



**OBSIDIAN ENERGY
ABANDONMENT PROGRAM 2019
OBSIDIAN ET AL FORT LIARD K-32**

VERTICAL WELL

Prepared by: _____
Clive Mountford, P. Eng.
The Barlon Engineering Group Ltd.

Reviewed by: _____
Craig Langford, Environmental Coordinator
Obsidian Energy

December 26, 2019 – Revision 1

1 OBJECTIVE

Abandon the wellbore as per Northwest Territories OROGO regulations

Well History Summary:

The well was spudded on February 19, 1999 to test the Chinkeh sand for gas to TD the well in the Mattson sand which was a secondary target. The surface hole was drilled with a 311 mm bit to a depth of 487.5 m where 244.5 mm surface casing was set and cemented. After drilling 222 mm hole to 1322 mKB a core was cut from 1322 mKB to 1339.4 mKB. Drilling continued to 1465 mKB where DST #1 was conducted over the Chinkeh interval from 1394 to 1408 mKB. Test results suggested no permeability in the Chinkeh. After reaching TD at 1695 mKB and logging the well, DST #2 was conducted over the interval 1635-1695 mKB. A small quantity of gas along with 550 ml of salt water in the drillpipe was recovered. The hole was cased with 177.8 mm casing and cemented. A tubing head and master valve were installed and the well was suspended.

2 WELL DATA

Operator: Obsidian Energy
200, 207 9 Avenue S.W.
Calgary AB, T2P 1K6

24 Hour Emergency #: 1-877-792-2990

NWT Operator Code:

AFE #: **TBD** – to be recorded with GL code on all bills and service orders and sent to Obsidian C/O Barlon Engineering

Coordinates : **Latitude:** 60 01' 39.211"
Longitude: 123 21' 49.639"

Elevations: **KB:** 484.50 m **KB – GL:** 4.40 m
GL: 480.10 m
PBTD: 1689.0 mKB MD
TD: 1695.0 mKB MD

Surface Casing: 244.5 mm, 53.57 kg/m, J-55 landed at 487.5 mKB MD
311 mm hole size
28.4 m³ 0:1:0 class G + 1% CaCl₂ (8 m³ cement returns)

Production Casing: 177.8 mm, 34.23 kg/m, L-80, LT&C landed at 1695.0 mKB MD
222 mm hole size

22.3 m³ 1:1:6 + 0.75% CFR & 11.4 m³ 0:1:0 G + 0.4% CFL-3 + 0.2% LTR (5 m³ cement returns)

Perforations: None

Wellhead: 245 mm x 279.4 mm 21 MPa Vetco Gray (see attached schematic)

Base of Groundwater Protection: 600 mKB

Table 1 – Tubular Data

	Surface Casing	Production Casing		Tubing
Size OD [mm]	244.5	177.8		N/A
Size ID [mm]	226.6	161.7		
Weight [kg/m]	53.57	34.23		
Grade	J-55	L-80		
Drift [mm]	222.6	158.5		
Capacity [m ³ /m]	0.0403	0.0205		
Annular Capacity [m ³ /m]				
Collapse [MPa]	13.93	26.41		
Burst [MPa]	24.27	43.71		
Tension [1000 daN]	255.8	241.3		

Geological Tops:
TBD

2 GENERAL REQUIREMENTS AND ENVIRONMENT, SAFETY, AND LOSS CONTROL REQUIREMENTS

General:

The Completion/Workover Program is a guide only and cannot cover every situation or replace good judgment, competency and common sense at the wellsite. Job conditions and field experience must dictate job procedures. Discuss any changes prior to implementation with the Calgary office.

Any operation outlined in this program or otherwise implied by the nature of the work to be conducted that requires clarification shall be discussed with the designated Calgary Well Operations Supervisor.

Calculations shall be confirmed on location prior to program execution.

Notifications & Reporting:

Ensure that OROGO is notified of any service rig move and/or flaring via the E- filing. Please ensure that the Oil and Gas Drilling and Production Regulations are followed

Send in the completion reports to the Wellview system by 08:00. Phone in to Completions Superintendent around 08:00 to update the day's operations and 16:00 to discuss the next day's plans.

Regulations:

The Wellsite Supervisor is to be familiar with and enforce Oil and Gas Operations Act and O.H. & S. regulations as they pertain to work on the site. The OROGO has adopted a policy that places responsibility of resident notification with the oil company representative. Failure to comply with this policy could result in a total shutdown of the operations. It is therefore extremely important for the wellsite supervisor to establish communication with any residents in the vicinity of the well who may be affected by the operation and keep them informed of any operation that is deemed to be disruptive to their daily living routine – acidizing, fracturing, testing, perforating, etc. Refer any questions to the Rig Coordinator or Completion Superintendent.

Health, Safety, & Environment:

All operations will be conducted in safe manner and in accordance with Obsidian Drilling / Completion / Workover Safe Operating Procedures and Obsidian Corporate Policies.

The following will also be understood by all parties and be complied with at all times:

- OROGO Emergency Response Plan
- Local/Regional Environmental Regulations
- OROGO Regulations and Procedures
- OH&S Regulations, Codes, and Practices

It is the responsibility of all employees and contractors to report hazardous/unsafe conditions as well as near misses. It is also their responsibility to advise their Supervisor or the Well Site Supervisor immediately of any task or condition which may cause an imminent danger situation.

Safety/Operational meetings and a hazard assessment which may include a review of Obsidian, Oil and Gas Drilling and Production Regulation, O.H. & S., and WHMIS regulations must be conducted and documented with all personnel at the beginning of the job, at each crew change and prior to secondary services conducting any work on location.

Emergency Response Plan:

The Well Site Supervisor and Rig Manager shall be fully aware of the content's within the Obsidian Corporate Emergency Response Plan, and will ensure that on all wells with a Site Specific Emergency Response Plan (ERP), crew members are briefed/ trained with respect to their individual duties within the Site Specific ERP. A copy of the Site Specific Emergency Response Plan must be on location.

3 NOTIFICATIONS PRIOR TO COMMENCING OPERATIONS

1. Notify OROGO at least 24 hours prior to commencing operations
2. Fill out Obsidian's Emergency Phone List and First Aid plan and email to the following people:
 - a. Project Managers (primary and alternative)
 - b. Area EH&S officer
 - c. Field Personnel

This form must also be posted in a conspicuous location on the lease. A copy is also found in the D&C ERP manual. By using these templates it will ensure you have the correct representatives identified and correct phone numbers. NOTE: It is your responsibility to ensure the templates you complete are accurate including directions to your specific site as per the road use agreements and from the nearest town. Remember these Emergency Phone List/First Aid Plan templates will be used in the event of an emergency situation and thus the need to ensure they are complete and accurate.

NOTE: When filled out properly this Emergency Phone List /First Aid Plan is used to meet regulations and must be on location for a first aid plan and ERP for your site, it was designed to meet all requirements of the regulations

CONTACT NUMBERS:

Obsidian Calgary

(403) 777-2500

Name	Title	Office Phone	Mobile	Email
Craig Langford	Environmental Coordinator	403-597-0428		Craig.Langford@obsidianenergy.com
Phil Johnson	President	403-206-9764	403-710-5919	pjohnson@barlon.ca
Clive Mountford	Engineering Manager	403-206-9762	403-999-5606	cmountford@barlon.ca

4 PROGRAM

1. Notify the Obsidian field office at least 24 hours before commencing well site operations. Ensure the following documentation is completed prior to commencing wellsite operations:
 - Obsidian *Wellsite Hazard Assessment Plot Plan*; scout the location for construction requirements, hazard identification, and wellhead specification.
 - Obsidian *Notice of Supervision* form.
 - Obsidian *Well Site / Facility Handover Form* with the Obsidian production staff.
 - Obsidian 'Ground Disturbance' requirements.

- Obsidian **Flaring / Venting / Incinerating Resident Notification Form**; deliver to all the applicable residents and document the date and time of delivery in Wellview - confirm with the Calgary office that the resident notification has been conducted.

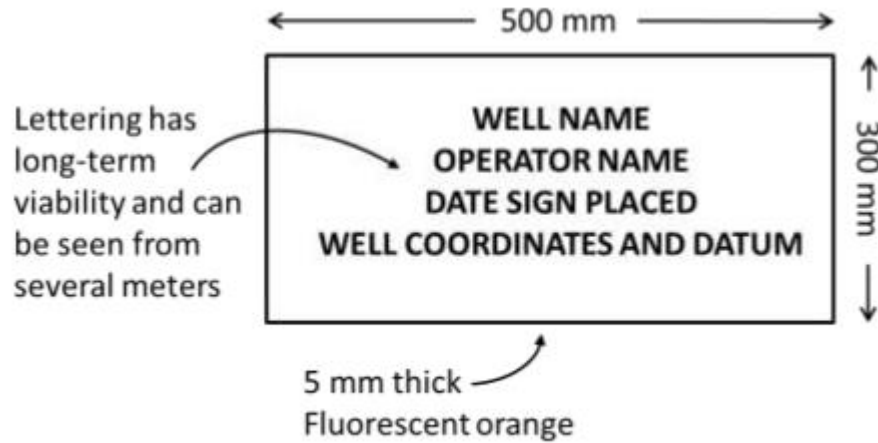
Note: Refer to the key contacts in the program for names and numbers.

2. Ensure the Well Servicing at least 7 days prior to the respective operations; these notifications must be submitted electronically to OROGO
3. Prior to mobilizing equipment to location, collect sample of water from wellbore and complete field water analysis to ensure the water in the wellbore is fresh water.
4. Mobilize in excavator and welding unit. This can be accomplished via helicopter or direct trucking to location. The access conditions will be analyzed as the abandonment commencement date approaches and the appropriate transportation method will be selected.
5. Conduct surface casing vent flow test to confirm the wellbore can be cut and capped. Fill out and sign the Surface Casing Vent Flow data sheet. Also ensure there is no pressure on the wellbore. If no evidence of gas migration or surface casing vent flow exits, proceed with cut and cap operation.
6. Pressure test casing to 7 MPa for 10 minutes.
7. Excavate a ditch / hole around the wellhead down to a depth of 2.5 m.
8. Ensure no wellhead pressure has built up by opening the casing or tubing valve. Perform a LEL atmospheric measurement in the excavation to ensure cutting operations are safe. Secure the wellhead with overhead rigging. Cut two windows into the production casing – DO NOT EXCEED 1/3 CASING CIRCUMFERENCE WITH EITHER WINDOW. Cut off both casings so that the production casing is recessed lower than the surface casing and that both casing strings are at least 2.0 meters below ground level when capped. Ensure all workers are fully prepared for well head and casing movement during this operation and are protected accordingly.
9. TACK Weld a metallurgic ally compatible steel plate across the production casing, using non continuous fillet welds to allow the production string to vent. Weld a separate steel plate in a similar fashion onto the surface casing. Weld the first two numbers of the location onto the top of the surface casing plate for future identification (i.e. – LSD-SECTION).

NOTE: All steel plates must be compatible with the production casing to avoid corrosion.

10. Fill in the excavation above the casings. Remove all debris and move off location. Install post and sign at casing stub location with the following information:

NOTE: No fluid or solids waste are expected to be generated during the operations.



11. Inform the field foreman that the job is complete.
12. Demobilize in excavator and welding unit. This can be accomplished via helicopter or direct trucking from location. The access conditions will be analyzed as the abandonment commencement date approaches and the appropriate transportation method will be selected. (send wellhead for metal recycling).
13. Prepare a sketch of the lease, including surplus equipment (non-expected), contaminated areas (non-expected), etc. and forward to Calgary.

5 DAILY REPORTS

Daily activity report for the preceding 24 hours is to be in typed form and emailed to Obsidian office weekdays prior to 7:30 A.M. MST time. On weekends email field copy of report daily to contacts listed below.

After hours, weekdays or holiday, call the advised appointed contact at:

Clive Mountford	cmountford@barlon.ca
Barlon Engineering	(403) 206-9762 (403) 999-5606
Phil Johnson	pjohnson@barlon.ca
Barlon Engineering	(403) 206-9764 (403) 719-5919
Craig Langford	Craig.Langford@obsidianenergy.com
Obsidian Energy	(403) 597-0428

NOTES: All operations carried out on behalf of Barlon shall be conducted in a safe manner, in compliance with the occupational health and safety act, OROGO regulations, and any other relevant act, regulation, or law.

Barlon's operations must protect and maintain the quality and integrity of the environment in compliance with all environmental acts and regulations.

All tickets to be stamped and labeled with the AFE number or cost center number, coded and signed by the Completion Field Supervisor.

All contracted services must have an on-going safety program in place, which is being implemented and monitored.

A copy of this program shall be on location at all times.

Ensure that CAODC safety inspections are completed on a weekly basis and faxed to Barlon's Calgary office.

Ensure safety meetings are held on a weekly basis with each crew. Minutes of these meetings are to be forwarded to Barlon's Calgary office with the morning report and noted in the tour book.

Ensure that daily BOP function tests are conducted and noted in the tour book.

Ensure that every seven (7) days a BOP drill is conducted and noted in the tour book.

Ensure that all personnel on site are aware of Barlon's EH&S policy

Ensure pre-job safety meetings are held and documented.

Ensure all personal protective equipment is in place and kept in good usable condition.

Ensure that all personnel are wearing/using personal protective equipment as required.

Ensure that hazards are identified and marked where required:

- Sump fences or markers should be in place
- Check and locate pipelines, power lines, and telephone lines before digging or trenching

Ensure that all spills are reported and cleaned up or recovered; this includes spilled drilling fluid, oil, produced water, diesel fuel or other chemicals.

Ensure that all wastes are disposed of in an approved manner, whether they are liquid or solid wastes.

Review MSDS sheets with crewmembers when handling hazardous chemicals.

Ensure that first aid equipment and supplies are in the designated location and readily available for use.

Record the fire extinguisher's number and location and ensure that they have recent inspection tags on them.

Ensure that all confined areas around the rig are thoroughly checked out with both a toxic gas detector and explosive meter, before workers enter the confined spaces.

Ensure that the air quality is monitored on locations where H₂S may be present.

Supervisor and the rig manager should be familiar with Barlon's emergency response plan. When working in an area where Barlon does not have an established field operation, the supervisor and rig manager will be responsible for the initial implementation of the ERP.

Ensure that security around the wellsite is adequately maintained, to prevent unauthorized entry, and prevent the theft and damage of materials and supplies.

ALL OPERATIONS WILL CONFORM TO ALL CURRENT OROGO, OH&S AND BARLON ENGINEERING REQUIREMENTS.

6 SERVICES

Table 2 – Service Contacts

Service	Name	Number
Wellsite Supervisor	TBD	
Welder	TBD	
Helicopter	TBD	
Excavator	TBD	

