quality standards for particulates (150 $\mu g/m^3$). If this standard is exceeded during any 15 minute period of remedial activities, particulate suppression actions will be taken. If this standard is exceeded during any 30 minute period of remedial activities, remedial work will temporarily cease (as described herein), and there will be further testing for PCBs and lead in the perimeter ambient air quality monitoring program. Periodic integrated sampling for airborne PCBs and lead will also be performed at each of the air monitoring locations. The details of the air monitoring program, along with measures proposed to reduce and control particulate emissions during remedial activities, are described in the following sections of this CAMP.

2. PROJECT OBJECTIVES

There are four primary objectives of this CAMP, as follows:

- To help protect human health and the environment;
- To use real-time monitoring results in conjunction with worker health and safety programs;
- To evaluate the effectiveness of, and need for, additional dust suppression controls; and
- To document air quality during site activities.

The specific air monitoring and data quality objectives are outlined below.

2.1 Air Monitoring Objectives

Perimeter air quality monitoring will be performed at various locations around the perimeter of ground intrusive activities. Perimeter air monitoring will be designed to accomplish the objectives described above, as well as:

- To establish background levels of PM_{10}, PCBs and lead in ambient air prior to initiation of site activities;
- To develop risk-based action levels which are protective of public health at the property line;
- To monitor and document perimeter ambient air levels of PM_{10}, PCBs and lead during site activities; and
- To evaluate the need for dust control measures to reduce airborne contaminants.

2.2 Data Quality Objectives

The number of samples collected for field screening depends on the level of data quality that can be expected from the testing method employed. Below is a discussion regarding Data Quality Objectives (DQOs) and the relative quality of the samples needed for types of data to be collected.

DQOs are established to define the quality of the data generated in relation to the methods used to collect the data and the data's anticipated end use. Real-time screening level data and periodic integrated sampling will be collected to evaluate contaminant levels in ambient air. The following DQO levels will be used during the performance of site actions:

Real-time screening data – Screening data applies to all field screening using equipment such as ambient dust monitors. The data collected generally do not include QA/QC samples. The real-time data will be used to document conditions occurring on the site during ground intrusive activities and to determine the need for more aggressive dust suppression activities or alteration of work activities. In addition, the real-time data will be used to show compliance with the action levels proposed in this CAMP.

Periodic Integrated data – This data collection applies to analyses performed off-site at an analytical laboratory. The analyses will be conducted in accordance with appropriate US EPA air sampling methods for PCBs and lead. The data will include the QA/QC elements specified by the appropriate US EPA method. In general, the integrated samples will be collected on a regular periodic basis and analyzed using the US EPA methods. The integrated data collection will also be used to confirm the real-time collection results for particulates and to help quantify the relationships between real-time particulate levels / concentrations and integrated PCB and lead exposures in air.

3. PERIMETER AIR MONITORING

The perimeter air monitoring system is intended to be protective of public health in the vicinity of the Site. The sampling program is designed to provide real-time and periodic air monitoring so that acceptable risks for acute and sub chronic exposures are not exceeded. Perimeter real-time monitoring will be conducted during all soil excavation periods and for one week (five days) prior to the excavation period. In accordance with these CAMP guidelines, it is recommended to perform real-time air monitoring for particulate matter less than 10 micrometers in size (PM_{10}). The continuous data collection of PM_{10} levels will serve as an indicator of potential PCB and lead particulate levels. However, because the volume of soil impacted by these constituents represents less than 10% of the total volume of soil to be handled on Site throughout the construction duration, the level of PCB and/or lead particulates in any sample is expected to be only a fraction of the total PM_{10} measured on site. Accordingly, if there is an exceedance of PM_{10} levels in the perimeter monitoring system, measures will be taken to reduce dust and particulate emissions, as described below. If these measures do not succeed in reducing PM_{10} levels below the 150 $\mu g/m^3$ standard, then remedial activities will temporarily cease, as described below, and further testing will be conducted to determine the level of PCBs and lead in particulate samples that exceed the 150 $\mu g/m^3$ standard. Particulate control measures will modified, when necessary, to address specific emission sources, and to allow critical remedial work to resume at the earliest possible opportunity.

An overview of the air monitoring activities is discussed below. Real-time air monitoring for PM_{10} will be conducted continuously at four (4) fixed perimeter locations each day. Monitoring operations for the four fixed locations are proposed to be conducted 24 hours/day and 7 days/week. The location of the four fixed air monitoring locations will remain constant from day to day throughout the entire remediation phase of the program. Monitoring will be conducted using real-time instruments capable of recording 15-minute average data for comparison to risk-based particulate action levels. In addition to the four fixed locations, it is proposed that PM_{10} be monitored each hour using portable sampling methodology at various additional (6-8) locations equally spaced around the site perimeter. In addition to the particulate (PM_{10}) sampling, once a week integrated 24-hour sampling for PCBs and lead will be conducted at the four fixed and one mobile locations. Integrated sampling for PCBs and lead will be performed at five sites one day a week, alternating days each week (i.e., Monday in Week 1, Tuesday in Week 2, etc.) The mobile location for the once per week integrated sampling will be determined based on site activities and meteorological conditions (e.g., wind direction) on the day of sampling.

The following are the Particulate Air Monitoring Protocols (Note: Background is defined as the lowest 15-minute concentration reported from any of the four fixed AM sites at the time of a possible exceedance):

- PM_{10} at the fixed locations will be measured on a continuous basis and reported as 15-minute averages. If ambient air concentrations (minus background levels) at any site are **150 $\mu g/m^3$** or greater for a 15-minute period, or if airborne dust is observed leaving the work site, dust suppression activities will be employed. Work activities will be continued during dust suppression, provided that the 15-minute levels (minus background) do not continue to exceed **150 $\mu g/m^3$** and no visible dust is migrating from the work site.

- If after implementation of dust suppression techniques, 15-minute levels (minus background) at any fixed site continue to exceed **150 $\mu g/m^3$** or dust is observed leaving the site, work shall be stopped, integrated sampling for PCBs and Lead will be initiated at all sites for the remainder of the day and a re-evaluation of site activities will be

performed. Work will resume provided that dust suppression and control measures, and other controls (including measures to control diesel exhaust), are successful in reducing the concentrations (minus background) to less than **150 µg/m^3** at all sites for 15 minutes and in preventing visible dust from migrating beyond the work site.

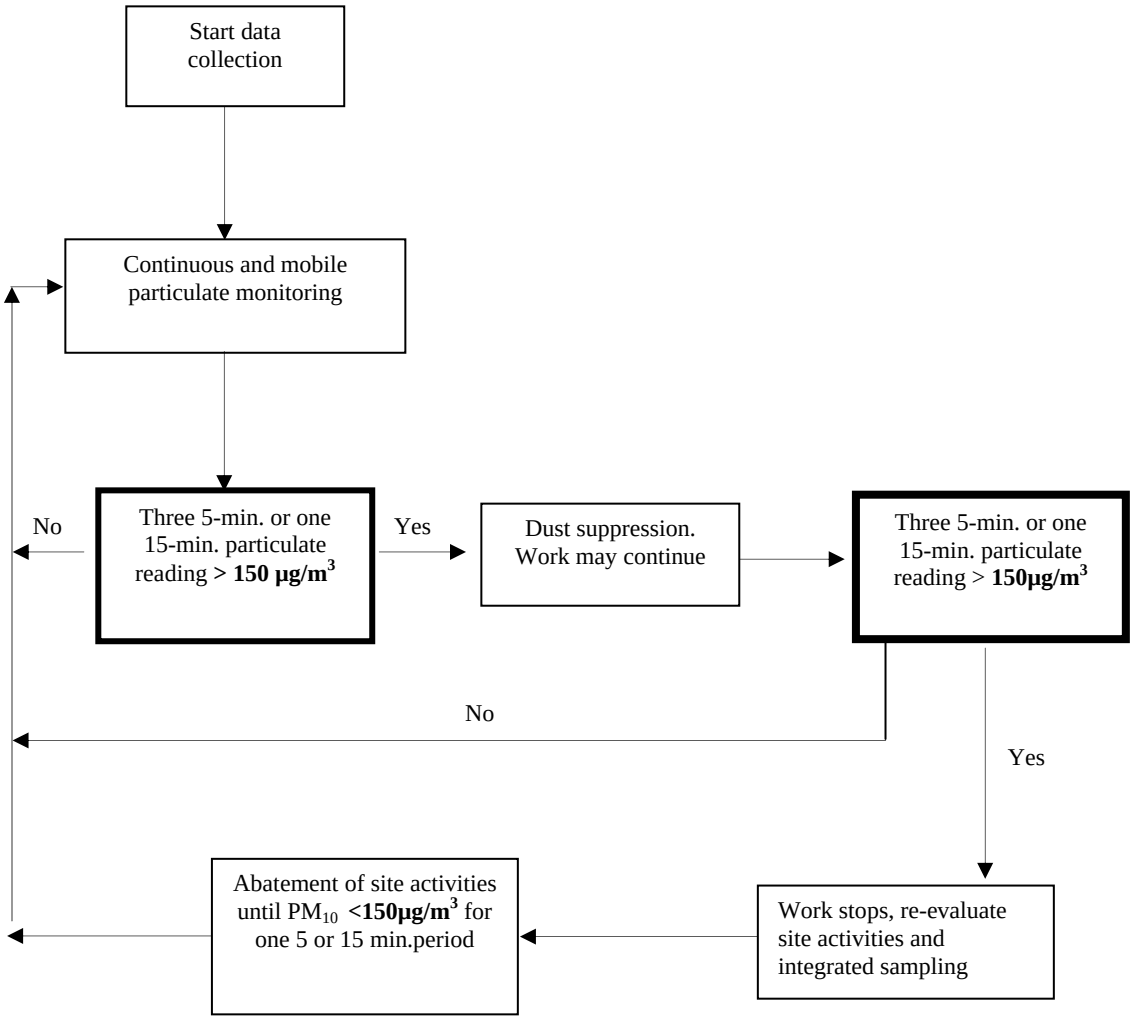
- Short-term (5-minute) concentrations (minus background) from the hourly perimeter surveys will also be compared to the action limit of **150 µg/m^3**. If three consecutive 5-minute concentrations (minus background) from a location exceed **150 µg/m^3**, dust suppression efforts will be initiated. If after implementation of dust suppression techniques three additional consecutive 5-minute readings (minus background) are greater than **150 µg/m^3** or dust is observed leaving the site, on-site intrusive activities shall be stopped until such time as the 5-minute levels (minus background) from the survey instrument drop below **150 µg/m^3** and dust leaving the site is under control. In addition, integrated sampling for PCBs and Lead will be initiated at all sites for the remainder of the day in order to determine the level of lead and PCB particulates therein.

- The decision criteria for evaluating PM_{10} data levels in conformance to action levels and for initiating emission control actions are shown on Figure 3-1.

Meteorological parameters consisting of wind speed, wind direction, sigma theta, temperature and relative humidity (or dewpoint temperature) will be monitored continuously on-site 24 hours/day and 7 days/week, and reported as 15-minute averages.

Data from all four fixed monitoring locations, plus the meteorological site, will be transferred automatically, every 15 minutes, via radio telemetry to a central computer data archiving system located on the property, plus via phone/modem daily, to a central database system at the contractor's central office location. On-site alarms will be triggered if and when any particulate action level exceedances occur so that all contractors can be notified. Data from the mobile sampling locations will be manually downloaded to the central on-site data base at the end of each sampling day.

Figure 3-1 Particulate Monitoring and Control Chart



3.1 Perimeter Monitoring System

3.1.1 Monitoring System Design

The perimeter air monitoring system will consist of the following components: five continuous PM_{10} instruments (four fixed air monitoring stations and one portable hand-held unit), six Polyurethane Foam (PUF) samplers for PCB sample collection, plus six HiVol samplers for lead sample collections, and a meteorological system. Each of these system components is described in the following subsections with the system specific QA/QC protocols being described in Section 8.1.

3.1.1.1 Continuous Particulates/ PCBs/ Lead Sampling

Real-time monitoring for PCBs and lead will involve the measurement of respirable dust as a surrogate for ambient PCBs and lead levels. Since real-time monitors for PCBs and lead are not available, respirable dust levels will be measured on a real-time basis at various locations during excavation activities to evaluate site-related particulate concentrations. The measured levels will then be compared to an action level for respirable dust which is based on inhalation impacts from PCBs and/or lead exposures. The data from the dust monitoring will also be relayed to the central computer located in the on-site trailer.

A direct reading real-time MIE DataRAM Analyzer or TSI DustTrak Aerosol Monitor, or equivalent, will be used to monitor for PM_{10} at perimeter locations. The measurement of dust levels is accomplished using infrared electromagnetic radiation to detect airborne particles. The dust meter will be configured to respond only to dust particles less than 10 micron in diameter. Readings from all site locations will be compared to the particulate action level. Figure 3-1 provides the real-time particulate monitoring protocol.

3.1.1.2 Integrated PCB Sampling

Routine integrated PCB samples will be collected using High-Volume Polyurethane Foam (PUF) samplers in accordance with US EPA Method TO-4A as presented in "The Compendium of Methods for the Determination of Toxic Organic Compounds in the Ambient Air", EPA Document NO. EPA/600/4-89/017.

The High-Volume PUF sampler consists of a sample head inlet which contains the sampling media (polyurethane foam), a high volume air blower which allows a large quantity of air to be drawn through the sampling media, and flow controllers and timers to quantify the flow rates and sample volumes. The air passes through the sample head into the PUF canister, where the semi-volatile compounds are trapped in the sampling media.

Prior to sample collection, each PUF sampler will be calibrated (see Section 8.1) using a calibration orifice according to Method TO-4A protocols. The PUF cartridge will be pre-cleaned and packed by the analytical laboratory and shipped to the site in an ice-packed cooler. At the completion of each sampling day, the PUF samples will be removed from the sample heads, wrapped in aluminum foil, labeled, and placed in an ice-packed cooler for shipment under chain-of-custody to the laboratory for analysis.

At a minimum six 24-hour PUF samples (four fixed sites, plus one mobile site and one blank) will be collected during each routine integrated sampling day. The mobile sampling location will be determined based on site remediation activities and wind conditions for each specific sampling day.

The PUF samples will be analyzed for PCBs using the standard EPA TO-4A method and Gas Chromatography / Mass Spectroscopy (GC/MS) technology.

3.1.1.3 Integrated Lead (Pb) Sampling

The air monitoring contractor will use General Metal Works Total Suspended Particulates (TSP) HiVol samplers or equivalent devices. Each sampler will be equipped with a flow controller, elapsed time monitor, control timer, and filter paper cartridge. This system features accurate collection of suspended particulates meeting or exceeding all EPA specifications. Air flow through the system is maintained at a constant rate by an electronic probe which automatically adjusts the speed of the sampler to correct for variations in line voltage, temperature, pressure and filter loading. Adjustable over a range from 20 scfm to 60 scfm, the air flow is controlled at a constant standard flow rate (at 25°C and 760 mm Hg) within plus or minus 1 scfm. The high volume air sampler, regulated by the controller, operates at the lowest possible speed necessary to sustain the desired air flow rate. The sample filters collected will be subsequently submitted to a laboratory for lead analyses. Each shipment to the lab will include one blank filter, which will also be analyzed for lead.

Once a week at six air monitoring locations (four fixed sites plus one mobile site and one blank), 24-hour particulate samples will be collected using HiVol samplers. The filters from these data collections will subsequently be sent to a subcontracted lab for lead (Pb) analysis. A section of each HiVol filter will be extracted with acid under sonication to digest the entrained metals. The resultant extract will then be filtered to remove extraneous particulate matter and then analyzed by graphite furnace atomic absorption spectroscopy. Lead concentrations will be determined by atomic absorption analysis. The protocol defined in the US EPA's **Test Method for Evaluating Solid Waste** (SW-846) is modified to be applicable for filter sample analysis for these compounds.

3.1.1.4 Meteorological System

A tripod-mounted meteorological station will be erected at a central location adjacent to the site. The tower will be mounted on a tripod and the sensors will be located three meters above ground level. The system will be equipped with sensors to measure wind speed and direction, sigma theta, temperature, and relative humidity or dewpoint temperature on a continuous basis during remedial activities. The station will record the data and allow instantaneous determination of the predominant wind direction and speed. A Climatronics EWS/ Wind Mark III system or equivalent is suggested for meteorological measurements.

3.1.1.5 Computer Control System/ Alarm System

A data logger or an equivalent device will be included in each air quality monitoring station, as well as the on-site meteorological monitoring station. The data logger will be programmed to assimilate data from the continuous air quality monitors and meteorological sensors once every 10 seconds, and store digital data in its internal memory. Fifteen-minute data averages will be computed and stored in the data logger at the end of each 15-minute period. Once the 15-minute value is formed, all data averages from each continuous monitoring parameter will be transmitted by a wireless, line-of-sight industrial radio transmitter network to a central desktop-based Data Acquisition and Handling System (DAHS). The DAHS will be located in an on-site environmentally controlled shelter.

The DAHS will be configured to display air quality and meteorological data simultaneously on the computer. The data presentation will be customized to assist the on-site operator in managing the data effectively. The DAHS will update the central computer data once every 15 minutes. The data will also be compared automatically with the pre-programmed action level concentrations for exceedance conditions.

A visual alarm indicator will be provided at the central on-site shelter where the DAHS is located. The alarm message indicating the parameters, location and concentration will be

displayed on the computer screen and a hard copy of the alarm message will be generated from a local, dedicated printer.

When an action level is exceeded in the particulate mode the system is in an alarm condition and the appropriate visual alarm will be displayed (see Figure 3-1).

If the action level is exceeded, visual alarms are illuminated in the central trailer. In the event of an alarm condition during site excavation time periods, the remediation contractor's site manager on duty or designated representative will identify the source and initiate mitigating the emission, if the source is associated with on-site activities. When all sites' 15-minute concentrations drop below the action level, the system will turn the alarms off automatically.

3.2 Monitoring Operations

Monitoring operations will require a full-time technician for the routine inspection and testing of the system. The technician is responsible for inspecting the equipment operation, replacing expendable supplies, testing and calibration of the air monitoring systems, and notifying the respective contractors site manager of alarm conditions.

Routine operations require the technician to perform the following functions:

- Make hourly PM_{10} perimeter surveys of the site during all site activity periods;
- Set up the four fixed and one mobile integrated sample sites one day per week;
- Provide routine calibration and QC documentation for all air monitoring equipment;
- Test the alarm system periodically;
- Inform the site manager of exceedances of action limits;
- Inspect the meteorological system for proper operation; and
- Download and ship data and QC materials to the central data processing center.

All system (PM_{10} and integrated PCB/lead sampler) calibrations are conducted through routine calibration checks (see Section 8.1). The PM_{10} systems are designed to provide for daily equipment calibration checks to test the calibration drift.

4. ACTION LEVELS

The site-specific risk-based action levels have been developed in compliance with risk assessment procedures, which are based on EPA guidelines established in **Risk Assessment Guidance for Superfund: Vol. I --- Human Health Evaluation Manual (Part C Risk Evaluation of Remedial Alternatives) (OSWER Directive 9285.7-01C)** with additional protective measuring to account for ingested dust during inhalation. The action levels have been developed to protect off-site receptors from adverse health impacts from PCBs, lead and particulates for both short-term acute exposures and long-term chronic exposures (See Attachment H2 of this document for details of Action Level development). These action levels will alert site management to control emissions or curtail operations to maintain off-site exposures at levels below the human health risk-based criteria.

The action level values have been derived using human health-based criteria for different averaging times. The action levels were set by relating peak concentrations observed over one averaging time to the peak concentrations which might be expected for a different averaging time. This method is based on empirical observations of concentrations observed in the vicinity of an emission source subjected to normal variations in atmospheric dispersion.

The following steps were taken in the risk-based action level development task (see Attachment H2 of this Plan for details):

A. Determine the compounds of interest at the Site (particulates, PCBs, lead).

B. Evaluate the potential for exposure at the Site by identifying human receptors (people living or working near the Site), and the ecological receptors. Typical human receptors include residents, workers at nearby businesses, schools, hospitals, and daycare centers. Ecological receptors include water bodies such as lakes and ponds, and other wildlife habitat. Using information on prevailing wind directions and other meteorological data, receptors that are likely to receive the highest air concentrations of compounds released from the Site during Site intrusive activities, were identified.

C. Determine exposure pathways for the identified receptors. The main exposure pathway for human receptors is inhalation of particulates during the Site activity. Depending on the specific receptors, the length and type of exposure is likely to vary. A simple air modeling exercise was used to factor in the distance of receptors to the remedial activities in order to develop the action levels.

D. Determine action levels based on both exposure and compound-specific toxicity. USEPA has developed compound-specific toxicity values that were used in the calculation of action levels.

E. Calculate action levels per US EPA risk assessment guidelines. Initially, action levels were calculated at the receptor locations. The results of air modeling were then used to calculate action levels at the perimeter of the excavation site.

F. Derive the action levels using human health-based criteria for different averaging times. The action levels were set by relating peak concentrations observed over one averaging time to the peak concentrations that might be expected for a different averaging time.

The Early Warning and Risk-Based Action Levels for the monitoring program are as follows:

Parameter	Early Warning Level	Risk-Based Action Level
Particulates	150 µg/m^3	150 µg/m^3

5. SAMPLING FREQUENCY

As presented in Section 3.0, sampling for respirable dust (PM_{10}) (as a surrogate for PCBs and lead) and meteorological parameters will occur 24 hours/day and 7 days/week on a real-time basis (15-minute averages) during site excavation activities. Mobile PM_{10} sampling plus integrated air sampling for PCBs and lead will occur less frequently.

5.1 Baseline (Pre-Remedial) Monitoring

Prior to the initiation of excavation activities, baseline monitoring will be performed for five consecutive 24-hour periods to quantify "background" levels of Site-specific contaminants. The anticipated baseline sampling program involves collection of 24-hour perimeter air quality (PM_{10}) data from the four fixed sampling locations. The samples will be collected on consecutive days preceding the startup of planned construction/ excavation activities. Additionally, 24-hour integrated PCB and lead samples will be taken from each of the four sampling locations (collected from 7:00 am to 7:00 am), plus one blank for each of the five days. The samples will be submitted to a laboratory for PCB and lead analyses. Meteorological data will also be collected for the entire 5-day baseline period.

5.2 Routine Monitoring

During ongoing construction/ excavation activity periods continuous air quality (PM_{10}) and meteorological sampling will be performed 24 hours/day and 7 days/week to quantify airborne levels of particulates. Following the baseline period, air samples (PM_{10}) will be collected from all four fixed sites continuously. In addition, manual hourly perimeter surveys will be conducted for PM_{10} at various other locations around the perimeter of the site. The once-a-week 24-hour integrated PCB and lead samples will be collected from six sample locations (four fixed sites, plus one mobile site and one blank each day), and all samples will be submitted to a laboratory on a weekly basis for analysis.

6. SAMPLE LOCATIONS

6.1 Continuous and Integrated Air Monitoring Locations

As noted previously, continuous PM_{10} air monitoring and integrated PCB and lead air sampling will be performed at four fixed stations. These stations will generally be situated along the perimeter of the Hastings-on-Hudson site, taking into account the location and proximity of sensitive receptors in the area. Although it is not possible to precisely identify the location of the four fixed air quality monitoring stations at this time, potential locations are shown in Figure 6-1. There will also be a meteorological monitoring station/location which will be located adjacent to the Air Monitoring Contractor's central data collection trailer which will be located in proximity to other on-site contractors' operational trailers (the location of all trailers to be determined).

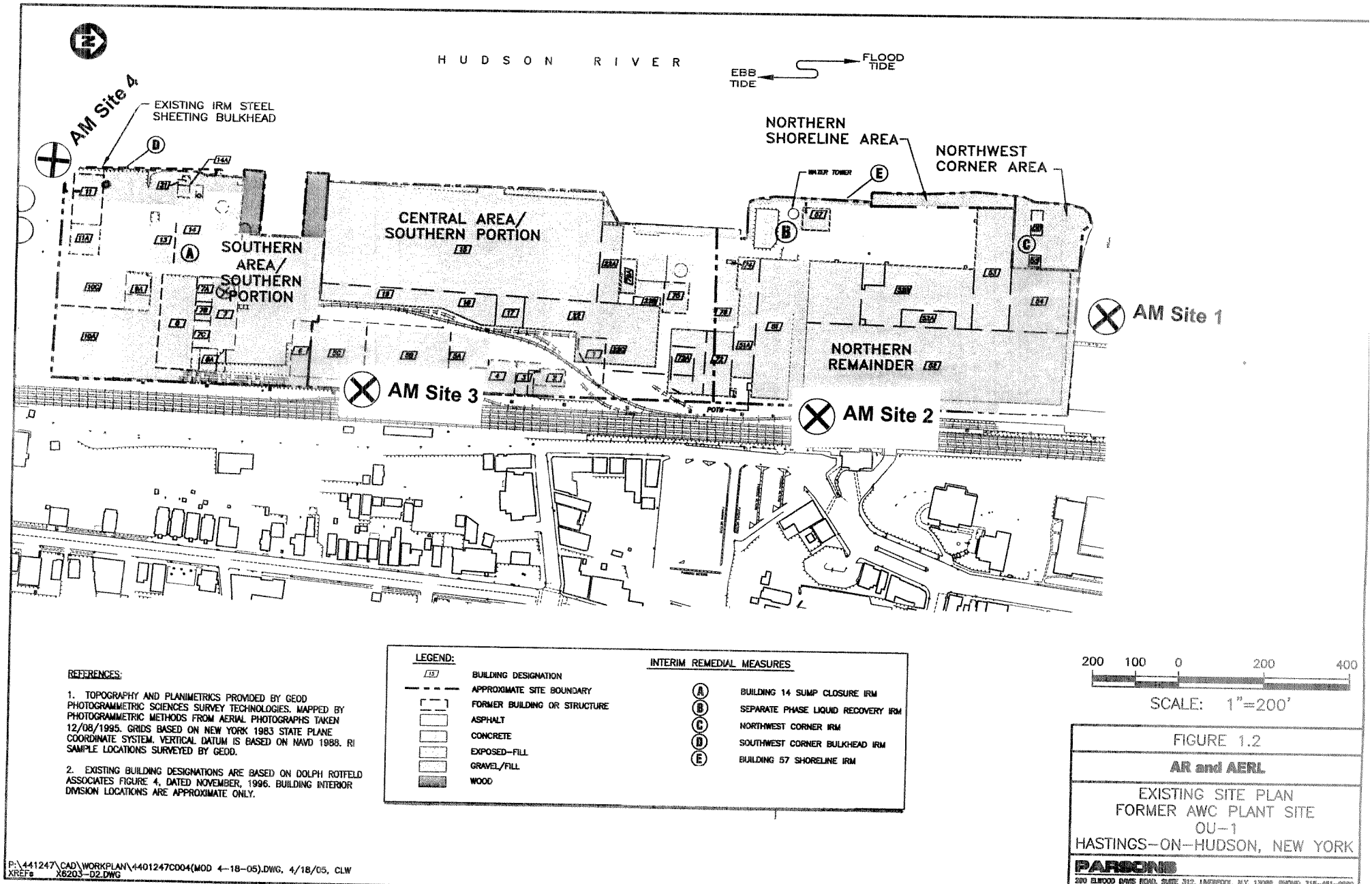


FIGURE 6-1 Air Monitoring Site Map

7. DATA VALIDATION AND REPORTING

7.1 Data Management Overview

Data will be transmitted from the site data collection systems to the central database management system as continuous analyzer readings reduced to digital form in 15-minute averages. For a 15-minute average to be a valid data point, 50%[1] of the 15-minute period must be valid. Data editing, validation and reporting should be performed by the air monitoring contractor via PC terminals linked to the project database residing in the AM contractor's central computer.

7.2 Data Validation

It is an objective of this CAMP that all ambient air monitoring and sampling data collected in response to this plan will be 90% complete, and that all ambient air monitoring and sampling data collected in response to this plan will be representative of actual conditions at the site perimeter. It is also the objective of this air monitoring plan that all ambient air monitoring and sampling data collected in response to this plan will be expressed in a manner and format that enables direct comparison with the applicable action levels.

For data to be considered valid, they shall be accurate and precise, represent factual conditions, be obtained from a calibrated well-functioning instrument, from air sampled without interference or obstruction, and be thoroughly documented as to traceability to recognized primary standards.

Routine calibration of the monitoring and sampling equipment will be consistent with the policies expressed in the respective manufacturer's manuals and with good quality assurance practices. All calibration standards will be traceable to the National Institute of Standards and Technology (NIST) or other authoritative standard. All real-time PM_{10} monitoring equipment will be zero checked daily. All integrated sampling equipment (for PCBs and lead) will be calibrated prior to collection of the initial field samples, following completion of all field sampling activities, and at least every three months or as necessary to meet quality assurance practices. All equipment calibrations will be documented.

7.3 Data Reporting

The data obtained from perimeter air monitoring and sampling will be used to make the following determinations:

- Baseline/background concentration levels prior to site remediation activities;
- Action level exceedances at site perimeter (fenceline) locations;
- Effectiveness of corrective actions when an action level is exceeded; and
- Effectiveness of the real-time PM_{10} monitoring as a surrogate when compared to integrated PCB and lead air sampling and subsequent analysis.

Prior to their use in making the above-mentioned determinations, the data must be evaluated by qualified and experienced personnel to ensure that the data quality objectives have been met. The evaluation process will include, but is not limited to, the following:

- Verifying that all requested analyses are reported;

[1] i.e., 45 of the 90 ten-second averages during each 15-minute period.

- Verifying that all real-time PM_{10} and meteorological instrumentation and sampling equipment has been properly calibrated and maintained;

- Verifying that all samples are analyzed according to the methods specified in the monitoring plan; and

- Verifying that laboratory quality control results fall within the laboratory acceptable criteria.

Environmental data that are not representative of environmental conditions because they were generated through poor field or laboratory practices will not be used in the evaluation process. This determination will be made using the professional judgment of a multi-disciplinary air monitoring contractor team and other personnel with direct experience in the data collection effort. This coordination is essential for the identification and proper evaluation of valid data. After data are evaluated, the data interpretation process may be performed.

During excavation, daily reporting protocols will be established for use by site managers. In this case, air monitoring results will be produced in an electronic and hard copy format. Reports depicting a summary of the air monitoring results will be provided on a weekly basis. A final air monitoring report will also be generated, which will include a summary of site activities for the entire period, and a record of all air monitoring results, including the following:

- Real-time PM_{10} (15-minute) data from the four fixed Air Monitoring (AM) locations

- Mobile PM_{10} (5-minute) data from the various mobile AM locations along with site maps indicating the mobile AM locations each day

- Real-time meteorological (15-minute) data from the central location

- Integrated (24-hour) PCB and lead sampling results from the once per week integrated sampling sessions, plus map showing the mobile integrated site location for each sample day.

8. EQUIPMENT QA/QC

The quality assurance and quality control (QA/QC) procedures proposed for this program are described in this section. The QA/QC procedures associated with the air quality measurements program are designed to ensure that data collected at the fenceline are accurate and correct. The QA/QC procedures should be conducted so as to not interfere with routine on-site activities and/or data collection during site activities.

8.1 Equipment Calibration and QA/QC Procedures

8.1.1 PM_{10} Monitors

The MIE DataRAM or TSI DustTrak or equivalent devices will be used to continuously monitor particulate emissions at the various fenceline locations. The monitors will be field checked daily using zero calibration air. At the beginning of each workday (prior to site intrusive activities) a calibration zero check will be performed on each unit at the measurement locations. A zero (or particulate-free) test sample, using the appropriate particulate filter supplied by the manufacturer for this purpose, will be placed over the sample inlet. The data output for the monitor will be observed and the response recorded in the air monitoring contractor's field logbook.

If the field technician determines that the instrument is in some way defective, the unit will be repaired or replaced, whichever takes less time. During the latter part of the workday each air quality measurement device will be QA/QC checked. If a system fails the QA/QC procedure and cannot be quickly corrected, the site manager will be immediately notified. The site technician will then take immediate measures to remedy the situation.

8.1.2 Integrated PCB and Lead Samplers

Periodic particulate sampling will be conducted for PCBs and lead as described in Section 3.1 of this Plan, using high-volume air sample collection devices. The samplers will be calibrated and operated according to US EPA procedures. The samplers will be calibrated on-site using a certified flow orifice device to determine volumetric flow rates at the beginning of the program and every three months thereafter. A single-point flow check will be performed at the beginning of each sample collection period and after the sampler has been moved to a new location. The sample media will be handled with appropriate sterile gloves to prevent contamination of the sample or degradation of the media or sample.

Following collection of the sample media, along with one blank filter sample per day, the filters will be packaged and sent to the analytical laboratory under a chain-of-custody (COC) protocol for immediate extraction and analysis. Results of the analysis will be received and reviewed for quality and reported.

8.1.3 Meteorological Measurement System

The on-site meteorological system will continuously measure and report the parameters listed in Section 3.1 of this Plan. QA/QC and calibration procedures will follow the manufacturer's recommendation for meteorological systems. A calibration of each parameter will be conducted on-site at the time of installation of the meteorological tower system and at least every six months thereafter, plus at the end of the program. The calibration results will be noted in the on-site field logbook and provided in the final project report.

8.1.4 Data Communication Equipment

The data communication technology is an important component of this program. In order to ensure that exceedances at the fenceline are quickly and properly reported, the air monitoring contractor will use a communications network that has been designed, tested and proven

previously on other programs. A radio frequency transmitter/receiver will be used to communicate data from the fenceline measurement devices and the central operations trailer.

The Air Monitoring contractor should periodically check the performance of the data telemetry system. A number of methods are available to perform this check. The following are examples of checks that can be performed:

- A known voltage can be entered into a Site's data logger to verify that the same response is reported back to the central database location.

- A data communication program can help ensure the accuracy of polled data via wireless radio or phone line through the following procedure: each string of data is transmitted with a CHECKSUM, which is a number representing the sum of data values; the program will add up the number of data values received and compare with the CHECKSUM transmitted; if the results do not match, the data will be re-transmitted automatically.

ATTACHMENT H1

STANDARD OPERATING PROCEDURES (SOP) -

OPERATION AND MAINTENANCE OF FENCELINE AIR MONITORING SYSTEMS

Standard Operating Procedures

Operation and Maintenance of Fenceline Air Monitoring Systems

Author: Leo Gendron
SOP No.: BP-1
Revision: 0
Date: July 27, 2006

1.0 PURPOSE AND SCOPE

- The purpose of this SOP is to provide guidance and direction for field technician personnel who will be responsible for maintaining the fenceline monitors at the former Anaconda Wire and Cable Plant Site Remedial Design Program in Hastings-on-Hudson, NY.
- This SOP is to be used along with the instrument and equipment manufacturer's operating manuals. This document assumes that operators who are onsite have been trained to perform the various tasks described in this SOP.

2.0 RESPONSIBILITIES

- The Air Monitoring Contractor's Project Manager is responsible for providing site operators with the appropriate documents for accomplishing the tasks associated with this SOP.
- The Project Engineer is responsible for providing adequate training to site operators relative to the tasks described in this SOP.
- The site technicians are to read and understand this SOP and use it as a guide for documenting tasks on the checklists associated with this SOP.

3.0 OPERATIONAL CHECKLIST

3.1 Daily/ Weekly/ Monthly Activities

- Perform all main shelter and fixed air monitoring system checks as defined in **Routine Operational Checklist (see attached).**
- Check that all continuous data (PM_{10} and meteorological) from the previous day have been telemetered to the central onsite database.
- Check that all manual (PM_{10}) data from the previous day have been downloaded to the central onsite database.
- Visually inspect the wind speed and wind direction sensors at the top of the meteorological tower. The wind vane should be pointing in the direction from which the wind is blowing and the wind speed cups should be turning smoothly. Damaged sensor vane or cups should be noted in the logbook and checklist. The damaged sensor should be repaired as soon as an experienced technician can be scheduled.

- Verify that meteorological parameter values appear reasonable. The wind speed, direction and temperature conditions should be comparable to the value on the computer screen. A further check can be made by consulting the radio weather report.

- One day each week, set up integrated sampling for PCBs and lead at five sites (four fixed plus one mobile site). Based on wind conditions and scheduled site activities for the weekly integrated sampling day, the onsite technician should locate and install the one mobile integrated sampling site for PCBs and lead. Technician should document this mobile location on a site map each week.

- At the conclusion of the weekly integrated sampling periods, fill out chain-of-custody (COC) forms for all PCB and lead samples that must be shipped to the laboratory (**see COC Form attached).**

- At each of the four fixed monitoring sites the technician should "down" the PM_{10} data channel by switching the data channel toggle switch to the "DOWN" position. At this point the technician may conduct a zero check for the PM_{10} instrument.

- Make any adjustments to the PM_{10} instruments, as required.

- Before leaving each site, make sure that the data channels' sample switch is in the "UP" position.

- Conduct hourly perimeter sampling for PM_{10} at an additional 6-8 sites along the site perimeter, filling out the **hand-held data sheet**, plus **site map** for each day **(see attached forms).**

- Notify site supervisor of any action level exceedances from the four fixed AM sites and/or any of the mobile AM locations during the day.

- Document all pertinent QC information on the daily field station log sheets **(see attached Field Station Log).**

- The technician should also:

– **Daily** – Retrieve all portable/manual AM sampling equipment from the field and store in a safe onsite location. Each portable sampling device should be left plugged into AC power for re-charge overnight.

– **Daily** – Download all manual data collected for the day and send electronically to the central database management staff.

– **Weekly** – Submit all QC documentation, daily hand-held data sheets, daily site maps and field station log sheets to the central data processing center. Fill out chain-of-custody forms and submit any PCB and lead samples to the laboratory.

– **Every three months** – Perform field calibrations of the integrated PCB and lead samplers.

– **Every six months** – Perform field calibrations of the central meteorological system.

4.0 OPERATION DURING SPECIAL CIRCUMSTANCES

4.1 High Humidity

- **PM_{10}**: The PM_{10} monitor principle of operation is based on near forward light scattering. In ambient situations where there are foggy and/or hazy conditions or if it is raining, the sampler will respond as though there were high particulate loadings. If it is determined that high moisture conditions are resulting in erroneously high PM_{10} data, then the site manager should be informed immediately.

4.2 Instrument Malfunction

- **PM_{10}**: If there is a malfunction of a PM_{10} instrument, the sensor should be removed from service and replaced with a spare unit. If a spare unit is not available the site manager should be informed that the site is not in full operation.

5.0 ACTION LEVEL EXCEEDANCE PROTOCOLS

5.1 Particulates (PM_{10})

If **15-minute average** data from any of the four fixed site particulate PM_{10} monitors exceed **150 µg/m^3** , an automatic alarm is triggered and the following procedure will be followed:

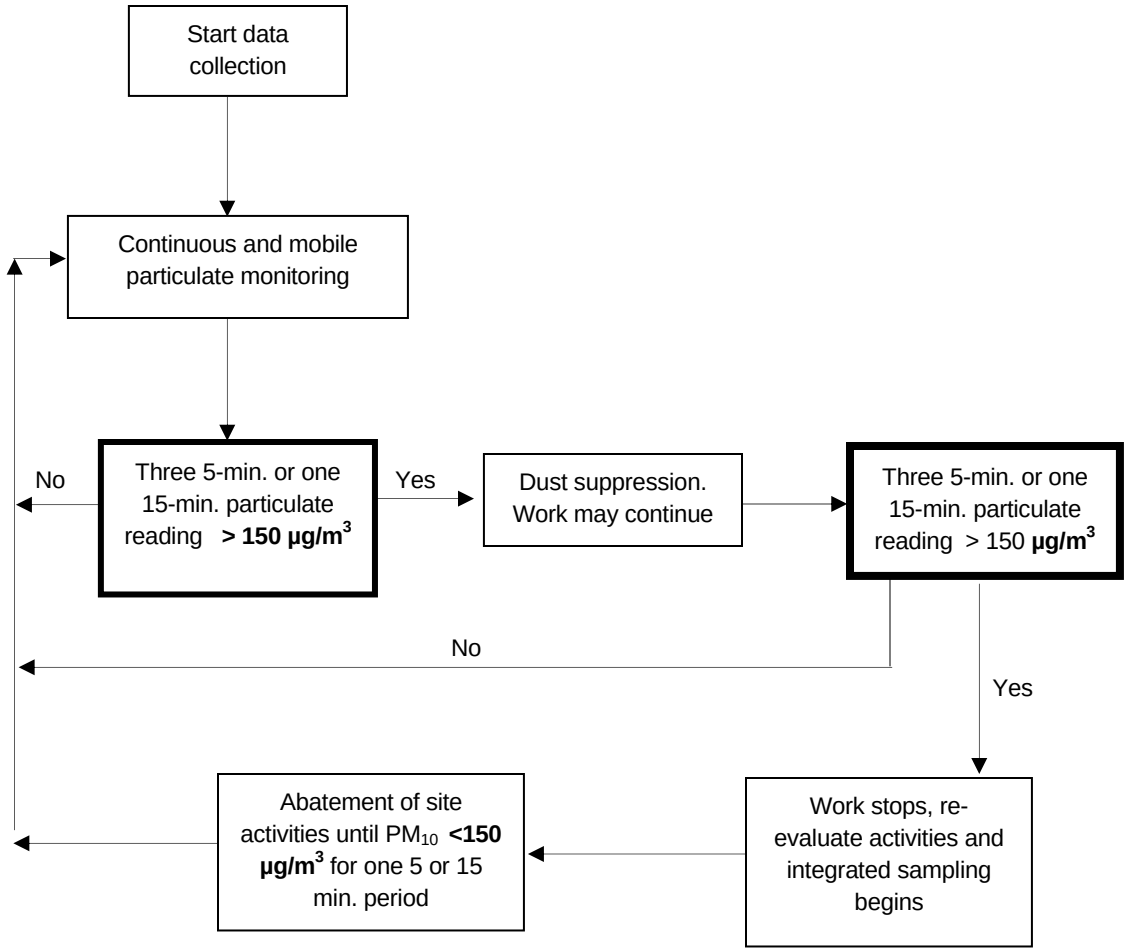
- The Air Monitoring Contractor will confirm the sampler is operating correctly.
- The Air Monitoring contractor will determine the background levels for the period (ie the lowest 15-minute concentration from any of the four fixed AM sites) and then subtract out the background levels for the 15-minute data average to determine if an action level exceedance has indeed occurred.
- The Site Manager will be notified and will be continually updated until exceedances cease.
- The Air Monitoring Contractor will make an assessment as to whether the exceedance is due to onsite or offsite activities. The Site Manager will also be advised.
- Particulate control measures will be undertaken by the remediation contractor.

If the **15-minute average** (minus background) from any of the fixed site particulate PM_{10} monitors exceeds **150 µg/m^3** for two consecutive 15-minute periods or if dust is observed to be leaving the site, all site intrusive activities must be stopped and site activities must be further evaluated so as to mitigate the particulate exposures at the fenceline AM locations. In addition, integrated sampling for PCBs and Lead will be initiated at all sites for the remainder of the day.

If three consecutive **5-minute averages** (minus background) from any of the manual perimeter PM_{10} survey sites exceed **150 µg/m^3**, an alarm will be triggered. The same steps as above should be followed.

If three additional **5-minute** averages (minus background) from any manual perimeter site location exceeds **150 µg/m^3** or if dust is observed to be leaving the site, all site intrusive activities must be stopped and site activities must be further evaluated so as to mitigate the particulate exposures at the fenceline AM locations. In addition, integrated sampling for PCBs and Lead will be initiated at all sites for the remainder of the day.

Particulate Monitoring and Control Chart



Routine Operations Checklist
Main Shelter

Week of (Mon. date) _____ **Techs** _____

Activity	Tech. Initials					Comments
Start of Day	**M**	**T**	**W**	**TH**	**F**	
1. Verify no faulty exceedance alarms						
2. Check for Voicemail messages						
3. Data polling from all sites						
4. Check for correct time on Odessa/colon blinking						
5. Record max/min temp. reset. 6. Record current temp						
7. Visual inspection of WS/WD sensors						
8. Verify met parameters are reasonable on PC screen						
After Monitor Startup						
1. Verify all channels are UP						
2. Check e-mail for messages						
End of Day						
Check printout						
End of Week						
1. Collect monitor check sheets and insert in 3-ring binder						
2. Fill out chain-of-custody forms						
3. Pack and ship samples to lab						
4. Ship any data to data processing staff						
5. Monthly – – Clean 10 µm nozzle of PM_{10} sensor – Replace PM_{10} internal filters – Clean PM_{10} cyclone – Check PM_{10} flow rate (adjust to 1.7 LPM)						

Routine Operations Checklist
Fixed AM Sites 1-4

Week of (Mon. date) _____ **Site #** _____

Activity	Tech. Initials					Comments
Start of Day	**M**	**T**	**W**	**TH**	**F**	
1. Verify that all power strips are on (pilot light is on)						
2. Verify Odessa displays correct time and colon is blinking						
3. Verify LED on radio transceiver is on or is flashing						
4. Check that PM10 sensor is operating (data displayed in LCD 5. Check that PM10 sensor zero (record value)						
Weekly						
1. Replace all sample line filters						
2. Perform PCB and lead sampling at designated locations.						
3. Document site map to indicate location of mobile PCB and lead sample location						

CHAIN OF CUSTODY RECORD

Page _____ of _____

Client/Project Name:	Project Location:
Project Number:	Field Logbook No.:
Sampler (Print Name)/(Affiliation):	Chain of Custody Tape No.:
Signature:	Send Results/Report to:

Field Sample No./ Identification	Date	Time	Grab	Comp	Sample Container (Size/Mat'l)	Sample Type (Liquid, Sludge, etc.)	Preservative	Field Filtered	Analysis Requested							Lab I.D.	Remarks

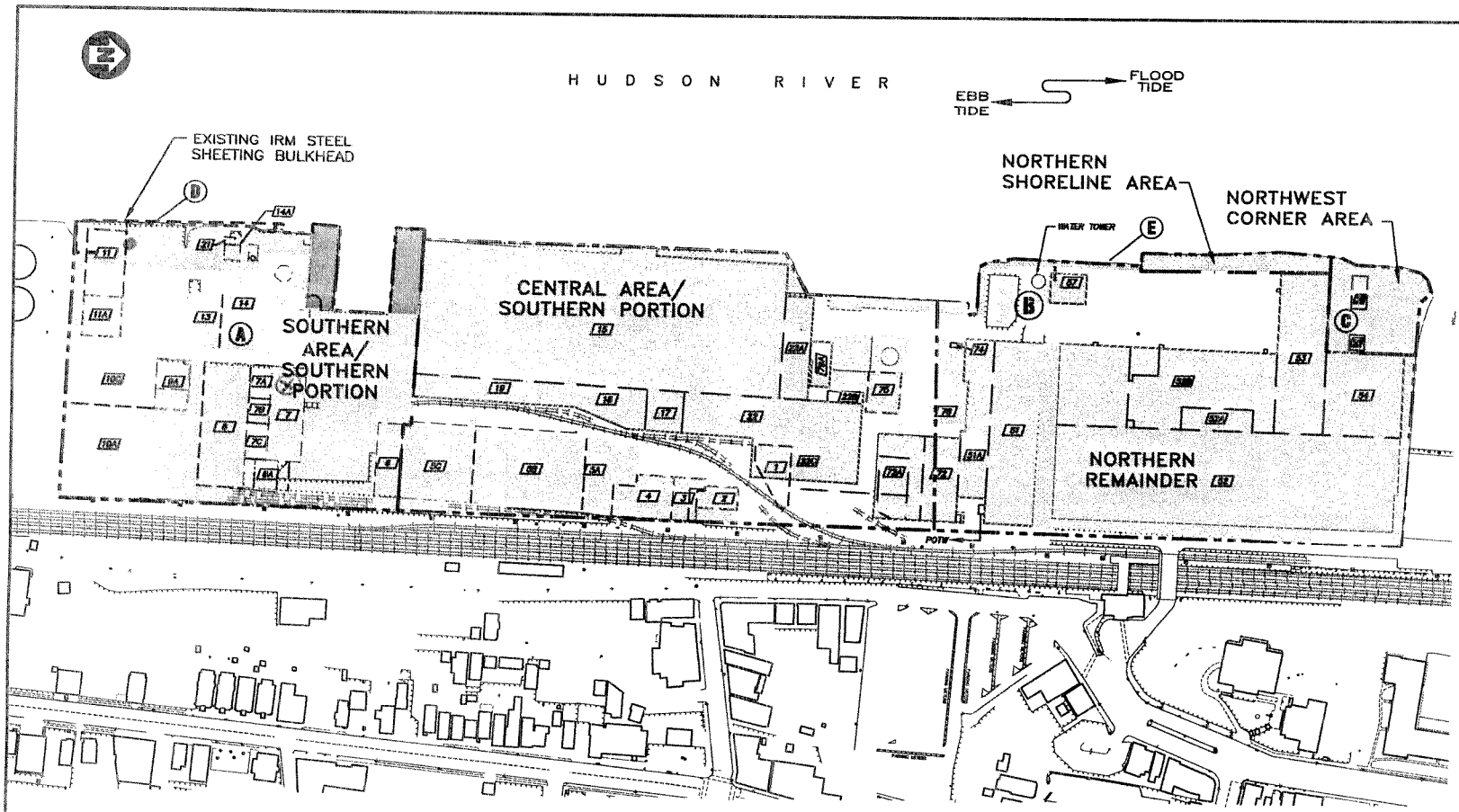
Relinquished by: (print name)	Date:	Received by: (print name)	Date:	Analytical Laboratory (Destination):
Signature:	Time:	Signature:	Time:	
Relinquished by: (print name)	Date:	Received by: (print name)	Date:	
Signature:	Time:	Signature:	Time:	
Relinquished by: (print name)	Date:	Received by: (print name)	Date:	
Signature:	Time:	Signature:	Time:	Serial No.

ATLANTIC RICHFIELD CO.
HASTINGS-ON-HUDSON, NY
HAND-HELD PERIMETER MONITORING

DATE: _____ TECH: _____ WEATHER: _____

TIME	LOCATION*	PM10 (ug/m3) 5-minute	COMMENTS

* Attached site map indicates daily mobile sample locations (A, B, C, D)



REFERENCES:

1. TOPOGRAPHY AND PLANIMETRICS PROVIDED BY GEOD PHOTOGRAMMETRIC SCIENCES SURVEY TECHNOLOGIES. MAPPED BY PHOTOGRAMMETRIC METHODS FROM AERIAL PHOTOGRAPHS TAKEN 12/08/1995. GRIDS BASED ON NEW YORK 1983 STATE PLANE COORDINATE SYSTEM. VERTICAL DATUM IS BASED ON NAVD 1988. RI SAMPLE LOCATIONS SURVEYED BY GEOD.

2. EXISTING BUILDING DESIGNATIONS ARE BASED ON DOLPH ROTFELD ASSOCIATES FIGURE 4, DATED NOVEMBER, 1996. BUILDING INTERIOR DIVISION LOCATIONS ARE APPROXIMATE ONLY.

LEGEND:

- BUILDING DESIGNATION
- APPROXIMATE SITE BOUNDARY
- FORMER BUILDING OR STRUCTURE
- ASPHALT
- CONCRETE
- EXPOSED-FILL
- GRAVEL/FILL
- WOOD

INTERIM REMEDIAL MEASURES

- (A) BUILDING 14 SUMP CLOSURE IRM
- (B) SEPARATE PHASE LIQUID RECOVERY IRM
- (C) NORTHWEST CORNER IRM
- (D) SOUTHWEST CORNER BULKHEAD IRM
- (E) BUILDING 57 SHORELINE IRM

200 100 0 200 400

SCALE: 1"=200'

FIGURE 1.2

AR and AERL

EXISTING SITE PLAN
FORMER AWC PLANT SITE
OU-1
HASTINGS-ON-HUDSON, NEW YORK

PARSONS
290 ELWOOD DAVIS ROAD, SUITE 312, LIVERPOOL, N.Y. 13088, PHONE: 315-451-9560

P:\441247\CAD\WORKPLAN\4401247C004(MOD 4-18-05).DWG, 4/18/05, CLW
XREFs: X6203-D2.DWG

DAILY HAND-HELD PERIMETER MONITORING MAP

FIELD STATION LOG

SITE:

NETWORK:

PROJECT NUMBER

DATE	TIME	COMMENTS	INITIALS	EMP.N0

ATTACHMENT H2

Risk Based Action Level Calculations

1. DERIVATION OF ACTION LEVELS FOR PARTICULATES

Action levels for particulates were calculated based on the presence of lead and PCBs in soil. The action levels were calculated assuming that 100% of these chemicals in soil would become airborne; in other words, the concentrations of lead and PCBs in particulates would mirror the concentrations in soil. The action levels were initially calculated assuming that a receptor is present at their residence or workplace. In order to relate these action levels to concentrations monitored at the fenceline, an air dispersion model was run to determine the amount of dispersion that could occur for particulates at the fenceline to the specific receptor location. The dispersion model was used to develop a dilution factor to relate particulate concentrations at the closest receptor location to the fenceline monitoring locations.

1.1 Particulate Action Levels at Receptor Locations

The closest human receptor locations to the Site are the Hudson Valley Health and Tennis Club located north of the site and residences located east of the site. The Tennis Club is likely to receive higher concentrations of particulates because of its proximity and the fact that it is at the same elevation as the BP facility. In contrast, the residences are located to the east at elevated locations. Somebody working at the tennis club on a daily basis is likely to be the most exposed receptor.

The air monitoring plan includes the following assumptions regarding the duration and length of remediation. The risk-based action levels incorporate this exposure frequency and duration.

- Total site remediation period will be 2 years
- Remediation activities will occur 10 hours per day
- Remediation activities will occur 5 days per week
- Remediation activities will occur 50 weeks per year

In order to develop action levels for particulates, it is first necessary to determine a risk-based acceptable concentration in air for the specific chemical. The air concentration is then divided by the chemical concentration in soil to determine an action level for particulates. Since the action level considers exposure for a 2-year period, it was considered more appropriate to use the average soil concentrations of lead and PCBs.

Because there is uncertainty in determining the average concentration, an upper bound estimate of the average concentration, the 95% upper confidence limit (UCL) on the arithmetic mean was used in the calculation. U.S. EPA (2002) provides guidance on the methodology for calculating 95% UCLs. The calculation of the 95% UCL is dependent on the data distribution, which can be normal, lognormal, or nonparametric. For normally distributed datasets, the guidance recommends the use of the Student's t-statistic to calculate a 95% UCL. However, for lognormal or nonparametric datasets, a variety of methods are used, depending on the skewness and other characteristics of the data. UCLs were calculated using U.S. EPA's ProUCL Version 3.0 software (U.S. EPA, 2004a). The software calculates 95% UCLs based on the data distribution. Guidance on using the software was obtained from the User's Guide (U.S. EPA, 2004b).

The table below shows summary information for lead and PCBs, including the minimum and maximum detected concentrations, frequency of detection, arithmetic mean and 95% UCLs on the arithmetic means. The lead dataset is lognormally distributed, and the PCB dataset is nonparametric (i.e., neither normal nor lognormal). Table 1 presents the ProUCL output tables.

Table 1

Compound	Frequency of Detection	Minimum Detection (mg/kg)	Maximum Detection (mg/kg)	Arithmetic Mean (mg/kg)	95% UCL (mg/kg)
LEAD	154 : 154 : 154	1.2	43,200	1,229	1,617
TOTAL PCBs	825 : 1104 : 1105	0.011	381,000	2,990	8,974

1.1.1 Lead

USEPA's risk assessment approach for lead does not involve the development of cancer or noncancer toxicity values (USEPA, 2006), therefore a risk-based air concentration for lead could not be developed. Instead, the National Ambient Air Quality Standard (NAAQS) for lead of 1.5 ug/m^3 (http://epa.gov/air/criteria.html) was used to establish the action level for particulates. The NAAQS is established for a 3-month average. Since the NAAQS is established assuming 24 hours exposure for 7 days a week, the value was modified to account for 10 hours for 5 days a week using the following equation:

$$Acceptable\,air\,concentration = \frac{1.5\mu g/m^3}{\frac{10hr}{24hr}\times\frac{5d}{7d}} = 5\mu g/m^3$$

In the next step, the particulate action level was calculated by dividing the acceptable air concentration by the 95% UCL for lead in soil and incorporating a unit conversion factor.

$$Particulate\,concentration = \frac{5\,\mu g/m^3}{\frac{1{,}617\,mg}{kg}\,x\,\frac{kg}{10^6}} = 3{,}117\,\mu g/m^3$$

1.1.2 PCBs

For PCBs, an acceptable air concentration was calculated by using a unit cancer risk factor and a target cancer risk level. For remediation purposes, USEPA typically recommends a target cancer risk range of $1x10^{-4}$ to $1x10^{-6}$. In this risk evaluation, acceptable air concentrations were calculated assuming target cancer risk levels of $1x10^{-6}$ and $1x10^{-5}$. USEPA's Integrated Risk Information System (IRIS; USEPA, 2006) states that for dust and aerosol inhalation, the cancer slope factor for high risk and persistent PCBs should be used. USEPA provides an upper-bound slope factor of 2 mg/kg-day and a central estimate slope factor of 1 mg/kg-day. The upper-bound slope factor of 2 mg/kg-day was used in the risk calculations, which is a conservative choice. Initially, this slope factor was converted to a unit risk factor by adjusting for body weight (70 kg) and daily inhalation rate (20 m^3/day):

$$Unit\ risk\ \ factor = 2\,\frac{kg-day}{mg}\,x\,\frac{1}{70kg}\,x\,\frac{20m^3}{day}\,x\,\frac{10^{-3}mg}{\mu g} = 5.7x10^{-4}m^3/\mu g$$

The following equation was used to derive an acceptable air concentration for PCBs. Two calculations were conducted assuming target cancer risk levels of $1x10^{-6}$ and $1x10^{-5}$. In accordance with the remediation schedule, it was assumed that a receptor could be exposed for 10 hours per day, 5 days per week, 50 weeks (250 days) per year and 2 years.

The following equation shows the calculation for the target cancer risk level of $1x10^{-6}$:

$$Acceptable\,air\,concentration = \frac{1x10^{-6} \times 70\,yr \times 365 day/yr}{5.7x10^{-4}\,m^3/ug \times 10^3\,\mu g/mg \times \frac{10hr}{24hr} \times \frac{5d}{7d} \times 250 day/yr \times 2\,yr} = 3.0 \times 10^{-4}\,mg/m^3$$

The acceptable air concentration based on the target cancer risk level of $1x10^{-5}$ is 10-fold higher, or $3.0x10^{-3}$ mg/m3.

In the next step, the particulate action level was calculated by dividing the acceptable air concentration by the 95% UCL for PCBs in soil and incorporating a unit conversion factor.

$$Particulate\,concentration = \frac{3.0 \times 10^{-4}\,mg/m^3}{\frac{8{,}974\,mg}{kg}\,x\,\frac{kg}{10^9\,ug}} = 33.4\ \mu g/m^3$$

The particulate concentration based on the target cancer risk level of $1x10^{-5}$ is 10-fold higher, or 334 ug/m^3.

The National Ambient Air Quality Standard (NAAQS) for PM_{10} (particulate matter less than 10 micrometers in diameter) is 150 ug/m^3 for a 24-hour averaging time. This value is within the range of particulate concentrations for PCBs calculated using the $1x10^{-5}$ and $1x10^{-6}$ target cancer risk levels. These results indicate that the 150 ug/m^3 PM_{10} standard would be protective of the presence of PCBs as well.

1.2 Air Dispersion Modeling to Relate Measured Concentrations to Long-Term Exposure

These particulate action levels were calculated for the actual receptor location; in other words, the residence or business at which the receptor is located. Since monitoring will occur at the fence line, it was necessary to develop particulate action levels for the fence line. A simple air dispersion modeling analysis was conducted to estimate the minimal amount of additional dispersion that would occur from the fence line where the monitors will be located to the receptor location.

The nearest public receptors are located along the eastern palisade about 50 to 100 ft above the site and a tennis club located close to sea level directly to the north of the site. There are no comparable receptors to the south of the site. Screening-level dispersion models have been applied to estimate the relative concentration at a fenceline monitor to long-term concentrations at each of these two types of receptors. Figure 6-1 of the report shows the potential locations of the monitors. Figure 1 in this appendix shows these locations plus the relative locations of the contaminated areas to the receptors of interest.

Given the conditions required to transport airborne particulate up to the top of the palisade are different from conditions to transport particulate northward, along the Hudson River valley, two sets of dispersion calculations were performed.

Modeling was performed in four steps.

1. Identify the source area and the downwind monitor that would result in the smallest difference between the concentration at the monitor and the off-site receptor. Generally speaking this would occur when the distance from the source to monitor is large compared to the distance between the monitor and the receptor.

2. Apply a model to estimate the short-term concentration that could occur due to remediation activities at a monitor.

3. Apply a model to estimate the long-term concentration that could occur due to remediation activities at a monitor. This long-term estimate incorporates the fraction of the year that the receptor is expected to be generally downwind of remedial activities.

4. Compute the ratio of the result of Step 3 to Step 2 to estimate an effective dilution factor that relates the monitored and measured concentrations.

Receptors on Palisade- Westerly Winds

For the receptors at elevation, exposure would occur when there is a westerly wind (all wind directions with a westerly component). A search of the National Weather Service (NWS) meteorological stations indicates that the most representative site for which there is a recent long-term is just south of Poughkeepsie, New York, along the east bank of the Hudson River. ENSR obtained four recent years of data (2001-2004) from this site from the National Climatic Data Center. During the daytime hours (6 AM to 6 PM) when remedial activities will be taking place, the meteorological data indicates that winds with a westerly component occur about 60% of the time.

It is assumed that excavations and related remedial activities are taking place in a 50-ft square area along the river's edge, such that either of the two monitors, which are located adjacent to the railroad tracks, are about 150 m downwind of this area. To simulate the minimum rate of turbulent diffusion that occurs during daylight hours, the atmospheric stability is assumed to be neutral (stability category D). EPA's screening-level dispersion model SCREEN3 was applied to the estimate short term (e.g., 10-minutes to 1 hour) concentration that would be associated with a 1 g/sec of emissions downwind of the area source. This results in a concentration of 1188 $\mu g/m^3$ per g/sec for an average 3.2 m/sec wind speed. The associated long-term concentration on top of the palisade cannot be computed with conventional dispersion models because the nearly vertical walls of the palisade effectively block the air flow. Instead a conceptual box model was applied, where the concentration is computed as follows:

Concentration $\mu g/m^3$ per g/sec = 1×10^6 x wind frequency (0.60) x

$$[\text{box height (15.24 m)} \times \text{box width (58 m)} \times \text{wind speed (3.2 m/sec)}]^{-1}$$

Where it is assumed that:

1) the plume mixes to the height of the palisade which is a minimum of 50 ft above the site

2) the box width is defined as 4.3 x sigma y at 170 m downwind from the source where the plume begins to climb the palisade

3) wind blows from the west 60% of the time.

This results in a concentration of 212 $\mu g/m^3$ per g/sec. The resultant dilution factor (ratio of long-term receptor concentration of 1188 $\mu g/m^3$ to short-term fenceline concentration of 212) is 5.6.

Receptor at the Tennis Club

For this receptor exposure would occur with southerly winds (any wind with a southerly component) which according to NWS data at Poughkeepsie occurs about 46% of the time. The smallest difference between the monitored concentration and concentration at this receptor would occur when remediation takes place at the southern end of the site, about 700 m south of monitoring site 1. Given that the monitor and receptor are at essentially the same elevation within the valley, SCREEN3 was applied to both locations based on a 50-ft square excavation area. The tennis court receptor was assumed to be 50 m north of monitoring site 1. The resultant SCREEN3 results indicate a downwind concentration of 84 ug/m^3 per g/sec at the monitor and 75 $\mu g/m^3$ per g/sec at the tennis club. Accounting for the fact that the winds are from the south 46% of time results in a long-term dilution factor of 2.44.

The lower dilution factor between these two types of receptors (2.44) is used in the setting of site action levels. This value is highly conservative as it assumes a source receptor configuration that minimizes the difference in concentrations between the monitor and off-site receptors, it assumes that the receptor would be downwind of the emission source whenever there are southerly winds, and it assumes that the monitored emissions will persist throughout the duration of the excavation. Given these factors it is likely that the dilution factor is protective by an order of magnitude or more.

1.3 Particulate Action Levels at the Fenceline

The particulate action levels at the fenceline were calculated by adjusting the particulate action levels at the receptor location by the dilution factor of 2.44 calculated in the air dispersion model. The resulting action levels are thus:

- Lead: 3,117 $\mu g/m^3$ x 2.44 = 7,605 $\mu g/m^3$
- PCBs: 33.4 $\mu g/m^3$ x 2.44 = 81 $\mu g/m^3$ for a $1x10^{-6}$ target cancer risk level

  334 $\mu g/m^3$ x 2.44 = 815 $\mu g/m^3$ for a $1x10^{-5}$ target cancer risk level

As noted earlier, the NAAQS for PM_{10} is 150 ug/m^3 for a 24-hour averaging time. This value is within the range of particulate concentrations for PCBs calculated using the $1x10^{-5}$ and $1x10^{-6}$ target cancer risk levels and well below the particulate action level for lead. These results indicate that the 150 ug/m^3 PM_{10} standard would be protective of the presence of lead PCBs as well.

Based on the results of the risk calculations, which show that the 150 ug/m^3 PM_{10} standard is protective of PCBs and lead in soil, the PM_{10} standard will be used as the fenceline particulate action level for all sample durations throughout the site remediation program.

References

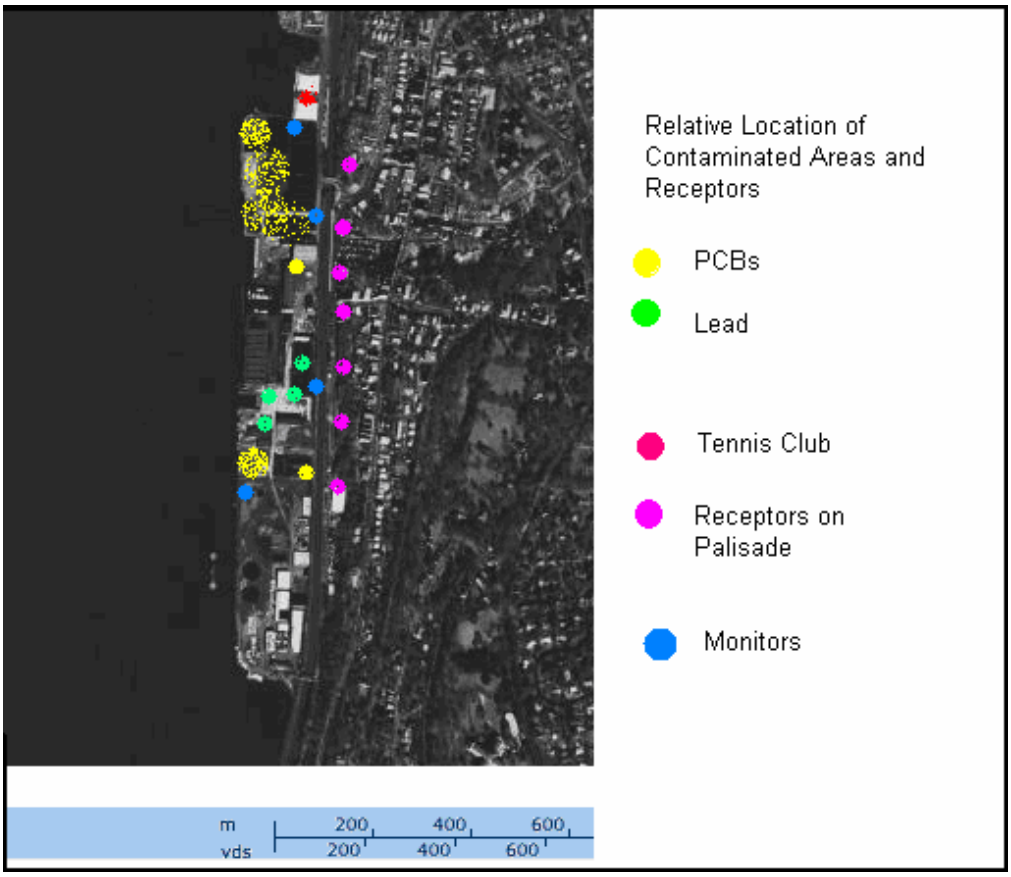
U.S. EPA. 2002. Calculating Upper Confidence Limits for Exposure Point Concentrations at Hazardous Waste Sites. OSWER 9285.6-10. December 2002.

U.S. EPA. 2004a. ProUCL Version 3.00.02. September 1, 2004 [URL: http://www.epa.gov/esd/tsc/download.htm]

U.S. EPA. 2004b. ProUCL Version 3.0 User Guide. U.S. EPA. EPA/660/R04/079, April 2004.

U.S. EPA. 2006. Integrated Risk Information System (IRIS). Environmental Criteria and Assessment Office. U.S. Environmental Protection Agency, Cincinnati, OH. [URL: http://www.epa.gov/iris/index.html]

Figure 1


Relative Location of Contaminated Areas and Receptors
PCBs
Lead
Tennis Club
Receptors on Palisade
Monitors
m
vds
200
400
600
200
400
600

Data File

Variable: LEAD

Raw Statistics	
Number of Valid Samples	154
Number of Unique Samples	146
Minimum	1.2
Maximum	43200
Mean	1229.087
Median	143.5
Standard Deviation	4778.4
Variance	22833106
Coefficient of Variation	3.887764
Skewness	6.671819

Gamma Statistics	
k hat	0.320591
k star (bias corrected)	0.318675
Theta hat	3833.815
Theta star	3856.869
nu hat	98.74206
nu star	98.15184
Approx.Chi Square Value (.05)	76.29354
Adjusted Level of Significance	0.048442
Adjusted Chi Square Value	76.1126

Log-transformed Statistics	
Minimum of log data	0.182322
Maximum of log data	10.6736
Mean of log data	4.986292
Standard Deviation of log data	1.952238
Variance of log data	3.811233

RECOMMENDATION
Data are lognormal (0.05)

Use H-UCL

Normal Distribution Test	
Lilliefors Test Statisitic	0.403319
Lilliefors 5% Critical Value	0.071396
Data not normal at 5% significance level	

95% UCL (Assuming Normal Distribution)	
Student's-t UCL	1866.303

Gamma Distribution Test	
A-D Test Statistic	11.75934
A-D 5% Critical Value	0.863444
K-S Test Statistic	0.233753
K-S 5% Critical Value	0.081769
Data do not follow gamma distribution at 5% significance level	

95% UCLs (Assuming Gamma Distribution)	
Approximate Gamma UCL	1581.224
Adjusted Gamma UCL	1584.983

Lognormal Distribution Test	
Lilliefors Test Statisitic	0.064403
Lilliefors 5% Critical Value	0.071396
Data are lognormal at 5% significance level	

95% UCLs (Assuming Lognormal Distribution)	
95% H-UCL	**1616.569**
95% Chebyshev (MVUE) UCL	1996.709
97.5% Chebyshev (MVUE) UCL	2449.35
99% Chebyshev (MVUE) UCL	3338.475

95% Non-parametric UCLs	
CLT UCL	1862.445
Adj-CLT UCL (Adjusted for skewness)	2083.646
Mod-t UCL (Adjusted for skewness)	1900.806
Jackknife UCL	1866.303
Standard Bootstrap UCL	1855.52
Bootstrap-t UCL	2466.067
Hall's Bootstrap UCL	2538.546
Percentile Bootstrap UCL	1904.257
BCA Bootstrap UCL	2123.312
95% Chebyshev (Mean, Sd) UCL	2907.5
97.5% Chebyshev (Mean, Sd) UCL	3633.751
99% Chebyshev (Mean, Sd) UCL	5060.33

Table 1

Data File

Variable: Total PCBs

Raw Statistics	
Number of Valid Samples	1104
Number of Unique Samples	653
Minimum	0.003
Maximum	381000
Mean	2990.046
Median	2.0545
Standard Deviation	19982.62
Variance	3.99E+08
Coefficient of Variation	6.683048
Skewness	11.82376

Gamma Statistics	
k hat	0.112348
k star (bias corrected)	0.112647
Theta hat	26614.13
Theta star	26543.58
nu hat	248.0646
nu star	248.7238
Approx.Chi Square Value (.05)	213.2023
Adjusted Level of Significance	0.049783
Adjusted Chi Square Value	213.1598

Log-transformed Statistics	
Minimum of log data	-5.809143
Maximum of log data	12.85055
Mean of log data	0.882093
Standard Deviation of log data	4.54272
Variance of log data	20.6363

RECOMMENDATION
Data are Non-parametric (0.05)

Use 99% Chebyshev (Mean, Sd) UCL

Normal Distribution Test	
Lilliefors Test Statisitic	0.444178
Lilliefors 5% Critical Value	0.026665
Data not normal at 5% significance level	

95% UCL (Assuming Normal Distribution)	
Student's-t UCL	3980.103

Gamma Distribution Test	
A-D Test Statistic	107.1043
A-D 5% Critical Value	1.632785
K-S Test Statistic	0.212637
K-S 5% Critical Value	0.037407
Data do not follow gamma distribution at 5% significance level	

95% UCLs (Assuming Gamma Distribution)	
Approximate Gamma UCL	3488.216
Adjusted Gamma UCL	3488.912

Lognormal Distribution Test	
Lilliefors Test Statisitic	0.126743
Lilliefors 5% Critical Value	0.026665
Data not lognormal at 5% significance level	

95% UCLs (Assuming Lognormal Distribution)	
95% H-UCL	N/A
95% Chebyshev (MVUE) UCL	189438.1
97.5% Chebyshev (MVUE) UCL	242860.6
99% Chebyshev (MVUE) UCL	347798.7

95% Non-parametric UCLs	
CLT UCL	3979.271
Adj-CLT UCL (Adjusted for skewness)	4207.947
Mod-t UCL (Adjusted for skewness)	4015.771
Jackknife UCL	3980.103
Standard Bootstrap UCL	3962.613
Bootstrap-t UCL	4281.615
Hall's Bootstrap UCL	4435.561
Percentile Bootstrap UCL	4022.418
BCA Bootstrap UCL	4117.566
95% Chebyshev (Mean, Sd) UCL	5611.515
97.5% Chebyshev (Mean, Sd) UCL	6745.827
99% Chebyshev (Mean, Sd) UCL	**8973.963**

Table 1 (cont)

APPENDIX I

Corrosion Protection Report

July 12, 2006

Mr. Damian Siebert, PE
Haley & Aldrich of New York
200 Town Centre Dr., Suite 2
Rochester, NY 14623-4264

CORRPRO COMPANIES INC
Preserve and Sustain Global Assets & Infrastructure
610 Brandywine Parkway
West Chester, PA 19380
Tel: (610) 344-7002
Fax: (610) 344-7092
www.corrpro.com

SUBJECT: OU-1 Remediations NYSDEC Site #3-60-022
1 River Street
Hastings-on Hudson, New York
Cathodic Protection of Sheet Piling
50 Percent Cathodic Protection Design Submission

REFERENCE: Our Job No. 401349

Dear Mr. Siebert:

We are pleased to submit this 50 percent design submission for the cathodic protection system to protect the buried portions of the steel piles, deadmen and anchor rods from corrosion. The cathodic protection (CP) design is based on using impressed current to achieve cathodic protection (corrosion control) of both sides of the buried steel piling and appurtenances. The alternative galvanic anode method is not feasible in this case because of the large amount of steel to be protected and the desired life of the system.

The system uses deep well ground beds (DWGB) to transmit the protection current to the structure. The anodes are designed to provide adequate current distribution for the design life of 100 years. The DWGB are all located within the land-side of the piles in order to eliminate the need to bore deep holes in the river and stay outside of the river bed area subject to dredging. A total of 25 DWGB are proposed. The surface area of the sheet pile, deadmen and anchor rods require a large amount of current to mitigate corrosion and the desired life expectancy of the system requires that the anodes be sized accordingly. Groups of DWGB are powered separately to increase adjustment flexibility.

The DWGB located within the sheet pile bulkhead have the capacity to protect the river side of the bulkhead. The anticipated depth of the rock strata behind the sheet piles will allow CP current to reach the river side of the sheet piles. Nevertheless, we have designed a supplemental anode system to be installed on the river side of the bulkhead. These are shallow anodes installed at intervals along the bulkhead to distribute CP current to the sheet pile exposed to the river and fill zones at the top of the piling, which is the most critical area. The design calls for these supplemental anodes to be installed below the maximum dredge line elevation. The supplemental anodes are powered by a separate rectifier.

The anodes are powered by transformer-rectifiers which convert AC to DC and reduce the voltage for use by the CP system. These rectifiers are pole- or wall-mounted above ground. Since locations for these rectifiers can not be specified with present information, the drawings

show them in general locations. We have also assumed AC input of 480 volts, 3 phase, but other inputs are available as needed.

Appendix A contains a preliminary Bill of Materials.

We appreciate the opportunity to work with you on this project. Please do not hesitate to call us if you have any questions.

Very truly yours,

Walter T. Young, P.E.
Principal Engineer

Cc: Ms. Cynthia Cogan
ENSR International, Inc.
3 Marcus Blvd
Albany, NY 12205

Encl

APPENDIX A

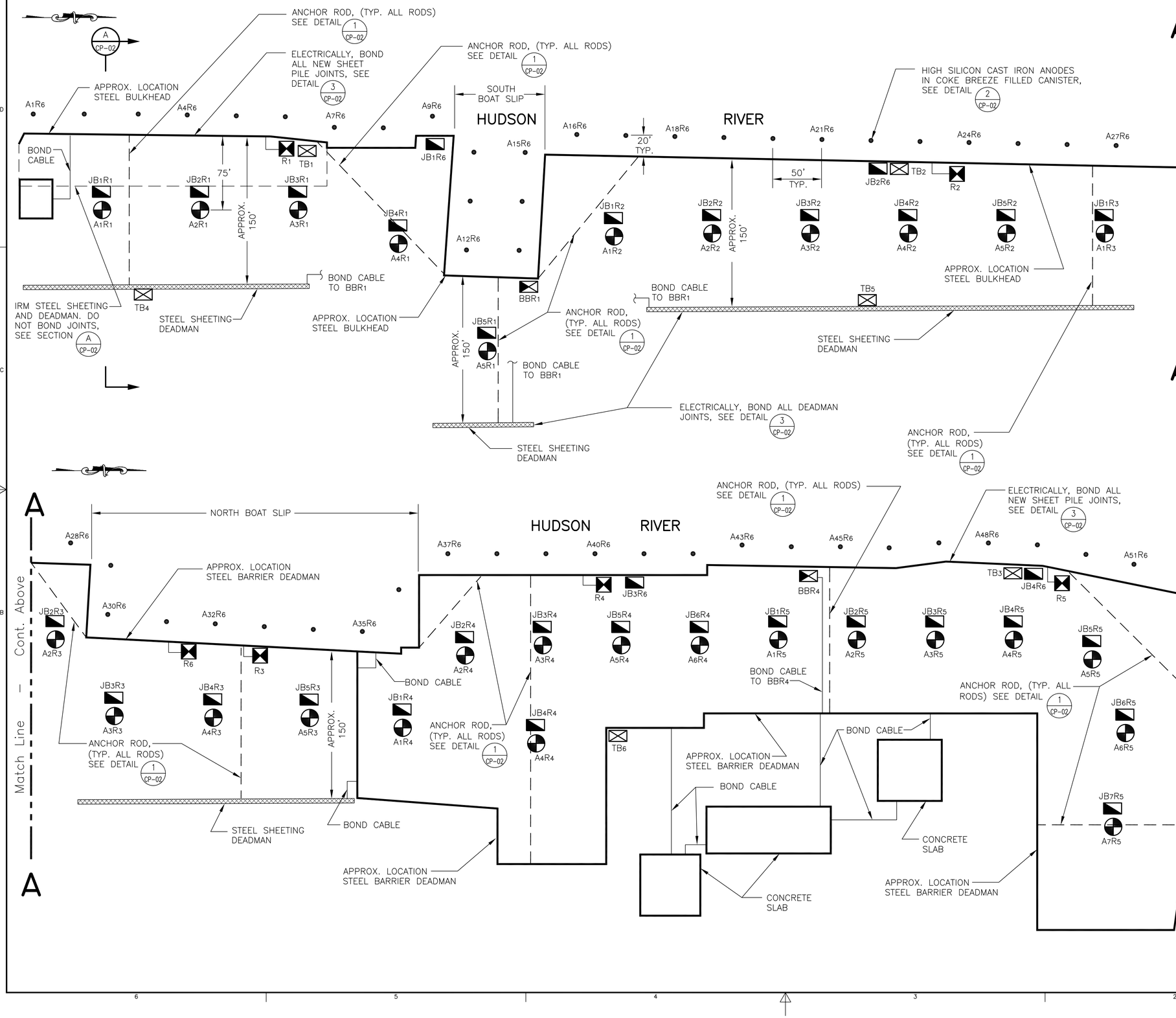
PRELIMINARY BILL OF MATERIALS

Item	Approx. Qty	Unit	Description	Cost
1	110	ea	Anode, Tubular Mixed Metal Oxide Type XL, 0.75" x 48". Supplied with a 150 foot length of # 8 AWG stranded copper cable center connected to the anode. Cable shall be provided with HALAR 40/65 direct burial Insulation	
2	96	ea	Anode, Tubular Mixed Metal Oxide Type XL, 0.75" x 48". Supplied with a 120 foot length of # 8 AWG stranded copper cable center connected to the anode. Cable shall be provided with HALAR 40/65 direct burial Insulation	
3	59	ea	High silicon cast iron anodes, Durichlor 51 composition, Type E, 3-inch diameter, 60 inches long, 50 feet AWG #8 AWG stranded copper lead wire with HALAR 40/65 direct burial insulation, end encapsulation, prepackaged in 8-inch x 84-inch galvanized steel canister filled with Loresco SC-3 coke breeze.	
4	261	ea	Anode Centering Device, Elgard Ventralizer, For 10" Diameter Hole and use with 0.75" anode and 1" diameter Vent Pipe	
5	1440	ft	Vent Pipe, 1" Slotted PVC, In 10 Foot Lengths. The vent pipe shall be specially designed for use in deep anode cathodic protection systems, with the following characteristics: Slotted vent pipe for the active anode area shall be 1-inch nominal, with 1.32 inch outside diameter, with openings placed in a strategic pattern to allow 360 degree venting ability without loss of pipe strength. The openings shall be 1.5 inches long with a width of 0.006 inch. The openings shall be staggered step-wise around the circumference of the vent pipe. The openings shall be parallel to the longitudinal centerline of the pipe, and shall be spaced 1-inch apart, circumferentially. Center-to-center spacing of the openings shall be 6 inches, vertically. Acceptable Products: Loresco Allvent™, or approved equal.	
6		ft	Vent Pipe, 1" Unslotted PVC, In 10 Foot Lengths	
7	1420	bags	Coke breeze. Loresco SC-3 Earth Contact Backfill, 50 lb Bags	
8	1911	lb	Environmental seal. Manufactured from bentonite clay, environmentally safe. Bulk Density - 70 lbs./ft.^{3} Acceptable Product: Loresco Perma-Plug or approved equal.	
9		ft	PVC surface casing. The surface casing pipe shall be Schedule 40 PVC conforming to ASTM D-1785. The casing pipe shall have the following characteristics: Diameter: 10-inches nominal, Length: Sufficient to reach the first organic layer below the surface	
10		ft	Steel casing pipe, 10-inches diameter	
11	25	ea	Anode vent boxes. Cast iron construction, nominally 12-inches in diameter, with a square top and suitable for	

			roadway use. Marker/vent boxes shall come with a top and bottom half and cover. The cover shall be cast with the words “Cathodic Protection” on top. Acceptable Products: Model 200 Roadway Test Box as manufactured by Bingham and Taylor.	
12	1	ea	Rectifier, Input 480 VAC three phase, with silicon bridge circuitry. Air cooled. Provided with input and output lightening protection. Provide an efficiency filter network on the DC output of the rectifier. Provide 1 negative and 5 positive output terminals each for AWG #4 stranded copper wire. The DC voltage rating will be 50 volts 250 amps. The rectifier will be manufactured with a 12 gauge steel galvanized cabinet with NEMA 3R rating. The cabinet will be constructed with a pedestal mounting structure.	
13	1	ea	Rectifier, Input 480 VAC three phase, with silicon bridge circuit. Air cooled. Provided with input and output lightening protection. Provide an efficiency filter network on the DC output of the rectifier. The DC voltage rating will be 50 volts 300 amps. Provide 1 negative and 8 positive output terminals each for AWG #4 stranded copper wire. The rectifier will be manufactured with a 12 gauge steel galvanized cabinet with NEMA 3R rating. The cabinet will be constructed with a pedestal mounting structure.	
14	1	ea	Rectifier, Input 480 VAC three phase, with silicon bridge circuitry. Air cooled. Provided with input and output lightening protection. Provide an efficiency filter network on the DC output of the rectifier. The DC voltage rating will be 50 volts 150 amps. Provide 1 negative and 3 positive output terminals each for AWG #4 stranded copper wire. The rectifier will be manufactured with a 12 gauge steel galvanized cabinet with NEMA 3R rating. The cabinet will be constructed with a pedestal mounting structure.	
15	1	ea	Rectifier. Air cooled., Input 480 VAC three phase, with silicon bridge circuitry, Provided with input and output lightening protection. Provide an efficiency filter network on the DC output of the rectifier. The DC voltage rating will be 50 volts 220 amps. Provide 1 negative and 5 positive output terminals each for AWG #4 stranded copper wire. The rectifier will be manufactured with a 12 gauge steel galvanized cabinet with NEMA 3R rating. The cabinet will be constructed with a pedestal mounting structure.	
16	1	ea	Rectifier, Input 480 VAC three phase, with silicon bridge circuitry. Air cooled. Provided with input and output lightening protection. Provide an efficiency filter network on the DC output of the rectifier. The DC voltage rating will be 50 volts 150 amps. Provide 1 negative and 4 positive output terminals each for AWG #4 stranded copper wire. The rectifier will be manufactured with a 12 gauge steel galvanized cabinet with NEMA 3R rating. The cabinet will be constructed with a pedestal mounting structure.	
17	1	ea	Rectifier, Input 480 VAC three phase, with silicon bridge circuitry. Air cooled. Provided with input and output lightening protection. Provide an efficiency filter network	

APPENDIX A
PRELIMINARY BILL OF MATERIALS

			on the DC output of the rectifier. The DC voltage rating will be 50 volts 150 amps. Provide 1 negative and 4 positive output terminals each for AWG #4 stranded copper wire. The rectifier will be manufactured with a 12 gauge steel galvanized cabinet with NEMA 3R rating. The cabinet will be constructed with a pedestal mounting structure.	
18	13	ea	Junction Box, Type S, 18"x16"x6", NEMA 4X, stainless steel, with hinged cover and hasp. With 11 circuits containing .001 ohm shunts and lugs for #4 AWG copper wire.	
19	12	ea	Junction Box, Type S, 18"x16"x6", NEMA 4X, stainless steel, with hinged cover and hasp. With 8 circuits containing .001 ohm shunts and lugs for #4 AWG copper wire.	
20	4	ea	Junction Box, Type S, 18"x16"x6", NEMA 4X, stainless steel, with hinged cover and hasp. With 15 circuits containing .001 ohm shunts and lugs for #8 AWG copper wire.	
21	12	ea	Permanent Reference Cell, Permacell 802, copper/copper sulfate, prepackaged in a cloth bag surrounded with low resistivity backfill material, supplied with 20 feet number 8 AWG stranded copper wire with Green HMWPE insulation.	
22	12	ea	Zinc electrode, prepackaged in backfill with 20 feet AWG #14 lead wire with yellow color HMWPE insulation.	
23	12	ea	Steel coupon. ½-inch dia. x ¾-inch long, mild steel, with two #12 AWG stranded copper wires attached, 20 feet long each, M.C. Miller Co. or equal.	
24	6	ea	Test Station, Gerome Manufacturing Series 2000, to fit on 2" conduit, with 11 terminals for test lead termination.	
25		ft	No. 4 stranded copper wire, HMWPE CP insulation.	
26		ea	Thermite weld molds. No. 4 stranded copper to flat vertical steel surface.	
27		ea	Thermite weld charges. No. 4 stranded copper wire to flat vertical steel surface.	
28		gal	Bituminous mastic coating. Carboline Bitumastic 50 or equal.	
29		ft	Warning Tape, Yellow plastic indicating buried cathodic protection wires.	
30	2	Ea	Bond box, Type T, 12"x10"x 5", NEMA 4X, stainless steel, with hinged cover and hasp. With 6 circuits containing lugs for #4 AWG copper wire.	



GENERAL NOTES:

1. CONTRACTOR SHALL VERIFY EXACT LOCATION AND ORIENTATION OF ALL PIPING, TANKS, CONDUITS, AND UNDERGROUND UTILITIES, INCLUDING PIPING AND STRUCTURES PRIOR TO EXCAVATION AND AUGURING/DRILLING WORK.
2. THE POSITION OF CATHODIC PROTECTION SYSTEM COMPONENTS SHOWN ON PLAN ARE PREFERRED. MINOR REPOSITIONING IS ALLOWABLE TO AVOID EXISTING STRUCTURES UPON APPROVAL OF ENGINEER
3. STEEL SHEET PILING SHALL BE CHECKED BY CONTRACTOR FOR CONTINUOUS ELECTRICAL CONTINUITY. INSTALL BOND STRAPS ACROSS SHEET PILE SECTIONS WHERE DISCONTINUITIES ARE FOUND.
4. ALL UNDERGROUND METALLIC PIPES (INCLUDING ANY NOT SHOWN ON THIS PLAN) WITHIN THE PROPERY LIMITS OF THE SITE SHALL BE ELECTRICALLY CONTINUOUS BY INSTALLING TWO #4 AWG STRANDED COPPER WIRES ACROSS ALL MECHANICAL PIPE JOINTS AND OTHER METALLIC COMPONENTS (QUANTITY OF BOND WIRES REQ'D. UNKNOWN). SEE DETAIL 3 CP-09 4 CP-09
5. ALL THERMITE WELD CONNECTIONS ARE TO BE COATED TO MATCH EXISTING COATING, IF ANY. IF THERE IS NO EXISTING COATING, USE A COAL TAR MASTIC COATING.

LEGEND:

- RECTIFIER (QUANTITY 6), SEE DETAIL 1,2 CP-05 1,2 CP-06 1 CP-08
- DEEP ANODE WELL (QUANTITY 25), SEE DETAIL 1 CP-03 1 CP-04
- ANODE JUNCTION BOX (QUANTITY 25), SEE DETAIL 2 CP-08
- BOND BOX (QUANTITY 3), SEE DETAIL 3 CP-09
- TEST STATION (QUANTITY 6), SEE DETAILS 2 CP-07 3 CP-07
- A1R6 CAST IRON ANODE, SEE DETAIL 2 CP-02

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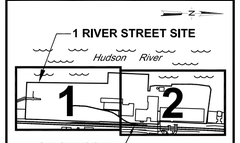
Fax: 610.344.7092
WWW.CORRPRO.COM



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Designed By:	WY
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Rev.	Description	By	Date

OU-1 REMEDIATION
NYSDEC SITE #3-60-022
1 RIVER STREET
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BULKHEAD PLAN

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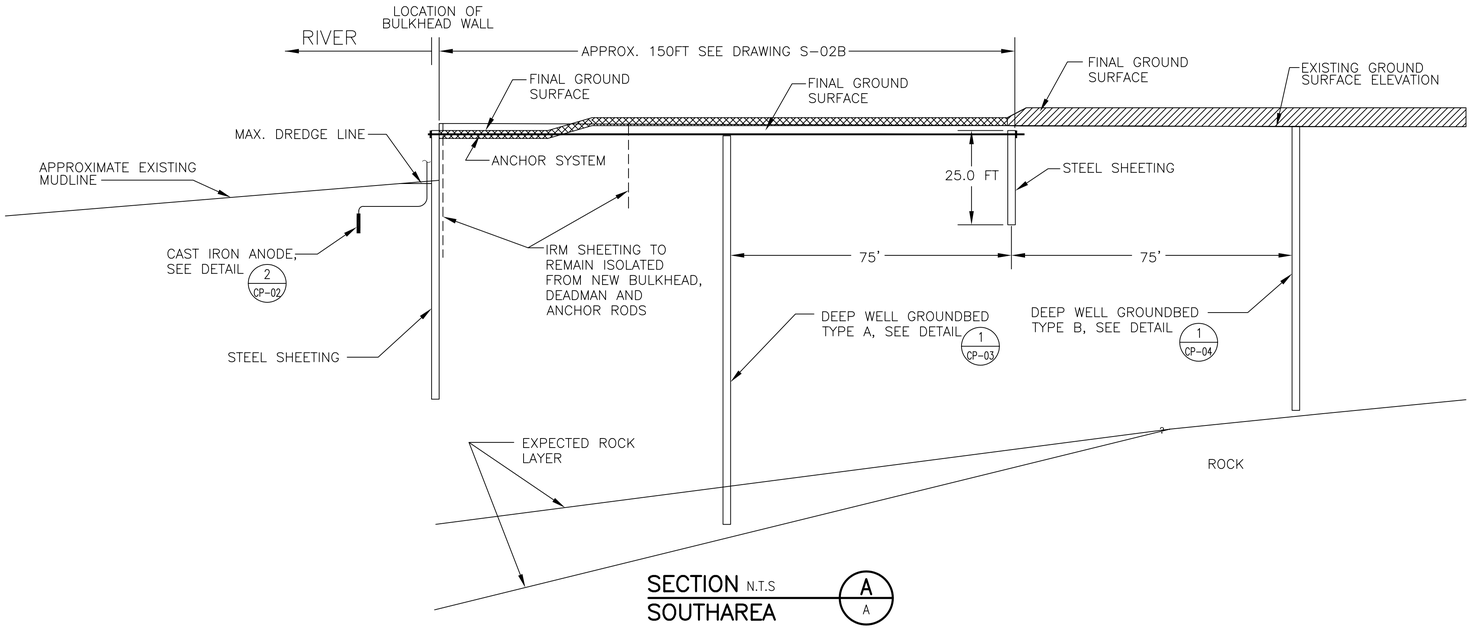
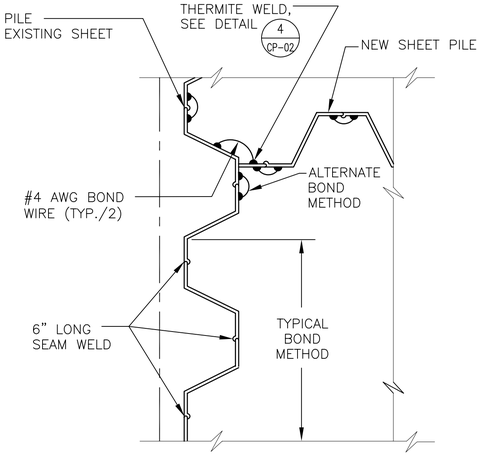
CP - 01

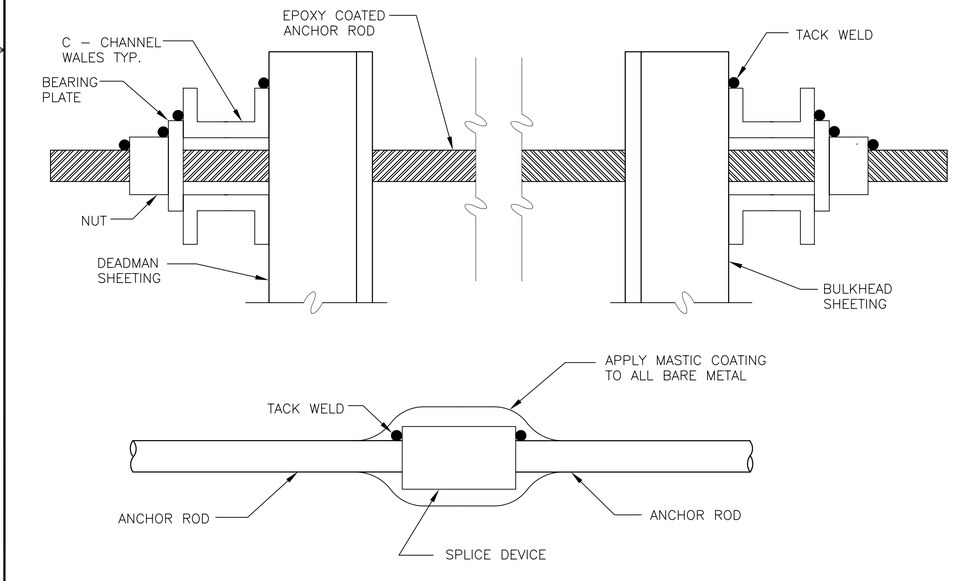


SECTION N.T.S — SOUTHAREA — A / A

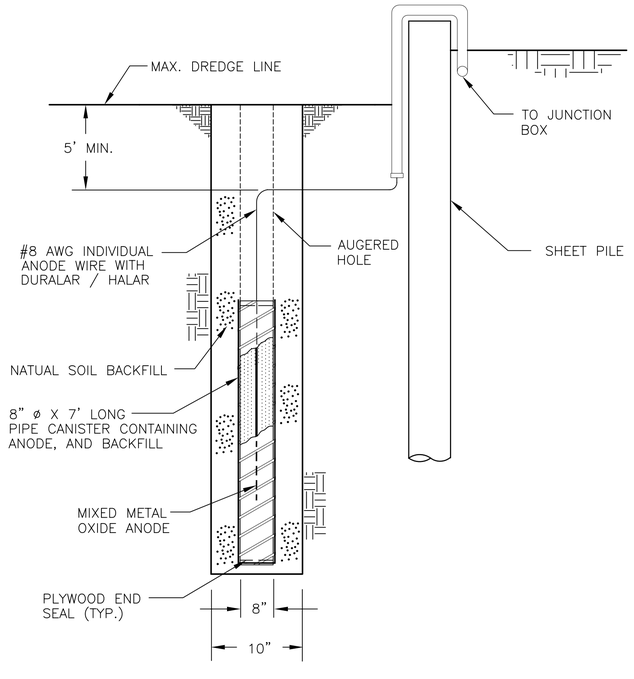


NEW AND EXIST. SHEET PILE BONDING

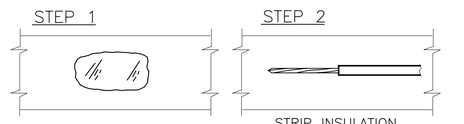
DETAIL N.T.S — TYPICAL SHEET PILE BONDING — 3 / CP-01

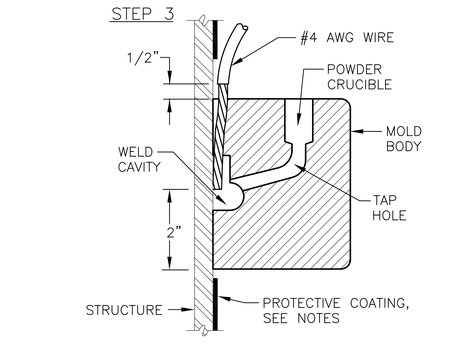


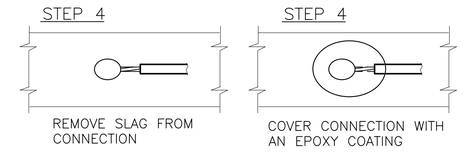
DETAIL N.T.S — ANCHOR ROD BONDING — 1 / CP-01



DETAIL N.T.S — INSTALLATION AT CAST IRON ANODES — 2 / CP-01 | CP-02







NOTES:

1. REMOVE MINIMUM AMOUNT OF COATING REQUIRED FOR PLACEMENT OF CRUCIBLE ON STRUCTURE. REMOVE COATING BY USE OF TORCH AND KNIFE, NOT BY HAMMERING.
2. AFTER WELD HAS COOLED, REMOVE SLAG, PRIME ENTIRE AREA AND ADJACENT COATING MINIMUM OF 2 INCHES.
3. WHEN PRIMER HAS DRIED, APPLY COAL TAR EPOXY COATING.
4. CHECK COATING WITH HIGH VOLTAGE FAULT DETECTOR.

DETAIL N.T.S — VERTICAL THERMITE WELD — 4 / CP-02

HALEY & ALDRICH OF NEW YORK
200 TOWN CENTRE DRIVE, SUITE 2
ROCHESTER, NY 14623
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Fax: 585.359.4650
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1380 ENTERPRISE DRIVE
WEST CHESTER, PENNSYLVANIA 19380
Tel: 610.344.7002
Fax: 610.344.7092
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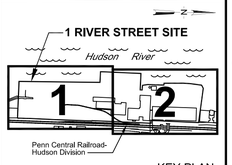

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BULKHEAD DETAILS

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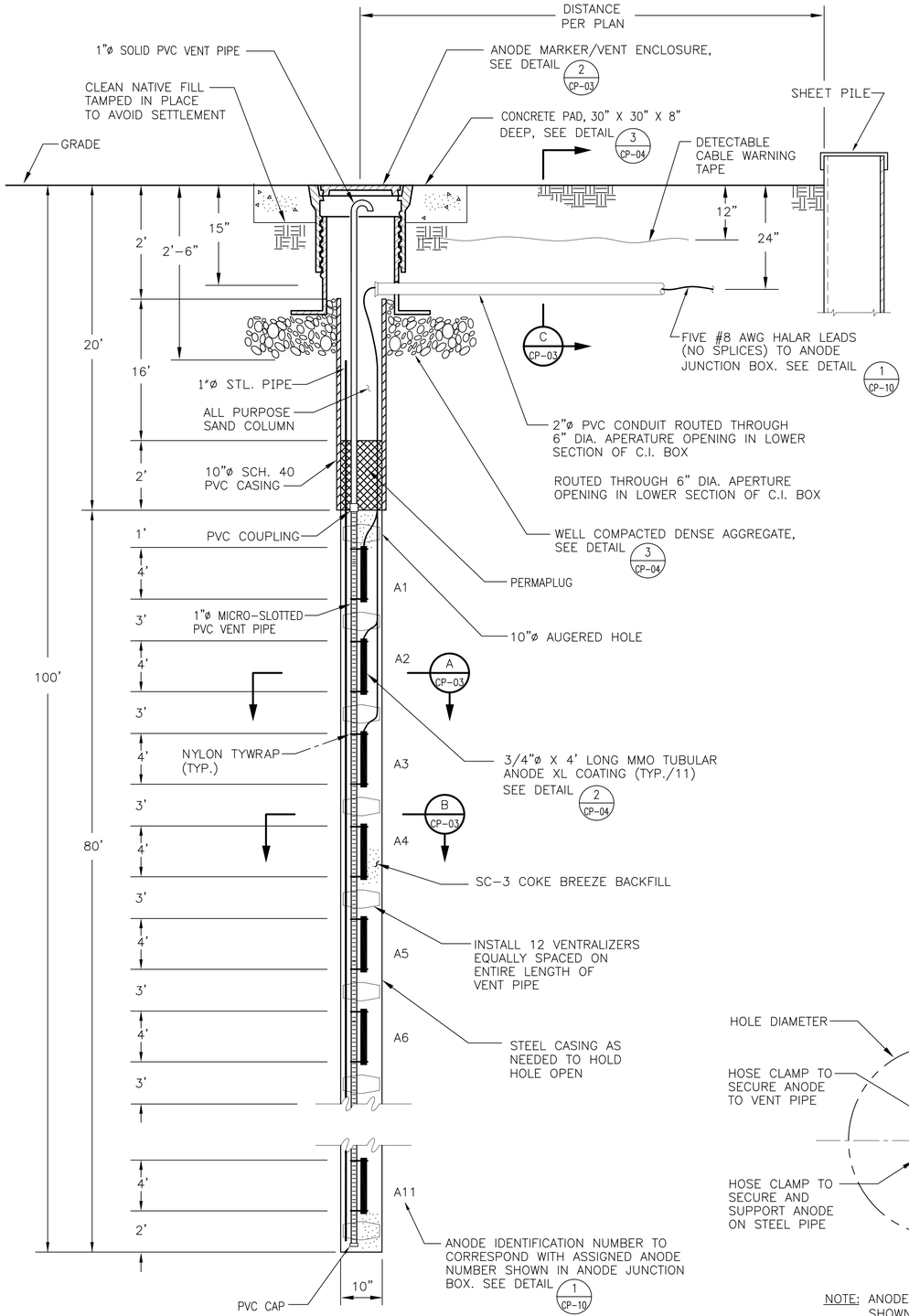
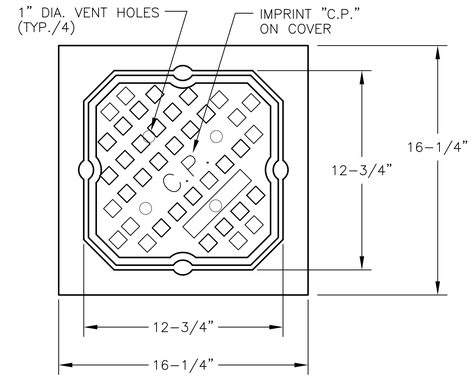
CP - 02

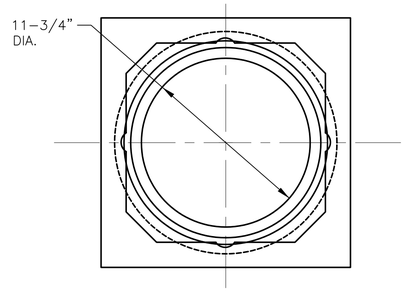


DETAIL N.T.S — 1 CP-02

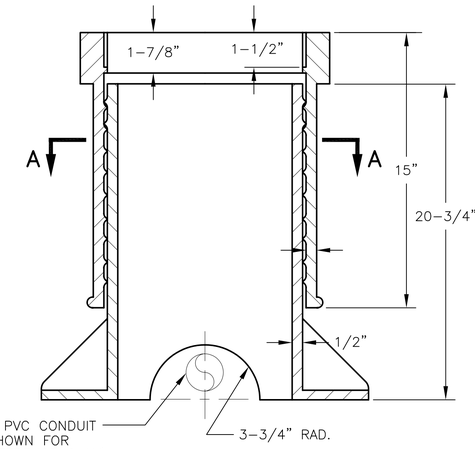
DEEP ANODE WELL GROUNDBED TYPE A
(ANODES A1R1 TO A5R1 AND A1R2 TO A5R2 AND A1R3 TO A5R3)



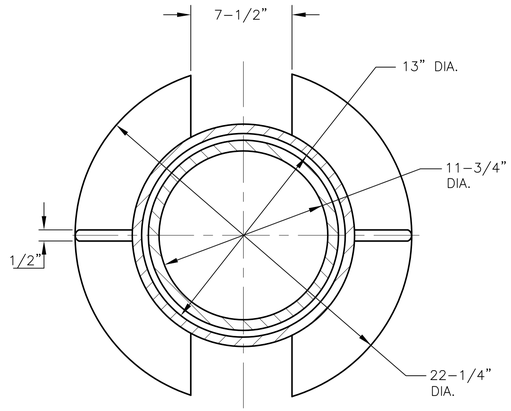
(TYPICAL TOP VIEW)



(PLAN OF FRAME WITHOUT LID)



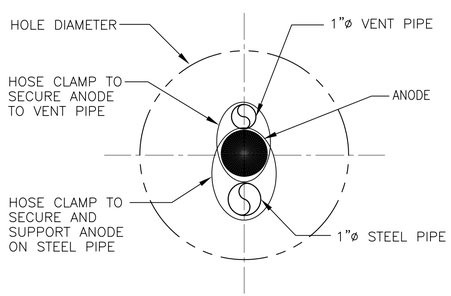
(ELEVATION VIEW)



(SECTION A-A)

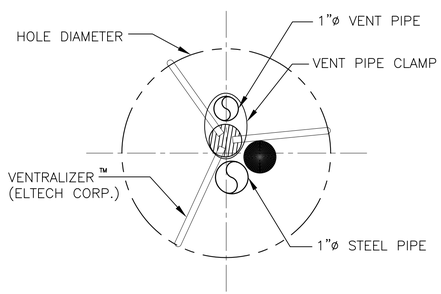
DETAIL N.T.S — 2 CP-03 | CP-04

ANODE MARKER/VENT ENCLOSURE



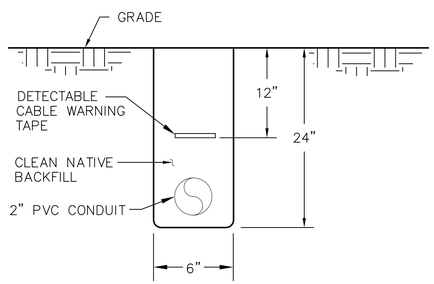
NOTE: ANODE VENTRALIZER NOT SHOWN FOR CLARITY.

SECTION N.T.S — A CP-03



NOTE: HOSE CLAMP TO STEEL PIPE NOT SHOWN FOR CLARITY.

SECTION N.T.S — B CP-03



SECTION N.T.S — C CP-03

HALEY & ALDRICH

HALEY & ALDRICH OF NEW YORK
200 TOWN CENTRE DRIVE, SUITE 2
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1380 ENTERPRISE DRIVE
WEST CHESTER, PENNSYLVANIA 19380
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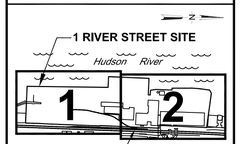

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OU-1 REMEDIATION
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1 RIVER STREET
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BULKHEAD DETAILS

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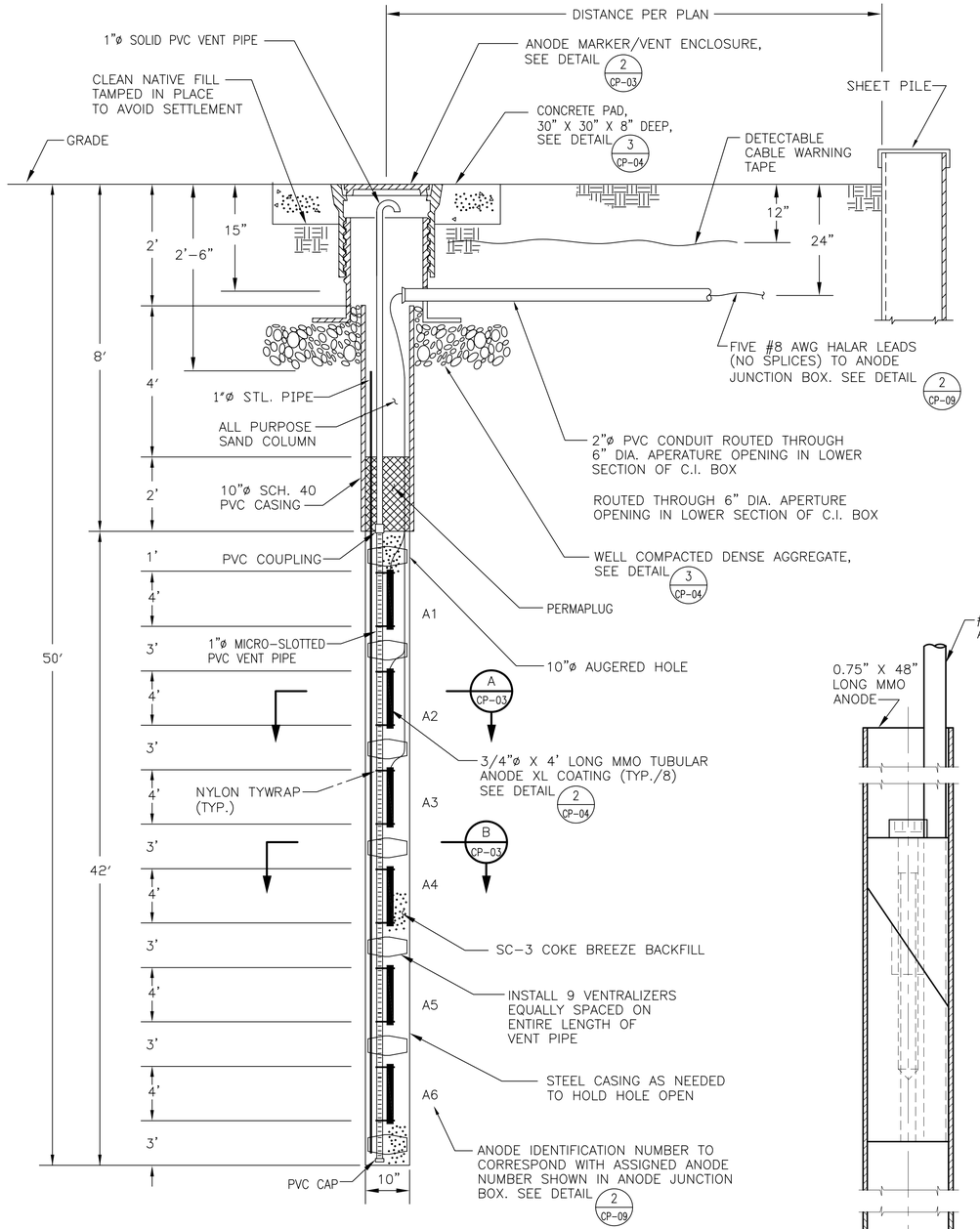
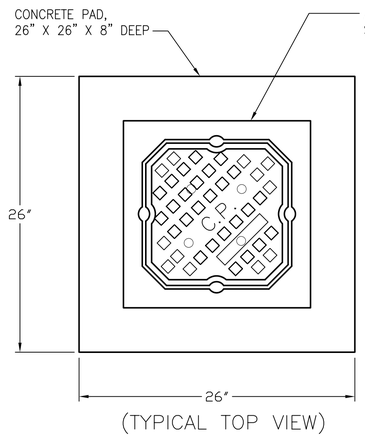
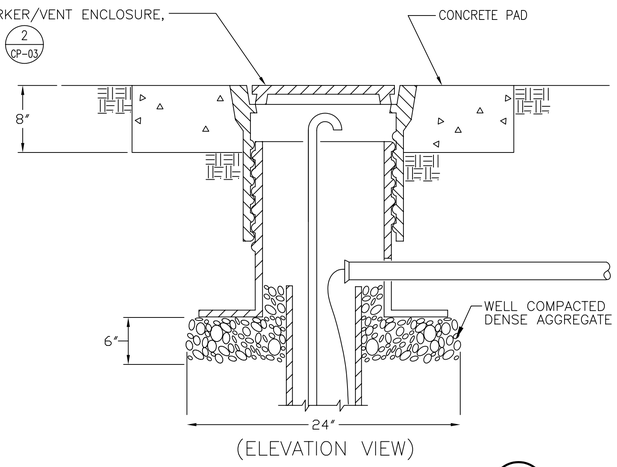
CP - 03



DETAIL N.T.S 1 CP-02

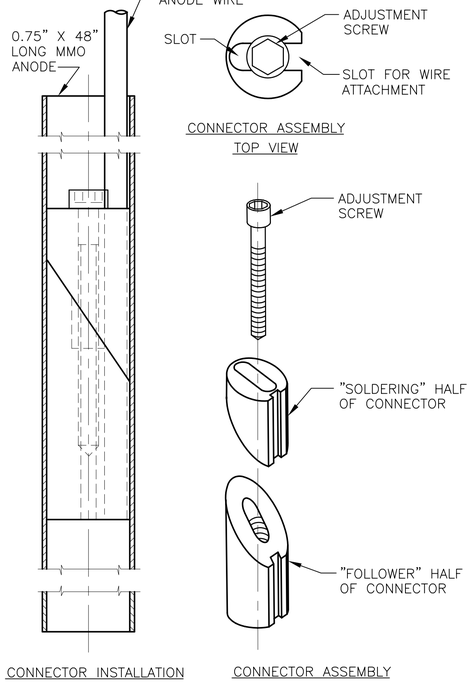
DEEP ANODE WELL GROUNDBED TYPE B
(ANODES A1R4 TO A6R4 AND A1R5 TO A7R5)





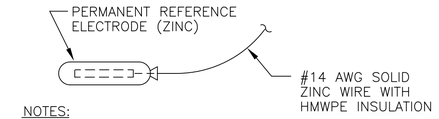
DETAIL N.T.S 3 CP-03 CP-04

ANODE MARKER/VENT ENCLOSURE WITH CONCRETE PAD & STONE BASE



DETAIL N.T.S 2 CP-03 CP-04

TYPICAL MMO TUBULAR ANODE

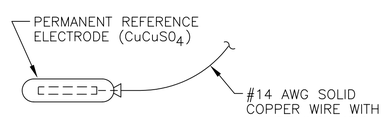


NOTES:

1. REMOVE REFERENCE ELECTRODE FROM PLASTIC BAG PRIOR TO INSTALLATION.
2. BEFORE BACKFILLING, WET REFERENCE ELECTRODE WITH APPROXIMATELY 2 GALLONS OF WATER. RAIN OR GROUND WATER IN DITCH WILL ALSO SUFFICE FOR THIS PURPOSE.
3. ZINC REFERENCE ELECTRODE WIRE TO BE TERMINATED AT TERMINAL NO. 9 OF THE TEST STATION BOARD.

DETAIL N.T.S 4 CP-07

ZINC REFERENCE ELECTRODE

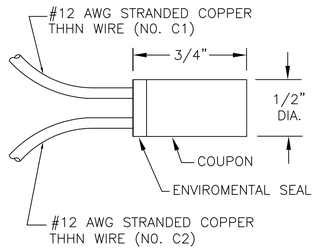


NOTES:

1. REMOVE REFERENCE ELECTRODE FROM PLASTIC BAG PRIOR TO INSTALLATION.
2. BEFORE BACKFILLING, WET REFERENCE ELECTRODE WITH APPROXIMATELY 2 GALLONS OF WATER. RAIN OR GROUND WATER IN DITCH WILL ALSO SUFFICE FOR THIS PURPOSE.
3. CuCuSO4 REFERENCE ELECTRODE WIRE TO BE TERMINATED AT TERMINAL NO. 11 OF THE TEST STATION BOARD.

DETAIL N.T.S 5 CP-07

CuCuSO4 REFERENCE ELECTRODE



NOTES:

COUPON WIRE NO. C1 AND C2 TO BE TERMINATED AT TERMINAL NO. 10 OF THE TEST STATION BOARD.

DETAIL N.T.S 6 CP-07

COUPON

HALEY & ALDRICH

HALEY & ALDRICH OF NEW YORK
200 TOWN CENTRE DRIVE, SUITE 2
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Tel: 585.359.9000
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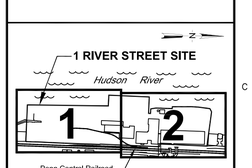

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BULKHEAD DETAILS

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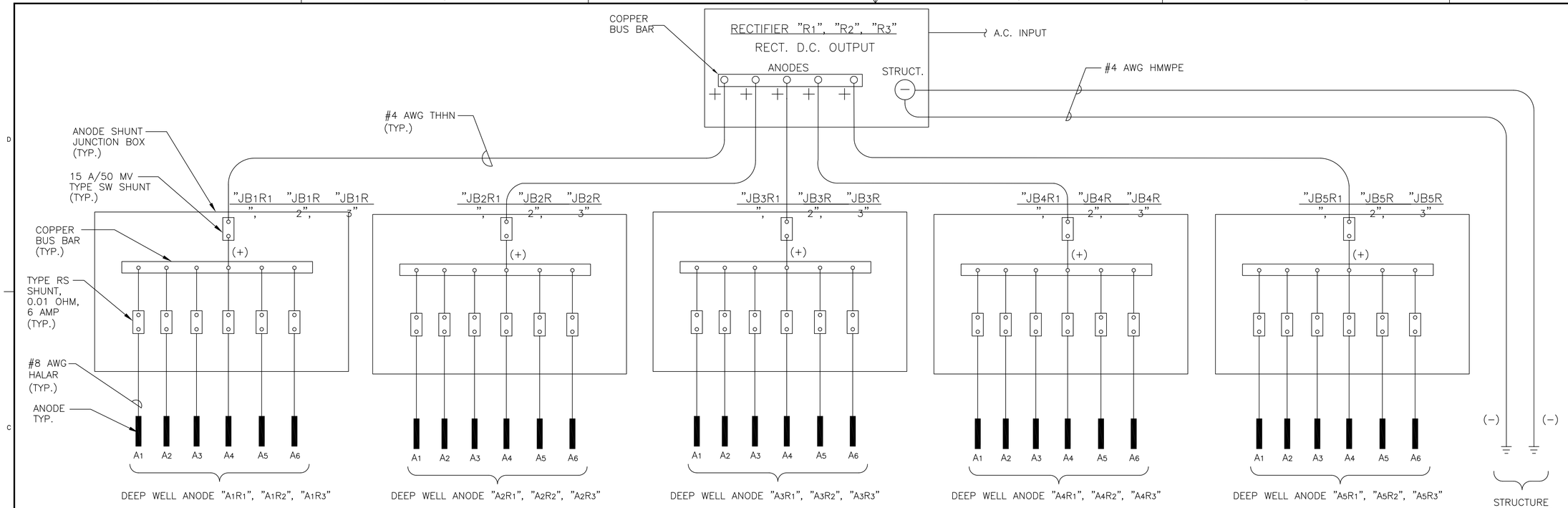
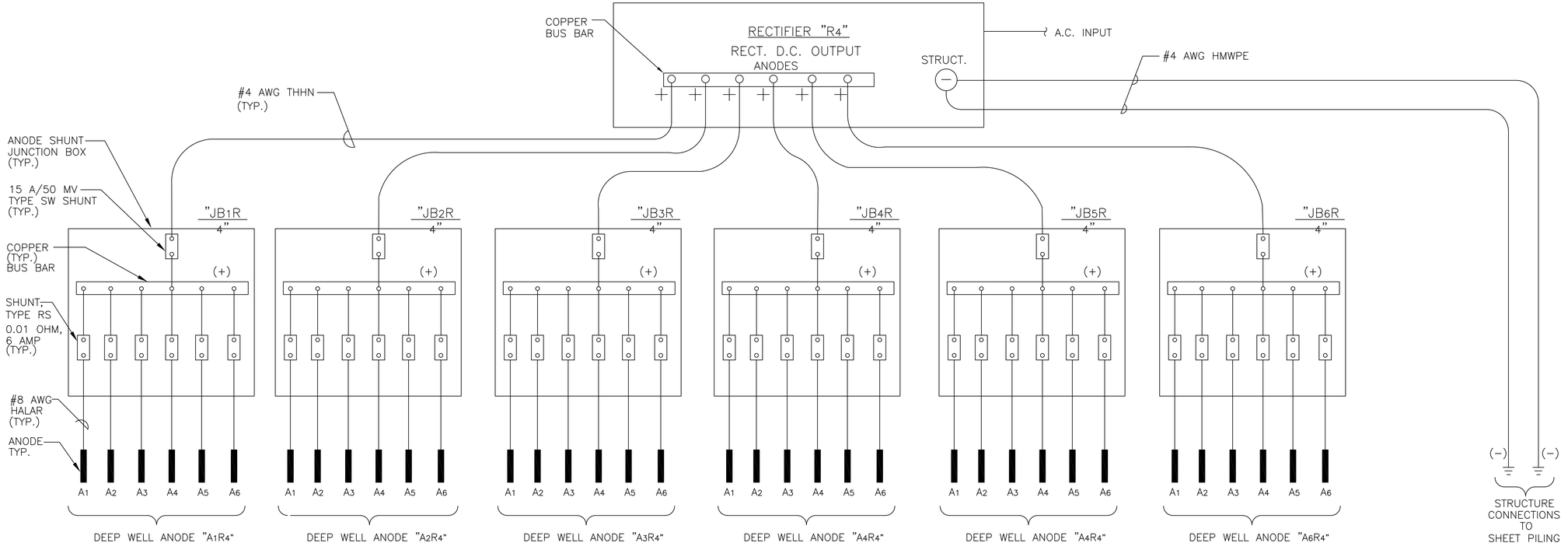
CP - 04



DETAIL N.T.S — 1 / CP-05

RECTIFIER "R1", "R2" & "R3" SYSTEMS – D.C. WIRING SCHEMATIC



DETAIL N.T.S — 2 / CP-05

RECTIFIER "R4" SYSTEM – D.C. WIRING SCHEMATIC

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HALEY & ALDRICH OF NEW YORK
200 TOWN CENTRE DRIVE, SUITE 2
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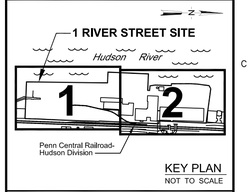

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BULKHEAD DETAILS

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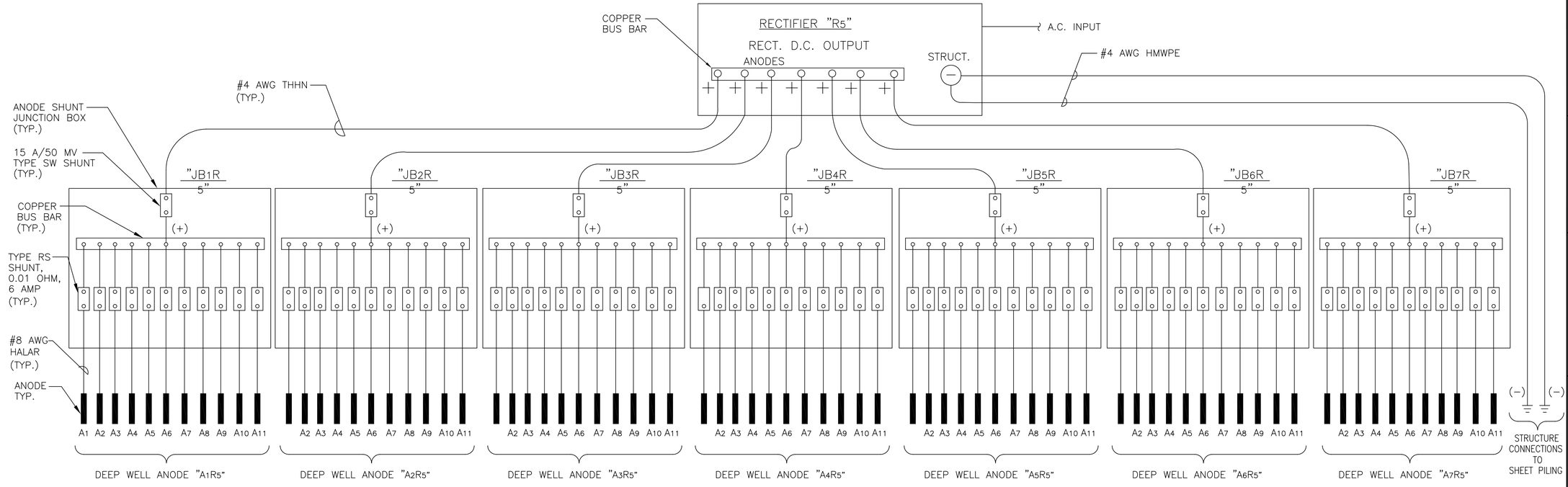
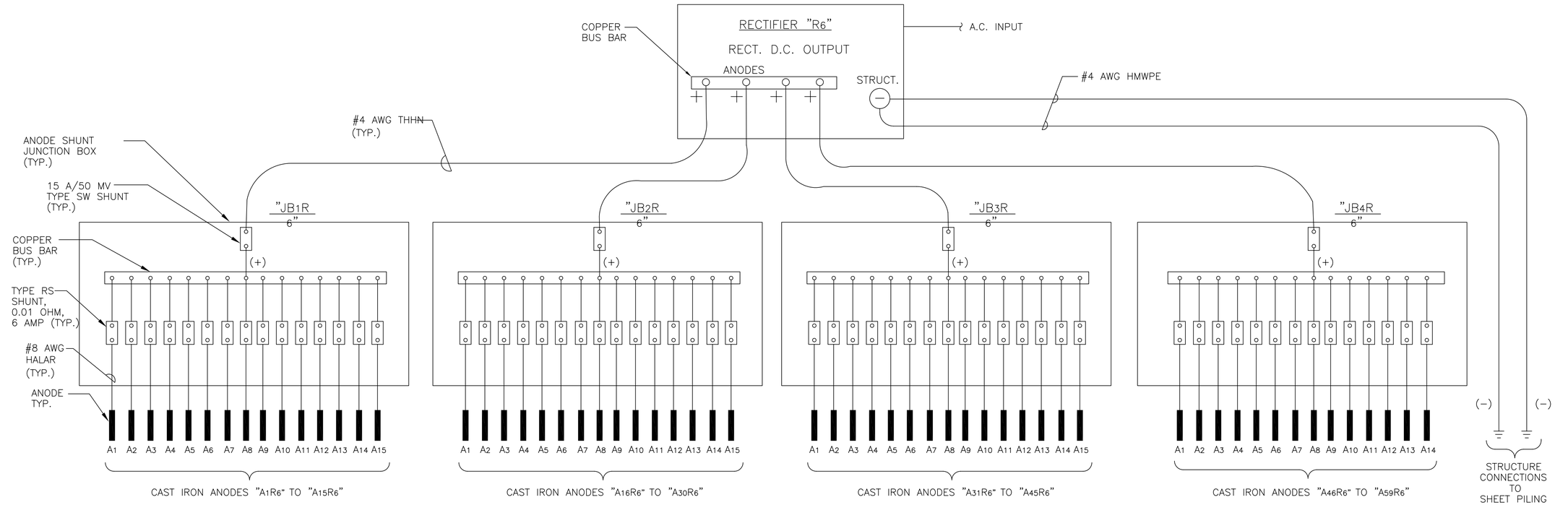
CP - 05



DETAIL N.T.S 1 CP-06

RECTIFIER "R5" SYSTEM – D.C. WIRING SCHEMATIC



DETAIL N.T.S 2 CP-06

RECTIFIER "R6" SYSTEM – D.C. WIRING SCHEMATIC

HALEY & ALDRICH OF NEW YORK
200 TOWN CENTRE DRIVE, SUITE 2
ROCHESTER, NY 14623
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Fax: 585.359.4650
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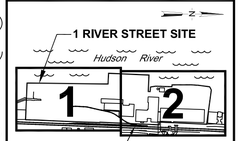

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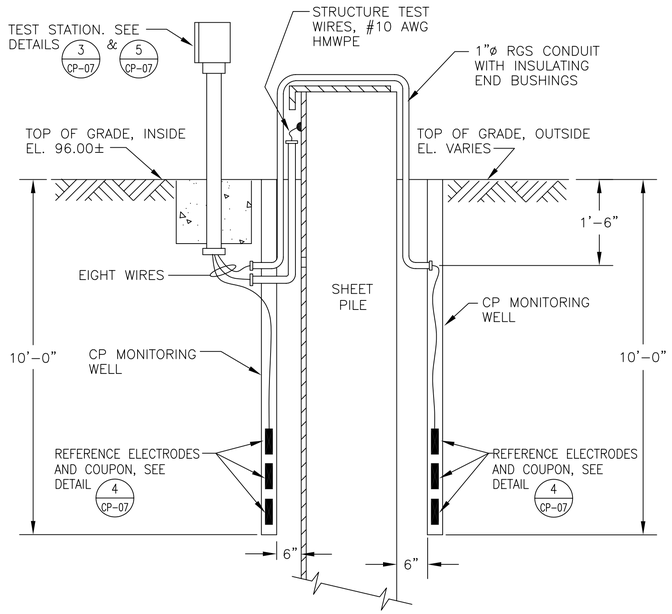
BULKHEAD DETAILS

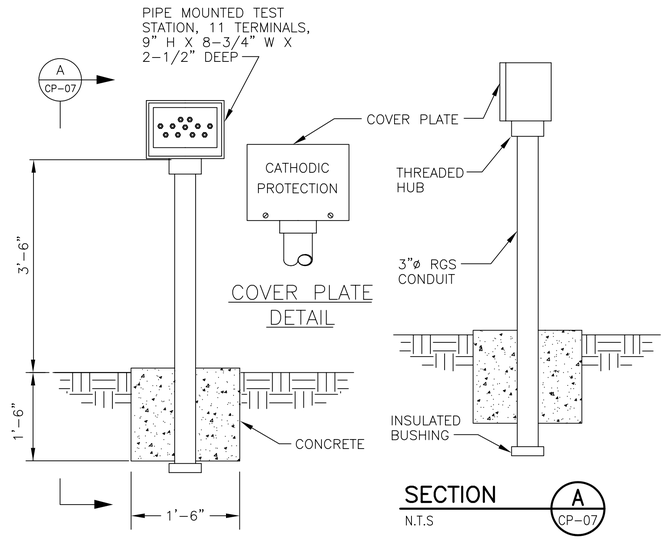
Sheet: 6 Of 10 | Issue:

CP - 06



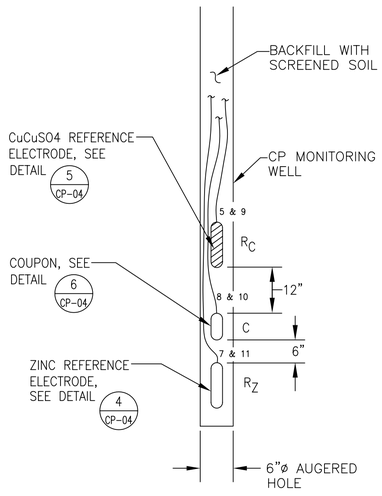
DETAIL N.T.S — 2 CP-07

TEST STATION "TB1 THRU TB6"



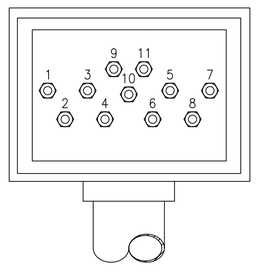
DETAIL N.T.S — 3 CP-07

POST MOUNTED TEST STATION



DETAIL N.T.S — 4 CP-07

TYPICAL CP MONITORING WELL



NOTE: TEST ENCLOSURE TERMINAL BOARD I.D. NUMBERS TO CORRESPOND WITH WIRE I.D. NUMBERS SHOWN IN DETAILS & SECTIONS. WIRES FROM PIPE, ANODES, ELECTRODES, & COUPON NOT SHOWN IN ENCLOSURE FOR CLARITY.

TEST STATION WIRING SCHEDULE	
TERMINAL	TEST WIRE LABEL
1	STRUCTURE 1
2	STRUCTURE 1
3	STRUCTURE 2
4	STRUCTURE 2
5	(R_Z) ZINC REFERENCE ELECTRODE
6	SPARE
7	(C) COUPON
8	(R_C) $CuCuSO_4$ REFERENCE ELECTRODE
9	(R_Z) ZINC REFERENCE ELECTRODE
10	(C) COUPON
11	(R_C) $CuCuSO_4$ REFERENCE ELECTRODE

DETAIL N.T.S — 5 CP-07

TEST STATIONS "TS1" THRU "TS13" TERMINAL BOARD

HALEY & ALDRICH

HALEY & ALDRICH OF NEW YORK
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WEST CHESTER, PENNSYLVANIA 19380
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Fax: 610.344.7092
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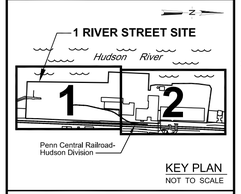

KEY PLAN
NOT TO SCALE

50% DESIGN

Project No.:	401349
Scale:	AS SHOWN
Date:	07/31/06
AutoCAD File:	
Drawn By:	MS
Designed By:	WY
Checked By:	AM
Approved By:	WY
Stamp:	

Rev.	Description	By	Date

OU-1 REMEDIATION
NYSDEC SITE #3-60-022
1 RIVER STREET
HASTINGS-ON-HUDSON, NY

BULKHEAD DETAILS

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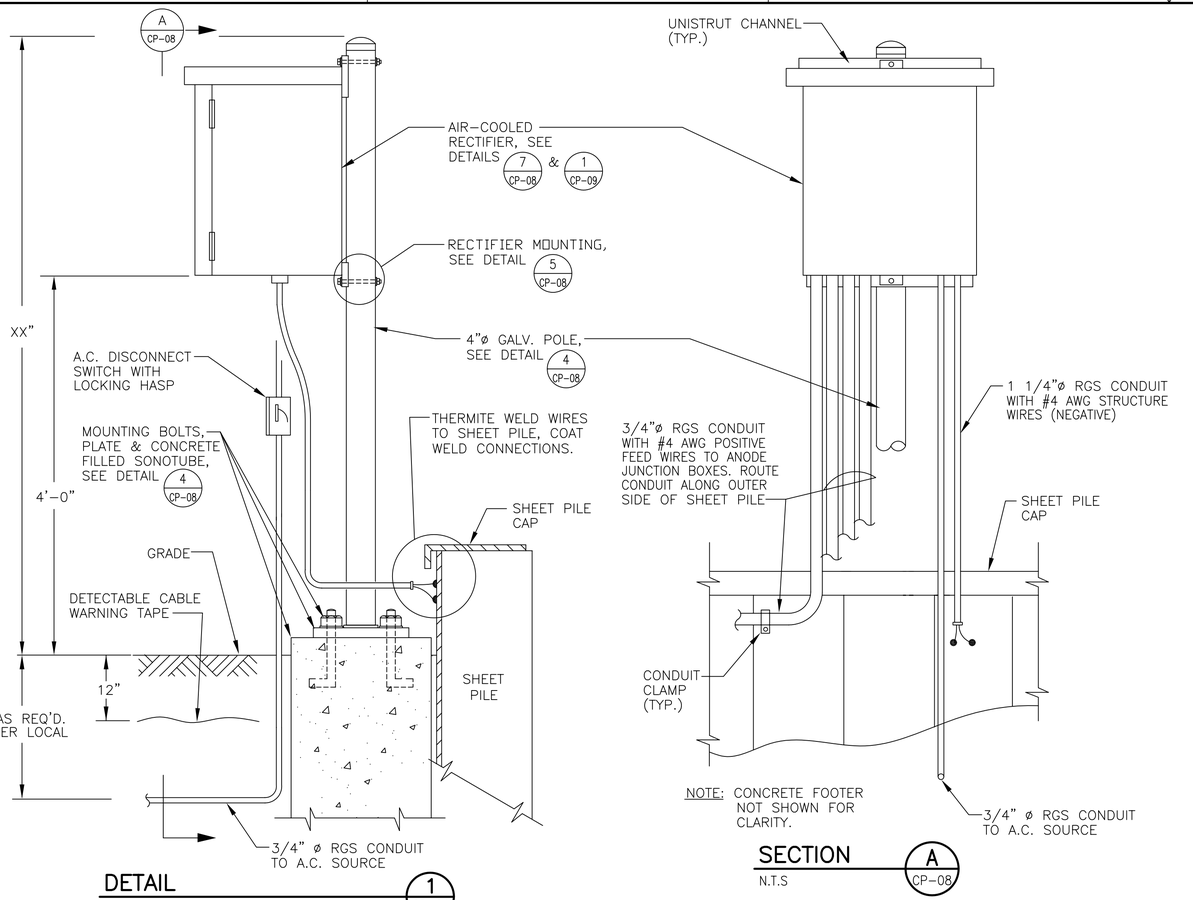
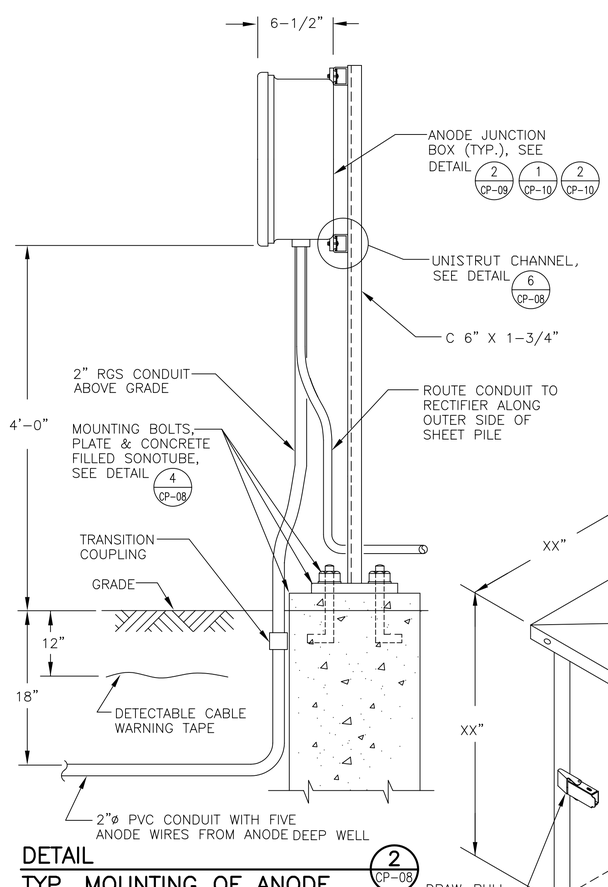
CP - 07

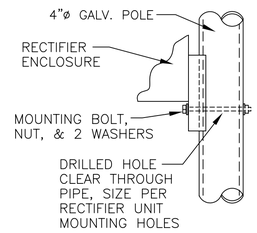


DETAIL
RECTIFIER MOUNTING
1
CP-01

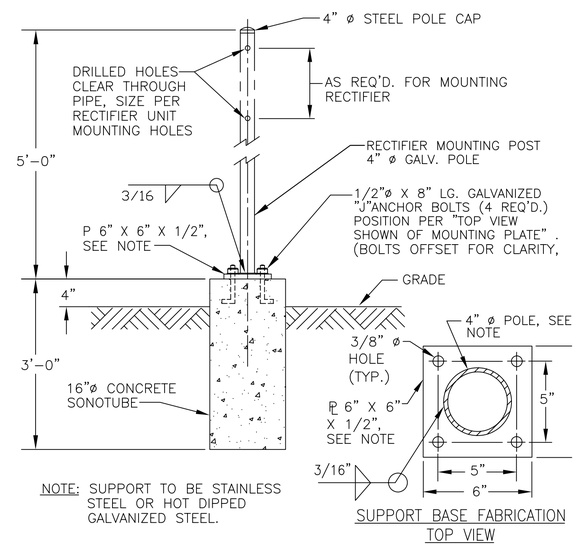
SECTION
N.T.S
A
CP-08



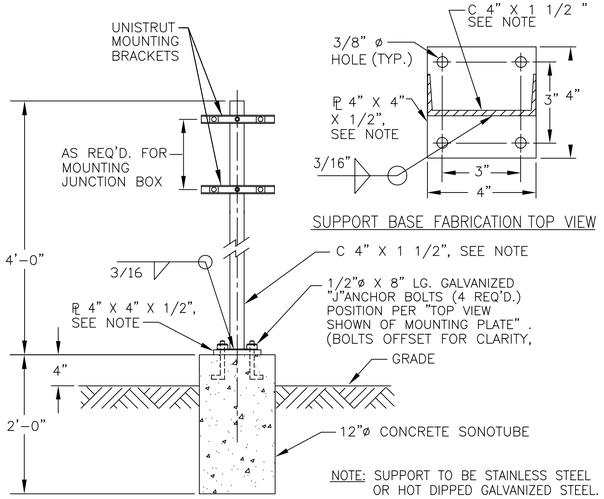
DETAIL
TYP. MOUNTING OF ANODE JUNCTION BOXES
2
CP-08



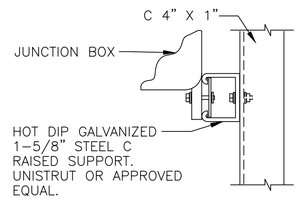
DETAIL
RECTIFIER MOUNTING ON 4"ø POLE
3
CP-08



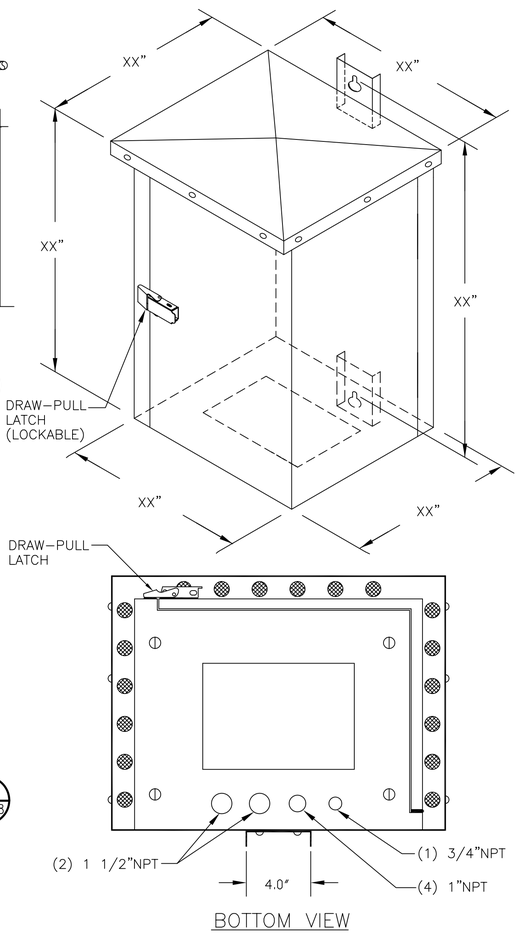
DETAIL
MOUNTING POLE INSTALLATION FOR RECTIFIER
4
CP-08



DETAIL
MOUNTING POLE INSTALLATION FOR ANODE/SHUNT JUNCTION BOX
5
CP-08



DETAIL
UNISTRUT CHANNEL FOR JUNCTION BOX
6
CP-08



BOTTOM VIEW

DETAIL
AIR-COOLED RECTIFIER ENCLOSURE
7
CP-08

HALEY & ALDRICH

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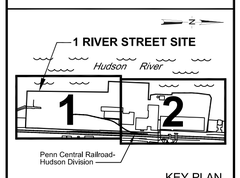

KEY PLAN
NOT TO SCALE

50% DESIGN

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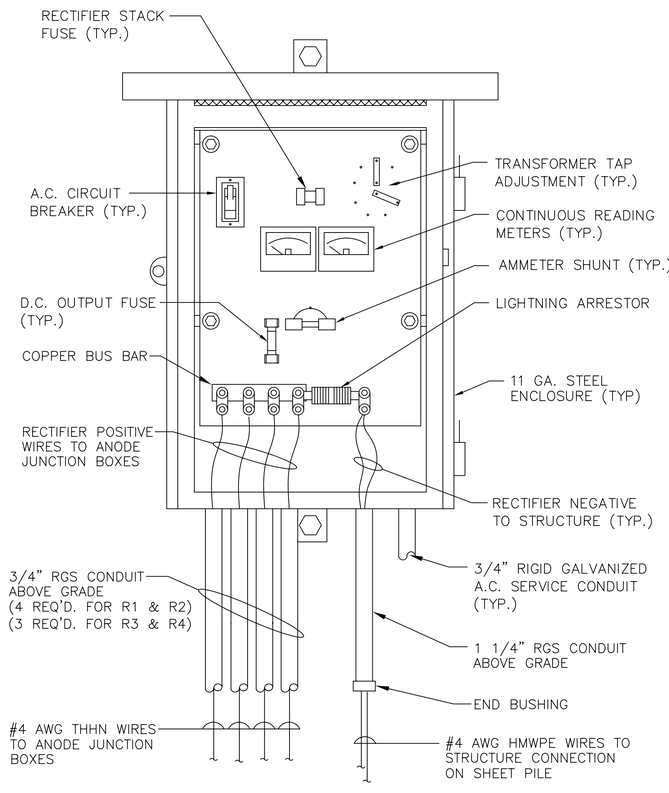
Rev.	Description	By	Date

OU-1 REMEDIATION
NYSDEC SITE #3-60-022
1 RIVER STREET
HASTINGS-ON-HUDSON, NY

BULKHEAD DETAILS

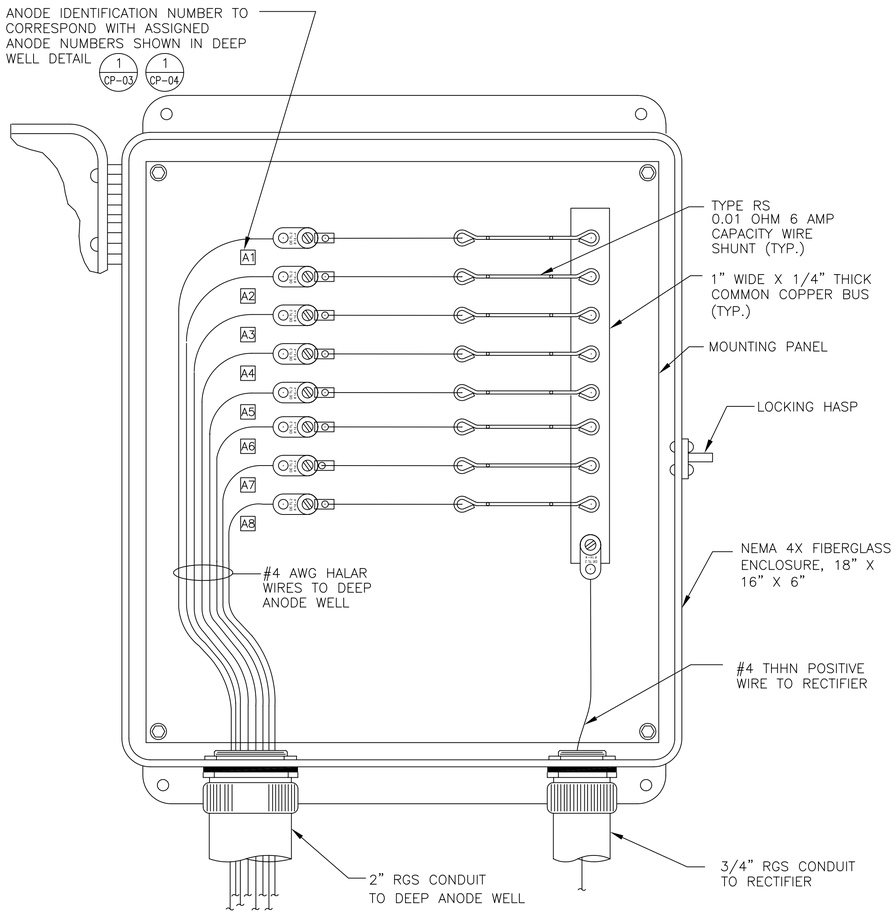
Sheet: 8 Of 10 | Issue:

CP - 08

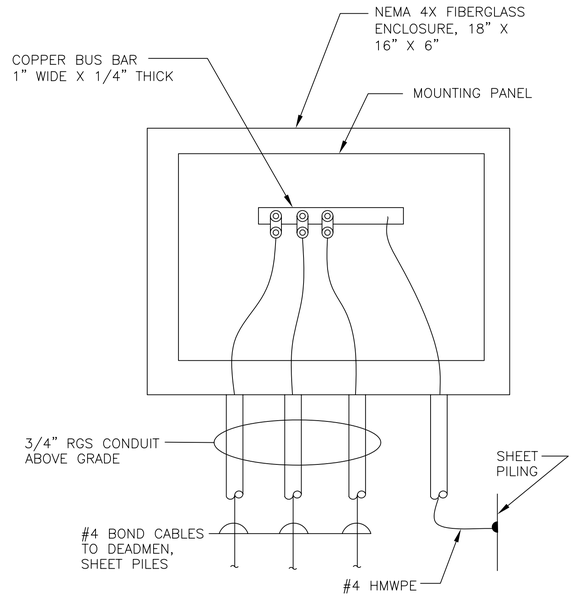


NOTE:
RECTIFIER PANEL SHOWN IS CONCEPTUAL, ACTUAL UNIT ORDERED MAY HAVE DIFFERENT PANEL LAYOUT. RECTIFIER RATING PER SPECIFICATIONS.

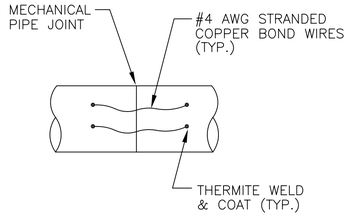
DETAIL N.T.S 1 CP-08
RECTIFIER PANEL



DETAIL N.T.S 2 CP-01, CP-04, CP-05, CP-08
TYPICAL ANODE JUNCTION BOX
JB1R4 TO JB6R4, JB1R5 TO JB7R5



DETAIL N.T.S 3 CP-01
BOND BOX – BBR1, BBR4



DETAIL N.T.S 4 CP-01
TYPICAL PIPE JOINT BOND
FOR ALL MECHANICAL JOINTS

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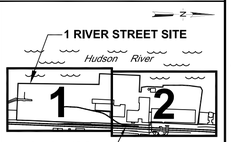

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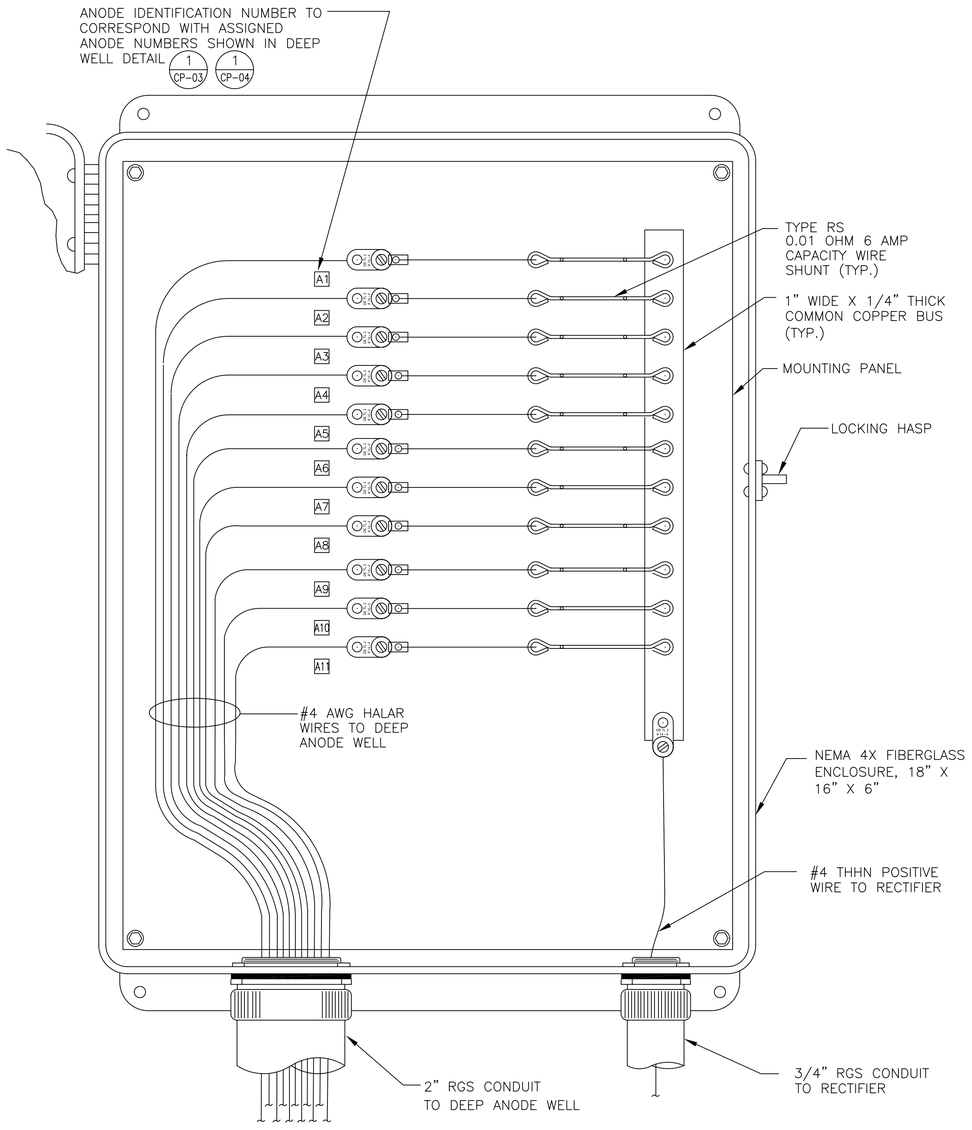
HASTINGS-ON-HUDSON, NY

BULKHEAD DETAILS

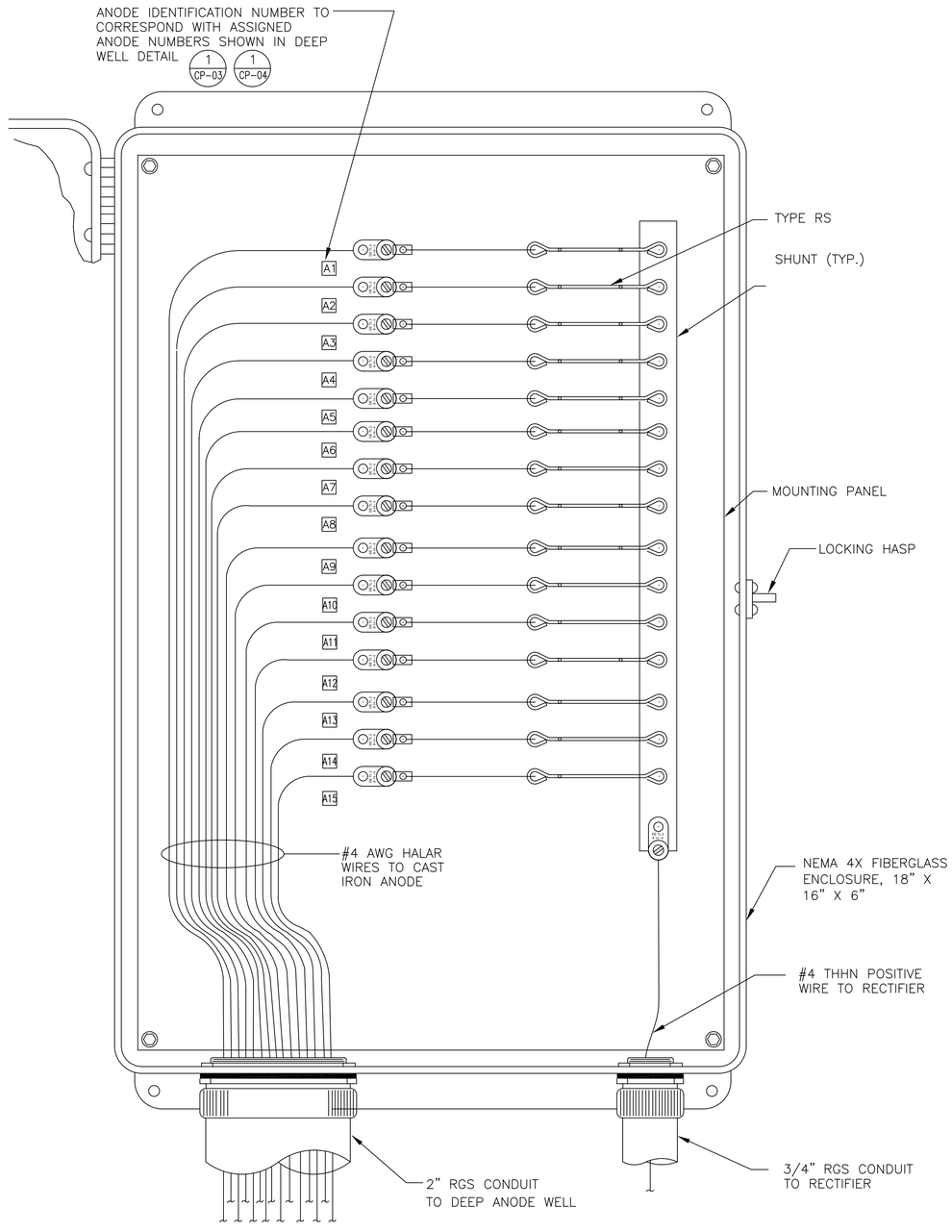
Sheet: 9 Of 10 | Issue:

CP - 09



DETAIL 1
TYPICAL ANODE JUNCTION BOX
JB1R1 TO JB5R1, JB1R2 TO JB5R2
AND JB1R3 TO JB5R3

CP-01, CP-03, CP-05



DETAIL 2
TYPICAL ANODE JUNCTION BOX
JB1R6 TO JB4R6

CP-01 CP-06

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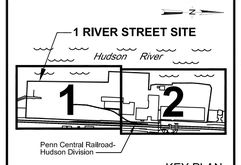

KEY PLAN
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50% DESIGN

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Rev.	Description	By	Date

OU-1 REMEDIATION
NYSDEC SITE #3-60-022
1 RIVER STREET
HASTINGS-ON-HUDSON, NY

BULKHEAD DETAILS

Sheet: 10 Of 10 | Issue:

CP - 10

APPENDIX J

Construction Sampling and Analysis Plan

APPENDIX J
CONSTRUCTION SAMPLING AND ANALYSIS PLAN

J1. INTRODUCTION

This preliminary Construction Sampling and Analysis Plan (CSAP) provides an overview of procedures to be used during the Remedial Action activities at the Site. A detailed description of the Site, the Site history and background, and a description of the Site-related impacts are provided in Appendix D. This CSAP shall be used in conjunction with the SAP provided in the Remedial Design Investigation Work Plan.

The CSAP will be finalized prior to the 100% Design based on the resolution of various permits and discussions with other agencies (e.g. TSCA).

J2. WASTE CHARACTERIZATION

Soil stockpiles generated during the Remedial Action activities will be characterized for proper disposal. Composite soil samples will be collected and analyzed for total PCBs (dry weight basis), Toxicity Characteristic Leaching Procedure (TCLP) metals, TCLP Volatile Organic Compounds (VOCs), and characteristic parameters including ignitability, reactivity, and corrosivity at the laboratory to determine deposition for waste disposal.

All potentially impacted liquid waste generated during excavation will be brought to the on-site, temporary wastewater treatment plant for processing. As such, no pre-treatment sampling and analysis will be required.

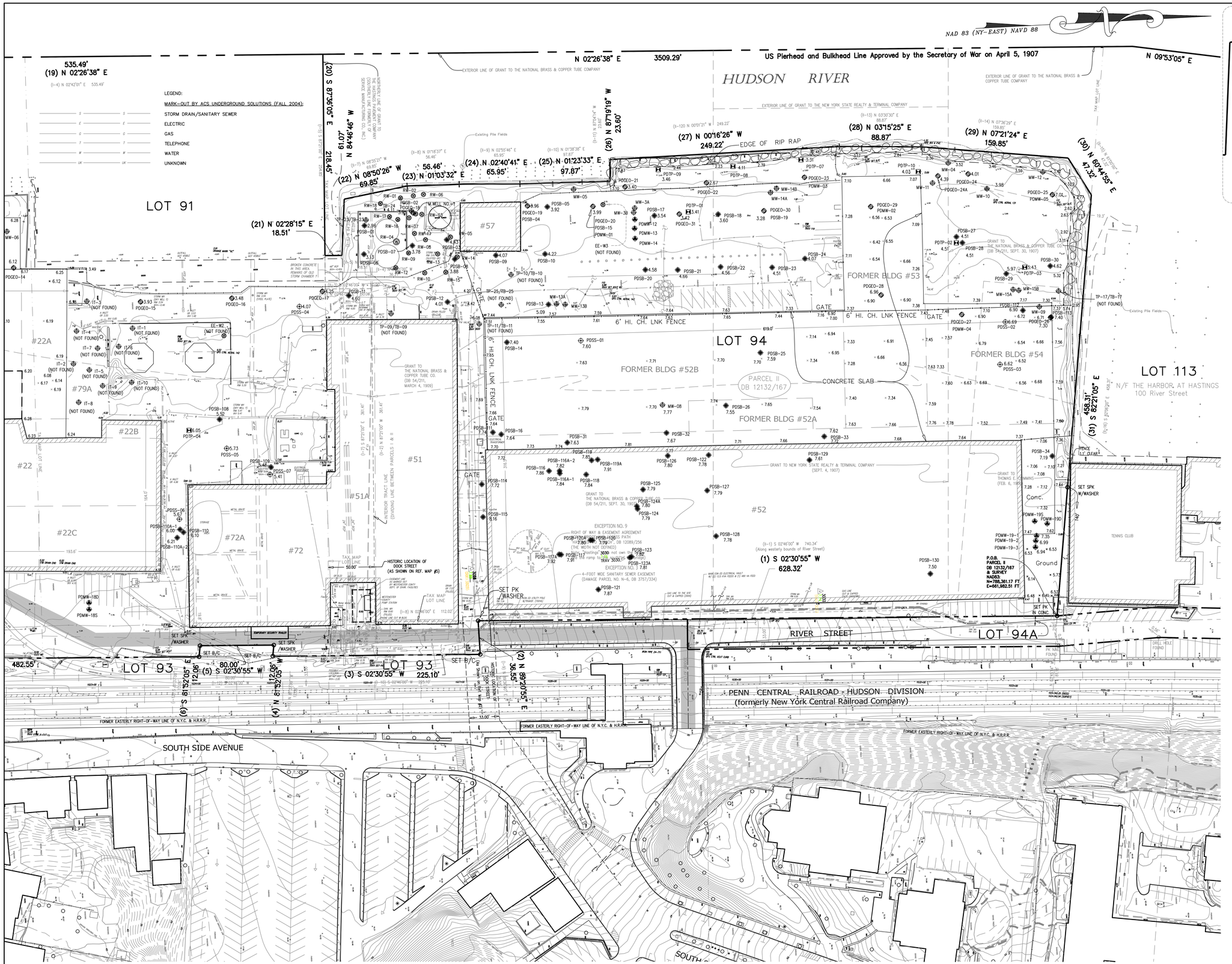
PCB impacted concrete slabs that may be encountered during excavation will require in place characterization, prior to demolition. Sampling frequency, not yet defined, will be based on guidance from an EPA Region II TSCA Coordinator.

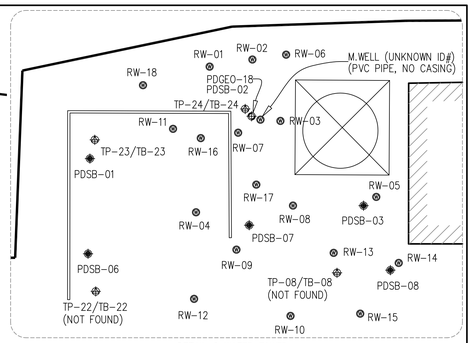
J3. SAMPLING AND ANALYSIS STANDARD OPERATING PROCEDURES

Sampling, analysis, and general field protocols shall be done in accordance with the "Guidelines for Fieldwork" set forth in the SAP presented in the Remedial Design Investigation Work Plan prepared by Parsons in September 2005.

APPENDIX K

Site Survey





DETAIL @ WATER TOWER
1"=20'

MONITORING WELL NO.	ELEVATIONS * TOP OUTER CASING	TOP INNER PIPE	GROUND
MW-03A	3.53	3.22	3.53
MW-03B	3.70	3.55	3.70
MW-04	5.64	5.39	3.90
MW-05	3.39	2.75	3.39
MW-06	7.72	7.49	7.72
MW-08	6.23	6.03	6.23
MW-09	7.12	6.87	7.12
MW-10	6.13	5.86	4.20
MW-11	6.33	6.04	4.60
MW-12	5.82	5.44	3.30
MW-13A	5.29	4.98	5.29
MW-13B	5.39	5.05	5.39
MW-14A	3.37	3.00	3.37
MW-14B	3.30	2.87	3.30
MW-15A	8.51	8.30	6.60
MW-15B	9.23	8.98	6.60
MW-(ID# UNKNOWN)	4.34	4.18	4.05
TP-23 / TB-23	5.46	5.26	3.10

HISTORICAL MONITORING WELL NO.	ELEVATIONS * TOP OUTER CASING	TOP INNER PIPE	GROUND
RW-01	3.80	3.65	3.00
RW-02	3.34	3.07	3.34
RW-03	4.17	3.97	4.17
RW-04	3.82	3.24	3.34
RW-05	4.50	4.05	4.50
RW-06	3.22	3.04	3.22
RW-07	4.05	3.84	4.05
RW-08	4.19	3.80	4.19
RW-09	4.17	3.75	4.00
RW-10	3.78	3.32	3.78
RW-11	3.61	2.95	3.61
RW-12	3.84	3.50	3.84
RW-13	3.57	3.27	3.57
RW-14	4.18	3.89	4.18
RW-15	3.79	3.61	3.79
RW-16	3.65	2.95	3.29
RW-17	4.35	4.05	4.35
RW-18	3.40	3.27	2.79

PRE-DESIGN MONITORING WELL NO.	ELEVATIONS * TOP OUTER CASING	TOP INNER PIPE	GROUND
PDMW-01 (PDGEO-20) (PDSB-15)	4.04	3.83	4.04
PDMW-02 (PDGEO-29)	6.80	6.60	6.80
PDMW-03 (PDGEO-23)	7.69	7.33	3.40
PDMW-04 (PDGEO-27)	7.23	6.94	7.23
PDMW-05 (PDGEO-25)	7.06	7.02	3.80
PDMW-12	3.82	3.17	3.82
PDMW-13	4.01	3.44	4.01
PDMW-14	4.01	3.45	4.01
PDMW-18D	7.87	7.43	7.87
PDMW-18S	7.95	7.64	7.95
PDMW-19D	7.46	7.32	7.46
PDMW-19S	7.39	7.23	7.39

* NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88) / US FOOT

MW HISTORICAL MONITORING WELL
TP/TB GOLDER PIEZOMETER
(MP)MW MALCOLM PERNIE WELL
EE ELDON ENVIRONMENTAL WELL
IT IT CORPORATION WELL
PDMW PRE-DESIGN MONITORING WELL
PDSS PRE-DESIGN SURFACE SOIL SAMPLE
PDSB PRE-DESIGN SOIL BORING
PDGEO PRE-DESIGN GEOTECHNICAL BORING
PDTP TEST PIT
RW HISTORICAL RECOVERY WELL (SEPARATE PHASE LIQUID RECOVERY IRM)

NOTES:

IN SOME CASES THE SAME HOLE WAS USED FOR PDSB BORING, PDGEO BORING AND/OR PDMW. WHERE THIS IS THE CASE MULTIPLE LABELS ARE SHOWN BUT ONLY ONE SYMBOL IS USED, FOR CLARITY PURPOSES.

HISTORICAL WELL LOCATION FOR WELLS NOT FOUND BASED ON DOLPH ROTFELD, FIGURE 4, DATED 1976, PARISH & WEINER, PLATE 2, DATED OCTOBER 1989 AND RETEC, FIGURE 2-8, DATED DECEMBER 1993. THESE LOCATIONS ARE APPROXIMATE ONLY, AS LAND SURVEYING DATA ARE NOT AVAILABLE.

LEGEND:
EXISTING TOPOGRAPHIC FEATURES
INLET
MH MAN HOLE
INACTIVE ACTIVE HYDRANT
WV WATER VALVE
GV GAS VALVE
POLE
SIGN
FENCE
BUILDING
RAILROAD
VEGETATION
GUARD RAIL
SURVEY CONTROL POINT
(1) S 02°30'55" W 628.32' SURVEY COURSE
(Along westerly bounds of River Street) DEED COURSE

GRAPHIC SCALE
40 0 20 40 80 160
(IN FEET)
1 inch = 40 ft.

SURVEY NOTES:

THIS SURVEY REPRESENTS AN UPDATE OF A MAP ENTITLED ENTITLED: "BOUNDARY AND TOPOGRAPHIC SURVEY, SECTION 10, BLOCK 8, LOTS 89, 91, 93 & 94, AR/AERL, VILLAGE OF HASTINGS ON HUDSON, TOWN OF GREENBURGH, WESTCHESTER COUNTY, NEW YORK, SCALE: 1" = 30 FT, DWG #04-209BT, SHEETS 1 THROUGH 4" PREPARED BY THIS OFFICE ON 5/10/2005, AND REVISED 5/23/2005.

SUBSURFACE EXPLORATION POINTS WERE FIELD SURVEYED DURING OCTOBER AND NOVEMBER OF 2005.

LOCATION OF SUBSURFACE EXPLORATIONS

NO.	DATE	DESCRIPTION	SURVEYED BY	DRAWN BY	DESIGNED BY	CHECKED BY
1	5/04/2006	UPDATE SURVEY; ADD ADDTL PDSB'S & PDMW'S				

REVISIONS

BOSWELL ENGINEERING
ENGINEERS – SURVEYORS – PLANNERS – SCIENTISTS
330 PHILLIPS AVENUE • SOUTH HACKENSACK, N.J. 07606
N.J. CERTIFICATE OF AUTHORIZATION No. 24GA27958000

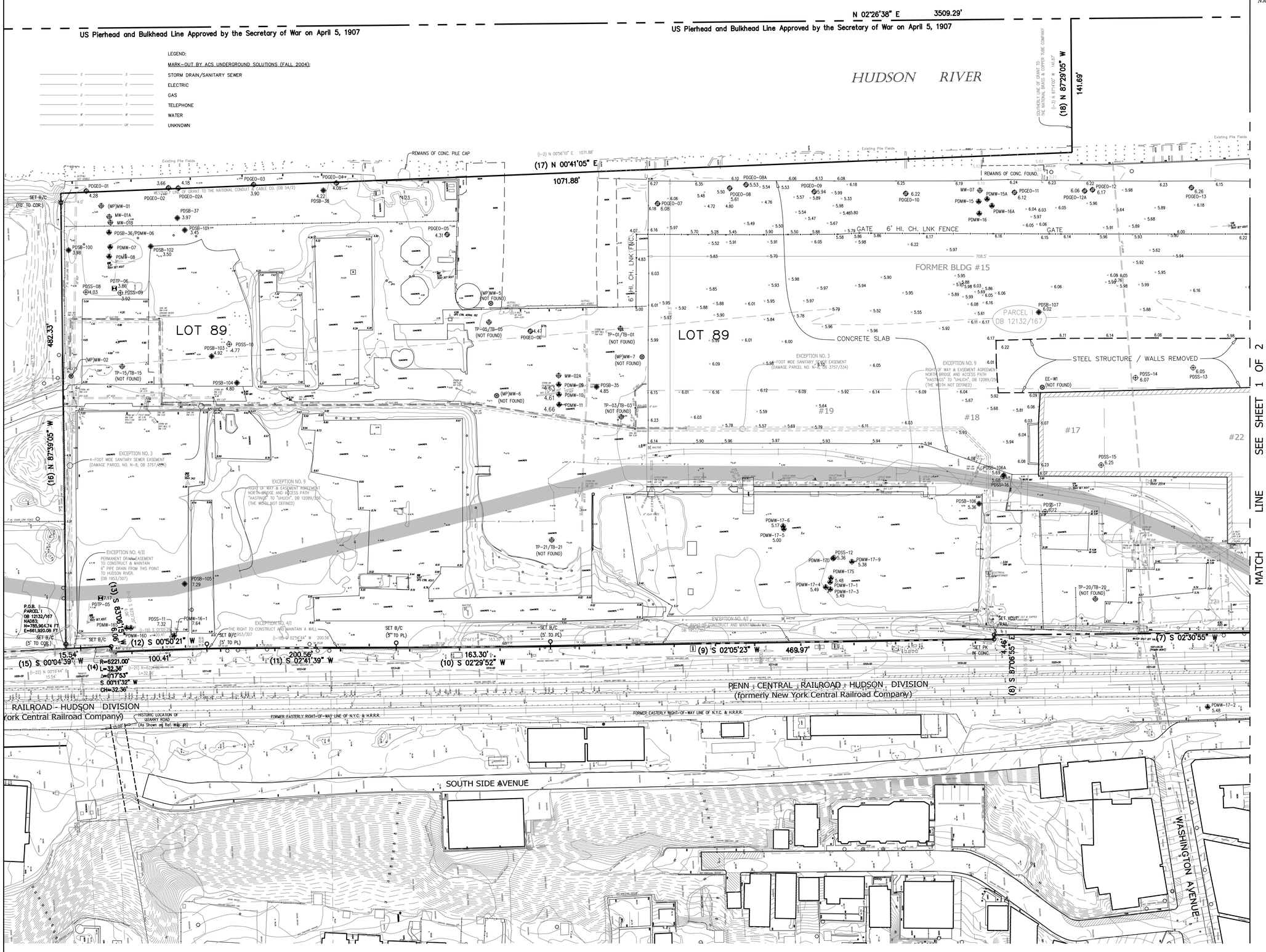
ANDRIJA BATISTIC
PROFESSIONAL LAND SURVEYOR
N.J. LIC. 35822
N.Y. LIC. 50535

AR / AERL
Village of Hastings on Hudson
Town of Greenburgh
Westchester County New York

BOUNDARY AND TOPOGRAPHIC SURVEY
SECTION 10
BLOCK 8
LOTS 89, 91, 93 & 94

SURVEYED BY: AB/JB	CHECKED BY: AB	SCALE: 1"=40'	JOB NO. 04-209	DATE: 1/27/2006
DRAWN BY: AB				

DRAWING NO. 04-209-MW SHEET 1 OF 2



NAD 83 (NY-EAST) NAVD 88

THE FOLLOWING ITEMS WERE NOT FOUND AT THE TIME OF THE FIELD SURVEY: (APPROXIMATE LOCATION SHOWN ON THIS MAP FOR INFORMATIONAL PURPOSES ONLY)

PIEZOMETERS:

TP-01/TB-01, TP-03/TB-03, TP-05/TB-05, TP-08/TB-08, TP-09/TB-09, TP-10/TB-10, TP-11/TB-11, TP-15/TB-15, TP-17/TB-17, TP-20/TB-20, TP-21/TB-21 & TP-22/TB-22.

MALCOLM PERNIE WELLS:

(MP)MW-05 & (MP)MW-06.

ELDON ENVIRONMENTAL WELLS:

EE-W1 & EE-W2.

IT CORPORATION WELLS:

IT-1, IT-2, IT-3, IT-4, IT-5, IT-6, IT-7, IT-8, IT-9 & IT-10.

MONITORING WELL NO.	ELEVATIONS * TOP OUTER CASING	TOP INNER PIPE	GROUND
(MP)MW-01	4.58	4.49	3.96
MW-01A	4.67	3.82	4.16
MW-01B	6.76	6.51	4.34
(MP)MW-02	7.38	6.48	4.52
MW-02A	4.62	4.21	4.74
MW-07	6.22	5.96	6.22

PRE-DESIGN MONITORING WELL NO.	ELEVATIONS * TOP OUTER CASING	TOP INNER PIPE	GROUND
PDMW-06 (PDSB-36)	6.34	6.22	3.79
PDMW-07	6.81	6.56	2.96
PDMW-08	6.92	6.68	3.31
PDMW-09	4.65	4.42	4.69
PDMW-10	4.62	3.99	4.62
PDMW-11	4.68	4.15	4.68
PDMW-15	5.32	5.04	5.27
PDMW-15A	6.11	5.79	6.11

* NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88) / US FOOT

- MW — HISTORICAL MONITORING WELL
- TP/TB — PIEZOMETER
- (MP)MW — MALCOLM PERNIE WELL
- EE — ELDON ENVIRONMENTAL WELL
- IT — IT CORPORATION WELL
- PDMW — PRE-DESIGN MONITORING WELL
- PDSS — PRE-DESIGN SURFACE SOIL SAMPLE
- PDSB — PRE-DESIGN SOIL BORING
- PDGEO — PRE-DESIGN GEOTECHNICAL BORING
- PDTP — TEST PIT
- RW — HISTORICAL RECOVERY WELL (SEPARATE PHASE LIQUID RECOVERY IRM)

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LEGEND:

EXISTING TOPOGRAPHIC FEATURES

- INLET
- MH — MAN HOLE
- INACTIVE / ACTIVE — HYDRANT
- WV — WATER VALVE
- GV — GAS VALVE
- POLE
- SIGN
- FENCE
- BUILDING
- RAILROAD
- VEGETATION
- GUARD RAIL
- SURVEY CONTROL POINT
- (1) S 02°30'55" W 628.32' — SURVEY COURSE
- (I-1) S 02°41'00" W 740.34' (Along westerly bounds of River Street) — DEED COURSE

SURVEY NOTES:

THIS SURVEY REPRESENTS AN UPDATE OF A MAP ENTITLED ENTITLED: "BOUNDARY AND TOPOGRAPHIC SURVEY, SECTION 10, BLOCK 8, LOTS 89, 91, 93 & 94, AR/AERL, VILLAGE OF HASTINGS ON HUDSON, TOWN OF GREENBURGH, WESTCHESTER COUNTY, NEW YORK, SCALE: 1" = 30 FT, DWG #04-209BT, SHEETS 1 THROUGH 4" PREPARED BY THIS OFFICE ON 5/10/2005, AND REVISED 5/23/2005.

SUBSURFACE EXPLORATION POINTS WERE FIELD SURVEYED DURING OCTOBER AND NOVEMBER OF 2005.

LOCATION OF SUBSURFACE EXPLORATIONS

GRAPHIC SCALE

40 0 20 40 80 160

(IN FEET)
1 inch = 40 ft.

NO.	DATE	DESCRIPTION	SURVEYED BY	DRAWN BY	DESIGNED BY	CHECKED BY
1	5/04/2006	UPDATE SURVEY; ADD ADDTL PDSB'S & PDMW'S				

REVISIONS

BOSWELL ENGINEERING
ENGINEERS – SURVEYORS – PLANNERS – SCIENTISTS
330 PHILLIPS AVENUE • SOUTH HACKENSACK, N.J. 07606
N.J. CERTIFICATE OF AUTHORIZATION No. 24GA27958000

ANDRIJA BATISTIC
PROFESSIONAL LAND SURVEYOR
N.J. LIC. 35822
N.Y. LIC. 50535

AR / AERL
Village of Hastings on Hudson
Town of Greenburgh
Westchester County New York

BOUNDARY AND TOPOGRAPHIC SURVEY
SECTION 10
BLOCK 8
LOTS 89, 91, 93 & 94

SURVEYED BY: AB/JB	SCALE: 1"=40'	JOB NO. 04-209	DATE: 1/27/2006
DRAWN BY: AB	CHECKED BY: AB		
DRAWING NO. 04-209-MW		SHEET 2 OF 2	