Overview of Port au Port #1 ST #3 Bullhead Acid Squeeze

Rev. 0

Submitted by

Enegi Oil Inc.
36, Quidi Vidi Road
St. John's
Newfoundland
A1A 1C1

May 2014

Report Approval Cover Sheet

Report Title:	**Overview of Port au Port #1 ST #3 Bullhead Acid Squeeze**
Project Name:	Garden Hill South

Approval Record

Rev. No.	Date	Prepared	Reviewed	Approved
0	6th May 2014	A. Pegram	D. Lau	A. Minty

Report Record of Revision

Report Title:	**Overview of Port au Port #1 ST #3 Bullhead Acid Squeeze**
Project Name:	Garden Hill South

Record of Revision

Rev. No.	Date	Revision Details
0	May 2014	Original.

Contents

1. Introduction

In December 2011, PDI Production Inc. (now Enegi Oil Inc.) submitted to the Energy Branch of the Newfoundland and Labrador Department of Natural Resources' Petroleum Engineering Division an application to undertake a workover program on their Port au Port #1 ST #3 well at the Garden Hill South site on the Port au Port Peninsula. One component of that program was an acid squeeze operation, which was performed by Schlumberger, under the supervision of Dragon Lance Management Corporation (who also prepared the application), on 13th February 2012.

The acid squeeze operation was performed as outlined in the application submitted to the DNR and in line with appropriate operational, safety and emergency procedures, again as detailed in the application and supporting submissions to the DNR. Specific relevant information is presented here, as outlined in the following sections.

2. Acid Squeeze Operation

The procedures employed for the following stages of the operation, as presented in PDIP's December 2011 application to the DNR, are included within Attachment 1 to this document:

- Workover matrix injection test.
- Workover bullhead acid injection.

Schlumberger's report of the injection is also included within Attachment 1. The constituents of the fluids injected, as detailed by Schlumberger in their Bill of Materials for the operation, are summarised in Table 1 below and described in Attachment 1 (as in the application).

Description	Base Fluid	Additives	
Main Acid	15% HCl Acid	A264	Corrosion Inhibitor
		L058	Iron Control Agent
		W054	Demulsifier
		F110	Surfactant
		U106	Chelating Agent
Diverter Acid	20% HCl Acid	A264	Corrosion Inhibitor
		J557	Visco Elastic Surfactant VDA
		U106	Chelating Agent
		K046	Methanol
		W054	Demulsifier
Diverter Breaker Fluid	Injection Water	U066	Mutual Solvent
		M003	Soda Ash

Table 1: Summary of Chemicals Injected

Attachment 1 also includes, for information, sections of the application that address the following:

- Schlumberger C&A rig-up diagram and rig-up spacing diagram.
- Surface equipment spacing required by the DNR.
- Arrangements for proper grounding of equipment.

3. Safety Procedures and Emergency Arrangements

Safety procedures are in place and implemented during all operations at the Garden Hill South site, and emergency procedures and contingency plans are also in place that describe the response to and provide guidance in the event of a hazardous occurrence. Emergency contact details are posted on noticeboards on site to ensure the necessary information is readily available in an emergency.

In addition to these standard safety and emergency procedures, details were provided in the December 2011 application to the DNR of general safety procedures and specific safety precautions applicable to the acid injection operation. These are reproduced in Attachment 2 to this document.

Attachment 1:

Operational Procedures and Information Relating to Acid Squeeze Operation

Workover Matrix Injection Test Procedure

Workover Bullhead Acid Injection Procedure

Schlumberger Report of Acid Injection*

Chemical Blends

Schlumberger C&A Rig-Up Diagram

Schlumberger C&A Rig-Up Spacing Diagram

NL-DNR Surface Equipment Spacing Chart

Proper Grounding of Equipment

[All information reproduced from or extracted from application for the workover program prepared by DLMC and submitted to the Newfoundland and Labrador Department for Natural Resources in December 2011, with the exception of *.]

16.0 WORKOVER MATRIX INJECTION TEST PROCEDURE:

16.1 Construct a dike containment system to collect and retain any possible leak from the C&A pumping unit and make sure that there are catch pans on all pumping line connections from the C&A unit to the wellhead.

16.2 Rig up the C&A unit as per Diagram in section #17, making sure that the rig up is in compliance with Schlumberger regulations drawing in section #18 for rig-up spacing and section #19 DNR equipment spacing regulations.

16.3 If there are any conflicts between the requirements in section #18 Schlumberger rig-up spacing diagram and section #19 DNR equipment spacing regulations, the Newfoundland DNR equipment spacing regulations will take precedence over all other spacing requirements. Make sure that all equipment spacing has been properly measured out and discuss with the office prior to pressure testing lines.

16.4 Pressure the annulus to 5,000 kPa (5 MPa) with glycol water and shut in annulus valve with gauge to monitor the annulus pressure constantly while proceeding with the injection test. Monitor closely as there will be pressure changes with temperature changes, as well as pressure changes if the production packer fails for any reason.

16.5 Prior to pumping any fluids (other than water) for the injection test:

16.5.1 Low range pressure test the C&A and all lines to the wellhead to ensure that there are no leaks to 1,500 kPa (1.5 MPa) low test for 15 minutes.

16.5.2 Check that the check valve is holding in the injection line.

16.5.3 Mid-range pressure test the C&A and all lines to the wellhead to ensure that there are no leaks to 10,500 kPa (10.5 MPa) low test for 15 minutes.

16.5.4 Check that the check valve is holding in the injection line.

16.5.5 High range pressure test the C&A and all lines to the wellhead to ensure that there are no leaks to 30,000 kPa (30.0 MPa) low test for 15 minutes.

16.5.6 Check that the check valve is holding in the injection line.

16.5.7 Bleed off pressure and drain water from the lines.

16.6 Prepare the load lines and feed lines to feed the preconditioned crude oil to the C&A pumper.

16.7 Fill the C&A tank with preconditioned crude oil and have a 10.00 m^3 vacuum truck load with preconditioned crude oil.

16.8 Ensure that all units and C&A pumper are properly grounded as per section #21.

16.9 Hold a pre-job safety meeting with all personnel on location and send all non-essential personnel to the site office.

16.10 Slowly open the wellhead line from wellhead to injection line and inspect and confirm that the injection check valve is holding and there are no visible leaks.

16.11 If the injection check valve is not holding or there are any visible leaks SHUT DOWN IMMEDIATELY and regroup and fix the issues.

16.12 When the lines are open and all safety conditions are confirmed then proceed pumping the preconditioned crude oil and follow the injection schedule of rates and pressure.

16.13 Make sure the rate and pressure recording equipment is working properly.

16.14 Establish a consistent feed rate with 0.5 m^3 (50 liters per minute) for 10 minutes.

16.15 If no problems follow the rate sheet at the bottom of this page.

16.16 If any pressure or feed rate problems then adjust as required to establish a good feed rate as the acid injection rates and stimulation will be adjusted as required.

16.17 At the conclusion of this pumping schedule shut down and SHUT-IN the well and record and monitor surface and BH pressures and temperature for minimum of 48 hours.

16.18 Record annulus pressure after shut down and well is shut-in.

Stage	Fluid System	Stage Volume (m^3)	Cumulative Total Volume (m^3)	Cumulative Volume (liters)	Pump Rate (m^3/min)	Pump Rate (liters/min)	Minutes
1	*Preconditioned Crude*	*0.50*	0.50	500	0.05	50	10
2	*Preconditioned Crude*	*0.50*	1.00	1000	0.10	100	5
3	*Preconditioned Crude*	*1.00*	2.00	2000	0.20	200	5
4	*Preconditioned Crude*	*1.25*	3.25	3250	0.25	250	5
5	*Preconditioned Crude*	*1.50*	4.75	4750	0.30	300	5
6	*Preconditioned Crude*	*1.75*	6.50	6500	0.35	350	5
7	*Preconditioned Crude*	*2.00*	8.50	8500	0.40	400	5
8	*Preconditioned Crude*	*2.25*	10.75	10750	0.45	450	5
9	*Preconditioned Crude*	*1.25*	12.00	12000	0.25	225	5
10	*Preconditioned Crude*	*0.50*	12.5	12500	0.10	100	5
11	*Preconditioned Crude*	*0.25*	12.75	12750	0.05	50	5
12	*Preconditioned Crude*	*0.375*	13.125	13125	0.025	25	15

24.0 WORKOVER BULLHEAD ACID INJECTION:

24.1 Review the Acidizing Contingency Plans with Schlumberger representative on location, refer to related information in the file attachments in Touch Ticket #4169584 and documents prepared by local field operations.

24.2 Rig up Schlumberger acid and water tanks, C & A Pumper to SLB Standards 5, 9, 11 and as per section #17, making sure that the rig up is in compliance with Schlumberger regulations drawing in section #18 for rig-up spacing and section #19 DNR equipment spacing regulations.

24.3 If there are any conflicts between the requirements of section #18 Schlumberger rig-up spacing diagram and section #19 DNR equipment spacing regulations, the Newfoundland DNR equipment spacing regulations will take precedence over all other spacing requirements. Make sure that all equipment spacing has been properly measured out and discuss with the office prior to pressure testing lines.

24.4 Hold Pre job safety meeting with all personnel on location and take meeting notes for all to sign off.

24.5 **Discuss the possible presence of CO_2, H_2S and acid gas in flow back fluid.** [Note that, although the probability that H_2S will be encountered is extremely low (~0.05%), all personnel directly involved with the flow back will have appropriate PPE and the necessary H_2S Alive certification. Should there be any indication of the presence of H_2S during flow back, the well will be shut-in to allow for discussions, more detailed risk assessment and re-evaluation of the proposed operations in light of the new information.]

24.6 Pressure the annulus to 5,000 kPa (5 MPa) with glycol water and shut in annulus valve with gauge to monitor the annulus pressure constantly while proceeding with the injection test. Monitor closely as there will be pressure changes with temperature changes, as well as pressure changes if the production packer fails for any reason.

24.7 Prepare the load lines and feed lines to feed the preconditioned crude oil to the C&A pumper for displacement fluids.

24.8 Have 2 x 10 m^3 vacuum trucks on location and loaded with displacement fluid as backup to the pump feed equipment available.

24.9 Prepare to perform acid bullheading operation.

24.10 Fill and pressure test treating lines to 30,000 kPa with water.

24.11 Confirm the check valve is holding in the injection line.

24.12 Bleed off pressure and drain water from the lines.

24.13 Perform injection Step Rate Test with displacement fluid and confirm pre-treatment rates at 3,000 kPa to 6,000 kPa surface pressures.

24.14 As soon as injectivity is confirmed, start treatment as per the **WORKOVER ACID INJECTION PUMPING SCHEDULE** in section #26.

24.15 **Do not exceed fracture pressure or maximum allowable pressure as agreed upon with the client representative. (See note on pressure limitations below.)**

24.16 Perform injection Step Rate Test with displacement fluids and confirm post-treatment rates at 5,000 kPa to 7,000 kPa surface pressures.

24.17 Rig down equipment / release all stimulation equipment and prepare to flow back the well.

24.18 Depending on the post data shut-in well for extended build up and /or put well on production for cleanup.

24.19 If the well is shut in for buildup then it will require load fluid recovery when opened back up.

24.20 Depending on the post data shut-in well for extended build up and /or put well on production for cleanup.

24.21 Once load fluid has been recovered, then produce the well in a similar manner to that described in section #15, at a low sustainable rate above the bubble point by monitoring the BHP and the producing GOR. If this well is produced below the bubble point then the GOR will be excessively high with the gas flashing out from the oil at reservoir point.

Pressure limitations:

Pressure calculations included in this document are estimates and it is recognized that actual pressures will depend upon multiple variables at the time of execution of the program. Pressures will be carefully monitored throughout the program, but at no time will pressures exceed 80% of specified limits of wellbore, surface and down hole equipment, as follows:

1. Surface pressures are expected to be approximately 22,500 kPa, approximately 65% of the surface line equipment limit of 34,500 kPa.
2. The estimated packer force differential will be 17,250 kPa, approximately 31% of the packer differential limit of 55,200 kPa.
3. The estimated tubing pressure at surface will be 22,500 kPa, approximately 31% of the tubing rating of 72,880 kPa.
4. The estimated tubing pressure down hole will be 22,500 kPa plus maximum differential HP of 6,000 kPa, approximately 40% of the tubing rating of 72,880 kPa.

5. The estimated tubing pressure down hole will be 22,500 kPa plus maximum differential HP of 31,980 kPa with 100% evacuation of fluid from the annulus side of the tubing, which is equivalent to approximately 75% of the tubing rating of 72,880 kPa. Even in this absolute worst case, which is extremely unlikely to happen in practice, there is a significant safety factor built in.

.

Schlumberger Cementing Service Report

Customer	Job Number
PDI Productions Inc.	

Well	Location (legal)	Schlumberger Location	Job Start
Port au Port #1(S.T. #3)	Port au Port NL	St. Johns	Feb/13/2012

Field	Formation Name/Type	Deviation	Bit Size	Well MD	Well TVD
Port au Port NL	Dolomite	deg	mm	4256.0 m	3467.0 m

County	State/Province NFLD	BHP	BHST	BHCT	Pore Press. Gradient
Well Master	API/UWI	kPa	56 degC	degC	kg/m3

Rig Name	Drilled For	Service Via
	Oil	Land

Offshore Zone	Well Class	Well Type
	Old	Other

Drilling Fluid Type	Max. Density	Plastic Viscosity
	kg/m3	cP

Service Line	Job Type
Cementing	Acidizing

Max. Allowed Tub. Press	Max. Allowed Ann. Press	WH Connection
20225 kPa	kPa	

Service Instructions

To perform VDA Diverting Acid treatment using 29.0 m3 of 15% HCl + 26.0 m3 20% VDA Acid

Casing/Liner

Depth, m	Size, mm	Weight, kg/m	Grade	Thread
2508.0	244	69.9	L-80	
0.0	0	0.0		

Tubing/Drill Pipe

T/D	Depth, m	Size, mm	Weight, kg/m	Grade	Thread
T	4255.0	73	9.7	L-80	
	0.0	0	0.0		

Perforations/Open Hole

Top, m	Bottom, m	shot/m	No. of Shots	Total Interval
m	m			m
m	m			Diameter
m	m			mm

Treat Down	Displacement	Packer Type	Packer Depth
Tubing	11.4 m3		m

Tubing Vol.	Casing Vol.	Annular Vol.	Openhole Vol.
m3	m3	m3	m3

Casing/Tubing Secured	1 Hole Vol. Circulated prior to Cement
[x]	[ ]

Lift Pressure	kPa

Pipe Rotated	Pipe Reciprocated
[ ]	[ ]

No. Centralizers	Top Plugs	Bottom Plugs

Cement Head Type	

Job Scheduled For	Arrived on Location	Leave Location
Feb/13/2012 10:03	Feb/13/2012 08:00	Feb/13/2012 17:00

Casing Tools		Squeeze Job	
Shoe Type		Squeeze Type	
Shoe Depth	m	Tool Type	
Stage Tool Type		Tool Depth	m
Stage Tool Depth	m	Tail Pipe Size	mm
Collar Type		Tail Pipe Depth	m
Collar Depth	m	Sqz. Total Vol.	m3

Date	Time 24-hr clock	Treating Pressure KPA	Flow Rate M3MN	Message
02/13/2012	10:03:03	88	0.00	
02/13/2012	10:04:03	88	0.00	
02/13/2012	10:05:03	88	0.00	
02/13/2012	10:06:03	88	0.00	
02/13/2012	10:07:03	88	0.00	
02/13/2012	10:08:03	120	0.00	
02/13/2012	10:09:03	625	0.02	
02/13/2012	10:10:02	22560	0.00	Equalize Well Head and Open
02/13/2012	10:10:03	22560	0.00	
02/13/2012	10:11:03	22339	0.00	
02/13/2012	10:12:03	7095	0.00	
02/13/2012	10:13:03	7095	0.00	
02/13/2012	10:14:03	7127	0.00	
02/13/2012	10:15:03	7127	0.00	
02/13/2012	10:16:03	7158	0.00	
02/13/2012	10:17:03	7158	0.00	
02/13/2012	10:18:03	7190	0.00	
02/13/2012	10:19:03	7190	0.00	
02/13/2012	10:20:03	7190	0.00	
02/13/2012	10:21:03	7221	0.00	
02/13/2012	10:22:03	7253	0.00	

Well	Field	Job Start	Customer	Job Number
Port au Port #1(S.T. #3)	Port au Port NL	Feb/13/2012	PDI Productions Inc.	

Date	Time 24-hr clock	Treating Pressure KPA	Flow Rate M3MN	Message
02/13/2012	10:24:03	7411	0.16	
02/13/2012	10:25:03	7947	0.18	
02/13/2012	10:26:03	7348	0.26	
02/13/2012	10:27:03	6874	0.26	
02/13/2012	10:28:03	7032	0.26	
02/13/2012	10:29:03	6811	0.26	
02/13/2012	10:30:03	6748	0.26	
02/13/2012	10:31:03	6811	0.26	
02/13/2012	10:32:03	7379	0.37	
02/13/2012	10:33:03	8926	0.37	
02/13/2012	10:34:03	9999	0.37	
02/13/2012	10:35:03	10946	0.37	
02/13/2012	10:36:03	12303	0.37	
02/13/2012	10:37:03	12902	0.37	
02/13/2012	10:38:03	13849	0.37	
02/13/2012	10:39:03	15806	0.37	
02/13/2012	10:40:03	16437	0.37	
02/13/2012	10:41:03	16753	0.36	
02/13/2012	10:42:03	16753	0.36	
02/13/2012	10:43:03	17542	0.36	
02/13/2012	10:44:03	18931	0.37	
02/13/2012	10:45:03	19183	0.37	
02/13/2012	10:46:03	18331	0.37	
02/13/2012	10:47:03	18710	0.37	
02/13/2012	10:48:03	18173	0.37	
02/13/2012	10:49:03	18836	0.37	
02/13/2012	10:50:03	18078	0.37	
02/13/2012	10:51:03	18142	0.37	
02/13/2012	10:52:03	17984	0.37	
02/13/2012	10:53:03	18078	0.37	
02/13/2012	10:54:03	17289	0.37	
02/13/2012	10:55:03	17416	0.37	
02/13/2012	10:56:03	17952	0.37	
02/13/2012	10:57:03	17258	0.37	
02/13/2012	10:58:03	17731	0.37	
02/13/2012	10:59:03	17605	0.37	
02/13/2012	11:00:03	17321	0.37	
02/13/2012	11:01:03	18299	0.37	
02/13/2012	11:02:03	18268	0.37	
02/13/2012	11:03:03	18015	0.37	
02/13/2012	11:04:03	18173	0.37	
02/13/2012	11:05:03	17668	0.37	
02/13/2012	11:06:03	18804	0.37	
02/13/2012	11:07:03	17952	0.37	
02/13/2012	11:08:03	18078	0.37	
02/13/2012	11:09:03	18931	0.37	
02/13/2012	11:10:03	18647	0.37	
02/13/2012	11:11:03	18331	0.37	
02/13/2012	11:12:03	18710	0.37	
02/13/2012	11:13:03	18331	0.37	
02/13/2012	11:14:03	18615	0.37	
02/13/2012	11:15:03	18363	0.37	
02/13/2012	11:16:03	17510	0.37	
02/13/2012	11:17:03	16911	0.37	

Well	Field	Job Start	Customer	Job Number
Port au Port #1(S.T. #3)	Port au Port NL	Feb/13/2012	PDI Productions Inc.	

Date	Time 24-hr clock	Treating Pressure KPA	Flow Rate M3MN	Message
02/13/2012	11:19:03	16721	0.37	
02/13/2012	11:20:03	15648	0.37	
02/13/2012	11:21:03	15585	0.37	
02/13/2012	11:22:03	14922	0.37	
02/13/2012	11:23:03	15143	0.37	
02/13/2012	11:24:03	15049	0.37	
02/13/2012	11:25:03	14985	0.37	
02/13/2012	11:26:03	15680	0.37	
02/13/2012	11:27:03	15269	0.37	
02/13/2012	11:28:03	15459	0.37	
02/13/2012	11:29:03	15869	0.37	
02/13/2012	11:30:03	15838	0.37	
02/13/2012	11:31:03	16059	0.40	
02/13/2012	11:32:03	15838	0.39	
02/13/2012	11:33:03	15774	0.39	
02/13/2012	11:34:03	15932	0.38	
02/13/2012	11:35:03	15585	0.38	
02/13/2012	11:36:03	16027	0.38	
02/13/2012	11:37:03	15869	0.38	
02/13/2012	11:38:03	15932	0.38	
02/13/2012	11:39:03	16248	0.38	
02/13/2012	11:40:03	15617	0.38	
02/13/2012	11:41:03	15680	0.38	
02/13/2012	11:42:03	16059	0.40	
02/13/2012	11:43:03	15995	0.40	
02/13/2012	11:44:03	15964	0.40	
02/13/2012	11:45:03	15743	0.40	
02/13/2012	11:46:03	16122	0.40	
02/13/2012	11:47:03	16311	0.40	
02/13/2012	11:48:03	16216	0.40	
02/13/2012	11:49:03	16153	0.40	
02/13/2012	11:50:03	16343	0.40	
02/13/2012	11:51:03	-25855	0.00	
02/13/2012	11:52:03	-25855	0.00	
02/13/2012	11:53:03	-25855	0.00	
02/13/2012	11:55:03	13313	0.00	
02/13/2012	11:56:03	14323	0.00	
02/13/2012	11:57:03	15143	0.39	
02/13/2012	11:58:03	15175	0.39	
02/13/2012	11:59:03	15396	0.39	
02/13/2012	12:00:03	15490	0.39	
02/13/2012	12:01:03	15838	0.38	
02/13/2012	12:02:03	15901	0.39	
02/13/2012	12:03:03	16248	0.39	
02/13/2012	12:04:03	16248	0.38	
02/13/2012	12:05:03	16090	0.39	
02/13/2012	12:06:03	16122	0.38	
02/13/2012	12:07:03	16248	0.38	
02/13/2012	12:08:03	16216	0.38	
02/13/2012	12:09:03	15995	0.38	
02/13/2012	12:10:03	16343	0.38	
02/13/2012	12:11:03	16595	0.38	
02/13/2012	12:12:03	15964	0.37	
02/13/2012	12:13:03	15869	0.37	

Well	Field	Job Start	Customer	Job Number
Port au Port #1(S.T. #3)	Port au Port NL	Feb/13/2012	PDI Productions Inc.	

Date	Time 24-hr clock	Treating Pressure KPA	Flow Rate M3MN	Message
02/13/2012	12:15:03	17069	0.37	
02/13/2012	12:16:03	16658	0.37	
02/13/2012	12:17:03	16627	0.37	
02/13/2012	12:18:03	16279	0.36	
02/13/2012	12:19:03	17226	0.36	
02/13/2012	12:20:03	16248	0.36	
02/13/2012	12:21:03	16816	0.37	
02/13/2012	12:22:03	16942	0.38	
02/13/2012	12:23:03	16942	0.39	
02/13/2012	12:24:03	17005	0.39	
02/13/2012	12:25:03	16879	0.39	
02/13/2012	12:26:03	16848	0.39	
02/13/2012	12:27:03	16911	0.40	
02/13/2012	12:28:03	16911	0.40	
02/13/2012	12:29:03	16500	0.41	
02/13/2012	12:30:03	17195	0.41	
02/13/2012	12:31:03	17479	0.42	
02/13/2012	12:32:03	17542	0.42	
02/13/2012	12:33:03	17447	0.42	
02/13/2012	12:34:03	17921	0.42	
02/13/2012	12:35:03	18047	0.42	
02/13/2012	12:36:03	18173	0.42	
02/13/2012	12:37:03	18142	0.42	
02/13/2012	12:38:03	18110	0.42	
02/13/2012	12:39:03	18110	0.42	
02/13/2012	12:40:03	17889	0.42	
02/13/2012	12:41:03	18426	0.42	
02/13/2012	12:42:03	18457	0.42	
02/13/2012	12:43:03	18994	0.42	
02/13/2012	12:44:03	18962	0.42	
02/13/2012	12:45:03	18868	0.42	
02/13/2012	12:46:03	18615	0.42	
02/13/2012	12:47:03	18931	0.42	
02/13/2012	12:48:03	18773	0.42	
02/13/2012	12:49:03	18994	0.42	
02/13/2012	12:50:03	18836	0.42	
02/13/2012	12:51:03	18741	0.42	
02/13/2012	12:52:03	19278	0.42	
02/13/2012	12:53:03	19278	0.42	
02/13/2012	12:54:03	19278	0.42	
02/13/2012	12:55:03	19278	0.42	
02/13/2012	12:56:03	19278	0.42	
02/13/2012	12:57:03	19278	0.42	
02/13/2012	12:58:03	19278	0.42	
02/13/2012	12:59:03	19278	0.42	End Pumping 29.8m3 Acid / 26m3 VDA
02/13/2012	13:05:03	12429	0.00	
02/13/2012	13:06:03	12240	0.00	
02/13/2012	13:07:03	12050	0.00	
02/13/2012	13:08:03	11861	0.00	
02/13/2012	13:09:03	11703	0.00	
02/13/2012	13:10:03	11514	0.00	
02/13/2012	13:11:03	11356	0.00	
02/13/2012	13:12:03	11198	0.00	
02/13/2012	13:13:03	11072	0.00	

Well	Field	Job Start	Customer	Job Number
Port au Port #1(S.T. #3)	Port au Port NL	Feb/13/2012	PDI Productions Inc.	

Date	Time 24-hr clock	Treating Pressure KPA	Flow Rate M3MN	Message
02/13/2012	13:15:03	15238	0.41	
02/13/2012	13:16:03	15522	0.41	
02/13/2012	13:17:03	15743	0.40	
02/13/2012	13:18:03	15585	0.41	
02/13/2012	13:19:03	16090	0.41	
02/13/2012	13:20:03	16153	0.41	
02/13/2012	13:21:03	15932	0.41	
02/13/2012	13:22:03	15806	0.41	
02/13/2012	13:23:03	15995	0.41	
02/13/2012	13:24:03	16122	0.41	
02/13/2012	13:25:03	16500	0.40	
02/13/2012	13:26:03	16658	0.41	
02/13/2012	13:27:03	16879	0.41	
02/13/2012	13:28:03	17069	0.41	
02/13/2012	13:29:03	17037	0.40	
02/13/2012	13:30:03	17132	0.41	
02/13/2012	13:31:03	17195	0.40	
02/13/2012	13:32:03	17037	0.40	
02/13/2012	13:33:03	17416	0.40	
02/13/2012	13:34:03	17668	0.41	
02/13/2012	13:35:03	17668	0.40	
02/13/2012	13:36:03	18078	0.41	
02/13/2012	13:37:03	18173	0.40	Finish 10m3 Water + U066
02/13/2012	13:39:03	12334	0.00	
02/13/2012	13:40:03	13975	0.27	
02/13/2012	13:41:03	13944	0.40	
02/13/2012	13:42:03	13755	0.10	
02/13/2012	13:43:03	13565	0.39	
02/13/2012	13:44:03	13376	0.39	
02/13/2012	13:45:03	13218	0.39	
02/13/2012	13:46:03	13060	0.39	
02/13/2012	13:47:03	12902	0.29	
02/13/2012	13:48:03	12745	0.00	
02/13/2012	13:49:03	12618	0.00	
02/13/2012	13:50:03	12492	0.00	
02/13/2012	13:51:03	12366	0.00	
02/13/2012	13:52:03	12240	0.00	
02/13/2012	13:53:03	12113	0.00	
02/13/2012	13:54:03	11987	0.00	
02/13/2012	13:55:03	11892	0.00	
02/13/2012	13:56:03	11766	0.39	
02/13/2012	13:57:03	11640	0.39	
02/13/2012	13:58:03	11545	0.39	
02/13/2012	13:59:03	11451	0.39	
02/13/2012	14:00:03	11356	0.39	
02/13/2012	14:01:03	11261	0.00	
02/13/2012	14:02:03	11166	0.00	
02/13/2012	14:03:03	11072	0.00	
02/13/2012	14:04:03	10977	0.00	
02/13/2012	14:05:03	10914	0.05	
02/13/2012	14:06:03	10819	0.00	
02/13/2012	14:07:03	656	0.00	
02/13/2012	14:08:03	183	0.00	
02/13/2012	14:09:03	278	0.00	

Well	Field	Job Start	Customer	Job Number
Port au Port #1(S.T. #3)	Port au Port NL	Feb/13/2012	PDI Productions Inc.	

Date	Time 24-hr clock	Treating Pressure KPA	Flow Rate M3MN	Message
02/13/2012	14:11:03	183	0.00	
02/13/2012	14:12:03	14291	0.41	
02/13/2012	14:14:03	15333	0.40	
02/13/2012	14:15:03	15995	0.40	
02/13/2012	14:16:03	16406	0.40	
02/13/2012	14:17:03	16753	0.40	
02/13/2012	14:18:03	17384	0.41	
02/13/2012	14:19:03	17510	0.40	
02/13/2012	14:20:03	17731	0.40	
02/13/2012	14:21:03	18110	0.40	
02/13/2012	14:22:03	18299	0.40	
02/13/2012	14:23:03	18647	0.40	
02/13/2012	14:24:03	19215	0.40	
02/13/2012	14:25:03	19373	0.40	
02/13/2012	14:26:03	19183	0.36	
02/13/2012	14:27:03	18268	0.25	
02/13/2012	14:28:03	18647	0.24	
02/13/2012	14:29:03	18489	0.24	
02/13/2012	14:30:03	18773	0.23	
02/13/2012	14:31:03	18868	0.23	
02/13/2012	14:32:03	18962	0.23	
02/13/2012	14:33:03	19088	0.23	
02/13/2012	14:34:03	19215	0.23	
02/13/2012	14:35:03	19404	0.23	
02/13/2012	14:36:03	19530	0.23	
02/13/2012	14:37:03	19625	0.23	
02/13/2012	14:38:03	19814	0.23	
02/13/2012	14:39:03	19341	0.19	
02/13/2012	14:40:03	19467	0.19	
02/13/2012	14:41:03	19783	0.19	
02/13/2012	14:42:03	-25855	0.00	
02/13/2012	14:44:03	19373	0.14	
02/13/2012	14:45:03	19941	0.18	
02/13/2012	14:46:03	19909	0.18	
02/13/2012	14:47:03	20225	0.18	
02/13/2012	14:48:03	20225	0.18	
02/13/2012	14:49:03	20225	0.18	
02/13/2012	14:51:03	19846	0.16	End Pumping 11.4m3 Crude
02/13/2012	14:52:03	20446	0.16	
02/13/2012	14:53:03	19120	0.00	
02/13/2012	14:54:03	18678	0.00	
02/13/2012	14:55:03	21045	0.11	Start Pumping 1m3 Glycol
02/13/2012	14:56:03	19625	0.14	
02/13/2012	14:57:03	19751	0.14	
02/13/2012	14:58:03	19972	0.15	
02/13/2012	14:59:03	19877	0.15	
02/13/2012	15:00:03	19814	0.15	
02/13/2012	15:01:03	19530	0.15	End Pumping 1m3 Glycol
02/13/2012	15:02:03	18142	0.00	
02/13/2012	15:03:03	17668	0.00	
02/13/2012	15:04:03	17100	0.00	
02/13/2012	15:05:03	16500	0.00	
02/13/2012	15:06:03	-25855	0.00	

Well	Field	Job Start	Customer	Job Number
Port au Port #1(S.T. #3)	Port au Port NL	Feb/13/2012	PDI Productions Inc.	

Post Job Summary

Average Pump Rates, m3/min				Volume of Fluid Injected, m3			
Slurry	N2	Mud	Maximum Rate	Total Slurry	Mud	Spacer	N2
0.35			0.43	0.0	0.0	0.0	

Treating Pressure Summary, kPa					Breakdown Fluid		
Maximum	Final	Average	Bump Plug to	Breakdown	Type	Volume	Density
23539	-25855	15280				m3	kg/m3

Avg. N2 Percent	Designed Slurry Volume	Displacement	Mix Water Temp		
%	0.0 m3	0.0 m3	degC	Cement Circulated to Surface? ☐	Volume m3
				Washed Thru Perfs ☐	To m

Customer or Authorized Representative	Schlumberger Supervisor		
Lyle McIntosh	Guy Waddleton	Circulation Lost ☐	Job Completed ☐
		-	-

6.0 CHEMICAL BLENDS:

[Extracted from December 2011 application to the DNR, excluding chemicals listed previously but not used in the injection.]

6.6 W054 - Non-Emulsifying Agent W54 is a multicomponent nonionic surfactant developed to provide nonemulsifying, water-wetting, surface and interfacial tension- reducing properties when added to stimulation fluids, whether acid or hydraulic fracturing fluids. Extensive field testing has indicated W054 to be a cost-efficient additive for preventing difficult-to-treat emulsions normally generated during acidizing treatments. It can also be used to break existing emulsions. W054 preferentially water- wets both sandstone and limestone rock and is compatible with most cationic and anionic additives.

6.7 A264 - CORBAN Acid Corrosion Inhibitor A264 has excellent dispersion properties and provides metal protection similar to Corrosion Inhibitor A260 in HCL acid systems. A264 is recommended for most acidizing applications where more environmentally friendly products are desired.

6.8 F110 - Surfactant is a nonionic surface-active agent used in aqueous-base stimulation fluids. Surfactants like F110 are used in aqueous-base stimulation fluids to lower the capillary forces that restrict fluid flow in the rock matrix. The use of F110 should result in less swabbing time, faster cleanup and more complete recovery of stimulation fluids.

6.9 U066 - Schlumberger Mutual Solvent U66 is a multifunctional nonionic agent. It is a mutual solvent in that it is soluble in acid, oil and water. It functions as a surfactant because it lowers the surface tension of water and acid and also lowers the interfacial tension between acid (and/or water) and oil.

6.10 L058 - Iron Stabilizer L58 is a very effective additive for preventing the precipitation of ferric hydroxide, Fe(OH)3, from spent acid. L058 provides by complexing the iron in solution–L058 reduces the ferric ion (Fe+3) to the more soluble ferrous ion (Fe+2) state.

6.11 J557 - is a self-diverting acid for carbonate matrix acidizing. The system uses a viscoelastic surfactant that gels as the acid spends. This gelation causes temporary plugging of the acid-etched channels to allow continuous acidizing of the unstimulated zone. J557 contains no polymer; therefore, it does not have a solid residue to cause damage to the rock.

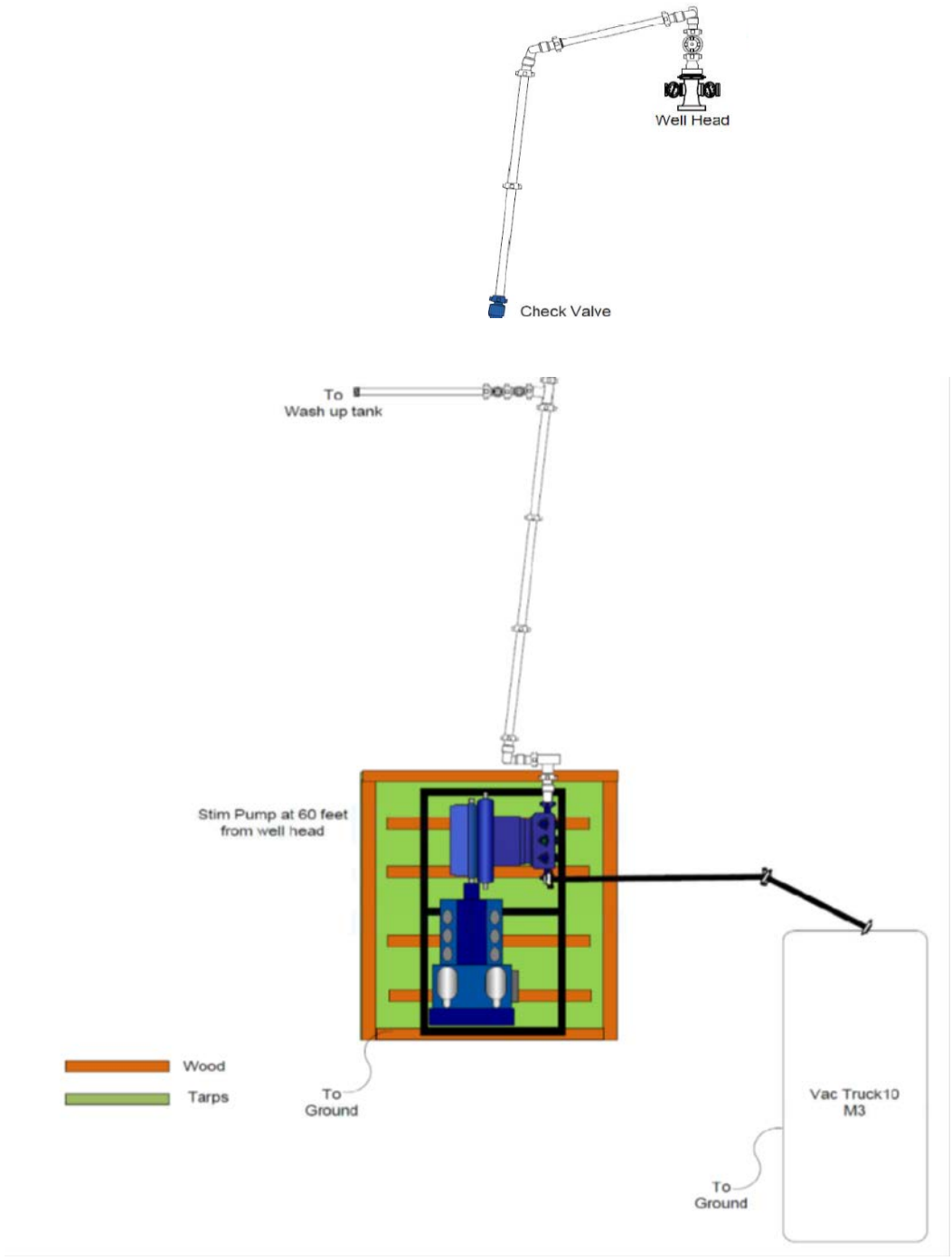
6.12 HCL - Hydrochloric acid (HCL) is a solution of hydrogen chloride (HCL) gas in water. The strength of the acid depends on how much HCL gas is

dissolved in a given quantity of water.

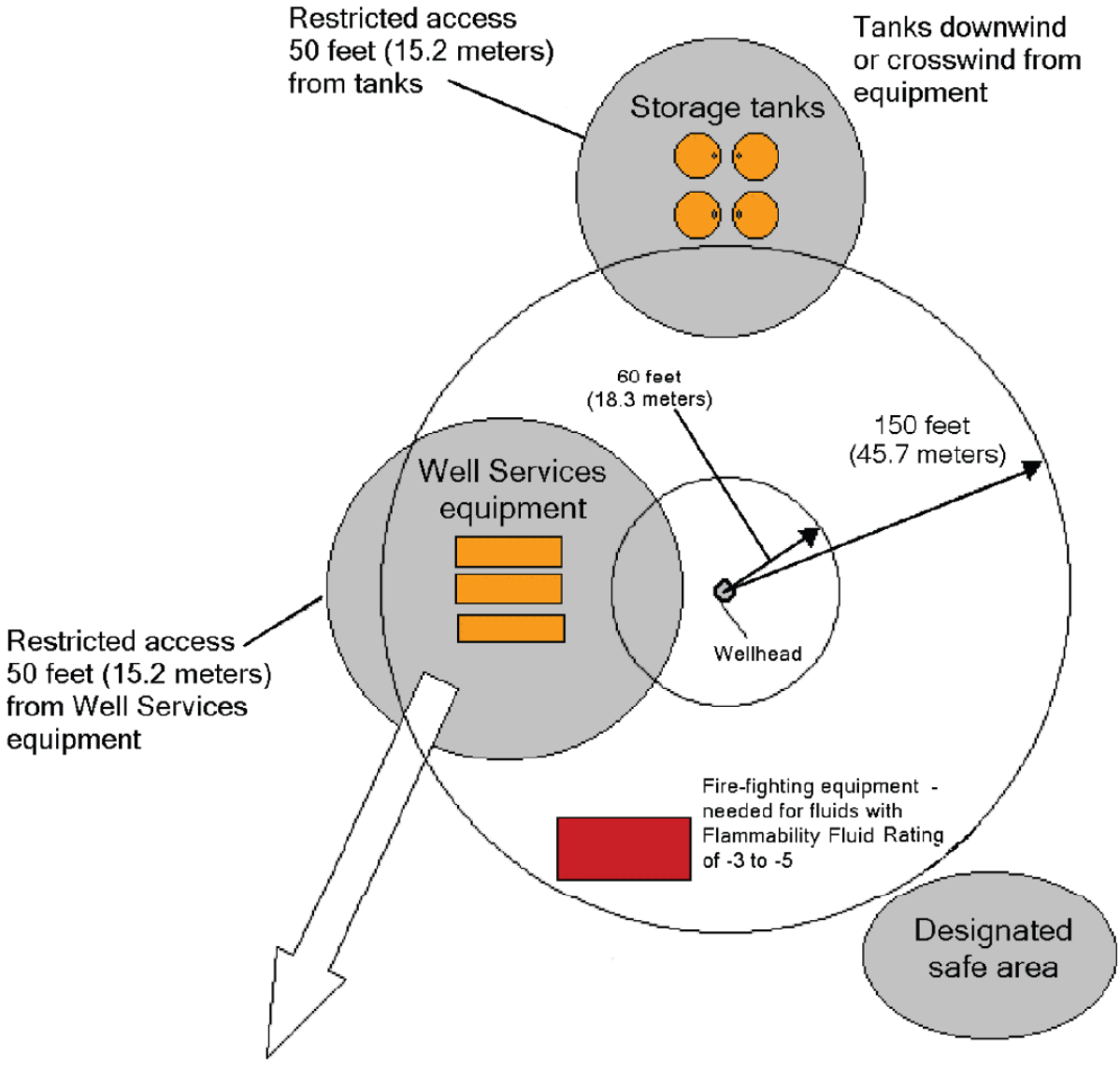
6.14 U106 - Chelating agent U106 is a multipurpose metal control chemical that is similar (chemically and physically) to U042. It will complex and control iron, calcium, barium and other metals by forming very stable coordination complexes in aqueous solutions. The major benefit of U106 over other metal control chemicals is its very high solubility in acid solutions. More than 10,000 ppm ferric iron can be stabilized in 15% HCL solutions.

6.15 K046 - Methanol K46 from Schlumberger lowers the surface tension of water and reduces capillary pressure which results in lower energy required to move the water across boundaries and through the formation matrix.

17.0 C&A RIG-UP DIAGRAM:



18.0 SCHLUMBERGER C&A RIG-UP SPACING DIAGRAM:



Escape route upwind or crosswind from storage tanks and the wellhead. Escape route must remain clear in the event of a fire at the storage tanks or wellhead.

Minimum Distances

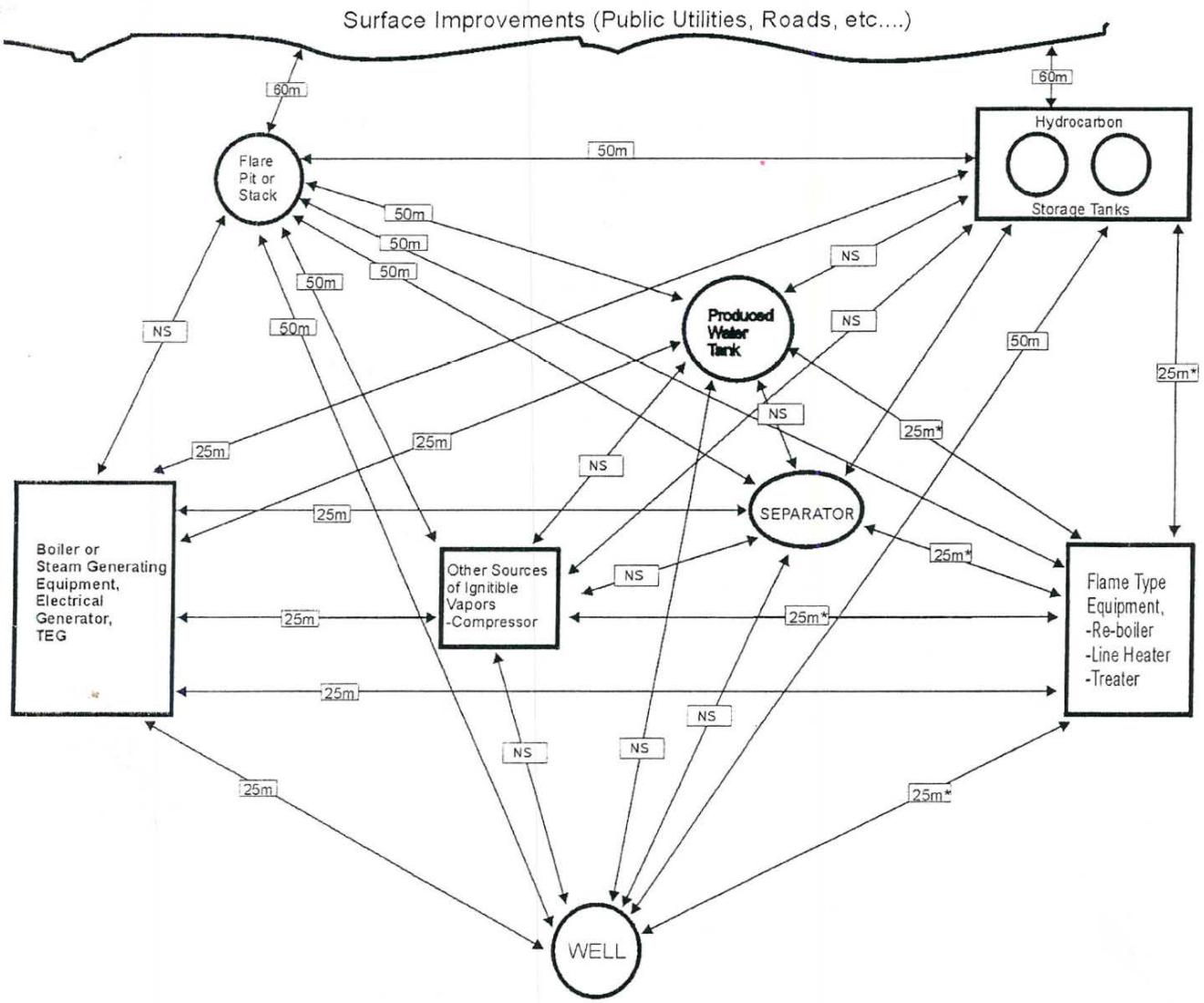
Blender to tanks > 25 feet (7.6 meters)
Blender to pumps > 20 feet (6.1 meters)
Pumps to wellhead > 60 feet (18.3 meters)
Tanks to wellhead > 150 feet (45.7 meters)

Restricted Access

50 feet (15.2 meters) from Well Services equipment
50 feet (15.2 meters) from tanks

19.0 NL-DNR SURFACE EQUIPMENT SPACING CHART:

Schedule 3
SURFACE EQUIPMENT SPACING
Minimum Distance Between Equipment

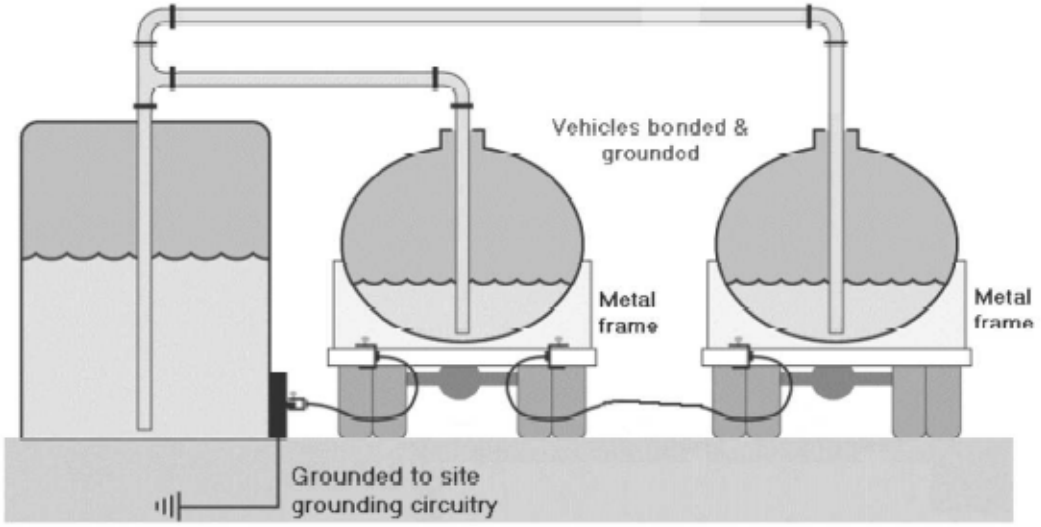


Treaters must be at least 5m
(shell to shell) from other treaters

* 25m without flame arresters
not specified with flame arresters

NS- Not Specified

21.0 PROPER GROUNDING OF EQUIPMENT:



Grounding

Connect all equipment containing, storing, mixing or pumping flammable fluids to an electrical ground.

An acceptable ground stake is a 1/2-in to 3/4-in inch (12 to 19 mm) diameter steel rod driven 3 to 5 feet (1 to 1.5 m) into the ground. Attach the ground cable tightly to this stake. It is acceptable to connect multiple pieces of equipment to a single ground point by using heavy cable.

For offshore installations, ensure there is good metal-to-metal contact with the platform or rig structure.

For land and offshore installations, verify that good metal-to-metal contact along the ground is established by using a volt-ohm meter. When measuring from one side of the grounded equipment to the ground stake, the reading must be less than 1 ohm. If it is not, check the ground system to see if the contacts should be retightened or the cables replaced.

Attachment 2:

Safety Procedures for Acid Squeeze Operation

General Safety

Specific Safety Precautions for Acid Injection

[All information reproduced from application for the workover program prepared by DLMC and submitted to the Newfoundland and Labrador Department for Natural Resources in December 2011.]

10.0 GENERAL SAFETY:

10.1 Prior to commencing operations the well site supervisor will consult the precompiled list of the nearest available emergency services at the end of this program and contact every contact to confirm the contact numbers and service availability.

10.2 This emergency services list is to be printed and posted in the work site office as well as a copy posted at the main worksite area in a location known and accessible to well site workers.

10.3 Make sure that **all non-required personnel and/or visitors** are off location during workover operations and if temporary access is granted for any reason, ensure that they are restricted to the office only and not operational areas and supervised by a properly trained and assigned safety person.

10.4 This workover operation will work day light hours only. Make sure that the daily operations and the next day of operations are reviewed with the office every day prior to closing of the day, as the program will be adjusted according to the previous day's events and discoveries on the well.

10.5 Ensure that all WHSCC and OH & S regulations are followed at all times and if unclear on operations consult directly with Steve McIntosh (contact details are given in the Contact List in section #31).

10.6 Hold a general safety meeting each morning as well as a follow up meeting for any new operation prior to doing the work to ensure that everyone is familiar with the task at hand and what is required in regards to safety concerns and proper PPE.

10.7 Ensure DNR spacing requirements are followed at all times, refer to inserted DNR spacing chart in section #19.

10.8 There are NO PLUGS or recorders in any of the "N" OR "XN" nipples, and the completion is unrestricted tubing with the exemptions listed under restrictions in the "Well Data" section.

"DO NOT REMOVE ANY WELLHEAD EQUIPMENT", leave the wellhead equipment intact as is and fully functional for this operation. Leave the integrity of the well head intact at all times.

10.9 All well servicing equipment must have a minimum pressure rating of 34.6MPa (5000 psi) working pressure.

10.10 Before commencing any operations, the well site supervisor in conjunction with all other service company representatives will conduct an initial inspection of all related equipment and conduct **walk-around inspections** in an effort to identify deficient well control and safety related items on a **daily basis**.

10.11 Safety meetings are to be held every day with well site personnel and recorded on the morning report.

10.12 Pre-job safety meetings are to be held prior to commencing new or non-routine work involving special precautions and procedures.

10.13 The well site supervisor will ensure that all contractors operate in full compliance with WHMIS, WHSCC and OH & S regulations and legislation. This includes confirmation of labels on hazardous materials and their containers which alert workers to the dangers of products and basic safety precautions required.

10.14 Material Safety Data Sheets (MSDS) for all hazardous products on the well site are to be provided by the supplier and stored at a location accessible to all. The database of MSDS must be printed out and reviewed prior to the use of any controlled products. In addition, a complete MSDS package/binder will be generated that will accompany personnel to the hospital in the event of an incident.

10.15 The well site supervisor will ensure that dangerous goods shipped or received are classified, packaged, marked, labeled and documented in accordance with the Transportation of Dangerous Goods Regulations.

10.16 If required, placards must be attached to vehicles transporting dangerous goods. All shipping documents must be forwarded to the Nisku office for filing.

25.0 SPECIFIC SAFETY PRECAUTIONS FOR ACID INJECTION:

25.1 SAFE HANDLING OF CHEMICALS

Chemicals vary greatly in hazardous properties. Some chemicals can be handled safely without any special protective equipment, while others do require such equipment. For further information regarding safe handling guidelines and potential health hazards, please refer to Schlumberger's Material Safety Data Sheets.

25.2 STANDARD HOOK-UP

In addition to the safe handling of chemicals, proper procedures for on-location operations must be followed to ensure a safely conducted treatment. Safety Standards 5, 9, 11, 16, 18, 22, 28, and 30 in the Well Services' publication "Field Safety Handbook" provide specific information regarding job planning, hook-up, pressure testing, preparation of fluids, pumping flammable and combustible fluids, emergency shutdown, flow back procedures and other pertinent information. If operations deviate from policies set out in these standards, then QHSE Standards 10 and 20 in the Well Services' publication "Field Safety Handbook" must be employed and an exemption approved for the operation to proceed.

25.3 PUMPING ENERGIZED FLUIDS

Special precautions are required when pumping carbon dioxide or nitrogen to ensure that exposure to uncontrolled compressed gases is eliminated. These are described in Safety Standards 9 and 11 of the Well Services' publication "Field Safety Handbook".

25.4 PUMPING FLAMMABLE AND COMBUSTIBLE FLUIDS

Special consideration is warranted when pumping flammable and combustible fluids, as defined in Safety Standard 30 of the Well Services' publication "Field Safety Handbook". It is necessary to determine the risk classification of the fluid and then follow appropriate procedures for handling.

25.5 EXPLOSIVE MIXTURES

"Industry Recommended Practice (IRP) Volume 18 – Upstream Petroleum Fire and Explosion Hazard Management (2006)" shall be used as guide for identification and mitigation of risk where the potential of explosive mixture exists.

Standards etc. referred to in this section have been provided to the DNR previously in a zip file.