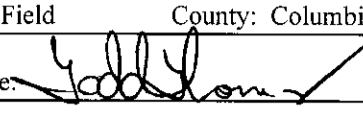


STATE OF OREGON
DEPARTMENT OF GEOLOGY AND MINERAL INDUSTRIES
800 NE Oregon Street #28, Portland OR 97232

HISTORY OF OIL OR GAS WELL
(In compliance with rules and regulations pursuant to ORS 520)

| | | |
|-------------------------------------|---|--|
| NW Natural (Company or Operator) | Northwest Natural Gas (Lease) | IW 22dH-22-65 (Well No.) |
| Sec. 22 T. 6N R. 5W | Surveyed Coordinates (if directional, BHL & SHL): SHL; N03°03'15"E 2286.41' & S86°56'45"E 1915.61' from the SW corner of Sec 22; T6N; R5W, BHL; 1264.37' N & 1189.94' E from surface location | |
| Wildcat: | (or) Field Name: Calvin Creek Storage Field | County: Columbia |
| Date: 3/16/98 | | Signature:  Position: Storage Development Engineer |

Use this form in reporting the daily operations at the well. (Operator may use his own forms, but heading of this form must also be completed and submitted.) Please submit a complete history of the well. Include such information as bit sizes, mud weights, casing sizes and depths set, amount of cement used, drilling depths, fishing, logging, perforating, and plugging procedures, and anything else pertinent to the operation. Do not include lithology.

| Date | |
|----------|--|
| 12/11/97 | Rig up, transfer mud, weld on conductor. Pick up drill collars, spud well with 17 1/2" bit. Drilling f/ 35' t/ 46'. |
| 12/12/97 | Wait on bit, bit sub. Drilling 17 1/2" hole f/ 46' t/ 264'. Circulate & wipe hole to surface. Drilling f/ 264' t/ 346'. |
| 12/13/97 | Drilling f/ 346' t/ 435'. Circulate & wipe hole to bit. RIH & circulate for casing. POH for casing. Rig up and run 428' of 13 3/8", 48#/ft, H-40 casing to 426'. Circulate hole clean. Cement casing w/ 300 sx type III cement w/ 2% sodium metasilicate + 3% CaCl. Bump plug @ 1 pm. WOC. Cut off casing and weld on wellhead. |
| 12/14/97 | Weld on wellhead. Test weld to 1000 psi. Nipple up BOPE. Test blind rams to 900 psi. RIH & test BOPE with State Rep witnessing. Drain pumps and secure rig for holidays. Release rig until 1/5/98. |
| 1/5/98 | Rig up mud lines, water lines, fill water tank, test blind rams to 700 psi. Condition mud & RIH. Drill plug, baffle plate, cement, & shoe. Drilling 12 1/4" hole f/ 435' t/ 470'. POH and pick up directional drilling assembly. |
| 1/6/98 | RIH. Directional drilling f/ 470' t/ 774'. Wipe hole to shoe. Directional drilling f/ 774' t/ 983'. Circulate & wipe hole to shoe & repair pump. RIH. Directional drilling f/ 983' t/ 1048'. Mud weight = 8.9 MD=541', TVD=514', 3.5° N09.3E; MD=689', TVD=687', 13.5° N34E; MD=899', TVD=882', 30.4° N29.5E |
| 1/7/98 | Directional drilling f/ 1048' t/ 1072'. Circulate clean. Wipe 3 stds, tight f/ 70' t/ 100' off bottom. Directional drilling f/ 1072' t/ 1103'. Survey & wipe hole 1 std. Tight f/ 40' t/ 70' off bottom. Directional drilling f/ 1103' t/ 1133'. Stick drill pipe, hole packed off. Work tight hole. Mud weight = 9.8 MD=987', TVD=956', 33.4° N36.5E |
| 1/8/98 | Work stuck pipe. Jar up & down. Rig up vibration unit and vibrate pipe while pulling up & pushing down. Pipe attachment failed. Rig up Dialog, run free point. Mud weight = 10.0 |
| 1/9/98 | Run in with wireline & shoot off @ 961'. Spot high viscous pill & POH. Lay down drilling jars, 1 jt of HWDP. Make up fishing tools & RIH. Break circulation to clear DP. Screw into fish. Rig up wireline & run inside DP to retrieve MWD. Run into obstruction @ 960'. Run inside drill pipe w/ wireline core barrel to clean out obstruction. Run inside drill pipe w/ overshot. Get over MWD, pull out, shear pins. Redress overshot. Run inside drillpipe & latch on MWD. Pull out of rope socket. Top of fish tools @ 1002'. Prepare to shoot off @ 990', obstruction @ 920'. Back off, circulate, screw back in, back off & POH. Back off 150' too high. RIH, circulate, screw back in to fish. Rig up Dialog, RIH w/ junk shot, still have obstruction. Rig up & run inside DP & shoot make up shot @ 810'. Back off & POH. Retrieve junk (drill pipe screen gasket) from inside drill pipe. RIH & try screwing into bumper sub. Mud weight = 10.0+ |
| 1/10/98 | POH, break out x/o sub, build skirt for x/o sub. RIH & circulate. Screw into sub. Attempt to run free point @ 999'. Run inside drill pipe w/ core barrel to 1004'. Unscrew manually @ 742'. Tighten & shoot, back off @ 742'. Run in w/ make up shot and shoot @ 742'. Run in w/ back off shot and shoot @ 999'. Back off drill pipe @ 925'. |

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| 1/10/98 cont. | Run in w/ make up shot & shoot @ 925'. Run in and shoot @ 999', back off @ 998'. POH & lay down 3 jts HWDP, bumper sub, x/o. Pick up 7" DC's, wash pipe assembly & RIH. Washing over drill pipe f/ 995'. |
| 1/11/98 | Washing over drill pipe f/ 995' t/ 1082'. POH, stand back wash pipe, make up fishing assembly. Repair pump, slip drilling line. RIH & circulate. Screw into fish & jar. POH, lay down fishing tools & pick up wash over assembly. RIH & wash f/ 995' t/ 1098'. POH w/ wash pipe. Mud weight = 9.9+ |
| 1/12/98 | Make up fish tools & RIH. Circulate & screw into fish. POH w/ fish. Lay down fishing tools, fish, MWD tools. Lay down wash pipe. Pick up hole opener, jars. Strap & pick up HWDP. Wash & ream f/ 997' t/ 1110'. POH, lay down hole opener. Pick up bit, stab, RIH. Wash to bottom. Mud weight = 9.8 |
| 1/13/98 | POH, lay down bit, stab & pick mud directional drilling assembly. RIH. Attempt to orient but MWD failed. POH to mud sensor and repair. RIH, testing MWD on way in. Ream 20' to bottom. Directional drilling 12 1/4" hole f/ 1135' t/ 1220'. Circulate & wipe hole. Pulled tight. Kelly up and circulate out 4 jts. Pull 1 std slick & RIH. Directional drilling f/ 1220' t/ 1310'. Circulate and condition hole. Circulate out 3 jts, pull 1 std slick. Mud weight = 9.8 MD=1105', TVD=1050', 40.6° N44.1E; MD=1256', TVD=1149', 56.4° N42.3E |
| 1/14/98 | Wipe hole. Directional drilling f/ 1310' t/ 1435'. Circulate, wipe hole 3 stds, slick. Directional drilling f/ 1435' t/ 1527'. Circulate, unplug flow line, build volume. Directional drilling f/ 1527' t/ 1620'. Circulate, POH, clean BHA. RIH w/ drill pipe below HWDP. Tight spots @ 2 nd , 3 rd , & 4 th stds from bottom. Circulate hole clean. Directional drilling f/ 1620' t/ 1683'. Mud weight = 9.9 MD=1349', TVD=1195', 64.9° N39.3E; MD=1503', TVD=1238', 81.1° N38.1E |
| 1/15/98 | Directional drilling f/ 1683' t/ 1745'. Survey, circulate. Wipe hole 8 stds. Directional drilling f/ 1745' t/ 1922'. Circulate for loggers. Directional drilling and circulating for logger f/ 1922' t/ 1995'. POH & lay down directional drilling tools. Make up hole opener & RIH. Mud weight = 9.8 MD=1660', TVD=1262', 85.1° N39.1E; MD=1816', TVD=1275', 84° N43.1E; MD=1940', TVD=1289', 82.8° N43.1E |
| 1/16/98 | Circulate hole clean. POH for logs. Rig up Schlumberger & run DIL, Sonic, GR, SP, FDCN, FMS free fall wireline logs to 1170'. Rig down loggers. Repair pump & RIH. Circulate & condition mud. POH for drill pipe conveyed logs. Rig up Schlumberger & run drill pipe logs. Mud weight = 9.9 |
| 1/17/98 | Run drill pipe logs. POH & lay down Schlumberger tools. Unload mud, tools. Lay down hole opener, pick up bit, stabilizer, RIH & hit bridge @ 1400'. Ream f/ 1400' t/ 1440', f/ 1500' t/ 1560', Circulate hole clean. Drilling f/ 1995' t/ 1997'. Circulate & condition mud, increase mud weight to 10.6. Wipe hole f/ 1997' t/ 1070'. Circulate hole clean & POH for casing. |
| 1/18/98 | Run 46 jts (1974") 8 5/8", 32#, J-55, modified LT&C casing with guide shoe, float collar, and annulus casing packer to 1995'. Cement casing with lead slurry, 430 sx type III + 2% salt + 0.4% CD-32 + 1% FL-62 and tail with 380 sx Class G + 3% CaCl + 0.65% CD-32 + 0.2% A-2. Inflate casing packer w/ 1 bbl of class "G" cement w/ 0.3% FL-52 + 0.65% CD-32 + 0.2% A-2. Pressure test ACP. Nipple down BOP, set casing slips, cut off casing, nipple up tubing spool. Nipple up BOPE. |
| 1/19/98 | Nipple up BOPE. Test blind rams to 750 psi. RIH & test BOPE w/ State Representative witnessing. Tag plug @ 1715'. Drilling plug, cement, float, cement, shoe to 1980'. POH for logs. Rig up Schlumberger & run CBL. Rig up lubricator and run CBL w/ 1250 psi on casing. |
| 1/20/98 | Run CBL. Rig down Schlumberger, RIH & drill cement to 1999'. Circulate clean. Transfer mud, clean mud pits, and fill with mud. Displace fluid from hole w/ drill in fluid. Circulate to shear mud and condition mud. POH & pick up directional drilling tools. |
| 1/21/98 | Make up BHA & RIH and test MWD tools. Directional drilling 7 7/8" hole f/ 1999' t/ 2116'. Survey, circulate samples for mud logger. Work stuck pipe @ 2111'. Work pipe free. POH to shoe, strap tubing, change screens on mud cleaner. RIH & directional drilling f/ 2116' t/ 2392'. Circulate clean & POH. Lay down jars, pick up new jars, check MWD tools, inspect bit & RIH. Mud weight = 8.5 MD=2097', TVD=1317', 78.7° N46.4E MD=2281', TVD=1335', 86.2° N48.5E |
| 1/22/98 | Directional drilling f/ 2392' t/ 2746'. Circulate & strap out of hole. Lay down directional tools. RIH & ream tight hole @ 2395', 2575' 2610'. Circulate & POH for logs. Rig up Schlumberger & run drill pipe CBL. Mud weight = 8.7 MD=2495', TVD=1353', 84° N48.5E; MD=2679', TVD=1369', 86.4° N52.2E |
| 1/23/98 | Rig up Schlumberger & run DIL, Sonic, GR, SP, FDCN, FMS drill pipe logs. Lay down logging tools & RIH. |

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| 1/23/98 cont. | Lay down wire line tools. POH lay down tools. RIH & circulate. POH to shoe. Mix flo-vis pill. |
| 1/24/98 | Shear flo-vis pill, rig up and transfer fluid to BJ Services. Displace open hole with 75 bbls filtered mud. POH to shoe & displace cased hole section with 130 bbls of KCl. POH. Rig up tongs, tools & make up 733' of Stratapac liner. Make up inner string & RIH to 1195'. String took weight. Pulled 70K & POH. |
| 1/25/98 | POH to packer. Lay down and rebuild packer. RIH. Won't run past 1175'. POH & lay down packer and inner string. RIH w/ 19 jts of blank pipe. Unload pipe, weld cross overs, pick up tools, pick up inner string & run inside 5 1/2" liner. |
| 1/26/98 | Make up stinger, pick up packer assembly. RIH with liner & packer. String took weight @ shoe. POH & change out drill pipe for HWDP. Run liner to 2746'. Rig up BJ and set packer @ 1121'. Test packer to 500 psi. Displace liner with filtered KCl. Displace liner annulus with breaker solution. POH & lay down packer tools, inner string. RIH with drill pipe & HWDP. POH & lay down pipe. Rig up and run 25 jts of tubing with side pocket mandrel & tie back stem. Mix and reverse circulate 40 bbls of corrosion inhibitor. |
| 1/27/98 | Space out tubing. Test tubing annulus to 500 psi. Nipple down BOPE. Nipple up tree. Load out tools, mud, and pipe. Clean mud pits. Rig down. Release Taylor Drilling Rig #4. |

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