APR 10 1996

ENGINEERING DATA TRANSMITTAL

Page 1 of 1

1. EDT № 613825

2. To: (Receiving Organization)	3. From: (Originating Organization)	4. Related EDT No.:
Characterization Project Operations (75100)	Characterization Equipment Design (75230)	611632
5. Proj./Prog./Dept./Div.:	**6. Cog. Engr.:**	**7. Purchase Order No.:**
Characterization	T. R. Farris	N/A

8. Originator Remarks:

ETN-94-0023
This report documents the successful completion of acceptance testing for the Rotary Mode Core Sampling (RMCS) trucks 3 & 4. The report includes a test report summary, and the test procedure (WHC-SD-WM-ATP-119), data sheets, and exception resolutions for each truck.

9. Equip./Component No.: HO-68K-4600, HO-68K-4647

10. System/Bldg./Facility: 200 General

11. Receiver Remarks:

12. Major Assm. Dwg. No.: H2-69000 REV. 1

13. Permit/Permit Application No.: N/A

14. Required Response Date: 4/15/96

15. DATA TRANSMITTED

(A) Item No.	(B) Document/Drawing No.	(C) Sheet No.	(D) Rev. No.	(E) Title or Description of Data Transmitted	(F) Approval Designator	(G) Reason for Transmittal	(H) Originator Disposition	(I) Receiver Disposition
1	WHC-SD-WM-ATR-119	ALL	0	ACCEPTANCE TEST REPORT for CORE SAMPLE TRUCKS 3 & 4	SQ	1	1	1

16. KEY

Approval Designator (F)	Reason for Transmittal (G)	Disposition (H) & (I)
E, S, Q, D or N/A (see WHC-CM-3-5, Sec.12.7)	1. Approval 4. Review 2. Release 5. Post-Review 3. Information 6. Dist. (Receipt Acknow. Required)	1. Approved 4. Reviewed no/comment 2. Approved w/comment 5. Reviewed w/comment 3. Disapproved w/comment 6. Receipt acknowledged

17. SIGNATURE/DISTRIBUTION (See Approval Designator for required signatures)

(G) Reason	(H) Disp.	(J) Name	(K) Signature	(L) Date	(M) MSIN	(J) Name	(K) Signature	(L) Date	(M) MSIN	(G) Reason	(H) Disp.
1	1	Cog.Eng: TR FARRIS	T. R. Farris	4/4/96	S7-12						
1	1	Cog.Mgr: JS SCHOFIELD	John Schofield	4/5/96	S7-12						
1	1	QA: ML MCELROY	M. L. McElroy	4/8/96	S7-07						
1	1	Safety: JA HARVEY	M. E. HUDA for		S7-07						
1	1	CPO: JS LEE		4-9-96	S7-03						
1	1	CED: RJ BLANCHARD		4/9/96	S7-12						

18. JE CORBETT — Signature of EDT Originator — Date 4/4/96

19. JG BURTON FOR — Authorized Representative for Receiving Organization — Date 4-9-96

20. JS SCHOFIELD — Cognizant Manager — Date 4/5/96

21. DOE APPROVAL (if required) Ctrl. No.
[] Approved
[] Approved w/comments
[] Disapproved w/comments

BD-7400-172-1

ACCEPTANCE TEST REPORT for CORE SAMPLE TRUCKS 3 & 4

J. E. Corbett
Westinghouse Hanford Company, Richland, WA 99352
U.S. Department of Energy Contract DE-AC06-87RL10930

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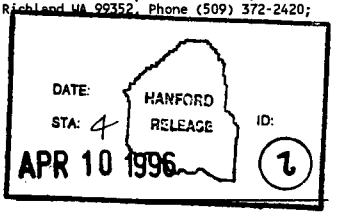
Key Words: Acceptance Testing, ATR, ATP, Rotary Mode Core Sampling, RMCS, Core Sample Truck, Truck 3, Truck 4.

Abstract: This report documents the successful completion of acceptance testing for the Rotary Mode Core Sampling (RMCS) trucks 3 & 4. The report includes a test report summary, and the test procedure (WHC-SD-WM-ATP-119), data sheets, and exception resolutions for each truck.



Release Approval 4/10/96 Date
Release Stamp

Approved for Public Release

ACCEPTANCE TEST REPORT FOR CORE SAMPLE TRUCKS 3 & 4

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ACCEPTANCE TEST REPORT FOR CORE SAMPLE TRUCKS 3 & 4

1.0 TEST REPORT SUMMARY AND CONCLUSIONS

The purpose of this Acceptance Test Report is to provide documentation for the acceptance testing of the rotary mode core sample trucks 3 and 4, designated as HO-68K-4600 and HO-68K-4647, respectively. This report conforms to the guidelines established in WHC-IP-1026, "Engineering Practice Guidelines," Appendix M, "Acceptance Test Procedures and Reports."

Rotary mode core sample trucks 3 and 4 were based upon the design of the second core sample truck (HO-68K-4345) which was constructed to implement rotary mode sampling of the waste tanks at Hanford. Successful completion of acceptance testing on June 30, 1995 verified that all design requirements were met.

This report is divided into four sections, beginning with general information. Acceptance testing was performed on trucks 3 & 4 during the months of March through June, 1995. All testing was performed at the "Rock Slinger" test site in the 200 West area. The sequence of testing was determined by equipment availability, and the initial revision of the Acceptance Test Procedure (ATP) was used for both trucks. Testing was directed by ICF-KH, with the support of WHC Characterization Equipment Engineering and Characterization Project Operations. Testing was completed per the ATP without discrepancies or deviations, except as noted below.

Section 2.0 of this report contains all the test exceptions encountered during acceptance testing of trucks 3 and 4. All the exceptions were resolved prior to completion of the ATP's. The resolution to each exception is fully described on the ATP exception / resolution sheets found in section 2.1 for truck 3, and section 2.2 for truck 4.

The entire ATP, as completed and filled out for truck 3, can be found in section 3.0 of this report. The entire ATP, as completed and filled out for truck 4, can be found in section 4.0 of this report.

2.0 EXCEPTION RESOLUTION AND DATA SHEETS

ATP Exception / Resolution Sheet

ITEM #	STEP #	DESCRIPTION OF PROBLEM	RESOLUTION TO PROBLEM	INITIALS
1	4.1	The following item does not have a certification tag per Table RR: Hoist hook. The following items do not have calibration stickers per Table RR: Hydrostatic head flow, penetration rate meter, and bit downward force.	The Hoist Hook has been certified and witnessed by WHC QC (see table RR). They Hydrostatic Head flow meter were removed and replace with mechanical flow control valves. The penetration rate meter and bit downward force has been calibrated and witnessed by WHC QC (see table RR).	MLL 6/30/95
2	7.1.1.8	No compressor oil pressure gauge.	The compressor was changed to an oiless compressor.	MLL 6/30/95
3	7.1.2.10	No torque converter oil temperature.	This is not a requirement of the vendor supplied hardware.	MLL 6/30/95
4	7.1.2.10	No bit weight pressure gauge.	This gauge was removed since it is redundant with with the drill bit downward force gauge and very inaccurate.	MLL 6/30/95
5	7.7.2	Attempted to calibrate downward force and unable to obtain consistent readings.	The seals for the pistons on the hydraulic cylinders were modified cup seals which vary the friction on the barrel of the hydraulic cylinder as the hydraulic pressure flucuates. The seals were changed, for both trucks 3 and 4, to an o-ring seal with a teflon backing ring. This change allievated the inconsistent readings and the downward force was sucessfully calibrated.	MLL 6/30/95
6		The following redlines were made throughout the ATP:	See below:	
	7.2.1.9	Was: "...from the platform to the ground..." Is: "...from the underside of each jack support to the ground..."	Change made for ease of measurements.	MLL 6/30/95
	7.2.1.10	Is: "...from the underside of each jack support to the ground..." Was: "...from the platform to the ground..."	Change made for ease of measurements.	MLL 6/30/95

TRUCK 3, SHEET 1 OF 6

6 cont.	7.3.6.6	Is: "...1st and second gears..." and "...attainable in 1st and second gear and..." Was: "...1st, 2nd, and 3rd gears..." and "...attainable in 1st through third gears and..."	Change made to physically lock out 3rd gear so as not to exceed limits set by the safety basis.	MLL 6/30/95
	7.3.6.6	Delete 3rd gear row from Table Q.	Row no longer applicable	MLL 6/30/95
	7.3.6.6	Delete Channel 4 and 5 rows from Table R.	Hydrostatic head flowmeters were removed fron the system and replaced with mechanical flow controls, there by eliminating monitoring capabilities.	MLL 6/30/95
	7.4.4	Is: "...Table U.." Was: "...Table T...".	Typographical error	MLL 6/30/95
	7.4.2.5.3	In Note: Change outward to inward and inward to outward.	Typographical error	MLL 6/30/95
	7.4.2.5.12	In Note: Change outward to inward and inward to outward.	Typographical error	MLL 6/30/95
	7.5	Remove "Hydrostatic head shielded receiver" and "Hydrostatic head drillstring" labels from Figure 15.	Hydrostatic head flow monitoring equipment was removed when the hydrostatic head flow meters were replaced.	MLL 6/30/95
	7.5	Swap SOV15 with flow control valve and SOV16 with flow control valve in figure 16.	Schematic changed when hydrostatic head flowmeters were replaced with mechanical flow control valves.	MLL 6/30/95
	7.5.2.2.	Delete Step	Did not need to add core barrel to quill rod. Attached drill strin cap directly to quill rod.	MLL 6/30/95
	7.5.2.9	Change "85 PSIG" to "75 to 85 PSIG".	Added tolerance to purge gas pressure for leak testing.	MLL 6/30/95
	7.5.4.6	Change "30 PSIG" to "30 ± 5 PSIG".	Added tolerances to hydrostatic head pressure for leak testing.	MLL 6/30/95
	7.5.4.8	Change "30 PSIG" to "30 ± 5 PSIG".	Added tolerances to hydrostatic head pressure for leak testing.	MLL 6/30/95
	7.5.4.12	Delete reference to flow meter.	Hydrostatic head flow rate is no longer measured.	MLL 6/30/95

TRUCK 3, SHEET 2 OF 6

6 cont.	7.5.4.14	Delete reference to flow meter.	Hydrostatic head flow rate is no longer measured.	MMS 6/30/95
	7.5.4.21	Is: "...pressure in row 1 of Table HH." Was: "...pressure and flow rate in rows 1 and 2 of Table HH". Delete: "Flow rate is being recorded on channel 5 of the VGR."	Hydrostatic head flow rate is no longer measured.	MMS 6/30/95
	7.5.4.24	Is: "...pressure in row 1 of Table HH." Was: "...pressure and gas flow rate in rows 1 and 2 of Table HH". Delete: "Shielded receiver flow rate is being recorded on channel 4 of the VGR".	Hydrostatic head flow rate is no longer measured.	MMS 6/30/95
	7.5.4.26	Is: "...pressures in row 3 of..." Was: "...pressures and flow rates in rows 3 and 4 of...".	Hydrostatic head flow rate is no longer measured.	MMS 6/30/95
	7.5.4.30	Is: "...pressures in row 5 of..." Was: "...pressures and flow rates in rows 5 and 6 of...".	Hydrostatic head flow rate is no longer measured.	MMS 6/30/95
	7.6.8	Delete "reduce temperature of the nitrogen measured at the instrumentation enclosure, to 40 F." Replace with "100 scfm"	The purpose fo this step is to verify that the purge gas thermocouple is reading the purge gas temperature.	MMS 6/30/95
	7.7.8.1	Change step to: Open the purge gas flow control valve.	7.7.8.1, 7.7.8.2, 7.7.8.3, and 7.7.8.5 were re-written to have an electronic signal injected into the system for testing the low purge gas temperature alarm and response instead of removing the purge gas thermocouple (TE-1).	MMS 6/30/95
	7.7.8.2	Change step to: Inject a mV signal in the purge gas connection box to simulate a low temperature.	See response for item #6 step 7.7.8.1.	MMS 6/30/95
	7.7.8.3	Delete: "Apply cold source (approximately 40°F) to the purge gas temperature thermocouple (TE-1)".	See response for item #6 step 7.7.8.1.	MMS 6/30/95

TRUCK 3, SHEET 3 OF 6

6 cont.	7.7.8.5	Replace: "Remove cold source from TE-1" with "disconnect the signal from TE-1."	See response for item #6 step 7.7.8.1.	MLM 6/30/95
	7.7.9.1	Replace: "Apply heat source...thermocouple (TE-1)" with "inject a mV signal in the purge gas connection box to simulate high temperature".	7.7.9.1, 7.7.9.3, 7.7.9.5, and 7.7.9.6 were re-written to have an electronic signal injected into the system for testing the high purge gas temperatue alarm and response instead of removing the purge gas thermocouple (TE-1).	MLM 6/30/95
	7.7.9.3	Replace: "Remove heat source from TE-1" with "Disconnect the signal from TE-1".	See response for item #6 step 7.7.9.1.	MLM 6/30/95
	7.7.9.5	Replace step with "shut the purge gas flow control valve".	See response for item #6 step 7.7.9.1.	MLM 6/30/95
	7.7.9.6	Delete Step.	See response for item #6 step 7.7.9.1.	MLM 6/30/95
	7.8.2.3	Replace " approximately 5 minutes." with "duration of the VGR test." and delete note.	7.8.2.3, 7.8.2.8, and 7.8.2.9 were re-written to allow for testing of the videographic recorder's remote data retrieval capabilities, which wer different than originally anticipated.	MLM 6/30/95
	7.8.2.8	Add "Operate the truck per Cognizant Engineers direction to gather data of the monitored parameters. Place mode switch in STBY." Also, delete note.	See response for item #6 step 7.8.2.3.	MLM 6/30/95
	7.8.2.9	Add " Make print out(s) of data for comparison."	See response for item #6 step 7.8.2.3.	MLM 6/30/95
	8.0.0.1	Add Step: "The operator shall fill out the core sample inspection data sheet prior to running the RMCST. See attachment 2.	Step added as a rsult of the corrective action form the bent shielded receiver tube on truck #4.	MLM 6/30/95
7	8.0.0.1	Prior to beginning section 8.0, the RLU was found to be inoperable during the completion of the core sample inspection data sheet.	The wires to the RLU motor were broken due to an improper setting of a set screw. The RLU was repaired and retested during the sampling portion of the ATP (section 8).	MLM 6/30/95

Truck 3, SHEET 4 OF 6

8	8.0	During the sampling section of this test procedure, it was noted that channel 6 on the VGR was inaccurate.	Channel 6 on the VGR was inaccurate due to water intrusion into the cable harness. Repairs were made to eliminate this problem.	[signature] 6/30/95
9	GENERAL	During sampling operations of the truck, the drill head was rotated with the chuck open causing damage to the hydraulic cylinders for downforce.	The drillhead was removed, chuck body replaced, hydraulic cylinders replaced, and preload properly adjusted under the supervision of the manufacturer's representative (Longyear). The drill head was reinstalled and the following installation checks performed to validate correct installation. STEP: SIGNATURE: 7.3.1.4 CE/TD [signature] 7.3.1.5 CE/TD [signature] 7.3.1.6 CE/TD [signature] 7.3.2.6 CE/TD [signature] 7.3.2.7 CE/TD [signature] load cell value 272.6 lbs 7.3.2.8 CE/TD [signature] 7.3.2.9 CE/TD [signature] 7.5.2.3 CE/TD [signature] 7.5.2.4 CE/TD [signature] 7.5.2.5 CE/TD [signature] 7.5.2.6 CE/TD [signature] 7.5.2.9 CE/TD [signature] 7.5.2.10 from the bottom of the bellows to the quill rod adapter cap. CE/TD [signature] 7.7.15.1 CE/TD [signature] 7.7.15.2 CE/TD [signature] 7.7.15.3 CE/TD [signature] 7.7.15.4 CE/TD [signature] 7.7.15.5 CE/TD [signature] 7.7.15.6 CE/TD [signature] 7.7.15.7 MEASURED DISPLAYED START 72 1/8 0 END 48 1/16 23.9 NET 24 1/16 23.9 CE/TD [signature]	[signature] 6/30/95

TRUCK 3, SHEET 5 OF 6

9 cont.			In addition to the above steps the downforce was recalibrated per work package ES-95-00081 and the penetration rate display functioned per visual inspection. CE	6/30/95
10.		Made redline changes to section 7.7.10 of the ATP as follows:	SEE BELOW:	
	7.7.10	Is "HYDROSTATIC HEAD DRILL STRING LOW PRESSURE ALARM" Was " HYDROSTATIC HEAD DRILL STRING (LOW FLOW) ALARM"	The alarm was changed from flow to pressure because the hydrostatic head flow is not longer measured. The hydrostatic head flow meters were changed to mechanical flow control valves.	6/30/95
	7.7.10.1	Is "INSTALL vent valve or change out assembly on DRILL STRING SUPPLY hos Q.D. fitting." Was "INSTALL vent valve in DRILL STRING SUPPLY hose Q.D. fitting."	Allowed option to connect change out assembly instead of vent valve to the drill string supply hose.	6/30/95
	7.7.10.4	Deleted step.	Step does not apply to pressure loss test.	6/30/95
	7.7.10.5	Completely rewrote step to "Turn the air flow off using off truck controls. Observe the siren sounds, the strobe flashes, and the hydrostatic head drill string light comes on and flashes fast." Also, added note "NOTE: This alarm functions off of the main system pressure which must bleed down to approximately 60 psig before alarm will sound."	Rewritten to support pressure loss test.	6/30/95
	7.7.10.12	Changed "PRESSURIZE SHIELDED RECEIVER" to "PRESSURIZE DRILL STRING (SOV-16)".	Typographical error	6/30/95

TRUCK 3, SHEET 6 OF 6

ATP Exception / Resolution Sheet

ITEM #	STEP #	DESCRIPTION OF PROBLEM	RESOLUTION TO PROBLEM	INITIALS
1	4.1	The following items need to have current calibration stickers per Table RR: Hydrostatic Head Flow Meters and Drill Bit downward force.	The Hydrostatic head flow meters were removed and replaced with mechanical flow control valves. The downward force has been calibrated and witnessed by WHC QC (See Table RR).	NLMS 6/30/95
2	7.1.1.8	No Compressor Oil Pressure Gauge.	The Compressor was changed to an oiless compressor.	NLMS 6/30/95
3	7.1.2.10	No Torque Converter Oil Temperature Gauge.	This is not a requirement of the vendor supplied hardware.	NLMS 6/30/95
4	7.1.2.10	No Bit Weight Pressure Gauge.	This gauge was removed since it is redundant with the drill bit downward force gauge and very inaccurate.	NLMS 6/30/95
5	8.1.2	Attachment does not mate up with the Auxillary Air Supply on the RMCST.	The air fitting on the foot clamp was in error and changed to match the other foot clamps on site.	NLMS 6/30/95
6	8.2.14.2	The Grapple Actuator Clasps were damaged during Pintel Rod separation.	Clasp material should have been heat treated to Rockwell hardness of 36-40 C. Corrected by ECN 623173.	NLMS 6/30/95
7	8.0	Bent Shielded Receiver Tube Section while attempting to traverse with the Shielded Receiver in the down position.	Removed and replaced Shielded Receiver tube section. Added daily core sample inspection check list to ATP as corrective action.	NLMS 6/30/95
8		Made Red Line changes to the ATP as follows:	See Below:	
	7.2.1.9	Deleted "Platform" replaced with "Bottom side of the Jack Support".	Change made for ease of measurement.	NLMS 6/30/95
	7.2.1.10	Deleted "Platform" replaced with "Underside of the Jack Support".	Change made for ease of measurement.	NLMS 6/30/95
	7.3.6.6	Was: "...1st, 2nd, and 3rd..." "...in 1st through third gears...". Is: "...1st and 2nd..." "...1st and second gears..."	Change made to physically lock out 3rd gear so as not to exceed limits set by safety basis.	NLMS 6/30/95

TRUCK 4, SHEET 1 OF 67

8 cont.	7.3.6.6	Table Q: Deleted 3rd gear row.	Row no longer applicable.	MLLE 6/30/95
	7.3.7	Removed Channel 4 and 5 from Table R.	Hydrostatic head flowmeters were removed from the system and replace with mechanical flow controls, there by eliminating monitoring capabilities.	MLLE 6/30/95
	7.4.4	Table T changed to Table U.	Typographical error.	MLLE 6/30
	7.4.2.5.3	Changed Outward to Inward and Inward to Outward.	Typographical error.	MLLE 6/30/95
	7.4.2.5.12	Changed Outward to Inward and Inward to Outward.	Typographical error.	MLLE 6/30/95
	7.5	Removed following labels from Figure 15. "Hydrostatic head Shield Receiver" and "Hydrostatic head Drill String".	Hydrostatic head flow monitoring equipment was removed when the hydrostatic head flow meters were replaced.	MLLE 6/30/95
	7.5	Swapped components in Figure 16. Swapped SOV15 and associated flow control valve and SOV16 and associated flow control valve.	Schematic changed when hydrostatic head flowmeters were replaced with mechanical flow control valves.	MLLE 6/30/95
	7.5.2.2	Deleted entire step.	Did not need to add core barrel to quill rod. Attached drill string cap directly to quill rod.	MLLE 6/30/95
	7.5.2.9	Changed "85" to "75 and 85".	Added tolerance to purge gas pressure for leak testing.	MLLE 6/30/95
	7.5.4.6	Changed "30 PSIG" to "30 ± 5 PSIG".	Added tolerance to hydrostatic head pressure for leak testing.	MLLE 6/30/95
	7.5.6.8	Changed "30 PSIG" to "30 ± 5 PSIG".	Added tolerance to hydrostatic head pressure for leak testing.	MLLE 6/30/95
	7.5.4.12	Deleted "Flow Meter and"	Hydrostatic head flow rate is no longer measured.	MLLE 6/30/95
	7.5.4.14	Deleted "Flow meter or"	Hydrostatic head flow rate is no longer measured.	MLLE 6/30/95

TRUCK 4, SHEET 2 OF 67

8 cont.	7.5.4.21	Was: "...pressure and flow rate in rows 1 and 2 of Table HH. Confirm that the flow rate is being recorded on channel 5 of the VGR, drill..." Is: "...pressure in row 1 of Table HH. Confirm that the drill..."	Hydrosttic head flow rate is no longer measured.	MM 6/30/95
	7.5.4.24	Was: "...pressure and gas flow rate in rows 1 and 2 of Table HH. Confirm that the shielded receiver flow rate is being recorded on Channel 4 of the VGR, shielded..." Is: "...pressure in row 1 of Table HH. Confirm that the shielded..."	Hydrostatic head flow rate is no longer measured.	MM 6/30/95
	7.5.4.26	Was: "...pressures and flow rates in rows 3 and 4 of..." Is: "...pressures in row 3 of..."	Hydrostatic head flow rate is no longer measured.	MM 6/30/95
	7.5.4.30	Was: "...pressures and gas flow rates in rows 5 and 6 of ..." "Is: "...pressures in row 5 of ..."	Hydrostatic head flow rate is no longer measured.	MM 6/30/95
	7.6.8	Delete "reduce temperature of the nitrogen, measured at the instrumentation enclosure, to 40°F." Replace with "100SCFM"	The purpose of this step is to verify that the purge gas thermocouple is reading the purge gas temperature.	MM 6/30/95
	7.7.8.1	Replaced step with "open the purge gas flow control valve".	7.7.8.1, 7.7.8.2, 7.7.8.3, and 7.7.8.5 were re-written to have an electronic signal injected into the system for testing the low purge gas temperature alarm and response instead of removing the purge gas thermocouple (TE-I).	MM 6/30/95
	7.7.8.2	Replaced step with "inject a mV signal in the purge gas connection box to simulate a low temperature."	See response for item #8. Step 7.7.8.1.	MM 6/30/95
	7.7.8.3	Delete "apply cold source (approximately 40°F) to the purge gas temperature thermocouple (TE-1)."	See response for item #8. Step 7.7.8.1.	MM 6/30/95

TRUCK 4, SHEET 3 OF 67

8 cont.	7.7.8.5	Replace "remove cold source from TE-1." with "disconnect the signal from TE-1".	See response for item #8. Step 7.7.8.1.	MM 6/30/95
	7.7.9.1	Replace "apply heat source to the purge gas temperature thermocouple (TE-1)." with "inject a mV signal in the purge gas connection box to simulate high temperature."	7.7.9.1, 7.7.9.3, 7.7.9.5, and 7.7.9.6 were re-written to have an electronic signal injected into the system for testing the high purge gas temperature alarm and response instead of removing the purge gas thermocouple (TE-1).	MM 6/30/95
	7.7.9.3	Replace "heat source" with "the signal".	See response for item #8. Step 7.7.9.1.	MM 6/30/95
	7.7.9.5	Delete "reinstall temperature sensor in purge gas piping and"	See response for item #8. Step 7.7.9.1.	MM 6/30/95
	7.7.9.6	Deleted Step.	See response for item #8. Step 7.7.9.1.	MM 6/30/95
	7.8.2.3	Replace "approximately 5 minutes" with "duration of VGR test". and delete note.	7.8.2.3, 7.8.2.4, 7.8.2.8, 7.8.2.8.1, 7.8.2.8.2, and 7.8.2.9 were re-written or added to allow for testing of the videographic recorder's remote data retrieval capabilities, which were different than originally anticipated.	MM 6/30/95
	7.8.2.4	Delete Step.	See response for item #8, Step 7.8.2.3.	MM 6/30/95
	7.8.2.8	Delete note.	See response for item #8, Step 7.8.2.3.	MM 6/30/95
	7.8.2.8.1	Add step 7.8.2.8.1 "Operate truck per cognizant engineers direction to gather test data on RPM, purge gas pressure, downforce, penetration rate, lower RAM pressure, and purge gas flow.	See response for item #8, Step 7.8.2.3.	MM 6/30/95
	7.8.2.8.2	Add step 7.8.2.8.2 "Place REC mode switch in STBY".	See response for item #8, Step 7.8.2.3.	MM 6/30/95
	7.8.2.9	Add "make print out(s) of data for comparison".	See response for item #8, Step 7.8.2.9.	MM 6/30/95

TRUCK 4, SHEET 9 OF 67

8 cont.	8.0.0.1	Add step 8.0.0.1 "prior to start of each session, the daily core sample inspection check list shall be completed. See Attachment B."	Step added as a result of corrective action from the bent shielded receiver tube. See item #7.	MLH 6/30/95
9.	General	During the failure investigation of the Longyear drill head on truck #3 it was discovered that the yoke assembly bearings were not properly pre-loaded which was a contributing cause of the failure. The drill head assembly on truck #4 was inspected and found to have the same improper pre-load condition. Therefore, if the drillhead was rotated with the cuck open the chuck cyclinder could bind with the chuck assembly. See WHC-SD-WM-OTP-174.	The drillhead was removed and the preload properly adjusted under the supervision of the manufacturer's representative (Longyear). The drill head was reinstalled and the following installation checks performed to validate correct installation. STEP: SIGNATURE: 7.3.1.4 CE/TD TRF AH 7.3.1.5 CE/TD TRF AH 7.3.1.6 CE/TD TRF AH 7.3.2.6 CE/TD TRF AH 7.3.2.7 CE/TD TRF AH Loadcell value 220 lbs 7.3.2.8 CE/TD TRF AH 7.3.2.9 CE/TD TRF AH 7.5.2.3 CE/TD TRF AH 7.5.2.4 CE/TD JBG AH 7.5.2.5 CE/TD TRF AH 7.5.2.6 CE/TD TRF AH 7.5.2.9 CE/TD TRF AH 7.5.2.10 from the bottom of the bellows to the quill rod adapter cap. CE/TD TRF AH 7.7.15.1 CE/TD TRF AH 7.7.15.2 CE/TD TRF AH 7.7.15.3 CE/TD TRF AH 7.7.15.4 CE/TD TRF AH 7.7.15.5 CE/TD GBT AH 7.7.15.6 CE/TD TRF AH 7.7.15.7 MEASURED DISPLAYED START 81 0 END 57 23.89 NET 24 23.89 CE/TD TRF AH	MLH 6/30/95

TRUCK 4, SHEET 5 OF 67

9 cont.			In addition to the above steps the downforce was recalibrated per work package ES-95-00081 and the penetration rate display functioned per visual inspection. CE JN	
10.		Made redline changes to section 7.7.10 of the ATP as follows:	SEE BELOW:	
	7.7.10	Is "HYDROSTATIC HEAD DRILL STRING LOW PRESSURE ALARM" Was " HYDROSTATIC HEAD DRILL STRING (LOW FLOW) ALARM".	The alarm was changed from flow to pressure because the hydrostatic head flow is no longer measured. The hydrostatic heasd flow meters were changed to mechanical flow control valves.	NLM 6/30/95
	7.7.10.1	Is "INSTALL vent valve or change out assembly on DRILL STRING SUPPLY hose Q.D. fitting. Was "INSTALL vent valve in DRILL STRING SUPPLY hose Q.D. fitting."	Allowed option to connect change out assembly instead of vent valve to drill string supply hose.	NLM 6/30/95
	7.7.10.4	Deleted step.	Step does not apply to pressure loss test.	NLM 6/30/95
	7.7.10.5	Completely rewrote step to "Turn the air flow off using off truck controls. Observe the siren sounds, the strobe flashes, and the hydrostatic head drill string light comes on and flashes fast." Also, added note "NOTE: This alarm functions off of main system pressure which must bleed down to approximately 60 psig before alarm will sound."	Rewritten to support pressure loss test.	NLM 6/30/95
	7.7.10.12	Changed "PRESSURIZE SHIELDED RECEIVER" to "PRESSURIZE DRILL STRING (SOV-16)".	Typographical error	NLM 6/30/95
11	7.4.20	Table V was incorrectly filled in.	The differences should have been calculated between run 1 and run 2 (ref. 7.4.20).	NLM 6/30/95

TRUCK 4, SHEET 6 OF 7

11 cont.			This would have yielded values of .10 feet for the digital counter and .05 feet for the mechanical counter. Not all of the cable was unreeled during run 1 as required by step 7.4.16 and documented by the measured length. Therefore, the measured delta between run 1 and run 2 should be added to both the final mechanical and final digital counter values for run 1. This would make the difference for the digital counter .04 feet and the mechanical counter .11 feet. Since the mechanical counter reads out to the nearest tenth of a foot, the mechanical accuracy required should be ±.1 feet instead of ±.10 feet as reported in table V and therefore, both counters are acceptable.	

Table TT. TRUCK 4, SHEET 7 OF 7

(insert additional sheets, as required)

Test Sample Data Sheet – TRUCK 3

Item	Description		Condition	Response	
1	Description of Test Medium		K-Mag/Sludge/Mixture/Etc	K-MAG	
2	Universal Sampler Number		For Record Only	94-371	
3	Segment Number		For Record Only	1	
4	Date of Sampling		For Record Only	06/20/95 / 11:00	
5	Encoder Values of Previous Segment at Bottom of Drill String	Mechanical	feet	N/A	
		Digital	feet	N/A	
6	Encoder Values at Bottom of Drill String	Mechanical	feet	17.6	
		Digital	feet	17.64	
7	Grapple Counter at Bottom of Drill String		~~feet~~ REVOLUTIONS	8.1	
8	Purge Gas (gage/display)	Pressure	psig	43+	35
		Flow Rate	cfm	40	41
9	Longyear Drill Speed		rpm	35	
10	Predicted Spent Sampler Location	Mechanical	feet	19.3	
		Digital	feet	19.34	
11	Indicated Spent Sampler Location	Mechanical	feet	19.2	
		Digital	feet	19.22	
12	Drill String - with sampler removed	Pressure	psig	.09	
		Flow Rate	cfm	0.3	
13	Maximum Force to Unseat Sampler / Grapple Rod		lbs	66 / 64#	
14	Loadcell Weight with Sampler Attached		lbs	64.6	
15	Cleanliness of Sampler		For Record Only	clean	
16	Sample Characteristics When convenient to do so, each sample should be analyzed to determine the characteristics of the waste collected in the sampler.	Volume	For Record Only	N/A	
		Weight	For Record Only	N/A	
		Length	For Record Only	119"	
17	Drilling Time Required to Take Sample		minutes	11:45-11:52 / ~7 min.	

COMMENTS: PEN. RATE UP TO ~13"/min - LOST DOWNFORCE + PG FLOW ALARM; CLEARED BIT AND PROCEEDED @ ~4.5"/min

Table SS.

DOWN FORCE: ~800-1100#

5

Test Sample Data Sheet – TRUCK 3

Item	Description		Condition	Response
1	Description of Test Medium		K-Mag/Sludge/Mixture/Etc	K-MAG
2	Universal Sampler Number		ForRecordOnly	94-352
3	Segment Number		ForRecordOnly	1
4	Date of Sampling		ForRecordOnly	06/19/95 / 14:00
5	Encoder Values of Previous Segment at Bottom of Drill String	Mechanical	feet	N/A
		Digital	feet	N/A
6	Encoder Values at Bottom of Drill String	Mechanical	feet	N/A *
		Digital	feet	N/A *
7	Grapple Counter at Bottom of Drill String		~~feet~~ revolutions	8.2
8	Purge Gas (gage/display)	Pressure	psig	18.4
		Flow Rate	cfm	42
9	Longyear Drill Speed		rpm	~~1200~~ 35
10	Predicted Spent Sampler Location	Mechanical	feet	N/A
		Digital	feet	N/A
11	Indicated Spent Sampler Location	Mechanical	feet	19.2
		Digital	feet	19.21
12	Drill String - with sampler removed	Pressure	psig	1.5
		Flow Rate	cfm	~.3 **
13	Maximum Force to Unseat Sampler / Pinch Rod		lbs	70.0 / 45
14	Loadcell Weight with Sampler Attached		lbs	67.8
15	Cleanliness of Sampler		ForRecordOnly	Clean
16	Sample Characteristics. When convenient to do so, each sample should be analyzed to determine the characteristics of the waste collected in the sampler.	Volume	ForRecordOnly	N/A
		Weight	ForRecordOnly	N/A
		Length	ForRecordOnly	14 1/4"
17	Drilling Time Required to Take Sample		minutes	~3

COMMENTS: PENETRATION START: 14:40 END: 1451
BEGAN IN ROTARY, 100 DOWNFORCE, WENT TO PUSH - DOWNFORCE TO 800 #
BACK TO ROTARY, 14"/min PENETRATION RATE THEN BACK DOWN TO ~7 "/min
DOWNFORCE ~ 700 ~~800~~ # 900

* SAMPLER INSERTED INTO CORE BARREL & INSTALLED W/ DRILL STRING
** CHATTER PROBLEM WHEN AS FLOW OPEN PAST 0.3 CFM.

Test Sample Data Sheet - TRUCK 4

Item	Description		Condition	Response	
1	Description of Test Medium		K-Mag/Sludge/Mixture/Etc	K-MAG	
2	Universal Sampler Number		For Record Only	94-343	
3	Segment Number		For Record Only	2	
4	Date of Sampling		For Record Only	5/31/95	
5	Encoder Values of Previous Segment at Bottom of Drill String	Mechanical	feet	N/A	
		Digital	feet	N/A	
6	Encoder Values at Bottom of Drill String	Mechanical	feet	19.0	
		Digital	feet	19.01	
7	Grapple Counter at Bottom of Drill String		feet	9.3	
8	Purge Gas (gage/display)	Pressure	psig	34	24
		Flow Rate	cfm	40	40
9	Longyear Drill Speed		rpm	43	
10	Predicted Spent Sampler Location	Mechanical	feet	20.5	
		Digital	feet	20.5	
11	Indicated Spent Sampler Location	Mechanical	feet	20.6	
		Digital	feet	20.59	
12	Drill String - with sampler removed	Pressure	psig	12	
		Flow Rate	cfm	N/A	
13	Maximum Force to Unseat Sampler		lbs	65.0	
14	Loadcell Weight with Sampler Attached		lbs	64.9	
15	Cleanliness of Sampler		For Record Only		
16	Sample Characteristics. When convenient to do so, each sample should be analyzed to determine the characteristics of the waste collected in the sampler.	Volume	For Record Only		
		Weight	For Record Only		
		Length	For Record Only	≈ 100%	
17	Drilling Time Required to Take Sample		minutes	3	

COMMENTS: 209 Lbs TO SHEAR PINTEL ROD, A 14 IN SAMPLE AS TAKEN, VALVE NOT ABLE TO CLOSE ON SAMPLER DUE TO CORE.

Table SS.

Test Sample Data Sheet – TRUCK 4

Item	Description		Condition	Response	
1	Description of Test Medium		K-Mag/Sludge/Mixture/Etc	K-MAG	
2	Universal Sampler Number		For Record Only	94-082	
3	Segment Number		For Record Only	1	
4	Date of Sampling		For Record Only	5/5/95	
5	Encoder Values of Previous Segment at Bottom of Drill String	Mechanical	feet	N/A	
		Digital	feet	N/A	
6	Encoder Values at Bottom of Drill String	Mechanical	feet	19.0	
		Digital	feet	19.05	
7	Grapple Counter at Bottom of Drill String		feet	68	
8	Purge Gas (gage/display)	Pressure	psig	25	24
		Flow Rate	cfm	44	42
9	Longyear Drill Speed		rpm	46	
10	Predicted Spent Sampler Location	Mechanical	feet	N/A	
		Digital	feet	N/A	
11	Indicated Spent Sampler Location	Mechanical	feet	19.0	
		Digital	feet	19.05	
12	Drill String - with sampler removed	Pressure	psig	.1	
		Flow Rate	cfm	N/A	
13	Maximum Force to Unseat Sampler		lbs	101	
14	Loadcell Weight with Sampler Attached		lbs	64	
15	Cleanliness of Sampler		For Record Only	CLEAN	
16	Sample Characteristics When convenient to do so, each sample should be analyzed to determine the characteristics of the waste collected in the sampler.	Volume	For Record Only		
		Weight	For Record Only		
		Length	For Record Only	≈ 14.5	
17	Drilling Time Required to Take Sample		minutes	7	

COMMENTS: GRAPPLE NOT LATCHED ONTO PINTEL ROD. SAMPLE LENGTH 14.5 INCHES. SR LOADCELL HIGH ALARM SET AT 80 Lbs NOT 350 Lbs. BALL VALVE NOT CLOSED.

Table SS.

ACCEPTANCE TEST REPORT FOR CORE SAMPLE TRUCKS 3 & 4

3.0 TRUCK 3 ACCEPTANCE TEST PROCEDURE

Table of Contents

4/4/96

1.0 PURPOSE AND INSTRUCTION

The purpose of this Acceptance Test Procedure is to provide instruction and documentation for acceptance testing of the rotary mode core sample trucks, HO-68K-4600 and HO-68K-4647. The procedure follows "Acceptance Test Procedures and Reports", contained in Appendix M, Revision 0, of WHC-CM-6-1, "Standard Engineering Practices".

Authorization for the implementation of this document is controlled by the associated Engineering Data Transmittal. Approval indicates testing will verify the performance of the equipment, compliance with regulations, and protection of personnel.

Any changes or exceptions to the ATP shall be documented on the ATP exception list and approved by the WHC technical representative. All steps to the ATP shall be attempted but do not need to be performed in numerical order if the WHC technical representative approves sequence changes.

All discrepancies, deviations, performance deficiencies, or irregularities involving the test procedure and equipment performance (including, but not limited to, fluid leaks, binding, impact damage, malfunctions, retests, and broken or damaged equipment) are to be noted on the "ATP Exception / Resolution Data Sheet". These exceptions shall be resolved by the ICF-KH Test Director with approval by the WHC Cognizant Engineer for Core Sampling and the WHC Quality Assurance Representative. All resolutions to the exceptions must be agreed upon by the responsible personnel and documented on the exception list, and initialed.

No testing shall be performed on faulty equipment; however, with the concurrence of the WHC Cognizant Engineer, tests may proceed on equipment that is not affected.

2.0 SCOPE

The rotary mode core sample trucks were based upon the design of the second core sample truck (HO-68K-4345) which was constructed to implement rotary mode sampling of the waste tanks at Hanford.

Acceptance testing of the rotary mode core sample trucks will verify that the design requirements have been met. All testing will be non-radioactive and stand-in materials shall be used to simulate waste tank conditions. Compressed air will be substituted for nitrogen during the majority of testing, with nitrogen being used only for flow characterization.

3.0 RESPONSIBILITIES

WHC Cognizant Engineer Core Sampling - Will observe testing to determine if equipment operates as required. Will Initial procedural steps as completed, indicating acceptance of step and associated data. Ensures exceptions to testing are noted on "ATP Exception/Resolution Sheet". Provides technical input as required to the ICF-KH Test Director and certified operator to ensure that all step are performed correctly.

ICF-KH Test Director - Shall Direct testing operations and activities, including equipment inspections and crew briefings at the start of each test and each day of testing, to verify required start conditions and personal protective equipment requirements are met, and to verify all personnel are aware of all applicable safety issues (section 4.4). Shall coordinate all testing with facility management, and acts as liaison between the participants in acceptance testing. Shall initial procedural steps as completed, indicating acceptance of step and associated data. Shall note exceptions to testing on "ATP Exception/Resolution Sheet". Shall resolve exceptions with concurrence of WHC Quality Assurance Engineer and WHC Cognizant Engineer.

Certified Operator - The operator for the core sample truck shall have proper WHC certifications indicating that he/she is qualified to operate the core sample truck. The certified operator will conduct testing according to this procedure, as appointed and requested by the ICF-KH Test Director and/or the WHC Cognizant Engineer. Will notify ICF-KH Test Director and WHC Cognizant Engineer of concerns, exceptions and off-normal conditions during testing.

WHC Quality Assurance - Will review test procedure to assure compliance with appropriate regulations.

WHC Quality Control - Will verify calibration status of gauges and test instruments. Initials or stamps, as required, indicating step completed. This may also require verification that selected data values as recorded are correct. Verifies exceptions to testing are noted on "ATP Exception/Resolution Sheet".

ICF-KH Quality Control - Will verify that all fabrication work is complete and that all drawing inspection criteria is documented and complete.

4.0 INFORMATION

4.1 PRE-TEST APPROVALS

Truck identification number HO-68K-4600

Longyear drill rig identification number HO-22-5663 TRUCK #3

The following items shall be approved prior to the start of the ATP.

All required welds have been inspected and accepted. VP (KEH 28) 3/22/95
ICF-KH QC Hold Pt. Date

VP 3/22/95 PER A.S.I FROM J.L. SMALLEY TO J.R. HEASLEY DATED 3/22/95 "ARE-ATP REQUIREMENTS..."

All gauges for testing have current calibration stickers. 6/30/95
WHC QC Hold Pt. Date

See ATP Exception/Resolution Sheet WHC-SD-WM-ATP-119 R. 0 M.C. Wing Hold 3/22/95

All point to point contunuity checks are complete (KEH 28) 3/22/95
ICF-KH QC Hold Pt. Date

VP 3/22/95 PER A.S.I. FROM J.L. SMALLEY TO J.R. HEASLEY DATED 3/22/95 "ARE-ATP REQUIREMENTS..."

4.2 TERMS AND DEFINITIONS

ATP	- Acceptance Test Procedure
ATR	- Acceptance Test Report
CE	- Cognizant Engineer
CW/CCW	- ClockWise/CounterClockWise
DS	- Drill String
FC	- Flow Control
HBD	- Hydraulic Bottom Detector
HH	- Hydrostatic Head
ICF-KH	- ICF-Kaiser Hanford
OTP	- Operability Test Procedure
PG	- Purge Gas
PGT	- Purge Gas Trailer
PIC	- Person In Charge
QA	- Quality Assurance
QC	- Quality Control
QD	- Quick Disconnect
QE	- Quality Engineer
RF	- Radio Frequency
RLU	- Remote Latch Unit
SCA	- Sample Changeout Assembly
SOV	- Solenoid Operated Valve
SR	- Shielded Receiver
TD	- Test Director
VGR	- Video Graphic Recorder
WHC	- Westinghouse Hanford Company

4.3 REFERENCES

WHC-CM-6-1, "Standard Engineering Practices"

4.4 SAFETY ISSUES

Warning - Take extra care to avoid possible pinch points while working on and near the rotating platform. All personnel on the platform will wear leather gloves during rotation.

Warning - Nitrogen gas or compressed air is supplied to the sample truck at high pressure. Breaking containment of the drill string while it is pressurized will cause a rapid release of gas. The following indicators must be observed so that the drill string is vented prior to being opened: pressure gages in the purge gas enclosure and digital displays in the instrument enclosure (refer to Figure 16 and Figure 15), as well as the green pressure indicator lights.

Warning - Nitrogen is stored in the purge gas trailer as a liquid. The nitrogen is stored at high pressure and extremely low temperatures (-250 to -320 °F). Exposure at these conditions will freeze skin immediately causing severe burns.

Warning - The warning sirens on the sample truck are very loud. Hearing protection shall be worn during siren activation.

Warning - Do not wear loose clothing when near the rotating drill string.

Warning - The Purge Gas Trailer uses propane gas as fuel. Keep flame and heat sources away from propane tank.

Warning - Nitrogen used during flow tests shall be routed to building exterior.

Warning - Longyear engine exhaust shall be routed to building exterior.

Note: - Supervision must conduct a pre-job safety session/crew briefing at the specified work location.

4.5 RADIATION AND CONTAMINATION CONTROL

All testing will be non-radioactive and stand-in materials shall be used to simulate waste tank conditions.

5.0 RECORDS

Pertinent operating conditions will be documented where requested in this ATP. Records for the testing of equipment will be recorded in the tables supplied within the procedure. The ICF-KH Test Director, WHC Cognizant Engineer for Core Sampling, and appropriate QC will initial in the space provided in the left-hand margin upon satisfactory completion of designated tasks.

The specified test personnel shall sign the "Test Completion Sign-Off Sheet" upon completion of all testing.

6.0 PREREQUISITES

6.1 SUPPLIES

6.1.1 Operating Equipment

- Core Sample Truck
- Air complerssor 125 PSIG, 90 SCFM
- Portable Electric Generator & Power Cables
- Appropriate Personal Protective Equipment
- Hand Levels
- Tape Measure

WHC FURNISHED EQUIPMENT

- Drill Rod
- Core Barrel and Rotary Drill Bit
- Riser Equipment
- Riser Gasket
- Pneumatic Foot Clamp with Controls
- Pintle Rod Container
- Universal Samplers
- Cable Spray Washer and Cap
- Drill String Wrenches
- Plastic Kamlok Caps
- Quill Rod Kamlok Adapter
- Drill String Kamlok Adapter
- Load Cell/Scale
- Spring Downforce Test Aparatus
- Drillstring Cap
- 30 Gallon Drum of K-Mag

6.1.2 Test Unique Equipment

- Riser mock up
- Exhaust ducting
- Test weights (10, 25, 50, 75, 100, 150, 200, and 400 lbs)
- Stopwatch
- Pressure gage and vent valve (used on vent line Q.D. fitting)
- Soap/leak check solution

6.2 PROCEDURES

No additional procedures will be required to complete testing.

6.3 CONDITIONS

6.3.1 Test Set Up

The Test Director will verify that the following tasks are complete, prior to test start:

- The assigned quality assurance representative has verified all items identified on the Item Status Verification Sheet.

- Cranes to be used in support of testing are approved for service.
- Acceptance testing Job Safety Analysis is complete.
- Functional testing has been completed.

6.3.2 Core Sample Truck

The Test Director will verify that the core sample truck is in the following configuration (for details of component locations, see figures in section 7.0):

- Leveling jacks are pinned in place or are fully retracted.
- Truck frame and electrical systems are properly grounded.
- Drill rig is centered on the rotating platform with the drill head at the rear of the truck, drill head and shielded receiver rams are retracted (lowered).
- **CONTROL CONSOLE** (Refer to Figure 3 on Page 12): ENCODER ASSEMBLY AC and DC power switches off, LATCHING CONTROL power and lockout reset keyswitches off, MOTOR CONTROL power and up/down switches off, HYDRAULIC CONTROL switches in spring loaded (off) position, SAMPLE ACTUATOR switches in spring loaded (off) position, INSTRUMENT POWER circuit breakers off.
- **CONTROL SELECT PANEL** (Refer to Figure 7 on Page 17): electrical control switch in CONSOLE CONTROL (except when using the pendent controller), and hydraulic control switch in CONSOLE HYD (except when using Longyear hydraulic controls).
- **HYDRAULIC BOTTOM DETECTOR** (Refer to Figure 11 on Page 28): Horn alarm in NORMAL, Keyswitch off.
- **INSTRUMENT ENCLOSURE ASSEMBLY** (Refer to Figure 10 on Page 27): REC mode switch in STBY, LOWER RAM display in PRESS, PURGE GAS FLOW display in 1, PURGE GAS off, PRESSURIZE SHIELDED RECEIVER off, PRESSURIZE DRILL STRING off, Purge Gas MODE in DRILL, each Digital Flow Indicator unit (Refer to 1, 2 and 3 of Figure 15 on Page 38) - power on and display select switch in FLOW.
- **PURGE GAS CONTROL ENCLOSURE** (Refer to Figure 16 on Page 38): All flow control valves (FC-1, FC-2 and FC-3) closed, all pressure regulating valves *initially* closed (normal settings are 85 psig for PR-1 and 30 psig for PR-2 and PR-3).
- **LONGYEAR DRILL & ENGINE** Clutch disengaged, transmission in neutral, spindle in low, engine throttle at lowest setting, four way control valve in HEAD position, three way control valves in center position, ram flow control valves closed, leveling jack flow control valves closed, rotating platform hydraulic bypass valve closed, keyswitch off.

7.0 TEST PROCEDURE (EQUIPMENT)

7.1 POWER, AIR, AND LONGYEAR ENGINE RELATED TESTING

Refer to Figures 1 and 2 on the following pages for the location of the system controls addressed within the remainder of this document.

7.1.1 INITIALIZE ELECTRICAL SYSTEM

TD/CE 7.1.1.1 **VERIFY** facility and test equipment are ready to support acceptance testing of the core sample truck, as per Section 6.3.

TD/CE 7.1.1.2 **CONNECT** the 120/240 volt power cable from the facility source to the sample truck. The receptacle (J10) is on the driver's side of the truck, near the ladder on the stationary platform.

TD/CE 7.1.1.3 **CONNECT** the 120 volt power cable from the facility source to the sample truck's air compressor. The receptacle (J15) is on the passenger side of the truck.

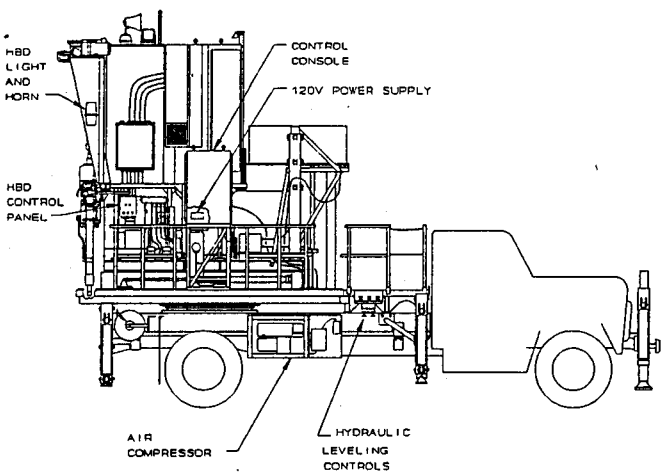

Figure 1) System Controls and Alarms (Passenger Side).

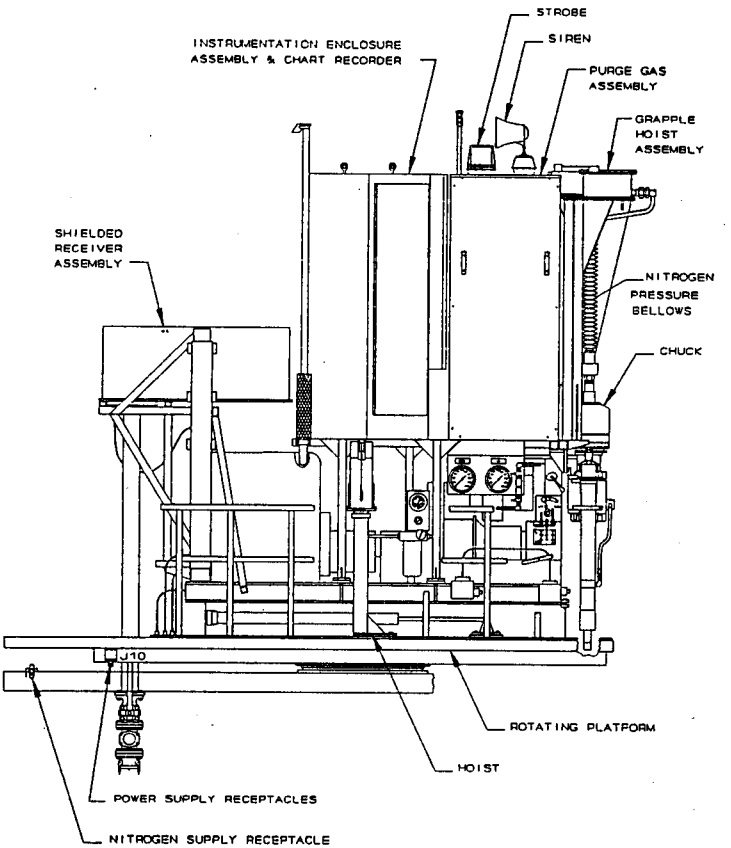

Figure 2) System Controls and Alarms (Driver Side).

Figure 3 below, indicates the location of the console control panels.

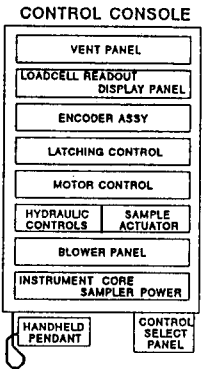

Figure 3) Control Console

TD/CE 7.1.1.4 **ACTIVATE** all breakers on the INSTRUMENT CORE SAMPLER POWER panel, (see Figure 3 below), of the control console.

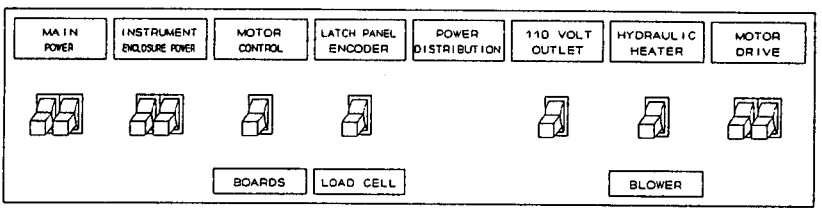

Figure 4) Instrument Core Sampler Power

TD/CE 7.1.1.5 **TURN** ON the power switches on each console control panel listed below, **VERIFY** that the POWER lights come ON, and **COMPLETE** the Table A.

NOTE: Whenever truck electronics are powered up, a 20 min warm up period is required prior to operation.

PANEL	CONDITION	LIGHT STATUS
ENCODER ASSY (AC and DC)	ON/OFF	ON
LATCHING CONTROL (Turn Key Clockwise)	ON/OFF	ON
MOTOR CONTROL PANEL	ON/OFF	ON

Table A.

TD/CE 7.1.1.6 **TURN** the air compressor ON and allow it to run until it automatically shuts off.

TD/CE 7.1.1.7 **RECORD** the maximum tank pressure in Table B below.

TD/CE 7.1.1.8 **BLEED** air from the tank until the compressor turns ON and **RECORD** the minimum tank pressure in Table B.

Parameter	Condition	Value
Maximum Tank Pressure	120 ± 20 psig	120
Minimum Tank Pressure	90 ± 20 psig	80
Compressor Oil Pressure	For Record Only	N/A

Table B.

7.1.2 INITIALIZE LONGYEAR ENGINE

TD/CE 7.1.2.1 **ENSURE** INITIALIZE ELECTRICAL SYSTEM is complete per 7.1.1.

TD/CE 7.1.2.2 **ENSURE** that the five (5) HYDRAULIC JACK leveling control valves are closed.

7.1.2.3 **ENSURE** nitrogen/air supply is shut off or disconnected.

TD/CE 7.1.2.4 **PLACE** the 4-way control valve in the HEAD position.

TD/CE 7.1.2.5 **ENSURE** that the drill rig transmission is in NEUTRAL.

TD/CE 7.1.2.6 **ENSURE** that the drill rig clutch is DISENGAGED.

TD/CE 7.1.2.7 To start the gas engine, **TURN** the key clockwise and **PUSH** the black start button (choke if necessary). **ADJUST** the throttle as necessary.

TD/CE 7.1.2.8 **ENSURE** that the two speed spindle is LOCKED in LOW.

TD/CE 7.1.2.9 **ENSURE** that the chuck is in the CLOSE position.

TD/CE 7.1.2.10 **RECORD** the information requested in Table C after the engine has warmed up.

PARAMETER	CONDITION	VALUE
Longyear Water Temperature	For Record Only	170 °F
Longyear Oil Pressure	For Record Only	50
Alternator Current	For Record Only	>0
Torque Converter Oil Temperature	For Record Only	N/A
Bit Weight Pressure	For Record Only	N/A
Hydraulic Filter Vacuum	For Record Only	8 psi
Ram Hydraulic Pressure, UP	For Record Only	270
Ram Hydraulic Pressure, DOWN	For Record Only	260
Hydraulic Supply Pressure	For Record Only	1000

Table C.

7.2 TRUCK LEVELING / HYDRAULIC RELATED TESTING

7.2.1 CORE SAMPLE TRUCK LEVELING

START CONDITION: Initialize Longyear Engine (ref. 7.1.2).

Refer to Figure 5 below for the hydraulic controls for positioning of the drill rig.

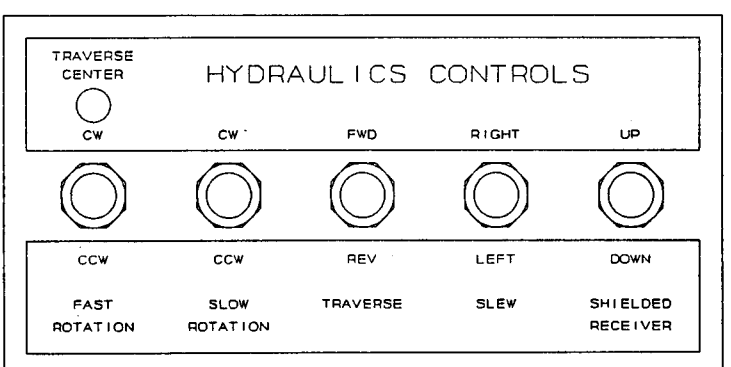

Figure 5) Hydraulic Positioning Controls

The sample truck is raised by five (5) hydraulic rams and is leveled using a portable hand level. The hydraulic controls associated with leveling are the 4-way control valve and the turn valves which control flow to each of the jacks (see Figure 6 below). When leveling the truck, lower the rams slowly in small increments so that the truck is lifted uniformly.

NOTE: The center jacks are used for stabilization. Lower these jacks only after lowering the front and rear lifting jacks.

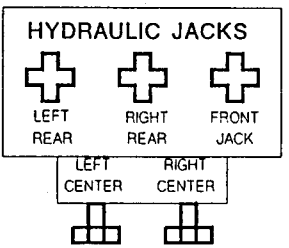

Figure 6) Leveling Controls

TD/CE 7.2.1.1 **PLACE** the four way control valve in the float position.

TD/CE 7.2.1.2 **CONNECT** the hydraulic leveling hoses from the main reservoir to the leveling system. The hoses are stored and coupled near the right rear leveling ram.

TD/CE 7.2.1.3 **PLACE** the manual/console hydraulic control switch in the MANUAL HYD. position.

TD/CE 7.2.1.4 **PLACE** the Longyear 4-way control valve in the RAISE position.

TD/CE 7.2.1.5 **RAISE** the truck by using the control valves to extend the jacks a minimum of 15 inch stroke.

TD/CE 7.2.1.6 **OBSERVE** the portable hand levels and **ADJUST** the turn valves until the core sample truck is level, per hand level indicators.

TD/CE 7.2.1.7 **PLACE** the 4-way control valve in the HEAD position, and allow truck to settle/stabilize.

TD/CE 7.2.1.8 **INSTALL** jack collars as backup supports with approximately 2 inch nominal clearance.

TD/CE 7.2.1.9 **MEASURE** and **RECORD** the distance (at each of 5 jacks) from the ~~platform~~ to the ground (high-1) in Table D.
↑UNDERSIDE OF EACH JACK SUPPORT
PLS malley 3/22/95

Description	Condition	RR	LR	Value LL	F	RC
HEIGHT (high-1) ± ½"	For Record Only	29 1/4	29 7/8	33 7/8	35 1/8	33
HEIGHT (high-2) ± ½"	For Record Only	29 1/4	29 7/8	33 5/8	35 1/8	32 3/4
Drift (high-1) - (high-2) ± ½"	For Record Only	0	0	1/8"	0	1/4"

Table D.

CAUTION: Personnel shall stand clear of the truck during 1 hour hold period.

TD/CE 7.2.1.10 After hold period (one hour minimum) **MEASURE** and **RECORD** in Table D. The distance from the ~~platform~~ to the ground (high-2). UNDERSIDE OF EACH JACK SUPPORT JJ Smalley 3/22/95

TD/CE 7.2.1.11 **CALCULATE** and **RECORD** in Table D. Any measured drift (high-1) - (high-2).

TD/CE 7.2.1.12 **REMOVE** jack collars.

TD/CE 7.2.1.13 **LOWER** the truck back to the minimum height required for remaining testing.

TD/CE 7.2.1.14 **LEVEL** the truck then **INSTALL** jack collars.

TD/CE 7.2.1.15 **PLACE** the 4-way control valve in the FLOAT position.

TD/CE 7.2.1.16 **DISCONNECT** the hydraulic hoses and **STORE** them on the sample truck.

TD/CE 7.2.1.17 **MEASURE** and **RECORD** the final distance from the platform to the ground in Table E.

Description	Condition	Value
Platform to Ground, in. 65"	For Record Only	65"

Table E.

7.2.2 RAISE/LOWER DRILL HEAD

START CONDITION: Initialize Longyear Engine (ref. 7.1.2).

TD/CE 7.2.2.1 **PLACE** the 4-way control valve in the RAISE position.

TD/CE 7.2.2.2 **OPEN** the DOWN SPEED CONTROL valve until the rams bottom out.

TD/CE 7.2.2.3 **MEASURE** and **RECORD** the distance from the bottom of quill rod adapter to the ground in Table F (low).

TD/CE 7.2.2.4 **PLACE** the 4-way control valve in the lower position.

TD/CE 7.2.2.5 **OPEN** the UP SPEED CONTROL valve until the rams are fully raised, then **CLOSE** valve.

TD/CE 7.2.2.6 **MEASURE** and **RECORD**, in Table F, the distance from the bottom of the quill rod adapter to the ground (high).

TD/CE 7.2.2.7 **CALCULATE** and **RECORD**, in Table F, the travel available for the push rams (high-low).

TD/CE 7.2.2.8 **PLACE** the 4-way control valve in the FLOAT position.

Description	Condition	Value
Quill Rod to Riser (high), in.	For Record Only	78 1/2
Quill Rod to Riser (low), in.	For Record Only	54 1/4
Travel of Rams (high-low), in.	For Record Only	24 1/4

Table F.

7.3 DRILL RIG / SAMPLE ACTUATOR / HBD

Refer to Figure 5 and Figure 7 for the location of the controls referenced in this section. Position the knobs on the "Control Select Panel" as necessary for CONTROL CONSOLE or PENDANT control.

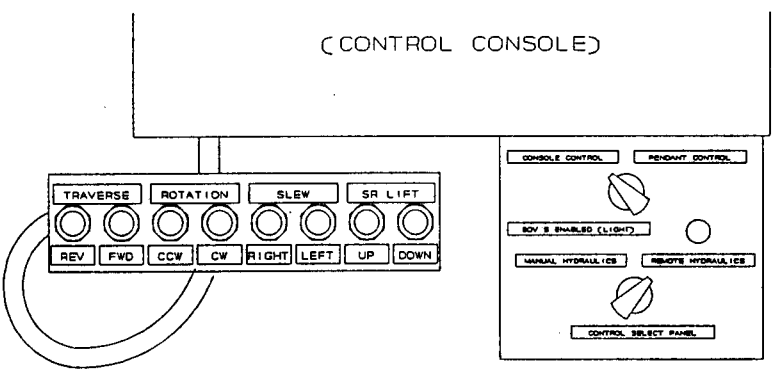

Figure 7) Pendant Controls and Control Select Panel

7.3.1 DRILL RIG POSITIONING

START CONDITION: Initialize Longyear Engine (ref. 7.1.2).

CAUTION: For slow rotation ensure drill head and shielded receiver have adequate clearance prior to rotating.

TD/CE 7.3.1.1 **POSITION** observers at sides of truck to verify platform rotation is free of obstructions.

TD/CE 7.3.1.2 **ENSURE** the manual crossover valve is in the closed position.

NOTE: The drill rig platform was designed with 400° rotation capability (with drill head at rear-center, platform can rotate 200° in either direction).

TD/CE 7.3.1.3 **VERIFY** full rotation in the SLOW ROTATION mode for both the control console and pendant in both the CW mode and then the CCW mode. Rotation should automatically be stopped by the limit switches. At step completion drill head should be at rear of truck. **RECORD** results in Table G.

MODE	Condition	CW ROTATION	CCW ROTATION
Console Control	OK/BAD	OK	OK
Pendant Control	OK/BAD	OK	OK

Table G.

TD/CE 7.3.1.4 **RAISE** the shielded receiver and drill head to there upmost position and **VERIFY** that fast rotation is inoperable without the drill rig traversely centered.

TD/CE 7.3.1.5 **CENTER** the drill rig and **LOWER** the drill head so that the up limit switch is not activated. **VERIFY** that fast rotation is inoperable with the drill head lowered.

TD/CE 7.3.1.6 **RAISE** the drill head to the upper most position and **LOWER** shielded receiver until the up limit switch is not activated. **VERIFY** that fast rotation is inoperable with the shielded receiver lowered.

TD/CE 7.3.1.7 **RAISE** shielded receiver to it's upmost position.

TD/CE 7.3.1.8 Use the FAST ROTATION switch on the control console to **VERIFY** full rotation, with 3 second time delay and audible alarm, in both the CW mode and then the CCW mode. Rotation should automatically be stopped by the limit switches. At step completion drill head should be at rear of truck. **RECORD** results in Table H.

PARAMETER	Condition	CW ROTATION	CCW ROTATION
3 Second Time Delay	OK/BAD	OK	OK
Audible Alarm	OK/BAD	OK	OK

Table H.

TD/CE 7.3.1.9 **TEST** the slew function for both console and pendant controls by holding the SLEW switches in the appropriate position until the drill rig stops. (The rig should slide about 6 inches from center each way.) **RECORD** results in Table I.

MODE	Condition	SLEW RIGHT	SLEW LEFT
Console Control	OK/BAD	OK	OK
Pendant Control	OK/BAD	OK	OK

Table I.

TD/CE 7.3.1.10 **ROTATE** the platform CCW so that the shielded receiver is at the rear of the truck.

TD/CE 7.3.1.11 **HOLD** the console TRAVERSE switch in the FORWARD position to extend the shielded receiver over the end of the platform then **RETRACT**. (The receiver should move about 24 inches.) Also **VERIFY** operation of the pendant TRAVERSE controls. Leave the shielded receiver in extended position. **RECORD** results in Table J.

MODE	Condition	TRAVERSE IN	TRAVERSE OUT
Console Control	OK/BAD	OK	OK
Pendant Control	OK/BAD	OK	OK

Table J.

TD/CE 7.3.1.12 **VERIFY** equipment clearance during slow rotation as follows:

TD/CE 7.3.1.12.1 With shielded receiver fully extended over the rear of the truck, **ROTATE** the platform CW to position the shielded receiver at the left side extreme forward location (just prior to contact with truck body/platform rails, as depicted at top of Figure 8).

TD/CE 7.3.1.12.2 **RETRACT** shielded receiver as necessary and **COMPLETE** full CW rotation. At step completion shielded receiver should be at rear of truck.

TD/CE 7.3.1.12.3 Fully **EXTEND** the shielded receiver and **ROTATE** platform CCW to position shielded receiver at the right side extreme forward location (opposite side as in step above).

7.3.1.12.4 **CENTER** drill rig and **ROTATE** the platform so that the drill head is at the rear of the truck.

TD/CE 7.3.1.13 **HOLD** the console TRAVERSE switch in the REVERSE position to extend the drill rig over the end of the platform then **RETRACT**. (The drill rig should move about 24 inches.) Also **VERIFY** operation of the pendant TRAVERSE controls. Leave drill head in extended position. **RECORD** results Table K.

MODE	Condition	TRAVERSE IN	TRAVERSE OUT
Console Control	OK/BAD	ok	ok
Pendant Control	OK/BAD	ok	ok

Table K.

TD/CE 7.3.1.14 **VERIFY** equipment clearance during slow rotation as follows:

TD/CE 7.3.1.14.1 With drill head fully extended over rear of truck, **ROTATE** the platform CCW to position the drill head at the right side extreme forward location (just prior to contact with truck body / platform rails, as depicted at bottom of Figure 8).

TD/CE 7.3.1.14.2 **ROTATE** platform in opposite direction (CW) to position drill head at left side extreme forward location (opposite side as in step above).

TD/CE 7.3.1.14.3 **CENTER** drill rig and **ROTATE** the platform so that the drill head is at the rear of the truck.

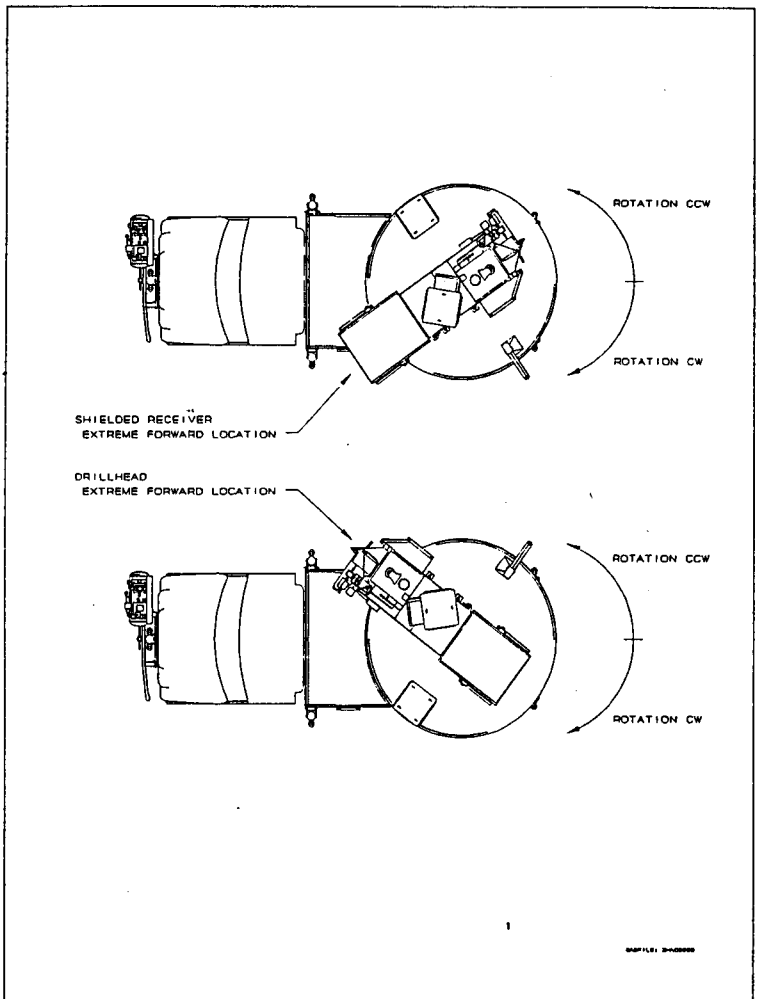

Figure 8) Platform Rotation - Traversed Drill Rig

7.3.2 SAMPLE ACTUATOR CABLE SWITCHES

START CONDITION: Initialize Electrical System (ref. 7.1.1)

CAUTION: For slow rotation ensure drill head and shielded receiver have adequate clearance prior to rotating.

TD/CE

7.3.2.1 **ROTATE** the platform to facilitate grapple hoist rotary valve actuator testing.

TD/CE

7.3.2.2 **SET** the motor speed control on the SAMPLER ACTUATOR panel to the 40 position. (Refer to Figure 9 below for the Actuator Controls.)

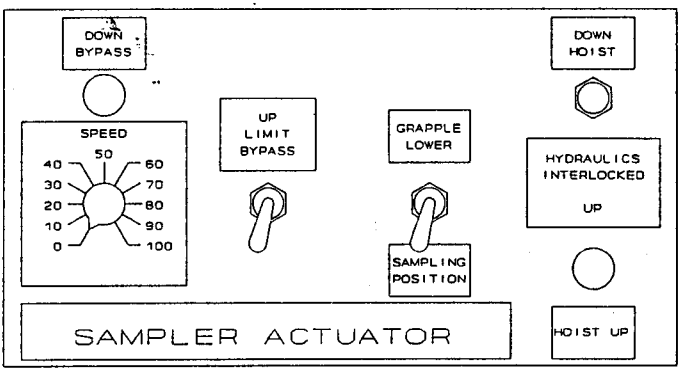

Figure 9) Drill Rig Actuator Controls

CAUTION: Possible pinch point. Grapple must be hand guided into tube I.D. to prevent damage to grapple and hoist cable.

TD/CE

7.3.2.3 **LOWER** the grapple by placing the mode switch on the SAMPLE ACTUATOR panel to the GRAPPLE LOWER position and the HOIST UP/DOWN switch to DOWN. (Lower the grapple until slack in the grapple cable automatically stops the hoist motor to verify slack detector operation.) **RECORD** loadcell reading in Table L.

TD/CE

7.3.2.4 **REMOVE** slack from the grapple cable by placing the mode switch on the SAMPLE ACTUATOR panel to the SAMPLING position and the HOIST UP/DOWN switch to UP. (The hoist should automatically stop when the slack is removed.) **RECORD** loadcell reading in Table L.

TD/CE 7.3.2.5 **RAISE** the grapple to allow connection to a sampler pintle by placing the actuator mode switch to GRAPPLE LOWER and the HOIST switch to the UP position.

TD/CE 7.3.2.6 **CONNECT** a sampler pintle to the grapple, **RAISE** the grapple until it automatically stops and **VERIFY** proper proximity switch (S24) operation by observing switch light is on.

TD/CE 7.3.2.7 **HOLD** the pintle release switch to the UP LIMIT BYPASS position and hoist switch in UP position and **VERIFY** the pintle rod releases from the grapple, followed by the grapple motor stalling out. **RELEASE** the UP LIMIT BYPASS and HOIST UP switches. **RECORD** the loadcell reading in Table L.

DESCRIPTION	CONDITION	VALUE
Load Cell Reading Slack Cable. lbs	For Record Only	5.8
Load Cell Reading Slack Cable Removed. lbs	For Record Only	19.6
Load Cell Reading Pintel Rod Release. lbs	For Record Only	198

Table L.

TD/CE 7.3.2.8 **VERIFY** that the grapple hoist can not be lowered without holding the uplimit bypass switch.

TD/CE 7.3.2.9 **PUSH** the SAMPLE DOWN BYPASS button on the SAMPLER ACTUATOR panel and **HOLD** the HOIST UP/DOWN switch in the DOWN position. (Lower the grapple several inches to clear the proximity switch.)

7.3.3 GRAPPLE HOIST LIFT CAPACITY AND BRAKE TEST

START CONDITION: Continued from above section.

CAUTION: Personnel shall stand clear of suspended loads.

TD/CE 7.3.3.1 **PERFORM** the following steps to test the load cell.

TD/CE 7.3.3.1.1 **SET** the grapple hoist motor speed control to an acceptable feed rate and **RECORD** setting in Table M.

TD/CE 7.3.3.1.2 **LOWER** grapple hoist rotary valve actuator through the quill rod and **ATTACH** the pintel weight hook.

TD/CE 7.3.3.1.3 **RECORD** in Table M (column 3), the tare weight from the load cell reading and the actual weight of the test weights to be used.

TD/CE AHJ 9/28 7.3.3.1.4 **ATTACH** to the pintel weight hook, one at a time, each of the weights and **RECORD** the weight indicated (gross weight - column 4).

TD/CE AHJ 9/28 7.3.3.1.5 **CALCULATE** and **RECORD** in Table M the difference between the tare weight and the indicated gross weight (net weight - column 5).

TD/CE AHJ 9/28 7.3.3.1.6 **CALCULATE** and **RECORD** in Table M the difference between the pretest and net load cell weights.

LOADING	CONDITION	WEIGHT (PreTest)	GROSS WEIGHT (Load Cell)	NET WEIGHT (Gross-Tare)	DIFFERENCE (PreTest-Net Weight)
MOTOR SPEED					
No Weights (tare)	± 0.5 lbs.	—	23.7	—	—
10 lbs.	± 0.5 lbs.	10	33.8	10.1 ~~23.6~~ AHJ	0.1
25 lbs.	± 1.0 lbs.	25	49.7	26.0	1.0
50 lbs.	± 1.5 lbs.	50	75.6	51.9	1.9
75 lbs.	± 2.0 lbs.	75	99.4	75.7	0.7
Weights Removed	±	0	24.1	0.4	0.4

Table M.

TD/CE AHJ 9/28 7.3.3.2 **POSITION** 150 lb test weight directly under the grapple.

TD/CE AHJ 9/28 7.3.3.3 **LOWER** grapple and connect to test weight.

TD/CE AHJ 9/28 7.3.3.4 **RAISE** and **LOWER** the grapple sufficiently to ensure hoist operation.

TD/CE AHJ 9/28 7.3.3.5 **RAISE** the loaded grapple high enough to load test the hoist brake.

TD/CE AHJ 9/28 7.3.3.6 **RECORD** start and stop heights in Table N and **VERIFY** no slippage occurs during one minute hold period.

TD/CE AHJ 9/28 7.3.3.7 **LOAD** the grapple with approximately 210 lbs of weight. **RECORD** actual weight (± 10 lbs) that the motor stalls at and the load cell reading in Table N.

TD/CE AHJ 9/28 7.3.3.8 **REMOVE** the test weights from the grapple.

Brake test	Start	Stop
Grapple height (in)	3/8	3/8
Stall weight actual (lbs)	210	
Stall weight load cell (lbs)	238.1	

Table N.

7.3.4 HOIST SPEED CONTROL AND COUNTER TEST

START CONDITION: Continued from above section.

TD/CE AHJ 9/28 7.3.4.1 **TEST** the hoist speed control by placing the speed control at the 30, 60, and the 90 settings. **LOWER** and **RAISE** the grapple a few feet to ensure that higher settings indicate faster speeds. **INDICATE** operation of the speed controller in Table P.

TD/CE AHJ 9/28 7.3.4.2 **VERIFY** proper operation of grapple drum counter (increasing numbers during grapple lowering, decreasing during raising).

		SPEED		
		30	60	90
Condition	OK/BAD	OK	OK	OK

Table P.

7.3.5 GRAPPLE ASSEMBLY TESTING

START CONDITION: Continued from above section.

TD/CE AHJ 9/28 7.3.5.1 **POSITION** a core barrel, with sampler installed, directly under the grapple.

TD/CE AHJ 9/28 7.3.5.2 **LOWER** the grapple by holding the mode switch on the SAMPLE ACTUATOR panel to the GRAPPLE LOWER position until grapple contacts the sampler pintle and slack in the grapple cable automatically stops the hoist motor.

TD/CE AHJ 9/28 7.3.5.3 **REMOVE** slack from the cable by placing the mode switch in the SAMPLING POSITION, and hold the HOIST UP/DOWN switch to UP. (The hoist motor should automatically stop when the slack is removed.)

TD/CE AHJ 9/28 7.3.5.4 **VERIFY** that the piston is not lifted in the sampler prior to the automatic slack removal shutdown.

TD/CE AHJ 9/28 7.3.5.5 **ENSURE** core barrel is secured, to prevent sampler from rising.

TD/CE 7.3.5.6 **PLACE** the mode switch in GRAPPLE LOWER and the HOIST switch in the UP position until the pintle rod shears and the proximity switch automatically stops the hoist motor.

TD/CE 7.3.5.7 **HOLD** the pintle release switch to the UP LIMIT BYPASS position and the hoist switch to UP to release the sampler pintle rod. Release switches.

TD/CE 7.3.5.8 **PUSH** the SAMPLE DOWN BYPASS button on the SAMPLER ACTUATOR panel and **HOLD** the HOIST UP/DOWN switch in the DOWN position. (Lower the grapple several inches to clear the proximity switch.)

7.3.6 INITIALIZE DRILL ROTATION

START CONDITION: Initialize Longyear Engine (ref. 7.1.2).

WARNING: Do not open the chuck while it is rotating nor start rotation while the chuck is open. Before the drill is shut down, always close the chuck.

TD/CE 7.3.6.1 **CONNECT** the nitrogen/air supply line from the sample truck to a portable compressor. The receptacle on the truck is located below the platform by the driver's door.

TD/CE 7.3.6.2 **ENSURE** all purge gas system components are fully vented, all valves (including quick disconnect fittings) are closed, the MODE switch (located at bottom of Instrument Enclosure Assembly) is in the DRILL position, and the function switches (Purge Gas, Pressurize Shielded receiver, and Pressurize Drill String) are in the off (closed) position.

TD/CE 7.3.6.3 **TURN ON** compressor and verify pressure is at 125 ± 15 psig.

TD/CE 7.3.6.4 **POSITION** the PURGE GAS switch to ON, **ENSURE** purge gas pressure regulator (PR-1) is adjusted to 85 psig, and slowly **OPEN** purge gas flow control valve (FC-1) to establish nominal flow rate (approximately 50 scfm).

TD/CE 7.3.6.5 **ENSURE** that the chuck is closed. **PLACE** the transmission in first gear, **ENGAGE** the clutch, and the drill should rotate.

TD/CE 7.3.6.6 **TEST** drill rig rotation in 1st, AND 2nd, ~~and 3rd~~ gears with the spindle in LOW. (Rotary mode sampling is limited to AND SECOND rotational speeds attainable in 1st ~~through third gears~~ and GEAR LOW range. Testing at higher speeds is not required and may damage equipment.) DO NOT EXCEED HIGH RPM TRIP POINT. **COMPARE** drill string RPM indicator with actual RPM as measured by stopwatch and marker, and **COMPLETE** Table Q.

	RPM					
	LOW (≈ 20)		MED LOW (≈ 40)		MED HIGH (≈ 60)	
	Indicated	Actual	Indicated	Actual	Indicated	Actual
1st Gear	33	32	38	39	51	52
2nd Gear	55	56	69	70	111	112
~~3rd Gear~~						

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Table Q.

The Video Graphic Recorder (VGR) displays and records various parameters during core sampling operations. The data is recorded on a magnetic tape located in the VGR housing. Only six of the total 12 channels are displayed, in a trending format, during core sampling operations. The remaining six channels are recorded, but not displayed during operations. The table below lists the parameters monitored. For testing purposes it will be necessary to change the display mode of the VGR from TREND to TEXT. The TEXT mode display will show all of the parameters monitored in a text format. A later step will outline how to place the VGR into the TEXT mode of display.

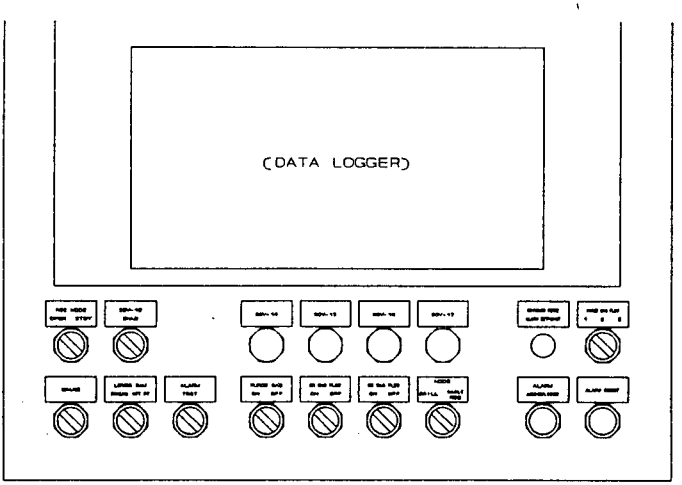

Figure 10) Electronic Chart Recorder

Channel	Parameter Monitored
1	Purge Gas Flow Rate
2	Purge Gas Pressure
3	Drill String Position
~~4~~	~~Hydrostatic Head Shielded Receiver~~
~~5~~	~~Hydrostatic Head Drill String~~
6	Shielded Receiver Pressure
7	Drill String Pressure
8	Drill Bit Rotational Speed
9	Drill Bit Penetration Rate
10	Drill Bit Down Force
11	Lower Ram Pressure Set Point
12	Lower Ram Pressure

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Table R.

7.3.7 HYDRAULIC BOTTOM DETECTOR TEST

START CONDITION: Initialize Longyear Engine (ref. 7.1.2).

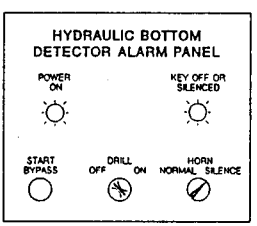

Figure 11) Hydraulic Bottom Detector Controls

TD/CE 7.3.7.1 **PLACE** the VGR in the TEXT mode by pressing the PAGE button located in the lower right corner of the VGR unit and using the arrow keys to select PAGE NO. 2. **PRESS** the PAGE button again after selecting PAGE NO. 2.

TD/CE 7.3.7.2 **PLACE** the 4-way valve in the HEAD position.

TD/CE 7.3.7.3 **ENSURE** that the ram DOWN SPEED CONTROL valve is CLOSED.

TD/CE 7.3.7.4 **OPEN** the ram UP SPEED CONTROL valve approximately 1/3 of a turn.

TD/CE 7.3.7.5 **TURN** the LOWER RAM switch on the instrumentation enclosure to the SET POINT position, then **ADJUST** the DOWNWARD FORCE ALARM SET POINT dial as necessary to adjust the set point pressure.

NOTE: The alarm set point will be displayed on the LOWER RAM PRESSURE readout in the instrumentation enclosure.

TD/CE 7.3.7.6 **RECORD** the set point pressure in Table S.

TD/CE 7.3.7.7 **DEPRESS** and **HOLD** the START BYPASS button on the HBD Panel.

TD/CE 7.3.7.8 **PLACE** the 4-way control valve in the LOWER position.

TD/CE 7.3.7.9 When the UP and DOWN ram gage pressures equalize, **ROTATE** the DRILL key to ON then **RELEASE** the START BYPASS button.

7.3.7.10 **TURN** the LOWER RAM PRESSURE/SET POINT switch to PRESSURE, then **SET** the RECORDER MODE switch to the OPERATE position.

NOTE: The alarm set point will be shown on channel 11 of the VGR.

TD/CE 7.3.7.11 **LOWER** the drill rod against a solid object until the alarms activate and pressure is reversed to the hydraulic rams.

TD/CE 7.3.7.12 **TURN** the HORN knob to SILENCE to quiet the siren, **POSITION** the 4-way valve to FLOAT to stop the rams, and **ROTATE** the DRILL key on the HBD panel to OFF to stop the strobe and disable the HBD.

TD/CE 7.3.7.13 **DOCUMENT**, in Table S, whether the horn, strobe, and ram reversal activate correctly or not.

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PARAMETER	CONDITION	TRIAL 1	TRIAL 2	TRIAL 3
~~Set~~ Point Pressure	psig	70.7	100	140
Horn & Strobe	OK/BAD	OK	OK	OK

Table S.

TD/CE 7.3.7.14 **RETURN** to step 7.3.7.2 and **REPEAT** process at two additional pressure differentials.

TD/CE 7.3.7.15 **RAISE** the ram and **CENTER** the drill rig and shielded receiver.

7.4 SHIELDED RECEIVER / REMOTE LATCH UNIT

START CONDITION: Initialize Longyear Engine (ref. 7.1.2).

CAUTION: For slow rotation ensure drill head and shielded receiver have adequate clearance prior to rotating.

TD/CE AHJ 3/28 7.4.1 **ROTATE** the platform so that the shielded receiver is at the rear of the truck.

TD/CE AHJ 3/28 7.4.2 **EXTEND** the receiver over the edge of the platform. **TEST** the SR Lift function for the control panel and pendant, and **RECORD** results in the Table T.

MODE	Condition	RECEIVER UP	RECEIVER DOWN
Console Control	OK/BAD	OK	OK
Pendant Control	OK/BAD	OK	OK

Table T.

TD/CE AHJ 3/28 7.4.3 **LOWER** the receiver by placing the SHIELDED RECEIVER switch in the DOWN position. Lower the receiver until it stops.

TD/CE AHJ 3/28 7.4.4 **MEASURE** and **RECORD** in ~~Table T~~ TABLE U JJB 3/28/95, the distance from the bottom of the shielded receiver column to the ground (low).

TD/CE AHJ 3/28 7.4.5 **RAISE** the shielded receiver until it stops.

TD/CE AHJ 3/28 7.4.6 **MEASURE** and **RECORD** in Table U, the distance from the bottom of the shielded receiver column to the ground (high).

TD/CE AHJ 3/28 7.4.7 **COMPUTE** the travel of the receiver (high-low), and **RECORD** results in Table U.

DESCRIPTION	CONDITION	VALUE
Receiver to Ground (high), in.	For Record Only	84
Receiver to Ground (low), in.	For Record Only	42
Travel of Receiver (high-low), in.	For Record Only	42

Table U.

Refer to Figure 12 and Figure 13 for the remote latch unit controls addressed below.

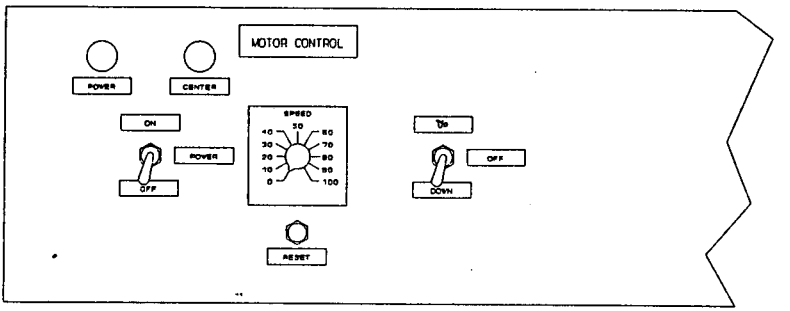


Figure 12) Shielded Reveiver Hoist Motor Panel.

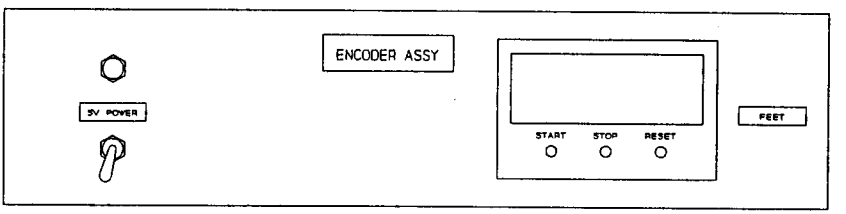


Figure 13) Shielded Receiver Encoder Panel.

TD/CE _____ 7.4.8 **SET** the digital and mechanical cable length counters at zero (0).

TD/CE _____ 7.4.9 **SET** the shielded receiver hoist motor speed at 40.

TD/CE _____ 7.4.10 **OPEN** the three inch ball valve and **LOWER** the remote latch unit until it passes through the end of the shielded receiver.

TD/CE _____ 7.4.11 **PLACE** a ring of tape around the cable at the very end of the shielded receiver (this will be used as a measurement reference point).

CAUTION

DO NOT ALLOW ANY TAPE TO BE RETRACTED INTO THE RECEIVER.

TD/CE _____ 7.4.12 **REMOVE** the sampler hoist weather cover.

TD/CE _____ 7.4.13 **REMOVE** the sampler hoist box lid.

NOTE: The following steps are repeated (two runs) to test the accuracy of the hoist cable counters over long distances. Start and final counter readings are recorded in the table below, along with the hoist speed, measured length, and calculations for length. Repeatability is calculated by comparing the two runs.

TD/CE _____ 7.4.14 **RECORD** the hoist motor speed setting for each run.

TD/CE _____ 7.4.15 With the tape at the bottom of the receiver, **RECORD** in Table V, the mechanical and digital cable counter values (Start).

TD/CE _____ 7.4.16 **DISCHARGE** all of the cable (should be at least 55 feet below the shielded receiver tube, nearly 4 minutes at a hoist speed of 100).

TD/CE _____ 7.4.17 **RECORD** the mechanical and digital cable counter values (Final).

TD/CE _____ 7.4.18 **MEASURE** and **RECORD** the amount of cable that was expelled.

TD/CE _____ 7.4.19 **COMPUTE** and **RECORD** the length of cable discharged as indicated by the mechanical and digital counters (Final-Start).

TD/CE _____ 7.4.20 ONCE the 2nd trial has been run, **COMPUTE** and **RECORD** the Mechanical length difference ($Mech._{Run\ 2} - Mech._{Run\ 1}$), and the Digital length difference ($Digi._{Run\ 2} - Digi._{Run\ 1}$).

NOTE: The difference in length must be within ± 0.04 ft for the digital counter, and within ± 0.10 ft for the mechanical counter.

TD/CE _____ 7.4.21 **REWIND** the hoist cable so the tape mark is at the bottom of the receiver and **RETURN** to step 7.4.14 for the 2nd run.

		1st Run SPEED = 40		2nd Run SPEED = 100	
		Final	Start	Final	Start
Mechanical Counter		70.5	8.4	70.5	8.4
Mech. (Final-Start)		62.1		62.1	
Digital Counter		70.51	8.42	7052	8.40
Digi. (Final-Start)		62.09		62.12	
Measured Length		62.2		62.2	
Difference (Digi)	± 0.04 ft	.03			
Difference (Mech)	± 0.10 ft	0			

Table V.

TD/CE AHJ 7.4.22 **REMOVE** all tape from the sampler hoist cable, then **RETRACT** the cable into the shielded receiver until the limit switches shut the motor OFF.

CAUTION: Do not retract any tape into the shielded receiver. Tape may become lodged in the receiver or otherwise damage the receiver.

TD/CE AHJ 7.4.23 **PERFORM** the following steps to test the load cell.

TD/CE AHJ 7.4.23.1 **SET** the sampler hoist motor speed control to an acceptable feed rate and **RECORD** setting in Table W (columns 3-5).

TD/CE AHJ 7.4.23.2 **LOWER** the cable through the shielded receiver.

TD/CE AHJ 7.4.23.3 **RECORD**, in Table W (column 3), the tare weight from load cell reading and actual weight of the test weights to be used.

TD/CE AHJ 7.4.23.4 **ATTACH** to the hoist cable, one at a time, each of the weights and **RECORD** the weight indicated (gross weight - column 4).

TD/CE AHJ 7.4.23.5 **CALCULATE** and **RECORD** in Table W the difference between the tare weight and the indicated gross weight (net weight - column 5).

TD/CE AHJ 7.4.23.6 **CALCULATE** and **RECORD** in Table W (column 6) the difference between the PreTest and net Load Cell weights.

TD/CE AHJ 7.4.23.7 **LOWER** the hoist cable to the ground to determine if the slack detector automatically stops the hoist motor.

TD/CE AHJ 7.4.23.8 **REMOVE** the weights from the hoist cable and **RETRACT** the cable to just below the shielded receiver.

TD/CE 7.4.23.9 **RECORD** the load cell reading.

LOADING	CONDITION	WEIGHT (PreTest)	GROSS WEIGHT (Load Cell)	NET WEIGHT (Gross-Tare)	DIFFERENCE (PreTest-Net Weight)
MOTOR SPEED	For Record Only	40			
No Weights (tare)	± 0.5 lbs.	56	—	—	—
10 lbs.	± 0.5 lbs.	10	64.7	54.7	1.3
25 lbs.	± 1.0 lbs.	25	80.3	55.3	0.7
50 lbs.	± 1.5 lbs.	50	105.1	55.1	0.9
75 lbs.	± 2.0 lbs.	75	128.9	53.9	2.1
Weights Removed	±	57.4	—	—	1.4

Table W.

TD/CE 7.4.23.10 **LOWER** cable and connect 300 lb. test weight.

TD/CE 7.4.23.11 **RAISE** cable to convenient height for brake load test. RECORD start and stop height in Table Y and **VERIFY** no slippage occurs during one minute hold period.

TD/CE 7.4.23.12 **LOWER** cable and load with approximately 400 lbs of weight. RECORD actual weight (± 10 lbs) that the motor stalls at and the load cell reading in Table Y.

Brake Test	Start	Stop
Height (in.)	4 7/8	4 7/8
Stall Weight (lbs)	400	
Stall Weight Load Cell (lbs)	400	

Table Y.

TD/CE 7.4.23.13 **REMOVE** the weights from the hoist cable and **REMOVE** any tape or dirt from cable.

TD/CE .4.24 **TURN** the power ON to the LATCHING CONTROL panel by turning the key clockwise (see Figure 14 below).

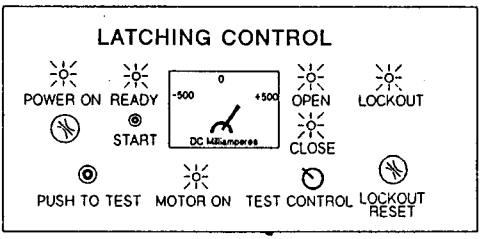


Figure 14) Shielded Receiver RLU Controls.

TD/CE AH/JLS 7.4.25 To test the remote latching unit (RLU), LOOK into the unit while holding it, PRESS START, and COMPLETE the steps below.

TD/CE AH/JLS 7.4.25.1 VERIFY that the MOTOR ON light comes on.

TD/CE AH/JLS 7.4.25.2 INDICATE, in Table Z, the status of the latch unit light (OPEN or CLOSED).

TD/CE AH/JLS 7.4.25.3 INDICATE, in Table Z, whether the cone on the shaft of the latch unit moves IN (allowing the sampler fingers to expand), or OUT (compressing the sampler fingers).

NOTE: OPEN light should correspond with ~~OUT~~IN ward shaft movement, CLOSED light should correspond with ~~IN~~OUT ward shaft movement. JLS 3/27/95

TD/CE AH/JLS 7.4.25.4 RECORD the ammeter value in Table Z.

TD/CE AH/JLS 7.4.25.5 When the hoist motor shuts OFF, VERIFY that the MOTOR light turns OFF.

TD/CE AH/JLS 7.4.25.6 INDICATE, in Table Z, the status of the latch unit light (OPEN or CLOSED).

TD/CE AH/JLS 7.4.25.7 RECORD the ammeter value in the Table Z.

TD/CE AH/JLS 7.4.25.8 After the latching unit completes the initial cycle, VERIFY the reverse cycle as described below.

TD/CE AH/JLS 7.4.25.9 While holding the latch unit, LOOK into the unit and PRESS START.

TD/CE AH/JLS 7.4.25.10 VERIFY that the MOTOR ON light comes on.

TD/CE AH/JLS 7.4.25.11 INDICATE, in Table Z, the status of the latch unit light (OPEN or CLOSED).

TD/CE AHJ GLS 7.4.25.12 **INDICATE**, in Table Z, whether the core on the shaft of the latch unit moves IN (allowing the sampler fingers to expand), or OUT (compressing the sampler fingers).

IN GLS 3/27/95

NOTE: OPEN light should correspond with ~~OUT~~ward shaft movement, CLOSED light should correspond with ~~IN~~ward shaft movement.

OUT

TD/CE AHJ GLS 7.4.25.13 **RECORD** the ammeter value in Table Z.

TD/CE AHJ GLS 7.4.25.14 When the hoist motor shuts OFF, **VERIFY** that the MOTOR light turns OFF.

TD/CE AHJ GLS 7.4.25.15 **INDICATE**, in Table Z, the status of the latch unit light (OPEN or CLOSED).

TD/CE AHJ GLS 7.4.25.16 **RECORD** the ammeter value in Table Z.

1st OBSERVATION		CONDITION	Status
MOTOR - ON & Shaft Moving	RLU Status Light	OPEN or CLOSED	CLOSED
	RLU Shaft Motion	IN or OUT	OUT
	AMMETER READING	For Record Only	105ma
MOTOR - OFF Shaft Stopped	RLU Status Light	OPEN or CLOSED	OPEN
	AMMETER READING	For Record Only	0
2nd OBSERVATION		**CONDITION**	**Status**
MOTOR - ON & Shaft Moving	RLU Status Light	OPEN or CLOSED	OPEN
	RLU Shaft Motion	IN or OUT	IN
	AMMETER READING	For Record Only	100ma
MOTOR - OFF Shaft Stopped	RLU Status Light	OPEN or CLOSED	CLOSED
	AMMETER READING	For Record Only	0

Table Z.

TD/CE AHJ GLS 7.4.26 Very carefully, **RETRACT** the cable while guiding the remote latch unit into the shielded receiver.

NOTE: Caution should be used when raising the RLU into the shielded receiver. (Possible pinch point).

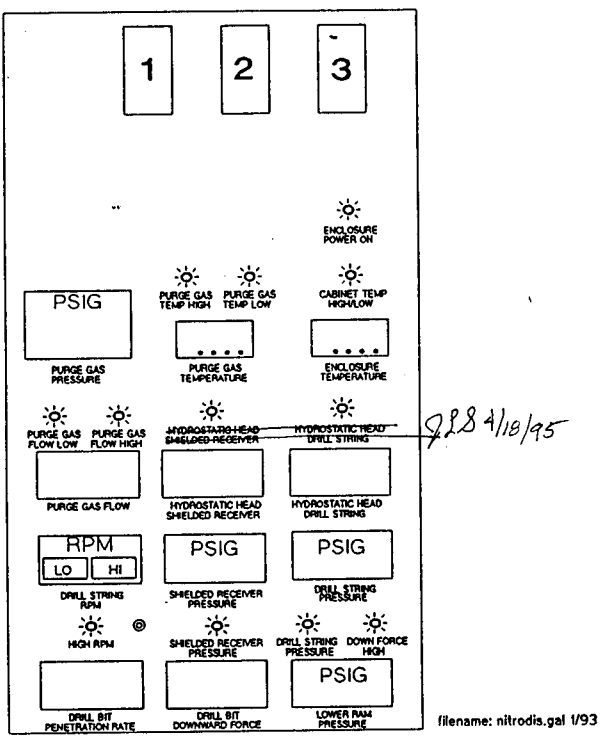
TD/CE AHJ GLS 7.4.27 **RAISE** the shielded receiver to the uppermost position.

TD/CE AHJ GLS 7.4.28 **REPLACE** the sampler hoist box lid. Torque the fasteners to 14-16 ft-lbs.

TD/CE AHJ GLS 7.4.29 **REPLACE** the shielded receiver weather cover.

7.5 PURGE GAS SYSTEM

Refer to Figure 15 below and Figure 16 on the following page for the location of the instrumentation display panel elements and the purge gas controls referenced throughout the remainder of this test procedure.



JJS 4/18/95

Figure 15) Instrumentation Display Panel.

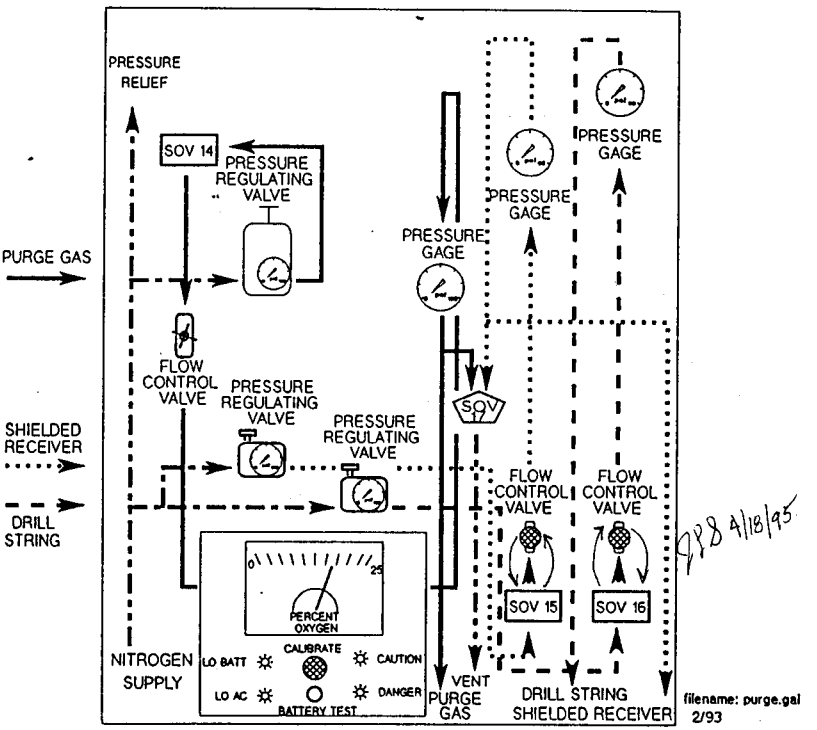


Figure 16) Purge Gas Controls.

7.5.1 VALID / INVALID SWITCH SETTINGS

START CONDITION: Initialize Electrical System (ref. 7.1.1).

TD/CE [signature] 7.5.1.1 For each of the switch settings shown in Table AA **CONFIRM** proper response on indicator light panel.

QE [signature] 3/29/95

M.S. Winfield

SWITCH SELECTIONS				Type of Command	INDICATOR LIGHT				CONDITION
Purge gas	Pressurize shielded receiver	Pressurize drill string	Mode		SOV 14	SOV 15	SOV 16	SOV 17	OK/BAD
OFF	OFF	OFF	Drill	VALID	OFF	OFF	OFF	OFF	OK
OFF	ON	OFF	Drill	INVALID	Flash	Flash	Flash	Flash	OK
OFF	OFF	ON	Drill	INVALID	Flash	Flash	Flash	Flash	OK
OFF	ON	ON	Drill	INVALID	Flash	Flash	Flash	Flash	OK
ON	OFF	OFF	Drill	VALID	ON	OFF	OFF	ON	OK
ON	ON	OFF	Drill	INVALID	ON	Flash	Flash	ON	OK
ON	OFF	ON	Drill	INVALID	ON	Flash	Flash	ON	OK
ON	ON	ON	Drill	INVALID	ON	Flash	Flash	ON	OK
OFF	OFF	OFF	Sample Rec.	VALID	OFF	OFF	OFF	ON	OK
ON	OFF	OFF	Sample Rec.	INVALID	Flash	Flash	Flash	ON	OK
OFF	ON	OFF	Sample Rec.	VALID	OFF	ON	OFF	OFF	OK
ON	ON	OFF	Sample Rec.	INVALID	Flash	ON	Flash	Flash	OK
OFF	OFF	ON	Sample Rec.	VALID	OFF	OFF	ON	ON	OK
ON	OFF	ON	Sample Rec.	INVALID	Flash	Flash	ON	ON	OK
OFF	ON	ON	Sample Rec.	VALID	OFF	ON	ON	OFF	OK
ON	ON	ON	Sample Rec.	INVALID	Flash	ON	ON	Flash	OK

Table AA.

TD/CE [signature] 7.5.1.2 **RETURN** switch settings to OFF and DRILL.

7.5.2 PURGE GAS SYSTEM LEAK CHECK

START CONDITION: Initialize Longyear Engine (ref. 7.1.2).

TD/CE ATJ 7.5.2.1 **ROTATE** the platform to facilitate leak check tests.

NOTE: Engine may be shutdown for remainder of this section.

TD/CE ___/___ ~~7.5.2.2 ATTACH the core barrel to the quill rod.~~ 9184/18/95

TD/CE ATJ 7.5.2.3 **ATTACH** drill string cap to bottom of core barrel.

TD/CE ATJ 7.5.2.4 **CONNECT** the nitrogen/air supply line from the sample truck to a portable compressor. The receptacle on the truck is located below the platform by the driver's door.

TD/CE ATJ 7.5.2.5 **ENSURE** all purge gas system components are fully vented and all valves (including quick disconnect fittings) are closed.

TD/CE ATJ 7.5.2.6 **PLACE** the MODE switch (located at bottom of Instrument Enclosure Assembly) in the DRILL position, and function switches (Purge Gas, Pressurize Shielded receiver, and Pressurize Drill String) in the off (closed) position.

TD/CE ATJ 7.5.2.7 **TURN ON** compressor and verify pressure is at 125 ± 15 psig.

NOTE: If flow rate is not sufficient to reduce pressure for effective soap solution leak tests, temporarily reduce pressure regulator settings.

TD/CE ATJ 7.5.2.8 **APPLY** soap or leak detection solution to purge gas piping and hose assembly joints from supply receptacle on truck to the following components in the Purge Gas Enclosure: SOV 14, SOV 15, SOV 16, and the pressure relief valve, RV-1. **VERIFY** no leaks exist.
QC 4/20/95 M.C. Wingfield

TD/CE ATJ 7.5.2.9 **POSITION** the PURGE GAS switch to ON, **ADJUST** purge gas pressure regulator (PR-1) to 85 psig, and slowly **OPEN** purge gas ~~flow control~~ valve (~~FC~~-1). .75 TO 85 9184/18/95

TD/CE ATJ 7.5.2.10 **APPLY** soap or leak detection solution to purge gas piping, components, and hose assembly joints from SOV-14 to SOV-17 and from SOV-14, through the grapple box, to the drill string cap. **VERIFY** no leaks exist.
QC 4/20/95 M.C. Wingfield

TD/CE ATJ 7.5.2.11 **ISOLATE** supply flow from purge gas system. **RECORD**, in Table BB, purge gas temp. and pressure at beginning and end of 15 min. hold period.

	Start	End
Pressure (psig)	79.2	79.5
Temperature (°F)	64	64

Table BB.

TD/CE 7.5.2.12 CONNECT the Sampler Changeout Assembly (SCA) to the shielded receiver.

TD/CE 7.5.2.13 PLACE the PURGE GAS SWITCH to OFF, the MODE switch in the SAMPLE REC position and PRESSURIZE SHIELDED RECVR SWITCH to ON.

TD/CE 7.5.2.14 ENSURE the isolation valve (on the SCA) is closed and the ball valve (on the shielded receiver) is open.

TD/CE 7.5.2.15 ADJUST shielded receiver pressure regulator (PR-2) to 30 psig, and slowly OPEN shielded receiver flow control valve (FC-2).

TD/CE 7.5.2.16 APPLY soap or leak detection solution to purge gas piping, components, and hose assembly from SOV-15 through SOV-17 to the two vent line quick disconnects (VENT TO TANK and VENT DRILL STRING) and from SOV-15, through the shielded receiver, to the isolation valve. VERIFY no leaks exist.

TD/CE 7.5.2.17 CLOSE the shielded receiver flow control valve. RECORD, in Table CC, purge gas temperature and shielded receiver pressure at beginning and end of 15 min. hold period.

	Start	End
Pressure (psig)	30.9	29.2
Temperature (°F)	64	64

Table CC.

TD/CE 7.5.2.18 PLACE the PRESSURIZE SHIELDED RECVR SWITCH to vent the shielded receiver.

TD/CE 7.5.2.19 PLACE the PRESSURIZE DRILL STRING SWITCH to ON.

TD/CE 7.5.2.20 ADJUST drill string pressure regulator (PR-3) to 30 psig, and slowly OPEN drill string flow control valve (FC-3).

TD/CE 7.5.2.21 APPLY soap or leak detection solution to purge gas piping, components, and hose assembly from SOV 16 to the SUPPLY DRILL STRING line quick disconnect. VERIFY no leaks exist.

TD/CE 7.5.2.22 CLOSE the drill string flow control valve. RECORD, in Table DD, purge gas temperature and drill string pressure at beginning and end of 15 min. hold period.

	Start	End
Pressure (psig)	30.3	30.01
Temperature (°F)	~~77~~ 64	64

Table DD.

TD/CE 7.5.2.23 **ENSURE** all purge gas system components are fully vented and all flow control valves and quick disconnect fittings are closed. **REMOVE** drill string cap.

TD/CE 7.5.2.24 **REMOVE** the SCA from the shielded receiver.

7.5.3 PURGE GAS COMPONENT OPERATION - DRILL MODE

START CONDITION: Initialize Longyear Engine (ref. 7.1.2).

TD/CE 7.5.3.1 **ROTATE** the platform, as required, to facilitate drill mode purge gas component testing.

NOTE: Longyear engine may be shutdown for remainder of this section.

TD/CE 7.5.3.2 **ENSURE** all purge gas system components are fully vented and all flow control valves and quick disconnect fittings are closed.

TD/CE 7.5.3.3 **INSTALL** pressure gage and vent valve on quick disconnect fitting of purge gas system vent line. **CLOSE** vent valve.

TD/CE 7.5.3.4 **ENSURE** air supply pressure is 125 ± 15 psig.

TD/CE 7.5.3.5 **PLACE** the MODE switch in the DRILL position, and function switches (Purge Gas, Pressurize Shielded receiver, and Pressurize Drill String) in the off (closed) position.

TD/CE QE 7.5.3.6 Slowly **OPEN** purge gas flow control valve and **VERIFY** that SOV-14 is physically closed by checking Purge Gas Flow Meters (no flow) and upstream pressure gage (positive pressure). **RECORD** valve condition in Table EE.

TD/CE QE 7.5.3.7 Slowly **OPEN** shielded receiver flow control valve and **VERIFY** that SOV-15 is physically closed by checking shielded receiver pressure gage (no pressure) and upstream pressure gage (positive pressure). **RECORD** valve condition in Table EE.

TD/CE QE 7.5.3.8 Slowly **OPEN** drill string flow control valve and **VERIFY** that SOV-16 is physically closed by checking drill string pressure gage (no pressure) and upstream pressure gage (positive pressure). **RECORD** valve condition in Table EE.

Q.E. = M.C. Winfield 4/20/95

TD/CE 7.5.3.9 **POSITION** the PURGE GAS switch to ON.

NOTE: At this point, the shielded receiver is normally vented to the tank and purge gas flow is routed past the drill bit.

TD/CE 7.5.3.10 Slowly **OPEN** the Purge Gas flow control valve and **VERIFY** that SOV-14 is physically open by checking Purge Gas Flow Meters (positive flow). **RECORD** valve condition in Table EE.

TD/CE 7.5.3.11 **VERIFY** that SOV-17 has physically shifted to the energized position (open to shielded receiver) by checking test gage on vent line (no pressure). **RECORD** valve condition in Table EE.

TD/CE 7.5.3.12 **CLOSE** Purge Gas Flow Control valve, **INSTALL** cap on drill string, then **OPEN** PURGE GAS Flow Control valve.

TD/CE 7.5.3.13 **PLACE** the PURGE GAS switch in the OFF position, and **VERIFY** that SOV-17 has physically shifted to the de-energized position (closed to shielded receiver) by checking test gage on vent line (momentary pressure rise). **RECORD** valve condition in Table EE.

TD/CE 7.5.3.14 **OPEN** vent line vent valve to depressurize drill string, then **REMOVE** drill string cap.

VALVE PERFORMANCE - DRILL MODE

Valve Designation	Condition	Open/Energized	Closed/De-energized
SOV-14, PG	OK/BAD	OK	OK
SOV-15, SR	OK/BAD	N/A	OK
SOV-16, DS	OK/BAD	N/A	OK
SOV-17, Vent	OK/BAD	OK	OK

Table EE.

TD/CE 7.5.3.15 **POSITION** the PURGE GAS switch to ON.

TD/CE 7.5.3.16 With purge gas pressure regulator set at near minimum operating conditions (approximately 20 psig), incrementally **ADJUST** the purge gas flow control valve from closed to full open (do NOT exceed 120 scfm). **RECORD** the drill string pressure, flow rate, and temperature in the following table.

QC = M.S. Winfield 4/20/95 **NOTE:** For Purge Gas Pressure use digital display on Instrument Enclosure Assy for GAGE 1, and use pressure gage, PG-1, in Purge Gas Enclosure for GAGE 2.

For Purge Gas Flow rate use digital display on Instrument Enclosure Assy; with PURGE GAS FLOW switch in position 1 for GAGE 1, 2 for GAGE 2, and 3 for GAGE 3.

For Purge Gas Temperature use digital display on Instrument Enclosure Assy for GAGE 1.

TD/CE [signature] 7.5.3.17 **VERIFY** that the purge gas flow rate and pressure are being recorded on channels 1 and 2 of the VGR.

TD/CE [signature] 7.5.3.18 **VERIFY** each purge gas instrument reading can be selected for display on the Instrumentation Display Panel.

TD/CE [signature] 7.5.3.19 **CLOSE** purge gas flow control valve.

TD/CE [signature] 7.5.3.20 **ADJUST** the purge gas pressure to near maximum operating conditions (approximately 85 psig), then incrementally **ADJUST** the purge gas flow control valve from closed to full open (do NOT exceed 120 scfm). **RECORD** the drill string pressure, flow rate, and temperature in Table FF.

dc [signature] m. c. Winfield

PARAMETER		CONDITION	GAGE 1	GAGE 2	GAGE 3
MINIMUM CONDITIONS	Purge Gas Pressure (20 psig max)	Record Only	7.4	8	n/a
	Purge Gas Flow Rate, ½ open (scfm) Purge Gas Flow Rate, max	Record Only	28 30	29.5 31.5	29.5 31.5
	Purge Gas Temperature (°F)	Record Only	66 73 [signature]	n/a	n/a
MAXIMUM CONDITIONS	Purge Gas Pressure (85 psig max)	Record Only	37.9	40	n/a
	Purge Gas Flow Rate, ½ open (scfm) Purge Gas Flow Rate, max	Record Only	95.5 99.9	97.7 102.0	97.3 101.7
	Purge Gas Temperature (°F)	Record Only	66 73 [signature]	n/a	n/a

Table FF.

TD/CE [signature] 7.5.3.21 **CLOSE** flow control valves.

7.5.4 PURGE GAS COMPONENT OPERATION - SAMPLE MODE

START CONDITION: Initialize Longyear Engine (ref. 7.1.2).

TD/CE [signature] 7.5.4.1 **ROTATE** the platform to position the shielded receiver to the rear of the truck. **LOWER** shielded receiver to convenient height for testing.

NOTE: Longyear may be shutdown for remainder of this section.

TD/CE [signature] 7.5.4.2 **CONNECT** the Sampler Changeout Assembly (SCA) to the shielded receiver, and to the drill string.

NOTE: A flow restrictor or partially open valve may be used in place of drill string.

TD/CE [signature] 7.5.4.3 **CLOSE** the isolation valve (on the SCA) and ball valve (on the shielded receiver).

TD/CE [signature] 7.5.4.4 **CONNECT** the SUPPLY DRILL STRING pneumatic hose to quick disconnect fitting on SCA.

TD/CE [signature] 7.5.4.5 With remaining function switches off, **PLACE** the purge gas MODE SWITCH to SAMPLE CHANGE.

TD/CE [signature] 7.5.4.6 **ENSURE** shielded receiver pressure regulator is adjusted to 30±5 psig. QSB 4/18/95

TD/CE [signature] 7.5.4.7 Slowly **OPEN** shielded receiver flow control valve and **VERIFY** that SOV-15 is physically closed by checking shielded receiver pressure gage (no pressure) and upstream pressure gage (positive pressure). **RECORD** valve condition in Table GG.

TD/CE [signature] 7.5.4.8 **ENSURE** drill string pressure regulator is adjusted to 30±5 psig. QSB 4/18/95

TD/CE [signature] 7.5.4.9 Slowly **OPEN** drill string flow control valve and **VERIFY** that SOV-16 is physically closed by checking drill string pressure gage (no pressure) and upstream pressure gage (positive pressure). **RECORD** valve condition in Table GG.

TD/CE [signature] 7.5.4.10 **CLOSE** flow control valves

TD/CE [signature] 7.5.4.11 Slowly **OPEN** purge gas flow control valve and **VERIFY** that SOV-14 is physically closed by checking Purge Gas Flow Meters (no flow) and upstream pressure gage (positive pressure). **PLACE** the PRESSURIZE DRILL STRING switch in the ON position and **VERIFY** that SOV-14 remains closed. **RECORD** valve condition in Table GG.

CAUTION: Do not exceed instrument limit of 10 scfm in following step.

TD/CE [signature] 7.5.4.12 Slowly **OPEN** drill string flow control valve and **VERIFY** that SOV-16 is physically open by checking drill string ~~flow meter and~~ pressure gage (positive). **RECORD** valve condition in Table GG. QSB 4/18/95

Q.C. = [signature] M.C. Mayfield 4/20/95

VALVE PERFORMANCE - SAMPLE MODE

VALVE DESIGNATION	CONDITION	OPEN/ENERGIZED	CLOSED/DE-ENERGIZED
SOV 14, PG	OK/BAD	N/A	OK
SOV 15, SR	OK/BAD	OK	OK
SOV 16, DS	OK/BAD	OK	OK
SOV 17, VENT	OK/BAD	OK	OK

Table GG.

TD/CE 7.5.4.13 **POSITION** the PRESSURIZE DRILL STRING switch to OFF and the PRESSURIZE SHIELDED RECEIVER switch to ON.

CAUTION: Do not exceed instrument limit of 10 scfm in following step.

TD/CE QC 4/20/95 7.5.4.14 Slowly **OPEN** shielded receiver flow control valve and **VERIFY** that SOV-15 is physically open by checking shielded receiver ~~flow meter or~~ pressure gage (positive). **RECORD** valve condition in Table GG. 9.S 4/18/95

TD/CE QC 4/20/95 7.5.4.15 **VERIFY** that SOV-17 has physically shifted to the de-energized position (closed to shielded receiver) by checking test gage on vent line (no pressure). **RECORD** valve condition in Table GG.

TD/CE QC 4/20/95 7.5.4.16 **DEPRESSURIZE** the shielded receiver by placing the PRESSURIZE SHIELDED RECEIVER switch to the OFF position. **VERIFY** that SOV-17 has physically shifted to the energized position (open to shielded receiver) by checking test gage on vent line (positive pressure). **RECORD** valve condition in Table GG.

TD/CE 7.5.4.17 **CLOSE** the shielded receiver and drill string flow control valves.

TD/CE 7.5.4.18 **OPEN** vent line test valve to depressurize vent line.

TD/CE 7.5.4.19 **PLACE** the purge gas MODE switch to SAMPLE CHANGE and the PRESSURIZE DRILL STRING switch in the ON position.

TD/CE 7.5.4.20 **ADJUST** the drill string pressure and flow as required, using an initial pressure setting of approximately 30 psig ~~and~~ 10 scfm max. Gas should flow steadily through the drill string. or 4/20

TD/CE QC 4/21/95 7.5.4.21 **RECORD** the drill string ~~pressure and flow rate~~ ok in rows ~~1 and 2~~ of Table HH. **CONFIRM** that the ~~flow rate is being recorded on channel 5 of the VGR,~~ drill string pressure is being recorded on channel 7 of the VGR, and that the digital pressure display on the instrument enclosure agrees with the gage in purge gas enclosure. 9.S 4/18/95

Q.C. 4/20/95 4/21/95

	PARAMETER	CONDITION	Drill String	Receiver
VALVES CLOSED	Pressure (psig)	Information Only	6.8	6.8
	Gas Flow Rate (scfm)	Information Only	N/A	N/A
VALVES OPEN	Pressure (psig)	Information Only	6.72	7.46
	Gas Flow Rate (scfm)	Information Only	N/A	N/A
ISOLATION VALVE CLOSED	Pressure (psig)	Information Only	6.71	0.11
	Gas Flow Rate (scfm)	Information Only	N/A	N/A

Table HH.

TD/CE 7.5.4.22 **POSITION** the PRESSURIZE SHIELDED RECEIVER switch to ON.

TD/CE 7.5.4.23 **ADJUST** the shielded receiver pressure equal to that set in the drill string. +.1 to .5

TD/CE QC 7.5.4.24 **RECORD** the shielded receiver pressure ~~and gas flow rate~~ in row~~s~~ 1 ~~and 2~~ of Table HH. **CONFIRM** that the ~~SHIELDED RECEIVER FLOW RATE is being recorded on channel 4 of the VGR,~~ SHIELDED RECEIVER PRESSURE is being recorded on channel 6 of the VGR, and that the digital pressure display on the instrument enclosure agrees with the gage in purge gas enclosure. 918 4/18/95

TD/CE 7.5.4.25 **OPEN** the isolation valve and shielded receiver ball valve.

TD/CE QC 7.5.4.26 With the valves open, **RECORD** the drill string and shielded receiver pressures ~~and flow rates~~ in row~~s~~ 3 ~~and 4~~ of Table HH. 918 4/18/95

TD/CE 7.5.4.27 **CLOSE** the isolation valve.

TD/CE 7.5.4.28 **DEPRESSURIZE** the shielded receiver by placing the PRESSURIZE SHIELDED RECEIVER switch to the OFF position, and opening vent line vent valve.

TD/CE 7.5.4.29 **CLOSE** the shielded receiver nitrogen flow control valve.

TD/CE QC 7.5.4.30 **RECORD** the drill string and shielded receiver pressures ~~and gas flow rates~~ in row~~s~~ 5 ~~and 6~~ of Table HH. 918 4/18/95

TD/CE 7.5.4.31 **STOP** the flow to the drill string by placing the PRESSURIZE DRILL STRING switch to the OFF position.

TD/CE 7.5.4.32 **PLACE** the purge gas MODE switch to the DRILL position.

Q.C. = M.C. Winfield 4/21/95

TD/CE AHJ 7.5.4.33 **CLOSE** the flow control valves, and facility air supply.

7.6 NITROGEN GAS FLOW CHARACTERIZATION

START CONDITION: Initialize Electrical System (ref. 7.1.1).

TD/CE AHJ 7.6.1 **CONNECT** the nitrogen supply line from the sample truck to Purge Gas Trailer.

TD/CE AHJ 7.6.2 **ENSURE** all purge gas system components are fully vented and all flow control valves are closed.

TD/CE AHJ 7.6.3 **POSITION** safety monitoring equipment and barriers to protect personnel from oxygen deprivation.

TD/CE AHJ 7.6.4 **ATTACH** ducting/hose to exhaust nitrogen from drill string to building exterior.

TD/CE AHJ 7.6.5 **REFER** to the nitrogen trailer operating instructions to start and operate the nitrogen trailer to supply nitrogen gas to the sample truck at 120 ±10 psig.

TD/CE AHJ 7.6.6 **PLACE** the MODE switch in the DRILL position and the PURGE GAS switch to ON.

TD/CE AHJ 7.6.7 **ADJUST** the purge gas pressure to near maximum operating conditions (approximately 85 psig), then incrementally **ADJUST** the purge gas flow control valve from closed to full open (do NOT exceed 120 scfm). **RECORD** the drill string pressure, flow rate, and temperature in the following Tables II and JJ. When flow reaches 50 scfm record water temperature reading from purge gas trailer.

PARAMETER	CONDITION	DISPLAY
Purge Gas Pressure (psig)	Information Only	AHJ 5.3.3
Purge Gas Flow Rate (≈30 scfm)	Information Only	31
Purge Gas Temperature (°F)	Information Only	66
Purge Gas Pressure (psig)	Information Only	5.4
Purge Gas Flow Rate (≈40 scfm)	Information Only	40
Purge Gas Temperature (°F)	Information Only	66

Table II.

PARAMETER	CONDITION	DISPLAY
Purge Gas Pressure (psig)	Information Only	8
Purge Gas Flow Rate (≈50 scfm)	Information Only	50
Purge Gas Temperature (°F)	Information Only	66
Purge Gas Trailer Water Temp. (°F)	Information Only	100
Purge Gas Pressure (psig)	Information Only	28.9
Purge Gas Flow Rate (full flow)	Information Only	115
Purge Gas Temperature (°F)	Information Only	66

Table JJ.

TD/CE 7.6.8 **ADJUST** Purge Gas Trailer controls to ~~reduce temperature of the nitrogen, measured at the instrumentation enclosure, to 40 °F.~~ 100 SCFM 9LB Allow temperature to stabilize (approximately 15 minutes). **RECORD**, in Table KK, gas temperature at drill bit exit, and purge gas enclosure.

For Record Only	Drill Bit	Enclosure
Gas Temperature °F	105	104

Table KK.

TD/CE 7.6.9 **CLOSE** purge gas shutoff valve and allow sample truck hose and piping system to fully vent.

TD/CE 7.6.10 **DISCONNECT** the nitrogen supply line between the sample truck and the Purge Gas Trailer.

TD/CE 7.6.11 **OPEN** vent line test valve and **CLOSE** flow control valves.

TD/CE 7.6.12 **REMOVE** the test equipment from the drill bit.

TD/CE 7.6.13 **REFER** to the nitrogen trailer operating instructions to shut down the nitrogen trailer.

7.7 ALARM SYSTEM CHECKOUT

NOTE: For the following sections indicate results (OK/BAD) in Table QQ on Page 62.

7.7.1 INSTRUMENT CABINET TEMPERATURE ALARM

START CONDITION: Initialize Longyear Engine (ref. 7.1.2).

TD/CE [signature] 7.7.1.1 Unacknowledged Alarm: **APPLY** heat source (approximately 90 °F) to the CABINET TEMPERATURE TRANSMITTER (thermocouple) in the Instrument Enclosure Assembly. The CABINET TEMP HI/LOW light will come on and flash fast. After approximately 60 seconds, the SIREN sounds, the STROBE flashes.

TD/CE [signature] 7.7.1.2 Acknowledgment: **PRESS** the ACKNOWLEDGE button to silence the SIREN and turn off the STROBE. The CABINET TEMP HI/LOW light remains on steady. **CHECK** that nothing happens when RESET is pressed.

TD/CE [signature] 7.7.1.3 Condition Normalized: **REMOVE** the heat source from the TEMPERATURE TRANSMITTER. Wait until the unit cools off. **OBSERVE** that the CABINET TEMP HI/LOW light flashes slow.

TD/CE [signature] 7.7.1.4 Repeat Alarm: **APPLY** cold source (approximately 50°F) to the CABINET TEMPERATURE TRANSMITTER (thermocouple) in the Instrument Enclosure Assembly. Observe the CABINET TEMP HI/LOW light remains on steady. **CHECK** that nothing happens when RESET is pressed.

TD/CE [signature] 7.7.1.5 Reset: **REMOVE** the cold source from the TEMPERATURE TRANSMITTER. Wait until the unit warms up. **OBSERVE** that the CABINET TEMP HI/LOW light flashes slow. **CHECK** that the LIGHT goes out when RESET is pressed.

7.7.2 DRILL BIT DOWNWARD FORCE MEASUREMENT

START CONDITION: Initialize Longyear Engine (ref. 7.1.2).

TD/CE [signature] 7.7.2.1 During this section **VERIFY** that drilling parameters can be selected and recorded on channels 8-12 of the VGR (refer to information on page 28).

TD/CE [signature] 7.7.2.2 **PLACE** a load measuring test adapter (scale) below the drill head.

TD/CE [signature] 7.7.2.3 **PLACE** downward force spring test unit on the scale. **ADJUST** tare force on DRILL BIT DOWNWARD FORCE to zero out the tare weight. **RECORD** tare weight in Table LL.

Tare Weight, lbs	00.

Table LL.

TD/CE [signature] 7.7.2.4 PLACE the 4-way control valve in the RAISE position.

TD/CE [signature] 7.7.2.5 OPEN the DOWN SPEED CONTROL valve until the drill bit contacts the downward force spring test unit.

TD/CE [signature] 7.7.2.6 Slowly INCREASE Drill Bit Down Force from 0 to 2000 lbs, MEASURE and RECORD the Drill Bit Downward Force digital display indication, actual scale reading, and approximate distance (length) of drill head ram extension in Table MM.

QC [signature]
m.s. Wingfield
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DOWNWARD FORCE, INDICATED	DOWNWARD FORCE, ACTUAL	DISTANCE, RAM EXTENSION
195	220	20
382	410	19
555	590	18
750	780	17
945	970	16
1130	1140	15
1320	1330	14
1525	1530	13
1710	1720	12
1915	1910	11
2120	2120	10

Table MM.

TD/CE [signature] 7.7.2.7 PLACE the 4-way control valve in the lower position.

TD/CE [signature] 7.7.2.8 OPEN the UP SPEED CONTROL valve until the rams are fully raised.

TD/CE [signature] 7.7.2.9 Set MODE switch to DRILL and Purge Gas (SOV #14) switch to ON (SR & DS off). ADJUST purge gas flow control valve (FC-1) to obtain PURGE GAS flow of approximately 30 scfm.

TD/CE [signature] 7.7.2.10 With spindle in LOW and transmission in first gear, ENGAGE the drill rig clutch and ADJUST rotation speed to allow for low penetration rate drilling.

TD/CE [signature] 7.7.2.11 PLACE the 4-way control valve in the RAISE position.

TD/CE [signature] 7.7.2.12 OPEN the DOWN SPEED CONTROL valve until the drill bit contacts the downward force spring test device.

TD/CE [signature] 7.7.2.13 Slowly INCREASE Drill Bit Down Force from 0 to just below 1000 lbs, MEASURE and RECORD the PURGE GAS PRESSURE, Drill Bit Down Force digital display indication, and actual scale reading in Table NN.

TD/CE [signature] 7.7.2.14 PLACE the 4-way control valve in the lower position.

TD/CE [signature] 7.7.2.15 OPEN the UP SPEED CONTROL valve until the rams are fully raised.

TD/CE [signature] 7.7.2.16 REPEAT the above six steps first with the purge gas flow adjusted to 50 scfm, and then with the purge gas flow control valve full open (max flow). RECORD data in Table NN.

QC [signature] 6/5/95

FLOW RATE	DOWNWARD FORCE, INDICATED	DOWNWARD FORCE, ACTUAL	GAS PRESSURE
≈ 30 scfm	85 170 293 374 492 590 710 804 884 989 1092	110 200 310 400 510 620 710 800 900 1000 1100	21.0
≈ 50 scfm	92 187 274 373 478 590 692 774 874 950 1074	110 200 310 400 500 610 710 800 910 1000 1100	31.7
max. flow ≈ 80.2	84 181 285 383 490 590 692 783 895 984 1092	100 200 300 400 500 610 700 800 900 1000 1100	55.5

Table NN.

7.7.3 HIGH DOWNWARD FORCE ALARM

START CONDITION: Initialize Longyear Engine (ref. 7.1.2), Initialize Drill Rotation (ref. 7.3.6).

TD/CE _____ 7.7.3.1 ENSURE lower RAM set point is adjusted to 60 psig.

TD/CE _____ 7.7.3.2 VERIFY proper drill bit and sampler are installed for alarm test. Set switches as in above test. ADJUST PURGE GAS to nominal flow rate (approximately 50 scfm).

TD/CE _____ 7.7.3.3 READJUST the downward force spring test device as required.

TD/CE _____ 7.7.3.4 ADJUST rotation of the drill string (minimum stable speed). LOWER the drill string (by placing 4-way control valve in RAISE and opening down speed control valve) until bit contacts the downward force spring test device.

TD/CE _____ 7.7.3.5 Timer: INCREASE the downward force using on-truck controls/valves until it exceeds the alarm set point (excessive force, approximately 1170 lbs). Maintain for 3 to 4 seconds. Then REDUCE the force to below the set point. No response should be observed from the alarm system.

TD/CE _____ 7.7.3.6 Unacknowledged Alarm: INCREASE the downward force, incrementally, to an excessive level. After 5 seconds OBSERVE: the SIREN sounds, the STROBE flashes, and the DOWNWARD FORCE HIGH Light comes on and flashes fast.

TD/CE _____ 7.7.3.7 Acknowledgment: PRESS the ACKNOWLEDGE button to silence the SIREN and turn off the STROBE. The DOWNWARD FORCE HIGH Light remains on steady. CHECK that nothing happens when RESET is pressed.

TD/CE _____ 7.7.3.8 Condition Normalized: RELEASE the downward force using on-truck controls. OBSERVE that the DOWNWARD FORCE HIGH Light flashes slow.

TD/CE _____ 7.7.3.9 Repeat Alarm: INCREASE the downward force to an excessive level and observe the DOWNWARD FORCE HIGH Light remains on steady. CHECK that nothing happens when RESET is pressed.

TD/CE _____ 7.7.3.10 End of Alarm: RELEASE the downward force and observe the LIGHT flashes slow. CHECK that the LIGHT goes out when RESET is pressed.

TD/CE _____ 7.7.3.11 Alarm in Passing: INCREASE the downward force to an excessive level. When the alarm is tripped release the downward force. CHECK that nothing happens when RESET is pressed.

TD/CE _____ 7.7.3.12 Reset: PRESS ACKNOWLEDGE and observe that the SIREN and the STROBE are deenergized and that the LIGHT flashes slow. CHECK that the LIGHT goes out when RESET is pressed.

TD/CE QC 7/5/95

7.7.3.13 Engine Shutdown Interlock: **INCREASE** the downward force to an excessive level for at least 3 seconds to trip the alarm. **PRESS** the ACKNOWLEDGE button to silence the SIREN and turn off the STROBE. After approximately 40 seconds, confirm that the alarm condition causes automatic shutdown of the drill rig engine.

TD/CE

7.7.3.14 Engine restart: Immediately after shutdown, **CONFIRM** that restart attempt within 10 sec is unsuccessful. **CONFIRM** that restart attempt approximately 30 sec <u>after</u> shutdown <u>is</u> successful.

<u>NOTE:</u> The above time delay is to prevent engine cycling.

7.7.4 HIGH RPM ALARM

START CONDITION: Initialize Longyear Engine (ref. 7.1.2), Initialize Drill Rotation (ref. 7.3.6).

TD/CE 7/7/95

7.7.4.1 **VERIFY** MODE switch is set to DRILL and Purge Gas (SOV #14) switch to ON (SR & DS off). **ADJUST** PURGE GAS to nominal flow rate (approximately 50 scfm).

TD/CE 7/7/95

7.7.4.2 Timer: **INCREASE** the drill string RPM's to an excessive level (55) for less than 5 seconds and then reduce to moderate speed. **OBSERVE** that the alarm system does not respond.

<u>NOTE:</u> Indicator light on digital display indicates active alarm set point.

TD/CE 7/7/95

7.7.4.3 Unacknowledged Alarm: **INCREASE** the DRILL STRING RPM's using the engine throttle to an excessive level for at least 5 seconds. **OBSERVE** that the SIREN sounds, the STROBE flashes, and the HIGH RPM Light comes on and flashes fast.

TD/CE 7/7/95

7.7.4.4 Acknowledgment: **PRESS** the ACKNOWLEDGE button to silence the SIREN and turn off the STROBE. The drill string HIGH RPM Light remains on steady. **OBSERVE** that nothing happens when RESET is pressed.

TD/CE 7/7/95

7.7.4.5 Condition Normalized: **REDUCE** the RPM's to a moderate value. **OBSERVE** that the drill string HIGH RPM flashes slow.

TD/CE 7/7/95

7.7.4.6 Repeat Alarm: **INCREASE** the DRILL STRING RPM's to an excessive level and **OBSERVE** LIGHT remains on steady. **CHECK** that nothing happens when RESET is pressed.

TD/CE 7/7/95

7.7.4.7 End of Alarm: **REDUCE** the drill string RPM and OBSERVE that the LIGHT flashes slow. **OBSERVE** that the LIGHT goes out when RESET is pressed.

TD/CE 7/7/95

7.7.4.8 Alarm in Passing: **INCREASE** the drill string RPM's to an excessive level. When the alarm is tripped, **REDUCE** the drill string RPM. **OBSERVE** that nothing happens when RESET is pressed.

TD/CE 7.7.4.9 Reset: PRESS ACKNOWLEDGE and OBSERVE that the LIGHT flashes slow. OBSERVE that the LIGHT goes out when RESET is pressed.

TD/CE QA 7.7.4.10 Engine Shutdown Interlock: INCREASE the DRILL STRING RPM's to an excessive level for at least 5 seconds to trip the HIGH RPM alarm. PRESS the ACKNOWLEDGE button to silence the SIREN and turn off the STROBE. After approximately 40 seconds, CONFIRM that the alarm condition causes automatic shutdown of the drill rig engine.

TD/CE 7.7.4.11 Engine restart: Immediately after shutdown, CONFIRM that restart attempt within 10 sec is unsuccessful. CONFIRM that restart attempt approximately 30 sec after shutdown is successful.

NOTE: The above time delay is to prevent engine cycling.

7.7.5 RPM SENSOR FAILURE ALARM

START CONDITION: Initialize Longyear Engine (ref. 7.1.2), Initialize Drill Rotation (ref. 7.3.6).

NOTE: The following steps simulate an RPM sensor failure by disconnecting both sensors, one at a time.

CAUTION: Do not wear loose clothing around the rotating drill head.

TD/CE 7.7.5.1 VERIFY MODE switch is set to DRILL and Purge Gas (SOV #14) switch to ON (SR & DS off). ADJUST PURGE GAS to nominal flow rate (approximately 50 scfm).

TD/CE 7.7.5.2 ADJUST and stabilize RPM to nominal value (approximately 50 RPM but less than 55 RPM.

TD/CE 7.7.5.3 Simulate sensor failure: DISCONNECT one of the RPM sensors by unscrewing the electrical connector on the sensor.

TD/CE 7.7.5.4 Timer: VERIFY that the drill rig shuts down after 45 seconds

TD/CE 7.7.5.5 Engine restart: Immediately after shutdown, CONFIRM that restart attempt within 10 sec is unsuccessful. CONFIRM that restart attempt approximately 30 sec after shutdown is successful.

TD/CE 7.7.5.6 RECONNECT the electrical connector to the RPM sensor.

TD/CE 7.7.5.7 REPEAT the above steps disconnecting the other RPM sensor.

7.7.6 PURGE GAS LOW FLOW ALARM

START CONDITION: Initialize Longyear Engine (ref. 7.1.2), Initialize Drill Rotation (ref. 7.3.6).

TD/CE 7.7.6.1 **DEENERGIZE** one purge gas Digital Flow Indicator (Refer to 1, 2 and 3 of Figure 15) to **VERIFY** that single out-of-tolerance indication does not trip alarm. **TURN** power back on and **REPEAT** test for each of remaining two digital flow indicators.

TD/CE 7.7.6.2 Timer: **INTERRUPT** the Purge Gas air flow for 8 to 9 seconds. Then turn the air back on. No response should be observed from the alarm system.

TD/CE 7.7.6.3 Unacknowledged Alarm: **TURN** the air flow down to approximately 30 scfm using purge gas control valves. After 10 seconds **OBSERVE** the SIREN sounds, the STROBE flashes, and the PURGE GAS FLOW LOW Light comes on and flashes fast.

TD/CE 7.7.6.4 Acknowledgment: **PRESS** the ACKNOWLEDGE button to silence the SIREN and turn off the STROBE. The PURGE GAS FLOW LOW Light remains on steady. **OBSERVE** that nothing happens when RESET is pressed.

TD/CE 7.7.6.5 Condition Normalized: **TURN** the air flow on using purge gas controls. **OBSERVE** that the PURGE GAS FLOW LOW Light flashes slow.

TD/CE 7.7.6.6 Repeat Alarm: **TURN** the air flow off and **OBSERVE** the PURGE GAS FLOW LOW Light remains on steady. **CHECK** that nothing happens when RESET is pressed.

TD/CE 7.7.6.7 End of Alarm: **TURN** the air flow back on and **OBSERVE** the LIGHT flashes slow. **CHECK** that the LIGHT goes out when RESET is pressed.

TD/CE 7.7.6.8 Alarm in Passing: **TURN** the air flow off. When the alarm is tripped, **TURN** the air flow back on. **CHECK** that nothing happens when RESET is pressed.

TD/CE 7.7.6.9 Reset: **PRESS** ACKNOWLEDGE and **OBSERVE** that the SIREN and the STROBE are deenergized and that the LIGHT flashes slow. **CHECK** that the LIGHT goes out when RESET is pressed.

TD/CE 7.7.6.10 Engine Shutdown Interlock: **TURN** the air flow off to trip the alarm. **PRESS** the ACKNOWLEDGE button to silence the SIREN and turn off the STROBE. After approximately 40 seconds, **CONFIRM** that the alarm condition causes automatic shutdown of the drill rig engine.

QC M. C. Winfield

TD/CE 7.7.6.11 Engine restart: Immediately after shutdown, **CONFIRM** that restart attempt within 10 sec is unsuccessful. **CONFIRM** that restart attempt approximately 30 sec <u>after</u> shutdown <u>is</u> successful.

NOTE: The above time delay is to prevent engine cycling.

7.7.7 PURGE GAS HIGH FLOW ALARM

NOTE: This test may require removal of sampler from drill string and temporary increase in Purge Gas Pressure regulators.

START CONDITION: Initialize Longyear Engine (ref. 7.1.2), Initialize Drill Rotation (ref. 7.3.6),.

TD/CE [signature] 7.7.7.1 Timer: **INCREASE** the air flow to excessive level (75 scfm) for 1 to 2 seconds, then **REDUCE** the air back to normal. No response should be observed from the alarm system.

TD/CE [signature] 7.7.7.2 Unacknowledged Alarm: **TURN** the air flow back up using purge gas control valves. After 3 seconds **OBSERVE** the SIREN sounds, the STROBE flashes, and the PURGE GAS FLOW HIGH Light comes on and flashes fast. **RECORD** flow rate. 98 SCFM

TD/CE [signature] 7.7.7.3 Acknowledgment: **PRESS** the ACKNOWLEDGE button to silence the SIREN and turn off the STROBE. The PURGE GAS FLOW HIGH Light remains on steady. **CHECK** that nothing happens when RESET is pressed.

TD/CE [signature] 7.7.7.4 Condition Normalized: **TURN** the air flow back down using purge gas controls. **OBSERVE** that the FLOW HIGH Light flashes slow. **RECORD** flow rate. 95 SCFM

TD/CE [signature] 7.7.7.5 Repeat Alarm: **TURN** the air flow back up and **OBSERVE** the HIGH FLOW LIGHT remains on steady. **CHECK** that nothing happens when RESET is pressed.

TD/CE [signature] 7.7.7.6 End of Alarm: **TURN** the air flow back off and **OBSERVE** the LIGHT flashes slow. **CHECK** that the LIGHT goes out when RESET is pressed.

TD/CE [signature] 7.7.7.7 Alarm in Passing: **TURN** the air flow back up. When the alarm is tripped, **TURN** the air flow back down. **CHECK** that nothing happens when RESET is pressed.

TD/CE [signature] 7.7.7.8 Reset: **PRESS** ACKNOWLEDGE and **OBSERVE** that the SIREN and the STROBE are deenergized and that the LIGHT flashes slow. **CHECK** that the LIGHT goes out when RESET is pressed.

~~TD/CE [signature] 7.7.7.9 INITIATE DRILL RIG ROTATION.~~ [signature] 3/27/95

7.7.8 PURGE GAS LOW TEMPERATURE ALARM

START CONDITION: Initialize Longyear Engine (ref. 7.1.2), Initialize Drill Rotation (ref. 7.3.6).

TD/CE _____ 7.7.8.1 ~~DISABLE Purge gas low flow alarm and CLOSE the Purge Gas flow control valve.~~ OPEN THE PURGE GAS FLOW CONTROL VALVE. QLS 3/27/95

TD/CE _____ 7.7.8.2 ~~REMOVE temperature sensor from piping in purge gas enclosure to allow access to temperature sensor.~~ INJECT A mV SIGNAL IN THE PURGE GAS CONNECTION BOX TO SIMULATE LOW TEMPERA

TD/CE _____ 7.7.8.3 Unacknowledged Alarm: ~~APPLY cold source (approximately 40 °F) to the Purge Gas Temperature Thermocouple (TE-1).~~ CONFIRM that the SIREN sounds, the STROBE flashes, and the PURGE GAS TEMP LOW light comes on and flashes fast. QLS 3/27/9

TD/CE _____ 7.7.8.4 Acknowledgment: PRESS the ACKNOWLEDGE button to silence the SIREN and turn off the STROBE. The PURGE GAS TEMP LOW light remains on steady. CHECK that nothing happens when RESET is pressed.

TD/CE _____ 7.7.8.5 Condition Normalized: ~~REMOVE cold source from TE-1.~~ OBSERVE that the TEMP LOW light flashes slow. DISCONNECT THE SIGNAL FROM TE-1 QLS 3/27/95

TD/CE _____ 7.7.8.6 Reset: VERIFY that the TEMP LOW light goes out when RESET is pressed.

7.7.9 PURGE GAS HIGH TEMPERATURE ALARM

START CONDITION: Continued from above section.

TD/CE _____ 7.7.9.1 Unacknowledged Alarm: ~~APPLY heat source to the Purge Gas Temperature Thermocouple (TE-1).~~ CONFIRM that the SIREN sounds, the STROBE flashes, and the PURGE GAS TEMP HIGH light comes on and flashes fast. INJECT A mV SIGNAL IN THE PURGE GAS CONNECTION BOX TO SIMULATE HIGH TEMPER QLS 3/27/95

TD/CE _____ 7.7.9.2 Acknowledgment: PRESS the ACKNOWLEDGE button to silence the SIREN and turn off the STROBE. The PURGE GAS TEMP HIGH light remains on steady. CHECK that nothing happens when RESET is pressed.

TD/CE _____ 7.7.9.3 Condition Normalized: ~~REMOVE heat source from TE-1.~~ OBSERVE that the TEMP HIGH light flashes slow. DISCONNECT THE SIGNAL FROM TE-1 QLS 3/27/95

7.7.9.4 Reset: VERIFY that the TEMP HIGH light goes out when RESET is pressed.

TD/CE _____ 7.7.9.5 ~~REINSTALL temperature sensor in purge gas piping and open Purge Gas flow control valve to nominal flow.~~ SHUT THE PURGE GAS FLOW CONTROL VALVE. QLS 3/27/95

~~TD/CE _____ 7.7.9.6 ENABLE Purge Gas Low flow alarm.~~ QLS 3/27/95

7.7.10 HYDROSTATIC HEAD DRILL STRING ~~(LOW FLOW)~~ ALARM LOW PRESSURE 9/8 6/30/95

START CONDITION: Initialize Electrical System.

TD/CE ____ / ____ 7.7.10.1 **INSTALL** vent valve ~~in~~ OR CHANGE OUT ASSEMBLY ON DRILL STRING SUPPLY hose Q.D. fitting. ~~**ENSURE** vent valve is closed.~~ 9/8 6/30/95

TD/CE ____ / ____ 7.7.10.2 **SET** MODE Switch to SAMPLE REC. and function switches (Purge Gas, Pressurize Shielded Receiver, and **PRESSURIZE** Drill String) to OFF.

TD/CE ____ / ____ 7.7.10.3 Open Valves: **SET** PRESSURIZE DRILL STRING (SOV-16) to ON, and **ADJUST** drill string flow control valve, ~~FC-3~~ to provide moderate flow ~~(0.5 scfm @ 30 psig).~~ 9/8 6/30/95

TD/CE ____ / N/A 7.7.10.4 ~~Timer: **INTERRUPT** the air flow for less than 3 seconds. Then **TURN** the air back on. No response should be observed from the alarm system.~~ 9/8 6/30/95

TD/CE ____ / ____ 7.7.10.5 TURN THE AIR FLOW OFF USING OFF TRUCK CONTROLS. ~~Unacknowledged Alarm: **REDUCE** the air flow to 0.2 or 0.3 scfm. After approximately 3 seconds~~ **OBSERVE** the SIREN sounds, the STROBE flashes, and the HYDROSTATIC HEAD DRILL STRING light comes on and flashes fast. NOTE: THIS ALARM FUNCTIONS OFF OF MAIN SYSTEM PRESSURE WHICH MUST BLEED DOWN TO APPROXIMATELY 60 PSIG BEFORE ALARM WILL SOUND.

TD/CE ____ / ____ 7.7.10.6 Acknowledgment: **PRESS** the ACKNOWLEDGE button to silence the SIREN and turn off the STROBE. The HYDROSTATIC HEAD DRILL STRING light glows steady. **CHECK** that nothing happens when RESET is pressed.

TD/CE ____ / ____ 7.7.10.7 Condition Normalized: **RETURN** air flow to nominal. **OBSERVE** that the HYDROSTATIC HEAD light flashes slow.

TD/CE ____ / ____ 7.7.10.8 Repeat Alarm: **TURN** the air flow off using off-truck controls and **OBSERVE** the LIGHT remains on steady. **CHECK** that nothing happens when RESET is pressed.

TD/CE ____ / ____ 7.7.10.9 End of Alarm: **TURN** the air flow on using off-truck controls and **OBSERVE** the LIGHT flashes slow. **CHECK** that the LIGHT goes out when RESET is pressed.

TD/CE ____ / ____ 7.7.10.10 Alarm in Passing: **TURN** the air flow off using the off-truck controls valves. When the alarm is tripped, **TURN** the air flow back on. **CHECK** that nothing happens when RESET is pressed.

TD/CE ____ / ____ 7.7.10.11 Reset: **PRESS** ACKNOWLEDGE and **OBSERVE** that the SIREN and the STROBE are deenergized and that the LIGHT flashes slow. **CHECK** that the LIGHT goes out when RESET is pressed.

TD/CE ____ / ____ 7.7.10.12 **TURN** PRESSURIZE SHIELDED RECEIVER to OFF.

7.7.11 DRILL STRING PRESSURE (ZERO PSIG) INDICATOR LIGHT

START CONDITION: Initialize electrical Systems, mode switch in sample Rec.

NOTE: Vacuum test line may be required for this test.

TD/CE 7.7.11.1 **ENSURE** valve is installed on drill string supply hose. **TURN** PRESSURIZE DRILL STRING to ON.

TD/CE 7.7.11.2 **CLOSE** vent valve and increase the pressure until green DRILL STRING PRESSURE light goes off. **CONFIRM** that the pressure is being recorded on channel 7 of the VGR.

TD/CE 7.7.11.3 Slowly **OPEN** vent valve to decrease pressure, and **VERIFY** the green DRILL STRING PRESSURE light comes back on when the DRILL STRING PRESSURE display reads 0 psig.

TD/CE 7.7.11.4 **TURN** PRESSURIZE DRILL STRING switch to OFF.

7.7.12 SHIELDED RECEIVER PRESSURE (ZERO PSIG) INDICATOR LIGHT

START CONDITION: Initialize electrical Systems, mode switch in sample Rec.

NOTE: Vacuum test line may be required for this test.

TD/CE 7.7.12.1 **ENSURE** Shielded Receiver Ball Valve is closed.

TD/CE 7.7.12.2 **TURN** PRESSURIZE SHIELDED RECEIVER to ON.

TD/CE 7.7.12.3 **INCREASE** the SHIELDED RECEIVER PRESSURE until green SHIELDED RECEIVER PRESSURE light goes off.

TD/CE 7.7.12.4 Slowly **OPEN** ball valve to decrease pressure, and **VERIFY** the green SHIELDED RECEIVER PRESSURE light comes back on when the SHIELDED RECEIVER PRESSURE display reads 0 psig.

TD/CE 7.7.12.5 **TURN** PRESSURIZE SHIELDED RECEIVER to OFF.

7.7.13 PURGE GAS PRESSURE (ZERO PSIG) INDICATOR LIGHT

START CONDITION: Initialize Electrical System (ref. 7.1.1).

NOTE: Vacuum test line may be required for this test.

TD/CE 7.7.13.1 **TURN** PURGE GAS switch to ON, and MODE switch to drill.

TD/CE 7.7.13.2 **INCREASE** the PURGE GAS PRESSURE until green PURGE GAS PRESSURE light goes off.

TD/CE 7.7.13.3 DECREASE pressure and VERIFY the green PURGE GAS PRESSURE light comes back on when the PURGE GAS PRESSURE display reads 0 psig.

TD/CE 7.7.13.4 TURN purge gas switch to OFF.

7.7.14 EXHAUSTER SHUTDOWN ALARM

NOTE: START CONDITION: Initiate Longyear engine (Reference 7.1.2)

TD/CE 7.7.14.1 If not already available, OBTAIN key for key switch (S47) labeled EXHAUSTER INTERLOCK, located on the purge gas (PG) connection box.

TD/CE 7.7.14.2 Bypass exhauster interlock: if not done already INSERT and ACTUATE the key switch on the PG connection box labeled EXHAUSTER INTERLOCK.

TD/CE 7.7.14.3 VERIFY the light (DS33) above the EXHAUSTER INTERLOCK key switch illuminates.

TD/CE 7.7.14.4 PLACE truck in rotary mode of operation.

TD/CE 7.7.14.5 Simulate exhauster failure: while in rotary mode of operation ACTUATE key switch labeled EXHAUSTER INTERLOCK.

TD/CE 7.7.14.6 VERIFY that the indicator light above the key switch is goes out.

TD/CE 7.7.14.7 Five seconds after simulated exhauster failure, VERIFY that the EXHAUSTER SHUTDOWN ALARM light (DS31), located on the front panel of the instrument enclosure, starts flashing.

TD/CE 7.7.14.8 Ten seconds after the simulated exhauster failure, VERIFY that the drill rig and purge gas shutdown.

7.7.15 DRILL STRING DEPTH INDICATOR

START CONDITION: Initialize Longyear Engine (ref. 7.1.2), Initialize Electrical System (ref. 7.1.1).

TD/CE 7.7.15.1 RAISE the drill head until to its uppermost position.

TD/CE 7.7.15.2 MEASURE and RECORD the distance from the bottom of the quill rod to the ground in TABLE PP.

TD/CE 7.7.15.3 RECORD the DRILL STRING POSITION (channel 3) displayed by the VGR in Table PP.

TD/CE 7.7.15.4 LOWER the drill head and OBSERVE that the DRILL STRING POSITION indicates a change in position until the hydraulic rams bottom out.

TD/CE [illegible] 7.7.15.5 MEASURE and RECORD the distance from the bottom of the quill rod to the ground in TABLE PP.

TD/CE [illegible] 7.7.15.6 RECORD the DRILL STRING POSITION (channel 3) displayed by the VGR in Table PP.

TD/CE [illegible] 7.7.15.7 CALCULATE the difference between the starting and end position of the drill head for both the measured and displayed values. RECORD these values in Table PP.

Description	Measured	Displayed
Starting Distance in.	78 1/4	0
Ending Distance in.	54 1/4	24
Net Distance Traveled in.	24	24

Table PP.

For Table QQ, indicate results (OK/BAD) obtained from steps in section 7.7.

ALARM	TIMER	UNACKNOWL. ALARM	ACKNOWL.	COND. NORMAL	REPEAT ALARM	RESET	ALARM - PASSING	ENGINE SD/RS
Cabinet Temp.		OK	OK	OK	OK	OK	N/A	N/A
Down Force	OK	OK	OK	OK	OK	OK	OK	OK
High RPM	OK	OK	OK	OK	OK	OK	OK	OK
PG Low Flow	OK	OK	OK	OK	OK	OK	OK	
PG High Flow	OK	OK	OK	OK	OK	OK	OK	
PG Low Temp.		OK	OK	OK		OK		
PG High Temp.		OK	OK	OK		OK		
HH DS FLOW	N/A	OK	OK	OK	OK	OK	OK	
INDICATOR LIGHT	ON	OFF						
DS Pressure	OK	OK						
SR Pressure	OK	OK						
PG pressure	OK	OK						

Table QQ.

7.8 VIDEO GRAPHIC RECORDER

7.8.1 DISPLAY RESET

TD/CE 7.8.1.1 **PRESS** the PAGE button located in the lower right corner of the VGR unit.

TD/CE 7.8.1.2 **SELECT** the PAGE NO. 1 using the up/down arrow keys to the left of the PAGE button.

TD/CE 7.8.1.3 **PRESS** the PAGE button after selecting PAGE NO. 1 option.

7.8.2 VIDEO GRAPHIC RECORDER DATA TRANSFER

START CONDITION: Initialize Longyear Engine (ref. 7.1.2), Initialize Electrical System (ref. 7.1.1),.

NOTE: The following equipment is needed to perform the VGR data transfer

RADIO FREQUENCY (RF) MODEM	PROXIM INC.
CABLE, RS-232 SERIAL	MODEM TO COMPUTER
COMPUTER, PC COMPATIBLE	ANY BRAND LAP TOP
SOFTWARE	AENET AND PC SUPPORT SOFTWARE FROM ESTERLINE ANGUS

TD/CE 7.8.2.1 **VERIFY** the VGR is powered up and ready to operate.

TD/CE 7.8.2.2 **PLACE** the REC MODE switch on Instrument Enclosure to REC.

TD/CE 7.8.2.3 Gather test data: Allow VGR to record data for ~~approximately five minutes.~~ DURATION OF THE VGR TEST. 9 L 8 6/20/95

NOTE: ~~The status of the truck (idle or operating) does not matter. The previous step insures that there is some data to transfer.~~ 9 L 8 6/20/95

TD/CE 7.8.2.4 **PLACE** the REC MODE switch on the Instrument Enclosure to STBY.

NOTE: Data retrieval computer setup: If the test is to be performed indoors, or with wall and other obstacles between the VGR and computer/RF modem, insure that the computer/RF modem used to retrieve data is within 500 feet of the VGR. If the test is conducted outdoors, or where there are no obstacles between the VGR and computer/RF modem, then the distance between the VGR and computer/RF modem can be up to 800 feet.

TD/CE 7.8.2.5 **CONNECT** data retrieval computer and RF modem using a RS-232 serial cable.

TD/CE 7.8.2.6 **APPLY** power to computer and RF modem.

TD/CE 7.8.2.7 If not already, **LOAD** Esterline Angus AENet and PC Support Software onto data retrieval computer and **RUN** AENet Software.

TD/CE

7.8.2.8 **RETRIEVE** data from VGR using computer/RF modem using AENet software. OPERATE THE TRUCK PER COG.ENGR. DIRECTION TO GATHER DATA OF MONITORED PARAMETERS. PLACE MODE SWITCH IN STBY. QLB 6/20/95

~~**NOTE:** Depending on how much data is in the VGR the pervious step may take several minutes to complete.~~ QLB 6/20/95

TD/CE

7.8.2.9 **REVIEW** retrieved data using AENet or PC Support Software from Esterline Angus. **DETERMINE** if data is from the truck VGR under test by comparing data, including but not limited to, date/time stamp, VGR ID and analog data. MAKE PRINT OUT(S) OF DATA FOR COMPARISON. QLB 6/20/95

8.0 TEST PROCEDURE (SAMPLING)

8.0.0.1 THE OPERATOR SHALL FILL OUT THE CORE SAMPLE INSPECTION DATA SHEET PRIOR TO RUNNING THE RMCS SEE ATTACH #2. JJB 5/23/96

This portion of the ATP is intended to demonstrate that the truck components work together to perform the required task of sampling. It is specifically generic and is only intended to be a guide for the cognizant engineer to perform sampling operations. It is left to the cognizant engineer's discretion to use appropriate methods to obtain the core sample. All problems and anomalies encountered during sampling will be documented in the same manner as described previously in this document. As part of the sampling test, the following steps will be verified where appropriate, and signed off at the completion of sampling operations. The sample will be taken by drilling one or more segments into hard K-mag.

TD/CE 8.0.1 **VERIFY** bit penetration rate during saltcake simulant drilling is at least 19 inches in a 30 minute period by confirming that sample drilling times recorded on the Test Sample Data Sheets (Item 17), are 30 minutes or less for a 19 inch segment.

TD/CE 8.0.2 **VERIFY** compatibility between hydrostatic head system and purge gas system by observing proper operation of purge gas system in drill mode and in sample recovery mode.

TD/CE 8.0.3 **VERIFY** compatibility between hydrostatic head system and existing core sampling equipment by observing trouble-free operation and connection of purge gas system components to core sampling truck during sampling operations.

TD/CE 8.0.4 **VERIFY** that gasses which require venting will be vented back to tank by observing proper operation of purge gas system valves in venting through the drill rod spray washer.

8.1 PREPARE TO SAMPLE

8.1.1 **PREPARE** the drill string as directed below:

8.1.1.1 **OBTAIN** the appropriate drill rod sections for sampling tests.

8.1.1.2 **CLEAN** each piece of drill rod to assure there is no foreign material inside and **INSPECT** for damage.

8.1.2 **ASSEMBLE** and **INSTALL** the riser adapter, gaskets, drill rod washer, wiper seal, and foot clamp onto the simulated tank riser as depicted in Figure 17 below.

8.1.3 **COVER** the ground in the immediate area around the riser with kraft paper, plastic, or rubber as necessary.

8.1.4 **ROTATE** the platform to position the quill rod directly over the tank riser.

8.1.5 **LOWER** the quill rod to the full DOWN position.

8.1.6 **SET** the truck height required for sampling as directed below:

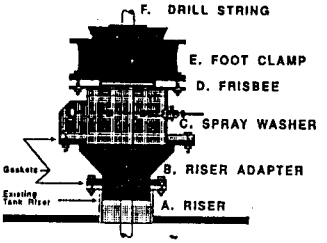


Figure 17) Riser Assembly.

8.1.6.1 **PLACE** the 4-way valve in the FLOAT position, then **CONNECT** the hydraulic hoses to the hydraulic leveling system.

8.1.6.2 **RAISE** the core sample truck uniformly to set the QUILL ROD ADAPTER to RISER FLANGE DISTANCE (see Figure 18 below) to that indicated by the cognizant engineer.

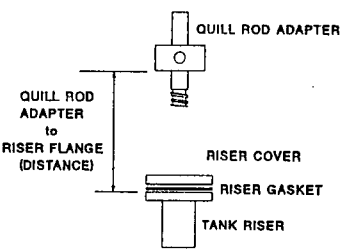


Figure 18) Quill Rod Adapter to Riser Flange Distance.

8.1.6.3 **ENSURE** all leveling control valves are closed, then **PLACE** the 4-way valve in the FLOAT position.

8.1.6.4 **DISCONNECT** and **STORE** the hydraulic leveling hoses.

8.1.7 **RAISE** the quill rod to the full UP position, then **ROTATE** the platform to allow installation of the drill string into the riser assembly.

WARNING - The universal sampler valve is closed by a high force spring. Keep the sampler piston fully lowered into the sampler to prevent accidental closing of the valve.

8.1.8 **CONNECT** the bit to the core barrel and **LATCH** the sampler into the core barrel by hand and **VERIFY** connection is good.

8.1.9 **ENSURE** that the plug has been removed from the wiper seal, then **INSERT** the core barrel with sampler into the foot clamp.

8.1.10 **INSTALL** the drill rods, **EXCEPT** the 19" sections as directed below:

NOTE: The first 19 inch section will be installed in section 8.2.

8.1.10.1 **APPLY** a generous amount of pipe joint compound to the threads of each section before assembly.

8.1.10.2 **LUBRICATE** the wiper seal with Molylube as necessary to allow installation of the drill string and to minimize friction during operation.

8.1.10.3 **LOWER** the assembled drill string into the foot clamp and wiper seal using the platform crane or other suitable means.

8.1.11 **PREPARE** the nitrogen supply system as directed below:

8.1.11.1 **ENSURE** that the DRILL STRING, SHIELDED RECEIVER, and PURGE GAS flow controls within the purge gas enclosure are closed.

8.1.11.2 **CONNECT** the vent line (VENT TO TANK) at the left rear of the sample truck to the vent port on the drill rod washer.

8.1.11.3 **CONNECT** the vent line (VENT DRILL STRING) at the left rear of the sample truck to the vacuum test device.

8.1.11.4 **CONNECT** the nitrogen/air supply from the compressor to the receiving port near the driver's door on the sample truck.

8.1.11.5 **ENSURE** supply air is at 125±15 psig.

8.2 PERFORM CORE SAMPLING

8.2.1 **ROTATE** the platform to place the quill rod directly over the DS.

8.2.2 **POSITION** the DS and **RESET** the mechanical grapple counter as directed below:

8.2.2.1 **OPEN** the chuck, **LOWER** the quill rod and **CONNECT** to the DS.

8.2.2.2 **CLOSE** the chuck and **OPEN** the foot clamp.

8.2.2.3 **LOWER** the rams to the full down position.

8.2.2.4 **CLOSE** the foot clamp.

8.2.2.5 **DISCONNECT** the quill rod from the DS, then **RAISE** the rams to the full up position.

8.2.2.6 **PLACE** the GRAPPLE switch on the SAMPLE ACTUATOR panel to GRAPPLE LOWER, then HOLD the grapple HOIST switch to UP to raise the grapple to the upper limit switch.

8.2.2.7 **ZERO** the mechanical grapple counter.

8.2.2.8 **HOLD** the SAMPLE DOWN BYPASS button and **PLACE** the HOIST switch in the DOWN position until the grapple is lowered about 6 inches; (until the HYDRAULIC INTERLOCK light on the ACTUATOR panel goes out), then **RELEASE** the HOIST switch.

8.2.3 **ATTACH** a 19 inch section onto the assembled drill string with a generous amount of pipe joint compound.

8.2.4 **OPEN** the chuck, **LOWER** the quill rod and **MATE** the quill rod adapter to the DS.

8.2.5 **CLOSE** the chuck and **DEPRESS** the foot clamp pedal to OPEN the foot clamp.

8.2.6 **PREPARE** the actuator for the sampling as directed below:

8.2.6.1 **POSITION** the actuator mode switch to GRAPPLE LOWER and **HOLD** the hoist directional switch to DOWN to lower the grapple.

8.2.6.2 **RELEASE** the hoist directional switch when the hoist motor automatically stops. (The grapple rests on the sampler.)

8.2.6.3 **RECORD** the grapple cable length on the DATA SHEET Item 7.

8.2.6.4 **PLACE** the actuator mode switch in the SAMPLING position then **HOLD** the hoist directional switch in the UP position. (The hoist motor will automatically stop when slack is removed from the hoist cable.) **RELEASE** the hoist directional switch.

8.2.6.5 **SET** the RECORDER MODE switch to the OPERATE position. (See Figure 10 for reference).

8.2.7 **PLACE** the 4-way valve in the RAISE position.

8.2.8 **ENSURE** proper adjustment of the ram hydraulic pressure regulator set point.

NOTE: If necessary, adjust the regulator pressure to limit the down force applied by the rams, preventing buckling of the DS.

8.2.9 **ESTABLISH** purge gas flow as directed below:

8.2.9.1 **ENSURE** that the PURGE GAS FLOW control is fully closed.

8.2.9.2 **PLACE** the nitrogen MODE switch in the DRILL position.

8.2.9.3 **POSITION** the PURGE GAS switch to ON.

NOTE: At this point, the SR is vented to the tank and purge gas flow may be started past the drill bit.

8.2.9.4 **ADJUST** the PURGE GAS PRESSURE regulator as required.

8.2.9.5 **OPEN** the PURGE GAS FLOW control to establish nominal flow to the drill string.

8.2.9.6 **RECORD** the PURGE GAS PRESSURE and PURGE GAS FLOW rate, as indicated on the instrumentation display, in item 8 on the TEST SAMPLE DATA SHEET.

8.2.9.7 **ENGAGE** the Longyear to begin DS rotation at nominal speed.

8.2.9.8 **RECORD** the DRILL STRING RPM, as indicated on the instrumentation display panel, on item 9 of the DATA SHEET.

8.2.10 **SET** stopwatch to record time required to drill 19" segment, and **ADJUST** the DOWN ram control valve as required to start drill penetration.

8.2.11 **LUBRICATE** the wiper seal with Molylube as necessary for DS rotation.

8.2.12 When the stroke is completed, **PROCEED** as directed below:

8.2.13 **RECORD** time required to drill 19" segment (if applicable) on item 17 of the DATA SHEET, **DISENGAGE** the clutch, then **CLOSE** the PURGE GAS FLOW control valve.

8.2.14 **RAISE** the grapple and pintle rod as directed below:

8.2.14.1 **POSITION** the GRAPPLE switch to GRAPPLE LOWER.

8.2.14.2 **HOLD** the HOIST switch in the UP position to raise grapple and pintle rod up the DS about two feet, then **RELEASE** the HOIST UP switch.

NOTE: The grapple assembly will start moving up the DS with the pintle rod and piston attached. The rotary valve on the sampler will be closed by a spring mechanism. The pintle rod will then be separated from the sampler piston when a force of 150 lbs is developed at the piston stop.

8.2.15 **POSITION** the DATA LOGGER MODE switch to STANDBY to allow the rams to be raised.

8.2.16 **RAISE** the DS about 1 inch to ensure trouble-free installation of the next sampler.

8.2.17 **HOLD** the SAMPLE ACTUATOR HOIST switch in the UP position to raise grapple and pintle rod to just below upper limit switch, then **RELEASE** the HOIST UP switch.

8.2.18 **PLACE** the PURGE GAS switch in the OFF position, then **CLOSE** the PURGE GAS FLOW control valve.

8.2.19 **VERIFY** from the purge gas pressure gage, purge gas display, and green indicator light that the drill string and grapple box are vented.

> **CAUTION**
>
> **IF AN INDICATOR SHOWS THE GRAPPLE BOX IS PRESSURIZED, DO NOT UNTHREAD THE QUILL ROD.**

8.2.20 **CLOSE** the foot clamp.

8.2.21 **OPEN** the chuck, **UNTHREAD** and **RAISE** the quill rod adapter from the DS. **CLOSE** the chuck.

8.2.22 **ROTATE** the platform to place the quill rod aside of the DS.

8.2.23 **PRESSURIZE** the DS to maintain hydrostatic head as directed below:

8.2.23.1 **CONNECT** the cable spray washer and SCA to the DS then **CONNECT** the SUPPLY DRILL STRING line from the right rear of the truck to the SCA.

8.2.23.2 **ENSURE** that the SCA isolation valve is CLOSED.

8.2.23.3 **INSTALL** the kamlock cap onto the SCA.

8.2.23.4 **PLACE** the purge gas MODE switch to SAMPLE RECOVERY and the DS GAS FLOW switch in the ON position.

8.2.23.5 **VERIFY** that the DS FLOW control valve is CLOSED, then **ADJUST** the DS PRESSURE to 30 psig.

8.2.23.6 **OPEN** the DS FLOW control to allow minimal flow (1-5 scfm) through the DS. (Gas should flow slowly, but steadily.)

8.2.24 **ATTACH** the pintle/pull-rod overpack to the quill rod adapter.

8.2.25 **HOLD** the SAMPLE ACTUATOR HOIST switch in the UP position to raise grapple and pintle rod to the upper limit switch, then **RELEASE** the HOIST UP switch.

8.2.26 **ENGAGE** the UP LIMIT BYPASS switch and **HOLD** the HOIST switch in the UP position until the pintle releases.

8.2.27 **DETACH** the overpack from the quill rod adapter and **VERIFY** that the pintle is in the overpack.

8.2.28 **HOLD** the SAMPLE DOWN BYPASS button and **HOLD** the HOIST switch in the DOWN position to lower the grapple about 6 inches (so that the actuator HYDRAULIC INTERLOCK light goes OFF), then **RELEASE** the button and switch.

8.3 RECOVER SPENT SAMPLER FROM DRILL STRING

8.3.1 **POSITION** the SR over the DS, then **LOWER** and **MATE** the SR to the sampler change-out assembly.

8.3.2 **ENSURE** that the RLU is in the CLOSED position.

8.3.3 **PRESSURIZE** the DS to maintain hydrostatic head as directed below:

8.3.3.1 **PLACE** the purge gas MODE switch to SAMPLE RECOVERY and the PRESSURIZE DRILL STRING switch in the ON position.

8.3.3.2 **VERIFY** that the DS FLOW control valve is CLOSED, then **ADJUST** the DS PRESSURE to 30 psig.

8.3.3.3 **OPEN** the DS FLOW control to allow minimal flow (less than 0.5 scfm) through the DS. (Gas should flow slowly, but steadily.)

8.3.3.4 **POSITION** the PRESSURIZE SHIELDED RECEIVER switch to ON.

8.3.3.5 **ADJUST** the SR pressure regulator slightly higher than that set in the DS.

8.3.3.6 **OPEN** and **CLOSE** the SR flow control slightly to bring the SR pressure just above that in the DS.

8.3.3.7 **OPEN** the isolation valve on the sampler change-out assembly and SR ball valve.

8.3.4 **RAISE** RLU to the full UP position, then zero the mechanical and digital receiver cable counters.

8.3.5 **LOWER** the RLU **UNTIL** slack in the cable stops the motor.

8.3.6 **RECORD** the electronic and mechanical encoder readings on the DATA SHEET Item 11.

8.3.7 **UNSEAT** and **RAISE** the sampler as directed below:

8.3.7.1 **SET** the speed control on the motor control panel to 0.

8.3.7.2 **HOLD** the hoist directional switch in the UP position.

8.3.7.3 **OBSERVE** the LOADCELL READOUT on the CONTROL CONSOLE and slowly **INCREASE** the hoist speed (do not exceed 50). **RAISE** the sampler about 2 feet and **RECORD** the highest LOADCELL weight on the DATA SHEET Item 13.

8.3.7.4 **RECORD** the LOADCELL weight on the DATA SHEET Item 14.

8.3.7.5 **ADJUST** the DS FLOW control to reset minimal flow (1-5 scfm) through the DS. (Gas should flow slowly, but steadily.)

8.3.7.6 **RECORD** the DS PRESSURE and FLOW as indicated on the instrumentation display in Item 12 of the DATA SHEET.

8.3.7.7 **INCREASE** the speed to near 50 to raise the sampler up the DS.

8.3.8 **INSPECT** the sampler in the sight glass.

8.3.9 **INDICATE** the cleanliness of the sampler on the DATA SHEET Item 15.

8.3.10 If excessive material is observed on the sampler, **NOTE** condition on the Test Sample Data Sheet.

8.3.11 **RAISE** the sampler into the SR until the upper limit switch is reached and the SR hoist automatically stops.

8.3.12 **CLOSE** the isolation valve on the sampler change-out assembly.

8.3.13 **DE-PRESSURIZE** the SR as directed below:

8.3.13.1 **DE-PRESSURIZE** the SR by placing the PRESSURIZE SHIELDED RECEIVER switch to OFF.

NOTE: The SR nitrogen supply will be closed and the SR will be vented if it was pressurized.

8.3.13.2 **VERIFY** that the SR is vented by observing the purge gas assembly gages, the instrumentation pressure and the green SR pressure indicator lights.

CAUTION

IF AN INDICATOR SHOWS THE SHIELDED RECEIVER IS PRESSURIZED, DO NOT DISCONNECT THE SR FROM THE CHANGE-OUT ASSEMBLY.

8.3.14 **CLOSE** the ball valve on the SR.

8.3.15 **UNLATCH** and **RAISE** the SR away from the SCA.

8.3.16 **ROTATE** the platform so the SR is not over the riser.

8.3.17 **OPEN** the ball valve on the SR.

8.3.18 **LOWER** the RLU until the sampler is out of the SR.

8.3.19 **DISCONNECT** the RLU from the sampler as directed below:

8.3.19.1 **ENSURE** that the READY light is ON.

8.3.19.2 **PUSH** the START button momentarily. The OPEN light should illuminate within 2 minutes. **HOLD** the sampler during this operation to keep it from dropping out of the RLU.

8.3.19.3 **PUSH** and **HOLD** the START button on the Latching Control panel to attain the CLOSED position.

8.3.20 **RAISE** the RLU into the SR until the upper limit switch is reached and the SR hoist automatically stops.

8.3.21 **CLOSE** the ball valve on the SR.

8.3.22 **PREPARE** truck and test materials for additional core drilling as directed by the cognizant engineer. If final ATP core has been completed **ENSURE** truck configured for safe disposition.

MAJOR EQUIPMENT COMPONENTS

NAME	PURPOSE
Rotary Drilling Platform	Supports core drill and auxiliary equipment.
Drilling Unit	Longyear Model 34 drill rig which applies rotary motion and downward thrust to the drill string (rotation is disabled for push mode)
Drill Rod Hoist	Hoist mounted on the rotary platform that provides on-site method to handle transfer cask stand, riser equipment and drill string.
Drill Rod Washer Assembly	Spray washes and wipes drill rod during retrieval. Provides seal between tank and environment.
Quill Rod	A section of drill rod which remains in the drill head and is used to transfer power from the drilling unit to the drill string.
Drill String	Transmits power from drill unit to drill bit. Composed of various pieces of drill rod.
Core Barrel/Bit Assembly	Holds sampler during sampling (Is Drill string Section #1).
Universal Sampler	Collects sample and retains sample when transported to lab.
Foot Clamp	Retains drill string when shielded receiver or quill rod is disconnected.
Riser Adapters	Provides means to connect spray washer to various sizes of risers.
Kamlok Adapters	Provide connections of shielded receiver to drill rod and casks.

MAJOR EQUIPMENT COMPONENTS (cont)

NAME	PURPOSE
Caps	Covers for adapters in standby status.
Shielded Receiver	Retrieves sample from drill string by an internal power winch and cable. Provides interim sample shielding, and deposits sample in transfer cask; also removes clean sampler from cask and transfers it to drill string for next sample.
Remote Latch Unit	Means to retrieve and release samplers. (Raised and lowered by shielded receiver winch.)
Weight Transducer	Transducer sampler weighing device. (Attached to cable sheave on shielded receiver.)
Cable Length Counter (Mechanical)	Digital revolution counter. (Attached to cable sheave inside shielded receiver.)
Cable Length Counter (Electronic)	Digital readout in control console that tells how much cable has been lowered down drill string.
Cable Spray Washer	Used in drill string to wash internal cables. (Shielded receiver and sample actuator winch cables.)
Sampler Change-Out Assembly	Provides means to maintain pressure within the drill string while samplers are exchanged.
Nitrogen Supply System	Provides drill bit cooling and cleaning during rotary drilling. Provides method of maintaining a suppressed liquid level within the drill string.

Item Status Verification Sheet

ITEM	REQUIREMENT	QC VERIFY
Hoist Hook *	CERT. TAG	6/30/95
Grapple Box (pressure vessel)	ASME STAMP	3/22/95
Shielded Receiver (pressure vessel)	ASME STAMP	3/22/95
Hydraulic Ram Pressure UP gage	CAL. STICKER	3/22/95
Hydraulic Ram Pressure DOWN gage	CAL. STICKER	3/22/95
Purge Gas Pressure Meter	CAL. STICKER	3/22/95
Purge Gas Temperature Meter	CAL. STICKER	3/22/95
Instrumentation Cabinet Temperature Meter	CAL. STICKER	3/22/95
Purge Gas Flow Meters	CAL. STICKER	3/22/95
Hydrostatic Head Flow Meters *	CAL. STICKER	N/A
Drill String RPM Meter	CAL. STICKER	3/22/95
Shielded Receiver Pressure Meter	CAL. STICKER	3/22/95
Drill String Pressure Meter	CAL. STICKER	3/22/95
Bit Penetration Rate Meter *	CAL. STICKER	6/30/95
Bit Downward Force *	CAL. STICKER	6/30/95
Oxygen Sensor	CAL. STICKER	3/22/95

Table RR.

* See Exception WHC-SD-WM-ATP-119 R.0

M.E. Wingfield
3/22/95

Test Sample Data Sheet *

Item	Description		Condition	Response	
1	Description of Test Medium		K-Mag/Sludge/Mixture/Etc		
2	Universal Sampler Number		For Record Only		
3	Segment Number		For Record Only		
4	Date of Sampling		For Record Only		
5	Encoder Values of Previous Segment at Bottom of Drill String	Mechanical	feet		
		Digital	feet		
6	Encoder Values at Bottom of Drill String	Mechanical	feet		
		Digital	feet		
7	Grapple Counter at Bottom of Drill String		feet		
8	Purge Gas (gage/display)	Pressure	psig		
		Flow Rate	cfm		
9	Longyear Drill Speed		rpm		
10	Predicted Spent Sampler Location	Mechanical	feet		
		Digital	feet		
11	Indicated Spent Sampler Location	Mechanical	feet		
		Digital	feet		
12	Drill String - with sampler removed	Pressure	psig		
		Flow Rate	cfm		
13	Maximum Force to Unseat Sampler		lbs		
14	Loadcell Weight with Sampler Attached		lbs		
15	Cleanliness of Sampler		For Record Only		
16	Sample Characteristics When convenient to do so, each sample should be analyzed to determine the characteristics of the waste collected in the sampler.	Volume	For Record Only		
		Weight	For Record Only		
		Length	For Record Only		
17	Drilling Time Required to Take Sample		minutes		

COMMENTS: _____

Table SS.

* SEE ATR SECTION 2.0 Pg 2-15 & 2-16

& 4/4/96 (J. CORBET)

ATP Exception / Resolution Sheet *

ITEM #	STEP #	DESCRIPTION OF PROBLEM	RESOLUTION TO PROBLEM	INITIALS

Table TT. SHEET _____ OF _____

(insert additional sheets, as required) *See ATR Section 2.0 pg 2-2 through 2-7 SC 4/4/96

ATR Comment Sheet

ITEM #	STEP #	COMMENT	INITIALS
1	8.0	During sampling section of this test procedure, it was noted that the hydrostatic head flow control valves chatter unless they are turned down to minimum flow when SR SOV switch is turned on. This will be reflected in the operating procedure before the system goes to the field.	MM 6/30/95

Test Completion Sign-Off Sheet

All tests have been completed as delineated in this Acceptance Test Procedure. All exceptions have been documented and resolved as indicated on the "ATP Exception / Resolution Sheet". The core sample truck and associated equipment can be operated in a safe manner and are accepted as meeting all development criteria. The Core Sample Truck is now ready for operability testing preparations.

Signature	Date
Test Director	6/30/95
Quality Assurance	6/30/95
Waste Tank Safety Assurance	6/30/95
Core Sampling Cognizant Engineer	6/30/95
Mechanical Engineering	6/30/95
Core Sampling Manager	6/30/95

APPENDIX ONE: Criteria Index

CRITERIA	CRITERIA PROVEN	ATP PARAGRAPH NUMBER WHC-SD-WM-ATP-048
The bit designed shall be compatible with the disposable sludge sampler (drawing H-2-99316).	DEVELOPMENT TEST	N/A
The bit designed shall be compatible with existing drill string (type BX).	DEVELOPMENT TEST	N/A
The distance from the end of the bit to the lower end of the sludge sampler rotary valve shall be no greater than three inches.	DEVELOPMENT TEST	N/A
The new hydrostatic head balancing system (HHS) shall be compatible with the new purge gas system and/or the existing compressor on the CST.	ROTARY MODE ATP WHC-SD-WM-ATR-048	8.0.2
The HHS system shall meet the criteria from WHC-SD-WM-WP-054 Rev. 0. If discrepancies between this document and WHC-SD-WM-CR-044 are found, WHC-SD-WM-CR-044 takes precedence.	DESIGN REVIEW FOR ROTARY MODE CORE SAMPLE TRUCK #2	N/A
The HHS system shall be capable of keeping waste material out of the drill string during sampler exchanges.	ROTARY MODE ATP WHC-SD-WM-ATR-048	8.0.4
The HHS system shall be capable of maintaining hydrostatic head pressures of 30 psig.*	STRESS ANALYSIS REPORT, ASME STAMP CERTIFICATE, DESIGN REVIEW	N/A
The HHS system shall be compatible with existing core sampling equipment (ie. drill string).	ROTARY MODE ATP WHC-SD-WM-ATR-048	8.0.3
The HHS system shall be capable of monitoring the gas flow to the drill string.	ROTARY MODE ATP WHC-SD-WM-ATR-048	7.6.4
The HHS system shall be capable of monitoring the gas pressure to the drill string.	ROTARY MODE ATP WHC-SD-WM-ATR-048	7.6.4
Gasses which require venting shall be piped back to the tank.	ROTARY MODE ATP WHC-SD-WM-ATR-048	8.0.5
The HHS system shall have the shielded receiver or any part of the system that become a pressurized vessel (under DOT or WHC standards), designed to all applicable regulatory and company standards.	STRESS ANALYSIS REPORT, ASME STAMP CERTIFICATE, DESIGN REVIEW	N/A

* Indicates change to criteria document

CRITERIA	CRITERIA PROVEN	ATP PARAGRAPH NUMBER WHC-SD-WM-ATP-048
The sampler shall obtain and retain 85% of the sampler's designed capacity 90% of the time (does not apply to transition zones).*	ROTARY MODE ATP WHC-SD-WM-ATR-048	8.0.7
The sampler shall obtain and retain liquid, sludge, and salt-cake samples.	ROTARY MODE ATP WHC-SD-WM-ATR-048	8.0.7
The sampler shall be compatible with existing core sampling equipment :drill string, shipping casks and liners, and shielded receiver.	ROTARY MODE ATP WHC-SD-WM-ATR-048	8.0.3
Both PNL's 325A and 222-S's hot cells shall be capable of recovering the sampled material. The sampler does not need to be compatible with the current extrusion system. If not, design a system to enable sample recovery.	TEST OF EXTRUDER DESIGN	N/A
The designed capacity of the sampler shall be at least 11.29 cubic inches.	DESIGN REVIEW FOR RMCST #2	N/A
The sampler shall not fill prior to pushing the drill string.	ROTARY MODE ATP WHC-SD-WM-ATR-048	8.0.9
The sampler shall minimize changes in chemical and physical properties of the sample (moisture, total organic, etc...).	MOISTURE TESTS	N/A
Modifications made to the disposable sampler shall be incorporated into the universal sampling system.	DESIGN REVIEW FOR RMCST #2	N/A
The sampler shall be able to operate under 30 psig working pressure, * and 55 psig test pressure (hydrostatic head forces).	ROTARY MODE ATP WHC-SD-WM-ATR-048 DESIGN REVIEW FOR RMCST #2	8.0.9 N/A
The sampler shall be able to operate while containing the source term identified in SD-WM-WP-004 Rev. 1. (ie. 2000 R/hr for 7 days and 100 R/hr for 3 months.)	SARP	N/A
The radioactive contamination of the outside surfaces of the sampler shall be as low as reasonably achievable upon extraction from the drill string.	DESIGN REVIEW FOR RMCST #2	N/A
The sampler shall meet requirements outlined in SD-WM-WP-004 and WHC-SD-WM-CR-044. Criteria listed in this table shall take precedence if discrepancies exist.	SAMPLER TEST & DESIGN REVIEW	N/A
The piston shear pin shall shear at 150 lbs. force.*	SAMPLER TEST	N/A
With the sampler valve in the closed position and the sampler fully filled with water and held in a vertical position for a one hour period the valve mechanism will show no leakage.*	ROTARY MODE ATP WHC-SD-WM-ATR-048	8.0.8

CRITERIA	CRITERIA PROVEN	ATP PARAGRAPH NUMBER WHC-SD-WM-ATP-048
The bit shall not penetrate a predetermined depth of the steel liner of a tank at 1500 lbs force and 50* RPM after running a predetermined amount of time. Mechanical Engineering is to develop the penetration rate based on estimated tank steel liner and safe field sampling conditions.	ENVELOPE TEST REPORT	N/A
The bit shall be capable of being cooled to a maximum ΔT (from the ambient waste temperature to the bit/waste interface temperature) of 105°F (Appendix A). This shall require the development of a sampling envelope discussed below.	ENVELOPE TEST REPORT	N/A
The bit shall penetrate salt cake material at a rate of at least 19 inches in a 30 minute period.	ROTARY MODE ATP WHC-SD-WM-ATR-048	8.0.1
The following table (TABLE B-1) shows the operational parameters for the purge gas feed system.	PGT QA INSPECTION PLAN	N/A
The minimum N_2 purity shall be 97% by volume. No volatile gases shall be present.	NITROGEN P.O.	N/A
The purge gas temperature shall not be allowed to drop below 35°F or rise above 100°F with tank farm out-of-door temperatures ranging from 0°F to 120°F.*	DESIGN REVIEW & PGT QA INSPECTION PLAN	N/A
The supply system shall be easy to refill.	PGT QA INSPECTION PLAN	N/A
The supply shall last for a minimum of 8 hours of drilling (16 hours or more is desirable).	DESIGN REVIEW FOR RMCST #2	N/A
The system and gas chosen must be designed such that waste or tank conditions are not made worse by the addition of the gas at any location in the tank.	SAFETY ASSESSMENT OR LIMITED SAR	
The following table (TABLE B-2) lists the instrumentation and parameters to be installed on the CST.	DESIGN REVIEW & ENVELOPE TEST REPORT	N/A
The safety envelope shall be established using the variables shown in TABLE B-3.	ENVELOPE TEST REPORT, THERMAL MODELING	N/A
Envelope testing shall be conducted at impact level 2 on a representative simulant(s).	ENVELOPE TEST REPORT, SIMULANT DOCUMENT	N/A
Verification and final performance testing shall be conducted in a representative depth of a simulant, at impact level 3.*	ROTARY MODE ATP WHC-SD-WM-ATR-048	8.0

* Indicates change to criteria document

TABLE B-1..OPERATIONAL PARAMETERS FOR THE PURGE GAS FEED SYSTEM

PARAMETER	RANGE	
	Low	High
Flow Rate	0 cfm	50 cfm
Supply Pressure	20 psig	90 psig
Temperature	35°F	100°F

TABLE B-2..INSTRUMENTATION AND PARAMETERS TO BE INSTALLED ON THE CST

PARAMETER	RANGE		MEASUREMENT ACCURACY	CONTROL	ALARM
	Low	High			
Drill String Rotational Speed	0 rpm	300 rpm	± 3 rpm	manual	low/high when a down force is applied
Drill Bit Downward Force	0 lbs.	5000 lbs.	± 50 lbs.	manual	high
Penetration Rate	0 inches/ minute	20 inches/ minute	± 0.5 inch/minute	none	none
Purge Gas Flow	0 cfm	90 cfm	± 2 cfm	manual	low
Purge Gas Temp.	0°F	100°F	± 5°F	none	low/high

TABLE B-3..SAFETY ENVELOPE PARAMETERS

VARIABLE	MINIMUM	MAXIMUM
Rotary Mode Downward Force	N/A	1500 lbs force
Purge Gas Flow	0 cfm	50 cfm
Drill String RPM	N/A	55 rpm
Feed Rate	0 inches/minute	10 inches/minute

ATTACHMENT 1

DON'T SAY IT --- *Write It!*

DATE: 3/22/95

TO: J. R. HEADLEY

FROM: J. L. SMALLEY

Telephone: 372-0886

cc:

SUBJECT: PRE-ATP REQUIREMENTS FOR ICF KH

The process control package (PCP) 29 was written to support changes made during start up testing and ATP of rotary mode core sample trucks 3 and 4. Before the ATP can commence, ICF KH Quality Control must verify that all required welds and electrical continuity checks have been performed and accepted. Since work performed to PCP 29 is in support of the ATP, weld inspections performed as required by this package is exempt from being performed prior to the start of the ATP. However, all welds requiring QC verification must be completed before the end of the ATP. In addition, all wiring changes indicated by PCP 29 is exempt from point to point continuity checks since the cognizant electrical engineer witnessed work performed and functionally checked the system after work was completed.

J L Smalley 3/22/95

J. L. Smalley
Cognizant Engineer

ATTACHMENT 2

CORE SAMPLE/INSPECTION DATA SHEET

ENSURE THE FOLLOWING CONDITIONS FOLLOWING RMCS TRUCK POWER-UP	DATE: / INITIAL:	DATE: / INITIAL:	DATE: / INITIAL:	DATE: / INITIAL:	DATE: / INITIAL:	DATE: 6-2-95 / INITIAL:	DATE: 6-2-95 / INITIAL:	DATE: 6-5-95 / INITIAL:
SR IS POSITIONED FOR SAFE OPERATION	5-23-95 Raised OAK	5-24-95 Raised OAK	5/25/95 Raised OAK	5/26/95 Raised OAK	5/30/95 Raised OAK			
QUILL ROD IS POSITIONED FOR SAFE OPERATION	5-23-95 up OAK	5-24-95 OAK	5/25/95 Raised OAK	5/26/95 Raised OAK	5/30/95 Raised OAK			
DRILL HEAD RAM VALVES CLOSED	5-23-95 OAK	5-24-95 OAK	5/25/95 OAK	5/26/95 OAK	5/30/95 OAK			
4 WAY VALVE IN HEAD OR FLOAT POSITION	5-23-95 OAK	5-24-95 OAK	5/25/95 OAK	5/26/95 OAK	5/30/95 OAK			
JACK HOSES DISCONNECTED	5-23-95 OAK	5-24-95 OAK	5/25/95 OAK	5/26/95 OAK	5/30/95 OAK			
VISUALLY INSPECT ELECTRICAL CORDS FOR DAMAGE	5-23-95 OAK	5-24-95 OAK	5/25/95 OAK	5/26/95 OAK	5/30/95 OAK			
VISUALLY INSPECT HYDRAULIC LINES & FITTINGS FOR ABNORMAL LEAKAGE AND/OR DAMAGE	5-23-95 OAK	5-24-95 OAK	5/25/95 OAK	5/26/95 OAK	5/30/95 OAK			
VISUALLY INSPECT AIR/NITROGEN HOSES FOR DAMAGE	5-23-95 OAK	5-24-95 OAK	5/25/95 OAK	5/26/95 OAK	5/30/95 OAK	6-2-95		
DRILL ENGINE FUEL LEVEL SATISFACTORY	1/8 5-23-95 OAK ①	5-24-95 OAK	5/25/95 OAK	5/26/95 OAK	5/30/95 OAK	6-2-95		
DRILL ENGINE OIL LEVEL SATISFACTORY	5-23-95 OAK	5-24-95 OAK	5/25/95 OAK	5/26/95 OAK	5/30/95 OAK	6-2-95		
DRILL ENGINE WATER SATISFACTORY	5-23-95 OAK	5-24-95 OAK	5/25/95 OAK	5/26/95 OAK	5/30/95 OAK	6-2-95		
ALARM LIGHTS OPERATIONAL ON INSTRUMENT DISP	5-23-95 OAK	5-24-95 OAK	5/25/95 OAK	5/26/95 OAK	5/30/95 OAK	6-2-95		

① Fuel truck will be filling

*1 Need water

*3 low

2-88

WHC-SD-WM-ATR-119 Rev. 0

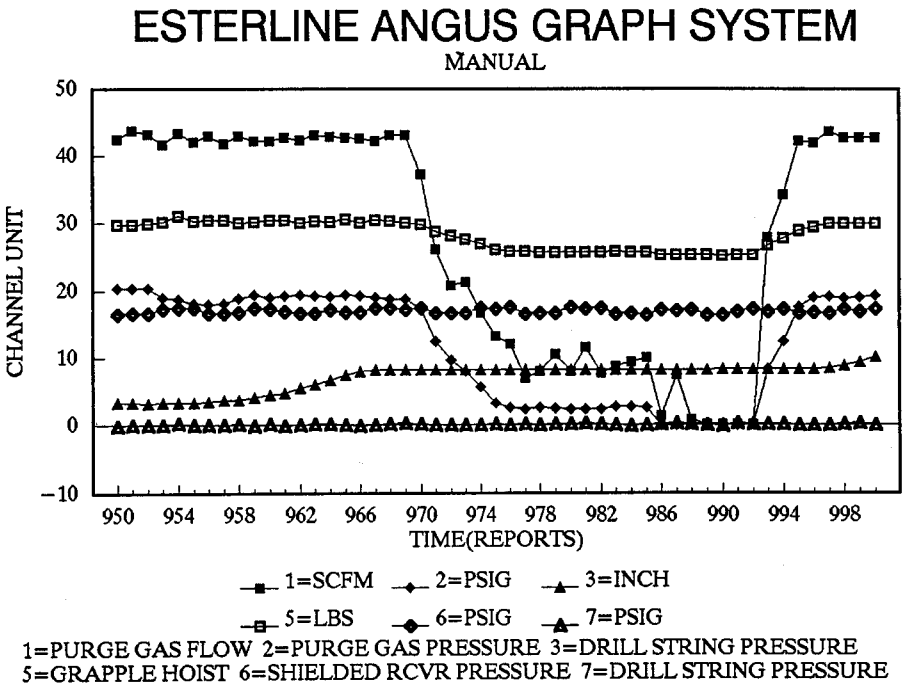
RMCS ATP CHECKLIST

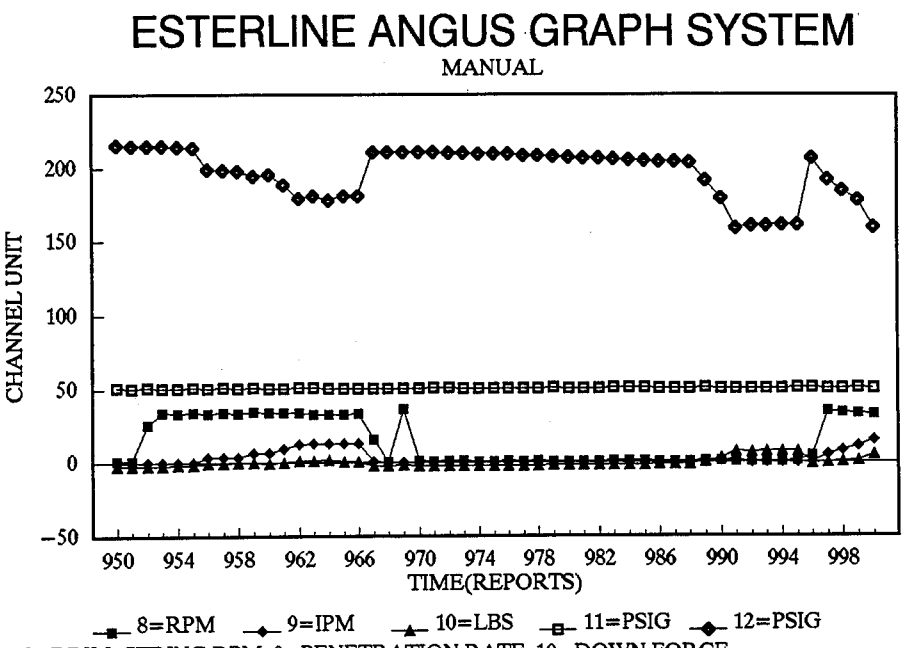
TRUCK #3 H0-68K-4600

	Initial/ Date											
1. SR positioned for safe Operation	5-20-95 OK	5-22-95 Initial OK										
2. Drill Rod positioned for safe operation	5-20-95 OK	5-22-95 OK										
3. Drill head vent valves closed	5-20-95 OK	5-22-95 OK										
4. 4-way valve in head in float position	5-20-95 OK	5-22-95 OK										
5. Jack hoses disconnected	5-20-95 OK	5-22-95 OK										
6. Visually inspect elect. cords for damage	5-20-95 OK	5-22-95 OK										
7. Visually inspect hydraulic hoses & fittings for abnormal leakage or damage	5-20-95 OK	5-22-95 OK										
8. Visually Inspect exposed air/N_2 hoses for damage	5-20-95 OK	5-22-95 OK										
9. Drill engine fuel level OK	#0 5-20-95 OK	5-22-95 OK										
10 Drill engine oil level OK	5-20-95 OK	5-22-95 OK										
11. Drill engine H_2O satisfactory	5-20-95 OK	5-22-95 OK										
12. Alarm lights monitored on instrument display	5-20-95 OK	5-22-95 OK										

#0 Gauge inaccurate - reads E, but has been filled

ATTACHMENT 3


ESTERLINE ANGUS GRAPH SYSTEM
MANUAL
CHANNEL UNIT
50
40
30
20
10
0
−10
950 954 958 962 966 970 974 978 982 986 990 994 998
TIME(REPORTS)
1=SCFM 2=PSIG 3=INCH
5=LBS 6=PSIG 7=PSIG
1=PURGE GAS FLOW 2=PURGE GAS PRESSURE 3=DRILL STRING PRESSURE
5=GRAPPLE HOIST 6=SHIELDED RCVR PRESSURE 7=DRILL STRING PRESSURE


ESTERLINE ANGUS GRAPH SYSTEM
MANUAL
CHANNEL UNIT
250
200
150
100
50
0
-50
950 954 958 962 966 970 974 978 982 986 990 994 998
TIME(REPORTS)
8=RPM 9=IPM 10=LBS 11=PSIG 12=PSIG
8=DRILL STRING RPM 9=PENETRATION RATE 10=DOWN FORCE
11=LOWER RAM PRESSURE SET POINT 12=LOWER RAM PRESSURE

4.0 TRUCK 4 ACCEPTANCE TEST PROCEDURE

Table of Contents

1.0 PURPOSE AND INSTRUCTION

The purpose of this Acceptance Test Procedure is to provide instruction and documentation for acceptance testing of the rotary mode core sample trucks, HO-68K-4600 and HO-68K-4647. The procedure follows "Acceptance Test Procedures and Reports", contained in Appendix M, Revision 0, of WHC-CM-6-1, "Standard Engineering Practices".

Authorization for the implementation of this document is controlled by the associated Engineering Data Transmittal. Approval indicates testing will verify the performance of the equipment, compliance with regulations, and protection of personnel.

Any changes or exceptions to the ATP shall be documented on the ATP exception list and approved by the WHC technical representative. All steps to the ATP shall be attempted but do not need to be performed in numerical order if the WHC technical representative approves sequence changes.

All discrepancies, deviations, performance deficiencies, or irregularities involving the test procedure and equipment performance (including, but not limited to, fluid leaks, binding, impact damage, malfunctions, retests, and broken or damaged equipment) are to be noted on the "ATP Exception / Resolution Data Sheet". These exceptions shall be resolved by the ICF-KH Test Director with approval by the WHC Cognizant Engineer for Core Sampling and the WHC Quality Assurance Representative. All resolutions to the exceptions must be agreed upon by the responsible personnel and documented on the exception list, and initialed.

No testing shall be performed on faulty equipment; however, with the concurrence of the WHC Cognizant Engineer, tests may proceed on equipment that is not affected.

2.0 SCOPE

The rotary mode core sample trucks were based upon the design of the second core sample truck (HO-68K-4345) which was constructed to implement rotary mode sampling of the waste tanks at Hanford.

Acceptance testing of the rotary mode core sample trucks will verify that the design requirements have been met. All testing will be non-radioactive and stand-in materials shall be used to simulate waste tank conditions. Compressed air will be substituted for nitrogen during the majority of testing, with nitrogen being used only for flow characterization.

3.0 RESPONSIBILITIES

WHC Cognizant Engineer Core Sampling - Will observe testing to determine if equipment operates as required. Will Initial procedural steps as completed, indicating acceptance of step and associated data. Ensures exceptions to testing are noted on "ATP Exception/Resolution Sheet". Provides technical input as required to the ICF-KH Test Director and certified operator to ensure that all step are performed correctly.

ICF-KH Test Director - Shall Direct testing operations and activities, including equipment inspections and crew briefings at the start of each test and each day of testing, to verify required start conditions and personal protective equipment requirements are met, and to verify all personnel are aware of all applicable safety issues (section 4.4). Shall coordinate all testing with facility management, and acts as liaison between the participants in acceptance testing. Shall initial procedural steps as completed, indicating acceptance of step and associated data. Shall note exceptions to testing on "ATP Exception/Resolution Sheet". Shall resolve exceptions with concurrence of WHC Quality Assurance Engineer and WHC Cognizant Engineer.

Certified Operator - The operator for the core sample truck shall have proper WHC certifications indicating that he/she is qualified to operate the core sample truck. The certified operator will conduct testing according to this procedure, as appointed and requested by the ICF-KH Test Director and/or the WHC Cognizant Engineer. Will notify ICF-KH Test Director and WHC Cognizant Engineer of concerns, exceptions and off-normal conditions during testing.

WHC Quality Assurance - Will review test procedure to assure compliance with appropriate regulations.

WHC Quality Control - Will verify calibration status of gauges and test instruments. Initials or stamps, as required, indicating step completed. This may also require verification that selected data values as recorded are correct. Verifies exceptions to testing are noted on "ATP Exception/Resolution Sheet".

ICF-KH Quality Control - Will verify that all fabrication work is complete and that all drawing inspection criteria is documented and complete.

4.0 INFORMATION

4.1 PRE-TEST APPROVALS

Truck identification number HO-68K-4647

Longyear drill rig identification number HO-22-5665 TRUCK #4

The following items shall be approved prior to the start of the ATP.

All required welds have been inspected and accepted. PER D.S.I. TO J.R. HEADLEY FROM J.L. SMALLEY "PRE-ATP REQUIREMENTS FOR ICF KH" DATED 3/22/95 — VP 3/28/95 — ICF-KH QC Hold Pt. — Date

All gauges for testing have current calibration stickers. See Exception Noted on WHC-SD-WM-ATP-119 M.C. Wingfield 3/28/95 — 6/30/95 — WHC QC Hold Pt. — Date

All point to point contunuity checks are complete PER D.S.I. TO J.R. HEADLEY FROM J.L. SMALLEY "PRE-ATP REQUIREMENTS FOR ICF KH" DATED 3/22/95 — VP 3/28/95 — ICF-KH QC Hold Pt. — Date

4.2 TERMS AND DEFINITIONS

ATP	- Acceptance Test Procedure
ATR	- Acceptance Test Report
CE	- Cognizant Engineer
CW/CCW	- ClockWise/CounterClockWise
DS	- Drill String
FC	- Flow Control
HBD	- Hydraulic Bottom Detector
HH	- Hydrostatic Head
ICF-KH	- ICF-Kaiser Hanford
OTP	- Operability Test Procedure
PG	- Purge Gas
PGT	- Purge Gas Trailer
PIC	- Person In Charge
QA	- Quality Assurance
QC	- Quality Control
QD	- Quick Disconnect
QE	- Quality Engineer
RF	- Radio Frequency
RLU	- Remote Latch Unit
SCA	- Sample Changeout Assembly
SOV	- Solenoid Operated Valve
SR	- Shielded Receiver
TD	- Test Director
VGR	- Video Graphic Recorder
WHC	- Westinghouse Hanford Company

4.3 REFERENCES

WHC-CM-6-1, "Standard Engineering Practices"

4.4 SAFETY ISSUES

Warning - Take extra care to avoid possible pinch points while working on and near the rotating platform. All personnel on the platform will wear leather gloves during rotation.

Warning - Nitrogen gas or compressed air is supplied to the sample truck at high pressure. Breaking containment of the drill string while it is pressurized will cause a rapid release of gas. The following indicators must be observed so that the drill string is vented prior to being opened: pressure gages in the purge gas enclosure and digital displays in the instrument enclosure (refer to Figure 16 and Figure 15), as well as the green pressure indicator lights.

Warning - Nitrogen is stored in the purge gas trailer as a liquid. The nitrogen is stored at high pressure and extremely low temperatures (-250 to -320 °F). Exposure at these conditions will freeze skin immediately causing severe burns.

Warning - The warning sirens on the sample truck are very loud. Hearing protection shall be worn during siren activation.

Warning - Do not wear loose clothing when near the rotating drill string.

Warning - The Purge Gas Trailer uses propane gas as fuel. Keep flame and heat sources away from propane tank.

Warning - Nitrogen used during flow tests shall be routed to building exterior.

Warning - Longyear engine exhaust shall be routed to building exterior.

Note: - Supervision must conduct a pre-job safety session/crew briefing at the specified work location.

4.5 RADIATION AND CONTAMINATION CONTROL

All testing will be non-radioactive and stand-in materials shall be used to simulate waste tank conditions.

5.0 RECORDS

Pertinent operating conditions will be documented where requested in this ATP. Records for the testing of equipment will be recorded in the tables supplied within the procedure. The ICF-KH Test Director, WHC Cognizant Engineer for Core Sampling, and appropriate QC will initial in the space provided in the left-hand margin upon satisfactory completion of designated tasks.

The specified test personnel shall sign the "Test Completion Sign-Off Sheet" upon completion of all testing.

6.0 PREREQUISITES

6.1 SUPPLIES

6.1.1 Operating Equipment

- Core Sample Truck
- Air complerssor 125 PSIG, 90 SCFM
- Portable Electric Generator & Power Cables
- Appropriate Personal Protective Equipment
- Hand Levels
- Tape Measure

WHC FURNISHED EQUIPMENT

- Drill Rod
- Core Barrel and Rotary Drill Bit
- Riser Equipment
- Riser Gasket
- Pneumatic Foot Clamp with Controls
- Pintle Rod Container
- Universal Samplers
- Cable Spray Washer and Cap
- Drill String Wrenches
- Plastic Kamlok Caps
- Quill Rod Kamlok Adapter
- Drill String Kamlok Adapter
- Load Cell/Scale
- Spring Downforce Test Aparatus
- Drillstring Cap
- 30 Gallon Drum of K-Mag

6.1.2 Test Unique Equipment

- Riser mock up
- Exhaust ducting
- Test weights (10, 25, 50, 75, 100, 150, 200, and 400 lbs)
- Stopwatch
- Pressure gage and vent valve (used on vent line Q.D. fitting)
- Soap/leak check solution

6.2 PROCEDURES

No additional procedures will be required to complete testing.

6.3 CONDITIONS

6.3.1 Test Set Up

The Test Director will verify that the following tasks are complete, prior to test start:

- The assigned quality assurance representative has verified all items identified on the Item Status Verification Sheet.

- Cranes to be used in support of testing are approved for service.
- Acceptance testing Job Safety Analysis is complete.
- Functional testing has been completed.

6.3.2 Core Sample Truck

The Test Director will verify that the core sample truck is in the following configuration (for details of component locations, see figures in section 7.0):

- Leveling jacks are pinned in place or are fully retracted.
- Truck frame and electrical systems are properly grounded.
- Drill rig is centered on the rotating platform with the drill head at the rear of the truck, drill head and shielded receiver rams are retracted (lowered).
- **CONTROL CONSOLE** (Refer to Figure 3 on Page 12): ENCODER ASSEMBLY AC and DC power switches off, LATCHING CONTROL power and lockout reset keyswitches off, MOTOR CONTROL power and up/down switches off, HYDRAULIC CONTROL switches in spring loaded (off) position, SAMPLE ACTUATOR switches in spring loaded (off) position, INSTRUMENT POWER circuit breakers off.
- **CONTROL SELECT PANEL** (Refer to Figure 7 on Page 17): electrical control switch in CONSOLE CONTROL (except when using the pendent controller), and hydraulic control switch in CONSOLE HYD (except when using Longyear hydraulic controls).
- **HYDRAULIC BOTTOM DETECTOR** (Refer to Figure 11 on Page 28): Horn alarm in NORMAL, Keyswitch off.
- **INSTRUMENT ENCLOSURE ASSEMBLY** (Refer to Figure 10 on Page 27): REC mode switch in STBY, LOWER RAM display in PRESS, PURGE GAS FLOW display in 1, PURGE GAS off, PRESSURIZE SHIELDED RECEIVER off, PRESSURIZE DRILL STRING off, Purge Gas MODE in DRILL, each Digital Flow Indicator unit (Refer to 1, 2 and 3 of Figure 15 on Page 38) - power on and display select switch in FLOW.
- **PURGE GAS CONTROL ENCLOSURE** (Refer to Figure 16 on Page 38): All flow control valves (FC-1, FC-2 and FC-3) closed, all pressure regulating valves *initially* closed (normal settings are 85 psig for PR-1 and 30 psig for PR-2 and PR-3).
- **LONGYEAR DRILL & ENGINE** Clutch disengaged, transmission in neutral, spindle in low, engine throttle at lowest setting, four way control valve in HEAD position, three way control valves in center position, ram flow control valves closed, leveling jack flow control valves closed, rotating platform hydraulic bypass valve closed, keyswitch off.

7.0 TEST PROCEDURE (EQUIPMENT)

7.1 POWER, AIR, AND LONGYEAR ENGINE RELATED TESTING

Refer to Figures 1 and 2 on the following pages for the location of the system controls addressed within the remainder of this document.

7.1.1 INITIALIZE ELECTRICAL SYSTEM

TD/CE 7.1.1.1 **VERIFY** facility and test equipment are ready to support acceptance testing of the core sample truck, as per Section 6.3.

TD/CE 7.1.1.2 **CONNECT** the 120/240 volt power cable from the facility source to the sample truck. The receptacle (J10) is on the driver's side of the truck, near the ladder on the stationary platform.

TD/CE 7.1.1.3 **CONNECT** the 120 volt power cable from the facility source to the sample truck's air compressor. The receptacle (J15) is on the passenger side of the truck.

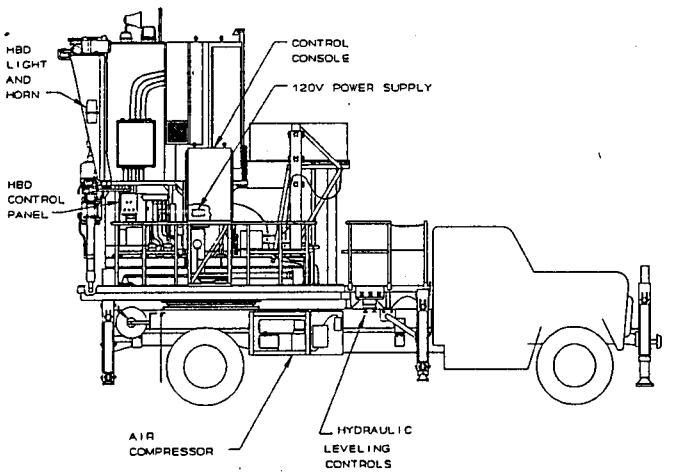


Figure 1) System Controls and Alarms (Passenger Side).

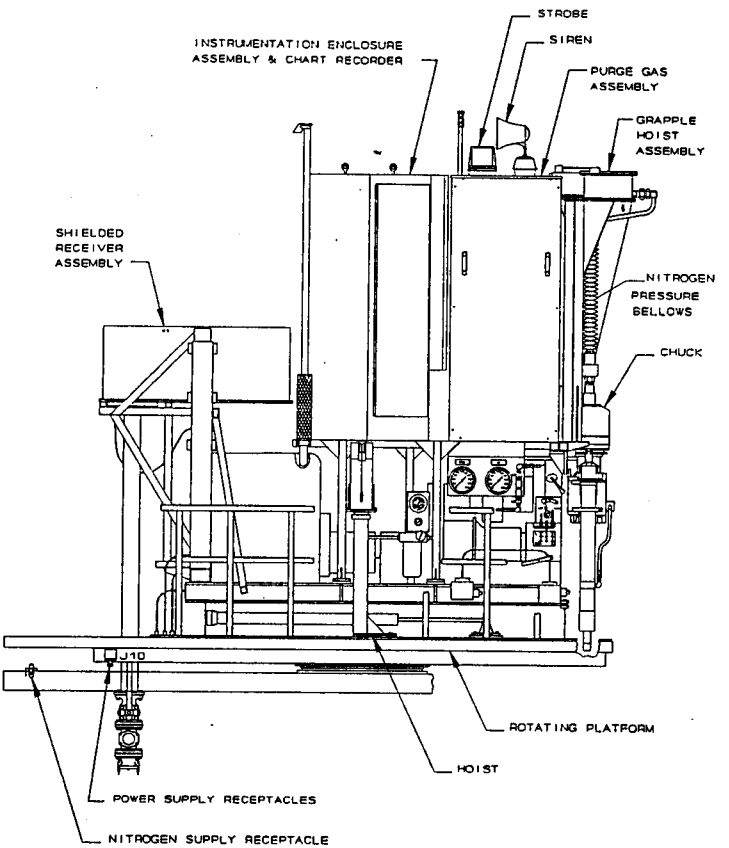


Figure 2) System Controls and Alarms (Driver Side).

Figure 3 below, indicates the location of the console control panels.

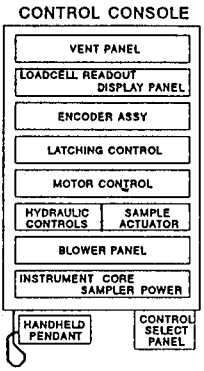


Figure 3) Control Console

TD/CE 7.1.1.4 **ACTIVATE** all breakers on the INSTRUMENT CORE SAMPLER POWER panel, (see Figure 3 below), of the control console.

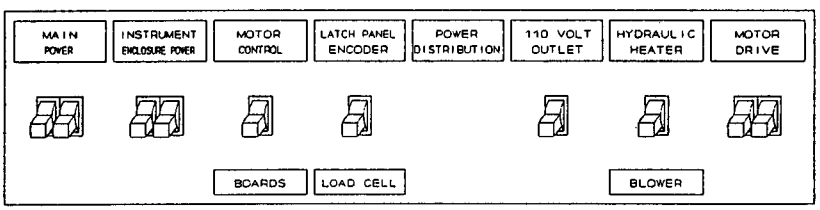


Figure 4) Instrument Core Sampler Power

TD/CE 7.1.1.5 **TURN** ON the power switches on each console control panel listed below, **VERIFY** that the POWER lights come ON, and **COMPLETE** the Table A.

NOTE: Whenever truck electronics are powered up, a 20 min warm up period is required prior to operation.

PANEL	CONDITION	LIGHT STATUS
ENCODER ASSY (AC and DC)	ON/OFF	OK
LATCHING CONTROL (Turn Key Clockwise)	ON/OFF	OK
MOTOR CONTROL PANEL	ON/OFF	OK

Table A.

TD/CE 7.1.1.6 **TURN** the air compressor ON and allow it to run until it automatically shuts off.

TD/CE 7.1.1.7 **RECORD** the maximum tank pressure in Table B below.

TD/CE 7.1.1.8 **BLEED** air from the tank until the compressor turns ON and **RECORD** the minimum tank pressure in Table B.

Parameter	Condition	Value
Maximum Tank Pressure	120 ± 20 psig	120
Minimum Tank Pressure	90 ± 20 psig	100
Compressor Oil Pressure	For Record Only	N/A

Table B.

7.1.2 INITIALIZE LONGYEAR ENGINE

TD/CE 7.1.2.1 **ENSURE** INITIALIZE ELECTRICAL SYSTEM is complete per 7.1.1.

TD/CE 7.1.2.2 **ENSURE** that the five (5) HYDRAULIC JACK leveling control valves are closed.

7.1.2.3 **ENSURE** nitrogen/air supply is shut off or disconnected.

TD/CE 7.1.2.4 **PLACE** the 4-way control valve in the HEAD position.

TD/CE 7.1.2.5 **ENSURE** that the drill rig transmission is in NEUTRAL.

TD/CE 7.1.2.6 **ENSURE** that the drill rig clutch is DISENGAGED.

TD/CE 7.1.2.7 To start the gas engine, **TURN** the key clockwise and **PUSH** the black start button (choke if necessary). **ADJUST** the throttle as necessary.

TD/CE 7.1.2.8 **ENSURE** that the two speed spindle is LOCKED in LOW.

TD/CE 7.1.2.9 **ENSURE** that the chuck is in the CLOSE position.

TD/CE 7.1.2.10 **RECORD** the information requested in Table C after the engine has warmed up.

PARAMETER	CONDITION	VALUE
Longyear Water Temperature	For Record Only	150
Longyear Oil Pressure	For Record Only	50
Alternator Current	For Record Only	>0
Torque Converter Oil Temperature	For Record Only	N/A
Bit Weight Pressure	For Record Only	N/A
Hydraulic Filter Vacuum	For Record Only	.1
Ram Hydraulic Pressure, UP	For Record Only	220
Ram Hydraulic Pressure, DOWN	For Record Only	240
Hydraulic Supply Pressure	For Record Only	975

Table C.

7.2 TRUCK LEVELING / HYDRAULIC RELATED TESTING

7.2.1 CORE SAMPLE TRUCK LEVELING

START CONDITION: Initialize Longyear Engine (ref. 7.1.2).

Refer to Figure 5 below for the hydraulic controls for positioning of the drill rig.

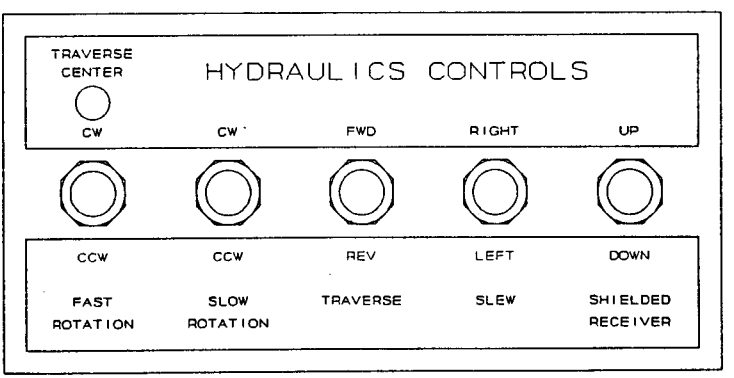


Figure 5) Hydraulic Positioning Controls

The sample truck is raised by five (5) hydraulic rams and is leveled using a portable hand level. The hydraulic controls associated with leveling are the 4-way control valve and the turn valves which control flow to each of the jacks (see Figure 6 below). When leveling the truck, lower the rams slowly in small increments so that the truck is lifted uniformly.

NOTE: The center jacks are used for stabilization. Lower these jacks only after lowering the front and rear lifting jacks.

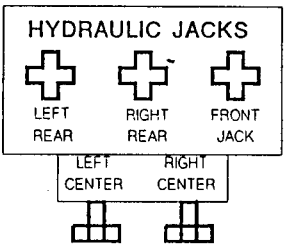


Figure 6) Leveling Controls

TD/CE 7.2.1.1 **PLACE** the four way control valve in the float position.

TD/CE 7.2.1.2 **CONNECT** the hydraulic leveling hoses from the main reservoir to the leveling system. The hoses are stored and coupled near the right rear leveling ram.

TD/CE 7.2.1.3 **PLACE** the manual/console hydraulic control switch in the MANUAL HYD. position.

TD/CE 7.2.1.4 **PLACE** the Longyear 4-way control valve in the RAISE position.

TD/CE 7.2.1.5 **RAISE** the truck by using the control valves to extend the jacks a minimum of 15 inch stroke.

TD/CE 7.2.1.6 **OBSERVE** the portable hand levels and **ADJUST** the turn valves until the core sample truck is level, per hand level indicators.

TD/CE 7.2.1.7 **PLACE** the 4-way control valve in the HEAD position, and allow truck to settle/stabilize.

TD/CE 7.2.1.8 **INSTALL** jack collars as backup supports with approximately 2 inch nominal clearance.

TD/CE 7.2.1.9 **MEASURE** and **RECORD** the distance (at each of 5 jacks) from the ~~platform~~ to the ground (high-1) in Table D.
BOTTOM SIDE OF THE JACK SUPPORT 3/28/95

Description	Condition	RC	F	Value	LR	
HEIGHT (high-1) ± ¼"	For Record Only	35 1/2	36 1/8	35 5/8	30 1/8	31
HEIGHT (high-2) ± ¼"	For Record Only	35 1/2	36 1/8	35 5/8	30 1/8	31
Drift (high-1) - (high-2) ± ½"	For Record Only	-0-	-0-	-0-	-0-	-0-

Table D.

CAUTION: Personnel shall stand clear of the truck during 1 hour hold period.

TD/CE 7.2.1.10 After hold period (one hour minimum) **MEASURE** and **RECORD** in Table D. The distance from the ~~platform~~ to the ground (high-2). UNDERSIDE OF THE JACK SUPPORT 9:23 3/28/95

TD/CE 7.2.1.11 **CALCULATE** and **RECORD** in Table D. Any measured drift (high-1) - (high-2).

TD/CE 7.2.1.12 **REMOVE** jack collars.

TD/CE 7.2.1.13 **LOWER** the truck back to the minimum height required for remaining testing.

TD/CE 7.2.1.14 **LEVEL** the truck then **INSTALL** jack collars.

TD/CE 7.2.1.15 **PLACE** the 4-way control valve in the FLOAT position.

TD/CE 7.2.1.16 **DISCONNECT** the hydraulic hoses and **STORE** them on the sample truck.

TD/CE 7.2.1.17 **MEASURE** and **RECORD** the final distance from the platform to the ground in Table E.

Description	Condition	Value
Platform to Ground, in.	For Record Only	68 1/4

Table E.

7.2.2 RAISE/LOWER DRILL HEAD

START CONDITION: Initialize Longyear Engine (ref. 7.1.2).

TD/CE 7.2.2.1 **PLACE** the 4-way control valve in the RAISE position.

TD/CE 7.2.2.2 **OPEN** the DOWN SPEED CONTROL valve until the rams bottom out.

TD/CE 7.2.2.3 **MEASURE** and **RECORD** the distance from the bottom of quill rod adapter to the ground in Table F (low).

TD/CE 7.2.2.4 **PLACE** the 4-way control valve in the lower position.

TD/CE 7.2.2.5 **OPEN** the UP SPEED CONTROL valve until the rams are fully raised, then CLOSE valve.

TD/CE 7.2.2.6 **MEASURE** and **RECORD**, in Table F, the distance from the bottom of the quill rod adapter to the ground (high).

TD/CE 7.2.2.7 **CALCULATE** and **RECORD**, in Table F, the travel available for the push rams (high-low).

TD/CE 7.2.2.8 **PLACE** the 4-way control valve in the FLOAT position.

Description	Condition	Value
Quill Rod to Riser (high), in.	For Record Only	78 7/8
Quill Rod to Riser (low), in.	For Record Only	55"
Travel of Rams (high-low), in.	For Record Only	23 7/8

Table F.

7.3 DRILL RIG / SAMPLE ACTUATOR / HBD

Refer to Figure 5 and Figure 7 for the location of the controls referenced in this section. Position the knobs on the "Control Select Panel" as necessary for CONTROL CONSOLE or PENDANT control.

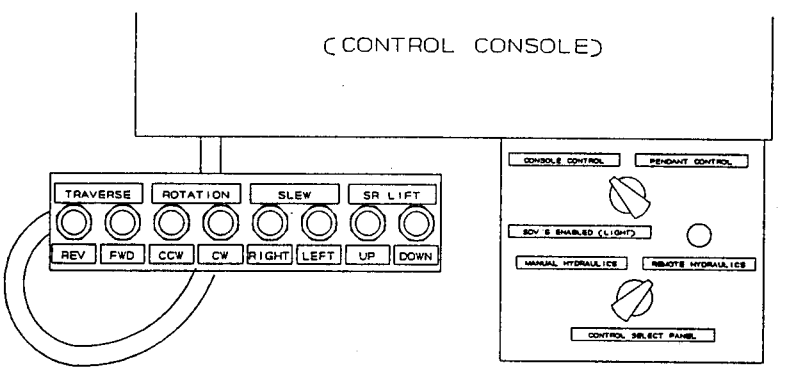


Figure 7) Pendant Controls and Control Select Panel

7.3.1 DRILL RIG POSITIONING

START CONDITION: Initialize Longyear Engine (ref. 7.1.2).

CAUTION: For slow rotation ensure drill head and shielded receiver have adequate clearance prior to rotating.

TD/CE 7.3.1.1 **POSITION** observers at sides of truck to verify platform rotation is free of obstructions.

TD/CE 7.3.1.2 **ENSURE** the manual crossover valve is in the closed position.

NOTE: The drill rig platform was designed with 400° rotation capability (with drill head at rear-center, platform can rotate 200° in either direction).

TD/CE 7.3.1.3 **VERIFY** full rotation in the SLOW ROTATION mode for both the control console and pendant in both the CW mode and then the CCW mode. Rotation should automatically be stopped by the limit switches. At step completion drill head should be at rear of truck. **RECORD** results in Table G.

MODE	Condition	CW ROTATION	CCW ROTATION
Console Control	OK/BAD	OK	OK
Pendant Control	OK/BAD	OK	OK

Table G.

TD/CE 7.3.1.4 **RAISE** the shielded receiver and drill head to there upmost position and **VERIFY** that fast rotation is inoperable without the drill rig traversely centered.

TD/CE 7.3.1.5 **CENTER** the drill rig and **LOWER** the drill head so that the up limit switch is not activated. **VERIFY** that fast rotation is inoperable with the drill head lowered.

TD/CE 7.3.1.6 **RAISE** the drill head to the upper most position and **LOWER** shielded receiver until the up limit switch is not activated. **VERIFY** that fast rotation is inoperable with the shielded receiver lowered.

TD/CE 7.3.1.7 **RAISE** shielded receiver to it's upmost position.

TD/CE 7.3.1.8 Use the FAST ROTATION switch on the control console to **VERIFY** full rotation, with 3 second time delay and audible alarm, in both the CW mode and then the CCW mode. Rotation should automatically be stopped by the limit switches. At step completion drill head should be at rear of truck. **RECORD** results in Table H.

PARAMETER	Condition	CW ROTATION	CCW ROTATION
3 Second Time Delay	OK/BAD	OK	OK
Audible Alarm	OK/BAD	OK	OK

Table H.

TD/CE 7.3.1.9 **TEST** the slew function for both console and pendant controls by holding the SLEW switches in the appropriate position until the drill rig stops. (The rig should slide about 6 inches from center each way.) **RECORD** results in Table I.

MODE	Condition	SLEW RIGHT	SLEW LEFT
Console Control	OK/BAD	OK	OK
Pendant Control	OK/BAD	OK	OK

Table I.

TD/CE 7.3.1.10 **ROTATE** the platform CCW so that the shielded receiver is at the rear of the truck.

TD/CE 7.3.1.11 **HOLD** the console TRAVERSE switch in the FORWARD position to extend the shielded receiver over the end of the platform then **RETRACT**. (The receiver should move about 24 inches.) Also **VERIFY** operation of the pendant TRAVERSE controls. Leave the shielded receiver in extended position. **RECORD** results in Table J.

MODE	Condition	TRAVERSE IN	TRAVERSE OUT
Console Control	OK/BAD	OK	OK
Pendant Control	OK/BAD	OK	OK

Table J.

TD/CE 7.3.1.12 **VERIFY** equipment clearance during slow rotation as follows:

TD/CE 7.3.1.12.1 With shielded receiver fully extended over the rear of the truck, **ROTATE** the platform CW to position the shielded receiver at the left side extreme forward location (just prior to contact with truck body/platform rails, as depicted at top of Figure 8).

TD/CE

7.3.1.12.2 **RETRACT** shielded receiver as necessary and **COMPLETE** full CW rotation. At step completion shielded receiver should be at rear of truck.

TD/CE

7.3.1.12.3 Fully **EXTEND** the shielded receiver and **ROTATE** platform CCW to position shielded receiver at the right side extreme forward location (opposite side as in step above).

7.3.1.12.4 **CENTER** drill rig and **ROTATE** the platform so that the drill head is at the rear of the truck.

TD/CE

7.3.1.13 **HOLD** the console TRAVERSE switch in the REVERSE position to extend the drill rig over the end of the platform then **RETRACT**. (The drill rig should move about 24 inches.) Also **VERIFY** operation of the pendant TRAVERSE controls. Leave drill head in extended position. **RECORD** results Table K.

MODE	Condition	TRAVERSE IN	TRAVERSE OUT
Console Control	OK/BAD	OK	OK
Pendant Control	OK/BAD	OK	OK

Table K.

TD/CE

7.3.1.14 **VERIFY** equipment clearance during slow rotation as follows:

TD/CE

7.3.1.14.1 With drill head fully extended over rear of truck, **ROTATE** the platform CCW to position the drill head at the right side extreme forward location (just prior to contact with truck body / platform rails, as depicted at bottom of Figure 8).

TD/CE

7.3.1.14.2 **ROTATE** platform in opposite direction (CW) to position drill head at left side extreme forward location (opposite side as in step above).

TD/CE

7.3.1.14.3 **CENTER** drill rig and **ROTATE** the platform so that the drill head is at the rear of the truck.

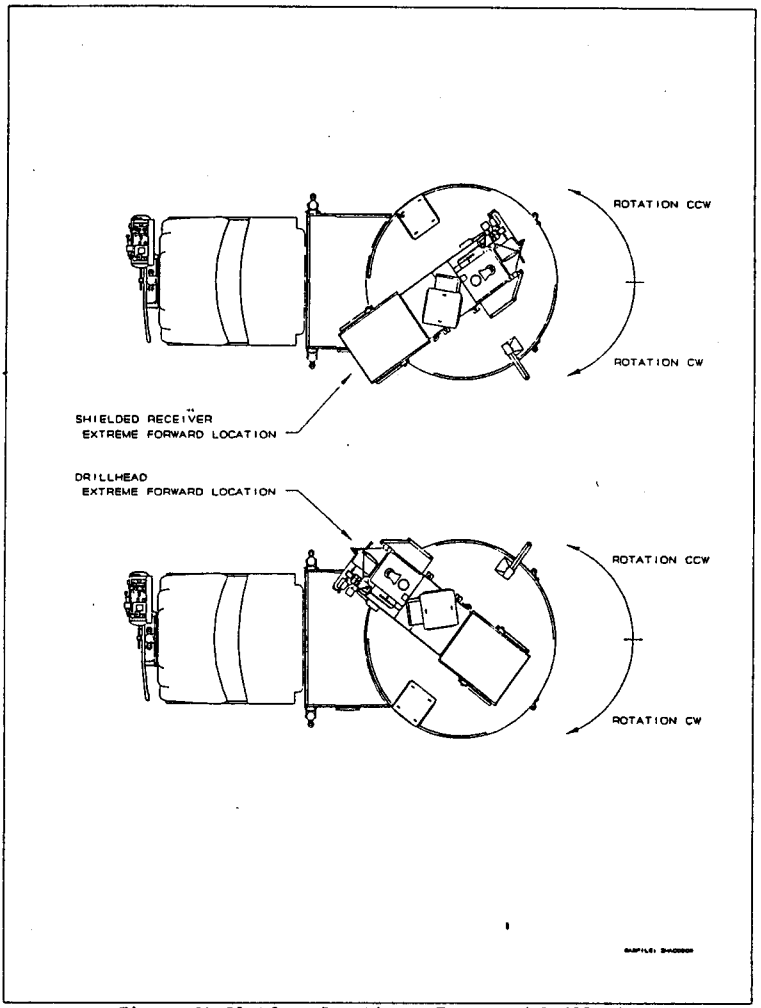


Figure 8) Platform Rotation - Traversed Drill Rig

7.3.2 SAMPLE ACTUATOR CABLE SWITCHES

START CONDITION: Initialize Electrical System (ref. 7.1.1)

CAUTION: For slow rotation ensure drill head and shielded receiver have adequate clearance prior to rotating.

TD/CE 7.3.2.1 **ROTATE** the platform to facilitate grapple hoist rotary valve actuator testing.

TD/CE 7.3.2.2 **SET** the motor speed control on the SAMPLER ACTUATOR panel to the 40 position. (Refer to Figure 9 below for the Actuator Controls.)

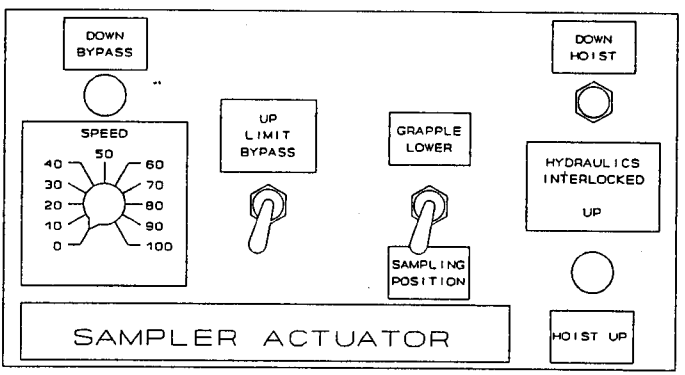


Figure 9) Drill Rig Actuator Controls

CAUTION: Possible pinch point. Grapple must be hand guided into tube I.D. to prevent damage to grapple and hoist cable.

TD/CE 7.3.2.3 **LOWER** the grapple by placing the mode switch on the SAMPLE ACTUATOR panel to the GRAPPLE LOWER position and the HOIST UP/DOWN switch to DOWN. (Lower the grapple until slack in the grapple cable automatically stops the hoist motor to verify slack detector operation.) **RECORD** loadcell reading in Table L.

TD/CE 7.3.2.4 **REMOVE** slack from the grapple cable by placing the mode switch on the SAMPLE ACTUATOR panel to the SAMPLING position and the HOIST UP/DOWN switch to UP. (The hoist should automatically stop when the slack is removed.) **RECORD** loadcell reading in Table L.

TD/CE 7.3.2.5 **RAISE** the grapple to allow connection to a sampler pintle by placing the actuator mode switch to GRAPPLE LOWER and the HOIST switch to the UP position.

TD/CE 7.3.2.6 **CONNECT** a sampler pintle to the grapple, **RAISE** the grapple until it automatically stops and **VERIFY** proper proximity switch (S24) operation by observing switch light is on.

TD/CE 7.3.2.7 **HOLD** the pintle release switch to the UP LIMIT BYPASS position and hoist switch in UP position and **VERIFY** the pintle rod releases from the grapple, followed by the grapple motor stalling out. **RELEASE** the UP LIMIT BYPASS and HOIST UP switches. **RECORD** the loadcell reading in Table L.

DESCRIPTION	CONDITION	VALUE
Load Cell Reading Slack Cable. lbs	For Record Only	4.4
Load Cell Reading Slack Cable Removed. lbs	For Record Only	22.7
Load Cell Reading Pintel Rod Release. lbs	For Record Only	168

Table L.

TD/CE 7.3.2.8 **VERIFY** that the grapple hoist can not be lowered without holding the uplimit bypass switch.

TD/CE 7.3.2.9 **PUSH** the SAMPLE DOWN BYPASS button on the SAMPLER ACTUATOR panel and **HOLD** the HOIST UP/DOWN switch in the DOWN position. (Lower the grapple several inches to clear the proximity switch.)

7.3.3 GRAPPLE HOIST LIFT CAPACITY AND BRAKE TEST

START CONDITION: Continued from above section.

CAUTION: Personnel shall stand clear of suspended loads.

TD/CE 7.3.3.1 **PERFORM** the following steps to test the load cell.

TD/CE 7.3.3.1.1 **SET** the grapple hoist motor speed control to an acceptable feed rate and **RECORD** setting in Table M.

TD/CE 7.3.3.1.2 **LOWER** grapple hoist rotary valve actuator through the quill rod and **ATTACH** the pintel weight hook.

TD/CE 7.3.3.1.3 **RECORD** in Table M (column 3), the tare weight from the load cell reading and the actual weight of the test weights to be used.

TD/CE Atj. 9/28 7.3.3.1.4 **ATTACH** to the pintel weight hook, one at a time, each of the weights and **RECORD** the weight indicated (gross weight - column 4).

TD/CE Atj. 9/28 7.3.3.1.5 **CALCULATE** and **RECORD** in Table M the difference between the tare weight and the indicated gross weight (net weight - column 5).

TD/CE Atj. 9/28 7.3.3.1.6 **CALCULATE** and **RECORD** in Table M the difference between the pretest and net load cell weights.

LOADING	CONDITION	WEIGHT (PreTest)	GROSS WEIGHT (Load Cell)	NET WEIGHT (Gross-Tare)	DIFFERENCE (PreTest-Net Weight)
MOTOR SPEED					
No Weights (tare)	± 0.5 lbs.	24.4			
10 lbs.	± 0.5 lbs.	10	34.3	24.3	0.1
25 lbs.	± 1.0 lbs.	25	49.2	24.2	0.2
50 lbs.	± 1.5 lbs.	50	74.5	24.5	0.1
75 lbs.	± 2.0 lbs.	75	98.6	23.6	0.8
Weights Removed	±	—	24.4	24.4	0

Table M. Atj.

TD/CE Atj. 9/28 7.3.3.2 **POSITION** 150 lb test weight directly under the grapple.

TD/CE Atj. 9/28 7.3.3.3 **LOWER** grapple and connect to test weight.

TD/CE Atj. 9/28 7.3.3.4 **RAISE** and **LOWER** the grapple sufficiently to ensure hoist operation.

TD/CE Atj. 9/28 7.3.3.5 **RAISE** the loaded grapple high enough to load test the hoist brake.

TD/CE Atj. 9/28 7.3.3.6 **RECORD** start and stop heights in Table N and **VERIFY** no slippage occurs during one minute hold period.

TD/CE Atj. 9/28 7.3.3.7 **LOAD** the grapple with approximately 210 lbs of weight. **RECORD** actual weight (± 10 lbs) that the motor stalls at and the load cell reading in Table N.

TD/CE Atj. 9/28 7.3.3.8 **REMOVE** the test weights from the grapple.

Brake test	Start	Stop
Grapple height (in)	4¼	4¼
Stall weight actual (lbs)	200	
Stall weight load cell (lbs)	223.3	

Table N.

7.3.4 HOIST SPEED CONTROL AND COUNTER TEST

START CONDITION: Continued from above section.

TD/CE 7.3.4.1 **TEST** the hoist speed control by placing the speed control at the 30, 60, and the 90 settings. **LOWER** and **RAISE** the grapple a few feet to ensure that higher settings indicate faster speeds. **INDICATE** operation of the speed controller in Table P.

TD/CE 7.3.4.2 **VERIFY** proper operation of grapple drum counter (increasing numbers during grapple lowering, decreasing during raising).

		SPEED		
		30	60	90
Condition	OK/BAD	OK	OK	OK

Table P.

7.3.5 GRAPPLE ASSEMBLY TESTING

START CONDITION: Continued from above section.

TD/CE 7.3.5.1 **POSITION** a core barrel, with sampler installed, directly under the grapple.

TD/CE 7.3.5.2 **LOWER** the grapple by holding the mode switch on the SAMPLE ACTUATOR panel to the GRAPPLE LOWER position until grapple contacts the sampler pintle and slack in the grapple cable automatically stops the hoist motor.

TD/CE 7.3.5.3 **REMOVE** slack from the cable by placing the mode switch in the SAMPLING POSITION, and hold the HOIST UP/DOWN switch to UP. (The hoist motor should automatically stop when the slack is removed.)

TD/CE 7.3.5.4 **VERIFY** that the piston is not lifted in the sampler prior to the automatic slack removal shutdown.

TD/CE 7.3.5.5 **ENSURE** core barrel is secured, to prevent sampler from rising.

TD/CE 7.3.5.6 **PLACE** the mode switch in GRAPPLE LOWER and the HOIST switch in the UP position until the pintle rod shears and the proximity switch automatically stops the hoist motor.

TD/CE 7.3.5.7 **HOLD** the pintle release switch to the UP LIMIT BYPASS position and the hoist switch to UP to release the sampler pintle rod. Release switches.

TD/CE 7.3.5.8 **PUSH** the SAMPLE DOWN BYPASS button on the SAMPLER ACTUATOR panel and **HOLD** the HOIST UP/DOWN switch in the DOWN position. (Lower the grapple several inches to clear the proximity switch.)

7.3.6 INITIALIZE DRILL ROTATION

START CONDITION: Initialize Longyear Engine (ref. 7.1.2).

WARNING: Do not open the chuck while it is rotating nor start rotation while the chuck is open. Before the drill is shut down, always close the chuck.

TD/CE 7.3.6.1 **CONNECT** the nitrogen/air supply line from the sample truck to a portable compressor. The receptacle on the truck is located below the platform by the driver's door.

TD/CE 7.3.6.2 **ENSURE** all purge gas system components are fully vented, all valves (including quick disconnect fittings) are closed, the MODE switch (located at bottom of Instrument Enclosure Assembly) is in the DRILL position, and the function switches (Purge Gas, Pressurize Shielded receiver, and Pressurize Drill String) are in the off (closed) position.

TD/CE 7.3.6.3 **TURN ON** compressor and verify pressure is at 125 ± 15 psig.

TD/CE 7.3.6.4 **POSITION** the PURGE GAS switch to ON, **ENSURE** purge gas pressure regulator (PR-1) is adjusted to 85 psig, and slowly **OPEN** purge gas flow control valve (FC-1) to establish nominal flow rate (approximately 50 scfm).

TD/CE 7.3.6.5 **ENSURE** that the chuck is closed. **PLACE** the transmission in first gear, **ENGAGE** the clutch, and the drill should rotate.

TD/CE 7.3.6.6 **TEST** drill rig rotation in 1st, AND 2nd, ~~and 3rd~~ gears with the spindle in LOW. (Rotary mode sampling is limited to AND SECOND rotational speeds attainable in 1st ~~through third~~ gears and QB LOW range. Testing at higher speeds is not required and may damage equipment.) DO NOT EXCEED HIGH RPM TRIP POINT. 3/28/95 **COMPARE** drill string RPM indicator with actual RPM as measured by stopwatch and marker, and **COMPLETE** Table Q.

	RPM					
	LOW (≈ 20)		MED LOW (≈ 40)		MED HIGH (≈ 60)	
	Indicated	Actual	Indicated	Actual	Indicated	Actual
1st Gear	22	22½	38	39	51	54
2nd Gear	37	38	58	60	117	121
~~3rd Gear~~						

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Table 9.

The Video Graphic Recorder (VGR) displays and records various parameters during core sampling operations. The data is recorded on a magnetic tape located in the VGR housing. Only six of the total 12 channels are displayed, in a trending format, during core sampling operations. The remaining six channels are recorded, but not displayed during operations. The table below lists the parameters monitored. For testing purposes it will be necessary to change the display mode of the VGR from TREND to TEXT. The TEXT mode display will show all of the parameters monitored in a text format. A later step will outline how to place the VGR into the TEXT mode of display.

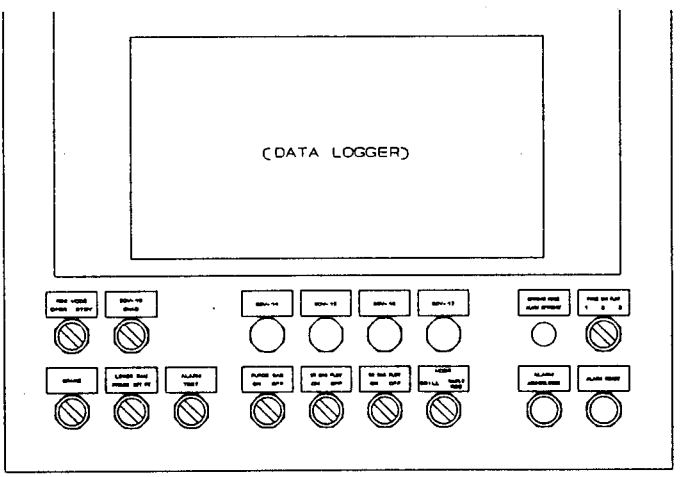

Figure 10) Electronic Chart Recorder

Channel	Parameter Monitored
1	Purge Gas Flow Rate
2	Purge Gas Pressure
3	Drill String Position
~~4~~	~~Hydrostatic Head Shielded Receiver~~
~~5~~	~~Hydrostatic Head Drill String~~
6	Shielded Receiver Pressure
7	Drill String Pressure
8	Drill Bit Rotational Speed
9	Drill Bit Penetration Rate
10	Drill Bit Down Force
11	Lower Ram Pressure Set Point
12	Lower Ram Pressure

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Table R.

7.3.7 HYDRAULIC BOTTOM DETECTOR TEST

START CONDITION: Initialize Longyear Engine (ref. 7.1.2).

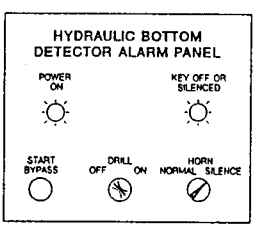

Figure 11) Hydraulic Bottom Detector Controls

TD/CE 7.3.7.1 **PLACE** the VGR in the TEXT mode by pressing the PAGE button located in the lower right corner of the VGR unit and using the arrow keys to select PAGE NO. 2. **PRESS** the PAGE button again after selecting PAGE NO. 2.

TD/CE 7.3.7.2 **PLACE** the 4-way valve in the HEAD position.

TD/CE 7.3.7.3 **ENSURE** that the ram DOWN SPEED CONTROL valve is CLOSED.

TD/CE 7.3.7.4 **OPEN** the ram UP SPEED CONTROL valve approximately 1/3 of a turn.

TD/CE 7.3.7.5 **TURN** the LOWER RAM switch on the instrumentation enclosure to the SET POINT position, then **ADJUST** the DOWNWARD FORCE ALARM SET POINT dial as necessary to adjust the set point pressure.

NOTE: The alarm set point will be displayed on the LOWER RAM PRESSURE readout in the instrumentation enclosure.

TD/CE 7.3.7.6 **RECORD** the set point pressure in Table S.

TD/CE 7.3.7.7 **DEPRESS** and **HOLD** the START BYPASS button on the HBD Panel.

TD/CE 7.3.7.8 **PLACE** the 4-way control valve in the LOWER position.

TD/CE 7.3.7.9 When the UP and DOWN ram gage pressures equalize, **ROTATE** the DRILL key to ON then **RELEASE** the START BYPASS button.

7.3.7.10 **TURN** the LOWER RAM PRESSURE/SET POINT switch to PRESSURE, then **SET** the RECORDER MODE switch to the OPERATE position.

NOTE: The alarm set point will be shown on channel 11 of the VGR.

TD/CE 7.3.7.11 **LOWER** the drill rod against a solid object until the alarms activate and pressure is reversed to the hydraulic rams.

TD/CE 7.3.7.12 **TURN** the HORN knob to SILENCE to quiet the siren, **POSITION** the 4-way valve to FLOAT to stop the rams, and **ROTATE** the DRILL key on the HBD panel to OFF to stop the strobe and disable the HBD.

TD/CE 7.3.7.13 **DOCUMENT**, in Table S, whether the horn, strobe, and ram reversal activate correctly or not.

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PARAMETER	CONDITION	TRIAL 1	TRIAL 2	TRIAL 3
Set Point Pressure	psig	50	100	120
Horn & Strobe	OK/BAD	OK	OK	OK

Table S.

TD/CE 7.3.7.14 **RETURN** to step 7.3.7.2 and **REPEAT** process at two additional pressure differentials.

TD/CE 7.3.7.15 **RAISE** the ram and **CENTER** the drill rig and shielded receiver.

7.4 SHIELDED RECEIVER / REMOTE LATCH UNIT

START CONDITION: Initialize Longyear Engine (ref. 7.1.2).

CAUTION: For slow rotation ensure drill head and shielded receiver have adequate clearance prior to rotating.

TD/CE [illegible] 7.4.1 **ROTATE** the platform so that the shielded receiver is at the rear of the truck.

TD/CE [illegible] 7.4.2 **EXTEND** the receiver over the edge of the platform. **TEST** the SR Lift function for the control panel and pendant, and **RECORD** results in the Table T.

MODE	Condition	RECEIVER UP	RECEIVER DOWN
Console Control	OK/BAD	OK	OK
Pendant Control	OK/BAD	OK	OK

Table T.

TD/CE [illegible] 7.4.3 **LOWER** the receiver by placing the SHIELDED RECEIVER switch in the DOWN position. Lower the receiver until it stops.

TD/CE [illegible] 7.4.4 **MEASURE** and **RECORD** in ~~Table T,~~ TABLE U the distance from the bottom of the shielded receiver column to the ground (low). MB 3/29/95

TD/CE [illegible] 7.4.5 **RAISE** the shielded receiver until it stops.

TD/CE [illegible] 7.4.6 **MEASURE** and **RECORD** in Table U, the distance from the bottom of the shielded receiver column to the ground (high).

TD/CE [illegible] 7.4.7 **COMPUTE** the travel of the receiver (high-low), and **RECORD** results in Table U.

DESCRIPTION	CONDITION	VALUE
Receiver to Ground (high), in.	For Record Only	84.5
Receiver to Ground (low), in.	For Record Only	42.5
Travel of Receiver (high-low), in.	For Record Only	42.0

Table U.

Refer to Figure 12 and Figure 13 for the remote latch unit controls addressed below.

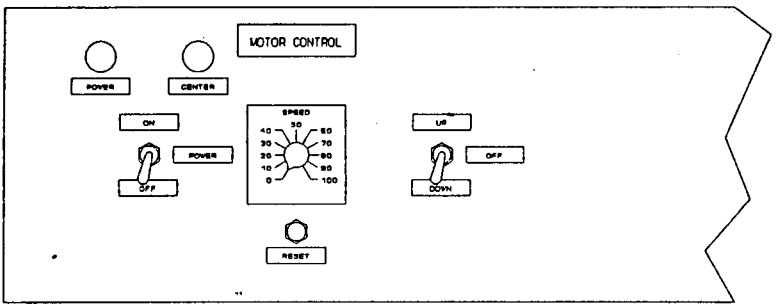


Figure 12) Shielded Reveiver Hoist Motor Panel.

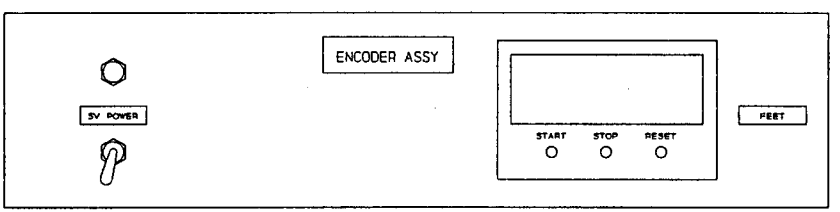


Figure 13) Shielded Receiver Encoder Panel.

TD/CE 7.4.8 **SET** the digital and mechanical cable length counters at zero (0).

TD/CE 7.4.9 **SET** the shielded receiver hoist motor speed at 40.

TD/CE 7.4.10 **OPEN** the three inch ball valve and **LOWER** the remote latch unit until it passes through the end of the shielded receiver.

TD/CE 7.4.11 **PLACE** a ring of tape around the cable at the very end of the shielded receiver (this will be used as a measurement reference point).

CAUTION

DO NOT ALLOW ANY TAPE TO BE RETRACTED INTO THE RECEIVER.

TD/CE .4.12 **REMOVE** the sampler hoist weather cover.

TD/CE .4.13 **REMOVE** the sampler hoist box lid.

NOTE: The following steps are repeated (two runs) to test the accuracy of the hoist cable counters over long distances. Start and final counter readings are recorded in the table below, along with the hoist speed, measured length, and calculations for length. Repeatability is calculated by comparing the two runs.

TD/CE 7.4.14 **RECORD** the hoist motor speed setting for each run.

TD/CE 7.4.15 With the tape at the bottom of the receiver, **RECORD** in Table V, the mechanical and digital cable counter values (Start).

TD/CE 7.4.16 **DISCHARGE** all of the cable (should be at least 55 feet below the shielded receiver tube, nearly 4 minutes at a hoist speed of 100).

TD/CE .4.17 **RECORD** the mechanical and digital cable counter values (Final).

TD/CE .4.18 **MEASURE** and **RECORD** the amount of cable that was expelled.

TD/CE 7.4.19 **COMPUTE** and **RECORD** the length of cable discharged as indicated by the mechanical and digital counters (Final-Start).

TD/CE .4.20 ONCE the 2nd trial has been run, **COMPUTE** and **RECORD** the Mechanical length difference ($Mech._{Run\ 2} - Mech._{Run\ 1}$), and the Digital length difference ($Digi._{Run\ 2} - Digi._{Run\ 1}$).

NOTE: The difference in length must be within ± 0.04 ft for the digital counter, and within ± 0.10 ft for the mechanical counter.

TD/CE .4.21 **REWIND** the hoist cable so the tape mark is at the bottom of the receiver and **RETURN** to step 7.4.14 for the 2nd run.

		1st Run SPEED = 100		2nd Run SPEED = 40	
		Final	Start	Final	Start
Mechanical Counter		69.7	8.3	69.7	8.35
Mech. (Final-Start)		61.4		61.35	
Digital Counter		69.57	8.35	69.56	8.24
Digi. (Final-Start)		61.22		61.32	
Measured Length		61.23		61.29	
Difference (Digi)	± 0.04 ft	.01		-.03	
Difference (Mech)	± 0.10 ft	-.17		-.06	

Table V.

TD/CE 7.4.22 **REMOVE** all tape from the sampler hoist cable, then **RETRACT** the cable into the shielded receiver until the limit switches shut the motor OFF.

CAUTION: Do not retract any tape into the shielded receiver. Tape may become lodged in the receiver or otherwise damage the receiver.

TD/CE 7.4.23 **PERFORM** the following steps to test the load cell.

TD/CE 7.4.23.1 **SET** the sampler hoist motor speed control to an acceptable feed rate and **RECORD** setting in Table W (columns 3-5).

TD/CE 7.4.23.2 **LOWER** the cable through the shielded receiver.

TD/CE 7.4.23.3 **RECORD**, in Table W (column 3), the tare weight (pre-test) from load cell reading and actual weight of the test weights to be used.

TD/CE 7.4.23.4 **ATTACH** to the hoist cable, one at a time, each of the weights and **RECORD** the weight indicated (gross weight - column 4).

TD/CE 7.4.23.5 **CALCULATE** and **RECORD** in Table W the difference between the tare weight and the indicated gross weight (net weight - column 5).

TD/CE 7.4.23.6 **CALCULATE** and **RECORD** in Table W (column 6) the difference between the PreTest and net Load Cell weights.

TD/CE 7.4.23.7 **LOWER** the hoist cable to the ground to determine if the slack detector automatically stops the hoist motor.

TD/CE 7.4.23.8 **REMOVE** the weights from the hoist cable and **RETRACT** the cable to just below the shielded receiver.

TD/CE 7.4.23.9 **RECORD** the load cell reading.

LOADING	CONDITION	WEIGHT (PreTest)	GROSS WEIGHT (Load Cell)	NET WEIGHT (Gross-Tare)	DIFFERENCE (PreTest-Net Weight)
MOTOR SPEED	For Record Only	40			
No Weights (tare)	± 0.5 lbs.	58.1			
10 lbs.	± 0.5 lbs.	10	68.2	10.1	0.1
25 lbs.	± 1.0 lbs.	25	81.7	23.6	-1.4
50 lbs.	± 1.5 lbs.	50	107.3	49.2	-0.8
75 lbs.	± 2.0 lbs.	75	131.9	73.8	1.2
Weights Removed	±	58.9			0.3

Table W.

TD/CE 7.4.23.10 **LOWER** cable and connect 300 lb. test weight.

TD/CE 7.4.23.11 **RAISE** cable to convenient height for brake load test. RECORD start and stop height in Table Y and **VERIFY** no slippage occurs during one minute hold period.

TD/CE 7.4.23.12 **LOWER** cable and load with approximately 400 lbs of weight. RECORD actual weight (± 10 lbs) that the motor stalls at and the load cell reading in Table Y.

Brake Test	Start	Stop
Height (in.)	14	14
Stall Weight (lbs)	400	
Stall Weight Load Cell (lbs)	400	

Table Y.

TD/CE 7.4.23.13 **REMOVE** the weights from the hoist cable and **REMOVE** any tape or dirt from cable.

TD/CE .4.24 **TURN** the power ON to the LATCHING CONTROL panel by turning the key clockwise (see Figure 14 below).

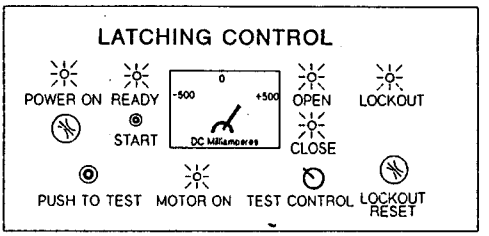


Figure 14) Shielded Receiver RLU Controls.

TD/CE 7.4.25 To test the remote latching unit (RLU), **LOOK** into the unit while holding it, **PRESS** START, and **COMPLETE** the steps below.

TD/CE 7.4.25.1 **VERIFY** that the MOTOR ON light comes on.

TD/CE 7.4.25.2 **INDICATE**, in Table Z, the status of the latch unit light (OPEN or CLOSED).

TD/CE 7.4.25.3 **INDICATE**, in Table Z, whether the cone on the shaft of the latch unit moves IN (allowing the sampler fingers to expand), or OUT (compressing the sampler fingers).

IN GJS 3/29/95

NOTE: OPEN light should correspond with ~~OUT~~ward shaft movement, CLOSED light should correspond with ~~IN~~ward shaft movement.

OUT

TD/CE 7.4.25.4 **RECORD** the ammeter value in Table Z.

TD/CE 7.4.25.5 When the hoist motor shuts OFF, **VERIFY** that the MOTOR light turns OFF.

TD/CE 7.4.25.6 **INDICATE**, in Table Z, the status of the latch unit light (OPEN or CLOSED).

TD/CE 7.4.25.7 **RECORD** the ammeter value in the Table Z.

TD/CE 7.4.25.8 After the latching unit completes the initial cycle, **VERIFY** the reverse cycle as described below.

TD/CE 7.4.25.9 While holding the latch unit, **LOOK** into the unit and **PRESS** START.

TD/CE 7.4.25.10 **VERIFY** that the MOTOR ON light comes on.

TD/CE 7.4.25.11 **INDICATE**, in Table Z, the status of the latch unit light (OPEN or CLOSED).

TD/CE 7.4.25.12 **INDICATE**, in Table Z, whether the core on the shaft of the latch unit moves IN (allowing the sampler fingers to expand), or OUT (compressing the sampler fingers).

IN 3/29/95

NOTE: OPEN light should correspond with ~~OUT~~ward shaft movement, CLOSED light should correspond with ~~IN~~ward shaft movement.

OUT

TD/CE 7.4.25.13 **RECORD** the ammeter value in Table Z.

TD/CE 7.4.25.14 When the hoist motor shuts OFF, **VERIFY** that the MOTOR light turns OFF.

TD/CE 7.4.25.15 **INDICATE**, in Table Z, the status of the latch unit light (OPEN or CLOSED).

TD/CE 7.4.25.16 **RECORD** the ammeter value in Table Z.

1st OBSERVATION		CONDITION	Status
MOTOR - ON & Shaft Moving	RLU Status Light	OPEN or CLOSED	C
	RLU Shaft Motion	IN or OUT	O
	AMMETER READING	For Record Only	105
MOTOR - OFF Shaft Stopped	RLU Status Light	OPEN or CLOSED	O
	AMMETER READING	For Record Only	-0-
2nd OBSERVATION		**CONDITION**	**Status**
MOTOR - ON & Shaft Moving	RLU Status Light	OPEN or CLOSED	O
	RLU Shaft Motion	IN or OUT	IN
	AMMETER READING	For Record Only	105
MOTOR - OFF Shaft Stopped	RLU Status Light	OPEN or CLOSED	C
	AMMETER READING	For Record Only	-0-

Table Z.

TD/CE .4.26 Very carefully, **RETRACT** the cable while guiding the remote latch unit into the shielded receiver.

NOTE: Caution should be used when raising the RLU into the shielded receiver. (Possible pinch point).

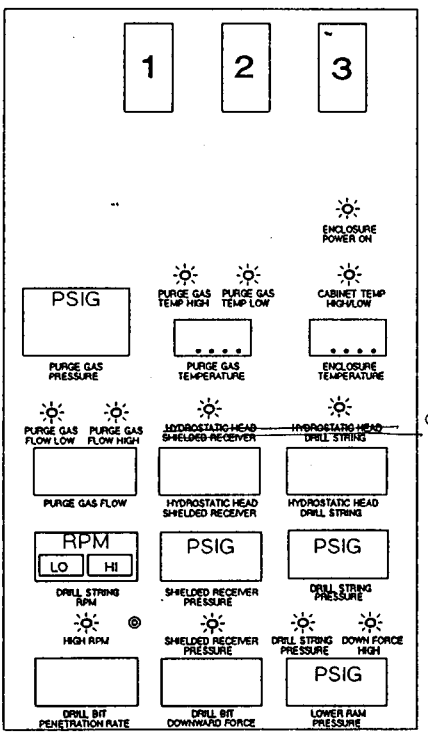
TD/CE .4.27 **RAISE** the shielded receiver to the uppermost position.

TD/CE 7.4.28 **REPLACE** the sampler hoist box lid. Torque the fasteners to 14-16 ft-lbs.

TD/CE .4.29 **REPLACE** the shielded receiver weather cover.

7.5 PURGE GAS SYSTEM

Refer to Figure 15 below and Figure 16 on the following page for the location of the instrumentation display panel elements and the purge gas controls referenced throughout the remainder of this test procedure.



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filename: nitrodis.gal 1/93

Figure 15) Instrumentation Display Panel.

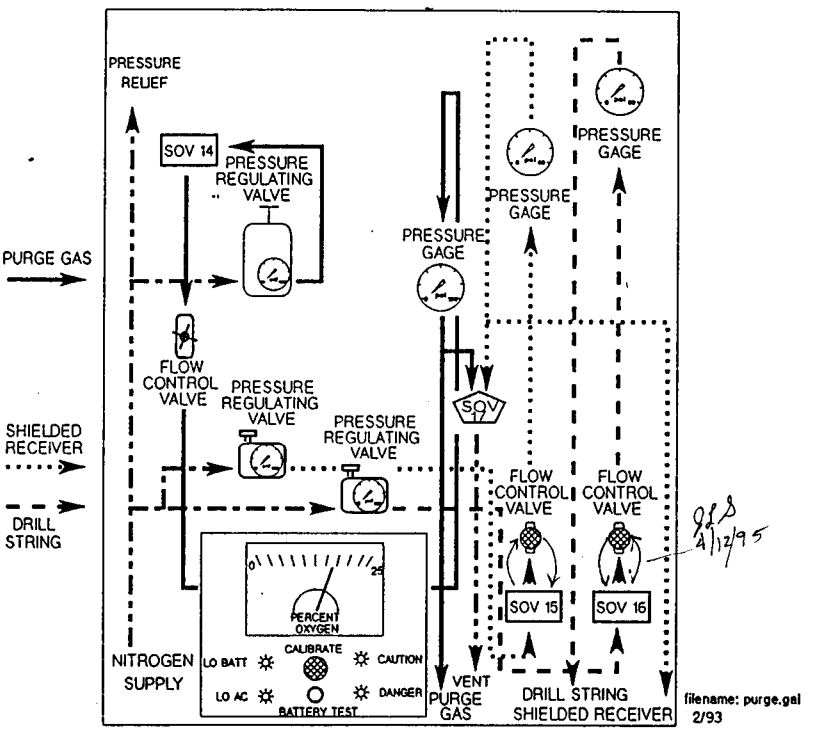

Figure 16) Purge Gas Controls.

7.5.1 VALID / INVALID SWITCH SETTINGS

START CONDITION: Initialize Electrical System (ref. 7.1.1).

TD/CE [signature] 7.5.1.1 For each of the switch settings shown in Table AA CONFIRM proper response on indicator light panel.

QC [signature] 03/29/95
M.C. Wingfield

SWITCH SELECTIONS				Type of Command	INDICATOR LIGHT				CONDITION
Purge gas	Pressurize shielded receiver	Pressurize drill string	Mode		SOV 14	SOV 15	SOV 16	SOV 17	OK/BAD
OFF	OFF	OFF	Drill	VALID	OFF	OFF	OFF	OFF	ok
OFF	ON	OFF	Drill	INVALID	Flash	Flash	Flash	Flash	ok
OFF	OFF	ON	Drill	INVALID	Flash	Flash	Flash	Flash	ok
OFF	ON	ON	Drill	INVALID	Flash	Flash	Flash	Flash	ok
ON	OFF	OFF	Drill	VALID	ON	OFF	OFF	ON	ok
ON	ON	OFF	Drill	INVALID	ON	Flash	Flash	ON	ok
ON	OFF	ON	Drill	INVALID	ON	Flash	Flash	ON	ok
ON	ON	ON	Drill	INVALID	ON	Flash	Flash	ON	ok
OFF	OFF	OFF	Sample Rec.	VALID	OFF	OFF	OFF	ON	ok
ON	OFF	OFF	Sample Rec.	INVALID	Flash	Flash	Flash	ON	ok
OFF	ON	OFF	Sample Rec.	VALID	OFF	ON	OFF	OFF	ok
ON	ON	OFF	Sample Rec.	INVALID	Flash	ON	Flash	Flash	ok
OFF	OFF	ON	Sample Rec.	VALID	OFF	OFF	ON	ON	ok
ON	OFF	ON	Sample Rec.	INVALID	Flash	Flash	ON	ON	ok
OFF	ON	ON	Sample Rec.	VALID	OFF	ON	ON	OFF	ok
ON	ON	ON	Sample Rec.	INVALID	Flash	ON	ON	Flash	ok

Table AA.

TD/CE [signature] 7.5.1.2 **RETURN** switch settings to OFF and DRILL.

7.5.2 PURGE GAS SYSTEM LEAK CHECK

START CONDITION: Initialize Longyear Engine (ref. 7.1.2).

TD/CE 7.5.2.1 **ROTATE** the platform to facilitate leak check tests.

NOTE: Engine may be shutdown for remainder of this section.

TD/CE ~~7.5.2.2 ATTACH the core barrel to the quill rod.~~

TD/CE 7.5.2.3 **ATTACH** drill string cap to bottom of core barrel.

TD/CE 7.5.2.4 **CONNECT** the nitrogen/air supply line from the sample truck to a portable compressor. The receptacle on the truck is located below the platform by the driver's door.

TD/CE 7.5.2.5 **ENSURE** all purge gas system components are fully vented and all valves (including quick disconnect fittings) are closed.

TD/CE 7.5.2.6 **PLACE** the MODE switch (located at bottom of Instrument Enclosure Assembly) in the DRILL position, and function switches (Purge Gas, Pressurize Shielded receiver, and Pressurize Drill String) in the off (closed) position.

TD/CE 7.5.2.7 **TURN ON** compressor and verify pressure is at 125 ± 15 psig.

NOTE: If flow rate is not sufficient to reduce pressure for effective soap solution leak tests, temporarily reduce pressure regulator settings.

TD/CE QC WHC APVO 4-12-95 7.5.2.8 **APPLY** soap or leak detection solution to purge gas piping and hose assembly joints from supply receptacle on truck to the following components in the Purge Gas Enclosure: SOV 14, SOV 15, SOV 16, and the pressure relief valve, RV-1. **VERIFY** no leaks exist.

TD/CE 7.5.2.9 **POSITION** the PURGE GAS switch to ON, **ADJUST** purge gas pressure regulator (PR-1) to ~~85~~ 75 to 85 psig, and slowly **OPEN** purge gas flow control valve (FC-1). 4/12

TD/CE QC WHC APVO 4-12-95 7.5.2.10 **APPLY** soap or leak detection solution to purge gas piping, components, and hose assembly joints from SOV-14 to SOV-17 and from SOV-14, through the grapple box, to the drill string cap. **VERIFY** no leaks exist.

TD/CE 7.5.2.11 **ISOLATE** supply flow from purge gas system. **RECORD**, in Table BB, purge gas temp. and pressure at beginning and end of 15 min. hold period.

	Start	End
Pressure (psig)	80	80
Temperature (°F)	69	69

Table BB.

TD/CE 7.5.2.12 **CONNECT** the Sampler Changeout Assembly (SCA) to the shielded receiver.

TD/CE 7.5.2.13 **PLACE** the PURGE GAS SWITCH to OFF, the MODE switch in the SAMPLE REC position and PRESSURIZE SHIELDED RECVR SWITCH to ON.

TD/CE 7.5.2.14 **ENSURE** the isolation valve (on the SCA) is closed and the ball valve (on the shielded receiver) is open.

TD/CE 7.5.2.15 **ADJUST** shielded receiver pressure regulator (PR-2) to 30 psig, and slowly **OPEN** shielded receiver flow control valve (FC-2).

TD/CE QC 4-12-95 7.5.2.16 **APPLY** soap or leak detection solution to purge gas piping, components, and hose assembly from SOV-15 through SOV-17 to the two vent line quick disconnects (VENT TO TANK and VENT DRILL STRING) and from SOV-15, through the shielded receiver, to the isolation valve. **VERIFY** no leaks exist.

TD/CE 7.5.2.17 **CLOSE** the shielded receiver flow control valve. **RECORD**, in Table CC, purge gas temperature and shielded receiver pressure at beginning and end of 15 min. hold period.

	Start	End
Pressure (psig)	31.69	31.91
Temperature (°F)	76	76

Table CC.

TD/CE 7.5.2.18 **PLACE** the PRESSURIZE SHIELDED RECVR SWITCH to vent the shielded receiver.

TD/CE 7.5.2.19 **PLACE** the PRESSURIZE DRILL STRING SWITCH to ON.

TD/CE 7.5.2.20 **ADJUST** drill string pressure regulator (PR-3) to 30 psig, and slowly **OPEN** drill string flow control valve (FC-3).

TD/CE QC 4-12-95 7.5.2.21 **APPLY** soap or leak detection solution to purge gas piping, components, and hose assembly from SOV 16 to the SUPPLY DRILL STRING line quick disconnect. **VERIFY** no leaks exist.

TD/CE 7.5.2.22 **CLOSE** the drill string flow control valve. **RECORD**, in Table DD, purge gas temperature and drill string pressure at beginning and end of 15 min. hold period.

	Start	End
Pressure (psig)	30.8	30.82
Temperature (°F)	78	79

Table DD.

TD/CE 7.5.2.23 **ENSURE** all purge gas system components are fully vented and all flow control valves and quick disconnect fittings are closed. **REMOVE** drill string cap.

TD/CE 7.5.2.24 **REMOVE** the SCA from the shielded receiver.

7.5.3 PURGE GAS COMPONENT OPERATION - DRILL MODE

START CONDITION: Initialize Longyear Engine (ref. 7.1.2).

TD/CE 7.5.3.1 **ROTATE** the platform, as required, to facilitate drill mode purge gas component testing.

NOTE: Longyear engine may be shutdown for remainder of this section.

TD/CE 7.5.3.2 **ENSURE** all purge gas system components are fully vented and all flow control valves and quick disconnect fittings are closed.

TD/CE 7.5.3.3 **INSTALL** pressure gage and vent valve on quick disconnect fitting of purge gas system vent line. **CLOSE** vent valve.

TD/CE 7.5.3.4 **ENSURE** air supply pressure is 125 ± 15 psig.

TD/CE 7.5.3.5 **PLACE** the MODE switch in the DRILL position, and function switches (Purge Gas, Pressurize Shielded receiver, and Pressurize Drill String) in the off (closed) position.

TD/CE QC WHC 119 4/96 4-12-95 7.5.3.6 Slowly **OPEN** purge gas flow control valve and **VERIFY** that SOV-14 is physically closed by checking Purge Gas Flow Meters (no flow) and upstream pressure gage (positive pressure). **RECORD** valve condition in Table EE.

TD/CE QC WHC 119 4/96 4-12-95 7.5.3.7 Slowly **OPEN** shielded receiver flow control valve and **VERIFY** that SOV-15 is physically closed by checking shielded receiver pressure gage (no pressure) and upstream pressure gage (positive pressure). **RECORD** valve condition in Table EE.

TD/CE QC WHC 119 4/96 4-12-95 7.5.3.8 Slowly **OPEN** drill string flow control valve and **VERIFY** that SOV-16 is physically closed by checking drill string pressure gage (no pressure) and upstream pressure gage (positive pressure). **RECORD** valve condition in Table EE.

TD/CE 7.5.3.9 **POSITION** the PURGE GAS switch to ON.

NOTE: At this point, the shielded receiver is normally vented to the tank and purge gas flow is routed past the drill bit.

TD/CE QC WHC 119 A/QC 4-12-95 7.5.3.10 Slowly **OPEN** the Purge Gas flow control valve and **VERIFY** that SOV-14 is physically open by checking Purge Gas Flow Meters (positive flow). **RECORD** valve condition in Table EE.

TD/CE QC WHC 119 A/QC 4-12-95 7.5.3.11 **VERIFY** that SOV-17 has physically shifted to the energized position (open to shielded receiver) by checking test gage on vent line (no pressure). **RECORD** valve condition in Table EE.

TD/CE 7.5.3.12 **CLOSE** Purge Gas Flow Control valve, **INSTALL** cap on drill string, then **OPEN** PURGE GAS Flow Control valve.

TD/CE QC WHC 119 A/QC 4-12-95 7.5.3.13 **PLACE** the PURGE GAS switch in the OFF position, and **VERIFY** that SOV-17 has physically shifted to the de-energized position (closed to shielded receiver) by checking test gage on vent line (momentary pressure rise). **RECORD** valve condition in Table EE.

TD/CE 7.5.3.14 **OPEN** vent line vent valve to depressurize drill string, then **REMOVE** drill string cap.

VALVE PERFORMANCE - DRILL MODE

Valve Designation	Condition	Open/Energized	Closed/De-energized
SOV-14, PG	OK/BAD	OPEN	CLOSED
SOV-15, SR	OK/BAD	N/A	CLOSED
SOV-16, DS	OK/BAD	N/A	CLOSED
SOV-17, Vent	OK/BAD	OPEN	CLOSED

Table EE.

TD/CE 7.5.3.15 **POSITION** the PURGE GAS switch to ON.

TD/CE QC WHC 119 A/QC 4-12-95 7.5.3.16 With purge gas pressure regulator set at near minimum operating conditions (approximately 20 psig), incrementally **ADJUST** the purge gas flow control valve from closed to full open (do NOT exceed 120 scfm). **RECORD** the drill string pressure, flow rate, and temperature in the following table.

NOTE: For Purge Gas Pressure use digital display on Instrument Enclosure Assy for GAGE 1, and use pressure gage, PG-1, in Purge Gas Enclosure for GAGE 2.

For Purge Gas Flow rate use digital display on Instrument Enclosure Assy; with PURGE GAS FLOW switch in position 1 for GAGE 1, 2 for GAGE 2, and 3 for GAGE 3.

For Purge Gas Temperature use digital display on Instrument Enclosure Assy for GAGE 1.

TD/CE 7.5.3.17 **VERIFY** that the purge gas flow rate and pressure are being recorded on channels 1 and 2 of the VGR.

TD/CE 7.5.3.18 **VERIFY** each purge gas instrument reading can be selected for display on the Instrumentation Display Panel.

TD/CE 7.5.3.19 **CLOSE** purge gas flow control valve.

TD/CE 7.5.3.20 **ADJUST** the purge gas pressure to near maximum operating conditions (approximately 85 psig), then incrementally **ADJUST** the purge gas flow control valve from closed to full open (do NOT exceed 120 scfm). **RECORD** the drill string pressure, flow rate, and temperature in Table FF.

	PARAMETER	CONDITION	GAGE 1	GAGE 2	GAGE 3
MINIMUM	Purge Gas Pressure (20 psig max)	Record Only	4.3	8	n/a
	Purge Gas Flow Rate, ½ open (scfm)	Record Only	33	33	33
	Purge Gas Flow Rate, max		35	35	36
CONDITIONS	Purge Gas Temperature (°F)	Record Only	73	n/a	n/a
MAXIMUM	Purge Gas Pressure (85 psig max)	Record Only	26.7	29	n/a
	Purge Gas Flow Rate, ½ open (scfm)	Record Only	105	105	105
	Purge Gas Flow Rate, max		108	108	109
CONDITIONS	Purge Gas Temperature (°F)	Record Only	71	n/a	n/a

Table FF.

TD/CE 7.5.3.21 **CLOSE** flow control valves.

7.5.4 PURGE GAS COMPONENT OPERATION - SAMPLE MODE

START CONDITION: Initialize Longyear Engine (ref. 7.1.2).

TD/CE 7.5.4.1 **ROTATE** the platform to position the shielded receiver to the rear of the truck. **LOWER** shielded receiver to convenient height for testing.

NOTE: Longyear may be shutdown for remainder of this section.

TD/CE 7.5.4.2 **CONNECT** the Sampler Changeout Assembly (SCA) to the shielded receiver, and to the drill string.

NOTE: A flow restrictor or partially open valve may be used in place of drill string.

TD/CE 7.5.4.3 **CLOSE** the isolation valve (on the SCA) and ball valve (on the shielded receiver).

TD/CE 7.5.4.4 **CONNECT** the SUPPLY DRILL STRING pneumatic hose to quick disconnect fitting on SCA.

TD/CE 7.5.4.5 With remaining function switches off, **PLACE** the purge gas MODE SWITCH to SAMPLE CHANGE.

TD/CE 7.5.4.6 **ENSURE** shielded receiver pressure regulator is adjusted to 30 ± 5 psig. 4/12/95

TD/CE QC WHC 119 4/12/95 7.5.4.7 Slowly **OPEN** shielded receiver flow control valve and **VERIFY** that SOV-15 is physically closed by checking shielded receiver pressure gage (no pressure) and upstream pressure gage (positive pressure). **RECORD** valve condition in Table GG.

TD/CE 7.5.4.8 **ENSURE** drill string pressure regulator is adjusted to 30 ± 5 psig. 4/12/95

TD/CE QC WHC 119 4/12/95 7.5.4.9 Slowly **OPEN** drill string flow control valve and **VERIFY** that SOV-16 is physically closed by checking drill string pressure gage (no pressure) and upstream pressure gage (positive pressure). **RECORD** valve condition in Table GG.

TD/CE 7.5.4.10 **CLOSE** flow control valves

TD/CE QC WHC 119 4/12/95 7.5.4.11 Slowly **OPEN** purge gas flow control valve and **VERIFY** that SOV-14 is physically closed by checking Purge Gas Flow Meters (no flow) and upstream pressure gage (positive pressure). **PLACE** the PRESSURIZE DRILL STRING switch in the ON position and **VERIFY** that SOV-14 remains closed. **RECORD** valve condition in Table GG.

CAUTION: Do not exceed instrument limit of 10 scfm in following step.

TD/CE QC WHC 119 4/12/95 7.5.4.12 Slowly **OPEN** drill string flow control valve and **VERIFY** that SOV-16 is physically open by checking drill ~~string flow meter and~~ pressure gage (positive). **RECORD** valve condition in Table GG. 4/12/95

VALVE PERFORMANCE - SAMPLE MODE

VALVE DESIGNATION	CONDITION	OPEN/ENERGIZED	CLOSED/DE-ENERGIZED
SOV 14, PG	OK/BAD	N/A	CLOSED
SOV 15, SR	OK/BAD	OPEN	CLOSED
SOV 16, DS	OK/BAD	OPEN	CLOSED
SOV 17, VENT	OK/BAD	OPEN	CLOSED

Table GG.

TD/CE 7.5.4.13 **POSITION** the PRESSURIZE DRILL STRING switch to OFF and the PRESSURIZE SHIELDED RECEIVER switch to ON.

CAUTION: Do not exceed instrument limit of 10 scfm in following step.

TD/CE QC 7.5.4.14 Slowly **OPEN** shielded receiver flow control valve and **VERIFY** that SOV-15 is physically open by checking shielded receiver ~~flow meter or~~ pressure gage (positive). **RECORD** valve condition in Table GG. 4/12/95

TD/CE QC 4-12-95 7.5.4.15 **VERIFY** that SOV-17 has physically shifted to the de-energized position (closed to shielded receiver) by checking test gage on vent line (no pressure). **RECORD** valve condition in Table GG.

TD/CE QC 4-12-95 7.5.4.16 **DEPRESSURIZE** the shielded receiver by placing the PRESSURIZE SHIELDED RECEIVER switch to the OFF position. **VERIFY** that SOV-17 has physically shifted to the energized position (open to shielded receiver) by checking test gage on vent line (positive pressure). **RECORD** valve condition in Table GG.

TD/CE 7.5.4.17 **CLOSE** the shielded receiver and drill string flow control valves.

TD/CE 7.5.4.18 **OPEN** vent line test valve to depressurize vent line.

TD/CE 7.5.4.19 **PLACE** the purge gas MODE switch to SAMPLE CHANGE and the PRESSURIZE DRILL STRING switch in the ON position.

TD/CE 7.5.4.20 **ADJUST** the drill string pressure and flow as required, using an initial pressure setting of approximately 30 psig and 10 scfm max. Gas should flow steadily through the drill string.

TD/CE QC 4-12-95 7.5.4.21 **RECORD** the drill string pressure ~~and flow rate in~~ rows 1 ~~and 2~~ of Table HH. **CONFIRM** that the ~~flow rate is being recorded on channel 5 of the VGR,~~ drill string pressure is being recorded on channel 7 of the VGR, and that the digital pressure display on the instrument enclosure agrees with the gage in purge gas enclosure. 4/12/95

PARAMETER		CONDITION	Drill String	Receiver
VALVES CLOSED	Pressure (psig)	Information Only	5.15	5.68
	Gas Flow Rate (scfm)	Information Only	N/A	N/A
VALVES OPEN	Pressure (psig)	Information Only	3.87	3.76
	Gas Flow Rate (scfm)	Information Only	N/A	N/A
ISOLATION VALVE CLOSED	Pressure (psig)	Information Only	4.83	.15
	Gas Flow Rate (scfm)	Information Only	N/A	N/A

Table HH.

TD/CE 7.5.4.22 **POSITION** the PRESSURIZE SHIELDED RECEIVER switch to ON.

TD/CE 7.5.4.23 **ADJUST** the shielded receiver pressure equal to that set in the drill string.

TD/CE QC WHC TRG 4.1.C 7.5.4.24 **RECORD** the shielded receiver pressure ~~and gas flow rate~~ in row~~s~~ ~~1 and 2~~ of Table HH. **CONFIRM** that the ~~SHIELDED RECEIVER FLOW RATE is being recorded on channel 4 of the~~ VGR, SHIELDED RECEIVER PRESSURE is being recorded on channel 6 of the VGR, and that the digital pressure display on the instrument enclosure agrees with the gage in purge gas enclosure. 4-12-95

TD/CE 7.5.4.25 **OPEN** the isolation valve and shielded receiver ball valve.

TD/CE QC WHC TRG 4.1.C 7.5.4.26 With the valves open, **RECORD** the drill string and shielded receiver pressures ~~and flow rates~~ in row~~s~~ 3 ~~and 4~~ of Table HH. 4-12-95

TD/CE 7.5.4.27 **CLOSE** the isolation valve.

TD/CE 7.5.4.28 **DEPRESSURIZE** the shielded receiver by placing the PRESSURIZE SHIELDED RECEIVER switch to the OFF position, and opening vent line vent valve.

TD/CE 7.5.4.29 **CLOSE** the shielded receiver nitrogen flow control valve.

TD/CE QC WHC TRG 4.1.C 7.5.4.30 **RECORD** the drill string and shielded receiver pressures ~~and gas flow rates~~ in row~~s~~ 5 ~~and 6~~ of Table HH. 4-12-95

TD/CE 7.5.4.31 **STOP** the flow to the drill string by placing the PRESSURIZE DRILL STRING switch to the OFF position.

TD/CE 7.5.4.32 **PLACE** the purge gas MODE switch to the DRILL position.

TD/CE 7.5.4.33 CLOSE the flow control valves, and facility air supply.

7.6 NITROGEN GAS FLOW CHARACTERIZATION

START CONDITION: Initialize Electrical System (ref. 7.1.1).

TD/CE 7.6.1 CONNECT the nitrogen supply line from the sample truck to Purge Gas Trailer.

TD/CE 7.6.2 ENSURE all purge gas system components are fully vented and all flow control valves are closed.

TD/CE 7.6.3 POSITION safety monitoring equipment and barriers to protect personnel from oxygen deprivation.

TD/CE 7.6.4 ATTACH ducting/hose to exhaust nitrogen from drill string to building exterior.

TD/CE 7.6.5 REFER to the nitrogen trailer operating instructions to start and operate the nitrogen trailer to supply nitrogen gas to the sample truck at 120 ±10 psig.

TD/CE 7.6.6 PLACE the MODE switch in the DRILL position and the PURGE GAS switch to ON.

TD/CE 7.6.7 ADJUST the purge gas pressure to near maximum operating conditions (approximately 85 psig), then incrementally ADJUST the purge gas flow control valve from closed to full open (do NOT exceed 120 scfm). RECORD the drill string pressure, flow rate, and temperature in the following Tables II and JJ. When flow reaches 50 scfm record water temperature reading from purge gas trailer.

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PARAMETER	CONDITION	DISPLAY
Purge Gas Pressure (psig)	Information Only	2.7
Purge Gas Flow Rate (~30 scfm)	Information Only	30
Purge Gas Temperature (°F)	Information Only	64
Purge Gas Pressure (psig)	Information Only	4.9
Purge Gas Flow Rate (~40 scfm)	Information Only	40
Purge Gas Temperature (°F)	Information Only	62

Table II.

PARAMETER	CONDITION	DISPLAY
Purge Gas Pressure (psig)	Information Only	7.6
Purge Gas Flow Rate (~50 scfm)	Information Only	50.5
Purge Gas Temperature (°F)	Information Only	62
Purge Gas Trailer Water Temp. (°F)	Information Only	106
Purge Gas Pressure (psig)	Information Only	~~6229.2~~
Purge Gas Flow Rate (full flow)	Information Only	119
Purge Gas Temperature (°F)	Information Only	~~29.268~~

Table JJ.

TD/CE 7.6.8 **ADJUST** Purge Gas Trailer controls to ~~reduce temperature of the nitrogen, measured at the instrumentation enclosure, to 40 °F.~~ 100 SCFM Allow temperature to stabilize (approximately 15 minutes). **RECORD**, in Table KK, gas temperature at drill bit exit, and purge gas enclosure.

For Record Only	Drill Bit	Enclosure
Gas Temperature °F	70	69

Table KK.

TD/CE 7.6.9 **CLOSE** purge gas shutoff valve and allow sample truck hose and piping system to fully vent.

TD/CE 7.6.10 **DISCONNECT** the nitrogen supply line between the sample truck and the Purge Gas Trailer.

TD/CE 7.6.11 **OPEN** vent line test valve and **CLOSE** flow control valves.

TD/CE 7.6.12 **REMOVE** the test equipment from the drill bit.

TD/CE 7.6.13 **REFER** to the nitrogen trailer operating instructions to shut down the nitrogen trailer.

7.7 ALARM SYSTEM CHECKOUT

NOTE: For the following sections indicate results (OK/BAD) in Table QQ on Page 62.

7.7.1 INSTRUMENT CABINET TEMPERATURE ALARM

START CONDITION: Initialize Longyear Engine (ref. 7.1.2).

TD/CE 7.7.1.1 Unacknowledged Alarm: **APPLY** heat source (approximately 90 °F) to the CABINET TEMPERATURE TRANSMITTER (thermocouple) in the Instrument Enclosure Assembly. The CABINET TEMP HI/LOW light will come on and flash fast. After approximately 60 seconds, the SIREN sounds, the STROBE flashes.

TD/CE 7.7.1.2 Acknowledgment: **PRESS** the ACKNOWLEDGE button to silence the SIREN and turn off the STROBE. The CABINET TEMP HI/LOW light remains on steady. **CHECK** that nothing happens when RESET is pressed.

TD/CE 7.7.1.3 Condition Normalized: **REMOVE** the heat source from the TEMPERATURE TRANSMITTER. Wait until the unit cools off. **OBSERVE** that the CABINET TEMP HI/LOW light flashes slow.

TD/CE 7.7.1.4 Repeat Alarm: **APPLY** cold source (approximately 50°F) to the CABINET TEMPERATURE TRANSMITTER (thermocouple) in the Instrument Enclosure Assembly. Observe the CABINET TEMP HI/LOW light remains on steady. **CHECK** that nothing happens when RESET is pressed.

TD/CE 7.7.1.5 Reset: **REMOVE** the cold source from the TEMPERATURE TRANSMITTER. Wait until the unit warms up. **OBSERVE** that the CABINET TEMP HI/LOW light flashes slow. **CHECK** that the LIGHT goes out when RESET is pressed.

7.7.2 DRILL BIT DOWNWARD FORCE MEASUREMENT

START CONDITION: Initialize Longyear Engine (ref. 7.1.2).

TD/CE 7.7.2.1 During this section **VERIFY** that drilling parameters can be selected and recorded on channels 8-12 of the VGR (refer to information on page 28).

TD/CE 7.7.2.2 **PLACE** a load measuring test adapter (scale) below the drill head.

TD/CE 7.7.2.3 **PLACE** downward force spring test unit on the scale. **ADJUST** tare force on DRILL BIT DOWNWARD FORCE to zero out the tare weight. **RECORD** tare weight in Table LL.

Tare Weight, lbs	0

Table LL.

TD/CE AH 7.7.2.4 **PLACE** the 4-way control valve in the RAISE position.

TD/CE AH 7.7.2.5 **OPEN** the DOWN SPEED CONTROL valve until the drill bit contacts the downward force spring test unit.

TD/CE AH QC 4-28-95 7.7.2.6 Slowly **INCREASE** Drill Bit Down Force from 0 to 2000 lbs, **MEASURE** and **RECORD** the Drill Bit Downward Force digital display indication, actual scale reading, and approximate distance (length) of drill head ram extension in Table MM.

SCALE USED: CALIBRATION # 776-66-01-001 EXP. 11/17/95

DOWNWARD FORCE, INDICATED	DOWNWARD FORCE, ACTUAL	DISTANCE, RAM EXTENSION
201	160	13
383	330-350	12
582	530	11
777	710	10
942	910	9
1120	1100	8
1290	1290	7
1449	1480	6
1639		
1840	Table MM 1650-1800 1890	5 4

TD/CE AH 7.7.2.7 **PLACE** the 4-way control valve in the lower position.

TD/CE AH 7.7.2.8 **OPEN** the UP SPEED CONTROL valve until the rams are fully raised.

TD/CE AH 7.7.2.9 Set MODE switch to DRILL and Purge Gas (SOV #14) switch to ON (SR & DS off). **ADJUST** purge gas flow control valve (FC-1) to obtain PURGE GAS flow of approximately 30 scfm.

TD/CE AH 7.7.2.10 With spindle in LOW and transmission in first gear, **ENGAGE** the drill rig clutch and **ADJUST** rotation speed to allow for low penetration rate drilling.

TD/CE AH 7.7.2.11 **PLACE** the 4-way control valve in the RAISE position.

TD/CE AH 7.7.2.12 **OPEN** the DOWN SPEED CONTROL valve until the drill bit contacts the downward force spring test device.

TD/CE AH 7.7.2.13 Slowly **INCREASE** Drill Bit Down Force from 0 to just below 1000 lbs, **MEASURE** and **RECORD** the PURGE GAS PRESSURE, Drill Bit Down Force digital display indication, and actual scale reading in Table NN.

TD/CE AH 7.7.2.14 **PLACE** the 4-way control valve in the lower position.

TD/CE 7.7.2.15 OPEN the UP SPEED CONTROL valve until the rams are fully raised.

TD/CE QC 7.7.2.16 REPEAT the above six steps first with the purge gas flow adjusted to 50 scfm, and then with the purge gas flow control valve full open (max flow). RECORD data in Table NN.

FLOW RATE	DOWNWARD FORCE, INDICATED	DOWNWARD FORCE, ACTUAL	GAS PRESSURE
≈ 30 scfm	~~+e~~ 918 217 370 550 730 910	160 350 530 710 910	~~17.7~~ 918 20.6 21.5 21.5 23.7 250
≈ 50 scfm	160 395 580 760 930	160 330 530 710 910	31.5 32 32 32 32
max. flow ≈ 82	190 390 570 750 950	160 330-350 530 710 910	56.5 56.9 57.4 57.3 57.3

Table NN.

7.7.3 HIGH DOWNWARD FORCE ALARM

START CONDITION: Initialize Longyear Engine (ref. 7.1.2), Initialize Drill Rotation (ref. 7.3.6).

TD/CE AHJ 9/28 7.7.3.1 **ENSURE** lower RAM set point is adjusted to 60 psig.

TD/CE AHJ 9/28 7.7.3.2 **VERIFY** proper drill bit and sampler are installed for alarm test. Set switches as in above test. **ADJUST** PURGE GAS to nominal flow rate (approximately 50 scfm).

TD/CE AHJ 9/28 7.7.3.3 **READJUST** the downward force spring test device as required.

TD/CE AHJ 9/28 7.7.3.4 **ADJUST** rotation of the drill string (minimum stable speed). **LOWER** the drill string (by placing 4-way control valve in RAISE and opening down speed control valve) until bit contacts the downward force spring test device.

TD/CE AHJ 9/28 7.7.3.5 Timer: **INCREASE** the downward force using on-truck controls/valves until it exceeds the alarm set point (excessive force, approximately 1170 lbs). Maintain for 3 to 4 seconds. Then **REDUCE** the force to below the set point. No response should be observed from the alarm system.

TD/CE AHJ 9/28 7.7.3.6 Unacknowledged Alarm: **INCREASE** the downward force, incrementally, to an excessive level. After 5 seconds **OBSERVE**: the SIREN sounds, the STROBE flashes, and the DOWNWARD FORCE HIGH Light comes on and flashes fast.

TD/CE AHJ 9/28 7.7.3.7 Acknowledgment: **PRESS** the ACKNOWLEDGE button to silence the SIREN and turn off the STROBE. The DOWNWARD FORCE HIGH Light remains on steady. **CHECK** that nothing happens when RESET is pressed.

TD/CE AHJ 9/28 7.7.3.8 Condition Normalized: **RELEASE** the downward force using on-truck controls. **OBSERVE** that the DOWNWARD FORCE HIGH Light flashes slow.

TD/CE AHJ 9/28 7.7.3.9 Repeat Alarm: **INCREASE** the downward force to an excessive level and observe the DOWNWARD FORCE HIGH Light remains on steady. **CHECK** that nothing happens when RESET is pressed.

TD/CE AHJ 9/28 7.7.3.10 End of Alarm: **RELEASE** the downward force and observe the LIGHT flashes slow. **CHECK** that the LIGHT goes out when RESET is pressed.

TD/CE AHJ 9/28 7.7.3.11 Alarm in Passing: **INCREASE** the downward force to an excessive level. When the alarm is tripped release the downward force. **CHECK** that nothing happens when RESET is pressed.

TD/CE AHJ 9/28 7.7.3.12 Reset: **PRESS** ACKNOWLEDGE and observe that the SIREN and the STROBE are deenergized and that the LIGHT flashes slow. **CHECK** that the LIGHT goes out when RESET is pressed.

TD/ICE QC 7.7.3.13 Engine Shutdown Interlock: **INCREASE** the downward force to an excessive level for at least 3 seconds to trip the alarm. **PRESS** the ACKNOWLEDGE button to silence the SIREN and turn off the STROBE. After approximately 40 seconds, **CONFIRM** that the alarm condition causes automatic shutdown of the drill rig engine.

TD/ICE 7.7.3.14 Engine restart: Immediately after shutdown, **CONFIRM** that restart attempt within 10 sec is unsuccessful. **CONFIRM** that restart attempt approximately 30 sec after shutdown is successful.

NOTE: The above time delay is to prevent engine cycling.

7.7.4 HIGH RPM ALARM

START CONDITION: Initialize Longyear Engine (ref. 7.1.2), Initialize Drill Rotation (ref. 7.3.6).

TD/ICE 7.7.4.1 **VERIFY** MODE switch is set to DRILL and Purge Gas (SOV #14) switch to ON (SR & DS off). **ADJUST** PURGE GAS to nominal flow rate (approximately 50 scfm).

TD/ICE 7.7.4.2 Timer: **INCREASE** the drill string RPM's to an excessive level (55) for less than 5 seconds and then reduce to moderate speed. **OBSERVE** that the alarm system does not respond.

NOTE: Indicator light on digital display indicates active alarm set point.

TD/ICE 7.7.4.3 Unacknowledged Alarm: **INCREASE** the DRILL STRING RPM's using the engine throttle to an excessive level for at least 5 seconds. **OBSERVE** that the SIREN sounds, the STROBE flashes, and the HIGH RPM Light comes on and flashes fast.

TD/ICE 7.7.4.4 Acknowledgment: **PRESS** the ACKNOWLEDGE button to silence the SIREN and turn off the STROBE. The drill string HIGH RPM Light remains on steady. **OBSERVE** that nothing happens when RESET is pressed.

TD/ICE 7.7.4.5 Condition Normalized: **REDUCE** the RPM's to a moderate value. **OBSERVE** that the drill string HIGH RPM flashes slow.

TD/ICE 7.7.4.6 Repeat Alarm: **INCREASE** the DRILL STRING RPM's to an excessive level and **OBSERVE** LIGHT remains on steady. **CHECK** that nothing happens when RESET is pressed.

TD/ICE 7.7.4.7 End of Alarm: **REDUCE** the drill string RPM and **OBSERVE** that the LIGHT flashes slow. **OBSERVE** that the LIGHT goes out when RESET is pressed.

TD/ICE 7.7.4.8 Alarm in Passing: **INCREASE** the drill string RPM's to an excessive level. When the alarm is tripped, **REDUCE** the drill string RPM. **OBSERVE** that nothing happens when RESET is pressed.

TD/CE 7.7.4.9 Reset: PRESS ACKNOWLEDGE and OBSERVE that the LIGHT flashes slow. OBSERVE that the LIGHT goes out when RESET is pressed.

TD/CE QC 7.7.4.10 Engine Shutdown Interlock: INCREASE the DRILL STRING RPM's to an excessive level for at least 5 seconds to trip the HIGH RPM alarm. PRESS the ACKNOWLEDGE button to silence the SIREN and turn off the STROBE. After approximately 40 seconds, CONFIRM that the alarm condition causes automatic shutdown of the drill rig engine.

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TD/CE 7.7.4.11 Engine restart: Immediately after shutdown, CONFIRM that restart attempt within 10 sec is unsuccessful. CONFIRM that restart attempt approximately 30 sec after shutdown is successful.

NOTE: The above time delay is to prevent engine cycling.

7.7.5 RPM SENSOR FAILURE ALARM

START CONDITION: Initialize Longyear Engine (ref. 7.1.2), Initialize Drill Rotation (ref. 7.3.6).

NOTE: The following steps simulate an RPM sensor failure by disconnecting both sensors, one at a time.

CAUTION: Do not wear loose clothing around the rotating drill head.

TD/CE 7.7.5.1 VERIFY MODE switch is set to DRILL and Purge Gas (SOV #14) switch to ON (SR & DS off). ADJUST PURGE GAS to nominal flow rate (approximately 50 scfm).

TD/CE 7.7.5.2 ADJUST and stabilize RPM to nominal value (approximately 50 RPM but less than 55 RPM.

TD/CE 7.7.5.3 Simulate sensor failure: DISCONNECT one of the RPM sensors by unscrewing the electrical connector on the sensor.

TD/CE 7.7.5.4 Timer: VERIFY that the drill rig shuts down after 45 seconds

TD/CE 7.7.5.5 Engine restart: Immediately after shutdown, CONFIRM that restart attempt within 10 sec is unsuccessful. CONFIRM that restart attempt approximately 30 sec after shutdown is successful.

TD/CE 7.7.5.6 RECONNECT the electrical connector to the RPM sensor.

TD/CE 7.7.5.7 REPEAT the above steps disconnecting the other RPM sensor.

7.7.6 PURGE GAS LOW FLOW ALARM

START CONDITION: Initialize Longyear Engine (ref. 7.1.2), Initialize Drill Rotation (ref. 7.3.6).

TD/CE 7.7.6.1 **DEENERGIZE** one purge gas Digital Flow Indicator (Refer to 1, 2 and 3 of Figure 15) to **VERIFY** that single out-of-tolerance indication does not trip alarm. **TURN** power back on and **REPEAT** test for each of remaining two digital flow indicators.

TD/CE 7.7.6.2 Timer: **INTERRUPT** the Purge Gas air flow for 8 to 9 seconds. Then turn the air back on. No response should be observed from the alarm system.

TD/CE 7.7.6.3 Unacknowledged Alarm: **TURN** the air flow down to approximately 30 scfm using purge gas control valves. After 10 seconds **OBSERVE** the SIREN sounds, the STROBE flashes, and the PURGE GAS FLOW LOW Light comes on and flashes fast.

TD/CE 7.7.6.4 Acknowledgment: **PRESS** the ACKNOWLEDGE button to silence the SIREN and turn off the STROBE. The PURGE GAS FLOW LOW Light remains on steady. **OBSERVE** that nothing happens when RESET is pressed.

TD/CE 7.7.6.5 Condition Normalized: **TURN** the air flow on using purge gas controls. **OBSERVE** that the PURGE GAS FLOW LOW Light flashes slow.

TD/CE 7.7.6.6 Repeat Alarm: **TURN** the air flow off and **OBSERVE** the PURGE GAS FLOW LOW Light remains on steady. **CHECK** that nothing happens when RESET is pressed.

TD/CE 7.7.6.7 End of Alarm: **TURN** the air flow back on and **OBSERVE** the LIGHT flashes slow. **CHECK** that the LIGHT goes out when RESET is pressed.

TD/CE 7.7.6.8 Alarm in Passing: **TURN** the air flow off. When the alarm is tripped, **TURN** the air flow back on. **CHECK** that nothing happens when RESET is pressed.

TD/CE 7.7.6.9 Reset: **PRESS** ACKNOWLEDGE and **OBSERVE** that the SIREN and the STROBE are deenergized and that the LIGHT flashes slow. **CHECK** that the LIGHT goes out when RESET is pressed.

TD/CE 7.7.6.10 Engine Shutdown Interlock: **TURN** the air flow off to trip the alarm. **PRESS** the ACKNOWLEDGE button to silence the SIREN and turn off the STROBE. After approximately 40 seconds, **CONFIRM** that the alarm condition causes automatic shutdown of the drill rig engine.

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TD/CE 7.7.6.11 Engine restart: Immediately after shutdown, **CONFIRM** that restart attempt within 10 sec is unsuccessful. **CONFIRM** that restart attempt approximately 30 sec after shutdown is successful.

NOTE: The above time delay is to prevent engine cycling.

7.7.7 PURGE GAS HIGH FLOW ALARM

NOTE: This test may require removal of sampler from drill string and temporary increase in Purge Gas Pressure regulators.

START CONDITION: Initialize Longyear Engine (ref. 7.1.2), Initialize Drill Rotation (ref. 7.3.6),.

TD/CE 9/28 7.7.7.1 Timer: **INCREASE** the air flow to excessive level (75 scfm) for 1 to 2 seconds, then **REDUCE** the air back to normal. No response should be observed from the alarm system.

TD/CE 9/28 7.7.7.2 Unacknowledged Alarm: **TURN** the air flow back up using purge gas control valves. After 3 seconds **OBSERVE** the SIREN sounds, the STROBE flashes, and the PURGE GAS FLOW HIGH Light comes on and flashes fast. **RECORD** flow rate.

TD/CE 9/28 7.7.7.3 Acknowledgment: **PRESS** the ACKNOWLEDGE button to silence the SIREN and turn off the STROBE. The PURGE GAS FLOW HIGH Light remains on steady. **CHECK** that nothing happens when RESET is pressed.

TD/CE 9/28 7.7.7.4 Condition Normalized: **TURN** the air flow back down using purge gas controls. **OBSERVE** that the FLOW HIGH Light flashes slow. **RECORD** flow rate. 92 SCFM

TD/CE 9/28 7.7.7.5 Repeat Alarm: **TURN** the air flow back up and **OBSERVE** the HIGH FLOW LIGHT remains on steady. **CHECK** that nothing happens when RESET is pressed.

TD/CE 9/28 7.7.7.6 End of Alarm: **TURN** the air flow back off and **OBSERVE** the LIGHT flashes slow. **CHECK** that the LIGHT goes out when RESET is pressed.

TD/CE 9/28 7.7.7.7 Alarm in Passing: **TURN** the air flow back up. When the alarm is tripped, **TURN** the air flow back down. **CHECK** that nothing happens when RESET is pressed.

TD/CE 9/28 7.7.7.8 Reset: **PRESS** ACKNOWLEDGE and **OBSERVE** that the SIREN and the STROBE are deenergized and that the LIGHT flashes slow. **CHECK** that the LIGHT goes out when RESET is pressed.

7.7.8 PURGE GAS LOW TEMPERATURE ALARM

START CONDITION: Initialize Longyear Engine (ref. 7.1.2), Initialize Drill Rotation (ref. 7.3.6).

TD/CE _____ 7.7.8.1 ~~**DISABLE** Purge gas low flow alarm and **CLOSE** the Purge Gas flow control valve.~~ OPEN THE PURGE GAS FLOW CONTROL VALVE

TD/CE _____ 7.7.8.2 ~~**REMOVE** temperature sensor from piping in purge gas enclosure to to allow access to temperature sensor.~~ INJECT A mV SIGNAL IN THE PURGE GAS CONNECTION BOX TO SIMULATE A LOW TEMPERATURE

TD/CE _____ 7.7.8.3 Unacknowledged Alarm: ~~APPLY cold source (approximately 40 °F) to the Purge Gas Temperature Thermocouple (TE-1).~~ **CONFIRM** that the SIREN sounds, the STROBE flashes, and the PURGE GAS TEMP LOW light comes on and flashes fast.

TD/CE _____ 7.7.8.4 Acknowledgment: **PRESS** the ACKNOWLEDGE button to silence the SIREN and turn off the STROBE. The PURGE GAS TEMP LOW light remains on steady. **CHECK** that nothing happens when RESET is pressed.

TD/CE _____ 7.7.8.5 Condition Normalized: ~~**REMOVE** cold source from TE-1.~~ DISCONNECT THE SIGNAL FROM TE-1 **OBSERVE** that the TEMP LOW light flashes slow.

TD/CE _____ 7.7.8.6 Reset: **VERIFY** that the TEMP LOW light goes out when RESET is pressed.

7.7.9 PURGE GAS HIGH TEMPERATURE ALARM

START CONDITION: Continued from above section.

TD/CE _____ 7.7.9.1 Unacknowledged Alarm: ~~APPLY heat source to the Purge Gas Temperature Thermocouple (TE-1).~~ INJECT A mV SIGNAL IN THE PURGE GAS CONNECTION BOX TO SIMULATE HIGH TEMP. **CONFIRM** that the SIREN sounds, the STROBE flashes, and the PURGE GAS TEMP HIGH light comes on and flashes fast.

TD/CE _____ 7.7.9.2 Acknowledgment: **PRESS** the ACKNOWLEDGE button to silence the SIREN and turn off the STROBE. The PURGE GAS TEMP HIGH light remains on steady. **CHECK** that nothing happens when RESET is pressed.

TD/CE _____ 7.7.9.3 Condition Normalized: **REMOVE** ~~heat source~~ THE SIGNAL from TE-1. **OBSERVE** that the TEMP HIGH light flashes slow.

7.7.9.4 Reset: **VERIFY** that the TEMP HIGH light goes out when RESET is pressed.

TD/CE _____ 7.7.9.5 ~~**REINSTALL** temperature sensor in purge gas piping and open~~ OPEN Purge Gas flow control valve to nominal flow.

TD/CE _____ ~~7.7.9.6 **ENABLE** Purge Gas Low flow alarm.~~

7.7.10 HYDROSTATIC HEAD DRILL STRING ~~(LOW FLOW)~~ ALARM LOW PRESSURE

START CONDITION: Initialize Electrical System.

TD/CE _____ 7.7.10.1 INSTALL vent valve ~~in~~ OR CHANGE OUT ASSEMBLY ON DRILL STRING SUPPLY hose Q.D. fitting ~~OR ENSURE vent valve is closed.~~ ~~CHANGE~~ QLB 6/29/95

TD/CE _____ 7.7.10.2 SET MODE Switch to SAMPLE REC. and function switches (Purge Gas, Pressurize Shielded Receiver, and PRESSURIZE Drill String) to OFF.

TD/CE _____ 7.7.10.3 Open Valves: SET PRESSURIZE DRILL STRING (SOV-16) to ON, and ADJUST drill string flow control valve, ~~FC-3~~ to provide moderate flow, ~~(0.5 scfm @ 30 psig).~~ QLB 6/29/95

TD/CE _____ ~~7.7.10.4 Timer: INTERRUPT the air flow for less than 3 seconds. Then TURN the air back on. No response should be observed from the alarm system.~~ QLB 6/29/95

TD/CE _____ ~~7.7.10.5 Unacknowledged Alarm: REDUCE the air flow to 0.2 or 0.3 scfm. After approximately 3 seconds OBSERVE the SIREN sounds, the STROBE flashes, and the HYDROSTATIC HEAD DRILL STRING light comes on and flashes fast.~~ TURN THE AIR FLOW OFF USING OFF TRUCK CONTROLS. OBSERVE THE SI SOUNDS, TH STROBE FLASHES, AL THE HYDROST HEAD DRILL STRING LIGHT COMES ON AND FLASHES FAST.

TD/CE _____ 7.7.10.6 Acknowledgment: PRESS the ACKNOWLEDGE button to silence the SIREN and turn off the STROBE. The HYDROSTATIC HEAD DRILL STRING light glows steady. CHECK that nothing happens when RESET is pressed. NOTE: THIS ALARM FUNCTIONS OFF OF MAIN SYSTEM PRESSURE WHICH MUST BLEED DOWN TO APPROXIMATELY 60 PSIG BEFORE ALARM WILL SOUND. QLB 6/29/95

TD/CE _____ 7.7.10.7 Condition Normalized: RETURN air flow to nominal. OBSERVE that the HYDROSTATIC HEAD light flashes slow.

TD/CE _____ 7.7.10.8 Repeat Alarm: TURN the air flow off using off-truck controls and OBSERVE the LIGHT remains on steady. CHECK that nothing happens when RESET is pressed.

TD/CE _____ 7.7.10.9 End of Alarm: TURN the air flow on using off-truck controls and OBSERVE the LIGHT flashes slow. CHECK that the LIGHT goes out when RESET is pressed.

TD/CE _____ 7.7.10.10 Alarm in Passing: TURN the air flow off using the off-truck controls valves. When the alarm is tripped, TURN the air flow back on. CHECK that nothing happens when RESET is pressed.

TD/CE _____ 7.7.10.11 Reset: PRESS ACKNOWLEDGE and OBSERVE that the SIREN and the STROBE are deenergized and that the LIGHT flashes slow. CHECK that the LIGHT goes out when RESET is pressed.

TD/CE _____ 7.7.10.12 TURN PRESSURIZE ~~SHIELDED RECEIVER~~ PRESSURIZE DRILL STRING (SOV-16) to OFF. QLB 6/29/95

7.7.11 DRILL STRING PRESSURE (ZERO PSIG) INDICATOR LIGHT

START CONDITION: Initialize electrical Systems, mode switch in sample Rec.

NOTE: Vacuum test line may be required for this test.

TD/CE 7.7.11.1 **ENSURE** valve is installed on drill string supply hose. **TURN** PRESSURIZE DRILL STRING to ON.

TD/CE 7.7.11.2 **CLOSE** vent valve and increase the pressure until green DRILL STRING PRESSURE light goes off. **CONFIRM** that the pressure is being recorded on channel 7 of the VGR.

TD/CE 7.7.11.3 Slowly **OPEN** vent valve to decrease pressure, and **VERIFY** the green DRILL STRING PRESSURE light comes back on when the DRILL STRING PRESSURE display reads 0 psig.

TD/CE 7.7.11.4 **TURN** PRESSURIZE DRILL STRING switch to OFF.

7.7.12 SHIELDED RECEIVER PRESSURE (ZERO PSIG) INDICATOR LIGHT

START CONDITION: Initialize electrical Systems, mode switch in sample Rec.

NOTE: Vacuum test line may be required for this test.

TD/CE 7.7.12.1 **ENSURE** Shielded Receiver Ball Valve is closed.

TD/CE 7.7.12.2 **TURN** PRESSURIZE SHIELDED RECEIVER to ON.

TD/CE 7.7.12.3 **INCREASE** the SHIELDED RECEIVER PRESSURE until green SHIELDED RECEIVER PRESSURE light goes off.

TD/CE 7.7.12.4 Slowly **OPEN** ball valve to decrease pressure, and **VERIFY** the green SHIELDED RECEIVER PRESSURE light comes back on when the SHIELDED RECEIVER PRESSURE display reads 0 psig.

TD/CE 7.7.12.5 **TURN** PRESSURIZE SHIELDED RECEIVER to OFF.

7.7.13 PURGE GAS PRESSURE (ZERO PSIG) INDICATOR LIGHT

START CONDITION: Initialize Electrical System (ref. 7.1.1).

NOTE: Vacuum test line may be required for this test.

TD/CE 7.7.13.1 **TURN** PURGE GAS switch to ON, and MODE switch to drill.

TD/CE 7.7.13.2 **INCREASE** the PURGE GAS PRESSURE until green PURGE GAS PRESSURE light goes off.

TD/CE 7.7.13.3 **DECREASE** pressure and **VERIFY** the green PURGE GAS PRESSURE light comes back on when the PURGE GAS PRESSURE display reads 0 psig.

TD/CE 7.7.13.4 **TURN** purge gas switch to OFF.

7.7.14 EXHAUSTER SHUTDOWN ALARM

NOTE: **START CONDITION:** Initiate Longyear engine (Reference 7.1.2)

TD/CE 7.7.14.1 If not already available, **OBTAIN** key for key switch (S47) labeled EXHAUSTER INTERLOCK, located on the purge gas (PG) connection box.

TD/CE 7.7.14.2 Bypass exhauster interlock: if not done already **INSERT** and **ACTUATE** the key switch on the PG connection box labeled EXHAUSTER INTERLOCK.

TD/CE 7.7.14.3 **VERIFY** the light (DS33) above the EXHAUSTER INTERLOCK key switch illuminates.

TD/CE 7.7.14.4 **PLACE** truck in rotary mode of operation.

TD/CE 7.7.14.5 Simulate exhauster failure: while in rotary mode of operation **ACTUATE** key switch labeled EXHAUSTER INTERLOCK.

TD/CE 7.7.14.6 **VERIFY** that the indicator light above the key switch is goes out.

TD/CE 7.7.14.7 Five seconds after simulated exhauster failure, **VERIFY** that the EXHAUSTER SHUTDOWN ALARM light (DS31), located on the front panel of the instrument enclosure, starts flashing.

TD/CE 7.7.14.8 Ten seconds after the simulated exhauster failure, **VERIFY** that the drill rig and purge gas shutdown.

7.7.15 DRILL STRING DEPTH INDICATOR

START CONDITION: Initialize Longyear Engine (ref. 7.1.2), Initialize Electrical System (ref. 7.1.1).

TD/CE 7.7.15.1 **RAISE** the drill head until to its uppermost position.

TD/CE 7.7.15.2 **MEASURE** and **RECORD** the distance from the bottom of the quill rod to the ground in TABLE PP.

TD/CE 7.7.15.3 **RECORD** the DRILL STRING POSITION (channel 3) displayed by the VGR in Table PP.

TD/CE 7.7.15.4 **LOWER** the drill head and **OBSERVE** that the DRILL STRING POSITION indicates a change in position until the hydraulic rams bottom out.

TD/CE 7/1/98 7.7.15.5 MEASURE and RECORD the distance from the bottom of the quill rod to the ground in TABLE PP.

TD/CE 7/1/98 7.7.15.6 RECORD the DRILL STRING POSITION (channel 3) displayed by the VGR in Table PP.

TD/CE 7/1/98 7.7.15.7 CALCULATE the difference between the starting and end position of the drill head for both the measured and displayed values. RECORD these values in Table PP.

Description	Measured	Displayed
Starting Distance in.	76 1/4	0.09
Ending Distance in.	52 3/8	24.04
Net Distance Traveled in.	24 1/8	23.95

Table PP.

For Table QQ, indicate results (OK/BAD) obtained from steps in section 7.7.

ALARM	TIMER	UNACKNOWL. ALARM	ACKNOWL.	COND. NORMAL	REPEAT ALARM	RESET	ALARM - PASSING	ENGINE SD/RS
Cabinet Temp.		OK	OK	OK	OK	OK	N/A	N/A
Down Force	OK	OK	OK	OK	OK	OK	OK	OK
High RPM	OK	OK	OK	OK	OK	OK	OK	OK
PG Low Flow	OK	OK	OK	OK	OK	OK	OK	
PG High Flow	OK	OK	OK	OK	OK	OK	OK	
PG Low Temp.		OK	OK	OK		OK		
PG High Temp.		OK	OK	OK		OK		
HH DS FLOW	N/A	OK	OK	OK	OK	OK	OK	
INDICATOR LIGHT	ON	OFF						
DS Pressure	OK	OK						
SR Pressure	OK	OK						
PG pressure	OK	OK						

Table QQ.

7.8 VIDEO GRAPHIC RECORDER

7.8.1 DISPLAY RESET

TD/CE ____/____ 7.8.1.1 **PRESS** the PAGE button located in the lower right corner of the VGR unit.

TD/CE ____/____ 7.8.1.2 **SELECT** the PAGE NO. 1 using the up/down arrow keys to the left of the PAGE button.

TD/CE ____/____ 7.8.1.3 **PRESS** the PAGE button after selecting PAGE NO. 1 option.

7.8.2 VIDEO GRAPHIC RECORDER DATA TRANSFER

START CONDITION: Initialize Longyear Engine (ref. 7.1.2), Initialize Electrical System (ref. 7.1.1),.

NOTE: The following equipment is needed to perform the VGR data transfer

RADIO FREQUENCY (RF) MODEM	PROXIM INC.
CABLE, RS-232 SERIAL	MODEM TO COMPUTER
COMPUTER, PC COMPATIBLE	ANY BRAND LAP TOP
SOFTWARE	AENET AND PC SUPPORT SOFTWARE FROM ESTERLINE ANGUS

TD/CE ____/____ 7.8.2.1 **VERIFY** the VGR is powered up and ready to operate.

TD/CE ____/____ 7.8.2.2 **PLACE** the REC MODE switch on Instrument Enclosure to REC.

TD/CE ____/____ 7.8.2.3 Gather test data: Allow VGR to record data for ~~approximately five minutes~~. duration of VGR Test.

~~**NOTE:** The status of the truck (idle or operating) does not matter. The previous step insures that there is some data to transfer.~~

TD/CE ____/____ 7.8.2.4 ~~**PLACE the REC MODE switch on the Instrument Enclosure to STBY.**~~

NOTE: Data retrieval computer setup: If the test is to be performed indoors, or with wall and other obstacles between the VGR and computer/RF modem, insure that the computer/RF modem used to retrieve data is within 500 feet of the VGR. If the test is conducted outdoors, or where there are no obstacles between the VGR and computer/RF modem, then the distance between the VGR and computer/RF modem can be up to 800 feet.

TD/CE ____/____ 7.8.2.5 **CONNECT** data retrieval computer and RF modem using a RS-232 serial cable.

TD/CE ____/____ 7.8.2.6 **APPLY** power to computer and RF modem.

TD/CE ____/____ 7.8.2.7 If not already, **LOAD** Esterline Angus AENet and PC Support Software onto data retrieval computer and **RUN** AENet Software.

TD/CE 7.8.2.8 **RETRIEVE** data from VGR using computer/RF modem using AENet software.

NOTE: Depending on how much data is in the VGR the pervious step may take several minutes to complete

TD/CE 7.8.2.9 **REVIEW** retrieved data using AENet or PC Support Software from Esterline Angus. **DETERMINE** if data is from the truck VGR under test by comparing data, including but not limited to, date/time stamp, VGR ID and analog data. Make print out(s) of data for comparison.

7.8.2.8.1 Operate truck per Cog. Eng. direction to gather test data on RPM, Purge Gas pressure, down force, penetration rate, lower ram pressure & purge gas flow.

7.8.2.8.2 Place Rec Mode switch in STBY.

~~Record data~~

8.0 TEST PROCEDURE (SAMPLING)

8.0.0.1 PRIOR TO THE START OF EACH SESSION, THE ~~ATP~~ DAILY CORE SA
This portion of the ATP is intended to demonstrate that the truck components work together to perform the required task of sampling. It is specifically generic and is only intended to be a guide for the cognizant engineer to perform sampling operations. It is left to the cognizant engineer's discretion to use appropriate methods to obtain the core sample. All problems and anomalies encountered during sampling will be documented in the same manner as described previously in this document. As part of the sampling test, the following steps will be verified where appropriate, and signed off at the completion of sampling operations. The sample will be taken by drilling one or more segments into hard K-mag.

INSPECT CHECK LIST SH BE COMPLE SEE ATTACH

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TOUCH 8.0.1 **VERIFY** bit penetration rate during saltcake simulant drilling is at least 19 inches in a 30 minute period by confirming that sample drilling times recorded on the Test Sample Data Sheets (Item 17), are 30 minutes or less for a 19 inch segment.

TOUCH 8.0.2 **VERIFY** compatibility between hydrostatic head system and purge gas system by observing proper operation of purge gas system in drill mode and in sample recovery mode.

TOUCH 8.0.3 **VERIFY** compatibility between hydrostatic head system and existing core sampling equipment by observing trouble-free operation and connection of purge gas system components to core sampling truck during sampling operations.

TOUCH 8.0.4 **VERIFY** that gasses which require venting will be vented back to tank by observing proper operation of purge gas system valves in venting through the drill rod spray washer.

8.1 PREPARE TO SAMPLE

8.1.1 **PREPARE** the drill string as directed below:

8.1.1.1 **OBTAIN** the appropriate drill rod sections for sampling tests.

8.1.1.2 **CLEAN** each piece of drill rod to assure there is no foreign material inside and **INSPECT** for damage.

8.1.2 **ASSEMBLE** and **INSTALL** the riser adapter, gaskets, drill rod washer, wiper seal, and foot clamp onto the simulated tank riser as depicted in Figure 17 below.

8.1.3 **COVER** the ground in the immediate area around the riser with kraft paper, plastic, or rubber as necessary.

8.1.4 **ROTATE** the platform to position the quill rod directly over the tank riser.

8.1.5 **LOWER** the quill rod to the full DOWN position.

8.1.6 **SET** the truck height required for sampling as directed below:

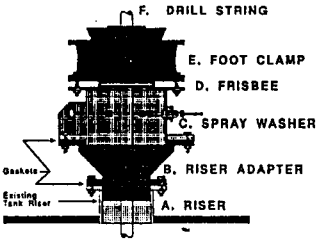


Figure 17) Riser Assembly.

8.1.6.1 **PLACE** the 4-way valve in the FLOAT position, then **CONNECT** the hydraulic hoses to the hydraulic leveling system.

8.1.6.2 **RAISE** the core sample truck uniformly to set the QUILL ROD ADAPTER to RISER FLANGE DISTANCE (see Figure 18 below) to that indicated by the cognizant engineer.

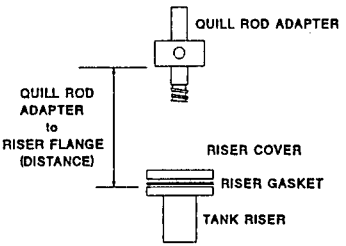


Figure 18) Quill Rod Adapter to Riser Flange Distance.

8.1.6.3 **ENSURE** all leveling control valves are closed, then **PLACE** the 4-way valve in the FLOAT position.

8.1.6.4 **DISCONNECT** and **STORE** the hydraulic leveling hoses.

8.1.7 **RAISE** the quill rod to the full UP position, then **ROTATE** the platform to allow installation of the drill string into the riser assembly.

WARNING - The universal sampler valve is closed by a high force spring. Keep the sampler piston fully lowered into the sampler to prevent accidental closing of the valve.

8.1.8 **CONNECT** the bit to the core barrel and **LATCH** the sampler into the core barrel by hand and **VERIFY** connection is good.

8.1.9 **ENSURE** that the plug has been removed from the wiper seal, then **INSERT** the core barrel with sampler into the foot clamp.

8.1.10 **INSTALL** the drill rods, EXCEPT the 19" sections as directed below:

NOTE: The first 19 inch section will be installed in section 8.2.

8.1.10.1 **APPLY** a generous amount of pipe joint compound to the threads of each section before assembly.

8.1.10.2 **LUBRICATE** the wiper seal with Molylube as necessary to allow installation of the drill string and to minimize friction during operation.

8.1.10.3 **LOWER** the assembled drill string into the foot clamp and wiper seal using the platform crane or other suitable means.

8.1.11 **PREPARE** the nitrogen supply system as directed below:

8.1.11.1 **ENSURE** that the DRILL STRING, SHIELDED RECEIVER, and PURGE GAS flow controls within the purge gas enclosure are closed.

8.1.11.2 **CONNECT** the vent line (VENT TO TANK) at the left rear of the sample truck to the vent port on the drill rod washer.

8.1.11.3 **CONNECT** the vent line (VENT DRILL STRING) at the left rear of the sample truck to the vacuum test device.

8.1.11.4 **CONNECT** the nitrogen/air supply from the compressor to the receiving port near the driver's door on the sample truck.

8.1.11.5 **ENSURE** supply air is at 125±15 psig.

8.2 PERFORM CORE SAMPLING

8.2.1 **ROTATE** the platform to place the quill rod directly over the DS.

8.2.2 **POSITION** the DS and **RESET** the mechanical grapple counter as directed below:

8.2.2.1 **OPEN** the chuck, **LOWER** the quill rod and **CONNECT** to the DS.

8.2.2.2 **CLOSE** the chuck and **OPEN** the foot clamp.

8.2.2.3 **LOWER** the rams to the full down position.

8.2.2.4 **CLOSE** the foot clamp.

8.2.2.5 **DISCONNECT** the quill rod from the DS, then **RAISE** the rams to the full up position.

8.2.2.6 **PLACE** the GRAPPLE switch on the SAMPLE ACTUATOR panel to GRAPPLE LOWER, then HOLD the grapple HOIST switch to UP to raise the grapple to the upper limit switch.

8.2.2.7 **ZERO** the mechanical grapple counter.

8.2.2.8 **HOLD** the SAMPLE DOWN BYPASS button and **PLACE** the HOIST switch in the DOWN position until the grapple is lowered about 6 inches; (until the HYDRAULIC INTERLOCK light on the ACTUATOR panel goes out), then **RELEASE** the HOIST switch.

8.2.3 **ATTACH** a 19 inch section onto the assembled drill string with a generous amount of pipe joint compound.

8.2.4 **OPEN** the chuck, **LOWER** the quill rod and **MATE** the quill rod adapter to the DS.

8.2.5 **CLOSE** the chuck and **DEPRESS** the foot clamp pedal to OPEN the foot clamp.

8.2.6 **PREPARE** the actuator for the sampling as directed below:

8.2.6.1 **POSITION** the actuator mode switch to GRAPPLE LOWER and **HOLD** the hoist directional switch to DOWN to lower the grapple.

8.2.6.2 **RELEASE** the hoist directional switch when the hoist motor automatically stops. (The grapple rests on the sampler.)

8.2.6.3 **RECORD** the grapple cable length on the DATA SHEET Item 7.

8.2.6.4 **PLACE** the actuator mode switch in the SAMPLING position then **HOLD** the hoist directional switch in the UP position. (The hoist motor will automatically stop when slack is removed from the hoist cable.) **RELEASE** the hoist directional switch.

8.2.6.5 **SET** the RECORDER MODE switch to the OPERATE position. (See Figure 10 for reference).

8.2.7 **PLACE** the 4-way valve in the RAISE position.

8.2.8 **ENSURE** proper adjustment of the ram hydraulic pressure regulator set point.

NOTE: If necessary, adjust the regulator pressure to limit the down force applied by the rams, preventing buckling of the DS.

8.2.9 **ESTABLISH** purge gas flow as directed below:

8.2.9.1 **ENSURE** that the PURGE GAS FLOW control is fully closed.

8.2.9.2 **PLACE** the nitrogen MODE switch in the DRILL position.

8.2.9.3 **POSITION** the PURGE GAS switch to ON.

NOTE: At this point, the SR is vented to the tank and purge gas flow may be started past the drill bit.

8.2.9.4 **ADJUST** the PURGE GAS PRESSURE regulator as required.

8.2.9.5 **OPEN** the PURGE GAS FLOW control to establish nominal flow to the drill string.

8.2.9.6 **RECORD** the PURGE GAS PRESSURE and PURGE GAS FLOW rate, as indicated on the instrumentation display, in item 8 on the TEST SAMPLE DATA SHEET.

8.2.9.7 **ENGAGE** the Longyear to begin DS rotation at nominal speed.

8.2.9.8 **RECORD** the DRILL STRING RPM, as indicated on the instrumentation display panel, on item 9 of the DATA SHEET.

8.2.10 **SET** stopwatch to record time required to drill 19" segment, and **ADJUST** the DOWN ram control valve as required to start drill penetration.

8.2.11 **LUBRICATE** the wiper seal with Molylube as necessary for DS rotation.

8.2.12 When the stroke is completed, **PROCEED** as directed below:

8.2.13 **RECORD** time required to drill 19" segment (if applicable) on item 17 of the DATA SHEET, **DISENGAGE** the clutch, then **CLOSE** the PURGE GAS FLOW control valve.

8.2.14 **RAISE** the grapple and pintle rod as directed below:

8.2.14.1 **POSITION** the GRAPPLE switch to GRAPPLE LOWER.

8.2.14.2 **HOLD** the HOIST switch in the UP position to raise grapple and pintle rod up the DS about two feet, then **RELEASE** the HOIST UP switch.

NOTE: The grapple assembly will start moving up the DS with the pintle rod and piston attached. The rotary valve on the sampler will be closed by a spring mechanism. The pintle rod will then be separated from the sampler piston when a force of 150 lbs is developed at the piston stop.

8.2.15 **POSITION** the DATA LOGGER MODE switch to STANDBY to allow the rams to be raised.

8.2.16 **RAISE** the DS about 1 inch to ensure trouble-free installation of the next sampler.

8.2.17 **HOLD** the SAMPLE ACTUATOR HOIST switch in the UP position to raise grapple and pintle rod to just below upper limit switch, then **RELEASE** the HOIST UP switch.

8.2.18 **PLACE** the PURGE GAS switch in the OFF position, then **CLOSE** the PURGE GAS FLOW control valve.

8.2.19 **VERIFY** from the purge gas pressure gage, purge gas display, and green indicator light that the drill string and grapple box are vented.

> **CAUTION**
>
> **IF AN INDICATOR SHOWS THE GRAPPLE BOX IS PRESSURIZED, DO NOT UNTHREAD THE QUILL ROD.**

8.2.20 **CLOSE** the foot clamp.

8.2.21 **OPEN** the chuck, **UNTHREAD** and **RAISE** the quill rod adapter from the DS. **CLOSE** the chuck.

8.2.22 **ROTATE** the platform to place the quill rod aside of the DS.

8.2.23 **PRESSURIZE** the DS to maintain hydrostatic head as directed below:

8.2.23.1 **CONNECT** the cable spray washer and SCA to the DS then **CONNECT** the SUPPLY DRILL STRING line from the right rear of the truck to the SCA.

8.2.23.2 **ENSURE** that the SCA isolation valve is CLOSED.

8.2.23.3 **INSTALL** the kamlock cap onto the SCA.

8.2.23.4 **PLACE** the purge gas MODE switch to SAMPLE RECOVERY and the DS GAS FLOW switch in the ON position.

8.2.23.5 **VERIFY** that the DS FLOW control valve is CLOSED, then **ADJUST** the DS PRESSURE to 30 psig.

8.2.23.6 **OPEN** the DS FLOW control to allow minimal flow (1-5 scfm) through the DS. (Gas should flow slowly, but steadily.)

8.2.24 **ATTACH** the pintle/pull-rod overpack to the quill rod adapter.

8.2.25 **HOLD** the SAMPLE ACTUATOR HOIST switch in the UP position to raise grapple and pintle rod to the upper limit switch, then **RELEASE** the HOIST UP switch.

8.2.26 **ENGAGE** the UP LIMIT BYPASS switch and **HOLD** the HOIST switch in the UP position until the pintle releases.

8.2.27 **DETACH** the overpack from the quill rod adapter and **VERIFY** that the pintle is in the overpack.

8.2.28 HOLD the SAMPLE DOWN BYPASS button and HOLD the HOIST switch in the DOWN position to lower the grapple about 6 inches (so that the actuator HYDRAULIC INTERLOCK light goes OFF), then RELEASE the button and switch.

8.3 RECOVER SPENT SAMPLER FROM DRILL STRING

8.3.1 POSITION the SR over the DS, then LOWER and MATE the SR to the sampler change-out assembly.

8.3.2 ENSURE that the RLU is in the CLOSED position.

8.3.3 PRESSURIZE the DS to maintain hydrostatic head as directed below:

8.3.3.1 PLACE the purge gas MODE switch to SAMPLE RECOVERY and the PRESSURIZE DRILL STRING switch in the ON position.

8.3.3.2 VERIFY that the DS FLOW control valve is CLOSED, then ADJUST the DS PRESSURE to 30 psig.

8.3.3.3 OPEN the DS FLOW control to allow minimal flow (less than 0.5 scfm) through the DS. (Gas should flow slowly, but steadily.)

8.3.3.4 POSITION the PRESSURIZE SHIELDED RECEIVER switch to ON.

8.3.3.5 ADJUST the SR pressure regulator slightly higher than that set in the DS.

8.3.3.6 OPEN and CLOSE the SR flow control slightly to bring the SR pressure just above that in the DS.

8.3.3.7 OPEN the isolation valve on the sampler change-out assembly and SR ball valve.

8.3.4 RAISE RLU to the full UP position, then zero the mechanical and digital receiver cable counters.

8.3.5 LOWER the RLU UNTIL slack in the cable stops the motor.

8.3.6 RECORD the electronic and mechanical encoder readings on the DATA SHEET Item 11.

8.3.7 UNSEAT and RAISE the sampler as directed below:

8.3.7.1 SET the speed control on the motor control panel to 0.

8.3.7.2 HOLD the hoist directional switch in the UP position.

8.3.7.3 OBSERVE the LOADCELL READOUT on the CONTROL CONSOLE and slowly INCREASE the hoist speed (do not exceed 50). RAISE the sampler about 2 feet and RECORD the highest LOADCELL weight on the DATA SHEET Item 13.

8.3.7.4 RECORD the LOADCELL weight on the DATA SHEET Item 14.

8.3.7.5 **ADJUST** the DS FLOW control to reset minimal flow (1-5 scfm) through the DS. (Gas should flow slowly, but steadily.)

8.3.7.6 **RECORD** the DS PRESSURE and FLOW as indicated on the instrumentation display in Item 12 of the DATA SHEET.

8.3.7.7 **INCREASE** the speed to near 50 to raise the sampler up the DS.

8.3.8 **INSPECT** the sampler in the sight glass.

8.3.9 **INDICATE** the cleanliness of the sampler on the DATA SHEET Item 15.

8.3.10 If excessive material is observed on the sampler, **NOTE** condition on the Test Sample Data Sheet.

8.3.11 **RAISE** the sampler into the SR until the upper limit switch is reached and the SR hoist automatically stops.

8.3.12 **CLOSE** the isolation valve on the sampler change-out assembly.

8.3.13 **DE-PRESSURIZE** the SR as directed below:

8.3.13.1 **DE-PRESSURIZE** the SR by placing the PRESSURIZE SHIELDED RECEIVER switch to OFF.

NOTE: The SR nitrogen supply will be closed and the SR will be vented if it was pressurized.

8.3.13.2 **VERIFY** that the SR is vented by observing the purge gas assembly gages, the instrumentation pressure and the green SR pressure indicator lights.

CAUTION

IF AN INDICATOR SHOWS THE SHIELDED RECEIVER IS PRESSURIZED, DO NOT DISCONNECT THE SR FROM THE CHANGE-OUT ASSEMBLY.

8.3.14 **CLOSE** the ball valve on the SR.

8.3.15 **UNLATCH** and **RAISE** the SR away from the SCA.

8.3.16 **ROTATE** the platform so the SR is not over the riser.

8.3.17 **OPEN** the ball valve on the SR.

8.3.18 **LOWER** the RLU until the sampler is out of the SR.

8.3.19 **DISCONNECT** the RLU from the sampler as directed below:

8.3.19.1 **ENSURE** that the READY light is ON.

8.3.19.2 **PUSH** the START button momentarily. The OPEN light should illuminate within 2 minutes. **HOLD** the sampler during this operation to keep it from dropping out of the RLU.

8.3.19.3 **PUSH** and **HOLD** the START button on the Latching Control panel to attain the CLOSED position.

8.3.20 **RAISE** the RLU into the SR until the upper limit switch is reached and the SR hoist automatically stops.

8.3.21 **CLOSE** the ball valve on the SR.

8.3.22 **PREPARE** truck and test materials for additional core drilling as directed by the cognizant engineer. If final ATP core has been completed **ENSURE** truck configured for safe disposition.

MAJOR EQUIPMENT COMPONENTS

NAME	PURPOSE
Rotary Drilling Platform	Supports core drill and auxiliary equipment.
Drilling Unit	Longyear Model 34 drill rig which applies rotary motion and downward thrust to the drill string (rotation is disabled for push mode)
Drill Rod Hoist	Hoist mounted on the rotary platform that provides on-site method to handle transfer cask stand, riser equipment and drill string.
Drill Rod Washer Assembly	Spray washes and wipes drill rod during retrieval. Provides seal between tank and environment.
Quill Rod	A section of drill rod which remains in the drill head and is used to transfer power from the drilling unit to the drill string.
Drill String	Transmits power from drill unit to drill bit. Composed of various pieces of drill rod.
Core Barrel/Bit Assembly	Holds sampler during sampling (Is Drill string Section #1).
Universal Sampler	Collects sample and retains sample when transported to lab.
Foot Clamp	Retains drill string when shielded receiver or quill rod is disconnected.
Riser Adapters	Provides means to connect spray washer to various sizes of risers.
Kamlok Adapters	Provide connections of shielded receiver to drill rod and casks.

MAJOR EQUIPMENT COMPONENTS (cont)

NAME	PURPOSE
Caps	Covers for adapters in standby status.
Shielded Receiver	Retrieves sample from drill string by an internal power winch and cable. Provides interim sample shielding, and deposits sample in transfer cask; also removes clean sampler from cask and transfers it to drill string for next sample.
Remote Latch Unit	Means to retrieve and release samplers. (Raised and lowered by shielded receiver winch.)
Weight Transducer	Transducer sampler weighing device. (Attached to cable sheave on shielded receiver.)
Cable Length Counter (Mechanical)	Digital revolution counter. (Attached to cable sheave inside shielded receiver.)
Cable Length Counter (Electronic)	Digital readout in control console that tells how much cable has been lowered down drill string.
Cable Spray Washer	Used in drill string to wash internal cables. (Shielded receiver and sample actuator winch cables.)
Sampler Change-Out Assembly	Provides means to maintain pressure within the drill string while samplers are exchanged.
Nitrogen Supply System	Provides drill bit cooling and cleaning during rotary drilling. Provides method of maintaining a suppressed liquid level within the drill string.

Item Status Verification Sheet

ITEM	REQUIREMENT	QC VERIFY
Hoist Hook	CERT. TAG	3/28/95
Grapple Box (pressure vessel)	ASME STAMP	
Shielded Receiver (pressure vessel)	ASME STAMP	
Hydraulic Ram Pressure UP gage	CAL. STICKER	
Hydraulic Ram Pressure DOWN gage	CAL. STICKER	
Purge Gas Pressure Meter	CAL. STICKER	
Purge Gas Temperature Meter	CAL. STICKER	
Instrumentation Cabinet Temperature Meter	CAL. STICKER	
Purge Gas Flow Meters	CAL. STICKER	3/28/95
Hydrostatic Head Flow Meters	CAL. STICKER	N/A
Drill String RPM Meter	CAL. STICKER	3/28/95
Shielded Receiver Pressure Meter	CAL. STICKER	3/28/95
Drill String Pressure Meter	CAL. STICKER	3/28/95
Bit Penetration Rate Meter	CAL. STICKER	3/28/95
Bit Downward Force	CAL. STICKER	6/30/95
Oxygen Sensor	CAL. STICKER	3/28/95

Table RR.

Test Sample Data Sheet*

Item	Description		Condition	Response	
1	Description of Test Medium		K-Mag/Sludge/Mixture/Etc		
2	Universal Sampler Number		For Record Only		
3	Segment Number		For Record Only		
4	Date of Sampling		For Record Only		
5	Encoder Values of Previous Segment at Bottom of Drill String	Mechanical	feet		
		Digital	feet		
6	Encoder Values at Bottom of Drill String	Mechanical	feet		
		Digital	feet		
7	Grapple Counter at Bottom of Drill String		feet		
8	Purge Gas (gage/display)	Pressure	psig		
		Flow Rate	cfm		
9	Longyear Drill Speed		rpm		
10	Predicted Spent Sampler Location	Mechanical	feet		
		Digital	feet		
11	Indicated Spent Sampler Location	Mechanical	feet		
		Digital	feet		
12	Drill String - with sampler removed	Pressure	psig		
		Flow Rate	cfm		
13	Maximum Force to Unseat Sampler		lbs		
14	Loadcell Weight with Sampler Attached		lbs		
15	Cleanliness of Sampler		For Record Only		
16	Sample Characteristics When convenient to do so, each sample should be analyzed to determine the characteristics of the waste collected in the sampler.	Volume	For Record Only		
		Weight	For Record Only		
		Length	For Record Only		
17	Drilling Time Required to Take Sample		minutes		

COMMENTS:

Table SS.

* SEE ATR SECTION 2.0 Pg 2-17 & 2-18

SC 4/4/96

ATP Exception / Resolution Sheet *

ITEM #	STEP #	DESCRIPTION OF PROBLEM	RESOLUTION TO PROBLEM	INITIALS

Table TT. SHEET _____ OF _____

(insert additional sheets, as required)

* SEE ATR SECTION 2.0 Pg 2-8 THROUGH 2-14 4/4/96

ATP Comment Sheet

ITEM #	STEP #	COMMENT	INITIALS
1	7.7.2	After completion and acceptance of this section, the piston seals for the hydraulic rams were replaced with a new seal design which would reduce the effect of dynamic friction differences caused by flucuations in the hydraulic ram pressure. This change in design affected the drill bit downward force causing a retest of this section (7.7.2). This retest is shown in attachment D.	MLL ± 6/30/95

Test Completion Sign-Off Sheet

All tests have been completed as delineated in this Acceptance Test Procedure. All exceptions have been documented and resolved as indicated on the "ATP Exception / Resolution Sheet". The core sample truck and associated equipment can be operated in a safe manner and are accepted as meeting all development criteria. The Core Sample Truck is now ready for operability testing preparations.

Signature	Date
Test Director	6/30/95
Quality Assurance	6/30/95
Waste Tank Safety Assurance	6/30/95
Core Sampling Cognizant Engineer	6/30/95
Mechanical Engineering	6/30/95
Core Sampling Manager	6/30/95

APPENDIX ONE: Criteria Index

CRITERIA	CRITERIA PROVEN	ATP PARAGRAPH NUMBER WHC-SD-WM-ATP-048
The bit designed shall be compatible with the disposable sludge sampler (drawing H-2-99315).	DEVELOPMENT TEST	N/A
The bit designed shall be compatible with existing drill string (type BX).	DEVELOPMENT TEST	N/A
The distance from the end of the bit to the lower end of the sludge sampler rotary valve shall be no greater than three inches.	DEVELOPMENT TEST	N/A
The new hydrostatic head balancing system (HHS) shall be compatible with the new purge gas system and/or the existing compressor on the CST.	ROTARY MODE ATP WHC-SD-WM-ATR-048	8.0.2
The HHS system shall meet the criteria from WHC-SD-WM-WP-054 Rev. 0. If discrepancies between this document and WHC-SD-WM-CR-044 are found, WHC-SD-WM-CR-044 takes precedence.	DESIGN REVIEW FOR ROTARY MODE CORE SAMPLE TRUCK #2	N/A
The HHS system shall be capable of keeping waste material out of the drill string during sampler exchanges.	ROTARY MODE ATP WHC-SD-WM-ATR-048	8.0.4
The HHS system shall be capable of maintaining hydrostatic head pressures of 30 psig.*	STRESS ANALYSIS REPORT, ASME STAMP CERTIFICATE, DESIGN REVIEW	N/A
The HHS system shall be compatible with existing core sampling equipment (ie. drill string).	ROTARY MODE ATP WHC-SD-WM-ATR-048	8.0.3
The HHS system shall be capable of monitoring the gas flow to the drill string.	ROTARY MODE ATP WHC-SD-WM-ATR-048	7.6.4
The HHS system shall be capable of monitoring the gas pressure to the drill string.	ROTARY MODE ATP WHC-SD-WM-ATR-048	7.6.4
Gasses which require venting shall be piped back to the tank.	ROTARY MODE ATP WHC-SD-WM-ATR-048	8.0.5
The HHS system shall have the shielded receiver or any part of the system that become a pressurized vessel (under DOT or WHC standards), designed to all applicable regulatory and company standards.	STRESS ANALYSIS REPORT, ASME STAMP CERTIFICATE, DESIGN REVIEW	N/A

* Indicates change to criteria document

CRITERIA	CRITERIA PROVEN	ATP PARAGRAPH NUMBER WHC-SD-WM-ATP-048
The sampler shall obtain and retain 85% of the sampler's designed capacity 90% of the time (does not apply to transition zones).*	ROTARY MODE ATP WHC-SD-WM-ATR-048	8.0.7
The sampler shall obtain and retain liquid, sludge, and salt-cake samples.	ROTARY MODE ATP WHC-SD-WM-ATR-048	8.0.7
The sampler shall be compatible with existing core sampling equipment :drill string, shipping casks and liners, and shielded receiver.	ROTARY MODE ATP WHC-SD-WM-ATR-048	8.0.3
Both PNL's 325A and 222-S's hot cells shall be capable of recovering the sampled material. The sampler does not need to be compatible with the current extrusion system. If not, design a system to enable sample recovery.	TEST OF EXTRUDER DESIGN	N/A
The designed capacity of the sampler shall be at least 11.29 cubic inches.	DESIGN REVIEW FOR RMCST #2	N/A
The sampler shall not fill prior to pushing the drill string.	ROTARY MODE ATP WHC-SD-WM-ATR-048	8.0.9
The sampler shall minimize changes in chemical and physical properties of the sample (moisture, total organic, etc...).	MOISTURE TESTS	N/A
Modifications made to the disposable sampler shall be incorporated into the universal sampling system.	DESIGN REVIEW FOR RMCST #2	N/A
The sampler shall be able to operate under 30 psig working pressure, * and 55 psig test pressure (hydrostatic head forces).	ROTARY MODE ATP WHC-SD-WM-ATR-048 DESIGN REVIEW FOR RMCST #2	8.0.9 N/A
The sampler shall be able to operate while containing the source term identified in SD-WM-WP-004 Rev. 1. (ie. 2000 R/hr for 7 days and 100 R/hr for 3 months.)	SARP	N/A
The radioactive contamination of the outside surfaces of the sampler shall be as low as reasonably achievable upon extraction from the drill string.	DESIGN REVIEW FOR RMCST #2	N/A
The sampler shall meet requirements outlined in SD-WM-WP-004 and WHC-SD-WM-CR-044. Criteria listed in this table shall take precedence if discrepancies exist.	SAMPLER TEST & DESIGN REVIEW	N/A
The piston shear pin shall shear at 150 lbs. force.*	SAMPLER TEST	N/A
With the sampler valve in the closed position and the sampler fully filled with water and held in a vertical position for a one hour period the valve mechanism will show no leakage.*	ROTARY MODE ATP WHC-SD-WM-ATR-048	8.0.8

CRITERIA	CRITERIA PROVEN	ATP PARAGRAPH NUMBER WHC-SD-WM-ATP-048
The bit shall not penetrate a predetermined depth of the steel liner of a tank at 1500 lbs force and 50* RPM after running a predetermined amount of time. Mechanical Engineering is to develop the penetration rate based on estimated tank steel liner and safe field sampling conditions.	ENVELOPE TEST REPORT	N/A
The bit shall be capable of being cooled to a maximum ΔT (from the ambient waste temperature to the bit/waste interface temperature) of 105°F (Appendix A). This shall require the development of a sampling envelope discussed below.	ENVELOPE TEST REPORT	N/A
The bit shall penetrate salt cake material at a rate of at least 19 inches in a 30 minute period.	ROTARY MODE ATP WHC-SD-WM-ATR-048	8.0.1
The following table (TABLE B-1) shows the operational parameters for the purge gas feed system.	PGT QA INSPECTION PLAN	N/A
The minimum N_2 purity shall be 97% by volume. No volatile gases shall be present.	NITROGEN P.O.	N/A
The purge gas temperature shall not be allowed to drop below 35°F or rise above 100°F with tank farm out-of-door temperatures ranging from 0°F to 120°F.*	DESIGN REVIEW & PGT QA INSPECTION PLAN	N/A
The supply system shall be easy to refill.	PGT QA INSPECTION PLAN	N/A
The supply shall last for a minimum of 8 hours of drilling (16 hours or more is desirable).	DESIGN REVIEW FOR RMCST #2	N/A
The system and gas chosen must be designed such that waste or tank conditions are not made worse by the addition of the gas at any location in the tank.	SAFETY ASSESSMENT OR LIMITED SAR	
The following table (TABLE B-2) lists the instrumentation and parameters to be installed on the CST.	DESIGN REVIEW & ENVELOPE TEST REPORT	N/A
The safety envelope shall be established using the variables shown in TABLE B-3.	ENVELOPE TEST REPORT, THERMAL MODELING	N/A
Envelope testing shall be conducted at impact level 2 on a representative simulant(s).	ENVELOPE TEST REPORT, SIMULANT DOCUMENT	N/A
Verification and final performance testing shall be conducted in a representative depth of a simulant, at impact level 3.*	ROTARY MODE ATP WHC-SD-WM-ATR-048	8.0

* Indicates change to criteria document

TABLE B-1..OPERATIONAL PARAMETERS FOR THE PURGE GAS FEED SYSTEM

PARAMETER	RANGE	
	Low	High
Flow Rate	0 cfm	50 cfm
Supply Pressure	20 psig	90 psig
Temperature	35°F	100°F

TABLE B-2..INSTRUMENTATION AND PARAMETERS TO BE INSTALLED ON THE CST

PARAMETER	RANGE		MEASUREMENT ACCURACY	CONTROL	ALARM
	Low	High			
Drill String Rotational Speed	0 rpm	300 rpm	± 3 rpm	manual	low/high when a down force is applied
Drill Bit Downward Force	0 lbs.	5000 lbs.	± 50 lbs.	manual	high
Penetration Rate	0 inches/ minute	20 inches/ minute	± 0.5 inch/minute	none	none
Purge Gas Flow	0 cfm	90 cfm	± 2 cfm	manual	low
Purge Gas Temp.	0°F	100°F	± 5°F	none	low/high

TABLE B-3..SAFETY ENVELOPE PARAMETERS

VARIABLE	MINIMUM	MAXIMUM
Rotary Mode Downward Force	N/A	1500 lbs force
Purge Gas Flow	0 cfm	50 cfm
Drill String RPM	N/A	55 rpm
Feed Rate	0 inches/minute	10 inches/minute

ATTACHMENT A

WHC-SD-WM-ATR-119 REV. 0

DON'T SAY IT --- *Write It!* DATE: 3/22/95

TO: J. R. HEADLEY FROM: J. L. SMALLEY

Telephone: 372-0886

CC:

SUBJECT: PRE-ATP REQUIREMENTS FOR ICF KH

The process control package (PCP) 29 was written to support changes made during start up testing and ATP of rotary mode core sample trucks 3 and 4. Before the ATP can commence, ICF KH Quality Control must verify that all required welds and electrical continuity checks have been performed and accepted. Since work performed to PCP 29 is in support of the ATP, weld inspections performed as required by this package is exempt from being performed prior to the start of the ATP. However, all welds requiring QC verification must be completed before the end of the ATP. In addition, all wiring changes indicated by PCP 29 is exempt from point to point continuity checks since the cognizant electrical engineer witnessed work performed and functionally checked the system after work was completed.

J L Smalley 3/22/95

J. L. Smalley
Cognizant Engineer

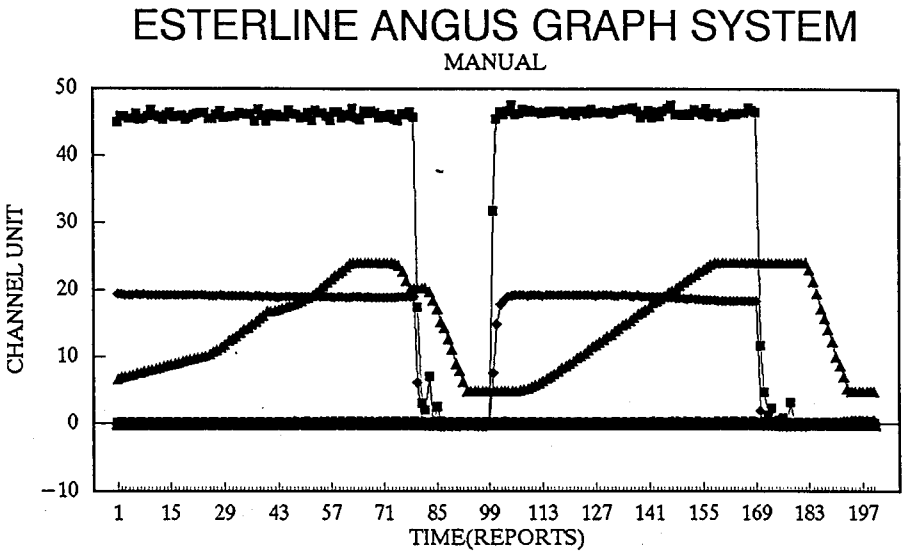
ATTACHMENT B

DATA SHEET 5 - DAILY CORE SAMPLE/INSPECTION

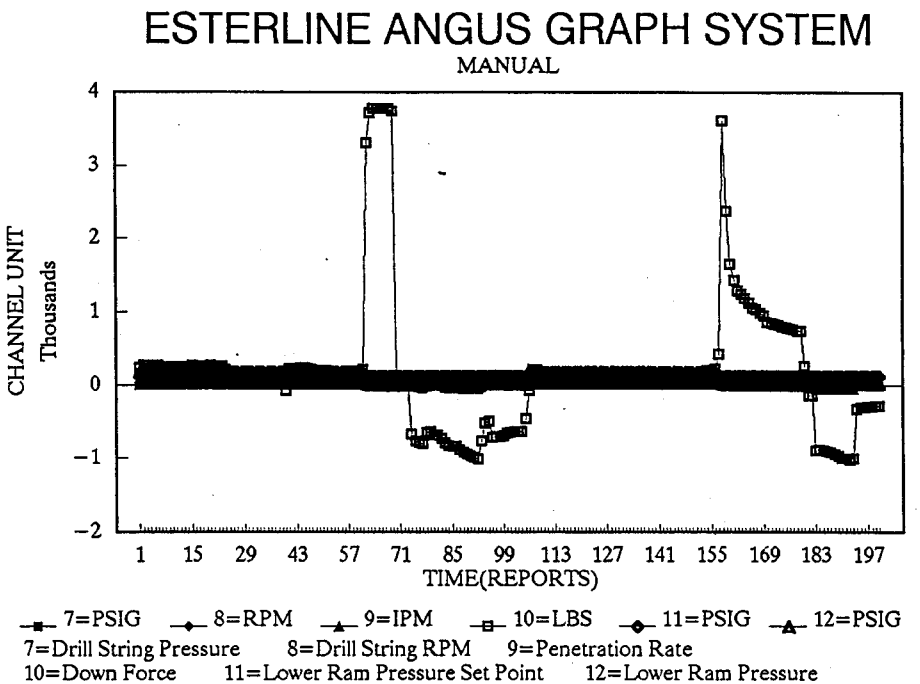
TANK # ATP RISER # N/A

ENSURE THE FOLLOWING CONDITIONS DAILY, PRIOR TO SAMPLING	DATE: / INITIAL:	DATE: / INITIAL:	DATE: / INITIAL:	DATE: / INITIAL:	DATE: / INITIAL:
SR IS POSITIONED FOR SAFE OPERATION	5.11-95				
QUILL ROD IS POSITIONED FOR SAFE OPERATION	5-11-95				
DRILL HEAD RAM VALVES CLOSED	5-11-95				
4 WAY VALVE IN HEAD OR FLOAT POSITION	5-11-95				
JACK HOSES DISCONNECTED	5-11-95				
VISUALLY INSPECT ELECTRICAL CORDS FOR DAMAGE	5-11-95				
VISUALLY INSPECT HYDRAULIC LINES & FITTINGS FOR ABNORMAL LEAKAGE AND/OR DAMAGE	5-12-95				
VISUALLY INSPECT AIR/NITROGEN HOSES FOR DAMAGE	5-11-95				
DRILL ENGINE FUEL LEVEL SATISFACTORY	5-11-95				
DRILL ENGINE OIL LEVEL SATISFACTORY	5-11-95				
DRILL ENGINE WATER SATISFACTORY	5-11-95				
SR HOIST FUNCTIONS FOR UP AND DOWN	5-11-95				
RLU MOTOR FUNCTIONS FOR OPEN AND CLOSE	5-11-95				
GRAPPLE HOIST FUNCTIONS FOR UP AND DOWN	5-11-95				
ALARM LIGHTS OPERATIONAL ON INSTRUMENT DISP	5-11-95				
CHART RECORDER FUNCTIONS PROPERLY/PAPER FOLDING CORRECTLY/ENOUGH PAPER (5m)	N/A				
CLOCKWISE & COUNTERCLOCKWISE SLOW ROTATION	5-11-95				
CLOCKWISE & COUNTERCLOCKWISE FAST ROTATION	5-11-95				
FORWARD & REVERSE TRAVEL	5-11-95				

ATTACHMENT C



1=Purge Gas Flow 2=Purge Gas Pressure 3=Drill String Position
4=Shielded Receiver Flow 5=Drill Sting Flow 6=Shielded Reciever Pressure


ESTERLINE ANGUS GRAPH SYSTEM
MANUAL
CHANNEL UNIT
Thousands
4
3
2
1
0
−1
−2
1 15 29 43 57 71 85 99 113 127 141 155 169 183 197
TIME(REPORTS)
7=PSIG 8=RPM 9=IPM 10=LBS 11=PSIG 12=PSIG
7=Drill String Pressure 8=Drill String RPM 9=Penetration Rate
10=Down Force 11=Lower Ram Pressure Set Point 12=Lower Ram Pressure

ATTACHMENT D

7.7 ALARM SYSTEM CHECKOUT

NOTE: For the following sections indicate results (OK/BAD) in Table QQ on Page 62.

7.7.1 INSTRUMENT CABINET TEMPERATURE ALARM

START CONDITION: Initialize Longyear Engine (ref. 7.1.2).

TD/CE ____/____ 7.7.1.1 Unacknowledged Alarm: **APPLY** heat source (approximately 90 °F) to the CABINET TEMPERATURE TRANSMITTER (thermocouple) in the Instrument Enclosure Assembly. The CABINET TEMP HI/LOW light will come on and flash fast. After approximately 60 seconds, the SIREN sounds, the STROBE flashes.

TD/CE ____/____ 7.7.1.2 Acknowledgment: **PRESS** the ACKNOWLEDGE button to silence the SIREN and turn off the STROBE. The CABINET TEMP HI/LOW light remains on steady. **CHECK** that nothing happens when RESET is pressed.

TD/CE ____/____ 7.7.1.3 Condition Normalized: **REMOVE** the heat source from the TEMPERATURE TRANSMITTER. Wait until the unit cools off. **OBSERVE** that the CABINET TEMP HI/LOW light flashes slow.

TD/CE ____/____ 7.7.1.4 Repeat Alarm: **APPLY** cold source (approximately 50°F) to the CABINET TEMPERATURE TRANSMITTER (thermocouple) in the Instrument Enclosure Assembly. Observe the CABINET TEMP HI/LOW light remains on steady. **CHECK** that nothing happens when RESET is pressed.

TD/CE ____/____ 7.7.1.5 Reset: **REMOVE** the cold source from the TEMPERATURE TRANSMITTER. Wait until the unit warms up. **OBSERVE** that the CABINET TEMP HI/LOW light flashes slow. **CHECK** that the LIGHT goes out when RESET is pressed.

7.7.2 DRILL BIT DOWNWARD FORCE MEASUREMENT

START CONDITION: Initialize Longyear Engine (ref. 7.1.2).

TD/CE JS/AW 7.7.2.1 During this section **VERIFY** that drilling parameters can be selected and recorded on channels 8-12 of the VGR (refer to information on page 28).

TD/CE JS/AW 7.7.2.2 **PLACE** a load measuring test adapter (scale) below the drill head.

TD/CE JS/AW 7.7.2.3 **PLACE** downward force spring test unit on the scale. **ADJUST** tare force on DRILL BIT DOWNWARD FORCE to zero out the tare weight. **RECORD** tare weight in Table LL.

Tare Weight, lbs	00

Table LL.

TD/CE _____ 7.7.2.4 **PLACE** the 4-way control valve in the RAISE position.

TD/CE _____ 7.7.2.5 **OPEN** the DOWN SPEED CONTROL valve until the drill bit contacts the downward force spring test unit.

TD/CE _____ 7.7.2.6 Slowly **INCREASE** Drill Bit Down Force from 0 to 2000 lbs, **MEASURE** and **RECORD** the Drill Bit Downward Force digital display indication, actual scale reading, and approximate distance (length) of drill head ram extension in Table MM.

QC M.C Wingfield 6/5/95

DOWNWARD FORCE, INDICATED	DOWNWARD FORCE, ACTUAL	DISTANCE, RAM EXTENSION
320	290	18
680	630	17
1034	990	16
1387	1350	15
1727	1670	14

Table MM.

TD/CE _____ 7.7.2.7 **PLACE** the 4-way control valve in the lower position.

TD/CE _____ 7.7.2.8 **OPEN** the UP SPEED CONTROL valve until the rams are fully raised.

TD/CE _____ 7.7.2.9 Set MODE switch to DRILL and Purge Gas (SOV #14) switch to ON (SR & DS off). **ADJUST** purge gas flow control valve (FC-1) to obtain PURGE GAS flow of approximately 30 scfm.

TD/CE _____ 7.7.2.10 With spindle in LOW and transmission in first gear, **ENGAGE** the drill rig clutch and **ADJUST** rotation speed to allow for low penetration rate drilling.

TD/CE _____ 7.7.2.11 **PLACE** the 4-way control valve in the RAISE position.

TD/CE _____ 7.7.2.12 **OPEN** the DOWN SPEED CONTROL valve until the drill bit contacts the downward force spring test device.

TD/CE _____ 7.7.2.13 Slowly **INCREASE** Drill Bit Down Force from 0 to just below 1000 lbs, **MEASURE** and **RECORD** the PURGE GAS PRESSURE, Drill Bit Down Force digital display indication, and actual scale reading in Table NN.

TD/CE _____ 7.7.2.14 **PLACE** the 4-way control valve in the lower position.

TD/CE [signature] 7.7.2.15 **OPEN** the UP SPEED CONTROL valve until the rams are fully raised.

TD/CE [signature] 7.7.2.16 **REPEAT** the above six steps first with the purge gas flow adjusted to 50 scfm, and then with the purge gas flow control valve full open (max flow). **RECORD** data in Table NN.

QC [signature] 6/15/95

FLOW RATE	DOWNWARD FORCE, INDICATED	DOWNWARD FORCE, ACTUAL	GAS PRESSURE
≈ 30 scfm	128	100	18.2
	287	210	18.2
	359	310	18.2
	459	410	18.2
	560	500	18.2
	692	610	18.2
	776	700	18.2
	860	810	18.2
	956	900	18.2
	1065	1000	18.2
≈ 50 scfm	200	100	30.3
	278	200	30.3
	376	310	30.3
	485	400	30.3
	579	500	30.3
	678	~~600~~ 600 TR 6/13/95	30.3
	765	710	30.3
	854	800	30.6
	985	910	30.7
	1051	1000	30.7
max. flow ≈ 83~86	189	100	56.2
	254	200	56.2
	344	310	56.1
	444	400	56.2
	565	510	56.2
	689	620	56.2
	750	710	56.2
	832	800	56.2
	958	910	56.1
	1048	1000	56.1

Table NN.