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RCI ENVIRONMENTAL

◆ HANFORD N SPRINGS SHEET PILE TEST PILE PROGRAM

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INDEX

N SPRINGS PILE TEST PROGRAM

PILE TEST NARRATIVE SUMMARY

TEST N91 @ STA 1+60

TEST N93 @ STA 11+50

TEST N95 @ STA 23+60

TEST N96 @ STA 30+20

TEST N97 @ STA 34+00

DAILY REPORTS

ORIGINAL PILE TEST SUBMITTAL

N SPRINGS SHEET PILE TEST PROGRAM SUMMARY

SUMMARY

The test program work began on Dec. 2, 1994 and was completed on Dec. 30, 1994. Initially the Subcontractor attempted to install piling with vibratory hammers. After several attempts, with very little penetration accomplished, a diesel impact hammer was utilized. Although there was improvement in performance it quickly became obvious that if the dense soil was to be penetrated it would require still larger pile hammers. Test pits were dug to explore ground conditions which confirmed that dense soil and not large obstructions was preventing penetration. For the second test a variable energy hydraulic hammer capable of higher driving energy than the diesel hammer was utilized. Although early indications during driving appeared to be successful, it was discovered after extraction, that the pile had reached only 30' penetration and then refused to penetrate further due to the dense Ringold formation. The high energy produced by the hammer had destroyed the bottoms of the pile. Three further tests were conducted utilizing maximum hammer energy before pile failure occurred, all of which penetrated approximately 30 feet, but 10 to 15 feet short of the desired clay layer. Even though the pile penetrated to 30 feet with minor damage to the tips of the pile, most had twisted and in some cases separated at the interlocks. Adequate testing was performed to demonstrate that interlocking Z piling cannot be driven to the clay layer, and at even lesser depths severe damage occurs. The Ringold formation is therefore deemed not penetrable with standard methods of construction due to its density and cementation. It is concluded therefore that a sheet pile wall can only be installed after the insitu material is "broken up" and loosened prior to pile installation.

TEST NO 1 N-97

PZ35 (heavy) sheetpile were driven with the APE 400 vibratory hammer to depths of 5 and 7 feet at two locations. A backhoe was then utilized to excavate and explore underground conditions. A 14 foot pit was dug and then attempts to drive the pile with the APE 400 and a Delmag D-19 Diesel hammer were conducted. The piling were driven approximately 20' below the bottom of the pit. Geologists confirmed the material being encountered was the Ringold formation. A hydraulic impact hammer (IHC s70) was then utilized at a nearby location and energy levels of up to 50000 ft-lbs was observed while two pairs of piling appeared to be driven into the clay layer at a depth of 48 feet. Upon extraction however it was discovered that this excessive energy was destroying the ends of the pile at a depth of 30 feet and penetration was not being obtained.

TEST NO 2 N-96

Several attempts in the "diesel burn pit " area were made initially with a small vibro hammer (APE 200) where refusal at approximately 5 to 8 feet was encountered in either the Hanford or backfilled soils. Casteel CZ128(medium) sheetpile were used for the initial test. A larger vibro (APE 400) was then utilized until it became obvious the medium weight sheet was not adequate for the difficult driving conditions. Several pairs of PZ35(heavy) sheets were then tested with the large vibro hammer with penetrations of 8 to 12 feet obtained. Three pairs of
sheets were then threaded together and driven to apparent refusal, at a depth of approximately 35 feet, with a diesel hammer (Delmag D-19). A variable energy hydraulic hammer (IHC S-70) was then used and the sheets were driven an additional 15 feet. As was discovered at test No 1, (at the end of the test program when the pile were ultimately extracted by assisting with backhoe excavation) these pile were also severely damaged and did not reach indicated elevations.

TEST NO'S 3, 4 & 5 @ N-92, N-93 & N-95 RESPECTIVELY

At all three remaining locations 4 pairs, or 8 pile were installed by threading the pile prior to beginning driving and then alternatively driving on each pair so that no single pile would precede its neighbor by more that a few feet. This was done to enhance their ability to remain together as a unit and not separate from the interlocks. As in all previous tests, pile shoes had been welded on all pile. In Order to possibly enhance driving capability one pair of sheets was welded solid at the interlock. After several uses there was no damage in the welded interlock area. Testing for the welded grout angle was also conducted at all 3 locations. In all instances it remained intact with no structural damage or intrusion of soil which would prevent future grouting. The S-70 hydraulic hammer was utilized but with a reduced energy setting of 30000 foot pounds to prevent severe damage. When blow counts became excessive, where damage was thought to occur, driving ceased and the pile were extracted. Penetration on all pile at the three locations was in the range of 28 to 36 feet, still some 10 feet shy of the intended clay layer. Although there was not severe tip damage as in tests 1 & 2 all pile were twisted and in some instances had come out of the interlock 3 to 10 feet from the tip. In almost all cases the pile shoes had sustained little damage. It appeared at every location the pile began to deviate from intended alignment prior to getting through the 15 to 20 foot Hanford geologic zone. This was attributed to the large rock and cobbles commonly found in this formation

SUMMARY OF CONCLUSIONS

Although the sheet pile could not be driven through the insitu dense material there are several viable construction methods that could be utilized to "break up" or "remove" the material prior to driving. These contingency plans are discussed in further detail as follows:

- **PRE-EXCAVATE Utilizing a large backhoe excavate a vertical trench shored in the Hanford formation to a depth of 15 to 20 feet and extending to the clay layer. Screen any large cobble or boulder and replace the material back into the excavated trench. Utilize a bio-degradable slurry, as required, in the open excavation to prevent caving of any sand lenses. The trench backfill will be at a density to allow driving the sheet pile with conventional hammers to be relatively easy.**
- **PRE-PUNCH Using a large (approx. 50'X 4'X 6") steel beam suspended by a crane continuously drop the beam a few feet into a pre-excavated and shored shallow trench. This action will break the material into fine pieces which will act as a slurry to hold them in suspension and enable their removal. Bio-degradable slurry will be utilized to assist this action and maintain a open slotted trench. As soon as the beam reaches the clay layer it will be removed and sheet pile inserted. The suspended broken fine material will be pumped as backfill alongside the sheetpile. Supplemental backfilling will be done with trench excavations and imported material as needed. The process is then repeated. This method would provide very little exposure to personnel from any possible contaminated material that would be found in the trench. This method has been utilized successfully in Canada, and it should be considered as innovative technology for sheetpile installation in a contaminated environment.**

- **PRE-DRILL Using a large auger, on four foot centers, drill to the clay layer a hole approximately three feet in diameter. Screen the material for oversize cobble or boulder and place back into a previously drilled hole. Continue this process prior to installing pile. Utilizing a pair of heavyweight Z Sheet pile that has been fully welded at the interlock seam, drive the pile into the previously drilled holes where the cemented dense material has been broken up. The small area of undisturbed material between each hole can be driven through, (the interlock has been welded solid), as it now has an area to move to when required for displacement.**

Each of the forgoing alternates would need to be tested prior to ordering sheetpile. Each has it's advantages and disadvantages regarding health safety, cultural and economic benefits. The first recommendation would be to pre-excavate as it is the most proven regarding construction methods and technology. After confirmation of production any of the methods could be utilized for a 3000 linear foot wall, with a anticipated cost increase from the original plan in the range of 10 to 40 percent.

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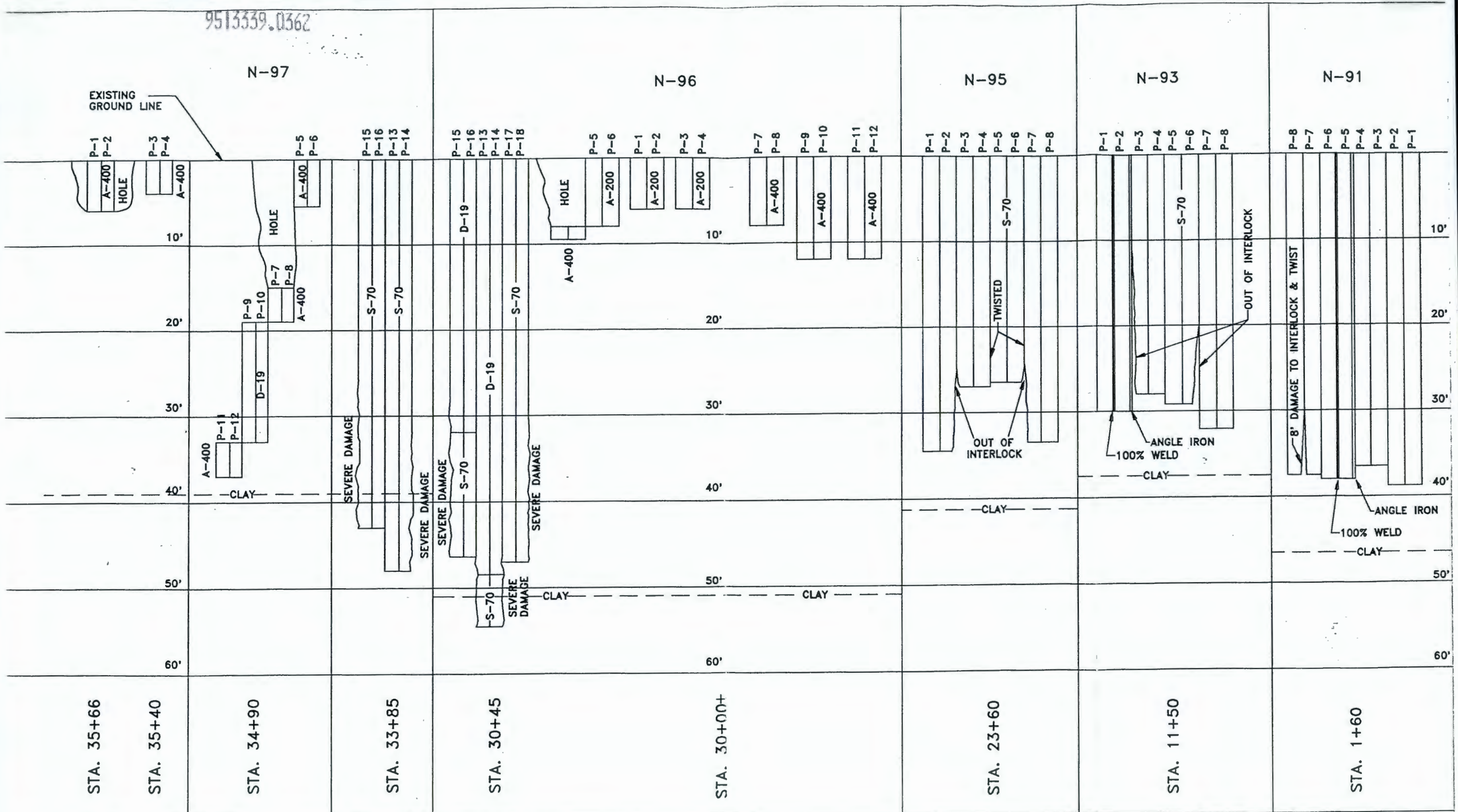

DESIGN/CONSTRUCT SHEET PILE BARRIER
N-SPRING

SHEET PILE TEST PROGRAM
FINAL INSTALLATION
SUBCONTRACT No. 22192-14-EE-000001

N SPRINGS SHEET PILE BARRIER WALL - SUBCONTRACT 22194-14-EE-000001

PILE TEST INSTALLATION REPORT NO _____ DATE 12/20-22/94 LOCATION N-91 SHEET ___ OF ___

INSPECTOR BILL MCDANIEL / ROGER BROWN WEATHER CLEAR / COOL AM / PM WARM TEMP ± 50°

SHEET PILE NUMBER	TEST # 3 N-91							
	01	02	03	04	05	06	07	08
VISUAL (✓=OK)								
LENGTH IN FEET	50'							
SHEET TYPE	PZ27S							
THICKNESS	1/2" +							
END CUTOFFS	✓	✓	✓	✓	✓	✓	✓	✓
INTERLOCKS	✓	✓	✓	✓	✓	✓	✓	✓
LINEARITY	✓	✓	✓	✓	✓	✓	✓	✓
PILE SHOES	✓	✓	✓	✓	✓	✓	✓	✓
INSTALLATION								
INCLINATION %								
PERPENDICULAR								
PARRALLEL/WALL								
HAMMER-TYPE	HYD. IMPACT							
HAMMER-MODEL	IHC S-70							
ENERGY SETTING								
TIME START	12/20/94 10:00 AM							
TIME END	12/21/94 2:10 PM							
FINAL PENETRATION	38 PT		36 PT		38 PT		38 PT	
REMARKS								

NOTES

ALL PAIRS STOOD AND TACKED TO TEMPLATE AM 12/20/94. PAIR N-91/05-06 ARE WELDED 100% @ INTERLOCK. GROUT INTERLOCK ANGLE IRON STITCH WELDED TO SHEET N-91/06.

12-20-94

FIRST 4 TO 8' OF DRIVING USED VERY LIGHT ENERGY TO SET PAIRS INTO GROUND FOR SAFETY REASONS. BEGAN DRIVING SHEETS WITH 27,000 TO 30,000 FT LBS AFTER ALL SHEETS SET. STAIRSTEP SHEETS FOR MAXIMUM LEAD OF 2-4 FEET. STOPPED DRIVING 12/20/94 @ 3:30 PM WITH ± 27 PT IMPEDED.

12-21-94

BEGAN DRIVING AGAIN @ 7:30 AM, ± 27 PT STARTING POINT. N-91/01-02 DRIFTING TOWARDS HILLSIDE AND OUT OF PLUMB ± 4-5". TOP OF PAIR N-91/03-04 HAS SHRUNK WHERE HEMET WILL NO PASS BEYOND ADJACENT PAIRS. STOPPED DRIVING @ 8:30 AM DUE TO INCREASED BLOW COUNT (PLEASE REFER TO ATTACHED). EXTRACTED N-91/03-04 WITH APE 400 VIBRO HAMMER. REDRIVE N-91/03-04 WITH APE 400 VIBRO HAMMER TO WITHIN 1 PT OF ORIGINAL DRIVING DEPTH. BEGAN DRIVING AGAIN WITH HYDRAULIC IMPACT HAMMER

12-21-94 COMPLETED DRIVING @ 2:10 PM AND BEGAN SETUP FOR PILE EXTRACTION. PLEASE REFER TO PAGE 4 FOR EXTRACTION NOTES.

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N SPRINGS SHEETPILE BARRIER WALL- SHEET PILE INSTALLATION REPORT FOR BLOW COUNT

REPORT NO ____. SHEET ____ OF ____. DATE ____. INSPECT. ____.

PILE NO N91 / 01-02				PILE NO N-91 / 03-04				PILE NO N-91 / 05-06				PILE NO N91 / 07-08			
FEET	BLOWS		OTHER	FEET	BLOWS		OTHER	FEET	BLOWS		OTHER	FEET	BLOWS		OTHER
12/20 0	[illegible]		10K FT LBS	12/20 0	1		10K FT LBS	12/20 0	2		10K FT LBS	12/20 0	10		10K FT LBS
1	20			1	20			1	17			1	30		
2	33			2	23			2	37			2	110		
3	70			3	44			3	73			3	44		
4	90			4	50			4	140			4	40		
5	74			5	69			5	16	±60 BLOW/MIN	28K FT LBS	5	51		21K FT LBS
6	75			6	73			6	16			6	85		
7	76			7	64			7	13			7	37	±80 BLOW/MIN	
8	80			8	17	±60 BLOW/MIN	26K FT LBS	8	16			8	30		
9	30	±60 BLOWS/MIN	28K FT LBS	9	15			9	13			9	10		
10	16			10	12			0	14			10	11		
1	11			1	12			1	13			1	12	±40 BLOW/MIN	28K FT LBS
2	11			2	11			2	14			2	9		
3	10			3	14			3	14		29K FT LBS	3	11		
4	12			4	15			4	15			4	12		
5	13		30K FT LBS	5	13			5	13			5	11		
6	12			6	[illegible]	±60 BLOW/MIN		6	13	±60 BLOW/MIN		6	9	±60 BLOW/MIN	
7	12	±60 BLOW/MIN		7	10		29K FT LBS	7	13		30K FT LBS	7	8		
8	13			8	14			8	14			8	11		
9	12		30K FT LBS	9	15			9	17			9	15		
20	11			20	14			0	15			20	14		29K FT LBS
1	11			1	11			1	16			1	12		
2	12			2	11			2	14		29K FT LBS	2	14		
3	12		28K FT LBS	3	11			3	17			3	19		
4	14			4	11			4	18			4	20		
5	16			5	15			5	16			5	18		
6	16			6	17			6	19		28K FT LBS	6	15		
* 12/20 7	21		*	12/20 7	15		28K FT LBS *	12/20 7	20		*	12/20 7	14		27K FT LBS *
12/21 8	20			12/21 8	16			8	26			12/21 8	25		
" 9	28			" 9	24			9	37			" 9	29		

NOTES

DRIVING DATES — BEGAN 12/20/94, COMPLETED 12-21-94

* NOTES

9513339.0364

N SPRINGS SHEETPILE BARRIER WALL- SHE. . 'ILE INSTALLATION REPORT FOR BLOW COUNT

REPORT NO _____. SHEET OF _____. DATE _____. INSPECT. _____.

PILE NO N-91 / 01-02				PILE NO N-91 / 03-04				PILE NO N91 / 05-06				PILE NO N-91 / 07-08			
FEET	BLOWS		OTHER	FEET	BLOWS		OTHER	FEET	BLOWS		OTHER	FEET	BLOWS		OTHER
30	29	±60 BLOW/MIN	28 K FT LBS	30	40	±60 BLOW/MIN	28 K FT LBS	30	38	±60 BLOW/MIN	28 K FT LBS	30	33	±60 BLOW/MIN	28 K FT LBS
12/21 1	31			12/21 1	56			12/21 1	59			12/21 1	52		
2	38			2	34			2	59			2	57		
3	47			3	56			3	46			3			
4	48			4	50	1:44 PM 12/21/94		4	57			4	35		28 K FT LBS
5	31			5	54			5	50			5	44		
6	45			6	40+			6	56+			6	50		
7	50			7				7	70			7	58		
8	51			8				8	65			8	73		
9				9				9				9			
0				0				0				0			
1				1				1				1			
2				2				2				2			
3				3				3				3			
4				4				4				4			
5				5				5				5			
6				6				6				6			
7				7				7				7			
8				8				8				8			
9				9				9				9			
0				0				0				0			
1				1				1				1			
2				2				2				2			
3				3				3				3			
4				4				4				4			
5				5				5				5			
6				6				6				6			
7				7				7				7			
8				8				8				8			
9				9				9				9			

NOTES

PLEASE REFER TO PREVIOUS SHEET FOR DRIVING NOTES.

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9513339.0366

LOCATION N-91 / EXTRACTION NOTES

DATE 12/21-22/94

2:10 pm 12/21/94 COMPLETED PILE DRIVING @ N-91
PLACED HAMMER DOWN TO FIX TWISTED HEAD BLOCK

BEGAN TO EXTRACT PAIR 1 N-91/01-02 @ 2:50 pm.
2:54 pm 10' EXTRACTED / PAUSE FOR RAD CHECK.
3:00 pm FULLY EXTRACTED / RAD CHECK NO CONTAMINATION FOUND

MOVED TO PAIR 3 N-91/05-06 FOR EXTRACTION 3:04 pm
EXTRACTION
3:10 pm STOP FOR RAD.
PAIR 2 N-91/03-04 PULLING UP WITH PAIR 3. RAD CHECK

3:15 pm PAIRS 2 & 3 EXTRACTED
APPROXIMATELY 30 FT EXTRACTED

APE 400 VIBRO ON PAIR 4 N-91/07-08 3:20 pm
3:35 pm PAIR 4 N-91/07-08 EXTRACTED
NO RAD CONTAMINATION FOUND.

12/22/94 EXTRACTION CONTINUED @ N-91 PAIRS 2 & 3

BEGAN WITH PAIR 3 N-91/05-06 WITH CRANE NO VIBRO @ 7:30 AM
NO MOVEMENT
PICKED APE 400 VIBRO
7:40 AM EXTRACTED 2-3 FT NO RAD FOUND. PAIR 2 & 3 INTERLOCK BOUND.

SETUP MANBASKET TO HOOKUP PAIR 3 W/ 2 PART 7:53 AM
TRY TO PULL PAIR 3 W/ 2 PART 7:56 AM

BURN OFF MATTING END OF INTERLOCK PAIR 2 BINDING W/ PAIR 3 PREVENTING EXTRACTION
@ 8:12 SET APE 400 ON DOWNSTREAM SHEET OF PAIR 3 END EXTRACTED TO LEVEL OF OTHER SHEET.
@ 8:20 SET APE 400 ON PAIR 2 AND EXTRACTED STOPPED FOR RAD CHECK 8:28 SET ON PAIR 3 AND EXTRACTED. STOPPED FOR RAD CHECK. 9:00 AM ALL SHEETS EXTRACTED AND RAD CHECKED. NO CONTAMINATION FOUND. FOR SHEET AND INTERLOCK DAMAGE REFERENCE PHOTOS OF N-91.

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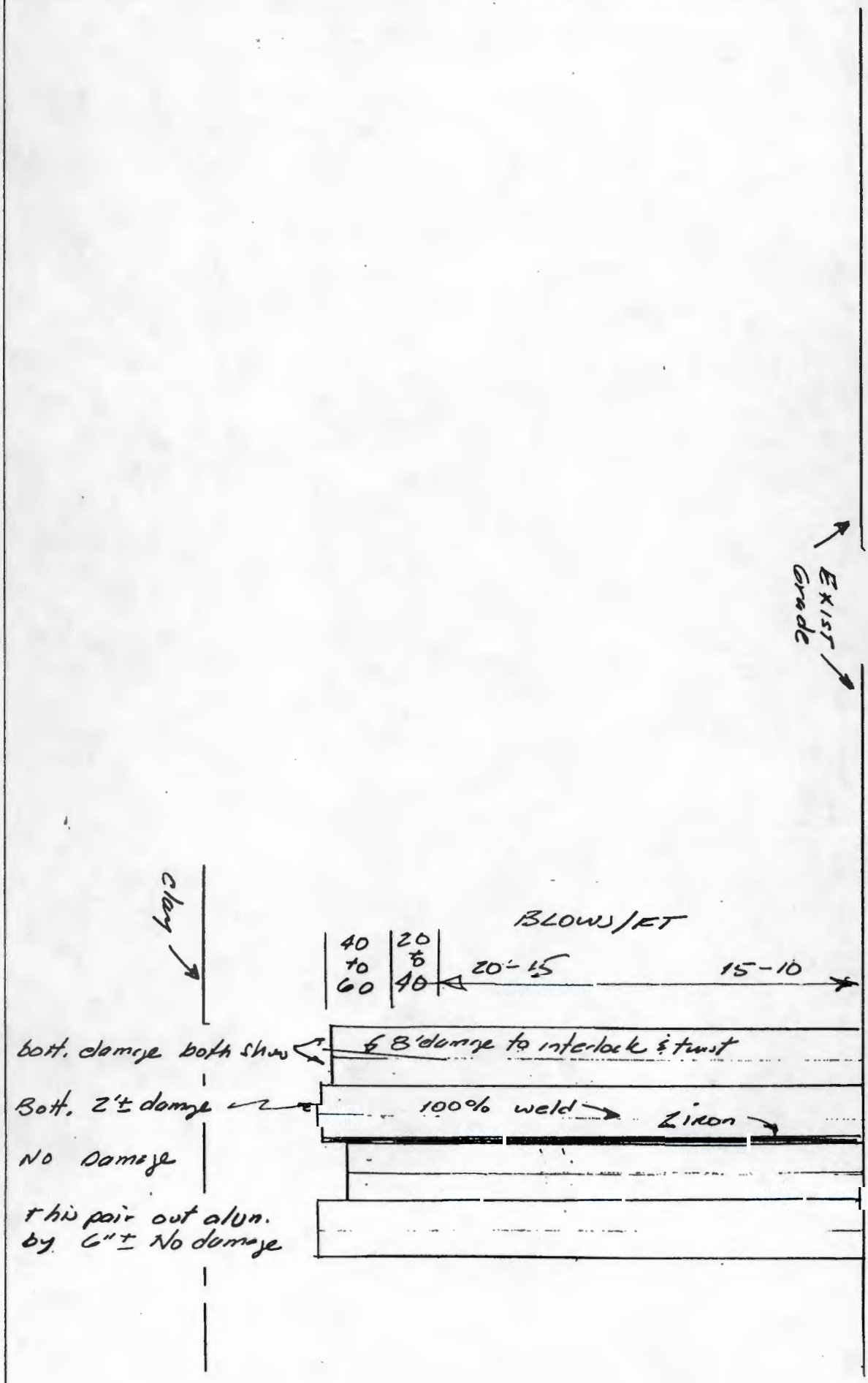
SUMMARY OF TEST PILE 12-20-94 thru

N 91 AREA
STA 1+52 to 1+68



@ 2900 ± Orient N 5-70

NATIONAL 42.182 100 SHEETS

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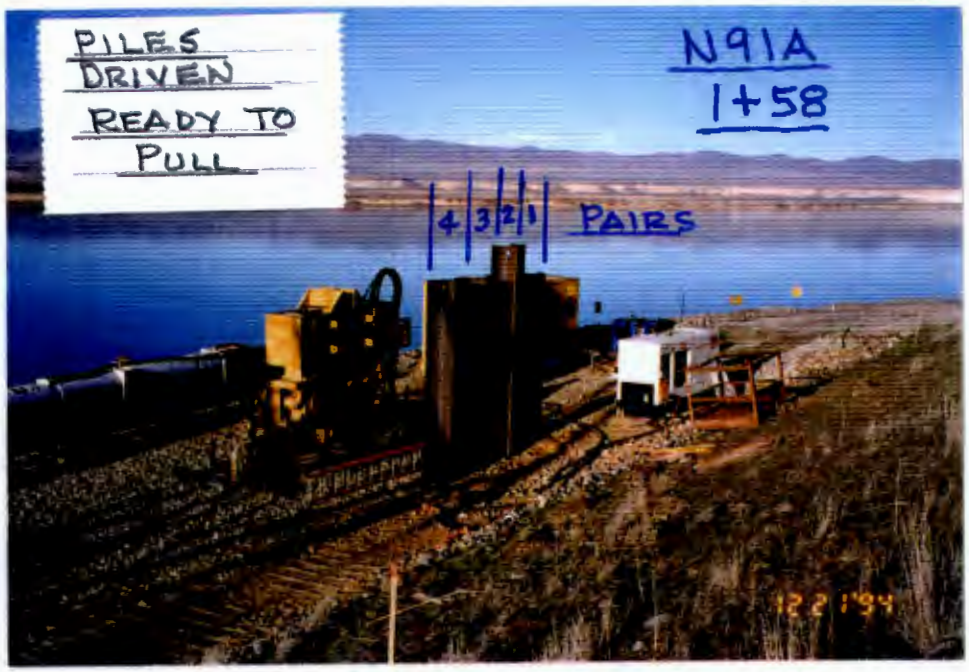
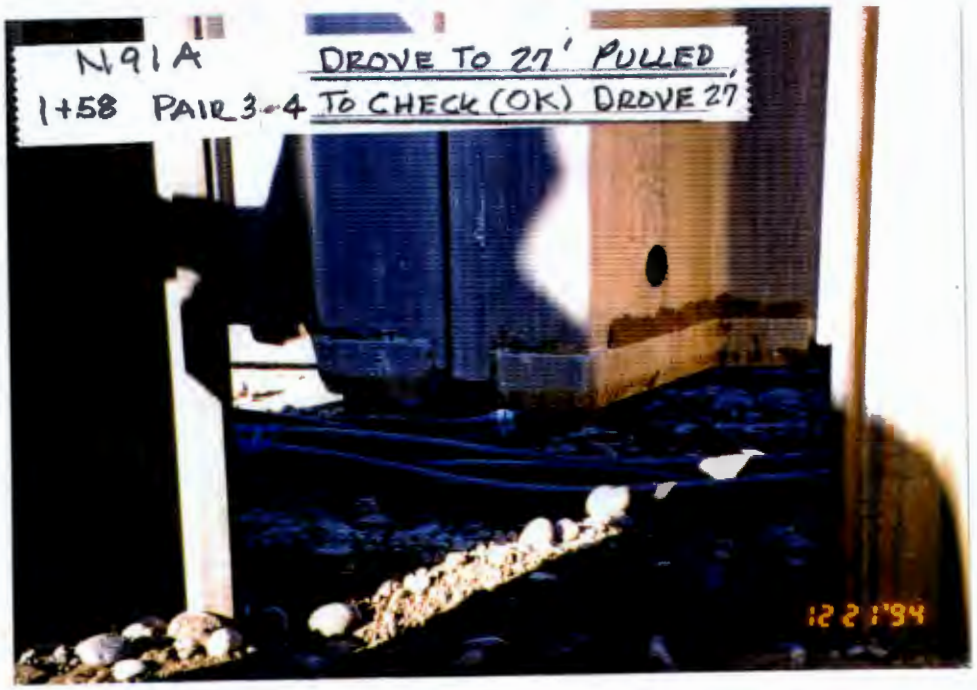
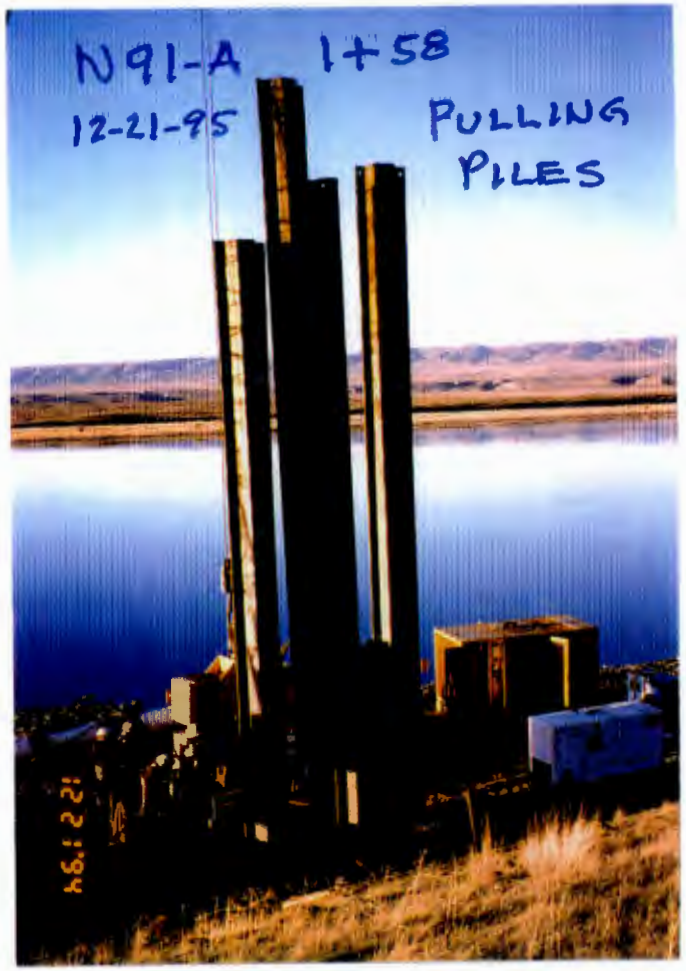




PREPARED FOR BECHTEL HANFORD, INC.
HANFORD N SPRINGS SHEET PILE BARRIER WALL DESIGN AND CONSTRUCTION

RCI ENVIRONMENTAL
PO BOX 6090
KENT, WA 98064



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PREPARED FOR BECHTEL HANFORD, INC.
HANFORD N SPRINGS SHEET PILE BARRIER WALL DESIGN AND CONSTRUCTION

RCI ENVIRONMENTAL
PO BOX 6090
KENT, WA 98064

N SPRINGS SHEET PILE BARRIE ALL - SUBCONTRACT 22194-14-EE-000001

PILE TEST INSTALLATION REPORT NO _____ DATE 12-23-94 LOCATION N-93 SHEET 1 OF 3

INSPECTOR BILL MCDANIEL WEATHER COLD / FOG TEMP ± 34°

SHEET PILE NUMBER	11+62		11+58		11+54		11+50	
	1	2	3	4	5	6	7	8
VISUAL CHECK								
LENGTH IN FEET	44'		50'		50'		48'	
SHEET TYPE	PZ35							
THICKNESS	1/2"							
END CUTOFFS	✓	✓	✓	✓	✓	✓	✓	✓
INTERLOCKS	✓	✓	✓	✓	✓	✓	✓	✓
LINEARITY	✓	✓	✓	✓	✓	✓	✓	✓
PILE SHOES	✓	✓	✓	✓	✓	✓	✓	✓
INSTALLATION								
INCLINATION %								
PERPENDICULAR								
PARRALLEL/WALL								
HAMMER-TYPE	HYD.	IMPACT						
HAMMER-MODEL	S-70							
ENERGY SETTING								
TIME START	12:45							
TIME END	2:49		2:56		2:34		2:44	
FINAL PENETRATION	29.5'		28'		29'		32'	
REMARKS	100% WELD ANGLE FULL LENGTH SHEETS ONE AND TWO		WELDED ANGLE BOTTOM 6 1/2' SHEETS THREE AND FOUR					

NOTES

BEGAN DRIVING 12-23-94 12:45 pm.
BEGAN ADDITIONAL DRIVING 7:35 AM 12-27-94

@ 8:10 AM 12-27-94 BLOWS PER FOOT ABOVE 50 / STOPPED DRIVING.
11:00 AM 12-27-94 PREPARE TO EXTRACT SHEETS PLEASE REFER TO SHEET 3 OF 3 N-93 12-27-94
12:00 — 12:30 pm LUNCH BREAK
2:24 pm BEGAN SHEET EXTRACTION

9513339.0372

N SPRINGS SHEETPILE BARRIER WALL- SHEET PILE INSTALLATION REPORT FOR BLOW COUNT

REPORT NO ____ . SHEET 2 OF 3 . DATE 12-23-94 . INSPECT. BILL MCDANIEL N-93

PILE NO 1-2 UPSTREAM				PILE NO 3-4				PILE NO 5-6				PILE NO 7-8 DOWNSTREAM			
FEET	BLOWS		OTHER	FEET	BLOWS		OTHER	FEET	BLOWS		OTHER	FEET	BLOWS		OTHER
0				0				0				12/27 30	57		28K FTLBS
1				1				1				31	60		
2				2				2				32	58		
3				3				3				3			
4				4				4				4			
12/23 5	1:12			12/23 5	1:12			12/23 5	1:12			5			
6	14	1:38		6	22			6	12	1:48	28K FTLBS	6			
7	22			7				7	15			12/23 7	1:20		
8	35		27K FTLBS	8	41		23K FTLBS	8	24			8	27	1:58	27K FTLBS
9	43			9	38			9	33			9	23		
10	42			10	33			0	27			0	24		
1	28+	1:43		1	26		26K FTLBS	1	26			1	27		
2	36	2:12	28K FTLBS	2	26			2	30			2	27		
3	31			3	24			3	26			3	29		
4	23			4	26			4	21			4	21		
5	22			5	19	1:35		5	21			5	22		
6	21			6	21	2:21		6	18	2:29		6	27		
7	22			7	21			7	23			7	33		
8	21	2:17		8	24		28K FTLBS	8	30			8	29		
9	13			9	33			9	32			9	34		
20	21			20	34			0	33			0	30	2:06	
1	25			1	31		26K FTLBS	1	40			1	29	2:37	
2	25			2	34	2:25		2	39			2	26		
3	29			3	30	2:53		3	42			3	28		
4	33	2:49		4	45			4	45	2:34		4	32		
5	29		28K FTLBS	5	40			12/27* 5	38	7:45 AM	28K FTLBS	5	30		
* 12/27 6		7:35 AM		6	42	2:56		6	52			6	39		30.5K FTLBS
7	89			12/27* 7	47		28K FTLBS	7	57			7	43	2:44	
8				8	57			8	72			12/27* 8	45	7:55 AM	28K FTLBS
9				9				9	73			9	50		"

NOTES

BEGAN DRIVING AT 12:45 PM 12-23-95

*TUESDAY 12-27-94 7:35 AM BEGAN DRIVING AGAIN

9513339.0373

9513339.0374

JOB SHEET PILE TEST ITEM

N-93 AREA

PAGE (3) OF (3)

WM E McDANIEL BY DATE 12-27-94 SHEET OF

STA.	11+62	11+58	11+54	11+50
PAIR	(1)	(2)	(3)	(4)
SHEETS	1-2	3-4	5-6	7-8
PEN Z	± 29.5'	28'	29'	32'

START TO PULL SHEETS AT 11:00 A.M. RIG. VIB HMR APE-400

11:22 Start to Pull SHEETS (1-2) w/ RAD CHECK EVERY 5 FT

11:36 SHEETS (1-2) UP. 26 FT
SHEETS 2 AND 3 OUT OF Interlock ± 20 FT Bottom

11:38 PULL (5-6) } (5-6) UP 4 FT
11:48 } Sheet 4 UP 2 FT

11:52 PULL (7-8) (w/ RAD chks at EACH 5 FT)
Sheet 6 comming up w/ 7 & 8

LUNCH 12:30 to 1:00

1:10 UP 26 FT (7-8) + sheet 6
Sheets 6 & 7 out of Interlock (± 10 FT AT BOTTOM)

1:17 } Change to 2-PART Block & PULL out
1:30 } Sheets. 6-7-8
PULL sheets 1 & 2 & Lay down

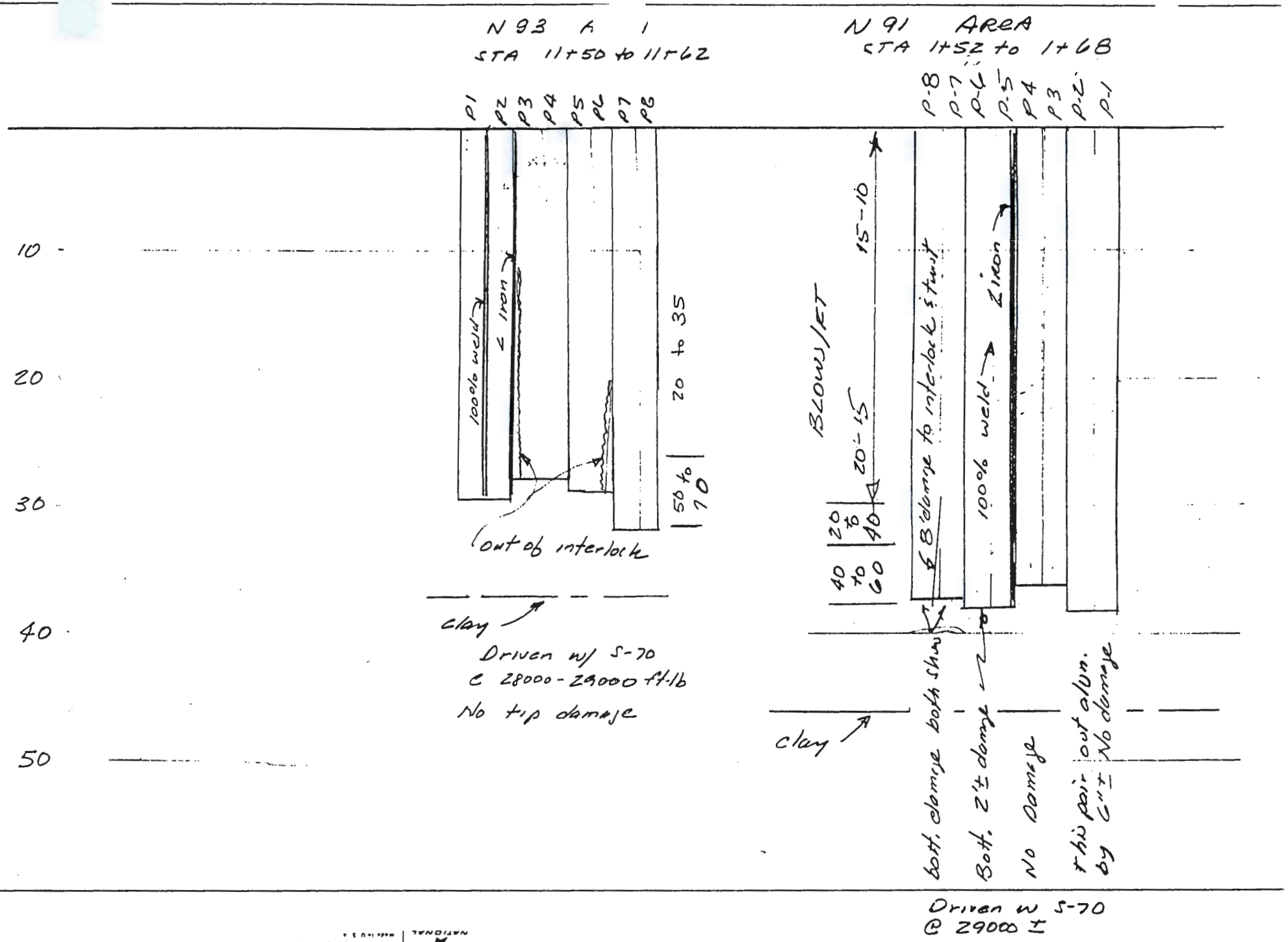
1:45 - 1:52 RIG 400 to PULL
PULL 3-4-5 w/ ARR 400

2:05
Change to 2 Part Block.

2:10
PULL OUT sheets. 3-4-5 & Lay down.

2:24
2:30 Prepare to Move to Test Site. 23+50

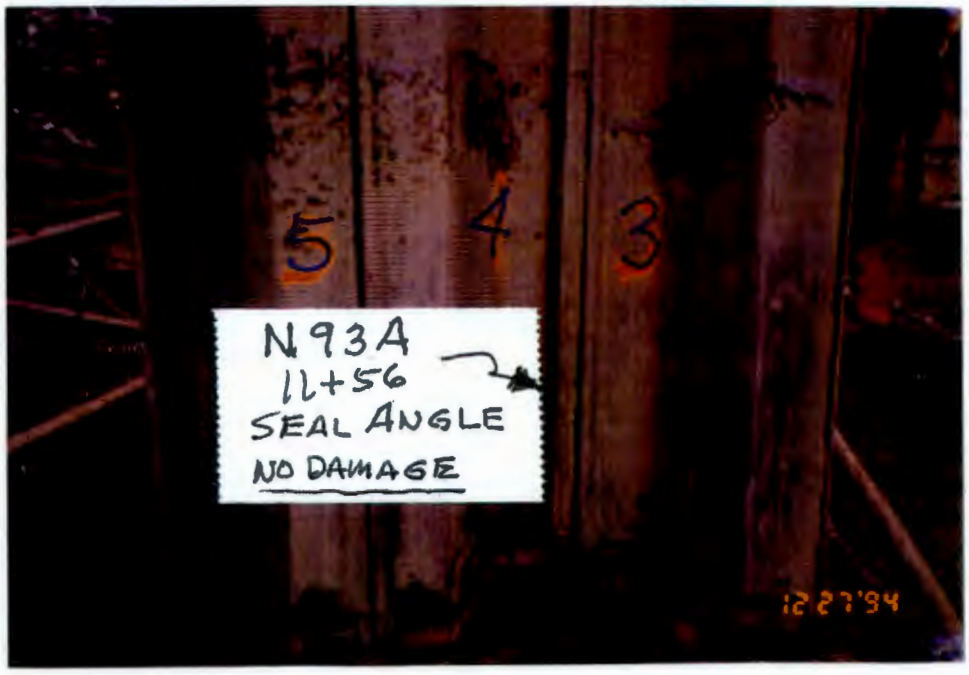
NOTE: Check Sheets - 8 Sheets w/ 7 Interlocks, TWO Interlocks had Seperated at BOTTOM 10 to 20 w/ No Evidence of DAMAGE AT BOTTOM -
ALL SHOES were w/o Damage -
Several spots in Interlocks show Heat Color & melted metal FROM Vibration -!



95 1339 0375

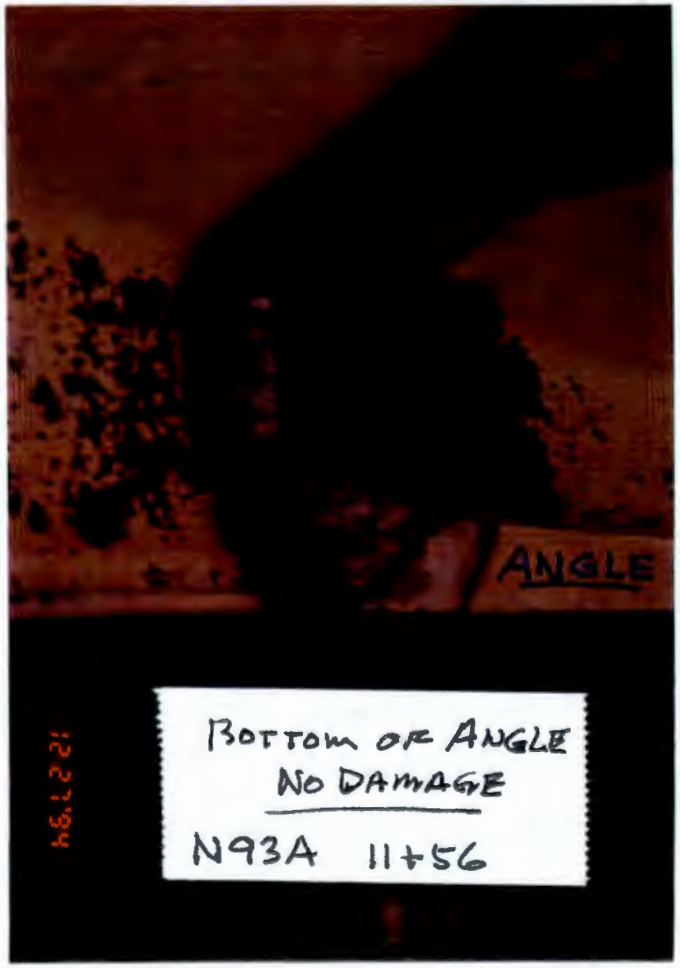
NATIONAL 42-182 100 SHEETS

9513339.0376



PREPARED FOR BECHTEL HANFORD, INC.
HANFORD N SPRINGS SHEET PILE BARRIER WALL DESIGN AND CONSTRUCTION

RCI ENVIRONMENTAL
PO BOX 6090
KENT, WA 98064



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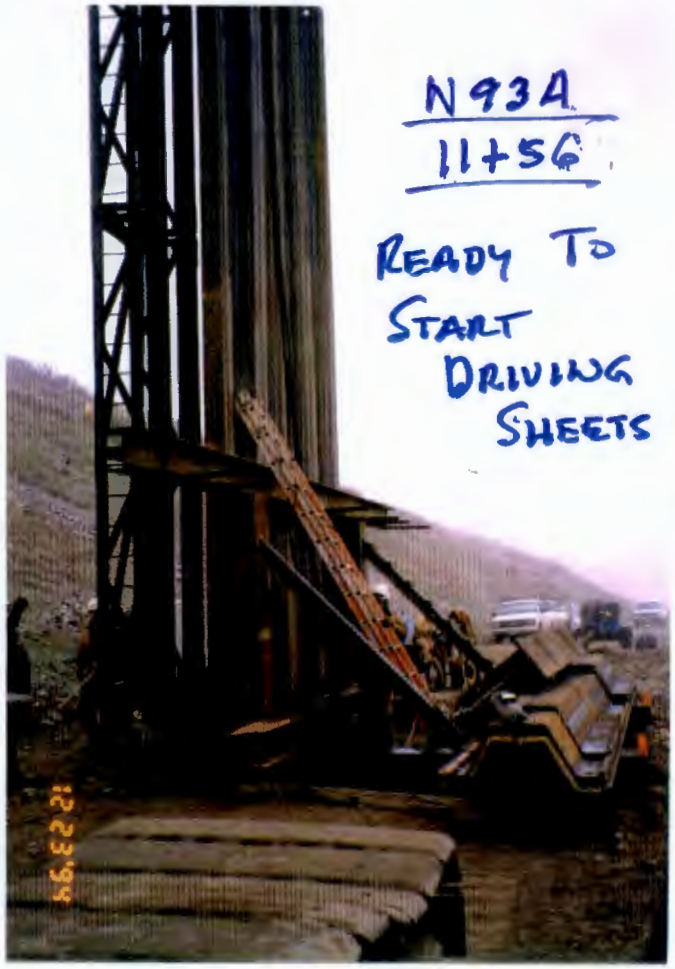
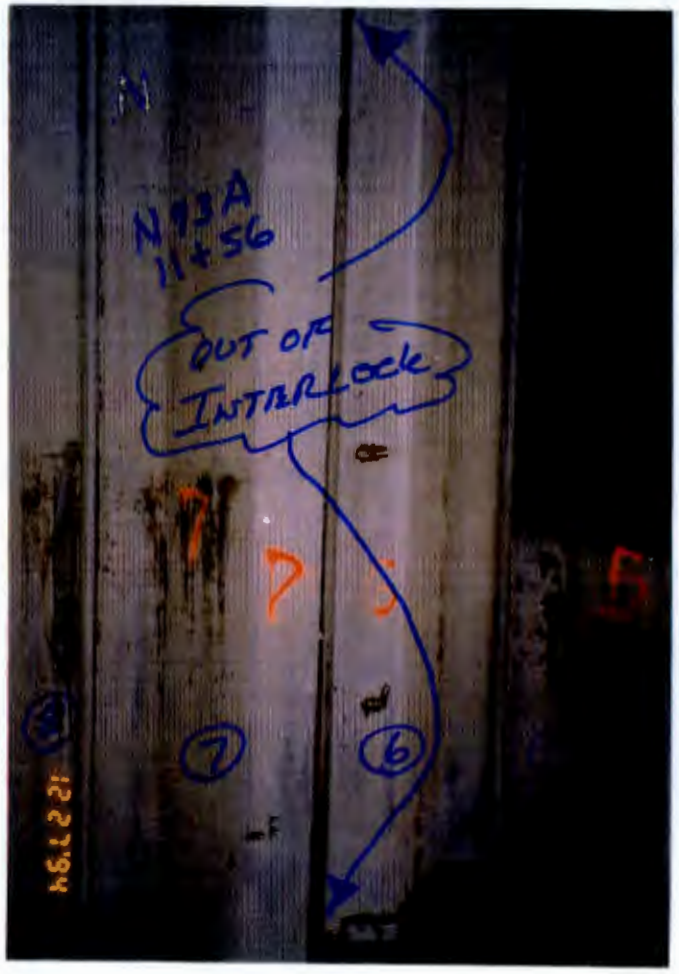
RCI ENVIRONMENTAL PO BOX 6090 KENT, WA 98064	PREPARED FOR BECHTEL HANFORD, INC. HANFORD N SPRINGS SHEET PILE BARRIER WALL DESIGN AND CONSTRUCTION





RCI ENVIRONMENTAL PO BOX 6090 KENT, WA 98064	PREPARED FOR BECHTEL HANFORD, INC. HANFORD N SPRINGS SHEET PILE BARRIER WALL DESIGN AND CONSTRUCTION

N SPRINGS SHEET PILE BARRIER .L - SUBCONTRACT 22194-14-EE-000001

PILE TEST INSTALLATION REPORT NO _____ DATE 12/28/94 12/29/94 LOCATION N-95A STA. 23+50 - 23+66 SHEET 1 OF 4

INSPECTOR BILL McDANIEL WEATHER CLEAR/COLD TEMP 36-38°

SHEET PILE NUMBER	N95A							
	01	02	03	04	05	06	07	08
VISUAL (✓OK)								
LENGTH IN FEET	55'							✓
SHEET TYPE	PZ40							✓
THICKNESS	1/2" +							✓
END CUTOFFS	✓	✓	✓	✓	✓	✓	✓	✓
INTERLOCKS	✓	✓	✓	✓	✓	✓	✓	✓
LINEARITY	✓	✓	✓	✓	✓	✓	✓	✓
PILE SHOES	✓	✓	✓	✓	✓	✓	✓	✓
INSTALLATION								
INCLINATION %								
PERPENDICULAR								
PARRALLEL/WALL								
HAMMER-TYPE	HYD IMPACT							✓
HAMMER-MODEL	S-70							✓
ENERGY SETTING								
TIME START	4:27 PM 12/28/94		4:18 PM	12/28/94	3:58 PM	12/28/94	3:50 PM	12/28/94
TIME END	2:44 PM	12/29/94						✓
FINAL PENETRATION	37.5 FT		27.5 FT		27 FT		34 FT	
REMARKS								
	UNIVERSAL DRIVING SHOE							✓

NOTES

WED 12/28/94 11:15 AM BEGIN SETTING SHEETS UP TO TEMPLATE ~ NOON - 12:30 PM BREAK FOR LUNCH / SHEETS 1 & 2 SETUP @ TEMPLATE. 12:30 - 1:40 PM SHEET 3 & 4 SETUP @ TEMPLATE / 1:40 pm - 2:20 pm SHEETS 5 & 6 SETUP @ TEMPLATE / 2:20 PM - 3:00 pm SHEETS 7 & 8 SETUP @ TEMPLATE. / 3:00 pm - 3:15 pm PICK HAMMER AND HEADS / 3:15 pm - 3:32 pm HOOK up HYDRAULICS 3:32 pm - 4:30 pm 12/28/94 START SHEET PAIRS ± 5 pt INTO GROUND.

THURS 12/29/94 7:15 AM BEGIN DRIVING
9:00 AM TO 9:55 AM FRESH HEAD PAIRS 1 AND 2
10:20 AM TO 1:20 pm FRESH HEAD PAIRS 1, 2 AND 3
2:44 pm BLOW COUNT up TO 70 BLOWS PER FOOT. STOPPED DRIVING.

PREPARE TO EXTRACT SHEETS. PLEASE REFER TO PAGE 3 of 3 N-95-A
3:30 pm PAIR 4 EXTRACTED NO CONTAMINATION FOUND.

9513339.0379

N SPRINGS SHEETPILE BARRIER WALL- SHEE LE INSTALLATION REPORT FOR BLOW COUNT

REPORT NO N-95A SHEET 2 OF 4. DATE 12/28 — 12/29/94 INSPECT. BILL MCDANIEL

PILE NO N-95A PAIR 1				PILE NO N-95A PAIR 2				PILE NO N-95A PAIR 3				PILE NO N-95A PAIR 4			
FEET	BLOWS		OTHER	FEET	BLOWS		OTHER	FEET	BLOWS		OTHER	FEET	BLOWS		OTHER
0		4:27 PM	12/28/94	0		4:18 PM	12/28/94	0		3:58 PM	12/28/94	0		3:50 PM	12/28/94
1				1	1			1	4			1	6		
2	100		7K FTLBS	2	26			2	10		7K FTLBS	2	14		
3	+50			* 3	1		12K FTLBS	3	22			3	43		7K FTLBS
4				4	21	7:28 AM	12/29/94	* 4	19	4:07 PM	12/28/94	4	48		
* 5		4:30 pm	12/28	5	27			5	20		12K FTLBS	5	50		
6			10K FTLBS	6	27			6	27			6	44		
7				7	15		26K FTLBS	7	25			7	84		
8		8:23 AM 12/29		8	13			8	14		25K FTLBS	* 8	—	7:37 AM 12/29	
9	11		27K FTLBS	9	13			9	11			9	16		24K FTLBS
10	18			0	17		27K FTLBS	10	12			10	20		
1	18			1	23			1	15		27K FTLBS	1	18		
2	19			2	27			2	17			2	17		28K FTLBS
3	21			3	27			3	25	8:20 AM 12/29		3	20		
4	30		28K FTLBS	4	34		28K FTLBS	4	26		28K FTLBS	4	24		
5	26			5	33	10:03 AM	12/29/94	5	24			5	25	8:42 AM 12/29	
6	34	9:26 AM 12/29		6	25			6	30	8:48 AM 12/29		6	27		
7	32			7	29			7	29	10:23 AM		7	25		29K FTLBS
8	38			8	41	10:17 AM		8	35			8	22		
9	32	10:09 AM		9	38			9	45			9	27		
20	27			0	32	10:45 AM		20	34	10:27 AM		20	32	10:23 AM	28K FTLBS
1	30			1	25			1	36		27K FTLBS	1	23		
2	28	10:26 AM 22/27K FTLBS		2	30			2	38			2	19		
3	28			3	23			3	20	1:37 PM	28K FTLBS	3	17		
4	33			4	33	11:15 AM		4	25	2:07 PM		4	18	10:52 AM	
5	37			5	39			5	31		29K FTLBS	5	22	1:22 PM	
6	33		28K FTLBS	6	43	2:00 pm		6	35			6	30		
7	34			7	41			7	19+	2:10 pm	12/29/94	7	30		
8	38	1:52 PM		8	35+			8				8	35		
9	41		29K FTLBS	9				9				9	38	1:45 PM	

NOTES

SET SHEETS LATE PM 12/28/94. * REPRESENTS DATE CHANGE TO 12/29/94

PAIRS #1 & 4 CONTINUED ON ADDITIONAL BLOW COUNT LOG.

REFER TO PAGE 4 FOR EXTRACTION NOTES.

9513339.0380

N SPRINGS SHEETPILE BARRIER WALL- SHEET LE INSTALLATION REPORT FOR BLOW COUNT

REPORT NO N-95A SHEET 3 OF 4 . DATE 12/28/94 12/29/94 . INSPECT. BILL MCKANIA.

PILE NO N-95A PAIR 1				PILE NO N-95-A PAIR 2				PILE NO N-95A PAIR 3				PILE NO N-95A PAIR 4			
FEET	BLOWS		OTHER	FEET	BLOWS		OTHER	FEET	BLOWS		OTHER	FEET	BLOWS		OTHER
30	39	2:13 PM	29K FT LBS	0				0				30	37		28K FT LBS
1	41	2:49 PM		1				1				1	40		↓
2	40			2				2				2	53		29K FT LBS
3	35			3				3				3	51	2:40 PM	↓
4	37			4				4				4	63	2:44 pm 12/29/94	
5	44			5				5				5			
6	50	2:53 pm	↓	6				6				6			
7				7				7				7			
8				8				8				8			
9				9				9				9			
0				0				0				0			
1				1				1				1			
2				2				2				2			
3				3				3				3			
4				4				4				4			
5				5				5				5			
6				6				6				6			
7				7				7				7			
8				8				8				8			
9				9				9				9			
0				0				0				0			
1				1				1				1			
2				2				2				2			
3				3				3				3			
4				4				4				4			
5				5				5				5			
6				6				6				6			
7				7				7				7			
8				8				8				8			
9				9				9				9			

NOTES

PLEASE REFER TO PAGES 1 & 2 FOR DRIVING INFORMATION NOTES.
PLEASE REFER TO PAGE 4 FOR EXTRACTION DETAILS.

9513339.0381

9513339.0382

SHEET PILE WALL TEST INSTALLATION
FOUR PAIRS (8 SHEETS) PZ-40'S

WM E McDANIEL AREA. N-95A DATE PAGE 3 OF 3

LOCATION N95A AREA STA 23+50 to 23+66

12-29-94 THURSDAY + 12-30-94 FRIDAY

2:44 PM STOPPED DRIVING -
PREPARE TO PULL W/ APE 400 VIBRATORY HAMMER

4:45 P.M. Ready to PULL PAIR #4

5:30 P.M. PULLED UP 34 FT @ 5' Steps.
to check RAD. FOUND NO Contamination
SHUT DOWN

12-30-94 7:20 A.M Ready to Continue - Pulling

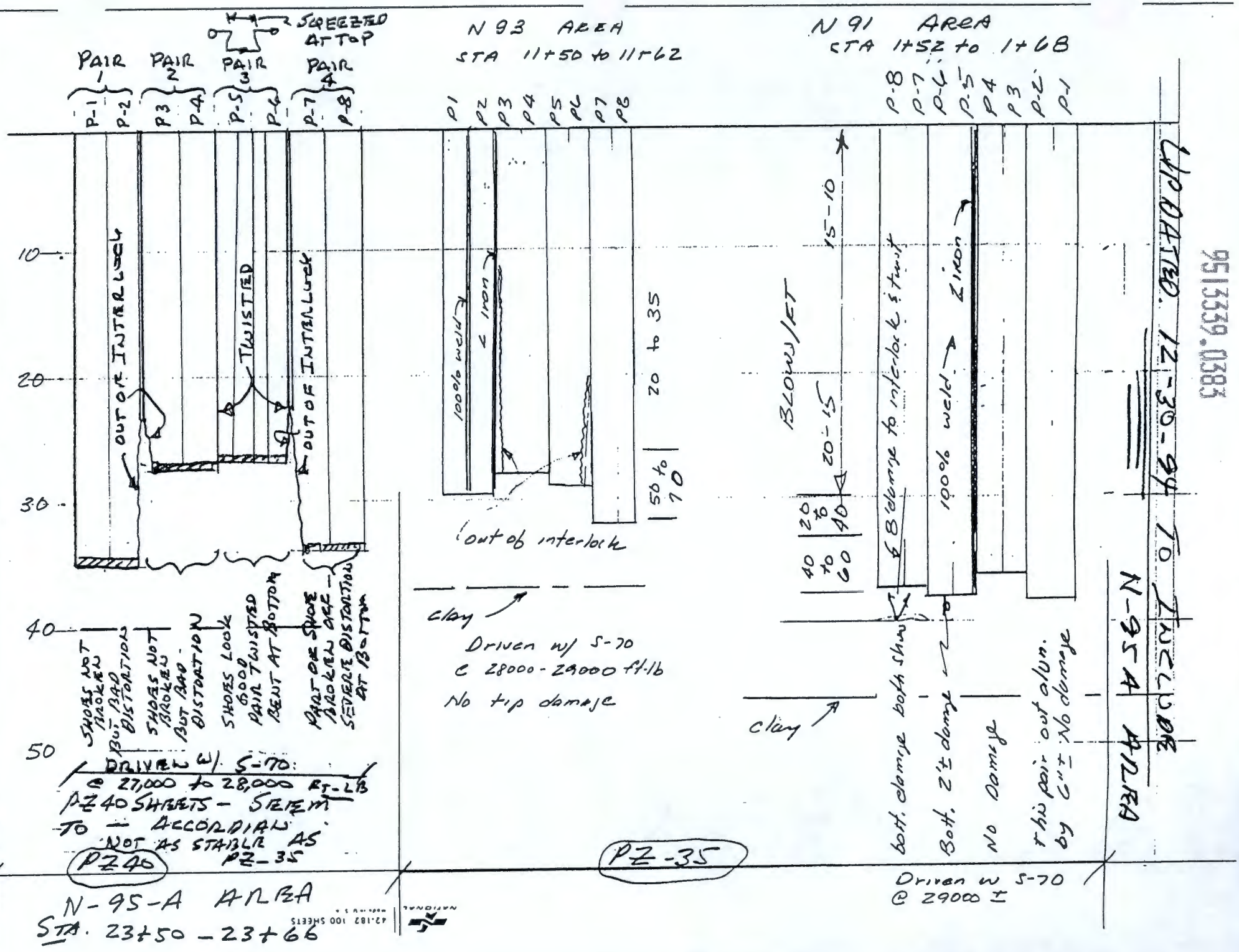
7:40 LAID PAIR #4 DOWN SHEETS 7 & 8
SHOE ON SHEET #7 BROKEN OFF
Bottom bad - distorted
Sheets 6 & 7 out of Interlock (12 FT)
AT BOTTOM

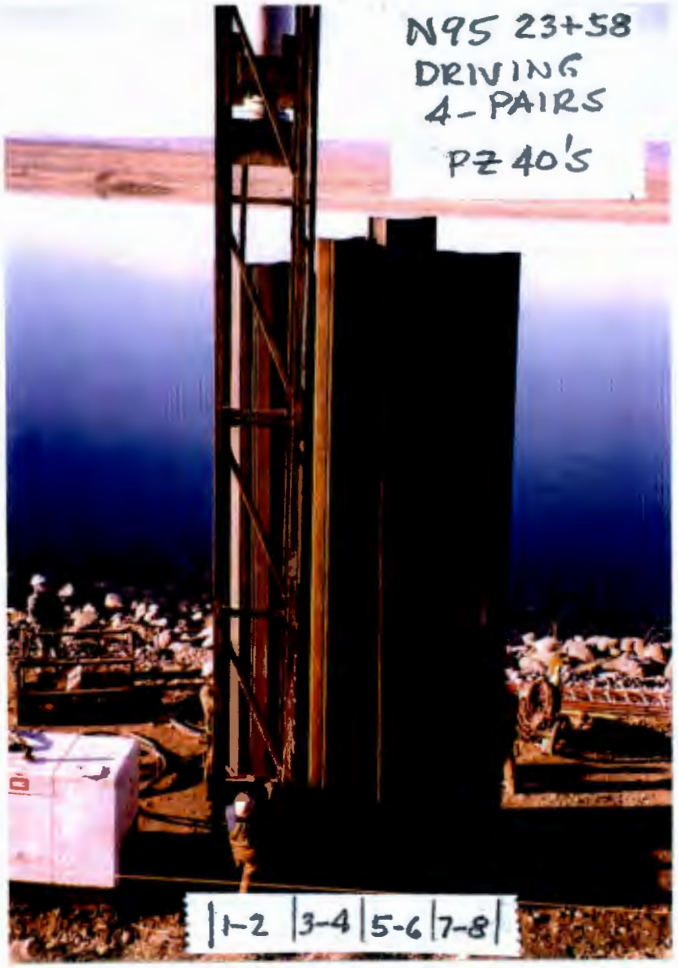
7:44 - 8:24 PULL PAIR #1 35.5' @ 5' stops to
Check RAD - FOUND NO Contamination
Bottom of Sheet Distorted
Sheets 2 & 3 out of Interlock (± 12 FT)
AT BOTTOM

8:35 - 9:30 PULL PAIR 3 UP 27 FT W/ RAD CHKS
at 5 FT Intervals
(No Contamination)
SHEETS Distorted - No Severe Damage.
Sheet 7 was out of Interlock
w/ Sheet 7 For ± 12 FT.

9:30 - 10:00 PULL PAIR 2 UP 27 FT W/ RAD CHKS
at 5 FT Intervals.
No Contamination
BOTTOM SHOE END BAD DISTORTION
SHEET 3 WAS OUT of interlock w/Sheet 2
± 12 FT.

Conclusion: W E McDaniel
TIPS of PAIRS 1 & 4 BAD Damage.
ALL 4-PAIRS were Twisted and
Permanently bent at lower 6 Ft-12 FT
PZ-40 Sheets are Not as STABLE As. PZ-35 SHEET 5
(IN PAIRS) (IN PAIRS)


SQUEEZED AT TOP
PAIR 1
PAIR 2
PAIR 3
PAIR 4
P-1 P-2 P3 P4 P-5 P-6 P-7 P-8
OUT OF INTERLOCK
TWISTED
OUT OF INTERLOCK
10
20
30
40
50
SHOES NOT BROKEN BUT BAD DISTORTION
SHOES NOT BROKEN BUT BAD DISTORTION
SHOES LOOK GOOD PAIR TWISTED RENT AT BOTTOM
PART OF SHOE BROKEN OFF SEVERE DISTORTION AT BOTTOM
DRIVEN w/ S-70:
@ 27,000 to 28,000 FT-LB
PZ 40 SHEETS - SEEM TO - ACCORDIAN
NOT AS STABLE AS PZ-35
PZ40
N-95-A AREA
STA. 23+50 - 23+66
N 93 AREA
STA 11+50 to 11+62
P1 P2 P3 P4 P5 P6 P7 P8
100% weld
I iron
20 to 35
50 to 70
out of interlock
clay
Driven w/ S-70
@ 28000 - 29000 ft-lb
No tip damage
PZ-35
N 91 AREA
STA 1+52 to 1+68
P-8 P-7 P-6 P-5 P4 P3 P-2 P-1
BLOWS/FT
15-10
20-15
20 to 40
40 to 60
I iron
100% weld
6 8 damage to interlock & twist
clay
both damage both shoes
Both. 2'± damage
No Damage
this pair out alun. by 6"± No damage
Driven w S-70
@ 29000 ±
N-95A AREA
UPDATED 12-30-94 TO INCLUDE
9513339.0383



9513339.0384

RCI ENVIRONMENTAL PO BOX 6090 KENT, WA 98064	PREPARED FOR BECHTEL HANFORD, INC. HANFORD N SPRINGS SHEET PILE BARRIER WALL DESIGN AND CONSTRUCTION

RCI ENVIRONMENTAL PO BOX 6090 KENT, WA 98064	PREPARED FOR BECHTEL HANFORD, INC. HANFORD N SPRINGS SHEET PILE BARRIER WALL DESIGN AND CONSTRUCTION

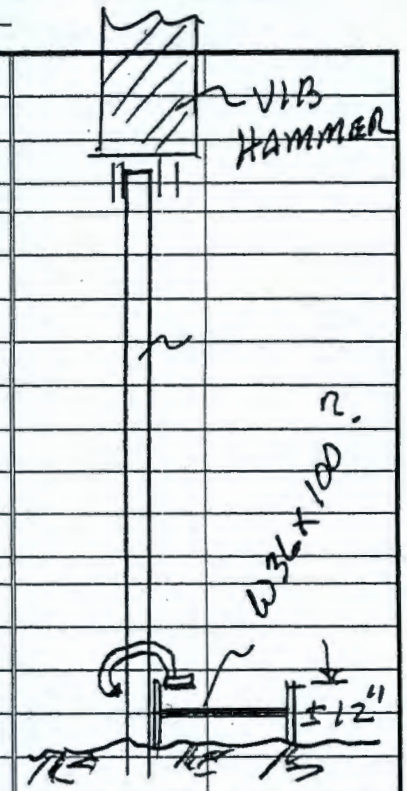
RCI ENVIRONMENTAL PO BOX 6090 KENT, WA 98064	PREPARED FOR BECHTEL HANFORD, INC. HANFORD N SPRINGS SHEET PILE BARRIER WALL DESIGN AND CONSTRUCTION

N SPRINGS SHEET PILE BARRIER WALL - SUBCONTRACT 22194-14-EE-000001

PILE TEST INSTALLATION REPORT NO 1 DATE 12-02-94 LOCATION N96A SHEET 1 OF 2

INSPECTOR W. McDANIEL WEATHER OVERCAST TEMP COLD

STATION	30+10		30+04				
SHEET PILE NUMBER	96-1-2		96-3-4				
VISUAL (✓-OK)							
LENGTH IN FEET	50'	50'	50'	50'			
SHEET TYPE	CZ128	CZ128	CZ128	CZ128			
THICKNESS	3/8	3/8					
END CUTOFFS	✓	✓					
INTERLOCKS	✓	✓					
LINEARITY	✓	✓					
PILE SHOES	UNIVERSAL	UNIVERSAL	UNIV.	UNIV.			
INSTALLATION							
INCLINATION %							
PERPENDICULAR							
PARRALLEL/WALL							
HAMMER-TYPE	VIB.		VIB.				
HAMMER-MODEL	APE-200		APE 200				
ENERGY SETTING							
TIME START	3:44		4:04				
TIME END	3:55		4:10				
FINAL PENETRATION	6 FT		5.5 FT				
REMARKS	TEST DRIVE W/O LEADS OR TEMPLATE ② ①		②				



NOTES

① Pull and check Rad-ok MALE Interlock LIGHT Damage (Hit a Rock)

② Pull and check Rad-ok No more damage noted.

② Set PAIR AGAINST WF BEAM

9513339.0387

N SPRINGS SHEETPILE BARRIER WALL- SHEET PILE INSTALLATION REPORT FOR BLOW COUNT

REPORT NO 1. SHEET 2 OF 2. DATE 12-02-95 INSPECT. WMC

PILE NO 96-1-2				PILE NO 96-3-4				PILE NO				PILE NO			
FEET	BLOWS		OTHER	FEET	BLOWS		OTHER	FEET	BLOWS		OTHER	FEET	BLOWS		OTHER
0		3:44		0		4:04		0				0			
1		:45		1				1				1			
2		:48		2		.05		2				2			
3				3				3				3			
4		:50		4		.06		4				4			
5				5		.08		5				5			
6		3:52		5½'		.10		6				6			
7				7		QUIT AT 4:10		7				7			
8				8		On Rocks		8				8			
9				9				9				9			
0				0				0				0			
1				1				1				1			
2				2				2				2			
3				3				3				3			
4				4				4				4			
5				5				5				5			
6				6				6				6			
7				7				7				7			
8				8				8				8			
9				9				9				9			
0				0				0				0			
1				1				1				1			
2				2				2				2			
3				3				3				3			
4				4				4				4			
5				5				5				5			
6				6				6				6			
7				7				7				7			
8				8				8				8			
9				9				9				9			

NOTES

9513339.0388

N SPRINGS SHEET PILE BARRIER WALL - SUBCONTRACT 22194-14-EE-000001

PILE TEST INSTALLATION REPORT NO 2 DATE 12-05-94 LOCATION N96A SHEET 1 OF 3

INSPECTOR W. McDANIEL WEATHER OVERCAST TEMP COLD

STATION	30+10		30+10					
SHEET PILE NUMBER	96-5-6		96-5-6					
			continued					
VISUAL (✓-OK)								
LENGTH IN FEET	50'	50'	50	50'				
SHEET TYPE	CZ128	CZ128	CZ128	CZ128				
THICKNESS	3/8	3/8	3/8	3/8				
END CUTOFFS	✓	✓	✓					
INTERLOCKS	✓	✓	✓					
LINEARITY	✓	✓	✓					
PILE SHOES	UNIVERSAL	UNIV.	UNIV.	UNIV.				
INSTALLATION								
INCLINATION %								
PERPENDICULAR			Continue Driving					
PARRALLEL/WALL			w/ New Hammer					
HAMMER-TYPE	VIB-		VIB					
HAMMER-MODEL	APE 200		APE 400					
ENERGY SETTING								
TIME START	8:00		9:09					
TIME END	8:16		9:22					
FINAL PENETRATION	8.0 FT		9.5 FT					
REMARKS	DRIVE w/o LEADS		DRIVE w/o LEADS					
	OR GUIDE TEMPLATE		OR GUIDE TEMPLATE					
	(GROUND EL. 405)		(GROUND EL. 405)					
			PULL AND CHK RAD - OK ①					

Continued on Sheet 2 & 3

NOTES

① Some damage to male Interlock - 3/8 sheet above "Shoe" Buckled - SHOW CURLED OUT TOP of sheets 3/8"R failed under GRIPPER VISE. DECIDED TO CHANGE TO PZ35 HEAVY WT. PILE

9513339.0389

N SPRINGS SHEET PILE BARRIER WALL - SUBCONTRACT 22194-14-EE-000001

PILE TEST INSTALLATION REPORT NO 2 DATE 12-05-95 LOCATION N 96A SHEET 2 OF 3

INSPECTOR W. MC DANIEL WEATHER OVER CAST TEMP COLD

STATION	30+05		30+00		29+75			
SHEET PILE NUMBER	96-7-8		96-9-10		96-11-12			
VISUAL CHECK								
LENGTH IN FEET	60'	60'	60'	60'	58'	58'		
SHEET TYPE	PZ 35	PZ 35	PZ 35	PZ 35	PZ 35	PZ 35		
THICKNESS	✓	✓	✓	✓	✓	✓		
END CUTOFFS	✓	✓	✓	✓	(TRIMMED TOP - OK)			
INTERLOCKS	✓	✓	✓	✓	✓	✓		
LINEARITY	✓	✓	✓	✓	✓	✓		
PILE SHOES	CAST PZ 35	✓	← ditto		← ditto			
INSTALLATION	TEST DRIVE							
INCLINATION %	W/O LEADS		SAME		SAME			
PERPENDICULAR	W/O GUIDE TEMPLATE							
PARRALLEL/WALL	W/ GUIDE BEAM ON GROUND							
HAMMER-TYPE	VIB.		VIB		VIB			
HAMMER-MODEL	APE 400		APE 400		APE 400			
ENERGY SETTING								
TIME START	10:48		11:04		1:30			
TIME END	10:52		11:19		1:45			
FINAL PENETRATION	(8 FT)		(12 FT)		(12 FT)			
REMARKS	MOVED to other Side of BEAM							
	GROUND EL. 405		GROUND EL. 405		GROUND EL. 405			
NOTES	0' 10:48		PZ35 PAIR		PULL AND CHK RAD			
	3 10:49		BROK OUT AT TOP		OK			
	6 10:50		AT CLAMP AREA		MOVE TO N-97			
	8' 10:52 STOP		FRESH HEAD & MOVE		AREA			
PULL -	CHK RAD - OK		PULL-CHK-RAD-OK					

9513339.0390

N SPRINGS SHEETPILE BARRIER WALL- SHEET PILE INSTALLATION REPORT FOR BLOW COUNT

REPORT NO 2 . SHEET 3 OF 3 . DATE 12-05-95. INSPECT. W Mc D.

PILE NO 96-5-6				PILE NO continued on 96-5-6				PILE NO 96-9-10				PILE NO 96-11-12			
APE-200 VIB.				APE-400 VIB.				30+00				29+75			
FEET	BLOWS		OTHER	FEET	BLOWS		OTHER	FEET	BLOWS		OTHER	FEET	BLOWS		OTHER
0		8:00		0				0		11:09		0		1:30	
1				1				1				1			
2				2				2				2			
3				3				3				3			
4				4				4				4			
5				5				5		11:10		5			
6		:05	8:12	6				6				6			
7				7				7		:11		7			
8			8:16	8		9:09		8		:12		8		1:33	1:36
9				9				9		:13		9			
0	9 MIN FOR 8 FT			0	9:15	9:17		10		11:14		10			
1				1				1				11			
2				2				2		11:17		12			1:45
3				3	Continued			3		11:19		3		STOPPED 9	
4				4	Driving at			4		STOP DRIVING		4			
5				5	8 FT.			5				5			
6				6				6		STOPPED MOVING		6			
7				7	w/ APE 400			7		AT 12 FT		7		MOVE TO	
8				8				8		DEPTH.		8			
9				9				9				9		N97A	
0				0				0				0			
1				1				1				1			
2				2				2				2			
3				3				3				3			
4				4				4				4			
5				5				5				5			
6				6				6				6			
7				7				7				7			
8				8				8				8			
9				9				9				9			

NOTES

9513339.0391

N SPRINGS SHEET PILE BARRIER LL - SUBCONTRACT 22194-14-EE-000001

PILE TEST INSTALLATION REPORT NO 6 DATE 12-09-94 LOCATION N96A SHEET 1 OF 2

INSPECTOR Wm. McDaniel WEATHER CLOUDY TEMP COLD

STATION	30+45		30+45				
SHEET PILE NUMBER	96 13-14		96 - 15-16				
VISUAL (OK)							
LENGTH IN FEET	60'	60'	TRY to Thread				
SHEET TYPE	PZ 35	PZ 35	2ND PAIR				
THICKNESS	1/2"	1/2"	w/ Hyd. Crane				
END CUTOFFS	✓	✓					
INTERLOCKS	✓	✓	Can't get				
LINEARITY	✓	✓	in close				
PILE SHOES	(Cast Str	FULL SHOE)	Enough to				
			Reach -				
INSTALLATION	GRND EL.	405					
INCLINATION %			Decided to				
PERPENDICULAR			Thread				
PARRALLEL/WALL			Next work				
HAMMER-TYPE	DIESEL IMPACT		Day (Monday)				
HAMMER-MODEL	DELMAG	D19-32					
ENERGY SETTING	FULL						
TIME START	10:20 -	11:47					
TIME END		3:14 PM					
FINAL PENETRATION	49 FT						
REMARKS	DRIVE w/ LEADS						
	& 1-SIDE TEMPLATE						

NOTES

9513339.0392

N SPRINGS SHEETPILE BARRIER WALL- SHEET PILE INSTALLATION REPORT FOR BLOW COUNT

REPORT NO 6. SHEET 2 OF 2. DATE 12-09-94 INSPECT. .

PILE NO ① 30+45 96-13/14				PILE NO 96-13/14 Continued				PILE NO				PILE NO			
FEET	BLOWS		OTHER	FEET	BLOWS		OTHER	FEET	BLOWS		OTHER	FEET	BLOWS		OTHER
0			11:47	30	52			0				0			
1	10			1	32			1				1			
2	10			2	27			2				2			
3	10			3	38			3				3			
4	10			4	32			4				4			
5	10			5	36			5				5			
6	10			6	50			6				6			
7	24			7	60			7				7			
8	24			8	61			8				8			
9	21			9	60			9				9			
10	16			40	63			0				0			
1	32			1	84	1:29		1				1			
2	36			2				2				2			
3	40			3	400			3				3			
4	48			4				4				4			
15	55	12:43	12:52	5	136			5				5			
16	70			6	100			6				6			
7	82			7	103			7				7			
8	74			8	91			8				8			
9	74			49	49/6"		3:14 PM	9				9			
20	68			0			QUIT	0				0			
1	60			1				1				1			
2	58			2				2				2			
3	59			3				3				3			
4	67			4				4				4			
5	70			5				5				5			
6	72			6				6				6			
7	64			7				7				7			
8	55			8				8				8			
29	52			9				9				9			

NOTES

① Drive w/ Diesel Hammer
Delmag D-19-32

9513339.0393

N SPRINGS SHEET PILE BARRIER WALL - SUBCONTRACT 22194-14-EE-000001

PILE TEST INSTALLATION REPORT NO 7 DATE 12-12-94 LOCATION N964 SHEET 1 OF 2

INSPECTOR W. Mc Daniel WEATHER OVERCAST TEMP COLD

STATION	30+41		30+49					
SHEET PILE NUMBER	96 - 15/16		96 17/18					
	(2ND PAIR)		(3RD PAIR) ①					
VISUAL (✓=OK)								
LENGTH IN FEET	60'	60'	60'	60'				
SHEET TYPE	PZ 35	PZ 35	PZ 35	PZ 35				
THICKNESS	1/2"	1/2"	1/2"	1/2"				
END CUTOFFS	✓	✓	✓	✓				
INTERLOCKS	✓	✓	✓	✓				
LINEARITY	✓	✓	✓	✓				
PILE SHOES	(Cast-Stl	FULL SHOE)	(Cast Stl	FULL Shoe)				
INSTALLATION	GROUND @	EL 405	GRND EL.	405				
INCLINATION %								
PERPENDICULAR								
PARRALLEL/WALL								
HAMMER-TYPE	Diesel	Impact	HYDRAULIC	IMPACT				
HAMMER-MODEL	DELMAG-	D-19-32	IHC -	S70				
ENERGY SETTING								
TIME START	9:02		2:08					
TIME END	10:54		3:47					
FINAL PENETRATION	(33.7 FT)		45.0	FT				
REMARKS	DRIVE W/ LEADS FOR HAMMER		DRIVE W/ LEADS FOR HAMMER					
	one Side	Template	ONE SIDE	TEMPLATE.				

NOTES

① 9:30 AM S-70 Hydraulic Impact Hammer Arrived
Start Preparing to Drive 3RD PAIR w/ S-70

9513339.0394

N SPRINGS SHEETPILE BARRIER WALL- SHEET PILE INSTALLATION REPORT FOR BLOW COUNT

REPORT NO 7 . SHEET 2 OF 2 . DATE 12-12-94 INSPECT. .

PILE NO 30+41 96-15/16				PILE NO 30+41 Cont'd.				PILE NO 30+49 96-17/18				PILE NO			
FEET	BLOWS		OTHER	FEET	BLOWS		OTHER	FEET	BLOWS		OTHER	FEET	BLOWS		OTHER
0	EL. 405		9:02	30	183			0	EL. 405		2:08	30	25		
1	2			1	165			1	10			1	27		
2	8			2	168			2	8			2	32		
3	16			3	180			3	8			3	32		
4	12			34	106	33.7'	10:54	4	8			4	52	* FRESH Head	
5	11			5	STOPPED		TO	5	11			5	59		
6	11			6	FRESH HEAD			6	14			6	56		
7	17			7				7	14			7	64		
8	21			8				8	14			8	80		
9	21			9				9	15			9	59		
10	20			0				10	10			40	48		
1	16			1				1	10			1	68		
2	19			2				2	24			2	122	* FRESH HEAD	
3	36			3				3	29			3	93		
4	53			4				4	25			4	160		
5	66			5				5	30			45	200	< STOP	
6	64			6				6	30			6		TOP	
7	80			7				7	74			7		Buckled	
8	88			8				8	45			8			
9	87			9				9	44			9			
20	91			0				20	50			0			
1	82			1				1	44			1			
2	83			2				2	51			2			
3	78			3				3	56			3			
4	90			4				4	57			4			
5	107			5				5	60			5			
6	129			6				6	61			6			
7	146			7				7	53			7			
8	162			8				8	41			8			
29	145			9				9	26			9			

NOTES

9513339.0395

N SPRINGS SHEET PILE BARRIER WALL - SUBCONTRACT 22194-14-EE-000001

PILE TEST INSTALLATION REPORT NO 8 DATE 12-13-94 LOCATION N96A SHEET 1 OF 1

INSPECTOR W.E. McDANIEL WEATHER OVERCAST TEMP COLD

STATION	30+49		30+45		30+41			
SHEET PILE NUMBER	96 - 17/18		96 - 13/14		96 - 15/16			
VISUAL (✓-OK)								
LENGTH IN FEET	60'	60'	60'	60'	60'	60'		
SHEET TYPE	PZ 35	PZ 35	PZ 35	PZ-35	PZ 35	PZ 35		
THICKNESS	1/2"	1/2"	← Same		← Same			
END CUTOFFS	✓	✓	Same		Same			
INTERLOCKS	✓	✓						
LINEARITY	✓	✓						
PILE SHOES	East Side	FULL SHOE	← Same		← Same			
INSTALLATION	GRND EL. 405		← Same		← Same			
INCLINATION %								
PERPENDICULAR								
PARRALLEL/WALL								
HAMMER-TYPE	HYDRAULIC IMPACT		Same		Same			
HAMMER-MODEL	IHC S-70							
ENERGY SETTING								
TIME START	8:35		8:00 +	8:57	8:13 +	9:11		
TIME END	8:40		8:10	9:08	8:22	9:15		
FINAL PENETRATION	46 RT		52 RT	55 RT	46.7'	48 RT		
REMARKS	DRIVE W/ LEADS FOR HAMMER ONE SIDE TEMPLATE		Same		Same			
NOTES	BLOWS		Blows	Blows	BLOWS			
	45' 200		49 ?	52 118	44 180			
	46' STOP		50	53 131	45 250			
			51 104	54 165	46 220			
			52 136	55 EST	47 250			
			? 4'	→ EL. 350	48			
			Below Elev Line					

9513339.0396

RCI ENVIRONMENTAL PO BOX 6090 KENT, WA 98064	PREPARED FOR BECHTEL HANFORD, INC. HANFORD N SPRINGS SHEET PILE BARRIER WALL DESIGN AND CONSTRUCTION

PREPARED FOR BECHTEL HANFORD, INC.
HANFORD N SPRINGS SHEET PILE BARRIER WALL DESIGN AND CONSTRUCTION

RCI ENVIRONMENTAL
PO BOX 6090
KENT, WA 98064

PREPARED FOR BECHTEL HANFORD, INC.
HANFORD N SPRINGS SHEET PILE BARRIER WALL DESIGN AND CONSTRUCTION

RCI ENVIRONMENTAL
PO BOX 6090
KENT, WA 98064

RCI ENVIRONMENTAL PO BOX 6090 KENT, WA 98064	PREPARED FOR BECHTEL HANFORD, INC. HANFORD N SPRINGS SHEET PILE BARRIER WALL DESIGN AND CONSTRUCTION

9513339.0401

RCI ENVIRONMENTAL PO BOX 6090 KENT, WA 98064	PREPARED FOR BECHTEL HANFORD, INC. HANFORD N SPRINGS SHEET PILE BARRIER WALL DESIGN AND CONSTRUCTION

RCI ENVIRONMENTAL PO BOX 6090 KENT, WA 98064	PREPARED FOR BECHTEL HANFORD, INC. HANFORD N SPRINGS SHEET PILE BARRIER WALL DESIGN AND CONSTRUCTION

N SPRINGS SHEET PILE BARRIER WALL - SUBCONTRACT 22194-14-EE-000001

PILE TEST INSTALLATION REPORT NO 3 DATE 12-06-94 LOCATION N-97A SHEET 1 OF 3

INSPECTOR W. McDANIEL WEATHER SNOW THEN CLEAR TEMP COLD

STATION	35+66		35+40		35+38	
SHEET PILE NUMBER	97-1-2		97-3-4		NO TEST DRIVE	
VISUAL (FOK)						
LENGTH IN FEET {FRESH HEADED}	± 58'	± 58'				
SHEET TYPE	PZ35	PZ35				
THICKNESS	1/2	1/2				
END CUTOFFS	✓	✓	SAME		SAME	
INTERLOCKS	✓	✓				
LINEARITY	✓	✓				
PILE SHOES	(CAST STL FOR PZ35)					
INSTALLATION	GROUND EL. 401		GROUND EL 401		GROUND EL. 401	
INCLINATION %						
PERPENDICULAR						
PARRALLEL/WALL						
HAMMER-TYPE	VIB		VIB		VIB	2 PART BLOCK SPUN FOULED HOIST LINES - STOP TO REPAIR 2:15
HAMMER-MODEL	APE 400		APE 400		APE 400	
ENERGY SETTING						
TIME START	10:24		10:57		1:15	
TIME END	10:53		11:16		2:05	
FINAL PENETRATION	6.0 FT				2:15	
REMARKS	TEST DRIVE W/O LEADS W/O TEMPLATE W/ FOOTER GUIDE/BEAM		SAME		SAME MOVED OUT TO LET JOHN DREER LOADER DIG TEST HOLE	

NOTES

9513339.0403

N SPRINGS SHEET PILE BARRIER WALL - SUBCONTRACT 22194-14-EE-000001

PILE TEST INSTALLATION REPORT NO 3 DATE 12-06-94 LOCATION N97-A SHEET 2 OF 3

INSPECTOR W. McDANIEL WEATHER TEMP

STATION	35+66
SHEET PILE NUMBER	
VISUAL CHECK	DUG HOLE WITH JOHN DEERE BACKHOE
LENGTH IN FEET	TO SEE WHAT MATERIAL WAS STOPPING
SHEET TYPE	PILES
THICKNESS	2:18 to 2:30 (AT STA 35+66)
END CUTOFFS	
INTERLOCKS	DUG ± 6 FT HOLE BOTTOM ± EL 395
LINEARITY	
PILE SHOES	401 to 395 MIXED SAND, GRAVEL AND
	SOME COBBLES TO 6" / 7" DIA.
INSTALLATION	
INCLINATION %	AT EL 395 ± HIT HARD TO DIG MAT'L
PERPENDICULAR	SIMILAR TO MAT'L 0'-6'
PARRALLEL/WALL	BUT APPEARS IT WAS CEMENTED
HAMMER-TYPE	ONCE DUG - MAT'L DOES NOT
HAMMER-MODEL	SHOW CEMENTATION - ?
ENERGY SETTING	2:50 MOVED TO ± 30+10 DUG HOLE W/ JD BACKHOE
TIME START	DOWN TO ± 9 FT (± EL. 396) STARTED CAVING IN.
TIME END	ENDED W/ ± 8' DEPTH
FINAL PENETRATION	MAT'L AT 8' TO 9' DEPTH HIGH RATIO OF COARSE
REMARKS	GRAVEL AND COBBLES - NOT STANDING - NOT DENSE
	4:00 PM QUIT FOR DAY

NOTES

2:15 - 4:00 PM
PILE CREW WORKING ON 3900 CRANE
TO CORRECT - 2 PART TWISTING & FOULING -

9513339.0404

N SPRINGS SHEETPILE BARRIER WALL- SHEET PILE INSTALLATION REPORT FOR BLOW COUNT

REPORT NO 3. SHEET 3 OF 3. DATE 12-06-94 INSPECT. WMD

PILE NO	97-1-2 35+66			PILE NO	97-3-4 35+40			PILE NO				PILE NO			
FEET	BLOWS		OTHER	FEET	BLOWS		OTHER	FEET	BLOWS		OTHER	FEET	BLOWS		OTHER
0		10:30		0		11:04		0				0			
1				1				1				1			
2				2		:05		2				2			
3				3		:06		3				3			
4		:31		4		:07		4				4			
5		:34		~~5~~	4.3	11:08		5				5			
~~6~~	5.5	:35	10:37	6				6				6			
~~7~~	6'		10:35	7				7				7			
8				8				8				8			
9				9				9				9			
0				0				0				0			
1				1				1				1			
2				2				2				2			
3	10:40 POLL PILES			3	11:16 POLL PILES			3				3			
4	CHKD RAD			4	CHK RAD			4				4			
5	OK			5	OK			5				5			
6				6				6				6			
7				7				7				7			
8				8				8				8			
9				9				9				9			
0				0				0				0			
1				1				1				1			
2				2				2				2			
3				3				3				3			
4				4				4				4			
5				5				5				5			
6				6				6				6			
7				7				7				7			
8				8				8				8			
9				9				9				9			

NOTES

9513339.0405

N SPRINGS SHEET PILE BARRIER WALL - SUBCONTRACT 22194-14-EE-000001

PILE TEST INSTALLATION REPORT NO 4 DATE 12-07-94 LOCATION N97A SHEET 1 OF 1

INSPECTOR WE McDANIEL WEATHER OVERCAST TEMP COLD

STATION	34+90			34+90	
SHEET PILE NUMBER	97-5-6		9A.M to 2:30PM	Moving in Crawler Hyd Backhoe	
	97PZ3	97PZ4	to	Test Fracv a Hole through Hard mat'l	
VISUAL (-OK)					
LENGTH IN FEET	30'	30'	below ± 6 FT	EST. BL. 395 FT	
SHEET TYPE	PZ 35	PZ 35	2:36 To 3:35	FRACV HOLE ELEV. 401 to EST. 386	
THICKNESS	1/2	1/2	0' + 6' =	Not Dense - Poor Graded	
END CUTOFFS	✓	✓		Sand Gravel Cobbles	
INTERLOCKS	✓	✓		few Boulders 10" to 16"	
LINEARITY	✓	✓	6'-15' =	Est. Ringold	
PILE SHOES	(Cast Str /PZ-35)			Variation in Color	
				Some Brownish Some Grey	
INSTALLATION	GROUND EL. 401				
INCLINATION %				6'-15' Stands Vertical	
PERPENDICULAR			DRIVE	appears Cemented	
PARRALLEL/WALL			DATA	but After Fracv. Soil	
HAMMER-TYPE	VIBRATORY		0' 8:29	matl's do not show Cementation	
HAMMER-MODEL	APE-400				
ENERGY SETTING			3.5' 8:30		
TIME START	8:29		4' 8:31		
TIME END	8:45		5' 8:33 8:37		
FINAL PENETRATION	5 1/2 FT				
REMARKS	TEST DRIVE W/O LEADS		5 1/2 ft 8:39		
	W/ BEAM FOOT GUIDE				
	* ①				

NOTES

* TRY W/ SHORT PAIR OF SHEETS TO SEE IF LENGTH WAS WASTING A LOT OF THE VIBRATORY DRIVER ENERGY — SHORTER SHOWS LESS LATERAL WHIP ETC BUT APPARENTLY SMALL DIFFERENCE IN PENETRATION ENERGY.

① Pulled sheet - Top of sheet broken where Hydraulic Gripper Grabs Sheet.

CHK RAD - OK

9513339.0406

N SPRINGS SHEET PILE BARRIER WALL - SUBCONTRACT 22194-14-EE-000001

PILE TEST INSTALLATION REPORT NO 5 DATE 12-08-95 LOCATION N-97A SHEET 1 OF 2

INSPECTOR W.E. McDaniel WEATHER CLEAR THEN CLOUDY TEMP COLD LOW 40's

STATION	34+90				34+90		34+90
SHEET PILE NUMBER	97-7-8				97-9-10		97-11-12
VISUAL (✓=OK)							NOTE ①
LENGTH IN FEET	30 FT	30 FT			30 FT	30 FT	
SHEET TYPE	PZ-35	PZ 35			PZ 35	PZ 35	
THICKNESS	1/2"	1/2"			1/2	1/2	
END CUTOFFS	✓	✓			✓	✓	
INTERLOCKS	✓	✓			✓	✓	
LINEARITY	✓	✓			✓	✓	
PILE SHOES	Cast STL (PZ-35)				FULL Cast STL Shoe. (IN HOLE)		
INSTALLATION	① BTM OF HOLE EL. 387		DRIVE DATA		START EL. 387		
INCLINATION %			0'	8:18 EL. 387'			
PERPENDICULAR							
PARRALLEL/WALL			4'	8:23 8:25			
HAMMER-TYPE	VIB.		4'	8:26	DIESEL		VIB
HAMMER-MODEL	APE-400		STOP -		DELMAG 19-32		APE-400
ENERGY SETTING			PULLED PILE				(DRIVE 4 Ft & PULL OUT)
TIME START	8:18		PREPARE TO		12:31 PM		1:20
TIME END	8:26		DRIVE W/ DIESEL		12:53 PM		1:45
FINAL PENETRATION	4 FT		HAMMER		14 FT (TO EL. 373)		14 Ft + 4 = 18'
REMARKS	DRIVE IN BOTTOM OF EXCAV. HOLE W/O LEADS				DRIVE IN BTM OF EXCAV. HOLE. W/ LEADS		Checked RAD OK
					See Sheet 2/2		

NOTES

① Set on W/ APE 400 VIB TO PULL RAN PILE ON DOWN + 4 FT (EL. 373 to 369') where it Stopped moving - Then Pulled Pile OUT -

9513339.0407

N SPRINGS SHEETPILE BARRIER WALL- SHEET PILE INSTALLATION REPORT FOR BLOW COUNT

REPORT NO 5 . SHEET 2 OF 2 . DATE 12-08-95 INSPECT. .

N-97A

PILE NO 34+90 97-9-10				PILE NO				PILE NO				PILE NO			
FEET	BLOWS		OTHER	FEET	BLOWS		OTHER	FEET	BLOWS		OTHER	FEET	BLOWS		OTHER
0			12:31	0				0				0			
1	20			1				1				1			
2	54			2				2				2			
3	48			3				3				3			
4	54			4				4				4			
5	58			5				5				5			
6	50			6				6				6			
7	43			7				7				7			
8	57			8				8				8			
9	58			9				9				9			
10	61			0				0				0			
1	57			1				1				1			
2	57			2				2				2			
3	47			3				3				3			
14	46			4				4				4			
5			12:53	5				5				5			
6				6				6				6			
7				7				7				7			
8				8				8				8			
9				9				9				9			
20				0				0				0			
1				1				1				1			
2				2				2				2			
3				3				3				3			
4				4				4				4			
5				5				5				5			
6				6				6				6			
7				7				7				7			
8				8				8				8			
9				9				9				9			

NOTES

9513339.0408

N SPRINGS SHEET PILE BARRIER WALL - SUBCONTRACT 22194-14-EE-000001

PILE TEST INSTALLATION REPORT NO 9 DATE 12-13-94 LOCATION N97A SHEET 1 OF 2

INSPECTOR W.E. McDANIEL WEATHER CLOUDY TEMP COLD

STATION	33+85		33+81	
SHEET PILE NUMBER	97 – 15/16		97 – 13/14	
VISUAL (✓=OK)				
LENGTH IN FEET	60'	60'	60'	60'
SHEET TYPE	PZ-35	PZ 35	PZ35	PZ 35
THICKNESS	1/2	1/2	1/2	1/2
END CUTOFFS	✓	✓	SAME	
INTERLOCKS	✓	✓		
LINEARITY	✓	✓		
PILE SHOES	(Test Stl	FULL SHOE) ←	SAME	
INSTALLATION	GRND – EL. 401		GRND. EL 401	
INCLINATION %				
PERPENDICULAR				
PARRALLEL/WALL				
HAMMER-TYPE	HYDRAULIC	IMPACT ←	SAME	
HAMMER-MODEL	IHC	S-70	IHC	S-70
ENERGY SETTING				
TIME START	1:40		3:10	
TIME END	2:07		4:08	
FINAL PENETRATION	(48 FT)		(44 FT)	
REMARKS	HAMMER IN LEADS		SAME	
	ONE SIDE TEMPLATE			
	FOR 1 SHEETS			

NOTES

9513339.0409

N SPRINGS SHEETPILE BARRIER WALL- SHEE. . .LE INSTALLATION REPORT FOR BLOW COUNT

REPORT NO 9. SHEET 2 OF 2. DATE 12-13-94 INSPECT. W McDaniel

PILE NO 33+85 97- 15/16				PILE NO Contd				PILE NO 33+81 97 13/14				PILE NO Contd.			
FEET	BLOWS		OTHER	FEET	BLOWS		OTHER	FEET	BLOWS		OTHER	FEET	BLOWS		OTHER
0	El. 401	1:40	Fl-Lb.	30	24		28000	0	El. 401	3:10		30	50		28000
1			15-20,000	1	21		To	1	5		15000	1	48		To
2				2	21		30000	2	4		To	2	50		30000
3				3	22			3	10		20000	3	74		
4	10			4	17			4	14			4	95		
5	10			5	20			5	9			5	100		
6	10			6	18			6	10			6	107		50000
7	20			7	21			7	10			7	90		50000
8	?			8	33			8	10			8	95		30000
9	?			9	40	Est.		9	40		28000	9	99		
10	39			40	47	Clay		10	40		To	40	110		
1	44			1	39	EL		1	40		30000	1	84		
2	45		30,000	2	33			2	30			2	78		
3	36			3	35			3	38			3	98	Stop	
4	40			4	33			4	34			4		4:08	
5	42			5	35			5	52			5		QUIT FOR DAY	
6	38			6	33			6	45			6			
7	31			7	40			7	53			7			
8	24			48	40	2 PM		8	39			8			
9	25			9				9	40			9			
20	24			50				20	50			0			
1	25			1				1	60			1			
2	20		30000	2				2	49			2			
3	17			3				3	56			3			
4	8			4				4	55			4			
5	11			5				5	46			5			
6	21			6				6	40			6			
7	25			7				7	44			7			
8	27			8				8	47			8			
9	26			9				9	43			9			

NOTES

9513339.0410

N SPRINGS SHEET PILE BARRIER WALL - SUBCONTRACT 22194-14-EE-000001

PILE TEST INSTALLATION REPORT NO 10 DATE 12-14-94 LOCATION N97A SHEET 1 OF 1

INSPECTOR WE McDaniel WEATHER CLOUDY TEMP 35-38

STATION	33+85				33+81			
SHEET PILE NUMBER	97 15/16				97 13/14			
VISUAL (E-OK)								
LENGTH IN FEET	60'	60'			Same			
SHEET TYPE	PZ35	PZ 35						
THICKNESS								
END CUTOFFS	7 A.M	Rigged up to			Pull Sheets -			
INTERLOCKS		and Inspect						
LINEARITY		TRY TO PULL W/			APE-200 VIB HAMMER			
PILE SHOES	—	DID NOT MOVE —						
INSTALLATION								
INCLINATION %		TRY TO PULL W/			APE 400			
PERPENDICULAR		PULLING ALTERNATELY			ON Upstream 97-15/16			
PARRALLEL/WALL					& DOWNSTREAM PAIRS 97-13/14			
HAMMER-TYPE		Finally	got 97-15/16		(Upstream Pair)			
HAMMER-MODEL					up ± 44'			
ENERGY SETTING		Still	in Ground		and Interlocked			
TIME START		with	97-13/14		PAIR.			
TIME END								
FINAL PENETRATION		4:10	PM SHUT DOWN		FOR DAY			
REMARKS								

NOTES

9513339.0411

N SPRINGS SHEET PILE BARRIER WALL - SUBCONTRACT 22194-14-EE-000001

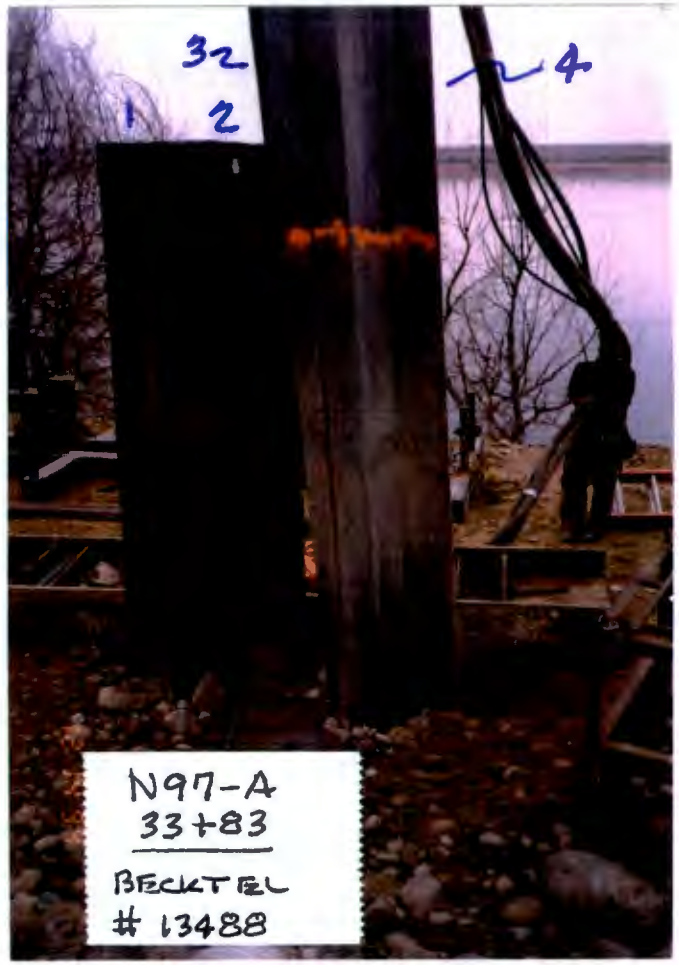
PILE TEST INSTALLATION REPORT NO 11 DATE 12/15/ LOCATION N-97A SHEET 1 OF 1

INSPECTOR WEATHER CLOUDY THEN CLEAR TEMP 94

SHEET PILE NUMBER	33+85 97- 15/16	33+81 97- 13/14					
VISUAL (OK)							
LENGTH IN FEET	— REMOVING SHEETS —						
SHEET TYPE							
THICKNESS	8 A.M to 9 AM						
END CUTOFFS							
INTERLOCKS	PULLED SHEETS OUT W/ APE-400						
LINEARITY							
PILE SHOES	Both Sheets have Severe Damage						
INSTALLATION	in Area 20 FT ABOVE TIP						
INCLINATION %							
PERPENDICULAR	to TIP.						
PARRALLEL/WALL							
HAMMER-TYPE	Twisted Spiral Interlocks Split out						
HAMMER-MODEL	and Sheets Rolled up into						
ENERGY SETTING	Coil Etc.						
TIME START							
TIME END							
FINAL PENETRATION	10 A.M Start moving to AREA N91-A						
REMARKS							

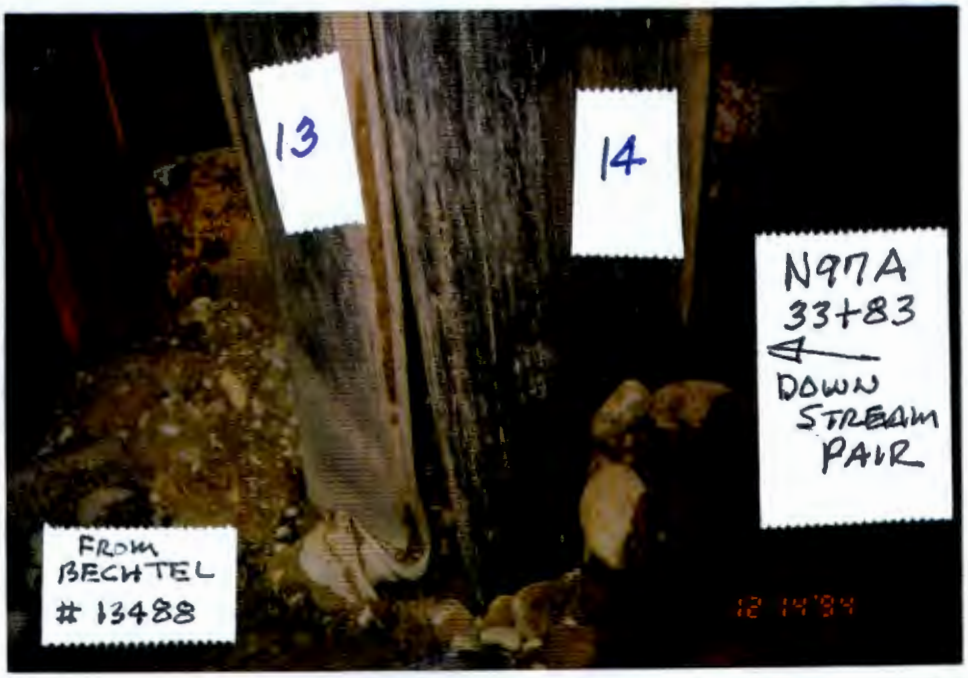
NOTES

9513339.0412



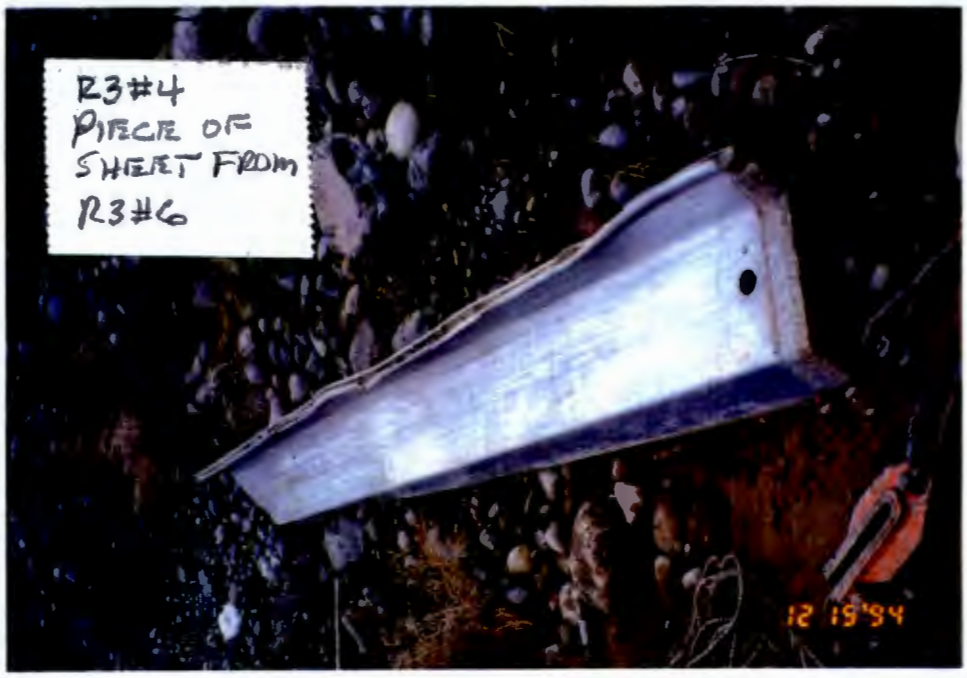
9513339.0413

RCI ENVIRONMENTAL PO BOX 6090 KENT, WA 98064	PREPARED FOR BECHTEL HANFORD, INC. HANFORD N SPRINGS SHEET PILE BARRIER WALL DESIGN AND CONSTRUCTION



PREPARED FOR BECHTEL HANFORD, INC.
HANFORD N SPRINGS SHEET PILE BARRIER WALL DESIGN AND CONSTRUCTION

RCI ENVIRONMENTAL
PO BOX 6090
KENT, WA 98064



PREPARED FOR BECHTEL HANFORD, INC.
HANFORD N SPRINGS SHEET PILE BARRIER WALL DESIGN AND CONSTRUCTION

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PO BOX 6090
KENT, WA 98064

PREPARED FOR BECHTEL HANFORD, INC.
HANFORD N SPRINGS SHEET PILE BARRIER WALL DESIGN AND CONSTRUCTION

RCI ENVIRONMENTAL
PO BOX 6090
KENT, WA 98064

RCI ENVIRONMENTAL INC.
Environmental Contractors & Engineers

9513339.0417

DAILY FOREMAN'S REPORT

Sheet 1 of 2

DATE:	JOB NO:	PROJECT:	FOREMAN:
29-94	394-E	HANFORD N SPRINGS	ROGER BROWN

DESCRIPTION OF WORK DONE TODAY:

*NOTE: PLEASE REFER ALSO TO PREVIOUSLY SUBMITTED PROGRESS REPORT #5.
PLACEMENT OF BORROW MATERIAL CONTINUED FROM STATION 23+00 - 25+00 ON ACCESS ROAD. BURN PIT EXCAVATION ± 90% COMPLETE TODAY. FLECHER GENERAL MANATANOC 3900 ONSITE PILE BUCKS BEGAN TO ASSEMBLE. RCI LABOR ON SITE BEGAN TO ASSIST RCT'S IN RELOCATING ZONES.

STABILIZATION ACTIVITIES STOPPED FROM 12:00 PM UNTIL 2:15 PM BECAUSE OF RADIOLOGICAL REASONS. CONTAMINATED TUMBLE WEED HAD FALLEN ONTO NEW STABILIZED ACCESS ROAD. WORK ACTIVITIES SUSPENDEND BY RCT UNTIL MATERIAL REMOVED.

SUBS & OTHER FOREMAN ON SITE TODAY: NAME	DESCRIPTION OF WORK DONE
1 DAVE BAKER BHI	MONITORED ALL WORK ACTIVITIES.
2 JOE ZORIC BHI	" " " "
3 RANDY HAVENOR BHI	" " " "
4 STEELMAN - QUIFF	ROAD STABILIZATION
5 FLECHER GENERAL	ASSEMBLE CRANE / PREP FOR PIPE DRIVING.
6	

EXTRA WORK OR CHANGED CONDITIONS:

N/A

MATERIALS DELIVERED TODAY: DESCRIPTION	DELIVERY TICKET NUMBERS	ESTIMATED QUANTITY	UNIT
1 TWO SEMI LOADS OF SHEET PILE 16 PAIRS OF SHEETS		16 PAIRS	
2 ONE SEMI LOAD OF TEMPLATE MATERIALS & MATS.			
3 900 LF SILT FENCE AND 220 "T" POSTS.	SILT FENCE	900	LF
4	"T" POSTS	220	EA
5 STABILIZATION MATERIAL	PLEASE REFER TO		
6	DAILY DRIVERS		
7	REPORT THIS DATE	1,022	CY

ITEMS OF WORK COMPLETED TODAY: DESCRIPTION	BID ITEM NUMBER	ESTIMATED QUANTITY	UNIT
1 CRANE ASSEMBLED			
2 BURN PIT ± 90% COMPLETE READY FOR			
3 STABILIZATION MATERIAL.			
ACCESS ROAD FROM 23+00 - 25+00 COMPLETE			
5 BORROW PIT SAMPLE TAKEN FOR TESTING (2ND SAMP.)			
6 INITIAL SAMPLE TAKEN BEFORE PIT OPENED.			
7 KLEN DRILLING OPERATION BEING DEMOBBED BY			
8 FRI. ALL EQUIP/MATERIALS TO BE GONE.			
9			
10			
11			
12			
13			
14			

ACCIDENTS/SAFETY/COMMENTS:

MADE COMMENT TO ALL EQUIPMENT OPERATOR/TRUCK DRIVERS EVERYONE MUST KEEP SEAT BELTS ON @ ALL TIMES WHILE OPERATING. VEHICLE TRAFFIC TO BE KEPT AT A SAFE SPEED. INSPECTIONS OF EQUIPMENT @ A MINIMUM EACH MORNING TO BE DONE.

USE ADDITIONAL SHEETS IF NECESSARY

RCI ENVIRONMENTAL INC.
Environmental Contractors & Engineers

9513339.0418

DAILY FOREMAN'S REPORT

Sheet 1 of 1

DATE:	JOB NO:	PROJECT:	FOREMAN:
-30-94	394E	HANFORD N SPRINGS	RUSSEL REEDY

DESCRIPTION OF WORK DONE TODAY:

BEGAN PLACING BORROW FROM ON SITE PIT OVER BURN PIT TO STABILIZE. AFTER LUNCH RCT STOPPED WORK IN BURN-PIT BECAUSE OF AIR BORNE DUST FROM SURFACE OF BURN PIT. MOVED OPERATION TO ± 24+00. OVERSIZED MATERIAL OBSERVED IN SEVERAL LOADS REVIEWED PIT OPERATION, THEN MET WITH STEELMAN-DUFF 4-MAN AND OPERATOR REVIEWED SPEC. W/ THEM & CORRECTED SITUATION. IN PLACE OVERSIZE TO BE REMOVED TO THE OUTER EDGE OF FILL SLOPE FOR SOLID BASE THAT WILL NOT EFFECT SHEET-PILE INSTALLATION. BEGAN TO INSTALL SILT FENCE @ TOE OF NEW ACCESS ROAD ± 25+00 – 23+00 W/ RCIE LABORER, HAD TO DRESS IN WHITES DENA W/ HEALTH PHYSICS THERE TO MONITOR & SURVEY HIM OUT.

SUBS & OTHER FOREMAN ON SITE TODAY: NAME	DESCRIPTION OF WORK DONE
1 DAVE BAKER / JOE ZORIC BHI	MONITOR ALL WORK ACTIVITIES
2 STEELMAN-DUFF INC	ACCESS ROAD STABILIZATION
3 FLECHER GENERAL	PREPED SHEETS FOR THURS. TEST
4 ROGERS SURVEY	ENSURE ROAD DESIGN ACHIEVED.
5 RCT REASONS	MONITOR WORK ACTIVITIES.
6	

EXTRA WORK OR CHANGED CONDITIONS:

N/A

MATERIALS DELIVERED TODAY: DESCRIPTION	DELIVERY TICKET NUMBERS	ESTIMATED QUANTITY	UNIT
1 STABILIZATION MATERIAL	PLEASE REFER TO		
2	DAILY DRIVE		
3	REPORTS THIS DATE	1,414	CY
4			
5			
6			
7			

ITEMS OF WORK COMPLETED TODAY: DESCRIPTION	BID ITEM NUMBER	ESTIMATED QUANTITY	UNIT
1 PLACEMENT OF STABILIZATION MATERIAL (SEE TRK REP. QTY)		1,400	CY
2 PLACEMENT OF SILT FENCE.	—	200	LF
REMOVAL & REESTABLISHMENT OF RAD CONTROL AREAS	—	1000	LF
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			

ACCIDENTS/SAFETY/COMMENTS:

COOL TEMPS TODAY WINTER UPON US EVERYONE TO DRESS APPROPRIATELY. ALSO TODAY GOOD EXAMPLE WITH THE HIGH WINDS +30 MPH & THE BLOWING DUST THAT IT IS VERY IMPORTANT TO WEAR SAFETY GLASSES @ ALL TIMES. THIS MESSAGE PASSED ON TO THE TROUPS.

USE ADDITIONAL SHEETS IF NECESSARY

4-94

RCI ENVIRONMENTAL INC.
Environmental Contractors & Engineers

9513339.0419

DAILY FOREMAN'S REPORT

Sheet 1 of 2

TE:	JOB NO:	PROJECT:	FOREMAN:
-1-94	394 E	HANFORD N SPRINGS	RHUEL REEDY

DESCRIPTION OF WORK DONE TODAY:

ROAD STABILIZATION CONTINUED IN THE AREA BETWEEN 35+00-37+00 COMPLETED MID MORNING MOVED DOWN STATION TO ± 23+00 ON ROAD WIDENING OPERATION TOWARDS STATION 20+00. FLECHER GENERAL CONT. PREP WORK ON SHEETS AND EQUIPMENT TO BEGIN TEST PILE PROGRAM ON FRIDAY. RCIE RECEIVED VERBAL APPROVAL ON OUR TEST PILE PROGRAM SUBMITTAL. WE MAY PROCEED WITH WORK AND MAKE REVISIONS TO OUR PLAN WHEN COMMENTS ARE RETURNED. IN THE THURS. MEETING WE RECEIVED A HAND WRITTEN ADMINISTRATIVE CHANGE ORDER TO TRIM THE VERTICAL SLOPE ALONG ACCESS ROAD BACK TO MATCH EXIST. SLOPE GRADES. RECIEVED APPROVAL FROM SAFETY, ECOLOGY AND CULTURAL RESOURCES JOY WOODRUFF TO BE ON SITE TO MONITOR THIS WORK ACTIVITY, WE WILL USE EHI D-8 CAT TO PERFORM THIS TASK

SUBS & OTHER FOREMAN ON SITE TODAY: NAME	DESCRIPTION OF WORK DONE
1 DAVE BAKER BECHTEL HANFORD INC.	MONITORED ALL FIELD AND ADMINISTRATIVE WORK
2 STEELMAN - DUFF INC	ACCESS ROAD STABILIZATION
3 FLECHER GENERAL	PREP FOR SHEET PILE TEST DRIVING
4 ROGERS SURVEY.	ACCESS ROAD CONTROL (DESIGN & SPEC)
5 RCT'S	MONITOR WORK ACTIVITIES SURVEY EQUIP/PEOPLE IF
6	NECCESARY

EXTRA WORK OR CHANGED CONDITIONS:

N/A

MATERIALS DELIVERED TODAY: DESCRIPTION	DELIVERY TICKET NUMBERS	ESTIMATED QUANTITY	UNIT
1 ON SITE BORROW	PLEASE REFER TO	1,722	CY
2	DAILY DRIVER		
3	REPORTS THIS DATE		
4			
5			
6			
7			

ITEMS OF WORK COMPLETED TODAY: DESCRIPTION	BID ITEM NUMBER	ESTIMATED QUANTITY	UNIT
1 TEST PILE DRIVING PLAN APPROVED W/COMMENTS			
2 ACCESS ROAD FROM STA 23+00 - 20+00 & 35+00 TO 37+00			
INITIAL ROAD CONSTRUCTION CONCENTRATING ON WIDTH FOR			
CRAWLER CRANE. AFTER TEST PILE PROGRAM OFF THE			
5 GROUND ROAD TO BE BROUGHT TO DESIGN ELEVATION			
6			
7			
8			
9			
10			
11			
12			
13			
14			

ACCIDENTS/SAFETY/COMMENTS:

RCIE LABORER ASSISTING RCT IN REMOVING AND REESTABLISHING CONTROL ROPES ALONG ACCESS ROAD STABILIZATION. FLECHER GENERAL TO PURCHASE NEW FIRE EXTINGUISHERS AND HAVE SPARES AVAILABE FOR USE IF NECCESARY.

USE ADDITIONAL SHEETS IF NECESSARY

RCI ENVIRONMENTAL INC.
Environmental Contractors & Engineers

9513339.0420

DAILY FOREMAN'S REPORT

Sheet 1 of 1

DATE:	JOB NO:	PROJECT:	FOREMAN:
-2-94	394 E	HANFORD N SPRINGS SHEET PILE	RHUEL REEDY

DESCRIPTION OF WORK DONE TODAY:

CONTINUED WITH ROAD STABILIZATION STATIONS 21+00 TO 23+00 W/OPEN ACCESS ROAD FOR CRAWLER CRANE. AT 7:00 AM HELD SITE SPECIFIC SAFETY MEETING WITH DAVE BAKER. REVIEWED RWP AND JSA'S FOR WORK TO BE DONE DURING TEST PILE PHASE RCT CREW AND HEATH PHYSICS MANAGERS ON HAND TO REVIEW THEIR POLICIES AND CONTENTS OF RWP. BEGAN AND COMPLETED DRESSING VERTICAL CUT IN FIRST OF 3 LOCATIONS STATIONS 21+00 TO 23+00. AFTER SLOPE DRESSED AND MADE SAFE STABILIZATION MATERIAL PLACED OVER BURDEN MATERIAL. MOBBED REMAINDER OF MAT & EQUIP TO FIRST TEST PILE LOCATION. EFFORT MADE WITH MED. WEIGHT SHEET AND SMALL VIB. HAMMER W/AS NOT SUCCESSFULL. PLACE LARGE VIB HAMMER ON MED WEIGHT SHEET WITH NO LUCK. PLEASE REFER TO TEST PILE DRIVING LOG FOR DETAILED ACCOUNT.

SUBS & OTHER FOREMAN ON SITE TODAY NAME	DESCRIPTION OF WORK DONE
1 DAVE BAKER BHI	MONITOR ALL FIELD AND ADMINISTRATIVE WORK ACTIVITIES
2 STEELMAN-DUFF INC	ROAD STABILIZATION
3 FLECHER GENERAL	BEGAN INITIAL TEST PILE PHASE
4 ROGERS SURVEY	ENSURE ROAD DESIGN & SPEC.
5 RCT'S	MONITOR WORK ACTIVITIES FOR RADIOLOGICAL COMP.
6 BILL MCDANIAL	QAQC REP RCIE FOR SHEET PILE TEST

EXTRA WORK OR CHANGED CONDITIONS:

N/A

MATERIALS DELIVERED TODAY DESCRIPTION	DELIVERY TICKET NUMBERS	ESTIMATED QUANTITY	UNIT
1 ONE TRUCK LOAD OF PZ 35 SHEETS	N/A	8 PAIRS	
2 ONE TRUCK LOAD OF PZ 40 SHEETS	N/A	8 PAIRS	
3 STABILIZATION MATERIAL	N/A	1,666	CY
4			
5			
6			
7			

ITEMS OF WORK COMPLETED TODAY DESCRIPTION	BID ITEM NUMBER	ESTIMATED QUANTITY	UNIT
1 DRESSED SLOPE FROM STA 21+00 - 23+00 PER	N/A	200	LF
2 ADMINISTRATIVE CHANGE ORDER #1			
MADE INITIAL TRY WITH MED WEIGHT SHEET AND SMALL	N/A	N/A	
5 VIBRITORY HAMMER (SEE DRIVING LOG)			
6			
7 ACCESS ROAD WIDENED FROM STATION 23+00 TO 19+50		350	LF
8 HAD 2 LOAD OF OVERSIZE MATERIAL BROUGHT DOWN			
9 SITE AND PLACED IN FILL. W/ENT TO BORROW PIT &			
10 STOPPED OPERATION. HAD LOADER & D-8 CAT MOVE TO			
11 NEW LOCATION WITHIN THE PIT TO FIND SMALLER MAT.			
12 OVERSIZED THAT WAS PLACE W/ITHIN THE ROADWAY WAS			
13 ORDERED TO BE MOVED OUT TO THE OUTER SLOPE AS			
14 NOT TO CREATE CONFLICT WITH THE SHEETPILE INSTALLATION			

ACCIDENTS/SAFETY/COMMENTS:

HELD SITE SPECIFIC SAFETY MEETING FOR TEST PILE PHASE OF W/ORK. W/ORKER MADE COMMENTS AS TO THEIR SPECIFIC WORK ACTIVITIES RCT'S LAID OUT ALL RADIOLOGICAL CONCERNS AND REQUIREMENTS OF THE RWP.

USE ADDITIONAL SHEETS IF NECESSARY

9513339.0421

RCI ENVIRONMENTAL INC.
Environmental Contractors & Engineers

DAILY FOREMAN'S REPORT

Sheet 1 of 1

TE:	JOB NO:	PROJECT:	FOREMAN:
5-94	394E	HANFORD W SPRINGS SHEET PILE	RHUEL REEDY

DESCRIPTION OF WORK DONE TODAY:

CONTINUED WITH ROAD STABILIZATION ACTIVITIES FROM 19+50 - 15+00. INITIAL PASS TO GET ROAD WIDTH FOR CRAWLER CRANE. STEELMAN-DUFF MOBBED IN A WATER TRUCK BUT WAS NOT USED, DID NOT WANT TO PLACE WT ON HAUL ROAD FOR SAFETY REASONS. POSSIBILITY OF FREEZING AND MAKING DRIVING VERY HAZERDOUS. THIS WAS CONFIRMED WITH DAVE BAKER. GRADER TAKEN TO STA. 33+00 → 37+00 FINAL GRADE ACCESS ROAD FOR CRAWLER CRANE ACCESS. TEST PILE WORK STARTED AGAIN @ INITIAL SITE STATION 30+10 MED WEIGHT SHEET WITH LARGE HAMMER UNSUCCESSFUL. TRIED HEAVY SHEET W/ LARGE VIB HAMMER ALSO UNSUCCESSFUL MOVED UP STATION APPROX. 50 FEET TRIED AGAIN WITH HEAVY SHEET AND LARGE HAMMER WITH SAME RESULT (SEE DRIVING LOG.). DECIDED TO MOVE TO STATION 35+58 AND MAKE ATTEMPT @ 2ND TEST STATION, BEGAN TO MOB TO NEW LOCATION

SUBS & OTHER FOREMAN ON SITE TODAY: NAME	DESCRIPTION OF WORK DONE
1 DAVE BAKE BHI	MONITOR ALL FIELD AND ADMINISTRATIVE ACTIVITIES
2 STEELMAN - DUFF	ACCESS ROAD STABILIZATION
3 FLECHER GENERAL	TEST PILE DRIVING
4 AMERICAN PILE DRIVING EQUIPMENT	MONITOR OPERATION OF VIBRITORY HAMMER
5 BILL MCDANIEL	RCIE QAQC REP FOR TEST PILE DRIVING.
6 RCT'S	MONITOR WORK ACTIVITIES - SURVEY OF WORKER / EQUIP.

EXTRA WORK OR CHANGED CONDITIONS:

A

MATERIALS DELIVERED TODAY: DESCRIPTION	DELIVERY TICKET NUMBERS	ESTIMATED QUANTITY	UNIT
1 STABILIZATION MATERIAL.	PLEASE REFER		
2	TO DAILY DRIVERS		
3	REPORTS		
4			
5			
6			
7			

ITEMS OF WORK COMPLETED TODAY: DESCRIPTION	BID ITEM NUMBER	ESTIMATED QUANTITY	UNIT
1 FOREMAN SPOKE WITH DAVE BAKER AND MERLE ARRANGEMENTS			
2 ARE BEING MADE TO MOVE AND EXCAVATOR DOWN ON SITE TRY			
TO DIG DOWN AND LOCATE ANY POSSIBLE OBSTRUCTIONS			
HELPING THE SHEET PILE FROM BEING DRIVEN. DAVE			
5 CALLED BILL CARPENTER TO MAKE THE EQUIPMENT MOVE			
6 RCIE TO RENT HOE.			
7			
8 RCIE LABORER RELOCATING FENCE POSTS AND RAD ROPE			
9 TO ALLOW ROAD STABILIZATION AND WIDENING TO PROCEED.			
10			
11			
12			
13			
14			

ACCIDENTS/SAFETY/COMMENTS:

WEEKLY SAFETY MEETING. TOPICS INCLUDED WINTER CONDITIONS AND PROPER CLOTHING SPOKE AGAIN ABOUT RAD CONCERNS. INTRODUCED RHUEL REEDY AS SITE SAFETY REP. ALL INJURIES NO MATTER HOW MINOR NEED TO BE REPORTED TO THE SAFETY REP.

USE ADDITIONAL SHEETS IF NECESSARY

RCI ENVIRONMENTAL INC.
Environmental Contractors & Engineers

9513339.0422

DAILY FOREMAN'S REPORT

Sheet 1 of 1

DATE:	JOB NO:	PROJECT:	FOREMAN:
6-94	394E	HANFORD N SPRINGS SHEET PILE BARRIER	RHUEL REEDY

DESCRIPTION OF WORK DONE TODAY:

CONTINUED ROAD STABILIZATION STARTING AT STATION 15+00 DOWN STATION. FINISH GRADE FROM STATION 34+00 TO 37+00. MOVED CRAWLER CRANE FROM FIRST TEST DRIVING STATION TO SECOND @ ± 35+58 OF ACCESS ROAD. TRIED TO DRIVE HEAVY SHEET WITH KING KONG HAMMER WITH NO SUCCESS. DAVE BAKER CONFIRMED W/ BILL CARPENTER THE USE OF 310C EXTEND HOE FOR EXCAVATION TO LOCATE ANY OBSTRUCTIONS. DAVE LINED UP PERMIT AND GOT NEW RWP WRITTEN FOR EXC. RHUEL REEDY MODIFIED JSA'S TO COVER NEW SCOPE OF WORK. BY 2:00PM ALL PAPER WORK AND EQUIPMENT ON SITE FOR WORK TO PROCEED. STARTED EXC @ STATION 35+58. EXCAVATED DOWN ± 8' FOUND SOIL TO BE VERY TIGHTLY COMPACTED AT RUN MATERIAL MOVED DOWN STATION TO DIESEL BURN PIT AND EXC. TO SAME 8' DEPTH FOUND SIMILAR COMP. MATERIAL. PLEASE REFER TO BILL MCDANIAL QAQC REPORTS FOR TEST PILE PHASE.

SUBS & OTHER FOREMAN ON SITE TODAY: NAME	DESCRIPTION OF WORK DONE
1 DAVE BAKER BHI	MONITOR ALL FIELD ACTIVITIES AND ADMINISTRATIVE
2 JAY WOODRUFF CULTURAL SERVICES	MONITOR EXCAVATION @ TEST PILE LOCATIONS
3 STELLMAN DUFF INC	ACCESS ROAD STABILIZATION
4 FLECHER GENERAL	TEST PILE INSTALLATION
5 RCT'S	SETUP CONTROL ZONES AND MONITOR / SURVEY.
6 BILL MC DANIEL	QAQC REP TEST PILE PHASE RCIE

EXTRA WORK OR CHANGED CONDITIONS:

N/A

MATERIALS DELIVERED TODAY: DESCRIPTION	DELIVERY TICKET NUMBERS	ESTIMATED QUANTITY	UNIT
1 STABILIZATION MATERIAL	N/A		
2			
3			
4			
5			
6			
7			

ITEMS OF WORK COMPLETED TODAY: DESCRIPTION	BID ITEM NUMBER	ESTIMATED QUANTITY	UNIT
1 FLECHER GENERAL MADE CALL TO GET IMPACT HAMMER	N/A		
2 ON THE ROAD AND HEADED THIS DIRECTION.			
3 EXCAVATED PIT @ FIRST 2 TEST PILE LOCATIONS TO A			
DEPTH OF ± 8' W/ BHI JOHN DEER 310C BACKHOE			
5 FOUND SOIL CONDITIONS TO BE VERY TIGHTLY			
6 COMPACTED COBBLES.			
7			
8 ROAD WIDENED AND STABILIZED FROM STATION ± 15+00			
9 TO STATION ± 10+00			
10			
11 RCIE LABORER RELOCATING RAD ROPE AND FENCE POSTS TO			
12 ALLOW ROAD STABILIZATION AND WIDENING TO PROCEED.			
13			
14			

ACCIDENTS/SAFETY/COMMENTS:

NEW RWP AND JSA'S WRITTEN AND REVIEWED W/ ALL SITE WORKERS / OBSERVERS OF TEST PILE PROGRAM TO ENCOMPASS THE ADDITION OF THE EXCAVATION ACTIVITES TO TAKE PLACE. RCIE DISCUSSED JSA AND SIGNATURE SHEET. RCT REVIEWED RWP AND ITS CONTENTS ALL INVOLVED SIGNED OFF. RCIE TO MAINTAIN JSA SIGN-OFF SHEET DAVE BAKE TO ADMINISTER RWP SIGN OFF FOR ALL VISITORS.

USE ADDITIONAL SHEETS IF NECESSARY

RCI ENVIRONMENTAL INC.
Environmental Contractors & Engineers

9513339.0423

DAILY FOREMAN'S REPORT

Sheet 1 of 1

DATE:	JOB NO:	PROJECT:	FOREMAN:
7-94	394E	HANFORD W SPRINGS SHEET PILE	RUWEL REEDY

DESCRIPTION OF WORK DONE TODAY:

CONTINUED WITH THE ROAD STABILIZATION AND INITIAL WIDENING FOR CRAWLER CRANE ACCESS FROM STATION 8+50 TO 3100. ROGER BROWN MET W/ DAVE BAKER REGARDING REVISED SAFTEY ISSUES CONCERNING REVISED TEST PILE WORK ACTIVITIES. @ 10:00 AM ROGER COVERED SAME MATERIAL WITH RCT MANAGEMENT INCORPORATING THEIR COMMENTS TO REVISIONS. THREE SAFETY ISSUES WERE IDENTIFIED, WELDING AND CUTTING OPERATIONS NEED TO HAVE TAGGEDS FIRE EXTINGUISHERS PRESENT @ EACH DESIGNATED (PERMITTED LOCATION) WITH AN ACCESSIBLE BACKUP AVAILABLE, IN ADDITION EACH WELD/BURN LOCATION TO HAVE DESIGNATED FIRE WATCH. WAS ALSO BROUGHT TO OUR ATTENTION THAT AN IDIVIDUAL WAS SEEN URINATING IN THE RIVER. ALL EMPLOYEES/SUBCONTRACTORS WERE NOTIFIED OF NON COMPLIANCE; 10:30 AM

SUBS & OTHER FOREMAN ON SITE TODAY: NAME	DESCRIPTION OF WORK DONE
1 DAVE BAKER (BHI)	MONITOR ALL WORK & ADMINISTRATIVE ACTIVITIES
2 STELLMAN-DUFF INC	ACCESS ROAD STABILIZATION AND WIDENING
3 FLECHER GENERAL	SHEET PILE TEST DRIVING.
4 RCT'S	MONITOR ON SITE WORK — RADIOLOGICAL CONCERNS
5 JOY WOODRUFF (CULTURAL SERVICES)	MONITOR EXCAVATION @ TEST LOCATIONS
6 BILL MCDANIEL	QA QC REP TEST PILE AIRGE RCIE

EXTRA WORK OR CHANGED CONDITIONS:

N/A

MATERIALS DELIVERED TODAY: DESCRIPTION	DELIVERY TICKET NUMBERS	ESTIMATED QUANTITY	UNIT
1 STABILIZATION MATERIAL			
2			
3			
4			
5			
6			
7			

ITEMS OF WORK COMPLETED TODAY: DESCRIPTION	BID ITEM NUMBER	ESTIMATED QUANTITY	UNIT
1 BECHTEL HANFORD LINK BELT 5400 ARRIVED ON SITE			
2 @ 2:30 PM MOBBED DOWN TO STATION 35+58			
AND EXCAVATED DOWN TO WATER TABLE. PLEASE			
REFER TO BILL MCDANIELS LOG FOR DETAILED EXC.			
5 ACCOUNT. RCT PERSONNEL ON HAND AS WELL AS			
6 JOY WOODRUFF OF CULTURAL SERVICES TO MONITOR			
7 EXCAVATION ACTIVITIES.			
8			
9			
10			
11			
12			
13			
14			

ACCIDENTS/SAFETY/COMMENTS:

ROGER REVIEWED REVISED SCOPE W/ RCT PERSONNEL, DAVE BAKER AND ALL SITE EMPLOYEES INVOLVED IN TEST PILE PROGRAM. @ 12:30 OPERATIONS STOOD DOWN FOR MANDITORY DOE SAFETY MEETING CONCERNING AN INCIDENT @ ANOTHER SITE.

USE ADDITIONAL SHEETS IF NECESSARY

RCI ENVIRONMENTAL INC.
Environmental Contractors & Engineers

9513339 0424

DAILY FOREMAN'S REPORT

Sheet 1 of 2

DATE:	JOB NO:	PROJECT:	FOREMAN:
8-94	292192-14-EE-000001	HANFORD N SPRINGS SHEET PILE	RHUEL REEDY

DESCRIPTION OF WORK DONE TODAY:

STABILIZATION MATERIAL PLACEMENT @ TURNAROUND STATION 100 - 0+00. @ 7:00 AM CONDUCTED A PREJOB INCORPARATING EXCAVATION ACTIVITY AND OTHER MODIFIED ACTIVITIES IN THE TEST PILE PROGRAM. AFTER PREJOB TRIED KING KONG HAMMER WENT 4 LF TO REFUSAL. PLEASE REFER TO BILL MCDANIELS TEST PILE DRIVING LOG. ROGER BROWN MET ON SITE WITH MERLE LAUTERBACH / DAVE BAKER / FLECHER GENERAL / JERRY JACKSH AT MEETING MERLE DIRECTED RCIE TO GET WHAT EVER TOOLS / EQUIPMENT THAT WE AND JERRY FELT NECCESSARY TO GET THIS JOB COMPLETED. @ 1:00 pm MEETING DAVE HERMEN FINAL OK ON OUTSTANDING SAFETY ISSUES, NOTE FLECHER NEEDS TO RESPOND FASTER TO NON-COMPLIANCE ITEMS. ITEM OF ACTION IN MEETING ALL PETROLEUM SPILLS NEED TO BE REPORTED NO MATTER HOW SMALL TO DAVE BAKER. / DUST CONTROL — TRK PACKING WT. TODAY

SUBS & OTHER FOREMAN ON SITE TODAY: NAME	DESCRIPTION OF WORK DONE
1 DAVE BAKER	MONITOR ALL FIELD AND ADMINISTRATIVE ACTIVITIES.
2 STEEMAN - DUFF	ROAD STABILIZATION
3 FLECHER GENERAL	TEST PILE DRIVING
4 RCT'S	MONITOR (SURVEY AS NEEDED) FIELD ACTIVITES.
5 GENE CONTRAN	RCIE PROJECT MANAGER ONSITE TO REVIEW PROGRESS
6 BILL MCDANIAL	RCIE QA FOR TEST PILE PROGRAM.

~~EXTRA WORK OR CHANGED CONDITIONS:~~

QUALITY CONTROL.

WAS DISCUSSED @ 1:00 PM MEETING THAT THERE WOULD BE AN AUDIT NEXT TUESDAY WITH JOE ZORIC AND JOAN PASTINO. ROAD STABILIZATION / INITIAL WIDENING COMP DOWN TO 0+00. OPERATION TURNING AROUND GOING BACK UP STATION BRING ROAD UP TO DESIGN ELEVATION.

OUT OF SPEC. SAFETY ITEMS CORRECTED IE. WELD AND BURN AREAS

MATERIALS DELIVERED TODAY: DESCRIPTION	DELIVERY TICKET NUMBERS	ESTIMATED QUANTITY	UNIT
1 STABILIZATION MATERIAL	N/A	1,484	CY
2			
3			
4			
5			
6			
7			

ITEMS OF WORK COMPLETED TODAY: DESCRIPTION	BID ITEM NUMBER	ESTIMATED QUANTITY	UNIT
1 THE NUMBER OF PEOPLE VISITING SITE IS OUT OF CONTROL			
2 DAVE SETUP BARRICADES @ PROJECT ENTRANCE			
3 ANYONE WISHING ACCESS MUST CONTACT MR. BAKER			
5 DROVE PILE WITH IMPACT HAMMER (SEE BILL MCDANIELS LOG)			
6			
7			
8			
9			
10			
11			
12			
13			
14			

ACCIDENTS/SAFETY/COMMENTS:

ROGER BROWN MET WITH RCT MANAGERS REGARDING SAFETY ISSUES INVOLVED WITH EXCAVATION IN RADIOLOGICAL AREAS. FLECHER GENERAL WAS FOUND OUT OF SPEC WITH TWO ITEMS THE FIRST ITEM FIRE EXTINGUISHERS WERE NOT TAGGED AND NO FIRE WATCH @ CUT AND BURN STATION. RCIE WAS AWARE OF THESE ITEMS YESTERDAY AND HAD SUSPENDED WORK ACTIVITIES UNTIL WORK COMPLIED W/ SPEC. FLECHER GENERAL MADE CORRECTIONS IN THEIR METHOD AND WORK CONTINUED TODAY

USE ADDITIONAL SHEETS IF NECESSARY

4-94

RCI ENVIRONMENTAL INC.
Environmental Contractors & Engineers

9513339.0425

DAILY FOREMAN'S REPORT

Sheet 1 of 1

DATE:	JOB NO:	PROJECT:	FOREMAN:
9-94	29192-14-EE-000001	HANFORD-N SPRINGS SHEET PILE	RAHEL REEDY

DESCRIPTION OF WORK DONE TODAY:

ROAD STABILIZATION 1450 – 5400 ROAD FILLED AND GRADED TO DESIGN ELEVATION. ATTEMPT TO EXC. TRENCH TO REFUSAL ELEVATION ± 16 FT CUT FROM EXIST. ROAD ELEVATION. MATERIAL SLUFFED AND HOLE BECOMING TO LARGE / OPERATION STOPPED AND BHI RENTAL 5400 EXCAVATOR MOBBED BACK TO TOP OF HILL. DROVE HEAVY SHEET W/ IMPACT HAMMER. PLEASE REFER TO BILL MCDANIELS TEST PILE REP. AFTER DISCUSSION W/ JERRY JACKSHA MADE ARRANGEMENTS TO MOB FOSTER HYD. IMPACT HAMMER ON SITE AND ATTEMPT PILE DRIVING.

SUBS & OTHER FOREMAN ON SITE TODAY: NAME	DESCRIPTION OF WORK DONE
1 DAVE BAKER	MONITOR FIELD AND ADMINISTRATIVE WORK ACTIVITIES.
2 STEELMAN-DUFF INC	ROAD STABILIZATION
3 FLECHER GENERAL	TEST PILE PROGRAM
4 RCI'S	MONITOR / SURVEY FIELD ACTIVITIES
5 JOY WOODRUFF	CULTURAL SERVICES REP. DURING EXCAVATION
6 BILL MCDANIEL	QA REP FOR PILE TEST PILE PROGRAM

~~EXTRA WORK OR CHANGED CONDITIONS:~~ QUALITY CONTROL

MADE ADJUSTMENT IN STABILIZATION MATERIAL BEING DISPLACED. HAULED SEVERAL LOADS OF FINES TO PUT ON ACCESS ROAD TO HELP BIND MATERIAL. INITIAL MAT. HAD LITTLE TO NO FINES AND MATERIAL WOULD NOT COMPACT.

MATERIALS DELIVERED TODAY DESCRIPTION	DELIVERY TICKET NUMBERS	ESTIMATED QUANTITY	UNIT
1 STABILIZATION MATERIAL	N/A		
2			
3			
4			
5			
6			
7			

ITEMS OF WORK COMPLETED TODAY DESCRIPTION	BID ITEM NUMBER	ESTIMATED QUANTITY	UNIT
1			
2 ACCESS ROAD TO DESIGN ELEVATION FROM 0400-5400		N/A	
INITIATED PLANS TO MOB ADDITIONAL EQUIPMENT ON SITE			
5 FOR DRIVING SHEET PILE.			
6			
7			
8			
9			
10			
11			
12			
13			
14			

ACCIDENTS/SAFETY/COMMENTS:

SPOKE ABOUT ROAD STABILIZATION ACTIVITIES / ALL PERSONNEL (INCL RCI'S) IN THE VICINITY OF STABILIZATION ACTIVITIES MUST KEEP SAFE DISTANCE FROM WORK. STAY VISIBLE TO ALL TRUCKS AND MACHINE OPERATORS. DO NOT WALK BEHIND ANY MOVING EQUIPMENT. RCI PERSONNEL ESTABLISHED LARGE CONTROL ZONE FOR EXC AND PILE TEST ACTIVITIES RESTRICTED ACCESS TO NON ESSENTIAL PEOPLE FOR SAFETY REASONS.

USE ADDITIONAL SHEETS IF NECESSARY

RCI ENVIRONMENTAL INC.
Environmental Contractors & Engineers

9513339.0426

DAILY FOREMAN'S REPORT

Sheet 1 of 2

DATE:	JOB NO:	PROJECT:	FOREMAN:
12-94	29192-14-EE-000001	HANFORD N SPRINGS SHEET PILE BARRIER	ROGER BROWN

DESCRIPTION OF WORK DONE TODAY:

ACCESS ROAD STABILIZATION LIMITED TO DOWNSTREAM ACCESS ROAD INTERSECTION, FILLING ROAD TO DESIGN ELEVATION. AT APPROXIMATELY 2:00 pm BEGAN WORKING ON STABILIZATION OF MATERIAL DISPLACED ON ACCESS ROAD FROM SLOPE TRIMMING ACTIVITIES. BY 3:30 pm ROAD TO GRADE AND STABILIZED FROM STATION 0+00 TO 14+00. AFTER SAFETY MEETING BEGAN PILE DRIVING WITH DIESEL IMPACT HAMMER @ 9:30 AM HYD IMPACT HAMMER ON SITE. PREPARATIONS BEGAN ON GETTING HYD. HAMMER ON LINE BY EARLY AFTERNOON BEGAN USE OF HYD HAMMER, PLEASE REFERENCE BILL MCDANIELS DAILY DRIVING LOG REPORT. JERRY JACKSHA HAS DECIDED NEXT SECTION TO TEST DRIVE WOULD BE 34+00 TOWARDS STA. 34+00. THIS IS A CHANGE FROM RCIE TEST PILE PROGRAM WHICH CALLS FOR STA 35+58 PER JERRY JACKSHA'S DIRECTION.

SUBS & OTHER FOREMAN ON SITE TODAY: NAME	DESCRIPTION OF WORK DONE
1 DAVE BAKER (BHI)	MONITOR ALL FIELD AND ADMINISTRATIVE ACTIVITIES.
2 Joy Woodruff	MONITOR SLOPE TRIMMING ACTIVITY
3 RCT's	ALL FIELD WORK MONITORED AND SURVEYED.
4 STEELMAN RUFF INC	ACCESS ROAD STABILIZATION
5 FLECHER GENERAL	TEST PILE INSTALLATION
6 BILL MC DANIEL	RCIE QC REP FOR TEST PILE PROGRAM.

~~EXTRA WORK OR CHANGED CONDITIONS:~~ QUANITY CONTROL

ROGER BROWN CROSS SECTIONED ACCESS ROAD FROM 0+00 TO 13+00 TO VARIFY DESIGN WIDTH. RECEIVED APPROVAL FROM DAVE BAKER TO TRIM EXIST. VERTICAL SLOPE FOR WIDTH AND SAFETY PURPOSES. Joy WOODRUFF ON SITE TO MONITOR SLOPE TRIM. AS WELL AS RCT PERSONNEL. OVERSIZED MATERIAL MATERIAL OBSERVED BEING PLACED IN ROADWAY. ADJUSTMENT MADE @ PIT AND PLACED OVERSIZED MATERIAL DOZED TO THE OUTER LIMITS OF ACCESS ROAD SLOPE. PLEASE REFER TO DAILY ROAD CQC CHECKLIST FOR ADDITIONAL INFORMATION.

MATERIALS DELIVERED TODAY: DESCRIPTION	DELIVERY TICKET NUMBERS	ESTIMATED QUANTITY	UNIT
1 HYDRAULIC IMPACT HAMMER (DELMEG 19-32)	N/A	1	EA
2			
3			
4			
5			
6			
7			

ITEMS OF WORK COMPLETED TODAY: DESCRIPTION	BID ITEM NUMBER	ESTIMATED QUANTITY	UNIT
1 ROAD STABILIZATION COMPLETE FROM 0+00 — 14+00 NEEDS			
2 ONLY TO BE FINAL GRADED WITH CAT 14G MOTOR			
3 GRADER.			
4			
5 ALL RAD ROPES FROM 0+00 TO 13+00 REESTABLISHED CONTROL			
6 ZONES WITH RCIE LABORER PER THE DIRECTION OF RCT			
7 PERSONNEL.			
8			
9 ASSEMBLED AND ERECTED HYDRAULIC IMPACT HAMMER ON			
10 3900 CRANE AND BEGAN TEST WORK WITH THIS HAMMER.			
11			
12			
13			
14			

ACCIDENTS/SAFETY/COMMENTS:

WEEKLY SAFETY MEETING HELD @ 7:00 TOPICS INCLUDED. WEATHER CONDITIONS AND PROPER CLOTHING AND DRIVING TACTICS. ALSO INCLUDED IN CONVERSATION WAS SEASONAL STRESS FACTORS. KEEPING MIND ON JOB @ HAND AND POSSIBLE STRESS RELIEVERS. ROGER BROWN ALSO CONDUCTED SITE SPECIFIC MEETING W/ TEST PILE CREW INCORPORATING HYDRAULIC IMPACT HAMMER TO BE USED IN TEST POTENTIAL HAZARDS AND SAFETY PRECAUTIONS.

USE ADDITIONAL SHEETS IF NECESSARY

RCI ENVIRONMENTAL INC.
Environmental Contractors & Engineers

9513339.0427

DAILY FOREMAN'S REPORT

Sheet 1 of 2

DATE:	JOB NO:	PROJECT:	FOREMAN:
13-94	29192-14-EE-000001	HANFORD N SPRINGS SHEET PILE	ROGER BROWN

DESCRIPTION OF WORK DONE TODAY:

FINISHED STABILIZATION MATERIAL PLACEMENT @ APPROX 1:30 pm AND COMP W/ FINISH BLADE WORK BY SAME TIME. ROGER BROWN / DAVE BAKER DROVE FULL LENGTH OF ACCESS ROAD AND DAVE BAKER GAVE ROAD HIS VERBAL APPROVAL. ALL SURFACE CONTAMINATION ZONES HAVE BEEN REESTABLISHED. @ STA 7+00 RCT'S CONT. TO SURVEY NARROW BAND OF SCA AND RELEASING AREA. LEFT BHI D-8 DOZER @ APPROX STATION 2+00 EXIST WELL CASING @ STATION 6+00 IS OBSTRUCTING ACCESS FOR CRAWLER CRANE. ROGER SPOKE W/ RANDY HAVENOR AND HE GAVE OK TO CUT CASING OFF AND DRESS AREA. D-8 WILL THEN BE MOVED TO TOP OF HILL FOR DEMOB. RCT RELEASE 4 SOLO DUMP TRUCKS FOR DEMOB FROM SITE. DAILY TRUCK REPORTS SUBMITTED TO DAVE BAKER. PILE DRIVING CREW MOBBED TO STATION ± 34+00 SETUP FOR NEXT TEST PILE PHASE.

SUBS & OTHER FOREMAN ON SITE TODAY: NAME	DESCRIPTION OF WORK DONE
1 DAVE BAKER (BHI)	MONITOR ALL FIELD & ADMINISTRATIVE WORK
2 STEELMAN-DUFF INC	ROAD STABILIZATION (Comp. As of 1:30 pm)
3 FLECHER GENERAL	TEST PILE PROGRAM
4 RCT	SURVEY AND MONITOR FIELD ACTIVITIES
5 BILL McDANIEL	RCIE QA FOR TEST PILE PROGRAM.
6 JOE ZORIC (BHI ECOLOGY)	ON SITE TO MONITOR HYD. LEAK CLEANUP.

~~EXTRA WORK OR CHANGED CONDITIONS:~~

QUALITY CONTROL

THIS MORNING HAD A BROKEN HYDRAULIC LINE ON THE IMPACT HAMMER. SPILLED APPROXIMATELY 8 GALLONS OF OIL ONTO THE GROUND. DAVE BAKER AND JOE ZORIC NOTIFIED. DAVE LINED UP DELIVERY OF 55 GAL. DRUMS TO DISPOSE OF CONTAMINATED SOIL. FLECHER GENERAL PERSONNEL PLACED ABSORBENT RAGS OVER FLUID AND DISPOSED OF THE SOIL INTO THE BARRELS THAT DAVE BAKER HAD DELIVERED. APPROXIMATE QUANTITY OF FLUID SPILLED WAS 8 GAL. DAVE BAKER LABELED THE DRUMS AND THEY WERE REMOVED FROM THE SITE. RHUEL REEDY SPOKE WITH JOE ZORIC AND RECEIVED A COPY OF HIS SPILL REPORT FOR RCIE RECORDS.

MATERIALS DELIVERED TODAY DESCRIPTION	DELIVERY TICKET NUMBERS	ESTIMATED QUANTITY	UNIT
1 STABILIZATION MATERIAL	N/A	1,176	CY
2			
3			
4			
5			
6			
7			

ITEMS OF WORK COMPLETED TODAY DESCRIPTION	BID ITEM NUMBER	ESTIMATED QUANTITY	UNIT
1 ACCESS ROAD STABILIZATION COMPLETE AND APPROVED BY DAVE			
2 BAKER.			
3			
USED HYD IMPACT HAMMER TO DRIVE PZ 35'S @ STATION ± 34+00			
5 PLEASE REFER TO DAILY DRIVING LOG FOR DETAILED ACCOUNT			
6 OF PILE DRIVING.			
7			
8			
9			
10			
11			
12			
13			
14			

ACCIDENTS/SAFETY/COMMENTS:

DAVE HERMEN ON SITE REQUESTED FALL PROTECTION PLAN FOR PILE BUCKS CLIMBING ON HYD. HAMMER LEADS AND TEMP. EACH OF PILE BUCKS WERE WEARING FALL PROTECTION AND WERE USING THE DEVICES CORRECTLY. DAVE ALSO REQUESTED THAT A SET OF JSA'S BE WRITTEN TO COVER THE SILT FENCE INSTALLATION ACTIVITY. RCIE CORPRATE SAFETY OFFICER AND SITE SAFETY OFFICER NOTIFIED AND BEGAN TO COMPILE THE REQUESTED DATA.

USE ADDITIONAL SHEETS IF NECESSARY

RCI ENVIRONMENTAL INC.
Environmental Contractors & Engineers

9513339.0428

AILY FOREMAN'S REPORT

Sheet 1 of 2

DATE:	JOB NO:	PROJECT:	FOREMAN:
4-94	291012-14-EE-000001	HANFORD N SPRINGS SHEET PILE	FOWER BROWN

DESCRIPTION OF WORK DONE TODAY:

TWO RCIE VISITORS ON SITE / JC BRUMMOND AND GENE COLTRAN. REVIEWED PROGRESS OF TEST PROG. AND DISCUSSED POSSIBLE SOLUTIONS. RCIE DISPATCHED ADDITIONAL LABORER TO ASSIST IN INSTALLATION OF SILT FENCE ALONG TOE OF ACCESS ROAD SLOPE AND REESTABLISH SURFACE CONTAMINATION CONTROL AREA. RUNEL REDY MET WITH JOAN PLASTINO AND JOE ZORIC FOR INITIAL ADMINISTRATIVE AUDIT. FEW SMALL DISCREPENCIES WITH TRAINING RECORDS RUNEL TO CORRECT ANY ERRORS OR MISSING DATA JOE ZORIC WILL ASSIST IN LOCATING MISSING DOCUMENTS, JOAN PLASTINO COMMENT ABOUT SAFETY OFFICER QUALIFICATIONS AND CERTIFICATION THAT RECORD COPY OF ALL PROJECT DOCUMENTS RECEIVED BY (CINDY DECAMP) RCIE MAIN OFFICE. BOTH JOAN AND JOE RECOMMENDED SATISFACTORY RATING ON AUDIT.

SUBS & OTHER FOREMAN ON SITE TODAY: NAME	DESCRIPTION OF WORK DONE
1 DAVE BAKER / BILL SHOAF	MONITOR ALL ADMINISTRATIVE AND FIELD ACTIVITIES
2 FLECHER GENERAL	INSTALLATION OF TEST PILE PHASE
3 RCT PERSONNEL	MONITOR / SURVEY FIELD ACTIVITIES
4 BILL MCDANIEL	RCIE QAQC REP FOR TEST PILE PHASE
5 JC BRUMMOND	(VISITOR) RCIE VICE PRESIDENT
6 GENE COLTRAN	(VISITOR) RCIE PROJECT MANAGER

~~EXTRA WORK OR CHANGED CONDITIONS:~~

QUANITY CONTROL

AFTER GROUNDING STRAPS FAILED 3900 CRAWLER CRANE LAID DOWN TO COMPLETE SAFETY INSPECTION. RICK LIEN ALSO TO SEND RIGGING OUT FIRST THING 12-15-94 AM TO BE LOAD TESTED.

MATERIALS DELIVERED TODAY: DESCRIPTION	DELIVERY TICKET NUMBERS	ESTIMATED QUANTITY	UNIT
1 N/A			
2			
3			
4			
5			
6			
7			

ITEMS OF WORK COMPLETED TODAY: DESCRIPTION	BID ITEM NUMBER	ESTIMATED QUANTITY	UNIT
1 7:30 TO 8:30 AM DIESEL IMPACT (DELMEG 19-32) HAMMER DEMOBBED			
2 FROM PROJECT. AGREED W/ JERRY JACKSHA, DAVE BAKER,			
RCIE, & FLECHER GENERAL THIS TOOL NO LONGER REQUIRED			
FOR PROJECT NOT THE CORRECT TOOL.			
5			
6 BEGAN ATTEMPTING TO PULL SHEETS @ STATION ± 35+00. EXTRACTION			
7 WITH VIBRO HAMMER. PUT GROUNDING STRAPS ON NEAR END			
8 OF DAY, BROKE STRAPS. PLEASE REFER TO BILL MCDANIELS			
9 DRIVING LOG, FOR FURTHER DETAIL, ALSO REFERENCE FLECHER			
10 GENERAL DAILY REPORT ATTACHED.			
11			
12			
13			
14			

ACCIDENTS/SAFETY/COMMENTS:

BEFORE EXTRACTION OF SHEETS TO BEGIN HELD SAFETY MEETING WITH CREW AND RCT PERSONNEL TO REVIEW RAD PROCEDURES DURING EXTRACTION OF SHEETS. CRANE BOOM LOWERED FOR COMPLETE SAFETY CHECK AFTER GROUND STRAPS FAILED. PICK GEAR ALSO SENT OUT TO BE LOAD TESTED.

USE ADDITIONAL SHEETS IF NECESSARY

RCI ENVIRONMENTAL INC.
Environmental Contractors & Engineers

9513539.0429

DAILY FOREMAN'S REPORT

Sheet 1 of 2

DATE:	JOB NO:	PROJECT:	FOREMAN:
-15-94	22192-14-EE-000001	HANFORD N SPRINGS SHEET PILE	RINEL REEDY

DESCRIPTION OF WORK DONE TODAY:

GENERAL BEGAN TO EXTRACT LAST PILE @ STATION 35+00 USING APE 400 VIBRO HAMMER, @ APPROXIMATELY 8:30 AM AN "O" RING IN ONE OF THE CONTROL VALVES ON THE APE POWER PACK FAILED. THERE WAS APPROXIMATELY 2 GALLONS OF VEGETABLE HYDRAULIC OIL SPILLED ONTO THE GROUND. PILE BUCKS PLACED OIL ABSORBENT RAGS OVER CONTAMINATED AREA. DAVE BAKER'S ASST. BILL SHOAF WAS NOTIFIED AND REQUESTED A DISPOSAL DRUM FOR CLEANUP. RINEL REEDY PHONE JOE ZORK OF THE SPILL, GAVE HIM LOCATION, TYPE OF CONTAMINATE AND QUANTITY OF SPILL. RCIE LABORERS CONTINUED TO RELOCATE SCA ALONG ACCESS ROAD TO TOE OF SLOPE AND INSTALL SILT FENCE, BETWEEN STATION 13+00 TO 9+00. AFTER VIBRO HAMMER DOWN FLECHER GENERAL SENT MAN TO TOWN TO PICKUP REPLACEMENT HYD. OIL AND TAKE RIGGING IN TO BE LOAD TESTED.

SUBS & OTHER FOREMAN ON SITE TODAY: NAME	DESCRIPTION OF WORK DONE
1 DAVE BAKER / BILL SHOAF (BHI)	MONITOR ALL ADMINISTRATIVE AND FIELD ACTIVITIES.
2 MERLE LAUTERBACH (BHI)	PROJECT MANAGER - OBSERVE SHEET EXTRACTION
3 FLECHER GENERAL	TEST PILE INSTALLATION
4 RCT	MONITOR / SURVEY ALL FIELD ACTIVITIES
5 BILL MCDANIEL	RCIE QA REP FOR TEST PILE PHASE.
6	

~~EXTRA WORK OR CHANGED CONDITIONS:~~ QUALITY CONTROL

NOTIFIED JOE ZORIC OF HYD. OIL SPILL. OBTAINED PROPER DISPOSAL CONTAINERS AND CLEANED UP SPILL. JOE GAVE RCIE COPY OF HIS REPORT OF OUR RECORDS. BROKEN GROUNDING STRAPS AND RIGGING SENT OUT TO BE LOAD TESTED. PLEASE REFER TO BILL MCDANIELS TEST PILE LOG FOR DETAILED ACCOUNT OF TEST PILE PROGRAM.

MATERIALS DELIVERED TODAY: DESCRIPTION	DELIVERY TICKET NUMBERS	ESTIMATED QUANTITY	UNIT
1 VEGETABLE HYDRAULIC OIL	N/A	15	GAL
2 SPARE HYDRAULIC HOSE	N/A	10	LF
3			
4			
5			
6			
7			

ITEMS OF WORK COMPLETED TODAY: DESCRIPTION	BID ITEM NUMBER	ESTIMATED QUANTITY	UNIT
1 @ THURS MEETING W/ BHI. NOTIFIED DAVE BAKER / MERL LAUTERBACH / JERRY JACKSHA /			
2 HOMER SIERMAN THAT PRESENT TEST PILE PROGRAM HAVING LITTLE			
SUCCESS. PRESENTED RESULTS TO DATE AND DISSCUSSED POSSIBLE			
CONTIGENCY PLANS FOR INSTALLATION OF SHEET PILE WALL.			
5			
6 RCIE & BHI AGREE THAT SUCCESSFUL CONTIGENCY PLAN MUST BE			
7 ESTABLISHED TO INSTALL WALL.			
8			
9 MEETING SCHEDULE FOR 12-16-94 TO PRESENT RCIE POSSIBLE			
10 CONTIGENCY PLANS WITH APPROX. SCHEDULE AND PRELIMINARY			
11 BUDGET NUMBERS.			
12			
13			
14			

ACCIDENTS/SAFETY/COMMENTS:

3900 CRAWLER CRANE LAID DOWN AND DETAILED INSPECTION PERFORMED ON BOOM & HEADING AFTER GROUNDING STRAPS HAD BROKEN DURING SHEET EXTRACTION. RIGGING SENT OUT TO BE LOAD TESTED. DURING AM MEETING CLEARANCES TO WORK ZONES, HOUSEKEEPING AND EAR PROTECTION WERE TOPICS.

4-94

USE ADDITIONAL SHEETS IF NECESSARY

RCI ENVIRONMENTAL INC.
Environmental Contractors & Engineers

9513339.0430

DAILY FOREMAN'S REPORT

Sheet 1 of 2

DATE:	JOB NO:	PROJECT:	FOREMAN:
10-94	22192-14-EE-000001	HANFORD N SPRINGS SHEET PILE WALL	RHUEL REEDY

DESCRIPTION OF WORK DONE TODAY:

FLECHER GENERAL REPAIRED APE POWER PACK / EXTRACTED FINAL SHEET @ 135+00. EXTRACTION MORE DIFFICULT THAN ANTICIPATED. SHEET HAD BEEN DRIVEN WITH HYD. IMPACT WITH RELATIVELY LOW BLOW COUNT (PLEASE REFER TO RCIE DRIVING LOG) HOWEVER, THE PAIR HAD EXTENSIVE DAMAGE INTERLOCK SPLIT @ BOTTOM OF SHEET FOR ± 6': MET @ MO920 W/ BHI PERSONNEL TO DISSCUSS CONTIGENCY PLANS AND SCHEDULE FOR NEXT FEW WEEKS. AGREED TO BEGIN ADMINISTRATIVE WORK TO MOB DRILLER ON SITE TO BORE HOLES FOR SHEETPILE WALL. NEXT WEEK FLECHER TO GO TO REMAINING TEST LOCATIONS AND FINISH INITIAL TEST PROGRAM. USEFUL INFORMATION WILL BE GAINED FOR FUTURE CONTIGENCY PLANS.
3900 CRAWLER CRANE @ FIRST TEST LOCATION IN ATEMPT TO PULL THE THREE TEST PILES THERE. WERE NOT SUCCESSFULL. CRANE BEING MOBBED TO 3RD TEST LOCATION @ ± 0400 OF ACCESS ROAD. PZ 35 SHEETS BEING PREPED FOR MONDAY AM TEST DRIVING.

SUBS & OTHER FOREMAN ON SITE TODAY: NAME	DESCRIPTION OF WORK DONE
1 Dave Baker	MONITOR ALL ADMINISTRATIVE AND FIELD ACTIVITIES
2 FLECHER GENERAL	TEST PILE INSTALLATION / EXTRACTION
3 RCT	MONITORED FIELD ACTIVITIES SURVEY AS REQUIRED.
4 CH2MHILL REP FOR TEST PILE PHASE	MONITOR PILE INSTALLATION / EXTRACTION
5 BILL MC DANIAL	RCIE QA REP FOR TEST PILE PHASE.
6	

~~EXTRA WORK OR CHANGED CONDITIONS~~:

QUALITY CONTROL

RCIE FIELD OFFICE PERSONNEL MAKING RECORD COPIES OF ALL DOCUMENTS RECIEVED OR PRODUCED AND TRANSMITTING TO RCIE MAIN OFFICE. CINDY DE CAMP LOGGING ALL DOCUMENTS AND RETURNING DETAILED ACCOUNT OF ALL DOCUMENTATION RECEIVED.

MATERIALS DELIVERED TODAY DESCRIPTION	DELIVERY TICKET NUMBERS	ESTIMATED QUANTITY	UNIT
1 N/A			
2			
3			
4			
5			
6			
7			

ITEMS OF WORK COMPLETED TODAY: DESCRIPTION	BID ITEM NUMBER	ESTIMATED QUANTITY	UNIT
1 RCIE LABORERS INSTALLED ±400 LF SILT FENCE AND			
2 REESTABLISHED ± 1000 LF OF SCM TO TOE OF ACCESS			
ROAD. RCT MONITORED AND SHUT OPERATION DOWN @ 2:45			
BECAUSE OF HIS REQUIRED PAPERWORK. RCIE LABORERS			
5 FINISHED THE DAY HOUSEKEEPING.			
6			
7			
8			
9			
10			
11			
12			
13			
14			

ACCIDENTS/SAFETY/COMMENTS:

HOUSEKEEPING TOPIC. NOW MOVING TO STATION 0400 LOCATION THAT WE ARE EXITING SHALL BE LEFT IN A NEAT AND SAFE MANNER. MOVING EQUIPMENT ALL GROUND PERSONNEL TO STAY VISIBLE TO MACHINE OPERATORS.

USE ADDITIONAL SHEETS IF NECESSARY

RCI ENVIRONMENTAL INC.
Environmental Contractors & Engineers

9513339.0431

AILY FOREMAN'S REPORT

Sheet 1 of 2

DATE:	JOB NO:	PROJECT:	FOREMAN:
2-19-94	22192-14-EE-000001	HANFORD N SPRINGS SHEET ALE BARRIER	RAMEL REEDY

DESCRIPTION OF WORK DONE TODAY:

RCIE LABORERS CONTINUED TO INSTALL SILT FENCE ALONG ACCESS ROAD @ TOE OF SLOPE. ± STA 9+00 TO 5+00, SCHEDULE TO INSTALL ADDITIONAL 800 LF TO ± STATION 2+00. SAFETY SIGNS REQUESTED BY DAVE HERMEN ARE READY FOR PICKUP WILL BE ON SITE TUES. AM. FLECHER GENERAL MOBILIZED 3900 CRAWLER CRANE TO THIRD TEST STATION 1+29. MOVED HYD HAMMER AND LEADS W/POWER PACK TO THIRD STATION. MOBILIZED ADDITIONAL LEADS ON SITE FROM LAMPSON'S YARD. PREPED 4 PAIRS OF SHEETS FOR INSTALLATION. WELD ON ANGLES AND ALSO WELDED PAIRS OF SHEETS TOGETHER. SETUP TEMPLATE READY FOR AM TEST DRIVING.

SUBS & OTHER FOREMAN ON SITE TODAY: NAME	DESCRIPTION OF WORK DONE
1 DAVE BAKER	MONITOR ALL FIELD AND ADMINISTRATIVE ACTIVITIES
2 JOE ZORIC	ONSITE FOR DELIVERY OF DISPOSAL DRUMS.
3 RCI'S	MONITOR ALL FIELD ACTIVITIES.
4 FLECHER GENERAL	MOB TO THIRD TEST PILE STATION
5 BILL SHOAF	
6 BILL MCDANIEL.	WORKED W/R. BROWN ON TEST PILE CONTIGENCIES.

~~EXTRA WORK OR CHANGED CONDITIONS:~~

QUANTY CONTROL.

JOE ZORIC HAD 3 EA 55 GAL DRUMS DELIVERED FOR ANY POSSIBLE SPILL THAT MAY OCCUR. WHILE THERE TRUCK PICKED UP DRUMS CONTAINING THE VEGETABLE HYDRAULIC OIL THAT HAD PREVIOUSLY LEAKED FROM A FAILED "O" RING ON A HYDRAULIC CONTROL VALVE. THERE WAS NO PILE DRIVING ACTIVITY TODAY. MOBILIZATION TO THIRD TEST PILE STATION AND SETUP FOR 12/20/94 TEST DRIVING.

MATERIALS DELIVERED TODAY: DESCRIPTION	DELIVERY TICKET NUMBERS	ESTIMATED QUANTITY	UNIT
1 ADDITIONAL LEADS FOR HYDRAULIC HAMMER	N/A	1	EA
2			
3			
4			
5			
6			
7			

ITEMS OF WORK COMPLETED TODAY: DESCRIPTION	BID ITEM NUMBER	ESTIMATED QUANTITY	UNIT
1			
2 PREP FOR THIRD TEST PILE STATION. SPENT DAY GETTING			
3 READY FOR TUESDAY DRIVING.			
4			
5 ROGER BROWN AND BILL MCDANIEL STAYED @ OFFICE			
6 IN TOWN WORKED ON BUDGET NUMBERS FOR			
7 POSSIBLE CONTIGENCIES TO DRIVING PILES. OBJECTIVE			
8 FIND ALT METHOD OF INSTALLING SHEET PILE AND			
9 MAINTAIN BHI BUDGET.			
10			
11			
12			
13			
14			

ACCIDENTS/SAFETY/COMMENTS:

WEEKLY SAFETY MEETING HELD, TOPICS INCLUDED HOLIDAY STRESS, ALSO DISCUSSED IN DETAIL MOB DOWN TO THIRD TEST LOCATION. IE KEEPING NONESENTIAL PEOPLE OUT OF AREA. EYE & EAR PROTECTION SIGNS TO BE ON SITE 12/20/94. TWO ITEMS TO CORRECT. 1) STORAGE OF GAS BOTTLES AND GUARD FOR DISKGRINDER THAT PILE BUCKS ARE USING. NOTIFIED JIM CRAWFORD AND RICK LEN TO GET THEM CORRECTED.

USE ADDITIONAL SHEETS IF NECESSARY

RCI ENVIRONMENTAL INC.
Environmental Contractors & Engineers

9513339.0432

AILY FOREMAN'S REPORT

Sheet 1 of 2

DATE:	JOB NO:	PROJECT:	FOREMAN:
0/94	22192-14-EE-000001	HANFORD N SPRINGS SHEET PILE.	RHUEL REEDY

DESCRIPTION OF WORK DONE TODAY:

- LABORERS COMPLETED INSTALLATION OF SILT FENCE TO APPROXIMATELY STATION 2+00. STARTED INSTALLATION OF FENCE AT STATION ± 25+00, RCT TO REQUIRE ANTI "C", FOR THIS PORTION OF ACCESS ROAD.
- FLECHER BEGAN STANDING PZ 35 SHEETS AT 8:30 AM AGAINST TEMPLATE. @ APPROX 10:30 FOUR PAIRS OF SHEETS STOOD, THREADED AND LEVELED FOR STAIRSTEP DRIVING. EACH PAIR OF SHEETS HAVE BEEN WELDED SOLID TO ACTED AS SINGLE SHEET. ANGLE IRON @ GROUTED JOINT STICH WELDED W/ ± 3" WELDS ON 6" CENTERS. HYDRAULIC HAMMER WITH ADDITIONAL LEADS STOOD AND PLACED ON THIRD PAIR. BEGAN TO DRIVE @ 11:30 AM PLEASE REFER TO DRIVING LOG FOR DETAILED INFORMATION REGARDING TEST PILE DRIVING.

SUBS & OTHER FOREMAN ON SITE TODAY:	NAME	DESCRIPTION OF WORK DONE:
1	DAVE BAKER (BHI)	MONITOR ALL ADMINISTRATIVE AND FIELD ACTIVITIES.
2	BILL SHEAJE (BHI)	MONITOR TEST PILE INSTALLATION FOR DAVE BAKER
3	FLECHER GENERAL	INSTALLATION OF TEST PILE PROGRAM
4	RCT'S	MONITOR AND SURVEY ALL FIELD ACTIVITIES
5	RANDY HAVENOR (BHI)	ON SITE TO INSPECT EXIST. WELL HEADS ON ACCESS ROAD
6	MERLE LAUTERBACH (BHI)	PM ON SITE TO OBSERVE TEST DRIVING @ 3RD LOCATION

~~EXTRA WORK OR CHANGED CONDITIONS~~:

QUALITY CONTROL

EACH OF FOUR PAIRS STOOD WELDED CONTINUOUS TO INSURE JOINT SEAL. AFTER SHEETS STOOD AND THREADED TOGETHER THEY WERE ATTACHED TO TEMPLATE TO ENSURE THEY ARE BEING DRIVEN LEVEL. ADDITIONAL LEADS ADDED TO HYDRAULIC IMPACT HAMMER TO GIVE GREATER STABILITY AND MORE ACCURATE DRIVING. ENERGY ON IMPACT HAMMER REDUCED TO 30,000 LBS GUARD AGAINST SHEETS BEING DEFORMED. THIS ALLOWED SHEET BLOW COUNT TO RAISE. DIRECT INVERSE RELATIONSHIP BETWEEN HAMMER ENERGY AND BLOW COUNT. PLEASE REFER TO DRIVING LOG FOR DETAILED ACCOUNT.

MATERIALS DELIVERED TODAY	DESCRIPTION	DELIVERY TICKET NUMBERS	ESTIMATED QUANTITY	UNIT
1	N/A			
2				
3				
4				
5				
6				
7				

ITEMS OF WORK COMPLETED TODAY:	DESCRIPTION	BID ITEM NUMBER	ESTIMATED QUANTITY	UNIT
1	SILT FENCE COMPLETE TO STATION ± 2+00. BEGAN			
2	INSTALLATION OF FENCE NEAR SAMPLING STATION			
	STATION ± 25+00.			
5	NOW TO THIRD TEST SITE COMPLETE BEGAN TEST PILE			
6	DRIVING @ THIRD LOCATION.			
7				
8	GENE COLTRAN RUE PROJECT MANAGER @ RUE OFFICE			
9	IN RICHLAND FOR ASSISTANCE IN DEVELOPEMENT OF TEST			
10	PILE CONTIGENCY PLANS.			
11				
12				
13				
14				

ACCIDENTS/SAFETY/COMMENTS:

RESTRICTED ACCESS OF VEHICLES @ TEST LOCATION # 3 OF NON-ESENTIAL PERSONNEL TO ALLOW FOR POSSIBLE EMERGENCIES AND FLECHER ACCESS TO THEIR WORK. ESTABLISHED BARRIERS @ DOWN STREAM ACCESS ROAD TO LIMIT VEHICLE TRAFFIC. ERRECTED EAR/EYE/HEAD PROTECTION SIGNS @ TEST LOCATION AND VARIOUS LOCATIONS THROUGHOUT THE SITE

USE ADDITIONAL SHEETS IF NECESSARY

4-94

9513339.0433

RCI ENVIRONMENTAL INC.
Environmental Contractors & Engineers

DAILY FOREMAN'S REPORT

Sheet 1 of 2

DATE:	JOB NO:	PROJECT:	FOREMAN:
21-94	22192-14-EE-000001	HANFORD N SPRINGS SHEET PILE	ROGER BROWN

DESCRIPTION OF WORK DONE TODAY:

LABORERS COMPLETED INSTALLATION OF SILT FENCE ON ACCESS ROAD, LAST 300 LF FROM STATION ± 25+00 TO STATION ± 22+00. BEGAN TO REMOVE ALL DAMAGED AND EXTRA "T" POST FROM ACCESS ROAD AND STORE @ RCIE FIELD OFFICE.

CONTINUED TEST DRIVING @ THIRD LOCATION. DROVE ALL FOUR PAIRS OF SHEETS TO WITHIN FOUR FEET OF CLAY LAYER. EXTRACTED THREE OF FOUR PAIRS AND STOPPED DUE TO DARKNESS. PLEASE REFER TO DAILY DRIVING LOG FOR DETAILED ACCOUNT OF TEST PILE INSTALLATION.

ROGER BROWN ATTENDED AFTERNOON MEETING W/ BHI MANAGEMENT TEAM PER REQUEST OF MERLE LAUTERBACH DISCUSSION OF POTENTIAL INSTALLATION CONTIGENCY PLANS.

SUBS & OTHER FOREMAN ON SITE TODAY: NAME	DESCRIPTION OF WORK DONE
1 DONE BAKER	MONITOR ALL ADMINISTRATIVE AND FIELD ACTIVITIES.
2 FLECHER GENERAL	INSTALLATION OF TEST PILE PROGRAM
3 RCI'S	MONITOR / SURVEY OF ALL FIELD ACTIVITIES.
4	
5 BILL MCDANIEL.	QAQC REP FOR RCIE ON TEST PILE PROGRAM.
6	

~~EXTRA WORK OR CHANGED CONDITIONS~~:

QUALITY CONTROL

AFTER BLOW COUNT BECAME ACCESSIVE APPROX. 8:30 AM EXTRACTED ONE PAIR OF PZ 35 SHEETS FROM TEST STATION 3. FOUND NO DAMAGE TO SHEET @ THAT TIME. DROVE SINGLE PAIR BACK IN LINE WITH REMAINING 3 PAIRS AND CONTINUED DRIVING AS A UNIT. WAS AGREED @ SITE THAT SHEETS HAD REACH REFUSAL @ APPROX 4 FEET ABOVE CLAY LAYER. EXTRACTED 3 OF 4 PAIRS BY DARK. A DETAILED ACCOUNT OF SHEET DAMAGE TO BE ON 12-22-94 REPORT, AFTER 4TH SHEET EXTRACTED. PLEASE REFER TO DRIVING LOG FOR ADDITIONAL INFORMATION REGARDING 3RD TEST LOCATION THIS DATE.

MATERIALS DELIVERED TODAY: DESCRIPTION	DELIVERY TICKET NUMBERS	ESTIMATED QUANTITY	UNIT
1 N/A			
2			
3			
4			
5			
6			
7			

ITEMS OF WORK COMPLETED TODAY: DESCRIPTION	BID ITEM NUMBER	ESTIMATED QUANTITY	UNIT
1 INSTALLATION OF SILT FENCE COMPLETE LABORERS BEGAN			
2 SITE / ACCESS ROAD CLEANUP OF DEBRIS AND			
3 ADDITIONAL MATERIALS.			
5 GENE COLTRAN @ RCIE RICHLAND OFFICE TO ASSIST W/			
6 TEST PILE CONTIGENCY PLANS.			
7			
8 RHUEL REEDY INVESTIGATION AND RESEACH WORK ON			
9 POSSIBLE EQUIPMENT OPTIONS FOR TEST PILE INSTALLATION			
10 CONTIGENCY PLANS.			
11			
12			
13			
14			

ACCIDENTS/SAFETY/COMMENTS:

RCI'S MONITOR OF SHEET EXTRACTION. REVIEW OF EXTRACTION PROCEDURES. LIMITED SITE ACCESS FOR ONLY KEY SITE PERSONNEL. ALL OTHER OBSERVERS TO STAY CLEAR OF AREA. EAR / EYE PROTECTION CONFIRMED FOR ALL SITE PERSONNEL.

USE ADDITIONAL SHEETS IF NECESSARY

RCI ENVIRONMENTAL INC.
Environmental Contractors & Engineers

9513339.0434

D. _Y FOREMAN'S REPORT

Sheet 1 of 2

DATE:	JOB NO:	PROJECT:	FOREMAN:
12/94	22192-14-EE-000001	HANFORD N SPRINGS SHEET PILE W/AL	ROGER BROWN

DESCRIPTION OF WORK DONE TODAY:

LABORERS COMPLETED INSTALLATION OF SILT FENCE. ALSO INSTALLED SKIRTING AROUND RCIE / FLECHER GENERAL FIELD OFFICE / LUNCH SHACK. CLEANED UP AND DISPOSED OF ALL CONSTRUCTION DEBRIS ALONG ACCESS ROAD.

BEGAN TO PULL REMAINING SHEETS @ TEST STATION #3. SHEETS WERE DAMAGED TO THE POINT THAT THEY HAD TO BE (CUT OFF) FRESHENED UP FOR USE ON NEXT TEST STATION. APE 400 VIBRO HAMMER USED TO EXTRACT SHEETS. BEGAN TO MOB TO TEST STATION #4 FOR 12/23/94 DRIVING. PLEASE REFER TO BILL MCDANIELS' DRIVING LOG FOR MORE INFORMATION REGARDING TEST DRIVING.

SUBS & OTHER FOREMAN ON SITE TODAY: NAME	DESCRIPTION OF WORK DONE
1 BILL SHOAF	BHI TECH. REP FOR SHEET PILE INSTALLATION
2 DAVE BAKER	MONITOR ALL ADMINISTRATIVE / FIELD ACTIVITIES.
3 RCI	MONITOR FIELD ACTIVITIES SURVEY AS REQUIRED
4 FLECHER GENERAL	INSTALLATION OF TEST PILES.
5 BILL MCDANIEL	RCIE QA REP FOR TEST PILE PROGRAM.
6	

~~EXTRA WORK OR CHANGED CONDITIONS:~~

QUALITY CONTROL

PHOTOS TAKEN OF ALL SHEETS AFTER EXTRACTION. AFTER SHEETS PULLED @ THIRD TEST LOCATION ANY DAMAGED PORTIONS (TOPS / BOTTOMS) OF SHEETS REMOVED BEFORE THEY WERE DRIVEN @ NEXT TEST LOCATION. RCI PERSONNEL SURVEYED ALL SHEETS DURING THEIR EXTRACTION @ LOCATION #3.

MATERIALS DELIVERED TODAY: DESCRIPTION	DELIVERY TICKET NUMBERS	ESTIMATED QUANTITY	UNIT
1 N/A			
2			
3			
4			
5			
6			
7			

ITEMS OF WORK COMPLETED TODAY: DESCRIPTION	BID ITEM NUMBER	ESTIMATED QUANTITY	UNIT
1 COMPLETED INSTALLATION OF SILT FENCE ALONG ACCESS			
2 ROAD. THIS WAS EDDY VANVANKERS LAST DAY. PAY CONTRACT			
3			
4 COMPLETED TEST PILE DRIVING @ LOCATION #3 AND EXTRACTED			
5 SHEETS. REP FOR MOB TO TEST LOCATION #4 PLEASE REFER			
6 TO RCIE QA TEST DRIVING LOG FOR DETAILED ACCOUNT OF			
7 TEST DRIVING LOCATION #3.			
8			
9 INVESTIGATIVE WORK CONTINUED FOR POSSIBLE CONTINGENCY PLANS			
10 FOR INSTALLATION OF SHEET PILE BARRIER.			
11			
12			
13			
14			

ACCIDENTS/SAFETY/COMMENTS:

REVIEWED UPCOMMING TEST LOCATIONS AND WORK. EAR PROTECTION AND ALERT TO MOVING EQUIPMENT. MOVING BACK AND FORTH BETWEEN TEST LOCATIONS. CRANE SWING RADIUS TO BE GUARDED BY FLECHER GENERAL PERSONNEL WHILE CRANE SWINGING TO PREVENT GETTING ANYONE CAUGHT BETWEEN SLEEVE AND COUNTER WEIGHT.

USE ADDITIONAL SHEETS IF NECESSARY

4-94

RCI ENVIRONMENTAL INC.
Environmental Contractors & Engineers

9513339.0435

DAILY FOREMAN'S REPORT

Sheet 1 of 2

DATE:	JOB NO:	PROJECT:	FOREMAN:
12-94	2192-14-02-00001	HANFORD N SPRINGS SHEET PILE WALL	ROGER BROWN

DESCRIPTION OF WORK DONE TODAY:

RCIE LABORER WORKED HALF DAY TO COMPLETE SILT FENCE ADDED @ STATION ± 57+00; CLEANING ALL CONSTRUCTION DEBRIS FROM ACCESS ROAD.
TOM PILE PROGRAM CONTINUED @ STATION ± 116+00. SHEETS STAGED AGAINST TEMPLATE AND BEGAN DRIVING @ APPROXIMATELY 11:30 AM. STAMPED TWO SHEETS ± 4' AND BROKE FOR LUNCH. BEGAN DRIVING AGAIN @ 12:30 PM. PLEASE REFER TO FLETCHER GENERAL'S DAILY REPORT AND RCIE'S QAQC REPORT FOR TEST PILE PHASE.

SUBS & OTHER FOREMAN ON SITE TODAY: NAME	DESCRIPTION OF WORK DONE
1 BILL SHEAF BHI	MONITOR TEST PILE INSTALLATION
2 FLETCHER GENERAL	INSTALLATION OF TEST PILE PROGRAM
3 RCI'S	MONITOR / SURVEY FIELD ACTIVITIES.
4 DAVE HERMEN	SAFETY REP FOR BHI MONITOR FIELD ACTIVITIES
5	
6 BILL McDANIEL.	QAQC REP FOR RCIE TEST PILE PROGRAM.

~~EXTRA WORK OR CHANGED CONDITIONS:~~

QUALITY CONTROL

ALL SHEETS INSPECTED PRIOR TO INSTALLATION / WELDS / SIGNS OF STRESS. IN ADDITION THESE SHEETS WERE TRIMMED (DAMAGED PORTIONS REMOVED) AFTER EXTRACTION @ TEST LOCATION #5. TEMPLATE USED TO ENSURE SHEETS ARE DRIVEN VERTICALLY. RCIE CONFIRMED REFUSAL BLOW COUNT TO ENSURE SHEETS NOT DAMAGED EXTENSIVELY.

PLEASE REFER TO RCIE TEST PILE QAQC LOG, FOR FURTHER INFORMATION.

MATERIALS DELIVERED TODAY DESCRIPTION	DELIVERY TICKET NUMBERS	ESTIMATED QUANTITY	UNIT
1 N/A			
2			
3			
4			
5			
6			
7			

ITEMS OF WORK COMPLETED TODAY: DESCRIPTION	BID ITEM NUMBER	ESTIMATED QUANTITY	UNIT
1 SHEET PILE TEST DRIVING @ 4TH LOCATION UNDERWAY. WILL			
2 EXTRACT SHEETS ON THURS. 12/27/94 FOLLOWING HOLIDAY			
3 WEEKEND.			
4			
5 ALL SILT FENCE INSTALLED AND ALL CONSTRUCTION DEBRIS			
6 PICKED UP AND REMOVED FROM ACCESS ROAD. REMAINING			
7 RCIE LABORER LAID-OFF.			
8			
9			
10			
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12			
13			
14			

ACCIDENTS/SAFETY/COMMENTS:

@ APPROX 11:00 AM ONE OF THE PILE PICKS (JERRY MILSAP) RECEIVED SMALL BURN ON THE BACK OF HIS NECK FROM A PIECE OF WELDING SLAG THAT CAME INTO CONTACT WITH HIS SKIN. DAVE HERMEN ESCORTED HIM TO FIRST AIDE STATION FOR TREATMENT. HE WAS RELEASE TO RETURN TO WORK. DURING LUNCH HOUR SAMEL REEDY REVIEWED PROPER WELD AND BURN PROCEDURES AS WELL AS APPROPRIATE PROTECTIVE CLOTHING.

USE ADDITIONAL SHEETS IF NECESSARY

4-94

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RCI ENVIRONMENTAL INC.
Environmental Contractors & Engineers

DAILY FOREMAN'S REPORT

Sheet 1 of 2

D	JOB NO:	PROJECT:	FOREMAN:
6/27/94	22192-14-EE-000001	HANFORD N SPRINGS SHEET PILE BARRIER	ROGER BROWN.

DESCRIPTION OF WORK DONE TODAY:

CONTINUED WITH TEST DRIVING AT TEST LOCATION # 4. BEGAN DRIVING WITH IMPACT HAMMER AFTER SAFETY MEETING. TOOK SHEETS DOWN TO APPROXIMATELY 34 FT. BEFORE REFUSAL. HAD HIGH BLOW COUNT ≥ 50 PER FOOT ON SHEETS. LAYED IMPACT HAMMER DOWN AND HOOKED UP APE 400 VIBRO HAMMER FOR EXTRACTION. PULLED SHEETS AFTER LUNCH WITH APE 400. MOVED EQUIPMENT TO TEST LOCATION #5 BY 4:30pm. WELDED DRIVING TIPS ON PZ-40 SHEETS TO BE USED @ TEST LOCATION #5.

SUBS & OTHER FOREMAN ON SITE TODAY: NAME	DESCRIPTION OF WORK DONE
1 DAVE BAKER	MONITOR ALL FIELD AND ADMINISTRATIVE ACTIVITIES
2 BILL SHOAF	ASSIST DAVE BAKER
3 RGT	MONITOR ALL FIELD ACTIVITIES AND SURVEY AS REQUIRED
4 FLECHER GENERAL	INSTALLATION OF TEST PILE PROGRAM.
5 BILL MCDANIEL	QAQC REP FOR RCIE ON TEST PILE PROGRAM.
6	

EXTRA ~~WORK OR CHANGED CONDITIONS~~: QAQC

BILL MCDANIEL / ROGER BROWN OBSERVED INSTALLATION AND EXTRACTION OF PZ 35 SHEETS @ TEST LOCATION # 4. PHOTO'S TAKEN OF EACH SHEET DURING EXTRACTION TO DOCUMENT DAMAGE TO EACH SHEET DURING DRIVING. PLEASE REFER TO BILL MCDANIELS TEST PILE DRIVING LOG FOR DETAILED ACCOUNT OF TEST LOCATION # 4. INCLUDED (DRIVING RECORD, PHOTO'S, DESCRIPTION OF DAMAGE TO EACH SHEET AND INTERLOCK.)

MATERIALS DELIVERED TODAY DESCRIPTION	DELIVERY TICKET NUMBERS	ESTIMATED QUANTITY	UNIT
1 N/A			
2			
3			
4			
5			
6			
7			

ITEMS OF WORK COMPLETED TODAY: DESCRIPTION	BID ITEM NUMBER	ESTIMATED QUANTITY	UNIT
1 Completion of Test Pile Location #4. Prepped for			
2 Location 5. Mobbed equipment and materials			
3 Location 5.			
4			
5			
6			
7			
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9			
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ACCIDENTS/SAFETY/COMMENTS:

SPOKE ABOUT ALCOHOL CONSUMPTION / ABUSE / DEPRESSION. ALL INDIVIDUALS ARE RESPONSIBLE FOR THE SAFETY OF OTHERS ON THE JOB SITE. IF ANY INDIVIDUAL IMPAIRED PUTS EVERYONE ELSE ON THE SITE IN JEPARDY OF BEING HURT. NO ALCOHOL ON SITE @ ANY TIME. NO CONSUMPTION DURING WORKING HOURS. MODERATION... MODERATION... MODERATION.

USE ADDITIONAL SHEETS IF NECESSARY

9513339.0437

RCI ENVIRONMENTAL INC.
Environmental Contractors & Engineers

DAILY FOREMAN'S REPORT

Sheet 1 of 2

DATE:	JOB NO:	PROJECT:	FOREMAN:
5-94	22192-14-EE-000001	HANFORD N SPRINGS SHEET PILE WALL	ROGER BROWN

DESCRIPTION OF WORK DONE TODAY:

MOBILIZED TO TEST LOCATION #5. SETUP FOR PILE DRIVING.
PLEASE REFER TO ATTACHED FLECHER GENERAL DAILY REPORT FOR DETAILED ACCOUNT OF DAYS WORK ACTIVITIES.
FOR PILE TEST DRIVING DETAILS PLEASE REFER TO BILL MCDANIELS TEST DRIVING LOG.

SUBS & OTHER FOREMAN ON SITE TODAY: NAME	DESCRIPTION OF WORK DONE
1 DAVE BAKER	MONITOR ALL FIELD AND ADMINASTRATIVE ACTIVITIES
2 BILL SHOAF	" " " " " "
3 RCI PERSONNEL	MONITOR AND SURVEY AS REQUIRED ALL FIELD WORK
4 FLECHER GENERAL	INSTALLATION OF TEST PILE PROGRAM.
5	
6	

~~EXTRA WORK OR CHANGED CONDITIONS:~~ QAQC

BILL MCDANIEL ON SITE TO MONITOR AND RECORD ALL TEST PILE DATA. FOR A DETAILED ACCOUNT OF THIS DAYS TEST DRIVING DATA PLEASE REFER TO BILL MCDANIELS TEST PILE DRIVING LOG.

MATERIALS DELIVERED TODAY DESCRIPTION	DELIVERY TICKET NUMBERS	ESTIMATED QUANTITY	UNIT
1 N/A		N/A	
2			
3			
4			
5			
6			
7			

ITEMS OF WORK COMPLETED TODAY: DESCRIPTION	BID ITEM NUMBER	ESTIMATED QUANTITY	UNIT
1 MOB & SETUP FOR TEST LOCATION 5. BY CHANGE ORDER			
2 IS THIS TO BE FINAL TEST LOCATION.		N/A	
3			
4			
5			
6			
7			
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9			
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11			
12			
13			
14			

ACCIDENTS/SAFETY/COMMENTS:
MOBILIZATION WAS MAIN TOPIC / MOVING EQUIPMENT / SPOTTER FOR CRANE WHILE MOBBING TO TEST LOCATION 5.

USE ADDITIONAL SHEETS IF NECESSARY

9513339.0438

RCI ENVIRONMENTAL INC.
Environmental Contractors & Engineers

DAILY FOREMAN'S REPORT

Sheet 1 of 2

D	JOB NO:	PROJECT:	FOREMAN:
29-94	22192-14-EE-00000	HANFORD N SPRINGS SHEET PILE	ROGER BROWN

DESCRIPTION OF WORK DONE TODAY:

Last test station ~~[illegible]~~ use of PZ 40's slowed / ~~hemet~~ that was used on PZ 35 does not match profile of PZ 40. Drove sheets to ± 35' and began to extract all driving done with hydraulic impact hammer. APE 400 vibro hammer use to pull piles. No contamination found on any of extracted sheets. Please refer to Flecher General Daily Report for additional information.

SUBS & OTHER FOREMAN ON SITE TODAY: NAME	DESCRIPTION OF WORK DONE
1 Dave Baker	Monitor all field and administrative activities
2 Bill Shoaf	" " " " " " " "
3 RGT Personnel	Monitor and survey as required all field activities
4 Flecher General	Installation of ~~sheet pile test~~ program.
5	
6	

~~E... WORK OR CHANGED CONDITIONS:~~

QAQC

Bill McDaniel on site to monitor all pile driving and extraction. RGT's on site to monitor sheet extraction. No contamination found. Photo's taken of all extracted sheet pile and damage measured and recorded in Bill McDaniel's test pile driving log.

MATERIALS DELIVERED TODAY DESCRIPTION	DELIVERY TICKET NUMBERS	ESTIMATED QUANTITY	UNIT
1 N/A			
2			
3			
4			
5			
6			
7			

ITEMS OF WORK COMPLETED TODAY: DESCRIPTION	BID ITEM NUMBER	ESTIMATED QUANTITY	UNIT
1 See Above.			
2			
3			
4			
5			
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12			
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14			

ACCIDENTS/SAFETY/COMMENTS:

Discussed operation and use of man basket. All persons in basket to wear harness attached to basket from rear. Also topic of test program nearing end / remind everyone not to ~~be~~ get careless.

4-94

USE ADDITIONAL SHEETS IF NECESSARY

RCI ENVIRONMENTAL INC.
Environmental Contractors & Engineers

95|3339.0439

DAILY FOREMAN'S REPORT

Sheet 1 of 2

DATE:	JOB NO:	PROJECT:	FOREMAN:
30-94	22192-14-EE-0000	HANFORD N SPRINGS SHEET PILE	ROGER BROWN

DESCRIPTION OF WORK DONE TODAY:

CONTINUED W/TH EXTRACTION OF LAST TWO SHEETS @ LAST TEST STATION. GENERAL HAVING PROBLEMS WITH APE 400 VIBRO HAMMER POWER PACK. PILE BUCK HAVING TO OPERATE THROTTLE BY HAND. SHEETS EXTRACTED BY 9:30 AM. DAMAGE TO BOTH PAIRS. @ 10:30 BEGAN TO MOB ALL EQUIP. AND MATERIALS TO LAY DOWN YARD @ TOP OF UPSTREAM ACCESS ROAD.

SUBS & OTHER FOREMAN ON SITE TODAY: NAME	DESCRIPTION OF WORK DONE
1 DAVE BAKER	MONITOR ALL FIELD AND ADMINISTRATIVE ACTIVITIES
2 BILL SHOAF	" " " " " "
3 RGT PERSONNEL	MONITOR AND SURVEY AS REQUIRED ALL FIELD ACTIVITIES
4 FLECHER GENERAL	INSTALLATION OF SHEET PILE TEST PROGRAM.
5	
6	

~~EXTRA WORK OR CHANGED CONDITIONS~~: QAQC

BILL MCDANIEL ON SITE TO MONITOR SHEET EXTRACTION DAMAGE RECORDED MEASURED AND PHOTOGRAPHED. ~~[illegible]~~ LAID EXTRACTED SHEETS ON PLASTIC TO HAVE RGT'S SURVEY. NO CONTAMINATION FOUND. PLEASE REFER ~~[illegible]~~ TEST PILE DRIVING LOG.

MATERIALS DELIVERED TODAY DESCRIPTION	DELIVERY TICKET NUMBERS	ESTIMATED QUANTITY	UNIT
1 N/A			
2			
3			
4			
5			
6			
7			

ITEMS OF WORK COMPLETED TODAY: DESCRIPTION	BID ITEM NUMBER	ESTIMATED QUANTITY	UNIT
1			
2 PLEASE SEE ABOVE.			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			

ACCIDENTS/SAFETY/COMMENTS:

SHEET EXTRACTION PROCEDURES. PLASTIC AND AFFIXATIVE ON SITE TO BE USED WHILE SHEET EXTRACTED. PLACE ON AND AROUND SHEET PRIOR TO SURVEY BY RGT.

USE ADDITIONAL SHEETS IF NECESSARY

9513339.0440

COPY

N-SPRINGS SHEET PILE BARRIER WALL INSTALLATION DESIGN AND OPERATIONS SUBMITTALS

A. TEST PILE PROGRAM: FIRST SUBMITTAL, 11/30/94, revised - 12/15/94
B. 30% DESIGN SUBMITTAL: FIRST SUBMITTAL, ,revised -
C. 90% DESIGN SUBMITTAL: FIRST SUBMITTAL, , revised -
D. 100% DESIGN SUBMITTAL: FIRST SUBMITTAL, ,revised -

prepared for,

BECHTEL HANFORD, INC.
Contract No. 22192-14-EE-000001

prepared by,

RCI Environmental, Inc.
P.O. Box 6090

Kent, WA 98032

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I. ACTIVITY SEQUENCE AND SCHEDULE

Test Pile Work Plan

II. SITE SECURITY AND SAFETY

III. CONTINGENCIES

IV. EQUIPMENT, MATERIALS AND MANPOWER

Attachments

A-1 **Test Pile Location and Data Sheet

A-2 **Specifications and Manufacturers Data on Sheets

A-3 **Specifications on Test Pile Program Equipment, Hammers

A-4 **Driving Logs and Miscellaneous Associated Submittals for Test Pile Program

I. ACTIVITY SEQUENCE/SCHEDULE

Upon notice to proceed with construction, RCI Environmental, Inc. (RCIE) will mobilize the required equipment to the staging area at the top of the access roads. All security fencing, barricades, or barriers will be placed around the staging area as required. Surveying will have been accomplished to establish the high water mark and to set up the grid for haul road construction. All horizontal limits for haul roads and for the sheet pile wall location will be established by the surveying efforts prior to road construction. These activities will take approximately 3 days to complete.

Following satisfactory completion of the preparatory items listed above, RCIE will begin filling the diesel burn pit area using the bermed material nearby, and using borrow material as necessary from the Contractor borrow source. Haul road construction will begin at the down stream end of the project. Please refer to Attachment A-1 to review technical specifications for the haul road construction and temporary erosion and sedimentation controls along the Columbia River. Haul road construction will take approximately 7 working days to complete.

As the haul road construction progresses, areas will become available for the initiation of the test pile program. Beginning at approximately Station 35.45, RCIE will execute the installation of four 50 foot sheet pile sections ("pairs") of sufficient length to the clay layer. Each sheet pile classification (medium and heavy) must be represented at each test station, which will result in a total of eight sheets being driven at each location (please refer to Attachment A-2 for manufacturer's data/specifications on the different sheet classifications to be tested during this phase). All sheets will have a minimum yield strength of 45,000 psi, and all will be retrofitted with driving shoes, except the medium sheets which are a cold rolled sheet.

Seven of the test pile driving events will occur at specific locations approved by the Contractor. One more location will be determined by the Contractor. During the test pile driving phase, three different driving mechanisms will be employed (vibratory, controllable hydraulic impact, impact, please refer to Attachment A-3 for specifications on the hammers to be used). If there are no major impacts due to subsurface conditions, or due to contamination issues, the test pile program will take approximately 10 working days to complete. All piling utilized in the test program will be assigned a unique identification number and will be marked in one foot increments along the length of the sheet. New identification numbers will be assigned to sheets when used in a new location. Please refer to Section III of this Plan for contingency plans and potential scenarios.

The test pile driving activities will be sequenced according to data gathered during the test well installations. Areas known to be free of detectable contamination will be given first priority for test pile driving in order to allow the operation to continue without delay until the end. We believe that data gathered during the first few rounds can be used to determine the appropriate sheet classification. Initial orders for sheets could be considered at that time avoiding potential schedule impacts, even if the test pile program is not complete due to contamination issues. If the test pile program is delayed for reasons other that contamination issues, we would delay ordering sheets until the test program is complete and the Contractor approves of the sheet pile selection. Our 30% Design submittal will address this issue in further detail.

TEST PILE WORK PLAN-

Initially, all equipment and required materials will be mobilized to the first test pile station and staged to allow access to the sheets and to the driving location. There will be 4 pairs of each classification of sheet to be used in the test pile program (4 ea. medium sheets, CZ 128 X 50' with pile tips, and 4 ea. heavy sheets, PZ 35 X 50' with pile tips). The crew will begin with installation of the CZ 128 sheets using the APE 200 vibratory hammer. Penetration data will be recorded by the CQCR during all driving operations.

If piles penetrated up to 25 feet using the APE 200, the APE 400 hammer can be used at 3/4 power. If penetrated to 30 feet, the APE 400 can be used at full power as long as the sheet continues moving. Heat build-up within the interlocks must be monitored and controlled during all driving operations. Other scenarios to be used in the event that the APE 200 does not drive sheets adequately include the use of the diesel hammer with pile leads and helmet. The impact hammer will deliver energy capable of delivering driving stresses of up to .95 of the yield stress of the sheet pile as determined by the Wave Equation Method of analysis. Again, all penetration data must be recorded (see log in Attachment A-4). If the impact hammer driving appears desirable, we will mobilize the PDA monitoring equipment for any further use of impact driving. However, we do not believe that driving sheets with an impact hammer will be desirable or required. It is our professional opinion that a large vibratory driver will install the sheets with less exposure to damage to the sheets and will display more consistent evidence when the soil changes to silty clay. Therefore, if we use the impact hammer, we would plan to drive the first set of four test sheets without using PDA monitoring. If test driving with the impact hammer shows some advantage, we would mobilize PDA monitoring equipment to be used during any additional impact hammer test driving. If required the third hammer that would be mobilized would be a hydraulic impact hammer. Proper size of this hammer would also be determined by the wave equation method of analysis.

Following the successful driving of CZ 128 sheets, they will begin to be extracted. A Radiological Control Technician (RCT) will be required during all extractions to survey the sheets as they are removed. If surveying shows no contamination, the sheet will be placed back in the stockpile of CZ 128 sheets to be re-used at the next station. If contamination is confirmed, two workers will be prepared (with suits, cleaning materials, drums, etc.) to begin a decontamination operation. The sheets will be cleaned using hand towels and a non-phosphate detergent, and then re-surveyed by the RCT. If clean, they will be placed back in the stockpile. If still contaminated and unable to be cleaned, they will be placed in a separate stockpile to be managed by Contractor. Following the full extraction of the sheet, it will be inspected for damage at the tips and the interlocks, and a written record noting depth or damage of other changes to sheets such as deflections or bends. Photographic records will be maintained for damaged areas with sheet identification number clearly shown in the photograph. The above-described procedure will be repeated exactly for the PZ 35 sheets.

II. SITE SECURITY/SAFETY

The RCIE Superintendent (Roger Brown) will control all access to the site. All site workers will attend a daily safety meeting at the project site. A daily site log will be maintained where all other visitors to the site will sign in and out. Each worker will be briefed on the importance of security at this site, and will be charged with the responsibility of immediately notifying their Foreman or the Superintendent of security violations.

A combination of barriers, yellow and magenta rope, and/or warning signs will be present at the project site delineating areas of limited access. All excavation and fill areas will be considered Exclusionary until designated otherwise. Only workers trained in accordance with 29 CFR 1910.120, Hazardous Waste Site Operations, and trained for radiological work ("trained") will be allowed in these areas. The Support Zone will be established at the top of the existing access roads, roughly in the middle, and will consist of portable latrine facilities, storage for equipment/tools/materials, and an office trailer. This area will be the break/lunch area, the safe refuge area, and the command post for all operations. There will be a latrine supplied at the bottom of the downstream access road also. There will be at least one portable phone on site at all times.

Lane closures of existing public roadways is not anticipated. Construction warning signs will be placed in the immediate vicinity of each entry/exit location. Flaggers are not anticipated to be required. All trucks used for importing backfill or road material will be required to obey all local traffic laws.

III. CONTINGENCIES

RCIE has identified potential scenarios which could result in the sheet not reaching the desired tip elevation. Each scenario has been analyzed and a contingency plan presented to address the possibility of test program failure.

The most obvious potential problem would be encountering subsurface obstructions such as large boulders, logs, or buried concrete. In the event that these obstructions are encountered, RCIE will continue to make efforts to drive the sheet using the different hammers. If all options are unsuccessful, we will re-align the wall around the obstruction. In this way, the test pile phase will provide valuable data regarding problem areas along the proposed alignment, and will allow for additional contingencies to be built in to the Design Submittals.

Another potential problem is the possibility that native overburden material will be unsuitable for conventional driving techniques. This is a case where the optional driving mechanisms would be employed including hydraulic hammers or impact hammers. If these mechanisms also fail, we may have to resort to some form of subgrade preparation prior to attempting to drive the sheets in the most troublesome areas. This option of test pile driving could potentially cause contamination problems for equipment, sheets, personnel, etc.

Contamination of test pile sheets may also cause delays and problems. If contamination is detected during sheet extraction, RCIE will implement a decontamination procedure utilizing hand towels and a small amount of non-phosphate detergent. The sheet will be extract in five foot increments, allowing the RCT to survey the exposed surfaces, and allowing for decontamination, if necessary. If decontamination is unsuccessful, the affected sheets will be turned over to Contractor for final disposition.

Additional contingencies will be developed as the test pile program progresses, and will be added to this plan as necessary. Also, all subsequent design submittals will include contingency planning to address potential problems.

IV. EQUIPMENT, MATERIALS AND MANPOWER

The test pile program will be accomplished using a Manitowac 3900 crawler crane and a Grove RT65S 35 ton rough terrain crane. The crane will be assembled and a safety inspection checklist prepared before any crane operations commence. All initial test driving will be done using an APE Model 200 or Model 400 vibratory hammer. We would prefer not to use any driving mechanism other than vibratory. The vibratory hammer offers a greater degree of control over the sheet as it is driven, allows for easier detection of subsurface damage to the sheets, allows immediate extraction of the sheets, and also will cause less damage to sheets. If the test pile program is successful using this mechanism, we propose not to use the other options because of the overall advantages of the vibratory mechanism. In the event that another mechanism is required, the impact hammer to be used will be the Delmag 19-32 Diesel Hammer. The Hydraulic Impact Hammer will be a IHC-S-70. Please refer to Attachment A-3 to review a list of the proposed equipment for the test pile program, and manufacturer's specifications for all driving mechanisms. All driving mechanisms meet the specified performance criteria required by the Contract Documents, Exhibit E, 2.3, A, B, and C.

We will require a Radiological Control Technician on site for the duration of the test pile program. This will allow the immediate extraction and survey of each sheet as soon as the drive is successful. The pile bucks will be available to hand wash sheets (using hand towels and a small amount of non-phosphate detergent) in five foot increments if necessary for decontamination. All excess rinse liquids will be collected in Contractor-supplied 55 gallon drums and transported to the staging area for Contractor pickup. In the event that the sheets cannot be adequately decontaminated, it may be necessary to turn them over to Contractor for final disposition. We will avoid the known "hot spots" until the end of the test pile program to avoid unnecessary delays in pre-determining what sheet seems most appropriate for the project.

The sheets to be used for the test pile program are as follows:

Heavy sheets	PZ 35
Medium sheets	CZ 128

There are catalog cut sheets with specifications for each different sheet classification in Attachment A-2.

9513339.0447

Attachment A-1
Test Pile Location and Data Sheet

9513339.0448

DATE 12-02-94 | WEMcD

BARRIER WALL - SHEET PILES DATA - TABLE

STA.	DRILL HOLE #	LOCATE L/R OF ℄/L	DEPTH TO CLAY	ELEV CLAY	ELEV O.G.	ELEV. FIN. ROAD	REQ'D SHEET W/4' PEN.	SCHED SEQ-UENCE	
35+58	N97-A	9' L	35.0'	361.4	396.4	401.0	43.6'	2	45
30+45	N96-A	3' L	60.0'	354.0	414.0	405.0	55.0'	1	56
23+16	N95-A	7' L	38.5'	360.3	398.8	401.0	44.7'	7	46
16+08	N99-A	25' L	36.5'	358.3	394.8	401.0	46.7'	6	48
16+01	N94-A	18' L	36.5'	358.3	394.8	401.0	46.7'		48
11+07	N93-A	1.5' L	33.0'	363.4	396.4	401.0	41.6'	5	43
6+39	N92-A	3.5' L	40.5'	359.7	400.2	401.0	45.3'	4	47
1+42	N91-A	3.0' L	44.0'	356.0	400.0	402.0	50.0'	3	51

ROBISON CONSTRUCTION, INCORPORATED

N SPRINGS SHEET PILE BARRIE.. ..ALL - SUBCONTRACT 22194-14-EE-000001

PILE TEST INSTALLATION REPORT NO__________ **DATE________** **LOCATION______________** **SHEET____OF______**

INSPECTOR ____________________ **WEATHER ____________________** **TEMP ____________________**

SHEET PILE NUMBER								
VISUAL (✓OK)								
LENGTH IN FEET								
SHEET TYPE								
THICKNESS								
END CUTOFFS								
INTERLOCKS								
LINEARITY								
PILE SHOES								
INSTALLATION								
INCLINATION %								
PERPENDICULAR								
PARRALLEL/WALL								
HAMMER-TYPE								
HAMMER-MODEL								
ENERGY SETTING								
TIME START								
TIME END								
FINAL PENETRATION								
REMARKS								

NOTES

9513339.0449

N SPRINGS SHEETPILE BARRIER WALL- SHEET PILE INSTALLATION REPORT FOR BLOW COUNT

REPORT NO _____. SHEET ____ OF ____. DATE _____. INSPECT. _____.

PILE NO				PILE NO				PILE NO				PILE NO			
FEET	BLOWS		OTHER	FEET	BLOWS		OTHER	FEET	BLOWS		OTHER	FEET	BLOWS		OTHER
0				0				0				0			
1				1				1				1			
2				2				2				2			
3				3				3				3			
4				4				4				4			
5				5				5				5			
6				6				6				6			
7				7				7				7			
8				8				8				8			
9				9				9				9			
0				0				0				0			
1				1				1				1			
2				2				2				2			
3				3				3				3			
4				4				4				4			
5				5				5				5			
6				6				6				6			
7				7				7				7			
8				8				8				8			
9				9				9				9			
0				0				0				0			
1				1				1				1			
2				2				2				2			
3				3				3				3			
4				4				4				4			
5				5				5				5			
6				6				6				6			
7				7				7				7			
8				8				8				8			
9				9				9				9			

NOTES

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Attachment A-2
Specifications and Manufacturer's Data
on Sheets

HANFORD - PZ35 X D19-32 12/08/94

No.	Ultimate Capacity kips	Max C. Stress ksi	Max T. Stress ksi	Blow Count BPF	Stroke ft	Energy k-ft
1	250.0	23.861	3.005	40.1	8.11	17.22
2	300.0	24.588	2.519	56.8	8.41	17.05
3	350.0	24.974	1.842	67.9	8.57	16.74
4	400.0	25.107	1.608	82.6	8.64	16.70
5	450.0	25.171	1.119	99.5	8.68	16.61
6	500.0	25.836	1.239	114.0	8.97	17.25

HANFORD - PZ35 X IHC S70 12/08/94

No.	Ultimate Capacity kips	Max C. Stress ksi	Max T. Stress ksi	Blow Count BPF	Stroke ft	Energy k-ft
1	300.0	12.611	2.399	169.7	1.00	6.39
2	300.0	16.245	2.369	80.2	1.63	10.34
3	300.0	19.185	2.219	54.1	2.26	14.30
4	300.0	21.781	2.035	42.2	2.90	18.25
5	300.0	24.074	1.839	35.2	3.53	22.19
6	300.0	26.248	1.511	30.6	4.16	26.17
7	300.0	28.114	1.429	27.2	4.79	30.15
8	300.0	29.964	1.417	24.7	5.43	34.11
9	300.0	31.744	1.419	22.7	6.06	38.04
10	300.0	33.356	1.506	21.1	6.69	42.02

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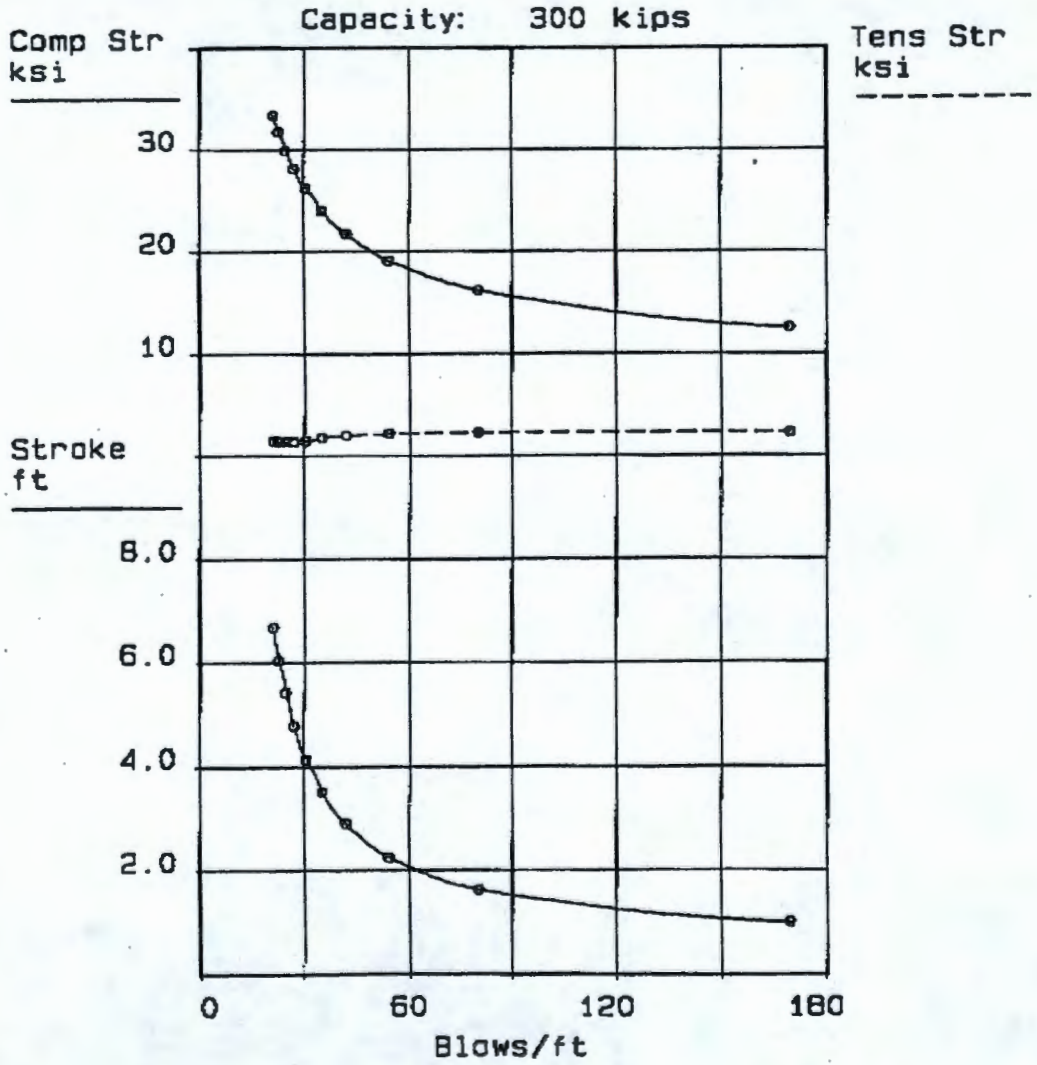
Goble Rausche Likins & Associates, Inc.

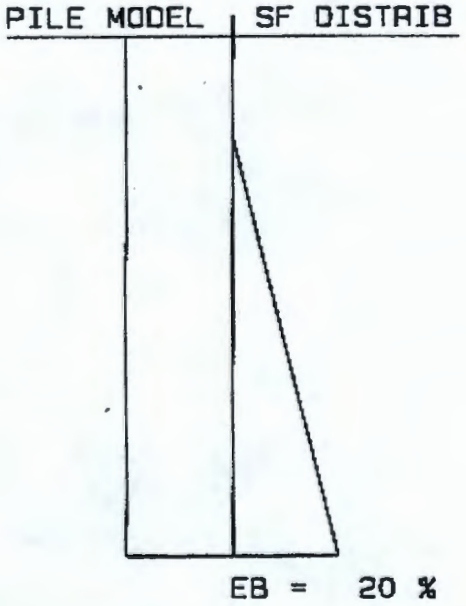
GRLWEAP(TM) Version 1.993-1

HANFORD - PZ35 X IHC S70

12/08/94



IHC Hydh S 70		
Efficiency	.950	
Helmet	2.00	kips
H Cushion	0	k/in
Q = .100	.100	in
J = .150	.150	s/ft
Pile Length	50.00	ft
P-Top Area	38.82	in2

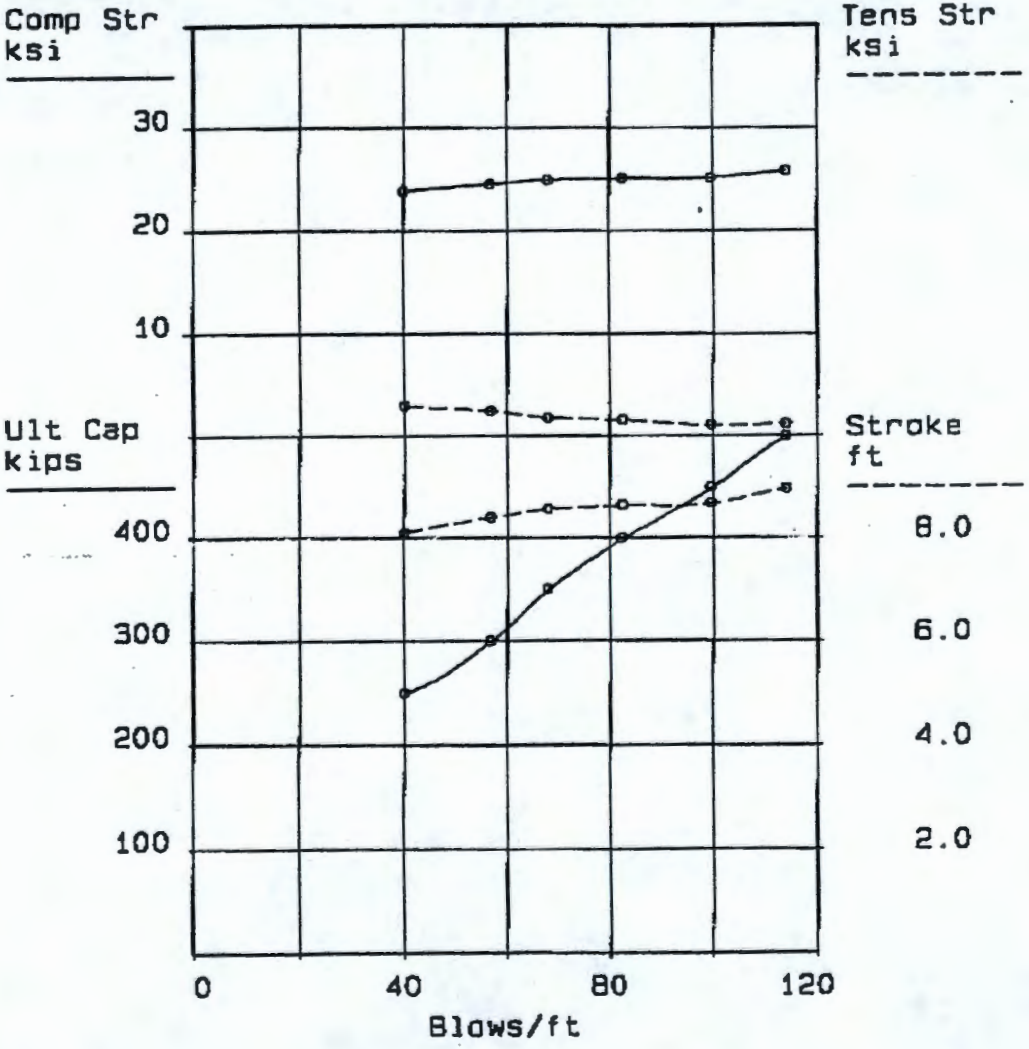


le Rausche Likins & Associates, Inc.

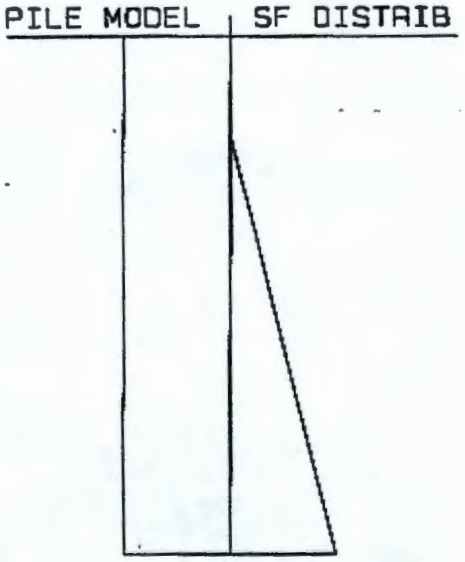
GRLWEAP (TM) Version 1.993-1

HANFORD - PZ35 X D19-32

12/08/94



DELMAG D 19-32		
Efficiency	.720	
Helmet	2.00	kips
H Cushion	60155	k/in
Q = .100	.100	in
J = .150	.150	s/ft
Pile Length	50.00	ft
P-Top Area	38.82	in2



EB = 20 %

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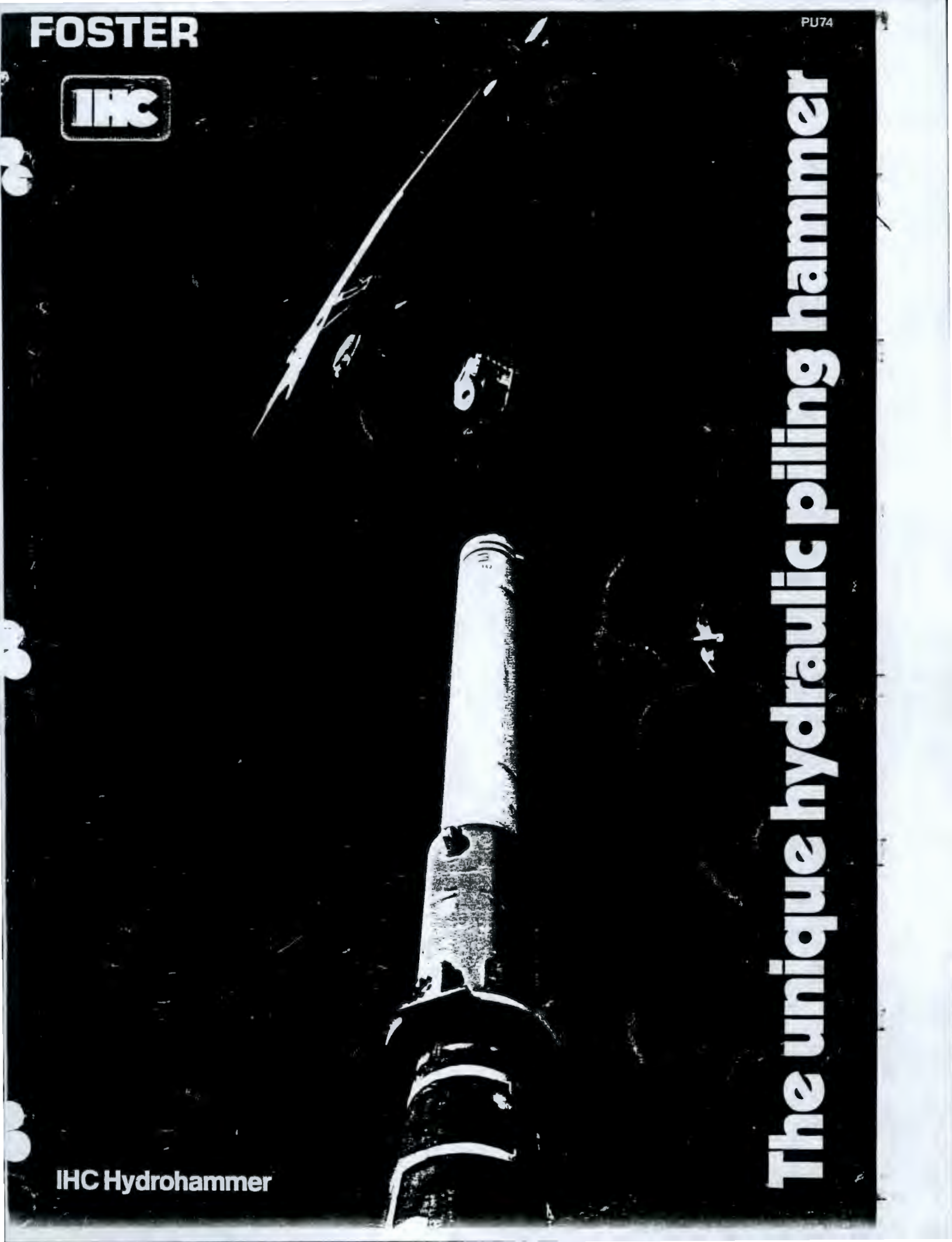
FOSTER

IHC

PU74

The unique hydraulic piling hammer



IHC Hydrohammer

IHC Hydrohammer

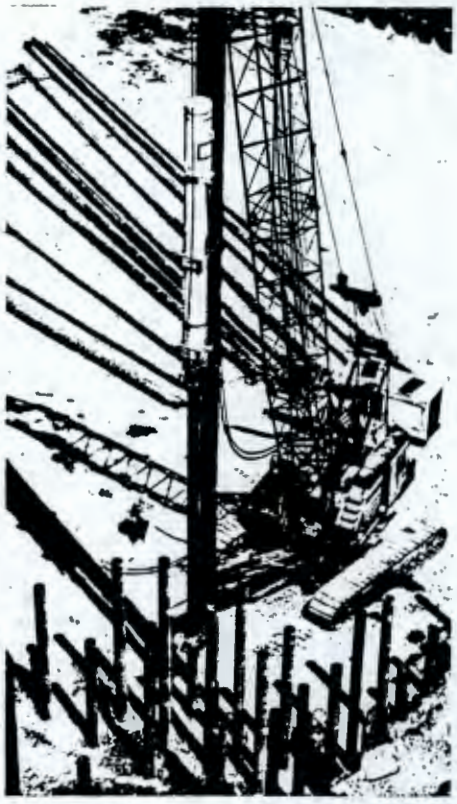
the unique piling hammer

The IHC Hydrohammer, the first intelligent piling hammer, has ushered in a new era in piledriving technology. This electronically-controlled, hydraulic piling hammer is the answer to the demands imposed by modern foundation technology.
The highly reliable electronic control system of the Hydrohammer ensures optimum control of the piling process, and the design enables a range of safety, monitoring and indicating devices to be incorporated without the need for sensitive mechanical components. Compared with other piling hammers, the Hydrohammer may justly be described as multi-functional. The limited number of components contributes greatly to its reliability. Dutch and foreign patents have been applied for in respect of the unique construction of the Hydrohammer.

General information

The Hydrohammer is a universal hydraulic piling hammer for use onshore or offshore, in air or submerged. More than 20 years' development, manufacturing and operating experience lie behind the revolutionary design. Among the most striking advantages of the Hydrohammer are the control of the energy per blow and the limited number of components. The weight of the Hydrohammer is small in comparison with the energy which it generates.
The net energy applied to the pile, which is measured during every blow and shown on the control panel, can be continuously regulated from maximum to less than 5%.
As the energy is precisely known, the force in the pile can be accurately computed. If desired, the Hydrohammer can deliver a single blow with full energy control.
The control system causes the ram to stop automatically if:
- the pile starts to run faster than the hammer (in soft soils);
- the Hydrohammer is not correctly positioned on the pile;
- the stroke becomes too high;
- the blow energy is too high.

An indicator system is incorporated to enable controlling and monitoring underwater piling operations.
The Hydrohammer is of modular construction. There are no bolts, hoses or other connections inside the hammer, a fact which contributes to its reliability. Should vital parts such as valves, accumulators, sensors, etc. require replacement, these can easily be reached from the outside. Exhaustive tests on various types of piling operation on land and offshore have fully confirmed the reliability, controllability and ease of operation of the Hydrohammer.



Offshore piling

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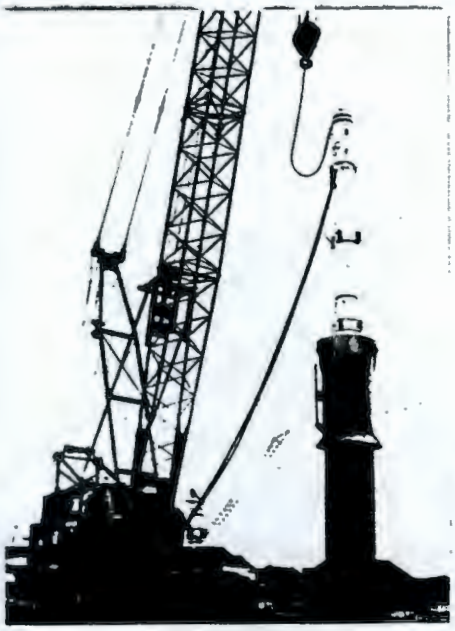
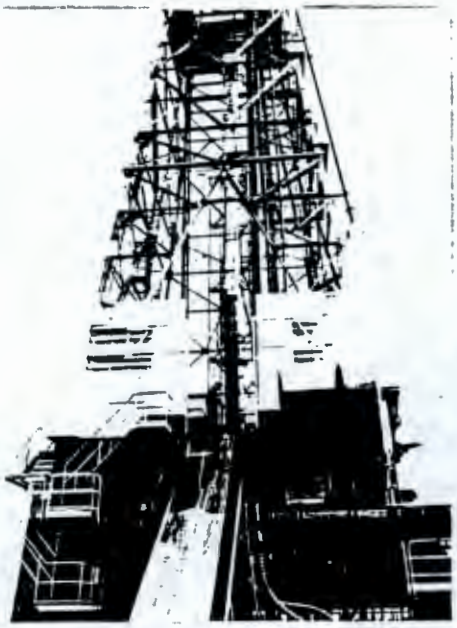
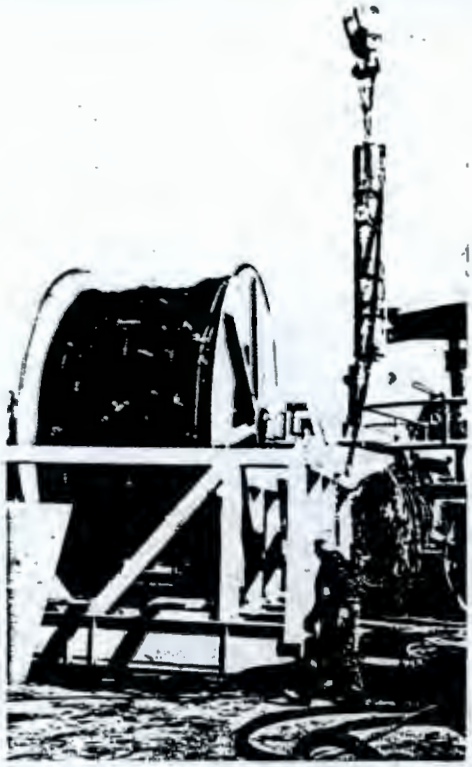
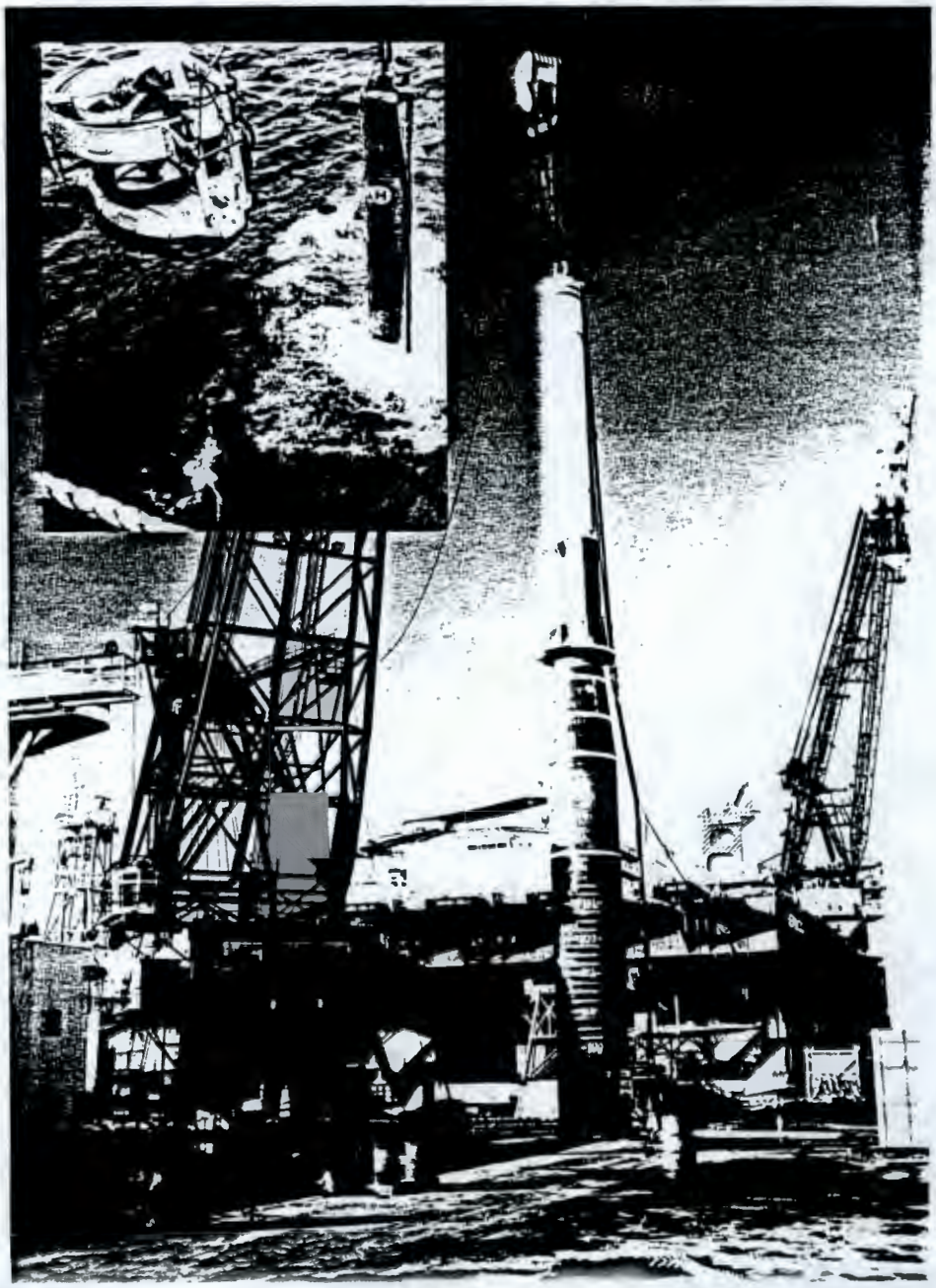






The Hydrohammer is ideal for offshore pile-driving, either above or below the surface. Besides the features listed on the previous page, it possesses several advantages in the offshore environment.

- It is very slim and can thus follow the pile through the guides of a jacket; no followers are needed.
- No cushioning material is required, provided that the special anvil is used.
- Models up to and including the S-250 can pass through the rotary table of a drilling rig.
- The maximum energy per blow can be used when driving piles in very great waterdepths.
- All relevant components have been tested for piling at depths of up to 2,000 m. In principle, the hammer can operate in even deeper water.
- The Hydrohammer is the most popular hammer for driving conductor pipes.
- The hammer is tested horizontally on deck before being lowered for underwater piling. When all hydraulic and electrical connections have been made, the hammer is operated on deck. The ram is moved hydraulically to and fro over a controllable distance by means of the control system and the valves.
- The automatic circulation of hydraulic fluid through hoses, hammer and power pack when the unit is at rest ensures an even temperature and the venting of air.
- Fixed pile guide sleeves, enabling the Hydrohammer to sit freely on top of the pile.
- Engineering assistance based on many years' experience of offshore piling, both above the water and submerged, is available.
- All necessary ancillary equipment, such as pile guide sleeves, adaptors, compensators, winches, etc. can be supplied.
- IHC Hydrohammer guarantees service and provides operational assistance.



Operation

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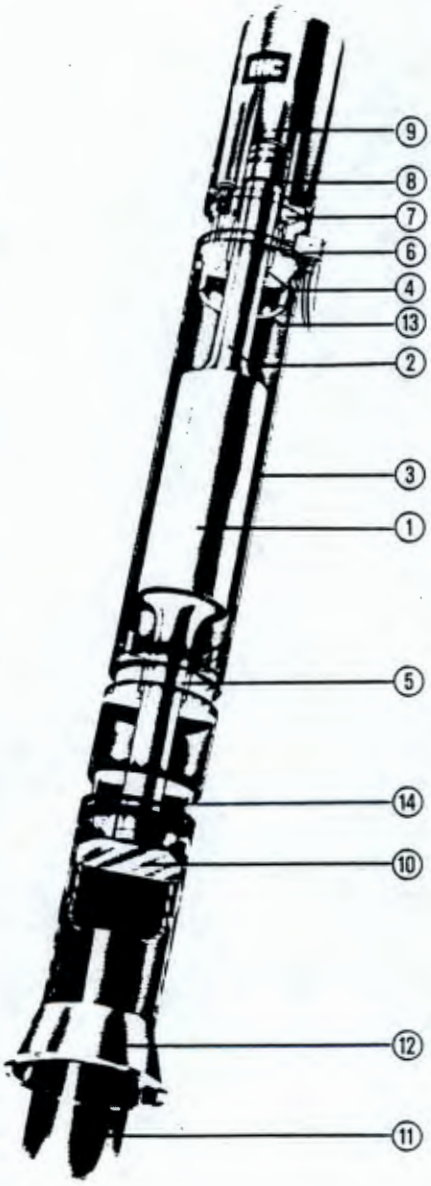
The special ram ①, which forms part of the piston rod ②, is mounted in the totally-enclosed housing ③ and runs in sealed, oil-lubricated bushes ④ and ⑤. This bearing arrangement affords low friction and eliminates wear, even at angles.
Hydraulic fluid flows via the hose connection ⑥ and the valves in ring ⑦ to the underside of the piston ⑧ in the cylinder ⑨, the pressure of the fluid lifts the ram ①. On the downward stroke, additional energy is delivered to the ram, producing an acceleration of 2 g. The maximum stroke of 1 m thus corresponds to a fall height of 2 m. As the accelerative force on the ram can be controlled independently of the hydraulic pressure, any loss of blow energy when working at great depth can be easily compensated. To drive a pile through a pipe or through the pile guides of a jacket, the hoses are connected at the top of the Hydrohammer.
In the position of rest, the independently-operating delivery and return valves are both open, allowing the oil to circulate through hoses, Hydrohammer and filters, thus preventing malfunction as a result of filthy oil.
During piling operation, the ram hits the special anvil ⑩, which is placed on top of the steel pile ⑪ without the use of cushioning material. The pile guide sleeve ⑫ enables the Hydrohammer to sit freely on top of the pile without the need for a special guide frame. Pile guide sleeves can be supplied for all pile diameters, larger or smaller than the Hydrohammer, together with adaptors for intermediate sizes. Provision is made on the housing for attaching lead clamps for onshore piling with leader. In this situation, the pile guide ⑫ is not used, and piling is carried out with conventional pile helmets. Fixed helmets can be supplied to ensure optimum centring of the Hydrohammer, thus reducing the risk of damage of the pile. When driving concrete piles, a softwood packing must be used.
When the Hydrohammer is used for extraction, the ram hits the limiter ⑬ beneath ring ⑦. The energy is then transmitted via the housing, and the special Hydrohammer pile attachment to the pile itself. A shock absorber ⑭ is fitted at the bottom of the housing to absorb the rebounce from the pile and avoid damage of the Hydrohammer.



Control

The electronic control system, which is easy to operate, contributes in large measure to the reliability and versatility of the Hydrohammer.
Additional instrumentation – and with this greater susceptibility to faults – is not necessary, even for underwater piledriving, because all relevant information and the required safety can be obtained via the existing control system.
The most important data, such as blow energy and blow rate, and signals indicating the most common faults are presented on the control panel. The piling process can be remotely controlled. Should a fault develop, the hammer stops automatically and the reason for the stoppage is immediately shown on the panel, enabling the operator to take appropriate action.
The IHC printer, with the aid of which a report of the piling operation is produced on a strip of paper, can be connected to any control unit. The following data are registered:

- Project information
- Pile data
- Date and time
- Starting and stopping times
- Penetration
- Number of blows per 25 cm and/or 1 ft of penetration
- Mean blow energy per 25 cm or 1 ft
- Number of blows per minute
- Total number of blows
- Faults and time of occurrence.

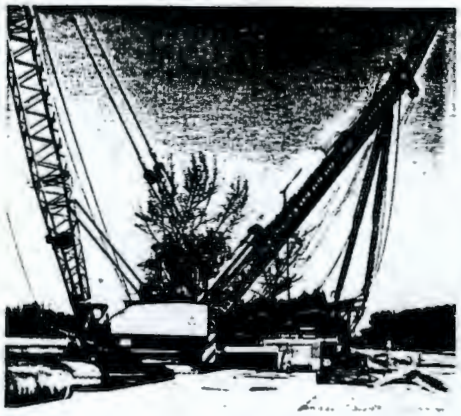
For offshore applications, a control panel with built-in printer, video screen and floppy disc can be supplied. An extensive package of piling and system data is presented on the screen, and all information is assembled on the disc.
The printer can produce the piling report simultaneously or subsequently.
The report can also be read off the disc by a computer, after which the results can be processed and/or compared with previous calculations.

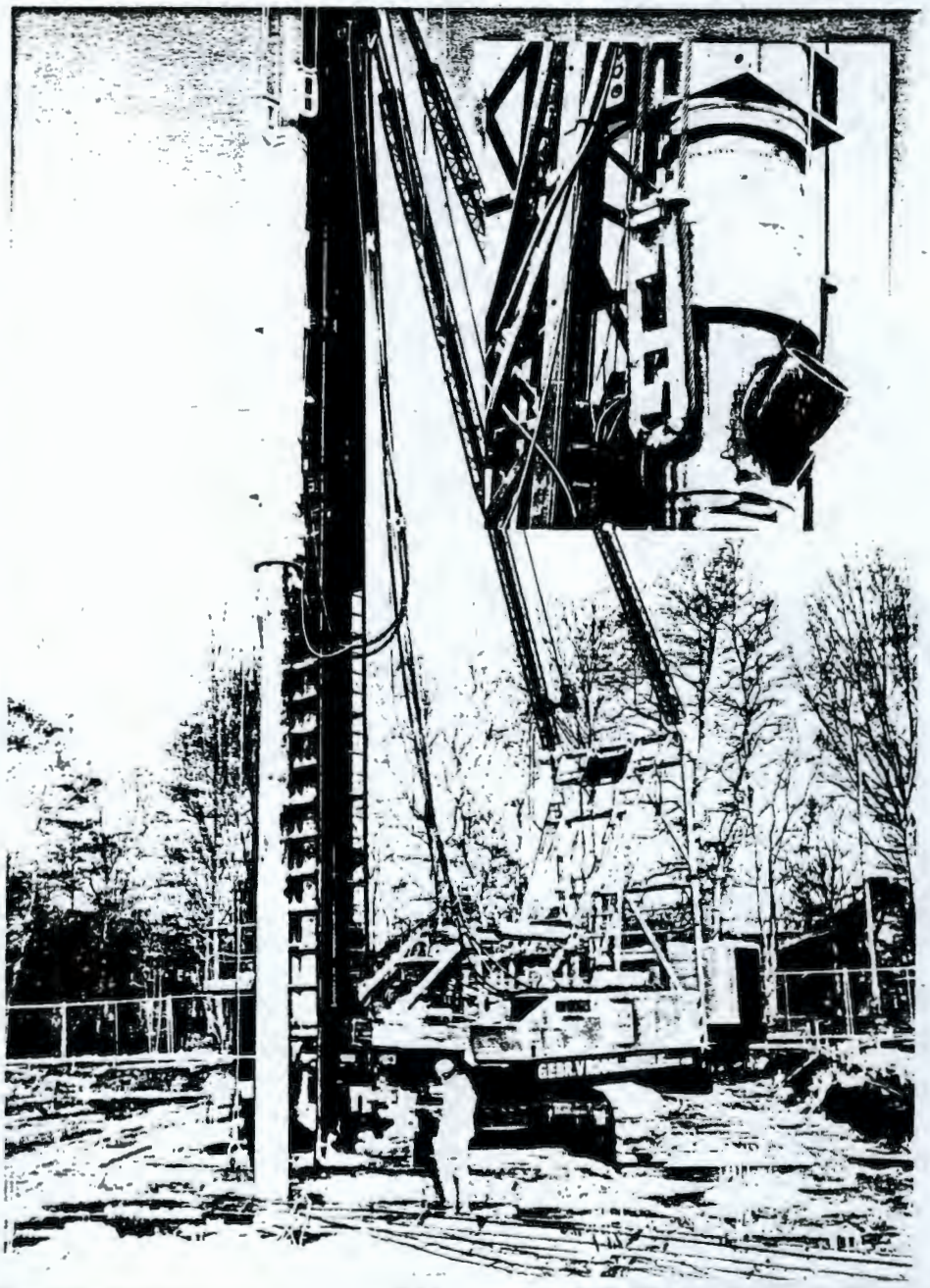
Onshore piling

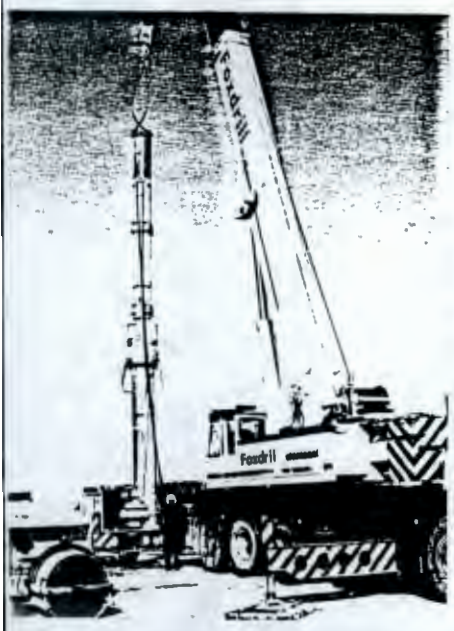
PF13339.0460

For piledriving operations on land, the Hydrohammer offers the following advantages over conventional equipment:

- High rate of completion, thanks to higher blow rate, high efficiency and undiminished performance after protracted operation.
- Simple to operate.
- Low fuel consumption, as result of the high efficiency.
- Low initial investment. With the wide range of control and the reliability, a smaller number of different hammers are required to cover the total energy range.
- The Hydrohammer can operate at any angle. In principle, it is even feasible to drive a pile horizontally.
- The Hydrohammer is suitable both for driving and extracting piles.
- No resonant vibration in adjacent buildings, thanks to controllable blow rate and impact energy.
- Display of the energy per blow delivered to the pile enables the operation to be monitored throughout.
- Absence of wear. The Hydrohammer is totally enclosed and the ram is supported in oil-lubricated bearings.
- T[illegible] is no environmental pollution. T[illegible] ydrohammer emits neither exhaust fumes nor oil splashes.
- To compare the performance of a Hydrohammer with a diesel hammer: 10 kNm net energy per blow of a Hydrohammer is equal to 25 kNm rated energy per blow of a diesel hammer.
- The engine of the crane can serve as the power source for the Hydrohammer.
- A printer, which automatically produces a report of the piling operation, is available as an optional extra.







Technical data IHC Hydrohammer

95P5339.0461

TYPE			S-35	S-70	S-90	S-200	S-250	S-400	S-500	S-800	S-1000	S-1600	S-2000	S-3000
OPERATING DATA														
Max pile energy/blow	(1)	kNm	35	70	90	200	250	400	500	800	1,000	1,600	2,000	3,000
		ft.lbs	25,500	51,000	66,000	145,000	182,500	290,000	365,000	580,000	730,000	1,160,000	1,460,000	2,210,000
Min pile energy/blow		kNm	2	2	3	7	10	20	20	40	40	60	60	100
		ft.lbs	1,450	1,450	2,200	5,000	7,300	14,500	14,500	29,000	29,000	43,500	58,000	72,500
Blow rate (max energy)	(2)	bl/min	60	50	50	45	45	45	45	45	45	40.	40	35
PEW ratio	(3)	kNm/ton	5.6	7.8	8.2	8	8.3	7.8	7.9	7.7	8	7.8	8	
		ft.lbs/lbs	1.9	2.6	2.8	2.7	2.8	2.6	2.6	2.5	2.7	2.6	2.7	
WEIGHTS														
Ram		ton	3.3	3.5	4.5	10	12.5	20	25	40	50	80	100	150
		lbs	7,300	7,700	10,000	22,200	27,600	44,400	55,300	88,000	110,500	177,600	221,000	332,000
Hammer (in air)		ton	6.3	7.3	9.2	22.5	27.5	47	57	85	106	165	210	325
		lbs	13,900	16,200	20,300	50,000	61,000	104,000	126,000	188,000	235,000	365,000	465,000	720,000
Flat-bottom anvil		ton	0.7	0.8	0.8	3.5	3.5	5	6	8	8	27	30	38
		lbs	1,550	1,800	1,800	7,700	7,700	11,100	13,300	17,700	17,700	60,000	66,800	84,000
Pile sleeve incl. ballast	(4)	ton	3.5	4.2	4.2	9	9	15	16	27	32	70	75	85
		lbs	7,700	9,300	9,300	20,000	20,000	33,300	35,400	60,000	70,600	155,000	166,000	188,000
Total weight in air	(5)	ton	10.5	12.3	14.2	35	40	67	74	120	146	262	315	468
		lbs	23,200	27,500	31,400	77,000	88,800	148,000	162,000	266,400	324,000	580,000	697,000	1,035,000
Total weight submerged	(5)	ton	8.3	9	11	25	30	52	64	104	125	204	248	390
		lbs	18,400	20,000	24,300	55,200	66,600	115,000	142,000	230,000	276,000	451,000	549,000	863,000
DIMENSIONS														
Outside dia. of hammer A		mm	610	610	610	915	915	1,220	1,220	1,520	1,520	1,830	1,830	2,130
		inch	24	24	24	36	36	48	48	60	60	72	72	84
Length of hammer B		mm	5,600	7,130	7,880	8,900	9,660	9,400	10,140	9,300	9,400	12,700	13,900	16,750
		inch	220	270	310	350	380	370	400	367	370	500	550	660
Sleeve for piles up to (OD) C	(6)	mm	760	915	915	1,220	1,220	1,520	1,520	1,830	1,830	2,130	2,130	2,440
		inch	30	36	36	48	48	60	60	72	72	84	84	96
Length of pile in sleeve D		mm	1,220	1,520	1,520	2,650	2,650	3,690	3,470	3,750	3,750	3,750	3,750	3,800
		inch	48	60	60	105	105	145	137	148	148	148	148	150
Length of hammer with sleeve and ballast E		mm	7,300	9,150	9,900	12,000	12,800	13,560	14,120	13,850	14,350	17,450	16,700	21,500
		inch	290	360	390	475	505	535	556	545	565	690	740	650
HYDRAULIC DATA														
Operating pressure		bar	200	220	280	200	250	250	300	220	280	220	275	280
		psi	2,900	3,150	4,000	2,900	3,600	3,600	4,300	3,150	4,000	3,150	3,900	4,000
Max. pressure		bar	350	350	350	350	350	350	350	350	350	350	350	350
		psi	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000	5,000
Oil flow		l/min	150	220	220	700	700	1,400	1,400	2,800	2,800	4,000	4,000	7,000
		usg/min	40	58	58	185	185	370	370	740	740	1,060	1,060	1,850
Power pack	(7)	kW	85	140	140	450	450	800	800	1,500	1,500	2,400	2,400	3,700
Hydraulic hose (ID)	(8)	mm	25	32	32	50	2x50	2x50	2x50	100	100	100	100	140
		inch	1	1.25	1.25	2	2x2	2x2	2x2	4	4	4	4	5.5

(1) Maximum energy measured in the pile and based on the use of the standard Hydrohammer anvil.
(2) Number of blows at maximum energy per blow and with power as stated in the Table. At lower energy per blow, the number of blows can rise to 100-150 per minute, depending upon the type of hammer and the nature of the piling operation.
(3) The pile energy-weight ratio (PEW) is the maximum blow energy per unit of hammer weight measured in the pile, the hammer weight in this case being the submerged weight including ballast, sleeve and anvil.
(4) Lighter pile sleeves can be used when operating in air.
(5) Total weight of hammer plus sleeve, ballast and anvil.
(6) Sleeves for piles of larger diameter can be supplied, so can inserts for smaller diameter piles.
(7) Surface and underwater power packs are available.
(8) Reels for the hoses can be supplied on request.

The manufacturer reserves the right to alter the specifications or equipment without notice.

L.B. Foster Company
Pile Driving and Extracting Equipment

National Distributor For IHC Hydrohammers
United States and Caribbean

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IHC

IHC Hydrohammer – P.O. Box 1 –

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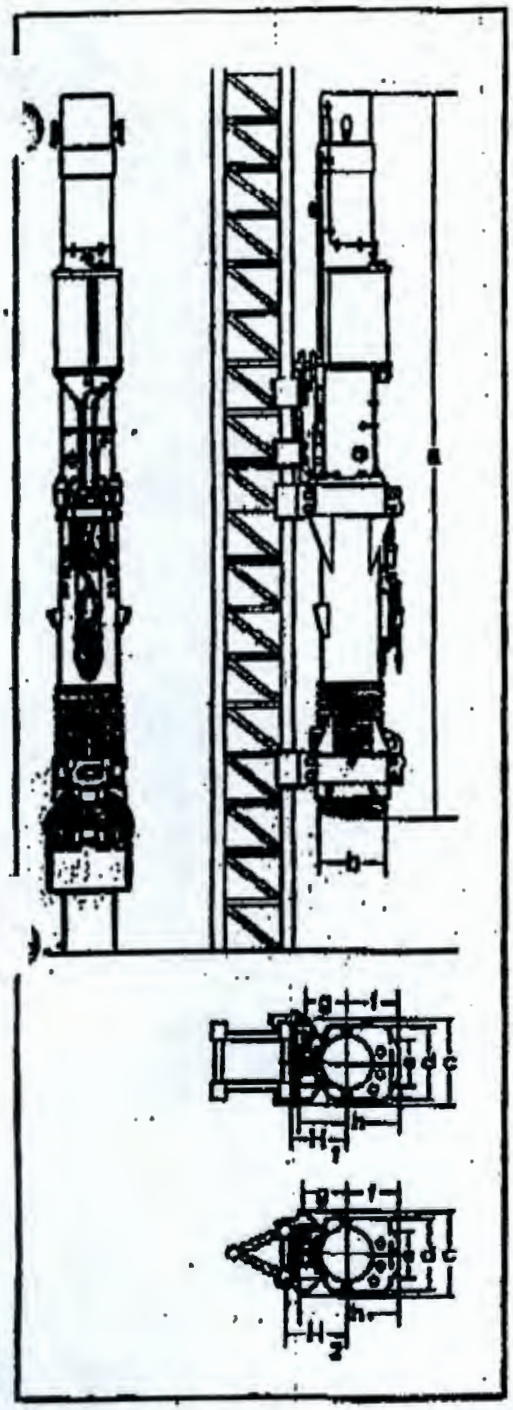
NEW **DELMAG**

D19-32



Specifications *

Energy:

Pumpsetting 1	20,640 Ft. Lbs.
Pumpsetting 2	28,680 Ft. Lbs.
Pumpsetting 3	37,685 Ft. Lbs.
Pumpsetting 4	42,800 Ft. Lbs.
Maximum Stroke	10.2 Ft.
Speed	37-53 Blows/Min.
Maximum Batter	1:2
Fuel Consumption at Full Load	1.45 Gal./Hr.
Oil Consumption	.26 Gal./Hr.

Weights:

Total Operational	Approx. 7,900 Lbs.
Piston	Approx. 4,190 Lbs.

Capacities:

Fuel Tank	8.45 Gal.
Oil Tank	2.38 Gal.

*Specifications subject to change

Dimension

A	15.5'
B	17.32"
C	22.04"
D	19.09"
E	12.60"
F	13.58"
G	11.02"
H	26.18"
H_1	14.7"
H_2	16.75"

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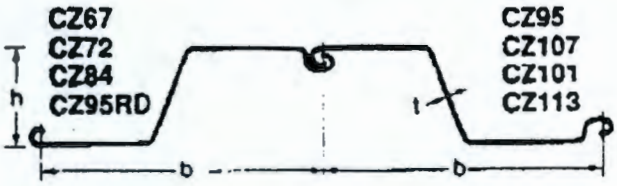

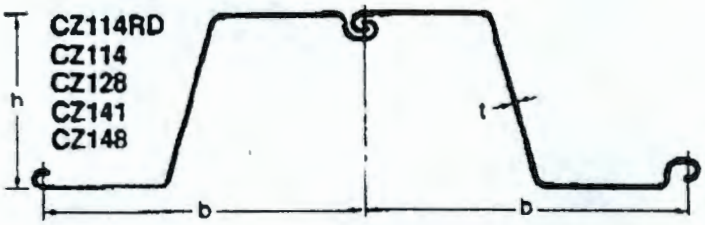

Casteel Sheet Piling Specifications

Sections	Width b	Height h	Thickness t (1)	Coating Area (2)	Sectional Area	Mass of pile	Mass of wall	Section Modulus	Moment of Inertia	Radius of Gyration	Sections
	in.	in.	in.	sq. ft./lin. ft. of pile	in.²/lin.ft.	lb./lin.ft.	lb./ft.²	in.³/lin.ft.	in.⁴/lin.ft.	in.	
CZ67	21.65	7.88	0.217	4.78	4.03	24.76	13.72	10.69	42.11	3.23	CZ67
CZ72	21.65	7.88	0.236	4.78	4.30	26.70	14.83	11.68	46.00	3.27	CZ72
CZ84	21.65	7.88	0.276	4.78	5.05	31.05	17.21	13.62	53.63	3.27	CZ84
CZ95RD	21.65	7.88	0.308	4.78	5.58	34.28	19.00	15.16	59.73	3.27	CZ95RD
CZ95	21.65	7.88	0.315	4.78	5.72	35.15	19.46	15.53	61.15	3.27	CZ95
CZ101	21.65	7.88	0.335	4.78	6.08	37.37	20.70	16.50	65.01	3.27	CZ101
CZ107	21.65	7.88	0.354	4.78	6.44	39.58	21.91	17.48	68.84	3.27	CZ107
CZ113	21.65	7.88	0.375	4.78	6.80	41.70	23.10	18.40	72.70	3.27	CZ113
CZ114RD	24.02	13.39	0.315	5.90	6.43	43.80	21.88	29.76	199.24	5.55	CZ114RD
CZ114	24.02	13.39	0.335	5.90	6.88	46.83	23.40	31.62	211.60	5.55	CZ114
CZ128	24.02	13.39	0.375	5.90	7.68	52.28	26.22	35.34	236.50	5.55	CZ128
CZ141	24.02	13.39	0.413	5.90	8.48	57.92	28.88	39.06	261.40	5.55	CZ141
CZ148	24.02	13.39	0.433	5.90	8.88	60.68	30.31	40.92	273.90	5.55	CZ148

(1) Flanges and webs of the steel piles have the same thickness.
(2) Factor for estimating sq. ft. of sheet piling surface area to be coated per lin. ft. of pile; excludes interior surface of interlocks.
NOTE: Drawings, specifications and data have been taken from manufacturers' specifications.
- All piling sections can be produced in the following steel quality: ASTM A 328, ASTM A 572 Grade 50, ASTM A 690
- Piling corners and special connectors supplied on request.
- For special built-up sections, box piles, etc. contact your CASTEEL USA, Inc. representative.
- All Casteel sheet piling is manufactured in the USA and meets or exceeds all "Buy American" specifications for steel sheet piling.

Steel Qualities

	Minimum Ultimate Stress		Minimum Yield Stress		Minimum Elongation in 8 ins.
	PSI	MPa	PSI	MPa	%
ASTM 328	70000	485	38400	270	17
ASTM A572 Grade 50	65000	450	50000	345	18
ASTM A690	70000	485	50000	345	18

BETHLEHEM INTERMEDIATE SHEET PILING

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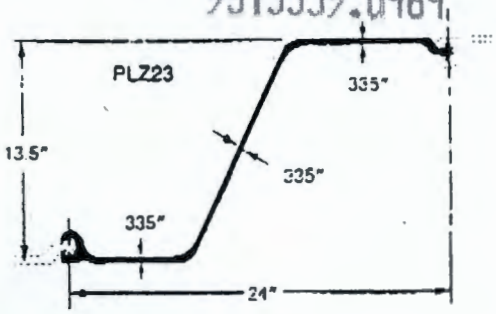
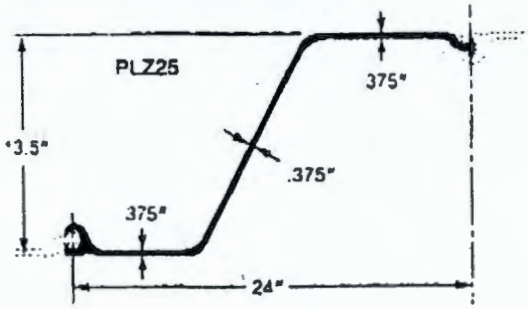




Properties and Weights

Section Designation	Area sq in.	Nominal Width, in.	Weight in Pounds: Per lin ft of bar	Weight in Pounds: Per sq ft of wall	Moment of Inertia, in.⁴	Section Modulus, in.³: Single Section	Section Modulus, in.³: Per lin ft of wall	Surface Area, sq ft per lin ft of bar: Total Area	Surface Area, sq ft per lin ft of bar: Nominal Coating Area*
PLZ23	13.28	24	45.2	22.6	407.5	60.4	30.2	5.98	5.52
PLZ25	14.60	24	49.6	24.8	446.5	65.7	32.8	5.98	5.52

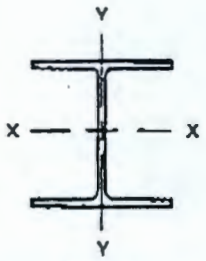
*Excludes socket interior and ball of interlock.

Dimensions:

The dimensions given are nominal

Notes:

Steel Grades: PLZ23 and PLZ25 can be supplied in ASTM A328 grade and in high-strength, low-alloy grades ASTM A572 - Grade 50 and ASTM A690.



BETHLEHEM STEEL H-PILES

Properties and Weights

Section Number	Weight per Foot	Area of Section	Depth of Section	Flange: Width	Flange: Thickness	Web Thickness	Axis X-X			Axis Y-Y			Surface Area
	lb	A in.²	d in.	b_f in.	t_f in.	t_w in.	I_x in.⁴	S_x in.³	r_x in.	I_y in.⁴	S_y in.³	r_y in.	ft²/ft
HP14x	117*	34.4	14.21	14.885	0.805	0.805	1220	172	5.96	443	59.5	3.59	7.11
	102	30.0	14.01	14.735	0.705	0.705	1050	150	5.92	380	51.4	3.56	7.06
	89	26.1	13.83	14.695	0.615	0.615	904	131	5.88	326	44.3	3.53	7.02
	73	21.4	13.61	14.585	0.505	0.505	729	107	5.84	261	35.8	3.49	6.96
HP12x	84	24.6	12.28	12.295	0.685	0.685	650	106	5.14	213	34.6	2.94	5.97
	74	21.8	12.13	12.215	0.610	0.605	569	93.8	5.11	186	30.4	2.92	5.91
	63	18.4	11.94	12.125	0.515	0.515	472	79.1	5.06	153	25.3	2.88	5.86
	53	15.5	11.78	12.045	0.435	0.435	393	66.8	5.03	127	21.1	2.86	5.82
HP10x	57	16.8	9.99	10.225	0.565	0.565	294	58.8	4.18	101	19.7	2.45	4.91
	42	12.4	9.70	10.075	0.420	0.415	210	43.4	4.13	71.7	14.2	2.41	4.83
HP8x	36	10.6	8.02	8.115	0.445	0.445	119	29.8	3.36	40.3	9.88	1.95	3.92

*Not available in A572 Grade 60.

Dimensions:

The dimensions given are nominal.

Notes:

Steel Grades: Bethlehem H-piles can be supplied in ASTM A36, high-strength low-alloy ASTM A572-Grades 50 and 60, and in ASTM A690 (minimum of 50 tons required per size). In addition, Bethlehem can also supply H-piles to meet Charpy (CVN) requirements.

If you need additional product data, or information more specific to your particular project, please call our Piling Product Sales and Marketing Office in Bethlehem direct: (800) 521-0432. FAX (215) 694-2640.

Form No. 2006
December 1991

Bethlehem

Piling Products
Bethlehem Steel Corporation
Bethlehem, PA 18016

American Association State Highway and Transportation Officials Standard
AASHTO No.: M22

Standard Specification for High-Strength Low-Alloy Columbium-Vanadium Steels of Structural Quality[1]

This standard is issued under the fixed designation A 572/A 572M; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ε) indicates an editorial change since the last revision or reapproval.

This specification has been approved for use by agencies of the Department of Defense and for listing in the DoD Index of Specifications and Standards.

ε[1] NOTE—Supplementary Requirement S1 was changed to S90 in April 1987.

1. Scope

1.1 This specification covers four grades of high-strength low-alloy structural steel shapes, plates, sheet piling, and bars. Grades 42 [290] and 50 [345] are intended for riveted, bolted, or welded construction of bridges, buildings, and other structures. Grades 60 [415] and 65 [450] are intended for riveted or bolted construction of bridges, or for riveted, bolted, or welded construction in other applications.

1.2 For welded bridge construction notch toughness is an important requirement. For this or other applications where notch-toughness requirements are indicated, they shall be negotiated between the purchaser and the producer.

1.3 The use of columbium, vanadium, and nitrogen, or combinations thereof, within the limitations noted in Section 5, shall be at the option of the producer unless otherwise specified. Where designation of one of these elements or combination of elements is desired, reference is made to Supplementary Requirement S1 in which these elements and their common combinations are listed as to type. When such a designation is desired, both the grade and type must be specified.

1.4 The maximum thicknesses available in the grades and products covered by this specification are shown in Table 1.

1.5 When the steel is to be welded, it is presupposed that a welding procedure suitable for the grade of steel and intended use or service will be utilized.

1.6 The values stated in either inch-pound units or SI units are to be regarded as standard. Within the text, the SI units are shown in brackets. The values stated in each system are not exact equivalents; therefore, each system must be used independently of the other. Combining values from the two systems may result in nonconformance with the specification.

2. Referenced Documents

2.1 *ASTM Standards:*

A 6/A 6M Specification for General Requirements for Rolled Steel Plates, Shapes, Sheet Piling, and Bars for Structural Use[2]

A 36/A 36M Specification for Structural Steel[2]

A 514/A 514M Specification for High-Yield-Strength, Quenched and Tempered Alloy Steel Plate, Suitable for Welding[2]

3. General Requirements for Delivery

3.1 Material furnished under this specification shall conform to the applicable requirements of the current edition of Specification A 6/A 6M.

4. Process

4.1 The steel shall be made by one or more of the following processes: open-hearth, basic-oxygen, or electric-furnace.

5. Chemical Requirements

5.1 The heat analysis shall conform to the requirements prescribed in Table 2 and in 5.3.

5.2 The steel shall conform on product analysis to the requirements prescribed in Table 2 and 5.3 subject to the product analysis tolerances in Specification A 6/A 6M.

5.3 Alloy content shall be in accordance with one of the following types:

Elements	Heat Analysis, %
Type 1—Columbium[A]	0.005–0.05[B]
Type 2—Vanadium	0.01–0.15
Type 3—Columbium[C] (0.05 max, %) plus vanadium[C]	0.02–0.15
Type 4—Nitrogen[D] (with vanadium)	0.015 max

[A] Columbium when added either singly or in combination with vanadium shall be restricted to the following unless killed steel is furnished:

[1] This specification is under the jurisdiction of ASTM Committee A-1 on Steel, Stainless Steel and Related Alloys, and is the direct responsibility of Subcommittee A01.02 on Structural Steel for Bridges, Rolling Stock, and Ships.

Current edition approved July 26, 1985. Published September 1985. Originally published as A 572 – 66. Last previous edition A 572 – 85.

[2] *Annual Book of ASTM Standards*, Vol 01.04.

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95 1339.0466

TABLE 1 Maximum Product Thickness

Grade	Yield Point, min ksi	Yield Point, min [MPa]	Maximum Thickness or Size: Plates and Bars in.	Plates and Bars [mm]	Structural Shapes Groups[B]	Sheet Piling	Zees and Rolled Tees
42 [290][A]	42	[290]	6	[150]	all	all	all
50 [345][A]	50	[345]	4	[100]	all	all	all
60 [415][A]	60	[415]	1¼	[32]	1 and 2	all	all
65 [450]	65	[450]	1¼	[32]	1	not available	all

[A] In the above tabulation, Grades 42, 50, and 60 [290, 345, and 415], are the yield point levels most closely approximating a geometric progression pattern between 36 ksi [250 MPa], min, yield point steels covered by Specification A 36/A 36M and 100 ksi [690 MPa], min, yield strength steels covered by Specification A 514/A 514M.
[B] See Specification A 6/A 6M.

TABLE 2 Chemical Requirements[A]
(Heat Analysis)

Diameter Thickness, or Distance Between Parallel Faces, in. [mm]	Grade	Carbon, max, %	Manganese,[B] max, %	Phosphorus, max, %	Sulfur, max, %	Silicon[C]: Plates to 1½-in. [40-mm] Thick, Shapes to 426 lb/ft [634 kg/m], Sheet Piling, Bars, Zees, and Rolled Tees[D] max, %	Silicon[C]: Plates Over 1½-in. [40-mm] Thick and Shapes Over 426 lb/ft [634 kg/m] range, %
6 [150]	42 [290]	0.21	1.35	0.04	0.05	0.40	0.15–0.40
4 [100]	50 [345]	0.23	1.35	0.04	0.05	0.40	0.15–0.40
1¼ [32]	60 [415]	0.26	1.35	0.04	0.05	0.40	. . .
>½–1¼ [13–32]	65 [450]	0.23	1.65	0.04	0.05	0.40	. . .
≤½ [13][E]	65 [450]	0.26	1.35	0.04	0.05	0.40	. . .

[A] Copper when specified shall have a minimum content of 0.20 % by heat analysis (0.18 % product analysis).
[B] Manganese, minimum by heat analysis of 0.80 % (0.75 % product analysis) shall be required for all plates over ⅜ in. [10 mm] in thickness; a minimum of 0.50 % (0.45 % product analysis) shall be required for plates ⅜ in. [10 mm] and less in thickness, and for all other products. The manganese to carbon ratio shall not be less than 2 to 1.
[C] Silicon content in excess of 0.40 % by heat analysis must be negotiated.
[D] Bars over 1½ in. [40 mm] in diameter, thickness, or distance between parallel faces, shall be made by a killed steel practice.
[E] An alternative chemical requirement with a maximum carbon of 0.21 % and a maximum manganese of 1.65 % is permissible with the balance of the elements as shown in Table 2.

Grades	Maximum Plate, Bar, Sheet Piling, Zees, and Rolled Tee Thicknesses, in. [mm]	Structural Shape Size Groupings (Specification A 6/A 6M, Table A)
42 and 50 [290 and 345]	¾ [20]	Groups 1 and 2
60 and 65 [415 and 450]	½ [13]	Group 1

[B] Product analysis limits = 0.004–0.060 %.
[C] Product analysis limits = 0.01 to 0.16 when columbium and vanadium are used in combination.
[D] Nitrogen (0.015 max %) when added as a supplement to vanadium shall be reported, and the minimum ratio of vanadium to nitrogen shall be 4 to 1.

6. Mechanical Requirements

6.1 *Tensile Properties:*

6.1.1 The material as represented by the test specimens shall conform to the tensile properties given in Table 3.

6.1.2 For material under 5/16 in. [8 mm] in thickness or diameter, a deduction from the percentage of elongation in 8 in. [200 mm], specified in Table 3, of 1.25 % shall be made for each decrease of 1/32 in. [0.8 mm] of the specified thickness or diameter below 5/16 in. [8 mm].

TABLE 3 Tensile Requirements[A]

Grade	Yield Point, min ksi	Yield Point, min [MPa]	Tensile Strength, min ksi	Tensile Strength, min [MPa]	Minimum Elongation,[B,C,D] in 8 in. [200 mm]	Minimum Elongation,[B,C,D] in 2 in. [50 mm]
42 [290]	42	[290]	60	[415]	20	24
50 [345]	50	[345]	65	[450]	18	21
60 [415]	60	[415]	75	[520]	16	18
65 [450]	65	[450]	80	[550]	15	17

[A] For plates wider than 24 in. [600 mm], the test specimen in the transverse direction. See 11.2 of Specification A 6/A 6M.
[B] Elongation not required to be determined for floor plate.
[C] For wide flange shapes over 426 lb/ft [634 kg/m] elongation in 2 in. [50 mm] of 19 % minimum applies.
[D] For plates wider than 24 in. [600 mm], the elongation requirement is reduced two percentage points for Grades 42 and 50 [290 and 345], and three percentage points for Grades 60 and 65 [415 and 450].

NOV-30-94 WED 13:45 HAYWARD OFFICE FAX NO. 18004471174 P. 05

SUPPLEMENTARY REQUIREMENTS

The following supplementary requirement shall apply when specified in the order or contract:

S90. Types

S90.1 When a purchaser prefers to designate the specific elements (columbium, vanadium, nitrogen, or combinations thereof), one of the types listed below shall be specified. The type in addition to the grade must be shown on the order.

Type 1—Columbium
Type 2—Vanadium
Type 3—Columbium and vanadium
Type 4—Vanadium and nitrogen

S90.2 The composition limits of Section 5 shall apply fc any of these types.

Standardized supplementary requirements for use at the option of the purchaser are listed in Specification A 6/A 6M. Those that are considered suitable for use with this specification are listed by title:

S14. Bend Test.

S18. Maximum Tensile Strength.

The American Society for Testing and Materials takes no position respecting the validity of any patent rights asserted in connection with any item mentioned in this standard. Users of this standard are expressly advised that determination of the validity of any such patent rights, and the risk of infringement of such rights, are entirely their own responsibility.

This standard is subject to revision at any time by the responsible technical committee and must be reviewed every five years and if not revised, either reapproved or withdrawn. Your comments are invited either for revision of this standard or for additional standards and should be addressed to ASTM Headquarters. Your comments will receive careful consideration at a meeting of the responsible technical committee, which you may attend. If you feel that your comments have not received a fair hearing you should make your views known to the ASTM Committee on Standards, 1916 Race St., Philadelphia, PA 19103.

NOV-30-94 WED 13:46 HAYWARD OFFICE FAX NO. 18004471174 P.06

25311 | 025-0171 | 0104-26027-01701 | BETHLEHEM | [illegible]

9513339.0468

TO
L B FOSTER CO
PO BOX 47367
DORAVILLE GA 30362

SHIP TO
L B FOSTER CO
C/O HANFORD NUCLEAR FACILITY
INTERSECTION OF HWY 24 & 240
MAIN GATE
RICHLAND WA

QUALITY STEEL MELTED AND MANUFACTURED IN USA

Bill Miller
3 Pages

SPECIFICATION
ASTM A572-93 GR50

INSPECTION-TEST REPORTS
10320 2 TEST REPORTS

HEAT NO.	NO. PIECES	DESCRIPTION	LENGTH FEET	LENGTH IN.	LENGTH FRCT.	WEIGHT	YIELD POINT	TENSILE STRENGTH	ELONG %	ELONG IN	BENDS
181L226	8	PZ40X65.6	60			31488	70000	81500	24.0	8	
							69500	82000	22.0	8	
171L229	2	PZ35X66	60			7920	67500	82000	26.0	8	

CHEMICAL ANALYSIS

HEAT NO.	C	MN	P	S	SI	CU	NI	CR	MO	V	N	CB	ZR
181L226	.18	1.26	.010	.030	.05	.11	.04	.06	.02	.048		.001	
171L229	.21	1.26	.009	.029	.05	.13	.05	.06	.02	.046		.001	

"I CERTIFY THAT THE ABOVE RESULTS ARE A TRUE AND CORRECT COPY OF ACTUAL RESULTS CONTAINED IN RECORDS MAINTAINED BY BETHLEHEM AND ARE IN FULL COMPLIANCE WITH THE REQUIREMENTS OF THE SPECIFICATION CITED ABOVE. I FURTHER CERTIFY THAT THE MATERIAL HAS BEEN TESTED AND INSPECTED IN ACCORDANCE WITH THE CITED SPECIFICATION AND IS IN CONFORMANCE THERETO. THIS TEST REPORT CANNOT BE ALTERED AND MUST BE TRANSMITTED INTACT WITH ANY SUBSEQUENT THIRD PARTY TEST REPORTS, IF REQUIRED."

R. C. Atkinson
CHIEF METALLURGIST

PURCHASE ORDER NO.	MILL ORDER NO.	SHIPPER'S NO.	SHIPPED FROM	DATE SHIPPED
25311	9513339.0025-0071	0104-26028-01/01	BETHLEHEM	11/23/94

SOLD TO
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PO BOX 47367
DORAVILLE GA 30362

SHIP TO
L B FOSTER CO
C/O HANFORD NUCLEAR FACILITY
INTERSECTION OF HWY 24 & 240
MAIN GATE
RICHLAND WA

QUALITY STEEL MELTED AND MANUFACTURED IN USA

SPECIFICATION
ASTM A572-93 GR50

INSPECTION-TEST REPORTS
10320 2 TEST REPORTS

HEAT NO.	NO. PIECES	DESCRIPTION	LENGTH FEET	LENGTH IN.	LENGTH FRCT.	WEIGHT	YIELD POINT	TENSILE STRENGTH	ELONG %	ELONG IN	BENDS
171L233	11	PZ35X66	60			43560	63000	78000	24.0	8	
							64000	78000	23.0	8	

CHEMICAL ANALYSIS

HEAT NO.	C	MN	P	S	SI	CU	NI	CR	MO	V	N	CB	ZR
171L233	.18	1.33	.009	.033	.06	.15	.05	.03	.02	.045		.001	

"I CERTIFY THAT THE ABOVE RESULTS ARE A TRUE AND CORRECT COPY OF ACTUAL RESULTS CONTAINED IN RECORDS MAINTAINED BY BETHLEHEM AND ARE IN FILL COMPLIANCE WITH THE REQUIREMENTS OF THE SPECIFICATION CITED ABOVE. I FURTHER CERTIFY THAT THE MATERIAL HAS BEEN TESTED AND INSPECTED IN ACCORDANCE WITH THE CITED SPECIFICATION AND IS IN CONFORMANCE THERETO. THIS TEST REPORT CANNOT BE ALTERED AND MUST BE TRANSMITTED INTACT WITH ANY SUBSEQUENT THIRD PARTY TEST REPORTS, IF REQUIRED."

R. C. Atkinson
CHIEF METALLURGIST

PURCHASE ORDER NO.	MILL ORDER NO.	SHIPPER'S NO.	SHIPPED FROM	DATE SHIPPED
25311	9513339.0470 028-0171	0104-26029-01/01	BETHLEHEM	11/23/94

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INTERSECTION OF HWY 24 & 240
MAIN GATE
RICHLAND WA

QUALITY STEEL MELTED AND MANUFACTURED IN USA

SPECIFICATION
ASTM A572-93 GR50

INSPECTION-TEST REPORTS
10320 2 TEST REPORTS

HEAT NO.	NO. PIECES	DESCRIPTION	LENGTH FEET	LENGTH IN.	LENGTH FRCT.	WEIGHT	YIELD POINT	TENSILE STRENGTH	ELONG %	ELONG IN	BENDS
171L233	2	PZ35X66	60			7920	63000	78000	24.0	8	
171L229	9	PZ35X66	60			35640	67500	82000	26.0	8	
							67500	82000	24.0	8	

CHEMICAL ANALYSIS

HEAT NO.	C	MN	P	S	SI	CU	NI	CR	MO	V	N	CB	ZR
171L233	.18	1.33	.009	.033	.06	.15	.05	.03	.02	.045		.001	
171L229	.21	1.26	.009	.029	.05	.13	.05	.06	.02	.046		.001	

I CERTIFY THAT THE ABOVE RESULTS ARE A TRUE AND CORRECT COPY OF ACTUAL RESULTS CONTAINED IN RECORDS MAINTAINED BY BETHLEHEM AND ARE IN FILL COMPLIANCE WITH THE REQUIREMENTS OF THE SPECIFICATION CITED ABOVE. I FURTHER CERTIFY THAT THE MATERIAL HAS BEEN TESTED AND INSPECTED IN ACCORDANCE WITH THE CITED SPECIFICATION AND IS IN CONFORMANCE THERETO. THIS TEST REPORT CANNOT BE ALTERED AND MUST BE TRANSMITTED INTACT WITH ANY SUBSEQUENT THIRD PARTY TEST REPORTS, IF REQUIRED."

R. C. Atkinson
CHIEF METALLURGIST

DATE:NOVEMBER 30, 1994

CERTIFICATE OF COMPLIANCE

CUSTOMER: GENERAL CONSTRUCTION

P.O.#10189

VBFA S.O.#2712
VBFA P.O.#1020

QUANTITY SHIPPED: 24 PCS.

MATERIAL: ASTM A-27

PART #:VB500

WE HEREBY CERTIFY THAT THE MATERIALS AND PROCESSES USED TO MANUFACTURER THE ABOVE ITEMS SUPPLIED BY VERSABITE FOUNDATION ACCESSORIES ARE OF DOMESTIC ORIGIN.

VERSABITE FOUNDATION ACCESSORIES

BY: _____
JAY N. ROGERS
SALES REPRESENTATIVE

DPN/113094-4

VERSABITE Foundation Accessories
19600 CIPOLE RD. TUALATIN OREGON 97062
1-800-678-8772 FAX 503-692-5939

DATE:NOVEMBER 30, 1994

CERTIFICATE OF COMPLIANCE

CUSTOMER: GENERAL CONSTRUCTION

P.O.#10189

VBFA S.O.#2712
VBFA P.O.#1045

QUANTITY SHIPPED: 24 PCS.

MATERIAL: ASTM A-27

PART #:VB535R/L

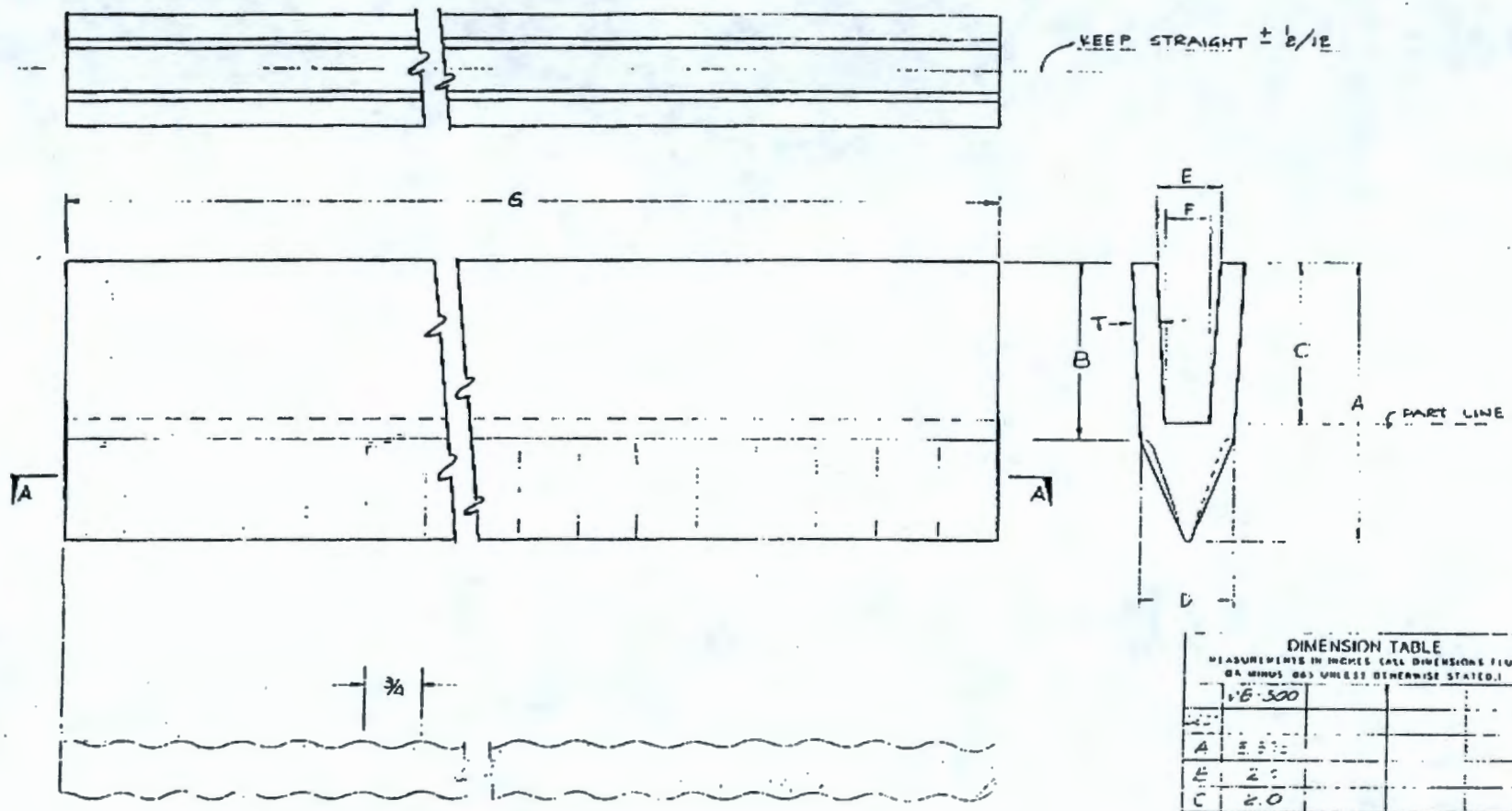
WE HEREBY CERTIFY THAT THE MATERIALS AND PROCESSES USED TO MANUFACTURER THE ABOVE ITEMS SUPPLIED BY VERSABITE FOUNDATION ACCESSORIES ARE OF DOMESTIC ORIGIN.

VERSABITE FOUNDATION ACCESSORIES

BY: _____
JAY N. ROGERS
SALES REPRESENTATIVE

DFN/113094-3

VERSABITE Foundation Accessories
19600 CIPOLE RD. TUALATIN OREGON 97062
1-800-678-8772 FAX 503-692-5939



SECTION A-A

DIMENSION TABLE
MEASUREMENTS IN INCHES (ALL DIMENSIONS PLUS OR MINUS .06) UNLESS OTHERWISE STATED.

	VE-500		
A	[illegible]		
B	[illegible]		
C	2.0		
D	1.125		
E	.75		
F	.5625		
G	30.0		
I	31.25		
WT.	18		

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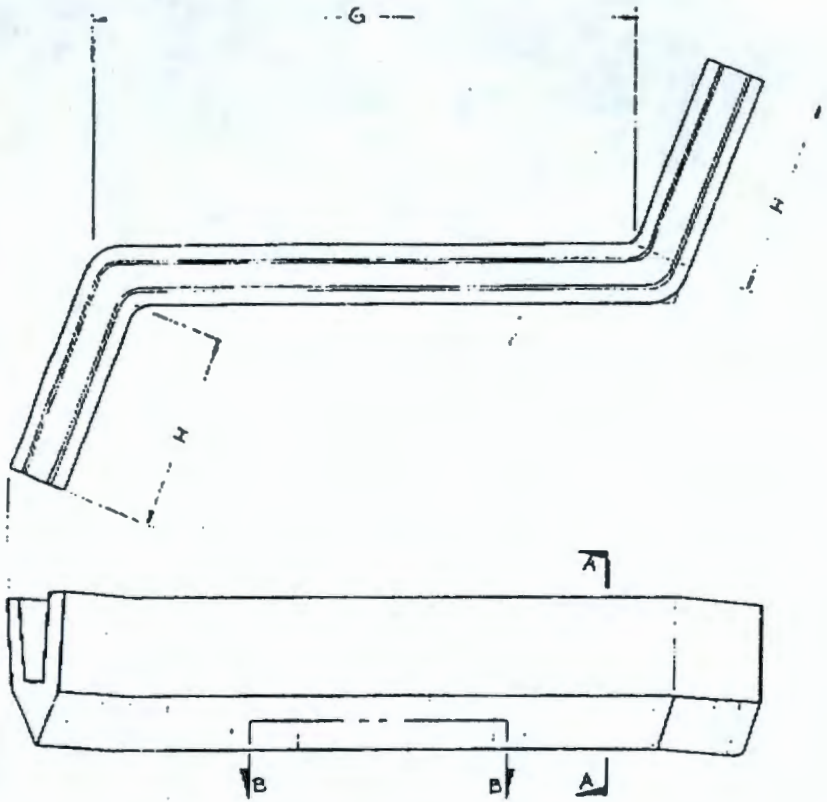
VERSABITE Foundation Accessories

SCALE FULL | DRAWN BY C. HUNG
DATE 6/23/83 | SCALE 2:1 SECT.

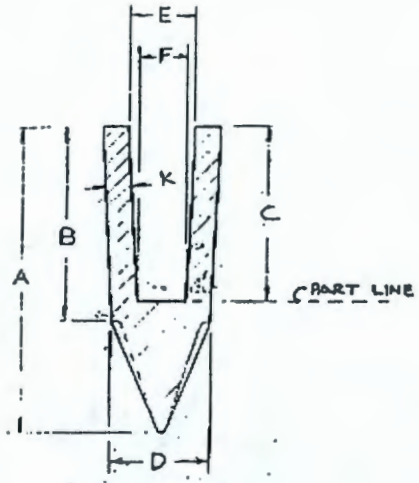
PROTECTOR DETAIL - SHEET PILE

DRAWING NUMBER 500 (10)

3-23-84



SECTION B-B



SECTION A-A

DIMENSION TABLE

(MEASUREMENTS IN INCHES. ALL DIMENSIONS PLUS OR MINUS .005 UNLESS OTHERWISE STATED.)

PART				45.555	
VER.				FIT 5 P2 .35	
A				9.5	
B				2.0	
C				8.0	
D				1.375	
E				.87	
F				.70	
G				15.0875	
H				4.75	
I				5.80	
K				.3125	
WT.					

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VERSABITE

SCALE 1/2	ANNOTATED BY:	DRAWN BY C. HINK
DATE: 6/29/83		REVISED 6-8-83 C.H.

PROTECTOR DETAIL - SHEET PILE

500Z (11)

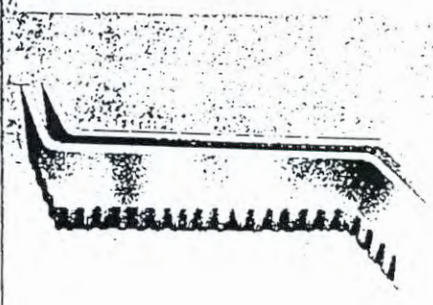
3-28-89

SHEET PILE ACCESSORIES

UNIVERSAL DRIVE POINT

Your choice of our "universal" to fit all piles or our wide selection of tips made to fit each of the most popular sheet piles used.

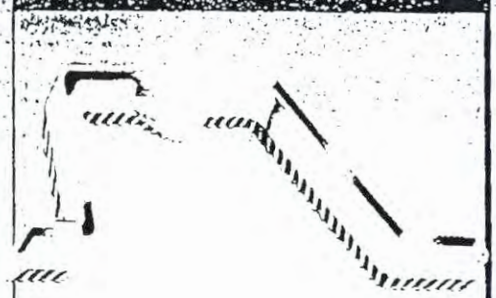
Call for information on Sheet Pile Drive Points to fit the sheet you are using.



Z-SHEET DRIVE POINT

WELD PROCEDURE

These points should be welded with a 5/16 fillet along the entire length of the top flange on both sides using 70xx series rod.



PATENT NO 4,662,793

DOUBLE Z DRIVE POINT

VersaBite has the patented double sheet pile protector to place on a pair of sheets. This not only protects the sheet but also the interlock. Please inquire about the double sheet pile protector for your set of sheets.

WELD RINGS

Weld rings can be ordered to all sizes of pipe and wall thicknesses. The standard weld ring is 3/16" or 1/4" thick.

VERSABOOT TIMBER PILE TIPS

The VersaBoot is a cold-formed, tough carbon steel boot for timber piles. Cost of the VersaBoot is low, attachment is fast.

For minimum field labor with maximum pile tip utilization, VersaBoot comes in 6, 7, and 8 inch inside diameter. Order in a range of sizes to accommodate variation in pile tips, and select the one that fits. Almost no cutting of the piles will be required. Attach easily just drive three flat-headed [illegible] into the sides. The entire pile end is protected and utilized.

ARROW POINT TIMBER PILE TIP

Comes in three tip sizes [illegible] 8 to [illegible] and [illegible] to [illegible]. The point is 3/16" or [illegible] thick. Quickly welded. Quick and easy and ready for immediate [illegible]

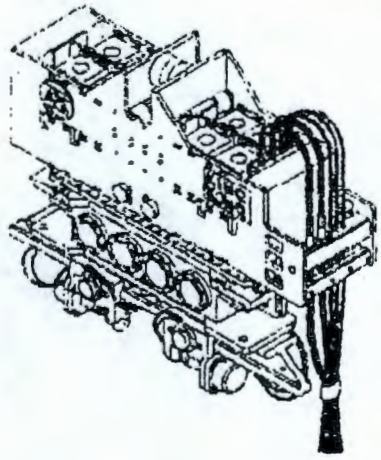
9513339.0476

Attachment A-3
Specifications on Test Pile
Driving Equipment/Hammers

APE "KING KONG" MODEL 400
VIBRATORY PILE DRIVER/EXTRACTOR

for driving and extracting heavy caissons, driving sheets or plates in clay soil conditions

SPECIFICATIONS

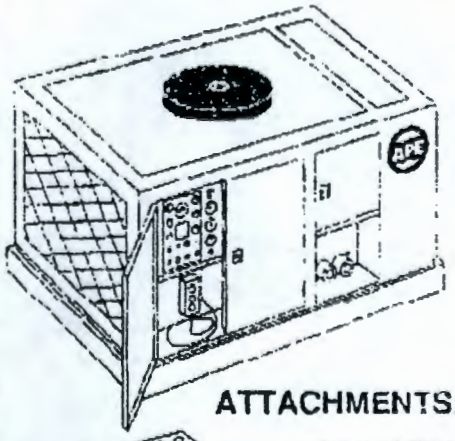


VIBRATOR:	Eccentric moment	13,000 in-lbs (15,000 kg-cm)
	Drive force	400 Tons (3,559 kN)
	Frequency (cpm)	0 to 1500
	Amplitude	1 1/8" (28.5 mm)
	Pile Clamp Force	250 Tons (2,224 kN)
	Line pull for extraction	200 Tons (1,780 kN)
	Hydraulic hose length	200 feet (61 meters)
	Suspended weight*	34,000 lbs (15,455 Kg)
	Length	120 inches (3,048 mm)
	Width	26 inches (660 mm)
	Height	70 inches (1,778 mm)
	Height with clamp	96 inches (2,438 mm)

APE engineers can adjust flows and pressures to job site requirements
* Suspended weight includes all hoses.

APE MODEL 800 HYDRAULIC POWER UNIT

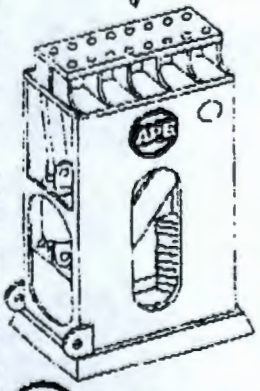
hydraulic source for super large vibros and high torque drills



POWER UNIT:	Engine	CAT 3412 Twin turbo 800 HP
	Maximum power	800 HP (597 kW)
	Operating speed	2000 RPM
	Maximum drive pressure	6000 psi (414 bar)
	Maximum hyd flow: Forward:	250 gpm (946 lpm)
	Maximum hyd flow: Reverse:*	250 gpm (946 lpm)
	Clamp pressure	6000 psi (414 bar)
	Clamp pump flow @ 2200 rpm	10 gpm (38 lpm)
	Weight	24,000 lbs (10,909 kg)
	Length	174 inches (4,420 mm)
	Width	82 inches (2,083 mm)
	Height	96 inches (2,438 mm)

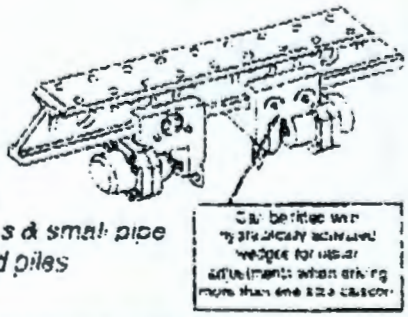
* Operates APE Model 75 Drill with 75,000 ft lbs of torque @ 50 rpm

ATTACHMENTS:



CONCRETE CLAMP:
for driving and extraction

- *Vertical cylinder*
- *Fits up to 24" (609 mm)*
- *Light weight*
- *Easy to install*
- *Heavy duty cylinder*
- *60 ton clamp (534 kN)*
- *Fits to all types of Vibros*
- *Adapts to fit concrete piles & small pipe*
- *Deep grip works on rotted piles*



APE CAISSON CLAMP:
for driving and extraction

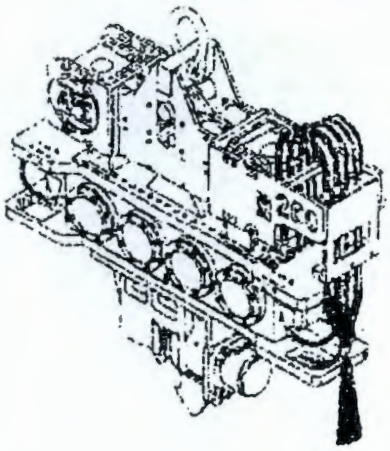
- *T bar design*
- *Fits caissons 16" to 11 feet*
- *One piece cast beam*
- *Will not bend or break*
- *No need for cylinder guards*
- *Simple wedge-lock design*
- *Fits all types of Vibros*
- *Light weight with strength*
- *Jaws will not crack piles*

Hydraulic wedge-lock optional

AMERICAN PILEDRIVING EQUIPMENT 7032 SOUTH 196TH KENT, WA. 98032
(206) 872-0141

APE MODEL 200B VIBRATORY DRIVER/EXTRACTOR WITH MODEL 325 POWER UNIT

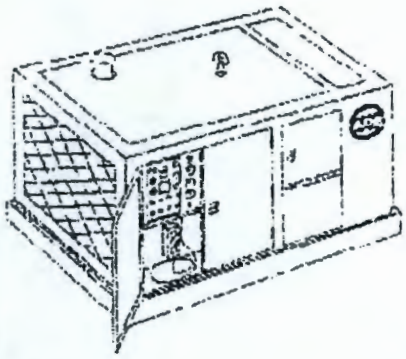
SPECIFICATIONS



VIBRATOR:	
Eccentric moment:	4400 in. lb (3080 kg-cm)
Drive force (variable):	100 tons (888 kN)
Frequency (cpm) (variable):	0 to 1000*
Amplitude:	1/4 to 1" inch (25.4 mm)
Pile Clamp Force for sheet piles:	250 tons (2224 kN)
Caisson Clamp Force:	500 tons (4444 kN)
Line pull for extraction	100 tons (890 kN)
Hydraulic hose length:	150' (50m)
Suspended weight without clamp attachment	11,000 lbs. (5000 kg)
Suspended weight with sheet clamp:	13,300 lbs (5909 kg)
Suspended weight with caisson beam & clamps:	15,600 lbs. (7090 kg)*
Length:	101 inches (2565 mm)
Width throat:	14 inches (356 mm)
Height with sheet clamp attachment:	96 inches (2438 mm)

* Add 2200 lbs to suspended weight when using beam clamps.

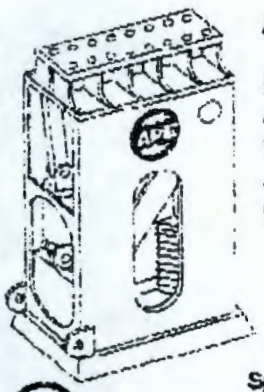
** Frequency is adjustable at control console or hand held pendant and can be increased to 1650 cpm on larger power unit



POWER UNIT:	
Engine:	CAT or Cummins
Maximum power:	325 (243 kW)
Operating speed:	800 to 2200 rpm
Maximum drive pressure.	5,000 psi (344 bar)
Maximum hyd flow- Forward	0 to 130 gpm (492 lpm)
Maximum hyd flow- Reverse:	same as above
Clamp pressure:	5000 psi (344 bar)
Clamp pump flow @ 2200 rpm:	10 gpm (38 lpm)
Weight*	8,900 lbs. (4,041 kg)
Length:	110" (2,794 mm)
Width:	66" (1,676 mm)
Height:	62" (1,575 mm)

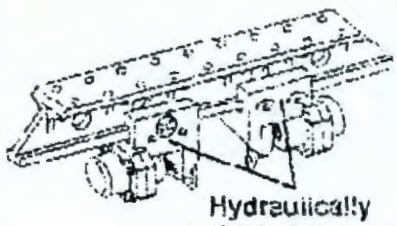
Note: The APE Model 200 vibro can operate off the larger 500 horsepower power unit increasing cpm from 1300 to 1650 cpm thus adding 70 tons of additional drive force.

ATTACHMENTS:



APE WOOD/CONCRETE CLAMP
for driving and extracting

Weight:	*3800 lbs.*
Height:	*60 inches*
Width:	*25 inches*
Jaw opening:	*24 inches*
Clamp Force:	*250 tons*



Hydraulically activated wedges Patented by APE

APE CAISSON BEAM & CLAMPS:
for driving and extracting

Weight:	*32800 lbs.*
Height:	*21 inches*
Width:	*96 inches*
Jaw opening:	*16" to 14 feet*
Clamp Force:	*500 tons*

Specifications vary due to design improvment and manufacturing. Consult factory.

AMERICAN PILEDRIVING EQUIPMENT 7032 SOUTH 196TH KENT, WA. 98032
(206) 872-0141

9513339.0479

Berminghammer®
CORPORATION LIMITED

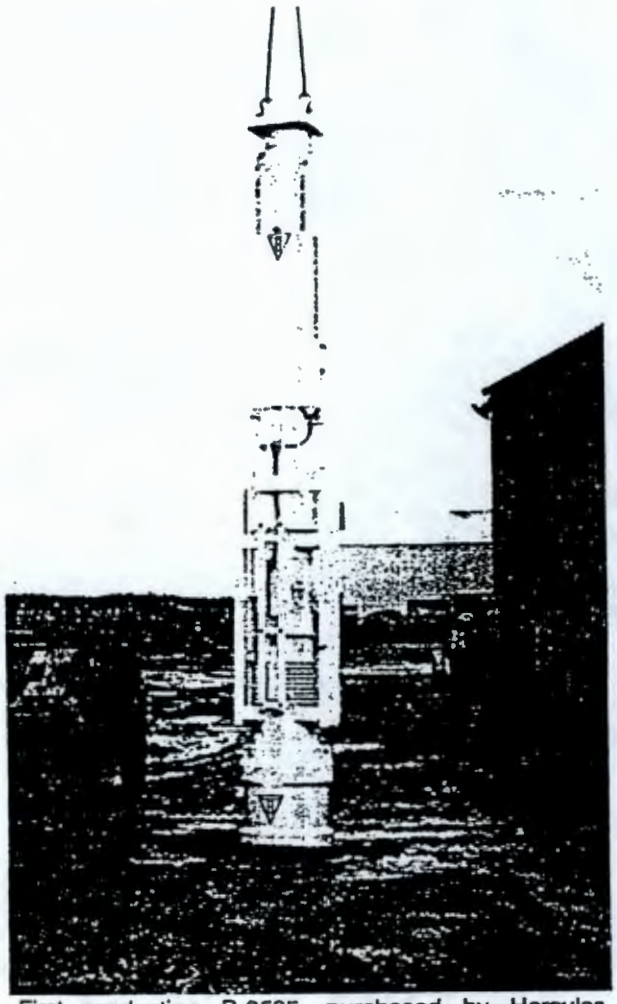
B-3505 DIRECT DRIVE DIESEL PILE HAMMER

Advantages:

* The Original Pressure Fuel Injection System that eliminates pre-combustion and stalling in soft driving -- standard on all Berminghammers.
* Direct Drive Cap System that doubles transferred energy to the pile.
* Direct Drive Cap System will drive all H-piles, pipe piles up to 20 inches and with a cast-steel adapter, will drive concrete piles.
* Chromed cylinders that decrease friction and add years to the life of the cylinder.
* Integral trip track for positive piston engagement
* Remote throttle that allows the stroke to be varied while the hammer is running.
* Air-actuated oiling system.
* Available with Canola-based environmentally friendly lubricating oil.
* Removable catch ring allows the piston to be removed, without taking the hammer out of the leads.

Specifications:

* 4,000 lb. (1,814 kg.) ram
* 12,000 lbs. (5,442 kg.) operating weight
* 46,000 ft. lbs. (62.3 kJ) rating
* 16 gal. (59 L.) fuel tanks
* 2 gal. (7.3 L.) oil tanks
* Fits in 26 X 8 box leads
* Fits on all types of spud-type lead

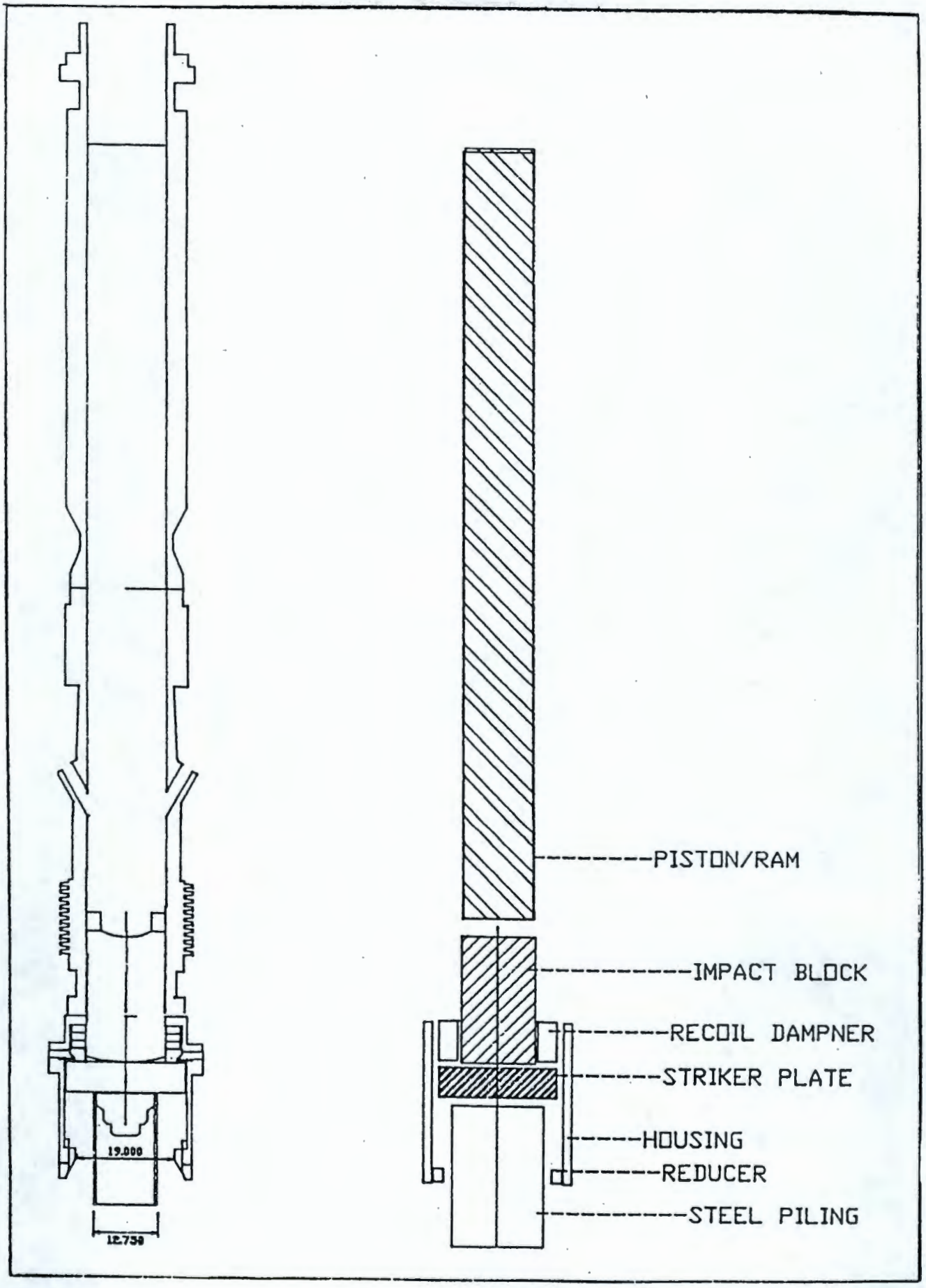


First production B-3505, purchased by Hercules Machinery Corporation, of Sterling, VA.

IMPACT EQUIPMENT, INC.
P.O. BOX 396
MARYLHURST, OR 97036
(503) 656-0422 WATTS (800) 880-0869
FAX: (503) 656-2652

9513339.0480

BERMINGHAMMER PATENTED DIRECT DRIVE SYSTEM



B-3505

Operating Weight		
Total operating weight	12,000 lb	5,442 kg
Weight of tool box	150 lb	68 kg
Total shipping weight	12,150 lb	5,510 kg
Performance		
Ram Weight	4,000 lb	1,814 kg
Maximum ram stroke	11.5 ft	3.5 m
Rated energy	**46,000 ft·lb**	**62.3 kJ**
Maximum developed energy	34,000 ft·lb	46.1 kJ
Blows per minute	36–60	36–60
Capacity		
Fuel tank capacity	15.6 gal (U.S.)	59.0 litres
Fuel consumption	1.4 gal per hour	5.3 litres per hour
Oil tank capacity	1.9 gal (U.S.)	7.3 litres
Oil consumption	0.16 gal per hour	0.6 litres per hour
Dimensions		
Overall length	18.1 ft	5.52 m
Depth	27.5 in	699 mm
Width	24 in	610 mm

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B-3505 4000 lb (1814 kg) Piston						
BPM	STROKE (feet)	ENERGY (ft-lb)		BPM	STROKE (metres)	ENERGY (Joules)
35	11.5	46000		35	3.60	6540
36	11.2	44800		36	3.41	6180
37	10.6	42400		37	3.22	5850
38	10.0	40000		38	3.06	5550
39	9.5	38000		39	2.90	5270
40	9.0	36000		40	2.76	5000
41	8.6	34400		41	2.63	4760
42	8.2	32800		42	2.50	4540
43	7.8	31200		43	2.39	4330
44	7.5	30000		44	2.28	4140
45	7.1	28400		45	2.18	3960
46	6.8	27200		46	2.09	3780
47	6.6	26400		47	2.00	3630
48	6.3	25200		48	1.92	3480
49	6.0	24000		49	1.84	3340
50	5.8	23200		50	1.77	3200
51	5.6	22400		51	1.70	3080
52	5.4	21600		52	1.63	2960
53	5.2	20800		53	1.57	2850
54	5.0	20000		54	1.51	2750
55	4.8	19200		55	1.46	2650
56	4.6	18400		56	1.41	2550
57	4.5	18000		57	1.36	2470
58	4.3	17200		58	1.31	2380
59	4.2	16800		59	1.27	2300
60	4.0	16000		60	1.23	2220

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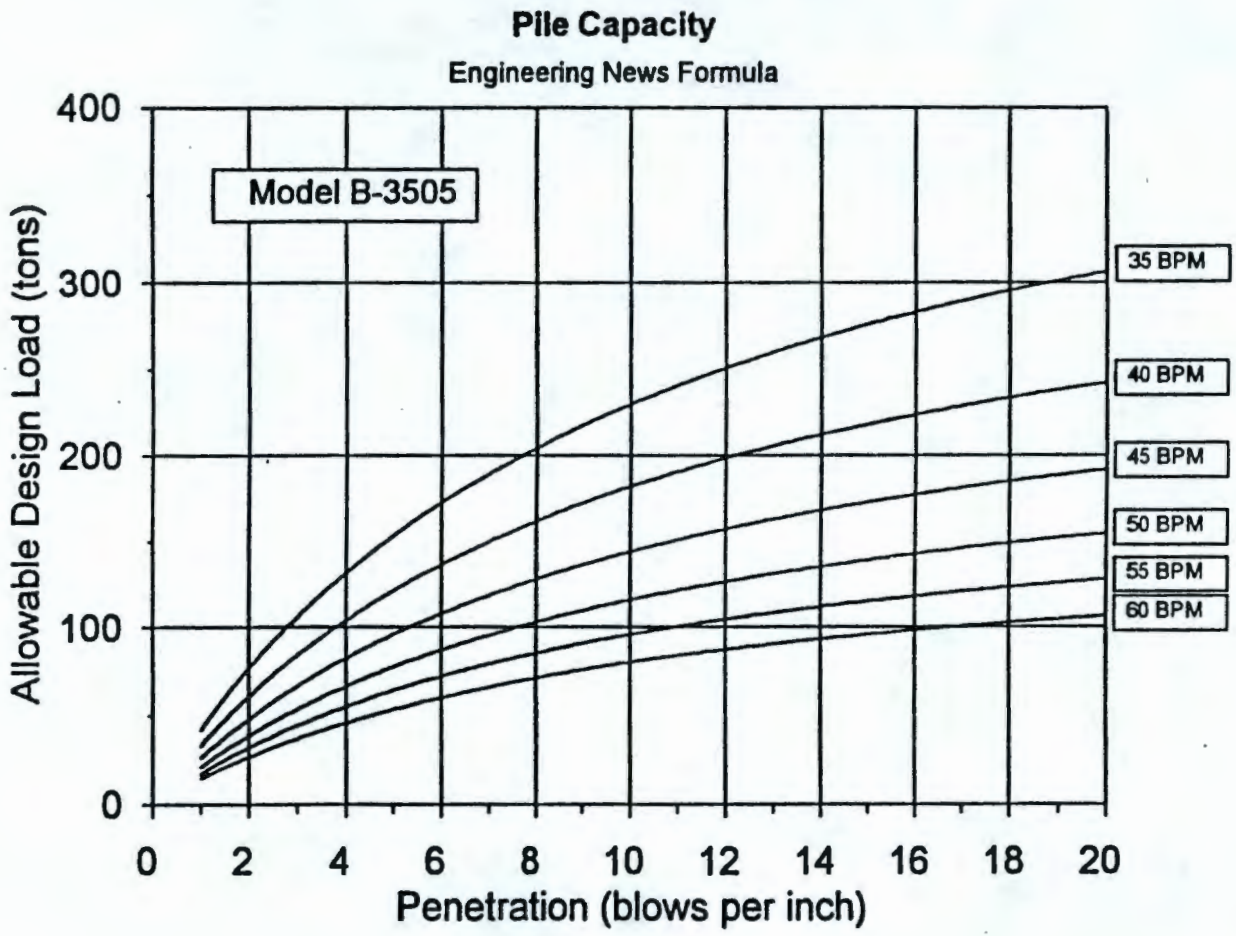

B-3505	4000 lb Piston	
BPM	Stroke	Energy
35	11.5	46,000
36	11.2	44,800
37	10.6	42,400
38	10.0	40,000
39	9.5	38,000
40	9.0	36,000
41	8.6	34,400
42	8.2	32,800
43	7.8	31,200
44	7.5	30,000
45	7.1	28,400
46	6.8	27,200
47	6.6	26,400
48	6.3	25,200
49	6.0	24,000
50	5.8	23,200
51	5.6	22,400
52	5.4	21,600
53	5.2	20,800
54	5.0	20,000
55	4.8	19,200
56	4.6	18,400
57	4.5	18,000
58	4.3	17,200
59	4.2	16,800
60	4.0	16,000

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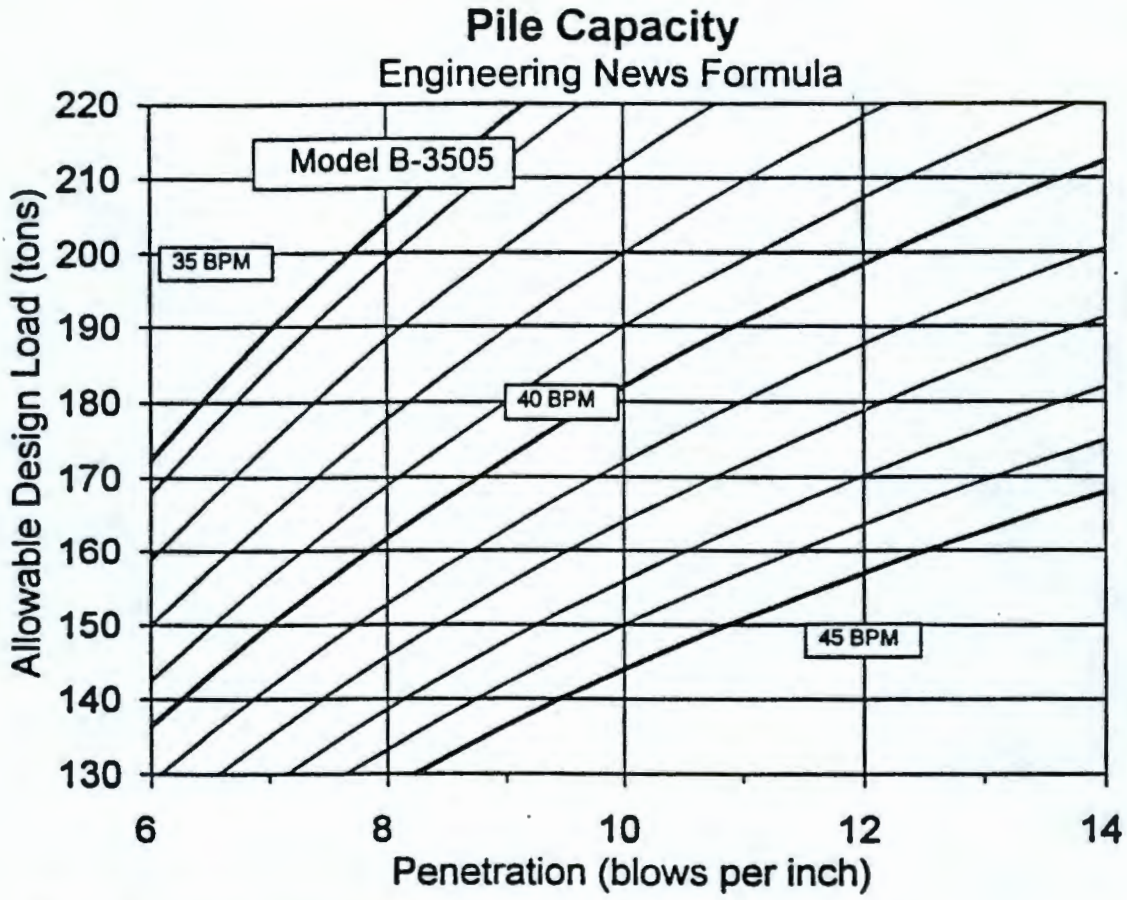

B-3505 4000 lb (1814 kg) Piston					
BPM	STROKE (feet)	ENERGY (ft-lb)	BPM	STROKE (metres)	ENERGY (Joules)
35	11.5	46000	35	3.60	6540
36	11.2	44800	36	3.41	6180
37	10.6	42400	37	3.22	5850
38	10.0	40000	38	3.06	5550
39	9.5	38000	39	2.90	5270
40	9.0	36000	40	2.76	5000
41	8.6	34400	41	2.63	4760
42	8.2	32800	42	2.50	4540
43	7.8	31200	43	2.39	4330
44	7.5	30000	44	2.28	4140
45	7.1	28400	45	2.18	3960

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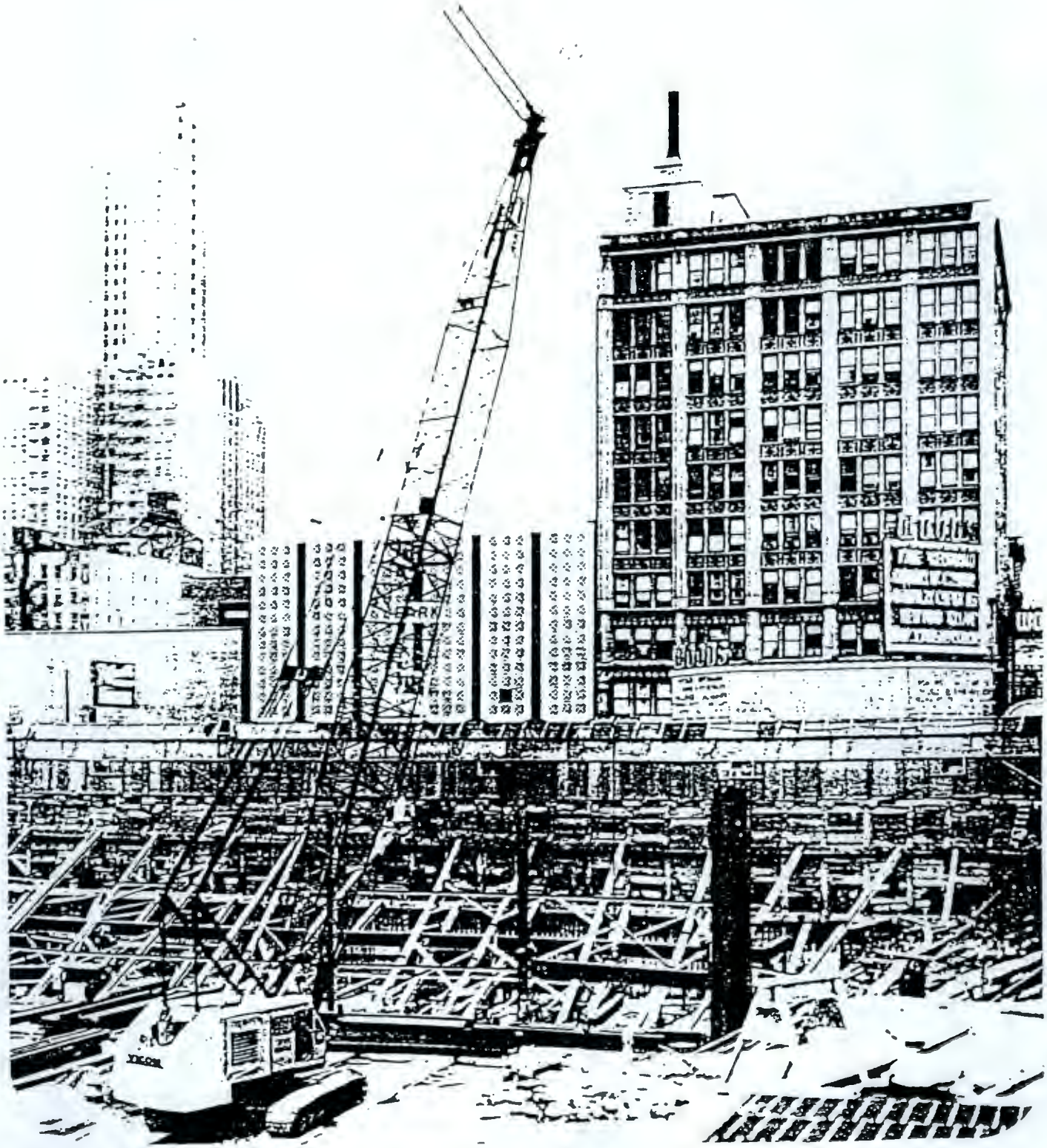
MANITOWOC SPECIFICATIONS

3900



24273

NOTE 1

CRAWLER FRAMES MAY BE REMOVED FOR LOADING, REDUCING ALL HEIGHTS 13 IN. USE CAB DIM 10' 10" FOR LOAD WIDTH.

NOTE 2

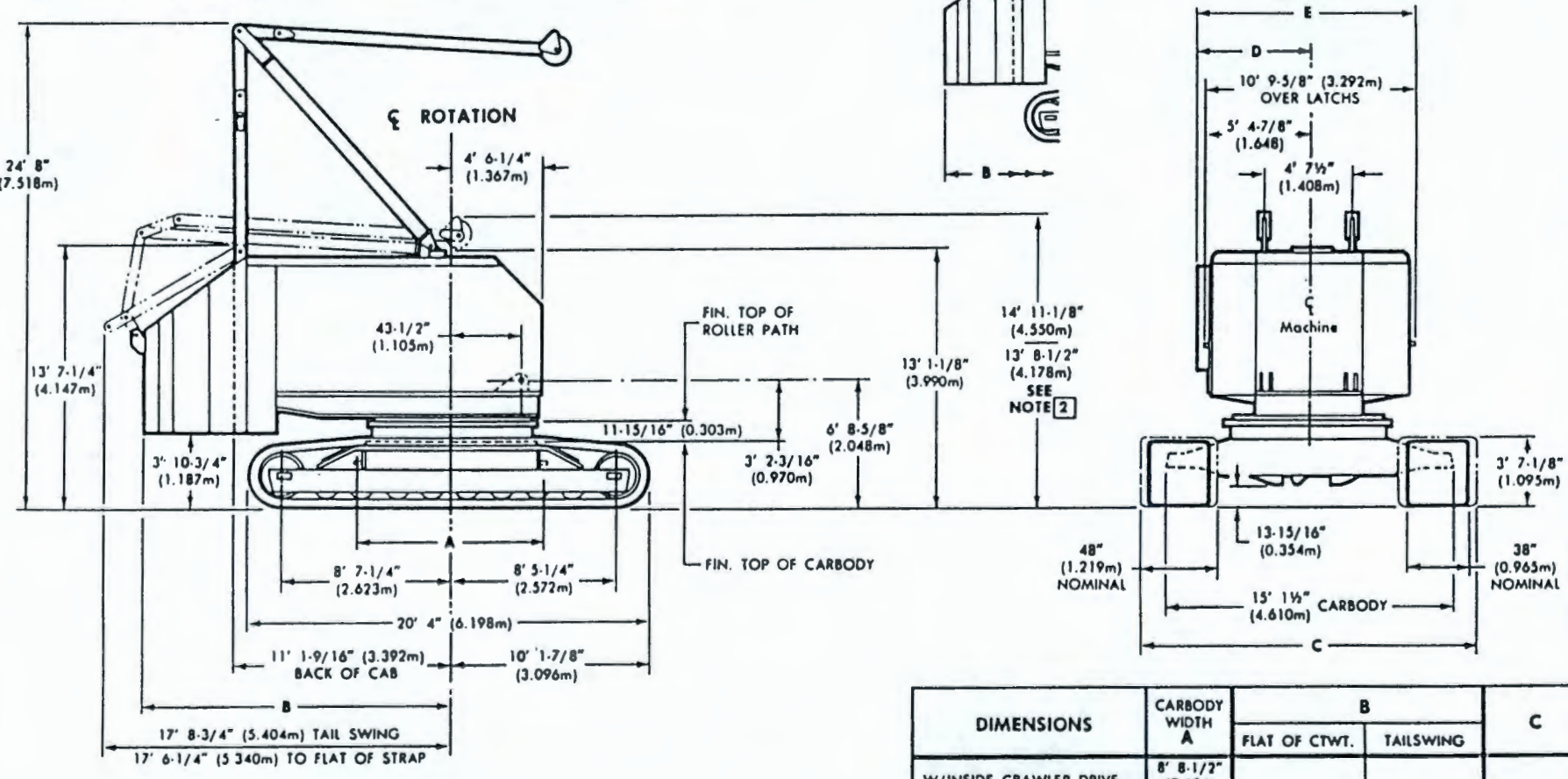
SPECIAL LOW CLEARANCE GANTRY 42732 OVERALL CLEARANCE HEIGHT.

NOTE 3

HEIGHT DIMENSIONS SHOWN ARE FOR OUTSIDE DRIVE WITH 48" TREADS.

- WITH 38" TREADS DEDUCT 1/2".
- FOR INSIDE DRIVE WITH 48" TREADS DEDUCT 1/4".
- WITH 38" TREADS DEDUCT 3/4".

DIMENSIONS	D	E
W/CAT. & G.M. VICON	5' 8-7/16" (1.738m)	11' 3-3/16" (3.434m)
W/CUMMINS VICON	5' 7-11/16" (1.719m)	11' 0-7/16" (3.364m)



3900
(100 Ton Machine)

DIMENSIONS		CARBODY WIDTH A	B FLAT OF CTWT.	B TAILSWING	C
W/INSIDE CRAWLER DRIVE		8' 8-1/2" (2.654)			
W/OUTSIDE CRAWLER DRIVE		9' 11" (3.022m)			
2ND CTWT.			14' 2-7/16" (4.329m)	15' 1-3/8" (4.607m)	
3RD CTWT.	W/PENDANT OR LINK TYPE BACKHITCH.		15' 6-15/16" (4.748m)	15' 9-1/8" (4.804m)	
OVER 38" CRAWLERS					16' 8" (5 080m)
OVER 48" CRAWLERS					17' 6" (5

6-15-81
3-21-68
-6-64

SUPEF DWG. 24273 OF 11-30-60 & 0-136B Drwg. D

24273

OUTLINE DIMENSIONS

MANITOWOC ENGINEERING CO.

A Division of The Manitowoc Company, Inc. Manitowoc, Wisconsin

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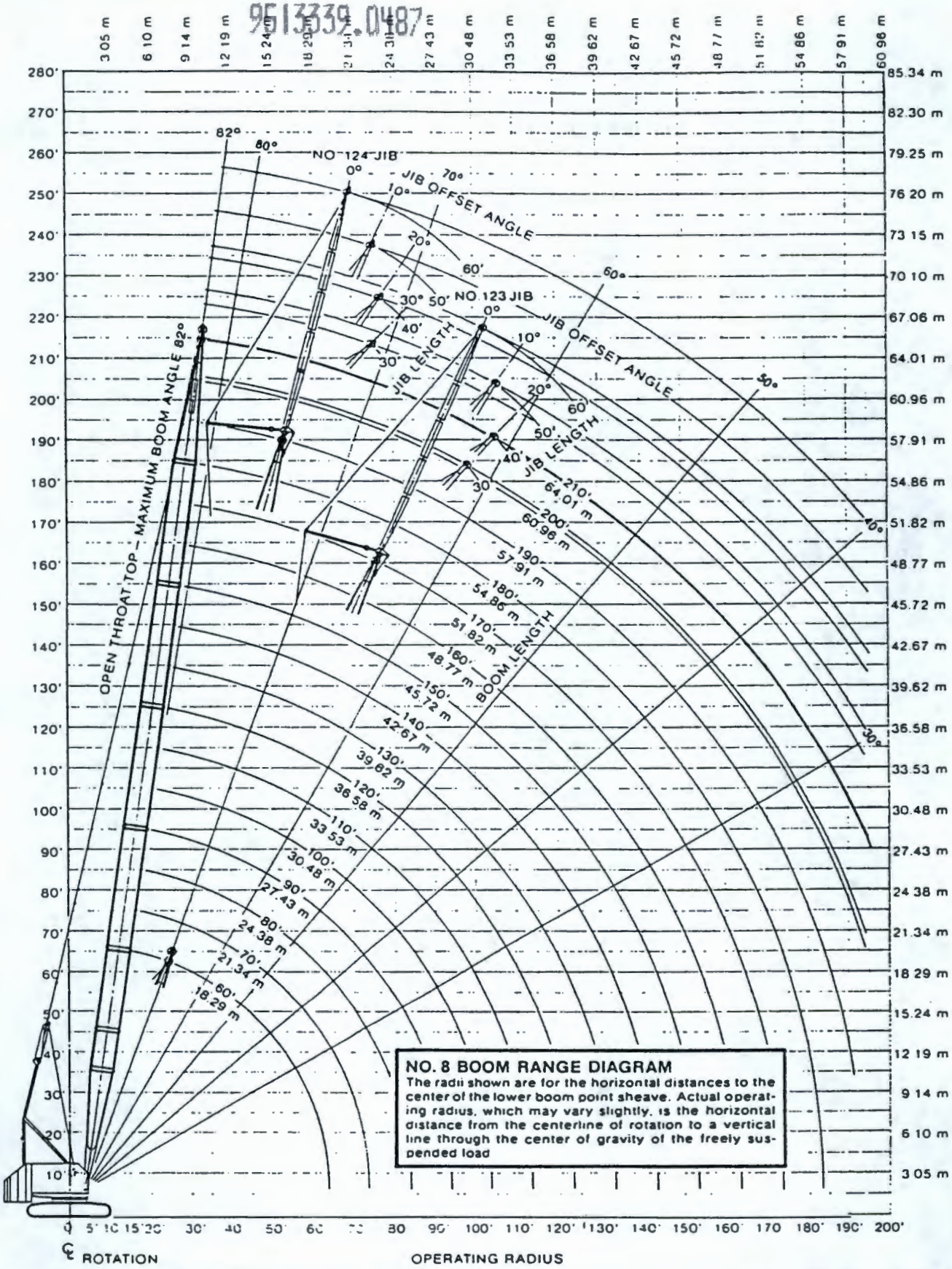

NO. 8 BOOM RANGE DIAGRAM

The radii shown are for the horizontal distances to the center of the lower boom point sheave. Actual operating radius, which may vary slightly, is the horizontal distance from the centerline of rotation to a vertical line through the center of gravity of the freely suspended load

Because of a program of continuing improvements, Manitowoc Engineering Co. reserves the right to change this description at any time, without notice.

MANITOWOC ENGINEERING CO.
(A division of The Manitowoc Company, Inc.)
Manitowoc, Wisconsin 54220

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MANITOWOC ENGINEERING CO.

A Division of The Manitowoc Company, Inc. Manitowoc, Wisconsin 54220

LIFTCRANE CAPACITIES

MEETS ANSI B30.5 REQUIREMENTS

3900 CRAWLER

BOOM NO. 8 WITH OPEN THROAT TOP 74,000 LB. COUNTERWEIGHT

LIFTING CAPACITIES: Capacities for various boom lengths and operating radii are for freely suspended loads and do not exceed **75%** of a static tipping load. Capacities based on structural competence are shown by shaded areas.

Upper boom point capacity (whip line) for single part line is 22,500 lbs. (20,000 lbs. when rear auxiliary drum is used). In all cases, upper boom point capacities cannot exceed those listed for the main boom capacity.

Capacities are shown in pounds. Weight of jib, (see chart A), all load blocks, hooks, weight ball, slings, hoist lines, etc., beneath boom and jib point sheaves, is to be considered part of the main boom load. Boom is not to be lowered beyond radii where combined weights are greater than rated capacity. Where no capacity is shown, operation is not intended or approved. See boom raising capability chart.

OPERATING CONDITIONS: Machine to operate in a level position on a firm surface with gantry in working position and be rigged in accordance with and under conditions referred to in rigging drawing No. 48029 or No. 48237 and load line specification chart No. 4899.

Crane operator judgment must be used to allow for dynamic load effects of swinging, hoisting or lowering, travel, wind conditions, as well as adverse operating conditions and physical machine depreciation.

OPERATING RADIUS: Operating radius is the horizontal distance from the axis of rotation to the center of vertical hoist line or load block with the load freely suspended. Add 11" to boom point radius for radius of sheave when using single part hoist line.

Boom angle is the angle between horizontal and centerline of boom butt and inserts and is an indication of operating radius. In all cases, operating radius shall govern capacity.

BOOM POINT ELEVATION: Boom point elevation, in feet, is the vertical distance from ground level to centerline of boom point shaft.

MACHINE EQUIPMENT: Machine equipped with 20'4" crawlers, 38" or 48" treads, 15' retractable gantry, 10 or 12 part boom hoist reeving, two 1-1/2" boom pendants, 1st ctwt. = 32,000 lbs., 2nd ctwt. = 26,500 lbs., 3rd ctwt. = 15,500 lbs.

HOIST REEVING FOR MAIN LOAD BLOCK					
No. Parts of Line	1	2	3	4	5
Maximum Load – Lbs.	22,500	45,000	67,500	90,000	112,500
No. Parts of Line	6	7	8	9	
Maximum Load – Lbs.	135,000	157,500	180,000	200,000	

LOAD AND WHIP LINE SPECIFICATIONS
LOAD LINE: 1" — 6x25 Filler Wire, Improved Plow Steel, Regular Lay, IWRC. Minimum Breaking Strength 44.9 Ton. (Approx. Weight Per Ft. in Lbs. 1.85)
WHIP LINE: 1" — 6x25 Filler Wire, Improved Plow Steel, Regular Lay, IWRC. Minimum Breaking Strength 44.9 Ton. Maximum Load — 22,500 lbs. per Line. (Approx. Weight Per Ft. in Lbs. 1.85)

MAXIMUM BOOM AND JIB LENGTHS LIFTED UNASSISTED					
OVER FRONT OF BLOCKED CRAWLERS			OVER SIDE OF CRAWLERS		
Bm. Lgth.	Jib No. 123	Jib No. 124	Bm. Lgth.	Jib. No. 123	Jib No. 124
210'	—	—	190'	—	—
200'	—	—	180'	—	30'
190'	30'	60'	170'	30'	60'
180'	50'	60'	160'	60'	60'
170'	60'	60'			
Load block, hook and weight ball on ground at start.					

(A) DEDUCT FROM CAPACITIES WHEN JIB IS ATTACHED		
Jib Lgth.	Jib No. 123	Jib No. 124
30'	2,500 Lb.	1,800 Lb.
40'	3,100 Lb.	2,050 Lb.
50'	3,700 Lb.	2,300 Lb.
60'	4,400 Lb.	2,500 Lb.

For jib capacities, consult jib chart.

Boom Lgth.: Feet	Oper. Rad.: Feet	Boom Ang.: Deg.	Boom Point: Elev.	Capacity:
60	15	79.1	65.6	200,000
	16	78.1	65.4	200,000
	17	77.1	65.1	180,200
	18	76.1	64.9	163,400
	19	75.2	64.7	149,400
	20	74.2	64.4	137,500
	22	72.2	63.8	118,600
	24	70.1	63.1	104,100
	26	68.1	62.3	92,700
	28	66.0	61.5	83,400
	30	63.9	60.5	75,800
	32	61.8	59.5	69,400
	34	59.6	58.4	63,900
	36	57.3	57.2	59,200
	38	55.0	55.8	55,100
	40	52.7	54.4	51,500
	45	46.4	50.1	44,200
	50	39.4	44.7	38,500
	55	31.1	37.6	34,100
	60	20.0	27.2	30,500
70	15	80.6	75.7	200,000
	16	79.8	75.6	200,000
	17	79.0	75.4	179,900
	18	78.1	75.2	163,100
	19	77.3	74.9	149,100
	20	76.5	74.7	137,200
	22	74.8	74.2	118,200
	24	73.1	73.6	103,700
	26	71.4	73.0	92,300
	28	69.6	72.3	83,000
	30	67.9	71.5	75,400
	32	66.1	70.6	69,000
	34	64.3	69.7	63,500
	36	62.5	68.7	58,800
	38	60.6	67.6	54,700

Boom Lgth.: Feet	Oper. Rad.: Feet	Boom Ang.: Deg.	Boom Point: Elev.	Capacity:
70	40	58.7	66.5	51,100
	45	53.8	63.1	43,800
	50	48.5	59.1	38,100
	55	42.8	54.2	33,700
	60	36.4	48.2	30,000
	65	28.7	40.3	27,100
	70	18.5	28.9	24,500
80	16	81.1	85.7	200,000
	17	80.4	85.5	179,700
	18	79.6	85.4	162,900
	19	78.9	85.2	148,800
	20	78.2	85.0	137,000
	22	76.7	84.5	118,000
	24	75.2	84.0	103,500
	26	73.8	83.5	92,000
	28	72.3	82.9	82,800
	30	70.8	82.2	75,100
	32	69.2	81.5	68,700
	34	67.7	80.7	63,200
	36	66.1	79.8	58,500
	38	64.6	78.9	54,400
	40	63.0	77.9	50,800
	45	58.9	75.1	43,500
	50	54.6	71.8	37,800
	55	50.0	68.0	33,300
	60	45.2	63.4	29,700
	65	39.9	58.0	26,700
	70	33.9	51.3	24,200
	75	26.9	42.8	22,100
	80	17.3	30.5	20,200

Boom Lgth.: Feet	Oper. Rad.: Feet	Boom Ang.: Deg.	Boom Point: Elev.	Capacity:
90	18	80.8	95.5	162,600
	19	80.2	95.3	148,500
	20	79.5	95.2	136,600
	22	78.2	94.8	117,600
	24	76.9	94.3	103,100
	26	75.6	93.8	91,700
	28	74.3	93.3	82,400
	30	73.0	92.7	74,700
	32	71.6	92.1	68,300
	34	70.3	91.4	62,800
	36	68.9	90.6	58,100
	38	67.5	89.8	54,000
	40	66.2	89.0	50,400
	45	62.6	86.6	43,000
	50	59.0	83.8	37,400
	55	55.2	80.6	32,900
	60	51.2	76.8	29,300
	65	47.0	72.5	26,300
	70	42.5	67.4	23,800
	75	37.5	61.5	21,600
	80	31.9	54.3	19,800
	85	25.3	45.1	18,200
	90	16.3	31.9	16,700

Boom Lgth.: Feet	Oper. Rad.: Feet	Boom Ang.: Deg.	Boom Point: Elev.	Capacity:
100	19	81.2	105.5	148,400
	20	80.6	105.3	136,500
	22	79.4	105.0	117,500
	24	78.2	104.6	103,000
	26	77.1	104.1	91,500
	28	75.9	103.6	82,300
	30	74.7	103.1	74,600
	32	73.5	102.5	68,200
	34	72.3	101.9	62,700
	36	71.1	101.3	58,000
	38	69.9	100.6	53,900
	40	68.7	99.8	50,200
	45	65.6	97.7	42,900
	50	62.4	95.3	37,200
	55	59.1	92.5	32,800
	60	55.7	89.3	29,100
	65	52.1	85.6	26,100
	70	48.4	81.5	23,600
	75	44.5	76.7	21,500
	80	40.2	71.2	19,600
	85	35.5	64.8	18,000
	90	30.3	57.0	16,600
	95	24.0	47.3	15,300
	100	15.5	33.3	14,200

Capacities continue on reverse side.

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MANITOWOC ENGINEERING CO.
Division of The Manitowoc Company, Inc. Manitowoc, Wisconsin 54220

JIB LIFTING CAPACITIES — 3900

MEETS ANSI B30.5 REQUIREMENTS

JIB NO. 123 WITH 12'6" STRUT ON BOOM NO. 8 WITH OPEN THROAT TOP 74,000 LB. COUNTERWEIGHT

0 DEGREE JIB OFFSET ANGL

Chart supplements boom capacity chart No. 6292-A. Capacities are for freely suspended loads based on tipping. Strength of structural components or other factors. Crane operator judgment must be used to allow for dynamic load effects of swinging. Hoisting or lowering, travel, wind conditions, as well as adverse operating conditions and physical machine depreciation.

Capacities do not exceed 75% of a static tipping load with machine on a firm, level surface. Capacities based on structural competence are denoted by shaded areas. Operatir radius is the horizontal distance from the axis of rotation the center of vertical hoist line or load block. Weight of a load blocks, hooks, weight ball, slings, hoist lines, etc beneath boom and jib point sheaves, is considered part of th jib load. Boom and jib are not to be lowered beyond rac where combined weights are greater than rated capacit Maximum capacity on 1" — 6x25 IPS, IWRC is 22,500 lb./lin Refer to jib assembly No. 43730.

30 FOOT JIB

JIB POINT RADIUS: FEET	CAPACITIES IN POUNDS — BOOM LENGTH — FEET											JIB POINT RADIUS: FEET
	90	100	110	120	130	140	150	160	170	180	190	
40 *	40,000	40,000	40,000	40,000	40,000	40,000	40,000	40,000	40,000	40,000	40,000	40 *
45	40,000	40,000	40,000	40,000	40,000	40,000	40,000	40,000	40,000	39,900	39,600	45
50	37,500	37,100	36,700	36,300	36,000	35,700	35,300	34,900	34,600	34,200	33,900	50
55	33,000	32,600	32,200	31,800	31,500	31,200	30,800	30,400	30,100	29,700	29,400	55
60	29,400	28,900	28,600	28,200	27,900	27,500	27,100	26,800	26,400	26,100	25,700	60
65	26,400	25,900	25,600	25,200	24,800	24,500	24,100	23,800	23,400	23,000	22,700	65
70	23,800	23,400	23,000	22,600	22,300	22,000	21,500	21,200	20,900	20,500	20,200	70
80	19,800	19,400	19,000	18,600	18,300	17,900	17,500	17,200	16,800	16,400	16,100	80
90	16,800	16,300	16,000	15,500	15,200	14,900	14,400	14,100	13,800	13,400	13,000	90
100	14,400	13,900	13,600	13,100	12,800	12,500	12,000	11,700	11,400	11,000	10,600	100
110		12,000	11,600	11,200	10,900	10,500	10,100	9,800	9,400	9,000	8,700	110
120			10,000	9,600	9,300	8,900	8,500	8,200	7,800	7,400	7,100	120
130				8,300	7,900	7,600	7,200	6,800	6,500	6,100	5,800	130
140					6,800	6,500	6,000	5,700	5,400	4,900	4,600	140
150						5,500	5,100	4,700	4,400	4,000	3,600	150
160							4,200	3,900	3,500	3,100		160

40 FOOT JIB

JIB POINT RADIUS: FEET	CAPACITIES IN POUNDS — BOOM LENGTH — FEET											JIB POINT RADIUS: FEET
	90	100	110	120	130	140	150	160	170	180		
50 *	30,000	30,000	30,000	30,000	30,000	30,000	30,000	30,000	30,000	30,000		50 *
55	30,000	30,000	30,000	30,000	30,000	30,000	30,000	30,000	30,000	29,800		55
60	29,500	29,000	28,700	28,300	27,900	27,600	27,200	26,900	26,500	26,100		60
65	26,500	26,000	25,700	25,300	24,900	24,600	24,200	23,800	23,500	23,100		65
70	23,900	23,500	23,100	22,700	22,400	22,000	21,600	21,300	21,000	20,600		70
80	19,900	19,500	19,100	18,700	18,300	18,000	17,600	17,300	16,900	16,500		80
90	16,900	16,400	16,100	15,600	15,300	14,900	14,500	14,200	13,800	13,400		90
100	14,500	14,000	13,700	13,200	12,900	12,500	12,100	11,800	11,400	11,000		100
110	12,500	12,100	11,700	11,300	10,900	10,600	10,200	9,800	9,500	9,100		110
120		10,500	10,100	9,700	9,400	9,000	8,600	8,200	7,900	7,500		120
130			8,800	8,400	8,000	7,700	7,200	6,900	6,600	6,200		130
140				7,200	6,900	6,500	6,100	5,800	5,400	5,000		140
150					5,900	5,600	5,100	4,800	4,400	4,000		150
160						4,700	4,300	3,900	3,600	3,200		160

50 FOOT JIB

JIB POINT RADIUS: FEET	CAPACITIES IN POUNDS — BOOM LENGTH — FEET											JIB POINT RADIUS: FEET
	90	100	110	120	130	140	150	160	170	180		
70 *	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000		70 *
75	20,000	20,000	20,000	20,000	20,000	20,000	19,600	19,300	19,000	18,600		75
80	20,000	19,600	19,200	18,800	18,500	18,100	17,700	17,400	17,100	16,700		80
90	17,000	16,500	16,200	15,700	15,400	15,100	14,700	14,300	14,000	13,600		90
100	14,600	14,100	13,800	13,300	13,000	12,700	12,200	11,900	11,600	11,200		100
110	12,600	12,200	11,800	11,400	11,100	10,700	10,300	10,000	9,600	9,200		110
120	11,000	10,600	10,200	9,800	9,500	9,100	8,700	8,400	8,000	7,600		120
130		9,200	8,900	8,500	8,100	7,800	7,400	7,000	6,700	6,300		130
140			7,700	7,300	7,000	6,600	6,200	5,900	5,500	5,100		140
150				6,300	6,000	5,600	5,200	4,900	4,500	4,100		150
160					5,200	4,800	4,400	4,000	3,700	3,300		160
170						4,000	3,600	3,300				170

60 FOOT JIB

JIB POINT RADIUS: FEET	CAPACITIES IN POUNDS — BOOM LENGTH — FEET											JIB POINT RADIUS: FEET
	90	100	110	120	130	140	150	160	170			
105 *	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000			105 *
110	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	9,600			110
115	10,000	10,000	10,000	10,000	10,000	9,900	9,500	9,200	8,800			115
120	10,000	10,000	10,000	9,800	9,500	9,100	8,700	8,400	8,000			120
125	10,000	9,900	9,500	9,100	8,800	8,400	8,000	7,700	7,300			125
130	9,700	9,300	8,900	8,500	8,100	7,800	7,400	7,000	6,700			130
140		8,100	7,800	7,300	7,000	6,600	6,200	5,900	5,500			140
150			6,800	6,400	6,000	5,700	5,300	4,900	4,600			150
160				5,500	5,200	4,800	4,400	4,100	3,700			16
170					4,400	4,100	3,700	3,300	3,000			1

* These capacities apply for ALL lesser radii obtainable.

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9513339.0490

MANITOWOC ENGINEERING CO.
Division of The Manitowoc Company, Inc. Manitowoc, Wisconsin 54220

JIB LIFTING CAPACITIES — 3900

MEETS ANSI B30.5 REQUIREMENTS

JIB NO. 123 WITH 12'6" STRUT ON BOOM NO. 8 WITH OPEN THROAT TOP 74,000 LB. COUNTERWEIGHT

20 DEGREE JIB OFFSET ANGLE

Chart supplements boom capacity chart No. 6292-A. Capacities are for freely suspended loads based on tipping, strength of structural components or other factors. Crane operator judgment must be used to allow for dynamic load effects of swinging, hoisting or lowering, travel, wind conditions, as well as adverse operating conditions and physical machine depreciation.

Capacities do not exceed 75% of a static tipping load with machine on a firm, level surface. Capacities based on structural competence are denoted by shaded areas. Operatin radius is the horizontal distance from the axis of rotation t the center of vertical hoist line or load block. Weight of al load blocks, hooks, weight ball, slings, hoist lines, etc. beneath boom and jib point sheaves, is considered part of th jib load. Boom and jib are not to be lowered beyond radi where combined weights are greater than rated capacity Maximum capacity on 1" — 6x25 IPS, IWRC is 22,500 lb./line Refer to jib assembly No. 43730.

30 FOOT JIB

JIB POINT RADIUS: FEET	CAPACITIES IN POUNDS — BOOM LENGTH — FEET											JIB POINT RADIUS: FEET
	90	100	110	120	130	140	150	160	170	180	190	
45 *	40,000	40,000	40,000	40,000	40,000	40,000	40,000	40,000				45 *
50	38,600	38,300	38,000	37,700	37,500	37,300	37,000	36,700	36,300	35,500	34,700	50
55	34,000	33,700	33,400	33,100	32,800	32,600	32,300	32,000	31,800	31,500	31,200	55
60	30,200	29,900	29,600	29,300	29,000	28,800	28,500	28,200	27,900	27,600	27,400	60
65	27,100	26,800	26,500	26,200	25,900	25,600	25,300	25,000	24,800	24,500	24,200	65
70	24,500	24,200	23,900	23,500	23,300	23,000	22,600	22,400	22,100	21,800	21,500	70
75	22,300	21,900	21,600	21,300	21,000	20,700	20,400	20,100	19,800	19,500	19,200	75
80	20,300	20,000	19,700	19,300	19,100	18,800	18,400	18,200	17,900	17,500	17,300	80
85	18,700	18,300	18,000	17,600	17,400	17,100	16,700	16,400	16,200	15,800	15,500	85
90		16,800	16,500	16,100	15,900	15,600	15,200	14,900	14,600	14,300	14,000	90
95		15,500	15,200	14,800	14,500	14,200	13,900	13,600	13,300	13,000	12,700	95
100			14,000	13,600	13,400	13,100	12,700	12,400	12,100	11,800	11,500	100
110					11,300	11,000	10,700	10,400	10,100	9,700	9,400	110
120						9,400	9,000	8,700	8,400	8,000	7,700	120
130								7,300	7,000	6,600	6,300	130
140									5,800	5,400	5,100	140

40 FOOT JIB

JIB POINT RADIUS: FEET	CAPACITIES IN POUNDS — BOOM LENGTH — FEET											JIB POINT RADIUS: FEET
	90	100	110	120	130	140	150	160	170	180		
50 *	30,000	30,000	30,000	30,000	30,000	30,000	30,000	30,000				50 *
55	30,000	30,000	30,000	30,000	30,000	30,000	30,000	30,000	29,700	29,100		55
60	30,000	30,000	30,000	29,700	29,500	29,200	29,000	28,700	28,500	28,100		60
65	27,500	27,100	26,900	26,600	26,300	26,100	25,800	25,500	25,300	25,000		65
70	24,800	24,500	24,200	23,900	23,600	23,400	23,100	22,800	22,600	22,300		70
75	22,600	22,200	22,000	21,600	21,400	21,100	20,800	20,500	20,200	19,900		75
80	20,600	20,300	20,000	19,700	19,400	19,100	18,800	18,500	18,300	17,900		80
85	18,900	18,600	18,300	17,900	17,700	17,400	17,100	16,800	16,500	16,200		85
90	17,400	17,100	16,800	16,400	16,200	15,900	15,500	15,300	15,000	14,700		90
100		14,500	14,300	13,900	13,600	13,300	13,000	12,700	12,400	12,100		100
110			12,200	11,900	11,600	11,300	10,900	10,700	10,400	10,000		110
120					9,900	9,600	9,200	8,900	8,600	8,300		120
130							7,800	7,500	7,200	6,900		130
140								6,300	6,000	5,600		140

50 FOOT JIB

JIB POINT RADIUS: FEET	CAPACITIES IN POUNDS — BOOM LENGTH — FEET											JIB POINT RADIUS: FEET
	90	100	110	120	130	140	150	160	170	180		
75 *	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000		75 *
80	20,000	20,000	20,000	20,000	19,800	19,500	19,200	19,000	18,700	18,400		80
85	19,200	18,900	18,600	18,300	18,000	17,800	17,500	17,200	17,000	16,700		85
90	17,700	17,400	17,100	16,800	16,500	16,200	15,900	15,700	15,400	15,100		90
95	16,400	16,000	15,700	15,400	15,200	14,900	14,600	14,300	14,000	13,700		95
100	15,200	14,800	14,500	14,200	13,900	13,700	13,300	13,100	12,800	12,500		100
105	14,100	13,700	13,400	13,100	12,800	12,600	12,200	12,000	11,700	11,400		105
110		12,800	12,500	12,100	11,900	11,600	11,200	11,000	10,700	10,400		110
120			10,800	10,400	10,100	9,900	9,500	9,200	9,000	8,600		120
130					8,700	8,400	8,100	7,800	7,500	7,200		130
140							6,800	6,500	6,300	5,900		140
150								5,500	5,200	4,800		150

60 FOOT JIB

JIB POINT RADIUS: FEET	CAPACITIES IN POUNDS — BOOM LENGTH — FEET											JIB POINT RADIUS: FEET
	90	100	110	120	130	140	150	160	170			
115 *	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000			115 *
120		10,000	10,000	10,000	10,000	10,000	9,700	9,400	9,200			120
125			10,000	9,800	9,600	9,300	8,900	8,700	8,400			125
130				9,100	8,900	8,600	8,200	8,000	7,700			130
135				8,500	8,200	7,900	7,600	7,300	7,000			135
140					7,600	7,300	7,000	6,700	6,400			140
145						6,800	6,400	6,200	5,900			145
150							5,900	5,600	5,300			150
155								5,200	4,900			155
160								4,700	4,400			160

* These capacities apply for ALL lesser radii obtainable.

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Form No.

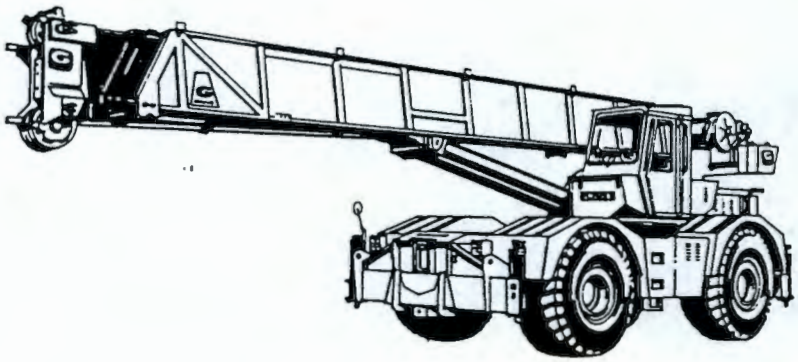
9513339.0491

GROVE®

PHONE 717 • 597-8121
TWX 510 • 650-3580
TELEX NUMBERS:
MAIN OFFICE 842308
SERVICE 842393
CABLE: GROVEMFG

S/N 30402

SERVICE MANUAL



MODELS RT65S & RT75S ROUGH TERRAIN CRANES

GROVE MANUFACTURING COMPANY
SHADY GROVE, PENNSYLVANIA 17256
A DIVISION OF WALTER KIDDE & COMPANY, INC.

SEPTEMBER 1973

Printed in U.S.A.

RT65S

9513339.0492

35 TON CAP.

S/N 30402

34 ft. - 136 ft. BOOM

PCSA CLASS 10-147

(POWER PINNED)

RATED LIFTING CAPACITIES IN POU

ON OUTRIGGERS FULLY EXTENDED - 360°

Radius in Feet	Main Boom Length in Feet Power Pinned Fly Retracted									Power Pin Fly & 81' Main	32' Boom Ext & 81' Main	32' Boom Ext & 104' Boom
	34	38	44	50	56	62	68	74	81	104	112	136
10	70,000 (63.5)	68,000 (67)	63,700 (70.5)	58,000 (73)	48,500 (75)					See Warning Note D	See Warning Note E	See Warning Note F
12	62,000 (60)	61,000 (63.5)	57,500 (67.5)	52,300 (70.5)	48,500 (73)	43,900 (75)						
15	53,000 (53.5)	52,200 (58.5)	50,200 (63.5)	45,400 (67)	42,000 (70)	39,500 (72)	36,500 (74)	35,000 (75.5)				
20	41,800 (42)	41,700 (49)	41,000 (55.5)	37,000 (60.5)	34,100 (64)	31,900 (67)	30,200 (69.5)	28,600 (71.5)	27,200 (74)			
25	30,600 (26)	30,000 (37.5)	30,000 (47)	29,600 (53.5)	28,400 (58)	26,500 (62)	25,000 (65)	23,600 (67)	22,400 (70)	19,500 (75.5)	16,300 (75.5)	
30		24,500 (21.5)	24,500 (37)	24,500 (46)	24,300 (52)	22,500 (56.5)	21,100 (60)	19,900 (63)	19,100 (66)	16,400 (72.5)	14,650 (74)	
35			19,120 (23.5)	19,120 (37)	19,120 (45)	19,120 (50.5)	18,100 (55)	17,000 (58.5)	16,000 (62)	14,000 (69.5)	12,870 (71.5)	9,600 (75.5)
40				14,650 (25.5)	14,650 (37)	14,650 (44)	14,650 (49.5)	14,650 (53.5)	13,800 (58)	12,100 (66.5)	11,470 (69)	7,700 (73.5)
45					11,480 (26.5)	11,480 (36.5)	11,480 (43.5)	11,480 (48.5)	11,480 (53.5)	10,500 (63.5)	10,330 (66)	6,870 (71)
50						9,200 (27.5)	9,200 (36.5)	9,200 (43)	9,200 (48.5)	9,270 (60.5)	9,390 (63)	6,220 (68.5)
55							7,330 (28.5)	7,330 (36.5)	7,330 (43.5)	8,180 (57)	8,600 (60)	5,650 (66.5)
60							5,870 (16.5)	5,870 (29)	5,870 (37.5)	7,250 (53.5)	7,920 (57)	5,110 (64)
65								4,560 (19)	4,560 (31)	6,340 (50)	6,790 (54)	4,700 (61.5)
70									3,380 (22.5)	5,280 (46)	5,660 (50.5)	4,320 (59)
75										4,380 (42)	4,700 (47)	4,000 (56.5)
80										3,620 (37)	3,680 (43)	3,690 (54)
85										2,950 (32)	3,170 (39)	3,390 (51)
90										2,370 (25.5)	2,550 (34.5)	3,090 (48)
95										1,860 (17)	2,010 (29)	2,650 (45)
100											1,520 (23.5)	2,150 (42)
105											1,020 (16)	1,700 (38.5)
110												1,290 (34.5)

A6-829-001610C & -002135A

ON OUTRIGGERS F

Radius in Feet	Main Boom Power Pinn			
	34	38	44	50
10	70,000 (63.5)	68,000 (67)	63,700 (70.5)	58,000 (73)
12	62,000 (60)	61,000 (63.5)	57,500 (67.5)	52,300 (70.5)
15	53,000 (53.5)	52,200 (58.5)	50,200 (63.5)	45,400 (67)
20	41,800 (42)	41,700 (49)	41,000 (55.5)	37,000 (60.5)
25	30,600 (26)	30,000 (37.5)	30,000 (47)	29,600 (53.5)
30		24,500 (21.5)	24,500 (37)	24,500 (46)
35			21,200 (23.5)	21,200 (37)
40				17,350 (25.5)
45				
50				
55				
60				
65				
70				
75				
80				
85				
90				
95				
100				
105				
110				
115				
120				
125				

ON RUBBER CAPACITIES

Radius in Feet	Stationary Capacity Boom Centered Over Front	Stationary Capacity Defined Arc (1) Over Front	2.5 MPH Capacity Boom Centered (2) Over Front	Stationary Capacity 360° Arc
10	57,610 (a)	44,800 (a)	36,210 (a)	36,000 (a)
12	50,450 (a)	39,130 (a)	31,420 (a)	25,300 (b)
15	42,260 (a)	31,250 (a)	25,950 (a)	20,500 (c)
20	29,250 (b)	25,000 (b)	19,650 (b)	11,500 (c)
25	19,180 (c)	19,180 (c)	15,270 (c)	7,810 (c)
30	13,720 (c)	13,720 (c)	12,190 (c)	5,000 (c)
35	10,070 (c)	10,070 (c)	9,680 (c)	3,140 (c)
40	7,310 (c)	7,310 (c)	6,920 (c)	1,600 (c)
45	5,590 (c)	5,590 (c)	5,110 (c)	

A6-829-001622A

Maximum Permissible Boom Length:
(a) 33 ft.
(b) 44 ft.
(c) 56 ft.

Notes f:

(1) Defined Arc - Left front
(2) Mechanical swing lock p
Chart based on 21.00x25-24
70 PSI/65 PSI/50 PSI cold
lower inflation pressures.
Capacities appearing above
and tipping should not be re
Capacities do not exceed 8
accordance with SAE J-765.
Capacities are applicable wit
32 ft. boom extension and e
rubber lifts.

9513339.0493

ft. - 136 ft. BOOM

r CLASS 10-147

(POWER PINNED)

GROVE®

FULL HYDRAULIC

SELF-PROPELLED CRANE

.IFTING CAPACITIES IN POUNDS

ON OUTRIGGERS FULLY EXTENDED - OVER FRONT

Boom Ext. & Main 112	32' Boom Ext. & 104' Boom 136
See Warning Note E	See Warning Note F
6,300 (75.5)	
4,650 (74)	
2,870 (71.5)	9,600 (75.5)
1,470 (69)	7,700 (73.5)
0,330 (66)	6,870 (71)
9,[illegible] (67)	[illegible] (68.5)
8,[illegible] (60)	[illegible] (66.5)
7,920 (57)	5,110 (64)
6,790 (54)	4,700 (61.5)
5,660 (50.5)	4,320 (59)
4,700 (47)	4,000 (56.5)
3,880 (43)	3,690 (54)
3,170 (39)	3,390 (51)
2,550 (34.5)	3,090 (48)
2,010 (29)	2,650 (45)
1,520 (23.5)	2,150 (42)
1,020 (16)	1,700 (38.5)
	1,290 (34.5)

0C & -002135A

Radius in Feet	Main Boom Length in Feet Power Pinned Fly Retracted									Power Pin. Fly & 81' Main	32' Boom Ext. & 81' Main	32' Boom Ext. & 104' Boom
	34	38	44	50	56	62	68	74	81	104	112	136
10	70,000 (63.5)	68,000 (67)	63,700 (70.5)	58,000 (73)	48,500 (75)					See Warning Note D	See Warning Note E	See Warning Note F
12	62,000 (60)	61,000 (63.5)	57,500 (67.5)	52,300 (70.5)	48,500 (73)	43,900 (75)						
15	53,000 (53.5)	52,200 (58.5)	50,200 (63.5)	45,400 (67)	42,000 (70)	39,500 (72)	36,500 (74)	35,000 (75.5)				
20	41,800 (42)	41,700 (49)	41,000 (55.5)	37,000 (60.5)	34,100 (64)	31,900 (67)	30,200 (69.5)	28,600 (71.5)	27,200 (74)			
25	30,600 (26)	30,000 (37.5)	30,000 (47)	29,600 (53.5)	28,400 (58)	26,500 (62)	25,000 (65)	23,600 (67)	22,400 (70)	19,500 (75.5)	16,300 (75.5)	
30		24,500 (21.5)	24,500 (37)	24,500 (46)	24,300 (52)	22,500 (56.5)	21,100 (60)	19,900 (63)	19,100 (66)	16,400 (72.5)	14,650 (74)	
35			21,200 (23.5)	21,200 (37)	21,000 (45)	19,400 (50.5)	18,100 (55)	17,000 (58.5)	16,000 (62)	14,000 (69.5)	12,870 (71.5)	9,600 (75.5)
40				17,350 (25.5)	17,350 (37)	17,000 (44)	15,800 (49.5)	14,800 (53.5)	13,800 (58)	12,100 (66.5)	11,470 (69)	7,700 (73.5)
45					13,760 (26.5)	13,760 (36.5)	13,760 (43.5)	12,900 (48.5)	12,000 (53.5)	10,500 (63.5)	10,330 (66)	6,870 (71)
50						11,240 (27.5)	11,240 (36.5)	11,240 (43)	10,600 (48.5)	9,270 (60.5)	9,390 (63)	6,220 (68.5)
55							9,200 (28.5)	9,200 (36.5)	9,200 (43.5)	8,180 (57)	8,600 (60)	5,650 (66.5)
60							7,520 (16.5)	7,520 (29)	7,520 (37.5)	7,520 (53.5)	7,920 (57)	5,110 (64)
65								6,090 (19)	6,090 (31)	6,450 (50)	7,210 (54)	4,700 (61.5)
70									5,110 (22.5)	5,750 (46)	6,500 (50.5)	4,320 (59)
75										5,140 (42)	5,880 (47)	4,000 (56.5)
80										4,600 (37)	5,120 (43)	3,690 (54)
85										3,980 (32)	4,340 (39)	3,390 (51)
90										3,310 (25.5)	3,680 (34.5)	3,090 (48)
95										2,730 (17)	3,080 (29)	2,810 (45)
100											2,540 (23.5)	2,500 (42)
105											2,070 (16)	2,210 (38.5)
110												1,940 (34.5)
115												1,700 (30)
120												1,380 (25)
125												1,070 (18.5)

A6-829-001604C & -002135A

Notes for On Outriggers

A. Capacities do not exceed 85% o tipping as determined by test i accordance with SAE J-765.

B. Capacities appearing above the boi line are based on structural strengt and tipping should not be relied upo as a capacity limitation.

C. Do not exceed any rated load whe lifting regardless of whether it is base on structural strength or stability.

D. For boom lengths less than 104 f with power pinned fly extended, th rated loads are determined by boor angle only in the column headed b 104 ft. boom. For boom angles nc shown, use rating of next lowe boom angle.

E. For boom lengths less than 112 f with power pinned fly retracted an 32 ft. boom ext. erected, the rate loads are determined by boom angl only in the column headed by 112 f boom. For boom angles not show use rating of next lower boom angl

F. For boom lengths less than 136 f with power pinned fly extended an 32 ft. boom ext. erected, the rate loads are determined by boom ang only in the column headed by 136 f boom. For boom angles not show use rating of next lower boom angle

G. Boom angle is the included angle b tween horizontal and the axis of th boom base section after lifting rate load.

H. WARNING: For Krueger L.M. option-when using 32 ft. boom exte sion and/or power pinned fly th Krueger L.M.I. rating will apply f full boom extension (power pinne fly extended) only.

A6-829-00298

Notes for On Rubber Capacities

(1) Defined Arc - Left front track CL to right front track CL.
(2) Mechanical swing lock pin must be engaged.
Chart based on 21.00x25-24 ply/26.5x25-26 ply/29.5x25-22 ply tires and 70 PSI/65 PSI/50 PSI cold inflation pressures. Loads must be reduced for lower inflation pressures.
Capacities appearing above BOLD LINE are based on structural strength and tipping should not be relied upon as a capacity limitation.
Capacities do not exceed 85% of tipping loads as determined by test in accordance with SAE J-765.
Capacities are applicable with machine on a firm level surface only.
32 ft. boom extension and extended power pinned fly not permitted for on rubber lifts.

Maximum Permissible Boom Length:
(a) 33 ft.
(b) 44 ft.
(c) 56 ft.

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GROVE®

FULL HYDRAULIC

SELF-PROPELLED CRANE

JIB CAPACITIES IN POUNDS

24 ft. JIB and 32 ft. EXT. Combination

Main Boom Angle	Min. 5° Offset	17° Offset	Max. 30° Offset
76°	6,000	5,200	4,600
70	4,300	3,940	3,650
65	3,420	3,200	3,010
60	2,760	2,600	2,470
55	2,220	2,110	2,020

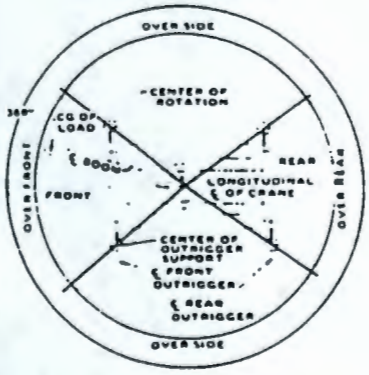
A6-829-001823E

Notes for Jib Capacities

1. 24 ft. jib and 32 ft. ext. combination may be used for single line lifting crane service only. Capacities are based on structural strength of 24 ft. jib and 32 ft. ext. combination at given main boom angle. When lifting with 24 ft. jib and 32 ft. ext., capacities must not exceed structural capacity of jib combination at given main boom angle or stability capacity of applicable boom length listed in boom capacity chart for actual working radius, whichever is less.
2. Maximum total length of boom including 32 ft. ext. for purpose of erecting 24 ft. jib below 10° is 92 ft.
3. WARNING: Operation of machine with heavier loads than the capacities listed is strictly prohibited. Machine tipping with jib occurs rapidly and without advance warning.
4. 24 FT. JIB WARNING: For total boom length including 32 ft. ext. greater than 92 ft. with 24 ft. jib in working position the boom angle must not be less than 50° since loss of stability will occur causing a tipping condition.

LIFTING AREA DIAGRAMS

ON OUTRIGGERS



NOTE BOLD LINES DETERMINE THE LIMITING POSITION OF ANY LOAD FOR OPERATION WITHIN WORKING AREAS INDICATED

NOTE OVER SIDE CAPACITIES CAN BE LIFTED IN THE OVER REAR AREA

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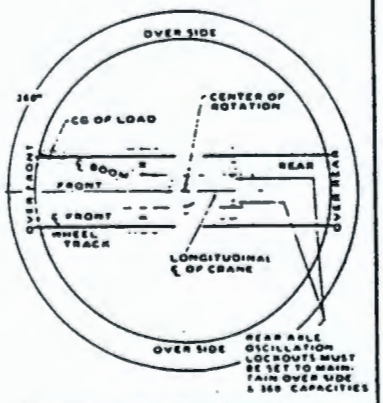
ON RUBBER



NOTE BOLD LINES DETERMINE THE LIMITING POSITION OF ANY LOAD FOR OPERATION WITHIN ANY WORKING AREAS INDICATED

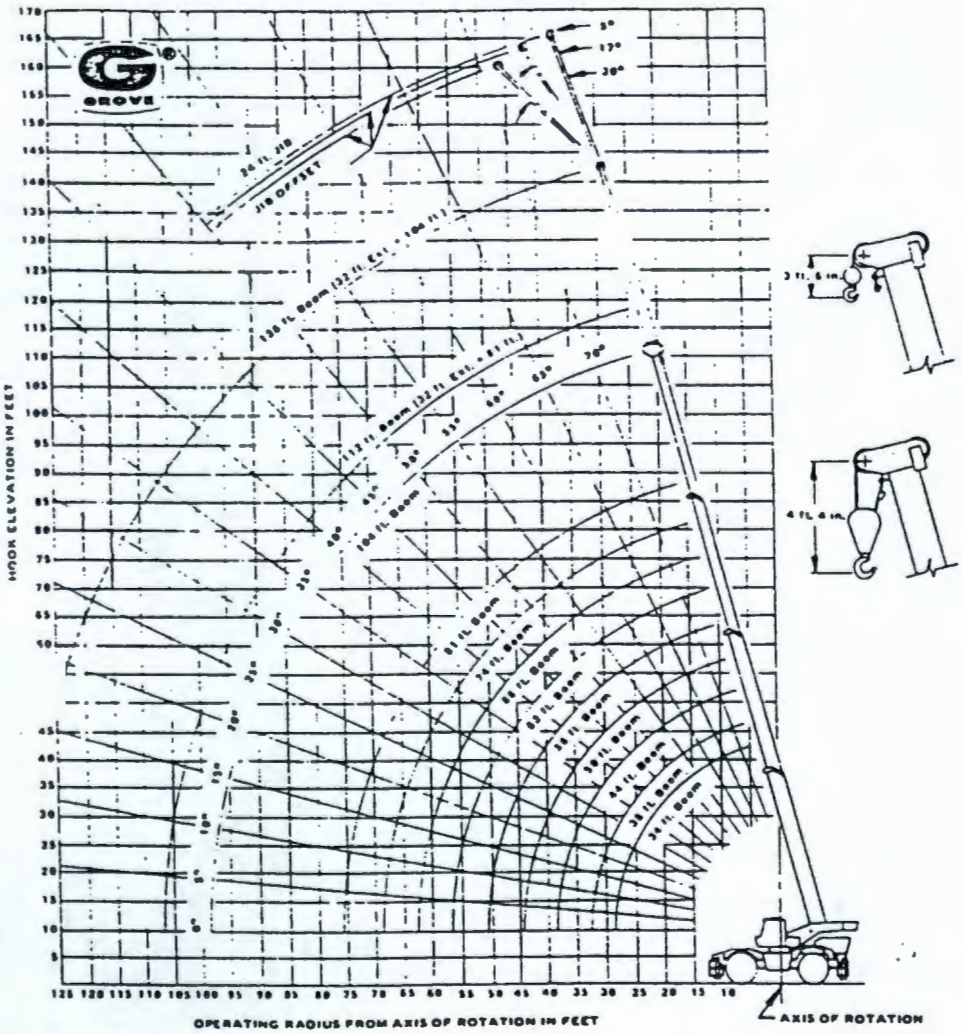
NOTE OVER SIDE CAPACITIES CAN BE LIFTED IN THE OVER REAR AREA

C6-829-001158-1

GROVE

RT65S

RANGE DIAGRAM



C6-829-002569-2

Notes for Lifting Capacities

1. Do not exceed any rated lifting capacity. Rated lifting capacities are based on freely suspended loads with the machine leveled and standing on a firm supporting surface. Ratings with outriggers are based on outriggers being extended to their maximum position and tires raised free of crane weight before extending the boom or lifting loads.
2. Practical working loads for each particular job shall be established by the user depending on operating condition to include: the supporting surface, wind and other factors affecting stability, hazardous surroundings, experience of personnel, handling of load, etc. No attempt must be made to move a load horizontally on the ground in any direction.
3. Operating radius is the horizontal distance from the axis of rotation before loading to the centerline of the vertical hoist line or tackle with loads applied.
4. "On Rubber" lifting (if permitted) depends on proper tire inflation, capacity and condition. "On Rubber" loads may be transported at a maximum vehicle speed of 2.5 mi/hr (4 Km/hr) on a firm and level surface under conditions specified.
5. Jibs may be used for lifting crane service only. Jib capacities are based on structural strength of jib or main boom and on main boom angle.
6. Operation is not intended or approved for any conditions outside of those shown hereon. Handling of personnel from the boom is not authorized except with equipment furnished and installed by Grove Manufacturing Company.
7. For clamshell or concrete bucket operation, weight of bucket and load must not exceed 80% of rated lifting capacities.
8. Power-telescoping boom sections must be extended equally at all times. Long cantilever booms can create a tipping condition when in extended and lowered position.
9. The maximum load which may be telescoped is limited by hydraulic pressure, boom angle, boom lubrication, etc. It is safe to attempt to telescope any load within the limits of rated lifting capacity chart.
10. With certain boom and hoist tackle combinations, maximum capacities may not be obtainable with standard cable lengths.
11. With certain boom and load combinations, raising of load with boom lift cylinders may not be possible. Operational safety is not affected by this condition.
12. Keep load handling devices a minimum of 12 inches (30 cm) below boom head when lowering or extending boom.
13. If actual boom length and/or radius is between values listed, use lifting capacity for the next longer rated length and/or radius.
14. All load handling devices and boom attachments are considered part of the load and suitable allowances must be made for their combined weights.
15. Operation of this equipment in excess of rating charts or disregard of the instructions is hazardous and voids the warranty and manufacturer's liability.

WEIGHT REDUCTIONS FOR LOAD HANDLING DEVICES

32 ft HOOM EXTENSION	
†STOWED -	346 lbs.
†ERECTED -	2,630 lbs.
24 ft. JIB & 32 ft. EXT. COMB.	
†ERECTED -	6,000 lbs.
††ERECTED -	950 lbs.

†Reduction of main boom capacities.
††Reduction of 32 ft. Ext. capacities

HOOK BLOCK	
40 Ton, 3 Sheave	640 lbs.
15 Ton, 1 Sheave	310 lbs.
Auxiliary Boom Head (15 in.)	190 lbs.
Auxiliary Boom Head (18 in.)	220 lbs.
5 Ton, Headache Ball	150 lbs.
7½ Ton, Headache Ball	300 lbs.
10 Ton, Headache Ball	500 lbs.

NOTE: All Load Handling Devices and Boom Attachments are Considered Part of the Load and Suitable Allowances MUST BE MADE for Their Combined Weight.
Weights are for Grove furnished equipment.

GROVE

GROVE MANUFACTURING
KIDOE

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GROVE

SPECIFICATIONS

ENGINE SPECIFICATIONS

MAKE & MODEL	Detroit Diesel 6V-53N	*Cummins Diesel V555-C200	Caterpillar 3160 Diesel
TYPE	6 Cylinder O.H.V.	8 Cylinder O.H.V.	8 Cylinder O.H.V.
BORE & STROKE	3.875 in. x 4.50 in. (98mm x 114mm)	4.625 in. x 4.125 in. (117mm x 105mm)	4.5 in. x 5.0 in. (114mm x 127mm)
DISPLACEMENT	318 cu.in. (5212cm³)	555 cu.in. (9096cm³)	636 cu.in. (10424cm³)
HORSEPOWER (NET)	173 @ 2500 RPM	176 @ 2600 RPM	174 @ 2600 RPM
GOVERNED RPM	2500	2600	2600
TORQUE (NET)	396 lbs. ft. @ 1500 RPM	391 lbs. ft. @ 1800 RPM	449 lbs. ft. @ 1290 RPM
ELECTRICAL SYSTEM	12-Volt, Negative Ground	12-Volt, Negative Ground	12-Volt, Negative Ground
COMBUSTION SYSTEM	2 Cycle with blower	4 Cycle, Naturally Aspirated	4 Cycle, Naturally Aspirated
COOLING SYSTEM	Liquid	Liquid	Liquid
FUEL CAPACITY	60 Gallon (227 Liters)	60 Gallon (227 Liters)	60 Gallon (227 Liters)
ALTERNATOR	60 Amp, 12-volt	55 Amp, 12-volt	55 Amp, 12-volt
BATTERY	(2) 204 A.H., 12-volt	(2) 204 A.H., 12-volt	(2) 204 A.H., 12-volt
AIR CLEANER	Dry Type	Dry Type	Dry Type
AIR COMPRESSOR	7.25 CFM	13.2 CFM	12 CFM
HOURMETER	Yes	Yes	Yes

*Denotes Optional Equipment

SPEED AND GRADEABILITY

Forward Drive	Transmission Range	Gear Shift	Maximum Speed MPH	Maximum Speed KMH	Gradeability @ Stall (%)	Tractive Effort At Stall LBS.	Tractive Effort At Stall KGS.
4 Wheel Drive	Low	1st	2.1	3	72.8	45,033	20,426.9
4 Wheel Drive	Low	2nd	3.9	6	32.1	23,791	10,791.6
4 Wheel Drive	Low	3rd	10.0	16	9.9	8,706	3,949.0
2 Wheel Drive	High	1st	4.8	8	24.7	18,907	8,576.2
2 Wheel Drive	High	2nd	8.8	14	11.8	10,003	4,537.4
2 Wheel Drive	High	3rd	21.8	35	2.9	3,658	1,659.3

NOTE: All performance data is based on standard machine and may vary plus or minus 10% due to variations in engine performance.

WORKING WEIGHTS

Standard Machine With	Total Weight (lbs.)	Axle Weight Distribution Front	Axle Weight Distribution Rear
32-12 Boom (10.06m - 34.14m)	66,240 (30,504.6kgs)	33,178 (15,503.1kgs)	33,072 (15,001.4kgs)
34-136 Boom (10.36m - 41.45m)	68,230 (31,428.3kgs)	37,697 (17,099.5kgs)	31,533 (14,330.5kgs)

DIMENSIONS

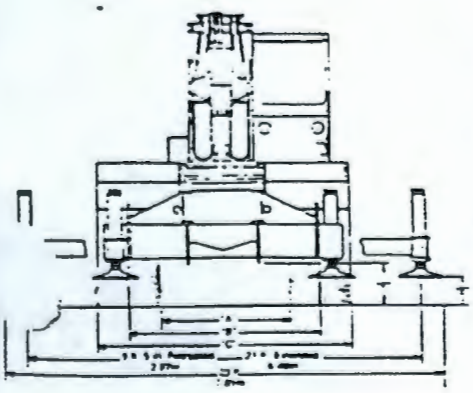
TIRE SIZE	A	B	C	D	E	F
21.00 x 25	70 in. (1.78m)	96½ in. (2.45m)	10 ft. 3 in. (3.12m)	31 in. (787mm)	12 in. (305mm)	19 in. (483mm)
26.5 x 25	67 in. (1.70m)	97¼ in. (2.48m)	10 ft. 6 in. (3.25m)	31 in. (787mm)	12¼ in. (311mm)	19 in. (483mm)
29.5 x 25	66 in. (1.68m)	98½ in. (2.50m)	10 ft. 11 in. (3.33m)	33 in. (838mm)	14¼ in. (362mm)	21 in. (533mm)

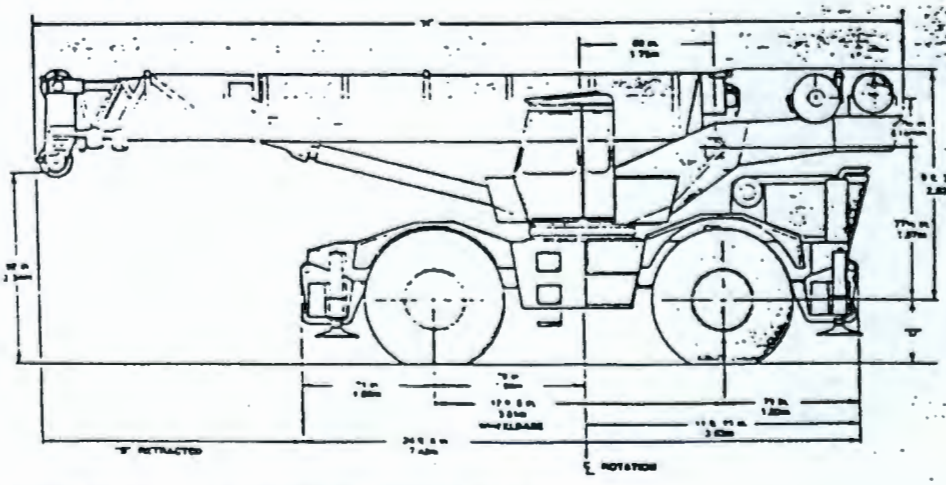
FENDER WIDTH – 10 ft. 11 in. (3.33m)

BOOM LENGTH	G	H
*33 ft. - 80 ft. (10.06m - 24.38m)	15 ft. 6 in. (4.72m)	41 ft. 2 in. (12.55m)
*34 ft. - 104 ft. (10.36m - 31.70m)	16 ft. 5 in. (5.03m)	42 ft. 2 in. (12.85m)

*32 foot (9.75m) extension stowed

TAIL SWING – 13 ft. 6 in. (4.11m)
TURNING RADIUS – 23 ft. 4 in. (7.11m)
OVERALL HEIGHT WITH STANDARD TIRES 11 ft. 10 in. (3.61m)





Constant improvement and engineering progress make it necessary that we reserve the right to make specification, equipment, and price changes without notice.

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GROVE

SPECIFICATIONS

BOOM — 33 ft. – 112 ft. (10.06m x 34.14m). 4 section boom; 2 full power trapezoidal sections to 80 ft. (24.38m) with integral check valves on each telescoping cylinder and a 32 ft. (9.75m) "SwingAway" lattice boom extension.

*34 ft. – 136 ft. (10.36m x 41.45m). 5 section boom; 2 full power and 1 power pinned trapezoidal sections to 104 ft. (31.70m) with integral check valves on each telescoping cylinder and a 32 ft. (9.75m) "SwingAway" lattice boom extension. Boom telescope sections are individually controlled. Each boom section is supported on graphite impregnated nylatron wear pads.

BOOM NOSE — Three sheaves mounted on heavy duty tapered roller bearings. Removable pin type rope guards allow easy reeving. Rope dead ends on each side of the boom nose.

BOOM ELEVATION — Dual double-acting hydraulic cylinders with integral holding valves, elevation from –4° to 76°. Control lever and foot pedal provided for hand or foot operation.

SWING — Ball bearing swing circle. 360° continuous rotation. Grove Planetary Gear Box with automatic disc swing brake, hand operated positive (Plunger type) turntable lock. Swing speed 2.6 RPM.

CAB — Turntable-mounted on vibration and sound-absorbing rubber grommets, full vision, all steel, fully enclosed, laminated safety glass windows throughout, removable windshield with storage provision, hinged skylight, sliding left side door, sliding right side and rear vent windows. Full length control levers, fully adjustable operator's seat. Full engine instruments and controls. Combination hand and foot throttle. All crane superstructure and outrigger controls, sight leveling bubble, boom angle indicator, propane heater, forced hot air defroster, electric windshield wiper, dome light, dash light, air horn, front cab mounted work lights, door and window locks, 2¾ lb. (1.25 kg.) dry type fire extinguisher.

CAB INSTRUMENTATION — Engine oil pressure gage, engine water temperature gage, voltmeter, electric fuel gage, electric tachometer, air pressure gage, transmission and torque converter oil temperature gage.

OUTRIGGERS — Hydraulic double-box integral with main frame; telescoping beams, vertical jacks with integral check valves and mechanical spin locks on each vertical jack to secure outrigger jacks at any level. Beams extend to 21 ft. 0 in. (6.40m) centerline to centerline, retract to 9 ft. 5 in. (2.87m). Independent or simultaneous control in-out-up-and-down. Outrigger controls in operator's cab. Sequence control arrangement eliminates accidental actuation. 24 in. dia. (610mm) aluminum floats with storage racks.

MAIN FRAME — All welded construction with full depth longitudinals braced by cross-members. Frame reinforced at critical points to insure a rigid turntable mounting. Front and rear lifting, towing, and tie down lugs are integral with the main frame.

TRANSMISSION AND TORQUE CONVERTER — Engine mounted converter, 1.82:1 stall ratio with PTO for hydraulic pumps. Remote mounted full powershift transmission with rear axle disconnect.

SPEEDS — 6 forward and 6 reverse.

TURNING RADIUS — 23 ft. 4 in. (7.11m)

AXLES — Front: Planetary drive with dual steering cylinders mounted rigid to frame.

Rear: Planetary drive with dual steering cylinders mounted to allow 0 in. to 10 in. (254mm) oscillation.

OSCILLATION LOCKOUTS — Automatic hydraulic on rear axle. Allows oscillation only with boom over front.

SERVICE BRAKES — Full air on all four wheels. Size: 20 in. x 5 in. (508mm x 127mm) with 36 sq. in. (232cm²) chambers.

PARKING BRAKES — Front axle equipped with "fail safe" spring set emergency and parking brakes.

STEERING — Front: Power assist hydraulic control.

Rear: Full hydraulic, tiller bar control. Independent front and rear steer control allows maximum "On the Move" maneuverability.

TIRES — 21.00 x 25 – 24 ply earth-mover type, tubeless.

*26.5 x 25 – 26 ply wide base, earth-mover type, tubeless.

*29.5 x 25 – 22 ply wide base, earth-mover type, tubeless.

HYDRAULIC SYSTEM:

RESERVOIR — 133 gallon (503 liter) capacity, all steel welded construction with integral baffles, clean-out access and exterior oil sight level.

FILTER — Full flow return line replaceable cartridge with by-pass protection and filter by-pass indicator.

PUMPS — 4 main gear pumps, 146 GPM capacity, (553 LPM). Power steering pump 18.7 GPM capacity (71 LPM). Pump disconnect lever operated from carrier deck.

CONTROL VALVES — Precision four-way double-acting with integral load check, main and circuit relief valves. Four individual valve banks permitting simultaneous independent control of four crane functions. Maximum operation pressure 2500 PSI (175.8 kgs/cm²).

OIL COOLER — Full flow, fin and tube, oil to air.

POWER DISTRIBUTION — (Main hoist, auxiliary hoist): (Boom elevation, mid telescope, main hoist boost) Fly telescope, outriggers, rear steer, lift boost) (Swing).

MISCELLANEOUS STANDARD EQUIPMENT — Complete light package, tool box and storagewell, fenders, hook-block tie down, ether injection cold starting aid, chassis mounted rear view mirror.

*Denotes optional equipment

HOIST SPECIFICATIONS

DESCRIPTION: Series parallel circuitry and two motors provide both high line pull and speed ranges. Power up and down, equal speed, planetary reduction with integral automatic brake.		DESCRIPTION: Power up and down, equal speed, planetary reduction with integral automatic brake.	
HOIST DATA	MAIN HOIST Grove Model 32S-1716A	*AUXILIARY HOIST Grove Model 15S-16	*AUXILIARY HOIST (FREE FALL) Model 40 SGECR
Drum Dimensions (cm)	16 in. dia. (406mm) 16 in. length (406mm) 24 in. dia. flange (610mm)	12 in. dia. (305mm) 16 in. length (406mm) 17.5 in. dia. flange (445mm)	9 in. dia. (229mm) 13 in. length (330mm) 17.5 in. dia. flange (445mm)
Performance: Max. Single Line Speed (mpm) Max. Single Line Pull (kgs)	Hi-Speed Range / Lo-Speed Range 525 FPM (160.02m/min) / 265 FPM (80.77m/min) 8 400 lbs. (3810.2kgs) / 16 800 lbs. (7620.5kgs)	255 FPM (77.72m/min) 8 880 lbs. (4027.5kgs)	290 FPM (88.39m/min) 9 145 lbs. (4148.2kgs)
[illegible]	[illegible] ft. of ½ in. dia. rope (152.12m of 13mm)	[illegible] [illegible] ft. of ½ in. dia. rope (146.30m of 13mm)	[illegible] ft. of ½ in. dia. rope (235.74m of 13mm)
Permissible Single Line Rope Pull (kgs)	½ in. (13mm) 6x41 class - 14 605 lbs. (6624.8kgs) ½ in. (13mm) 19x7 class - 13,700 lbs. (6214.3kgs)	½ in. (13mm) 19x7 class - 6,150 lbs. (2789.6kgs) ½ in. (13mm) 6x37 class - 7 200 lbs. (3265.9kgs) ½ in. (13mm) 19x7 or 6x41 class - 7,650 lbs. (3469.5kgs)	½ in. (13mm) 19x7 class - 6,150 lbs. (2789.6kgs) ½ in. (13mm) 6x37 class - 7,200 lbs. (3265.9kgs)

*Denotes Optional Equipment

▲ 6th layer of rope not recommended for hoisting operations

The name Grove and the Trapezoidal shape are registered trademarks of Grove Manufacturing Co.

9513339.0498

STOP !
READ THIS . . .

FOREWORD

This manual contains information related to operational characteristics, servicing, maintenance and adjustments of components incorporated on current production models of the RT65S and RT75S model cranes.

Before placing your Grove crane into service, carefully read all sections of this manual. Keep in mind that safe and proper operation of your machine depends upon your knowledge of the standard heavy equipment safety rules and servicing and maintenance procedures contained herein.

Grove cranes are designed and engineered to provide maximum safety and performance with routine service and maintenance. By following the recommended procedures in this manual, your Grove crane will provide dependable service.

Because of the many variations of optional equipment and continued design improvement, certain detailed information may not always apply. Always check identity of equipment before proceeding with service and maintenance.

PAUL PARISH CONSULTANT
1306 SOUTH VANCOUVER STREET, KENNEWICK, WASHINGTON 99337-3355
CRANE - RIGGING - WATER FRONT OPERATIONS - INSPECTION - CERTIFICATION
509-582-9303 - 509-586-0411

CERTIFICATE OF UNIT TEST AND/OR EXAMINATION OF CRANE, DERRICK OR OTHER MATERIAL HANDLING DEVICE

RTIFICATE NO: 473-11-28-95 OWNERS ID NO: 224

1. OWNER: NEIL F. LAMPSON, INC.

2. OWNERS ADDRESS: POB 6510, KENNEWICK, WA 99336

3. DEVICE (CHECK),CRANE: X DERRICK: OTHER:
   LOCATION: (a)REMAINS AT WORKSITE: (b)CHANGES WORKSITE: X
   (c)BARGE: IF (b) OR (c) EXPLAINE: RENTAL EQUIPMENT

4. DESCRIPTION: ROUGH TERRAIN HYDRAULIC CRANE

5. MANUFACTURER: GROVE SERIAL NO: 30402

6. MAXIMUM RATED CAPACITY: 35 TON MODEL NO: RT65S

7 "ERVICE STATUS, LIFTING: X OTHER: NA

8. BOOM, LENGTH: 81'MAIN 32'JIB TYPE: STRUCTURAL BOX/LATTICE JIB

9. TEST LOADS APPLIED:

RADIUS	PROOF LOAD	RATED LOAD	OUTRIGGERS (yes,no)	BOOM DIRECTION (side,rear,360)
NA				

   DESCRIPTION OF PROOF LOAD: NA

10. BASIS FOR ASSIGNED LOAD RATINGS: MANUFACTURER/OWNER

11. REMARKS AND/OR LIMITATIONS IMPOSED: NONE, PERIODIC INSPECTION AND OPERATIONAL TEST.

12. I CERTIFY THAT ON 11/28/94 THE ABOVE DEVICE WAS EXAMINED AND OR TESTED BY THE UNDERSIGNED OR HIS AUTHORIZED REPRESENTATIVE WHO, IN HIS OPINION, SAID THE UNIT MET THE REQUIREMENTS OF: ANSI B30.5

NAME OF AUTHORIZED PERSON: PAUL PARISH

SIGNATORY AUTHORITY: Paul Parish DATE: 11/28/94

Accredited by the State of Washington
Department of Labor & Industries, Certificate #105

PAUL PARISH CONSULTANT
1306 SOUTH VANCOUVER STREET, KENNEWICK, WASHINGTON 99337-3355
CRANE - RIGGING - WATER FRONT OPERATIONS - INSPECTION - CERTIFICATION
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   LOCATION: (a)REMAINS AT WORKSITE: (b)CHANGES WORKSITE: X
   (c)BARGE: IF (b) OR (c) EXPLAINE: RENTAL EQUIPMENT

4. DESCRIPTION: ROUGH TERRAIN HYDRAULIC CRANE

5. MANUFACTURER: GROVE SERIAL NO: 30402

6. MAXIMUM RATED CAPACITY: 35 TON MODEL NO: RT65S

7 ERVICE STATUS, LIFTING: X OTHER: NA

8. BOOM, LENGTH: 81'MAIN 32'JIB TYPE: STRUCTURAL BOX/LATTICE JIB

9. TEST LOADS APPLIED:

RADIUS	PROOF LOAD	RATED LOAD	OUTRIGGERS (yes,no)	BOOM DIRECTION (side,rear,360)
NA				

DESCRIPTION OF PROOF LOAD: NA

0. BASIS FOR ASSIGNED LOAD RATINGS: MANUFACTURER/OWNER

1. REMARKS AND/OR LIMITATIONS IMPOSED: NONE, PERIODIC INSPECTION AND OPERATIONAL TEST.

2. I CERTIFY THAT ON 11/28/94 THE ABOVE DEVICE WAS EXAMINED AND OR TESTED BY THE UNDERSIGNED OR HIS AUTHORIZED REPRESENTATIVE WHO, IN HIS OPINION, SAID THE UNIT MET THE REQUIREMENTS OF: ANSI B30.5

ME OF AUTHORIZED PERSON: PAUL PARISH

SIGNATORY AUTHORITY: Paul Parish DATE: 11/28/94

Accredited by the State of Washington
Department of Labor & Industries, Certificate #105

CERTIFICATION of INSPECTION

Cert No. 472 Date of Insp. 11-28-94

Unit No. 428 Manuf. MANITOWOC

Model 3900 B S/N 39561

Eq. Type/Struct. CRANE Capacity 100 TON

INSPECTION CLASSIFICATION

ANSI B30.5

PAUL PARISH, Consultant

CRANE • RIGGING • INSPECTION • CERTIFICATION
LONGSHORE & WATERFRONT OPERATIONS

(509) 582 - 9303

1306 SOUTH VANCOUVER

KENNEWICK, WASHINGTON 99337

CERTIFICATION of INSPECTION

Cert No. 473 Date of Insp. 11-28-94

Unit No. 224 Manuf. GROVE

Model RT 655 S/N 30402

Eq. Type/Struct. CRANE Capacity 35 TON

INSPECTION CLASSIFICATION

ANSI B30.5

PAUL PARISH, Consultant

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LONGSHORE & WATERFRONT OPERATIONS

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1306 SOUTH VANCOUVER

KENNEWICK, WASHINGTON 99337

95 3339 0501

9513339.0502

Attachment 4
Driving Logs and Miscellaneous
Submittals for the Test Pile Program

SHEET PILE WALL INSTALLATION REPORT (CQAP)						
Location Station:				To Station:		
Date:				Weather:		Temp.:
Inspector:				Installer:		
Sheet Pile Number:						
Visual:	(checked and acceptable)					
a. Surface Condition						
b. Length (supplied)						
c. Linearity (acceptable)						
d. Interlocks (acceptable)						
e. End cut offs (acceptable)						
f. Check sheet thickness (1/2")						
Installation Data:						
a Measure inclination %						
	perpendicular					
	parallel to barrier plane					
b. Pile driver type						
	model					
c. Time Start						
d. Complete driving						
e. Final Penetration (ft.)						
f. Operation remarks						
g. Driving Record						
	Time in seconds (vibratory)					
	Blows (impact)					
	0'-5'					
	5'-10'					
	10'-15'					
	15'-20'					
	20'-25'					
	25'-30'					
	30'-35'					
	35'-40'					
	40'-45'					
	45'-50'					

9513339.0504

FLETCHER GENERAL CONSTRUCTION
FLETCHER GENERAL, INC.
TACOMA BRANCH
P.O. BOX 1684 • TACOMA, WA 98401
(206) 572-7432 • FAX (206) 627-4904

November 30, 1994

RCI Environmental, Inc.
PO Box 6090
Kent, Washington 98064

Attention: Roger Brown

RE: SHEET PILE BARRIER N-SPRINGS -- EQUIPMENT LIST

Dear Roger,

We will be using the following pieces of large equipment on the above mentioned project. All this equipment complies with and meets all requirements of WISHA and OSHA standards.

1. Manitowoc 3900 -- 100 Ton Crawler Crane.
2. Grove RT65S -- 35 Ton Rough Terrain Hydro-Crane.
3. APE Model 200 Vibratory Pile Driving Hammer.
4. APE Model 400 Vibratory Pile Driving Hammer.
5. Birminghammer B-3505 Direct Drive Diesel Hammer.
5. 1991 Chevrolet Pickup.

Please call me if you have any questions.

Sincerely,

FLETCHER GENERAL CONSTRUCTION

Richard W. Lien
Superintendent