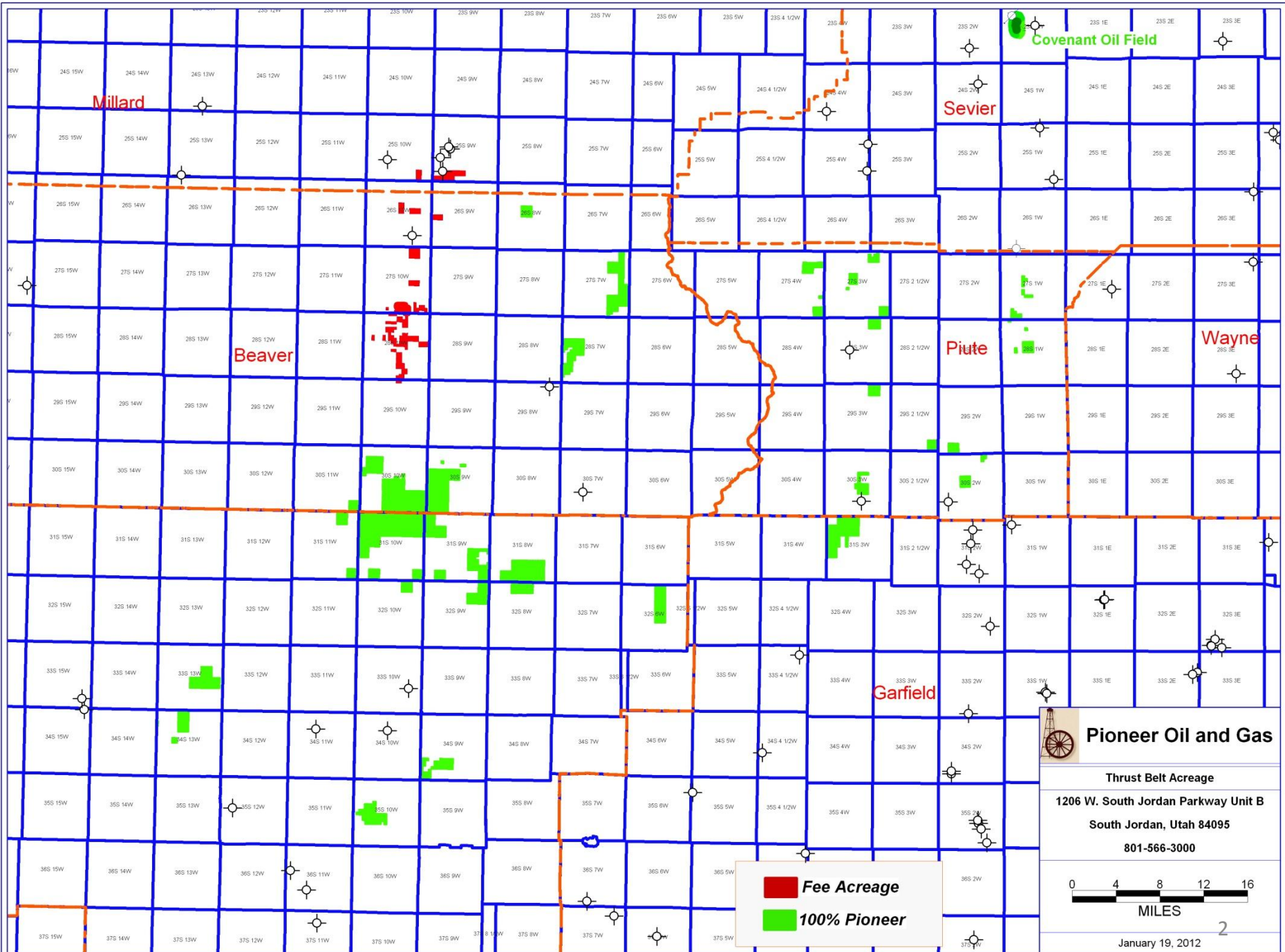
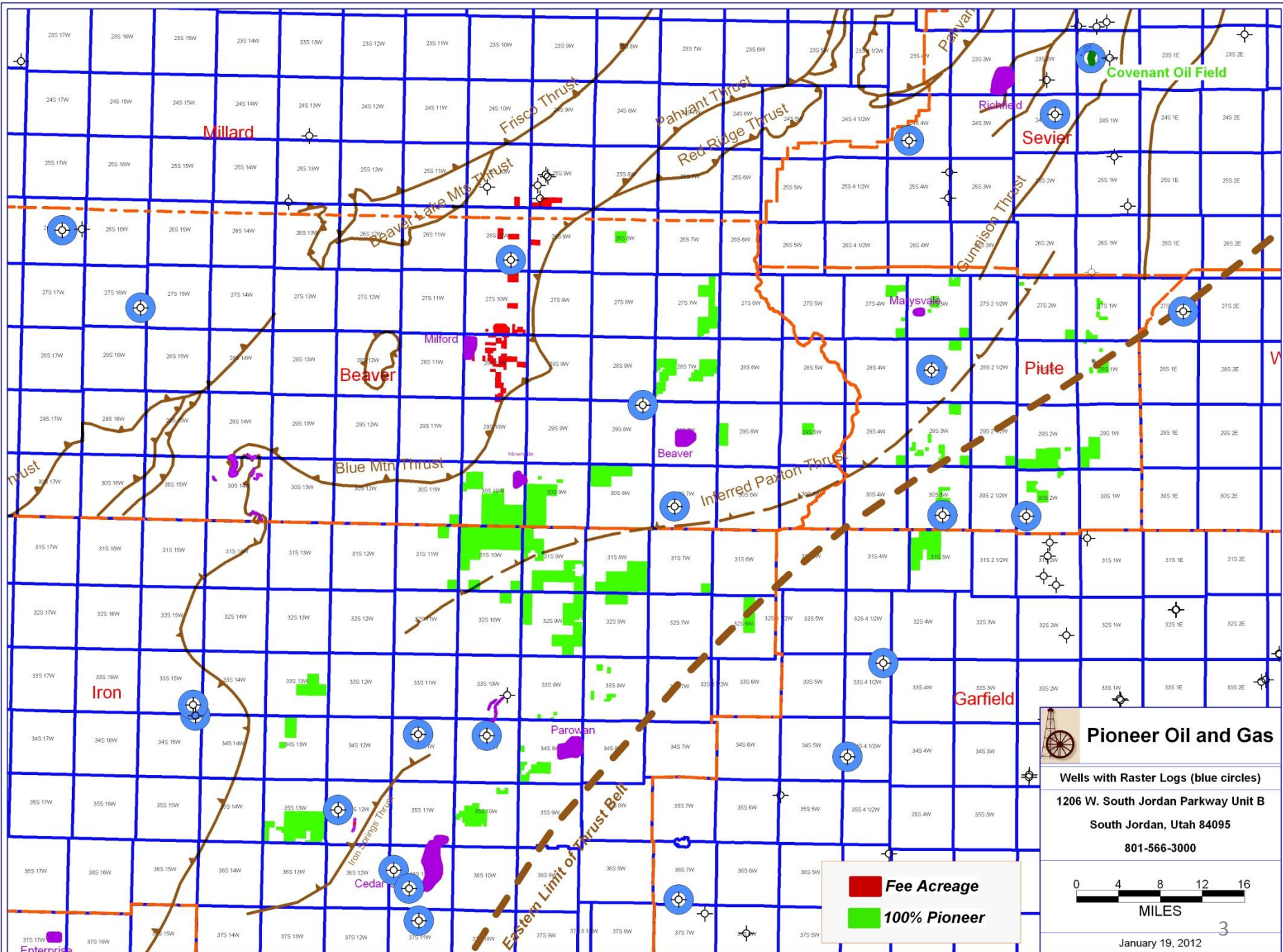




Location Map for the Central Utah Thrust Belt Project



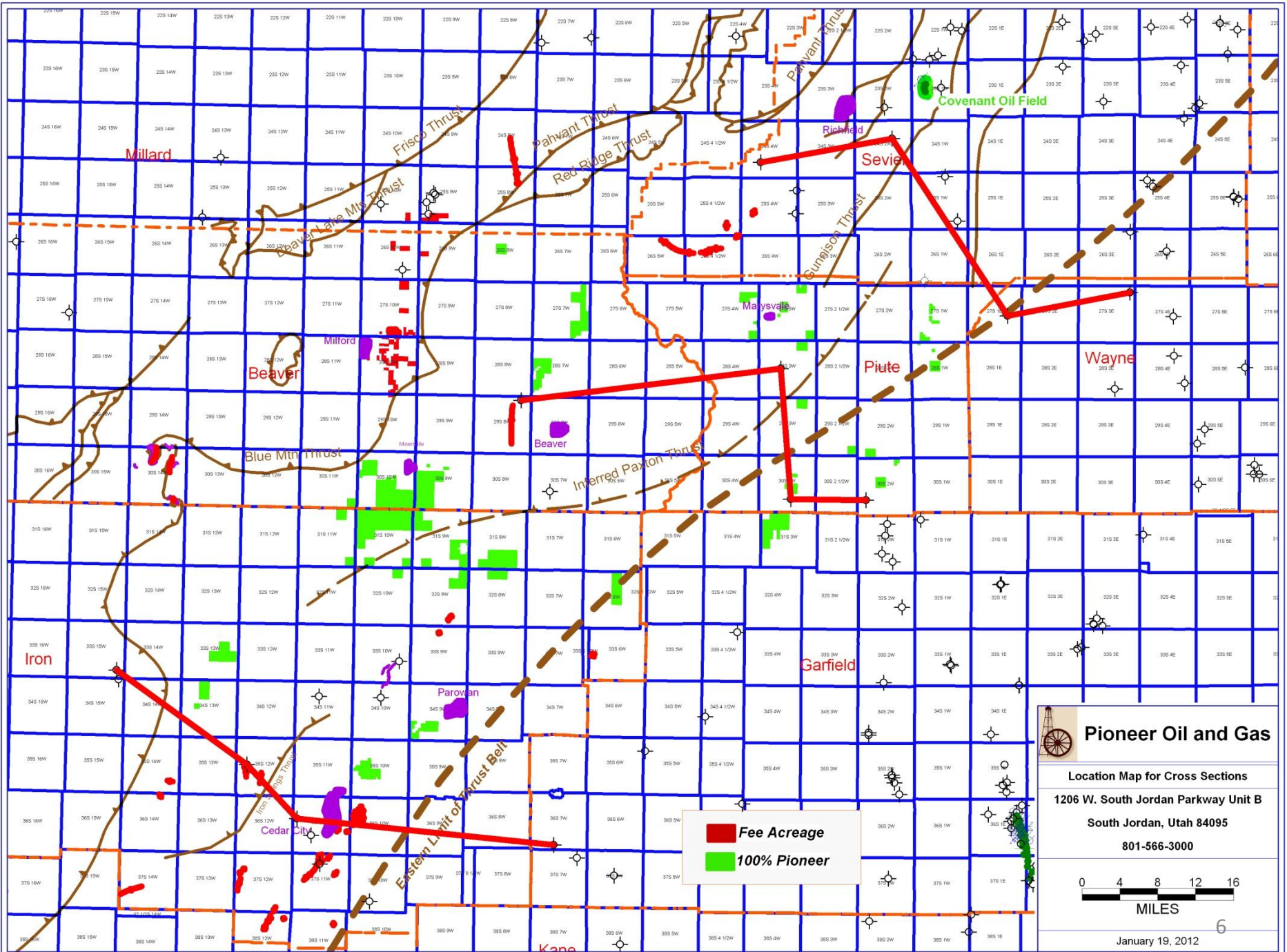


AGE		CENTRAL UTAH THRUST BELT			
		WESTERN AREA	CENTRAL AREA	EASTERN AREA	
Cenozoic	Tertiary	Tertiary strata			
	Cretaceous	Canyon Range Conglomerate	North Horn Formation		Mesaverde Group
Indianola Group			Sixmile Canyon Formation	Mancos Shale	upper Blue Gate Shale ●
			Funk Valley Formation ☆		Emery Sandstone ●
Allen Valley Shale			Ferron Sandstone ☆		
Sanpete Formation			Dakota Sandstone ☆		
San Pitch Formation	Cedar Mountain Formation				
Jurassic	Upper Jurassic strata missing		Morrison Formation		
	Twist Gulch Formation		Summerville Formation Curtis Formation Entrada Sandstone		
	Arapien Shale		Carmel Formation		
	Twin Creek Limestone ☆ <small>(Watton Canyon, Boundary Ridge, Rich, Sliderock, and Gypsum Spring Mbrs)</small>				
	Navajo Sandstone ☆				
Triassic	Ankareh Formation ☆ Thaynes Limestone ☆ Woodside Shale	Chinle Formation ☆ Moenkopi Formation ☆			
Permian	Park City/Phosphoria Fm ●	Kaibab Limestone ☆	Black Box Dolomite ☆		
	Diamond Creek Sandstone ☆ Kirkman Limestone ☆	Toroweap Formation ☆ ●	White Rim Sandstone ☆		
Pennsylvanian	Oquirrh Group		Pennsylvanian strata missing		
Mississippian	Manning Canyon Shale ● Great Blue Limestone ☆	Doughnut Formation ●	Upper Mississippian strata missing		
	Humberg Formation ☆				
	Deseret Limestone ☆ ● (includes Delle Phosphatic Shale Member)		Redwall Limestone ☆		
	Gardison Limestone ☆				
Devonian	Devonian strata (dolomite and sandstone)				
Silurian	Silurian strata (dolomite)	Silurian and Ordovician strata missing			
Ordovician	Ordovician strata (ls, dol, ss)				
Cambrian	Carbonate rocks undivided Ophir Formation Tintic Quartzite				

Central Utah Thrust Belt Stratigraphic Column

☆ reservoir rocks
● source rocks

Douglas A. Sprinkel, Utah Geological Survey



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Location Map for Cross Sections

1206 W. South Jordan Parkway Unit B

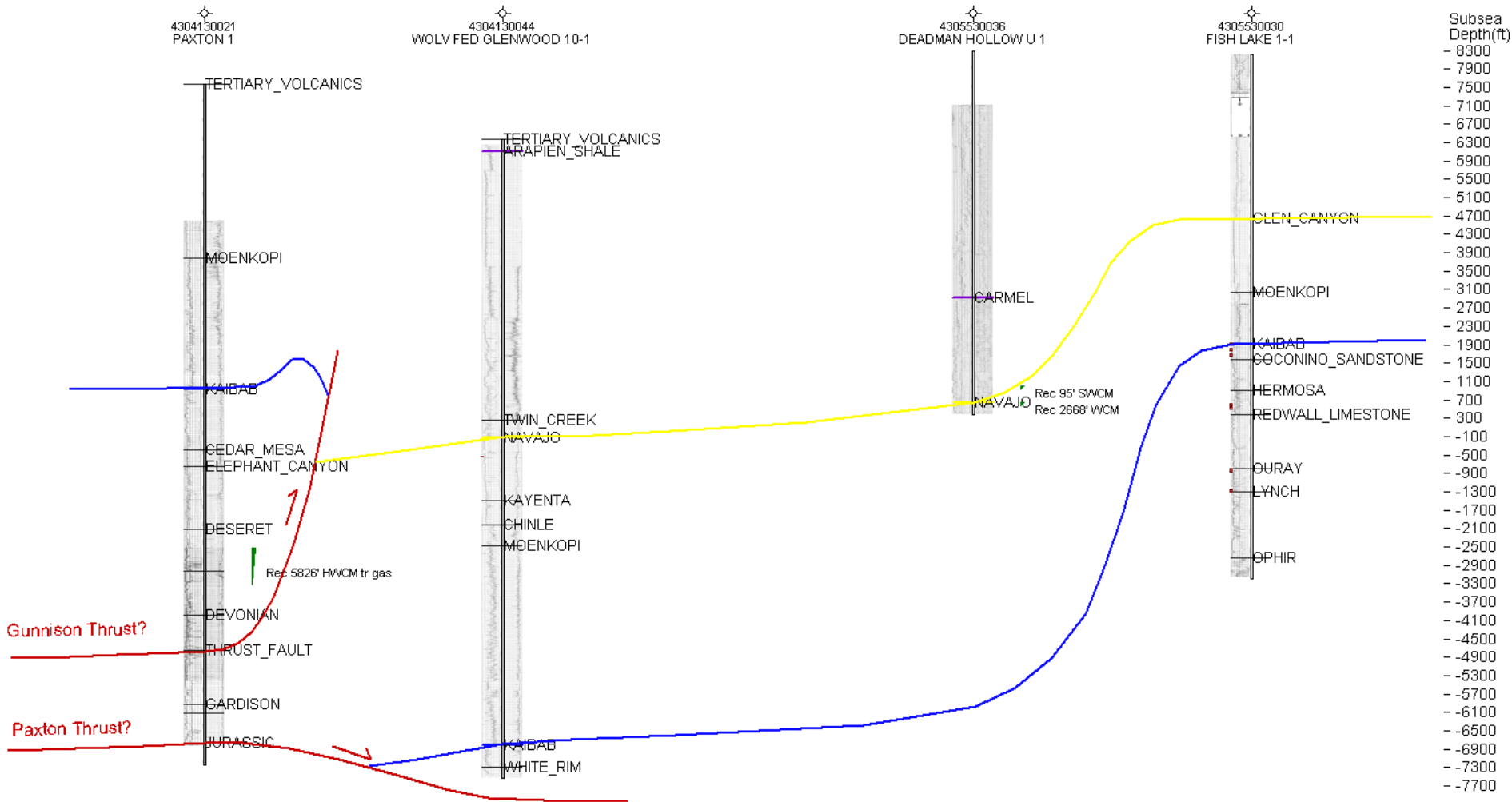
South Jordan, Utah 84095

801-566-3000

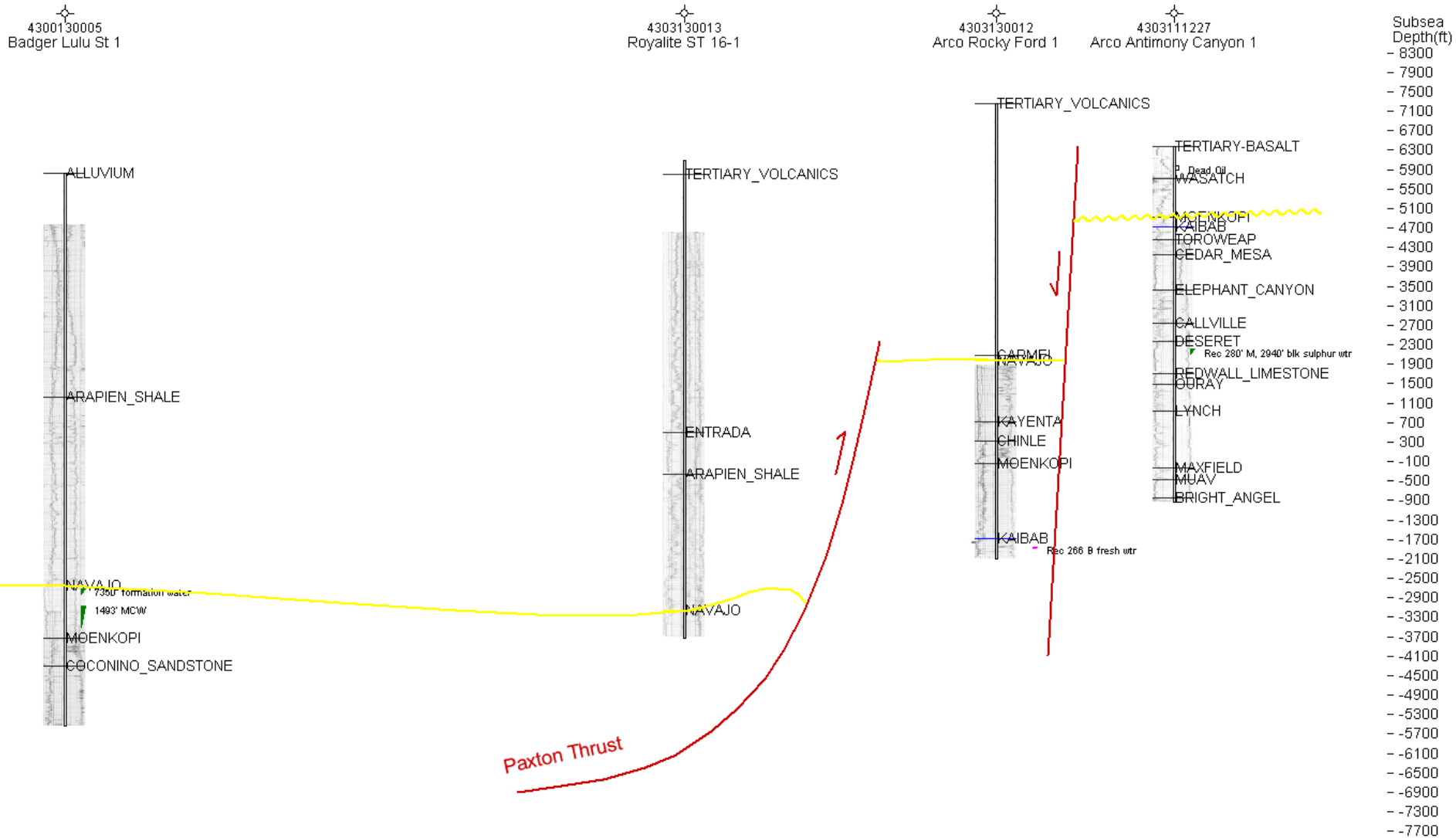
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January 19, 2012

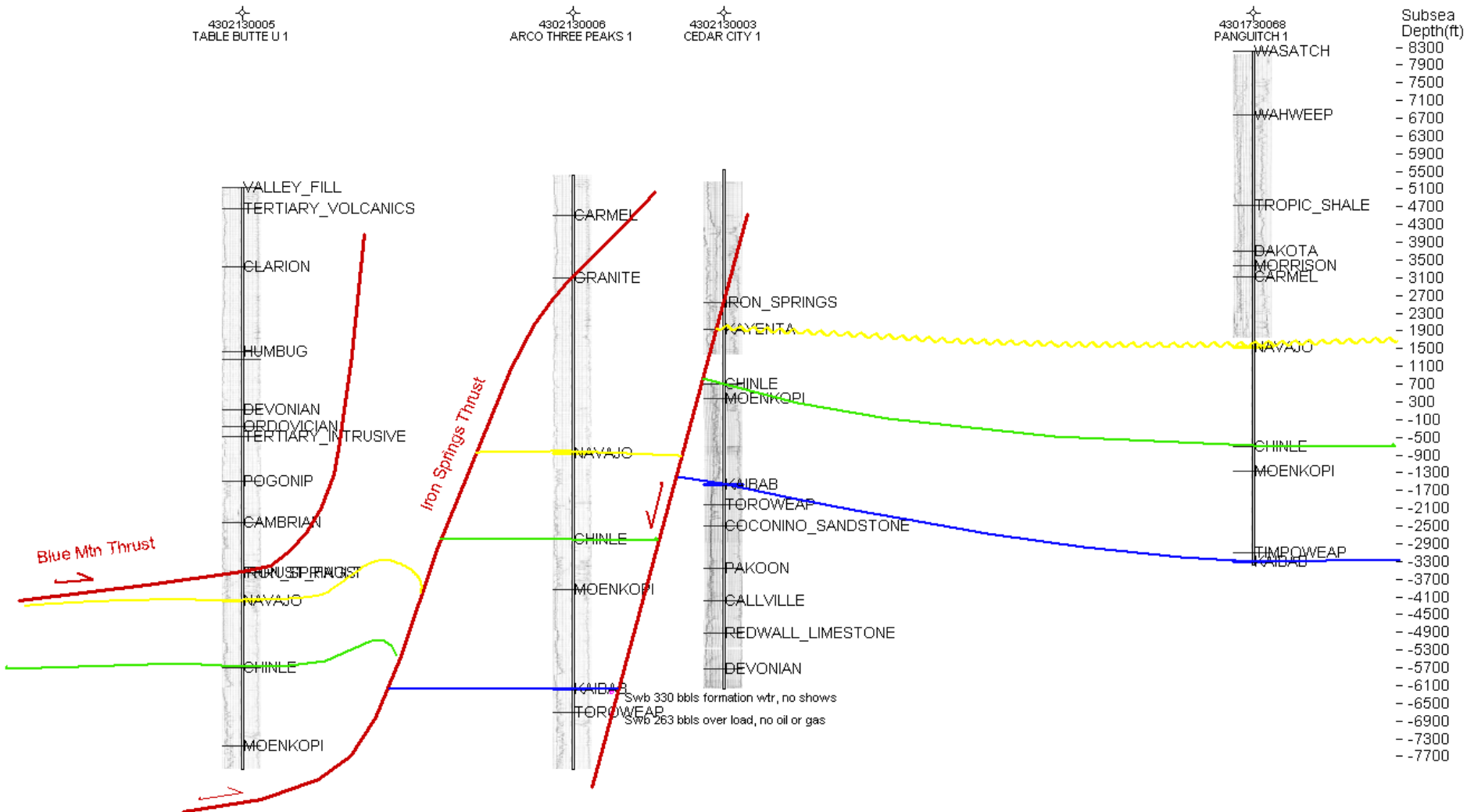
Northern East-West Structural Cross Section



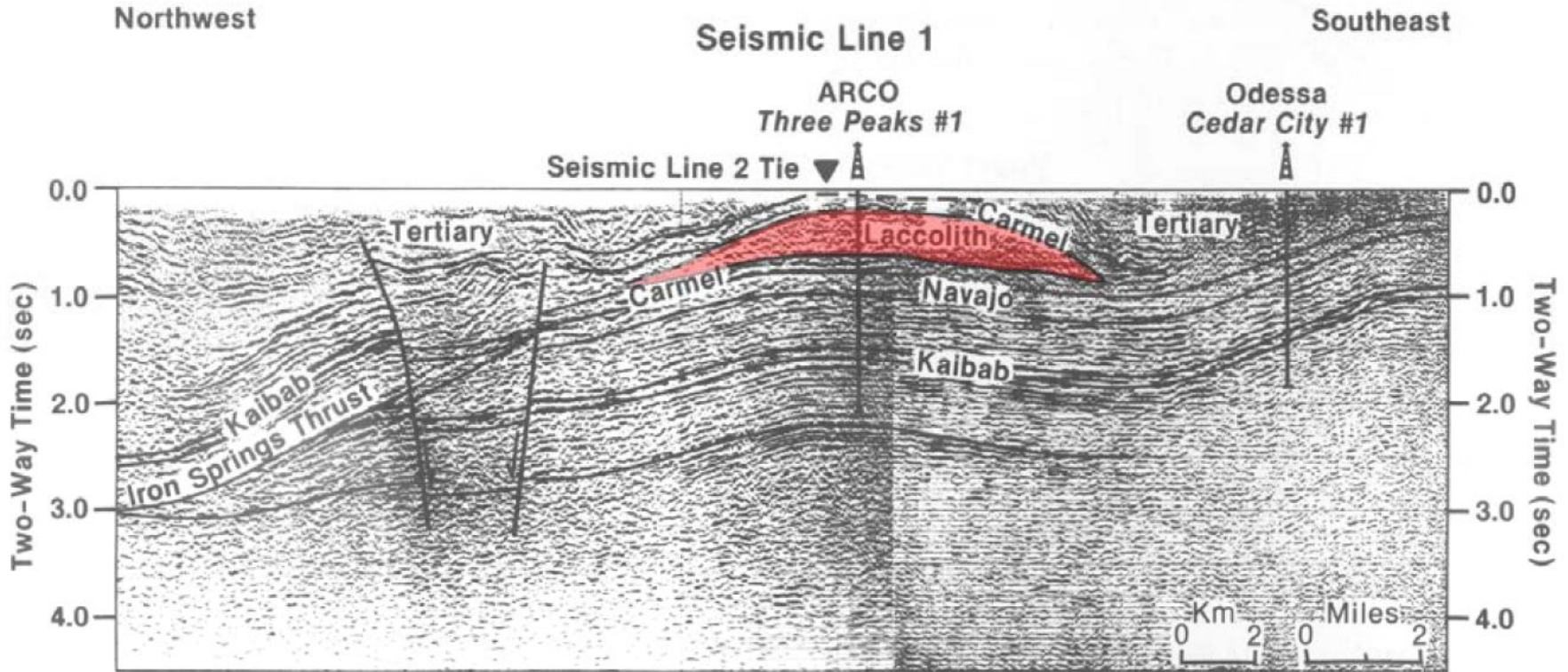
Central East-West Structural Cross Section



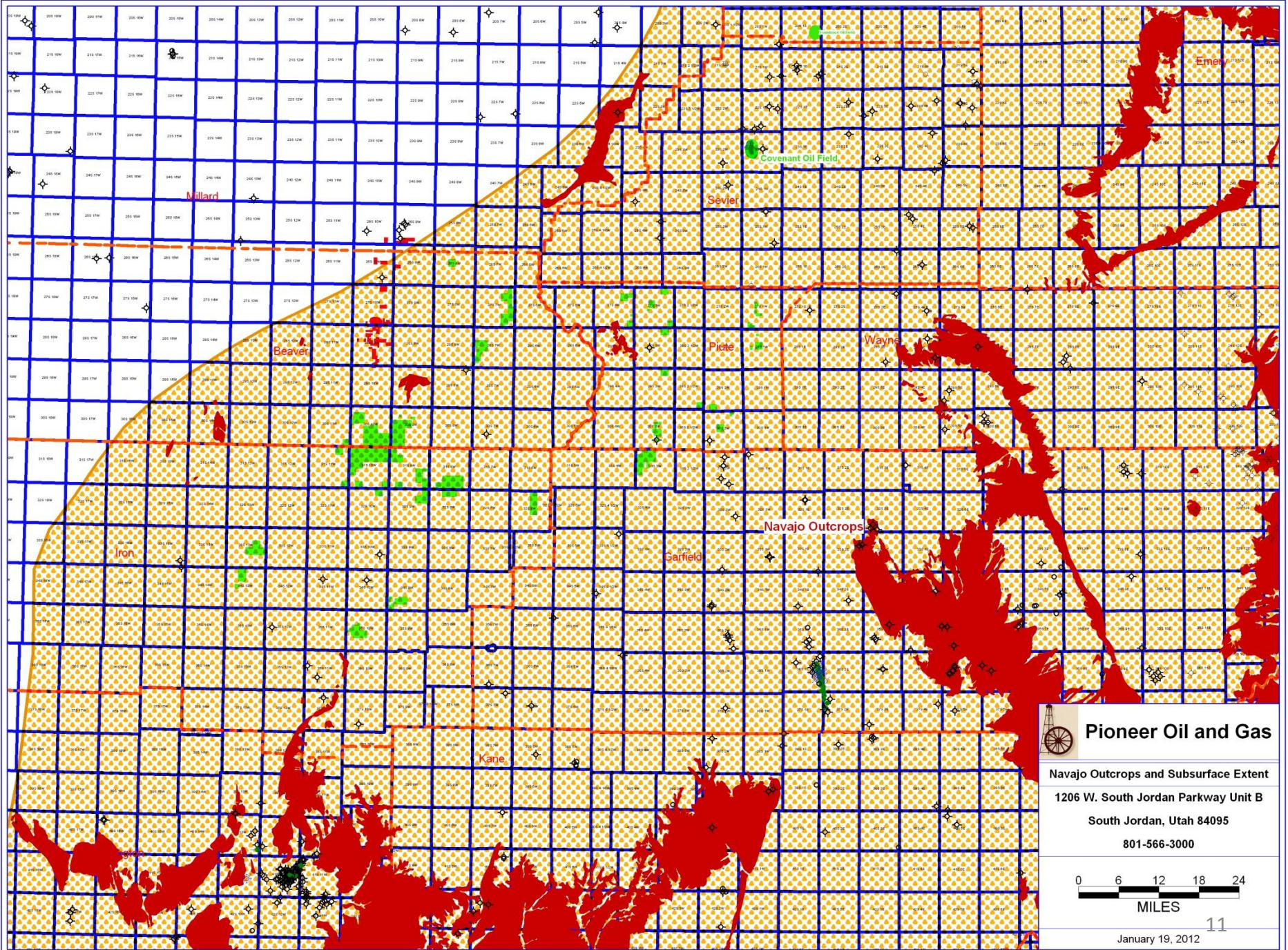
Southern East-West Structural Cross Section



2-D Seismic Line covering the central part of Southern East-West Structural Cross Section



Hacker, D. B. et al, 2007, Shallow Level Emplacement Mechanism of the Miocene Iron Axis Laccolith Group, Southwest Utah, GSA Rocky Mountain Section Annual Meeting, St. George, Utah



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Navajo Outcrops and Subsurface Extent

1206 W. South Jordan Parkway Unit B

South Jordan, Utah 84095

801-566-3000



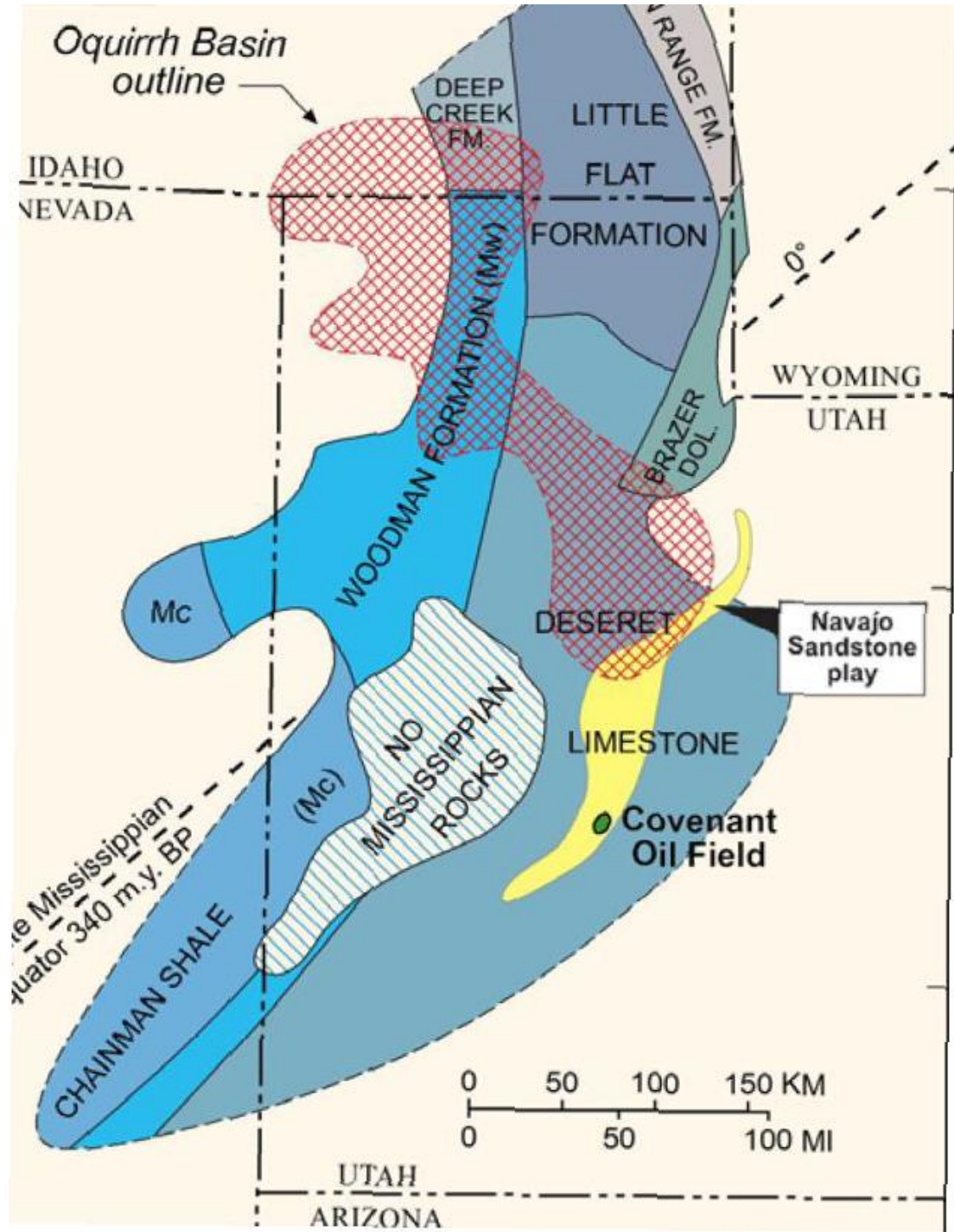
January 19, 2012 **11**

AGE		CENTRAL UTAH THRUST BELT			
		WESTERN AREA	CENTRAL AREA	EASTERN AREA	
Cenozoic	Tertiary	Tertiary strata			
	Cretaceous	Canyon Range Conglomerate	North Horn Formation		Mesaverde Group
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	Diamond Creek Sandstone ☆ Kirkman Limestone ☆	Toroweap Formation ☆ ●	White Rim Sandstone ☆		
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	Humbug Formation ☆				
	Deseret Limestone ☆ ● (includes Delle Phosphatic Shale Member)		Redwall Limestone ☆		
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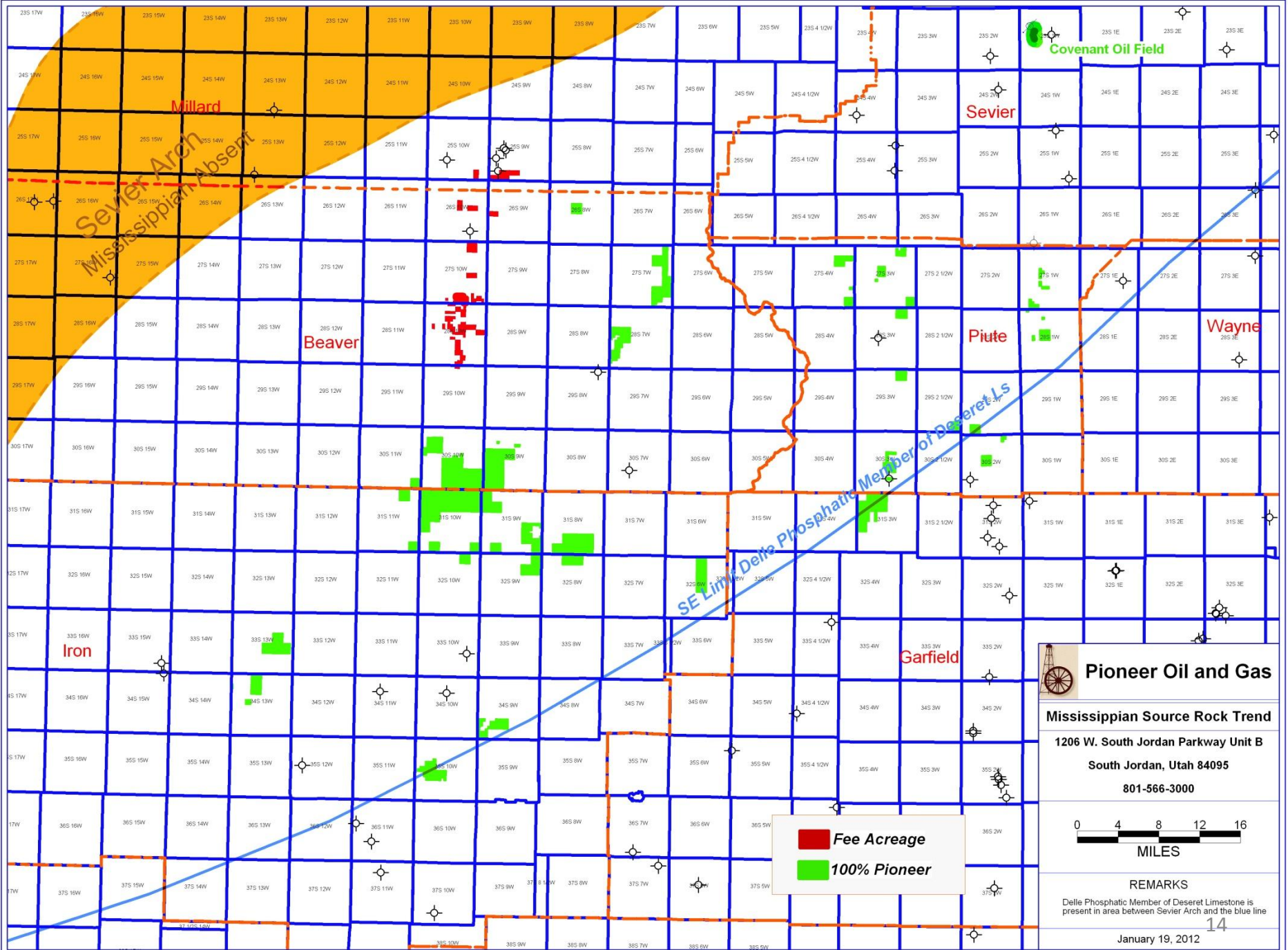
Central Utah Thrust Belt Stratigraphic Column

Potential Reservoir and Source Rock Intervals are highlighted

☆ reservoir rocks
● source rocks



Location of the Mississippian Delle Phosphatic Member present in the Deseret Limestone and other Mississippian formations (modified from Sandberg and Gutschick, 1984).



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Mississippian Source Rock Trend

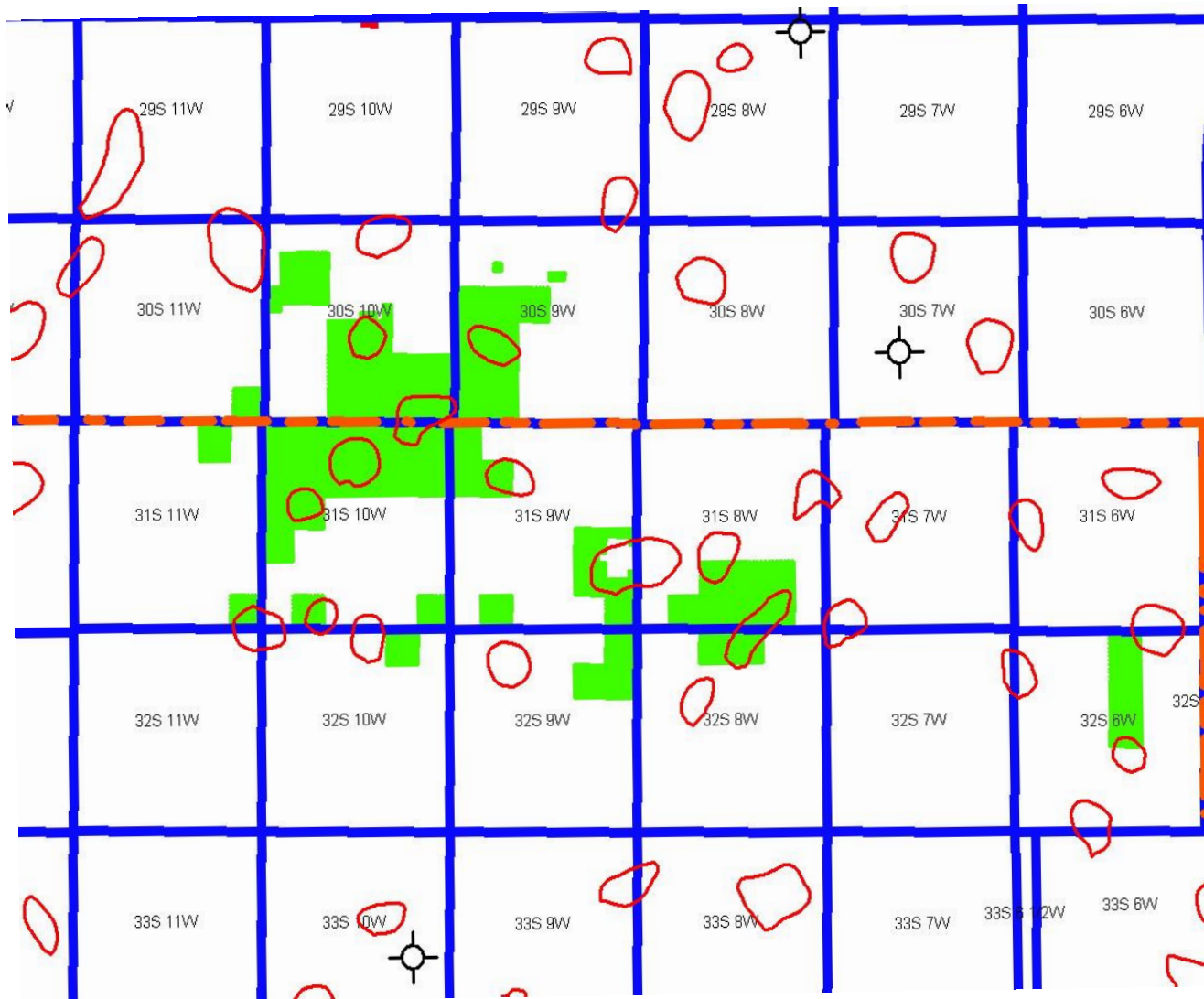
1206 W. South Jordan Parkway Unit B
 South Jordan, Utah 84095
 801-566-3000

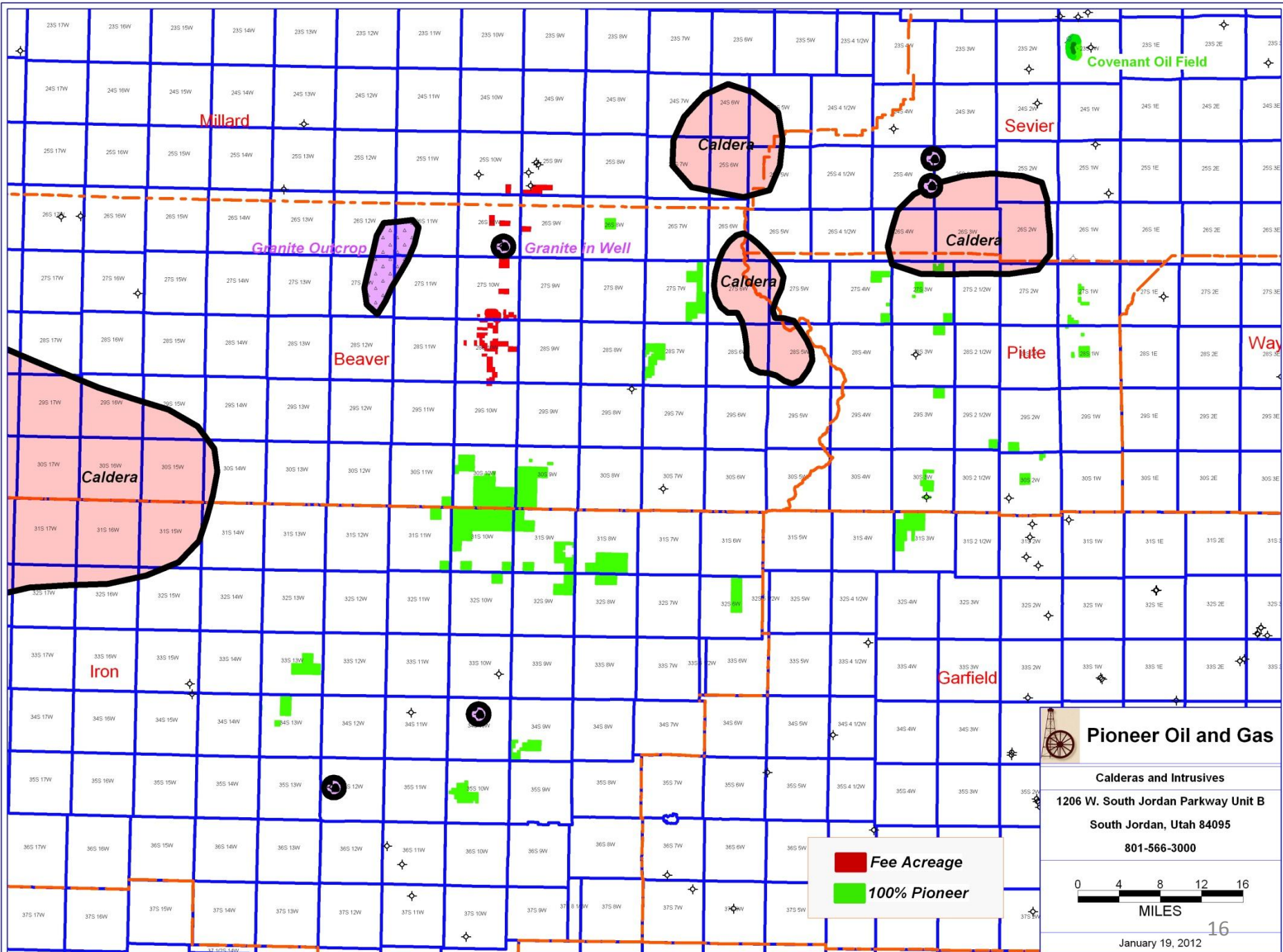
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REMARKS
 Delle Phosphatic Member of Deseret Limestone is present in area between Sevier Arch and the blue line

January 19, 2012

Satellite Geochem Ratio Anomalies





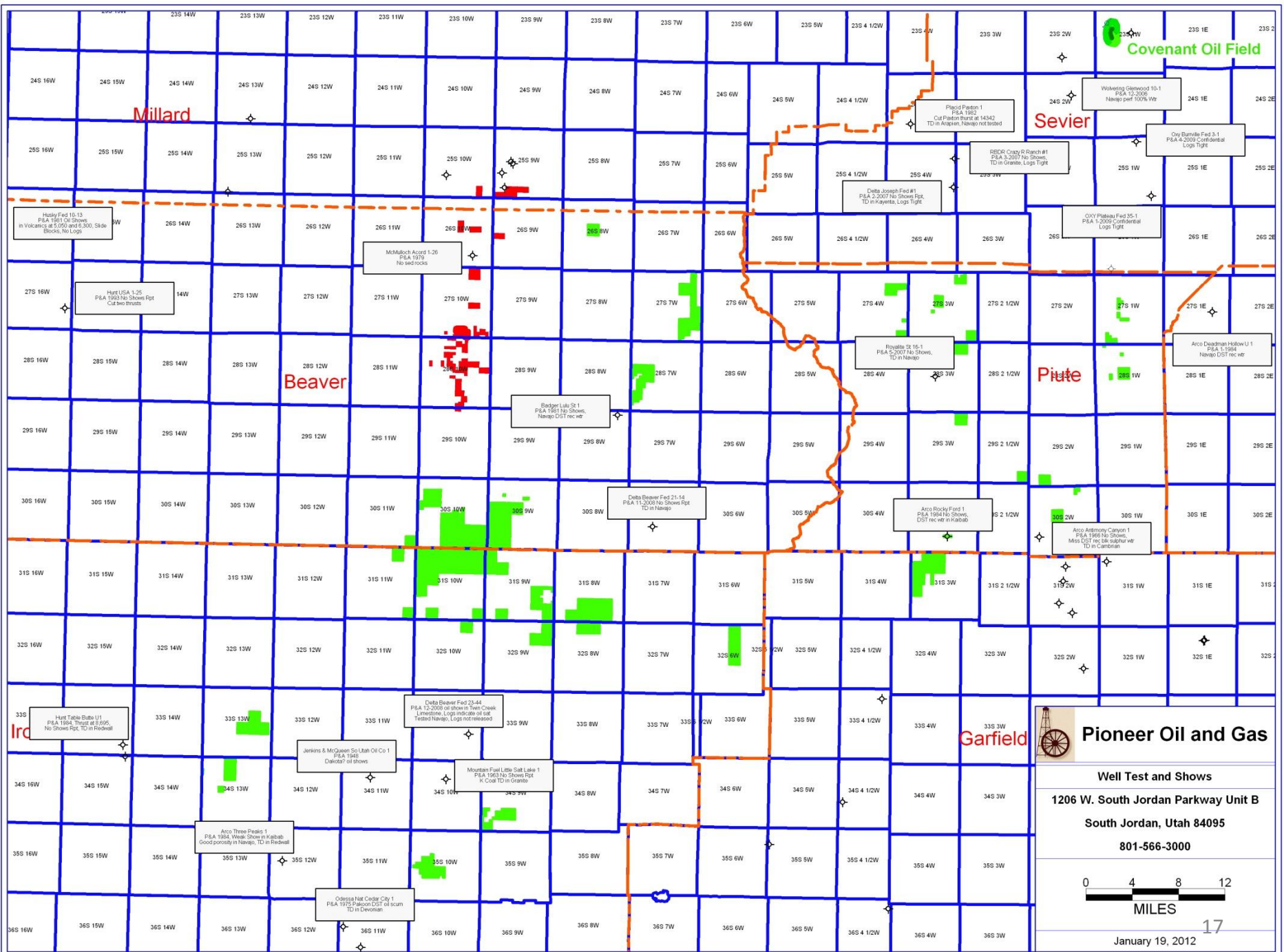
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Calderas and Intrusives

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0 4 8 12 16
 MILES

16
 January 19, 2012



Covenant Oil Field

Millard

Sevier

Beaver

Piute

Garfield

Irce

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Well Test and Shows

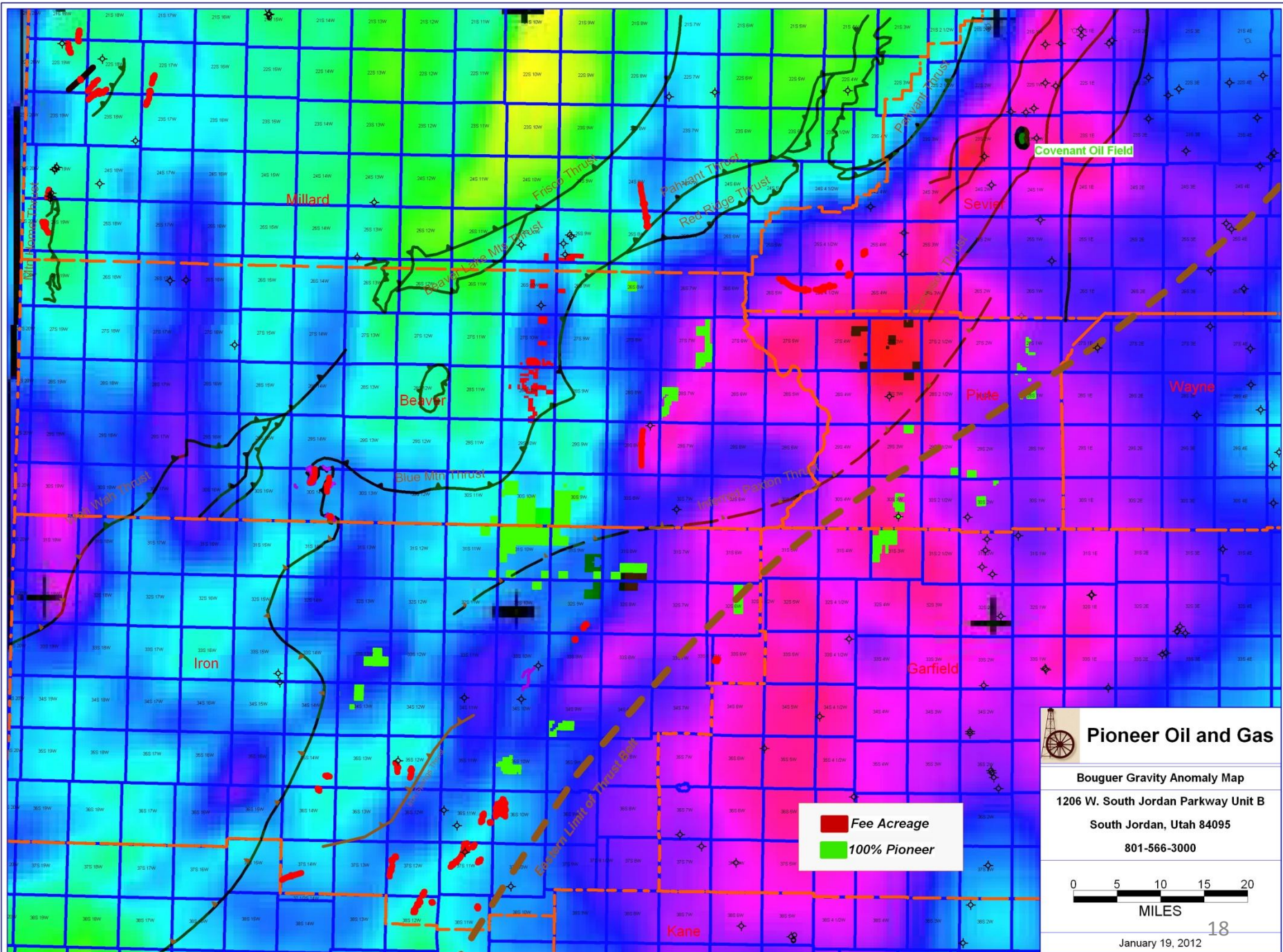
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Bouguer Gravity Anomaly Map

1206 W. South Jordan Parkway Unit B

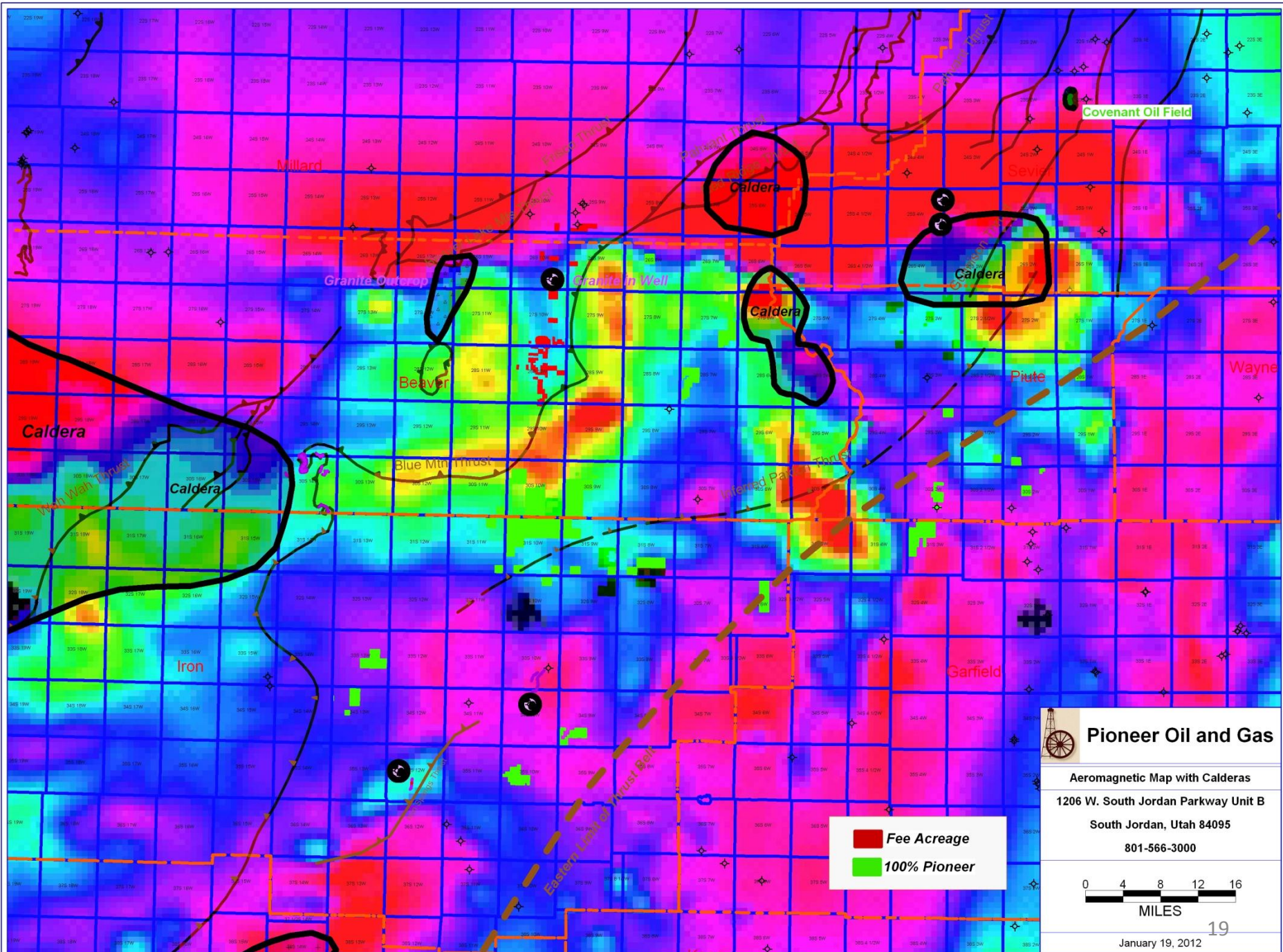
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0 5 10 15 20
MILES

18

January 19, 2012



Covenant Oil Field

Caldera

Caldera

Caldera

Caldera

Caldera

Beaver

Blue Mtn Thrust

Utah Thrust

Piute

Wayne

Garfield

Iron

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Aeromagnetic Map with Calderas

1206 W. South Jordan Parkway Unit B

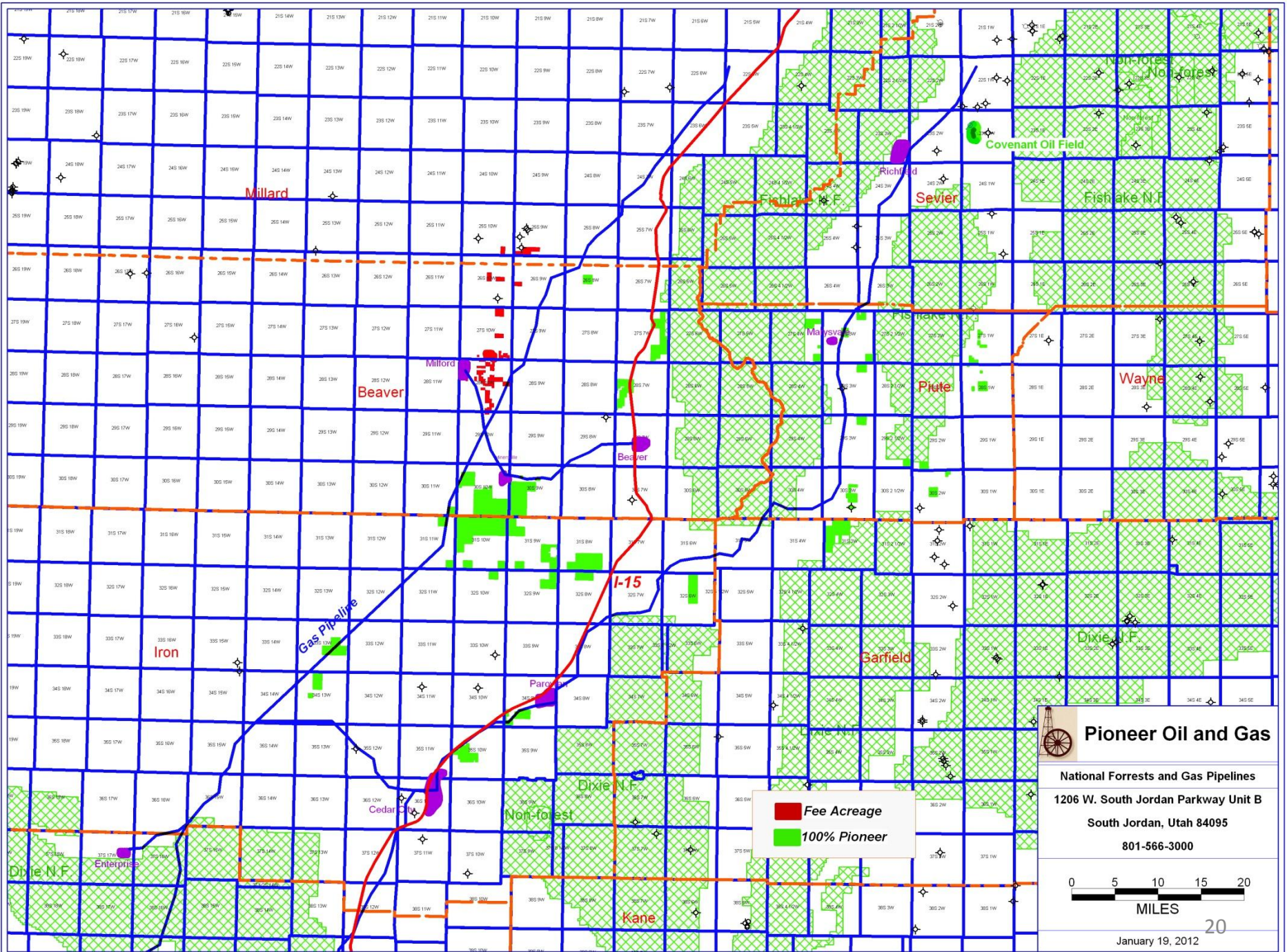
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Fee Acreage
 100% Pioneer



January 19, 2012



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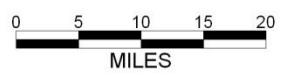
National Forests and Gas Pipelines

1206 W. South Jordan Parkway Unit B

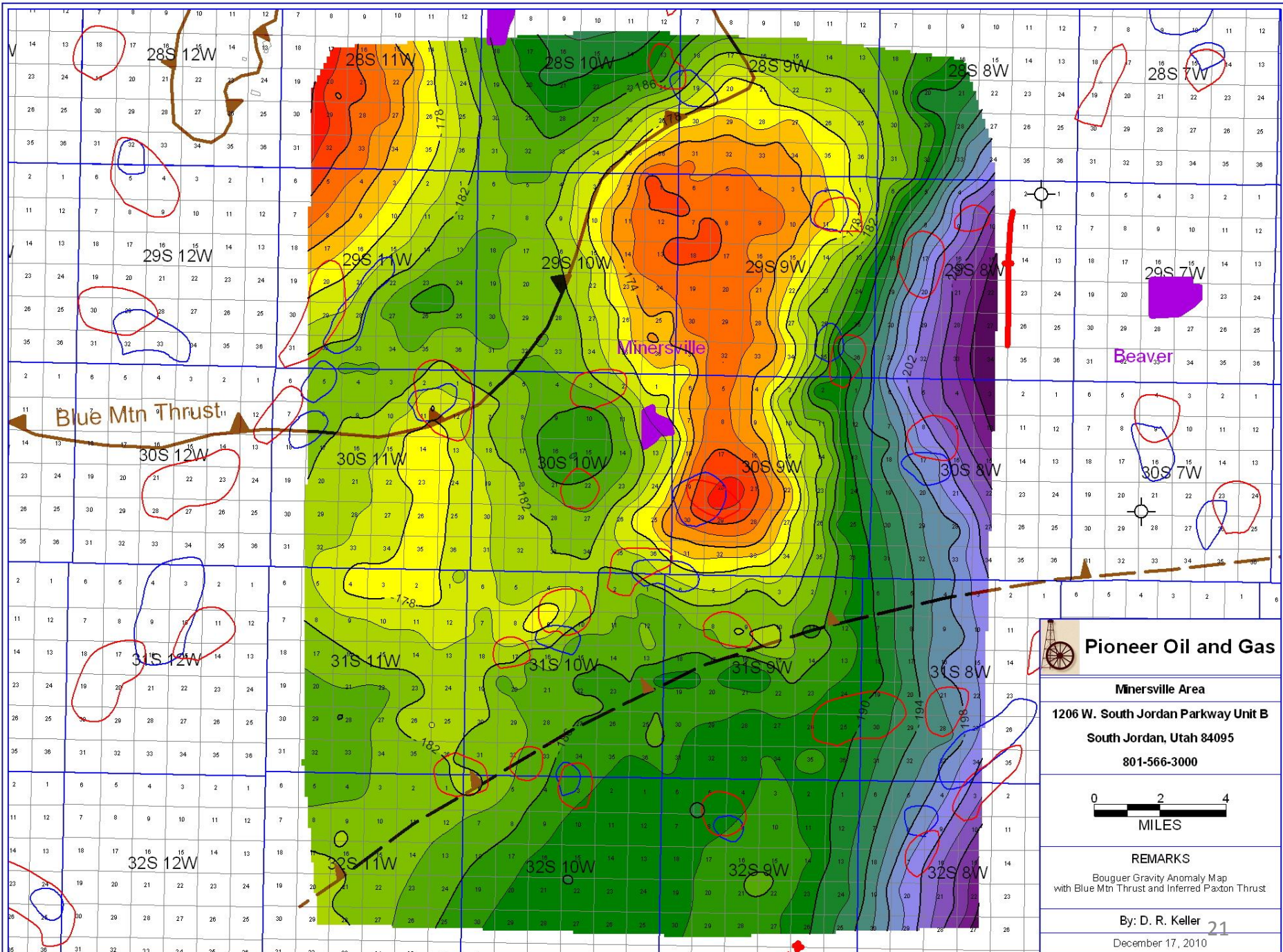
South Jordan, Utah 84095

801-566-3000

■ Fee Acreage
■ 100% Pioneer



January 19, 2012



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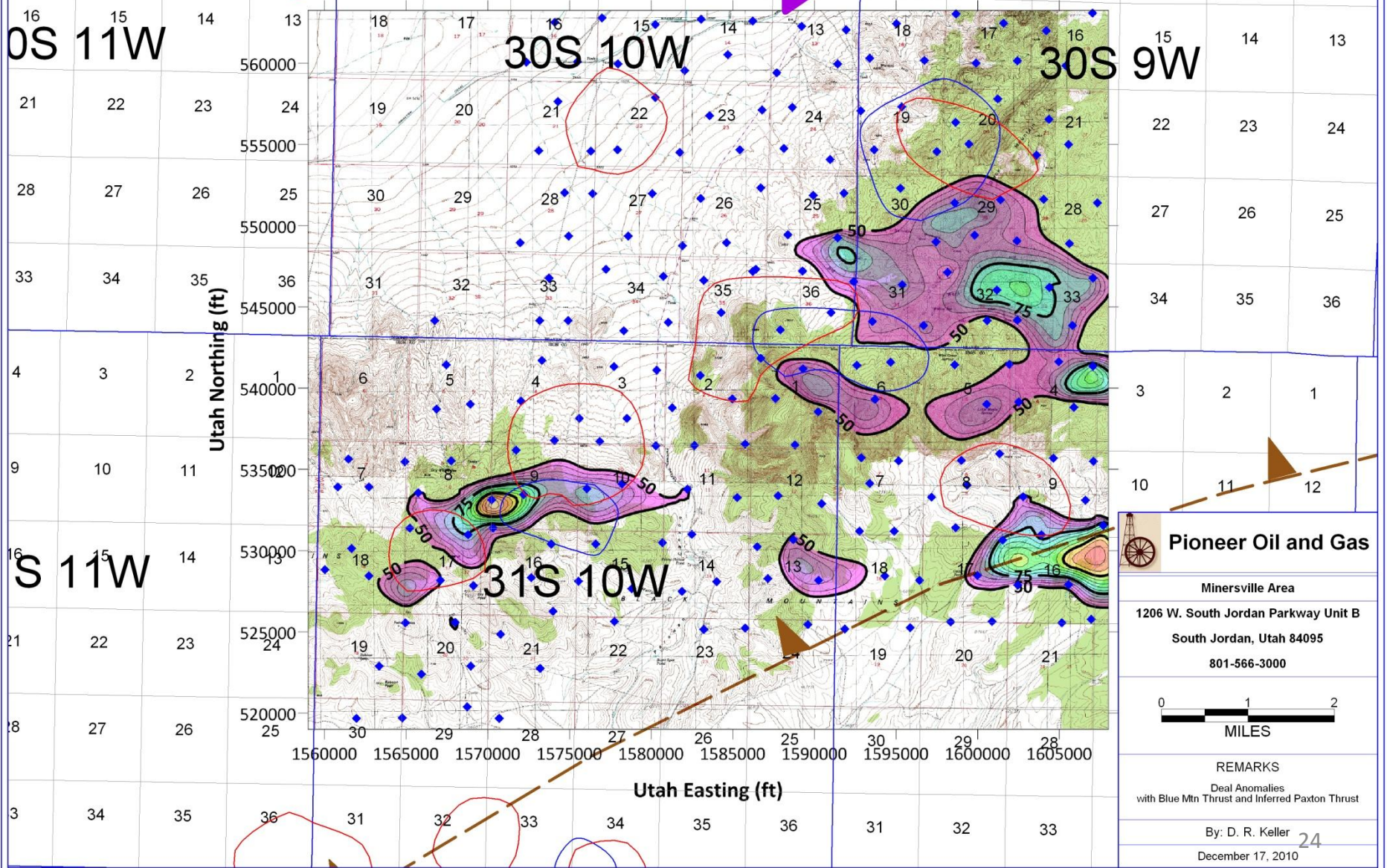
Minersville Area
1206 W. South Jordan Parkway Unit B
South Jordan, Utah 84095
801-566-3000



REMARKS
 Bouguer Gravity Anomaly Map
 with Blue Mtn Thrust and Inferred Paxton Thrust

By: D. R. Keller **21**
 December 17, 2010

Bouguer Gravity Processed using Deal positive anomalies)



Pioneer Oil and Gas

Minersville Area
 1206 W. South Jordan Parkway Unit B
 South Jordan, Utah 84095
 801-566-3000



REMARKS
 Deal Anomalies
 with Blue Mtn Thrust and Inferred Paxton Thrust

By: D. R. Keller
 December 17, 2010