



30.015.36414

DIRECTIONAL SURVEY REPORT

MARBOB ENERGY

BIRDIE FEDERAL #8

EDDY COUNTY, NEW MEXICO

PREPARED BY: MIKE EVANS

Pathfinder Energy Services, Inc.
6213 W. County Road 112 • Midland, TX • 79706
(432)681-6000

DIRECTIONAL SURVEY COMPANY REPORT:

1. NAME OF SURVEYING COMPANY: PATHFINDER ENERGY SERVICES
2. NAME OF PERSON(S) PERFORMING SURVEY:
A) KYLE TABOR
3. POSITION OF SAID PERSON(S): (A-F) SURVEYORS (FIELD ENGINEERS)
4. DATE(S) ON WHICH SURVEY WAS PERFORMED: 12/22/08 TO 12/29/08
5. STATE IN WHICH SURVEY WAS PERFORMED: NEW MEXICO
6. LOCATION OF WELL: EDDY COUNTY, NM
7. TYPE OF SURVEY(S) PERFORMED: MWD
8. COMPLETE IDENTIFICATION OF WELL:

MARBOB ENERGY
BIRDIE FEDERAL #8
EDDY COUNTY, NM
RIG: PERMIAN #4
9. SURVEY CERTIFIED FROM: 2,996 TO 5,951 FEET MEASURED DEPTH.

THIS IS TO VERIFY THAT ATTACHED DOCUMENTS SHOWING THE WELL TO BE DISPLACED AT 122.66 FEET ON A BEARING OF 214.93 DEGREES FROM THE CENTER OF THE ROTARY TABLE AT A PROJECTED BIT DEPTH OF 6,000 FEET, ARE TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE.



MIKE EVANS
MWD ENGINEER

PathFinder Energy Services, Inc.

BHL Report

Page 01/01
Tie-in Date: 12/22/2008
Date Completed: 12/29/2008

MARBOB ENERGY
BIRDIE FED # 8
EDDY COUNTY, NM
Rig:PERMIAN # 4
PathFinder Office Supervisor: FRANCISCO SINISTERRA
PathFinder Field Engineers:K. TABOR
E. PAYNE

Survey Horiz. Reference:WELLHEAD
Ref Coordinates: LAT:32.50.14.2423 N LON:103.59.25.5294 W
GRID Reference:NAD27 new mexico east Transverse Mercator
Ref GRID Coord: X: 605322.8000 Y: 668488.0000
North Aligned To:GRID NORTH
Total Magnetic Correction: 7.93° EAST TO GRID
Vertical Section Plane: 210.39
Survey Vert. Reference: 21.00' Kelly Bushing To Ground
Altitude:3695.00' Ground To MSL

Measured Depth	6000.00	(feet)
Inclination	0.53	(deg)
Azimuth	19.36	(deg)
True Vertical Depth	5993.51	(feet)
Vertical Section	122.27	(feet)
Survey X cord	605252.56	(feet)
Survey Y cord	668387.44	(feet)
Survey Lat	32.83701375 N	(deg)
Survey Lon	103.99065457 W	(deg)
Rectangular Corr. N/S	100.56 S	(feet)
Rectangular Corr. E/W	70.24 W	(feet)
Closure Distance	122.66	(feet)
Direction of Closure	214.93	(deg)
Dogleg Severity	0.00	(deg/100ft)

PathFinder Energy Services, Inc.

Survey Report

MARBOB ENERGY

BIRDIE FED # 8

EDDY COUNTY, NM

Rig:PERMIAN # 4

PathFinder Office Supervisor: FRANCISCO SINISTERRA

PathFinder Field Engineers: K. TABOR

E. PAYNE

Survey Horiz. Reference:WELLHEAD

Ref Coordinates: LAT:32.50.14.2423 N LON:103.59.25.5294 W

Reference:NAD27 new mexico east Transverse Mercator

Ref GRID Coord: X: 605322.8000 Y: 668488.0000

North Aligned To:GRID NORTH

Total Magnetic Correction: 7.93° EAST TO GRID

Vertical Section Plane: 210.39

Survey Vert. Reference: 21.00' Kelly Bushing To Ground

Altitude:3695.00' Ground To MSL

Survey Calculations by PathCalc v1.99 using Minimum Curvature

Measured Depth (ft)	Incl (deg)	Drift Dir. (deg)	TVD (ft)	Course Length (ft)	Vertical Section (ft)	TOTAL Rectangular Offsets (ft) (ft)		Closure Dist Dir (ft) (deg)	DLS (dg/100ft)	
TIE IN PROVIDED BY SCIENTIFIC DRILLING @ 2950' MD.										
2950.00	1.29	191.08	2949.38	0.00	11.90	29.67 S	27.07 E	40.16@ 137.62	0.00	
THE FOLLOWING ARE PATHFINDER MWD SURVEYS @ 2996' MD.										
2996.00	1.85	209.80	2995.36	46.00	13.13	30.82 S	26.60 E	40.71@ 139.20	1.64	
3059.00	3.25	210.68	3058.30	63.00	15.93	33.24 S	25.18 E	41.70@ 142.85	2.22	
3122.00	4.22	206.20	3121.16	63.00	20.03	36.86 S	23.25 E	43.58@ 147.76	1.61	
3185.00	4.84	207.97	3183.97	63.00	25.00	41.28 S	20.98 E	46.31@ 153.06	1.01	
3248.00	5.98	216.58	3246.69	63.00	30.92	46.27 S	17.78 E	49.56@ 158.98	2.22	
3312.00	6.07	232.93	3310.34	64.00	37.36	50.98 S	13.09 E	52.64@ 165.60	2.68	
3375.00	6.16	235.48	3372.98	63.00	43.49	54.91 S	7.65 E	55.44@ 172.07	0.45	
3407.00	6.16	236.45	3404.80	32.00	46.59	56.83 S	4.80 E	57.03@ 175.17	0.33	
3470.00	5.63	234.78	3467.46	63.00	52.44	60.48 S	0.54 W	60.48@ 180.51	0.88	
3532.00	5.72	233.28	3529.16	62.00	58.06	64.08 S	5.50 W	64.32@ 184.91	0.28	
3596.00	5.63	233.55	3592.84	64.00	63.88	67.85 S	10.58 W	68.67@ 188.86	0.15	
3659.00	5.36	235.21	3655.55	63.00	69.40	71.37 S	15.48 W	73.03@ 192.24	0.50	
3723.00	5.28	229.06	3719.28	64.00	74.90	75.00 S	20.16 W	77.67@ 195.05	0.90	
3786.00	5.36	227.83	3782.01	63.00	80.45	78.88 S	24.53 W	82.61@ 197.28	0.22	
3850.00	5.28	228.62	3845.73	64.00	86.10	82.83 S	28.96 W	87.75@ 199.27	0.17	
3945.00	5.54	230.12	3940.31	95.00	94.57	88.66 S	35.76 W	95.60@ 201.96	0.31	
4040.00	5.28	233.02	4034.89	95.00	102.92	94.23 S	42.77 W	103.48@ 204.41	0.40	
4103.00	5.45	228.71	4097.61	63.00	108.44	97.95 S	47.33 W	108.79@ 205.79	0.69	
4166.00	5.36	230.65	4160.33	63.00	114.04	101.79 S	51.86 W	114.24@ 207.00	0.32	
4229.00	5.19	231.00	4223.06	63.00	119.46	105.45 S	56.35 W	119.56@ 208.12	0.27	
4292.00	4.40	232.40	4285.84	63.00	124.37	108.72 S	60.47 W	124.40@ 209.09	1.27	

PathFinder Energy Services, Inc.

Survey Report

MARBOB ENERGY
BIRDIE FED # 8
EDDY COUNTY, NM
RIG:PERMIAN # 4

Page 02/02

Measured Depth (ft)	Incl (deg)	Drift Dir. (deg)	TVD (ft)	Course Length (ft)	Vertical Section (ft)	TOTAL Rectangular Offsets (ft) (ft)		Closure Dist Dir (ft) (deg)		DLS (dg/100ft)
4355.00	3.43	231.79	4348.69	63.00	128.37	111.36 S	63.87 W	128.37@	209.84	1.54
4418.00	1.76	232.49	4411.63	63.00	131.02	113.11 S	66.12 W	131.02@	210.31	2.65
4482.00	0.44	319.15	4475.62	64.00	131.85	113.52 S	67.06 W	131.85@	210.57	2.80
4577.00	1.06	343.67	4570.61	95.00	131.13	112.40 S	67.54 W	131.14@	211.00	0.72
4671.00	0.70	308.08	4664.60	94.00	130.46	111.22 S	68.24 W	130.48@	211.53	0.68
4735.00	0.62	312.38	4728.59	64.00	130.33	110.74 S	68.80 W	130.37@	211.85	0.15
4830.00	0.62	309.57	4823.59	95.00	130.14	110.07 S	69.58 W	130.22@	212.30	0.03
4925.00	0.70	317.04	4918.58	95.00	129.90	109.31 S	70.37 W	130.01@	212.77	0.12
5019.00	0.79	326.01	5012.57	94.00	129.45	108.36 S	71.13 W	129.62@	213.28	0.16
5114.00	0.79	310.80	5107.57	95.00	129.05	107.39 S	71.99 W	129.28@	213.84	0.22
5209.00	1.14	305.35	5202.55	95.00	128.85	106.41 S	73.25 W	129.19@	214.54	0.38
5305.00	0.35	100.65	5298.55	96.00	128.67	105.91 S	73.75 W	129.06@	214.85	1.53
5400.00	0.44	55.30	5393.54	95.00	128.24	105.76 S	73.16 W	128.60@	214.67	0.33
5495.00	0.53	19.71	5488.54	95.00	127.48	105.14 S	72.71 W	127.83@	214.67	0.32
5591.00	0.70	26.47	5584.54	96.00	126.45	104.19 S	72.30 W	126.82@	214.76	0.19
5683.00	0.70	32.72	5676.53	92.00	125.33	103.22 S	71.75 W	125.70@	214.80	0.08
5778.00	0.70	35.09	5771.52	95.00	124.17	102.26 S	71.10 W	124.54@	214.81	0.03
5871.00	0.35	30.08	5864.52	93.00	123.32	101.55 S	70.63 W	123.69@	214.82	0.38
5951.00	0.53	19.36	5944.52	80.00	122.72	100.98 S	70.39 W	123.09@	214.88	0.25
STRAIGHT LINE PROJECTION TO BIT @ 6000' MD.										
6000.00	0.53	19.36	5993.51	49.00	122.27	100.56 S	70.24 W	122.66@	214.93	0.00



TIE-IN SURVEY INFORMATION SHEET

CLIENT INFORMATION

CLIENT:	MARBOB ENERGY		
LEASE / WELL No.:	BIRDIE FEDERAL	# 8	
WELL LOCATION:	EDDY COUNTY, NEW MEXICO		
COUNTY / STATE / COUNTRY:	EDDY	NM	U.S.A.
RIG:	PERMIAN #4		
API WELL No:	30-015-36414		
JOB No:	101008145 WT-WT		
P.O. / AFE No.			
DIRECTIONAL COMPANY:	PATHFINDER ENERGY SERVICES		

WELL SITE INFORMATION

TOTAL MAGNETIC CORRECTION (TMC):			
On Wall Plat:	7.93	LWD Calculated:	7.926949
		Agreed Upon:	7.926949
X =	605322.800000	Feet	Y = 668488.000000
			Feet
SITE LATITUDE:	32.837290 N	SITE LONGITUDE:	103.990425 W
GRID SYSTEM:	TRUE ☐ UTM ☐ LAMBERT ☒	ZONE:	NEW MEXICO EAST
PROPOSED DRIFT DIRECTION:	210.39		
KELLY BUSHING ELEVATION:	21		
ALTITUDE:	3695	Feet	WATER DEPTH: 0
			Feet

TIE-IN SURVEY

MEASURED DEPTH:	2950'
DRIFT ANGLE:	1.29
DRIFT DIRECTION:	191.08
TRUE VERTICAL DEPTH:	2949.37
VERTICAL SECTION:	-29.67
RECTANGULAR COORDINATE (N / S) :	-29.67
RECTANGULAR COORDINATE (E / W) :	27.07
CLOSURE DISTANCE / DIRECTION:	
SURVEY CALCULATION METHOD:	AA ☐ MC ☒ RC ☐ BT ☐
SOURCE OF TIE-IN DATA (COMPANY):	SCIENTIFIC DRILLING CONTROLS
COPY OF TIE-IN SURVEY REPORT	☒ YES ☐ NO

WELL PLAN

KICKOFF DEPTH:	2950	TOTAL DEPTH:	5907
KICKOFF ANGLE:	1.29	MAX ANGLE:	6

PES Engineers: KYLE TABOR
ERIC PAYNE

**Signature of both field engineers required if applicable

Directional Driller: _____

DATE: 21-Dec-2008

S C I E N T I F I C D E P L I N G C O N T R O L S

KEEPER GYRO SURVEY

Directional Survey Report

for

HARBOR

Well Number	:	BIRDIE FEDERAL NO. 8
Well Location	:	BOOY COUNTY, NEW MEXICO
Job Number	:	32K12081MAR
Location Latitude	:	32.832
Survey Date	:	at 21-DE
S.D.C. Personnel	:	VICTOR MEFENDEZ JR.
Length Units	:	Feet
North Reference	:	<u>TRUE North</u> <i>Grid Convergence (-0.18°)</i>
Grid Correction	:	0.00 Degrees
Survey Depth Zero	:	RKB
Proposal Direction	:	
Calculation Method	:	Minimum Curvature

Remarks : The OUTPUN Survey will be called definitive

S C I E N T I F I C O R I L L I N G C O N T R O L S

Outcrop Survey

for

MARROB

Page 1

Well No.: RICHIE FEDERAL HOLE

Date: Jul 21-66

Job No.: 30612081MAR

TRUE

Proposed: 0.00

Depth	I.V.O.	V.S.	Inc	Azimuth	Latitude	Departure	Decl
(Feet)	(Feet)	(Feet)	Deg.	Deg.	(Feet)	(Feet)	/100

0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
100.00	100.00	-0.07	0.17	243.17	0.07	-0.13	0.17
200.00	200.00	-0.25	0.86	145.32	-0.75	0.14	0.90
300.00	299.97	-2.50	1.57	145.32	-2.50	1.17	0.71
400.00	399.94	-4.74	1.46	151.03	-4.74	2.76	0.19
500.00	499.91	-6.83	1.27	152.49	-6.83	3.99	0.19
600.00	599.88	-8.69	1.46	133.12	-8.69	5.33	0.50
700.00	699.85	-10.40	1.55	128.33	-10.40	7.33	0.16
800.00	799.82	-11.18	1.76	87.39	-11.18	9.57	1.03
900.00	899.77	-10.69	1.96	75.37	-10.69	12.41	0.69
1000.00	999.71	-9.86	2.07	77.22	-9.86	15.83	0.13
1100.00	1099.64	-9.21	1.75	80.40	-9.21	19.10	0.34
1200.00	1199.62	-8.86	1.22	84.75	-8.86	21.66	0.54
1300.00	1299.60	-8.93	1.24	98.93	-8.93	23.79	0.50
1400.00	1399.58	-9.33	1.07	104.90	-9.33	25.76	0.21
1500.00	1499.56	-9.85	1.02	108.23	-9.85	27.51	0.08
1600.00	1599.55	-10.39	0.92	108.73	-10.39	29.17	0.10
1700.00	1699.54	-11.20	0.85	108.17	-11.20	30.57	0.45
1800.00	1799.53	-11.93	0.27	221.64	-11.93	30.71	0.86
1900.00	1899.53	-12.77	0.78	169.98	-12.77	30.57	0.65
2000.00	1999.52	-13.80	0.53	219.52	-13.80	30.50	0.59
2100.00	2099.51	-14.93	0.90	190.60	-14.93	30.06	0.51
2200.00	2199.50	-16.49	0.96	159.92	-16.49	29.63	0.16
2300.00	2299.49	-18.01	0.84	183.09	-18.01	29.30	0.29
2400.00	2399.47	-19.61	1.00	174.75	-19.61	29.34	0.21
2500.00	2499.45	-21.78	1.49	177.16	-21.78	29.49	0.19
2600.00	2599.42	-24.00	1.15	203.35	-24.00	29.15	0.63
2700.00	2699.41	-25.55	0.73	186.27	-25.55	28.69	0.50
2800.00	2799.40	-27.02	1.07	207.04	-27.02	28.19	0.47
2900.00	2899.38	-28.69	1.07	205.00	-28.69	27.37	0.04
2950.00	2949.37	-29.67	1.29	191.08	-29.67	27.07	0.72

The Horizontal Displacement (in Feet) at

Measured Depth 2950.00 is 40.16 in a Direction of 137.82 Degrees

PathFinder Energy Services, Inc.

Magnetic & Grid Calculations

MARBOB ENERGY
BIRDIE FEDERAL #8
EDDY COUNTY, NEW MEXICO
Rig:PEMIAN 4

Tue Dec 16 11:05:24 2008

Coordinates

Latitude: 32.837290 N (32 deg. 50 min. 14.2423 sec.)
Longitude: 103.990425 W (-103 deg. 59 min. 25.5294 sec.)
Elevation: 3695.00 feet.
Calculation Date: Dec/16/2008

Magnetic Calculations

Model: IGRF2005
Dip Angle: 60.7579 degrees
Total Magnetic Field: 0.49214 gauss
Magnetic Declination: 8.112895 degrees
Horizontal Intensity: 0.240410 gauss
To Convert a Magnetic Dir. to a TRUE North Dir. Add 8.112895 Degr

Transverse Mercator Grid Calculations NAD27

Grid System: Transverse Mercator: new mexico east
Ellipsoid: Clarke 1866
X: 605322.8000 feet
Y: 668488.0000 feet
True to Grid: (convergence) -0.185945 degrees
Magnetic to Grid: 7.926949 degrees
To Convert a Magnetic Dir. to a GRID dir. Add 7.926949 Degr.

OCD-ARTESIA

Form 3160-3
(February 2005)

UNITED STATES DEPARTMENT OF THE INTERIOR BUREAU OF LAND MANAGEMENT

APPLICATION FOR PERMIT TO DRILL OR REENTER

1a. Type of work ☒ DRILL ☐ REENTER		5. Lease Serial No. NMNM 86025	
1b. Type of Well ☒ Oil Well ☐ Gas Well ☐ Other ☒ Single Zone ☐ Multiple Zone		6. If Indian, Allottee or Tribe Name	
2. Name of Operator Marbob Energy Corporation		7. If Unit or CA Agreement, Name and No	
3a. Address, P.O. Box 227, Artesia, NM 88211-0228		8. Lease Name and Well No. Birdie Federal #8	
3b. Phone No. (include area code) 505-748-3303		9. API Well No. 30-015-36414	
4. Location of Well (Report location clearly and in accordance with any State requirements.) At surface 1600' FNL & 1650' FEL At proposed prod zone BHL: 1650' FNL & 1650' FEL Roswell Controlled Water Basin		10. Field and Pool, or Exploratory Loco Hills; Glorieta-Yeso	
11. Sec, T R M or Bk and Survey or Area Section 17, T17S - R30E		12. County or Parish Eddy County	
13. State NM		14. Distance in miles and direction from nearest town or post office* About 1.5 miles from Loco Hills, NM	
15. Distance from proposed* location to nearest property or lease line, ft (Also to nearest drng unit line, if any) 330'	16. No. of acres in lease 280.00	17. Spacing Unit dedicated to this well 40	
18. Distance from proposed location* to nearest well, drilling, completed, applied for, on this lease, ft	19. Proposed Depth 5930'	20. BLM/BIA Bond No. on file NMB000412	
21. Elevations (Show whether DF, KDB, RT, GL, etc.) 3674' GL	22. Approximate date work will start* 06/09/2008	23. Estimated duration 15 Days	

24. Attachments

The following, completed in accordance with the requirements of Onshore Oil and Gas Order No 1, must be attached to this form

- | | |
|---|--|
| 1. Well plat certified by a registered surveyor | 4. Bond to cover the operations unless covered by an existing bond on file (see Item 20 above) |
| 2. A Drilling Plan | 5. Operator certification |
| 3. A Surface Use Plan (if the location is on National Forest System Lands, the SUPO must be filed with the appropriate Forest Service Office) | 6. Such other site specific information and/or plans as may be required by the BLM |

25. Signature <i>Nancy T. Agnew</i>	Name (Printed Typed) Nancy T. Agnew	Date 05/09/2008
Title Land Department		

Approved by (Signature) <i>/s/ James Stovall</i>	Name (Printed Typed)	Date JUL 2 2008
Title FIELD MANAGER		Office CARLSBAD FIELD OFFICE

Application approval does not warrant or certify that the applicant holds legal or equitable title to those rights in the subject lease which would entitle the applicant to conduct operations thereon.

Conditions of approval, if any, are attached

APPROVAL FOR TWO YEARS

Title 18 USC Section 1001 and Title 43 USC Section 1212, make it a crime for any person knowingly and willfully to make to any department or agency of the United States any false, fictitious or fraudulent statements or representations as to any matter within its jurisdiction

*(Instructions on page 2)

SEE ATTACHED FOR
CONDITIONS OF APPROVAL

NOTE: NEW PIT RULE
19-15-17 NMAC PART 17
A form C-144 must be approved
before starting drilling operations.

PROVAL SUBJECT TO
GENERAL REQUIREMENTS
AND SPECIAL STIPULATIONS
...ATTACHED

DISTRICT I
1625 N. FRENCH DR., HOBBS, NM 88240

DISTRICT II
1301 W. GRAND AVENUE, ARTESIA, NM 88210

DISTRICT III
1000 Rio Brazos Rd., Aztec, NM 87410

DISTRICT IV
1220 S. ST. FRANCIS DR., SANTA FE, NM 87505

State of New Mexico
Energy, Minerals and Natural Resources Department

OIL CONSERVATION DIVISION
1220 SOUTH ST. FRANCIS DR.
Santa Fe, New Mexico 87505

Form C-102
Revised October 12, 2005
Submit to Appropriate District Office
State EDDYse - 4 Copies
Fee EDDYse - 3 Copies

WELL LOCATION AND ACREAGE DEDICATION PLAT

☐ AMENDED REPORT

API Number		Pool Code 96718	Pool Name Loco Hills; Glorieta-Yeso
Property Code 23246	Property Name BIRDIE FEDERAL		Well Number 8
OGRID No. 14049	Operator Name MARBOB ENERGY CORPORATION		Elevation 3674'

Surface Location

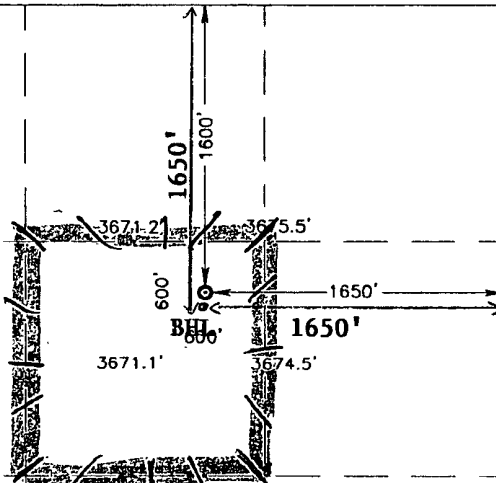
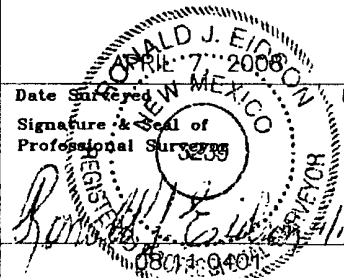
UL or lot No.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
G	17	17-S	30-E		1600	NORTH	1650	EAST	EDDY

Bottom Hole Location If Different From Surface

UL or lot No.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
G	17	17-S	30-E		1650	North	1650	East	Eddy

Dedicated Acres	Joint or Infill	Consolidation Code	Order No.
40			

NO ALLOWABLE WILL BE ASSIGNED TO THIS COMPLETION UNTIL ALL INTERESTS HAVE BEEN CONSOLIDATED
OR A NON-STANDARD UNIT HAS BEEN APPROVED BY THE DIVISION

 GEODETIC COORDINATES NAD 27 NME Y=668488.0 N X=605322.8 E LAT.=32.837290° N LONG.=103.990425° W	OPERATOR CERTIFICATION I hereby certify that the information herein is true and complete to the best of my knowledge and belief, and that this organization either owns a working interest or unleased mineral interest in the land including the proposed bottom hole location or has a right to drill this well at this location pursuant to a contract with an owner of such mineral or working interest, or to a voluntary pooling agreement or a compulsory pooling order heretofore entered by the division. <u>Nancy T. Agnew</u> 5/9/08 Signature Date <u>Nancy T. Agnew</u> Printed Name
	SURVEYOR CERTIFICATION I hereby certify that the well location shown on this plat was plotted from field notes of actual surveys made by me or under my supervision, and that the same is true and correct to the best of my belief.  Date Surveyed: <u>5/9/08</u> DSS Signature & Seal of Professional Surveyor: <u>Ronald J. Eidson</u>
	Certificate No. GARY G. EIDSON 12641 RONALD J. EIDSON 3239