ROCKY MOUNTAIN OILFIELD TESTING CENTER

PROJECT TEST RESULTS

D-JAX PUMP-OFF CONTROLLER

APRIL 4,1995

FC9510 / 95PT4

ROCKY MOUNTAIN OILFIELD TESTING CENTER

D-JAX PUMP-OFF CONTROLLER

PROJECT TEST RESULTES

Prepared for:

Industry Publication

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ABSTRACT

The Rocky Mountain Oilfield Testing Center (RMOTC) conducted a field test on the D-JAX Pump-Off Controller (POC) at the Naval Petroleum Reserve Number 3 (NPR-3) located 35 miles north of Casper, Wyoming. D-JAX Corporation of Midland, Texas, manufactures the D-JAX POC used for controlling fluid pounding by reducing the operating time of the pumping units. For the purpose of this test, D-JAX POCs were attached to DOE Wells 64-65-SX-10 and 73-31-SX-10. The test results showed a decrease in costs associated with electrical consumption, as well as surface and downhole maintenance. The cost reduction may vary depending on well production, well location, electrical cost, and general condition of the beam pumping system.

ROCKY MOUNTAIN OILFIELD TESTING CENTER
D-JAX PUMP-OFF CONTROLLER
PROJECT TEST RESULTS

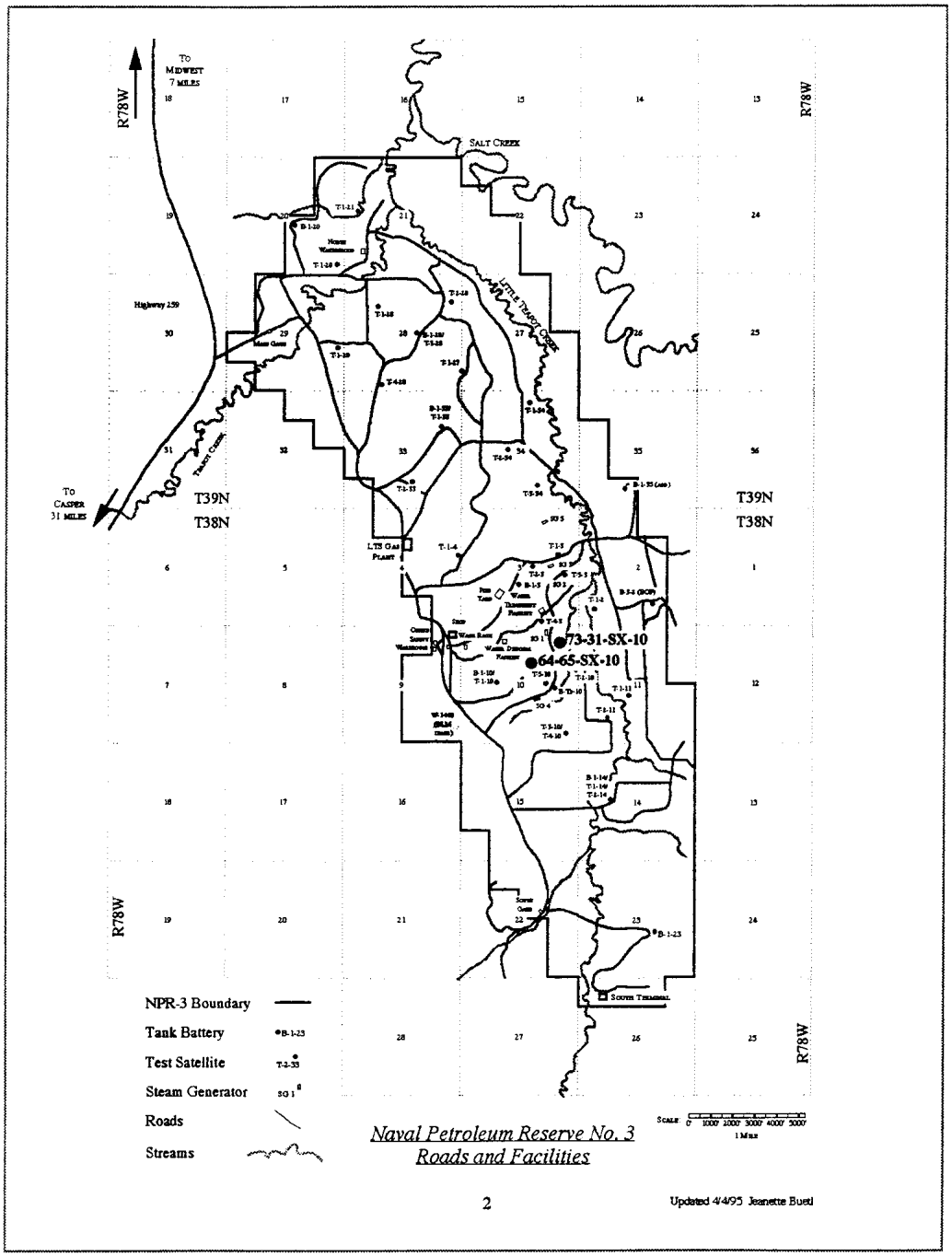
April 4, 1995

INTRODUCTION:

The Rocky Mountain Oilfield Testing Center (RMOTC) conducted a field test on the **D-JAX Pump-Off** Controller (POC) at the Naval Petroleum Reserve Number 3 (NPR-3) located 35 miles north of Casper in Natrona County, Wyoming (T39N, R78W, Section 10 [see Map 1, page 21). D-JAX Corporation of Midland, Texas, manufactures the D-JAX POC that is used to control fluid pounding by using micro-processor technology and software. The POC detects different levels of fluid pounding by monitoring time required for each stroke of the polish rod. Fluid pounding occurs when the pump does not fill completely on the upstroke.

The D-JAX POC is an electronic system attached to a beam pumping unit on an oil well. The system measures the speed of a pumping unit, and will shut the pumping unit down when a speed increase is detected. The speed increase is an indicator of a pumped-off condition in the well. The POC will leave the well down for a predetermined period and then restart the unit. The unit will run for a predetermined amount of time (i.e., 10 seconds). The speed will then be checked with every stroke and measured against the starting speed. The POC will allow the unit to run until three consecutive strokes show a speed increase. Then the POC will shut the unit down. The speed change is measured in milliseconds.

The D-JAX POC reduced the operating time of the pumping units which decreased costs associated with electrical consumption, as well as surface and downhole maintenance. Operator time was reduced and the quality of data collected improved.



Naval Petroleum Reserve No. 3
Roads and Facilities

Updated 4/4/95 Jeanette Buetl

BENEFITS OF D-JAX PUMP-OFF CONTROLLER:

1. Provides unit shutdown when fluid entry is low.
2. Provides indication of pump failure.
3. Provides indication of hole in tubing.
4. Provides daily run time in hours and percentage.
5. Provides 30-day history of production run times.
6. Can be used as a daily reservoir management tool instead of relying upon physical testing data which may take weeks to obtain.
7. Reduces manpower requirements.
8. Reduces lost production due to inaccurate time clock settings.
9. Reduces dry pumping of well.
10. Reduces stuffing box failures and environmental cleanup expense.
11. Reduces surface and downhole repair and maintenance costs.

TEST RESULTS:

Two D-JAX POCs were tested at NPR-3, on wells 73-31-SX-10 and 64-65-SX-10, from September 1994 through December 1994. Both wells are in an active steam drive area and are produced from the Shannon formation at a depth of 350 to 410 ft. Both wells were run 100% of the time prior to installation of the POCs.

PRODUCTION INFORMATION:

	WELL 73-31-SX-10	WELL 64-65-SX-10
Pumping unit	J25B53E36	J571376E54
Pump size, inches	2 "	2 "
Strokes per minute	21.9	19.9
Stroke length, inches	3611	5411
Pump Capacity, BPD	294 BPD	401 BPD
Aug avg BOPD	9.9	11
Aug avg BWPD	109.6	230.1
Aug avg % daily run time	100%	100%
Aug avg daily run time	24 hrs	24 hrs
Sept avg BOPD	8.0	12.0
Sept avg BWPD	114.7	217.5
Sept avg % daily run time	37%	99%
Sept avg daily run time	9.3 hrs	23.7 hrs
Oct avg BOPD	9.2	11.1
Oct avg BWPD	85.4	217.9
Oct avg % daily run time	32%	68%
Oct avg daily run time	7.6 hrs	16.5 hrs
Nov avg BOPD	11.1	10.9
Nov avg BWPD	129.3	149.5
Nov avg % daily run time	40%	36%
Nov avg daily run time	9.7 hrs	8.7 hrs
Dec avg BOPD	9.6	12.9
Dec avg BWPD	99.6	110.4
Dec avg % daily run time	32%	32%
Dec avg daily run time	7.7 hrs	7.7 hrs

Pump capacity calculated at 80% of mechanical equipment capability.

WELL INFORMATION:

A reduction in run time occurred on both wells. Run time was reduced from 100 percent in August to 32 percent in December. The production on 73-31-SX-10 remained stable, while 64-65-SX-10 showed an Increase in average daily oil production.

Both wells were treated for scale in September; no other changes or treatments were made.

Each well experienced fluctuations in daily run time that would have been unnoticed without the POC. All producing wells experience differences in inflow performance and are over pumped to compensate for the fluctuation. The POC controls the amount of time the pumping unit runs, producing only when there is fluid available to lift.

WELL 73-31-SX-10:

On November 13, the steam quality was changed from 60 to 75 percent in steam generator pattern 1 -D which affects this well. There was an immediate increase in run time for the well which was observed on November 15 and resulted in increased production (see chart 6). This response might not have been noticed if the well had been operating on a 100 percent time clock. The production would have been recovered since the well was being over pumped, but if the well had been equipped with a conventional time clock set at 30 percent, the production increase would not have been recovered. Therefore, the POC proved to be an effective reservoir management tool.

WELL 64-65-SX-10:

The delta time on this unit was changed twice before the POC had control of the well. After the 5 millisecond delta was installed, the POC controlled the well throughout the remainder of the test.

An intermittent relay failure occurred on October 26, and again on November 28, when it was diagnosed and replaced. Response time from the manufacturer was immediate.

Steam Generator No. 4, which affects this well, was shut down November 4 (see chart 8). The POC responded to the reduction in production which was caused by the decrease in injection by reducing the daily run time of the well. Steam Generator No. 4 was returned to operation on November 27, and the run time on the well increased November 30.

On December 3, an increase in run time occurred. The speed detected at the start of the cycle remained constant; therefore, the unit did not shut down, and the run time increased. The production operator observed the change on the POC and took action to analyze the well. The well was tested and the results were 5.9 bbl oil and 70.5 bbl water, a decrease from the previous test of 12.9 bbl oil and 110.4 bbl water. The tubing was pressure tested and a hole was detected. The well was pulled, repaired, and returned to production. If the POC had not been on the well, several days may have passed causing lost production until the problem was detected.

CONCLUSION:

The D-JAX Pump-Off Controllers performed favorably in the tests at NPR-3. The POCs reduced the operating time of the pumping units, while maximizing the production from each well. The run time was reduced from 100 to 32 percent on the wells tested. The reduction in operating time will reduce electrical consumption and decrease surface and downhole maintenance costs in producing wells.

Response to changing conditions of fluid injection into the formation provided the engineer and operator with a daily management tool.

One POC had a relay failure which was repaired on site.

Production operators found the D-JAX POCs easy to operate and maintain. Time spent analyzing the well daily for proper pumping operation was reduced. The well was only analyzed when the POC run time changed. With reduced run time of equipment, less maintenance was required and there were no stuffing box failures.

The POCs were easy to install. They operated successfully in inclement weather conditions that included windy, wet and dry conditions, and temperatures ranging from - 150 to 950.

The D-Jax Pump-Off Controllers are available in stand-alone units or equipped with radio telemetry linked to a host computer. At remote locations where access may be limited due to weather conditions or shortage of manpower, the POCs would provide pumping unit control and production history.

For more information on the D-JAX Pump-Off Controllers, contact Dee Mills, D-JAX Corporation, P.O. Box 1073, 1608 South Main, Midland, Texas 79702, phone (915) 683-5710, (800) 446-3529, or FAX (915) 683-3415.

ACKNOWLEDGEMENTS

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RMOTCs goal is to partner with the oil industry to improve productivity through field testing of new petroleum technology, evaluate new equipment and techniques, disseminate information to the petroleum industry, and conduct training for universities, Native Americans, and private industry. For more information contact the Rocky Mountain Oilfield Testing Center, 907 North Poplar, Suite 100, Casper, Wyoming 82601 or telephone (307) 261-5000, Extension 5060.

APPENDIX A

WELL 64-65-SX-1 0

WELL NO. 64-65-SX-10

RMOTC TEST DATA
D-JAX WELL TENDER
PUMP-OFF CONTROLLER

Strokes Per Minute (SPM) 19.9
Stroke Length 54"
Pump Size 2.00"

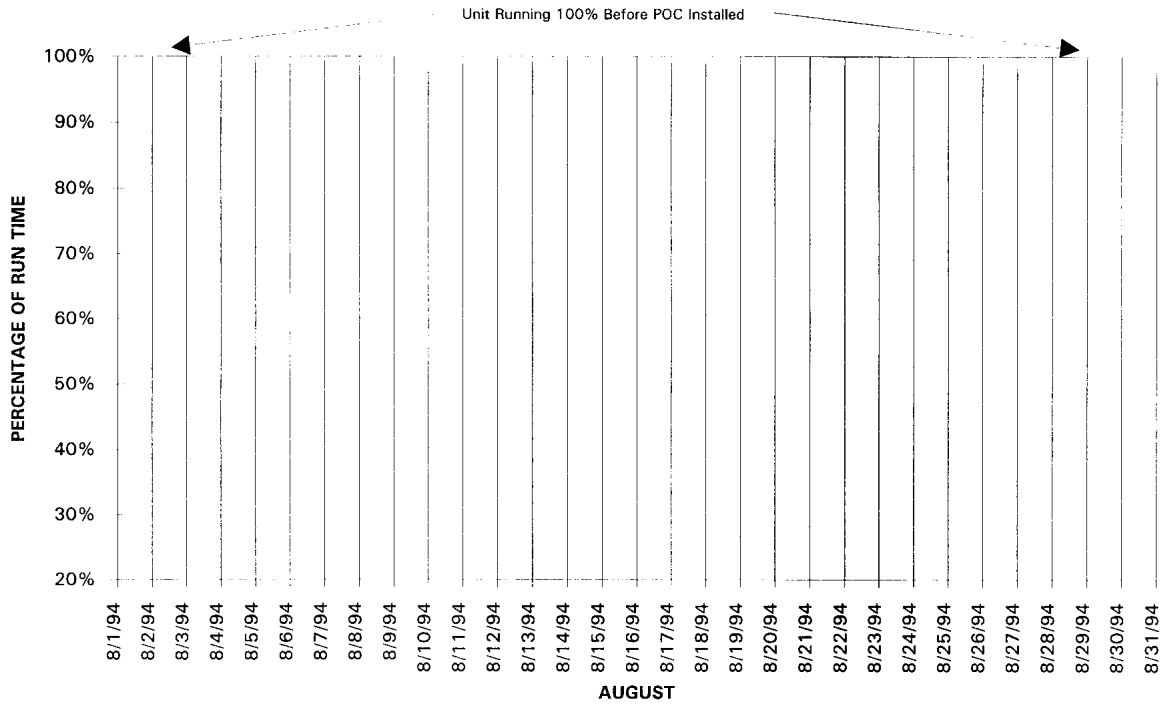
Date	Oil (bbls)	Water (bbls)	Fluid Above Pump (ft.)	R.T. Today (Hrs.)	%.R.T. Today	R.T. Yesterday (Hrs.)	% R.T. Yesterday	P.U.T. (sec.)	S-Fail (min.)	F.B.S. (ms)	P.O.S. (ms)	Delta (ms)	Remarks
8/1/94						24	100%						
8/2/94						24	100%						
8/3/94						24	100%						
8/4/94						24	100%						
8/5/94						24	100%						
8/6/94						24	100%						
8/7/94						24	100%						
8/8/94						24	100%						
8/9/94						24	100%						
8/10/94						24	100%						
8/11/94						24	100%						
8/12/94	11.0	224.4	0			24	100%						
8/13/94						24	100%						
8/14/94						24	100%						
8/15/94						24	100%						
8/16/94						24	100%						
8/17/94						24	100%						
8/18/94						24	100%						
8/19/94						24	100%						
8/20/94						24	100%						
8/21/94	10.9	235.7	0			24	100%						
8/22/94						24	100%						
8/23/94						24	100%						
8/24/94						24	100%						
8/25/94						24	100%						
8/26/94						24	100%						
8/27/94						24	100%						
8/28/94						24	100%						
8/29/94						24	100%						
8/30/94						24	100%						
8/31/94						24	100%						
Monthly Average	**11.0**	**230.1**											

R.T. = Run Time Today-8 hrs (12 pm to 8 am)
R.T. = Run Time Yesterday-24 hr period
P.U.T. = Pump Up Time
F.B.S. = Full Barrel Speed
P.O.S. = Pump Off Speed

3/28/95
RMOTCTES.D2
MRT/jb

D-JAX CONTROLLER % RUN TIME
64-65-SX-10

D-JAX1.XLS Chart 11



Average Monthly Run Time 100%
Average Daily Run Time 24.0 Hours

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WELL NO. 64-65-SX-10

RMOTC TEST DATA
D-JAX WELL TENDER
PUMP-OFF CONTROLLER

Strokes Per Minute (SPM) 19.9
Stroke Length 54"
Pump Size 2.00"

Date	Oil (bbls)	Water (bbls)	Fluid Above Pump (ft.)	R.T. Today (Hrs.)	%.R.T. Today	R.T. Yesterday (Hrs.)	% R.T. Yesterday	P.U.T. (sec.)	S-Fail (min.)	F.B.S. (ms)	P.O.S. (ms)	Delta (ms)	Remarks
9/1/94						24	100%						
9/2/94						24	100%						
9/3/94						24	100%						
9/4/94						24	100%						
9/5/94						24	100%						
9/6/94						24	100%						
9/7/94						24	100%						
9/8/94						24	100%						
9/9/94						24	100%	10	16	3415	3409	20	
9/10/94	11.4	220.8	0			24	100%	10	16	3436	3428	20	
9/11/94						24	100%	10	16	3411	3421	20	
9/12/94													Down Scale Squeeze
9/13/94													Down Scale Squeeze
9/14/94				21.5	97%	24	100%	10	16	3019	3028	20	
9/15/94	10.9	225.9	0	8.2	98%	24	100%	10	16	3015	3022	20	
9/16/94				8.7	98%	23.6	97%	10	16	3016	3022	20	
9/17/94				9	98%	23.6	98%	10	16	3022	3017	20	
9/18/94				7.9	99%	23.6	98%	10	16	3020	3012	20	
9/19/94				8.2	99%	23.7	98%	10	16	3020	3013	20	
9/20/94				8.8	97%	23.6	98%	10	16	2993	2999	20	
9/21/94				8.7	96%	23.6	98%	10	16	3013	3020	20	
9/22/94				8.9	99%	23.6	98%	10	16	3017	3021	20	
9/23/94	13.8	205.7	0	8.4	97%	23.7	98%	10	16	3014	3021	20	
9/24/94				8	97%	23.6	98%	10	16	3022	3014	20	
9/25/94				8.5	98%	23.6	98%	10	16	3020	3015	20	
9/26/94				8.3	99%	23.6	98%	10	16	3021	3013	20	
9/27/94				8.3	99%	23.7	98%	10	16	3020	3012	20	
9/28/94				8.7	99%	23.9	98%	10	16	2942	2952	20	
9/29/94				8.4	99%	23.8	99%	10	16	3014	3021	20	
9/30/94				8.9	98%	23.6	98%	10	16	3013	3022	20	
Monthly Average	12.0	217.5				23.7	99%						

R.T. = Run Time Today-8 hrs (12 pm to 8 am)
R.T. = Run Time Yesterday-24 hr period
P.U.T. = Pump Up Time
F.B.S. = Full Barrel Speed
P.O.S. = Pump Off Speed

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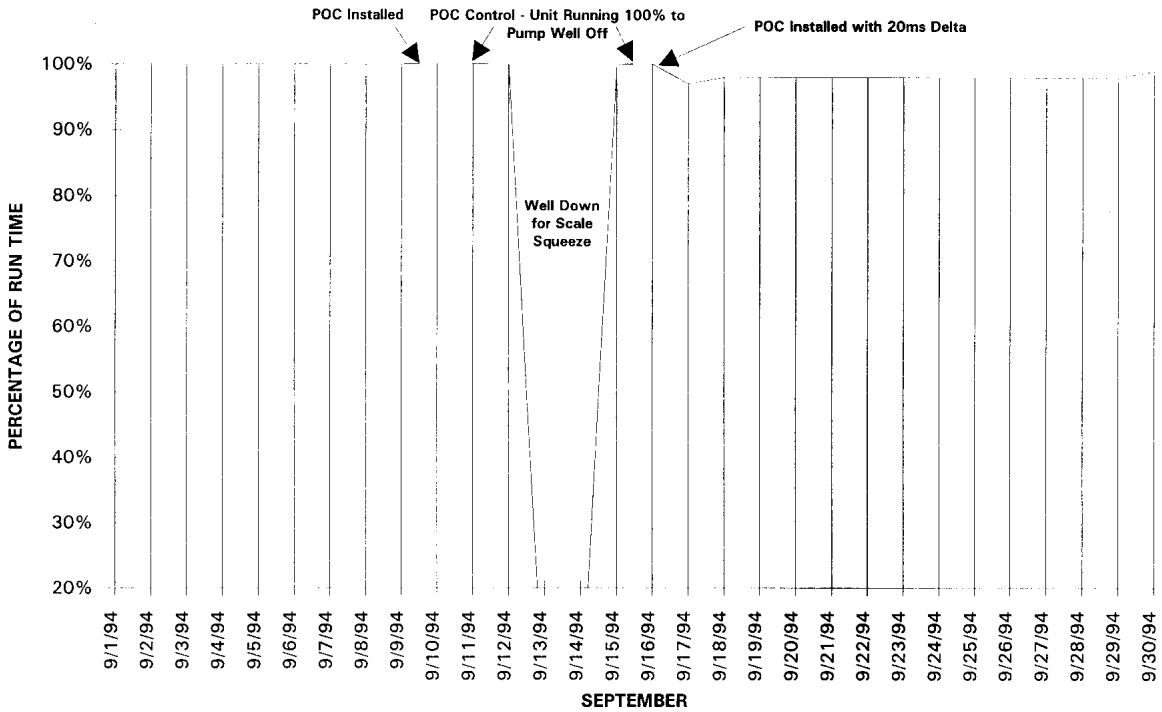
D-JAX CONTROLLER % RUN TIME
64-65-SX-10

D-JAX1.XLS Chart 10



Average Monthly Run Time (Starting September 9, 1994) **99%**
Average Daily Run Time (Starting September 9, 1994) **23.7 Hours**

3/28/95

MRT/jb

WELL NO. 64-65-SX-10

RMOTC TEST DATA
D-JAX WELL TENDER
PUMP-OFF CONTROLLER

Strokes Per Minute (SPM) 19.9
Stroke Length 54"
Pump Size 2.00"

Date	Oil (bbls)	Water (bbls)	Fluid Above Pump (ft.)	R.T. Today (Hrs.)	%.R.T. Today	R.T. Yesterday (Hrs.)	% R.T. Yesterday	P.U.T. (sec.)	S-Fail (min.)	F.B.S. (ms)	P.O.S. (ms)	Delta (ms)	Remarks
10/1/94				8.3	98%	23.7	98%	10	16	3013	3020	20	
10/2/94				8.4	97%	23.6	98%	10	16	3020	3013	20	Delta to 10ms
10/3/94				8.7	98%	23.6	98%	10	16	3021	3020	10	
10/4/94	11.5	224.5	0	8.4	97%	23.6	98%	10	16	3022	3018	10	
10/5/94				8.6	99%	22.6	94%	10	16	3022	3017	10	
10/6/94				8.2	99%	23.9	91%	10	16	3019	3020	10	
10/7/94				8.7	96%	23.7	91%	10	16	3016	3020	10	
10/8/94				6.2	69%	23.7	93%	10	16	3014	3019	10	
10/9/94				8.5	98%	21.1	93%	10	16	3015	3021	10	
10/10/94				8.6	97%	23.8	99%	10	16	3013	3021	5	Delta to 5ms
10/11/94				5.3	57%	18.8	78%	10	16	3023	3023	5	
10/12/94	10.9	231.0	0	4.8	56%	13.6	57%	10	16	3023	3022	5	
10/13/94				4.9	53%	13.7	57%	10	16	3020	3020	5	
10/14/94				4.7	56%	14.2	59%	10	16	3021	3023	5	
10/15/94				5.8	65%	13.8	57%	10	16	3020	3022	5	
10/16/94				4.9	58%	13.9	58%	10	16	3022	3023	5	
10/17/94	11.0	225.0	0	4.2	48%	13.2	55%	10	16	3019	3019	5	
10/18/94				5	57%	13	54%	10	16	3021	3022	5	
10/19/94				4.8	54%	13.2	55%	10	16	3021	3020	5	
10/20/94				4.3	50%	13.1	54%	10	16	3021	3020	5	
10/21/94				5.4	51%	12.8	53%	10	16	3021	3019	5	
10/22/94				4.6	49%	12.1	50%	10	16	3019	3020	5	
10/23/94				4.2	49%	11.6	48%	10	16	3020	3020	5	
10/24/94				3.9	46%	11.5	48%	10	16	3020	3023	5	
10/25/94				3.7	43%	7.6	32%	10	16	3020	3021	5	
10/26/94				5.6	52%	11.1	46%	10	16	2945	2946	5	
10/27/94				0	10%	(* 24)	(* 100%)						Intermittent Relay Problem
10/28/94	10.9	191.0	0	0	0%	(* 24)	(* 100%)						Intermittent Relay Problem
10/29/94				0	0%	(* 1.6)	(* 6%)				3020	5	
10/30/94				3.8	44%	11.4	47%	10	16	3019	3019	5	
10/31/94				4.2	44%	10.5	43%	10	16	3017	3018	5	
Monthly Average	**11.1**	**217.9**				**16.5**	**68%**						

* Not Included in Monthly Average

R.T. = Run Time Today-8 hrs (12 pm to 8 am)
R.T. = Run Time Yesterday-24 hr period
P.U.T. = Pump Up Time
F.B.S. = Full Barrel Speed
P.O.S. = Pump Off Speed

3/28/95
RMOTCTES.D2
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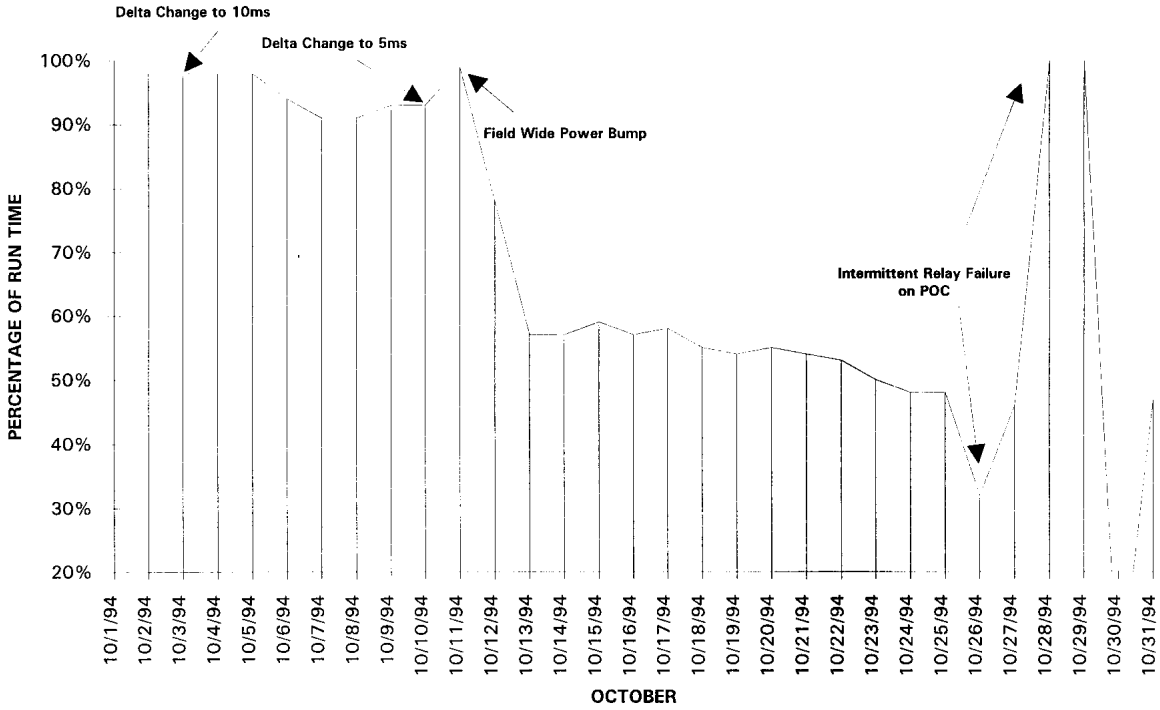
D-JAX CONTROLLER % RUN TIME
64-65-SX-10

D-JAX1.XLS Chart 7



Average Monthly Run Time 68%
Average Daily Run Time 16.5 Hours

3/28/95

MRT/jb

WELL NO. 64-65-SX-10

RMOTC TEST DATA
D-JAX WELL TENDER
PUMP-OFF CONTROLLER

Strokes Per Minute (SPM) 19.9
Stroke Length 54"
Pump Size 2.00"

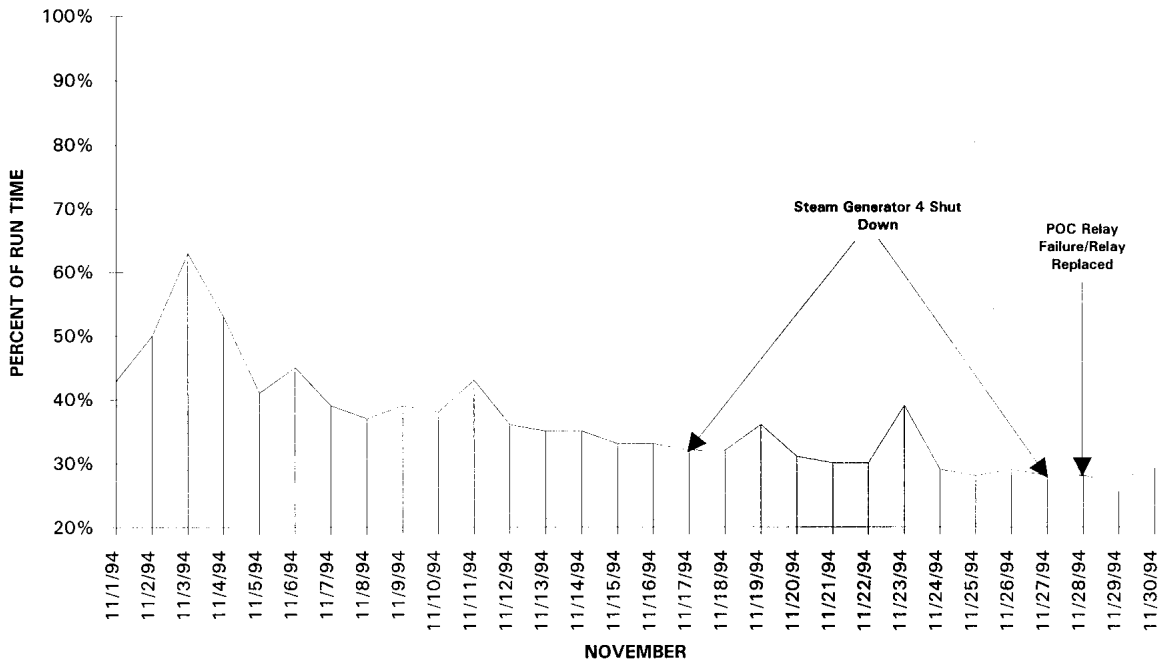
Date	Oil (bbls)	Water (bbls)	Fluid Above Pump (ft.)	R.T. Today (Hrs.)	%.R.T. Today	R.T. Yesterday (Hrs.)	% R.T. Yesterday	P.U.T. (sec.)	S-Fail (min.)	F.B.S. (ms)	P.O.S. (ms)	Delta (ms)	Remarks
11/1/94				7.2	71%	12	50%	10	16	3020	3022	5	
11/2/94				5.9	61%	15.2	63%	10	16	3018	3018	5	
11/3/94				4.3	42%	12.7	53%	10	16	3019	3020	5	
11/4/94	9.8	179.0	0	4.4	42%	9.9	41%	10	16	3020	3019	5	
11/5/94				3.9	39%	10.8	45%	10	16	3013	3017	5	
11/6/94				2.2	23%	9.5	39%	10	16	3019	3017	5	
11/7/94				3.7	39%	9	37%	10	16	3017	3018	5	
11/8/94				3.7	38%	9.4	39%	10	16	3017	3018	5	
11/9/94				4.5	47%	8.1	38%	10	16	3016	3018	5	
11/10/94				3.5	36%	10.5	43%	10	16	3019	3019	5	
11/11/94				3.4	35%	8.7	36%	10	16	3018	3019	5	
11/12/94				3.3	35%	8.6	35%	10	16	3014	3013	5	
11/13/94				3.3	34%	8.4	35%	10	16	3018	3018	5	
11/14/94				3.2	33%	8.1	33%	10	16	3020	3019	5	
11/15/94				3.2	32%	7.9	33%	10	16	3019	3018	5	
11/16/94				3.2	32%	7.8	32%	10	16	3018	3019	5	
11/17/94				3.3	35%	7.7	32%	10	16	3021	3021	5	Steam Generator 4 Down
11/18/94				3	31%	8.8	36%	10	16	3020	3021	5	
11/19/94				3	31%	7.5	31%	10	16	3019	3021	5	
11/20/94				3	30%	7.4	30%	10	16	3018	3018	5	
11/21/94				4.1	43%	7.3	30%	10	16	3018	3015	5	
11/22/94				3	29%	9.3	39%	10	16	3023	3024	5	
11/23/94				5.2	26%	7.1	29%	10	16	3029	3033	5	
11/24/94				2.7	29%	6.8	28%	10	16	3019	3020	5	
11/25/94	12.0	120.0	0	2.8	29%	7	29%	10	16	3016	3018	5	
11/26/94				2.8	28%	6.9	28%	10	16	3018	3019	5	
11/27/94				2.6	28%	6.8	28%	10	16	3021	3022	5	Steam Generator 4 On
11/28/94				3.8	47%	6.6	27%	10	16	2935	2943	5	POC Relay Replaced
11/29/94				3.9	37%	7.2	30%	10	16	3022	3022	5	
11/30/94				2.5	26%	7.9	33%	10	16	3018	3019	5	
Monthly Average	**10.9**	**149.5**				**8.7**	**36%**						

R.T. = Run Time Today-8 hrs (12 pm to 8 am)
R.T. = Run Time Yesterday-24 hr period
P.U.T. = Pump Up Time
F.B.S. = Full Barrel Speed
P.O.S. = Pump Off Speed

3/28/95
RMOTCTES.D2
MRT/jb

D-JAX CONTROLLER % RUN TIME
64-65-SX-10

D-JAX1.XLS Chart 8



Average Monthly Run Time 36%
Average Daily Run Time 8.7 Hours

3/28/95

MRT/jb

WELL NO. 64-65-SX-10

RMOTC TEST DATA
D-JAX WELL TENDER
PUMP-OFF CONTROLLER

Strokes Per Minute (SPM) 19.9
Stroke Length 54"
Pump Size 2.00"

Date	Oil (bbls)	Water (bbls)	Fluid Above Pump (ft.)	R.T. Today (Hrs.)	%.R.T. Today	R.T. Yesterday (Hrs.)	% R.T. Yesterday	P.U.T. (sec.)	S-Fail (min.)	F.B.S. (ms)	P.O.S. (ms)	Delta (ms)	Remarks
12/1/94				2.4	26%	6.3	26%	10	16	3016	3017	5	
12/2/94	12.9	110.4	0	2.5	25%	6.8	28%	10	16	3018	3021	5	
12/3/94				3.1	34%	6.2	25%	10	16	3018	3018	5	
12/4/94				6.3	66%	10	42%	10	16	3023	3022	5	
12/5/94				2.4	25%	10.2	42%	10	16	3021	3022	5	
12/6/94	(* 5.9)	(* 70.5)	0	6.4	67%	6.1	25%	10	16	3016	3018	5	
12/7/94													Down-Hole In Tubing
12/8/94													Down-Hole In Tubing
12/9/94				4.5	49%			10	16	3021	3021		
12/10/94				3.5	35%	10.5	43%	10	16	3016	3018	5	
12/11/94				3.2	32%	8.4	35%	10	16	3024	3026	5	
12/12/94				3.8	30%	7.5	31%	10	16	3025	3025	5	
12/13/94				2.8	29%	7.2	30%	10	16	3021	3021	5	
12/14/94				3	30%	7.3	30%	10	16	3019	3019	5	
12/15/94				2.7	29%	7.1	35%	10	16	3017	3016	5	
12/16/94				2.6	28%	6.9	29%	10	16	3020	3020	5	
12/17/94				3.3	34%	8.1	33%	10	16	3019	3019	5	
12/18/94				3.5	36%	7.4	30%	10	16	3019	3020	5	
12/19/94				2.8	28%	8.6	35%	10	16	3020	3023	5	
12/20/94				2.7	28%	6.9	28%	10	16	3019	3020	5	
12/21/94				2.7	28%	6.8	28%	10	16	3019	3021	5	
12/22/94				3.6	38%	6.8	28%	10	16	3022	3022	5	
12/23/94				2.8	28%	9.3	38%	10	16	3019	3020	5	
12/24/94				2.8	28%	6.9	28%	10	16	3020	3021	5	
12/25/94				2.8	28%	6.9	28%	10	16	3019	3020	5	
12/26/94				2.7	28%	9.2	38%	10	16	3020	3021	5	
12/27/94				2.7	28%	9.2	38%	10	16	3018	3019	5	
12/28/94				2.9	28%	6.9	28%	10	16	3020	3020	5	
12/29/94				2.8	28%	6.9	28%	10	16	3020	3021	5	
12/30/94				2.9	28%	6.9	28%	10	16	3013	3013	5	
12/31/94				2.7	28%	6.9	28%	10	16	3025	3024	5	
Monthly Average	12.9	110.4				7.7	32%						

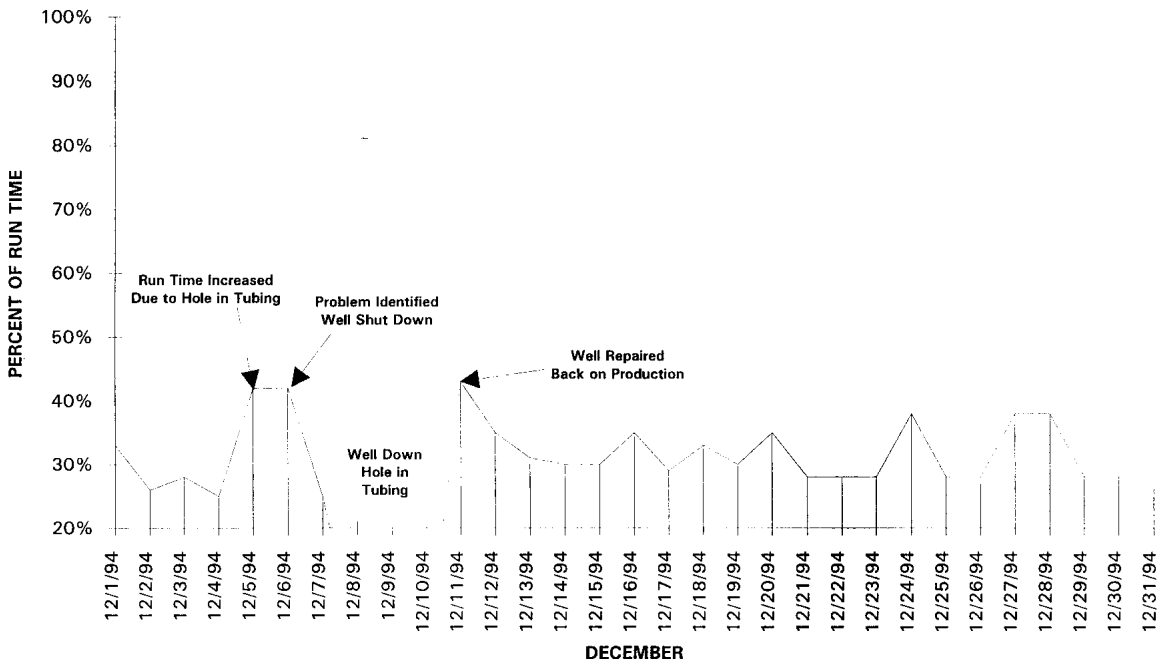
* Not Included in Monthly Average Due to Hole in Tubing

R.T. = Run Time Today-8 hrs (12 pm to 8 am)
R.T. = Run Time Yesterday-24 hr period
P.U.T. = Pump Up Time
F.B.S. = Full Barrel Speed
P.O.S. = Pump Off Speed

3/28/95
RMOTCTES.D2
MRT/jb

D-JAX CONTROLLER % RUN TIME
64-65-SX-10

D-JAX1.XLS Chart 9



Average Monthly Run Time 32%
Average Daily Run Time 7.7 Hours

3/28/95

MRT/jb

APPENDIX B

WELL 73-31-SX-10

WELL NO. 73-31-SX-10

RMOTC TEST DATA
D-JAX WELL TENDER
PUMP-OFF CONTROLLER

Strokes Per Minute (SPM) 21.9
Stroke Length 36"
Pump Size 2.00"

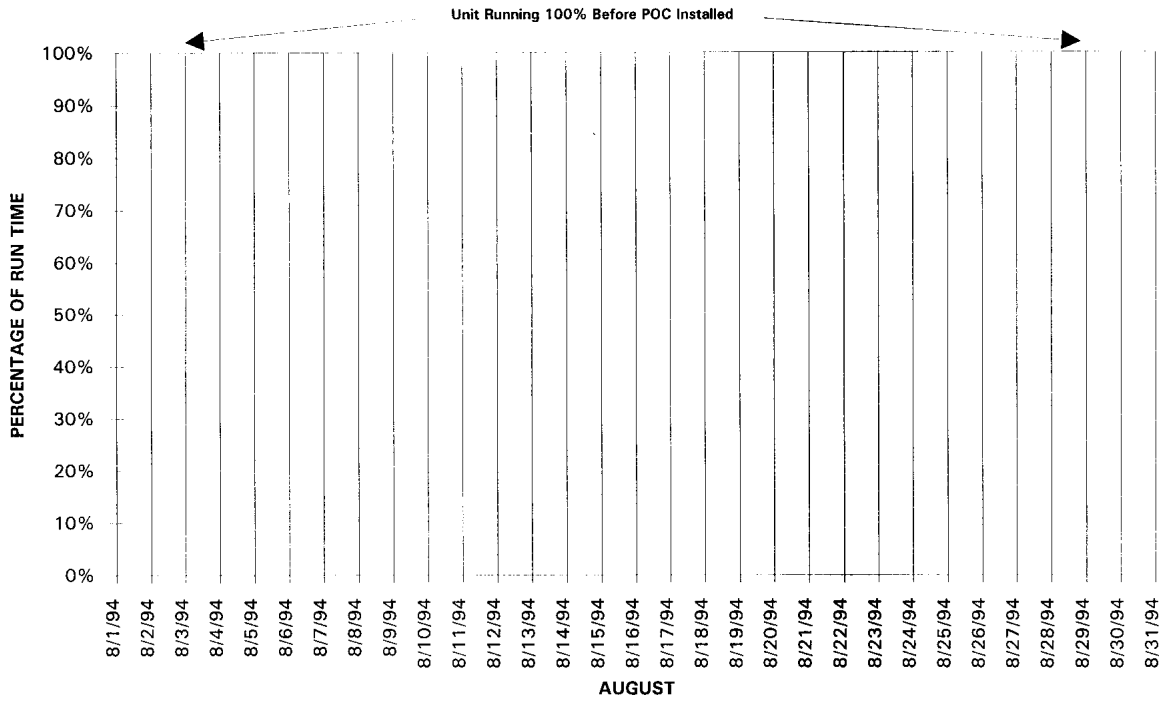
Date	Oil (bbls)	Water (bbls)	Fluid Above Pump (ft.)	R.T. Today (Hrs.)	% R.T. Today	R.T. Yesterday (Hrs.)	% R.T. Yesterday	P.U.T. (sec.)	S-Fail (min.)	F.B.S. (ms)	P.O.S. (ms)	Delta (ms)	Remarks
8/1/94	10.1	108.4	0			24	100%						
8/2/94						24	100%						
8/3/94						24	100%						
8/4/94						24	100%						
8/5/94						24	100%						
8/6/94						24	100%						
8/7/94						24	100%						
8/8/94						24	100%						
8/9/94						24	100%						
8/10/94						24	100%						
8/11/94						24	100%						
8/12/94						24	100%						
8/13/94						24	100%						
8/14/94	9.5	130.2	0			24	100%						
8/15/94						24	100%						
8/16/94						24	100%						
8/17/94						24	100%						
8/18/94						24	100%						
8/19/94						24	100%						
8/20/94						24	100%						
8/21/94						24	100%						
8/22/94						24	100%						
8/23/94						24	100%						
8/24/94						24	100%						
8/25/94						24	100%						
8/26/94						24	100%						
8/27/94						24	100%						
8/28/94						24	100%						
8/29/94						24	100%						
8/30/94						24	100%						
8/31/94	10.1	90.2	0			24	100%						
Monthly Average	**9.9**	**109.6**											

R.T. = Run Time Today-8 hrs (12 pm to 8 am)
R.T. = Run Time Yesterday- 24 hr period
P.U.T. = Pump up time
S-Fail = Sensor Fail
F.B.S. = Full Barrel Speed
P.O.S. = Pump off Speed

3/28/95
RMOTCTES.DAT
MRT/jb

D-JAX CONTROLLER % RUN TIME
73-31-SX-10

D-JAX2.XLS Chart 12



3/28/95

Average Monthly Run Time 100%
Average Daily Run Time 25 Hours

MRT/jb

WELL NO. 73-31-SX-10

RMOTC TEST DATA
D-JAX WELL TENDER
PUMP-OFF CONTROLLER

Strokes Per Minute (SPM) 21.9
Stroke Length 36"
Pump Size 2.00"

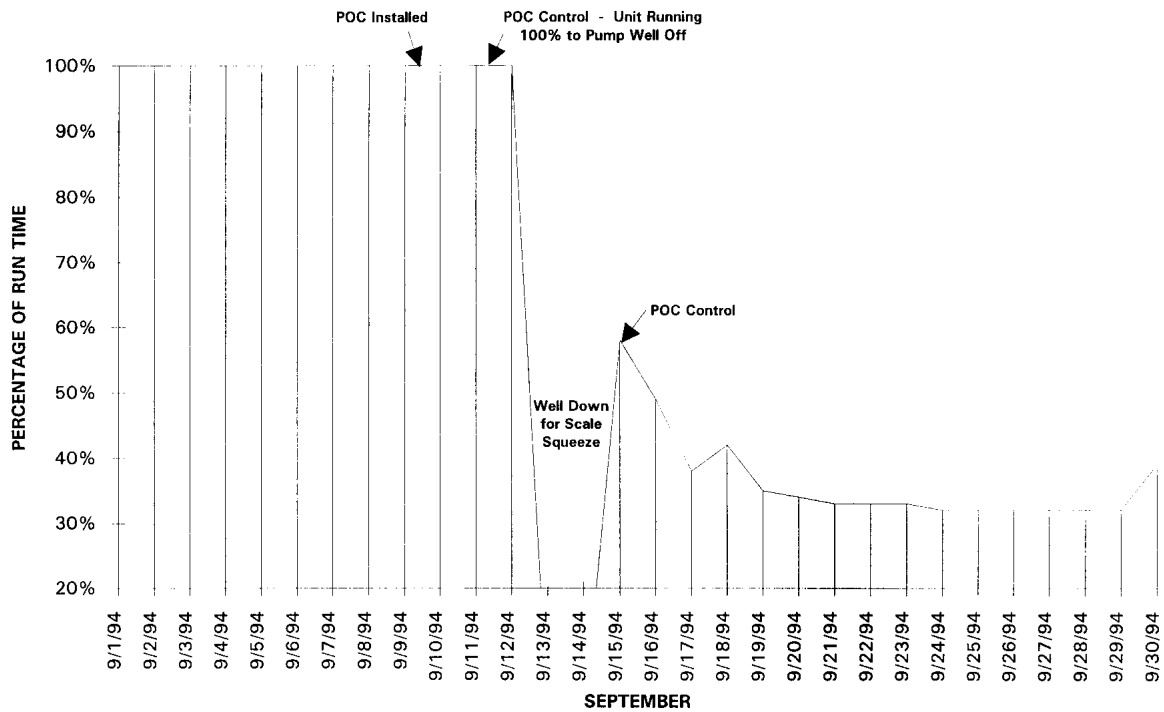
Date	Oil (bbls)	Water (bbls)	Fluid Above Pump (ft.)	R.T. Today (Hrs.)	% R.T. Today	R.T. Yesterday (Hrs.)	% R.T. Yesterday	P.U.T. (sec.)	S-Fail (min.)	F.B.S. (ms)	P.O.S. (ms)	Delta (ms)	Remarks
9/1/94						24	100%						
9/2/94						24	100%						
9/3/94						24	100%						
9/4/94						24	100%						
9/5/94						24	100%						
9/6/94						24	100%						
9/7/94						24	100%						
9/8/94						24	100%						
9/9/94						24	100%	10	5	2743	2704	0.15	
9/10/94						24	100%	10	5	2735	2736	0.15	
9/11/94	8.8	77.1	0			24	100%	10	5	2738	2739	0.15	
9/12/94								10	5	2734	2736	0.15	Down Scale Squeeze
9/13/94								10	5				Down Scale Squeeze
9/14/94	6.6	156.8	0	3.1	38%	13.9	58%	10	5	2479	2737	0.15	
9/15/94				3.2	39%	13.9	49%	10	5	2734	2740	0.15	
9/16/94				4	45%	11.7	38%	10	5	2739	2736	0.15	
9/17/94				3.1	36%	9.2	42%	10	5	2740	2739	0.15	
9/18/94				2.7	34%	10.1	35%	10	5	2744	2733	0.15	
9/19/94				2.8	34%	8.6	34%	10	5	2744	2744	0.15	
9/20/94				3.1	34%	8.3	33%	10	5	2742	2742	0.15	
9/21/94				3	33%	8.1	33%	10	5	2731	2731	0.15	
9/22/94				3	33%	8	33%	10	5	2733	2739	0.15	
9/23/94				2.9	33%	8	32%	10	5	2745	2745	0.15	
9/24/94	8.6	110.3	0	2.7	32%	7.9	32%	10	5	2738	2740	0.15	
9/25/94				2.8	32%	7.9	32%	10	5	2734	2734	0.15	
9/26/94				3.4	41%	7.9	32%	10	5	2736	2735	0.15	
9/27/94				2.7	32%	7.8	32%	10	5	2739	2738	0.15	
9/28/94				2.8	32%	7.9	32%	10	5	2736	2740	0.15	
9/29/94				4.4	39%	9.4	39%	10	5	2731	2737	0.15	
9/30/94				2.9	40%	9.6	40%	10	5	2733	2740	0.15	
Monthly Average	8.0	114.7				9.3	37%						

R.T. = Run Time Today-8 hrs (12 pm to 8 am)
R.T. = Run Time Yesterday- 24 hr period
P.U.T. = Pump up time
S-Fail = Sensor Fail
F.B.S. = Full Barrel Speed
P.O.S. = Pump off Speed

3/28/95
RMOTCTES.DAT
MRT/jb

D-JAX CONTROLLER % RUN TIME
73-31-SX-10

D-JAX2.XLS Chart 11



3/28/95

Average Monthly Run Time (Starting September 9, 1994) 37%
Average Daily Run Time (Starting September 9, 1994) 9.3 Hours

MRT/jb

WELL NO. 73-31-SX-10

RMOTC TEST DATA
D-JAX WELL TENDER
PUMP-OFF CONTROLLER

Strokes Per Minute (SPM) 21.9
Stroke Length 36"
Pump Size 2.00"

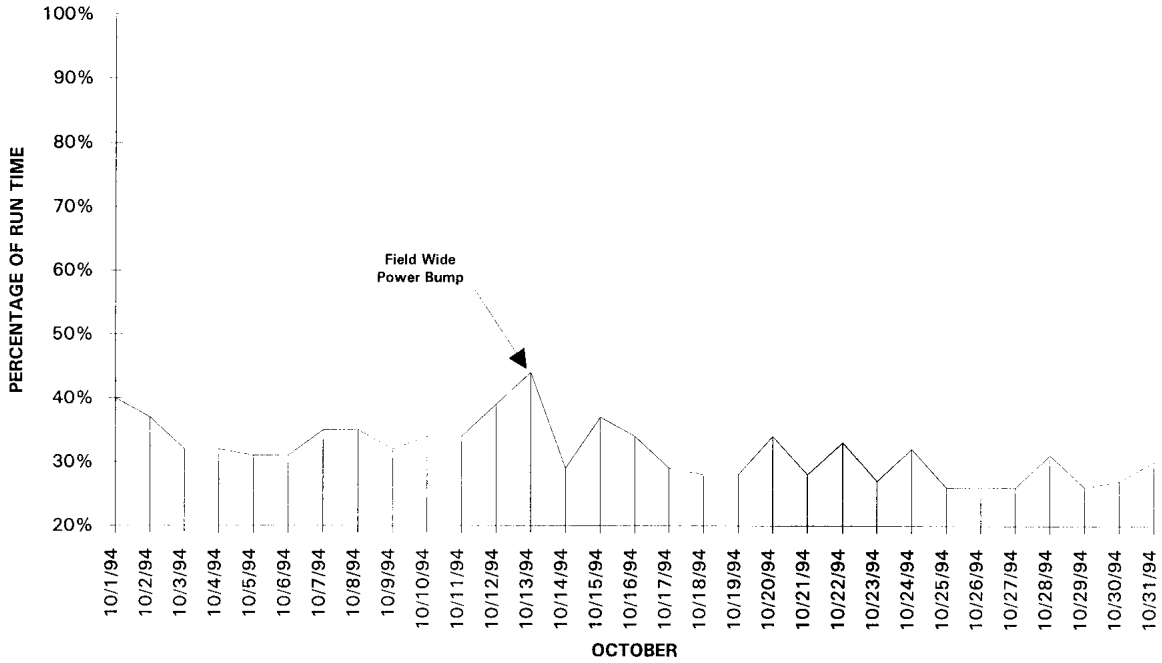
Date	Oil (bbls)	Water (bbls)	Fluid Above Pump (ft.)	R.T. Today (Hrs.)	% R.T. Today	R.T. Yesterday (Hrs.)	% R.T. Yesterday	P.U.T. (sec.)	S-Fail (min.)	F.B.S. (ms)	P.O.S. (ms)	Delta (ms)	Remarks
10/1/94				2.7	32%	9	37%	10	5	2731	2740	0.15	
10/2/94				2.8	32%	7.7	32%	10	5	2733	2732	0.15	
10/3/94				2.9	31%	7.7	32%	10	5	2732	2731	0.15	
10/4/94				2.8	32%	7.6	31%	10	5	2737	2737	0.15	
10/5/94				3.4	39%	7.5	31%	10	5	2731	2731	0.15	
10/6/94				3.1	36%	8.7	35%	10	5	2726	2729	0.15	
10/7/94	9.7	97.8	0	2.8	36%	8.7	35%	10	5	2732	2732	0.15	
10/8/94				2.7	30%	7.7	32%	10	5	2731	2732	0.15	
10/9/94				2.6	30%	7.3	34%	10	5	2728	2729	0.15	
10/10/94				3.3	30%	7.2	34%	10	5	2729	2738	0.15	
10/11/94				2.8	30%	9.3	39%	10	5	2734	2735	0.15	Power Bump
10/12/94				2.6	29%	10.7	44%	10	5	2748	2747	0.15	
10/13/94				3.4	37%	7.1	29%	10	5	2738	2738	0.15	
10/14/94				2.4	38%	8.9	37%	10	5	2737	2738	0.15	
10/15/94				2.6	29%	8.3	34%	10	5	2738	2739	0.15	
10/16/94				2.4	29%	6.9	29%	10	5	2737	2738	0.15	
10/17/94	9.5	83.0	0	2.5	28%	6.9	28%	10	5	2733	2733	0.15	
10/18/94				2.8	31%	6.8	28%	10	5	2736	2736	0.15	
10/19/94				2.5	28%	8.3	34%	10	5	2739	2736	0.15	
10/20/94				3.1	37%	6.7	28%	10	5	2738	2736	0.15	
10/21/94				2.9	33%	8.1	33%	10	5	2737	2736	0.15	
10/22/94				3.1	27%	6.6	27%	10	5	2736	2739	0.15	
10/23/94				2.3	27%	7.7	32%	10	5	2744	2743	0.15	
10/24/94				2.3	26%	6.4	26%	10	5	2739	2742	0.15	
10/25/94				2.3	29%	6.4	26%	10	5	2727	2742	0.15	
10/26/94				2.6	29%	6.3	26%	10	5	2736	2736	0.15	
10/27/94	8.3	75.3	0	2.4	26%	8.1	31%	10	5	2736	2740	0.15	
10/28/94				2.4	26%	6.4	26%	10	5	2739	2738	0.15	
10/29/94				2.4	27%	6.4	27%	10	5	2729	2728	0.15	
10/30/94				2.9	28%	7.2	30%	10	5	2733	2734	0.15	
10/31/94				2.8	29%	6.9	30%	10	5	2731	2731	0.15	
Monthly Average	**9.2**	**85.4**				**7.6**	**32%**						

R.T. = Run Time Today-8 hrs (12 pm to 8 am)
R.T. = Run Time Yesterday- 24 hr period
P.U.T. = Pump up time
S-Fail = Sensor Fail
F.B.S. = Full Barrel Speed
P.O.S. = Pump off Speed

3/28/95
RMOTCTES.DAT
MRT/jb

D-JAX CONTROLLER % RUN TIME
73-31-SX-10

D-JAX2.XLS Chart 5



3/28/95

Average Monthly Run Time 32%
Average Daily Run Time 7.6 Hours

MRT/jb

WELL NO. 73-31-SX-10

RMOTC TEST DATA
D-JAX WELL TENDER
PUMP-OFF CONTROLLER

Strokes Per Minute (SPM) 21.9
Stroke Length 36"
Pump Size 2.00"

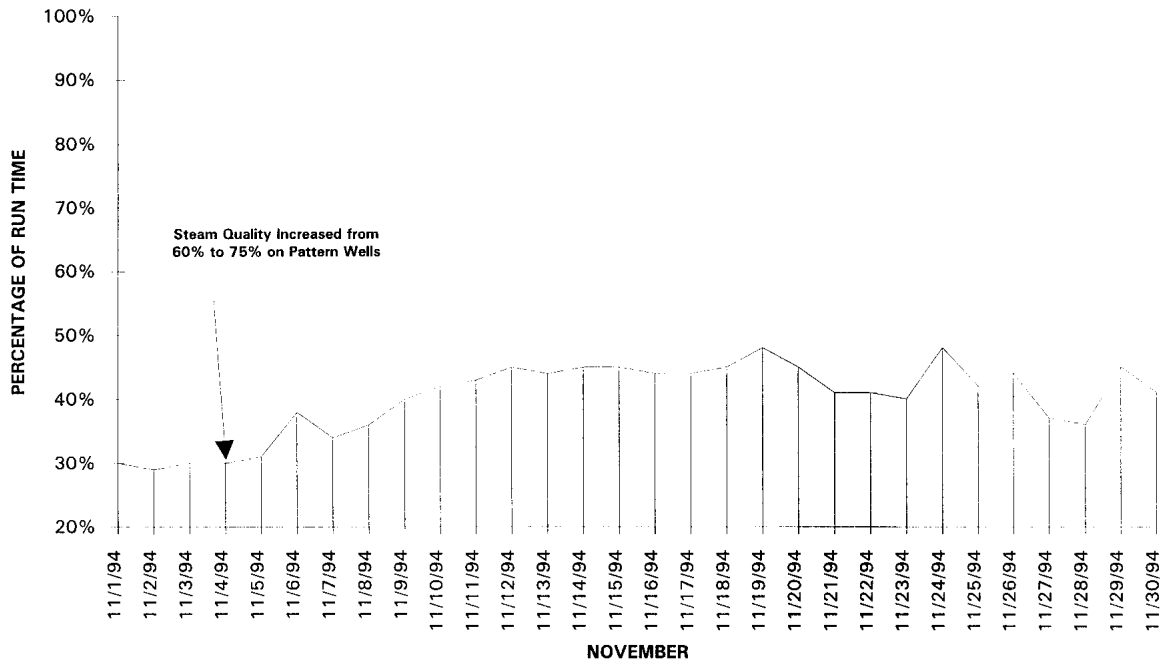
Date	Oil (bbls)	Water (bbls)	Fluid Above Pump (ft.)	R.T. Today (Hrs.)	% R.T. Today	R.T. Yesterday (Hrs.)	% R.T. Yesterday	P.U.T. (sec.)	S-Fail (min.)	F.B.S. (ms)	P.O.S. (ms)	Delta (ms)	Remarks
11/1/94				2.8	29%	7	29%	10	5	2722	2724	0.15	
11/2/94				2.9	30%	7.2	30%	10	5	2730	2731	0.15	
11/3/94				3.2	31%	7.4	30%	10	5	2733	2733	0.15	
11/4/94				3.4	32%	7.5	31%	10	5	2733	2737	0.15	Steam Quality Increased
11/5/94				3.2	33%	9.1	38%	10	5	2729	2730	0.15	
11/6/94				3.6	37%	8.3	34%	10	5	2732	2733	0.15	
11/7/94	11.1	129.3	0	4	40%	9.1	36%	10	5	2729	2729	0.15	
11/8/94				4.1	41%	9.7	40%	10	5	2728	2729	0.15	
11/9/94				4.2	42%	10.1	42%	10	5	2730	2730	0.15	
11/10/94				4.4	44%	10.5	43%	10	5	2729	2729	0.15	
11/11/94				4.3	45%	10.8	45%	10	5	2729	2730	0.15	
11/12/94				4.3	45%	10.7	44%	10	5	2730	2729	0.15	
11/13/94				4.4	45%	10.8	45%	10	5	2729	2729	0.15	
11/14/94				4.3	45%	10.8	45%	10	5	2730	2729	0.15	
11/15/94				4.3	44%	10.7	44%	10	5	2731	2730	0.15	
11/16/94				4.4	44%	10.6	44%	10	5	2727	2727	0.15	
11/17/94				4.1	43%	10.8	45%	10	5	2729	2730	0.15	
11/18/94				5	50%	11.6	48%	10	5	2732	2735	0.15	
11/19/94				4	41%	11	45%	10	5	2731	2733	0.15	
11/20/94				4.1	41%	9.9	41%	10	5	2728	2728	0.15	
11/21/94				3.9	40%	9.9	41%	10	5	2732	2733	0.15	
11/22/94				4.9	48%	9.6	40%	10	5	2734	2733	0.15	
11/23/94				4.3	39%	11.5	48%	10	5	2730	2730	0.15	
11/24/94				4.1	44%	10.2	42%	10	5	2727	2730	0.15	
11/25/94				3.7	38%	10	44%	10	5	2736	2737	0.15	
11/26/94				3.6	37%	9	37%	10	5	2728	2729	0.15	
11/27/94				3.9	41%	8.8	36%	10	5	2734	2735	0.15	
11/28/94				4	41%	10.9	45%	10	5	2728	2729	0.15	
11/29/94				3.7	35%	9.9	41%	10	5	2735	2735	0.15	
11/30/94				3.2	34%	8.4	35%	10	5	2728	2729	0.15	
Monthly Average	**11.1**	**129.3**				**9.7**	**40%**						

R.T. = Run Time Today-8 hrs (12 pm to 8 am)
R.T. = Run Time Yesterday- 24 hr period
P.U.T. = Pump up time
S-Fail = Sensor Fail
F.B.S. = Full Barrel Speed
P.O.S. = Pump off Speed

3/28/95
RMOTCTES.DAT
MRT/jb

D-JAX CONTROLLER % RUN TIME
73-31-SX-10

D-JAX2.XLS Chart 6



3/28/95

Average Monthly Run Time 40%
Average Daily Run Time 9.7 Hours

MRT/jb

WELL NO. 73-31-SX-10

RMOTC TEST DATA
D-JAX WELL TENDER
PUMP-OFF CONTROLLER

Strokes Per Minute (SPM) 21.9
Stroke Length 36"
Pump Size 2.00"

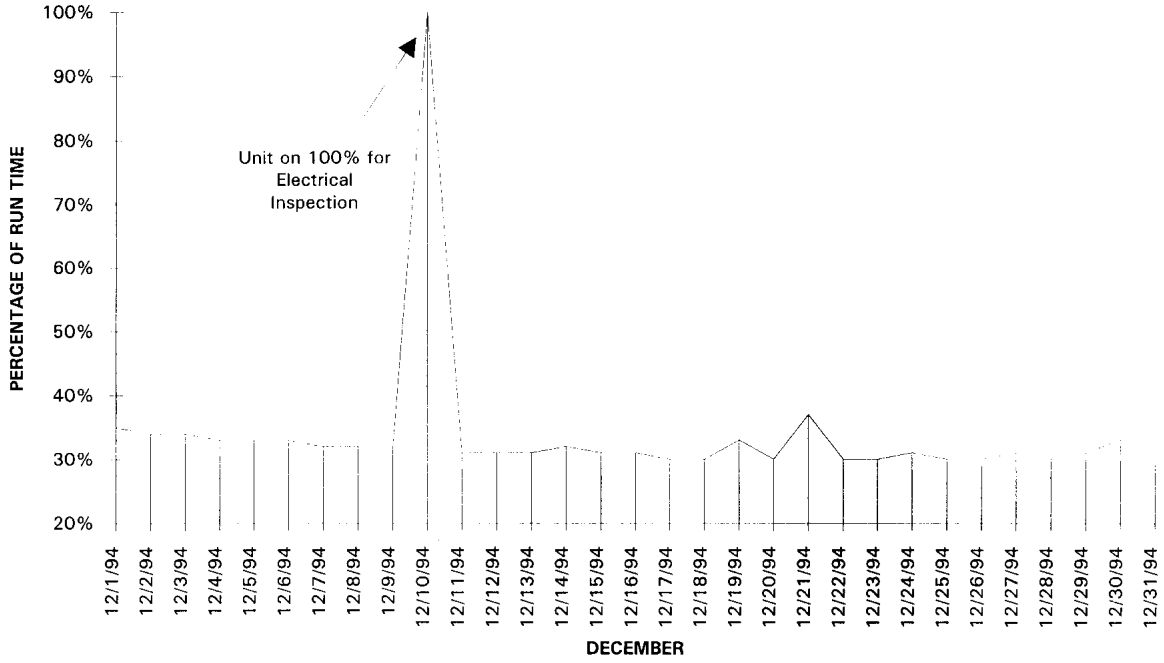
Date	Oil (bbls)	Water (bbls)	Fluid Above Pump (ft.)	R.T. Today (Hrs.)	% R.T. Today	R.T. Yesterday (Hrs.)	% R.T. Yesterday	P.U.T. (sec.)	S-Fail (min.)	F.B.S. (ms)	P.O.S. (ms)	Delta (ms)	Remarks
12/1/94				3.2	35%	8.3	34%	10	5	2728	2727	0.15	
12/2/94				3.3	34%	8.2	34%	10	5	2726	2728	0.15	
12/3/94				3.1	33%	8.1	33%	10	5	2725	2727	0.15	
12/4/94				3.2	33%	8	33%	10	5	2752	2734	0.15	
12/5/94				0.32	33%	7.9	33%	10	5	2733	2736	0.15	
12/6/94				3.1	32%	7.8	32%	10	5	2731	2733	0.15	
12/7/94	9.0	106.4	0	3.3	32%	7.8	32%	10	5	2731	2730	0.15	
12/8/94				3.3	32%	7.8	32%	10	5	N/A	N/A	0.15	Electrical Inspection
12/9/94				2.9	31%	(* 24)	(* 100%)	10	5	2731	2730	0.15	
12/10/94				3.2	31%	7.5	31%	10	5	2734	2733	0.15	
12/11/94				3	31%	7.5	31%	10	5	2729	2730	0.15	
12/12/94				2.9	31%	7.5	31%	10	5	2729	2731	0.15	
12/13/94				3	31%	7.7	32%	10	5	2754	2755	0.15	
12/14/94				3.1	31%	7.5	31%	10	5	2743	2761	0.15	
12/15/94				2.9	31%	7.5	31%	10	5	2743	2713	0.15	
12/16/94				2.9	30%	7.4	30%	10	5	2740	2735	0.15	
12/17/94				3.3	34%	7.4	30%	10	5	2750	2753	0.15	
12/18/94				2.9	30%	8	33%	10	5	2738	2743	0.15	
12/19/94				3.8	38%	7.3	30%	10	5	2742	2746	0.15	
12/20/94				2.9	31%	8.9	37%	10	5	2731	2737	0.15	
12/21/94				3	30%	7.4	30%	10	5	2749	2750	0.15	
12/22/94	10.1	92.7	0	2.9	30%	7.3	30%	10	5	2745	2748	0.15	
12/23/94				3	31%	7.6	31%	10	5	2755	2757	0.15	
12/24/94				2.9	30%	7.4	30%	10	5	2751	2747	0.15	
12/25/94				2.9	30%	7.4	30%	10	5	2751	2747	0.15	
12/26/94				3	31%	7.5	31%	10	5	2739	2744	0.15	
12/27/94				3	31%	7.5	31%	10	5	2739	2744	0.15	
12/28/94				3.5	33%	7.6	31%	10	5	2747	2768	0.15	
12/29/94				3.3	33%	8	33%	10	5	2739	2740	0.15	
12/30/94				3.4	34%	8	33%	10	5	2750	2761	0.15	
12/31/94				4.1	42%	7.9	33%	10	5	2720	2718	0.15	
Monthly Average	**9.6**	**99.6**				**7.7**	**32%**						
*** Not Included in Monthly Averages**													

R.T. = Run Time Today-8 hrs (12 pm to 8 am)
R.T. = Run Time Yesterday- 24 hr period
P.U.T. = Pump up time
S-Fail = Sensor Fail
F.B.S. = Full Barrel Speed
P.O.S. = Pump off Speed

3/28/95
RMOTCTES.DAT
MRT/jb

D-JAX CONTROLLER % RUN TIME
73-31-SX-10

D-JAX2.XLS Chart 7



Average Monthly Run Time 32%
Average Daily Run Time 7.7 Hours

3/28/95

MRT/jb