

Well Name: PIEROGI BS FEDERAL COM	Well Location: T24S / R28E / SEC 34 / SWSE /	County or Parish/State:
Well Number: 502H	Type of Well: OIL WELL	Allottee or Tribe Name:
Lease Number: NMNM17222	Unit or CA Name:	Unit or CA Number:
US Well Number: 3001548476	Well Status: Approved Application for Permit to Drill	Operator: MARATHON OIL PERMIAN LLC

Notice of Intent

Sundry ID: 2767257

Type of Submission: Notice of Intent

Type of Action: APD Change

Date Sundry Submitted: 12/21/2023

Time Sundry Submitted: 07:23

Date proposed operation will begin: 01/08/2024

Procedure Description: Marathon Oil respectfully requests approval to change the SHL, BHL, well name, and drill plan for the approved Kyle Federal 24-28-34 TB 13H well as follows: New Well Name: Pierogi BS Federal Com 502H Approved SHL: 756' FSL 1859' FEL, Sec. 34, 24S, 28E Proposed SHL: 816' FSL 1859' FEL, Sec. 34, 24S, 28E Approved BHL: 100' FNL 400' FEL, Sec. 34, 24S, 28E Proposed BHL: 100' FNL 1620' FEL, Sec. 22, 24S, 28E Casing Design Change: Approved Casing & Cement Design: Surface Csg: 17.5" hole, 13.375", 54.5# J55, STC csg set @ 450'. Tail: 458 sx Class C Int Csg: 12.25" hole, 9.625", 40#, J55, LTC csg set @ 2620'. Lead: 507 sx Class C, 360 sx Class C Prod Csg: 8.75" hole, 5.5", 20#, P110, BTC csg set @ 14657'. Lead: 1086 sx Class C, 1659 sx Class H Proposed Casing & Cement Design: Surface Csg: 17.5" hole, 13.375, 54.5#, J55, STC csg set @ 500'. Lead: 166 sx Class C, Tail: 99 sx Class C Int Csg: 12.25" hole, 9.625", 40#, P110HC, BTC csg set @ 7629'. Lead: 1294 sx Class C, Tail 147 sx Class C Prod Csg: 8.75" hole, 5.5", 23#, P110HC, TLW csg se @ 24004'. Tail: 3175 sx Class H Please see attached C102, drill plan for casing and cement design changes, and directional plan. Also included is the approved well pad with the proposed SHL moves. No additional disturbance is requested.

NOI Attachments

Procedure Description

- Pierogi_Fed_Well_Pad_20231222092723.pdf
- Pierogi_BS_Federal_Com_502H_Drill_Plan_20231221192304.pdf
- Pierogi_BS_Federal_Com_502H_Dir_Plan_20231221192252.pdf
- Pierogi_BS_Federal_Com_502H_AC_20231221192242.pdf
- C102_Pierogi_BS_Fed_Com_502H_20231221192229.pdf

Received by OCD: 2/12/2024 10:40:06 AM

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Conditions of Approval

Specialist Review

Kyle_Fed_24_28_34_TB_13H_COA_20240123102416.pdf

Operator

I certify that the foregoing is true and correct. Title 18 U.S.C. Section 1001 and Title 43 U.S.C. 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. Electronic submission of Sundry Notices through this system satisfies regulations requiring a

Operator Electronic Signature: TERRI STATHEM

Signed on: DEC 22, 2023 09:27 AM

Name: MARATHON OIL PERMIAN LLC

Title: Regulatory Compliance Manager

Street Address: 990 TOWN & COUNTRY BLVD

City: HOUSTONState: TX

Phone: (713) 296-2113

Email address: TSTATHEM@MARATHONOIL.COM

Field

Representative Name:

Street Address:

City:State:Zip:

Phone:

Email address:

BLM Point of Contact

BLM POC Name: CHRISTOPHER WALLS

BLM POC Title: Petroleum Engineer

BLM POC Phone: 5752342234

BLM POC Email Address: cwalls@blm.gov

Disposition: Approved

Disposition Date: 02/08/2024

Signature: Chris Walls

Form 3160-5
(June 2019)

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

FORM APPROVED
OMB No. 1004-0137
Expires: October 31, 2021

SUNDRY NOTICES AND REPORTS ON WELLS
Do not use this form for proposals to drill or to re-enter an abandoned well. Use Form 3160-3 (APD) for such proposals.

5. Lease Serial No.	
6. If Indian, Allottee or Tribe Name	
7. If Unit of CA/Agreement, Name and/or No.	
8. Well Name and No.	
9. API Well No.	
10. Field and Pool or Exploratory Area	11. Country or Parish, State

12. CHECK THE APPROPRIATE BOX(ES) TO INDICATE NATURE OF NOTICE, REPORT OR OTHER DATA

TYPE OF SUBMISSION	TYPE OF ACTION				
☐ Notice of Intent	☐ Acidize	☐ Deepen	☐ Production (Start/Resume)	☐ Water Shut-Off	
☐ Subsequent Report	☐ Alter Casing	☐ Hydraulic Fracturing	☐ Reclamation	☐ Well Integrity	
☐ Final Abandonment Notice	☐ Casing Repair	☐ New Construction	☐ Recomplete	☐ Other	
	☐ Change Plans	☐ Plug and Abandon	☐ Temporarily Abandon		
	☐ Convert to Injection	☐ Plug Back	☐ Water Disposal		

13. Describe Proposed or Completed Operation: Clearly state all pertinent details, including estimated starting date of any proposed work and approximate duration thereof. If the proposal is to deepen directionally or recompleate horizontally, give subsurface locations and measured and true vertical depths of all pertinent markers and zones. Attach the Bond under which the work will be perfonned or provide the Bond No. on file with BLM/BIA. Required subsequent reports must be filed within 30 days following completion of the involved operations. If the operation results in a multiple completion or recompletion in a new interval, a Form 3160-4 must be filed once testing has been completed. Final Abandonment Notices must be filed only after all requirements, including reclamation, have been completed and the operator has detennined that the site is ready for final inspection.)

14. I hereby certify that the foregoing is true and correct. Name (Printed/Typed)	Title
Signature	Date

THE SPACE FOR FEDERAL OR STATE OFFICE USE

Approved by	Title	Date
Conditions of approval, if any, are attached. Approval of this notice 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.	Office	

Title 18 U.S.C Section 1001 and Title 43 U.S.C 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)

GENERAL INSTRUCTIONS

This form is designed for submitting proposals to perform certain well operations and reports of such operations when completed as indicated on Federal and Indian lands pursuant to applicable Federal law and regulations. Any necessary special instructions concerning the use of this form and the number of copies to be submitted, particularly with regard to local area or regional procedures and practices, are either shown below, will be issued by or may be obtained from the local Federal office.

SPECIFIC INSTRUCTIONS

Item 4 - Locations on Federal or Indian land should be described in accordance with Federal requirements. Consult the local Federal office for specific instructions.

Item 13: Proposals to abandon a well and subsequent reports of abandonment should include such special information as is required by the local Federal office. In addition, such proposals and reports should include reasons for the abandonment; data on any former or present productive zones or other zones with present significant fluid contents not sealed off by cement or otherwise; depths (top and bottom) and method of placement of cement plugs; mud or other material placed below, between and above plugs; amount, size, method of parting of any casing, liner or tubing pulled and the depth to the top of any tubing left in the hole; method of closing top of well and date well site conditioned for final inspection looking for approval of the abandonment. If the proposal will involve **hydraulic fracturing operations**, you must comply with 43 CFR 3162.3-3, including providing information about the protection of usable water. Operators should provide the best available information about all formations containing water and their depths. This information could include data and interpretation of resistivity logs run on nearby wells. Information may also be obtained from state or tribal regulatory agencies and from local BLM offices.

NOTICES

The privacy Act of 1974 and the regulation in 43 CFR 2.48(d) provide that you be furnished the following information in connection with information required by this application.

AUTHORITY: 30 U.S.C. 181 et seq., 351 et seq., 25 U.S.C. 396; 43 CFR 3160.

PRINCIPAL PURPOSE: The information is used to: (1) Evaluate, when appropriate, approve applications, and report completion of subsequent well operations, on a Federal or Indian lease; and (2) document for administrative use, information for the management, disposal and use of National Resource lands and resources, such as: (a) evaluating the equipment and procedures to be used during a proposed subsequent well operation and reviewing the completed well operations for compliance with the approved plan; (b) requesting and granting approval to perform those actions covered by 43 CFR 3162.3-2, 3162.3-3, and 3162.3-4; (c) reporting the beginning or resumption of production, as required by 43 CFR 3162.4-1(c) and (d) analyzing future applications to drill or modify operations in light of data obtained and methods used.

ROUTINE USES: Information from the record and/or the record will be transferred to appropriate Federal, State, local or foreign agencies, when relevant to civil, criminal or regulatory investigations or prosecutions in connection with congressional inquiries or to consumer reporting agencies to facilitate collection of debts owed the Government.

EFFECT OF NOT PROVIDING THE INFORMATION: Filing of this notice and report and disclosure of the information is mandatory for those subsequent well operations specified in 43 CFR 3162.3-2, 3162.3-3, 3162.3-4.

The Paperwork Reduction Act of 1995 requires us to inform you that:

The BLM collects this information to evaluate proposed and/or completed subsequent well operations on Federal or Indian oil and gas leases.

Response to this request is mandatory.

The BLM would like you to know that you do not have to respond to this or any other Federal agency-sponsored information collection unless it displays a currently valid OMB control number.

BURDEN HOURS STATEMENT: Public reporting burden for this form is estimated to average 8 hours per response, including the time for reviewing instructions, gathering and maintaining data, and completing and reviewing the form. Direct comments regarding the burden estimate or any other aspect of this form to U.S. Department of the Interior, Bureau of Land Management (1004-0137), Bureau Information Collection Clearance Officer (WO-630), 1849 C St., N.W., Mail Stop 401 LS, Washington, D.C. 20240

Additional Information

Additional Remarks

Approved Casing & Cement Design:

Surface Csg: 17.5 hole, 13.375, 54.5# J55, STC csg set @ 450. Tail: 458 sx Class C

Int Csg: 12.25 hole, 9.625, 40#, J55, LTC csg set @ 2620. Lead: 507 sx Class C, 360 sx Class C

Prod Csg: 8.75 hole, 5.5, 20#, P110, BTC csg set @ 14657. Lead: 1086 sx Class C, 1659 sx Class H

Proposed Casing & Cement Design:

Surface Csg: 17.5 hole, 13.375, 54.5#, J55, STC csg set @ 500. Lead: 166 sx Class C, Tail: 99 sx Class C

Int Csg: 12.25 hole, 9.625, 40#, P110HC, BTC csg set @ 7629. Lead: 1294 sx Class C, Tail 147 sx Class C

Prod Csg: 8.75 hole, 5.5, 23#, P110HC, TLW csg se @ 24004. Tail: 3175 sx Class H

Please see attached C102, drill plan for casing and cement design changes, and directional plan. Also included is the approved well pad with the proposed SHL moves. No additional disturbance is requested.

Location of Well

0. SHL: SWSE / 756 FSL / 1859 FEL / TWSP: 24S / RANGE: 28E / SECTION: 34 / LAT: 32.168602 / LONG: -104.0725072 (TVD: 0 feet, MD: 0 feet)

PPP: SESE / 1343 FSL / 400 FEL / TWSP: 24S / RANGE: 28E / SECTION: 34 / LAT: 32.1702236 / LONG: -104.0678063 (TVD: 9535 feet, MD: 10782 feet)

PPP: SESE / 100 FSL / 400 FEL / TWSP: 24S / RANGE: 28E / SECTION: 34 / LAT: 32.1668074 / LONG: -104.0677749 (TVD: 9535 feet, MD: 10057 feet)

BHL: NENE / 100 FNL / 400 FEL / TWSP: 24S / RANGE: 28E / SECTION: 34 / LAT: 32.1810214 / LONG: -104.0679057 (TVD: 9535 feet, MD: 14657 feet)

WELL PAD LOCATION PLAT

PIEROGI FEDERAL COM
SEC. 34 TWP. 24-S RGE. 28-E
SURVEY: N.M.P.M.
COUNTY: EDDY

OPERATOR: MARATHON OIL PERMIAN LLC
U.S.G.S. TOPOGRAPHIC MAP: MALAGA, N.M.



60' 0' 60' 120'
SCALE: 1" = 120'

TOTAL SHORT-TERM DISTURBANCE
AREA = 6.73 ACRES
(WELL PAD AND TOPSOIL RESERVE)

NAD 83

A	E:(X)621842.35 N:(Y)424910.14	LAT:32.16788853 LON:-104.07315546
B	E:(X)621842.29 N:(Y)425510.14	LAT:32.16953786 LON:-104.07315096
C	E:(X)622292.27 N:(Y)425510.16	LAT:32.16953492 LON:-104.07169668
D	E:(X)622292.30 N:(Y)424926.44	LAT:32.16793034 LON:-104.07170119
E	E:(X)622288.11 N:(Y)424910.24	LAT:32.16788583 LON:-104.07171486

NAD 27

A	E:(X)580658.47 N:(Y)424851.89	LAT:32.16776624 LON:-104.07266490
B	E:(X)580658.43 N:(Y)425451.88	LAT:32.16941560 LON:-104.07266036
C	E:(X)581108.40 N:(Y)425451.89	LAT:32.16941263 LON:-104.07120614
D	E:(X)581108.42 N:(Y)424868.18	LAT:32.16780802 LON:-104.07121069
E	E:(X)581104.23 N:(Y)424851.98	LAT:32.16776352 LON:-104.07122436

PROPOSED PAD

LINE	BEARING	DISTANCE
L1	N 00°00'18" W	600.00'
L2	N 89°59'49" E	449.98'
L3	S 00°00'08" E	583.72'
L4	S 14°29'51" W	16.73'
L5	S 89°59'14" W	445.76'

SECTION 34,
T-24-S, R-28-E

BRANSON
PROPERTIES LLC

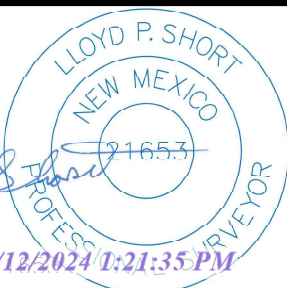
PROPOSED
LEASE ROAD

TIE TABLE

TIE	BEARING	DISTANCE
TIE-1	S 50°54'08" W	793.15'
TIE-2	S 73°15'56" E	1,692.81'

2" IRON PIPE W/GLO CAP
FND FOR S/4 COR.
OF SEC. 34

DECEMBER 7, 2023



NOTE:

THIS IS NOT A BOUNDARY SURVEY, APPARENT PROPERTY CORNERS AND PROPERTY LINES ARE SHOWN FOR INFORMATION ONLY. BOUNDARY DATA SHOWN IS FROM STATE OF NEW MEXICO OIL CONSERVATION DIVISION FORM C-102 INCLUDED IN THIS SUBMITTAL.

I, LLOYD P. SHORT, NEW MEXICO PROFESSIONAL SURVEYOR NO. 21653, DO HEREBY CERTIFY THAT THIS EASEMENT SURVEY PLAT AND THE ACTUAL SURVEY ON THE GROUND UPON WHICH IT IS BASED WERE PERFORMED BY ME OR UNDER MY DIRECT SUPERVISION; THAT I AM RESPONSIBLE FOR THIS SURVEY; THAT THIS SURVEY MEETS THE MINIMUM STANDARDS FOR SURVEYING IN NEW MEXICO; AND THAT IT IS TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE AND BELIEF. I FURTHER CERTIFY THAT THIS SURVEY IS NOT A LAND DIVISION OR SUBDIVISION AS DEFINED IN THE NEW MEXICO SUBDIVISION ACT AND THAT THIS INSTRUMENT IS AN EASEMENT SURVEY PLAT CROSSING AN EXISTING TRACT OR TRACTS.

2	12/04/2023	JCS
REV.	DATE	BY

SHEET 2 OF 6

PREPARED BY:
DELTA FIELD SERVICES, LLC
510 TRENTON ST.
WEST MONROE, LA 71291
318-323-6900 OFFICE
JOB No. MRO_0009_PE

MARATHON OIL PERMIAN, LLC.
DRILLING AND OPERATIONS PLAN



WELL NAME & NUMBER:

PIEROGI BS FEDERAL COM 502H

LOCATION:

SECTION **34**
EDDYTOWNSHIP **24S**
COUNTY,RANGE **28E**
NEW MEXICO**Section 1:****GEOLOGICAL FORMATIONS**

Name of Surface Formation:

Permian

Elevation:

2999 feet

Estimated Tops of Important Geological Markers:

Formation	TVD (ft)	MD (ft)	Elevation (ft SS)	Lithologies	Mineral Resources	Producing Formation?
Rustler		27	2999	Anhydrite	Brine	No
Salado	681	708	2318	Salt/Anhydrite	Brine	No
Castile	949	976	2050	Salt/Anhydrite	Brine	No
Base of Salt (BX)	2465	2492	534	Salt/Anhydrite	Brine	No
Lamar	2605	2632	394	Sandstone/Shale	None	No
Bell Canyon	2659	2686	340	Sandstone	Oil	No
Cherry Canyon	3496	3523	-497	Sandstone	Oil	No
Brushy Canyon	4724	4751	-1725	Sandstone	Oil	No
Bone Spring Lime	6323	6350	-3324	Limestone	None	No
Upper Avalon Shale	6600	6627	-3601	Shale	Oil	Yes
1st Bone Spring Sand	7235	7262	-4236	Sandstone	Oil	Yes
2nd Bone Spring Carbonate	7556	7583	-4557	Limestone/Shale	None	No
2nd Bone Spring Sand	8043	8070	-5044	Sandstone	Oil	Yes
3rd Bone Spring Carbonate	8346	8373	-5347	Limestone	Oil	No
3rd Bone Spring Sand	9168	9195	-6169	Sandstone	Oil	Yes
Wolfcamp	9537	9564	-6538	Sandstone/Shale/Carbonates	Natural Gas / Oil	Yes
Wolfcamp A	9667	9694	-6668	Sandstone/Shale/Carbonates	Natural Gas / Oil	Yes
Wolfcamp B	9946	9973	-6947	Sandstone/Shale/Carbonates	Natural Gas / Oil	No
Wolfcamp C	10231	10258	-7232	Sandstone/Shale/Carbonates	Natural Gas / Oil	Yes
Wolfcamp D	10748	10775	-7749	Sandstone/Shale/Carbonates	Natural Gas / Oil	Yes
Strawn	11807	11834	-8808	Carbonates/Sands/Clays	Natural Gas	Possible

Section 2:**BLOWOUT PREVENTER TESTING PROCEDURE**

Pressure Rating (PSI):

10M

Rating Depth:

10000

Equipment:

13 5/8 BOP Annular (5,000 psi WP) and BOP Stack (10,000 psi WP) will be installed and tested before drilling all holes.

Requesting Variance?

Yes

Variance Request:

A variance is requested for the use of a flexible choke line from the BOP to Choke Manifold. See attached for specs and hydrostatic test chart.

Testing Procedure:

BOP/BOPE will be tested to 250 psi low and a high of 100% WP for the Annular and 5,000psi for the BOP Stacking before drilling the intermediate hole, 10,000psi for the BOP Stacking before drilling the production hole. Testing will be conducted by an independent service company per Onshore Order 2 requirements. The System may be upgraded to a higher pressure but still tested to the working pressure listed in the Equipment Description above. If the system is upgraded all the components installed will be functional and tested.

Pipe rams will be operationally checked each 24 hour period. Blind rams will be operationally checked on each trip out of the hole. These checks will be noted on the daily tour sheets. Other accessories to the BOP equipment will include a Kelly cock, full opening safety valve / inside BOP and choke lines and choke manifold. See attached schematics.

Formation integrity test will be performed per Onshore Order #2. On Exploratory wells or on that portion of any well approved for a 5M BOPE system or greater, a pressure integrity test of each casing shoe shall be performed. Will be tested in accordance with Onshore Oil and Gas Order #2 III.B.1.i. A multibowl wellhead is being used. The BOP will be tested per Onshore Order #2 after installation on the surface casing which will cover testing requirements for a maximum of 30 days. If any seal subject to test pressure is broken the system must be tested. See attached schematic.

Section 3: CASING PROGRAM

String Type	Hole Size	Casing Size	Top Set MD	Bottom Set MD	Top Set TVD	Bottom Set TVD	Top Set MSL	Bottom Set MSL	Weight (lbs/ft)	Grade	Joint Type	Collapse SF	Burst SF	Joint SF Type	Joint SF	Body SF Type	Body SF
Surface	17.5	13.375	0	500	0	527	2999	2472	54.5	J55	BTC	5.22	1.81	BUOY	4.52	BUOY	4.52
Intermediate	12.25	9.625	0	7629	0	7562	2999	-4563	40	P110HC	BTC	1.20	1.42	BUOY	2.44	BUOY	2.44
Production	8.75	5.5	0	24004	0	8235	2999	-5236	23	P110HC	TLW	2.53	1.26	BUOY	2.22	BUOY	2.22

All casing strings will be tested in accordance with Onshore Oil and Gas Order #2 III.B.1.h

Safety Factors will Meet or Exceed

Casing Condition: New
Casing Standard: API
Tapered String? No

Yes or No

Is casing new? If used, attach certification as required in Onshore Order #1.	Yes
Does casing meet API specifications? If no, attach casing specification sheet.	Yes
Is premium or uncommon casing planned? If yes attach casing specification sheet.	No
Does the above casing design meet or exceed BLM's minimum standards? If not provide justification (loading assumptions, casing design criteria).	Yes
Will the intermediate pipe be kept at a minimum 1/3 fluid filled to avoid approaching the collapse pressure rating of the casing?	Yes
Is well located within Capitan Reef?	No
If yes, does production casing cement tie back a minimum of 50' above the Reef?	
Is proposed well within the designated four string boundary?	
Is well located in R-111-P and SOPA?	No
If yes, are the first three strings cemented to surface?	
Is the second string set 100' to 600' below the base of salt?	
Is well located in SOPA but not in R-111-P?	No
If yes, are the first 2 strings cemented to surface and third string cement tied back 500' into previous casing?	
Is well located in high Cave/Karst?	No
If yes, are there two strings cemented to surface?	
If yes, is there a contingency casing if lost circulation occurs?	
Is well located in critical Cave/Karst?	No
If yes, are there three strings cemented to surface?	

Section 4: CEMENT PROGRAM

String Type	Lead/Tail	Top MD	Bottom MD	Quantity (sks)	Yield (ft³/sks)	Density (ppg)	Slurry Volume (ft³)	Excess (%)	Cement Type	Additives
Surface	Lead	0	350	166	2.12	12.5	353	25	Class C	Extender, Accelerator, LCM
Surface	Tail	350	500	99	1.32	14.8	130	25	Class C	Accelerator
Intermediate	Lead	0	7129	1294	2.18	12.4	2822	25	Class C	Extender, Accelerator, LCM
Intermediate	Tail	7129	7629	147	1.33	14.8	196	25	Class C	Retarder
Production	Tail	7329	24004	3175	1.68	13	5333	25	Class H	Retarder, Extender, Fluid Loss, Suspension Agent

Stage tool depth(s) will be adjusted based on hole conditions and cement volumes will be adjusted proportionally. Stage tool will be set a minimum of 50 feet below previous casing and a minimum of 200 feet above current shoe. Lab reports with the 500 psi compressive strength time for the cement will be onsite for review.

Pilot Hole? No
Pilot Hole Depth: N/A
KOP Depth: N/A
Plugging Procedure for Pilot Hole: N/A

Plug Top	Plug Bottom	Excess (%)	Quantity (sx)	Density (ppg)	Yield (ft3/sks)	Water gal/sk	Slurry Description and Cement Type

Section 5:

CIRCULATING MEDIUM

Mud System Type: Closed

Will an air or gas system be used? No

Describe what will be on location to control well or mitigate other conditions:

The necessary mud products for additional weight and fluid loss control will be on location at all times.

Describe the mud monitoring system utilized:

Losses or gains in the mud system will be monitored visually/manually as well as with an electronic PVT.

Circulating Medium Table:

Top Depth	Bottom Depth	Mud Type	Min. Weight (ppg)	Max Weight (ppg)
0	500	Water Based Mud	8.4	8.8
500	7629	Brine or Oil Based Mud	9.2	10.2
7629	24004	Oil Based Mud	10.5	12.5

Section 6:

TESTING, LOGGING, CORING

List of production tests including testing procedures, equipment and safety measures:

GR from TD to surface (horizontal well - vertical portion of hole)

List of open and cased hole logs run in the well:

GR while drilling from Intermediate casing shoe to TD.

Coring operation description for the well:

Run gamma-ray (GR) and corrected neutron log (CNL) or analogous to surface for future development of the area, one per shared well pad not to exceed 200’ radial distance.

Section 7:

ANTICIPATED PRESSURE

Anticipated Bottom Hole Pressure: 5353 PSI

Anticipated Bottom Hole Temperature: 195 °F

Anticipated Abnormal Pressure? No

Anticipated Abnormal Temperature? No

Potential Hazards:

H2S detection equipment will be in operation after drilling out the surface casing shoe until the production casing has been cemented. Breathing equipment will be on location from drilling out the surface shoe until production casing is cemented. If H2S is encountered the operator will comply with Onshore Order #6. Adequate flare lines will be installed off the mud/gas separator where gas may be flared safely. All personnel will be familiar with all aspects of safe operation of equipment being used to drill this well. See attached H2S Contingency Plan.

Section 8:

OTHER INFORMATION

Auxiliary Well Control and Monitoring Equipment:

A Kelly cock will be in the drill string at all times. A full opening drill pipe stabbing valve having the appropriate connections will be on the rig floor unobstructed and readily accessible at all times.

Hydrogen Sulfide detection equipment will be in operation after drilling out the surface casing shoe until the production casing is cemented. Breathing equipment will be on location upon drilling the surface casing shoe until total depth is reached. If Hydrogen Sulfide is encountered, measured amounts and formations will be reported to the BLM.

Anticipated Starting Date and Duration of Operations:

Road and location construction will begin after the BLM has approved the APD. Anticipated spud date will be as soon as possible after BLM approval and as soon as a rig will be available. Move in operations and drilling is expected to take 30 days.

DRILL PLAN CHANGE REGISTER

PIEROGI BS FEDERAL COM 502H
SECTION 34, TOWNSHIP 24S, RANGE 28E
EDDY COUNTY, NEW MEXICO

Original Document Date:	Tuesday, December 19, 2023
Prepared By:	Anthony Monaco
Submitted By:	Adrian Covarrubias

Revised Date:	Monday, October 18, 2021	Submittal Date:	Monday, November 1, 2021
Revised By:	Court Nelson (Drilling Engineer)	Submittal Type:	NOI Change to AAPD Sundry Notice
	Matt Baker (Geologist)	Submitted By:	Melissa Szudera

Summary of Revisions:

Section	Description
2 - Casing	Removed second intermediate string
4 - Cement	Removed second intermediate string
5 - Mud	Removed second intermediate string

Revised Date:		Submittal Date:	
Revised By:		Submittal Type:	
		Submitted By:	

Summary of Revisions:

Section	Description

Revised Date:		Submittal Date:	
Revised By:		Submittal Type:	
		Submitted By:	

Summary of Revisions:

Section	Description

Revised Date:		Submittal Date:	
Revised By:		Submittal Type:	
		Submitted By:	

Summary of Revisions:

Section	Description



Marathon Oil

**Eddy County, New Mexico (NAD 27)
Pierogi Federal Com (302H, 502H, 552H)
Pierogi BS Federal Com 502H**

Wellbore #1

Plan: Design #1

Standard Planning Report

12 December, 2023





MS Directional Planning Report



Database:	EDM 5000.15 Conroe DB	Local Co-ordinate Reference:	Well Pierogi BS Federal Com 502H
Company:	Marathon Oil	TVD Reference:	WELL @ 3022.50usft (Precision 580)
Project:	Eddy County, New Mexico (NAD 27)	MD Reference:	WELL @ 3022.50usft (Precision 580)
Site:	Pierogi Federal Com (302H, 502H, 552H)	North Reference:	Grid
Well:	Pierogi BS Federal Com 502H	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Design #1		

Project	Eddy County, New Mexico (NAD 27)		
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	Pierogi Federal Com (302H, 502H, 552H)		
Site Position:		Northing:	425,201.89 usft
From:	Map	Easting:	580,858.43 usft
Position Uncertainty:	0.00 usft	Slot Radius:	13-3/16 "
		Latitude:	32° 10' 7.417 N
		Longitude:	104° 4' 19.257 W

Well	Pierogi BS Federal Com 502H		
Well Position	+N/-S	0.00 usft	Northing: 425,171.90 usft
	+E/-W	0.00 usft	Easting: 580,858.43 usft
Position Uncertainty	0.00 usft	Wellhead Elevation:	usft
Grid Convergence:	0.139 °	Ground Level:	2,999.00 usft

Wellbore	Wellbore #1				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	HDGM2023	12/31/2023	6.617	59.733	47,386.00

Design	Design #1				
Audit Notes:					
Version:	Phase:	PLAN	Tie On Depth:	0.00	
Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)	
	0.00	0.00	0.00	359.20	

Plan Survey Tool Program	Date	12/12/2023			
Depth From (usft)	Depth To (usft)	Survey (Wellbore)	Tool Name	Remarks	
1	0.00	24,004.19	Design #1 (Wellbore #1)	MWD+IFR1+FDIR	
				OWSG MWD + IFR1 + FDIR	

Plan Sections											
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	TFO (°)	Target	
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.000		
1,800.00	0.00	0.00	1,800.00	0.00	0.00	0.00	0.00	0.00	0.000		
2,300.06	10.00	162.13	2,297.52	-41.43	13.36	2.00	2.00	0.00	162.125		
6,427.73	10.00	162.13	6,362.48	-723.68	233.39	0.00	0.00	0.00	0.000		
6,927.79	0.00	0.00	6,860.00	-765.11	246.75	2.00	-2.00	0.00	180.000		
7,729.84	0.00	0.00	7,662.04	-765.11	246.75	0.00	0.00	0.00	0.000		
8,629.84	90.00	359.20	8,235.00	-192.21	238.79	10.00	10.00	0.00	359.204		
24,004.19	90.00	359.20	8,235.00	15,180.66	25.27	0.00	0.00	0.00	0.000	LTP/PBHL_Pierogi	



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Project:	Eddy County, New Mexico (NAD 27)	MD Reference:	WELL @ 3022.50usft (Precision 580)
Site:	Pierogi Federal Com (302H, 502H, 552H)	North Reference:	Grid
Well:	Pierogi BS Federal Com 502H	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Design #1		

Planned Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
100.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00
200.00	0.00	0.00	200.00	0.00	0.00	0.00	0.00	0.00	0.00
300.00	0.00	0.00	300.00	0.00	0.00	0.00	0.00	0.00	0.00
400.00	0.00	0.00	400.00	0.00	0.00	0.00	0.00	0.00	0.00
500.00	0.00	0.00	500.00	0.00	0.00	0.00	0.00	0.00	0.00
600.00	0.00	0.00	600.00	0.00	0.00	0.00	0.00	0.00	0.00
700.00	0.00	0.00	700.00	0.00	0.00	0.00	0.00	0.00	0.00
800.00	0.00	0.00	800.00	0.00	0.00	0.00	0.00	0.00	0.00
900.00	0.00	0.00	900.00	0.00	0.00	0.00	0.00	0.00	0.00
1,000.00	0.00	0.00	1,000.00	0.00	0.00	0.00	0.00	0.00	0.00
1,100.00	0.00	0.00	1,100.00	0.00	0.00	0.00	0.00	0.00	0.00
1,200.00	0.00	0.00	1,200.00	0.00	0.00	0.00	0.00	0.00	0.00
1,300.00	0.00	0.00	1,300.00	0.00	0.00	0.00	0.00	0.00	0.00
1,400.00	0.00	0.00	1,400.00	0.00	0.00	0.00	0.00	0.00	0.00
1,500.00	0.00	0.00	1,500.00	0.00	0.00	0.00	0.00	0.00	0.00
1,600.00	0.00	0.00	1,600.00	0.00	0.00	0.00	0.00	0.00	0.00
1,700.00	0.00	0.00	1,700.00	0.00	0.00	0.00	0.00	0.00	0.00
1,800.00	0.00	0.00	1,800.00	0.00	0.00	0.00	0.00	0.00	0.00
KOP, 2.00°/100' Build									
1,900.00	2.00	162.13	1,899.98	-1.66	0.54	-1.67	2.00	2.00	0.00
2,000.00	4.00	162.13	1,999.84	-6.64	2.14	-6.67	2.00	2.00	0.00
2,100.00	6.00	162.13	2,099.45	-14.94	4.82	-15.00	2.00	2.00	0.00
2,200.00	8.00	162.13	2,198.70	-26.53	8.56	-26.65	2.00	2.00	0.00
2,300.06	10.00	162.13	2,297.52	-41.43	13.36	-41.61	2.00	2.00	0.00
Begin 10.00° Tangent									
2,400.00	10.00	162.13	2,395.95	-57.95	18.69	-58.21	0.00	0.00	0.00
2,500.00	10.00	162.13	2,494.43	-74.48	24.02	-74.81	0.00	0.00	0.00
2,600.00	10.00	162.13	2,592.91	-91.01	29.35	-91.41	0.00	0.00	0.00
2,700.00	10.00	162.13	2,691.39	-107.54	34.68	-108.01	0.00	0.00	0.00
2,800.00	10.00	162.13	2,789.87	-124.06	40.01	-124.61	0.00	0.00	0.00
2,900.00	10.00	162.13	2,888.35	-140.59	45.34	-141.21	0.00	0.00	0.00
3,000.00	10.00	162.13	2,986.83	-157.12	50.67	-157.81	0.00	0.00	0.00
3,100.00	10.00	162.13	3,085.31	-173.65	56.00	-174.42	0.00	0.00	0.00
3,200.00	10.00	162.13	3,183.79	-190.18	61.33	-191.02	0.00	0.00	0.00
3,300.00	10.00	162.13	3,282.27	-206.71	66.66	-207.62	0.00	0.00	0.00
3,400.00	10.00	162.13	3,380.75	-223.24	71.99	-224.22	0.00	0.00	0.00
3,500.00	10.00	162.13	3,479.23	-239.76	77.32	-240.82	0.00	0.00	0.00
3,600.00	10.00	162.13	3,577.71	-256.29	82.66	-257.42	0.00	0.00	0.00
3,700.00	10.00	162.13	3,676.19	-272.82	87.99	-274.02	0.00	0.00	0.00
3,800.00	10.00	162.13	3,774.67	-289.35	93.32	-290.63	0.00	0.00	0.00
3,900.00	10.00	162.13	3,873.15	-305.88	98.65	-307.23	0.00	0.00	0.00
4,000.00	10.00	162.13	3,971.63	-322.41	103.98	-323.83	0.00	0.00	0.00
4,100.00	10.00	162.13	4,070.11	-338.94	109.31	-340.43	0.00	0.00	0.00
4,200.00	10.00	162.13	4,168.59	-355.47	114.64	-357.03	0.00	0.00	0.00
4,300.00	10.00	162.13	4,267.07	-371.99	119.97	-373.63	0.00	0.00	0.00
4,400.00	10.00	162.13	4,365.55	-388.52	125.30	-390.23	0.00	0.00	0.00
4,500.00	10.00	162.13	4,464.03	-405.05	130.63	-406.84	0.00	0.00	0.00
4,600.00	10.00	162.13	4,562.51	-421.58	135.96	-423.44	0.00	0.00	0.00
4,700.00	10.00	162.13	4,661.00	-438.11	141.29	-440.04	0.00	0.00	0.00
4,800.00	10.00	162.13	4,759.48	-454.64	146.62	-456.64	0.00	0.00	0.00
4,900.00	10.00	162.13	4,857.96	-471.17	151.95	-473.24	0.00	0.00	0.00
5,000.00	10.00	162.13	4,956.44	-487.69	157.28	-489.84	0.00	0.00	0.00



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Project:	Eddy County, New Mexico (NAD 27)	MD Reference:	WELL @ 3022.50usft (Precision 580)
Site:	Pierogi Federal Com (302H, 502H, 552H)	North Reference:	Grid
Well:	Pierogi BS Federal Com 502H	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Design #1		

Planned Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
5,100.00	10.00	162.13	5,054.92	-504.22	162.61	-506.44	0.00	0.00	0.00
5,200.00	10.00	162.13	5,153.40	-520.75	167.94	-523.05	0.00	0.00	0.00
5,300.00	10.00	162.13	5,251.88	-537.28	173.27	-539.65	0.00	0.00	0.00
5,400.00	10.00	162.13	5,350.36	-553.81	178.60	-556.25	0.00	0.00	0.00
5,500.00	10.00	162.13	5,448.84	-570.34	183.94	-572.85	0.00	0.00	0.00
5,600.00	10.00	162.13	5,547.32	-586.87	189.27	-589.45	0.00	0.00	0.00
5,700.00	10.00	162.13	5,645.80	-603.39	194.60	-606.05	0.00	0.00	0.00
5,800.00	10.00	162.13	5,744.28	-619.92	199.93	-622.65	0.00	0.00	0.00
5,900.00	10.00	162.13	5,842.76	-636.45	205.26	-639.25	0.00	0.00	0.00
6,000.00	10.00	162.13	5,941.24	-652.98	210.59	-655.86	0.00	0.00	0.00
6,100.00	10.00	162.13	6,039.72	-669.51	215.92	-672.46	0.00	0.00	0.00
6,200.00	10.00	162.13	6,138.20	-686.04	221.25	-689.06	0.00	0.00	0.00
6,300.00	10.00	162.13	6,236.68	-702.57	226.58	-705.66	0.00	0.00	0.00
6,400.00	10.00	162.13	6,335.16	-719.09	231.91	-722.26	0.00	0.00	0.00
6,427.73	10.00	162.13	6,362.47	-723.68	233.39	-726.87	0.00	0.00	0.00
Begin 2.00°/100' Drop									
6,500.00	8.56	162.13	6,433.79	-734.77	236.96	-738.00	2.00	-2.00	0.00
6,600.00	6.56	162.13	6,532.92	-747.28	241.00	-750.57	2.00	-2.00	0.00
6,700.00	4.56	162.13	6,632.45	-756.50	243.97	-759.83	2.00	-2.00	0.00
6,800.00	2.56	162.13	6,732.25	-762.40	245.88	-765.76	2.00	-2.00	0.00
6,900.00	0.56	162.13	6,832.21	-764.98	246.71	-768.35	2.00	-2.00	0.00
6,927.79	0.00	162.13	6,860.00	-765.11	246.75	-768.48	2.00	-2.00	0.00
Begin Vertical Hold									
7,000.00	0.00	0.00	6,932.21	-765.11	246.75	-768.48	0.00	0.00	0.00
7,100.00	0.00	0.00	7,032.21	-765.11	246.75	-768.48	0.00	0.00	0.00
7,200.00	0.00	0.00	7,132.21	-765.11	246.75	-768.48	0.00	0.00	0.00
7,300.00	0.00	0.00	7,232.21	-765.11	246.75	-768.48	0.00	0.00	0.00
7,400.00	0.00	0.00	7,332.21	-765.11	246.75	-768.48	0.00	0.00	0.00
7,500.00	0.00	0.00	7,432.21	-765.11	246.75	-768.48	0.00	0.00	0.00
7,600.00	0.00	0.00	7,532.21	-765.11	246.75	-768.48	0.00	0.00	0.00
7,700.00	0.00	0.00	7,632.21	-765.11	246.75	-768.48	0.00	0.00	0.00
7,729.84	0.00	0.00	7,662.04	-765.11	246.75	-768.48	0.00	0.00	0.00
KOP, 10.00°/100' Build									
7,750.00	2.02	359.20	7,682.20	-764.76	246.75	-768.13	10.00	10.00	0.00
7,800.00	7.02	359.20	7,732.03	-760.82	246.69	-764.19	10.00	10.00	0.00
7,850.00	12.02	359.20	7,781.33	-752.56	246.58	-755.93	10.00	10.00	0.00
7,900.00	17.02	359.20	7,829.71	-740.03	246.40	-743.40	10.00	10.00	0.00
7,950.00	22.02	359.20	7,876.83	-723.33	246.17	-726.70	10.00	10.00	0.00
8,000.00	27.02	359.20	7,922.31	-702.59	245.88	-705.96	10.00	10.00	0.00
8,050.00	32.02	359.20	7,965.80	-677.97	245.54	-681.33	10.00	10.00	0.00
8,100.00	37.02	359.20	8,006.99	-649.65	245.15	-653.01	10.00	10.00	0.00
8,150.00	42.02	359.20	8,045.55	-617.85	244.70	-621.20	10.00	10.00	0.00
8,200.00	47.02	359.20	8,081.19	-582.81	244.22	-586.16	10.00	10.00	0.00
8,250.00	52.02	359.20	8,113.64	-544.79	243.69	-548.14	10.00	10.00	0.00
8,300.00	57.02	359.20	8,142.65	-504.10	243.12	-507.44	10.00	10.00	0.00
8,350.00	62.02	359.20	8,168.01	-461.02	242.53	-464.37	10.00	10.00	0.00
8,400.00	67.02	359.20	8,189.52	-415.91	241.90	-419.25	10.00	10.00	0.00
8,450.00	72.02	359.20	8,207.01	-369.09	241.25	-372.42	10.00	10.00	0.00
8,500.00	77.02	359.20	8,220.35	-320.92	240.58	-324.25	10.00	10.00	0.00
8,550.00	82.02	359.20	8,229.45	-271.78	239.90	-275.10	10.00	10.00	0.00
8,600.00	87.02	359.20	8,234.22	-222.03	239.21	-225.35	10.00	10.00	0.00
8,629.84	90.00	359.20	8,235.00	-192.21	238.79	-195.52	10.00	10.00	0.00
Begin 90.00° Lateral									



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Planned Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
8,700.00	90.00	359.20	8,235.00	-122.05	237.82	-125.36	0.00	0.00	0.00
8,800.00	90.00	359.20	8,235.00	-22.06	236.43	-25.36	0.00	0.00	0.00
8,900.00	90.00	359.20	8,235.00	77.93	235.04	74.64	0.00	0.00	0.00
9,000.00	90.00	359.20	8,235.00	177.92	233.65	174.64	0.00	0.00	0.00
9,100.00	90.00	359.20	8,235.00	277.91	232.26	274.64	0.00	0.00	0.00
9,200.00	90.00	359.20	8,235.00	377.90	230.87	374.64	0.00	0.00	0.00
9,300.00	90.00	359.20	8,235.00	477.89	229.49	474.64	0.00	0.00	0.00
9,400.00	90.00	359.20	8,235.00	577.88	228.10	574.64	0.00	0.00	0.00
9,500.00	90.00	359.20	8,235.00	677.87	226.71	674.64	0.00	0.00	0.00
9,600.00	90.00	359.20	8,235.00	777.86	225.32	774.64	0.00	0.00	0.00
9,700.00	90.00	359.20	8,235.00	877.85	223.93	874.64	0.00	0.00	0.00
9,800.00	90.00	359.20	8,235.00	977.84	222.54	974.64	0.00	0.00	0.00
9,900.00	90.00	359.20	8,235.00	1,077.83	221.15	1,074.64	0.00	0.00	0.00
10,000.00	90.00	359.20	8,235.00	1,177.82	219.76	1,174.64	0.00	0.00	0.00
10,100.00	90.00	359.20	8,235.00	1,277.81	218.37	1,274.64	0.00	0.00	0.00
10,200.00	90.00	359.20	8,235.00	1,377.80	216.99	1,374.64	0.00	0.00	0.00
10,300.00	90.00	359.20	8,235.00	1,477.79	215.60	1,474.64	0.00	0.00	0.00
10,400.00	90.00	359.20	8,235.00	1,577.78	214.21	1,574.64	0.00	0.00	0.00
10,500.00	90.00	359.20	8,235.00	1,677.78	212.82	1,674.64	0.00	0.00	0.00
10,600.00	90.00	359.20	8,235.00	1,777.77	211.43	1,774.64	0.00	0.00	0.00
10,700.00	90.00	359.20	8,235.00	1,877.76	210.04	1,874.64	0.00	0.00	0.00
10,800.00	90.00	359.20	8,235.00	1,977.75	208.65	1,974.64	0.00	0.00	0.00
10,900.00	90.00	359.20	8,235.00	2,077.74	207.26	2,074.64	0.00	0.00	0.00
11,000.00	90.00	359.20	8,235.00	2,177.73	205.88	2,174.64	0.00	0.00	0.00
11,100.00	90.00	359.20	8,235.00	2,277.72	204.49	2,274.64	0.00	0.00	0.00
11,200.00	90.00	359.20	8,235.00	2,377.71	203.10	2,374.64	0.00	0.00	0.00
11,300.00	90.00	359.20	8,235.00	2,477.70	201.71	2,474.64	0.00	0.00	0.00
11,400.00	90.00	359.20	8,235.00	2,577.69	200.32	2,574.64	0.00	0.00	0.00
11,500.00	90.00	359.20	8,235.00	2,677.68	198.93	2,674.64	0.00	0.00	0.00
11,600.00	90.00	359.20	8,235.00	2,777.67	197.54	2,774.64	0.00	0.00	0.00
11,700.00	90.00	359.20	8,235.00	2,877.66	196.15	2,874.64	0.00	0.00	0.00
11,800.00	90.00	359.20	8,235.00	2,977.65	194.76	2,974.64	0.00	0.00	0.00
11,900.00	90.00	359.20	8,235.00	3,077.64	193.38	3,074.64	0.00	0.00	0.00
12,000.00	90.00	359.20	8,235.00	3,177.63	191.99	3,174.64	0.00	0.00	0.00
12,100.00	90.00	359.20	8,235.00	3,277.62	190.60	3,274.64	0.00	0.00	0.00
12,200.00	90.00	359.20	8,235.00	3,377.61	189.21	3,374.64	0.00	0.00	0.00
12,300.00	90.00	359.20	8,235.00	3,477.60	187.82	3,474.64	0.00	0.00	0.00
12,400.00	90.00	359.20	8,235.00	3,577.59	186.43	3,574.64	0.00	0.00	0.00
12,500.00	90.00	359.20	8,235.00	3,677.58	185.04	3,674.64	0.00	0.00	0.00
12,600.00	90.00	359.20	8,235.00	3,777.57	183.65	3,774.64	0.00	0.00	0.00
12,700.00	90.00	359.20	8,235.00	3,877.56	182.27	3,874.64	0.00	0.00	0.00
12,800.00	90.00	359.20	8,235.00	3,977.55	180.88	3,974.64	0.00	0.00	0.00
12,900.00	90.00	359.20	8,235.00	4,077.54	179.49	4,074.64	0.00	0.00	0.00
13,000.00	90.00	359.20	8,235.00	4,177.53	178.10	4,174.64	0.00	0.00	0.00
13,100.00	90.00	359.20	8,235.00	4,277.52	176.71	4,274.64	0.00	0.00	0.00
13,200.00	90.00	359.20	8,235.00	4,377.51	175.32	4,374.64	0.00	0.00	0.00
13,300.00	90.00	359.20	8,235.00	4,477.51	173.93	4,474.64	0.00	0.00	0.00
13,400.00	90.00	359.20	8,235.00	4,577.50	172.54	4,574.64	0.00	0.00	0.00
13,500.00	90.00	359.20	8,235.00	4,677.49	171.15	4,674.64	0.00	0.00	0.00
13,600.00	90.00	359.20	8,235.00	4,777.48	169.77	4,774.64	0.00	0.00	0.00
13,700.00	90.00	359.20	8,235.00	4,877.47	168.38	4,874.64	0.00	0.00	0.00
13,800.00	90.00	359.20	8,235.00	4,977.46	166.99	4,974.64	0.00	0.00	0.00
13,900.00	90.00	359.20	8,235.00	5,077.45	165.60	5,074.64	0.00	0.00	0.00
14,000.00	90.00	359.20	8,235.00	5,177.44	164.21	5,174.64	0.00	0.00	0.00



MS Directional Planning Report



Database:	EDM 5000.15 Conroe DB	Local Co-ordinate Reference:	Well Pierogi BS Federal Com 502H
Company:	Marathon Oil	TVD Reference:	WELL @ 3022.50usft (Precision 580)
Project:	Eddy County, New Mexico (NAD 27)	MD Reference:	WELL @ 3022.50usft (Precision 580)
Site:	Pierogi Federal Com (302H, 502H, 552H)	North Reference:	Grid
Well:	Pierogi BS Federal Com 502H	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Design #1		

Planned Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
14,100.00	90.00	359.20	8,235.00	5,277.43	162.82	5,274.64	0.00	0.00	0.00
14,200.00	90.00	359.20	8,235.00	5,377.42	161.43	5,374.64	0.00	0.00	0.00
14,300.00	90.00	359.20	8,235.00	5,477.41	160.04	5,474.64	0.00	0.00	0.00
14,400.00	90.00	359.20	8,235.00	5,577.40	158.66	5,574.64	0.00	0.00	0.00
14,500.00	90.00	359.20	8,235.00	5,677.39	157.27	5,674.64	0.00	0.00	0.00
14,600.00	90.00	359.20	8,235.00	5,777.38	155.88	5,774.64	0.00	0.00	0.00
14,700.00	90.00	359.20	8,235.00	5,877.37	154.49	5,874.64	0.00	0.00	0.00
14,800.00	90.00	359.20	8,235.00	5,977.36	153.10	5,974.64	0.00	0.00	0.00
14,900.00	90.00	359.20	8,235.00	6,077.35	151.71	6,074.64	0.00	0.00	0.00
15,000.00	90.00	359.20	8,235.00	6,177.34	150.32	6,174.64	0.00	0.00	0.00
15,100.00	90.00	359.20	8,235.00	6,277.33	148.93	6,274.64	0.00	0.00	0.00
15,200.00	90.00	359.20	8,235.00	6,377.32	147.54	6,374.64	0.00	0.00	0.00
15,300.00	90.00	359.20	8,235.00	6,477.31	146.16	6,474.64	0.00	0.00	0.00
15,400.00	90.00	359.20	8,235.00	6,577.30	144.77	6,574.64	0.00	0.00	0.00
15,500.00	90.00	359.20	8,235.00	6,677.29	143.38	6,674.64	0.00	0.00	0.00
15,600.00	90.00	359.20	8,235.00	6,777.28	141.99	6,774.64	0.00	0.00	0.00
15,700.00	90.00	359.20	8,235.00	6,877.27	140.60	6,874.64	0.00	0.00	0.00
15,800.00	90.00	359.20	8,235.00	6,977.26	139.21	6,974.64	0.00	0.00	0.00
15,900.00	90.00	359.20	8,235.00	7,077.25	137.82	7,074.64	0.00	0.00	0.00
16,000.00	90.00	359.20	8,235.00	7,177.24	136.43	7,174.64	0.00	0.00	0.00
16,100.00	90.00	359.20	8,235.00	7,277.24	135.05	7,274.64	0.00	0.00	0.00
16,200.00	90.00	359.20	8,235.00	7,377.23	133.66	7,374.64	0.00	0.00	0.00
16,300.00	90.00	359.20	8,235.00	7,477.22	132.27	7,474.64	0.00	0.00	0.00
16,400.00	90.00	359.20	8,235.00	7,577.21	130.88	7,574.64	0.00	0.00	0.00
16,500.00	90.00	359.20	8,235.00	7,677.20	129.49	7,674.64	0.00	0.00	0.00
16,600.00	90.00	359.20	8,235.00	7,777.19	128.10	7,774.64	0.00	0.00	0.00
16,700.00	90.00	359.20	8,235.00	7,877.18	126.71	7,874.64	0.00	0.00	0.00
16,800.00	90.00	359.20	8,235.00	7,977.17	125.32	7,974.64	0.00	0.00	0.00
16,900.00	90.00	359.20	8,235.00	8,077.16	123.93	8,074.64	0.00	0.00	0.00
17,000.00	90.00	359.20	8,235.00	8,177.15	122.55	8,174.64	0.00	0.00	0.00
17,100.00	90.00	359.20	8,235.00	8,277.14	121.16	8,274.64	0.00	0.00	0.00
17,200.00	90.00	359.20	8,235.00	8,377.13	119.77	8,374.64	0.00	0.00	0.00
17,300.00	90.00	359.20	8,235.00	8,477.12	118.38	8,474.64	0.00	0.00	0.00
17,400.00	90.00	359.20	8,235.00	8,577.11	116.99	8,574.64	0.00	0.00	0.00
17,500.00	90.00	359.20	8,235.00	8,677.10	115.60	8,674.64	0.00	0.00	0.00
17,600.00	90.00	359.20	8,235.00	8,777.09	114.21	8,774.64	0.00	0.00	0.00
17,700.00	90.00	359.20	8,235.00	8,877.08	112.82	8,874.64	0.00	0.00	0.00
17,800.00	90.00	359.20	8,235.00	8,977.07	111.44	8,974.64	0.00	0.00	0.00
17,900.00	90.00	359.20	8,235.00	9,077.06	110.05	9,074.64	0.00	0.00	0.00
18,000.00	90.00	359.20	8,235.00	9,177.05	108.66	9,174.64	0.00	0.00	0.00
18,100.00	90.00	359.20	8,235.00	9,277.04	107.27	9,274.64	0.00	0.00	0.00
18,200.00	90.00	359.20	8,235.00	9,377.03	105.88	9,374.64	0.00	0.00	0.00
18,300.00	90.00	359.20	8,235.00	9,477.02	104.49	9,474.64	0.00	0.00	0.00
18,400.00	90.00	359.20	8,235.00	9,577.01	103.10	9,574.64	0.00	0.00	0.00
18,500.00	90.00	359.20	8,235.00	9,677.00	101.71	9,674.64	0.00	0.00	0.00
18,600.00	90.00	359.20	8,235.00	9,776.99	100.32	9,774.64	0.00	0.00	0.00
18,700.00	90.00	359.20	8,235.00	9,876.98	98.94	9,874.64	0.00	0.00	0.00
18,800.00	90.00	359.20	8,235.00	9,976.97	97.55	9,974.64	0.00	0.00	0.00
18,900.00	90.00	359.20	8,235.00	10,076.96	96.16	10,074.64	0.00	0.00	0.00
19,000.00	90.00	359.20	8,235.00	10,176.95	94.77	10,174.64	0.00	0.00	0.00
19,100.00	90.00	359.20	8,235.00	10,276.94	93.38	10,274.64	0.00	0.00	0.00
19,200.00	90.00	359.20	8,235.00	10,376.93	91.99	10,374.64	0.00	0.00	0.00
19,300.00	90.00	359.20	8,235.00	10,476.92	90.60	10,474.64	0.00	0.00	0.00
19,400.00	90.00	359.20	8,235.00	10,576.91	89.21	10,574.64	0.00	0.00	0.00



MS Directional Planning Report



Database:	EDM 5000.15 Conroe DB	Local Co-ordinate Reference:	Well Pierogi BS Federal Com 502H
Company:	Marathon Oil	TVD Reference:	WELL @ 3022.50usft (Precision 580)
Project:	Eddy County, New Mexico (NAD 27)	MD Reference:	WELL @ 3022.50usft (Precision 580)
Site:	Pierogi Federal Com (302H, 502H, 552H)	North Reference:	Grid
Well:	Pierogi BS Federal Com 502H	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Design #1		

Planned Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
19,500.00	90.00	359.20	8,235.00	10,676.91	87.83	10,674.64	0.00	0.00	0.00
19,600.00	90.00	359.20	8,235.00	10,776.90	86.44	10,774.64	0.00	0.00	0.00
19,700.00	90.00	359.20	8,235.00	10,876.89	85.05	10,874.64	0.00	0.00	0.00
19,800.00	90.00	359.20	8,235.00	10,976.88	83.66	10,974.64	0.00	0.00	0.00
19,900.00	90.00	359.20	8,235.00	11,076.87	82.27	11,074.64	0.00	0.00	0.00
20,000.00	90.00	359.20	8,235.00	11,176.86	80.88	11,174.64	0.00	0.00	0.00
20,100.00	90.00	359.20	8,235.00	11,276.85	79.49	11,274.64	0.00	0.00	0.00
20,200.00	90.00	359.20	8,235.00	11,376.84	78.10	11,374.64	0.00	0.00	0.00
20,300.00	90.00	359.20	8,235.00	11,476.83	76.71	11,474.64	0.00	0.00	0.00
20,400.00	90.00	359.20	8,235.00	11,576.82	75.33	11,574.64	0.00	0.00	0.00
20,500.00	90.00	359.20	8,235.00	11,676.81	73.94	11,674.64	0.00	0.00	0.00
20,600.00	90.00	359.20	8,235.00	11,776.80	72.55	11,774.64	0.00	0.00	0.00
20,700.00	90.00	359.20	8,235.00	11,876.79	71.16	11,874.64	0.00	0.00	0.00
20,800.00	90.00	359.20	8,235.00	11,976.78	69.77	11,974.64	0.00	0.00	0.00
20,900.00	90.00	359.20	8,235.00	12,076.77	68.38	12,074.64	0.00	0.00	0.00
21,000.00	90.00	359.20	8,235.00	12,176.76	66.99	12,174.64	0.00	0.00	0.00
21,100.00	90.00	359.20	8,235.00	12,276.75	65.60	12,274.64	0.00	0.00	0.00
21,200.00	90.00	359.20	8,235.00	12,376.74	64.22	12,374.64	0.00	0.00	0.00
21,300.00	90.00	359.20	8,235.00	12,476.73	62.83	12,474.64	0.00	0.00	0.00
21,400.00	90.00	359.20	8,235.00	12,576.72	61.44	12,574.64	0.00	0.00	0.00
21,500.00	90.00	359.20	8,235.00	12,676.71	60.05	12,674.64	0.00	0.00	0.00
21,600.00	90.00	359.20	8,235.00	12,776.70	58.66	12,774.64	0.00	0.00	0.00
21,700.00	90.00	359.20	8,235.00	12,876.70	57.27	12,874.64	0.00	0.00	0.00
21,800.00	90.00	359.20	8,235.00	12,976.69	55.88	12,974.64	0.00	0.00	0.00
21,900.00	90.00	359.20	8,235.00	13,076.68	54.49	13,074.64	0.00	0.00	0.00
22,000.00	90.00	359.20	8,235.00	13,176.67	53.10	13,174.64	0.00	0.00	0.00
22,100.00	90.00	359.20	8,235.00	13,276.66	51.72	13,274.64	0.00	0.00	0.00
22,200.00	90.00	359.20	8,235.00	13,376.65	50.33	13,374.64	0.00	0.00	0.00
22,300.00	90.00	359.20	8,235.00	13,476.64	48.94	13,474.64	0.00	0.00	0.00
22,400.00	90.00	359.20	8,235.00	13,576.63	47.55	13,574.64	0.00	0.00	0.00
22,500.00	90.00	359.20	8,235.00	13,676.62	46.16	13,674.64	0.00	0.00	0.00
22,600.00	90.00	359.20	8,235.00	13,776.61	44.77	13,774.64	0.00	0.00	0.00
22,700.00	90.00	359.20	8,235.00	13,876.60	43.38	13,874.64	0.00	0.00	0.00
22,800.00	90.00	359.20	8,235.00	13,976.59	41.99	13,974.64	0.00	0.00	0.00
22,900.00	90.00	359.20	8,235.00	14,076.58	40.61	14,074.64	0.00	0.00	0.00
23,000.00	90.00	359.20	8,235.00	14,176.57	39.22	14,174.64	0.00	0.00	0.00
23,100.00	90.00	359.20	8,235.00	14,276.56	37.83	14,274.64	0.00	0.00	0.00
23,200.00	90.00	359.20	8,235.00	14,376.55	36.44	14,374.64	0.00	0.00	0.00
23,300.00	90.00	359.20	8,235.00	14,476.54	35.05	14,474.64	0.00	0.00	0.00
23,400.00	90.00	359.20	8,235.00	14,576.53	33.66	14,574.64	0.00	0.00	0.00
23,500.00	90.00	359.20	8,235.00	14,676.52	32.27	14,674.64	0.00	0.00	0.00
23,600.00	90.00	359.20	8,235.00	14,776.51	30.88	14,774.64	0.00	0.00	0.00
23,700.00	90.00	359.20	8,235.00	14,876.50	29.49	14,874.64	0.00	0.00	0.00
23,800.00	90.00	359.20	8,235.00	14,976.49	28.11	14,974.64	0.00	0.00	0.00
23,900.00	90.00	359.20	8,235.00	15,076.48	26.72	15,074.64	0.00	0.00	0.00
24,004.19	90.00	359.20	8,235.00	15,180.66	25.27	15,178.83	0.00	0.00	0.00
PBHL									



MS Directional Planning Report



Database:	EDM 5000.15 Conroe DB	Local Co-ordinate Reference:	Well Pierogi BS Federal Com 502H
Company:	Marathon Oil	TVD Reference:	WELL @ 3022.50usft (Precision 580)
Project:	Eddy County, New Mexico (NAD 27)	MD Reference:	WELL @ 3022.50usft (Precision 580)
Site:	Pierogi Federal Com (302H, 502H, 552H)	North Reference:	Grid
Well:	Pierogi BS Federal Com 502H	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Design #1		

Design Targets

Target Name - hit/miss target - Shape	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude
KOP/FTP_Pierogi 502 - plan misses target center by 756.20usft at 0.00usft MD (0.00 TVD, 0.00 N, 0.00 E) - Point	0.00	0.00	0.00	-715.11	245.87	424,456.79	581,104.30	32° 10' 0.038 N	104° 4' 16.418 W
PPP-3_Pierogi 502H - plan misses target center by 0.15usft at 10692.85usft MD (8235.00 TVD, 1870.60 N, 210.14 E) - Point	0.00	0.00	8,235.00	1,870.60	209.99	427,042.50	581,068.42	32° 10' 25.628 N	104° 4' 16.762 W
PPP-2_Pierogi 502H - plan misses target center by 0.17usft at 9349.87usft MD (8235.00 TVD, 527.75 N, 228.79 E) - Point	0.00	0.00	8,235.00	527.75	228.62	425,699.65	581,087.05	32° 10' 12.338 N	104° 4' 16.583 W
PPP-4_Pierogi 502H - plan misses target center by 0.05usft at 20080.27usft MD (8235.00 TVD, 11257.12 N, 79.77 E) - Point	0.00	0.00	8,235.00	11,257.12	79.72	436,429.02	580,938.15	32° 11' 58.523 N	104° 4' 18.012 W
LTP/PBHL_Pierogi 50 - plan hits target center - Point	0.00	0.00	8,235.00	15,180.66	25.27	440,352.56	580,883.70	32° 12' 37.353 N	104° 4' 18.535 W

Plan Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
1,800.00	1,800.00	0.00	0.00	KOP, 2.00°/100' Build
2,300.06	2,297.52	-41.43	13.36	Begin 10.00° Tangent
6,427.73	6,362.47	-723.68	233.39	Begin 2.00°/100' Drop
6,927.79	6,860.00	-765.11	246.75	Begin Vertical Hold
7,729.84	7,662.04	-765.11	246.75	KOP, 10.00°/100' Build
8,629.84	8,235.00	-192.21	238.79	Begin 90.00° Lateral
24,004.19	8,235.00	15,180.66	25.27	PBHL



Marathon Oil

**Eddy County, New Mexico (NAD 27)
Pierogi Federal Com (302H, 502H, 552H)
Pierogi BS Federal Com 502H**

**Wellbore #1
Design #1**

Anticollision Report

12 December, 2023





MS Directional Anticollision Report



Company:	Marathon Oil	Local Co-ordinate Reference:	Well Pierogi BS Federal Com 502H
Project:	Eddy County, New Mexico (NAD 27)	TVD Reference:	WELL @ 3022.50usft (Precision 580)
Reference Site:	Pierogi Federal Com (302H, 502H, 552H)	MD Reference:	WELL @ 3022.50usft (Precision 580)
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	Pierogi BS Federal Com 502H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	EDM 5000.15 Conroe DB
Reference Design:	Design #1	Offset TVD Reference:	Reference Datum

Reference	Design #1
Filter type:	NO GLOBAL FILTER: Using user defined selection & filtering criteria
Interpolation Method:	MD + Stations Interval 100.00usft
Depth Range:	Unlimited
Results Limited by:	Maximum centre distance of 10,000.00usft
Warning Levels Evaluated at:	2.00 Sigma
Error Model:	ISCWSA
Scan Method:	Closest Approach 3D
Error Surface:	Pedal Curve
Casing Method:	Not applied

Survey Tool Program		Date	12/12/2023		
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
0.00	24,004.19	Design #1 (Wellbore #1)	MWD+IFR1+FDIR	OWSG MWD + IFR1 + FDIR Correction	

Summary						
Site Name Offset Well - Wellbore - Design	Reference Measured Depth (usft)	Offset Measured Depth (usft)	Distance Between Centres (usft)	Distance Between Ellipses (usft)	Separation Factor	Warning
Boondock 3 State						
Boondock 3 B2OB State 1H - Wellbore #1 - Surveys	8,126.48	13,347.00	498.38	407.98	5.513	CC, ES
Boondock 3 B2OB State 1H - Wellbore #1 - Surveys	8,150.00	13,347.00	499.27	408.27	5.486	SF
Boondock 3 H3PA State Com 1H - Wellbore #1 - Surveys	8,293.75	13,685.00	784.84	717.42	11.640	CC, ES, SF
Fiddle Fire Fed Com (#301H & 302H)						
Fiddle Fire Fed Com 301H - Wellbore #1 - Design #2	23,009.48	7,173.80	2,166.61	2,016.82	14.465	CC, ES
Fiddle Fire Fed Com 301H - Wellbore #1 - Design #2	23,200.00	7,178.67	2,174.94	2,023.98	14.407	SF
Fiddle Fire Fed Com 302H - Wellbore #1 - Design #1	21,760.58	7,150.00	2,175.80	2,036.80	15.652	CC
Fiddle Fire Fed Com 302H - Wellbore #1 - Design #1	21,800.00	7,150.00	2,176.16	2,036.71	15.605	ES
Fiddle Fire Fed Com 302H - Wellbore #1 - Design #1	22,000.00	7,150.00	2,188.94	2,047.71	15.499	SF
Fiddle Fire Fed Com (Offsets)						
Chicken Fry Federal Com 1H - Wellbore #1 - Surveys	23,983.93	8,287.64	1,237.80	1,071.36	7.437	CC
Chicken Fry Federal Com 1H - Wellbore #1 - Surveys	24,000.00	8,288.57	1,237.90	1,071.34	7.432	ES
Chicken Fry Federal Com 1H - Wellbore #1 - Surveys	24,004.19	8,288.81	1,237.96	1,071.37	7.431	SF
Fiddle Fee 23 X # 1H - Wellbore #1 - Surveys	21,691.05	14,421.00	2,371.81	2,221.32	15.761	CC
Fiddle Fee 23 X # 1H - Wellbore #1 - Surveys	21,700.00	14,421.00	2,371.82	2,221.25	15.752	ES
Fiddle Fee 23 X # 1H - Wellbore #1 - Surveys	22,500.00	14,421.00	2,505.97	2,339.68	15.070	SF
Fiddle Fee 24-28-23 (3-4-7-8) WB #8H - Wellbore #1 - S	23,058.92	8,228.75	1,672.53	1,511.85	10.409	CC, ES
Fiddle Fee 24-28-23 (3-4-7-8) WB #8H - Wellbore #1 - S	23,100.00	8,229.81	1,673.04	1,512.05	10.392	SF
Fiddle Fee 24-28-23 (3-4-7-8) WD #3H - Wellbore #1 - S	22,388.25	8,229.00	1,648.68	1,495.22	10.744	CC
Fiddle Fee 24-28-23 (3-4-7-8) WD #3H - Wellbore #1 - S	22,400.00	8,229.00	1,648.72	1,495.17	10.737	ES
Fiddle Fee 24-28-23 (3-4-7-8) WD #3H - Wellbore #1 - S	22,500.00	8,229.00	1,652.46	1,498.32	10.720	SF
Fiddle Fee 24-28-23 (3-4-7-8) WD #4H - Wellbore #1 - S	21,717.77	8,269.26	1,662.13	1,513.15	11.157	CC, ES
Fiddle Fee 24-28-23 (3-4-7-8) WD #4H - Wellbore #1 - S	21,800.00	8,269.44	1,664.16	1,514.58	11.125	SF
Fiddle Fee 24-28-23 TH #2H - Wellbore #1 - Wellbore #1	23,715.23	8,349.00	1,736.13	1,573.05	10.646	CC, ES
Fiddle Fee 24-28-23 TH #2H - Wellbore #1 - Wellbore #1	23,800.00	8,349.00	1,738.20	1,574.57	10.622	SF
Fiddle Fee 24-28-23 WA #6H - Wellbore #1 - Surveys	23,400.79	8,247.47	1,675.05	1,514.87	10.457	CC, ES
Fiddle Fee 24-28-23 WA #6H - Wellbore #1 - Surveys	23,500.00	8,244.91	1,677.98	1,517.15	10.433	SF
Fiddle Fee 24-28-23 WD #7H - Wellbore #1 - Surveys	23,543.22	8,482.58	1,767.13	1,601.83	10.690	CC, ES
Fiddle Fee 24-28-23 WD #7H - Wellbore #1 - Surveys	23,600.00	8,490.59	1,768.03	1,602.31	10.669	SF
Fiddle Fee 24-28-23 WXY #9H - Wellbore #1 - Surveys	22,779.39	8,314.90	1,754.97	1,597.64	11.154	CC
Fiddle Fee 24-28-23 WXY #9H - Wellbore #1 - Surveys	22,800.00	8,313.88	1,755.09	1,597.58	11.143	ES
Fiddle Fee 24-28-23 WXY #9H - Wellbore #1 - Surveys	22,900.00	8,308.83	1,759.10	1,600.98	11.125	SF
Tiger 14-24S-28E RB #124H - Wellbore #1 - Surveys	24,004.19	12,975.00	1,928.58	1,754.40	11.073	CC, ES, SF

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

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COMPASS 5000.15 Build 91E



MS Directional Anticollision Report



Company:	Marathon Oil	Local Co-ordinate Reference:	Well Pierogi BS Federal Com 502H
Project:	Eddy County, New Mexico (NAD 27)	TVD Reference:	WELL @ 3022.50usft (Precision 580)
Reference Site:	Pierogi Federal Com (302H, 502H, 552H)	MD Reference:	WELL @ 3022.50usft (Precision 580)
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	Pierogi BS Federal Com 502H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	EDM 5000.15 Conroe DB
Reference Design:	Design #1	Offset TVD Reference:	Reference Datum

Summary

Site Name	Reference Measured Depth (usft)	Offset Measured Depth (usft)	Distance Between Centres (usft)	Between Ellipses (usft)	Separation Factor	Warning
Offset Well - Wellbore - Design						
George (113H, 114H, 123H)						
George 113H - Wellbore #1 - Surveys	24,004.19	14,791.00	2,244.75	2,028.74	10.392	CC, ES, SF
George 114H - Wellbore #1 - Design #1	24,004.19	14,787.64	1,249.12	1,037.88	5.913	CC, ES, SF
George 123H - Wellbore #1 - Surveys	24,004.19	15,648.44	2,041.23	1,832.22	9.766	CC, ES, SF
Pierogi Federal Com (302H, 502H, 552H)						
Pierogi BS Federal Com 302H - Wellbore #1 - Design #1	1,779.81	1,780.26	26.68	14.41	2.175	CC
Pierogi BS Federal Com 302H - Wellbore #1 - Design #1	1,800.00	1,800.34	26.76	14.35	2.157	ES, SF
Pierogi BS Federal Com 552H - Wellbore #1 - Design #1	1,500.00	1,500.00	29.99	19.68	2.908	CC, ES
Pierogi BS Federal Com 552H - Wellbore #1 - Design #1	1,600.00	1,599.50	30.80	19.79	2.797	SF

Offset Design: Boondock 3 State - Boondock 3 B2OB State 1H - Wellbore #1 - Surveys

Survey Program:		176-, 466-										Offset Site Error:		0.00 usft	
Reference		Offset		Semi Major Axis		Azimuth		Offset Wellbore Centre		Rule Assigned:		Offset Well Error:		0.00 usft	
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Azimuth from North (°)	+N/-S (usft)	+E/-W (usft)	Distance Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning		
0.00	0.00	0.00	12.50	0.00	0.00	169.314	-5,901.96	1,113.65	6,006.12						
100.00	100.00	111.54	124.04	0.14	0.17	169.313	-5,901.72	1,113.71	6,005.93	6,005.63	0.31	N/A			
200.00	200.00	224.11	236.60	0.50	0.44	169.311	-5,901.05	1,113.83	6,005.36	6,004.43	0.93	6,447.146			
300.00	300.00	321.43	333.93	0.85	0.78	169.313	-5,900.52	1,113.55	6,004.78	6,003.14	1.63	3,674.141			
400.00	400.00	399.78	412.27	1.21	1.06	169.317	-5,900.22	1,113.07	6,004.30	6,002.04	2.27	2,647.714			
426.75	426.75	414.25	426.75	1.31	1.10	169.317	-5,900.21	1,113.04	6,004.28	6,001.86	2.41	2,487.843			
500.00	500.00	466.00	478.49	1.57	1.28	169.315	-5,900.36	1,113.25	6,004.50	6,001.65	2.85	2,103.802			
600.00	600.00	574.25	586.73	1.93	1.48	169.301	-5,900.59	1,114.81	6,004.99	6,001.59	3.41	1,761.721			
700.00	700.00	641.00	653.48	2.29	1.53	169.298	-5,900.90	1,115.19	6,005.53	6,001.71	3.82	1,573.167			
800.00	800.00	759.11	771.55	2.65	1.69	169.324	-5,902.35	1,112.75	6,006.40	6,002.06	4.34	1,384.075			
900.00	900.00	862.28	874.58	3.00	1.91	169.373	-5,903.59	1,107.75	6,006.67	6,001.76	4.92	1,221.963			
1,000.00	1,000.00	937.85	949.88	3.36	2.10	169.433	-5,905.22	1,101.60	6,007.30	6,001.84	5.46	1,100.630			
1,100.00	1,100.00	975.00	986.82	3.72	2.19	169.471	-5,906.29	1,097.76	6,008.50	6,002.59	5.91	1,017.204			
1,200.00	1,200.00	975.00	986.82	4.08	2.19	169.471	-5,906.29	1,097.76	6,011.22	6,004.95	6.26	959.591			
1,300.00	1,300.00	1,060.39	1,071.48	4.44	2.46	169.575	-5,910.27	1,087.44	6,013.83	6,006.93	6.89	872.671			
1,400.00	1,400.00	1,094.25	1,104.95	4.80	2.56	169.622	-5,912.60	1,082.87	6,018.18	6,010.82	7.35	818.307			
1,500.00	1,500.00	1,164.00	1,173.67	5.16	2.79	169.728	-5,918.70	1,072.58	6,023.95	6,016.02	7.93	759.522			
1,600.00	1,600.00	1,164.00	1,173.67	5.51	2.79	169.728	-5,918.70	1,072.58	6,030.19	6,021.91	8.28	727.945			
1,700.00	1,700.00	1,255.99	1,263.99	5.87	3.13	169.882	-5,927.99	1,057.82	6,037.39	6,028.41	8.98	672.241			
1,800.00	1,800.00	1,478.42	1,481.82	6.23	4.02	170.289	-5,948.48	1,017.94	6,043.33	6,033.12	10.22	591.610			
1,900.00	1,899.98	1,722.95	1,721.16	6.57	5.05	170.759	-5,965.26	970.81	6,044.67	6,033.08	11.58	521.772			
2,000.00	1,999.84	1,806.55	1,803.15	6.90	5.40	170.919	-5,970.33	955.29	6,042.58	6,030.32	12.26	492.763			
2,100.00	2,099.45	1,888.11	1,883.30	7.23	5.75	171.073	-5,975.36	941.08	6,037.38	6,024.45	12.93	466.757			
2,200.00	2,198.70	1,977.56	1,971.29	7.56	6.14	171.241	-5,981.01	925.99	6,029.03	6,015.38	13.65	441.717			
2,300.06	2,297.52	13,347.00	8,248.37	7.89	79.18	-171.836	-904.25	-110.41	6,014.35	5,966.80	47.55	126.484			
2,400.00	2,395.95	13,347.00	8,248.37	8.23	79.18	-171.326	-904.25	-110.41	5,914.71	5,867.07	47.64	124.162			
2,500.00	2,494.43	13,347.00	8,248.37	8.57	79.18	-170.797	-904.25	-110.41	5,815.02	5,767.30	47.73	121.838			
2,600.00	2,592.91	13,347.00	8,248.37	8.91	79.18	-170.248	-904.25	-110.41	5,715.35	5,667.53	47.82	119.514			
2,700.00	2,691.39	13,347.00	8,248.37	9.26	79.18	-169.679	-904.25	-110.41	5,615.68	5,567.76	47.92	117.192			
2,800.00	2,789.87	13,347.00	8,248.37	9.61	79.18	-169.087	-904.25	-110.41	5,516.03	5,468.01	48.02	114.872			
2,900.00	2,888.35	13,347.00	8,248.37	9.96	79.18	-168.472	-904.25	-110.41	5,416.39	5,368.27	48.12	112.555			
3,000.00	2,986.83	13,347.00	8,248.37	10.32	79.18	-167.833	-904.25	-110.41	5,316.77	5,268.54	48.23	110.240			
3,100.00	3,085.31	13,347.00	8,248.37	10.67	79.18	-167.168	-904.25	-110.41	5,217.15	5,168.82	48.34	107.929			
3,200.00	3,183.79	13,347.00	8,248.37	11.03	79.18	-166.476	-904.25	-110.41	5,117.56	5,069.11	48.45	105.623			

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation



MS Directional Anticollision Report



Company:	Marathon Oil	Local Co-ordinate Reference:	Well Pierogi BS Federal Com 502H
Project:	Eddy County, New Mexico (NAD 27)	TVD Reference:	WELL @ 3022.50usft (Precision 580)
Reference Site:	Pierogi Federal Com (302H, 502H, 552H)	MD Reference:	WELL @ 3022.50usft (Precision 580)
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	Pierogi BS Federal Com 502H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	EDM 5000.15 Conroe DB
Reference Design:	Design #1	Offset TVD Reference:	Reference Datum

Offset Design: Boondock 3 State - Boondock 3 B2OB State 1H - Wellbore #1 - Surveys													Offset Site Error:	0.00 usft
Survey Program: 176-, 466- Reference													Offset Well Error:	0.00 usft
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Semi Major Axis Reference (usft)	Offset (usft)	Azimuth from North (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Distance Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning	
3,300.00	3,282.27	13,347.00	8,248.37	11.39	79.18	-165.756	-904.25	-110.41	5,017.98	4,969.41	48.57	103.320		
3,400.00	3,380.75	13,347.00	8,248.37	11.76	79.18	-165.005	-904.25	-110.41	4,918.42	4,869.73	48.69	101.022		
3,500.00	3,479.23	13,347.00	8,248.37	12.12	79.18	-164.223	-904.25	-110.41	4,818.87	4,770.06	48.81	98.730		
3,600.00	3,577.71	13,347.00	8,248.37	12.48	79.18	-163.408	-904.25	-110.41	4,719.34	4,670.41	48.93	96.442		
3,700.00	3,676.19	13,347.00	8,248.37	12.85	79.18	-162.557	-904.25	-110.41	4,619.84	4,570.78	49.06	94.161		
3,800.00	3,774.67	13,347.00	8,248.37	13.22	79.18	-161.669	-904.25	-110.41	4,520.36	4,471.16	49.20	91.886		
3,900.00	3,873.15	13,347.00	8,248.37	13.58	79.18	-160.741	-904.25	-110.41	4,420.90	4,371.56	49.33	89.617		
4,000.00	3,971.63	13,347.00	8,248.37	13.95	79.18	-159.773	-904.25	-110.41	4,321.46	4,271.99	49.47	87.355		
4,100.00	4,070.11	13,347.00	8,248.37	14.32	79.18	-158.760	-904.25	-110.41	4,222.05	4,172.44	49.61	85.100		
4,200.00	4,168.59	13,347.00	8,248.37	14.69	79.18	-157.702	-904.25	-110.41	4,122.67	4,072.91	49.76	82.853		
4,300.00	4,267.07	13,347.00	8,248.37	15.06	79.18	-156.595	-904.25	-110.41	4,023.32	3,973.41	49.91	80.613		
4,400.00	4,365.55	13,347.00	8,248.37	15.44	79.18	-155.437	-904.25	-110.41	3,924.01	3,873.94	50.06	78.381		
4,500.00	4,464.03	13,347.00	8,248.37	15.81	79.18	-154.226	-904.25	-110.41	3,824.72	3,774.50	50.22	76.157		
4,600.00	4,562.51	13,347.00	8,248.37	16.18	79.18	-152.958	-904.25	-110.41	3,725.48	3,675.10	50.38	73.941		
4,700.00	4,661.00	13,347.00	8,248.37	16.56	79.18	-151.632	-904.25	-110.41	3,626.28	3,575.73	50.55	71.734		
4,800.00	4,759.48	13,347.00	8,248.37	16.93	79.18	-150.244	-904.25	-110.41	3,527.13	3,476.40	50.72	69.536		
4,900.00	4,857.96	13,347.00	8,248.37	17.30	79.18	-148.792	-904.25	-110.41	3,428.02	3,377.12	50.90	67.346		
5,000.00	4,956.44	13,347.00	8,248.37	17.68	79.18	-147.273	-904.25	-110.41	3,328.97	3,277.88	51.08	65.166		
5,100.00	5,054.92	13,347.00	8,248.37	18.05	79.18	-145.686	-904.25	-110.41	3,229.97	3,178.70	51.27	62.995		
5,200.00	5,153.40	13,347.00	8,248.37	18.43	79.18	-144.026	-904.25	-110.41	3,131.04	3,079.57	51.47	60.833		
5,300.00	5,251.88	13,347.00	8,248.37	18.81	79.18	-142.294	-904.25	-110.41	3,032.18	2,980.51	51.67	58.681		
5,400.00	5,350.36	13,347.00	8,248.37	19.18	79.18	-140.487	-904.25	-110.41	2,933.40	2,881.52	51.88	56.538		
5,500.00	5,448.84	13,347.00	8,248.37	19.56	79.18	-138.603	-904.25	-110.41	2,834.70	2,782.60	52.10	54.406		
5,600.00	5,547.32	13,347.00	8,248.37	19.94	79.18	-136.643	-904.25	-110.41	2,736.10	2,683.77	52.33	52.283		
5,700.00	5,645.80	13,347.00	8,248.37	20.31	79.18	-134.607	-904.25	-110.41	2,637.60	2,585.03	52.57	50.170		
5,800.00	5,744.28	13,347.00	8,248.37	20.69	79.18	-132.495	-904.25	-110.41	2,539.22	2,486.39	52.83	48.067		
5,900.00	5,842.76	13,347.00	8,248.37	21.07	79.18	-130.309	-904.25	-110.41	2,440.97	2,387.88	53.09	45.974		
6,000.00	5,941.24	13,347.00	8,248.37	21.45	79.18	-128.053	-904.25	-110.41	2,342.87	2,289.49	53.38	43.891		
6,100.00	6,039.72	13,347.00	8,248.37	21.83	79.18	-125.729	-904.25	-110.41	2,244.94	2,191.25	53.68	41.818		
6,200.00	6,138.20	13,347.00	8,248.37	22.21	79.18	-123.342	-904.25	-110.41	2,147.19	2,093.18	54.01	39.755		
6,300.00	6,236.68	13,347.00	8,248.37	22.58	79.18	-120.900	-904.25	-110.41	2,049.67	1,995.30	54.36	37.702		
6,400.00	6,335.16	13,347.00	8,248.37	22.96	79.18	-118.408	-904.25	-110.41	1,952.39	1,897.64	54.75	35.659		
6,427.73	6,362.48	13,347.00	8,248.37	23.07	79.18	-117.709	-904.25	-110.41	1,925.47	1,870.60	54.86	35.095		
6,500.00	6,433.79	13,347.00	8,248.37	23.34	79.18	-116.007	-904.25	-110.41	1,855.29	1,800.11	55.17	33.626		
6,600.00	6,532.92	13,347.00	8,248.37	23.71	79.18	-114.069	-904.25	-110.41	1,758.10	1,702.47	55.63	31.603		
6,700.00	6,632.45	13,347.00	8,248.37	24.08	79.18	-112.633	-904.25	-110.41	1,660.92	1,604.79	56.13	29.592		
6,800.00	6,732.25	13,347.00	8,248.37	24.43	79.18	-111.709	-904.25	-110.41	1,563.87	1,507.20	56.67	27.596		
6,900.00	6,832.21	13,347.00	8,248.37	24.79	79.18	-111.304	-904.25	-110.41	1,467.13	1,409.86	57.27	25.617		
6,927.79	6,860.00	13,347.00	8,248.37	24.88	79.18	-111.284	-904.25	-110.41	1,440.31	1,382.86	57.45	25.070		
7,000.00	6,932.21	13,347.00	8,248.37	25.11	79.18	-111.284	-904.25	-110.41	1,370.85	1,312.90	57.95	23.655		
7,100.00	7,032.21	13,347.00	8,248.37	25.43	79.18	-111.284	-904.25	-110.41	1,275.14	1,216.39	58.76	21.703		
7,200.00	7,132.21	13,347.00	8,248.37	25.76	79.18	-111.284	-904.25	-110.41	1,180.15	1,120.43	59.72	19.762		
7,300.00	7,232.21	13,347.00	8,248.37	26.08	79.18	-111.284	-904.25	-110.41	1,086.06	1,025.16	60.90	17.835		
7,400.00	7,332.21	13,347.00	8,248.37	26.41	79.18	-111.284	-904.25	-110.41	993.12	930.76	62.36	15.926		
7,500.00	7,432.21	13,347.00	8,248.37	26.74	79.18	-111.284	-904.25	-110.41	901.70	837.48	64.22	14.042		
7,600.00	7,532.21	13,347.00	8,248.37	27.06	79.18	-111.284	-904.25	-110.41	812.29	745.69	66.61	12.195		
7,700.00	7,632.21	13,347.00	8,248.37	27.39	79.18	-111.284	-904.25	-110.41	725.66	655.93	69.73	10.407		
7,729.84	7,662.04	13,347.00	8,248.37	27.49	79.18	-111.284	-904.25	-110.41	700.51	629.67	70.84	9.889		
7,750.00	7,682.20	13,347.00	8,248.37	27.56	79.18	-111.334	-904.25	-110.41	683.79	612.15	71.64	9.544		
7,800.00	7,732.03	13,347.00	8,248.37	27.72	79.18	-111.883	-904.25	-110.41	643.98	570.14	73.84	8.722		
7,850.00	7,781.33	13,347.00	8,248.37	27.87	79.18	-113.022	-904.25	-110.41	607.11	530.80	76.31	7.956		
7,900.00	7,829.71	13,347.00	8,248.37	28.02	79.18	-114.714	-904.25	-110.41	574.07	495.05	79.02	7.265		

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation



MS Directional Anticollision Report



Company:	Marathon Oil	Local Co-ordinate Reference:	Well Pierogi BS Federal Com 502H
Project:	Eddy County, New Mexico (NAD 27)	TVD Reference:	WELL @ 3022.50usft (Precision 580)
Reference Site:	Pierogi Federal Com (302H, 502H, 552H)	MD Reference:	WELL @ 3022.50usft (Precision 580)
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	Pierogi BS Federal Com 502H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	EDM 5000.15 Conroe DB
Reference Design:	Design #1	Offset TVD Reference:	Reference Datum

Offset Design: Boondock 3 State - Boondock 3 B2OB State 1H - Wellbore #1 - Surveys													Offset Site Error:
Survey Program: 176-, 466-													Offset Well Error:
Reference	Offset	Semi Major Axis		Azimuth		Offset Wellbore Centre		Rule Assigned:		Warning			
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference	Offset	from North (°)	+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	
7,950.00	7,876.83	13,347.00	8,248.37	28.16	79.18	-116.901	-904.25	-110.41	545.83	463.94	81.89	6.665	
8,000.00	7,922.31	13,347.00	8,248.37	28.30	79.18	-119.509	-904.25	-110.41	523.39	438.63	84.75	6.176	
8,050.00	7,965.80	13,347.00	8,248.37	28.42	79.18	-122.444	-904.25	-110.41	507.69	420.31	87.38	5.810	
8,100.00	8,006.99	13,347.00	8,248.37	28.54	79.18	-125.605	-904.25	-110.41	499.51	409.98	89.53	5.579	
8,126.48	8,027.76	13,347.00	8,248.37	28.60	79.18	-127.334	-904.25	-110.41	498.38	407.98	90.41	5.513 CC, ES	
8,150.00	8,045.55	13,347.00	8,248.37	28.65	79.18	-128.886	-904.25	-110.41	499.27	408.27	91.01	5.486 SF	
8,200.00	8,081.19	13,347.00	8,248.37	28.76	79.18	-132.189	-904.25	-110.41	506.99	415.30	91.69	5.529	
8,250.00	8,113.64	13,347.00	8,248.37	28.85	79.18	-135.430	-904.25	-110.41	522.26	430.64	91.61	5.701	
8,300.00	8,142.65	13,347.00	8,248.37	28.94	79.18	-138.539	-904.25	-110.41	544.32	453.42	90.91	5.988	
8,350.00	8,168.01	13,347.00	8,248.37	29.02	79.18	-141.470	-904.25	-110.41	572.25	482.50	89.75	6.376	
8,400.00	8,189.52	13,347.00	8,248.37	29.10	79.18	-144.191	-904.25	-110.41	605.03	516.72	88.31	6.851	
8,450.00	8,207.01	13,347.00	8,248.37	29.16	79.18	-146.690	-904.25	-110.41	641.70	554.94	86.75	7.397	
8,500.00	8,220.35	13,347.00	8,248.37	29.22	79.18	-148.964	-904.25	-110.41	681.36	596.19	85.17	8.000	
8,550.00	8,229.45	13,347.00	8,248.37	29.28	79.18	-151.019	-904.25	-110.41	723.25	639.63	83.62	8.649	
8,600.00	8,234.22	13,347.00	8,248.37	29.32	79.18	-152.866	-904.25	-110.41	766.72	684.57	82.15	9.333	
8,629.84	8,235.00	13,347.00	8,248.37	29.35	79.18	-153.875	-904.25	-110.41	793.18	711.85	81.32	9.754	
8,700.00	8,235.00	13,347.00	8,248.37	29.41	79.18	-156.002	-904.25	-110.41	856.32	776.77	79.54	10.765	
8,800.00	8,235.00	13,347.00	8,248.37	29.52	79.18	-158.537	-904.25	-110.41	948.02	870.59	77.42	12.245	
8,900.00	8,235.00	13,347.00	8,248.37	29.66	79.18	-160.622	-904.25	-110.41	1,041.25	965.56	75.69	13.757	
9,000.00	8,235.00	13,347.00	8,248.37	29.82	79.18	-162.362	-904.25	-110.41	1,135.63	1,061.37	74.25	15.294	
9,100.00	8,235.00	13,347.00	8,248.37	30.00	79.18	-163.835	-904.25	-110.41	1,230.90	1,157.84	73.06	16.848	
9,200.00	8,235.00	13,347.00	8,248.37	30.21	79.18	-165.094	-904.25	-110.41	1,326.86	1,254.81	72.05	18.416	
9,300.00	8,235.00	13,347.00	8,248.37	30.44	79.18	-166.184	-904.25	-110.41	1,423.38	1,352.19	71.19	19.994	
9,400.00	8,235.00	13,347.00	8,248.37	30.69	79.18	-167.135	-904.25	-110.41	1,520.35	1,449.90	70.46	21.579	
9,500.00	8,235.00	13,347.00	8,248.37	30.97	79.18	-167.971	-904.25	-110.41	1,617.69	1,547.87	69.82	23.169	
9,600.00	8,235.00	13,347.00	8,248.37	31.27	79.18	-168.713	-904.25	-110.41	1,715.34	1,646.07	69.27	24.764	
9,700.00	8,235.00	13,347.00	8,248.37	31.58	79.18	-169.374	-904.25	-110.41	1,813.24	1,744.46	68.78	26.361	
9,800.00	8,235.00	13,347.00	8,248.37	31.92	79.18	-169.968	-904.25	-110.41	1,911.36	1,843.00	68.36	27.961	
9,900.00	8,235.00	13,347.00	8,248.37	32.28	79.18	-170.503	-904.25	-110.41	2,009.67	1,941.68	67.98	29.561	
10,000.00	8,235.00	13,347.00	8,248.37	32.66	79.18	-170.989	-904.25	-110.41	2,108.13	2,040.48	67.65	31.163	
10,100.00	8,235.00	13,347.00	8,248.37	33.05	79.18	-171.431	-904.25	-110.41	2,206.73	2,139.38	67.35	32.765	
10,200.00	8,235.00	13,347.00	8,248.37	33.46	79.18	-171.836	-904.25	-110.41	2,305.46	2,238.37	67.08	34.367	
10,300.00	8,235.00	13,347.00	8,248.37	33.89	79.18	-172.207	-904.25	-110.41	2,404.29	2,337.44	66.84	35.969	
10,400.00	8,235.00	13,347.00	8,248.37	34.34	79.18	-172.549	-904.25	-110.41	2,503.21	2,436.58	66.63	37.570	
10,500.00	8,235.00	13,347.00	8,248.37	34.80	79.18	-172.864	-904.25	-110.41	2,602.21	2,535.78	66.43	39.170	
10,600.00	8,235.00	13,347.00	8,248.37	35.27	79.18	-173.157	-904.25	-110.41	2,701.29	2,635.03	66.26	40.770	
10,700.00	8,235.00	13,347.00	8,248.37	35.76	79.18	-173.429	-904.25	-110.41	2,800.43	2,734.33	66.10	42.368	
10,800.00	8,235.00	13,347.00	8,248.37	36.27	79.18	-173.682	-904.25	-110.41	2,899.63	2,833.68	65.95	43.965	
10,900.00	8,235.00	13,347.00	8,248.37	36.79	79.18	-173.919	-904.25	-110.41	2,998.89	2,933.07	65.82	45.560	
11,000.00	8,235.00	13,347.00	8,248.37	37.32	79.18	-174.141	-904.25	-110.41	3,098.19	3,032.49	65.70	47.154	
11,100.00	8,235.00	13,347.00	8,248.37	37.86	79.18	-174.348	-904.25	-110.41	3,197.54	3,131.94	65.60	48.746	
11,200.00	8,235.00	13,347.00	8,248.37	38.41	79.18	-174.543	-904.25	-110.41	3,296.92	3,231.43	65.50	50.337	
11,300.00	8,235.00	13,347.00	8,248.37	38.98	79.18	-174.727	-904.25	-110.41	3,396.35	3,330.94	65.41	51.925	
11,400.00	8,235.00	13,347.00	8,248.37	39.55	79.18	-174.900	-904.25	-110.41	3,495.80	3,430.47	65.33	53.512	
11,500.00	8,235.00	13,347.00	8,248.37	40.14	79.18	-175.064	-904.25	-110.41	3,595.29	3,530.03	65.25	55.097	
11,600.00	8,235.00	13,347.00	8,248.37	40.74	79.18	-175.219	-904.25	-110.41	3,694.80	3,629.61	65.19	56.679	
11,700.00	8,235.00	13,347.00	8,248.37	41.34	79.18	-175.366	-904.25	-110.41	3,794.34	3,729.21	65.13	58.259	
11,800.00	8,235.00	13,347.00	8,248.37	41.96	79.18	-175.505	-904.25	-110.41	3,893.90	3,828.82	65.08	59.837	
11,900.00	8,235.00	13,347.00	8,248.37	42.58	79.18	-175.637	-904.25	-110.41	3,993.48	3,928.46	65.03	61.412	
12,000.00	8,235.00	13,347.00	8,248.37	43.21	79.18	-175.763	-904.25	-110.41	4,093.09	4,028.10	64.98	62.985	
12,100.00	8,235.00	13,347.00	8,248.37	43.85	79.18	-175.883	-904.25	-110.41	4,192.71	4,127.76	64.95	64.556	
12,200.00	8,235.00	13,347.00	8,248.37	44.50	79.18	-175.997	-904.25	-110.41	4,292.35	4,227.44	64.91	66.124	

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation



MS Directional Anticollision Report



Company:	Marathon Oil	Local Co-ordinate Reference:	Well Pierogi BS Federal Com 502H
Project:	Eddy County, New Mexico (NAD 27)	TVD Reference:	WELL @ 3022.50usft (Precision 580)
Reference Site:	Pierogi Federal Com (302H, 502H, 552H)	MD Reference:	WELL @ 3022.50usft (Precision 580)
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	Pierogi BS Federal Com 502H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	EDM 5000.15 Conroe DB
Reference Design:	Design #1	Offset TVD Reference:	Reference Datum

Offset Design:Boondock 3 State - Boondock 3 B2OB State 1H - Wellbore #1 - Surveys													Offset Site Error:	0.00 usft	
Survey Program: 176-, 466-		Reference		Offset		Semi Major Axis		Offset Wellbore Centre		Rule Assigned:				Offset Well Error:	0.00 usft
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Azimuth from North (°)	+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning		
12,300.00	8,235.00	13,347.00	8,248.37	45.15	79.18	-176.106	-904.25	-110.41	4,392.01	4,327.12	64.89	67.689			
12,400.00	8,235.00	13,347.00	8,248.37	45.81	79.18	-176.211	-904.25	-110.41	4,491.68	4,426.82	64.86	69.251			
12,500.00	8,235.00	13,347.00	8,248.37	46.48	79.18	-176.310	-904.25	-110.41	4,591.37	4,526.53	64.84	70.811			
12,600.00	8,235.00	13,347.00	8,248.37	47.15	79.18	-176.406	-904.25	-110.41	4,691.07	4,626.24	64.82	72.367			
12,700.00	8,235.00	13,347.00	8,248.37	47.83	79.18	-176.497	-904.25	-110.41	4,790.78	4,725.97	64.81	73.921			
12,800.00	8,235.00	13,347.00	8,248.37	48.52	79.18	-176.585	-904.25	-110.41	4,890.50	4,825.70	64.80	75.472			
12,900.00	8,235.00	13,347.00	8,248.37	49.21	79.18	-176.670	-904.25	-110.41	4,990.24	4,925.45	64.79	77.020			
13,000.00	8,235.00	13,347.00	8,248.37	49.90	79.18	-176.751	-904.25	-110.41	5,089.98	5,025.20	64.79	78.564			
13,100.00	8,235.00	13,347.00	8,248.37	50.60	79.18	-176.828	-904.25	-110.41	5,189.74	5,124.95	64.79	80.106			
13,200.00	8,235.00	13,347.00	8,248.37	51.31	79.18	-176.903	-904.25	-110.41	5,289.50	5,224.72	64.79	81.644			
13,300.00	8,235.00	13,347.00	8,248.37	52.02	79.18	-176.976	-904.25	-110.41	5,389.28	5,324.49	64.79	83.179			
13,400.00	8,235.00	13,347.00	8,248.37	52.74	79.18	-177.045	-904.25	-110.41	5,489.06	5,424.26	64.80	84.711			
13,500.00	8,235.00	13,347.00	8,248.37	53.46	79.18	-177.112	-904.25	-110.41	5,588.85	5,524.04	64.81	86.239			
13,600.00	8,235.00	13,347.00	8,248.37	54.18	79.18	-177.177	-904.25	-110.41	5,688.64	5,623.83	64.82	87.764			
13,700.00	8,235.00	13,347.00	8,248.37	54.91	79.18	-177.239	-904.25	-110.41	5,788.45	5,723.62	64.83	89.285			
13,800.00	8,235.00	13,347.00	8,248.37	55.64	79.18	-177.300	-904.25	-110.41	5,888.26	5,823.41	64.85	90.803			
13,900.00	8,235.00	13,347.00	8,248.37	56.37	79.18	-177.358	-904.25	-110.41	5,988.08	5,923.21	64.86	92.317			
14,000.00	8,235.00	13,347.00	8,248.37	57.11	79.18	-177.415	-904.25	-110.41	6,087.90	6,023.01	64.88	93.828			
14,100.00	8,235.00	13,347.00	8,248.37	57.85	79.18	-177.469	-904.25	-110.41	6,187.73	6,122.82	64.91	95.335			
14,200.00	8,235.00	13,347.00	8,248.37	58.60	79.18	-177.522	-904.25	-110.41	6,287.56	6,222.63	64.93	96.838			
14,300.00	8,235.00	13,347.00	8,248.37	59.35	79.18	-177.573	-904.25	-110.41	6,387.40	6,322.45	64.95	98.338			
14,400.00	8,235.00	13,347.00	8,248.37	60.10	79.18	-177.623	-904.25	-110.41	6,487.24	6,422.26	64.98	99.833			
14,500.00	8,235.00	13,347.00	8,248.37	60.86	79.18	-177.671	-904.25	-110.41	6,587.09	6,522.08	65.01	101.325			
14,600.00	8,235.00	13,347.00	8,248.37	61.61	79.18	-177.718	-904.25	-110.41	6,686.95	6,621.91	65.04	102.813			
14,700.00	8,235.00	13,347.00	8,248.37	62.37	79.18	-177.763	-904.25	-110.41	6,786.80	6,721.73	65.07	104.297			
14,800.00	8,235.00	13,347.00	8,248.37	63.14	79.18	-177.807	-904.25	-110.41	6,886.67	6,821.56	65.11	105.777			
14,900.00	8,235.00	13,347.00	8,248.37	63.90	79.18	-177.850	-904.25	-110.41	6,986.53	6,921.39	65.14	107.253			
15,000.00	8,235.00	13,347.00	8,248.37	64.67	79.18	-177.891	-904.25	-110.41	7,086.40	7,021.22	65.18	108.725			
15,100.00	8,235.00	13,347.00	8,248.37	65.44	79.18	-177.932	-904.25	-110.41	7,186.27	7,121.06	65.22	110.192			
15,200.00	8,235.00	13,347.00	8,248.37	66.21	79.18	-177.971	-904.25	-110.41	7,286.15	7,220.90	65.26	111.656			
15,300.00	8,235.00	13,347.00	8,248.37	66.98	79.18	-178.009	-904.25	-110.41	7,386.03	7,320.73	65.30	113.115			
15,400.00	8,235.00	13,347.00	8,248.37	67.76	79.18	-178.047	-904.25	-110.41	7,485.91	7,420.58	65.34	114.571			
15,500.00	8,235.00	13,347.00	8,248.37	68.54	79.18	-178.083	-904.25	-110.41	7,585.80	7,520.42	65.38	116.022			
15,600.00	8,235.00	13,347.00	8,248.37	69.32	79.18	-178.118	-904.25	-110.41	7,685.69	7,620.26	65.43	117.468			
15,700.00	8,235.00	13,347.00	8,248.37	70.10	79.18	-178.152	-904.25	-110.41	7,785.58	7,720.11	65.47	118.911			
15,800.00	8,235.00	13,347.00	8,248.37	70.89	79.18	-178.186	-904.25	-110.41	7,885.48	7,819.95	65.52	120.349			
15,900.00	8,235.00	13,347.00	8,248.37	71.67	79.18	-178.219	-904.25	-110.41	7,985.37	7,919.80	65.57	121.783			
16,000.00	8,235.00	13,347.00	8,248.37	72.46	79.18	-178.250	-904.25	-110.41	8,085.27	8,019.65	65.62	123.212			
16,100.00	8,235.00	13,347.00	8,248.37	73.25	79.18	-178.282	-904.25	-110.41	8,185.18	8,119.50	65.67	124.637			
16,200.00	8,235.00	13,347.00	8,248.37	74.04	79.18	-178.312	-904.25	-110.41	8,285.08	8,219.36	65.72	126.058			
16,300.00	8,235.00	13,347.00	8,248.37	74.83	79.18	-178.341	-904.25	-110.41	8,384.99	8,319.21	65.78	127.474			
16,400.00	8,235.00	13,347.00	8,248.37	75.63	79.18	-178.370	-904.25	-110.41	8,484.90	8,419.06	65.83	128.885			
16,500.00	8,235.00	13,347.00	8,248.37	76.42	79.18	-178.399	-904.25	-110.41	8,584.81	8,518.92	65.89	130.292			
16,600.00	8,235.00	13,347.00	8,248.37	77.22	79.18	-178.426	-904.25	-110.41	8,684.72	8,618.78	65.95	131.695			
16,700.00	8,235.00	13,347.00	8,248.37	78.02	79.18	-178.453	-904.25	-110.41	8,784.64	8,718.63	66.00	133.093			
16,800.00	8,235.00	13,347.00	8,248.37	78.82	79.18	-178.480	-904.25	-110.41	8,884.55	8,818.49	66.06	134.486			
16,900.00	8,235.00	13,347.00	8,248.37	79.62	79.18	-178.505	-904.25	-110.41	8,984.47	8,918.35	66.12	135.875			
17,000.00	8,235.00	13,347.00	8,248.37	80.42	79.18	-178.531	-904.25	-110.41	9,084.39	9,018.21	66.18	137.259			
17,100.00	8,235.00	13,347.00	8,248.37	81.22	79.18	-178.555	-904.25	-110.41	9,184.32	9,118.07	66.25	138.638			
17,200.00	8,235.00	13,347.00	8,248.37	82.03	79.18	-178.579	-904.25	-110.41	9,284.24	9,217.93	66.31	140.013			
17,300.00	8,235.00	13,347.00	8,248.37	82.83	79.18	-178.603	-904.25	-110.41	9,384.17	9,317.79	66.37	141.383			
17,400.00	8,235.00	13,347.00	8,248.37	83.64	79.18	-178.626	-904.25	-110.41	9,484.09	9,417.66	66.44	142.748			

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation



MS Directional Anticollision Report



Company:	Marathon Oil	Local Co-ordinate Reference:	Well Pierogi BS Federal Com 502H
Project:	Eddy County, New Mexico (NAD 27)	TVD Reference:	WELL @ 3022.50usft (Precision 580)
Reference Site:	Pierogi Federal Com (302H, 502H, 552H)	MD Reference:	WELL @ 3022.50usft (Precision 580)
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	Pierogi BS Federal Com 502H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	EDM 5000.15 Conroe DB
Reference Design:	Design #1	Offset TVD Reference:	Reference Datum

Offset Design: Boondock 3 State - Boondock 3 B2OB State 1H - Wellbore #1 - Surveys													Offset Site Error: 0.00 usft
Survey Program: 176-, 466-													Offset Well Error: 0.00 usft
Reference	Offset	Semi Major Axis	Rule Assigned:										
Measured Depth	Vertical Depth	Measured Depth	Vertical Depth	Reference	Offset	Azimuth from North	Offset Wellbore Centre	Distance Between Centres	Distance Between Ellipses	Minimum Separation	Separation Factor	Warning	
(usft)	(usft)	(usft)	(usft)	(usft)	(usft)	(°)	+N/-S (usft)	+E/-W (usft)	(usft)	(usft)	(usft)		
17,500.00	8,235.00	13,347.00	8,248.37	84.45	79.18	-178.649	-904.25	-110.41	9,584.02	9,517.52	66.51	144.109	
17,600.00	8,235.00	13,347.00	8,248.37	85.26	79.18	-178.671	-904.25	-110.41	9,683.95	9,617.38	66.57	145.465	
17,700.00	8,235.00	13,347.00	8,248.37	86.07	79.18	-178.693	-904.25	-110.41	9,783.89	9,717.25	66.64	146.816	
17,800.00	8,235.00	13,347.00	8,248.37	86.88	79.18	-178.714	-904.25	-110.41	9,883.82	9,817.11	66.71	148.162	
17,900.00	8,235.00	13,347.00	8,248.37	87.69	79.18	-178.735	-904.25	-110.41	9,983.75	9,916.97	66.78	149.504	

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation



MS Directional Anticollision Report



Company:	Marathon Oil	Local Co-ordinate Reference:	Well Pierogi BS Federal Com 502H
Project:	Eddy County, New Mexico (NAD 27)	TVD Reference:	WELL @ 3022.50usft (Precision 580)
Reference Site:	Pierogi Federal Com (302H, 502H, 552H)	MD Reference:	WELL @ 3022.50usft (Precision 580)
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	Pierogi BS Federal Com 502H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	EDM 5000.15 Conroe DB
Reference Design:	Design #1	Offset TVD Reference:	Reference Datum

Offset Design: Boondock 3 State - Boondock 3 H3PA State Com 1H - Wellbore #1 - Surveys													Offset Site Error:
Survey Program: 178-, 468- Reference													Offset Well Error:
Measured Depth (usft)	Vertical Depth (usft)	Offset Measured Depth (usft)	Offset Vertical Depth (usft)	Semi Major Axis Reference (usft)	Semi Major Axis Offset (usft)	Azimuth from North (°)	Offset Wellbore Centre +N/-S (usft)	Offset Wellbore Centre +E/-W (usft)	Distance Between Centres (usft)	Rule Assigned: Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning
0.00	0.00	0.00	15.50	0.00	0.00	168.565	-5,900.93	1,193.61	6,020.46				
100.00	100.00	98.20	113.70	0.14	0.15	168.566	-5,900.84	1,193.50	6,020.34	6,020.06	0.29	N/A	
200.00	200.00	209.81	225.31	0.50	0.38	168.568	-5,900.52	1,193.14	6,019.99	6,019.12	0.88	6,860.083	
300.00	300.00	311.34	326.83	0.85	0.74	168.569	-5,900.10	1,192.96	6,019.56	6,017.97	1.60	3,770.696	
400.00	400.00	409.42	424.92	1.21	1.09	168.568	-5,899.64	1,193.03	6,019.11	6,016.81	2.30	2,613.089	
500.00	500.00	506.47	521.96	1.57	1.37	168.569	-5,899.33	1,192.84	6,018.75	6,015.81	2.94	2,044.845	
600.00	600.00	687.04	702.51	1.93	1.59	168.590	-5,898.23	1,190.38	6,018.03	6,014.51	3.52	1,710.247	
700.00	700.00	809.29	824.70	2.29	1.82	168.619	-5,896.59	1,186.87	6,016.14	6,012.03	4.11	1,464.939	
800.00	800.00	927.89	943.01	2.65	2.11	168.692	-5,895.51	1,178.86	6,013.91	6,009.16	4.75	1,264.953	
900.00	900.00	974.00	988.88	3.00	2.22	168.736	-5,895.31	1,174.15	6,011.75	6,006.53	5.23	1,150.533	
1,000.00	1,000.00	1,036.56	1,051.05	3.36	2.41	168.801	-5,895.63	1,167.21	6,010.27	6,004.50	5.78	1,040.512	
1,083.21	1,083.21	1,068.92	1,083.21	3.66	2.51	168.836	-5,896.19	1,163.66	6,009.92	6,003.75	6.17	973.409	
1,100.00	1,100.00	1,075.44	1,089.69	3.72	2.53	168.843	-5,896.34	1,162.94	6,009.94	6,003.68	6.25	960.919	
1,200.00	1,200.00	1,163.00	1,176.68	4.08	2.80	168.937	-5,899.37	1,153.48	6,011.12	6,004.24	6.88	873.511	
1,300.00	1,300.00	1,163.00	1,176.68	4.44	2.80	168.937	-5,899.37	1,153.48	6,012.34	6,005.10	7.24	830.545	
1,400.00	1,400.00	1,163.00	1,176.68	4.80	2.80	168.937	-5,899.37	1,153.48	6,015.22	6,007.63	7.60	791.959	
1,500.00	1,500.00	1,250.84	1,263.91	5.16	3.10	169.032	-5,904.02	1,144.20	6,018.50	6,010.25	8.25	729.667	
1,600.00	1,600.00	1,301.07	1,313.77	5.51	3.27	169.087	-5,907.23	1,138.98	6,022.84	6,014.06	8.77	686.449	
1,700.00	1,700.00	1,352.00	1,364.29	5.87	3.44	169.142	-5,910.90	1,133.77	6,028.00	6,018.70	9.30	648.066	
1,800.00	1,800.00	1,452.41	1,463.87	6.23	3.80	169.252	-5,918.54	1,123.42	6,033.59	6,023.57	10.02	602.342	
1,900.00	1,899.98	1,555.87	1,566.45	6.57	4.17	169.370	-5,926.41	1,112.51	6,037.41	6,026.69	10.73	562.805	
2,000.00	1,999.84	1,670.67	1,680.25	6.90	4.60	169.507	-5,934.99	1,100.11	6,037.63	6,026.16	11.48	526.045	
2,100.00	2,099.45	1,789.08	1,797.63	7.23	5.05	169.655	-5,943.56	1,087.06	6,034.15	6,021.90	12.25	492.580	
2,200.00	2,198.70	1,911.24	1,918.76	7.56	5.51	169.810	-5,951.94	1,073.59	6,026.87	6,013.82	13.04	462.021	
2,300.06	2,297.52	2,022.66	2,029.24	7.89	5.95	169.960	-5,959.27	1,061.13	6,015.87	6,002.06	13.81	435.736	
2,400.00	2,395.95	2,138.97	2,144.52	8.23	6.40	170.122	-5,966.75	1,047.62	6,002.99	5,988.40	14.59	411.456	
2,500.00	2,494.43	2,281.19	2,285.52	8.57	6.95	170.316	-5,975.12	1,030.98	5,989.59	5,974.11	15.48	386.928	
2,600.00	2,592.91	2,376.15	2,379.71	8.91	7.32	170.450	-5,980.27	1,020.14	5,975.83	5,959.65	16.19	369.189	
2,700.00	2,691.39	2,463.68	2,466.61	9.26	7.66	170.571	-5,985.07	1,010.78	5,962.28	5,945.41	16.87	353.498	
2,800.00	2,789.87	2,707.83	2,709.28	9.61	8.60	170.846	-5,995.06	986.02	5,947.27	5,929.12	18.14	327.795	
2,900.00	2,888.35	13,685.00	8,740.08	9.96	79.13	146.143	-904.31	557.71	5,923.56	5,875.44	48.12	123.087	
3,000.00	2,986.83	13,685.00	8,740.08	10.32	79.13	145.839	-904.31	557.71	5,823.69	5,775.44	48.25	120.708	
3,100.00	3,085.31	13,685.00	8,740.08	10.67	79.13	145.524	-904.31	557.71	5,723.82	5,675.45	48.37	118.332	
3,200.00	3,183.79	13,685.00	8,740.08	11.03	79.13	145.198	-904.31	557.71	5,623.95	5,575.45	48.50	115.961	
3,300.00	3,282.27	13,685.00	8,740.08	11.39	79.13	144.858	-904.31	557.71	5,524.09	5,475.46	48.63	113.595	
3,400.00	3,380.75	13,685.00	8,740.08	11.76	79.13	144.505	-904.31	557.71	5,424.23	5,375.46	48.76	111.234	
3,500.00	3,479.23	13,685.00	8,740.08	12.12	79.13	144.138	-904.31	557.71	5,324.38	5,275.47	48.90	108.878	
3,600.00	3,577.71	13,685.00	8,740.08	12.48	79.13	143.755	-904.31	557.71	5,224.53	5,175.49	49.04	106.529	
3,700.00	3,676.19	13,685.00	8,740.08	12.85	79.13	143.357	-904.31	557.71	5,124.69	5,075.50	49.19	104.186	
3,800.00	3,774.67	13,685.00	8,740.08	13.22	79.13	142.941	-904.31	557.71	5,024.86	4,975.52	49.34	101.849	
3,900.00	3,873.15	13,685.00	8,740.08	13.58	79.13	142.508	-904.31	557.71	4,925.03	4,875.54	49.49	99.520	
4,000.00	3,971.63	13,685.00	8,740.08	13.95	79.13	142.055	-904.31	557.71	4,825.21	4,775.56	49.64	97.198	
4,100.00	4,070.11	13,685.00	8,740.08	14.32	79.13	141.582	-904.31	557.71	4,725.39	4,675.59	49.80	94.884	
4,200.00	4,168.59	13,685.00	8,740.08	14.69	79.13	141.087	-904.31	557.71	4,625.59	4,575.63	49.96	92.579	
4,300.00	4,267.07	13,685.00	8,740.08	15.06	79.13	140.568	-904.31	557.71	4,525.79	4,475.66	50.13	90.281	
4,400.00	4,365.55	13,685.00	8,740.08	15.44	79.13	140.025	-904.31	557.71	4,426.01	4,375.71	50.30	87.992	
4,500.00	4,464.03	13,685.00	8,740.08	15.81	79.13	139.455	-904.31	557.71	4,326.23	4,275.76	50.47	85.713	
4,600.00	4,562.51	13,685.00	8,740.08	16.18	79.13	138.857	-904.31	557.71	4,226.46	4,175.81	50.65	83.442	
4,700.00	4,661.00	13,685.00	8,740.08	16.56	79.13	138.228	-904.31	557.71	4,126.71	4,075.88	50.83	81.181	
4,800.00	4,759.48	13,685.00	8,740.08	16.93	79.13	137.567	-904.31	557.71	4,026.97	3,975.95	51.02	78.930	
4,900.00	4,857.96	13,685.00	8,740.08	17.30	79.13	136.870	-904.31	557.71	3,927.24	3,876.03	51.21	76.689	
5,000.00	4,956.44	13,685.00	8,740.08	17.68	79.13	136.135	-904.31	557.71	3,827.52	3,776.12	51.40	74.458	

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation



MS Directional Anticollision Report



Company:	Marathon Oil	Local Co-ordinate Reference:	Well Pierogi BS Federal Com 502H
Project:	Eddy County, New Mexico (NAD 27)	TVD Reference:	WELL @ 3022.50usft (Precision 580)
Reference Site:	Pierogi Federal Com (302H, 502H, 552H)	MD Reference:	WELL @ 3022.50usft (Precision 580)
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	Pierogi BS Federal Com 502H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	EDM 5000.15 Conroe DB
Reference Design:	Design #1	Offset TVD Reference:	Reference Datum

Offset Design: Boondock 3 State - Boondock 3 H3PA State Com 1H - Wellbore #1 - Surveys													Offset Site Error:
Survey Program: 178-, 468- Reference													Offset Well Error:
Measured Depth (usft)	Vertical Depth (usft)	Offset Measured Depth (usft)	Vertical Depth (usft)	Semi Major Axis Reference (usft)	Offset (usft)	Azimuth from North (°)	Offset Wellbore Centre		Distance Between Centres (usft)		Minimum Separation (usft)	Separation Factor	Warning
							+N/-S (usft)	+E/-W (usft)					
5,100.00	5,054.92	13,685.00	8,740.08	18.05	79.13	135.360	-904.31	557.71	3,727.82	3,676.21	51.60	72.238	
5,200.00	5,153.40	13,685.00	8,740.08	18.43	79.13	134.540	-904.31	557.71	3,628.14	3,576.33	51.81	70.029	
5,300.00	5,251.88	13,685.00	8,740.08	18.81	79.13	133.673	-904.31	557.71	3,528.47	3,476.45	52.02	67.831	
5,400.00	5,350.36	13,685.00	8,740.08	19.18	79.13	132.755	-904.31	557.71	3,428.82	3,376.59	52.23	65.644	
5,500.00	5,448.84	13,685.00	8,740.08	19.56	79.13	131.781	-904.31	557.71	3,329.20	3,276.74	52.45	63.468	
5,600.00	5,547.32	13,685.00	8,740.08	19.94	79.13	130.748	-904.31	557.71	3,229.59	3,176.91	52.68	61.304	
5,700.00	5,645.80	13,685.00	8,740.08	20.31	79.13	129.649	-904.31	557.71	3,130.02	3,077.10	52.91	59.152	
5,800.00	5,744.28	13,685.00	8,740.08	20.69	79.13	128.480	-904.31	557.71	3,030.47	2,977.31	53.15	57.012	
5,900.00	5,842.76	13,685.00	8,740.08	21.07	79.13	127.234	-904.31	557.71	2,930.95	2,877.55	53.40	54.885	
6,000.00	5,941.24	13,685.00	8,740.08	21.45	79.13	125.906	-904.31	557.71	2,831.46	2,777.81	53.66	52.770	
6,100.00	6,039.72	13,685.00	8,740.08	21.83	79.13	124.488	-904.31	557.71	2,732.02	2,678.10	53.92	50.667	
6,200.00	6,138.20	13,685.00	8,740.08	22.21	79.13	122.973	-904.31	557.71	2,632.61	2,578.42	54.19	48.578	
6,300.00	6,236.68	13,685.00	8,740.08	22.58	79.13	121.352	-904.31	557.71	2,533.25	2,478.78	54.48	46.501	
6,400.00	6,335.16	13,685.00	8,740.08	22.96	79.13	119.618	-904.31	557.71	2,433.95	2,379.18	54.77	44.438	
6,427.73	6,362.48	13,685.00	8,740.08	23.07	79.13	119.116	-904.31	557.71	2,406.42	2,351.56	54.86	43.868	
6,500.00	6,433.79	13,685.00	8,740.08	23.34	79.13	117.861	-904.31	557.71	2,334.65	2,279.57	55.08	42.387	
6,600.00	6,532.92	13,685.00	8,740.08	23.71	79.13	116.373	-904.31	557.71	2,235.29	2,179.89	55.40	40.346	
6,700.00	6,632.45	13,685.00	8,740.08	24.08	79.13	115.227	-904.31	557.71	2,135.98	2,080.24	55.74	38.318	
6,800.00	6,732.25	13,685.00	8,740.08	24.43	79.13	114.470	-904.31	557.71	2,036.86	1,980.75	56.10	36.305	
6,900.00	6,832.21	13,685.00	8,740.08	24.79	79.13	114.133	-904.31	557.71	1,938.08	1,881.59	56.49	34.308	
6,927.79	6,860.00	13,685.00	8,740.08	24.88	79.13	114.116	-904.31	557.71	1,910.70	1,854.10	56.60	33.757	
7,000.00	6,932.21	13,685.00	8,740.08	25.11	79.13	114.116	-904.31	557.71	1,839.70	1,782.80	56.91	32.329	
7,100.00	7,032.21	13,685.00	8,740.08	25.43	79.13	114.116	-904.31	557.71	1,741.53	1,684.17	57.36	30.362	
7,200.00	7,132.21	13,685.00	8,740.08	25.76	79.13	114.116	-904.31	557.71	1,643.58	1,585.72	57.86	28.408	
7,300.00	7,232.21	13,685.00	8,740.08	26.08	79.13	114.116	-904.31	557.71	1,545.89	1,487.48	58.41	26.467	
7,400.00	7,332.21	13,685.00	8,740.08	26.41	79.13	114.116	-904.31	557.71	1,448.52	1,389.49	59.03	24.540	
7,500.00	7,432.21	13,685.00	8,740.08	26.74	79.13	114.116	-904.31	557.71	1,351.53	1,291.80	59.73	22.628	
7,600.00	7,532.21	13,685.00	8,740.08	27.06	79.13	114.116	-904.31	557.71	1,255.01	1,194.47	60.54	20.731	
7,700.00	7,632.21	13,685.00	8,740.08	27.39	79.13	114.116	-904.31	557.71	1,159.08	1,097.60	61.49	18.851	
7,729.84	7,662.04	13,685.00	8,740.08	27.49	79.13	114.116	-904.31	557.71	1,130.60	1,068.79	61.80	18.293	
7,750.00	7,682.20	13,685.00	8,740.08	27.56	79.13	114.170	-904.31	557.71	1,111.44	1,049.41	62.02	17.920	
7,800.00	7,732.03	13,685.00	8,740.08	27.72	79.13	114.767	-904.31	557.71	1,064.66	1,002.07	62.58	17.012	
7,850.00	7,781.33	13,685.00	8,740.08	27.87	79.13	116.001	-904.31	557.71	1,019.34	956.18	63.16	16.138	
7,900.00	7,829.71	13,685.00	8,740.08	28.02	79.13	117.821	-904.31	557.71	976.05	912.29	63.76	15.308	
7,950.00	7,876.83	13,685.00	8,740.08	28.16	79.13	120.153	-904.31	557.71	935.43	871.06	64.37	14.533	
8,000.00	7,922.31	13,685.00	8,740.08	28.30	79.13	122.898	-904.31	557.71	898.16	833.18	64.98	13.823	
8,050.00	7,965.80	13,685.00	8,740.08	28.42	79.13	125.944	-904.31	557.71	864.98	799.41	65.58	13.190	
8,100.00	8,006.99	13,685.00	8,740.08	28.54	79.13	129.171	-904.31	557.71	836.65	770.51	66.14	12.649	
8,150.00	8,045.55	13,685.00	8,740.08	28.65	79.13	132.465	-904.31	557.71	813.89	747.25	66.65	12.212	
8,200.00	8,081.19	13,685.00	8,740.08	28.76	79.13	135.723	-904.31	557.71	797.36	730.31	67.05	11.892	
8,250.00	8,113.64	13,685.00	8,740.08	28.85	79.13	138.864	-904.31	557.71	787.59	720.27	67.32	11.699	
8,293.75	8,139.22	13,685.00	8,740.08	28.93	79.13	141.471	-904.31	557.71	784.84	717.42	67.43	11.640 CC, ES, SF	
8,300.00	8,142.65	13,685.00	8,740.08	28.94	79.13	141.831	-904.31	557.71	784.90	717.47	67.43	11.640	
8,350.00	8,168.01	13,685.00	8,740.08	29.02	79.13	144.586	-904.31	557.71	789.38	722.01	67.36	11.718	
8,400.00	8,189.52	13,685.00	8,740.08	29.10	79.13	147.112	-904.31	557.71	800.88	733.75	67.13	11.931	
8,450.00	8,207.01	13,685.00	8,740.08	29.16	79.13	149.405	-904.31	557.71	819.02	752.27	66.74	12.272	
8,500.00	8,220.35	13,685.00	8,740.08	29.22	79.13	151.471	-904.31	557.71	843.23	776.99	66.24	12.729	
8,550.00	8,229.45	13,685.00	8,740.08	29.28	79.13	153.323	-904.31	557.71	872.85	807.17	65.67	13.291	
8,600.00	8,234.22	13,685.00	8,740.08	29.32	79.13	154.976	-904.31	557.71	907.11	842.05	65.07	13.941	
8,629.84	8,235.00	13,685.00	8,740.08	29.35	79.13	155.874	-904.31	557.71	929.47	864.77	64.71	14.365	
8,700.00	8,235.00	13,685.00	8,740.08	29.41	79.13	157.759	-904.31	557.71	984.57	920.68	63.89	15.410	
8,800.00	8,235.00	13,685.00	8,740.08	29.52	79.13	159.990	-904.31	557.71	1,066.16	1,003.26	62.90	16.950	

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation



MS Directional Anticollision Report



Company:	Marathon Oil	Local Co-ordinate Reference:	Well Pierogi BS Federal Com 502H
Project:	Eddy County, New Mexico (NAD 27)	TVD Reference:	WELL @ 3022.50usft (Precision 580)
Reference Site:	Pierogi Federal Com (302H, 502H, 552H)	MD Reference:	WELL @ 3022.50usft (Precision 580)
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	Pierogi BS Federal Com 502H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	EDM 5000.15 Conroe DB
Reference Design:	Design #1	Offset TVD Reference:	Reference Datum

Offset Design: Boondock 3 State - Boondock 3 H3PA State Com 1H - Wellbore #1 - Surveys													Offset Site Error:
Survey Program: 178-, 468- Reference													0.00 usft
Measured Depth (usft)	Vertical Depth (usft)	Offset Measured Depth (usft)	Vertical Depth (usft)	Semi Major Axis Reference (usft)	Offset (usft)	Azimuth from North (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Distance Between Centres (usft)	Rule Assigned: Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning
8,900.00	8,235.00	13,685.00	8,740.08	29.66	79.13	161.814	-904.31	557.71	1,150.67	1,088.59	62.08	18.536	
9,000.00	8,235.00	13,685.00	8,740.08	29.82	79.13	163.330	-904.31	557.71	1,237.48	1,176.08	61.40	20.153	
9,100.00	8,235.00	13,685.00	8,740.08	30.00	79.13	164.608	-904.31	557.71	1,326.15	1,265.30	60.85	21.793	
9,200.00	8,235.00	13,685.00	8,740.08	30.21	79.13	165.700	-904.31	557.71	1,416.34	1,355.94	60.40	23.449	
9,300.00	8,235.00	13,685.00	8,740.08	30.44	79.13	166.642	-904.31	557.71	1,507.76	1,447.73	60.03	25.116	
9,400.00	8,235.00	13,685.00	8,740.08	30.69	79.13	167.462	-904.31	557.71	1,600.21	1,540.48	59.73	26.791	
9,500.00	8,235.00	13,685.00	8,740.08	30.97	79.13	168.184	-904.31	557.71	1,693.51	1,634.03	59.48	28.471	
9,600.00	8,235.00	13,685.00	8,740.08	31.27	79.13	168.822	-904.31	557.71	1,787.54	1,728.27	59.28	30.155	
9,700.00	8,235.00	13,685.00	8,740.08	31.58	79.13	169.392	-904.31	557.71	1,882.19	1,823.08	59.11	31.841	
9,800.00	8,235.00	13,685.00	8,740.08	31.92	79.13	169.903	-904.31	557.71	1,977.36	1,918.39	58.98	33.527	
9,900.00	8,235.00	13,685.00	8,740.08	32.28	79.13	170.363	-904.31	557.71	2,072.99	2,014.12	58.87	35.215	
10,000.00	8,235.00	13,685.00	8,740.08	32.66	79.13	170.781	-904.31	557.71	2,169.01	2,110.23	58.78	36.901	
10,100.00	8,235.00	13,685.00	8,740.08	33.05	79.13	171.161	-904.31	557.71	2,265.38	2,206.67	58.71	38.588	
10,200.00	8,235.00	13,685.00	8,740.08	33.46	79.13	171.508	-904.31	557.71	2,362.05	2,303.40	58.65	40.273	
10,300.00	8,235.00	13,685.00	8,740.08	33.89	79.13	171.827	-904.31	557.71	2,458.98	2,400.37	58.61	41.957	
10,400.00	8,235.00	13,685.00	8,740.08	34.34	79.13	172.121	-904.31	557.71	2,556.15	2,497.58	58.57	43.639	
10,500.00	8,235.00	13,685.00	8,740.08	34.80	79.13	172.392	-904.31	557.71	2,653.53	2,594.98	58.55	45.320	
10,600.00	8,235.00	13,685.00	8,740.08	35.27	79.13	172.643	-904.31	557.71	2,751.10	2,692.57	58.53	47.000	
10,700.00	8,235.00	13,685.00	8,740.08	35.76	79.13	172.877	-904.31	557.71	2,848.84	2,790.32	58.53	48.677	
10,800.00	8,235.00	13,685.00	8,740.08	36.27	79.13	173.094	-904.31	557.71	2,946.73	2,888.21	58.52	50.352	
10,900.00	8,235.00	13,685.00	8,740.08	36.79	79.13	173.297	-904.31	557.71	3,044.76	2,986.23	58.52	52.025	
11,000.00	8,235.00	13,685.00	8,740.08	37.32	79.13	173.487	-904.31	557.71	3,142.91	3,084.38	58.53	53.696	
11,100.00	8,235.00	13,685.00	8,740.08	37.86	79.13	173.666	-904.31	557.71	3,241.17	3,182.63	58.54	55.365	
11,200.00	8,235.00	13,685.00	8,740.08	38.41	79.13	173.833	-904.31	557.71	3,339.54	3,280.98	58.56	57.031	
11,300.00	8,235.00	13,685.00	8,740.08	38.98	79.13	173.991	-904.31	557.71	3,438.00	3,379.43	58.57	58.694	
11,400.00	8,235.00	13,685.00	8,740.08	39.55	79.13	174.140	-904.31	557.71	3,536.55	3,477.95	58.60	60.356	
11,500.00	8,235.00	13,685.00	8,740.08	40.14	79.13	174.280	-904.31	557.71	3,635.18	3,576.56	58.62	62.014	
11,600.00	8,235.00	13,685.00	8,740.08	40.74	79.13	174.413	-904.31	557.71	3,733.88	3,675.23	58.64	63.670	
11,700.00	8,235.00	13,685.00	8,740.08	41.34	79.13	174.539	-904.31	557.71	3,832.64	3,773.97	58.67	65.323	
11,800.00	8,235.00	13,685.00	8,740.08	41.96	79.13	174.659	-904.31	557.71	3,931.47	3,872.77	58.70	66.973	
11,900.00	8,235.00	13,685.00	8,740.08	42.58	79.13	174.772	-904.31	557.71	4,030.36	3,971.63	58.73	68.620	
12,000.00	8,235.00	13,685.00	8,740.08	43.21	79.13	174.880	-904.31	557.71	4,129.30	4,070.53	58.77	70.265	
12,100.00	8,235.00	13,685.00	8,740.08	43.85	79.13	174.983	-904.31	557.71	4,228.29	4,169.49	58.80	71.906	
12,200.00	8,235.00	13,685.00	8,740.08	44.50	79.13	175.081	-904.31	557.71	4,327.33	4,268.49	58.84	73.544	
12,300.00	8,235.00	13,685.00	8,740.08	45.15	79.13	175.175	-904.31	557.71	4,426.41	4,367.53	58.88	75.179	
12,400.00	8,235.00	13,685.00	8,740.08	45.81	79.13	175.264	-904.31	557.71	4,525.53	4,466.61	58.92	76.811	
12,500.00	8,235.00	13,685.00	8,740.08	46.48	79.13	175.350	-904.31	557.71	4,624.69	4,565.73	58.96	78.439	
12,600.00	8,235.00	13,685.00	8,740.08	47.15	79.13	175.432	-904.31	557.71	4,723.89	4,664.88	59.00	80.064	
12,700.00	8,235.00	13,685.00	8,740.08	47.83	79.13	175.511	-904.31	557.71	4,823.11	4,764.07	59.04	81.686	
12,800.00	8,235.00	13,685.00	8,740.08	48.52	79.13	175.586	-904.31	557.71	4,922.37	4,863.28	59.09	83.304	
12,900.00	8,235.00	13,685.00	8,740.08	49.21	79.13	175.658	-904.31	557.71	5,021.66	4,962.52	59.14	84.918	
13,000.00	8,235.00	13,685.00	8,740.08	49.90	79.13	175.728	-904.31	557.71	5,120.98	5,061.79	59.18	86.529	
13,100.00	8,235.00	13,685.00	8,740.08	50.60	79.13	175.795	-904.31	557.71	5,220.32	5,161.09	59.23	88.136	
13,200.00	8,235.00	13,685.00	8,740.08	51.31	79.13	175.859	-904.31	557.71	5,319.68	5,260.41	59.28	89.740	
13,300.00	8,235.00	13,685.00	8,740.08	52.02	79.13	175.921	-904.31	557.71	5,419.07	5,359.75	59.33	91.340	
13,400.00	8,235.00	13,685.00	8,740.08	52.74	79.13	175.981	-904.31	557.71	5,518.49	5,459.11	59.38	92.936	
13,500.00	8,235.00	13,685.00	8,740.08	53.46	79.13	176.038	-904.31	557.71	5,617.92	5,558.49	59.43	94.528	
13,600.00	8,235.00	13,685.00	8,740.08	54.18	79.13	176.094	-904.31	557.71	5,717.37	5,657.89	59.48	96.116	
13,700.00	8,235.00	13,685.00	8,740.08	54.91	79.13	176.148	-904.31	557.71	5,816.84	5,757.31	59.54	97.700	
13,800.00	8,235.00	13,685.00	8,740.08	55.64	79.13	176.199	-904.31	557.71	5,916.33	5,856.74	59.59	99.280	
13,900.00	8,235.00	13,685.00	8,740.08	56.37	79.13	176.250	-904.31	557.71	6,015.84	5,956.19	59.65	100.856	
14,000.00	8,235.00	13,685.00	8,740.08	57.11	79.13	176.298	-904.31	557.71	6,115.36	6,055.66	59.70	102.427	

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation



MS Directional Anticollision Report



Company:	Marathon Oil	Local Co-ordinate Reference:	Well Pierogi BS Federal Com 502H
Project:	Eddy County, New Mexico (NAD 27)	TVD Reference:	WELL @ 3022.50usft (Precision 580)
Reference Site:	Pierogi Federal Com (302H, 502H, 552H)	MD Reference:	WELL @ 3022.50usft (Precision 580)
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	Pierogi BS Federal Com 502H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	EDM 5000.15 Conroe DB
Reference Design:	Design #1	Offset TVD Reference:	Reference Datum

Offset Design: Boondock 3 State - Boondock 3 H3PA State Com 1H - Wellbore #1 - Surveys												Offset Site Error:	0.00 usft
Survey Program: 178-, 468- Reference												Offset Well Error:	0.00 usft
Measured Depth (usft)	Vertical Depth (usft)	Offset Measured Depth (usft)	Vertical Depth (usft)	Semi Major Axis Reference (usft)	Offset (usft)	Azimuth from North (°)	Offset Wellbore Centre		Rule Assigned: Distance Between Centres (usft)		Minimum Separation (usft)	Separation Factor	Warning
+N/-S (usft)	+E/-W (usft)	Between Ellipses (usft)	Between Centres (usft)	Between Centres (usft)	Between Centres (usft)	Between Centres (usft)	Between Centres (usft)	Between Centres (usft)	Between Centres (usft)	Between Centres (usft)	Between Centres (usft)	Between Centres (usft)	Between Centres (usft)
14,100.00	8,235.00	13,685.00	8,740.08	57.85	79.13	176.345	-904.31	557.71	6,214.90	6,155.14	59.76	103.995	
14,200.00	8,235.00	13,685.00	8,740.08	58.60	79.13	176.390	-904.31	557.71	6,314.45	6,254.63	59.82	105.558	
14,300.00	8,235.00	13,685.00	8,740.08	59.35	79.13	176.434	-904.31	557.71	6,414.02	6,354.14	59.88	107.117	
14,400.00	8,235.00	13,685.00	8,740.08	60.10	79.13	176.477	-904.31	557.71	6,513.60	6,453.66	59.94	108.672	
14,500.00	8,235.00	13,685.00	8,740.08	60.86	79.13	176.518	-904.31	557.71	6,613.19	6,553.19	60.00	110.222	
14,600.00	8,235.00	13,685.00	8,740.08	61.61	79.13	176.558	-904.31	557.71	6,712.79	6,652.73	60.06	111.768	
14,700.00	8,235.00	13,685.00	8,740.08	62.37	79.13	176.597	-904.31	557.71	6,812.41	6,752.29	60.12	113.309	
14,800.00	8,235.00	13,685.00	8,740.08	63.14	79.13	176.635	-904.31	557.71	6,912.04	6,851.85	60.19	114.846	
14,900.00	8,235.00	13,685.00	8,740.08	63.90	79.13	176.672	-904.31	557.71	7,011.68	6,951.43	60.25	116.378	
15,000.00	8,235.00	13,685.00	8,740.08	64.67	79.13	176.708	-904.31	557.71	7,111.32	7,051.01	60.31	117.906	
15,100.00	8,235.00	13,685.00	8,740.08	65.44	79.13	176.742	-904.31	557.71	7,210.98	7,150.60	60.38	119.429	
15,200.00	8,235.00	13,685.00	8,740.08	66.21	79.13	176.776	-904.31	557.71	7,310.65	7,250.20	60.45	120.947	
15,300.00	8,235.00	13,685.00	8,740.08	66.98	79.13	176.809	-904.31	557.71	7,410.32	7,349.81	60.51	122.461	
15,400.00	8,235.00	13,685.00	8,740.08	67.76	79.13	176.841	-904.31	557.71	7,510.01	7,449.43	60.58	123.969	
15,500.00	8,235.00	13,685.00	8,740.08	68.54	79.13	176.872	-904.31	557.71	7,609.70	7,549.05	60.65	125.474	
15,600.00	8,235.00	13,685.00	8,740.08	69.32	79.13	176.902	-904.31	557.71	7,709.40	7,648.68	60.72	126.973	
15,700.00	8,235.00	13,685.00	8,740.08	70.10	79.13	176.932	-904.31	557.71	7,809.11	7,748.32	60.79	128.467	
15,800.00	8,235.00	13,685.00	8,740.08	70.89	79.13	176.961	-904.31	557.71	7,908.83	7,847.97	60.86	129.957	
15,900.00	8,235.00	13,685.00	8,740.08	71.67	79.13	176.989	-904.31	557.71	8,008.55	7,947.62	60.93	131.441	
16,000.00	8,235.00	13,685.00	8,740.08	72.46	79.13	177.016	-904.31	557.71	8,108.28	8,047.28	61.00	132.921	
16,100.00	8,235.00	13,685.00	8,740.08	73.25	79.13	177.043	-904.31	557.71	8,208.01	8,146.94	61.07	134.396	
16,200.00	8,235.00	13,685.00	8,740.08	74.04	79.13	177.069	-904.31	557.71	8,307.76	8,246.61	61.15	135.866	
16,300.00	8,235.00	13,685.00	8,740.08	74.83	79.13	177.094	-904.31	557.71	8,407.51	8,346.28	61.22	137.330	
16,400.00	8,235.00	13,685.00	8,740.08	75.63	79.13	177.119	-904.31	557.71	8,507.26	8,445.96	61.30	138.790	
16,500.00	8,235.00	13,685.00	8,740.08	76.42	79.13	177.143	-904.31	557.71	8,607.02	8,545.65	61.37	140.245	
16,600.00	8,235.00	13,685.00	8,740.08	77.22	79.13	177.167	-904.31	557.71	8,706.79	8,645.34	61.45	141.694	
16,700.00	8,235.00	13,685.00	8,740.08	78.02	79.13	177.190	-904.31	557.71	8,806.56	8,745.03	61.52	143.139	
16,800.00	8,235.00	13,685.00	8,740.08	78.82	79.13	177.213	-904.31	557.71	8,906.33	8,844.73	61.60	144.578	
16,900.00	8,235.00	13,685.00	8,740.08	79.62	79.13	177.235	-904.31	557.71	9,006.12	8,944.43	61.68	146.012	
17,000.00	8,235.00	13,685.00	8,740.08	80.42	79.13	177.257	-904.31	557.71	9,105.90	9,044.14	61.76	147.441	
17,100.00	8,235.00	13,685.00	8,740.08	81.22	79.13	177.278	-904.31	557.71	9,205.69	9,143.85	61.84	148.865	
17,200.00	8,235.00	13,685.00	8,740.08	82.03	79.13	177.298	-904.31	557.71	9,305.49	9,243.57	61.92	150.283	
17,300.00	8,235.00	13,685.00	8,740.08	82.83	79.13	177.319	-904.31	557.71	9,405.29	9,343.29	62.00	151.696	
17,400.00	8,235.00	13,685.00	8,740.08	83.64	79.13	177.339	-904.31	557.71	9,505.09	9,443.01	62.08	153.104	
17,500.00	8,235.00	13,685.00	8,740.08	84.45	79.13	177.358	-904.31	557.71	9,604.90	9,542.73	62.16	154.507	
17,600.00	8,235.00	13,685.00	8,740.08	85.26	79.13	177.377	-904.31	557.71	9,704.71	9,642.46	62.25	155.905	
17,700.00	8,235.00	13,685.00	8,740.08	86.07	79.13	177.396	-904.31	557.71	9,804.53	9,742.19	62.33	157.297	
17,800.00	8,235.00	13,685.00	8,740.08	86.88	79.13	177.414	-904.31	557.71	9,904.34	9,841.93	62.42	158.684	

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

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COMPASS 5000.15 Build 91E



MS Directional Anticollision Report



Company:	Marathon Oil	Local Co-ordinate Reference:	Well Pierogi BS Federal Com 502H
Project:	Eddy County, New Mexico (NAD 27)	TVD Reference:	WELL @ 3022.50usft (Precision 580)
Reference Site:	Pierogi Federal Com (302H, 502H, 552H)	MD Reference:	WELL @ 3022.50usft (Precision 580)
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	Pierogi BS Federal Com 502H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	EDM 5000.15 Conroe DB
Reference Design:	Design #1	Offset TVD Reference:	Reference Datum

Offset Design: Fiddle Fire Fed Com (#301H & 302H) - Fiddle Fire Fed Com 301H - Wellbore #1 - Design #2														Offset Site Error:	0.00 usft
Survey Program: 0-MWD+HRGM														Offset Well Error:	0.00 usft
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Semi Major Axis Reference (usft)	Offset (usft)	Azimuth from North (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Distance Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning		
13,300.00	8,235.00	6,900.00	6,803.09	52.02	28.18	9.345	14,174.78	1,769.71	9,931.47	9,874.53	56.94	174.433			
13,400.00	8,235.00	6,900.00	6,803.09	52.74	28.18	9.448	14,174.78	1,769.71	9,834.09	9,777.06	57.03	172.436			
13,500.00	8,235.00	6,900.00	6,803.09	53.46	28.18	9.554	14,174.78	1,769.71	9,736.76	9,679.63	57.13	170.433			
13,600.00	8,235.00	6,900.00	6,803.09	54.18	28.18	9.662	14,174.78	1,769.71	9,639.48	9,582.25	57.23	168.426			
13,700.00	8,235.00	6,900.00	6,803.09	54.91	28.18	9.773	14,174.78	1,769.71	9,542.26	9,484.92	57.34	166.413			
13,800.00	8,235.00	6,900.00	6,803.09	55.64	28.18	9.885	14,174.78	1,769.71	9,445.10	9,387.65	57.45	164.394			
13,900.00	8,235.00	6,900.00	6,803.09	56.37	28.18	10.000	14,174.78	1,769.71	9,348.00	9,290.43	57.57	162.371			
14,000.00	8,235.00	6,900.00	6,803.09	57.11	28.18	10.117	14,174.78	1,769.71	9,250.96	9,193.26	57.69	160.343			
14,100.00	8,235.00	6,921.86	6,824.62	57.85	28.24	10.249	14,177.67	1,772.10	9,153.87	9,095.97	57.90	158.107			
14,200.00	8,235.00	6,924.78	6,827.49	58.60	28.25	10.374	14,178.06	1,772.48	9,056.92	8,998.88	58.04	156.046			
14,300.00	8,235.00	6,927.70	6,830.36	59.35	28.26	10.501	14,178.45	1,772.88	8,960.04	8,901.85	58.19	153.981			
14,400.00	8,235.00	6,950.00	6,852.18	60.10	28.32	10.648	14,181.42	1,776.39	8,863.32	8,804.91	58.41	151.742			
14,500.00	8,235.00	6,950.00	6,852.18	60.86	28.32	10.780	14,181.42	1,776.39	8,766.54	8,707.98	58.56	149.699			
14,600.00	8,235.00	6,950.00	6,852.18	61.61	28.32	10.914	14,181.42	1,776.39	8,669.84	8,611.12	58.72	147.651			
14,700.00	8,235.00	6,950.00	6,852.18	62.37	28.32	11.052	14,181.42	1,776.39	8,573.21	8,514.33	58.88	145.599			
14,800.00	8,235.00	6,950.00	6,852.18	63.14	28.32	11.192	14,181.42	1,776.39	8,476.66	8,417.61	59.05	143.544			
14,900.00	8,235.00	6,950.00	6,852.18	63.90	28.32	11.336	14,181.42	1,776.39	8,380.19	8,320.96	59.23	141.485			
15,000.00	8,235.00	6,950.00	6,852.18	64.67	28.32	11.484	14,181.42	1,776.39	8,283.81	8,224.39	59.42	139.422			
15,100.00	8,235.00	6,950.00	6,852.18	65.44	28.32	11.635	14,181.42	1,776.39	8,187.51	8,127.90	59.61	137.356			
15,200.00	8,235.00	6,950.00	6,852.18	66.21	28.32	11.789	14,181.42	1,776.39	8,091.31	8,031.50	59.81	135.287			
15,300.00	8,235.00	6,950.00	6,852.18	66.98	28.32	11.948	14,181.42	1,776.39	7,995.19	7,935.17	60.02	133.215			
15,400.00	8,235.00	6,950.00	6,852.18	67.76	28.32	12.110	14,181.42	1,776.39	7,899.17	7,838.94	60.23	131.141			
15,500.00	8,235.00	6,950.00	6,852.18	68.54	28.32	12.277	14,181.42	1,776.39	7,803.25	7,742.79	60.46	129.064			
15,600.00	8,235.00	6,950.00	6,852.18	69.32	28.32	12.448	14,181.42	1,776.39	7,707.44	7,646.74	60.70	126.984			
15,700.00	8,235.00	6,950.00	6,852.18	70.10	28.32	12.623	14,181.42	1,776.39	7,611.73	7,550.79	60.94	124.903			
15,800.00	8,235.00	6,971.70	6,873.25	70.89	28.37	12.830	14,184.32	1,780.62	7,516.00	7,454.74	61.26	122.692			
15,900.00	8,235.00	6,974.63	6,876.09	71.67	28.38	13.020	14,184.71	1,781.26	7,420.48	7,358.95	61.53	120.594			
16,000.00	8,235.00	6,977.57	6,878.93	72.46	28.38	13.214	14,185.11	1,781.91	7,325.07	7,263.25	61.82	118.496			
16,100.00	8,235.00	6,980.50	6,881.76	73.25	28.39	13.414	14,185.50	1,782.57	7,229.78	7,167.67	62.11	116.398			
16,200.00	8,235.00	7,000.00	6,900.48	74.04	28.44	13.647	14,188.12	1,787.36	7,134.70	7,072.23	62.47	114.211			
16,300.00	8,235.00	7,000.00	6,900.48	74.83	28.44	13.854	14,188.12	1,787.36	7,039.64	6,976.86	62.78	112.132			
16,400.00	8,235.00	7,000.00	6,900.48	75.63	28.44	14.067	14,188.12	1,787.36	6,944.72	6,881.61	63.10	110.054			
16,500.00	8,235.00	7,000.00	6,900.48	76.42	28.44	14.286	14,188.12	1,787.36	6,849.94	6,786.50	63.44	107.976			
16,600.00	8,235.00	7,000.00	6,900.48	77.22	28.44	14.511	14,188.12	1,787.36	6,755.31	6,691.52	63.79	105.900			
16,700.00	8,235.00	7,000.00	6,900.48	78.02	28.44	14.742	14,188.12	1,787.36	6,660.84	6,596.68	64.15	103.826			
16,800.00	8,235.00	7,000.00	6,900.48	78.82	28.44	14.981	14,188.12	1,787.36	6,566.53	6,501.99	64.53	101.753			
16,900.00	8,235.00	7,000.00	6,900.48	79.62	28.44	15.227	14,188.12	1,787.36	6,472.39	6,407.46	64.93	99.684			
17,000.00	8,235.00	7,000.00	6,900.48	80.42	28.44	15.481	14,188.12	1,787.36	6,378.43	6,313.09	65.34	97.617			
17,100.00	8,235.00	7,000.00	6,900.48	81.22	28.44	15.742	14,188.12	1,787.36	6,284.66	6,218.89	65.77	95.555			
17,200.00	8,235.00	7,000.00	6,900.48	82.03	28.44	16.012	14,188.12	1,787.36	6,191.08	6,124.86	66.22	93.496			
17,300.00	8,235.00	7,000.00	6,900.48	82.83	28.44	16.290	14,188.12	1,787.36	6,097.70	6,031.02	66.68	91.443			
17,400.00	8,235.00	7,000.00	6,900.48	83.64	28.44	16.578	14,188.12	1,787.36	6,004.54	5,937.38	67.17	89.395			
17,500.00	8,235.00	7,021.44	6,920.86	84.45	28.48	16.924	14,191.01	1,793.35	5,911.43	5,843.70	67.73	87.281			
17,600.00	8,235.00	7,024.35	6,923.61	85.26	28.49	17.239	14,191.40	1,794.23	5,818.67	5,750.41	68.26	85.240			
17,700.00	8,235.00	7,027.26	6,926.35	86.07	28.49	17.564	14,191.80	1,795.11	5,726.15	5,657.34	68.82	83.206			
17,800.00	8,235.00	7,030.16	6,929.08	86.88	28.50	17.901	14,192.19	1,796.01	5,633.88	5,564.49	69.40	81.182			
17,900.00	8,235.00	7,050.00	6,947.63	87.69	28.54	18.299	14,194.86	1,802.53	5,541.99	5,471.94	70.05	79.114			
18,000.00	8,235.00	7,050.00	6,947.63	88.50	28.54	18.653	14,194.86	1,802.53	5,450.22	5,379.55	70.67	77.120			
18,100.00	8,235.00	7,050.00	6,947.63	89.32	28.54	19.020	14,194.86	1,802.53	5,358.74	5,287.42	71.32	75.138			
18,200.00	8,235.00	7,050.00	6,947.63	90.13	28.54	19.400	14,194.86	1,802.53	5,267.58	5,195.58	71.99	73.166			
18,300.00	8,235.00	7,050.00	6,947.63	90.95	28.54	19.795	14,194.86	1,802.53	5,176.74	5,104.04	72.70	71.208			
18,400.00	8,235.00	7,050.00	6,947.63	91.76	28.54	20.204	14,194.86	1,802.53	5,086.24	5,012.81	73.43	69.263			

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation



MS Directional Anticollision Report



Company:	Marathon Oil	Local Co-ordinate Reference:	Well Pierogi BS Federal Com 502H
Project:	Eddy County, New Mexico (NAD 27)	TVD Reference:	WELL @ 3022.50usft (Precision 580)
Reference Site:	Pierogi Federal Com (302H, 502H, 552H)	MD Reference:	WELL @ 3022.50usft (Precision 580)
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	Pierogi BS Federal Com 502H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	EDM 5000.15 Conroe DB
Reference Design:	Design #1	Offset TVD Reference:	Reference Datum

Offset Design: Fiddle Fire Fed Com (#301H & 302H) - Fiddle Fire Fed Com 301H - Wellbore #1 - Design #2													Offset Site Error:
Survey Program: 0-MWD+HRGM													Offset Well Error:
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Semi Major Axis Reference (usft)	Semi Major Axis Offset (usft)	Azimuth from North (°)	Offset Wellbore Centre +N/-S (usft)	Offset Wellbore Centre +E/-W (usft)	Distance Between Centres (usft)	Rule Assigned: Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning
18,500.00	8,235.00	7,050.00	6,947.63	92.58	28.54	20.630	14,194.86	1,802.53	4,996.11	4,921.91	74.20	67.332	
18,600.00	8,235.00	7,050.00	6,947.63	93.40	28.54	21.072	14,194.86	1,802.53	4,906.36	4,831.36	75.00	65.417	
18,700.00	8,235.00	7,050.00	6,947.63	94.22	28.54	21.531	14,194.86	1,802.53	4,817.01	4,741.17	75.84	63.518	
18,800.00	8,235.00	7,050.00	6,947.63	95.04	28.54	22.010	14,194.86	1,802.53	4,728.09	4,651.38	76.71	61.638	
18,900.00	8,235.00	7,050.00	6,947.63	95.86	28.54	22.508	14,194.86	1,802.53	4,639.62	4,562.00	77.62	59.776	
19,000.00	8,235.00	7,050.00	6,947.63	96.68	28.54	23.027	14,194.86	1,802.53	4,551.63	4,473.06	78.57	57.934	
19,100.00	8,235.00	7,050.00	6,947.63	97.50	28.54	23.569	14,194.86	1,802.53	4,464.14	4,384.58	79.56	56.113	
19,200.00	8,235.00	7,070.37	6,966.42	98.32	28.57	24.210	14,197.60	1,809.89	4,376.97	4,296.33	80.64	54.275	
19,300.00	8,235.00	7,073.21	6,969.02	99.15	28.58	24.813	14,197.98	1,810.97	4,290.52	4,208.79	81.73	52.495	
19,400.00	8,235.00	7,076.04	6,971.61	99.97	28.58	25.442	14,198.36	1,812.06	4,204.66	4,121.80	82.87	50.741	
19,500.00	8,235.00	7,078.87	6,974.18	100.79	28.59	26.100	14,198.74	1,813.16	4,119.43	4,035.38	84.05	49.013	
19,600.00	8,235.00	7,100.00	6,993.26	101.62	28.62	26.872	14,201.56	1,821.79	4,035.06	3,949.71	85.35	47.279	
19,700.00	8,235.00	7,100.00	6,993.26	102.44	28.62	27.582	14,201.56	1,821.79	3,951.16	3,864.53	86.62	45.612	
19,800.00	8,235.00	7,100.00	6,993.26	103.27	28.62	28.325	14,201.56	1,821.79	3,868.02	3,780.07	87.96	43.976	
19,900.00	8,235.00	7,100.00	6,993.26	104.10	28.62	29.105	14,201.56	1,821.79	3,785.70	3,696.36	89.35	42.371	
20,000.00	8,235.00	7,100.00	6,993.26	104.92	28.62	29.923	14,201.56	1,821.79	3,704.26	3,613.46	90.80	40.798	
20,100.00	8,235.00	7,100.00	6,993.26	105.75	28.62	30.783	14,201.56	1,821.79	3,623.74	3,531.43	92.30	39.258	
20,200.00	8,235.00	7,100.00	6,993.26	106.58	28.62	31.687	14,201.56	1,821.79	3,544.21	3,450.33	93.88	37.754	
20,300.00	8,235.00	7,100.00	6,993.26	107.41	28.62	32.638	14,201.56	1,821.79	3,465.74	3,370.23	95.51	36.287	
20,400.00	8,235.00	7,100.00	6,993.26	108.24	28.62	33.639	14,201.56	1,821.79	3,388.41	3,291.20	97.21	34.857	
20,500.00	8,235.00	7,100.00	6,993.26	109.07	28.62	34.694	14,201.56	1,821.79	3,312.29	3,213.32	98.97	33.466	
20,600.00	8,235.00	7,100.00	6,993.26	109.90	28.62	35.807	14,201.56	1,821.79	3,237.47	3,136.67	100.81	32.116	
20,700.00	8,235.00	7,100.00	6,993.26	110.73	28.62	36.981	14,201.56	1,821.79	3,164.04	3,061.34	102.70	30.808	
20,800.00	8,235.00	7,100.00	6,993.26	111.56	28.62	38.220	14,201.56	1,821.79	3,092.11	2,987.44	104.67	29.543	
20,900.00	8,235.00	7,100.00	6,993.26	112.39	28.62	39.530	14,201.56	1,821.79	3,021.77	2,915.07	106.69	28.322	
21,000.00	8,235.00	7,120.54	7,011.49	113.23	28.65	41.022	14,204.30	1,830.85	2,952.81	2,843.92	108.89	27.118	
21,100.00	8,235.00	7,123.27	7,013.88	114.06	28.66	42.498	14,204.66	1,832.10	2,885.91	2,774.85	111.06	25.986	
21,200.00	8,235.00	7,125.98	7,016.26	114.89	28.66	44.058	14,205.02	1,833.36	2,820.96	2,707.67	113.28	24.901	
21,300.00	8,235.00	7,128.69	7,018.63	115.72	28.67	45.706	14,205.38	1,834.63	2,758.09	2,642.53	115.56	23.866	
21,400.00	8,235.00	7,150.00	7,037.03	116.56	28.70	47.550	14,208.19	1,844.99	2,697.75	2,579.74	118.02	22.859	
21,500.00	8,235.00	7,150.00	7,037.03	117.39	28.70	49.370	14,208.19	1,844.99	2,639.42	2,519.06	120.36	21.929	
21,600.00	8,235.00	7,150.00	7,037.03	118.23	28.70	51.293	14,208.19	1,844.99	2,583.65	2,460.91	122.74	21.050	
21,700.00	8,235.00	7,150.00	7,037.03	119.06	28.70	53.321	14,208.19	1,844.99	2,530.60	2,405.47	125.13	20.224	
21,800.00	8,235.00	7,150.00	7,037.03	119.90	28.70	55.459	14,208.19	1,844.99	2,480.45	2,352.93	127.52	19.452	
21,900.00	8,235.00	7,150.00	7,037.03	120.73	28.70	57.709	14,208.19	1,844.99	2,433.38	2,303.48	129.89	18.734	
22,000.00	8,235.00	7,150.00	7,037.03	121.57	28.70	60.072	14,208.19	1,844.99	2,389.57	2,257.33	132.24	18.070	
22,100.00	8,235.00	7,150.00	7,037.03	122.41	28.70	62.550	14,208.19	1,844.99	2,349.19	2,214.67	134.53	17.462	
22,200.00	8,235.00	7,150.00	7,037.03	123.24	28.70	65.140	14,208.19	1,844.99	2,312.45	2,175.70	136.75	16.910	
22,300.00	8,235.00	7,150.00	7,037.03	124.08	28.70	67.838	14,208.19	1,844.99	2,279.49	2,140.62	138.87	16.414	
22,400.00	8,235.00	7,150.00	7,037.03	124.92	28.70	70.640	14,208.19	1,844.99	2,250.51	2,109.63	140.88	15.974	
22,500.00	8,235.00	7,150.00	7,037.03	125.76	28.70	73.537	14,208.19	1,844.99	2,225.64	2,082.89	142.75	15.591	
22,600.00	8,235.00	7,150.00	7,037.03	126.59	28.70	76.518	14,208.19	1,844.99	2,205.03	2,060.56	144.47	15.263	
22,700.00	8,235.00	7,150.00	7,037.03	127.43	28.70	79.571	14,208.19	1,844.99	2,188.80	2,042.80	146.01	14.991	
22,800.00	8,235.00	7,150.00	7,037.03	128.27	28.70	82.680	14,208.19	1,844.99	2,177.05	2,029.70	147.35	14.775	
22,900.00	8,235.00	7,170.98	7,054.77	129.11	28.72	85.767	14,210.94	1,855.86	2,169.37	2,020.62	148.75	14.584	
23,000.00	8,235.00	7,173.56	7,056.92	129.95	28.73	88.906	14,211.27	1,857.24	2,166.63	2,016.92	149.71	14.472	
23,009.48	8,235.00	7,173.80	7,057.12	130.03	28.73	89.204	14,211.31	1,857.37	2,166.61	2,016.82	149.79	14.465 CC, ES	
23,100.00	8,235.00	7,176.12	7,059.05	130.79	28.73	92.043	14,211.61	1,858.62	2,168.49	2,018.05	150.45	14.414	
23,200.00	8,235.00	7,178.67	7,061.17	131.63	28.73	95.158	14,211.94	1,860.01	2,174.94	2,023.98	150.96	14.407 SF	
23,300.00	8,235.00	7,200.00	7,078.61	132.47	28.76	98.113	14,214.69	1,871.96	2,186.33	2,034.83	151.50	14.431	
23,400.00	8,235.00	7,200.00	7,078.61	133.31	28.76	101.135	14,214.69	1,871.96	2,201.70	2,050.16	151.55	14.528	
23,500.00	8,235.00	7,200.00	7,078.61	134.15	28.76	104.092	14,214.69	1,871.96	2,221.48	2,070.09	151.39	14.674	

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation



MS Directional Anticollision Report



Company:	Marathon Oil	Local Co-ordinate Reference:	Well Pierogi BS Federal Com 502H
Project:	Eddy County, New Mexico (NAD 27)	TVD Reference:	WELL @ 3022.50usft (Precision 580)
Reference Site:	Pierogi Federal Com (302H, 502H, 552H)	MD Reference:	WELL @ 3022.50usft (Precision 580)
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	Pierogi BS Federal Com 502H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	EDM 5000.15 Conroe DB
Reference Design:	Design #1	Offset TVD Reference:	Reference Datum

Offset Design: Fiddle Fire Fed Com (#301H & 302H) - Fiddle Fire Fed Com 301H - Wellbore #1 - Design #2													Offset Site Error: 0.00 usft
Survey Program:	0-MWD+HRGM												Offset Well Error: 0.00 usft
Reference	Offset	Semi Major Axis		Rule Assigned:									
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference	Offset	Offset Wellbore Centre	Distance	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning	
23,600.00	8,235.00	7,200.00	7,078.61	134.99	28.76	106.970	14,214.69	1,871.96	2,245.54	2,094.50	151.03	14.868	
23,700.00	8,235.00	7,200.00	7,078.61	135.83	28.76	109.758	14,214.69	1,871.96	2,273.74	2,123.24	150.50	15.108	
23,800.00	8,235.00	7,200.00	7,078.61	136.68	28.76	112.448	14,214.69	1,871.96	2,305.94	2,156.13	149.81	15.393	
23,900.00	8,235.00	7,200.00	7,078.61	137.52	28.76	115.034	14,214.69	1,871.96	2,341.97	2,193.00	148.97	15.721	
24,000.00	8,235.00	7,200.00	7,078.61	138.36	28.76	117.512	14,214.69	1,871.96	2,381.66	2,233.65	148.01	16.092	
24,004.19	8,235.00	7,200.00	7,078.61	138.39	28.76	117.613	14,214.69	1,871.96	2,383.40	2,235.43	147.96	16.108	



MS Directional Anticollision Report



Company:	Marathon Oil	Local Co-ordinate Reference:	Well Pierogi BS Federal Com 502H
Project:	Eddy County, New Mexico (NAD 27)	TVD Reference:	WELL @ 3022.50usft (Precision 580)
Reference Site:	Pierogi Federal Com (302H, 502H, 552H)	MD Reference:	WELL @ 3022.50usft (Precision 580)
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	Pierogi BS Federal Com 502H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	EDM 5000.15 Conroe DB
Reference Design:	Design #1	Offset TVD Reference:	Reference Datum

Offset Design: Fiddle Fire Fed Com (#301H & 302H) - Fiddle Fire Fed Com 302H - Wellbore #1 - Design #1														Offset Site Error:	0.00 usft
Survey Program: 0-MWD+HRGM														Offset Well Error:	0.00 usft
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Semi Major Axis Reference (usft)	Offset (usft)	Azimuth from North (°)	Offset Wellbore Centre +N-S (usft)	+E-W (usft)	Distance Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning		
12,000.00	8,235.00	7,200.00	7,084.54	43.21	28.31	9.926	12,962.27	1,904.34	9,999.75	9,944.62	55.12	181.401			
12,100.00	8,235.00	7,200.00	7,084.54	43.85	28.31	10.035	12,962.27	1,904.34	9,902.17	9,846.99	55.18	179.467			
12,200.00	8,235.00	7,200.00	7,084.54	44.50	28.31	10.145	12,962.27	1,904.34	9,804.64	9,749.41	55.23	177.527			
12,300.00	8,235.00	7,200.00	7,084.54	45.15	28.31	10.258	12,962.27	1,904.34	9,707.16	9,651.87	55.29	175.580			
12,400.00	8,235.00	7,200.00	7,084.54	45.81	28.31	10.373	12,962.27	1,904.34	9,609.73	9,554.39	55.35	173.626			
12,500.00	8,235.00	7,200.00	7,084.54	46.48	28.31	10.491	12,962.27	1,904.34	9,512.36	9,456.95	55.41	171.666			
12,600.00	8,235.00	7,200.00	7,084.54	47.15	28.31	10.611	12,962.27	1,904.34	9,415.04	9,359.56	55.48	169.699			
12,700.00	8,235.00	7,200.00	7,084.54	47.83	28.31	10.733	12,962.27	1,904.34	9,317.78	9,262.23	55.55	167.727			
12,800.00	8,235.00	7,200.00	7,084.54	48.52	28.31	10.859	12,962.27	1,904.34	9,220.58	9,164.95	55.63	165.747			
12,900.00	8,235.00	7,200.00	7,084.54	49.21	28.31	10.987	12,962.27	1,904.34	9,123.43	9,067.72	55.71	163.762			
13,000.00	8,235.00	7,200.00	7,084.54	49.90	28.31	11.117	12,962.27	1,904.34	9,026.35	8,970.56	55.80	161.771			
13,100.00	8,235.00	7,200.00	7,084.54	50.60	28.31	11.251	12,962.27	1,904.34	8,929.34	8,873.45	55.89	159.773			
13,200.00	8,235.00	7,200.00	7,084.54	51.31	28.31	11.387	12,962.27	1,904.34	8,832.39	8,776.41	55.98	157.769			
13,300.00	8,235.00	7,200.00	7,084.54	52.02	28.31	11.527	12,962.27	1,904.34	8,735.51	8,679.43	56.08	155.759			
13,400.00	8,235.00	7,200.00	7,084.54	52.74	28.31	11.670	12,962.27	1,904.34	8,638.70	8,582.51	56.19	153.743			
13,500.00	8,235.00	7,200.00	7,084.54	53.46	28.31	11.816	12,962.27	1,904.34	8,541.96	8,485.66	56.30	151.721			
13,600.00	8,235.00	7,200.00	7,084.54	54.18	28.31	11.965	12,962.27	1,904.34	8,445.31	8,388.89	56.42	149.694			
13,700.00	8,235.00	7,200.00	7,084.54	54.91	28.31	12.119	12,962.27	1,904.34	8,348.72	8,292.18	56.54	147.661			
13,800.00	8,235.00	7,200.00	7,084.54	55.64	28.31	12.275	12,962.27	1,904.34	8,252.22	8,195.56	56.67	145.622			
13,900.00	8,235.00	7,200.00	7,084.54	56.37	28.31	12.436	12,962.27	1,904.34	8,155.81	8,099.01	56.80	143.577			
14,000.00	8,235.00	7,200.00	7,084.54	57.11	28.31	12.600	12,962.27	1,904.34	8,059.48	8,002.54	56.95	141.527			
14,100.00	8,235.00	7,200.00	7,084.54	57.85	28.31	12.769	12,962.27	1,904.34	7,963.24	7,906.15	57.10	139.472			
14,200.00	8,235.00	7,200.00	7,084.54	58.60	28.31	12.941	12,962.27	1,904.34	7,867.10	7,809.85	57.25	137.412			
14,300.00	8,235.00	7,200.00	7,084.54	59.35	28.31	13.118	12,962.27	1,904.34	7,771.06	7,713.64	57.42	135.347			
14,400.00	8,235.00	7,200.00	7,084.54	60.10	28.31	13.300	12,962.27	1,904.34	7,675.11	7,617.52	57.59	133.277			
14,500.00	8,235.00	7,200.00	7,084.54	60.86	28.31	13.486	12,962.27	1,904.34	7,579.27	7,521.50	57.77	131.203			
14,600.00	8,235.00	7,200.00	7,084.54	61.61	28.31	13.677	12,962.27	1,904.34	7,483.54	7,425.58	57.96	129.124			
14,700.00	8,235.00	7,200.00	7,084.54	62.37	28.31	13.873	12,962.27	1,904.34	7,387.92	7,329.77	58.15	127.041			
14,800.00	8,235.00	7,200.00	7,084.54	63.14	28.31	14.075	12,962.27	1,904.34	7,292.42	7,234.06	58.36	124.954			
14,900.00	8,235.00	7,200.00	7,084.54	63.90	28.31	14.282	12,962.27	1,904.34	7,197.04	7,138.46	58.58	122.863			
15,000.00	8,235.00	7,200.00	7,084.54	64.67	28.31	14.495	12,962.27	1,904.34	7,101.79	7,042.98	58.80	120.769			
15,100.00	8,235.00	7,200.00	7,084.54	65.44	28.31	14.713	12,962.27	1,904.34	7,006.67	6,947.63	59.04	118.672			
15,200.00	8,235.00	7,200.00	7,084.54	66.21	28.31	14.938	12,962.27	1,904.34	6,911.69	6,852.40	59.29	116.572			
15,300.00	8,235.00	7,200.00	7,084.54	66.98	28.31	15.169	12,962.27	1,904.34	6,816.85	6,757.30	59.55	114.469			
15,400.00	8,235.00	7,200.00	7,084.54	67.76	28.31	15.407	12,962.27	1,904.34	6,722.16	6,662.34	59.82	112.364			
15,500.00	8,235.00	7,200.00	7,084.54	68.54	28.31	15.652	12,962.27	1,904.34	6,627.63	6,567.52	60.11	110.258			
15,600.00	8,235.00	7,200.00	7,084.54	69.32	28.31	15.904	12,962.27	1,904.34	6,533.26	6,472.85	60.41	108.150			
15,700.00	8,235.00	7,200.00	7,084.54	70.10	28.31	16.164	12,962.27	1,904.34	6,439.06	6,378.34	60.72	106.041			
15,800.00	8,235.00	7,200.00	7,084.54	70.89	28.31	16.432	12,962.27	1,904.34	6,345.04	6,283.99	61.05	103.932			
15,900.00	8,235.00	7,200.00	7,084.54	71.67	28.31	16.708	12,962.27	1,904.34	6,251.21	6,189.81	61.39	101.823			
16,000.00	8,235.00	7,200.00	7,084.54	72.46	28.31	16.993	12,962.27	1,904.34	6,157.56	6,095.81	61.75	99.715			
16,100.00	8,235.00	7,200.00	7,084.54	73.25	28.31	17.287	12,962.27	1,904.34	6,064.12	6,002.00	62.13	97.607			
16,200.00	8,235.00	7,200.00	7,084.54	74.04	28.31	17.591	12,962.27	1,904.34	5,970.90	5,908.38	62.52	95.502			
16,300.00	8,235.00	7,180.17	7,068.37	74.83	28.29	17.795	12,962.38	1,892.87	5,877.74	5,814.90	62.84	93.542			
16,400.00	8,235.00	7,179.88	7,068.13	75.63	28.29	18.116	12,962.39	1,892.70	5,784.96	5,721.70	63.26	91.442			
16,500.00	8,235.00	7,179.59	7,067.89	76.42	28.29	18.448	12,962.39	1,892.54	5,692.43	5,628.72	63.71	89.347			
16,600.00	8,235.00	7,179.30	7,067.65	77.22	28.29	18.791	12,962.39	1,892.38	5,600.15	5,535.97	64.18	87.256			
16,700.00	8,235.00	7,179.01	7,067.41	78.02	28.29	19.146	12,962.39	1,892.21	5,508.15	5,443.47	64.67	85.170			
16,800.00	8,235.00	7,178.72	7,067.17	78.82	28.29	19.514	12,962.39	1,892.05	5,416.42	5,351.23	65.19	83.091			
16,900.00	8,235.00	7,178.43	7,066.93	79.62	28.29	19.895	12,962.39	1,891.89	5,325.00	5,259.27	65.73	81.018			
17,000.00	8,235.00	7,178.14	7,066.69	80.42	28.29	20.290	12,962.40	1,891.73	5,233.88	5,167.59	66.29	78.954			
17,100.00	8,235.00	7,177.86	7,066.45	81.22	28.29	20.700	12,962.40	1,891.57	5,143.10	5,076.22	66.88	76.899			

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

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COMPASS 5000.15 Build 91E



MS Directional Anticollision Report



Company:	Marathon Oil	Local Co-ordinate Reference:	Well Pierogi BS Federal Com 502H
Project:	Eddy County, New Mexico (NAD 27)	TVD Reference:	WELL @ 3022.50usft (Precision 580)
Reference Site:	Pierogi Federal Com (302H, 502H, 552H)	MD Reference:	WELL @ 3022.50usft (Precision 580)
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	Pierogi BS Federal Com 502H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	EDM 5000.15 Conroe DB
Reference Design:	Design #1	Offset TVD Reference:	Reference Datum

Offset Design: Fiddle Fire Fed Com (#301H & 302H) - Fiddle Fire Fed Com 302H - Wellbore #1 - Design #1													Offset Site Error:
Survey Program: 0-MWD+HRGM													Offset Well Error:
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Semi Major Axis Reference (usft)	Offset (usft)	Azimuth from North (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Distance Between Centres (usft)	Minimum Separation (usft)	Separation Factor	Warning	
17,200.00	8,235.00	7,177.57	7,066.22	82.03	28.29	21.125	12,962.40	1,891.40	5,052.67	4,985.17	67.50	74.854	
17,300.00	8,235.00	7,177.28	7,065.98	82.83	28.29	21.567	12,962.40	1,891.24	4,962.60	4,894.45	68.15	72.820	
17,400.00	8,235.00	7,177.00	7,065.74	83.64	28.29	22.026	12,962.40	1,891.08	4,872.92	4,804.09	68.83	70.798	
17,500.00	8,235.00	7,176.71	7,065.50	84.45	28.29	22.503	12,962.40	1,890.92	4,783.65	4,714.11	69.54	68.790	
17,600.00	8,235.00	7,176.42	7,065.27	85.26	28.29	23.000	12,962.41	1,890.76	4,694.81	4,624.53	70.29	66.797	
17,700.00	8,235.00	7,176.14	7,065.03	86.07	28.29	23.517	12,962.41	1,890.60	4,606.43	4,535.37	71.07	64.819	
17,800.00	8,235.00	7,175.85	7,064.79	86.88	28.29	24.055	12,962.41	1,890.45	4,518.54	4,446.65	71.88	62.859	
17,900.00	8,235.00	7,175.57	7,064.56	87.69	28.28	24.617	12,962.41	1,890.29	4,431.15	4,358.41	72.74	60.918	
18,000.00	8,235.00	7,175.29	7,064.32	88.50	28.28	25.203	12,962.41	1,890.13	4,344.31	4,270.68	73.64	58.996	
18,100.00	8,235.00	7,175.00	7,064.09	89.32	28.28	25.814	12,962.41	1,889.97	4,258.05	4,183.48	74.58	57.096	
18,200.00	8,235.00	7,174.72	7,063.85	90.13	28.28	26.453	12,962.41	1,889.81	4,172.41	4,096.84	75.56	55.219	
18,300.00	8,235.00	7,174.44	7,063.62	90.95	28.28	27.121	12,962.42	1,889.66	4,087.41	4,010.82	76.59	53.367	
18,400.00	8,235.00	7,174.16	7,063.38	91.76	28.28	27.820	12,962.42	1,889.50	4,003.11	3,925.44	77.67	51.540	
18,500.00	8,235.00	7,173.87	7,063.15	92.58	28.28	28.551	12,962.42	1,889.34	3,919.54	3,840.74	78.80	49.741	
18,600.00	8,235.00	7,173.59	7,062.92	93.40	28.28	29.318	12,962.42	1,889.19	3,836.76	3,756.78	79.98	47.971	
18,700.00	8,235.00	7,173.31	7,062.68	94.22	28.28	30.121	12,962.42	1,889.03	3,754.82	3,673.61	81.22	46.232	
18,800.00	8,235.00	7,173.03	7,062.45	95.04	28.28	30.965	12,962.42	1,888.88	3,673.78	3,591.27	82.51	44.525	
18,900.00	8,235.00	7,172.75	7,062.21	95.86	28.28	31.850	12,962.43	1,888.72	3,593.69	3,509.83	83.86	42.853	
19,000.00	8,235.00	7,172.47	7,061.98	96.68	28.28	32.781	12,962.43	1,888.57	3,514.62	3,429.34	85.27	41.216	
19,100.00	8,235.00	7,172.19	7,061.75	97.50	28.28	33.760	12,962.43	1,888.41	3,436.64	3,349.89	86.75	39.616	
19,200.00	8,235.00	7,171.91	7,061.52	98.32	28.28	34.790	12,962.43	1,888.26	3,359.82	3,271.54	88.29	38.056	
19,300.00	8,235.00	7,171.63	7,061.28	99.15	28.28	35.874	12,962.43	1,888.10	3,284.26	3,194.37	89.89	36.536	
19,400.00	8,235.00	7,171.36	7,061.05	99.97	28.28	37.017	12,962.43	1,887.95	3,210.03	3,118.47	91.56	35.059	
19,500.00	8,235.00	7,171.08	7,060.82	100.79	28.28	38.222	12,962.43	1,887.80	3,137.23	3,043.93	93.30	33.625	
19,600.00	8,235.00	7,170.80	7,060.59	101.62	28.28	39.494	12,962.44	1,887.64	3,065.97	2,970.86	95.11	32.237	
19,700.00	8,235.00	7,170.52	7,060.36	102.44	28.28	40.835	12,962.44	1,887.49	2,996.35	2,899.37	96.98	30.897	
19,800.00	8,235.00	7,170.25	7,060.13	103.27	28.28	42.252	12,962.44	1,887.34	2,928.49	2,829.57	98.92	29.604	
19,900.00	8,235.00	7,169.97	7,059.90	104.10	28.28	43.748	12,962.44	1,887.19	2,862.51	2,761.59	100.93	28.362	
20,000.00	8,235.00	7,150.00	7,043.02	104.92	28.25	45.159	12,962.55	1,876.50	2,798.88	2,696.08	102.81	27.225	
20,100.00	8,235.00	7,150.00	7,043.02	105.75	28.25	46.831	12,962.55	1,876.50	2,737.08	2,632.15	104.93	26.084	
20,200.00	8,235.00	7,150.00	7,043.02	106.58	28.25	48.596	12,962.55	1,876.50	2,677.60	2,570.48	107.11	24.998	
20,300.00	8,235.00	7,150.00	7,043.02	107.41	28.25	50.461	12,962.55	1,876.50	2,620.57	2,511.23	109.34	23.967	
20,400.00	8,235.00	7,150.00	7,043.02	108.24	28.25	52.427	12,962.55	1,876.50	2,566.18	2,454.57	111.61	22.993	
20,500.00	8,235.00	7,150.00	7,043.02	109.07	28.25	54.501	12,962.55	1,876.50	2,514.59	2,400.68	113.91	22.076	
20,600.00	8,235.00	7,150.00	7,043.02	109.90	28.25	56.683	12,962.55	1,876.50	2,465.98	2,349.75	116.23	21.217	
20,700.00	8,235.00	7,150.00	7,043.02	110.73	28.25	58.977	12,962.55	1,876.50	2,420.53	2,301.97	118.55	20.417	
20,800.00	8,235.00	7,150.00	7,043.02	111.56	28.25	61.383	12,962.55	1,876.50	2,378.41	2,257.54	120.87	19.677	
20,900.00	8,235.00	7,150.00	7,043.02	112.39	28.25	63.900	12,962.55	1,876.50	2,339.81	2,216.65	123.16	18.998	
21,000.00	8,235.00	7,150.00	7,043.02	113.23	28.25	66.527	12,962.55	1,876.50	2,304.91	2,179.49	125.41	18.379	
21,100.00	8,235.00	7,150.00	7,043.02	114.06	28.25	69.258	12,962.55	1,876.50	2,273.87	2,146.27	127.60	17.820	
21,200.00	8,235.00	7,150.00	7,043.02	114.89	28.25	72.087	12,962.55	1,876.50	2,246.86	2,117.15	129.70	17.323	
21,300.00	8,235.00	7,150.00	7,043.02	115.72	28.25	75.005	12,962.55	1,876.50	2,224.02	2,092.31	131.70	16.887	
21,400.00	8,235.00	7,150.00	7,043.02	116.56	28.25	77.999	12,962.55	1,876.50	2,205.48	2,071.90	133.58	16.511	
21,500.00	8,235.00	7,150.00	7,043.02	117.39	28.25	81.057	12,962.55	1,876.50	2,191.35	2,056.04	135.31	16.195	
21,600.00	8,235.00	7,150.00	7,043.02	118.23	28.25	84.163	12,962.55	1,876.50	2,181.72	2,044.85	136.87	15.940	
21,700.00	8,235.00	7,150.00	7,043.02	119.06	28.25	87.298	12,962.55	1,876.50	2,176.65	2,038.39	138.26	15.743	
21,760.58	8,235.00	7,150.00	7,043.02	119.57	28.25	89.204	12,962.55	1,876.50	2,175.80	2,036.80	139.01	15.652 CC	
21,800.00	8,235.00	7,150.00	7,043.02	119.90	28.25	90.445	12,962.55	1,876.50	2,176.16	2,036.71	139.45	15.605 ES	
21,900.00	8,235.00	7,150.00	7,043.02	120.73	28.25	93.584	12,962.55	1,876.50	2,180.27	2,039.82	140.45	15.524	
22,000.00	8,235.00	7,150.00	7,043.02	121.57	28.25	96.698	12,962.55	1,876.50	2,188.94	2,047.71	141.23	15.499 SF	
22,100.00	8,235.00	7,150.00	7,043.02	122.41	28.25	99.767	12,962.55	1,876.50	2,202.12	2,060.32	141.80	15.530	
22,200.00	8,235.00	7,150.00	7,043.02	123.24	28.25	102.776	12,962.55	1,876.50	2,219.73	2,077.57	142.16	15.614	

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation



MS Directional Anticollision Report



Company:	Marathon Oil	Local Co-ordinate Reference:	Well Pierogi BS Federal Com 502H
Project:	Eddy County, New Mexico (NAD 27)	TVD Reference:	WELL @ 3022.50usft (Precision 580)
Reference Site:	Pierogi Federal Com (302H, 502H, 552H)	MD Reference:	WELL @ 3022.50usft (Precision 580)
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	Pierogi BS Federal Com 502H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	EDM 5000.15 Conroe DB
Reference Design:	Design #1	Offset TVD Reference:	Reference Datum

Offset Design: Fiddle Fire Fed Com (#301H & 302H) - Fiddle Fire Fed Com 302H - Wellbore #1 - Design #1													Offset Site Error: 0.00 usft
Survey Program: 0-MWD+HRGM													Offset Well Error: 0.00 usft
Reference	Offset	Semi Major Axis	Rule Assigned:										
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference	Offset	Azimuth from North (°)	Offset Wellbore Centre	Distance Between Centres (usft)	Distance Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning	
22,300.00	8,235.00	7,150.00	7,043.02	124.08	28.25	105.711	12,962.55	1,876.50	2,241.67	2,099.35	142.33	15.750	
22,400.00	8,235.00	7,150.00	7,043.02	124.92	28.25	108.560	12,962.55	1,876.50	2,267.81	2,125.52	142.29	15.938	
22,500.00	8,235.00	7,150.00	7,043.02	125.76	28.25	111.312	12,962.55	1,876.50	2,298.01	2,155.93	142.08	16.174	
22,600.00	8,235.00	7,150.00	7,043.02	126.59	28.25	113.961	12,962.55	1,876.50	2,332.11	2,190.41	141.70	16.458	
22,700.00	8,235.00	7,150.00	7,043.02	127.43	28.25	116.502	12,962.55	1,876.50	2,369.94	2,228.78	141.17	16.788	
22,800.00	8,235.00	7,150.00	7,043.02	128.27	28.25	118.932	12,962.55	1,876.50	2,411.33	2,270.83	140.50	17.162	
22,900.00	8,235.00	7,150.00	7,043.02	129.11	28.25	121.250	12,962.55	1,876.50	2,456.10	2,316.38	139.72	17.579	
23,000.00	8,235.00	7,150.00	7,043.02	129.95	28.25	123.456	12,962.55	1,876.50	2,504.05	2,365.22	138.83	18.037	
23,100.00	8,235.00	7,150.00	7,043.02	130.79	28.25	125.552	12,962.55	1,876.50	2,555.03	2,417.17	137.86	18.534	
23,200.00	8,235.00	7,150.00	7,043.02	131.63	28.25	127.541	12,962.55	1,876.50	2,608.84	2,472.02	136.82	19.068	
23,300.00	8,235.00	7,150.00	7,043.02	132.47	28.25	129.426	12,962.55	1,876.50	2,665.32	2,529.60	135.72	19.638	
23,400.00	8,235.00	7,150.00	7,043.02	133.31	28.25	131.212	12,962.55	1,876.50	2,724.30	2,589.72	134.58	20.242	
23,500.00	8,235.00	7,150.00	7,043.02	134.15	28.25	132.903	12,962.55	1,876.50	2,785.63	2,652.21	133.41	20.880	
23,600.00	8,235.00	7,150.00	7,043.02	134.99	28.25	134.504	12,962.55	1,876.50	2,849.14	2,716.92	132.22	21.548	
23,700.00	8,235.00	7,150.00	7,043.02	135.83	28.25	136.020	12,962.55	1,876.50	2,914.70	2,783.68	131.02	22.246	
23,800.00	8,235.00	7,150.00	7,043.02	136.68	28.25	137.454	12,962.55	1,876.50	2,982.18	2,852.36	129.82	22.972	
23,900.00	8,235.00	7,150.00	7,043.02	137.52	28.25	138.813	12,962.55	1,876.50	3,051.43	2,922.82	128.61	23.725	
24,000.00	8,235.00	7,150.00	7,043.02	138.36	28.25	140.099	12,962.55	1,876.50	3,122.36	2,994.94	127.42	24.504	
24,004.19	8,235.00	7,150.00	7,043.02	138.39	28.25	140.152	12,962.55	1,876.50	3,125.37	2,997.99	127.37	24.537	

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation



MS Directional Anticollision Report



Company:	Marathon Oil	Local Co-ordinate Reference:	Well Pierogi BS Federal Com 502H
Project:	Eddy County, New Mexico (NAD 27)	TVD Reference:	WELL @ 3022.50usft (Precision 580)
Reference Site:	Pierogi Federal Com (302H, 502H, 552H)	MD Reference:	WELL @ 3022.50usft (Precision 580)
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	Pierogi BS Federal Com 502H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	EDM 5000.15 Conroe DB
Reference Design:	Design #1	Offset TVD Reference:	Reference Datum

Offset Design: Fiddle Fire Fed Com (Offsets) - Chicken Fry Federal Com 1H - Wellbore #1 - Surveys													Offset Site Error:
Survey Program: 447-MWD+HRGM													Offset Well Error:
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Semi Major Axis Reference (usft)	Offset (usft)	Azimuth from North (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Distance Between Centres (usft)	Rule Assigned: Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning
9,200.00	8,235.00	14,415.00	9,555.39	30.21	76.67	6.531	10,142.54	1,348.83	9,916.73	9,854.49	62.24	159.338	
9,300.00	8,235.00	14,415.00	9,555.39	30.44	76.67	6.606	10,142.54	1,348.83	9,818.44	9,756.15	62.29	157.622	
9,400.00	8,235.00	14,415.00	9,555.39	30.69	76.67	6.683	10,142.54	1,348.83	9,720.19	9,657.85	62.35	155.903	
9,500.00	8,235.00	14,415.00	9,555.39	30.97	76.67	6.761	10,142.54	1,348.83	9,621.98	9,559.57	62.41	154.179	
9,600.00	8,235.00	14,415.00	9,555.39	31.27	76.67	6.841	10,142.54	1,348.83	9,523.81	9,461.34	62.47	152.452	
9,700.00	8,235.00	14,415.00	9,555.39	31.58	76.67	6.923	10,142.54	1,348.83	9,425.67	9,363.13	62.54	150.720	
9,800.00	8,235.00	14,415.00	9,555.39	31.92	76.67	7.006	10,142.54	1,348.83	9,327.57	9,264.97	62.61	148.985	
9,900.00	8,235.00	14,415.00	9,555.39	32.28	76.67	7.091	10,142.54	1,348.83	9,229.52	9,166.84	62.68	147.245	
10,000.00	8,235.00	14,415.00	9,555.39	32.66	76.67	7.178	10,142.54	1,348.83	9,131.50	9,068.75	62.76	145.502	
10,100.00	8,235.00	14,415.00	9,555.39	33.05	76.67	7.267	10,142.54	1,348.83	9,033.53	8,970.69	62.84	143.755	
10,200.00	8,235.00	14,415.00	9,555.39	33.46	76.67	7.358	10,142.54	1,348.83	8,935.61	8,872.68	62.92	142.005	
10,300.00	8,235.00	14,415.00	9,555.39	33.89	76.67	7.451	10,142.54	1,348.83	8,837.73	8,774.72	63.01	140.251	
10,400.00	8,235.00	14,415.00	9,555.39	34.34	76.67	7.546	10,142.54	1,348.83	8,739.90	8,676.79	63.11	138.493	
10,500.00	8,235.00	14,415.00	9,555.39	34.80	76.67	7.644	10,142.54	1,348.83	8,642.12	8,578.91	63.20	136.732	
10,600.00	8,235.00	14,415.00	9,555.39	35.27	76.67	7.743	10,142.54	1,348.83	8,544.39	8,481.08	63.31	134.967	
10,700.00	8,235.00	14,415.00	9,555.39	35.76	76.67	7.845	10,142.54	1,348.83	8,446.71	8,383.30	63.41	133.199	
10,800.00	8,235.00	14,415.00	9,555.39	36.27	76.67	7.950	10,142.54	1,348.83	8,349.09	8,285.56	63.53	131.428	
10,900.00	8,235.00	14,415.00	9,555.39	36.79	76.67	8.057	10,142.54	1,348.83	8,251.53	8,187.88	63.64	129.654	
11,000.00	8,235.00	14,415.00	9,555.39	37.32	76.67	8.166	10,142.54	1,348.83	8,154.02	8,090.25	63.76	127.877	
11,100.00	8,235.00	14,415.00	9,555.39	37.86	76.67	8.279	10,142.54	1,348.83	8,056.57	7,992.68	63.89	126.097	
11,200.00	8,235.00	14,415.00	9,555.39	38.41	76.67	8.394	10,142.54	1,348.83	7,959.19	7,895.17	64.03	124.314	
11,300.00	8,235.00	14,415.00	9,555.39	38.98	76.67	8.512	10,142.54	1,348.83	7,861.88	7,797.71	64.16	122.528	
11,400.00	8,235.00	14,415.00	9,555.39	39.55	76.67	8.633	10,142.54	1,348.83	7,764.63	7,700.32	64.31	120.739	
11,500.00	8,235.00	14,415.00	9,555.39	40.14	76.67	8.757	10,142.54	1,348.83	7,667.45	7,602.99	64.46	118.948	
11,600.00	8,235.00	14,415.00	9,555.39	40.74	76.67	8.885	10,142.54	1,348.83	7,570.35	7,505.73	64.62	117.154	
11,700.00	8,235.00	14,415.00	9,555.39	41.34	76.67	9.016	10,142.54	1,348.83	7,473.33	7,408.54	64.78	115.358	
11,800.00	8,235.00	14,415.00	9,555.39	41.96	76.67	9.150	10,142.54	1,348.83	7,376.38	7,311.42	64.96	113.559	
11,900.00	8,235.00	14,415.00	9,555.39	42.58	76.67	9.288	10,142.54	1,348.83	7,279.51	7,214.38	65.14	111.759	
12,000.00	8,235.00	14,415.00	9,555.39	43.21	76.67	9.431	10,142.54	1,348.83	7,182.74	7,117.41	65.32	109.956	
12,100.00	8,235.00	14,415.00	9,555.39	43.85	76.67	9.577	10,142.54	1,348.83	7,086.05	7,020.53	65.52	108.152	
12,200.00	8,235.00	14,415.00	9,555.39	44.50	76.67	9.727	10,142.54	1,348.83	6,989.45	6,923.73	65.72	106.345	
12,300.00	8,235.00	14,415.00	9,555.39	45.15	76.67	9.882	10,142.54	1,348.83	6,892.95	6,827.01	65.94	104.537	
12,400.00	8,235.00	14,415.00	9,555.39	45.81	76.67	10.041	10,142.54	1,348.83	6,796.55	6,730.39	66.16	102.728	
12,500.00	8,235.00	14,415.00	9,555.39	46.48	76.67	10.205	10,142.54	1,348.83	6,700.26	6,633.87	66.39	100.917	
12,600.00	8,235.00	14,415.00	9,555.39	47.15	76.67	10.374	10,142.54	1,348.83	6,604.08	6,537.44	66.64	99.105	
12,700.00	8,235.00	14,415.00	9,555.39	47.83	76.67	10.548	10,142.54	1,348.83	6,508.01	6,441.12	66.89	97.292	
12,800.00	8,235.00	14,415.00	9,555.39	48.52	76.67	10.728	10,142.54	1,348.83	6,412.07	6,344.91	67.16	95.479	
12,900.00	8,235.00	14,415.00	9,555.39	49.21	76.67	10.913	10,142.54	1,348.83	6,316.25	6,248.81	67.43	93.664	
13,000.00	8,235.00	14,415.00	9,555.39	49.90	76.67	11.104	10,142.54	1,348.83	6,220.56	6,152.83	67.73	91.850	
13,100.00	8,235.00	14,415.00	9,555.39	50.60	76.67	11.302	10,142.54	1,348.83	6,125.01	6,056.98	68.03	90.035	
13,200.00	8,235.00	14,415.00	9,555.39	51.31	76.67	11.506	10,142.54	1,348.83	6,029.60	5,961.25	68.35	88.220	
13,300.00	8,235.00	14,415.00	9,555.39	52.02	76.67	11.717	10,142.54	1,348.83	5,934.34	5,865.66	68.68	86.406	
13,400.00	8,235.00	14,415.00	9,555.39	52.74	76.67	11.935	10,142.54	1,348.83	5,839.25	5,770.22	69.03	84.593	
13,500.00	8,235.00	14,415.00	9,555.39	53.46	76.67	12.161	10,142.54	1,348.83	5,744.32	5,674.92	69.39	82.780	
13,600.00	8,235.00	14,415.00	9,555.39	54.18	76.67	12.395	10,142.54	1,348.83	5,649.56	5,579.79	69.77	80.969	
13,700.00	8,235.00	14,415.00	9,555.39	54.91	76.67	12.637	10,142.54	1,348.83	5,554.99	5,484.81	70.17	79.159	
13,800.00	8,235.00	14,415.00	9,555.39	55.64	76.67	12.888	10,142.54	1,348.83	5,460.61	5,390.02	70.59	77.352	
13,900.00	8,235.00	14,415.00	9,555.39	56.37	76.67	13.149	10,142.54	1,348.83	5,366.44	5,295.40	71.03	75.547	
14,000.00	8,235.00	14,415.00	9,555.39	57.11	76.67	13.419	10,142.54	1,348.83	5,272.48	5,200.98	71.50	73.745	
14,100.00	8,235.00	14,415.00	9,555.39	57.85	76.67	13.700	10,142.54	1,348.83	5,178.74	5,106.76	71.98	71.946	
14,200.00	8,235.00	14,415.00	9,555.39	58.60	76.67	13.992	10,142.54	1,348.83	5,085.25	5,012.76	72.49	70.152	
14,300.00	8,235.00	14,415.00	9,555.39	59.35	76.67	14.296	10,142.54	1,348.83	4,992.00	4,918.98	73.02	68.361	

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation



MS Directional Anticollision Report



Company:	Marathon Oil	Local Co-ordinate Reference:	Well Pierogi BS Federal Com 502H
Project:	Eddy County, New Mexico (NAD 27)	TVD Reference:	WELL @ 3022.50usft (Precision 580)
Reference Site:	Pierogi Federal Com (302H, 502H, 552H)	MD Reference:	WELL @ 3022.50usft (Precision 580)
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	Pierogi BS Federal Com 502H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	EDM 5000.15 Conroe DB
Reference Design:	Design #1	Offset TVD Reference:	Reference Datum

Offset Design: Fiddle Fire Fed Com (Offsets) - Chicken Fry Federal Com 1H - Wellbore #1 - Surveys												Offset Site Error:	0.00 usft
Survey Program: 447-MWD+HRGM												Offset Well Error:	0.00 usft
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Semi Major Axis Reference (usft)	Offset (usft)	Azimuth from North (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Distance Between Centres (usft)	Rule Assigned: Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning
14,400.00	8,235.00	14,415.00	9,555.39	60.10	76.67	14.612	10,142.54	1,348.83	4,899.03	4,825.44	73.59	66.576	
14,500.00	8,235.00	14,415.00	9,555.39	60.86	76.67	14.942	10,142.54	1,348.83	4,806.33	4,732.16	74.18	64.797	
14,600.00	8,235.00	14,415.00	9,555.39	61.61	76.67	15.285	10,142.54	1,348.83	4,713.94	4,639.14	74.80	63.024	
14,700.00	8,235.00	14,415.00	9,555.39	62.37	76.67	15.643	10,142.54	1,348.83	4,621.86	4,546.41	75.45	61.258	
14,800.00	8,235.00	14,415.00	9,555.39	63.14	76.67	16.018	10,142.54	1,348.83	4,530.11	4,453.98	76.14	59.499	
14,900.00	8,235.00	14,415.00	9,555.39	63.90	76.67	16.409	10,142.54	1,348.83	4,438.73	4,361.87	76.86	57.750	
15,000.00	8,235.00	14,415.00	9,555.39	64.67	76.67	16.818	10,142.54	1,348.83	4,347.72	4,270.10	77.62	56.010	
15,100.00	8,235.00	14,415.00	9,555.39	65.44	76.67	17.246	10,142.54	1,348.83	4,257.12	4,178.69	78.43	54.281	
15,200.00	8,235.00	14,415.00	9,555.39	66.21	76.67	17.695	10,142.54	1,348.83	4,166.94	4,087.67	79.27	52.563	
15,300.00	8,235.00	14,415.00	9,555.39	66.98	76.67	18.166	10,142.54	1,348.83	4,077.22	3,997.06	80.17	50.859	
15,400.00	8,235.00	14,415.00	9,555.39	67.76	76.67	18.661	10,142.54	1,348.83	3,988.00	3,906.89	81.11	49.167	
15,500.00	8,235.00	14,415.00	9,555.39	68.54	76.67	19.181	10,142.54	1,348.83	3,899.29	3,817.19	82.11	47.491	
15,600.00	8,235.00	14,415.00	9,555.39	69.32	76.67	19.729	10,142.54	1,348.83	3,811.15	3,727.99	83.16	45.832	
15,700.00	8,235.00	14,415.00	9,555.39	70.10	76.67	20.306	10,142.54	1,348.83	3,723.60	3,639.34	84.26	44.190	
15,800.00	8,235.00	14,415.00	9,555.39	70.89	76.67	20.915	10,142.54	1,348.83	3,636.70	3,551.27	85.43	42.567	
15,900.00	8,235.00	14,415.00	9,555.39	71.67	76.67	21.558	10,142.54	1,348.83	3,550.49	3,463.82	86.67	40.965	
16,000.00	8,235.00	14,415.00	9,555.39	72.46	76.67	22.238	10,142.54	1,348.83	3,465.01	3,377.04	87.98	39.386	
16,100.00	8,235.00	14,415.00	9,555.39	73.25	76.67	22.958	10,142.54	1,348.83	3,380.34	3,290.98	89.36	37.830	
16,200.00	8,235.00	14,415.00	9,555.39	74.04	76.67	23.722	10,142.54	1,348.83	3,296.52	3,205.71	90.81	36.301	
16,300.00	8,235.00	14,415.00	9,555.39	74.83	76.67	24.534	10,142.54	1,348.83	3,213.63	3,121.28	92.35	34.799	
16,400.00	8,235.00	14,415.00	9,555.39	75.63	76.67	25.397	10,142.54	1,348.83	3,131.74	3,037.77	93.97	33.326	
16,500.00	8,235.00	14,415.00	9,555.39	76.42	76.67	26.317	10,142.54	1,348.83	3,050.93	2,955.24	95.68	31.885	
16,600.00	8,235.00	14,415.00	9,555.39	77.22	76.67	27.298	10,142.54	1,348.83	2,971.28	2,873.79	97.49	30.478	
16,700.00	8,235.00	14,415.00	9,555.39	78.02	76.67	28.346	10,142.54	1,348.83	2,892.90	2,793.51	99.39	29.106	
16,800.00	8,235.00	14,415.00	9,555.39	78.82	76.67	29.468	10,142.54	1,348.83	2,815.89	2,714.50	101.39	27.773	
16,900.00	8,235.00	14,415.00	9,555.39	79.62	76.67	30.671	10,142.54	1,348.83	2,740.37	2,636.87	103.49	26.479	
17,000.00	8,235.00	14,415.00	9,555.39	80.42	76.67	31.962	10,142.54	1,348.83	2,666.45	2,560.76	105.70	25.227	
17,100.00	8,235.00	14,415.00	9,555.39	81.22	76.67	33.350	10,142.54	1,348.83	2,594.29	2,486.29	108.01	24.020	
17,200.00	8,235.00	14,415.00	9,555.39	82.03	76.67	34.845	10,142.54	1,348.83	2,524.03	2,413.61	110.42	22.859	
17,300.00	8,235.00	14,415.00	9,555.39	82.83	76.67	36.458	10,142.54	1,348.83	2,455.83	2,342.90	112.93	21.747	
17,400.00	8,235.00	14,415.00	9,555.39	83.64	76.67	38.199	10,142.54	1,348.83	2,389.86	2,274.33	115.53	20.686	
17,500.00	8,235.00	14,415.00	9,555.39	84.45	76.67	40.082	10,142.54	1,348.83	2,326.33	2,208.11	118.22	19.678	
17,600.00	8,235.00	14,415.00	9,555.39	85.26	76.67	42.119	10,142.54	1,348.83	2,265.43	2,144.45	120.98	18.725	
17,700.00	8,235.00	14,415.00	9,555.39	86.07	76.67	44.325	10,142.54	1,348.83	2,207.38	2,083.57	123.81	17.829	
17,800.00	8,235.00	14,415.00	9,555.39	86.88	76.67	46.715	10,142.54	1,348.83	2,152.42	2,025.74	126.68	16.992	
17,900.00	8,235.00	14,415.00	9,555.39	87.69	76.67	49.301	10,142.54	1,348.83	2,100.78	1,971.22	129.56	16.214	
18,000.00	8,235.00	14,415.00	9,555.39	88.50	76.67	52.099	10,142.54	1,348.83	2,052.71	1,920.27	132.44	15.499	
18,100.00	8,235.00	14,415.00	9,555.39	89.32	76.67	55.120	10,142.54	1,348.83	2,008.48	1,873.21	135.28	14.847	
18,200.00	8,235.00	14,415.00	9,555.39	90.13	76.67	58.372	10,142.54	1,348.83	1,968.34	1,830.31	138.04	14.260	
18,300.00	8,235.00	14,415.00	9,555.39	90.95	76.67	61.861	10,142.54	1,348.83	1,932.55	1,791.87	140.68	13.737	
18,400.00	8,235.00	14,415.00	9,555.39	91.76	76.67	65.583	10,142.54	1,348.83	1,901.34	1,758.18	143.16	13.281	
18,500.00	8,235.00	14,415.00	9,555.39	92.58	76.67	69.530	10,142.54	1,348.83	1,874.96	1,729.52	145.44	12.892	
18,600.00	8,235.00	14,415.00	9,555.39	93.40	76.67	73.681	10,142.54	1,348.83	1,853.60	1,706.13	147.47	12.569	
18,700.00	8,235.00	14,415.00	9,555.39	94.22	76.67	78.005	10,142.54	1,348.83	1,837.44	1,688.23	149.22	12.314	
18,800.00	8,235.00	14,415.00	9,555.39	95.04	76.67	82.463	10,142.54	1,348.83	1,826.63	1,675.98	150.64	12.126	
18,900.00	8,235.00	14,415.00	9,555.39	95.86	76.67	87.003	10,142.54	1,348.83	1,821.24	1,669.52	151.72	12.004	
19,000.00	8,235.00	14,323.61	9,552.61	96.68	75.48	87.398	10,233.87	1,347.37	1,818.88	1,667.26	151.62	11.996	
19,100.00	8,235.00	14,261.46	9,551.31	97.50	74.68	89.129	10,296.01	1,346.79	1,817.71	1,665.91	151.80	11.974	
19,104.19	8,235.00	14,258.92	9,551.27	97.54	74.64	89.204	10,298.55	1,346.80	1,817.71	1,665.90	151.81	11.974	
19,200.00	8,235.00	14,225.00	9,550.91	98.32	74.20	92.029	10,332.46	1,347.01	1,818.97	1,666.84	152.13	11.957	
19,300.00	8,235.00	14,159.47	9,551.84	99.15	73.36	93.593	10,397.97	1,348.21	1,822.60	1,670.45	152.15	11.979	
19,400.00	8,235.00	14,103.51	9,554.72	99.97	72.65	95.576	10,453.83	1,349.88	1,829.23	1,677.09	152.15	12.023	

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation



MS Directional Anticollision Report



Company:	Marathon Oil	Local Co-ordinate Reference:	Well Pierogi BS Federal Com 502H
Project:	Eddy County, New Mexico (NAD 27)	TVD Reference:	WELL @ 3022.50usft (Precision 580)
Reference Site:	Pierogi Federal Com (302H, 502H, 552H)	MD Reference:	WELL @ 3022.50usft (Precision 580)
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	Pierogi BS Federal Com 502H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	EDM 5000.15 Conroe DB
Reference Design:	Design #1	Offset TVD Reference:	Reference Datum

Offset Design: Fiddle Fire Fed Com (Offsets) - Chicken Fry Federal Com 1H - Wellbore #1 - Surveys													Offset Site Error:
Survey Program: 447-MWD+HRGM													Offset Well Error:
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Semi Major Axis Reference (usft)	Offset (usft)	Azimuth from North (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Distance Between Centres (usft)	Minimum Separation (usft)	Separation Factor	Warning	
19,500.00	8,235.00	13,849.00	9,566.68	100.79	69.40	88.596	10,707.90	1,352.76	1,836.95	1,686.18	150.77	12.184	
19,600.00	8,235.00	13,755.00	9,566.42	101.62	68.21	88.868	10,801.88	1,350.81	1,836.28	1,685.68	150.61	12.192	
19,651.45	8,235.00	13,710.97	9,566.71	102.04	67.65	89.204	10,845.89	1,349.71	1,836.14	1,685.58	150.56	12.195	
19,700.00	8,235.00	13,671.75	9,567.00	102.44	67.16	89.627	10,885.11	1,349.00	1,836.27	1,685.73	150.54	12.198	
19,800.00	8,235.00	13,517.00	9,564.49	103.27	65.21	87.146	11,039.76	1,344.93	1,833.65	1,683.84	149.81	12.240	
19,900.00	8,235.00	13,452.92	9,565.54	104.10	64.40	88.778	11,103.74	1,341.59	1,832.20	1,682.27	149.92	12.221	
19,930.18	8,235.00	13,432.10	9,566.18	104.35	64.14	89.204	11,124.53	1,340.55	1,832.12	1,682.19	149.93	12.220	
20,000.00	8,235.00	13,378.00	9,568.07	104.92	63.47	89.923	11,178.55	1,338.32	1,832.54	1,682.66	149.89	12.226	
20,100.00	8,235.00	13,308.09	9,570.94	105.75	62.60	91.298	11,248.37	1,336.25	1,834.39	1,684.50	149.89	12.238	
20,200.00	8,235.00	13,138.76	9,575.97	106.58	60.52	88.141	11,417.53	1,331.45	1,835.95	1,686.93	149.03	12.320	
20,300.00	8,235.00	13,028.71	9,573.57	107.41	59.19	87.682	11,527.53	1,329.03	1,833.75	1,684.97	148.79	12.325	
20,400.00	8,235.00	12,916.77	9,569.69	108.24	57.84	87.141	11,639.40	1,328.54	1,831.90	1,683.32	148.58	12.329	
20,500.00	8,235.00	12,812.00	9,564.20	109.07	56.60	86.933	11,744.02	1,328.21	1,828.79	1,680.32	148.48	12.317	
20,600.00	8,235.00	12,738.21	9,561.19	109.90	55.73	88.132	11,817.74	1,327.68	1,826.43	1,677.78	148.64	12.287	
20,662.47	8,235.00	12,699.24	9,560.84	110.42	55.28	89.204	11,856.70	1,327.15	1,826.02	1,677.25	148.77	12.274	
20,700.00	8,235.00	12,675.91	9,560.99	110.73	55.00	89.852	11,880.03	1,326.80	1,826.17	1,677.33	148.84	12.269	
20,800.00	8,235.00	12,606.22	9,562.93	111.56	54.20	91.236	11,949.68	1,325.67	1,827.95	1,679.04	148.91	12.275	
20,900.00	8,235.00	12,440.91	9,565.36	112.39	52.31	88.258	12,114.95	1,323.77	1,829.57	1,681.30	148.28	12.339	
21,000.00	8,235.00	12,347.61	9,562.99	113.23	51.27	88.566	12,208.21	1,323.57	1,828.53	1,680.25	148.29	12.331	
21,020.60	8,235.00	12,341.00	9,562.77	113.40	51.19	89.204	12,214.82	1,323.64	1,828.43	1,680.04	148.39	12.322	
21,100.00	8,235.00	12,295.14	9,562.02	114.06	50.69	90.732	12,260.66	1,324.17	1,828.99	1,680.40	148.59	12.309	
21,200.00	8,235.00	12,241.70	9,563.14	114.89	50.10	92.845	12,314.09	1,324.81	1,832.20	1,683.41	148.80	12.313	
21,300.00	8,235.00	12,108.77	9,569.51	115.72	48.66	91.362	12,446.81	1,321.82	1,834.90	1,686.44	148.46	12.359	
21,400.00	8,235.00	12,023.13	9,574.40	116.56	47.74	92.024	12,532.28	1,319.29	1,837.98	1,689.56	148.42	12.384	
21,500.00	8,235.00	11,744.35	9,581.95	117.39	44.85	83.877	12,810.41	1,306.32	1,839.93	1,693.16	146.77	12.536	
21,600.00	8,235.00	11,681.00	9,581.57	118.23	44.22	85.543	12,873.57	1,301.45	1,834.98	1,687.89	147.10	12.475	
21,700.00	8,235.00	11,553.20	9,580.34	119.06	42.98	84.249	13,000.79	1,289.47	1,828.57	1,681.82	146.75	12.460	
21,800.00	8,235.00	11,492.00	9,582.13	119.90	42.40	86.040	13,061.67	1,283.58	1,824.62	1,677.54	147.07	12.406	
21,900.00	8,235.00	11,357.68	9,583.16	120.73	41.17	84.428	13,195.41	1,271.69	1,820.22	1,673.51	146.72	12.406	
22,000.00	8,235.00	11,304.00	9,582.63	121.57	40.70	86.594	13,248.94	1,267.57	1,815.56	1,668.39	147.17	12.337	
22,100.00	8,235.00	11,230.71	9,583.36	122.41	40.07	87.853	13,322.04	1,262.52	1,812.78	1,665.37	147.42	12.297	
22,200.00	8,235.00	11,128.50	9,585.48	123.24	39.22	87.749	13,424.07	1,256.85	1,811.56	1,664.09	147.47	12.284	
22,300.00	8,235.00	11,050.72	9,585.42	124.08	38.61	88.804	13,501.81	1,254.39	1,810.35	1,662.60	147.75	12.253	
22,337.15	8,235.00	11,022.00	9,585.48	124.39	38.39	89.204	13,530.52	1,253.85	1,810.28	1,662.42	147.86	12.243	
22,400.00	8,235.00	10,980.28	9,585.79	124.92	38.08	90.208	13,572.24	1,253.33	1,810.68	1,662.60	148.07	12.228	
22,500.00	8,235.00	10,866.35	9,587.50	125.76	37.26	89.547	13,686.15	1,252.58	1,812.40	1,664.17	148.23	12.227	
22,600.00	8,235.00	10,745.69	9,586.48	126.59	36.44	88.566	13,806.80	1,251.03	1,811.76	1,663.35	148.40	12.208	
22,700.00	8,235.00	8,227.70	8,205.25	127.43	28.16	43.257	15,174.31	1,264.45	1,782.11	1,661.71	120.40	14.801	
22,800.00	8,235.00	8,231.54	8,209.09	128.27	28.18	45.578	15,174.50	1,264.34	1,711.66	1,587.41	124.25	13.776	
22,900.00	8,235.00	8,235.50	8,213.04	129.11	28.19	48.094	15,174.70	1,264.23	1,644.26	1,515.98	128.28	12.818	
23,000.00	8,235.00	8,239.58	8,217.12	129.95	28.21	50.819	15,174.91	1,264.12	1,580.31	1,447.83	132.48	11.929	
23,100.00	8,235.00	8,243.80	8,221.32	130.79	28.22	53.765	15,175.12	1,264.00	1,520.23	1,383.44	136.80	11.113	
23,200.00	8,235.00	8,248.14	8,225.66	131.63	28.24	56.945	15,175.35	1,263.89	1,464.51	1,323.33	141.19	10.373	
23,300.00	8,235.00	8,252.62	8,230.14	132.47	28.26	60.363	15,175.59	1,263.77	1,413.66	1,268.09	145.57	9.711	
23,400.00	8,235.00	8,257.25	8,234.76	133.31	28.27	64.022	15,175.84	1,263.64	1,368.22	1,218.36	149.86	9.130	
23,500.00	8,235.00	8,262.04	8,239.53	134.15	28.29	67.915	15,176.11	1,263.52	1,328.75	1,174.82	153.93	8.632	
23,600.00	8,235.00	8,266.99	8,244.47	134.99	28.31	72.025	15,176.38	1,263.39	1,295.78	1,138.13	157.66	8.219	
23,700.00	8,235.00	8,272.10	8,249.58	135.83	28.33	76.326	15,176.67	1,263.26	1,269.84	1,108.93	160.90	7.892	
23,800.00	8,235.00	8,277.40	8,254.86	136.68	28.35	80.779	15,176.98	1,263.12	1,251.34	1,087.80	163.54	7.652	
23,900.00	8,235.00	8,282.88	8,260.34	137.52	28.37	85.338	15,177.31	1,262.98	1,240.63	1,075.18	165.45	7.499	
23,983.93	8,235.00	8,287.64	8,265.09	138.22	28.38	89.204	15,177.59	1,262.86	1,237.80	1,071.36	166.44	7.437 CC	
24,000.00	8,235.00	8,288.57	8,266.01	138.36	28.39	89.946	15,177.65	1,262.84	1,237.90	1,071.34	166.56	7.432 ES	

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation



MS Directional Anticollision Report



Company:	Marathon Oil	Local Co-ordinate Reference:	Well Pierogi BS Federal Com 502H
Project:	Eddy County, New Mexico (NAD 27)	TVD Reference:	WELL @ 3022.50usft (Precision 580)
Reference Site:	Pierogi Federal Com (302H, 502H, 552H)	MD Reference:	WELL @ 3022.50usft (Precision 580)
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	Pierogi BS Federal Com 502H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	EDM 5000.15 Conroe DB
Reference Design:	Design #1	Offset TVD Reference:	Reference Datum

Offset Design: Fiddle Fire Fed Com (Offsets) - Chicken Fry Federal Com 1H - Wellbore #1 - Surveys													Offset Site Error: 0.00 usft
Survey Program: 447-MWD+HRGM													Offset Well Error: 0.00 usft
Reference	Offset	Semi Major Axis		Distance		Rule Assigned:							
Measured	Vertical	Measured	Vertical	Reference	Offset	Azimuth	Offset Wellbore Centre	Between	Between	Minimum	Separation	Warning	
Depth	Depth	Depth	Depth			from North	+N/-S	+E/-W	Centres	Ellipses	Separation		
(usft)	(usft)	(usft)	(usft)	(usft)	(usft)	(°)	(usft)	(usft)	(usft)	(usft)	(usft)		
24,004.19	8,235.00	8,288.81	8,266.25	138.39	28.39	90.139	15,177.66	1,262.83	1,237.96	1,071.37	166.59	7.431 SF	



MS Directional Anticollision Report



Company:	Marathon Oil	Local Co-ordinate Reference:	Well Pierogi BS Federal Com 502H
Project:	Eddy County, New Mexico (NAD 27)	TVD Reference:	WELL @ 3022.50usft (Precision 580)
Reference Site:	Pierogi Federal Com (302H, 502H, 552H)	MD Reference:	WELL @ 3022.50usft (Precision 580)
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	Pierogi BS Federal Com 502H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	EDM 5000.15 Conroe DB
Reference Design:	Design #1	Offset TVD Reference:	Reference Datum

Offset Design: Fiddle Fire Fed Com (Offsets) - Fiddle Fee 23 X # 1H - Wellbore #1 - Surveys													Offset Site Error:
Survey Program: 87-GYRO-NS, 602-MWD+HRGM													Offset Well Error:
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Semi Major Axis Reference (usft)	Major Axis Offset (usft)	Azimuth from North (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Distance Between Centres (usft)	Rule Assigned: Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning
12,000.00	8,235.00	14,421.00	9,557.77	43.21	117.14	10.687	12,895.09	2,025.90	9,977.07	9,832.80	144.27	69.157	
12,100.00	8,235.00	14,421.00	9,557.77	43.85	117.14	10.804	12,895.09	2,025.90	9,879.97	9,735.64	144.32	68.457	
12,200.00	8,235.00	14,421.00	9,557.77	44.50	117.14	10.923	12,895.09	2,025.90	9,782.92	9,638.54	144.38	67.757	
12,300.00	8,235.00	14,421.00	9,557.77	45.15	117.14	11.044	12,895.09	2,025.90	9,685.93	9,541.49	144.44	67.056	
12,400.00	8,235.00	14,421.00	9,557.77	45.81	117.14	11.168	12,895.09	2,025.90	9,589.01	9,444.50	144.51	66.356	
12,500.00	8,235.00	14,421.00	9,557.77	46.48	117.14	11.294	12,895.09	2,025.90	9,492.15	9,347.57	144.58	65.655	
12,600.00	8,235.00	14,421.00	9,557.77	47.15	117.14	11.423	12,895.09	2,025.90	9,395.35	9,250.71	144.65	64.954	
12,700.00	8,235.00	14,421.00	9,557.77	47.83	117.14	11.555	12,895.09	2,025.90	9,298.63	9,153.91	144.72	64.253	
12,800.00	8,235.00	14,421.00	9,557.77	48.52	117.14	11.689	12,895.09	2,025.90	9,201.97	9,057.17	144.80	63.552	
12,900.00	8,235.00	14,421.00	9,557.77	49.21	117.14	11.827	12,895.09	2,025.90	9,105.38	8,960.51	144.87	62.850	
13,000.00	8,235.00	14,421.00	9,557.77	49.90	117.14	11.967	12,895.09	2,025.90	9,008.87	8,863.92	144.96	62.149	
13,100.00	8,235.00	14,421.00	9,557.77	50.60	117.14	12.111	12,895.09	2,025.90	8,912.44	8,767.40	145.04	61.447	
13,200.00	8,235.00	14,421.00	9,557.77	51.31	117.14	12.258	12,895.09	2,025.90	8,816.09	8,670.96	145.13	60.746	
13,300.00	8,235.00	14,421.00	9,557.77	52.02	117.14	12.408	12,895.09	2,025.90	8,719.82	8,574.59	145.22	60.044	
13,400.00	8,235.00	14,421.00	9,557.77	52.74	117.14	12.562	12,895.09	2,025.90	8,623.63	8,478.31	145.32	59.343	
13,500.00	8,235.00	14,421.00	9,557.77	53.46	117.14	12.719	12,895.09	2,025.90	8,527.53	8,382.11	145.42	58.641	
13,600.00	8,235.00	14,421.00	9,557.77	54.18	117.14	12.880	12,895.09	2,025.90	8,431.52	8,286.00	145.52	57.940	
13,700.00	8,235.00	14,421.00	9,557.77	54.91	117.14	13.044	12,895.09	2,025.90	8,335.61	8,189.98	145.63	57.239	
13,800.00	8,235.00	14,421.00	9,557.77	55.64	117.14	13.213	12,895.09	2,025.90	8,239.79	8,094.05	145.74	56.538	
13,900.00	8,235.00	14,421.00	9,557.77	56.37	117.14	13.385	12,895.09	2,025.90	8,144.07	7,998.22	145.85	55.838	
14,000.00	8,235.00	14,421.00	9,557.77	57.11	117.14	13.562	12,895.09	2,025.90	8,048.46	7,902.49	145.97	55.137	
14,100.00	8,235.00	14,421.00	9,557.77	57.85	117.14	13.743	12,895.09	2,025.90	7,952.96	7,806.86	146.09	54.437	
14,200.00	8,235.00	14,421.00	9,557.77	58.60	117.14	13.929	12,895.09	2,025.90	7,857.56	7,711.34	146.22	53.737	
14,300.00	8,235.00	14,421.00	9,557.77	59.35	117.14	14.119	12,895.09	2,025.90	7,762.29	7,615.93	146.35	53.038	
14,400.00	8,235.00	14,421.00	9,557.77	60.10	117.14	14.315	12,895.09	2,025.90	7,667.13	7,520.64	146.49	52.339	
14,500.00	8,235.00	14,421.00	9,557.77	60.86	117.14	14.515	12,895.09	2,025.90	7,572.10	7,425.47	146.63	51.641	
14,600.00	8,235.00	14,421.00	9,557.77	61.61	117.14	14.720	12,895.09	2,025.90	7,477.20	7,330.42	146.77	50.943	
14,700.00	8,235.00	14,421.00	9,557.77	62.37	117.14	14.932	12,895.09	2,025.90	7,382.43	7,235.50	146.92	50.246	
14,800.00	8,235.00	14,421.00	9,557.77	63.14	117.14	15.148	12,895.09	2,025.90	7,287.80	7,140.72	147.08	49.550	
14,900.00	8,235.00	14,421.00	9,557.77	63.90	117.14	15.371	12,895.09	2,025.90	7,193.32	7,046.08	147.24	48.854	
15,000.00	8,235.00	14,421.00	9,557.77	64.67	117.14	15.600	12,895.09	2,025.90	7,098.99	6,951.58	147.41	48.160	
15,100.00	8,235.00	14,421.00	9,557.77	65.44	117.14	15.835	12,895.09	2,025.90	7,004.81	6,857.24	147.58	47.466	
15,200.00	8,235.00	14,421.00	9,557.77	66.21	117.14	16.076	12,895.09	2,025.90	6,910.80	6,763.05	147.75	46.773	
15,300.00	8,235.00	14,421.00	9,557.77	66.98	117.14	16.325	12,895.09	2,025.90	6,816.96	6,669.03	147.93	46.081	
15,400.00	8,235.00	14,421.00	9,557.77	67.76	117.14	16.581	12,895.09	2,025.90	6,723.30	6,575.18	148.12	45.390	
15,500.00	8,235.00	14,421.00	9,557.77	68.54	117.14	16.844	12,895.09	2,025.90	6,629.82	6,481.51	148.32	44.701	
15,600.00	8,235.00	14,421.00	9,557.77	69.32	117.14	17.116	12,895.09	2,025.90	6,536.54	6,388.02	148.52	44.012	
15,700.00	8,235.00	14,421.00	9,557.77	70.10	117.14	17.395	12,895.09	2,025.90	6,443.46	6,294.74	148.72	43.326	
15,800.00	8,235.00	14,421.00	9,557.77	70.89	117.14	17.683	12,895.09	2,025.90	6,350.59	6,201.65	148.93	42.640	
15,900.00	8,235.00	14,421.00	9,557.77	71.67	117.14	17.980	12,895.09	2,025.90	6,257.93	6,108.78	149.15	41.957	
16,000.00	8,235.00	14,421.00	9,557.77	72.46	117.14	18.286	12,895.09	2,025.90	6,165.51	6,016.13	149.38	41.275	
16,100.00	8,235.00	14,421.00	9,557.77	73.25	117.14	18.602	12,895.09	2,025.90	6,073.33	5,923.72	149.61	40.595	
16,200.00	8,235.00	14,421.00	9,557.77	74.04	117.14	18.928	12,895.09	2,025.90	5,981.40	5,831.55	149.85	39.917	
16,300.00	8,235.00	14,421.00	9,557.77	74.83	117.14	19.265	12,895.09	2,025.90	5,889.73	5,739.64	150.09	39.241	
16,400.00	8,235.00	14,421.00	9,557.77	75.63	117.14	19.613	12,895.09	2,025.90	5,798.33	5,647.99	150.34	38.568	
16,500.00	8,235.00	14,421.00	9,557.77	76.42	117.14	19.973	12,895.09	2,025.90	5,707.23	5,556.63	150.60	37.896	
16,600.00	8,235.00	14,421.00	9,557.77	77.22	117.14	20.346	12,895.09	2,025.90	5,616.43	5,465.56	150.87	37.228	
16,700.00	8,235.00	14,421.00	9,557.77	78.02	117.14	20.731	12,895.09	2,025.90	5,525.94	5,374.80	151.14	36.562	
16,800.00	8,235.00	14,421.00	9,557.77	78.82	117.14	21.129	12,895.09	2,025.90	5,435.79	5,284.37	151.42	35.899	
16,900.00	8,235.00	14,421.00	9,557.77	79.62	117.14	21.542	12,895.09	2,025.90	5,345.99	5,194.29	151.70	35.240	
17,000.00	8,235.00	14,421.00	9,557.77	80.42	117.14	21.971	12,895.09	2,025.90	5,256.56	5,104.56	152.00	34.583	
17,100.00	8,235.00	14,421.00	9,557.77	81.22	117.14	22.414	12,895.09	2,025.90	5,167.51	5,015.22	152.30	33.931	

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation



MS Directional Anticollision Report



Company:	Marathon Oil	Local Co-ordinate Reference:	Well Pierogi BS Federal Com 502H
Project:	Eddy County, New Mexico (NAD 27)	TVD Reference:	WELL @ 3022.50usft (Precision 580)
Reference Site:	Pierogi Federal Com (302H, 502H, 552H)	MD Reference:	WELL @ 3022.50usft (Precision 580)
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	Pierogi BS Federal Com 502H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	EDM 5000.15 Conroe DB
Reference Design:	Design #1	Offset TVD Reference:	Reference Datum

Offset Design: Fiddle Fire Fed Com (Offsets) - Fiddle Fee 23 X # 1H - Wellbore #1 - Surveys														Offset Site Error:	0.00 usft
Survey Program: 87-GYRO-NS, 602-MWD+HRGM														Offset Well Error:	0.00 usft
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Semi Major Axis Reference (usft)	Major Axis Offset (usft)	Azimuth from North (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Distance Between Centres (usft)	Rule Assigned: Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning		
17,200.00	8,235.00	14,421.00	9,557.77	82.03	117.14	22.875	12,895.09	2,025.90	5,078.88	4,926.28	152.60	33.282			
17,300.00	8,235.00	14,421.00	9,557.77	82.83	117.14	23.353	12,895.09	2,025.90	4,990.67	4,837.76	152.91	32.637			
17,400.00	8,235.00	14,421.00	9,557.77	83.64	117.14	23.849	12,895.09	2,025.90	4,902.92	4,749.68	153.23	31.996			
17,500.00	8,235.00	14,421.00	9,557.77	84.45	117.14	24.365	12,895.09	2,025.90	4,815.64	4,662.08	153.56	31.361			
17,600.00	8,235.00	14,421.00	9,557.77	85.26	117.14	24.902	12,895.09	2,025.90	4,728.86	4,574.98	153.89	30.730			
17,700.00	8,235.00	14,421.00	9,557.77	86.07	117.14	25.460	12,895.09	2,025.90	4,642.62	4,488.40	154.22	30.104			
17,800.00	8,235.00	14,421.00	9,557.77	86.88	117.14	26.042	12,895.09	2,025.90	4,556.94	4,402.39	154.56	29.484			
17,900.00	8,235.00	14,421.00	9,557.77	87.69	117.14	26.647	12,895.09	2,025.90	4,471.86	4,316.96	154.90	28.870			
18,000.00	8,235.00	14,421.00	9,557.77	88.50	117.14	27.278	12,895.09	2,025.90	4,387.40	4,232.16	155.24	28.262			
18,100.00	8,235.00	14,421.00	9,557.77	89.32	117.14	27.937	12,895.09	2,025.90	4,303.62	4,148.03	155.59	27.660			
18,200.00	8,235.00	14,421.00	9,557.77	90.13	117.14	28.624	12,895.09	2,025.90	4,220.53	4,064.60	155.93	27.066			
18,300.00	8,235.00	14,421.00	9,557.77	90.95	117.14	29.342	12,895.09	2,025.90	4,138.20	3,981.92	156.28	26.480			
18,400.00	8,235.00	14,421.00	9,557.77	91.76	117.14	30.092	12,895.09	2,025.90	4,056.66	3,900.04	156.62	25.902			
18,500.00	8,235.00	14,421.00	9,557.77	92.58	117.14	30.876	12,895.09	2,025.90	3,975.96	3,819.01	156.95	25.332			
18,600.00	8,235.00	14,421.00	9,557.77	93.40	117.14	31.697	12,895.09	2,025.90	3,896.16	3,738.88	157.28	24.772			
18,700.00	8,235.00	14,421.00	9,557.77	94.22	117.14	32.557	12,895.09	2,025.90	3,817.31	3,659.71	157.60	24.221			
18,800.00	8,235.00	14,421.00	9,557.77	95.04	117.14	33.458	12,895.09	2,025.90	3,739.47	3,581.56	157.91	23.681			
18,900.00	8,235.00	14,421.00	9,557.77	95.86	117.14	34.402	12,895.09	2,025.90	3,662.71	3,504.51	158.20	23.152			
19,000.00	8,235.00	14,421.00	9,557.77	96.68	117.14	35.392	12,895.09	2,025.90	3,587.09	3,428.62	158.47	22.635			
19,100.00	8,235.00	14,421.00	9,557.77	97.50	117.14	36.432	12,895.09	2,025.90	3,512.69	3,353.97	158.73	22.131			
19,200.00	8,235.00	14,421.00	9,557.77	98.32	117.14	37.524	12,895.09	2,025.90	3,439.59	3,280.64	158.95	21.640			
19,300.00	8,235.00	14,421.00	9,557.77	99.15	117.14	38.671	12,895.09	2,025.90	3,367.88	3,208.73	159.14	21.163			
19,400.00	8,235.00	14,421.00	9,557.77	99.97	117.14	39.877	12,895.09	2,025.90	3,297.63	3,138.33	159.30	20.701			
19,500.00	8,235.00	14,421.00	9,557.77	100.79	117.14	41.144	12,895.09	2,025.90	3,228.96	3,069.55	159.41	20.256			
19,600.00	8,235.00	14,421.00	9,557.77	101.62	117.14	42.478	12,895.09	2,025.90	3,161.96	3,002.48	159.47	19.827			
19,700.00	8,235.00	14,421.00	9,557.77	102.44	117.14	43.881	12,895.09	2,025.90	3,096.73	2,937.25	159.48	19.417			
19,800.00	8,235.00	14,421.00	9,557.77	103.27	117.14	45.357	12,895.09	2,025.90	3,033.40	2,873.97	159.43	19.026			
19,900.00	8,235.00	14,421.00	9,557.77	104.10	117.14	46.909	12,895.09	2,025.90	2,972.09	2,812.78	159.31	18.656			
20,000.00	8,235.00	14,421.00	9,557.77	104.92	117.14	48.543	12,895.09	2,025.90	2,912.92	2,753.81	159.11	18.307			
20,100.00	8,235.00	14,421.00	9,557.77	105.75	117.14	50.260	12,895.09	2,025.90	2,856.03	2,697.20	158.83	17.981			
20,200.00	8,235.00	14,421.00	9,557.77	106.58	117.14	52.065	12,895.09	2,025.90	2,801.55	2,643.09	158.46	17.679			
20,300.00	8,235.00	14,421.00	9,557.77	107.41	117.14	53.960	12,895.09	2,025.90	2,749.63	2,591.63	158.00	17.402			
20,400.00	8,235.00	14,421.00	9,557.77	108.24	117.14	55.948	12,895.09	2,025.90	2,700.42	2,542.97	157.45	17.151			
20,500.00	8,235.00	14,421.00	9,557.77	109.07	117.14	58.030	12,895.09	2,025.90	2,654.07	2,497.27	156.80	16.927			
20,600.00	8,235.00	14,421.00	9,557.77	109.90	117.14	60.209	12,895.09	2,025.90	2,610.72	2,454.67	156.05	16.730			
20,700.00	8,235.00	14,421.00	9,557.77	110.73	117.14	62.483	12,895.09	2,025.90	2,570.54	2,415.31	155.22	16.560			
20,800.00	8,235.00	14,421.00	9,557.77	111.56	117.14	64.852	12,895.09	2,025.90	2,533.66	2,379.33	154.33	16.417			
20,900.00	8,235.00	14,421.00	9,557.77	112.39	117.14	67.313	12,895.09	2,025.90	2,500.25	2,346.86	153.39	16.300			
21,000.00	8,235.00	14,421.00	9,557.77	113.23	117.14	69.862	12,895.09	2,025.90	2,470.43	2,317.99	152.44	16.206			
21,100.00	8,235.00	14,421.00	9,557.77	114.06	117.14	72.493	12,895.09	2,025.90	2,444.34	2,292.82	151.52	16.132			
21,200.00	8,235.00	14,421.00	9,557.77	114.89	117.14	75.199	12,895.09	2,025.90	2,422.11	2,271.41	150.69	16.073			
21,300.00	8,235.00	14,421.00	9,557.77	115.72	117.14	77.970	12,895.09	2,025.90	2,403.83	2,253.79	150.04	16.022			
21,400.00	8,235.00	14,421.00	9,557.77	116.56	117.14	80.795	12,895.09	2,025.90	2,389.60	2,239.97	149.63	15.971			
21,500.00	8,235.00	14,421.00	9,557.77	117.39	117.14	83.661	12,895.09	2,025.90	2,379.49	2,229.95	149.54	15.912			
21,600.00	8,235.00	14,421.00	9,557.77	118.23	117.14	86.556	12,895.09	2,025.90	2,373.55	2,223.71	149.84	15.840			
21,691.05	8,235.00	14,421.00	9,557.77	118.99	117.14	89.204	12,895.09	2,025.90	2,371.81	2,221.32	150.49	15.761 CC			
21,700.00	8,235.00	14,421.00	9,557.77	119.06	117.14	89.465	12,895.09	2,025.90	2,371.82	2,221.25	150.57	15.752 ES			
21,800.00	8,235.00	14,421.00	9,557.77	119.90	117.14	92.372	12,895.09	2,025.90	2,374.31	2,222.58	151.73	15.648			
21,900.00	8,235.00	14,421.00	9,557.77	120.73	117.14	95.263	12,895.09	2,025.90	2,380.99	2,227.72	153.28	15.534			
22,000.00	8,235.00	14,421.00	9,557.77	121.57	117.14	98.123	12,895.09	2,025.90	2,391.84	2,236.71	155.14	15.418			
22,100.00	8,235.00	14,421.00	9,557.77	122.41	117.14	100.939	12,895.09	2,025.90	2,406.81	2,249.58	157.23	15.308			
22,200.00	8,235.00	14,421.00	9,557.77	123.24	117.14	103.699	12,895.09	2,025.90	2,425.80	2,266.34	159.46	15.213			

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation



MS Directional Anticollision Report



Company:	Marathon Oil	Local Co-ordinate Reference:	Well Pierogi BS Federal Com 502H
Project:	Eddy County, New Mexico (NAD 27)	TVD Reference:	WELL @ 3022.50usft (Precision 580)
Reference Site:	Pierogi Federal Com (302H, 502H, 552H)	MD Reference:	WELL @ 3022.50usft (Precision 580)
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	Pierogi BS Federal Com 502H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	EDM 5000.15 Conroe DB
Reference Design:	Design #1	Offset TVD Reference:	Reference Datum

Offset Design: Fiddle Fire Fed Com (Offsets) - Fiddle Fee 23 X # 1H - Wellbore #1 - Surveys													Offset Site Error: 0.00 usft
Survey Program:	87-GYRO-NS, 602-MWD+HRGM												Offset Well Error: 0.00 usft
Reference	Offset	Semi Major Axis	Reference	Offset	Azimuth	Offset Wellbore Centre	Distance	Rule Assigned:	Between	Between	Minimum	Separation	Warning
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	from North (°)	+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Separation (usft)	Factor	
22,300.00	8,235.00	14,421.00	9,557.77	124.08	117.14	106.392	12,895.09	2,025.90	2,448.73	2,286.98	161.76	15.138	
22,400.00	8,235.00	14,421.00	9,557.77	124.92	117.14	109.009	12,895.09	2,025.90	2,475.50	2,311.45	164.05	15.090	
22,500.00	8,235.00	14,421.00	9,557.77	125.76	117.14	111.542	12,895.09	2,025.90	2,505.97	2,339.68	166.29	15.070 SF	
22,600.00	8,235.00	14,421.00	9,557.77	126.59	117.14	113.987	12,895.09	2,025.90	2,540.01	2,371.59	168.43	15.081	
22,700.00	8,235.00	14,421.00	9,557.77	127.43	117.14	116.339	12,895.09	2,025.90	2,577.49	2,407.05	170.44	15.122	
22,800.00	8,235.00	14,421.00	9,557.77	128.27	117.14	118.597	12,895.09	2,025.90	2,618.25	2,445.93	172.32	15.194	
22,900.00	8,235.00	14,421.00	9,557.77	129.11	117.14	120.758	12,895.09	2,025.90	2,662.15	2,488.10	174.04	15.296	
23,000.00	8,235.00	14,421.00	9,557.77	129.95	117.14	122.824	12,895.09	2,025.90	2,709.03	2,533.41	175.61	15.426	
23,100.00	8,235.00	14,421.00	9,557.77	130.79	117.14	124.795	12,895.09	2,025.90	2,758.73	2,581.71	177.03	15.584	
23,200.00	8,235.00	14,421.00	9,557.77	131.63	117.14	126.673	12,895.09	2,025.90	2,811.12	2,632.83	178.29	15.767	
23,300.00	8,235.00	14,421.00	9,557.77	132.47	117.14	128.462	12,895.09	2,025.90	2,866.04	2,686.64	179.40	15.976	
23,400.00	8,235.00	14,421.00	9,557.77	133.31	117.14	130.164	12,895.09	2,025.90	2,923.35	2,742.97	180.38	16.207	
23,500.00	8,235.00	14,421.00	9,557.77	134.15	117.14	131.783	12,895.09	2,025.90	2,982.91	2,801.68	181.23	16.459	
23,600.00	8,235.00	14,421.00	9,557.77	134.99	117.14	133.322	12,895.09	2,025.90	3,044.60	2,862.63	181.96	16.732	
23,700.00	8,235.00	14,421.00	9,557.77	135.83	117.14	134.784	12,895.09	2,025.90	3,108.27	2,925.69	182.58	17.024	
23,800.00	8,235.00	14,421.00	9,557.77	136.68	117.14	136.174	12,895.09	2,025.90	3,173.82	2,990.72	183.10	17.333	
23,900.00	8,235.00	14,421.00	9,557.77	137.52	117.14	137.496	12,895.09	2,025.90	3,241.13	3,057.60	183.54	17.659	
24,000.00	8,235.00	14,421.00	9,557.77	138.36	117.14	138.752	12,895.09	2,025.90	3,310.09	3,126.21	183.88	18.001	
24,004.19	8,235.00	14,421.00	9,557.77	138.39	117.14	138.803	12,895.09	2,025.90	3,313.02	3,129.12	183.90	18.016	

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation



MS Directional Anticollision Report



Company:	Marathon Oil	Local Co-ordinate Reference:	Well Pierogi BS Federal Com 502H
Project:	Eddy County, New Mexico (NAD 27)	TVD Reference:	WELL @ 3022.50usft (Precision 580)
Reference Site:	Pierogi Federal Com (302H, 502H, 552H)	MD Reference:	WELL @ 3022.50usft (Precision 580)
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	Pierogi BS Federal Com 502H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	EDM 5000.15 Conroe DB
Reference Design:	Design #1	Offset TVD Reference:	Reference Datum

Offset Design: Fiddle Fire Fed Com (Offsets) - Fiddle Fee 24-28-23 (3-4-7-8) WB #8H - Wellbore #1 - Surveys													Offset Site Error:
													0.00 usft
Survey Program:	167-MWD+HRGM												Offset Well Error:
Reference	Offset												0.00 usft
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Semi Major Axis Reference	Offset	Azimuth from North (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Distance Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning
13,200.00	8,235.00	7,963.00	7,906.11	51.31	29.51	8.758	14,251.33	1,696.39	9,995.71	9,937.23	58.48	170.928	
13,300.00	8,235.00	7,963.00	7,906.11	52.02	29.51	8.854	14,251.33	1,696.39	9,897.16	9,838.59	58.57	168.993	
13,400.00	8,235.00	7,963.00	7,906.11	52.74	29.51	8.952	14,251.33	1,696.39	9,798.64	9,739.99	58.66	167.055	
13,500.00	8,235.00	7,963.00	7,906.11	53.46	29.51	9.052	14,251.33	1,696.39	9,700.16	9,641.41	58.75	165.115	
13,600.00	8,235.00	7,963.00	7,906.11	54.18	29.51	9.154	14,251.33	1,696.39	9,601.70	9,542.86	58.84	163.172	
13,700.00	8,235.00	7,963.00	7,906.11	54.91	29.51	9.258	14,251.33	1,696.39	9,503.28	9,444.34	58.94	161.226	
13,800.00	8,235.00	7,963.00	7,906.11	55.64	29.51	9.365	14,251.33	1,696.39	9,404.89	9,345.85	59.05	159.278	
13,900.00	8,235.00	7,963.00	7,906.11	56.37	29.51	9.473	14,251.33	1,696.39	9,306.54	9,247.39	59.15	157.327	
14,000.00	8,235.00	7,963.00	7,906.11	57.11	29.51	9.584	14,251.33	1,696.39	9,208.22	9,148.96	59.26	155.374	
14,100.00	8,235.00	7,963.00	7,906.11	57.85	29.51	9.698	14,251.33	1,696.39	9,109.94	9,050.56	59.38	153.419	
14,200.00	8,235.00	7,963.00	7,906.11	58.60	29.51	9.814	14,251.33	1,696.39	9,011.69	8,952.20	59.50	151.462	
14,300.00	8,235.00	7,963.00	7,906.11	59.35	29.51	9.932	14,251.33	1,696.39	8,913.49	8,853.87	59.62	149.503	
14,400.00	8,235.00	7,963.00	7,906.11	60.10	29.51	10.053	14,251.33	1,696.39	8,815.32	8,755.58	59.75	147.541	
14,500.00	8,235.00	7,963.00	7,906.11	60.86	29.51	10.177	14,251.33	1,696.39	8,717.20	8,657.32	59.88	145.578	
14,600.00	8,235.00	7,963.00	7,906.11	61.61	29.51	10.303	14,251.33	1,696.39	8,619.12	8,559.10	60.02	143.613	
14,700.00	8,235.00	7,963.00	7,906.11	62.37	29.51	10.433	14,251.33	1,696.39	8,521.09	8,460.93	60.16	141.646	
14,800.00	8,235.00	7,963.00	7,906.11	63.14	29.51	10.566	14,251.33	1,696.39	8,423.10	8,362.79	60.30	139.677	
14,900.00	8,235.00	7,963.00	7,906.11	63.90	29.51	10.701	14,251.33	1,696.39	8,325.15	8,264.70	60.46	137.707	
15,000.00	8,235.00	7,963.00	7,906.11	64.67	29.51	10.840	14,251.33	1,696.39	8,227.26	8,166.65	60.61	135.735	
15,100.00	8,235.00	7,983.83	7,926.91	65.44	29.58	10.989	14,251.93	1,697.38	8,129.38	8,068.51	60.87	133.562	
15,200.00	8,235.00	7,985.48	7,928.55	66.21	29.59	11.135	14,251.97	1,697.46	8,031.58	7,970.54	61.04	131.575	
15,300.00	8,235.00	7,987.13	7,930.21	66.98	29.59	11.285	14,252.02	1,697.54	7,933.84	7,872.62	61.22	129.587	
15,400.00	8,235.00	7,988.80	7,931.87	67.76	29.60	11.438	14,252.07	1,697.62	7,836.15	7,774.74	61.41	127.598	
15,500.00	8,235.00	7,990.49	7,933.56	68.54	29.60	11.596	14,252.12	1,697.70	7,738.53	7,676.92	61.61	125.609	
15,600.00	8,235.00	7,992.19	7,935.26	69.32	29.61	11.757	14,252.17	1,697.79	7,640.96	7,579.15	61.81	123.619	
15,700.00	8,235.00	7,993.91	7,936.97	70.10	29.61	11.923	14,252.22	1,697.87	7,543.46	7,481.44	62.02	121.629	
15,800.00	8,235.00	7,995.64	7,938.70	70.89	29.62	12.093	14,252.28	1,697.96	7,446.02	7,383.79	62.24	119.639	
15,900.00	8,235.00	7,997.38	7,940.44	71.67	29.63	12.268	14,252.33	1,698.04	7,348.66	7,286.19	62.46	117.649	
16,000.00	8,235.00	7,999.14	7,942.20	72.46	29.63	12.447	14,252.38	1,698.13	7,251.36	7,188.66	62.70	115.659	
16,100.00	8,235.00	8,000.92	7,943.97	73.25	29.64	12.632	14,252.44	1,698.22	7,154.13	7,091.20	62.94	113.669	
16,200.00	8,235.00	8,002.71	7,945.76	74.04	29.64	12.821	14,252.49	1,698.31	7,056.99	6,993.80	63.19	111.680	
16,300.00	8,235.00	8,004.52	7,947.56	74.83	29.65	13.015	14,252.55	1,698.40	6,959.92	6,896.47	63.45	109.691	
16,400.00	8,235.00	8,006.35	7,949.39	75.63	29.65	13.216	14,252.60	1,698.49	6,862.94	6,799.21	63.72	107.703	
16,500.00	8,235.00	8,008.19	7,951.22	76.42	29.66	13.421	14,252.66	1,698.58	6,766.04	6,702.04	64.00	105.716	
16,600.00	8,235.00	8,010.04	7,953.08	77.22	29.67	13.633	14,252.72	1,698.68	6,669.23	6,604.94	64.29	103.731	
16,700.00	8,235.00	8,011.92	7,954.95	78.02	29.67	13.851	14,252.78	1,698.77	6,572.52	6,507.93	64.60	101.747	
16,800.00	8,235.00	8,013.81	7,956.84	78.82	29.68	14.076	14,252.83	1,698.87	6,475.91	6,411.00	64.91	99.764	
16,900.00	8,235.00	8,015.72	7,958.75	79.62	29.69	14.307	14,252.89	1,698.97	6,379.40	6,314.16	65.24	97.784	
17,000.00	8,235.00	8,017.65	7,960.67	80.42	29.69	14.546	14,252.96	1,699.07	6,283.00	6,217.42	65.58	95.806	
17,100.00	8,235.00	8,019.59	7,962.61	81.22	29.70	14.792	14,253.02	1,699.17	6,186.71	6,120.78	65.94	93.830	
17,200.00	8,235.00	8,021.56	7,964.57	82.03	29.70	15.046	14,253.08	1,699.27	6,090.55	6,024.24	66.30	91.857	
17,300.00	8,235.00	8,023.54	7,966.55	82.83	29.71	15.308	14,253.14	1,699.37	5,994.50	5,927.81	66.69	89.888	
17,400.00	8,235.00	8,025.54	7,968.55	83.64	29.72	15.578	14,253.21	1,699.47	5,898.59	5,831.50	67.09	87.921	
17,500.00	8,235.00	8,027.56	7,970.56	84.45	29.72	15.858	14,253.27	1,699.58	5,802.81	5,735.31	67.51	85.959	
17,600.00	8,235.00	8,029.60	7,972.60	85.26	29.73	16.147	14,253.34	1,699.69	5,707.18	5,639.24	67.94	84.001	
17,700.00	8,235.00	8,031.66	7,974.65	86.07	29.74	16.445	14,253.41	1,699.79	5,611.70	5,543.30	68.40	82.048	
17,800.00	8,235.00	8,033.73	7,976.72	86.88	29.74	16.754	14,253.48	1,699.90	5,516.37	5,447.51	68.87	80.100	
17,900.00	8,235.00	8,035.83	7,978.82	87.69	29.75	17.074	14,253.54	1,700.02	5,421.22	5,351.86	69.36	78.157	
18,000.00	8,235.00	8,037.95	7,980.95	88.50	29.81	17.413	14,254.12	1,700.94	5,326.27	5,256.32	69.95	76.144	
18,100.00	8,235.00	8,039.00	7,982.00	89.32	29.81	17.755	14,254.12	1,700.94	5,231.47	5,160.99	70.48	74.227	
18,200.00	8,235.00	8,040.00	7,983.00	90.13	29.81	18.110	14,254.12	1,700.94	5,136.86	5,065.83	71.03	72.316	
18,300.00	8,235.00	8,041.00	7,984.00	90.95	29.81	18.479	14,254.12	1,700.94	5,042.47	4,970.86	71.61	70.413	

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation



MS Directional Anticollision Report



Company:	Marathon Oil	Local Co-ordinate Reference:	Well Pierogi BS Federal Com 502H
Project:	Eddy County, New Mexico (NAD 27)	TVD Reference:	WELL @ 3022.50usft (Precision 580)
Reference Site:	Pierogi Federal Com (302H, 502H, 552H)	MD Reference:	WELL @ 3022.50usft (Precision 580)
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	Pierogi BS Federal Com 502H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	EDM 5000.15 Conroe DB
Reference Design:	Design #1	Offset TVD Reference:	Reference Datum

Offset Design: Fiddle Fire Fed Com (Offsets) - Fiddle Fee 24-28-23 (3-4-7-8) WB #8H - Wellbore #1 - Surveys													Offset Site Error:
													0.00 usft
Survey Program:	Reference	Offset	Semi Major Axis		Azimuth		Offset Wellbore Centre		Rule Assigned:		Distance		Offset Well Error:
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Reference	Offset	from North (°)	+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning	0.00 usft
18,400.00	8,235.00	8,053.00	91.76	29.81	18.862	14,254.12	1,700.94	4,948.29	4,876.07	72.22	68.518		
18,500.00	8,235.00	8,053.00	92.58	29.81	19.259	14,254.12	1,700.94	4,854.35	4,781.49	72.85	66.631		
18,600.00	8,235.00	8,053.00	93.40	29.81	19.672	14,254.12	1,700.94	4,760.65	4,687.13	73.52	64.754		
18,700.00	8,235.00	8,054.12	94.22	29.81	20.103	14,254.16	1,701.00	4,667.22	4,592.99	74.22	62.881		
18,800.00	8,235.00	8,060.82	95.04	29.83	20.554	14,254.39	1,701.37	4,574.06	4,499.07	74.99	60.999		
18,900.00	8,235.00	8,067.25	95.86	29.85	21.023	14,254.60	1,701.71	4,481.19	4,405.40	75.78	59.131		
19,000.00	8,235.00	8,073.42	96.68	29.88	21.512	14,254.80	1,702.05	4,388.62	4,312.00	76.62	57.278		
19,100.00	8,235.00	8,079.34	97.50	29.89	22.022	14,254.99	1,702.37	4,296.39	4,218.90	77.49	55.442		
19,200.00	8,235.00	8,085.04	98.32	29.91	22.554	14,255.17	1,702.67	4,204.51	4,126.10	78.41	53.622		
19,300.00	8,235.00	8,090.52	99.15	29.93	23.109	14,255.34	1,702.97	4,113.00	4,033.63	79.37	51.820		
19,400.00	8,235.00	8,095.80	99.97	29.95	23.690	14,255.50	1,703.25	4,021.89	3,941.51	80.38	50.036		
19,500.00	8,235.00	8,100.88	100.79	29.97	24.298	14,255.65	1,703.52	3,931.21	3,849.78	81.44	48.272		
19,600.00	8,235.00	8,105.79	101.62	29.98	24.934	14,255.79	1,703.78	3,841.00	3,758.45	82.55	46.529		
19,700.00	8,235.00	8,110.52	102.44	30.00	25.600	14,255.93	1,704.03	3,751.27	3,667.55	83.72	44.808		
19,800.00	8,235.00	8,115.09	103.27	30.01	26.299	14,256.06	1,704.27	3,662.07	3,577.12	84.95	43.110		
19,900.00	8,235.00	8,119.50	104.10	30.03	27.033	14,256.18	1,704.50	3,573.44	3,487.20	86.24	41.436		
20,000.00	8,235.00	8,123.77	104.92	30.04	27.804	14,256.30	1,704.73	3,485.42	3,397.82	87.60	39.788		
20,100.00	8,235.00	8,127.89	105.75	30.05	28.614	14,256.41	1,704.94	3,398.06	3,309.03	89.03	38.167		
20,200.00	8,235.00	8,131.89	106.58	30.07	29.467	14,256.51	1,705.15	3,311.42	3,220.88	90.54	36.574		
20,300.00	8,235.00	8,135.75	107.41	30.08	30.365	14,256.61	1,705.35	3,225.54	3,133.41	92.13	35.012		
20,400.00	8,235.00	8,139.49	108.24	30.09	31.313	14,256.71	1,705.55	3,140.50	3,046.70	93.80	33.480		
20,500.00	8,235.00	8,143.35	109.07	30.10	32.313	14,256.80	1,705.75	3,056.36	2,960.79	95.56	31.982		
20,600.00	8,235.00	8,147.58	109.90	30.12	33.369	14,256.91	1,705.96	2,973.20	2,875.77	97.42	30.518		
20,700.00	8,235.00	8,151.73	110.73	30.13	34.486	14,257.01	1,706.17	2,891.10	2,791.72	99.38	29.091		
20,800.00	8,235.00	8,155.78	111.56	30.14	35.667	14,257.11	1,706.38	2,810.16	2,708.72	101.44	27.702		
20,900.00	8,235.00	8,159.75	112.39	30.16	36.918	14,257.20	1,706.57	2,730.48	2,626.87	103.61	26.354		
21,000.00	8,235.00	8,163.64	113.23	30.17	38.243	14,257.30	1,706.76	2,652.17	2,546.28	105.89	25.047		
21,100.00	8,235.00	8,167.44	114.06	30.18	39.648	14,257.39	1,706.94	2,575.36	2,467.08	108.28	23.785		
21,200.00	8,235.00	8,171.17	114.89	30.20	41.139	14,257.47	1,707.12	2,500.19	2,389.41	110.78	22.569		
21,300.00	8,235.00	8,174.82	115.72	30.21	42.720	14,257.56	1,707.29	2,426.81	2,313.40	113.40	21.400		
21,400.00	8,235.00	8,178.40	116.56	30.22	44.399	14,257.64	1,707.46	2,355.38	2,239.24	116.14	20.281		
21,500.00	8,235.00	8,181.91	117.39	30.23	46.181	14,257.72	1,707.62	2,286.09	2,167.11	118.98	19.214		
21,600.00	8,235.00	8,185.35	118.23	30.24	48.073	14,257.79	1,707.77	2,219.15	2,097.22	121.93	18.200		
21,700.00	8,235.00	8,188.72	119.06	30.25	50.079	14,257.87	1,707.92	2,154.76	2,029.79	124.98	17.241		
21,800.00	8,235.00	8,192.02	119.90	30.26	52.207	14,257.94	1,708.07	2,093.17	1,965.07	128.10	16.340		
21,900.00	8,235.00	8,195.26	120.73	30.27	54.460	14,258.01	1,708.21	2,034.63	1,903.34	131.29	15.497		
22,000.00	8,235.00	8,198.44	121.57	30.28	56.842	14,258.08	1,708.34	1,979.41	1,844.89	134.52	14.714		
22,100.00	8,235.00	8,201.56	122.41	30.29	59.357	14,258.15	1,708.48	1,927.80	1,790.03	137.77	13.993		
22,200.00	8,235.00	8,204.62	123.24	30.30	62.004	14,258.21	1,708.60	1,880.09	1,739.10	140.98	13.335		
22,300.00	8,235.00	8,207.63	124.08	30.31	64.783	14,258.27	1,708.73	1,836.58	1,692.44	144.14	12.742		
22,400.00	8,235.00	8,210.58	124.92	30.32	67.689	14,258.33	1,708.85	1,797.59	1,650.41	147.17	12.214		
22,500.00	8,235.00	8,213.48	125.76	30.33	70.716	14,258.39	1,708.97	1,763.41	1,613.36	150.05	11.752		
22,600.00	8,235.00	8,216.32	126.59	30.34	73.853	14,258.45	1,709.08	1,734.32	1,581.62	152.70	11.358		
22,700.00	8,235.00	8,219.12	127.43	30.35	77.087	14,258.51	1,709.19	1,710.59	1,555.51	155.09	11.030		
22,800.00	8,235.00	8,221.86	128.27	30.36	80.401	14,258.56	1,709.30	1,692.45	1,535.30	157.14	10.770		
22,900.00	8,235.00	8,224.56	129.11	30.37	83.775	14,258.62	1,709.40	1,680.06	1,521.23	158.84	10.577		
23,000.00	8,235.00	8,227.21	129.95	30.38	87.186	14,258.67	1,709.50	1,673.57	1,513.45	160.12	10.452		
23,058.92	8,235.00	8,228.75	130.45	30.38	89.204	14,258.70	1,709.56	1,672.53	1,511.85	160.68	10.409 CC, ES		
23,100.00	8,235.00	8,229.81	130.79	30.39	90.611	14,258.72	1,709.60	1,673.04	1,512.05	160.99	10.392 SF		
23,200.00	8,235.00	8,232.37	131.63	30.39	94.026	14,258.77	1,709.70	1,678.47	1,517.06	161.41	10.399		
23,300.00	8,235.00	8,234.89	132.47	30.40	97.407	14,258.82	1,709.79	1,689.81	1,528.41	161.40	10.469		
23,400.00	8,235.00	8,237.36	133.31	30.41	100.731	14,258.86	1,709.88	1,706.94	1,545.96	160.99	10.603		

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation



MS Directional Anticollision Report



Company:	Marathon Oil	Local Co-ordinate Reference:	Well Pierogi BS Federal Com 502H
Project:	Eddy County, New Mexico (NAD 27)	TVD Reference:	WELL @ 3022.50usft (Precision 580)
Reference Site:	Pierogi Federal Com (302H, 502H, 552H)	MD Reference:	WELL @ 3022.50usft (Precision 580)
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	Pierogi BS Federal Com 502H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	EDM 5000.15 Conroe DB
Reference Design:	Design #1	Offset TVD Reference:	Reference Datum

Offset Design: Fiddle Fire Fed Com (Offsets) - Fiddle Fee 24-28-23 (3-4-7-8) WB #8H - Wellbore #1 - Surveys													Offset Site Error: 0.00 usft
Survey Program: 167-MWD+HRGM													Offset Well Error: 0.00 usft
Reference	Offset	Semi Major Axis		Rule Assigned:		Distance		Minimum		Separation		Warning	
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference	Offset	from North (°)	+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Separation (usft)		
23,500.00	8,235.00	8,239.79	8,182.46	134.15	30.42	103.978	14,258.91	1,709.97	1,729.69	1,569.51	160.18	10.798	
23,600.00	8,235.00	8,242.19	8,184.85	134.99	30.43	107.130	14,258.95	1,710.05	1,757.84	1,598.80	159.04	11.053	
23,700.00	8,235.00	8,244.54	8,187.20	135.83	30.43	110.174	14,259.00	1,710.14	1,791.13	1,633.54	157.59	11.366	
23,800.00	8,235.00	8,244.69	8,187.36	136.68	30.44	113.101	14,259.00	1,710.15	1,829.30	1,673.41	155.89	11.734	
23,900.00	8,235.00	8,246.67	8,189.33	137.52	30.44	115.899	14,259.04	1,710.22	1,872.03	1,718.03	154.00	12.156	
24,000.00	8,235.00	8,248.62	8,191.28	138.36	30.45	118.567	14,259.07	1,710.29	1,919.02	1,767.07	151.94	12.630	
24,004.19	8,235.00	8,248.70	8,191.36	138.39	30.45	118.675	14,259.07	1,710.29	1,921.08	1,769.22	151.86	12.651	

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

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COMPASS 5000.15 Build 91E



MS Directional Anticollision Report



Company:	Marathon Oil	Local Co-ordinate Reference:	Well Pierogi BS Federal Com 502H
Project:	Eddy County, New Mexico (NAD 27)	TVD Reference:	WELL @ 3022.50usft (Precision 580)
Reference Site:	Pierogi Federal Com (302H, 502H, 552H)	MD Reference:	WELL @ 3022.50usft (Precision 580)
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	Pierogi BS Federal Com 502H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	EDM 5000.15 Conroe DB
Reference Design:	Design #1	Offset TVD Reference:	Reference Datum

Offset Design: Fiddle Fire Fed Com (Offsets) - Fiddle Fee 24-28-23 (3-4-7-8) WD #3H - Wellbore #1 - Surveys													Offset Site Error:
													0.00 usft
Survey Program:	Reference	Offset	Semi Major Axis		Azimuth		Offset Wellbore Centre		Rule Assigned:		Distance		Offset Well Error:
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Reference	Offset	from North (°)	+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning	0.00 usft
12,600.00	8,235.00	8,301.92	8,285.58	47.15	29.04	8.772	13,587.04	1,697.41	9,925.71	9,866.88	58.83	168.726	
12,700.00	8,235.00	8,301.39	8,285.05	47.83	29.04	8.869	13,587.05	1,697.40	9,827.12	9,768.21	58.90	166.831	
12,800.00	8,235.00	8,300.85	8,284.51	48.52	29.04	8.968	13,587.05	1,697.39	9,728.55	9,669.57	58.98	164.933	
12,900.00	8,235.00	8,300.31	8,283.97	49.21	29.03	9.069	13,587.06	1,697.38	9,630.02	9,570.95	59.07	163.033	
13,000.00	8,235.00	8,299.76	8,283.42	49.90	29.03	9.172	13,587.06	1,697.37	9,531.51	9,472.36	59.15	161.130	
13,100.00	8,235.00	8,299.21	8,282.87	50.60	29.03	9.277	13,587.07	1,697.36	9,433.04	9,373.80	59.24	159.224	
13,200.00	8,235.00	8,298.66	8,282.32	51.31	29.03	9.384	13,587.07	1,697.35	9,334.60	9,275.26	59.34	157.316	
13,300.00	8,235.00	8,298.10	8,281.76	52.02	29.03	9.494	13,587.08	1,697.34	9,236.19	9,176.76	59.43	155.406	
13,400.00	8,235.00	8,297.54	8,281.20	52.74	29.02	9.606	13,587.08	1,697.32	9,137.82	9,078.28	59.53	153.493	
13,500.00	8,235.00	8,296.97	8,280.63	53.46	29.02	9.720	13,587.08	1,697.31	9,039.48	8,979.84	59.64	151.578	
13,600.00	8,235.00	8,296.40	8,280.06	54.18	29.02	9.837	13,587.09	1,697.30	8,941.18	8,881.44	59.74	149.660	
13,700.00	8,235.00	8,295.83	8,279.49	54.91	29.02	9.956	13,587.09	1,697.29	8,842.92	8,783.06	59.85	147.741	
13,800.00	8,235.00	8,295.25	8,278.91	55.64	29.02	10.079	13,587.10	1,697.28	8,744.69	8,684.72	59.97	145.819	
13,900.00	8,235.00	8,294.67	8,278.33	56.37	29.02	10.204	13,587.10	1,697.27	8,646.51	8,586.42	60.09	143.896	
14,000.00	8,235.00	8,294.08	8,277.74	57.11	29.01	10.331	13,587.11	1,697.26	8,548.37	8,488.16	60.21	141.970	
14,100.00	8,235.00	8,293.49	8,277.15	57.85	29.01	10.462	13,587.11	1,697.25	8,450.27	8,389.93	60.34	140.043	
14,200.00	8,235.00	8,292.89	8,276.56	58.60	29.01	10.596	13,587.12	1,697.24	8,352.22	8,291.75	60.47	138.114	
14,300.00	8,235.00	8,292.29	8,275.96	59.35	29.01	10.733	13,587.12	1,697.22	8,254.22	8,193.61	60.61	136.183	
14,400.00	8,235.00	8,291.69	8,275.35	60.10	29.01	10.873	13,587.13	1,697.21	8,156.26	8,095.51	60.75	134.251	
14,500.00	8,235.00	8,291.08	8,274.75	60.86	29.00	11.017	13,587.14	1,697.20	8,058.35	7,997.45	60.90	132.317	
14,600.00	8,235.00	8,290.47	8,274.13	61.61	29.00	11.164	13,587.14	1,697.19	7,960.50	7,899.44	61.06	130.382	
14,700.00	8,235.00	8,289.85	8,273.52	62.37	29.00	11.315	13,587.15	1,697.18	7,862.70	7,801.48	61.21	128.445	
14,800.00	8,235.00	8,289.23	8,272.90	63.14	29.00	11.470	13,587.15	1,697.17	7,764.95	7,703.57	61.38	126.507	
14,900.00	8,235.00	8,288.61	8,272.27	63.90	29.00	11.629	13,587.16	1,697.16	7,667.27	7,605.72	61.55	124.569	
15,000.00	8,235.00	8,287.98	8,271.64	64.67	28.99	11.791	13,587.16	1,697.14	7,569.64	7,507.91	61.73	122.629	
15,100.00	8,235.00	8,287.34	8,271.01	65.44	28.99	11.958	13,587.17	1,697.13	7,472.08	7,410.16	61.91	120.688	
15,200.00	8,235.00	8,286.70	8,270.37	66.21	28.99	12.130	13,587.17	1,697.12	7,374.58	7,312.47	62.10	118.747	
15,300.00	8,235.00	8,286.06	8,269.72	66.98	28.99	12.306	13,587.18	1,697.11	7,277.15	7,214.85	62.30	116.805	
15,400.00	8,235.00	8,285.41	8,269.07	67.76	28.98	12.487	13,587.19	1,697.10	7,179.79	7,117.28	62.51	114.862	
15,500.00	8,235.00	8,284.75	8,268.42	68.54	28.98	12.672	13,587.19	1,697.08	7,082.50	7,019.78	62.72	112.919	
15,600.00	8,235.00	8,284.09	8,267.76	69.32	28.98	12.863	13,587.20	1,697.07	6,985.29	6,922.35	62.94	110.976	
15,700.00	8,235.00	8,283.43	8,267.09	70.10	28.98	13.060	13,587.20	1,697.06	6,888.16	6,824.98	63.18	109.032	
15,800.00	8,235.00	8,282.76	8,266.43	70.89	28.98	13.261	13,587.21	1,697.05	6,791.11	6,727.70	63.42	107.089	
15,900.00	8,235.00	8,282.09	8,265.75	71.67	28.97	13.469	13,587.22	1,697.03	6,694.15	6,630.49	63.67	105.146	
16,000.00	8,235.00	8,281.41	8,265.07	72.46	28.97	13.683	13,587.22	1,697.02	6,597.28	6,533.36	63.93	103.203	
16,100.00	8,235.00	8,280.72	8,264.39	73.25	28.97	13.903	13,587.23	1,697.01	6,500.51	6,436.31	64.20	101.261	
16,200.00	8,235.00	8,280.03	8,263.70	74.04	28.97	14.130	13,587.23	1,697.00	6,403.83	6,339.36	64.48	99.320	
16,300.00	8,235.00	8,279.33	8,263.00	74.83	28.96	14.364	13,587.24	1,696.98	6,307.26	6,242.49	64.77	97.380	
16,400.00	8,235.00	8,278.63	8,262.30	75.63	28.96	14.605	13,587.25	1,696.97	6,210.80	6,145.72	65.07	95.441	
16,500.00	8,235.00	8,277.93	8,261.59	76.42	28.96	14.854	13,587.25	1,696.96	6,114.44	6,049.05	65.39	93.503	
16,600.00	8,235.00	8,277.21	8,260.88	77.22	28.96	15.111	13,587.26	1,696.94	6,018.21	5,952.49	65.72	91.567	
16,700.00	8,235.00	8,276.50	8,260.16	78.02	28.96	15.376	13,587.27	1,696.93	5,922.11	5,856.04	66.07	89.633	
16,800.00	8,235.00	8,275.77	8,259.44	78.82	28.95	15.649	13,587.27	1,696.92	5,826.13	5,759.70	66.43	87.702	
16,900.00	8,235.00	8,275.04	8,258.71	79.62	28.95	15.932	13,587.28	1,696.90	5,730.29	5,663.48	66.81	85.773	
17,000.00	8,235.00	8,274.31	8,257.98	80.42	28.95	16.225	13,587.29	1,696.89	5,634.60	5,567.40	67.20	83.847	
17,100.00	8,235.00	8,273.57	8,257.24	81.22	28.95	16.528	13,587.30	1,696.88	5,539.06	5,471.45	67.61	81.925	
17,200.00	8,235.00	8,272.82	8,256.49	82.03	28.94	16.841	13,587.30	1,696.86	5,443.67	5,375.63	68.04	80.006	
17,300.00	8,235.00	8,272.07	8,255.74	82.83	28.94	17.165	13,587.31	1,696.85	5,348.46	5,279.97	68.49	78.092	
17,400.00	8,235.00	8,271.31	8,254.98	83.64	28.94	17.501	13,587.32	1,696.83	5,253.43	5,184.47	68.96	76.182	
17,500.00	8,235.00	8,270.54	8,254.21	84.45	28.94	17.850	13,587.33	1,696.82	5,158.58	5,089.13	69.45	74.277	
17,600.00	8,235.00	8,269.77	8,253.44	85.26	28.93	18.211	13,587.33	1,696.81	5,063.93	4,993.96	69.97	72.378	
17,700.00	8,235.00	8,268.99	8,252.66	86.07	28.93	18.587	13,587.34	1,696.79	4,969.49	4,898.98	70.50	70.485	

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation



MS Directional Anticollision Report



Company:	Marathon Oil	Local Co-ordinate Reference:	Well Pierogi BS Federal Com 502H
Project:	Eddy County, New Mexico (NAD 27)	TVD Reference:	WELL @ 3022.50usft (Precision 580)
Reference Site:	Pierogi Federal Com (302H, 502H, 552H)	MD Reference:	WELL @ 3022.50usft (Precision 580)
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	Pierogi BS Federal Com 502H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	EDM 5000.15 Conroe DB
Reference Design:	Design #1	Offset TVD Reference:	Reference Datum

Offset Design: Fiddle Fire Fed Com (Offsets) - Fiddle Fee 24-28-23 (3-4-7-8) WD #3H - Wellbore #1 - Surveys												Offset Site Error:	0.00 usft
Survey Program: 173-MWD+HRGM												Offset Well Error:	0.00 usft
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Semi Major Axis Reference (usft)	Offset (usft)	Azimuth from North (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Distance Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning
17,800.00	8,235.00	8,268.21	8,251.88	86.88	28.93	18.977	13,587.35	1,696.78	4,875.27	4,804.20	71.07	68.599	
17,900.00	8,235.00	8,267.42	8,251.09	87.69	28.93	19.382	13,587.36	1,696.76	4,781.28	4,709.62	71.66	66.720	
18,000.00	8,235.00	8,266.62	8,250.29	88.50	28.92	19.803	13,587.36	1,696.75	4,687.55	4,615.27	72.28	64.850	
18,100.00	8,235.00	8,265.82	8,249.48	89.32	28.92	20.242	13,587.37	1,696.73	4,594.08	4,521.14	72.94	62.988	
18,200.00	8,235.00	8,265.01	8,248.67	90.13	28.92	20.699	13,587.38	1,696.72	4,500.89	4,427.27	73.62	61.136	
18,300.00	8,235.00	8,264.19	8,247.86	90.95	28.91	21.175	13,587.39	1,696.70	4,407.99	4,333.65	74.34	59.295	
18,400.00	8,235.00	8,263.36	8,247.03	91.76	28.91	21.671	13,587.40	1,696.69	4,315.42	4,240.32	75.10	57.465	
18,500.00	8,235.00	8,262.53	8,246.20	92.58	28.91	22.189	13,587.41	1,696.67	4,223.18	4,147.29	75.89	55.647	
18,600.00	8,235.00	8,261.69	8,245.36	93.40	28.91	22.731	13,587.41	1,696.66	4,131.31	4,054.58	76.73	53.842	
18,700.00	8,235.00	8,260.85	8,244.52	94.22	28.90	23.297	13,587.42	1,696.64	4,039.82	3,962.20	77.61	52.052	
18,800.00	8,235.00	8,259.99	8,243.66	95.04	28.90	23.889	13,587.43	1,696.63	3,948.74	3,870.20	78.54	50.277	
18,900.00	8,235.00	8,259.13	8,242.80	95.86	28.90	24.509	13,587.44	1,696.61	3,858.10	3,778.58	79.52	48.519	
19,000.00	8,235.00	8,258.26	8,241.93	96.68	28.89	25.158	13,587.45	1,696.60	3,767.94	3,687.39	80.55	46.779	
19,100.00	8,235.00	8,257.39	8,241.06	97.50	28.89	25.840	13,587.46	1,696.58	3,678.29	3,596.65	81.64	45.058	
19,200.00	8,235.00	8,256.50	8,240.17	98.32	28.89	26.555	13,587.47	1,696.57	3,589.18	3,506.40	82.78	43.357	
19,300.00	8,235.00	8,255.61	8,239.28	99.15	28.89	27.307	13,587.48	1,696.55	3,500.66	3,416.67	83.99	41.679	
19,400.00	8,235.00	8,254.71	8,238.38	99.97	28.88	28.097	13,587.49	1,696.53	3,412.77	3,327.50	85.27	40.024	
19,500.00	8,235.00	8,253.81	8,237.48	100.79	28.88	28.930	13,587.50	1,696.52	3,325.57	3,238.96	86.62	38.394	
19,600.00	8,235.00	8,252.89	8,236.56	101.62	28.88	29.806	13,587.51	1,696.50	3,239.11	3,151.07	88.04	36.791	
19,700.00	8,235.00	8,251.97	8,235.64	102.44	28.87	30.731	13,587.52	1,696.49	3,153.45	3,063.91	89.54	35.217	
19,800.00	8,235.00	8,251.03	8,234.71	103.27	28.87	31.707	13,587.53	1,696.47	3,068.65	2,977.52	91.13	33.673	
19,900.00	8,235.00	8,250.09	8,233.77	104.10	28.87	32.738	13,587.54	1,696.45	2,984.80	2,891.99	92.81	32.162	
20,000.00	8,235.00	8,249.15	8,232.82	104.92	28.86	33.829	13,587.55	1,696.44	2,901.97	2,807.40	94.58	30.684	
20,100.00	8,235.00	8,248.19	8,231.86	105.75	28.86	34.983	13,587.56	1,696.42	2,820.25	2,723.81	96.44	29.243	
20,200.00	8,235.00	8,247.22	8,230.89	106.58	28.86	36.205	13,587.57	1,696.40	2,739.75	2,641.34	98.41	27.840	
20,300.00	8,235.00	8,246.25	8,229.92	107.41	28.86	37.501	13,587.58	1,696.38	2,660.57	2,560.08	100.49	26.477	
20,400.00	8,235.00	8,245.26	8,228.94	108.24	28.85	38.875	13,587.59	1,696.37	2,582.83	2,480.16	102.67	25.157	
20,500.00	8,235.00	8,244.27	8,227.94	109.07	28.85	40.334	13,587.60	1,696.35	2,506.67	2,401.70	104.97	23.881	
20,600.00	8,235.00	8,243.27	8,226.94	109.90	28.85	41.883	13,587.61	1,696.33	2,432.24	2,324.86	107.38	22.652	
20,700.00	8,235.00	8,242.25	8,225.93	110.73	28.84	43.529	13,587.62	1,696.31	2,359.69	2,249.80	109.90	21.472	
20,800.00	8,235.00	8,241.23	8,224.91	111.56	28.84	45.277	13,587.64	1,696.30	2,289.22	2,176.69	112.53	20.343	
20,900.00	8,235.00	8,240.20	8,223.88	112.39	28.84	47.135	13,587.65	1,696.28	2,221.02	2,105.74	115.27	19.267	
21,000.00	8,235.00	8,239.16	8,222.83	113.23	28.83	49.108	13,587.66	1,696.26	2,155.29	2,037.18	118.12	18.247	
21,100.00	8,235.00	8,238.11	8,221.78	114.06	28.83	51.203	13,587.67	1,696.24	2,092.29	1,971.24	121.05	17.284	
21,200.00	8,235.00	8,237.05	8,220.72	114.89	28.82	53.425	13,587.68	1,696.22	2,032.25	1,908.19	124.06	16.381	
21,300.00	8,235.00	8,235.98	8,219.65	115.72	28.82	55.778	13,587.70	1,696.20	1,975.45	1,848.33	127.12	15.540	
21,400.00	8,235.00	8,234.89	8,218.57	116.56	28.82	58.266	13,587.71	1,696.19	1,922.18	1,791.96	130.21	14.762	
21,500.00	8,235.00	8,233.80	8,217.48	117.39	28.81	60.890	13,587.72	1,696.17	1,872.73	1,739.43	133.30	14.049	
21,600.00	8,235.00	8,229.00	8,212.68	118.23	28.80	63.649	13,587.78	1,696.08	1,827.43	1,691.10	136.33	13.404	
21,700.00	8,235.00	8,229.00	8,212.68	119.06	28.80	66.544	13,587.78	1,696.08	1,786.57	1,647.27	139.30	12.825	
21,800.00	8,235.00	8,229.00	8,212.68	119.90	28.80	69.566	13,587.78	1,696.08	1,750.48	1,608.34	142.14	12.315	
21,900.00	8,235.00	8,229.00	8,212.68	120.73	28.80	72.706	13,587.78	1,696.08	1,719.46	1,574.66	144.80	11.875	
22,000.00	8,235.00	8,229.00	8,212.68	121.57	28.80	75.952	13,587.78	1,696.08	1,693.78	1,546.57	147.21	11.506	
22,100.00	8,235.00	8,229.00	8,212.68	122.41	28.80	79.286	13,587.78	1,696.08	1,673.69	1,524.35	149.34	11.207	
22,200.00	8,235.00	8,229.00	8,212.68	123.24	28.80	82.690	13,587.78	1,696.08	1,659.39	1,508.27	151.13	10.980	
22,300.00	8,235.00	8,229.00	8,212.68	124.08	28.80	86.140	13,587.78	1,696.08	1,651.04	1,498.50	152.54	10.823	
22,388.25	8,235.00	8,229.00	8,212.68	124.82	28.80	89.204	13,587.78	1,696.08	1,648.68	1,495.22	153.46	10.744 CC	
22,400.00	8,235.00	8,229.00	8,212.68	124.92	28.80	89.612	13,587.78	1,696.08	1,648.72	1,495.17	153.56	10.737 ES	
22,500.00	8,235.00	8,229.00	8,212.68	125.76	28.80	93.082	13,587.78	1,696.08	1,652.46	1,498.32	154.15	10.720 SF	
22,600.00	8,235.00	8,221.88	8,205.56	126.59	28.77	96.521	13,587.87	1,695.96	1,662.21	1,507.90	154.30	10.772	
22,700.00	8,235.00	8,220.73	8,204.41	127.43	28.77	99.910	13,587.88	1,695.95	1,677.87	1,523.80	154.07	10.890	
22,800.00	8,235.00	8,219.55	8,203.23	128.27	28.77	103.225	13,587.90	1,695.93	1,699.29	1,545.83	153.46	11.073	

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation



MS Directional Anticollision Report



Company:	Marathon Oil	Local Co-ordinate Reference:	Well Pierogi BS Federal Com 502H
Project:	Eddy County, New Mexico (NAD 27)	TVD Reference:	WELL @ 3022.50usft (Precision 580)
Reference Site:	Pierogi Federal Com (302H, 502H, 552H)	MD Reference:	WELL @ 3022.50usft (Precision 580)
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	Pierogi BS Federal Com 502H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	EDM 5000.15 Conroe DB
Reference Design:	Design #1	Offset TVD Reference:	Reference Datum

Offset Design: Fiddle Fire Fed Com (Offsets) - Fiddle Fee 24-28-23 (3-4-7-8) WD #3H - Wellbore #1 - Surveys													Offset Site Error:	0.00 usft
Survey Program: 173-MWD+HRGM													Offset Well Error:	0.00 usft
Reference	Offset	Semi Major Axis		Rule Assigned:		Distance		Warning						
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference	Offset	Azimuth from North (°)	+N-S (usft)	+E-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor		
22,900.00	8,235.00	8,218.35	8,202.03	129.11	28.76	106.447	13,587.91	1,695.91	1,726.24	1,573.74	152.50	11.319		
23,000.00	8,235.00	8,217.13	8,200.81	129.95	28.76	109.561	13,587.93	1,695.89	1,758.47	1,607.23	151.25	11.627		
23,100.00	8,235.00	8,215.87	8,199.55	130.79	28.75	112.554	13,587.95	1,695.87	1,795.70	1,645.97	149.73	11.993		
23,200.00	8,235.00	8,214.59	8,198.27	131.63	28.75	115.418	13,587.97	1,695.85	1,837.62	1,689.61	148.01	12.416		
23,300.00	8,235.00	8,213.28	8,196.96	132.47	28.75	118.148	13,587.98	1,695.83	1,883.92	1,737.80	146.12	12.893		
23,400.00	8,235.00	8,211.93	8,195.61	133.31	28.74	120.741	13,588.00	1,695.81	1,934.29	1,790.17	144.12	13.421		
23,500.00	8,235.00	8,210.56	8,194.24	134.15	28.74	123.198	13,588.02	1,695.79	1,988.41	1,846.38	142.03	14.000		
23,600.00	8,235.00	8,209.15	8,192.83	134.99	28.73	125.521	13,588.04	1,695.77	2,045.99	1,906.09	139.90	14.625		
23,700.00	8,235.00	8,207.71	8,191.39	135.83	28.73	127.713	13,588.06	1,695.74	2,106.74	1,968.99	137.75	15.294		
23,800.00	8,235.00	8,206.23	8,189.91	136.68	28.72	129.780	13,588.09	1,695.72	2,170.40	2,034.80	135.60	16.006		
23,900.00	8,235.00	8,204.71	8,188.39	137.52	28.72	131.726	13,588.11	1,695.70	2,236.72	2,103.25	133.48	16.757		
24,000.00	8,235.00	8,203.16	8,186.84	138.36	28.71	133.558	13,588.13	1,695.68	2,305.48	2,174.08	131.40	17.546		
24,004.19	8,235.00	8,203.09	8,186.78	138.39	28.71	133.633	13,588.13	1,695.68	2,308.40	2,177.09	131.31	17.580		

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation



MS Directional Anticollision Report



Company:	Marathon Oil	Local Co-ordinate Reference:	Well Pierogi BS Federal Com 502H
Project:	Eddy County, New Mexico (NAD 27)	TVD Reference:	WELL @ 3022.50usft (Precision 580)
Reference Site:	Pierogi Federal Com (302H, 502H, 552H)	MD Reference:	WELL @ 3022.50usft (Precision 580)
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	Pierogi BS Federal Com 502H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	EDM 5000.15 Conroe DB
Reference Design:	Design #1	Offset TVD Reference:	Reference Datum

Offset Design: Fiddle Fire Fed Com (Offsets) - Fiddle Fee 24-28-23 (3-4-7-8) WD #4H - Wellbore #1 - Surveys													Offset Site Error:
													0.00 usft
Survey Program:	Reference	Offset	Semi Major Axis		Azimuth from North (°)	Offset Wellbore Centre		Rule Assigned:		Minimum Separation (usft)	Separation Factor	Warning	Offset Well Error:
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Reference	Offset		+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)				0.00 usft
11,900.00	8,235.00	8,258.44	8,206.75	42.58	29.89	8.812	12,917.53	1,718.79	9,957.46	9,899.37	58.09	171.407	
12,000.00	8,235.00	8,258.50	8,206.81	43.21	29.89	8.909	12,917.53	1,718.79	9,858.88	9,800.72	58.16	169.526	
12,100.00	8,235.00	8,258.56	8,206.87	43.85	29.89	9.008	12,917.53	1,718.79	9,760.32	9,702.10	58.22	167.641	
12,200.00	8,235.00	8,258.62	8,206.93	44.50	29.89	9.109	12,917.53	1,718.79	9,661.80	9,603.51	58.29	165.753	
12,300.00	8,235.00	8,258.68	8,206.99	45.15	29.89	9.212	12,917.53	1,718.79	9,563.31	9,504.94	58.36	163.862	
12,400.00	8,235.00	8,258.74	8,207.05	45.81	29.89	9.317	12,917.53	1,718.79	9,464.84	9,406.41	58.44	161.968	
12,500.00	8,235.00	8,258.81	8,207.11	46.48	29.89	9.425	12,917.53	1,718.79	9,366.41	9,307.90	58.51	160.070	
12,600.00	8,235.00	8,258.87	8,207.18	47.15	29.89	9.534	12,917.53	1,718.79	9,268.02	9,209.42	58.60	158.170	
12,700.00	8,235.00	8,258.93	8,207.24	47.83	29.89	9.646	12,917.53	1,718.79	9,169.66	9,110.98	58.68	156.266	
12,800.00	8,235.00	8,258.99	8,207.30	48.52	29.89	9.761	12,917.53	1,718.79	9,071.33	9,012.56	58.77	154.359	
12,900.00	8,235.00	8,259.06	8,207.37	49.21	29.89	9.878	12,917.53	1,718.79	8,973.04	8,914.18	58.86	152.450	
13,000.00	8,235.00	8,259.12	8,207.43	49.90	29.89	9.997	12,917.53	1,718.79	8,874.79	8,815.84	58.95	150.537	
13,100.00	8,235.00	8,259.19	8,207.50	50.60	29.89	10.120	12,917.53	1,718.79	8,776.58	8,717.53	59.05	148.622	
13,200.00	8,235.00	8,259.26	8,207.56	51.31	29.89	10.245	12,917.53	1,718.80	8,678.41	8,619.26	59.16	146.704	
13,300.00	8,235.00	8,259.32	8,207.63	52.02	29.89	10.373	12,917.53	1,718.80	8,580.29	8,521.02	59.26	144.784	
13,400.00	8,235.00	8,259.39	8,207.70	52.74	29.89	10.503	12,917.53	1,718.80	8,482.20	8,422.83	59.37	142.861	
13,500.00	8,235.00	8,259.46	8,207.76	53.46	29.89	10.637	12,917.53	1,718.80	8,384.16	8,324.67	59.49	140.935	
13,600.00	8,235.00	8,259.53	8,207.83	54.18	29.89	10.774	12,917.53	1,718.80	8,286.17	8,226.56	59.61	139.008	
13,700.00	8,235.00	8,259.60	8,207.90	54.91	29.89	10.915	12,917.53	1,718.80	8,188.23	8,128.50	59.73	137.078	
13,800.00	8,235.00	8,259.67	8,207.97	55.64	29.89	11.059	12,917.53	1,718.80	8,090.34	8,030.47	59.86	135.145	
13,900.00	8,235.00	8,259.74	8,208.04	56.37	29.89	11.206	12,917.53	1,718.80	7,992.50	7,932.50	60.00	133.211	
14,000.00	8,235.00	8,259.81	8,208.12	57.11	29.89	11.357	12,917.53	1,718.80	7,894.71	7,834.57	60.14	131.274	
14,100.00	8,235.00	8,259.88	8,208.19	57.85	29.89	11.511	12,917.53	1,718.80	7,796.98	7,736.70	60.28	129.336	
14,200.00	8,235.00	8,259.96	8,208.26	58.60	29.89	11.670	12,917.53	1,718.80	7,699.31	7,638.87	60.44	127.395	
14,300.00	8,235.00	8,260.03	8,208.34	59.35	29.89	11.833	12,917.53	1,718.80	7,601.70	7,541.10	60.59	125.453	
14,400.00	8,235.00	8,260.11	8,208.41	60.10	29.89	12.000	12,917.53	1,718.80	7,504.15	7,443.39	60.76	123.509	
14,500.00	8,235.00	8,260.18	8,208.49	60.86	29.89	12.171	12,917.53	1,718.81	7,406.67	7,345.74	60.93	121.564	
14,600.00	8,235.00	8,260.26	8,208.56	61.61	29.89	12.347	12,917.53	1,718.81	7,309.25	7,248.15	61.11	119.617	
14,700.00	8,235.00	8,260.34	8,208.64	62.37	29.90	12.528	12,917.53	1,718.81	7,211.91	7,150.62	61.29	117.669	
14,800.00	8,235.00	8,260.41	8,208.72	63.14	29.90	12.713	12,917.53	1,718.81	7,114.64	7,053.15	61.48	115.720	
14,900.00	8,235.00	8,260.49	8,208.80	63.90	29.90	12.904	12,917.53	1,718.81	7,017.44	6,955.76	61.68	113.769	
15,000.00	8,235.00	8,260.57	8,208.88	64.67	29.90	13.100	12,917.53	1,718.81	6,920.33	6,858.44	61.89	111.818	
15,100.00	8,235.00	8,260.65	8,208.96	65.44	29.90	13.302	12,917.53	1,718.81	6,823.30	6,761.19	62.11	109.866	
15,200.00	8,235.00	8,260.74	8,209.04	66.21	29.90	13.509	12,917.53	1,718.81	6,726.35	6,664.02	62.33	107.913	
15,300.00	8,235.00	8,260.82	8,209.13	66.98	29.90	13.723	12,917.53	1,718.81	6,629.50	6,566.94	62.57	105.959	
15,400.00	8,235.00	8,260.90	8,209.21	67.76	29.90	13.943	12,917.53	1,718.81	6,532.74	6,469.93	62.81	104.006	
15,500.00	8,235.00	8,260.99	8,209.29	68.54	29.90	14.169	12,917.53	1,718.81	6,436.09	6,373.02	63.07	102.052	
15,600.00	8,235.00	8,261.07	8,209.38	69.32	29.90	14.402	12,917.53	1,718.82	6,339.53	6,276.20	63.33	100.098	
15,700.00	8,235.00	8,261.16	8,209.47	70.10	29.90	14.643	12,917.53	1,718.82	6,243.08	6,179.47	63.61	98.145	
15,800.00	8,235.00	8,261.25	8,209.56	70.89	29.90	14.891	12,917.53	1,718.82	6,146.75	6,082.85	63.90	96.192	
15,900.00	8,235.00	8,261.34	8,209.64	71.67	29.90	15.147	12,917.53	1,718.82	6,050.54	5,986.33	64.20	94.240	
16,000.00	8,235.00	8,261.43	8,209.73	72.46	29.90	15.412	12,917.53	1,718.82	5,954.45	5,889.93	64.52	92.289	
16,100.00	8,235.00	8,261.52	8,209.83	73.25	29.90	15.685	12,917.53	1,718.82	5,858.49	5,793.64	64.85	90.340	
16,200.00	8,235.00	8,261.61	8,209.92	74.04	29.90	15.967	12,917.53	1,718.82	5,762.67	5,697.47	65.19	88.392	
16,300.00	8,235.00	8,261.70	8,210.01	74.83	29.90	16.258	12,917.53	1,718.82	5,666.99	5,601.44	65.56	86.446	
16,400.00	8,235.00	8,261.80	8,210.10	75.63	29.90	16.560	12,917.53	1,718.82	5,571.47	5,505.53	65.93	84.502	
16,500.00	8,235.00	8,261.89	8,210.20	76.42	29.90	16.872	12,917.53	1,718.82	5,476.10	5,409.77	66.33	82.561	
16,600.00	8,235.00	8,261.99	8,210.30	77.22	29.90	17.195	12,917.53	1,718.82	5,380.90	5,314.16	66.74	80.623	
16,700.00	8,235.00	8,262.09	8,210.40	78.02	29.90	17.530	12,917.53	1,718.83	5,285.89	5,218.71	67.17	78.689	
16,800.00	8,235.00	8,262.19	8,210.49	78.82	29.90	17.877	12,917.53	1,718.83	5,191.05	5,123.43	67.63	76.759	
16,900.00	8,235.00	8,262.29	8,210.59	79.62	29.90	18.237	12,917.53	1,718.83	5,096.42	5,028.32	68.10	74.833	
17,000.00	8,235.00	8,262.39	8,210.70	80.42	29.90	18.611	12,917.53	1,718.83	5,001.99	4,933.39	68.60	72.913	

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation



MS Directional Anticollision Report



Company:	Marathon Oil	Local Co-ordinate Reference:	Well Pierogi BS Federal Com 502H
Project:	Eddy County, New Mexico (NAD 27)	TVD Reference:	WELL @ 3022.50usft (Precision 580)
Reference Site:	Pierogi Federal Com (302H, 502H, 552H)	MD Reference:	WELL @ 3022.50usft (Precision 580)
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	Pierogi BS Federal Com 502H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	EDM 5000.15 Conroe DB
Reference Design:	Design #1	Offset TVD Reference:	Reference Datum

Offset Design: Fiddle Fire Fed Com (Offsets) - Fiddle Fee 24-28-23 (3-4-7-8) WD #4H - Wellbore #1 - Surveys													Offset Site Error:
													0.00 usft
Survey Program:	Reference	Offset	Semi Major Axis	Offset	Offset Wellbore Centre	Distance	Rule Assigned:	Offset Well Error:					
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference	Offset	from North (")	+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning
17,100.00	8,235.00	8,262.49	8,210.80	81.22	29.90	18.998	12,917.53	1,718.83	4,907.79	4,838.66	69.13	70.998	
17,200.00	8,235.00	8,262.60	8,210.90	82.03	29.90	19.402	12,917.53	1,718.83	4,813.82	4,744.14	69.68	69.090	
17,300.00	8,235.00	8,262.70	8,211.01	82.83	29.90	19.821	12,917.53	1,718.83	4,720.09	4,649.84	70.25	67.188	
17,400.00	8,235.00	8,262.81	8,211.12	83.64	29.90	20.257	12,917.53	1,718.83	4,626.63	4,555.77	70.86	65.294	
17,500.00	8,235.00	8,262.92	8,211.22	84.45	29.90	20.711	12,917.53	1,718.83	4,533.45	4,461.96	71.50	63.409	
17,600.00	8,235.00	8,263.03	8,211.33	85.26	29.90	21.184	12,917.53	1,718.84	4,440.57	4,368.40	72.17	61.533	
17,700.00	8,235.00	8,263.14	8,211.45	86.07	29.90	21.677	12,917.53	1,718.84	4,348.00	4,275.13	72.87	59.668	
17,800.00	8,235.00	8,263.25	8,211.56	86.88	29.90	22.192	12,917.53	1,718.84	4,255.76	4,182.15	73.61	57.813	
17,900.00	8,235.00	8,263.37	8,211.67	87.69	29.90	22.729	12,917.53	1,718.84	4,163.89	4,089.50	74.39	55.971	
18,000.00	8,235.00	8,263.48	8,211.79	88.50	29.91	23.291	12,917.53	1,718.84	4,072.40	3,997.18	75.22	54.142	
18,100.00	8,235.00	8,263.60	8,211.91	89.32	29.91	23.878	12,917.53	1,718.84	3,981.32	3,905.23	76.08	52.328	
18,200.00	8,235.00	8,263.72	8,212.02	90.13	29.91	24.493	12,917.53	1,718.84	3,890.67	3,813.67	77.00	50.529	
18,300.00	8,235.00	8,263.84	8,212.14	90.95	29.91	25.137	12,917.53	1,718.84	3,800.50	3,722.53	77.96	48.747	
18,400.00	8,235.00	8,263.96	8,212.27	91.76	29.91	25.812	12,917.53	1,718.85	3,710.82	3,631.84	78.98	46.983	
18,500.00	8,235.00	8,264.08	8,212.39	92.58	29.91	26.521	12,917.53	1,718.85	3,621.69	3,541.64	80.06	45.238	
18,600.00	8,235.00	8,264.21	8,212.52	93.40	29.91	27.265	12,917.53	1,718.85	3,533.14	3,451.95	81.19	43.515	
18,700.00	8,235.00	8,264.34	8,212.64	94.22	29.91	28.047	12,917.53	1,718.85	3,445.22	3,362.83	82.39	41.815	
18,800.00	8,235.00	8,264.47	8,212.77	95.04	29.91	28.871	12,917.53	1,718.85	3,357.98	3,274.32	83.66	40.139	
18,900.00	8,235.00	8,264.60	8,212.90	95.86	29.91	29.737	12,917.53	1,718.85	3,271.46	3,186.46	85.00	38.488	
19,000.00	8,235.00	8,264.73	8,213.04	96.68	29.91	30.651	12,917.53	1,718.85	3,185.73	3,099.32	86.41	36.866	
19,100.00	8,235.00	8,264.87	8,213.17	97.50	29.91	31.615	12,917.53	1,718.86	3,100.86	3,012.95	87.91	35.274	
19,200.00	8,235.00	8,265.00	8,213.31	98.32	29.91	32.633	12,917.53	1,718.86	3,016.92	2,927.43	89.49	33.713	
19,300.00	8,235.00	8,265.14	8,213.45	99.15	29.91	33.709	12,917.54	1,718.86	2,933.98	2,842.82	91.16	32.186	
19,400.00	8,235.00	8,265.28	8,213.59	99.97	29.91	34.847	12,917.54	1,718.86	2,852.14	2,759.22	92.92	30.694	
19,500.00	8,235.00	8,265.43	8,213.73	100.79	29.91	36.052	12,917.54	1,718.86	2,771.49	2,676.71	94.78	29.241	
19,600.00	8,235.00	8,265.57	8,213.88	101.62	29.91	37.329	12,917.54	1,718.86	2,692.14	2,595.39	96.75	27.827	
19,700.00	8,235.00	8,265.72	8,214.03	102.44	29.91	38.682	12,917.54	1,718.86	2,614.20	2,515.39	98.81	26.456	
19,800.00	8,235.00	8,265.87	8,214.18	103.27	29.91	40.118	12,917.54	1,718.87	2,537.81	2,436.82	100.99	25.129	
19,900.00	8,235.00	8,266.02	8,214.33	104.10	29.91	41.641	12,917.54	1,718.87	2,463.12	2,359.84	103.28	23.849	
20,000.00	8,235.00	8,266.18	8,214.48	104.92	29.91	43.259	12,917.54	1,718.87	2,390.27	2,284.59	105.68	22.619	
20,100.00	8,235.00	8,266.33	8,214.64	105.75	29.91	44.977	12,917.54	1,718.87	2,319.45	2,211.26	108.19	21.439	
20,200.00	8,235.00	8,266.49	8,214.80	106.58	29.91	46.802	12,917.54	1,718.87	2,250.84	2,140.04	110.80	20.314	
20,300.00	8,235.00	8,266.65	8,214.96	107.41	29.92	48.739	12,917.54	1,718.87	2,184.66	2,071.14	113.52	19.244	
20,400.00	8,235.00	8,266.82	8,215.12	108.24	29.92	50.794	12,917.54	1,718.88	2,121.13	2,004.79	116.33	18.233	
20,500.00	8,235.00	8,266.99	8,215.29	109.07	29.92	52.974	12,917.54	1,718.88	2,060.49	1,941.27	119.22	17.283	
20,600.00	8,235.00	8,267.16	8,215.46	109.90	29.92	55.282	12,917.54	1,718.88	2,003.02	1,880.84	122.18	16.394	
20,700.00	8,235.00	8,267.33	8,215.63	110.73	29.92	57.722	12,917.54	1,718.88	1,948.98	1,823.81	125.17	15.571	
20,800.00	8,235.00	8,267.50	8,215.81	111.56	29.92	60.297	12,917.54	1,718.88	1,898.67	1,770.50	128.18	14.813	
20,900.00	8,235.00	8,267.68	8,215.99	112.39	29.92	63.006	12,917.54	1,718.89	1,852.41	1,721.25	131.16	14.123	
21,000.00	8,235.00	8,267.86	8,216.17	113.23	29.92	65.847	12,917.54	1,718.89	1,810.49	1,676.40	134.08	13.503	
21,100.00	8,235.00	8,268.05	8,216.36	114.06	29.92	68.814	12,917.54	1,718.89	1,773.22	1,636.32	136.90	12.953	
21,200.00	8,235.00	8,268.24	8,216.54	114.89	29.92	71.901	12,917.54	1,718.89	1,740.91	1,601.35	139.56	12.475	
21,300.00	8,235.00	8,268.43	8,216.73	115.72	29.92	75.095	12,917.54	1,718.89	1,713.83	1,571.82	142.01	12.069	
21,400.00	8,235.00	8,268.62	8,216.93	116.56	29.92	78.380	12,917.54	1,718.90	1,692.23	1,548.03	144.20	11.735	
21,500.00	8,235.00	8,268.82	8,217.13	117.39	29.92	81.740	12,917.54	1,718.90	1,676.33	1,530.24	146.09	11.474	
21,600.00	8,235.00	8,269.02	8,217.33	118.23	29.92	85.151	12,917.54	1,718.90	1,666.30	1,518.66	147.64	11.286	
21,700.00	8,235.00	8,269.23	8,217.53	119.06	29.92	88.592	12,917.54	1,718.90	1,662.22	1,513.41	148.81	11.170	
21,717.77	8,235.00	8,269.26	8,217.57	119.21	29.92	89.204	12,917.54	1,718.90	1,662.13	1,513.15	148.98	11.157 CC, ES	
21,800.00	8,235.00	8,269.44	8,217.74	119.90	29.92	92.037	12,917.54	1,718.90	1,664.16	1,514.58	149.58	11.125 SF	
21,900.00	8,235.00	8,269.65	8,217.95	120.73	29.92	95.461	12,917.54	1,718.91	1,672.09	1,522.13	149.96	11.150	
22,000.00	8,235.00	8,269.86	8,218.17	121.57	29.93	98.842	12,917.54	1,718.91	1,685.92	1,535.98	149.94	11.244	
22,100.00	8,235.00	8,270.09	8,218.39	122.41	29.93	102.156	12,917.54	1,718.91	1,705.51	1,555.97	149.55	11.405	

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation



MS Directional Anticollision Report



Company:	Marathon Oil	Local Co-ordinate Reference:	Well Pierogi BS Federal Com 502H
Project:	Eddy County, New Mexico (NAD 27)	TVD Reference:	WELL @ 3022.50usft (Precision 580)
Reference Site:	Pierogi Federal Com (302H, 502H, 552H)	MD Reference:	WELL @ 3022.50usft (Precision 580)
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	Pierogi BS Federal Com 502H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	EDM 5000.15 Conroe DB
Reference Design:	Design #1	Offset TVD Reference:	Reference Datum

Offset Design: Fiddle Fire Fed Com (Offsets) - Fiddle Fee 24-28-23 (3-4-7-8) WD #4H - Wellbore #1 - Surveys													Offset Site Error:	0.00 usft
Survey Program: 173-MWD+HRGM		Offset		Semi Major Axis		Offset Wellbore Centre			Rule Assigned:				Offset Well Error:	0.00 usft
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Azimuth from North (°)	+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning	
22,200.00	8,235.00	8,270.31	8,218.62	123.24	29.93	105.384	12,917.55	1,718.91	1,730.67	1,581.86	148.81	11.630		
22,300.00	8,235.00	8,270.54	8,218.85	124.08	29.93	108.510	12,917.55	1,718.92	1,761.16	1,613.39	147.76	11.919		
22,400.00	8,235.00	8,270.77	8,219.08	124.92	29.93	111.521	12,917.55	1,718.92	1,796.70	1,650.24	146.45	12.268		
22,500.00	8,235.00	8,271.01	8,219.32	125.76	29.93	114.408	12,917.55	1,718.92	1,837.00	1,692.08	144.92	12.676		
22,600.00	8,235.00	8,271.25	8,219.56	126.59	29.93	117.164	12,917.55	1,718.92	1,881.76	1,738.54	143.22	13.139		
22,700.00	8,235.00	8,271.50	8,219.81	127.43	29.93	119.786	12,917.55	1,718.93	1,930.66	1,789.28	141.38	13.656		
22,800.00	8,235.00	8,271.75	8,220.06	128.27	29.93	122.274	12,917.55	1,718.93	1,983.41	1,843.96	139.44	14.224		
22,900.00	8,235.00	8,272.01	8,220.32	129.11	29.93	124.628	12,917.55	1,718.93	2,039.69	1,902.24	137.45	14.840		
23,000.00	8,235.00	8,272.27	8,220.58	129.95	29.93	126.853	12,917.55	1,718.93	2,099.24	1,963.81	135.42	15.501		
23,100.00	8,235.00	8,272.54	8,220.85	130.79	29.93	128.952	12,917.55	1,718.94	2,161.77	2,028.38	133.39	16.206		
23,200.00	8,235.00	8,272.81	8,221.12	131.63	29.94	130.931	12,917.55	1,718.94	2,227.03	2,095.66	131.37	16.952		
23,300.00	8,235.00	8,273.09	8,221.40	132.47	29.94	132.794	12,917.55	1,718.94	2,294.80	2,165.42	129.38	17.737		
23,400.00	8,235.00	8,273.38	8,221.68	133.31	29.94	134.549	12,917.55	1,718.94	2,364.86	2,237.43	127.43	18.558		
23,500.00	8,235.00	8,273.67	8,221.98	134.15	29.94	136.202	12,917.55	1,718.95	2,437.01	2,311.47	125.54	19.413		
23,600.00	8,235.00	8,273.97	8,222.27	134.99	29.94	137.758	12,917.55	1,718.95	2,511.07	2,387.37	123.70	20.300		
23,700.00	8,235.00	8,274.27	8,222.58	135.83	29.94	139.224	12,917.55	1,718.95	2,586.87	2,464.95	121.93	21.217		
23,800.00	8,235.00	8,274.58	8,222.89	136.68	29.94	140.606	12,917.56	1,718.96	2,664.27	2,544.05	120.22	22.162		
23,900.00	8,235.00	8,274.90	8,223.21	137.52	29.94	141.909	12,917.56	1,718.96	2,743.14	2,624.56	118.58	23.133		
24,000.00	8,235.00	8,275.23	8,223.53	138.36	29.94	143.139	12,917.56	1,718.96	2,823.34	2,706.33	117.01	24.129		
24,004.19	8,235.00	8,275.24	8,223.55	138.39	29.94	143.189	12,917.56	1,718.96	2,826.72	2,709.78	116.94	24.171		

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

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COMPASS 5000.15 Build 91E



MS Directional Anticollision Report



Company:	Marathon Oil	Local Co-ordinate Reference:	Well Pierogi BS Federal Com 502H
Project:	Eddy County, New Mexico (NAD 27)	TVD Reference:	WELL @ 3022.50usft (Precision 580)
Reference Site:	Pierogi Federal Com (302H, 502H, 552H)	MD Reference:	WELL @ 3022.50usft (Precision 580)
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	Pierogi BS Federal Com 502H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	EDM 5000.15 Conroe DB
Reference Design:	Design #1	Offset TVD Reference:	Reference Datum

Offset Design: Fiddle Fire Fed Com (Offsets) - Fiddle Fee 24-28-23 TH #2H - Wellbore #1 - Wellbore #1														Offset Site Error:	0.00 usft
Survey Program: 612-MWD+HRGM														Offset Well Error:	0.00 usft
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Semi Major Axis Reference (usft)	Offset (usft)	Azimuth from North (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Distance Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning		
13,900.00	8,235.00	8,210.00	8,195.31	56.37	26.98	9.280	14,911.31	1,772.51	9,964.36	9,906.61	57.75	172.543			
14,000.00	8,235.00	8,210.64	8,195.95	57.11	26.98	9.382	14,911.32	1,772.45	9,865.92	9,808.06	57.86	170.507			
14,100.00	8,235.00	8,211.29	8,196.60	57.85	26.98	9.485	14,911.33	1,772.40	9,767.51	9,709.53	57.98	168.470			
14,200.00	8,235.00	8,211.94	8,197.25	58.60	26.99	9.590	14,911.34	1,772.34	9,669.13	9,611.04	58.10	166.430			
14,300.00	8,235.00	8,212.61	8,197.91	59.35	26.99	9.698	14,911.36	1,772.28	9,570.79	9,512.57	58.22	164.388			
14,400.00	8,235.00	8,213.28	8,198.58	60.10	26.99	9.808	14,911.37	1,772.22	9,472.48	9,414.13	58.35	162.345			
14,500.00	8,235.00	8,213.96	8,199.26	60.86	26.99	9.920	14,911.38	1,772.15	9,374.21	9,315.73	58.48	160.300			
14,600.00	8,235.00	8,214.66	8,199.95	61.61	27.00	10.034	14,911.40	1,772.09	9,275.97	9,217.36	58.61	158.254			
14,700.00	8,235.00	8,215.36	8,200.65	62.37	27.00	10.151	14,911.41	1,772.03	9,177.77	9,119.02	58.75	156.206			
14,800.00	8,235.00	8,216.06	8,201.35	63.14	27.00	10.271	14,911.42	1,771.97	9,079.61	9,020.71	58.90	154.157			
14,900.00	8,235.00	8,216.78	8,202.07	63.90	27.00	10.393	14,911.44	1,771.90	8,981.49	8,922.44	59.05	152.106			
15,000.00	8,235.00	8,217.51	8,202.79	64.67	27.01	10.517	14,911.45	1,771.84	8,883.41	8,824.21	59.20	150.055			
15,100.00	8,235.00	8,218.25	8,203.53	65.44	27.01	10.645	14,911.47	1,771.77	8,785.38	8,726.02	59.36	148.002			
15,200.00	8,235.00	8,219.00	8,204.27	66.21	27.01	10.775	14,911.48	1,771.70	8,687.39	8,627.87	59.52	145.949			
15,300.00	8,235.00	8,219.76	8,205.03	66.98	27.02	10.909	14,911.50	1,771.64	8,589.45	8,529.75	59.69	143.895			
15,400.00	8,235.00	8,220.52	8,205.79	67.76	27.02	11.045	14,911.51	1,771.57	8,491.55	8,431.68	59.87	141.840			
15,500.00	8,235.00	8,221.30	8,206.57	68.54	27.02	11.185	14,911.53	1,771.50	8,393.70	8,333.66	60.05	139.785			
15,600.00	8,235.00	8,222.09	8,207.36	69.32	27.02	11.327	14,911.55	1,771.43	8,295.91	8,235.67	60.23	137.729			
15,700.00	8,235.00	8,222.89	8,208.15	70.10	27.03	11.474	14,911.56	1,771.36	8,198.17	8,137.74	60.43	135.673			
15,800.00	8,235.00	8,223.71	8,208.96	70.89	27.03	11.624	14,911.58	1,771.29	8,100.48	8,039.85	60.62	133.618			
15,900.00	8,235.00	8,224.53	8,209.78	71.67	27.03	11.777	14,911.60	1,771.21	8,002.85	7,942.02	60.83	131.562			
16,000.00	8,235.00	8,255.00	8,240.13	72.46	27.14	11.915	14,912.35	1,768.58	7,905.43	7,844.24	61.19	129.205			
16,100.00	8,235.00	8,255.00	8,240.13	73.25	27.14	12.076	14,912.35	1,768.58	7,807.91	7,746.51	61.40	127.163			
16,200.00	8,235.00	8,255.00	8,240.13	74.04	27.14	12.242	14,912.35	1,768.58	7,710.45	7,648.83	61.62	125.122			
16,300.00	8,235.00	8,255.00	8,240.13	74.83	27.14	12.412	14,912.35	1,768.58	7,613.07	7,551.21	61.85	123.081			
16,400.00	8,235.00	8,255.00	8,240.13	75.63	27.14	12.586	14,912.35	1,768.58	7,515.75	7,453.65	62.09	121.041			
16,500.00	8,235.00	8,255.00	8,240.13	76.42	27.14	12.765	14,912.35	1,768.58	7,418.50	7,356.16	62.34	119.001			
16,600.00	8,235.00	8,255.00	8,240.13	77.22	27.14	12.948	14,912.35	1,768.58	7,321.32	7,258.73	62.60	116.963			
16,700.00	8,235.00	8,255.00	8,240.13	78.02	27.14	13.137	14,912.35	1,768.58	7,224.22	7,161.36	62.86	114.926			
16,800.00	8,235.00	8,255.00	8,240.13	78.82	27.14	13.330	14,912.35	1,768.58	7,127.21	7,064.07	63.13	112.890			
16,900.00	8,235.00	8,255.00	8,240.13	79.62	27.14	13.529	14,912.35	1,768.58	7,030.27	6,966.85	63.42	110.856			
17,000.00	8,235.00	8,255.00	8,240.13	80.42	27.14	13.733	14,912.35	1,768.58	6,933.43	6,869.71	63.71	108.823			
17,100.00	8,235.00	8,255.00	8,240.13	81.22	27.14	13.944	14,912.35	1,768.58	6,836.67	6,772.65	64.02	106.793			
17,200.00	8,235.00	8,255.00	8,240.13	82.03	27.14	14.160	14,912.35	1,768.58	6,740.01	6,675.67	64.33	104.765			
17,300.00	8,235.00	8,255.00	8,240.13	82.83	27.14	14.383	14,912.35	1,768.58	6,643.45	6,578.78	64.66	102.740			
17,400.00	8,235.00	8,255.00	8,240.13	83.64	27.14	14.612	14,912.35	1,768.58	6,546.99	6,481.98	65.00	100.717			
17,500.00	8,235.00	8,255.00	8,240.13	84.45	27.14	14.848	14,912.35	1,768.58	6,450.64	6,385.28	65.36	98.697			
17,600.00	8,235.00	8,255.00	8,240.13	85.26	27.14	15.091	14,912.35	1,768.58	6,354.40	6,288.67	65.73	96.681			
17,700.00	8,235.00	8,255.00	8,240.13	86.07	27.14	15.341	14,912.35	1,768.58	6,258.28	6,192.17	66.11	94.669			
17,800.00	8,235.00	8,255.00	8,240.13	86.88	27.14	15.600	14,912.35	1,768.58	6,162.28	6,095.78	66.50	92.660			
17,900.00	8,235.00	8,255.00	8,240.13	87.69	27.14	15.866	14,912.35	1,768.58	6,066.41	5,999.50	66.92	90.656			
18,000.00	8,235.00	8,255.00	8,240.13	88.50	27.14	16.142	14,912.35	1,768.58	5,970.68	5,903.33	67.35	88.657			
18,100.00	8,235.00	8,255.00	8,240.13	89.32	27.14	16.426	14,912.35	1,768.58	5,875.09	5,807.30	67.79	86.663			
18,200.00	8,235.00	8,255.00	8,240.13	90.13	27.14	16.719	14,912.35	1,768.58	5,779.65	5,711.39	68.26	84.674			
18,300.00	8,235.00	8,255.00	8,240.13	90.95	27.14	17.023	14,912.35	1,768.58	5,684.36	5,615.62	68.74	82.692			
18,400.00	8,235.00	8,255.00	8,240.13	91.76	27.14	17.336	14,912.35	1,768.58	5,589.25	5,520.00	69.25	80.716			
18,500.00	8,235.00	8,255.00	8,240.13	92.58	27.14	17.661	14,912.35	1,768.58	5,494.30	5,424.53	69.77	78.747			
18,600.00	8,235.00	8,255.00	8,240.13	93.40	27.14	17.997	14,912.35	1,768.58	5,399.54	5,329.22	70.32	76.785			
18,700.00	8,235.00	8,255.00	8,240.13	94.22	27.14	18.345	14,912.35	1,768.58	5,304.96	5,234.07	70.89	74.832			
18,800.00	8,235.00	8,255.00	8,240.13	95.04	27.14	18.705	14,912.35	1,768.58	5,210.60	5,139.11	71.49	72.887			
18,900.00	8,235.00	8,255.00	8,240.13	95.86	27.14	19.079	14,912.35	1,768.58	5,116.44	5,044.33	72.11	70.952			
19,000.00	8,235.00	8,255.00	8,240.13	96.68	27.14	19.467	14,912.35	1,768.58	5,022.51	4,949.75	72.76	69.026			

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation



MS Directional Anticollision Report



Company:	Marathon Oil	Local Co-ordinate Reference:	Well Pierogi BS Federal Com 502H
Project:	Eddy County, New Mexico (NAD 27)	TVD Reference:	WELL @ 3022.50usft (Precision 580)
Reference Site:	Pierogi Federal Com (302H, 502H, 552H)	MD Reference:	WELL @ 3022.50usft (Precision 580)
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	Pierogi BS Federal Com 502H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	EDM 5000.15 Conroe DB
Reference Design:	Design #1	Offset TVD Reference:	Reference Datum

Offset Design: Fiddle Fire Fed Com (Offsets) - Fiddle Fee 24-28-23 TH #2H - Wellbore #1 - Wellbore #1												Offset Site Error:	0.00 usft
Survey Program: 612-MWD+HRGM												Offset Well Error:	0.00 usft
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Semi Major Axis Reference (usft)	Offset (usft)	Azimuth from North (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Distance Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning
19,100.00	8,235.00	8,255.00	8,240.13	97.50	27.14	19.869	14,912.35	1,768.58	4,928.82	4,855.38	73.44	67.111	
19,200.00	8,235.00	8,255.00	8,240.13	98.32	27.14	20.288	14,912.35	1,768.58	4,835.39	4,761.23	74.15	65.207	
19,300.00	8,235.00	8,255.00	8,240.13	99.15	27.14	20.722	14,912.35	1,768.58	4,742.22	4,667.32	74.90	63.316	
19,400.00	8,235.00	8,255.00	8,240.13	99.97	27.14	21.174	14,912.35	1,768.58	4,649.33	4,573.65	75.68	61.437	
19,500.00	8,235.00	8,255.00	8,240.13	100.79	27.14	21.645	14,912.35	1,768.58	4,556.75	4,480.26	76.49	59.572	
19,600.00	8,235.00	8,255.00	8,240.13	101.62	27.14	22.135	14,912.35	1,768.58	4,464.48	4,387.14	77.35	57.722	
19,700.00	8,235.00	8,255.00	8,240.13	102.44	27.14	22.645	14,912.35	1,768.58	4,372.56	4,294.32	78.24	55.887	
19,800.00	8,235.00	8,255.00	8,240.13	103.27	27.14	23.178	14,912.35	1,768.58	4,281.00	4,201.82	79.18	54.069	
19,900.00	8,235.00	8,255.00	8,240.13	104.10	27.14	23.733	14,912.35	1,768.58	4,189.82	4,109.66	80.16	52.268	
20,000.00	8,235.00	8,255.00	8,240.13	104.92	27.14	24.314	14,912.35	1,768.58	4,099.05	4,017.86	81.19	50.486	
20,100.00	8,235.00	8,255.00	8,240.13	105.75	27.14	24.920	14,912.35	1,768.58	4,008.73	3,926.45	82.27	48.724	
20,200.00	8,235.00	8,255.00	8,240.13	106.58	27.14	25.554	14,912.35	1,768.58	3,918.87	3,835.46	83.41	46.982	
20,300.00	8,235.00	8,255.00	8,240.13	107.41	27.14	26.219	14,912.35	1,768.58	3,829.52	3,744.92	84.61	45.263	
20,400.00	8,235.00	8,255.00	8,240.13	108.24	27.14	26.914	14,912.35	1,768.58	3,740.71	3,654.85	85.86	43.567	
20,500.00	8,235.00	8,255.00	8,240.13	109.07	27.14	27.644	14,912.35	1,768.58	3,652.47	3,565.29	87.18	41.896	
20,600.00	8,235.00	8,255.00	8,240.13	109.90	27.14	28.409	14,912.35	1,768.58	3,564.86	3,476.29	88.56	40.251	
20,700.00	8,235.00	8,255.00	8,240.13	110.73	27.14	29.213	14,912.35	1,768.58	3,477.91	3,387.89	90.02	38.634	
20,800.00	8,235.00	8,255.00	8,240.13	111.56	27.14	30.058	14,912.35	1,768.58	3,391.69	3,300.13	91.55	37.045	
20,900.00	8,235.00	8,281.89	8,266.93	112.39	27.24	30.908	14,913.16	1,766.45	3,305.99	3,212.72	93.27	35.444	
21,000.00	8,235.00	8,283.42	8,268.45	113.23	27.25	31.840	14,913.21	1,766.34	3,221.35	3,126.37	94.97	33.918	
21,100.00	8,235.00	8,284.97	8,269.99	114.06	27.25	32.823	14,913.27	1,766.23	3,137.60	3,040.84	96.76	32.426	
21,200.00	8,235.00	8,286.55	8,271.57	114.89	27.26	33.859	14,913.32	1,766.12	3,054.84	2,956.20	98.64	30.970	
21,300.00	8,235.00	8,288.16	8,273.17	115.72	27.27	34.953	14,913.37	1,766.00	2,973.13	2,872.51	100.61	29.550	
21,400.00	8,235.00	8,289.79	8,274.80	116.56	27.27	36.108	14,913.43	1,765.89	2,892.56	2,789.88	102.69	28.169	
21,500.00	8,235.00	8,291.45	8,276.45	117.39	27.28	37.328	14,913.49	1,765.77	2,813.25	2,708.39	104.86	26.828	
21,600.00	8,235.00	8,293.15	8,278.14	118.23	27.28	38.619	14,913.55	1,765.65	2,735.28	2,628.14	107.14	25.530	
21,700.00	8,235.00	8,294.87	8,279.86	119.06	27.29	39.985	14,913.61	1,765.53	2,658.79	2,549.26	109.53	24.274	
21,800.00	8,235.00	8,296.62	8,281.61	119.90	27.30	41.431	14,913.67	1,765.42	2,583.91	2,471.88	112.03	23.064	
21,900.00	8,235.00	8,298.41	8,283.39	120.73	27.30	42.962	14,913.73	1,765.30	2,510.77	2,396.13	114.64	21.901	
22,000.00	8,235.00	8,300.22	8,285.20	121.57	27.31	44.584	14,913.80	1,765.17	2,439.53	2,322.18	117.36	20.787	
22,100.00	8,235.00	8,302.08	8,287.05	122.41	27.32	46.302	14,913.87	1,765.05	2,370.38	2,250.20	120.18	19.724	
22,200.00	8,235.00	8,303.96	8,288.93	123.24	27.32	48.121	14,913.93	1,764.93	2,303.48	2,180.38	123.10	18.712	
22,300.00	8,235.00	8,305.89	8,290.85	124.08	27.33	50.047	14,914.01	1,764.81	2,239.05	2,112.93	126.12	17.754	
22,400.00	8,235.00	8,307.84	8,292.80	124.92	27.34	52.085	14,914.08	1,764.68	2,177.31	2,048.10	129.21	16.851	
22,500.00	8,235.00	8,309.84	8,294.79	125.76	27.34	54.240	14,914.16	1,764.56	2,118.48	1,986.12	132.37	16.005	
22,600.00	8,235.00	8,311.88	8,296.82	126.59	27.35	56.514	14,914.23	1,764.43	2,062.82	1,927.26	135.56	15.217	
22,700.00	8,235.00	8,313.95	8,298.89	127.43	27.36	58.910	14,914.31	1,764.31	2,010.60	1,871.82	138.77	14.488	
22,800.00	8,235.00	8,316.07	8,301.00	128.27	27.37	61.430	14,914.40	1,764.18	1,962.08	1,820.11	141.97	13.820	
22,900.00	8,235.00	8,318.23	8,303.15	129.11	27.37	64.072	14,914.48	1,764.05	1,917.55	1,772.43	145.12	13.214	
23,000.00	8,235.00	8,320.43	8,305.35	129.95	27.38	66.834	14,914.57	1,763.92	1,877.29	1,729.12	148.17	12.670	
23,100.00	8,235.00	8,322.68	8,307.59	130.79	27.39	69.710	14,914.66	1,763.79	1,841.58	1,690.50	151.08	12.190	
23,200.00	8,235.00	8,324.97	8,309.88	131.63	27.40	72.693	14,914.76	1,763.66	1,810.68	1,656.89	153.80	11.773	
23,300.00	8,235.00	8,327.31	8,312.22	132.47	27.41	75.771	14,914.85	1,763.53	1,784.86	1,628.58	156.28	11.421	
23,400.00	8,235.00	8,349.00	8,333.86	133.31	27.49	78.897	14,915.80	1,762.43	1,764.52	1,606.02	158.50	11.132	
23,500.00	8,235.00	8,349.00	8,333.86	134.15	27.49	82.126	14,915.80	1,762.43	1,749.42	1,589.06	160.36	10.909	
23,600.00	8,235.00	8,349.00	8,333.86	134.99	27.49	85.401	14,915.80	1,762.43	1,739.95	1,578.10	161.85	10.750	
23,700.00	8,235.00	8,349.00	8,333.86	135.83	27.49	88.701	14,915.80	1,762.43	1,736.20	1,573.25	162.95	10.655	
23,715.23	8,235.00	8,349.00	8,333.86	135.96	27.49	89.204	14,915.80	1,762.43	1,736.13	1,573.05	163.08	10.646 CC, ES	
23,800.00	8,235.00	8,349.00	8,333.86	136.68	27.49	92.004	14,915.80	1,762.43	1,738.20	1,574.57	163.63	10.622 SF	
23,900.00	8,235.00	8,349.00	8,333.86	137.52	27.49	95.289	14,915.80	1,762.43	1,745.94	1,582.03	163.90	10.652	
24,000.00	8,235.00	8,349.00	8,333.86	138.36	27.49	98.534	14,915.80	1,762.43	1,759.33	1,595.57	163.77	10.743	
24,004.19	8,235.00	8,349.00	8,333.86	138.39	27.49	98.669	14,915.80	1,762.43	1,760.02	1,596.26	163.75	10.748	

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation



MS Directional
Anticollision Report



Company:	Marathon Oil	Local Co-ordinate Reference:	Well Pierogi BS Federal Com 502H
Project:	Eddy County, New Mexico (NAD 27)	TVD Reference:	WELL @ 3022.50usft (Precision 580)
Reference Site:	Pierogi Federal Com (302H, 502H, 552H)	MD Reference:	WELL @ 3022.50usft (Precision 580)
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	Pierogi BS Federal Com 502H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	EDM 5000.15 Conroe DB
Reference Design:	Design #1	Offset TVD Reference:	Reference Datum



MS Directional Anticollision Report



Company:	Marathon Oil	Local Co-ordinate Reference:	Well Pierogi BS Federal Com 502H
Project:	Eddy County, New Mexico (NAD 27)	TVD Reference:	WELL @ 3022.50usft (Precision 580)
Reference Site:	Pierogi Federal Com (302H, 502H, 552H)	MD Reference:	WELL @ 3022.50usft (Precision 580)
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	Pierogi BS Federal Com 502H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	EDM 5000.15 Conroe DB
Reference Design:	Design #1	Offset TVD Reference:	Reference Datum

Offset Design: Fiddle Fire Fed Com (Offsets) - Fiddle Fee 24-28-23 WA #6H - Wellbore #1 - Surveys													Offset Site Error:
Survey Program: 127-GYRO-NS, 712-MWD+HRGM													Offset Well Error:
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Semi Major Axis Reference (usft)	Major Axis Offset (usft)	Azimuth from North (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Distance Between Centres (usft)	Distance Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning
13,600.00	8,235.00	8,313.90	8,293.90	54.18	27.38	8.906	14,599.62	1,708.90	9,942.18	9,884.39	57.79	172.054	
13,700.00	8,235.00	8,313.67	8,293.67	54.91	27.38	9.004	14,599.62	1,708.90	9,843.62	9,785.74	57.88	170.056	
13,800.00	8,235.00	8,313.44	8,293.45	55.64	27.38	9.104	14,599.62	1,708.90	9,745.10	9,687.11	57.99	168.055	
13,900.00	8,235.00	8,313.21	8,293.22	56.37	27.38	9.206	14,599.62	1,708.90	9,646.60	9,588.51	58.09	166.053	
14,000.00	8,235.00	8,312.98	8,292.98	57.11	27.38	9.310	14,599.62	1,708.89	9,548.14	9,489.94	58.20	164.049	
14,100.00	8,235.00	8,312.74	8,292.74	57.85	27.38	9.417	14,599.63	1,708.89	9,449.71	9,391.39	58.32	162.043	
14,200.00	8,235.00	8,312.50	8,292.50	58.60	27.38	9.525	14,599.63	1,708.89	9,351.31	9,292.88	58.43	160.035	
14,300.00	8,235.00	8,312.26	8,292.26	59.35	27.38	9.636	14,599.63	1,708.89	9,252.95	9,194.40	58.55	158.025	
14,400.00	8,235.00	8,312.01	8,292.01	60.10	27.38	9.750	14,599.63	1,708.89	9,154.62	9,095.95	58.68	156.014	
14,500.00	8,235.00	8,311.76	8,291.76	60.86	27.38	9.865	14,599.63	1,708.89	9,056.33	8,997.53	58.81	154.001	
14,600.00	8,235.00	8,311.50	8,291.51	61.61	27.38	9.984	14,599.63	1,708.88	8,958.08	8,899.14	58.94	151.987	
14,700.00	8,235.00	8,311.25	8,291.25	62.37	27.37	10.105	14,599.64	1,708.88	8,859.87	8,800.79	59.08	149.972	
14,800.00	8,235.00	8,310.98	8,290.99	63.14	27.37	10.228	14,599.64	1,708.88	8,761.69	8,702.47	59.22	147.955	
14,900.00	8,235.00	8,310.72	8,290.72	63.90	27.37	10.355	14,599.64	1,708.88	8,663.56	8,604.20	59.37	145.937	
15,000.00	8,235.00	8,310.45	8,290.45	64.67	27.37	10.484	14,599.64	1,708.88	8,565.47	8,505.96	59.52	143.918	
15,100.00	8,235.00	8,310.17	8,290.17	65.44	27.37	10.616	14,599.65	1,708.87	8,467.43	8,407.76	59.67	141.899	
15,200.00	8,235.00	8,309.89	8,289.90	66.21	27.37	10.752	14,599.65	1,708.87	8,369.43	8,309.60	59.83	139.878	
15,300.00	8,235.00	8,309.61	8,289.61	66.98	27.37	10.890	14,599.65	1,708.87	8,271.48	8,211.48	60.00	137.857	
15,400.00	8,235.00	8,309.32	8,289.33	67.76	27.37	11.032	14,599.65	1,708.87	8,173.58	8,113.41	60.17	135.835	
15,500.00	8,235.00	8,309.03	8,289.03	68.54	27.37	11.178	14,599.65	1,708.87	8,075.73	8,015.38	60.35	133.812	
15,600.00	8,235.00	8,308.74	8,288.74	69.32	27.37	11.327	14,599.66	1,708.86	7,977.94	7,917.40	60.54	131.790	
15,700.00	8,235.00	8,308.44	8,288.44	70.10	27.37	11.480	14,599.66	1,708.86	7,880.20	7,819.47	60.73	129.767	
15,800.00	8,235.00	8,308.13	8,288.13	70.89	27.36	11.636	14,599.66	1,708.86	7,782.52	7,721.59	60.92	127.744	
15,900.00	8,235.00	8,307.82	8,287.82	71.67	27.36	11.796	14,599.66	1,708.86	7,684.89	7,623.77	61.13	125.720	
16,000.00	8,235.00	8,307.50	8,287.51	72.46	27.36	11.961	14,599.67	1,708.85	7,587.33	7,525.99	61.34	123.697	
16,100.00	8,235.00	8,307.18	8,287.19	73.25	27.36	12.130	14,599.67	1,708.85	7,489.84	7,428.28	61.56	121.675	
16,200.00	8,235.00	8,306.86	8,286.86	74.04	27.36	12.303	14,599.67	1,708.85	7,392.41	7,330.62	61.78	119.652	
16,300.00	8,235.00	8,306.53	8,286.53	74.83	27.36	12.481	14,599.68	1,708.85	7,295.05	7,233.03	62.02	117.631	
16,400.00	8,235.00	8,306.19	8,286.19	75.63	27.36	12.664	14,599.68	1,708.84	7,197.76	7,135.50	62.26	115.610	
16,500.00	8,235.00	8,305.85	8,285.85	76.42	27.36	12.852	14,599.68	1,708.84	7,100.55	7,038.03	62.51	113.590	
16,600.00	8,235.00	8,305.50	8,285.50	77.22	27.36	13.045	14,599.68	1,708.84	7,003.41	6,940.64	62.77	111.571	
16,700.00	8,235.00	8,305.14	8,285.15	78.02	27.35	13.243	14,599.69	1,708.84	6,906.36	6,843.32	63.04	109.553	
16,800.00	8,235.00	8,304.78	8,284.79	78.82	27.35	13.448	14,599.69	1,708.83	6,809.39	6,746.07	63.32	107.537	
16,900.00	8,235.00	8,304.42	8,284.42	79.62	27.35	13.657	14,599.69	1,708.83	6,712.51	6,648.90	63.61	105.522	
17,000.00	8,235.00	8,304.04	8,284.05	80.42	27.35	13.874	14,599.70	1,708.83	6,615.73	6,551.81	63.91	103.509	
17,100.00	8,235.00	8,303.66	8,283.67	81.22	27.35	14.096	14,599.70	1,708.83	6,519.04	6,454.81	64.23	101.499	
17,200.00	8,235.00	8,303.28	8,283.28	82.03	27.35	14.325	14,599.71	1,708.82	6,422.45	6,357.90	64.55	99.491	
17,300.00	8,235.00	8,302.88	8,282.89	82.83	27.35	14.562	14,599.71	1,708.82	6,325.97	6,261.08	64.89	97.485	
17,400.00	8,235.00	8,302.48	8,282.49	83.64	27.34	14.805	14,599.71	1,708.82	6,229.60	6,164.36	65.24	95.482	
17,500.00	8,235.00	8,302.08	8,282.08	84.45	27.34	15.056	14,599.72	1,708.82	6,133.35	6,067.74	65.61	93.483	
17,600.00	8,235.00	8,301.66	8,281.66	85.26	27.34	15.316	14,599.72	1,708.81	6,037.21	5,971.22	65.99	91.487	
17,700.00	8,235.00	8,301.24	8,281.24	86.07	27.34	15.583	14,599.73	1,708.81	5,941.21	5,874.82	66.39	89.495	
17,800.00	8,235.00	8,300.80	8,280.81	86.88	27.34	15.860	14,599.73	1,708.81	5,845.34	5,778.54	66.80	87.507	
17,900.00	8,235.00	8,300.36	8,280.37	87.69	27.34	16.145	14,599.73	1,708.80	5,749.61	5,682.38	67.23	85.524	
18,000.00	8,235.00	8,299.92	8,279.92	88.50	27.34	16.440	14,599.74	1,708.80	5,654.03	5,586.35	67.68	83.545	
18,100.00	8,235.00	8,299.46	8,279.46	89.32	27.33	16.746	14,599.74	1,708.80	5,558.60	5,490.46	68.14	81.572	
18,200.00	8,235.00	8,298.99	8,279.00	90.13	27.33	17.062	14,599.75	1,708.79	5,463.34	5,394.70	68.63	79.605	
18,300.00	8,235.00	8,298.52	8,278.52	90.95	27.33	17.389	14,599.75	1,708.79	5,368.24	5,299.10	69.14	77.645	
18,400.00	8,235.00	8,298.03	8,278.03	91.76	27.33	17.728	14,599.76	1,708.79	5,273.33	5,203.66	69.67	75.691	
18,500.00	8,235.00	8,297.54	8,277.54	92.58	27.33	18.080	14,599.76	1,708.79	5,178.62	5,108.39	70.22	73.744	
18,600.00	8,235.00	8,297.03	8,277.04	93.40	27.33	18.444	14,599.77	1,708.78	5,084.10	5,013.30	70.80	71.806	
18,700.00	8,235.00	8,296.52	8,276.52	94.22	27.32	18.823	14,599.78	1,708.78	4,989.80	4,918.39	71.41	69.876	

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation



MS Directional Anticollision Report



Company:	Marathon Oil	Local Co-ordinate Reference:	Well Pierogi BS Federal Com 502H
Project:	Eddy County, New Mexico (NAD 27)	TVD Reference:	WELL @ 3022.50usft (Precision 580)
Reference Site:	Pierogi Federal Com (302H, 502H, 552H)	MD Reference:	WELL @ 3022.50usft (Precision 580)
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	Pierogi BS Federal Com 502H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	EDM 5000.15 Conroe DB
Reference Design:	Design #1	Offset TVD Reference:	Reference Datum

Offset Design: Fiddle Fire Fed Com (Offsets) - Fiddle Fee 24-28-23 WA #6H - Wellbore #1 - Surveys													Offset Site Error:
Survey Program: 127-GYRO-NS, 712-MWD+HRGM													Offset Well Error:
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Semi Major Axis Reference (usft)	Major Axis Offset (usft)	Azimuth from North (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Distance Between Centres (usft)	Rule Assigned: Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning
18,800.00	8,235.00	8,235.99	8,275.99	95.04	27.32	19.215	14,599.78	1,708.77	4,895.72	4,823.68	72.04	67.955	
18,900.00	8,235.00	8,295.45	8,275.46	95.86	27.32	19.624	14,599.79	1,708.77	4,801.88	4,729.18	72.71	66.044	
19,000.00	8,235.00	8,294.91	8,274.91	96.68	27.32	20.048	14,599.79	1,708.77	4,708.30	4,634.90	73.40	64.144	
19,100.00	8,235.00	8,294.34	8,274.35	97.50	27.32	20.490	14,599.80	1,708.76	4,614.98	4,540.85	74.13	62.255	
19,200.00	8,235.00	8,293.77	8,273.77	98.32	27.32	20.950	14,599.81	1,708.76	4,521.95	4,447.06	74.89	60.379	
19,300.00	8,235.00	8,293.19	8,273.19	99.15	27.31	21.429	14,599.81	1,708.76	4,429.23	4,353.54	75.69	58.516	
19,400.00	8,235.00	8,292.59	8,272.59	99.97	27.31	21.929	14,599.82	1,708.75	4,336.83	4,260.29	76.53	56.666	
19,500.00	8,235.00	8,291.98	8,271.98	100.79	27.31	22.450	14,599.83	1,708.75	4,244.77	4,167.36	77.41	54.832	
19,600.00	8,235.00	8,291.35	8,271.35	101.62	27.31	22.995	14,599.84	1,708.74	4,153.08	4,074.74	78.34	53.014	
19,700.00	8,235.00	8,290.71	8,270.71	102.44	27.31	23.563	14,599.84	1,708.74	4,061.78	3,982.47	79.31	51.213	
19,800.00	8,235.00	8,290.05	8,270.06	103.27	27.30	24.159	14,599.85	1,708.74	3,970.90	3,890.56	80.33	49.430	
19,900.00	8,235.00	8,289.38	8,269.39	104.10	27.30	24.781	14,599.86	1,708.73	3,880.47	3,799.06	81.41	47.666	
20,000.00	8,235.00	8,288.70	8,268.70	104.92	27.30	25.434	14,599.87	1,708.73	3,790.52	3,707.98	82.54	45.923	
20,100.00	8,235.00	8,287.99	8,268.00	105.75	27.30	26.118	14,599.88	1,708.72	3,701.08	3,617.35	83.73	44.202	
20,200.00	8,235.00	8,287.27	8,267.28	106.58	27.29	26.836	14,599.89	1,708.72	3,612.20	3,527.21	84.98	42.504	
20,300.00	8,235.00	8,286.53	8,266.54	107.41	27.29	27.590	14,599.90	1,708.72	3,523.91	3,437.61	86.30	40.831	
20,400.00	8,235.00	8,285.78	8,265.78	108.24	27.29	28.383	14,599.91	1,708.71	3,436.27	3,348.57	87.70	39.184	
20,500.00	8,235.00	8,285.00	8,265.00	109.07	27.29	29.216	14,599.92	1,708.71	3,349.32	3,260.15	89.16	37.565	
20,600.00	8,235.00	8,284.20	8,264.21	109.90	27.28	30.095	14,599.93	1,708.70	3,263.11	3,172.40	90.71	35.975	
20,700.00	8,235.00	8,283.39	8,263.39	110.73	27.28	31.020	14,599.94	1,708.70	3,177.71	3,085.38	92.33	34.415	
20,800.00	8,235.00	8,282.55	8,262.55	111.56	27.28	31.997	14,599.95	1,708.69	3,093.19	2,999.14	94.05	32.889	
20,900.00	8,235.00	8,281.69	8,261.69	112.39	27.27	33.028	14,599.96	1,708.69	3,009.62	2,913.76	95.86	31.396	
21,000.00	8,235.00	8,280.80	8,260.80	113.23	27.27	34.117	14,599.98	1,708.68	2,927.08	2,829.31	97.76	29.940	
21,100.00	8,235.00	8,279.89	8,259.90	114.06	27.27	35.269	14,599.99	1,708.68	2,845.65	2,745.88	99.77	28.522	
21,200.00	8,235.00	8,278.96	8,258.96	114.89	27.27	36.489	14,600.00	1,708.67	2,765.45	2,663.56	101.89	27.143	
21,300.00	8,235.00	8,278.00	8,258.00	115.72	27.26	37.781	14,600.02	1,708.67	2,686.57	2,582.46	104.11	25.806	
21,400.00	8,235.00	8,277.01	8,257.01	116.56	27.26	39.150	14,600.03	1,708.66	2,609.14	2,502.70	106.44	24.512	
21,500.00	8,235.00	8,275.99	8,255.99	117.39	27.26	40.602	14,600.05	1,708.65	2,533.29	2,424.40	108.89	23.264	
21,600.00	8,235.00	8,274.94	8,254.95	118.23	27.25	42.142	14,600.06	1,708.65	2,459.17	2,347.71	111.46	22.063	
21,700.00	8,235.00	8,273.86	8,253.87	119.06	27.25	43.778	14,600.08	1,708.64	2,386.93	2,272.79	114.14	20.912	
21,800.00	8,235.00	8,272.75	8,252.76	119.90	27.24	45.513	14,600.10	1,708.64	2,316.76	2,199.82	116.94	19.812	
21,900.00	8,235.00	8,271.60	8,251.61	120.73	27.24	47.355	14,600.12	1,708.63	2,248.85	2,129.01	119.84	18.765	
22,000.00	8,235.00	8,270.42	8,250.43	121.57	27.24	49.310	14,600.14	1,708.63	2,183.41	2,060.56	122.85	17.773	
22,100.00	8,235.00	8,269.20	8,249.21	122.41	27.23	51.383	14,600.16	1,708.62	2,120.66	1,994.71	125.95	16.838	
22,200.00	8,235.00	8,267.94	8,247.95	123.24	27.23	53.579	14,600.18	1,708.61	2,060.85	1,931.73	129.12	15.961	
22,300.00	8,235.00	8,266.64	8,246.65	124.08	27.22	55.903	14,600.20	1,708.61	2,004.25	1,871.91	132.34	15.144	
22,400.00	8,235.00	8,265.29	8,245.30	124.92	27.22	58.357	14,600.23	1,708.60	1,951.14	1,815.55	135.59	14.390	
22,500.00	8,235.00	8,263.90	8,243.91	125.76	27.21	60.944	14,600.25	1,708.59	1,901.80	1,762.96	138.84	13.698	
22,600.00	8,235.00	8,263.00	8,243.01	126.59	27.18	63.657	14,600.47	1,708.54	1,856.58	1,714.58	141.99	13.075	
22,700.00	8,235.00	8,263.00	8,243.01	127.43	27.18	66.505	14,600.47	1,708.54	1,815.69	1,670.58	145.12	12.512	
22,800.00	8,235.00	8,263.00	8,243.01	128.27	27.18	69.477	14,600.47	1,708.54	1,779.50	1,631.40	148.10	12.016	
22,900.00	8,235.00	8,259.84	8,239.85	129.11	27.20	72.568	14,600.33	1,708.57	1,748.27	1,597.35	150.92	11.584	
23,000.00	8,235.00	8,257.44	8,237.45	129.95	27.19	75.755	14,600.37	1,708.56	1,722.30	1,568.85	153.46	11.223	
23,100.00	8,235.00	8,255.00	8,235.01	130.79	27.18	79.029	14,600.42	1,708.55	1,701.82	1,546.13	155.69	10.931	
23,200.00	8,235.00	8,252.53	8,232.54	131.63	27.18	82.372	14,600.48	1,708.54	1,687.03	1,529.45	157.58	10.706	
23,300.00	8,235.00	8,250.03	8,230.04	132.47	27.17	85.763	14,600.53	1,708.53	1,678.07	1,518.99	159.09	10.548	
23,400.00	8,235.00	8,247.49	8,227.50	133.31	27.16	89.177	14,600.58	1,708.52	1,675.05	1,514.87	160.17	10.458	
23,400.79	8,235.00	8,247.47	8,227.48	133.32	27.16	89.204	14,600.58	1,708.52	1,675.05	1,514.87	160.18	10.457 CC, ES	
23,500.00	8,235.00	8,244.91	8,224.92	134.15	27.15	92.592	14,600.63	1,708.51	1,677.98	1,517.15	160.83	10.433 SF	
23,600.00	8,235.00	8,242.29	8,222.30	134.99	27.14	95.983	14,600.69	1,708.49	1,686.85	1,525.80	161.05	10.474	
23,700.00	8,235.00	8,239.64	8,219.65	135.83	27.13	99.327	14,600.75	1,708.48	1,701.55	1,540.70	160.84	10.579	
23,800.00	8,235.00	8,236.95	8,216.96	136.68	27.12	102.603	14,600.81	1,708.46	1,721.94	1,561.70	160.24	10.746	

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation



MS Directional Anticollision Report



Company:	Marathon Oil	Local Co-ordinate Reference:	Well Pierogi BS Federal Com 502H
Project:	Eddy County, New Mexico (NAD 27)	TVD Reference:	WELL @ 3022.50usft (Precision 580)
Reference Site:	Pierogi Federal Com (302H, 502H, 552H)	MD Reference:	WELL @ 3022.50usft (Precision 580)
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	Pierogi BS Federal Com 502H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	EDM 5000.15 Conroe DB
Reference Design:	Design #1	Offset TVD Reference:	Reference Datum

Offset Design: Fiddle Fire Fed Com (Offsets) - Fiddle Fee 24-28-23 WA #6H - Wellbore #1 - Surveys												Offset Site Error:	0.00 usft
Survey Program: 127-GYRO-NS, 712-MWD+HRGM												Offset Well Error:	0.00 usft
Reference	Offset	Semi Major Axis	Distance	Rule Assigned:									
Measured	Vertical	Measured	Vertical	Reference	Offset	Azimuth	Offset Wellbore Centre	Between	Between	Minimum	Separation	Warning	
Depth	Depth	Depth	Depth	Reference	Offset	from North	+N/-S	+E/-W	Centres	Ellipses	Separation		
(usft)	(usft)	(usft)	(usft)	(usft)	(usft)	(°)	(usft)	(usft)	(usft)	(usft)	(usft)		
23,900.00	8,235.00	8,234.22	8,214.23	137.52	27.11	105.792	14,600.86	1,708.45	1,747.82	1,588.54	159.27	10.974	
24,000.00	8,235.00	8,231.45	8,211.46	138.36	27.10	108.878	14,600.92	1,708.43	1,778.94	1,620.96	157.98	11.261	
24,004.19	8,235.00	8,231.33	8,211.34	138.39	27.10	109.005	14,600.93	1,708.43	1,780.36	1,622.44	157.92	11.274	



MS Directional Anticollision Report



Company:	Marathon Oil	Local Co-ordinate Reference:	Well Pierogi BS Federal Com 502H
Project:	Eddy County, New Mexico (NAD 27)	TVD Reference:	WELL @ 3022.50usft (Precision 580)
Reference Site:	Pierogi Federal Com (302H, 502H, 552H)	MD Reference:	WELL @ 3022.50usft (Precision 580)
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	Pierogi BS Federal Com 502H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	EDM 5000.15 Conroe DB
Reference Design:	Design #1	Offset TVD Reference:	Reference Datum

Offset Design: Fiddle Fire Fed Com (Offsets) - Fiddle Fee 24-28-23 WD #7H - Wellbore #1 - Surveys													Offset Site Error:
													0.00 usft
Survey Program:	Reference	Offset	Semi Major Axis	Azimuth	Offset Wellbore Centre	Distance	Rule Assigned:	Offset Well Error:					
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference	Offset	from North (°)	+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning
13,600.00	8,235.00	7,157.00	7,079.17	54.18	26.11	10.128	14,528.13	1,911.50	9,972.20	9,916.27	55.93	178.298	
13,700.00	8,235.00	7,157.00	7,079.17	54.91	26.11	10.238	14,528.13	1,911.50	9,874.70	9,818.66	56.04	176.215	
13,800.00	8,235.00	7,157.00	7,079.17	55.64	26.11	10.351	14,528.13	1,911.50	9,777.25	9,721.10	56.15	174.127	
13,900.00	8,235.00	7,157.00	7,079.17	56.37	26.11	10.467	14,528.13	1,911.50	9,679.85	9,623.58	56.27	172.034	
14,000.00	8,235.00	7,157.00	7,079.17	57.11	26.11	10.584	14,528.13	1,911.50	9,582.50	9,526.11	56.39	169.936	
14,100.00	8,235.00	7,157.00	7,079.17	57.85	26.11	10.704	14,528.13	1,911.50	9,485.21	9,428.70	56.52	167.834	
14,200.00	8,235.00	7,157.00	7,079.17	58.60	26.11	10.827	14,528.13	1,911.50	9,387.98	9,331.33	56.65	165.727	
14,300.00	8,235.00	7,157.00	7,079.17	59.35	26.11	10.952	14,528.13	1,911.50	9,290.80	9,234.02	56.78	163.616	
14,400.00	8,235.00	7,157.00	7,079.17	60.10	26.11	11.080	14,528.13	1,911.50	9,193.69	9,136.76	56.93	161.500	
14,500.00	8,235.00	7,157.00	7,079.17	60.86	26.11	11.211	14,528.13	1,911.50	9,096.64	9,039.56	57.08	159.380	
14,600.00	8,235.00	7,157.00	7,079.17	61.61	26.11	11.344	14,528.13	1,911.50	8,999.65	8,942.42	57.23	157.256	
14,700.00	8,235.00	7,157.00	7,079.17	62.37	26.11	11.481	14,528.13	1,911.50	8,902.73	8,845.34	57.39	155.128	
14,800.00	8,235.00	7,157.00	7,079.17	63.14	26.11	11.620	14,528.13	1,911.50	8,805.88	8,748.32	57.56	152.997	
14,900.00	8,235.00	7,157.00	7,079.17	63.90	26.11	11.763	14,528.13	1,911.50	8,709.10	8,651.37	57.73	150.861	
15,000.00	8,235.00	7,157.00	7,079.17	64.67	26.11	11.909	14,528.13	1,911.50	8,612.39	8,554.48	57.91	148.723	
15,100.00	8,235.00	7,157.00	7,079.17	65.44	26.11	12.058	14,528.13	1,911.50	8,515.76	8,457.67	58.10	146.581	
15,200.00	8,235.00	7,157.00	7,079.17	66.21	26.11	12.211	14,528.13	1,911.50	8,419.21	8,360.92	58.29	144.436	
15,300.00	8,235.00	7,196.65	7,118.13	66.98	26.26	12.328	14,533.94	1,906.98	8,322.08	8,263.45	58.63	141.940	
15,400.00	8,235.00	7,199.02	7,120.45	67.76	26.27	12.486	14,534.32	1,906.70	8,225.62	8,166.77	58.85	139.780	
15,500.00	8,235.00	7,201.45	7,122.83	68.54	26.28	12.647	14,534.72	1,906.42	8,129.23	8,070.16	59.07	137.619	
15,600.00	8,235.00	7,203.93	7,125.26	69.32	26.29	12.811	14,535.13	1,906.13	8,032.93	7,973.62	59.30	135.457	
15,700.00	8,235.00	7,206.47	7,127.74	70.10	26.30	12.980	14,535.56	1,905.82	7,936.71	7,877.16	59.54	133.294	
15,800.00	8,235.00	7,247.00	7,167.27	70.89	26.45	13.108	14,543.01	1,900.89	7,841.18	7,781.27	59.91	130.874	
15,900.00	8,235.00	7,247.00	7,167.27	71.67	26.45	13.287	14,543.01	1,900.89	7,745.06	7,684.90	60.16	128.737	
16,000.00	8,235.00	7,247.00	7,167.27	72.46	26.45	13.471	14,543.01	1,900.89	7,649.05	7,588.63	60.42	126.600	
16,100.00	8,235.00	7,247.00	7,167.27	73.25	26.45	13.660	14,543.01	1,900.89	7,553.13	7,492.44	60.69	124.461	
16,200.00	8,235.00	7,247.00	7,167.27	74.04	26.45	13.854	14,543.01	1,900.89	7,457.32	7,396.36	60.96	122.322	
16,300.00	8,235.00	7,247.00	7,167.27	74.83	26.45	14.053	14,543.01	1,900.89	7,361.63	7,300.38	61.25	120.183	
16,400.00	8,235.00	7,247.00	7,167.27	75.63	26.45	14.257	14,543.01	1,900.89	7,266.05	7,204.50	61.55	118.044	
16,500.00	8,235.00	7,248.65	7,168.88	76.42	26.45	14.465	14,543.31	1,900.69	7,170.59	7,108.72	61.87	115.898	
16,600.00	8,235.00	7,267.05	7,186.84	77.22	26.52	14.656	14,546.67	1,898.49	7,075.23	7,012.98	62.24	113.671	
16,700.00	8,235.00	7,389.07	7,306.12	78.02	26.98	14.718	14,568.04	1,884.26	6,979.93	6,917.02	62.91	110.956	
16,800.00	8,235.00	7,404.78	7,321.52	78.82	27.04	14.923	14,570.64	1,882.52	6,884.48	6,821.19	63.29	108.781	
16,900.00	8,235.00	7,420.48	7,336.90	79.62	27.10	15.134	14,573.23	1,880.80	6,789.11	6,725.43	63.68	106.615	
17,000.00	8,235.00	7,461.40	7,377.04	80.42	27.25	15.319	14,579.88	1,876.47	6,693.83	6,629.68	64.15	104.347	
17,100.00	8,235.00	7,515.10	7,429.84	81.22	27.45	15.500	14,588.21	1,871.32	6,598.56	6,533.89	64.67	102.036	
17,200.00	8,235.00	7,500.47	7,415.47	82.03	27.40	15.767	14,585.89	1,872.79	6,503.34	6,438.33	65.01	100.032	
17,300.00	8,235.00	7,516.00	7,430.73	82.83	27.46	16.004	14,588.34	1,871.24	6,408.31	6,342.86	65.45	97.909	
17,400.00	8,235.00	7,516.00	7,430.73	83.64	27.46	16.269	14,588.34	1,871.24	6,313.41	6,247.54	65.87	95.852	
17,500.00	8,235.00	7,516.00	7,430.73	84.45	27.46	16.541	14,588.34	1,871.24	6,218.67	6,152.38	66.30	93.800	
17,600.00	8,235.00	7,516.00	7,430.73	85.26	27.46	16.823	14,588.34	1,871.24	6,124.10	6,057.36	66.75	91.752	
17,700.00	8,235.00	7,547.42	7,461.64	86.07	27.57	17.073	14,593.23	1,868.41	6,029.47	5,962.19	67.29	89.610	
17,800.00	8,235.00	7,553.08	7,467.21	86.88	27.59	17.365	14,594.15	1,867.90	5,935.17	5,867.38	67.78	87.563	
17,900.00	8,235.00	7,558.88	7,472.90	87.69	27.62	17.665	14,595.09	1,867.38	5,841.03	5,772.74	68.30	85.524	
18,000.00	8,235.00	7,564.82	7,478.73	88.50	27.64	17.975	14,596.07	1,866.84	5,747.08	5,678.25	68.83	83.493	
18,100.00	8,235.00	7,570.89	7,484.69	89.32	27.66	18.296	14,597.09	1,866.29	5,653.32	5,583.93	69.39	81.472	
18,200.00	8,235.00	7,577.10	7,490.79	90.13	27.69	18.627	14,598.14	1,865.73	5,559.76	5,489.79	69.97	79.461	
18,300.00	8,235.00	7,606.00	7,519.12	90.95	27.79	18.935	14,603.20	1,863.12	5,466.53	5,395.92	70.61	77.420	
18,400.00	8,235.00	7,606.00	7,519.12	91.76	27.79	19.299	14,603.20	1,863.12	5,373.33	5,302.11	71.22	75.445	
18,500.00	8,235.00	7,606.00	7,519.12	92.58	27.79	19.675	14,603.20	1,863.12	5,280.38	5,208.52	71.86	73.479	
18,600.00	8,235.00	7,606.00	7,519.12	93.40	27.79	20.065	14,603.20	1,863.12	5,187.70	5,115.17	72.53	71.524	
18,700.00	8,235.00	7,606.00	7,519.12	94.22	27.79	20.469	14,603.20	1,863.12	5,095.29	5,022.06	73.23	69.581	

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation



MS Directional Anticollision Report



Company:	Marathon Oil	Local Co-ordinate Reference:	Well Pierogi BS Federal Com 502H
Project:	Eddy County, New Mexico (NAD 27)	TVD Reference:	WELL @ 3022.50usft (Precision 580)
Reference Site:	Pierogi Federal Com (302H, 502H, 552H)	MD Reference:	WELL @ 3022.50usft (Precision 580)
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	Pierogi BS Federal Com 502H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	EDM 5000.15 Conroe DB
Reference Design:	Design #1	Offset TVD Reference:	Reference Datum

Offset Design: Fiddle Fire Fed Com (Offsets) - Fiddle Fee 24-28-23 WD #7H - Wellbore #1 - Surveys												Offset Site Error:	0.00 usft
Survey Program: 167-MWD+IFR1												Offset Well Error:	0.00 usft
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Semi Major Axis Reference (usft)	Offset (usft)	Azimuth from North (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Distance Between Centres (usft)	Minimum Separation (usft)	Separation Factor	Warning	
18,800.00	8,235.00	7,626.59	7,539.29	95.04	27.87	20.854	14,606.91	1,861.27	5,003.11	4,929.13	73.98	67.629	
18,900.00	8,235.00	7,639.30	7,551.74	95.86	27.92	21.266	14,609.23	1,860.13	4,911.20	4,836.45	74.75	65.702	
19,000.00	8,235.00	7,652.16	7,564.33	96.68	27.97	21.694	14,611.58	1,858.99	4,819.56	4,744.01	75.55	63.792	
19,100.00	8,235.00	7,668.96	7,777.71	97.50	28.78	21.816	14,645.58	1,842.16	4,727.82	4,651.16	76.66	61.673	
19,200.00	8,235.00	7,875.00	7,783.69	98.32	28.81	22.285	14,646.37	1,841.74	4,636.10	4,558.60	77.50	59.820	
19,300.00	8,235.00	7,875.00	7,783.69	99.15	28.81	22.782	14,646.37	1,841.74	4,544.72	4,466.35	78.37	57.991	
19,400.00	8,235.00	7,875.00	7,783.69	99.97	28.81	23.299	14,646.37	1,841.74	4,453.71	4,374.43	79.28	56.178	
19,500.00	8,235.00	7,907.33	7,815.68	100.79	28.93	23.789	14,650.48	1,839.45	4,362.72	4,282.44	80.28	54.344	
19,600.00	8,235.00	7,911.87	7,820.15	101.62	28.95	24.342	14,651.11	1,839.11	4,272.41	4,191.13	81.28	52.565	
19,700.00	8,235.00	7,916.60	7,824.83	102.44	28.96	24.918	14,651.78	1,838.74	4,182.52	4,100.20	82.32	50.806	
19,800.00	8,235.00	7,921.55	7,829.70	103.27	28.98	25.519	14,652.50	1,838.35	4,093.09	4,009.67	83.42	49.067	
19,900.00	8,235.00	7,926.72	7,834.80	104.10	29.00	26.147	14,653.27	1,837.93	4,004.14	3,919.58	84.56	47.350	
20,000.00	8,235.00	7,932.13	7,840.13	104.92	29.02	26.802	14,654.09	1,837.49	3,915.70	3,829.94	85.76	45.656	
20,100.00	8,235.00	7,965.00	7,872.42	105.75	29.14	27.423	14,659.49	1,834.62	3,828.07	3,741.04	87.03	43.986	
20,200.00	8,235.00	7,965.00	7,872.42	106.58	29.14	28.151	14,659.49	1,834.62	3,740.66	3,652.32	88.34	42.343	
20,300.00	8,235.00	7,965.00	7,872.42	107.41	29.14	28.914	14,659.49	1,834.62	3,653.90	3,564.18	89.72	40.727	
20,400.00	8,235.00	7,965.00	7,872.42	108.24	29.14	29.714	14,659.49	1,834.62	3,567.83	3,476.67	91.16	39.137	
20,500.00	8,235.00	7,965.00	7,872.42	109.07	29.14	30.553	14,659.49	1,834.62	3,482.50	3,389.82	92.68	37.576	
20,600.00	8,235.00	7,980.34	7,887.46	109.90	29.20	31.392	14,662.15	1,833.23	3,397.94	3,303.68	94.26	36.048	
20,700.00	8,235.00	7,999.21	7,905.99	110.73	29.27	32.264	14,665.37	1,831.60	3,314.14	3,218.22	95.92	34.551	
20,800.00	8,235.00	8,017.39	7,923.85	111.56	29.34	33.185	14,668.42	1,830.10	3,231.17	3,133.51	97.66	33.087	
20,900.00	8,235.00	8,034.93	7,941.09	112.39	29.41	34.156	14,671.30	1,828.73	3,149.09	3,049.61	99.48	31.656	
21,000.00	8,235.00	8,051.85	7,957.74	113.23	29.47	35.182	14,674.04	1,827.47	3,067.99	2,966.60	101.39	30.259	
21,100.00	8,235.00	8,068.61	7,974.24	114.06	29.54	36.264	14,676.73	1,826.26	2,987.94	2,884.55	103.39	28.900	
21,200.00	8,235.00	8,085.50	7,990.86	114.89	29.60	37.404	14,679.44	1,825.02	2,909.03	2,803.54	105.48	27.578	
21,300.00	8,235.00	8,102.50	8,007.60	115.72	29.66	38.605	14,682.18	1,823.75	2,831.35	2,723.68	107.67	26.297	
21,400.00	8,235.00	8,119.62	8,024.45	116.56	29.73	39.872	14,684.95	1,822.45	2,755.02	2,645.06	109.95	25.056	
21,500.00	8,235.00	8,136.86	8,041.40	117.39	29.79	41.209	14,687.75	1,821.12	2,680.13	2,567.80	112.34	23.858	
21,600.00	8,235.00	8,144.00	8,048.42	118.23	29.82	42.658	14,688.91	1,820.57	2,606.85	2,492.02	114.83	22.702	
21,700.00	8,235.00	8,164.65	8,068.73	119.06	29.90	44.136	14,692.31	1,818.95	2,535.27	2,417.87	117.41	21.594	
21,800.00	8,235.00	8,178.13	8,081.97	119.90	29.95	45.726	14,694.57	1,817.89	2,465.60	2,345.51	120.09	20.531	
21,900.00	8,235.00	8,192.00	8,095.60	120.73	30.00	47.405	14,696.93	1,816.78	2,397.98	2,275.11	122.87	19.516	
22,000.00	8,235.00	8,206.28	8,109.61	121.57	30.06	49.175	14,699.39	1,815.64	2,332.58	2,206.84	125.74	18.551	
22,100.00	8,235.00	8,220.98	8,124.04	122.41	30.11	51.042	14,701.96	1,814.46	2,269.60	2,140.91	128.69	17.637	
22,200.00	8,235.00	8,236.98	8,139.73	123.24	30.18	53.005	14,704.81	1,813.16	2,209.22	2,077.52	131.70	16.775	
22,300.00	8,235.00	8,255.65	8,158.03	124.08	30.25	55.060	14,708.15	1,811.62	2,151.65	2,016.89	134.76	15.966	
22,400.00	8,235.00	8,274.60	8,176.61	124.92	30.32	57.221	14,711.58	1,810.04	2,097.11	1,959.25	137.86	15.212	
22,500.00	8,235.00	8,293.84	8,195.45	125.76	30.39	59.490	14,715.08	1,808.40	2,045.84	1,904.87	140.97	14.513	
22,600.00	8,235.00	8,313.38	8,214.59	126.59	30.47	61.868	14,718.66	1,806.71	1,998.08	1,854.02	144.06	13.870	
22,700.00	8,235.00	8,337.06	8,237.78	127.43	30.56	64.333	14,722.98	1,804.65	1,954.08	1,806.98	147.09	13.284	
22,800.00	8,235.00	8,360.86	8,261.14	128.27	30.65	66.914	14,727.04	1,802.61	1,914.06	1,764.00	150.05	12.756	
22,900.00	8,235.00	8,381.53	8,281.48	129.11	30.73	69.626	14,730.32	1,800.88	1,878.32	1,725.43	152.90	12.285	
23,000.00	8,235.00	8,399.65	8,299.34	129.95	30.79	72.456	14,733.02	1,799.38	1,847.15	1,691.58	155.57	11.873	
23,100.00	8,235.00	8,415.87	8,315.34	130.79	30.86	75.393	14,735.29	1,798.07	1,820.81	1,662.77	158.04	11.521	
23,200.00	8,235.00	8,431.61	8,330.88	131.63	30.91	78.414	14,737.44	1,796.79	1,799.52	1,639.28	160.24	11.230	
23,300.00	8,235.00	8,446.94	8,346.01	132.47	30.97	81.505	14,739.51	1,795.54	1,783.48	1,621.34	162.14	11.000	
23,400.00	8,235.00	8,461.86	8,360.76	133.31	31.03	84.647	14,741.49	1,794.30	1,772.82	1,609.12	163.70	10.830	
23,500.00	8,235.00	8,476.41	8,375.13	134.15	31.08	87.825	14,743.40	1,793.09	1,767.65	1,602.75	164.90	10.720	
23,543.22	8,235.00	8,482.58	8,381.22	134.52	31.10	89.204	14,744.20	1,792.58	1,767.13	1,601.83	165.30	10.690 CC, ES	
23,600.00	8,235.00	8,490.59	8,389.13	134.99	31.13	91.018	14,745.23	1,791.90	1,768.03	1,602.31	165.71	10.669 SF	
23,700.00	8,235.00	8,501.00	8,399.42	135.83	31.17	94.219	14,746.57	1,791.02	1,773.95	1,607.81	166.14	10.678	
23,800.00	8,235.00	8,513.96	8,412.24	136.68	31.22	97.383	14,748.19	1,789.93	1,785.38	1,619.20	166.17	10.744	

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation



MS Directional Anticollision Report



Company:	Marathon Oil	Local Co-ordinate Reference:	Well Pierogi BS Federal Com 502H
Project:	Eddy County, New Mexico (NAD 27)	TVD Reference:	WELL @ 3022.50usft (Precision 580)
Reference Site:	Pierogi Federal Com (302H, 502H, 552H)	MD Reference:	WELL @ 3022.50usft (Precision 580)
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	Pierogi BS Federal Com 502H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	EDM 5000.15 Conroe DB
Reference Design:	Design #1	Offset TVD Reference:	Reference Datum

Offset Design: Fiddle Fire Fed Com (Offsets) - Fiddle Fee 24-28-23 WD #7H - Wellbore #1 - Surveys													Offset Site Error: 0.00 usft
Survey Program: 167-MWD+IFR1													Offset Well Error: 0.00 usft
Reference	Offset	Semi Major Axis		Distance		Rule Assigned:		Warning					
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference	Offset	Offset Wellbore Centre	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor			
						+N/-S (usft)	+E/-W (usft)						
23,900.00	8,235.00	8,523.80	8,421.97	137.52	31.26	100.514	14,749.40	1,789.12	1,802.22	1,636.38	165.84	10.868	
24,000.00	8,235.00	8,533.20	8,431.27	138.36	31.29	103.583	14,750.52	1,788.35	1,824.33	1,659.18	165.15	11.047	
24,004.19	8,235.00	8,533.59	8,431.65	138.39	31.29	103.710	14,750.57	1,788.31	1,825.37	1,660.26	165.11	11.055	



MS Directional Anticollision Report



Company:	Marathon Oil	Local Co-ordinate Reference:	Well Pierogi BS Federal Com 502H
Project:	Eddy County, New Mexico (NAD 27)	TVD Reference:	WELL @ 3022.50usft (Precision 580)
Reference Site:	Pierogi Federal Com (302H, 502H, 552H)	MD Reference:	WELL @ 3022.50usft (Precision 580)
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	Pierogi BS Federal Com 502H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	EDM 5000.15 Conroe DB
Reference Design:	Design #1	Offset TVD Reference:	Reference Datum

Offset Design: Fiddle Fire Fed Com (Offsets) - Fiddle Fee 24-28-23 WXY #9H - Wellbore #1 - Surveys													Offset Site Error:
Survey Program: 127-GYRO-NS, 705-MWD+HRGM													Offset Well Error:
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Semi Major Axis Reference (usft)	Offset (usft)	Azimuth from North (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Distance Between Centres (usft)	Rule Assigned: Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning
13,000.00	8,235.00	8,498.56	8,440.25	49.90	30.03	9.371	13,972.85	1,794.62	9,929.93	9,871.24	58.69	169.185	
13,100.00	8,235.00	8,497.87	8,439.55	50.60	30.03	9.474	13,972.86	1,794.64	9,831.54	9,772.75	58.79	167.242	
13,200.00	8,235.00	8,497.16	8,438.85	51.31	30.03	9.579	13,972.88	1,794.65	9,733.18	9,674.29	58.88	165.298	
13,300.00	8,235.00	8,496.45	8,438.13	52.02	30.02	9.686	13,972.89	1,794.67	9,634.85	9,575.87	58.98	163.350	
13,400.00	8,235.00	8,495.73	8,437.41	52.74	30.02	9.796	13,972.90	1,794.68	9,536.56	9,477.47	59.09	161.400	
13,500.00	8,235.00	8,494.99	8,436.68	53.46	30.02	9.907	13,972.91	1,794.70	9,438.30	9,379.11	59.19	159.448	
13,600.00	8,235.00	8,494.25	8,435.93	54.18	30.02	10.021	13,972.93	1,794.72	9,340.08	9,280.78	59.30	157.493	
13,700.00	8,235.00	8,493.49	8,435.17	54.91	30.01	10.138	13,972.94	1,794.73	9,241.90	9,182.48	59.42	155.536	
13,800.00	8,235.00	8,492.72	8,434.41	55.64	30.01	10.257	13,972.96	1,794.75	9,143.76	9,084.22	59.54	153.578	
13,900.00	8,235.00	8,491.95	8,433.63	56.37	30.01	10.378	13,972.97	1,794.76	9,045.66	8,986.00	59.66	151.617	
14,000.00	8,235.00	8,491.16	8,432.84	57.11	30.01	10.503	13,972.99	1,794.78	8,947.60	8,887.81	59.79	149.654	
14,100.00	8,235.00	8,490.36	8,432.04	57.85	30.00	10.630	13,973.00	1,794.80	8,849.58	8,789.66	59.92	147.689	
14,200.00	8,235.00	8,489.54	8,431.23	58.60	30.00	10.759	13,973.02	1,794.81	8,751.61	8,691.56	60.06	145.722	
14,300.00	8,235.00	8,488.72	8,430.41	59.35	30.00	10.892	13,973.03	1,794.83	8,653.69	8,593.49	60.20	143.754	
14,400.00	8,235.00	8,487.88	8,429.57	60.10	30.00	11.028	13,973.05	1,794.85	8,555.81	8,495.47	60.34	141.784	
14,500.00	8,235.00	8,487.03	8,428.72	60.86	29.99	11.167	13,973.06	1,794.86	8,457.98	8,397.49	60.49	139.813	
14,600.00	8,235.00	8,486.17	8,427.86	61.61	29.99	11.309	13,973.08	1,794.88	8,360.21	8,299.55	60.65	137.841	
14,700.00	8,235.00	8,485.30	8,426.98	62.37	29.99	11.455	13,973.10	1,794.90	8,262.48	8,201.67	60.81	135.867	
14,800.00	8,235.00	8,484.41	8,426.09	63.14	29.98	11.604	13,973.11	1,794.92	8,164.81	8,103.83	60.98	133.892	
14,900.00	8,235.00	8,483.50	8,425.19	63.90	29.98	11.756	13,973.13	1,794.94	8,067.20	8,006.05	61.15	131.916	
15,000.00	8,235.00	8,482.59	8,424.28	64.67	29.98	11.913	13,973.15	1,794.95	7,969.65	7,908.31	61.33	129.939	
15,100.00	8,235.00	8,481.65	8,423.34	65.44	29.97	12.073	13,973.17	1,794.97	7,872.16	7,810.64	61.52	127.962	
15,200.00	8,235.00	8,480.71	8,422.40	66.21	29.97	12.237	13,973.19	1,794.99	7,774.73	7,713.02	61.71	125.983	
15,300.00	8,235.00	8,479.75	8,421.44	66.98	29.97	12.406	13,973.21	1,795.01	7,677.37	7,615.45	61.91	124.005	
15,400.00	8,235.00	8,478.77	8,420.46	67.76	29.96	12.578	13,973.23	1,795.03	7,580.07	7,517.95	62.12	122.026	
15,500.00	8,235.00	8,477.78	8,419.47	68.54	29.96	12.756	13,973.25	1,795.05	7,482.85	7,420.52	62.33	120.046	
15,600.00	8,235.00	8,476.77	8,418.46	69.32	29.96	12.938	13,973.27	1,795.07	7,385.70	7,323.14	62.56	118.067	
15,700.00	8,235.00	8,475.74	8,417.43	70.10	29.95	13.124	13,973.29	1,795.09	7,288.63	7,225.84	62.79	116.087	
15,800.00	8,235.00	8,474.70	8,416.39	70.89	29.95	13.316	13,973.31	1,795.11	7,191.64	7,128.61	63.02	114.108	
15,900.00	8,235.00	8,473.64	8,415.33	71.67	29.95	13.513	13,973.34	1,795.13	7,094.73	7,031.45	63.27	112.129	
16,000.00	8,235.00	8,472.56	8,414.25	72.46	29.94	13.716	13,973.36	1,795.15	6,997.90	6,934.37	63.53	110.151	
16,100.00	8,235.00	8,471.46	8,413.15	73.25	29.94	13.924	13,973.38	1,795.17	6,901.17	6,837.37	63.80	108.174	
16,200.00	8,235.00	8,470.34	8,412.04	74.04	29.94	14.138	13,973.41	1,795.19	6,804.53	6,740.46	64.07	106.198	
16,300.00	8,235.00	8,469.21	8,410.90	74.83	29.93	14.359	13,973.43	1,795.21	6,707.99	6,643.63	64.36	104.223	
16,400.00	8,235.00	8,468.05	8,409.75	75.63	29.93	14.585	13,973.46	1,795.23	6,611.56	6,546.89	64.66	102.249	
16,500.00	8,235.00	8,466.87	8,408.57	76.42	29.92	14.819	13,973.49	1,795.25	6,515.23	6,450.25	64.97	100.277	
16,600.00	8,235.00	8,465.68	8,407.37	77.22	29.92	15.059	13,973.51	1,795.28	6,419.01	6,353.71	65.30	98.307	
16,700.00	8,235.00	8,464.46	8,406.15	78.02	29.91	15.307	13,973.54	1,795.30	6,322.91	6,257.27	65.63	96.339	
16,800.00	8,235.00	8,442.00	8,383.71	78.82	29.84	15.564	13,974.10	1,795.68	6,226.99	6,161.14	65.86	94.553	
16,900.00	8,235.00	8,442.00	8,383.71	79.62	29.84	15.828	13,974.10	1,795.68	6,131.13	6,064.91	66.23	92.576	
17,000.00	8,235.00	8,442.00	8,383.71	80.42	29.84	16.099	13,974.10	1,795.68	6,035.41	5,968.80	66.61	90.603	
17,100.00	8,235.00	8,442.00	8,383.71	81.22	29.84	16.380	13,974.10	1,795.68	5,939.83	5,872.81	67.02	88.634	
17,200.00	8,235.00	8,442.00	8,383.71	82.03	29.84	16.669	13,974.10	1,795.68	5,844.39	5,776.96	67.43	86.668	
17,300.00	8,235.00	8,442.00	8,383.71	82.83	29.84	16.969	13,974.10	1,795.68	5,749.11	5,681.24	67.87	84.707	
17,400.00	8,235.00	8,442.00	8,383.71	83.64	29.84	17.278	13,974.10	1,795.68	5,653.99	5,585.67	68.33	82.751	
17,500.00	8,235.00	8,442.00	8,383.71	84.45	29.84	17.598	13,974.10	1,795.68	5,559.05	5,490.25	68.80	80.800	
17,600.00	8,235.00	8,442.00	8,383.71	85.26	29.84	17.929	13,974.10	1,795.68	5,464.28	5,394.99	69.29	78.856	
17,700.00	8,235.00	8,442.00	8,383.71	86.07	29.84	18.271	13,974.10	1,795.68	5,369.71	5,299.90	69.81	76.917	
17,800.00	8,235.00	8,442.00	8,383.71	86.88	29.84	18.626	13,974.10	1,795.68	5,275.33	5,204.98	70.35	74.985	
17,900.00	8,235.00	8,442.00	8,383.71	87.69	29.84	18.994	13,974.10	1,795.68	5,181.17	5,110.25	70.92	73.061	
18,000.00	8,235.00	8,442.00	8,383.71	88.50	29.84	19.376	13,974.10	1,795.68	5,087.23	5,015.72	71.50	71.145	
18,100.00	8,235.00	8,442.00	8,383.71	89.32	29.84	19.772	13,974.10	1,795.68	4,993.52	4,921.40	72.12	69.238	

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation



MS Directional Anticollision Report



Company:	Marathon Oil	Local Co-ordinate Reference:	Well Pierogi BS Federal Com 502H
Project:	Eddy County, New Mexico (NAD 27)	TVD Reference:	WELL @ 3022.50usft (Precision 580)
Reference Site:	Pierogi Federal Com (302H, 502H, 552H)	MD Reference:	WELL @ 3022.50usft (Precision 580)
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	Pierogi BS Federal Com 502H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	EDM 5000.15 Conroe DB
Reference Design:	Design #1	Offset TVD Reference:	Reference Datum

Offset Design: Fiddle Fire Fed Com (Offsets) - Fiddle Fee 24-28-23 WXY #9H - Wellbore #1 - Surveys													Offset Site Error:
Survey Program: 127-GYRO-NS, 705-MWD+HRGM													Offset Well Error:
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Semi Major Axis Reference (usft)	Offset (usft)	Azimuth from North (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Distance Between Centres (usft)	Distance Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning
18,200.00	8,235.00	8,442.00	8,383.71	90.13	29.84	20.183	13,974.10	1,795.68	4,900.06	4,827.29	72.77	67.340	
18,300.00	8,235.00	8,442.00	8,383.71	90.95	29.84	20.609	13,974.10	1,795.68	4,806.87	4,733.43	73.44	65.452	
18,400.00	8,235.00	8,442.00	8,383.71	91.76	29.84	21.053	13,974.10	1,795.68	4,713.95	4,639.80	74.15	63.575	
18,500.00	8,235.00	8,442.00	8,383.71	92.58	29.84	21.515	13,974.10	1,795.68	4,621.33	4,546.44	74.89	61.710	
18,600.00	8,235.00	8,442.00	8,383.71	93.40	29.84	21.995	13,974.10	1,795.68	4,529.03	4,453.36	75.66	59.858	
18,700.00	8,235.00	8,442.00	8,383.71	94.22	29.84	22.496	13,974.10	1,795.68	4,437.05	4,360.58	76.48	58.019	
18,800.00	8,235.00	8,442.00	8,383.71	95.04	29.84	23.018	13,974.10	1,795.68	4,345.44	4,268.11	77.33	56.194	
18,900.00	8,235.00	8,442.00	8,383.71	95.86	29.84	23.562	13,974.10	1,795.68	4,254.20	4,175.97	78.22	54.385	
19,000.00	8,235.00	8,442.00	8,383.71	96.68	29.84	24.130	13,974.10	1,795.68	4,163.36	4,084.19	79.16	52.592	
19,100.00	8,235.00	8,442.00	8,383.71	97.50	29.84	24.723	13,974.10	1,795.68	4,072.95	3,992.80	80.15	50.817	
19,200.00	8,235.00	8,442.00	8,383.71	98.32	29.84	25.343	13,974.10	1,795.68	3,983.00	3,901.81	81.19	49.060	
19,300.00	8,235.00	8,442.00	8,383.71	99.15	29.84	25.992	13,974.10	1,795.68	3,893.54	3,811.26	82.27	47.324	
19,400.00	8,235.00	8,442.00	8,383.71	99.97	29.84	26.671	13,974.10	1,795.68	3,804.60	3,721.19	83.42	45.608	
19,500.00	8,235.00	8,442.00	8,383.71	100.79	29.84	27.383	13,974.10	1,795.68	3,716.23	3,631.61	84.62	43.915	
19,600.00	8,235.00	8,442.00	8,383.71	101.62	29.84	28.129	13,974.10	1,795.68	3,628.46	3,542.58	85.89	42.246	
19,700.00	8,235.00	8,442.00	8,383.71	102.44	29.84	28.912	13,974.10	1,795.68	3,541.34	3,454.12	87.22	40.602	
19,800.00	8,235.00	8,442.00	8,383.71	103.27	29.84	29.735	13,974.10	1,795.68	3,454.92	3,366.30	88.62	38.985	
19,900.00	8,235.00	8,418.65	8,360.37	104.10	29.75	30.599	13,974.83	1,796.02	3,369.10	3,279.17	89.93	37.464	
20,000.00	8,235.00	8,416.72	8,358.44	104.92	29.75	31.508	13,974.90	1,796.05	3,284.21	3,192.75	91.47	35.906	
20,100.00	8,235.00	8,414.72	8,356.44	105.75	29.74	32.465	13,974.97	1,796.07	3,200.20	3,107.11	93.09	34.379	
20,200.00	8,235.00	8,412.63	8,354.35	106.58	29.73	33.474	13,975.05	1,796.10	3,117.12	3,022.33	94.79	32.885	
20,300.00	8,235.00	8,410.45	8,352.17	107.41	29.73	34.537	13,975.13	1,796.13	3,035.07	2,938.49	96.58	31.425	
20,400.00	8,235.00	8,408.17	8,349.90	108.24	29.72	35.659	13,975.22	1,796.16	2,954.11	2,855.65	98.46	30.002	
20,500.00	8,235.00	8,405.79	8,347.53	109.07	29.71	36.844	13,975.31	1,796.18	2,874.35	2,773.91	100.44	28.617	
20,600.00	8,235.00	8,403.31	8,345.04	109.90	29.70	38.096	13,975.42	1,796.21	2,795.90	2,693.37	102.52	27.271	
20,700.00	8,235.00	8,400.71	8,342.44	110.73	29.69	39.419	13,975.52	1,796.24	2,718.85	2,614.14	104.70	25.967	
20,800.00	8,235.00	8,397.98	8,339.72	111.56	29.68	40.819	13,975.64	1,796.27	2,643.33	2,536.34	106.99	24.706	
20,900.00	8,235.00	8,395.12	8,336.86	112.39	29.67	42.300	13,975.76	1,796.30	2,569.49	2,460.10	109.38	23.491	
21,000.00	8,235.00	8,392.12	8,333.86	113.23	29.66	43.867	13,975.90	1,796.33	2,497.45	2,385.58	111.88	22.323	
21,100.00	8,235.00	8,388.96	8,330.71	114.06	29.65	45.526	13,976.04	1,796.37	2,427.40	2,312.92	114.48	21.204	
21,200.00	8,235.00	8,385.63	8,327.38	114.89	29.64	47.281	13,976.20	1,796.40	2,359.50	2,242.32	117.18	20.136	
21,300.00	8,235.00	8,382.13	8,323.88	115.72	29.62	49.139	13,976.37	1,796.43	2,293.94	2,173.97	119.97	19.121	
21,400.00	8,235.00	8,378.42	8,320.18	116.56	29.61	51.103	13,976.55	1,796.46	2,230.94	2,108.09	122.85	18.160	
21,500.00	8,235.00	8,374.51	8,316.27	117.39	29.60	53.179	13,976.75	1,796.50	2,170.70	2,044.90	125.80	17.255	
21,600.00	8,235.00	8,370.36	8,312.13	118.23	29.58	55.369	13,976.96	1,796.53	2,113.47	1,984.66	128.81	16.408	
21,700.00	8,235.00	8,365.96	8,307.74	119.06	29.57	57.677	13,977.20	1,796.56	2,059.50	1,927.65	131.85	15.620	
21,800.00	8,235.00	8,361.28	8,303.07	119.90	29.55	60.104	13,977.46	1,796.59	2,009.04	1,874.14	134.90	14.893	
21,900.00	8,235.00	8,356.30	8,298.09	120.73	29.53	62.651	13,977.75	1,796.63	1,962.38	1,824.45	137.93	14.227	
22,000.00	8,235.00	8,348.00	8,289.81	121.57	29.50	65.310	13,978.24	1,796.67	1,919.78	1,778.89	140.89	13.627	
22,100.00	8,235.00	8,348.00	8,289.81	122.41	29.50	68.097	13,978.24	1,796.67	1,881.51	1,737.73	143.79	13.085	
22,200.00	8,235.00	8,348.00	8,289.81	123.24	29.50	70.992	13,978.24	1,796.67	1,847.87	1,701.33	146.55	12.609	
22,300.00	8,235.00	8,348.00	8,289.81	124.08	29.50	73.986	13,978.24	1,796.67	1,819.12	1,670.00	149.12	12.199	
22,400.00	8,235.00	8,348.00	8,289.81	124.92	29.50	77.069	13,978.24	1,796.67	1,795.47	1,644.03	151.45	11.856	
22,500.00	8,235.00	8,348.00	8,289.81	125.76	29.50	80.224	13,978.24	1,796.67	1,777.15	1,623.66	153.49	11.578	
22,600.00	8,235.00	8,348.00	8,289.81	126.59	29.50	83.435	13,978.24	1,796.67	1,764.32	1,609.10	155.22	11.367	
22,700.00	8,235.00	8,318.80	8,260.67	127.43	29.39	86.622	13,980.10	1,796.90	1,756.76	1,600.25	156.51	11.224	
22,779.39	8,235.00	8,314.90	8,256.78	128.10	29.38	89.204	13,980.36	1,796.95	1,754.97	1,597.64	157.33	11.154 CC	
22,800.00	8,235.00	8,313.88	8,255.76	128.27	29.37	89.875	13,980.42	1,796.96	1,755.09	1,597.58	157.51	11.143 ES	
22,900.00	8,235.00	8,308.83	8,250.72	129.11	29.36	93.122	13,980.76	1,797.02	1,759.10	1,600.98	158.12	11.125 SF	
23,000.00	8,235.00	8,303.66	8,245.56	129.95	29.34	96.345	13,981.12	1,797.09	1,768.74	1,610.40	158.34	11.170	
23,100.00	8,235.00	8,298.36	8,240.27	130.79	29.32	99.521	13,981.48	1,797.16	1,783.92	1,625.73	158.19	11.277	
23,200.00	8,235.00	8,292.92	8,234.85	131.63	29.30	102.634	13,981.86	1,797.24	1,804.50	1,646.82	157.68	11.444	

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation



MS Directional Anticollision Report



Company:	Marathon Oil	Local Co-ordinate Reference:	Well Pierogi BS Federal Com 502H
Project:	Eddy County, New Mexico (NAD 27)	TVD Reference:	WELL @ 3022.50usft (Precision 580)
Reference Site:	Pierogi Federal Com (302H, 502H, 552H)	MD Reference:	WELL @ 3022.50usft (Precision 580)
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	Pierogi BS Federal Com 502H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	EDM 5000.15 Conroe DB
Reference Design:	Design #1	Offset TVD Reference:	Reference Datum

Offset Design: Fiddle Fire Fed Com (Offsets) - Fiddle Fee 24-28-23 WXY #9H - Wellbore #1 - Surveys													Offset Site Error: 0.00 usft
Survey Program: 127-GYRO-NS, 705-MWD+HRGM													Offset Well Error: 0.00 usft
Reference	Offset	Semi Major Axis	Reference	Offset	Offset Wellbore Centre	Rule Assigned:	Distance	Between	Between	Minimum	Separation	Warning	
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Reference	Offset	+N-S (usft)	+E-W (usft)	Centres (usft)	Ellipses (usft)	Separation (usft)	Factor
23,300.00	8,235.00	8,287.34	8,229.29	132.47	29.28	105.668		13,982.26	1,797.34	1,830.30	1,673.46	156.84	11.670
23,400.00	8,235.00	8,281.62	8,223.58	133.31	29.25	108.608		13,982.67	1,797.43	1,861.10	1,705.39	155.71	11.952
23,500.00	8,235.00	8,275.74	8,217.72	134.15	29.23	111.446		13,983.09	1,797.54	1,896.66	1,742.32	154.34	12.289
23,600.00	8,235.00	8,269.70	8,211.70	134.99	29.21	114.172		13,983.54	1,797.66	1,936.71	1,783.96	152.75	12.679
23,700.00	8,235.00	8,263.50	8,205.52	135.83	29.19	116.781		13,984.00	1,797.79	1,980.98	1,829.99	150.99	13.120
23,800.00	8,235.00	8,257.13	8,199.17	136.68	29.16	119.271		13,984.48	1,797.93	2,029.20	1,880.09	149.10	13.609
23,900.00	8,235.00	8,250.58	8,192.64	137.52	29.14	121.641		13,984.99	1,798.08	2,081.08	1,933.96	147.12	14.145
24,000.00	8,235.00	8,243.85	8,185.93	138.36	29.11	123.891		13,985.51	1,798.24	2,136.36	1,991.28	145.08	14.726
24,004.19	8,235.00	8,243.56	8,185.64	138.39	29.11	123.983		13,985.53	1,798.25	2,138.75	1,993.75	144.99	14.751

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation



MS Directional Anticollision Report



Company:	Marathon Oil	Local Co-ordinate Reference:	Well Pierogi BS Federal Com 502H
Project:	Eddy County, New Mexico (NAD 27)	TVD Reference:	WELL @ 3022.50usft (Precision 580)
Reference Site:	Pierogi Federal Com (302H, 502H, 552H)	MD Reference:	WELL @ 3022.50usft (Precision 580)
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	Pierogi BS Federal Com 502H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	EDM 5000.15 Conroe DB
Reference Design:	Design #1	Offset TVD Reference:	Reference Datum

Offset Design: Fiddle Fire Fed Com (Offsets) - Tiger 14-24S-28E RB #124H - Wellbore #1 - Surveys													Offset Site Error:
Survey Program: 104-IS-GYRO-WLINE, 692-GYRO-NS, 7616-MWD+HRGM													Offset Well Error:
Reference	Offset	Semi Major Axis		Rule Assigned:		Distance		Minimum		Separation		Warning	
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference	Offset	Azimuth from North (°)	+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Separation (usft)	Factor	
14,700.00	8,235.00	12,975.00	8,201.99	62.37	112.65	10.032	15,678.03	1,888.32	9,952.90	9,809.88	143.02	69.593	
14,800.00	8,235.00	12,975.00	8,201.99	63.14	112.65	10.142	15,678.03	1,888.32	9,854.70	9,711.58	143.12	68.856	
14,900.00	8,235.00	12,975.00	8,201.99	63.90	112.65	10.253	15,678.03	1,888.32	9,756.53	9,613.31	143.23	68.120	
15,000.00	8,235.00	12,975.00	8,201.99	64.67	112.65	10.367	15,678.03	1,888.32	9,658.41	9,515.07	143.34	67.383	
15,100.00	8,235.00	12,975.00	8,201.99	65.44	112.65	10.483	15,678.03	1,888.32	9,560.32	9,416.87	143.45	66.645	
15,200.00	8,235.00	12,975.00	8,201.99	66.21	112.65	10.601	15,678.03	1,888.32	9,462.27	9,318.70	143.57	65.908	
15,300.00	8,235.00	12,975.00	8,201.99	66.98	112.65	10.722	15,678.03	1,888.32	9,364.26	9,220.58	143.69	65.171	
15,400.00	8,235.00	12,975.00	8,201.99	67.76	112.65	10.846	15,678.03	1,888.32	9,266.30	9,122.49	143.81	64.434	
15,500.00	8,235.00	12,975.00	8,201.99	68.54	112.65	10.972	15,678.03	1,888.32	9,168.38	9,024.44	143.94	63.696	
15,600.00	8,235.00	12,975.00	8,201.99	69.32	112.65	11.100	15,678.03	1,888.32	9,070.50	8,926.43	144.07	62.959	
15,700.00	8,235.00	12,975.00	8,201.99	70.10	112.65	11.232	15,678.03	1,888.32	8,972.68	8,828.47	144.21	62.221	
15,800.00	8,235.00	12,975.00	8,201.99	70.89	112.65	11.367	15,678.03	1,888.32	8,874.90	8,730.55	144.34	61.484	
15,900.00	8,235.00	12,975.00	8,201.99	71.67	112.65	11.504	15,678.03	1,888.32	8,777.17	8,632.68	144.49	60.747	
16,000.00	8,235.00	12,975.00	8,201.99	72.46	112.65	11.645	15,678.03	1,888.32	8,679.49	8,534.85	144.64	60.009	
16,100.00	8,235.00	12,975.00	8,201.99	73.25	112.65	11.789	15,678.03	1,888.32	8,581.87	8,437.08	144.79	59.272	
16,200.00	8,235.00	12,975.00	8,201.99	74.04	112.65	11.936	15,678.03	1,888.32	8,484.30	8,339.35	144.94	58.535	
16,300.00	8,235.00	12,975.00	8,201.99	74.83	112.65	12.086	15,678.03	1,888.32	8,386.79	8,241.68	145.11	57.798	
16,400.00	8,235.00	12,975.00	8,201.99	75.63	112.65	12.240	15,678.03	1,888.32	8,289.33	8,144.06	145.27	57.061	
16,500.00	8,235.00	12,975.00	8,201.99	76.42	112.65	12.398	15,678.03	1,888.32	8,191.94	8,046.50	145.44	56.324	
16,600.00	8,235.00	12,975.00	8,201.99	77.22	112.65	12.560	15,678.03	1,888.32	8,094.61	7,948.99	145.62	55.587	
16,700.00	8,235.00	12,975.00	8,201.99	78.02	112.65	12.725	15,678.03	1,888.32	7,997.35	7,851.55	145.80	54.851	
16,800.00	8,235.00	12,975.00	8,201.99	78.82	112.65	12.895	15,678.03	1,888.32	7,900.16	7,754.17	145.99	54.115	
16,900.00	8,235.00	12,975.00	8,201.99	79.62	112.65	13.069	15,678.03	1,888.32	7,803.04	7,656.86	146.18	53.379	
17,000.00	8,235.00	12,975.00	8,201.99	80.42	112.65	13.247	15,678.03	1,888.32	7,705.99	7,559.61	146.38	52.643	
17,100.00	8,235.00	12,975.00	8,201.99	81.22	112.65	13.429	15,678.03	1,888.32	7,609.02	7,462.43	146.59	51.908	
17,200.00	8,235.00	12,975.00	8,201.99	82.03	112.65	13.617	15,678.03	1,888.32	7,512.13	7,365.33	146.80	51.173	
17,300.00	8,235.00	12,975.00	8,201.99	82.83	112.65	13.809	15,678.03	1,888.32	7,415.32	7,268.30	147.02	50.438	
17,400.00	8,235.00	12,975.00	8,201.99	83.64	112.65	14.007	15,678.03	1,888.32	7,318.59	7,171.35	147.24	49.704	
17,500.00	8,235.00	12,975.00	8,201.99	84.45	112.65	14.209	15,678.03	1,888.32	7,221.96	7,074.48	147.47	48.971	
17,600.00	8,235.00	12,975.00	8,201.99	85.26	112.65	14.417	15,678.03	1,888.32	7,125.41	6,977.70	147.71	48.238	
17,700.00	8,235.00	12,975.00	8,201.99	86.07	112.65	14.631	15,678.03	1,888.32	7,028.97	6,881.01	147.96	47.505	
17,800.00	8,235.00	12,975.00	8,201.99	86.88	112.65	14.851	15,678.03	1,888.32	6,932.62	6,784.41	148.22	46.773	
17,900.00	8,235.00	12,975.00	8,201.99	87.69	112.65	15.077	15,678.03	1,888.32	6,836.38	6,687.90	148.48	46.042	
18,000.00	8,235.00	12,975.00	8,201.99	88.50	112.65	15.310	15,678.03	1,888.32	6,740.25	6,591.50	148.75	45.312	
18,100.00	8,235.00	12,975.00	8,201.99	89.32	112.65	15.549	15,678.03	1,888.32	6,644.24	6,495.20	149.03	44.582	
18,200.00	8,235.00	12,975.00	8,201.99	90.13	112.65	15.795	15,678.03	1,888.32	6,548.34	6,399.01	149.33	43.853	
18,300.00	8,235.00	12,975.00	8,201.99	90.95	112.65	16.049	15,678.03	1,888.32	6,452.57	6,302.94	149.63	43.125	
18,400.00	8,235.00	12,975.00	8,201.99	91.76	112.65	16.310	15,678.03	1,888.32	6,356.93	6,206.99	149.94	42.398	
18,500.00	8,235.00	12,975.00	8,201.99	92.58	112.65	16.579	15,678.03	1,888.32	6,261.42	6,111.16	150.26	41.672	
18,600.00	8,235.00	12,975.00	8,201.99	93.40	112.65	16.857	15,678.03	1,888.32	6,166.06	6,015.47	150.59	40.947	
18,700.00	8,235.00	12,975.00	8,201.99	94.22	112.65	17.143	15,678.03	1,888.32	6,070.84	5,919.91	150.93	40.223	
18,800.00	8,235.00	12,975.00	8,201.99	95.04	112.65	17.438	15,678.03	1,888.32	5,975.78	5,824.50	151.28	39.500	
18,900.00	8,235.00	12,975.00	8,201.99	95.86	112.65	17.743	15,678.03	1,888.32	5,880.89	5,729.24	151.65	38.779	
19,000.00	8,235.00	12,975.00	8,201.99	96.68	112.65	18.058	15,678.03	1,888.32	5,786.17	5,634.14	152.03	38.059	
19,100.00	8,235.00	12,975.00	8,201.99	97.50	112.65	18.383	15,678.03	1,888.32	5,691.63	5,539.20	152.42	37.341	
19,200.00	8,235.00	12,975.00	8,201.99	98.32	112.65	18.719	15,678.03	1,888.32	5,597.27	5,444.45	152.83	36.625	
19,300.00	8,235.00	12,975.00	8,201.99	99.15	112.65	19.067	15,678.03	1,888.32	5,503.12	5,349.88	153.25	35.910	
19,400.00	8,235.00	12,975.00	8,201.99	99.97	112.65	19.427	15,678.03	1,888.32	5,409.18	5,255.50	153.68	35.197	
19,500.00	8,235.00	12,975.00	8,201.99	100.79	112.65	19.800	15,678.03	1,888.32	5,315.46	5,161.33	154.13	34.487	
19,600.00	8,235.00	12,975.00	8,201.99	101.62	112.65	20.186	15,678.03	1,888.32	5,221.97	5,067.37	154.60	33.778	
19,700.00	8,235.00	12,975.00	8,201.99	102.44	112.65	20.586	15,678.03	1,888.32	5,128.73	4,973.65	155.08	33.072	
19,800.00	8,235.00	12,975.00	8,201.99	103.27	112.65	21.001	15,678.03	1,888.32	5,035.74	4,880.17	155.58	32.368	

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation



MS Directional Anticollision Report



Company:	Marathon Oil	Local Co-ordinate Reference:	Well Pierogi BS Federal Com 502H
Project:	Eddy County, New Mexico (NAD 27)	TVD Reference:	WELL @ 3022.50usft (Precision 580)
Reference Site:	Pierogi Federal Com (302H, 502H, 552H)	MD Reference:	WELL @ 3022.50usft (Precision 580)
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	Pierogi BS Federal Com 502H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	EDM 5000.15 Conroe DB
Reference Design:	Design #1	Offset TVD Reference:	Reference Datum

Offset Design: Fiddle Fire Fed Com (Offsets) - Tiger 14-24S-28E RB #124H - Wellbore #1 - Surveys													Offset Site Error:
Survey Program: 104-IS-GYRO-WLINE, 692-GYRO-NS, 7616-MWD+HRGM													Offset Well Error:
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference	Offset	Semi Major Axis	Azimuth from North (°)	Offset Wellbore Centre	+N/-S (usft)	+E/-W (usft)	Distance Between Centres (usft)	Minimum Separation (usft)	Warning
19,900.00	8,235.00	12,975.00	8,201.99	104.10	112.65	21.431	15,678.03	1,888.32	4,943.03	4,786.94	156.09	31.667	
20,000.00	8,235.00	12,975.00	8,201.99	104.92	112.65	21.878	15,678.03	1,888.32	4,850.62	4,693.99	156.63	30.969	
20,100.00	8,235.00	12,975.00	8,201.99	105.75	112.65	22.342	15,678.03	1,888.32	4,758.50	4,601.32	157.18	30.274	
20,200.00	8,235.00	12,975.00	8,201.99	106.58	112.65	22.824	15,678.03	1,888.32	4,666.71	4,508.96	157.75	29.583	
20,300.00	8,235.00	12,975.00	8,201.99	107.41	112.65	23.326	15,678.03	1,888.32	4,575.27	4,416.93	158.34	28.895	
20,400.00	8,235.00	12,975.00	8,201.99	108.24	112.65	23.848	15,678.03	1,888.32	4,484.19	4,325.24	158.95	28.211	
20,500.00	8,235.00	12,975.00	8,201.99	109.07	112.65	24.392	15,678.03	1,888.32	4,393.50	4,233.91	159.59	27.531	
20,600.00	8,235.00	12,975.00	8,201.99	109.90	112.65	24.959	15,678.03	1,888.32	4,303.22	4,142.98	160.24	26.855	
20,700.00	8,235.00	12,975.00	8,201.99	110.73	112.65	25.550	15,678.03	1,888.32	4,213.38	4,052.47	160.92	26.184	
20,800.00	8,235.00	12,975.00	8,201.99	111.56	112.65	26.166	15,678.03	1,888.32	4,124.01	3,962.40	161.61	25.518	
20,900.00	8,235.00	12,975.00	8,201.99	112.39	112.65	26.810	15,678.03	1,888.32	4,035.14	3,872.80	162.33	24.857	
21,000.00	8,235.00	12,975.00	8,201.99	113.23	112.65	27.483	15,678.03	1,888.32	3,946.80	3,783.72	163.07	24.203	
21,100.00	8,235.00	12,975.00	8,201.99	114.06	112.65	28.186	15,678.03	1,888.32	3,859.02	3,695.19	163.84	23.554	
21,200.00	8,235.00	12,975.00	8,201.99	114.89	112.65	28.923	15,678.03	1,888.32	3,771.86	3,607.24	164.62	22.912	
21,300.00	8,235.00	12,975.00	8,201.99	115.72	112.65	29.693	15,678.03	1,888.32	3,685.35	3,519.92	165.43	22.277	
21,400.00	8,235.00	12,975.00	8,201.99	116.56	112.65	30.501	15,678.03	1,888.32	3,599.54	3,433.28	166.26	21.650	
21,500.00	8,235.00	12,975.00	8,201.99	117.39	112.65	31.348	15,678.03	1,888.32	3,514.48	3,347.37	167.11	21.031	
21,600.00	8,235.00	12,975.00	8,201.99	118.23	112.65	32.237	15,678.03	1,888.32	3,430.22	3,262.25	167.97	20.421	
21,700.00	8,235.00	12,975.00	8,201.99	119.06	112.65	33.170	15,678.03	1,888.32	3,346.84	3,177.98	168.86	19.820	
21,800.00	8,235.00	12,975.00	8,201.99	119.90	112.65	34.151	15,678.03	1,888.32	3,264.38	3,094.63	169.75	19.230	
21,900.00	8,235.00	12,975.00	8,201.99	120.73	112.65	35.182	15,678.03	1,888.32	3,182.93	3,012.27	170.66	18.650	
22,000.00	8,235.00	12,975.00	8,201.99	121.57	112.65	36.267	15,678.03	1,888.32	3,102.57	2,930.99	171.58	18.082	
22,100.00	8,235.00	12,975.00	8,201.99	122.41	112.65	37.409	15,678.03	1,888.32	3,023.38	2,850.88	172.50	17.527	
22,200.00	8,235.00	12,975.00	8,201.99	123.24	112.65	38.613	15,678.03	1,888.32	2,945.45	2,772.04	173.41	16.985	
22,300.00	8,235.00	12,975.00	8,201.99	124.08	112.65	39.881	15,678.03	1,888.32	2,868.89	2,694.58	174.32	16.458	
22,400.00	8,235.00	12,975.00	8,201.99	124.92	112.65	41.217	15,678.03	1,888.32	2,793.82	2,618.62	175.20	15.946	
22,500.00	8,235.00	12,975.00	8,201.99	125.76	112.65	42.627	15,678.03	1,888.32	2,720.35	2,544.29	176.06	15.451	
22,600.00	8,235.00	12,975.00	8,201.99	126.59	112.65	44.115	15,678.03	1,888.32	2,648.62	2,471.74	176.88	14.974	
22,700.00	8,235.00	12,975.00	8,201.99	127.43	112.65	45.684	15,678.03	1,888.32	2,578.77	2,401.12	177.65	14.516	
22,800.00	8,235.00	12,975.00	8,201.99	128.27	112.65	47.339	15,678.03	1,888.32	2,510.96	2,332.61	178.34	14.079	
22,900.00	8,235.00	12,975.00	8,201.99	129.11	112.65	49.084	15,678.03	1,888.32	2,445.36	2,266.40	178.96	13.665	
23,000.00	8,235.00	12,975.00	8,201.99	129.95	112.65	50.924	15,678.03	1,888.32	2,382.15	2,202.69	179.46	13.274	
23,100.00	8,235.00	12,975.00	8,201.99	130.79	112.65	52.862	15,678.03	1,888.32	2,321.54	2,141.69	179.84	12.909	
23,200.00	8,235.00	12,975.00	8,201.99	131.63	112.65	54.901	15,678.03	1,888.32	2,263.71	2,083.64	180.07	12.571	
23,300.00	8,235.00	12,975.00	8,201.99	132.47	112.65	57.044	15,678.03	1,888.32	2,208.91	2,028.78	180.13	12.263	
23,400.00	8,235.00	12,975.00	8,201.99	133.31	112.65	59.294	15,678.03	1,888.32	2,157.35	1,977.36	179.99	11.986	
23,500.00	8,235.00	12,975.00	8,201.99	134.15	112.65	61.649	15,678.03	1,888.32	2,109.27	1,929.64	179.63	11.742	
23,600.00	8,235.00	12,975.00	8,201.99	134.99	112.65	64.110	15,678.03	1,888.32	2,064.92	1,885.89	179.03	11.534	
23,700.00	8,235.00	12,975.00	8,201.99	135.83	112.65	66.674	15,678.03	1,888.32	2,024.54	1,846.36	178.18	11.362	
23,800.00	8,235.00	12,975.00	8,201.99	136.68	112.65	69.337	15,678.03	1,888.32	1,988.38	1,811.29	177.09	11.228	
23,900.00	8,235.00	12,975.00	8,201.99	137.52	112.65	72.093	15,678.03	1,888.32	1,956.66	1,780.90	175.76	11.133	
24,000.00	8,235.00	12,975.00	8,201.99	138.36	112.65	74.932	15,678.03	1,888.32	1,929.61	1,755.37	174.24	11.074	
24,004.19	8,235.00	12,975.00	8,201.99	138.39	112.65	75.053	15,678.03	1,888.32	1,928.58	1,754.40	174.18	11.073 CC, ES, SF	

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation



MS Directional Anticollision Report



Company:	Marathon Oil	Local Co-ordinate Reference:	Well Pierogi BS Federal Com 502H
Project:	Eddy County, New Mexico (NAD 27)	TVD Reference:	WELL @ 3022.50usft (Precision 580)
Reference Site:	Pierogi Federal Com (302H, 502H, 552H)	MD Reference:	WELL @ 3022.50usft (Precision 580)
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	Pierogi BS Federal Com 502H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	EDM 5000.15 Conroe DB
Reference Design:	Design #1	Offset TVD Reference:	Reference Datum

Offset Design: George (113H, 114H, 123H) - George 113H - Wellbore #1 - Surveys													Offset Site Error:	0.00 usft
Survey Program: 224-Reference		Offset		Semi Major Axis		Offset Wellbore Centre			Rule Assigned: Distance				Offset Well Error:	0.00 usft
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Azimuth from North (°)	+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning	
16,100.00	8,235.00	14,575.99	7,318.25	73.25	166.63	0.760	17,229.08	267.14	9,994.86	9,798.57	196.29	50.919		
16,200.00	8,235.00	14,577.64	7,318.27	74.04	166.66	0.767	17,229.11	265.50	9,895.32	9,698.94	196.38	50.389		
16,300.00	8,235.00	14,579.30	7,318.29	74.83	166.70	0.773	17,229.13	263.83	9,795.79	9,599.32	196.47	49.858		
16,400.00	8,235.00	14,600.00	7,318.71	75.63	167.17	0.666	17,229.47	243.14	9,696.30	9,499.32	196.99	49.223		
16,500.00	8,235.00	14,600.00	7,318.71	76.42	167.17	0.682	17,229.47	243.14	9,596.79	9,399.74	197.04	48.704		
16,600.00	8,235.00	14,600.00	7,318.71	77.22	167.17	0.697	17,229.47	243.14	9,497.28	9,300.18	197.10	48.185		
16,700.00	8,235.00	14,600.00	7,318.71	78.02	167.17	0.713	17,229.47	243.14	9,397.79	9,200.63	197.16	47.666		
16,800.00	8,235.00	14,600.00	7,318.71	78.82	167.17	0.730	17,229.47	243.14	9,298.30	9,101.08	197.22	47.147		
16,900.00	8,235.00	14,600.00	7,318.71	79.62	167.17	0.746	17,229.47	243.14	9,198.83	9,001.55	197.28	46.628		
17,000.00	8,235.00	14,600.00	7,318.71	80.42	167.17	0.763	17,229.47	243.14	9,099.37	8,902.03	197.34	46.109		
17,100.00	8,235.00	14,600.00	7,318.71	81.22	167.17	0.781	17,229.47	243.14	8,999.92	8,802.51	197.41	45.590		
17,200.00	8,235.00	14,600.00	7,318.71	82.03	167.17	0.798	17,229.47	243.14	8,900.49	8,703.01	197.47	45.072		
17,300.00	8,235.00	14,600.00	7,318.71	82.83	167.17	0.817	17,229.47	243.14	8,801.06	8,603.52	197.54	44.554		
17,400.00	8,235.00	14,600.00	7,318.71	83.64	167.17	0.835	17,229.47	243.14	8,701.65	8,504.05	197.61	44.036		
17,500.00	8,235.00	14,607.82	7,318.92	84.45	167.35	0.802	17,229.60	235.32	8,602.25	8,404.41	197.84	43.480		
17,600.00	8,235.00	14,618.25	7,319.20	85.26	167.59	0.750	17,229.77	224.90	8,502.87	8,304.73	198.14	42.913		
17,700.00	8,235.00	14,628.17	7,319.48	86.07	167.81	0.701	17,229.93	214.98	8,403.49	8,205.06	198.43	42.350		
17,800.00	8,235.00	14,637.62	7,319.76	86.88	168.02	0.653	17,230.07	205.54	8,304.13	8,105.42	198.70	41.791		
17,900.00	8,235.00	14,646.63	7,320.03	87.69	168.23	0.608	17,230.20	196.54	8,204.77	8,005.80	198.97	41.236		
18,000.00	8,235.00	14,655.23	7,320.30	88.50	168.42	0.564	17,230.32	187.94	8,105.43	7,906.20	199.23	40.683		
18,100.00	8,235.00	14,663.45	7,320.56	89.32	168.61	0.522	17,230.42	179.73	8,006.11	7,806.62	199.49	40.134		
18,200.00	8,235.00	14,671.31	7,320.81	90.13	168.79	0.481	17,230.52	171.87	7,906.79	7,707.06	199.73	39.587		
18,300.00	8,235.00	14,678.84	7,321.06	90.95	168.96	0.442	17,230.61	164.34	7,807.50	7,607.53	199.97	39.043		
18,400.00	8,235.00	14,686.06	7,321.30	91.76	169.12	0.404	17,230.69	157.13	7,708.22	7,508.01	200.20	38.502		
18,500.00	8,235.00	14,692.98	7,321.54	92.58	169.28	0.368	17,230.77	150.21	7,608.95	7,408.52	200.43	37.962		
18,600.00	8,235.00	14,699.63	7,321.77	93.40	169.43	0.332	17,230.84	143.57	7,509.70	7,309.05	200.66	37.426		
18,700.00	8,235.00	14,706.01	7,322.00	94.22	169.58	0.298	17,230.90	137.19	7,410.47	7,209.60	200.88	36.891		
18,800.00	8,235.00	14,712.16	7,322.22	95.04	169.72	0.265	17,230.96	131.05	7,311.26	7,110.17	201.09	36.358		
18,900.00	8,235.00	14,675.06	7,321.00	95.86	168.87	0.576	17,230.51	168.12	7,212.06	7,011.68	200.38	35.993		
19,000.00	8,235.00	14,677.84	7,321.09	96.68	168.94	0.573	17,230.55	165.34	7,112.91	6,912.38	200.52	35.472		
19,100.00	8,235.00	14,680.63	7,321.17	97.50	169.00	0.570	17,230.59	162.56	7,013.77	6,813.10	200.67	34.952		
19,200.00	8,235.00	14,683.41	7,321.26	98.32	169.06	0.567	17,230.63	159.78	6,914.67	6,713.85	200.82	34.432		
19,300.00	8,235.00	14,686.19	7,321.34	99.15	169.13	0.563	17,230.67	156.99	6,815.59	6,614.61	200.97	33.913		
19,400.00	8,235.00	14,688.98	7,321.43	99.97	169.19	0.560	17,230.71	154.21	6,716.53	6,515.40	201.13	33.394		
19,500.00	8,235.00	14,691.76	7,321.51	100.79	169.25	0.556	17,230.75	151.43	6,617.50	6,416.22	201.28	32.877		
19,600.00	8,235.00	14,694.54	7,321.60	101.62	169.32	0.552	17,230.78	148.65	6,518.50	6,317.06	201.44	32.359		
19,700.00	8,235.00	14,713.43	7,322.22	102.44	169.75	0.403	17,230.99	129.78	6,419.49	6,217.54	201.94	31.788		
19,800.00	8,235.00	14,715.07	7,322.27	103.27	169.78	0.407	17,231.01	128.13	6,320.54	6,118.46	202.08	31.277		
19,900.00	8,235.00	14,716.73	7,322.32	104.10	169.82	0.412	17,231.03	126.47	6,221.63	6,019.41	202.22	30.766		
20,000.00	8,235.00	14,718.40	7,322.37	104.92	169.86	0.416	17,231.05	124.81	6,122.75	5,920.38	202.37	30.256		
20,100.00	8,235.00	14,720.08	7,322.42	105.75	169.90	0.420	17,231.07	123.13	6,023.91	5,821.39	202.51	29.746		
20,200.00	8,235.00	14,721.77	7,322.47	106.58	169.94	0.424	17,231.09	121.43	5,925.10	5,722.44	202.66	29.236		
20,300.00	8,235.00	14,723.48	7,322.52	107.41	169.97	0.428	17,231.11	119.73	5,826.34	5,623.52	202.82	28.727		
20,400.00	8,235.00	14,725.20	7,322.57	108.24	170.01	0.433	17,231.13	118.01	5,727.62	5,524.64	202.97	28.219		
20,500.00	8,235.00	14,726.93	7,322.61	109.07	170.05	0.437	17,231.15	116.28	5,628.94	5,425.80	203.13	27.710		
20,600.00	8,235.00	14,728.67	7,322.66	109.90	170.09	0.441	17,231.17	114.54	5,530.31	5,327.01	203.30	27.203		
20,700.00	8,235.00	14,730.43	7,322.71	110.73	170.13	0.445	17,231.20	112.78	5,431.73	5,228.26	203.47	26.695		
20,800.00	8,235.00	14,732.20	7,322.76	111.56	170.17	0.450	17,231.22	111.01	5,333.20	5,129.55	203.65	26.189		
20,900.00	8,235.00	14,733.98	7,322.81	112.39	170.21	0.454	17,231.24	109.23	5,234.72	5,030.90	203.83	25.682		
21,000.00	8,235.00	14,735.78	7,322.85	113.23	170.25	0.458	17,231.26	107.44	5,136.30	4,932.29	204.01	25.177		
21,100.00	8,235.00	14,737.58	7,322.90	114.06	170.29	0.463	17,231.29	105.63	5,037.95	4,833.75	204.20	24.671		
21,200.00	8,235.00	14,739.41	7,322.95	114.89	170.34	0.467	17,231.31	103.81	4,939.66	4,735.26	204.40	24.167		

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation



MS Directional Anticollision Report



Company:	Marathon Oil	Local Co-ordinate Reference:	Well Pierogi BS Federal Com 502H
Project:	Eddy County, New Mexico (NAD 27)	TVD Reference:	WELL @ 3022.50usft (Precision 580)
Reference Site:	Pierogi Federal Com (302H, 502H, 552H)	MD Reference:	WELL @ 3022.50usft (Precision 580)
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	Pierogi BS Federal Com 502H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	EDM 5000.15 Conroe DB
Reference Design:	Design #1	Offset TVD Reference:	Reference Datum

Offset Design: George (113H, 114H, 123H) - George 113H - Wellbore #1 - Surveys													Offset Site Error: 0.00 usft
Survey Program: 224-Reference													Offset Well Error: 0.00 usft
Measured Depth (usft)	Vertical Depth (usft)	Offset Measured Depth (usft)	Offset Vertical Depth (usft)	Semi Major Axis Reference (usft)	Semi Major Axis Offset (usft)	Azimuth from North (°)	Offset Wellbore Centre +N/-S (usft)	Offset Wellbore Centre +E/-W (usft)	Distance Between Centres (usft)	Rule Assigned: Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning
21,300.00	8,235.00	14,741.24	7,322.99	115.72	170.38	0.472	17,231.33	101.97	4,841.44	4,636.83	204.60	23.663	
21,400.00	8,235.00	14,743.09	7,323.04	116.56	170.42	0.476	17,231.36	100.12	4,743.29	4,538.47	204.82	23.159	
21,500.00	8,235.00	14,744.96	7,323.08	117.39	170.46	0.481	17,231.38	98.26	4,645.22	4,440.18	205.03	22.656	
21,600.00	8,235.00	14,746.83	7,323.13	118.23	170.50	0.485	17,231.41	96.38	4,547.23	4,341.97	205.26	22.153	
21,700.00	8,235.00	14,748.73	7,323.17	119.06	170.55	0.490	17,231.43	94.49	4,449.33	4,243.83	205.50	21.651	
21,800.00	8,235.00	14,750.63	7,323.22	119.90	170.59	0.494	17,231.46	92.59	4,351.53	4,145.78	205.75	21.150	
21,900.00	8,235.00	14,752.55	7,323.26	120.73	170.63	0.499	17,231.48	90.67	4,253.82	4,047.82	206.00	20.649	
22,000.00	8,235.00	14,754.49	7,323.30	121.57	170.68	0.503	17,231.51	88.73	4,156.23	3,949.96	206.27	20.149	
22,100.00	8,235.00	14,756.44	7,323.34	122.41	170.72	0.508	17,231.54	86.78	4,058.75	3,852.20	206.55	19.650	
22,200.00	8,235.00	14,758.41	7,323.39	123.24	170.77	0.513	17,231.56	84.82	3,961.39	3,754.55	206.84	19.152	
22,300.00	8,235.00	14,760.39	7,323.43	124.08	170.81	0.517	17,231.59	82.84	3,864.17	3,657.02	207.15	18.654	
22,400.00	8,235.00	14,762.38	7,323.47	124.92	170.86	0.522	17,231.62	80.84	3,767.09	3,559.62	207.47	18.157	
22,500.00	8,235.00	14,764.40	7,323.51	125.76	170.90	0.526	17,231.65	78.83	3,670.17	3,462.35	207.81	17.661	
22,600.00	8,235.00	14,766.42	7,323.55	126.59	170.95	0.531	17,231.68	76.80	3,573.41	3,365.24	208.17	17.166	
22,700.00	8,235.00	14,768.47	7,323.59	127.43	171.00	0.536	17,231.71	74.76	3,476.84	3,268.29	208.55	16.671	
22,800.00	8,235.00	14,770.53	7,323.63	128.27	171.04	0.540	17,231.74	72.70	3,380.46	3,171.51	208.95	16.178	
22,900.00	8,235.00	14,772.61	7,323.66	129.11	171.09	0.545	17,231.77	70.62	3,284.30	3,074.93	209.37	15.687	
23,000.00	8,235.00	14,774.70	7,323.70	129.95	171.14	0.550	17,231.80	68.53	3,188.38	2,978.56	209.82	15.196	
23,100.00	8,235.00	14,776.81	7,323.74	130.79	171.19	0.554	17,231.83	66.42	3,092.71	2,882.42	210.29	14.707	
23,200.00	8,235.00	14,791.00	7,323.96	131.63	171.51	0.317	17,232.05	52.23	2,997.35	2,786.34	211.01	14.205	
23,300.00	8,235.00	14,791.00	7,323.96	132.47	171.51	0.357	17,232.05	52.23	2,902.26	2,690.76	211.50	13.722	
23,400.00	8,235.00	14,791.00	7,323.96	133.31	171.51	0.401	17,232.05	52.23	2,807.51	2,595.49	212.02	13.242	
23,500.00	8,235.00	14,791.00	7,323.96	134.15	171.51	0.447	17,232.05	52.23	2,713.14	2,500.56	212.58	12.763	
23,600.00	8,235.00	14,791.00	7,323.96	134.99	171.51	0.498	17,232.05	52.23	2,619.18	2,406.00	213.18	12.286	
23,700.00	8,235.00	14,791.00	7,323.96	135.83	171.51	0.553	17,232.05	52.23	2,525.69	2,311.88	213.81	11.813	
23,800.00	8,235.00	14,791.00	7,323.96	136.68	171.51	0.613	17,232.05	52.23	2,432.72	2,218.22	214.49	11.342	
23,900.00	8,235.00	14,791.00	7,323.96	137.52	171.51	0.678	17,232.05	52.23	2,340.32	2,125.11	215.21	10.874	
24,000.00	8,235.00	14,791.00	7,323.96	138.36	171.51	0.750	17,232.05	52.23	2,248.58	2,032.60	215.98	10.411	
24,004.19	8,235.00	14,791.00	7,323.96	138.39	171.51	0.753	17,232.05	52.23	2,244.75	2,028.74	216.01	10.392 CC, ES, SF	

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation



MS Directional Anticollision Report



Company:	Marathon Oil	Local Co-ordinate Reference:	Well Pierogi BS Federal Com 502H
Project:	Eddy County, New Mexico (NAD 27)	TVD Reference:	WELL @ 3022.50usft (Precision 580)
Reference Site:	Pierogi Federal Com (302H, 502H, 552H)	MD Reference:	WELL @ 3022.50usft (Precision 580)
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	Pierogi BS Federal Com 502H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	EDM 5000.15 Conroe DB
Reference Design:	Design #1	Offset TVD Reference:	Reference Datum

Offset Design: George (113H, 114H, 123H) - George 114H - Wellbore #1 - Design #1											Offset Site Error: 0.00 usft		
Survey Program: 0-								Rule Assigned:				Offset Well Error: 0.00 usft	
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Semi Major Axis Offset (usft)	Azimuth from North (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Distance Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning
14,800.00	8,235.00	14,588.63	7,228.29	63.14	167.10	0.545	15,913.48	247.56	9,987.44	9,792.10	195.34	51.128	
14,900.00	8,235.00	14,590.80	7,228.26	63.90	167.15	0.546	15,913.50	245.40	9,887.98	9,692.56	195.42	50.598	
15,000.00	8,235.00	14,592.96	7,228.22	64.67	167.20	0.547	15,913.51	243.24	9,788.53	9,593.02	195.50	50.068	
15,100.00	8,235.00	14,595.12	7,228.18	65.44	167.25	0.548	15,913.53	241.07	9,689.09	9,493.50	195.59	49.538	
15,200.00	8,235.00	14,597.28	7,228.14	66.21	167.30	0.549	15,913.55	238.91	9,589.67	9,393.99	195.67	49.009	
15,300.00	8,235.00	14,599.44	7,228.11	66.98	167.35	0.550	15,913.56	236.75	9,490.25	9,294.49	195.76	48.479	
15,400.00	8,235.00	14,601.61	7,228.07	67.76	167.40	0.551	15,913.58	234.59	9,390.85	9,195.01	195.84	47.951	
15,500.00	8,235.00	14,603.77	7,228.03	68.54	167.45	0.552	15,913.60	232.43	9,291.46	9,095.53	195.93	47.422	
15,600.00	8,235.00	14,605.93	7,227.99	69.32	167.49	0.554	15,913.61	230.26	9,192.08	8,996.07	196.02	46.894	
15,700.00	8,235.00	14,608.09	7,227.95	70.10	167.54	0.555	15,913.63	228.10	9,092.72	8,896.61	196.11	46.366	
15,800.00	8,235.00	14,610.26	7,227.92	70.89	167.59	0.556	15,913.65	225.94	8,993.37	8,797.17	196.20	45.839	
15,900.00	8,235.00	14,612.42	7,227.88	71.67	167.64	0.557	15,913.66	223.78	8,894.03	8,697.75	196.29	45.312	
16,000.00	8,235.00	14,614.58	7,227.84	72.46	167.69	0.559	15,913.68	221.62	8,794.71	8,598.33	196.38	44.785	
16,100.00	8,235.00	14,616.74	7,227.80	73.25	167.74	0.560	15,913.70	219.46	8,695.40	8,498.94	196.47	44.259	
16,200.00	8,235.00	14,618.90	7,227.77	74.04	167.79	0.561	15,913.72	217.29	8,596.11	8,399.55	196.56	43.733	
16,300.00	8,235.00	14,621.07	7,227.73	74.83	167.84	0.563	15,913.73	215.13	8,496.84	8,300.18	196.65	43.207	
16,400.00	8,235.00	14,623.23	7,227.69	75.63	167.89	0.564	15,913.75	212.97	8,397.58	8,200.83	196.75	42.682	
16,500.00	8,235.00	14,625.39	7,227.65	76.42	167.94	0.566	15,913.77	210.81	8,298.34	8,101.49	196.84	42.157	
16,600.00	8,235.00	14,627.55	7,227.61	77.22	167.99	0.567	15,913.78	208.65	8,199.12	8,002.18	196.94	41.633	
16,700.00	8,235.00	14,629.71	7,227.58	78.02	168.03	0.569	15,913.80	206.48	8,099.91	7,902.87	197.04	41.109	
16,800.00	8,235.00	14,631.88	7,227.54	78.82	168.08	0.570	15,913.82	204.32	8,000.72	7,803.59	197.14	40.585	
16,900.00	8,235.00	14,634.04	7,227.50	79.62	168.13	0.572	15,913.83	202.16	7,901.56	7,704.32	197.23	40.062	
17,000.00	8,235.00	14,636.20	7,227.46	80.42	168.18	0.574	15,913.85	200.00	7,802.41	7,605.08	197.33	39.539	
17,100.00	8,235.00	14,638.36	7,227.43	81.22	168.23	0.575	15,913.87	197.84	7,703.29	7,505.85	197.44	39.017	
17,200.00	8,235.00	14,640.53	7,227.39	82.03	168.28	0.577	15,913.88	195.68	7,604.19	7,406.65	197.54	38.495	
17,300.00	8,235.00	14,642.69	7,227.35	82.83	168.33	0.579	15,913.90	193.51	7,505.11	7,307.47	197.64	37.973	
17,400.00	8,235.00	14,644.85	7,227.31	83.64	168.38	0.581	15,913.92	191.35	7,406.06	7,208.31	197.75	37.452	
17,500.00	8,235.00	14,647.01	7,227.28	84.45	168.43	0.583	15,913.93	189.19	7,307.03	7,109.18	197.85	36.932	
17,600.00	8,235.00	14,649.17	7,227.24	85.26	168.48	0.585	15,913.95	187.03	7,208.03	7,010.07	197.96	36.412	
17,700.00	8,235.00	14,651.34	7,227.20	86.07	168.53	0.587	15,913.97	184.87	7,109.05	6,910.98	198.07	35.892	
17,800.00	8,235.00	14,653.50	7,227.16	86.88	168.57	0.589	15,913.98	182.71	7,010.10	6,811.93	198.18	35.373	
17,900.00	8,235.00	14,655.66	7,227.12	87.69	168.62	0.591	15,914.00	180.54	6,911.19	6,712.90	198.29	34.854	
18,000.00	8,235.00	14,657.82	7,227.09	88.50	168.67	0.593	15,914.02	178.38	6,812.30	6,613.90	198.40	34.336	
18,100.00	8,235.00	14,659.99	7,227.05	89.32	168.72	0.595	15,914.03	176.22	6,713.45	6,514.93	198.52	33.818	
18,200.00	8,235.00	14,662.15	7,227.01	90.13	168.77	0.598	15,914.05	174.06	6,614.63	6,415.99	198.63	33.301	
18,300.00	8,235.00	14,664.31	7,226.97	90.95	168.82	0.600	15,914.07	171.90	6,515.84	6,317.09	198.75	32.784	
18,400.00	8,235.00	14,666.47	7,226.94	91.76	168.87	0.602	15,914.08	169.73	6,417.09	6,218.22	198.87	32.268	
18,500.00	8,235.00	14,668.63	7,226.90	92.58	168.92	0.605	15,914.10	167.57	6,318.38	6,119.39	198.99	31.752	
18,600.00	8,235.00	14,670.80	7,226.86	93.40	168.97	0.608	15,914.12	165.41	6,219.71	6,020.60	199.12	31.237	
18,700.00	8,235.00	14,672.96	7,226.82	94.22	169.02	0.610	15,914.13	163.25	6,121.09	5,921.85	199.24	30.722	
18,800.00	8,235.00	14,675.12	7,226.78	95.04	169.06	0.613	15,914.15	161.09	6,022.51	5,823.14	199.37	30.208	
18,900.00	8,235.00	14,677.28	7,226.75	95.86	169.11	0.616	15,914.17	158.93	5,923.97	5,724.47	199.50	29.694	
19,000.00	8,235.00	14,679.44	7,226.71	96.68	169.16	0.619	15,914.18	156.76	5,825.49	5,625.85	199.64	29.181	
19,100.00	8,235.00	14,681.61	7,226.67	97.50	169.21	0.622	15,914.20	154.60	5,727.05	5,527.28	199.77	28.668	
19,200.00	8,235.00	14,683.77	7,226.63	98.32	169.26	0.625	15,914.22	152.44	5,628.67	5,428.76	199.91	28.156	
19,300.00	8,235.00	14,685.93	7,226.60	99.15	169.31	0.629	15,914.23	150.28	5,530.35	5,330.29	200.06	27.644	
19,400.00	8,235.00	14,688.09	7,226.56	99.97	169.36	0.632	15,914.25	148.12	5,432.09	5,231.88	200.20	27.133	
19,500.00	8,235.00	14,690.26	7,226.52	100.79	169.41	0.636	15,914.27	145.96	5,333.89	5,133.53	200.35	26.623	
19,600.00	8,235.00	14,692.42	7,226.48	101.62	169.46	0.640	15,914.28	143.79	5,235.76	5,035.25	200.51	26.113	
19,700.00	8,235.00	14,694.58	7,226.44	102.44	169.51	0.644	15,914.30	141.63	5,137.70	4,937.03	200.67	25.603	
19,800.00	8,235.00	14,696.74	7,226.41	103.27	169.56	0.648	15,914.32	139.47	5,039.71	4,838.88	200.83	25.095	
19,900.00	8,235.00	14,698.90	7,226.37	104.10	169.60	0.652	15,914.33	137.31	4,941.80	4,740.81	201.00	24.586	

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation



MS Directional Anticollision Report



Company:	Marathon Oil	Local Co-ordinate Reference:	Well Pierogi BS Federal Com 502H
Project:	Eddy County, New Mexico (NAD 27)	TVD Reference:	WELL @ 3022.50usft (Precision 580)
Reference Site:	Pierogi Federal Com (302H, 502H, 552H)	MD Reference:	WELL @ 3022.50usft (Precision 580)
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	Pierogi BS Federal Com 502H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	EDM 5000.15 Conroe DB
Reference Design:	Design #1	Offset TVD Reference:	Reference Datum

Offset Design: George (113H, 114H, 123H) - George 114H - Wellbore #1 - Design #1												Offset Site Error:	0.00 usft
Survey Program: 0-												Offset Well Error:	0.00 usft
Measured Depth (usft)	Vertical Depth (usft)	Offset Measured Depth (usft)	Vertical Depth (usft)	Semi Major Axis Reference (usft)	Offset (usft)	Azimuth from North (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Distance Between Centres (usft)	Rule Assigned: Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning
20,000.00	8,235.00	14,701.07	7,226.33	104.92	169.65	0.656	15,914.35	135.15	4,843.98	4,642.81	201.17	24.079	
20,100.00	8,235.00	14,703.23	7,226.29	105.75	169.70	0.661	15,914.37	132.98	4,746.25	4,544.90	201.35	23.572	
20,200.00	8,235.00	14,705.39	7,226.26	106.58	169.75	0.666	15,914.38	130.82	4,648.62	4,447.08	201.54	23.066	
20,300.00	8,235.00	14,707.55	7,226.22	107.41	169.80	0.671	15,914.40	128.66	4,551.08	4,349.35	201.73	22.560	
20,400.00	8,235.00	14,709.71	7,226.18	108.24	169.85	0.676	15,914.42	126.50	4,453.66	4,251.73	201.93	22.055	
20,500.00	8,235.00	14,711.88	7,226.14	109.07	169.90	0.681	15,914.43	124.34	4,356.35	4,154.21	202.14	21.551	
20,600.00	8,235.00	14,714.04	7,226.11	109.90	169.95	0.687	15,914.45	122.18	4,259.16	4,056.81	202.36	21.048	
20,700.00	8,235.00	14,716.20	7,226.07	110.73	170.00	0.693	15,914.47	120.01	4,162.11	3,959.53	202.58	20.545	
20,800.00	8,235.00	14,718.36	7,226.03	111.56	170.05	0.700	15,914.48	117.85	4,065.20	3,862.38	202.82	20.044	
20,900.00	8,235.00	14,720.53	7,225.99	112.39	170.09	0.706	15,914.50	115.69	3,968.44	3,765.38	203.06	19.543	
21,000.00	8,235.00	14,722.69	7,225.95	113.23	170.14	0.713	15,914.52	113.53	3,871.84	3,668.52	203.32	19.043	
21,100.00	8,235.00	14,724.85	7,225.92	114.06	170.19	0.721	15,914.53	111.37	3,775.42	3,571.83	203.59	18.544	
21,200.00	8,235.00	14,727.01	7,225.88	114.89	170.24	0.729	15,914.55	109.21	3,679.19	3,475.32	203.87	18.046	
21,300.00	8,235.00	14,729.17	7,225.84	115.72	170.29	0.737	15,914.57	107.04	3,583.16	3,378.99	204.17	17.550	
21,400.00	8,235.00	14,731.34	7,225.80	116.56	170.34	0.746	15,914.58	104.88	3,487.36	3,282.88	204.48	17.055	
21,500.00	8,235.00	14,733.50	7,225.77	117.39	170.39	0.755	15,914.60	102.72	3,391.80	3,186.99	204.81	16.561	
21,600.00	8,235.00	14,735.66	7,225.73	118.23	170.44	0.765	15,914.62	100.56	3,296.50	3,091.34	205.16	16.068	
21,700.00	8,235.00	14,737.82	7,225.69	119.06	170.49	0.776	15,914.64	98.40	3,201.48	2,995.96	205.52	15.577	
21,800.00	8,235.00	14,739.99	7,225.65	119.90	170.54	0.787	15,914.65	96.23	3,106.78	2,900.87	205.91	15.088	
21,900.00	8,235.00	14,742.15	7,225.61	120.73	170.59	0.799	15,914.67	94.07	3,012.41	2,806.10	206.31	14.601	
22,000.00	8,235.00	14,744.31	7,225.58	121.57	170.63	0.812	15,914.69	91.91	2,918.42	2,711.69	206.74	14.117	
22,100.00	8,235.00	14,746.47	7,225.54	122.41	170.68	0.826	15,914.70	89.75	2,824.84	2,617.66	207.19	13.634	
22,200.00	8,235.00	14,748.63	7,225.50	123.24	170.73	0.841	15,914.72	87.59	2,731.72	2,524.06	207.66	13.155	
22,300.00	8,235.00	14,750.80	7,225.46	124.08	170.78	0.857	15,914.74	85.43	2,639.09	2,430.94	208.15	12.679	
22,400.00	8,235.00	14,752.96	7,225.43	124.92	170.83	0.875	15,914.75	83.26	2,547.03	2,338.36	208.67	12.206	
22,500.00	8,235.00	14,755.12	7,225.39	125.76	170.88	0.894	15,914.77	81.10	2,455.58	2,246.37	209.21	11.737	
22,600.00	8,235.00	14,757.28	7,225.35	126.59	170.93	0.916	15,914.79	78.94	2,364.82	2,155.05	209.77	11.273	
22,700.00	8,235.00	14,759.44	7,225.31	127.43	170.98	0.939	15,914.80	76.78	2,274.83	2,064.48	210.35	10.815	
22,800.00	8,235.00	14,761.61	7,225.28	128.27	171.03	0.964	15,914.82	74.62	2,185.71	1,974.78	210.94	10.362	
22,900.00	8,235.00	14,763.77	7,225.24	129.11	171.08	0.993	15,914.84	72.46	2,097.58	1,886.04	211.53	9.916	
23,000.00	8,235.00	14,765.93	7,225.20	129.95	171.13	1.024	15,914.85	70.29	2,010.54	1,798.42	212.13	9.478	
23,100.00	8,235.00	14,768.09	7,225.16	130.79	171.17	1.060	15,914.87	68.13	1,924.77	1,712.07	212.70	9.049	
23,200.00	8,235.00	14,770.26	7,225.12	131.63	171.22	1.100	15,914.89	65.97	1,840.43	1,627.19	213.24	8.631	
23,300.00	8,235.00	14,772.42	7,225.09	132.47	171.27	1.145	15,914.90	63.81	1,757.74	1,544.01	213.73	8.224	
23,400.00	8,235.00	14,774.58	7,225.05	133.31	171.32	1.198	15,914.92	61.65	1,676.92	1,462.81	214.12	7.832	
23,500.00	8,235.00	14,776.74	7,225.01	134.15	171.37	1.259	15,914.94	59.48	1,598.28	1,383.90	214.37	7.456	
23,600.00	8,235.00	14,778.90	7,224.97	134.99	171.42	1.330	15,914.95	57.32	1,522.14	1,307.69	214.44	7.098	
23,700.00	8,235.00	14,781.07	7,224.94	135.83	171.47	1.416	15,914.97	55.16	1,448.90	1,234.64	214.26	6.762	
23,800.00	8,235.00	14,783.23	7,224.90	136.68	171.52	1.519	15,914.99	53.00	1,379.02	1,165.28	213.74	6.452	
23,900.00	8,235.00	14,785.39	7,224.86	137.52	171.57	1.648	15,915.00	50.84	1,313.04	1,100.26	212.79	6.171	
24,000.00	8,235.00	14,787.55	7,224.82	138.36	171.62	1.811	15,915.02	48.68	1,251.58	1,040.27	211.31	5.923	
24,004.19	8,235.00	14,787.64	7,224.82	138.39	171.62	1.819	15,915.02	48.59	1,249.12	1,037.88	211.23	5.913 CC, ES, SF	

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation



MS Directional Anticollision Report



Company:	Marathon Oil	Local Co-ordinate Reference:	Well Pierogi BS Federal Com 502H
Project:	Eddy County, New Mexico (NAD 27)	TVD Reference:	WELL @ 3022.50usft (Precision 580)
Reference Site:	Pierogi Federal Com (302H, 502H, 552H)	MD Reference:	WELL @ 3022.50usft (Precision 580)
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	Pierogi BS Federal Com 502H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	EDM 5000.15 Conroe DB
Reference Design:	Design #1	Offset TVD Reference:	Reference Datum

Offset Design: George (113H, 114H, 123H) - George 123H - Wellbore #1 - Surveys												Offset Site Error:	0.00 usft
Survey Program: 225-Reference												Offset Well Error:	0.00 usft
Measured Depth (usft)	Vertical Depth (usft)	Offset Measured Depth (usft)	Offset Vertical Depth (usft)	Semi Major Axis Reference (usft)	Semi Major Axis Offset (usft)	Azimuth from North (°)	Offset Wellbore Centre +N/-S (usft)	Offset Wellbore Centre +E/-W (usft)	Distance Between Centres (usft)	Rule Assigned: Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning
16,100.00	8,235.00	15,561.00	8,199.07	73.25	169.00	-0.064	17,221.05	123.91	9,943.88	9,743.95	199.94	49.735	
16,200.00	8,235.00	15,561.00	8,199.07	74.04	169.00	-0.057	17,221.05	123.91	9,843.89	9,643.89	200.00	49.218	
16,300.00	8,235.00	15,561.00	8,199.07	74.83	169.00	-0.049	17,221.05	123.91	9,743.90	9,543.83	200.07	48.702	
16,400.00	8,235.00	15,561.00	8,199.07	75.63	169.00	-0.041	17,221.05	123.91	9,643.91	9,443.77	200.14	48.185	
16,500.00	8,235.00	15,561.00	8,199.07	76.42	169.00	-0.033	17,221.05	123.91	9,543.92	9,343.71	200.21	47.669	
16,600.00	8,235.00	15,561.00	8,199.07	77.22	169.00	-0.025	17,221.05	123.91	9,443.93	9,243.65	200.28	47.153	
16,700.00	8,235.00	15,561.00	8,199.07	78.02	169.00	-0.017	17,221.05	123.91	9,343.94	9,143.59	200.35	46.637	
16,800.00	8,235.00	15,561.00	8,199.07	78.82	169.00	-0.009	17,221.05	123.91	9,243.95	9,043.52	200.43	46.122	
16,900.00	8,235.00	15,561.00	8,199.07	79.62	169.00	0.005	17,221.05	123.91	9,143.96	8,943.46	200.50	45.606	
17,000.00	8,235.00	15,561.00	8,199.07	80.42	169.00	0.009	17,221.05	123.91	9,043.97	8,843.40	200.57	45.091	
17,100.00	8,235.00	15,561.00	8,199.07	81.22	169.00	0.018	17,221.05	123.91	8,943.98	8,743.34	200.65	44.576	
17,200.00	8,235.00	15,561.00	8,199.07	82.03	169.00	0.027	17,221.05	123.91	8,843.99	8,643.27	200.72	44.061	
17,300.00	8,235.00	15,561.00	8,199.07	82.83	169.00	0.036	17,221.05	123.91	8,744.00	8,543.21	200.80	43.546	
17,400.00	8,235.00	15,561.00	8,199.07	83.64	169.00	0.046	17,221.05	123.91	8,644.02	8,443.14	200.87	43.032	
17,500.00	8,235.00	15,561.00	8,199.07	84.45	169.00	0.056	17,221.05	123.91	8,544.03	8,343.08	200.95	42.518	
17,600.00	8,235.00	15,561.00	8,199.07	85.26	169.00	0.066	17,221.05	123.91	8,444.04	8,243.01	201.03	42.004	
17,700.00	8,235.00	15,561.00	8,199.07	86.07	169.00	0.076	17,221.05	123.91	8,344.05	8,142.94	201.11	41.491	
17,800.00	8,235.00	15,561.00	8,199.07	86.88	169.00	0.087	17,221.05	123.91	8,244.06	8,042.88	201.19	40.977	
17,900.00	8,235.00	15,561.00	8,199.07	87.69	169.00	0.098	17,221.05	123.91	8,144.08	7,942.81	201.27	40.464	
18,000.00	8,235.00	15,561.00	8,199.07	88.50	169.00	0.109	17,221.05	123.91	8,044.09	7,842.74	201.35	39.951	
18,100.00	8,235.00	15,561.00	8,199.07	89.32	169.00	0.120	17,221.05	123.91	7,944.10	7,742.68	201.43	39.439	
18,200.00	8,235.00	15,561.00	8,199.07	90.13	169.00	0.132	17,221.05	123.91	7,844.12	7,642.61	201.51	38.927	
18,300.00	8,235.00	15,561.00	8,199.07	90.95	169.00	0.144	17,221.05	123.91	7,744.13	7,542.54	201.59	38.415	
18,400.00	8,235.00	15,561.00	8,199.07	91.76	169.00	0.156	17,221.05	123.91	7,644.15	7,442.47	201.68	37.903	
18,500.00	8,235.00	15,561.00	8,199.07	92.58	169.00	0.169	17,221.05	123.91	7,544.16	7,342.40	201.76	37.392	
18,600.00	8,235.00	15,561.00	8,199.07	93.40	169.00	0.182	17,221.05	123.91	7,444.18	7,242.33	201.85	36.880	
18,700.00	8,235.00	15,561.00	8,199.07	94.22	169.00	0.195	17,221.05	123.91	7,344.19	7,142.26	201.93	36.370	
18,800.00	8,235.00	15,561.00	8,199.07	95.04	169.00	0.209	17,221.05	123.91	7,244.21	7,042.19	202.02	35.859	
18,900.00	8,235.00	15,561.00	8,199.07	95.86	169.00	0.223	17,221.05	123.91	7,144.23	6,942.12	202.10	35.349	
19,000.00	8,235.00	15,561.00	8,199.07	96.68	169.00	0.237	17,221.05	123.91	7,044.24	6,842.05	202.19	34.839	
19,100.00	8,235.00	15,561.00	8,199.07	97.50	169.00	0.252	17,221.05	123.91	6,944.26	6,741.98	202.28	34.330	
19,200.00	8,235.00	15,561.00	8,199.07	98.32	169.00	0.267	17,221.05	123.91	6,844.28	6,641.91	202.37	33.821	
19,300.00	8,235.00	15,561.00	8,199.07	99.15	169.00	0.283	17,221.05	123.91	6,744.30	6,541.84	202.46	33.312	
19,400.00	8,235.00	15,561.00	8,199.07	99.97	169.00	0.299	17,221.05	123.91	6,644.32	6,441.77	202.55	32.804	
19,500.00	8,235.00	15,561.57	8,199.05	100.79	169.01	0.311	17,221.05	123.34	6,544.34	6,341.69	202.65	32.294	
19,600.00	8,235.00	15,563.50	8,198.98	101.62	169.05	0.311	17,221.06	121.41	6,444.36	6,241.57	202.78	31.779	
19,700.00	8,235.00	15,565.43	8,198.91	102.44	169.10	0.311	17,221.07	119.49	6,344.38	6,141.46	202.92	31.266	
19,800.00	8,235.00	15,567.35	8,198.85	103.27	169.14	0.311	17,221.08	117.56	6,244.40	6,041.35	203.05	30.753	
19,900.00	8,235.00	15,569.28	8,198.78	104.10	169.18	0.311	17,221.09	115.64	6,144.42	5,941.23	203.19	30.240	
20,000.00	8,235.00	15,571.21	8,198.72	104.92	169.23	0.311	17,221.10	113.71	6,044.44	5,841.12	203.32	29.728	
20,100.00	8,235.00	15,573.14	8,198.66	105.75	169.27	0.311	17,221.11	111.78	5,944.46	5,741.00	203.46	29.217	
20,200.00	8,235.00	15,575.07	8,198.60	106.58	169.31	0.311	17,221.12	109.85	5,844.48	5,640.89	203.59	28.707	
20,300.00	8,235.00	15,576.99	8,198.54	107.41	169.36	0.311	17,221.13	107.93	5,744.50	5,540.77	203.73	28.197	
20,400.00	8,235.00	15,578.92	8,198.48	108.24	169.40	0.311	17,221.14	106.00	5,644.52	5,440.65	203.87	27.687	
20,500.00	8,235.00	15,580.85	8,198.42	109.07	169.45	0.311	17,221.15	104.07	5,544.54	5,340.54	204.01	27.178	
20,600.00	8,235.00	15,582.78	8,198.36	109.90	169.49	0.311	17,221.16	102.15	5,444.56	5,240.42	204.14	26.670	
20,700.00	8,235.00	15,584.71	8,198.30	110.73	169.53	0.312	17,221.17	100.22	5,344.59	5,140.30	204.28	26.163	
20,800.00	8,235.00	15,586.63	8,198.25	111.56	169.58	0.312	17,221.18	98.29	5,244.61	5,040.18	204.42	25.656	
20,900.00	8,235.00	15,588.56	8,198.19	112.39	169.62	0.312	17,221.19	96.36	5,144.63	4,940.07	204.56	25.150	
21,000.00	8,235.00	15,590.49	8,198.14	113.23	169.66	0.312	17,221.20	94.44	5,044.65	4,839.95	204.70	24.644	
21,100.00	8,235.00	15,592.42	8,198.09	114.06	169.71	0.312	17,221.21	92.51	4,944.67	4,739.83	204.84	24.139	
21,200.00	8,235.00	15,594.35	8,198.03	114.89	169.75	0.312	17,221.22	90.58	4,844.69	4,639.71	204.98	23.635	

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation



MS Directional Anticollision Report



Company:	Marathon Oil	Local Co-ordinate Reference:	Well Pierogi BS Federal Com 502H
Project:	Eddy County, New Mexico (NAD 27)	TVD Reference:	WELL @ 3022.50usft (Precision 580)
Reference Site:	Pierogi Federal Com (302H, 502H, 552H)	MD Reference:	WELL @ 3022.50usft (Precision 580)
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	Pierogi BS Federal Com 502H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	EDM 5000.15 Conroe DB
Reference Design:	Design #1	Offset TVD Reference:	Reference Datum

Offset Design: George (113H, 114H, 123H) - George 123H - Wellbore #1 - Surveys													Offset Site Error:	0.00 usft
Survey Program: 225-													Offset Well Error:	0.00 usft
Reference	Offset	Semi Major Axis	Offset	Wellbore Centre	Rule Assigned:	Distance	Minimum	Separation	Warning					
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Azimuth from North (°)	+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor		
21,300.00	8,235.00	15,596.28	8,197.98	115.72	169.79	0.312	17,221.23	88.65	4,744.71	4,539.59	205.12	23.131		
21,400.00	8,235.00	15,598.21	8,197.93	116.56	169.84	0.312	17,221.24	86.72	4,644.74	4,439.47	205.27	22.628		
21,500.00	8,235.00	15,600.13	8,197.88	117.39	169.88	0.312	17,221.25	84.80	4,544.76	4,339.35	205.41	22.126		
21,600.00	8,235.00	15,602.06	8,197.83	118.23	169.93	0.312	17,221.26	82.87	4,444.78	4,239.23	205.55	21.624		
21,700.00	8,235.00	15,603.99	8,197.78	119.06	169.97	0.312	17,221.27	80.94	4,344.80	4,139.11	205.69	21.123		
21,800.00	8,235.00	15,605.92	8,197.74	119.90	170.01	0.312	17,221.28	79.01	4,244.82	4,038.99	205.84	20.622		
21,900.00	8,235.00	15,607.85	8,197.69	120.73	170.06	0.312	17,221.29	77.08	4,144.85	3,938.87	205.98	20.123		
22,000.00	8,235.00	15,609.78	8,197.64	121.57	170.10	0.312	17,221.30	75.16	4,044.87	3,838.75	206.12	19.624		
22,100.00	8,235.00	15,611.71	8,197.60	122.41	170.14	0.312	17,221.31	73.23	3,944.89	3,738.63	206.27	19.125		
22,200.00	8,235.00	15,613.64	8,197.56	123.24	170.19	0.313	17,221.32	71.30	3,844.92	3,638.51	206.41	18.628		
22,300.00	8,235.00	15,615.56	8,197.51	124.08	170.23	0.313	17,221.33	69.37	3,744.94	3,538.39	206.55	18.131		
22,400.00	8,235.00	15,617.49	8,197.47	124.92	170.27	0.313	17,221.34	67.44	3,644.96	3,438.26	206.70	17.634		
22,500.00	8,235.00	15,619.42	8,197.43	125.76	170.32	0.313	17,221.35	65.51	3,544.99	3,338.14	206.84	17.139		
22,600.00	8,235.00	15,621.35	8,197.39	126.59	170.36	0.313	17,221.36	63.59	3,445.01	3,238.02	206.99	16.644		
22,700.00	8,235.00	15,623.28	8,197.35	127.43	170.41	0.313	17,221.37	61.66	3,345.04	3,137.90	207.13	16.149		
22,800.00	8,235.00	15,625.21	8,197.31	128.27	170.45	0.313	17,221.38	59.73	3,245.06	3,037.78	207.28	15.656		
22,900.00	8,235.00	15,627.14	8,197.27	129.11	170.49	0.313	17,221.39	57.80	3,145.09	2,937.66	207.42	15.163		
23,000.00	8,235.00	15,629.07	8,197.24	129.95	170.54	0.313	17,221.40	55.87	3,045.11	2,837.55	207.57	14.670		
23,100.00	8,235.00	15,631.00	8,197.20	130.79	170.58	0.314	17,221.41	53.94	2,945.14	2,737.43	207.71	14.179		
23,200.00	8,235.00	15,632.93	8,197.17	131.63	170.62	0.314	17,221.42	52.01	2,845.17	2,637.31	207.86	13.688		
23,300.00	8,235.00	15,634.86	8,197.13	132.47	170.67	0.314	17,221.43	50.08	2,745.20	2,537.19	208.00	13.198		
23,400.00	8,235.00	15,636.79	8,197.10	133.31	170.71	0.314	17,221.44	48.15	2,645.22	2,437.08	208.15	12.708		
23,500.00	8,235.00	15,638.72	8,197.07	134.15	170.75	0.314	17,221.45	46.23	2,545.25	2,336.96	208.29	12.220		
23,600.00	8,235.00	15,640.64	8,197.04	134.99	170.80	0.314	17,221.46	44.30	2,445.28	2,236.85	208.44	11.731		
23,700.00	8,235.00	15,642.57	8,197.01	135.83	170.84	0.315	17,221.47	42.37	2,345.32	2,136.73	208.58	11.244		
23,800.00	8,235.00	15,644.50	8,196.98	136.68	170.89	0.315	17,221.48	40.44	2,245.35	2,036.62	208.72	10.757		
23,900.00	8,235.00	15,646.43	8,196.95	137.52	170.93	0.315	17,221.49	38.51	2,145.38	1,936.51	208.87	10.272		
24,000.00	8,235.00	15,648.36	8,196.92	138.36	170.97	0.315	17,221.51	36.58	2,045.42	1,836.41	209.01	9.786		
24,004.19	8,235.00	15,648.44	8,196.92	138.39	170.98	0.315	17,221.51	36.50	2,041.23	1,832.22	209.02	9.766	CC, ES, SF	

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation



MS Directional Anticollision Report



Company:	Marathon Oil	Local Co-ordinate Reference:	Well Pierogi BS Federal Com 502H
Project:	Eddy County, New Mexico (NAD 27)	TVD Reference:	WELL @ 3022.50usft (Precision 580)
Reference Site:	Pierogi Federal Com (302H, 502H, 552H)	MD Reference:	WELL @ 3022.50usft (Precision 580)
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	Pierogi BS Federal Com 502H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	EDM 5000.15 Conroe DB
Reference Design:	Design #1	Offset TVD Reference:	Reference Datum

Offset Design: Pierogi Federal Com (302H, 502H, 552H) - Pierogi BS Federal Com 302H - Wellbore #1 - Design #1													Offset Site Error:
Survey Program: 0-MWD+IFR1+FDIR													Offset Well Error:
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Semi Major Axis Reference (usft)	Semi Major Axis Offset (usft)	Azimuth from North (°)	Offset Wellbore Centre +N/-S (usft)	Offset Wellbore Centre +E/-W (usft)	Distance Between Centres (usft)	Rule Assigned: Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning
0.00	0.00	0.00	0.00	0.00	0.00	0.000	29.99	0.00	29.99				
100.00	100.00	100.00	100.00	0.14	0.14	0.000	29.99	0.00	29.99	29.72	0.27	109.360	
200.00	200.00	200.00	200.00	0.50	0.50	0.000	29.99	0.00	29.99	29.00	0.99	30.257	
300.00	300.00	300.00	300.00	0.85	0.85	0.000	29.99	0.00	29.99	28.28	1.71	17.557	
400.00	400.00	400.00	400.00	1.21	1.21	0.000	29.99	0.00	29.99	27.56	2.43	12.367	
500.00	500.00	500.00	500.00	1.57	1.57	0.000	29.99	0.00	29.99	26.85	3.14	9.545	
524.13	524.13	524.13	524.13	1.66	1.66	0.000	29.99	0.00	29.99	26.67	3.32	9.047	
600.00	600.00	600.00	600.00	1.93	1.93	0.000	29.99	0.00	29.99	26.13	3.86	7.772	
633.33	633.33	633.33	633.33	2.05	2.05	0.000	29.99	0.00	29.99	25.89	4.10	7.318	
700.00	700.00	700.00	700.00	2.29	2.29	0.000	29.99	0.00	29.99	25.41	4.58	6.554	
800.00	800.00	800.00	800.00	2.65	2.65	0.000	29.99	0.00	29.99	24.70	5.29	5.666	
900.00	900.00	900.00	900.00	3.00	3.00	0.000	29.99	0.00	29.99	23.98	6.01	4.990	
1,000.00	1,000.00	1,000.00	1,000.00	3.36	3.36	0.000	29.99	0.00	29.99	23.26	6.73	4.458	
1,100.00	1,100.00	1,100.00	1,100.00	3.72	3.72	0.000	29.99	0.00	29.99	22.55	7.44	4.029	
1,200.00	1,200.00	1,200.00	1,200.00	4.08	4.08	0.000	29.99	0.00	29.99	21.83	8.16	3.675	
1,300.00	1,300.00	1,300.00	1,300.00	4.44	4.44	0.000	29.99	0.00	29.99	21.11	8.88	3.378	
1,400.00	1,400.00	1,400.00	1,400.00	4.80	4.80	0.000	29.99	0.00	29.99	20.40	9.59	3.126	
1,500.00	1,500.00	1,500.00	1,500.00	5.16	5.16	0.000	29.99	0.00	29.99	19.68	10.31	2.908	
1,600.00	1,600.00	1,600.44	1,600.42	5.51	5.50	3.072	29.19	1.57	29.23	18.21	11.02	2.653	
1,700.00	1,700.00	1,700.63	1,700.47	5.87	5.84	13.130	26.78	6.25	27.51	15.79	11.71	2.349	
1,779.81	1,779.81	1,780.26	1,779.81	6.16	6.11	27.177	23.73	12.19	26.68	14.41	12.27	2.175 CC	
1,800.00	1,800.00	1,800.34	1,799.79	6.23	6.18	31.531	22.81	13.99	26.76	14.35	12.41	2.157 ES, SF	
1,900.00	1,899.98	1,899.47	1,898.17	6.57	6.52	51.936	17.29	24.74	30.79	17.72	13.07	2.356	
2,000.00	1,999.84	1,998.03	1,995.53	6.90	6.86	65.007	10.27	38.41	40.25	26.56	13.69	2.941	
2,100.00	2,099.45	2,095.94	2,091.65	7.23	7.20	71.557	1.78	54.94	53.41	39.11	14.30	3.736	
2,200.00	2,198.70	2,193.10	2,186.36	7.56	7.54	74.335	-8.12	74.22	69.31	54.40	14.90	4.650	
2,300.06	2,297.52	2,289.50	2,279.54	7.89	7.89	75.091	-19.39	96.17	87.56	72.04	15.51	5.644	
2,400.00	2,395.95	2,384.81	2,370.81	8.23	8.24	75.674	-31.93	120.59	108.13	92.02	16.11	6.711	
2,500.00	2,494.43	2,479.02	2,460.07	8.57	8.59	76.858	-45.68	147.37	131.25	114.55	16.70	7.861	
2,600.00	2,592.91	2,571.87	2,547.04	8.91	8.94	78.286	-60.54	176.31	156.94	139.68	17.26	9.091	
2,700.00	2,691.39	2,665.24	2,633.49	9.26	9.30	79.877	-76.65	207.69	185.04	167.17	17.87	10.356	
2,800.00	2,789.87	2,760.93	2,721.89	9.61	9.68	81.286	-93.37	240.26	213.69	195.14	18.55	11.518	
2,900.00	2,888.35	2,856.62	2,810.30	9.96	10.07	82.364	-110.09	272.84	242.44	223.18	19.25	12.593	
3,000.00	2,986.83	2,952.31	2,898.71	10.32	10.46	83.216	-126.82	305.41	271.24	251.28	19.96	13.588	
3,100.00	3,085.31	3,048.00	2,987.11	10.67	10.86	83.905	-143.54	337.98	300.10	279.42	20.68	14.511	
3,200.00	3,183.79	3,143.69	3,075.52	11.03	11.26	84.475	-160.27	370.55	328.99	307.58	21.41	15.368	
3,300.00	3,282.27	3,239.38	3,163.93	11.39	11.66	84.952	-176.99	403.12	357.90	335.76	22.14	16.165	
3,400.00	3,380.75	3,335.07	3,252.33	11.76	12.07	85.359	-193.71	435.70	386.83	363.95	22.88	16.907	
3,500.00	3,479.23	3,430.75	3,340.74	12.12	12.48	85.710	-210.44	468.27	415.78	392.16	23.62	17.600	
3,600.00	3,577.71	3,526.44	3,429.15	12.48	12.89	86.015	-227.16	500.84	444.75	420.37	24.37	18.247	
3,700.00	3,676.19	3,622.13	3,517.55	12.85	13.31	86.283	-243.89	533.41	473.72	448.59	25.13	18.853	
3,800.00	3,774.67	3,717.82	3,605.96	13.22	13.73	86.520	-260.61	565.98	502.70	476.81	25.88	19.421	
3,900.00	3,873.15	3,813.51	3,694.37	13.58	14.15	86.732	-277.33	598.56	531.68	505.04	26.64	19.955	
4,000.00	3,971.63	3,909.20	3,782.77	13.95	14.58	86.921	-294.06	631.13	560.68	533.27	27.41	20.457	
4,100.00	4,070.11	4,004.89	3,871.18	14.32	15.00	87.093	-310.78	663.70	589.68	561.50	28.17	20.930	
4,200.00	4,168.59	4,100.58	3,959.59	14.69	15.43	87.248	-327.50	696.27	618.68	589.74	28.94	21.376	
4,300.00	4,267.07	4,196.27	4,047.99	15.06	15.86	87.389	-344.23	728.85	647.69	617.97	29.71	21.797	
4,400.00	4,365.55	4,291.95	4,136.40	15.44	16.29	87.518	-360.95	761.42	676.70	646.21	30.49	22.196	
4,500.00	4,464.03	4,387.64	4,224.81	15.81	16.72	87.637	-377.68	793.99	705.71	674.45	31.26	22.574	
4,600.00	4,562.51	4,483.33	4,313.21	16.18	17.15	87.746	-394.40	826.56	734.72	702.68	32.04	22.932	
4,700.00	4,661.00	4,579.02	4,401.62	16.56	17.58	87.847	-411.12	859.13	763.74	730.92	32.82	23.272	
4,800.00	4,759.48	4,674.71	4,490.03	16.93	18.02	87.941	-427.85	891.71	792.76	759.16	33.60	23.595	

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation



MS Directional Anticollision Report



Company:	Marathon Oil	Local Co-ordinate Reference:	Well Pierogi BS Federal Com 502H
Project:	Eddy County, New Mexico (NAD 27)	TVD Reference:	WELL @ 3022.50usft (Precision 580)
Reference Site:	Pierogi Federal Com (302H, 502H, 552H)	MD Reference:	WELL @ 3022.50usft (Precision 580)
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	Pierogi BS Federal Com 502H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	EDM 5000.15 Conroe DB
Reference Design:	Design #1	Offset TVD Reference:	Reference Datum

Offset Design: Pierogi Federal Com (302H, 502H, 552H) - Pierogi BS Federal Com 302H - Wellbore #1 - Design #1													Offset Site Error:
													0.00 usft
Survey Program:	Reference	Offset	Semi Major Axis	Azimuth		Offset Wellbore Centre		Rule Assigned:		Minimum	Separation	Warning	Offset Well Error:
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Reference	Offset	from North (°)	+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Separation (usft)	Factor		0.00 usft
4,900.00	4,857.96	4,770.40	4,578.43	17.30	18.45	-444.57	924.28	821.78	787.40	34.38	23.902		
5,000.00	4,956.44	4,866.09	4,666.84	17.68	18.89	-461.29	956.85	850.81	815.64	35.16	24.195		
5,100.00	5,054.92	4,961.78	4,755.25	18.05	19.33	-478.02	989.42	879.83	843.88	35.95	24.474		
5,200.00	5,153.40	5,057.47	4,843.66	18.43	19.77	-494.74	1,021.99	908.86	872.12	36.74	24.741		
5,300.00	5,251.88	5,153.16	4,932.06	18.81	20.21	-511.47	1,054.57	937.88	900.36	37.52	24.995		
5,400.00	5,350.36	5,248.84	5,020.47	19.18	20.64	-528.19	1,087.14	966.91	928.60	38.31	25.239		
5,500.00	5,448.84	5,344.53	5,108.88	19.56	21.08	-544.91	1,119.71	995.94	956.84	39.10	25.471		
5,600.00	5,547.32	5,440.22	5,197.28	19.94	21.53	-561.64	1,152.28	1,024.97	985.08	39.89	25.695		
5,700.00	5,645.80	5,535.91	5,285.69	20.31	21.97	-578.36	1,184.86	1,054.00	1,013.32	40.68	25.909		
5,800.00	5,744.28	5,631.60	5,374.10	20.69	22.41	-595.09	1,217.43	1,083.03	1,041.56	41.47	26.114		
5,900.00	5,842.76	5,727.29	5,462.50	21.07	22.85	-611.81	1,250.00	1,112.07	1,069.80	42.27	26.311		
6,000.00	5,941.24	5,822.98	5,550.91	21.45	23.29	-628.53	1,282.57	1,141.10	1,098.04	43.06	26.500		
6,100.00	6,039.72	5,918.67	5,639.32	21.83	23.74	-645.26	1,315.14	1,170.13	1,126.28	43.85	26.682		
6,200.00	6,138.20	6,023.37	5,736.09	22.21	24.22	-663.51	1,350.70	1,199.11	1,154.37	44.74	26.800		
6,300.00	6,236.68	6,178.74	5,881.64	22.58	24.92	-688.32	1,399.02	1,225.10	1,179.00	46.09	26.578		
6,400.00	6,335.16	6,337.72	6,033.39	22.96	25.60	-709.93	1,441.11	1,246.32	1,198.97	47.36	26.318		
6,427.73	6,362.48	6,382.33	6,076.42	23.07	25.78	-715.30	1,451.57	1,251.35	1,203.66	47.69	26.240		
6,500.00	6,433.79	6,499.42	6,190.19	23.34	26.25	-727.94	1,476.18	1,262.95	1,214.44	48.51	26.035		
6,600.00	6,532.92	6,663.17	6,350.99	23.71	26.86	-742.02	1,503.61	1,275.67	1,226.14	49.53	25.756		
6,700.00	6,632.45	6,828.43	6,514.78	24.08	27.45	-751.96	1,522.97	1,284.41	1,234.00	50.41	25.478		
6,800.00	6,732.25	6,994.62	6,680.49	24.43	28.00	-757.59	1,533.93	1,289.11	1,237.96	51.15	25.203		
6,900.00	6,832.21	7,146.38	6,832.21	24.79	28.47	-758.93	1,536.54	1,289.85	1,238.09	51.76	24.920		
6,927.79	6,860.00	7,174.17	6,860.00	24.88	28.55	-758.93	1,536.54	1,289.80	1,237.87	51.93	24.836		
7,000.00	6,932.21	7,246.91	6,932.65	25.11	28.76	-756.23	1,536.51	1,289.79	1,237.42	52.38	24.625		
7,035.69	6,967.90	7,282.45	6,967.90	25.23	28.86	-751.68	1,536.46	1,289.78	1,237.19	52.60	24.521		
7,100.00	7,032.21	7,344.59	7,028.60	25.43	29.02	-738.52	1,536.33	1,289.86	1,236.85	53.01	24.333		
7,200.00	7,132.21	7,433.99	7,112.62	25.76	29.24	-708.26	1,536.01	1,290.66	1,236.99	53.67	24.048		
7,300.00	7,232.21	7,512.43	7,181.69	26.08	29.41	-671.23	1,535.63	1,293.28	1,238.93	54.34	23.798		
7,400.00	7,332.21	7,579.41	7,236.21	26.41	29.53	-632.38	1,535.22	1,298.84	1,243.86	54.99	23.621		
7,500.00	7,432.21	7,635.82	7,278.36	26.74	29.63	-594.92	1,534.83	1,308.35	1,252.81	55.55	23.555		
7,600.00	7,532.21	7,683.12	7,310.71	27.06	29.69	-560.44	1,534.47	1,322.57	1,266.59	55.97	23.628		
7,700.00	7,632.21	7,722.84	7,335.60	27.39	29.74	-529.50	1,534.15	1,341.97	1,285.73	56.24	23.862		
7,729.84	7,662.04	7,733.43	7,341.87	27.49	29.75	-520.97	1,534.06	1,348.81	1,292.52	56.29	23.964		
7,750.00	7,682.20	7,750.00	7,351.37	27.56	29.77	-507.38	1,533.92	1,353.70	1,297.35	56.35	24.021		
7,800.00	7,732.03	7,750.00	7,351.37	27.72	29.77	-507.38	1,533.92	1,366.05	1,309.76	56.29	24.268		
7,850.00	7,781.33	7,776.67	7,365.81	27.87	29.79	-484.97	1,533.69	1,378.74	1,322.41	56.33	24.478		
7,900.00	7,829.71	7,800.00	7,377.57	28.02	29.81	-464.82	1,533.48	1,391.67	1,335.36	56.31	24.714		
7,950.00	7,876.83	7,814.65	7,384.54	28.16	29.82	-451.94	1,533.34	1,404.57	1,348.35	56.22	24.985		
8,000.00	7,922.31	7,834.15	7,393.30	28.30	29.84	-434.51	1,533.16	1,417.32	1,361.19	56.13	25.250		
8,050.00	7,965.80	7,850.00	7,399.97	28.42	29.85	-420.14	1,533.01	1,429.76	1,373.76	56.01	25.528		
8,100.00	8,006.99	7,873.96	7,409.30	28.54	29.86	-398.08	1,532.78	1,441.71	1,385.79	55.92	25.781		
8,150.00	8,045.55	7,900.00	7,418.39	28.65	29.87	-373.68	1,532.53	1,453.08	1,397.23	55.85	26.020		
8,200.00	8,081.19	7,914.60	7,423.00	28.76	29.88	-359.82	1,532.38	1,463.66	1,407.96	55.71	26.274		
8,250.00	8,113.64	7,935.17	7,428.88	28.85	29.88	-340.12	1,532.18	1,473.43	1,417.82	55.61	26.494		
8,300.00	8,142.65	7,950.00	7,432.69	28.94	29.89	-325.78	1,532.03	1,482.27	1,426.77	55.51	26.705		
8,350.00	8,168.01	7,976.66	7,438.59	29.02	29.89	-299.79	1,531.76	1,490.03	1,434.55	55.47	26.860		
8,400.00	8,189.52	8,000.00	7,442.76	29.10	29.89	-276.83	1,531.52	1,496.70	1,441.25	55.45	26.992		
8,450.00	8,207.01	8,018.52	7,445.39	29.16	29.89	-258.50	1,531.33	1,502.20	1,446.76	55.43	27.100		
8,500.00	8,220.35	8,050.00	7,448.52	29.22	29.89	-227.18	1,531.00	1,506.55	1,451.07	55.49	27.151		
8,550.00	8,229.45	8,050.00	7,448.52	29.28	29.89	-227.18	1,531.00	1,509.57	1,454.09	55.48	27.209		
8,600.00	8,234.22	8,091.21	7,450.00	29.32	29.88	-186.00	1,530.57	1,511.27	1,455.65	55.62	27.172		
8,629.84	8,235.00	8,098.46	7,450.00	29.35	29.88	-178.76	1,530.50	1,511.59	1,455.92	55.67	27.151		

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation



MS Directional Anticollision Report



Company:	Marathon Oil	Local Co-ordinate Reference:	Well Pierogi BS Federal Com 502H
Project:	Eddy County, New Mexico (NAD 27)	TVD Reference:	WELL @ 3022.50usft (Precision 580)
Reference Site:	Pierogi Federal Com (302H, 502H, 552H)	MD Reference:	WELL @ 3022.50usft (Precision 580)
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	Pierogi BS Federal Com 502H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	EDM 5000.15 Conroe DB
Reference Design:	Design #1	Offset TVD Reference:	Reference Datum

Offset Design: Pierogi Federal Com (302H, 502H, 552H) - Pierogi BS Federal Com 302H - Wellbore #1 - Design #1												Offset Site Error:	0.00 usft
Survey Program: 0-MWD+IFR1+FDIR												Offset Well Error:	0.00 usft
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Semi Major Axis Reference (usft)	Offset (usft)	Azimuth from North (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Distance Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning
8,700.00	8,235.00	8,168.62	7,450.00	29.41	29.86	89.403	-108.60	1,529.77	1,511.80	1,455.85	55.95	27.022	
8,800.00	8,235.00	8,268.62	7,450.00	29.52	29.85	89.403	-8.60	1,528.73	1,512.10	1,455.72	56.38	26.821	
8,900.00	8,235.00	8,368.62	7,450.00	29.66	29.85	89.403	91.39	1,527.69	1,512.40	1,455.54	56.85	26.602	
9,000.00	8,235.00	8,468.62	7,450.00	29.82	29.87	89.403	191.38	1,526.64	1,512.69	1,455.32	57.37	26.365	
9,100.00	8,235.00	8,568.62	7,450.00	30.00	29.91	89.403	291.38	1,525.60	1,512.99	1,455.05	57.94	26.113	
9,200.00	8,235.00	8,668.62	7,450.00	30.21	29.98	89.403	391.37	1,524.56	1,513.29	1,454.74	58.55	25.846	
9,300.00	8,235.00	8,768.62	7,450.00	30.44	30.08	89.403	491.36	1,523.52	1,513.58	1,454.38	59.20	25.567	
9,400.00	8,235.00	8,868.44	7,450.00	30.69	30.22	89.411	591.18	1,522.49	1,513.89	1,454.00	59.89	25.278	
9,500.00	8,235.00	8,968.44	7,450.00	30.97	30.41	89.411	691.17	1,521.46	1,514.20	1,453.58	60.62	24.979	
9,600.00	8,235.00	9,068.44	7,450.00	31.27	30.63	89.411	791.17	1,520.44	1,514.51	1,453.12	61.39	24.672	
9,700.00	8,235.00	9,168.44	7,450.00	31.58	30.90	89.411	891.16	1,519.41	1,514.82	1,452.63	62.19	24.358	
9,800.00	8,235.00	9,268.44	7,450.00	31.92	31.19	89.411	991.16	1,518.38	1,515.12	1,452.10	63.03	24.039	
9,900.00	8,235.00	9,368.43	7,450.00	32.28	31.52	89.411	1,091.15	1,517.35	1,515.43	1,451.53	63.90	23.716	
10,000.00	8,235.00	9,468.43	7,450.00	32.66	31.88	89.411	1,191.14	1,516.33	1,515.74	1,450.94	64.80	23.389	
10,100.00	8,235.00	9,568.43	7,450.00	33.05	32.25	89.411	1,291.14	1,515.30	1,516.05	1,450.31	65.74	23.062	
10,200.00	8,235.00	9,668.43	7,450.00	33.46	32.65	89.411	1,391.13	1,514.27	1,516.36	1,449.66	66.70	22.733	
10,300.00	8,235.00	9,768.43	7,450.00	33.89	33.07	89.411	1,491.13	1,513.24	1,516.67	1,448.97	67.70	22.404	
10,400.00	8,235.00	9,868.43	7,450.00	34.34	33.51	89.411	1,591.12	1,512.22	1,516.98	1,448.26	68.72	22.076	
10,500.00	8,235.00	9,968.43	7,450.00	34.80	33.96	89.411	1,691.11	1,511.19	1,517.29	1,447.53	69.76	21.750	
10,600.00	8,235.00	10,068.43	7,450.00	35.27	34.44	89.411	1,791.11	1,510.16	1,517.60	1,446.77	70.83	21.425	
10,700.00	8,235.00	10,168.43	7,450.00	35.76	34.92	89.411	1,891.10	1,509.14	1,517.91	1,445.98	71.93	21.104	
10,800.00	8,235.00	10,268.43	7,450.00	36.27	35.42	89.411	1,991.10	1,508.11	1,518.22	1,445.18	73.04	20.785	
10,900.00	8,235.00	10,368.43	7,450.00	36.79	35.94	89.411	2,091.09	1,507.08	1,518.53	1,444.35	74.18	20.471	
11,000.00	8,235.00	10,468.43	7,450.00	37.32	36.47	89.411	2,191.08	1,506.05	1,518.84	1,443.50	75.34	20.160	
11,100.00	8,235.00	10,568.43	7,450.00	37.86	37.01	89.411	2,291.08	1,505.03	1,519.15	1,442.63	76.52	19.854	
11,200.00	8,235.00	10,668.43	7,450.00	38.41	37.56	89.411	2,391.07	1,504.00	1,519.46	1,441.74	77.71	19.552	
11,300.00	8,235.00	10,768.43	7,450.00	38.98	38.13	89.411	2,491.07	1,502.97	1,519.77	1,440.84	78.93	19.255	
11,400.00	8,235.00	10,868.42	7,450.00	39.55	38.71	89.411	2,591.06	1,501.94	1,520.08	1,439.91	80.16	18.963	
11,500.00	8,235.00	10,968.42	7,450.00	40.14	39.29	89.411	2,691.05	1,500.92	1,520.39	1,438.98	81.41	18.676	
11,600.00	8,235.00	11,068.42	7,450.00	40.74	39.89	89.411	2,791.05	1,499.89	1,520.70	1,438.02	82.67	18.394	
11,700.00	8,235.00	11,168.42	7,450.00	41.34	40.49	89.411	2,891.04	1,498.86	1,521.00	1,437.05	83.95	18.118	
11,800.00	8,235.00	11,268.42	7,450.00	41.96	41.11	89.411	2,991.04	1,497.84	1,521.31	1,436.07	85.24	17.847	
11,900.00	8,235.00	11,368.42	7,450.00	42.58	41.73	89.411	3,091.03	1,496.81	1,521.62	1,435.07	86.55	17.581	
12,000.00	8,235.00	11,468.42	7,450.00	43.21	42.36	89.411	3,191.02	1,495.78	1,521.93	1,434.06	87.87	17.320	
12,100.00	8,235.00	11,568.42	7,450.00	43.85	43.00	89.411	3,291.02	1,494.75	1,522.24	1,433.04	89.20	17.065	
12,200.00	8,235.00	11,668.42	7,450.00	44.50	43.65	89.411	3,391.01	1,493.73	1,522.55	1,432.01	90.54	16.816	
12,300.00	8,235.00	11,768.42	7,450.00	45.15	44.31	89.411	3,491.01	1,492.70	1,522.86	1,430.96	91.90	16.571	
12,400.00	8,235.00	11,868.42	7,450.00	45.81	44.97	89.411	3,591.00	1,491.67	1,523.17	1,429.91	93.26	16.332	
12,500.00	8,235.00	11,968.42	7,450.00	46.48	45.64	89.411	3,691.00	1,490.64	1,523.48	1,428.84	94.64	16.098	
12,600.00	8,235.00	12,068.42	7,450.00	47.15	46.31	89.411	3,790.99	1,489.62	1,523.79	1,427.77	96.03	15.869	
12,700.00	8,235.00	12,168.42	7,450.00	47.83	46.99	89.411	3,890.98	1,488.59	1,524.10	1,426.68	97.42	15.645	
12,800.00	8,235.00	12,268.42	7,450.00	48.52	47.68	89.411	3,990.98	1,487.56	1,524.41	1,425.59	98.82	15.425	
12,900.00	8,235.00	12,368.41	7,450.00	49.21	48.37	89.411	4,090.97	1,486.54	1,524.72	1,424.49	100.24	15.211	
13,000.00	8,235.00	12,468.41	7,450.00	49.90	49.07	89.411	4,190.97	1,485.51	1,525.03	1,423.37	101.66	15.001	
13,100.00	8,235.00	12,568.41	7,450.00	50.60	49.77	89.411	4,290.96	1,484.48	1,525.34	1,422.25	103.09	14.797	
13,200.00	8,235.00	12,668.41	7,450.00	51.31	50.48	89.411	4,390.95	1,483.45	1,525.65	1,421.13	104.52	14.596	
13,300.00	8,235.00	12,768.41	7,450.00	52.02	51.19	89.411	4,490.95	1,482.43	1,525.96	1,419.99	105.97	14.400	
13,400.00	8,235.00	12,868.15	7,450.00	52.74	51.90	89.423	4,590.68	1,481.41	1,526.28	1,418.86	107.42	14.209	
13,500.00	8,235.00	12,968.15	7,450.00	53.46	52.62	89.423	4,690.68	1,480.40	1,526.60	1,417.73	108.88	14.021	
13,600.00	8,235.00	13,068.15	7,450.00	54.18	53.35	89.423	4,790.67	1,479.39	1,526.93	1,416.59	110.34	13.838	
13,700.00	8,235.00	13,168.15	7,450.00	54.91	54.08	89.423	4,890.67	1,478.38	1,527.26	1,415.45	111.81	13.659	
13,800.00	8,235.00	13,268.15	7,450.00	55.64	54.81	89.423	4,990.66	1,477.38	1,527.59	1,414.30	113.29	13.484	

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation



MS Directional Anticollision Report



Company:	Marathon Oil	Local Co-ordinate Reference:	Well Pierogi BS Federal Com 502H
Project:	Eddy County, New Mexico (NAD 27)	TVD Reference:	WELL @ 3022.50usft (Precision 580)
Reference Site:	Pierogi Federal Com (302H, 502H, 552H)	MD Reference:	WELL @ 3022.50usft (Precision 580)
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	Pierogi BS Federal Com 502H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	EDM 5000.15 Conroe DB
Reference Design:	Design #1	Offset TVD Reference:	Reference Datum

Offset Design: Pierogi Federal Com (302H, 502H, 552H) - Pierogi BS Federal Com 302H - Wellbore #1 - Design #1													Offset Site Error:
Survey Program: 0-MWD+IFR1+FDIR													Offset Well Error:
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Semi Major Axis Reference (usft)	Offset (usft)	Azimuth from North (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Distance Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning
13,900.00	8,235.00	13,368.15	7,450.00	56.37	55.55	89.423	5,090.66	1,476.37	1,527.91	1,413.14	114.77	13.313	
14,000.00	8,235.00	13,468.15	7,450.00	57.11	56.29	89.423	5,190.65	1,475.36	1,528.24	1,411.98	116.26	13.145	
14,100.00	8,235.00	13,568.15	7,450.00	57.85	57.03	89.423	5,290.64	1,474.35	1,528.57	1,410.82	117.75	12.981	
14,200.00	8,235.00	13,668.15	7,450.00	58.60	57.78	89.423	5,390.64	1,473.35	1,528.89	1,409.64	119.25	12.821	
14,300.00	8,235.00	13,768.15	7,450.00	59.35	58.53	89.423	5,490.63	1,472.34	1,529.22	1,408.47	120.75	12.664	
14,400.00	8,235.00	13,868.15	7,450.00	60.10	59.28	89.423	5,590.63	1,471.33	1,529.55	1,407.29	122.26	12.510	
14,500.00	8,235.00	13,968.15	7,450.00	60.86	60.03	89.423	5,690.62	1,470.32	1,529.88	1,406.10	123.77	12.360	
14,600.00	8,235.00	14,068.15	7,450.00	61.61	60.79	89.423	5,790.62	1,469.32	1,530.20	1,404.91	125.29	12.213	
14,700.00	8,235.00	14,168.14	7,450.00	62.37	61.55	89.423	5,890.61	1,468.31	1,530.53	1,403.72	126.81	12.069	
14,800.00	8,235.00	14,268.14	7,450.00	63.14	62.32	89.423	5,990.60	1,467.30	1,530.86	1,402.52	128.34	11.928	
14,900.00	8,235.00	14,368.14	7,450.00	63.90	63.08	89.423	6,090.60	1,466.29	1,531.18	1,401.32	129.87	11.790	
15,000.00	8,235.00	14,468.14	7,450.00	64.67	63.85	89.423	6,190.59	1,465.29	1,531.51	1,400.11	131.40	11.655	
15,100.00	8,235.00	14,568.14	7,450.00	65.44	64.62	89.423	6,290.59	1,464.28	1,531.84	1,398.90	132.94	11.523	
15,200.00	8,235.00	14,668.14	7,450.00	66.21	65.40	89.423	6,390.58	1,463.27	1,532.17	1,397.69	134.48	11.393	
15,300.00	8,235.00	14,768.14	7,450.00	66.98	66.17	89.423	6,490.57	1,462.26	1,532.49	1,396.47	136.02	11.266	
15,400.00	8,235.00	14,868.14	7,450.00	67.76	66.95	89.423	6,590.57	1,461.25	1,532.82	1,395.25	137.57	11.142	
15,500.00	8,235.00	14,968.14	7,450.00	68.54	67.73	89.423	6,690.56	1,460.25	1,533.15	1,394.03	139.12	11.020	
15,600.00	8,235.00	15,068.14	7,450.00	69.32	68.51	89.423	6,790.56	1,459.24	1,533.48	1,392.80	140.68	10.901	
15,700.00	8,235.00	15,168.14	7,450.00	70.10	69.29	89.423	6,890.55	1,458.23	1,533.80	1,391.57	142.23	10.784	
15,800.00	8,235.00	15,268.14	7,450.00	70.89	70.08	89.423	6,990.55	1,457.22	1,534.13	1,390.34	143.79	10.669	
15,900.00	8,235.00	15,368.14	7,450.00	71.67	70.87	89.423	7,090.54	1,456.22	1,534.46	1,389.10	145.35	10.557	
16,000.00	8,235.00	15,468.14	7,450.00	72.46	71.65	89.423	7,190.53	1,455.21	1,534.79	1,387.87	146.92	10.446	
16,100.00	8,235.00	15,568.13	7,450.00	73.25	72.44	89.423	7,290.53	1,454.20	1,535.11	1,386.63	148.49	10.338	
16,200.00	8,235.00	15,668.13	7,450.00	74.04	73.24	89.423	7,390.52	1,453.19	1,535.44	1,385.38	150.06	10.232	
16,300.00	8,235.00	15,768.13	7,450.00	74.83	74.03	89.423	7,490.52	1,452.19	1,535.77	1,384.14	151.63	10.128	
16,400.00	8,235.00	15,868.13	7,450.00	75.63	74.82	89.423	7,590.51	1,451.18	1,536.10	1,382.89	153.21	10.026	
16,500.00	8,235.00	15,968.13	7,450.00	76.42	75.62	89.423	7,690.50	1,450.17	1,536.42	1,381.64	154.78	9.926	
16,600.00	8,235.00	16,068.13	7,450.00	77.22	76.42	89.423	7,790.50	1,449.16	1,536.75	1,380.39	156.36	9.828	
16,700.00	8,235.00	16,168.13	7,450.00	78.02	77.22	89.423	7,890.49	1,448.16	1,537.08	1,379.13	157.95	9.732	
16,800.00	8,235.00	16,268.13	7,450.00	78.82	78.02	89.423	7,990.49	1,447.15	1,537.41	1,377.88	159.53	9.637	
16,900.00	8,235.00	16,368.13	7,450.00	79.62	78.82	89.423	8,090.48	1,446.14	1,537.74	1,376.62	161.12	9.544	
17,000.00	8,235.00	16,468.13	7,450.00	80.42	79.62	89.423	8,190.48	1,445.13	1,538.06	1,375.36	162.71	9.453	
17,100.00	8,235.00	16,568.13	7,450.00	81.22	80.42	89.423	8,290.47	1,444.13	1,538.39	1,374.10	164.30	9.364	
17,200.00	8,235.00	16,668.13	7,450.00	82.03	81.23	89.423	8,390.46	1,443.12	1,538.72	1,372.83	165.89	9.276	
17,300.00	8,235.00	16,768.13	7,450.00	82.83	82.04	89.423	8,490.46	1,442.11	1,539.05	1,371.56	167.48	9.189	
17,400.00	8,235.00	16,868.13	7,450.00	83.64	82.84	89.423	8,590.45	1,441.10	1,539.38	1,370.30	169.08	9.104	
17,500.00	8,235.00	16,968.12	7,450.00	84.45	83.65	89.423	8,690.45	1,440.09	1,539.70	1,369.03	170.68	9.021	
17,600.00	8,235.00	17,068.12	7,450.00	85.26	84.46	89.423	8,790.44	1,439.09	1,540.03	1,367.75	172.28	8.939	
17,700.00	8,235.00	17,168.12	7,450.00	86.07	85.27	89.423	8,890.44	1,438.08	1,540.36	1,366.48	173.88	8.859	
17,800.00	8,235.00	17,268.12	7,450.00	86.88	86.08	89.423	8,990.43	1,437.07	1,540.69	1,365.21	175.48	8.780	
17,900.00	8,235.00	17,368.12	7,450.00	87.69	86.90	89.423	9,090.42	1,436.06	1,541.02	1,363.93	177.08	8.702	
18,000.00	8,235.00	17,468.12	7,450.00	88.50	87.71	89.423	9,190.42	1,435.06	1,541.34	1,362.65	178.69	8.626	
18,100.00	8,235.00	17,568.12	7,450.00	89.32	88.52	89.423	9,290.41	1,434.05	1,541.67	1,361.37	180.30	8.551	
18,200.00	8,235.00	17,668.12	7,450.00	90.13	89.34	89.423	9,390.41	1,433.04	1,542.00	1,360.09	181.91	8.477	
18,300.00	8,235.00	17,768.12	7,450.00	90.95	90.15	89.423	9,490.40	1,432.03	1,542.33	1,358.81	183.52	8.404	
18,400.00	8,235.00	17,868.12	7,450.00	91.76	90.97	89.423	9,590.39	1,431.03	1,542.66	1,357.53	185.13	8.333	
18,500.00	8,235.00	17,968.12	7,450.00	92.58	91.79	89.423	9,690.39	1,430.02	1,542.98	1,356.24	186.74	8.263	
18,600.00	8,235.00	18,068.12	7,450.00	93.40	92.61	89.423	9,790.38	1,429.01	1,543.31	1,354.96	188.36	8.194	
18,700.00	8,235.00	18,168.12	7,450.00	94.22	93.43	89.423	9,890.38	1,428.00	1,543.64	1,353.67	189.97	8.126	
18,800.00	8,235.00	18,268.10	7,450.00	95.04	94.37	88.777	10,000.34	1,426.06	1,543.96	1,351.74	191.62	8.054	
18,900.00	8,235.00	18,368.10	7,450.00	95.86	95.19	88.777	10,105.32	1,423.92	1,542.72	1,349.49	193.24	7.984	
19,000.00	8,235.00	18,468.10	7,450.00	96.68	96.01	88.777	10,205.29	1,421.79	1,542.08	1,347.22	194.86	7.914	

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation



MS Directional Anticollision Report



Company:	Marathon Oil	Local Co-ordinate Reference:	Well Pierogi BS Federal Com 502H
Project:	Eddy County, New Mexico (NAD 27)	TVD Reference:	WELL @ 3022.50usft (Precision 580)
Reference Site:	Pierogi Federal Com (302H, 502H, 552H)	MD Reference:	WELL @ 3022.50usft (Precision 580)
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	Pierogi BS Federal Com 502H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	EDM 5000.15 Conroe DB
Reference Design:	Design #1	Offset TVD Reference:	Reference Datum

Offset Design: Pierogi Federal Com (302H, 502H, 552H) - Pierogi BS Federal Com 302H - Wellbore #1 - Design #1													Offset Site Error: 0.00 usft
Survey Program: 0-MWD+IFR1+FDIR													Offset Well Error: 0.00 usft
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Semi Major Axis Reference (usft)	Semi Major Axis Offset (usft)	Azimuth from North (°)	Offset Wellbore Centre +N/-S (usft)	Offset Wellbore Centre +E/-W (usft)	Distance Between Centres (usft)	Distance Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning
19,100.00	8,235.00	18,583.09	7,450.00	97.50	96.84	88.777	10,305.27	1,419.65	1,541.44	1,344.96	196.47	7.846	
19,200.00	8,235.00	18,683.09	7,450.00	98.32	97.66	88.777	10,405.24	1,417.52	1,540.80	1,342.70	198.09	7.778	
19,300.00	8,235.00	18,783.09	7,450.00	99.15	98.49	88.777	10,505.22	1,415.38	1,540.15	1,340.44	199.72	7.712	
19,400.00	8,235.00	18,883.08	7,450.00	99.97	99.31	88.777	10,605.19	1,413.25	1,539.51	1,338.17	201.34	7.646	
19,500.00	8,235.00	18,983.08	7,450.00	100.79	100.14	88.777	10,705.17	1,411.11	1,538.87	1,335.91	202.96	7.582	
19,600.00	8,235.00	19,083.08	7,450.00	101.62	100.96	88.777	10,805.14	1,408.98	1,538.23	1,333.64	204.58	7.519	
19,700.00	8,235.00	19,183.08	7,450.00	102.44	101.79	88.777	10,905.11	1,406.85	1,537.59	1,331.38	206.21	7.456	
19,800.00	8,235.00	19,283.07	7,450.00	103.27	102.62	88.777	11,005.09	1,404.71	1,536.94	1,329.11	207.84	7.395	
19,900.00	8,235.00	19,383.07	7,450.00	104.10	103.44	88.777	11,105.06	1,402.58	1,536.30	1,326.84	209.46	7.334	
20,000.00	8,235.00	19,483.07	7,450.00	104.92	104.27	88.777	11,205.04	1,400.44	1,535.66	1,324.57	211.09	7.275	
20,100.00	8,235.00	19,583.06	7,450.00	105.75	105.10	88.777	11,305.01	1,398.31	1,535.02	1,322.30	212.72	7.216	
20,200.00	8,235.00	19,683.06	7,450.00	106.58	105.93	88.777	11,404.99	1,396.17	1,534.38	1,320.03	214.35	7.158	
20,300.00	8,235.00	19,783.06	7,450.00	107.41	106.76	88.777	11,504.96	1,394.04	1,533.74	1,317.76	215.98	7.101	
20,400.00	8,235.00	19,883.06	7,450.00	108.24	107.59	88.777	11,604.94	1,391.90	1,533.10	1,315.49	217.61	7.045	
20,500.00	8,235.00	19,983.05	7,450.00	109.07	108.42	88.777	11,704.91	1,389.77	1,532.46	1,313.21	219.24	6.990	
20,600.00	8,235.00	20,083.05	7,450.00	109.90	109.26	88.777	11,804.88	1,387.63	1,531.82	1,310.94	220.87	6.935	
20,700.00	8,235.00	20,183.05	7,450.00	110.73	110.09	88.777	11,904.86	1,385.50	1,531.17	1,308.67	222.51	6.881	
20,800.00	8,235.00	20,283.05	7,450.00	111.56	110.92	88.777	12,004.83	1,383.36	1,530.53	1,306.39	224.14	6.828	
20,900.00	8,235.00	20,383.04	7,450.00	112.39	111.75	88.777	12,104.81	1,381.23	1,529.89	1,304.12	225.77	6.776	
21,000.00	8,235.00	20,483.04	7,450.00	113.23	112.59	88.777	12,204.78	1,379.09	1,529.25	1,301.84	227.41	6.725	
21,100.00	8,235.00	20,583.04	7,450.00	114.06	113.42	88.777	12,304.76	1,376.96	1,528.61	1,299.57	229.05	6.674	
21,200.00	8,235.00	20,683.03	7,450.00	114.89	114.25	88.777	12,404.73	1,374.82	1,527.97	1,297.29	230.68	6.624	
21,300.00	8,235.00	20,783.03	7,450.00	115.72	115.09	88.777	12,504.70	1,372.69	1,527.33	1,295.01	232.32	6.574	
21,400.00	8,235.00	20,883.03	7,450.00	116.56	115.92	88.777	12,604.68	1,370.55	1,526.69	1,292.73	233.96	6.526	
21,500.00	8,235.00	20,983.03	7,450.00	117.39	116.76	88.777	12,704.65	1,368.42	1,526.05	1,290.46	235.60	6.477	
21,600.00	8,235.00	21,083.02	7,450.00	118.23	117.60	88.777	12,804.63	1,366.28	1,525.41	1,288.18	237.23	6.430	
21,700.00	8,235.00	21,183.02	7,450.00	119.06	118.43	88.777	12,904.60	1,364.15	1,524.77	1,285.90	238.87	6.383	
21,800.00	8,235.00	21,283.02	7,450.00	119.90	119.27	88.777	13,004.58	1,362.01	1,524.13	1,283.62	240.51	6.337	
21,900.00	8,235.00	21,383.01	7,450.00	120.73	120.11	88.777	13,104.55	1,359.88	1,523.49	1,281.34	242.16	6.291	
22,000.00	8,235.00	21,483.01	7,450.00	121.57	120.94	88.777	13,204.53	1,357.74	1,522.85	1,279.06	243.80	6.246	
22,100.00	8,235.00	21,583.01	7,450.00	122.41	121.78	88.777	13,304.50	1,355.61	1,522.21	1,276.78	245.44	6.202	
22,200.00	8,235.00	21,683.01	7,450.00	123.24	122.62	88.777	13,404.47	1,353.47	1,521.57	1,274.49	247.08	6.158	
22,300.00	8,235.00	21,783.00	7,450.00	124.08	123.46	88.777	13,504.45	1,351.34	1,520.94	1,272.21	248.72	6.115	
22,400.00	8,235.00	21,883.00	7,450.00	124.92	124.30	88.777	13,604.42	1,349.20	1,520.30	1,269.93	250.37	6.072	
22,500.00	8,235.00	21,983.00	7,450.00	125.76	125.14	88.777	13,704.40	1,347.07	1,519.66	1,267.65	252.01	6.030	
22,600.00	8,235.00	22,083.00	7,450.00	126.59	125.97	88.777	13,804.37	1,344.93	1,519.02	1,265.36	253.65	5.989	
22,700.00	8,235.00	22,182.99	7,450.00	127.43	126.81	88.777	13,904.35	1,342.80	1,518.38	1,263.08	255.30	5.947	
22,800.00	8,235.00	22,282.99	7,450.00	128.27	127.65	88.777	14,004.32	1,340.66	1,517.74	1,260.80	256.94	5.907	
22,900.00	8,235.00	22,382.99	7,450.00	129.11	128.49	88.777	14,104.30	1,338.53	1,517.10	1,258.51	258.59	5.867	
23,000.00	8,235.00	22,482.98	7,450.00	129.95	129.34	88.777	14,204.27	1,336.39	1,516.46	1,256.23	260.23	5.827	
23,100.00	8,235.00	22,582.98	7,450.00	130.79	130.18	88.777	14,304.24	1,334.26	1,515.83	1,253.94	261.88	5.788	
23,200.00	8,235.00	22,682.98	7,450.00	131.63	131.02	88.777	14,404.22	1,332.12	1,515.19	1,251.66	263.53	5.750	
23,300.00	8,235.00	22,782.98	7,450.00	132.47	131.86	88.777	14,504.19	1,329.99	1,514.55	1,249.37	265.18	5.712	
23,400.00	8,235.00	22,882.97	7,450.00	133.31	132.70	88.777	14,604.17	1,327.85	1,513.91	1,247.09	266.82	5.674	
23,500.00	8,235.00	22,982.97	7,450.00	134.15	133.54	88.777	14,704.14	1,325.72	1,513.27	1,244.80	268.47	5.637	
23,600.00	8,235.00	23,082.97	7,450.00	134.99	134.38	88.777	14,804.12	1,323.58	1,512.63	1,242.52	270.12	5.600	
23,700.00	8,235.00	23,182.96	7,450.00	135.83	135.23	88.777	14,904.09	1,321.45	1,512.00	1,240.23	271.77	5.564	
23,800.00	8,235.00	23,282.96	7,450.00	136.68	136.07	88.777	15,004.07	1,319.32	1,511.36	1,237.94	273.42	5.528	
23,900.00	8,235.00	23,382.96	7,450.00	137.52	136.91	88.777	15,104.04	1,317.18	1,510.72	1,235.66	275.07	5.492	
23,982.25	8,235.00	23,455.58	7,450.00	138.21	137.52	89.204	15,176.64	1,315.63	1,510.23	1,233.82	276.41	5.464	
24,000.00	8,235.00	23,455.58	7,450.00	138.36	137.52	89.993	15,176.64	1,315.63	1,510.33	1,233.69	276.64	5.460	
24,004.19	8,235.00	23,455.58	7,450.00	138.39	137.52	90.178	15,176.64	1,315.63	1,510.39	1,233.70	276.69	5.459	

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation



MS Directional
Anticollision Report



Company:	Marathon Oil	Local Co-ordinate Reference:	Well Pierogi BS Federal Com 502H
Project:	Eddy County, New Mexico (NAD 27)	TVD Reference:	WELL @ 3022.50usft (Precision 580)
Reference Site:	Pierogi Federal Com (302H, 502H, 552H)	MD Reference:	WELL @ 3022.50usft (Precision 580)
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	Pierogi BS Federal Com 502H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	EDM 5000.15 Conroe DB
Reference Design:	Design #1	Offset TVD Reference:	Reference Datum



MS Directional Anticollision Report



Company:	Marathon Oil	Local Co-ordinate Reference:	Well Pierogi BS Federal Com 502H
Project:	Eddy County, New Mexico (NAD 27)	TVD Reference:	WELL @ 3022.50usft (Precision 580)
Reference Site:	Pierogi Federal Com (302H, 502H, 552H)	MD Reference:	WELL @ 3022.50usft (Precision 580)
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	Pierogi BS Federal Com 502H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	EDM 5000.15 Conroe DB
Reference Design:	Design #1	Offset TVD Reference:	Reference Datum

Offset Design: Pierogi Federal Com (302H, 502H, 552H) - Pierogi BS Federal Com 552H - Wellbore #1 - Design #1													Offset Site Error:
Survey Program: 0-MWD+IFR1+FDIR													Offset Well Error:
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Semi Major Axis Reference (usft)	Semi Major Axis Offset (usft)	Azimuth from North (°)	Offset Wellbore Centre +N/-S (usft)	Offset Wellbore Centre +E/-W (usft)	Distance Between Centres (usft)	Rule Assigned: Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning
0.00	0.00	0.00	0.00	0.00	0.00	180.000	-29.99	0.00	29.99				
100.00	100.00	100.00	100.00	0.14	0.14	180.000	-29.99	0.00	29.99	29.72	0.27	109.360	
200.00	200.00	200.00	200.00	0.50	0.50	180.000	-29.99	0.00	29.99	29.00	0.99	30.257	
300.00	300.00	300.00	300.00	0.85	0.85	180.000	-29.99	0.00	29.99	28.28	1.71	17.557	
400.00	400.00	400.00	400.00	1.21	1.21	180.000	-29.99	0.00	29.99	27.56	2.43	12.367	
500.00	500.00	500.00	500.00	1.57	1.57	180.000	-29.99	0.00	29.99	26.85	3.14	9.545	
524.13	524.13	524.13	524.13	1.66	1.66	180.000	-29.99	0.00	29.99	26.67	3.32	9.047	
600.00	600.00	600.00	600.00	1.93	1.93	180.000	-29.99	0.00	29.99	26.13	3.86	7.772	
633.33	633.33	633.33	633.33	2.05	2.05	180.000	-29.99	0.00	29.99	25.89	4.10	7.318	
700.00	700.00	700.00	700.00	2.29	2.29	180.000	-29.99	0.00	29.99	25.41	4.58	6.554	
800.00	800.00	800.00	800.00	2.65	2.65	180.000	-29.99	0.00	29.99	24.70	5.29	5.666	
900.00	900.00	900.00	900.00	3.00	3.00	180.000	-29.99	0.00	29.99	23.98	6.01	4.990	
1,000.00	1,000.00	1,000.00	1,000.00	3.36	3.36	180.000	-29.99	0.00	29.99	23.26	6.73	4.458	
1,100.00	1,100.00	1,100.00	1,100.00	3.72	3.72	180.000	-29.99	0.00	29.99	22.55	7.44	4.029	
1,200.00	1,200.00	1,200.00	1,200.00	4.08	4.08	180.000	-29.99	0.00	29.99	21.83	8.16	3.675	
1,300.00	1,300.00	1,300.00	1,300.00	4.44	4.44	180.000	-29.99	0.00	29.99	21.11	8.88	3.378	
1,400.00	1,400.00	1,400.00	1,400.00	4.80	4.80	180.000	-29.99	0.00	29.99	20.40	9.59	3.126	
1,500.00	1,500.00	1,500.00	1,500.00	5.16	5.16	180.000	-29.99	0.00	29.99	19.68	10.31	2.908 CC, ES	
1,600.00	1,600.00	1,599.50	1,599.48	5.51	5.50	177.119	-30.76	1.55	30.80	19.79	11.01	2.797 SF	
1,700.00	1,700.00	1,698.75	1,698.59	5.87	5.83	169.420	-33.05	6.17	33.65	21.96	11.70	2.877	
1,800.00	1,800.00	1,797.54	1,797.00	6.23	6.17	159.430	-36.85	13.83	39.47	27.10	12.37	3.191	
1,900.00	1,899.98	1,895.76	1,894.50	6.57	6.50	149.414	-42.12	24.45	47.32	34.31	13.01	3.638	
2,000.00	1,999.84	1,993.43	1,990.99	6.90	6.84	139.657	-48.83	37.97	56.05	42.45	13.60	4.121	
2,100.00	2,099.45	2,090.45	2,086.28	7.23	7.18	130.315	-56.94	54.32	66.24	52.06	14.18	4.673	
2,200.00	2,198.70	2,186.74	2,180.18	7.56	7.52	121.587	-66.40	73.38	78.32	63.58	14.74	5.314	
2,300.06	2,297.52	2,283.31	2,273.64	7.89	7.87	113.618	-77.20	95.17	92.42	77.08	15.34	6.025	
2,400.00	2,395.95	2,381.51	2,368.50	8.23	8.22	107.107	-88.49	117.93	107.40	91.37	16.03	6.700	
2,500.00	2,494.43	2,479.78	2,463.41	8.57	8.59	102.240	-99.79	140.71	123.36	106.63	16.73	7.372	
2,600.00	2,592.91	2,578.04	2,558.33	8.91	8.95	98.516	-111.09	163.48	139.97	122.52	17.45	8.023	
2,700.00	2,691.39	2,676.30	2,653.24	9.26	9.32	95.598	-122.39	186.26	157.01	138.84	18.16	8.644	
2,800.00	2,789.87	2,774.56	2,748.16	9.61	9.69	93.260	-133.69	209.04	174.36	155.47	18.89	9.232	
2,900.00	2,888.35	2,872.83	2,843.08	9.96	10.06	91.351	-144.99	231.81	191.94	172.32	19.61	9.785	
3,000.00	2,986.83	2,971.09	2,937.99	10.32	10.44	89.766	-156.29	254.59	209.68	189.34	20.35	10.306	
3,100.00	3,085.31	3,069.35	3,032.91	10.67	10.82	88.432	-167.59	277.37	227.56	206.48	21.08	10.795	
3,200.00	3,183.79	3,167.62	3,127.83	11.03	11.20	87.293	-178.89	300.14	245.54	223.72	21.82	11.254	
3,300.00	3,282.27	3,265.88	3,222.74	11.39	11.58	86.312	-190.19	322.92	263.60	241.04	22.56	11.686	
3,400.00	3,380.75	3,364.14	3,317.66	11.76	11.96	85.457	-201.49	345.70	281.72	258.42	23.30	12.091	
3,500.00	3,479.23	3,462.40	3,412.58	12.12	12.34	84.706	-212.79	368.47	299.90	275.85	24.04	12.473	
3,600.00	3,577.71	3,560.67	3,507.49	12.48	12.73	84.042	-224.09	391.25	318.12	293.32	24.79	12.832	
3,700.00	3,676.19	3,658.93	3,602.41	12.85	13.11	83.450	-235.39	414.03	336.37	310.83	25.54	13.170	
3,800.00	3,774.67	3,757.19	3,697.33	13.22	13.50	82.919	-246.69	436.80	354.66	328.37	26.29	13.490	
3,900.00	3,873.15	3,855.46	3,792.24	13.58	13.89	82.441	-257.98	459.58	372.98	345.93	27.04	13.792	
4,000.00	3,971.63	3,953.72	3,887.16	13.95	14.28	82.008	-269.28	482.36	391.32	363.52	27.80	14.077	
4,100.00	4,070.11	4,051.98	3,982.08	14.32	14.67	81.614	-280.58	505.13	409.67	381.12	28.55	14.348	
4,200.00	4,168.59	4,150.24	4,076.99	14.69	15.06	81.254	-291.88	527.91	428.05	398.74	29.31	14.604	
4,300.00	4,267.07	4,248.51	4,171.91	15.06	15.45	80.923	-303.18	550.69	446.44	416.37	30.07	14.848	
4,400.00	4,365.55	4,346.77	4,266.83	15.44	15.84	80.619	-314.48	573.46	464.84	434.02	30.83	15.079	
4,500.00	4,464.03	4,445.03	4,361.74	15.81	16.24	80.338	-325.78	596.24	483.26	451.67	31.59	15.299	
4,600.00	4,562.51	4,543.29	4,456.66	16.18	16.63	80.078	-337.08	619.01	501.68	469.34	32.35	15.508	
4,700.00	4,661.00	4,641.56	4,551.57	16.56	17.02	79.836	-348.38	641.79	520.12	487.01	33.11	15.708	
4,800.00	4,759.48	4,739.82	4,646.49	16.93	17.42	79.611	-359.68	664.57	538.56	504.69	33.87	15.899	
4,900.00	4,857.96	4,838.08	4,741.41	17.30	17.81	79.401	-370.98	687.34	557.02	522.38	34.64	16.081	

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation



MS Directional Anticollision Report



Company:	Marathon Oil	Local Co-ordinate Reference:	Well Pierogi BS Federal Com 502H
Project:	Eddy County, New Mexico (NAD 27)	TVD Reference:	WELL @ 3022.50usft (Precision 580)
Reference Site:	Pierogi Federal Com (302H, 502H, 552H)	MD Reference:	WELL @ 3022.50usft (Precision 580)
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	Pierogi BS Federal Com 502H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	EDM 5000.15 Conroe DB
Reference Design:	Design #1	Offset TVD Reference:	Reference Datum

Offset Design: Pierogi Federal Com (302H, 502H, 552H) - Pierogi BS Federal Com 552H - Wellbore #1 - Design #1													Offset Site Error:
Survey Program: 0-MWD+IFR1+FDIR													Offset Well Error:
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Semi Major Axis Reference (usft)	Offset (usft)	Azimuth from North (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Distance Between Centres (usft)	Rule Assigned: Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning
5,000.00	4,956.44	4,936.35	4,836.32	17.68	18.21	79.204	-382.28	710.12	575.47	540.07	35.40	16.254	
5,100.00	5,054.92	5,034.61	4,931.24	18.05	18.60	79.020	-393.58	732.90	593.94	557.77	36.17	16.421	
5,200.00	5,153.40	5,132.87	5,026.16	18.43	19.00	78.847	-404.88	755.67	612.41	575.47	36.94	16.580	
5,300.00	5,251.88	5,231.13	5,121.07	18.81	19.39	78.684	-416.18	778.45	630.88	593.18	37.70	16.733	
5,400.00	5,350.36	5,329.40	5,215.99	19.18	19.79	78.530	-427.48	801.23	649.36	610.89	38.47	16.879	
5,500.00	5,448.84	5,427.66	5,310.91	19.56	20.19	78.385	-438.77	824.00	667.85	628.61	39.24	17.020	
5,600.00	5,547.32	5,525.92	5,405.82	19.94	20.58	78.248	-450.07	846.78	686.34	646.33	40.01	17.155	
5,700.00	5,645.80	5,624.19	5,500.74	20.31	20.98	78.118	-461.37	869.56	704.83	664.05	40.78	17.285	
5,800.00	5,744.28	5,722.45	5,595.66	20.69	21.38	77.994	-472.67	892.33	723.33	681.78	41.55	17.410	
5,900.00	5,842.76	5,820.71	5,690.57	21.07	21.77	77.877	-483.97	915.11	741.82	699.51	42.32	17.530	
6,000.00	5,941.24	5,918.97	5,785.49	21.45	22.17	77.765	-495.27	937.89	760.33	717.24	43.09	17.646	
6,100.00	6,039.72	6,017.24	5,880.41	21.83	22.57	77.659	-506.57	960.66	778.83	734.97	43.86	17.757	
6,200.00	6,138.20	6,115.50	5,975.32	22.21	22.97	77.558	-517.87	983.44	797.34	752.71	44.63	17.865	
6,300.00	6,236.68	6,213.76	6,070.24	22.58	23.37	77.461	-529.17	1,006.22	815.85	770.44	45.40	17.969	
6,400.00	6,335.16	6,312.03	6,165.15	22.96	23.77	77.369	-540.47	1,028.99	834.36	788.18	46.18	18.069	
6,427.73	6,362.48	6,339.28	6,191.48	23.07	23.88	77.344	-543.60	1,035.31	839.49	793.10	46.39	18.096	
6,500.00	6,433.79	6,410.27	6,260.06	23.34	24.16	77.342	-551.77	1,051.77	852.98	806.03	46.95	18.169	
6,600.00	6,532.92	6,508.40	6,354.84	23.71	24.56	77.536	-563.05	1,074.51	872.01	824.30	47.71	18.278	
6,700.00	6,632.45	6,606.28	6,449.39	24.08	24.96	77.947	-574.31	1,097.20	891.46	843.00	48.46	18.396	
6,800.00	6,732.25	6,703.81	6,543.59	24.43	25.36	78.558	-585.52	1,119.81	911.39	862.19	49.20	18.524	
6,900.00	6,832.21	6,800.85	6,637.33	24.79	25.75	79.357	-596.68	1,142.30	931.87	881.94	49.93	18.664	
6,927.79	6,860.00	6,827.72	6,663.29	24.88	25.86	79.610	-599.77	1,148.53	937.68	887.55	50.13	18.707	
7,000.00	6,932.21	6,897.47	6,730.66	25.11	26.14	80.275	-607.79	1,164.70	952.89	902.26	50.63	18.821	
7,100.00	7,032.21	6,994.06	6,823.96	25.43	26.54	81.162	-618.90	1,187.08	974.15	922.83	51.33	18.980	
7,200.00	7,132.21	7,090.66	6,917.27	25.76	26.93	82.011	-630.00	1,209.47	995.64	943.61	52.02	19.138	
7,300.00	7,232.21	7,187.25	7,010.57	26.08	27.32	82.826	-641.11	1,231.86	1,017.32	964.60	52.72	19.295	
7,400.00	7,332.21	7,283.85	7,103.88	26.41	27.72	83.607	-652.22	1,254.25	1,039.20	985.78	53.43	19.451	
7,500.00	7,432.21	7,380.44	7,197.18	26.74	28.11	84.356	-663.33	1,276.64	1,061.26	1,007.13	54.13	19.607	
7,600.00	7,532.21	7,477.03	7,290.49	27.06	28.50	85.075	-674.43	1,299.03	1,083.49	1,028.66	54.83	19.761	
7,700.00	7,632.21	7,573.63	7,383.79	27.39	28.90	85.766	-685.54	1,321.42	1,105.88	1,050.34	55.53	19.913	
7,729.84	7,662.04	7,602.45	7,411.63	27.49	29.01	85.966	-688.86	1,328.10	1,112.59	1,056.84	55.74	19.959	
7,750.00	7,682.20	7,621.88	7,430.40	27.56	29.09	86.119	-691.09	1,332.61	1,117.11	1,061.22	55.89	19.989	
7,800.00	7,732.03	7,669.55	7,476.45	27.72	29.29	86.648	-696.57	1,343.66	1,128.18	1,071.95	56.23	20.064	
7,850.00	7,781.33	7,716.19	7,521.50	27.87	29.48	87.384	-701.94	1,354.47	1,139.08	1,082.52	56.56	20.140	
7,900.00	7,829.71	7,761.45	7,565.22	28.02	29.66	88.316	-707.14	1,364.96	1,149.88	1,093.00	56.87	20.218	
7,950.00	7,876.83	7,804.98	7,607.27	28.16	29.84	89.432	-712.15	1,375.05	1,160.67	1,103.50	57.17	20.301	
8,000.00	7,922.31	7,851.70	7,652.41	28.30	30.03	90.749	-717.50	1,385.85	1,171.58	1,114.08	57.50	20.376	
8,050.00	7,965.80	7,914.80	7,713.61	28.42	30.28	92.300	-724.33	1,399.60	1,182.21	1,124.25	57.95	20.399	
8,100.00	8,006.99	7,975.14	7,772.44	28.54	30.52	93.955	-730.29	1,411.62	1,192.55	1,134.19	58.37	20.432	
8,150.00	8,045.55	8,032.22	7,828.33	28.65	30.74	95.703	-735.42	1,421.97	1,202.89	1,144.16	58.73	20.481	
8,200.00	8,081.19	8,085.51	7,880.72	28.76	30.95	97.536	-739.77	1,430.72	1,213.52	1,154.46	59.06	20.549	
8,250.00	8,113.64	8,134.49	7,929.02	28.85	31.13	99.440	-743.38	1,438.00	1,224.70	1,165.37	59.33	20.642	
8,300.00	8,142.65	8,178.64	7,972.67	28.94	31.30	101.404	-746.32	1,443.93	1,236.73	1,177.16	59.56	20.763	
8,350.00	8,168.01	8,217.45	8,011.12	29.02	31.44	103.413	-748.65	1,448.64	1,249.82	1,190.06	59.76	20.915	
8,400.00	8,189.52	8,250.41	8,043.83	29.10	31.56	105.451	-750.45	1,452.27	1,264.18	1,204.27	59.91	21.103	
8,450.00	8,207.01	8,277.01	8,070.27	29.16	31.66	107.501	-751.79	1,454.96	1,279.94	1,219.92	60.02	21.326	
8,500.00	8,220.35	8,296.79	8,089.94	29.22	31.73	109.546	-752.71	1,456.81	1,297.17	1,237.08	60.10	21.584	
8,550.00	8,229.45	8,309.29	8,102.37	29.28	31.77	111.569	-753.26	1,457.92	1,315.88	1,255.74	60.15	21.878	
8,600.00	8,234.22	8,314.06	8,107.12	29.32	31.79	113.553	-753.46	1,458.33	1,335.98	1,275.81	60.17	22.205	
8,629.84	8,235.00	8,313.07	8,106.14	29.35	31.79	114.713	-753.42	1,458.25	1,348.57	1,288.40	60.16	22.415	
8,700.00	8,235.00	8,307.16	8,100.25	29.41	31.77	117.354	-753.17	1,457.73	1,380.09	1,319.94	60.16	22.941	
8,800.00	8,235.00	8,298.28	8,091.42	29.52	31.73	120.909	-752.77	1,456.95	1,429.76	1,369.60	60.17	23.764	

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation



MS Directional Anticollision Report



Company:	Marathon Oil	Local Co-ordinate Reference:	Well Pierogi BS Federal Com 502H
Project:	Eddy County, New Mexico (NAD 27)	TVD Reference:	WELL @ 3022.50usft (Precision 580)
Reference Site:	Pierogi Federal Com (302H, 502H, 552H)	MD Reference:	WELL @ 3022.50usft (Precision 580)
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	Pierogi BS Federal Com 502H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	EDM 5000.15 Conroe DB
Reference Design:	Design #1	Offset TVD Reference:	Reference Datum

Offset Design: Pierogi Federal Com (302H, 502H, 552H) - Pierogi BS Federal Com 552H - Wellbore #1 - Design #1													Offset Site Error:
Survey Program: 0-MWD+IFR1+FDIR													Offset Well Error:
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Semi Major Axis Reference (usft)	Semi Major Axis Offset (usft)	Azimuth from North (°)	Offset Wellbore Centre +N/-S (usft)	Offset Wellbore Centre +E/-W (usft)	Distance Between Centres (usft)	Distance Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning
8,900.00	8,235.00	8,235.83	8,082.01	29.66	31.70	124.215	-752.34	1,456.08	1,484.48	1,424.30	60.19	24.665	
9,000.00	8,235.00	9,954.22	9,040.00	29.82	34.49	89.410	191.23	1,526.70	1,523.22	1,469.79	53.42	28.512	
9,100.00	8,235.00	10,054.22	9,040.00	30.00	34.57	89.410	291.23	1,525.67	1,523.52	1,469.83	53.69	28.378	
9,200.00	8,235.00	10,154.22	9,040.00	30.21	34.69	89.410	391.22	1,524.64	1,523.83	1,469.82	54.00	28.218	
9,300.00	8,235.00	10,254.22	9,040.00	30.44	34.84	89.410	491.22	1,523.61	1,524.13	1,469.76	54.37	28.035	
9,400.00	8,235.00	10,354.22	9,040.00	30.69	35.03	89.410	591.21	1,522.58	1,524.44	1,469.66	54.78	27.829	
9,500.00	8,235.00	10,454.22	9,040.00	30.97	35.25	89.410	691.21	1,521.56	1,524.74	1,469.50	55.24	27.603	
9,600.00	8,235.00	10,554.22	9,040.00	31.27	35.49	89.410	791.20	1,520.53	1,525.05	1,469.30	55.75	27.357	
9,700.00	8,235.00	10,654.22	9,040.00	31.58	35.75	89.410	891.19	1,519.50	1,525.35	1,469.05	56.30	27.094	
9,800.00	8,235.00	10,754.21	9,040.00	31.92	36.04	89.410	991.19	1,518.47	1,525.66	1,468.76	56.90	26.815	
9,900.00	8,235.00	10,854.21	9,040.00	32.28	36.34	89.410	1,091.18	1,517.44	1,525.96	1,468.43	57.53	26.523	
10,000.00	8,235.00	10,954.21	9,040.00	32.66	36.67	89.410	1,191.18	1,516.41	1,526.27	1,468.05	58.22	26.218	
10,100.00	8,235.00	11,054.21	9,040.00	33.05	37.01	89.410	1,291.17	1,515.38	1,526.57	1,467.64	58.94	25.902	
10,200.00	8,235.00	11,154.21	9,040.00	33.46	37.37	89.410	1,391.16	1,514.35	1,526.88	1,467.18	59.69	25.578	
10,300.00	8,235.00	11,254.21	9,040.00	33.89	37.74	89.410	1,491.16	1,513.32	1,527.18	1,466.69	60.49	25.247	
10,400.00	8,235.00	11,354.21	9,040.00	34.34	38.13	89.410	1,591.15	1,512.29	1,527.49	1,466.17	61.32	24.910	
10,500.00	8,235.00	11,454.21	9,040.00	34.80	38.54	89.410	1,691.15	1,511.26	1,527.79	1,465.60	62.19	24.568	
10,600.00	8,235.00	11,554.21	9,040.00	35.27	38.96	89.410	1,791.14	1,510.23	1,528.10	1,465.01	63.09	24.223	
10,700.00	8,235.00	11,654.21	9,040.00	35.76	39.40	89.410	1,891.13	1,509.20	1,528.40	1,464.39	64.02	23.876	
10,800.00	8,235.00	11,754.21	9,040.00	36.27	39.84	89.410	1,991.13	1,508.17	1,528.71	1,463.73	64.97	23.528	
10,900.00	8,235.00	11,854.21	9,040.00	36.79	40.31	89.410	2,091.12	1,507.14	1,529.01	1,463.05	65.96	23.180	
11,000.00	8,235.00	11,954.21	9,040.00	37.32	40.78	89.410	2,191.12	1,506.11	1,529.32	1,462.34	66.98	22.833	
11,100.00	8,235.00	12,054.21	9,040.00	37.86	41.27	89.410	2,291.11	1,505.08	1,529.62	1,461.60	68.02	22.487	
11,200.00	8,235.00	12,154.21	9,040.00	38.41	41.77	89.410	2,391.10	1,504.05	1,529.93	1,460.84	69.09	22.144	
11,300.00	8,235.00	12,254.21	9,040.00	38.98	42.28	89.410	2,491.10	1,503.02	1,530.23	1,460.05	70.18	21.804	
11,400.00	8,235.00	12,354.20	9,040.00	39.55	42.80	89.410	2,591.09	1,501.99	1,530.54	1,459.24	71.30	21.467	
11,500.00	8,235.00	12,454.20	9,040.00	40.14	43.33	89.410	2,691.09	1,500.96	1,530.85	1,458.41	72.43	21.135	
11,600.00	8,235.00	12,554.20	9,040.00	40.74	43.88	89.410	2,791.08	1,499.93	1,531.15	1,457.56	73.59	20.807	
11,700.00	8,235.00	12,654.20	9,040.00	41.34	44.43	89.410	2,891.07	1,498.90	1,531.46	1,456.69	74.77	20.483	
11,800.00	8,235.00	12,754.20	9,040.00	41.96	44.99	89.410	2,991.07	1,497.87	1,531.76	1,455.80	75.96	20.165	
11,900.00	8,235.00	12,854.20	9,040.00	42.58	45.56	89.410	3,091.06	1,496.84	1,532.07	1,454.89	77.18	19.851	
12,000.00	8,235.00	12,954.20	9,040.00	43.21	46.15	89.410	3,191.06	1,495.81	1,532.37	1,453.96	78.41	19.543	
12,100.00	8,235.00	13,054.20	9,040.00	43.85	46.73	89.410	3,291.05	1,494.78	1,532.68	1,453.02	79.66	19.241	
12,200.00	8,235.00	13,154.20	9,040.00	44.50	47.33	89.410	3,391.04	1,493.75	1,532.98	1,452.06	80.92	18.944	
12,300.00	8,235.00	13,254.20	9,040.00	45.15	47.94	89.410	3,491.04	1,492.72	1,533.29	1,451.09	82.20	18.653	
12,400.00	8,235.00	13,354.20	9,040.00	45.81	48.55	89.410	3,591.03	1,491.69	1,533.60	1,450.10	83.49	18.368	
12,500.00	8,235.00	13,454.20	9,040.00	46.48	49.17	89.410	3,691.03	1,490.67	1,533.90	1,449.10	84.80	18.089	
12,600.00	8,235.00	13,554.20	9,040.00	47.15	49.80	89.410	3,791.02	1,489.64	1,534.21	1,448.09	86.12	17.815	
12,700.00	8,235.00	13,654.20	9,040.00	47.83	50.43	89.410	3,891.01	1,488.61	1,534.51	1,447.06	87.45	17.547	
12,800.00	8,235.00	13,754.20	9,040.00	48.52	51.07	89.410	3,991.01	1,487.58	1,534.82	1,446.03	88.79	17.285	
12,900.00	8,235.00	13,854.20	9,040.00	49.21	51.72	89.410	4,091.00	1,486.55	1,535.12	1,444.98	90.15	17.029	
13,000.00	8,235.00	13,954.19	9,040.00	49.90	52.38	89.410	4,191.00	1,485.52	1,535.43	1,443.92	91.52	16.778	
13,100.00	8,235.00	14,054.19	9,040.00	50.60	53.03	89.410	4,290.99	1,484.49	1,535.74	1,442.84	92.89	16.532	
13,200.00	8,235.00	14,154.19	9,040.00	51.31	53.70	89.410	4,390.99	1,483.46	1,536.04	1,441.76	94.28	16.293	
13,300.00	8,235.00	14,254.19	9,040.00	52.02	54.37	89.410	4,490.98	1,482.43	1,536.35	1,440.67	95.67	16.058	
13,400.00	8,235.00	14,353.90	9,040.00	52.74	55.04	89.423	4,590.98	1,481.41	1,536.66	1,439.58	97.08	15.829	
13,500.00	8,235.00	14,453.90	9,040.00	53.46	55.72	89.423	4,690.98	1,480.40	1,536.98	1,438.49	98.49	15.606	
13,600.00	8,235.00	14,553.90	9,040.00	54.18	56.41	89.423	4,790.97	1,479.39	1,537.31	1,437.40	99.91	15.387	
13,700.00	8,235.00	14,653.90	9,040.00	54.91	57.10	89.423	4,890.97	1,478.38	1,537.63	1,436.29	101.34	15.173	
13,800.00	8,235.00	14,753.90	9,040.00	55.64	57.80	89.423	4,990.96	1,477.38	1,537.96	1,435.18	102.78	14.964	
13,900.00	8,235.00	14,853.90	9,040.00	56.37	58.49	89.423	5,090.96	1,476.37	1,538.28	1,434.06	104.23	14.759	
14,000.00	8,235.00	14,953.90	9,040.00	57.11	59.20	89.423	5,190.95	1,475.36	1,538.61	1,432.93	105.68	14.559	

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation



MS Directional Anticollision Report



Company:	Marathon Oil	Local Co-ordinate Reference:	Well Pierogi BS Federal Com 502H
Project:	Eddy County, New Mexico (NAD 27)	TVD Reference:	WELL @ 3022.50usft (Precision 580)
Reference Site:	Pierogi Federal Com (302H, 502H, 552H)	MD Reference:	WELL @ 3022.50usft (Precision 580)
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	Pierogi BS Federal Com 502H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	EDM 5000.15 Conroe DB
Reference Design:	Design #1	Offset TVD Reference:	Reference Datum

Offset Design: Pierogi Federal Com (302H, 502H, 552H) - Pierogi BS Federal Com 552H - Wellbore #1 - Design #1													Offset Site Error:
Survey Program: 0-MWD+IFR1+FDIR													Offset Well Error:
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Semi Major Axis Reference (usft)	Semi Major Axis Offset (usft)	Azimuth from North (°)	Offset Wellbore Centre +N/-S (usft)	Offset Wellbore Centre +E/-W (usft)	Distance Between Centres (usft)	Distance Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning
14,100.00	8,235.00	15,053.90	9,040.00	57.85	59.91	89.423	5,290.64	1,474.35	1,538.93	1,431.80	107.14	14.364	
14,200.00	8,235.00	15,153.90	9,040.00	58.60	60.62	89.423	5,390.64	1,473.35	1,539.26	1,430.66	108.60	14.173	
14,300.00	8,235.00	15,253.90	9,040.00	59.35	61.33	89.423	5,490.63	1,472.34	1,539.58	1,429.51	110.07	13.987	
14,400.00	8,235.00	15,353.90	9,040.00	60.10	62.05	89.423	5,590.63	1,471.33	1,539.91	1,428.36	111.55	13.804	
14,500.00	8,235.00	15,453.90	9,040.00	60.86	62.78	89.423	5,690.62	1,470.32	1,540.23	1,427.20	113.04	13.626	
14,600.00	8,235.00	15,553.89	9,040.00	61.61	63.50	89.423	5,790.62	1,469.32	1,540.56	1,426.03	114.52	13.452	
14,700.00	8,235.00	15,653.89	9,040.00	62.37	64.23	89.423	5,890.61	1,468.31	1,540.88	1,424.86	116.02	13.281	
14,800.00	8,235.00	15,753.89	9,040.00	63.14	64.96	89.423	5,990.60	1,467.30	1,541.21	1,423.69	117.52	13.115	
14,900.00	8,235.00	15,853.89	9,040.00	63.90	65.70	89.423	6,090.60	1,466.29	1,541.53	1,422.51	119.02	12.952	
15,000.00	8,235.00	15,953.89	9,040.00	64.67	66.44	89.423	6,190.59	1,465.29	1,541.86	1,421.33	120.53	12.792	
15,100.00	8,235.00	16,053.89	9,040.00	65.44	67.18	89.423	6,290.59	1,464.28	1,542.18	1,420.14	122.05	12.636	
15,200.00	8,235.00	16,153.89	9,040.00	66.21	67.93	89.423	6,390.58	1,463.27	1,542.51	1,418.95	123.56	12.484	
15,300.00	8,235.00	16,253.89	9,040.00	66.98	68.67	89.423	6,490.57	1,462.26	1,542.83	1,417.75	125.09	12.334	
15,400.00	8,235.00	16,353.89	9,040.00	67.76	69.42	89.423	6,590.57	1,461.25	1,543.16	1,416.55	126.61	12.188	
15,500.00	8,235.00	16,453.89	9,040.00	68.54	70.17	89.423	6,690.56	1,460.25	1,543.48	1,415.34	128.14	12.045	
15,600.00	8,235.00	16,553.89	9,040.00	69.32	70.93	89.423	6,790.56	1,459.24	1,543.81	1,414.13	129.68	11.905	
15,700.00	8,235.00	16,653.89	9,040.00	70.10	71.69	89.423	6,890.55	1,458.23	1,544.14	1,412.92	131.21	11.768	
15,800.00	8,235.00	16,753.89	9,040.00	70.89	72.45	89.423	6,990.55	1,457.22	1,544.46	1,411.70	132.76	11.634	
15,900.00	8,235.00	16,853.89	9,040.00	71.67	73.21	89.423	7,090.54	1,456.22	1,544.79	1,410.49	134.30	11.502	
16,000.00	8,235.00	16,953.88	9,040.00	72.46	73.97	89.423	7,190.53	1,455.21	1,545.11	1,409.26	135.85	11.374	
16,100.00	8,235.00	17,053.88	9,040.00	73.25	74.74	89.423	7,290.53	1,454.20	1,545.44	1,408.04	137.40	11.248	
16,200.00	8,235.00	17,153.88	9,040.00	74.04	75.51	89.423	7,390.52	1,453.19	1,545.76	1,406.81	138.95	11.124	
16,300.00	8,235.00	17,253.88	9,040.00	74.83	76.28	89.423	7,490.52	1,452.19	1,546.09	1,405.58	140.51	11.003	
16,400.00	8,235.00	17,353.88	9,040.00	75.63	77.05	89.423	7,590.51	1,451.18	1,546.41	1,404.34	142.07	10.885	
16,500.00	8,235.00	17,453.88	9,040.00	76.42	77.82	89.423	7,690.50	1,450.17	1,546.74	1,403.10	143.64	10.769	
16,600.00	8,235.00	17,553.88	9,040.00	77.22	78.60	89.423	7,790.50	1,449.16	1,547.06	1,401.86	145.20	10.655	
16,700.00	8,235.00	17,653.88	9,040.00	78.02	79.38	89.423	7,890.49	1,448.16	1,547.39	1,400.62	146.77	10.543	
16,800.00	8,235.00	17,753.88	9,040.00	78.82	80.15	89.423	7,990.49	1,447.15	1,547.72	1,399.38	148.34	10.434	
16,900.00	8,235.00	17,853.88	9,040.00	79.62	80.94	89.423	8,090.48	1,446.14	1,548.04	1,398.13	149.91	10.326	
17,000.00	8,235.00	17,953.88	9,040.00	80.42	81.72	89.423	8,190.48	1,445.13	1,548.37	1,396.88	151.49	10.221	
17,100.00	8,235.00	18,053.88	9,040.00	81.22	82.50	89.423	8,290.47	1,444.13	1,548.69	1,395.63	153.07	10.118	
17,200.00	8,235.00	18,153.88	9,040.00	82.03	83.29	89.423	8,390.46	1,443.12	1,549.02	1,394.37	154.65	10.016	
17,300.00	8,235.00	18,253.87	9,040.00	82.83	84.07	89.423	8,490.46	1,442.11	1,549.34	1,393.11	156.23	9.917	
17,400.00	8,235.00	18,353.87	9,040.00	83.64	84.86	89.423	8,590.45	1,441.10	1,549.67	1,391.85	157.81	9.820	
17,500.00	8,235.00	18,453.87	9,040.00	84.45	85.65	89.423	8,690.45	1,440.09	1,550.00	1,390.59	159.40	9.724	
17,600.00	8,235.00	18,553.87	9,040.00	85.26	86.44	89.423	8,790.44	1,439.09	1,550.32	1,389.33	160.99	9.630	
17,700.00	8,235.00	18,653.87	9,040.00	86.07	87.24	89.423	8,890.44	1,438.08	1,550.65	1,388.07	162.58	9.538	
17,800.00	8,235.00	18,753.87	9,040.00	86.88	88.03	89.423	8,990.43	1,437.07	1,550.97	1,386.80	164.17	9.447	
17,900.00	8,235.00	18,853.87	9,040.00	87.69	88.83	89.423	9,090.42	1,436.06	1,551.30	1,385.53	165.77	9.358	
18,000.00	8,235.00	18,953.87	9,040.00	88.50	89.62	89.423	9,190.42	1,435.06	1,551.62	1,384.26	167.36	9.271	
18,100.00	8,235.00	19,053.87	9,040.00	89.32	90.42	89.423	9,290.41	1,434.05	1,551.95	1,382.99	168.96	9.185	
18,200.00	8,235.00	19,153.87	9,040.00	90.13	91.22	89.423	9,390.41	1,433.04	1,552.28	1,381.72	170.56	9.101	
18,300.00	8,235.00	19,253.87	9,040.00	90.95	92.02	89.423	9,490.40	1,432.03	1,552.60	1,380.44	172.16	9.018	
18,400.00	8,235.00	19,353.87	9,040.00	91.76	92.82	89.423	9,590.39	1,431.03	1,552.93	1,379.16	173.76	8.937	
18,500.00	8,235.00	19,453.87	9,040.00	92.58	93.62	89.423	9,690.39	1,430.02	1,553.25	1,377.89	175.37	8.857	
18,600.00	8,235.00	19,553.87	9,040.00	93.40	94.42	89.423	9,790.38	1,429.01	1,553.58	1,376.61	176.97	8.779	
18,700.00	8,235.00	19,653.86	9,040.00	94.22	95.23	89.423	9,890.38	1,428.00	1,553.91	1,375.32	178.58	8.701	
18,800.00	8,235.00	19,758.99	9,040.00	95.04	96.15	88.771	10,005.48	1,426.05	1,553.63	1,373.29	180.34	8.615	
18,900.00	8,235.00	19,868.98	9,040.00	95.86	96.96	88.771	10,105.45	1,423.91	1,552.98	1,371.04	181.94	8.536	
19,000.00	8,235.00	19,968.98	9,040.00	96.68	97.77	88.771	10,205.43	1,421.76	1,552.33	1,368.79	183.54	8.458	
19,100.00	8,235.00	20,068.98	9,040.00	97.50	98.58	88.771	10,305.40	1,419.62	1,551.69	1,366.54	185.15	8.381	
19,200.00	8,235.00	20,168.97	9,040.00	98.32	99.39	88.771	10,405.38	1,417.47	1,551.04	1,364.29	186.75	8.305	

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation



MS Directional Anticollision Report



Company:	Marathon Oil	Local Co-ordinate Reference:	Well Pierogi BS Federal Com 502H
Project:	Eddy County, New Mexico (NAD 27)	TVD Reference:	WELL @ 3022.50usft (Precision 580)
Reference Site:	Pierogi Federal Com (302H, 502H, 552H)	MD Reference:	WELL @ 3022.50usft (Precision 580)
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	Pierogi BS Federal Com 502H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	EDM 5000.15 Conroe DB
Reference Design:	Design #1	Offset TVD Reference:	Reference Datum

Offset Design: Pierogi Federal Com (302H, 502H, 552H) - Pierogi BS Federal Com 552H - Wellbore #1 - Design #1												Offset Site Error:	0.00 usft
Survey Program: 0-MWD+IFR1+FDIR												Offset Well Error:	0.00 usft
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Semi Major Axis Reference (usft)	Offset (usft)	Azimuth from North (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Distance Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning
19,300.00	8,235.00	20,268.97	9,040.00	99.15	100.20	88.771	10,505.35	1,415.32	1,550.39	1,362.03	188.36	8.231	
19,400.00	8,235.00	20,368.97	9,040.00	99.97	101.01	88.771	10,605.33	1,413.18	1,549.75	1,359.78	189.97	8.158	
19,500.00	8,235.00	20,468.97	9,040.00	100.79	101.82	88.771	10,705.30	1,411.03	1,549.10	1,357.52	191.58	8.086	
19,600.00	8,235.00	20,568.96	9,040.00	101.62	102.63	88.771	10,805.27	1,408.89	1,548.45	1,355.26	193.19	8.015	
19,700.00	8,235.00	20,668.96	9,040.00	102.44	103.45	88.771	10,905.25	1,406.74	1,547.81	1,353.01	194.80	7.946	
19,800.00	8,235.00	20,768.96	9,040.00	103.27	104.26	88.771	11,005.22	1,404.60	1,547.16	1,350.75	196.41	7.877	
19,900.00	8,235.00	20,868.95	9,040.00	104.10	105.08	88.771	11,105.20	1,402.45	1,546.52	1,348.49	198.03	7.810	
20,000.00	8,235.00	20,968.95	9,040.00	104.92	105.89	88.771	11,205.17	1,400.31	1,545.87	1,346.23	199.64	7.743	
20,100.00	8,235.00	21,068.77	9,040.00	105.75	106.71	88.779	11,304.96	1,398.17	1,545.23	1,343.97	201.26	7.678	
20,200.00	8,235.00	21,168.77	9,040.00	106.58	107.52	88.779	11,404.94	1,396.04	1,544.60	1,341.72	202.87	7.614	
20,300.00	8,235.00	21,268.76	9,040.00	107.41	108.34	88.779	11,504.91	1,393.91	1,543.96	1,339.47	204.49	7.550	
20,400.00	8,235.00	21,368.76	9,040.00	108.24	109.16	88.779	11,604.89	1,391.78	1,543.33	1,337.22	206.11	7.488	
20,500.00	8,235.00	21,468.76	9,040.00	109.07	109.98	88.779	11,704.86	1,389.65	1,542.69	1,334.97	207.73	7.426	
20,600.00	8,235.00	21,568.75	9,040.00	109.90	110.80	88.779	11,804.84	1,387.52	1,542.06	1,332.71	209.35	7.366	
20,700.00	8,235.00	21,668.75	9,040.00	110.73	111.62	88.779	11,904.81	1,385.39	1,541.43	1,330.46	210.97	7.306	
20,800.00	8,235.00	21,768.75	9,040.00	111.56	112.44	88.779	12,004.79	1,383.25	1,540.79	1,328.20	212.59	7.248	
20,900.00	8,235.00	21,868.75	9,040.00	112.39	113.27	88.779	12,104.76	1,381.12	1,540.16	1,325.95	214.22	7.190	
21,000.00	8,235.00	21,968.74	9,040.00	113.23	114.09	88.779	12,204.73	1,378.99	1,539.53	1,323.69	215.84	7.133	
21,100.00	8,235.00	22,068.74	9,040.00	114.06	114.91	88.779	12,304.71	1,376.86	1,538.89	1,321.43	217.46	7.077	
21,200.00	8,235.00	22,168.74	9,040.00	114.89	115.73	88.779	12,404.68	1,374.73	1,538.26	1,319.17	219.09	7.021	
21,300.00	8,235.00	22,268.74	9,040.00	115.72	116.56	88.779	12,504.66	1,372.60	1,537.63	1,316.92	220.71	6.967	
21,400.00	8,235.00	22,368.73	9,040.00	116.56	117.38	88.779	12,604.63	1,370.47	1,537.00	1,314.66	222.34	6.913	
21,500.00	8,235.00	22,468.73	9,040.00	117.39	118.21	88.779	12,704.61	1,368.33	1,536.36	1,312.40	223.97	6.860	
21,600.00	8,235.00	22,568.73	9,040.00	118.23	119.03	88.779	12,804.58	1,366.20	1,535.73	1,310.14	225.59	6.807	
21,700.00	8,235.00	22,668.72	9,040.00	119.06	119.86	88.779	12,904.56	1,364.07	1,535.10	1,307.88	227.22	6.756	
21,800.00	8,235.00	22,768.72	9,040.00	119.90	120.69	88.779	13,004.53	1,361.94	1,534.47	1,305.61	228.85	6.705	
21,900.00	8,235.00	22,868.72	9,040.00	120.73	121.52	88.779	13,104.51	1,359.81	1,533.83	1,303.35	230.48	6.655	
22,000.00	8,235.00	22,968.72	9,040.00	121.57	122.34	88.779	13,204.48	1,357.68	1,533.20	1,301.09	232.11	6.605	
22,100.00	8,235.00	23,068.71	9,040.00	122.41	123.17	88.779	13,304.45	1,355.54	1,532.57	1,298.83	233.74	6.557	
22,200.00	8,235.00	23,168.71	9,040.00	123.24	124.00	88.779	13,404.43	1,353.41	1,531.94	1,296.56	235.37	6.509	
22,300.00	8,235.00	23,268.71	9,040.00	124.08	124.83	88.779	13,504.40	1,351.28	1,531.31	1,294.30	237.00	6.461	
22,400.00	8,235.00	23,368.70	9,040.00	124.92	125.66	88.779	13,604.38	1,349.15	1,530.67	1,292.04	238.64	6.414	
22,500.00	8,235.00	23,468.70	9,040.00	125.76	126.49	88.779	13,704.35	1,347.02	1,530.04	1,289.77	240.27	6.368	
22,600.00	8,235.00	23,568.70	9,040.00	126.59	127.32	88.779	13,804.33	1,344.89	1,529.41	1,287.51	241.90	6.322	
22,700.00	8,235.00	23,668.70	9,040.00	127.43	128.15	88.779	13,904.30	1,342.76	1,528.78	1,285.24	243.54	6.277	
22,800.00	8,235.00	23,768.69	9,040.00	128.27	128.98	88.779	14,004.28	1,340.62	1,528.15	1,282.98	245.17	6.233	
22,900.00	8,235.00	23,868.69	9,040.00	129.11	129.81	88.779	14,104.25	1,338.49	1,527.52	1,280.71	246.81	6.189	
23,000.00	8,235.00	23,968.69	9,040.00	129.95	130.65	88.779	14,204.22	1,336.36	1,526.88	1,278.44	248.44	6.146	
23,100.00	8,235.00	24,068.69	9,040.00	130.79	131.48	88.779	14,304.20	1,334.23	1,526.25	1,276.18	250.08	6.103	
23,200.00	8,235.00	24,168.68	9,040.00	131.63	132.31	88.779	14,404.17	1,332.10	1,525.62	1,273.91	251.71	6.061	
23,300.00	8,235.00	24,268.68	9,040.00	132.47	133.15	88.779	14,504.15	1,329.97	1,524.99	1,271.64	253.35	6.019	
23,400.00	8,235.00	24,368.68	9,040.00	133.31	133.98	88.779	14,604.12	1,327.84	1,524.36	1,269.37	254.99	5.978	
23,500.00	8,235.00	24,468.67	9,040.00	134.15	134.81	88.779	14,704.10	1,325.70	1,523.73	1,267.10	256.63	5.938	
23,600.00	8,235.00	24,568.67	9,040.00	134.99	135.65	88.779	14,804.07	1,323.57	1,523.10	1,264.84	258.26	5.897	
23,700.00	8,235.00	24,668.67	9,040.00	135.83	136.48	88.779	14,904.05	1,321.44	1,522.47	1,262.57	259.90	5.858	
23,800.00	8,235.00	24,768.67	9,040.00	136.68	137.32	88.779	15,004.02	1,319.31	1,521.84	1,260.30	261.54	5.819	
23,900.00	8,235.00	24,868.66	9,040.00	137.52	138.15	88.779	15,104.00	1,317.18	1,521.21	1,258.03	263.18	5.780	
23,982.24	8,235.00	24,941.32	9,040.00	138.21	138.76	89.204	15,176.64	1,315.63	1,520.72	1,256.29	264.43	5.751	
24,000.00	8,235.00	24,941.32	9,040.00	138.36	138.76	89.993	15,176.64	1,315.63	1,520.82	1,256.31	264.52	5.749	
24,004.19	8,235.00	24,941.32	9,040.00	138.39	138.76	90.178	15,176.64	1,315.63	1,520.88	1,256.35	264.53	5.749	

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

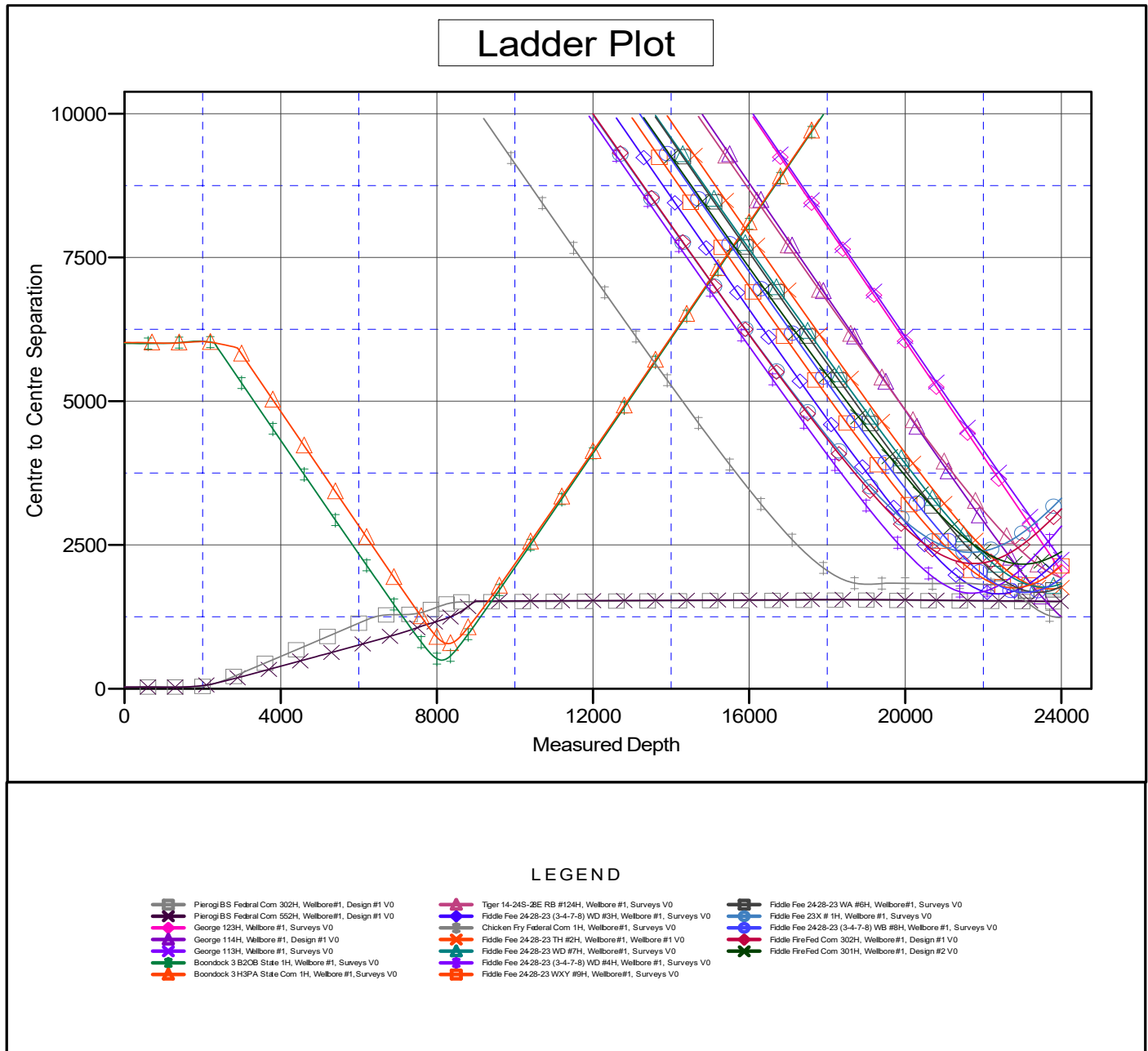


MS Directional Anticollision Report



Company:	Marathon Oil	Local Co-ordinate Reference:	Well Pierogi BS Federal Com 502H
Project:	Eddy County, New Mexico (NAD 27)	TVD Reference:	WELL @ 3022.50usft (Precision 580)
Reference Site:	Pierogi Federal Com (302H, 502H, 552H)	MD Reference:	WELL @ 3022.50usft (Precision 580)
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	Pierogi BS Federal Com 502H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	EDM 5000.15 Conroe DB
Reference Design:	Design #1	Offset TVD Reference:	Reference Datum

Reference Depths are relative to WELL @ 3022.50usft (Precision 580) Coordinates are relative to: Pierogi BS Federal Com 502H
 Offset Depths are relative to Offset Datum Coordinate System is US State Plane 1927 (Exact solution), New Mexico East 301
 Central Meridian is 104° 20' 0.000 W Grid Convergence at Surface is: 0.139°



CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation



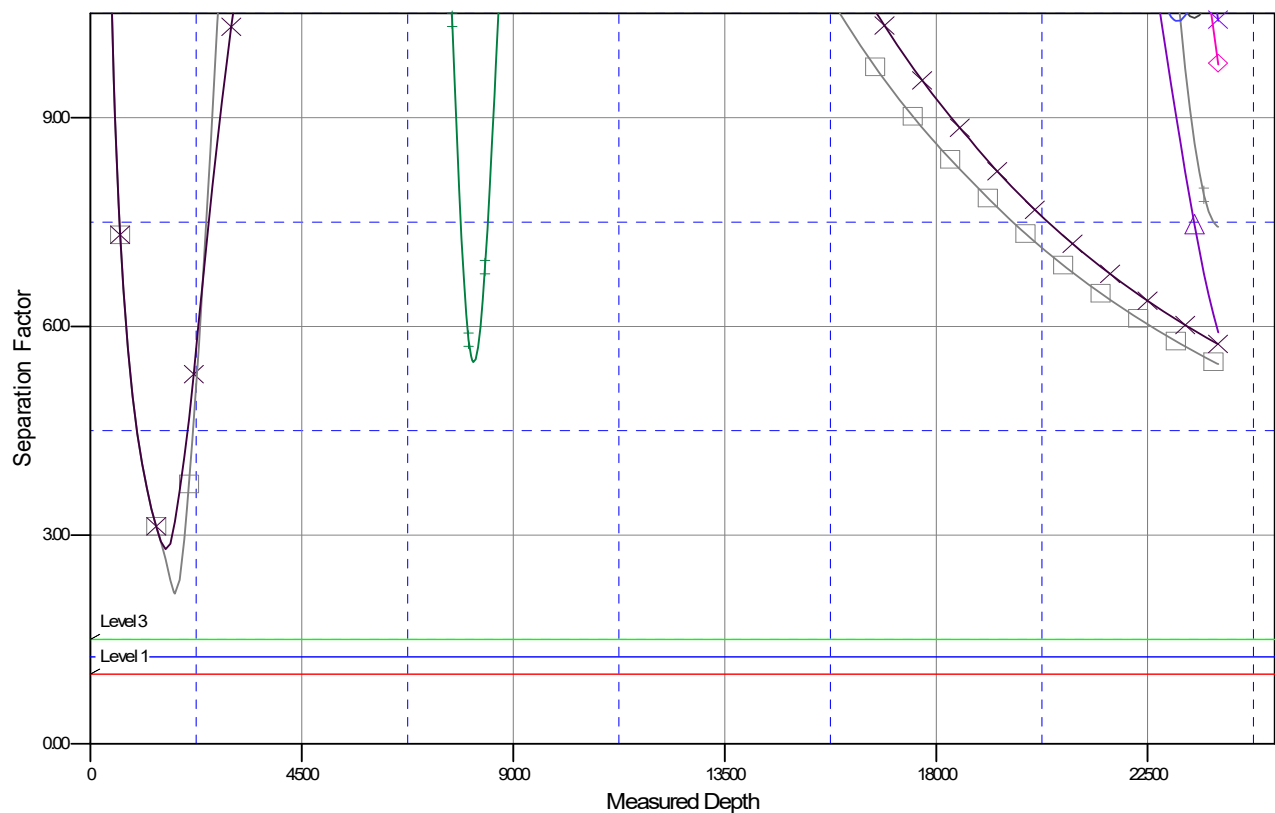
MS Directional Anticollision Report



Company:	Marathon Oil	Local Co-ordinate Reference:	Well Pierogi BS Federal Com 502H
Project:	Eddy County, New Mexico (NAD 27)	TVD Reference:	WELL @ 3022.50usft (Precision 580)
Reference Site:	Pierogi Federal Com (302H, 502H, 552H)	MD Reference:	WELL @ 3022.50usft (Precision 580)
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	Pierogi BS Federal Com 502H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	Wellbore #1	Database:	EDM 5000.15 Conroe DB
Reference Design:	Design #1	Offset TVD Reference:	Reference Datum

Reference Depths are relative to WELL @ 3022.50usft (Precision 580) Coordinates are relative to: Pierogi BS Federal Com 502H
 Offset Depths are relative to Offset Datum Coordinate System is US State Plane 1927 (Exact solution), New Mexico East 30
 Central Meridian is 104° 20' 0.000 W Grid Convergence at Surface is: 0.139°

Separation Factor Plot



LEGEND

Pierogi BS Federal Com 302H, Wellbore #1, Design #1 V0	Tiger 14-24S-2BE RB #124H, Wellbore #1, Surveys V0	Fiddle Fee 2428-23 WA #6H, Wellbore #1, Surveys V0
Pierogi BS Federal Com 552H, Wellbore #1, Design #1 V0	Fiddle Fee 2428-23 (3-4-7-8) WD #3H, Wellbore #1, Surveys V0	Fiddle Fee 23X #1H, Wellbore #1, Surveys V0
George 123H, Wellbore #1, Surveys V0	Chicken Fry Federal Com 1H, Wellbore #1, Surveys V0	Fiddle Fee 2428-23 (3-4-7-8) WB #8H, Wellbore #1, Surveys V0
George 114H, Wellbore #1, Design #1 V0	Fiddle Fee 2428-23 TH #2H, Wellbore #1, Wellbore #1 V0	Fiddle FireFed Com 302H, Wellbore #1, Design #1 V0
George 113H, Wellbore #1, Surveys V0	Fiddle Fee 2428-23 WD #7H, Wellbore #1, Surveys V0	Fiddle FireFed Com 301H, Wellbore #1, Design #2 V0
Boondock 3 B2CB State 1H, Wellbore #1, Surveys V0	Fiddle Fee 2428-23 (3-4-7-8) WD #4H, Wellbore #1, Surveys V0	
Boondock 3 HSPA State Com 1H, Wellbore #1, Surveys V0	Fiddle Fee 2428-23 WXY #9H, Wellbore #1, Surveys V0	

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

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

AMENDED REPORT

¹ API Number 30-015-48476		² Pool Code 64450	³ Pool Name WILLOW LAKE BONE SPRING
⁴ Property Code	⁵ Property Name PIEROGI BS FEDERAL COM		⁶ Well Number 502H
⁷ OGRID No. 372098	⁸ Operator Name MARATHON OIL PERMIAN LLC		⁹ Elevation 2999'

UL or lot no.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
O	34	24S	28E		816'	SOUTH	1859'	EAST	EDDY

UL or lot no. B	Section 22	Township 24S	Range 28E	Lot Idn	Feet from the 100'	North/South line NORTH	Feet from the 1620'	East/West line EAST	County EDDY
¹² Dedicated Acres 960.00		¹³ Joint or Infill		¹⁴ Consolidation Code		¹⁵ Order No.			

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LAST TAKE/BOTTOM HOLE
FNL 100' FEL 1620', SECTION 22
NAD 83, SPCS NM EAST
X:622067.25' / Y:440411.12'
LAT:32.21049756 / LON:-104.07230706
NAD 27, SPCS NM EAST
X:580883.70' / Y:440352.56'
LAT:32.21037580 / LON:-104.07181523

PPP-4
FSL 1341' FEL 1649', SECTION 22
NAD 83, SPCS NM EAST
X:622121.78' / Y:436487.50'
LAT:32.19971161 / LON:-104.07216155
NAD 27, SPCS NM EAST
X:580938.15' / Y:436429.02'
LAT:32.19958972 / LON:-104.07167005

PPP-3
FNL 2685' FEL 1629', SECTION 34
NAD 83, SPCS NM EAST
X:622252.25' / Y:427100.80'
LAT:32.17390769 / LON:-104.07181352
NAD 27, SPCS NM EAST
X:581068.42' / Y:427042.50'
LAT:32.17378547 / LON:-104.07132284

PPP-2
FSL 1343' FEL 1624', SECTION 34
NAD 83, SPCS NM EAST
X:622270.92' / Y:425757.92'
LAT:32.17021614 / LON:-104.07176375
NAD 27, SPCS NM EAST
X:581087.05' / Y:425699.65'
LAT:32.17009386 / LON:-104.07127318

KOP/FTP
FSL 100' FEL 1620', SECTION 34
NAD 83, SPCS NM EAST
X:622288.19' / Y:424515.04'
LAT:32.16679947 / LON:-104.07171768
NAD 27, SPCS NM EAST
X:581104.30' / Y:424456.79'
LAT:32.16667715 / LON:-104.07122722

SURFACE HOLE
FSL 816' FEL 1859', SECTION 34
NAD 83, SPCS NM EAST
X:622042.30' / Y:425230.16'
LAT:32.16876690 / LON:-104.07250674
NAD 27, SPCS NM EAST
X:580858.43' / Y:425171.90'
LAT:32.16864462 / LON:-104.07201619

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OPERATOR CERTIFICATION
I hereby certify that the information contained 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 a mineral or working interest, or to a voluntary pooling agreement or a compulsory pooling order heretofore entered by the division.

JTstathem 12/21/20
Signature Date
TStathem
Printed Name
tstathem@marathonoil.com
E-mail Address

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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.

Lloyd P. Short
Date of Survey: **DECEMBER 1, 2023**
Signature and Seal of Professional Surveyor

LLOYD P. SHORT
NEW MEXICO
21653
PROFESSIONAL SURVEYOR

*FTP TO LTP LINE BEARINGS

PRODUCTION LINE	BEARING/LENGTH
L1	N00°47'47"W ~ 15897.61'

CORNER COORDINATES
NAD 83, SPCS NM EAST

A - X: 623685.59' / Y: 440506.10'
B - X: 623799.89' / Y: 435150.66'
C - X: 623853.93' / Y: 429793.49'
D - X: 623909.23' / Y: 424422.82'
E - X: 621226.81' / Y: 424409.95'
F - X: 621190.23' / Y: 429780.74'
G - X: 621117.44' / Y: 435144.26'
H - X: 621044.41' / Y: 440514.29'

CORNER COORDINATES
NAD 27, SPCS NM EAST

A - X: 582502.01' / Y: 440447.52'
B - X: 582616.19' / Y: 435092.18'
C - X: 582670.12' / Y: 429735.12'
D - X: 582725.30' / Y: 424364.55'
E - X: 580042.94' / Y: 424351.72'
F - X: 580006.48' / Y: 429722.40'
G - X: 579933.80' / Y: 435085.82'
H - X: 579860.89' / Y: 440455.75'

0

Drill Line Events Section Corners Drill Line Dimension Lines Federal Leases NMSLO HSU HSU Corners

All bearings and coordinates refer to New Mexico State Plane coordinate system, East Zone, U.S. Survey Feet.

SHEET 1 OF 2
JOB No. MRO_0009_PE
REV 1 TCS 11/8/2023

PECOS DISTRICT DRILLING CONDITIONS OF APPROVAL

OPERATOR'S NAME:	Marathon Oil
LEASE NO.:	NMNM17222
LOCATION:	Section 34, T.24 S, R.28 E., NMPM
COUNTY:	Eddy County, New Mexico
WELL NAME & NO.:	Kyle Fed 24 28 34 TB 13H
SURFACE HOLE FOOTAGE:	816'/S & 1859'/E
BOTTOM HOLE FOOTAGE:	100'/N & 1620'/E

Changes approved through engineering via **Sundry 2767257** on 1-23-2024. Any previous COAs not addressed within the updated COAs still apply.

COA

H₂S	☐ Yes	☒ No		
Potash / WIPP	☒ None	☐ Secretary	☐ R-111-P	☐ WIPP
Cave / Karst	☐ Low	☐ Medium	☒ High	☐ Critical
Wellhead	☐ Conventional	☒ Multibowl	☐ Both	☐ Diverter
Cementing	☐ Primary Squeeze	☐ Cont. Squeeze	☐ EchoMeter	☐ DV Tool
Special Req	☐ Break Testing	☐ Water Disposal	☒ COM	☐ Unit
Variance	☒ Flex Hose	☐ Casing Clearance	☐ Pilot Hole	☐ Capitan Reef
Variance	☐ Four-String	☐ Offline Cementing	☐ Fluid-Filled	☐ Open Annulus
☐ Batch APD / Sundry				

A. HYDROGEN SULFIDE

Hydrogen Sulfide (H₂S) monitors shall be installed prior to drilling out the surface shoe. If H₂S is detected in concentrations greater than 100 ppm, the Hydrogen Sulfide area must meet all requirements from **43 CFR 3176**, which includes equipment and personnel/public protection items. If Hydrogen Sulfide is encountered, provide measured values and formations to the BLM.

B. CASING

1. The **13-3/8** inch surface casing shall be set at approximately **450** feet (a minimum of **70 feet (Eddy County)** into the Rustler Anhydrite, above the salt, and below usable fresh water) and cemented to the surface.
 - a. If cement does not circulate to the surface, the appropriate BLM office shall be notified and a temperature survey utilizing an electronic type temperature survey with surface log readout will be used or a cement bond log shall be run to verify the top of the cement. Temperature survey will be run a minimum of six hours after pumping cement and ideally between 8-10 hours after completing the cement job.
 - b. Wait on cement (WOC) time for a primary cement job will be a minimum of **8**

hours or 500 pounds compressive strength, whichever is greater. (This is to include the lead cement)

- c. Wait on cement (WOC) time for a remedial job will be a minimum of 4 hours after bringing cement to surface or 500 pounds compressive strength, whichever is greater.
 - d. If cement falls back, remedial cementing will be done prior to drilling out that string.
2. The minimum required fill of cement behind the 9-5/8 inch intermediate casing is:
- Cement to surface. If cement does not circulate see B.1.a, c-d above.
- Wait on cement (WOC) time for a primary cement job is to include the lead cement slurry due to cave/karst.**
- ❖ In High Cave/Karst Areas if cement does not circulate to surface on the first two casing strings, the cement on the 3rd casing string must come to surface.
3. The minimum required fill of cement behind the 5-1/2 inch production casing is:
- Cement should tie-back at least **200 feet** into previous casing string. Operator shall provide method of verification.

C. PRESSURE CONTROL

1. Variance approved to use flex line from BOP to choke manifold. Manufacturer's specification to be readily available. No external damage to flex line. Flex line to be installed as straight as possible (no hard bends).
2. Operator has proposed a multi-bowl wellhead assembly. This assembly will only be tested when installed on the surface casing. Minimum working pressure of the blowout preventer (BOP) and related equipment (BOPE) required for drilling below the casing shoe shall be **5000 (5M)** psi.
 - a. Wellhead shall be installed by manufacturer's representatives, submit documentation with subsequent sundry.
 - b. If the welding is performed by a third party, the manufacturer's representative shall monitor the temperature to verify that it does not exceed the maximum temperature of the seal.
 - c. Manufacturer representative shall install the test plug for the initial BOP test.
 - d. If the cement does not circulate and one inch operations would have been possible with a standard wellhead, the well head shall be cut off, cementing operations performed and another wellhead installed.
 - e. Whenever any seal subject to test pressure is broken, all the tests in 43 CFR 3172 must be followed.

D. SPECIAL REQUIREMENT (S)

Communitization Agreement

- The operator will submit a Communitization Agreement to the Santa Fe Office, 301 Dinosaur Trail Santa Fe, New Mexico 87508, at least 90 days before the anticipated date of first production from a well subject to a spacing order issued by the New Mexico Oil Conservation Division. The Communitization Agreement will include the signatures of all working interest owners in all Federal and Indian leases subject to the Communitization Agreement (i.e., operating rights owners and lessees of record), or certification that the operator has obtained the written signatures of all such owners and will make those signatures available to the BLM immediately upon request.
- The operator will submit an as-drilled survey well plat of the well completion, but are not limited to, those specified in 43 CFR 3171 and 3172.
- If the operator does not comply with this condition of approval, the BLM may take enforcement actions that include, but are not limited to, those specified in 43 CFR 3163.1.
- In addition, the well sign shall include the surface and bottom hole lease numbers. When the Communitization Agreement number is known, it shall also be on the sign.

GENERAL REQUIREMENTS

The BLM is to be notified in advance for a representative to witness:

- a. Spudding well (minimum of 24 hours)
- b. Setting and/or Cementing of all casing strings (minimum of 4 hours)
- c. BOPE tests (minimum of 4 hours)

☒ Eddy County

Email or call the Carlsbad Field Office, 620 East Greene St., Carlsbad, NM 88220, BLM_NM_CFO_DrillingNotifications@BLM.GOV
(575) 361-2822

☒ Lea County

Call the Hobbs Field Station, 414 West Taylor, Hobbs NM 88240,
(575) 689-5981

1. Unless the production casing has been run and cemented or the well has been properly plugged, the drilling rig shall not be removed from over the hole without prior approval.
 - a. In the event the operator has proposed to drill multiple wells utilizing a skid/walking rig. Operator shall secure the wellbore on the current well, after installing and testing the wellhead, by installing a blind flange of like pressure

- rating to the wellhead and a pressure gauge that can be monitored while drilling is performed on the other well(s).
- b. When the operator proposes to set surface casing with Spudder Rig
 - Notify the BLM when moving in and removing the Spudder Rig.
 - Notify the BLM when moving in the 2nd Rig. Rig to be moved in within 90 days of notification that Spudder Rig has left the location.
 - BOP/BOPE test to be conducted per **43 CFR part 3170 Subpart 3172** as soon as 2nd Rig is rigged up on well.
 2. Floor controls are required for 3M or Greater systems. These controls will be on the rig floor, unobstructed, readily accessible to the driller and will be operational at all times during drilling and/or completion activities. Rig floor is defined as the area immediately around the rotary table; the area immediately above the substructure on which the draw works are located, this does not include the dog house or stairway area.
 3. The record of the drilling rate along with the GR/N well log run from TD to surface (horizontal well – vertical portion of hole) shall be submitted to the BLM office as well as all other logs run on the borehole 30 days from completion. If available, a digital copy of the logs is to be submitted in addition to the paper copies. The Rustler top and top and bottom of Salt are to be recorded on the Completion Report.

A. CASING

1. Changes to the approved APD casing program need prior approval if the items substituted are of lesser grade or different casing size or are Non-API. The Operator can exchange the components of the proposal with that of superior strength (i.e. changing from J-55 to N-80, or from 36# to 40#). Changes to the approved cement program need prior approval if the altered cement plan has less volume or strength or if the changes are substantial (i.e. Multistage tool, ECP, etc.). The initial wellhead installed on the well will remain on the well with spools used as needed.
2. Wait on cement (WOC) for Potash Areas: After cementing but before commencing any tests, the casing string shall stand cemented under pressure until both of the following conditions have been met: 1) cement reaches a minimum compressive strength of 500 psi for all cement blends, 2) until cement has been in place at least 24 hours. WOC time will be recorded in the driller's log. The casing integrity test can be done (prior to the cement setting up) immediately after bumping the plug.
3. Wait on cement (WOC) for Water Basin: After cementing but before commencing any tests, the casing string shall stand cemented under pressure until both of the following conditions have been met: 1) cement reaches a minimum compressive strength of 500 psi at the shoe, 2) until cement has been in place at least 8 hours. WOC time will be recorded in the driller's log. See individual casing strings for details regarding lead cement slurry requirements. The casing integrity test can be done (prior to the cement setting up) immediately after bumping the plug.

4. Provide compressive strengths including hours to reach required 500 pounds compressive strength prior to cementing each casing string. Have well specific cement details onsite prior to pumping the cement for each casing string.
5. No pea gravel permitted for remedial or fall back remedial without prior authorization from the BLM engineer.
6. On that portion of any well approved for a 5M BOPE system or greater, a pressure integrity test of each casing shoe shall be performed. Formation at the shoe shall be tested to a minimum of the mud weight equivalent anticipated to control the formation pressure to the next casing depth or at total depth of the well. This test shall be performed before drilling more than 20 feet of new hole.
7. If hardband drill pipe is rotated inside casing, returns will be monitored for metal. If metal is found in samples, drill pipe will be pulled and rubber protectors which have a larger diameter than the tool joints of the drill pipe will be installed prior to continuing drilling operations.
8. Whenever a casing string is cemented in the R-111-P potash area, the NMOCD requirements shall be followed.

B. PRESSURE CONTROL

1. All blowout preventer (BOP) and related equipment (BOPE) shall comply with well control requirements as described in **43 CFR part 3170 Subpart 3172** and **API STD 53 Sec. 5.3**.
2. If a variance is approved for a flexible hose to be installed from the BOP to the choke manifold, the following requirements apply: The flex line must meet the requirements of API 16C. Check condition of flexible line from BOP to choke manifold, replace if exterior is damaged or if line fails test. Line to be as straight as possible with no hard bends and is to be anchored according to Manufacturer's requirements. The flexible hose can be exchanged with a hose of equal size and equal or greater pressure rating. Anchor requirements, specification sheet and hydrostatic pressure test certification matching the hose in service, to be onsite for review. These documents shall be posted in the company man's trailer and on the rig floor.
3. 5M or higher system requires an HCR valve, remote kill line and annular to match. The remote kill line is to be installed prior to testing the system and tested to stack pressure.
4. If the operator has proposed a multi-bowl wellhead assembly in the APD. The following requirements must be met:

- a. Wellhead shall be installed by manufacturer's representatives, submit documentation with subsequent sundry.
 - b. If the welding is performed by a third party, the manufacturer's representative shall monitor the temperature to verify that it does not exceed the maximum temperature of the seal.
 - c. Manufacturer representative shall install the test plug for the initial BOP test.
 - d. Whenever any seal subject to test pressure is broken, all the tests in **43 CFR part 3170 Subpart 3172** must be followed.
 - e. If the cement does not circulate and one inch operations would have been possible with a standard wellhead, the well head shall be cut off, cementing operations performed and another wellhead installed.
5. The appropriate BLM office shall be notified a minimum of 4 hours in advance for a representative to witness the tests.
 - a. In a water basin, for all casing strings utilizing slips, these are to be set as soon as the crew and rig are ready and any fallback cement remediation has been done. The casing cut-off and BOP installation can be initiated four hours after installing the slips, which will be approximately six hours after bumping the plug. For those casing strings not using slips, the minimum wait time before cut-off is eight hours after bumping the plug. BOP/BOPE testing can begin after cut-off or once cement reaches 500 psi compressive strength (including lead cement), whichever is greater. However, if the float does not hold, cut-off cannot be initiated until cement reaches 500 psi compressive strength (including lead when specified).
 - b. In potash areas, for all casing strings utilizing slips, these are to be set as soon as the crew and rig are ready and any fallback cement remediation has been done. For all casing strings, casing cut-off and BOP installation can be initiated at twelve hours after bumping the cement plug. The BOPE test can be initiated after bumping the cement plug with the casing valve open. (only applies to single stage cement jobs, prior to the cement setting up.)
 - c. The tests shall be done by an independent service company utilizing a test plug not a cup or J-packer and can be initiated immediately with the casing valve open. The operator also has the option of utilizing an independent tester to test without a plug (i.e. against the casing) pursuant to **43 CFR part 3170 Subpart 3172** with the pressure not to exceed 70% of the burst rating for the casing. Any test against the casing must meet the WOC time for water basin (8 hours) or potash (24 hours) or 500 pounds compressive strength, whichever is greater, prior to initiating the test (see casing segment as lead cement may be critical item).
 - d. The test shall be run on a 5000 psi chart for a 2-3M BOP/BOP, on a 10000 psi chart for a 5M BOP/BOPE and on a 15000 psi chart for a 10M BOP/BOPE.

If a linear chart is used, it shall be a one hour chart. A circular chart shall have a maximum 2 hour clock. If a twelve hour or twenty-four hour chart is used, tester shall make a notation that it is run with a two hour clock.

- e. The results of the test shall be reported to the appropriate BLM office.
- f. All tests are required to be recorded on a calibrated test chart. A copy of the BOP/BOPE test chart and a copy of independent service company test will be submitted to the appropriate BLM office.
- g. The BOP/BOPE test shall include a low pressure test from 250 to 300 psi. The test will be held for a minimum of 10 minutes if test is done with a test plug and 30 minutes without a test plug. This test shall be performed prior to the test at full stack pressure.
- h. BOP/BOPE must be tested by an independent service company within 500 feet of the top of the Wolfcamp formation if the time between the setting of the intermediate casing and reaching this depth exceeds 20 days. This test does not exclude the test prior to drilling out the casing shoe as per **43 CFR part 3170 Subpart 3172**.

C. DRILLING MUD

Mud system monitoring equipment, with derrick floor indicators and visual and audio alarms, shall be operating before drilling into the Wolfcamp formation, and shall be used until production casing is run and cemented.

D. WASTE MATERIAL AND FLUIDS

All waste (i.e. drilling fluids, trash, salts, chemicals, sewage, gray water, etc.) created as a result of drilling operations and completion operations shall be safely contained and disposed of properly at a waste disposal facility. No waste material or fluid shall be disposed of on the well location or surrounding area.

Porto-johns and trash containers will be on-location during fracturing operations or any other crew-intensive operations.

ZS 1/23/2024

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 Rd., Aztec, NM 87410
Phone:(505) 334-6178 Fax:(505) 334-6170
District IV
1220 S. St Francis Dr., Santa Fe, NM 87505
Phone:(505) 476-3470 Fax:(505) 476-3462

State of New Mexico
Energy, Minerals and Natural Resources
Oil Conservation Division
1220 S. St Francis Dr.
Santa Fe, NM 87505

CONDITIONS

Action 313442

CONDITIONS

Operator: MARATHON OIL PERMIAN LLC 990 Town & Country Blvd. Houston, TX 77024	OGRID: 372098
	Action Number: 313442
	Action Type: [C-103] NOI Change of Plans (C-103A)

CONDITIONS

Created By	Condition	Condition Date
ward.rikala	All original COA's still apply. Additionally, if cement is not circulated to surface during cementing, then a CBL is required.	2/12/2024