

Well Name: Pierogi BS Fed Com	Well Location: T24S / R28E / SEC 34 / SWSE /	County or Parish/State:
Well Number: 302H	Type of Well: CONVENTIONAL GAS WELL	Allottee or Tribe Name:
Lease Number: NMNM17222	Unit or CA Name:	Unit or CA Number:
US Well Number: 3001548294	Well Status: Unapproved Application for Permit to Drill	Operator: MARATHON OIL PERMIAN LLC

Notice of Intent

Sundry ID: 2767256

Type of Submission: Notice of Intent

Type of Action: APD Change

Date Sundry Submitted: 12/21/2023

Time Sundry Submitted: 07:20

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 WA 11H well as follows: New Well Name: Pierogi BS Federal Com 302H
Approved SHL: 696' FSL 1860' FEL, Sec. 34, 24S, 28E Proposed SHL: 846' FSL 1858' FEL, Sec. 34, 24S, 28E
Approved BHL: 330' FNL 1999' FEL, Sec. 34, 24S, 28E Proposed BHL: 100' FNL 330' 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 1 Csg: 12.25" hole, 9.625", 40#, J55, LTC csg set @ 2620'. Lead: 507 sx Class C, 360 sx Class C Int 2 Csg: 8.75" hole, 7", 29#, P110, BTC csg set @ 10110'. Lead: 642 sx Class C, 181 sx Class H Prod Liner: 6.125" hole, 4.5", 13.5#, P110, BTC liner set @ 9810-14468'. Tail: 467 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 @ 7091'. Lead: 1198 sx Class C, Tail 147 sx Class C Prod Csg: 8.75" hole, 5.5", 23#, P110HC, TLW csg se @ 23456'. Tail: 3173 sx Class H Please see attached C102, drill plan for casing and cement design changes, and directional plan for review. Also included is the approved well pad with the proposed SHL moves. No additional disturbance requested by this sundry.

NOI Attachments

- Procedure Description
- Final_Final_Pierogi_Well_layout_20240103054546.pdf
 - Pierogi_BS_Federal_Com_302H_Drill_Plan_20231221191948.pdf
 - Pierogi_BS_Federal_Com_302H_Dir_Plan_20231221191936.pdf
 - Pierogi_BS_Federal_Com_302H___AC_v1_20231221191926.pdf

Well Name: Pierogi BS Fed Com	Well Location: T24S / R28E / SEC 34 / SWSE /	County or Parish/State:
Well Number: 302H	Type of Well: CONVENTIONAL GAS WELL	Allottee or Tribe Name:
Lease Number: NMNM17222	Unit or CA Name:	Unit or CA Number:
US Well Number: 3001548294	Well Status: Unapproved Application for Permit to Drill	Operator: MARATHON OIL PERMIAN LLC

C102_Pierogi_BS_Fed_Com_302H_20231221191909.pdf

Conditions of Approval

Specialist Review

Pigerogi_BS_Fed_Com_302H_COA_20240109093904.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: JAN 03, 2024 05:45 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

SUBMIT IN TRIPLICATE - Other instructions on page 2	
1. Type of Well ☐ Oil Well ☐ Gas Well ☐ Other	
2. Name of Operator	
3a. Address	3b. Phone No. (include area code)
4. Location of Well (Footage, Sec., T.,R.,M., or Survey Description)	

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

Int 2 Csg: 8.75 hole, 7, 29#, P110, BTC csg set @ 10110. Lead: 642 sx Class C, 181 sx Class H

Prod Liner: 6.125 hole, 4.5, 13.5#, P110, BTC liner set @ 9810-14468. Tail: 467 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 @ 7091. Lead: 1198 sx Class C, Tail 147 sx Class C

Prod Csg: 8.75 hole, 5.5, 23#, P110HC, TLW csg se @ 23456. Tail: 3173 sx Class H

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

Location of Well

0. SHL: SWSE / 696 FSL / 1860 FEL / TWSP: 24S / RANGE: 28E / SECTION: 34 / LAT: 32.1684371 / LONG: -104.0725076 (TVD: 0 feet, MD: 0 feet)

PPP: NWSE / 2685 FNL / 2011 FEL / TWSP: 24S / RANGE: 28E / SECTION: 34 / LAT: 32.1739055 / LONG: -104.0730489 (TVD: 9722 feet, MD: 12114 feet)

PPP: NWSE / 1343 FSL / 2018 FEL / TWSP: 24S / RANGE: 28E / SECTION: 34 / LAT: 32.1702137 / LONG: -104.0730363 (TVD: 9722 feet, MD: 10772 feet)

PPP: SWSE / 330 FSL / 2024 FEL / TWSP: 24S / RANGE: 28E / SECTION: 34 / LAT: 32.1674291 / LONG: -104.0730268 (TVD: 9722 feet, MD: 10101 feet)

BHL: NWNE / 330 FNL / 1999 FEL / TWSP: 24S / RANGE: 28E / SECTION: 34 / LAT: 32.1803789 / LONG: -104.073071 (TVD: 9722 feet, MD: 14468 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_FE

MARATHON OIL PERMIAN, LLC.
DRILLING AND OPERATIONS PLAN



WELL NAME & NUMBER:

PIEROGI BS FEDERAL COM 302H

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.

Marathon Oil Permian LLC.

Drilling & Operations Plan - Page 2 of 3

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	7091	0	6787	2999	-3788	40	P110HC	BTC	1.20	1.42	BUOY	2.44	BUOY	2.44
Production	8.75	5.5	0	23456	0	7450	2999	-4451	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	6591	1198	2.18	12.4	2611	25	Class C	Extender,Accelerator,LCM
Intermediate	Tail	6591	7091	147	1.33	14.8	196	25	Class C	Retarder
Production	Tail	6791	23456	3173	1.68	13	5330	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	7091	Brine or Oil Based Mud	9.2	10.2
7091	23456	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: 4843 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.



Marathon Oil

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

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 302H
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 302H	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 302H					
Well Position	+N/-S	0.00 usft	Northing:	425,201.89 usft	Latitude:	32° 10' 7.417 N
	+E/-W	0.00 usft	Easting:	580,858.43 usft	Longitude:	104° 4' 19.257 W
Position Uncertainty		0.00 usft	Wellhead Elevation:	usft	Ground Level:	2,999.00 usft
Grid Convergence:	0.139 °					

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	359.21	

Plan Survey Tool Program	Date	12/12/2023			
Depth From (usft)	Depth To (usft)	Survey (Wellbore)	Tool Name	Remarks	
1	0.00	23,455.58	Design #1 (Wellbore #1)	MWD+IFR1+FDIR	
				OWSG MWD + IFR1 + FDIR	



MS Directional Planning Report



Database:	EDM 5000.15 Conroe DB	Local Co-ordinate Reference:	Well Pierogi BS Federal Com 302H
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 302H	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Design #1		

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	
1,500.00	0.00	0.00	1,500.00	0.00	0.00	0.00	0.00	0.00	0.000	
2,624.87	22.50	117.18	2,596.19	-99.58	193.95	2.00	2.00	0.00	117.178	
5,999.30	22.50	117.18	5,713.81	-689.34	1,342.59	0.00	0.00	0.00	0.000	
7,124.17	0.00	0.00	6,810.00	-788.92	1,536.54	2.00	-2.00	0.00	180.000	
7,191.21	0.00	0.00	6,877.04	-788.92	1,536.54	0.00	0.00	0.00	0.000	
8,091.21	90.00	359.40	7,450.00	-215.99	1,530.57	10.00	10.00	0.00	359.403	
8,811.02	90.00	359.40	7,450.00	503.77	1,523.08	0.00	0.00	0.00	0.000	PPP-2_Pierogi 302
8,811.41	90.00	359.41	7,450.00	504.17	1,523.08	2.00	0.00	2.00	90.000	
12,839.11	90.00	359.41	7,450.00	4,531.65	1,481.70	0.00	0.00	0.00	0.000	PI-1_Pierogi 302H
12,839.67	90.00	359.42	7,450.00	4,532.21	1,481.69	2.00	0.00	2.00	90.000	
18,197.24	90.00	359.42	7,450.00	9,889.51	1,427.71	0.00	0.00	0.00	0.000	PI-2_Pierogi 302H
18,229.54	90.00	358.78	7,450.00	9,921.81	1,427.20	2.00	0.00	-2.00	-90.000	
23,455.58	90.00	358.78	7,450.00	15,146.65	1,315.63	0.00	0.00	0.00	0.000	LTP-PBHL_Pierogi



MS Directional Planning Report



Database:	EDM 5000.15 Conroe DB	Local Co-ordinate Reference:	Well Pierogi BS Federal Com 302H
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 302H	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
KOP, 2.00°/100' Build									
1,600.00	2.00	117.18	1,599.98	-0.80	1.55	-0.82	2.00	2.00	0.00
1,700.00	4.00	117.18	1,699.84	-3.19	6.21	-3.27	2.00	2.00	0.00
1,800.00	6.00	117.18	1,799.45	-7.17	13.96	-7.36	2.00	2.00	0.00
1,900.00	8.00	117.18	1,898.70	-12.73	24.80	-13.07	2.00	2.00	0.00
2,000.00	10.00	117.18	1,997.47	-19.88	38.72	-20.41	2.00	2.00	0.00
2,100.00	12.00	117.18	2,095.62	-28.59	55.69	-29.36	2.00	2.00	0.00
2,200.00	14.00	117.18	2,193.06	-38.87	75.70	-39.91	2.00	2.00	0.00
2,300.00	16.00	117.18	2,289.64	-50.69	98.72	-52.05	2.00	2.00	0.00
2,400.00	18.00	117.18	2,385.27	-64.04	124.73	-65.76	2.00	2.00	0.00
2,500.00	20.00	117.18	2,479.82	-78.91	153.69	-81.02	2.00	2.00	0.00
2,600.00	22.00	117.18	2,573.17	-95.28	185.57	-97.83	2.00	2.00	0.00
2,624.87	22.50	117.18	2,596.19	-99.58	193.95	-102.25	2.00	2.00	0.00
Begin 22.50° Tangent									
2,700.00	22.50	117.18	2,665.60	-112.71	219.52	-115.73	0.00	0.00	0.00
2,800.00	22.50	117.18	2,757.99	-130.19	253.56	-133.67	0.00	0.00	0.00
2,900.00	22.50	117.18	2,850.38	-147.67	287.60	-151.62	0.00	0.00	0.00
3,000.00	22.50	117.18	2,942.77	-165.14	321.64	-169.56	0.00	0.00	0.00
3,100.00	22.50	117.18	3,035.16	-182.62	355.68	-187.51	0.00	0.00	0.00
3,200.00	22.50	117.18	3,127.55	-200.10	389.72	-205.45	0.00	0.00	0.00
3,300.00	22.50	117.18	3,219.94	-217.58	423.76	-223.40	0.00	0.00	0.00
3,400.00	22.50	117.18	3,312.33	-235.05	457.80	-241.34	0.00	0.00	0.00
3,500.00	22.50	117.18	3,404.72	-252.53	491.84	-259.29	0.00	0.00	0.00
3,600.00	22.50	117.18	3,497.11	-270.01	525.88	-277.23	0.00	0.00	0.00
3,700.00	22.50	117.18	3,589.50	-287.48	559.92	-295.18	0.00	0.00	0.00
3,800.00	22.50	117.18	3,681.89	-304.96	593.96	-313.12	0.00	0.00	0.00
3,900.00	22.50	117.18	3,774.28	-322.44	628.00	-331.07	0.00	0.00	0.00
4,000.00	22.50	117.18	3,866.67	-339.92	662.04	-349.01	0.00	0.00	0.00
4,100.00	22.50	117.18	3,959.05	-357.39	696.08	-366.96	0.00	0.00	0.00
4,200.00	22.50	117.18	4,051.44	-374.87	730.12	-384.90	0.00	0.00	0.00
4,300.00	22.50	117.18	4,143.83	-392.35	764.16	-402.85	0.00	0.00	0.00
4,400.00	22.50	117.18	4,236.22	-409.83	798.20	-420.79	0.00	0.00	0.00
4,500.00	22.50	117.18	4,328.61	-427.30	832.24	-438.74	0.00	0.00	0.00
4,600.00	22.50	117.18	4,421.00	-444.78	866.27	-456.68	0.00	0.00	0.00
4,700.00	22.50	117.18	4,513.39	-462.26	900.31	-474.63	0.00	0.00	0.00
4,800.00	22.50	117.18	4,605.78	-479.73	934.35	-492.57	0.00	0.00	0.00
4,900.00	22.50	117.18	4,698.17	-497.21	968.39	-510.52	0.00	0.00	0.00
5,000.00	22.50	117.18	4,790.56	-514.69	1,002.43	-528.46	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 302H
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 302H	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	22.50	117.18	4,882.95	-532.17	1,036.47	-546.41	0.00	0.00	0.00
5,200.00	22.50	117.18	4,975.34	-549.64	1,070.51	-564.35	0.00	0.00	0.00
5,300.00	22.50	117.18	5,067.73	-567.12	1,104.55	-582.30	0.00	0.00	0.00
5,400.00	22.50	117.18	5,160.12	-584.60	1,138.59	-600.24	0.00	0.00	0.00
5,500.00	22.50	117.18	5,252.51	-602.07	1,172.63	-618.19	0.00	0.00	0.00
5,600.00	22.50	117.18	5,344.90	-619.55	1,206.67	-636.13	0.00	0.00	0.00
5,700.00	22.50	117.18	5,437.29	-637.03	1,240.71	-654.08	0.00	0.00	0.00
5,800.00	22.50	117.18	5,529.68	-654.51	1,274.75	-672.02	0.00	0.00	0.00
5,900.00	22.50	117.18	5,622.07	-671.98	1,308.79	-689.97	0.00	0.00	0.00
5,999.30	22.50	117.18	5,713.81	-689.34	1,342.59	-707.78	0.00	0.00	0.00
Begin 2.00°/100' Drop									
6,100.00	20.48	117.18	5,807.51	-706.19	1,375.41	-725.08	2.00	-2.00	0.00
6,200.00	18.48	117.18	5,901.78	-721.42	1,405.08	-740.73	2.00	-2.00	0.00
6,300.00	16.48	117.18	5,997.15	-735.14	1,431.80	-754.81	2.00	-2.00	0.00
6,400.00	14.48	117.18	6,093.52	-747.34	1,455.55	-767.33	2.00	-2.00	0.00
6,500.00	12.48	117.18	6,190.76	-757.99	1,476.29	-778.27	2.00	-2.00	0.00
6,600.00	10.48	117.18	6,288.75	-767.08	1,494.00	-787.60	2.00	-2.00	0.00
6,700.00	8.48	117.18	6,387.38	-774.60	1,508.66	-795.33	2.00	-2.00	0.00
6,800.00	6.48	117.18	6,486.52	-780.55	1,520.24	-801.44	2.00	-2.00	0.00
6,900.00	4.48	117.18	6,586.06	-784.92	1,528.74	-805.92	2.00	-2.00	0.00
7,000.00	2.48	117.18	6,685.87	-787.69	1,534.15	-808.77	2.00	-2.00	0.00
7,100.00	0.48	117.18	6,785.83	-788.87	1,536.45	-809.98	2.00	-2.00	0.00
7,124.17	0.00	0.00	6,810.00	-788.92	1,536.54	-810.03	2.00	-2.00	-484.79
Begin Vertical Hold									
7,191.21	0.00	0.00	6,877.04	-788.92	1,536.54	-810.03	0.00	0.00	0.00
KOP, 10.00°/100' Build									
7,200.00	0.88	359.40	6,885.83	-788.85	1,536.54	-809.96	10.00	10.00	0.00
7,250.00	5.88	359.40	6,935.73	-785.91	1,536.51	-807.02	10.00	10.00	0.00
7,300.00	10.88	359.40	6,985.18	-778.62	1,536.43	-799.73	10.00	10.00	0.00
7,350.00	15.88	359.40	7,033.80	-767.06	1,536.31	-788.17	10.00	10.00	0.00
7,400.00	20.88	359.40	7,081.24	-751.30	1,536.15	-772.41	10.00	10.00	0.00
7,450.00	25.88	359.40	7,127.12	-731.47	1,535.94	-752.57	10.00	10.00	0.00
7,500.00	30.88	359.40	7,171.10	-707.71	1,535.69	-728.82	10.00	10.00	0.00
7,550.00	35.88	359.40	7,212.84	-680.21	1,535.41	-701.32	10.00	10.00	0.00
7,600.00	40.88	359.40	7,252.02	-649.18	1,535.09	-670.29	10.00	10.00	0.00
7,650.00	45.88	359.40	7,288.35	-614.85	1,534.73	-635.96	10.00	10.00	0.00
7,700.00	50.88	359.40	7,321.55	-577.49	1,534.34	-598.59	10.00	10.00	0.00
7,750.00	55.88	359.40	7,351.37	-537.37	1,533.92	-558.47	10.00	10.00	0.00
7,800.00	60.88	359.40	7,377.57	-494.81	1,533.48	-515.91	10.00	10.00	0.00
7,850.00	65.88	359.40	7,399.97	-450.13	1,533.01	-471.23	10.00	10.00	0.00
7,900.00	70.88	359.40	7,418.39	-403.67	1,532.53	-424.76	10.00	10.00	0.00
7,950.00	75.88	359.40	7,432.69	-355.77	1,532.03	-376.86	10.00	10.00	0.00
8,000.00	80.88	359.40	7,442.76	-306.82	1,531.52	-327.90	10.00	10.00	0.00
8,050.00	85.88	359.40	7,448.52	-257.17	1,531.00	-278.25	10.00	10.00	0.00
8,091.21	90.00	359.40	7,450.00	-215.99	1,530.57	-237.08	10.00	10.00	0.00
Begin 90.00° Lateral									
8,100.00	90.00	359.40	7,450.00	-207.21	1,530.48	-228.29	0.00	0.00	0.00
8,200.00	90.00	359.40	7,450.00	-107.21	1,529.44	-128.29	0.00	0.00	0.00
8,300.00	90.00	359.40	7,450.00	-7.22	1,528.40	-28.29	0.00	0.00	0.00
8,400.00	90.00	359.40	7,450.00	92.78	1,527.36	71.71	0.00	0.00	0.00
8,500.00	90.00	359.40	7,450.00	192.77	1,526.32	171.71	0.00	0.00	0.00
8,600.00	90.00	359.40	7,450.00	292.77	1,525.28	271.71	0.00	0.00	0.00
8,700.00	90.00	359.40	7,450.00	392.76	1,524.24	371.71	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 302H
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 302H	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)
8,800.00	90.00	359.40	7,450.00	492.76	1,523.19	471.71	0.00	0.00	0.00
8,811.02	90.00	359.40	7,450.00	503.77	1,523.08	482.72	0.00	0.00	0.00
8,811.41	90.00	359.41	7,450.00	504.17	1,523.08	483.12	2.00	0.00	2.00
Hold 90.00° Inc, 359.41° Azm									
8,900.00	90.00	359.41	7,450.00	592.75	1,522.17	571.71	0.00	0.00	0.00
9,000.00	90.00	359.41	7,450.00	692.74	1,521.14	671.71	0.00	0.00	0.00
9,100.00	90.00	359.41	7,450.00	792.74	1,520.11	771.71	0.00	0.00	0.00
9,200.00	90.00	359.41	7,450.00	892.73	1,519.08	871.70	0.00	0.00	0.00
9,300.00	90.00	359.41	7,450.00	992.73	1,518.06	971.70	0.00	0.00	0.00
9,400.00	90.00	359.41	7,450.00	1,092.72	1,517.03	1,071.70	0.00	0.00	0.00
9,500.00	90.00	359.41	7,450.00	1,192.72	1,516.00	1,171.70	0.00	0.00	0.00
9,600.00	90.00	359.41	7,450.00	1,292.71	1,514.97	1,271.70	0.00	0.00	0.00
9,700.00	90.00	359.41	7,450.00	1,392.71	1,513.95	1,371.70	0.00	0.00	0.00
9,800.00	90.00	359.41	7,450.00	1,492.70	1,512.92	1,471.70	0.00	0.00	0.00
9,900.00	90.00	359.41	7,450.00	1,592.70	1,511.89	1,571.70	0.00	0.00	0.00
10,000.00	90.00	359.41	7,450.00	1,692.69	1,510.87	1,671.70	0.00	0.00	0.00
10,100.00	90.00	359.41	7,450.00	1,792.69	1,509.84	1,771.70	0.00	0.00	0.00
10,200.00	90.00	359.41	7,450.00	1,892.68	1,508.81	1,871.70	0.00	0.00	0.00
10,300.00	90.00	359.41	7,450.00	1,992.68	1,507.78	1,971.70	0.00	0.00	0.00
10,400.00	90.00	359.41	7,450.00	2,092.67	1,506.76	2,071.70	0.00	0.00	0.00
10,500.00	90.00	359.41	7,450.00	2,192.67	1,505.73	2,171.70	0.00	0.00	0.00
10,600.00	90.00	359.41	7,450.00	2,292.66	1,504.70	2,271.70	0.00	0.00	0.00
10,700.00	90.00	359.41	7,450.00	2,392.65	1,503.67	2,371.70	0.00	0.00	0.00
10,800.00	90.00	359.41	7,450.00	2,492.65	1,502.65	2,471.69	0.00	0.00	0.00
10,900.00	90.00	359.41	7,450.00	2,592.64	1,501.62	2,571.69	0.00	0.00	0.00
11,000.00	90.00	359.41	7,450.00	2,692.64	1,500.59	2,671.69	0.00	0.00	0.00
11,100.00	90.00	359.41	7,450.00	2,792.63	1,499.57	2,771.69	0.00	0.00	0.00
11,200.00	90.00	359.41	7,450.00	2,892.63	1,498.54	2,871.69	0.00	0.00	0.00
11,300.00	90.00	359.41	7,450.00	2,992.62	1,497.51	2,971.69	0.00	0.00	0.00
11,400.00	90.00	359.41	7,450.00	3,092.62	1,496.48	3,071.69	0.00	0.00	0.00
11,500.00	90.00	359.41	7,450.00	3,192.61	1,495.46	3,171.69	0.00	0.00	0.00
11,600.00	90.00	359.41	7,450.00	3,292.61	1,494.43	3,271.69	0.00	0.00	0.00
11,700.00	90.00	359.41	7,450.00	3,392.60	1,493.40	3,371.69	0.00	0.00	0.00
11,800.00	90.00	359.41	7,450.00	3,492.60	1,492.37	3,471.69	0.00	0.00	0.00
11,900.00	90.00	359.41	7,450.00	3,592.59	1,491.35	3,571.69	0.00	0.00	0.00
12,000.00	90.00	359.41	7,450.00	3,692.59	1,490.32	3,671.69	0.00	0.00	0.00
12,100.00	90.00	359.41	7,450.00	3,792.58	1,489.29	3,771.69	0.00	0.00	0.00
12,200.00	90.00	359.41	7,450.00	3,892.58	1,488.27	3,871.69	0.00	0.00	0.00
12,300.00	90.00	359.41	7,450.00	3,992.57	1,487.24	3,971.69	0.00	0.00	0.00
12,400.00	90.00	359.41	7,450.00	4,092.57	1,486.21	4,071.68	0.00	0.00	0.00
12,500.00	90.00	359.41	7,450.00	4,192.56	1,485.18	4,171.68	0.00	0.00	0.00
12,600.00	90.00	359.41	7,450.00	4,292.55	1,484.16	4,271.68	0.00	0.00	0.00
12,700.00	90.00	359.41	7,450.00	4,392.55	1,483.13	4,371.68	0.00	0.00	0.00
12,800.00	90.00	359.41	7,450.00	4,492.54	1,482.10	4,471.68	0.00	0.00	0.00
12,839.11	90.00	359.41	7,450.00	4,531.65	1,481.70	4,510.79	0.00	0.00	0.00
Begin 2.00°/100' Turn									
12,839.67	90.00	359.42	7,450.00	4,532.21	1,481.69	4,511.35	2.00	0.00	2.00
Hold 90.00° Inc, 359.42° Azm									
12,900.00	90.00	359.42	7,450.00	4,592.54	1,481.09	4,571.68	0.00	0.00	0.00
13,000.00	90.00	359.42	7,450.00	4,692.53	1,480.08	4,671.68	0.00	0.00	0.00
13,100.00	90.00	359.42	7,450.00	4,792.53	1,479.07	4,771.68	0.00	0.00	0.00
13,200.00	90.00	359.42	7,450.00	4,892.52	1,478.06	4,871.68	0.00	0.00	0.00
13,300.00	90.00	359.42	7,450.00	4,992.52	1,477.06	4,971.68	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 302H
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 302H	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)
13,400.00	90.00	359.42	7,450.00	5,092.51	1,476.05	5,071.68	0.00	0.00	0.00
13,500.00	90.00	359.42	7,450.00	5,192.51	1,475.04	5,171.68	0.00	0.00	0.00
13,600.00	90.00	359.42	7,450.00	5,292.50	1,474.03	5,271.68	0.00	0.00	0.00
13,700.00	90.00	359.42	7,450.00	5,392.50	1,473.03	5,371.68	0.00	0.00	0.00
13,800.00	90.00	359.42	7,450.00	5,492.49	1,472.02	5,471.68	0.00	0.00	0.00
13,900.00	90.00	359.42	7,450.00	5,592.49	1,471.01	5,571.67	0.00	0.00	0.00
14,000.00	90.00	359.42	7,450.00	5,692.48	1,470.00	5,671.67	0.00	0.00	0.00
14,100.00	90.00	359.42	7,450.00	5,792.48	1,468.99	5,771.67	0.00	0.00	0.00
14,200.00	90.00	359.42	7,450.00	5,892.47	1,467.99	5,871.67	0.00	0.00	0.00
14,300.00	90.00	359.42	7,450.00	5,992.47	1,466.98	5,971.67	0.00	0.00	0.00
14,400.00	90.00	359.42	7,450.00	6,092.46	1,465.97	6,071.67	0.00	0.00	0.00
14,500.00	90.00	359.42	7,450.00	6,192.46	1,464.96	6,171.67	0.00	0.00	0.00
14,600.00	90.00	359.42	7,450.00	6,292.45	1,463.96	6,271.67	0.00	0.00	0.00
14,700.00	90.00	359.42	7,450.00	6,392.45	1,462.95	6,371.67	0.00	0.00	0.00
14,800.00	90.00	359.42	7,450.00	6,492.44	1,461.94	6,471.67	0.00	0.00	0.00
14,900.00	90.00	359.42	7,450.00	6,592.44	1,460.93	6,571.67	0.00	0.00	0.00
15,000.00	90.00	359.42	7,450.00	6,692.43	1,459.93	6,671.67	0.00	0.00	0.00
15,100.00	90.00	359.42	7,450.00	6,792.43	1,458.92	6,771.67	0.00	0.00	0.00
15,200.00	90.00	359.42	7,450.00	6,892.42	1,457.91	6,871.67	0.00	0.00	0.00
15,300.00	90.00	359.42	7,450.00	6,992.42	1,456.90	6,971.67	0.00	0.00	0.00
15,400.00	90.00	359.42	7,450.00	7,092.41	1,455.90	7,071.66	0.00	0.00	0.00
15,500.00	90.00	359.42	7,450.00	7,192.41	1,454.89	7,171.66	0.00	0.00	0.00
15,600.00	90.00	359.42	7,450.00	7,292.40	1,453.88	7,271.66	0.00	0.00	0.00
15,700.00	90.00	359.42	7,450.00	7,392.40	1,452.87	7,371.66	0.00	0.00	0.00
15,800.00	90.00	359.42	7,450.00	7,492.39	1,451.87	7,471.66	0.00	0.00	0.00
15,900.00	90.00	359.42	7,450.00	7,592.39	1,450.86	7,571.66	0.00	0.00	0.00
16,000.00	90.00	359.42	7,450.00	7,692.38	1,449.85	7,671.66	0.00	0.00	0.00
16,100.00	90.00	359.42	7,450.00	7,792.38	1,448.84	7,771.66	0.00	0.00	0.00
16,200.00	90.00	359.42	7,450.00	7,892.37	1,447.83	7,871.66	0.00	0.00	0.00
16,300.00	90.00	359.42	7,450.00	7,992.37	1,446.83	7,971.66	0.00	0.00	0.00
16,400.00	90.00	359.42	7,450.00	8,092.36	1,445.82	8,071.66	0.00	0.00	0.00
16,500.00	90.00	359.42	7,450.00	8,192.36	1,444.81	8,171.66	0.00	0.00	0.00
16,600.00	90.00	359.42	7,450.00	8,292.35	1,443.80	8,271.66	0.00	0.00	0.00
16,700.00	90.00	359.42	7,450.00	8,392.35	1,442.80	8,371.66	0.00	0.00	0.00
16,800.00	90.00	359.42	7,450.00	8,492.34	1,441.79	8,471.65	0.00	0.00	0.00
16,900.00	90.00	359.42	7,450.00	8,592.34	1,440.78	8,571.65	0.00	0.00	0.00
17,000.00	90.00	359.42	7,450.00	8,692.33	1,439.77	8,671.65	0.00	0.00	0.00
17,100.00	90.00	359.42	7,450.00	8,792.33	1,438.77	8,771.65	0.00	0.00	0.00
17,200.00	90.00	359.42	7,450.00	8,892.32	1,437.76	8,871.65	0.00	0.00	0.00
17,300.00	90.00	359.42	7,450.00	8,992.32	1,436.75	8,971.65	0.00	0.00	0.00
17,400.00	90.00	359.42	7,450.00	9,092.31	1,435.74	9,071.65	0.00	0.00	0.00
17,500.00	90.00	359.42	7,450.00	9,192.31	1,434.74	9,171.65	0.00	0.00	0.00
17,600.00	90.00	359.42	7,450.00	9,292.30	1,433.73	9,271.65	0.00	0.00	0.00
17,700.00	90.00	359.42	7,450.00	9,392.30	1,432.72	9,371.65	0.00	0.00	0.00
17,800.00	90.00	359.42	7,450.00	9,492.29	1,431.71	9,471.65	0.00	0.00	0.00
17,900.00	90.00	359.42	7,450.00	9,592.29	1,430.71	9,571.65	0.00	0.00	0.00
18,000.00	90.00	359.42	7,450.00	9,692.28	1,429.70	9,671.65	0.00	0.00	0.00
18,100.00	90.00	359.42	7,450.00	9,792.28	1,428.69	9,771.65	0.00	0.00	0.00
18,197.24	90.00	359.42	7,450.00	9,889.51	1,427.71	9,868.89	0.00	0.00	0.00
Begin 2.00°/100' Turn									
18,200.00	90.00	359.37	7,450.00	9,892.27	1,427.68	9,871.65	2.00	0.00	-2.00
18,229.54	90.00	358.78	7,450.00	9,921.81	1,427.20	9,901.18	2.00	0.00	-2.00
Hold 90.00° Inc, 358.78° Azm									
18,300.00	90.00	358.78	7,450.00	9,992.25	1,425.70	9,971.64	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 302H
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 302H	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)
18,400.00	90.00	358.78	7,450.00	10,092.23	1,423.56	10,071.64	0.00	0.00	0.00
18,500.00	90.00	358.78	7,450.00	10,192.20	1,421.43	10,171.64	0.00	0.00	0.00
18,600.00	90.00	358.78	7,450.00	10,292.18	1,419.29	10,271.63	0.00	0.00	0.00
18,700.00	90.00	358.78	7,450.00	10,392.16	1,417.16	10,371.63	0.00	0.00	0.00
18,800.00	90.00	358.78	7,450.00	10,492.14	1,415.02	10,471.63	0.00	0.00	0.00
18,900.00	90.00	358.78	7,450.00	10,592.11	1,412.89	10,571.63	0.00	0.00	0.00
19,000.00	90.00	358.78	7,450.00	10,692.09	1,410.75	10,671.62	0.00	0.00	0.00
19,100.00	90.00	358.78	7,450.00	10,792.07	1,408.62	10,771.62	0.00	0.00	0.00
19,200.00	90.00	358.78	7,450.00	10,892.04	1,406.48	10,871.62	0.00	0.00	0.00
19,300.00	90.00	358.78	7,450.00	10,992.02	1,404.35	10,971.61	0.00	0.00	0.00
19,400.00	90.00	358.78	7,450.00	11,092.00	1,402.21	11,071.61	0.00	0.00	0.00
19,500.00	90.00	358.78	7,450.00	11,191.98	1,400.08	11,171.61	0.00	0.00	0.00
19,600.00	90.00	358.78	7,450.00	11,291.95	1,397.94	11,271.61	0.00	0.00	0.00
19,700.00	90.00	358.78	7,450.00	11,391.93	1,395.81	11,371.60	0.00	0.00	0.00
19,800.00	90.00	358.78	7,450.00	11,491.91	1,393.67	11,471.60	0.00	0.00	0.00
19,900.00	90.00	358.78	7,450.00	11,591.89	1,391.54	11,571.60	0.00	0.00	0.00
20,000.00	90.00	358.78	7,450.00	11,691.86	1,389.40	11,671.59	0.00	0.00	0.00
20,100.00	90.00	358.78	7,450.00	11,791.84	1,387.27	11,771.59	0.00	0.00	0.00
20,200.00	90.00	358.78	7,450.00	11,891.82	1,385.13	11,871.59	0.00	0.00	0.00
20,300.00	90.00	358.78	7,450.00	11,991.79	1,383.00	11,971.59	0.00	0.00	0.00
20,400.00	90.00	358.78	7,450.00	12,091.77	1,380.86	12,071.58	0.00	0.00	0.00
20,500.00	90.00	358.78	7,450.00	12,191.75	1,378.73	12,171.58	0.00	0.00	0.00
20,600.00	90.00	358.78	7,450.00	12,291.73	1,376.59	12,271.58	0.00	0.00	0.00
20,700.00	90.00	358.78	7,450.00	12,391.70	1,374.46	12,371.57	0.00	0.00	0.00
20,800.00	90.00	358.78	7,450.00	12,491.68	1,372.32	12,471.57	0.00	0.00	0.00
20,900.00	90.00	358.78	7,450.00	12,591.66	1,370.19	12,571.57	0.00	0.00	0.00
21,000.00	90.00	358.78	7,450.00	12,691.63	1,368.05	12,671.57	0.00	0.00	0.00
21,100.00	90.00	358.78	7,450.00	12,791.61	1,365.92	12,771.56	0.00	0.00	0.00
21,200.00	90.00	358.78	7,450.00	12,891.59	1,363.79	12,871.56	0.00	0.00	0.00
21,300.00	90.00	358.78	7,450.00	12,991.57	1,361.65	12,971.56	0.00	0.00	0.00
21,400.00	90.00	358.78	7,450.00	13,091.54	1,359.52	13,071.55	0.00	0.00	0.00
21,500.00	90.00	358.78	7,450.00	13,191.52	1,357.38	13,171.55	0.00	0.00	0.00
21,600.00	90.00	358.78	7,450.00	13,291.50	1,355.25	13,271.55	0.00	0.00	0.00
21,700.00	90.00	358.78	7,450.00	13,391.48	1,353.11	13,371.55	0.00	0.00	0.00
21,800.00	90.00	358.78	7,450.00	13,491.45	1,350.98	13,471.54	0.00	0.00	0.00
21,900.00	90.00	358.78	7,450.00	13,591.43	1,348.84	13,571.54	0.00	0.00	0.00
22,000.00	90.00	358.78	7,450.00	13,691.41	1,346.71	13,671.54	0.00	0.00	0.00
22,100.00	90.00	358.78	7,450.00	13,791.38	1,344.57	13,771.53	0.00	0.00	0.00
22,200.00	90.00	358.78	7,450.00	13,891.36	1,342.44	13,871.53	0.00	0.00	0.00
22,300.00	90.00	358.78	7,450.00	13,991.34	1,340.30	13,971.53	0.00	0.00	0.00
22,400.00	90.00	358.78	7,450.00	14,091.32	1,338.17	14,071.53	0.00	0.00	0.00
22,500.00	90.00	358.78	7,450.00	14,191.29	1,336.03	14,171.52	0.00	0.00	0.00
22,600.00	90.00	358.78	7,450.00	14,291.27	1,333.90	14,271.52	0.00	0.00	0.00
22,700.00	90.00	358.78	7,450.00	14,391.25	1,331.76	14,371.52	0.00	0.00	0.00
22,800.00	90.00	358.78	7,450.00	14,491.22	1,329.63	14,471.51	0.00	0.00	0.00
22,900.00	90.00	358.78	7,450.00	14,591.20	1,327.49	14,571.51	0.00	0.00	0.00
23,000.00	90.00	358.78	7,450.00	14,691.18	1,325.36	14,671.51	0.00	0.00	0.00
23,100.00	90.00	358.78	7,450.00	14,791.16	1,323.22	14,771.51	0.00	0.00	0.00
23,200.00	90.00	358.78	7,450.00	14,891.13	1,321.09	14,871.50	0.00	0.00	0.00
23,300.00	90.00	358.78	7,450.00	14,991.11	1,318.95	14,971.50	0.00	0.00	0.00
23,400.00	90.00	358.78	7,450.00	15,091.09	1,316.82	15,071.50	0.00	0.00	0.00
23,455.58	90.00	358.78	7,450.00	15,146.65	1,315.63	15,127.07	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 302H
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 302H	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Design #1		

Design Targets

Target Name									
- hit/miss target	Dip Angle	Dip Dir.	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
- Shape	(°)	(°)	(usft)	(usft)	(usft)	(usft)	(usft)		
KOP/FTP_Pierogi 302	0.00	0.00	0.00	-738.92	1,535.85	424,462.97	582,394.28	32° 10' 0.068 N	104° 4' 1.410 W
- plan misses target center by 1704.36usft at 0.00usft MD (0.00 TVD, 0.00 N, 0.00 E)									
- Point									
PPP-2_Pierogi 302H	0.00	0.00	7,450.00	503.77	1,523.08	425,705.66	582,381.51	32° 10' 12.366 N	104° 4' 1.523 W
- plan hits target center									
- Point									
PPP-3_Pierogi 302H	0.00	0.00	7,450.00	11,228.72	1,399.16	436,430.61	582,257.59	32° 11' 58.507 N	104° 4' 2.656 W
- plan misses target center by 0.13usft at 19536.76usft MD (7450.00 TVD, 11228.72 N, 1399.29 E)									
- Point									
LTP-PBHL Pierogi 30	0.00	0.00	7,450.00	15,146.65	1,315.63	440,348.54	582,174.06	32° 12' 37.282 N	104° 4' 3.516 W
- plan hits target center									
- Point									
PI-1_Pierogi 302H	0.00	0.00	7,450.00	4,531.65	1,481.70	429,733.54	582,340.13	32° 10' 52.228 N	104° 4' 1.888 W
- plan hits target center									
- Point									
PI-2_Pierogi 302H	0.00	0.00	7,450.00	9,889.51	1,427.71	435,091.40	582,286.14	32° 11' 45.253 N	104° 4' 2.362 W
- plan hits target center									
- Point									

Plan Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
1,500.00	1,500.00	0.00	0.00	KOP, 2.00°/100' Build
2,624.87	2,596.19	-99.58	193.95	Begin 22.50° Tangent
5,999.30	5,713.81	-689.34	1,342.59	Begin 2.00°/100' Drop
7,124.17	6,810.00	-788.92	1,536.54	Begin Vertical Hold
7,191.21	6,877.04	-788.92	1,536.54	KOP, 10.00°/100' Build
8,091.21	7,450.00	-215.99	1,530.57	Begin 90.00° Lateral
8,811.41	7,450.00	504.17	1,523.08	Hold 90.00° Inc, 359.41° Azm
12,839.11	7,450.00	4,531.65	1,481.70	Begin 2.00°/100' Turn
12,839.67	7,450.00	4,532.21	1,481.69	Hold 90.00° Inc, 359.42° Azm
18,197.24	7,450.00	9,889.51	1,427.71	Begin 2.00°/100' Turn
18,229.54	7,450.00	9,921.81	1,427.20	Hold 90.00° Inc, 358.78° Azm
23,455.58	7,450.00	15,146.65	1,315.63	PBHL



Marathon Oil

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

**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 302H
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 302H	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	23,455.58	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)	Between Ellipses (usft)	Separation Factor	Warning
Fiddle Fire Fed Com (#301H & 302H)						
Fiddle Fire Fed Com 301H - Wellbore #1 - Design #2	22,481.97	7,200.00	651.82	497.68	4.229	CC, ES
Fiddle Fire Fed Com 301H - Wellbore #1 - Design #2	22,500.00	7,200.00	652.07	497.77	4.226	SF
Fiddle Fire Fed Com 302H - Wellbore #1 - Design #1	21,229.14	7,200.00	653.12	509.49	4.547	CC, ES
Fiddle Fire Fed Com 302H - Wellbore #1 - Design #1	21,300.00	7,200.00	656.95	512.22	4.539	SF
Fiddle Fire Fed Com (Offsets)						
Chicken Fry Federal Com 1H - Wellbore #1 - Surveys	23,417.16	7,470.36	29.62	-132.48	0.183	Level 3, CC, ES, SF
Fiddle Fee 23 X # 1H - Wellbore #1 - Surveys	21,159.38	14,421.00	2,209.11	2,059.07	14.723	CC, ES
Fiddle Fee 23 X # 1H - Wellbore #1 - Surveys	21,800.00	14,421.00	2,300.12	2,140.96	14.452	SF
Fiddle Fee 24-28-23 (3-4-7-8) WB #8H - Wellbore #1 - Surveys	22,529.53	7,507.76	350.50	192.93	2.224	CC, ES, SF
Fiddle Fee 24-28-23 (3-4-7-8) WD #3H - Wellbore #1 - Surveys	21,879.43	7,473.52	340.49	190.48	2.270	CC, ES, SF
Fiddle Fee 24-28-23 (3-4-7-8) WD #4H - Wellbore #1 - Surveys	21,188.42	7,500.30	351.55	205.84	2.413	CC
Fiddle Fee 24-28-23 (3-4-7-8) WD #4H - Wellbore #1 - Surveys	21,200.00	7,500.25	351.74	205.83	2.411	ES, SF
Fiddle Fee 24-28-23 TH #2H - Wellbore #1 - Wellbore #1	23,159.53	7,483.06	514.94	356.28	3.246	CC, ES, SF
Fiddle Fee 24-28-23 WA #6H - Wellbore #1 - Surveys	22,885.25	7,466.14	356.16	199.20	2.269	CC, ES
Fiddle Fee 24-28-23 WA #6H - Wellbore #1 - Surveys	22,900.00	7,466.29	356.46	199.31	2.268	SF
Fiddle Fee 24-28-23 WD #7H - Wellbore #1 - Surveys	22,866.63	7,583.85	539.13	380.06	3.389	CC, ES, SF
Fiddle Fee 24-28-23 WXY #9H - Wellbore #1 - Surveys	22,333.39	7,496.00	464.54	310.26	3.011	CC, ES, SF
Tiger 14-24S-28E RB #124H - Wellbore #1 - Surveys	23,455.58	12,975.00	1,069.98	893.35	6.058	CC, ES, SF
Fiddle Fire Fed Com (Offsets) NAD 83						
Rustler Breaks 26/23 W2ML Fee Com 1H - Wellbore #1 -	12,513.05	7,425.47	653.46	580.10	8.908	CC, ES, SF
George (113H, 114H, 123H)						
George 113H - Wellbore #1 - Surveys	23,455.58	13,551.00	2,050.21	1,869.58	11.351	CC, ES, SF
George 114H - Wellbore #1 - Design #1	23,455.58	13,511.19	756.29	572.53	4.116	CC, ES, SF
George 123H - Wellbore #1 - Surveys	23,455.58	14,393.83	2,193.63	1,997.33	11.175	CC, ES, SF
George Offsets						
Willow Lake WA 15 1H - Wellbore #1 - Surveys	23,455.58	7,471.12	2,455.94	2,389.50	36.966	CC, ES, SF
Willow Lake WC 15 1H - Wellbore #1 - Surveys	23,455.58	7,308.31	2,269.15	2,205.22	35.489	CC, ES, SF
Pierogi Federal Com (302H, 502H, 552H)						
Pierogi BS Federal Com 502H - Wellbore #1 - Design #1	1,780.26	1,779.81	26.68	14.41	2.175	CC
Pierogi BS Federal Com 502H - Wellbore #1 - Design #1	1,800.00	1,799.45	26.75	14.35	2.157	ES, SF
Pierogi BS Federal Com 552H - Wellbore #1 - Design #1	2,650.17	2,641.98	50.63	32.19	2.746	CC, ES
Pierogi BS Federal Com 552H - Wellbore #1 - Design #1	2,700.00	2,691.38	51.04	32.24	2.715	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 302H
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 302H	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 Offset Well - Wellbore - Design	Reference Measured Depth (usft)	Offset Measured Depth (usft)	Distance Between Centres (usft)	Between Ellipses (usft)	Separation Factor	Warning
Salt Draw 2 Fee (Offsets NAD27)						
Willow Lake 35 MD Federal Com 1H - Wellbore #1 - Surv	7,747.88	7,371.70	795.90	742.34	14.858	CC, ES
Willow Lake 35 MD Federal Com 1H - Wellbore #1 - Surv	12,507.15	12,790.00	1,095.79	995.75	10.953	SF
Salt Draw 2 Fee 1H						
Salt Draw 2 B2DM Fee 1H - Wellbore #1 - Surveys	7,936.65	7,412.86	863.54	809.77	16.060	CC, ES, SF

Offset Design: Fiddle Fire Fed Com (#301H & 302H) - Fiddle Fire Fed Com 301H - Wellbore #1 - Design #2

Survey Program:	0-MWD+HRGM												Offset Site Error:	0.00 usft
Reference	Offset	Semi Major Axis	Highside	Offset Wellbore Centre	Rule Assigned:	Distance	Between	Between	Minimum	Separation	Factor	Warning	Offset Well Error:	0.00 usft
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Tooface (")	+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Separation (usft)	Factor		
12,500.00	7,450.00	6,385.08	6,297.60	49.29	25.98	21.432	14,082.08	1,835.96	9,962.62	9,908.24	54.38	183.207		
12,600.00	7,450.00	6,397.24	6,309.50	49.99	26.03	21.548	14,083.54	1,833.95	9,863.39	9,808.93	54.47	181.090		
12,700.00	7,450.00	6,409.41	6,321.41	50.70	26.08	21.667	14,085.00	1,831.95	9,764.17	9,709.61	54.56	178.977		
12,800.00	7,450.00	6,421.57	6,333.32	51.42	26.14	21.788	14,086.46	1,829.94	9,664.94	9,610.30	54.65	176.866		
12,839.11	7,450.00	6,426.32	6,337.97	51.70	26.16	21.836	14,087.03	1,829.16	9,626.14	9,571.46	54.68	176.042		
12,839.67	7,450.00	6,426.39	6,338.04	51.70	26.16	21.754	14,087.04	1,829.14	9,625.58	9,570.90	54.68	176.030		
12,900.00	7,450.00	6,433.73	6,345.22	52.13	26.19	21.828	14,087.92	1,827.93	9,565.72	9,510.99	54.74	174.759		
13,000.00	7,450.00	6,445.89	6,357.12	52.85	26.25	21.953	14,089.37	1,825.93	9,466.50	9,411.67	54.83	172.655		
13,100.00	7,450.00	6,458.05	6,369.03	53.58	26.30	22.081	14,090.83	1,823.92	9,367.28	9,312.35	54.92	170.554		
13,200.00	7,450.00	6,470.20	6,380.93	54.31	26.36	22.212	14,092.29	1,821.91	9,268.06	9,213.04	55.02	168.457		
13,300.00	7,450.00	6,482.36	6,392.83	55.04	26.41	22.345	14,093.75	1,819.91	9,168.84	9,113.72	55.11	166.364		
13,400.00	7,450.00	6,494.52	6,404.74	55.78	26.47	22.481	14,095.21	1,817.90	9,069.62	9,014.41	55.21	164.274		
13,500.00	7,450.00	6,506.68	6,416.64	56.52	26.52	22.619	14,096.67	1,815.89	8,970.40	8,915.09	55.31	162.188		
13,600.00	7,450.00	6,518.84	6,428.54	57.27	26.58	22.761	14,098.12	1,813.89	8,871.18	8,815.77	55.41	160.106		
13,700.00	7,450.00	6,531.00	6,440.45	58.02	26.63	22.906	14,099.58	1,811.88	8,771.96	8,716.45	55.51	158.028		
13,800.00	7,450.00	6,543.16	6,452.35	58.77	26.69	23.054	14,101.04	1,809.88	8,672.75	8,617.14	55.61	155.955		
13,900.00	7,450.00	6,555.32	6,464.25	59.52	26.74	23.205	14,102.50	1,807.87	8,573.53	8,517.82	55.71	153.885		
14,000.00	7,450.00	6,567.47	6,476.15	60.28	26.80	23.359	14,103.96	1,805.86	8,474.32	8,418.50	55.82	151.820		
14,100.00	7,450.00	6,579.63	6,488.06	61.04	26.85	23.517	14,105.41	1,803.86	8,375.11	8,319.18	55.92	149.760		
14,200.00	7,450.00	6,591.79	6,499.96	61.80	26.91	23.679	14,106.87	1,801.85	8,275.89	8,219.86	56.03	147.705		
14,300.00	7,450.00	6,603.95	6,511.86	62.56	26.96	23.844	14,108.33	1,799.84	8,176.68	8,120.54	56.14	145.654		
14,400.00	7,450.00	6,616.11	6,523.77	63.33	27.02	24.013	14,109.79	1,797.84	8,077.47	8,021.23	56.25	143.608		
14,500.00	7,450.00	6,628.27	6,535.67	64.10	27.07	24.186	14,111.25	1,795.83	7,978.26	7,921.91	56.36	141.566		
14,600.00	7,450.00	6,640.43	6,547.57	64.87	27.13	24.363	14,112.71	1,793.82	7,879.06	7,822.59	56.47	139.530		
14,700.00	7,450.00	6,652.59	6,559.48	65.64	27.18	24.544	14,114.16	1,791.82	7,779.85	7,723.27	56.58	137.499		
14,800.00	7,450.00	6,664.74	6,571.38	66.42	27.24	24.729	14,115.62	1,789.81	7,680.65	7,623.95	56.69	135.474		
14,900.00	7,450.00	6,676.90	6,583.28	67.20	27.29	24.919	14,117.08	1,787.80	7,581.44	7,524.63	56.81	133.453		
15,000.00	7,450.00	6,689.06	6,595.18	67.98	27.35	25.114	14,118.54	1,785.80	7,482.24	7,425.32	56.93	131.438		
15,100.00	7,450.00	6,701.22	6,607.09	68.76	27.40	25.314	14,120.00	1,783.79	7,383.04	7,326.00	57.04	129.429		
15,200.00	7,450.00	6,713.38	6,618.99	69.54	27.46	25.518	14,121.46	1,781.78	7,283.84	7,226.68	57.16	127.425		
15,300.00	7,450.00	6,725.54	6,630.89	70.33	27.51	25.728	14,122.91	1,779.78	7,184.65	7,127.37	57.28	125.426		
15,400.00	7,450.00	6,737.70	6,642.80	71.12	27.56	25.944	14,124.37	1,777.77	7,085.45	7,028.05	57.40	123.434		
15,500.00	7,450.00	6,749.86	6,654.70	71.90	27.62	26.164	14,125.83	1,775.76	6,986.26	6,928.73	57.53	121.447		
15,600.00	7,450.00	6,753.09	6,657.86	72.70	27.63	26.224	14,126.22	1,775.23	6,887.07	6,829.46	57.61	119.540		
15,700.00	7,450.00	6,753.09	6,657.86	73.49	27.63	26.224	14,126.22	1,775.23	6,787.91	6,730.22	57.69	117.659		
15,800.00	7,450.00	6,769.32	6,673.79	74.28	27.70	26.545	14,128.18	1,772.78	6,688.73	6,630.90	57.83	115.662		
15,900.00	7,450.00	6,775.35	6,679.73	75.08	27.73	26.674	14,128.91	1,771.98	6,589.59	6,531.65	57.93	113.743		
16,000.00	7,450.00	6,781.43	6,685.71	75.87	27.76	26.810	14,129.66	1,771.25	6,490.45	6,432.41	58.04	111.827		

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 302H
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 302H	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:	Reference	Offset	Semi Major Axis	Highside	Offset Wellbore Centre	Distance	Rule Assigned:	Offset Well Error:					
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Reference	Toolface (°)	+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	0.00 usft	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning	
16,100.00	7,450.00	6,787.56	6,691.75	76.67	27.78	26.954	14,130.41	1,770.57	6,391.33	6,333.19	58.15	109.914	
16,200.00	7,450.00	6,800.00	6,704.04	77.47	27.83	27.263	14,131.96	1,769.39	6,292.24	6,233.96	58.28	107.964	
16,300.00	7,450.00	6,800.00	6,704.04	78.27	27.83	27.263	14,131.96	1,769.39	6,193.15	6,134.77	58.37	106.095	
16,400.00	7,450.00	6,800.00	6,704.04	79.07	27.83	27.263	14,131.96	1,769.39	6,094.08	6,035.61	58.47	104.226	
16,500.00	7,450.00	6,812.52	6,716.43	79.88	27.88	27.601	14,133.52	1,768.48	5,995.02	5,936.42	58.60	102.299	
16,600.00	7,450.00	6,818.87	6,722.72	80.68	27.90	27.782	14,134.32	1,768.12	5,895.99	5,837.27	58.72	100.405	
16,700.00	7,450.00	6,825.26	6,729.06	81.49	27.93	27.972	14,135.13	1,767.83	5,796.98	5,738.13	58.84	98.514	
16,800.00	7,450.00	6,831.70	6,735.43	82.29	27.95	28.170	14,135.95	1,767.61	5,697.99	5,639.02	58.97	96.625	
16,900.00	7,450.00	6,850.00	6,753.58	83.10	28.02	28.775	14,138.29	1,767.37	5,599.04	5,539.91	59.13	94.695	
17,000.00	7,450.00	6,850.00	6,753.58	83.91	28.02	28.775	14,138.29	1,767.37	5,500.07	5,440.82	59.24	92.838	
17,100.00	7,450.00	6,850.00	6,753.58	84.72	28.02	28.775	14,138.29	1,767.37	5,401.14	5,341.77	59.37	90.981	
17,200.00	7,450.00	6,850.00	6,753.58	85.53	28.02	28.775	14,138.29	1,767.37	5,302.24	5,242.75	59.49	89.124	
17,300.00	7,450.00	6,864.41	6,767.87	86.34	28.07	29.294	14,140.15	1,767.60	5,203.36	5,143.71	59.65	87.237	
17,400.00	7,450.00	6,871.06	6,774.46	87.16	28.09	29.547	14,141.01	1,767.83	5,104.51	5,044.71	59.79	85.370	
17,500.00	7,450.00	6,877.74	6,781.07	87.97	28.11	29.810	14,141.88	1,768.13	5,005.68	4,945.74	59.94	83.506	
17,600.00	7,450.00	6,884.44	6,787.71	88.78	28.13	30.082	14,142.75	1,768.52	4,906.89	4,846.79	60.10	81.645	
17,700.00	7,450.00	6,900.00	6,803.09	89.60	28.18	30.749	14,144.79	1,769.71	4,808.15	4,747.88	60.27	79.775	
17,800.00	7,450.00	6,900.00	6,803.09	90.42	28.18	30.749	14,144.79	1,769.71	4,709.41	4,648.98	60.43	77.929	
17,900.00	7,450.00	6,900.00	6,803.09	91.23	28.18	30.749	14,144.79	1,769.71	4,610.72	4,550.12	60.60	76.082	
18,000.00	7,450.00	6,900.00	6,803.09	92.05	28.18	30.749	14,144.79	1,769.71	4,512.09	4,451.31	60.78	74.235	
18,100.00	7,450.00	6,918.34	6,821.16	92.87	28.23	31.598	14,147.21	1,771.66	4,413.45	4,352.48	60.97	72.388	
18,197.24	7,450.00	6,924.99	6,827.70	93.67	28.25	31.923	14,148.10	1,772.51	4,317.60	4,256.44	61.16	70.596	
18,200.00	7,450.00	6,925.18	6,827.88	93.69	28.25	32.203	14,148.12	1,772.53	4,314.88	4,253.72	61.16	70.545	
18,229.54	7,450.00	6,927.19	6,829.86	93.93	28.26	35.095	14,148.39	1,772.81	4,285.79	4,224.57	61.22	70.001	
18,300.00	7,450.00	6,931.96	6,834.54	94.51	28.27	35.342	14,149.02	1,773.48	4,216.46	4,155.08	61.37	68.700	
18,400.00	7,450.00	6,950.00	6,852.18	95.33	28.32	36.316	14,151.43	1,776.39	4,118.13	4,056.53	61.59	66.859	
18,500.00	7,450.00	6,950.00	6,852.18	96.15	28.32	36.316	14,151.43	1,776.39	4,019.80	3,957.98	61.83	65.015	
18,600.00	7,450.00	6,950.00	6,852.18	96.98	28.32	36.316	14,151.43	1,776.39	3,921.57	3,859.49	62.08	63.169	
18,700.00	7,450.00	6,950.00	6,852.18	97.80	28.32	36.316	14,151.43	1,776.39	3,823.42	3,761.07	62.35	61.322	
18,800.00	7,450.00	6,965.79	6,867.53	98.62	28.36	37.221	14,153.54	1,779.39	3,725.31	3,662.69	62.61	59.496	
18,900.00	7,450.00	6,972.54	6,874.07	99.45	28.37	37.622	14,154.44	1,780.81	3,627.29	3,564.39	62.91	57.660	
19,000.00	7,450.00	6,979.27	6,880.58	100.28	28.39	38.032	14,155.35	1,782.29	3,529.37	3,466.15	63.22	55.825	
19,100.00	7,450.00	6,986.00	6,887.05	101.10	28.40	38.449	14,156.25	1,783.86	3,431.54	3,367.98	63.56	53.991	
19,200.00	7,450.00	7,000.00	6,900.48	101.93	28.44	39.346	14,158.13	1,787.36	3,333.82	3,269.92	63.90	52.170	
19,300.00	7,450.00	7,000.00	6,900.48	102.76	28.44	39.346	14,158.13	1,787.36	3,236.19	3,171.89	64.30	50.326	
19,400.00	7,450.00	7,000.00	6,900.48	103.58	28.44	39.346	14,158.13	1,787.36	3,138.71	3,073.97	64.74	48.482	
19,500.00	7,450.00	7,012.73	6,912.61	104.41	28.46	40.193	14,159.85	1,790.82	3,041.34	2,976.16	65.17	46.665	
19,600.00	7,450.00	7,019.36	6,918.89	105.24	28.48	40.646	14,160.74	1,792.74	2,944.13	2,878.46	65.66	44.837	
19,700.00	7,450.00	7,025.97	6,925.14	106.07	28.49	41.105	14,161.63	1,794.72	2,847.08	2,780.88	66.20	43.010	
19,800.00	7,450.00	7,032.56	6,931.33	106.90	28.50	41.570	14,162.52	1,796.76	2,750.21	2,683.43	66.78	41.184	
19,900.00	7,450.00	7,050.00	6,947.63	107.73	28.54	42.838	14,164.87	1,802.53	2,653.59	2,586.21	67.38	39.384	
20,000.00	7,450.00	7,050.00	6,947.63	108.56	28.54	42.838	14,164.87	1,802.53	2,557.11	2,489.01	68.10	37.548	
20,100.00	7,450.00	7,050.00	6,947.63	109.40	28.54	42.838	14,164.87	1,802.53	2,460.91	2,392.01	68.90	35.716	
20,200.00	7,450.00	7,050.00	6,947.63	110.23	28.54	42.838	14,164.87	1,802.53	2,365.03	2,295.24	69.79	33.888	
20,300.00	7,450.00	7,065.07	6,961.55	111.06	28.56	43.973	14,166.89	1,807.91	2,269.40	2,198.71	70.70	32.101	
20,400.00	7,450.00	7,071.47	6,967.43	111.89	28.58	44.466	14,167.75	1,810.30	2,174.17	2,102.41	71.75	30.302	
20,500.00	7,450.00	7,077.84	6,973.25	112.73	28.59	44.963	14,168.61	1,812.76	2,079.34	2,006.41	72.93	28.512	
20,600.00	7,450.00	7,084.18	6,979.01	113.56	28.60	45.462	14,169.46	1,815.26	1,984.98	1,910.73	74.25	26.734	
20,700.00	7,450.00	7,100.00	6,993.26	114.40	28.62	46.732	14,171.57	1,821.79	1,891.20	1,815.52	75.69	24.987	
20,800.00	7,450.00	7,100.00	6,993.26	115.23	28.62	46.732	14,171.57	1,821.79	1,797.96	1,720.57	77.39	23.232	
20,900.00	7,450.00	7,100.00	6,993.26	116.07	28.62	46.732	14,171.57	1,821.79	1,705.49	1,626.17	79.32	21.503	
21,000.00	7,450.00	7,100.00	6,993.26	116.90	28.62	46.732	14,171.57	1,821.79	1,613.91	1,532.41	81.50	19.803	

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 302H
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 302H	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	Offset	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Distance Between Centres (usft)	Rule Assigned: Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning
21,100.00	7,450.00	7,115.27	7,006.84	117.74	28.65	47.987	14,173.61	1,828.46	1,523.24	1,439.36	83.88	18.160	
21,200.00	7,450.00	7,121.36	7,012.21	118.57	28.66	48.494	14,174.42	1,831.23	1,433.81	1,347.16	86.65	16.546	
21,300.00	7,450.00	7,127.42	7,017.51	119.41	28.66	49.002	14,175.22	1,834.03	1,345.82	1,256.00	89.82	14.983	
21,400.00	7,450.00	7,133.42	7,022.75	120.25	28.67	49.508	14,176.02	1,836.87	1,259.56	1,166.12	93.44	13.480	
21,500.00	7,450.00	7,150.00	7,037.03	121.09	28.70	50.923	14,178.20	1,844.99	1,175.52	1,077.97	97.55	12.050	
21,600.00	7,450.00	7,150.00	7,037.03	121.92	28.70	50.923	14,178.20	1,844.99	1,093.91	991.64	102.27	10.696	
21,700.00	7,450.00	7,150.00	7,037.03	122.76	28.70	50.923	14,178.20	1,844.99	1,015.59	907.98	107.61	9.438	
21,800.00	7,450.00	7,150.00	7,037.03	123.60	28.70	50.923	14,178.20	1,844.99	941.39	827.81	113.58	8.288	
21,900.00	7,450.00	7,150.00	7,037.03	124.44	28.70	50.923	14,178.20	1,844.99	872.36	752.20	120.15	7.260	
22,000.00	7,450.00	7,168.48	7,052.67	125.28	28.72	52.518	14,180.62	1,854.53	809.37	682.07	127.30	6.358	
22,100.00	7,450.00	7,174.15	7,057.41	126.12	28.73	53.011	14,181.36	1,857.56	754.56	619.94	134.62	5.605	
22,200.00	7,450.00	7,179.78	7,062.08	126.96	28.73	53.501	14,182.09	1,860.61	709.58	567.92	141.67	5.009	
22,300.00	7,450.00	7,185.35	7,066.68	127.80	28.74	53.987	14,182.81	1,863.68	676.41	528.65	147.76	4.578	
22,400.00	7,450.00	7,200.00	7,078.61	128.64	28.76	55.266	14,184.70	1,871.96	656.95	504.60	152.35	4.312	
22,481.97	7,450.00	7,200.00	7,078.61	129.33	28.76	55.266	14,184.70	1,871.96	651.82	497.68	154.14	4.229 CC, ES	
22,500.00	7,450.00	7,200.00	7,078.61	129.48	28.76	55.266	14,184.70	1,871.96	652.07	497.77	154.30	4.226 SF	
22,600.00	7,450.00	7,200.00	7,078.61	130.32	28.76	55.266	14,184.70	1,871.96	662.42	508.69	153.73	4.309	
22,700.00	7,450.00	7,200.00	7,078.61	131.16	28.76	55.266	14,184.70	1,871.96	687.32	536.38	150.93	4.554	
22,800.00	7,450.00	7,200.00	7,078.61	132.00	28.76	55.266	14,184.70	1,871.96	725.26	578.72	146.54	4.949	
22,900.00	7,450.00	7,217.73	7,092.77	132.84	28.78	56.811	14,186.97	1,882.39	773.91	632.19	141.71	5.461	
23,000.00	7,450.00	7,222.94	7,096.87	133.69	28.78	57.264	14,187.63	1,885.54	831.91	695.73	136.18	6.109	
23,100.00	7,450.00	7,228.11	7,100.90	134.53	28.79	57.712	14,188.28	1,888.70	897.27	766.57	130.69	6.865	
23,200.00	7,450.00	7,233.22	7,104.87	135.37	28.79	58.154	14,188.93	1,891.86	968.50	843.00	125.50	7.717	
23,300.00	7,450.00	7,250.00	7,117.68	136.21	28.81	59.596	14,191.03	1,902.49	1,044.55	923.56	120.99	8.633	
23,400.00	7,450.00	7,250.00	7,117.68	137.06	28.81	59.596	14,191.03	1,902.49	1,124.08	1,007.54	116.54	9.646	
23,455.58	7,450.00	7,250.00	7,117.68	137.52	28.81	59.596	14,191.03	1,902.49	1,169.64	1,055.37	114.27	10.236	

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 302H
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 302H	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)	Semi Major Axis Offset (usft)	Highside Toolface (°)	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		
11,300.00	7,450.00	7,250.00	7,123.47	41.30	28.37	58.851	12,931.97	1,935.69	9,954.36	9,897.94	56.42	176.438			
11,400.00	7,450.00	7,250.00	7,123.47	41.93	28.37	58.851	12,931.97	1,935.69	9,854.56	9,798.13	56.43	174.619			
11,500.00	7,450.00	7,250.00	7,123.47	42.57	28.37	58.851	12,931.97	1,935.69	9,754.77	9,698.32	56.45	172.799			
11,600.00	7,450.00	7,250.00	7,123.47	43.21	28.37	58.851	12,931.97	1,935.69	9,654.98	9,598.51	56.47	170.977			
11,700.00	7,450.00	7,250.00	7,123.47	43.86	28.37	58.851	12,931.97	1,935.69	9,555.20	9,498.71	56.49	169.154			
11,800.00	7,450.00	7,250.00	7,123.47	44.51	28.37	58.851	12,931.97	1,935.69	9,455.42	9,398.91	56.51	167.329			
11,900.00	7,450.00	7,250.00	7,123.47	45.18	28.37	58.851	12,931.97	1,935.69	9,355.64	9,299.12	56.53	165.504			
12,000.00	7,450.00	7,250.00	7,123.47	45.85	28.37	58.851	12,931.97	1,935.69	9,255.88	9,199.33	56.55	163.677			
12,100.00	7,450.00	7,250.00	7,123.47	46.53	28.37	58.851	12,931.97	1,935.69	9,156.11	9,099.54	56.57	161.850			
12,200.00	7,450.00	7,250.00	7,123.47	47.21	28.37	58.851	12,931.97	1,935.69	9,056.35	8,999.76	56.59	160.021			
12,300.00	7,450.00	7,250.00	7,123.47	47.90	28.37	58.851	12,931.97	1,935.69	8,956.60	8,899.98	56.62	158.192			
12,400.00	7,450.00	7,250.00	7,123.47	48.59	28.37	58.851	12,931.97	1,935.69	8,856.85	8,800.21	56.64	156.362			
12,500.00	7,450.00	7,250.00	7,123.47	49.29	28.37	58.851	12,931.97	1,935.69	8,757.11	8,700.44	56.67	154.531			
12,600.00	7,450.00	7,250.00	7,123.47	49.99	28.37	58.851	12,931.97	1,935.69	8,657.37	8,600.67	56.70	152.699			
12,700.00	7,450.00	7,250.00	7,123.47	50.70	28.37	58.851	12,931.97	1,935.69	8,557.64	8,500.92	56.72	150.867			
12,800.00	7,450.00	7,250.00	7,123.47	51.42	28.37	58.851	12,931.97	1,935.69	8,457.91	8,401.16	56.75	149.035			
12,839.11	7,450.00	7,250.00	7,123.47	51.70	28.37	58.851	12,931.97	1,935.69	8,418.92	8,362.15	56.76	148.318			
12,839.67	7,450.00	7,250.00	7,123.47	51.70	28.37	58.774	12,931.97	1,935.69	8,418.35	8,361.59	56.76	148.308			
12,900.00	7,450.00	7,250.00	7,123.47	52.13	28.37	58.774	12,931.97	1,935.69	8,358.20	8,301.41	56.78	147.202			
13,000.00	7,450.00	7,250.00	7,123.47	52.85	28.37	58.774	12,931.97	1,935.69	8,258.48	8,201.67	56.81	145.368			
13,100.00	7,450.00	7,250.00	7,123.47	53.58	28.37	58.774	12,931.97	1,935.69	8,158.78	8,101.94	56.84	143.534			
13,200.00	7,450.00	7,250.00	7,123.47	54.31	28.37	58.774	12,931.97	1,935.69	8,059.08	8,002.21	56.87	141.700			
13,300.00	7,450.00	7,250.00	7,123.47	55.04	28.37	58.774	12,931.97	1,935.69	7,959.39	7,902.48	56.91	139.866			
13,400.00	7,450.00	7,250.00	7,123.47	55.78	28.37	58.774	12,931.97	1,935.69	7,859.71	7,802.77	56.94	138.031			
13,500.00	7,450.00	7,250.00	7,123.47	56.52	28.37	58.774	12,931.97	1,935.69	7,760.03	7,703.06	56.98	136.197			
13,600.00	7,450.00	7,250.00	7,123.47	57.27	28.37	58.774	12,931.97	1,935.69	7,660.37	7,603.35	57.01	134.362			
13,700.00	7,450.00	7,250.00	7,123.47	58.02	28.37	58.774	12,931.97	1,935.69	7,560.71	7,503.66	57.05	132.527			
13,800.00	7,450.00	7,250.00	7,123.47	58.77	28.37	58.774	12,931.97	1,935.69	7,461.06	7,403.97	57.09	130.692			
13,900.00	7,450.00	7,250.00	7,123.47	59.52	28.37	58.774	12,931.97	1,935.69	7,361.42	7,304.30	57.13	128.858			
14,000.00	7,450.00	7,250.00	7,123.47	60.28	28.37	58.774	12,931.97	1,935.69	7,261.80	7,204.63	57.17	127.023			
14,100.00	7,450.00	7,250.00	7,123.47	61.04	28.37	58.774	12,931.97	1,935.69	7,162.18	7,104.97	57.21	125.189			
14,200.00	7,450.00	7,250.00	7,123.47	61.80	28.37	58.774	12,931.97	1,935.69	7,062.57	7,005.32	57.25	123.354			
14,300.00	7,450.00	7,250.00	7,123.47	62.56	28.37	58.774	12,931.97	1,935.69	6,962.98	6,905.68	57.30	121.520			
14,400.00	7,450.00	7,250.00	7,123.47	63.33	28.37	58.774	12,931.97	1,935.69	6,863.39	6,806.05	57.34	119.686			
14,500.00	7,450.00	7,250.00	7,123.47	64.10	28.37	58.774	12,931.97	1,935.69	6,763.82	6,706.43	57.39	117.853			
14,600.00	7,450.00	7,237.85	7,114.26	64.87	28.35	57.680	12,932.05	1,927.76	6,664.24	6,606.83	57.41	116.084			
14,700.00	7,450.00	7,237.18	7,113.75	65.64	28.35	57.620	12,932.05	1,927.33	6,564.69	6,507.23	57.46	114.255			
14,800.00	7,450.00	7,236.51	7,113.24	66.42	28.35	57.559	12,932.06	1,926.90	6,465.16	6,407.65	57.51	112.425			
14,900.00	7,450.00	7,235.84	7,112.72	67.20	28.35	57.499	12,932.06	1,926.47	6,365.64	6,308.08	57.56	110.596			
15,000.00	7,450.00	7,235.17	7,112.21	67.98	28.35	57.438	12,932.07	1,926.04	6,266.13	6,208.52	57.61	108.768			
15,100.00	7,450.00	7,234.51	7,111.70	68.76	28.35	57.378	12,932.07	1,925.61	6,166.64	6,108.98	57.66	106.940			
15,200.00	7,450.00	7,233.85	7,111.19	69.54	28.35	57.318	12,932.08	1,925.19	6,067.17	6,009.45	57.72	105.112			
15,300.00	7,450.00	7,233.18	7,110.68	70.33	28.35	57.258	12,932.08	1,924.77	5,967.72	5,909.94	57.78	103.284			
15,400.00	7,450.00	7,232.53	7,110.18	71.12	28.35	57.198	12,932.08	1,924.35	5,868.28	5,810.44	57.84	101.457			
15,500.00	7,450.00	7,231.87	7,109.67	71.90	28.35	57.139	12,932.09	1,923.93	5,768.86	5,710.96	57.90	99.631			
15,600.00	7,450.00	7,231.21	7,109.16	72.70	28.35	57.079	12,932.09	1,923.51	5,669.46	5,611.50	57.97	97.804			
15,700.00	7,450.00	7,230.56	7,108.66	73.49	28.35	57.020	12,932.10	1,923.10	5,570.09	5,512.05	58.03	95.978			
15,800.00	7,450.00	7,229.91	7,108.16	74.28	28.35	56.961	12,932.10	1,922.68	5,470.74	5,412.63	58.11	94.152			
15,900.00	7,450.00	7,229.26	7,107.65	75.08	28.35	56.902	12,932.10	1,922.27	5,371.41	5,313.23	58.18	92.327			
16,000.00	7,450.00	7,228.61	7,107.15	75.87	28.34	56.843	12,932.11	1,921.86	5,272.10	5,213.85	58.25	90.502			
16,100.00	7,450.00	7,227.96	7,106.65	76.67	28.34	56.784	12,932.11	1,921.45	5,172.83	5,114.49	58.33	88.677			
16,200.00	7,450.00	7,227.32	7,106.15	77.47	28.34	56.725	12,932.12	1,921.05	5,073.58	5,015.16	58.42	86.852			

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 302H
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 302H	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)	Semi Major Axis Offset (usft)	Highside Toolface (°)	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
16,300.00	7,450.00	7,226.68	7,105.65	78.27	28.34	56.667	12,932.12	1,920.64	4,974.36	4,915.86	58.50	85.027	
16,400.00	7,450.00	7,226.03	7,105.15	79.07	28.34	56.609	12,932.12	1,920.24	4,875.17	4,816.58	58.59	83.202	
16,500.00	7,450.00	7,225.40	7,104.65	79.88	28.34	56.550	12,932.13	1,919.84	4,776.02	4,717.33	58.69	81.377	
16,600.00	7,450.00	7,224.76	7,104.16	80.68	28.34	56.492	12,932.13	1,919.44	4,676.90	4,618.11	58.79	79.552	
16,700.00	7,450.00	7,224.12	7,103.66	81.49	28.34	56.435	12,932.14	1,919.04	4,577.82	4,518.93	58.90	77.727	
16,800.00	7,450.00	7,223.49	7,103.17	82.29	28.34	56.377	12,932.14	1,918.64	4,478.78	4,419.78	59.01	75.902	
16,900.00	7,450.00	7,222.86	7,102.67	83.10	28.34	56.319	12,932.14	1,918.25	4,379.79	4,320.66	59.13	74.076	
17,000.00	7,450.00	7,222.23	7,102.18	83.91	28.34	56.262	12,932.15	1,917.85	4,280.84	4,221.59	59.25	72.250	
17,100.00	7,450.00	7,221.60	7,101.69	84.72	28.34	56.204	12,932.15	1,917.46	4,181.94	4,122.56	59.38	70.423	
17,200.00	7,450.00	7,220.97	7,101.20	85.53	28.34	56.147	12,932.16	1,917.07	4,083.10	4,023.57	59.52	68.595	
17,300.00	7,450.00	7,220.34	7,100.71	86.34	28.34	56.090	12,932.16	1,916.68	3,984.31	3,924.63	59.68	66.766	
17,400.00	7,450.00	7,219.72	7,100.22	87.16	28.33	56.033	12,932.16	1,916.30	3,885.58	3,825.75	59.84	64.936	
17,500.00	7,450.00	7,219.10	7,099.73	87.97	28.33	55.977	12,932.17	1,915.91	3,786.92	3,726.91	60.01	63.106	
17,600.00	7,450.00	7,218.48	7,099.24	88.78	28.33	55.920	12,932.17	1,915.53	3,688.34	3,628.14	60.19	61.273	
17,700.00	7,450.00	7,217.86	7,098.76	89.60	28.33	55.863	12,932.17	1,915.15	3,589.83	3,529.43	60.39	59.440	
17,800.00	7,450.00	7,217.24	7,098.27	90.42	28.33	55.807	12,932.18	1,914.77	3,491.40	3,430.79	60.61	57.604	
17,900.00	7,450.00	7,216.63	7,097.79	91.23	28.33	55.751	12,932.18	1,914.39	3,393.07	3,332.22	60.84	55.767	
18,000.00	7,450.00	7,216.02	7,097.30	92.05	28.33	55.695	12,932.19	1,914.01	3,294.84	3,233.74	61.10	53.928	
18,100.00	7,450.00	7,215.40	7,096.82	92.87	28.33	55.639	12,932.19	1,913.63	3,196.71	3,135.34	61.37	52.087	
18,197.24	7,450.00	7,214.81	7,096.35	93.67	28.33	55.585	12,932.19	1,913.27	3,101.41	3,039.75	61.67	50.294	
18,200.00	7,450.00	7,214.79	7,096.34	93.69	28.33	55.734	12,932.19	1,913.26	3,098.71	3,037.03	61.67	50.243	
18,229.54	7,450.00	7,214.56	7,096.15	93.93	28.33	57.248	12,932.19	1,913.11	3,069.81	3,008.04	61.77	49.697	
18,300.00	7,450.00	7,213.89	7,095.62	94.51	28.33	57.189	12,932.20	1,912.70	3,001.01	2,938.99	62.01	48.392	
18,400.00	7,450.00	7,212.94	7,094.87	95.33	28.33	57.107	12,932.20	1,912.12	2,903.49	2,841.10	62.39	46.537	
18,500.00	7,450.00	7,200.00	7,084.54	96.15	28.31	55.975	12,932.28	1,904.34	2,806.21	2,743.47	62.74	44.729	
18,600.00	7,450.00	7,200.00	7,084.54	96.98	28.31	55.975	12,932.28	1,904.34	2,709.05	2,645.85	63.20	42.864	
18,700.00	7,450.00	7,200.00	7,084.54	97.80	28.31	55.975	12,932.28	1,904.34	2,612.11	2,548.40	63.72	40.997	
18,800.00	7,450.00	7,200.00	7,084.54	98.62	28.31	55.975	12,932.28	1,904.34	2,515.41	2,451.13	64.29	39.128	
18,900.00	7,450.00	7,200.00	7,084.54	99.45	28.31	55.975	12,932.28	1,904.34	2,418.98	2,354.06	64.92	37.259	
19,000.00	7,450.00	7,200.00	7,084.54	100.28	28.31	55.975	12,932.28	1,904.34	2,322.85	2,257.22	65.64	35.389	
19,100.00	7,450.00	7,200.00	7,084.54	101.10	28.31	55.975	12,932.28	1,904.34	2,227.06	2,160.63	66.44	33.521	
19,200.00	7,450.00	7,200.00	7,084.54	101.93	28.31	55.975	12,932.28	1,904.34	2,131.66	2,064.33	67.34	31.656	
19,300.00	7,450.00	7,200.00	7,084.54	102.76	28.31	55.975	12,932.28	1,904.34	2,036.70	1,968.35	68.35	29.796	
19,400.00	7,450.00	7,200.00	7,084.54	103.58	28.31	55.975	12,932.28	1,904.34	1,942.25	1,872.74	69.50	27.944	
19,500.00	7,450.00	7,200.00	7,084.54	104.41	28.31	55.975	12,932.28	1,904.34	1,848.38	1,777.57	70.81	26.104	
19,600.00	7,450.00	7,200.00	7,084.54	105.24	28.31	55.975	12,932.28	1,904.34	1,755.18	1,682.89	72.29	24.279	
19,700.00	7,450.00	7,200.00	7,084.54	106.07	28.31	55.975	12,932.28	1,904.34	1,662.78	1,588.80	73.99	22.474	
19,800.00	7,450.00	7,200.00	7,084.54	106.90	28.31	55.975	12,932.28	1,904.34	1,571.31	1,495.39	75.92	20.696	
19,900.00	7,450.00	7,200.00	7,084.54	107.73	28.31	55.975	12,932.28	1,904.34	1,480.94	1,402.80	78.14	18.951	
20,000.00	7,450.00	7,200.00	7,084.54	108.56	28.31	55.975	12,932.28	1,904.34	1,391.89	1,311.20	80.69	17.249	
20,100.00	7,450.00	7,200.00	7,084.54	109.40	28.31	55.975	12,932.28	1,904.34	1,304.43	1,220.80	83.63	15.598	
20,200.00	7,450.00	7,200.00	7,084.54	110.23	28.31	55.975	12,932.28	1,904.34	1,218.89	1,131.89	87.00	14.010	
20,300.00	7,450.00	7,200.00	7,084.54	111.06	28.31	55.975	12,932.28	1,904.34	1,135.73	1,044.85	90.88	12.497	
20,400.00	7,450.00	7,200.00	7,084.54	111.89	28.31	55.975	12,932.28	1,904.34	1,055.48	960.16	95.33	11.072	
20,500.00	7,450.00	7,200.00	7,084.54	112.73	28.31	55.975	12,932.28	1,904.34	978.89	878.49	100.39	9.750	
20,600.00	7,450.00	7,200.00	7,084.54	113.56	28.31	55.975	12,932.28	1,904.34	906.86	800.75	106.11	8.547	
20,700.00	7,450.00	7,200.00	7,084.54	114.40	28.31	55.975	12,932.28	1,904.34	840.57	728.14	112.43	7.476	
20,800.00	7,450.00	7,200.00	7,084.54	115.23	28.31	55.975	12,932.28	1,904.34	781.49	662.25	119.24	6.554	
20,900.00	7,450.00	7,200.00	7,084.54	116.07	28.31	55.975	12,932.28	1,904.34	731.37	605.12	126.25	5.793	
21,000.00	7,450.00	7,200.00	7,084.54	116.90	28.31	55.975	12,932.28	1,904.34	692.15	559.19	132.96	5.206	
21,100.00	7,450.00	7,200.00	7,084.54	117.74	28.31	55.975	12,932.28	1,904.34	665.77	527.04	138.73	4.799	
21,200.00	7,450.00	7,200.00	7,084.54	118.57	28.31	55.975	12,932.28	1,904.34	653.77	510.94	142.83	4.577	

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 302H
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 302H	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:		Distance		Minimum		Separation		Warning		
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference	Offset	Highside Toolface (°)	Offset Wellbore Centre	+N-S (usft)	+E-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Separation (usft)		
21,229.14	7,450.00	7,200.00	7,084.54	118.82	28.31	55.975	12,932.28	1,904.34	653.12	509.49	143.63	4.547 CC, ES		
21,300.00	7,450.00	7,200.00	7,084.54	119.41	28.31	55.975	12,932.28	1,904.34	656.95	512.22	144.73	4.539 SF		
21,400.00	7,450.00	7,186.30	7,073.41	120.25	28.30	54.773	12,932.36	1,896.35	674.80	530.80	144.00	4.686		
21,500.00	7,450.00	7,185.47	7,072.73	121.09	28.30	54.700	12,932.36	1,895.88	706.74	565.17	141.57	4.992		
21,600.00	7,450.00	7,184.64	7,072.05	121.92	28.30	54.627	12,932.37	1,895.41	750.73	613.03	137.70	5.452		
21,700.00	7,450.00	7,183.82	7,071.37	122.76	28.29	54.555	12,932.37	1,894.94	804.80	671.76	133.04	6.049		
21,800.00	7,450.00	7,183.00	7,070.69	123.60	28.29	54.483	12,932.38	1,894.47	867.08	738.98	128.10	6.769		
21,900.00	7,450.00	7,182.18	7,070.02	124.44	28.29	54.411	12,932.38	1,894.00	935.91	812.69	123.22	7.595		
22,000.00	7,450.00	7,181.36	7,069.35	125.28	28.29	54.340	12,932.39	1,893.54	1,009.97	891.35	118.61	8.515		
22,100.00	7,450.00	7,180.55	7,068.68	126.12	28.29	54.269	12,932.39	1,893.08	1,088.18	973.81	114.37	9.515		
22,200.00	7,450.00	7,179.74	7,068.01	126.96	28.29	54.198	12,932.40	1,892.63	1,169.72	1,059.20	110.52	10.584		
22,300.00	7,450.00	7,178.94	7,067.35	127.80	28.29	54.127	12,932.40	1,892.17	1,253.93	1,146.87	107.06	11.712		
22,400.00	7,450.00	7,178.14	7,066.69	128.64	28.29	54.057	12,932.41	1,891.72	1,340.31	1,236.34	103.97	12.891		
22,500.00	7,450.00	7,177.34	7,066.03	129.48	28.29	53.987	12,932.41	1,891.28	1,428.47	1,327.26	101.21	14.114		
22,600.00	7,450.00	7,176.55	7,065.37	130.32	28.29	53.917	12,932.41	1,890.83	1,518.09	1,419.34	98.75	15.373		
22,700.00	7,450.00	7,175.76	7,064.71	131.16	28.29	53.848	12,932.42	1,890.39	1,608.94	1,512.38	96.56	16.663		
22,800.00	7,450.00	7,174.97	7,064.06	132.00	28.28	53.779	12,932.42	1,889.95	1,700.82	1,606.22	94.60	17.980		
22,900.00	7,450.00	7,174.18	7,063.41	132.84	28.28	53.710	12,932.43	1,889.51	1,793.56	1,700.72	92.84	19.318		
23,000.00	7,450.00	7,173.40	7,062.76	133.69	28.28	53.642	12,932.43	1,889.08	1,887.04	1,795.78	91.27	20.676		
23,100.00	7,450.00	7,172.62	7,062.11	134.53	28.28	53.574	12,932.44	1,888.65	1,981.16	1,891.31	89.85	22.049		
23,200.00	7,450.00	7,171.85	7,061.46	135.37	28.28	53.506	12,932.44	1,888.22	2,075.83	1,987.25	88.58	23.435		
23,300.00	7,450.00	7,171.07	7,060.82	136.21	28.28	53.438	12,932.44	1,887.79	2,170.98	2,083.55	87.43	24.831		
23,400.00	7,450.00	7,170.31	7,060.18	137.06	28.28	53.371	12,932.45	1,887.37	2,266.54	2,180.15	86.39	26.236		
23,455.58	7,450.00	7,169.88	7,059.82	137.52	28.28	53.333	12,932.45	1,887.14	2,319.81	2,233.96	85.85	27.020		

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 302H
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 302H	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)	Semi Major Axis Offset (usft)	Highside Toolface (°)	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
8,700.00	7,450.00	14,415.00	9,555.39	30.01	76.67	-177.982	10,112.55	1,348.83	9,946.75	9,884.81	61.94	160.587	
8,800.00	7,450.00	14,415.00	9,555.39	30.12	76.67	-177.982	10,112.55	1,348.83	9,849.04	9,787.05	61.99	158.875	
8,811.02	7,450.00	14,415.00	9,555.39	30.14	76.67	-177.982	10,112.55	1,348.83	9,838.28	9,776.28	62.00	158.686	
8,811.41	7,450.00	14,415.00	9,555.39	30.14	76.67	-177.945	10,112.55	1,348.83	9,837.89	9,775.89	62.00	158.679	
8,900.00	7,450.00	14,415.00	9,555.39	30.27	76.67	-177.945	10,112.55	1,348.83	9,751.38	9,689.33	62.05	157.159	
9,000.00	7,450.00	14,415.00	9,555.39	30.47	76.67	-177.945	10,112.55	1,348.83	9,653.76	9,591.65	62.11	155.439	
9,100.00	7,450.00	14,415.00	9,555.39	30.71	76.67	-177.945	10,112.55	1,348.83	9,556.20	9,494.03	62.17	153.716	
9,200.00	7,450.00	14,415.00	9,555.39	30.99	76.67	-177.945	10,112.55	1,348.83	9,458.68	9,396.45	62.23	151.989	
9,300.00	7,450.00	14,415.00	9,555.39	31.29	76.67	-177.945	10,112.55	1,348.83	9,361.22	9,298.92	62.30	150.258	
9,400.00	7,450.00	14,415.00	9,555.39	31.63	76.67	-177.945	10,112.55	1,348.83	9,263.81	9,201.44	62.37	148.523	
9,500.00	7,450.00	14,415.00	9,555.39	31.99	76.67	-177.945	10,112.55	1,348.83	9,166.46	9,104.01	62.45	146.785	
9,600.00	7,450.00	14,415.00	9,555.39	32.37	76.67	-177.945	10,112.55	1,348.83	9,069.17	9,006.64	62.53	145.043	
9,700.00	7,450.00	14,415.00	9,555.39	32.78	76.67	-177.945	10,112.55	1,348.83	8,971.93	8,909.32	62.61	143.298	
9,800.00	7,450.00	14,415.00	9,555.39	33.21	76.67	-177.945	10,112.55	1,348.83	8,874.76	8,812.06	62.70	141.549	
9,900.00	7,450.00	14,415.00	9,555.39	33.65	76.67	-177.945	10,112.55	1,348.83	8,777.65	8,714.86	62.79	139.798	
10,000.00	7,450.00	14,415.00	9,555.39	34.11	76.67	-177.945	10,112.55	1,348.83	8,680.61	8,617.72	62.88	138.043	
10,100.00	7,450.00	14,415.00	9,555.39	34.59	76.67	-177.945	10,112.55	1,348.83	8,583.63	8,520.65	62.98	136.285	
10,200.00	7,450.00	14,415.00	9,555.39	35.08	76.67	-177.945	10,112.55	1,348.83	8,486.73	8,423.64	63.09	134.524	
10,300.00	7,450.00	14,415.00	9,555.39	35.58	76.67	-177.945	10,112.55	1,348.83	8,389.89	8,326.70	63.20	132.760	
10,400.00	7,450.00	14,415.00	9,555.39	36.10	76.67	-177.945	10,112.55	1,348.83	8,293.13	8,229.83	63.31	130.993	
10,500.00	7,450.00	14,415.00	9,555.39	36.64	76.67	-177.945	10,112.55	1,348.83	8,196.45	8,133.03	63.43	129.223	
10,600.00	7,450.00	14,415.00	9,555.39	37.18	76.67	-177.945	10,112.55	1,348.83	8,099.86	8,036.30	63.55	127.451	
10,700.00	7,450.00	14,415.00	9,555.39	37.74	76.67	-177.945	10,112.55	1,348.83	8,003.34	7,939.66	63.68	125.676	
10,800.00	7,450.00	14,415.00	9,555.39	38.31	76.67	-177.945	10,112.55	1,348.83	7,906.91	7,843.09	63.82	123.899	
10,900.00	7,450.00	14,415.00	9,555.39	38.89	76.67	-177.945	10,112.55	1,348.83	7,810.57	7,746.61	63.96	122.120	
11,000.00	7,450.00	14,415.00	9,555.39	39.48	76.67	-177.945	10,112.55	1,348.83	7,714.32	7,650.22	64.11	120.338	
11,100.00	7,450.00	14,415.00	9,555.39	40.08	76.67	-177.945	10,112.55	1,348.83	7,618.17	7,553.91	64.26	118.554	
11,200.00	7,450.00	14,415.00	9,555.39	40.69	76.67	-177.945	10,112.55	1,348.83	7,522.12	7,457.71	64.42	116.768	
11,300.00	7,450.00	14,415.00	9,555.39	41.30	76.67	-177.945	10,112.55	1,348.83	7,426.18	7,361.59	64.59	114.980	
11,400.00	7,450.00	14,415.00	9,555.39	41.93	76.67	-177.945	10,112.55	1,348.83	7,330.34	7,265.58	64.76	113.191	
11,500.00	7,450.00	14,415.00	9,555.39	42.57	76.67	-177.945	10,112.55	1,348.83	7,234.62	7,169.68	64.94	111.400	
11,600.00	7,450.00	14,415.00	9,555.39	43.21	76.67	-177.945	10,112.55	1,348.83	7,139.01	7,073.88	65.13	109.608	
11,700.00	7,450.00	14,415.00	9,555.39	43.86	76.67	-177.945	10,112.55	1,348.83	7,043.53	6,978.20	65.33	107.814	
11,800.00	7,450.00	14,415.00	9,555.39	44.51	76.67	-177.945	10,112.55	1,348.83	6,948.17	6,882.63	65.54	106.019	
11,900.00	7,450.00	14,415.00	9,555.39	45.18	76.67	-177.945	10,112.55	1,348.83	6,852.94	6,787.19	65.75	104.224	
12,000.00	7,450.00	14,415.00	9,555.39	45.85	76.67	-177.945	10,112.55	1,348.83	6,757.86	6,691.88	65.98	102.428	
12,100.00	7,450.00	14,415.00	9,555.39	46.53	76.67	-177.945	10,112.55	1,348.83	6,662.91	6,596.70	66.21	100.631	
12,200.00	7,450.00	14,415.00	9,555.39	47.21	76.67	-177.945	10,112.55	1,348.83	6,568.12	6,501.66	66.46	98.834	
12,300.00	7,450.00	14,415.00	9,555.39	47.90	76.67	-177.945	10,112.55	1,348.83	6,473.48	6,406.77	66.71	97.037	
12,400.00	7,450.00	14,415.00	9,555.39	48.59	76.67	-177.945	10,112.55	1,348.83	6,379.01	6,312.03	66.98	95.241	
12,500.00	7,450.00	14,415.00	9,555.39	49.29	76.67	-177.945	10,112.55	1,348.83	6,284.71	6,217.45	67.26	93.444	
12,600.00	7,450.00	14,415.00	9,555.39	49.99	76.67	-177.945	10,112.55	1,348.83	6,190.58	6,123.04	67.55	91.649	
12,700.00	7,450.00	14,415.00	9,555.39	50.70	76.67	-177.945	10,112.55	1,348.83	6,096.65	6,028.80	67.85	89.855	
12,800.00	7,450.00	14,415.00	9,555.39	51.42	76.67	-177.945	10,112.55	1,348.83	6,002.91	5,934.74	68.17	88.062	
12,839.11	7,450.00	14,415.00	9,555.39	51.70	76.67	-177.945	10,112.55	1,348.83	5,966.30	5,898.01	68.29	87.361	
12,839.67	7,450.00	14,415.00	9,555.39	51.70	76.67	-177.916	10,112.55	1,348.83	5,965.78	5,897.48	68.30	87.351	
12,900.00	7,450.00	14,415.00	9,555.39	52.13	76.67	-177.916	10,112.55	1,348.83	5,909.37	5,840.88	68.50	86.270	
13,000.00	7,450.00	14,415.00	9,555.39	52.85	76.67	-177.916	10,112.55	1,348.83	5,816.05	5,747.21	68.84	84.481	
13,100.00	7,450.00	14,415.00	9,555.39	53.58	76.67	-177.916	10,112.55	1,348.83	5,722.96	5,653.75	69.21	82.694	
13,200.00	7,450.00	14,415.00	9,555.39	54.31	76.67	-177.916	10,112.55	1,348.83	5,630.10	5,560.52	69.58	80.910	
13,300.00	7,450.00	14,415.00	9,555.39	55.04	76.67	-177.916	10,112.55	1,348.83	5,537.49	5,467.51	69.98	79.129	
13,400.00	7,450.00	14,415.00	9,555.39	55.78	76.67	-177.916	10,112.55	1,348.83	5,445.15	5,374.75	70.39	77.352	

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 302H
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 302H	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)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Distance Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning	
13,500.00	7,450.00	14,415.00	9,555.39	56.52	76.67	-177.916	10,112.55	1,348.83	5,353.08	5,282.25	70.83	75.579		
13,600.00	7,450.00	14,415.00	9,555.39	57.27	76.67	-177.916	10,112.55	1,348.83	5,261.29	5,190.01	71.28	73.811		
13,700.00	7,450.00	14,415.00	9,555.39	58.02	76.67	-177.916	10,112.55	1,348.83	5,169.82	5,098.06	71.75	72.048		
13,800.00	7,450.00	14,415.00	9,555.39	58.77	76.67	-177.916	10,112.55	1,348.83	5,078.66	5,006.41	72.25	70.291		
13,900.00	7,450.00	14,415.00	9,555.39	59.52	76.67	-177.916	10,112.55	1,348.83	4,987.84	4,915.07	72.77	68.541		
14,000.00	7,450.00	14,415.00	9,555.39	60.28	76.67	-177.916	10,112.55	1,348.83	4,897.38	4,824.07	73.32	66.798		
14,100.00	7,450.00	14,415.00	9,555.39	61.04	76.67	-177.916	10,112.55	1,348.83	4,807.30	4,733.41	73.89	65.062		
14,200.00	7,450.00	14,415.00	9,555.39	61.80	76.67	-177.916	10,112.55	1,348.83	4,717.62	4,643.13	74.49	63.335		
14,300.00	7,450.00	14,415.00	9,555.39	62.56	76.67	-177.916	10,112.55	1,348.83	4,628.36	4,553.25	75.11	61.618		
14,400.00	7,450.00	14,415.00	9,555.39	63.33	76.67	-177.916	10,112.55	1,348.83	4,539.55	4,463.78	75.77	59.911		
14,500.00	7,450.00	14,415.00	9,555.39	64.10	76.67	-177.916	10,112.55	1,348.83	4,451.21	4,374.75	76.46	58.215		
14,600.00	7,450.00	14,415.00	9,555.39	64.87	76.67	-177.916	10,112.55	1,348.83	4,363.38	4,286.19	77.19	56.531		
14,700.00	7,450.00	14,415.00	9,555.39	65.64	76.67	-177.916	10,112.55	1,348.83	4,276.08	4,198.14	77.95	54.860		
14,800.00	7,450.00	14,415.00	9,555.39	66.42	76.67	-177.916	10,112.55	1,348.83	4,189.35	4,110.61	78.74	53.203		
14,900.00	7,450.00	14,415.00	9,555.39	67.20	76.67	-177.916	10,112.55	1,348.83	4,103.22	4,023.64	79.58	51.562		
15,000.00	7,450.00	14,415.00	9,555.39	67.98	76.67	-177.916	10,112.55	1,348.83	4,017.74	3,937.28	80.46	49.937		
15,100.00	7,450.00	14,415.00	9,555.39	68.76	76.67	-177.916	10,112.55	1,348.83	3,932.94	3,851.56	81.38	48.329		
15,200.00	7,450.00	14,415.00	9,555.39	69.54	76.67	-177.916	10,112.55	1,348.83	3,848.87	3,766.53	82.35	46.741		
15,300.00	7,450.00	14,415.00	9,555.39	70.33	76.67	-177.916	10,112.55	1,348.83	3,765.58	3,682.22	83.36	45.172		
15,400.00	7,450.00	14,415.00	9,555.39	71.12	76.67	-177.916	10,112.55	1,348.83	3,683.12	3,598.70	84.43	43.626		
15,500.00	7,450.00	14,415.00	9,555.39	71.90	76.67	-177.916	10,112.55	1,348.83	3,601.55	3,516.01	85.54	42.102		
15,600.00	7,450.00	14,415.00	9,555.39	72.70	76.67	-177.916	10,112.55	1,348.83	3,520.93	3,434.22	86.71	40.604		
15,700.00	7,450.00	14,415.00	9,555.39	73.49	76.67	-177.916	10,112.55	1,348.83	3,441.33	3,353.39	87.94	39.131		
15,800.00	7,450.00	14,415.00	9,555.39	74.28	76.67	-177.916	10,112.55	1,348.83	3,362.82	3,273.59	89.23	37.687		
15,900.00	7,450.00	14,415.00	9,555.39	75.08	76.67	-177.916	10,112.55	1,348.83	3,285.47	3,194.89	90.58	36.272		
16,000.00	7,450.00	14,415.00	9,555.39	75.87	76.67	-177.916	10,112.55	1,348.83	3,209.38	3,117.39	91.99	34.889		
16,100.00	7,450.00	14,415.00	9,555.39	76.67	76.67	-177.916	10,112.55	1,348.83	3,134.63	3,041.17	93.46	33.539		
16,200.00	7,450.00	14,415.00	9,555.39	77.47	76.67	-177.916	10,112.55	1,348.83	3,061.32	2,966.32	95.00	32.224		
16,300.00	7,450.00	14,415.00	9,555.39	78.27	76.67	-177.916	10,112.55	1,348.83	2,989.56	2,892.95	96.61	30.946		
16,400.00	7,450.00	14,415.00	9,555.39	79.07	76.67	-177.916	10,112.55	1,348.83	2,919.46	2,821.19	98.27	29.707		
16,500.00	7,450.00	14,415.00	9,555.39	79.88	76.67	-177.916	10,112.55	1,348.83	2,851.15	2,751.14	100.01	28.509		
16,600.00	7,450.00	14,415.00	9,555.39	80.68	76.67	-177.916	10,112.55	1,348.83	2,784.75	2,682.95	101.80	27.354		
16,700.00	7,450.00	14,415.00	9,555.39	81.49	76.67	-177.916	10,112.55	1,348.83	2,720.41	2,616.75	103.66	26.244		
16,800.00	7,450.00	14,415.00	9,555.39	82.29	76.67	-177.916	10,112.55	1,348.83	2,658.27	2,552.70	105.57	25.181		
16,900.00	7,450.00	14,415.00	9,555.39	83.10	76.67	-177.916	10,112.55	1,348.83	2,598.50	2,490.97	107.53	24.166		
17,000.00	7,450.00	14,415.00	9,555.39	83.91	76.67	-177.916	10,112.55	1,348.83	2,541.26	2,431.73	109.53	23.201		
17,100.00	7,450.00	14,415.00	9,555.39	84.72	76.67	-177.916	10,112.55	1,348.83	2,486.72	2,375.15	111.56	22.290		
17,200.00	7,450.00	14,415.00	9,555.39	85.53	76.67	-177.916	10,112.55	1,348.83	2,435.07	2,321.45	113.62	21.432		
17,300.00	7,450.00	14,415.00	9,555.39	86.34	76.67	-177.916	10,112.55	1,348.83	2,386.49	2,270.81	115.68	20.629		
17,400.00	7,450.00	14,415.00	9,555.39	87.16	76.67	-177.916	10,112.55	1,348.83	2,341.18	2,223.44	117.74	19.884		
17,500.00	7,450.00	14,415.00	9,555.39	87.97	76.67	-177.916	10,112.55	1,348.83	2,299.33	2,179.56	119.77	19.198		
17,600.00	7,450.00	14,415.00	9,555.39	88.78	76.67	-177.916	10,112.55	1,348.83	2,261.13	2,139.37	121.76	18.571		
17,700.00	7,450.00	14,415.00	9,555.39	89.60	76.67	-177.916	10,112.55	1,348.83	2,226.77	2,103.09	123.68	18.005		
17,800.00	7,450.00	14,415.00	9,555.39	90.42	76.67	-177.916	10,112.55	1,348.83	2,196.42	2,070.92	125.50	17.501		
17,900.00	7,450.00	14,415.00	9,555.39	91.23	76.67	-177.916	10,112.55	1,348.83	2,170.27	2,043.05	127.22	17.059		
18,000.00	7,450.00	14,415.00	9,555.39	92.05	76.67	-177.916	10,112.55	1,348.83	2,148.45	2,019.65	128.80	16.680		
18,100.00	7,450.00	14,415.00	9,555.39	92.87	76.67	-177.916	10,112.55	1,348.83	2,131.11	2,000.88	130.23	16.364		
18,197.24	7,450.00	14,415.00	9,555.39	93.67	76.67	-177.916	10,112.55	1,348.83	2,118.64	1,987.20	131.45	16.118		
18,200.00	7,450.00	14,415.00	9,555.39	93.69	76.67	-177.921	10,112.55	1,348.83	2,118.35	1,986.88	131.48	16.112		
18,229.54	7,450.00	14,415.00	9,555.39	93.93	76.67	-177.979	10,112.55	1,348.83	2,115.47	1,983.66	131.81	16.049		
18,300.00	7,450.00	14,415.00	9,555.39	94.51	76.67	-177.979	10,112.55	1,348.83	2,110.23	1,977.70	132.53	15.923		
18,400.00	7,450.00	14,370.35	9,553.99	95.33	76.09	-177.985	10,157.17	1,348.13	2,106.35	1,973.30	133.04	15.832		

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 302H
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 302H	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)	Semi Major Axis Offset (usft)	Highside Toolface (°)	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	7,450.00	14,292.11	9,551.85	96.15	75.07	-177.996	10,235.37	1,346.93	2,103.61	1,970.35	133.26	15.785	
18,600.00	7,450.00	14,225.00	9,550.91	96.98	74.20	-178.036	10,302.47	1,347.01	2,102.17	1,968.63	133.54	15.742	
18,611.83	7,450.00	14,225.00	9,550.91	97.07	74.20	-178.036	10,302.47	1,347.01	2,102.14	1,968.51	133.63	15.732	
18,700.00	7,450.00	14,180.24	9,551.24	97.80	73.63	-178.082	10,347.22	1,347.73	2,102.86	1,968.94	133.92	15.702	
18,800.00	7,450.00	14,132.00	9,553.06	98.62	73.01	-178.146	10,395.41	1,348.98	2,106.32	1,972.10	134.22	15.693	
18,900.00	7,450.00	14,080.52	9,556.24	99.45	72.36	-178.223	10,446.77	1,350.62	2,112.17	1,977.72	134.45	15.710	
19,000.00	7,450.00	13,822.01	9,566.43	100.28	69.06	-178.427	10,704.90	1,352.35	2,117.27	1,983.54	133.73	15.832	
19,047.91	7,450.00	13,788.14	9,566.32	100.67	68.63	-178.428	10,738.76	1,351.67	2,117.11	1,983.26	133.86	15.816	
19,100.00	7,450.00	13,749.92	9,566.45	101.10	68.14	-178.423	10,776.97	1,350.66	2,117.30	1,983.32	133.98	15.803	
19,200.00	7,450.00	13,566.00	9,565.58	101.93	65.82	-178.424	10,960.82	1,346.79	2,117.54	1,984.03	133.51	15.861	
19,300.00	7,450.00	13,521.00	9,564.51	102.76	65.26	-178.403	11,005.77	1,345.10	2,115.39	1,981.41	133.98	15.789	
19,324.81	7,450.00	13,511.21	9,564.47	102.96	65.14	-178.397	11,015.56	1,344.66	2,115.30	1,981.20	134.09	15.775	
19,400.00	7,450.00	13,472.00	9,564.99	103.58	64.64	-178.365	11,054.71	1,342.64	2,116.16	1,981.79	134.37	15.749	
19,500.00	7,450.00	13,410.14	9,566.91	104.41	63.87	-178.319	11,116.47	1,339.56	2,119.12	1,984.46	134.65	15.737	
19,600.00	7,450.00	13,326.57	9,570.14	105.24	62.83	-178.293	11,199.92	1,336.72	2,123.02	1,988.19	134.83	15.746	
19,700.00	7,450.00	13,080.24	9,574.98	106.07	59.81	-178.254	11,446.03	1,329.87	2,126.69	1,992.54	134.15	15.853	
19,800.00	7,450.00	12,955.94	9,571.27	106.90	58.31	-178.291	11,570.27	1,328.69	2,123.71	1,989.63	134.08	15.839	
19,900.00	7,450.00	12,812.00	9,564.20	107.73	56.60	-178.355	11,714.03	1,328.21	2,118.67	1,984.82	133.85	15.829	
20,000.00	7,450.00	12,763.04	9,561.86	108.56	56.02	-178.374	11,762.93	1,327.94	2,113.95	1,979.60	134.35	15.735	
20,100.00	7,450.00	12,718.00	9,560.91	109.40	55.49	-178.386	11,807.96	1,327.42	2,111.82	1,976.99	134.82	15.664	
20,149.39	7,450.00	12,693.36	9,560.85	109.81	55.21	-178.390	11,832.60	1,327.07	2,111.70	1,976.67	135.03	15.639	
20,200.00	7,450.00	12,668.47	9,561.09	110.23	54.92	-178.395	11,857.48	1,326.69	2,112.18	1,976.96	135.22	15.620	
20,300.00	7,450.00	12,611.22	9,562.75	111.06	54.25	-178.403	11,914.69	1,325.74	2,114.93	1,979.39	135.54	15.604	
20,400.00	7,450.00	12,373.17	9,563.78	111.89	51.55	-178.479	12,152.68	1,323.41	2,115.43	1,980.48	134.96	15.675	
20,500.00	7,450.00	12,310.63	9,562.10	112.73	50.86	-178.529	12,215.18	1,323.98	2,112.94	1,977.61	135.33	15.613	
20,539.98	7,450.00	12,295.21	9,562.02	113.06	50.69	-178.543	12,230.60	1,324.16	2,112.70	1,977.18	135.52	15.589	
20,600.00	7,450.00	12,247.00	9,562.94	113.56	50.16	-178.587	12,278.80	1,324.75	2,113.61	1,977.94	135.67	15.579	
20,700.00	7,450.00	12,221.45	9,563.94	114.40	49.88	-178.607	12,304.33	1,324.89	2,116.32	1,980.19	136.14	15.546	
20,800.00	7,450.00	12,152.00	9,567.19	115.23	49.12	-178.609	12,373.68	1,323.44	2,121.04	1,984.64	136.40	15.550	
20,900.00	7,450.00	12,058.00	9,572.38	116.07	48.11	-178.580	12,467.49	1,320.24	2,126.60	1,989.99	136.60	15.568	
21,000.00	7,450.00	11,955.53	9,578.31	116.90	47.02	-178.572	12,569.75	1,317.59	2,132.39	1,995.60	136.79	15.588	
21,100.00	7,450.00	11,718.48	9,581.53	117.74	44.59	-178.352	12,806.21	1,304.25	2,132.47	1,995.91	136.56	15.616	
21,125.69	7,450.00	11,706.50	9,581.46	117.95	44.47	-178.334	12,818.15	1,303.33	2,132.37	1,995.68	136.68	15.601	
21,200.00	7,450.00	11,586.00	9,580.78	118.57	43.29	-178.122	12,938.19	1,292.92	2,132.46	1,995.78	136.68	15.602	
21,300.00	7,450.00	7,258.97	7,238.57	119.41	24.62	-6.517	15,090.22	1,292.68	2,110.40	2,050.36	60.04	35.148	
21,400.00	7,450.00	7,272.51	7,252.04	120.25	24.67	-7.056	15,091.55	1,292.30	2,010.91	1,950.72	60.19	33.410	
21,500.00	7,450.00	7,286.77	7,266.23	121.09	24.72	-7.706	15,092.93	1,291.90	1,911.39	1,851.06	60.33	31.682	
21,600.00	7,450.00	7,300.38	7,279.78	121.92	24.77	-8.424	15,094.21	1,291.53	1,811.85	1,751.37	60.48	29.960	
21,700.00	7,450.00	7,313.38	7,292.71	122.76	24.82	-9.221	15,095.40	1,291.18	1,712.29	1,651.67	60.62	28.246	
21,800.00	7,450.00	7,325.80	7,305.08	123.60	24.87	-10.110	15,096.52	1,290.85	1,612.72	1,551.95	60.77	26.538	
21,900.00	7,450.00	7,337.68	7,316.91	124.44	24.91	-11.109	15,097.57	1,290.54	1,513.13	1,452.21	60.92	24.838	
22,000.00	7,450.00	7,349.07	7,328.25	125.28	24.95	-12.237	15,098.54	1,290.24	1,413.52	1,352.45	61.08	23.144	
22,100.00	7,450.00	7,360.04	7,339.18	126.12	25.00	-13.532	15,099.47	1,289.96	1,313.91	1,252.67	61.23	21.457	
22,200.00	7,450.00	7,370.66	7,349.76	126.96	25.03	-15.037	15,100.34	1,289.68	1,214.28	1,152.88	61.40	19.777	
22,300.00	7,450.00	7,380.82	7,359.89	127.80	25.07	-16.784	15,101.16	1,289.41	1,114.64	1,053.07	61.57	18.103	
22,400.00	7,450.00	7,390.55	7,369.58	128.64	25.11	-18.832	15,101.93	1,289.15	1,014.99	953.23	61.76	16.435	
22,500.00	7,450.00	7,399.88	7,378.88	129.48	25.14	-21.257	15,102.65	1,288.90	915.34	853.38	61.96	14.773	
22,600.00	7,450.00	7,408.84	7,387.80	130.32	25.18	-24.162	15,103.33	1,288.65	815.69	753.50	62.19	13.117	
22,700.00	7,450.00	7,417.43	7,396.37	131.16	25.21	-27.681	15,103.96	1,288.40	716.04	653.59	62.45	11.466	
22,800.00	7,450.00	7,425.69	7,404.61	132.00	25.24	-31.993	15,104.56	1,288.17	616.41	553.63	62.78	9.819	
22,900.00	7,450.00	7,433.64	7,412.54	132.84	25.27	-37.331	15,105.13	1,287.94	516.81	453.59	63.21	8.176	
23,000.00	7,450.00	7,441.29	7,420.16	133.69	25.30	-43.972	15,105.66	1,287.71	417.26	353.40	63.86	6.534	

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 302H
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 302H	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	Highside	Offset Wellbore Centre	Rule Assigned:				Warning				
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference	Offset	Toolface (°)	+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	
23,100.00	7,450.00	7,448.66	7,427.51	134.53	25.32	-52.199	15,106.17	1,287.49	317.83	252.84	64.99	4.891	
23,200.00	7,450.00	7,455.81	7,434.65	135.37	25.35	-62.260	15,106.65	1,287.28	218.69	151.18	67.51	3.240	
23,300.00	7,450.00	7,462.69	7,441.50	136.21	25.37	-73.871	15,107.10	1,287.07	120.59	44.38	76.21	1.582	
23,400.00	7,450.00	7,469.26	7,448.06	137.06	25.40	-86.242	15,107.52	1,286.88	34.21	-112.24	146.45	0.234 Level 3	
23,417.16	7,450.00	7,470.36	7,449.15	137.20	25.40	-88.363	15,107.59	1,286.84	29.62	-132.48	162.11	0.183 Level 3, CC, ES, SF	
23,455.58	7,450.00	7,472.79	7,451.58	137.52	25.41	-93.047	15,107.74	1,286.77	48.47	-63.50	111.97	0.433 Level 3	

CC - Min centre to center distance or covergent 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 302H
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 302H	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)	Highside Toolface (°)	Offset Wellbore Centre		Rule Assigned: Distance Between Centres (usft)		Minimum Separation (usft)	Separation Factor	Warning
+N/-S (usft)	+E/-W (usft)												
11,500.00	7,450.00	14,421.00	9,557.77	42.57	117.14	163.365	12,865.10	2,025.90	9,913.68	9,767.82	145.86	67.967	
11,600.00	7,450.00	14,421.00	9,557.77	43.21	117.14	163.365	12,865.10	2,025.90	9,816.20	9,670.28	145.92	67.271	
11,700.00	7,450.00	14,421.00	9,557.77	43.86	117.14	163.365	12,865.10	2,025.90	9,718.77	9,572.79	145.98	66.576	
11,800.00	7,450.00	14,421.00	9,557.77	44.51	117.14	163.365	12,865.10	2,025.90	9,621.39	9,475.34	146.04	65.880	
11,900.00	7,450.00	14,421.00	9,557.77	45.18	117.14	163.365	12,865.10	2,025.90	9,524.07	9,377.95	146.11	65.184	
12,000.00	7,450.00	14,421.00	9,557.77	45.85	117.14	163.365	12,865.10	2,025.90	9,426.80	9,280.62	146.18	64.488	
12,100.00	7,450.00	14,421.00	9,557.77	46.53	117.14	163.365	12,865.10	2,025.90	9,329.59	9,183.34	146.25	63.792	
12,200.00	7,450.00	14,421.00	9,557.77	47.21	117.14	163.365	12,865.10	2,025.90	9,232.44	9,086.11	146.32	63.096	
12,300.00	7,450.00	14,421.00	9,557.77	47.90	117.14	163.365	12,865.10	2,025.90	9,135.35	8,988.95	146.40	62.400	
12,400.00	7,450.00	14,421.00	9,557.77	48.59	117.14	163.365	12,865.10	2,025.90	9,038.32	8,891.84	146.48	61.704	
12,500.00	7,450.00	14,421.00	9,557.77	49.29	117.14	163.365	12,865.10	2,025.90	8,941.36	8,794.80	146.56	61.008	
12,600.00	7,450.00	14,421.00	9,557.77	49.99	117.14	163.365	12,865.10	2,025.90	8,844.47	8,697.83	146.65	60.312	
12,700.00	7,450.00	14,421.00	9,557.77	50.70	117.14	163.365	12,865.10	2,025.90	8,747.65	8,600.92	146.73	59.616	
12,800.00	7,450.00	14,421.00	9,557.77	51.42	117.14	163.365	12,865.10	2,025.90	8,650.90	8,504.08	146.82	58.920	
12,839.11	7,450.00	14,421.00	9,557.77	51.70	117.14	163.365	12,865.10	2,025.90	8,613.08	8,466.22	146.86	58.648	
12,839.67	7,450.00	14,421.00	9,557.77	51.70	117.14	163.405	12,865.10	2,025.90	8,612.54	8,465.68	146.86	58.644	
12,900.00	7,450.00	14,421.00	9,557.77	52.13	117.14	163.405	12,865.10	2,025.90	8,554.22	8,407.31	146.92	58.224	
13,000.00	7,450.00	14,421.00	9,557.77	52.85	117.14	163.405	12,865.10	2,025.90	8,457.63	8,310.61	147.01	57.529	
13,100.00	7,450.00	14,421.00	9,557.77	53.58	117.14	163.405	12,865.10	2,025.90	8,361.11	8,213.99	147.11	56.834	
13,200.00	7,450.00	14,421.00	9,557.77	54.31	117.14	163.405	12,865.10	2,025.90	8,264.67	8,117.45	147.22	56.139	
13,300.00	7,450.00	14,421.00	9,557.77	55.04	117.14	163.405	12,865.10	2,025.90	8,168.32	8,020.99	147.32	55.444	
13,400.00	7,450.00	14,421.00	9,557.77	55.78	117.14	163.405	12,865.10	2,025.90	8,072.06	7,924.62	147.44	54.750	
13,500.00	7,450.00	14,421.00	9,557.77	56.52	117.14	163.405	12,865.10	2,025.90	7,975.89	7,828.34	147.55	54.056	
13,600.00	7,450.00	14,421.00	9,557.77	57.27	117.14	163.405	12,865.10	2,025.90	7,879.81	7,732.15	147.67	53.362	
13,700.00	7,450.00	14,421.00	9,557.77	58.02	117.14	163.405	12,865.10	2,025.90	7,783.84	7,636.05	147.79	52.669	
13,800.00	7,450.00	14,421.00	9,557.77	58.77	117.14	163.405	12,865.10	2,025.90	7,687.96	7,540.05	147.91	51.976	
13,900.00	7,450.00	14,421.00	9,557.77	59.52	117.14	163.405	12,865.10	2,025.90	7,592.20	7,444.15	148.04	51.284	
14,000.00	7,450.00	14,421.00	9,557.77	60.28	117.14	163.405	12,865.10	2,025.90	7,496.54	7,348.37	148.18	50.592	
14,100.00	7,450.00	14,421.00	9,557.77	61.04	117.14	163.405	12,865.10	2,025.90	7,401.00	7,252.69	148.31	49.901	
14,200.00	7,450.00	14,421.00	9,557.77	61.80	117.14	163.405	12,865.10	2,025.90	7,305.58	7,157.12	148.45	49.211	
14,300.00	7,450.00	14,421.00	9,557.77	62.56	117.14	163.405	12,865.10	2,025.90	7,210.28	7,061.68	148.60	48.521	
14,400.00	7,450.00	14,421.00	9,557.77	63.33	117.14	163.405	12,865.10	2,025.90	7,115.11	6,966.36	148.75	47.832	
14,500.00	7,450.00	14,421.00	9,557.77	64.10	117.14	163.405	12,865.10	2,025.90	7,020.08	6,871.17	148.91	47.144	
14,600.00	7,450.00	14,421.00	9,557.77	64.87	117.14	163.405	12,865.10	2,025.90	6,925.18	6,776.11	149.07	46.457	
14,700.00	7,450.00	14,421.00	9,557.77	65.64	117.14	163.405	12,865.10	2,025.90	6,830.43	6,681.20	149.23	45.770	
14,800.00	7,450.00	14,421.00	9,557.77	66.42	117.14	163.405	12,865.10	2,025.90	6,735.84	6,586.43	149.40	45.085	
14,900.00	7,450.00	14,421.00	9,557.77	67.20	117.14	163.405	12,865.10	2,025.90	6,641.40	6,491.82	149.58	44.400	
15,000.00	7,450.00	14,421.00	9,557.77	67.98	117.14	163.405	12,865.10	2,025.90	6,547.12	6,397.36	149.76	43.717	
15,100.00	7,450.00	14,421.00	9,557.77	68.76	117.14	163.405	12,865.10	2,025.90	6,453.02	6,303.08	149.95	43.035	
15,200.00	7,450.00	14,421.00	9,557.77	69.54	117.14	163.405	12,865.10	2,025.90	6,359.10	6,208.96	150.14	42.355	
15,300.00	7,450.00	14,421.00	9,557.77	70.33	117.14	163.405	12,865.10	2,025.90	6,265.37	6,115.03	150.34	41.675	
15,400.00	7,450.00	14,421.00	9,557.77	71.12	117.14	163.405	12,865.10	2,025.90	6,171.83	6,021.29	150.54	40.998	
15,500.00	7,450.00	14,421.00	9,557.77	71.90	117.14	163.405	12,865.10	2,025.90	6,078.50	5,927.75	150.75	40.321	
15,600.00	7,450.00	14,421.00	9,557.77	72.70	117.14	163.405	12,865.10	2,025.90	5,985.39	5,834.42	150.97	39.647	
15,700.00	7,450.00	14,421.00	9,557.77	73.49	117.14	163.405	12,865.10	2,025.90	5,892.50	5,741.31	151.19	38.974	
15,800.00	7,450.00	14,421.00	9,557.77	74.28	117.14	163.405	12,865.10	2,025.90	5,799.84	5,648.42	151.42	38.303	
15,900.00	7,450.00	14,421.00	9,557.77	75.08	117.14	163.405	12,865.10	2,025.90	5,707.44	5,555.78	151.65	37.634	
16,000.00	7,450.00	14,421.00	9,557.77	75.87	117.14	163.405	12,865.10	2,025.90	5,615.29	5,463.40	151.90	36.968	
16,100.00	7,450.00	14,421.00	9,557.77	76.67	117.14	163.405	12,865.10	2,025.90	5,523.42	5,371.28	152.15	36.304	
16,200.00	7,450.00	14,421.00	9,557.77	77.47	117.14	163.405	12,865.10	2,025.90	5,431.84	5,279.44	152.40	35.642	
16,300.00	7,450.00	14,421.00	9,557.77	78.27	117.14	163.405	12,865.10	2,025.90	5,340.56	5,187.89	152.66	34.983	
16,400.00	7,450.00	14,421.00	9,557.77	79.07	117.14	163.405	12,865.10	2,025.90	5,249.59	5,096.66	152.93	34.326	

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 302H
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 302H	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)	Highside Toolface (°)	Offset Wellbore Centre		Distance Between Centres (usft)		Minimum Separation (usft)	Separation Factor	Warning	
							+N/-S (usft)	+E/-W (usft)						
16,500.00	7,450.00	14,421.00	9,557.77	79.88	117.14	163.405	12,865.10	2,025.90	5,158.96	5,005.75	153.21	33.673		
16,600.00	7,450.00	14,421.00	9,557.77	80.68	117.14	163.405	12,865.10	2,025.90	5,068.68	4,915.19	153.49	33.022		
16,700.00	7,450.00	14,421.00	9,557.77	81.49	117.14	163.405	12,865.10	2,025.90	4,978.78	4,825.00	153.78	32.376		
16,800.00	7,450.00	14,421.00	9,557.77	82.29	117.14	163.405	12,865.10	2,025.90	4,889.26	4,735.18	154.08	31.732		
16,900.00	7,450.00	14,421.00	9,557.77	83.10	117.14	163.405	12,865.10	2,025.90	4,800.16	4,645.78	154.38	31.093		
17,000.00	7,450.00	14,421.00	9,557.77	83.91	117.14	163.405	12,865.10	2,025.90	4,711.50	4,556.81	154.69	30.458		
17,100.00	7,450.00	14,421.00	9,557.77	84.72	117.14	163.405	12,865.10	2,025.90	4,623.30	4,468.30	155.00	29.827		
17,200.00	7,450.00	14,421.00	9,557.77	85.53	117.14	163.405	12,865.10	2,025.90	4,535.59	4,380.26	155.32	29.201		
17,300.00	7,450.00	14,421.00	9,557.77	86.34	117.14	163.405	12,865.10	2,025.90	4,448.40	4,292.75	155.65	28.579		
17,400.00	7,450.00	14,421.00	9,557.77	87.16	117.14	163.405	12,865.10	2,025.90	4,361.76	4,205.78	155.98	27.964		
17,500.00	7,450.00	14,421.00	9,557.77	87.97	117.14	163.405	12,865.10	2,025.90	4,275.70	4,119.38	156.31	27.353		
17,600.00	7,450.00	14,421.00	9,557.77	88.78	117.14	163.405	12,865.10	2,025.90	4,190.26	4,033.61	156.65	26.749		
17,700.00	7,450.00	14,421.00	9,557.77	89.60	117.14	163.405	12,865.10	2,025.90	4,105.47	3,948.49	156.99	26.152		
17,800.00	7,450.00	14,421.00	9,557.77	90.42	117.14	163.405	12,865.10	2,025.90	4,021.39	3,864.07	157.33	25.561		
17,900.00	7,450.00	14,421.00	9,557.77	91.23	117.14	163.405	12,865.10	2,025.90	3,938.05	3,780.39	157.66	24.977		
18,000.00	7,450.00	14,421.00	9,557.77	92.05	117.14	163.405	12,865.10	2,025.90	3,855.51	3,697.51	158.00	24.402		
18,100.00	7,450.00	14,421.00	9,557.77	92.87	117.14	163.405	12,865.10	2,025.90	3,773.81	3,615.47	158.33	23.835		
18,197.24	7,450.00	14,421.00	9,557.77	93.67	117.14	163.405	12,865.10	2,025.90	3,695.22	3,536.57	158.65	23.292		
18,200.00	7,450.00	14,421.00	9,557.77	93.69	117.14	163.334	12,865.10	2,025.90	3,693.00	3,534.35	158.66	23.277		
18,229.54	7,450.00	14,421.00	9,557.77	93.93	117.14	162.579	12,865.10	2,025.90	3,669.35	3,510.60	158.75	23.114		
18,300.00	7,450.00	14,421.00	9,557.77	94.51	117.14	162.579	12,865.10	2,025.90	3,613.34	3,454.37	158.97	22.730		
18,400.00	7,450.00	14,421.00	9,557.77	95.33	117.14	162.579	12,865.10	2,025.90	3,534.73	3,375.47	159.26	22.194		
18,500.00	7,450.00	14,421.00	9,557.77	96.15	117.14	162.579	12,865.10	2,025.90	3,457.23	3,297.68	159.55	21.669		
18,600.00	7,450.00	14,421.00	9,557.77	96.98	117.14	162.579	12,865.10	2,025.90	3,380.91	3,221.10	159.81	21.156		
18,700.00	7,450.00	14,421.00	9,557.77	97.80	117.14	162.579	12,865.10	2,025.90	3,305.86	3,145.81	160.05	20.655		
18,800.00	7,450.00	14,421.00	9,557.77	98.62	117.14	162.579	12,865.10	2,025.90	3,232.15	3,071.90	160.26	20.169		
18,900.00	7,450.00	14,421.00	9,557.77	99.45	117.14	162.579	12,865.10	2,025.90	3,159.90	2,999.47	160.43	19.696		
19,000.00	7,450.00	14,421.00	9,557.77	100.28	117.14	162.579	12,865.10	2,025.90	3,089.19	2,928.62	160.57	19.239		
19,100.00	7,450.00	14,421.00	9,557.77	101.10	117.14	162.579	12,865.10	2,025.90	3,020.13	2,859.48	160.65	18.799		
19,200.00	7,450.00	14,421.00	9,557.77	101.93	117.14	162.579	12,865.10	2,025.90	2,952.85	2,792.16	160.69	18.376		
19,300.00	7,450.00	14,421.00	9,557.77	102.76	117.14	162.579	12,865.10	2,025.90	2,887.46	2,726.80	160.66	17.973		
19,400.00	7,450.00	14,421.00	9,557.77	103.58	117.14	162.579	12,865.10	2,025.90	2,824.10	2,663.54	160.56	17.589		
19,500.00	7,450.00	14,421.00	9,557.77	104.41	117.14	162.579	12,865.10	2,025.90	2,762.91	2,602.53	160.39	17.226		
19,600.00	7,450.00	14,421.00	9,557.77	105.24	117.14	162.579	12,865.10	2,025.90	2,704.04	2,543.91	160.13	16.887		
19,700.00	7,450.00	14,421.00	9,557.77	106.07	117.14	162.579	12,865.10	2,025.90	2,647.63	2,487.85	159.78	16.571		
19,800.00	7,450.00	14,421.00	9,557.77	106.90	117.14	162.579	12,865.10	2,025.90	2,593.85	2,434.52	159.33	16.280		
19,900.00	7,450.00	14,421.00	9,557.77	107.73	117.14	162.579	12,865.10	2,025.90	2,542.87	2,384.09	158.78	16.015		
20,000.00	7,450.00	14,421.00	9,557.77	108.56	117.14	162.579	12,865.10	2,025.90	2,494.86	2,336.74	158.12	15.778		
20,100.00	7,450.00	14,421.00	9,557.77	109.40	117.14	162.579	12,865.10	2,025.90	2,449.99	2,292.63	157.36	15.569		
20,200.00	7,450.00	14,421.00	9,557.77	110.23	117.14	162.579	12,865.10	2,025.90	2,408.44	2,251.93	156.51	15.389		
20,300.00	7,450.00	14,421.00	9,557.77	111.06	117.14	162.579	12,865.10	2,025.90	2,370.38	2,214.81	155.57	15.237		
20,400.00	7,450.00	14,421.00	9,557.77	111.89	117.14	162.579	12,865.10	2,025.90	2,335.98	2,181.42	154.56	15.113		
20,500.00	7,450.00	14,421.00	9,557.77	112.73	117.14	162.579	12,865.10	2,025.90	2,305.41	2,151.88	153.53	15.016		
20,600.00	7,450.00	14,421.00	9,557.77	113.56	117.14	162.579	12,865.10	2,025.90	2,278.83	2,126.31	152.51	14.942		
20,700.00	7,450.00	14,421.00	9,557.77	114.40	117.14	162.579	12,865.10	2,025.90	2,256.37	2,104.80	151.57	14.887		
20,800.00	7,450.00	14,421.00	9,557.77	115.23	117.14	162.579	12,865.10	2,025.90	2,238.15	2,087.40	150.75	14.847		
20,900.00	7,450.00	14,421.00	9,557.77	116.07	117.14	162.579	12,865.10	2,025.90	2,224.28	2,074.14	150.15	14.814		
21,000.00	7,450.00	14,421.00	9,557.77	116.90	117.14	162.579	12,865.10	2,025.90	2,214.85	2,065.03	149.82	14.783		
21,100.00	7,450.00	14,421.00	9,557.77	117.74	117.14	162.579	12,865.10	2,025.90	2,209.91	2,060.06	149.85	14.748		
21,159.38	7,450.00	14,421.00	9,557.77	118.23	117.14	162.579	12,865.10	2,025.90	2,209.11	2,059.07	150.04	14.723 CC, ES		
21,200.00	7,450.00	14,421.00	9,557.77	118.57	117.14	162.579	12,865.10	2,025.90	2,209.48	2,059.23	150.25	14.705		
21,300.00	7,450.00	14,421.00	9,557.77	119.41	117.14	162.579	12,865.10	2,025.90	2,213.58	2,062.53	151.05	14.654		

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 302H
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 302H	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						Rule Assigned:					Offset Well Error: 0.00 usft	
Reference	Offset	Semi Major Axis	Reference	Offset	Highside	Offset Wellbore Centre	Distance	Between	Between	Minimum	Separation	Warning	
Measured	Vertical	Measured	Vertical	Reference	Offset	Toolface	+N/-S	+E/-W	Centres	Ellipses	Separation	Factor	
Depth	Depth	Depth	Depth	Reference	Offset	(°)	(usft)	(usft)	(usft)	(usft)	(usft)		
(usft)	(usft)	(usft)	(usft)	(usft)	(usft)	(°)	(usft)	(usft)	(usft)	(usft)	(usft)		
21,400.00	7,450.00	14,421.00	9,557.77	120.25	117.14	162.579	12,865.10	2,025.90	2,222.17	2,069.96	152.21	14.599	
21,500.00	7,450.00	14,421.00	9,557.77	121.09	117.14	162.579	12,865.10	2,025.90	2,235.21	2,081.53	153.68	14.544	
21,600.00	7,450.00	14,421.00	9,557.77	121.92	117.14	162.579	12,865.10	2,025.90	2,252.62	2,097.24	155.38	14.498	
21,700.00	7,450.00	14,421.00	9,557.77	122.76	117.14	162.579	12,865.10	2,025.90	2,274.30	2,117.07	157.23	14.465	
21,800.00	7,450.00	14,421.00	9,557.77	123.60	117.14	162.579	12,865.10	2,025.90	2,300.12	2,140.96	159.15	14.452 SF	
21,900.00	7,450.00	14,421.00	9,557.77	124.44	117.14	162.579	12,865.10	2,025.90	2,329.95	2,168.86	161.09	14.463	
22,000.00	7,450.00	14,421.00	9,557.77	125.28	117.14	162.579	12,865.10	2,025.90	2,363.64	2,200.65	162.99	14.502	
22,100.00	7,450.00	14,421.00	9,557.77	126.12	117.14	162.579	12,865.10	2,025.90	2,401.03	2,236.22	164.80	14.569	
22,200.00	7,450.00	14,421.00	9,557.77	126.96	117.14	162.579	12,865.10	2,025.90	2,441.94	2,275.42	166.51	14.665	
22,300.00	7,450.00	14,421.00	9,557.77	127.80	117.14	162.579	12,865.10	2,025.90	2,486.20	2,318.11	168.09	14.791	
22,400.00	7,450.00	14,421.00	9,557.77	128.64	117.14	162.579	12,865.10	2,025.90	2,533.63	2,364.10	169.53	14.945	
22,500.00	7,450.00	14,421.00	9,557.77	129.48	117.14	162.579	12,865.10	2,025.90	2,584.07	2,413.24	170.84	15.126	
22,600.00	7,450.00	14,421.00	9,557.77	130.32	117.14	162.579	12,865.10	2,025.90	2,637.34	2,465.34	172.00	15.334	
22,700.00	7,450.00	14,421.00	9,557.77	131.16	117.14	162.579	12,865.10	2,025.90	2,693.26	2,520.24	173.02	15.566	
22,800.00	7,450.00	14,421.00	9,557.77	132.00	117.14	162.579	12,865.10	2,025.90	2,751.69	2,577.77	173.92	15.822	
22,900.00	7,450.00	14,421.00	9,557.77	132.84	117.14	162.579	12,865.10	2,025.90	2,812.46	2,637.76	174.70	16.099	
23,000.00	7,450.00	14,421.00	9,557.77	133.69	117.14	162.579	12,865.10	2,025.90	2,875.42	2,700.06	175.36	16.397	
23,100.00	7,450.00	14,421.00	9,557.77	134.53	117.14	162.579	12,865.10	2,025.90	2,940.44	2,764.52	175.92	16.715	
23,200.00	7,450.00	14,421.00	9,557.77	135.37	117.14	162.579	12,865.10	2,025.90	3,007.37	2,830.99	176.38	17.050	
23,300.00	7,450.00	14,421.00	9,557.77	136.21	117.14	162.579	12,865.10	2,025.90	3,076.10	2,899.34	176.76	17.402	
23,400.00	7,450.00	14,421.00	9,557.77	137.06	117.14	162.579	12,865.10	2,025.90	3,146.51	2,969.44	177.07	17.770	
23,455.58	7,450.00	14,421.00	9,557.77	137.52	117.14	162.579	12,865.10	2,025.90	3,186.33	3,009.12	177.21	17.981	

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 302H
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 302H	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
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Semi Major Axis Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Distance Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning		
12,600.00	7,450.00	7,820.31	7,763.53	49.99	29.07	135.354	14,222.24	1,691.84	9,936.81	9,878.79	58.02	171.279			
12,700.00	7,450.00	7,819.42	7,762.64	50.70	29.07	135.274	14,222.27	1,691.82	9,836.91	9,778.85	58.05	169.441			
12,800.00	7,450.00	7,818.52	7,761.74	51.42	29.07	135.193	14,222.30	1,691.80	9,737.01	9,678.91	58.10	167.604			
12,839.11	7,450.00	7,818.17	7,761.38	51.70	29.07	135.161	14,222.31	1,691.79	9,697.94	9,639.83	58.11	166.885			
12,839.67	7,450.00	7,818.16	7,761.37	51.70	29.07	135.338	14,222.31	1,691.79	9,697.38	9,639.26	58.11	166.875			
12,900.00	7,450.00	7,817.61	7,760.82	52.13	29.06	135.288	14,222.33	1,691.78	9,637.11	9,578.97	58.14	165.766			
13,000.00	7,450.00	7,816.68	7,759.89	52.85	29.06	135.204	14,222.36	1,691.75	9,537.21	9,479.03	58.18	163.928			
13,100.00	7,450.00	7,784.00	7,727.25	53.58	28.96	132.088	14,223.58	1,691.02	9,437.51	9,379.41	58.10	162.443			
13,200.00	7,450.00	7,784.00	7,727.25	54.31	28.96	132.088	14,223.58	1,691.02	9,337.60	9,279.46	58.14	160.593			
13,300.00	7,450.00	7,784.00	7,727.25	55.04	28.96	132.088	14,223.58	1,691.02	9,237.70	9,179.51	58.19	158.744			
13,400.00	7,450.00	7,784.00	7,727.25	55.78	28.96	132.088	14,223.58	1,691.02	9,137.80	9,079.56	58.24	156.896			
13,500.00	7,450.00	7,784.00	7,727.25	56.52	28.96	132.088	14,223.58	1,691.02	9,037.91	8,979.62	58.29	155.048			
13,600.00	7,450.00	7,784.00	7,727.25	57.27	28.96	132.088	14,223.58	1,691.02	8,938.01	8,879.67	58.34	153.200			
13,700.00	7,450.00	7,784.00	7,727.25	58.02	28.96	132.088	14,223.58	1,691.02	8,838.12	8,779.73	58.39	151.354			
13,800.00	7,450.00	7,784.00	7,727.25	58.77	28.96	132.088	14,223.58	1,691.02	8,738.23	8,679.79	58.45	149.508			
13,900.00	7,450.00	7,782.07	7,725.32	59.52	28.96	131.893	14,223.64	1,690.97	8,638.35	8,579.85	58.49	147.683			
14,000.00	7,450.00	7,778.80	7,722.05	60.28	28.95	131.561	14,223.75	1,690.90	8,538.46	8,479.93	58.53	145.873			
14,100.00	7,450.00	7,775.53	7,718.79	61.04	28.94	131.224	14,223.86	1,690.82	8,438.58	8,380.00	58.58	144.063			
14,200.00	7,450.00	7,544.98	7,488.35	61.80	28.24	97.241	14,228.14	1,685.84	8,338.61	8,280.95	57.65	144.640			
14,300.00	7,450.00	7,544.40	7,487.77	62.56	28.24	97.132	14,228.15	1,685.83	8,238.67	8,180.98	57.70	142.790			
14,400.00	7,450.00	7,543.83	7,487.19	63.33	28.24	97.025	14,228.15	1,685.83	8,138.74	8,081.00	57.75	140.940			
14,500.00	7,450.00	7,543.25	7,486.62	64.10	28.24	96.918	14,228.15	1,685.83	8,038.81	7,981.02	57.79	139.092			
14,600.00	7,450.00	7,542.69	7,486.05	64.87	28.24	96.812	14,228.16	1,685.82	7,938.89	7,881.04	57.84	137.245			
14,700.00	7,450.00	7,542.12	7,485.49	65.64	28.23	96.706	14,228.16	1,685.82	7,838.96	7,781.06	57.90	135.399			
14,800.00	7,450.00	7,541.56	7,484.93	66.42	28.23	96.602	14,228.16	1,685.82	7,739.04	7,681.09	57.95	133.555			
14,900.00	7,450.00	7,541.01	7,484.37	67.20	28.23	96.498	14,228.16	1,685.81	7,639.11	7,581.11	58.00	131.712			
15,000.00	7,450.00	7,540.46	7,483.82	67.98	28.23	96.395	14,228.17	1,685.81	7,539.19	7,481.14	58.05	129.870			
15,100.00	7,450.00	7,539.91	7,483.28	68.76	28.23	96.292	14,228.17	1,685.81	7,439.28	7,381.17	58.11	128.030			
15,200.00	7,450.00	7,539.37	7,482.74	69.54	28.23	96.191	14,228.17	1,685.81	7,339.36	7,281.20	58.16	126.192			
15,300.00	7,450.00	7,538.83	7,482.20	70.33	28.22	96.090	14,228.17	1,685.80	7,239.45	7,181.23	58.22	124.355			
15,400.00	7,450.00	7,538.30	7,481.66	71.12	28.22	95.989	14,228.18	1,685.80	7,139.54	7,081.26	58.27	122.520			
15,500.00	7,450.00	7,537.77	7,481.13	71.90	28.22	95.890	14,228.18	1,685.80	7,039.63	6,981.30	58.33	120.686			
15,600.00	7,450.00	7,537.24	7,480.61	72.70	28.22	95.791	14,228.18	1,685.80	6,939.72	6,881.33	58.39	118.855			
15,700.00	7,450.00	7,536.72	7,480.09	73.49	28.22	95.693	14,228.18	1,685.80	6,839.82	6,781.37	58.45	117.025			
15,800.00	7,450.00	7,536.20	7,479.57	74.28	28.22	95.596	14,228.18	1,685.79	6,739.92	6,681.41	58.51	115.198			
15,900.00	7,450.00	7,535.69	7,479.05	75.08	28.21	95.499	14,228.19	1,685.79	6,640.02	6,581.45	58.57	113.372			
16,000.00	7,450.00	7,535.18	7,478.54	75.87	28.21	95.403	14,228.19	1,685.79	6,540.13	6,481.50	58.63	111.548			
16,100.00	7,450.00	7,534.67	7,478.03	76.67	28.21	95.307	14,228.19	1,685.79	6,440.24	6,381.54	58.69	109.727			
16,200.00	7,450.00	7,534.17	7,477.53	77.47	28.21	95.213	14,228.19	1,685.79	6,340.35	6,281.59	58.76	107.908			
16,300.00	7,450.00	7,533.67	7,477.03	78.27	28.21	95.118	14,228.20	1,685.79	6,240.47	6,181.64	58.82	106.090			
16,400.00	7,450.00	7,533.17	7,476.54	79.07	28.21	95.025	14,228.20	1,685.79	6,140.59	6,081.70	58.89	104.276			
16,500.00	7,450.00	7,532.68	7,476.04	79.88	28.21	94.932	14,228.20	1,685.78	6,040.71	5,981.75	58.95	102.463			
16,600.00	7,450.00	7,532.19	7,475.55	80.68	28.20	94.840	14,228.20	1,685.78	5,940.84	5,881.81	59.02	100.653			
16,700.00	7,450.00	7,531.70	7,475.07	81.49	28.20	94.749	14,228.20	1,685.78	5,840.97	5,781.88	59.09	98.845			
16,800.00	7,450.00	7,531.22	7,474.59	82.29	28.20	94.658	14,228.21	1,685.78	5,741.11	5,681.94	59.16	97.040			
16,900.00	7,450.00	7,530.74	7,474.11	83.10	28.20	94.567	14,228.21	1,685.78	5,641.25	5,582.01	59.23	95.237			
17,000.00	7,450.00	7,530.27	7,473.63	83.91	28.20	94.478	14,228.21	1,685.78	5,541.39	5,482.09	59.31	93.436			
17,100.00	7,450.00	7,529.80	7,473.16	84.72	28.20	94.389	14,228.21	1,685.78	5,441.55	5,382.17	59.38	91.638			
17,200.00	7,450.00	7,529.33	7,472.69	85.53	28.20	94.300	14,228.22	1,685.78	5,341.70	5,282.25	59.46	89.843			
17,300.00	7,450.00	7,528.86	7,472.23	86.34	28.19	94.212	14,228.22	1,685.78	5,241.87	5,182.33	59.53	88.050			
17,400.00	7,450.00	7,528.40	7,471.76	87.16	28.19	94.125	14,228.22	1,685.78	5,142.04	5,082.43	59.61	86.260			
17,500.00	7,450.00	7,527.94	7,471.31	87.97	28.19	94.038	14,228.22	1,685.78	5,042.21	4,982.52	59.69	84.472			

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 302H
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 302H	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
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Semi Major Axis Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Distance Between Centres (usft)	Rule Assigned: Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning
17,600.00	7,450.00	7,527.48	7,470.85	88.78	28.19	93.952	14,228.22	1,685.78	4,942.40	4,882.63	59.77	82.687	
17,700.00	7,450.00	7,527.03	7,470.40	89.60	28.19	93.867	14,228.23	1,685.78	4,842.59	4,782.73	59.86	80.905	
17,800.00	7,450.00	7,526.58	7,469.95	90.42	28.19	93.782	14,228.23	1,685.78	4,742.79	4,682.85	59.94	79.126	
17,900.00	7,450.00	7,526.14	7,469.50	91.23	28.19	93.698	14,228.23	1,685.78	4,643.00	4,582.97	60.03	77.349	
18,000.00	7,450.00	7,525.69	7,469.06	92.05	28.18	93.614	14,228.23	1,685.78	4,543.21	4,483.10	60.12	75.574	
18,100.00	7,450.00	7,525.25	7,468.62	92.87	28.18	93.530	14,228.23	1,685.78	4,443.44	4,383.23	60.21	73.803	
18,197.24	7,450.00	7,524.83	7,468.19	93.67	28.18	93.450	14,228.23	1,685.78	4,346.43	4,286.13	60.30	72.083	
18,200.00	7,450.00	7,524.82	7,468.18	93.69	28.18	93.401	14,228.23	1,685.78	4,343.68	4,283.38	60.30	72.034	
18,229.54	7,450.00	7,524.69	7,468.05	93.93	28.18	92.949	14,228.23	1,685.78	4,314.22	4,253.89	60.33	71.512	
18,300.00	7,450.00	7,524.38	7,467.75	94.51	28.18	92.899	14,228.24	1,685.78	4,244.00	4,183.60	60.40	70.266	
18,400.00	7,450.00	7,523.95	7,467.32	95.33	28.18	92.829	14,228.24	1,685.78	4,144.35	4,083.85	60.50	68.499	
18,500.00	7,450.00	7,523.52	7,466.89	96.15	28.18	92.759	14,228.24	1,685.78	4,044.72	3,984.11	60.61	66.735	
18,600.00	7,450.00	7,523.10	7,466.47	96.98	28.18	92.690	14,228.24	1,685.78	3,945.10	3,884.38	60.72	64.972	
18,700.00	7,450.00	7,522.68	7,466.04	97.80	28.17	92.621	14,228.24	1,685.78	3,845.51	3,784.68	60.84	63.212	
18,800.00	7,450.00	7,522.26	7,465.63	98.62	28.17	92.553	14,228.24	1,685.78	3,745.94	3,684.98	60.96	61.454	
18,900.00	7,450.00	7,521.85	7,465.21	99.45	28.17	92.485	14,228.25	1,685.78	3,646.39	3,585.31	61.08	59.697	
19,000.00	7,450.00	7,521.43	7,464.80	100.28	28.17	92.418	14,228.25	1,685.78	3,546.87	3,485.65	61.21	57.942	
19,100.00	7,450.00	7,521.03	7,464.39	101.10	28.17	92.351	14,228.25	1,685.78	3,447.37	3,386.02	61.35	56.189	
19,200.00	7,450.00	7,520.62	7,463.99	101.93	28.17	92.285	14,228.25	1,685.78	3,347.91	3,286.41	61.50	54.438	
19,300.00	7,450.00	7,520.22	7,463.58	102.76	28.17	92.219	14,228.25	1,685.78	3,248.47	3,186.82	61.66	52.688	
19,400.00	7,450.00	7,519.82	7,463.18	103.58	28.17	92.154	14,228.25	1,685.78	3,149.08	3,087.26	61.82	50.939	
19,500.00	7,450.00	7,519.42	7,462.79	104.41	28.16	92.089	14,228.26	1,685.78	3,049.72	2,987.72	62.00	49.191	
19,600.00	7,450.00	7,519.48	7,462.85	105.24	28.16	92.099	14,228.26	1,685.78	2,950.40	2,888.22	62.19	47.442	
19,700.00	7,450.00	7,519.05	7,462.41	106.07	28.16	92.029	14,228.26	1,685.78	2,851.14	2,788.75	62.39	45.696	
19,800.00	7,450.00	7,518.62	7,461.98	106.90	28.16	91.958	14,228.26	1,685.78	2,751.92	2,689.31	62.61	43.951	
19,900.00	7,450.00	7,518.19	7,461.56	107.73	28.16	91.888	14,228.26	1,685.79	2,652.77	2,589.92	62.85	42.206	
20,000.00	7,450.00	7,517.76	7,461.13	108.56	28.16	91.819	14,228.26	1,685.79	2,553.68	2,490.57	63.11	40.461	
20,100.00	7,450.00	7,517.34	7,460.71	109.40	28.16	91.750	14,228.26	1,685.79	2,454.67	2,391.27	63.40	38.716	
20,200.00	7,450.00	7,516.92	7,460.29	110.23	28.16	91.681	14,228.27	1,685.79	2,355.74	2,292.02	63.72	36.970	
20,300.00	7,450.00	7,516.50	7,459.87	111.06	28.16	91.613	14,228.27	1,685.79	2,256.90	2,192.82	64.07	35.223	
20,400.00	7,450.00	7,516.09	7,459.45	111.89	28.15	91.545	14,228.27	1,685.79	2,158.17	2,093.70	64.47	33.475	
20,500.00	7,450.00	7,515.67	7,459.04	112.73	28.15	91.477	14,228.27	1,685.79	2,059.56	1,994.64	64.92	31.726	
20,600.00	7,450.00	7,515.26	7,458.63	113.56	28.15	91.410	14,228.27	1,685.80	1,961.10	1,895.67	65.42	29.975	
20,700.00	7,450.00	7,514.85	7,458.22	114.40	28.15	91.343	14,228.27	1,685.80	1,862.79	1,796.79	66.00	28.223	
20,800.00	7,450.00	7,514.45	7,457.81	115.23	28.15	91.277	14,228.28	1,685.80	1,764.68	1,698.01	66.67	26.469	
20,900.00	7,450.00	7,514.04	7,457.41	116.07	28.15	91.211	14,228.28	1,685.80	1,666.79	1,599.35	67.44	24.714	
21,000.00	7,450.00	7,513.64	7,457.01	116.90	28.15	91.145	14,228.28	1,685.80	1,569.17	1,500.82	68.35	22.958	
21,100.00	7,450.00	7,513.24	7,456.61	117.74	28.15	91.080	14,228.28	1,685.80	1,471.86	1,402.45	69.42	21.203	
21,200.00	7,450.00	7,512.84	7,456.21	118.57	28.14	91.015	14,228.28	1,685.80	1,374.95	1,304.26	70.69	19.451	
21,300.00	7,450.00	7,512.45	7,455.81	119.41	28.14	90.950	14,228.28	1,685.81	1,278.51	1,206.29	72.22	17.703	
21,400.00	7,450.00	7,512.05	7,455.42	120.25	28.14	90.886	14,228.29	1,685.81	1,182.66	1,108.58	74.08	15.966	
21,500.00	7,450.00	7,511.66	7,455.03	121.09	28.14	90.822	14,228.29	1,685.81	1,087.55	1,011.20	76.35	14.244	
21,600.00	7,450.00	7,511.28	7,454.64	121.92	28.14	90.759	14,228.29	1,685.81	993.41	914.24	79.17	12.547	
21,700.00	7,450.00	7,510.89	7,454.25	122.76	28.14	90.695	14,228.29	1,685.81	900.54	817.83	82.70	10.889	
21,800.00	7,450.00	7,510.50	7,453.87	123.60	28.14	90.633	14,228.29	1,685.81	809.36	722.19	87.17	9.285	
21,900.00	7,450.00	7,510.12	7,453.49	124.44	28.14	90.570	14,228.29	1,685.81	720.53	627.66	92.86	7.759	
22,000.00	7,450.00	7,509.74	7,453.11	125.28	28.13	90.508	14,228.29	1,685.81	635.02	534.86	100.16	6.340	
22,100.00	7,450.00	7,509.36	7,452.73	126.12	28.13	90.446	14,228.30	1,685.82	554.39	444.91	109.48	5.064	
22,200.00	7,450.00	7,508.99	7,452.35	126.96	28.13	90.385	14,228.30	1,685.82	481.08	359.98	121.10	3.973	
22,300.00	7,450.00	7,508.61	7,451.98	127.80	28.13	90.324	14,228.30	1,685.82	418.97	284.32	134.65	3.112	
22,400.00	7,450.00	7,508.24	7,451.61	128.64	28.13	90.263	14,228.30	1,685.82	373.67	225.66	148.01	2.525	
22,500.00	7,450.00	7,507.87	7,451.24	129.48	28.13	90.202	14,228.30	1,685.82	351.74	195.10	156.64	2.245	

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 302H
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 302H	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		Between		Minimum	Separation	Warning	
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference	Offset	Highside Toolface (°)	Offset Wellbore Centre	+N-S (usft)	+E-W (usft)	Between Centres (usft)	Between Ellipses (usft)		
22,529.53	7,450.00	7,507.76	7,451.13	129.73	28.13	90.185	14,228.30	1,685.82	350.50	192.93	157.57	2.224 CC, ES, SF	
22,600.00	7,450.00	7,507.50	7,450.87	130.32	28.13	90.142	14,228.30	1,685.82	357.52	201.13	156.38	2.286	
22,700.00	7,450.00	7,507.14	7,450.50	131.16	28.13	90.082	14,228.30	1,685.82	389.76	241.68	148.08	2.632	
22,800.00	7,450.00	7,506.77	7,450.14	132.00	28.13	90.023	14,228.30	1,685.82	442.72	306.37	136.35	3.247	
22,900.00	7,450.00	7,506.41	7,449.78	132.84	28.12	89.964	14,228.31	1,685.82	510.00	385.12	124.87	4.084	
23,000.00	7,450.00	7,506.05	7,449.42	133.69	28.12	89.905	14,228.31	1,685.83	586.68	471.59	115.08	5.098	
23,100.00	7,450.00	7,505.69	7,449.06	134.53	28.12	89.846	14,228.31	1,685.83	669.54	562.37	107.16	6.248	
23,200.00	7,450.00	7,505.34	7,448.70	135.37	28.12	89.788	14,228.31	1,685.83	756.55	655.69	100.86	7.501	
23,300.00	7,450.00	7,504.98	7,448.35	136.21	28.12	89.730	14,228.31	1,685.83	846.44	750.59	95.85	8.831	
23,400.00	7,450.00	7,504.63	7,448.00	137.06	28.12	89.673	14,228.31	1,685.83	938.38	846.54	91.84	10.218	
23,455.58	7,450.00	7,504.44	7,447.80	137.52	28.12	89.641	14,228.31	1,685.83	990.15	900.20	89.95	11.007	

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 302H
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 302H	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)	Highside Toolface (°)	Offset Wellbore Centre		Distance Between Centres (usft)		Minimum Separation (usft)	Separation Factor	Warning		
							+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)					
11,900.00	7,450.00	7,871.00	7,854.86	45.18	27.61	143.405	13,566.51	1,689.52	9,984.10	9,926.58	57.52	173.584			
12,000.00	7,450.00	7,871.00	7,854.86	45.85	27.61	143.405	13,566.51	1,689.52	9,884.23	9,826.67	57.56	171.729			
12,100.00	7,450.00	7,871.00	7,854.86	46.53	27.61	143.405	13,566.51	1,689.52	9,784.36	9,726.76	57.60	169.874			
12,200.00	7,450.00	7,871.00	7,854.86	47.21	27.61	143.405	13,566.51	1,689.52	9,684.49	9,626.85	57.64	168.018			
12,300.00	7,450.00	7,871.00	7,854.86	47.90	27.61	143.405	13,566.51	1,689.52	9,584.63	9,526.95	57.68	166.162			
12,400.00	7,450.00	7,871.00	7,854.86	48.59	27.61	143.405	13,566.51	1,689.52	9,484.77	9,427.04	57.73	164.305			
12,500.00	7,450.00	7,871.00	7,854.86	49.29	27.61	143.405	13,566.51	1,689.52	9,384.91	9,327.14	57.77	162.449			
12,600.00	7,450.00	7,871.00	7,854.86	49.99	27.61	143.405	13,566.51	1,689.52	9,285.06	9,227.24	57.82	160.592			
12,700.00	7,450.00	7,871.00	7,854.86	50.70	27.61	143.405	13,566.51	1,689.52	9,185.21	9,127.34	57.87	158.735			
12,800.00	7,450.00	7,871.00	7,854.86	51.42	27.61	143.405	13,566.51	1,689.52	9,085.36	9,027.45	57.91	156.878			
12,839.11	7,450.00	7,871.00	7,854.86	51.70	27.61	143.405	13,566.51	1,689.52	9,046.31	8,988.38	57.93	156.152			
12,839.67	7,450.00	7,871.00	7,854.86	51.70	27.61	143.567	13,566.51	1,689.52	9,045.75	8,987.82	57.93	156.142			
12,900.00	7,450.00	7,871.00	7,854.86	52.13	27.61	143.567	13,566.51	1,689.52	8,985.52	8,927.55	57.96	155.022			
13,000.00	7,450.00	7,840.27	7,824.16	52.85	27.51	141.447	13,567.72	1,688.84	8,885.52	8,827.64	57.88	153.522			
13,100.00	7,450.00	7,838.78	7,822.67	53.58	27.50	141.338	13,567.78	1,688.81	8,785.67	8,727.75	57.92	151.682			
13,200.00	7,450.00	7,837.27	7,821.16	54.31	27.50	141.227	13,567.85	1,688.78	8,685.82	8,627.85	57.97	149.842			
13,300.00	7,450.00	7,835.73	7,819.62	55.04	27.49	141.114	13,567.92	1,688.76	8,585.97	8,527.96	58.01	148.002			
13,400.00	7,450.00	7,834.17	7,818.07	55.78	27.49	140.999	13,567.98	1,688.73	8,486.12	8,428.06	58.06	146.164			
13,500.00	7,450.00	7,832.59	7,816.48	56.52	27.48	140.881	13,568.05	1,688.70	8,386.28	8,328.17	58.11	144.326			
13,600.00	7,450.00	7,830.98	7,814.88	57.27	27.48	140.760	13,568.12	1,688.67	8,286.44	8,228.29	58.16	142.488			
13,700.00	7,450.00	7,829.35	7,813.25	58.02	27.47	140.637	13,568.20	1,688.64	8,186.60	8,128.40	58.20	140.652			
13,800.00	7,450.00	7,827.70	7,811.60	58.77	27.47	140.512	13,568.27	1,688.61	8,086.77	8,028.52	58.26	138.817			
13,900.00	7,450.00	7,826.02	7,809.92	59.52	27.46	140.384	13,568.35	1,688.58	7,986.94	7,928.63	58.31	136.982			
14,000.00	7,450.00	7,824.31	7,808.22	60.28	27.46	140.253	13,568.43	1,688.55	7,887.11	7,828.75	58.36	135.149			
14,100.00	7,450.00	7,822.58	7,806.49	61.04	27.45	140.119	13,568.51	1,688.52	7,787.29	7,728.88	58.41	133.317			
14,200.00	7,450.00	7,820.82	7,804.73	61.80	27.44	139.982	13,568.59	1,688.49	7,687.47	7,629.00	58.47	131.486			
14,300.00	7,450.00	7,819.03	7,802.94	62.56	27.44	139.842	13,568.67	1,688.47	7,587.65	7,529.13	58.52	129.657			
14,400.00	7,450.00	7,817.21	7,801.13	63.33	27.43	139.699	13,568.76	1,688.44	7,487.84	7,429.26	58.58	127.829			
14,500.00	7,450.00	7,815.37	7,799.29	64.10	27.43	139.553	13,568.84	1,688.41	7,388.03	7,329.40	58.63	126.002			
14,600.00	7,450.00	7,813.49	7,797.41	64.87	27.42	139.404	13,568.93	1,688.38	7,288.23	7,229.53	58.69	124.177			
14,700.00	7,450.00	7,811.59	7,795.51	65.64	27.41	139.251	13,569.03	1,688.35	7,188.43	7,129.68	58.75	122.354			
14,800.00	7,450.00	7,809.65	7,793.57	66.42	27.41	139.094	13,569.12	1,688.32	7,088.63	7,029.82	58.81	120.532			
14,900.00	7,450.00	7,770.41	7,754.39	67.20	27.28	135.679	13,571.07	1,687.89	6,988.96	6,930.28	58.67	119.118			
15,000.00	7,450.00	7,766.02	7,750.00	67.98	27.26	135.266	13,571.27	1,687.85	6,889.14	6,830.42	58.72	117.324			
15,100.00	7,450.00	7,554.19	7,538.28	68.76	26.54	106.540	13,577.16	1,687.83	6,789.16	6,731.51	57.65	117.761			
15,200.00	7,450.00	7,552.98	7,537.07	69.54	26.54	106.324	13,577.17	1,687.84	6,689.27	6,631.56	57.71	115.921			
15,300.00	7,450.00	7,551.77	7,535.85	70.33	26.53	106.107	13,577.19	1,687.86	6,589.38	6,531.62	57.76	114.083			
15,400.00	7,450.00	7,550.56	7,534.64	71.12	26.53	105.891	13,577.20	1,687.88	6,489.49	6,431.68	57.81	112.246			
15,500.00	7,450.00	7,549.35	7,533.43	71.90	26.53	105.674	13,577.22	1,687.91	6,389.61	6,331.73	57.87	110.411			
15,600.00	7,450.00	7,548.14	7,532.23	72.70	26.52	105.458	13,577.23	1,687.93	6,289.72	6,231.80	57.93	108.578			
15,700.00	7,450.00	7,546.93	7,531.02	73.49	26.52	105.241	13,577.25	1,687.95	6,189.85	6,131.86	57.99	106.747			
15,800.00	7,450.00	7,545.73	7,529.82	74.28	26.51	105.024	13,577.26	1,687.97	6,089.97	6,031.93	58.05	104.918			
15,900.00	7,450.00	7,544.53	7,528.62	75.08	26.51	104.807	13,577.28	1,687.99	5,990.10	5,932.00	58.11	103.090			
16,000.00	7,450.00	7,543.33	7,527.42	75.87	26.51	104.589	13,577.29	1,688.01	5,890.24	5,832.07	58.17	101.265			
16,100.00	7,450.00	7,542.13	7,526.22	76.67	26.50	104.372	13,577.31	1,688.03	5,790.37	5,732.15	58.23	99.442			
16,200.00	7,450.00	7,540.94	7,525.03	77.47	26.50	104.155	13,577.32	1,688.06	5,690.52	5,632.23	58.29	97.621			
16,300.00	7,450.00	7,539.74	7,523.83	78.27	26.49	103.937	13,577.34	1,688.08	5,590.67	5,532.31	58.36	95.803			
16,400.00	7,450.00	7,538.55	7,522.64	79.07	26.49	103.720	13,577.35	1,688.10	5,490.82	5,432.40	58.42	93.986			
16,500.00	7,450.00	7,537.36	7,521.45	79.88	26.48	103.502	13,577.37	1,688.13	5,390.98	5,332.49	58.49	92.172			
16,600.00	7,450.00	7,536.17	7,520.26	80.68	26.48	103.285	13,577.38	1,688.15	5,291.14	5,232.59	58.56	90.360			
16,700.00	7,450.00	7,534.98	7,519.07	81.49	26.48	103.067	13,577.40	1,688.17	5,191.31	5,132.69	58.63	88.551			
16,800.00	7,450.00	7,533.80	7,517.89	82.29	26.47	102.849	13,577.41	1,688.20	5,091.49	5,032.79	58.70	86.744			

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 302H
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 302H	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		Highside		Offset Wellbore Centre		Rule Assigned:		Distance		Offset Well Error:
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Reference	Offset	Toolface (°)	+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning	0.00 usft
16,900.00	7,450.00	7,532.61	7,516.71	83.10	26.47	102.631	13,577.42	1,688.22	4,991.67	4,932.90	58.77	84.939	
17,000.00	7,450.00	7,531.43	7,515.52	83.91	26.46	102.414	13,577.44	1,688.25	4,891.86	4,833.02	58.84	83.136	
17,100.00	7,450.00	7,530.25	7,514.34	84.72	26.46	102.196	13,577.45	1,688.27	4,792.06	4,733.14	58.92	81.336	
17,200.00	7,450.00	7,529.07	7,513.17	85.53	26.46	101.978	13,577.47	1,688.30	4,692.27	4,633.27	58.99	79.539	
17,300.00	7,450.00	7,527.90	7,511.99	86.34	26.45	101.760	13,577.48	1,688.32	4,592.48	4,533.41	59.07	77.744	
17,400.00	7,450.00	7,526.72	7,510.82	87.16	26.45	101.543	13,577.50	1,688.35	4,492.71	4,433.55	59.15	75.951	
17,500.00	7,450.00	7,525.55	7,509.64	87.97	26.44	101.325	13,577.51	1,688.37	4,392.94	4,333.71	59.24	74.161	
17,600.00	7,450.00	7,524.38	7,508.47	88.78	26.44	101.107	13,577.53	1,688.40	4,293.18	4,233.87	59.32	72.374	
17,700.00	7,450.00	7,523.21	7,507.30	89.60	26.43	100.889	13,577.54	1,688.42	4,193.44	4,134.03	59.41	70.588	
17,800.00	7,450.00	7,522.04	7,506.13	90.42	26.43	100.672	13,577.56	1,688.45	4,093.71	4,034.21	59.50	68.806	
17,900.00	7,450.00	7,520.87	7,504.97	91.23	26.43	100.454	13,577.57	1,688.48	3,993.99	3,934.40	59.59	67.025	
18,000.00	7,450.00	7,519.71	7,503.80	92.05	26.42	100.236	13,577.58	1,688.51	3,894.29	3,834.60	59.69	65.247	
18,100.00	7,450.00	7,518.54	7,502.64	92.87	26.42	100.019	13,577.60	1,688.53	3,794.60	3,734.81	59.78	63.472	
18,197.24	7,450.00	7,517.41	7,501.51	93.67	26.41	99.807	13,577.61	1,688.56	3,697.67	3,637.79	59.88	61.747	
18,200.00	7,450.00	7,517.38	7,501.48	93.69	26.41	99.688	13,577.61	1,688.56	3,694.92	3,635.04	59.89	61.698	
18,229.54	7,450.00	7,517.04	7,501.14	93.93	26.41	98.570	13,577.62	1,688.57	3,665.50	3,605.58	59.92	61.175	
18,300.00	7,450.00	7,516.88	7,500.98	94.51	26.41	98.544	13,577.62	1,688.57	3,595.35	3,535.35	60.00	59.920	
18,400.00	7,450.00	7,515.58	7,499.68	95.33	26.41	98.327	13,577.63	1,688.60	3,495.82	3,435.70	60.12	58.149	
18,500.00	7,450.00	7,514.28	7,498.38	96.15	26.40	98.112	13,577.65	1,688.64	3,396.32	3,336.08	60.24	56.379	
18,600.00	7,450.00	7,512.98	7,497.08	96.98	26.40	97.897	13,577.67	1,688.67	3,296.85	3,236.48	60.37	54.611	
18,700.00	7,450.00	7,511.70	7,495.80	97.80	26.39	97.683	13,577.68	1,688.70	3,197.40	3,136.90	60.51	52.844	
18,800.00	7,450.00	7,510.41	7,494.51	98.62	26.39	97.469	13,577.70	1,688.73	3,098.00	3,037.35	60.65	51.079	
18,900.00	7,450.00	7,509.14	7,493.24	99.45	26.39	97.257	13,577.71	1,688.76	2,998.63	2,937.82	60.81	49.314	
19,000.00	7,450.00	7,507.87	7,491.97	100.28	26.38	97.045	13,577.73	1,688.80	2,899.31	2,838.33	60.97	47.550	
19,100.00	7,450.00	7,506.60	7,490.70	101.10	26.38	96.834	13,577.74	1,688.83	2,800.03	2,738.88	61.15	45.787	
19,200.00	7,450.00	7,505.34	7,489.44	101.93	26.37	96.624	13,577.76	1,688.86	2,700.81	2,639.46	61.35	44.024	
19,300.00	7,450.00	7,504.09	7,488.19	102.76	26.37	96.414	13,577.77	1,688.89	2,601.64	2,540.08	61.56	42.261	
19,400.00	7,450.00	7,502.84	7,486.94	103.58	26.36	96.206	13,577.79	1,688.92	2,502.54	2,440.75	61.79	40.498	
19,500.00	7,450.00	7,501.59	7,485.70	104.41	26.36	95.998	13,577.80	1,688.95	2,403.52	2,341.47	62.05	38.734	
19,600.00	7,450.00	7,500.35	7,484.46	105.24	26.35	95.791	13,577.82	1,688.98	2,304.58	2,242.24	62.34	36.970	
19,700.00	7,450.00	7,499.12	7,483.23	106.07	26.35	95.585	13,577.83	1,689.01	2,205.73	2,143.08	62.65	35.205	
19,800.00	7,450.00	7,497.89	7,482.00	106.90	26.35	95.379	13,577.85	1,689.04	2,106.99	2,043.98	63.01	33.438	
19,900.00	7,450.00	7,496.67	7,480.78	107.73	26.34	95.174	13,577.86	1,689.07	2,008.38	1,944.96	63.42	31.669	
20,000.00	7,450.00	7,495.45	7,479.56	108.56	26.34	94.970	13,577.88	1,689.10	1,909.91	1,846.03	63.88	29.899	
20,100.00	7,450.00	7,494.24	7,478.35	109.40	26.33	94.767	13,577.89	1,689.13	1,811.60	1,747.19	64.41	28.126	
20,200.00	7,450.00	7,493.04	7,477.14	110.23	26.33	94.565	13,577.91	1,689.15	1,713.49	1,648.47	65.03	26.351	
20,300.00	7,450.00	7,491.83	7,475.94	111.06	26.32	94.363	13,577.92	1,689.18	1,615.62	1,549.87	65.74	24.574	
20,400.00	7,450.00	7,490.64	7,474.75	111.89	26.32	94.163	13,577.93	1,689.21	1,518.02	1,451.42	66.59	22.795	
20,500.00	7,450.00	7,489.45	7,473.55	112.73	26.32	93.963	13,577.95	1,689.24	1,420.75	1,353.15	67.60	21.016	
20,600.00	7,450.00	7,488.26	7,472.37	113.56	26.31	93.763	13,577.96	1,689.27	1,323.88	1,255.07	68.81	19.239	
20,700.00	7,450.00	7,487.08	7,471.19	114.40	26.31	93.565	13,577.98	1,689.29	1,227.52	1,157.24	70.29	17.465	
20,800.00	7,450.00	7,485.90	7,470.01	115.23	26.30	93.367	13,577.99	1,689.32	1,131.79	1,059.70	72.09	15.700	
20,900.00	7,450.00	7,484.73	7,468.84	116.07	26.30	93.170	13,578.00	1,689.35	1,036.87	962.54	74.33	13.950	
21,000.00	7,450.00	7,483.57	7,467.68	116.90	26.30	92.974	13,578.02	1,689.38	942.99	865.86	77.13	12.226	
21,100.00	7,450.00	7,482.40	7,466.51	117.74	26.29	92.779	13,578.03	1,689.40	850.51	769.82	80.69	10.541	
21,200.00	7,450.00	7,481.25	7,465.36	118.57	26.29	92.585	13,578.04	1,689.43	759.93	674.70	85.24	8.915	
21,300.00	7,450.00	7,480.10	7,464.21	119.41	26.28	92.391	13,578.06	1,689.45	672.03	580.92	91.12	7.376	
21,400.00	7,450.00	7,478.95	7,463.06	120.25	26.28	92.198	13,578.07	1,689.48	588.01	489.28	98.73	5.956	
21,500.00	7,450.00	7,477.81	7,461.92	121.09	26.27	92.006	13,578.08	1,689.51	509.79	401.29	108.50	4.699	
21,600.00	7,450.00	7,476.67	7,460.78	121.92	26.27	91.814	13,578.10	1,689.53	440.46	319.90	120.56	3.653	
21,700.00	7,450.00	7,475.54	7,459.65	122.76	26.27	91.624	13,578.11	1,689.56	384.87	250.88	133.99	2.872	
21,800.00	7,450.00	7,474.41	7,458.52	123.60	26.26	91.434	13,578.12	1,689.58	349.63	204.07	145.55	2.402	

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 302H
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 302H	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	Highside	Offset Wellbore Centre	Rule Assigned:								Warning
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference	Offset	Toolface (°)	+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	
21,879.43	7,450.00	7,473.52	7,457.63	124.27	26.26	91.284	13,578.13	1,689.60	340.49	190.48	150.01	2.270	CC, ES, SF
21,900.00	7,450.00	7,473.29	7,457.40	124.44	26.26	91.245	13,578.14	1,689.61	341.11	190.90	150.20	2.271	
22,000.00	7,450.00	7,472.17	7,456.28	125.28	26.25	91.057	13,578.15	1,689.63	361.20	215.43	145.77	2.478	
22,100.00	7,450.00	7,471.05	7,455.17	126.12	26.25	90.869	13,578.16	1,689.66	405.68	270.08	135.60	2.992	
22,200.00	7,450.00	7,469.94	7,454.06	126.96	26.25	90.683	13,578.17	1,689.68	467.63	343.37	124.26	3.763	
22,300.00	7,450.00	7,468.84	7,452.95	127.80	26.24	90.497	13,578.19	1,689.70	541.10	426.94	114.16	4.740	
22,400.00	7,450.00	7,467.74	7,451.85	128.64	26.24	90.312	13,578.20	1,689.73	622.00	516.11	105.89	5.874	
22,500.00	7,450.00	7,466.64	7,450.76	129.48	26.24	90.127	13,578.21	1,689.75	707.81	608.49	99.32	7.127	
22,600.00	7,450.00	7,465.55	7,449.67	130.32	26.23	89.944	13,578.22	1,689.78	796.92	702.80	94.12	8.467	
22,700.00	7,450.00	7,464.46	7,448.58	131.16	26.23	89.761	13,578.24	1,689.80	888.36	798.36	90.00	9.871	
22,800.00	7,450.00	7,463.38	7,447.50	132.00	26.22	89.579	13,578.25	1,689.82	981.47	894.77	86.70	11.320	
22,900.00	7,450.00	7,462.30	7,446.42	132.84	26.22	89.398	13,578.26	1,689.85	1,075.81	991.78	84.03	12.802	
23,000.00	7,450.00	7,461.23	7,445.35	133.69	26.22	89.217	13,578.27	1,689.87	1,171.09	1,089.24	81.85	14.307	
23,100.00	7,450.00	7,460.16	7,444.28	134.53	26.21	89.038	13,578.28	1,689.89	1,267.10	1,187.04	80.06	15.827	
23,200.00	7,450.00	7,459.09	7,443.21	135.37	26.21	88.859	13,578.30	1,689.91	1,363.68	1,285.11	78.57	17.357	
23,300.00	7,450.00	7,458.03	7,442.15	136.21	26.20	88.680	13,578.31	1,689.94	1,460.72	1,383.40	77.32	18.892	
23,400.00	7,450.00	7,456.98	7,441.09	137.06	26.20	88.503	13,578.32	1,689.96	1,558.13	1,481.87	76.27	20.430	
23,455.58	7,450.00	7,456.39	7,440.51	137.52	26.20	88.405	13,578.33	1,689.97	1,612.41	1,536.66	75.75	21.285	

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 302H
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 302H	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:
Survey Program: 173-MWD+HRGM													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)	Highside Toolface (°)	Offset Wellbore Centre		Distance Between Centres (usft)		Minimum Separation (usft)	Separation Factor	Warning
							+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)			
11,200.00	7,450.00	7,600.78	7,549.10	40.69	27.79	107.205	12,886.58	1,715.94	9,996.81	9,940.61	56.20	177.871	
11,300.00	7,450.00	7,599.77	7,548.10	41.30	27.79	107.040	12,886.59	1,715.94	9,896.87	9,840.64	56.22	176.026	
11,400.00	7,450.00	7,598.77	7,547.09	41.93	27.78	106.876	12,886.60	1,715.94	9,796.92	9,740.68	56.25	174.181	
11,500.00	7,450.00	7,597.76	7,546.09	42.57	27.78	106.711	12,886.61	1,715.93	9,696.98	9,640.71	56.27	172.334	
11,600.00	7,450.00	7,596.76	7,545.08	43.21	27.78	106.546	12,886.62	1,715.93	9,597.04	9,540.75	56.29	170.486	
11,700.00	7,450.00	7,595.75	7,544.07	43.86	27.77	106.381	12,886.63	1,715.92	9,497.10	9,440.79	56.32	168.637	
11,800.00	7,450.00	7,594.74	7,543.07	44.51	27.77	106.215	12,886.64	1,715.92	9,397.17	9,340.82	56.34	166.787	
11,900.00	7,450.00	7,593.74	7,542.06	45.18	27.77	106.049	12,886.65	1,715.91	9,297.23	9,240.86	56.37	164.937	
12,000.00	7,450.00	7,592.73	7,541.06	45.85	27.76	105.883	12,886.66	1,715.91	9,197.30	9,140.90	56.40	163.086	
12,100.00	7,450.00	7,591.73	7,540.05	46.53	27.76	105.716	12,886.67	1,715.90	9,097.36	9,040.94	56.42	161.234	
12,200.00	7,450.00	7,590.72	7,539.05	47.21	27.76	105.549	12,886.68	1,715.90	8,997.43	8,940.98	56.45	159.382	
12,300.00	7,450.00	7,589.71	7,538.04	47.90	27.75	105.382	12,886.69	1,715.90	8,897.50	8,841.02	56.48	157.530	
12,400.00	7,450.00	7,588.71	7,537.03	48.59	27.75	105.215	12,886.70	1,715.89	8,797.57	8,741.06	56.51	155.677	
12,500.00	7,450.00	7,587.70	7,536.03	49.29	27.75	105.047	12,886.71	1,715.89	8,697.64	8,641.10	56.54	153.824	
12,600.00	7,450.00	7,586.70	7,535.02	49.99	27.74	104.879	12,886.72	1,715.88	8,597.71	8,541.14	56.57	151.971	
12,700.00	7,450.00	7,585.69	7,534.02	50.70	27.74	104.711	12,886.73	1,715.88	8,497.79	8,441.18	56.61	150.118	
12,800.00	7,450.00	7,584.69	7,533.01	51.42	27.74	104.543	12,886.74	1,715.87	8,397.87	8,341.22	56.64	148.265	
12,839.11	7,450.00	7,584.29	7,532.62	51.70	27.74	104.477	12,886.75	1,715.87	8,358.79	8,302.13	56.65	147.541	
12,839.67	7,450.00	7,584.29	7,532.61	51.70	27.74	104.547	12,886.75	1,715.87	8,358.22	8,301.57	56.65	147.530	
12,900.00	7,450.00	7,583.68	7,532.01	52.13	27.73	104.445	12,886.75	1,715.87	8,297.94	8,241.27	56.68	146.412	
13,000.00	7,450.00	7,582.67	7,531.00	52.85	27.73	104.276	12,886.76	1,715.86	8,198.02	8,141.31	56.71	144.560	
13,100.00	7,450.00	7,581.67	7,529.99	53.58	27.73	104.106	12,886.77	1,715.86	8,098.10	8,041.36	56.75	142.707	
13,200.00	7,450.00	7,580.66	7,528.99	54.31	27.72	103.935	12,886.78	1,715.85	7,998.19	7,941.40	56.78	140.855	
13,300.00	7,450.00	7,579.66	7,527.98	55.04	27.72	103.765	12,886.79	1,715.85	7,898.27	7,841.45	56.82	139.003	
13,400.00	7,450.00	7,578.65	7,526.98	55.78	27.72	103.594	12,886.80	1,715.85	7,798.36	7,741.50	56.86	137.152	
13,500.00	7,450.00	7,577.64	7,525.97	56.52	27.71	103.423	12,886.81	1,715.84	7,698.45	7,641.55	56.90	135.302	
13,600.00	7,450.00	7,576.64	7,524.97	57.27	27.71	103.252	12,886.82	1,715.84	7,598.54	7,541.60	56.94	133.452	
13,700.00	7,450.00	7,575.63	7,523.96	58.02	27.71	103.081	12,886.84	1,715.83	7,498.63	7,441.65	56.98	131.603	
13,800.00	7,450.00	7,574.63	7,522.95	58.77	27.70	102.909	12,886.85	1,715.83	7,398.73	7,341.71	57.02	129.754	
13,900.00	7,450.00	7,573.62	7,521.95	59.52	27.70	102.737	12,886.86	1,715.82	7,298.83	7,241.76	57.06	127.907	
14,000.00	7,450.00	7,572.62	7,520.94	60.28	27.70	102.565	12,886.87	1,715.82	7,198.93	7,141.82	57.11	126.060	
14,100.00	7,450.00	7,571.61	7,519.94	61.04	27.69	102.392	12,886.88	1,715.81	7,099.03	7,041.88	57.15	124.214	
14,200.00	7,450.00	7,601.00	7,549.32	61.80	27.79	107.324	12,886.58	1,715.95	6,999.21	6,941.85	57.36	122.032	
14,300.00	7,450.00	7,601.00	7,549.32	62.56	27.79	107.324	12,886.58	1,715.95	6,899.32	6,841.91	57.41	120.180	
14,400.00	7,450.00	7,601.00	7,549.32	63.33	27.79	107.324	12,886.58	1,715.95	6,799.44	6,741.98	57.46	118.330	
14,500.00	7,450.00	7,601.00	7,549.32	64.10	27.79	107.324	12,886.58	1,715.95	6,699.56	6,642.05	57.52	116.480	
14,600.00	7,450.00	7,601.00	7,549.32	64.87	27.79	107.324	12,886.58	1,715.95	6,599.69	6,542.12	57.57	114.633	
14,700.00	7,450.00	7,601.00	7,549.32	65.64	27.79	107.324	12,886.58	1,715.95	6,499.82	6,442.19	57.63	112.787	
14,800.00	7,450.00	7,564.57	7,512.90	66.42	27.67	101.179	12,886.95	1,715.78	6,399.85	6,342.36	57.49	111.329	
14,900.00	7,450.00	7,563.56	7,511.89	67.20	27.67	101.005	12,886.96	1,715.78	6,299.98	6,242.44	57.54	109.494	
15,000.00	7,450.00	7,562.56	7,510.88	67.98	27.66	100.830	12,886.97	1,715.77	6,200.11	6,142.52	57.59	107.661	
15,100.00	7,450.00	7,618.80	7,567.12	68.76	27.85	110.190	12,886.26	1,716.03	6,100.38	6,042.41	57.97	105.233	
15,200.00	7,450.00	7,599.97	7,548.29	69.54	27.79	107.155	12,886.60	1,715.94	6,000.53	5,942.61	57.92	103.593	
15,300.00	7,450.00	7,585.90	7,534.23	70.33	27.74	104.819	12,886.82	1,715.87	5,900.69	5,842.78	57.91	101.902	
15,400.00	7,450.00	7,575.00	7,523.33	71.12	27.71	102.973	12,886.97	1,715.82	5,800.84	5,742.94	57.91	100.178	
15,500.00	7,450.00	7,566.30	7,514.63	71.90	27.68	101.479	12,887.07	1,715.78	5,701.00	5,643.09	57.92	98.433	
15,600.00	7,450.00	7,559.20	7,507.53	72.70	27.65	100.247	12,887.15	1,715.75	5,601.17	5,543.23	57.94	96.671	
15,700.00	7,450.00	7,553.29	7,501.62	73.49	27.63	99.215	12,887.21	1,715.72	5,501.34	5,443.37	57.97	94.899	
15,800.00	7,450.00	7,548.30	7,496.63	74.28	27.62	98.338	12,887.26	1,715.70	5,401.51	5,343.51	58.01	93.118	
15,900.00	7,450.00	7,544.03	7,492.36	75.08	27.60	97.584	12,887.29	1,715.68	5,301.69	5,243.64	58.05	91.332	
16,000.00	7,450.00	7,540.33	7,488.66	75.87	27.59	96.929	12,887.32	1,715.67	5,201.88	5,143.79	58.09	89.542	
16,100.00	7,450.00	7,537.10	7,485.43	76.67	27.58	96.354	12,887.35	1,715.65	5,102.07	5,043.93	58.14	87.748	

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 302H
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 302H	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 Well Error:	0.00 usft
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Semi Major Axis Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre		Distance Between Centres (usft)		Minimum Separation (usft)	Separation Factor	Warning
							+N-S (usft)	+E-W (usft)	Between Centres (usft)	Between Ellipses (usft)			
16,200.00	7,450.00	7,534.25	7,482.58	77.47	27.57	95.847	12,887.37	1,715.64	5,002.27	4,944.08	58.20	85.953	
16,300.00	7,450.00	7,531.72	7,480.05	78.27	27.56	95.396	12,887.38	1,715.63	4,902.48	4,844.23	58.25	84.157	
16,400.00	7,450.00	7,529.45	7,477.78	79.07	27.55	94.992	12,887.40	1,715.62	4,802.70	4,744.39	58.31	82.359	
16,500.00	7,450.00	7,527.42	7,475.75	79.88	27.55	94.628	12,887.41	1,715.61	4,702.93	4,644.55	58.38	80.562	
16,600.00	7,450.00	7,525.58	7,473.91	80.68	27.54	94.298	12,887.42	1,715.60	4,603.16	4,544.72	58.44	78.765	
16,700.00	7,450.00	7,523.90	7,472.23	81.49	27.54	93.998	12,887.43	1,715.60	4,503.41	4,444.90	58.51	76.968	
16,800.00	7,450.00	7,522.38	7,470.71	82.29	27.53	93.725	12,887.44	1,715.59	4,403.66	4,345.08	58.58	75.172	
16,900.00	7,450.00	7,520.98	7,469.31	83.10	27.53	93.474	12,887.44	1,715.58	4,303.93	4,245.28	58.65	73.377	
17,000.00	7,450.00	7,519.69	7,468.02	83.91	27.52	93.243	12,887.45	1,715.58	4,204.21	4,145.48	58.73	71.583	
17,100.00	7,450.00	7,518.50	7,466.83	84.72	27.52	93.030	12,887.45	1,715.57	4,104.51	4,045.69	58.81	69.790	
17,200.00	7,450.00	7,517.40	7,465.73	85.53	27.51	92.832	12,887.46	1,715.57	4,004.82	3,945.92	58.90	67.999	
17,300.00	7,450.00	7,516.38	7,464.71	86.34	27.51	92.649	12,887.46	1,715.56	3,905.14	3,846.16	58.98	66.209	
17,400.00	7,450.00	7,515.43	7,463.77	87.16	27.51	92.478	12,887.47	1,715.56	3,805.48	3,746.41	59.07	64.420	
17,500.00	7,450.00	7,514.55	7,462.88	87.97	27.50	92.319	12,887.47	1,715.56	3,705.84	3,646.67	59.17	62.633	
17,600.00	7,450.00	7,513.72	7,462.05	88.78	27.50	92.170	12,887.47	1,715.55	3,606.22	3,546.95	59.27	60.847	
17,700.00	7,450.00	7,512.94	7,461.27	89.60	27.50	92.030	12,887.48	1,715.55	3,506.62	3,447.25	59.37	59.063	
17,800.00	7,450.00	7,512.21	7,460.54	90.42	27.50	91.899	12,887.48	1,715.55	3,407.05	3,347.57	59.48	57.280	
17,900.00	7,450.00	7,511.53	7,459.86	91.23	27.49	91.775	12,887.48	1,715.54	3,307.50	3,247.90	59.60	55.499	
18,000.00	7,450.00	7,511.00	7,459.33	92.05	27.49	91.681	12,887.48	1,715.54	3,207.98	3,148.26	59.72	53.718	
18,100.00	7,450.00	7,511.00	7,459.33	92.87	27.49	91.681	12,887.48	1,715.54	3,108.48	3,048.63	59.85	51.935	
18,197.24	7,450.00	7,511.00	7,459.33	93.67	27.49	91.681	12,887.48	1,715.54	3,011.77	2,951.78	59.99	50.203	
18,200.00	7,450.00	7,511.00	7,459.33	93.69	27.49	91.665	12,887.48	1,715.54	3,009.03	2,949.03	60.00	50.154	
18,229.54	7,450.00	7,511.00	7,459.33	93.93	27.49	91.520	12,887.48	1,715.54	2,979.68	2,919.63	60.04	49.627	
18,300.00	7,450.00	7,511.00	7,459.33	94.51	27.49	91.520	12,887.48	1,715.54	2,909.72	2,849.56	60.16	48.370	
18,400.00	7,450.00	7,511.00	7,459.33	95.33	27.49	91.520	12,887.48	1,715.54	2,810.48	2,750.15	60.33	46.586	
18,500.00	7,450.00	7,511.00	7,459.33	96.15	27.49	91.520	12,887.48	1,715.54	2,711.29	2,650.78	60.52	44.802	
18,600.00	7,450.00	7,511.00	7,459.33	96.98	27.49	91.520	12,887.48	1,715.54	2,612.17	2,551.45	60.72	43.019	
18,700.00	7,450.00	7,511.00	7,459.33	97.80	27.49	91.520	12,887.48	1,715.54	2,513.12	2,452.17	60.95	41.235	
18,800.00	7,450.00	7,511.00	7,459.33	98.62	27.49	91.520	12,887.48	1,715.54	2,414.14	2,352.95	61.19	39.451	
18,900.00	7,450.00	7,511.00	7,459.33	99.45	27.49	91.520	12,887.48	1,715.54	2,315.25	2,253.79	61.47	37.666	
19,000.00	7,450.00	7,511.00	7,459.33	100.28	27.49	91.520	12,887.48	1,715.54	2,216.47	2,154.69	61.77	35.880	
19,100.00	7,450.00	7,511.00	7,459.33	101.10	27.49	91.520	12,887.48	1,715.54	2,117.79	2,055.68	62.12	34.093	
19,200.00	7,450.00	7,511.00	7,459.33	101.93	27.49	91.520	12,887.48	1,715.54	2,019.25	1,956.74	62.51	32.304	
19,300.00	7,450.00	7,511.00	7,459.33	102.76	27.49	91.520	12,887.48	1,715.54	1,920.86	1,857.91	62.95	30.513	
19,400.00	7,450.00	7,506.68	7,455.01	103.58	27.48	90.817	12,887.50	1,715.53	1,822.64	1,759.22	63.42	28.740	
19,500.00	7,450.00	7,506.36	7,454.69	104.41	27.48	90.764	12,887.50	1,715.52	1,724.62	1,660.62	64.00	26.945	
19,600.00	7,450.00	7,506.02	7,454.36	105.24	27.48	90.710	12,887.50	1,715.52	1,626.85	1,562.16	64.69	25.148	
19,700.00	7,450.00	7,505.69	7,454.02	106.07	27.47	90.655	12,887.50	1,715.52	1,529.37	1,463.86	65.50	23.349	
19,800.00	7,450.00	7,505.35	7,453.68	106.90	27.47	90.600	12,887.50	1,715.52	1,432.23	1,365.76	66.47	21.549	
19,900.00	7,450.00	7,505.01	7,453.34	107.73	27.47	90.545	12,887.50	1,715.52	1,335.51	1,267.89	67.62	19.749	
20,000.00	7,450.00	7,504.67	7,453.00	108.56	27.47	90.489	12,887.50	1,715.52	1,239.32	1,170.29	69.03	17.954	
20,100.00	7,450.00	7,504.32	7,452.65	109.40	27.47	90.432	12,887.51	1,715.52	1,143.78	1,073.03	70.75	16.166	
20,200.00	7,450.00	7,503.97	7,452.30	110.23	27.47	90.375	12,887.51	1,715.51	1,049.07	976.19	72.89	14.393	
20,300.00	7,450.00	7,503.61	7,451.94	111.06	27.47	90.317	12,887.51	1,715.51	955.44	879.88	75.56	12.645	
20,400.00	7,450.00	7,503.26	7,451.59	111.89	27.47	90.259	12,887.51	1,715.51	863.24	784.30	78.94	10.935	
20,500.00	7,450.00	7,502.89	7,451.22	112.73	27.47	90.200	12,887.51	1,715.51	772.99	689.72	83.26	9.284	
20,600.00	7,450.00	7,502.53	7,450.86	113.56	27.46	90.140	12,887.51	1,715.51	685.44	596.61	88.83	7.716	
20,700.00	7,450.00	7,502.16	7,450.49	114.40	27.46	90.080	12,887.51	1,715.51	601.78	505.77	96.01	6.268	
20,800.00	7,450.00	7,501.78	7,450.12	115.23	27.46	90.019	12,887.51	1,715.51	523.89	418.69	105.20	4.980	
20,900.00	7,450.00	7,501.41	7,449.74	116.07	27.46	89.957	12,887.52	1,715.50	454.72	338.20	116.53	3.902	
21,000.00	7,450.00	7,501.03	7,449.36	116.90	27.46	89.895	12,887.52	1,715.50	398.86	269.64	129.22	3.087	
21,100.00	7,450.00	7,500.64	7,448.97	117.74	27.46	89.832	12,887.52	1,715.50	362.50	221.98	140.52	2.580	

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 302H
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 302H	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 Well Error:	0.00 usft
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Semi Major Axis Reference	Offset	Highside Toolface (°)	Offset Wellbore Centre		Rule Assigned: Distance Between Centres (usft)		Minimum Separation (usft)	Separation Factor	Warning	
							+N-S (usft)	+E-W (usft)	Between Centres (usft)	Between Ellipses (usft)				
21,188.42	7,450.00	7,500.30	7,448.63	118.48	27.46	89.776	12,887.52	1,715.50	351.55	205.84	145.71	2.413 CC		
21,200.00	7,450.00	7,500.25	7,448.58	118.57	27.46	89.769	12,887.52	1,715.50	351.74	205.83	145.91	2.411 ES, SF		
21,300.00	7,450.00	7,499.86	7,448.19	119.41	27.46	89.705	12,887.52	1,715.50	368.83	225.90	142.93	2.580		
21,400.00	7,450.00	7,499.46	7,447.79	120.25	27.45	89.640	12,887.52	1,715.50	410.31	276.22	134.09	3.060		
21,500.00	7,450.00	7,499.06	7,447.39	121.09	27.45	89.574	12,887.53	1,715.49	469.75	346.20	123.55	3.802		
21,600.00	7,450.00	7,498.65	7,446.98	121.92	27.45	89.508	12,887.53	1,715.49	541.28	427.44	113.83	4.755		
21,700.00	7,450.00	7,498.24	7,446.57	122.76	27.45	89.441	12,887.53	1,715.49	620.72	514.99	105.73	5.871		
21,800.00	7,450.00	7,497.82	7,446.15	123.60	27.45	89.373	12,887.53	1,715.49	705.41	606.21	99.21	7.110		
21,900.00	7,450.00	7,497.40	7,445.73	124.44	27.45	89.305	12,887.53	1,715.49	793.68	699.66	94.02	8.442		
22,000.00	7,450.00	7,496.98	7,445.31	125.28	27.45	89.235	12,887.53	1,715.49	884.44	794.56	89.88	9.841		
22,100.00	7,450.00	7,496.55	7,444.88	126.12	27.44	89.165	12,887.54	1,715.48	977.01	890.46	86.55	11.289		
22,200.00	7,450.00	7,496.11	7,444.44	126.96	27.44	89.094	12,887.54	1,715.48	1,070.91	987.06	83.85	12.772		
22,300.00	7,450.00	7,495.67	7,444.00	127.80	27.44	89.023	12,887.54	1,715.48	1,165.83	1,084.19	81.65	14.279		
22,400.00	7,450.00	7,495.23	7,443.56	128.64	27.44	88.950	12,887.54	1,715.48	1,261.54	1,181.71	79.82	15.804		
22,500.00	7,450.00	7,494.78	7,443.11	129.48	27.44	88.877	12,887.54	1,715.48	1,357.86	1,279.55	78.31	17.340		
22,600.00	7,450.00	7,494.32	7,442.66	130.32	27.44	88.803	12,887.54	1,715.48	1,454.68	1,377.64	77.04	18.883		
22,700.00	7,450.00	7,493.86	7,442.19	131.16	27.44	88.728	12,887.55	1,715.47	1,551.91	1,475.94	75.97	20.429		
22,800.00	7,450.00	7,493.40	7,441.73	132.00	27.43	88.652	12,887.55	1,715.47	1,649.46	1,574.41	75.06	21.977		
22,900.00	7,450.00	7,492.93	7,441.26	132.84	27.43	88.575	12,887.55	1,715.47	1,747.29	1,673.02	74.28	23.524		
23,000.00	7,450.00	7,492.45	7,440.78	133.69	27.43	88.498	12,887.55	1,715.47	1,845.36	1,771.75	73.61	25.069		
23,100.00	7,450.00	7,491.97	7,440.30	134.53	27.43	88.419	12,887.55	1,715.47	1,943.62	1,870.58	73.04	26.612		
23,200.00	7,450.00	7,491.48	7,439.81	135.37	27.43	88.340	12,887.56	1,715.46	2,042.05	1,969.51	72.54	28.151		
23,300.00	7,450.00	7,490.99	7,439.32	136.21	27.43	88.259	12,887.56	1,715.46	2,140.62	2,068.51	72.11	29.686		
23,400.00	7,450.00	7,490.49	7,438.82	137.06	27.42	88.178	12,887.56	1,715.46	2,239.32	2,167.59	71.74	31.216		
23,455.58	7,450.00	7,490.21	7,438.54	137.52	27.42	88.132	12,887.56	1,715.46	2,294.23	2,222.68	71.55	32.064		

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 302H
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 302H	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)	Semi Major Axis Offset (usft)	Highside Toolface (°)	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	
13,200.00	7,450.00	7,210.64	7,199.79	54.31	23.34	62.126	14,853.30	1,850.80	9,970.88	9,917.70	53.18	187.492		
13,300.00	7,450.00	7,213.43	7,202.57	55.04	23.35	62.382	14,853.37	1,850.63	9,871.03	9,817.80	53.23	185.445		
13,400.00	7,450.00	7,215.00	7,204.14	55.78	23.36	62.526	14,853.42	1,850.54	9,771.18	9,717.90	53.27	183.417		
13,500.00	7,450.00	7,215.00	7,204.14	56.52	23.36	62.526	14,853.42	1,850.54	9,671.33	9,618.02	53.31	181.413		
13,600.00	7,450.00	7,215.00	7,204.14	57.27	23.36	62.526	14,853.42	1,850.54	9,571.48	9,518.13	53.35	179.410		
13,700.00	7,450.00	7,215.00	7,204.14	58.02	23.36	62.526	14,853.42	1,850.54	9,471.64	9,418.25	53.39	177.406		
13,800.00	7,450.00	7,215.00	7,204.14	58.77	23.36	62.526	14,853.42	1,850.54	9,371.80	9,318.37	53.43	175.402		
13,900.00	7,450.00	7,215.00	7,204.14	59.52	23.36	62.526	14,853.42	1,850.54	9,271.96	9,218.49	53.47	173.399		
14,000.00	7,450.00	7,215.00	7,204.14	60.28	23.36	62.526	14,853.42	1,850.54	9,172.13	9,118.61	53.51	171.396		
14,100.00	7,450.00	7,215.00	7,204.14	61.04	23.36	62.526	14,853.42	1,850.54	9,072.30	9,018.74	53.56	169.393		
14,200.00	7,450.00	7,215.00	7,204.14	61.80	23.36	62.526	14,853.42	1,850.54	8,972.47	8,918.87	53.60	167.391		
14,300.00	7,450.00	7,215.00	7,204.14	62.56	23.36	62.526	14,853.42	1,850.54	8,872.65	8,819.01	53.65	165.390		
14,400.00	7,450.00	7,215.00	7,204.14	63.33	23.36	62.526	14,853.42	1,850.54	8,772.83	8,719.14	53.69	163.389		
14,500.00	7,450.00	7,215.00	7,204.14	64.10	23.36	62.526	14,853.42	1,850.54	8,673.02	8,619.28	53.74	161.389		
14,600.00	7,450.00	7,215.00	7,204.14	64.87	23.36	62.526	14,853.42	1,850.54	8,573.21	8,519.43	53.79	159.390		
14,700.00	7,450.00	7,215.00	7,204.14	65.64	23.36	62.526	14,853.42	1,850.54	8,473.41	8,419.57	53.84	157.392		
14,800.00	7,450.00	7,215.00	7,204.14	66.42	23.36	62.526	14,853.42	1,850.54	8,373.61	8,319.72	53.89	155.394		
14,900.00	7,450.00	7,215.00	7,204.14	67.20	23.36	62.526	14,853.42	1,850.54	8,273.81	8,219.88	53.94	153.398		
15,000.00	7,450.00	7,215.00	7,204.14	67.98	23.36	62.526	14,853.42	1,850.54	8,174.02	8,120.04	53.99	151.402		
15,100.00	7,450.00	7,215.00	7,204.14	68.76	23.36	62.526	14,853.42	1,850.54	8,074.24	8,020.20	54.04	149.408		
15,200.00	7,450.00	7,247.70	7,236.77	69.54	23.48	65.638	14,854.24	1,848.60	7,974.24	7,920.00	54.25	146.999		
15,300.00	7,450.00	7,248.65	7,237.72	70.33	23.48	65.731	14,854.26	1,848.54	7,874.46	7,820.15	54.31	145.000		
15,400.00	7,450.00	7,249.61	7,238.68	71.12	23.48	65.826	14,854.29	1,848.48	7,774.68	7,720.31	54.37	143.003		
15,500.00	7,450.00	7,250.60	7,239.66	71.90	23.49	65.922	14,854.32	1,848.43	7,674.90	7,620.47	54.43	141.008		
15,600.00	7,450.00	7,251.59	7,240.65	72.70	23.49	66.021	14,854.35	1,848.37	7,575.13	7,520.64	54.49	139.014		
15,700.00	7,450.00	7,252.61	7,241.67	73.49	23.49	66.121	14,854.38	1,848.31	7,475.36	7,420.81	54.56	137.021		
15,800.00	7,450.00	7,253.64	7,242.70	74.28	23.50	66.224	14,854.42	1,848.25	7,375.60	7,320.98	54.62	135.031		
15,900.00	7,450.00	7,254.70	7,243.75	75.08	23.50	66.328	14,854.45	1,848.18	7,275.85	7,221.16	54.69	133.042		
16,000.00	7,450.00	7,255.77	7,244.82	75.87	23.51	66.435	14,854.48	1,848.12	7,176.10	7,121.34	54.76	131.054		
16,100.00	7,450.00	7,256.86	7,245.91	76.67	23.51	66.544	14,854.52	1,848.06	7,076.36	7,021.53	54.83	129.069		
16,200.00	7,450.00	7,257.98	7,247.02	77.47	23.51	66.655	14,854.55	1,847.99	6,976.63	6,921.73	54.90	127.086		
16,300.00	7,450.00	7,259.11	7,248.15	78.27	23.52	66.768	14,854.59	1,847.92	6,876.90	6,821.93	54.97	125.104		
16,400.00	7,450.00	7,260.27	7,249.31	79.07	23.52	66.884	14,854.63	1,847.85	6,777.18	6,722.14	55.04	123.125		
16,500.00	7,450.00	7,261.45	7,250.49	79.88	23.53	67.003	14,854.67	1,847.78	6,677.47	6,622.35	55.12	121.147		
16,600.00	7,450.00	7,262.65	7,251.69	80.68	23.53	67.123	14,854.71	1,847.71	6,577.77	6,522.57	55.20	119.172		
16,700.00	7,450.00	7,263.88	7,252.91	81.49	23.53	67.247	14,854.75	1,847.64	6,478.07	6,422.80	55.27	117.199		
16,800.00	7,450.00	7,265.13	7,254.16	82.29	23.54	67.373	14,854.79	1,847.57	6,378.39	6,323.03	55.35	115.228		
16,900.00	7,450.00	7,266.41	7,255.43	83.10	23.54	67.503	14,854.84	1,847.49	6,278.71	6,223.27	55.44	113.259		
17,000.00	7,450.00	7,267.71	7,256.73	83.91	23.55	67.635	14,854.88	1,847.41	6,179.04	6,123.52	55.52	111.292		
17,100.00	7,450.00	7,269.04	7,258.06	84.72	23.55	67.770	14,854.93	1,847.34	6,079.39	6,023.78	55.61	109.327		
17,200.00	7,450.00	7,270.40	7,259.41	85.53	23.56	67.908	14,854.98	1,847.26	5,979.74	5,924.05	55.70	107.365		
17,300.00	7,450.00	7,271.78	7,260.79	86.34	23.56	68.050	14,855.03	1,847.17	5,880.11	5,824.32	55.79	105.405		
17,400.00	7,450.00	7,273.20	7,262.21	87.16	23.57	68.195	14,855.08	1,847.09	5,780.48	5,724.61	55.88	103.447		
17,500.00	7,450.00	7,274.64	7,263.65	87.97	23.57	68.343	14,855.13	1,847.01	5,680.87	5,624.90	55.97	101.492		
17,600.00	7,450.00	7,276.12	7,265.12	88.78	23.58	68.495	14,855.19	1,846.92	5,581.28	5,525.20	56.07	99.539		
17,700.00	7,450.00	7,277.63	7,266.63	89.60	23.58	68.651	14,855.25	1,846.83	5,481.69	5,425.52	56.17	97.588		
17,800.00	7,450.00	7,279.18	7,268.17	90.42	23.59	68.810	14,855.31	1,846.74	5,382.12	5,325.85	56.28	95.640		
17,900.00	7,450.00	7,280.75	7,269.74	91.23	23.60	68.974	14,855.37	1,846.64	5,282.57	5,226.19	56.38	93.694		
18,000.00	7,450.00	7,309.00	7,297.91	92.05	23.70	71.972	14,856.57	1,844.98	5,183.20	5,126.58	56.62	91.546		
18,100.00	7,450.00	7,309.00	7,297.91	92.87	23.70	71.972	14,856.57	1,844.98	5,083.66	5,026.93	56.72	89.622		
18,197.24	7,450.00	7,309.00	7,297.91	93.67	23.70	71.972	14,856.57	1,844.98	4,986.88	4,930.05	56.83	87.753		
18,200.00	7,450.00	7,309.00	7,297.91	93.69	23.70	72.143	14,856.57	1,844.98	4,984.13	4,927.30	56.83	87.700		

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 302H
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 302H	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)	Semi Major Axis Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre		Distance Between Centres (usft)		Minimum Separation (usft)	Separation Factor	Warning
							+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)			
18,229.54	7,450.00	7,309.00	7,297.91	93.93	23.70	73.787	14,856.57	1,844.98	4,954.76	4,897.89	56.87	87.132	
18,300.00	7,450.00	7,309.00	7,297.91	94.51	23.70	73.787	14,856.57	1,844.98	4,884.73	4,827.78	56.95	85.775	
18,400.00	7,450.00	7,309.00	7,297.91	95.33	23.70	73.787	14,856.57	1,844.98	4,785.37	4,728.30	57.07	83.851	
18,500.00	7,450.00	7,309.00	7,297.91	96.15	23.70	73.787	14,856.57	1,844.98	4,686.03	4,628.83	57.20	81.928	
18,600.00	7,450.00	7,309.00	7,297.91	96.98	23.70	73.787	14,856.57	1,844.98	4,586.72	4,529.39	57.33	80.006	
18,700.00	7,450.00	7,309.00	7,297.91	97.80	23.70	73.787	14,856.57	1,844.98	4,487.45	4,429.98	57.47	78.085	
18,800.00	7,450.00	7,309.00	7,297.91	98.62	23.70	73.787	14,856.57	1,844.98	4,388.20	4,330.59	57.61	76.165	
18,900.00	7,450.00	7,309.00	7,297.91	99.45	23.70	73.787	14,856.57	1,844.98	4,288.99	4,231.23	57.77	74.246	
19,000.00	7,450.00	7,309.00	7,297.91	100.28	23.70	73.787	14,856.57	1,844.98	4,189.82	4,131.89	57.93	72.327	
19,100.00	7,450.00	7,309.00	7,297.91	101.10	23.70	73.787	14,856.57	1,844.98	4,090.69	4,032.59	58.10	70.409	
19,200.00	7,450.00	7,309.00	7,297.91	101.93	23.70	73.787	14,856.57	1,844.98	3,991.60	3,933.33	58.28	68.491	
19,300.00	7,450.00	7,309.00	7,297.91	102.76	23.70	73.787	14,856.57	1,844.98	3,892.56	3,834.09	58.47	66.574	
19,400.00	7,450.00	7,313.46	7,302.37	103.58	23.71	74.230	14,856.78	1,844.72	3,793.57	3,734.88	58.69	64.637	
19,500.00	7,450.00	7,323.99	7,312.87	104.41	23.75	75.286	14,857.26	1,844.12	3,694.62	3,635.68	58.95	62.676	
19,600.00	7,450.00	7,333.78	7,322.62	105.24	23.79	76.278	14,857.68	1,843.56	3,595.72	3,536.50	59.22	60.721	
19,700.00	7,450.00	7,342.88	7,331.71	106.07	23.82	77.212	14,858.06	1,843.06	3,496.87	3,437.37	59.50	58.773	
19,800.00	7,450.00	7,351.39	7,340.19	106.90	23.85	78.092	14,858.41	1,842.59	3,398.07	3,338.28	59.79	56.830	
19,900.00	7,450.00	7,359.34	7,348.13	107.73	23.88	78.922	14,858.72	1,842.17	3,299.34	3,239.23	60.11	54.892	
20,000.00	7,450.00	7,366.80	7,355.57	108.56	23.91	79.706	14,859.00	1,841.77	3,200.67	3,140.24	60.44	52.959	
20,100.00	7,450.00	7,373.81	7,362.57	109.40	23.93	80.447	14,859.26	1,841.41	3,102.09	3,041.30	60.79	51.030	
20,200.00	7,450.00	7,380.40	7,369.15	110.23	23.95	81.149	14,859.49	1,841.07	3,003.58	2,942.42	61.17	49.105	
20,300.00	7,450.00	7,386.62	7,375.36	111.06	23.98	81.814	14,859.71	1,840.75	2,905.17	2,843.60	61.57	47.183	
20,400.00	7,450.00	7,392.50	7,381.22	111.89	24.00	82.445	14,859.90	1,840.46	2,806.87	2,744.86	62.01	45.264	
20,500.00	7,450.00	7,398.05	7,386.77	112.73	24.02	83.045	14,860.08	1,840.19	2,708.68	2,646.20	62.49	43.349	
20,600.00	7,450.00	7,403.32	7,392.03	113.56	24.04	83.615	14,860.25	1,839.93	2,610.62	2,547.62	63.00	41.436	
20,700.00	7,450.00	7,418.72	7,407.40	114.40	24.09	85.293	14,860.69	1,839.19	2,512.71	2,449.09	63.62	39.497	
20,800.00	7,450.00	7,430.83	7,419.49	115.23	24.14	86.622	14,860.98	1,838.63	2,414.95	2,350.67	64.28	37.571	
20,900.00	7,450.00	7,439.71	7,428.36	116.07	24.17	87.601	14,861.17	1,838.22	2,317.37	2,252.38	64.99	35.658	
21,000.00	7,450.00	7,446.50	7,435.15	116.90	24.19	88.351	14,861.29	1,837.91	2,219.99	2,154.23	65.77	33.755	
21,100.00	7,450.00	7,451.86	7,440.50	117.74	24.21	88.945	14,861.37	1,837.67	2,122.86	2,056.23	66.63	31.862	
21,200.00	7,450.00	7,456.20	7,444.84	118.57	24.23	89.427	14,861.43	1,837.48	2,026.00	1,958.42	67.58	29.977	
21,300.00	7,450.00	7,459.79	7,448.42	119.41	24.24	89.825	14,861.48	1,837.32	1,929.46	1,860.80	68.66	28.101	
21,400.00	7,450.00	7,462.80	7,451.43	120.25	24.25	90.159	14,861.51	1,837.19	1,833.29	1,763.42	69.88	26.236	
21,500.00	7,450.00	7,465.37	7,453.99	121.09	24.26	90.444	14,861.54	1,837.08	1,737.55	1,666.29	71.26	24.384	
21,600.00	7,450.00	7,467.58	7,456.20	121.92	24.27	90.690	14,861.56	1,836.98	1,642.32	1,569.48	72.84	22.547	
21,700.00	7,450.00	7,469.51	7,458.13	122.76	24.27	90.904	14,861.58	1,836.90	1,547.68	1,473.03	74.66	20.731	
21,800.00	7,450.00	7,471.20	7,459.82	123.60	24.28	91.093	14,861.59	1,836.82	1,453.76	1,377.01	76.76	18.940	
21,900.00	7,450.00	7,472.70	7,461.32	124.44	24.29	91.259	14,861.60	1,836.76	1,360.71	1,281.51	79.20	17.181	
22,000.00	7,450.00	7,474.04	7,462.66	125.28	24.29	91.408	14,861.61	1,836.70	1,268.72	1,186.66	82.05	15.462	
22,100.00	7,450.00	7,475.24	7,463.85	126.12	24.29	91.542	14,861.62	1,836.65	1,178.03	1,092.62	85.40	13.794	
22,200.00	7,450.00	7,476.32	7,464.94	126.96	24.30	91.662	14,861.63	1,836.60	1,088.96	999.61	89.35	12.187	
22,300.00	7,450.00	7,477.30	7,465.92	127.80	24.30	91.771	14,861.64	1,836.56	1,001.97	907.95	94.02	10.657	
22,400.00	7,450.00	7,478.20	7,466.81	128.64	24.30	91.871	14,861.64	1,836.52	917.63	818.09	99.54	9.218	
22,500.00	7,450.00	7,479.02	7,467.63	129.48	24.31	91.962	14,861.65	1,836.49	836.74	730.68	106.06	7.889	
22,600.00	7,450.00	7,479.77	7,468.38	130.32	24.31	92.046	14,861.65	1,836.46	760.42	646.74	113.68	6.689	
22,700.00	7,450.00	7,480.46	7,469.08	131.16	24.31	92.123	14,861.65	1,836.43	690.17	567.75	122.42	5.638	
22,800.00	7,450.00	7,481.10	7,469.72	132.00	24.32	92.194	14,861.66	1,836.40	628.03	495.99	132.05	4.756	
22,900.00	7,450.00	7,481.70	7,470.31	132.84	24.32	92.260	14,861.66	1,836.37	576.65	434.73	141.92	4.063	
23,000.00	7,450.00	7,482.25	7,470.86	133.69	24.32	92.322	14,861.66	1,836.35	539.09	388.31	150.78	3.575	
23,100.00	7,450.00	7,482.77	7,471.38	134.53	24.32	92.379	14,861.66	1,836.33	518.37	361.44	156.93	3.303	
23,159.53	7,450.00	7,483.06	7,471.67	135.03	24.32	92.411	14,861.66	1,836.32	514.94	356.28	158.66	3.246 CC, ES, SF	
23,200.00	7,450.00	7,483.25	7,471.86	135.37	24.32	92.433	14,861.67	1,836.31	516.53	357.62	158.90	3.251	

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 302H
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 302H	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
Reference	Offset	Semi Major Axis		Distance		Rule Assigned:							
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning
23,300.00	7,450.00	7,483.70	7,472.31	136.21	24.32	92.483	14,861.67	1,836.29	533.75	377.36	156.39	3.413	
23,400.00	7,450.00	7,484.12	7,472.73	137.06	24.33	92.530	14,861.67	1,836.27	568.32	417.88	150.43	3.778	
23,455.58	7,450.00	7,484.35	7,472.95	137.52	24.33	92.555	14,861.67	1,836.26	593.97	447.74	146.23	4.062	



MS Directional Anticollision Report



Company:	Marathon Oil	Local Co-ordinate Reference:	Well Pierogi BS Federal Com 302H
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 302H	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		Semi Major Axis			Offset Wellbore Centre		Rule Assigned:				Offset Well Error:	0.00 usft	
Reference	Vertical	Reference	Vertical	Reference	Offset	Highside			Distance						
Measured Depth (usft)	Depth (usft)	Measured Depth (usft)	Depth (usft)			Toolface (°)	+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning		
12,900.00	7,450.00	7,246.61	7,227.36	52.13	23.86	53.581	14,580.01	1,682.24	9,991.98	9,938.48	53.50	186.778			
13,000.00	7,450.00	7,249.29	7,230.04	52.85	23.87	53.913	14,580.07	1,682.24	9,892.05	9,838.51	53.54	184.756			
13,100.00	7,450.00	7,251.96	7,232.71	53.58	23.88	54.245	14,580.13	1,682.24	9,792.12	9,738.54	53.59	182.735			
13,200.00	7,450.00	7,254.62	7,235.37	54.31	23.89	54.579	14,580.19	1,682.25	9,692.20	9,638.56	53.63	180.714			
13,300.00	7,450.00	7,257.27	7,238.01	55.04	23.90	54.915	14,580.25	1,682.25	9,592.27	9,538.59	53.68	178.694			
13,400.00	7,450.00	7,259.91	7,240.65	55.78	23.91	55.252	14,580.31	1,682.25	9,492.34	9,438.62	53.73	176.675			
13,500.00	7,450.00	7,262.53	7,243.27	56.52	23.91	55.590	14,580.37	1,682.26	9,392.42	9,338.64	53.78	174.658			
13,600.00	7,450.00	7,265.15	7,245.89	57.27	23.92	55.929	14,580.42	1,682.26	9,292.50	9,238.67	53.83	172.641			
13,700.00	7,450.00	7,267.75	7,248.49	58.02	23.93	56.270	14,580.48	1,682.26	9,192.57	9,138.70	53.88	170.626			
13,800.00	7,450.00	7,270.34	7,251.08	58.77	23.94	56.612	14,580.54	1,682.27	9,092.65	9,038.73	53.93	168.611			
13,900.00	7,450.00	7,272.92	7,253.66	59.52	23.95	56.955	14,580.59	1,682.27	8,992.73	8,938.75	53.98	166.599			
14,000.00	7,450.00	7,275.49	7,256.23	60.28	23.96	57.300	14,580.65	1,682.27	8,892.81	8,838.78	54.03	164.587			
14,100.00	7,450.00	7,278.05	7,258.79	61.04	23.96	57.645	14,580.71	1,682.28	8,792.89	8,738.81	54.08	162.578			
14,200.00	7,450.00	7,280.60	7,261.34	61.80	23.97	57.992	14,580.76	1,682.28	8,692.98	8,638.84	54.14	160.570			
14,300.00	7,450.00	7,283.14	7,263.88	62.56	23.98	58.340	14,580.82	1,682.28	8,593.06	8,538.87	54.19	158.563			
14,400.00	7,450.00	7,285.67	7,266.41	63.33	23.99	58.690	14,580.87	1,682.29	8,493.15	8,438.90	54.25	156.559			
14,500.00	7,450.00	7,288.19	7,268.92	64.10	24.00	59.040	14,580.92	1,682.29	8,393.23	8,338.93	54.31	154.556			
14,600.00	7,450.00	7,290.69	7,271.43	64.87	24.01	59.391	14,580.98	1,682.30	8,293.32	8,238.96	54.36	152.555			
14,700.00	7,450.00	7,293.19	7,273.92	65.64	24.01	59.744	14,581.03	1,682.30	8,193.41	8,138.99	54.42	150.557			
14,800.00	7,450.00	7,295.68	7,276.41	66.42	24.02	60.098	14,581.09	1,682.31	8,093.51	8,039.03	54.48	148.560			
14,900.00	7,450.00	7,298.15	7,278.89	67.20	24.03	60.453	14,581.14	1,682.31	7,993.60	7,939.06	54.54	146.566			
15,000.00	7,450.00	7,300.62	7,281.35	67.98	24.04	60.808	14,581.19	1,682.31	7,893.69	7,839.09	54.60	144.574			
15,100.00	7,450.00	7,303.07	7,283.81	68.76	24.05	61.165	14,581.24	1,682.32	7,793.79	7,739.13	54.66	142.584			
15,200.00	7,450.00	7,305.52	7,286.25	69.54	24.05	61.523	14,581.30	1,682.32	7,693.89	7,639.17	54.72	140.597			
15,300.00	7,450.00	7,307.95	7,288.69	70.33	24.06	61.882	14,581.35	1,682.33	7,593.99	7,539.20	54.79	138.612			
15,400.00	7,450.00	7,310.82	7,291.55	71.12	24.07	62.307	14,581.41	1,682.34	7,494.09	7,439.24	54.85	136.624			
15,500.00	7,450.00	7,313.67	7,294.40	71.90	24.08	62.733	14,581.47	1,682.34	7,394.20	7,339.28	54.92	134.640			
15,600.00	7,450.00	7,316.49	7,297.22	72.70	24.09	63.158	14,581.53	1,682.35	7,294.30	7,239.32	54.99	132.658			
15,700.00	7,450.00	7,319.27	7,300.00	73.49	24.10	63.581	14,581.58	1,682.36	7,194.41	7,139.36	55.05	130.680			
15,800.00	7,450.00	7,322.03	7,302.75	74.28	24.11	64.002	14,581.64	1,682.37	7,094.52	7,039.40	55.12	128.705			
15,900.00	7,450.00	7,324.75	7,305.48	75.08	24.12	64.422	14,581.70	1,682.38	6,994.64	6,939.45	55.19	126.732			
16,000.00	7,450.00	7,327.45	7,308.17	75.87	24.13	64.841	14,581.75	1,682.40	6,894.75	6,839.49	55.26	124.764			
16,100.00	7,450.00	7,330.11	7,310.84	76.67	24.13	65.258	14,581.81	1,682.41	6,794.87	6,739.54	55.33	122.798			
16,200.00	7,450.00	7,332.75	7,313.48	77.47	24.14	65.673	14,581.86	1,682.42	6,694.99	6,639.59	55.41	120.836			
16,300.00	7,450.00	7,335.36	7,316.09	78.27	24.15	66.087	14,581.91	1,682.44	6,595.12	6,539.64	55.48	118.877			
16,400.00	7,450.00	7,337.95	7,318.67	79.07	24.16	66.498	14,581.96	1,682.45	6,495.24	6,439.69	55.55	116.921			
16,500.00	7,450.00	7,340.50	7,321.23	79.88	24.17	66.909	14,582.02	1,682.47	6,395.37	6,339.75	55.63	114.969			
16,600.00	7,450.00	7,343.03	7,323.76	80.68	24.18	67.317	14,582.07	1,682.49	6,295.51	6,239.81	55.70	113.020			
16,700.00	7,450.00	7,345.54	7,326.26	81.49	24.18	67.724	14,582.12	1,682.50	6,195.64	6,139.87	55.78	111.075			
16,800.00	7,450.00	7,348.02	7,328.74	82.29	24.19	68.128	14,582.16	1,682.52	6,095.79	6,039.93	55.86	109.133			
16,900.00	7,450.00	7,350.47	7,331.19	83.10	24.20	68.531	14,582.21	1,682.54	5,995.93	5,940.00	55.93	107.195			
17,000.00	7,450.00	7,352.90	7,333.62	83.91	24.21	68.932	14,582.26	1,682.56	5,896.08	5,840.06	56.01	105.260			
17,100.00	7,450.00	7,355.30	7,336.02	84.72	24.22	69.332	14,582.31	1,682.58	5,796.23	5,740.14	56.09	103.330			
17,200.00	7,450.00	7,357.68	7,338.40	85.53	24.22	69.729	14,582.35	1,682.60	5,696.39	5,640.21	56.18	101.402			
17,300.00	7,450.00	7,360.03	7,340.75	86.34	24.23	70.124	14,582.40	1,682.62	5,596.55	5,540.29	56.26	99.479			
17,400.00	7,450.00	7,362.37	7,343.08	87.16	24.24	70.517	14,582.44	1,682.64	5,496.72	5,440.38	56.34	97.559			
17,500.00	7,450.00	7,364.67	7,345.39	87.97	24.25	70.908	14,582.49	1,682.66	5,396.89	5,340.46	56.43	95.643			
17,600.00	7,450.00	7,366.96	7,347.68	88.78	24.25	71.297	14,582.53	1,682.69	5,297.07	5,240.56	56.51	93.730			
17,700.00	7,450.00	7,369.22	7,349.94	89.60	24.26	71.684	14,582.57	1,682.71	5,197.26	5,140.65	56.60	91.821			
17,800.00	7,450.00	7,371.46	7,352.18	90.42	24.27	72.069	14,582.61	1,682.73	5,097.45	5,040.76	56.69	89.916			
17,900.00	7,450.00	7,373.68	7,354.40	91.23	24.28	72.452	14,582.65	1,682.76	4,997.64	4,940.86	56.78	88.015			
18,000.00	7,450.00	7,375.88	7,356.60	92.05	24.28	72.833	14,582.70	1,682.78	4,897.85	4,840.98	56.87	86.117			

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 302H
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 302H	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
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Semi Major Axis Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre		Distance Between Centres (usft)		Minimum Separation (usft)	Separation Factor	Warning
							+N/-S (usft)	+E/-W (usft)					
18,100.00	7,450.00	7,378.06	7,358.77	92.87	24.29	73.211	14,582.74	1,682.81	4,798.06	4,741.09	56.97	84.224	
18,197.24	7,450.00	7,380.15	7,360.87	93.67	24.30	73.577	14,582.77	1,682.83	4,701.04	4,643.98	57.06	82.386	
18,200.00	7,450.00	7,380.21	7,360.93	93.69	24.30	73.816	14,582.78	1,682.83	4,698.28	4,641.22	57.06	82.334	
18,229.54	7,450.00	7,380.84	7,361.56	93.93	24.30	76.014	14,582.79	1,682.84	4,668.82	4,611.73	57.09	81.776	
18,300.00	7,450.00	7,382.33	7,363.05	94.51	24.30	76.241	14,582.81	1,682.86	4,598.58	4,541.42	57.16	80.446	
18,400.00	7,450.00	7,384.43	7,365.14	95.33	24.31	76.562	14,582.85	1,682.88	4,498.91	4,441.64	57.27	78.560	
18,500.00	7,450.00	7,386.51	7,367.22	96.15	24.32	76.880	14,582.89	1,682.91	4,399.24	4,341.87	57.37	76.678	
18,600.00	7,450.00	7,388.57	7,369.28	96.98	24.32	77.196	14,582.93	1,682.93	4,299.60	4,242.11	57.48	74.800	
18,700.00	7,450.00	7,390.60	7,371.31	97.80	24.33	77.510	14,582.96	1,682.96	4,199.96	4,142.37	57.59	72.924	
18,800.00	7,450.00	7,392.62	7,373.33	98.62	24.34	77.821	14,583.00	1,682.99	4,100.35	4,042.64	57.71	71.051	
18,900.00	7,450.00	7,394.62	7,375.33	99.45	24.34	78.130	14,583.04	1,683.01	4,000.75	3,942.92	57.83	69.182	
19,000.00	7,450.00	7,396.60	7,377.31	100.28	24.35	78.437	14,583.07	1,683.04	3,901.17	3,843.22	57.95	67.315	
19,100.00	7,450.00	7,398.56	7,379.27	101.10	24.36	78.741	14,583.10	1,683.07	3,801.62	3,743.53	58.08	65.451	
19,200.00	7,450.00	7,400.50	7,381.21	101.93	24.36	79.044	14,583.14	1,683.10	3,702.08	3,643.87	58.22	63.589	
19,300.00	7,450.00	7,402.67	7,383.38	102.76	24.37	79.383	14,583.18	1,683.13	3,602.58	3,544.21	58.36	61.729	
19,400.00	7,450.00	7,405.66	7,386.37	103.58	24.38	79.850	14,583.23	1,683.17	3,503.09	3,444.58	58.52	59.866	
19,500.00	7,450.00	7,408.53	7,389.24	104.41	24.39	80.300	14,583.28	1,683.21	3,403.64	3,344.96	58.68	58.006	
19,600.00	7,450.00	7,411.30	7,392.00	105.24	24.40	80.734	14,583.32	1,683.25	3,304.22	3,245.37	58.85	56.149	
19,700.00	7,450.00	7,413.96	7,394.66	106.07	24.41	81.153	14,583.37	1,683.29	3,204.83	3,145.81	59.03	54.294	
19,800.00	7,450.00	7,416.52	7,397.22	106.90	24.42	81.558	14,583.41	1,683.32	3,105.49	3,046.27	59.22	52.443	
19,900.00	7,450.00	7,418.99	7,399.69	107.73	24.42	81.948	14,583.45	1,683.36	3,006.18	2,946.76	59.42	50.593	
20,000.00	7,450.00	7,421.37	7,402.08	108.56	24.43	82.326	14,583.48	1,683.39	2,906.92	2,847.29	59.63	48.745	
20,100.00	7,450.00	7,423.67	7,404.38	109.40	24.44	82.691	14,583.52	1,683.42	2,807.71	2,747.85	59.87	46.899	
20,200.00	7,450.00	7,425.90	7,406.60	110.23	24.45	83.044	14,583.55	1,683.44	2,708.56	2,648.44	60.12	45.055	
20,300.00	7,450.00	7,428.04	7,408.75	111.06	24.45	83.385	14,583.58	1,683.47	2,609.47	2,549.08	60.39	43.211	
20,400.00	7,450.00	7,430.12	7,410.82	111.89	24.46	83.716	14,583.61	1,683.50	2,510.46	2,449.77	60.69	41.368	
20,500.00	7,450.00	7,432.13	7,412.83	112.73	24.47	84.036	14,583.64	1,683.52	2,411.52	2,350.51	61.01	39.526	
20,600.00	7,450.00	7,434.08	7,414.78	113.56	24.47	84.347	14,583.67	1,683.54	2,312.67	2,251.30	61.37	37.683	
20,700.00	7,450.00	7,435.96	7,416.66	114.40	24.48	84.648	14,583.69	1,683.57	2,213.93	2,152.16	61.77	35.841	
20,800.00	7,450.00	7,437.79	7,418.49	115.23	24.48	84.940	14,583.72	1,683.59	2,115.30	2,053.08	62.22	33.997	
20,900.00	7,450.00	7,439.56	7,420.26	116.07	24.49	85.223	14,583.74	1,683.61	2,016.81	1,954.08	62.72	32.154	
21,000.00	7,450.00	7,441.28	7,421.98	116.90	24.50	85.498	14,583.76	1,683.63	1,918.47	1,855.17	63.30	30.309	
21,100.00	7,450.00	7,442.94	7,423.64	117.74	24.50	85.765	14,583.78	1,683.64	1,820.31	1,756.36	63.95	28.463	
21,200.00	7,450.00	7,444.56	7,425.26	118.57	24.51	86.024	14,583.81	1,683.66	1,722.36	1,657.65	64.71	26.617	
21,300.00	7,450.00	7,446.13	7,426.83	119.41	24.51	86.276	14,583.83	1,683.68	1,624.66	1,559.08	65.59	24.771	
21,400.00	7,450.00	7,447.66	7,428.36	120.25	24.52	86.521	14,583.84	1,683.69	1,527.26	1,460.64	66.62	22.926	
21,500.00	7,450.00	7,449.15	7,429.85	121.09	24.52	86.759	14,583.86	1,683.71	1,430.21	1,362.38	67.83	21.085	
21,600.00	7,450.00	7,450.59	7,431.29	121.92	24.53	86.991	14,583.88	1,683.72	1,333.60	1,264.32	69.28	19.249	
21,700.00	7,450.00	7,451.99	7,432.69	122.76	24.53	87.217	14,583.90	1,683.74	1,237.53	1,166.50	71.03	17.424	
21,800.00	7,450.00	7,453.36	7,434.06	123.60	24.54	87.436	14,583.91	1,683.75	1,142.13	1,068.98	73.15	15.614	
21,900.00	7,450.00	7,454.69	7,435.39	124.44	24.54	87.650	14,583.93	1,683.76	1,047.59	971.84	75.75	13.830	
22,000.00	7,450.00	7,455.99	7,436.69	125.28	24.54	87.859	14,583.94	1,683.78	954.16	875.18	78.98	12.081	
22,100.00	7,450.00	7,457.25	7,437.95	126.12	24.55	88.062	14,583.96	1,683.79	862.20	779.18	83.02	10.385	
22,200.00	7,450.00	7,458.48	7,439.18	126.96	24.55	88.259	14,583.97	1,683.80	772.24	684.11	88.13	8.762	
22,300.00	7,450.00	7,459.68	7,440.38	127.80	24.56	88.452	14,583.98	1,683.81	685.07	590.43	94.64	7.239	
22,400.00	7,450.00	7,460.85	7,441.55	128.64	24.56	88.640	14,584.00	1,683.82	601.90	498.96	102.94	5.847	
22,500.00	7,450.00	7,461.99	7,442.69	129.48	24.56	88.824	14,584.01	1,683.83	524.64	411.24	113.39	4.627	
22,600.00	7,450.00	7,463.11	7,443.80	130.32	24.57	89.003	14,584.02	1,683.84	456.29	330.22	126.07	3.619	
22,700.00	7,450.00	7,464.19	7,444.89	131.16	24.57	89.178	14,584.03	1,683.85	401.45	261.48	139.97	2.868	
22,800.00	7,450.00	7,465.25	7,445.95	132.00	24.57	89.349	14,584.04	1,683.86	366.22	214.28	151.93	2.410	
22,885.25	7,450.00	7,466.14	7,446.84	132.72	24.58	89.491	14,584.05	1,683.87	356.16	199.20	156.96	2.269 CC, ES	
22,900.00	7,450.00	7,466.29	7,446.99	132.84	24.58	89.516	14,584.05	1,683.87	356.46	199.31	157.16	2.268 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 302H
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 302H	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	Rule Assigned:										Warning
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference	Offset	Highside Toolface (°)	Offset Wellbore Centre	+N-S (usft)	+E-W (usft)	Distance Between Centres (usft)	Distance Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor
23,000.00	7,450.00	7,467.30	7,448.00	133.69	24.58	89.678	14,584.06	1,683.88	374.19	220.87	153.32	2.441	
23,100.00	7,450.00	7,468.29	7,448.99	134.53	24.58	89.838	14,584.07	1,683.89	415.89	272.63	143.26	2.903	
23,200.00	7,450.00	7,469.26	7,449.96	135.37	24.59	89.993	14,584.08	1,683.90	475.30	343.84	131.46	3.616	
23,300.00	7,450.00	7,470.21	7,450.90	136.21	24.59	90.145	14,584.09	1,683.90	546.68	426.10	120.58	4.534	
23,400.00	7,450.00	7,471.13	7,451.83	137.06	24.59	90.294	14,584.10	1,683.91	625.94	514.47	111.47	5.616	
23,455.58	7,450.00	7,471.64	7,452.33	137.52	24.59	90.375	14,584.10	1,683.92	672.38	565.21	107.17	6.274	

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 302H
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 302H	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)	Semi Major Axis Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre		Distance Between Centres (usft)		Minimum Separation (usft)	Separation Factor	Warning		
							+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)					
12,800.00	7,450.00	5,684.06	5,627.40	51.42	20.62	17.687	14,269.70	1,962.91	9,957.19	9,907.51	49.69	200.390			
12,839.11	7,450.00	5,687.28	5,630.57	51.70	20.63	17.718	14,270.28	1,962.96	9,918.82	9,869.09	49.72	199.483			
12,839.67	7,450.00	5,687.33	5,630.62	51.70	20.63	17.664	14,270.29	1,962.96	9,918.26	9,868.54	49.72	199.470			
12,900.00	7,450.00	5,692.33	5,635.53	52.13	20.65	17.711	14,271.21	1,963.04	9,859.07	9,809.29	49.78	198.071			
13,000.00	7,450.00	5,720.00	5,662.72	52.85	20.76	17.975	14,276.33	1,963.41	9,761.01	9,711.07	49.94	195.463			
13,100.00	7,450.00	5,720.00	5,662.72	53.58	20.76	17.975	14,276.33	1,963.41	9,662.89	9,612.90	50.00	193.268			
13,200.00	7,450.00	5,720.00	5,662.72	54.31	20.76	17.975	14,276.33	1,963.41	9,564.82	9,514.76	50.06	191.067			
13,300.00	7,450.00	5,733.71	5,676.19	55.04	20.81	18.108	14,278.90	1,963.57	9,466.78	9,416.61	50.18	188.670			
13,400.00	7,450.00	5,752.40	5,694.54	55.78	20.88	18.292	14,282.39	1,963.77	9,368.75	9,318.43	50.31	186.209			
13,500.00	7,450.00	5,771.09	5,712.90	56.52	20.95	18.479	14,285.89	1,963.97	9,270.72	9,220.26	50.45	183.755			
13,600.00	7,450.00	5,789.79	5,731.28	57.27	21.02	18.670	14,289.39	1,964.14	9,172.69	9,122.10	50.59	181.308			
13,700.00	7,450.00	5,808.50	5,749.65	58.02	21.09	18.863	14,292.89	1,964.31	9,074.67	9,023.93	50.73	178.868			
13,800.00	7,450.00	5,830.88	5,771.64	58.77	21.18	19.100	14,297.08	1,964.51	8,976.65	8,925.75	50.89	176.391			
13,900.00	7,450.00	5,853.46	5,793.82	59.52	21.27	19.345	14,301.29	1,964.73	8,878.62	8,827.57	51.05	173.922			
14,000.00	7,450.00	5,875.93	5,815.89	60.28	21.35	19.595	14,305.47	1,964.97	8,780.59	8,729.38	51.21	171.465			
14,100.00	7,450.00	5,898.27	5,837.85	61.04	21.44	19.851	14,309.61	1,965.23	8,682.56	8,631.19	51.37	169.019			
14,200.00	7,450.00	5,952.91	5,891.56	61.80	21.65	20.504	14,319.63	1,965.90	8,584.49	8,532.86	51.64	166.241			
14,300.00	7,450.00	6,006.14	5,943.92	62.56	21.85	21.181	14,329.15	1,966.61	8,486.36	8,434.45	51.90	163.506			
14,400.00	7,450.00	6,004.89	5,942.69	63.33	21.84	21.165	14,328.95	1,966.58	8,388.23	8,336.24	51.99	161.348			
14,500.00	7,450.00	6,016.97	5,954.58	64.10	21.89	21.324	14,331.12	1,966.73	8,290.11	8,237.99	52.12	159.056			
14,600.00	7,450.00	6,029.16	5,966.56	64.87	21.94	21.486	14,333.32	1,966.87	8,192.01	8,139.76	52.26	156.768			
14,700.00	7,450.00	6,041.45	5,978.65	65.64	21.98	21.651	14,335.54	1,967.01	8,093.93	8,041.54	52.39	154.482			
14,800.00	7,450.00	6,053.84	5,990.83	66.42	22.03	21.820	14,337.80	1,967.14	7,995.87	7,943.34	52.53	152.201			
14,900.00	7,450.00	6,079.00	6,015.56	67.20	22.13	22.170	14,342.40	1,967.37	7,897.85	7,845.13	52.72	149.819			
15,000.00	7,450.00	6,079.00	6,015.56	67.98	22.13	22.170	14,342.40	1,967.37	7,799.82	7,746.99	52.83	147.650			
15,100.00	7,450.00	6,094.90	6,031.19	68.76	22.19	22.396	14,345.33	1,967.52	7,701.82	7,648.83	52.99	145.356			
15,200.00	7,450.00	6,110.93	6,046.95	69.54	22.25	22.629	14,348.28	1,967.68	7,603.83	7,550.68	53.15	143.069			
15,300.00	7,450.00	6,351.00	6,283.51	70.33	23.16	26.709	14,388.96	1,969.31	7,505.47	7,451.54	53.93	139.178			
15,400.00	7,450.00	6,382.87	6,315.02	71.12	23.28	27.335	14,393.74	1,969.05	7,406.82	7,352.70	54.12	136.853			
15,500.00	7,450.00	6,388.25	6,320.34	71.90	23.30	27.443	14,394.58	1,968.99	7,308.33	7,254.09	54.24	134.732			
15,600.00	7,450.00	6,393.73	6,325.75	72.70	23.32	27.554	14,395.44	1,968.92	7,209.88	7,155.51	54.37	132.611			
15,700.00	7,450.00	6,399.31	6,331.25	73.49	23.34	27.667	14,396.32	1,968.86	7,111.45	7,056.95	54.50	130.490			
15,800.00	7,450.00	6,404.99	6,336.87	74.28	23.36	27.783	14,397.22	1,968.78	7,013.06	6,958.42	54.63	128.371			
15,900.00	7,450.00	6,410.79	6,342.58	75.08	23.38	27.902	14,398.15	1,968.70	6,914.70	6,859.93	54.77	126.252			
16,000.00	7,450.00	6,440.00	6,371.39	75.87	23.49	28.514	14,402.99	1,968.24	6,816.48	6,761.51	54.96	124.015			
16,100.00	7,450.00	6,440.00	6,371.39	76.67	23.49	28.514	14,402.99	1,968.24	6,718.14	6,663.04	55.10	121.936			
16,200.00	7,450.00	6,440.00	6,371.39	77.47	23.49	28.514	14,402.99	1,968.24	6,619.84	6,564.61	55.23	119.855			
16,300.00	7,450.00	6,440.00	6,371.39	78.27	23.49	28.514	14,402.99	1,968.24	6,521.61	6,466.23	55.37	117.772			
16,400.00	7,450.00	6,440.00	6,371.39	79.07	23.49	28.514	14,402.99	1,968.24	6,423.42	6,367.90	55.52	115.687			
16,500.00	7,450.00	6,440.00	6,371.39	79.88	23.49	28.514	14,402.99	1,968.24	6,325.29	6,269.61	55.68	113.600			
16,600.00	7,450.00	6,945.07	6,869.98	80.68	25.35	43.602	14,472.64	1,933.93	6,226.77	6,169.83	56.94	109.363			
16,700.00	7,450.00	6,978.00	6,902.57	81.49	25.47	45.095	14,476.16	1,930.76	6,127.85	6,070.72	57.13	107.256			
16,800.00	7,450.00	6,978.00	6,902.57	82.29	25.47	45.095	14,476.16	1,930.76	6,028.67	5,971.43	57.24	105.329			
16,900.00	7,450.00	6,978.00	6,902.57	83.10	25.47	45.095	14,476.16	1,930.76	5,929.51	5,872.17	57.34	103.403			
17,000.00	7,450.00	6,978.00	6,902.57	83.91	25.47	45.095	14,476.16	1,930.76	5,830.38	5,772.93	57.45	101.478			
17,100.00	7,450.00	6,978.00	6,902.57	84.72	25.47	45.095	14,476.16	1,930.76	5,731.29	5,673.72	57.57	99.552			
17,200.00	7,450.00	6,978.00	6,902.57	85.53	25.47	45.095	14,476.16	1,930.76	5,632.22	5,574.53	57.69	97.626			
17,300.00	7,450.00	6,978.00	6,902.57	86.34	25.47	45.095	14,476.16	1,930.76	5,533.19	5,475.38	57.82	95.701			
17,400.00	7,450.00	6,978.00	6,902.57	87.16	25.47	45.095	14,476.16	1,930.76	5,434.20	5,376.25	57.95	93.775			
17,500.00	7,450.00	6,978.00	6,902.57	87.97	25.47	45.095	14,476.16	1,930.76	5,335.24	5,277.15	58.09	91.849			
17,600.00	7,450.00	6,978.00	6,902.57	88.78	25.47	45.095	14,476.16	1,930.76	5,236.32	5,178.09	58.23	89.923			
17,700.00	7,450.00	6,978.00	6,902.57	89.60	25.47	45.095	14,476.16	1,930.76	5,137.45	5,079.06	58.38	87.997			

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 302H
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 302H	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)	Semi Major Axis Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre		Distance Between Centres (usft)		Minimum Separation (usft)	Separation Factor	Warning
							+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)			
17,800.00	7,450.00	6,996.44	6,920.80	90.42	25.53	45.968	14,478.26	1,928.89	5,038.56	4,979.99	58.57	86.029	
17,900.00	7,450.00	7,004.02	6,928.28	91.23	25.56	46.335	14,479.13	1,928.11	4,939.73	4,880.98	58.74	84.093	
18,000.00	7,450.00	7,011.71	6,935.88	92.05	25.59	46.714	14,480.03	1,927.31	4,840.92	4,782.00	58.92	82.160	
18,100.00	7,450.00	7,019.52	6,943.60	92.87	25.62	47.104	14,480.95	1,926.50	4,742.14	4,683.03	59.11	80.232	
18,197.24	7,450.00	7,027.24	6,951.22	93.67	25.64	47.495	14,481.86	1,925.69	4,646.12	4,586.83	59.29	78.360	
18,200.00	7,450.00	7,027.46	6,951.43	93.69	25.64	47.737	14,481.88	1,925.66	4,643.39	4,584.10	59.30	78.307	
18,229.54	7,450.00	7,029.84	6,953.78	93.93	25.65	50.194	14,482.17	1,925.41	4,614.25	4,554.90	59.36	77.738	
18,300.00	7,450.00	7,035.59	6,959.46	94.51	25.67	50.490	14,482.85	1,924.80	4,544.80	4,485.30	59.50	76.380	
18,400.00	7,450.00	7,043.86	6,967.62	95.33	25.70	50.921	14,483.85	1,923.92	4,446.28	4,386.56	59.72	74.456	
18,500.00	7,450.00	7,052.27	6,975.92	96.15	25.73	51.365	14,484.86	1,923.01	4,347.79	4,287.85	59.94	72.535	
18,600.00	7,450.00	7,068.00	6,991.44	96.98	25.79	52.213	14,486.79	1,921.30	4,249.36	4,189.18	60.17	70.617	
18,700.00	7,450.00	7,068.00	6,991.44	97.80	25.79	52.213	14,486.79	1,921.30	4,150.96	4,090.54	60.42	68.705	
18,800.00	7,450.00	7,068.00	6,991.44	98.62	25.79	52.213	14,486.79	1,921.30	4,052.64	3,991.96	60.68	66.791	
18,900.00	7,450.00	7,088.17	7,011.33	99.45	25.86	53.336	14,489.30	1,919.09	3,954.33	3,893.39	60.94	64.891	
19,000.00	7,450.00	7,097.66	7,020.68	100.28	25.90	53.878	14,490.49	1,918.05	3,856.10	3,794.88	61.22	62.991	
19,100.00	7,450.00	7,107.28	7,030.17	101.10	25.93	54.438	14,491.71	1,916.99	3,757.93	3,696.42	61.51	61.095	
19,200.00	7,450.00	7,117.03	7,039.78	101.93	25.97	55.015	14,492.95	1,915.92	3,659.83	3,598.01	61.82	59.203	
19,300.00	7,450.00	7,126.91	7,049.52	102.76	26.00	55.611	14,494.22	1,914.82	3,561.79	3,499.65	62.14	57.316	
19,400.00	7,450.00	7,136.94	7,059.40	103.58	26.04	56.226	14,495.52	1,913.72	3,463.83	3,401.35	62.49	55.434	
19,500.00	7,450.00	7,157.00	7,079.17	104.41	26.11	57.491	14,498.14	1,911.50	3,365.97	3,303.15	62.83	53.577	
19,600.00	7,450.00	7,157.00	7,079.17	105.24	26.11	57.491	14,498.14	1,911.50	3,268.16	3,204.92	63.24	51.683	
19,700.00	7,450.00	7,157.00	7,079.17	106.07	26.11	57.491	14,498.14	1,911.50	3,170.48	3,106.80	63.68	49.788	
19,800.00	7,450.00	7,157.00	7,079.17	106.90	26.11	57.491	14,498.14	1,911.50	3,072.96	3,008.79	64.16	47.892	
19,900.00	7,450.00	7,157.00	7,079.17	107.73	26.11	57.491	14,498.14	1,911.50	2,975.60	2,910.90	64.69	45.997	
20,000.00	7,450.00	7,157.00	7,079.17	108.56	26.11	57.491	14,498.14	1,911.50	2,878.42	2,813.15	65.27	44.101	
20,100.00	7,450.00	7,157.00	7,079.17	109.40	26.11	57.491	14,498.14	1,911.50	2,781.43	2,715.53	65.90	42.206	
20,200.00	7,450.00	7,157.00	7,079.17	110.23	26.11	57.491	14,498.14	1,911.50	2,684.67	2,618.08	66.60	40.313	
20,300.00	7,450.00	7,190.00	7,111.61	111.06	26.24	59.664	14,502.89	1,907.76	2,587.56	2,520.46	67.10	38.564	
20,400.00	7,450.00	7,195.72	7,117.21	111.89	26.26	60.051	14,503.79	1,907.09	2,491.09	2,423.23	67.86	36.710	
20,500.00	7,450.00	7,201.75	7,123.12	112.73	26.28	60.464	14,504.78	1,906.38	2,394.86	2,326.17	68.69	34.865	
20,600.00	7,450.00	7,208.13	7,129.37	113.56	26.30	60.905	14,505.85	1,905.63	2,298.92	2,229.31	69.60	33.029	
20,700.00	7,450.00	7,214.89	7,135.98	114.40	26.33	61.377	14,507.01	1,904.82	2,203.28	2,132.67	70.61	31.205	
20,800.00	7,450.00	7,247.00	7,167.27	115.23	26.45	63.682	14,513.02	1,900.89	2,108.35	2,036.96	71.40	29.531	
20,900.00	7,450.00	7,247.00	7,167.27	116.07	26.45	63.682	14,513.02	1,900.89	2,013.26	1,940.57	72.69	27.696	
21,000.00	7,450.00	7,247.00	7,167.27	116.90	26.45	63.682	14,513.02	1,900.89	1,918.67	1,844.52	74.15	25.876	
21,100.00	7,450.00	7,247.00	7,167.27	117.74	26.45	63.682	14,513.02	1,900.89	1,824.66	1,748.86	75.80	24.073	
21,200.00	7,450.00	7,290.69	7,209.82	118.57	26.61	67.022	14,521.37	1,895.54	1,731.08	1,654.22	76.86	22.522	
21,300.00	7,450.00	7,330.04	7,248.28	119.41	26.76	70.254	14,528.28	1,890.92	1,637.77	1,559.59	78.18	20.948	
21,400.00	7,450.00	7,350.22	7,268.05	120.25	26.84	71.992	14,531.63	1,888.62	1,544.96	1,464.91	80.04	19.301	
21,500.00	7,450.00	7,366.63	7,284.13	121.09	26.90	73.443	14,534.34	1,886.77	1,452.90	1,370.66	82.24	17.666	
21,600.00	7,450.00	7,383.01	7,300.18	121.92	26.96	74.923	14,537.05	1,884.94	1,361.77	1,277.00	84.77	16.065	
21,700.00	7,450.00	7,399.38	7,316.22	122.76	27.02	76.433	14,539.75	1,883.12	1,271.75	1,184.07	87.68	14.505	
21,800.00	7,450.00	7,415.72	7,332.23	123.60	27.08	77.971	14,542.45	1,881.32	1,183.10	1,092.04	91.06	12.993	
21,900.00	7,450.00	7,432.43	7,348.62	124.44	27.14	79.573	14,545.21	1,879.50	1,096.16	1,001.18	94.98	11.541	
22,000.00	7,450.00	7,449.62	7,365.48	125.28	27.21	81.250	14,548.00	1,877.68	1,011.35	911.80	99.56	10.159	
22,100.00	7,450.00	7,466.23	7,381.79	126.12	27.27	82.898	14,550.66	1,875.98	929.28	824.36	104.92	8.857	
22,200.00	7,450.00	7,482.28	7,397.56	126.96	27.33	84.513	14,553.18	1,874.40	850.73	739.56	111.17	7.652	
22,300.00	7,450.00	7,497.80	7,412.82	127.80	27.39	86.094	14,555.59	1,872.92	776.81	658.42	118.39	6.561	
22,400.00	7,450.00	7,512.81	7,427.59	128.64	27.44	87.638	14,557.87	1,871.53	708.98	582.44	126.54	5.603	
22,500.00	7,450.00	7,526.68	7,441.24	129.48	27.50	89.074	14,559.98	1,870.28	649.17	513.78	135.39	4.795	
22,600.00	7,450.00	7,541.03	7,455.35	130.32	27.55	90.567	14,562.22	1,868.99	599.80	455.54	144.27	4.158	
22,700.00	7,450.00	7,556.26	7,470.33	131.16	27.61	92.158	14,564.67	1,867.61	563.58	411.50	152.09	3.706	

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 302H
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 302H	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		Rule Assigned:		Distance		Between		Minimum	Separation	Warning			
Measured	Vertical	Measured	Vertical	Reference	Offset	Highside	Offset Wellbore Centre		Between	Between	Separation	Factor			
Depth	Depth	Depth	Depth			Toolface	+N-S	+E-W	Centres	Ellipses	Separation				
(usft)	(usft)	(usft)	(usft)	(usft)	(usft)	(°)	(usft)	(usft)	(usft)	(usft)	(usft)				
22,800.00	7,450.00	7,572.47	7,486.24	132.00	27.67	93.853	14,567.37	1,866.15	543.11	385.66	157.45	3.449			
22,866.63	7,450.00	7,583.85	7,497.40	132.56	27.71	95.044	14,569.31	1,865.12	539.13	380.06	159.07	3.389	CC, ES, SF		
22,900.00	7,450.00	7,589.73	7,503.18	132.84	27.73	95.660	14,570.33	1,864.59	540.13	380.92	159.21	3.393			
23,000.00	7,450.00	7,608.05	7,521.13	133.69	27.80	97.574	14,573.58	1,862.94	554.87	397.78	157.09	3.532			
23,100.00	7,450.00	7,626.20	7,538.91	134.53	27.87	99.464	14,576.85	1,861.30	585.97	434.06	151.91	3.857			
23,200.00	7,450.00	7,644.65	7,556.97	135.37	27.94	101.373	14,580.21	1,859.66	631.01	486.05	144.96	4.353			
23,300.00	7,450.00	7,663.39	7,575.32	136.21	28.01	103.298	14,583.65	1,858.00	687.24	549.80	137.44	5.000			
23,400.00	7,450.00	7,682.44	7,593.97	137.06	28.09	105.235	14,587.18	1,856.32	752.14	621.99	130.15	5.779			
23,455.58	7,450.00	7,693.17	7,604.46	137.52	28.13	106.314	14,589.17	1,855.38	791.18	664.82	126.37	6.261			

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



MS Directional Anticollision Report



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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 302H	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)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Distance Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning
12,300.00	7,450.00	8,264.21	8,206.23	47.90	29.19	151.368	13,953.96	1,797.77	9,994.88	9,936.77	58.10	172.021	
12,400.00	7,450.00	8,261.44	8,203.46	48.59	29.18	151.276	13,954.17	1,797.83	9,895.25	9,837.11	58.15	170.181	
12,500.00	7,450.00	8,258.64	8,200.67	49.29	29.17	151.183	13,954.38	1,797.89	9,795.63	9,737.44	58.19	168.341	
12,600.00	7,450.00	8,255.80	8,197.84	49.99	29.16	151.087	13,954.59	1,797.96	9,696.02	9,637.78	58.23	166.500	
12,700.00	7,450.00	8,252.92	8,194.97	50.70	29.15	150.990	13,954.81	1,798.02	9,596.41	9,538.13	58.28	164.659	
12,800.00	7,450.00	8,250.01	8,192.07	51.42	29.14	150.891	13,955.04	1,798.09	9,496.81	9,438.48	58.33	162.818	
12,839.11	7,450.00	8,248.87	8,190.93	51.70	29.13	150.852	13,955.13	1,798.12	9,457.86	9,399.51	58.35	162.098	
12,839.67	7,450.00	8,248.85	8,190.91	51.70	29.13	150.961	13,955.13	1,798.12	9,457.29	9,398.95	58.35	162.088	
12,900.00	7,450.00	8,247.07	8,189.14	52.13	29.12	150.900	13,955.27	1,798.16	9,397.21	9,338.83	58.38	160.977	
13,000.00	7,450.00	8,244.09	8,186.16	52.85	29.11	150.797	13,955.50	1,798.24	9,297.62	9,239.19	58.43	159.136	
13,100.00	7,450.00	8,241.06	8,183.15	53.58	29.10	150.692	13,955.74	1,798.31	9,198.03	9,139.56	58.48	157.295	
13,200.00	7,450.00	8,238.01	8,180.10	54.31	29.09	150.585	13,955.98	1,798.39	9,098.46	9,039.93	58.53	155.455	
13,300.00	7,450.00	8,234.91	8,177.02	55.04	29.08	150.476	13,956.23	1,798.48	8,998.88	8,940.30	58.58	153.615	
13,400.00	7,450.00	8,231.77	8,173.89	55.78	29.07	150.365	13,956.48	1,798.56	8,899.32	8,840.69	58.63	151.775	
13,500.00	7,450.00	8,228.59	8,170.72	56.52	29.06	150.251	13,956.73	1,798.65	8,799.76	8,741.07	58.69	149.936	
13,600.00	7,450.00	8,225.37	8,167.52	57.27	29.04	150.136	13,957.00	1,798.74	8,700.21	8,641.47	58.75	148.097	
13,700.00	7,450.00	8,222.11	8,164.27	58.02	29.03	150.017	13,957.26	1,798.83	8,600.67	8,541.86	58.80	146.260	
13,800.00	7,450.00	8,218.81	8,160.97	58.77	29.02	149.897	13,957.53	1,798.93	8,501.13	8,442.27	58.86	144.423	
13,900.00	7,450.00	8,215.46	8,157.64	59.52	29.01	149.773	13,957.81	1,799.03	8,401.61	8,342.68	58.92	142.586	
14,000.00	7,450.00	8,158.00	8,100.44	60.28	28.79	147.497	13,962.86	1,801.10	8,302.52	8,243.83	58.69	141.472	
14,100.00	7,450.00	8,158.00	8,100.44	61.04	28.79	147.497	13,962.86	1,801.10	8,202.95	8,144.19	58.76	139.589	
14,200.00	7,450.00	8,158.00	8,100.44	61.80	28.79	147.497	13,962.86	1,801.10	8,103.40	8,044.56	58.85	137.707	
14,300.00	7,450.00	8,158.00	8,100.44	62.56	28.79	147.497	13,962.86	1,801.10	8,003.86	7,944.93	58.93	135.827	
14,400.00	7,450.00	8,158.00	8,100.44	63.33	28.79	147.497	13,962.86	1,801.10	7,904.33	7,845.32	59.01	133.947	
14,500.00	7,450.00	8,158.00	8,100.44	64.10	28.79	147.497	13,962.86	1,801.10	7,804.82	7,745.72	59.10	132.068	
14,600.00	7,450.00	8,158.00	8,100.44	64.87	28.79	147.497	13,962.86	1,801.10	7,705.31	7,646.13	59.19	130.190	
14,700.00	7,450.00	8,158.00	8,100.44	65.64	28.79	147.497	13,962.86	1,801.10	7,605.82	7,546.54	59.28	128.313	
14,800.00	7,450.00	8,158.00	8,100.44	66.42	28.79	147.497	13,962.86	1,801.10	7,506.34	7,446.97	59.37	126.438	
14,900.00	7,450.00	8,158.00	8,100.44	67.20	28.79	147.497	13,962.86	1,801.10	7,406.88	7,347.42	59.46	124.564	
15,000.00	7,450.00	8,158.00	8,100.44	67.98	28.79	147.497	13,962.86	1,801.10	7,307.43	7,247.87	59.56	122.691	
15,100.00	7,450.00	8,158.00	8,100.44	68.76	28.79	147.497	13,962.86	1,801.10	7,208.00	7,148.34	59.66	120.819	
15,200.00	7,450.00	8,158.00	8,100.44	69.54	28.79	147.497	13,962.86	1,801.10	7,108.58	7,048.82	59.76	118.949	
15,300.00	7,450.00	8,158.00	8,100.44	70.33	28.79	147.497	13,962.86	1,801.10	7,009.18	6,949.31	59.87	117.080	
15,400.00	7,450.00	8,158.00	8,100.44	71.12	28.79	147.497	13,962.86	1,801.10	6,909.79	6,849.82	59.97	115.213	
15,500.00	7,450.00	8,158.00	8,100.44	71.90	28.79	147.497	13,962.86	1,801.10	6,810.43	6,750.34	60.08	113.348	
15,600.00	7,450.00	8,158.00	8,100.44	72.70	28.79	147.497	13,962.86	1,801.10	6,711.08	6,650.88	60.20	111.484	
15,700.00	7,450.00	8,158.00	8,100.44	73.49	28.79	147.497	13,962.86	1,801.10	6,611.75	6,551.44	60.31	109.621	
15,800.00	7,450.00	8,136.21	8,078.76	74.28	28.71	146.552	13,964.89	1,802.00	6,512.39	6,452.11	60.28	108.036	
15,900.00	7,450.00	8,130.14	8,072.73	75.08	28.68	146.282	13,965.47	1,802.26	6,413.07	6,352.71	60.36	106.253	
16,000.00	7,450.00	8,124.00	8,066.62	75.87	28.66	146.004	13,966.05	1,802.51	6,313.76	6,253.32	60.43	104.472	
16,100.00	7,450.00	8,117.80	8,060.45	76.67	28.64	145.720	13,966.64	1,802.76	6,214.46	6,153.94	60.51	102.693	
16,200.00	7,450.00	8,111.52	8,054.21	77.47	28.61	145.428	13,967.25	1,803.02	6,115.17	6,054.58	60.60	100.916	
16,300.00	7,450.00	8,105.18	8,047.90	78.27	28.59	145.129	13,967.86	1,803.28	6,015.90	5,955.22	60.68	99.142	
16,400.00	7,450.00	8,098.76	8,041.52	79.07	28.56	144.823	13,968.49	1,803.55	5,916.65	5,855.88	60.76	97.370	
16,500.00	7,450.00	8,092.27	8,035.07	79.88	28.54	144.509	13,969.12	1,803.81	5,817.41	5,756.55	60.85	95.601	
16,600.00	7,450.00	8,085.70	8,028.54	80.68	28.51	144.186	13,969.77	1,804.08	5,718.18	5,657.24	60.94	93.834	
16,700.00	7,450.00	8,064.00	8,006.96	81.49	28.43	143.087	13,971.93	1,804.97	5,619.00	5,558.09	60.91	92.256	
16,800.00	7,450.00	8,064.00	8,006.96	82.29	28.43	143.087	13,971.93	1,804.97	5,519.78	5,458.73	61.05	90.411	
16,900.00	7,450.00	8,064.00	8,006.96	83.10	28.43	143.087	13,971.93	1,804.97	5,420.60	5,359.39	61.20	88.567	
17,000.00	7,450.00	8,064.00	8,006.96	83.91	28.43	143.087	13,971.93	1,804.97	5,321.44	5,260.08	61.36	86.725	
17,100.00	7,450.00	8,064.00	8,006.96	84.72	28.43	143.087	13,971.93	1,804.97	5,222.32	5,160.80	61.52	84.886	
17,200.00	7,450.00	8,045.52	7,988.59	85.53	28.36	142.111	13,973.81	1,805.68	5,123.18	5,061.66	61.52	83.275	

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 302H
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 302H	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)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Distance Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning
17,300.00	7,450.00	8,038.65	7,981.77	86.34	28.33	141.740	13,974.52	1,805.92	5,024.08	4,962.45	61.63	81.523	
17,400.00	7,450.00	8,031.68	7,974.84	87.16	28.30	141.358	13,975.24	1,806.16	4,925.01	4,863.27	61.74	79.774	
17,500.00	7,450.00	8,024.60	7,967.79	87.97	28.27	140.964	13,975.98	1,806.39	4,825.95	4,764.10	61.85	78.028	
17,600.00	7,450.00	8,017.40	7,960.64	88.78	28.25	140.559	13,976.74	1,806.61	4,726.92	4,664.96	61.96	76.286	
17,700.00	7,450.00	8,010.08	7,953.37	89.60	28.22	140.140	13,977.52	1,806.82	4,627.92	4,565.84	62.08	74.546	
17,800.00	7,450.00	8,002.64	7,945.97	90.42	28.19	139.709	13,978.32	1,807.02	4,528.94	4,466.74	62.20	72.810	
17,900.00	7,450.00	7,995.08	7,938.46	91.23	28.16	139.263	13,979.14	1,807.21	4,429.99	4,367.67	62.33	71.076	
18,000.00	7,450.00	7,987.39	7,930.82	92.05	28.13	138.804	13,979.98	1,807.39	4,331.07	4,268.62	62.46	69.346	
18,100.00	7,450.00	7,969.00	7,912.54	92.87	28.06	137.674	13,982.01	1,807.76	4,232.20	4,169.73	62.47	67.746	
18,197.24	7,450.00	7,969.00	7,912.54	93.67	28.06	137.674	13,982.01	1,807.76	4,136.05	4,073.36	62.69	65.977	
18,200.00	7,450.00	7,969.00	7,912.54	93.69	28.06	137.408	13,982.01	1,807.76	4,133.33	4,070.63	62.70	65.927	
18,229.54	7,450.00	7,969.00	7,912.54	93.93	28.06	134.716	13,982.01	1,807.76	4,104.15	4,041.38	62.76	65.390	
18,300.00	7,450.00	7,969.00	7,912.54	94.51	28.06	134.716	13,982.01	1,807.76	4,034.61	3,971.68	62.93	64.109	
18,400.00	7,450.00	7,969.00	7,912.54	95.33	28.06	134.716	13,982.01	1,807.76	3,935.98	3,872.80	63.19	62.292	
18,500.00	7,450.00	7,969.00	7,912.54	96.15	28.06	134.716	13,982.01	1,807.76	3,837.42	3,773.97	63.45	60.477	
18,600.00	7,450.00	7,946.54	7,890.23	96.98	27.97	133.274	13,984.57	1,808.13	3,738.82	3,675.37	63.45	58.927	
18,700.00	7,450.00	7,940.06	7,883.80	97.80	27.94	132.846	13,985.34	1,808.23	3,640.34	3,576.68	63.65	57.190	
18,800.00	7,450.00	7,933.41	7,877.19	98.62	27.92	132.401	13,986.13	1,808.33	3,541.91	3,478.05	63.87	55.456	
18,900.00	7,450.00	7,926.58	7,870.41	99.45	27.89	131.939	13,986.95	1,808.42	3,443.56	3,379.47	64.09	53.726	
19,000.00	7,450.00	7,919.56	7,863.45	100.28	27.86	131.457	13,987.81	1,808.52	3,345.28	3,280.95	64.33	51.999	
19,100.00	7,450.00	7,912.36	7,856.30	101.10	27.83	130.955	13,988.70	1,808.60	3,247.08	3,182.49	64.59	50.275	
19,200.00	7,450.00	7,904.96	7,848.96	101.93	27.80	130.432	13,989.63	1,808.69	3,148.96	3,084.11	64.85	48.554	
19,300.00	7,450.00	7,897.35	7,841.41	102.76	27.77	129.886	13,990.60	1,808.77	3,050.94	2,985.80	65.14	46.837	
19,400.00	7,450.00	7,874.00	7,818.27	103.58	27.68	128.162	13,993.65	1,808.98	2,953.07	2,887.88	65.20	45.296	
19,500.00	7,450.00	7,874.00	7,818.27	104.41	27.68	128.162	13,993.65	1,808.98	2,855.20	2,789.56	65.65	43.494	
19,600.00	7,450.00	7,874.00	7,818.27	105.24	27.68	128.162	13,993.65	1,808.98	2,757.49	2,691.35	66.13	41.695	
19,700.00	7,450.00	7,860.06	7,804.45	106.07	27.63	127.094	13,995.51	1,809.09	2,659.90	2,593.48	66.42	40.049	
19,800.00	7,450.00	7,847.27	7,791.78	106.90	27.57	126.089	13,997.22	1,809.17	2,562.43	2,495.68	66.75	38.389	
19,900.00	7,450.00	7,834.41	7,779.03	107.73	27.52	125.052	13,998.95	1,809.24	2,465.10	2,397.98	67.12	36.729	
20,000.00	7,450.00	7,821.47	7,766.21	108.56	27.47	123.984	14,000.70	1,809.29	2,367.91	2,300.39	67.52	35.068	
20,100.00	7,450.00	7,808.45	7,753.31	109.40	27.42	122.882	14,002.46	1,809.34	2,270.90	2,202.92	67.98	33.406	
20,200.00	7,450.00	7,762.45	7,707.71	110.23	27.24	118.781	14,008.48	1,809.18	2,174.05	2,106.23	67.82	32.055	
20,300.00	7,450.00	7,786.88	7,731.94	111.06	27.33	120.998	14,005.38	1,809.38	2,077.45	2,008.29	69.17	30.036	
20,400.00	7,450.00	7,747.51	7,692.91	111.89	27.18	117.367	14,010.60	1,809.28	1,981.03	1,911.77	69.26	28.605	
20,500.00	7,450.00	7,666.86	7,612.81	112.73	26.87	109.183	14,019.75	1,807.77	1,884.72	1,816.11	68.61	27.471	
20,600.00	7,450.00	7,684.48	7,630.34	113.56	26.93	111.057	14,018.08	1,808.25	1,788.62	1,718.58	70.04	25.537	
20,700.00	7,450.00	7,659.80	7,605.81	114.40	26.84	108.420	14,020.70	1,807.62	1,692.79	1,622.03	70.76	23.922	
20,800.00	7,450.00	7,638.43	7,584.56	115.23	26.76	106.063	14,022.80	1,807.06	1,597.32	1,525.60	71.72	22.271	
20,900.00	7,450.00	7,619.76	7,565.97	116.07	26.69	103.950	14,024.52	1,806.55	1,502.32	1,429.38	72.94	20.596	
21,000.00	7,450.00	7,603.29	7,549.57	116.90	26.63	102.051	14,025.94	1,806.09	1,407.90	1,333.43	74.47	18.907	
21,100.00	7,450.00	7,591.00	7,537.32	117.74	26.59	100.612	14,026.95	1,805.73	1,314.20	1,237.82	76.38	17.205	
21,200.00	7,450.00	7,582.68	7,529.03	118.57	26.56	99.628	14,027.61	1,805.50	1,221.44	1,142.67	78.76	15.508	
21,300.00	7,450.00	7,575.52	7,521.90	119.41	26.53	98.776	14,028.19	1,805.31	1,129.86	1,048.21	81.65	13.838	
21,400.00	7,450.00	7,568.33	7,514.74	120.25	26.50	97.917	14,028.76	1,805.13	1,039.78	954.65	85.13	12.215	
21,500.00	7,450.00	7,561.12	7,507.55	121.09	26.48	97.050	14,029.34	1,804.96	951.62	862.28	89.34	10.652	
21,600.00	7,450.00	7,553.88	7,500.34	121.92	26.45	96.175	14,029.93	1,804.80	865.97	771.51	94.46	9.168	
21,700.00	7,450.00	7,546.62	7,493.10	122.76	26.42	95.294	14,030.51	1,804.66	783.66	682.98	100.68	7.784	
21,800.00	7,450.00	7,539.33	7,485.84	123.60	26.40	94.407	14,031.10	1,804.52	705.84	597.67	108.17	6.525	
21,900.00	7,450.00	7,532.02	7,478.55	124.44	26.37	93.514	14,031.70	1,804.40	634.18	517.14	117.04	5.419	
22,000.00	7,450.00	7,524.67	7,471.23	125.28	26.34	92.615	14,032.29	1,804.29	570.99	443.89	127.10	4.492	
22,100.00	7,450.00	7,517.31	7,463.89	126.12	26.32	91.712	14,032.89	1,804.19	519.39	381.74	137.65	3.773	
22,200.00	7,450.00	7,509.91	7,456.52	126.96	26.29	90.804	14,033.50	1,804.10	483.09	335.99	147.10	3.284	

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 302H
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 302H	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		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)	Highside Toolface (°)	+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning	
22,300.00	7,450.00	7,502.49	7,449.12	127.80	26.26	89.892	14,034.10	1,804.02	465.69	312.44	153.25	3.039	3.011CC, ES, SF	
22,333.39	7,450.00	7,496.00	7,442.65	128.08	26.24	89.094	14,034.64	1,803.97	464.54	310.26	154.29	3.041		
22,400.00	7,450.00	7,496.00	7,442.65	128.64	26.24	89.094	14,034.64	1,803.97	469.29	314.98	154.32	3.041		
22,500.00	7,450.00	7,487.20	7,433.89	129.48	26.20	88.013	14,035.37	1,803.91	493.44	342.99	150.44	3.280		
22,600.00	7,450.00	7,478.70	7,425.42	130.32	26.17	86.970	14,036.12	1,803.87	535.33	392.04	143.29	3.736		
22,700.00	7,450.00	7,469.45	7,416.21	131.16	26.14	85.838	14,036.97	1,803.85	591.20	456.30	134.90	4.382		
22,800.00	7,450.00	7,459.35	7,406.15	132.00	26.10	84.607	14,037.93	1,803.85	657.48	530.80	126.69	5.190		
22,900.00	7,450.00	7,448.27	7,395.13	132.84	26.05	83.263	14,039.05	1,803.88	731.33	612.02	119.31	6.130		
23,000.00	7,450.00	7,436.07	7,383.00	133.69	26.01	81.794	14,040.33	1,803.96	810.65	697.69	112.96	7.176		
23,100.00	7,450.00	7,422.57	7,369.58	134.53	25.96	80.183	14,041.83	1,804.08	893.97	786.34	107.64	8.305		
23,200.00	7,450.00	7,407.55	7,354.66	135.37	25.90	78.413	14,043.59	1,804.28	980.26	877.04	103.22	9.497		
23,300.00	7,450.00	7,393.74	7,340.96	136.21	25.84	76.810	14,045.28	1,804.52	1,068.77	969.28	99.48	10.743		
23,400.00	7,450.00	7,380.77	7,328.10	137.06	25.79	75.327	14,046.91	1,804.79	1,159.01	1,062.70	96.31	12.034		
23,455.58	7,450.00	7,373.35	7,320.74	137.52	25.76	74.490	14,047.85	1,804.97	1,209.76	1,114.99	94.78	12.765		

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 302H
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 302H	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)	Semi Major Axis Reference (usft)	Semi Major Axis Offset (usft)	Highside Toolface (°)	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
14,000.00	7,450.00	12,975.00	8,201.99	60.28	112.65	145.408	15,648.04	1,888.32	9,992.68	9,849.02	143.66	69.559	
14,100.00	7,450.00	12,975.00	8,201.99	61.04	112.65	145.408	15,648.04	1,888.32	9,893.10	9,749.37	143.73	68.833	
14,200.00	7,450.00	12,975.00	8,201.99	61.80	112.65	145.408	15,648.04	1,888.32	9,793.53	9,649.74	143.79	68.108	
14,300.00	7,450.00	12,975.00	8,201.99	62.56	112.65	145.408	15,648.04	1,888.32	9,693.97	9,550.11	143.86	67.383	
14,400.00	7,450.00	12,975.00	8,201.99	63.33	112.65	145.408	15,648.04	1,888.32	9,594.42	9,450.49	143.94	66.658	
14,500.00	7,450.00	12,975.00	8,201.99	64.10	112.65	145.408	15,648.04	1,888.32	9,494.88	9,350.87	144.01	65.933	
14,600.00	7,450.00	12,975.00	8,201.99	64.87	112.65	145.408	15,648.04	1,888.32	9,395.35	9,251.27	144.08	65.208	
14,700.00	7,450.00	12,975.00	8,201.99	65.64	112.65	145.408	15,648.04	1,888.32	9,295.83	9,151.67	144.16	64.483	
14,800.00	7,450.00	12,975.00	8,201.99	66.42	112.65	145.408	15,648.04	1,888.32	9,196.32	9,052.08	144.24	63.759	
14,900.00	7,450.00	12,975.00	8,201.99	67.20	112.65	145.408	15,648.04	1,888.32	9,096.82	8,952.50	144.31	63.035	
15,000.00	7,450.00	12,975.00	8,201.99	67.98	112.65	145.408	15,648.04	1,888.32	8,997.33	8,852.93	144.40	62.310	
15,100.00	7,450.00	12,975.00	8,201.99	68.76	112.65	145.408	15,648.04	1,888.32	8,897.85	8,753.37	144.48	61.587	
15,200.00	7,450.00	12,975.00	8,201.99	69.54	112.65	145.408	15,648.04	1,888.32	8,798.39	8,653.82	144.56	60.863	
15,300.00	7,450.00	12,975.00	8,201.99	70.33	112.65	145.408	15,648.04	1,888.32	8,698.93	8,554.29	144.65	60.139	
15,400.00	7,450.00	12,975.00	8,201.99	71.12	112.65	145.408	15,648.04	1,888.32	8,599.49	8,454.76	144.73	59.416	
15,500.00	7,450.00	12,975.00	8,201.99	71.90	112.65	145.408	15,648.04	1,888.32	8,500.06	8,355.24	144.82	58.693	
15,600.00	7,450.00	12,975.00	8,201.99	72.70	112.65	145.408	15,648.04	1,888.32	8,400.65	8,255.74	144.91	57.970	
15,700.00	7,450.00	12,975.00	8,201.99	73.49	112.65	145.408	15,648.04	1,888.32	8,301.25	8,156.24	145.01	57.248	
15,800.00	7,450.00	12,975.00	8,201.99	74.28	112.65	145.408	15,648.04	1,888.32	8,201.86	8,056.76	145.10	56.525	
15,900.00	7,450.00	12,975.00	8,201.99	75.08	112.65	145.408	15,648.04	1,888.32	8,102.49	7,957.30	145.20	55.803	
16,000.00	7,450.00	12,975.00	8,201.99	75.87	112.65	145.408	15,648.04	1,888.32	8,003.14	7,857.84	145.30	55.082	
16,100.00	7,450.00	12,975.00	8,201.99	76.67	112.65	145.408	15,648.04	1,888.32	7,903.80	7,758.41	145.40	54.360	
16,200.00	7,450.00	12,975.00	8,201.99	77.47	112.65	145.408	15,648.04	1,888.32	7,804.48	7,658.98	145.50	53.639	
16,300.00	7,450.00	12,975.00	8,201.99	78.27	112.65	145.408	15,648.04	1,888.32	7,705.18	7,559.57	145.60	52.919	
16,400.00	7,450.00	12,975.00	8,201.99	79.07	112.65	145.408	15,648.04	1,888.32	7,605.89	7,460.18	145.71	52.198	
16,500.00	7,450.00	12,975.00	8,201.99	79.88	112.65	145.408	15,648.04	1,888.32	7,506.62	7,360.80	145.82	51.478	
16,600.00	7,450.00	12,975.00	8,201.99	80.68	112.65	145.408	15,648.04	1,888.32	7,407.38	7,261.44	145.93	50.758	
16,700.00	7,450.00	12,975.00	8,201.99	81.49	112.65	145.408	15,648.04	1,888.32	7,308.15	7,162.10	146.05	50.039	
16,800.00	7,450.00	12,975.00	8,201.99	82.29	112.65	145.408	15,648.04	1,888.32	7,208.95	7,062.78	146.17	49.320	
16,900.00	7,450.00	12,975.00	8,201.99	83.10	112.65	145.408	15,648.04	1,888.32	7,109.76	6,963.48	146.29	48.602	
17,000.00	7,450.00	12,975.00	8,201.99	83.91	112.65	145.408	15,648.04	1,888.32	7,010.60	6,864.20	146.41	47.883	
17,100.00	7,450.00	12,975.00	8,201.99	84.72	112.65	145.408	15,648.04	1,888.32	6,911.47	6,764.93	146.54	47.166	
17,200.00	7,450.00	12,975.00	8,201.99	85.53	112.65	145.408	15,648.04	1,888.32	6,812.36	6,665.69	146.67	46.448	
17,300.00	7,450.00	12,975.00	8,201.99	86.34	112.65	145.408	15,648.04	1,888.32	6,713.28	6,566.48	146.80	45.732	
17,400.00	7,450.00	12,975.00	8,201.99	87.16	112.65	145.408	15,648.04	1,888.32	6,614.22	6,467.29	146.93	45.015	
17,500.00	7,450.00	12,975.00	8,201.99	87.97	112.65	145.408	15,648.04	1,888.32	6,515.19	6,368.12	147.07	44.299	
17,600.00	7,450.00	12,975.00	8,201.99	88.78	112.65	145.408	15,648.04	1,888.32	6,416.20	6,268.98	147.22	43.584	
17,700.00	7,450.00	12,975.00	8,201.99	89.60	112.65	145.408	15,648.04	1,888.32	6,317.23	6,169.87	147.36	42.869	
17,800.00	7,450.00	12,975.00	8,201.99	90.42	112.65	145.408	15,648.04	1,888.32	6,218.30	6,070.78	147.51	42.154	
17,900.00	7,450.00	12,975.00	8,201.99	91.23	112.65	145.408	15,648.04	1,888.32	6,119.40	5,971.73	147.67	41.440	
18,000.00	7,450.00	12,975.00	8,201.99	92.05	112.65	145.408	15,648.04	1,888.32	6,020.54	5,872.71	147.83	40.726	
18,100.00	7,450.00	12,975.00	8,201.99	92.87	112.65	145.408	15,648.04	1,888.32	5,921.72	5,773.72	147.99	40.013	
18,197.24	7,450.00	12,975.00	8,201.99	93.67	112.65	145.408	15,648.04	1,888.32	5,825.66	5,677.50	148.16	39.321	
18,200.00	7,450.00	12,975.00	8,201.99	93.69	112.65	145.123	15,648.04	1,888.32	5,822.93	5,674.77	148.16	39.301	
18,229.54	7,450.00	12,975.00	8,201.99	93.93	112.65	142.202	15,648.04	1,888.32	5,793.78	5,645.57	148.21	39.091	
18,300.00	7,450.00	12,975.00	8,201.99	94.51	112.65	142.202	15,648.04	1,888.32	5,724.29	5,575.95	148.34	38.589	
18,400.00	7,450.00	12,975.00	8,201.99	95.33	112.65	142.202	15,648.04	1,888.32	5,625.70	5,477.18	148.52	37.878	
18,500.00	7,450.00	12,975.00	8,201.99	96.15	112.65	142.202	15,648.04	1,888.32	5,527.17	5,378.46	148.71	37.168	
18,600.00	7,450.00	12,975.00	8,201.99	96.98	112.65	142.202	15,648.04	1,888.32	5,428.69	5,279.79	148.90	36.458	
18,700.00	7,450.00	12,975.00	8,201.99	97.80	112.65	142.202	15,648.04	1,888.32	5,330.27	5,181.17	149.10	35.749	
18,800.00	7,450.00	12,975.00	8,201.99	98.62	112.65	142.202	15,648.04	1,888.32	5,231.91	5,082.60	149.31	35.040	
18,900.00	7,450.00	12,975.00	8,201.99	99.45	112.65	142.202	15,648.04	1,888.32	5,133.61	4,984.08	149.53	34.332	

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 302H
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 302H	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:	0.00 usft
Survey Program: 104-IS-GYRO-WLINE, 692-GYRO-NS, 7616-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)	Semi Major Axis Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre		Distance Between Centres (usft)		Minimum Separation (usft)	Separation Factor	Warning
							+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)			
19,000.00	7,450.00	12,975.00	8,201.99	100.28	112.65	142.202	15,648.04	1,888.32	5,035.37	4,885.62	149.75	33.625	
19,100.00	7,450.00	12,975.00	8,201.99	101.10	112.65	142.202	15,648.04	1,888.32	4,937.21	4,787.23	149.98	32.918	
19,200.00	7,450.00	12,975.00	8,201.99	101.93	112.65	142.202	15,648.04	1,888.32	4,839.13	4,688.90	150.23	32.212	
19,300.00	7,450.00	12,975.00	8,201.99	102.76	112.65	142.202	15,648.04	1,888.32	4,741.12	4,590.64	150.48	31.507	
19,400.00	7,450.00	12,975.00	8,201.99	103.58	112.65	142.202	15,648.04	1,888.32	4,643.20	4,492.46	150.74	30.803	
19,500.00	7,450.00	12,975.00	8,201.99	104.41	112.65	142.202	15,648.04	1,888.32	4,545.37	4,394.36	151.01	30.099	
19,600.00	7,450.00	12,975.00	8,201.99	105.24	112.65	142.202	15,648.04	1,888.32	4,447.63	4,296.34	151.30	29.397	
19,700.00	7,450.00	12,975.00	8,201.99	106.07	112.65	142.202	15,648.04	1,888.32	4,350.00	4,198.41	151.59	28.695	
19,800.00	7,450.00	12,975.00	8,201.99	106.90	112.65	142.202	15,648.04	1,888.32	4,252.48	4,100.58	151.91	27.994	
19,900.00	7,450.00	12,975.00	8,201.99	107.73	112.65	142.202	15,648.04	1,888.32	4,155.08	4,002.85	152.23	27.295	
20,000.00	7,450.00	12,975.00	8,201.99	108.56	112.65	142.202	15,648.04	1,888.32	4,057.80	3,905.23	152.57	26.596	
20,100.00	7,450.00	12,975.00	8,201.99	109.40	112.65	142.202	15,648.04	1,888.32	3,960.66	3,807.73	152.93	25.898	
20,200.00	7,450.00	12,975.00	8,201.99	110.23	112.65	142.202	15,648.04	1,888.32	3,863.66	3,710.36	153.31	25.202	
20,300.00	7,450.00	12,975.00	8,201.99	111.06	112.65	142.202	15,648.04	1,888.32	3,766.83	3,613.12	153.70	24.507	
20,400.00	7,450.00	12,975.00	8,201.99	111.89	112.65	142.202	15,648.04	1,888.32	3,670.16	3,516.04	154.12	23.814	
20,500.00	7,450.00	12,975.00	8,201.99	112.73	112.65	142.202	15,648.04	1,888.32	3,573.67	3,419.12	154.56	23.122	
20,600.00	7,450.00	12,975.00	8,201.99	113.56	112.65	142.202	15,648.04	1,888.32	3,477.38	3,322.37	155.02	22.432	
20,700.00	7,450.00	12,975.00	8,201.99	114.40	112.65	142.202	15,648.04	1,888.32	3,381.31	3,225.81	155.51	21.744	
20,800.00	7,450.00	12,975.00	8,201.99	115.23	112.65	142.202	15,648.04	1,888.32	3,285.48	3,129.45	156.02	21.058	
20,900.00	7,450.00	12,975.00	8,201.99	116.07	112.65	142.202	15,648.04	1,888.32	3,189.89	3,033.33	156.57	20.374	
21,000.00	7,450.00	12,975.00	8,201.99	116.90	112.65	142.202	15,648.04	1,888.32	3,094.59	2,937.45	157.15	19.693	
21,100.00	7,450.00	12,975.00	8,201.99	117.74	112.65	142.202	15,648.04	1,888.32	2,999.60	2,841.84	157.76	19.014	
21,200.00	7,450.00	12,975.00	8,201.99	118.57	112.65	142.202	15,648.04	1,888.32	2,904.94	2,746.53	158.41	18.338	
21,300.00	7,450.00	12,975.00	8,201.99	119.41	112.65	142.202	15,648.04	1,888.32	2,810.65	2,651.55	159.10	17.666	
21,400.00	7,450.00	12,975.00	8,201.99	120.25	112.65	142.202	15,648.04	1,888.32	2,716.76	2,556.93	159.83	16.998	
21,500.00	7,450.00	12,975.00	8,201.99	121.09	112.65	142.202	15,648.04	1,888.32	2,623.33	2,462.73	160.61	16.334	
21,600.00	7,450.00	12,975.00	8,201.99	121.92	112.65	142.202	15,648.04	1,888.32	2,530.41	2,368.97	161.43	15.675	
21,700.00	7,450.00	12,975.00	8,201.99	122.76	112.65	142.202	15,648.04	1,888.32	2,438.04	2,275.73	162.31	15.021	
21,800.00	7,450.00	12,975.00	8,201.99	123.60	112.65	142.202	15,648.04	1,888.32	2,346.30	2,183.06	163.24	14.373	
21,900.00	7,450.00	12,975.00	8,201.99	124.44	112.65	142.202	15,648.04	1,888.32	2,255.26	2,091.03	164.22	13.733	
22,000.00	7,450.00	12,975.00	8,201.99	125.28	112.65	142.202	15,648.04	1,888.32	2,165.01	1,999.74	165.27	13.100	
22,100.00	7,450.00	12,975.00	8,201.99	126.12	112.65	142.202	15,648.04	1,888.32	2,075.65	1,909.28	166.37	12.476	
22,200.00	7,450.00	12,975.00	8,201.99	126.96	112.65	142.202	15,648.04	1,888.32	1,987.31	1,819.79	167.52	11.863	
22,300.00	7,450.00	12,975.00	8,201.99	127.80	112.65	142.202	15,648.04	1,888.32	1,900.13	1,731.39	168.74	11.261	
22,400.00	7,450.00	12,975.00	8,201.99	128.64	112.65	142.202	15,648.04	1,888.32	1,814.26	1,644.27	169.99	10.673	
22,500.00	7,450.00	12,975.00	8,201.99	129.48	112.65	142.202	15,648.04	1,888.32	1,729.92	1,558.64	171.28	10.100	
22,600.00	7,450.00	12,975.00	8,201.99	130.32	112.65	142.202	15,648.04	1,888.32	1,647.33	1,474.74	172.60	9.544	
22,700.00	7,450.00	12,975.00	8,201.99	131.16	112.65	142.202	15,648.04	1,888.32	1,566.77	1,392.87	173.90	9.010	
22,800.00	7,450.00	12,975.00	8,201.99	132.00	112.65	142.202	15,648.04	1,888.32	1,488.57	1,313.42	175.16	8.499	
22,900.00	7,450.00	12,975.00	8,201.99	132.84	112.65	142.202	15,648.04	1,888.32	1,413.13	1,236.81	176.31	8.015	
23,000.00	7,450.00	12,975.00	8,201.99	133.69	112.65	142.202	15,648.04	1,888.32	1,340.90	1,163.59	177.31	7.563	
23,100.00	7,450.00	12,975.00	8,201.99	134.53	112.65	142.202	15,648.04	1,888.32	1,272.43	1,094.39	178.04	7.147	
23,200.00	7,450.00	12,975.00	8,201.99	135.37	112.65	142.202	15,648.04	1,888.32	1,208.37	1,029.98	178.39	6.774	
23,300.00	7,450.00	12,975.00	8,201.99	136.21	112.65	142.202	15,648.04	1,888.32	1,149.45	971.22	178.23	6.449	
23,400.00	7,450.00	12,975.00	8,201.99	137.06	112.65	142.202	15,648.04	1,888.32	1,096.50	919.08	177.41	6.180	
23,455.58	7,450.00	12,975.00	8,201.99	137.52	112.65	142.202	15,648.04	1,888.32	1,069.98	893.35	176.63	6.058 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 302H
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 302H	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) NAD 83 - Rustler Breaks 26/23 W2ML Fee Com 1H - Wellbore #1 - Surveys													Offset Site Error:
													0.00 usft
Survey Program: 726-MWD+IGRF													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)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	Offset Wellbore Centre +E/-W (usft)	Distance Between Centres (usft)	Minimum Separation (usft)	Separation Factor	Warning	
0.00	0.00	572.00	598.30	0.00	0.00	26.645	4,322.54	2,168.85	4,873.01				
100.00	100.00	572.00	598.30	0.14	0.00	26.645	4,322.54	2,168.85	4,861.74	4,861.47	0.27	N/A	
200.00	200.00	572.00	598.30	0.50	0.00	26.645	4,322.54	2,168.85	4,852.51	4,851.98	0.53	9,169.799	
300.00	300.00	572.00	598.30	0.85	0.00	26.645	4,322.54	2,168.85	4,845.33	4,844.46	0.86	5,604.567	
400.00	400.00	572.00	598.30	1.21	0.00	26.645	4,322.54	2,168.85	4,840.20	4,838.99	1.22	3,982.068	
500.00	500.00	572.00	598.30	1.57	0.00	26.645	4,322.54	2,168.85	4,837.14	4,835.56	1.57	3,077.818	
600.00	600.00	622.58	648.85	1.93	0.09	26.626	4,322.86	2,167.14	4,835.91	4,833.88	2.02	2,391.501	
700.00	700.00	737.08	763.27	2.29	0.31	26.576	4,323.53	2,162.84	4,834.75	4,832.16	2.59	1,866.836	
800.00	800.00	839.13	865.22	2.65	0.70	26.525	4,324.26	2,158.37	4,833.43	4,830.09	3.34	1,445.785	
900.00	900.00	941.28	967.24	3.00	1.08	26.467	4,325.19	2,153.36	4,832.06	4,827.98	4.08	1,184.839	
1,000.00	1,000.00	1,043.26	1,069.08	3.36	1.46	26.406	4,326.21	2,148.09	4,830.65	4,825.83	4.81	1,003.430	
1,100.00	1,100.00	1,141.26	1,166.94	3.72	1.82	26.346	4,327.23	2,142.93	4,829.24	4,823.70	5.54	872.391	
1,200.00	1,200.00	1,239.55	1,265.09	4.08	2.18	26.286	4,328.24	2,137.86	4,827.87	4,821.62	6.26	771.604	
1,300.00	1,300.00	1,340.81	1,366.28	4.44	2.54	26.244	4,328.59	2,134.05	4,826.51	4,819.54	6.97	692.146	
1,400.00	1,400.00	1,443.67	1,469.12	4.80	2.90	26.234	4,327.69	2,132.65	4,825.12	4,817.43	7.69	627.466	
1,500.00	1,500.00	1,552.50	1,577.93	5.16	3.27	26.248	4,325.66	2,133.01	4,823.60	4,815.19	8.41	573.541	
1,600.00	1,599.98	1,656.58	1,681.95	5.50	3.61	-90.951	4,322.89	2,134.67	4,821.94	4,812.84	9.10	529.810	
1,700.00	1,699.84	1,754.92	1,780.24	5.84	3.94	-91.008	4,320.03	2,136.71	4,820.35	4,810.58	9.76	493.755	
1,800.00	1,799.45	1,845.50	1,870.74	6.18	4.24	-91.092	4,317.30	2,138.96	4,818.89	4,808.49	10.40	463.170	
1,900.00	1,898.70	1,928.64	1,953.79	6.52	4.52	-91.188	4,314.63	2,141.93	4,817.81	4,806.79	11.03	436.917	
2,000.00	1,997.47	2,019.23	2,044.22	6.86	4.83	-91.310	4,311.56	2,146.18	4,817.15	4,805.47	11.68	412.423	
2,100.00	2,095.62	2,131.87	2,156.71	7.21	5.21	-91.511	4,307.88	2,150.88	4,816.48	4,804.07	12.42	387.870	
2,200.00	2,193.06	2,231.71	2,256.45	7.57	5.56	-91.741	4,304.81	2,154.17	4,815.76	4,802.64	13.12	367.064	
2,300.00	2,289.64	2,322.36	2,346.99	7.93	5.87	-91.981	4,302.01	2,157.41	4,815.34	4,801.54	13.80	349.035	
2,400.00	2,385.27	2,425.81	2,450.31	8.29	6.24	-92.286	4,298.71	2,161.49	4,815.21	4,800.68	14.53	331.469	
2,500.00	2,479.82	2,540.90	2,565.24	8.67	6.65	-92.667	4,294.59	2,166.11	4,815.05	4,799.74	15.31	314.542	
2,600.00	2,573.17	2,658.39	2,682.52	9.05	7.08	-93.099	4,289.59	2,171.02	4,814.67	4,798.56	16.11	298.869	
2,624.87	2,596.19	2,682.37	2,706.45	9.14	7.16	-93.192	4,288.52	2,172.07	4,814.62	4,798.32	16.29	295.520	
2,700.00	2,665.60	2,754.68	2,778.61	9.44	7.43	-93.474	4,285.27	2,175.24	4,814.54	4,797.69	16.85	285.783	
2,716.33	2,680.69	2,770.40	2,794.30	9.50	7.48	-93.536	4,284.56	2,175.92	4,814.54	4,797.57	16.97	283.734	
2,800.00	2,757.99	2,838.00	2,861.77	9.84	7.73	-93.799	4,281.50	2,178.87	4,814.62	4,797.07	17.55	274.398	
2,900.00	2,850.38	2,928.15	2,951.81	10.24	8.05	-94.165	4,278.07	2,181.65	4,815.07	4,796.79	18.27	263.520	
3,000.00	2,942.77	3,006.01	3,029.64	10.66	8.33	-94.505	4,276.18	2,182.21	4,816.08	4,797.12	18.96	254.011	
3,100.00	3,035.16	3,104.21	3,127.83	11.07	8.68	-94.954	4,274.64	2,181.28	4,817.53	4,797.81	19.72	244.289	
3,200.00	3,127.55	3,209.84	3,233.43	11.49	9.05	-95.438	4,272.80	2,180.02	4,819.05	4,798.54	20.51	234.957	
3,300.00	3,219.94	3,296.33	3,319.90	11.92	9.36	-95.835	4,271.27	2,178.86	4,820.80	4,799.56	21.24	226.997	
3,400.00	3,312.33	3,381.93	3,405.49	12.35	9.66	-96.229	4,269.90	2,177.63	4,822.98	4,801.01	21.96	219.582	
3,500.00	3,404.72	3,479.33	3,502.86	12.78	10.00	-96.679	4,268.43	2,176.14	4,825.51	4,802.78	22.74	212.243	
3,600.00	3,497.11	3,580.33	3,603.83	13.21	10.36	-97.145	4,266.76	2,174.48	4,828.20	4,804.68	23.52	205.258	
3,700.00	3,589.50	3,665.35	3,688.83	13.65	10.66	-97.537	4,265.31	2,173.11	4,831.17	4,806.91	24.26	199.167	
3,800.00	3,681.89	3,748.78	3,772.24	14.09	10.96	-97.920	4,263.98	2,171.96	4,834.61	4,809.62	24.99	193.481	
3,900.00	3,774.28	3,837.78	3,861.23	14.53	11.27	-98.326	4,262.64	2,170.87	4,838.49	4,812.75	25.74	187.975	
4,000.00	3,866.67	3,929.57	3,953.00	14.98	11.60	-98.744	4,261.28	2,169.75	4,842.69	4,816.19	26.50	182.713	
4,100.00	3,959.05	4,019.79	4,043.20	15.43	11.92	-99.156	4,259.97	2,168.62	4,847.22	4,819.95	27.26	177.786	
4,200.00	4,051.44	4,108.96	4,132.35	15.87	12.24	-99.562	4,258.76	2,167.42	4,852.10	4,824.08	28.02	173.154	
4,300.00	4,143.83	4,206.94	4,230.32	16.32	12.59	-100.010	4,257.46	2,166.02	4,857.31	4,828.50	28.81	168.584	
4,400.00	4,236.22	4,313.37	4,336.72	16.77	12.97	-100.493	4,255.76	2,164.56	4,862.59	4,832.95	29.63	164.086	
4,500.00	4,328.61	4,415.45	4,438.77	17.23	13.33	-100.954	4,253.85	2,163.17	4,867.93	4,837.49	30.44	159.907	
4,600.00	4,421.00	4,516.00	4,539.29	17.68	13.69	-101.409	4,251.82	2,161.69	4,873.41	4,842.16	31.25	155.968	
4,700.00	4,513.39	4,603.44	4,626.70	18.13	14.01	-101.804	4,250.04	2,160.27	4,879.14	4,847.14	32.00	152.458	
4,800.00	4,605.78	4,688.92	4,712.16	18.59	14.31	-102.193	4,248.46	2,158.71	4,885.30	4,852.55	32.75	149.154	
4,900.00	4,698.17	4,779.36	4,802.57	19.05	14.64	-102.605	4,246.93	2,156.88	4,891.86	4,858.34	33.52	145.932	

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 302H
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 302H	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) NAD 83 - Rustler Breaks 26/23 W2ML Fee Com 1H - Wellbore #1 - Surveys														Offset Site Error:	0.00 usft
Survey Program: 726-MWD+IGRF														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)	Highside Toolface (°)	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		
5,000.00	4,790.56	4,872.09	4,895.26	19.50	14.97	-103.028	4,245.38	2,154.89	4,898.71	4,864.41	34.30	142.828			
5,100.00	4,882.95	4,966.72	4,989.85	19.96	15.31	-103.459	4,243.78	2,152.82	4,905.84	4,870.76	35.08	139.838			
5,200.00	4,975.34	5,062.56	5,085.66	20.42	15.65	-103.891	4,242.04	2,150.94	4,913.22	4,877.34	35.87	136.967			
5,300.00	5,067.73	5,145.16	5,168.23	20.88	15.95	-104.262	4,240.51	2,149.48	4,920.90	4,884.29	36.61	134.405			
5,400.00	5,160.12	5,221.82	5,244.87	21.34	16.22	-104.604	4,239.30	2,148.23	4,929.15	4,891.82	37.33	132.037			
5,500.00	5,252.51	5,306.67	5,329.71	21.80	16.53	-104.981	4,238.21	2,146.92	4,937.97	4,899.89	38.08	129.672			
5,600.00	5,344.90	5,417.31	5,440.31	22.26	16.92	-105.473	4,236.61	2,145.05	4,946.91	4,907.99	38.93	127.087			
5,700.00	5,437.29	5,517.72	5,540.69	22.73	17.28	-105.920	4,234.87	2,143.16	4,955.86	4,916.12	39.73	124.730			
5,800.00	5,529.68	5,609.93	5,632.88	23.19	17.61	-106.327	4,233.21	2,141.52	4,965.05	4,924.54	40.51	122.564			
5,900.00	5,622.07	5,697.52	5,720.43	23.65	17.93	-106.711	4,231.64	2,140.10	4,974.56	4,933.29	41.27	120.538			
5,999.30	5,713.81	5,780.26	5,803.16	24.11	18.23	-107.072	4,230.25	2,138.91	4,984.43	4,942.42	42.01	118.655			
6,000.00	5,714.46	5,780.84	5,803.74	24.11	18.23	-107.076	4,230.25	2,138.90	4,984.50	4,942.48	42.01	118.642			
6,100.00	5,807.51	5,870.00	5,892.88	24.57	18.55	-107.633	4,228.88	2,137.77	4,994.34	4,951.56	42.77	116.768			
6,200.00	5,901.78	5,975.30	5,998.16	25.01	18.93	-108.199	4,227.14	2,136.47	5,003.25	4,959.67	43.58	114.812			
6,300.00	5,997.15	6,076.34	6,099.17	25.44	19.29	-108.690	4,225.27	2,135.21	5,011.08	4,966.73	44.35	112.977			
6,400.00	6,093.52	6,172.41	6,195.22	25.85	19.64	-109.106	4,223.44	2,134.21	5,017.92	4,972.83	45.10	111.265			
6,500.00	6,190.76	6,267.68	6,290.47	26.25	19.98	-109.462	4,221.60	2,133.48	5,023.76	4,977.93	45.83	109.627			
6,600.00	6,288.75	6,362.25	6,385.02	26.63	20.32	-109.756	4,219.78	2,133.18	5,028.58	4,982.04	46.54	108.058			
6,700.00	6,387.38	6,453.56	6,476.32	27.00	20.65	-109.985	4,218.06	2,133.31	5,032.37	4,985.15	47.22	106.577			
6,800.00	6,486.52	6,542.00	6,564.74	27.35	20.96	-110.153	4,216.51	2,133.85	5,035.20	4,987.33	47.87	105.174			
6,900.00	6,586.06	6,636.91	6,659.63	27.69	21.29	-110.271	4,214.99	2,134.80	5,037.04	4,988.50	48.54	103.764			
7,000.00	6,685.87	6,740.68	6,763.38	28.02	21.66	-110.338	4,213.32	2,135.66	5,037.65	4,988.42	49.23	102.323			
7,100.00	6,785.83	6,831.72	6,854.42	28.33	21.98	-110.344	4,211.87	2,136.25	5,037.05	4,987.19	49.86	101.022			
7,124.17	6,810.00	6,851.85	6,874.53	28.40	22.05	6.841	4,211.58	2,136.41	5,036.77	4,986.76	50.00	100.730			
7,191.21	6,877.04	6,907.66	6,930.34	28.60	22.25	6.847	4,210.86	2,136.93	5,035.98	4,985.59	50.39	99.935			
7,200.00	6,885.83	6,914.97	6,937.65	28.62	22.27	7.447	4,210.78	2,137.00	5,035.82	4,985.38	50.44	99.830			
7,250.00	6,935.73	6,968.00	6,990.67	28.77	22.46	7.504	4,210.21	2,137.61	5,032.45	4,981.67	50.77	99.113			
7,300.00	6,985.18	6,994.47	7,017.14	28.90	22.55	7.616	4,209.98	2,137.91	5,024.83	4,973.84	50.99	98.538			
7,350.00	7,033.80	7,030.63	7,053.30	29.04	22.67	7.795	4,209.75	2,138.23	5,013.12	4,961.88	51.24	97.835			
7,400.00	7,081.24	7,065.96	7,088.62	29.16	22.79	8.045	4,209.63	2,138.46	4,997.37	4,945.89	51.47	97.084			
7,450.00	7,127.12	7,100.19	7,122.85	29.28	22.91	8.377	4,209.61	2,138.58	4,977.69	4,926.00	51.69	96.292			
7,500.00	7,171.10	7,156.00	7,178.67	29.39	23.10	8.829	4,209.76	2,138.60	4,954.30	4,902.31	51.98	95.303			
7,550.00	7,212.84	7,156.00	7,178.67	29.48	23.10	9.340	4,209.76	2,138.60	4,927.15	4,875.10	52.05	94.660			
7,600.00	7,252.02	7,198.37	7,221.03	29.57	23.24	10.052	4,210.00	2,138.53	4,896.61	4,844.34	52.27	93.685			
7,650.00	7,288.35	7,229.03	7,251.70	29.65	23.34	10.948	4,210.22	2,138.48	4,862.84	4,810.41	52.43	92.754			
7,700.00	7,321.55	7,257.15	7,279.82	29.71	23.43	12.104	4,210.46	2,138.45	4,826.09	4,773.52	52.57	91.807			
7,750.00	7,351.37	7,282.53	7,305.19	29.77	23.52	13.624	4,210.69	2,138.42	4,786.62	4,733.93	52.69	90.847			
7,800.00	7,377.57	7,304.95	7,327.61	29.81	23.59	15.673	4,210.92	2,138.40	4,744.72	4,691.93	52.79	89.879			
7,850.00	7,399.97	7,324.24	7,346.90	29.85	23.66	18.531	4,211.14	2,138.39	4,700.71	4,647.84	52.87	88.907			
7,900.00	7,418.39	7,343.00	7,365.66	29.87	23.72	22.748	4,211.36	2,138.38	4,654.92	4,601.98	52.95	87.918			
7,950.00	7,432.69	7,354.96	7,377.62	29.89	23.76	29.280	4,211.50	2,138.37	4,607.68	4,554.69	52.99	86.954			
8,000.00	7,442.76	7,365.92	7,388.58	29.89	23.80	40.384	4,211.64	2,138.38	4,559.34	4,506.32	53.03	85.983			
8,050.00	7,448.52	7,372.46	7,395.12	29.89	23.82	60.234	4,211.71	2,138.38	4,510.28	4,457.24	53.05	85.027			
8,091.21	7,450.00	7,374.48	7,397.14	29.88	23.82	85.378	4,211.74	2,138.38	4,469.57	4,416.52	53.05	84.255			
8,100.00	7,450.00	7,374.59	7,397.25	29.88	23.82	85.387	4,211.74	2,138.38	4,460.87	4,407.83	53.05	84.091			
8,200.00	7,450.00	7,375.80	7,398.46	29.86	23.83	85.493	4,211.75	2,138.38	4,361.99	4,308.94	53.04	82.236			
8,300.00	7,450.00	7,377.01	7,399.67	29.85	23.83	85.599	4,211.77	2,138.38	4,263.15	4,210.11	53.04	80.379			
8,400.00	7,450.00	7,378.22	7,400.88	29.86	23.84	85.704	4,211.78	2,138.38	4,164.37	4,111.33	53.03	78.521			
8,500.00	7,450.00	7,379.43	7,402.09	29.88	23.84	85.809	4,211.80	2,138.38	4,065.65	4,012.61	53.03	76.663			
8,600.00	7,450.00	7,380.63	7,403.29	29.93	23.84	85.914	4,211.81	2,138.38	3,966.99	3,913.96	53.03	74.803			
8,700.00	7,450.00	7,381.83	7,404.49	30.01	23.85	86.018	4,211.82	2,138.39	3,868.40	3,815.36	53.03	72.942			
8,800.00	7,450.00	7,383.02	7,405.68	30.12	23.85	86.123	4,211.84	2,138.39	3,769.88	3,716.85	53.04	71.081			

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 302H
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 302H	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) NAD 83 - Rustler Breaks 26/23 W2ML Fee Com 1H - Wellbore #1 - Surveys													Offset Site Error:
													0.00 usft
Survey Program:	Reference	Offset	Semi Major Axis	Highside	Offset Wellbore Centre	Distance	Rule Assigned:	Offset Well Error:					
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Reference	Toolface (°)	+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	0.00 usft	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning	
8,811.02	7,450.00	7,383.16	30.14	23.85	86.134	4,211.84	2,138.39	3,759.03	3,706.00	53.04	70.876		
8,811.41	7,450.00	7,383.16	30.14	23.85	86.132	4,211.84	2,138.39	3,758.64	3,705.61	53.04	70.869		
8,900.00	7,450.00	7,384.22	30.27	23.86	86.224	4,211.85	2,138.39	3,671.44	3,618.40	53.04	69.219		
9,000.00	7,450.00	7,385.41	30.47	23.86	86.328	4,211.87	2,138.39	3,573.09	3,520.04	53.05	67.356		
9,100.00	7,450.00	7,386.60	30.71	23.86	86.432	4,211.88	2,138.39	3,474.83	3,421.78	53.06	65.493		
9,200.00	7,450.00	7,387.78	30.99	23.87	86.535	4,211.89	2,138.39	3,376.67	3,323.61	53.07	63.629		
9,300.00	7,450.00	7,388.96	31.29	23.87	86.638	4,211.91	2,138.39	3,278.63	3,225.55	53.08	61.766		
9,400.00	7,450.00	7,390.14	31.63	23.88	86.741	4,211.92	2,138.40	3,180.70	3,127.61	53.10	59.901		
9,500.00	7,450.00	7,391.32	31.99	23.88	86.844	4,211.94	2,138.40	3,082.91	3,029.79	53.12	58.037		
9,600.00	7,450.00	7,392.49	32.37	23.88	86.947	4,211.95	2,138.40	2,985.27	2,932.12	53.14	56.173		
9,700.00	7,450.00	7,393.66	32.78	23.89	87.049	4,211.96	2,138.40	2,887.78	2,834.61	53.17	54.308		
9,800.00	7,450.00	7,394.83	33.21	23.89	87.151	4,211.98	2,138.40	2,790.47	2,737.26	53.21	52.444		
9,900.00	7,450.00	7,396.00	33.65	23.89	87.253	4,211.99	2,138.40	2,693.36	2,640.11	53.25	50.580		
10,000.00	7,450.00	7,397.16	34.11	23.90	87.355	4,212.00	2,138.41	2,596.47	2,543.17	53.30	48.717		
10,100.00	7,450.00	7,398.32	34.59	23.90	87.456	4,212.02	2,138.41	2,499.82	2,446.47	53.35	46.854		
10,200.00	7,450.00	7,399.47	35.08	23.91	87.558	4,212.03	2,138.41	2,403.45	2,350.03	53.42	44.991		
10,300.00	7,450.00	7,400.63	35.58	23.91	87.659	4,212.04	2,138.41	2,307.38	2,253.88	53.50	43.130		
10,400.00	7,450.00	7,401.78	36.10	23.91	87.759	4,212.06	2,138.41	2,211.66	2,158.07	53.59	41.270		
10,500.00	7,450.00	7,402.93	36.64	23.92	87.860	4,212.07	2,138.42	2,116.34	2,062.64	53.70	39.411		
10,600.00	7,450.00	7,404.07	37.18	23.92	87.960	4,212.08	2,138.42	2,021.47	1,967.64	53.83	37.554		
10,700.00	7,450.00	7,405.22	37.74	23.93	88.060	4,212.10	2,138.42	1,927.11	1,873.13	53.98	35.699		
10,800.00	7,450.00	7,406.36	38.31	23.93	88.160	4,212.11	2,138.42	1,833.36	1,779.19	54.16	33.848		
10,900.00	7,450.00	7,407.49	38.89	23.93	88.260	4,212.12	2,138.42	1,740.29	1,685.91	54.38	32.000		
11,000.00	7,450.00	7,408.63	39.48	23.94	88.359	4,212.14	2,138.43	1,648.04	1,593.40	54.65	30.157		
11,100.00	7,450.00	7,409.76	40.08	23.94	88.458	4,212.15	2,138.43	1,556.75	1,501.78	54.97	28.321		
11,200.00	7,450.00	7,410.89	40.69	23.94	88.557	4,212.16	2,138.43	1,466.60	1,411.24	55.36	26.494		
11,300.00	7,450.00	7,412.02	41.30	23.95	88.656	4,212.17	2,138.43	1,377.80	1,321.97	55.83	24.679		
11,400.00	7,450.00	7,413.14	41.93	23.95	88.755	4,212.19	2,138.44	1,290.64	1,234.23	56.40	22.882		
11,500.00	7,450.00	7,414.26	42.57	23.96	88.853	4,212.20	2,138.44	1,205.47	1,148.36	57.11	21.108		
11,600.00	7,450.00	7,415.38	43.21	23.96	88.951	4,212.21	2,138.44	1,122.75	1,064.78	57.97	19.367		
11,700.00	7,450.00	7,416.50	43.86	23.96	89.049	4,212.23	2,138.44	1,043.06	984.03	59.03	17.671		
11,800.00	7,450.00	7,417.61	44.51	23.97	89.146	4,212.24	2,138.45	967.15	906.85	60.31	16.038		
11,900.00	7,450.00	7,418.72	45.18	23.97	89.244	4,212.25	2,138.45	895.99	834.15	61.84	14.490		
12,000.00	7,450.00	7,419.83	45.85	23.97	89.341	4,212.26	2,138.45	830.78	767.15	63.63	13.057		
12,100.00	7,450.00	7,420.93	46.53	23.98	89.438	4,212.28	2,138.46	773.04	707.39	65.65	11.775		
12,200.00	7,450.00	7,422.04	47.21	23.98	89.535	4,212.29	2,138.46	724.57	656.74	67.83	10.683		
12,300.00	7,450.00	7,423.14	47.90	23.98	89.631	4,212.30	2,138.46	687.31	617.33	69.98	9.822		
12,400.00	7,450.00	7,424.24	48.59	23.99	89.727	4,212.31	2,138.46	663.16	591.30	71.86	9.228		
12,500.00	7,450.00	7,425.33	49.29	23.99	89.823	4,212.32	2,138.47	653.59	580.36	73.23	8.925		
12,513.05	7,450.00	7,425.47	49.38	23.99	89.836	4,212.33	2,138.47	653.46	580.10	73.36	8.908 CC, ES, SF		
12,600.00	7,450.00	7,426.42	49.99	24.00	89.919	4,212.34	2,138.47	659.21	585.31	73.90	8.920		
12,700.00	7,450.00	7,427.51	50.70	24.00	90.015	4,212.35	2,138.47	679.67	605.82	73.85	9.204		
12,800.00	7,450.00	7,428.60	51.42	24.00	90.110	4,212.36	2,138.48	713.67	640.48	73.20	9.750		
12,839.11	7,450.00	7,429.03	51.70	24.00	90.147	4,212.37	2,138.48	730.28	657.45	72.83	10.028		
12,839.67	7,450.00	7,429.03	51.70	24.00	90.148	4,212.37	2,138.48	730.53	657.71	72.82	10.032		
12,900.00	7,450.00	7,429.69	52.13	24.01	90.205	4,212.37	2,138.48	759.41	687.25	72.15	10.525		
13,000.00	7,450.00	7,430.77	52.85	24.01	90.300	4,212.39	2,138.48	814.89	743.99	70.91	11.492		
13,100.00	7,450.00	7,431.85	53.58	24.01	90.395	4,212.40	2,138.49	878.29	808.68	69.61	12.617		
13,200.00	7,450.00	7,432.93	54.31	24.02	90.489	4,212.41	2,138.49	948.02	879.67	68.36	13.869		
13,300.00	7,450.00	7,434.00	55.04	24.02	90.584	4,212.42	2,138.49	1,022.79	955.59	67.20	15.221		
13,400.00	7,450.00	7,435.08	55.78	24.02	90.678	4,212.43	2,138.50	1,101.56	1,035.41	66.15	16.652		
13,500.00	7,450.00	7,436.15	56.52	24.03	90.771	4,212.45	2,138.50	1,183.54	1,118.32	65.22	18.146		

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 302H
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 302H	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) NAD 83 - Rustler Breaks 26/23 W2ML Fee Com 1H - Wellbore #1 - Surveys													Offset Site Error:
													0.00 usft
Survey Program:	Reference	Offset	Semi Major Axis	Highside	Offset Wellbore Centre	Distance	Rule Assigned:	Offset Well Error:					
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Reference	Toolface (°)	+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning		
13,600.00	7,450.00	7,437.21	7,459.87	57.27	24.03	90.865	4,212.46	2,138.50	1,268.12	1,203.71	64.41	19.689	
13,700.00	7,450.00	7,438.28	7,460.93	58.02	24.03	90.958	4,212.47	2,138.51	1,354.79	1,291.10	63.69	21.271	
13,800.00	7,450.00	7,439.34	7,462.00	58.77	24.04	91.052	4,212.48	2,138.51	1,443.19	1,380.12	63.07	22.883	
13,900.00	7,450.00	7,440.40	7,463.06	59.52	24.04	91.144	4,212.49	2,138.51	1,533.01	1,470.49	62.52	24.520	
14,000.00	7,450.00	7,441.46	7,464.11	60.28	24.05	91.237	4,212.50	2,138.52	1,624.02	1,561.98	62.04	26.175	
14,100.00	7,450.00	7,442.52	7,465.17	61.04	24.05	91.330	4,212.52	2,138.52	1,716.03	1,654.41	61.63	27.845	
14,200.00	7,450.00	7,443.57	7,466.22	61.80	24.05	91.422	4,212.53	2,138.52	1,808.89	1,747.63	61.26	29.527	
14,300.00	7,450.00	7,444.62	7,467.27	62.56	24.06	91.514	4,212.54	2,138.53	1,902.48	1,841.54	60.94	31.218	
14,400.00	7,450.00	7,445.67	7,468.32	63.33	24.06	91.606	4,212.55	2,138.53	1,996.68	1,936.02	60.66	32.916	
14,500.00	7,450.00	7,446.72	7,469.37	64.10	24.06	91.697	4,212.56	2,138.54	2,091.42	2,031.01	60.41	34.620	
14,600.00	7,450.00	7,447.76	7,470.41	64.87	24.07	91.789	4,212.57	2,138.54	2,186.63	2,126.44	60.19	36.327	
14,700.00	7,450.00	7,448.80	7,471.45	65.64	24.07	91.880	4,212.59	2,138.54	2,282.25	2,222.25	60.00	38.037	
14,800.00	7,450.00	7,449.84	7,472.49	66.42	24.07	91.971	4,212.60	2,138.55	2,378.23	2,318.40	59.83	39.748	
14,900.00	7,450.00	7,450.88	7,473.53	67.20	24.08	92.062	4,212.61	2,138.55	2,474.53	2,414.85	59.68	41.461	
15,000.00	7,450.00	7,451.91	7,474.56	67.98	24.08	92.152	4,212.62	2,138.55	2,571.11	2,511.56	59.55	43.173	
15,100.00	7,450.00	7,452.94	7,475.59	68.76	24.08	92.242	4,212.63	2,138.56	2,667.94	2,608.50	59.44	44.886	
15,200.00	7,450.00	7,453.97	7,476.62	69.54	24.09	92.333	4,212.64	2,138.56	2,765.00	2,705.66	59.34	46.597	
15,300.00	7,450.00	7,455.00	7,477.65	70.33	24.09	92.422	4,212.65	2,138.57	2,862.26	2,803.01	59.25	48.307	
15,400.00	7,450.00	7,456.02	7,478.68	71.12	24.09	92.512	4,212.66	2,138.57	2,959.70	2,900.52	59.18	50.016	
15,500.00	7,450.00	7,457.05	7,479.70	71.90	24.10	92.602	4,212.68	2,138.57	3,057.30	2,998.19	59.11	51.722	
15,600.00	7,450.00	7,458.07	7,480.72	72.70	24.10	92.691	4,212.69	2,138.58	3,155.06	3,096.00	59.05	53.426	
15,700.00	7,450.00	7,459.08	7,481.74	73.49	24.10	92.780	4,212.70	2,138.58	3,252.95	3,193.94	59.01	55.127	
15,800.00	7,450.00	13,733.05	10,673.81	74.28	71.22	168.037	7,533.20	2,134.55	3,295.55	3,192.65	102.90	32.027	
15,845.22	7,450.00	13,745.05	10,673.74	74.64	71.42	168.037	7,545.19	2,134.44	3,295.31	3,192.05	103.26	31.914	
15,900.00	7,450.00	13,784.00	10,674.45	75.08	72.07	168.045	7,584.13	2,133.71	3,295.98	3,192.07	103.91	31.720	
16,000.00	7,450.00	13,907.75	10,675.69	75.87	74.14	168.053	7,707.85	2,132.25	3,297.12	3,191.53	105.59	31.226	
16,034.74	7,450.00	13,933.90	10,675.59	76.15	74.58	168.047	7,734.00	2,132.30	3,297.08	3,191.05	106.02	31.098	
16,100.00	7,450.00	14,001.53	10,675.47	76.67	75.71	168.027	7,801.63	2,132.79	3,297.20	3,190.19	107.01	30.812	
16,200.00	7,450.00	14,146.13	10,673.22	77.47	78.16	167.954	7,946.18	2,135.13	3,296.12	3,187.20	108.92	30.262	
16,300.00	7,450.00	14,229.31	10,671.48	78.27	79.58	167.893	8,029.31	2,137.53	3,294.89	3,184.62	110.27	29.880	
16,384.09	7,450.00	14,283.43	10,671.03	78.95	80.51	167.881	8,083.42	2,137.58	3,294.45	3,183.20	111.25	29.614	
16,400.00	7,450.00	14,292.05	10,671.03	79.07	80.65	167.880	8,092.04	2,137.55	3,294.47	3,183.05	111.42	29.569	
16,500.00	7,450.00	14,480.79	10,670.08	79.88	83.91	167.885	8,280.74	2,135.14	3,294.43	3,180.69	113.75	28.963	
16,600.00	7,450.00	14,551.39	10,669.08	80.68	85.14	167.912	8,351.28	2,132.62	3,292.48	3,177.51	114.97	28.637	
16,700.00	7,450.00	14,663.44	10,667.68	81.49	87.10	167.962	8,463.24	2,128.27	3,290.65	3,174.07	116.58	28.226	
16,800.00	7,450.00	14,777.21	10,664.82	82.29	89.09	167.905	8,576.94	2,129.89	3,288.72	3,170.47	118.24	27.813	
16,900.00	7,450.00	14,953.47	10,656.18	83.10	92.18	167.756	8,752.86	2,135.00	3,284.40	3,163.89	120.51	27.255	
17,000.00	7,450.00	15,015.00	10,654.12	83.91	93.27	167.776	8,814.31	2,132.72	3,280.46	3,158.77	121.69	26.958	
17,100.00	7,450.00	15,097.75	10,652.70	84.72	94.74	167.860	8,896.82	2,126.71	3,277.42	3,154.39	123.03	26.639	
17,200.00	7,450.00	15,160.11	10,652.08	85.53	95.85	167.935	8,958.96	2,121.57	3,274.96	3,150.77	124.18	26.372	
17,300.00	7,450.00	15,236.04	10,651.81	86.34	97.21	167.986	9,034.80	2,117.73	3,273.70	3,148.24	125.47	26.092	
17,400.00	7,450.00	15,343.09	10,650.99	87.16	99.11	168.035	9,141.75	2,113.65	3,272.36	3,145.30	127.06	25.755	
17,500.00	7,450.00	15,391.00	10,650.10	87.97	99.97	168.007	9,189.64	2,114.61	3,271.52	3,143.43	128.09	25.540	
17,525.47	7,450.00	15,425.90	10,649.57	88.18	100.59	167.978	9,224.51	2,115.82	3,271.31	3,142.72	128.60	25.439	
17,600.00	7,450.00	15,484.00	10,649.85	88.78	101.63	167.958	9,282.61	2,116.47	3,271.89	3,142.30	129.59	25.248	
17,700.00	7,450.00	15,716.86	10,647.91	89.60	105.80	167.869	9,515.34	2,118.88	3,273.01	3,140.53	132.48	24.705	
17,800.00	7,450.00	15,764.00	10,646.32	90.42	106.65	167.866	9,562.45	2,118.26	3,269.98	3,136.43	133.54	24.487	
17,900.00	7,450.00	15,832.87	10,645.19	91.23	107.90	167.888	9,631.27	2,116.01	3,268.09	3,133.30	134.78	24.247	
18,000.00	7,450.00	15,984.94	10,641.41	92.05	110.65	167.875	9,783.23	2,114.48	3,265.32	3,128.46	136.86	23.859	
18,100.00	7,450.00	16,046.00	10,640.99	92.87	111.75	167.865	9,844.29	2,114.32	3,264.23	3,126.18	138.05	23.645	
18,145.10	7,450.00	16,046.00	10,640.99	93.24	111.75	167.865	9,844.29	2,114.32	3,263.92	3,125.62	138.30	23.600	
18,197.24	7,450.00	16,046.00	10,640.99	93.67	111.75	167.865	9,844.29	2,114.32	3,264.34	3,125.77	138.57	23.558	

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 302H
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 302H	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) NAD 83 - Rustler Breaks 26/23 W2ML Fee Com 1H - Wellbore #1 - Surveys													Offset Site Error:
													0.00 usft
Survey Program:	726-MWD+IGRF												Offset Well Error:
Reference	Offset												0.00 usft
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Semi Major Axis Reference	Semi Major Axis Offset	Highside Toolface (°)	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
18,200.00	7,450.00	16,046.00	10,640.99	93.69	111.75	167.866	9,844.29	2,114.32	3,264.38	3,125.80	138.58	23.556	
18,229.54	7,450.00	16,046.00	10,640.99	93.93	111.75	167.879	9,844.29	2,114.32	3,265.05	3,126.33	138.72	23.537	
18,300.00	7,450.00	16,105.46	10,642.38	94.51	112.83	167.876	9,903.72	2,113.54	3,266.84	3,127.14	139.71	23.384	
18,400.00	7,450.00	16,206.49	10,645.87	95.33	114.67	167.874	10,004.68	2,112.23	3,270.40	3,129.11	141.29	23.147	
18,500.00	7,450.00	16,285.79	10,647.98	96.15	116.11	167.846	10,083.95	2,112.65	3,273.62	3,130.97	142.65	22.949	
18,600.00	7,450.00	16,508.79	10,650.13	96.98	120.16	167.709	10,306.86	2,116.35	3,275.20	3,129.56	145.64	22.488	
18,700.00	7,450.00	16,563.29	10,649.44	97.80	121.14	167.635	10,361.26	2,119.38	3,275.74	3,128.95	146.79	22.316	
18,800.00	7,450.00	16,761.49	10,643.89	98.62	124.73	167.285	10,558.75	2,134.44	3,274.59	3,124.99	149.59	21.890	
18,882.68	7,450.00	16,793.00	10,643.14	99.31	125.30	167.249	10,590.22	2,135.69	3,273.88	3,123.46	150.42	21.765	
18,900.00	7,450.00	16,793.00	10,643.14	99.45	125.30	167.249	10,590.22	2,135.69	3,273.92	3,123.41	150.52	21.751	
19,000.00	7,450.00	16,850.23	10,643.01	100.28	126.34	167.207	10,647.44	2,136.90	3,274.84	3,123.16	151.68	21.590	
19,100.00	7,450.00	17,108.06	10,639.86	101.10	131.08	167.113	10,905.17	2,136.18	3,273.74	3,118.81	154.93	21.130	
19,200.00	7,450.00	17,167.00	10,638.81	101.93	132.16	167.118	10,964.06	2,134.38	3,271.62	3,115.48	156.14	20.953	
19,300.00	7,450.00	17,214.06	10,638.81	102.76	133.03	167.137	11,011.08	2,132.29	3,270.90	3,113.70	157.20	20.808	
19,400.00	7,450.00	17,421.68	10,634.53	103.58	136.86	167.086	11,218.55	2,129.86	3,269.06	3,109.18	159.88	20.447	
19,500.00	7,450.00	17,478.51	10,633.03	104.41	137.91	167.097	11,275.31	2,127.66	3,266.19	3,105.11	161.07	20.278	
19,600.00	7,450.00	17,541.00	10,632.58	105.24	139.07	167.103	11,337.77	2,125.84	3,265.08	3,102.78	162.31	20.117	
19,700.00	7,450.00	17,682.92	10,632.18	106.07	141.70	167.157	11,479.54	2,119.60	3,264.63	3,100.35	164.28	19.872	
19,800.00	7,450.00	17,791.17	10,629.64	106.90	143.71	167.190	11,587.64	2,114.75	3,261.78	3,095.84	165.94	19.656	
19,900.00	7,450.00	17,845.63	10,629.10	107.73	144.72	167.223	11,642.00	2,111.58	3,260.01	3,092.93	167.08	19.512	
20,000.00	7,450.00	17,915.00	10,629.57	108.56	146.01	167.267	11,711.26	2,107.65	3,259.74	3,091.40	168.34	19.364	
20,004.08	7,450.00	17,915.00	10,629.57	108.60	146.01	167.267	11,711.26	2,107.65	3,259.74	3,091.37	168.36	19.361	
20,100.00	7,450.00	18,005.19	10,630.45	109.40	147.68	167.302	11,801.36	2,103.84	3,260.19	3,090.37	169.82	19.198	
20,200.00	7,450.00	18,156.11	10,630.62	110.23	150.49	167.336	11,952.14	2,098.69	3,260.23	3,088.31	171.92	18.963	
20,300.00	7,450.00	18,288.00	10,626.23	111.06	152.93	167.219	12,083.84	2,101.70	3,257.82	3,083.88	173.94	18.729	
20,400.00	7,450.00	18,331.18	10,624.93	111.89	153.72	167.153	12,126.92	2,104.33	3,256.50	3,081.45	175.05	18.603	
20,445.12	7,450.00	18,356.70	10,624.35	112.27	154.19	167.114	12,152.38	2,105.95	3,256.36	3,080.75	175.61	18.543	
20,500.00	7,450.00	18,392.11	10,623.79	112.73	154.85	167.059	12,187.71	2,108.27	3,256.56	3,080.22	176.34	18.468	
20,600.00	7,450.00	18,435.00	10,623.19	113.56	155.63	166.992	12,230.51	2,111.11	3,257.67	3,080.29	177.38	18.366	
20,700.00	7,450.00	18,435.00	10,623.19	114.40	155.63	166.992	12,230.51	2,111.11	3,261.56	3,083.79	177.76	18.348	
20,800.00	7,450.00	18,435.00	10,623.19	115.23	155.63	166.992	12,230.51	2,111.11	3,268.51	3,090.49	178.02	18.361	
20,900.00	7,450.00	18,435.00	10,623.19	116.07	155.63	166.992	12,230.51	2,111.11	3,278.49	3,100.36	178.13	18.405	
21,000.00	7,450.00	18,435.00	10,623.19	116.90	155.63	166.992	12,230.51	2,111.11	3,291.49	3,113.37	178.12	18.480	
21,100.00	7,450.00	18,435.00	10,623.19	117.74	155.63	166.992	12,230.51	2,111.11	3,307.46	3,129.49	177.97	18.585	
21,200.00	7,450.00	18,435.00	10,623.19	118.57	155.63	166.992	12,230.51	2,111.11	3,326.36	3,148.67	177.69	18.720	
21,300.00	7,450.00	18,435.00	10,623.19	119.41	155.63	166.992	12,230.51	2,111.11	3,348.14	3,170.84	177.30	18.884	
21,400.00	7,450.00	18,435.00	10,623.19	120.25	155.63	166.992	12,230.51	2,111.11	3,372.75	3,195.96	176.79	19.078	
21,500.00	7,450.00	18,435.00	10,623.19	121.09	155.63	166.992	12,230.51	2,111.11	3,400.12	3,223.94	176.17	19.300	
21,600.00	7,450.00	18,435.00	10,623.19	121.92	155.63	166.992	12,230.51	2,111.11	3,430.18	3,254.73	175.45	19.550	
21,700.00	7,450.00	18,435.00	10,623.19	122.76	155.63	166.992	12,230.51	2,111.11	3,462.88	3,288.24	174.65	19.828	
21,800.00	7,450.00	18,435.00	10,623.19	123.60	155.63	166.992	12,230.51	2,111.11	3,498.13	3,324.38	173.75	20.133	
21,900.00	7,450.00	18,435.00	10,623.19	124.44	155.63	166.992	12,230.51	2,111.11	3,535.86	3,363.08	172.78	20.464	
22,000.00	7,450.00	18,435.00	10,623.19	125.28	155.63	166.992	12,230.51	2,111.11	3,575.99	3,404.24	171.74	20.822	
22,100.00	7,450.00	18,435.00	10,623.19	126.12	155.63	166.992	12,230.51	2,111.11	3,618.43	3,447.79	170.64	21.205	
22,200.00	7,450.00	18,435.00	10,623.19	126.96	155.63	166.992	12,230.51	2,111.11	3,663.12	3,493.63	169.49	21.613	
22,300.00	7,450.00	18,435.00	10,623.19	127.80	155.63	166.992	12,230.51	2,111.11	3,709.96	3,541.67	168.29	22.045	
22,400.00	7,450.00	18,435.00	10,623.19	128.64	155.63	166.992	12,230.51	2,111.11	3,758.88	3,591.82	167.06	22.501	
22,500.00	7,450.00	18,435.00	10,623.19	129.48	155.63	166.992	12,230.51	2,111.11	3,809.80	3,644.01	165.79	22.980	
22,600.00	7,450.00	18,435.00	10,623.19	130.32	155.63	166.992	12,230.51	2,111.11	3,862.63	3,698.14	164.50	23.481	
22,700.00	7,450.00	18,435.00	10,623.19	131.16	155.63	166.992	12,230.51	2,111.11	3,917.31	3,754.12	163.19	24.005	
22,800.00	7,450.00	18,435.00	10,623.19	132.00	155.63	166.992	12,230.51	2,111.11	3,973.75	3,811.89	161.86	24.550	
22,900.00	7,450.00	18,435.00	10,623.19	132.84	155.63	166.992	12,230.51	2,111.11	4,031.88	3,871.35	160.53	25.116	

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 302H
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 302H	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) NAD 83 - Rustler Breaks 26/23 W2ML Fee Com 1H - Wellbore #1 - Surveys													Offset Site Error:	0.00 usft
Survey Program: 726-MWD+IGRF		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)	Highside Toolface (°)	+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning	
23,000.00	7,450.00	18,435.00	10,623.19	133.69	155.63	166.992	12,230.51	2,111.11	4,091.63	3,932.44	159.19	25.702		
23,100.00	7,450.00	18,435.00	10,623.19	134.53	155.63	166.992	12,230.51	2,111.11	4,152.93	3,995.07	157.86	26.308		
23,200.00	7,450.00	18,435.00	10,623.19	135.37	155.63	166.992	12,230.51	2,111.11	4,215.71	4,059.18	156.53	26.933		
23,300.00	7,450.00	18,435.00	10,623.19	136.21	155.63	166.992	12,230.51	2,111.11	4,279.90	4,124.70	155.20	27.577		
23,400.00	7,450.00	18,435.00	10,623.19	137.06	155.63	166.992	12,230.51	2,111.11	4,345.45	4,191.57	153.89	28.238		
23,455.58	7,450.00	18,435.00	10,623.19	137.52	155.63	166.992	12,230.51	2,111.11	4,382.44	4,229.28	153.16	28.613		

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 302H
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 302H	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:				Offset Well Error:	0.00 usft
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning		
15,600.00	7,450.00	13,551.00	7,347.33	72.70	143.46	-31.434	17,194.14	1,291.34	9,903.61	9,728.97	174.64	56.709			
15,700.00	7,450.00	13,551.00	7,347.33	73.49	143.46	-31.434	17,194.14	1,291.34	9,803.62	9,628.92	174.70	56.117			
15,800.00	7,450.00	13,551.00	7,347.33	74.28	143.46	-31.434	17,194.14	1,291.34	9,703.62	9,528.87	174.76	55.526			
15,900.00	7,450.00	13,551.00	7,347.33	75.08	143.46	-31.434	17,194.14	1,291.34	9,603.63	9,428.81	174.82	54.935			
16,000.00	7,450.00	13,551.00	7,347.33	75.87	143.46	-31.434	17,194.14	1,291.34	9,503.64	9,328.76	174.88	54.345			
16,100.00	7,450.00	13,551.00	7,347.33	76.67	143.46	-31.434	17,194.14	1,291.34	9,403.65	9,228.71	174.94	53.754			
16,200.00	7,450.00	13,551.00	7,347.33	77.47	143.46	-31.434	17,194.14	1,291.34	9,303.66	9,128.65	175.00	53.164			
16,300.00	7,450.00	13,551.00	7,347.33	78.27	143.46	-31.434	17,194.14	1,291.34	9,203.66	9,028.60	175.06	52.573			
16,400.00	7,450.00	13,551.00	7,347.33	79.07	143.46	-31.434	17,194.14	1,291.34	9,103.67	8,928.55	175.13	51.984			
16,500.00	7,450.00	13,551.00	7,347.33	79.88	143.46	-31.434	17,194.14	1,291.34	9,003.68	8,828.49	175.19	51.394			
16,600.00	7,450.00	13,551.00	7,347.33	80.68	143.46	-31.434	17,194.14	1,291.34	8,903.69	8,728.44	175.25	50.804			
16,700.00	7,450.00	13,551.00	7,347.33	81.49	143.46	-31.434	17,194.14	1,291.34	8,803.70	8,628.38	175.32	50.215			
16,800.00	7,450.00	13,551.00	7,347.33	82.29	143.46	-31.434	17,194.14	1,291.34	8,703.71	8,528.32	175.38	49.626			
16,900.00	7,450.00	13,551.00	7,347.33	83.10	143.46	-31.434	17,194.14	1,291.34	8,603.72	8,428.27	175.45	49.038			
17,000.00	7,450.00	13,551.00	7,347.33	83.91	143.46	-31.434	17,194.14	1,291.34	8,503.73	8,328.21	175.52	48.449			
17,100.00	7,450.00	13,551.00	7,347.33	84.72	143.46	-31.434	17,194.14	1,291.34	8,403.74	8,228.15	175.59	47.861			
17,200.00	7,450.00	13,551.00	7,347.33	85.53	143.46	-31.434	17,194.14	1,291.34	8,303.75	8,128.10	175.65	47.274			
17,300.00	7,450.00	13,551.00	7,347.33	86.34	143.46	-31.434	17,194.14	1,291.34	8,203.76	8,028.04	175.72	46.686			
17,400.00	7,450.00	13,551.00	7,347.33	87.16	143.46	-31.434	17,194.14	1,291.34	8,103.77	7,927.98	175.79	46.099			
17,500.00	7,450.00	13,551.00	7,347.33	87.97	143.46	-31.434	17,194.14	1,291.34	8,003.78	7,827.92	175.86	45.512			
17,600.00	7,450.00	13,551.00	7,347.33	88.78	143.46	-31.434	17,194.14	1,291.34	7,903.79	7,727.86	175.93	44.926			
17,700.00	7,450.00	13,551.00	7,347.33	89.60	143.46	-31.434	17,194.14	1,291.34	7,803.80	7,627.80	176.00	44.339			
17,800.00	7,450.00	13,551.00	7,347.33	90.42	143.46	-31.434	17,194.14	1,291.34	7,703.82	7,527.74	176.07	43.753			
17,900.00	7,450.00	13,551.00	7,347.33	91.23	143.46	-31.434	17,194.14	1,291.34	7,603.83	7,427.68	176.15	43.168			
18,000.00	7,450.00	13,551.00	7,347.33	92.05	143.46	-31.434	17,194.14	1,291.34	7,503.84	7,327.62	176.22	42.583			
18,100.00	7,450.00	13,551.00	7,347.33	92.87	143.46	-31.434	17,194.14	1,291.34	7,403.85	7,227.56	176.29	41.998			
18,197.24	7,450.00	13,551.00	7,347.33	93.67	143.46	-31.434	17,194.14	1,291.34	7,306.63	7,130.26	176.36	41.429			
18,200.00	7,450.00	13,551.00	7,347.33	93.69	143.46	-28.488	17,194.14	1,291.34	7,303.87	7,127.50	176.37	41.413			
18,229.54	7,450.00	13,551.00	7,347.33	93.93	143.46	10.717	17,194.14	1,291.34	7,274.33	7,097.95	176.39	41.241			
18,300.00	7,450.00	13,551.00	7,347.33	94.51	143.46	10.717	17,194.14	1,291.34	7,203.88	7,027.44	176.44	40.830			
18,400.00	7,450.00	13,551.00	7,347.33	95.33	143.46	10.717	17,194.14	1,291.34	7,103.89	6,927.38	176.51	40.246			
18,500.00	7,450.00	13,551.00	7,347.33	96.15	143.46	10.717	17,194.14	1,291.34	7,003.90	6,827.32	176.58	39.663			
18,600.00	7,450.00	13,551.00	7,347.33	96.98	143.46	10.717	17,194.14	1,291.34	6,903.91	6,727.25	176.66	39.081			
18,700.00	7,450.00	13,551.00	7,347.33	97.80	143.46	10.717	17,194.14	1,291.34	6,803.92	6,627.19	176.73	38.499			
18,800.00	7,450.00	13,551.00	7,347.33	98.62	143.46	10.717	17,194.14	1,291.34	6,703.94	6,527.13	176.81	37.917			
18,900.00	7,450.00	13,551.00	7,347.33	99.45	143.46	10.717	17,194.14	1,291.34	6,603.95	6,427.07	176.88	37.335			
19,000.00	7,450.00	13,551.00	7,347.33	100.28	143.46	10.717	17,194.14	1,291.34	6,503.96	6,327.00	176.96	36.754			
19,100.00	7,450.00	13,551.00	7,347.33	101.10	143.46	10.717	17,194.14	1,291.34	6,403.97	6,226.94	177.03	36.174			
19,200.00	7,450.00	13,551.00	7,347.33	101.93	143.46	10.717	17,194.14	1,291.34	6,303.99	6,126.88	177.11	35.594			
19,300.00	7,450.00	13,551.00	7,347.33	102.76	143.46	10.717	17,194.14	1,291.34	6,204.00	6,026.81	177.19	35.014			
19,400.00	7,450.00	13,551.00	7,347.33	103.58	143.46	10.717	17,194.14	1,291.34	6,104.02	5,926.75	177.26	34.435			
19,500.00	7,450.00	13,551.00	7,347.33	104.41	143.46	10.717	17,194.14	1,291.34	6,004.03	5,826.69	177.34	33.856			
19,600.00	7,450.00	13,551.00	7,347.33	105.24	143.46	10.717	17,194.14	1,291.34	5,904.05	5,726.63	177.42	33.277			
19,700.00	7,450.00	13,551.00	7,347.33	106.07	143.46	10.717	17,194.14	1,291.34	5,804.06	5,626.56	177.50	32.699			
19,800.00	7,450.00	13,551.00	7,347.33	106.90	143.46	10.717	17,194.14	1,291.34	5,704.08	5,526.50	177.58	32.122			
19,900.00	7,450.00	13,551.00	7,347.33	107.73	143.46	10.717	17,194.14	1,291.34	5,604.09	5,426.44	177.66	31.545			
20,000.00	7,450.00	13,551.00	7,347.33	108.56	143.46	10.717	17,194.14	1,291.34	5,504.11	5,326.38	177.74	30.968			
20,100.00	7,450.00	13,551.00	7,347.33	109.40	143.46	10.717	17,194.14	1,291.34	5,404.13	5,226.32	177.82	30.392			
20,200.00	7,450.00	13,551.00	7,347.33	110.23	143.46	10.717	17,194.14	1,291.34	5,304.15	5,126.25	177.90	29.816			
20,300.00	7,450.00	13,551.00	7,347.33	111.06	143.46	10.717	17,194.14	1,291.34	5,204.17	5,026.19	177.98	29.241			
20,400.00	7,450.00	13,551.00	7,347.33	111.89	143.46	10.717	17,194.14	1,291.34	5,104.19	4,926.13	178.06	28.666			
20,500.00	7,450.00	13,551.00	7,347.33	112.73	143.46	10.717	17,194.14	1,291.34	5,004.21	4,826.07	178.14	28.092			

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 302H
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 302H	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)	Measured Depth (usft)	Vertical Depth (usft)	Semi Major Axis Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Distance Between Centres (usft)	Rule Assigned: Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning
20,600.00	7,450.00	13,551.00	7,347.33	113.56	143.46	10.717	17,194.14	1,291.34	4,904.23	4,726.01	178.22	27.518	
20,700.00	7,450.00	13,551.00	7,347.33	114.40	143.46	10.717	17,194.14	1,291.34	4,804.26	4,625.96	178.30	26.944	
20,800.00	7,450.00	13,551.00	7,347.33	115.23	143.46	10.717	17,194.14	1,291.34	4,704.28	4,525.90	178.38	26.372	
20,900.00	7,450.00	13,551.00	7,347.33	116.07	143.46	10.717	17,194.14	1,291.34	4,604.31	4,425.84	178.47	25.799	
21,000.00	7,450.00	13,551.00	7,347.33	116.90	143.46	10.717	17,194.14	1,291.34	4,504.33	4,325.78	178.55	25.227	
21,100.00	7,450.00	13,551.00	7,347.33	117.74	143.46	10.717	17,194.14	1,291.34	4,404.36	4,225.73	178.63	24.656	
21,200.00	7,450.00	13,551.00	7,347.33	118.57	143.46	10.717	17,194.14	1,291.34	4,304.39	4,125.67	178.71	24.085	
21,300.00	7,450.00	13,551.00	7,347.33	119.41	143.46	10.717	17,194.14	1,291.34	4,204.42	4,025.62	178.80	23.515	
21,400.00	7,450.00	13,551.00	7,347.33	120.25	143.46	10.717	17,194.14	1,291.34	4,104.45	3,925.57	178.88	22.945	
21,500.00	7,450.00	13,551.00	7,347.33	121.09	143.46	10.717	17,194.14	1,291.34	4,004.48	3,825.52	178.96	22.376	
21,600.00	7,450.00	13,551.00	7,347.33	121.92	143.46	10.717	17,194.14	1,291.34	3,904.52	3,725.47	179.05	21.807	
21,700.00	7,450.00	13,551.00	7,347.33	122.76	143.46	10.717	17,194.14	1,291.34	3,804.56	3,625.42	179.13	21.239	
21,800.00	7,450.00	13,551.00	7,347.33	123.60	143.46	10.717	17,194.14	1,291.34	3,704.59	3,525.38	179.22	20.671	
21,900.00	7,450.00	13,551.00	7,347.33	124.44	143.46	10.717	17,194.14	1,291.34	3,604.64	3,425.34	179.30	20.104	
22,000.00	7,450.00	13,551.00	7,347.33	125.28	143.46	10.717	17,194.14	1,291.34	3,504.68	3,325.29	179.38	19.537	
22,100.00	7,450.00	13,551.00	7,347.33	126.12	143.46	10.717	17,194.14	1,291.34	3,404.72	3,225.26	179.47	18.971	
22,200.00	7,450.00	13,551.00	7,347.33	126.96	143.46	10.717	17,194.14	1,291.34	3,304.77	3,125.22	179.55	18.406	
22,300.00	7,450.00	13,551.00	7,347.33	127.80	143.46	10.717	17,194.14	1,291.34	3,204.82	3,025.19	179.64	17.841	
22,400.00	7,450.00	13,551.00	7,347.33	128.64	143.46	10.717	17,194.14	1,291.34	3,104.88	2,925.16	179.72	17.276	
22,500.00	7,450.00	13,551.00	7,347.33	129.48	143.46	10.717	17,194.14	1,291.34	3,004.94	2,825.13	179.81	16.712	
22,600.00	7,450.00	13,551.00	7,347.33	130.32	143.46	10.717	17,194.14	1,291.34	2,905.00	2,725.11	179.89	16.149	
22,700.00	7,450.00	13,551.00	7,347.33	131.16	143.46	10.717	17,194.14	1,291.34	2,805.07	2,625.09	179.97	15.586	
22,800.00	7,450.00	13,551.00	7,347.33	132.00	143.46	10.717	17,194.14	1,291.34	2,705.14	2,525.08	180.06	15.024	
22,900.00	7,450.00	13,551.00	7,347.33	132.84	143.46	10.717	17,194.14	1,291.34	2,605.22	2,425.07	180.14	14.462	
23,000.00	7,450.00	13,551.00	7,347.33	133.69	143.46	10.717	17,194.14	1,291.34	2,505.30	2,325.07	180.23	13.901	
23,100.00	7,450.00	13,551.00	7,347.33	134.53	143.46	10.717	17,194.14	1,291.34	2,405.39	2,225.08	180.32	13.340	
23,200.00	7,450.00	13,551.00	7,347.33	135.37	143.46	10.717	17,194.14	1,291.34	2,305.49	2,125.09	180.40	12.780	
23,300.00	7,450.00	13,551.00	7,347.33	136.21	143.46	10.717	17,194.14	1,291.34	2,205.60	2,025.11	180.49	12.220	
23,400.00	7,450.00	13,551.00	7,347.33	137.06	143.46	10.717	17,194.14	1,291.34	2,105.71	1,925.14	180.58	11.661	
23,455.58	7,450.00	13,551.00	7,347.33	137.52	143.46	10.717	17,194.14	1,291.34	2,050.21	1,869.58	180.63	11.351 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 302H
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 302H	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)	Offset Vertical Depth (usft)	Semi Major Axis Reference (usft)	Semi Major Axis Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre		Distance Between Centres (usft)		Minimum Separation (usft)	Separation Factor	Warning
							+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)			
14,200.00	7,450.00	13,287.26	7,251.01	61.80	137.67	42.332	15,873.42	1,548.69	9,983.26	9,815.37	167.89	59.464	
14,300.00	7,450.00	13,289.04	7,250.97	62.56	137.71	42.046	15,873.44	1,546.91	9,883.30	9,715.33	167.97	58.840	
14,400.00	7,450.00	13,290.82	7,250.94	63.33	137.75	41.758	15,873.45	1,545.13	9,783.33	9,615.28	168.05	58.215	
14,500.00	7,450.00	13,292.60	7,250.91	64.10	137.79	41.467	15,873.46	1,543.35	9,683.37	9,515.23	168.14	57.591	
14,600.00	7,450.00	13,294.39	7,250.88	64.87	137.83	41.173	15,873.48	1,541.57	9,583.41	9,415.18	168.23	56.967	
14,700.00	7,450.00	13,296.17	7,250.85	65.64	137.87	40.877	15,873.49	1,539.79	9,483.45	9,315.13	168.31	56.344	
14,800.00	7,450.00	13,297.95	7,250.82	66.42	137.91	40.579	15,873.51	1,538.01	9,383.49	9,215.09	168.40	55.721	
14,900.00	7,450.00	13,299.73	7,250.79	67.20	137.95	40.277	15,873.52	1,536.23	9,283.52	9,115.04	168.49	55.099	
15,000.00	7,450.00	13,301.51	7,250.76	67.98	137.99	39.974	15,873.53	1,534.45	9,183.56	9,014.99	168.58	54.477	
15,100.00	7,450.00	13,303.29	7,250.73	68.76	138.04	39.667	15,873.55	1,532.67	9,083.60	8,914.94	168.67	53.856	
15,200.00	7,450.00	13,305.07	7,250.69	69.54	138.08	39.358	15,873.56	1,530.89	8,983.65	8,814.89	168.76	53.235	
15,300.00	7,450.00	13,306.85	7,250.66	70.33	138.12	39.047	15,873.57	1,529.11	8,883.69	8,714.84	168.85	52.614	
15,400.00	7,450.00	13,308.63	7,250.63	71.12	138.16	38.732	15,873.59	1,527.32	8,783.73	8,614.79	168.94	51.994	
15,500.00	7,450.00	13,310.42	7,250.60	71.90	138.20	38.415	15,873.60	1,525.54	8,683.77	8,514.74	169.03	51.374	
15,600.00	7,450.00	13,312.20	7,250.57	72.70	138.24	38.095	15,873.62	1,523.76	8,583.82	8,414.69	169.12	50.755	
15,700.00	7,450.00	13,313.98	7,250.54	73.49	138.28	37.773	15,873.63	1,521.98	8,483.86	8,314.64	169.21	50.137	
15,800.00	7,450.00	13,315.76	7,250.51	74.28	138.32	37.447	15,873.64	1,520.20	8,383.90	8,214.60	169.31	49.519	
15,900.00	7,450.00	13,317.54	7,250.48	75.08	138.36	37.119	15,873.66	1,518.42	8,283.95	8,114.55	169.40	48.901	
16,000.00	7,450.00	13,319.32	7,250.45	75.87	138.40	36.789	15,873.67	1,516.64	8,183.99	8,014.50	169.50	48.284	
16,100.00	7,450.00	13,321.10	7,250.42	76.67	138.44	36.455	15,873.68	1,514.86	8,084.04	7,914.45	169.59	47.668	
16,200.00	7,450.00	13,322.88	7,250.38	77.47	138.48	36.119	15,873.70	1,513.08	7,984.09	7,814.40	169.69	47.052	
16,300.00	7,450.00	13,324.66	7,250.35	78.27	138.52	35.780	15,873.71	1,511.30	7,884.14	7,714.35	169.78	46.436	
16,400.00	7,450.00	13,326.44	7,250.32	79.07	138.56	35.438	15,873.73	1,509.52	7,784.19	7,614.30	169.88	45.821	
16,500.00	7,450.00	13,328.23	7,250.29	79.88	138.60	35.093	15,873.74	1,507.74	7,684.24	7,514.26	169.98	45.207	
16,600.00	7,450.00	13,330.01	7,250.26	80.68	138.64	34.745	15,873.75	1,505.96	7,584.29	7,414.21	170.08	44.593	
16,700.00	7,450.00	13,331.79	7,250.23	81.49	138.68	34.395	15,873.77	1,504.18	7,484.34	7,314.16	170.18	43.980	
16,800.00	7,450.00	13,333.57	7,250.20	82.29	138.72	34.042	15,873.78	1,502.39	7,384.39	7,214.12	170.28	43.367	
16,900.00	7,450.00	13,335.35	7,250.17	83.10	138.76	33.685	15,873.79	1,500.61	7,284.45	7,114.07	170.38	42.755	
17,000.00	7,450.00	13,337.13	7,250.14	83.91	138.80	33.326	15,873.81	1,498.83	7,184.50	7,014.03	170.48	42.144	
17,100.00	7,450.00	13,338.91	7,250.10	84.72	138.84	32.965	15,873.82	1,497.05	7,084.56	6,913.98	170.58	41.533	
17,200.00	7,450.00	13,340.69	7,250.07	85.53	138.88	32.600	15,873.84	1,495.27	6,984.61	6,813.94	170.68	40.923	
17,300.00	7,450.00	13,342.47	7,250.04	86.34	138.92	32.232	15,873.85	1,493.49	6,884.67	6,713.89	170.78	40.313	
17,400.00	7,450.00	13,344.26	7,250.01	87.16	138.96	31.862	15,873.86	1,491.71	6,784.73	6,613.85	170.88	39.704	
17,500.00	7,450.00	13,346.04	7,249.98	87.97	139.00	31.488	15,873.88	1,489.93	6,684.79	6,513.81	170.98	39.096	
17,600.00	7,450.00	13,347.82	7,249.95	88.78	139.04	31.112	15,873.89	1,488.15	6,584.86	6,413.77	171.09	38.488	
17,700.00	7,450.00	13,349.60	7,249.92	89.60	139.08	30.733	15,873.90	1,486.37	6,484.92	6,313.73	171.19	37.881	
17,800.00	7,450.00	13,351.38	7,249.89	90.42	139.12	30.351	15,873.92	1,484.59	6,384.98	6,213.69	171.29	37.275	
17,900.00	7,450.00	13,353.16	7,249.86	91.23	139.16	29.966	15,873.93	1,482.81	6,285.05	6,113.65	171.40	36.669	
18,000.00	7,450.00	13,354.94	7,249.82	92.05	139.20	29.578	15,873.95	1,481.03	6,185.12	6,013.62	171.50	36.064	
18,100.00	7,450.00	13,356.72	7,249.79	92.87	139.24	29.187	15,873.96	1,479.24	6,085.19	5,913.58	171.61	35.460	
18,197.24	7,450.00	13,358.45	7,249.76	93.67	139.28	28.805	15,873.97	1,477.51	5,988.02	5,816.31	171.71	34.873	
18,200.00	7,450.00	13,358.51	7,249.76	93.69	139.28	30.044	15,873.97	1,477.46	5,985.26	5,813.55	171.71	34.856	
18,229.54	7,450.00	13,359.21	7,249.75	93.93	139.30	41.412	15,873.98	1,476.76	5,955.75	5,784.00	171.75	34.677	
18,300.00	7,450.00	13,361.26	7,249.71	94.51	139.34	41.075	15,874.00	1,474.71	5,885.36	5,713.52	171.84	34.249	
18,400.00	7,450.00	13,364.17	7,249.66	95.33	139.41	40.592	15,874.02	1,471.80	5,785.46	5,613.49	171.97	33.642	
18,500.00	7,450.00	13,367.08	7,249.61	96.15	139.47	40.102	15,874.04	1,468.89	5,685.57	5,513.46	172.10	33.036	
18,600.00	7,450.00	13,369.99	7,249.56	96.98	139.54	39.606	15,874.06	1,465.98	5,585.67	5,413.44	172.24	32.430	
18,700.00	7,450.00	13,372.89	7,249.51	97.80	139.60	39.102	15,874.09	1,463.08	5,485.78	5,313.42	172.37	31.826	
18,800.00	7,450.00	13,375.80	7,249.46	98.62	139.67	38.591	15,874.11	1,460.17	5,385.90	5,213.39	172.50	31.222	
18,900.00	7,450.00	13,378.71	7,249.41	99.45	139.73	38.073	15,874.13	1,457.26	5,286.01	5,113.38	172.63	30.620	
19,000.00	7,450.00	13,381.62	7,249.36	100.28	139.80	37.548	15,874.15	1,454.35	5,186.13	5,013.36	172.77	30.018	
19,100.00	7,450.00	13,384.53	7,249.31	101.10	139.87	37.016	15,874.18	1,451.45	5,086.25	4,913.35	172.90	29.417	

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 302H
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 302H	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:
Survey Program: 0-													Offset Well Error:
Measured Depth (usft)	Vertical Depth (usft)	Offset Measured Depth (usft)	Vertical Depth (usft)	Semi Major Axis Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre		Distance Between Centres (usft)		Minimum Separation (usft)	Separation Factor	Warning
+N/-S (usft)	+E/-W (usft)	Between Ellipses (usft)		Minimum Separation (usft)		Separation Factor		Warning					
19,200.00	7,450.00	13,387.43	7,249.26	101.93	139.93	36.476	15,874.20	1,448.54	4,986.37	4,813.34	173.03	28.817	
19,300.00	7,450.00	13,390.34	7,249.21	102.76	140.00	35.929	15,874.22	1,445.63	4,886.50	4,713.33	173.17	28.218	
19,400.00	7,450.00	13,393.25	7,249.16	103.58	140.06	35.375	15,874.24	1,442.72	4,786.63	4,613.33	173.30	27.620	
19,500.00	7,450.00	13,396.16	7,249.11	104.41	140.13	34.813	15,874.27	1,439.82	4,686.76	4,513.33	173.44	27.023	
19,600.00	7,450.00	13,399.07	7,249.05	105.24	140.19	34.244	15,874.29	1,436.91	4,586.90	4,413.33	173.57	26.426	
19,700.00	7,450.00	13,401.97	7,249.00	106.07	140.26	33.667	15,874.31	1,434.00	4,487.05	4,313.34	173.71	25.831	
19,800.00	7,450.00	13,404.88	7,248.95	106.90	140.32	33.083	15,874.33	1,431.09	4,387.19	4,213.35	173.84	25.236	
19,900.00	7,450.00	13,407.79	7,248.90	107.73	140.39	32.491	15,874.36	1,428.19	4,287.35	4,113.36	173.98	24.643	
20,000.00	7,450.00	13,410.70	7,248.85	108.56	140.46	31.891	15,874.38	1,425.28	4,187.50	4,013.39	174.12	24.050	
20,100.00	7,450.00	13,413.61	7,248.80	109.40	140.52	31.284	15,874.40	1,422.37	4,087.67	3,913.41	174.25	23.458	
20,200.00	7,450.00	13,416.51	7,248.75	110.23	140.59	30.669	15,874.42	1,419.46	3,987.84	3,813.44	174.39	22.867	
20,300.00	7,450.00	13,419.42	7,248.70	111.06	140.65	30.047	15,874.45	1,416.56	3,888.01	3,713.48	174.53	22.277	
20,400.00	7,450.00	13,422.33	7,248.65	111.89	140.72	29.417	15,874.47	1,413.65	3,788.19	3,613.53	174.67	21.688	
20,500.00	7,450.00	13,425.24	7,248.60	112.73	140.78	28.780	15,874.49	1,410.74	3,688.38	3,513.58	174.80	21.100	
20,600.00	7,450.00	13,428.15	7,248.55	113.56	140.85	28.135	15,874.51	1,407.83	3,588.58	3,413.64	174.94	20.513	
20,700.00	7,450.00	13,431.05	7,248.50	114.40	140.92	27.482	15,874.54	1,404.93	3,488.79	3,313.71	175.08	19.927	
20,800.00	7,450.00	13,433.96	7,248.45	115.23	140.98	26.822	15,874.56	1,402.02	3,389.01	3,213.79	175.22	19.341	
20,900.00	7,450.00	13,436.87	7,248.39	116.07	141.05	26.155	15,874.58	1,399.11	3,289.23	3,113.87	175.36	18.757	
21,000.00	7,450.00	13,439.78	7,248.34	116.90	141.11	25.480	15,874.60	1,396.20	3,189.47	3,013.97	175.50	18.173	
21,100.00	7,450.00	13,442.69	7,248.29	117.74	141.18	24.798	15,874.63	1,393.30	3,089.73	2,914.08	175.64	17.591	
21,200.00	7,450.00	13,445.59	7,248.24	118.57	141.24	24.108	15,874.65	1,390.39	2,989.99	2,814.20	175.79	17.009	
21,300.00	7,450.00	13,448.50	7,248.19	119.41	141.31	23.412	15,874.67	1,387.48	2,890.27	2,714.34	175.93	16.428	
21,400.00	7,450.00	13,451.41	7,248.14	120.25	141.37	22.708	15,874.69	1,384.57	2,790.57	2,614.49	176.08	15.848	
21,500.00	7,450.00	13,454.32	7,248.09	121.09	141.44	21.997	15,874.72	1,381.67	2,690.89	2,514.66	176.23	15.270	
21,600.00	7,450.00	13,457.23	7,248.04	121.92	141.51	21.280	15,874.74	1,378.76	2,591.23	2,414.85	176.38	14.692	
21,700.00	7,450.00	13,460.13	7,247.99	122.76	141.57	20.556	15,874.76	1,375.85	2,491.59	2,315.06	176.53	14.114	
21,800.00	7,450.00	13,463.04	7,247.94	123.60	141.64	19.825	15,874.78	1,372.94	2,391.98	2,215.30	176.69	13.538	
21,900.00	7,450.00	13,465.95	7,247.89	124.44	141.70	19.088	15,874.81	1,370.04	2,292.40	2,115.55	176.85	12.963	
22,000.00	7,450.00	13,468.86	7,247.84	125.28	141.77	18.345	15,874.83	1,367.13	2,192.86	2,015.84	177.01	12.388	
22,100.00	7,450.00	13,471.77	7,247.79	126.12	141.83	17.595	15,874.85	1,364.22	2,093.35	1,916.16	177.19	11.814	
22,200.00	7,450.00	13,474.67	7,247.73	126.96	141.90	16.840	15,874.87	1,361.31	1,993.89	1,816.52	177.37	11.242	
22,300.00	7,450.00	13,477.58	7,247.68	127.80	141.96	16.079	15,874.90	1,358.41	1,894.48	1,716.92	177.56	10.669	
22,400.00	7,450.00	13,480.49	7,247.63	128.64	142.03	15.313	15,874.92	1,355.50	1,795.13	1,617.36	177.77	10.098	
22,500.00	7,450.00	13,483.40	7,247.58	129.48	142.10	14.541	15,874.94	1,352.59	1,695.85	1,517.86	177.99	9.528	
22,600.00	7,450.00	13,486.31	7,247.53	130.32	142.16	13.764	15,874.96	1,349.68	1,596.66	1,418.42	178.24	8.958	
22,700.00	7,450.00	13,489.21	7,247.48	131.16	142.23	12.982	15,874.99	1,346.78	1,497.57	1,319.05	178.52	8.389	
22,800.00	7,450.00	13,492.12	7,247.43	132.00	142.29	12.196	15,875.01	1,343.87	1,398.60	1,219.76	178.84	7.820	
22,900.00	7,450.00	13,495.03	7,247.38	132.84	142.36	11.406	15,875.03	1,340.96	1,299.79	1,120.57	179.22	7.252	
23,000.00	7,450.00	13,497.94	7,247.33	133.69	142.42	10.611	15,875.05	1,338.05	1,201.16	1,021.49	179.67	6.685	
23,100.00	7,450.00	13,500.85	7,247.28	134.53	142.49	9.813	15,875.08	1,335.15	1,102.78	922.56	180.22	6.119	
23,200.00	7,450.00	13,503.75	7,247.23	135.37	142.55	9.012	15,875.10	1,332.24	1,004.70	823.79	180.91	5.554	
23,300.00	7,450.00	13,506.66	7,247.18	136.21	142.62	8.207	15,875.12	1,329.33	907.04	725.24	181.80	4.989	
23,400.00	7,450.00	13,509.57	7,247.13	137.06	142.69	7.399	15,875.14	1,326.42	809.93	626.98	182.96	4.427	
23,455.58	7,450.00	13,511.19	7,247.10	137.52	142.72	6.949	15,875.16	1,324.81	756.29	572.53	183.76	4.116 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 302H
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 302H	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:	Reference	Offset	Semi Major Axis	Highside	Offset Wellbore Centre	Distance	Rule Assigned:	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)	Minimum Separation (usft)	Separation Factor	Warning		
15,600.00	7,450.00	14,320.00	8,224.22	72.70	141.06	179.242	17,199.47	1,364.30	9,937.67	9,764.44	173.23	57.365	
15,700.00	7,450.00	14,320.00	8,224.22	73.49	141.06	179.242	17,199.47	1,364.30	9,837.98	9,664.66	173.32	56.762	
15,800.00	7,450.00	14,320.00	8,224.22	74.28	141.06	179.242	17,199.47	1,364.30	9,738.30	9,564.89	173.41	56.158	
15,900.00	7,450.00	14,320.00	8,224.22	75.08	141.06	179.242	17,199.47	1,364.30	9,638.62	9,465.12	173.50	55.555	
16,000.00	7,450.00	14,320.00	8,224.22	75.87	141.06	179.242	17,199.47	1,364.30	9,538.94	9,365.35	173.59	54.951	
16,100.00	7,450.00	14,320.00	8,224.22	76.67	141.06	179.242	17,199.47	1,364.30	9,439.28	9,265.59	173.68	54.348	
16,200.00	7,450.00	14,320.00	8,224.22	77.47	141.06	179.242	17,199.47	1,364.30	9,339.62	9,165.84	173.77	53.746	
16,300.00	7,450.00	14,320.00	8,224.22	78.27	141.06	179.242	17,199.47	1,364.30	9,239.96	9,066.09	173.87	53.143	
16,400.00	7,450.00	14,320.00	8,224.22	79.07	141.06	179.242	17,199.47	1,364.30	9,140.32	8,966.35	173.97	52.541	
16,500.00	7,450.00	14,320.00	8,224.22	79.88	141.06	179.242	17,199.47	1,364.30	9,040.68	8,866.62	174.06	51.939	
16,600.00	7,450.00	14,320.00	8,224.22	80.68	141.06	179.242	17,199.47	1,364.30	8,941.05	8,766.89	174.16	51.337	
16,700.00	7,450.00	14,320.00	8,224.22	81.49	141.06	179.242	17,199.47	1,364.30	8,841.43	8,667.17	174.26	50.736	
16,800.00	7,450.00	14,320.00	8,224.22	82.29	141.06	179.242	17,199.47	1,364.30	8,741.82	8,567.46	174.37	50.134	
16,900.00	7,450.00	14,320.00	8,224.22	83.10	141.06	179.242	17,199.47	1,364.30	8,642.22	8,467.75	174.47	49.534	
17,000.00	7,450.00	14,320.00	8,224.22	83.91	141.06	179.242	17,199.47	1,364.30	8,542.63	8,368.05	174.58	48.933	
17,100.00	7,450.00	14,320.00	8,224.22	84.72	141.06	179.242	17,199.47	1,364.30	8,443.04	8,268.36	174.69	48.332	
17,200.00	7,450.00	14,320.00	8,224.22	85.53	141.06	179.242	17,199.47	1,364.30	8,343.47	8,168.67	174.80	47.732	
17,300.00	7,450.00	14,320.00	8,224.22	86.34	141.06	179.242	17,199.47	1,364.30	8,243.91	8,069.00	174.91	47.133	
17,400.00	7,450.00	14,320.00	8,224.22	87.16	141.06	179.242	17,199.47	1,364.30	8,144.35	7,969.33	175.02	46.533	
17,500.00	7,450.00	14,320.00	8,224.22	87.97	141.06	179.242	17,199.47	1,364.30	8,044.81	7,869.67	175.14	45.934	
17,600.00	7,450.00	14,320.00	8,224.22	88.78	141.06	179.242	17,199.47	1,364.30	7,945.28	7,770.03	175.26	45.335	
17,700.00	7,450.00	14,320.00	8,224.22	89.60	141.06	179.242	17,199.47	1,364.30	7,845.77	7,670.39	175.38	44.737	
17,800.00	7,450.00	14,320.00	8,224.22	90.42	141.06	179.242	17,199.47	1,364.30	7,746.26	7,570.76	175.50	44.139	
17,900.00	7,450.00	14,320.00	8,224.22	91.23	141.06	179.242	17,199.47	1,364.30	7,646.77	7,471.14	175.62	43.541	
18,000.00	7,450.00	14,320.00	8,224.22	92.05	141.06	179.242	17,199.47	1,364.30	7,547.29	7,371.54	175.75	42.943	
18,100.00	7,450.00	14,320.00	8,224.22	92.87	141.06	179.242	17,199.47	1,364.30	7,447.82	7,271.94	175.88	42.346	
18,197.24	7,450.00	14,320.00	8,224.22	93.67	141.06	179.242	17,199.47	1,364.30	7,351.12	7,175.11	176.01	41.766	
18,200.00	7,450.00	14,320.00	8,224.22	93.69	141.06	178.721	17,199.47	1,364.30	7,348.37	7,172.36	176.01	41.749	
18,229.54	7,450.00	14,320.00	8,224.22	93.93	141.06	173.188	17,199.47	1,364.30	7,319.00	7,142.95	176.05	41.573	
18,300.00	7,450.00	14,320.00	8,224.22	94.51	141.06	173.188	17,199.47	1,364.30	7,248.94	7,072.80	176.14	41.154	
18,400.00	7,450.00	14,320.00	8,224.22	95.33	141.06	173.188	17,199.47	1,364.30	7,149.53	6,973.25	176.28	40.558	
18,500.00	7,450.00	14,320.00	8,224.22	96.15	141.06	173.188	17,199.47	1,364.30	7,050.14	6,873.72	176.42	39.963	
18,600.00	7,450.00	14,320.00	8,224.22	96.98	141.06	173.188	17,199.47	1,364.30	6,950.76	6,774.20	176.56	39.369	
18,700.00	7,450.00	14,320.00	8,224.22	97.80	141.06	173.188	17,199.47	1,364.30	6,851.40	6,674.70	176.70	38.774	
18,800.00	7,450.00	14,320.00	8,224.22	98.62	141.06	173.188	17,199.47	1,364.30	6,752.06	6,575.21	176.85	38.181	
18,900.00	7,450.00	14,320.00	8,224.22	99.45	141.06	173.188	17,199.47	1,364.30	6,652.74	6,475.74	176.99	37.587	
19,000.00	7,450.00	14,320.00	8,224.22	100.28	141.06	173.188	17,199.47	1,364.30	6,553.44	6,376.29	177.15	36.994	
19,100.00	7,450.00	14,320.00	8,224.22	101.10	141.06	173.188	17,199.47	1,364.30	6,454.16	6,276.85	177.30	36.402	
19,200.00	7,450.00	14,320.00	8,224.22	101.93	141.06	173.188	17,199.47	1,364.30	6,354.90	6,177.44	177.46	35.810	
19,300.00	7,450.00	14,320.00	8,224.22	102.76	141.06	173.188	17,199.47	1,364.30	6,255.67	6,078.04	177.63	35.218	
19,400.00	7,450.00	14,320.00	8,224.22	103.58	141.06	173.188	17,199.47	1,364.30	6,156.46	5,978.67	177.79	34.627	
19,500.00	7,450.00	14,320.00	8,224.22	104.41	141.06	173.188	17,199.47	1,364.30	6,057.28	5,879.31	177.97	34.036	
19,600.00	7,450.00	14,320.00	8,224.22	105.24	141.06	173.188	17,199.47	1,364.30	5,958.13	5,779.98	178.14	33.446	
19,700.00	7,450.00	14,320.00	8,224.22	106.07	141.06	173.188	17,199.47	1,364.30	5,859.00	5,680.68	178.32	32.856	
19,800.00	7,450.00	14,320.00	8,224.22	106.90	141.06	173.188	17,199.47	1,364.30	5,759.91	5,581.40	178.51	32.267	
19,900.00	7,450.00	14,322.46	8,224.26	107.73	141.11	173.368	17,199.45	1,361.84	5,660.84	5,482.08	178.76	31.667	
20,000.00	7,450.00	14,325.59	8,224.30	108.56	141.18	173.597	17,199.43	1,358.71	5,561.81	5,382.78	179.03	31.066	
20,100.00	7,450.00	14,328.63	8,224.34	109.40	141.25	173.819	17,199.40	1,355.67	5,462.81	5,283.51	179.31	30.466	
20,200.00	7,450.00	14,331.56	8,224.37	110.23	141.32	174.034	17,199.38	1,352.74	5,363.86	5,184.27	179.58	29.868	
20,300.00	7,450.00	14,334.41	8,224.41	111.06	141.38	174.243	17,199.36	1,349.89	5,264.93	5,085.07	179.87	29.271	
20,400.00	7,450.00	14,337.17	8,224.44	111.89	141.44	174.445	17,199.34	1,347.13	5,166.05	4,985.90	180.16	28.675	
20,500.00	7,450.00	14,339.84	8,224.46	112.73	141.50	174.641	17,199.31	1,344.46	5,067.22	4,886.77	180.45	28.081	

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 302H
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 302H	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)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Distance Between Centres (usft)	Rule Assigned: Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning
20,600.00	7,450.00	14,342.44	8,224.49	113.56	141.56	174.832	17,199.29	1,341.86	4,968.42	4,787.68	180.75	27.488	
20,700.00	7,450.00	14,344.96	8,224.51	114.40	141.62	175.017	17,199.27	1,339.34	4,869.68	4,688.63	181.06	26.896	
20,800.00	7,450.00	14,347.41	8,224.54	115.23	141.67	175.197	17,199.25	1,336.89	4,770.99	4,589.62	181.37	26.306	
20,900.00	7,450.00	14,349.79	8,224.56	116.07	141.72	175.372	17,199.23	1,334.51	4,672.36	4,490.67	181.69	25.716	
21,000.00	7,450.00	14,352.11	8,224.58	116.90	141.78	175.542	17,199.21	1,332.20	4,573.78	4,391.76	182.02	25.128	
21,100.00	7,450.00	14,354.36	8,224.59	117.74	141.83	175.708	17,199.18	1,329.95	4,475.26	4,292.91	182.36	24.541	
21,200.00	7,450.00	14,356.55	8,224.61	118.57	141.88	175.869	17,199.16	1,327.76	4,376.82	4,194.11	182.71	23.956	
21,300.00	7,450.00	14,358.68	8,224.63	119.41	141.92	176.026	17,199.14	1,325.63	4,278.44	4,095.37	183.07	23.371	
21,400.00	7,450.00	14,360.75	8,224.64	120.25	141.97	176.179	17,199.12	1,323.55	4,180.14	3,996.70	183.44	22.788	
21,500.00	7,450.00	14,362.77	8,224.65	121.09	142.02	176.327	17,199.10	1,321.53	4,081.92	3,898.10	183.82	22.206	
21,600.00	7,450.00	14,364.74	8,224.66	121.92	142.06	176.472	17,199.08	1,319.57	3,983.79	3,799.57	184.22	21.625	
21,700.00	7,450.00	14,366.65	8,224.67	122.76	142.10	176.614	17,199.06	1,317.65	3,885.75	3,701.12	184.63	21.046	
21,800.00	7,450.00	14,368.52	8,224.68	123.60	142.14	176.752	17,199.04	1,315.78	3,787.82	3,602.76	185.06	20.468	
21,900.00	7,450.00	14,370.35	8,224.69	124.44	142.19	176.886	17,199.02	1,313.96	3,690.00	3,504.49	185.50	19.892	
22,000.00	7,450.00	14,372.13	8,224.70	125.28	142.23	177.017	17,199.00	1,312.18	3,592.30	3,406.33	185.97	19.316	
22,100.00	7,450.00	14,373.86	8,224.71	126.12	142.26	177.145	17,198.98	1,310.44	3,494.72	3,308.27	186.46	18.743	
22,200.00	7,450.00	14,375.55	8,224.72	126.96	142.30	177.270	17,198.97	1,308.75	3,397.29	3,210.32	186.96	18.171	
22,300.00	7,450.00	14,377.21	8,224.72	127.80	142.34	177.392	17,198.95	1,307.10	3,300.01	3,112.51	187.50	17.600	
22,400.00	7,450.00	14,378.82	8,224.73	128.64	142.38	177.512	17,198.93	1,305.48	3,202.89	3,014.84	188.06	17.031	
22,500.00	7,450.00	14,380.40	8,224.73	129.48	142.41	177.628	17,198.91	1,303.90	3,105.96	2,917.32	188.65	16.465	
22,600.00	7,450.00	14,381.94	8,224.74	130.32	142.45	177.742	17,198.89	1,302.36	3,009.23	2,819.97	189.27	15.900	
22,700.00	7,450.00	14,383.45	8,224.74	131.16	142.48	177.853	17,198.88	1,300.85	2,912.72	2,722.80	189.92	15.337	
22,800.00	7,450.00	14,384.93	8,224.74	132.00	142.51	177.962	17,198.86	1,299.38	2,816.46	2,625.85	190.61	14.776	
22,900.00	7,450.00	14,386.37	8,224.75	132.84	142.54	178.069	17,198.84	1,297.94	2,720.46	2,529.12	191.34	14.218	
23,000.00	7,450.00	14,387.78	8,224.75	133.69	142.58	178.173	17,198.83	1,296.53	2,624.76	2,432.64	192.11	13.663	
23,100.00	7,450.00	14,389.16	8,224.75	134.53	142.61	178.275	17,198.81	1,295.15	2,529.39	2,336.46	192.93	13.110	
23,200.00	7,450.00	14,390.50	8,224.75	135.37	142.64	178.374	17,198.79	1,293.80	2,434.39	2,240.59	193.81	12.561	
23,300.00	7,450.00	14,391.83	8,224.75	136.21	142.67	178.472	17,198.78	1,292.48	2,339.81	2,145.08	194.73	12.015	
23,400.00	7,450.00	14,393.12	8,224.75	137.06	142.70	178.568	17,198.76	1,291.19	2,245.70	2,049.98	195.72	11.474	
23,455.58	7,450.00	14,393.83	8,224.75	137.52	142.71	178.620	17,198.75	1,290.48	2,193.63	1,997.33	196.29	11.175 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 302H
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 302H	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 Offsets - Willow Lake WA 15 1H - Wellbore #1 - Surveys													Offset Site Error:
													0.00 usft
Survey Program:	Reference	Offset	Semi Major Axis	Highside	Offset Wellbore Centre	Distance	Rule Assigned:	Offset Well Error:					
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Reference	Toolface (°)	+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	0.00 usft	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning	
15,900.00	7,450.00	7,481.33	75.08	92.760	17,581.54	1,636.38	9,990.88		9,933.94	56.95	175.438		
16,000.00	7,450.00	7,481.21	75.87	92.736	17,581.54	1,636.38	9,890.93		9,833.92	57.01	173.499		
16,100.00	7,450.00	7,481.08	76.67	92.711	17,581.54	1,636.38	9,790.97		9,733.90	57.07	171.561		
16,200.00	7,450.00	7,480.96	77.47	92.687	17,581.54	1,636.38	9,691.01		9,633.88	57.13	169.626		
16,300.00	7,450.00	7,480.84	78.27	92.662	17,581.54	1,636.38	9,591.06		9,533.86	57.19	167.693		
16,400.00	7,450.00	7,480.71	79.07	92.637	17,581.54	1,636.38	9,491.10		9,433.84	57.26	165.762		
16,500.00	7,450.00	7,480.59	79.88	92.612	17,581.54	1,636.38	9,391.15		9,333.82	57.32	163.833		
16,600.00	7,450.00	7,480.46	80.68	92.588	17,581.54	1,636.38	9,291.19		9,233.81	57.39	161.907		
16,700.00	7,450.00	7,480.34	81.49	92.563	17,581.54	1,636.38	9,191.24		9,133.79	57.45	159.983		
16,800.00	7,450.00	7,480.21	82.29	92.538	17,581.54	1,636.38	9,091.29		9,033.77	57.52	158.062		
16,900.00	7,450.00	7,480.09	83.10	92.513	17,581.54	1,636.38	8,991.34		8,933.76	57.58	156.142		
17,000.00	7,450.00	7,479.96	83.91	92.487	17,581.54	1,636.38	8,891.39		8,833.74	57.65	154.226		
17,100.00	7,450.00	7,479.84	84.72	92.462	17,581.54	1,636.38	8,791.44		8,733.72	57.72	152.312		
17,200.00	7,450.00	7,479.71	85.53	92.437	17,581.54	1,636.38	8,691.50		8,633.71	57.79	150.401		
17,300.00	7,450.00	7,479.58	86.34	92.412	17,581.54	1,636.38	8,591.55		8,533.69	57.86	148.493		
17,400.00	7,450.00	7,479.46	87.16	92.386	17,581.54	1,636.37	8,491.61		8,433.68	57.93	146.587		
17,500.00	7,450.00	7,479.33	87.97	92.361	17,581.54	1,636.37	8,391.67		8,333.67	58.00	144.684		
17,600.00	7,450.00	7,479.20	88.78	92.336	17,581.54	1,636.37	8,291.73		8,233.65	58.07	142.785		
17,700.00	7,450.00	7,479.08	89.60	92.310	17,581.54	1,636.37	8,191.79		8,133.64	58.14	140.888		
17,800.00	7,450.00	7,478.95	90.42	92.284	17,581.54	1,636.37	8,091.85		8,033.63	58.22	138.994		
17,900.00	7,450.00	7,478.82	91.23	92.259	17,581.54	1,636.37	7,991.91		7,933.62	58.29	137.103		
18,000.00	7,450.00	7,478.69	92.05	92.233	17,581.54	1,636.37	7,891.98		7,833.61	58.37	135.215		
18,100.00	7,450.00	7,478.56	92.87	92.207	17,581.54	1,636.37	7,792.04		7,733.60	58.44	133.331		
18,197.24	7,450.00	7,478.44	93.67	92.182	17,581.54	1,636.37	7,694.87		7,636.35	58.52	131.502		
18,200.00	7,450.00	7,478.43	93.69	92.126	17,581.54	1,636.37	7,692.11		7,633.59	58.52	131.450		
18,229.54	7,450.00	7,478.39	93.93	91.669	17,581.54	1,636.37	7,662.60		7,604.06	58.54	130.895		
18,300.00	7,450.00	7,478.30	94.51	91.655	17,581.54	1,636.37	7,592.22		7,533.63	58.59	129.573		
18,400.00	7,450.00	7,478.17	95.33	91.635	17,581.54	1,636.37	7,492.35		7,433.67	58.67	127.699		
18,500.00	7,450.00	7,478.04	96.15	91.615	17,581.54	1,636.37	7,392.47		7,333.72	58.75	125.828		
18,600.00	7,450.00	7,477.91	96.98	91.595	17,581.54	1,636.37	7,292.60		7,233.77	58.83	123.960		
18,700.00	7,450.00	7,477.77	97.80	91.574	17,581.54	1,636.37	7,192.73		7,133.82	58.91	122.095		
18,800.00	7,450.00	7,477.64	98.62	91.554	17,581.54	1,636.37	7,092.87		7,033.88	58.99	120.234		
18,900.00	7,450.00	7,477.51	99.45	91.534	17,581.54	1,636.37	6,993.01		6,933.93	59.07	118.375		
19,000.00	7,450.00	7,477.38	100.28	91.513	17,581.54	1,636.37	6,893.15		6,834.00	59.16	116.520		
19,100.00	7,450.00	7,477.24	101.10	91.493	17,581.54	1,636.37	6,793.30		6,734.06	59.24	114.668		
19,200.00	7,450.00	7,477.11	101.93	91.472	17,581.54	1,636.37	6,693.46		6,634.13	59.33	112.820		
19,300.00	7,450.00	7,476.98	102.76	91.452	17,581.54	1,636.37	6,593.61		6,534.20	59.42	110.975		
19,400.00	7,450.00	7,476.84	103.58	91.431	17,581.54	1,636.37	6,493.78		6,434.27	59.50	109.133		
19,500.00	7,450.00	7,476.71	104.41	91.411	17,581.55	1,636.37	6,393.94		6,334.35	59.59	107.294		
19,600.00	7,450.00	7,476.57	105.24	91.390	17,581.55	1,636.37	6,294.12		6,234.43	59.68	105.459		
19,700.00	7,450.00	7,476.44	106.07	91.369	17,581.55	1,636.37	6,194.29		6,134.52	59.77	103.627		
19,800.00	7,450.00	7,476.30	106.90	91.348	17,581.55	1,636.37	6,094.48		6,034.61	59.87	101.799		
19,900.00	7,450.00	7,476.17	107.73	91.327	17,581.55	1,636.37	5,994.67		5,934.71	59.96	99.973		
20,000.00	7,450.00	7,476.03	108.56	91.306	17,581.55	1,636.37	5,894.87		5,834.81	60.06	98.152		
20,100.00	7,450.00	7,475.89	109.40	91.286	17,581.55	1,636.37	5,795.07		5,734.91	60.16	96.333		
20,200.00	7,450.00	7,475.76	110.23	91.264	17,581.55	1,636.37	5,695.28		5,635.02	60.26	94.518		
20,300.00	7,450.00	7,475.62	111.06	91.243	17,581.55	1,636.37	5,595.50		5,535.14	60.36	92.707		
20,400.00	7,450.00	7,475.48	111.89	91.222	17,581.55	1,636.37	5,495.72		5,435.26	60.46	90.898		
20,500.00	7,450.00	7,475.35	112.73	91.201	17,581.55	1,636.37	5,395.96		5,335.39	60.57	89.093		
20,600.00	7,450.00	7,475.21	113.56	91.180	17,581.55	1,636.37	5,296.20		5,235.53	60.67	87.292		
20,700.00	7,450.00	7,475.07	114.40	91.159	17,581.55	1,636.37	5,196.45		5,135.67	60.78	85.493		
20,800.00	7,450.00	7,474.93	115.23	91.137	17,581.55	1,636.37	5,096.72		5,035.82	60.89	83.698		

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 302H
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 302H	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 Offsets - Willow Lake WA 15 1H - Wellbore #1 - Surveys												Offset Site Error:	0.00 usft
Survey Program: 403-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)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Distance Between Centres (usft)	Rule Assigned: Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning
20,900.00	7,450.00	7,474.79	7,457.26	116.07	25.84	91.116	17,581.55	1,636.37	4,996.99	4,935.98	61.01	81.907	
21,000.00	7,450.00	7,474.65	7,457.12	116.90	25.84	91.095	17,581.55	1,636.37	4,897.27	4,836.15	61.13	80.118	
21,100.00	7,450.00	7,474.51	7,456.98	117.74	25.84	91.073	17,581.55	1,636.37	4,797.57	4,736.32	61.25	78.333	
21,200.00	7,450.00	7,474.37	7,456.84	118.57	25.84	91.052	17,581.55	1,636.37	4,697.88	4,636.51	61.37	76.550	
21,300.00	7,450.00	7,474.23	7,456.70	119.41	25.84	91.030	17,581.55	1,636.37	4,598.20	4,536.70	61.50	74.771	
21,400.00	7,450.00	7,474.09	7,456.56	120.25	25.83	91.008	17,581.55	1,636.37	4,498.54	4,436.91	61.63	72.995	
21,500.00	7,450.00	7,473.95	7,456.42	121.09	25.83	90.987	17,581.55	1,636.37	4,398.89	4,337.13	61.76	71.221	
21,600.00	7,450.00	7,473.81	7,456.28	121.92	25.83	90.965	17,581.55	1,636.37	4,299.26	4,237.35	61.90	69.451	
21,700.00	7,450.00	7,473.67	7,456.13	122.76	25.83	90.943	17,581.55	1,636.37	4,199.64	4,137.59	62.05	67.683	
21,800.00	7,450.00	7,473.52	7,455.99	123.60	25.83	90.921	17,581.55	1,636.37	4,100.05	4,037.85	62.20	65.918	
21,900.00	7,450.00	7,473.38	7,455.85	124.44	25.83	90.899	17,581.55	1,636.37	4,000.47	3,938.12	62.36	64.156	
22,000.00	7,450.00	7,473.24	7,455.71	125.28	25.83	90.877	17,581.55	1,636.37	3,900.92	3,838.40	62.52	62.396	
22,100.00	7,450.00	7,473.10	7,455.56	126.12	25.83	90.855	17,581.55	1,636.37	3,801.39	3,738.70	62.69	60.638	
22,200.00	7,450.00	7,472.95	7,455.42	126.96	25.83	90.833	17,581.55	1,636.37	3,701.88	3,639.01	62.87	58.883	
22,300.00	7,450.00	7,472.81	7,455.28	127.80	25.83	90.811	17,581.55	1,636.37	3,602.40	3,539.35	63.06	57.130	
22,400.00	7,450.00	7,472.66	7,455.13	128.64	25.83	90.789	17,581.55	1,636.37	3,502.96	3,439.70	63.25	55.379	
22,500.00	7,450.00	7,472.52	7,454.99	129.48	25.83	90.767	17,581.55	1,636.37	3,403.54	3,340.08	63.46	53.629	
22,600.00	7,450.00	7,472.37	7,454.84	130.32	25.83	90.745	17,581.55	1,636.37	3,304.16	3,240.47	63.69	51.881	
22,700.00	7,450.00	7,472.23	7,454.70	131.16	25.83	90.722	17,581.55	1,636.37	3,204.82	3,140.89	63.92	50.135	
22,800.00	7,450.00	7,472.08	7,454.55	132.00	25.83	90.700	17,581.55	1,636.37	3,105.52	3,041.34	64.18	48.390	
22,900.00	7,450.00	7,471.94	7,454.41	132.84	25.83	90.677	17,581.55	1,636.37	3,006.26	2,941.82	64.45	46.646	
23,000.00	7,450.00	7,471.79	7,454.26	133.69	25.83	90.655	17,581.55	1,636.37	2,907.06	2,842.32	64.74	44.903	
23,100.00	7,450.00	7,471.64	7,454.11	134.53	25.83	90.632	17,581.55	1,636.37	2,807.92	2,742.86	65.06	43.160	
23,200.00	7,450.00	7,471.50	7,453.97	135.37	25.83	90.610	17,581.55	1,636.37	2,708.83	2,643.43	65.40	41.418	
23,300.00	7,450.00	7,471.35	7,453.82	136.21	25.83	90.587	17,581.55	1,636.37	2,609.82	2,544.04	65.78	39.676	
23,400.00	7,450.00	7,471.20	7,453.67	137.06	25.83	90.564	17,581.55	1,636.37	2,510.89	2,444.69	66.19	37.934	
23,455.58	7,450.00	7,471.12	7,453.59	137.52	25.82	90.552	17,581.55	1,636.37	2,455.94	2,389.50	66.44	36.966 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 302H
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 302H	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 Offsets - Willow Lake WC 15 1H - Wellbore #1 - Surveys														Offset Site Error:	0.00 usft
Survey Program: 403-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)	Highside Toolface (°)	Offset Wellbore Centre		Distance Between Centres (usft)		Minimum Separation (usft)	Separation Factor	Warning		
							+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)					
15,700.00	7,450.00	6,833.79	6,833.73	73.49	23.24	15.530	17,367.69	1,523.61	9,994.57	9,940.62	53.95	185.270			
15,800.00	7,450.00	6,836.34	6,836.27	74.28	23.25	15.582	17,367.85	1,523.51	9,894.77	9,840.76	54.01	183.199			
15,900.00	7,450.00	6,838.92	6,838.84	75.08	23.26	15.636	17,368.01	1,523.42	9,794.98	9,740.90	54.08	181.131			
16,000.00	7,450.00	6,841.52	6,841.44	75.87	23.27	15.692	17,368.18	1,523.32	9,695.19	9,641.05	54.14	179.065			
16,100.00	7,450.00	6,844.16	6,844.07	76.67	23.28	15.748	17,368.34	1,523.22	9,595.41	9,541.19	54.21	177.000			
16,200.00	7,450.00	6,846.83	6,846.73	77.47	23.29	15.806	17,368.51	1,523.13	9,495.62	9,441.34	54.28	174.938			
16,300.00	7,450.00	6,876.00	6,875.82	78.27	23.39	16.475	17,370.44	1,522.14	9,395.93	9,341.47	54.46	172.531			
16,400.00	7,450.00	6,876.00	6,875.82	79.07	23.39	16.475	17,370.44	1,522.14	9,296.14	9,241.62	54.52	170.514			
16,500.00	7,450.00	6,876.00	6,875.82	79.88	23.39	16.475	17,370.44	1,522.14	9,196.35	9,141.77	54.58	168.499			
16,600.00	7,450.00	6,876.00	6,875.82	80.68	23.39	16.475	17,370.44	1,522.14	9,096.56	9,041.92	54.64	166.485			
16,700.00	7,450.00	6,876.00	6,875.82	81.49	23.39	16.475	17,370.44	1,522.14	8,996.78	8,942.08	54.70	164.473			
16,800.00	7,450.00	6,876.00	6,875.82	82.29	23.39	16.475	17,370.44	1,522.14	8,897.00	8,842.24	54.76	162.464			
16,900.00	7,450.00	6,876.00	6,875.82	83.10	23.39	16.475	17,370.44	1,522.14	8,797.23	8,742.41	54.83	160.456			
17,000.00	7,450.00	6,876.00	6,875.82	83.91	23.39	16.475	17,370.44	1,522.14	8,697.47	8,642.58	54.89	158.450			
17,100.00	7,450.00	6,876.00	6,875.82	84.72	23.39	16.475	17,370.44	1,522.14	8,597.71	8,542.75	54.96	156.447			
17,200.00	7,450.00	6,876.00	6,875.82	85.53	23.39	16.475	17,370.44	1,522.14	8,497.95	8,442.93	55.02	154.445			
17,300.00	7,450.00	6,876.00	6,875.82	86.34	23.39	16.475	17,370.44	1,522.14	8,398.21	8,343.12	55.09	152.446			
17,400.00	7,450.00	6,886.52	6,886.31	87.16	23.43	16.735	17,371.15	1,521.82	8,298.46	8,243.26	55.20	150.335			
17,500.00	7,450.00	6,892.39	6,892.16	87.97	23.45	16.885	17,371.55	1,521.64	8,198.71	8,143.42	55.29	148.280			
17,600.00	7,450.00	6,898.27	6,898.03	88.78	23.47	17.038	17,371.95	1,521.48	8,098.96	8,043.58	55.39	146.230			
17,700.00	7,450.00	6,904.17	6,903.92	89.60	23.49	17.196	17,372.36	1,521.32	7,999.22	7,943.74	55.48	144.185			
17,800.00	7,450.00	6,910.09	6,909.82	90.42	23.51	17.358	17,372.76	1,521.16	7,899.47	7,843.90	55.57	142.144			
17,900.00	7,450.00	6,916.03	6,915.74	91.23	23.54	17.525	17,373.17	1,521.01	7,799.73	7,744.06	55.67	140.108			
18,000.00	7,450.00	6,921.98	6,921.68	92.05	23.56	17.695	17,373.58	1,520.87	7,699.99	7,644.22	55.77	138.077			
18,100.00	7,450.00	6,927.96	6,927.64	92.87	23.58	17.871	17,373.99	1,520.73	7,600.25	7,544.39	55.86	136.052			
18,197.24	7,450.00	6,933.78	6,933.44	93.67	23.60	18.046	17,374.40	1,520.60	7,503.26	7,447.31	55.96	134.087			
18,200.00	7,450.00	6,933.94	6,933.61	93.69	23.60	18.771	17,374.41	1,520.59	7,500.51	7,444.55	55.96	134.031			
18,229.54	7,450.00	6,935.72	6,935.38	93.93	23.61	26.130	17,374.53	1,520.56	7,471.05	7,415.06	55.99	133.435			
18,300.00	7,450.00	6,939.97	6,939.62	94.51	23.62	26.310	17,374.82	1,520.47	7,400.80	7,344.74	56.06	132.017			
18,400.00	7,450.00	6,946.01	6,945.65	95.33	23.64	26.571	17,375.24	1,520.34	7,301.10	7,244.94	56.16	130.008			
18,500.00	7,450.00	6,952.07	6,951.69	96.15	23.67	26.839	17,375.66	1,520.23	7,201.40	7,145.14	56.26	128.004			
18,600.00	7,450.00	6,958.15	6,957.75	96.98	23.69	27.113	17,376.09	1,520.12	7,101.70	7,045.34	56.36	126.005			
18,700.00	7,450.00	6,964.24	6,963.82	97.80	23.71	27.394	17,376.51	1,520.01	7,002.01	6,945.54	56.46	124.012			
18,800.00	7,450.00	6,971.00	6,970.57	98.62	23.73	27.713	17,376.98	1,519.90	6,902.31	6,845.75	56.57	122.018			
18,900.00	7,450.00	6,971.00	6,970.57	99.45	23.73	27.713	17,376.98	1,519.90	6,802.63	6,745.98	56.65	120.083			
19,000.00	7,450.00	6,971.00	6,970.57	100.28	23.73	27.713	17,376.98	1,519.90	6,702.95	6,646.22	56.73	118.150			
19,100.00	7,450.00	6,971.00	6,970.57	101.10	23.73	27.713	17,376.98	1,519.90	6,603.28	6,546.46	56.82	116.221			
19,200.00	7,450.00	6,971.00	6,970.57	101.93	23.73	27.713	17,376.98	1,519.90	6,503.62	6,446.72	56.90	114.293			
19,300.00	7,450.00	6,971.00	6,970.57	102.76	23.73	27.713	17,376.98	1,519.90	6,403.98	6,346.99	56.99	112.369			
19,400.00	7,450.00	6,994.76	6,994.26	103.58	23.82	28.903	17,378.67	1,519.63	6,304.26	6,247.10	57.16	110.291			
19,500.00	7,450.00	6,998.96	6,998.45	104.41	23.84	29.125	17,378.98	1,519.60	6,204.61	6,147.34	57.26	108.351			
19,600.00	7,450.00	7,003.20	7,002.69	105.24	23.85	29.353	17,379.29	1,519.58	6,104.96	6,047.59	57.37	106.415			
19,700.00	7,450.00	7,007.51	7,006.98	106.07	23.87	29.589	17,379.60	1,519.56	6,005.31	5,947.84	57.48	104.484			
19,800.00	7,450.00	7,011.86	7,011.32	106.90	23.88	29.831	17,379.93	1,519.55	5,905.68	5,848.09	57.58	102.558			
19,900.00	7,450.00	7,016.27	7,015.71	107.73	23.90	30.081	17,380.25	1,519.54	5,806.05	5,748.36	57.69	100.636			
20,000.00	7,450.00	7,020.73	7,020.16	108.56	23.91	30.338	17,380.59	1,519.55	5,706.43	5,648.62	57.81	98.719			
20,100.00	7,450.00	7,025.24	7,024.67	109.40	23.93	30.604	17,380.93	1,519.55	5,606.81	5,548.89	57.92	96.806			
20,200.00	7,450.00	7,029.82	7,029.23	110.23	23.95	30.877	17,381.28	1,519.57	5,507.21	5,449.17	58.03	94.898			
20,300.00	7,450.00	7,034.45	7,033.84	111.06	23.96	31.160	17,381.63	1,519.59	5,407.61	5,349.46	58.15	92.995			
20,400.00	7,450.00	7,039.14	7,038.52	111.89	23.98	31.451	17,382.00	1,519.62	5,308.02	5,249.75	58.27	91.097			
20,500.00	7,450.00	7,043.89	7,043.25	112.73	24.00	31.751	17,382.36	1,519.66	5,208.43	5,150.05	58.39	89.203			
20,600.00	7,450.00	7,066.00	7,065.30	113.56	24.08	33.230	17,384.11	1,519.94	5,108.91	5,050.35	58.56	87.247			

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 302H
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 302H	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 Offsets - Willow Lake WC 15 1H - Wellbore #1 - Surveys												Offset Site Error:	0.00 usft
Survey Program: 403-												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)	Highside Toolface (°)	Offset Wellbore Centre		Rule Assigned: Distance Between Centres (usft)		Minimum Separation (usft)	Warning	
							+N/-S (usft)	+E/-W (usft)	Between Ellipses (usft)		Separation Factor		
20,700.00	7,450.00	7,066.00	7,065.30	114.40	24.08	33.230	17,384.11	1,519.94	5,009.32	4,950.66	58.67	85.385	
20,800.00	7,450.00	7,066.00	7,065.30	115.23	24.08	33.230	17,384.11	1,519.94	4,909.75	4,850.97	58.78	83.526	
20,900.00	7,450.00	7,066.00	7,065.30	116.07	24.08	33.230	17,384.11	1,519.94	4,810.20	4,751.30	58.90	81.670	
21,000.00	7,450.00	7,070.58	7,069.86	116.90	24.10	33.553	17,384.48	1,520.01	4,710.67	4,651.64	59.03	79.803	
21,100.00	7,450.00	7,079.60	7,078.85	117.74	24.13	34.205	17,385.20	1,520.17	4,611.14	4,551.97	59.17	77.928	
21,200.00	7,450.00	7,088.55	7,087.77	118.57	24.16	34.875	17,385.92	1,520.33	4,511.62	4,452.30	59.32	76.061	
21,300.00	7,450.00	7,097.44	7,096.63	119.41	24.19	35.563	17,386.62	1,520.50	4,412.10	4,352.64	59.46	74.200	
21,400.00	7,450.00	7,106.27	7,105.43	120.25	24.22	36.270	17,387.32	1,520.68	4,312.59	4,252.98	59.61	72.346	
21,500.00	7,450.00	7,115.04	7,114.17	121.09	24.26	36.997	17,388.02	1,520.86	4,213.09	4,153.32	59.76	70.498	
21,600.00	7,450.00	7,123.75	7,122.85	121.92	24.29	37.743	17,388.70	1,521.05	4,113.59	4,053.67	59.92	68.656	
21,700.00	7,450.00	7,132.40	7,131.47	122.76	24.32	38.509	17,389.38	1,521.25	4,014.10	3,954.03	60.07	66.821	
21,800.00	7,450.00	7,140.99	7,140.03	123.60	24.35	39.296	17,390.06	1,521.45	3,914.62	3,854.39	60.23	64.993	
21,900.00	7,450.00	7,149.52	7,148.54	124.44	24.38	40.104	17,390.72	1,521.66	3,815.15	3,754.75	60.40	63.170	
22,000.00	7,450.00	7,158.00	7,156.99	125.28	24.41	40.934	17,391.38	1,521.88	3,715.69	3,655.13	60.56	61.353	
22,100.00	7,450.00	7,172.20	7,171.14	126.12	24.46	42.387	17,392.47	1,522.24	3,616.24	3,555.50	60.74	59.536	
22,200.00	7,450.00	7,188.66	7,187.55	126.96	24.52	44.170	17,393.70	1,522.65	3,516.78	3,455.86	60.93	57.722	
22,300.00	7,450.00	7,204.09	7,202.93	127.80	24.58	45.944	17,394.82	1,523.02	3,417.33	3,356.21	61.12	55.916	
22,400.00	7,450.00	7,218.58	7,217.38	128.64	24.63	47.705	17,395.83	1,523.35	3,317.87	3,256.56	61.31	54.117	
22,500.00	7,450.00	7,232.20	7,230.98	129.48	24.68	49.451	17,396.76	1,523.64	3,218.41	3,156.91	61.51	52.325	
22,600.00	7,450.00	7,245.05	7,243.79	130.32	24.73	51.180	17,397.61	1,523.91	3,118.97	3,057.25	61.71	50.539	
22,700.00	7,450.00	7,257.18	7,255.89	131.16	24.77	52.888	17,398.38	1,524.15	3,019.53	2,957.60	61.93	48.760	
22,800.00	7,450.00	7,268.65	7,267.33	132.00	24.81	54.573	17,399.10	1,524.37	2,920.11	2,857.96	62.15	46.986	
22,900.00	7,450.00	7,270.64	7,269.32	132.84	24.82	54.874	17,399.23	1,524.41	2,820.72	2,758.35	62.37	45.228	
23,000.00	7,450.00	7,277.53	7,276.20	133.69	24.84	55.928	17,399.67	1,524.54	2,721.36	2,658.75	62.61	43.468	
23,100.00	7,450.00	7,284.38	7,283.03	134.53	24.87	57.000	17,400.09	1,524.67	2,622.03	2,559.16	62.86	41.711	
23,200.00	7,450.00	7,291.17	7,289.81	135.37	24.89	58.089	17,400.52	1,524.80	2,522.73	2,459.60	63.13	39.958	
23,300.00	7,450.00	7,297.92	7,296.54	136.21	24.92	59.195	17,400.94	1,524.93	2,423.48	2,360.05	63.43	38.207	
23,400.00	7,450.00	7,304.61	7,303.22	137.06	24.94	60.318	17,401.35	1,525.06	2,324.27	2,260.52	63.75	36.460	
23,455.58	7,450.00	7,308.31	7,306.92	137.52	24.96	60.949	17,401.58	1,525.12	2,269.15	2,205.22	63.94	35.489 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 302H
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 302H	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 502H - 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)	Highside Toolface (°)	Offset Wellbore Centre		Distance Between Centres (usft)		Minimum Separation (usft)	Separation Factor	Warning
							+N/-S (usft)	+E/-W (usft)					
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	
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	
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	
1,600.00	1,599.98	1,599.98	1,599.98	5.50	5.51	65.879	-29.99	0.00	29.23	18.22	11.02	2.654	
1,700.00	1,699.84	1,699.84	1,699.84	5.84	5.87	75.896	-29.99	0.00	27.51	15.80	11.71	2.350	
1,780.26	1,779.81	1,779.81	1,779.81	6.11	6.16	90.000	-29.99	0.00	26.68	14.41	12.27	2.175 CC	
1,800.00	1,799.45	1,799.45	1,799.45	6.18	6.23	94.254	-29.99	0.00	26.75	14.35	12.40	2.157 ES, SF	
1,900.00	1,898.70	1,898.36	1,898.34	6.52	6.57	114.684	-31.60	0.52	30.75	17.67	13.08	2.351	
2,000.00	1,997.47	1,997.31	1,997.15	6.86	6.89	127.989	-36.45	2.08	40.21	26.46	13.75	2.925	
2,100.00	2,095.62	2,096.20	2,095.67	7.21	7.22	134.822	-44.55	4.70	53.43	39.02	14.41	3.707	
2,200.00	2,193.06	2,194.93	2,193.68	7.57	7.54	137.893	-55.86	8.34	69.47	54.38	15.09	4.605	
2,300.00	2,289.64	2,293.40	2,290.97	7.93	7.87	138.958	-70.33	13.01	87.95	72.18	15.77	5.578	
2,400.00	2,385.27	2,391.19	2,387.27	8.29	8.20	139.727	-86.48	18.22	108.87	92.42	16.45	6.618	
2,500.00	2,479.82	2,488.30	2,482.90	8.67	8.53	141.111	-102.54	23.40	132.46	115.32	17.14	7.728	
2,600.00	2,573.17	2,584.64	2,577.78	9.05	8.86	142.749	-118.46	28.53	158.81	140.97	17.83	8.905	
2,624.87	2,596.19	2,608.47	2,601.24	9.14	8.94	143.171	-122.40	29.80	165.80	147.79	18.01	9.207	
2,700.00	2,665.60	2,680.36	2,672.04	9.44	9.19	144.540	-134.28	33.63	187.25	168.72	18.53	10.104	
2,800.00	2,757.99	2,776.04	2,766.28	9.84	9.52	145.939	-150.10	38.73	215.91	196.67	19.23	11.225	
2,900.00	2,850.38	2,871.73	2,860.51	10.24	9.86	147.011	-165.91	43.83	244.66	224.71	19.95	12.266	
3,000.00	2,942.77	2,967.42	2,954.75	10.66	10.20	147.858	-181.73	48.94	273.47	252.81	20.67	13.234	
3,100.00	3,035.16	3,063.11	3,048.98	11.07	10.54	148.543	-197.54	54.04	302.33	280.94	21.39	14.134	
3,200.00	3,127.55	3,158.80	3,143.22	11.49	10.88	149.109	-213.36	59.14	331.22	309.10	22.12	14.973	
3,300.00	3,219.94	3,254.49	3,237.45	11.92	11.23	149.584	-229.18	64.24	360.14	337.28	22.86	15.755	
3,400.00	3,312.33	3,350.18	3,331.69	12.35	11.57	149.989	-244.99	69.34	389.07	365.47	23.60	16.486	
3,500.00	3,404.72	3,445.87	3,425.92	12.78	11.92	150.337	-260.81	74.44	418.02	393.67	24.35	17.170	
3,600.00	3,497.11	3,541.56	3,520.16	13.21	12.27	150.641	-276.62	79.54	446.98	421.89	25.10	17.811	
3,700.00	3,589.50	3,637.25	3,614.39	13.65	12.62	150.907	-292.44	84.64	475.96	450.11	25.85	18.412	
3,800.00	3,681.89	3,732.93	3,708.63	14.09	12.97	151.143	-308.26	89.74	504.94	478.33	26.61	18.978	
3,900.00	3,774.28	3,828.62	3,802.86	14.53	13.32	151.353	-324.07	94.84	533.92	506.56	27.37	19.510	
4,000.00	3,866.67	3,924.31	3,897.09	14.98	13.67	151.542	-339.89	99.94	562.92	534.79	28.13	20.011	
4,100.00	3,959.05	4,020.00	3,991.33	15.43	14.03	151.712	-355.70	105.04	591.92	563.02	28.90	20.485	
4,200.00	4,051.44	4,115.69	4,085.56	15.87	14.38	151.867	-371.52	110.14	620.92	591.26	29.66	20.932	
4,300.00	4,143.83	4,211.38	4,179.80	16.32	14.74	152.007	-387.34	115.24	649.93	619.49	30.43	21.356	
4,400.00	4,236.22	4,307.07	4,274.03	16.77	15.09	152.136	-403.15	120.35	678.94	647.73	31.21	21.757	
4,500.00	4,328.61	4,402.76	4,368.27	17.23	15.45	152.254	-418.97	125.45	707.95	675.97	31.98	22.137	
4,600.00	4,421.00	4,498.45	4,462.50	17.68	15.80	152.362	-434.78	130.55	736.97	704.21	32.76	22.499	
4,700.00	4,513.39	4,594.14	4,556.74	18.13	16.16	152.463	-450.60	135.65	765.98	732.45	33.53	22.842	
4,800.00	4,605.78	4,689.82	4,650.97	18.59	16.52	152.556	-466.42	140.75	795.00	760.69	34.31	23.169	
4,900.00	4,698.17	4,785.51	4,745.21	19.05	16.88	152.643	-482.23	145.85	824.02	788.93	35.09	23.481	

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 302H
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 302H	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 502H - 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)	Highside Toolface (°)	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
5,000.00	4,790.56	4,881.20	4,839.44	19.50	17.23	152.723	-498.05	150.95	853.05	817.17	35.88	23.778	
5,100.00	4,882.95	4,976.89	4,933.68	19.96	17.59	152.799	-513.86	156.05	882.07	845.41	36.66	24.062	
5,200.00	4,975.34	5,072.58	5,027.91	20.42	17.95	152.869	-529.68	161.15	911.10	873.66	37.44	24.333	
5,300.00	5,067.73	5,168.27	5,122.15	20.88	18.31	152.935	-545.50	166.25	940.13	901.90	38.23	24.592	
5,400.00	5,160.12	5,263.96	5,216.38	21.34	18.67	152.998	-561.31	171.35	969.15	930.14	39.01	24.841	
5,500.00	5,252.51	5,359.65	5,310.62	21.80	19.03	153.056	-577.13	176.45	998.18	958.38	39.80	25.078	
5,600.00	5,344.90	5,455.34	5,404.85	22.26	19.39	153.112	-592.94	181.55	1,027.21	986.62	40.59	25.306	
5,700.00	5,437.29	5,551.02	5,499.09	22.73	19.75	153.164	-608.76	186.66	1,056.24	1,014.86	41.38	25.525	
5,800.00	5,529.68	5,646.71	5,593.32	23.19	20.11	153.213	-624.58	191.76	1,085.28	1,043.10	42.17	25.735	
5,900.00	5,622.07	5,742.40	5,687.56	23.65	20.47	153.260	-640.39	196.86	1,114.31	1,071.35	42.96	25.937	
5,999.30	5,713.81	5,837.42	5,781.13	24.11	20.83	153.304	-656.10	201.92	1,143.14	1,099.39	43.75	26.130	
6,000.00	5,714.46	5,838.09	5,781.79	24.11	20.84	153.307	-656.21	201.96	1,143.34	1,099.59	43.75	26.131	
6,100.00	5,807.51	5,934.23	5,876.47	24.57	21.20	153.565	-672.10	207.08	1,170.86	1,126.31	44.54	26.285	
6,200.00	5,901.78	6,031.16	5,971.93	25.01	21.57	153.714	-688.12	212.25	1,195.35	1,150.02	45.33	26.369	
6,300.00	5,997.15	6,128.78	6,068.06	25.44	21.94	153.761	-704.26	217.45	1,216.81	1,170.69	46.12	26.386	
6,400.00	6,093.52	6,226.96	6,164.76	25.85	22.31	153.711	-720.48	222.69	1,235.21	1,188.32	46.89	26.341	
6,500.00	6,190.76	6,325.59	6,261.88	26.25	22.68	153.568	-736.79	227.94	1,250.55	1,202.89	47.66	26.237	
6,600.00	6,288.75	6,424.54	6,359.33	26.63	23.06	153.334	-753.14	233.22	1,262.83	1,214.41	48.43	26.077	
6,700.00	6,387.38	6,511.90	6,445.56	27.00	23.38	153.113	-766.42	237.50	1,272.51	1,223.42	49.09	25.922	
6,800.00	6,486.52	6,600.00	6,532.92	27.35	23.71	152.927	-777.27	241.00	1,280.09	1,230.35	49.74	25.736	
6,900.00	6,586.06	6,686.79	6,619.28	27.69	24.03	152.780	-785.46	243.64	1,285.53	1,235.18	50.35	25.530	
7,000.00	6,685.87	6,774.58	6,706.86	28.02	24.34	152.663	-791.20	245.49	1,288.83	1,237.88	50.95	25.294	
7,100.00	6,785.83	6,862.52	6,794.73	28.33	24.65	152.578	-794.39	246.52	1,289.97	1,238.44	51.53	25.033	
7,124.17	6,810.00	6,883.79	6,816.00	28.40	24.73	-90.260	-794.78	246.65	1,289.92	1,238.26	51.67	24.967	
7,191.21	6,877.04	6,944.84	6,877.04	28.60	24.93	-90.275	-795.10	246.75	1,289.80	1,237.77	52.04	24.786	
7,200.00	6,885.83	6,953.62	6,885.83	28.62	24.96	-89.681	-795.10	246.75	1,289.80	1,237.71	52.09	24.760	
7,250.00	6,935.73	7,003.52	6,935.73	28.77	25.12	-89.813	-795.10	246.75	1,289.79	1,237.39	52.40	24.614	
7,282.21	6,967.66	7,035.46	6,967.66	28.85	25.23	-89.998	-795.10	246.75	1,289.78	1,237.19	52.60	24.522	
7,300.00	6,985.18	7,052.97	6,985.18	28.90	25.28	-90.133	-795.10	246.75	1,289.79	1,237.08	52.71	24.470	
7,350.00	7,033.80	7,101.60	7,033.80	29.04	25.44	-90.624	-795.10	246.75	1,289.87	1,236.85	53.01	24.331	
7,400.00	7,081.24	7,149.03	7,081.24	29.16	25.59	-91.260	-795.10	246.75	1,290.14	1,236.82	53.32	24.197	
7,450.00	7,127.12	7,194.91	7,127.12	29.28	25.74	-92.006	-795.10	246.75	1,290.76	1,237.14	53.62	24.074	
7,500.00	7,171.10	7,238.89	7,171.10	29.39	25.89	-92.818	-795.10	246.75	1,291.90	1,237.99	53.91	23.964	
7,550.00	7,212.84	7,280.63	7,212.84	29.48	26.02	-93.647	-795.10	246.75	1,293.77	1,239.57	54.20	23.872	
7,600.00	7,252.02	7,319.81	7,252.02	29.57	26.15	-94.441	-795.10	246.75	1,296.57	1,242.10	54.48	23.801	
7,650.00	7,288.35	7,356.14	7,288.35	29.65	26.27	-95.145	-795.10	246.75	1,300.53	1,245.78	54.74	23.757	
7,700.00	7,321.55	7,389.34	7,321.55	29.71	26.38	-95.704	-795.10	246.75	1,305.85	1,250.85	55.00	23.743	
7,750.00	7,351.37	7,419.16	7,351.37	29.77	26.47	-96.065	-795.10	246.75	1,312.72	1,257.48	55.24	23.763	
7,800.00	7,377.57	7,445.37	7,377.57	29.81	26.56	-96.178	-795.10	246.75	1,321.30	1,265.84	55.47	23.822	
7,850.00	7,399.97	7,467.77	7,399.97	29.85	26.63	-95.997	-795.10	246.75	1,331.72	1,276.05	55.67	23.922	
7,900.00	7,418.39	7,486.18	7,418.39	29.87	26.69	-95.484	-795.10	246.75	1,344.04	1,288.19	55.85	24.065	
7,950.00	7,432.69	7,500.48	7,432.69	29.89	26.74	-94.606	-795.10	246.75	1,358.29	1,302.29	56.00	24.254	
8,000.00	7,442.76	7,510.55	7,442.76	29.89	26.77	-93.340	-795.10	246.75	1,374.43	1,318.30	56.13	24.487	
8,050.00	7,448.52	7,516.31	7,448.52	29.89	26.79	-91.674	-795.10	246.75	1,392.36	1,336.14	56.22	24.765	
8,091.21	7,450.00	7,517.79	7,450.00	29.88	26.80	-90.000	-795.10	246.75	1,408.39	1,352.11	56.28	25.025	
8,100.00	7,450.00	7,517.79	7,450.00	29.88	26.80	-90.000	-795.10	246.75	1,411.94	1,355.66	56.29	25.084	
8,200.00	7,450.00	7,517.79	7,450.00	29.86	26.80	-90.000	-795.10	246.75	1,455.50	1,399.11	56.39	25.812	
8,300.00	7,450.00	7,517.79	7,450.00	29.85	26.80	-90.000	-795.10	246.75	1,504.46	1,447.98	56.48	26.638	
8,400.00	7,450.00	8,926.89	8,235.00	29.86	29.70	-121.266	74.82	234.67	1,512.48	1,455.48	57.00	26.535	
8,500.00	7,450.00	9,026.88	8,235.00	29.88	29.87	-121.259	174.81	233.28	1,512.78	1,455.25	57.53	26.294	
8,600.00	7,450.00	9,126.88	8,235.00	29.93	30.06	-121.253	274.80	231.89	1,513.08	1,454.97	58.11	26.038	
8,700.00	7,450.00	9,226.88	8,235.00	30.01	30.27	-121.246	374.79	230.50	1,513.37	1,454.64	58.73	25.768	

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 302H
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 302H	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 502H - Wellbore #1 - Design #1													Offset Site Error:
													0.00 usft
Survey Program:	Reference	Offset	Semi Major Axis	Highside	Offset Wellbore Centre	Distance	Rule Assigned:	Offset Well Error:					
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Reference	Toolface (°)	+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning		
8,800.00	7,450.00	9,326.88	8,235.00	30.12	30.51	-121.239	474.78	229.11	1,513.67	1,454.28	59.39	25.486	
8,811.02	7,450.00	9,337.90	8,235.00	30.14	30.54	-121.238	485.80	228.96	1,513.70	1,454.24	59.47	25.454	
8,811.41	7,450.00	9,338.30	8,235.00	30.14	30.54	-121.238	486.19	228.95	1,513.70	1,454.23	59.47	25.453	
8,900.00	7,450.00	9,426.88	8,235.00	30.27	30.77	-121.232	574.77	227.72	1,513.98	1,453.89	60.09	25.194	
9,000.00	7,450.00	9,526.88	8,235.00	30.47	31.05	-121.225	674.76	226.33	1,514.29	1,453.45	60.83	24.893	
9,100.00	7,450.00	9,626.88	8,235.00	30.71	31.35	-121.218	774.75	224.95	1,514.60	1,452.99	61.61	24.583	
9,200.00	7,450.00	9,726.88	8,235.00	30.99	31.67	-121.211	874.74	223.56	1,514.91	1,452.48	62.42	24.268	
9,300.00	7,450.00	9,826.88	8,235.00	31.29	32.02	-121.204	974.73	222.17	1,515.22	1,451.94	63.27	23.948	
9,400.00	7,450.00	9,926.88	8,235.00	31.63	32.38	-121.197	1,074.72	220.78	1,515.52	1,451.37	64.15	23.624	
9,500.00	7,450.00	10,026.88	8,235.00	31.99	32.76	-121.189	1,174.71	219.39	1,515.83	1,450.77	65.06	23.297	
9,600.00	7,450.00	10,126.88	8,235.00	32.37	33.16	-121.182	1,274.70	218.00	1,516.14	1,450.14	66.01	22.969	
9,700.00	7,450.00	10,226.88	8,235.00	32.78	33.58	-121.175	1,374.69	216.61	1,516.45	1,449.47	66.98	22.641	
9,800.00	7,450.00	10,326.88	8,235.00	33.21	34.01	-121.168	1,474.68	215.22	1,516.76	1,448.78	67.98	22.312	
9,900.00	7,450.00	10,426.88	8,235.00	33.65	34.46	-121.161	1,574.67	213.83	1,517.07	1,448.06	69.01	21.984	
10,000.00	7,450.00	10,526.87	8,235.00	34.11	34.93	-121.154	1,674.66	212.45	1,517.38	1,447.32	70.06	21.659	
10,100.00	7,450.00	10,626.87	8,235.00	34.59	35.41	-121.147	1,774.65	211.06	1,517.69	1,446.55	71.14	21.335	
10,200.00	7,450.00	10,726.87	8,235.00	35.08	35.90	-121.140	1,874.64	209.67	1,518.00	1,445.76	72.24	21.015	
10,300.00	7,450.00	10,826.87	8,235.00	35.58	36.41	-121.133	1,974.63	208.28	1,518.31	1,444.95	73.36	20.697	
10,400.00	7,450.00	10,926.87	8,235.00	36.10	36.93	-121.126	2,074.62	206.89	1,518.62	1,444.12	74.50	20.384	
10,500.00	7,450.00	11,026.87	8,235.00	36.64	37.46	-121.119	2,174.61	205.50	1,518.93	1,443.26	75.67	20.074	
10,600.00	7,450.00	11,126.87	8,235.00	37.18	38.01	-121.112	2,274.60	204.11	1,519.24	1,442.39	76.85	19.769	
10,700.00	7,450.00	11,226.87	8,235.00	37.74	38.56	-121.105	2,374.59	202.72	1,519.55	1,441.50	78.05	19.469	
10,800.00	7,450.00	11,326.87	8,235.00	38.31	39.13	-121.098	2,474.57	201.34	1,519.86	1,440.59	79.27	19.173	
10,900.00	7,450.00	11,426.87	8,235.00	38.89	39.71	-121.091	2,574.56	199.95	1,520.17	1,439.66	80.51	18.882	
11,000.00	7,450.00	11,526.87	8,235.00	39.48	40.30	-121.084	2,674.55	198.56	1,520.48	1,438.72	81.76	18.597	
11,100.00	7,450.00	11,626.87	8,235.00	40.08	40.90	-121.077	2,774.54	197.17	1,520.79	1,437.76	83.03	18.317	
11,200.00	7,450.00	11,726.87	8,235.00	40.69	41.51	-121.070	2,874.53	195.78	1,521.10	1,436.79	84.31	18.042	
11,300.00	7,450.00	11,826.87	8,235.00	41.30	42.12	-121.063	2,974.52	194.39	1,521.40	1,435.80	85.61	17.772	
11,400.00	7,450.00	11,926.87	8,235.00	41.93	42.75	-121.055	3,074.51	193.00	1,521.71	1,434.80	86.92	17.508	
11,500.00	7,450.00	12,026.87	8,235.00	42.57	43.38	-121.048	3,174.50	191.61	1,522.02	1,433.79	88.24	17.249	
11,600.00	7,450.00	12,126.86	8,235.00	43.21	44.02	-121.041	3,274.49	190.23	1,522.33	1,432.76	89.57	16.996	
11,700.00	7,450.00	12,226.86	8,235.00	43.86	44.67	-121.034	3,374.48	188.84	1,522.64	1,431.73	90.92	16.747	
11,800.00	7,450.00	12,326.86	8,235.00	44.51	45.33	-121.027	3,474.47	187.45	1,522.95	1,430.68	92.28	16.504	
11,900.00	7,450.00	12,426.86	8,235.00	45.18	45.99	-121.020	3,574.46	186.06	1,523.26	1,429.62	93.64	16.266	
12,000.00	7,450.00	12,526.86	8,235.00	45.85	46.66	-121.013	3,674.45	184.67	1,523.57	1,428.55	95.02	16.034	
12,100.00	7,450.00	12,626.86	8,235.00	46.53	47.33	-121.006	3,774.44	183.28	1,523.88	1,427.47	96.41	15.806	
12,200.00	7,450.00	12,726.86	8,235.00	47.21	48.01	-120.999	3,874.43	181.89	1,524.19	1,426.38	97.81	15.583	
12,300.00	7,450.00	12,826.86	8,235.00	47.90	48.70	-120.992	3,974.42	180.50	1,524.50	1,425.29	99.22	15.366	
12,400.00	7,450.00	12,926.86	8,235.00	48.59	49.39	-120.985	4,074.41	179.11	1,524.81	1,424.18	100.63	15.153	
12,500.00	7,450.00	13,026.86	8,235.00	49.29	50.09	-120.978	4,174.40	177.73	1,525.12	1,423.07	102.05	14.944	
12,600.00	7,450.00	13,126.86	8,235.00	49.99	50.79	-120.971	4,274.39	176.34	1,525.43	1,421.95	103.49	14.741	
12,700.00	7,450.00	13,226.86	8,235.00	50.70	51.50	-120.964	4,374.38	174.95	1,525.74	1,420.82	104.92	14.541	
12,800.00	7,450.00	13,326.86	8,235.00	51.42	52.21	-120.957	4,474.37	173.56	1,526.05	1,419.68	106.37	14.347	
12,839.11	7,450.00	13,365.96	8,235.00	51.70	52.49	-120.955	4,513.47	173.02	1,526.17	1,419.24	106.94	14.272	
12,839.67	7,450.00	13,366.53	8,235.00	51.70	52.50	-120.955	4,514.04	173.01	1,526.18	1,419.23	106.95	14.271	
12,900.00	7,450.00	13,426.86	8,235.00	52.13	52.93	-120.950	4,574.36	172.17	1,526.37	1,418.55	107.82	14.156	
13,000.00	7,450.00	13,526.86	8,235.00	52.85	53.65	-120.943	4,674.35	170.78	1,526.70	1,417.42	109.28	13.970	
13,100.00	7,450.00	13,626.85	8,235.00	53.58	54.37	-120.936	4,774.34	169.39	1,527.03	1,416.28	110.75	13.788	
13,200.00	7,450.00	13,726.85	8,235.00	54.31	55.10	-120.928	4,874.33	168.00	1,527.35	1,415.13	112.22	13.610	
13,300.00	7,450.00	13,826.85	8,235.00	55.04	55.84	-120.921	4,974.32	166.62	1,527.68	1,413.98	113.70	13.436	
13,400.00	7,450.00	13,926.85	8,235.00	55.78	56.57	-120.913	5,074.31	165.23	1,528.01	1,412.83	115.18	13.266	
13,500.00	7,450.00	14,026.85	8,235.00	56.52	57.31	-120.906	5,174.30	163.84	1,528.34	1,411.66	116.67	13.099	

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 302H
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 302H	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 502H - 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)	Highside Toolface (°)	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
13,600.00	7,450.00	14,126.85	8,235.00	57.27	58.06	-120.899	5,274.29	162.45	1,528.66	1,410.50	118.17	12.937	
13,700.00	7,450.00	14,226.85	8,235.00	58.02	58.80	-120.891	5,374.28	161.06	1,528.99	1,409.32	119.67	12.777	
13,800.00	7,450.00	14,326.85	8,235.00	58.77	59.55	-120.884	5,474.27	159.67	1,529.32	1,408.15	121.17	12.621	
13,900.00	7,450.00	14,426.85	8,235.00	59.52	60.30	-120.877	5,574.25	158.28	1,529.64	1,406.96	122.68	12.469	
14,000.00	7,450.00	14,526.85	8,235.00	60.28	61.06	-120.869	5,674.24	156.89	1,529.97	1,405.78	124.19	12.319	
14,100.00	7,450.00	14,626.85	8,235.00	61.04	61.82	-120.862	5,774.23	155.50	1,530.30	1,404.59	125.71	12.173	
14,200.00	7,450.00	14,726.85	8,235.00	61.80	62.58	-120.855	5,874.22	154.12	1,530.63	1,403.39	127.24	12.030	
14,300.00	7,450.00	14,826.85	8,235.00	62.56	63.34	-120.848	5,974.21	152.73	1,530.95	1,402.19	128.76	11.890	
14,400.00	7,450.00	14,926.85	8,235.00	63.33	64.11	-120.840	6,074.20	151.34	1,531.28	1,400.99	130.29	11.753	
14,500.00	7,450.00	15,026.84	8,235.00	64.10	64.87	-120.833	6,174.19	149.95	1,531.61	1,399.78	131.83	11.618	
14,600.00	7,450.00	15,126.84	8,235.00	64.87	65.64	-120.826	6,274.18	148.56	1,531.94	1,398.57	133.36	11.487	
14,700.00	7,450.00	15,226.84	8,235.00	65.64	66.42	-120.818	6,374.17	147.17	1,532.26	1,397.36	134.91	11.358	
14,800.00	7,450.00	15,326.84	8,235.00	66.42	67.19	-120.811	6,474.16	145.78	1,532.59	1,396.14	136.45	11.232	
14,900.00	7,450.00	15,426.84	8,235.00	67.20	67.97	-120.804	6,574.15	144.39	1,532.92	1,394.92	138.00	11.108	
15,000.00	7,450.00	15,526.84	8,235.00	67.98	68.75	-120.796	6,674.14	143.01	1,533.24	1,393.69	139.55	10.987	
15,100.00	7,450.00	15,626.84	8,235.00	68.76	69.53	-120.789	6,774.13	141.62	1,533.57	1,392.47	141.11	10.868	
15,200.00	7,450.00	15,726.84	8,235.00	69.54	70.31	-120.782	6,874.12	140.23	1,533.90	1,391.24	142.66	10.752	
15,300.00	7,450.00	15,826.84	8,235.00	70.33	71.10	-120.775	6,974.11	138.84	1,534.23	1,390.00	144.22	10.638	
15,400.00	7,450.00	15,926.84	8,235.00	71.12	71.88	-120.767	7,074.10	137.45	1,534.56	1,388.77	145.79	10.526	
15,500.00	7,450.00	16,026.84	8,235.00	71.90	72.67	-120.760	7,174.09	136.06	1,534.88	1,387.53	147.35	10.416	
15,600.00	7,450.00	16,126.84	8,235.00	72.70	73.46	-120.753	7,274.08	134.67	1,535.21	1,386.29	148.92	10.309	
15,700.00	7,450.00	16,226.84	8,235.00	73.49	74.25	-120.745	7,374.07	133.28	1,535.54	1,385.05	150.49	10.203	
15,800.00	7,450.00	16,326.83	8,235.00	74.28	75.05	-120.738	7,474.06	131.89	1,535.87	1,383.80	152.07	10.100	
15,900.00	7,450.00	16,426.83	8,235.00	75.08	75.84	-120.731	7,574.05	130.51	1,536.19	1,382.55	153.64	9.998	
16,000.00	7,450.00	16,526.83	8,235.00	75.87	76.64	-120.724	7,674.04	129.12	1,536.52	1,381.30	155.22	9.899	
16,100.00	7,450.00	16,626.83	8,235.00	76.67	77.43	-120.716	7,774.03	127.73	1,536.85	1,380.05	156.80	9.801	
16,200.00	7,450.00	16,726.83	8,235.00	77.47	78.23	-120.709	7,874.02	126.34	1,537.18	1,378.79	158.38	9.705	
16,300.00	7,450.00	16,826.83	8,235.00	78.27	79.03	-120.702	7,974.01	124.95	1,537.50	1,377.53	159.97	9.611	
16,400.00	7,450.00	16,926.83	8,235.00	79.07	79.83	-120.695	8,074.00	123.56	1,537.83	1,376.28	161.56	9.519	
16,500.00	7,450.00	17,026.83	8,235.00	79.88	80.64	-120.687	8,173.99	122.17	1,538.16	1,375.01	163.15	9.428	
16,600.00	7,450.00	17,126.83	8,235.00	80.68	81.44	-120.680	8,273.98	120.78	1,538.49	1,373.75	164.74	9.339	
16,700.00	7,450.00	17,226.83	8,235.00	81.49	82.24	-120.673	8,373.96	119.40	1,538.82	1,372.49	166.33	9.252	
16,800.00	7,450.00	17,326.83	8,235.00	82.29	83.05	-120.666	8,473.95	118.01	1,539.14	1,371.22	167.92	9.166	
16,900.00	7,450.00	17,426.83	8,235.00	83.10	83.86	-120.658	8,573.94	116.62	1,539.47	1,369.95	169.52	9.081	
17,000.00	7,450.00	17,526.83	8,235.00	83.91	84.67	-120.651	8,673.93	115.23	1,539.80	1,368.68	171.12	8.998	
17,100.00	7,450.00	17,626.83	8,235.00	84.72	85.48	-120.644	8,773.92	113.84	1,540.13	1,367.41	172.72	8.917	
17,200.00	7,450.00	17,726.82	8,235.00	85.53	86.29	-120.637	8,873.91	112.45	1,540.46	1,366.13	174.32	8.837	
17,300.00	7,450.00	17,826.82	8,235.00	86.34	87.10	-120.629	8,973.90	111.06	1,540.78	1,364.86	175.92	8.758	
17,400.00	7,450.00	17,926.82	8,235.00	87.16	87.91	-120.622	9,073.89	109.67	1,541.11	1,363.58	177.53	8.681	
17,500.00	7,450.00	18,026.82	8,235.00	87.97	88.72	-120.615	9,173.88	108.29	1,541.44	1,362.30	179.13	8.605	
17,600.00	7,450.00	18,126.82	8,235.00	88.78	89.54	-120.608	9,273.87	106.90	1,541.77	1,361.03	180.74	8.530	
17,700.00	7,450.00	18,226.82	8,235.00	89.60	90.35	-120.601	9,373.86	105.51	1,542.10	1,359.74	182.35	8.457	
17,800.00	7,450.00	18,326.82	8,235.00	90.42	91.17	-120.593	9,473.85	104.12	1,542.42	1,358.46	183.96	8.384	
17,900.00	7,450.00	18,426.82	8,235.00	91.23	91.98	-120.586	9,573.84	102.73	1,542.75	1,357.18	185.57	8.313	
18,000.00	7,450.00	18,526.82	8,235.00	92.05	92.80	-120.579	9,673.83	101.34	1,543.08	1,355.89	187.19	8.244	
18,100.00	7,450.00	18,626.82	8,235.00	92.87	93.62	-120.572	9,773.82	99.95	1,543.41	1,354.61	188.80	8.175	
18,197.24	7,450.00	18,724.06	8,235.00	93.67	94.42	-120.565	9,871.05	98.60	1,543.73	1,353.35	190.37	8.109	
18,200.00	7,450.00	18,726.82	8,235.00	93.69	94.44	-120.565	9,873.81	98.56	1,543.74	1,353.32	190.42	8.107	
18,229.54	7,450.00	18,756.36	8,235.00	93.93	94.68	-120.566	9,903.35	98.15	1,543.68	1,352.78	190.89	8.087	
18,300.00	7,450.00	18,826.82	8,235.00	94.51	95.26	-120.576	9,973.80	97.17	1,543.22	1,351.19	192.03	8.036	
18,400.00	7,450.00	18,926.81	8,235.00	95.33	96.08	-120.590	10,073.78	95.79	1,542.58	1,348.93	193.65	7.966	
18,500.00	7,450.00	19,026.81	8,235.00	96.15	96.90	-120.605	10,173.77	94.40	1,541.94	1,346.67	195.27	7.896	

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 302H
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 302H	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 502H - Wellbore #1 - Design #1												Offset Site Error:	0.00 usft
Survey Program: 0-MWD+HFR1+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)	Highside Toolface (°)	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
18,600.00	7,450.00	19,126.81	8,235.00	96.98	97.72	-120.619	10,273.76	93.01	1,541.30	1,344.41	196.89	7.828	
18,700.00	7,450.00	19,226.80	8,235.00	97.80	98.54	-120.633	10,373.75	91.62	1,540.65	1,342.15	198.51	7.761	
18,800.00	7,450.00	19,326.80	8,235.00	98.62	99.37	-120.647	10,473.74	90.23	1,540.01	1,339.88	200.13	7.695	
18,900.00	7,450.00	19,426.80	8,235.00	99.45	100.19	-120.661	10,573.72	88.84	1,539.37	1,337.62	201.75	7.630	
19,000.00	7,450.00	19,526.80	8,235.00	100.28	101.02	-120.675	10,673.71	87.45	1,538.73	1,335.35	203.38	7.566	
19,100.00	7,450.00	19,626.79	8,235.00	101.10	101.84	-120.689	10,773.70	86.06	1,538.09	1,333.09	205.00	7.503	
19,200.00	7,450.00	19,726.79	8,235.00	101.93	102.67	-120.704	10,873.69	84.68	1,537.45	1,330.82	206.63	7.441	
19,300.00	7,450.00	19,826.79	8,235.00	102.76	103.49	-120.718	10,973.67	83.29	1,536.80	1,328.55	208.25	7.380	
19,400.00	7,450.00	19,926.78	8,235.00	103.58	104.32	-120.732	11,073.66	81.90	1,536.16	1,326.28	209.88	7.319	
19,500.00	7,450.00	20,026.78	8,235.00	104.41	105.15	-120.746	11,173.65	80.51	1,535.52	1,324.01	211.51	7.260	
19,600.00	7,450.00	20,126.78	8,235.00	105.24	105.97	-120.761	11,273.64	79.12	1,534.88	1,321.74	213.14	7.201	
19,700.00	7,450.00	20,226.78	8,235.00	106.07	106.80	-120.775	11,373.62	77.73	1,534.24	1,319.47	214.77	7.144	
19,800.00	7,450.00	20,326.77	8,235.00	106.90	107.63	-120.789	11,473.61	76.34	1,533.60	1,317.20	216.40	7.087	
19,900.00	7,450.00	20,426.77	8,235.00	107.73	108.46	-120.803	11,573.60	74.95	1,532.96	1,314.93	218.03	7.031	
20,000.00	7,450.00	20,526.77	8,235.00	108.56	109.29	-120.818	11,673.59	73.57	1,532.32	1,312.66	219.66	6.976	
20,100.00	7,450.00	20,626.77	8,235.00	109.40	110.12	-120.832	11,773.57	72.18	1,531.67	1,310.38	221.29	6.922	
20,200.00	7,450.00	20,726.76	8,235.00	110.23	110.95	-120.846	11,873.56	70.79	1,531.03	1,308.11	222.92	6.868	
20,300.00	7,450.00	20,826.76	8,235.00	111.06	111.78	-120.861	11,973.55	69.40	1,530.39	1,305.83	224.56	6.815	
20,400.00	7,450.00	20,926.76	8,235.00	111.89	112.62	-120.875	12,073.54	68.01	1,529.75	1,303.56	226.19	6.763	
20,500.00	7,450.00	21,026.75	8,235.00	112.73	113.45	-120.889	12,173.52	66.62	1,529.11	1,301.28	227.83	6.712	
20,600.00	7,450.00	21,126.75	8,235.00	113.56	114.28	-120.904	12,273.51	65.23	1,528.47	1,299.01	229.47	6.661	
20,700.00	7,450.00	21,226.75	8,235.00	114.40	115.11	-120.918	12,373.50	63.84	1,527.83	1,296.73	231.10	6.611	
20,800.00	7,450.00	21,326.75	8,235.00	115.23	115.95	-120.932	12,473.49	62.45	1,527.19	1,294.45	232.74	6.562	
20,900.00	7,450.00	21,426.74	8,235.00	116.07	116.78	-120.947	12,573.47	61.07	1,526.55	1,292.17	234.38	6.513	
21,000.00	7,450.00	21,526.74	8,235.00	116.90	117.62	-120.961	12,673.46	59.68	1,525.91	1,289.90	236.02	6.465	
21,100.00	7,450.00	21,626.74	8,235.00	117.74	118.45	-120.976	12,773.45	58.29	1,525.27	1,287.62	237.65	6.418	
21,200.00	7,450.00	21,726.73	8,235.00	118.57	119.29	-120.990	12,873.44	56.90	1,524.63	1,285.34	239.29	6.371	
21,300.00	7,450.00	21,826.73	8,235.00	119.41	120.12	-121.004	12,973.42	55.51	1,523.99	1,283.06	240.93	6.325	
21,400.00	7,450.00	21,926.73	8,235.00	120.25	120.96	-121.019	13,073.41	54.12	1,523.35	1,280.78	242.58	6.280	
21,500.00	7,450.00	22,026.73	8,235.00	121.09	121.79	-121.033	13,173.40	52.73	1,522.71	1,278.50	244.22	6.235	
21,600.00	7,450.00	22,126.72	8,235.00	121.92	122.63	-121.048	13,273.39	51.34	1,522.07	1,276.22	245.86	6.191	
21,700.00	7,450.00	22,226.72	8,235.00	122.76	123.47	-121.062	13,373.37	49.96	1,521.43	1,273.93	247.50	6.147	
21,800.00	7,450.00	22,326.72	8,235.00	123.60	124.30	-121.077	13,473.36	48.57	1,520.80	1,271.65	249.14	6.104	
21,900.00	7,450.00	22,426.72	8,235.00	124.44	125.14	-121.091	13,573.35	47.18	1,520.16	1,269.37	250.79	6.062	
22,000.00	7,450.00	22,526.71	8,235.00	125.28	125.98	-121.106	13,673.34	45.79	1,519.52	1,267.09	252.43	6.020	
22,100.00	7,450.00	22,626.71	8,235.00	126.12	126.82	-121.120	13,773.33	44.40	1,518.88	1,264.80	254.08	5.978	
22,200.00	7,450.00	22,726.71	8,235.00	126.96	127.66	-121.135	13,873.31	43.01	1,518.24	1,262.52	255.72	5.937	
22,300.00	7,450.00	22,826.70	8,235.00	127.80	128.50	-121.150	13,973.30	41.62	1,517.60	1,260.24	257.37	5.897	
22,400.00	7,450.00	22,926.70	8,235.00	128.64	129.34	-121.164	14,073.29	40.23	1,516.96	1,257.95	259.01	5.857	
22,500.00	7,450.00	23,026.70	8,235.00	129.48	130.17	-121.179	14,173.28	38.85	1,516.32	1,255.67	260.66	5.817	
22,600.00	7,450.00	23,126.70	8,235.00	130.32	131.01	-121.193	14,273.26	37.46	1,515.69	1,253.38	262.30	5.778	
22,700.00	7,450.00	23,226.69	8,235.00	131.16	131.85	-121.208	14,373.25	36.07	1,515.05	1,251.10	263.95	5.740	
22,800.00	7,450.00	23,326.69	8,235.00	132.00	132.69	-121.223	14,473.24	34.68	1,514.41	1,248.81	265.60	5.702	
22,900.00	7,450.00	23,426.69	8,235.00	132.84	133.54	-121.237	14,573.23	33.29	1,513.77	1,246.53	267.24	5.664	
23,000.00	7,450.00	23,526.68	8,235.00	133.69	134.38	-121.252	14,673.21	31.90	1,513.13	1,244.24	268.89	5.627	
23,100.00	7,450.00	23,626.68	8,235.00	134.53	135.22	-121.267	14,773.20	30.51	1,512.50	1,241.95	270.54	5.591	
23,200.00	7,450.00	23,726.68	8,235.00	135.37	136.06	-121.281	14,873.19	29.12	1,511.86	1,239.67	272.19	5.554	
23,300.00	7,450.00	23,826.68	8,235.00	136.21	136.90	-121.296	14,973.18	27.74	1,511.22	1,237.38	273.84	5.519	
23,400.00	7,450.00	23,926.67	8,235.00	137.06	137.74	-121.311	15,073.16	26.35	1,510.58	1,235.09	275.49	5.483	
23,455.58	7,450.00	23,982.25	8,235.00	137.52	138.21	-121.319	15,128.73	25.57	1,510.23	1,233.82	276.40	5.464	

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 302H
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 302H	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)	Semi Major Axis Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre		Distance Between Centres (usft)		Minimum Separation (usft)	Separation Factor	Warning
							+N/-S (usft)	+E/-W (usft)					
0.00	0.00	0.00	0.00	0.00	0.00	180.000	-59.98	0.00	59.98				
100.00	100.00	100.00	100.00	0.14	0.14	180.000	-59.98	0.00	59.98	59.71	0.27	218.721	
200.00	200.00	200.00	200.00	0.50	0.50	180.000	-59.98	0.00	59.98	58.99	0.99	60.514	
300.00	300.00	300.00	300.00	0.85	0.85	180.000	-59.98	0.00	59.98	58.27	1.71	35.115	
400.00	400.00	400.00	400.00	1.21	1.21	180.000	-59.98	0.00	59.98	57.55	2.43	24.733	
500.00	500.00	500.00	500.00	1.57	1.57	180.000	-59.98	0.00	59.98	56.84	3.14	19.090	
600.00	600.00	600.00	600.00	1.93	1.93	180.000	-59.98	0.00	59.98	56.12	3.86	15.543	
700.00	700.00	700.00	700.00	2.29	2.29	180.000	-59.98	0.00	59.98	55.40	4.58	13.108	
800.00	800.00	800.00	800.00	2.65	2.65	180.000	-59.98	0.00	59.98	54.69	5.29	11.332	
900.00	900.00	900.00	900.00	3.00	3.00	180.000	-59.98	0.00	59.98	53.97	6.01	9.980	
1,000.00	1,000.00	1,000.00	1,000.00	3.36	3.36	180.000	-59.98	0.00	59.98	53.25	6.73	8.917	
1,100.00	1,100.00	1,100.00	1,100.00	3.72	3.72	180.000	-59.98	0.00	59.98	52.54	7.44	8.058	
1,200.00	1,200.00	1,200.00	1,200.00	4.08	4.08	180.000	-59.98	0.00	59.98	51.82	8.16	7.350	
1,300.00	1,300.00	1,300.00	1,300.00	4.44	4.44	180.000	-59.98	0.00	59.98	51.10	8.88	6.756	
1,400.00	1,400.00	1,400.00	1,400.00	4.80	4.80	180.000	-59.98	0.00	59.98	50.39	9.59	6.252	
1,500.00	1,500.00	1,500.00	1,500.00	5.16	5.16	180.000	-59.98	0.00	59.98	49.67	10.31	5.817	
1,600.00	1,599.98	1,599.08	1,599.06	5.50	5.50	62.826	-60.74	1.53	59.95	48.95	11.00	5.451	
1,700.00	1,699.84	1,698.16	1,698.00	5.84	5.83	62.838	-63.02	6.14	59.87	48.20	11.66	5.132	
1,800.00	1,799.45	1,797.24	1,796.71	6.18	6.17	62.857	-66.83	13.80	59.72	47.39	12.33	4.842	
1,900.00	1,898.70	1,896.32	1,895.06	6.52	6.51	62.884	-72.14	24.52	59.52	46.52	13.01	4.577	
2,000.00	1,997.47	1,995.41	1,992.95	6.86	6.85	62.920	-78.97	38.28	59.26	45.58	13.68	4.332	
2,100.00	2,095.62	2,094.51	2,090.25	7.21	7.20	62.963	-87.30	55.06	58.95	44.59	14.36	4.104	
2,200.00	2,193.06	2,193.61	2,186.85	7.57	7.55	63.015	-97.11	74.85	58.58	43.53	15.05	3.893	
2,300.00	2,289.64	2,293.10	2,283.09	7.93	7.90	63.366	-108.32	97.44	58.01	42.26	15.75	3.683	
2,400.00	2,385.27	2,393.03	2,379.62	8.29	8.27	66.424	-119.81	120.60	56.20	39.71	16.50	3.407	
2,500.00	2,479.82	2,492.78	2,475.97	8.67	8.63	73.186	-131.28	143.72	53.45	36.18	17.27	3.096	
2,600.00	2,573.17	2,592.23	2,572.03	9.05	9.00	84.370	-142.71	166.77	51.04	32.99	18.05	2.828	
2,624.87	2,596.19	2,616.90	2,595.87	9.14	9.10	87.870	-145.55	172.49	50.73	32.49	18.24	2.781	
2,650.17	2,619.56	2,641.98	2,620.09	9.24	9.19	91.573	-148.44	178.30	50.63	32.19	18.43	2.746 CC, ES	
2,700.00	2,665.60	2,691.38	2,667.81	9.44	9.38	98.837	-154.12	189.76	51.04	32.24	18.80	2.715 SF	
2,800.00	2,757.99	2,790.53	2,763.58	9.84	9.75	112.543	-165.52	212.74	54.28	34.76	19.52	2.781	
2,900.00	2,850.38	2,889.67	2,859.35	10.24	10.13	124.154	-176.92	235.72	60.23	40.03	20.21	2.981	
3,000.00	2,942.77	2,988.81	2,955.11	10.66	10.51	133.396	-188.32	258.70	68.20	47.30	20.91	3.262	
3,100.00	3,035.16	3,087.96	3,050.88	11.07	10.89	140.579	-199.72	281.68	77.56	55.94	21.62	3.588	
3,200.00	3,127.55	3,187.10	3,146.65	11.49	11.27	146.158	-211.12	304.66	87.87	65.52	22.35	3.932	
3,300.00	3,219.94	3,286.24	3,242.41	11.92	11.66	150.540	-222.52	327.64	98.84	75.74	23.10	4.280	
3,400.00	3,312.33	3,385.39	3,338.18	12.35	12.04	154.035	-233.92	350.62	110.26	86.41	23.85	4.622	
3,500.00	3,404.72	3,484.53	3,433.95	12.78	12.43	156.868	-245.32	373.60	122.01	97.39	24.62	4.955	
3,600.00	3,497.11	3,583.67	3,529.72	13.21	12.82	159.199	-256.72	396.58	134.01	108.61	25.40	5.276	
3,700.00	3,589.50	3,682.81	3,625.48	13.65	13.21	161.146	-268.12	419.56	146.18	120.00	26.18	5.583	
3,800.00	3,681.89	3,781.96	3,721.25	14.09	13.60	162.793	-279.52	442.54	158.50	131.53	26.97	5.877	
3,900.00	3,774.28	3,881.10	3,817.02	14.53	13.99	164.201	-290.92	465.52	170.93	143.17	27.76	6.157	
4,000.00	3,866.67	3,980.24	3,912.78	14.98	14.38	165.418	-302.32	488.50	183.45	154.89	28.56	6.423	
4,100.00	3,959.05	4,079.39	4,008.55	15.43	14.78	166.479	-313.73	511.48	196.04	166.68	29.36	6.677	
4,200.00	4,051.44	4,178.53	4,104.32	15.87	15.17	167.413	-325.13	534.47	208.68	178.52	30.16	6.918	
4,300.00	4,143.83	4,277.67	4,200.08	16.32	15.57	168.239	-336.53	557.45	221.38	190.41	30.97	7.148	
4,400.00	4,236.22	4,376.82	4,295.85	16.77	15.96	168.976	-347.93	580.43	234.12	202.34	31.78	7.367	
4,500.00	4,328.61	4,475.96	4,391.62	17.23	16.36	169.637	-359.33	603.41	246.89	214.30	32.59	7.576	
4,600.00	4,421.00	4,575.10	4,487.38	17.68	16.76	170.232	-370.73	626.39	259.68	226.28	33.40	7.775	
4,700.00	4,513.39	4,674.25	4,583.15	18.13	17.15	170.772	-382.13	649.37	272.51	238.29	34.22	7.965	
4,800.00	4,605.78	4,773.39	4,678.92	18.59	17.55	171.263	-393.53	672.35	285.35	250.32	35.03	8.146	
4,900.00	4,698.17	4,872.53	4,774.68	19.05	17.95	171.712	-404.93	695.33	298.22	262.37	35.85	8.319	

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 302H
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 302H	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)	Highside Toolface (°)	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
5,000.00	4,790.56	4,971.68	4,870.45	19.50	18.35	172.124	-416.33	718.31	311.10	274.43	36.67	8.484	
5,100.00	4,882.95	5,070.82	4,966.22	19.96	18.75	172.503	-427.73	741.29	323.99	286.51	37.49	8.643	
5,200.00	4,975.34	5,169.96	5,061.98	20.42	19.15	172.853	-439.13	764.27	336.90	298.59	38.31	8.794	
5,300.00	5,067.73	5,269.11	5,157.75	20.88	19.55	173.177	-450.53	787.25	349.82	310.69	39.13	8.940	
5,400.00	5,160.12	5,368.25	5,253.52	21.34	19.95	173.478	-461.93	810.23	362.75	322.80	39.95	9.079	
5,500.00	5,252.51	5,467.39	5,349.28	21.80	20.35	173.758	-473.33	833.21	375.69	334.91	40.78	9.213	
5,600.00	5,344.90	5,566.54	5,445.05	22.26	20.75	174.020	-484.73	856.19	388.64	347.03	41.60	9.341	
5,700.00	5,437.29	5,665.68	5,540.82	22.73	21.15	174.265	-496.13	879.18	401.59	359.16	42.43	9.465	
5,800.00	5,529.68	5,764.82	5,636.59	23.19	21.55	174.494	-507.54	902.16	414.56	371.30	43.26	9.584	
5,900.00	5,622.07	5,863.96	5,732.35	23.65	21.95	174.710	-518.94	925.14	427.52	383.44	44.08	9.698	
5,999.30	5,713.81	5,962.41	5,827.45	24.11	22.35	174.911	-530.26	947.96	440.41	395.50	44.91	9.807	
6,000.00	5,714.46	5,963.11	5,828.12	24.11	22.35	174.913	-530.34	948.12	440.50	395.58	44.91	9.808	
6,100.00	5,807.51	6,062.46	5,924.09	24.57	22.75	175.105	-541.76	971.15	451.72	405.99	45.74	9.876	
6,200.00	5,901.78	6,162.15	6,020.38	25.01	23.16	175.245	-553.22	994.25	459.49	412.94	46.56	9.869	
6,300.00	5,997.15	6,262.05	6,116.88	25.44	23.56	175.341	-564.71	1,017.41	463.79	416.42	47.37	9.791	
6,400.00	6,093.52	6,362.04	6,213.46	25.85	23.97	175.395	-576.21	1,040.59	464.61	416.44	48.17	9.645	
6,500.00	6,190.76	6,462.00	6,310.02	26.25	24.37	175.408	-587.70	1,063.76	461.96	412.99	48.96	9.435	
6,600.00	6,288.75	6,561.81	6,406.43	26.63	24.78	175.382	-599.18	1,086.89	455.82	406.08	49.74	9.164	
6,700.00	6,387.38	6,661.34	6,502.57	27.00	25.18	175.312	-610.63	1,109.96	446.22	395.72	50.51	8.835	
6,800.00	6,486.52	6,760.47	6,598.33	27.35	25.59	175.196	-622.03	1,132.94	433.17	381.91	51.26	8.451	
6,900.00	6,586.06	6,859.09	6,693.59	27.69	25.99	175.026	-633.37	1,155.80	416.67	364.68	51.99	8.014	
7,000.00	6,685.87	6,957.08	6,788.24	28.02	26.39	174.790	-644.63	1,178.51	396.76	344.05	52.71	7.527	
7,100.00	6,785.83	7,054.30	6,882.15	28.33	26.78	174.474	-655.81	1,201.05	373.47	320.05	53.42	6.991	
7,124.17	6,810.00	7,077.68	6,904.73	28.40	26.88	-68.440	-658.50	1,206.47	367.33	313.75	53.58	6.855	
7,191.21	6,877.04	7,142.44	6,967.29	28.60	27.14	-68.679	-665.95	1,221.48	350.04	296.00	54.04	6.478	
7,200.00	6,885.83	7,150.92	6,975.48	28.62	27.18	-68.346	-666.92	1,223.44	347.75	293.66	54.10	6.428	
7,250.00	6,935.73	7,198.77	7,021.70	28.77	27.37	-70.383	-672.43	1,234.53	333.85	279.41	54.44	6.133	
7,300.00	6,985.18	7,245.68	7,067.01	28.90	27.56	-73.386	-677.82	1,245.41	318.67	263.89	54.79	5.817	
7,350.00	7,033.80	7,291.29	7,111.07	29.04	27.75	-77.402	-683.07	1,255.98	302.67	247.53	55.14	5.489	
7,400.00	7,081.24	7,335.26	7,153.54	29.16	27.93	-82.410	-688.12	1,266.17	286.54	231.02	55.52	5.161	
7,450.00	7,127.12	7,377.25	7,194.10	29.28	28.10	-88.268	-692.95	1,275.91	271.27	215.34	55.93	4.850	
7,500.00	7,171.10	7,416.94	7,232.44	29.39	28.26	-94.678	-697.51	1,285.11	258.19	201.80	56.39	4.579	
7,550.00	7,212.84	7,454.03	7,268.27	29.48	28.41	-101.205	-701.78	1,293.70	248.92	192.01	56.90	4.374	
7,600.00	7,252.02	7,488.24	7,301.31	29.57	28.55	-107.360	-705.71	1,301.63	245.21	187.76	57.45	4.268	
7,602.64	7,254.01	7,489.96	7,302.98	29.57	28.56	-107.667	-705.91	1,302.03	245.20	187.72	57.48	4.266	
7,650.00	7,288.35	7,519.30	7,331.32	29.65	28.68	-112.709	-709.29	1,308.83	248.58	190.61	57.97	4.288	
7,700.00	7,321.55	7,546.98	7,358.06	29.71	28.79	-116.938	-712.47	1,315.25	259.91	201.50	58.41	4.450	
7,750.00	7,351.37	7,571.08	7,381.33	29.77	28.89	-119.847	-715.24	1,320.83	279.18	220.46	58.72	4.755	
7,800.00	7,377.57	7,591.39	7,400.95	29.81	28.97	-121.289	-717.57	1,325.54	305.62	246.73	58.90	5.189	
7,850.00	7,399.97	7,607.78	7,416.78	29.85	29.04	-121.098	-719.46	1,329.34	338.09	279.11	58.97	5.733	
7,900.00	7,418.39	7,620.12	7,428.70	29.87	29.09	-119.020	-720.88	1,332.20	375.31	316.33	58.98	6.363	
7,950.00	7,432.69	7,628.30	7,436.61	29.89	29.12	-114.656	-721.82	1,334.10	416.15	357.20	58.95	7.060	
8,000.00	7,442.76	7,632.28	7,440.45	29.89	29.14	-107.484	-722.28	1,335.02	459.59	400.70	58.89	7.805	
8,050.00	7,448.52	7,632.02	7,440.20	29.89	29.14	-97.087	-722.25	1,334.96	504.78	445.97	58.81	8.583	
8,091.21	7,450.00	7,628.62	7,436.91	29.88	29.12	-86.286	-721.86	1,334.17	542.81	484.07	58.74	9.241	
8,100.00	7,450.00	7,627.59	7,435.91	29.88	29.12	-86.009	-721.74	1,333.93	550.97	492.25	58.72	9.383	
8,200.00	7,450.00	7,615.85	7,424.57	29.86	29.07	-82.916	-720.39	1,331.21	644.92	586.36	58.56	11.013	
8,300.00	7,450.00	7,604.11	7,413.23	29.85	29.02	-79.943	-719.04	1,328.49	740.27	681.84	58.43	12.670	
8,400.00	7,450.00	7,592.37	7,401.89	29.86	28.97	-77.098	-717.69	1,325.77	836.54	778.22	58.32	14.344	
8,500.00	7,450.00	7,580.63	7,390.55	29.88	28.93	-74.387	-716.34	1,323.05	933.45	875.22	58.23	16.031	
8,600.00	7,450.00	7,568.89	7,379.21	29.93	28.88	-71.811	-714.99	1,320.33	1,030.82	972.67	58.15	17.728	
8,700.00	7,450.00	7,557.15	7,367.87	30.01	28.83	-69.369	-713.64	1,317.60	1,128.52	1,070.44	58.08	19.431	

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 302H
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 302H	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)	Highside Toolface (°)	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
8,800.00	7,450.00	7,545.41	7,356.53	30.12	28.78	-67.061	-712.29	1,314.88	1,226.48	1,168.47	58.02	21.141	
8,811.02	7,450.00	7,544.11	7,355.28	30.14	28.78	-66.815	-712.14	1,314.58	1,237.29	1,179.28	58.01	21.329	
8,811.41	7,450.00	7,544.07	7,355.24	30.14	28.78	-66.790	-712.13	1,314.57	1,237.68	1,179.67	58.01	21.336	
8,900.00	7,450.00	7,533.67	7,345.20	30.27	28.73	-64.866	-710.94	1,312.16	1,324.65	1,266.69	57.96	22.854	
9,000.00	7,450.00	7,521.93	7,333.86	30.47	28.69	-62.811	-709.59	1,309.44	1,422.97	1,365.06	57.91	24.572	
9,100.00	7,450.00	7,510.20	7,322.52	30.71	28.64	-60.875	-708.24	1,306.72	1,521.42	1,463.55	57.87	26.292	
9,200.00	7,450.00	10,685.75	9,040.00	30.99	35.84	179.997	892.73	1,519.17	1,590.00	1,545.73	44.27	35.920	
9,300.00	7,450.00	10,785.75	9,040.00	31.29	36.13	179.997	992.73	1,518.14	1,590.00	1,544.57	45.43	34.998	
9,400.00	7,450.00	10,885.75	9,040.00	31.63	36.44	179.997	1,092.72	1,517.11	1,590.00	1,543.38	46.62	34.105	
9,500.00	7,450.00	10,985.75	9,040.00	31.99	36.77	179.997	1,192.72	1,516.08	1,590.00	1,542.17	47.83	33.242	
9,600.00	7,450.00	11,085.75	9,040.00	32.37	37.12	179.997	1,292.71	1,515.05	1,590.00	1,540.94	49.06	32.407	
9,700.00	7,450.00	11,185.75	9,040.00	32.78	37.48	179.997	1,392.71	1,514.02	1,590.00	1,539.69	50.31	31.602	
9,800.00	7,450.00	11,285.75	9,040.00	33.21	37.86	179.997	1,492.70	1,512.99	1,590.00	1,538.42	51.58	30.826	
9,900.00	7,450.00	11,385.75	9,040.00	33.65	38.26	179.997	1,592.70	1,511.96	1,590.00	1,537.14	52.86	30.078	
10,000.00	7,450.00	11,485.75	9,040.00	34.11	38.67	179.998	1,692.69	1,510.93	1,590.00	1,535.84	54.16	29.357	
10,100.00	7,450.00	11,585.75	9,040.00	34.59	39.10	179.998	1,792.69	1,509.90	1,590.00	1,534.53	55.47	28.663	
10,200.00	7,450.00	11,685.75	9,040.00	35.08	39.54	179.998	1,892.68	1,508.87	1,590.00	1,533.20	56.80	27.994	
10,300.00	7,450.00	11,785.75	9,040.00	35.58	39.99	179.998	1,992.68	1,507.84	1,590.00	1,531.86	58.14	27.350	
10,400.00	7,450.00	11,885.75	9,040.00	36.10	40.45	179.998	2,092.67	1,506.81	1,590.00	1,530.52	59.48	26.730	
10,500.00	7,450.00	11,985.75	9,040.00	36.64	40.93	179.998	2,192.67	1,505.79	1,590.00	1,529.16	60.84	26.133	
10,600.00	7,450.00	12,085.75	9,040.00	37.18	41.42	179.998	2,292.66	1,504.76	1,590.00	1,527.79	62.21	25.558	
10,700.00	7,450.00	12,185.75	9,040.00	37.74	41.93	179.998	2,392.66	1,503.73	1,590.00	1,526.41	63.59	25.004	
10,800.00	7,450.00	12,285.75	9,040.00	38.31	42.44	179.998	2,492.65	1,502.70	1,590.00	1,525.02	64.98	24.471	
10,900.00	7,450.00	12,385.75	9,040.00	38.89	42.97	179.998	2,592.64	1,501.67	1,590.00	1,523.63	66.37	23.956	
11,000.00	7,450.00	12,485.75	9,040.00	39.48	43.50	179.998	2,692.64	1,500.64	1,590.00	1,522.23	67.77	23.461	
11,100.00	7,450.00	12,585.75	9,040.00	40.08	44.05	179.998	2,792.63	1,499.61	1,590.00	1,520.82	69.18	22.983	
11,200.00	7,450.00	12,685.75	9,040.00	40.69	44.61	179.999	2,892.63	1,498.58	1,590.00	1,519.40	70.60	22.522	
11,300.00	7,450.00	12,785.75	9,040.00	41.30	45.17	179.999	2,992.62	1,497.55	1,590.00	1,517.98	72.02	22.077	
11,400.00	7,450.00	12,885.75	9,040.00	41.93	45.75	179.999	3,092.62	1,496.52	1,590.00	1,516.55	73.45	21.647	
11,500.00	7,450.00	12,985.75	9,040.00	42.57	46.33	179.999	3,192.61	1,495.49	1,590.00	1,515.12	74.88	21.233	
11,600.00	7,450.00	13,085.75	9,040.00	43.21	46.92	179.999	3,292.61	1,494.46	1,590.00	1,513.68	76.32	20.832	
11,700.00	7,450.00	13,185.75	9,040.00	43.86	47.52	179.999	3,392.60	1,493.43	1,590.00	1,512.23	77.77	20.445	
11,800.00	7,450.00	13,285.75	9,040.00	44.51	48.13	179.999	3,492.60	1,492.40	1,590.00	1,510.78	79.22	20.071	
11,900.00	7,450.00	13,385.75	9,040.00	45.18	48.75	179.999	3,592.59	1,491.37	1,590.00	1,509.33	80.67	19.710	
12,000.00	7,450.00	13,485.75	9,040.00	45.85	49.37	179.999	3,692.59	1,490.34	1,590.00	1,507.87	82.13	19.360	
12,100.00	7,450.00	13,585.75	9,040.00	46.53	50.00	179.999	3,792.58	1,489.31	1,590.00	1,506.41	83.59	19.021	
12,200.00	7,450.00	13,685.75	9,040.00	47.21	50.63	179.999	3,892.58	1,488.28	1,590.00	1,504.94	85.06	18.693	
12,300.00	7,450.00	13,785.75	9,040.00	47.90	51.28	180.000	3,992.57	1,487.25	1,590.00	1,503.47	86.53	18.376	
12,400.00	7,450.00	13,885.75	9,040.00	48.59	51.93	180.000	4,092.57	1,486.22	1,590.00	1,502.00	88.00	18.068	
12,500.00	7,450.00	13,985.75	9,040.00	49.29	52.58	180.000	4,192.56	1,485.19	1,590.00	1,500.52	89.48	17.770	
12,600.00	7,450.00	14,085.75	9,040.00	49.99	53.24	180.000	4,292.55	1,484.16	1,590.00	1,499.04	90.96	17.481	
12,700.00	7,450.00	14,185.75	9,040.00	50.70	53.91	180.000	4,392.55	1,483.13	1,590.00	1,497.56	92.44	17.201	
12,800.00	7,450.00	14,285.75	9,040.00	51.42	54.58	180.000	4,492.54	1,482.10	1,590.00	1,496.08	93.92	16.929	
12,839.11	7,450.00	14,324.86	9,040.00	51.70	54.85	180.000	4,531.65	1,481.70	1,590.00	1,495.50	94.50	16.825	
12,839.67	7,450.00	14,325.42	9,040.00	51.70	54.85	180.000	4,532.21	1,481.69	1,590.00	1,495.49	94.51	16.823	
12,900.00	7,450.00	14,385.75	9,040.00	52.13	55.26	180.000	4,592.54	1,481.09	1,590.00	1,494.59	95.41	16.665	
13,000.00	7,450.00	14,485.75	9,040.00	52.85	55.94	180.000	4,692.53	1,480.08	1,590.00	1,493.10	96.90	16.409	
13,100.00	7,450.00	14,585.75	9,040.00	53.58	56.63	180.000	4,792.53	1,479.07	1,590.00	1,491.61	98.39	16.160	
13,200.00	7,450.00	14,685.75	9,040.00	54.31	57.32	180.000	4,892.52	1,478.06	1,590.00	1,490.11	99.89	15.918	
13,300.00	7,450.00	14,785.75	9,040.00	55.04	58.02	180.000	4,992.52	1,477.06	1,590.00	1,488.61	101.39	15.683	
13,400.00	7,450.00	14,885.75	9,040.00	55.78	58.72	180.000	5,092.51	1,476.05	1,590.00	1,487.11	102.89	15.454	
13,500.00	7,450.00	14,985.75	9,040.00	56.52	59.42	180.000	5,192.51	1,475.04	1,590.00	1,485.61	104.39	15.232	

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 302H
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 302H	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)	Semi Major Axis Offset (usft)	Highside Toolface (°)	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
13,600.00	7,450.00	15,085.75	9,040.00	57.27	60.13	180.000	5,292.50	1,474.03	1,590.00	1,484.11	105.89	15.015	
13,700.00	7,450.00	15,185.75	9,040.00	58.02	60.85	180.000	5,392.50	1,473.03	1,590.00	1,482.60	107.40	14.805	
13,800.00	7,450.00	15,285.75	9,040.00	58.77	61.56	180.000	5,492.49	1,472.02	1,590.00	1,481.10	108.90	14.600	
13,900.00	7,450.00	15,385.75	9,040.00	59.52	62.28	180.000	5,592.49	1,471.01	1,590.00	1,479.59	110.41	14.400	
14,000.00	7,450.00	15,485.75	9,040.00	60.28	63.01	180.000	5,692.48	1,470.00	1,590.00	1,478.08	111.92	14.206	
14,100.00	7,450.00	15,585.75	9,040.00	61.04	63.73	180.000	5,792.48	1,468.99	1,590.00	1,476.56	113.44	14.017	
14,200.00	7,450.00	15,685.75	9,040.00	61.80	64.46	180.000	5,892.47	1,467.99	1,590.00	1,475.05	114.95	13.832	
14,300.00	7,450.00	15,785.75	9,040.00	62.56	65.20	180.000	5,992.47	1,466.98	1,590.00	1,473.53	116.47	13.652	
14,400.00	7,450.00	15,885.75	9,040.00	63.33	65.93	180.000	6,092.46	1,465.97	1,590.00	1,472.02	117.98	13.477	
14,433.33	7,450.00	15,919.08	9,040.00	63.58	66.18	180.000	6,125.79	1,465.64	1,590.00	1,471.51	118.49	13.419	
14,500.00	7,450.00	15,985.75	9,040.00	64.10	66.67	180.000	6,192.46	1,464.96	1,590.00	1,470.50	119.50	13.305	
14,600.00	7,450.00	16,085.75	9,040.00	64.87	67.42	180.000	6,292.45	1,463.96	1,590.00	1,468.98	121.02	13.138	
14,700.00	7,450.00	16,185.75	9,040.00	65.64	68.16	180.000	6,392.45	1,462.95	1,590.00	1,467.46	122.54	12.975	
14,800.00	7,450.00	16,285.75	9,040.00	66.42	68.91	180.000	6,492.44	1,461.94	1,590.00	1,465.94	124.06	12.816	
14,900.00	7,450.00	16,385.75	9,040.00	67.20	69.66	180.000	6,592.44	1,460.93	1,590.00	1,464.41	125.59	12.661	
15,000.00	7,450.00	16,485.75	9,040.00	67.98	70.41	180.000	6,692.43	1,459.93	1,590.00	1,462.89	127.11	12.509	
15,100.00	7,450.00	16,585.75	9,040.00	68.76	71.17	180.000	6,792.43	1,458.92	1,590.00	1,461.37	128.63	12.361	
15,200.00	7,450.00	16,685.75	9,040.00	69.54	71.93	180.000	6,892.42	1,457.91	1,590.00	1,459.84	130.16	12.216	
15,300.00	7,450.00	16,785.75	9,040.00	70.33	72.69	180.000	6,992.42	1,456.90	1,590.00	1,458.31	131.69	12.074	
15,400.00	7,450.00	16,885.75	9,040.00	71.12	73.45	180.000	7,092.41	1,455.90	1,590.00	1,456.78	133.22	11.935	
15,500.00	7,450.00	16,985.75	9,040.00	71.90	74.22	180.000	7,192.41	1,454.89	1,590.00	1,455.25	134.75	11.800	
15,600.00	7,450.00	17,085.75	9,040.00	72.70	74.98	180.000	7,292.40	1,453.88	1,590.00	1,453.72	136.28	11.667	
15,700.00	7,450.00	17,185.75	9,040.00	73.49	75.75	180.000	7,392.40	1,452.87	1,590.00	1,452.19	137.81	11.538	
15,800.00	7,450.00	17,285.75	9,040.00	74.28	76.52	180.000	7,492.39	1,451.87	1,590.00	1,450.66	139.34	11.411	
15,900.00	7,450.00	17,385.75	9,040.00	75.08	77.30	180.000	7,592.39	1,450.86	1,590.00	1,449.13	140.87	11.287	
16,000.00	7,450.00	17,485.75	9,040.00	75.87	78.07	180.000	7,692.38	1,449.85	1,590.00	1,447.59	142.41	11.165	
16,100.00	7,450.00	17,585.75	9,040.00	76.67	78.85	180.000	7,792.38	1,448.84	1,590.00	1,446.06	143.94	11.046	
16,200.00	7,450.00	17,685.75	9,040.00	77.47	79.62	180.000	7,892.37	1,447.83	1,590.00	1,444.52	145.48	10.930	
16,300.00	7,450.00	17,785.75	9,040.00	78.27	80.40	180.000	7,992.37	1,446.83	1,590.00	1,442.99	147.01	10.816	
16,400.00	7,450.00	17,885.75	9,040.00	79.07	81.18	180.000	8,092.36	1,445.82	1,590.00	1,441.45	148.55	10.704	
16,500.00	7,450.00	17,985.75	9,040.00	79.88	81.97	180.000	8,192.36	1,444.81	1,590.00	1,439.92	150.09	10.594	
16,600.00	7,450.00	18,085.75	9,040.00	80.68	82.75	180.000	8,292.35	1,443.80	1,590.00	1,438.38	151.62	10.487	
16,700.00	7,450.00	18,185.75	9,040.00	81.49	83.54	180.000	8,392.35	1,442.80	1,590.00	1,436.84	153.16	10.381	
16,800.00	7,450.00	18,285.75	9,040.00	82.29	84.33	180.000	8,492.34	1,441.79	1,590.00	1,435.30	154.70	10.278	
16,900.00	7,450.00	18,385.75	9,040.00	83.10	85.11	180.000	8,592.34	1,440.78	1,590.00	1,433.76	156.24	10.177	
17,000.00	7,450.00	18,485.75	9,040.00	83.91	85.91	180.000	8,692.33	1,439.77	1,590.00	1,432.22	157.78	10.077	
17,100.00	7,450.00	18,585.75	9,040.00	84.72	86.70	180.000	8,792.33	1,438.77	1,590.00	1,430.68	159.32	9.980	
17,200.00	7,450.00	18,685.75	9,040.00	85.53	87.49	180.000	8,892.32	1,437.76	1,590.00	1,429.14	160.86	9.884	
17,300.00	7,450.00	18,785.75	9,040.00	86.34	88.28	180.000	8,992.32	1,436.75	1,590.00	1,427.59	162.41	9.790	
17,400.00	7,450.00	18,885.75	9,040.00	87.16	89.08	180.000	9,092.31	1,435.74	1,590.00	1,426.05	163.95	9.698	
17,433.13	7,450.00	18,918.88	9,040.00	87.42	89.34	180.000	9,125.44	1,435.41	1,590.00	1,425.54	164.46	9.668	
17,500.00	7,450.00	18,985.75	9,040.00	87.97	89.88	180.000	9,192.31	1,434.74	1,590.00	1,424.51	165.49	9.608	
17,600.00	7,450.00	19,085.75	9,040.00	88.78	90.67	180.000	9,292.30	1,433.73	1,590.00	1,422.97	167.03	9.519	
17,700.00	7,450.00	19,185.75	9,040.00	89.60	91.47	180.000	9,392.30	1,432.72	1,590.00	1,421.42	168.58	9.432	
17,800.00	7,450.00	19,285.75	9,040.00	90.42	92.27	180.000	9,492.29	1,431.71	1,590.00	1,419.88	170.12	9.346	
17,900.00	7,450.00	19,385.75	9,040.00	91.23	93.07	180.000	9,592.29	1,430.71	1,590.00	1,418.33	171.67	9.262	
18,000.00	7,450.00	19,485.75	9,040.00	92.05	93.88	180.000	9,692.28	1,429.70	1,590.00	1,416.79	173.21	9.179	
18,100.00	7,450.00	19,585.75	9,040.00	92.87	94.68	180.000	9,792.28	1,428.69	1,590.00	1,415.24	174.76	9.098	
18,197.24	7,450.00	19,682.99	9,040.00	93.67	95.46	180.000	9,889.51	1,427.71	1,590.00	1,413.74	176.26	9.021	
18,200.00	7,450.00	19,685.75	9,040.00	93.69	95.48	180.000	9,892.27	1,427.68	1,590.00	1,413.69	176.31	9.018	
18,229.54	7,450.00	19,715.29	9,040.00	93.93	95.72	180.000	9,921.81	1,427.20	1,590.00	1,413.24	176.76	8.995	
18,300.00	7,450.00	19,785.75	9,040.00	94.51	96.29	-180.000	9,992.25	1,425.69	1,590.00	1,412.15	177.85	8.940	

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 302H
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 302H	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)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Distance Between Centres (usft)	Minimum Separation (usft)	Separation Factor	Warning	
18,400.00	7,450.00	19,885.75	9,040.00	95.33	97.10	-179.999	10,092.23	1,423.55	1,590.00	1,410.60	179.40	8.863	
18,500.00	7,450.00	19,985.75	9,040.00	96.15	97.90	-179.999	10,192.20	1,421.40	1,590.00	1,409.05	180.95	8.787	
18,600.00	7,450.00	20,085.75	9,040.00	96.98	98.71	-179.999	10,292.18	1,419.26	1,590.00	1,407.51	182.49	8.713	
18,700.00	7,450.00	20,185.75	9,040.00	97.80	99.52	-179.998	10,392.16	1,417.11	1,590.00	1,405.96	184.04	8.639	
18,800.00	7,450.00	20,285.75	9,040.00	98.62	100.33	-179.998	10,492.13	1,414.96	1,590.00	1,404.41	185.59	8.567	
18,900.00	7,450.00	20,385.75	9,040.00	99.45	101.14	-179.998	10,592.11	1,412.82	1,590.00	1,402.86	187.14	8.496	
19,000.00	7,450.00	20,485.75	9,040.00	100.28	101.96	-179.997	10,692.09	1,410.67	1,590.00	1,401.31	188.69	8.427	
19,100.00	7,450.00	20,585.75	9,040.00	101.10	102.77	-179.997	10,792.07	1,408.53	1,590.00	1,399.76	190.24	8.358	
19,200.00	7,450.00	20,685.75	9,040.00	101.93	103.58	-179.996	10,892.04	1,406.38	1,590.00	1,398.21	191.79	8.290	
19,300.00	7,450.00	20,785.75	9,040.00	102.76	104.40	-179.996	10,992.02	1,404.24	1,590.00	1,396.66	193.34	8.224	
19,400.00	7,450.00	20,885.75	9,040.00	103.58	105.21	-179.996	11,092.00	1,402.09	1,590.00	1,395.11	194.89	8.158	
19,500.00	7,450.00	20,985.75	9,040.00	104.41	106.03	-179.995	11,191.97	1,399.95	1,590.00	1,393.56	196.44	8.094	
19,600.00	7,450.00	21,085.75	9,040.00	105.24	106.85	-179.995	11,291.95	1,397.81	1,590.00	1,392.01	197.99	8.031	
19,700.00	7,450.00	21,185.75	9,040.00	106.07	107.66	-179.995	11,391.93	1,395.68	1,590.00	1,390.46	199.54	7.968	
19,800.00	7,450.00	21,285.75	9,040.00	106.90	108.48	-179.995	11,491.91	1,393.55	1,590.00	1,388.90	201.10	7.907	
19,900.00	7,450.00	21,385.75	9,040.00	107.73	109.30	-179.996	11,591.88	1,391.42	1,590.00	1,387.35	202.65	7.846	
20,000.00	7,450.00	21,485.75	9,040.00	108.56	110.12	-179.996	11,691.86	1,389.29	1,590.00	1,385.80	204.20	7.786	
20,100.00	7,450.00	21,585.75	9,040.00	109.40	110.94	-179.996	11,791.84	1,387.15	1,590.00	1,384.25	205.75	7.728	
20,200.00	7,450.00	21,685.75	9,040.00	110.23	111.76	-179.996	11,891.81	1,385.02	1,590.00	1,382.69	207.31	7.670	
20,300.00	7,450.00	21,785.75	9,040.00	111.06	112.58	-179.996	11,991.79	1,382.89	1,590.00	1,381.14	208.86	7.613	
20,400.00	7,450.00	21,885.75	9,040.00	111.89	113.40	-179.996	12,091.77	1,380.76	1,590.00	1,379.59	210.41	7.557	
20,500.00	7,450.00	21,985.75	9,040.00	112.73	114.23	-179.996	12,191.75	1,378.63	1,590.00	1,378.03	211.97	7.501	
20,600.00	7,450.00	22,085.75	9,040.00	113.56	115.05	-179.996	12,291.72	1,376.50	1,590.00	1,376.48	213.52	7.447	
20,700.00	7,450.00	22,185.75	9,040.00	114.40	115.87	-179.997	12,391.70	1,374.37	1,590.00	1,374.93	215.07	7.393	
20,800.00	7,450.00	22,285.75	9,040.00	115.23	116.70	-179.997	12,491.68	1,372.23	1,590.00	1,373.37	216.63	7.340	
20,900.00	7,450.00	22,385.75	9,040.00	116.07	117.52	-179.997	12,591.66	1,370.10	1,590.00	1,371.82	218.18	7.288	
21,000.00	7,450.00	22,485.75	9,040.00	116.90	118.35	-179.997	12,691.63	1,367.97	1,590.00	1,370.26	219.74	7.236	
21,100.00	7,450.00	22,585.75	9,040.00	117.74	119.18	-179.997	12,791.61	1,365.84	1,590.00	1,368.71	221.29	7.185	
21,200.00	7,450.00	22,685.75	9,040.00	118.57	120.00	-179.997	12,891.59	1,363.71	1,590.00	1,367.15	222.85	7.135	
21,300.00	7,450.00	22,785.75	9,040.00	119.41	120.83	-179.997	12,991.56	1,361.58	1,590.00	1,365.60	224.40	7.086	
21,400.00	7,450.00	22,885.75	9,040.00	120.25	121.66	-179.997	13,091.54	1,359.44	1,590.00	1,364.04	225.96	7.037	
21,500.00	7,450.00	22,985.75	9,040.00	121.09	122.48	-179.998	13,191.52	1,357.31	1,590.00	1,362.49	227.51	6.989	
21,600.00	7,450.00	23,085.75	9,040.00	121.92	123.31	-179.998	13,291.50	1,355.18	1,590.00	1,360.93	229.07	6.941	
21,700.00	7,450.00	23,185.75	9,040.00	122.76	124.14	-179.998	13,391.47	1,353.05	1,590.00	1,359.38	230.62	6.894	
21,800.00	7,450.00	23,285.75	9,040.00	123.60	124.97	-179.998	13,491.45	1,350.92	1,590.00	1,357.82	232.18	6.848	
21,900.00	7,450.00	23,385.75	9,040.00	124.44	125.80	-179.998	13,591.43	1,348.79	1,590.00	1,356.26	233.74	6.803	
22,000.00	7,450.00	23,485.75	9,040.00	125.28	126.63	-179.998	13,691.41	1,346.66	1,590.00	1,354.71	235.29	6.758	
22,100.00	7,450.00	23,585.75	9,040.00	126.12	127.46	-179.998	13,791.38	1,344.52	1,590.00	1,353.15	236.85	6.713	
22,200.00	7,450.00	23,685.75	9,040.00	126.96	128.29	-179.998	13,891.36	1,342.39	1,590.00	1,351.59	238.41	6.669	
22,300.00	7,450.00	23,785.75	9,040.00	127.80	129.12	-179.999	13,991.34	1,340.26	1,590.00	1,350.04	239.96	6.626	
22,400.00	7,450.00	23,885.75	9,040.00	128.64	129.96	-179.999	14,091.31	1,338.13	1,590.00	1,348.48	241.52	6.583	
22,500.00	7,450.00	23,985.75	9,040.00	129.48	130.79	-179.999	14,191.29	1,336.00	1,590.00	1,346.92	243.08	6.541	
22,600.00	7,450.00	24,085.75	9,040.00	130.32	131.62	-179.999	14,291.27	1,333.87	1,590.00	1,345.37	244.64	6.499	
22,700.00	7,450.00	24,185.75	9,040.00	131.16	132.45	-179.999	14,391.25	1,331.74	1,590.00	1,343.81	246.19	6.458	
22,800.00	7,450.00	24,285.75	9,040.00	132.00	133.29	-179.999	14,491.22	1,329.60	1,590.00	1,342.25	247.75	6.418	
22,900.00	7,450.00	24,385.75	9,040.00	132.84	134.12	-179.999	14,591.20	1,327.47	1,590.00	1,340.69	249.31	6.378	
23,000.00	7,450.00	24,485.75	9,040.00	133.69	134.96	-179.999	14,691.18	1,325.34	1,590.00	1,339.13	250.87	6.338	
23,100.00	7,450.00	24,585.75	9,040.00	134.53	135.79	-180.000	14,791.16	1,323.21	1,590.00	1,337.58	252.42	6.299	
23,200.00	7,450.00	24,685.75	9,040.00	135.37	136.62	-180.000	14,891.13	1,321.08	1,590.00	1,336.02	253.98	6.260	
23,300.00	7,450.00	24,785.75	9,040.00	136.21	137.46	-180.000	14,991.11	1,318.95	1,590.00	1,334.46	255.54	6.222	
23,400.00	7,450.00	24,885.75	9,040.00	137.06	138.30	-180.000	15,091.09	1,316.81	1,590.00	1,332.90	257.10	6.184	
23,455.58	7,450.00	24,941.32	9,040.00	137.52	138.76	180.000	15,146.65	1,315.63	1,590.00	1,332.03	257.97	6.164	

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 302H
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 302H	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 302H
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 302H	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: Salt Draw 2 Fee (Offsets NAD27) - Willow Lake 35 MD Federal Com 1H - Wellbore #1 - Surveys												Offset Site Error:	0.00 usft
Survey Program: 100-, 7684-												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)	Highside Toolface (°)	Offset Wellbore Centre		Distance Between Centres (usft)		Minimum Separation (usft)	Separation Factor	Warning
							+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)			
0.00	0.00	0.00	13.50	0.00	0.00	102.595	-499.04	2,233.43	2,288.54				
100.00	100.00	76.61	90.11	0.14	0.10	102.594	-499.04	2,233.59	2,288.68	2,288.45	0.23	9,771.534	
200.00	200.00	173.00	186.50	0.50	0.38	102.593	-499.11	2,234.13	2,289.24	2,288.36	0.88	2,607.219	
300.00	300.00	257.66	271.16	0.85	0.68	102.593	-499.26	2,234.81	2,290.08	2,288.55	1.53	1,493.213	
400.00	400.00	333.29	346.77	1.21	0.95	102.587	-499.29	2,236.15	2,291.83	2,289.67	2.16	1,061.886	
500.00	500.00	400.00	413.45	1.57	1.19	102.581	-499.50	2,238.08	2,294.78	2,292.03	2.75	834.015	
600.00	600.00	488.65	502.04	1.93	1.52	102.584	-500.34	2,241.41	2,298.67	2,295.25	3.42	671.990	
700.00	700.00	588.70	602.00	2.29	1.88	102.598	-501.86	2,245.49	2,302.97	2,298.84	4.13	557.583	
800.00	800.00	714.23	727.43	2.65	2.33	102.612	-503.41	2,249.87	2,306.64	2,301.71	4.93	467.897	
900.00	900.00	814.14	827.30	3.00	2.68	102.625	-504.61	2,252.87	2,309.83	2,304.19	5.64	409.624	
1,000.00	1,000.00	938.10	951.20	3.36	3.11	102.656	-506.59	2,255.90	2,312.60	2,306.16	6.43	359.479	
1,100.00	1,100.00	1,074.89	1,087.96	3.72	3.58	102.707	-508.95	2,257.11	2,313.81	2,306.54	7.27	318.235	
1,200.00	1,200.00	1,231.07	1,244.13	4.08	4.12	102.734	-509.75	2,255.61	2,312.91	2,304.74	8.17	283.187	
1,300.00	1,300.00	1,333.47	1,346.51	4.44	4.48	102.735	-509.34	2,253.64	2,310.95	2,302.07	8.88	260.280	
1,400.00	1,400.00	1,431.34	1,444.36	4.80	4.82	102.737	-508.96	2,251.69	2,308.92	2,299.34	9.58	241.123	
1,500.00	1,500.00	1,519.61	1,532.62	5.16	5.12	102.742	-508.83	2,250.20	2,307.24	2,297.00	10.24	225.296	
1,600.00	1,599.98	1,606.53	1,619.52	5.50	5.42	-14.453	-508.86	2,249.19	2,304.43	2,293.54	10.89	211.630	
1,700.00	1,699.84	1,700.00	1,713.00	5.84	5.75	-14.509	-508.88	2,248.55	2,298.70	2,287.15	11.55	199.030	
1,800.00	1,799.45	1,786.18	1,799.17	6.18	6.05	-14.596	-508.99	2,248.33	2,290.03	2,277.84	12.19	187.893	
1,900.00	1,898.70	1,851.72	1,864.71	6.52	6.27	-14.698	-509.28	2,248.69	2,278.90	2,266.14	12.76	178.649	
2,000.00	1,997.47	1,900.00	1,912.98	6.86	6.44	-14.808	-509.62	2,249.67	2,266.12	2,252.86	13.26	170.869	
2,100.00	2,095.62	1,967.20	1,980.12	7.21	6.68	-14.961	-510.39	2,252.23	2,251.73	2,237.89	13.84	162.734	
2,200.00	2,193.06	2,000.00	2,012.87	7.57	6.80	-15.087	-510.91	2,254.03	2,236.16	2,221.88	14.28	156.578	
2,300.00	2,289.64	2,091.37	2,103.99	7.93	7.15	-15.329	-512.75	2,260.48	2,218.36	2,203.41	14.95	148.375	
2,400.00	2,385.27	2,156.15	2,168.50	8.29	7.41	-15.558	-514.34	2,266.17	2,198.98	2,183.46	15.52	141.684	
2,500.00	2,479.82	2,230.01	2,241.94	8.67	7.70	-15.837	-516.46	2,273.71	2,177.73	2,161.60	16.13	135.027	
2,600.00	2,573.17	2,325.68	2,337.03	9.05	8.06	-16.205	-519.62	2,283.80	2,153.69	2,136.87	16.83	127.984	
2,624.87	2,596.19	2,351.65	2,362.84	9.14	8.16	-16.309	-520.53	2,286.51	2,147.20	2,130.19	17.01	126.208	
2,700.00	2,665.60	2,472.17	2,482.73	9.44	8.61	-16.629	-524.56	2,298.12	2,126.88	2,109.15	17.73	119.974	
2,800.00	2,757.99	2,635.25	2,645.43	9.84	9.19	-17.104	-528.10	2,308.60	2,096.23	2,077.55	18.67	112.252	
2,900.00	2,850.38	2,741.49	2,751.53	10.24	9.56	-17.416	-530.41	2,313.53	2,064.13	2,044.72	19.42	106.311	
3,000.00	2,942.77	2,839.59	2,849.52	10.66	9.90	-17.729	-532.01	2,317.97	2,031.90	2,011.76	20.13	100.917	
3,100.00	3,035.16	2,939.57	2,949.40	11.07	10.25	-18.068	-533.29	2,322.18	1,999.36	1,978.50	20.86	95.834	
3,200.00	3,127.55	3,033.91	3,043.64	11.49	10.57	-18.400	-534.44	2,326.09	1,966.81	1,945.24	21.58	91.152	
3,300.00	3,219.94	3,129.23	3,138.89	11.92	10.90	-18.748	-535.53	2,329.99	1,934.26	1,911.96	22.30	86.743	
3,400.00	3,312.33	3,224.45	3,234.02	12.35	11.24	-19.109	-536.58	2,333.84	1,901.73	1,878.70	23.02	82.600	
3,500.00	3,404.72	3,322.90	3,332.39	12.78	11.58	-19.495	-537.62	2,337.68	1,869.12	1,845.36	23.76	78.665	
3,600.00	3,497.11	3,429.98	3,439.40	13.21	11.95	-19.932	-538.71	2,341.40	1,836.21	1,811.69	24.52	74.877	
3,700.00	3,589.50	3,541.81	3,551.19	13.65	12.33	-20.406	-539.70	2,344.09	1,802.32	1,777.02	25.30	71.248	
3,800.00	3,681.89	3,638.03	3,647.40	14.09	12.66	-20.838	-540.27	2,345.96	1,768.07	1,742.04	26.03	67.921	
3,900.00	3,774.28	3,731.26	3,740.61	14.53	12.99	-21.283	-540.56	2,347.76	1,733.86	1,707.10	26.76	64.789	
4,000.00	3,866.67	3,826.43	3,835.76	14.98	13.31	-21.774	-540.32	2,349.62	1,699.72	1,672.22	27.50	61.810	
4,100.00	3,959.05	3,925.18	3,934.49	15.43	13.65	-22.323	-539.54	2,351.34	1,665.43	1,637.19	28.25	58.962	
4,200.00	4,051.44	4,021.67	4,030.97	15.87	13.99	-22.886	-538.65	2,352.74	1,630.99	1,602.01	28.99	56.261	
4,300.00	4,143.83	4,115.99	4,125.27	16.32	14.31	-23.456	-537.88	2,353.97	1,596.56	1,566.83	29.73	53.699	
4,400.00	4,236.22	4,211.41	4,220.68	16.77	14.64	-24.040	-537.56	2,355.02	1,562.13	1,531.65	30.48	51.256	
4,500.00	4,328.61	4,304.42	4,313.69	17.23	14.96	-24.621	-537.59	2,355.94	1,527.76	1,496.54	31.22	48.933	
4,600.00	4,421.00	4,396.94	4,406.21	17.68	15.28	-25.220	-537.71	2,356.84	1,493.53	1,461.56	31.97	46.720	
4,700.00	4,513.39	4,488.59	4,497.85	18.13	15.60	-25.840	-537.86	2,357.77	1,459.50	1,426.79	32.72	44.612	
4,800.00	4,605.78	4,581.37	4,590.62	18.59	15.92	-26.493	-538.10	2,358.76	1,425.68	1,392.21	33.47	42.599	
4,900.00	4,698.17	4,677.16	4,686.41	19.05	16.25	-27.190	-538.56	2,359.67	1,391.94	1,357.72	34.22	40.671	
5,000.00	4,790.56	4,770.28	4,779.53	19.50	16.57	-27.882	-539.43	2,360.40	1,358.24	1,323.26	34.98	38.828	

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 302H
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 302H	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: Salt Draw 2 Fee (Offsets NAD27) - Willow Lake 35 MD Federal Com 1H - Wellbore #1 - Surveys													Offset Site Error:
Survey Program: 100-, 7684-													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)	Highside Toolface (°)	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
5,100.00	4,882.95	4,861.72	4,870.94	19.96	16.89	-28.563	-540.96	2,361.16	1,324.77	1,289.03	35.74	37.068	
5,200.00	4,975.34	4,955.20	4,964.41	20.42	17.21	-29.293	-542.59	2,362.01	1,291.56	1,255.06	36.50	35.385	
5,300.00	5,067.73	5,049.81	5,059.00	20.88	17.54	-30.068	-544.26	2,362.75	1,258.44	1,221.17	37.27	33.770	
5,400.00	5,160.12	5,143.83	5,153.01	21.34	17.87	-30.885	-545.80	2,363.39	1,225.43	1,187.40	38.03	32.220	
5,500.00	5,252.51	5,237.51	5,246.67	21.80	18.19	-31.749	-547.22	2,363.94	1,192.58	1,153.78	38.80	30.734	
5,600.00	5,344.90	5,330.30	5,339.45	22.26	18.51	-32.651	-548.63	2,364.45	1,159.96	1,120.38	39.58	29.309	
5,700.00	5,437.29	5,423.02	5,432.16	22.73	18.83	-33.601	-550.08	2,365.00	1,127.66	1,087.31	40.36	27.943	
5,800.00	5,529.68	5,518.06	5,527.19	23.19	19.16	-34.630	-551.56	2,365.44	1,095.54	1,054.41	41.14	26.633	
5,900.00	5,622.07	5,610.96	5,620.07	23.65	19.49	-35.692	-553.07	2,365.79	1,063.67	1,021.75	41.92	25.373	
5,999.30	5,713.81	5,702.99	5,712.09	24.11	19.81	-36.805	-554.58	2,366.14	1,032.39	989.68	42.71	24.175	
6,000.00	5,714.46	5,703.67	5,712.77	24.11	19.81	-36.810	-554.60	2,366.15	1,032.17	989.46	42.71	24.166	
6,100.00	5,807.51	5,801.30	5,810.39	24.57	20.15	-37.608	-556.31	2,366.33	1,002.20	958.70	43.50	23.042	
6,200.00	5,901.78	5,896.84	5,905.90	25.01	20.48	-38.326	-558.27	2,366.30	974.98	930.70	44.28	22.020	
6,300.00	5,997.15	5,993.21	6,002.25	25.44	20.82	-38.991	-560.49	2,366.23	950.62	905.57	45.05	21.100	
6,400.00	6,093.52	6,089.56	6,098.58	25.85	21.15	-39.592	-562.77	2,366.14	929.12	883.30	45.82	20.276	
6,500.00	6,190.76	6,188.51	6,197.49	26.25	21.49	-40.134	-565.25	2,366.02	910.39	863.81	46.58	19.546	
6,600.00	6,288.75	6,288.16	6,297.11	26.63	21.84	-40.592	-567.83	2,365.74	894.26	846.94	47.32	18.899	
6,700.00	6,387.38	6,386.85	6,395.77	27.00	22.19	-40.980	-569.93	2,365.26	880.76	832.71	48.05	18.330	
6,800.00	6,486.52	6,492.53	6,501.44	27.35	22.55	-41.405	-570.62	2,364.03	869.64	820.89	48.75	17.838	
6,900.00	6,586.06	6,594.52	6,603.39	27.69	22.91	-41.830	-569.41	2,361.73	860.59	811.14	49.45	17.403	
7,000.00	6,685.87	6,696.47	6,705.29	28.02	23.26	-42.203	-567.30	2,358.92	853.93	803.80	50.14	17.032	
7,100.00	6,785.83	6,806.70	6,815.40	28.33	23.64	-42.534	-564.31	2,354.83	849.14	798.36	50.78	16.722	
7,124.17	6,810.00	6,832.63	6,841.29	28.40	23.73	74.575	-563.47	2,353.63	848.20	797.27	50.93	16.654	
7,191.21	6,877.04	6,904.15	6,912.67	28.60	23.98	74.354	-561.09	2,350.03	845.54	794.19	51.35	16.466	
7,200.00	6,885.83	6,912.77	6,921.28	28.62	24.01	74.965	-560.80	2,349.57	845.15	793.74	51.41	16.440	
7,250.00	6,935.73	6,961.82	6,970.24	28.77	24.19	75.281	-559.25	2,347.02	842.32	790.59	51.73	16.284	
7,300.00	6,985.18	7,010.95	7,019.28	28.90	24.36	75.995	-557.81	2,344.56	838.44	786.42	52.02	16.117	
7,350.00	7,033.80	7,060.73	7,068.98	29.04	24.53	77.109	-556.41	2,342.05	833.56	781.27	52.29	15.941	
7,400.00	7,081.24	7,108.53	7,116.70	29.16	24.70	78.569	-555.09	2,339.60	827.82	775.28	52.54	15.756	
7,450.00	7,127.12	7,151.28	7,159.39	29.28	24.85	80.252	-554.05	2,337.56	821.65	768.86	52.78	15.567	
7,500.00	7,171.10	7,192.19	7,200.26	29.39	24.99	82.156	-553.25	2,335.82	815.42	762.43	52.99	15.387	
7,550.00	7,212.84	7,233.06	7,241.09	29.48	25.13	84.284	-552.61	2,334.25	809.46	756.29	53.17	15.224	
7,600.00	7,252.02	7,271.88	7,279.88	29.57	25.27	86.497	-552.08	2,332.81	804.10	750.78	53.32	15.082	
7,650.00	7,288.35	7,308.12	7,316.09	29.65	25.40	88.686	-551.66	2,331.51	799.77	746.34	53.43	14.968	
7,700.00	7,321.55	7,342.23	7,350.18	29.71	25.51	90.785	-551.29	2,330.29	796.89	743.38	53.51	14.892	
7,747.88	7,350.17	7,371.70	7,379.63	29.77	25.62	92.569	-550.97	2,329.21	795.90	742.34	53.57	14.858 CC, ES	
7,750.00	7,351.37	7,372.93	7,380.86	29.77	25.62	92.641	-550.96	2,329.16	795.91	742.34	53.57	14.858	
7,800.00	7,377.57	7,400.00	7,407.90	29.81	25.72	94.156	-550.66	2,328.16	797.22	743.62	53.60	14.873	
7,850.00	7,399.97	7,423.40	7,431.29	29.85	25.80	95.254	-550.39	2,327.28	801.18	747.56	53.62	14.943	
7,900.00	7,418.39	7,442.92	7,450.79	29.87	25.87	95.858	-550.13	2,326.54	808.05	754.44	53.62	15.071	
7,950.00	7,432.69	7,458.37	7,466.23	29.89	25.92	95.905	-549.90	2,325.95	817.99	764.39	53.61	15.260	
8,000.00	7,442.76	7,469.58	7,477.43	29.89	25.96	95.346	-549.72	2,325.51	831.04	777.45	53.59	15.508	
8,050.00	7,448.52	7,476.43	7,484.28	29.89	25.98	94.141	-549.61	2,325.25	847.13	793.56	53.57	15.813	
8,091.21	7,450.00	7,478.72	7,486.56	29.88	25.99	92.646	-549.57	2,325.16	862.54	808.98	53.56	16.105	
8,100.00	7,450.00	7,478.88	7,486.72	29.88	25.99	92.658	-549.56	2,325.15	866.06	812.50	53.55	16.171	
8,200.00	7,450.00	7,480.72	7,488.56	29.86	26.00	92.791	-549.53	2,325.08	911.14	857.57	53.57	17.008	
8,300.00	7,450.00	7,482.59	7,490.42	29.85	26.00	92.926	-549.50	2,325.01	964.52	910.86	53.65	17.977	
8,400.00	7,450.00	7,484.49	7,492.32	29.86	26.01	93.063	-549.47	2,324.94	1,024.89	971.11	53.78	19.058	
8,500.00	7,450.00	7,486.42	7,494.25	29.88	26.02	93.203	-549.43	2,324.86	1,091.10	1,037.18	53.92	20.235	
8,600.00	7,450.00	8,869.28	8,311.60	29.93	29.97	139.418	288.45	2,263.36	1,134.52	1,094.61	39.90	28.430	
8,700.00	7,450.00	8,967.20	8,312.24	30.01	30.74	139.377	386.36	2,263.98	1,136.10	1,095.41	40.69	27.920	
8,800.00	7,450.00	9,072.56	8,312.59	30.12	31.64	139.354	491.73	2,263.79	1,136.90	1,095.27	41.64	27.306	

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 302H
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 302H	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: Salt Draw 2 Fee (Offsets NAD27) - Willow Lake 35 MD Federal Com 1H - Wellbore #1 - Surveys													Offset Site Error:	0.00 usft	
Survey Program: 100-, 7684-		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)	Highside Toolface (°)	+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning		
8,811.02	7,450.00	9,083.41	8,312.69	30.14	31.73	139.356	502.57	2,263.69	1,136.99	1,095.26	41.73	27.245			
8,811.41	7,450.00	9,083.80	8,312.69	30.14	31.74	139.356	502.96	2,263.69	1,136.99	1,095.26	41.74	27.243			
8,900.00	7,450.00	9,183.77	8,313.34	30.27	32.66	139.384	602.92	2,262.49	1,137.34	1,094.63	42.71	26.629			
9,000.00	7,450.00	9,298.76	8,313.81	30.47	33.80	139.481	717.85	2,259.18	1,136.44	1,092.56	43.89	25.894			
9,100.00	7,450.00	9,387.00	8,314.72	30.71	34.72	139.581	806.04	2,256.44	1,135.82	1,091.03	44.79	25.358			
9,200.00	7,450.00	9,515.28	8,313.01	30.99	36.12	139.583	934.27	2,253.63	1,134.05	1,087.69	46.35	24.465			
9,300.00	7,450.00	9,622.11	8,310.02	31.29	37.34	139.553	1,041.02	2,250.76	1,130.85	1,083.15	47.70	23.707			
9,400.00	7,450.00	9,720.57	8,307.20	31.63	38.51	139.556	1,139.38	2,247.26	1,127.03	1,078.07	48.97	23.017			
9,500.00	7,450.00	9,809.27	8,305.77	31.99	39.58	139.599	1,228.01	2,244.02	1,124.09	1,073.98	50.11	22.431			
9,600.00	7,450.00	9,912.55	8,304.23	32.37	40.87	139.620	1,331.23	2,241.10	1,121.80	1,070.27	51.53	21.768			
9,700.00	7,450.00	10,012.36	8,302.32	32.78	42.14	139.656	1,430.96	2,237.55	1,118.71	1,065.78	52.94	21.133			
9,800.00	7,450.00	10,109.55	8,300.98	33.21	43.40	139.694	1,528.09	2,234.44	1,116.25	1,061.91	54.34	20.543			
9,900.00	7,450.00	10,198.64	8,300.45	33.65	44.58	139.774	1,617.11	2,231.03	1,114.01	1,058.38	55.63	20.027			
10,000.00	7,450.00	10,286.17	8,301.98	34.11	45.75	139.940	1,704.55	2,227.21	1,113.18	1,056.30	56.88	19.572			
10,052.25	7,450.00	10,334.00	8,303.57	34.36	46.40	140.074	1,752.28	2,224.65	1,113.05	1,055.50	57.55	19.341			
10,100.00	7,450.00	10,369.96	8,305.01	34.59	46.89	140.179	1,788.17	2,222.83	1,113.29	1,055.23	58.05	19.176			
10,200.00	7,450.00	10,449.14	8,308.53	35.08	47.97	140.352	1,867.23	2,220.55	1,115.48	1,056.26	59.22	18.837			
10,300.00	7,450.00	10,560.77	8,311.77	35.58	49.52	140.424	1,978.80	2,220.28	1,118.26	1,057.29	60.97	18.342			
10,400.00	7,450.00	10,673.92	8,310.94	36.10	51.09	140.297	2,091.94	2,221.63	1,119.05	1,056.17	62.87	17.799			
10,500.00	7,450.00	10,759.33	8,309.71	36.64	52.29	140.137	2,177.31	2,223.81	1,120.26	1,055.88	64.38	17.400			
10,600.00	7,450.00	10,877.73	8,310.46	37.18	53.98	140.042	2,295.69	2,225.65	1,122.57	1,056.16	66.40	16.905			
10,700.00	7,450.00	11,000.61	8,309.53	37.74	55.75	140.038	2,418.54	2,223.71	1,121.56	1,053.10	68.46	16.382			
10,800.00	7,450.00	11,100.89	8,308.30	38.31	57.22	140.040	2,518.80	2,221.60	1,119.94	1,049.76	70.18	15.958			
10,900.00	7,450.00	11,205.66	8,307.13	38.89	58.76	140.075	2,623.52	2,218.65	1,117.93	1,045.96	71.97	15.533			
11,000.00	7,450.00	11,300.90	8,305.92	39.48	60.17	140.076	2,718.73	2,216.64	1,116.25	1,042.60	73.64	15.157			
11,100.00	7,450.00	11,415.58	8,304.84	40.08	61.88	140.183	2,833.30	2,211.86	1,113.45	1,037.88	75.57	14.734			
11,200.00	7,450.00	11,508.27	8,304.90	40.69	63.28	140.335	2,925.87	2,207.10	1,110.86	1,033.72	77.14	14.401			
11,300.00	7,450.00	11,603.06	8,304.57	41.30	64.71	140.437	3,020.57	2,203.28	1,108.68	1,029.91	78.78	14.073			
11,400.00	7,450.00	11,690.55	8,304.09	41.93	66.03	140.476	3,108.04	2,201.02	1,107.29	1,026.94	80.35	13.780			
11,444.13	7,450.00	11,726.50	8,303.85	42.21	66.58	140.464	3,143.98	2,200.75	1,107.13	1,026.10	81.02	13.664			
11,500.00	7,450.00	11,778.18	8,303.41	42.57	67.36	140.416	3,195.66	2,201.07	1,107.34	1,025.34	82.00	13.505			
11,600.00	7,450.00	11,893.57	8,302.08	43.21	69.11	140.335	3,311.04	2,200.82	1,106.97	1,022.85	84.12	13.160			
11,700.00	7,450.00	12,000.16	8,300.60	43.86	70.74	140.308	3,417.61	2,199.15	1,105.54	1,019.48	86.07	12.845			
11,800.00	7,450.00	12,093.76	8,299.35	44.51	72.18	140.294	3,511.19	2,197.52	1,104.07	1,016.26	87.81	12.573			
11,893.03	7,450.00	12,175.45	8,299.28	45.13	73.44	140.314	3,592.86	2,196.12	1,103.60	1,014.27	89.33	12.354			
11,900.00	7,450.00	12,181.59	8,299.31	45.18	73.53	140.316	3,599.00	2,196.02	1,103.60	1,014.16	89.45	12.338			
12,000.00	7,450.00	12,278.14	8,300.32	45.85	75.02	140.370	3,695.53	2,194.51	1,104.06	1,012.85	91.20	12.105			
12,100.00	7,450.00	12,398.57	8,301.75	46.53	76.89	140.511	3,815.90	2,190.93	1,103.77	1,010.48	93.29	11.832			
12,200.00	7,450.00	12,500.46	8,302.76	47.21	78.48	140.709	3,917.65	2,185.79	1,101.99	1,006.95	95.04	11.595			
12,300.00	7,450.00	12,601.18	8,303.77	47.90	80.06	140.896	4,018.25	2,180.95	1,100.38	1,003.60	96.78	11.370			
12,400.00	7,450.00	12,712.28	8,304.86	48.59	81.81	141.139	4,129.17	2,174.69	1,098.24	999.60	98.64	11.134			
12,500.00	7,450.00	12,790.00	8,305.40	49.29	83.03	141.318	4,206.74	2,169.95	1,095.82	995.79	100.03	10.955			
12,507.15	7,450.00	12,790.00	8,305.40	49.34	83.03	141.318	4,206.74	2,169.95	1,095.79	995.75	100.04	10.953 SF			
12,600.00	7,450.00	12,790.00	8,305.40	49.99	83.03	141.318	4,206.74	2,169.95	1,099.72	999.70	100.02	10.995			
12,700.00	7,450.00	12,790.00	8,305.40	50.70	83.03	141.318	4,206.74	2,169.95	1,112.63	1,013.15	99.49	11.184			
12,800.00	7,450.00	12,790.00	8,305.40	51.42	83.03	141.318	4,206.74	2,169.95	1,134.25	1,035.76	98.49	11.516			
12,839.11	7,450.00	12,790.00	8,305.40	51.70	83.03	141.318	4,206.74	2,169.95	1,144.97	1,046.98	97.99	11.684			
12,839.67	7,450.00	12,790.00	8,305.40	51.70	83.03	141.315	4,206.74	2,169.95	1,145.13	1,047.15	97.98	11.687			
12,900.00	7,450.00	12,790.00	8,305.40	52.13	83.03	141.315	4,206.74	2,169.95	1,164.08	1,066.97	97.11	11.988			
13,000.00	7,450.00	12,790.00	8,305.40	52.85	83.03	141.315	4,206.74	2,169.95	1,201.51	1,106.08	95.43	12.590			
13,100.00	7,450.00	12,790.00	8,305.40	53.58	83.03	141.315	4,206.74	2,169.95	1,245.86	1,152.30	93.56	13.316			
13,200.00	7,450.00	12,790.00	8,305.40	54.31	83.03	141.315	4,206.74	2,169.95	1,296.42	1,204.84	91.58	14.156			

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 302H
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 302H	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: Salt Draw 2 Fee (Offsets NAD27) - Willow Lake 35 MD Federal Com 1H - Wellbore #1 - Surveys													Offset Site Error:
													0.00 usft
Survey Program:	Reference	Offset	Semi Major Axis	Highside	Offset Wellbore Centre	Distance	Rule Assigned:	Offset Well Error:					
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Reference	Toolface (°)	+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	0.00 usft	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning	
13,300.00	7,450.00	12,790.00	8,305.40	55.04	83.03	141.315	4,206.74	2,169.95	1,352.50	1,262.93	89.57	15.099	
13,400.00	7,450.00	12,790.00	8,305.40	55.78	83.03	141.315	4,206.74	2,169.95	1,413.43	1,325.84	87.59	16.137	
13,500.00	7,450.00	12,790.00	8,305.40	56.52	83.03	141.315	4,206.74	2,169.95	1,478.63	1,392.95	85.67	17.259	
13,600.00	7,450.00	12,790.00	8,305.40	57.27	83.03	141.315	4,206.74	2,169.95	1,547.54	1,463.69	83.85	18.455	
13,700.00	7,450.00	12,790.00	8,305.40	58.02	83.03	141.315	4,206.74	2,169.95	1,619.70	1,537.56	82.14	19.718	
13,800.00	7,450.00	12,790.00	8,305.40	58.77	83.03	141.315	4,206.74	2,169.95	1,694.69	1,614.14	80.55	21.039	
13,900.00	7,450.00	12,790.00	8,305.40	59.52	83.03	141.315	4,206.74	2,169.95	1,772.15	1,693.07	79.08	22.410	
14,000.00	7,450.00	12,790.00	8,305.40	60.28	83.03	141.315	4,206.74	2,169.95	1,851.77	1,774.05	77.72	23.825	
14,100.00	7,450.00	12,790.00	8,305.40	61.04	83.03	141.315	4,206.74	2,169.95	1,933.29	1,856.81	76.48	25.278	
14,200.00	7,450.00	12,790.00	8,305.40	61.80	83.03	141.315	4,206.74	2,169.95	2,016.47	1,941.12	75.35	26.763	
14,300.00	7,450.00	12,790.00	8,305.40	62.56	83.03	141.315	4,206.74	2,169.95	2,101.12	2,026.81	74.31	28.275	
14,400.00	7,450.00	12,790.00	8,305.40	63.33	83.03	141.315	4,206.74	2,169.95	2,187.06	2,113.69	73.37	29.810	
14,500.00	7,450.00	12,790.00	8,305.40	64.10	83.03	141.315	4,206.74	2,169.95	2,274.15	2,201.65	72.51	31.365	
14,600.00	7,450.00	12,790.00	8,305.40	64.87	83.03	141.315	4,206.74	2,169.95	2,362.27	2,290.55	71.72	32.936	
14,700.00	7,450.00	12,790.00	8,305.40	65.64	83.03	141.315	4,206.74	2,169.95	2,451.30	2,380.29	71.01	34.521	
14,800.00	7,450.00	12,790.00	8,305.40	66.42	83.03	141.315	4,206.74	2,169.95	2,541.14	2,470.78	70.36	36.116	
14,900.00	7,450.00	12,790.00	8,305.40	67.20	83.03	141.315	4,206.74	2,169.95	2,631.72	2,561.95	69.77	37.721	
15,000.00	7,450.00	12,790.00	8,305.40	67.98	83.03	141.315	4,206.74	2,169.95	2,722.96	2,653.73	69.23	39.332	
15,100.00	7,450.00	12,790.00	8,305.40	68.76	83.03	141.315	4,206.74	2,169.95	2,814.79	2,746.05	68.74	40.949	
15,200.00	7,450.00	12,790.00	8,305.40	69.54	83.03	141.315	4,206.74	2,169.95	2,907.16	2,838.87	68.29	42.569	
15,300.00	7,450.00	12,790.00	8,305.40	70.33	83.03	141.315	4,206.74	2,169.95	3,000.02	2,932.14	67.88	44.193	
15,400.00	7,450.00	12,790.00	8,305.40	71.12	83.03	141.315	4,206.74	2,169.95	3,093.33	3,025.81	67.51	45.819	
15,500.00	7,450.00	12,790.00	8,305.40	71.90	83.03	141.315	4,206.74	2,169.95	3,187.04	3,119.87	67.17	47.445	
15,600.00	7,450.00	12,790.00	8,305.40	72.70	83.03	141.315	4,206.74	2,169.95	3,281.12	3,214.26	66.86	49.072	
15,700.00	7,450.00	12,790.00	8,305.40	73.49	83.03	141.315	4,206.74	2,169.95	3,375.54	3,308.96	66.58	50.698	
15,800.00	7,450.00	12,790.00	8,305.40	74.28	83.03	141.315	4,206.74	2,169.95	3,470.28	3,403.96	66.32	52.323	
15,900.00	7,450.00	12,790.00	8,305.40	75.08	83.03	141.315	4,206.74	2,169.95	3,565.30	3,499.21	66.09	53.946	
16,000.00	7,450.00	12,790.00	8,305.40	75.87	83.03	141.315	4,206.74	2,169.95	3,660.59	3,594.72	65.88	55.568	
16,100.00	7,450.00	12,790.00	8,305.40	76.67	83.03	141.315	4,206.74	2,169.95	3,756.13	3,690.44	65.68	57.187	
16,200.00	7,450.00	12,790.00	8,305.40	77.47	83.03	141.315	4,206.74	2,169.95	3,851.89	3,786.38	65.50	58.803	
16,300.00	7,450.00	12,790.00	8,305.40	78.27	83.03	141.315	4,206.74	2,169.95	3,947.86	3,882.51	65.34	60.416	
16,400.00	7,450.00	12,790.00	8,305.40	79.07	83.03	141.315	4,206.74	2,169.95	4,044.02	3,978.82	65.20	62.026	
16,500.00	7,450.00	12,790.00	8,305.40	79.88	83.03	141.315	4,206.74	2,169.95	4,140.37	4,075.30	65.07	63.633	
16,600.00	7,450.00	12,790.00	8,305.40	80.68	83.03	141.315	4,206.74	2,169.95	4,236.89	4,171.94	64.95	65.236	
16,700.00	7,450.00	12,790.00	8,305.40	81.49	83.03	141.315	4,206.74	2,169.95	4,333.56	4,268.72	64.84	66.835	
16,800.00	7,450.00	12,790.00	8,305.40	82.29	83.03	141.315	4,206.74	2,169.95	4,430.38	4,365.64	64.74	68.430	
16,900.00	7,450.00	12,790.00	8,305.40	83.10	83.03	141.315	4,206.74	2,169.95	4,527.34	4,462.69	64.66	70.021	
17,000.00	7,450.00	12,790.00	8,305.40	83.91	83.03	141.315	4,206.74	2,169.95	4,624.43	4,559.85	64.58	71.608	
17,100.00	7,450.00	12,790.00	8,305.40	84.72	83.03	141.315	4,206.74	2,169.95	4,721.64	4,657.13	64.51	73.190	
17,200.00	7,450.00	12,790.00	8,305.40	85.53	83.03	141.315	4,206.74	2,169.95	4,818.97	4,754.52	64.45	74.768	
17,300.00	7,450.00	12,790.00	8,305.40	86.34	83.03	141.315	4,206.74	2,169.95	4,916.40	4,852.00	64.40	76.342	
17,400.00	7,450.00	12,790.00	8,305.40	87.16	83.03	141.315	4,206.74	2,169.95	5,013.94	4,949.58	64.35	77.911	
17,500.00	7,450.00	12,790.00	8,305.40	87.97	83.03	141.315	4,206.74	2,169.95	5,111.56	5,047.25	64.32	79.475	
17,600.00	7,450.00	12,790.00	8,305.40	88.78	83.03	141.315	4,206.74	2,169.95	5,209.28	5,145.00	64.28	81.035	
17,700.00	7,450.00	12,790.00	8,305.40	89.60	83.03	141.315	4,206.74	2,169.95	5,307.09	5,242.83	64.26	82.590	
17,800.00	7,450.00	12,790.00	8,305.40	90.42	83.03	141.315	4,206.74	2,169.95	5,404.97	5,340.73	64.24	84.140	
17,900.00	7,450.00	12,790.00	8,305.40	91.23	83.03	141.315	4,206.74	2,169.95	5,502.93	5,438.71	64.22	85.685	
18,000.00	7,450.00	12,790.00	8,305.40	92.05	83.03	141.315	4,206.74	2,169.95	5,600.96	5,536.75	64.21	87.226	
18,100.00	7,450.00	12,790.00	8,305.40	92.87	83.03	141.315	4,206.74	2,169.95	5,699.07	5,634.86	64.21	88.762	
18,197.24	7,450.00	12,790.00	8,305.40	93.67	83.03	141.315	4,206.74	2,169.95	5,794.52	5,730.32	64.21	90.250	
18,200.00	7,450.00	12,790.00	8,305.40	93.69	83.03	141.539	4,206.74	2,169.95	5,797.23	5,733.03	64.21	90.292	
18,229.54	7,450.00	12,790.00	8,305.40	93.93	83.03	144.040	4,206.74	2,169.95	5,826.26	5,762.06	64.21	90.743	

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 302H
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 302H	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: Salt Draw 2 Fee (Offsets NAD27) - Willow Lake 35 MD Federal Com 1H - Wellbore #1 - Surveys													Offset Site Error:
Survey Program: 100-, 7684-													Offset Well Error:
Measured Depth (usft)	Vertical Depth (usft)	Offset Measured Depth (usft)	Vertical Depth (usft)	Semi Major Axis Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre		Distance Between Centres (usft)		Minimum Separation (usft)	Separation Factor	Warning
+N/-S (usft)	+E/-W (usft)												
18,300.00	7,450.00	12,790.00	8,305.40	94.51	83.03	144.040	4,206.74	2,169.95	5,895.57	5,831.36	64.21	91.813	
18,400.00	7,450.00	12,790.00	8,305.40	95.33	83.03	144.040	4,206.74	2,169.95	5,993.97	5,929.75	64.22	93.329	
18,500.00	7,450.00	12,790.00	8,305.40	96.15	83.03	144.040	4,206.74	2,169.95	6,092.43	6,028.19	64.24	94.840	
18,600.00	7,450.00	12,790.00	8,305.40	96.98	83.03	144.040	4,206.74	2,169.95	6,190.94	6,126.68	64.26	96.346	
18,700.00	7,450.00	12,790.00	8,305.40	97.80	83.03	144.040	4,206.74	2,169.95	6,289.50	6,225.22	64.28	97.847	
18,800.00	7,450.00	12,790.00	8,305.40	98.62	83.03	144.040	4,206.74	2,169.95	6,388.10	6,323.79	64.30	99.343	
18,900.00	7,450.00	12,790.00	8,305.40	99.45	83.03	144.040	4,206.74	2,169.95	6,486.74	6,422.41	64.33	100.835	
19,000.00	7,450.00	12,790.00	8,305.40	100.28	83.03	144.040	4,206.74	2,169.95	6,585.43	6,521.07	64.36	102.321	
19,100.00	7,450.00	12,790.00	8,305.40	101.10	83.03	144.040	4,206.74	2,169.95	6,684.15	6,619.76	64.39	103.803	
19,200.00	7,450.00	12,790.00	8,305.40	101.93	83.03	144.040	4,206.74	2,169.95	6,782.91	6,718.48	64.43	105.279	
19,300.00	7,450.00	12,790.00	8,305.40	102.76	83.03	144.040	4,206.74	2,169.95	6,881.71	6,817.24	64.46	106.751	
19,400.00	7,450.00	12,790.00	8,305.40	103.58	83.03	144.040	4,206.74	2,169.95	6,980.54	6,916.03	64.50	108.218	
19,500.00	7,450.00	12,790.00	8,305.40	104.41	83.03	144.040	4,206.74	2,169.95	7,079.40	7,014.85	64.55	109.680	
19,600.00	7,450.00	12,790.00	8,305.40	105.24	83.03	144.040	4,206.74	2,169.95	7,178.30	7,113.71	64.59	111.136	
19,700.00	7,450.00	12,790.00	8,305.40	106.07	83.03	144.040	4,206.74	2,169.95	7,277.22	7,212.58	64.64	112.588	
19,800.00	7,450.00	12,790.00	8,305.40	106.90	83.03	144.040	4,206.74	2,169.95	7,376.17	7,311.49	64.68	114.035	
19,900.00	7,450.00	12,790.00	8,305.40	107.73	83.03	144.040	4,206.74	2,169.95	7,475.16	7,410.42	64.73	115.477	
20,000.00	7,450.00	12,790.00	8,305.40	108.56	83.03	144.040	4,206.74	2,169.95	7,574.17	7,509.38	64.78	116.914	
20,100.00	7,450.00	12,790.00	8,305.40	109.40	83.03	144.040	4,206.74	2,169.95	7,673.20	7,608.36	64.84	118.346	
20,200.00	7,450.00	12,790.00	8,305.40	110.23	83.03	144.040	4,206.74	2,169.95	7,772.26	7,707.37	64.89	119.773	
20,300.00	7,450.00	12,790.00	8,305.40	111.06	83.03	144.040	4,206.74	2,169.95	7,871.34	7,806.39	64.95	121.195	
20,400.00	7,450.00	12,790.00	8,305.40	111.89	83.03	144.040	4,206.74	2,169.95	7,970.45	7,905.44	65.01	122.612	
20,500.00	7,450.00	12,790.00	8,305.40	112.73	83.03	144.040	4,206.74	2,169.95	8,069.58	8,004.51	65.06	124.024	
20,600.00	7,450.00	12,790.00	8,305.40	113.56	83.03	144.040	4,206.74	2,169.95	8,168.73	8,103.60	65.13	125.430	
20,700.00	7,450.00	12,790.00	8,305.40	114.40	83.03	144.040	4,206.74	2,169.95	8,267.90	8,202.71	65.19	126.832	
20,800.00	7,450.00	12,790.00	8,305.40	115.23	83.03	144.040	4,206.74	2,169.95	8,367.09	8,301.83	65.25	128.229	
20,900.00	7,450.00	12,790.00	8,305.40	116.07	83.03	144.040	4,206.74	2,169.95	8,466.29	8,400.98	65.32	129.621	
21,000.00	7,450.00	12,790.00	8,305.40	116.90	83.03	144.040	4,206.74	2,169.95	8,565.52	8,500.14	65.38	131.008	
21,100.00	7,450.00	12,790.00	8,305.40	117.74	83.03	144.040	4,206.74	2,169.95	8,664.77	8,599.32	65.45	132.390	
21,200.00	7,450.00	12,790.00	8,305.40	118.57	83.03	144.040	4,206.74	2,169.95	8,764.03	8,698.51	65.52	133.766	
21,300.00	7,450.00	12,790.00	8,305.40	119.41	83.03	144.040	4,206.74	2,169.95	8,863.31	8,797.72	65.59	135.138	
21,400.00	7,450.00	12,790.00	8,305.40	120.25	83.03	144.040	4,206.74	2,169.95	8,962.60	8,896.94	65.66	136.505	
21,500.00	7,450.00	12,790.00	8,305.40	121.09	83.03	144.040	4,206.74	2,169.95	9,061.91	8,996.18	65.73	137.867	
21,600.00	7,450.00	12,790.00	8,305.40	121.92	83.03	144.040	4,206.74	2,169.95	9,161.24	9,095.43	65.80	139.223	
21,700.00	7,450.00	12,790.00	8,305.40	122.76	83.03	144.040	4,206.74	2,169.95	9,260.58	9,194.70	65.88	140.575	
21,800.00	7,450.00	12,790.00	8,305.40	123.60	83.03	144.040	4,206.74	2,169.95	9,359.93	9,293.98	65.95	141.922	
21,900.00	7,450.00	12,790.00	8,305.40	124.44	83.03	144.040	4,206.74	2,169.95	9,459.30	9,393.27	66.03	143.264	
22,000.00	7,450.00	12,790.00	8,305.40	125.28	83.03	144.040	4,206.74	2,169.95	9,558.68	9,492.57	66.10	144.600	
22,100.00	7,450.00	12,790.00	8,305.40	126.12	83.03	144.040	4,206.74	2,169.95	9,658.07	9,591.89	66.18	145.932	
22,200.00	7,450.00	12,790.00	8,305.40	126.96	83.03	144.040	4,206.74	2,169.95	9,757.48	9,691.21	66.26	147.259	
22,300.00	7,450.00	12,790.00	8,305.40	127.80	83.03	144.040	4,206.74	2,169.95	9,856.89	9,790.55	66.34	148.581	
22,400.00	7,450.00	12,790.00	8,305.40	128.64	83.03	144.040	4,206.74	2,169.95	9,956.32	9,889.90	66.42	149.897	

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 302H
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 302H	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: Salt Draw 2 Fee 1H - Salt Draw 2 B2DM Fee 1H - Wellbore #1 - Surveys													Offset Site Error:	0.00 usft
Survey Program: 177-, 414- 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)	Highside Toolface (°)	Offset Wellbore Centre		Distance Between Centres (usft)		Rule Assigned: Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning
0.00	0.00	0.00	15.50	0.00	0.00	101.435	-568.18	2,809.03	2,865.95					
100.00	100.00	75.63	91.13	0.14	0.11	101.433	-568.12	2,809.16	2,866.04	2,865.79	0.25	N/A		
200.00	200.00	165.14	180.63	0.50	0.25	101.427	-567.92	2,809.65	2,866.54	2,865.79	0.74	3,847.865		
300.00	300.00	270.88	286.37	0.85	0.60	101.412	-567.31	2,810.43	2,867.15	2,865.69	1.46	1,969.098		
400.00	400.00	379.10	394.58	1.21	0.99	101.385	-566.03	2,811.06	2,867.48	2,865.28	2.20	1,303.306		
500.00	500.00	543.80	559.27	1.57	1.19	101.346	-563.98	2,810.72	2,867.36	2,864.60	2.76	1,039.892		
600.00	600.00	879.37	893.89	1.93	2.04	101.290	-556.67	2,788.38	2,858.55	2,854.59	3.96	722.255		
700.00	700.00	995.57	1,009.40	2.29	2.43	101.238	-551.72	2,776.75	2,847.88	2,843.20	4.68	608.569		
800.00	800.00	1,089.49	1,102.75	2.65	2.76	101.197	-547.79	2,767.22	2,837.11	2,831.77	5.35	530.408		
900.00	900.00	1,185.58	1,198.28	3.00	3.10	101.163	-544.17	2,757.57	2,826.53	2,820.50	6.03	468.910		
1,000.00	1,000.00	1,288.33	1,300.43	3.36	3.48	101.112	-539.62	2,747.35	2,815.92	2,809.18	6.74	418.004		
1,100.00	1,100.00	1,382.25	1,393.76	3.72	3.82	101.046	-534.52	2,738.15	2,805.25	2,797.83	7.42	377.954		
1,200.00	1,200.00	1,462.52	1,473.55	4.08	4.12	100.983	-529.99	2,730.75	2,795.13	2,787.06	8.06	346.623		
1,300.00	1,300.00	1,543.73	1,554.34	4.44	4.42	100.918	-525.40	2,723.84	2,785.68	2,776.97	8.71	319.837		
1,400.00	1,400.00	1,660.10	1,670.11	4.80	4.86	100.832	-519.27	2,713.85	2,776.25	2,766.77	9.48	292.882		
1,500.00	1,500.00	1,760.78	1,770.26	5.16	5.23	100.774	-514.67	2,704.56	2,766.33	2,756.14	10.19	271.346		
1,600.00	1,599.98	1,837.01	1,846.13	5.50	5.52	-16.514	-511.46	2,697.92	2,755.31	2,744.50	10.82	254.756		
1,700.00	1,699.84	1,921.00	1,929.80	5.84	5.83	-16.662	-508.15	2,691.30	2,741.83	2,730.37	11.45	239.399		
1,800.00	1,799.45	2,029.18	2,037.57	6.18	6.23	-16.868	-504.20	2,682.83	2,725.18	2,713.00	12.18	223.818		
1,900.00	1,898.70	2,136.05	2,143.99	6.52	6.63	-17.113	-500.61	2,673.66	2,704.56	2,691.66	12.89	209.740		
2,000.00	1,997.47	2,214.62	2,222.25	6.86	6.92	-17.359	-498.37	2,667.10	2,681.02	2,667.50	13.52	198.334		
2,100.00	2,095.62	2,300.00	2,307.35	7.21	7.24	-17.648	-496.39	2,660.50	2,654.94	2,640.78	14.16	187.434		
2,200.00	2,193.06	2,423.30	2,430.22	7.57	7.70	-18.042	-494.21	2,650.45	2,625.44	2,610.50	14.94	175.735		
2,300.00	2,289.64	2,519.38	2,525.89	7.93	8.05	-18.440	-492.91	2,641.59	2,591.82	2,576.20	15.62	165.893		
2,400.00	2,385.27	2,621.04	2,627.13	8.29	8.44	-18.921	-491.36	2,632.55	2,555.43	2,539.10	16.33	156.512		
2,500.00	2,479.82	2,753.62	2,758.98	8.67	8.94	-19.619	-487.07	2,619.44	2,514.84	2,497.72	17.13	146.819		
2,600.00	2,573.17	2,877.60	2,882.03	9.05	9.42	-20.456	-480.89	2,605.63	2,469.97	2,452.07	17.90	137.967		
2,624.87	2,596.19	2,907.73	2,911.90	9.14	9.54	-20.688	-479.12	2,602.05	2,458.18	2,440.08	18.09	135.851		
2,700.00	2,665.60	2,972.87	2,976.43	9.44	9.80	-21.002	-475.01	2,594.11	2,422.09	2,403.51	18.59	130.320		
2,800.00	2,757.99	3,041.37	3,044.32	9.84	10.07	-21.345	-470.68	2,586.14	2,374.63	2,355.43	19.19	123.727		
2,900.00	2,850.38	3,128.00	3,130.28	10.24	10.41	-21.793	-465.30	2,576.80	2,328.01	2,308.15	19.86	117.228		
3,000.00	2,942.77	3,176.48	3,178.44	10.66	10.59	-22.047	-462.50	2,571.94	2,282.07	2,261.64	20.42	111.734		
3,100.00	3,035.16	3,242.18	3,243.77	11.07	10.84	-22.385	-459.29	2,565.85	2,237.17	2,216.13	21.04	106.306		
3,200.00	3,127.55	3,317.00	3,318.27	11.49	11.13	-22.762	-456.45	2,559.60	2,193.28	2,171.58	21.70	101.085		
3,300.00	3,219.94	3,401.68	3,402.62	11.92	11.45	-23.197	-453.47	2,552.83	2,149.87	2,127.49	22.38	96.056		
3,400.00	3,312.33	3,497.71	3,498.25	12.35	11.81	-23.729	-449.49	2,544.89	2,106.30	2,083.20	23.10	91.184		
3,500.00	3,404.72	3,588.00	3,588.12	12.78	12.15	-24.259	-445.40	2,537.25	2,062.65	2,038.85	23.81	86.639		
3,600.00	3,497.11	3,677.77	3,677.47	13.21	12.49	-24.810	-441.31	2,529.59	2,019.09	1,994.57	24.52	82.350		
3,700.00	3,589.50	3,782.88	3,782.05	13.65	12.90	-25.485	-436.50	2,520.20	1,975.34	1,950.08	25.27	78.178		
3,800.00	3,681.89	3,890.40	3,888.92	14.09	13.31	-26.209	-431.56	2,509.53	1,930.88	1,904.86	26.02	74.210		
3,900.00	3,774.28	3,954.11	3,952.27	14.53	13.55	-26.654	-428.75	2,503.34	1,886.77	1,860.08	26.69	70.692		
4,000.00	3,866.67	4,021.46	4,019.31	14.98	13.81	-27.135	-425.97	2,497.51	1,843.82	1,816.45	27.37	67.357		
4,100.00	3,959.05	4,106.09	4,103.63	15.43	14.13	-27.757	-422.68	2,491.05	1,801.96	1,773.87	28.10	64.135		
4,200.00	4,051.44	4,232.95	4,229.83	15.87	14.61	-28.775	-416.70	2,479.71	1,759.16	1,730.27	28.89	60.888		
4,300.00	4,143.83	4,325.51	4,321.76	16.32	14.97	-29.585	-411.69	2,470.14	1,715.35	1,685.71	29.63	57.886		
4,400.00	4,236.22	4,409.49	4,405.20	16.77	15.30	-30.341	-407.53	2,461.57	1,671.94	1,641.57	30.37	55.054		
4,500.00	4,328.61	4,500.50	4,495.65	17.23	15.65	-31.186	-403.45	2,452.37	1,628.90	1,597.78	31.12	52.347		
4,600.00	4,421.00	4,597.10	4,591.61	17.68	16.03	-32.126	-399.30	2,442.14	1,585.72	1,553.85	31.87	49.752		
4,700.00	4,513.39	4,683.15	4,677.07	18.13	16.36	-33.001	-395.80	2,432.70	1,542.54	1,509.91	32.62	47.283		
4,800.00	4,605.78	4,762.51	4,755.95	18.59	16.67	-33.829	-393.04	2,424.38	1,500.08	1,466.70	33.38	44.944		
4,900.00	4,698.17	4,826.00	4,819.10	19.05	16.91	-34.505	-391.19	2,418.04	1,458.54	1,424.41	34.13	42.737		
5,000.00	4,790.56	4,910.37	4,903.08	19.50	17.23	-35.451	-388.49	2,410.43	1,418.11	1,383.22	34.90	40.636		

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 302H
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 302H	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: Salt Draw 2 Fee 1H - Salt Draw 2 B2DM Fee 1H - Wellbore #1 - Surveys													Offset Site Error:	0.00 usft
Survey Program: 177-, 414- 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)	Highside Toolface (°)	Offset Wellbore Centre		Distance Between Centres (usft)		Minimum Separation (usft)	Separation Factor	Warning	
							+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)				
5,100.00	4,882.95	4,980.89	4,973.32	19.96	17.50	-36.304	-385.56	2,405.02	1,379.34	1,343.67	35.67	38.671		
5,200.00	4,975.34	5,056.97	5,049.16	20.42	17.78	-37.280	-381.93	2,400.06	1,342.12	1,305.67	36.45	36.821		
5,300.00	5,067.73	5,138.57	5,130.56	20.88	18.08	-38.341	-378.70	2,395.39	1,306.03	1,268.79	37.24	35.071		
5,400.00	5,160.12	5,204.00	5,195.88	21.34	18.32	-39.198	-376.71	2,392.07	1,271.11	1,233.09	38.02	33.431		
5,500.00	5,252.51	5,294.78	5,286.55	21.80	18.64	-40.420	-374.20	2,388.39	1,237.40	1,198.58	38.83	31.870		
5,600.00	5,344.90	5,370.77	5,362.47	22.26	18.91	-41.491	-371.90	2,386.31	1,205.48	1,165.86	39.62	30.422		
5,700.00	5,437.29	5,457.59	5,449.24	22.73	19.21	-42.760	-369.24	2,384.74	1,175.01	1,134.57	40.44	29.057		
5,800.00	5,529.68	5,548.95	5,540.55	23.19	19.52	-44.135	-366.90	2,383.24	1,145.24	1,103.98	41.26	27.757		
5,900.00	5,622.07	5,632.78	5,624.36	23.65	19.81	-45.433	-365.11	2,382.13	1,116.35	1,074.28	42.08	26.532		
5,999.30	5,713.81	5,712.26	5,703.82	24.11	20.07	-46.699	-363.48	2,381.94	1,089.28	1,046.40	42.88	25.402		
6,000.00	5,714.46	5,712.82	5,704.38	24.11	20.07	-46.706	-363.47	2,381.94	1,089.09	1,046.21	42.89	25.394		
6,100.00	5,807.51	5,798.21	5,789.75	24.57	20.35	-47.665	-361.79	2,382.69	1,064.68	1,020.98	43.70	24.364		
6,200.00	5,901.78	5,895.60	5,887.13	25.01	20.66	-48.729	-360.53	2,383.84	1,043.28	998.78	44.50	23.443		
6,300.00	5,997.15	5,994.19	5,985.71	25.44	20.97	-49.703	-360.10	2,385.00	1,024.39	979.10	45.29	22.618		
6,400.00	6,093.52	6,093.51	6,085.02	25.85	21.28	-50.584	-360.16	2,386.08	1,007.90	961.84	46.06	21.884		
6,500.00	6,190.76	6,196.92	6,188.43	26.25	21.60	-51.397	-360.65	2,386.99	993.60	946.79	46.81	21.225		
6,600.00	6,288.75	6,304.73	6,296.24	26.63	21.95	-52.136	-361.48	2,387.04	980.86	933.31	47.55	20.627		
6,700.00	6,387.38	6,402.54	6,394.04	27.00	22.27	-52.691	-362.25	2,386.44	969.84	921.55	48.28	20.086		
6,800.00	6,486.52	6,496.35	6,487.84	27.35	22.58	-53.148	-362.26	2,386.02	961.53	912.53	49.00	19.622		
6,900.00	6,586.06	6,586.47	6,577.96	27.69	22.89	-53.520	-361.48	2,385.92	956.09	906.39	49.70	19.237		
7,000.00	6,685.87	6,675.06	6,666.53	28.02	23.18	-53.824	-359.73	2,386.47	953.93	903.55	50.37	18.937		
7,016.30	6,702.16	6,689.51	6,680.98	28.07	23.23	-53.868	-359.36	2,386.62	953.88	903.40	50.48	18.896		
7,100.00	6,785.83	6,777.76	6,769.20	28.33	23.52	-54.067	-357.11	2,387.68	954.61	903.57	51.04	18.704		
7,124.17	6,810.00	6,805.26	6,796.69	28.40	23.61	63.084	-356.68	2,387.94	954.93	903.74	51.19	18.653		
7,191.21	6,877.04	6,881.54	6,872.97	28.60	23.86	63.075	-356.24	2,388.49	955.54	903.92	51.62	18.513		
7,200.00	6,885.83	6,891.54	6,882.96	28.62	23.89	63.678	-356.26	2,388.55	955.54	903.87	51.67	18.493		
7,250.00	6,935.73	6,941.77	6,933.19	28.77	24.06	63.958	-356.45	2,388.76	954.35	902.38	51.97	18.363		
7,300.00	6,985.18	6,989.95	6,981.37	28.90	24.21	64.615	-356.42	2,388.93	951.32	899.07	52.26	18.205		
7,350.00	7,033.80	7,037.42	7,028.84	29.04	24.37	65.642	-356.19	2,389.06	946.58	894.06	52.52	18.022		
7,400.00	7,081.24	7,083.87	7,075.29	29.16	24.52	67.025	-355.76	2,389.15	940.27	887.50	52.77	17.818		
7,450.00	7,127.12	7,126.12	7,117.54	29.28	24.66	68.674	-355.25	2,389.30	932.66	879.66	53.00	17.599		
7,500.00	7,171.10	7,166.17	7,157.58	29.39	24.79	70.587	-354.75	2,389.63	924.10	870.90	53.20	17.371		
7,550.00	7,212.84	7,204.24	7,195.64	29.48	24.92	72.719	-354.28	2,390.12	914.91	861.54	53.37	17.142		
7,600.00	7,252.02	7,240.03	7,231.43	29.57	25.04	75.003	-353.83	2,390.75	905.44	851.92	53.52	16.917		
7,650.00	7,288.35	7,279.00	7,270.38	29.65	25.17	77.616	-353.34	2,391.61	896.08	842.44	53.64	16.704		
7,700.00	7,321.55	7,306.29	7,297.67	29.71	25.25	79.818	-353.03	2,392.29	887.15	833.42	53.73	16.511		
7,750.00	7,351.37	7,336.26	7,327.62	29.77	25.35	82.186	-352.81	2,393.07	879.07	825.28	53.79	16.343		
7,800.00	7,377.57	7,362.36	7,353.72	29.81	25.43	84.325	-352.71	2,393.77	872.27	818.46	53.82	16.208		
7,850.00	7,399.97	7,384.44	7,375.79	29.85	25.50	86.137	-352.70	2,394.38	867.20	813.38	53.82	16.113		
7,900.00	7,418.39	7,402.38	7,393.72	29.87	25.56	87.541	-352.73	2,394.89	864.22	810.42	53.80	16.064		
7,936.65	7,429.28	7,412.86	7,404.19	29.88	25.60	88.273	-352.77	2,395.20	863.54	809.77	53.77	16.060 CC, ES, SF		
7,950.00	7,432.69	7,416.11	7,407.44	29.89	25.61	88.472	-352.78	2,395.29	863.63	809.88	53.76	16.066		
8,000.00	7,442.76	7,425.58	7,416.91	29.89	25.64	88.886	-352.83	2,395.57	865.66	811.96	53.70	16.120		
8,050.00	7,448.52	7,430.82	7,422.14	29.89	25.65	88.754	-352.86	2,395.72	870.40	816.76	53.64	16.228		
8,091.21	7,450.00	7,431.96	7,423.28	29.88	25.66	88.228	-352.87	2,395.76	876.35	822.77	53.58	16.357		
8,100.00	7,450.00	7,431.90	7,423.22	29.88	25.66	88.224	-352.87	2,395.76	877.86	824.29	53.57	16.389		
8,200.00	7,450.00	7,431.24	7,422.56	29.86	25.65	88.181	-352.87	2,395.74	900.87	847.39	53.48	16.846		
8,300.00	7,450.00	7,430.60	7,421.92	29.85	25.65	88.138	-352.86	2,395.72	934.08	880.61	53.47	17.469		
8,400.00	7,450.00	7,429.97	7,421.29	29.86	25.65	88.096	-352.86	2,395.70	976.44	922.91	53.53	18.241		
8,500.00	7,450.00	7,429.35	7,420.68	29.88	25.65	88.055	-352.85	2,395.68	1,026.82	973.18	53.64	19.143		
8,600.00	7,450.00	7,428.75	7,420.08	29.93	25.65	88.016	-352.85	2,395.66	1,084.11	1,030.33	53.78	20.159		
8,700.00	7,450.00	7,428.16	7,419.49	30.01	25.64	87.977	-352.85	2,395.65	1,147.26	1,093.33	53.93	21.273		

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 302H
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 302H	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: Salt Draw 2 Fee 1H - Salt Draw 2 B2DM Fee 1H - Wellbore #1 - Surveys												Offset Site Error:	0.00 usft
Survey Program: 177-, 414- 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)	Highside Toolface (°)	Offset Wellbore Centre		Distance Between Centres (usft)		Minimum Separation (usft)	Separation Factor	Warning
							+N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)			
8,800.00	7,450.00	7,427.59	7,418.92	30.12	25.64	87.939	-352.84	2,395.63	1,215.38	1,161.29	54.09	22.469	
8,811.02	7,450.00	7,427.53	7,418.85	30.14	25.64	87.934	-352.84	2,395.63	1,223.15	1,169.04	54.11	22.606	
8,811.41	7,450.00	7,427.53	7,418.85	30.14	25.64	87.935	-352.84	2,395.63	1,223.43	1,169.32	54.11	22.611	
8,900.00	7,450.00	7,427.03	7,418.36	30.27	25.64	87.902	-352.84	2,395.61	1,287.65	1,233.41	54.25	23.737	
9,000.00	7,450.00	7,426.48	7,417.81	30.47	25.64	87.865	-352.84	2,395.60	1,363.43	1,309.04	54.40	25.064	
9,100.00	7,450.00	7,425.94	7,417.27	30.71	25.64	87.830	-352.83	2,395.58	1,442.17	1,387.63	54.54	26.442	
9,200.00	7,450.00	7,425.42	7,416.75	30.99	25.64	87.795	-352.83	2,395.56	1,523.40	1,468.73	54.67	27.863	
9,300.00	7,450.00	7,424.91	7,416.23	31.29	25.63	87.761	-352.83	2,395.55	1,606.75	1,551.96	54.80	29.322	
9,400.00	7,450.00	7,424.40	7,415.73	31.63	25.63	87.728	-352.82	2,395.53	1,691.91	1,637.00	54.91	30.811	
9,500.00	7,450.00	7,423.91	7,415.24	31.99	25.63	87.695	-352.82	2,395.52	1,778.61	1,723.59	55.02	32.328	
9,600.00	7,450.00	7,423.43	7,414.76	32.37	25.63	87.663	-352.82	2,395.51	1,866.64	1,811.53	55.12	33.867	
9,700.00	7,450.00	7,422.96	7,414.28	32.78	25.63	87.632	-352.82	2,395.49	1,955.82	1,900.62	55.21	35.427	
9,800.00	7,450.00	7,422.49	7,413.82	33.21	25.63	87.601	-352.81	2,395.48	2,046.01	1,990.72	55.29	37.003	
9,900.00	7,450.00	7,422.04	7,413.37	33.65	25.62	87.571	-352.81	2,395.46	2,137.06	2,081.69	55.37	38.595	
10,000.00	7,450.00	7,421.59	7,412.92	34.11	25.62	87.541	-352.81	2,395.45	2,228.89	2,173.44	55.45	40.199	
10,100.00	7,450.00	7,421.16	7,412.49	34.59	25.62	87.512	-352.81	2,395.44	2,321.39	2,265.87	55.52	41.814	
10,200.00	7,450.00	7,420.73	7,412.06	35.08	25.62	87.484	-352.80	2,395.43	2,414.48	2,358.90	55.58	43.439	
10,300.00	7,450.00	7,420.31	7,411.64	35.58	25.62	87.456	-352.80	2,395.41	2,508.11	2,452.47	55.65	45.072	
10,400.00	7,450.00	7,419.90	7,411.23	36.10	25.62	87.429	-352.80	2,395.40	2,602.21	2,546.51	55.71	46.712	
10,500.00	7,450.00	7,419.49	7,410.82	36.64	25.62	87.402	-352.80	2,395.39	2,696.74	2,640.98	55.77	48.358	
10,600.00	7,450.00	7,419.10	7,410.43	37.18	25.61	87.376	-352.80	2,395.38	2,791.65	2,735.83	55.82	50.010	
10,700.00	7,450.00	7,418.71	7,410.04	37.74	25.61	87.350	-352.79	2,395.37	2,886.90	2,831.03	55.88	51.667	
10,800.00	7,450.00	7,418.33	7,409.66	38.31	25.61	87.325	-352.79	2,395.36	2,982.46	2,926.54	55.93	53.327	
10,900.00	7,450.00	7,417.95	7,409.28	38.89	25.61	87.300	-352.79	2,395.34	3,078.31	3,022.33	55.98	54.991	
11,000.00	7,450.00	7,417.59	7,408.92	39.48	25.61	87.276	-352.79	2,395.33	3,174.41	3,118.38	56.03	56.657	
11,100.00	7,450.00	7,417.22	7,408.55	40.08	25.61	87.252	-352.79	2,395.32	3,270.74	3,214.67	56.08	58.326	
11,200.00	7,450.00	7,416.87	7,408.20	40.69	25.61	87.228	-352.79	2,395.31	3,367.29	3,311.17	56.13	59.996	
11,300.00	7,450.00	7,416.52	7,407.85	41.30	25.61	87.205	-352.78	2,395.30	3,464.04	3,407.86	56.17	61.668	
11,400.00	7,450.00	7,416.18	7,407.51	41.93	25.61	87.182	-352.78	2,395.29	3,560.96	3,504.74	56.22	63.341	
11,500.00	7,450.00	7,415.84	7,407.17	42.57	25.60	87.160	-352.78	2,395.28	3,658.05	3,601.79	56.27	65.014	
11,600.00	7,450.00	7,415.51	7,406.84	43.21	25.60	87.138	-352.78	2,395.27	3,755.29	3,698.98	56.31	66.688	
11,700.00	7,450.00	7,415.18	7,406.51	43.86	25.60	87.116	-352.78	2,395.26	3,852.68	3,796.32	56.36	68.363	
11,800.00	7,450.00	7,414.86	7,406.19	44.51	25.60	87.095	-352.78	2,395.25	3,950.19	3,893.79	56.40	70.037	
11,900.00	7,450.00	7,414.55	7,405.88	45.18	25.60	87.074	-352.77	2,395.24	4,047.83	3,991.38	56.45	71.710	
12,000.00	7,450.00	7,414.24	7,405.57	45.85	25.60	87.054	-352.77	2,395.24	4,145.57	4,089.08	56.49	73.383	
12,100.00	7,450.00	7,413.93	7,405.27	46.53	25.60	87.034	-352.77	2,395.23	4,243.43	4,186.89	56.54	75.056	
12,200.00	7,450.00	7,413.63	7,404.97	47.21	25.60	87.014	-352.77	2,395.22	4,341.38	4,284.79	56.58	76.727	
12,300.00	7,450.00	7,413.34	7,404.67	47.90	25.60	86.994	-352.77	2,395.21	4,439.42	4,382.79	56.63	78.397	
12,400.00	7,450.00	7,413.05	7,404.38	48.59	25.60	86.975	-352.77	2,395.20	4,537.55	4,480.87	56.67	80.066	
12,500.00	7,450.00	7,412.76	7,404.10	49.29	25.59	86.956	-352.77	2,395.19	4,635.75	4,579.04	56.72	81.733	
12,600.00	7,450.00	7,412.48	7,403.82	49.99	25.59	86.938	-352.77	2,395.18	4,734.04	4,677.27	56.76	83.398	
12,700.00	7,450.00	7,412.21	7,403.54	50.70	25.59	86.919	-352.76	2,395.18	4,832.39	4,775.58	56.81	85.062	
12,800.00	7,450.00	7,411.93	7,403.27	51.42	25.59	86.901	-352.76	2,395.17	4,930.81	4,873.95	56.86	86.724	
12,839.11	7,450.00	7,411.83	7,403.16	51.70	25.59	86.894	-352.76	2,395.17	4,969.32	4,912.44	56.87	87.373	
12,839.67	7,450.00	7,411.83	7,403.16	51.70	25.59	86.898	-352.76	2,395.17	4,969.87	4,913.00	56.87	87.383	
12,900.00	7,450.00	7,411.67	7,403.00	52.13	25.59	86.887	-352.76	2,395.16	5,029.29	4,972.39	56.90	88.384	
13,000.00	7,450.00	7,411.40	7,402.74	52.85	25.59	86.869	-352.76	2,395.15	5,127.83	5,070.88	56.95	90.041	
13,100.00	7,450.00	7,411.14	7,402.48	53.58	25.59	86.852	-352.76	2,395.15	5,226.42	5,169.42	57.00	91.696	
13,200.00	7,450.00	7,410.89	7,402.22	54.31	25.59	86.835	-352.76	2,395.14	5,325.06	5,268.02	57.05	93.348	
13,300.00	7,450.00	7,410.63	7,401.97	55.04	25.59	86.819	-352.76	2,395.13	5,423.76	5,366.66	57.09	94.998	
13,400.00	7,450.00	7,410.39	7,401.72	55.78	25.59	86.802	-352.76	2,395.12	5,522.50	5,465.36	57.14	96.646	
13,500.00	7,450.00	7,410.14	7,401.48	56.52	25.59	86.786	-352.76	2,395.12	5,621.29	5,564.09	57.19	98.290	

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 302H
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 302H	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: Salt Draw 2 Fee 1H - Salt Draw 2 B2DM Fee 1H - Wellbore #1 - Surveys													Offset Site Error:
Survey Program: 177-, 414-													Offset Well Error:
Measured Depth (usft)	Vertical Depth (usft)	Offset Measured Depth (usft)	Vertical Depth (usft)	Semi Major Axis Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Distance Between Centres (usft)	Rule Assigned: Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning
13,600.00	7,450.00	7,409.90	7,401.23	57.27	25.59	86.770	-352.75	2,395.11	5,720.11	5,662.87	57.24	99.932	
13,700.00	7,450.00	7,409.66	7,401.00	58.02	25.58	86.754	-352.75	2,395.10	5,818.98	5,761.69	57.29	101.571	
13,800.00	7,450.00	7,409.43	7,400.76	58.77	25.58	86.739	-352.75	2,395.10	5,917.89	5,860.55	57.34	103.206	
13,900.00	7,450.00	7,409.20	7,400.53	59.52	25.58	86.724	-352.75	2,395.09	6,016.83	5,959.44	57.39	104.839	
14,000.00	7,450.00	7,408.97	7,400.31	60.28	25.58	86.709	-352.75	2,395.08	6,115.81	6,058.37	57.44	106.468	
14,100.00	7,450.00	7,408.75	7,400.08	61.04	25.58	86.694	-352.75	2,395.08	6,214.82	6,157.32	57.49	108.095	
14,200.00	7,450.00	7,408.53	7,399.86	61.80	25.58	86.679	-352.75	2,395.07	6,313.86	6,256.31	57.55	109.717	
14,300.00	7,450.00	7,408.31	7,399.64	62.56	25.58	86.665	-352.75	2,395.06	6,412.93	6,355.33	57.60	111.337	
14,400.00	7,450.00	7,408.09	7,399.43	63.33	25.58	86.650	-352.75	2,395.06	6,512.03	6,454.37	57.65	112.952	
14,500.00	7,450.00	7,407.88	7,399.21	64.10	25.58	86.636	-352.75	2,395.05	6,611.15	6,553.45	57.71	114.565	
14,600.00	7,450.00	7,407.67	7,399.01	64.87	25.58	86.623	-352.75	2,395.04	6,710.31	6,652.54	57.76	116.173	
14,700.00	7,450.00	7,407.46	7,398.80	65.64	25.58	86.609	-352.75	2,395.04	6,809.48	6,751.67	57.82	117.778	
14,800.00	7,450.00	7,407.26	7,398.60	66.42	25.58	86.595	-352.74	2,395.03	6,908.68	6,850.81	57.87	119.379	
14,900.00	7,450.00	7,407.06	7,398.39	67.20	25.58	86.582	-352.74	2,395.03	7,007.91	6,949.98	57.93	120.977	
15,000.00	7,450.00	7,406.86	7,398.20	67.98	25.58	86.569	-352.74	2,395.02	7,107.15	7,049.17	57.98	122.570	
15,100.00	7,450.00	7,406.67	7,398.00	68.76	25.58	86.556	-352.74	2,395.02	7,206.42	7,148.37	58.04	124.160	
15,200.00	7,450.00	7,406.47	7,397.81	69.54	25.57	86.543	-352.74	2,395.01	7,305.70	7,247.60	58.10	125.745	
15,300.00	7,450.00	7,406.28	7,397.62	70.33	25.57	86.531	-352.74	2,395.00	7,405.01	7,346.85	58.16	127.327	
15,400.00	7,450.00	7,406.09	7,397.43	71.12	25.57	86.518	-352.74	2,395.00	7,504.33	7,446.11	58.22	128.904	
15,500.00	7,450.00	7,405.91	7,397.24	71.90	25.57	86.506	-352.74	2,394.99	7,603.67	7,545.40	58.28	130.477	
15,600.00	7,450.00	7,405.72	7,397.06	72.70	25.57	86.494	-352.74	2,394.99	7,703.03	7,644.69	58.34	132.046	
15,700.00	7,450.00	7,405.54	7,396.88	73.49	25.57	86.482	-352.74	2,394.98	7,802.41	7,744.01	58.40	133.611	
15,800.00	7,450.00	7,405.36	7,396.70	74.28	25.57	86.470	-352.74	2,394.98	7,901.80	7,843.34	58.46	135.172	
15,900.00	7,450.00	7,405.19	7,396.52	75.08	25.57	86.458	-352.74	2,394.97	8,001.20	7,942.68	58.52	136.728	
16,000.00	7,450.00	7,405.01	7,396.35	75.87	25.57	86.447	-352.74	2,394.97	8,100.62	8,042.04	58.58	138.280	
16,100.00	7,450.00	7,404.84	7,396.18	76.67	25.57	86.435	-352.74	2,394.96	8,200.06	8,141.41	58.64	139.827	
16,200.00	7,450.00	7,404.67	7,396.01	77.47	25.57	86.424	-352.74	2,394.96	8,299.50	8,240.80	58.71	141.370	
16,300.00	7,450.00	7,404.50	7,395.84	78.27	25.57	86.413	-352.74	2,394.95	8,398.96	8,340.19	58.77	142.908	
16,400.00	7,450.00	7,404.34	7,395.67	79.07	25.57	86.402	-352.74	2,394.95	8,498.44	8,439.60	58.84	144.442	
16,500.00	7,450.00	7,404.17	7,395.51	79.88	25.57	86.391	-352.73	2,394.94	8,597.92	8,539.02	58.90	145.972	
16,600.00	7,450.00	7,404.01	7,395.35	80.68	25.57	86.380	-352.73	2,394.94	8,697.42	8,638.45	58.97	147.496	
16,700.00	7,450.00	7,403.85	7,395.19	81.49	25.57	86.370	-352.73	2,394.93	8,796.93	8,737.90	59.03	149.017	
16,800.00	7,450.00	7,403.69	7,395.03	82.29	25.57	86.359	-352.73	2,394.93	8,896.45	8,837.35	59.10	150.532	
16,900.00	7,450.00	7,403.54	7,394.87	83.10	25.57	86.349	-352.73	2,394.93	8,995.98	8,936.81	59.17	152.043	
17,000.00	7,450.00	7,403.38	7,394.72	83.91	25.56	86.339	-352.73	2,394.92	9,095.52	9,036.29	59.24	153.549	
17,100.00	7,450.00	7,403.23	7,394.57	84.72	25.56	86.329	-352.73	2,394.92	9,195.07	9,135.77	59.30	155.050	
17,200.00	7,450.00	7,403.08	7,394.41	85.53	25.56	86.319	-352.73	2,394.91	9,294.63	9,235.26	59.37	156.547	
17,300.00	7,450.00	7,402.93	7,394.26	86.34	25.56	86.309	-352.73	2,394.91	9,394.20	9,334.76	59.44	158.039	
17,400.00	7,450.00	7,402.78	7,394.12	87.16	25.56	86.299	-352.73	2,394.90	9,493.78	9,434.27	59.51	159.526	
17,500.00	7,450.00	7,402.63	7,393.97	87.97	25.56	86.289	-352.73	2,394.90	9,593.37	9,533.79	59.58	161.008	
17,600.00	7,450.00	7,402.49	7,393.83	88.78	25.56	86.280	-352.73	2,394.90	9,692.97	9,633.31	59.65	162.485	
17,700.00	7,450.00	7,402.35	7,393.68	89.60	25.56	86.270	-352.73	2,394.89	9,792.57	9,732.84	59.73	163.957	
17,800.00	7,450.00	7,402.21	7,393.54	90.42	25.56	86.261	-352.73	2,394.89	9,892.18	9,832.38	59.80	165.425	
17,900.00	7,450.00	7,402.07	7,393.40	91.23	25.56	86.252	-352.73	2,394.88	9,991.80	9,931.93	59.87	166.887	

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

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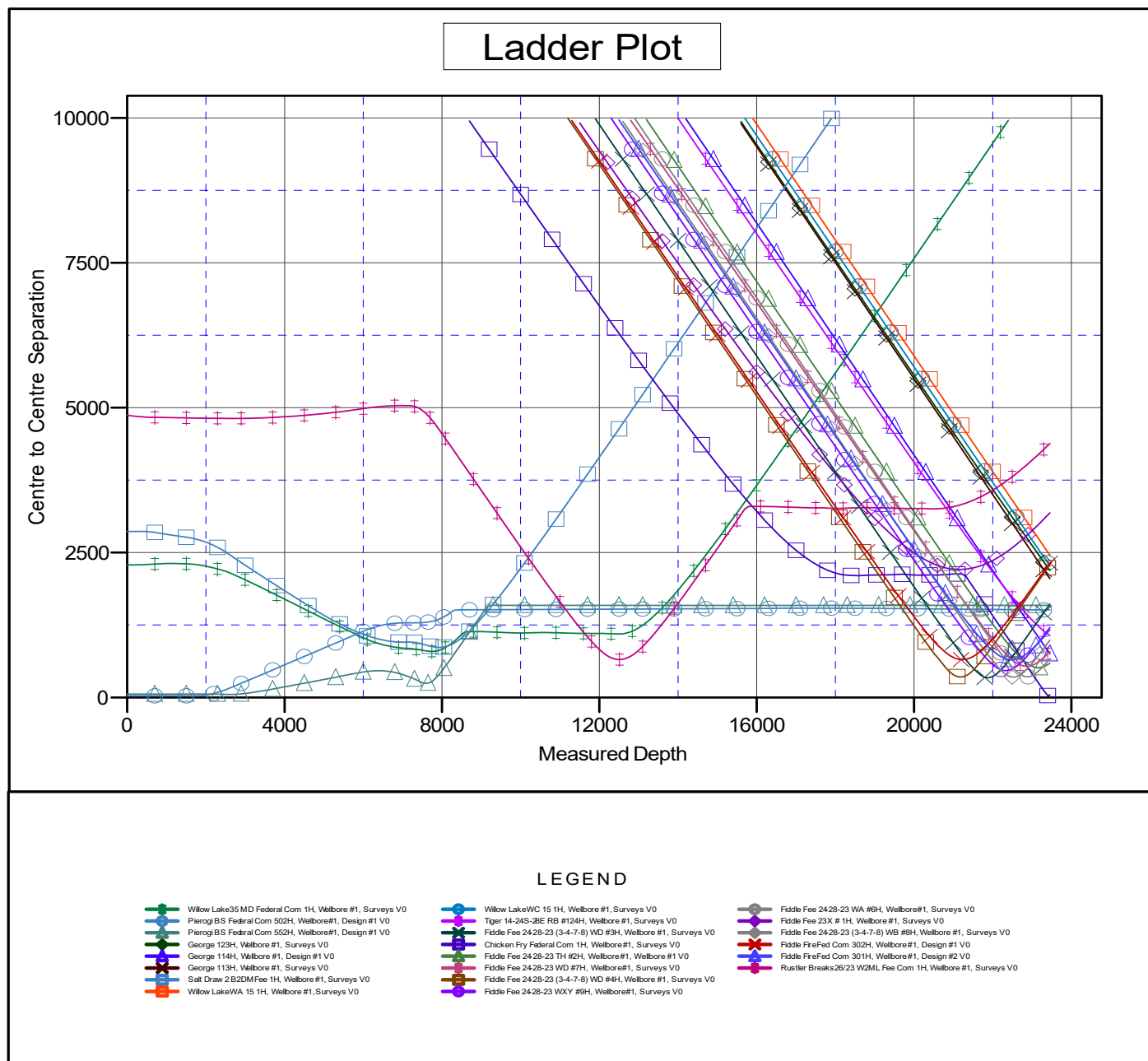


MS Directional Anticollision Report



Company:	Marathon Oil	Local Co-ordinate Reference:	Well Pierogi BS Federal Com 302H
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 302H	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 302H
 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

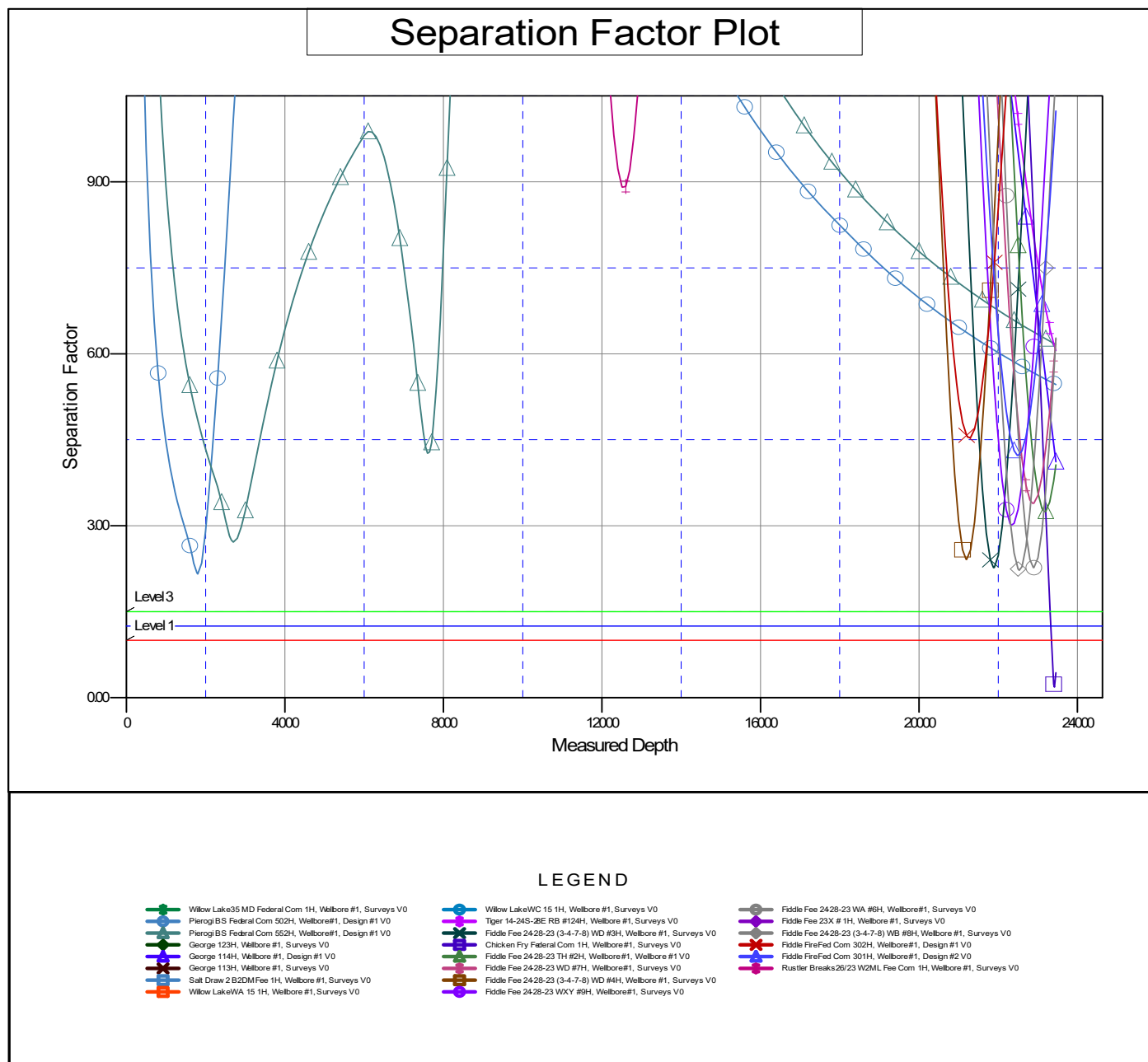


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Well Error:	0.00 usft	Output errors are at	2.00 sigma
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Reference Design:	Design #1	Offset TVD Reference:	Reference Datum

Reference Depths are relative to WELL @ 3022.50usft (Precision 580) Coordinates are relative to: Pierogi BS Federal Com 302H
 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°



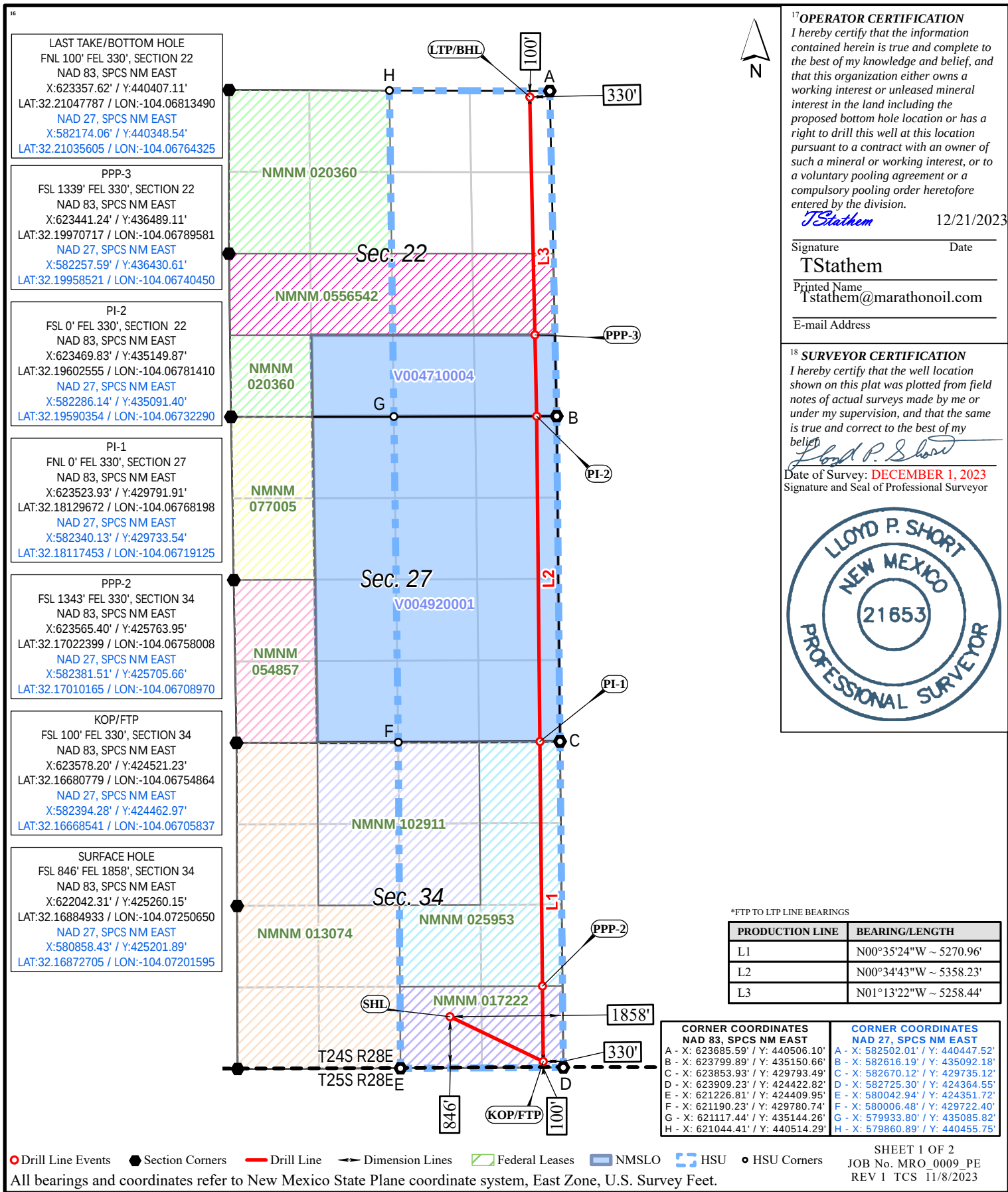
CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

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COMPASS 5000.15 Build 91E

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

☐ AMENDED REPORT

PECOS DISTRICT DRILLING CONDITIONS OF APPROVAL

OPERATOR'S NAME:	Marathon
LEASE NO.:	NMNM17222
LOCATION:	Section 34, T.24 S, R.28 E., NMPM
COUNTY:	Eddy County, New Mexico
WELL NAME & NO.:	Pierogi BS Fed Com 302H
SURFACE HOLE FOOTAGE:	846'/S & 1858'/E
BOTTOM HOLE FOOTAGE:	100'/N & 330'/E

*Previously known as Kyle Fed 24 28 34 WA 11H. Changes approved through engineering via **Sundry 2767256** on 1-9-2024. 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 shall meet Onshore Order 6 requirements, 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 **500** 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 inch 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 1/9/2024

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 313810

CONDITIONS

Operator: MARATHON OIL PERMIAN LLC 990 Town & Country Blvd. Houston, TX 77024	OGRID: 372098
	Action Number: 313810
	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.	2/16/2024