BORING LOG NO. 09-B88

CLIENT:	USACE, Galveston District Galveston, Texas	PROJECT:	TO-0012 Pipeline Dredging, Cedar Bayou & Anahuac Channel, Volume I
BORING LOCATION:	N: 13827189 E: 3261450	SITE:	Cedar Bayou PA6 Baytown, Texas

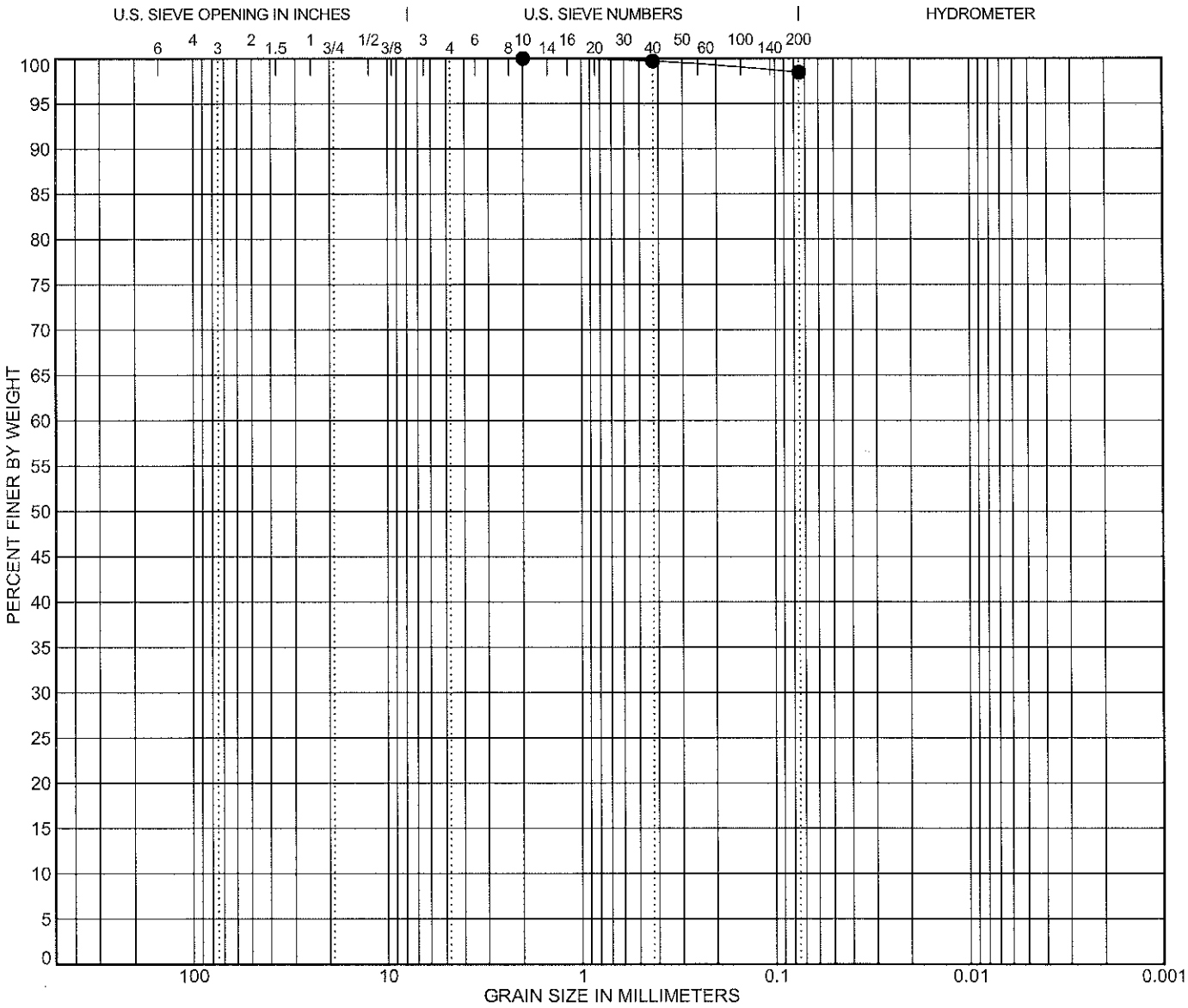
Approx. Surface Elevation: 11.6 feet

Graphic Log	DESCRIPTION	DEPTH, FEET	USCS SYMBOL	TYPE	RECOVERY, IN	SPT, BLOWS/FT	CALIBRATED HAND PENETROM., TSF	TORVANE, TSF	MOISTURE CONTENT, %	DRY DENSITY, PCF	LIQUID LIMIT, %	PLASTIC LIMIT, %	PLASTICITY INDEX	MINUS #200 SIEVE, %	COMPRESSIVE STRENGTH, TSF	FAILURE STRAIN, %	CONFINING PRESSURE, PSI
	FILL: FAT CLAY gray, dark gray and light brown, very soft, very high plasticity, wet (9.6 – 2.0)	1	CH	ST	8		0.25	0.25	48								
	FAT CLAY dark gray and light brown, very soft to stiff, high to very high plasticity, wet	3	CH	ST	18		0.25	0.2	78	53	114	27	87	98			
		5		ST	12		0.25	0.25	72								
		7		ST	14		0.25	0.35	49								
		9		ST	13		0.25	0.1	43								
		11		ST	15		0.25	0.1	86	52	83	27	56	100			
	- with sand seams below 12 feet	13		ST	13		1.25		37								
	- with calcareous nodules below 14 feet	15		ST	12		2.0		19								
		17		ST	11		2.0		20	108	54	17	37	96			
	-8.4	19		ST	13		1.5		23								
	Boring terminated at 20 feet.	20															

STRATIFICATION LINES REPRESENT APPROXIMATE BOUNDARIES BETWEEN SOIL TYPES. IN SITU, THE TRANSITION BETWEEN STRATA MAY BE MORE GRADUAL.

REMARKS: Wet rotary from ground surface due to the presence of surface water ponded.

WATER LEVEL OBSERVATIONS				
▽	▼	Terracon	DATE DRILLED 3/18/2010	Page 1 of 1
▼	▼		PROJECT NUMBER 92105186-A	09-B88
				EXHIBIT A-



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification		Classification	LL	PL	PI	Cc	Cu
● **09-B88**	**2.0**	**FAT CLAY(CH)**	**114**	**27**	**87**		

Percent Passing the Indicated Sieve

Specimen Identification		3/8"	#4	#10	#40	#100	#200
● **09-B88**	**2.0**			**100**	**99.7**		**98.4**

Specimen Identification		D100	D50	D30	D10	%Gravel	%Sand	%Silt	%Clay
● **09-B88**	**2.0**	**2**				**0.0**	**1.6**	**98.4**	

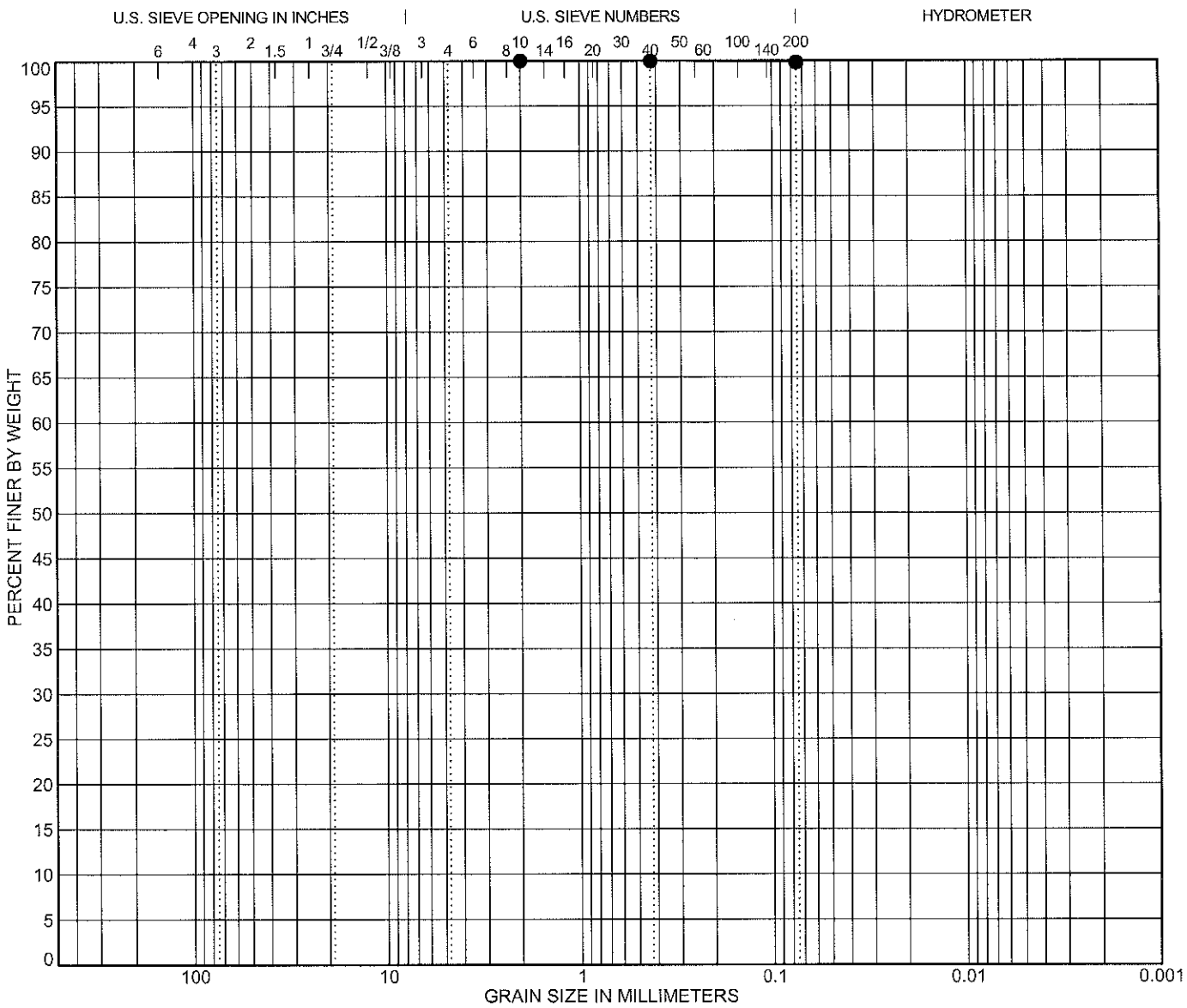
GRAIN SIZE DISTRIBUTION

TO-0012 Pipeline Dredging, Cedar Bayou & Anahuac Channel, Volume I
Baytown, Texas
Project Number 92105186-A

Terracon

Terracon Consultants, Inc.
11555 Clay Road, Suite 100
Houston, Texas 77043
Telephone: 713-690-8989
Fax: 713-690-8787

EXHIBIT



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification		Classification	LL	PL	PI	Cc	Cu
● **09-B88**	**10.0**	**FAT CLAY(CH)**	**83**	**27**	**56**		

Percent Passing the Indicated Sieve

Specimen Identification		3/8"	#4	#10	#40	#100	#200
● **09-B88**	**10.0**			**100**	**100**		**99.8**

Specimen Identification		D100	D50	D30	D10	%Gravel	%Sand	%Silt	%Clay
● **09-B88**	**10.0**	**2**				**0.0**	**0.2**	**99.8**	

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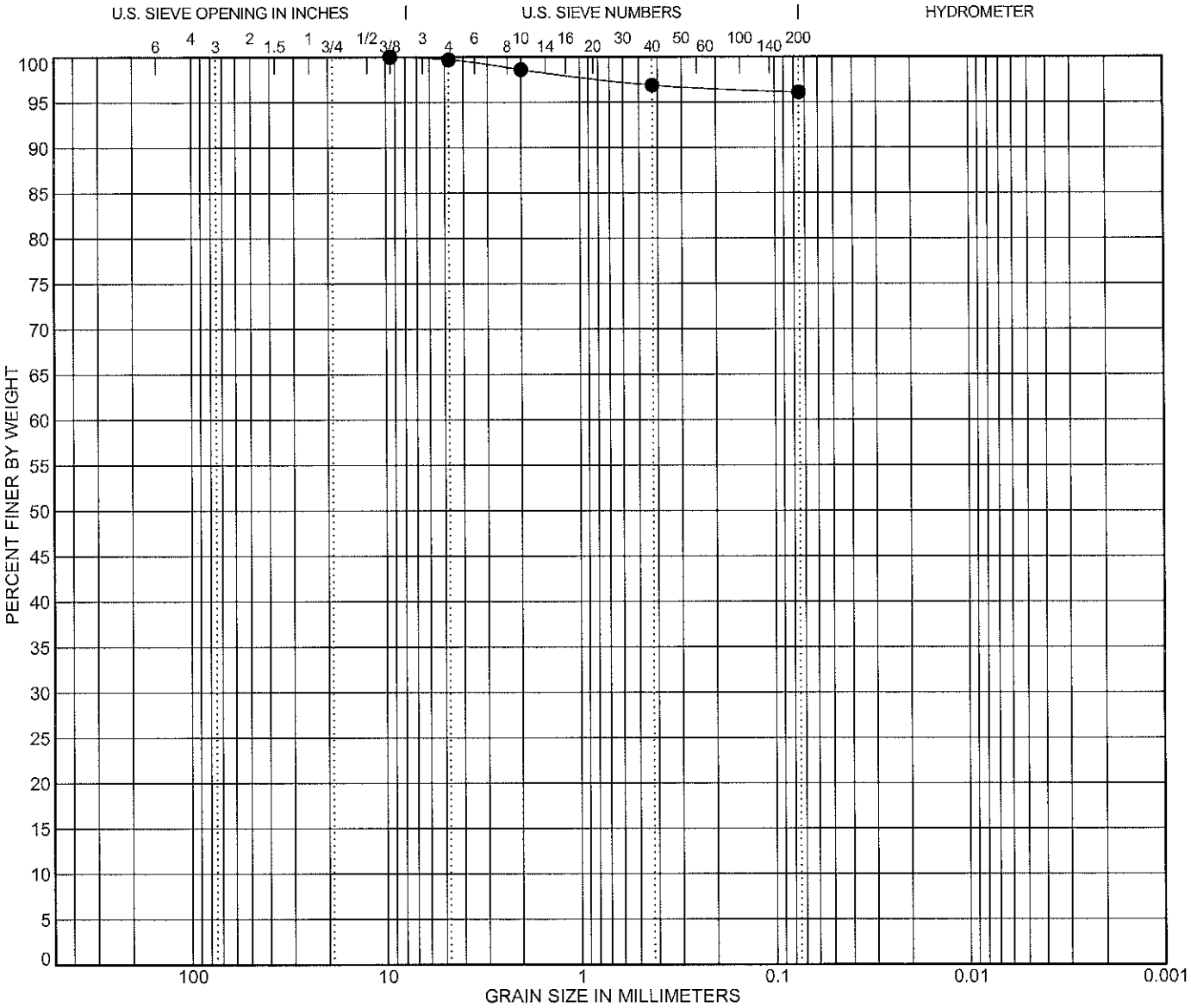

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification		Classification	LL	PL	PI	Cc	Cu
● 09-B88	16.0	**FAT CLAY(CH)**	**54**	**17**	**37**		

Percent Passing the Indicated Sieve

Specimen Identification		3/8"	#4	#10	#40	#100	#200
● 09-B88	16.0	**100**	**99.7**	**98.6**	**96.9**		**96.1**

Specimen Identification		D100	D50	D30	D10	%Gravel	%Sand	%Silt	%Clay
● 09-B88	16.0	**9.5**				**0.3**	**3.6**	**96.1**	

GRAIN SIZE DISTRIBUTION

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Baytown, Texas
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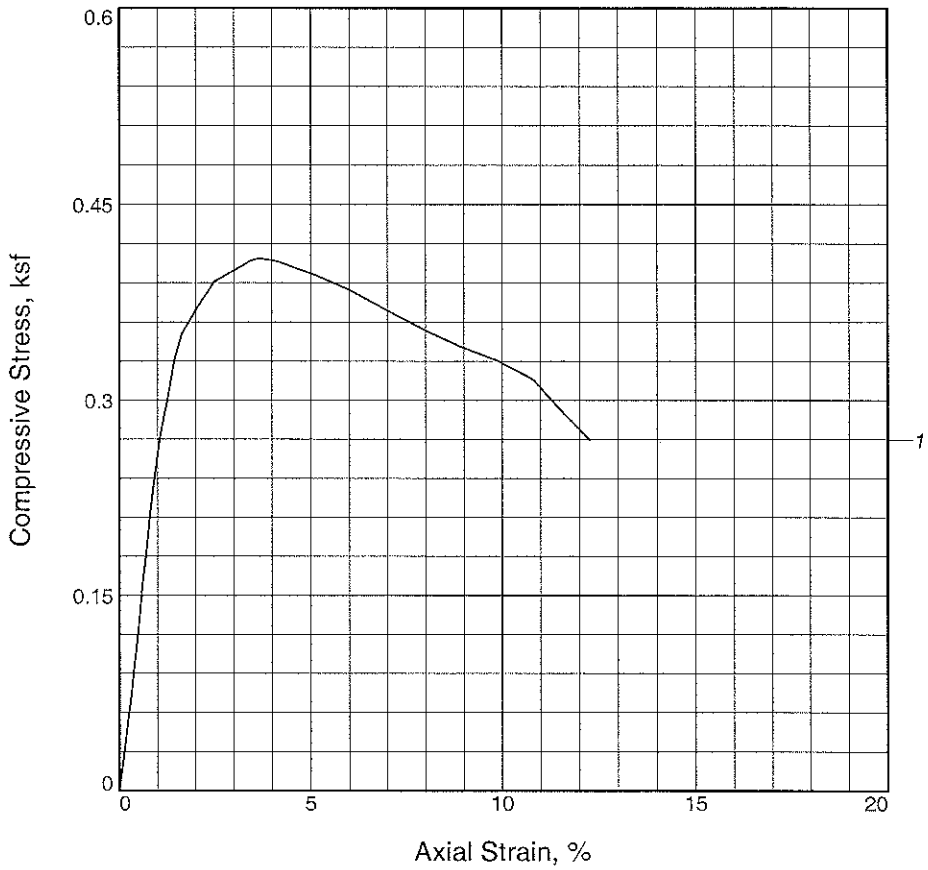
EXHIBIT
1

UNCONFINED COMPRESSION TEST



Sample No.	1			
Unconfined strength, ksf	0.409			
Undrained shear strength, ksf	0.204			
Failure strain, %	3.7			
Strain rate, in./min.	0.055			
Water content, %	85.5			
Wet density, pcf	95.9			
Dry density, pcf	51.7			
Saturation, %	101.4			
Void ratio	2.3191			
Specimen diameter, in.	2.805			
Specimen height, in.	5.719			
Height/diameter ratio	2.04			

Description: Dark gray Clay

LL =	**PL =**	**PI =**	**Assumed GS=** 2.75	**Type:** Undisturbed

Project No.: 92105186-B

Date Sampled:

Remarks:
ASTM D2166

Client: USACE

Project: Pipeline Dredging, Cedar Bayou and Anahuac Channel, PA 16. Contract no. W912HY-09-D-0021, Task Order No. 0012

Location: 09-B88

Sample Number: 6 **Depth:** 10-12 ft.

UNCONFINED COMPRESSION TEST
Terracon, Inc.
Houston, TX

Project name: TO-0012 Pipeline Dredging, Volume I, Cedar Bayou PA 6 | Client: USACE, Galveston District | Terracon Project # : 92105186-A

Boring	Depth	Field tests			Atterberg Limits			Grain Size Analysis														USCS Symbol (ASTM 2487)	Wc	γd	Strength tests																				
								Percent Pasing Sieve																	Direct Shear Test					Unconfined Compression				UU Triaxial Test				CU Triaxial Test						
		PP	TV	SPTn	LL	PL	PI	3/4"	3/8"	4	8	10	16	20	30	40	50	70	100	140	200				C	φ	Wc	γd	Symbol	C	Wc	γd	Symbol	C	Wc	γd	Symbol	C	φ	c'	φ'	Wc	γd	Symbol
	ft	tsf	tsf	bl/ft	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%	%		%	pcf	ksf	°	%	pcf		ksf	%	pcf		ksf	%	pcf		ksf	°	ksf	°	%	pcf	
09-B86	0-2	1.75																				CH**	22																						
	2-4	0.50			66	23	43		100	98		96				95					86	CH	23							1.3	23	98	CH**											
	4-6	1.25																				CH**	29																						
	6-8	1.00																				CH**	31																						
	8-10	0.50																				CH**	37																						
	10-12	0.25	0.20		59	20	39		100	97		95				93					86	CH	38											0.5	38	86	CH**							
	12-14	0.00	0.15																			CH**	70																						
	14-16	2.00			58	20	38		100	98		95				92					87	CH	17							3.5	17	112	CL**											
	16-18	1.50																				CL**	20																						
	18-20	1.75										100		100	100	100	100	100	100	99	88	CL*	25																						
	20-22	1.00																				CL**	24																						
	22-24	2.75																				CH**	28																						
	24-26	2.50			93	28	65									100					100	CH	30							2.5	30	92	CH**											
	26-28	2.50																				CH**	32																						
	28-30	2.50																				CH**	33																						
	30-32	3.00																				CH**	35																						
	32-34	1.75																				CH**	35																						
	34-36	2.50																				CH**	38																						
	36-38	2.50			88	28	60									100					100	CH	36	86																				
	38-40	2.00																				CH**	35																						
	40-42	2.25																				CH**	39																						
	42-44	1.50																				CH**	40																						
	44-46	2.25			101	32	69															CH*	41	81																				
	46-48	0.75																				CH**	28																						
	48-50	1.00																				CL**	20																						
	50-52	1.75																				CH**	24																						
	52-54	1.75																				CH**	27																						
	54-56	1.00			42	19	23					100				100					99	CL	29							1.6	29	96	CL**											
	56-58	1.50																				CH**	31																						
	58-60	1.25																				CH**	43																						
	60-62	1.50																				CH**	41																						
	62-64	1.00																				CH**	35																						
	64-66	1.00																				CH**	38																						
09-B87	0-2	0.25	0.30		59	20	39			100		100				98					95	CH	38																						
	2-4	0.25	0.15		96	27	69					100				100					97	CH	81							0.2	81	58	CH**											
	4-6	0.50	0.30																			CH**	31																						
	6-8	0.50	0.25																			CH**	32																						
	8-10	0.50	0.40																			CH**	24																						
	10-12	0.25	0.20		110	32	78					100				100					100	CH	79	55																					
	12-14	1.00																				CH**	30																						
	14-16	0.25	0.20																			CH**	39																						
	16-18	1.00																				CH**	34																						
	18-20	0.75																				CH**	32																						
09-B88	0-2	0.25	0.25																			CH**	48																						
	2-4	0.25	0.20		114	27	87					100				100					98	CH	78	53																					
	4-6	0.25	0.25																			CH**	72																						
	6-8	0.25	0.35																			CH**	49																						
	8-10	0.25	0.10																			CH**	43																						
	10-12	0.25	0.10		83	27	56									100					100	CH	86							0.2	86	52	CH**											
	12-14	1.25																				CH**	37																						
	14-16	2.00																				CH**	19																						
	16-18	2.00			54	17	37		100	100		99				97					96	CH	20	108																					
	18-20	1.50																				CH**	23																						