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	Northwest Natural Gas	IW 24C-23-65
(Company or Operator)	(Lease)	(Well No.)

Sec. 23 T. 6N R. 5W Surveyed Coordinates (if directional, BHL & SHL): SHL; 967.7' North & 1268.4' East from the SW corner of section 23, T6N; R5W, BHL; 561' S & 136' E from surface location

Wildcat: (or) Field Name: Calvin Creek Storage Field County: Columbia

Signature: Todd Thoms

Date: 5/12/00 Position: Construction Manager

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	
4/20/00	Spudded well. Rig to spud. Unload collars. Spud well with 17.5" bit to bottom of conductor barrel was 33'. Drill 17.5" hole to 412' K.B. Circulate hole clean. Drill to 445'. Circulate & POH. Rig up & run 13 5/8" casing. Mud density = 8.8, viscosity = 37.
4/21/00	Run 10 joints 13 3/8". Casing string length = 445.5' K.B. Casing circulated & reciprocated. Cemented by Halliburton. Lead: 226 SXS, class III, 5% cal/seal, 2% ca/cl2, .25% versaset, 5% salt, ¼ #/sx flocele, yield 1.77ft^3/sx. Tail: 111 SXS, class III, same additives as lead, yield 1.62 ft^3/sx. Lost 15 barrels mud to hole while circulating. Reduced pump rate, mud loss stopped. Weld & test head weld to 750 psi. Weld held ok. Nipple up BOPs. Mud density = 8.8, visc. = 37.
4/22/00	Nipple up BOPs & fab new manifold & pitcher nipple. Test blind rams to 1000 psi, ok. Trip in hole with 12.25" bit. Tag cement at 390'. Test BOP stack with DOGAMI rep. on location. Repair 1 hydraulic line. Drill cement, float and shoe. Circulate hole clean. POH & pick directional tools. Mud density = 8.6, visc. = 34.
4/23/00	Directionally drill from 450' to 723' K.B. Circulate & check MWD tool surface equipment. Tool failed, change. Trip in hole with directional tools, slightly tight. Directionally drill ahead to 900' K.B. Dummy trip into surface shoe, hole good. Directionally drill ahead, 9 7/8" hole. MD=551', TVD=551', 5.5° AZM 206.3; MD=764', TVD=757', 21.8° AZM 174.5; MD=982', TVD=946', 33.3° AZM 164.5, Mud density = 8.8, visc. = 39.
4/24/00	Drill from 1000' to 1281'. Circulate hole clean. Heavy clay build up. Wiper trip 7 STDS. Hole clean. Circulate bottoms up after dummy trip. Hole clean. Drill ahead to 1594.32' K.B. 1447.69 TVD. Sticky clay. Circulate & condition mud & hole. Dummy trip into casing & back to bottom. Hole good. Lay down directional tools. Prepare to trip in hole to cut core #1. MD=1203', TVD=1128', 35.8° AZM 162.2; MD=1594', TVD=1448', 34.9° AZM 166.9, Mud density = 8.9, visc. = 58.
4/25/00	Cut core #1, 1594' to 1604' 10' very slow coring. Trip out with core #1, recovered 5'7". Cut core #2 1604' to 1625' 21' core rate 2.89 ft/hr. Hole condition good. Mud density = 9, visc. = 48.
4/26/00	Cut core # 3, 1625' to 1656' K.B. Cut 31', recover 28.4'. Recover core, slightly tight. Wash to bottom with 2 pumps on hole {600gpm}. Cut core #4, 1656' to 1685'. Cut 29', recover 26'. Service core barrel. Mud density = 9, visc. = 45.
4/27/00	Run in hole with core #5. Wash to bottom with 2 pumps. Cut core #5 @ average penetration rate 2ft/hr. Core #5, 1685' to 1715'. Cut 29', recovered 27'. Trip in hole with core barrel #6. Wash to bottom with 2 pumps, 600 + gpm. Cut core #6, penetration rate still at 2 ft/hr. Mud density = 8.9, visc. = 40.
4/28/00	Core #6, 1715' to 1746'. Cut 31', recovered 31'. Lay down core barrel & tools. Make up 9 7/8", clean out string. Circulate & condition hole for logging. Lay down all drill pipe to prepare for reaming. Rig up Schlumberger

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4/28/00 cont.	logging unit & log well. Make up 12 ¼" hole opener. Trip into 445'. Start reaming 9 7/8" hole to 12 ¼" hole. Mud density = 9, visc. = 42.
4/29/00	Open 9 7/8" hole to 12 ¼" hole with hole opener. TD 12 ¼" hole @ 1726' K.B. Circulate & condition hole & mud to run casing. Pull hole opener to casing shoe. Wiper trip. Mud density = 9, visc. = 50.
4/30/00	Finish wiper trip to 1726'. Circulate & condition hole & mud to run casing. Lay down hole opener. Rig up to & run 8 5/8" casing. Landed casing at 1727' K.B. Circulate & condition mud & hole to cement casing. 25 barrels excess cement. Inflated ECP with cement. Nipple down stack. Set casing slips & install secondary seals. Hole size: 12 ¼" at 1727' K.B. Total string length = 1752.36'. Halliburton Cementers, lead: 170 sx, plus .5% halad 344, yield 1.42 ft^3/sx; tail: 500 sx, plus 3% KCl + .2% cfr-3 + .6% halad-344 + .2% super CBL, yield 1.35 ft^3/sx. Mud density = 8.9, visc. = 38.
5/1/00	Test tubing spool connection to 1000 psi, ok. Modify flowline & pitcher to fit new BOP. Function test BOPs. Test blind rams to 1000 psi. OK. Make up 7.875" bit trip in hole to drill out cement. Tag cement top at 1430' K.B. Drill out cement to 1504'. Test pipe rams annular and BOP equipment to 800 psi with DOGAMI witnessing, ok. Drill out cement to casing shoe at 1727' K.B. Clean out rathole to 1746' K.B. Pull bit back into casing. Circulate & condition mud.
5/2/00	Make up core barrel #7 with AUC 422 bit. RIH to top of ECP. Barrel hung up. POH and make up core barrel with arc 322 bit. Hole tight at ECP. Circulate & condition hole & mud. Drop ball cut core #7. Cut cores no. 8 & 9. Good recovery. Mud density = 8.7, visc. = 38.
5/3/00	Cut & retrieve core no. 10, 11 & 12. Ran in core no. 13. Hole good. Picked up kelly to wash to BTM., hole became tight. Break circulation with no problems & normal pressure. Start to clean to BTM. Had high torque. String stuck while rotating & moving pipe. No change in circulating pressure or volume. Work string & condition hole & mud. Mud density = 8.8, visc. = 38.
5/4/00	Work stuck drill string. Attempt to break up filter cake. Jar up to 140K. Mix & spot 20 barrel sap/morflo pill. String free immediately. Hole clean, no fill. Lay down 6 drill collars, replace with 6 HWDP. Slip & cut drill line. Set up makeup cathead rig service & function BOPs. Cut and recover core #13. Trip into casing shoe, repair swivel. Cut core #14. Mud density = 8.8, visc. = 37
5/5/00	Cut cores #15 & 16. Lay down core barrel & tools. Make up drilling BHA. Hung up at 1661' +/- {ECP}. Kelly up & attempt to work BHA through tight spot. Bit & 1st stab through. Unable to get 2nd stab through. Mud density = 8.8, visc. = 37.
5/6/00	Unable to get stabs through ECP, ID 7.812". Lay down stabs. Trip into hole 1713'. Ream from 1713 to 2047'. Drill from 2047 to 2591' K.B. Circulate hole clean. Dummy trip to casing shoe. Trip into bottom. Take bottom hole survey. 26°, AZM 164; MD=2591' Rig up Schlumberger logging unit. Mud density = 8.8, visc. = 41.
5/7/00	Finish logging with Schlumberger. Lay down monel & 2 HWDP. Pick up 24 joints 2 7/8" tubing for plug back string. Trip in hole with plug back string to 2591'. Circulate & condition hole to plug back. Plug back hole to 1836' with 163 sacks premium class III cement mixed at 13.7 lbs/gl. Cmt. Yield 1.77 cu/ft per sack, gauge volume 255 cu/ft., caliper vol. = 265 cu/ft., actual pumped = 286 cu/ft. Tubing pulled dry on stand no. 8 from bottom. Lay down tubing. Trip in hole with bit and drill string to bottom. Circulate and wait on cement to set. Mud density = 8.6, visc. = 41.
5/8/00	Clean out cement contamination & polish plug back to 1842'. Circulate the hole clean of cement. Pull bit back into casing shoe. Transfer mud to storage tank. Clean mud tanks. Fill tanks with clean water. Mix under reaming fluid, 3% KCl, vis 32 sec. Trip into TD. No fill on bottom. Displace hole with clean fluid. Mixed XCD polymer to raise viscosity. Start under reaming hole to 15". Mud density = 8.4, visc. = 32.
5/9/00	Scrape liner lap with under reamer. Hole clean & in gauge. Circulate bottoms twice & pull into shoe. Dump & clean mud tanks. Mix fresh batch of pack fluid. Displace hole. Rig up power tong unit. Make up 5.5" liner screen & tools. Run in hole with liner screen. Tag bottom. Release liner on bottom. Pull up & set packer. Test packer, plugged with pipe scale. Make up cup type gravel pack tools on stinger. Mud density = 8.4, visc. = 32.
5/10/00	Trip in with cup type gravel pack unit. Screw back into screened liner. Rig up to gravel pack. Gravel pack with 125 ft^3 20/40 sand. Calculated sand 121 ft^3. Packed very slow. Sand packed with 1000 psi, checked, topped once. Final pack rate 1.5 BBLS/min at 1000 psi. Reversed out small aount of sand. Lay down gravel pack equipment. Trip in hole with SLP-R packer. Tag liner top, latch on. Test latch & inflate SLP-R. Lay down packer setting tools. Mud density = 8.4, visc. = 32.

5/11/00	Rig up power tongs & pick up 5.5" tubing string & seal section. Unable to get string to proper length to land tubing compression & still land the hanger. Land tubing in tension with end of seal assembly 10" off BTM. Seal assembly is 15' long. Nipple down BOPs & equipment. Nipple up stack. Rig in pump line & test backside & wellhead connection. Pressure up & isolate pump, holding ok. Open lines to well. Bore pressure dropped immediately. Check for surface leaks, none. SLR packer or blanking plug is leaking. Mud density = 8.4, visc. = 32.
5/12/00	Pick up drill, 2 X 6.5" collars 16 HWDP & drill pipe. Tag liner top at 1643.75' K.B. Set full weights on packer, pound twice. Test for 10 min. at 1000 psi, ok. Lay down drill string. Rig up power tongs & rerun 5.5" tubing string. Tag liner & space out string, in full compression. Doughnut is neutral. Mix and pump corrosion inhibitor. Release rig. Mud density = 8.4, visc. = 32.