pMES0-414947371

Southern U.S. Business Unit
Domestic Production

Susp: 6/14/04

Marathon Oil Company

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

RECEIVED

MAY 25 2004

Oil Conservation Division
1220 S. St. Francis Drive
Santa Fe, NM 87505

May 24, 2004

Mr. Richard Ezeanyim
Oil Conservation Division
1220 South Saint Francis Drive
Santa Fe, New Mexico 87504

RE: Indian Hills Unit Well No. 49 (API No. 30-015-32723) Horizontal Re-Entry 705' FNL & 855' FEL, Sec. 28, Township 21 South, Range 24 East (SHL), 1,600' FNL & 660' FEL, Sec. 28, Township 21 South, Range 24 East (BHL) Indian Basin Upper Pennsylvanian Associated Pool

Dear Mr. Ezeanyim,

By means of this application, Marathon respectfully requests to re-enter the existing Indian Hills Unit Well No. 49, with an existing surface location of 705' FNL & 855' FEL, Sec. 28, 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 2,590' FNL & 1,000' FEL, Section 28, Township 21 South, Range 24 East, and shall remain dedicated to the standard spacing unit consisting of the north half of Section 28.

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 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 1,200' from the current Upper Pennsylvanian cut point. And while the existing well location and the location of the proposed kick-off point are in standard locations, the proposed Indian Hills Unit Well No. 49 horizontal is unorthodox because the toe of the lateral will extend within the 660 foot setback from the southern boundary of Unit Letter "H", within the proposed 320-acre "lay-down" gas proration unit dedicated to the north half of Section 28. 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 1,495' FNL & 742' FEL in Section 28 (at approximate depths of -3,934' SSTVD, 7,680' MD and 7,600' TVD), through to the anticipated end of the lateral section at 2,590' FNL & 1,000' FEL in Section 28 (at approximate depths of -3,954' SSTVD, 8,861' MD and 7,620' 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).

Logged In By

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. 49, the proration units related to the proposed well work, how the well (and specifically this horizontal program) fits into Marathon's reservoir management plan, and why the proposed location is geologically superior to a standard location in Section 28.

Well History and Directional Plan:
The Indian Hills Unit Well No. 49 was directionally drilled in May, 2003, to a total depth of 8,180' 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 7,680' MD. Assuming favorable hole conditions, it is anticipated that the wellbore will be drilled horizontally for approximately 1,200' from the kick-off point.

Proration Unit:
Currently, the Indian Hills Unit Well No. 49 is dedicated to the existing standard 320 acre spacing consisting of the north half of Section 28, 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. 10 (API No. 30-015-70534) producing according to Administrative Order NSL-4638 (SD), the Indian Hills Unit Well No. 34 (API No. 30-015-31751) producing according to Administrative Order NSL-4638-A (SD), and the Indian Hills Unit Well No. 17 (API No. 30-015-30661), 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. The ownership of this proration unit is identical to Section 28 which offsets to the south 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. 49 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 failed to most efficiently connect to a fracture network in the oil leg of the Upper Pennsylvanian formation. This data is supported by the relatively high current oil production rates in offset wells.

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. 20 (API No. 30-015-30658), the Indian Hills Unit Well No. 49, and the Indian Hills Unit Well No. 45 (API No. 30-015-32338) has been included to help illustrate this variability between three wells that are only 80 acres apart (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 embarking on a program of successive 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. 49 is unorthodox is identical in ownership to that of the proposed, standard, 320-acre gas spacing unit, no waivers or notifications are required.

Should you have any questions/comments/concerns, 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
P.O. Box 1980, Hobbs, NM 88241-1980

DISTRICT II
P.O. Drawer DD, Artesia, NM 88211-0719

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

DISTRICT IV
P.O. BOX 2088, SANTA FE, N.M. 87504-2088

State of New Mexico
Energy, Minerals and Natural Resources Department

OIL CONSERVATION DIVISION
P.O. Box 2088
Santa Fe, New Mexico 87504-2088

Form C-102
Revised February 10, 1994
Submit to Appropriate District Office
State Lease - 4 Copies
Fee Lease - 3 Copies

WELL LOCATION AND ACREAGE DEDICATION PLAT

☐ AMENDED REPORT

API Number	Pool Code	Pool Name
30-015-32723	33685	I. B. Upper Penn. Assoc.

Property Code	Property Name	Well Number
	INDIAN HILLS UNIT	49

OGRID No.	Operator Name	Elevation
	MARATHON OIL COMPANY	3649'

Surface Location

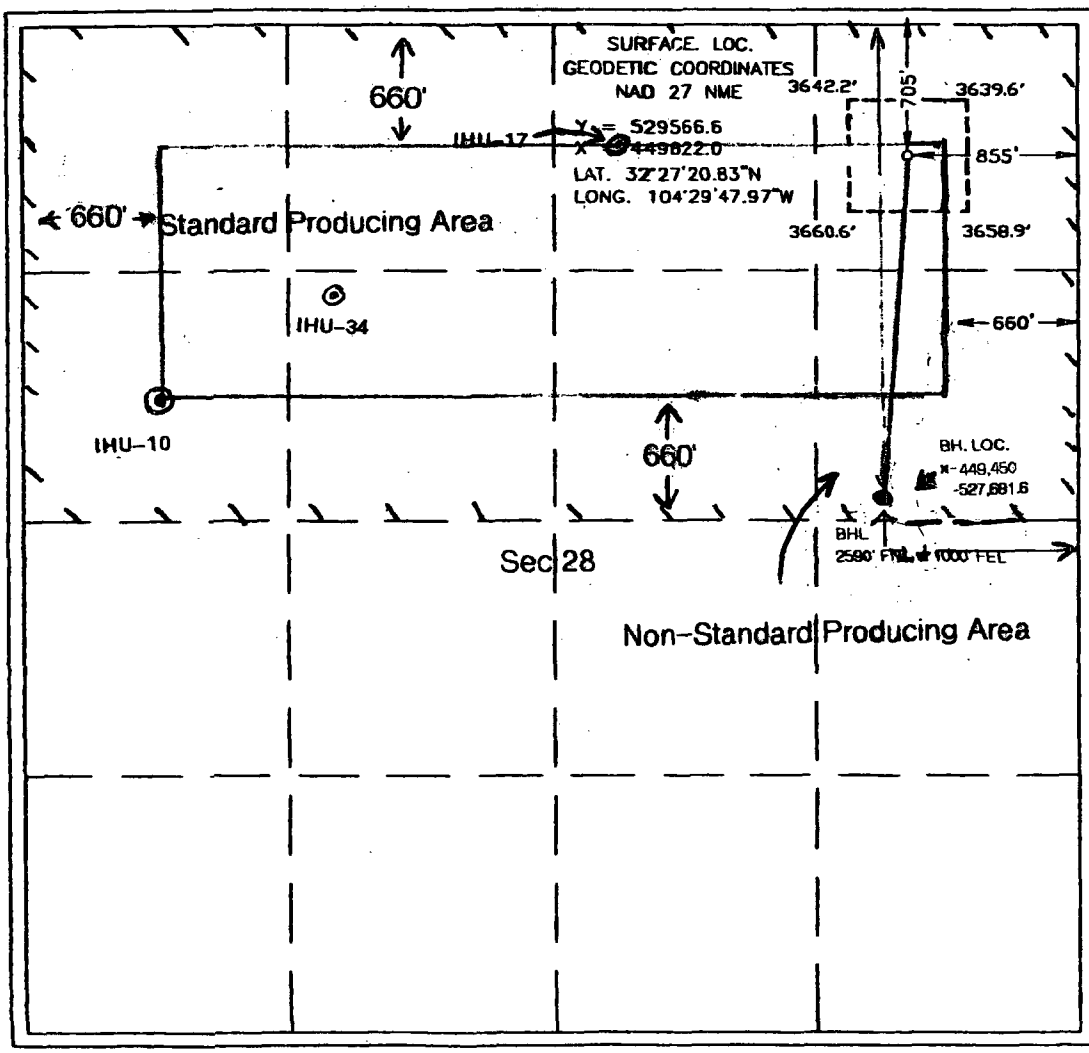
UL or lot No.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
A	28	21-S	24-E		705'	NORTH	855'	EAST	EDDY

Bottom Hole Location If Different From Surface

UL or lot No.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
H	28	21-S	24-E		2590	NORTH	1000	EAST	EDDY

Dedicated Acres	Joint or Infill	Consolidation Code	Order No.
320 N/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.

Mike Mick
Signature

Mike Mick
Printed Name

ADV. SR. Eng. Tech
Title

5-21-04
Date

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 supervison, and that the same is true and correct to the best of my belief.

AUGUST 13, 2002
Date Surveyed: AWB

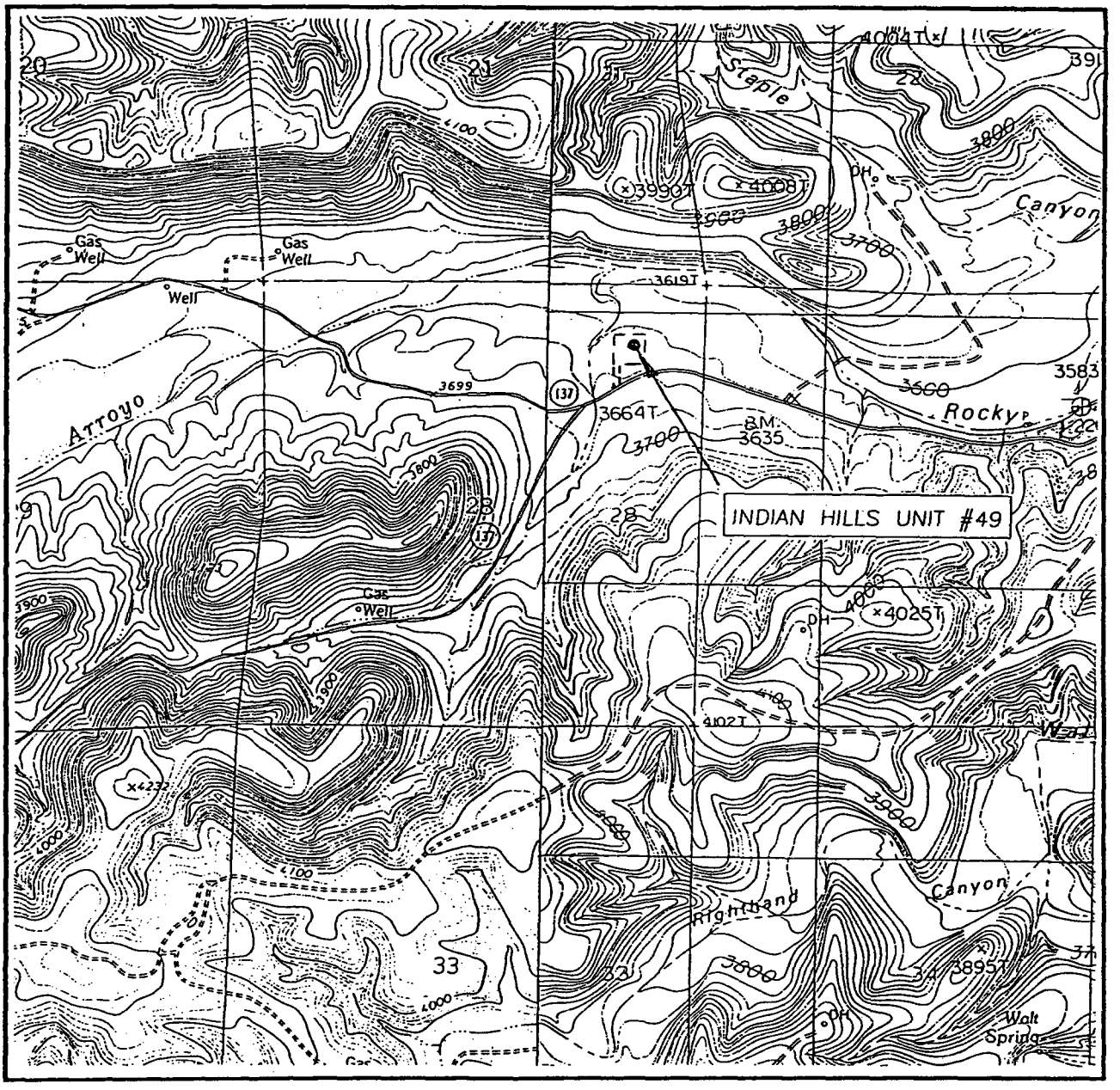
Signature & Seal of Professional Surveyor

Gary L. Eidson 3/7/03
02.11.0576

Certificate No. RONALD J. EIDSON 3239
GARY L. EIDSON 12641

ATTACHMENT #2

LOCATION VERIFICATION MAP



SCALE: 1" = 2000'

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

SEC. 28 TWP. 21-S RGE. 24-E

SURVEY N.M.P.M.

COUNTY EDDY

DESCRIPTION 705' FNL 855' FEL

ELEVATION 3649'

OPERATOR MARATHON OIL COMPANY

LEASE INDIAN HILLS UNIT

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

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

Marathon Oil Company

Structure : Indian Hills Unit #49 Slot : slot #1

Field : INDIAN BASIN Location : Eddy County New Mexico

Created by: danf
Date plotted : 21-May-2004
Plot Reference is ST Pln 2.
Coordinates are in feet reference slot #1.
True Vertical Depths are reference rotary table.
49stp2pp
--- Baker Hughes INTEQ ---

WELL PROFILE DATA

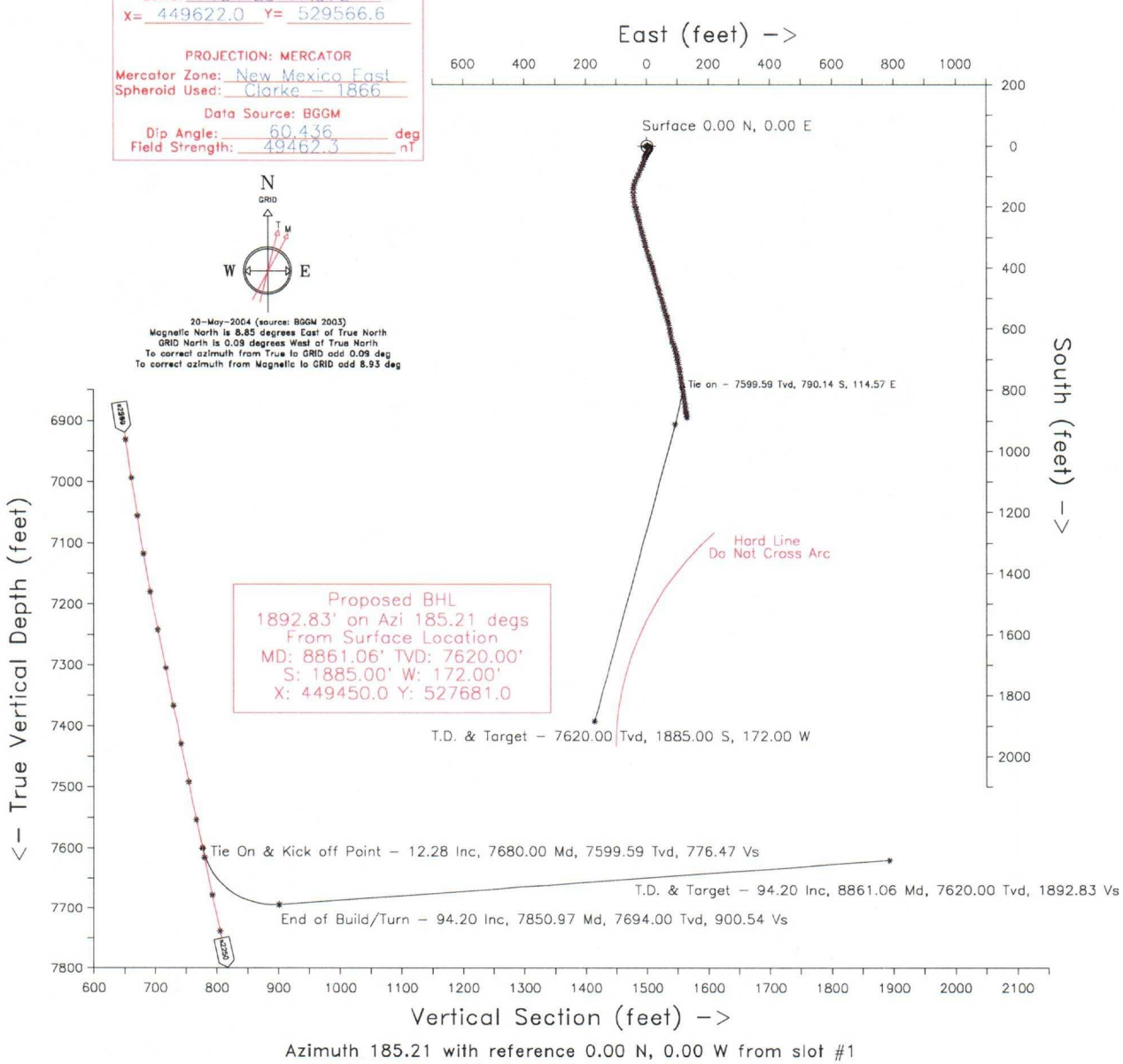
Point	MD	Inc	Dir	TVD	North	East	V. Sect	Deg/100
KOP	7680.00	12.28	170.32	7599.59	-790.14	114.57	776.47	0.00
End of Build/Turn	7850.97	94.20	195.14	7694.00	-912.59	91.10	900.54	48.58
T.D. & Target BHL	8861.06	94.20	195.14	7620.00	-1885.00	-172.00	1892.83	0.00

STRUCTURE SET-UP REFERENCE

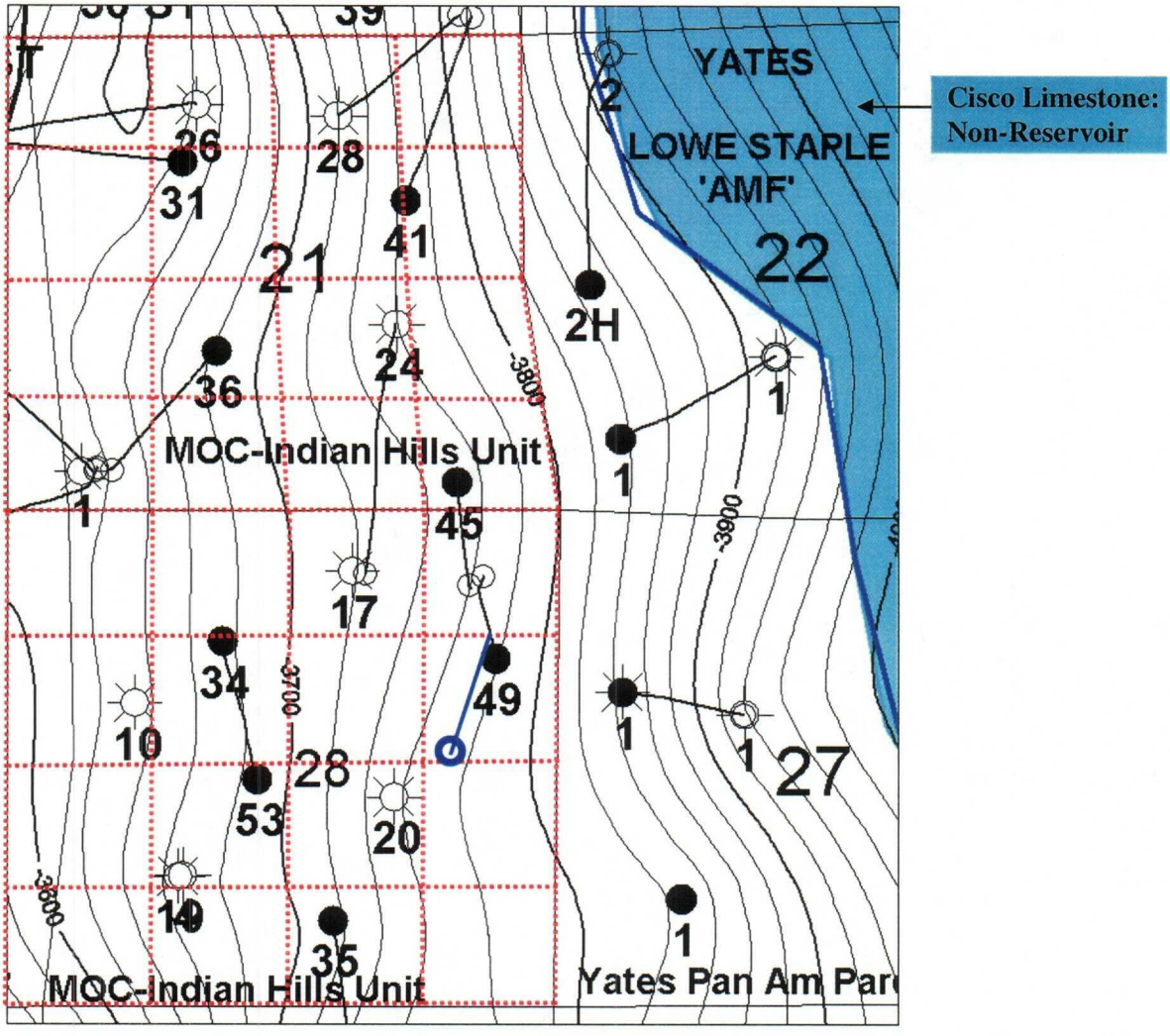
LAT : 32 27 20.826 N
LONG: 104 29 47.972 W
X= 449622.0 Y= 529566.6

PROJECTION: MERCATOR
Mercator Zone: New Mexico East
Spheroid Used: Clarke - 1866
Data Source: BGGM
Dip Angle: 60.436 deg
Field Strength: 49462.3 nT

20-May-2004 (source: BGGM 2003)
Magnetic North is 8.85 degrees East of True North
GRID North is 0.09 degrees West of True North
To correct azimuth from True to GRID add 0.09 deg
To correct azimuth from Magnetic to GRID add 8.93 deg



STRUCTURAL ELEVATION, TOP OF UPPER PENNSYLVANIAN AND PROPOSED IHU #49 LOCATION



Indian Hills Unit #49 Horizontal Well Assessment
Structural Section Hung on -4100'

Attachment #5