COGCC OIL AND GAS FIELD SCOUT CARD

Date	04/18/2016
Document No.	2056195

FIELD NAME	**BRUSH CREEK**
FIELD NUMBER	**7562**

LOCATION

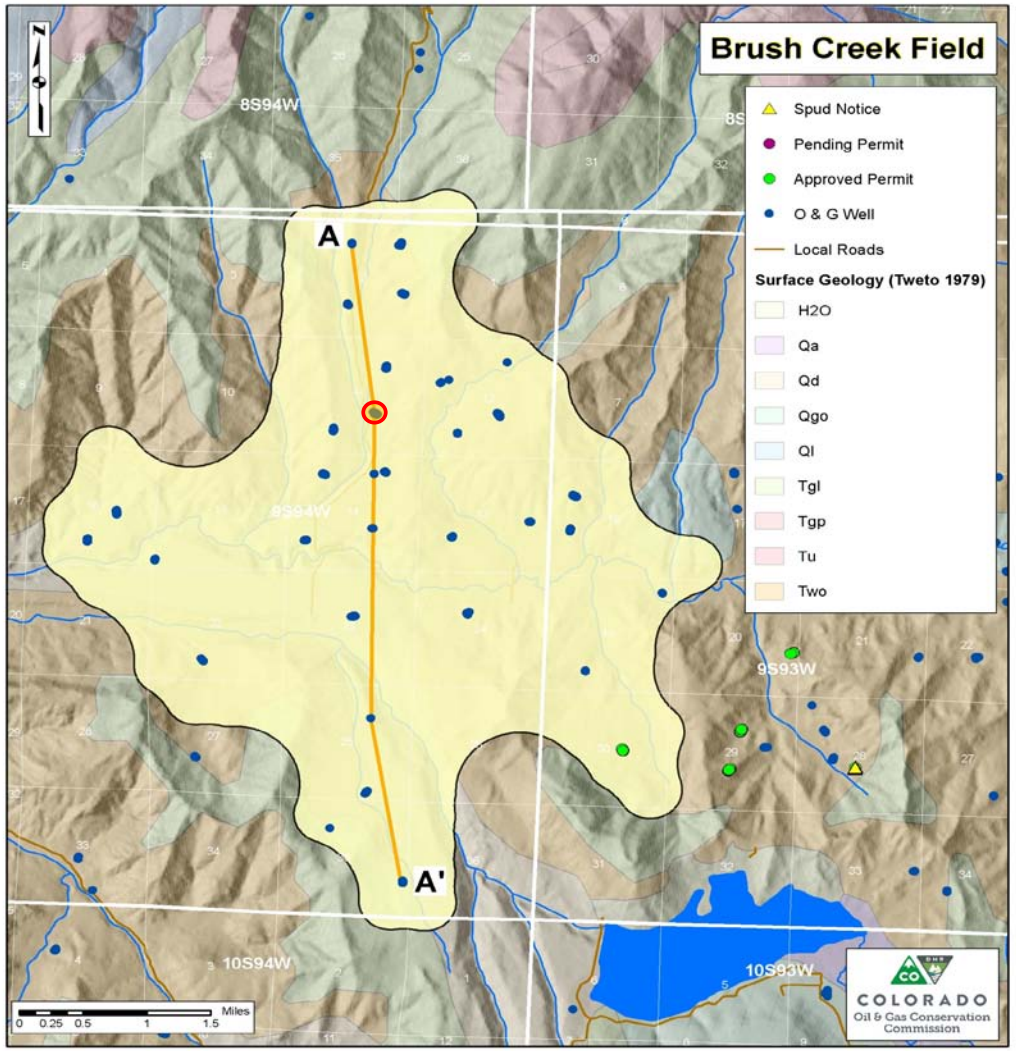
Basin	Piceance
Township(s)	9S
Range(s)	93W to 94W

SURFACE GEOLOGY

Surface Geology generally consists of Wasatch Formation, with a swath of glacial drift trending northwest to southeast in the southwestern portion of the field. Alluvium is present above the Wasatch Formation along the eastern fringe of the field and along creeks. The Green River Formation outcrops, overlying the Wasatch Formation, in the north-central and northwestern portions of the field. Glacial drift overlies the Wasatch Formation in the extreme northern and southern portions of the field.

GEOLOGIC STRUCTURE

None present within this field or nearby on COGCC's 250K GIS Geology layer.



Type Log Well

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				A - North				A' - South
STRATIGRAPHY			**API Number =>**	**077-08911**	**077-08345**	**077-08573**	**077-08444**	**077-09139**
			Surface Elevation =>	**7,965**	**7,400**	**7,277**	**7,366**	**7,732**
All depths are measured depths			**Well Type =>**	**Directional**	**Vertical**	**Vertical**	**Vertical**	**Directional**
Group	**Formation**	**Interval/Member**	**Isolation Concern**	**Log Top**	**Log Top**	**Log Top**	**Log Top**	**Log Top**
	Alluvium		Water	0		0		
	Glacial Drift		Water				0	
	Green River		Water					0
	Wasatch	Upper	Shallow Water		0			
	Wasatch	G-Sand*	Possible Gas / UIC	2,810/2,958*	2,192/2,342*	2,058/2,213*	1,900/2,063*	2,256/2,404*
	Wasatch	Fort Union*	None	3,290*	2,680*	2,558*	2,410*	2,719*
	Wasatch	Middle	None					
	Wasatch	Lower*	Water	4,667*	4,090*	3,866*	3,657*	3,992*
Mesaverde	Williams Fork	Ohio Creek	Water / UIC	4,870*	4,243*	4,006*	3,820*	4,264*
Mesaverde	Williams Fork	U. Mesaverde	Water	5,245	4,550*	4,366*	4,116*	4,580*
Mesaverde	Williams Fork	Top of Gas	Gas					
Mesaverde	Williams Fork	Cameo	Gas	7,775	7,128	7,036	6,646	7,079
Mesaverde	Iles	Rollins	Gas	8,207	7,430*	7,272	7,060*	7,502*
Mesaverde	Iles	Cozzette	Gas	8,630	7,847*	7,689	7,520	
Mesaverde	Iles	Corcoran	Gas	8,816	8,046*	7,886	7,680	
	Mancos		Possible Gas		8,229*	8,071		
	Niobrara		Possible Gas		10,884**			
	Frontier		Possible Gas		11,884**			
	Dakota		Possible Gas		12,334/12,399**			
	Morrison		Possible Gas		12,626**			
	Entrada		Possible Gas		13,131			
	Chinle		None		13,300			
	Weber		Possible Gas		14,007			

Type Logs for 077-08345: COGCC Document Numbers 2056196 (shallow - surface to 8570' MD) and 2056197 (deep - 12670' to 14445' MD)

Stippled cells indicate that the respective log top was not apparent on logs or the top may be covered by a shallower casing string above the logged interval. "Middle Wasatch" is an interval that may include multiple formation members, and therefore, log tops are not presented for the Middle Wasatch.

** COGCC log picks (Wasatch G-Sand [top of upper and lower intervals] and Fort Union are not commonly recognized by operators in this field; however, Wasatch G is completed in a shallow well in the adjacent Buzzard Creek Field to the north, 077-08637, NWNE 14-9S-93W; "Lower" Wasatch, as shown herein for water isolation, is not recognized in geologic literature)*

*** No log available to verify depth to top of Niobrara, Frontier, Dakota, or Morrison Formations in 077-08345; Dakota tops are for top of silt and top of sand; tops below Mancos are shown as reported by operator.*

WATER RESOURCE ISOLATION

Alluvium, glacial drift, the Green River Formation, and Upper Wasatch (weathered portion in which water supply wells are screened), Lower Wasatch, Ohio Creek, and Upper Mesaverde. The deepest water well within the field is 360', likely screened in glacial drift or the underlying Wasatch Formation.

PRODUCING ZONE ISOLATION

Primary Objectives: Mesaverde Group (Williams Fork, Cameo, Rollins, Cozzette, and Corcoran)

Secondary Objectives: Wasatch G was produced in one shallow well (077-08697, plugged and abandoned in 2012); Mancos/Niobrara produced in one deep horizontal well (077-10163); Mancos completed in one deep directional well (077-10094); Frontier and Mowry are also potential objectives, cited in Commission Order Nos. 429-13 and 429-14.

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UNDERGROUND INJECTION CONTROL

API Number	Well Name and Number	Type	Zone	Sample Top	Sample Bottom	TDS	Source
077-08815	McDaniel #11-16	Disposal	Williams Fork	4,984	5,055	29,920	SWAB - 10/20/2006
077-08969	Blackman #14-13	Source	Williams Fork - Corcoran	5,261	7,609	14,203	WH - 2/16/2007
077-09004	Blackman #15-9	Source	Williams Fork - Corcoran	5,498	7,866	20,575	WH - 2/13/2007
077-08970	Blackman #14-12	Source	Williams Fork - Corcoran	5,548	7,649	21,749	WH - 2/16/2007
077-08968	Blackman #14-14	Source	Williams Fork - Corcoran	5,648	7,703	21,311	WH - 2/13/2007
077-09095	Currier #26-15	Source	Williams Fork - Corcoran	5,667	7,703	12,486	WH - 2/13/2007
077-08696	Brush Creek Ranch #14-10	Source	Williams Fork - Iles	5,814	7,844	21,052	WH - 2/13/2007
077-10188	Jensen #17-13B	Source	Williams Fork	5,922	7,466	24,238	SEP - 6/18/2012
077-08907	McDaniel #14-1	Source	Williams Fork - Corcoran	5,924	7,986	17,338	WH - 2/13/2007
077-08972	Blackman #14-5	Source	Williams Fork - Corcoran	5,929	8,009	23,318	WH - 2/16/2007
077-09097	Currier #26-14	Source	Williams Fork	5,958	7,277	22,600	WH - 3/22/2007
077-08985	Blackman #23-4	Source	Williams Fork - Corcoran	5,974	7,947	19,771	WH - 2/13/2007
077-09035	Gipp #13-9	Source	Williams Fork	5,990	7,345	27,982	WH - 2/14/2007
077-09041	Gipp #13-15	Source	Williams Fork	6,015	7,732	17,767	WH - 3/11/2007
077-09008	Gunderson #13-14	Source	Williams Fork - Corcoran	6,023	8,125	24,315	WH - 2/13/2007
077-08971	Blackman #14-6	Source	Williams Fork - Corcoran	6,044	8,060	26,567	WH - 2/16/2007
077-08842	Brush Creek Ranch #14-11	Source	Williams Fork - Corcoran	6,050	8,130	18,976	WH - 2/13/2007
077-08986	Blackman #23-3	Source	Williams Fork - Corcoran	6,053	8,121	24,802	WH - 2/13/2007
077-09034	Gipp #13-8	Source	Williams Fork	6,071	7,426	17,938	WH - 2/14/2007
077-08957	McDaniel #11-15	Source	Williams Fork - Corcoran	6,074	8,182	41,097	WH - 3/22/2007
077-09036	Gipp #13-16	Source	Williams Fork - Corcoran	6,118	8,225	33,978	WH - 3/11/2007
077-09005	Blackman #15-8	Source	Williams Fork - Corcoran	6,164	8,221	18,676	WH - 2/16/2007
077-08841	Brush Creek Ranch #14-16	Source	Williams Fork	6,175	7,160	25,443	WH - 3/23/2007
077-08905	McDaniel #13-4	Source	Williams Fork	6,217	7,603	25,927	WH - 2/13/2007
077-08883	McDaniel #14-7	Source	Williams Fork - Corcoran	6,314	8,155	27,782	WH - 2/13/2007
077-08815	McDaniel #11-16	Source	Williams Fork - Iles	6,498	8,375	22,340	WH - 3/8/2005
077-08938	McDaniel #2-1	Source	Williams Fork - Corcoran	6,586	8,891	41,718	WH - 8/10/2006
077-09061	Gunderson #13-3	Source	Williams Fork - Corcoran	6,598	8,648	25,342	WH - 2/13/2007
077-08818	McDaniel #11-8	Source	Williams Fork - Iles	6,629[1]	8,430	21,979	WH - 3/8/2005
077-08860	Brush Creek Ranch #14-15	Source	Williams Fork - Iles	6,639	8,022	16,027	WH - 3/23/2007
077-08839	Gunderson Federal #12-7	Source	Williams Fork - Corcoran	6,703	8,785	74,557	WH - 2/13/2007
077-08906	McDaniel #2-9	Source	Williams Fork - Corcoran	6,729	8,830	24,800	WH - 3/22/2007
077-09082	Gunderson Federal #13-2	Source	Williams Fork - Corcoran	6,849	8,885	42,305	WH - 2/13/2007
077-08903	McDaniel #2-16	Source	Williams Fork - Corcoran	6,914	8,969	32,800	WH - 3/20/2007
077-08910	McDaniel #2-4	Source	Williams Fork - Corcoran	7,089	9,087	27,465	WH - 8/10/2006
077-08902	McDaniel #2-15	Source	Williams Fork - Corcoran	7,192	9,004	34,809	WH - 8/10/2006
077-08837	McElwain #12-12	Source	Cameo - Rollins	7,943[2]	8,649	23,433	WH - 3/2/2005

Aquifer Exemption: McDaniel #11-16 (Williams Fork) NWSE/4 Section 11, T9S, R94W (The injection formation TDS concentration was 29,920 mg/l; while an aquifer exemption was noticed and approved, it was not required by Rule 324B because of the high formation TDS [above 10,000 mg/l]).

"Source" wells are sorted in order from shallowest to deepest "Sample Top" depth below the "Disposal" well.

(1) Sample collected from the Williams Fork - Iles completion with a top perforation of 6629' prior to completing additional, shallower perforations in the Williams Fork Formation.

(2) Sample collected from the Cameo - Rollins completion with a top perforation of 7,943' prior to completing additional, shallower perforations in the Williams Fork Formation.

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COMMISSION ORDER SUMMARY (Significant Engineering and Spacing Issues)

429-1 (5/20/1985)	Mesaverde (including Cozzette and Corcoran): established 160-acre drilling and spacing units, 600' from quarter-section boundaries.
Various (2005-06)	Mesaverde: allowed three additional wells per 160-acre unit (40-acre well density)
Various (2006-09)	Mesaverde (Williams Fork and Iles): allowed 10-acre well density in certain parts of the field, 100' / 200' from 160-acre units. Allowed wells to be drilled vertically or directionally from common pads, with one pad per quarter-quarter section.
429-13 (2/22/2011)	Mesaverde Group and Deeper Formations: established an approximate 885.16-acre drilling and spacing unit for vertical and directional wells targeting the Mesaverde Group (Williams Fork and Iles) and Deeper formations (Mancos, Niobrara, Frontier, and Mowry), 200' from unit boundaries and one pad per quarter-quarter.
429-14 (1/23/2012)	Mesaverde Group and Deeper Formations: established one 160-acre drilling and spacing unit with 10-acre well density for vertical and directional wells targeting the Mesaverde Group and Deeper formation objectives (Mancos, Niobrara, Frontier, and Mowry), 600' from unit line, 100' well-to-well spacing and one pad per quarter-quarter.

HISTORIC WELL CONSTRUCTION

Other than four older wells with surface casing set from 369' to 536', surface casing setting depths generally range from 1,000' to 2,000'. Production casing generally terminates in the Iles or underlying Mancos formations. Production casing cement may be limited to coverage of the producing intervals, and coverage may be lacking across parts of the Mesaverde Group and Wasatch Formation.

NEW WELL CONSTRUCTION (effective 04/18/2016)

Minimum surface casing of 5% TVD required for well control in Mesa County (10% TVD recommended) and to cover water resources in the upper interval of the Wasatch Formation. Recommend setting depth of 1,000' or greater, based on limited available log data for surface to 1,000' and past practices in the field. Full cement coverage of the Mesaverde Group and Ohio Creek is required in the Piceance Basin through 2015. New Standards require cementing intermediate (if used) or production casing at least 200' above Lower Wasatch sands, as shown on the annotated type log for this field. Cement coverage (stage cement or increased primary cement for intermediate [if used] or production casing) is also required across the Wasatch G within one mile of productive Wasatch G wells.

PLUGGING OBJECTIVES

Plug(s) above Mancos and other deeper formations (if penetrated) to address potential future horizontal wells; plug above Mesaverde Group completions; plug across Ohio Creek and across Lower Wasatch (squeeze to 200' above Lower Wasatch if no annular cement coverage); Wasatch G plug if productive within one mile; stray gas isolation squeezes (if no annular cement) or in-casing stabilization plugs (if annular cement present) at 3,000-foot intervals if plugs are not already planned in those intervals as described above; surface casing shoe plug and surface plug. Larger surface casing shoe plugs should be considered for wells with less than 1,000' of surface casing.

NOTES

The eastern portion of this field in R93W is located within the Bradenhead Monitoring Area. Special requirements and Form 2 Conditions of Approval apply.