



PHOENIX
TECHNOLOGY SERVICES

October 27, 2014

Oil Conservation Division
State of New Mexico
811 S. First St.
Artesia, New Mexico 88210

Dear District 2 - Artesia

Attention: Regulatory Department

Re: Apache Corporation
Raven Federal #19H
Eddy County, NM
API #30-015-40916
Job No. 1411705

NM OIL CONSERVATION
ARTESIA DISTRICT
OCT 31 2014
RECEIVED

Enclosed please find the Survey Data Certification, and the original Plat and one copy of the Survey Report performed on the above referenced Well by Phoenix Technology Services, Inc. (P-5 No. 664171). Other information required by your office is as follows:

Name & Title of Surveyor	Drain Hole Number	Surveyed Depths		Dates Performed		Type of Survey
		From	To	Start	End	
Will St. John	19H	497	9,244	09/19/14	09/29/14	MWD

A certified plat on which the bottom hole location is oriented both to the surface location and to the lease lines (or unit lines in case of pooling) is attached to the survey report. If any other information is required, please contact the undersigned at the letterhead address and phone number.

Best Regards,

Dana Robinson

Dana Robinson
Operations Administrator
Certified mail receipt number: _____

7011 1570 0001 4365 2544

Phoenix Technology Services
SURVEY DATA CERTIFICATION



PHOENIX JOB NUMBER

1411705

OPERATOR

Apache Corporation

WELL NAME

Raven Federal #19H

COUNTY & STATE

Eddy County, New Mexico

API WELL NUMBER

3001540916

PROPOSED DIRECTION

279.32

TIE-IN DATA						
MEASURED	VERTICAL			N-S	E-W	DATA
DEPTH	DEPTH	INCLIN	AZIMUTH	COORD	COORD	SOURCE
405 ft	404.99 ft	0.61	223.57	1.85 ft	47 ft	Gyro

FIRST	FIRST		
SURVEY	SURVEY		
DATE	DEPTH	INCLIN	AZIMUTH
19-Sep-14	497 ft	0.8	216.1

SURVEY INSTRUMENT

TYPE

Phoenix MWD

LAST	LAST		
SURVEY	SURVEY		
DATE	DEPTH	INCLIN	AZIMUTH
29-Sep-14	9,244 ft	90.8	269.6

TO THE BEST OF MY KNOWLEDGE I
CERTIFY THIS SURVEY DATA TO BE
TRUE AND CORRECT.

PROJECTED	PROJECTED		
TD SURVEY	TD SURVEY		
DATE	DEPTH	INCLIN	AZIMUTH
29-Sep-14	9,315 ft	90.8	269.6

Will St. John

PRINT YOUR NAME ABOVE

Will St., John

SIGN YOUR NAME ABOVE

MAGNETIC DECLINATION OR TOTAL GRID

TOTAL CORRECTION USED

7.39

DECLINATION OR GRID

DECLINATION

29-Sep-2014

TODAY'S DATE

MWD SUPERVISOR 1

Will St. John

DIRECTIONAL DRILLER 1

Jon Woodgate

MWD SUPERVISOR 2

Shelby Johnson

DIRECTIONAL DRILLER 2

Brad Jones

12329 Cullen Road Houston, Texas 77066

(713)3370609 (Voice), (713)337-0599 (Fax)

DISTRICT I
1625 N. French Dr., Hobbs, NM 88240
Phone: (575) 393-6161 Fax: (575) 393-0720

DISTRICT II
811 S. First St., Artesia, NM 88210
Phone: (575) 748-1283 Fax: (575) 748-9720

DISTRICT III
1000 Rio Brazos Road, Aztec, NM 87410
Phone: (505) 334-6178 Fax: (505) 334-6170

DISTRICT IV
1220 S. St. Francis Dr., Santa Fe, NM 87505
Phone: (505) 476-3460 Fax: (505) 476-3462

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

NM OIL CONSERVATION DISTRICT
ARTESIA DISTRICT
Revised August 1, 2011
Submit one copy to appropriate District Office
OCT 31 2014

RECEIVED
AMENDED REPORT

WELL LOCATION AND ACREAGE DEDICATION PLAT

API Number	Pool Code	Pool Name
Property Code	Property Name RAVEN FEDERAL	Well Number 19H
OGRID No.	Operator Name APACHE CORPORATION	Elevation 3713'

Surface Location

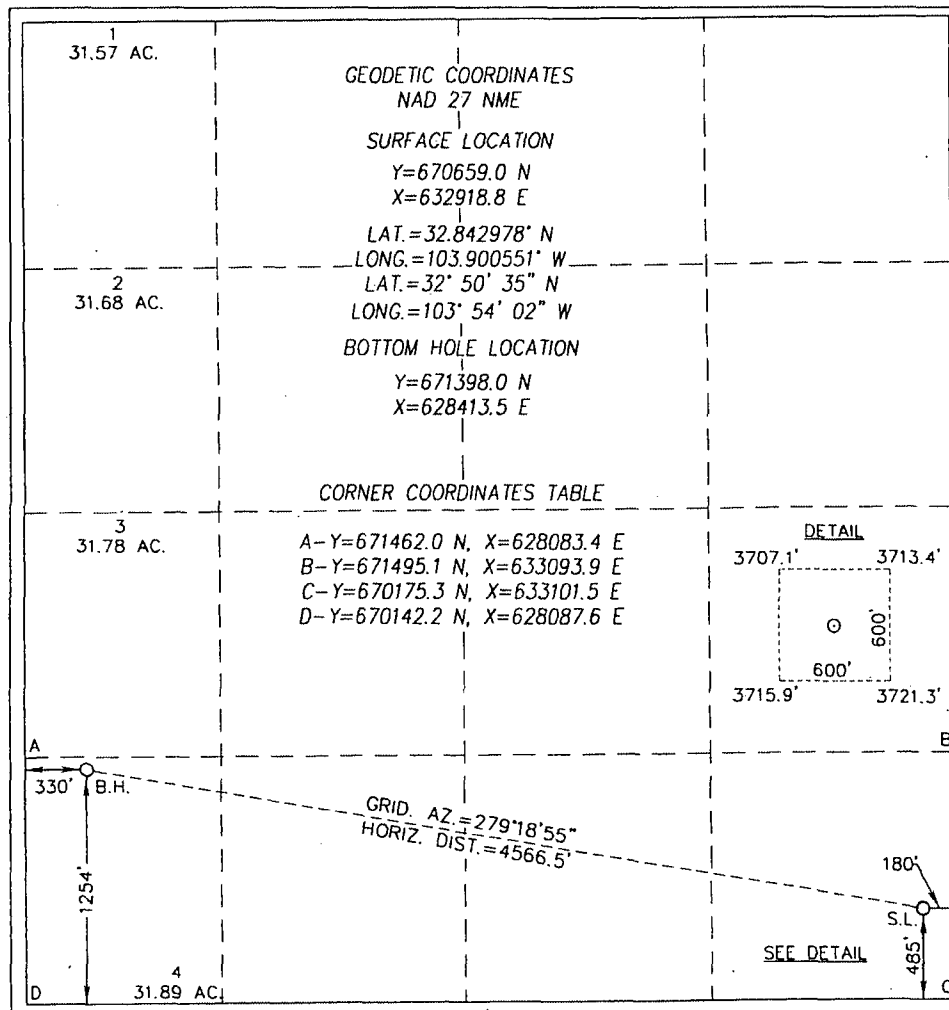
UL or lot No.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
P	7	17-S	31-E		485	SOUTH	180	EAST	EDDY

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
4	7	17-S	31-E		1254	SOUTH	330	WEST	EDDY

Dedicated Acres	Joint or Infill	Consolidation Code	Order No.

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 that the information herein is true and complete to the best of my knowledge and belief, and that this organization either owns a working interest or unleased mineral interest in the land including the proposed bottom hole location or has a right to drill this well at this location pursuant to a contract with an owner of such mineral or working interest, or to a voluntary pooling agreement or a compulsory pooling order heretofore entered by the division.

Signature _____ Date _____

Printed Name _____

E-mail Address _____

SURVEYOR CERTIFICATION

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

APRIL 19, 2012

Date of Survey _____
Signature & Seal of Professional Surveyor:

GARY C. EIDSON
NEW MEXICO
12641
REG. SURVEYOR
Certificate Number... Gary C. Eidson 12641
PROFESSIONAL J. Eidson 3239
DSR Ref. W.O. #12440769 JWSC W.O.: 14.13.0346

NM OIL CONSERVATION
ARTESIA DISTRICT
OCT 31 2014
RECEIVED

Apache Corporation

Eddy County, NM (NAD27 NME)

Raven Federal

#19H

WB1/Job #1411705

Survey: Phoenix MWD Survey

Standard Survey Report

27 October, 2014

Phoenix

Survey Report

Company:	Apache Corporation	Local Co-ordinate Reference:	Well #19H
Project:	Eddy County, NM (NAD27 NME)	TVD Reference:	KB @ 3724.00usft (Capstar 114)
Site:	Raven Federal	MD Reference:	KB @ 3724.00usft (Capstar 114)
Well:	#19H	North Reference:	Grid
Wellbore:	WB1/Job #1411705	Survey Calculation Method:	Minimum Curvature
Design:	Surveys (Capstar 114)	Database:	Compass 5000 GCR epdm

Project	Eddy County, NM (NAD27 NME)		
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	Raven Federal
-------------	---------------

Site Position:		Northing:	673,239.70 usft	Latitude:	32° 51' 0.24298 N
From:	Map	Easting:	633,303.50 usft	Longitude:	103° 53' 57.35087 W
Position Uncertainty:	0.00 usft	Slot Radius:	13-3/16 "	Grid Convergence:	0.24 °

Well	#19H				
Well Position	+N/-S	0.00 usft	Northing:	670,659.00 usft	Latitude: 32° 50' 34.72230 N
	+E/-W	0.00 usft	Easting:	632,918.80 usft	Longitude: 103° 54' 1.98434 W
Position Uncertainty	0.00 usft		Wellhead Elevation:	usft	Ground Level: 3,713.00 usft

Wellbore	WB1/Job #1411705
-----------------	------------------

Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	BGGM2014	9/9/2014	7.56	60.62	48,584

Design	Surveys (Capstar 114)
---------------	-----------------------

Audit Notes:	
Version:	1.0
Phase:	ACTUAL
Tie On Depth:	0.00

Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)
	0.00	0.00	0.00	279.32

Survey Program		Date	10/27/2014		
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
100.00	405.00	Gyrodatta Gyro Survey (WB1/Job #141170)	NS-GYRO-MS	North sensing gyrocompassing m/s	
479.00	9,315.00	Phoenix MWD Survey (WB1/Job #141170)	PHX+MWD+BGGM	PHX+MWD+BGGM v3:standard declination	

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)
405.00	0.61	223.57	404.99	-1.85	0.47	-0.77	0.00	0.00	0.00
Tie-on to Gyro									
497.00	0.80	216.10	496.99	-2.72	-0.24	-0.20	0.23	0.21	-8.12
First Phoenix MWD Survey									
628.00	0.70	238.00	627.98	-3.89	-1.46	0.81	0.23	-0.08	16.72
757.00	0.90	235.60	756.96	-4.88	-2.96	2.13	0.16	0.16	-1.86
885.00	1.30	243.50	884.94	-6.09	-5.09	4.04	0.33	0.31	6.17
1,013.00	0.50	63.00	1,012.93	-6.49	-5.89	4.77	1.41	-0.63	140.23
1,141.00	1.20	79.30	1,140.92	-5.98	-4.08	3.06	0.57	0.55	12.73

Phoenix

Survey Report

Company:	Apache Corporation	Local Co-ordinate Reference:	Well #19H
Project:	Eddy County, NM (NAD27 NME)	TVD Reference:	KB @ 3724.00usft (Capstar 114)
Site:	Raven Federal	MD Reference:	KB @ 3724.00usft (Capstar 114)
Well:	#19H	North Reference:	Grid
Wellbore:	WB1/Job #1411705	Survey Calculation Method:	Minimum Curvature
Design:	Surveys (Capstar 114)	Database:	Compass 5000 GCR epdm

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)
1,270.00	1.90	78.10	1,269.87	-5.29	-0.66	-0.21	0.54	0.54	-0.93
1,398.00	1.60	59.50	1,397.81	-3.95	2.96	-3.56	0.50	-0.23	-14.53
1,526.00	1.10	33.20	1,525.77	-2.01	5.17	-5.43	0.61	-0.39	-20.55
1,653.00	1.10	34.60	1,652.75	0.01	6.53	-6.44	0.02	0.00	1.10
1,781.00	1.30	5.30	1,780.72	2.47	7.36	-6.86	0.50	0.16	-22.89
1,910.00	1.10	347.60	1,909.70	5.13	7.23	-6.30	0.32	-0.16	-13.72
2,038.00	1.10	324.20	2,037.67	7.33	6.25	-4.98	0.35	0.00	-18.28
2,166.00	1.50	312.10	2,165.64	9.45	4.29	-2.70	0.38	0.31	-9.45
2,295.00	1.30	316.60	2,294.60	11.65	2.03	-0.11	0.18	-0.16	3.49
2,423.00	1.50	312.20	2,422.56	13.83	-0.21	2.45	0.18	0.16	-3.44
2,551.00	1.70	306.20	2,550.51	16.07	-2.98	5.55	0.20	0.16	-4.69
2,680.00	1.60	296.20	2,679.46	18.00	-6.14	8.98	0.24	-0.08	-7.75
2,811.00	1.00	270.50	2,810.43	18.82	-8.93	11.86	0.63	-0.46	-19.62
2,938.00	1.00	274.00	2,937.41	18.90	-11.14	14.06	0.05	0.00	2.76
3,072.00	1.10	273.80	3,071.39	19.07	-13.59	16.50	0.07	0.07	-0.15
3,200.00	1.10	262.00	3,199.36	18.98	-16.03	18.90	0.18	0.00	-9.22
3,328.00	1.10	252.50	3,327.34	18.44	-18.42	21.17	0.14	0.00	-7.42
3,401.00	1.00	260.70	3,400.33	18.13	-19.72	22.40	0.25	-0.14	11.23
3,490.00	1.40	249.70	3,489.31	17.62	-21.51	24.08	0.52	0.45	-12.36
3,618.00	1.80	201.40	3,617.26	15.21	-23.71	25.86	1.06	-0.31	-37.73
3,747.00	1.00	168.10	3,746.22	12.22	-24.21	25.87	0.86	-0.62	-25.81
3,875.00	0.30	348.00	3,874.22	11.46	-24.05	25.59	1.02	-0.55	140.55
4,004.00	1.00	61.20	4,003.21	12.33	-23.14	24.83	0.74	0.54	56.74
4,132.00	1.20	62.10	4,131.19	13.49	-20.97	22.88	0.16	0.16	0.70
4,260.00	1.20	57.80	4,259.16	14.83	-18.65	20.81	0.07	0.00	-3.36
4,306.00	1.30	65.30	4,305.15	15.31	-17.77	20.02	0.42	0.22	16.30
4,320.00	1.30	67.70	4,319.14	15.44	-17.48	19.75	0.39	0.00	17.14
4,363.00	1.10	11.50	4,362.14	16.03	-16.95	19.32	2.66	-0.47	-130.70
4,405.00	4.90	318.60	4,404.08	17.77	-18.05	20.69	10.30	9.05	-125.95
4,448.00	11.10	313.20	4,446.64	21.98	-22.29	25.56	14.51	14.42	-12.56
4,491.00	18.20	313.00	4,488.21	29.40	-30.23	34.59	16.51	16.51	-0.47
4,534.00	25.50	313.30	4,528.10	40.35	-41.89	47.87	16.98	16.98	0.70
4,577.00	31.80	311.50	4,565.81	54.22	-57.13	65.16	14.79	14.65	-4.19
4,619.00	37.90	309.30	4,600.27	69.74	-75.42	85.72	14.83	14.52	-5.24
4,662.00	42.70	307.60	4,633.05	87.01	-97.20	110.01	11.45	11.16	-3.95
4,705.00	45.80	306.40	4,663.85	105.05	-121.17	136.58	7.47	7.21	-2.79
4,748.00	49.10	306.20	4,692.92	123.80	-146.70	164.81	7.68	7.67	-0.47
4,790.00	52.00	307.40	4,719.61	143.23	-172.66	193.57	7.25	6.90	2.86
4,833.00	54.10	309.90	4,745.46	164.70	-199.48	223.52	6.74	4.88	5.81
4,876.00	57.30	312.20	4,769.69	188.03	-226.26	253.72	8.65	7.44	5.35
4,919.00	63.20	312.80	4,791.02	213.25	-253.76	284.95	13.77	13.72	1.40
4,962.00	69.80	313.40	4,808.15	240.18	-282.54	317.70	15.40	15.35	1.40
5,004.00	76.50	314.00	4,820.32	267.94	-311.58	350.86	16.01	15.95	1.43

Phoenix Survey Report

Company:	Apache Corporation	Local Co-ordinate Reference:	Well #19H
Project:	Eddy County, NM (NAD27 NME)	TVD Reference:	KB @ 3724.00usft (Capstar 114)
Site:	Raven Federal	MD Reference:	KB @ 3724.00usft (Capstar 114)
Well:	#19H	North Reference:	Grid
Wellbore:	WB1/Job #1411705	Survey Calculation Method:	Minimum Curvature
Design:	Surveys (Capstar 114)	Database:	Compass 5000 GCR epdm

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)	
5,047.00	82.80	312.70	4,828.04	296.96	-342.33	385.90	14.95	14.65	-3.02	
5,090.00	86.10	311.60	4,832.20	325.67	-374.05	421.86	8.09	7.67	-2.56	
5,205.00	90.30	306.40	4,835.82	397.96	-463.33	521.67	5.81	3.65	-4.52	
5,333.00	90.40	300.60	4,835.03	468.58	-570.02	638.38	4.53	0.08	-4.53	
5,461.00	90.70	296.00	4,833.80	529.24	-682.69	759.39	3.60	0.23	-3.59	
5,590.00	91.30	291.70	4,831.55	581.38	-800.63	884.21	3.37	0.47	-3.33	
5,718.00	90.80	287.60	4,829.20	624.41	-921.13	1,010.09	3.23	-0.39	-3.20	
5,846.00	90.60	284.90	4,827.64	660.22	-1,043.99	1,137.13	2.11	-0.16	-2.11	
5,975.00	90.40	281.90	4,826.51	690.11	-1,169.46	1,265.79	2.33	-0.16	-2.33	
6,103.00	91.60	280.30	4,824.28	714.75	-1,295.04	1,393.70	1.56	0.94	-1.25	
6,234.00	91.00	276.70	4,821.31	734.11	-1,424.55	1,524.63	2.79	-0.46	-2.75	
6,363.00	90.50	273.10	4,819.62	745.12	-1,553.04	1,653.21	2.82	-0.39	-2.79	
6,491.00	90.70	269.90	4,818.28	748.47	-1,680.97	1,780.00	2.50	0.16	-2.50	
6,619.00	91.10	269.00	4,816.27	747.24	-1,808.95	1,906.09	0.77	0.31	-0.70	
6,747.00	91.60	269.30	4,813.25	745.34	-1,936.90	2,032.04	0.46	0.39	0.23	
6,876.00	90.60	270.90	4,810.77	745.57	-2,065.87	2,159.34	1.46	-0.78	1.24	
7,004.00	90.90	270.60	4,809.10	747.25	-2,193.85	2,285.90	0.33	0.23	-0.23	
7,132.00	91.00	269.30	4,806.98	747.13	-2,321.83	2,412.18	1.02	0.08	-1.02	
7,261.00	91.50	270.10	4,804.16	746.46	-2,450.79	2,539.33	0.73	0.39	0.62	
7,392.00	91.50	269.50	4,800.73	746.00	-2,581.75	2,668.48	0.46	0.00	-0.46	
7,520.00	92.00	269.20	4,796.82	744.55	-2,709.68	2,794.49	0.46	0.39	-0.23	
7,654.00	92.40	268.70	4,791.68	742.10	-2,843.56	2,926.20	0.48	0.30	-0.37	
7,782.00	91.80	270.50	4,786.99	741.20	-2,971.46	3,052.27	1.48	-0.47	1.41	
7,911.00	89.60	272.10	4,785.41	744.13	-3,100.41	3,179.99	2.11	-1.71	1.24	
8,039.00	89.80	272.10	4,786.08	748.82	-3,228.32	3,306.97	0.16	0.16	0.00	
8,167.00	90.50	270.20	4,785.75	751.39	-3,356.29	3,433.67	1.58	0.55	-1.48	
8,299.00	90.70	269.90	4,784.37	751.50	-3,488.28	3,563.94	0.27	0.15	-0.23	
8,427.00	91.00	269.10	4,782.47	750.39	-3,616.26	3,690.05	0.67	0.23	-0.63	
8,556.00	90.80	269.90	4,780.44	749.26	-3,745.24	3,817.14	0.64	-0.16	0.62	
8,684.00	91.00	269.60	4,778.43	748.70	-3,873.22	3,943.34	0.28	0.16	-0.23	
8,815.00	90.80	269.50	4,776.37	747.68	-4,004.20	4,072.43	0.17	-0.15	-0.08	
8,944.00	89.80	269.90	4,775.70	747.00	-4,133.19	4,199.61	0.83	-0.78	0.31	
9,077.00	90.20	269.60	4,775.70	746.42	-4,266.19	4,330.76	0.38	0.30	-0.23	
9,244.00	90.80	269.60	4,774.24	745.25	-4,433.18	4,495.35	0.36	0.36	0.00	
Last Phoenix MWD Survey										
9,315.00	90.80	269.60	4,773.25	744.76	-4,504.17	4,565.33	0.00	0.00	0.00	
Projection to Bit										

Phoenix

Survey Report

Company:	Apache Corporation	Local Co-ordinate Reference:	Well #19H
Project:	Eddy County, NM (NAD27 NME)	TVD Reference:	KB @ 3724.00usft (Capstar 114)
Site:	Raven Federal	MD Reference:	KB @ 3724.00usft (Capstar 114)
Well:	#19H	North Reference:	Grid
Wellbore:	WB1/Job #1411705	Survey Calculation Method:	Minimum Curvature
Design:	Surveys (Capstar 114)	Database:	Compass 5000.GCR epdm

Survey Annotations				
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
405.00	404.99	-1.85	0.47	Tie-on to Gyro
497.00	496.99	-2.72	-0.24	First Phoenix MWD Survey
9,244.00	4,774.24	745.25	-4,433.18	Last Phoenix MWD Survey
9,315.00	4,773.25	744.76	-4,504.17	Projection to Bit

Checked By: _____	Approved By: _____	Date: _____
-------------------	--------------------	-------------