1-18-05 DATE IN	2-7-05 SUSPENSE	STOGNER ENGINEER	1-18-05 LOGGED IN	TYPE NSL	PSEM0501842016 APP NO.

ABOVE THIS LINE FOR DIVISION USE ONLY

NEW MEXICO OIL CONSERVATION DIVISION
- Engineering Bureau -
1220 South St. Francis Drive, Santa Fe, NM 87505

ADMINISTRATIVE APPLICATION CHECKLIST

THIS CHECKLIST IS MANDATORY FOR ALL ADMINISTRATIVE APPLICATIONS FOR EXCEPTIONS TO DIVISION RULES AND REGULATIONS WHICH REQUIRE PROCESSING AT THE DIVISION LEVEL IN SANTA FE

Application Acronyms:

[NSL-Non-Standard Location] [NSP-Non-Standard Proration Unit] [SD-Simultaneous Dedication]
[DHC-Downhole Commingling] [CTB-Lease Commingling] [PLC-Pool/Lease Commingling]
[PC-Pool Commingling] [OLS - Off-Lease Storage] [OLM-Off-Lease Measurement]
[WFX-Waterflood Expansion] [PMX-Pressure Maintenance Expansion]
[SWD-Salt Water Disposal] [IPI-Injection Pressure Increase]
[EOR-Qualified Enhanced Oil Recovery Certification] [PPR-Positive Production Response]

[1] **TYPE OF APPLICATION** - Check Those Which Apply for [A]

[A] Location - Spacing Unit - Simultaneous Dedication
☑ NSL ☐ NSP ☐ SD

Check One Only for [B] or [C]

[B] Commingling - Storage - Measurement
☐ DHC ☐ CTB ☐ PLC ☐ PC ☐ OLS ☐ OLM

[C] Injection - Disposal - Pressure Increase - Enhanced Oil Recovery
☐ WFX ☐ PMX ☐ SWD ☐ IPI ☐ EOR ☐ PPR

[D] Other: Specify _____

[2] **NOTIFICATION REQUIRED TO:** - Check Those Which Apply, or ☐ Does Not Apply

[A] ☐ Working, Royalty or Overriding Royalty Interest Owners

[B] ☐ Offset Operators, Leaseholders or Surface Owner

[C] ☐ Application is One Which Requires Published Legal Notice

[D] ☐ Notification and/or Concurrent Approval by BLM or SLO
U.S. Bureau of Land Management - Commissioner of Public Lands, State Land Office

[E] ☐ For all of the above, Proof of Notification or Publication is Attached, and/or,

[F] ☐ Waivers are Attached

[3] **SUBMIT ACCURATE AND COMPLETE INFORMATION REQUIRED TO PROCESS THE TYPE OF APPLICATION INDICATED ABOVE.**

[4] **CERTIFICATION:** I hereby certify that the information submitted with this application for administrative approval is **accurate** and **complete** to the best of my knowledge. I also understand that **no action** will be taken on this application until the required information and notifications are submitted to the Division.

Note: Statement must be completed by an individual with managerial and/or supervisory capacity.

Print or Type Name	Signature	Title	Date

e-mail Address

Southern U.S. Business Unit
Domestic Production

Marathon Oil Company

P.O. Box 3487
Houston, TX 77253-3487
Telephone 713/629-6600

December 8, 2004

Mr. Richard Ezeanyim
Oil Conservation Division
1220 S. St. Francis Dr.
Santa Fe, New Mexico 87504

RE: Indian Hills Unit Well No. 41 (API No. 30-015-32539) Unorthodox Location 199' FSL & 524' FEL, Sec. 16, Township 21 South, Range 24 East (SHL), 1,773' FNL & 1,227' FEL, Sec. 21, Township 21 South, Range 24 East (BHL) Indian Basin Upper Pennsylvanian Associated Pool

Dear Mr. Ezeanyim,

By means of this application, Marathon Oil Company respectfully requests to re-enter the existing Indian Hills Unit Well No. 41, with an existing surface location of 199' FSL & 524' FEL, Sec. 16, Township 21 South, Range 24 East, and horizontally drill to an unorthodox location in the Upper Pennsylvanian formation. The new final bottom hole location of the sidetrack will be in a non-standard location at 2,450' FNL & 2,350' FEL, Section 21, Township 21 South, Range 24 East, and shall remain dedicated to the standard spacing unit consisting of the east half of Section 21.

Marathon proposes to horizontally sidetrack the Indian Hills Unit Well No. 49 in the "Indian Basin Upper Pennsylvanian Associated Pool" as promulgated by the New Mexico Oil Conservation Division Order Nos. R-9922, R-9922-A, R-9922-B, R-9922-C, R-9922-D, and R-9922-E and by the general rules for the Associated Gas Pools of Southeast New Mexico as promulgated by Division Order No. R-5533. These rules require wells to be located no closer than 660 feet to the outer boundary of the proration/spacing unit and no closer than 330 feet to the governmental quarter/quarter section line. It is Marathon's intention to drill the lateral approximately 1,400' from the current Upper Pennsylvanian cut point. Indian Hills Unit Well No. 41 location is unorthodox because the proposed producing interval will infringe upon the 330 foot setback from the eastern internal boundary of the 320 acre "stand-up" gas proration unit dedicated to the west half of Section 21. Based on the proposed directional plan, it is expected that the Upper Pennsylvanian formation will be penetrated along the interval from the kick-off point at 1,641' FNL & 1,203' FEL in Section 21 (at approximate depths of -3,984' SSTVD, 8,325' MD and 8,001' TVD), through to the anticipated end of the lateral section at 2,450' FNL & 2,350' FEL in Section 21 (at approximate depths of -3,988' SSTVD, 9,771' MD and 8,005' TVD) – please see Attachment #1: Well Location and Acreage Dedication Plat, Attachment #2: Location Verification Map, and Attachment

#3: Directional Plat supplied by Baker Inteq, Marathon's proposed directional drilling company for the well).

In support of this application, specific details will be provided for the proposed unorthodox location. These details will include a brief history of the Indian Hills Unit Well No. 41, the proration units related to the proposed well work, how the well (and specifically the horizontal program) fits into Marathon's reservoir management plan, and why the proposed location is geologically superior to a standard location in Section 21.

Well History and Directional Plan:
The Indian Hills Unit Well No. 41 was directionally drilled in November, 2003 to a total depth of 8,800' MD. The well was completed in the Upper Pennsylvanian formation and placed on production. Marathon has evaluated the option to temporarily abandon the well due to lowering production rates, but believes that a horizontal sidetrack would help to best and most economically drain the reservoir.

Marathon's proposed plan is to first squeeze off the existing Upper Pennsylvanian formation perforations and set a whip-stock to kick-off at 8,325' MD. Assuming favorable hole conditions, it is anticipated that the wellbore will be drilled horizontally for approximately 1,400' from the kick-off point.

Proration Unit:
Currently, the Indian Hills Unit Well No. 41 is dedicated to the existing standard 320 acre spacing consisting of the east half of Section 21, Township 21 South, Range 24 East. The proposed lateral will remain within this same proration unit. Further, there are presently three other wells, the Indian Hills Unit Well No. 28 (API No. 30-015-31267), the Indian Hills Unit Well No. 45 (API No. 30-015-32338) producing according to AMENDED Administrative Order NSL-4750 (SD), and the Indian Hills Unit Well No. 24 (API No. 30-015-31266), that also produce from this proration unit.

The Indian Hills Unit is operated by Marathon Oil Company. Marathon has a 99.54544% working interest and Nearburg Exploration has a 0.45456% working interest. Further, the ownership of the eastern proration unit of Section 21, in which the entire length of the proposed Indian Hills Unit Well No. 41 horizontal well will be located, is identical to that of the western proration unit of Section 21, which offsets to the west the proposed unorthodox location in the Upper Pennsylvanian formation.

Geologic Issues:
The Indian Basin Upper Pennsylvanian Associated Pool is predominantly composed of dolomite and limestone sequences. With current technology, only the fractured, vuggy dolomite sequences have proven productive and economic. The proposed lateral in Indian Hills Unit Well No. 41 is an attempt to further develop the eastern extent of the oil bearing dolomite horizons within the Indian Hills Unit (please see Attachment #4: Upper Pennsylvanian Structure map) by connecting the wellbore with more of the productive fractured, vuggy reservoir. Further, based on Formation Micro Imager open hole logs of analogous wells, it is believed that many of the existing wells in the Indian Hills Unit have failed to most efficiently connect to a fracture network in the oil leg of the Upper Pennsylvanian formation.

Marathon has two geologic goals in drilling the proposed lateral. The first is to increase connectivity to the fracture network in the oil leg. A horizontal wellbore will provide this by greatly increasing the amount of reservoir exposed by the wellbore. The second goal of the proposed lateral is to expose the wellbore to potentially heterogeneous layers of the oil column. Marathon suspects that there may be oil bearing porosity developments within the dolomite sequences that are poorly connected to the existing vertical and deviated wellbores due to the discontinuous porosity and permeability in some areas of the Upper Pennsylvanian formation. A cross section between Indian Hills Unit Well No. 28, the Indian Hills Unit Well No. 41, the Indian Hills Unit Well No. 36 (API No. 30-015-32140), and the Indian Hills Unit Well No. 24 has been included to help illustrate this variability (please see Attachment #5).

Reservoir Management Plan:
Over the last several years, Marathon has focused on developing the oil potential of the Upper Pennsylvanian formation in the Indian Hills Unit. This has been accomplished primarily by infilling the well density to 80-acres in prospective oil areas. Marathon is evaluating the efficacy of horizontal wellbores as a method to improve oil recoveries from poorly drained areas of the Upper Pennsylvanian reservoir, and is accordingly continuing a program of horizontal wells to test the technology. Recently completed directional wellbores have confirmed strong oil potential in the eastern portion of the Indian Hills Unit. The terminus of the proposed lateral is targeted to improve drainage from an area along the eastern region of the Unit that Marathon believes is not being effectively drained by the existing wellbores.

It is Marathon's belief that the proposed unorthodox location represents a superior location in regards to both reservoir drainage and geologic risk. Firstly, the proposed azimuth for the wellbore will maximize the distance between the lateral and the existing wells thereby minimizing potential for well-to-well interference. Secondly, by extending the lateral to the proposed unorthodox terminus location, additional reservoir rock will be exposed to the wellbore, hence increasing the likelihood to encounter fractures and productive dolomite, and ultimately increasing reserves recovery.

Notifications:
It is Marathon's understanding that because the gas spacing unit to which the Indian Hills Unit Well No. 41 is unorthodox is identical in ownership to that of the proposed, standard, 320-acre gas spacing unit, no waivers or notifications are required.

If you have any questions, please feel free to contact me at (713) 296-1921.

Respectfully,

Mark Mick
Operations Engineer
Indian Basin Asset Team
Marathon Oil Company

ATTACHMENT 1

District I
1625 N. French Dr., Hobbs, NM 88240
District II
1301 W. Grand Avenue, Artesia, NM 88210
District III
1000 Rio Brazos Rd., Aztec, NM 87410
District IV
1220 S. St. Francis Dr., Santa Fe, NM 87505

State of New Mexico
Energy, Minerals & Natural Resources

OIL CONSERVATION DIVISION
1220 South St. Francis Dr.
Santa Fe, NM 87505

Form C-102
Revised June 10, 2003

Submit to Appropriate District Office
State Lease - 4 Copies
Fee Lease - 3 Copies

☐ AMENDED REPORT

WELL LOCATION AND ACREAGE DEDICATION PLAT

[1] API Number	[2] Pool Code	[3] Pool Name
30-015-32539	33685	INDIAN BASIN UPPER PENN ASSOCIATED

[4] Property Code	[5] Property Name	[6] Well Number
6409	INDIAN HILLS UNIT	41

[7] OGRID No.	[8] Operator Name	[9] Elevation
14021	Marathon Oil Company	4017'

[10] Surface Location

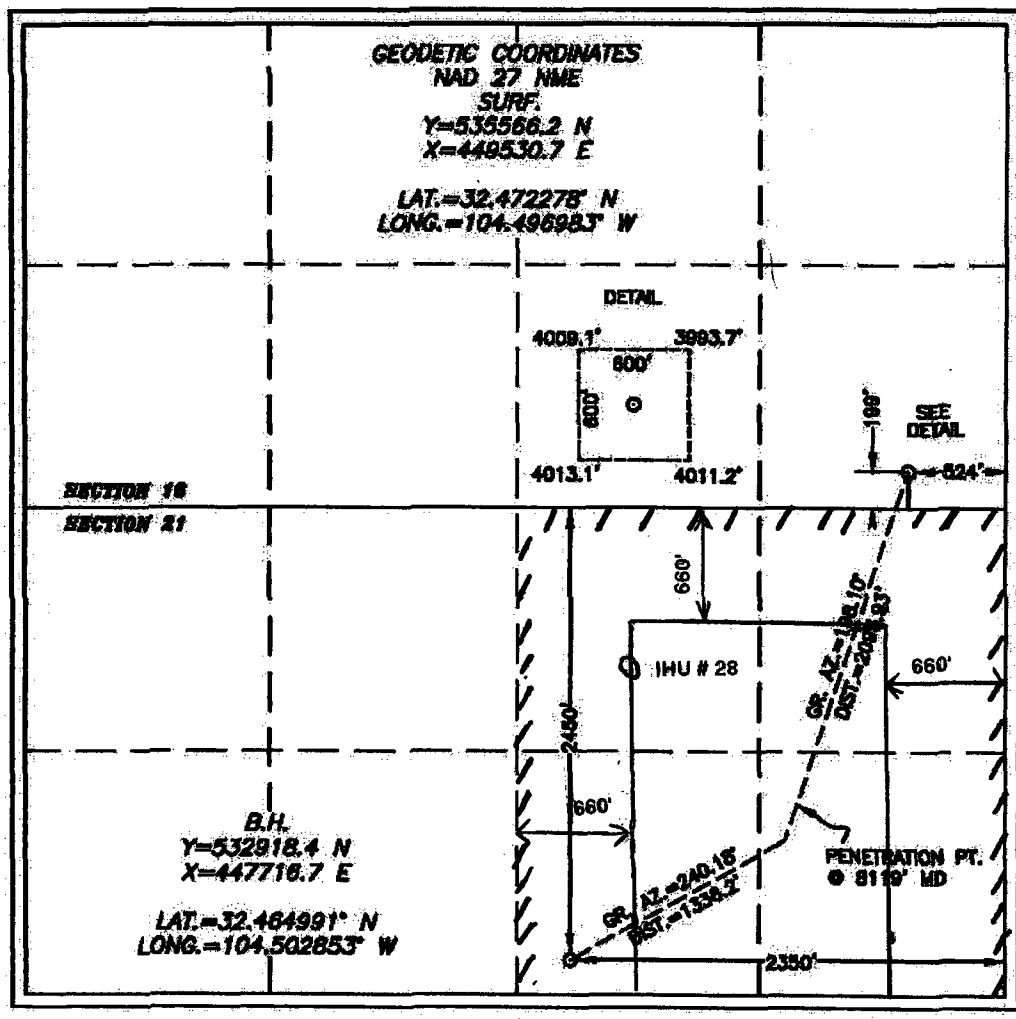
UL or lot no.	Section	Township	Range	Lot. Idn	Feet from the	North/South line	Feet from the	East/West line	County
P	16	21-S	24-E		199'	South	524'	East	EDDY

[11] Bottom Hole Location If Different From Surface

UL or lot no.	Section	Township	Range	Lot. Idn	Feet from the	North/South line	Feet from the	East/West line	County
G	21	21-S	24-E		2450'	North	2350'	East	Eddy

[12] Dedicated Acres	[13] Joint or Infill	[14] Consolidation Code	[15] Order No.
320 E/2			

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



OPERATOR CERTIFICATION

I hereby certify the the information contained herein is true and complete to the best of my knowledge and belief.

Signature: MMick
Printed Name: Mike Mick
Title: Adv. Sr. Eng. Tech
Date: 12-16-04

SURVEYOR CERTIFICATION

I hereby certify that the well location shown on this plat was plotted from field notes of actual surveys made by me or under my supervision, and that the same is true and correct to the best of my belief.

SEPTEMBER 30, 2002

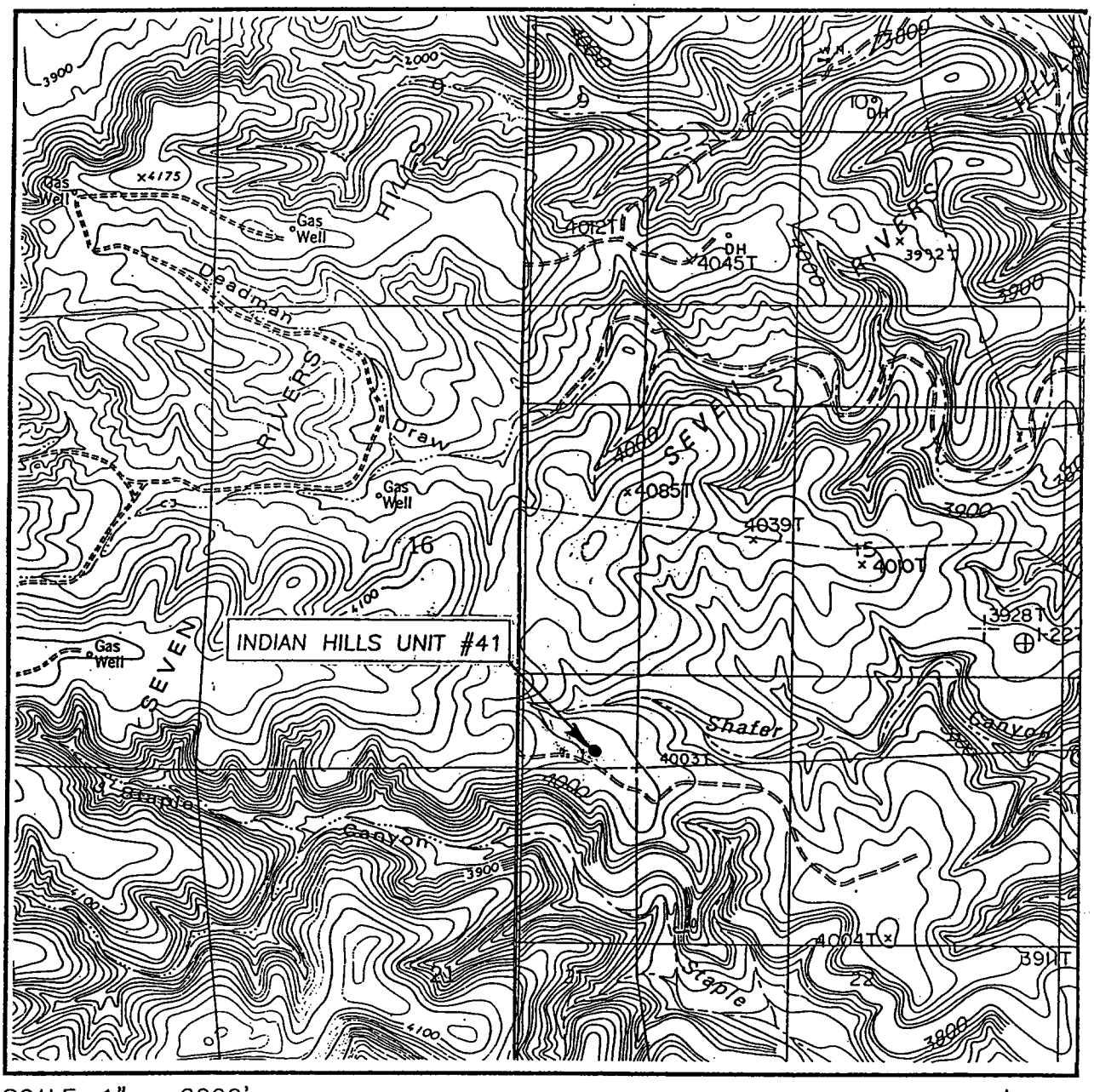
Date Surveyed REV: 12/15/04 JR
Signature & Seal of Professional Surveyor

04.13.1647

Certificate No. GARY EIDSON 12641

ATTACHMENT 2

LOCATION VERIFICATION MAP



SCALE: 1" = 2000'

CONTOUR INTERVAL: 20'
AZOTEA PEAK, N.M
MARTHA CREEK, N.M

SEC. 16 TWP. 21-S RGE. 24-E

SURVEY N.M.P.M.

COUNTY EDDY

DESCRIPTION 199' FSL 524' FEL

ELEVATION 4017'

OPERATOR MARATHON OIL COMPANY

LEASE INDIAN HILLS UNIT

U.S.G.S. TOPOGRAPHIC MAP
AZOTEA PEAK, & MARTHA CREEK, N.M

JOHN WEST SURVEYING
HOBBS, NEW MEXICO
(505) 393-3117

Marathon Oil Company

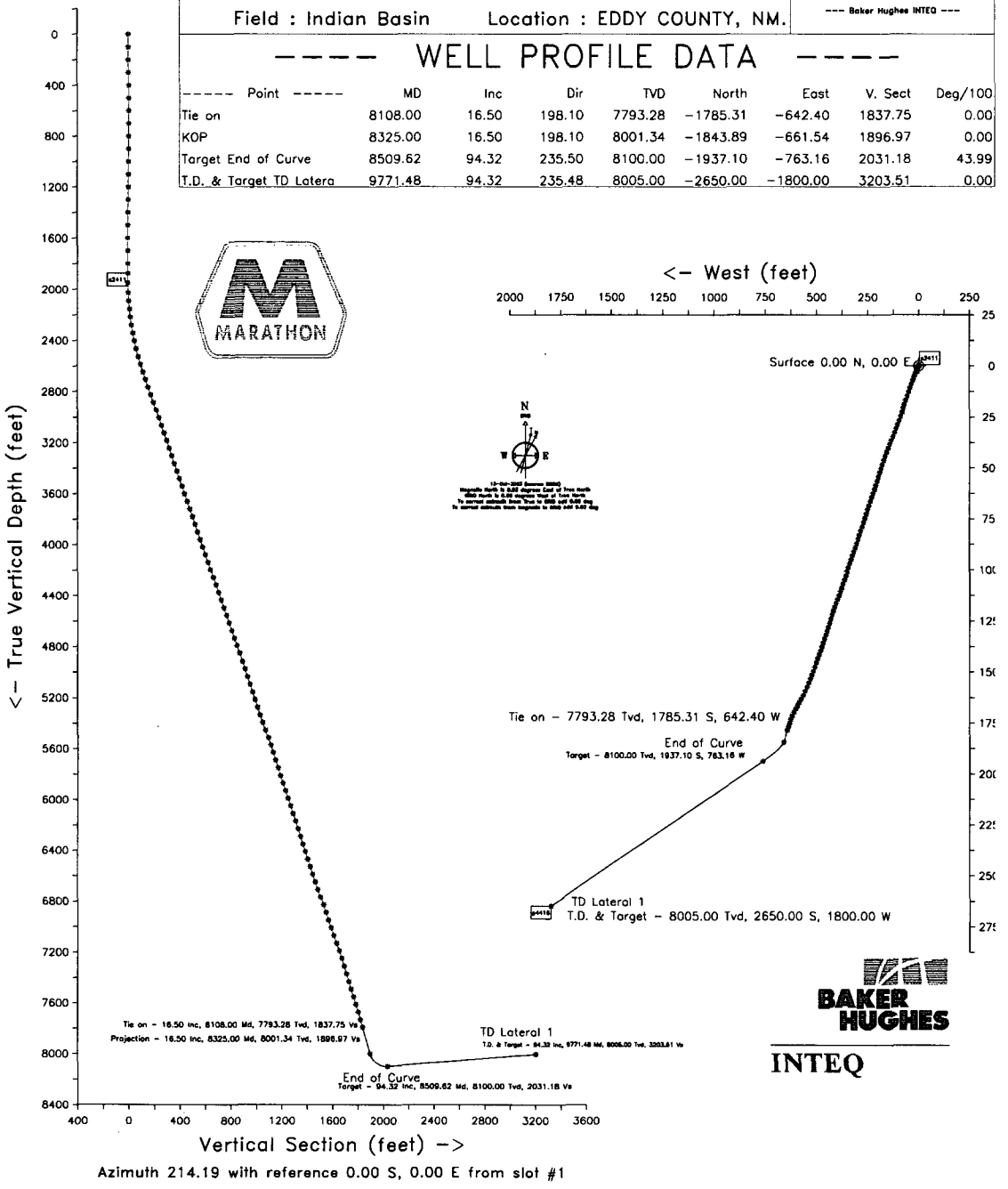
Structure : IHU 41 Slot : slot #1

Field : Indian Basin Location : EDDY COUNTY, NM.

Created by adryanm
Date plotted : 8-Dec-2004
Plot Reference is Plan 1 horizontal.
Coordinates are in feet reference slot #1.
True Vertical Depths are reference rotary table.
--- Baker Hughes INTEQ ---

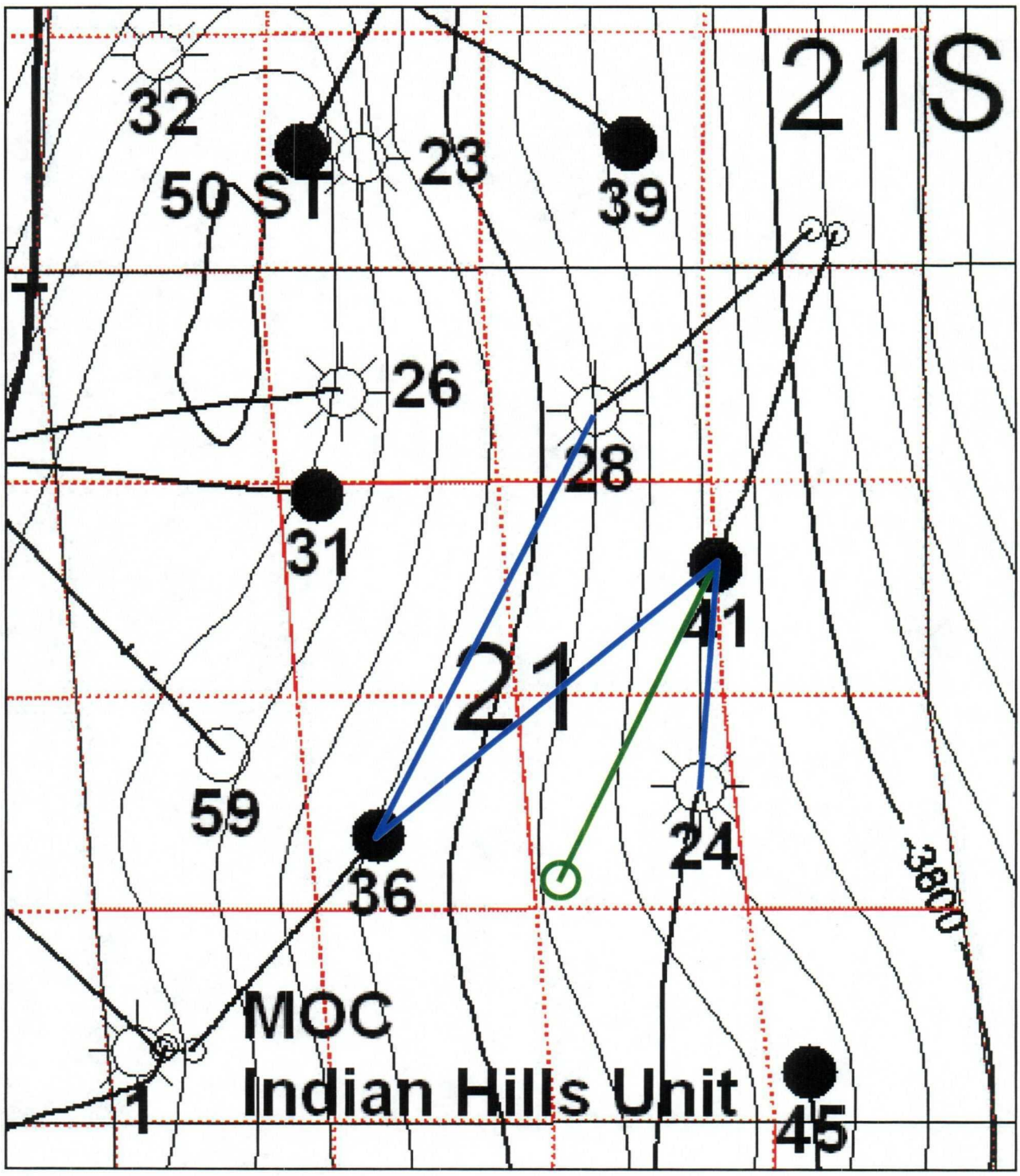
---- WELL PROFILE DATA ----

----- Point -----	MD	Inc	Dir	TVD	North	East	V. Sect	Deg/100
Tie on	8108.00	16.50	198.10	7793.28	-1785.31	-642.40	1837.75	0.00
KOP	8325.00	16.50	198.10	8001.34	-1843.89	-661.54	1896.97	0.00
Target End of Curve	8509.62	94.32	235.50	8100.00	-1937.10	-763.16	2031.18	43.99
T.D. & Target TD Latera	9771.48	94.32	235.48	8005.00	-2650.00	-1800.00	3203.51	0.00



Azimuth 214.19 with reference 0.00 S, 0.00 E from slot #1

Attachment #4



Line of Cross Section (See Attachment #5)

Projected Horizontal Well Path

Attachment #5

Structural Cross Section Through IHU 41 et. al.

(True Vertical Depth; Hung on Water Contact @ -4100')