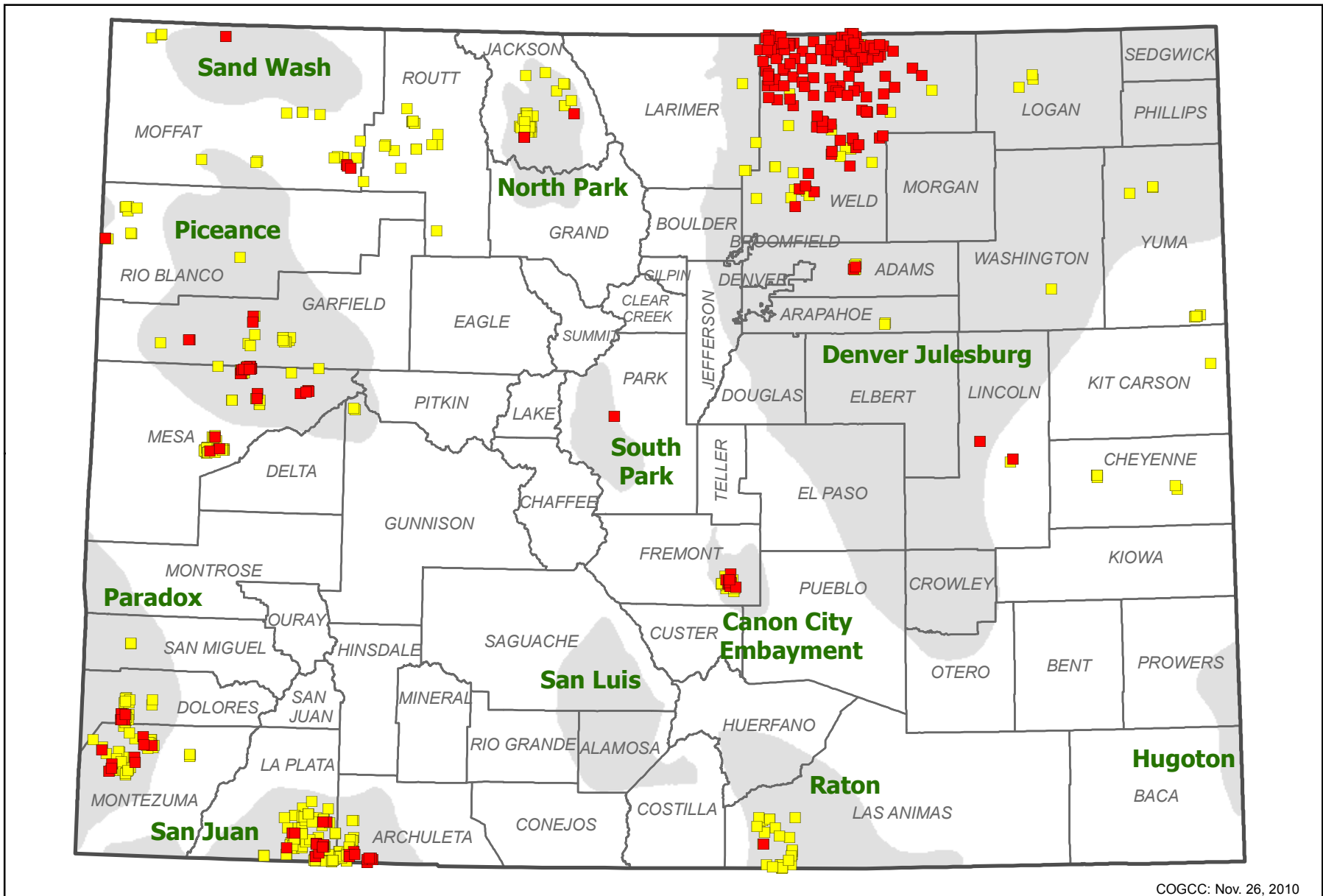


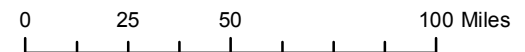
**HORIZONTAL WELLS IN COLORADO
STAFF PRESENTATION TO THE
COLORADO OIL AND GAS CONSERVATION COMMISSION
NOVEMBER 29, 2010**





Legend

- Horizontal Well Permits (2010)
- Horizontal Well Permits (1987- 2009)
- Oil and Gas Basins



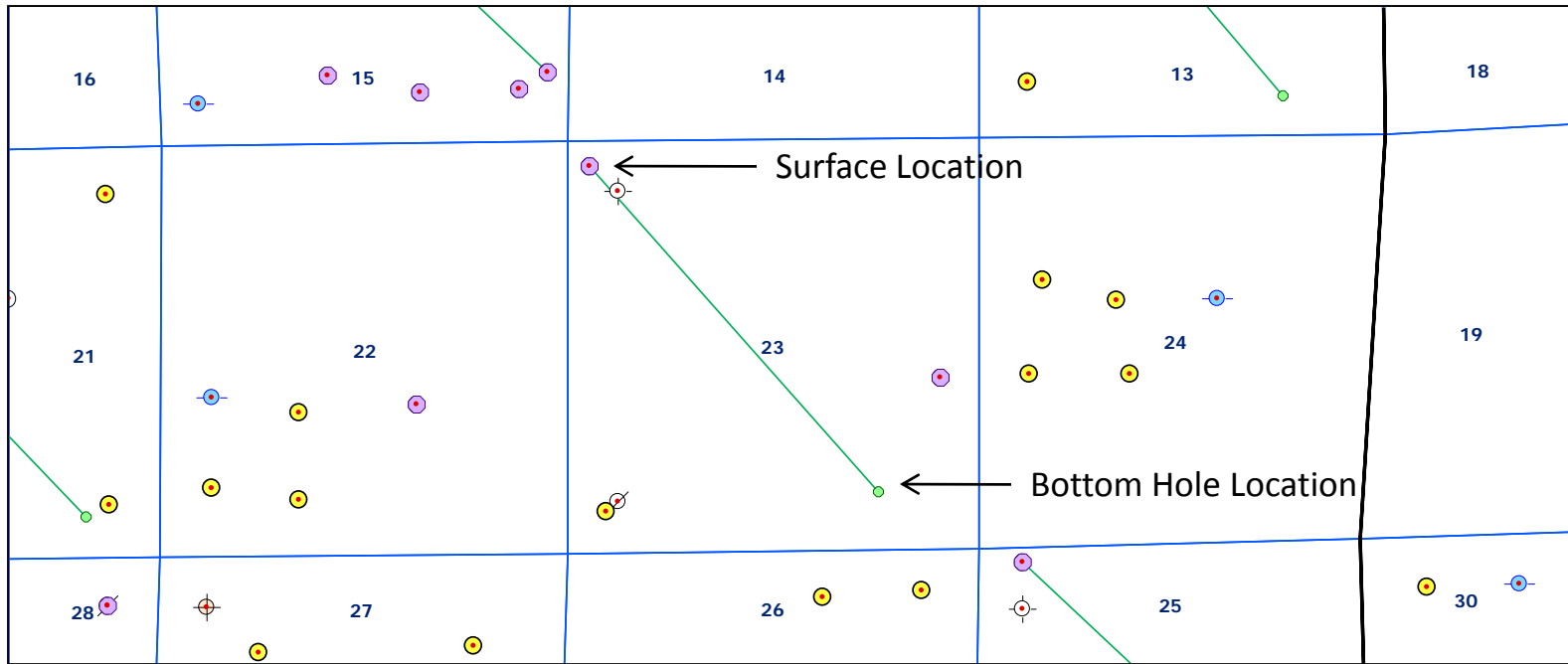
Horizontal Well Permits in Colorado

Reasons for Drilling Horizontal Wells

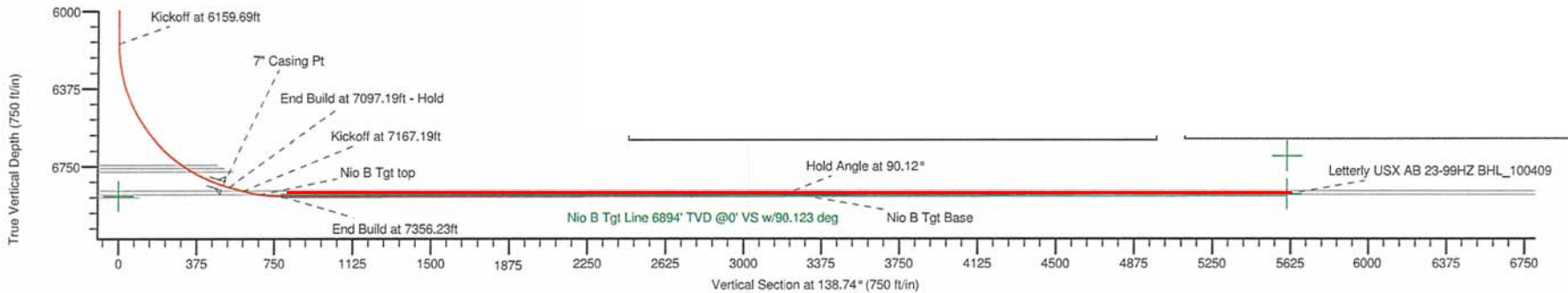
- Exposes more reservoir rock to the wellbore.
 - Used in lieu of a large number of vertical wells to efficiently drain the reservoir.
- Allows the wellbore to intersect natural fractures that may contain hydrocarbon accumulations.
 - Probability of a vertical well intersecting natural fractures is extremely low.
- Creates the opportunity to develop permeability in a reservoir where it is too tight for oil or gas to move to the well.
 - Can open up flow pathways through reservoir permeability barriers or from overlying/underlying source rocks.

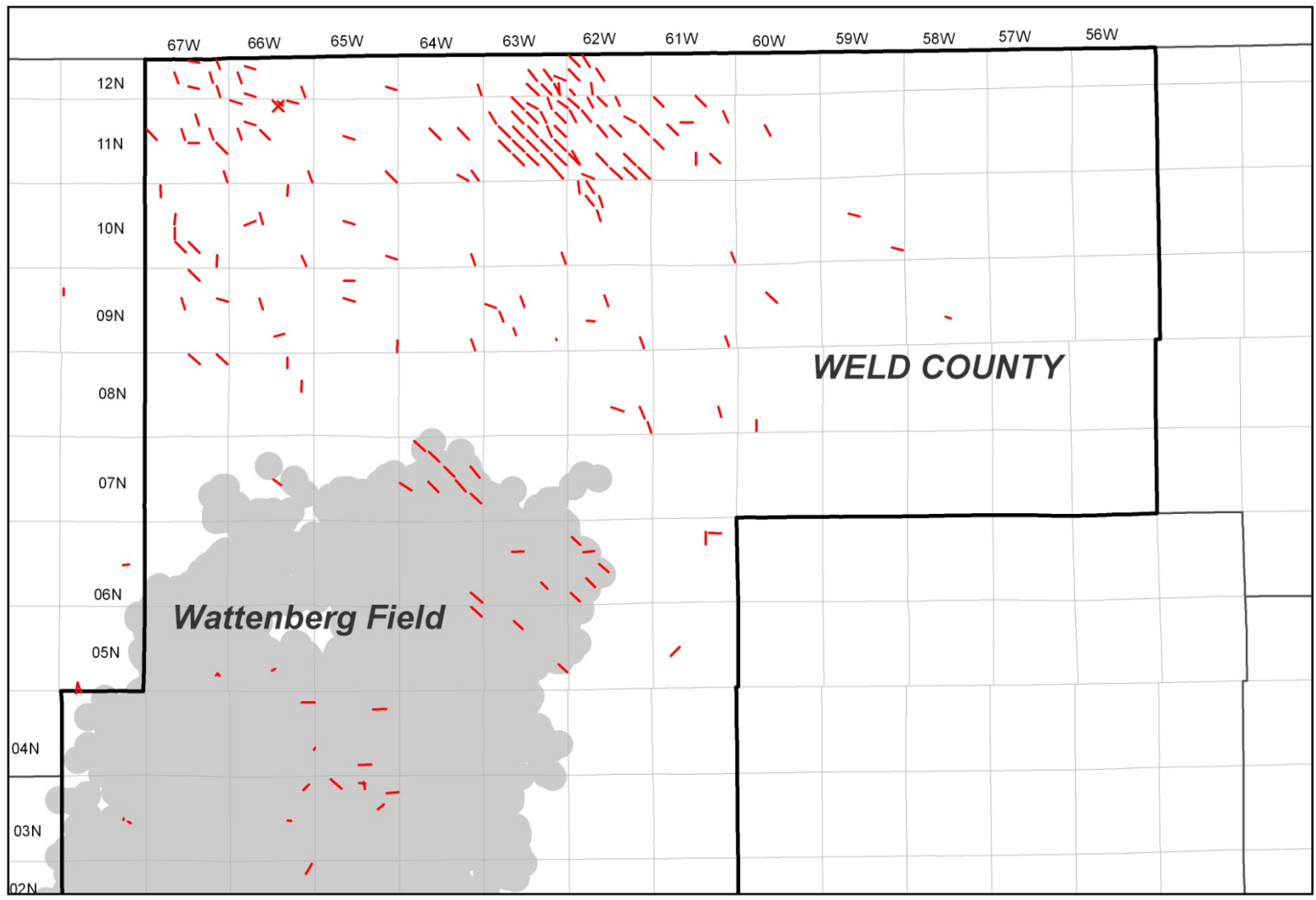
Example of a Horizontal Well

Map View

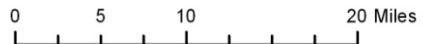


Cross Section View





Legend — Permitted Horizontal Wellbores



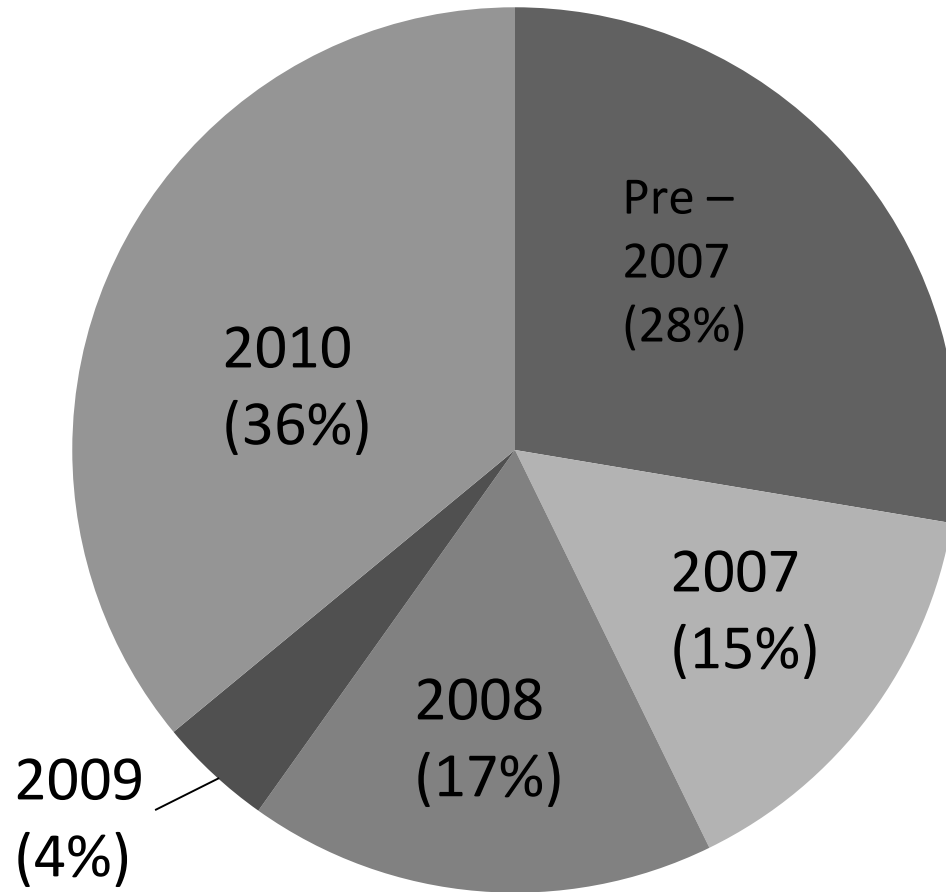
COGCC: Nov. 22, 2010

Orientation of Permitted Horizontal Wellbores in Northern Weld County, Colorado

Horizontal Well Permitting Activity

- Horizontal Well Permitting is currently at COGCC's historically highest levels.
- 276 horizontal well permits have been issued thus far in 2010.
- This accounts for about 36% of all horizontals permitted in Colorado.
- Increase in Spacing Order applications associated with horizontal wells in 2010.

Chart showing Percentage of Total Horizontal Permits by Year



Horizontal Well Permits by County and Year

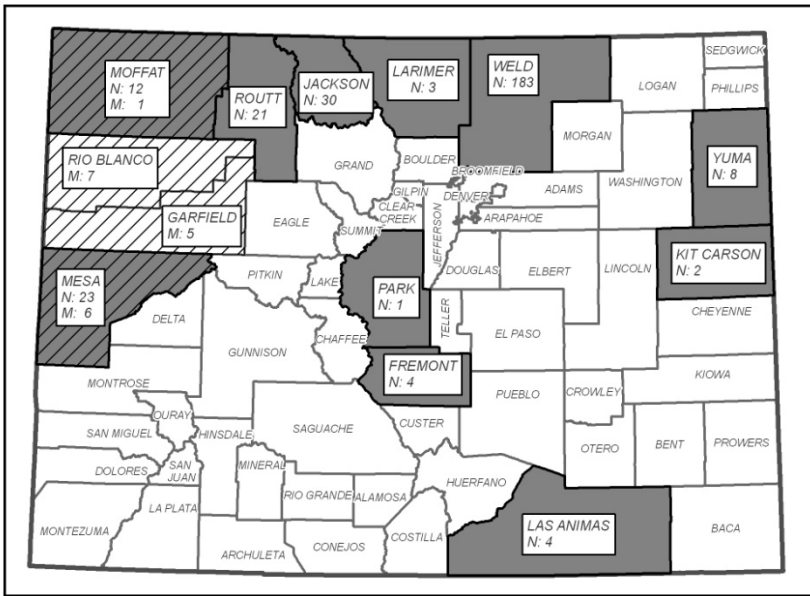
County	Permitted Before 2007	2007	2008	2009	2010	Total
ADAMS	0			6	2	8
ARAPAHOE	2					2
ARCHULETA	16	22	7	1	9	55
CHEYENNE	14					14
DOLORES	0	10	14		6	30
FREMONT	7	1	6		12	26
GARFIELD	16	1	2		5	24
GUNNISON	2					2
JACKSON	10	12	11		3	36
KIT CARSON	2					2
LA PLATA	38	24	9	15	21	107
LARIMER	4					4
LAS ANIMAS	23	6	4		1	34
LINCOLN	0		1		2	3
LOGAN	0	3				3
MESA	9	12	32	3	27	83
MOFFAT	12	6	6		4	28
MONTEZUMA	6	13	27	1	9	56
PARK	0				1	1
RIO BLANCO	11				1	12
ROUTT	23					23
SAN MIGUEL	1		1			2
WASHINGTON	1					1
WELD	15	4	5	6	173	203
YUMA	0	2	6			8
TOTAL	212	116	131	32	276	767
Percent of Total	28%	15%	17%	4%	36%	

Horizontal Target Formations

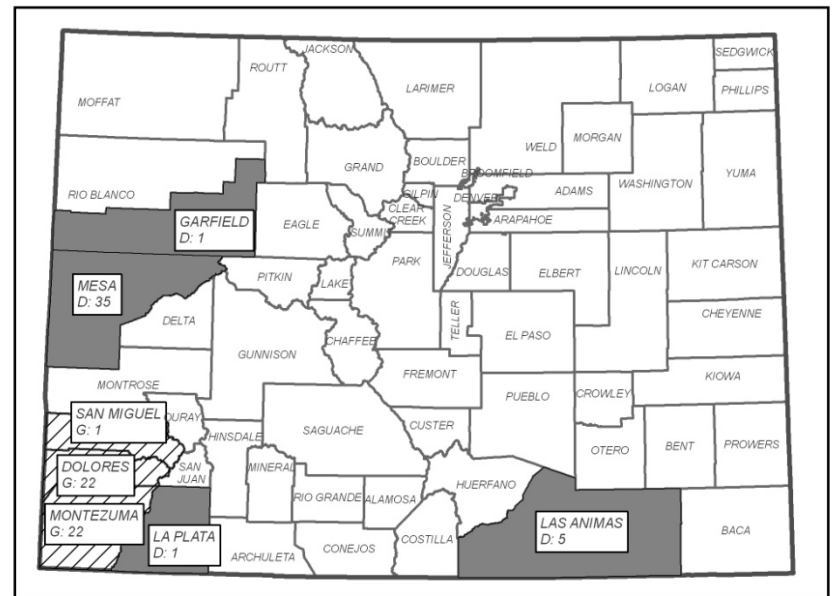
Permitted Formation	Permitted Before 2007	2007	2008	2009	2010	Grand Total
Niobrara	39	20	35	5	191	290
Fruitland Coal	34	46	16	16	30	142
Gothic Shale	0	3	31		11	45
Dakota	1	8	26	3	4	42
Leadville	4	14	11	1	4	34
Pierre Shale	12	1	5		10	28
Mancos	6	1			12	19
Vermejo Coal	15					15
All Others	101	23	7	7	14	152
Total	212	116	131	32	276	767

Permitted Horizontal Wells by Formations by County

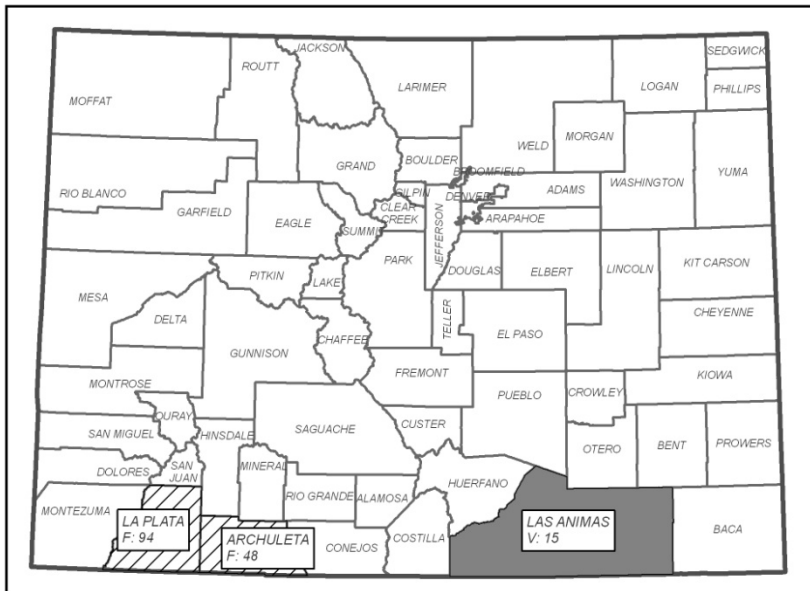
County	Niobrara	Fruitland Coal	Gothic Shale	Dakota	Leadville	Pierre	Mancos	Vermejo	All Other Formations	Total
ADAMS									8	8
ARAPAHOE									2	2
ARCHULETA		48							7	55
CHEYENNE									14	14
DOLORES			22		6				2	30
FREMONT	4					21			1	26
GARFIELD				1			5		18	24
GUNNISON									2	2
JACKSON	30								6	36
KIT CARSON	2								0	2
LA PLATA		94		1					12	107
LARIMER	3								1	4
LAS ANIMAS	4			5		7		15	3	34
LINCOLN									3	3
LOGAN									3	3
MESA	23			35			6		19	83
MOFFAT	12						1		15	28
MONTEZUMA			22		28				6	56
PARK	1								1	1
RIO BLANCO							7		5	12
ROUTT	21								2	23
SAN MIGUEL			1						1	2
WASHINGTON									1	1
WELD	183								20	203
YUMA	8								0	8
Total	290	142	45	42	34	28	19	15	152	767



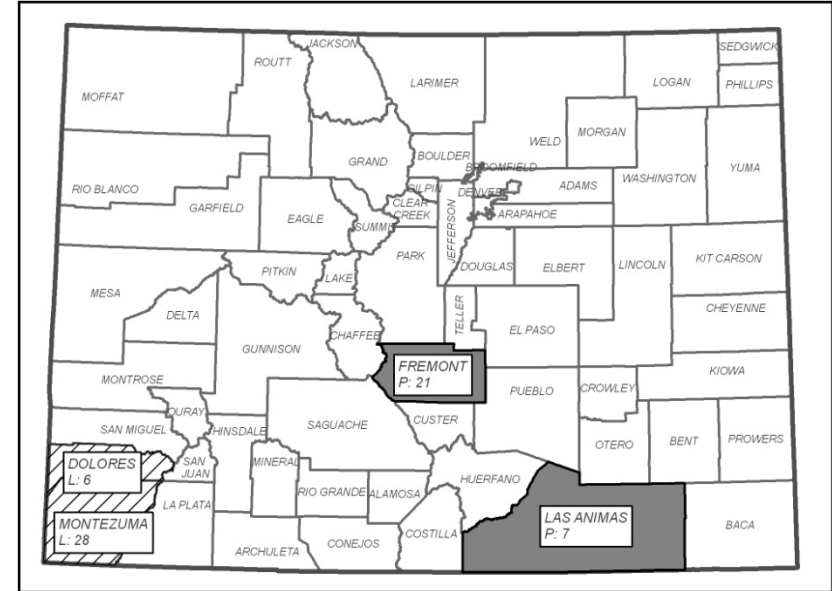
Niobrara and Mancos Niobrara (N) Mancos (M)



Dakota and Gothic Shale Dakota (D) Gothic Shale (G)



Vermejo and Fruitland Coals Vermejo (V) Fruitland (F)



Pierre Shale and Leadville Pierre Shale (P) Leadville (L)

Number of Horizontal Well Permits by Formation and County

Note: Only the top 8 formations are shown on this figure; horizontals have been permitted in several other formations.

Summary

- Horizontal well permitting activity has increased significantly during the past year, with 267 permits issued Statewide in 2010.
- Although Weld County experienced the highest level of permitting activity in 2010 (173 permits), horizontal well permits were also issued in 14 other Counties this year.
- The current primary target formations are Niobrara, Mancos, Gothic Shale, Pierre Shale, Fruitland Coal, Dakota, and Leadville formations.
- It is anticipated that horizontal well permitting will remain at current, or increased levels, during the next few years as Operators are testing a variety of configurations and techniques in a number of formations throughout the State.