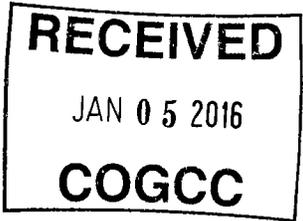




02292335

21.05.16

511 DOCUMENTS



BEFORE THE OIL & GAS CONSERVATION COMMISSION
OF THE STATE OF COLORADO

IN THE MATTER OF THE PROMULGATION) CAUSE NO. 531
AND ESTABLISHMENT OF FIELD RULES TO)
GOVERN OPERATIONS FOR THE) DOCKET NO. 160100046
NIOBRARA FORMATION, UNNAMED FIELD,)
WELD COUNTY, COLORADO) TYPE: SPACING

REQUEST FOR RECOMMENDATION OF
APPROVAL OF APPLICATION WITHOUT A HEARING

SandRidge Exploration & Production LLC, Operator No. 10598 (“SandRidge” or “Applicant”), by and through its undersigned attorneys, hereby requests pursuant to Rule 511.a. of the Rules and Regulations of the Colorado Oil and Gas Conservation Commission for the Director to recommend approval of its December 21, 2015 verified amended application (“Application”) and the supporting exhibits without a hearing.

Applicant requests that the above-captioned matter be approved based upon: (i) the merits of the Application, and (ii) Applicant’s sworn written testimony verifying sufficient facts along with exhibits that adequately support the relief requested in the Application. To Applicant’s information and belief, no protests were timely filed in this matter.

WHEREFORE, Applicant requests that its request for a recommendation for approval of its Application without a hearing be granted.

DATED this 4th day of January, 2016.

Respectfully submitted,

SANDRIDGE EXPLORATION & PRODUCTION LLC

By: 

Jillian Fulcher
Beatty & Wozniak, P.C.
Attorneys for Applicant
216 16th Street, Suite 1100
Denver, Colorado 80202
(303) 407-4499

RECEIVED

JAN 05 2016

COGCC

**SANDRIDGE
EXPLORATION
& PRODUCTION
LLC**

Cause No. 531
Docket No. 160100046

Land Testimony – Richard Silman
Cause No. 531; Docket No. 160100046
Spacing Application
Unnamed Field, Jackson County, Colorado

January 2016 Colorado Oil and Gas Conservation Commission Hearing

My name is Richard Silman, I am currently employed as a Landman for SandRidge Exploration and Production, LLC (“SandRidge” or “Applicant”). I graduated from the University of Oklahoma in 2009 with a Bachelor in Business Administration in Energy Management. I have over 7 years of experience in petroleum land management and the oil and gas business. I am personally familiar with the lands subject to, and the matters set forth in the November 25, 2015 verified application (the “Application”) filed herein, as amended on December 21, 2015. As specified in the amended Application, SandRidge is the successor-in-interest to EE3, LLC.

In support of the Application, I am submitting two exhibits. The exhibits are attached to my sworn testimony and form the basis for the Application requesting to: (1) vacate two approximate 640-acre drilling and spacing units established by Order No. 531-2 for Sections 17 and 20, Township 7 North, Range 80 West, 6th P.M.; and (2) establish a 1,280 acre drilling and spacing unit for said Sections 17 and 20, and authorizing up to eight (8) horizontal wells within the proposed unit, for production of oil, gas and associated hydrocarbons produced from the Niobrara Formation. In support of its Application, Applicant states and alleges as follows:

1. Exhibit No. L-1

Exhibit No. L-1 is an overhead map which shows the location of the Application Lands within Jackson County, Colorado.

2. Exhibit No. L-2

Exhibit No. L-2 is a map which demonstrates Applicant’s leasehold interest in the Application Lands.

Notice of Application/Notice of Hearing

Based on the examination of relevant contracts and records, the interested parties (owners within the proposed drilling and spacing unit) have been fully served with the Application and associated Notice of Hearing. Further as of the date of this testimony, SandRidge has not received any notice of objection or protest to the Application.

The matters described herein were devised under my direction and control. To the best of my knowledge and belief, all of the matters set forth herein, my testimony and the supporting exhibits, are true, correct and accurate.

Dated this 4th day of January, 2016.



Richard Silman, Landman
SandRidge Exploration and Production, LLC

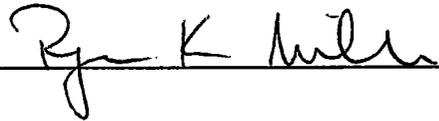
VERIFICATION

STATE OF OKLAHOMA)
) ss.
COUNTY OF OKLAHOMA)

The foregoing instrument was subscribed and sworn to before me this 4th day of January, 2016, by Richard Silman, Landman for SandRidge Exploration and Production, LLC.

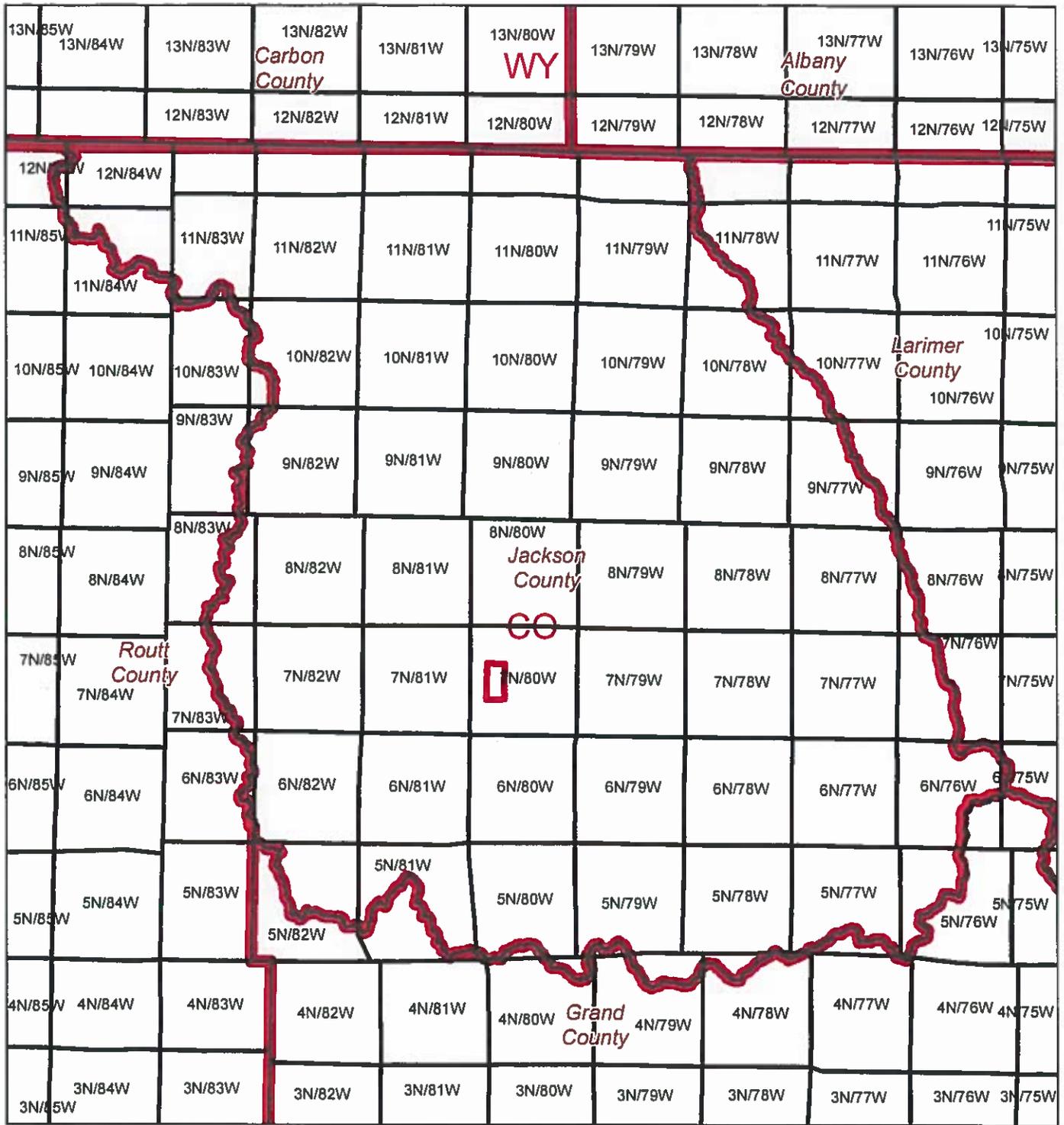
Witness my hand and official seal.

My commission expires: 1/22/18



Notary Public





Legend

 Spaced Lands



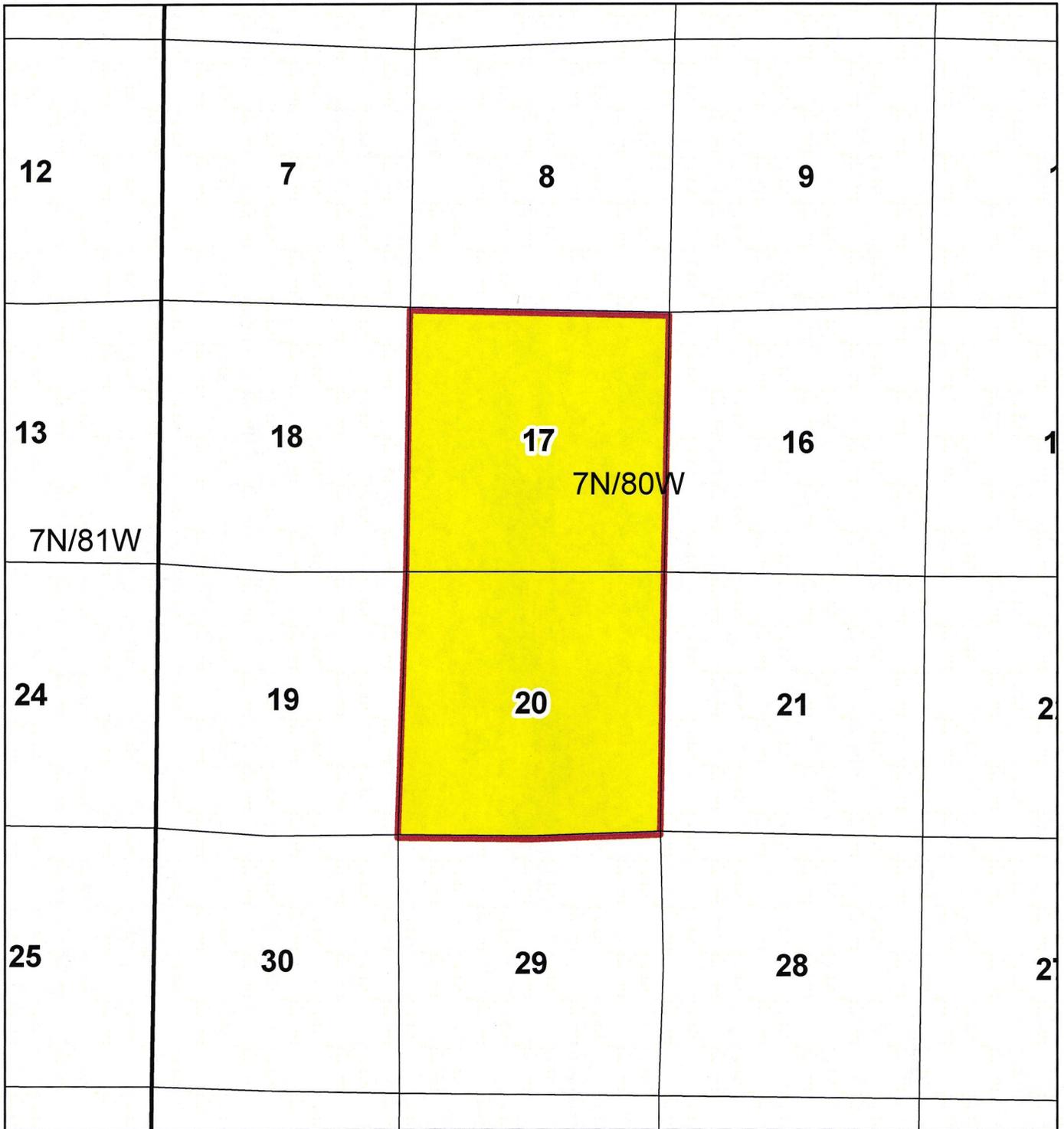
0 2.5 5 10
Miles

Spacing Unit Map

EXHIBIT-L1

12/22/2015

7N-80W, Sec. 17&20 : All
1280 Acres more or less



Legend

 Spaced Lands



0 0.5 1 Miles

Spacing Unit Map

EXHIBIT-L2
12/22/2015

7N-80W, Sec. 17&20 : All
1280 Acres more or less

APPENDIX

RICHARD J. SILMAN, RPL

5725 Lindhurst Road • Edmond, Oklahoma 73034 • 405.541.0250 • ricksilman@gmail.com

EDUCATION & CERTIFICATION

Registered Professional Landman (RPL)

University of Oklahoma—Norman, OK

Bachelor of Business Administration in Energy Management, May 2009

Minor in Finance

WORK EXPERIENCE

Landman

SandRidge Exploration and Production, LLC – Oklahoma City, Oklahoma, April 2014 - Present

- Landman for New Ventures/Appraisal team. Responsible for identifying new business opportunities and present findings to Senior Management.
- Managed 6 drilling rigs in Eastern Woods County, Oklahoma from April-December 2014, preparing over 40 locations to from start to finish to facilitate drilling operations.
- Filed and testified with the Oklahoma Corporation Commission for various hearings that include applications for spacing, pooling, increased density, and location exceptions.
- Prepare and administer land contracts, including JOA's, Participation Agreements, Farmout/Farmins, Assignments, PSA's, etc.
 - Coordination of A&D due diligence projects analyzing a wide array of issues involving the transaction of assets between the two entities. Review contracts and financial records, and handle issues related to marketing, preferential right of purchase, and advising on contractual risks.

Landman

Casillas Petroleum Corp.—Tulsa, Oklahoma, April 2012 - April 2014

- Land Manager for a small independent operator with approximately 800 operated and 350 outside operated assets across Oklahoma, Texas, and Kansas.
- Acquire, maintain, and prepare properties for drilling, recompletions, and reworks.
 - Independently overseeing all land and permitting phases, negotiations, including contract preparation, and testifying with the Oklahoma Corporation Commission.
 - Provide support for Accounting, Division Order, and Operations personnel.

Petroleum Landman

Shields Energy, Inc.—Fort Smith, Arkansas, June 2009 - April 2012

- Company Landman for a small independent Operator with operated and outside operated assets across Oklahoma, Arkansas, and Kansas; reporting directly to the Land Manager and ownership.
- Supervised and directed leasing, surface, ROW, and title due diligence efforts with brokers and attorneys for drilling and division order purposes. Experience with both Oklahoma and Arkansas title.
- Prepared, negotiated and analyzed contracts typically associated with exploration and production activities.
- Assisted in prospect sales, promoted deals, acquisition, and divestiture.

Landman Intern

XTO Energy—Fort Worth, Texas, May 2008 – August 2008

Landman Intern

Petrocasa Energy—Fort Worth, Texas, May 2007 - August 2007

AWARDS & ASSOCIATIONS

Membership Committee, Tulsa Association of Petroleum Landmen '13-Present

Secretary, Fort Smith Association of Professional Landmen '11-'12

Executive Committee, Fort Smith Association of Professional Landmen '09-'10

University of Oklahoma Student Congress Representative in the Business District '07

Geology Testimony – Scott Cherry
Cause No. 531; Docket No. 160100046
Spacing Application
Unnamed Field, Jackson County, Colorado

January 2016 Colorado Oil and Gas Conservation Commission Hearing

My name is Scott Cherry, and I am currently employed as a geologist by SandRidge Exploration and Production, LLC. I graduated from Baylor University with a Bachelor of Science degree in Geology and a Master of Science degree in Geology from the University of Arkansas. I have over 5 years of experience in oil and gas exploration and development in the continental United States. I am familiar with the lands subject to, and the matters set forth in the verified application (the “Application”) filed herein.

In support of the Application, I am submitting four (4) exhibits. The exhibits are attached to my sworn testimony and form the basis for the Application requesting an order to establish an approximate 1,280-acre drilling and spacing unit and authorize the drilling of up to eight (8) horizontal wells for Sections 17 and 20, Township 7 North, Range 80 West, 6th P.M. (“Application Lands”), for the production of oil, gas, and associated hydrocarbons from the Niobrara Formation.

1. Exhibit No. G-1

Exhibit No. G-1 is a type log for the Niobrara Formation for a well drilled in the vicinity of the Application Lands. Track 1 contains the gamma ray curve; Track 2 contains the deep resistivity curve, with red color-fill denoting values greater than or equal to 20 ohms; Track 3 contains density porosity and neutron porosity curves.

2. Exhibit No. G-2

Exhibit No. G-2 is a regional stratigraphic cross-section A-A', reference datum top of Niobrara. The location of cross-section A-A' is inset in Exhibit No. G-2. The cross-section shows the interval from the top of the Niobrara to the top of the underlying Carlile. Each log contains gamma ray, deep resistivity, neutron porosity, and, as available, density porosity. This exhibit demonstrates that the Niobrara Formation is laterally continuous throughout the vicinity of the Application Lands.

3. Exhibit No. G-3

Exhibit No. G-3 is a structure map constructed on the top of the Niobrara Formation. The regional dip for the Niobrara Formation underlying the Application Lands is approximately 600 feet per mile to the east.

4. Exhibit No. G-4

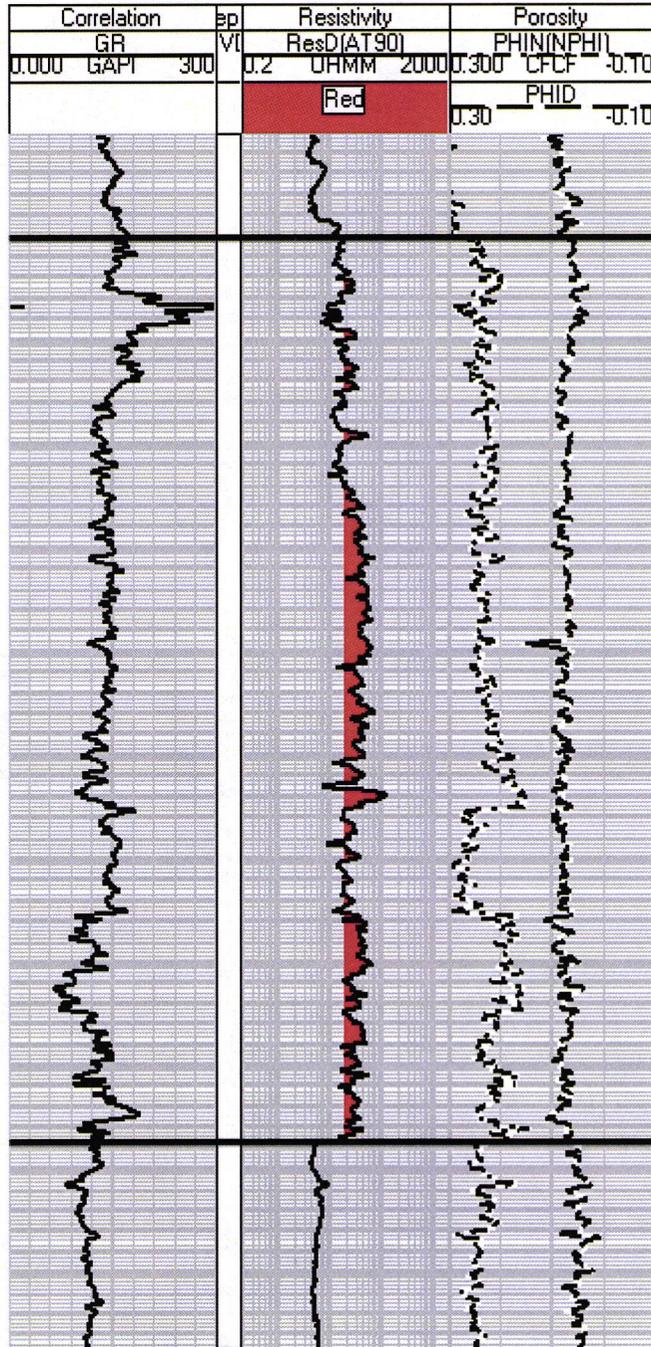
Exhibit No. G-4 is an isopach map of the total thickness of the Niobrara Formation. Total thickness of the Niobrara Formation underlying the Application Lands ranges from approximately 455 feet to 475 feet.

Exhibit No. G-1

Type Log



EOG RESOURCES INC
BUFFALO DITCH 2-32H
TWP: 7 N - Range: 80 W - Sec. 32
05057064640000



Niobrara

Carlile

Stratigraphic Cross-Section, Datum = Niobrara

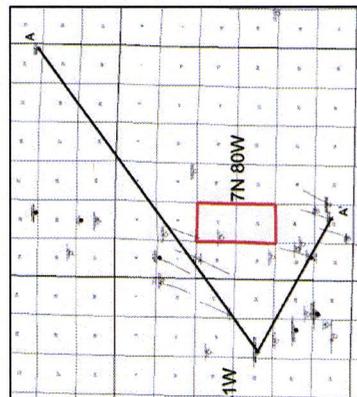
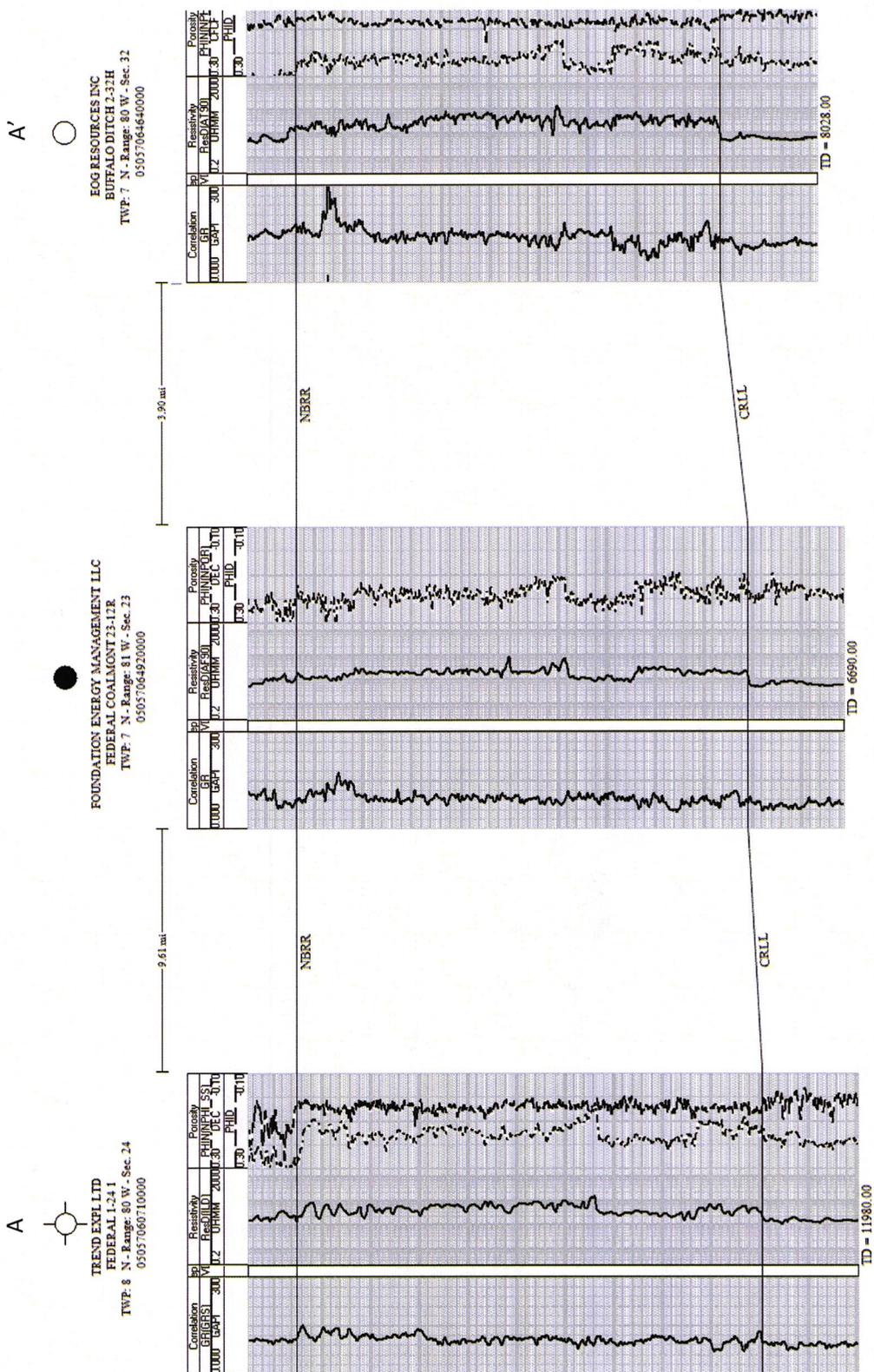


Exhibit No. G-3

Structural Map of Top of Niobrara

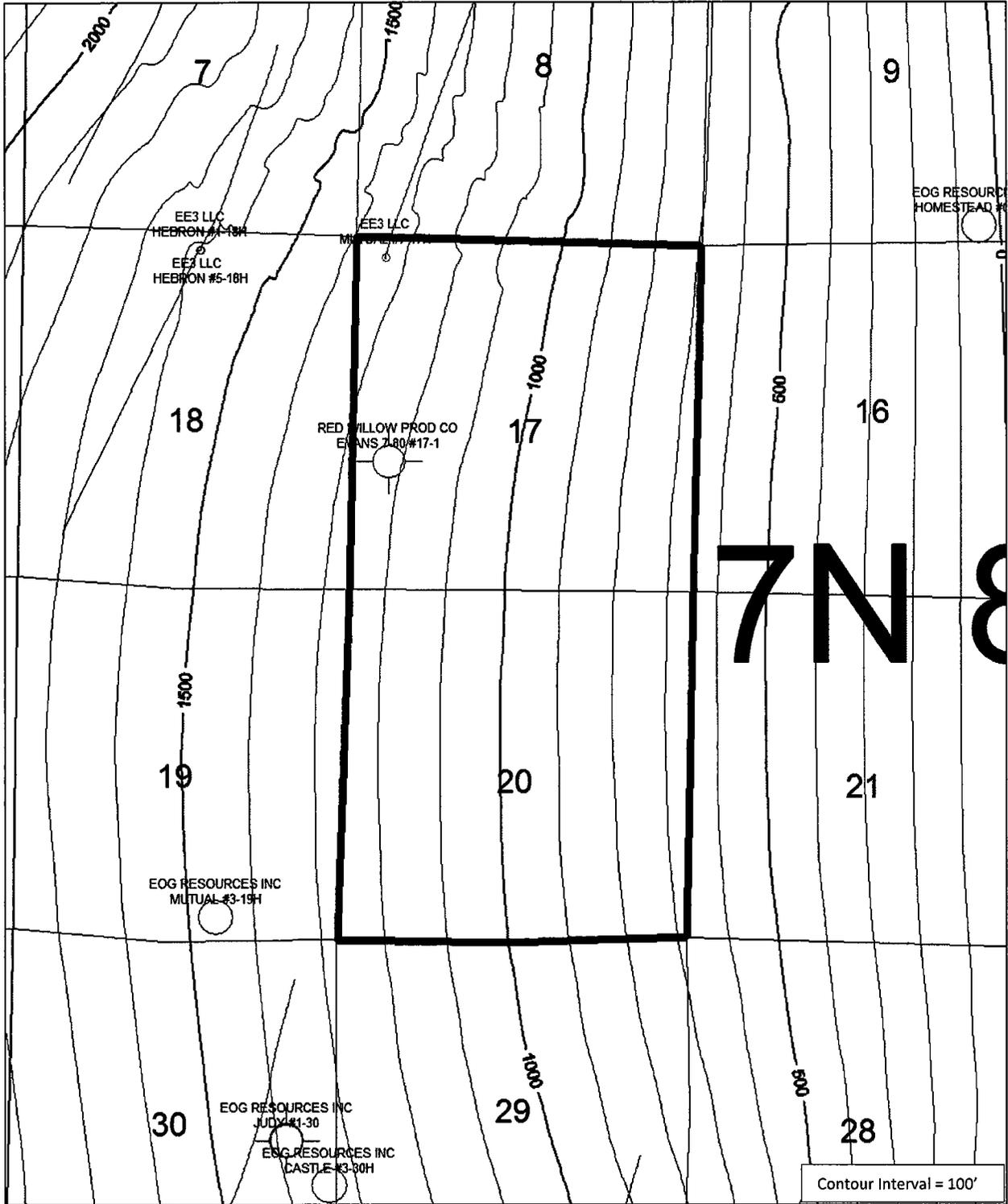
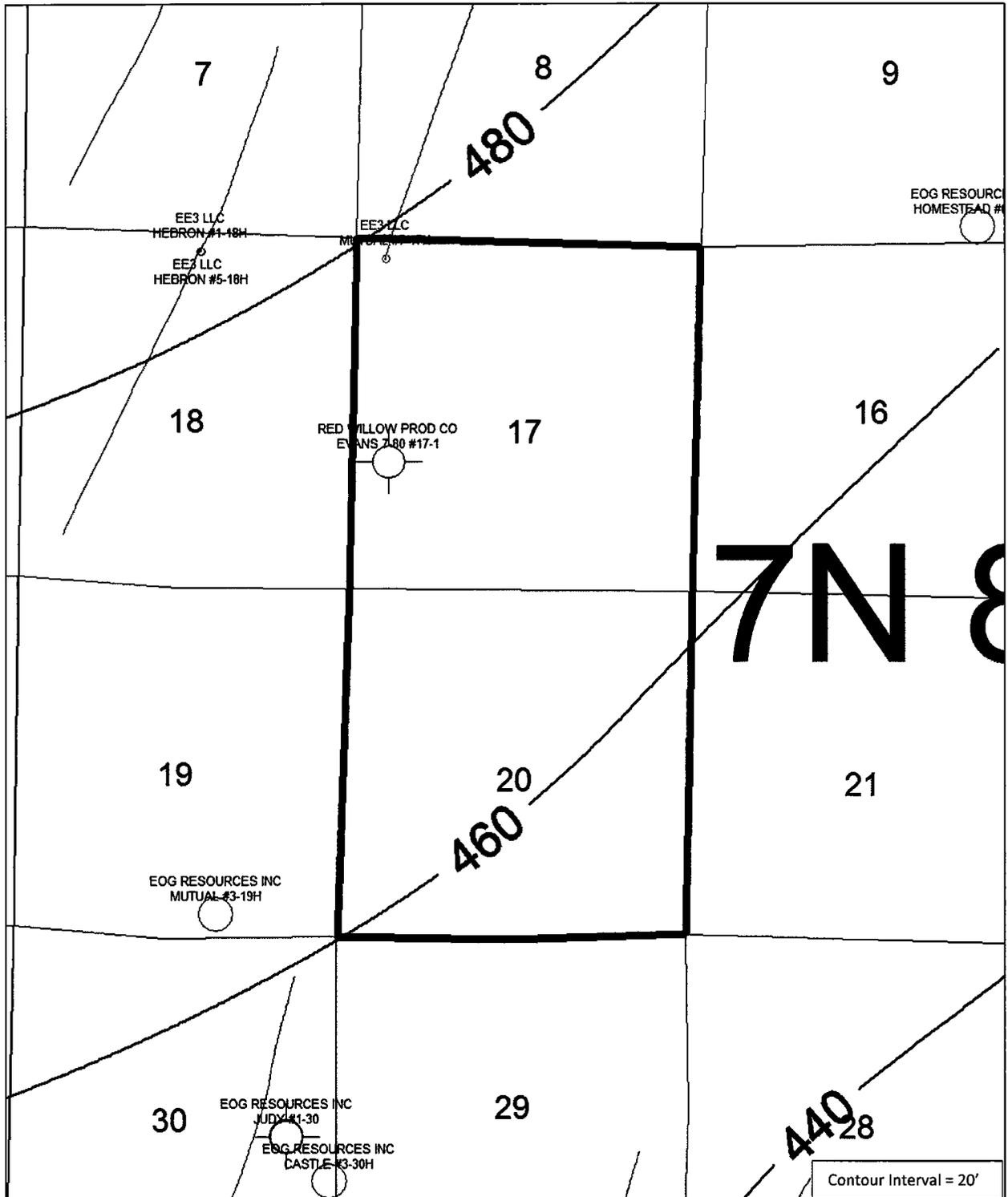


Exhibit No. G-4

Isopach of Niobrara Formation



APPENDIX

Scott Cherry
SandRidge Energy
123 Robert S. Kerr Ave
Oklahoma City, OK 73102
405-429-5500

EDUCATION:

Master of Science in Geology; 2012
University of Arkansas: Fayetteville, AR

Bachelor of Science in Geology; 2008
Baylor University: Waco, TX

EXPERIENCE:

SandRidge Energy – Geologist II

May 2014 – Present: Appraisals and New Ventures

- Engaged in regional studies of several onshore basins
- Responsible for evaluation of potential acquisitions
- Generation of unconventional prospects
- Primary geologist on North Park Basin

Chesapeake Energy – Geologist I

June 2012 – April 2014: Haynesville Shale Business Unit

- Supervised active multi-rig drilling program in Haynesville asset
- Prepared multi-year development plan utilizing pad drilling
- Generated various geological and subsurface maps
- Evaluated behind pipe potential in legacy fields

Pason Systems – Geologist

July 2008 – December 2010: mudlogging and wellsite geology

- Provided mudlogging services in Cotton Valley Lime, Bossier Shale, and Haynesville Shale plays
- Provided wellsite geological services and supervision of mudlogging in Haynesville and Woodford Shale plays, including quality control and interpretation of open hole logs, formation correlation, casing point recommendations, and onsite geosteering

Sandridge Exploration & Production LLC

Earuch F Broacha – Engineering Testimony

Cause No. 531, Docket No. 160100046

Request to vacate two approximate 640-acre drilling and spacing units established by Order No. 531-2 for Sections 17 and 20, Township 7 North, Range 80 West and establish an approximate 1,280-acre drilling and spacing unit for said Sections 17 and 20, and authorize the drilling of up to eight (8) horizontal wells within the proposed unit, for production of oil, gas and associated hydrocarbon from the Niobrara formation.

My name is Earuch Broacha, and I am currently employed as a Reservoir Engineering Advisor for Sandridge Energy Inc. (SD). I graduated from the Colorado School of Mines in 1978 with a Bachelor of Science degree in Chemical Engineering and Petroleum Refining. I have over 37 years of experience in reservoir engineering, petrophysical analysis, reservoir simulation, production operations, and related matters. I am familiar with the lands subject to, and the matters set forth in the November 25, 2015, verified application (the "Application") filed herein (amended December 21, 2015). My resume/c.v. is attached to this submission. See [Appendix](#).

In support of the Application, I am submitting three exhibits. The exhibits are attached to my sworn testimony and form the basis for the Application requesting an order to vacate the two existing approximate 640-acre drilling and spacing units, and establish an approximate 1,280-acre drilling and spacing unit for Sections 17 and 20, Township 7 North, Range 80 West, 6th P.M. ("Application Lands"), and authorizing the drilling of up to eight (8) horizontal wells within the proposed unit, for production of oil, gas and associated hydrocarbon from the Niobrara formation.

1. Exhibit No. E-1.1

Exhibit No. E-1.1 is a table showing reservoir engineering calculations for vertical wells that penetrated the Niobrara Formation in the North Park Basin in the area T6N-8N and R79W-81W. This table shows the calculated original oil-in-place ("OOIP") for a 640-acre drainage area surrounding each vertical well. The total thickness ("h") of the Niobrara, average water saturation ("SW") in the Niobrara and the average porosity ("por") in the Niobrara were estimated from publically released openhole logs run in each vertical well. The total thickness of the Niobrara formation consists of the sum of the individual chalk and marl benches/members within the Niobrara. The oil Formation Volume Factor ("Bo") was determined from PVT analyses on produced oil and gas samples collected on the Buffalo Ditch 1-32H. It should be noted that not all ten (10) vertical wells penetrated the entire Niobrara formation. The entire Niobrara is not present in the Fisher-15 (API 0505706260000), State 6-81-24-4 (API 05057065100000) and the Judy 1-30 (API 05057064660000) due to faulting and/or the total depth of the subject wells. This accounts for the lower OOIP per section for the Niobrara in these wells. Therefore from this exhibit it may be concluded that the average OOIP per section in the Niobrara, not including the Fisher-15 and the Judy 1-30, is 51.7 MMBO.

2. Exhibit No. E-2.1

Exhibit No. E-2.1 is a table showing reservoir engineering calculations for horizontal wells that are completed in the Niobrara Formation in the North Park Basin in the area T6N-8N and R80W-81W. This table shows the estimated ultimate recovery ("EUR"), OOIP and the calculated drainage area for each well. The EURs in the table were determined using production decline curve analysis, as shown in Exhibit No. E-3.1. A net Niobrara thickness of 169 ft was used for all wells based on the effective stimulated height determined from the analyses of the microseismic monitoring programs conducted on the Buffalo Ditch 2-32H and the Mutual 2-30H. To approximate the porosity over the 169' Niobrara interval, log-derived porosities from the ten vertical wells in Exhibit No. E-1.1, along with the available core data from the Buffalo Ditch 1-32H and Buffalo Ditch 2-32H were used. These analyses resulted in an average porosity of 8% over the subject 169 ft Niobrara interval. For the water saturation ("SW"), an analysis of log calculations from the ten referenced vertical wells and available core data indicated an average SW over the 169 ft Niobrara interval of 48.5%. Numerical reservoir simulation was used to determine an approximate oil recovery factor ("RF") using a range of reservoir permeabilities calculated from available core data and horizontal well rate-time analysis. This work resulted in an oil recovery factor of 13.9% being used in the drainage area calculations, and compares very well with recoveries currently being used for the Niobrara in the DJ Basin.

3. Exhibit No. E-3.1

Exhibit No. E-3.1, horizontal wells completed in the Niobrara formation in the North Park Basin, illustrates how decline curve analysis was used to extrapolate the individual well EURs used in the drainage area calculations shown in Exhibit No. E-2.1. Production curves are shown for fifteen (15) of the sixteen (16) horizontal Niobrara wells operated by Sandridge Exploration and Production LLC in the North Park Basin. Decline curve parameters used in analyzing the curves were "b-factors" in range of 1.1 – 1.5, with average of 1.29, and a terminal decline rate ("Dmin") of 5% per year. All horizontal wells have completed lateral lengths between approximately 2,800 ft to 5,100 ft, with a weighted average completed lateral length of approximately 4,000 ft.

Testimony and Conclusions

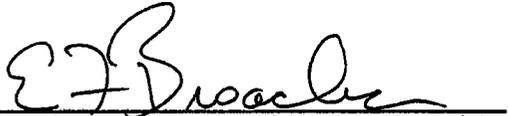
Sandridge Exploration and Production LLC (SD) believes that drilling and completing horizontal wells in the Niobrara Formation underlying the Application Lands in the North Park Basin is the most efficient and economic method to develop the resource potential of this formation. SD is monitoring the performance of all horizontal wells in all parts of the North Park and DJ Basins.

The calculated drainage areas for the horizontal Niobrara wells in Exhibit No. E-2.1 ranged from 4.96 acres to 100.9 acres with an average of 46.02 acres. These wells have laterals with lengths ranging from 2,800 ft to 5,100 ft with an average completed lateral length of 4,000 ft. It is assumed that horizontal Niobrara wells with lateral lengths of approximately 10,000 Ft will exhibit the same EUR increase over horizontal wells with lateral lengths less than 4,000 ft, 1.9 – 2.1 times, as observed in the Niobrara in the DJ Basin. Therefore the calculated drainage areas in Exhibit No. E-2.1 support a 1,280-acre drilling and spacing unit for the Niobrara formation and development with up to eight (8) horizontal wells in a 1,280-acre drilling and spacing unit.

Based on my engineering analysis, it is my recommendation that the Commission authorize the drilling of up to eight (8) horizontal wells within the proposed 1,280 acre drilling and spacing unit established for Sections 17 and 20, Township 7 North, Range 80 West, 6th P.M. for the production of oil, gas and associated hydrocarbons from the Niobrara Formation, and that by doing so, the development of the said application lands will promote efficient drainage, protect correlative rights and avoid waste of the resource.

The matters described herein were devised under my direction and control. To the best of my knowledge and belief, all matters set forth herein, my testimony and the supporting exhibits are true, correct and accurate.

Dated this 4th day of January, 2016.



Earuch Broacha, Reservoir Engineering Advisor
SandRidge Exploration and Production, LLC

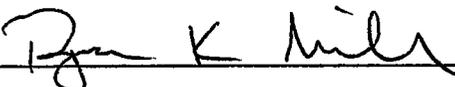
VERIFICATION

STATE OF OKLAHOMA)
) ss.
COUNTY OF OKLAHOMA)

The foregoing instrument was subscribed and sworn to before me this 4th day of January, 2016, by Earuch Broacha, Reservoir Engineering Advisor for SandRidge Exploration and Production, LLC.

Witness my hand and official seal.

My commission expires: 1/22/18



Notary Public



Exhibit No. E-1.1

Niobrara OOIP Calculations from Vertical Wells in North Park Basin
 T6H-T7N / R79W-R81W
 Jackson County, Colorado

By Well	API	Current Operator	Field	Sec	TWN	RNG	Top of Niobrara (feet)	Bottom of Niobrara (feet)	Average h (feet)	Average Porosity (%)	Average Sw (%)	SoPhiH	Niobrara Chalk OOIP per Section (Bbls Oil)	Niobrara Marl OOIP per Section (Bbls Oil)	Total Niobrara OOIP per Section (Bbls Oil)
State 1-36	05057060650000	Markus Production Inc	Coalmont	36	T7N	R81W	6,230	6,699	469	7.1%	59.4%	14.104	25,190,968	25,555,473	50,746,441
Federal 1-24	05057060710000	Trend Exploration LTD	Wildcat	24	T8N	R80W	10,624	11,100	476	4.4%	62.3%	10.307	15,244,250	21,840,951	37,085,201
SCM 1	05057062440000	Joseph P Doyle	Grizzly Creek	6	T6N	R80W	6,516	6,553	450	6.6%	48.0%	16.729	28,560,126	31,630,261	60,190,387
Fisher 15	0505706260000	Conoco Phillips Co	McCallium	15	T9N	R79W	7,234	7,602	368	4.9%	62.9%	8.576	10,293,773	20,560,994	30,854,767
Buffalo Ditch 2-32H	05057064640000	Sandridge Energy	Eclipse	32	T7N	R80W	7,093	7,536	443	5.7%	54.7%	12.132	17,148,733	26,502,551	43,651,284
Judy 1-30	05057064660000	Sandridge Energy	Unnamed	30	T7N	R80W	6,822	7,104	282	5.1%	41.1%	8.630	19,440,640	11,609,494	31,050,134
Vaneta 1-32D	05057064670000	Sandridge Energy	Eclipse	32	T7N	R80W	7,304	7,753	497	5.3%	39.2%	16.675	28,456,650	31,539,270	59,995,920
Federal Coalmont 23-12R	05057064920000	Foundation Energy MG	Coalmont	23	T7N	R81W	5,736	6,194	458	8.0%	57.7%	16.444	29,031,704	30,133,457	59,165,161
Arapaho State 6-18-36-3	05057065070000	Dakota Exploraton LLC	Grizzly Creek SE	36	T6N	R81W	5,828	6,259	431	8.6%	63.8%	13.813	26,332,586	23,365,063	49,697,649
State 6-81-24-4	05057065100000	Dakota Exploration LLC	Unnamed	24	T6N	R81W	5,921	6,299	378	10.3%	61.2%	14.774	22,830,953	30,325,118	53,156,071

Where:

OOIP = Original oil in place (bbls)
 Area = drainage area
 Bo = formation volume factor (rvb/STB)
 por = porosity (fraction)
 SW = water saturation (fraction)

Input Assumptions:

Bo = 1.38 Oil FVF in res bbls/STB calculated from PVT analysis
 Area = 640 acres in a single section

Equation Used:

OOIP = (7758*Area*h*por*(1-SW))/Bo

Notes:

Not all wells penetrated the entire Niobrara section

Exhibit No. E-2.1

Niobrara EUR and Drainage Area Calculations from Horizontal Wells in North Park Basin
 T6H-T8N / R80W-R81W
 Jackson County, Colorado

Lease	API	Sec	TWN	RNG	Date of 1st Production	30-Day (BOPD)	60-Day (BOPD)	90-Day (BOPD)	EUR (MBO)	OOIP (Mbbbls)	H (ft)	Porosity (Fraction)	Water Saturation (Fraction)	Calculated Drainage Area (acres)
Buffalo Ditch 01-32H	05057064630000	32	T7N	R80W	1/1/2008	217	253	225	67	482.01	169	0.08	0.485	12.31
Buffalo Ditch 02-32H	05057064640100	32	T7N	R80W	7/25/2008	68	54	58	58	417.27	169	0.08	0.485	10.66
Mutual 02-30H	05057064650000	30	T7N	R80W	7/25/2008	523	412	370	134	964.03	169	0.08	0.485	24.63
Mutual 07-17H	05057064720000	17	T7N	R80W	12/21/2008	394	326	290	255	1834.53	169	0.08	0.485	46.87
Surprise 04-06H	05057064800000	6	T6N	R80W	10/5/2010	325	239	220	115	827.34	169	0.08	0.485	21.14
Hebron 05-18H	05057065020000	18	T7N	R80W	12/23/2010	335	303	269	223	1604.32	169	0.08	0.485	40.99
Hebron 01-18H	05057065010000	18	T7N	R80W	12/20/2010	106	81	60	27	194.24	169	0.08	0.485	4.96
Coalmont 03-13H	05057065080000	13	T7N	R81W	8/1/2013	157	155	140	165	1187.05	169	0.08	0.485	30.33
Herbon03-12H	05057064980000	12	T7N	R81W	8/19/2013	385	420	375	374	2690.65	169	0.08	0.485	68.74
Hebron 02-07H	05057064990000	7	T7N	R80W	10/9/2013	238	230	177	155	1115.11	169	0.08	0.485	28.49
Damfino 02-06H	05057064820000	6	T6N	R80W	11/6/2013	507	550	527	345	2482.01	169	0.08	0.485	63.41
Peterson Ridge 01-20H	05057065150000	20	T8N	R80W	1/17/2014	300	292	241	222	1597.12	169	0.08	0.485	40.80
Spicer 03-32H	05057064690000	32	T7N	R80W	8/19/2014	453	226	447	368	2647.48	169	0.08	0.485	67.64
Grizzly 03-32H	05057065230000	32	T8N	R80W	9/8/2014	544	241	478	475	3417.27	169	0.08	0.485	87.30
Mutual 04-30H	05057064690000	30	T7N	R80W	12/22/2014	467	545	540	549	3949.64	169	0.08	0.485	100.90
Surprise 02-08H	05057065260000	8	T6N	R80W	7/13/2015	366	451	463	474	3410.07	169	0.08	0.485	87.12

Where:

OOIP = Original oil in place (bbls)
 EUR = estimated ultimate recovery (bbls)
 RF = recovery factor (fraction)
 Area = drainage area
 Bo = formation volume factor (rvb/STB)
 por = porosity (fraction)
 SW = water saturation (fraction)

Input Assumptions:

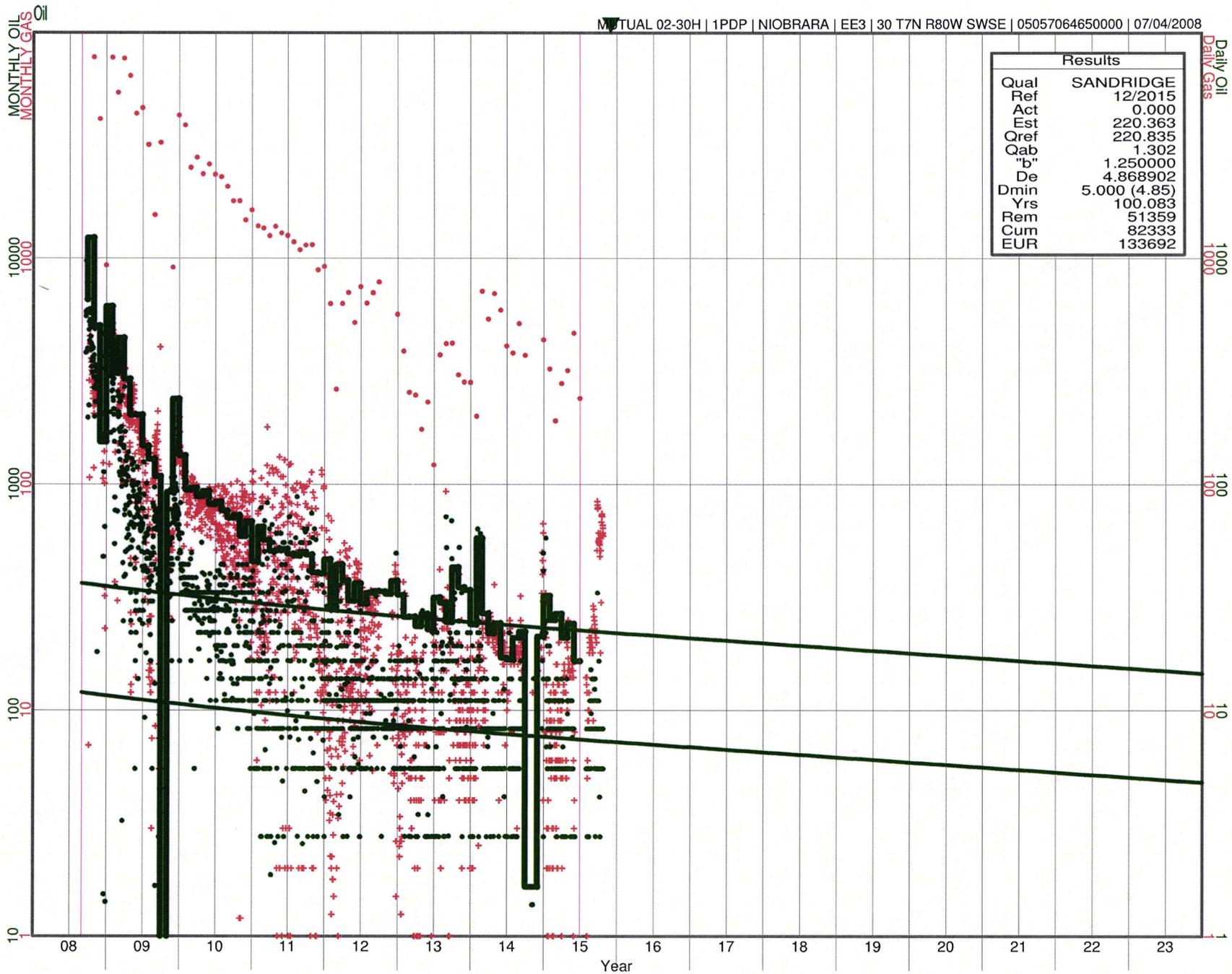
Bo = 1.38 Oil FVF in res bbls/STB calculated from PVT analysis
 SW = 0.485 Average water saturation (fraction) determined from log analysis
 RF = 0.139 Recovery factor (fraction) determined from reservoir simulation
 h = 169 Average height of propped frac in feet determined from microseismic data

Equation Used:

OOIP = EUR/RF
 Area = (OOIP*Bo)/(7758/1000*h*por*(1-SW))

Average Drainage Area:

46.02



MONTHLY OIL
MONTHLY GAS

10000
10000

1000
1000

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100

10
10

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Yrs	98.083
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Cum	49430
EUR	67180

Daily Oil
Daily Gas

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1000

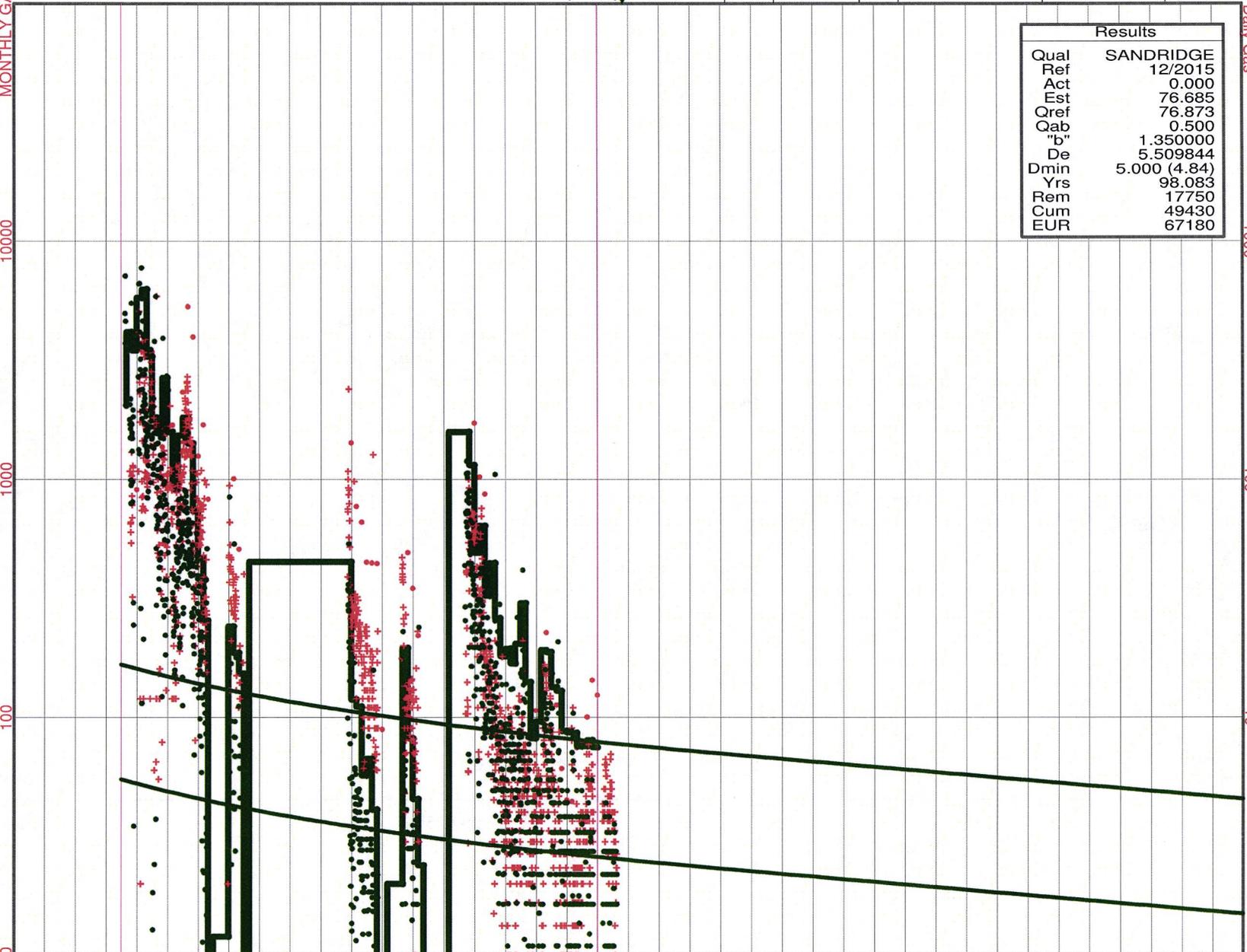
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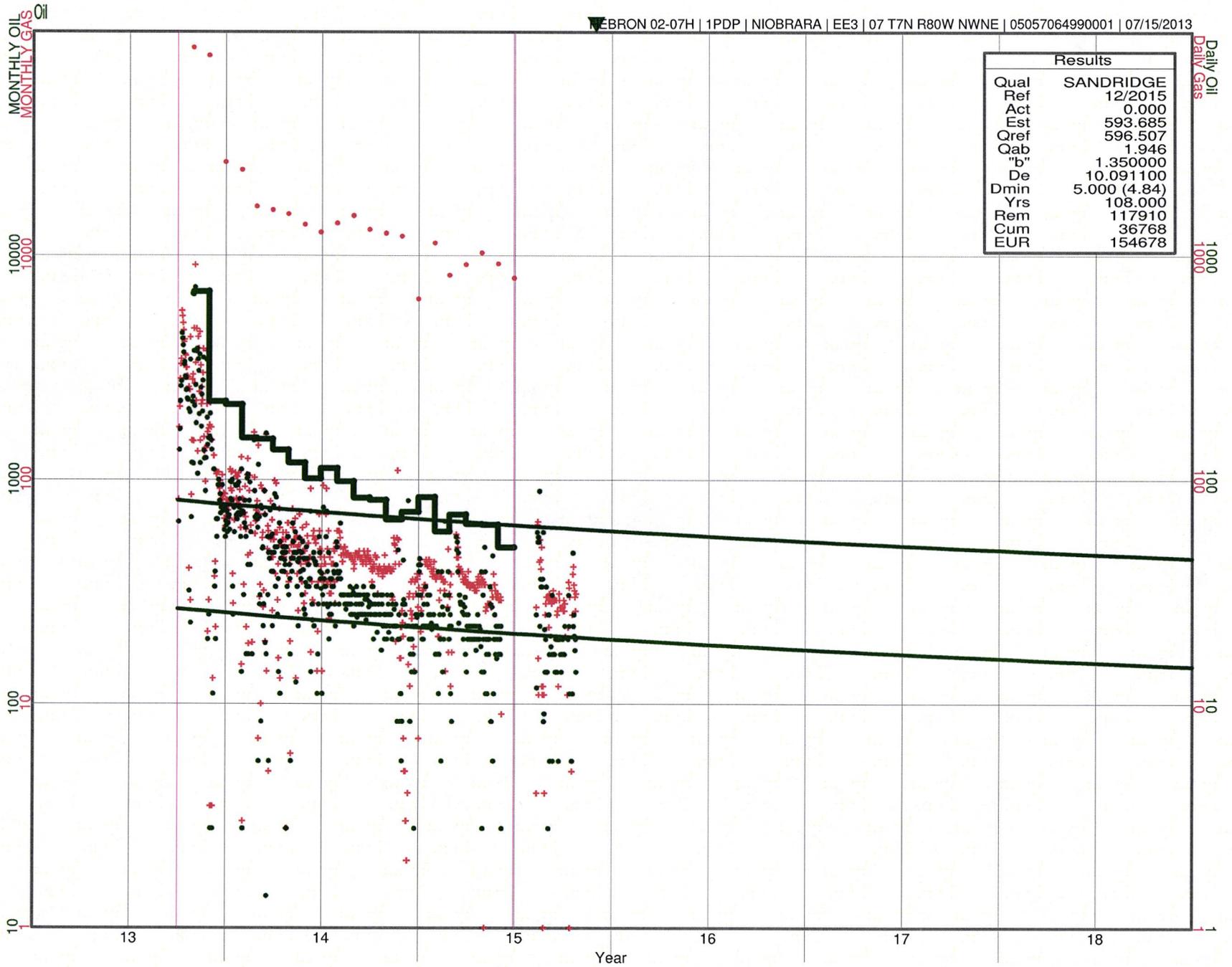
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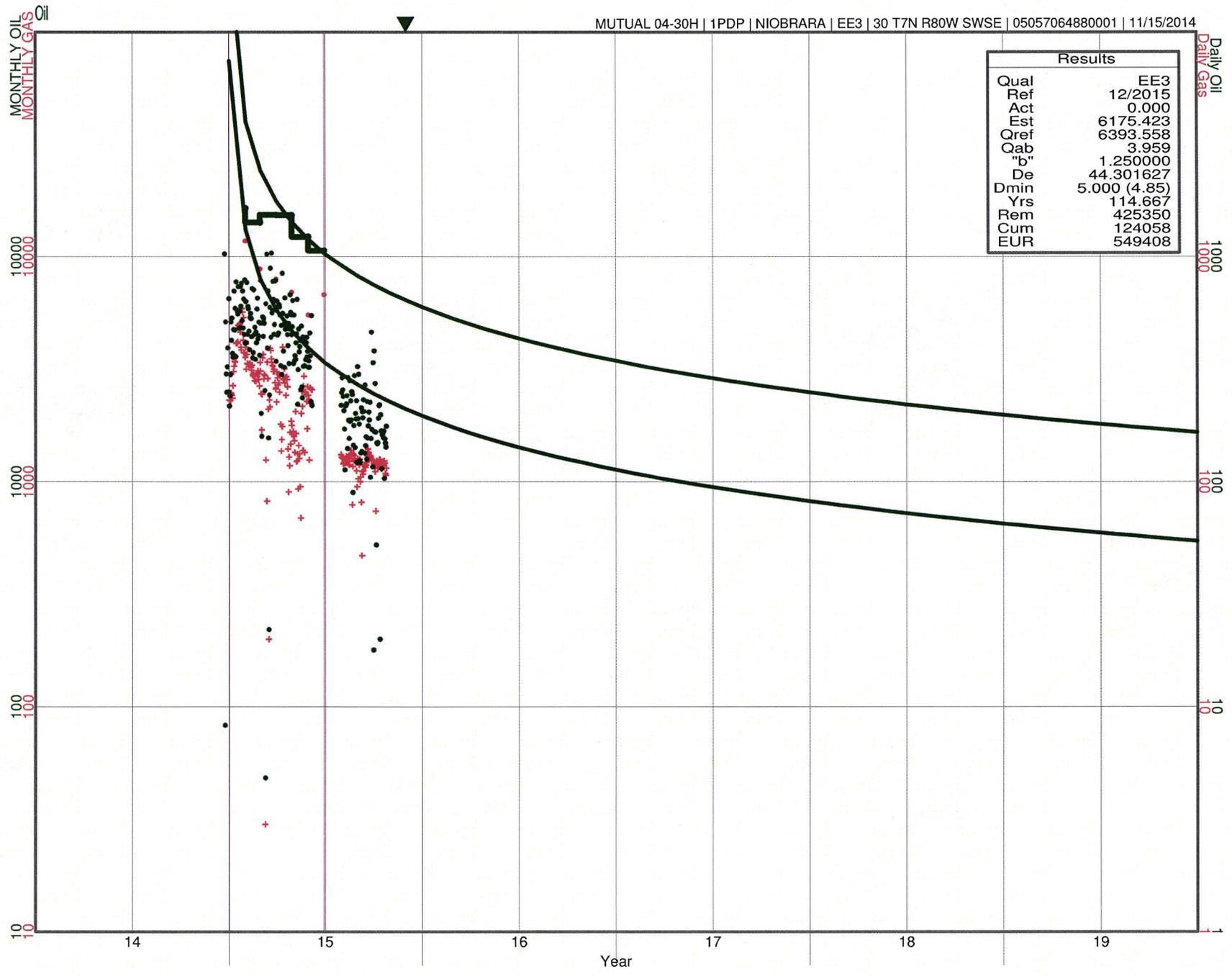
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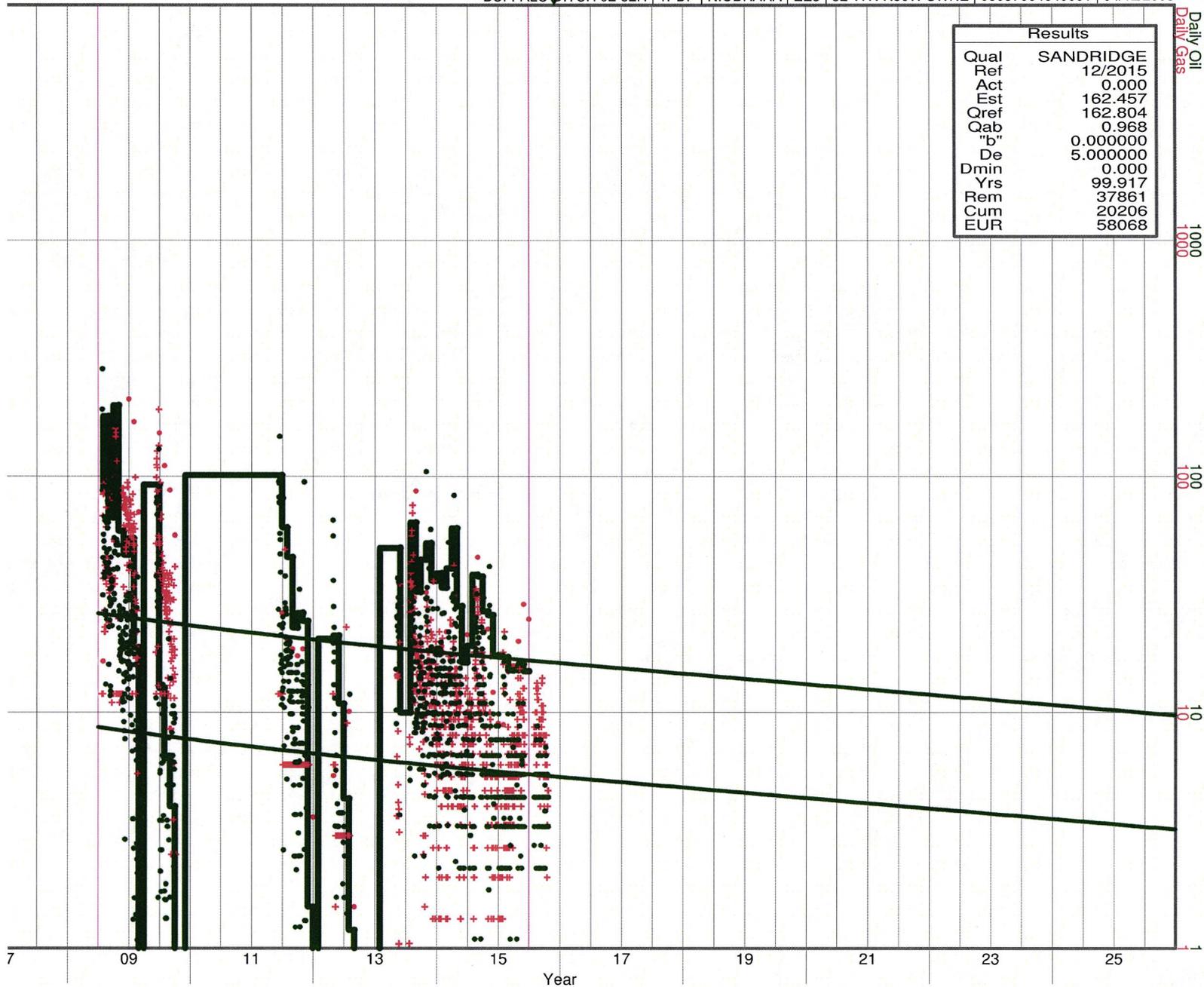
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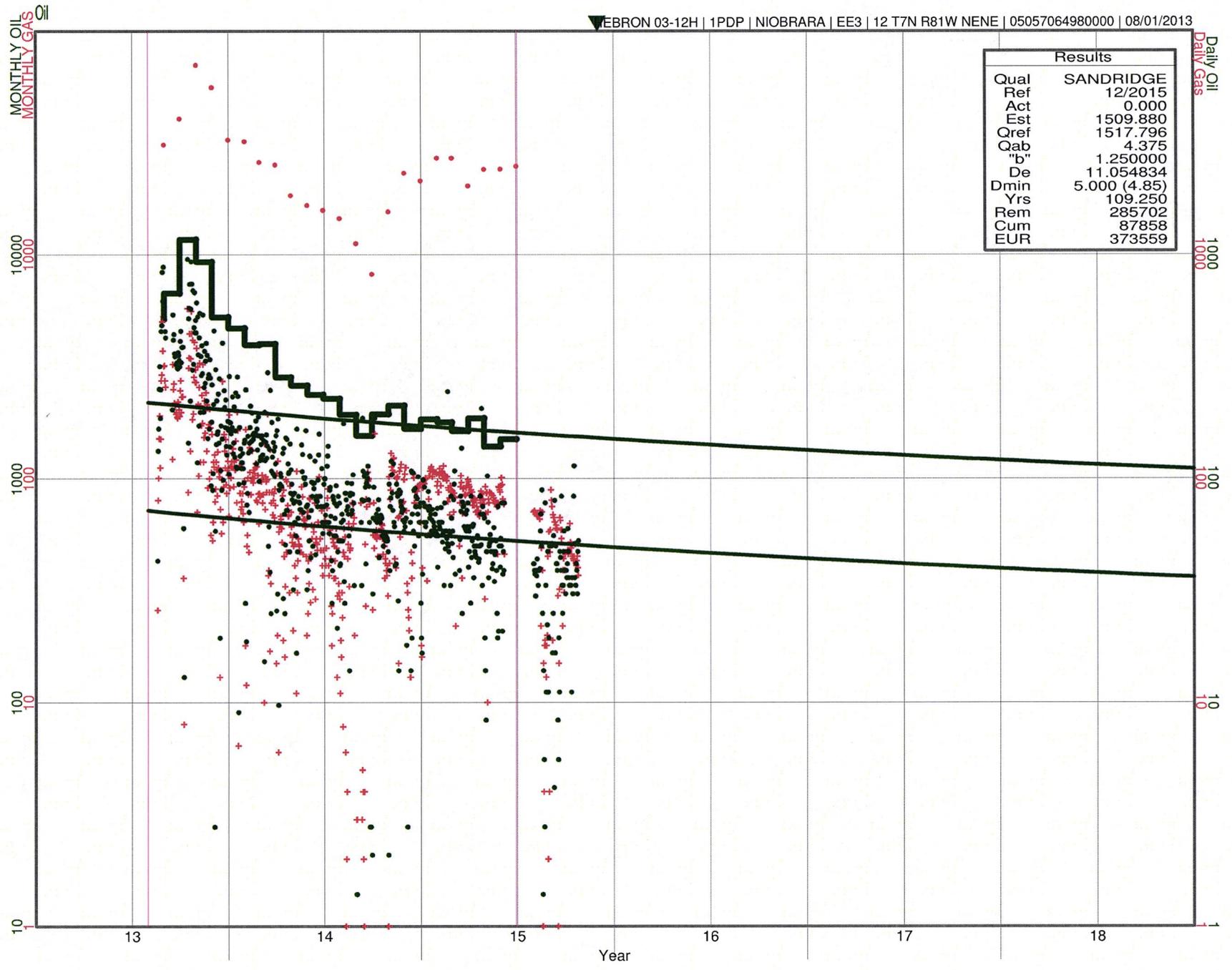


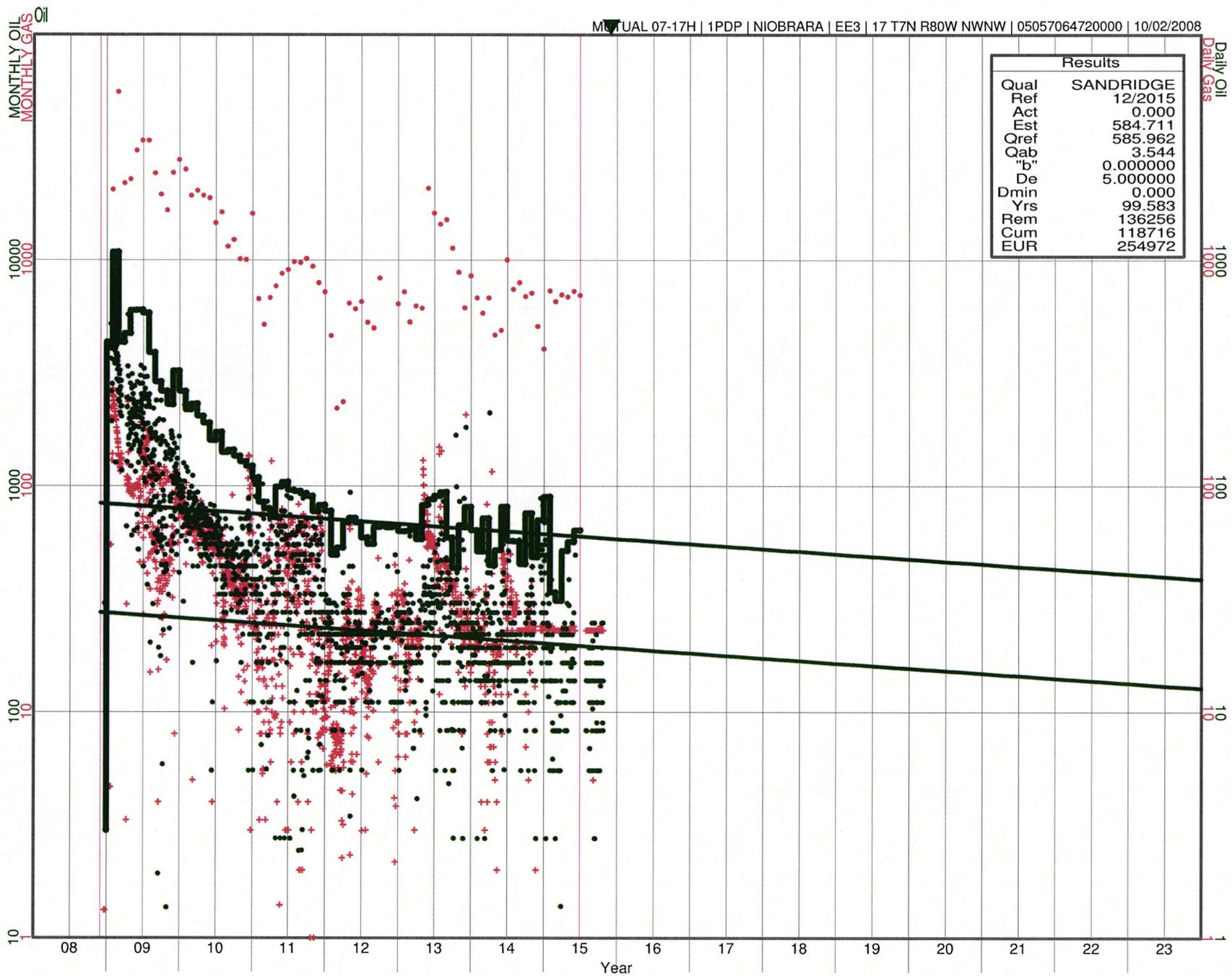


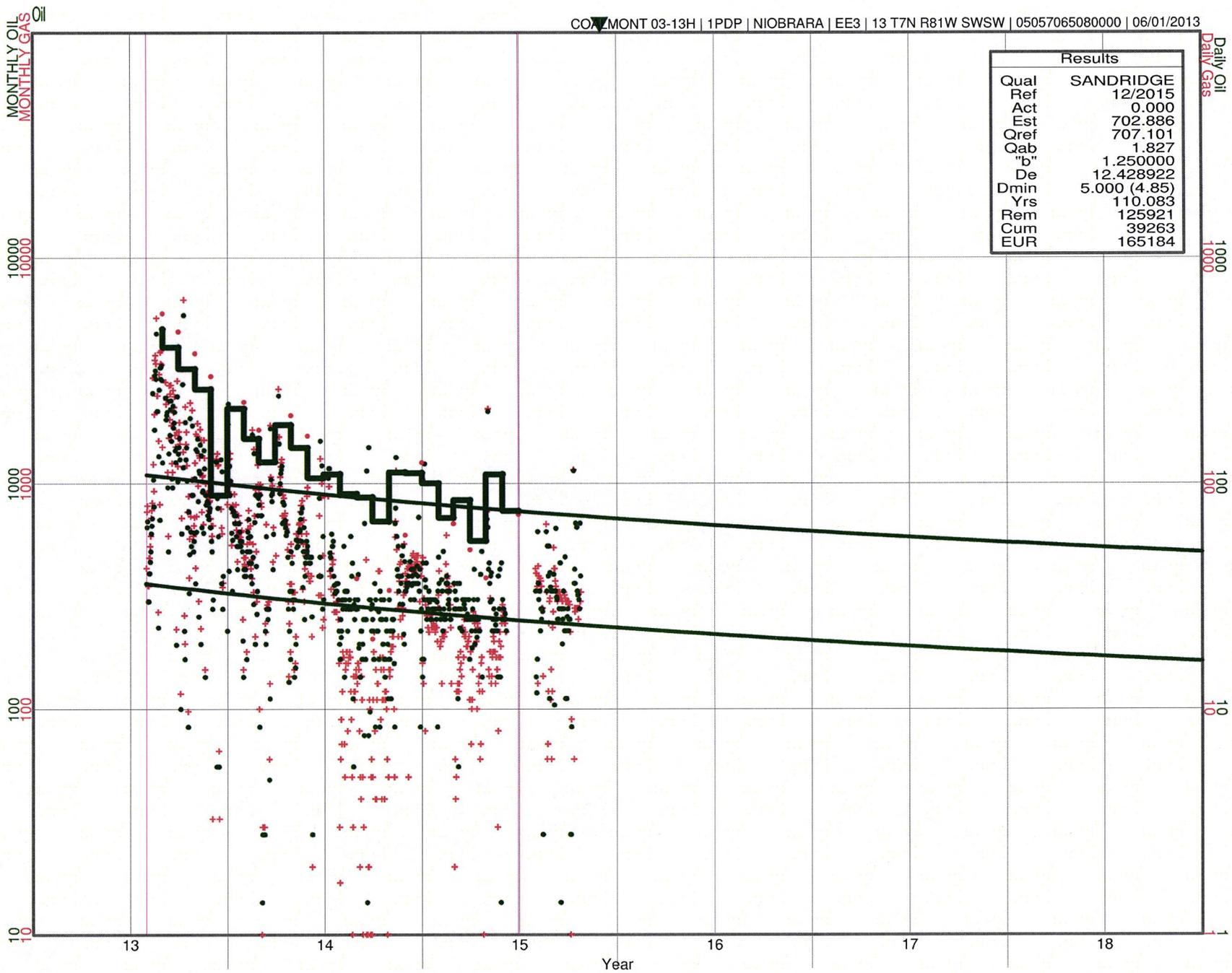
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EUR	549408



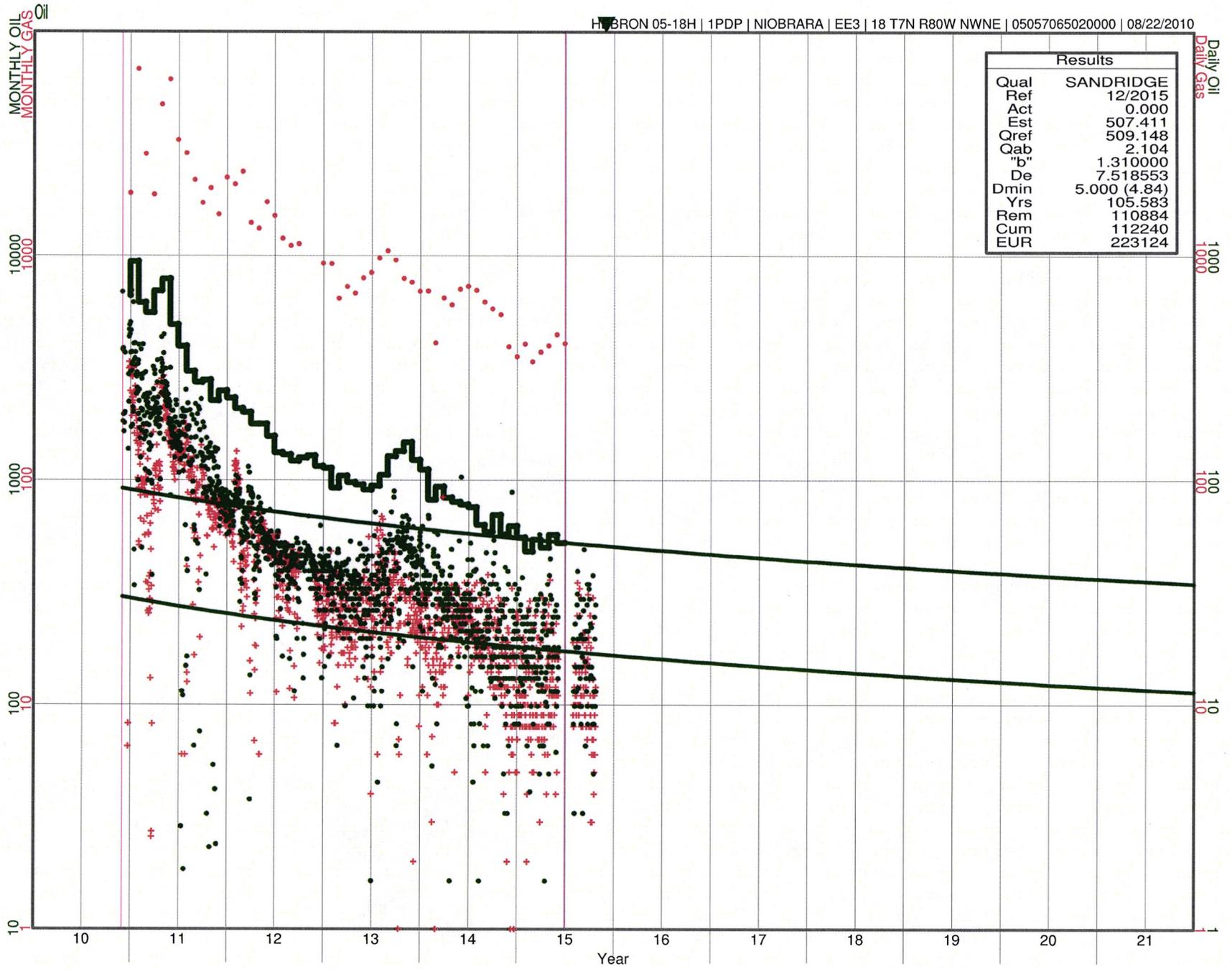
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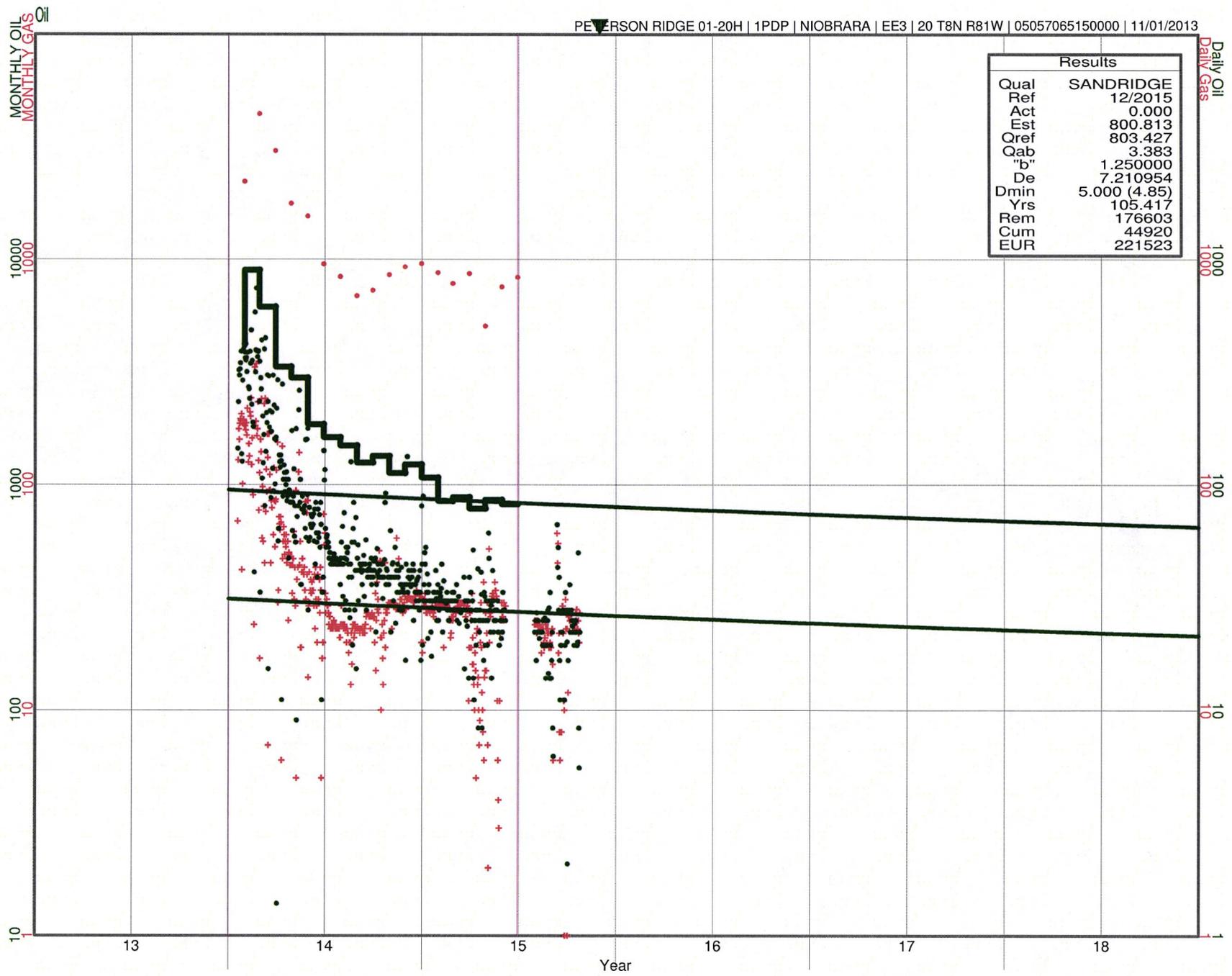




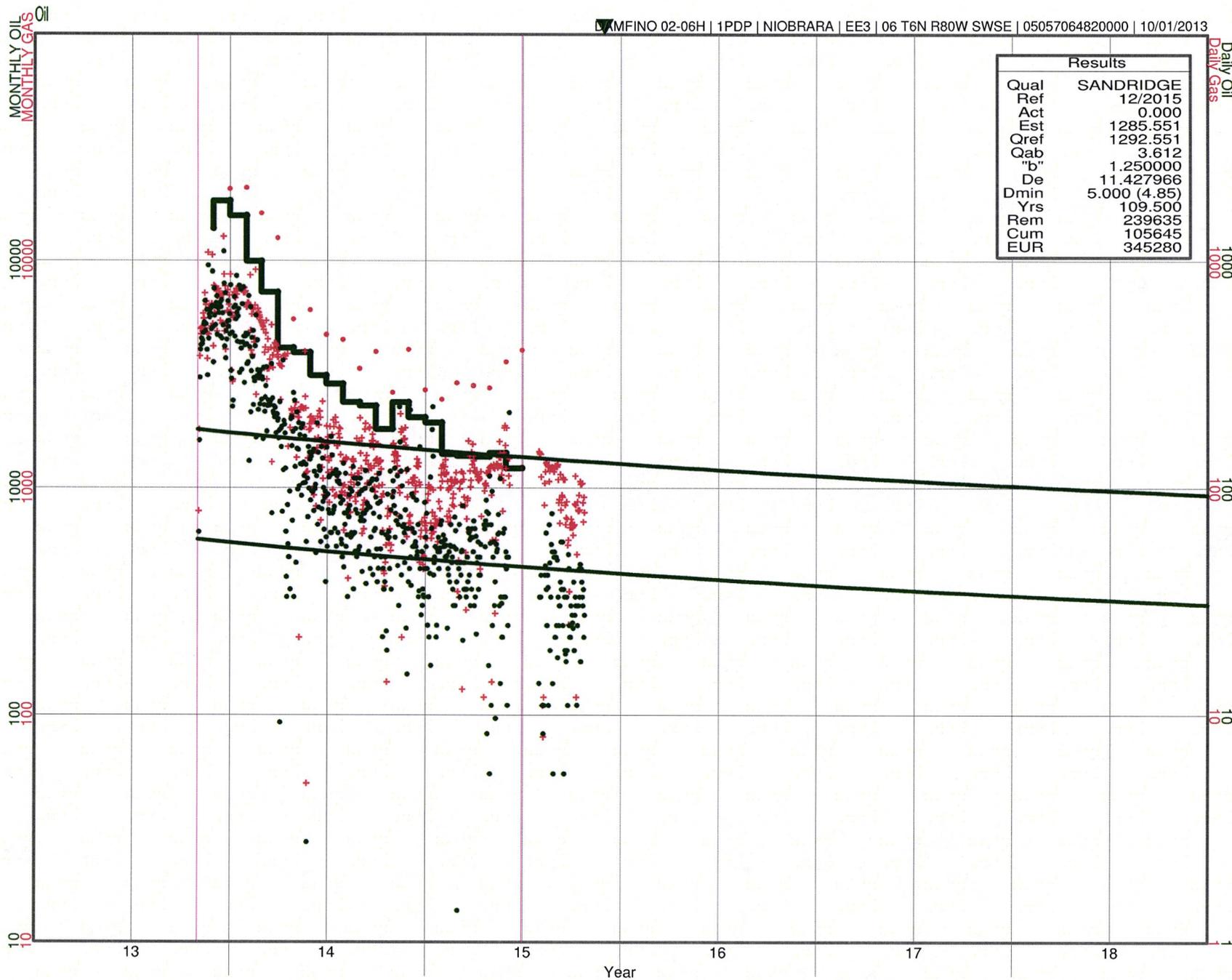


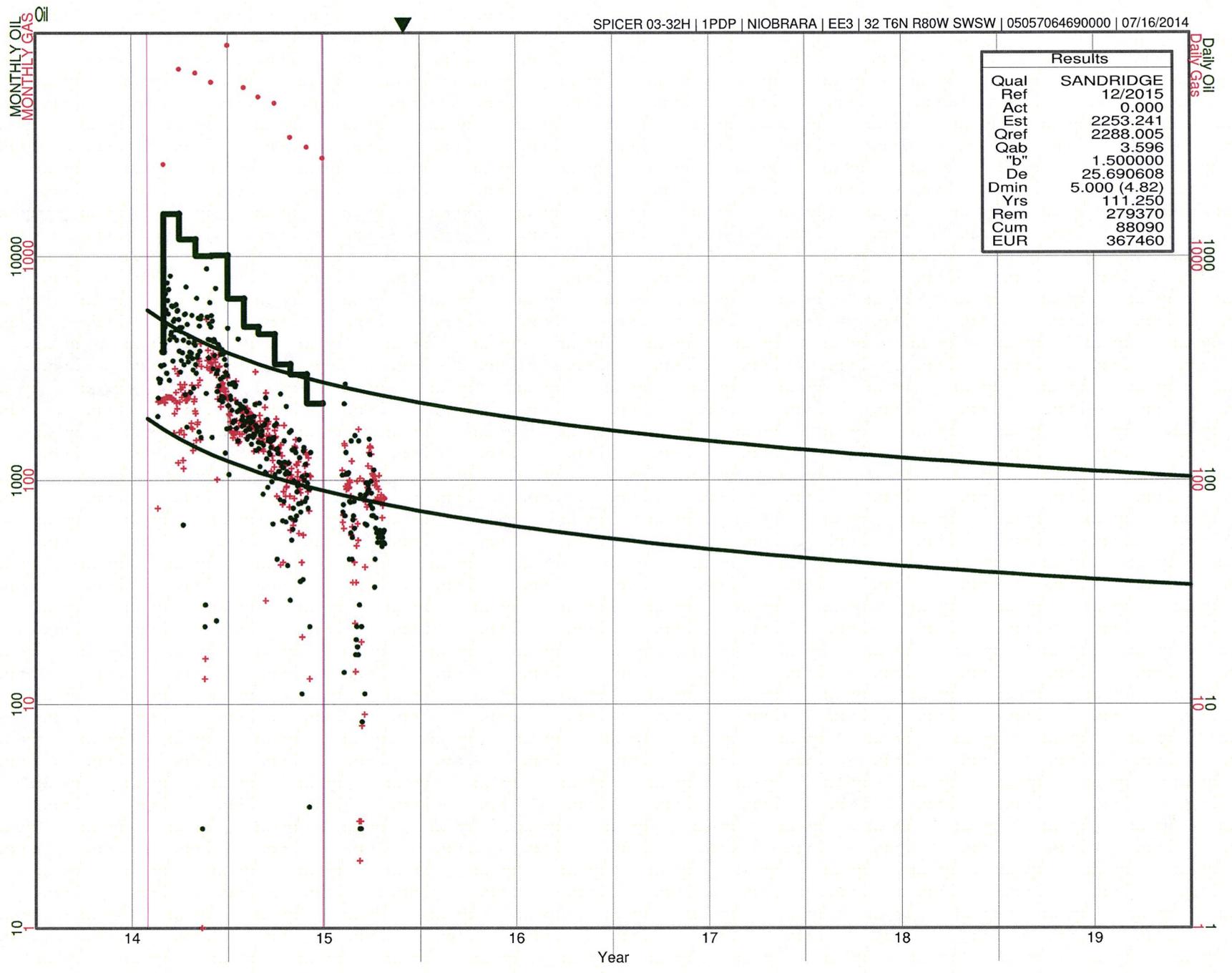
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Cum	39263
EUR	165184



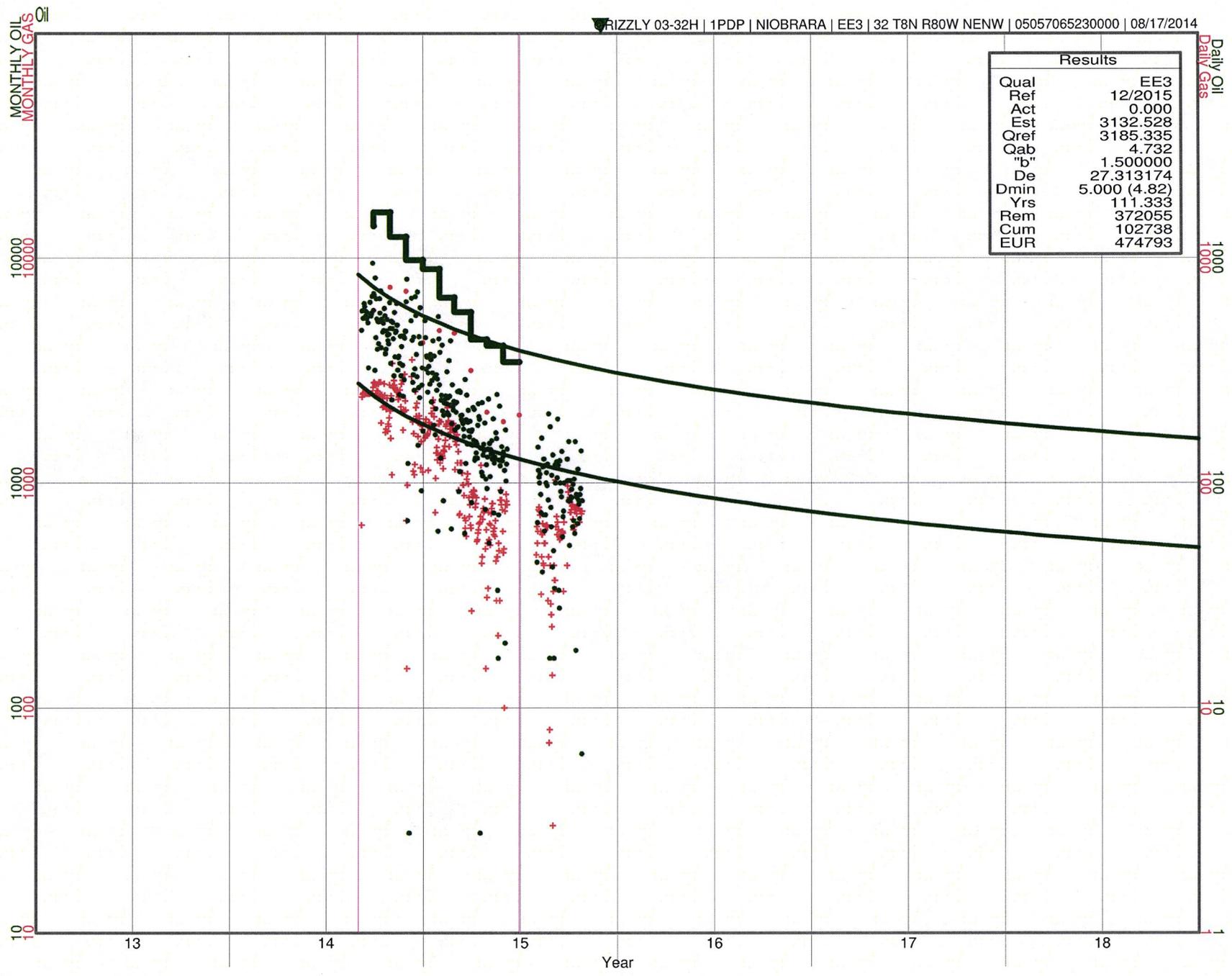


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Qab	3.383
"b"	1.250000
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Cum	44920
EUR	221523

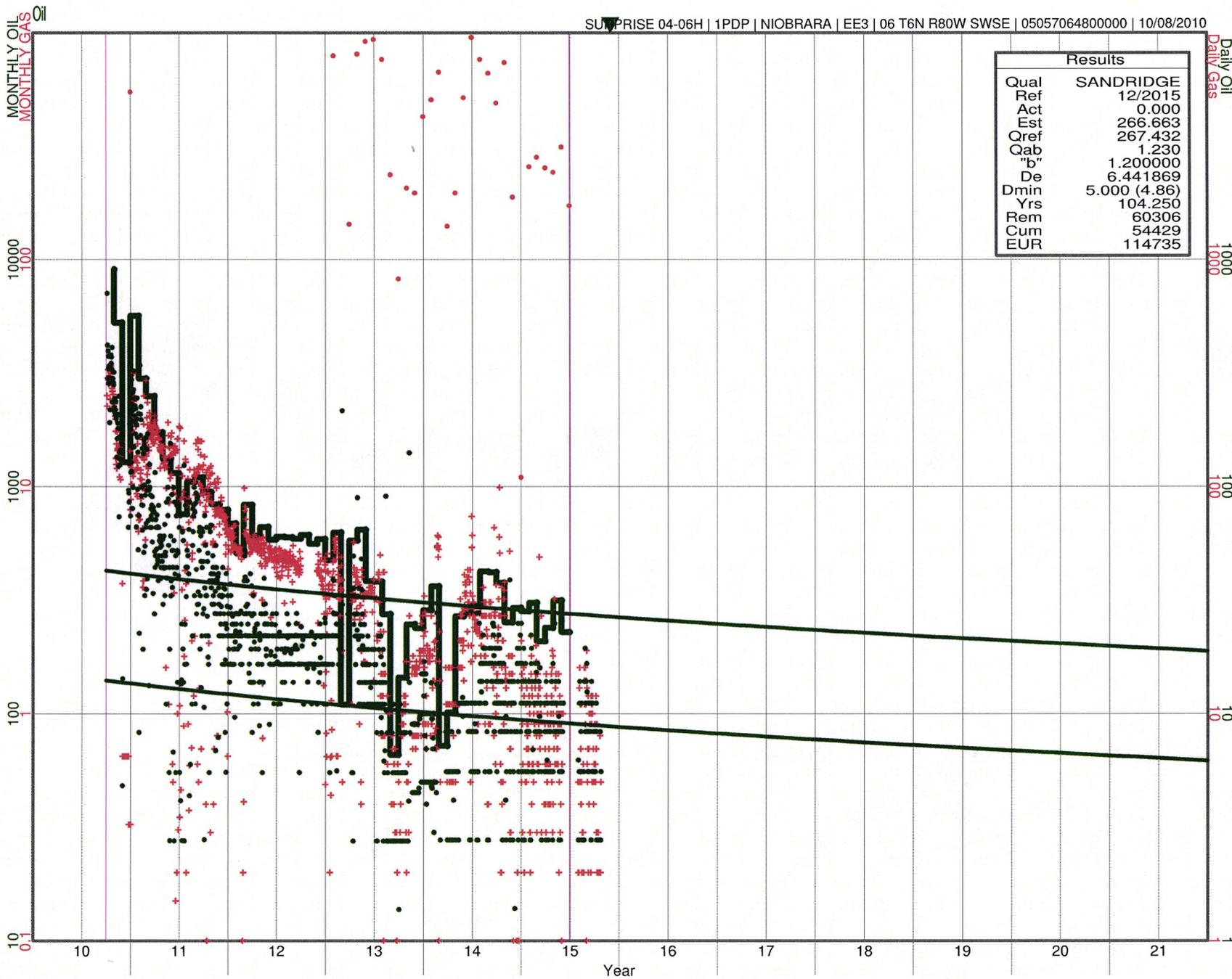


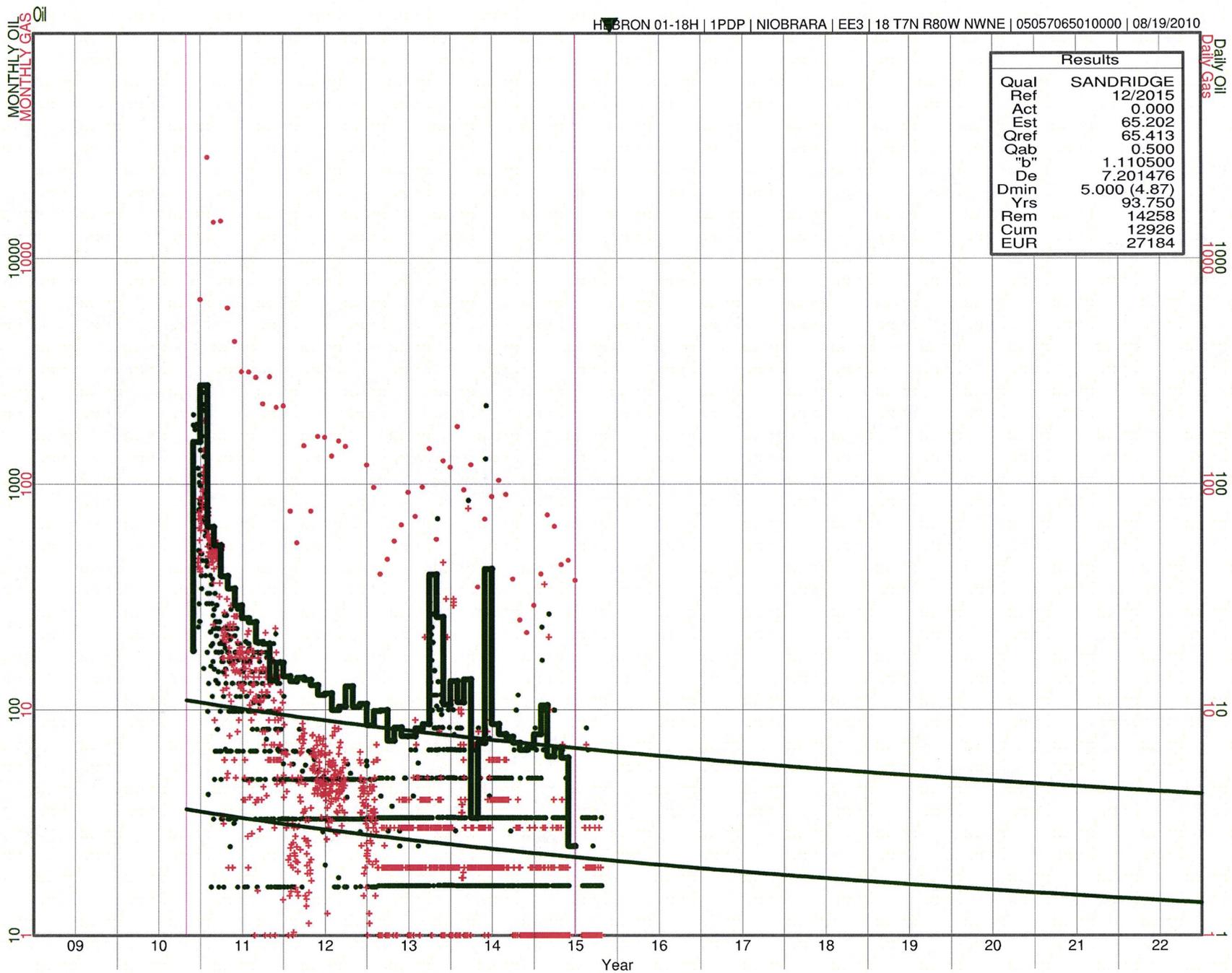


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Cum	88090
EUR	367460



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Cum	102738
EUR	474793





Results	
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"b"	1.110500
De	7.201476
Dmin	5.000 (4.87)
Yrs	93.750
Rem	14258
Cum	12926
EUR	27184

APPENDIX

Earuch F. Broacha

10001 Beaupre Dr, Arcadia OK 73007
303-828-8613 (cell) earuch@gmail.com

SUMMARY

- Management experience dealing with asset optimization, acquisition of exploration and exploitation projects, and field development projects in US, Mexico, Canada, South America and the Middle East.
- Reservoir computer simulation of oil fields under primary, secondary and tertiary recovery scenarios, and low permeability and under pressured gas fields. Technical experience dealing with all types of shales, sandstone and carbonate, single and dual porosity, conventional and low permeability reservoirs.
- Reservoir engineering, reservoir evaluation and reserves estimation using current reservoir analysis techniques, production data analysis, reservoir simulation, and various economics software systems.
- Completion design, implementation and post evaluation for shale and low permeability reservoirs.
- Design, implementation and analysis of results of diagnostic testing programs for waterflood and gas injection projects using computer simulation, PTA and tracer technologies.
- Hydraulic fracture treatment analysis, design, quality control and implementation on all types of fracture stimulation treatments.
- Petrophysical analyses and reservoir characterization studies.
- Creation and management of capital and expense budgets, along with tracking of AFE spending and post project economic evaluations.
- Evaluation of oil and gas properties for acquisition and divestiture using computer modeling, reservoir volumetrics & material balance, decline curve analysis, PTA, and economic modeling.
- Excellent computer skills with experience in numerous types of word processing, spreadsheet, presentation, database, reservoir simulation, geologic and economic software packages.

PROFESSIONAL EXPERIENCE

SANDRIDGE ENERGY

July 2015 – Present

Reservoir Engineering Advisor (Oklahoma City, Oklahoma)

Responsible for providing leadership in the evaluation of assets for purchase and in the identification of potential acquisition opportunities.

- Worked with SVP of Appraisal and New Ventures in the in the evaluation of assets for purchase and in the identification of potential acquisition opportunities.
- Lead evaluation of North Park Basin Niobrara opportunity resulting is signing of PSA in November 2015 and anticipated closing in December 2015.
- Generated 20 year development plan for North Park Basin asset including working with midstream on pipeline design.
- For each evaluation developed timelines and milestones, interacted with Seller and their Agents, prepared upper management presentations.
- Calculated original hydrocarbon –in-place and reserves for PDP, PUD, PROB and POSS type wells

- Developed type curves from offsetting analog production data.
- Analyzed OPEX and CAPEX data to create base case and upside case models.
- Reviewed in detail the currently being used completion techniques by the Seller and compared with the techniques being successfully used in other basins to evaluate unrealized upside potential.
- Created drilling / development scenarios to simulate various capital spending models.
- Preparation various bid matrices for upper management and BOD decision making.
- Reservoir engineering resource for entire company and mentor to development engineering teams.

AMERICAN ENERGY PARTNERS

July 2014 – June 2015

Reservoir Manager, Acquisitions and Special Projects (Oklahoma City, Oklahoma)

Responsible for providing leadership in the evaluation of assets for purchase and in the identification of potential acquisition opportunities.

- Managed evaluation teams consisting of members from the following disciplines: geology, petrophysics, operations, drilling, marketing, land and finance.
- For each evaluation developed timelines and milestones, interacted with Seller and their Agents, prepared upper management presentations.
- Calculated original hydrocarbon –in-place and reserves for PDP, PUD, PROB and POSS type wells
- Developed type curves from offsetting analog production data.
- Analyzed OPEX and CAPEX data to create base case and upside case models.
- Reviewed in detail the currently being used completion techniques by the Seller and compared with the techniques being successfully used in other basins to evaluate unrealized upside potential.
- Created drilling / development scenarios to simulate various capital spending models.
- Worked with third party auditors in the reconciliation of SEC reserves.
- Assisted in setting up VDRs for financial institutions and was point person in addressing all questions.
- Assisted Finance in the preparation various bid matrices for upper management decision making.

BILL BARRETT CORPORATION

April 2008 – July 2014

Reservoir Engineering and Reserves Manager (Denver, Colorado)

Responsible for providing leadership to Reservoir Engineering Department, corporate SEC reserves, 10K filing, reserve Audits and the dissemination of new completion technologies to the various Development Teams in the company.

- Managed the Reservoir Engineering Department. Set priorities for reservoir engineers and mentor the less experienced reservoir engineers.
- Managed the Corporate Reserves Group. Oversee and direct all aspects of the yearly Reserves process including SEC Reserves and 10K filings. Oversee management of Corporate Reserves Database.
- Assisted in the writing of corporate earnings statements and investor presentations / updates.
- Reported to Board of Directors Reserves & Compensation Committee.
- Oversaw preparation of compensation metrics related to production & reserves

- Interacted with area completions teams to review current completion programs and make recommendation for areas of improvement in both effectiveness and costs.
- Reviewed “new” completion technologies and evaluate potential impact on company’s current completion programs.

Senior Engineering Advisor / DJ Basin Development Team Manager (Denver, Colorado)

Responsible for providing leadership and engineering support to all interdisciplinary groups working in the DJ Basin Niobrara Development Team.

- Managed the DJ Basin Development Team. Oversaw and directed all aspects of the program from permitting, drilling, completions, facility installation, reserve estimation and marketing. Focus of team is development of Niobrara using horizontal well and hydraulic fracturing technologies.
- Assisted in the evaluation of DJ Basin well completion designs and recommended modifications to optimize production and reserves.
- Worked with the Reservoir Group in the determination of methods to predict reserves for DJ Basin horizontal Niobrara and Codell wells. Assisted in evaluation and understanding how other operators in the DJ Basin determine reserves for their horizontal Niobrara and Codell wells.
- Worked with the Reservoir and Geologic Groups to define limits on reserve estimates based on reservoir volumetrics for the Niobrara and Codell.

Senior Completions Engineer (Denver, Colorado)

Responsible for providing leadership and support to all Exploration and Development Teams in the areas of well completions, hydraulic fracture treatment design, well testing, petrophysics, PTA, shale well engineering and economic modeling.

- Designed and supervised all Niobrara completions in the DJ Basin. Evaluated well results and implemented completion improvements to optimize production and reserves
- Designed and implemented all core analysis, logging, well testing and completion programs for all exploration plays in company. Worked on exploration plays in the Bakken, Niobrara Shale, Gothic shale, Manning Canyon shale, Juana Lopez shale, Hovenweep shale, Mead Peak shale, Castle Peak, Wasatch, Green River, Fort Union and Honker Trail – Cutler formations.
- Supervised hydraulic fracturing and completion operations in the field for all exploration, step-out, new and “high profile” wells for entire company.
- Assisted Exploration Teams in coordinating workflow between land / permitting, geology, completions and drilling departments. Prepared all exploration AFE packages and perform all pre- and post-economic evaluations for exploration plays. Modified and maintained drilling rig and completion schedules for all exploration plays.
- Worked with Teams in preparing all engineering and economic exhibits for COGCC spacing hearings.
- Planned, initiated and supervised all surface and downhole microseismic measurements of fracture stimulation treatments pumped in the various exploration plays. Results of analyses used to change lateral configuration and completion programs.
- Collaborated with Marketing and Midstream groups to evaluate feasibility and economics of installing gas and oil gathering and water disposal systems for the Gothic Shale development program. Provided coordination between groups, production forecasts, development schedules and economics.
- Designed and supervised all data collection, testing and completion programs for the Blacktail Ridge Area. This is exploration / exploitation project. Target formations are Wasatch, Green River, Castle Peak and Uteland Butte formations.

- Designed and implemented all completion programs for deep (~20,000 ft) Lakota, Muddy and Frontier formations in Cave Gulch Field.
- Provided completion improvement recommendations for all plays (development and exploration) in company based on reanalysis of production, core and PVT data.
- Provided assistance to Reserves Group in estimating production profiles, recovery rates and reserves for all wells in the various exploration plays.

SAMSON RESOURCES COMPANY

December 2002 – April 2008

Williston Basin Team Leader – Rocky Mountain Division (Denver, Colorado)

Responsible for providing leadership and support to the Williston Basin Team in the areas of reserve estimation, reservoir engineering, petrophysics, model simulation, PTA, tight gas/oil well engineering and economic modeling.

- Team leader for North Dakota Bakken Development Team. Coordinated workflow between land/permitting, geology, completions/operations, reservoir engineering and drilling departments. Prepared all AFE packages and performed all pre- and post-economic evaluations on Bakken Wells. Modified and maintained rig schedule for North Dakota Development.
- Worked with Reservoir Engineering Group to determine best methods for estimation of reserves in the Bakken.
- Prepared all reservoir engineering and economic exhibits for NDIC spacing hearings and testified at all hearings as expert witness.
- Completed petrophysics study on North Dakota Bakken/Sanish/Three Forks formations. Results of study used in designing drilling and completion programs.
- Completed model simulation study of various wellbore configurations for Bakken development program. Results of study used to modify lateral orientation and spacing unit size to optimize individual well reserves.
- Planned, initiated and supervised surface tiltmeter measurements of fracture stimulation treatments pumped in the Bakken. Results of analysis used to change lateral configuration and completion program.
- Collaborated with Marketing and Midstream groups to evaluate feasibility and economics of installing gas and oil gathering and water disposal systems for the Bakken development program. Provided coordination between groups, production forecasts, development schedules and economics.

District Engineer – Rocky Mountain Division (Denver, Colorado)

Responsible for providing support to the Rocky Mountain Division in the areas of reservoir engineering, reserve estimation, petrophysics, model simulation, PTA, tight gas/oil well engineering and economic modeling.

- Provided engineering support in areas of reservoir simulation, petrophysical evaluation, geo-statistical modeling, analog field analysis, well performance analysis and economics, spacing hearing preparation and AFE package generation for the Southern Wyoming Fractured Lewis Development Program.
- Provided engineering support in areas of reservoir simulation, petrophysical evaluation, geo-statistical modeling, analog field analysis, well performance analysis and economics, spacing hearing preparation and AFE package generation for the Colorado (Moffat County) Fractured Nugget Development Program.

- Member of team that evaluated and initiated development of Entrada, Wingate and Navajo formations in the Salt Valley Anticline Area of the Paradox Basin in Utah. Engineering support in areas of petrophysical evaluation, geo-statistical modeling, analog field analysis, well performance analysis and generation of development scenario economics.
- Member of team that evaluated and initiated development of Duprow and Winnipegosis formations in North Dakota. Engineering support in areas of petrophysical evaluation, analog field analysis, well performance analysis and prediction, reservoir simulation, reserve determination and generation of development scenario economics.

District Engineer – Gulf Coast Division (Tulsa, Oklahoma)

Responsible for providing support to the Southern Gulf Coast Division in the areas of reservoir engineering, reserve determination, petrophysics, model simulation, PTA, tight gas well engineering and economic modeling.

- Designed, implemented and analyzed all testing and completion programs for the South Texas Exploration wells. Main focus of exploration was Vicksburg, Frio and Lobo formations.
- Involved in evaluation of all Southern Gulf Coast acquisition opportunities by providing analog field analyses, statistical reserve evaluation using “Rose” technique and project economics for all PDP, PDNP and PUD cases.
- Performed economic evaluation on all Division new drilling and development prospects, including rate and reserve predictions.
- Special project consultant to entire company in areas of hydraulic fracture design, pressure transient analysis and reservoir simulation.
- Completed a petrophysics study on the Vicksburg formation in Samson exploration and development areas in South Texas.
- Completed model simulation studies to evaluate well performance, drainage patterns and infill well potential in isolated Vicksburg fault blocks.
- Utilized Saphir and Topaz software to analyze all pressure buildup tests run in South Texas and develop well performance predictions.

BURLINGTON RESOURCES
Farmington, New Mexico

June 2001 – November 2002

Senior Staff Reservoir Engineer

Responsible for providing leadership to the Inventory Development Team in the areas of reservoir engineering, reserve estimation, petrophysics, tight gas well engineering and economic modeling.

- Designed and implemented 80-acre infill development program in Mesaverde in Southern Colorado. Provided leadership in the preparation of testimony for the Tribal and COGCC Infill Hearings and presented case. Early estimates indicate that the proposed 80-acre infill program will provide up to 65 BCF of additional reserves and an uplift of approximately 30 MMCFD in the first year.
- Analyzed and interpreted production, pressure and well test data from tight gas wells to identify well performance problems and recommended solutions. Analyses resulted in the identification of liquid loading problems in Pictured Cliffs wells that resulted in a change in the standard post completion clean out procedures. These procedural modifications resulted in a 20% increase in early producing rates and a 10% reduction in LOE costs.
- Handled capital and expense budgets and tracking functions for team. Monitored AFE spending and performed post project economic evaluations. Developed new tracking system to streamline process that provided more time to concentration on production/engineering issues.

- Designed and implemented 80-acre infill pilot program in Pictured Cliffs as part of resource optimization program for the Pictured Cliffs. Provided leadership in the preparation of testimony for the NMOCD Infill Pilot Hearing and served as an expert witness at the Hearing. The Picture Cliffs Infill Program is of extreme importance to the company as it has the potential of providing up to 400 BCF of additional reserves.
- Designed and implemented coring and petrophysics program for Pictured Cliffs to determine OGIP and remaining reserves. Results of program indicate that infill may not be required on all acreage. This has the potential of saving the company approximately 100 \$MM by not drilling in the areas that are currently being efficiently drained by existing wells.
- Member of multi-disciplinary team involved in petrophysical analysis and field development of on-shore field in China. Developed petrophysical model that assisted in explaining productions trends in field and located areas of poor depletion.
- Member of multi-disciplinary team involved in development of tight gas sands in Canada.
- Worked with Fruitland Coal and Lewis Shale teams in areas of hydraulic fracture treatment analysis, formation evaluation and reservoir simulation.

PROTECHNICS / CORE LABORATORIES
Houston, Texas

February 1996 – May 2001

Manager of Reservoir Engineering

Assigned the task of building reservoir engineering and interwell tracer department. Responsible for all the reservoir engineering related activities performed globally by company and supervised operations of company's analytical laboratory.

- Analyzed and interpreted production, injection, pressure and well test data from primary, secondary and tertiary recovery projects to identify well performance problems and recommended solutions. Set up reservoir models using various reservoir simulators to diagnosed reservoir and well performance issues and recommend possible changes to optimize field recovery and profitability. Designed and interpreted results from reservoir evaluation programs involving the use of interwell tracers and bottomhole pressure measurements.
- Performed the reservoir simulations for the integrated field studies on various coal bed methane projects in the UK. Results of studies indicated that selling company had overestimated reserves by 45%.
- Increased revenue from interwell tracer and reservoir analysis services from less than \$100 M to projected \$1.2 MM per year.
- Supervised operations of ProTechnics' analytical laboratory. Assignment involved the reengineering of work processes to streamline sample analyses and improve detection results. A new system was set up to improve tracking of sample analyses on a per project basis to assist in improving customer billing efficiency.

Chief Reservoir Engineer

Recruited to handle all the reservoir engineering and marketing activities resulting from the company's plans to expand the interwell tracer and pressure telemetry system departments. Responsibilities were then broadened to include the supervision all reservoir and petroleum engineering activities the company was involved in worldwide.

- Developed system of tracking, analyzing data and reporting results from pressure telemetry service which resulted in a 250% increase in services performed and a 400% increase in revenue.

- Performed field study evaluating the full cycle economics of various stimulation techniques and determination of the resulting reserves for the Mesaverde Formation in New Mexico for major independent operator. Results showed operator that their “cost reduction” program implemented on the well stimulation program had actually reduced well lives by 50% and increased the finding cost of their reserves by 150%. As a result the company modified their completion program.
- Member of engineering team that selected workover candidates and designed re-frac treatments in a number of fields located offshore Trinidad for major US Oil Company. Program was most successful workover program company had ever performed in Trinidad resulting in production increases of 100% - 300% per well.

ANSCHUTZ EXPLORATION CORPORATION
Denver, Colorado

May 1994 - November 1995

Manager of Engineering

Primarily responsible for providing support to all exploration geologists in the areas of reservoir simulation, reservoir evaluation, reserve estimation, production forecasting, drilling and completion program design, analog field analysis and project economics. Supervised reservoir engineering activities for domestic and international office locations.

- Performed completion consultant role for company with emphasis on formation damage minimization, hydraulic fracturing and low permeability reservoirs.
- Developed reservoir computer models to predict producing rates and reserves for various prospects and provided the engineering analysis and economic evaluation for these prospects.
- Provided leadership for the team that designed Lodgepole exploration/development program for company’s North Dakota acreage and the Morrow exploration/development program for the company’s Southern Colorado acreage.

FOREST OIL CORPORATION
Denver, Colorado

November 1992 - April 1994

Staff Production Engineer

Provided support in the areas of project management, reservoir evaluation and production optimization for sandstone and carbonate reservoirs in on and offshore environments. Daily responsibilities included project management, reservoir evaluation, reserve estimation of exploitation, and workover projects on individual well and field level projects. Technical engineering duties included completion design, hydraulic fracture design and analysis and field supervision, transient well test design and analysis, and waterflood facilities design and all aspects of field quality control.

- Designed compressor installations for on- and offshore wells in the Gulf of Mexico and Louisiana resulting in production increases from 2 to 7 mmcf/d per well.
- Redesigned frac treatments for deep east Texas wells resulting in a 350% increase in producing rates and a 50% reduction in the amount of proppant pumped.
- Designed facilities, including carbon dioxide separation system utilizing membrane technology, to allow production from the Fusselman and Ellenburger formations to meet pipeline specifications in the Vermejo Field thereby increasing net revenue from field by \$5 MM per year.
- Discovered mismanagement of injected water during evaluation of two Oklahoma waterflood projects. This resulted in the creation of fieldwide development plans to optimize both flood projects.

AMOCO PRODUCTION COMPANY

February 1979 - October 1992

Staff Petroleum Engineer

Southern Rockies Business Unit, Denver Colorado

Directly responsible for all aspects of reservoir management for five of Amoco's major low permeability gas fields in the states of New Mexico, Wyoming and Colorado. Areas of responsibility included the designing and supervision of drilling, production and completion operations and the performing of reservoir simulation and petrophysical studies.

- Designed and implemented program to improve the productivity of the Dakota formation in the San Juan Basin. The program involved the application of field test results in the development of a fracture geometry model and new fracture treatment designs resulting in productivity increases of 100-200% (equivalent to \$1.3 MM increase in gross revenue per well per year).
- Utilized computer analyses techniques on San Juan Basin Dakota log and core data resulting in the discovery of a previously unproduced interval. Designed program to identify and evaluate this interval in the field. Sustained, unstimulated producing rates in excess of 3.5 MMCFD were observed in most wells tested.
- Designed and implemented petrophysical and completion programs to improve productivity of Muddy J formation in the Wattenberg Field. These programs resulted in productivity increases of 100% or 500 MCFD (equivalent to \$340 M in gross revenue per year).
- Designed and implemented production optimization program for the Chase and Council Grove formations in the Hugoton Field in Kansas which resulted in a 35% reduction in drilling/completion costs and a 15% reduction in operating costs
- Evaluated Tenneco Chase and Council Grove properties using petrophysical analyses and reservoir simulation for purchase resulting in a \$50 MM savings.

Senior Petroleum Engineer

Northern Division EOR Group, Denver Colorado

Pressure transient analysis and various core analysis techniques were used to create reservoir models that predicted field performance under carbon dioxide flooding for several of Amoco's Wyoming oil fields.

- Using computer simulation designed and implemented a carbon dioxide pilot flood in the Darwin and Madison formations of the Lost Soldier Unit. The results showed a 10-15% increase in oil recovery over waterflooding with a net worth of \$70 MM over a five year period.
- Evaluated and improved operations on the Lost Soldier Tensleep steamflood. Various programs resulted in a 15% reduction in operation costs with no apparent loss of production.

Petroleum Engineer-SG

Northern Division Operations Group, Denver Colorado

Responsible for all testing, completions and workovers in two of Amoco's Wyoming low permeability gas fields, Moxa Arch and Wamsutter. Performed duties of well completion and quality control consultant for all of Northern Division

- Evaluated purchase of Cities service Gas Company's interest in Moxa Arch and Wamsutter gas wells resulting in additional revenue of \$80 MM over a five year period.
- Performed field optimization and infill drilling study on the Tensleep formation in the Beaver Creek Field. The study involved the utilization of geological attribute analysis and reservoir simulation and resulted in a reduction of \$10 M per month in operating expenses and a production increase of 7,500 BOPD from 20 new infill wells.

Research Engineer

Tulsa Research Center- Hydraulic Fracturing Group

Worked in the areas of hydraulic fracture design, pre-frac and post-frac well testing and hydraulic fracture simulator development. Designed and supervised pre and post frac field testing, developed frac fluid quality control guidelines and laboratory testing procedures for frac fluids, and worked with the service companies on the determination of proppant pack conductivity.

- Designed and implemented fracture field tests for the Bravo Dome Field. Analyses of the tests were used to reengineer the completion program resulting in increases in carbon dioxide rates of 40% and reduction in completion costs of \$16 M per well.
- Redesigned the completion program for the Almond formation in the Wamsutter Field resulting in rate increases of 2-4 MMCFD (equivalent to an increase in gross revenue of \$4-8 MM per well in the first year).

Petroleum Engineer

Riverton District Office, Riverton Wyoming

Directly responsible for engineering designs on all drilling wells, completions, and workovers for Lander Field. Responsible for determining project reserves and economics for all completions.

EDUCATION

Colorado School of Mines: B.S. Chemical Engineering & Petroleum Refining (December 1978)

Amoco Production Company Training Center: 900 Hours Advanced Studies in Petroleum Engineering, Petrophysics, Geology and Economics

PROFESSIONAL REFERENCES

Available on request.