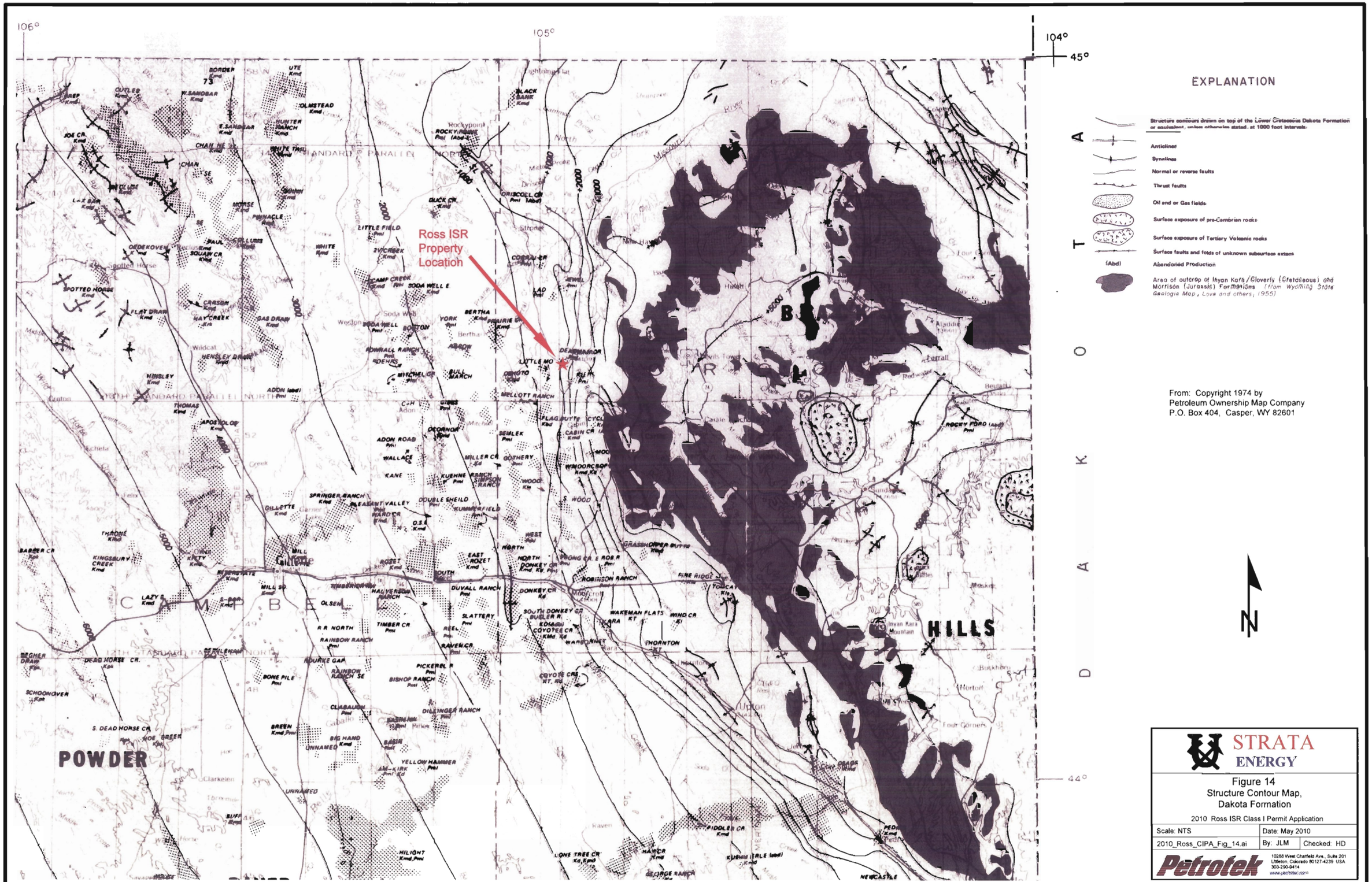
106°
105°
104°
45°
44°
Ross ISR Property Location
POWDER
RIVER
BASIN
HILLS
DAKOTA
EXPLANATION
Structure contours drawn on top of the Lower Cretaceous Dakota Formation or equivalent, unless otherwise stated, at 1000 foot intervals.
Anticlines
Synclines
Normal or reverse faults
Thrust faults
Oil and or Gas fields
Surface exposure of pre-Cambrian rocks
Surface exposure of Tertiary Volcanic rocks
Surface faults and folds of unknown subsurface extent
(Abd) Abandoned Production
Area of outcrop of Inyan Kara/Cloverly (Cretaceous) and Morrison (Jurassic) Formations (from Wyoming State Geologic Map, Love and others, 1955)
From: Copyright 1974 by
Petroleum Ownership Map Company
P.O. Box 404, Casper, WY 82601
N
STRATA ENERGY
Figure 14
Structure Contour Map,
Dakota Formation
2010 Ross ISR Class I Permit Application
Scale: NTS
Date: May 2010
2010_Ross_CIPA_Fig_14.ai
By: JLM
Checked: HD
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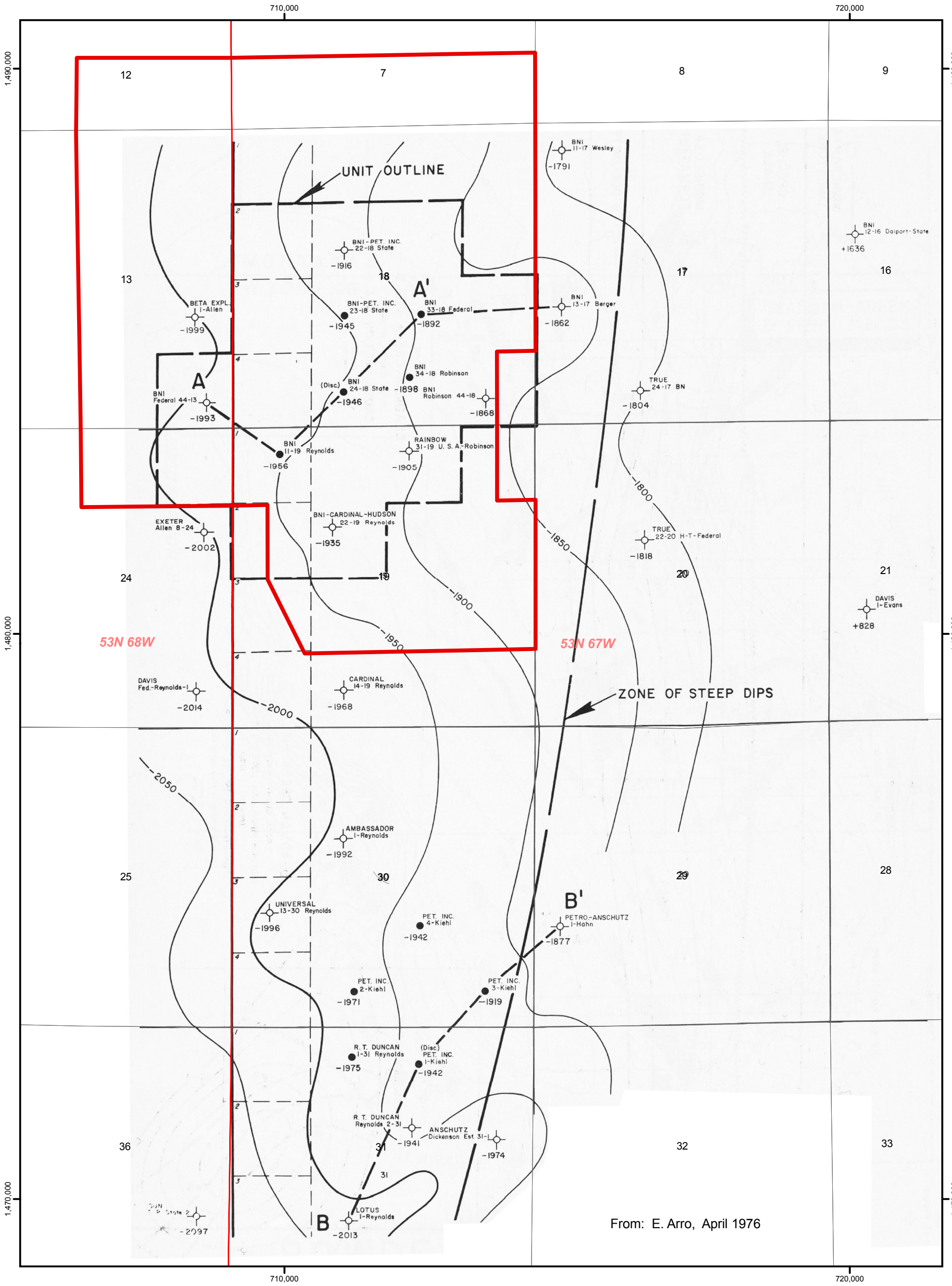

Legend

Ross ISR Permit Boundary

Contour Interval = 50ft.

Projection: Wyoming State Plane East, NAD 83, (feet)

0 0.25 0.5 0.75 1 Miles

STRATA ENERGY

Figure 15
Stucture Contour,
Minnekahta Formation
2010 Ross ISR Class I Permit Application

Scale: 1:20,000	Date: May 2010	
2010_Ross_CIPA_Fig_15.mxd	By: JLM	Checked: KC

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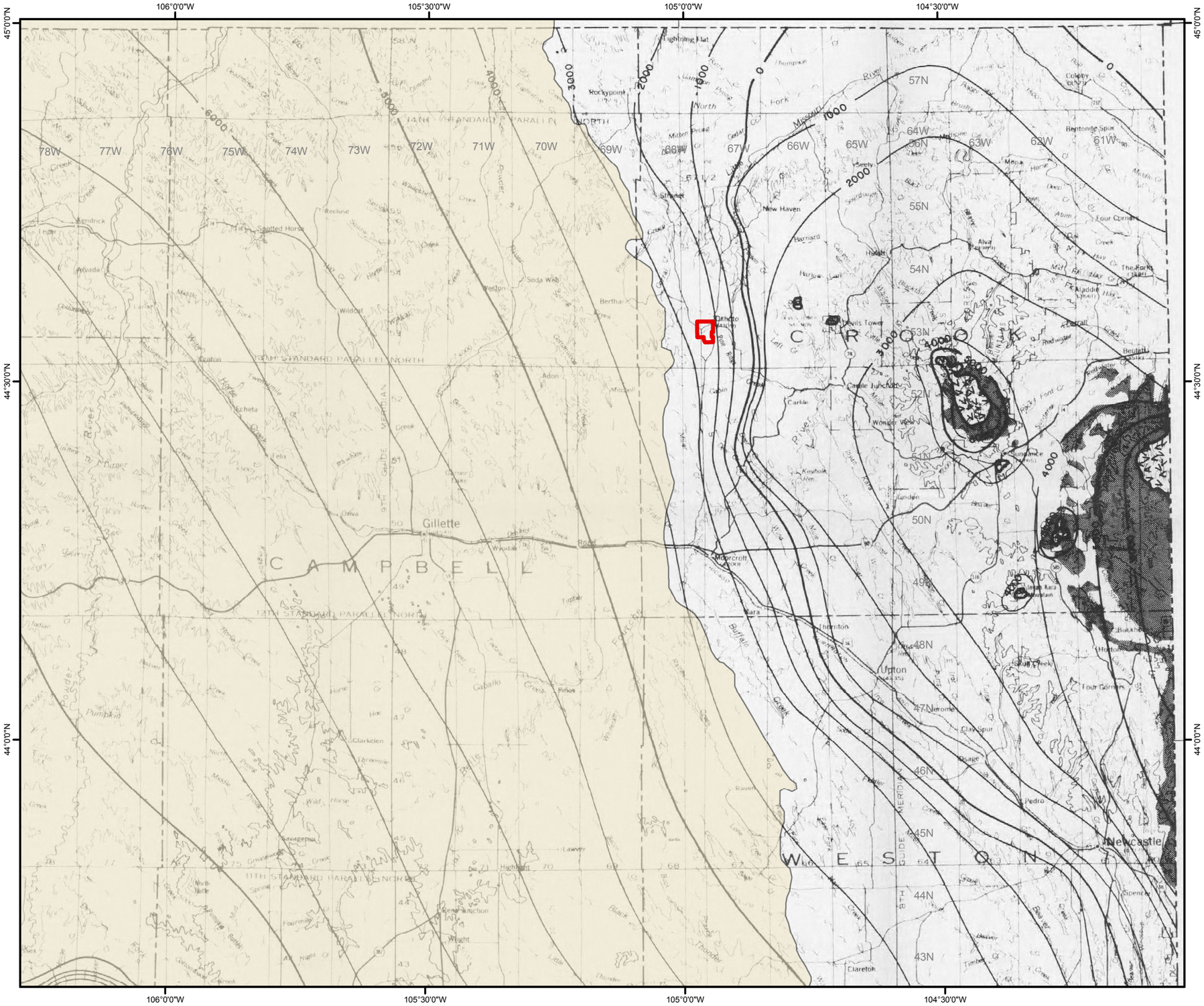
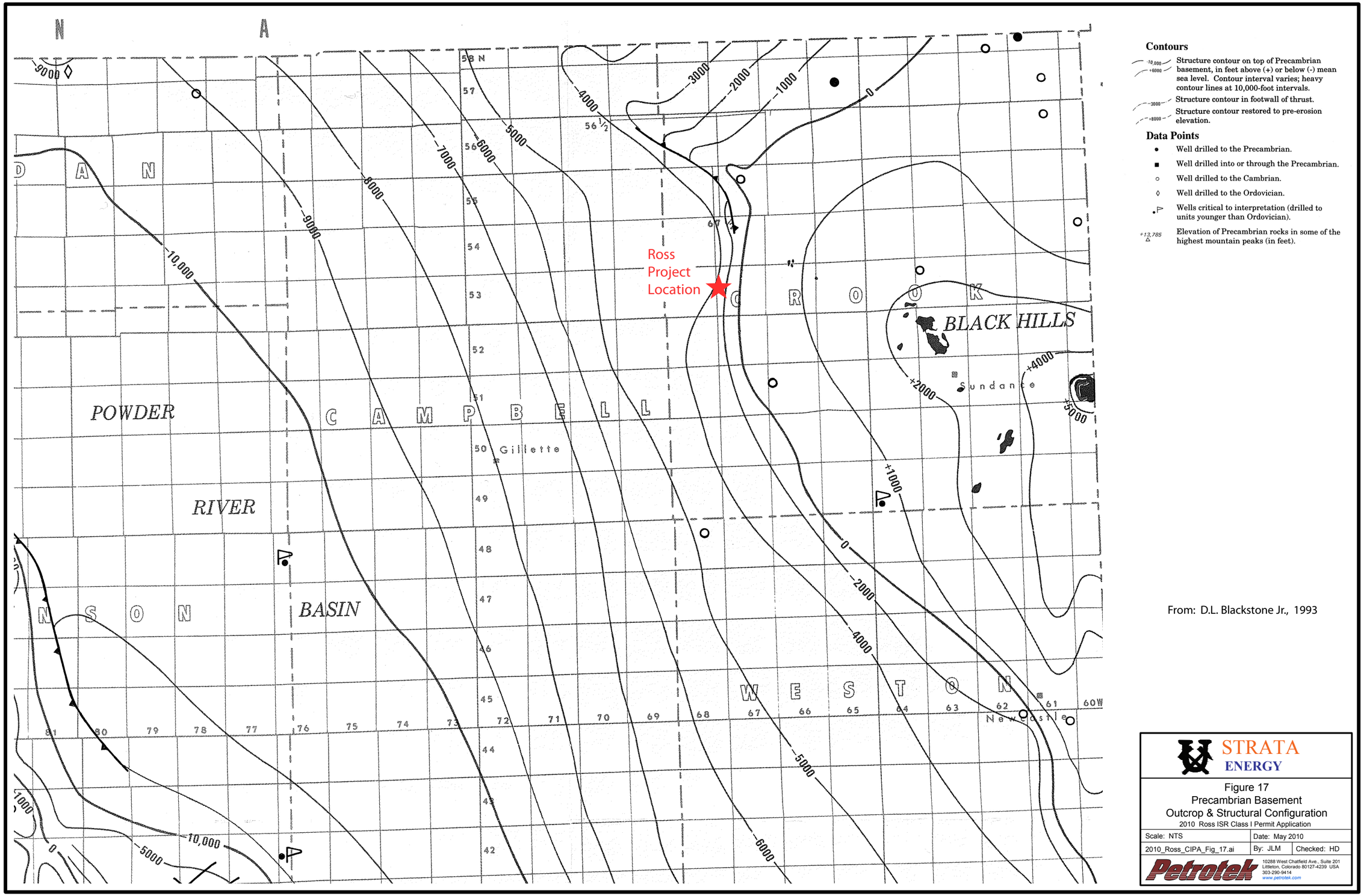

106°0'0"W
105°30'0"W
105°0'0"W
104°30'0"W
45°0'0"N
44°30'0"N
44°0'0"N
Gillette
C A M P B E L L
W E S T O N
Newcastle
Moorcroft
Upton
Thermopolis
Lightning Flat
Rockypoint
New Haven
Devils Tower
Sundance
Aladdin
Beulah
Bentonite Spur
Mesa
Four Corners
Alva
Hulett
Carlile
Wonder Hill
Linden
Kara
Pedro
Osage
Clay Spur
Jerome
Four Corners
Bukhill
Hotch
Spencer
Clareton
Wright
Highbrett
Lawver
Spotted Horse
Recluse
Wendrick
Arvada
Soda Well
Weston
Wildcat
Adon
Berthal
Oshoto
Colony
Moon
Pumpkin
Clarkelen
Savageton
North Butte
Pumpkin Buttes
Fourmile
Cow Junction
Thunder
Black
Little
Raven
Lance
Timber
Beaver
Cottonwood
Powder
Belle Fourche
Cheyenne
Little Missouri
Dry Fork
Donkey Creek
Rozet
Wyodak
Caballo
Buffalo
Cheta
Felix
Pine Tree
Horse Creek
Lance Creek
Sand Creek
Hay Creek
Bear Creek
Beaver Creek
Pine Creek
Cottonwood Creek
Dry Creek
Little Missouri River
Belle Fourche River
Cheyenne River
Dry Fork Cheyenne River
Powder River
Little Powder River
Thunder Creek
Black Thunder Creek
Little Thunder Creek
Raven Creek
Lance Creek
Timber Creek
Beaver Creek
Cottonwood Creek
Pine Tree Creek
Horse Creek
Caballo Creek
Buffalo Creek
Pumpkin Creek
Wildcat Creek
Weston Creek
Soda Well Creek
Adon Creek
Berthal Creek
Oshoto Creek
Colony Creek
Moon Creek
Donkey Creek
Rozet Creek
Wyodak Creek
Cheta Creek
Felix


Contours
Structure contour on top of Precambrian basement, in feet above (+) or below (-) mean sea level. Contour interval varies; heavy contour lines at 10,000-foot intervals.
Structure contour in footwall of thrust.
Structure contour restored to pre-erosion elevation.
Data Points
Well drilled to the Precambrian.
Well drilled into or through the Precambrian.
Well drilled to the Cambrian.
Well drilled to the Ordovician.
Wells critical to interpretation (drilled to units younger than Ordovician).
Elevation of Precambrian rocks in some of the highest mountain peaks (in feet).
Ross Project Location
BLACK HILLS
POWDER RIVER BASIN
Gillette
Sundance
Newcastle
From: D.L. Blackstone Jr., 1993
STRATA ENERGY
Figure 17
Precambrian Basement
Outcrop & Structural Configuration
2010 Ross ISR Class I Permit Application
Scale: NTS
Date: May 2010
2010_Ross_CIPA_Fig_17.ai
By: JLM
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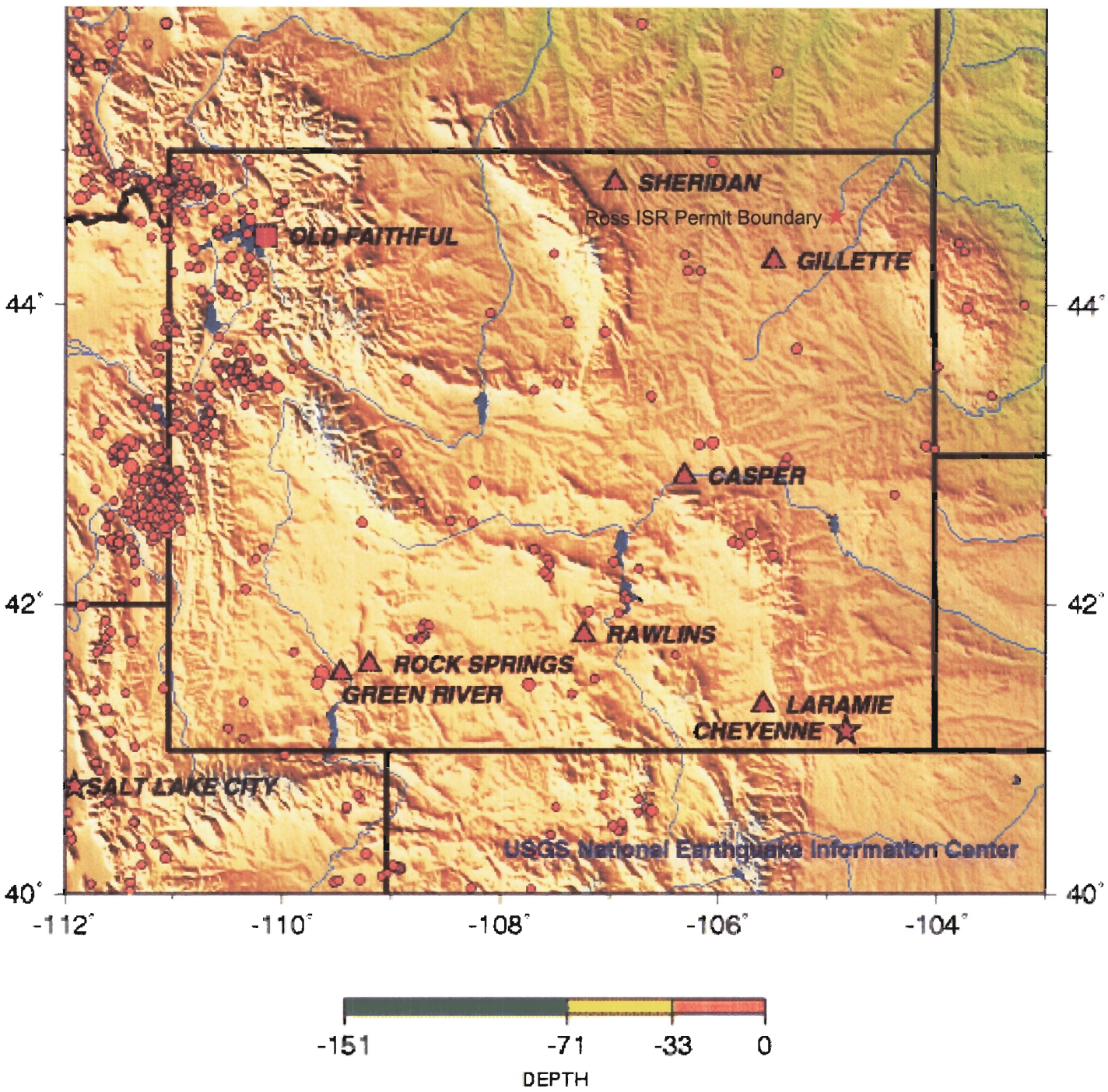
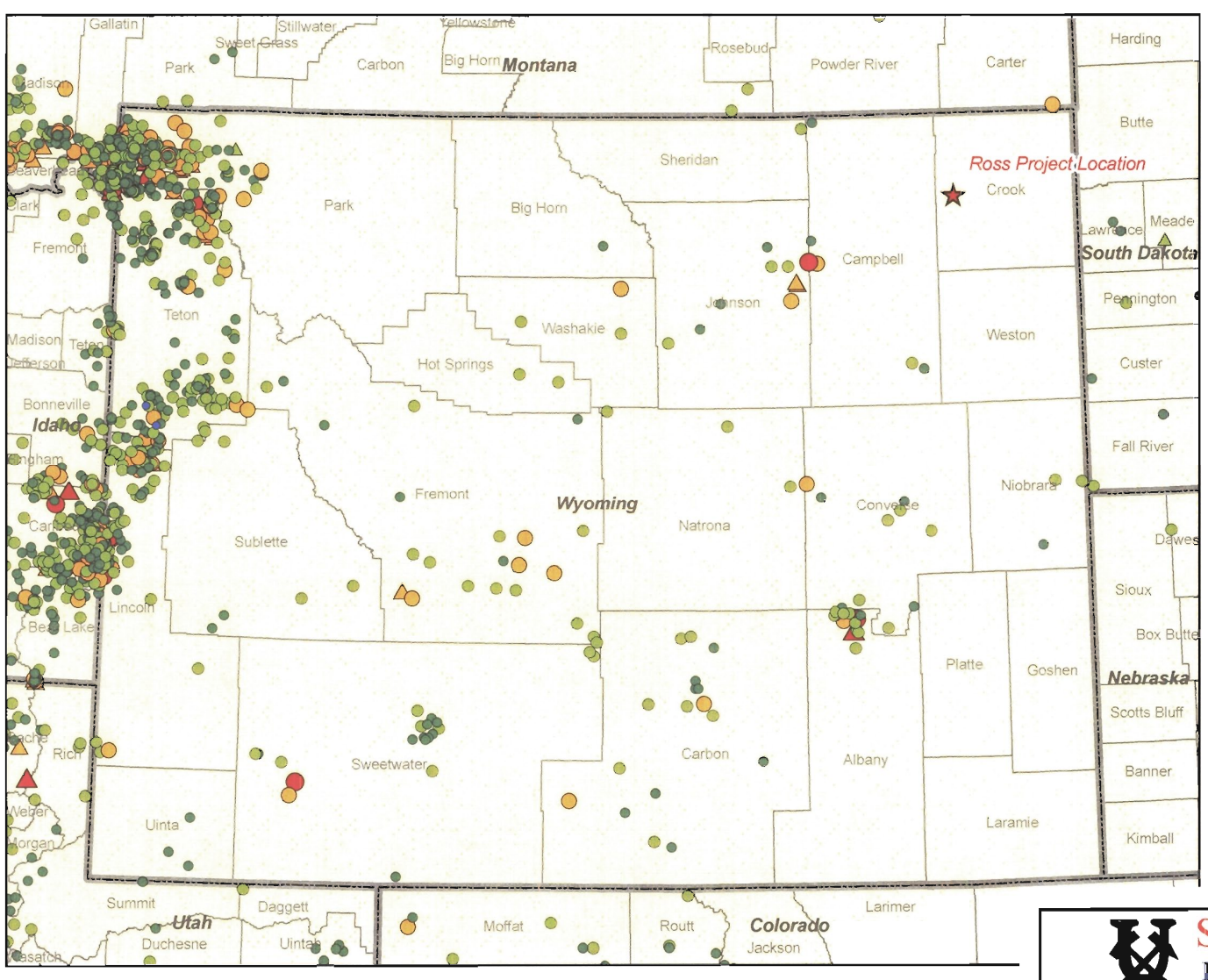
Seismicity of Wyoming
1990 - 2006



Depth is in kilometers.
Purple Triangles: Cities
Purple Star: Capital City
Circles: Earthquakes
(color represents depth range)



Earthquakes of Wyoming
1882 - Present

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Figure 18
Seismicity of Wyoming, 1990-2006; and Earthquakes in Wyoming, 1882-Present
2010 Ross ISR Class I Permit Application

Scale: NTS	Date: May 2010	
2010_Ross_CIPA_Fig_F-18.ai	By: JLM	Checked: HD

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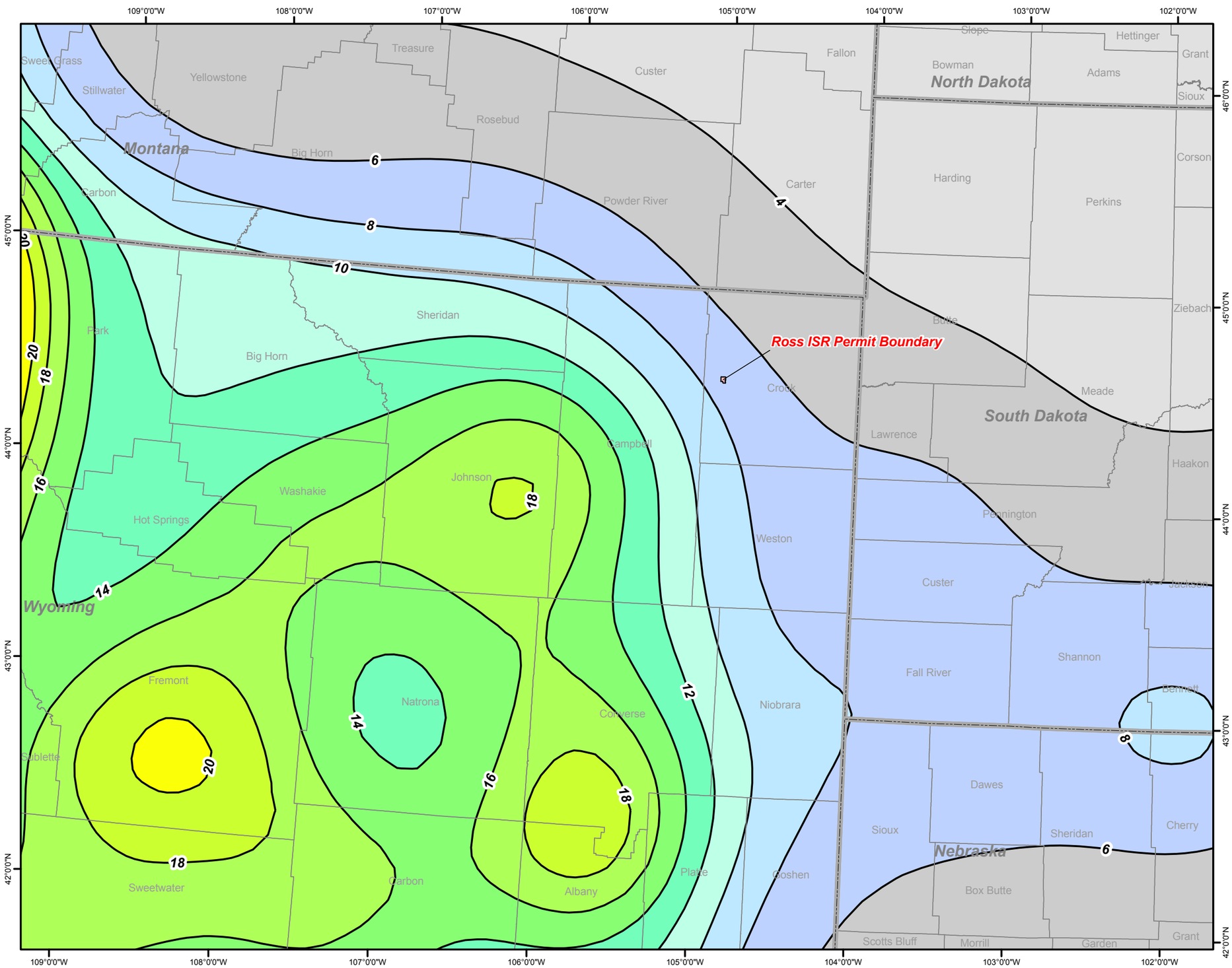
Map Source: USGS website
Earthquake locations are from the USGS/NEIC PDE catalog.



Legend

Ross ISR Permit Boundary

Percent G

- 160-200
- 120-160
- 80-120
- 60-80
- 50-60
- 40-50
- 30-40
- 20-30
- 18-20
- 16-18
- 14-16
- 12-14
- 10-12
- 8-10
- 6-8
- 4-6
- 2-4
- 0-2

Note:
National Seismic Hazard Mapping Project (2008 data)

N

0 10 20 30 40 50 Miles

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Figure 19
Peak Acceleration (%g) with 2% Probability of Exceedance in 50 Years

2010 Ross ISR Class I Permit Application

Scale: 1:2,000,000	Date: May 2010	
2010_Ross_CIPA_Fig_19.mxd	By: JLM	Checked: HD

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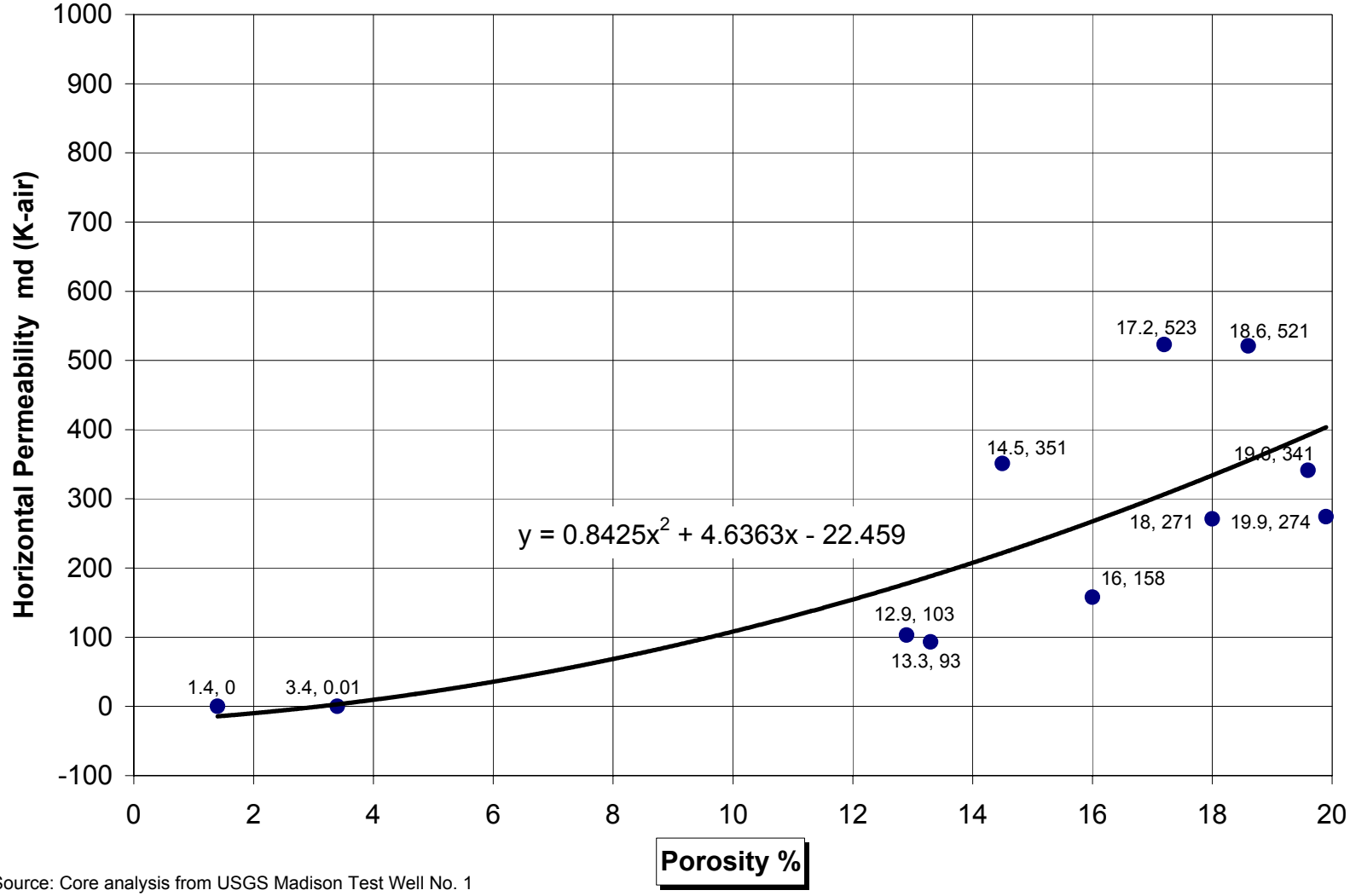
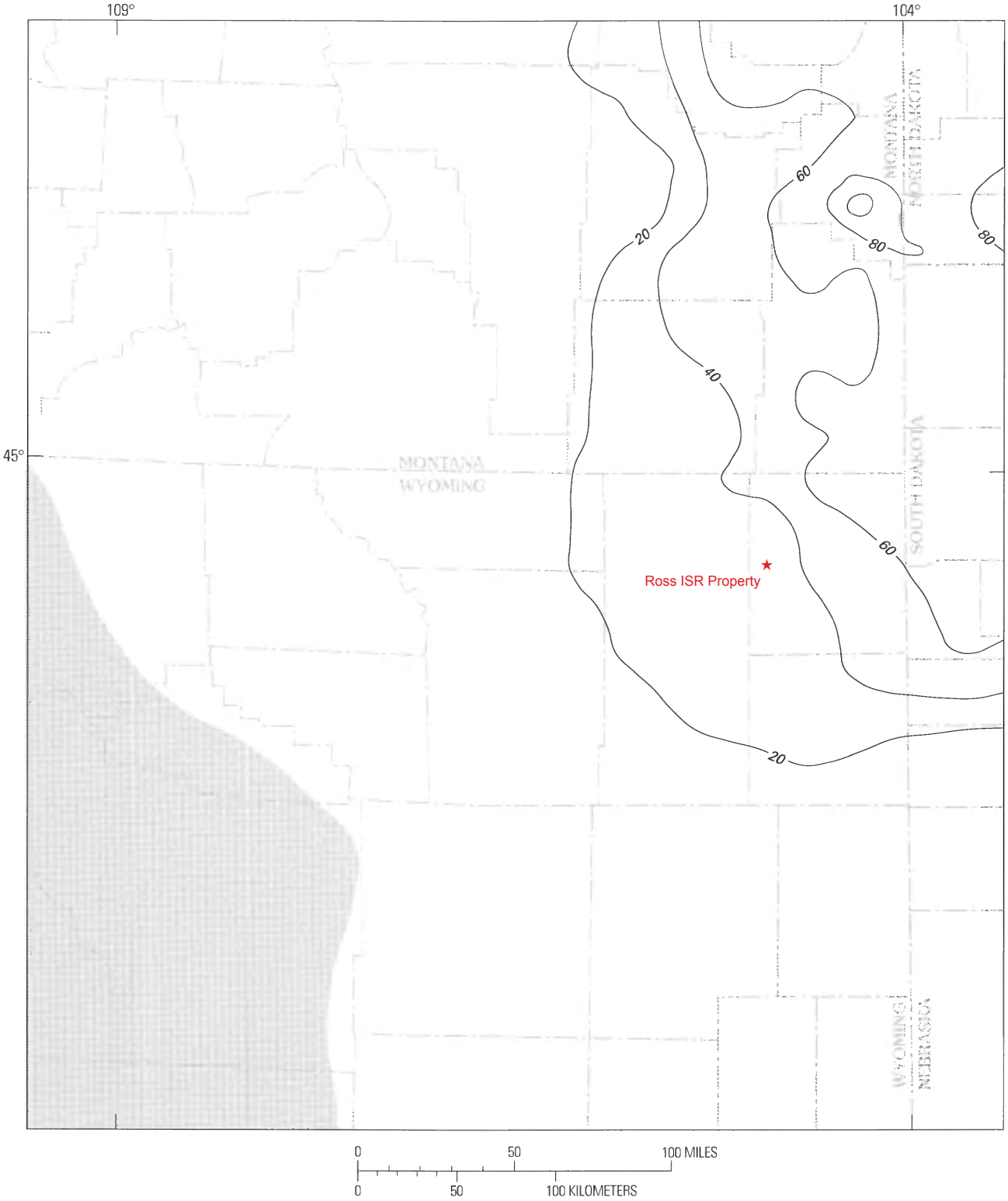
Projection: Wyoming State Plane East, NAD 83, (feet)

Figure 20
Horizontal Permeability vs. Porosity in Flathead Formation



Source: Core analysis from USGS Madison Test Well No. 1



From:
Geological Survey Professional Paper 1917
David L. Macke, 1993

N

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Figure 21
Isopach Map,
Ice Box Member of the Winnipeg Group

2010 Ross ISR Class I Permit Application

Scale: See Bar Scale	Date: May 2010	
2010_Ross_CIPA_Fig_21.ai	By: JLM	Checked: HD

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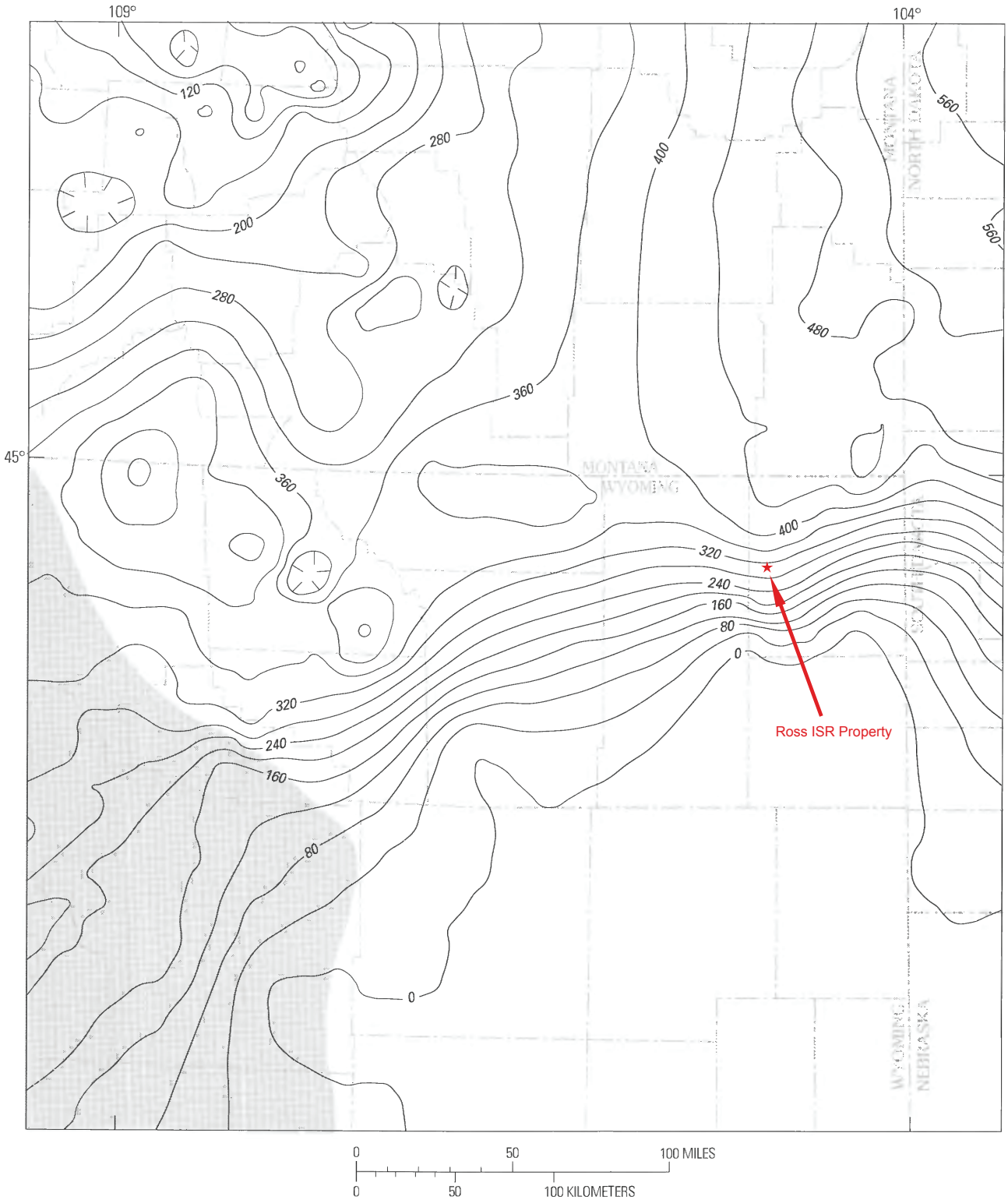

From:
Geological Survey Professional Paper 1917
David L. Macke, 1993

N

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Figure 22
Isopach Map,
Red River Formation

2010 Ross ISR Class I Permit Application

Scale: See Bar Scale	Date: May 2010	
2010_Ross_CIPA_Fig_22.ai	By: JLM	Checked: HD

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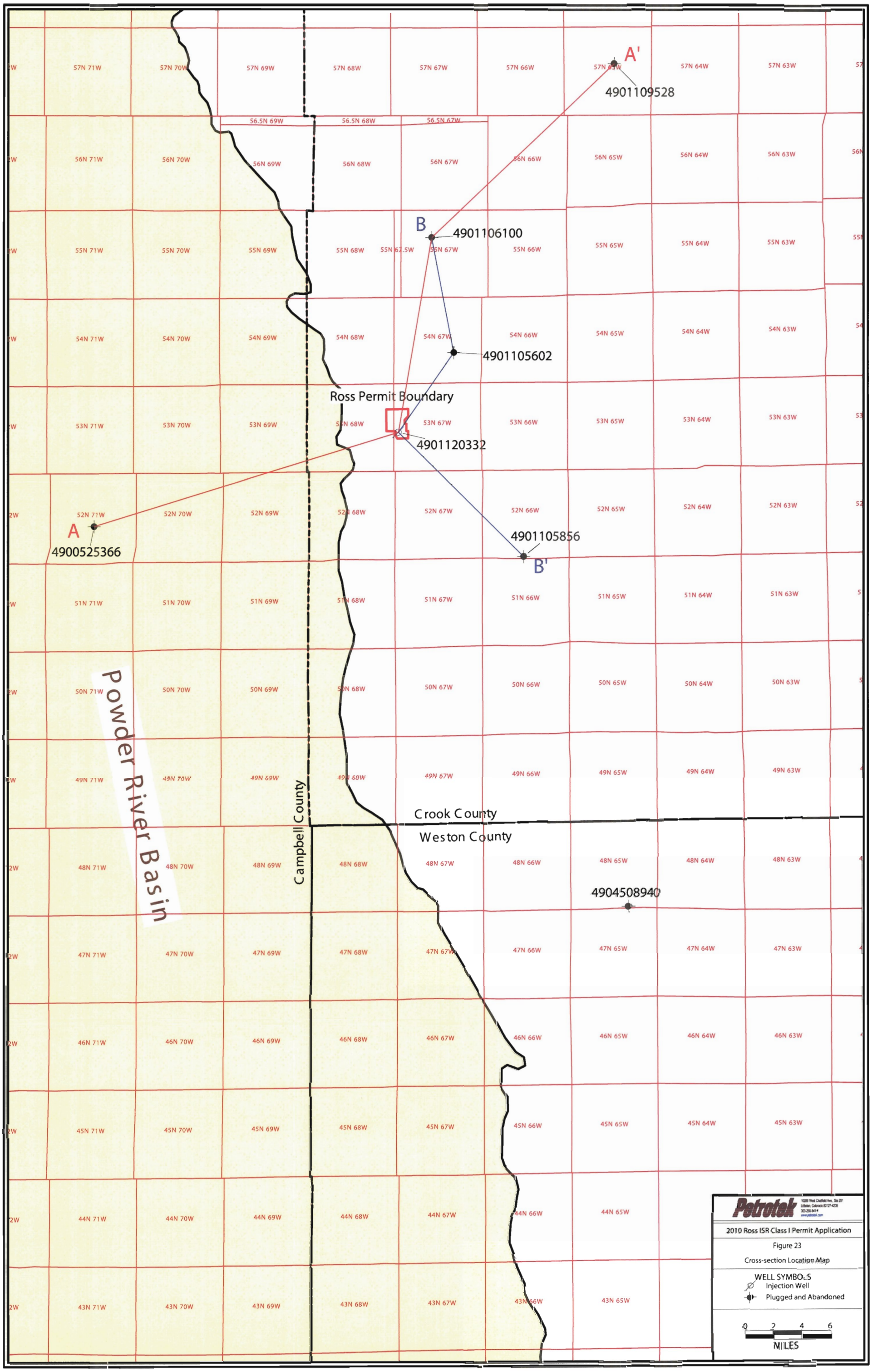
A'
4901109528
B
4901106100
4901105602
Ross Permit Boundary
4901120332
A
4900525366
4901105856
B'
Powder River Basin
Campbell County
Crook County
Weston County
4904508940
Petrotek
2010 Ross ISR Class I Permit Application
Figure 23
Cross-section Location Map
WELL SYMBOLS
Injection Well
Plugged and Abandoned
0 2 4 6
MILES