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a. CORE DRILLING: Show all time actually spent in drilling activity except time spent handling rods and changing bit.
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- d. Casing: Show time spent placing or pulling casing. List size of casing and total footage involved in box located in upper right corner.
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Contract: III OV The III Date: 100 Drill I Add a Child	101	1	L REPORT
Contract: <u>BUdgeU, G</u> . Date: <u>9</u> <u>3</u> 19 <u>85</u> Drill <u>34 Akiddridl</u> MONTH DAY Location: Jerome, Ariz Foreman's Signature: Jack & Haypip	DRILL NO.	TF	RUCK NO.
Footage Summary	Feet	Tot	tal Casing
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From To From To Reamed	d covered	Size	Footage
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Core Drilling Product Handling Rod (change bit) Description Size Name			of Units
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Rock Bit - Overburden Other (Describe)	Constant and the second		
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Casing – Placing	torna elanoito	194 194 -19	-
- Pulling	10-C2 (21.5 10.60	00 8 .0	
	ane ane an	111 PD	100
Cementing - Handling Rods OTHER	units and the	i ure	and the second second
- Prep Hole & Grout Water hauling miles	loa	ads	
- Setting Core boxes: A size/ H	a no).	
- Drilling Length of waterline:	110	1,1,1,1,1,10	
Rigging Up - Rigging Down	Aunipolis	16-64-01	
	up Butterpige	Hz 10	
Condition Hole, Lost Circulation Serial no Lost bits: Size Serial no Surveying, Inclination Test Terration ft Hole #			
Surveying, Inclination Test Depth:ft. Hole # Mobilization/Demobilization Casing lost or left in hole: Size			
dasing lost of left in hole. Dize			
Other (Explain) for Client Hole # VORKING ON AIR BOMP: 3 Longco Hole #	(minter a)	entre Lan	
Bit changes: Size Serial #	Depth		
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Contract: <u>Budge 4</u> . Location: Jerome, Ar	<u>; Z</u> Fo	preman's Sign	ature:	Joch R	Hay	lip	DH		18	
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INSTRUCTIONS

SWILL MATCHER

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INSTRUCTIONS

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Flortkic (3) Cementing - Handling Rods OTHER	
Cementing - Handling Rods OTHER	
Prop Hole & Grout	
- Prep Hole & Grout Water hauling miles loads	
- Setting Core boxes: size/ no.	
- Drilling Length of waterline:	
Moving - Hole to Hole Lost tools: Description	
Rigging Up- Rigging Down	
Condition Hole, Lost Circulation Lost bits: Size Serial no	
Surveying, Inclination Test Depth: ft. Hole #	
Mobilization/Demobilization Casing lost or left in hole: Size ft	
Other (Explain) Mai ut 2 for Client Hole #	
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Bit changes: Size Serial # Depth	
(Include	
first bit	
Total Hours 53 in hole)	
Driller's Initials 725	-
Shift DRILLERS Hrs. HELPERS Hrs. TRUCK DRIVERS	Hrs
B	+
C Remarks: Help String Cleithic Cable - Worked on Set up	<u> </u>
Remarks: Help String Cleithic Cable - Worked on set up	
Chriked equip 1 Man 11	
HAC	

Contrac Locatio	n: <i>Irrom</i>	e #	+ 2 Ariz	Da <i>ی NGL</i> Fo	nte: m prema	<u>9</u> -	DAY Daturer	19 25 Drit	hivel	7 <u>37</u> TYPE		06 IILL NO.		CK NO.
Shift	Hole No.	Angle	Mate	erial Drilled		it Size Type	and the second division of the second divisio	Footage S Footage S	Rea	ming	Fe Drilled or	et Core Re-	in I	Casing Hole
							From	То	From	То	Reamed	covered	Size	Footag
Day	Ruli	110				NUL	0	5			10	5		
A	901-1	<u>///</u>			- pu	such	13	10				<u> </u>		
Aft B	1 1 1										-			
Nite												-		
Nite C														
ł	- Hourly Distril	bution		Day	Af	t.	Nite			Supp	lies Consume	ed		
Core Di		-		2							Product	Day	Aft.	Nite
	lling Rod (cha		it)					Descriptio	n S	ize	Name	Nu	mber of	Units
	rden - rock bi	the second s						Portland						
	ng Hole - Dia.	bit						Lumnite				_		
	Drilling	,						Calseal Mud	50	<u>u </u>		-		
Hand	lling Rod (bit)						Mud	100;	S		-		+
Bock	Bit - Overbu	rden										-		+
Reamin		ruen	.)					FARAN	ind 1	INN	RAN			+
	- Placing									A CONTRACTOR				
	- Pulling											-		1
Delays -	Client Acct.	1 a S 1	19			111.00	5.14	11.00	1 N.2 E.	21.0				
Fle	ctric			(4)										
Cement	ting - Handlin	the second s	the second s			4	×.				OTHER			
	- Prep Ho	le & G	irout					the second		n	niles	loa	ds	
	- Setting							Core boxe		S	ize/	no.		
	- Drilling							Length of	waterline	:				
	- Hole to Ho			(2)				Lost tools:	Descripti	on				
Mix Mu		Down	1											
	ion Hole, Los	t Circu	lation					Lost bits:	Size	9	Serial no			
Name of Concession, Name of Concession, Name of Street, or other Distances, Name of Street, Name o	ing, Inclinatio										Hole #			
	ation/Demob										ze			
Other (Explain) The	quel	·	5										
								Lor	igco	Hol	e # e #			
								Bit change	es: S	lize	Serial #	Depth		
	·····							(Include	NQ	<u>RS 9</u>	0693	3		
		Total	Hours	B	1			first bit in hole)	M	WLL	90383	3		
		ller's l		The										
Shift		DRIL	LERS		Hrs.		HE	LPERS		Hrs.	TRU	CK DRIVE	RS	Hrs
A	T.Fis	her	2	nty ngaara	10	J.C.	Rase	Nberg		8				
В	J.L. S.	hRu	pede	e l	8									
С						1								

Contra	. Buda		#Z	· .)ata.	Minne 9-	General apolis, Min	nnesota 554	14 」 <i>人</i> 加	27	100	"DAILY		
Contrac	et: <u>Budge</u> on: <u>Trave</u>	<u> </u>	1.	L	M	ONTH	DAY		· · · ·	TYPE	DF	RILL NO.	TRU	JCK NO.
Locatio	on: <u>HRUm</u>	Pr	HRIZ	Onthe F	orema	n's Sign	ature:	tryfly	loid					
		1	1				$\overline{\mathcal{A}}$	Enotana	Summary		E	eet	Total	I Casing
Shift	Hole No.	Angle	Mate	rial Drilled		it Size	D	rilling	the second se	ming		Core Re-		Hole
Shirt	HOLE NO.	An	IVIALE		8	а Туре	From	То	From	То	Reamed		Size	Footag
Day A	901-1	110			N	JWL	10	95			<i>d:5</i>	£5°		
Aft B	tera na se	а. С.												
Nite C			A. 1											
Core D	Hourly Distril	outio	n	Day	Af	τ.	Nite			Supp	lies Consum Product	ed Day	Aft.	Nite
	dling Rod (cha	anna	ni+)	0				Descriptio		ze	Name	and the second se	umber of	and the second se
	rden - rock bi		51()		+			Portland			INGILIE	140		
	ng Hole - Dia.				1			Lumnite				-	1	
	Drilling				1			Calseal				-		
	ling Rod (bit)						Mud	50#	<u>. </u>		_		1
								Mud	100#	•				
Rock	k Bit - Overbu	rden						Other (De						
Reamin	the second se	5)					EZ M	ud i	get 1	BCRUid	/		
	— Placing											_		
	– Pulling											_		
Delays	- Client Acct.	-									м.			
		·									0.000	_ L		
Cemen	ting - Handlin		and the second design of the s		+				P		OTHER			
	- Prep Ho	ole &	Grout				10 A	Core how		n	niles ize/	loa no.		
	- Setting - Drilling				1			Length of	waterline:	>	120/	110.		
Moving	- Hole to Ho				+	+								
	Up - Rigging		'n	1	1				Description					
Mix Mu		Don						1						
Condit	ion Hole, Los	t Circ	ulation					Lost bits:	Size	S	Serial no			
the second se	ing, Inclinatio		the second se					Depth		ft. ŀ	lole #		1	
	zation/Demot	oilizat	ion					Casing los	t or left in	hole: Si	ze	ft.		
Other	(Explain)							for Cl	ient	Hole	e # e #			
								Lor	ngco	Hol	e #			
								Bit change	es: S	ze	Serial #	Depth		
								(Include						
		Total	Hours	8	+			first bit in hole)	-					
			Initials	TIS		21	ori viji i	. A. 1	-					
Shift		DRI	LLERS		Hrs.		HEL	PERS		Hrs.	TRU	CK DRIVE	RS	Hr
Α	7.6.S.	hAur	der	N 14 M	8	7.C.	Rose	wheng.		8			•	
В														
С						1								
Rema	rks:							5						

3. Com

	C	F	GYEAR (ontracting	COMPAN Division	Y	O				
			General (Office				"DAILY		. REPORT
P. J. Ja				nesota 554		:	1 0			
Contract: Budge #2 Location: Terome, Arizo	Da	te: MONTH	BAY(1	9 <u>25</u> Øi	11 <u></u>	<u>37</u>		06		
Location Ferome, ARIZO	NG FO	reman's Sigr	atura	Jary for	hold			ILL NO.		ook no.
		reman s orgi	alure.	/ //						
		Dia Olar		Footage	Summary		Fe	et	(al Casing
Shift Hole No. 원 N	laterial Drilled	Bit Size & Type		rilling	the second s	ming	Drilled or	the restricted the testion of		Hole
`			From	То	From	То	Reamed	covered	Size	Footage
Day 9011 +119		NOWL	95	130			35	35		
A 7077 11		Touran	10	100				30	v	
Aft B										
Nite		ĸ		-						
с				+						
Hourly Distribution	Day	Aft.	Nite	r		Supr	lies Consum	ed `	LI	-
Core Drilling	5					0	Product	Day	Aft	. Nite
Handling Rod (change bit)	/			Descriptio	on Si	ze	Name	N	umber o	f Units
Overburden - rock bit				Portland						
Collaring Hole - Dia. bit				Lumnite				<u> </u>		
Rotary Drilling Handling Rod (bit)				Calseal Mud	50#	<u> </u>				
				Mud	100#		de tre transmission admittantes ar		+	
Rock Bit - Overburden				Other (De		-				
Reaming (to)						al d	Blevid	1		
Casing — Placing										
– Pulling								_		
Delays - Client Acct.										
Cementing - Handling Rods							OTHER	_ L		
- Prep Hole & Grout				Water hau	ling		niles	loa	de	
- Setting							ize/			
- Drilling					waterline:					
Moving - Hole to Hole										
Rigging Up - Rigging Down										
Mix Mud Condition Hole, Lost Circulation					0.					
Surveying, Inclination Test							Serial no Hole #			
Mobilization/Demobilization							ze			
Other (Explain) Repaire	2						e #			
mpar -				Loi	ngco	Hol	e #			
				Bit chang				Depth		
·				(Include						
Total Usur	5 8			first bit						
Total Hours				in hole)						
Driller's Initials	s The		19 N (19 N	$(A, \phi_{i,k}) \in \mathbb{R}$				1		
Shift DRILLER		Hrs.		PERS		Hrs.	TRU	CK DRIVE	RS	Hrs
A J.L. SchRoade,		8 J.L.	Rasens	berg	4	8				
В				/						
C P.h. SchRopely	Kanan	6								
Remarks:										
	and the second									
The alive lang him	SIC III L									

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6							General	Office		1.14		"DALLY	וווממ	DEDOD.
	0.					Minne	apolis, Mir	nnesota 554	14	-				REPOR
Contrac	ct: <u>Budga</u> on: <u>Texo</u> n	17	42		Date:	4-	19_1	9 <u>85</u> Aril	II/	n37	0	06	/	
	Tenn		As:	12010		MONTH	DAY (len 1	A	TYPE	DF	ILL NO.	TRU	JCK NO.
Locatio	$m: \underline{\nabla \mathcal{T} \mathcal{R} \mathcal{O} \mathcal{A}}$	18	, JIRI C	cona_	Foren	nan's Sigr	hature:	ungin	190		and the second se			
					Т			Footage	Summary		Fe	et	Tota	Casing
Shift	Hole No.	Angle	Mate	rial Drilled	4	Bit Size & Type		illing		ming	Drilled or	Core Re-		Hole
		◄				or type	From	То	From	То	Reamed	covered	Size	Footage
Day	Gard	110				2011.11	17.0	17-			11-			
A	901-1 -	1//			- R	DOWL	130	175			45	45		
-								1			-			
Aft B	- (-									
Nite				8. s										
C											_			
	L Hourly Distril	bution		Day		Aft.	Nite			Cum	lies Consume			
Core D	and the second se	Jucion		6			INICO			Supp	Product	Day	Aft.	Nite
	lling Rod (cha	ange b	oit)					Descriptio	n S	ze	Name	the second se	mber of	the second s
	rden - rock bi						v.	Portland						
-	ng Hole - Dia.	bit			_			Lumnite						
and the second se	Drilling							Calseal	F 0/				 	
Hand	lling Rod (bit)						Mud Mud	50 / 100 /		14			
Rock	Bit - Overbu	rden			+			Other (De		_			+	+
Reamin)						ud 3g	4/ 1	Storoid	1	+	+
	- Placing							2		<u> </u>				+
and the second s	— Pulling													
Delays -	Client Acct.											n		
0		-												
Cement	ting - Handlin - Prep Ho					+		Mator hou	line		OTHER		I.	
	- Setting		1001			· · · ·		Core boxe	iing	II	niles ize/	load no.	as	
	- Drilling	.*	×											
Moving	- Hole to Ho	le						Lost tools:	Descripti	on				
	Up - Rigging	Dow	n											
Mix Mu	on Hole, Los	+ Circ	ulation											
Concession of the local division of the loca	ng, Inclinatio	_	the second s					Lost bits:	Size	S	erial no			
Mobiliz	ation/Demob	ilizati	on					Casing lost	or left in	π. F	lole # ze			
Other (Explain) Rep	Dure	Hyd	2							e #			
	10	huc	· 6					Lor	ngco	Hole	#			
								Bit change				Depth		
					_			(Include						
		Tetal	Hours	B				first bit						
<u> </u>		TOLA	Hours	0				in hole)						
	Dril	ler's l	nitials	TIS	8 . I	아님이	111	1-21-25						
Shift		DRIL	LERS		Hrs		HEL	PERS		Hrs.	TRU		RS	Hrs
A	J.h. Se	hro	edere-	the later.	8	J.C.	Rosen	beng	4	3				
B	4. 51							/						
C	P.K. Seh				13									
Remar	ks:											977 - 12/11/2 - 700 - 70 - 70 - 70 - 70 - 70 - 70 -		
		ż	×								· · · ·			
Sal	thoke (1:+1	1 40	Flogs	fort	C 13	hrs							
21	· · ·			,										and the second s

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	•			C)		GYEAR (ontracting General (Y	0				
	1		ر			Minne	apolis, Min	nesota 554	14					REPORT
Contra	ct: <u>Budy</u> on: <u>Fron</u> e	ir	5#	D	ate: _	9-	20_1	9 <i>85</i> pril	1_ <u>/ m</u>	37	10	06	/	
	T		1.		м	ONTH	DAY	Junel.	Inel.	TYPE	DF	ILL NO.	TR	UCK NO.
Locatio	on: Meone		IKI ZON	Fa_F	orema	n's Sigr	nature:	engren	low					
	1	1 1					+++	Footage	Summary		E	eet	Tota	al Casing
Shift	Hole No.	Angle	Mate	rial Drilled	-	it Size	Dr	illing		ming		Core Re-		Hole
Sint	noie No.	A	IVIALE		8	Туре	From	To	From	To	Reamed		Size	Footage
-				9 S. 1			1997				and the dr			
Day A	901-1 1	110			NG	TWL	175	218			43	#3		
Aft														
B	Second Cold				_			1						
Nite														
С														
	L Hourly Distri	hution	L	Dav	Af	• 1	Nite	1		Cum	Lies Consum			
Core D		Dution	1	Day	AI	<u> </u>	INITE			Supp	lies Consum Product	Day	Aft	. Nite
	dling Rod (cha	ange h	(i+)					Descriptio		ze	Name			of Units
	irden - rock bi		л <i>ц</i> /					Portland	л э	26	Name			
	ng Hole - Dia.							Lumnite	-					
	Drilling	DIL						Calseal					+	
	dling Rod (bit	•)						Mud	50#	¥			+	
- Harri	aning nou (bit	./						Mud	100#				-	
Roc	k Bit - Overbu	rden						Other (De	scribe)			-		
Reami)	,a*				FZ-M	ud 50	al	laroid	1		
and the second se	- Placing													
	- Pulling												1	
Delays	- Client Acct.	1.50	1.1.1.1		1. A. 1.	17	27				1	-		
	2 A													
Cemen	ting - Handlin	g Roc	ls								OTHER			
	- Prep Ho	le & C	Grout					Water hau	iling	m	niles	loa	ds	
	- Setting	V						Core box	es:	si	ze/	no.		
	- Drilling							Length of	waterline	:				
	- Hole to Ho						Course of the second second	Lost tools	: Descripti	on				
	Up - Rigging	Dow	n		· · · · · ·	-								
Mix M		. 0'												
	ion Hole, Los		Contraction of the local division of the loc								erial no			
and the owner where the party of	ing, Inclinatio							Depth	:	ft. H	lole #			
	zation/Demot (Explain)	JIIIZat	ion					Casing los	t or left in	hole: Siz	ze	ft		
Other	(Explain)							for C	lient		e#			
									ngco	HOIE	5 TT	1		
								Bit chang	es: 5	ize	Serial # <i>8 </i>	Jepth	1	
								(Include	NQ					
		Total	Hours	8				first bit in hole)						
		TOTAL												
	Dri	iller's	Initials	715	100	2								
Shift	t	DRI	LLERS		Hrs.		HEL	PERS		Hrs.	TRU	CK DRIVI	ERS	Hrs
A	J.L. S	hao	eden	-	8	J.C.	Rosen	berg	<u></u>	8				
В		,			- 12			,				×	·	
С	P.L. Sel	ROPE	the		8									
Rema	rks:						2							
							1							
<u> </u>	1.	A	· .	51- 11	. lit	Ú		- 11-	51		Stag			
C-	DroveCo	ru	TROM	F10 14 51	6777	-01-	any -	Uhop	1 - 0	0	Uniky			

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				14			General	Office		1999 - C.		"DAILY	DRILL	REPOR
	Rud		# 7 .			Minne	apolis, Mir > /	nesota 554	14	177	10			
Contrac	t: Duay		40		Date: _	NONTH	DAM	9 <u>20</u> Oril	1	TYPE	00	RILL NO.	TRU	JCK NO.
Locatio	n: Jeron	ne,	HRIZ	ona	Forema	an's Sigr	nature:	tysch	vede	~				
			1				-U		Summary			eet		I Casing
Shift	Hole No.	Angle	Mate	rial Drilled		Bit Size	Dr	illing	Y	ming		Core Re-		Hole
onne	11010 1101	A				& Type	From	То	From	To	Reamed		Size	Footage
Day A	901-1	+110			r	QWL	218	259	. E		41	41		
Aft B	a de la compañía de l													
Nite C						- 1								
	Investor District	1		Deut		64 T	Alla					<u> </u>		
Core D	Hourly Distri	bution	1	Day		rt,	Nite			Supp	Product	ed Day	Aft.	Nite
	lling Rod (ch	ange b	oit)		1			Descriptio	n S	ize	Name		imber of	and the second se
	rden - rock b							Portland						
	ng Hole - Dia	. bit			-			Lumnite	-					
	Drilling lling Rod (bi	+)			+			Calseal Mud	50	¥			+	
Tranc	ing nou (bi	.,	- Cable - meters		+			Mud	1007					+
Rock	Bit - Overbu	urden						Other (De		_				
Reamin	the second s)					E.Z MI	1d 59	al E	Revoid	_/_		
	- Placing - Pulling												+	
the second s	Client Acct				+							-		
Cement	ing - Handlin										OTHER			
	- Prep He - Setting		Grout		-			Water hau	ling	n	niles ize/	loa		
	- Drilling							Length of			120/			
Moving	- Hole to Ho													
Rigging Mix Mu	Up - Riggin	g Dow	n										t.	
	on Hole, Lo	st Circ	ulation					Lost bits:	Size	5	Serial no			
	ng, Inclinati							Depth		ft. F	lole #			
	ation/Demo	bilizati	ion					Casing los	t or left in	hole: Si	ze	ft		
Other (Explain)				+			for Cl	ient	Hole	e # e #			
								Lor Bit change		Hole	e # Serial #	Denth		
	and the second second	<i>ä</i> i			+			(Include						
								first bit					•	
		Total	Hours	8				in hole)						
	Dr	iller's	Initials	PLS					· · · ·	· · · · ·				
Shift		DRII	LLERS		Hrs.		HEL	PERS		Hrs.	TRU	CK DRIVE	RS	Hrs
A	P.L. S.	thRO	eder	•	8	V.C.	Rosen	berg	4.1	8				
B						+		/						
Remar	ks:						<mark>Status</mark>							
		1												

				Ç	Minr	NGYEAR Contracting General neapolis, Mir	Division Office nnesota 554	114	0				REPOR
Contra	n: <u>Jevo</u>	, ,	#2	D	ate: 9	-23 1	985 Dri	n 44	137	10	66	1	
Contrac					MONTH	DAY	-521	11	TYPE	DF	RILL NO.	TR	JCK NO.
Locatio	n:	m-f		F	oreman's Si	gnature:	111	Ser.	~ 0-5-V				
							Footage	Summary		F	eet	Tota	I Casing
Shift	Hole No.	Angle	Mate	rial Drilled	Bit Size	· · · · · · · · · · · · · · · · · · ·	rilling		ming		Core Re-		Hole
		A			oc Type	From	То	From	То	Reamed	covered	Size	Footag €
Day A	901-1	+11°			NQUI	259	285			26	22		
							+			1			
Aft B	he an				1					1			
Nite	14.5°2 1.1		2										
С	tari a r	1											
	Hourly Distril	butior	<u>ו</u>	Day	Aft.	Nite	ľ		Suppl	ies Consum	ed		
Core D	rilling	-	X	5						Product	Day	Aft.	Nite
	lling Rod (cha		it) weese	2			Descriptio	on Si	ze	Name	N	umber o	Units
	rden - rock bi		. *				Portland Lumnite				_		
and the second se	ng Hole - Dia. Drilling	DIT					Calseal				-	+	
and the second s	lling Rod (bit)					Mud	50 /	ŧ			+	
	¥						Mud	100 /	ŧ				
	Bit - Overbu	rden					Other (De	escribe)					
Reamin)		· · · · · ·		EZina	d 50	111-				
	– Placing – Pulling												
And in case of the local division of the loc	- Client Acct.	· · ·	* 9								-	+	
Cemen	ting - Handlin	1000								OTHER			
	- Prep Ho	le & C	Grout	19 - 14 	1. X.A.					iles			
	- Setting - Drilling	4					1	es:		ze/			
Moving	- Hole to Ho												
Rigging	Up - Rigging	the second s	n		1.1.1		· .	1. ^{1.8}					
Mix Mu		0.				1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1			211				
the second se	ion Hole, Los ing, Inclinatio				·					erial no.			
	ation/Demob		the second s			-				ole # e			
	Explain)						for C	lient	Hole	e #			
Shi	pe Rals			\hat{n}			Lo	ngco	Hole	#			
,				0			Bit chang	es: S	ize S	Serial #	•		
L				· .			(Include		wi L	881112	59		
		Tatal	Hours	8			first bit in hole)	,					
			Initials	Ph			in noie,						
Shift		and the second se	LLERS	VOX.	Hrs.	HEI	PERS		Hrs.	TRU	CK DRIVE	RS	Hrs
A	P.L. Se	hee	1/1-	and other a		F. Rosen			8		OK DIII VI		
В						8	1						
С								1					
Rema	ks: Took	5'	rods c	tt and	put o	n 220	10 rods	(22))		•		
	42			Carrow	7								
			1		/ /								
			· · · · · · · · · · · · · · · · · · ·	م مىر		· ·							
	NOT	FE. If	itom is ch	argeable to	client place	e circle arou	nd time ent	try, Please	follow in	structions o	n reverse si	de.	

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•				С	C	ontracting General	Office		Q		"DAILY	DRILL	REPORT
Contrac	t: Buda	ſ	#	Da	te: <u>9</u> -	2 1	9 <u>87</u> Dril	LA	13-	710	06	/	
Locatio	n: <u>Jero</u>	i, -(Fo	MONTH preman's Sign	DAY	P.1.	2.h	TYPE	DR	ILL NO.	TRU	JCK NO.
					1	1		Summary			et		I Casing
Shift	Hole No.	Angle	Mate	rial Drilled	Bit Size & Type	Dr From	rilling To	Rea From	ming To		Core Re-	in Size	Hole
	1.11					From	10	From	10	Reamed	covered	Size	Footage
Day A	901-1	+/]°			NRWL	285	313			28	24	i,	
Aft B													
Nite C	6473 A												
				ы 18 1 г.							L <u>.</u>		
Core D	lourly Distri	butior	n .	Day 6	Aft.	Nite				lies Consum Product	ed Day	Aft.	Nite
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	th of gra	avel	Tor	271 of	Hele			-					
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NOTE: If item is chargeable to client, place circle around time entry. Please follow instructions on reverse side.

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		Ā			&	Туре	From	То	From	To	Reamed		Size	Footage
Day						•								
A	901.1	-110						332						
													<i>h</i> .	
Aft														
В											-			
	24.00	1	1	- 1.1 - 1										
Nite C	×													
C	5 · · · · · · · · ·	1000 g			1.1	н с. °.,		2 · · ·	1.	-1.8				
	Hourly Distril	oution	ו	Day	Af	t.	Nite			Supp	lies Consume	d		
Core D				1				1997 - 1997 -			Product	Day	Aft.	Nite
	lling Rod (cha		oit)					Descriptio	n S	ize	Name	Nu	umber of	Units
	<u>rden - rock bi</u> ng Hole - Dia.							Portland Lumnite						
	Drilling	DIT						Calseal			1			
	lling Rod (bit)			+			Mud	50	¥		-	1	+
								Mud	100		1	-		
Rock	Bit - Overbu	rden						Other (Des	scribe)			-		
Reamin	the second se)											
	- Placing											_		
and the second se	- Pulling											-		
Delays	Client Acct.													
Comon	ting - Handlin	a Poo	10	$\left(\right)$							OTHER	_ L	1	
Cemen	- Prep Ho							Water hau	lina	m	niles	loa	de	
	- Setting		STOUL					Core boxe	s:	''	ze/	no.		
packe	r - Drilling	144	12.10 Mar	13			1	Length of	waterline	1. 2 1 ² 18				
Moving	- Hole to Hol	е						Lost tools:	Descripti	on				
	Up - Rigging	Dow	n			A	1 m							
Mix Mu	id on Hole, Los	C:	ulation.							1.4 				
The second se	ing, Inclinatio										erial no			
	ation/Demob				+						lole #			
	Explain)				+						ze e #			
				1	1			Lon		Hole	e#			
								Bit change				Depth		
								(Include		1				
WF Chy	distant in the second sec	And the state of the local division of the l		'4				first bit						
L		Total	Hours	8	-			in hole)						
an B	Dril	ler's l	Initials	a.D	$\tau = q_{\rm e} (k)$		111	14	7 d I					
Shift			LERS	r	Hrs.		HEL	PERS		Hrs.	TRU	CK DRIVE	RS	Hrs
A	P.L.S.	chie	reder	An increase in	8	3.	Rosen	bura			11 () 11 ()			
В					÷)						
С									Ι					
	ks: Packer				hole			FLENIX	To	iel a	inc They	acker		
Len	nentw,	enl	041	1910 t	or me	Tion						1		
F				,	me	-								
					H	/						-		

,				C		Co	ontracting General (0		"DAILY	DRILL	REPOR
Contrac	et: <u>Budg</u> on: <u>Seve</u> r	4	#2	D	ate:	10 -	<u>- 7</u> 1	9 <u>87</u> Dril	$1 - L, \Lambda$	1 - 3 TYPE	7/0			JCK NO.
Locatio	on: Jeron	<i>2, ℓ</i>		F	oreman	n's Sign	ature: 7	Par :	1 da	An	red			
								Footage S	Summary		Fe	eet	Tota	I Casing
Shift	Hole No.	Angle	Mate	erial Drilled		t Size Type		illing		ming	Drilled or	Core Re-	in	Hole
		4			~	Type	From	То	From	То	Reamed	covered	Size	Footag
Day	4.4.4					<u> </u>		17						
Α	101-1	11°			- 104	aut		332						
Aft B		12												
Nite C														
	Hourly Distri	hutio	l	Day	Aft		Nite			<u> </u>	lies Consum			
Core D		butto		Day			IVILE			Supp	Product	Day	Aft.	Nite
	dling Rod (ch	ange b	oit)		+	-+		Descriptio	n S	ze	Name		umber of	
	rden - rock bi	and the second						Portland					1	T
Collari	ng Hole - Dia.	bit						Lumnite						
Rotary	Drilling							Calseal						
Hand	dling Rod (bit	:)		201				Mud	50 /			_		
								Mud	100#	ŧ _		_		
	k Bit - Overbu	rden						Other (De				·		_
Reamin)					PACKE	r_NG	WL_				
-	 Placing Pulling 							LP - 500	100	<u>#</u>		7		
Part of the second s		A. 10				-+-					an in a second to second the			
Delays	- Client Acct.													
Caman	ting - Handlin	a Roo	40	$\overline{\Omega}$	+	+					OTHER			
Connen	- Prep Ho			3			6.1.1.1.1	Water hau	lina	'n	niles	loa	ds	
	- Setting		Gioat	(4)			2	Core boxe	s:		ize/			
	- Drilling													
Moving	- Hole to Ho							Lost tools:						
	Up - Rigging	Dow	n											
Mix Mu					-			-						
	ion Hole, Los	the second s	and the second		10 X 12						Serial no			
	ing, Inclinatio						in a starter of the				lole #			
	(Explain)	JIIZal	1011	+	+						ze			
				+							e # e #			
				+	1						Serial #			
					1			(Include				· ·		
								first bit	-		·····			
		Total	Hours	R.c.				in hole)						
	A 23 6-	11.0.1.	In tatala.	RAY						e 1. X. 4.1				
	Dri			KO.S										
Shift	PIQ	DRI	LLERS		Hrs.			PERS		Hrs.	TRU	CK DRIVE	ERS	Hrs
A	PLize	600	Pal	1997 - B. B. M.	20)	Reser	, Knray		8			-	
B														
C	rks: Put	7	nd	For i	h, T_{I}	· <	1	Inct	prost				¥.	
rema	rks: <u>ru</u>	A	- par	NYF 1	n) / /		Time	- 901	presa	1 4				
			-		N	NI	/							
					10	H)	-							
					111	X								

	а. Му			Ç)	C	ontracting General (apolis, Min	Office Inesota 554	14	0				. REPORI
Contra	t: Buda	4 7	#2	· · ·)ate: /	0.	3 1	985 Dril	1 2	11-3	210	66	1	
Locatio	et: <u>Budg</u> on: <u>Secon</u>	e		F	oremai	о <mark>мтн</mark> n's Sigr	DAY	Det	LS.	TYPE	DR	ILL NO.	TR	JCK NO.
	1		1				1	Footage	Summary		Fe	et	Tota	l Casing
Shift	Hole No.	Angle	Mate	rial Drilled		it Size	Dr	illing		ming		Core Re-	4	Hole
		Ā			8	Туре	From	То	From	То	Reamed	covered	Size	Footage
Day A	901-1	-110	30		14	in L		332						
Aft B											- V			
Nite C			- 1V											
	l Hourly Distril	butior		Day	Af	+ 1	Nite			Supp	lies Consum	l		
Core D		Julio		Day	<u>+-~</u>	<u>.</u>	INILG			Supp	Product	Dav	Aft	Nite
	dling Rod (cha	ange b	oit)					Descriptio	n S	ize	Name		umber o	Contraction of the local division of the loc
Overbu	irden - rock bi	it						Portland				-		
-	ng Hole - Dia.	bit						Lumnite					_	
	Drilling							Calseal	50,	<u></u>				
Hand	dling Rod (bit	:)			+			Mud Mud	100					
Bock	k Bit - Overbu	rden						Other (De		· · _			+	
Reamin		laon)		-				0011207				1	
Casing	- Placing	1 a.	1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 -											
and the second se	- Pulling													
Delays	- Client Acct.													_
										<u></u>	OTHER			
Cemen	ting - Handlin - Prep Ho							Water hau	ling		niles	loa	de	
	- Setting			2	1			Core boxe	s:	''	ze/	no.		
Pack	+ - Drilling			(8)										
	a - Hole to Ho							Lost tools:	Descripti	on				
	Up - Rigging	Dow	'n	11 1 1 1 1 X							Eq.			
Mix Mu	ion Hole, Los	+ Circ	ulation						0.					
	ing, Inclinatio		and the second se		1						erial no lole #			
	zation/Demot			1	1						ze			
Other	(Explain)										#			
								Lor	ngco		#			
L								Bit change				Depth		
				8	+			(Include		1.5 ¹¹ -	· ·			
		Total	Hours	8	-			first bit in hole)			,			
		TOTA	Hours	VIG	-			1111010/						
	Dri	ller's	Initials	12S				× 9.						
Shift		DRI	LLERS		Hrs.			PERS		Hrs.	TRU	CK DRIVI	ERS	Hrs
A	RL. Se	heo	rd 1-		8	5	Kosen	burg	1.4	8				
B								,					·	
	rks: Prill	n d	part	ser at	30	7. 4	niker	was ha	ART A L	ria ,	lown an	d stee	00140	reds
Dull	ed out a	nd	cuT	teeth iv	51	T. 1	roduit	wen T T	rough	parke	ralet	Botter	/ /	
/						1	1/1-		,	,				
						1	5							
1						111								

				Ç	$\mathbf{)}$	C	ontracting General (Office		0		"DAU V		REPORT
Contrac	n: Jeron	£	72	C	Date: _/	Minne	apolis, Min	nesota 554 9 <u>8 7</u> Dril	14 1/	7 - 3	7/0			
Locatio	n: Jeron	n C		F	orema	n's Sigr	ature:	pat	1.1	h	mel			
		0					Γ	Footage S	Summary		Fe	eet	Tota	al Casing
Shift	Hole No.	Angle	Mate	rial Drilled		it Size Type	Dr From	illing To		ming To	Drilled or Reamed	Core Re- covered	in Size	Hole Footage
Day A	901-1	-/1 °			NG	WL		332					161	
Aft B	5 ⁻ ¹ 2								1					
Nite	n so ^{ta} l é diferent es		. 4			3 - 19		2 ¹⁰ -	Car C					
С					100	17 ₂₈ 19 3	1.1							
	Hourly Distri	bution	н	Day	Af	t.	Nite			Supp	lies Consum		1	BUIL
	rilling Iling Rod (ch rden - rock b		it)			_		Descriptio Portland	on Si	ze	Product Name	Day Nu	Aft umber o	. Nite of Units
	ng Hole - Dia.							Lumnite						
Rotary	Drilling							Calseal						
Hand	lling Rod (bit	t)						Mud Mud	50 // 100 //			_		
	Bit - Overbu	Irden						Other (De						
	- Placing	L.)					EZ m.	10 5	g4L				
No. of Concession, name	- Pulling				+							-		
	Client Acct.			·	1						071150			
Cement	ting - Handlin - Prep Ho				+		1	Water hau	ling		OTHER	loa	de	
	- Setting		nout	X				Core boxe	s:	11 	niles ze/	no.		
	- Drilling			8	1			Length of	waterline:					
	- Hole to Ho													
Rigging Mix Mu	<u>IUp - Rigging</u> Id	<u>Down</u>	<u>1</u>			ан сарана Х			5		1			
Contraction of the local division of the loc	ion Hole, Los	the second s	the second se	a e com							erial no			
and the second division of the second divisio	ing, Inclinationation			· · · · ·				Depth		ft. H	lole #			
	Explain)	JIIZati	on					for Cl	ient	Hole	ze e #			
	0	ana ina a						Lor	ngco	Hole	e#			
					1			Bit change (Include			Serial # 	Depth		
		Total	Hours	8				first bit in hole)	a en la s	·				
	A Dri			ROS.	1 0	0 sta	94 N. S. S.		. 64. 4					
Shift		the second s	LERS		Hrs.	I	HEL	PERS		Hrs.	TRU	CK DRIVE	RS	Hrs
A	Pil. Se	chre	ela		7	J.,	Rosent		1.21 1.11	8			-	
В		× (, , , , , , , , , , , , , , , , , , , ,						
С		11 -	h	7.0-			10.5		au 0 1		ante i	1.1.		
Remai Dri i	ks: <u>redr</u> LLed ce	met	from	n 307'			ker 32		ere bi	naina	rods iv	n Mel C		
						-	HZ-							
						11	1							

•				Ç		С	ontracting General C			0		"DAILY	DRILL	. REPORI
C	. Buda	0				0.	S 1	n 8 n.:		11-3	710	06	1	
Locatio	n: <u>Jerpu</u>	£.		F	oreman	SNTH S Sign	DAY nature:	Put S	Si	TYPE	DF	ILL NO.	TR	UCK NO.
					1		T	Footage S	Summary		F	et	Total Casing	
Shift	Hole No.	Angle	Mate	rial Drilled		Bit Size & Type	Dri From	illing To		ming To	Drilled or Reamed		in Size	Hole Footage
Day A	901-1	-110			N	Ridul		332						
Aft B	्रहेल्ला का पि उन										1 			
Nite C											A.2 1			
	Hourly Distri	butior		Day	Aft	. 1	Nite			Supp	lies Consum	ed		
Core D Hand Overbu		ange b it						Descriptio Portland Lumnite	on S	the second se	Product Name	Day	Aft umber o	and the second se
Rotary	Drilling Iling Rod (bit							Calseal Mud	507			_		
								Mud	100 /	¥				
Reamin	<u>Bit-Overbu</u> g (to	rden)					Other (De				1	+	
	- Placing		· /		1	-		E - MM	<u>a</u>					
	- Pulling													
Delays	- Client Acct.					1				<u></u>		-		
Cemen	ting - Handlin	g Roc	ls								OTHER	_ L		
	- Prep Ho				1			Water hau	ling	`m	iles	loa	ds	
	- Setting	A	2 - 2 	$\left \right\rangle$				Core boxe	s:	si	ze/	no.		
	 - Drilling - Hole to Ho 			(8)				-						
	Up - Rigging		n e ^{an}	e program de la composición de				LOST TOOIS.	Descripti					
Mix Mu	bu	20.0			· · · · ·		S = 4 ² − 8	-	54 (A)	1.0	1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 - 1997 -	- 3		
	ion Hole, Los					-	a				erial no			
	ing, Inclinatio				+		the second				lole # ze			
	Explain)				1			for Cl	lient	Hole	#	,		
								Lor	ngco	Hole	#			
								(Include	es: S	ize 	Serial #	Depth		
		Total	Hours	8				first bit in hole)		1	20			
			Initials	TD.D.		•e. h. h		in noie/						
Shift		DRI	LLERS		Hrs.			PERS		Hrs.	TRU	CK DRIV	ERS	Hrs
A	P.L. Se	- 1.00	older		8	J,	Rosen	turg		8				
B														
C	rks: pull.	d	rods	5 97 7	imes	To	clean	bil. a	of Th	ronah	packer	- Te k	otton	, 07
hel.	Ks: .		Lole	is che			1-	J						
						M	4							
					1	11	/							

Contra	ct: Budg	Ċ	#2		Date: _			nesota 554 9 3 5 Dril		M-3-	7 10	"DAILY <i>C</i> 6	1	
Locatio	on: Jeroin	.(ř	Forem	момтн an's Sigr	DAY nature:	Para	12	TYPE Anno	DF	ILL NO.	TR	UCK NO.
4		e	1			Bit Size		Footage				eet	Total Cas	
Shift	Hole No.	Angl	Mate	erial Drilled		& Type	Dr From	illing To	From	aming To		Core Re- covered	in Size	Hole Footag
Day	901-1	-110	0.91.40	19 - 19 - 19 - 19 - 19 - 19 - 19 - 19 -			*121.17 (· · · · · · · · · · · · · · · · · · ·			-		
Α	101-1		-4. -	e e e e e e e e e e e e e e e e e e e	1	PUL	332	334	12	A	2	2		
Aft							19.15	<u>`````````````````````````````````````</u>						
В			14 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1			· · · · · · · · · · · · · · · · · · ·		14 AV						
		14 17	And Sec.	3	<u>1</u> 3	an shi sh	12323	C	1. (A				t	
Nite C														
N. Politica de sele	l Hourly Distrik			Dov		ral 1 6 44 1	Nito	inte la Pila. Pila	nasi nasi		<u> </u>			
and the second se	rilling			Day 3	- A	ft.	Nite				ies Consume Product	Day	Aft	Nit
	ling Rod (cha							Descriptio	n S		Name	The second		f Units
	rden - rock bi		n 11	an sergi a	(1) by		ni în es	Portland		1	1995 e	6. p. 85		
	ng Hole - Dia.	A CONTRACTOR OF			-	1		Lumnite			21			
the second se	Drilling			• • • • • • • • • • • •	1.1.5	1. S. 1. 1.	19. A. 20	Calseal		<u></u>	1 2 11 11			
Hand	ling Rod (bit		<u> </u>	K	1 250 9	t entri su li i	n en la real	Mud Mud	50 / 100 /	¥		-		
Rock	Bit - Overbu	den		1				Other (De		r <u>(</u>		-		
Reamin)					EZmu		al		1		
	- Placing	te state	l de				. 12.77	1. 1. M. V			A. P. P.		· · · ·	
the part of the design of the local division of	- Pulling				23.0							-		
Delays	Client Acct.				Sec. Sa.	1		- 211	·····		na tenang langan Kantang langan langa	-		
Cemen	ting - Handling	Rode	;	1	-		1				OTHER	- <u>L</u>		
	- Prep Ho				1 - 1 -	× 10.	arta i kaya	Water haul	ing	mi		loac	ls'	
	- Setting	14.4	e na gu	•	100		al Maria	Core boxe	s:	siz	les e/	no.	· •	
	- Drilling	1.1.1.1					- 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1	Length of	waterline					
	- Hole to Hol Up - Rigging		ste stell		+	18.2		Lost tools:	Descripti	on		and the second se		
Mix Mu		DOWN		0	1.14	de si .		3 1 1 1 1						
Concession of the local division of the loca	on Hole, Lost			(3)	a av 🔆		le contra de	Lost bits:	Size	Se	rial no.	1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1		
	ng, Inclination	the second s			1. 1		3 Mar 4				ole #			
	ation/Demobi Explain)	lizatio	on	Sec. 2	- * . La	5 8 S	1. 1. 1. 1.				• <u> </u>			
Contraction of the local division of the loc					+			for Cli	ent	Hole	#		5 5 2	
wen	to may	er t	0.5	2			5 5 5 Get	Lon Bit change			# erial #		<u>.</u>	
	(4) (1)				1						3			
								first bit			14.1	1.14		
	1	otal H	lours	R		Er Maria	-1 - L	in hole)	1111		A State	1.1		
	Drill	er's Ir	nitials	21)	1.58		Selves A	Vila se						
Shift			LERS	VAD.	Hrs.	T	HELF	PERS	T		TRUC		RS	Hrs
A	P.L. Sel			15. J.	8			burg	1	6	moe			
В					A Firster		•	- J				2		
С		1 1				<u> </u>								
Remar	ks: Had	1 400	7 of	gravel	4 1	fat.	of good	vock ; {	Condi	inning	Hole) 1	colvill	Ifat	67
Cav	e, B.T.it	Ker	p to	VIAC IN	Oh k	A A tak	V STORI	ay The an	To ten T	LAK in the a				

Contra	et: Budge	# 2		a an	Date:	10 .	8 1	925 Dril	LAn.	3.7	100	0.61	1	
	on: <u> </u>				Forem	мо мтн an's Sigr	DAY nature: 🥳	Pet 2	2.01	TYPE	d. Dr	RILL NO.	TR	UCK NO.
					T		 	Footage S	Summary		F	eėt	Tota	I Casing
Shift	Hole No.	Angle	Mate	erial Drilled		Bit Size	Dr	rilling	and the second se	ming		Core Re-		Hole
		◄				& Type	From	То	From	То	Reamed	covered	Size	Footag
Day	Class 1	- 11 -					~ ~ ~							
Α	901-1	11	1 0 7				334	1 2 20 2		1.1.1				
	4										-	1		
Aft B	1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1				- 2		1940	1	4	-15 (* .)	19 12 ¹²⁶			•
					х. — 4.									
Nite					(19 Jr	10	1. St	1.1.1	2.42 ¹⁰					
С	64 h	6.00		te est at the		· · ·		4	· · · · · ·					
	Hourly Distril	oution		Day		ft.	Nite	T		Supp	lies Consum	ed		
	rilling		er eg pa	u tha cast at a		and the	orie danieli.	x 1 × 2 × .	1.1	15	Product	Day	Aft.	Nit
Hand	lling Rod (cha	inge bi	t)		- 5 ⁰⁰			Descriptio	n Si	ze	Name	-	imber o	
	rden - rock bi		s , i (e.b	an sa ta ta ta	1.1	12 - 20	53 NA 21 N	Portland		<u> </u>		and the second		
	ng Hole - Dia.	bit						Lumnite	-					
	Drilling lling Rod (bit	1			-			Calseal Mud	504	<u> </u>				_
Tianc	ing nou (bit	/			14.75			Mud					+	
Rock	Bit - Overbu	rden	1					Other (Des				-		
	ng (329 to			(2)					*					
	- Placing	121.1	- 1	(2)						· ·			*	
And the second se	- Pulling				-							_		_
	Client Acct.			(2)		a di teria. Tanàna di teri				<u></u>		-		
<u>rement</u>	ting - Handling	Rode		102						· · · ·	OTHER			
Contern	- Prep Ho			h ta an a		1.1.1		Water haul	ina	m	iles	load	ls	
	- Setting	12.00	0	si teo i i	1.75		84. Af 4	Core boxes	s:	sia	iles ze/	no.		
	- Drilling			and the second	i ester	5 - G.	ala ji	Length of	waterline:			g good and a		
	- Hole to Hol							Lost tools:	Descriptio	on		in the first state		
Mix Mu	Up - Rigging	Down		1. Y. M. 1. N. 4. N.		n der der Kunstand im	anders (* 1					ta nesi . Umrtasi	<i>*</i> 2	
	on Hole, Lost	Circul	ation	And the second	1				5 K		erial no	2		
	ng, Inclinatio			- A.				Depth:	5120	0.	ole #	an di sarta		
	ation/Demob	ilizatio	n		1 	147 . 1					е			
	Explain)					a vi sa					# #			
Ship,	ping rad	5		6)	1.1.1.1		1. Di.						s. ²	
					+			Bit change	s: Si	ze S	Serial #	Depth		
					+-			(Include first bit		<u> </u>			,	
		Total H	ours	8		1.125	112 ** *	in hole)		i Institute	e	the state.		
ан (,	D			3218			+ 4 1	CONT DIVISIONS AND						
		ler's In		(raid)	1			$\{a_{ij}\} \in \{i \in [i]\}$	ing tan kari	G. 94 - 1 - 1		1.		
Shift					Hrs.			PERS		Hrs.	TRU	CK DRIVE	RS	Hrs
B	P14.)c	1.000	1+~		8	1.4	lospab	4×19	<u>,</u>				-	
C					1			· · ·						
Remar	ks:								·					

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Locatio	n: <u>Fern</u>	1.1		Fr	1 - 12 - 1 - 1		Footage S	and the second se	red.	Fe	et	Tota	I Casing
Shift	Hole No.	Angle	Mate	rial Drilled	Bit Size & Type		rilling To	Rea From	ming To	Drilled or Reamed	Core Re- covered		Hole Foota
Day A	401.1	· [] ^{.0} .			BQINE	33.47	341			7	-7		
Aft B	. waada		17 2003	Addread and	n. geriese Va	ibelat y	- 1 - 1		a, 194 - 2				
Nite C			- 	. Viel av ⁴⁴					3.13.	<u>o e :</u>		24 (Y	
	1 316 ACTO		ાં ત્યું હુન્			ta anti cui	5 M(1) - 410	Arrest 1997			a		
Care D	Hourly Distrib	oution	- 1996 - 1	Day	Aft.	Nite	Second Lands		Supp	olies Consume		1	
	rilling Iling Rod (cha			4		and an and a second	Descriptio		-	Product Name	Day	Aft.	
	rden - rock bi			al respond	. Shirthe P	an en angen angen	Portland			Ivame	INC		
and the second sec	ng Hole - Dia.	And a state of the					Lumnite			1.47		1	-
the state of the s	Drilling	and the second second second second		ر با مغان ا	and the second second		Calseal			along and			
	lling Rod (bit			:	Angen St. A	ar ni 69 - 1	Mud	50#	4	utin tra	· · See 5		
					·		Mud	100#	<u> </u>		121 - C		
and the second se	Bit - Overbu	rden			14 11 11 11		Other (De	scribe)		• n .			
Reamin)								-		
	- Placing - Pulling	2004.02								· · · · · · · · · · · · · · · · · · ·	-		
Contraction of the local data	- Fulling Client Acct.				in de la des	Andreas Striptic Stream and		· · · · · · · · · · · · · · · · · · ·			-		
Delays -	Client Acct.				1	1211		······································	e. ¹⁰⁷		-		
Cement	ing - Handlin	a Bode				2 - C				OTHER	a 2 -	1	
	- Prep Ho			2 · · · ·	I I	αγ · α · α − β _α	Water hau	ling	. n	niles		ds	
	- Setting		, tri eli				Core boxe	s:	S	ize/	no.		
	- Drilling) (₁		al ang gan			Length of	waterline:	1997 - 1997 -	Contraction of the			
	- Hole to Hol						Lost tools:	Descriptio	on				
<u>Rigging</u> Mix Mu	Up - Rigging	Down	1917 - 943 1917 - 943		100 - 14 14 14 14 14 14 14 14 14 14 14 14 14	· · · · · · · · · · · · · · · · · · ·			ng ngan kari Ting terter ak	na series Nacional de la catalita de	a de Santo Maria de Cal		
	on Hole, Los	t Circu	lation	27						Serial no			
	ng, Inclinatio			6						Hole #			
and the second second second second	ation/Demob		The second s	and the second second	an shear in	and and				ze			
Other (Explain)					ann an an an Annaichean an An Annaichean an Annaichean a				e #			
MORK	be al da	mini te			المراجعة المرجعة		Lon	gco	Hol	e #	el entre e		
2 11	diament.	1		2			Bit change		ze	Serial #	Depth		
v							(Include	BL	WILL	84477	134		
		-					first bit						
		I otal I	Hours	8	1995 (⁹⁴ 7) (2017)		in hole)	*1 	<u> </u>		1994 (1994) 		
	Cont. Dril	ler's Ir	nitials	PUD	1 3.1 ²⁴ 471	a si geni a	10 (D ~ L)).			e la la ser la	1-1-1-1-1	· · · ·	
Shift	the second s		LERS		Hrs.		PERS		Hrs.	TRUC	CK DRIVE	RS	Н
A	P.L.S.	100	edier		8 7	Reser	burg		8	· · · · · · · · · · · · · · · · · · ·			
B	_						1				· · ·		
С													
Remar	ks: pann	rd :	120150	· 1410	hile ?	o thid	1014						

CRC OFFICE SUPPLY DIST., INC. -MINNEAPOLIS, MINN. 55402

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, ,				0	l.	NGYEAR Contracting General	g Division Office	1	C		"DAILY	DRILL	REPOR
Contra	t: Budae	<i>‡</i> 7	2	Da	Mir ate: 10	nneapolis, Mi	innesota 554 19 <u>Å</u> Dri	114 11 <i>L_M</i> 1	- 37	10	CA	,	
Locatio	n: <u>Budye</u> n: <u>Jerro</u>	ť		Fo	MONT preman's S	H DAY	Dar 2	e.	TYPE	DF	RILL NO.	TRU	ICK NO.
	- Bernar	e	х, з.			9		Summary	с – K	F	eét	Total	Casing
Shift	Hole No.	Angle	Mate	rial Drilled	Bit Si & Ty		orilling To	Rea From	ming To	Drilled or Reamed	Core Re- covered	in Size	Hole Footage
Day				an an an se		1		Sela tor	• • • • • • •				
Α	901-1	-110	a .	2 4 41	BQUEL	341	351			10	112		
Aft													
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	a Barbar	1. 1.4	a de la	$\{f_i, j \in [j]\}$	a dan	eg ¹ The c	1.00	1.12	(rar)	a na a	5		
Nite C								1. V.		8.875		5	
	dafia inc.	14.2	4 1 g		A 64	- Nite	_ <u></u>		0		8		
	Hourly Distri			Day	Aft.	Nite		19. 1	Supp	lies Consum Product	Day	Aft.	Nite
	lling Rod (ch			4			Description	n S	ize		the second se	imber of	
	rden - rock bi			te the second	e Rhidin daech	in nyev all price	Portland				- 12 - 12		T
	ng Hole - Dia.				1. 1. ¹ .		Lumnite			14	10. j. og.		
	Drilling			1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1	Straight Contract	and the same	Calseal	.1 ant		an ta ana			
Hand	lling Rod (bit	:) • • • • • • •	2.55	$(\beta, \beta, \beta, \beta) \in \mathcal{H}_{2,n}$ is	a ng mga sa	an ang	Mud	50#		e fuidh a		1. 14	-
D	D't O I				*		Mud	100#	ŧ	Server and a server	<u></u>		
Reamin	<u>Bit - Overbung (</u> to		1	1975			Other (De	escribe)	• ₁₀ - 8	•			
	– Placing		1	2- 12 - 11		- x					-		
	- Pulling		·····	2		1. 2. 7.2					-		+
and the second	- Client Acct.	0.457	4	1		1 - 12 - 12 ⁴ -		1. C			2		
-	COL A	and the second se	$\{S_{i}\} \in \{g_{i}\} \subset \{g_{i}\}$	1. J. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1.	1		8.1 m. j. 1		2 - Y Y	11			
Cemen	ting - Handlin									OTHER			
	- Prep Ho	le & C	Grout			** *****	Water hau	ling	m	iles	loa	ds	
	- Setting					- Tes T	Core box	es:	si	ze/	no.		
Maria	- Drilling						Length of	waterline					
	- Hole to Ho Up - Rigging	and the second		States and	lating and a	and the second of a	Lost tools	Descripti	on		-1. TP		
Mix Mu		DOW		0	se eladored	l. mark Agentie	-			5	The later	z 3	
Condit	ion Hole, Los	t Circu	lation	14)	2	1.1.1.1.1.1.1	Lost bits:	Size	S	erial no.	de ser	5 I Z	
	ing, Inclinatio					6 R -				ole #			
	ation/Demob	oilizati	on	and disc.	14 U.	for the second				e			
Other (Explain)						for C	lient	Hole	#			
				a hit na hinn		1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1	Lo	ngco	Hole	#	enter av s		
		·				-				Serial #			
					4		first bit	p.c.	WL L	79.11	350		
		Total	Hours	No. and	5. 1. <u>1.</u> 1. 1. 1	1	in hole)		s trader	x			
	Dri				(2. a.).	an againg	- ∳10, 5	-	- 1943 - L		11/ 382	÷.	
Shift			LERS		Hrs.	HE	LPERS		Hrs.	TRU	CK DRIVE	RS	Hrs
Α	P.1.50	live	edu		X	J. Raier	Deves-		8	5		· · · · · · · · · · · · · · · · · · ·	
В					- (** **		· / ·						
С			1		<u>, </u>								
Remai	ks: <u>He d</u>	137 E'''	« dvil (To bot	t ett çu	en 1 74 8							
	and the second sec		<u>, </u>	/		$\overline{\gamma}$							
		·····		1		+							
				11	17								
	NOT	TE: If	item is ch	nargeable to	client, pla	ce circle arou	und time en	ry. Please	follow in	structions o	n reverse si	de.	

CRC OFFICE SUPPLY DIST., INC.-MINNEAPOLIS, MINN. 55402

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Contract: Budge	Da	MONTH	DAY	9 Dril	1 10	TYPE	DF	RILL NO.	TR	UCK NO.
The sales party	F0	reman's Sig		Footage S				eet	Tot	al Casing
Shift Hole No.	Material Drilled	Bit Size & Type		illing To	the second s	ming To	Drilled or Reamed	Core Re-		Hole
Day A 901-1 -11°		3444	351	355		Sector in	4	4		10014
Aft graduit	2 - 12 - 12 - 12 - 12 - 12 - 12 - 12 -		1. 14 g. 1. 1							,
B Nite		् संदुर्ग संदर्भ		 Romanizas		the s				
C	มารู้อาสุมุขมาย	u stericti	(1	≥ 14 <u>,ζ.</u> , 4	مبر 1 - 5 - 5 - 5				
Hourly Distribution	Day	Aft.	Nite				ies Consum			
Core Drilling Handling Rod (change bit)	······································	t Attaction of	•	Descriptio		ze	Product Name	Day	Aft	. Nit f Units
Overburden - rock bit	n de la companya de l	The second		Portland	'II 31	20	Name	140		
Collaring Hole - Dia. bit				Lumnite				ener en	1	
Rotary Drilling	A A A A A A	11 M		Calseal				-	1	
Handling Rod (bit)	5 · · · · · // · · · ·	a and the second		Mud	50#	£	· .	the group of the	1	
				Mud	100#	£ .	t station and	ha i		
Rock Bit - Overburden		n en	a.,	Other (De	scribe)					
Reaming (to))			FZ nob	id 5	d.		1		
Casing – Placing		1994 - 1995 -						_		
- Pulling				· · ·	 					
Delays - Client Acct.						<u> </u>				
	(Ag 130) an dial for a	a) 36°								
Cementing - Handling Rods - Prep Hole & Grou			na far i sina.	Water baul	line		OTHER	the stars	1.	
- Setting			and a second	Care how	ling	mi	les		JS	
- Drilling				Core boxe Length of	s:	\$1Z	e/	no.		
Moving - Hole to Hole				Lost tools:						
Rigging Up - Rigging Down	<i>.b</i> .			LUST TOOIS.	Description					
Mix Mud		1	1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1			1994 - A.		1 1	-	
Condition Hole, Lost Circulat			e r 👘	Lost bits:	Size	Se	rial no		The A	1
Surveying, Inclination Test			the section of				le #			
Mobilization/Demobilization	1	(1) (1) (1)	A. Tring				1 <u></u>			
Other (Explain)				for Cli	ient	Hole	#	цт, н,		
atting up Bla. 44 Barr	t i se a fin	vel 1. 1	a de la composition de	Lon	gco	Hole	#	1. I. N.		
J T					s: Si	ze S	erial #	Depth		
				(Include	BW	4-6-	SH1 35	·		
				first bit			, , ,	/		
Total Hou Driller's Initi	1725 N			in hole)				<u></u>		
Shift DRILLE	1914 W 1919 1941	Hrs.	HFI	PERS		Hrs.	TRU	CK DRIVE	RS	Hr
A Pl. Scheord		the state of the s	Roste b.			8				
B , , , , , , , , , , , , , , , , , , ,				20		0		1		
C				÷			·			
	the second s	7' no.		act k						

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	n: <u>Jero</u> :	1 1 1	10 - 17 - 17		1			1 1 12 12		and the second	स्वयत्वे स	7 / 0. 		T . (10
Shift	Hole No.	Angle	Mat	erial C	Drilled		it Size	Dr	Footage :		ning		eet Core Re-		l Casing Hole
	- 1.4		1			8	Type	From	То	From	То		covered	Size	Foota
Day A	901-1 100-1	-11 *		· · · · · · ·		BW	144		355		9.112				
Aft B	9. 9.9.9.999	8 (2)		24	- 6. S		nit ylije	i Restynct	1	1995 - 1974 - 1975 1974 - 1975		· * 1.182			
Nite C	61,2 (24)) ; 						er i sagi	e tra sta a	ante desta					84	
	Hourly Distrik			-	Day	Af	e start F	Nite			Sunn	lies Consum	ad		
and the second se	rilling			a_{1070}		a di sa	Sey Las	TVILG		·94 .	Supp	Product	Dav	Aft	. N
Hand Overbu	lling Rod (cha rden - rock bi ng Hole - Dia.	ange b it				e Status	- X:5.7		Descriptic Portland Lumnite		ze	Name		imber o	
	Drilling			-		1.1			Calseal						-
	lling Rod (bit			1.	11	dige.		entre serve	Mud	50#	inter an	etter al l'al la l	-	+	-
									Mud	100#	$r = e^{i \frac{1}{2} T t}$	h e sterer			
	Bit - Overbu	rden						1	Other (De		$z \leq 1$	1. n. 1	· · · ·	1.1	
Reamin	ng (to — Placing	14.78)							- 110		500	- 3-		
	– Pulling			-					BRP	acker				+	
and the second second	Client Acct.	i negeri	ada a a		31. 1. 4. 4.	2); - 24	14					· . *	<u>.</u>		
	₽)(1 ≤ 321 ≤				1.			1.1.1	1111	$ _{L^{\infty}(\mathbb{R}^{n})} = _{L^{\infty}(\mathbb{R}^{n})}$	4. Γ.	1 <u>1</u> 1 1		1	
Cement	ing - Handlin	and the second se			V I		1			1999 - C. 199	196 9 1	OTHER	·		
	- Prep Ho					14	1.1		Water hau	ling	m	iles	load		
1.1. 7.6	- Setting - Drilling		en l'agrèces engliser	16	Į		*		Core boxe	S:	si	ze/	no.		
Moving	- Hole to Hol		an an aire an	1						waterline: Descriptio					
	Up - Rigging		1	e estre y	t da sta		19.00	nergan e	LOST TOOIS.	Descriptic	·	Theo gia	r set y a		
Mix Mu	d		1			1 200		- Section	es de la	u	4.00.00	er i strij	a general de la	9. ₁₀ 2	
	on Hole, Lost			and the second	$(a_{i})_{i\in I}$	1	1					erial no.			
the second se	ng, Inclinatio ation/Demob											ole #			
	Explain)	mzatio	on	1 1 1 1 1 1 1		3 9		1				.e			
				-		£ .					Hole	# #			
····	<u>107 307 30</u>	ipt y	~	3					Bit change (Include	es: Si	ze	Serial #	Depth		
		-			-				first bit					1	
- 0	Dril		Hours nitials	T	R VA				in hole)	<u></u> 		<u> </u>	1 1 		
Shift	1	DRIL	LERS	10	1.6/	Hrs.		HEL	PERS		Hrs.	TRU	CK DRIVE	RS	F
A B	P. L. Set		1		· · · · · ·		3., 1	Pasa	97 J	5	1				
С												3			

y 2 CRC OFFICE SUPPLY DIST., INC.-MINNEAPOLIS, MINN. 55402 CLIENT .

, . ,				C)	C	ontracting General		(C		"DAILY	DRILL	REPOR
Contra	et: Budg	1 \$	1.	r.	3 4 S & M & S &	Carlo I.	전에 나는 것이 같아.			7	10	061	1	
	on: Jevon			F	oreman's	ітн Sign	DAY	9 <u>85</u> Dril <i>Pal</i>	Sh	TYPE	DI	RILL NO.	TR	UCK NO.
-	Alt arris	e	<u>, , , ,</u>		Dia			Footage S	Summary	is anti da	F	eet	Tota	al Casing
Shift	Hole No.	Angl	Mate	rial Drilled	Bit S & T		Dr From	illing To	Rea From	ming To	Drilled or Reamed	Core Re- covered	in Size	Hole Footage
Day	901-1	-110		ll tool	BUIL	14		355		e e e ma	Ticanicu	Covered	0126	Tootag
						1946 - 28 				1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1		a saran an Brander an		
Aft B	trijk, jada	ona B	a i portior	ari, hesi e e	ta induk;	√त}.	nte grita	1 - 40 - 10 ⁴⁴ 08	daria- v	et in verse "	C 1927/2, 3	ne at	0775-00 1912	t w
Nite	- colorar s	9-1-2134	મહેલું લુકાર	ti taraturi t K	8 <u>3 9</u> 1	2013	est est d'	1 01 000	st the s	1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1	त्र ने दिसमें है. देश देशके दे कि	00 - 31 au 31 - 21 au	run H	
С	en]† ∮9010.		er ole pr		्त्र चार्यप्रव	orin o	$B_{\rm e}(t) \in \Omega_{10}$	21 22 22 24	પાછ પુર્વાદ્વા	at the side		$\hat{u}_{r} = (\hat{v}_{r}) \hat{v}_{r} \hat{v}_{r}$	a de la	
Coro	Hourly Distril	bution		Day	Aft.		Nite			Suppl	ies Consum		1	
Hand	lling Rod (cha	ange bi	it)					Descriptio	n Si	ze			Aft.	
	rden - rock bi ng Hole - Dia.		11 13 1 4 163	thi equit in	1	6.19	(<u>1</u>) - 1-1,19	Portland Lumnite	1971 A <u>RG A</u>	<u></u>	er Brinnen i S	and the second	i gui tr	
	Drilling		i gle i i i	e de la la la			ing Reg	Calseal		nograph org				
	lling Rod (bit			i zaglašti	areas an	- q. (.) - (e sal i, isalah	Mud Mud	50# 100#	on inge an	in a tractica. Na managina di tractica Na managina di tra			
Rock	Bit - Overbu	rden	an Tarana					Other (Des			ri in second	-		
	ng (to)					18.500				#6	1. 1. 1.	
	– Placing – Pulling	анану Стал и			1 1 1 1	10 1		8 April	s.r.		ing graffikari Richard			
	Client Acct.	n Uirrati	Maria di di	ağını türkleri ile	the states		riya ta d	e al der e		e ti Inadi	1			
	 shotlerit 			13	na, estra e	14 1		- 1 // 119 g	1994 (P. 17	(j		ter en en		
Cement	ting - Handling			121		-			Ignala a					
	- Prep Ho - Setting		rout	G	- 19 10 - 13 9 19 19 19		Rec MG	Water haul	ing	mi	les	load	ds	
	- Drilling	me t	التربي المستنبية المراجعة التربية المستنبية الموالية	14)	1. 1.1.17 · · ·		en en alte	Length of	waterline:	SIZ	e/	no.		
Moving	- Hole to Hol		1	U.	2.15			-		the second se				
Mix Mu		1.08	- S.		in ser later. The series of the		na 151 a 15 Martin Ing	. 4. ⁻¹ ,39 - 55 ³) 	e i si i i Secondaria	den est. Avis est	- 	n ya ka shin Manazira	An o	
Conditi	on Hole, Lost	t Circu	lation	stan ser	945 - A		a an gui th	Lost bits:	Size	Se	rial no.	$(q_1, k_1) = \dots = 0$	ť.	
Surveyi	ng, Inclinatio	n Test	in the second second	21.22	di Casa Casa Casa		an ghanna	Depth:	<u> </u>	ft. Ho	ole #	and an		
	ation/Demob Explain)	llizatio	on .	nan af i Adiri	10. 203 oct. 1		1. 1. 103. 1	for Cli	ent	Hole	#	$(1, 1, \dots, 1)$		
	tion the	1997 - 1997 - 1997 1997 - 1997	1		1 Standard	-	er i Farre	Lon	gco	Hole	#	Carrier and		
											erial #			
		Total H	Hours	8	tant i e		dana artis	first bit in hole)		nga si nga si	et t _{here} te de		ana Ang ang	
	CIA Dril	ler's Ir	nitials	2hd). ()위()가 가??	Үнэг ам	won y	(Marx)	स्टब्स् सन्दर्भ स्वर	<u></u>		
Shift		DRIL	LERS		Hrs.			PERS	2.1-7	Hrs.	TRU	CK DRIVE	RS	Hrs.
A B	P.L.Se	Air or	de-	1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1	8	TR.	oscy les	irg ;	<u> </u>	8			e i	
С												1.1.1.		
Remar	ks: <u>very</u>	1.1	1.1	Chevin 7	; +	H.	1.0.10	5+1	LL cas	* <u>*</u> *				
<u>.</u>						1	1	4						

	t: <u>Budge</u> n: <u>Seron e</u>		2	D	ate: <u>//</u> MC	ONTH 's Sigr	DAY 1	95 Dril Put 1	1_1_M 	TYPE	DF	26 RILL NO.	TR	UCK NO.
	in the starte		6 -1			- -			·				· · · ·	
Shift	Hole No.	Angle	Mate	rial Drilled	Bit	t Size	D	Footage S		ming		Core Re-	•	al Casing Hole
Ginit	mole no.	A	inaco		&	Туре	From	То	From	То		covered	Size	Footag
Day	901 (C.167	1.57	1 - S. 4 -	$\gamma_{1,M}$		• 1860 (17) •	181 pr 17 m		- 3	12 6 16 3	and the state	1.55.11		
A	And the second			2	RW			255			1	C NG		
	a givin cen N	- 14 A.	1. <u>1. 1. 1.</u> 	(C) 7 4 5	Ha/G .	ayata sa	and set from the		1994 - S. (1994) Sec. 1			an a	0.81	
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CRC OFFICE SUPPLY DIST., INC. --MINNEAPOLIS, MINN. 55402

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Rotary Drilling Calseal Handling Rod (bit) Mud Rock Bit - Overburden Mud Reaming (to) Other (Describe) Casing - Placing Other (Describe) - Pulling Other (Describe) Delays - Client Acct. Other (Describe) - Pulling Other (Describe) Cementing - Handling Rods OTHER · Prep Hole & Grout Vater hauling miles loads · Setting OTHER · Orther Delays - Client Acct. · Prep Hole & Grout Vater hauling miles no. · Setting Use tools: Description · Setting Lost bits: Size Serial no. · Dorbling Lost bits: Size Serial no. Mobilization/Demobilization Casing lost or left in hole: Size ft. Other (Explain) Casing lost or left in hole: Size ft. · Driller's Initials · Other (Include ff. · Driller's Initials · Other · Driller's Initials · Other · Driller's Initials · Other · Other (Explain) · Other · Other (Explain) · Other · Other (Explain) <t< td=""><td></td><td></td><td></td><td> 125/70</td><td>a la seguration</td><td></td><td>hr an</td><td>sel i terre en ig</td><td></td><td>s (st. 19<u>24)</u></td><td>t star of</td><td>10.01812.1164</td><td></td><td>Pair O</td><td>_</td></t<>				125/70	a la seguration		hr an	sel i terre en ig		s (st. 19 <u>24)</u>	t star of	10.01812.1164		Pair O	_
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Reaming (to)					1										
Casing - Placing			rden `		and the second		1. 11	A. 1	Other (De	scribe)	entra cuia	Theorem	Jahr Maria	· ··· · · ·	
Pulling			4)	10	-		· · · · · · · · · · · · · · · · · · ·					-		
Delays - Client Acct.			10,000	a contra a c	All the state										
Cementing - Handling Rods OTHER - Prep Hole & Grout Water hauling miles loads - Setting (4) - Setting (4) - Drillfing U Moving - Hole & Grout Length of waterline: Moving - Hole to Hole Lost tools: Description Rigging Up - Rigging Down Lost tools: Description Mix Mud Lost bits: Size Condition Hole, Lost Circulation Lost bits: Size	and a party of the local data and the second se	the same the same same same same same same same sam	-		-										
Cementing - Handling Róds OTHER - Prép Hole & Grout Water hauling miles loads - Setting (4) - Drillíng Length of waterline: Moving - Hole to Hole Lost tools: Description Rigging Up - Rigging Down Lost tools: Description Mix Mud Lost bits: Size		and the second se		the second s	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	1.15.13	1111	(***) · · · ·				1. A	1. A. 1.	1	
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Setting (4) Core boxes: size/ no. Drilling Length of waterline: no. Moving - Hole to Hole Lost tools: Description	Cemen				Search .					a filiana. S			in Kalen K		
Image: Second				1.	10	1	1 1 1	1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1	Water hau	ling	mil	es	load	ds	
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Condition Hole, Lost Circulation			Dow	<u>n</u>	1.0000.0322.0			and the state of the state					16 es 1 s		
Surveying, Inclination Test			+ Circi	ulation											
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Total Hours Image: Constraint of the second secon											ze Se				
Total Hours Figure in hole) Driller's Initials Image: Constraint of the second	1.					+				20 <u>5-0-0</u>					
Driller's Initials Hrs. HELPERS Hrs. TRUCK DRIVERS A PL. Schwedter 8 JRober burg 8 B			Total	Hours		+					· · · · ·	- 1-1			
Shift DRILLERS Hrs. HELPERS Hrs. TRUCK DRIVERS A P.L. Schweder 8 JRoper burg 8 B			TOLA	nours	1000	+			In note)		<u></u>				
A P.L. Schweder 8 J.Rosenburg 8 B C					POA	$= \sqrt{2}$	8.23			, (1 <u>17 -</u>	- Margana min.		a (^R)	×!	
B C												TRU	CK DRIVE	RS	Hrs
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							- Contraction		and the second s					а.	
						and a	5								

CLIENT

Longyear Company

308 E. Pima Street Phoenix, AZ 85004

Telephone: (602) 258-6543 Telex: 667-428

July 22, 1985

A. F. Budge (Mining) Ltd. c/o Ben F. Dickerson III 7340 E. Shoeman Lane, Suite 111 "B" (E) Scottsdale, Arizona 85251

RECEIVED JUL 2 4 1985

Dear Sir;

Enclosed you will find our proposal covering your planned drilling project located near Jerome, Arizona.

For this program we would plan to furnish a Longyear 34 air-powered drill machine equipped will all the necessary tools, casing, rods, and bits needed to complete the program.

It is also understood that miners lamps and self rescue will be furnished by the client at no cost to Longyear Company.

In computing the diamond drilling footage charges as outlined in the attached proposal, Longyear has assumed that the diamond bit expense will not exceed \$2.50 per foot drilled. In the event the actual diamond bit expense experienced on the program exceeds the \$2.50 per foot allowance, 50% of such overage will become an invoiceable charge in addition to alloother outlined charges.

It is understood that a prepayment of \$10,000.00 will be needed before drilling will commence, and that this prepayment will be used as retention money toward the last invoice. Invoiceing will be twice a month, due upon receipt. However, if sufficient financial information can be furnished to Mr. Bob Martin in our Minneapolis office, phone (612) 331-1331, he will determine if the billing can be open account.

We appreciate the opportunity to make our drilling services available to you for this project.

Sincerely,

LONGYEAR COMPANY

Jussell Leadon

Manager, Southwestern Zone Contract Drilling Division

RGB:es c: D. Swayne Encl.

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	onovear

To: <u>A. F. Budge (Mining) Ltd</u> c/o Ben F. Dickerson III DRILLING PROPOSAL Submitted by: Longyear Co.

308	Ε.	Pima	Stree	et
Phoe	eni	x, Ar:	izona	85004
(60)	2)	258-6	543	

Date July 22, 1985

7340 E. Shoeman Lane, Suite 111 "B" (E) Subject: Drilling Program Located Near -

Scottsdale, Arizona 85251

Jerome, Arizona

Attn: Mr. Ben Dickerson III

1. Mobilization and Demobilization of personnel and equipment - Per rig from and to portal.

a. Coring rig: Mobilization - \$ 500.00 Demobilization - \$ 500.00

b. Rotary rig: Mobilization - \$ _____ Demobilization - \$ _____ Mob & Demob of Companyowned compressor \$100.00

2. Overburden Drilling (or collaring hole)

From (ft)	To (ft)	Rock B	it Size	 Diamond Bit Size
			-\$	

3. Rotary Drilling

From (ft)	To (ft)	Hole Size(s)			

4. Diamond Core Drilling

		2.5"	1.875"	Core Size(s) 1.432"	
From (ft)	To (ft)	HQ	NQ	BQ	
0	250	\$ <u>23.05</u> 23.85	\$ 22.35	\$2 <u>2.05</u> 22.05	\$
500	1000		24.00	23.85	
		لمه من ها مه به مه			

Angle hole drilling

LONGYEAR COMPANY DRILLING PROPOSAL

3

To	A	. F. Budge (Mining) Ltd.	Date_July 22, 1985		
			Bate n	er Hour	
5.	Rid	Time (<u>2</u> man crew)	Rotary Rig	Core Rig	
0.	a.	Cementing – hole preparation, grouting and drilling	\$	\$67.10	
	b.	(including necessary rod handling time) Hole stabilizing and/or plugging		\$67.10	
	c.	Installing and pulling casing		\$ <u>67.10</u>	
	d.	Rigging up and down		\$ <u>59.50</u>	
	e.	Moving between holes	\$	\$ <u>59.50</u>	
	f.	Drilling, reaming, casing, stabilizing, etc. (hourly contracts)	\$	-2	
	g.	Re-entry and cleaning out old hole, plus cost of all bits and supplies	\$	\$67.10	
	h.	Installing and dismantling water lines	\$	\$ <u>59.50</u>	
	i.	Tractor service (or at Longyear's hired cost)	\$	\$_N/A	
	j.	Hole survey or inclination test .+. rental & related. cost. of.	\$		
	k.	Wedging operations, plus cost of wedge and wedge bits	\$	-\$	
	۱.	Time spent moving equipment from portal into mi and out at end of project.			
	m.	mine in success of 10 has non work owortime		\$ <u>22.10</u>	
6.	St	andby or Delays			
	Fo	or the convenience or the responsibility of client $(\underline{2} man crew)$	\$	\$ <u>59.50</u>	
7.	Ca	sing and Casing Shoe (at Longyear List Price)			
	a.	Left in hole at client's request	100	_ %	
	b.	Lost through normal drilling operations	100	_ %	
8.	R	maning RexXx will be invoiced at \$67.10 per hour plu	s bits.	,	
	A	T DEPTH to to	to	to	
	-	toft\$\$			
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	_	toftft			

DRILLING PROPOSAL

1

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To:	A	. F. Budge (Mining) Ltd.	Date	July	22, 1985
	2		*		
9.	In	hole materials Invoicable to Client (At Longyear FOB job cost plus <u>12</u>	?%)		*
	a.	Drill mud	Yes_	<u>X</u>	No
	b.	Mud additives	Yes_	X	No
	c.	Hole stabilizing or plugging materials	Yes_	X	No
	d.	Cement	Yes_	X	No
	e.	Hole plugs	Yes_	X	No
	f.	OtherSoluble Oil	¥es_	X	
		Rod Grease	Yes_	X	,
10.	qmo	pressor mex Furnishing Charges will be invoiced at \$800.00 per us cost of fuel to operate.	c mo.	for Lo	ngyear owned
		Water truck rental charge	\$		_per month
	ь.	Water truck mileage			per mile
	с.	Water truck driver (full time, if required)	\$		Per hour
	d.	Water, if purchased	At Lo	ongyear's c	ost
	e.	Water line installation .and. dismantling	\$ 59	.50	Per hour
11.	Ac	cess Roads and Drill Sites will be Prepared and Maintained by:			
	(<u>x</u>) Client			
	() Longyear Co	@\$		Per hour
12.	Сог	re Boxes			n n
		HQ	a \$ <u>3.</u>	00 :	_each + freight
	N	<u>NQ-BQ</u> size @	<u>s</u> 2.	75	_each + freight
13.	Foo	otage Compensation (hourly contracts)	\$		_ per foot drilled
14.	Per	Diem Charge To cover living allowances for crews	\$ <u> </u>		
15.	Bit	s and Setting Charges (at Longyear's list price)			per day worked
	a.	Rotary or rock bits	Yes_		No <u>X</u>
	b.	Diamond bits and shells in excess of \$2,50 per foot, split 50/50.	Yes_	X	No
16.	Otł	her See cover letter.	•		· · · · ·

- 1

DRILLING PROPOSAL GENERAL SPECIFICATIONS

3

Date_

To	Α.	F. Budge (Mining) Ltd.	DateJ	July 22, 1985
17.	Ar	nticipated Requirements and Conditions		
	а.	One Drill(s); type Longyear 34 air-powered dril	1	
		One Shift(s) per day (_2man crew @ 10hours per shift)		
	c. d.	5 Day(s) per week or 10 hrs. a day, 6 days a overtime in excess of 10 h Minimum contract footage 4,000 ft.	week w/ rs. per	/client paying f week.
	e.	Number of holes10+		Ū.
	f.	Maximum depth 1,000 ft.		
	g.	Average depth 300 ft.	1	
	-	Attitude of holes (from horizontal)		
		1) Vertical		•
		2) Angle @ 6 - 45 degrees. up and up to -90° dow	n	
	i.	Average depth of overburden ft. Composition		
	i.	Size of hole or core size required: <u>HO</u> , NO, BO		
	k.	Rock type to be drilled:		
	١.	Other:		
18.	We pro	surance: will carry Comprehensive General Liability and Automobile Insura operty damage and also statutory Workmen's Compensation Insurance. C I be furnished upon request.		
19.		voices		
	a.	Invoices covering the work performed will be prepared as promptly as day of each month and payment shall be due upon		er the fifteenth and last of invoice.
	ь.	Invoices arising from this project will be subject to all applicable state Privilege, etc.)	taxes (Sale	es, Use, Gross Receipts
20.		ces quoted herein are firm only if this proposal is accepted on or before_ d if work is commenced within a reasonable period of time.	Augus	t 30, 1985
21.	me	is proposal together with its covering letter will constitute the terms an nt. Your authorized signature in the space provided below will acknow idate the agreement.	d condition Swledge you	ur acceptance and will
ACC Corr	EPT pan	Contra		Western Zone ling Division
By_	1	Jon F. h Julkannan Title Agent		
Date	3	August 2, 1985	1	Page 4 of 4



Longyear Company

308 E. Pima Street Phoenix, AZ 85004

Telephone: (602) 258-6543 Telex: 667-428

July 18, 1985

A.F. Budge (Mining) Ltd

Ben F. Dickerson III 7340 E. Shoeman Lane Suite 111 "B" (E) Scottsdale, Arizona 85251

Dear Sir:

Enclosed you will find our proposal covering your planned drilling project located near Jerome, Arizona.

For this program we would plan to furnish a Longyear LM-37 drill machine, requiring 440 3 phase power on site. It is understood that an electrician will be available at no expense to Longyear Co. to wire power to the equipment.

It is also understood that miners lamps and self rescue will be furnished by the client at no cost to Longyear Company.

In computing the diamond drilling footage charges as outlined in the attached proposal, Longyear has assumed that the diamond bit expense will not exceed \$2.50 per foot drilled. In the event the actual diamond bit expense experienced on the program exceeds the \$2.50 per foot allowance, 50% of such overage will become an invoiceable charge in addition to all other outlined charges.

It is understood that a prepayment of \$10,000.00 will be needed before drilling will commence, and that this prepayment will be used as retention money toward the last invoice. Invoiceing will be twice a month, due upon receipt. However, if sufficient financial information can be furnished to Mr. Bob Martin in our Minneapolis office, phone (612) 331-1331, he will determine if the billing can be open account.

We appreciate the opportunity to make our drilling service avail able to you for this project.

Sincerely

LONGYEAR COMPANY inul

Manager, Southwestern Zone Contract Drilling Division

RGB/sb c: D. Swayne Encl.



DRILLING PROPOSAL

Submitted by: Longyear Co.

• •

o: I	Ben F. Die	ckerson III		Date_July 18, 1985			
	7340 E. Shoeman Lane			Subject: Drilling Program Located Near -			
	Suite Ill Scottsdale	"B" (E) e, Arizona 8525	1	Jerome, Arizona			
-	Attn: Mr. Ben Dickerson III					an a	
Mo	obilization and	d Demobilization of pe	ersonnel and equip	ment - per rie	g from and to	portal.	
a.	Coring rig:	Mobilization - \$_	500,00	Demobilization	n - \$ <u>500.00</u>		
		Mobilization – \$_		•	n – \$		
0	verburden Dri	lling (or collaring hole			Diama	ad Rit Sizo	
	From (ft)	To (ft)		Bit Size		nd Bit Size	
-				-\$			
_							
R	otary Drilling					Sec. 1	
-	From (ft)	To (ft)		Hole Size(s)			
			\$	3	5		
-						-	
-							
D	iamond Core	Drilling	2.5"	1.875" Cor	re Size(s)	,	
	From (ft)	To (ft)	HQ	NQ	BQ		
_	0	- 250	\$	\$ 23.15	\$ <u>22.85</u> 22.85	S	
-							
-							
-							
_							

Pace 1 of 1

LONGYEAR COMPANY DRILLING PROPOSAL

i	Date	July 1	8, 1985
2		and the second se	er Hour Core Rig
Rig Time (man crew)	Rotary		
a. Cementing – hole preparation, grouting and drilling	\$		
b. Hole stabilizing and/or plugging	\$		\$_67.10
c. Installing and pulling casing	\$		\$_67.10
d. Rigging up and down	\$		\$ 59.50
e. Moving between holes	\$		\$ 59.50
f. Drilling, reaming, casing, stabilizing, etc. (hourly contracts)	\$		5
g. Re-entry and cleaning out old hole, plus cost of all bits and supplies	\$		\$
h. Installing and dismantling water lines	\$		\$
i. Tractor service (or at Longyear's hired cost)	\$		\$ <u>N/A</u>
j. Hole survey or inclination test . + . rental . & related .cost. of instrument.	\$		\$ <u>59.50</u>
k. Wedging operations, plus cost of wedge and wedge bits	\$		
I. Time spent moving equipment from portal into mine and out at end of project.	\$		\$ 59.50
m.	\$		-\$
Standby or Delays			
For the convenience or the responsibility of client $(\underline{2} $ man crew)	\$		\$ 59.50
Casing and Casing Shoe (at Longyear List Price)			
a. Left in hole at client's request	1(00	_ %
b. Lost through normal drilling operations.		00	_ %
D. Lost anough hormal anning operationer for the for the former of			
Reaming Max Max will be invoiced at \$67.10 per hour plu	s bits	•	
AT DEPTH to to	to)	to
tott\$			
to ft to			
to ft			
toftft			Page 2 of 4

LONGYEAR COMPANY DRILLING PROPOSAL

To:

Date July 18, 1985

9.	In hole materials Invoicable to Client (At Longyear FOB job cost plus 1	2 %)	
	a. Drill mud	Yes X	No======
	b. Mud additives	Yes X	No
	c. Hole stabilizing or plugging materials	Yes X	No
	d. Cement	Yes <u>X</u>	No
	e. Hole plugs	Yes X	No
	f. Other Soluble oil		
	Rod Grease	Yes X	
10.	Water Furnishing Charges		
	a. Water truck rental charge	. \$	per month
	b. Water truck mileage		per mile
	c. Water truck driver (full time, if required)	. \$	== Per hour
	d. Water, if purchased	. At Longyear's	cost
	e. Water line installation .and. dismantling	\$ 59.50	Per hour
11.	Access Roads and Drill Sites will be Prepared and Maintained by:		
	(<u>X</u>) Client		
	() Longyear Co	@\$	Per hour
12.	Core Boxes		
	HQsize	@\$_3.00	each + freight
	NQ-BQ size		each + freight
		¢	T per foot drilled
	Footage Compensation (hourly contracts)		
	Per Diem Charge To cover living allowances for crews.	. 3	per man per day worked
15.	Bits and Setting Charges (at Longyear's list price)		NoX
	a. Rotary or rock bits		
	b. Diamond bits and shells in excess of \$2.50 per foot, split 50/50.	. Yes <u>x</u>	No
16.	Other See cover letter.		and the second second

LONGYEAR COMPANY DRILLING PROPOSAL GENERAL SPECIFICATIONS

				3005
Date.		1 37	18.	1985
Dale.	00	Sec. Y		

17.	Anticipated	Requirements	and	Conditions
-----	-------------	--------------	-----	------------

To.

a	One Drill(s); type Longyear LM-37	
b	one Shift(s) per day (man crew @8_ hours per shift).	3
c	6 Day(s) per week	ē.,
d.	Minimum contract footage 4,000 ft.	
e.	Number of holes10+	
f.	Maximum depthft.	
g.	Average depth 250 ft.	
h.	Attitude of holes (from horizontal)	
	1) Vertical 2) Angle @ degrees. up	-1
i.	Average depth of overburden ft. Composition	
j.	Size of hole or core size required: <u>HQ</u> , NQ, BQ	
k.	Rock type to be drilled:	
١.	Other:	

18. Insurance:

We will carry Comprehensive General Liability and Automobile Insurance covering personal injury and property damage and also statutory Workmen's Compensation Insurance. Certificates showing these coverages will be furnished upon request.

19. Invoices

- a. Invoices covering the work performed will be prepared as promptly as possible after the fifteenth and last day of each month and payment shall be due upon receipt of invoice.
- b. Invoices arising from this project will be subject to all applicable state taxes (Sales, Use, Gross Receipts, Privilege, etc.)
- Prices quoted herein are firm only if this proposal is accepted on or before ________
 and if work is commenced within a reasonable period of time.
- 21. This proposal together with its covering letter will constitute the terms and conditions of this working agreement. Your authorized signature in the space provided below will acknowledge your acceptance and will validate the agreement.

ACCEPTED:

Company_____

By_

Date

Title_

Manager, Southwestern Zone Contract Drilling Division

24 WOLVERINE DRILI

The 24 Wolverine Drill combines the cost efficient and conservative design features of the 24 Standard Drill with the convenience of direct air or electric drive and rigid mounting for underground operations. All existing advantages of the 24 Standard Drill apply to the Wolverine. The same features with the exception of the throttle control and bit speed tachometer - have been incorporated in the Wolverine design. Since the tachometer requires a 12V power source, it is not compatible with the Wolverine arrangement. Rotation controls for the Wolverine are furnished to suit the air or electric power source.

Power Options

The drill may be supplied with an industrial, heavy-duty, vane-type air motor or an electric motor compatible with local electric conditions. Consult your local Longyear Marketing Center for electrical conditions that are different than those in the specifications.

Hydraulic System

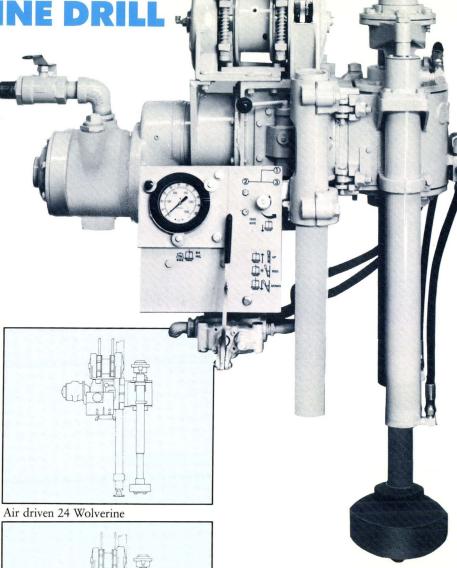
A separate air or electrically driven auxiliary hydraulic pump/tank system is utilized to provide power for the Wolverine hydraulic feed system. This auxiliary hydraulic system is priced separately but is an essential item for all Wolverine drills.

Column Mounting

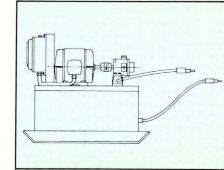
Heavy-duty clamps integrated into the main housing provide strong, rigid means of mounting the drill on $2^{3/4}$ inch (70 mm) columns. The columns are optional extras.

Bevel Pinion Protection

A bevel pinion safety cover is fitted to both the 24 Standard Drill and the Wolverine to protect the operator during open-head hoisting operations and to protect the bevel from damage by hoisting plugs, rods or tools.



For reliable low cost underground core drilling



Satellite oil circulating system

SPECIFICATIONS FOR THE LONGYEAR 24 WOLVERINE DRILL

					911 1			
			A	AIR	60	ELE	CTRIC) Hz
	Slow Bevel Gears	Low Gear 2nd Gear High Gear	45:	3 rpm 2 rpm 2 rpm	18: 41(3 rpm) rpm 7 rpm	15 34	3 rpm 1 rpm 2 rpm
BIT SPEEDS	Medium Bevel Gears	Low Gear 2nd Gear High Gear	759	9 rpm 9 rpm 3 rpm	683	6 rpm 3 rpm 3 rpm	255 rpm 569 rpm 1052 rpm	
	Fast Bevel Gears	Low Gear 2nd Gear High Gear	1062	5 rpm 2 rpm 4 rpm1	956	3 rpm 5 rpm 6 rpm ¹	79	7 rpm 7 rpm 4 rpm
			ft/min	m/min	ft/min	m/min	ft/min	m/min
HOISTING SPEEDS		Low Gear 2nd Gear High Gear	68 154 286	20 46 87	61 139 257	18 42 78	52 116 215	≠ 16 35 66
POWER			Air Cons	5 kW) 000 rpm sumption @ 90 psi /min @	Louis A 10 hp (7 3 ph, 60 230/460 1800 rpr	.5 kW) cyc	Louis A 10 hp (7 3 ph, 50 220/380 1500 rpr	.5 kW) cyc
TRANSMISS Type Speeds	SION		Automo gear ra	otive slidin tios 4.13:1	g gear type , 1.86:1, 1	ə 3; :1		
DRUM HOIST Drum diameter Width Capacity (5/16 inch cable)		5-1/2 in 2-3/4 in	iches (140 iches (70 r (19.7 m)	mm)				
HYDRAULIC Drive ro Cylinder Length o Angle ra	d ID ID of feed		1-13/16 2-1/2 in	inches (46 iches (64 r ies (610 m	nm)			
HYDRAULIC PUMP ³ Type Volume Maximum working pressure Recommended continuous working pressure		0 to 7.5 1000 ps	e volume 5 gpm (0 to si (6895 kP (3448 kPa	a)	n)	. 1."		
			lb	kg		lb	kg	
APPROXIMA	TE WEIGHT	Net weight Boxed U.S. Boxed exp.	650 700 800	295 320 365		780 830 930	353 376 421	
	-		Inches	mm	_	Inches	mm	
DIMENSION	S ²	Width Length Height	24 38 58	610 965 1460		25 47 58	635 1194 1460	
CUBIC CON	TENT ² Boxed for ex			5 ft³ 7 m³		3	2 ft ³ 9 m ³	

'Continuous operation at these speeds is not recommended.

²Dimensions shown are for drill in drilling position. Cubic content is for drill broken down for export shipment. ³Auxiliary hydraulic system is priced separately but is an essential item for all Wolverine Drills.

Longyear is constantly striving to improve its products and must, therefore, reserve the right to change design, materials, specifications and price without notice.

Cover protects operator and shields

bevel pinion against damage.

Electric driven 24 Wolverine

LONGYEAR COMPANY 925 Delaware Street S.E. Minneapolis, Minnesota 55414 U.S.A.

Phoenix, Arizona York, Pennsylvania Salt Lake City, Utah Spokane, Washingtor

P.O. Box 14189 Farrarmere Benoni, Transvaal 1518 SOUTH AFRICA

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ONGYEAR (U.K.) LIMITED Littlemoor Eckington Sheffield S31 9EF ENGLAND

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LONGYEAR CANADA INC.

St. Leonard, Quebec Concord, Ontario New Westminster, B.C.

San Jose COSTA RICA, C.A.







*****. *



Citer Parp

24 Diamond Core Drill



This field-proven drill combines ruggedness and efficiency with light weight and transportability. It is the driller's choice for the medium-depth coring and sampling program.

\$ 20,000 Diamee (Atlas Coped - 35 Hp unit) 1000 frt. Drill string 1000' N or B (used) 12,000 Corebble, pamp, etc 7,500 40 500 4000 drilling at 40'shift 100 shifts x # 200 20,000 Bitz + supplies at \$3.00/ft 12,000 \$ 72,500 - Powers -Powers - U.g. drilling. Silie Vole. fair # of gougy fault zones will need some additives Hydraulie rig Nor B size Guesses Et/shift Range - to -Bit & additions costelft _____ to Down Longyear's tyl. rig have any big problem? Call 612-757-1028 @ 5 (3 out time)

Specifications Longyear 65 diamond core drill

Rated Capacity	EW—EX	600 ft.	183 m.	
	AW—AX	500 ft.	152 m.	
	BW—BX	350 ft.	107 m.	
	NW—NX	300 ft.	91 m.	
Rotary Air Motor (HP)		2	20	
Dimensions	Width	15½ in.	39.4 cm.	
	Height	12 in.	30.5 cm.	
	Length	42½ in.	108 cm.	
Net Weight				
Standard	Drill with chuck	200 lbs.	91 kg.	
Standard Drill with blas	t hole coupling	195 lbs.	88.4 kg.	
Drill equipped with	n 65 Rod Puller	290 lbs.	131.5 kg.	
Bit Rotating Speeds —	Nominal			
÷	Standard	0-150	0 RPM	
	Optional		0 RPM	
	Optional	0-300	00 RPM	
Screw Feed — ''Built-in	n'' type			
	ength of Feed	24 in.	60.9 cm.	
	g Feed Screw*	1½ in.	3.8 cm.	
	ed Gears (4) —			
Revolutions	/inch advance	100 200	200 500	
	Standard		, 300, 500 300, 1100	
	Optional		1, 170	
	Special	0, 10	, 170	

* Optional heavy-wall feed screw available for non-coring blast hole drilling.

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The Longyear 65 for fast core drilling blast hole drilling



© Longyear Company 1980 Bulletin B-5002 Bp 5m 7/80

Now from Longyear . . . **65 Diamond Core Drill**

Longyear

65 Diamond Core Drill Lightweight Powerful Air-driven

The Longyear 65 has all the job-proven features which made the CP-65 one of the world's most widely used, light-weight diamond core drills.

Its minimal weight (200 lbs., 90.7 kg.) and its length $(42\frac{1}{2})^{\prime}$, 1.08M) make it easy to move and set up in small working spaces.

The powerful 20 h.p., reversible air motor provides smooth, sustained, vibration-free drive for faster penetration, plus fast positioning of the feed screw and fast make and break of drill rods under power when blast hole drilling.

Well balanced over-all design results in dependable performance and smoother, faster drilling.



GROUT PIPE CLAMP includes column pipe, saddle clamp, safety collar and bushing. TWO SIZES AVAILABLE: For 11/2" or 2" grout pipe and for 3" grout pipe.

31/2" DOUBLE SCREW COLUMN with jaw-type saddle, safety collar, wrench and jack bar. Side arm also available



Construction

Steel housings of ample section make the Longyear 65 a fully enclosed, dust-proof, oil-tight unit. Every pound of useless weight has been eliminated without sacrificing sturdiness and durability. Ball bearings are used throughout the drill, and its efficient spur gear drive has all parts running in grease or oil so that wear and friction losses are at a minimum

Power-Vane Motor

The high-torque, rotary type air motor develops ample power to drill to depths of 600' (with EW fittings) with ordinary mine air pressures. It is trouble free, runs without vibration and is economical in air consumption. The flexibility of stepless throttle regulation with high torque even at low speeds, makes for low bit cost and maximum core recovery. The motor pinion is renewable, instead of being integral with the rotor shaft, which is the usual construction.

Feed

The built-in screw feed makes the 65 a selfcontained unit. It maintains absolute alignment of working parts, regardless of feed pressure. The distance from center line of the feed screw to the bottom of the cone is held to a minimum, thereby reducing the tendency to push the mounting out of line. In average drilling, ordinary rock drill mounting suffices, without extra bracing. Four sets of feed gears, any one of which may be engaged without stopping the drill, give wide selectivity in rate of feed and enable the operator to take full advantage of variations in ground and bit condition.

Self-lubricating feed screw gives full 24inch run - sufficient to change 2-foot rods in restricted quarters. Entire drill swings down and out of the way (by loosening one nut) when pulling rods. The feed screw easily accommodates the EW core barrel. so that use of a short core barrel in starting holes is unnecessary.

Mounting

Mounts on a standard rock drill saddle and works in any position from column, arm or crossbar. Short overall length of the drill eliminates much costly station cutting.

Safety Chuck

A two-jaw safety chuck, carefully machined for perfect balance at high speeds, is provided. Chuck jaws are tightened by two oversize chuck screws with countersunk heads that cannot get caught in the operator's clothing. The chuck body has three pairs of holes for chuck screws. Successive pairs of holes may be used as threads become worn, thus giving long life. A long Allen-type wrench, with deep engagement, gives ample leverage to readily tighten chuck screws without tendency to slip.

Pneumatic Rod Puller

The optional 65 rod puller is of the twoposition type, bolted to the drill saddle plate for perfect alignment with the drill hole. A guide arm is provided to insure rod alignment and prevent binding. Its use is strongly recommended for holes deeper than 100'.

It will handle 400' of EW rods at 90 psi air pressure on vertical holes and longer lengths on angle and flat holes. Weight of drill, equipped with the rod puller, is 290 lbs.

Heavy Wall Feed Screw

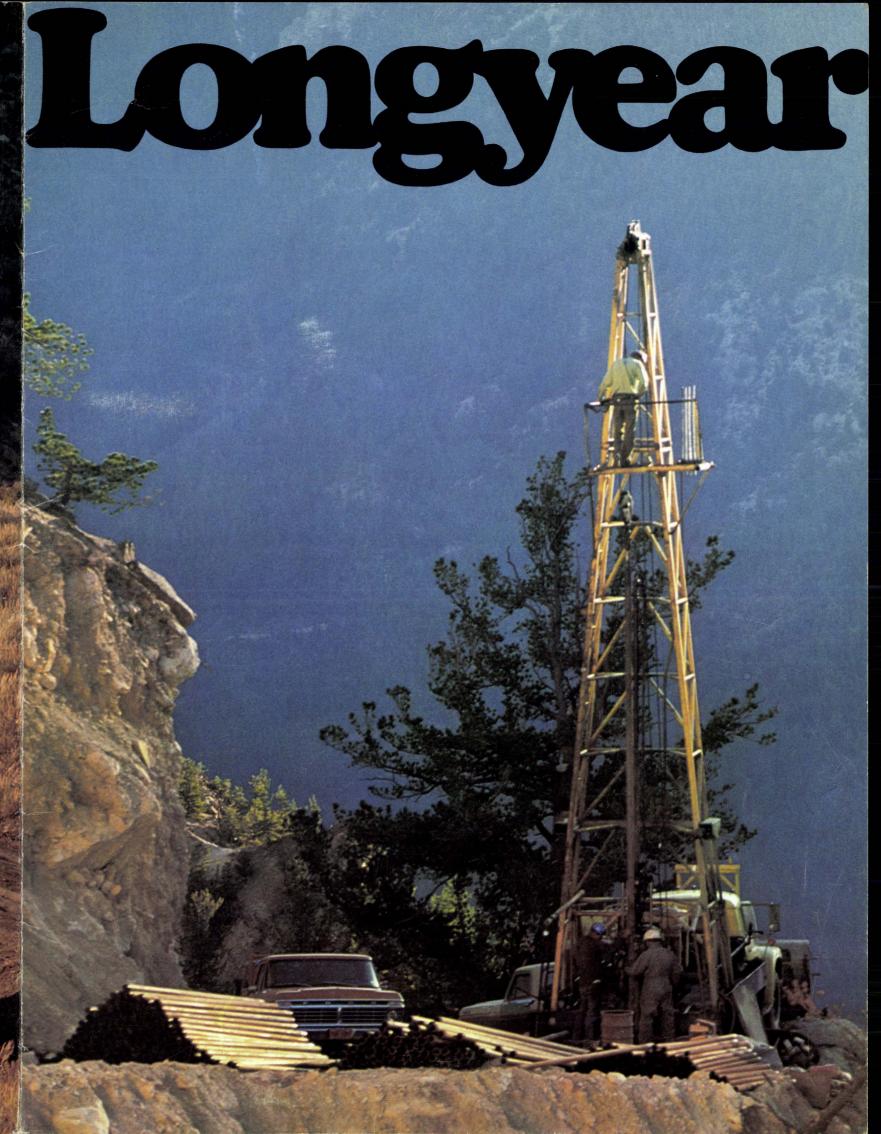
This optional feed screw is available for non-coring blast hole drilling. A high speed water swivel and blast hole rod coupling can be threaded directly to the feed screw, eliminating the chuck.

For more information about products or contracting services, contact the Longyear office nearest you:

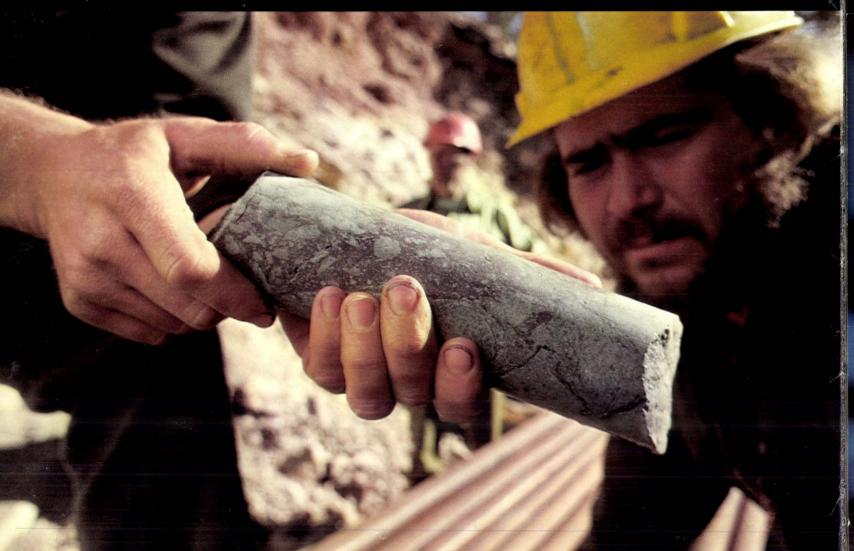
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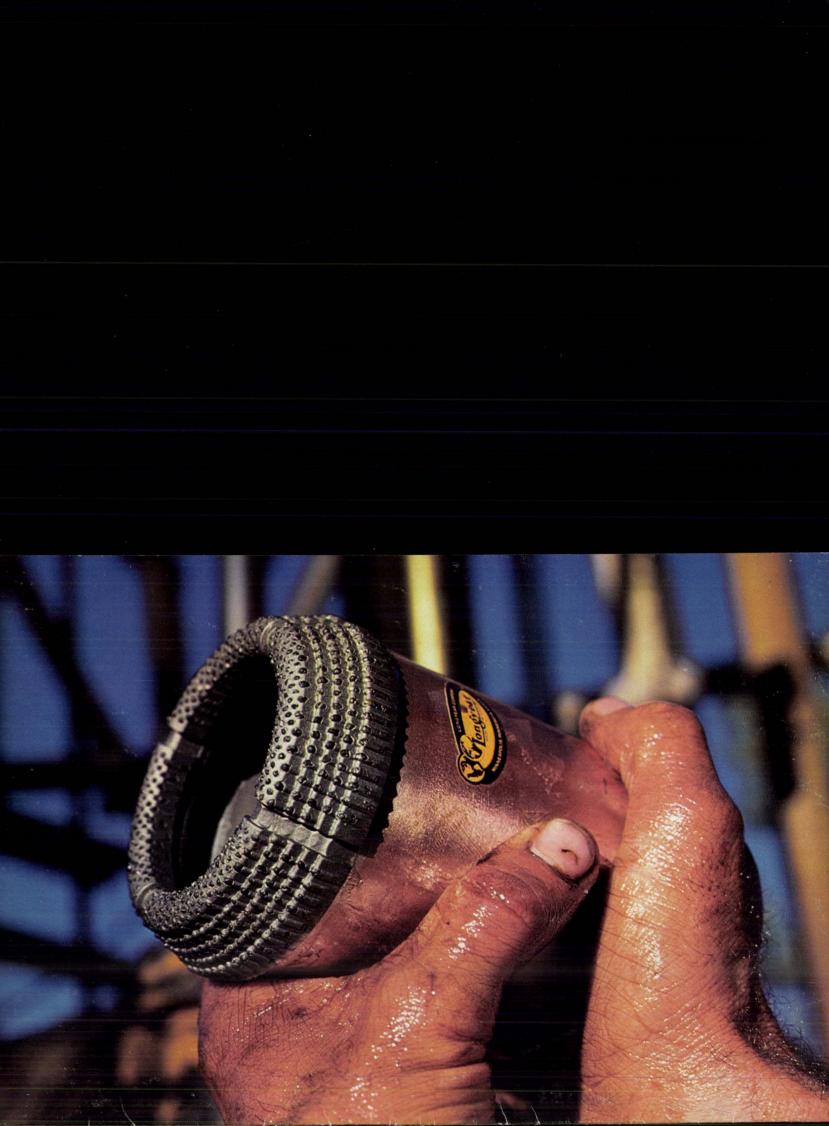
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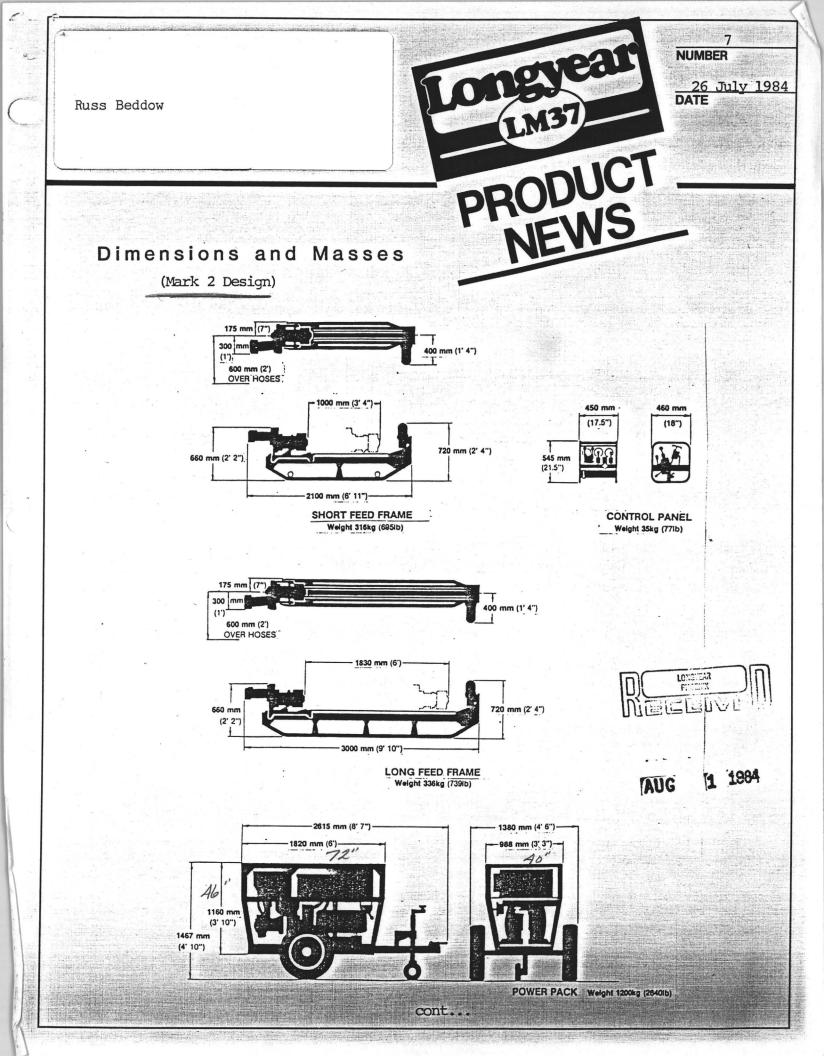
Longyear. Where in the world do you need us?

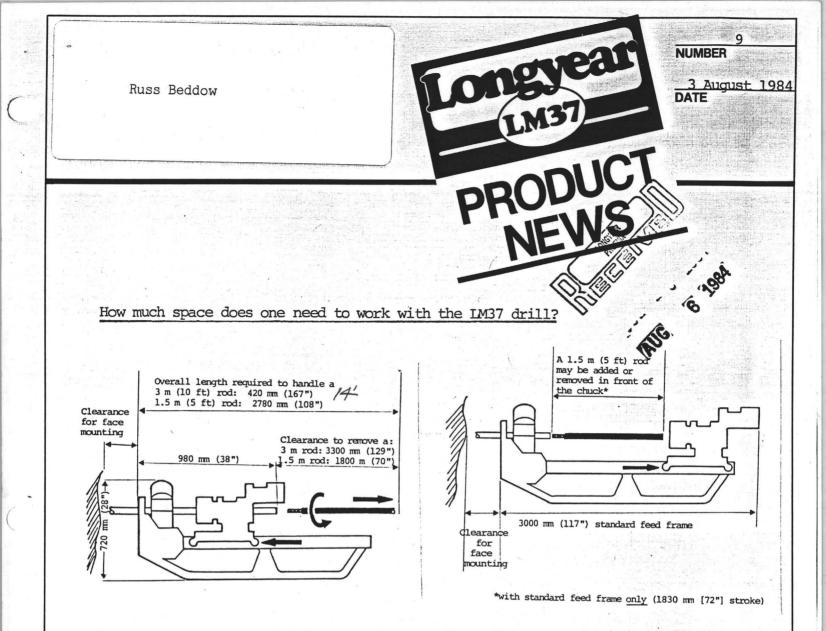


Industrialization of the world over the past century has de-manded ever-increasing amounts of metals and other basic raw materials. Throughout most of this time, Longyear has grown along with the mining industry – providing diamond core drilling services and equipment for recovering the core samples so invaluable for geological information and for verifying the presence of workable mineral deposits. Longyear crews, in the course of recovering millions of meters of core in every conceivable kind of geological formation, have developed a unique combination of skills and tools for accomplishing their tasks. The combination is available to you as a complete contract drilling service, or the tool system can be provided for operation by your crews. Longyear's help in selecting the tools and putting them to work comes along with them. We're ready – any place in the world – when you need us.









There are no set dimensions or rules of thumb. However, the following should be considered:

- 1. ORIENTATION (ANGLE) OF THE HOLE. This will determine the general shape of the minimum space required.
- 2. <u>DEPTH OF HOLE</u>. There must be enough space near the feed frame to stack all the rods. The rod stack must be conveniently positioned for ease and speed of rod cycling. For deep holes drilled with conventional core barrels, a helper's platform may be required at certain angles to speed up rod handling.
- 3. <u>ADDING RODS</u>. The fastest and most convenient way of adding or removing rods is from behind the drill head. Note on the sketches that the overall length required to remove a 1.5 m (5 ft) rod is less if the rod is pulled from behind the chuck rather than between the chuck and rod holder.
- 4. CONTROL PANEL. The control panel must be positioned in a convenient and safe place. This is particularly true for steep up-holes. This position varies from set-up to set-up and with working conditions. The control panel requires some space (width) but this is usually not a major concern.

5. <u>POWER PACK</u>. It is desirable to place the power pack as far away as practical from the operator's station to reduce noise levels and to position it so that the air flow is directed away from the operator (and towards a ventilated area). The 6 m (20 ft) connecting hoses limit the distance between the power pack and the rest of the drill.

On steep up-holes, the rod holder may have to be lifted quite high to be anchored to the rock face. In this case, the length of the hoses leading to the rod holder and feed cylinder would be the limiting factor.

NOTE: DO NOT LENGTHEN HOSES WITHOUT APPROVAL FROM THE FACTORY.

6. <u>SHORT FEED FRAME</u>. Consider this frame for confined spaces. The overall length (without face mounting assembly) is 2170 mm (85 in). The stroke is 1000 mm (39 in) only so that a 15 m (5 ft) rod would have to be added from behind the drill head. In this case, a minimum overall length of 2780 mm (108 in) would be required (see sketch). Very short rods (0.5 m or 2 ft) could be added between the chuck and the rod holder. Make sure the power pack will still fit.

Ivan.

DRILLS

PAGE

LM37 DIAMOND CORE DRILL

			Shipping ight	Expo	ert Boxing	
Model	Description	kg	lb	m ³	ft ³	Price US \$
LM37	Drill with standard feed frame	1 100	2,425	4.40	155.38	\$59,450.00
LM37	Drill with short feed frame	1 020	2,249	3.96	139.84	58,525.00

BASIC DRILL INCLUDES:

Power pack less prime mover, and less starter	Feed frame, complete with drill head and rod holder
Interconnecting hoses	One set of jaws for both chuck and rod holder
Control panel	One set of guide bushes

TABLE I / POWER UNIT	Price US \$
Standard electric motor mounted on drill — Standard motor starter assembly mounted on drill —	\$1,500.00 \$3,600.00
NOTE: Starter assembly supplied by the customer must meet certain minimum specifications to sa warranty conditions. Contact Longyear Minneapolis for full details.	tisfy Longyear

STANDARD ELECTRIC MOTOR (p/n 44778) SPECIFICATIONS

Power:	50 hp (37 kW)	General purpose, open drip proof.
Voltage:	230/460 v A.C.	Class 'B' insulation. Normal starting torque.
Phases:	3 phase	NEMA design B. 40°C. ambient.
Frequency:	60 Hertz	Continuous duty. Horizontal ball bearing.
Speed:	1800 rpm	Special varnish treatment type B.
Frame size:	326T	Conduit box located on right hand side when
Service factor:	1.15	facing output shaft end.

STANDARD MOTOR STARTER ASSEMBLY (p/n 49181) SPECIFICATIONS

For 50 hp, 1800 rpm, 460 v, 3 PH, 60 Hz Motor

Across-the-line non-reversing magnetic motor starter, 3 phase, 3 pole, NEMA type 4, NEMA size 3, watertight, dusttight, stainless steel enclosure. Foot mounted. Cabinet Size: Height - 20 in

Width - 30 in Depth - 8 in

Starter includes:

- 1. 100 AMP main disconnect switch (shielded)
- 2. Labelled indication lamp for low oil level
- 3. Labelled run light
- 4. Labelled phase reversal light
- 5. Start-Stop and Reset in panel
- 6. 12 volt remote start/stop wiring
- 7. Three overload heaters
- 8. Labelled overload indication lamp

DRILLS

Longyear

SECTION A UNITED STATES PRICE LIST Effective June 1, 1984 First Edition

LM37 DIAMOND CORE DRILL

TABLE II / DRILL HEAD GEAR SET

Specify gear set to be mounted in the drill head. One set included with drill. Choose from table below. Extra or alternate sets can be purchased separately at prices shown below. Unless otherwise specified, medium gears will be supplied.

-	HIGH SPEED RATIO 1:1.29	MEDIUM SPEED RATIO 1:1.73	LOW SPEED RATIO 1:2.38	UNIT PRICE US \$
Drive Gear	94332	94407	94482	380.00
Driven Gear	94311	94406	94481	515.00

TABLE III / JAWS AND BUSHINGS

Specify chuck jaw set, rod holder set, and guide bush set to be mounted on drill. One set included with drill. Choose from table below.

Extra or alternate sets can be purchased separately.

Unless otherwise specified, LTK 46 Jaws and Bushings will be supplied.

	LTK 46	LTK 56	AQ	BQ	AW Casing	AXWL	BXWL	AW AW-UL	BW BW-UL	Price/Set US \$
Chuck Jaw Set	94636	94576	94570	94572	94574	94580	94574	94636	94578	840.00
Rod Holder Jaw Set	94582	94593	94683	94587	94591	94585	94591	94582	94589	400.00
Guide Bush Set	94559	94567	94564	94562		94564		94564	94562	280.00

TABLE IV / MOUNTINGS

For proper set-up and operation of the drill, one item of each of the following three groups is essential.

		Price US \$
56083 56084*	Face mounting assembly, or Face mounting assembly with jacking screws	565.00 635.00
94488*	Anchor bar assembly (also called adjustable leg) 2 each required per drill, or	665.00/set
94474	Anchor bar assembly spike (also called adjustable leg) 2 each required per drill.	485.00/set
94495*	Control panel mounting, or	145.00
94499 *Unless oth drill.	Control panel stand nerwise specified, these items will be supplied with the drill, and the prices listed will l	195.00 be added to the

TABLE V / ACCESSORY EQUIPMENT

		US \$
56030	Wheels and towing group (towing ball)	2,955.00
94946	Wheels and towing group (towing eye)	3,070.00
94503	Mining bar mounting	2,480.00
56049	Feed frame support bracket (Qty required: 2)	105.00
56044	Lifting beam for power pack	545.00
94471	Rod slide	1,960.00
94462	Rod slide with wireline sheave	2,705.00
94530	Rotation service unit	3,875.00
94637	Gear puller	85.00
94554	Hex. socket set (in)	60.00
93765	Allen key set (metric)	12.00

PRINTED IN U.S.A.

Price

Russ Beddow



NQ Capacity

The drill head and rod holder both have an ID of 60 mm (2.36 in) allowing the passage of a BQ reaming shell. Drilling with larger-diameter tools is possible under certain conditions and with definite limitations as follows:

1.	The entire face clamp assembly must be removed, leaving a 125 mm (4.87 in) opening through mounting bracket 94459. Automated rod
	handling capability and its inherent safety are then lost,
	obviously, but this might either be acceptable (on flat holes, for instance) or somehow compensated for by the user (at its own risks!).
	NOTE: The absence of support up front will impose more care

in starting a hole in hard rock and might increase vibrations.

- 2. A sub must be used below the head.
- 3. 1.5 m (5 ft) rods or casings should be used although 3 m (10 ft) lengths may also be practical in certain cases, with the head swung out of the way. This relates to standard-length feed frames.
- 4. Depth guidelines for NQ drilling are estimated to be:

 100 m (330 ft)
 vertical up

 120 m (400 ft)
 horizontal

 200 m (660 ft)
 vertical down

Ivan.



Dimensions and Masses

(Mark 3 Design)

1. Dimensions

		Pack k 3)		l Pack rd length)		l Panel t stand)
	mm	in	m	in	mm	in
Length	1850	72.2	2765	108.8(9')	450	17.7
Width ²	900	35.1	725	28.5	460	18.1
Height ³	1030	40.2	720	28.3	545	21.5

¹Length is basically unchanged from the Mark 2 design. ²Width is 88 mm (3.4 in) shorter than the Mark 2 design. ³Height is 130 mm (5 in) less than the Mark 2 design.

NOTE: With tow bar and wheels, dimensions become:

Length:	3250	m	(127 in)
Width:	1420	mm	(55 in)
Height:	1270 1	mm	(50 in)

2. Net Masses (approximate)

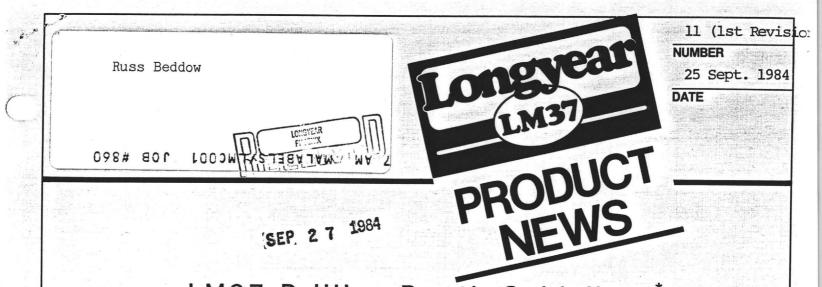
1.	Mark 3 Power Pack with motor, starter, oil, less hoses	1200	2640
	Mark 3 Power Pack with oil, less motor, starter, and hoses	920	2030
3.	Complete feed frame with rotation unit, chuck and holder	336	740
4.	Rotation unit and chuck	83	183
5.	Face clamp plus jaws and bushes	42	93
6.	Control panel plus all hoses	70	155
JŻ.		38	84
8.	Rod slide p/n 94471	25	56
9.	Face mounting p/n 94840	44	97
10.	Anchor bar	19	42

kq

1b

The electric motor and frame may vary in size and weight. The 200 frame size motor as used by Longyear Australia is 260 kg (573 lb). The 326T frame size motor as used by Longyear U.S.A. is 237 kg (522 lb).

1 van.



LM37 Drilling Depth Guidelines*

Please remove Product News #11 dated 30 August 1984 from your files. It is now obsolete. Replace it with this issue.

We have revised our previous guidelines to take into account the following:

- -a 10% allowance for rod drag which we feel is more realistic than the 20% used earlier. This is for vertical up and down holes only.
- -a different weight for aluminum rods. Published data was contradictory and we have opted for the weights that are most widely published and most up-to-date.
- NOTE: The guidelines which will appear in the product bulletin will be the same as those printed here.

	Hole Direction								
	Verti	cal Up	Horiz	contal	Vertical Down				
System	m	ft	m	ft	m	ft			
LTK 46 (or TT46) with Alu rods with LTK rods	450 350	1500 1150	600 450	2000 1500	800 625	2600 2050			
LTK 56 (or TT56) with Alu rods with LTK rods	300 300	1000 1000	400 400	1300 1300	500 500	1650 1650			
AW 34	450	1500	600	2000	700	2300			
BW 44	225	750	400	1300	400	1300			
AQ	250	820	400	1300	- 400	1300			
BQ	200	650	350	1150 🗸	325	1050			

*These figures are based on field experience and may be reasonably expected. Actual drilling capability will depend on in-hole tools and conditions, as well as drilling techniques used. These variable factors will cause changes in depths obtained. Please, <u>always refer to the drill's specifications for available</u> <u>thrust</u>, <u>pull</u> and torque to aid in estimating capacities for your specific application. Note that no claim is made for products listed that are not produced by the Longyear Company to perform at these depths. Russ Beddow



20

185

Depth Capacity with AQ Drill Rods

We have now seen the IM37 drill to its rated depth capacity on numerous occasions (particularly in BQ or BQ-3 sizes) and even go well beyond the rating in several instances. This is not entirely surprising since our drilling depth guidelines were purposely conservative.

We are now happy to report what we believe to be a record depth so far for AQ drilling. One of the two IM37 drills at Homestake Mining Company (USA) has completed an AQ, +5°/horizontal hole at a depth of 1921 feet (585 m). This is 621 feet (185 m) beyond the published depth guideline for horizontal AQ holes (1300 feet or 400 m). Chuck speed was about 500 rpm at the bottom of the hole (low speed gear set).

An earlier AQ flat hole was completed by Homestake at 1488 feet (453 m) on December 11, 1984. The chuck was still turning at 900 rpm (medium speed gears).

In South Africa, Boart Drilling has reached 1598 feet (487 m) with AQ on a flat hole. Daily footage at the bottom of the hole continued to be what it was throughout the hole. Interestingly, the round tripping time (out and back in) at the bottom of the hole was only one hour. This would be about 265 feet (81 m) in 5 minutes as opposed to the 200-230 feet (60-70 m) in 5 minutes printed in the bulletin.

Ivan.

REMINDER: This publication is for internal distribution only.



JAN 2 8 1985

As you know, any depth guideline is just that - a guideline. It was first based on certain assumptions (straight and clean hole, equipment in good condition, capable driller and so on). Then theoretical calculations shaped by Engineering judgement provided a broad basis for establishing capacities. Finally, and most important, extensive field experience with seven IM37's was used to either confirm or modify these capacities to arrive at our final general guidelines.

To extrapolate these capacities for a specific application, please be aware of the following limiting factors:

-For Vertical Down Holes: the pulling force of the feed cylinder which is available to lift the rods out of the hole.

-For Vertical Up Holes: the feed force of the feed cylinder which is available to support the weight of the rod string and apply a suitable load to the bit for efficient drilling. The drillability of the rock will have a major influence on the ultimate depth capacity.

-For Horizontal Holes: the torque available at the chuck to rotate a given-size bit at rpm's high enough to obtain efficient performance. This is in fact the combination of:

- a. the torque required to make the bit cut and
- b. the torque required to rotate the rod string against friction.

However, remember that the output torque at the chuck varies with different gear sets and different drilling speeds, thereby greatly influencing the effective depth capacity. What we have shown in our table is a general compromise guideline which tries to account for all these variables.

Ivan.

Specifications

POWER Wisconsin, Gas John Deere Diesel Deutz Diesel	4 cylinder *31 HP (4 cylinder *40 HP (3 cylinder *40 HP (@ 2200 RPM		
*Rated 15% below engine manufactu		g =====		
TRANSMISSION, Type Speeds	Heavy Duty Synch 4 forward	nro-Mesh		
HOIST, Type Drum Dimensions Drum Capacity (½" cable) Bare Drum Line Speeds**	190 ft. (58 m) 90 ft.	iameter, 5-1/8 in (13 . (27.4 m) cable suppl ft. (26, 52, 96, 162 m)	ied with drill	
RANGE SELECTOR, Type Ranges Number of Bit Speeds	Sliding gear Low, high, neutral 8 forward	SR.		
HYDRAULIC PUMP, Type Volume Maximum Pressure	Variable volume 0-12 gallons (0-45 l 1000 psi (70 Kg per	iters) per minute square cm)		
HQ 3-7/8-IN. HYD. HEAD Spindle I.D. Hydraulic Cylinder I.D. Feed Length Angle Range	Twin-cylinder type 3-7/8 inches (98.4 3 ¹ /2 inches (88.9 mi 24 inches (610 mm) 360°	mm) n)		
NQ 3-INCH HYD. HEAD Spindle I.D. Hydraulic Cylinder I.D. Feed Length Angle Range	Twin-cylinder type 3 inches (76 mm) 3 ¹ /2 inches (88.9 mr 24 inches (610 mm) 360°	n)		
	Stub Shaft Power Take-Off	Air-cooled Gasoline Engine	Water-cooled Diesel Engine	Air-cooled Diesel (Deutz)
OVERALL DIMENSIONS Width Length Height	42 in. (107 cm) 96¼ in. (244 cm) 57 in. (145 cm)	42 in. (107 cm) 103 in. (261 cm) 57 in. (145 cm)	42 in. (107 cm) 103 in. (261 cm) 57 in. (145 cm)	42 (107 cm) 96 ¹ /2 in. (244 cm) 57 in. (145 cm)
APPROX. WEIGHT Net HQ 3-7/8-In. Hyd Head NQ 3-In. Hyd. Head	2400 lbs (1090 Kg) 2280 lbs (1035 Kg)	3015 lbs (1370 Kg) 2895 lbs (1315 Kg)	3305 lbs (1500 Kg) 3185 lbs (1450 Kg)	3230 lbs (1460 Kg) 3110 lbs (1410 Kg)
For Domestic Shipment HQ 3-7/8-In. Hyd. Head NQ 3-In. Hyd. Head	2810 pounds 2700 pounds	3425 pounds 3310 pounds	3715 pounds 3600 pounds	3640 pounds 3525 pounds
F or Export HQ 3-7/8-In. Hyd. Head NQ 3-In. Hyd. Head	3100 lbs (1410 Kg) 2990 lbs (1360 Kg)	3715 lbs (1688 Kg) 3600 lbs (1636 Kg)	4005 lbs (1820 Kg) 3890 lbs (1765 Kg)	3930 lbs (1783 Kg) 3815 lbs (1730 Kg)
CUBIC DISPLACEMENT Crated for Export	160 cu.ft(4.5 cu.m)	170 cu.ft(4.8 cu.m)	175 cu.ft(5 cu.m)	170 cu.ft(4.8 cu.m)

Accessory equipment

CATHEAD, Type Spool Diameter, Length Bare Spool Speeds** Approximate Weight	Topside 8 in. (203 mm) diameter, 6½ in. (165 mm) long 92, 189, 348, 584 ft. (28, 58, 106, 178 m) per minute 115 pounds (52 Kg)	
WIRELINE HOIST, Type Drum Diameter, Length Drum Capacity Bare Drum Speed** Approximate Weight	Built-in 7 in. (178 mm) diameter, 17 in. (432 mm) long 4200 ft. (1280 m) of 3/16 inch (4.76 mm) wire rope 416 feet (127 m) per minute 250 pounds (113 Kg)	
RETRACTION KIT Travel Length Approximate Weight	Hydraulic 13 inches (330 mm) 60 pounds (27 Kg)	
BV-3420 MAST, Type Rod Length Capacity Approximate Weight	Vertical or angle 20 feet (6.1 m) 1900 pounds (862 Kg)	
AUTOMATIC CHUCK, Type Capacity Jaws	Spring-loaded, hydraulically released EW rods through HQ rods/NW Casing Tungsten Carbide insert type	
*Based at engine speeds of 2200 rpm.	For Stub-Shaft model, speeds will vary according to power unit used.	

Forward Bit speeds

	Engine RPM	Low Range RPM	High Range RPM
HQ	2200	20, 41, 74, 124	211, 438, 803, 1350
3-7/8" HYD.	1800	16, 33, 60, 101	172, 357, 653, 1105
HEAD	1100	10, 20, 37, 62	105, 219, 401, 675
NQ	2200	28, 56, 102, 170	290, 600, 1100, 1850
3" HYD.	1800	22, 45, 82, 139	236, 490, 900, 1510
HEAD	1100	14, 28, 51, 85	145, 300, 550, 925

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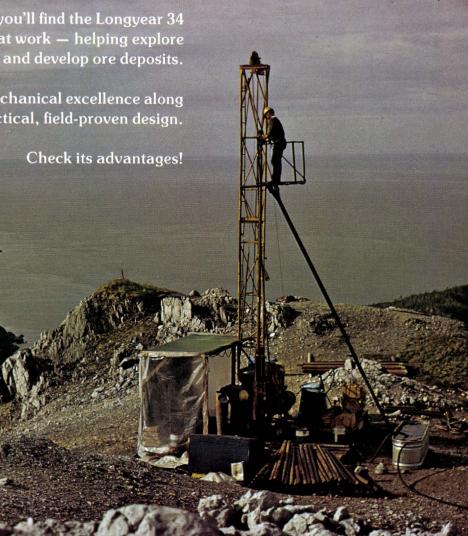
From Alaska to Zambia, you'll find the Longyear 34 diamond core drill at work – helping explore

The "34" gives you mechanical excellence along with practical, field-proven design.



Bulletin 1600E Bp 5M 3/81 ©Longyear Company 1981 Printed in U.S.A.

34 drill



Examine the features of the Longyear 34 drill

Hoist clutch – hydraulically operated, internal-expanding clutch is smoothacting, easy to operate and inexpensive to maintain. Free-spinning drum lets hoisting plug return to the operator by its own weight. Completely enclosed for all-weather protection.

Power — modular design provides a choice of dependable diesel or gasoline engines. Air or electric power are available on special order. Stub-shaft units are also available for customer installation of power unit.

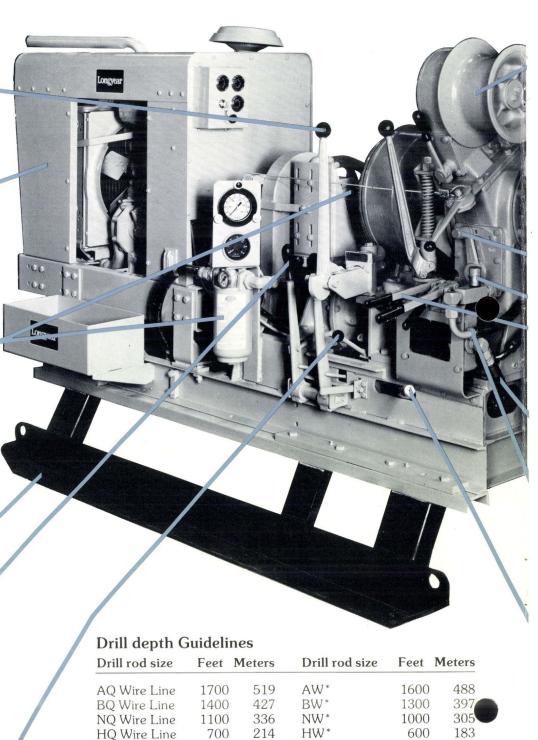
High-capacity hydraulic system live hydraulic system provides for operation of hydraulic components when drill clutch is disengaged. Variable volume, vane-type pump delivers exactly the amount of oil required, thus overheating, foaming of oil and horsepower requirements are minimized. An efficient oil filter is provided to protect the hydraulic system. 📩

Self-propelling attachment — this option provides the necessary fairleads, sheaves and rollers to allow the drill to be moved under its own power by using the hoisting cable.

Skid — welded structural steel construction provides long life under severe operating conditions. Modular design permits easy transfer of drill from skid to truck-mount and vice versa.

Flexible coupling – compensates for minor misalignment and cushions shocks imposed by drilling.

Transmission — synchro-mesh. Four forward speeds. Combination of speed range selector and 4-speed transmission provides the correct bit speed for any drilling situation without the need for changing bevel gears. There are 8 usable bit speeds for each throttle setting. By simply shifting a selector lever, the operator can select higher drilling speeds when using diamond bits and lower speeds for roller or drag bits . . . assuring the most efficient engine and drilling performance on any job.



Drill rod size	Feet	Meters	Drill rod size	Feet	Meters
AQ Wire Line	1700	519	AW*	1600	488
BQ Wire Line	1400	427	BW*	1300	397
NQ Wire Line	1100	336	NW*	1000	305
HQ Wire Line	700	214	HW*	600	183
BCQ Wire Line	1600	488	CHD76	1000	305
NCQ Wire Line	1275	389	CHD101	650	198
HCQ Wire Line	950	290	*DCDM	A upset w	all tubing.

Skid mounted			e mounted nast, 20 foot	Vehicle mounted Vertical mast, 20 foot or 30 foot			
I	Model	Description	Model	Description	Model	Description	
1	34SN 34SH	Drill Unit With 3" Hydraulic Head Drill Unit with 3-7/8" Hydraulic Head Units include Transmission, Drum Hoist, Speed Range Selector, 90' Single Part Hoisting Cable.	34TA2N 34TA2H 34UA2N 34UA2H	Truck Mtd. Drill, 3" Head, 20' Mast Truck Mtd. Drill, 3-7/8" Head, 20' Mast Trailer Mtd. Drill, 3" Head, 20' Mast Trailer Mtd. Drill, 3-7/8" Head, 20' Mast Units include Mast Raising Cylinder, Truck Bed or Trailer Mounting, Transmission, Drum Hoist, 90' Single Part Hoisting Cable, Retraction Price does not include truck or trailer.	34TV2N 34TV2H 34TV3N 34TV3H 34UV2N 34UV2H	Truck Mtd. Drill, 3" Head, 20' Mast Truck Mtd. Drill, 3-7/8" Head, 20' Mast Truck Mtd. Drill, 3" Head, 30' Mast Truck Mtd. Drill, 3-7/8" Head, 30' Mast Trailer Mtd. Drill, 3-7/8" Head, 20' Mast Trailer Mtd. Drill, 3-7/8" Head, 20' Mast Units include Mast Raising Cylinder, Truck or Trailer Bed, Transmission, Drum Hoist, 90' Single Part Hoisting Cable, Retraction. Price does not include truck or trailer.	
II	0 GW4D F31 JD3	No Power Unit (Stub Shaft) Wisconsin air cooled gas engine Air Cooled Deutz Water Cooled John Deere Diesel	0 GW4D F31T JD3T	No Power Unit (Stub Shaft) Wisconsin air cooled gas engine Air Cooled Deutz Water Cooled John Deere Diesel	0 GW4D F31T JD3T	No Power Unit (Stub Shaft) Wisconsin air cooled gas engine Air Cooled Deutz Water Cooled John Deere Diesel	
III	NM HM NA HA	3" Mechanical Chuck 3-7/8" Mechanical Chuck 3" Automatic Chuck 3-7/8" Automatic Chuck	NM HM NA HA	3" Mechanical Chuck 3-7/8" Mechanical Chuck 3" Automatic Chuck 3-7/8" Automatic Chuck	NM HM NA HA	3" Mechanical Chuck 3-7/8" Mechanical Chuck 3" Automatic Chuck 3-7/8" Automatic Chuck	
ĪV	0	No Selection	0 FS IS IT	No Selection Ford Single Axle International Single Axle International Tandem Axle	0 FS IS IT	No Selection Ford Single Axle International Single Axle International Tandem Axle	
V	C R W SP M A 22 24 26 F K KH NSG HSG	Cathead Hydraulic Retraction **5 Wireline Hoist (Built-in) Self Propelling Unit BV-3420 Mast Angle Hole Attachment, BV-3420 Mast **4 Wireline Attachment, BV-3420 Mast Cathead Attachment, BV-3420 Mast Mast Lighting Harness Blank Bore Flex Coupling Instrumentation Kit 3" Instrumentation Kit 3-7/8" Head Guards 3" + Head Guards 3-7/8" +	C WT W AT 22 24 26 HJA SJA F K KH NSG HSG	Cathead Wireline Hoist (truck only) Wireline Hoist (trailer only) Angle Hole Attachment, 3420 Mast ^{**} 4 (truck only) Angle Hole Attachment, [*] 4 (trailer only) Drilling Fluid Pump Remote Control Wireline Attachment, 3420 Mast (Sheave) Cathead Attachment, 3420 Mast (Sheave) Mast Lighting Harness Hydraulic Drilling Jacks (truck only) Screw Jacks (truck only) Blank Bore Flex Coupling Instrument Kit 3." Instrument Kit 3.7/8" Head Guards 3." + Head Guards 3.7/8" +	C WLO 3S 11 12 26 HJV SVJ 105 130 F K KH NSG HSG	Cathead Wireline Hoist Triple Line Sheave Assembly Drilling Fluid Pump Remote Control Traveling Block W-shackle Mast lighting Harness Hydraulic Drilling Jacks Screw Jacks Hoisting Cable Other than Std. 105' 2 part for 20' Mast 130' 2 part for 30' Mast - or 3 part for 20' Mast 170' 3 part for 30' Mast Blank Bore Flex Coupling Instrument Kit 3'' Instrument Kit 3-7/8" Head Guards 3'' + Head Guards 3-7/8" +	

FOOTNOTES: ** 4 Must be added, ** 5 Must be added if Option M is selected, + Available as standard equipment on drills sold in U.S.

Chuck jaw sets & bushing for mechanical chuck

DRILL ROD SIZE		Е	EW	А	AW, AQ	В	BW, BQ	Ν	NW	NQ	HQ
Mechanical	Drive Rod Bushing	18980	-18976	18979	18975	18978	18974	18977	18973	18972	N/A
Chuck 3" Chuck Jaw Set		158	15862		15863		15864		15865		N/A
Mechanical	Drive Rod Bushing	25181	25182	25183	25184	25185	25186	25187	25188	25189	25147
Chuck 3-7/8"	Chuck Jaw Set	258	320	25	823	25	826	258	829	25832	25169

Chuck jaw sets & bushings for automatic chuck

	Size	EW	AW	AQ	BW	BQ	NW	NQ	HW, HQ, HWY
Chuck Jaw Set	Rod	38456	38458	38458	38460	38462	38463	38465	38464
(3 Jaws)	Casing	38457	38459	_	38461	-	38464	-	
Hood	Rod		290)12	290)13	290)14	29015
Bushing	Casing	29012	29013		29014		29015	-	29015
3" Drive Rod	Rod	29173	283	364	283	362	28359	28358	-
Bushing	Casing	29171	29170	_	28357	_		_	—
3-7/8" Drive Rod	Rod	29179	283	341	283	338	28336	28335	28333
Bushing	Casing	29177	29178	-	28334		28333		_

Vahiela mounted

Adaptability is standard equipment on every Longyear 34 drilling rig

The modular selection process

Standardization of basic drilling rig components allows flexibility in selecting the components to meet your drilling requirements, together with the economy and careful engineering of a factory-built system.

Change vour Longvegr rig to meet new drilling needs

Modular design gives you unmatched *adaptability* . . . an important benefit for as long as you own your Longyear drill.

Module and mounting interfaces are standardized, so it is a simple matter to alter the configuration of your drill rig as your drilling requirments change

Many modular features can even be added or substituted in the field. Frames and mounting surfaces are predrilled to eliminate the fuss of complicated custom fitting

The result is fast flexibility to meet changing needs, decreased drill downtime, and lower operating costs.

Select vour ria

1 / Construct a model number by selecting one of the Basic Drill Assemblies. All subsequent selections must be made from the same vertical column. Example: A 34 skid-mounted drill with 3-7/8" Head. 34SH

2 / Select the Power Option from Table II. Example: A John Deere Diesel JD3

3 / Select the desired Chuck from Table III. Example: 3-7/8" Automatic Chuck HA

4 / Select the drive rod bushing and chuck jaw size by placing that size in the model number from the table. Example: Drive Rod Bushing and Chuck Jaw size desired is HQ HQ

For information to order additional or different size sets, see table.

5 / You may select one of the five truck options offered by Longyear under Table IV, or you may furnish your own truck. Customer-furnished trucks must meet the following minimum specifications: single rear axle with 187" wheelbase and 120" cab to rear axle length OR tandem rear axle with 169" wheelbase and 102" cab to centerline of tandem axle length; 17,-000[#] minimum rear axle capacity; 8:00 x 20 minimum tires; reinforced frame; 108" maximum height to top of cab; 60" maximum height from frame to top of cab. For skid and trailer mounted units no selection should be made. Example: No Selection 0

6 / Select accessory equipment as desired from Table V for best operation. (Longyear recommends the 535 RQ Pumping Unit available with either gas or diesel power, see price book for complete specifications). All trucks and trailers are furnished predrilled for mounting the pump and are equipped with a standpipe and discharge hose. Other ancillary equipment such as the suction hose and water swivel hose should be selected from the Longyear Catalog.

Example: Cathead, Hydraulic Retraction, Wireline Hoise (Drill Mount) and Self Propelling. C,R,W,SP

For example the unit model number is: 34SH-JD3-HA-HQ-0-C,R,W,SP which describes the entire drill

chucking operation to increase drilling efficiency and operator safety. Cathead — an optional feature for drive hammer operation, general handling and lifting tasks. Hydraulic swivelhead — available in 3" size for rods through NQ size or casing through BW size, or 3-7/8" for rods through HQ size or casing through NW size. Incorporates twin $(3^{1}/2'')$ hydraulic cylinders with a full 24"

stroke.

Safety Headguards — are designed to improve the safety of the Driller's and Helper's working environment. Expanded metal front and rear guards provide an effective shield around the rotating spindle of the drill head, preventing potential injury due to loose clothing, rags or tools getting caught in the rotating components. The guards move together with the drill head to render complete protection during the entire stroke of the swivelhead. Safety Headquards may be ordered factory installed on new drills or in kit form for field installation on existing Longvear rigs

Speed range selector — for selecting high or low range swivelhead rotating speeds.

Feed control – positive control of weight on the bit and rate of advance is accomplished by bleeding oil from the lower end of the feed cylinders through a needle type control valve. A quickreturn circuit is provided for raising the drive rod to re-chuck. The directional control valve used to control the hydraulic head incorporates four independent valve positions: up, down, neutral and float. At shallow depths, the directional control valve should be set in a down position, where full hydraulic pump pressure can be applied above the pistons to provide bit weight. At greater depths, set the directional simplifies installation and minimizes the control valve in float position, and the cost of adding extra hydraulic accessoweight of the drill string can be employed to provide bit weight, without the necessity of applying hydraulic pressure above the pistons. Advantages: less horsepower required . . . cooler oil

. . . less wear.

3-spool, 4-way hydraulic valve -

ries. When needed, accessories are

simply connected to receive full

Overcenter clutch - the over-

for long periods of time while

undue heating and wear.

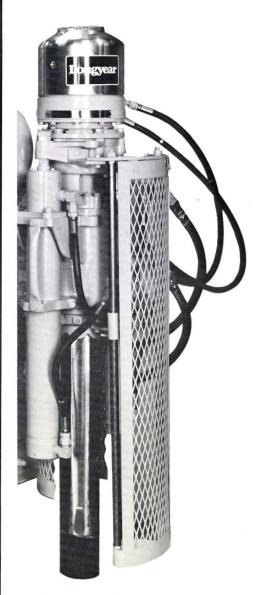
center clutch may be disengaged

engine is running without creating

hydraulic power.

Hydraulic retraction — "this option features a full 13" travel giving 10" minimum hole clearance.

Automatic chuck — an optional feature which eliminates the manual



Swivelhead

Longyear hydraulic swivelheads have accurate control of bit pressure and rate of advance. Variable-volume pump delivers correct volume of oil to the head for efficient advance of bit in constantly changing rock formations.

Large cylinders provide powerful bit pressure and rod pull plus fast chuck return. Wide spacing of cylinders and guide rods give excellent rigidity and smooth operation.

"34" drills can be supplied with either the NQ (3-inch) or HQ (3-7/8-inch)hydraulic swivelheads. The NQ will pass NQ wireline, NW rods or BW casing. The HQ will pass HQ wire line, HW rods or NW casing.

The HQ head (shown above) features a brass measuring rod scaled in inches.

Special features, optional equipment

(1) (2) (6) (7) (4) (9) (5) (10) (8) (13)

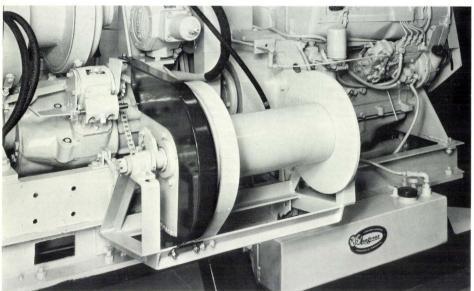
Available with the Longyear 34 Drilling System are many easily attached accessories which include automatic chuck, cathead, wireline hoist, instrumentation kit, hydraulic retraction, self-propelling unit, BV-3420 mast, mast raising cylinder, mast lighting harness, BV-3420 mast wireline attachment and BV-3420 mast cathead attachment.

34 drill controls

- 1 Wireline hoist brake lever
- 2 Wireline hoist clutch lever
- 3 Main clutch lever
- 4 Hoist clutch lever
- 5 Hoist brake lever
- 6 Transmission shift lever
- 7 Wireline hoist engaging lever
- 8 Speed range selector lever
- 9 Retraction lever
- 10 Engine throttle control
- 11 Swivelhead control lever
- 12 Control lever for optional. automatic chuck
- 13 Hydraulic swivelhead feed control valve

Central grouping of all controls saves waste motion and allows the operator more hours of profitable drilling. Convenient location is shown above.

Wireline hoist

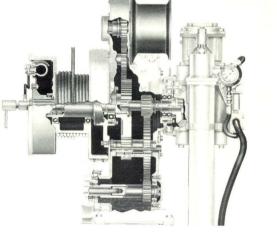


A built-in wireline hoist can be supplied as accessory equipment. The drum assembly mounts securely on the skid frame and features maintenance free sealed ball bearings. It is driven from the transmission power take-off by roller

chain. The power take-off can be disengaged when drilling. The "built-in" feature eliminates the nuisance of a separate hoist unit while giving the operator "finger-tip" control from the central control station.

Transmission and hoist gear train assembly

The survey of th



High quality, anti-friction bearings, used throughout, require less attention and have a long service life.

Oil bath system lubricates gears and other rotating parts. Grease and oil fittings are easily accessible.

BV-3420 mast

For drilling vertical or angle holes combination vertical-and-angle hole mast features advanced design for efficient drilling operations. Adequate capacity to handle rods in either vertical or angle hole position at the rated capacity of the drill.

Designed so that forces developed when hoisting drill string are confined within the drill mast assembly. There is no tendency for the drill to lift off the ground.

ROLLER BEARING SHEAVES in heavyduty crown block.

ACCOMMODATES PULL OF 20-FOOT ROD LENGTHS. Mast is extremely stable through entire range of drilling positions.

2-PART MAIN POLE is flanged and bolted together. Easily dismantled for transporting.

ROD RACK. Adequate capacity to store rods to the rated capacity of the drill.

WORKING PLATFORM. Swivels to remain horizontal as mast is angled. Platform has access from built-in ladder provided with the mast.

Automatic chuck

Optional, automatic chuck is spring loaded and hydraulically released. Advantages are increased footage, smoother rotation, safer operation and operator ease. Chuck has three hardened steel chuck jaws with Longyear designed tungsten carbide inserts to grip rods firmly.



Instrumentation kit

The instrumentation kit gives a visual reading of the drill string RPM and bit weight. The kit contains a 12V DC electric tachometer and a hydraulic pressure gauge.

A dial ring on the pressure gauge is "zeroed" with the bit just off bottom. When drilling commences, the load transferred to the bit can be read directly in pounds or kilograms on the dial

The hydraulic gauge is equipped with an oscillation damper for easier, more accurate reading.

The accurate readings obtained with the kit enable the driller to maximize penetration rates and extend bit life.



QUICK-DETACH PINS are used throughout at adjustment points.

MASTS - raised and lowered by hoist cable or by optional hydraulic cylinder. For optimum safety and ease of operation, the hydraulic cylinder is recommended.

RETRACTION. Mast allows drill retraction of up to 13 inches. Crown sheave remains in perfect alignment with hole even when drill is retracted and when mast is in any operating position.

BACKSTAY LEGS telescope and adjust with quick-detach pins when mast is angled or lowered. Purchased as accessory equipment with rod slide.

ACCESSORY WIRELINE SHEAVE **ATTACHMENT** is purchased separately for use with the wireline hoist. (A)

ACCESSORY CATHEAD SHEAVE **ATTACHMENT** is purchased separately for use with cathead. (B)

ROD SLIDE for ease in feeding rods through the swivelhead when angle-hole drilling. Rod slide and backstay legs are accessory items and are specified as anglehole attachments. Neither is necessary for vertical hole drilling.

