

District I
1625 N French Dr, Hobbs, NM 88240
District II
1301 W Grand Avenue, Artesia, NM 88210
District III
1000 Rio Brazos Road, 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, NM 87505

Form C-144 CLEZ
July 21, 2008

For closed-loop systems that only use above ground steel tanks or haul-off bins and propose to implement waste removal for closure, submit to the appropriate NMOCD District Office.

Closed-Loop System Permit or Closure Plan Application

(that only use above ground steel tanks or haul-off bins and propose to implement waste removal for closure)

Type of action: ☒ Permit ☐ Closure

Instructions: Please submit one application (Form C-144 CLEZ) per individual closed-loop system request. For any application request other than for a closed-loop system that only use above ground steel tanks or haul-off bins and propose to implement waste removal for closure, please submit a Form C-144.

Please be advised that approval of this request does not relieve the operator of liability should operations result in pollution of surface water, ground water or the environment. Nor does approval relieve the operator of its responsibility to comply with any other applicable governmental authority's rules, regulations or ordinances.

1. Operator: COG OPERATING LLC OGRID #: 229137
Address: 550 WEST TEXAS, SUITE 100 MIDLAND, TX 79701
Facility or well name: Grave Digger State Com #5H
API Number: 30-015- 40412 OCD Permit Number: 213106
U/L or Qtr/Qtr UL D Section 2 Township 20S Range 25E County: EDDY
Center of Proposed Design: Latitude N/A Longitude N/A NAD: ☐ 1927 ☐ 1983
Surface Owner: ☐ Federal ☒ State ☐ Private ☐ Tribal Trust or Indian Allotment

2. ☒ **Closed-loop System:** Subsection H of 19.15.17.11 NMAC
Operation: ☒ Drilling a new well ☐ Workover or Drilling (Applies to activities which require prior approval of a permit or notice of intent) ☐ P&A
☐ Above Ground Steel Tanks or ☒ Haul-off Bins

3. **Signs:** Subsection C of 19.15.17.11 NMAC
☐ 12"x 24", 2" lettering, providing Operator's name, site location, and emergency telephone numbers
☒ Signed in compliance with 19.15.3.103 NMAC

RECEIVED

JUN 21 2012

NMOCD ARTESIA

4. **Closed-loop Systems Permit Application Attachment Checklist:** Subsection B of 19.15.17.9 NMAC
Instructions: Each of the following items must be attached to the application. Please indicate, by a check mark in the box, that the documents are attached.
☒ Design Plan - based upon the appropriate requirements of 19.15.17.11 NMAC
☒ Operating and Maintenance Plan - based upon the appropriate requirements of 19.15.17.12 NMAC
☒ Closure Plan (Please complete Box 5) - based upon the appropriate requirements of Subsection C of 19.15.17.9 NMAC and 19.15.17.13 NMAC
☐ Previously Approved Design (attach copy of design) API Number: _____
☐ Previously Approved Operating and Maintenance Plan API Number: _____

5. **Waste Removal Closure For Closed-loop Systems That Utilize Above Ground Steel Tanks or Haul-off Bins Only:** (19.15.17.13.D NMAC)
Instructions: Please identify the facility or facilities for the disposal of liquids, drilling fluids and drill cuttings. Use attachment if more than two facilities are required.
Disposal Facility Name: CRI Disposal Facility Permit Number: R1966
Disposal Facility Name: GM INC Disposal Facility Permit Number: 711-019-001
Will any of the proposed closed-loop system operations and associated activities occur on or in areas that will not be used for future service and operations?
☐ Yes (If yes, please provide the information below) ☒ No
Required for impacted areas which will not be used for future service and operations:
☐ Soil Backfill and Cover Design Specifications - based upon the appropriate requirements of Subsection H of 19.15.17.13 NMAC
☐ Re-vegetation Plan - based upon the appropriate requirements of Subsection I of 19.15.17.13 NMAC
☐ Site Reclamation Plan - based upon the appropriate requirements of Subsection G of 19.15.17.13 NMAC

Operator Application Certification:

I hereby certify that the information submitted with this application is true, accurate and complete to the best of my knowledge and belief.

Name (Print): Kacie Connally Title: PERMITTING TECH
Signature: Kacie Connally Date: 05/08/12
e-mail address: kconnally@concho.com Telephone: 432-221-0336

7. **OCD Approval:** ☒ Permit Application (including closure plan) ☐ Closure Plan (only)

OCD Representative Signature: _____

Approval Date: _____

Title: _____

OCD Permit Number: _____

8. **Closure Report (required within 60 days of closure completion):** Subsection K of 19.15.17.13 NMAC

Instructions: Operators are required to obtain an approved closure plan prior to implementing any closure activities and submitting the closure report. The closure report is required to be submitted to the division within 60 days of the completion of the closure activities. Please do not complete this section of the form until an approved closure plan has been obtained and the closure activities have been completed.

☐ Closure Completion Date: _____

9. **Closure Report Regarding Waste Removal Closure For Closed-loop Systems That Utilize Above Ground Steel Tanks or Haul-off Bins Only:**

Instructions: Please identify the facility or facilities for where the liquids, drilling fluids and drill cuttings were disposed. Use attachment if more than two facilities were utilized.

Disposal Facility Name: _____

Disposal Facility Permit Number: _____

Disposal Facility Name: _____

Disposal Facility Permit Number: _____

Were the closed-loop system operations and associated activities performed on or in areas that *will not* be used for future service and operations?

☐ Yes (If yes, please demonstrate compliance to the items below) ☐ No

Required for impacted areas which will not be used for future service and operations:

☐ Site Reclamation (Photo Documentation)

☐ Soil Backfilling and Cover Installation

☐ Re-vegetation Application Rates and Seeding Technique

10. **Operator Closure Certification:**

I hereby certify that the information and attachments submitted with this closure report is true, accurate and complete to the best of my knowledge and belief. I also certify that the closure complies with all applicable closure requirements and conditions specified in the approved closure plan.

Name (Print): _____

Title: _____

Signature: _____

Date: _____

e-mail address: _____

Telephone: _____

Closed Loop Operation & Maintenance Procedure

All drilling fluid circulated over shaker(s) with cuttings discharged into roll off container.

Fluid and fines below shaker(s) are circulated with transfer pump through centrifuge(s) or solids separator with cuttings and fines discharged into roll off container.

Fluid is continuously re-circulated through equipment with polymer added to aid separation of cutting fines.

Roll off containers are lined and de-watered with fluids re-circulated into system.

Additional tank is used to capture unused drilling fluid or cement returns from casing jobs.

This equipment will be maintained 24 hrs./day by solids control personnel and or rig crews that stay on location.

Cuttings will be hauled to either:

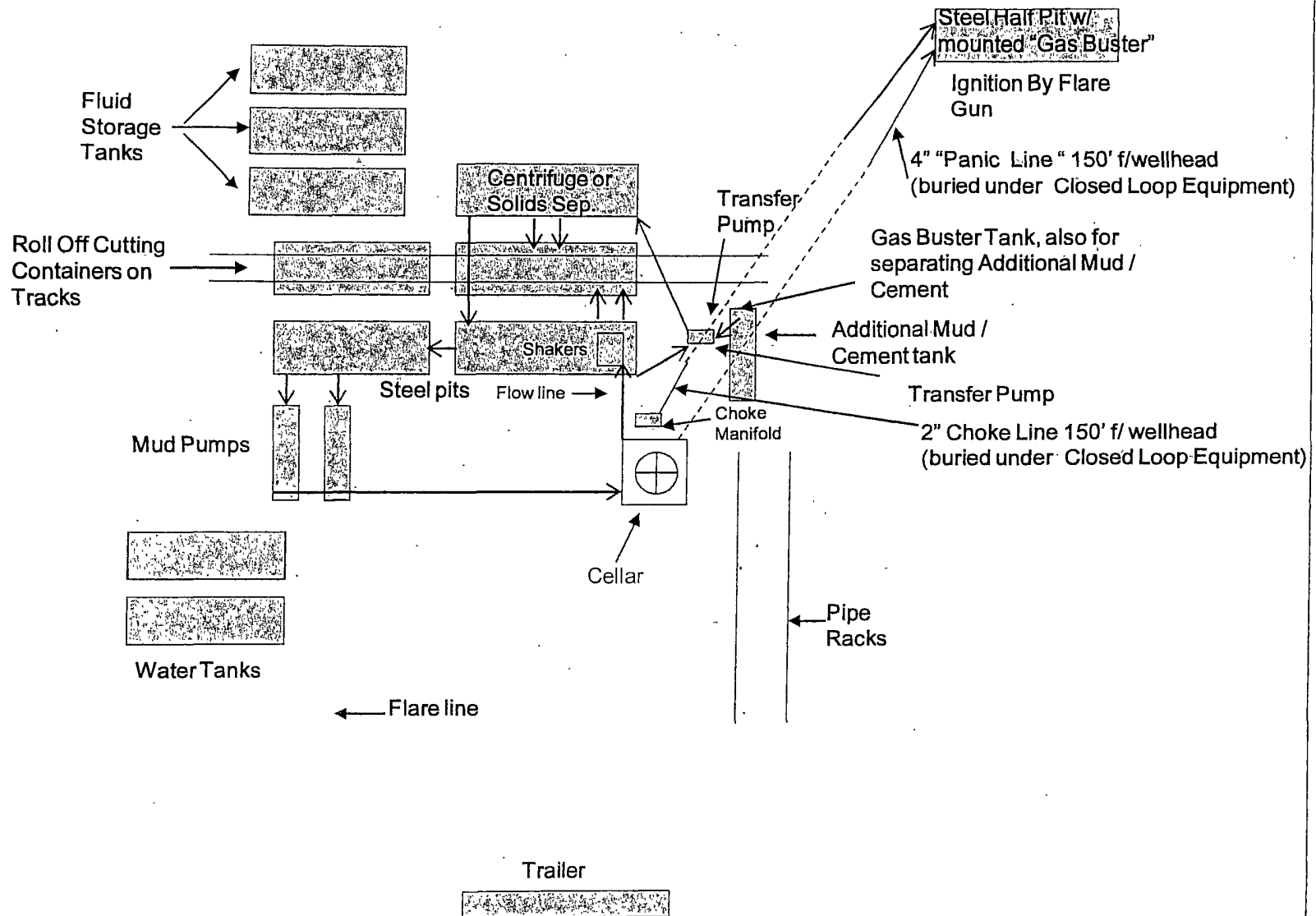
CRI (permit number R9166)

or

GMI (permit number 711-019-001)

dependent upon which rig is available to drill this well.

COG Operating LLC
Closed Loop Equipment Diagram



DISTRICT I
1625 N French Dr., Hobbs, NM 88240
Phone (575) 393-6161 Fax: (575) 393-0720
DISTRICT II
811 S. First St., Artesia, NM 88210
Phone: (575) 748-1283 Fax: (575) 748-9720
DISTRICT III
1000 Rio Brazos Road, Aztec, NM 87410
Phone: (505) 334-6178 Fax: (505) 334-6170
DISTRICT IV
1220 S St Francis Dr., Santa Fe, NM 87505
Phone: (505) 476-3460 Fax: (505) 476-3462

State of New Mexico
Energy, Minerals & Natural Resources Department
OIL CONSERVATION DIVISION
1220 South St. Francis Dr.
Santa Fe, New Mexico 87505

Form C-102
Revised August 1, 2011
Submit one copy to appropriate
District Office

☐ AMENDED REPORT

WELL LOCATION AND ACREAGE DEDICATION PLAT

API Number 30-015-	Pool Code 97565	Pool Name N Seven Rivers; Glorieta Yeso
Property Code 308178	Property Name GRAVE DIGGER STATE COM	Well Number 5H
OGRID No. 229137	Operator Name COG OPERATING, LLC	Elevation 3473'

Surface Location

UL or lot No.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
4	2	20-S	25-E		205	NORTH	990	WEST	EDDY

Bottom Hole Location If Different From Surface

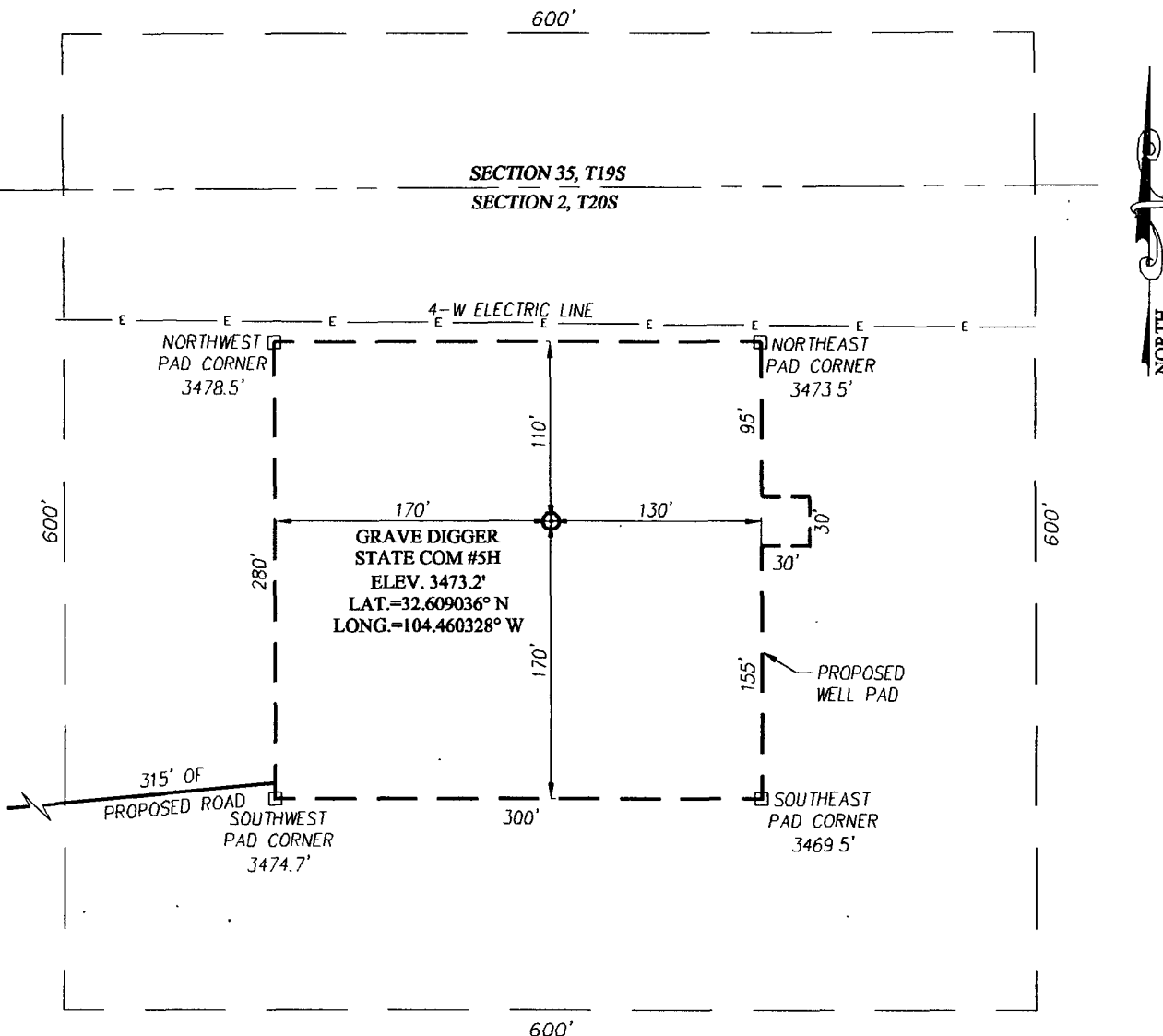
UL or lot No.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
M	2	20-S	25-E		330	SOUTH	990	WEST	EDDY

Dedicated Acres 160.46	Joint or Infill	Consolidation Code	Order No
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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

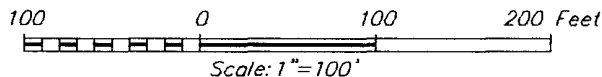
Project Area Producing Area GRID AZ = 180°12'16" HORIZ. DIST. = 4705.5' 40.46 AC. 40.32 AC. 40.20 AC. 40.06 AC. 990' 205' 330' UL S.L. B.H.	OPERATOR CERTIFICATION I hereby certify that the information herein is true and complete to the best of my knowledge and belief, and that this organization either 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. Signature 6-19-12 Date Kelly J. Holly Printed Name kholly@concho.com E-mail Address
	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. MAY 3, 2012 Date of Survey Signature & Seal of Professional Surveyor Certificate Number: 3239 Surveyor: Ronald J. Eidson DSS: JWSC W O 12 11.0906
	GEODETIC COORDINATES NAD 27 NME SURFACE LOCATION Y=585302.0 N X=460894.9 E LAT.=32.609036° N LONG.=104.460328° W BOTTOM HOLE LOCATION Y=580597.9 N X=460878.1 E
	CORNER COORDINATES TABLE ① - Y=585504.1 N, X=459905.8 E ② - Y=585507.9 N, X=461227.1 E ③ - Y=580276.9 N, X=459887.2 E ④ - Y=580265.0 N, X=461209.8 E

SECTION 2, TOWNSHIP 20 SOUTH, RANGE 25 EAST, N.M.P.M.
EDDY COUNTY **NEW MEXICO**



DIRECTIONS TO LOCATION

FROM THE INTERSECTION OF HIGHWAY 285 (SEVEN RIVERS HWY) AND CO. RD. 23 (ROCK DAISY RD), GO WEST ON CO. RD. 23 APPROX. 3.0 MILES. TURN LEFT AND GO SOUTH APPROX. 1.0 MILE TO THE EXISTING GRAVE DIGGER STATE COM #1H WELL PAD. FROM THE SOUTHEAST CORNER OF THE EXISTING WELL PAD, FOLLOW PROPOSED ROAD SURVEY STAKES EAST APPROX. 315 FEET TO THIS LOCATION.



COG OPERATING, LLC

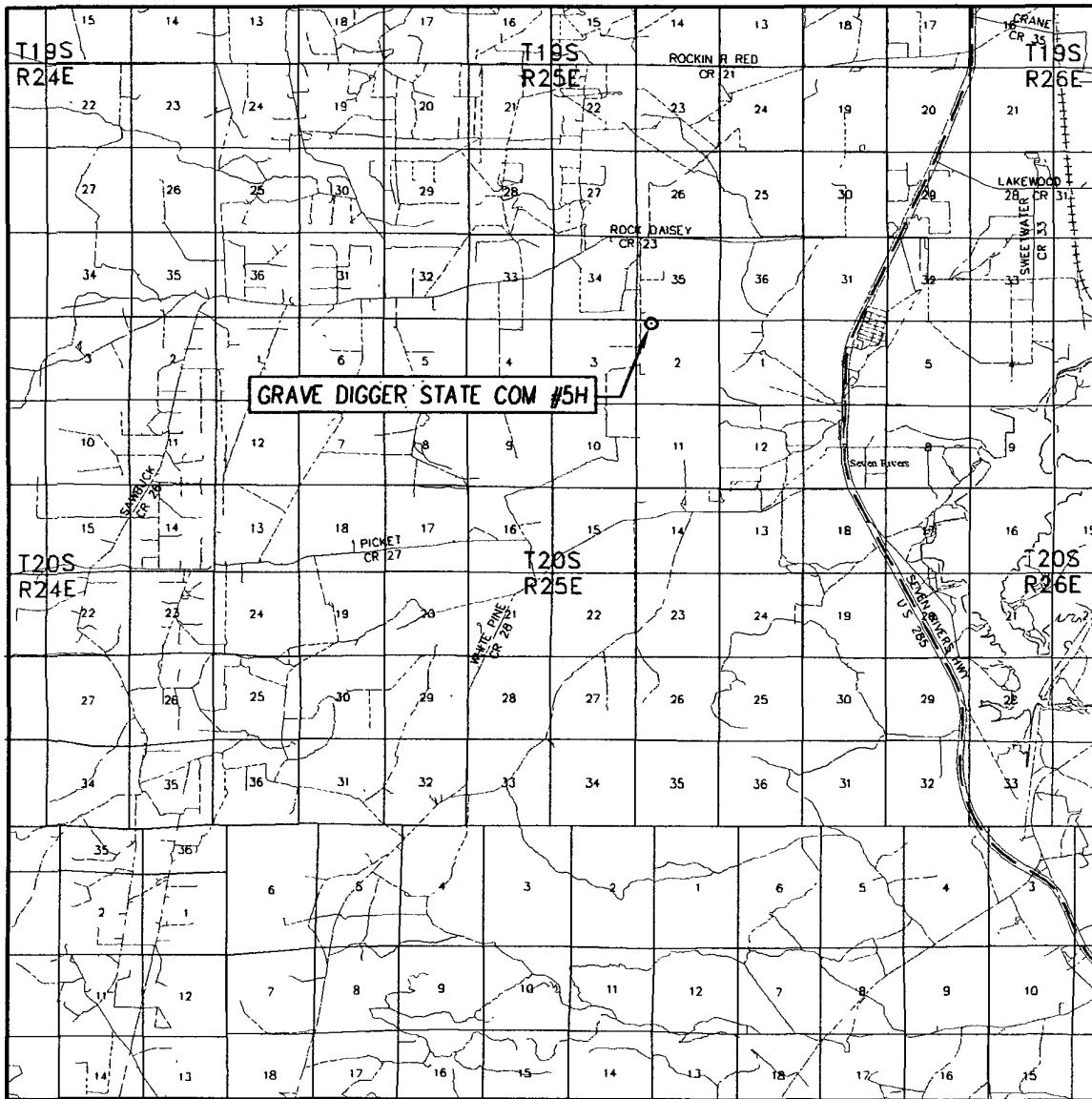
**GRAVE DIGGER STATE COM #5H WELL
 LOCATED 205 FEET FROM THE NORTH LINE
 AND 990 FEET FROM THE WEST LINE OF SECTION 2,
 TOWNSHIP 20 SOUTH, RANGE 25 EAST, N.M.P.M.,
 EDDY COUNTY, NEW MEXICO**

PROVIDING SURVEYING SERVICES
 SINCE 1946
JOHN WEST SURVEYING COMPANY
 412 N DAL PASO
 HOBBS, N.M. 88240
 (575) 393-3117 www.jwsc.biz

Survey Date: 5/3/12	CAD Date: 5/18/12	Drawn By: DSS
W.O. No.: 12110906	Rev:	Rel W.O.:

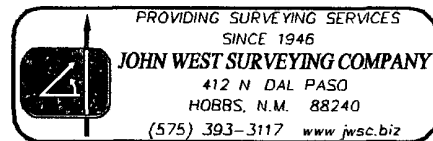
Sheet 1 of 1

VICINITY MAP

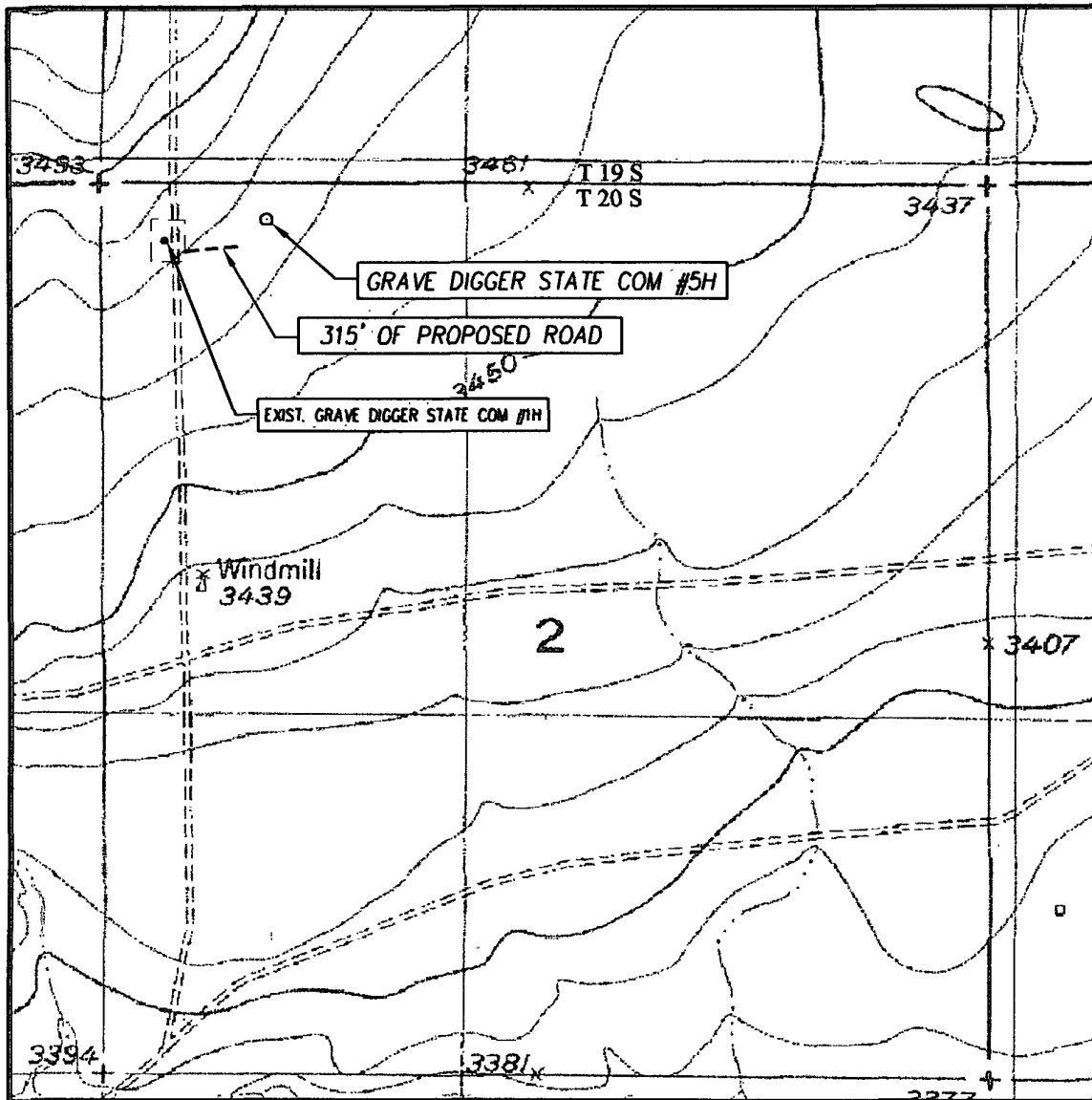


SCALE: 1" = 2 MILES

SEC. 2 TWP. 20-S RGE. 25-E
 SURVEY N.M.P.M.
 COUNTY EDDY STATE NEW MEXICO
 DESCRIPTION 205' FNL & 990' FWL
 ELEVATION 3473'
 OPERATOR COG OPERATING, LLC
 LEASE GRAVE DIGGER STATE COM



LOCATION VERIFICATION MAP



SCALE: 1" = 1000'

CONTOUR INTERVAL:
SEVEN RIVERS, N.M. - 10'

SEC. 2 TWP. 20-S RGE. 25-E

SURVEY N.M.P.M.

COUNTY EDDY STATE NEW MEXICO

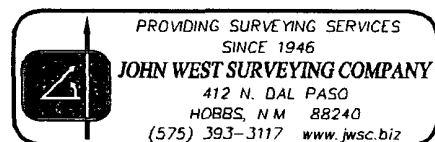
DESCRIPTION 205' FNL & 990' FWL

ELEVATION 3473'

OPERATOR COG OPERATING, LLC

LEASE GRAVE DIGGER STATE COM

U.S.G.S. TOPOGRAPHIC MAP
SEVEN RIVERS, N.M.



COG Operating LLC

Eddy County, NM

Grave Digger State Com 5H

Grave Digger State Com 5H

Wellbore #1

Plan: Plan #1

Surface: 250' FNL, 990' FWL, Sec 2, T20S, R25E, Lot 4

BHL: 330' FSL, 990' FWL, Sec 2, T20S, R25E, Unit M

PP: 330' FNL, 977' FWL, Sec 2, T20S, R25E, Lot 4

Standard Planning Report

12 June, 2012

Crescent Directional Drilling

Planning Report

Database:	Houston R5000 HISTORICAL	Local Co-ordinate Reference:	Site Grave Digger State Com 5H
Company:	COG Operating LLC	TVD Reference:	WELL @ 3491 00ft (Original Well Elev)
Project:	Eddy County, NM	MD Reference:	WELL @ 3491 00ft (Original Well Elev)
Site:	Grave Digger State Com 5H	North Reference:	Grid
Well:	Grave Digger State Com 5H	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan #1		

Project:	Eddy County, NM		
Map System:	US State Plane 1927 (Exact solution)	System Datum:	Mean Sea Level
Geo Datum:	NAD 1927 (NADCON CONUS)		
Map Zone:	New Mexico East 3001		

Site	Grave Digger State Com 5H				
Site Position:		Northing:	585,302 00 ft	Latitude:	32 60903232
From:	Map	Easting:	460,894 90 ft	Longitude:	-104 46033050
Position Uncertainty:	0 00 ft	Slot Radius:	13 200 in	Grid Convergence:	-0 07 °

Well	Grave Digger State Com 5H					
Well Position	+N/-S	0 00 ft	Northing:	585,302 00 ft	Latitude:	32 60903232
	+E/-W	0 00 ft	Easting:	460,894 90 ft	Longitude:	-104 46033050
Position Uncertainty		0 00 ft	Wellhead Elevation:		Ground Level:	3,473 00 ft

Wellbore:		Wellbore #1			
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	6/12/2012	7 90	60 36	48,648

Design:	Plan #1			
Audit Notes:				
Version:	Phase:	PLAN	Tie On Depth:	0 00
Vertical Section:	Depth From (TVD)	+N/-S	+E/-W	Direction
	(ft)	(ft)	(ft)	(°)
	0 00	0 00	0 00	180 20

Plan Sections										
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)	TFO (°)	Target
0 00	0 00	0 00	0 00	0 00	0 00	0 00	0 00	0 00	0 00	
2,458 36	0 00	0 00	2,458 36	0 00	0 00	0 00	0 00	0 00	0 00	
3,212 53	90 50	185 96	2,935.81	-479 03	-50.01	12 00	12 00	0 00	185 96	
3,375 94	90 50	179 42	2,934 38	-642 16	-57 68	4 00	0 00	-4 00	-89 97	
7,438 23	90 50	179 42	2,898 96	-4,704 10	-16 80	0 00	0 00	0 00	0 00	PBHL (Grave Digger :

Crescent Directional Drilling

Planning Report

Database:	Houston R5000 HISTORICAL	Local Co-ordinate Reference:	Site Grave Digger State Com 5H
Company:	COG Operating LLC	TVD Reference:	WELL @ 3491.00ft (Original Well Elev)
Project:	Eddy County, NM	MD Reference:	WELL @ 3491.00ft (Original Well Elev)
Site:	Grave Digger State Com 5H	North Reference:	Gnd
Well:	Grave Digger State Com 5H	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan #1		

Planned Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
2,458.36	0.00	0.00	2,458.36	0.00	0.00	0.00	0.00	0.00	0.00
KOP - Start Build @ 12.00°/100'									
2,500.00	5.00	185.96	2,499.95	-1.80	-0.19	1.81	12.00	12.00	0.00
2,600.00	17.00	185.96	2,597.93	-20.74	-2.17	20.75	12.00	12.00	0.00
2,700.00	29.00	185.96	2,689.82	-59.53	-6.21	59.55	12.00	12.00	0.00
2,800.00	41.00	185.96	2,771.59	-116.47	-12.16	116.51	12.00	12.00	0.00
2,813.02	42.56	185.96	2,781.29	-125.09	-13.06	125.14	12.00	12.00	0.00
PP @ 2813.02 MD, 2781.29 TVD, 42.56 INC, 185.96 AZ, 125.14 VS									
2,900.00	53.00	185.96	2,839.66	-189.07	-19.74	189.14	12.00	12.00	0.00
3,000.00	65.00	185.96	2,891.08	-274.17	-28.62	274.27	12.00	12.00	0.00
3,100.00	77.00	185.96	2,923.58	-368.03	-38.42	368.17	12.00	12.00	0.00
3,200.00	89.00	185.96	2,935.75	-466.57	-48.71	466.74	12.00	12.00	0.00
3,212.53	90.50	185.96	2,935.81	-479.03	-50.01	479.20	12.00	12.00	0.00
Landing Point - Start Turn @ 4.00°/100'									
3,300.00	90.50	182.46	2,935.04	-566.25	-56.43	566.45	4.00	0.00	-4.00
3,375.94	90.50	179.42	2,934.38	-642.16	-57.68	642.36	4.00	0.00	-4.00
EOT - Hold @ 179.42° AZ									
3,400.00	90.50	179.42	2,934.17	-666.22	-57.44	666.43	0.00	0.00	0.00
3,500.00	90.50	179.42	2,933.30	-766.22	-56.43	766.41	0.00	0.00	0.00
3,600.00	90.50	179.42	2,932.43	-866.21	-55.42	866.40	0.00	0.00	0.00
3,700.00	90.50	179.42	2,931.55	-966.20	-54.42	966.39	0.00	0.00	0.00
3,800.00	90.50	179.42	2,930.68	-1,066.19	-53.41	1,066.37	0.00	0.00	0.00
3,900.00	90.50	179.42	2,929.81	-1,166.18	-52.41	1,166.36	0.00	0.00	0.00
4,000.00	90.50	179.42	2,928.94	-1,266.17	-51.40	1,266.35	0.00	0.00	0.00
4,100.00	90.50	179.42	2,928.07	-1,366.16	-50.39	1,366.33	0.00	0.00	0.00
4,200.00	90.50	179.42	2,927.19	-1,466.15	-49.39	1,466.32	0.00	0.00	0.00
4,300.00	90.50	179.42	2,926.32	-1,566.14	-48.38	1,566.31	0.00	0.00	0.00
4,400.00	90.50	179.42	2,925.45	-1,666.14	-47.37	1,666.29	0.00	0.00	0.00
4,500.00	90.50	179.42	2,924.58	-1,766.13	-46.37	1,766.28	0.00	0.00	0.00
4,600.00	90.50	179.42	2,923.71	-1,866.12	-45.36	1,866.27	0.00	0.00	0.00
4,700.00	90.50	179.42	2,922.83	-1,966.11	-44.36	1,966.25	0.00	0.00	0.00
4,800.00	90.50	179.42	2,921.96	-2,066.10	-43.35	2,066.24	0.00	0.00	0.00
4,900.00	90.50	179.42	2,921.09	-2,166.09	-42.34	2,166.23	0.00	0.00	0.00
5,000.00	90.50	179.42	2,920.22	-2,266.08	-41.34	2,266.22	0.00	0.00	0.00
5,100.00	90.50	179.42	2,919.35	-2,366.07	-40.33	2,366.20	0.00	0.00	0.00
5,200.00	90.50	179.42	2,918.47	-2,466.06	-39.32	2,466.19	0.00	0.00	0.00
5,300.00	90.50	179.42	2,917.60	-2,566.06	-38.32	2,566.18	0.00	0.00	0.00
5,400.00	90.50	179.42	2,916.73	-2,666.05	-37.31	2,666.16	0.00	0.00	0.00
5,500.00	90.50	179.42	2,915.86	-2,766.04	-36.30	2,766.15	0.00	0.00	0.00
5,600.00	90.50	179.42	2,914.99	-2,866.03	-35.30	2,866.14	0.00	0.00	0.00
5,700.00	90.50	179.42	2,914.11	-2,966.02	-34.29	2,966.12	0.00	0.00	0.00
5,800.00	90.50	179.42	2,913.24	-3,066.01	-33.29	3,066.11	0.00	0.00	0.00
5,900.00	90.50	179.42	2,912.37	-3,166.00	-32.28	3,166.10	0.00	0.00	0.00
6,000.00	90.50	179.42	2,911.50	-3,265.99	-31.27	3,266.08	0.00	0.00	0.00
6,100.00	90.50	179.42	2,910.63	-3,365.98	-30.27	3,366.07	0.00	0.00	0.00
6,200.00	90.50	179.42	2,909.75	-3,465.98	-29.26	3,466.06	0.00	0.00	0.00
6,300.00	90.50	179.42	2,908.88	-3,565.97	-28.25	3,566.05	0.00	0.00	0.00
6,400.00	90.50	179.42	2,908.01	-3,665.96	-27.25	3,666.03	0.00	0.00	0.00
6,500.00	90.50	179.42	2,907.14	-3,765.95	-26.24	3,766.02	0.00	0.00	0.00
6,600.00	90.50	179.42	2,906.27	-3,865.94	-25.24	3,866.01	0.00	0.00	0.00
6,700.00	90.50	179.42	2,905.39	-3,965.93	-24.23	3,965.99	0.00	0.00	0.00
6,800.00	90.50	179.42	2,904.52	-4,065.92	-23.22	4,065.98	0.00	0.00	0.00
6,900.00	90.50	179.42	2,903.65	-4,165.91	-22.22	4,165.97	0.00	0.00	0.00
7,000.00	90.50	179.42	2,902.78	-4,265.91	-21.21	4,265.95	0.00	0.00	0.00

Crescent Directional Drilling

Planning Report

Database:	Houston R5000 HISTORICAL	Local Co-ordinate Reference:	Site Grave Digger State Com 5H
Company:	COG Operating LLC	TVD Reference:	WELL @ 3491' 00ft (Original Well Elev)
Project:	Eddy County, NM	MD Reference:	WELL @ 3491' 00ft (Original Well Elev)
Site:	Grave Digger State Com 5H	North Reference:	Grid
Well:	Grave Digger State Com 5H	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Plan #1		

Planned Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
7,100.00	90.50	179.42	2,901.91	-4,365.90	-20.20	4,365.94	0.00	0.00	0.00
7,200.00	90.50	179.42	2,901.03	-4,465.89	-19.20	4,465.93	0.00	0.00	0.00
7,300.00	90.50	179.42	2,900.16	-4,565.88	-18.19	4,565.91	0.00	0.00	0.00
7,400.00	90.50	179.42	2,899.29	-4,665.87	-17.18	4,665.90	0.00	0.00	0.00
7,438.23	90.50	179.42	2,898.96	-4,704.10	-16.80	4,704.13	0.00	0.00	0.00

TD @ 7438.23' MD, 2898.96' TVD - PBHL (Grave Digger State Com 5H Plan 1)

Design Targets

Target Name	hit/miss target	Dip Angle (°)	Dip Dir (°)	TVD (ft)	+N/-S (ft)	+E/-W (ft)	Northing (ft)	Easting (ft)	Latitude	Longitude
PBHL (Grave Digger Sta	- plan hits target center	0.00	0.00	2,898.96	-4,704.10	-16.80	580,597.90	460,878.10	32 59610156	-104 46036681
- Point										

Formations

Measured Depth (ft)	Vertical Depth (ft)	Name	Lithology	Dip (°)	Dip Direction (°)
5,916.76	2,912.22	Target Centerline 2940' KBTVD @ 0' V'		-0.50	180.20

Plan Annotations

Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
2,458.36	2,458.36	0.00	0.00	KOP - Start Build @ 12 00°/100'
2,813.02	2,781.29	-125.09	-13.06	PP @ 2813.02 MD, 2781.29 TVD, 42.56 INC, 185.96 AZ, 125.14 VS
3,212.53	2,935.81	-479.03	-50.01	Landing Point - Start Turn @ 4 00°/100'
3,375.94	2,934.38	-642.16	-57.68	EOT - Hold @ 179 42° AZ
7,438.23	2,898.96	-4,704.10	-16.80	TD @ 7438.23 MD, 2898.96 TVD



**COG Operating LLC
Grave Digger State Com 5H
Eddy County, NM
Plan #1**



Surface Location Ground Elev: 3473.00 WELL @ 3491.00ft (Original Well Elev)					
+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
0.00	0.00	585302.00	460894.90	32.60903232	-104.46033049

TARGET DETAILS							
Name	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
PBHL (Grave Digger State Com 5H Plan 1)	2898.96	-4704.10	-16.80	580597.90	460878.10	32.59610156	-104.46036680

SECTION DETAILS										
Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	VSect	Annotation
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
2	2458.36	0.00	0.00	2458.36	0.00	0.00	0.00	0.00	0.00	KOP - Start Build @ 12.00°100'
3	3212.53	90.50	185.96	2935.81	-479.03	-50.01	12.00	185.96	479.20	Landing Point - Start Turn @ 4.00°100'
4	3375.94	90.50	179.42	2934.38	-642.16	-57.68	4.00	-89.97	642.36	EOT - Hold @ 179.42°AZ
5	7438.23	90.50	179.42	2898.96	-4704.10	-16.80	0.00	0.00	4704.13	TD @ 7438.23' MD, 2898.96' TVD



Azimuths to Grid North
True North: 0.07°
Magnetic North: 7.97°

Magnetic Field
Strength: 48648.5snT
Dip Angle: 60.36°
Date: 6/12/2012
Model: IGRF2010

