EXHIBIT(s)
FOR
ORDER NO(s).

COGCC

191 - 60

510 - 46

523 - 5

-

Antero Resources Piceance Corporation

Application for an Order Establishing Spacing and Well Location Rules for the Mancos Group

Cause No. 191
Docket No. 0901 SP 03

December 31, 2008

ANTERO RESOURCES

Antero Resources Piceance Corporation

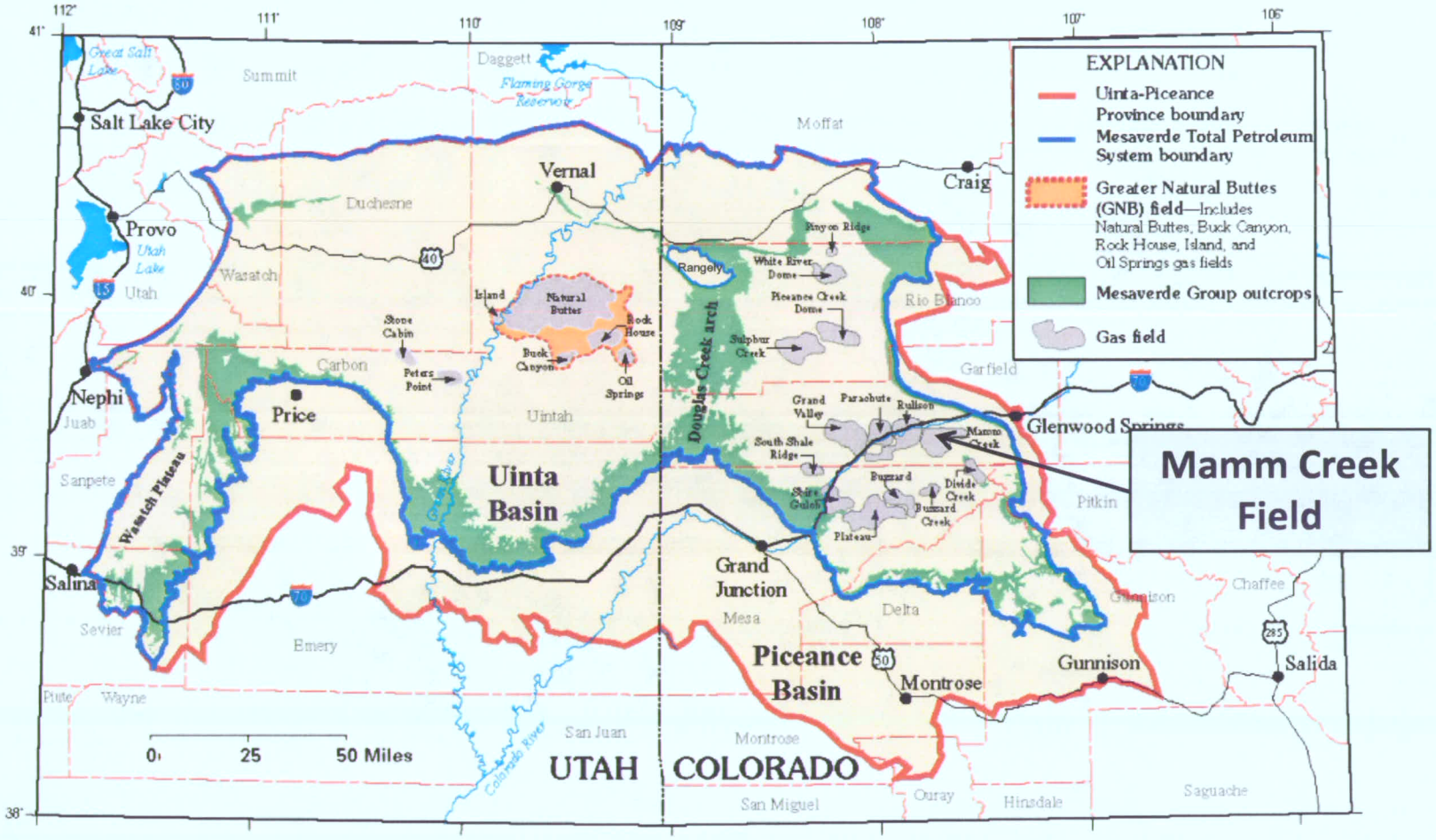
Geology Exhibits

Cause No. 191
Docket No. 0901 SP 03

December 31, 2008

Piceance and Uinta Basin Locator Map

ANTERO RESOURCES



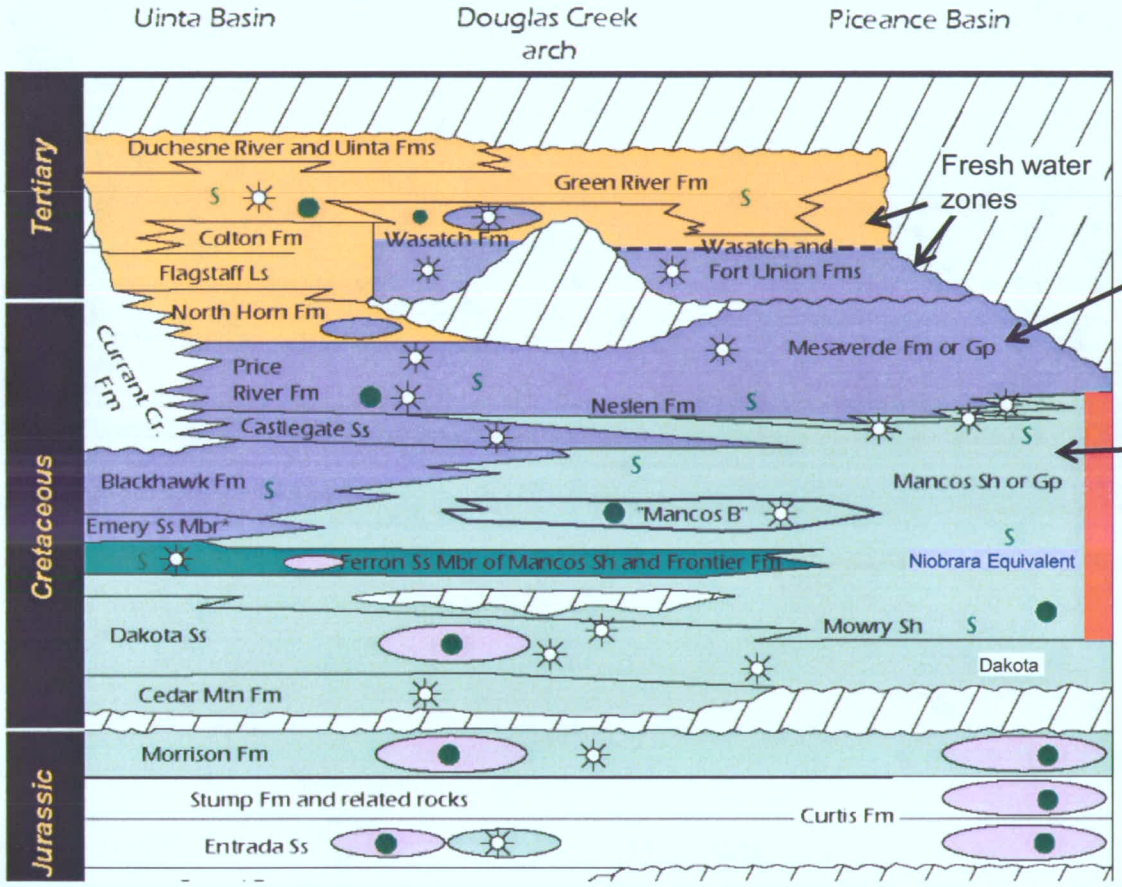
From USGS DDS-69-B

Thick deposits of the Mancos Group in including the Mancos Shale through the Mowry Shale interval underlie this entire area

Exhibit G-1
Cause No. 191
Docket No. 0901 SP 03
Piceance Basin, Colorado
Basin Locator Map

Stratigraphic Column of Uinta-Piceance Hydrocarbon Province

ANTERO RESOURCES



Mesaverde Group

- Non-marine fluvial to marginal marine shoreline deposition
- Sandstone and coal dominated tight gas reservoirs

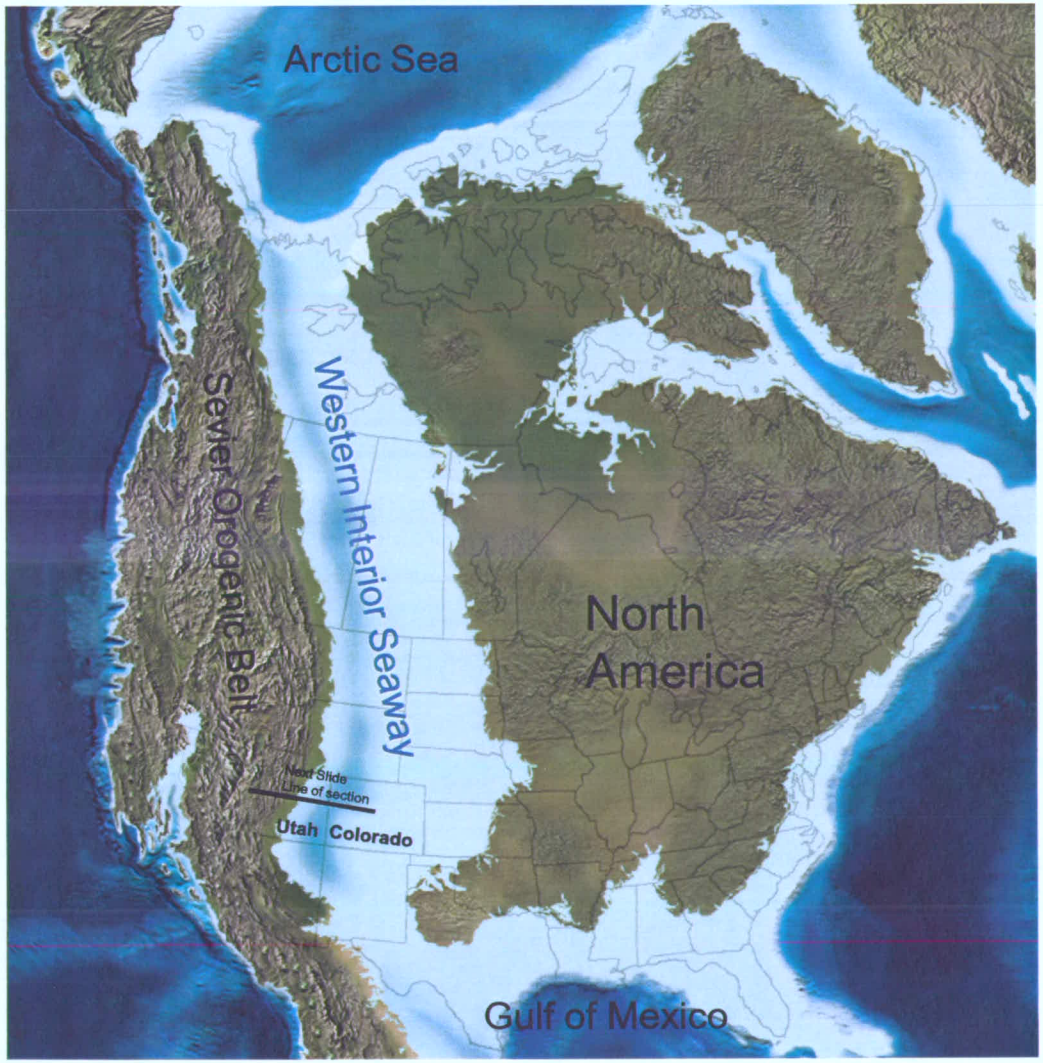
Mancos Group – Eastern Piceance

- Includes Mancos Shale, Niobrara Equivalent, and Mowry Shale
- Marine deposition basinward of shorelines in a shallow to deep shelf ramp setting
- Distal sandstone, siltstone, and shale tight gas reservoirs
- Self sourcing when sufficiently buried to generate hydrocarbons

Modified From USGS DDS-69-B

Exhibit G-2
Cause No. 191
Docket No. 0901 SP 03
Piceance Basin, Colorado
Stratigraphic Column

Mancos Depositional Setting
Late Cretaceous 85 Million Years Ago



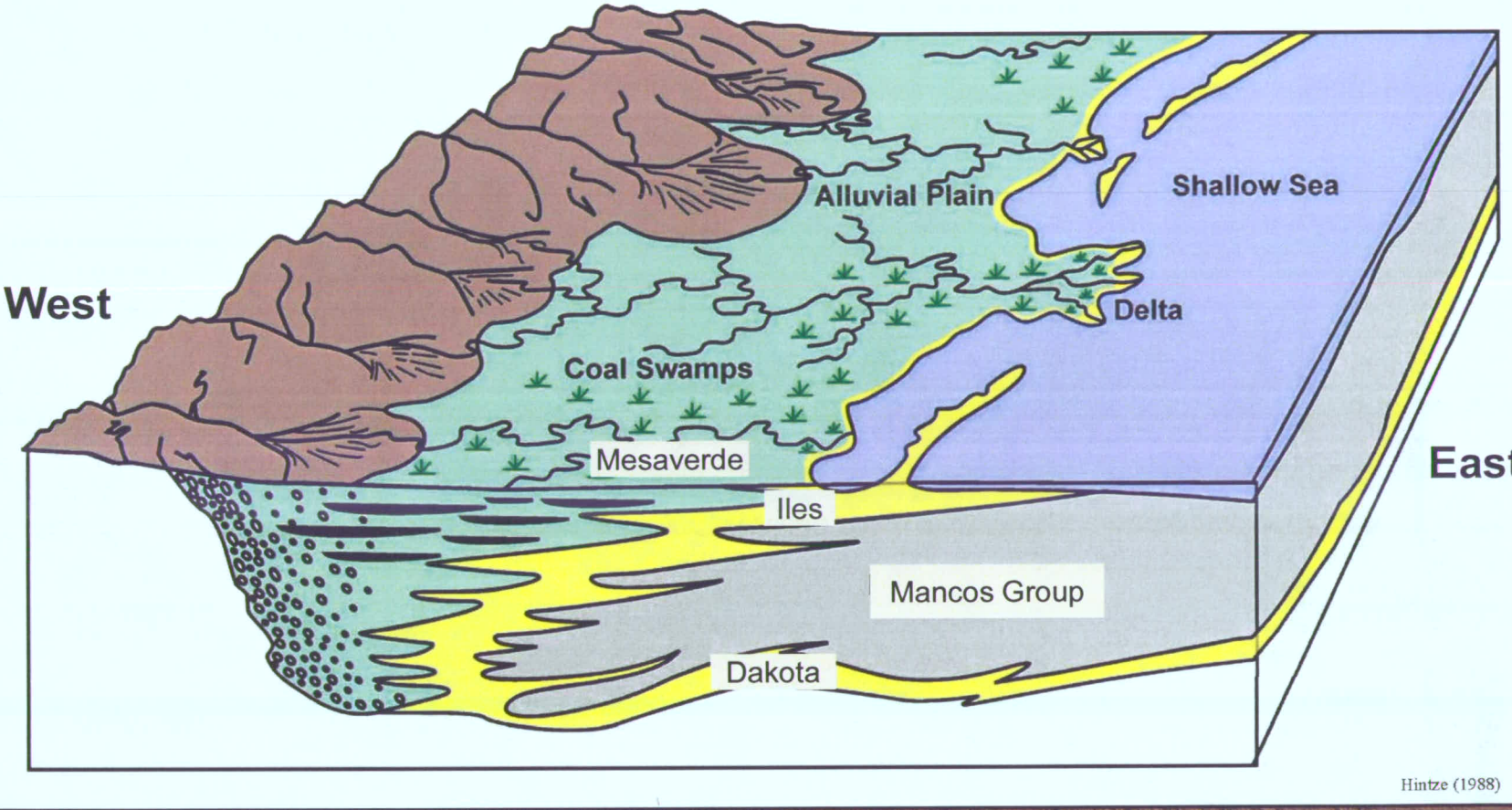
- The Mancos Shale and it's equivalents were deposited across a broad area of western North America within the confines of the Western Interior Seaway.

- The Sevier Orogenic Belt uplift was the source of sediment that was eventually transported and deposited into the seaway.

Paleogeographic Map
By Dr. Ron Blakey
Northern Arizona University

Exhibit G-3
Cause No. 191
Docket No. 0901 SP 03
Piceance Basin, Colorado
Mancos Depositional Setting

Generalized Environments of Deposition
Upper Cretaceous Western Interior Seaway



Late Cretaceous depositional environments. CWIS was storm-dominated.

Modified from Hintze (1988) and Pattison (2008)

Exhibit G-4
Cause No. 191
Docket No. 0901 SP 03
Piceance Basin, Colorado
Cretaceous Depositional Environments

Mancos/Mowry Marine Shale Depositional Model

- Oxygenated, shallow shelf setting
- Storm dominated depositional processes disperse sand, silt, mud, and organic materials to deeper water

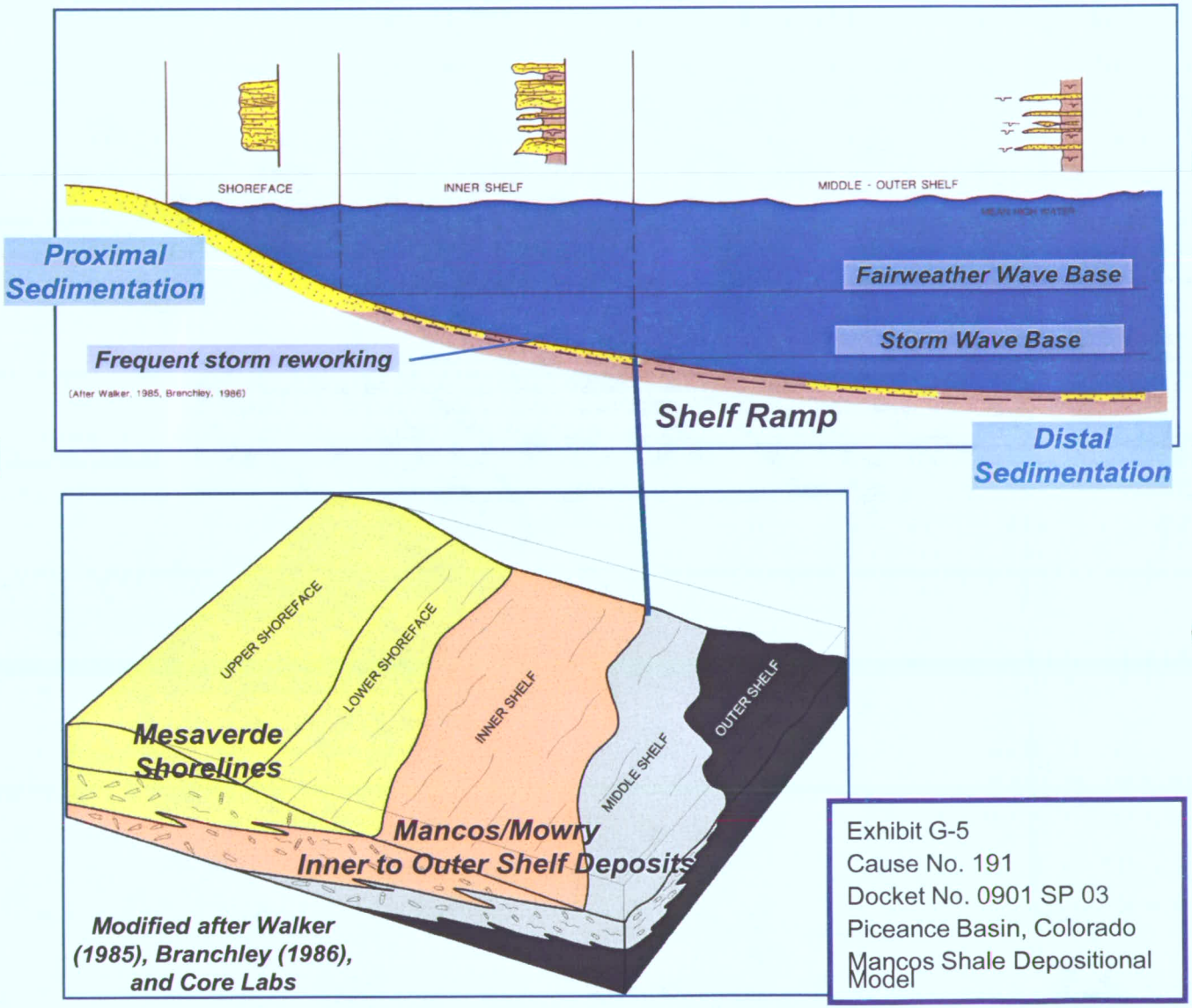
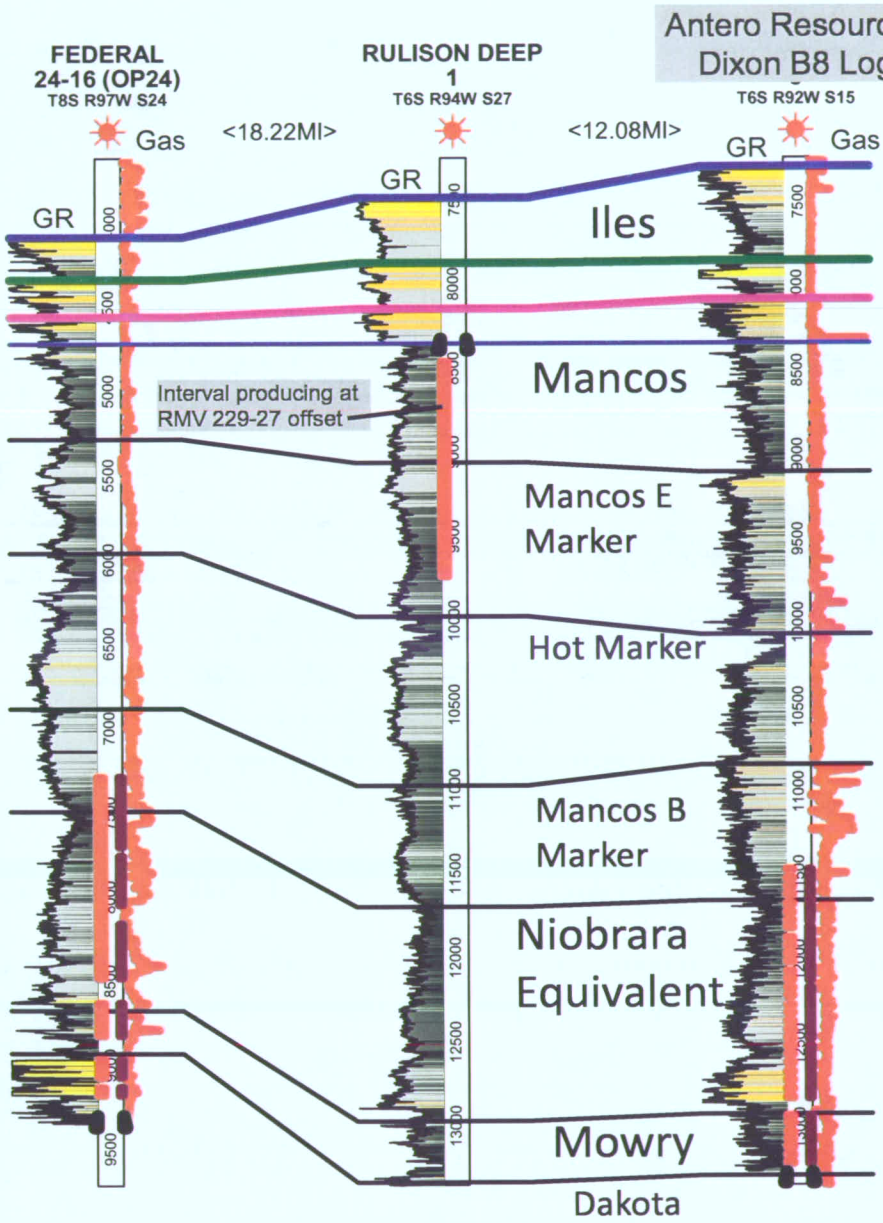


Exhibit G-5
Cause No. 191
Docket No. 0901 SP 03
Piceance Basin, Colorado
Mancos Shale Depositional Model

E-W Log section from Orchard to N. Mamm Creek



Regional cross section along the Colorado River corridor through deep wells

- Mancos very fine grained "mudrock" lithologies are present regionally
- Distal sediment packages are correlative in bulk packages
- All 3 wells are producing from or tested gas shows in the Mancos/Mowry interval

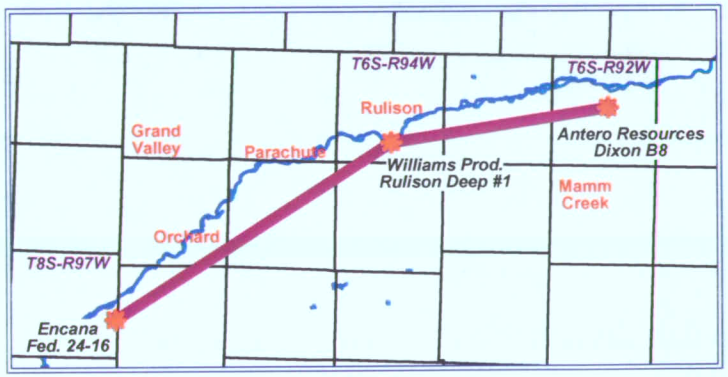


Exhibit G-6
Cause No. 191
Docket No. 0901 SP 03
Piceance Basin, Colorado
E-W Mancos Log X-Section

Basic Gas Storage and Flow in Gas Shale Reservoirs

Shale reservoirs store gas in multiple ways

- Sorbed gas molecules physically adhere to the internal pore surfaces of organic material, generally < 50 nanometers (50×10^{-9} meters) in size
  - A methane molecule is 0.38 nanometers
- Compressed or free gas is stored in the open porosity in the inorganic matrix
- Compressed or free gas is stored in open natural fractures of various size and origin

- Gas moves through the shale reservoir by several transfer mechanisms
  - Diffusion processes for pore space < 50 nanometer
  - Diffusion and Darcy flow processes for pore space > 50 nanometer
  - Darcy flow processes for natural fractures

Exhibit G-7
Cause No. 191
Docket No. 0901 SP 03
Piceance Basin, Colorado
Gas Shale Storage and Flow

North Mamm Creek
E. Piceance Basin Mancos/Mowry
Antero Resources Dixon B8 Type Log

- Top Mancos Shale to base Mowry = 4800'
- Offshore marine shelf environments dominate deposition
- Mudrock lithologies consisting of silt to clay sized particles dominate
- Organic matter present in all lithologies
  - Higher thermal maturity and kerogen type favors gas production
  - Mowry and Niobrara Equiv. intervals contain best source rocks regionally
- Reservoir contains both adsorbed and free gas
- Very low K relative to Mesaverde reservoirs
  - nanodarcy (10^{-9}) versus microdarcy (10^{-6})
- Natural Fractures have been identified in all lithologies

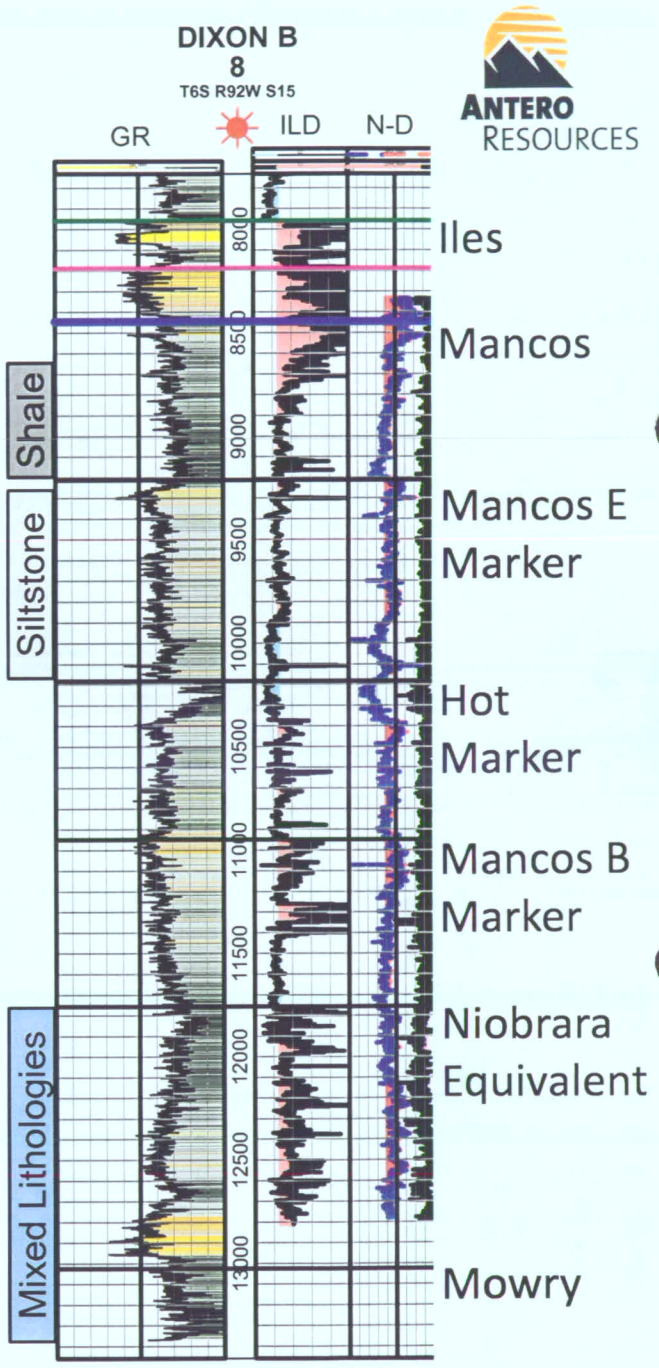


Exhibit G-8
Cause No. 191
Docket No. 0901 SP 03
Piceance Basin, Colorado
Mancos /Mowry Type Log

Mancos Shale Characteristics

- Marine shale with siltstone beds and laminations
  - 4-5% porosity
  - Extremely low K, nanodarcy range
  - Adsorbed gas content = 37 scf/ton
    - Isotherm at Dever C7
  - Total Organic Carbon 1-2%
- Tends to be more ductile
- Open, partially healed, and resistive natural fractures observed on Formation Micro-Imager logs

DEVER C 7
T6S R92W S18

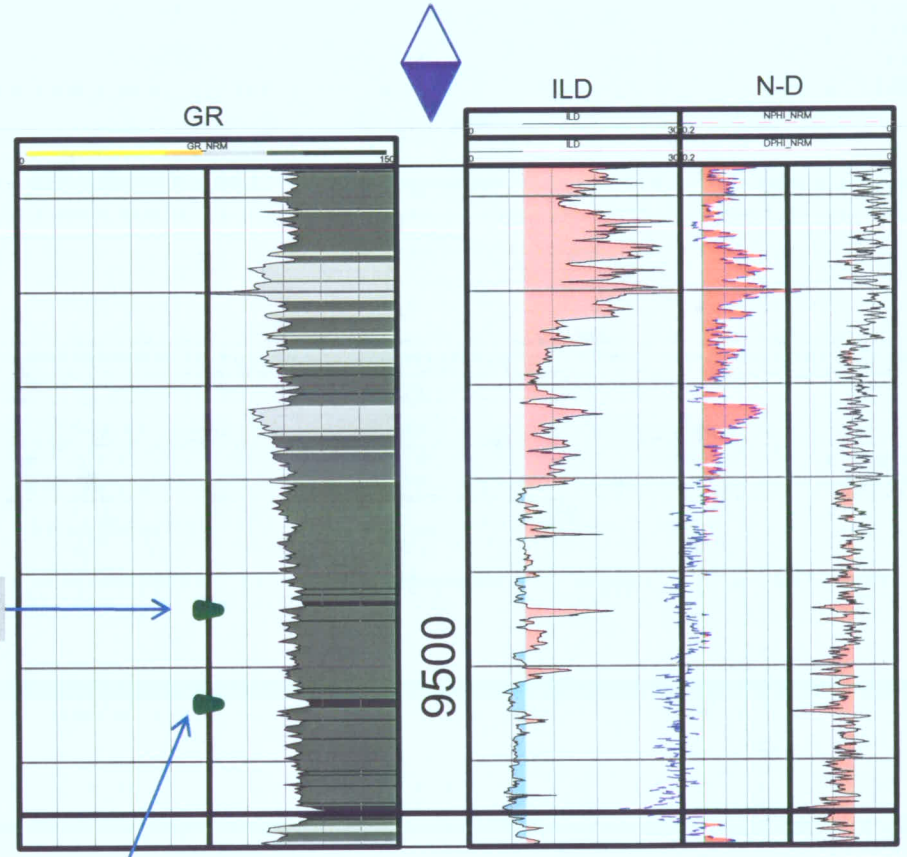
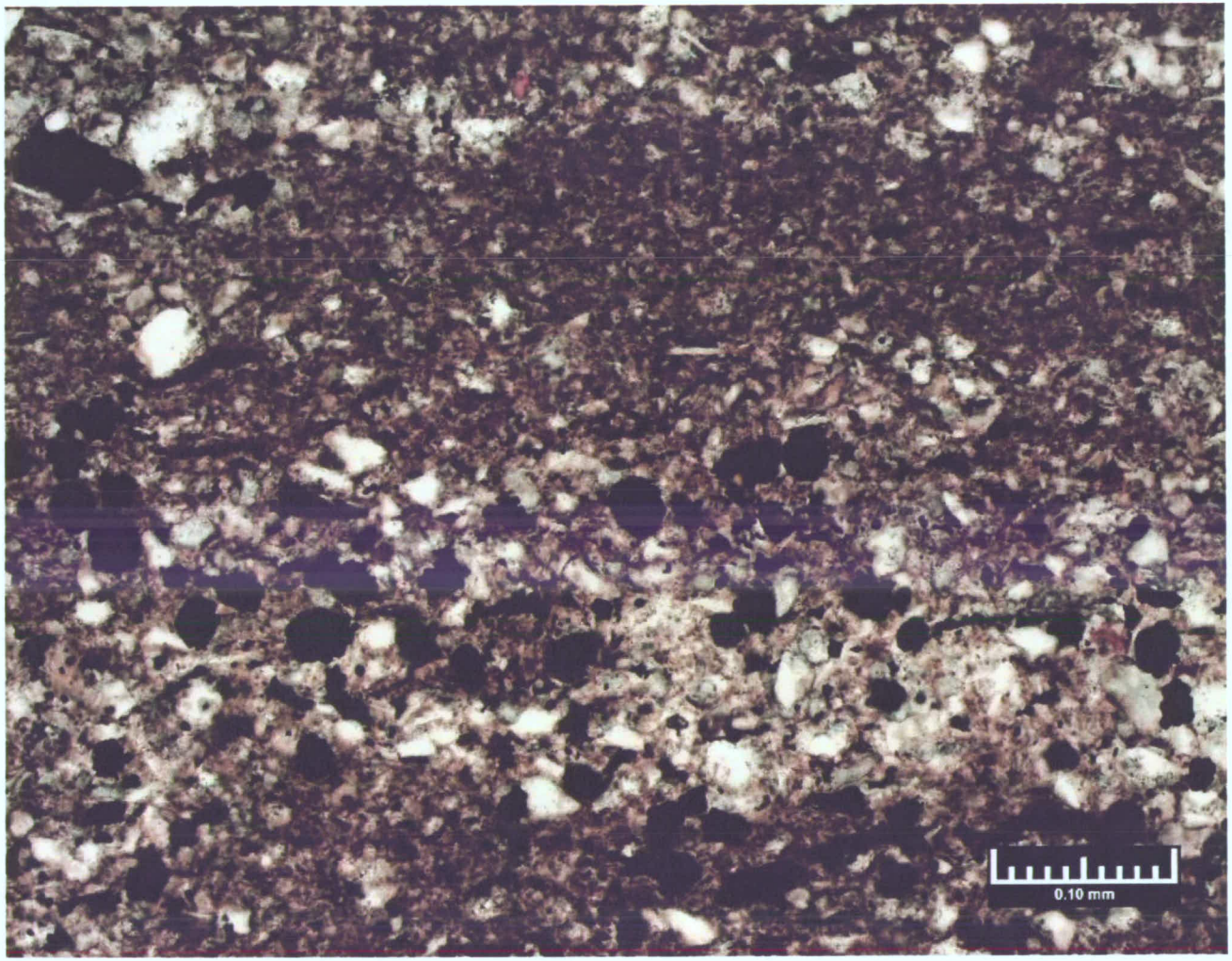


Exhibit G-9
Cause No. 191
Docket No. 0901 SP 03
Piceance Basin, Colorado
Mancos Shale Example

Thin Section Photograph & Mineralogy of Mancos Shale Lithology – 9539.1'

Silt = 0.0625 to 0.0039 mm, Clay < 0.0039 mm



Lithology: Argillaceous siltstone to silty shale

Texture: Burrowed with localized traces of remnant bedding; the original fabric appears to have contained relatively grain-rich and grain-poor laminations; burrows dominantly have horizontal orientations

Estimated Average Grain Size: <0.02 mm

Grain Sorting: Poorly sorted

Grains: Monocrystalline quartz > feldspar > muscovite > detrital dolomite > organic fragments > chert > polycrystalline quartz > biotite, skeletal fragments > shale/mudstone fragments, heavy minerals (zircon, tourmaline), schist fragments

Matrix: Abundant detrital clay-rich matrix fills intergranular areas in grain-rich areas and supports grains in matrix-rich portions of the sample; XRD analysis has detected 37% total clay (by weight)

Cements and Replacement Minerals: Common small crystals and small crystal aggregates of pyrite that replaces grains, matrix, and carbonaceous fragments; trace to very minor amounts of fine crystalline dolomite and calcite as grain replacements

Pore System: No discernible pores using standard petrographic techniques

Sample	CLAYS				CARBONATES			OTHER MINERALS						TOTALS		
Depth (ft)	Chlorite	Kaolinite	Illite	Mx I/S*	Calcite†	Dolomite	Siderite	Quartz	K-spar	Plag.	Pyrite	Apatite	Barite	Clays	Carb.	Other
9539.1	9	3	20	5	1	8	Tr	34	1	15	2	2	0	37	9	54

* Ordered interstratified mixed-layer illite/smectite; Approximately 20-25% expandable interlayers

† May include the Fe-rich variety

Exhibit G-10
Cause No. 191
Docket No. 0901 SP 03
Piceance Basin, Colorado
Thin Section and XRD - Shale

Mancos Shale Adsorption Isotherm

ANTERO RESOURCES

- Rock samples recovered by rotary sidewall coring – good quality samples
- Reservoir pressure determined by direct measurement at Dever C9 (cased hole dynamic tester)

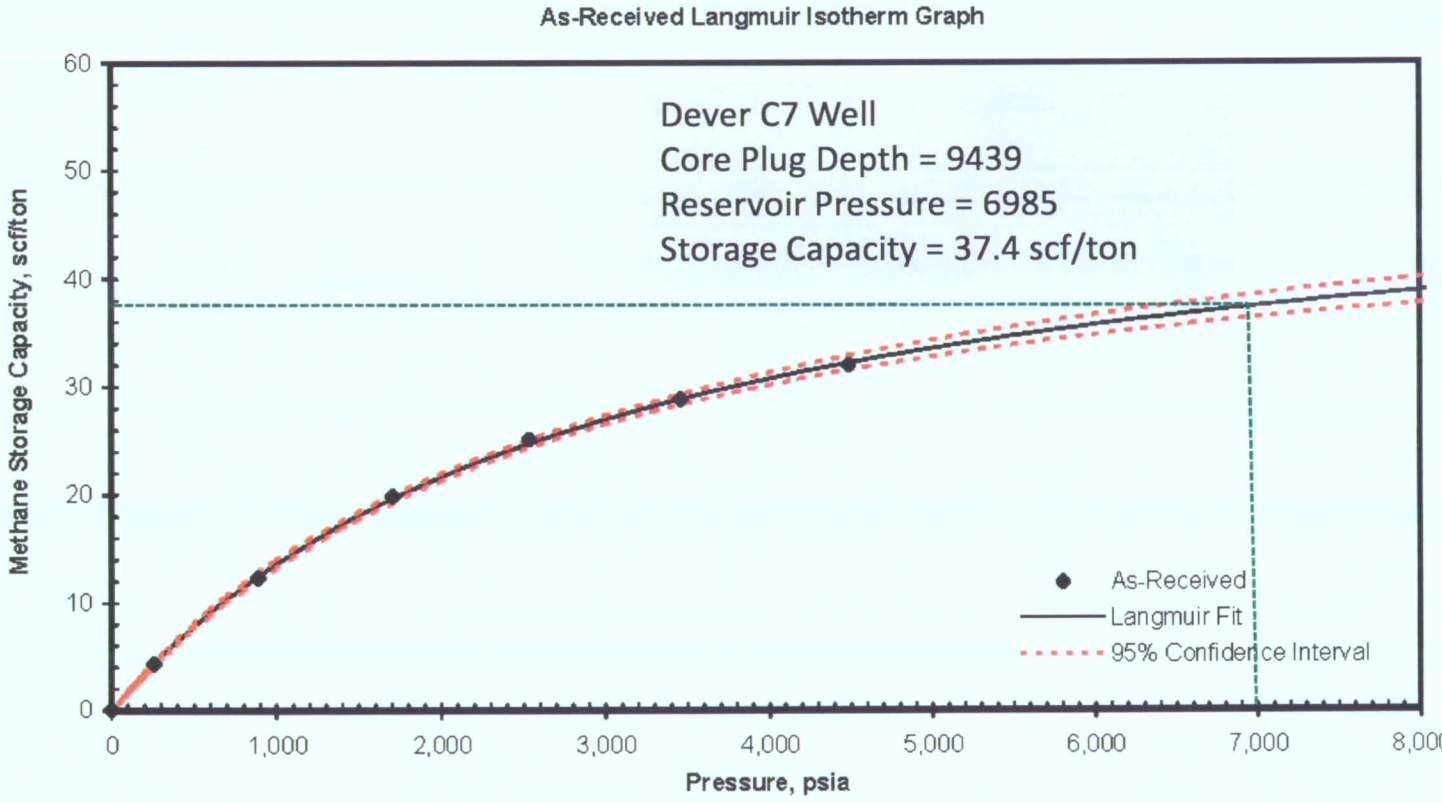


Exhibit G-11
Cause No. 191
Docket No. 0901 SP 03
Piceance Basin, Colorado
Mancos Shale Isotherm

Mancos Siltstone, Silty Sandstone

ANTERO RESOURCES

DEVER C 7

T6S R92W S18

- Marine siltstone with varying clay content and very fine sandtone beds and laminations
  - 5% porosity is typical for this lithotype
  - Extremely low K, nano to micro-darcy
  - Adsorbed gas content = 26-28 scf/ton
  - Total Organic Carbon ~1%
- Tends to be more brittle
- Open, partially healed, and resistive natural fractures observed on Formation Micro-Imager logs

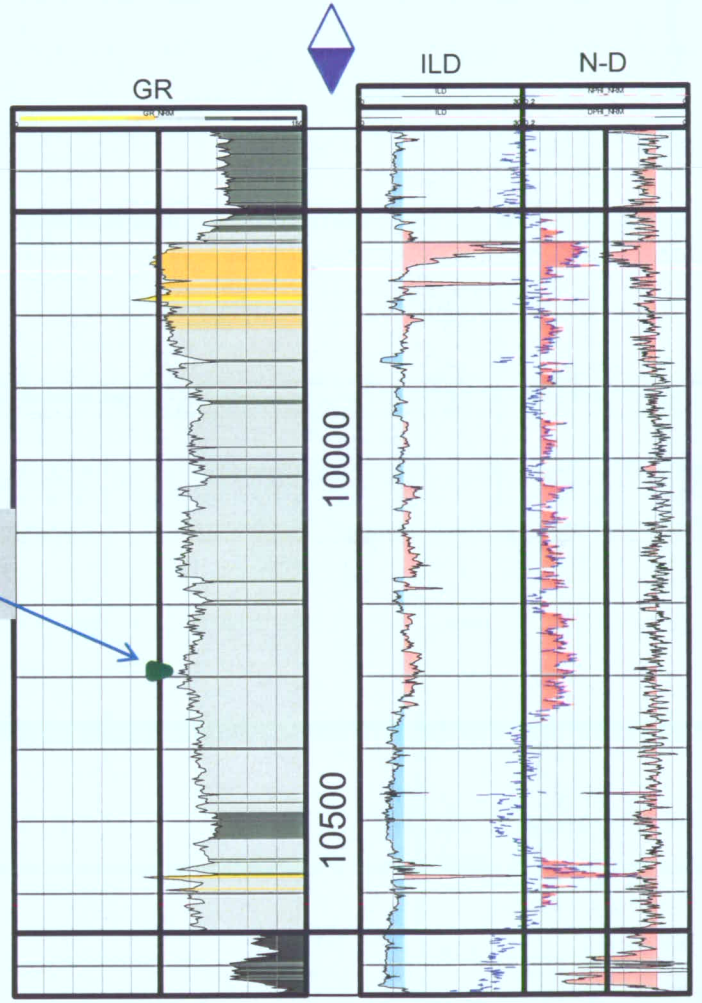
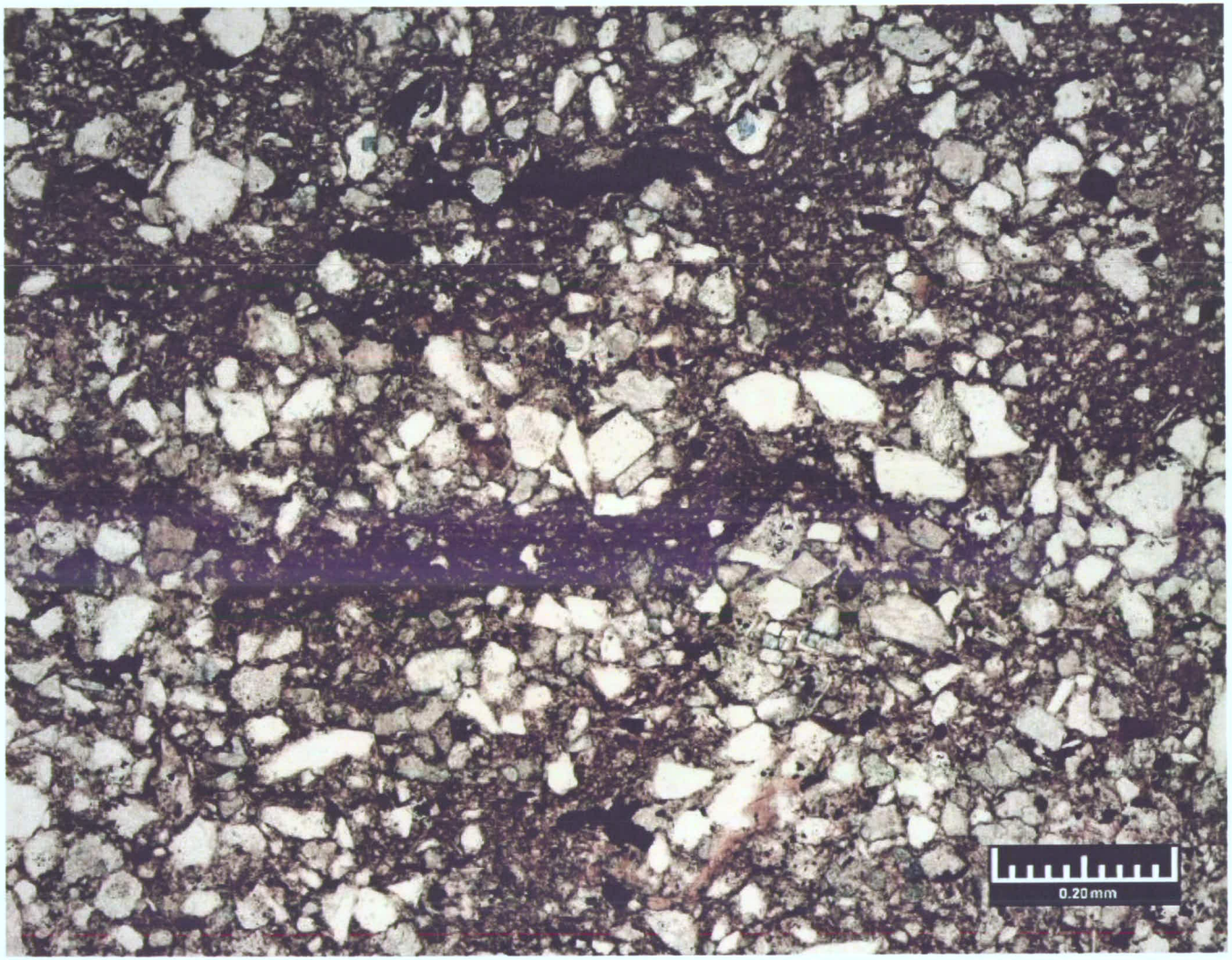


Exhibit G-12
Cause No. 191
Docket No. 0901 SP 03
Piceance Basin, Colorado
Mancos Siltstone Example

Thin Section Photograph & Mineralogy of Mancos Siltstone Lithology – 10292'

Silt = 0.0625 to 0.0039 mm, Clay < 0.0039 mm



Lithology: Slightly dolomitic, argillaceous sandy siltstone to argillaceous, silty, very fine-grained sandstone

Texture: Burrowed with localized traces of remnant bedding; the original fabric appears to have a few thin sand laminations; burrows dominantly have horizontal orientations, with a few burrows having oblique orientations

Estimated Average Grain Size: 0.07 mm

Grain Sorting: Poorly sorted

Grains: Monocrystalline quartz > feldspar, detrital dolomite > muscovite, polycrystalline quartz > chert > schist fragments > phyllite/slate fragments, siltstone/sandstone fragments, biotite

Matrix: Abundant detrital clay-rich matrix fills intergranular areas; XRD analysis has detected 28% total clay (by weight)

Cements and Replacement Minerals: Common finely disseminated pyrite as replacement of grains, matrix, and carbonaceous fragments; minor amounts of dolomite (ferroan) cement, as overgrowths on detrital dolomite grains, and as fine crystalline replacement of grains and matrix

Pore System: No discernible pores using standard petrographic techniques

Sample	CLAYS				CARBONATES			OTHER MINERALS						TOTALS		
Depth (ft)	Chlorite	Kaolinite	Illite	Mx I/S*	Calcite[1]	Dolomite	Siderite	Quartz	K-spar	Plag.	Pyrite	Apatite	Barite	Clays	Carb.	Other
10292.0	6	3	15	4	0	11	Tr	44	1	12	3	1	0	28	11	61

* Ordered interstratified mixed-layer illite/smectite; Approximately 20-25% expandable interlayers

[1] May include the Fe-rich variety

Exhibit G-13
Cause No. 191
Docket No. 0901 SP 03
Piceance Basin, Colorado
Thin Section & XRD - Siltstone

Niobrara Equivalent Mowry Shale

- Calcareous shale, siltstone, and sandy, argillaceous limestone
  - 5-7% porosity
  - No gas content data collected in field to date
  - Published data suggest quality source rock, Total Organic Carbon 2+%
  - Calcareous fraction increases downward
  - Varies from more ductile to brittle

- Mowry is usually siliceous with bentonite beds
  - Published data suggest good quality source rock (USGS DDS-69-B)

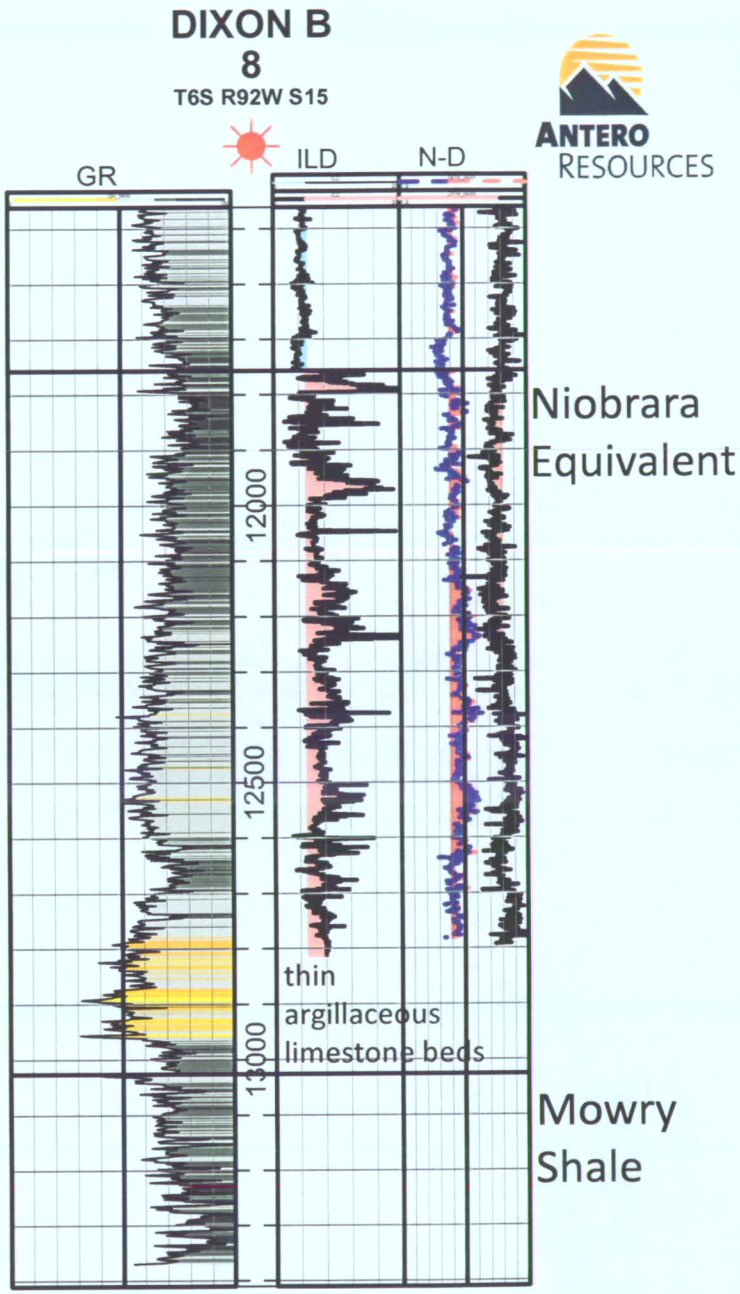
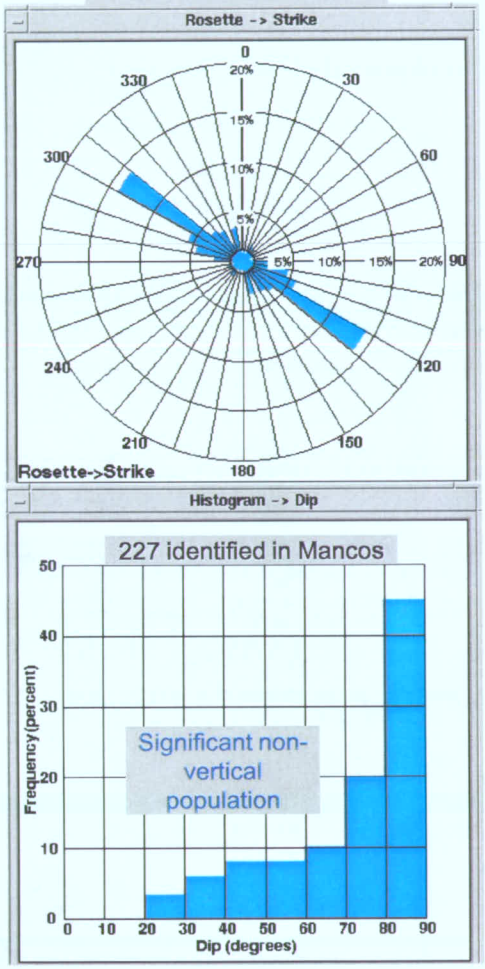


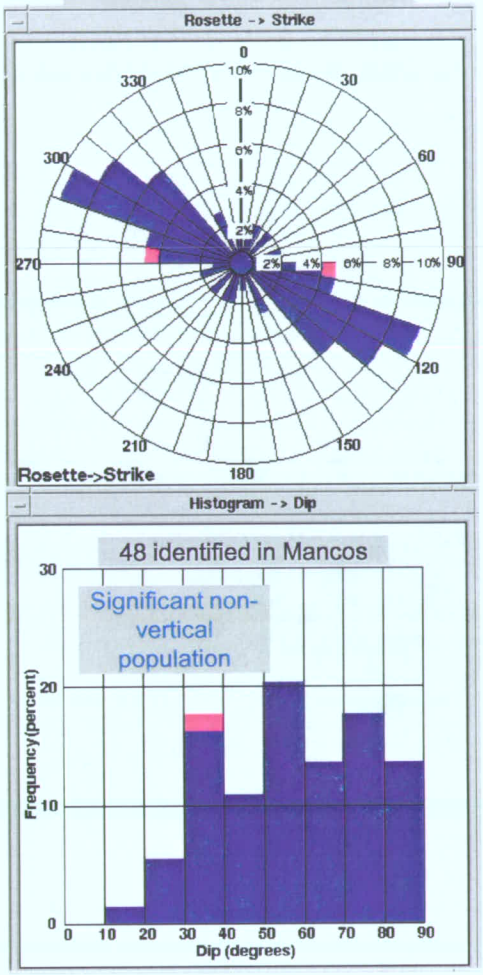
Exhibit G-14
Cause No. 191
Docket No. 0901 SP 03
Piceance Basin, Colorado
Niobrara-Mowry Example

North Mamm Creek Natural Fracture and Stress Orientations

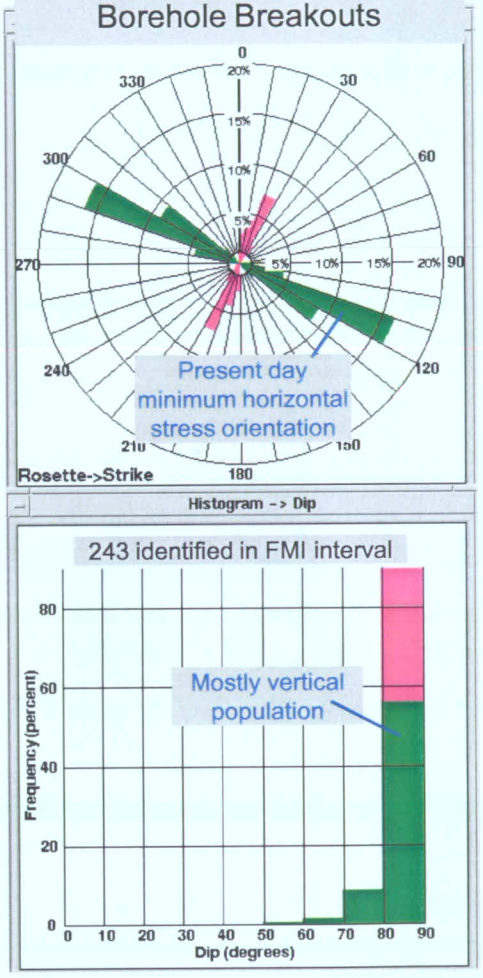
Resistive/Healed



Open/Partially Open



Drilling Induced Fractures & Borehole Breakouts



Data from Dever C7 formation micro-imager log (FMI)
These fractures have been characterized as short and isolated, and dominated by lithologically bound fractures

Exhibit G-15
Cause No. 191
Docket No. 0901 SP 03
Piceance Basin, Colorado
Fracture and Stress Rosettes

Mancos/Mowry Shale Reservoir Drainage Characteristics

- Hydraulic fractures are required to effectively contact adequate surface area of the extremely low permeability shale gas reservoir

- Hydraulic fractures will propagate parallel to the present day, highly anisotropic minimum stress orientation inferred by drilling induced fractures and borehole breakouts on formation micro-imager logs

- Hydraulic fractures will propagate parallel or nearly parallel to most of the natural fractures intersected by the wellbore

- Hydraulic fractures will propagate vertically and intersect an identified population of non-vertical natural fractures

- Resulting reservoir drainage patterns will be highly elliptical and parallel to the Mesaverde tight gas sand drainage patterns

Exhibit G-16
Cause No. 191
Docket No. 0901 SP 03
Piceance Basin, Colorado
Stimulation Characteristics

Antero Mancos Well Results

- Antero initiated a drilling pilot to evaluate Mancos reserves in January 2008

- Objective: Test productivity and evaluate the economics of extremely low permeability mudrock lithologies of the Mancos/Mowry Shale

- Pilot Results
  - Open hole logging suites obtained to determine reservoir parameters
  - Rock Samples recovered for gas in place analysis, petrography, maturity, XRD, and geochemical analysis
  - Reservoir pressure measured using Cased Hole Dynamic Tester
  - Obtained Formation Micro-Imager logs used to characterize fracturing
  - 5 gas wells flowing to sales established productivity across entire interval
  - Determined a range for gas in place from this data

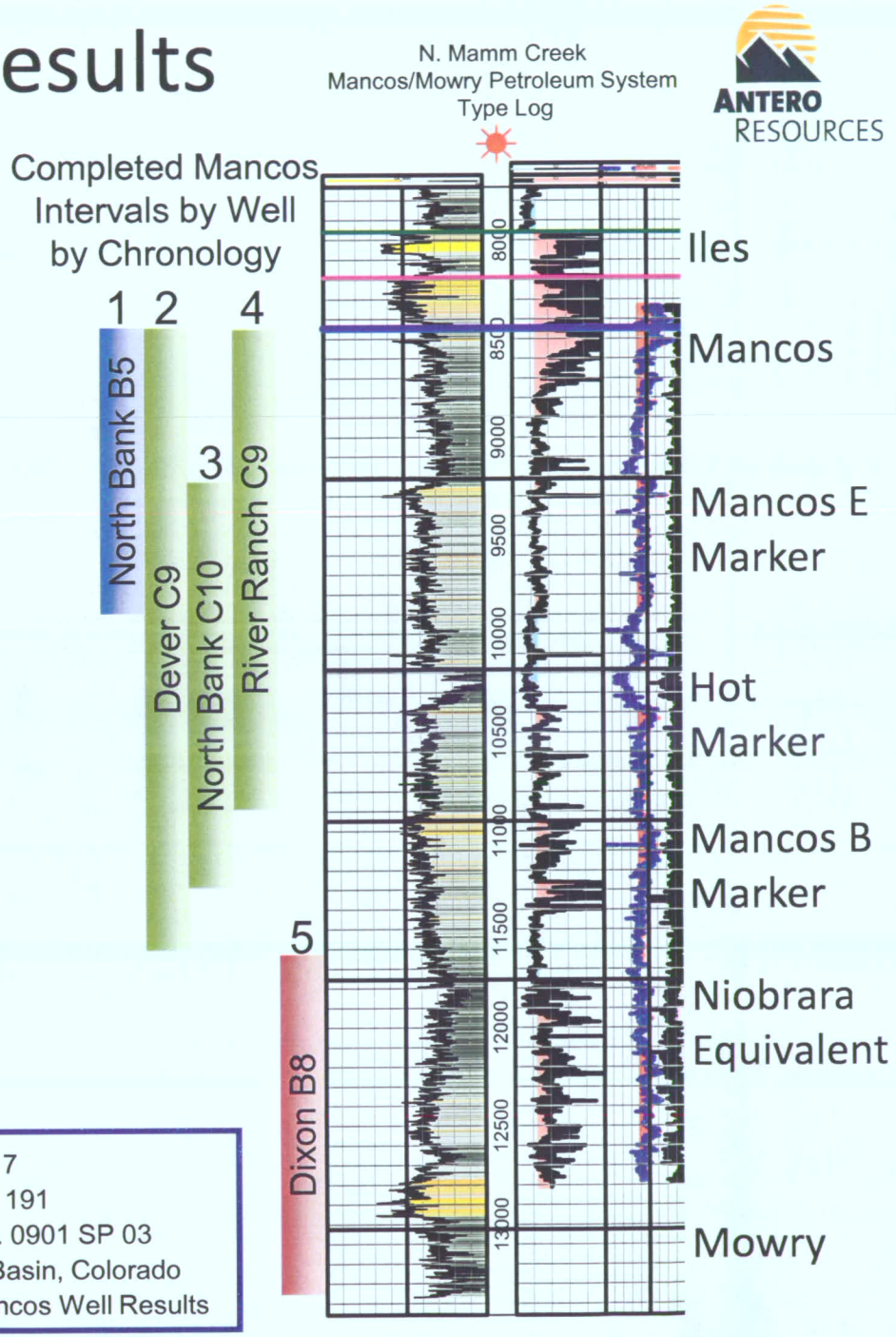


Exhibit G-17
Cause No. 191
Docket No. 0901 SP 03
Piceance Basin, Colorado
Antero Mancos Well Results

Antero Resources
Mancos/Mowry Geological Presentation Summary

ANTERO RESOURCES

- The Mancos/Mowry Shale interval underlies the entire application boundary

- Reservoir characteristics are similar across the entire application boundary

- The entire interval has been completed and is producing to sales in a series pilot wells across the area

- All lithologic intervals within this interval are gas bearing and capable of producing gas in economic quantities when combined with the shallower Iles and Williams Fork 10-acre development program

- Increased Mancos/Mowry interval well densities are needed to produce a reasonable portion of the large gas resource in place due to the extremely low permeability of the reservoir and the limited, elliptical drainage area that will be accessed from a stimulated vertical wellbore
    - Drainage ellipse orientations will be parallel in the shallower Mesaverde completions and the deeper Mancos/Mowry completions

Exhibit G-18
Cause No. 191
Docket No. 0901 SP 03
Piceance Basin, Colorado
Geo Presentation Summary

Antero Resources Piceance Corporation

Engineering Exhibits

Cause No. 191
Docket No. 0901 SP 03

December 31, 2008

N. Mamm Creek
Mancos/Mowry Interval
Type Log

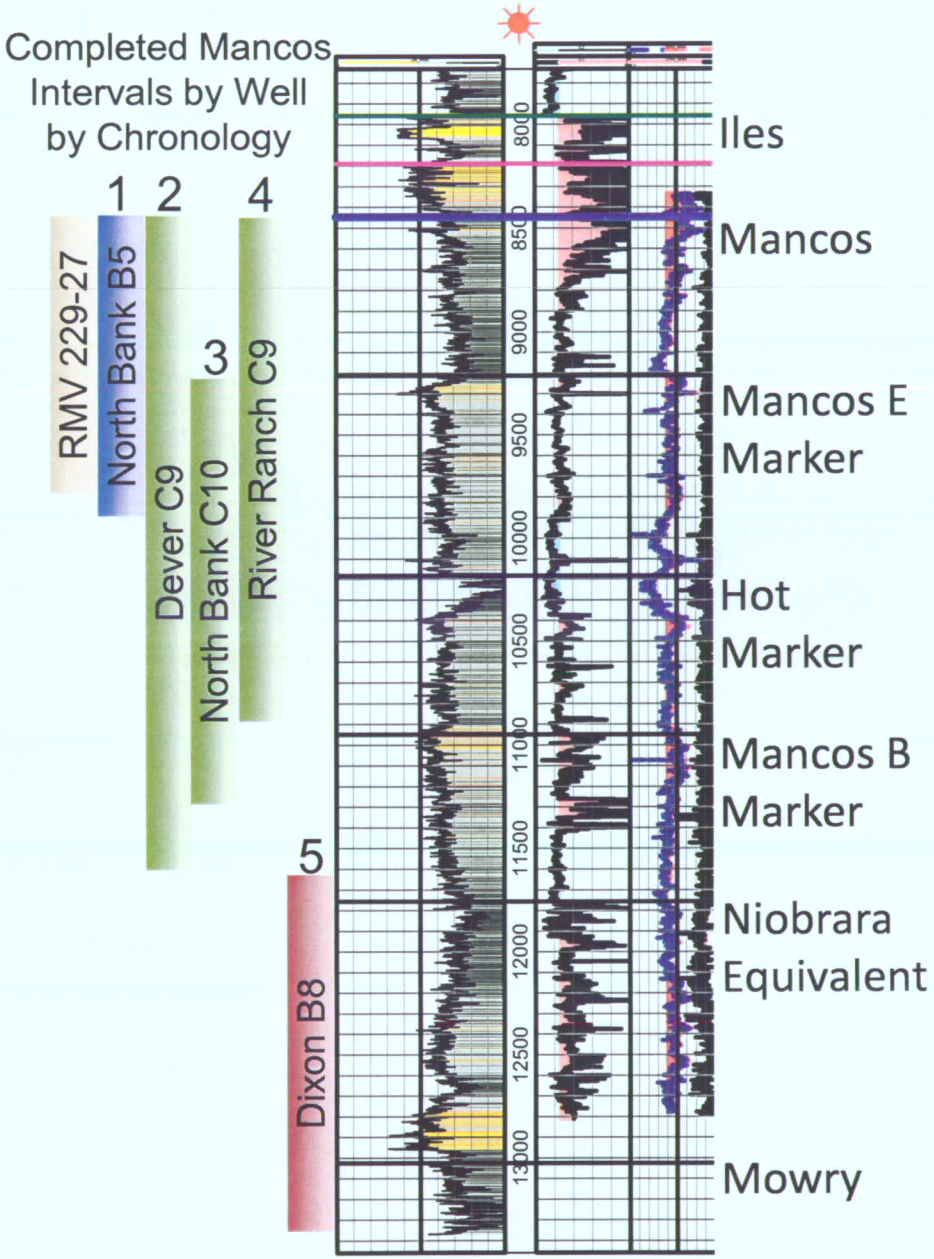
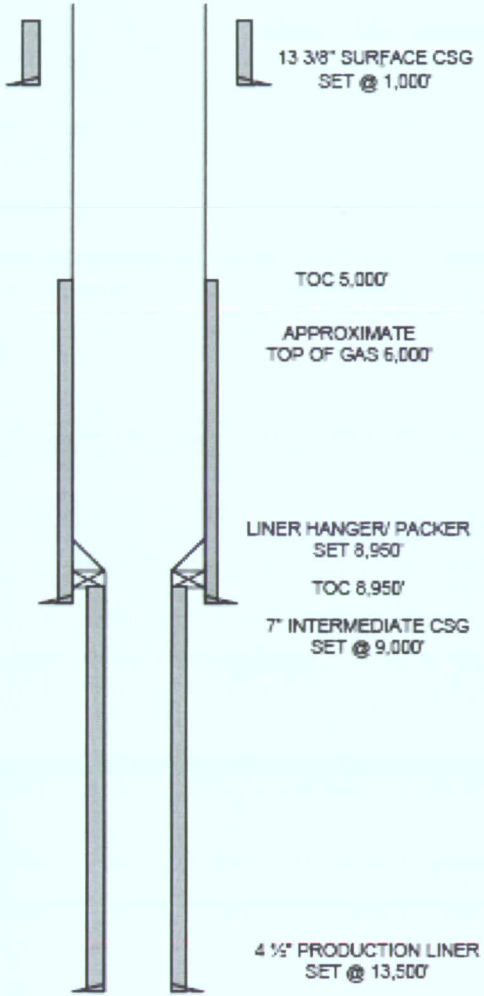


Exhibit E-1
Cause No. 191
Docket No. 0901 SP 03
Piceance Basin, Colorado
Completion Intervals

MANCOS WELLBORE SCHEMATIC



WILLIAMS FORK / ILES VS. MANCOS SHALE RELATIVE FRACTURE DIMENSIONS

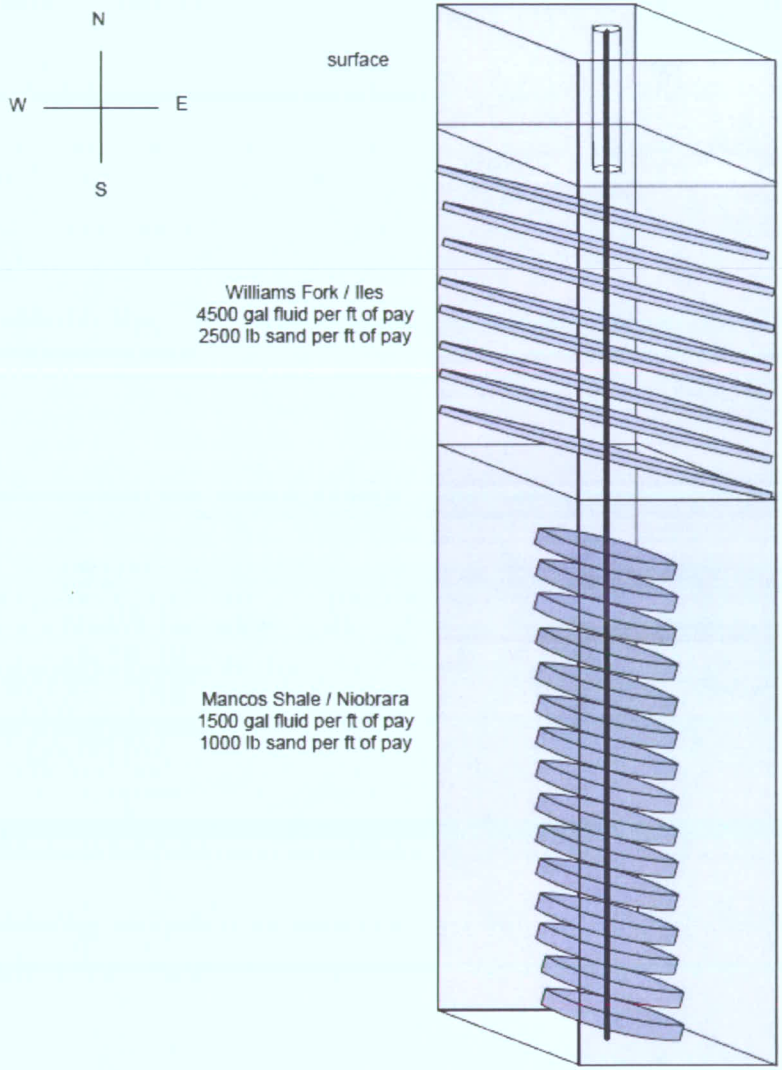
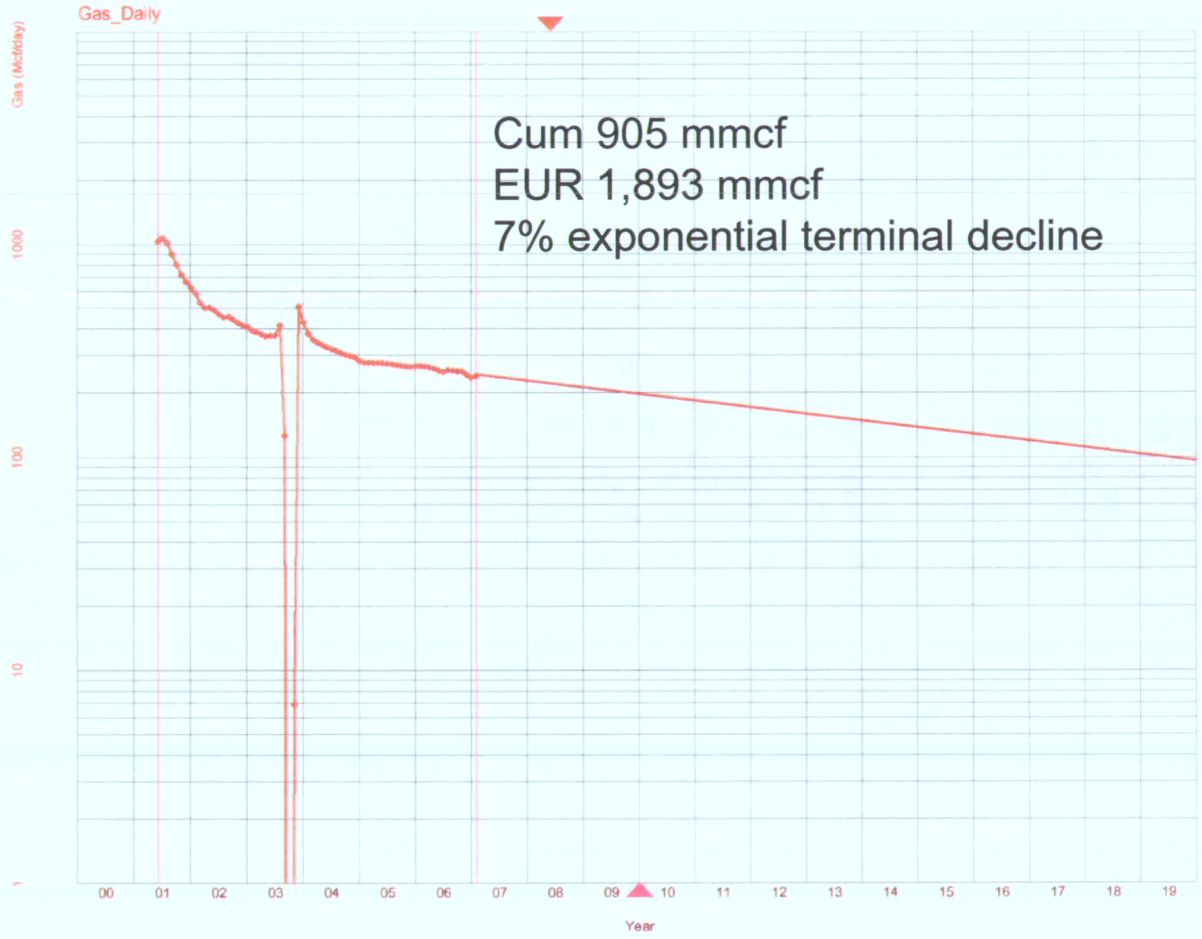


Exhibit E-2
Cause No. 191
Docket No. 0901 SP 03
Piceance Basin, Colorado
Wellbore Design & Typical Completion

Mancos Shale Type Curve
Rulison Field: Williams RMV 229-27

ANTERO RESOURCES



Upper Mancos producer with lengthy production history
Completed in the upper 1/3 of the Mancos (2001)
Sec 27, T6S-R94W

Exhibit E-3
Cause No. 191
Docket No. 0901 SP 03
Piceance Basin, Colorado
Long Term Mancos Producer

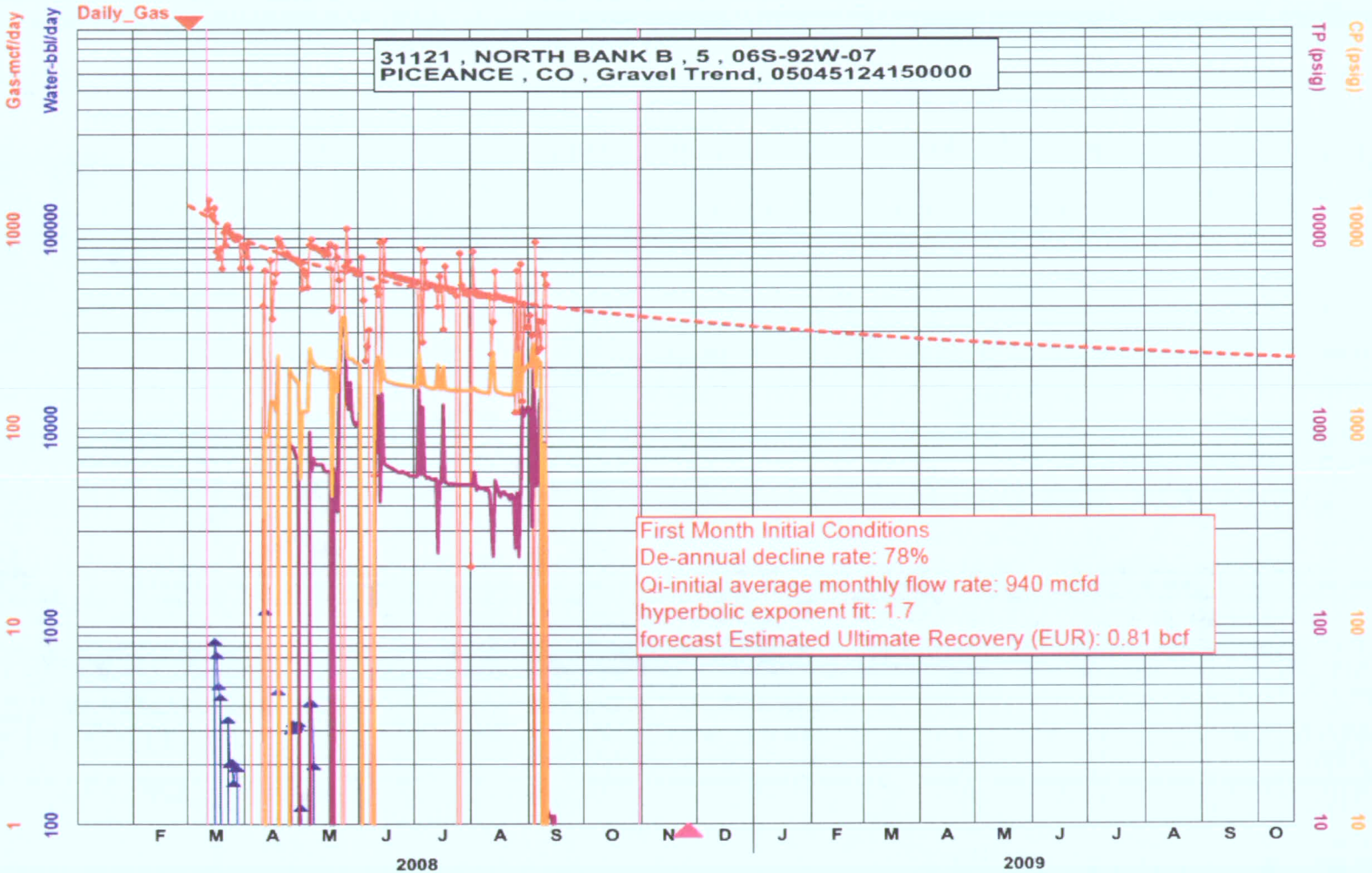
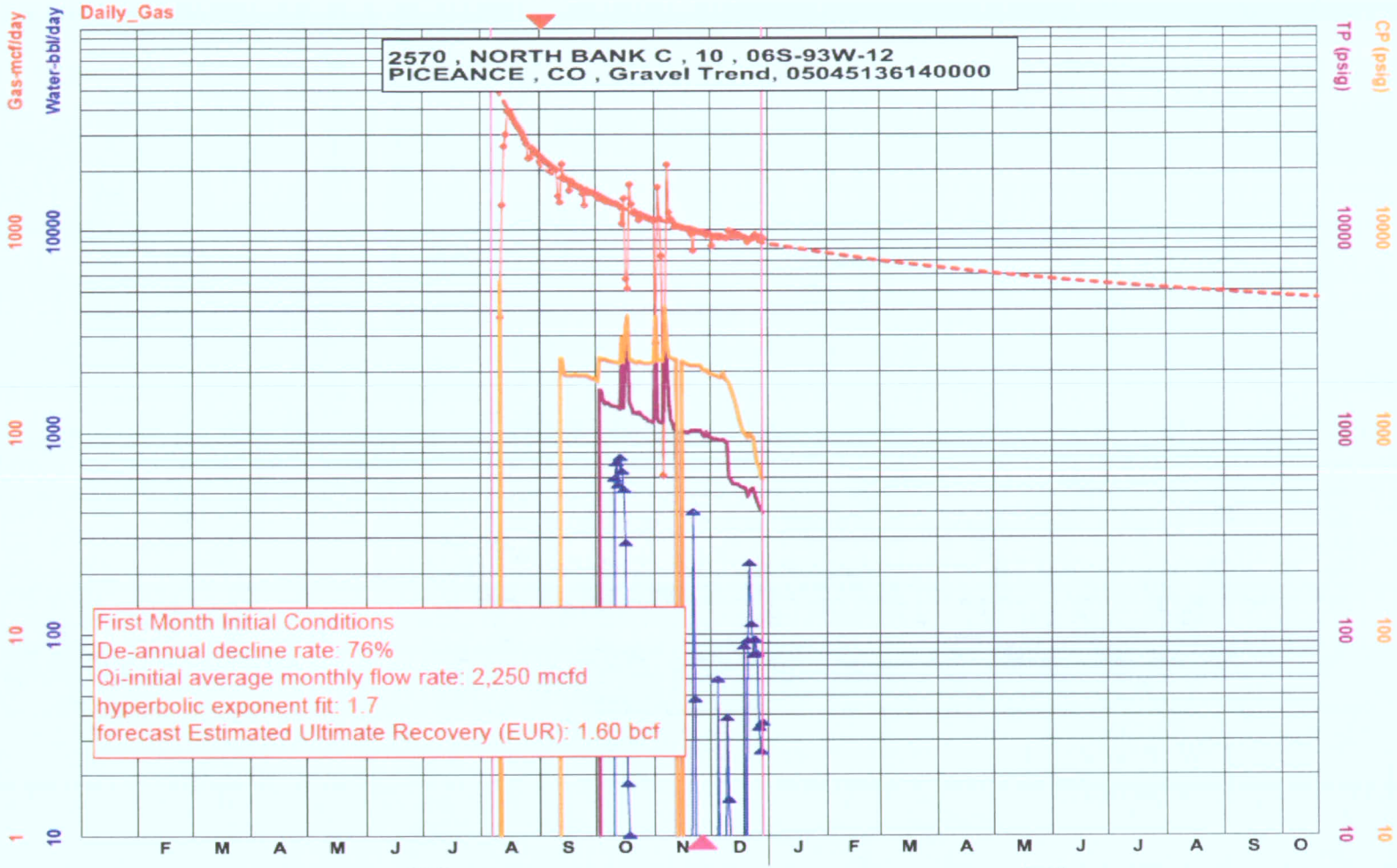


Exhibit E-4
Cause No. 191
Docket No. 0901 SP 03
Piceance Basin, Colorado
Antero Mancos Well 1



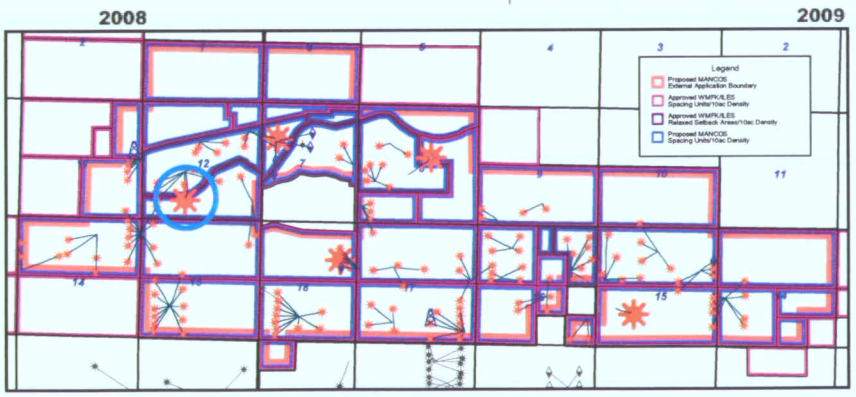


Exhibit E-5
Cause No. 191
Docket No. 0901 SP 03
Piceance Basin, Colorado
Antero Mancos Well 2

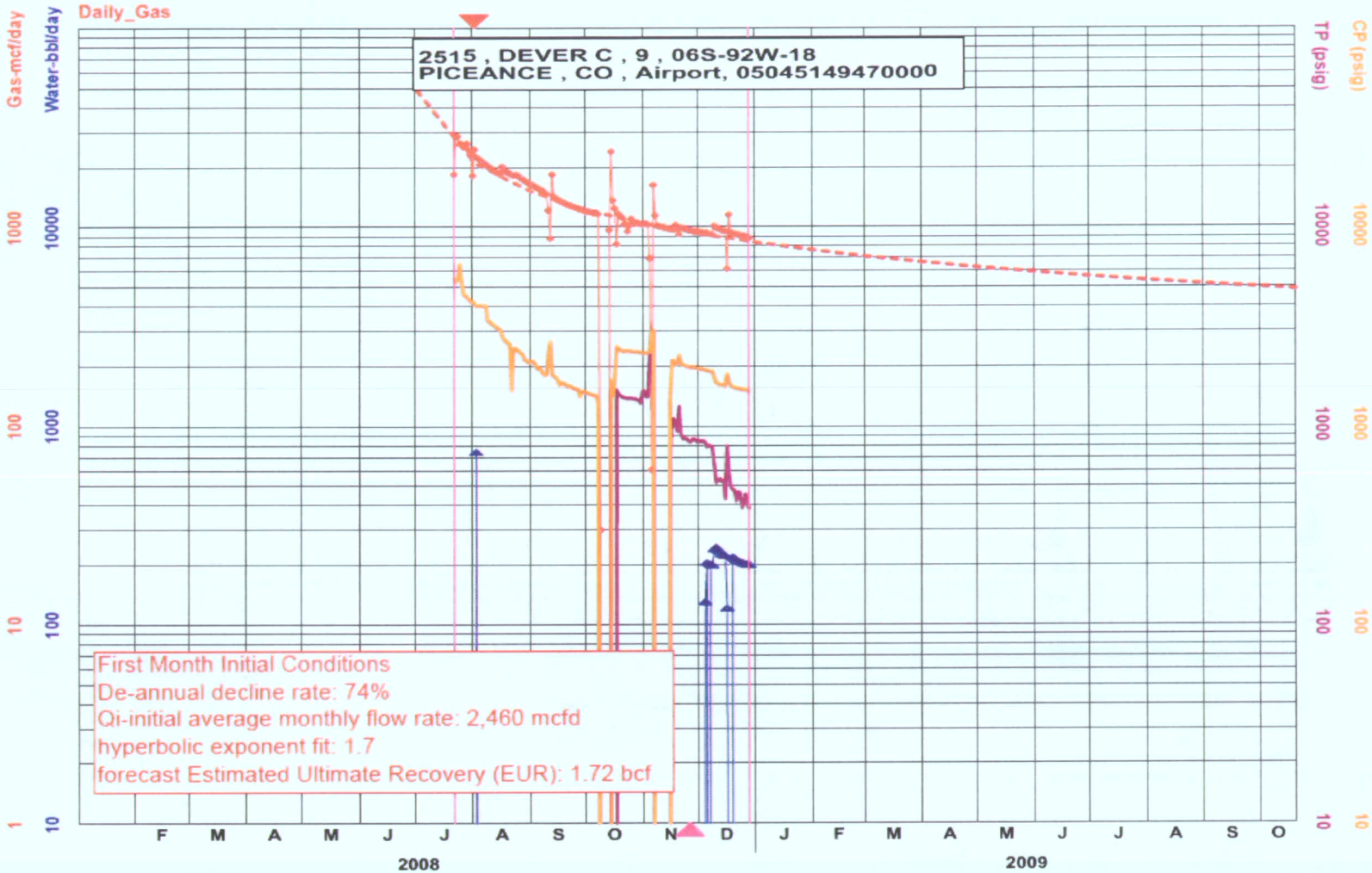
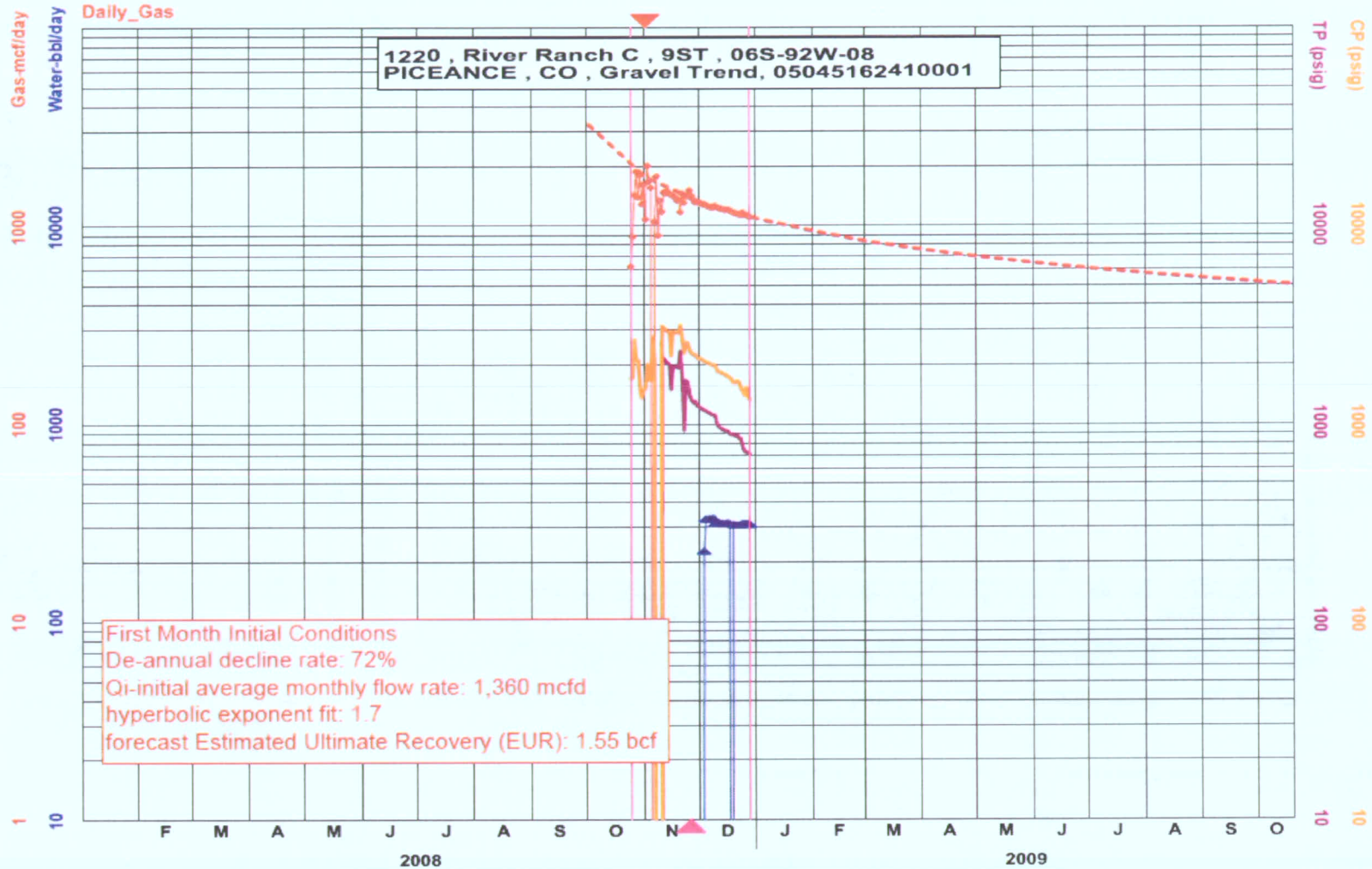


Exhibit E-6
Cause No. 191
Docket No. 0901 SP 03
Piceance Basin, Colorado
Antero Mancos Well 3



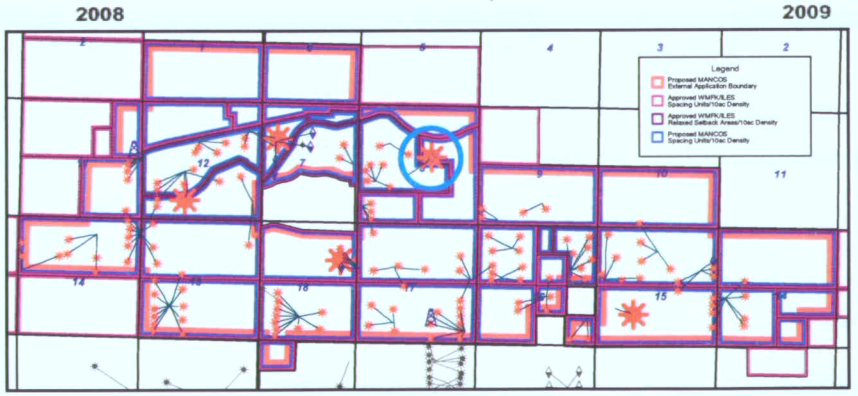


Exhibit E-7
Cause No. 191
Docket No. 0901 SP 03
Piceance Basin, Colorado
Antero Mancos Well 4

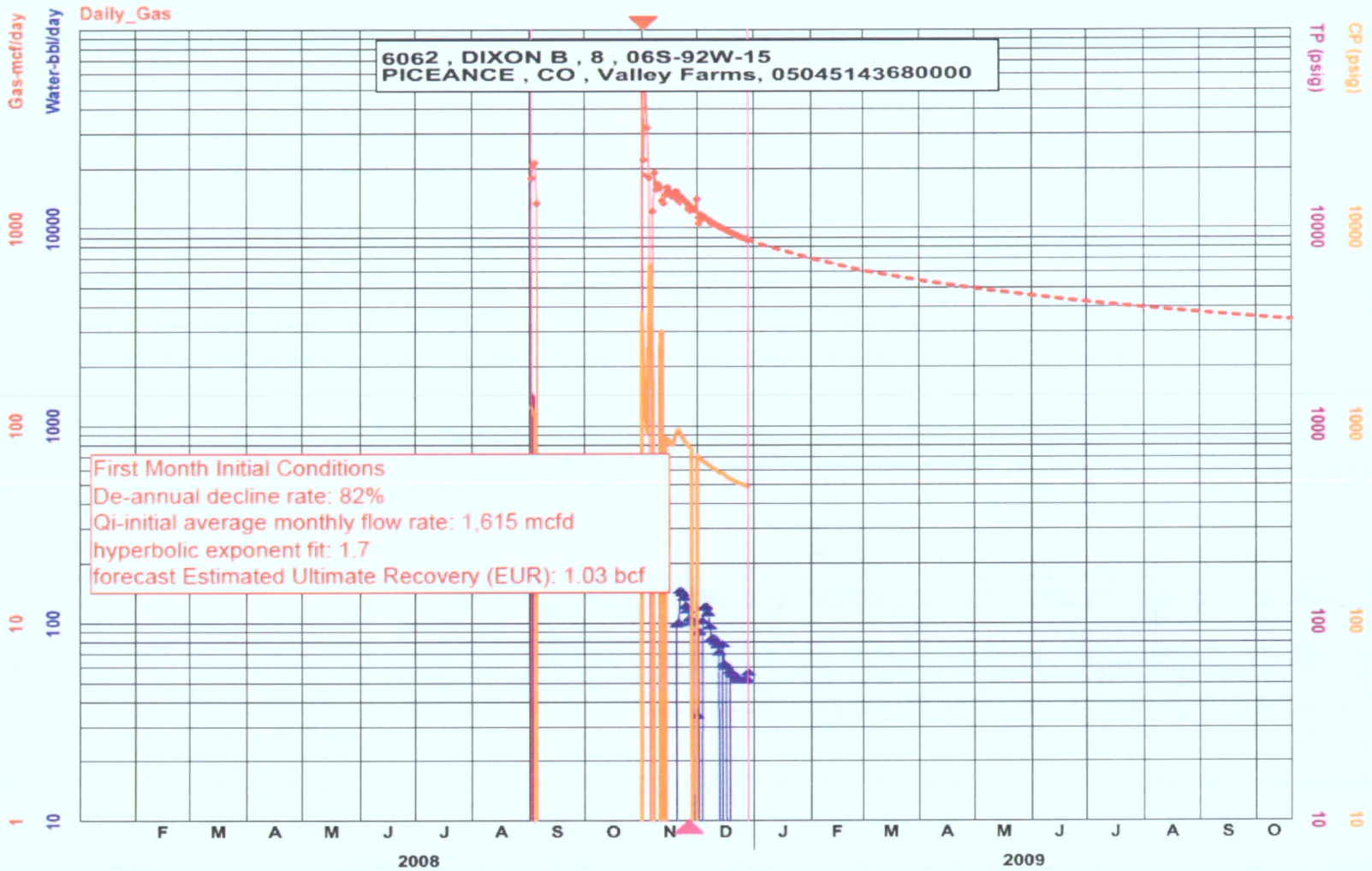
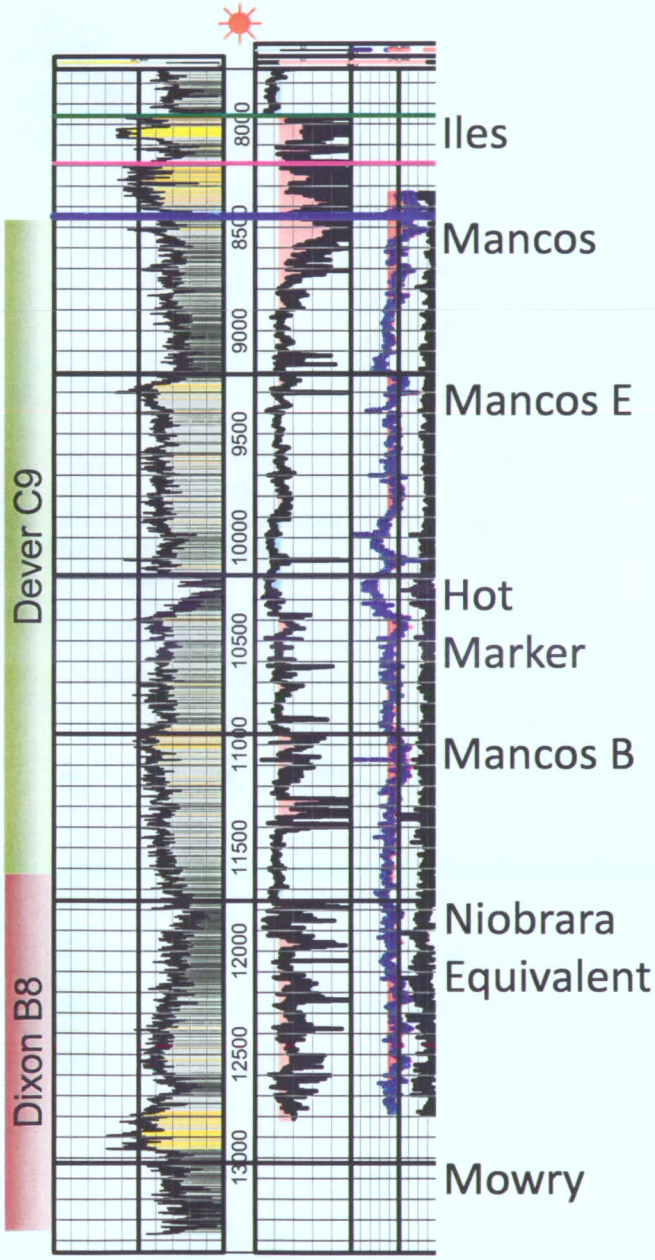


Exhibit E-8
Cause No. 191
Docket No. 0901 SP 03
Piceance Basin, Colorado
Antero Mancos Well 5

N. Mamm Creek
Mancos/Mowry Interval
Type Log



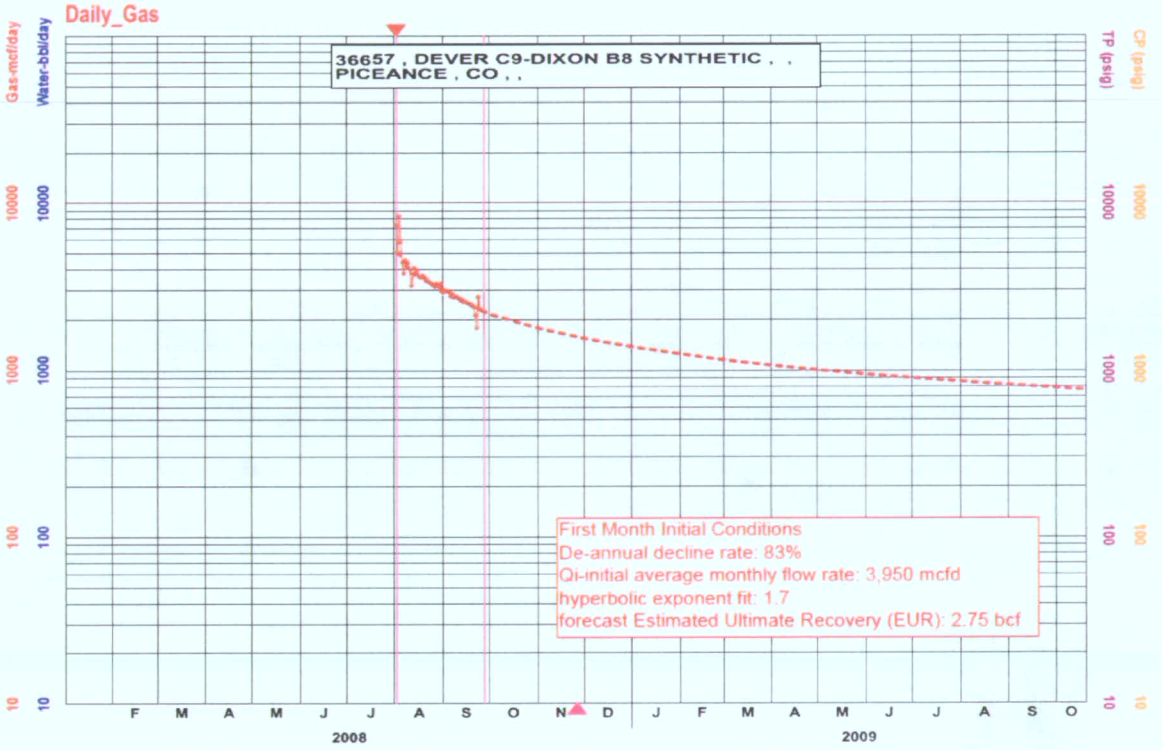


Exhibit E-9
Cause No. 191
Docket No. 0901 SP 03
Piceance Basin, Colorado
Synthetic "Full" Mancos Well

Average Performance of 144 WF/Iles wells

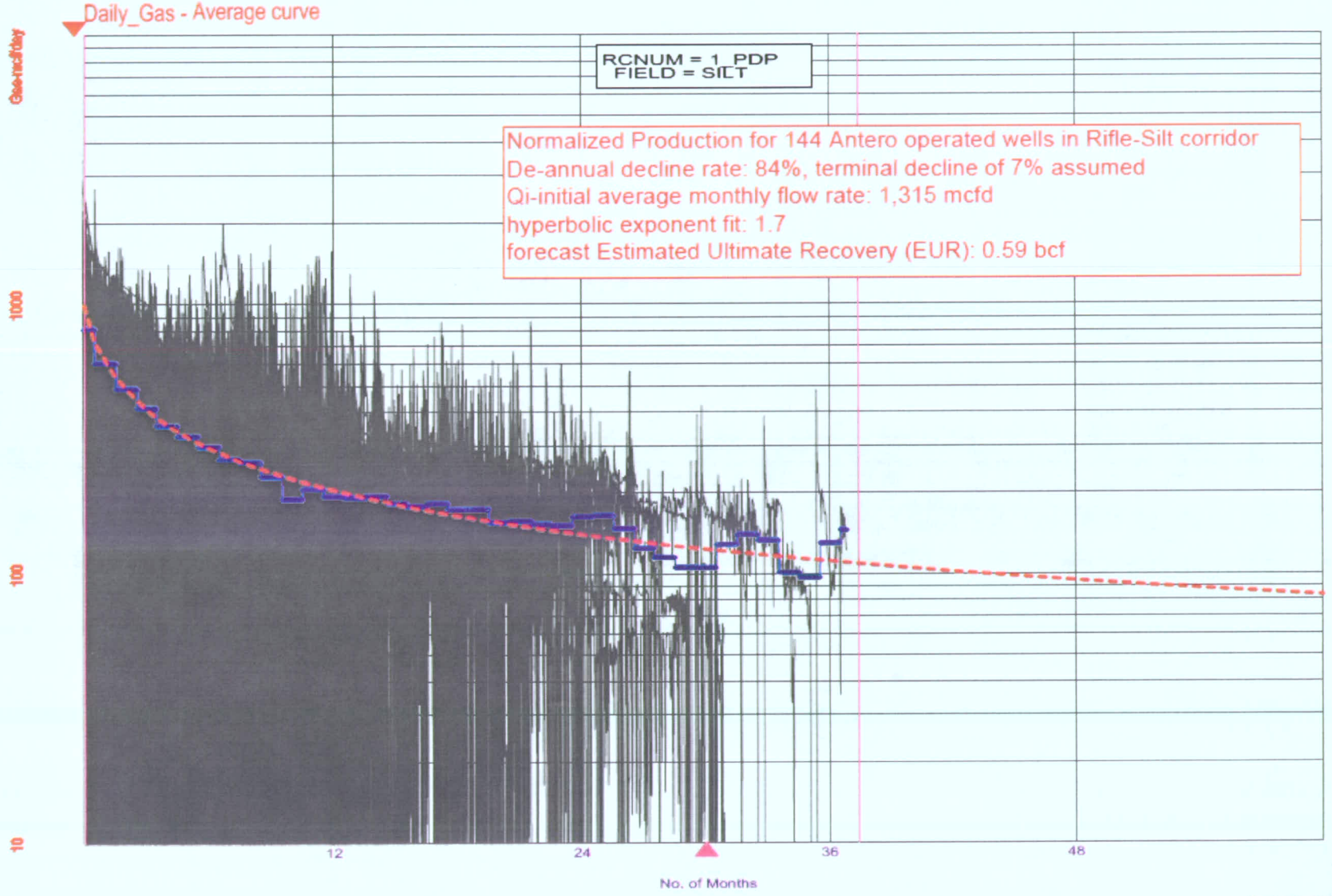


Exhibit E-10
Cause No. 191
Docket No. 0901 SP 03
Piceance Basin, Colorado
Performance of Uphole Intervals in Subject Area

Simple Economics

- Average EUR
  - 0.59 bcf for shallow horizons
  - 2.75 bcf for Mancos Group interval
  - 3.34 bcf for combined well
- Average well cost
  - $1,800,000 for shallow well
  - $5,750,000 for deep well commingled with shallow
- Average finding & development cost (F&D)
  - $3.05/mcf gross; $3.81/mcf net
  - $1.72/mcf; $2.12/mcf net
- Market price during 2008 in Piceance has varied from $1.78 to $8.94 (Gas Daily CIG monthly pricing - avg for year of $6.25)
- No allowance for royalties, state taxes, operating costs, fuel, gathering/compression, overhead, time value of money

Exhibit E-11
Cause No. 191
Docket No. 0901 SP 03
Piceance Basin, Colorado
Simple Economics

Detailed Economics

- 0.59 bcf
- $1,800,000 for shallow well
- 19% royalty
- 8.75% effective rate ad valorem + severance
- $0.90 gathering/compression, 6% fuel
- $6.25 CIG price
- Undiscounted payout-13.8 yrs; Undiscounted return on investment-1.2
- Same parameters, except 70% improvement (0.4 bcf) to EUR of 1.0 bcf
- Undiscounted payout-4.7 yrs; Undiscounted return on investment-2.1

- 3.34 bcf
- $ 5,750,000 for deep well
- 19% royalty
- 8.75% effective rate ad valorem + severance
- $0.90 gathering/compression, 6% fuel
- $6.25 CIG price
- Undiscounted payout-6.6yrs; Undiscounted return on investment-2.0
- Same parameters, except 0.4 bcf improvement to EUR of 3.75 bcf
- Undiscounted payout-5.3 yrs; Undiscounted return on investment-2.2

Exhibit E-12
Cause No. 191
Docket No. 0901 SP 03
Piceance Basin, Colorado
Detailed Economics

N. Mamm Creek Mancos/Mowry Interval Volumetrics

ANTERO RESOURCES

- Adsorbed gas in place (GIP) estimated using Mancos rock characteristics
  - Adsorbed GIP = 1.359 x Area x Height x Density X Gas Content
  - Adsorbed GIP = 1.359 X 10 acres x 4509' x 2.62 g/cc x 30 scf/ton (avg)
    - Adsorbed GIP = 5.0 bcf per 10 acres
- A range for free gas in place (GIP) can be estimated using standard gas volumetric calculations
  - Pore pressure gradient = 0.71–0.74 psi/ft (Dever C9 CHDT)
  - Temperature range = 225-310 deg F
  - Porosity = 4-6 %, Gas Saturation = 25-35%, Thickness = 4509'
    - Free GIP = 6.3-13.6 bcf per 10 acres
- Total Mancos GIP = adsorbed gas + free gas component
  - Total GIP, 640 acres = 700-1,000+ bcf
  - Total GIP, 10 acres = 11.3-18.6 bcf
- Mancos/Mowry completions EUR in range of 0.8 bcf to 2.75 bcf per 10 acre location
  - Based on decline curve analysis and "synthetic" Mancos well performance
- Estimated recovery factor of GIP per 10 acre location in range of 4-24%

Exhibit E-13
Cause No. 191
Docket No. 0901 SP 03
Piceance Basin, Colorado
Volumetric Summary

Benefits of Regulatory Change for Mancos/Mowry Interval

ANTERO RESOURCES

- Balance development with wildlife, multi-use, environmental issues/concerns
  - Identical unit outline/setbacks allow efficient development (same wellbore)
  - Reduces number of surface pads needed for full development (small tracts)

- Prevention of waste (Act: 34-60-103) and production efficiencies through multi-zone commingling (Rule 322)
  - Prevents economic waste by combining objective depths (combines poorer performing shallower formations with deeper potential)
  - Allows for development of many smaller leases which might otherwise go undeveloped due to current minimum statewide setbacks and well pad limitations
  - Absent order, would create issue of mixed bottom hole/surface ownership
  - Allows for optimal placement of wells to achieve maximum recovery of resources

- Maintains adequate setback to protect correlative rights

- Reduces administrative burden for operator, mineral owners and COGCC by eliminating 318a waiver process

- Eases royalty disbursement and reduces confusion for royalty owners (similar ownership with shallower formations)

Exhibit E-14
Cause No. 191
Docket No. 0901 SP 03
Piceance Basin, Colorado
Benefits of Commingling/Spacing

Summary

- Economics for shallow Williams Fork and Iles wells vary from uneconomic to moderately commercial based on prices and ultimate recoveries
- Incremental Mancos production and costs improve economics substantially such that commercial at average 2008 gas prices
- Commingling of Mancos, Iles and Williams Fork intervals will prevent waste and ease administration
- Gas-in-place is significant in the Mancos Intervals, suggesting low recovery factors of 4% – 24%
- Fracture stimulations in Mancos are substantially smaller than in Williams Fork and Iles formations
- Lower estimated permeabilities given rock type suggest significantly smaller drainage capability
- Low recovery factor, small fracture stimulations and lower perms support development on 10 acre spacing and protect correlative rights
- An allowable of one Mancos well per 20 acres would leave up to an estimated 88 bcf recoverable per section
- An allowable of one Mancos well per 40 acres would leave up to an estimated 132 bcf recoverable per section

Exhibit E-15
Cause No. 191
Docket No. 0901 SP 03
Piceance Basin, Colorado
Engineering Summary