

# Big Data Cloud Accelerate



Department of Conservation

# Fraud Detection Results

## All Years

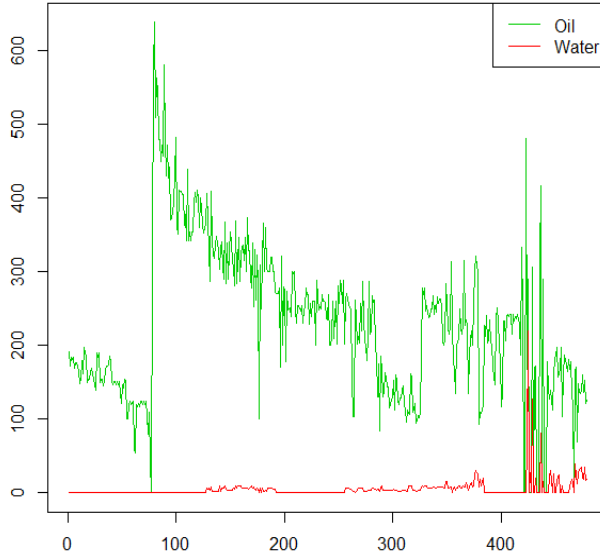
Detector	Number of Unique Firms	Number of Cases Detected	Total Oil Derived from Behavior
1	1	50	547
2	2	58	1,277
3	3	45	835
4	4	93	1,840
5	5	71	1,632
6	Total	317	6,131

## 2015

Detector	Number of Unique Firms	Number of Cases Detected	Total Oil Derived from Behavior
1	1	9	26
2	2	18	220
3	3	7	27
4	4	35	1,257
5	5	27	941
6	Total	96	2,471

# Detector #1: Oil production without water production

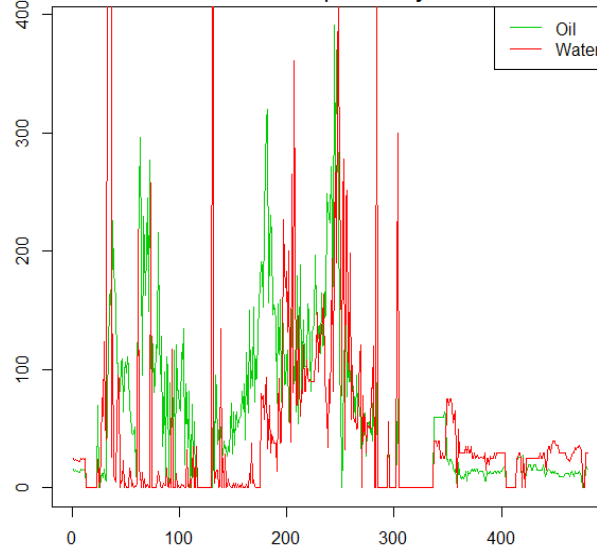
Firm = Redbank Oil  
Well = 2950288  
Total Oil = 60140 | Total Days= 7182



Time

firm	well	well_lease	prod_date	oil	gas	water	days_prod
Redbank Oil	2950288	Porter	2011-08-01	237	0	0	31
Redbank Oil	2950288	Porter	2011-09-01	230	0	0	30
Redbank Oil	2950288	Porter	2011-10-01	187	0	0	31
Redbank Oil	2950288	Porter	2011-11-01	334	0	0	30
Redbank Oil	2950288	Porter	2011-12-01	248	0	0	31
Redbank Oil	2950288	Porter	2012-03-01	482	0	0	29
Redbank Oil	2950288	Porter	2012-11-01	170	0	0	30

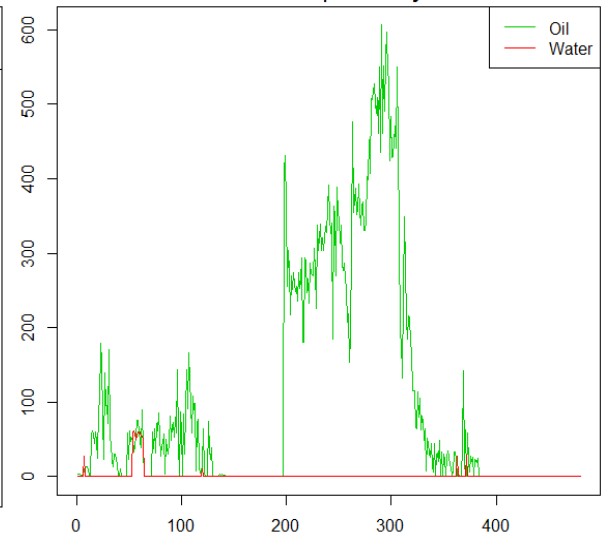
Firm = Sun Mountain Oil & Gas  
Well = 2904729  
Total Oil = 4308 | Total Days= 928



Time

firm	well	well_lease	prod_date	oil	gas	water	days_prod
Sun Mountain Oil & Gas	2904729	Biggar	1988-05-01	43	0	0	26
Sun Mountain Oil & Gas	2904729	Biggar	1988-08-01	34	0	0	11
Sun Mountain Oil & Gas	2904729	Biggar	1988-10-01	40	0	0	28
Sun Mountain Oil & Gas	2904729	Biggar	1988-12-01	34	0	0	12
Sun Mountain Oil & Gas	2904729	Biggar	1989-04-01	72	0	0	18
Sun Mountain Oil & Gas	2904729	Biggar	1989-05-01	29	0	0	9
Sun Mountain Oil & Gas	2904729	Biggar	1989-07-01	36	0	0	31
Sun Mountain Oil & Gas	2904729	Biggar	1989-09-01	64	0	0	30

Firm = Pyramid Oil Co.  
Well = 2904792  
Total Oil = 49119 | Total Days= 7336

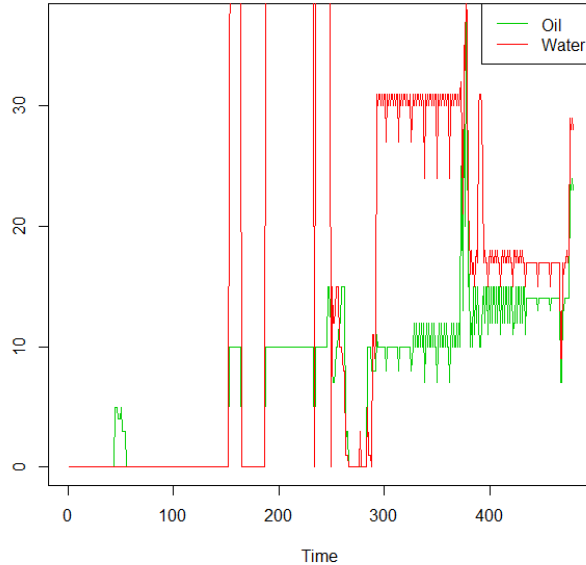


Time

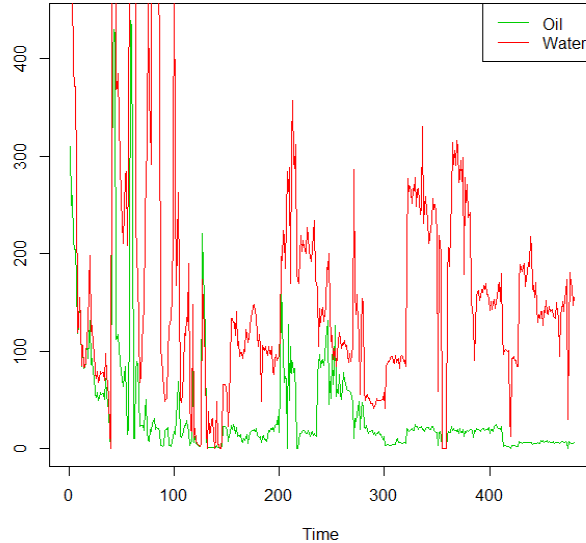
firm	well	well_lease	prod_date	oil	gas	water	days_prod
Pyramid Oil Co.	2904792	Shomate	2006-11-01	6	0	0	7
Pyramid Oil Co.	2904792	Shomate	2006-12-01	33	0	0	11
Pyramid Oil Co.	2904792	Shomate	2007-01-01	33	0	0	5
Pyramid Oil Co.	2904792	Shomate	2007-02-01	24	0	0	7
Pyramid Oil Co.	2904792	Shomate	2007-04-01	6	0	0	1
Pyramid Oil Co.	2904792	Shomate	2007-08-01	40	0	0	17
Pyramid Oil Co.	2904792	Shomate	2007-09-01	142	0	0	27
Pyramid Oil Co.	2904792	Shomate	2007-10-01	10	0	0	23

# Detector #2: Days on production exceeds 10bbl of total oil produced per month

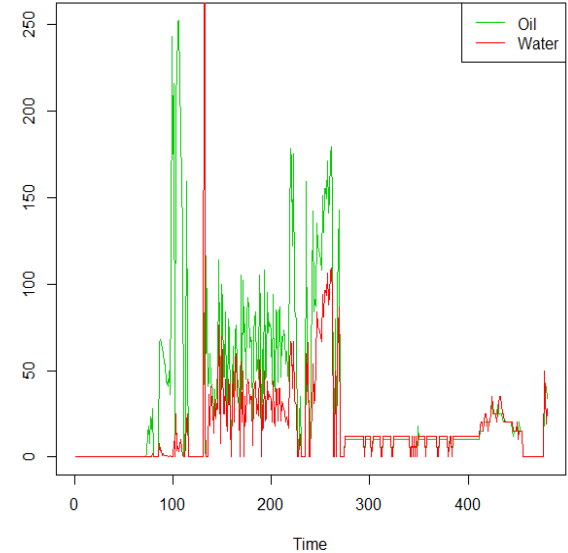
Firm = Morrison Oil Co., LLC.  
Well = 2906467  
Total Oil = 1409 | Total Days= 4414



Firm = Vaquero Energy, Inc.  
Well = 2904912  
Total Oil = 628 | Total Days= 3157



Firm = D D Natural Resources LLC  
Well = 2904693  
Total Oil = 1200 | Total Days= 3681



	firm	well	well_lease	prod_date	oil	gas	water	days_prod
Morrison Oil Co., LLC.	2906467	Lawson-Bennett	2006-03-01	10	0	31	31	
Morrison Oil Co., LLC.	2906467	Lawson-Bennett	2006-05-01	10	0	31	31	
Morrison Oil Co., LLC.	2906467	Lawson-Bennett	2006-07-01	10	0	31	31	
Morrison Oil Co., LLC.	2906467	Lawson-Bennett	2006-08-01	10	0	31	31	
Morrison Oil Co., LLC.	2906467	Lawson-Bennett	2006-10-01	10	0	31	31	
Morrison Oil Co., LLC.	2906467	Lawson-Bennett	2006-12-01	10	0	31	31	
Morrison Oil Co., LLC.	2906467	Lawson-Bennett	2007-01-01	10	0	31	31	

	firm	well	well_lease	prod_date	oil	gas	water	days_prod
Vaquero Energy, Inc.	2904912	John C. Hershey	2015-02-01	7	0	141	28	
Vaquero Energy, Inc.	2904912	John C. Hershey	2015-03-01	7	0	143	31	
Vaquero Energy, Inc.	2904912	John C. Hershey	2015-04-01	8	0	136	30	
Vaquero Energy, Inc.	2904912	John C. Hershey	2015-05-01	6	0	135	31	
Vaquero Energy, Inc.	2904912	John C. Hershey	2015-06-01	7	0	134	30	
Vaquero Energy, Inc.	2904912	John C. Hershey	2015-07-01	7	0	150	31	
Vaquero Energy, Inc.	2904912	John C. Hershey	2015-08-01	7	0	139	31	
Vaquero Energy, Inc.	2904912	John C. Hershey	2015-09-01	7	0	136	30	

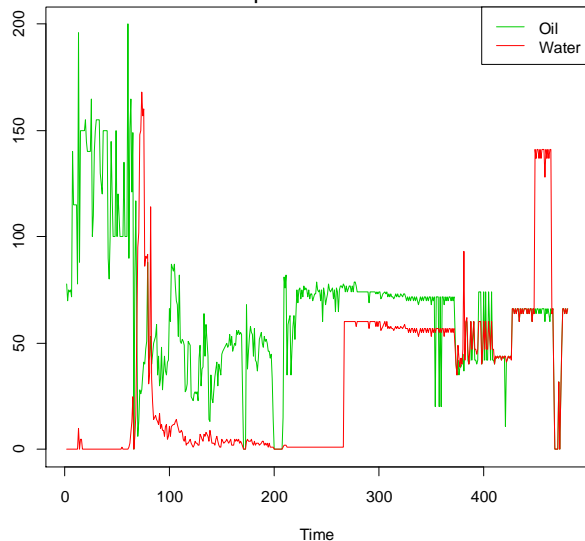
	firm	well	well_lease	prod_date	oil	gas	water	days_prod
D D Natural Resources LLC	2904693	Mattson	2009-08-01	10	0	12	31	
D D Natural Resources LLC	2904693	Mattson	2009-09-01	10	0	12	30	
D D Natural Resources LLC	2904693	Mattson	2009-10-01	10	0	12	31	
D D Natural Resources LLC	2904693	Mattson	2009-11-01	10	0	12	30	
D D Natural Resources LLC	2904693	Mattson	2009-12-01	10	0	12	31	
D D Natural Resources LLC	2904693	Mattson	2010-01-01	10	0	12	31	

# Detector #3: Static oil production above 10bbl of total oil produced per month for over 6 months

Firm = C & M Oil Co. & Investments

Well = 2906017

Total Oil = 6117 | Total Num Static Periods= 69

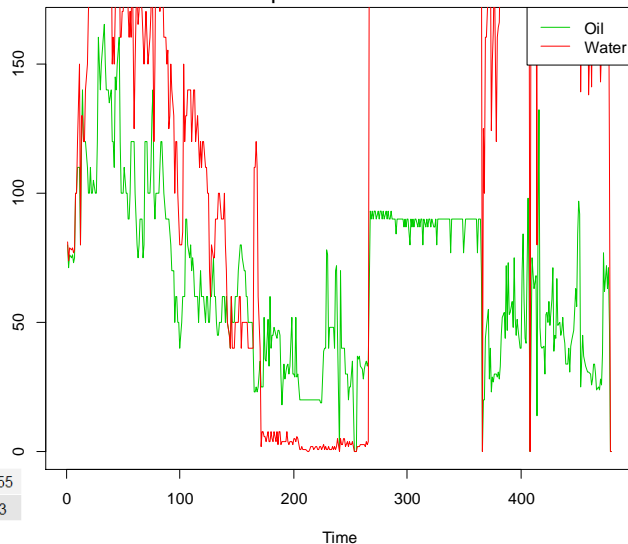


Static Oil Value	39	42	44	46	60	66	72	73	74	77	79	100	115	140	150	155
Frequency	1	3	1	1	1	7	8	3	18	2	1	7	3	3	7	3

Firm = Petro Capital Resources, LLC

Well = 2900613

Total Oil = 9660 | Total Num Static Periods= 139

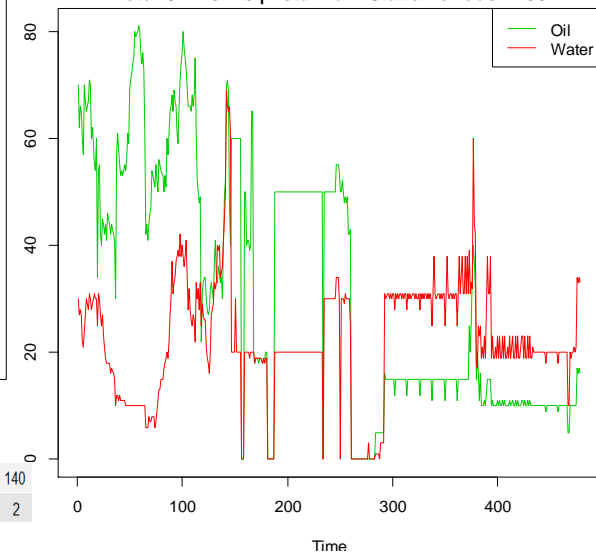


Static Oil Value	19	20	23	25	30	31	34	40	45	47	48	50	60	70	80	87	90	93	100	110	120	140
Frequency	1	19	1	3	3	1	2	5	2	1	3	8	14	2	1	1	49	2	10	1	8	2

Firm = Morrison Oil Co., LLC.

Well = 2949406

Total Oil = 5426 | Total Num Static Periods= 206



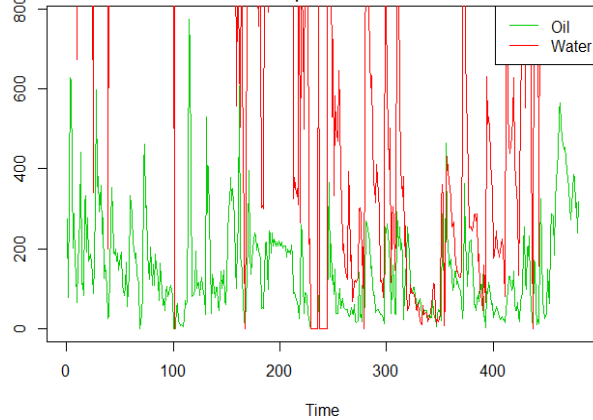
Static Oil Value	5	10	11	15	19	20	34	41	42	50	55	60	65	66
Frequency	9	49	1	69	4	1	1	1	1	58	1	8	1	2

## Detector #4: Increase in oil production without an increase in water

Firm = Naftex Operating Co.

Well = 2944726

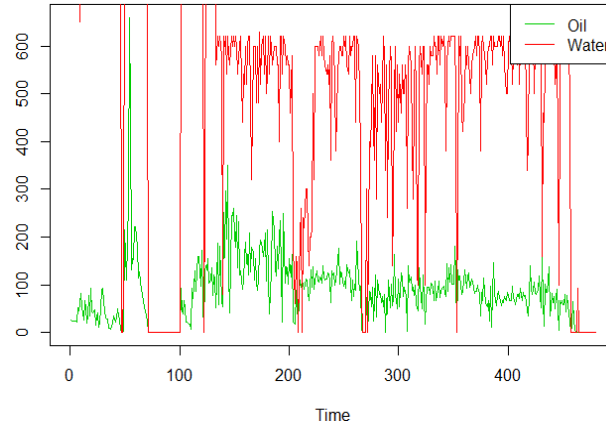
Total Oil = 16089 | Total Num Events = 84



Firm = Pyramid Oil Co.

Well = 2904800

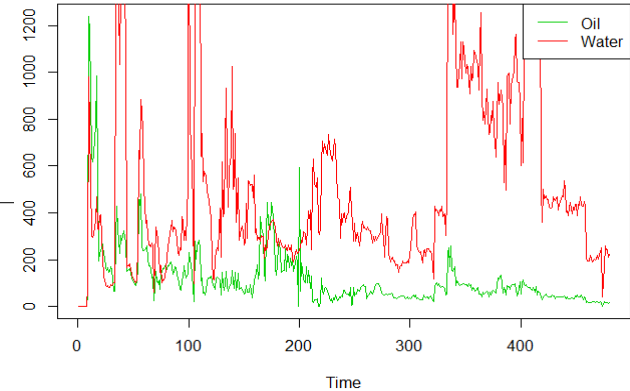
Total Oil = 9949 | Total Num Events = 81



Firm = Vaquero Energy, Inc.

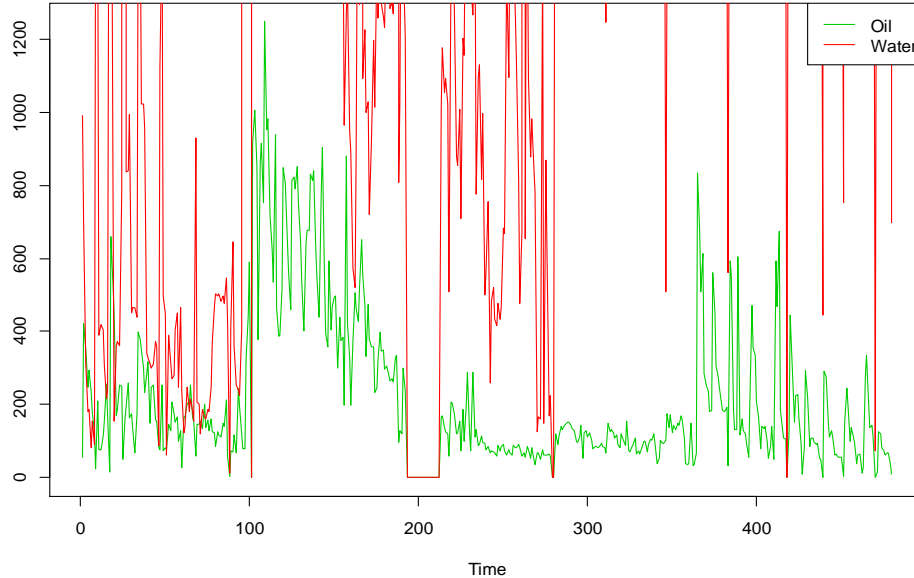
Well = 2955785

Total Oil = 7897 | Total Num Events = 74

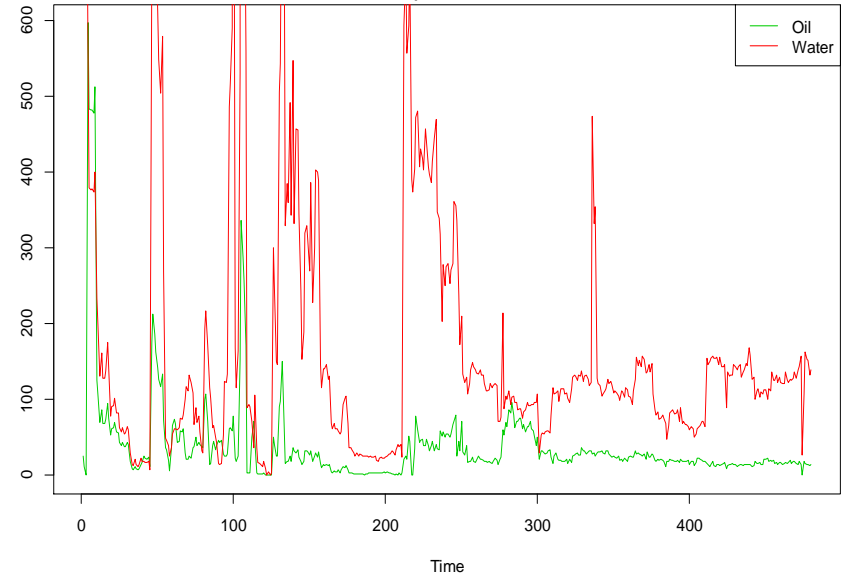


## Detector #5: Water production per month > 3\*rolling median

Firm = Naftex Operating Co.  
Well = 2949735  
Total Oil = 35155 | Total Num Events = 63



Firm = Vaquero Energy, Inc.  
Well = 2904906  
Total Oil = 4555 | Total Num Events = 61



# Validated Fraud Case for Detector 3

	firm	well	oil	days_prod	oil_result	static_count
1	Bennett Petroleum, Inc.	2906257	15064	5598	1242	21
2	Bennett Petroleum, Inc.	2906254	2808	1890	1212	21
3	Bennett Petroleum, Inc.	2906263	2831	1818	1150	18
4	Bennett Petroleum, Inc.	2904620	14372	4830	1072	19
5	Bennett Petroleum, Inc.	2906256	14797	5316	928	21



# All Detectors

## Fraud as a % of Total Production

yr	oil	total_oil_derived	fraud_pct
2000	701,261	161,119	0.23
2001	676,537	145,766	0.22
2002	630,279	134,121	0.21
2003	655,108	147,225	0.22
2004	661,947	145,345	0.22
2005	641,727	142,997	0.22
2006	677,899	163,454	0.24
2007	666,538	122,927	0.18
2008	674,631	128,997	0.19
2009	679,768	140,439	0.21
2010	758,106	156,283	0.21
2011	838,357	174,456	0.21
2012	828,468	175,882	0.21
2013	794,078	179,433	0.23
2014	835,456	179,840	0.22
2015	743,808	152,234	0.2

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