Well name: **Winston Gas Com. 31 Fed.** #10 Directional
Operator: **Devon Energy Production Company L.P.**
String type: Production

Location: Section 31, T21S, R24E

Design parameters:

Collapse
Mud weight: 8.800 ppg
Design is based on evacuated pipe.

Burst
Max anticipated surface pressure: 3,931 psi
Internal gradient: 0.000 psi/ft
Calculated BHP 3,931 psi

Annular backup: 8.80 ppg

Minimum design factors:

Collapse:
Design factor 1.125

Burst:
Design factor 1.00

Tension:
8 Round STC: 1.80 (J)
8 Round LTC: 1.80 (J)
Buttress: 1.60 (J)
Premium: 1.50 (J)
Body yield: 1.60 (B)

Tension is based on air weight.
Neutral point: 7,500 ft

Estimated cost: 78,541 ($)

Environment:
H2S considered? Yes
Surface temperature: 75 °F
Bottom hole temperature: 144 °F
Temperature gradient: 0.80 °F/100ft
Minimum section length: 1,000 ft

Directional Info - Build & Drop
Kick-off point 4500 ft
Departure at shoe: 400 ft
Maximum dogleg: 1.5 °/100ft
Inclination at shoe: 0 °

Run Seq	Segment Length (ft)	Size (in)	Nominal Weight (lbs/ft)	Grade	End Finish	True Vert Depth (ft)	Measured Depth (ft)	Drift Diameter (in)	Est. Cost ($)
2	7200	7	23.00	L-80	LT&C	7162	7200	6.25	64580
1	1438	7	23.00	HCL-80	LT&C	8600	8638	6.25	13961

Run Seq	Collapse Load (psi)	Collapse Strength (psi)	Collapse Design Factor	Burst Load (psi)	Burst Strength (psi)	Burst Design Factor	Tension Load (kips)	Tension Strength (kips)	Tension Design Factor
2	3274	3761	1.15	3931	6340	1.61	197.8	435	2.20 J
1	3931	5650	1.44	657	6340	9.64	33.1	485	14.66 J

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Remarks:
Collapse is based on a vertical depth of 8600 ft, a mud weight of 8.8 ppg The casing is considered to be evacuated for collapse purposes.
Collapse strength is based on the Westcott, Dunlop & Kemler method of biaxial correction for tension.

Burst strength is not adjusted for tension.
Collapse strength is (biaxially) derated for doglegs in directional wells by multiplying the tensile stress by the cross section area to calculate a