Dewey-Burdock Project
License Renewal Application for SUA-1600
Fall River and Custer Counties,
South Dakota
Combined Technical Report/Environmental Report

PLATES

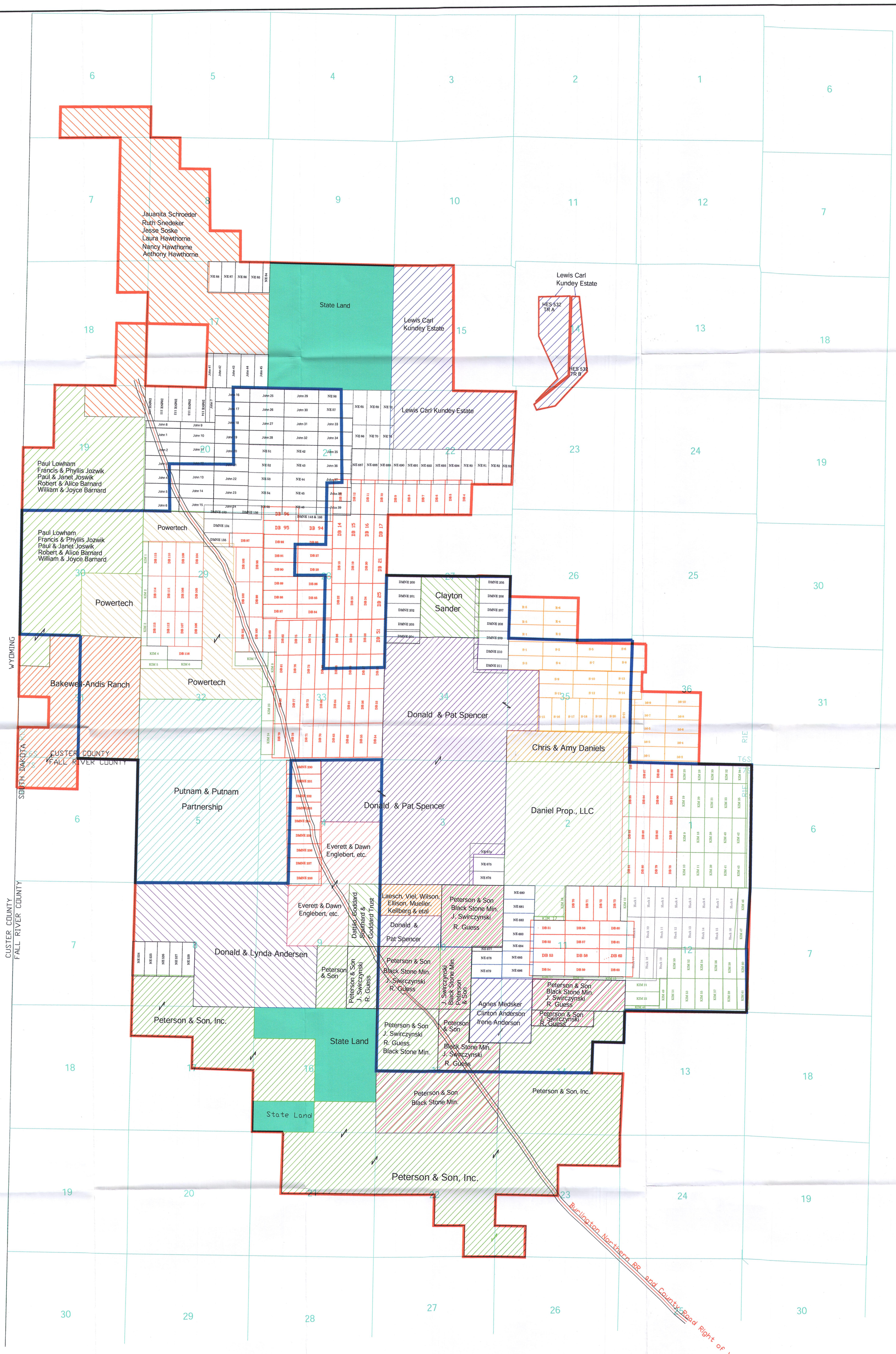
March 2024

Prepared for

U.S. Nuclear Regulatory Commission
11545 Rockville Pike
Rockville, MD 20852

Prepared by

Powertech (USA) Inc.
PO Box 448
Edgemont, South Dakota 57735
Phone: 303-790-7528



LEGEND

Powertech Mineral Holdings

Proposed Permit Boundary

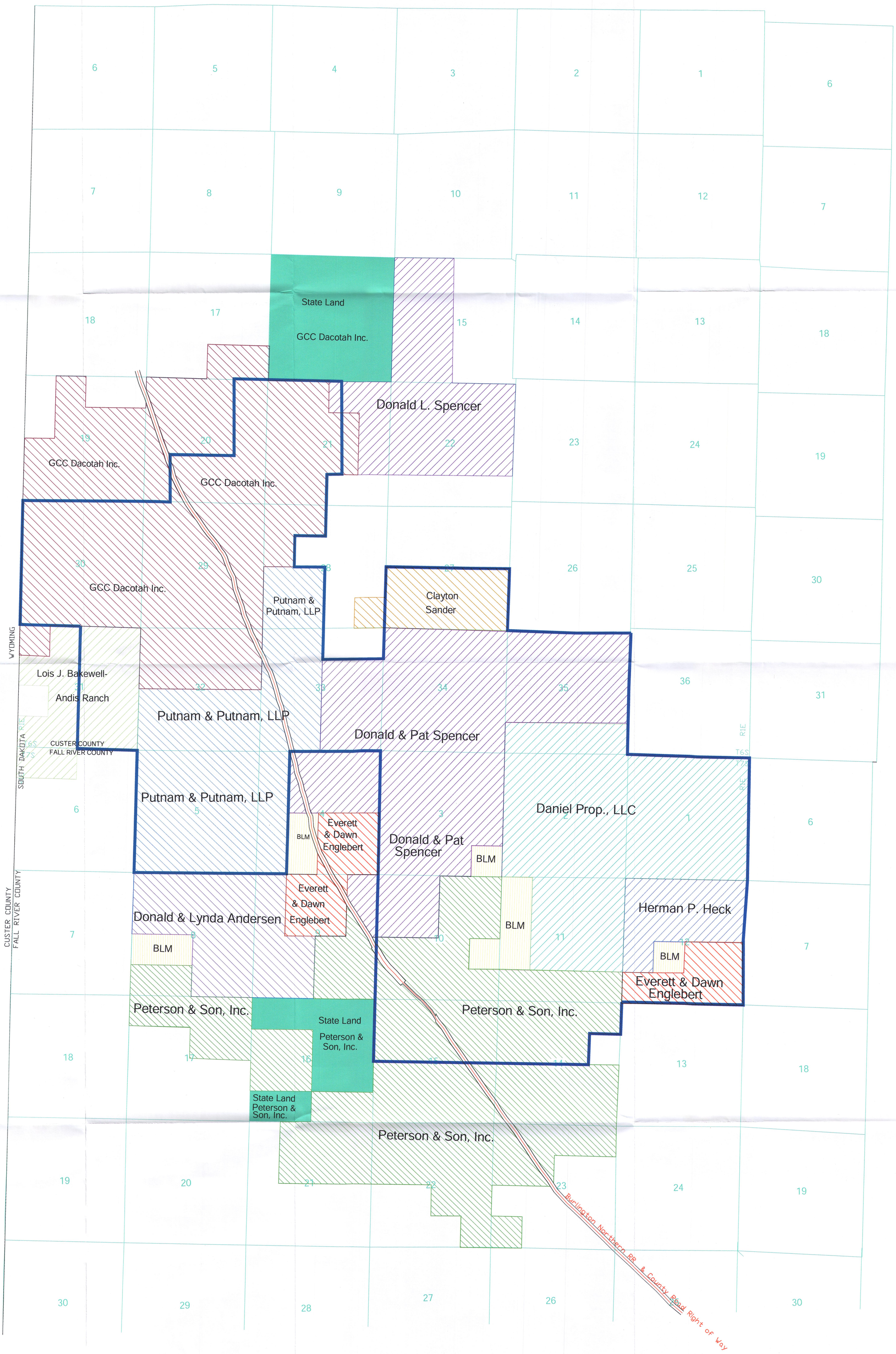
SCALE FEET
0 2000 4000

N

POWERTECH (USA) INC.

Plate 1.5-1
Mineral Ownership
Fall River & Custer counties

PROJECT	Derey-Burdock Project
COORDS	NAD 27 South Dakota State Plane South
FILENAME	Dewey-Burdock_Mineral_map_2-11-2009.dwg



LEGEND

Proposed Permit Boundary

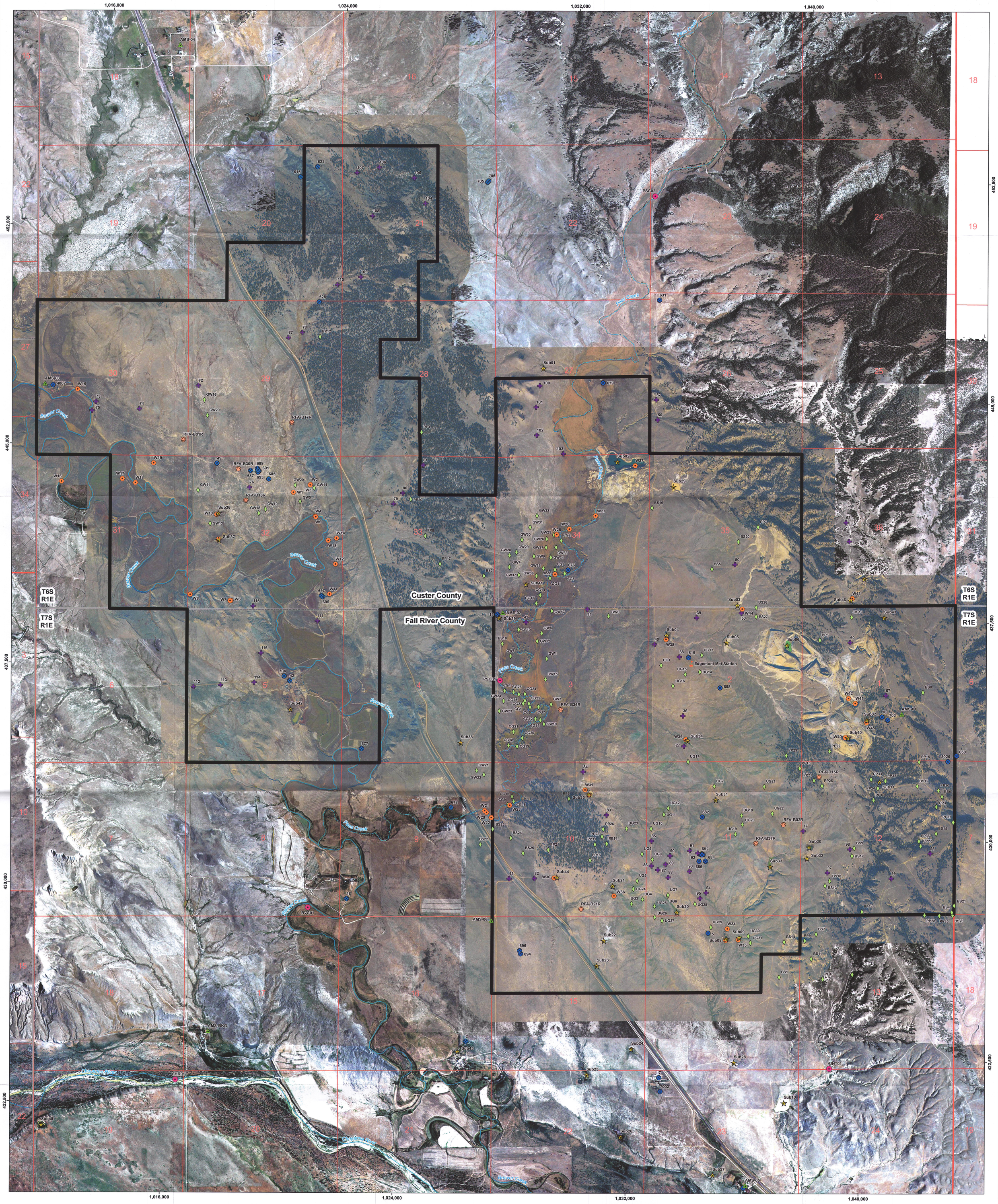
SCALE FEET
0 2000 4000

N

POWERTECH (USA) INC.

Plate 1.5-2
Surface Use Agreements
Fall River & Custer counties

PROJECT	Derey-Burdock Project
COORDS	NAD 27 South Dakota State Plane South
FILENAME	Dewey-Burdock_Surface_Use_Agreements_2-11-2009.dwg

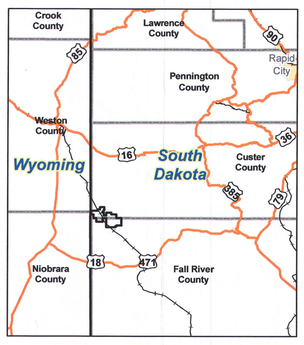


Legend

- Project Boundary
- Ephemeral Streams
- Perennial Streams

Sampling Location Type

- Particulates, Radon 222, Soil, TLD (Env. Radiation)
- Meteorological Station
- Stream
- Surface Subimpoundment
- Ground Water
- Soil
- Vegetation
- Wetlands
- Radon Flux



N

Feet: 0, 500, 1,000, 2,000, 3,000, 4,000

Meters: 0, 250, 500, 1,000

CONSULTANT	REVISIONS #	DRAWN	CHECKED	APPROVED	DATE
REF 998					
CHECK SCALES: If this bar does not measure 1 inch this map is not at its original scale					
Arch E 36" x 48"					

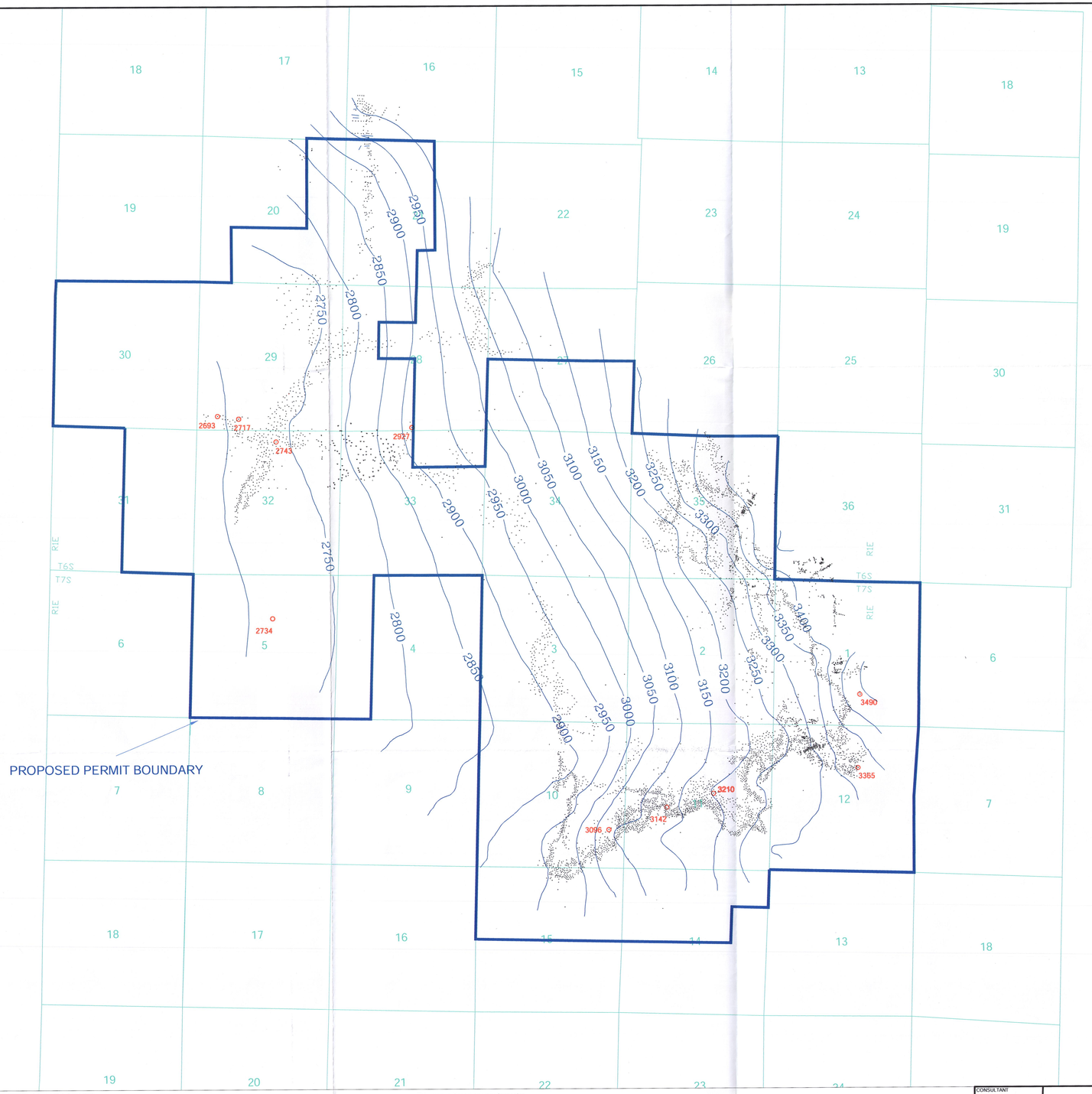
POWERTECH (USA) INC.

Plate 2.5-1

Environmental Sampling Locations

Dewey-Burdock Project

PLOT DATE	16-Dec-2013	DATE	16-Dec-2013
DRAWN	S.Hetrick	PDF FILE	R998_SamplingLocations.pdf
CHECKED	John Mays	CAD FILE	P:\Dewey-Burdock\Submittals\Technical Report (TR)\June 2013 Revisions\SamplingLocations.mxd
COORDS	NAD 27, South Dakota State Plane South (feet)		



This map is based on very few holes.
Most holes were not drilled this deep.

N

SCALE FEET
0 1000 2000

CONSULTANT

REF R994

CHECK SCALES
If this bar does not measure 1 inch this map is not at its original scale

Arch D 24" x 36"

REVISIONS

#	DRAWN	CHECKED	APPROVED	DATE

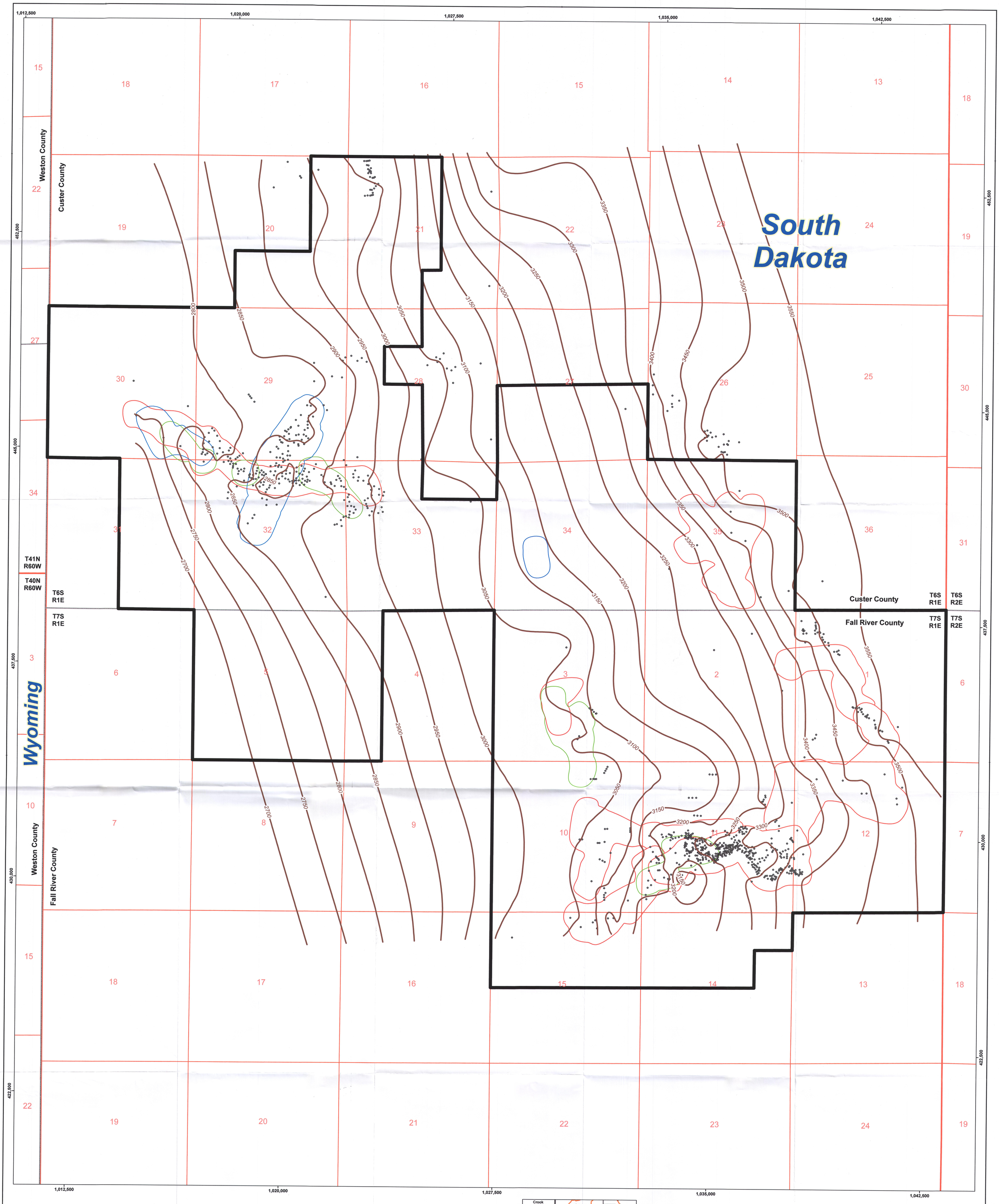
POWERTECH (USA) INC.

Plate 2.6-1
Structure Map
Top of the Unkpapa

PLOT DATE	14-Dec-2013	DATE	14-Dec-2013
DRAWN	RC	CHECKED	
SCALE	as noted	FILENAME	k:\powertech\11185\acad\dwgs_final_tr\r994_unpapastructure100.dwg

PROJECT Dewey-Burdock Project
COORDS State Plane- NAD27

1 OF 1

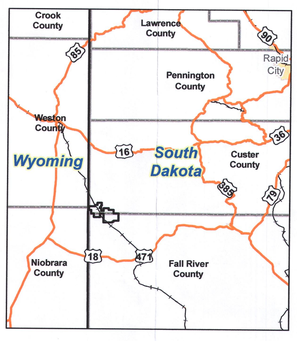


Legend

- Project Boundary
- Structure Contour Line (feet above sea level)
- Drill Hole Data Point Locations

Potential Well Fields

- Fall River
- Upper Chilson
- Middle/Lower Chilson



N

0 500 1,000 2,000 3,000 4,000 Feet

0 250 500 1,000 Meters

CONSULTANT	REVISIONS #	DRAWN	CHECKED	APPROVED	DATE
REF 990					
CHECK SCALES: If this bar does not measure 1 inch this map is not at its original scale	PLOT DATE 16-Dec-2013	DATE 16-Dec-2013			
Arch E 36" x 48"	DRAWN R. Lichnovsky	PDF FILE R990_MorrisonStructure50.pdf	COORDS NAD 27, South Dakota State Plane South (feet)		
	CHECKED F. Lichnovsky	CAD FILE P:\Dewey-Burdock\Submittals\WWC NRC TR RAI June 2011\Exhibit 2.6-1.mxd			

POWERTECH (USA) INC.

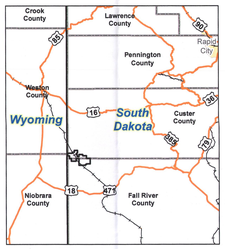
Plate 2.6-2

Structure on Top of Morrison
Custer & Fall River Counties
Dewey-Burdock Project

Potential Burdock Well Field 1 Monitor Ring

Legend

- Project Boundary
- Structure Contour Line
- Drill Hole Data Point Locations
- Potential Burdock Well Field 1 Monitor Ring



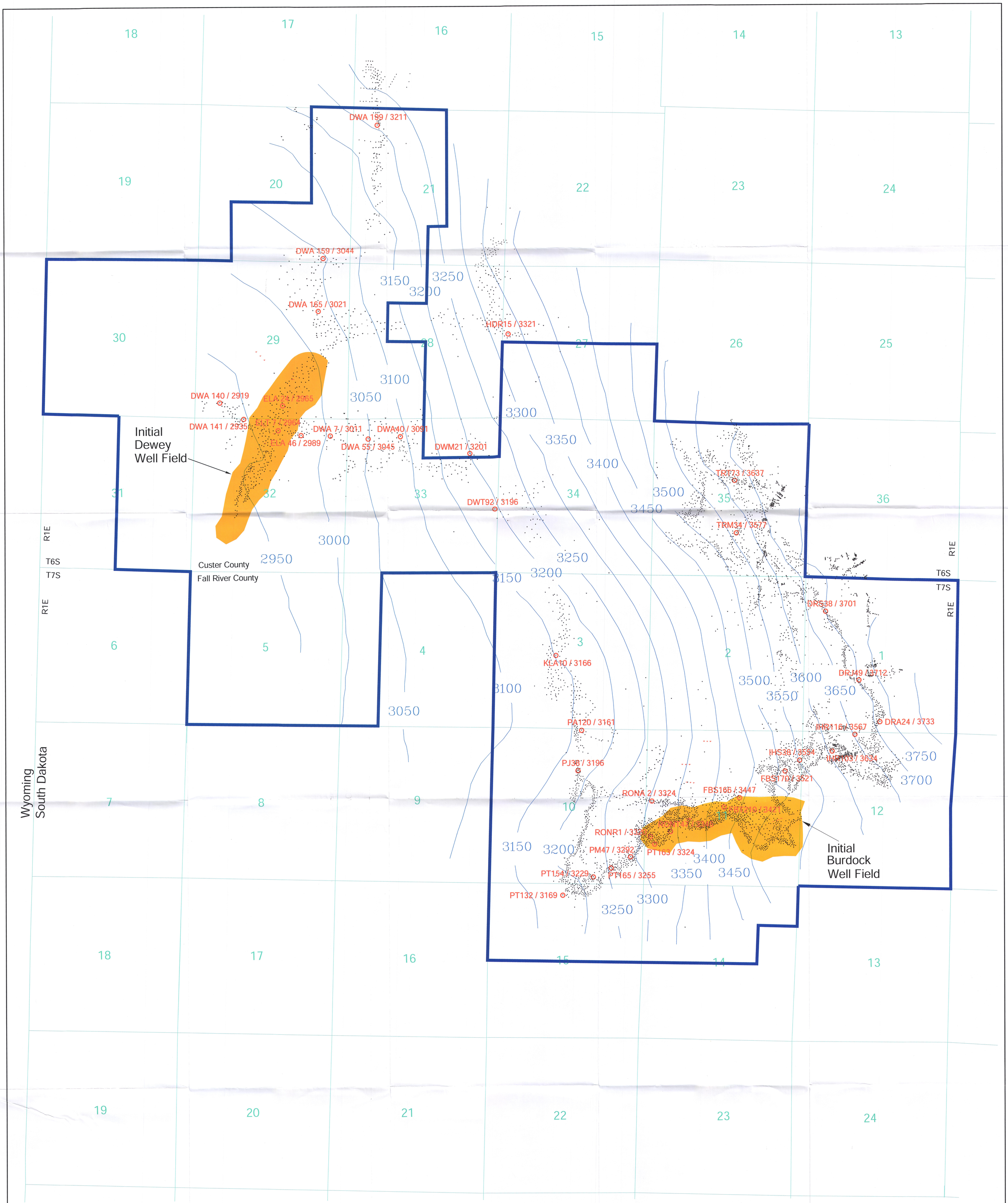
N

Feet: 0 100 200 400 600 800
Meters: 0 50 100 200

CONSULTANT	REVISIONS #	DRAWN	CHECKED	APPROVED	DATE
REF 999					
CHECK SCALES					
If this bar does not measure 1 inch this map is not at its original scale	PLOT DATE 14-Dec-2013	DATE 14-Dec-2013			
	DRAWN S. Hetrick	PDF FILE R999_MorrisonStructureBurdock.pdf	COORD NAD 27, South Dakota State Plane South (feet)		
ANSI E 30" x 42"	CHECKED F. Lichnovsky	CAD FILE P:\Dewey-Burdock\Submittals\WWC NRC TR RAI June-2011\Plate 2.6-2a MorrisonStructure.mxd			

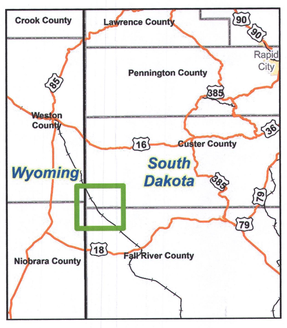
POWERTECH (USA) INC.

Plate 2.6-2a
Structure to the Top of Morrison
Burdock Area
Township 7S, Range 1E
Dewey-Burdock Project



Legend

- Initial Well Fields
- Permit Boundary
- 3000 — Contour Intervals, Feet Above Mean Sea Level
- TVA Borehole Locations
- Powertech Exploration Borehole Locations
- PM47 / 3292 — Elevation Measures at Borehole (Hole / Elevation)



N

Feet
0 500 1,000 2,000 3,000 4,000
0 250 500 1,000
Meters

CONSULTANT

REVISIONS

#	DRAWN	CHECKED	APPROVED	DATE

REF 980

CHECK SCALES
If this bar does not measure 1 inch this map is not at its original scale

Arch E 36" x 48"

PLOT DATE	14-Dec-2013	DATE	13-Dec-2013
DRAWN	Hetrick, Lichnovsky	CHECKED	W. Mays
SCALE	1" = 1000'	FILENAME	k:\powertech\11185\acad\dwgs_final_tr\chilson member of lakota structure 7-7-2009.dwg

POWERTECH (USA) INC.

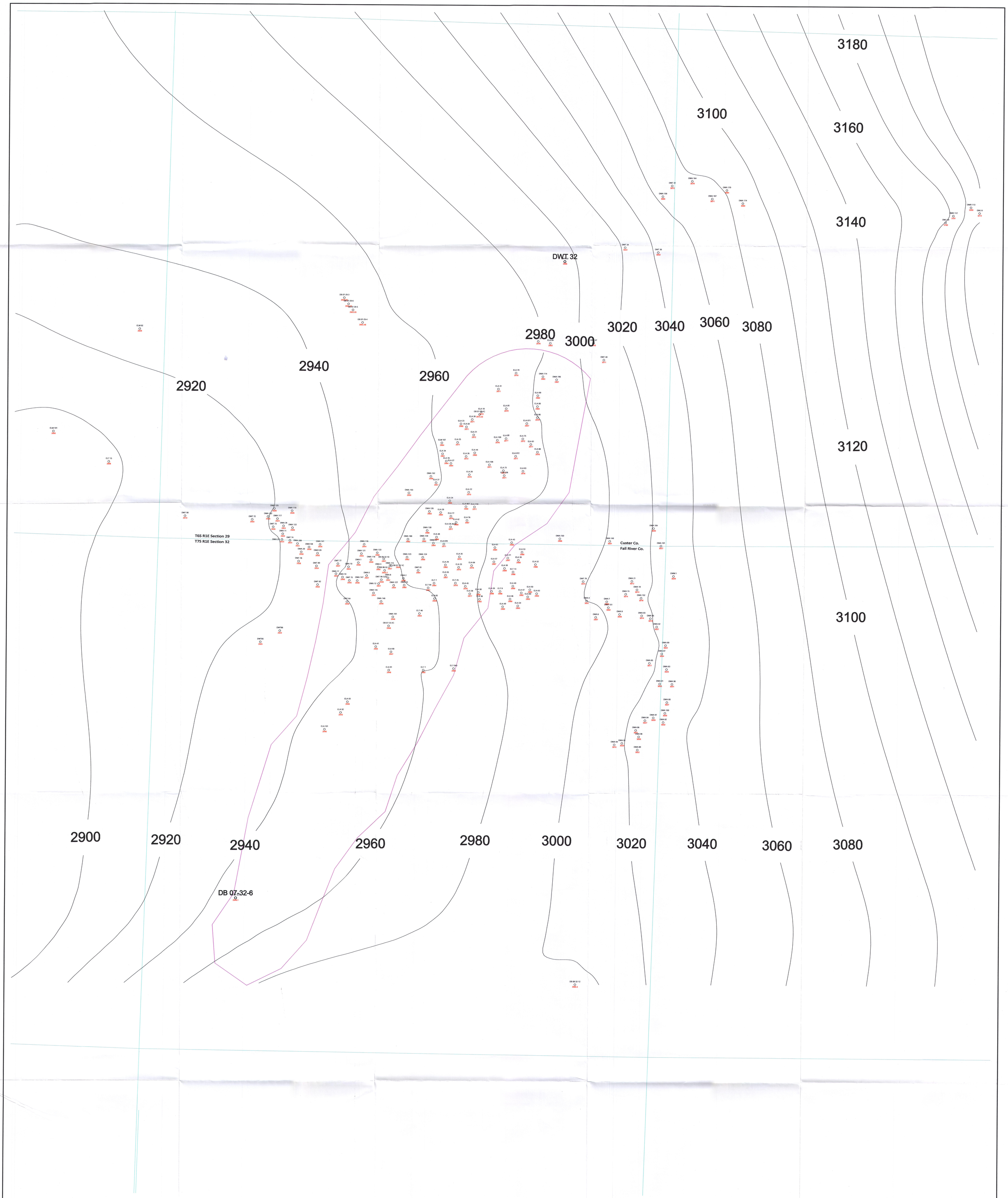
Plate 2.6-3

Structure Map - Top of the Chilson Member of the Lakota Formation

PROJECT Dewey-Burdock Project

COORDS NAD 1927, South Dakota State Plane South (feet)

OF



Legend

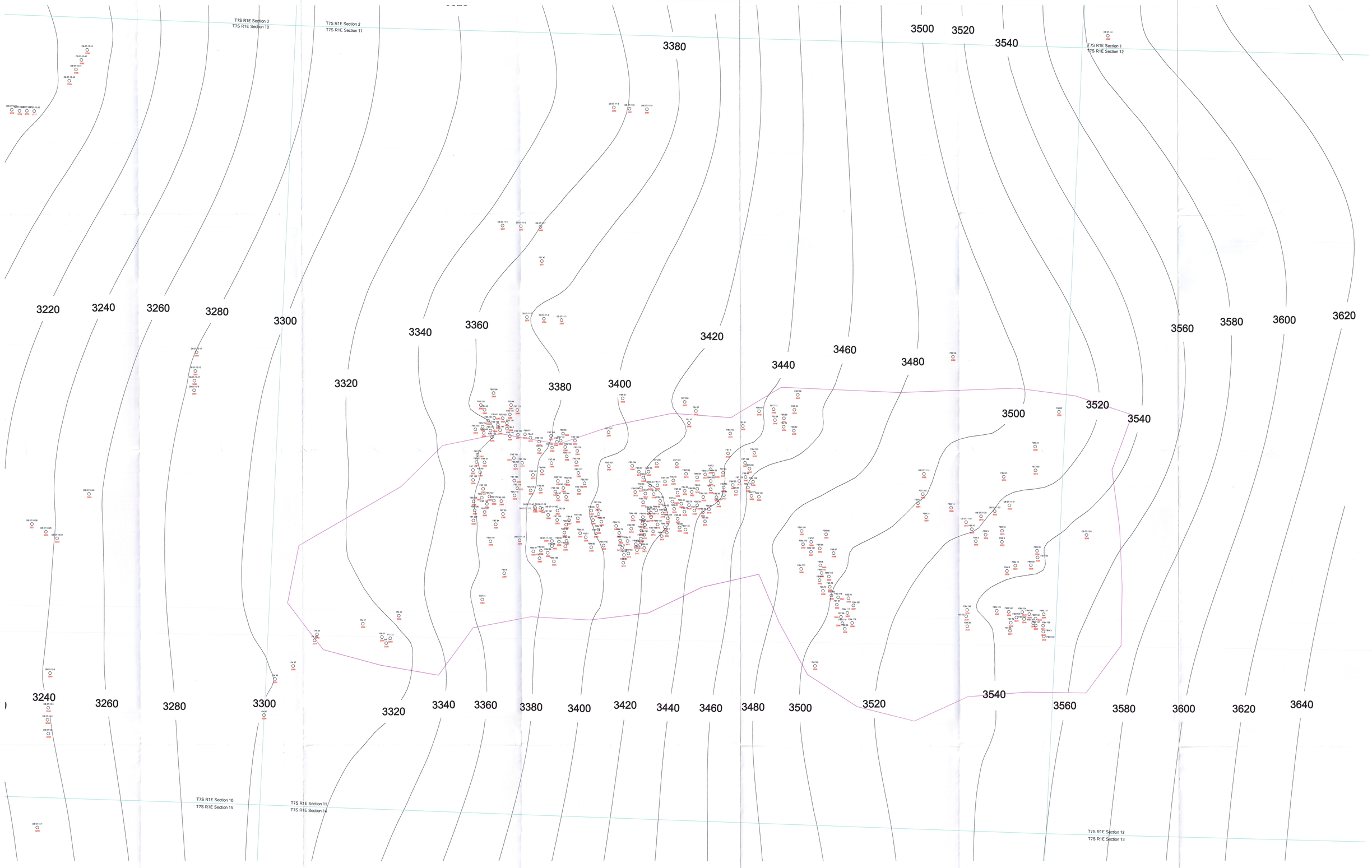
- Dewey Well Field Monitor Ring (Approx.)
- —2900— Contour Intervals, Feet Above Mean Sea Level
- DWA 94 / 3015 — Borehole Locations, Countour Intervals in Red

N

0 150 300 600 900 1200 Feet

0 75 150 300 Meters

CONSULTANT	REVISIONS # / DRAWN / CHECKED / APPROVED / DATE				POWERTECH (USA) INC. Plate 2.6-3a
REF 348					Structure Map - Top of the Chilson Member of the Lakota Formation Dewey Well Field 1
CHECK SCALES If this bar does not measure 1 inch this map is not at its original scale	PLOT DATE 14-Dec-2013	DATE 13-Dec-2013		PROJECT Dewey-Burdock Project	
	DRAWN F. Lichnovsky	CHECKED W. Mays		COORDS NAD 27, South Dakota State Plane South (feet)	
Arch E 36" x 48"	SCALE 1" = 300	FILENAME k:\powertech\11185\acad\dwgs_final_tr\dewey_lakota_structure_7-21-09_(3).dwg			OF



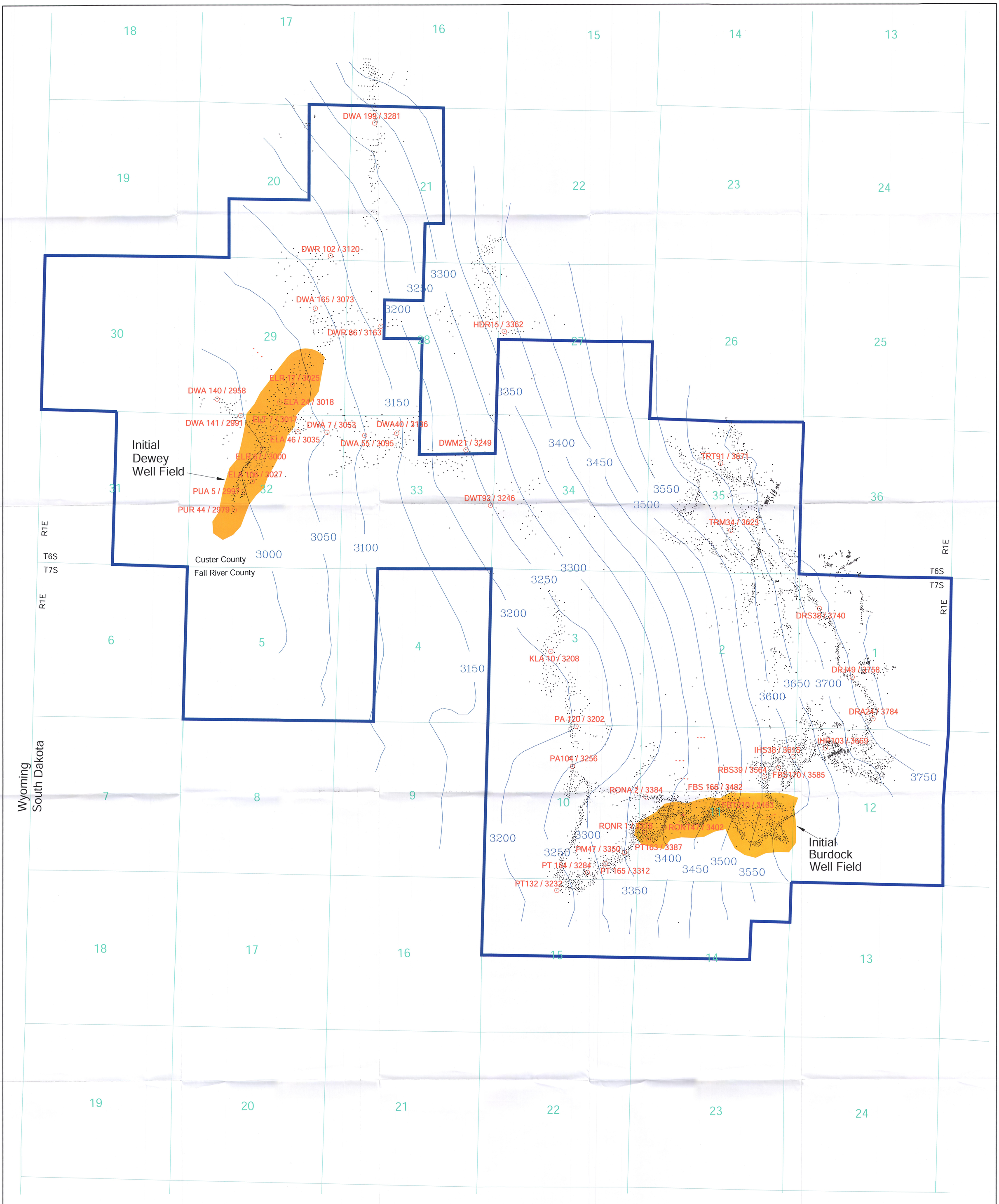
N

Feet
0 100 200 400 600 800
0 50 100 200
Meters

Legend

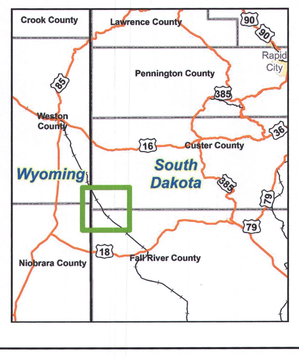
- Burdock Well Field Monitor Ring (Approx.)
- —2900— Contour Intervals, Feet Above Mean Sea Level
- Borehole Locations, Countour Intervals in Red

CONSULTANT					POWERTECH (USA) INC.
	REVISIONS # / DRAWN / CHECKED / APPROVED / DATE				Plate 2.6-3b
REF 345					Structure Map - Top of the Chilson Member of the Lakota Formation Burdock Well Field 1
CHECK SCALES: If this bar does not measure 1 inch, drawing is not at its original scale	PLOT DATE 14-Dec-2013	DATE 13-Dec-2013	PROJECT Dewey-Burdock Project		
	DRAWN R. Lichnovsky	CHECKED W. Mays	COORD. NAD 27, South Dakota State Plane South (feet)		
ANSI E 36" x 48"	SCALE 1" = 200'	FILENAME k:\powertech\11185\acad\dwgs_final_tr\burdock lakota structure 7-26-2009.dwg			OF



Legend

- Initial Well Fields
- Permit Boundary
- 3000 — Contour Intervals, Feet Above Mean Sea Level
- Borehole Locations
- PM47 / 3350 — Measured Thickness at Borehole (Hole / Thickness)



N

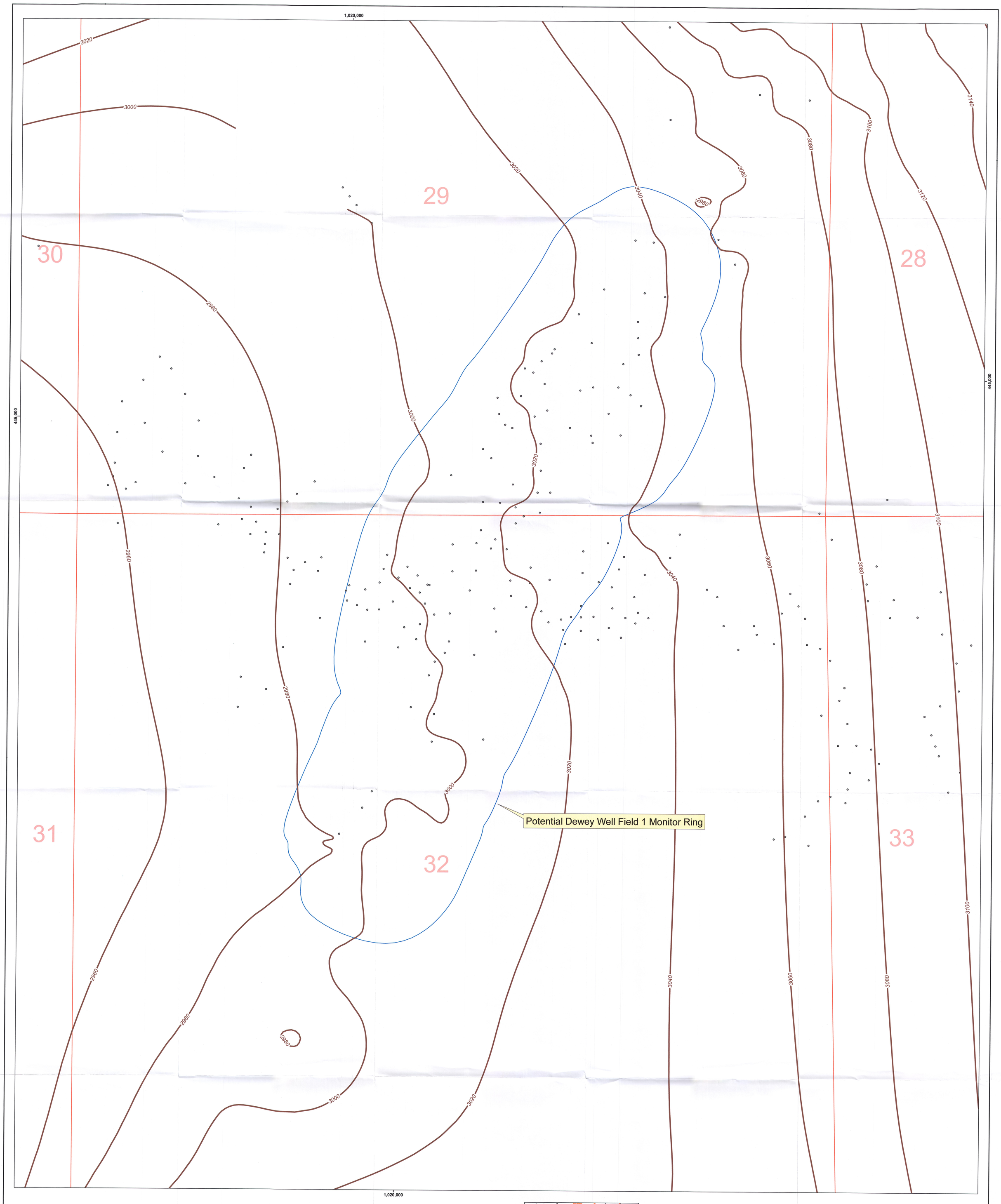
Feet: 0 500 1,000 2,000 3,000 4,000
Meters: 0 250 500 1,000

CONSULTANT	REVISIONS #	DRAWN	CHECKED	APPROVED	DATE
REF 985					
CHECK SCALES: If this bar does not measure 1 inch this map is not at its original scale	PLOT DATE 14-Dec-2013	DATE 13-Dec-2013	PROJECT Dewey-Burdock Project		
Arch E 36" x 48"	DRAWN Hetrick, Lichnovsky	CHECKED W. Mays	COORDS NAD 27, South Dakota State Plane South (feet)		
	SCALE 1" = 1000'	FILENAME k:\powertech\11185\acad\dwgs_final_tr\fuson structure 7-7-2009.dwg			OF

POWERTECH (USA) INC.

Plate 2.6-4

Structure Map - Top of the Fuson Shale



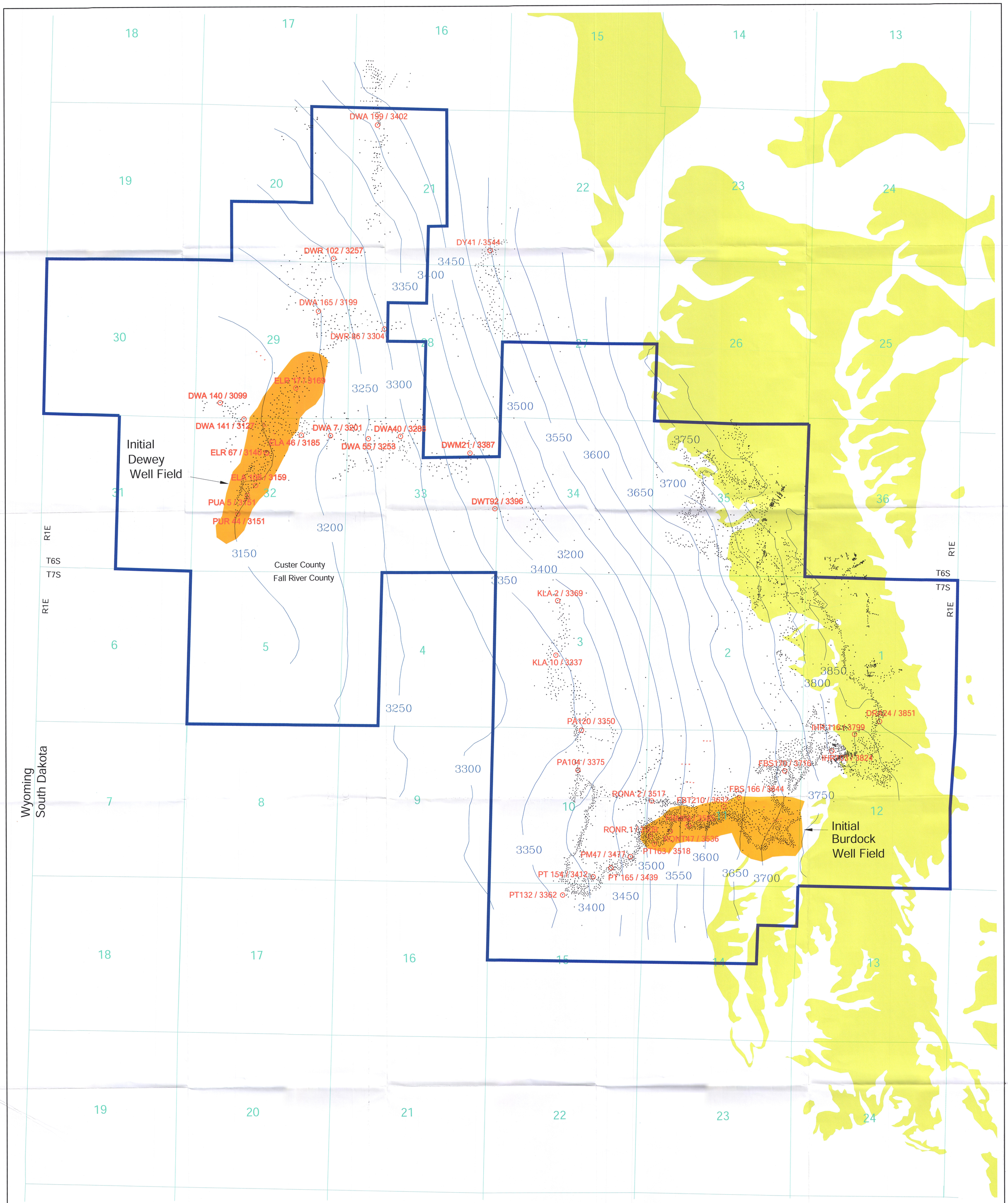
Feet
0 100 200 400 600 800
0 50 100 200
Meters

N

Legend

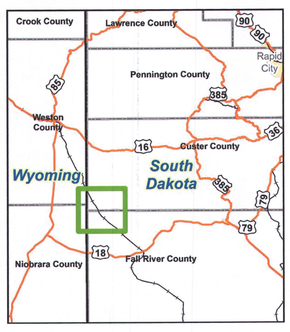
- Project Boundary
- Structure Contour Line
- Drill Hole Data Point Locations
- Potential Dewey Well Field 1 Monitor Ring

CONSULTANT	REVISIONS # / DRAWN / CHECKED / APPROVED / DATE	POWERTECH (USA) INC.
REF 001		**Plate 2.6-4a**
CHECK SCALES: If this bar does not measure 1 inch this map is not at its original scale	PLOT DATE 14-Dec-2013 / DATE 14-Dec-2013	**Top of Fuson, Structure Contour Map**
Arch E 36" x 48"	DRAWN S. Hetrick / PDF FILE R001_FusonStructureDewey.pdf / COORDS NAD 27, South Dakota State Plane South (feet)	**Dewey Well Field 1**
	CHECKED F. Lichnovsky / CAD FILE P:\Dewey-Burdock\Submittals\WWC NRC TR RAI June 2011\Plate 2.6-4a FusonStructure.mxd	**Township 6S, Range 1E**
		Dewey-Burdock Project



Legend

- Fall River Outcrop
- Initial Well Fields
- Permit Boundary
- 3200 — Contour Intervals, Feet Above Mean Sea Level
- TVA Borehole Locations
- Powertech Exploration Borehole Locations
- PM47 / 3477 — Elevation Measures at Borehole (Hole / Elevation)



N

Feet
0 500 1,000 2,000 3,000 4,000
0 250 500 1,000
Meters

CONSULTANT	REVISIONS #	DRAWN	CHECKED	APPROVED	DATE
REF 983					
CHECK SCALES					

If this bar does not measure 1 inch this map is not at its original scale

Arch E 36" x 48"

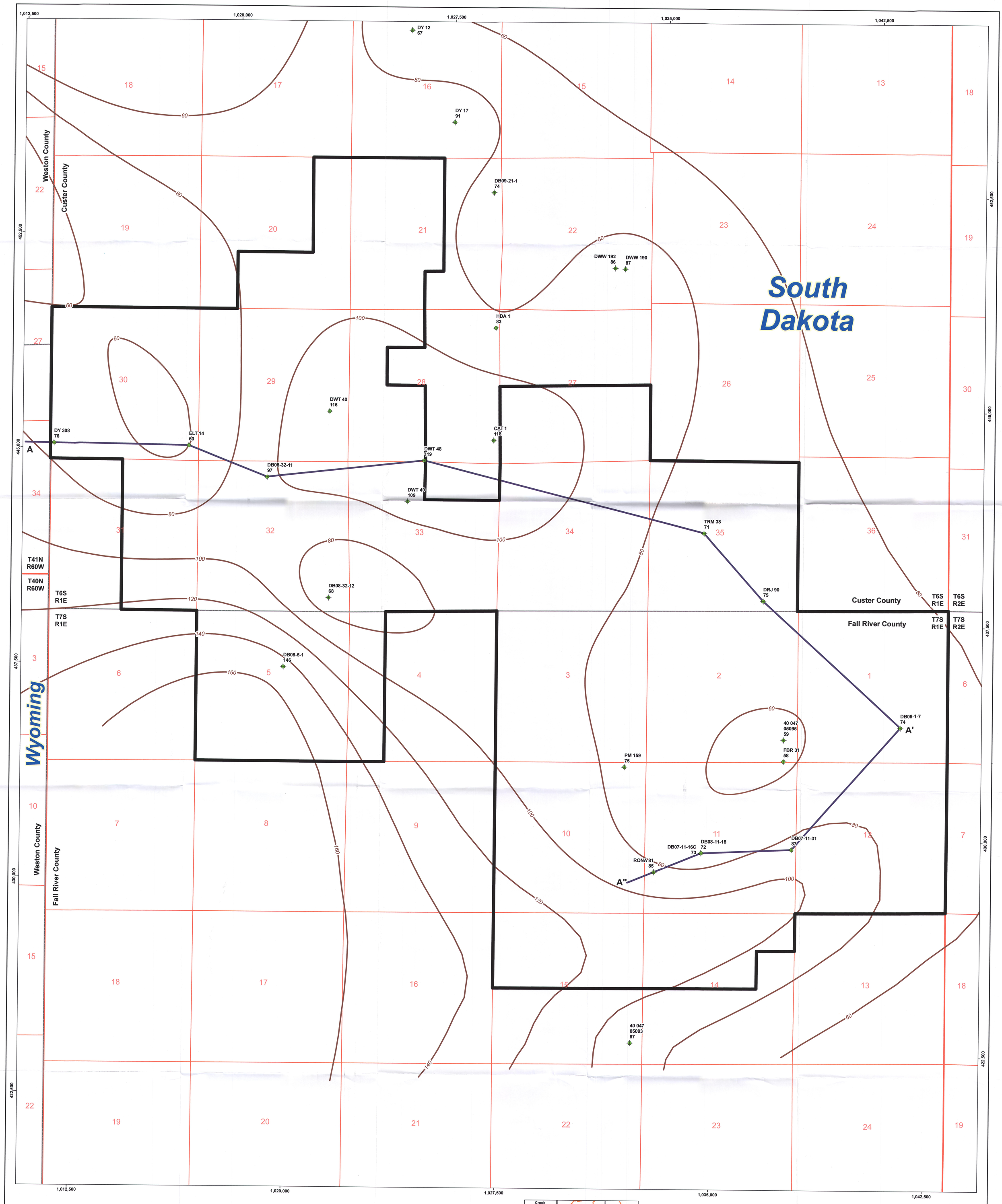
PLOT DATE	14-Dec-2013	DATE	13-Dec-2013
DRAWN	Hetrick, Lichnovsky	CHECKED	W. Mays
SCALE	1" = 1000'	FILENAME	k:\powertech\11185\acad\dwgs_final_tr\fall river structure 7-7-2009.dwg

PROJECT Dewey-Burdock Project
COORDS NAD 27, South Dakota State Plane South (feet)

POWERTECH (USA) INC.

Plate 2.6-5

Structure Map - Top of the Fall River Formation


South Dakota
Wyoming
Weston County
Custer County
Fall River County
T41N R60W
T40N R60W
T6S R1E
T7S R1E
T6S R2E
T7S R2E
A
A'
A"
DY 12 67
DY 17 91
DB09-21-1 74
DWW 192 86
DWW 190 87
HDA 1 83
DWT 40 116
DY 308 76
ELT 14 60
DB08-32-11 97
DWT 48 119
CAT 1 118
DWT 49 109
TRM 38 71
DB08-32-12 68
DRJ 90 75
DB08-5-1 146
DB08-1-7 74
40 047 05095 59
FBR 31 58
PM 159 75
DB07-11-16C 73
DB08-11-18 72
DB07-11-31 87
RONA 81 85
40 047 05093 87
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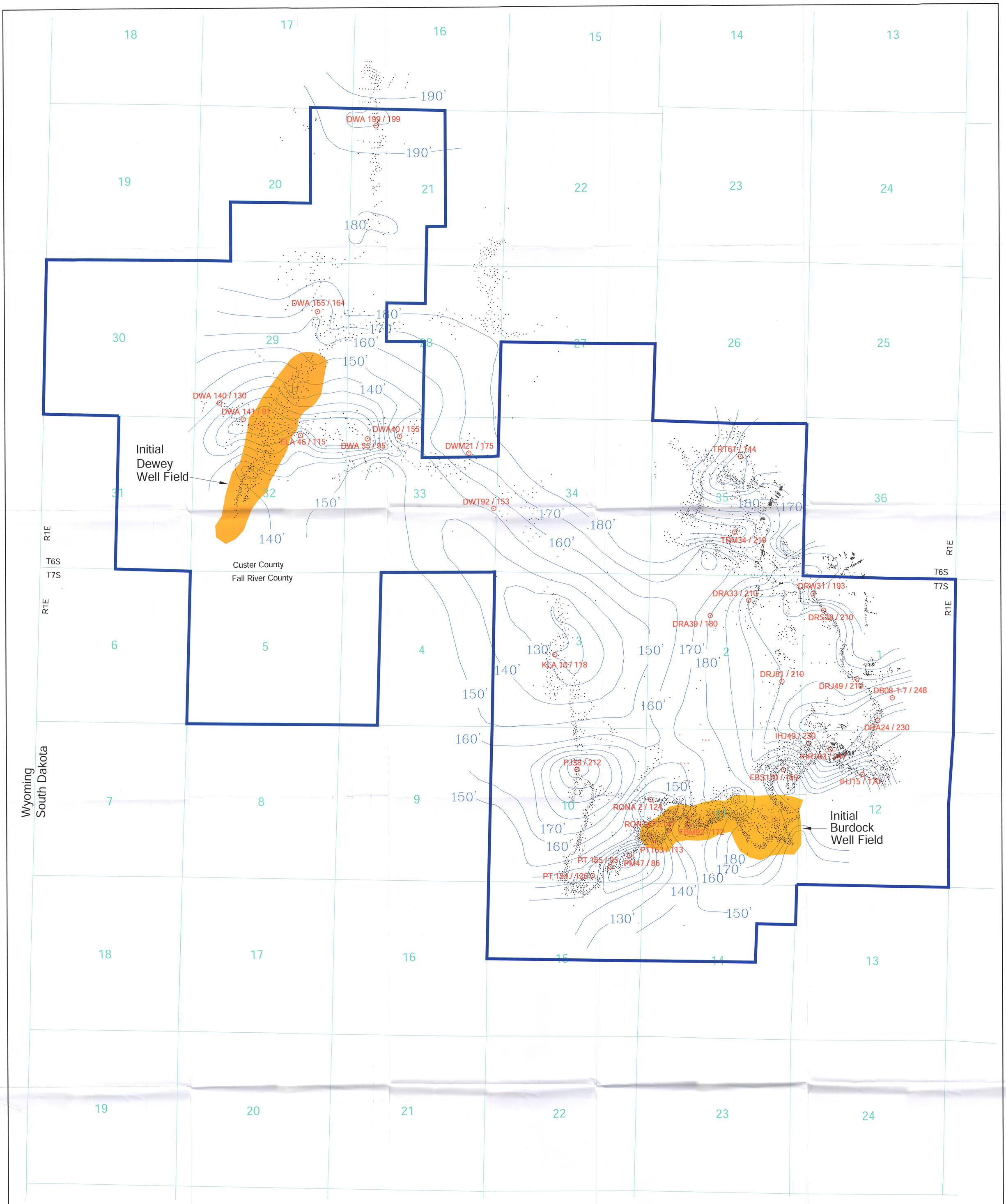
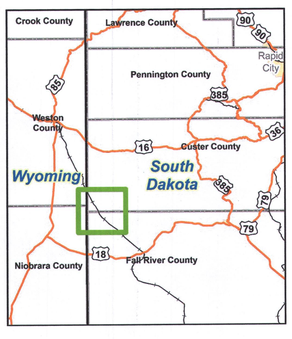
1,020,000
1,027,500
1,035,000
1,042,500
452,500
445,000
437,500
430,000
422,500
Feet
0 500 1,000 2,000 3,000 4,000
0 250 500 1,000
Meters
N
Crook County
Lawrence County
Rapid City
Pennington County
Weston County
Wyoming
South Dakota
Custer County
Niobrara County
Fall River County
Legend
Project Boundary
Isopach Contour Line (feet)
Cross Section Index Line
Drill Hole Location Showing Thickness (feet)
CONSULTANT
REVISIONS
DRAWN CHECKED APPROVED DATE
REF 989
CHECK SCALES
If this bar does not measure 1 inch this map is not at its original scale
Arch E 36" x 48"
PLOT DATE 14-Dec-2013
DATE 14-Dec-2013
DRAWN F. Lichnovsky
CHECKED F. Lichnovsky
PDF FILE R989_MorrisonIsopach.pdf
CAD FILE P:\Dewey-Burdock\Submittals\WWC NRC TR RAI June 2011\Exhibit 2.6-2.mxd
COORDS NAD 27, South Dakota State Plane South (feet)
POWERTECH (USA) INC.
Plate 2.6-6
Isopach Map of the Morrison Formation
Custer & Fall River Counties
Dewey-Burdock Project



Legend

- Initial Well Fields
- Permit Boundary
- 150' Thickness
- TVA Borehole Locations
- Powertech Exploration Borehole Locations
- PM47 / 86 Measured Thickness at Borehole (Hole / Thickness)

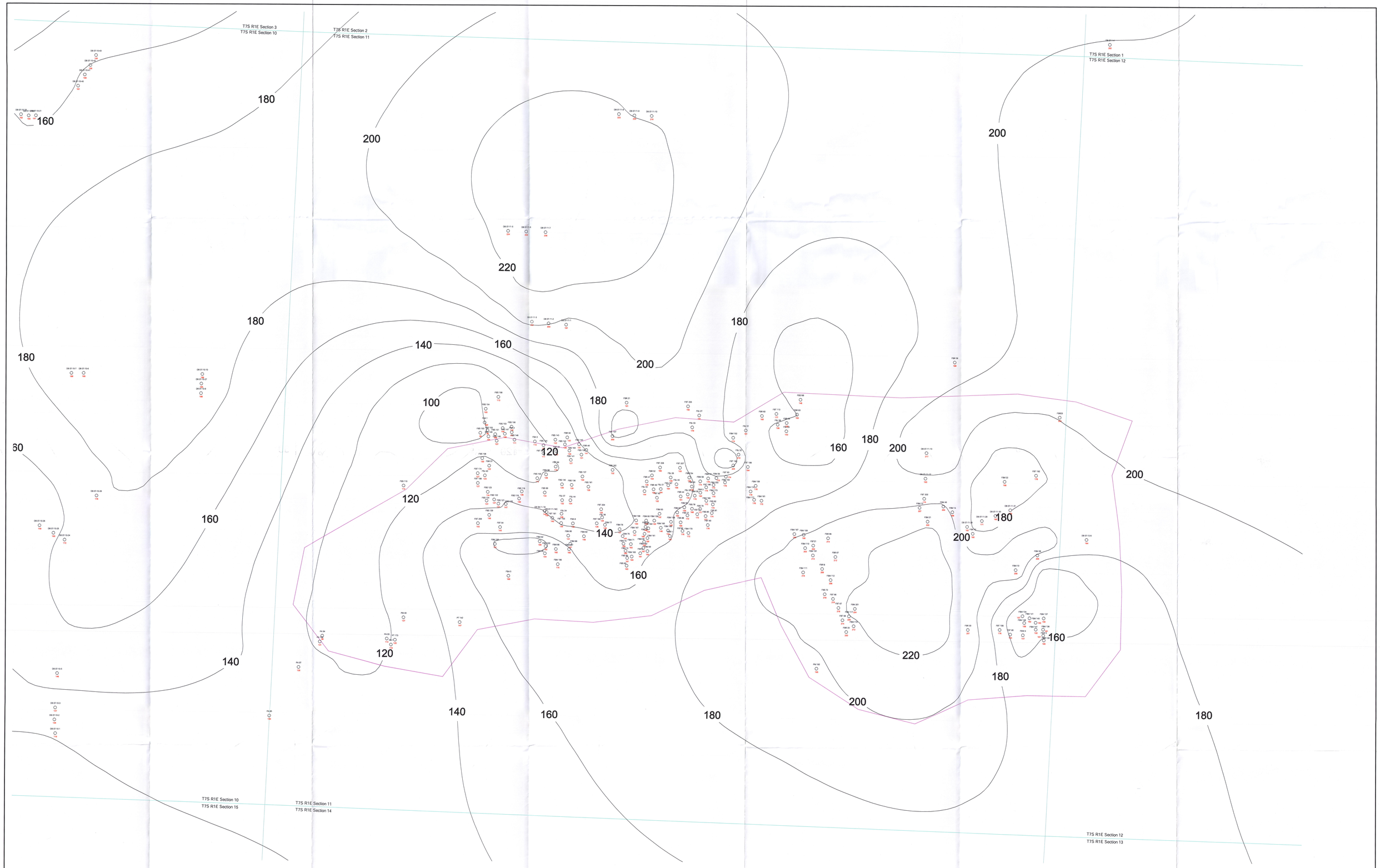


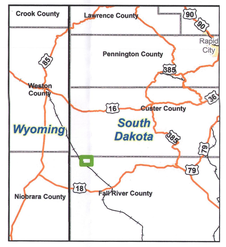
N

Feet: 0 500 1,000 2,000 3,000 4,000

Meters: 0 250 500 1,000

CONSULTANT	REVISIONS # / DRAWN / CHECKED / APPROVED / DATE	POWERTECH (USA) INC. Plate 2.6-7
REF 979		Isopach of the Chilson Member of the Lakota Formation
CHECK SCALES: If this bar does not measure 1 inch this map is not at its original scale	PLOT DATE 14-Dec-2013 / DATE 13-Dec-2013	PROJECT Dewey-Burdock Project
	DRAWN Hetrick, Lichnovsky / CHECKED W. Mays	COORDS NAD 1927, South Dakota State Plane South (feet)
Arch E 36" x 48"	SCALE 1" = 1000' / FILENAME k:\powertech\11185\acad\dwgs_final_tr\chilson member of lakota isopach 7-7-2009.dwg	OF





Legend

- Burdock Well Field Monitor Ring
- 140 Thickness
- Borehole Locations, Thickness in Red

CONSULTANT

REVISIONS #	DRAWN	CHECKED	APPROVED	DATE

REF 004

CHECK SCALES

If this bar does not measure 1 inch this map is not at its original scale

ARCH E 36" x 48"

PLOT DATE	14-Dec-2013	DATE	26-Jul-2009
DRAWN	R. Lichnovsky	CHECKED	W. Mays
SCALE	1" = 200'	FILENAME	k:\powertech\11185\acad\dwgs_final_b\burdock lakota isopach 7-26-2009.dwg

POWERTECH (USA) INC.

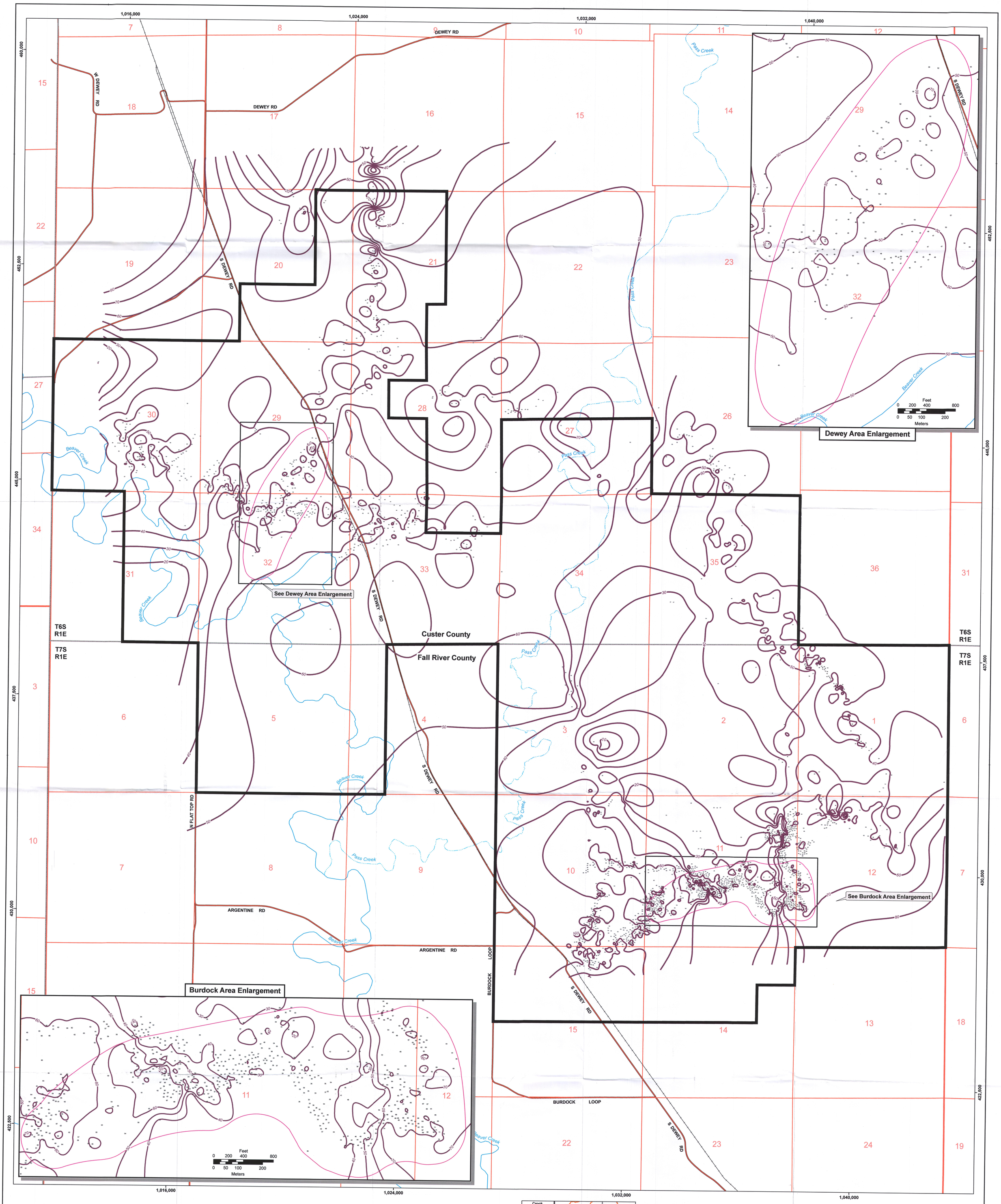
Plate 2.6-7a

Isopach of the Chilson Member of the Lakota Formation Burdock Well Field 1

PROJECT Dewey-Burdock Project

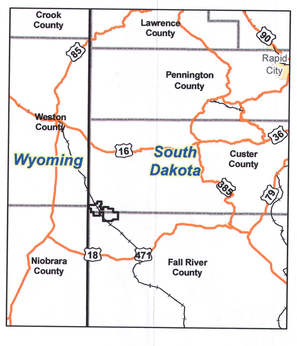
COORD. NAD 27, South Dakota State Plane South (feet)

OF



Legend

- Project Boundary
- BNSF Railroad
- County Roads
- Ephemeral Streams
- Perennial Streams
- Fuson Thickness (feet)
- Initial Well Field Areas
- Measured Thickness of Fuson Shale (drill hole location is the center of text label)



N

Feet
0 500 1,000 2,000 3,000 4,000
0 250 500 1,000
Meters

CONSULTANT	REVISIONS #	DRAWN	CHECKED	APPROVED	DATE
REF 984					
CHECK SCALES: If this bar does not measure 1 inch this map is not at its original scale	PLOT DATE 26-Jun-2013	DATE 26-Jun-2013			
Arch E 36" x 48"	DRAWN Hetrick, Lichnovsky	PDF FILE R984_FusonIsopach.pdf			
	CHECKED F. L. Lichnovsky	CAD FILE P:\Dewey-Burdock\Submittals\Technical Report (TR)\June 2013 Revisions\FusonIsopach.mxd			

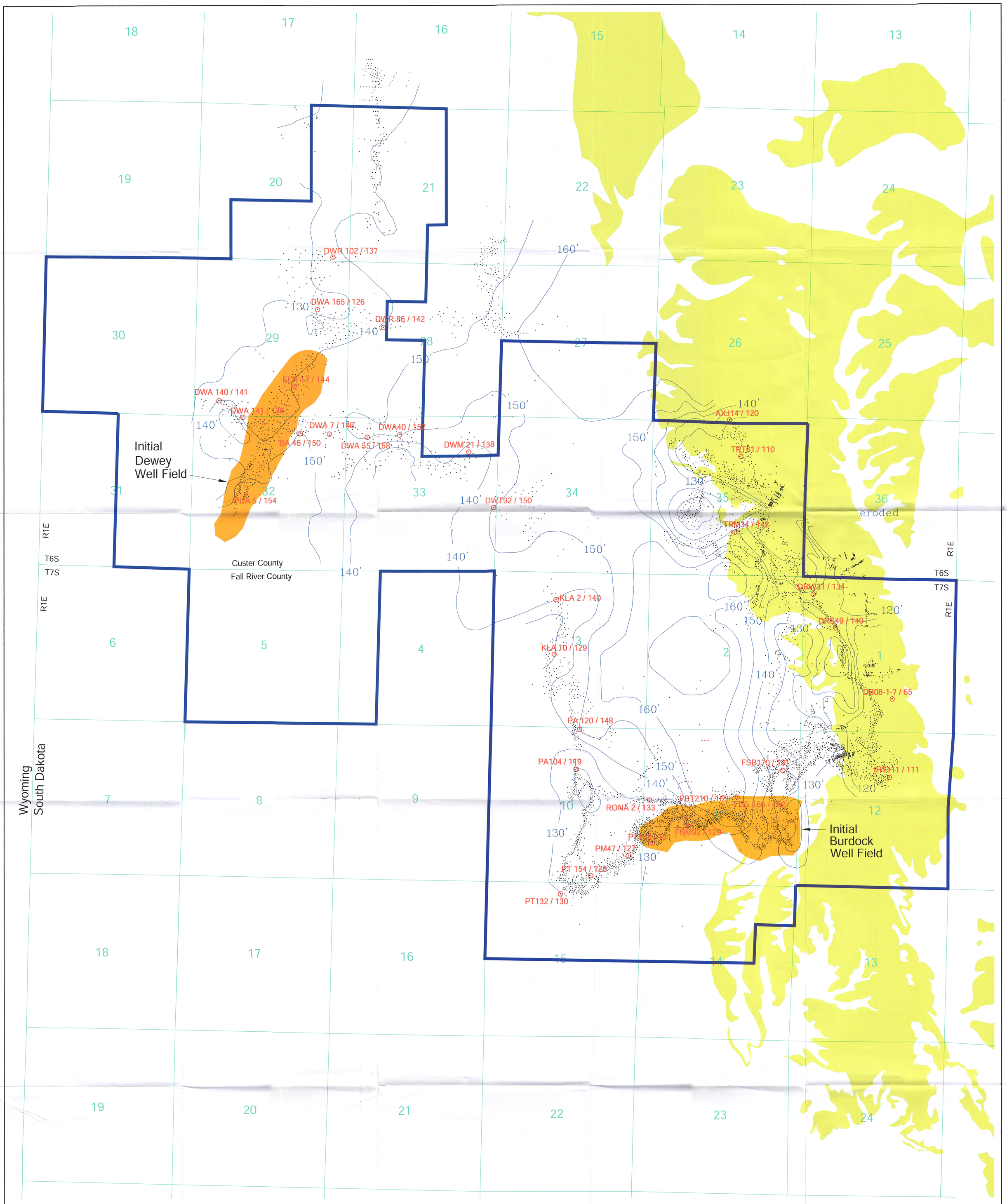
POWERTECH (USA) INC.

Plate 2.6-8

Isopach of the Fuson Shale

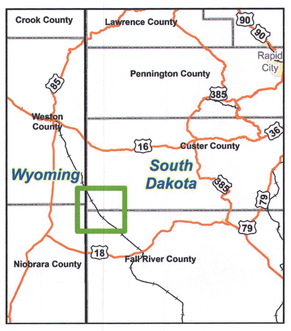
Dewey-Burdock Project

COORDS NAD 27, South Dakota State Plane South (feet)



Legend

- Fall River Outcrop
- Initial Well Fields
- Permit Boundary
- 50' Thickness
- TVA Borehole Locations
- Powertech Exploration Borehole Locations
- PM47 / 127 Measured Thickness at Borehole (Hole / Thickness)



N

Feet
0 500 1,000 2,000 3,000 4,000
0 250 500 1,000
Meters

CONSULTANT

REVISIONS

#	DRAWN	CHECKED	APPROVED	DATE

REF 982

CHECK SCALES
If this bar does not measure 1 inch this map is not at its original scale

Arch E 36" x 48"

PLOT DATE 17-Dec-2013 | DATE 17-Dec-2013 | PROJECT Dewey-Burdock Project
DRAWN Hetrick, Lichnovsky | CHECKED W. Mays | COORDS NAD 27, South Dakota State Plane South (feet)
SCALE 1" = 1000' | FILENAME k:\powertech\11185\acad\dwgs_final_tr\fall river isopach 7-7-2009.dwg

POWERTECH (USA) INC.

Plate 2.6-9

Isopach of the Fall River Formation

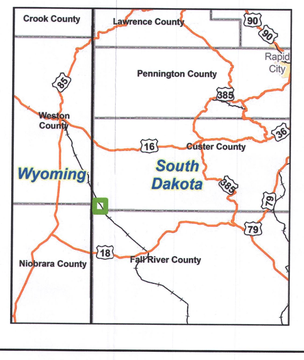
OF

T6S R1E Section 29
T7S R1E Section 32

Custer Co.
Fall River Co.

Legend

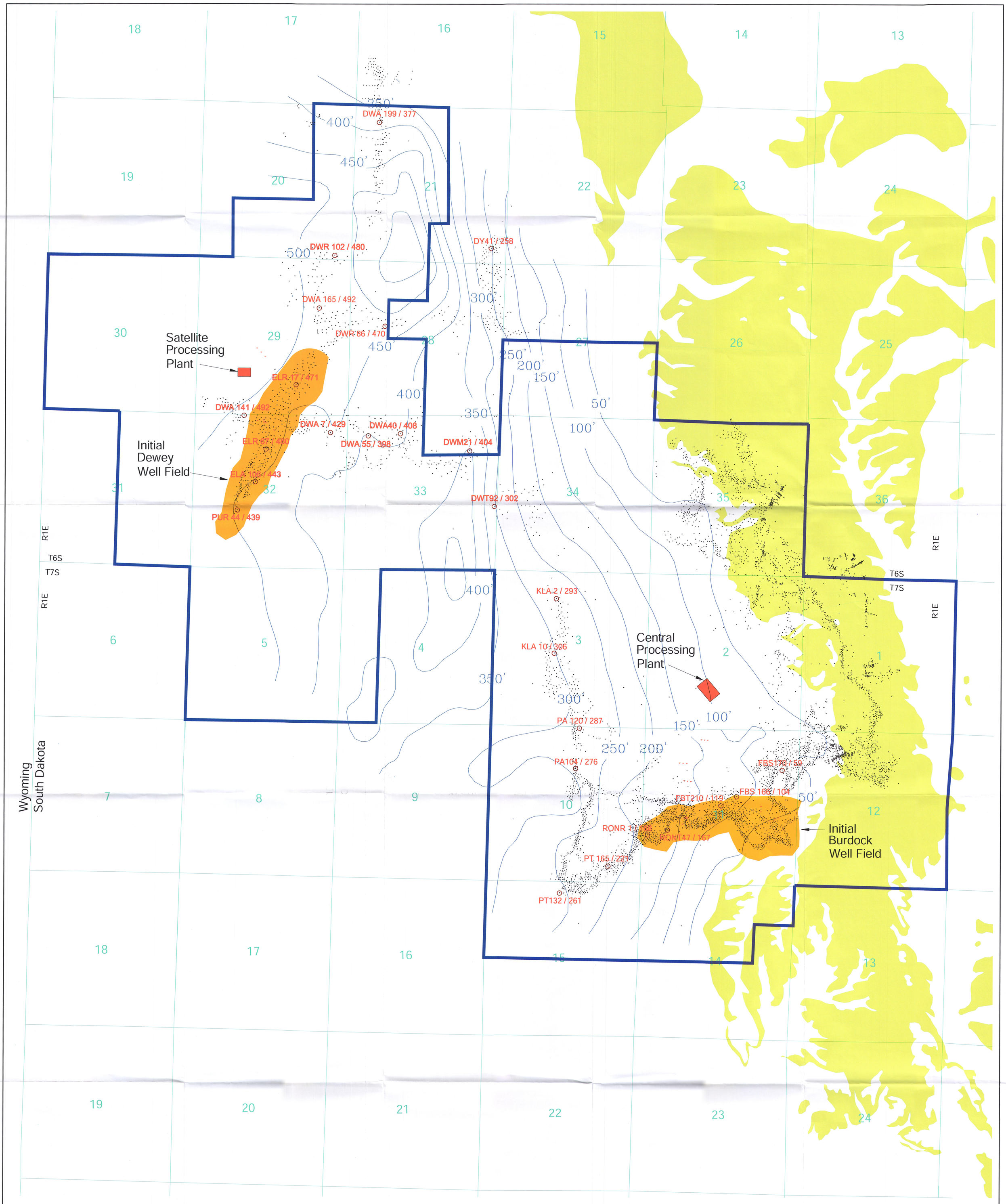
- Dewey Well Field Monitor Ring (Approx.)
- 160 — Thickness
- PUR 44 — Borehole Locations, Thickness in Red



N

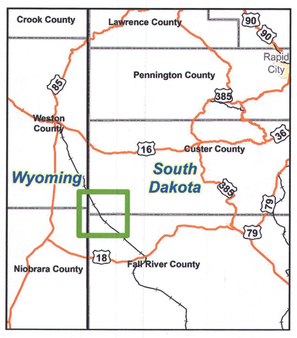
Feet
0 150 300 600 900 1200
0 75 150 300
Meters

CONSULTANT	REVISIONS # / DRAWN / CHECKED / APPROVED / DATE	POWERTECH (USA) INC. Plate 2.6-9a
REF 346		Isopach of the Fall River Formation Dewey Well Field 1
CHECK SCALES: If this bar does not measure 1 inch this map is not at its original scale	PLOT DATE 15-Dec-2013 / DATE 14-Dec-2013	PROJECT Dewey-Burdock Project
	DRAWN / CHECKED F. Lichnovsky	COORDS NAD 27, South Dakota State Plane (feet)
Arch E 36" x 48"	SCALE 1" = 300'	FILENAME k:\powertech\11185\acad\dwgs_final_tr\dewey_fall_river_isopach_7-22-09.dwg



Legend

- Processing Plant Sites
- Fall River Outcrop
- Initial Well Fields
- Permit Boundary
- 100' Thickness
- TVA Borehole Locations
- Powertech Exploration Borehole Locations
- PA104 / 276 Measured Thickness at Borehole (Hole / Thickness)



N

0 500 1,000 2,000 3,000 4,000 Feet

0 250 500 1,000 Meters

CONSULTANT	REVISIONS # / DRAWN / CHECKED / APPROVED / DATE	POWERTECH (USA) INC. Plate 2.6-10
REF 986		Isopach of the Upper Confining Graneros Group
CHECK SCALES: If this bar does not measure 1 inch this map is not at its original scale	PLOT DATE 17-Dec-2013 / DATE 17-Dec-2013	PROJECT Dewey-Burdock Project
	DRAWN Hetrick, Lichnovsky / CHECKED W. Mays	COORDS NAD 27, South Dakota State Plane South (feet)
Arch E 36" x 48"	SCALE 1" = 1000' / FILENAME p:\dewey-burdock\nrc supplimental\finals\isopach upper confining unit mowry and skull.dwg	OF

South Dakota

Wyoming

Custer County

Weston County

Fall River County

T41N R60W

T40N R60W

T6S R1E

T7S R1E

T6S R2E

T7S R2E

Pass Creek

Beaver Creek

Cheyenne River

1,012,500 1,020,000 1,027,500 1,035,000 1,042,500

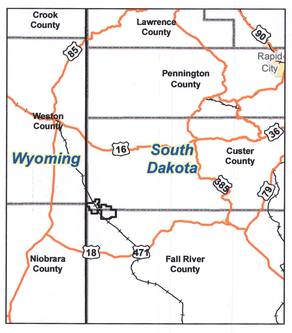
452,500 445,000 437,500 430,000 422,500

Legend

- Drill Hole Locations with Measured Depth of Alluvium (feet)
- Project Boundary
- Structure Contour Line
- Ephemeral Streams
- Perennial Streams
- Alluvium

Potential Well Fields

- Fall River
- Upper Chilson
- Middle/Lower Chilson



N

Feet: 0 500 1,000 2,000 3,000 4,000

Meters: 0 250 500 1,000

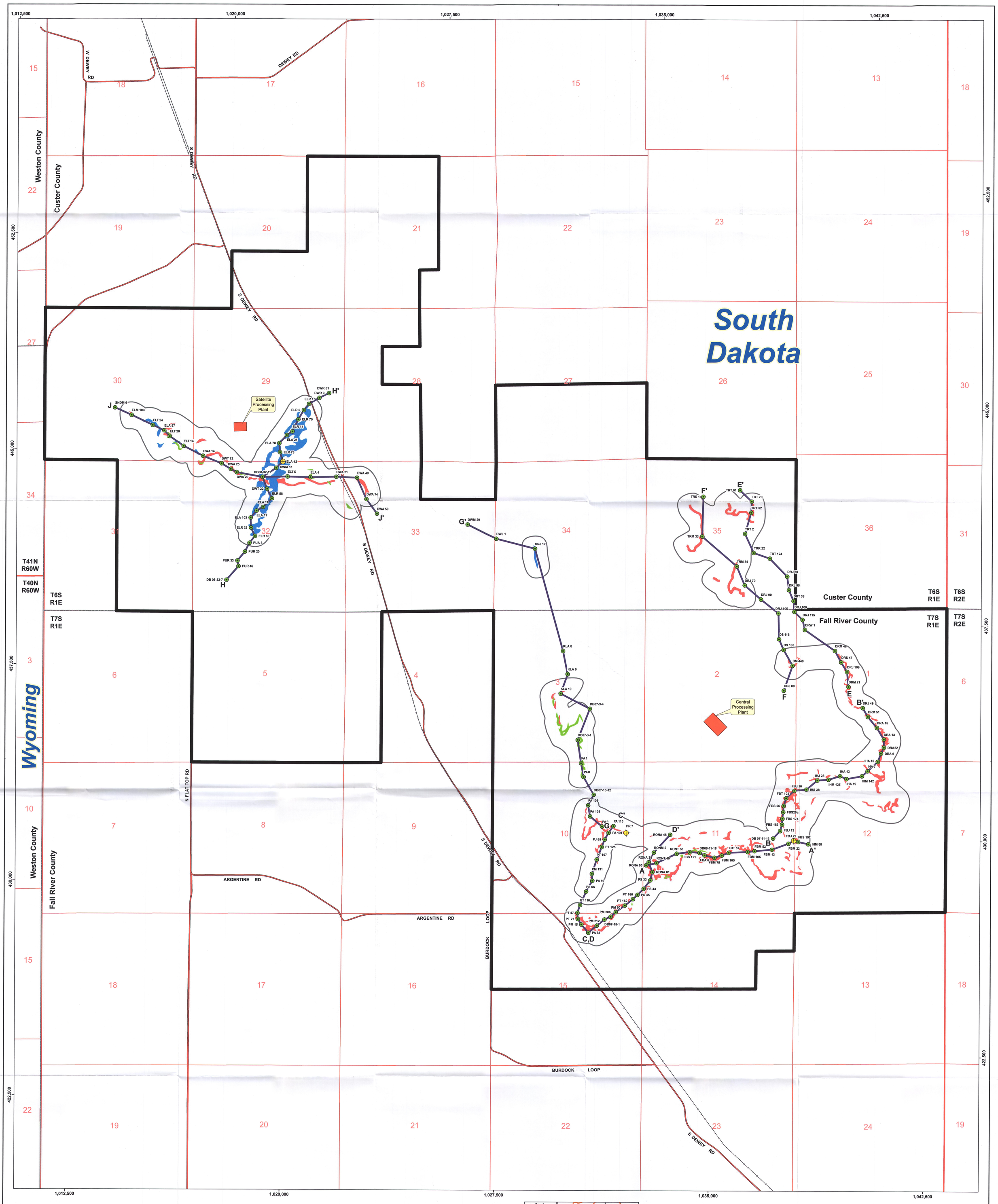
CONSULTANT	REVISIONS #	DRAWN	CHECKED	APPROVED	DATE
REF 987					
CHECK SCALES: If this bar does not measure 1 inch this map is not at its original scale					
Arch E 36" x 48"					

POWERTECH (USA) INC.

Plate 2.6-11

Alluvium Isopach
Custer & Fall River Counties
Dewey-Burdock Project

PLOT DATE	14-Dec-2013	DATE	14-Dec-2013
DRAWN	S. Hetrick	PDF FILE	R987_Isopach-Alluvium.pdf
CHECKED	F. Lichnovsky	CAD FILE	P:\Dewey-Burdock\Submittals\WWC NRC TR RAI June 2011\Exhibit 2.6-8.mxd
COORDS	NAD 27, South Dakota State Plane South (feet)		

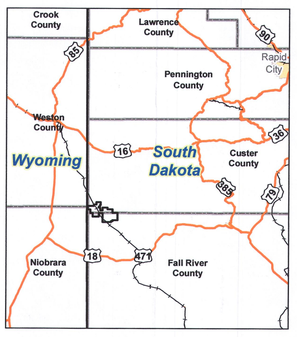


Legend

- Project Boundary
- Cross Section Index Lines
- Holes Used in Type Logs
- Holes Used in Cross Sections
- Overall Potential Well Field Areas
- Processing Plants
- BNSF Railroad
- County Roads

Ore Bodies

- Lower Fall River
- Upper Chilson
- Middle/Lower Chilson



N

Feet: 0, 500, 1,000, 2,000, 3,000, 4,000
Meters: 0, 250, 500, 1,000

CONSULTANT

REVISIONS #	DRAWN	CHECKED	APPROVED	DATE

REF 981

CHECK SCALES: If this bar does not measure 1 inch this map is not at its original scale

Arch E 36" x 48"

PLOT DATE 14-Dec-2013 | DATE 14-Dec-2013

DRAWN S. Hetrick | POF FILE R981_CrossSectionIndex.pdf | COORD'S NAD 27, South Dakota State Plane South (feet)

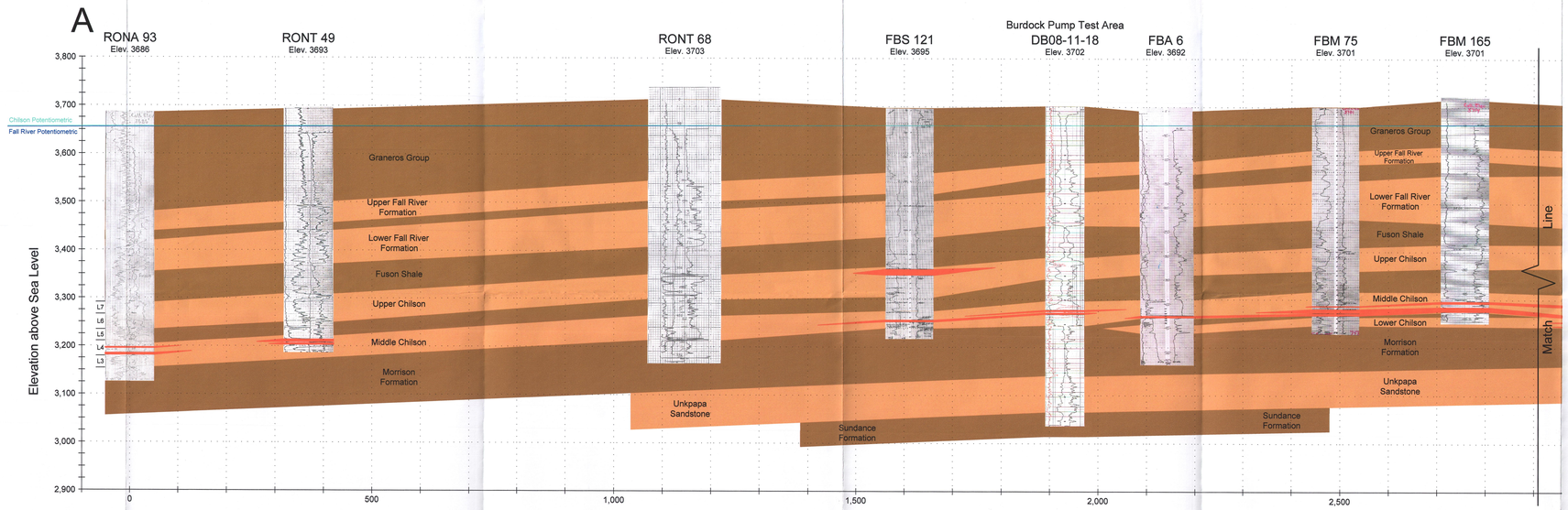
CHECKED J. Bonner, J. Mays | CAD FILE P:\Dewey-Burdock\Submittals\WWC NRC TR RAI June 2011\Exhibit 2.7-1.mxd

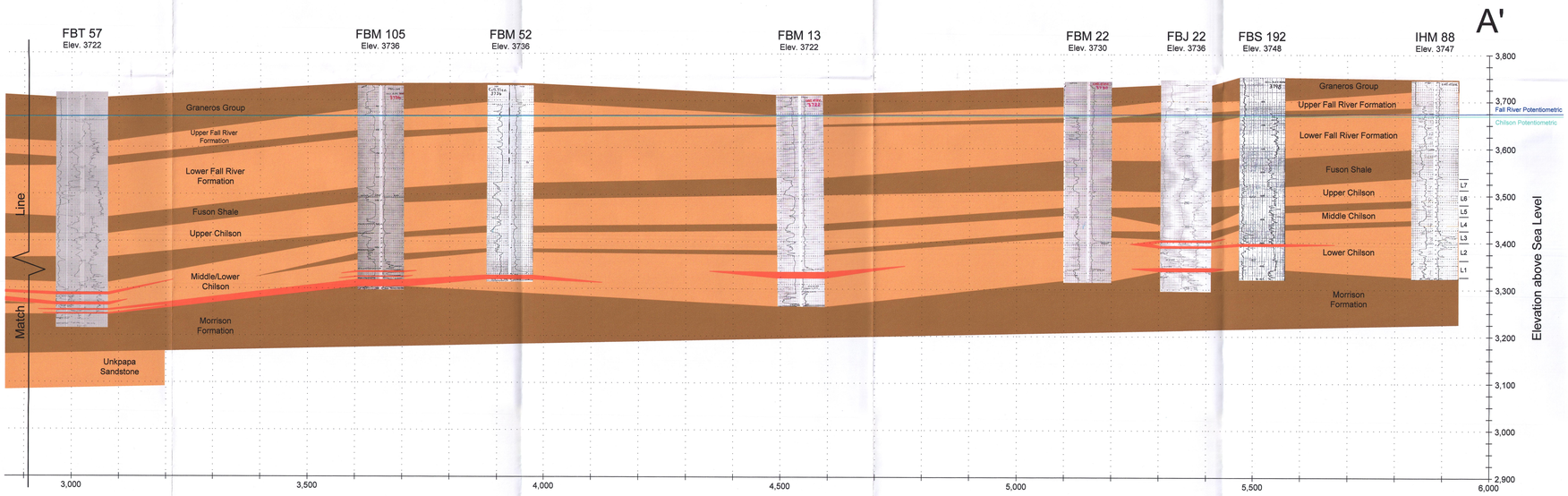
POWERTECH (USA) INC.

Plate 2.6-12

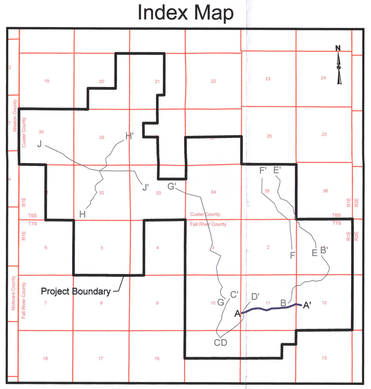
Cross Section Index Map

Dewey-Burdock Project





Index Map



Legend

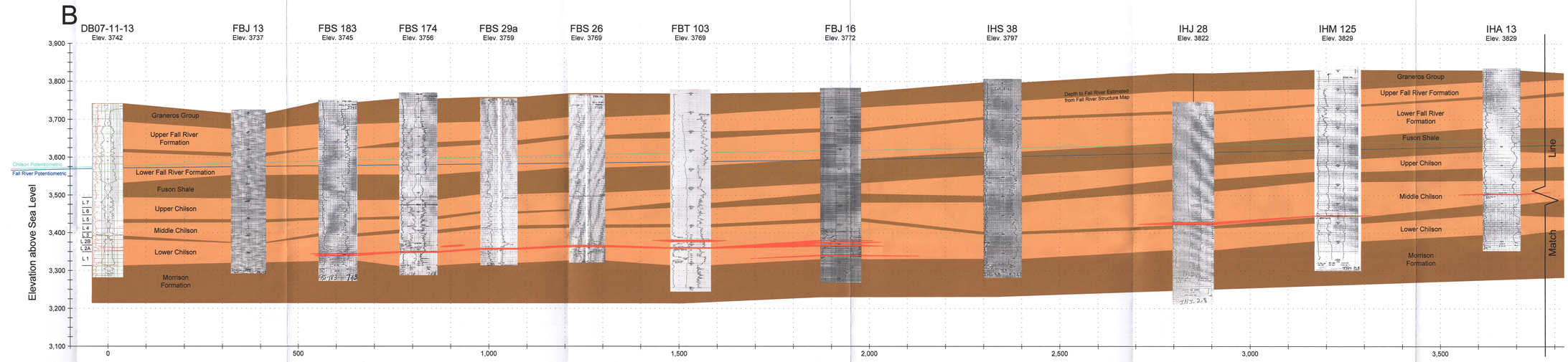
- Ore
- Confining Clays and Shale
- Sand

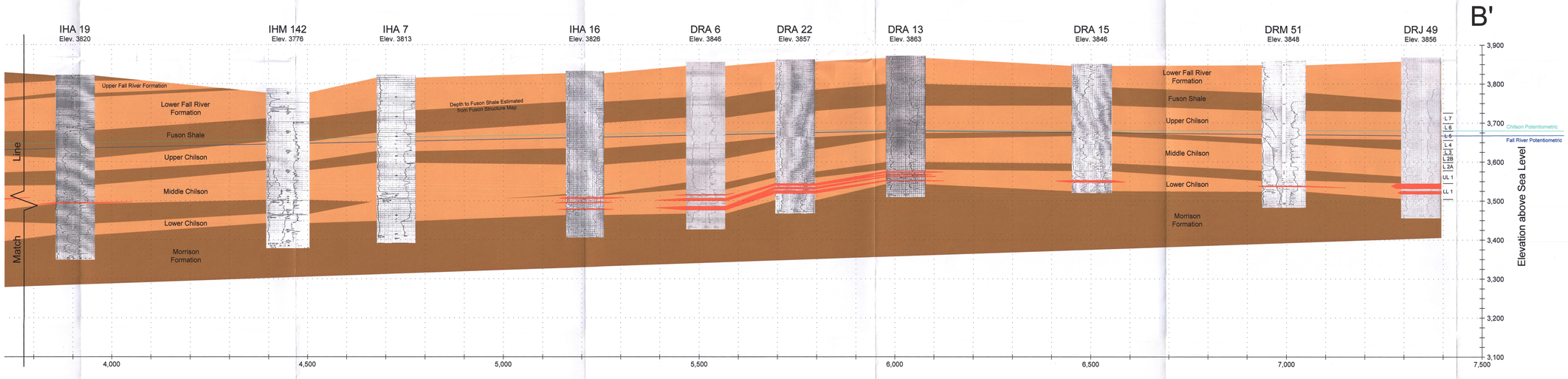
Horizontal Scale = Vertical Scale

Feet: 0 50 100 200 300 400

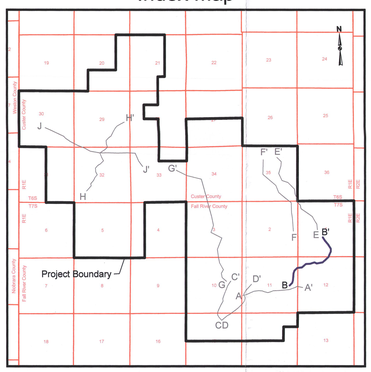
Meters: 0 25 50 100

CONSULTANT	REVISIONS # / DRAWN / CHECKED / APPROVED / DATE	POWERTECH (USA) INC.
REF 966		Plate 2.6-12a
CHECK SCALES: If this bar does not measure 1 inch this map is not at its original scale		Cross Section A - A'
Arch E 36" x 48"	PLOT DATE 26-Jun-2013 / DATE 26-Jun-2013	Dewey-Burdock Project
	DRAWN R. Lichnovsky / PDF FILE R966_P_X_Burdock_A-A.pdf	COORDS NAD 27, South Dakota State Plane South (feet)
	CHECKED F. L. Lichnovsky / CAD FILE p:\dewey-burdock\submittals\technical report (tr)\june 2013 revisions\p_x_burdock_a-a.dwg	





Index Map



Legend

- Ore
- Confining Clays and Shale
- Sand

Horizontal Scale = Vertical Scale

Feet: 0 50 100 200 300 400

Meters: 0 25 50 100

CONSULTANT	REVISIONS #	DRAWN	CHECKED	APPROVED	DATE
REF 967					
CHECK SCALES					
If this bar does not measure 1 inch this map is not at its original scale					
Arch E 36" x 48"					

POWERTECH (USA) INC.

Plate 2.6-12b

Cross Section B - B'

Dewey-Burdock Project

PLOT DATE	26-Jun-2013	DATE	26-Jun-2013
DRAWN	R. Lichnovsky	PDF FILE	R967_P_X_Burdock_B-B.pdf
CHECKED	F. L. Lichnovsky	CAD FILE	p:\dewey-burdock\submittals\technical report (tr)\june 2013 revisions\p_x_burdock_b-b.dwg
COORDS	NAD 27, South Dakota State Plane South (feet)		