ADDENDUM 3.5-C

VEGETATION DENSITY SUMMARIES

Energy Metals
Moore Ranch
Report: Density Summary

Site Id: AG
Name: Agricultural grassland
Comm. Type/Form: Vegetation Baseline
Sample Date: 6/11/2007

Sample Method: Transect
Sample Size: 50 sq. m.
Number of Samples: 22
Report Date: 8/13/2007

	Mean (Number/Plot)	Relative Density	Std. Dev. n - 1 (Number/Plot)	Mean (Number/sq.m.)	Mean (Number/Acre)
Full Shrubs					
Artemisia cana	6.45	77.17	14.64	0.13	522.64
Artemisia tridentata	1.41	16.85	6.61	0.03	114.10
Atriplex canescens	0.32	3.80	1.29	0.01	25.76
Sub-Total	8.18	97.83	22.54	0.16	662.50
Sub-Shrubs & Half-Shrubs					
Artemisia frigida	0.18	2.17	0.50	0.00	14.72
Sub-Total	0.18	2.17	0.50	0.00	14.72
Total	8.36	100.00	17.05	0.17	677.22

Energy Metals
Moore Ranch
Report: Density Summary

Site Id: BS
Name: Big sagebrush shrubland
Comm. Type/Form: Vegetation Baseline
Sample Date: 6/14/2007

Sample Method: Transect
Sample Size: 50 sq. m.
Number of Samples: 20
Report Date: 8/13/2007

	Mean (Number/Plot)	Relative Density	Std. Dev. n - 1 (Number/Plot)	Mean (Number/sq.m.)	Mean (Number/Acre)
Full Shrubs					
Artemisia cana	12.20	17.38	18.86	0.24	987.85
Artemisia tridentata	34.70	49.43	37.46	0.69	2,809.72
Atriplex canescens	3.80	5.41	13.38	0.08	307.69
Sub-Total	50.70	72.22	69.69	1.01	4,105.26
Sub-Shrubs & Half-Shrubs					
Artemisia frigida	16.70	23.79	58.01	0.33	1,352.23
Artemisia pedatifida	2.80	3.99	12.52	0.06	226.72
Sub-Total	19.50	27.78	70.53	0.39	1,578.95
Total	70.20	100.00	60.34	1.40	5,684.21

Energy Metals
Moore Ranch
Report: Density Summary

Site Id: M
Name: Meadow grassland
Comm. Type/Form: Vegetation Baseline
Sample Date: 6/15/2007

Sample Method: Transect
Sample Size: 50 sq. m.
Number of Samples: 20
Report Date: 8/13/2007

	Mean (Number/Plot)	Relative Density	Std. Dev. n - 1 (Number/Plot)	Mean (Number/sq.m.)	Mean (Number/Acre)
Full Shrubs					
Artemisia cana	3.15	87.50	7.34	0.06	255.06
Atriplex canescens	0.10	2.78	0.45	0.00	8.10
Sub-Total	3.25	90.28	7.79	0.07	263.16
Sub-Shrubs & Half-Shrubs					
Artemisia frigida	0.30	8.33	1.13	0.01	24.29
Krascheninnikovia lanata	0.05	1.39	0.22	0.00	4.05
Sub-Total	0.35	9.72	1.35	0.01	28.34
Total	3.60	100.00	8.34	0.07	291.50

Energy Metals
Moore Ranch
Report: Density Summary

Site Id: UG
Name: Upland grassland
Comm. Type/Form: Vegetation Baseline
Sample Date: 6/15/2007

Sample Method: Transect
Sample Size: 50 sq. m.
Number of Samples: 20
Report Date: 8/13/2007

	Mean (Number/Plot)	Relative Density	Std. Dev. n - 1 (Number/Plot)	Mean (Number/sq.m.)	Mean (Number/Acre)
Full Shrubs					
Artemisia cana	4.60	20.00	7.26	0.09	372.47
Artemisia tridentata	7.40	32.17	12.56	0.15	599.19
Atriplex canescens	0.05	0.22	0.22	0.00	4.05
Sub-Total	12.05	52.39	20.04	0.24	975.71
Sub-Shrubs & Half-Shrubs					
Artemisia frigida	2.95	12.83	5.93	0.06	238.87
Artemisia pedatifida	8.00	34.78	28.33	0.16	647.77
Sub-Total	10.95	47.61	34.26	0.22	886.64
Total	23.00	100.00	29.35	0.46	1,862.35

Energy Metals
Moore Ranch
Report: Density Summary

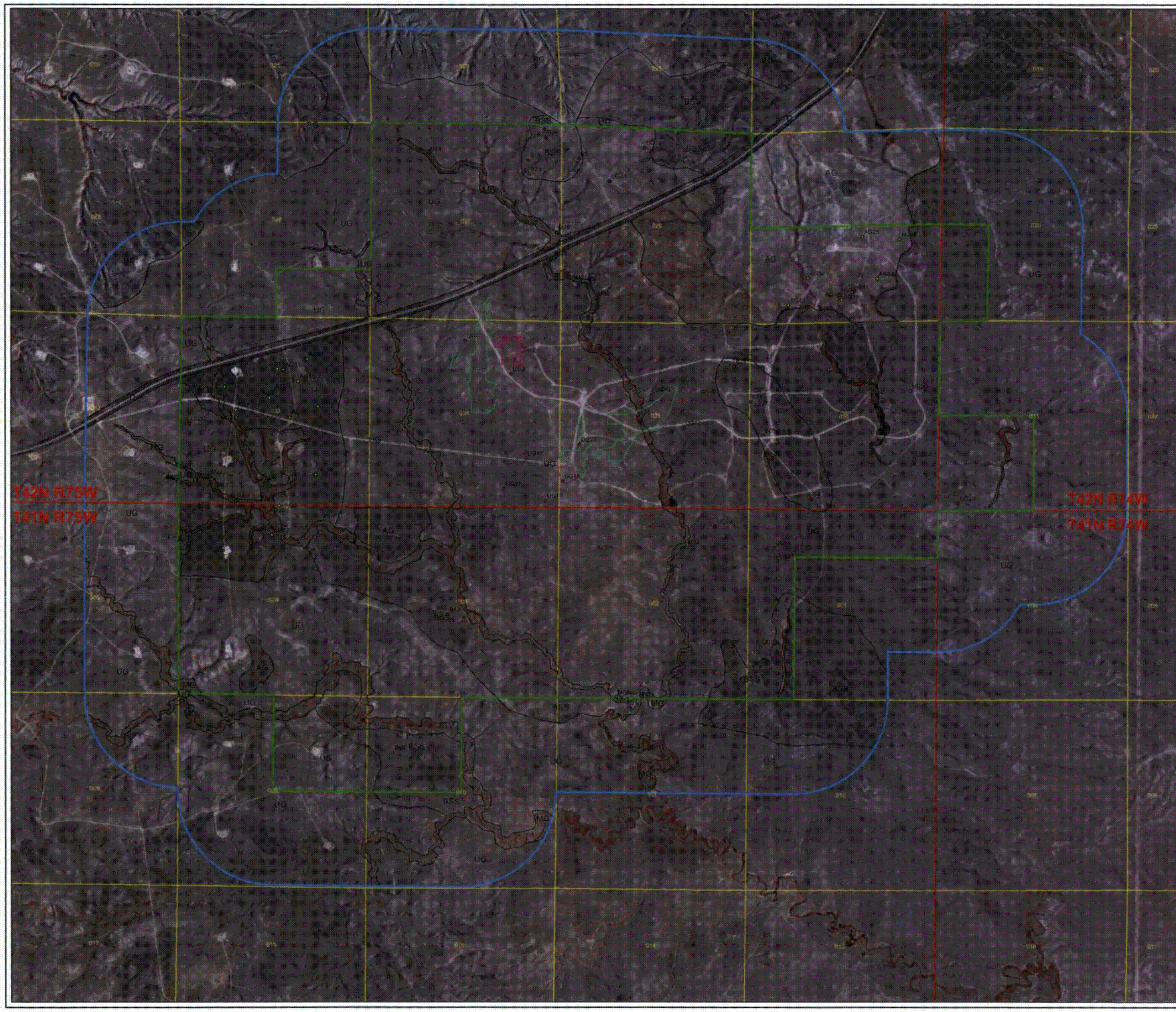
Site Id: UG
Name: Upland grassland
Comm. Type/Form: Vegetation Baseline
Sample Date: 6/15/2007

Sample Method: Transect
Sample Size: 50 sq. m.
Number of Samples: 20
Report Date: 8/13/2007

	Mean (Number/Plot)	Relative Density	Std. Dev. n - 1 (Number/Plot)	Mean (Number/sq.m.)	Mean (Number/Acre)

ADDENDUM 3.5-D

MOORE RANCH VEGETATION MAP



ENERGYMETALS
CORPORATION US

Moore Ranch Uranium Project Vegetation Mapping

Figure 3.5.5-1

Designed by: B. Schladweiler (BKS)
Drawn by: C. Robinson
Checked by: K. Halvorson, BKS
Date Drawn: 2/26/07
Date Modified: 4/26/07
Date Modified: 5/11/07
Date Modified: 7/30/07
Date Modified: 9/6/07

Scale: 1" = 1500'
Projection: NAD 1983, UTM Zone 13
Year of CIR photo: 2001
Sheet: 1 of 1
File: Moore_Ranch_Vegetation_Map_Final.mxd

Legals

T42N R75W
Sections 26-27, 33-36
S1/2 Sec. 25
S1/2, SE1/4 of Sec. 28

T42N R74W
SW1/4 of Sec. 31
SW1/2, SW1/4 of Sec. 30

T41N R75W
Secions 2, 3, 4
N1/2, N1/2 of Sec. 1
W1/2, W1/2 of Sec.1
NE1/4 of Sec. 9
NW1/4 of Sec. 10

Legend

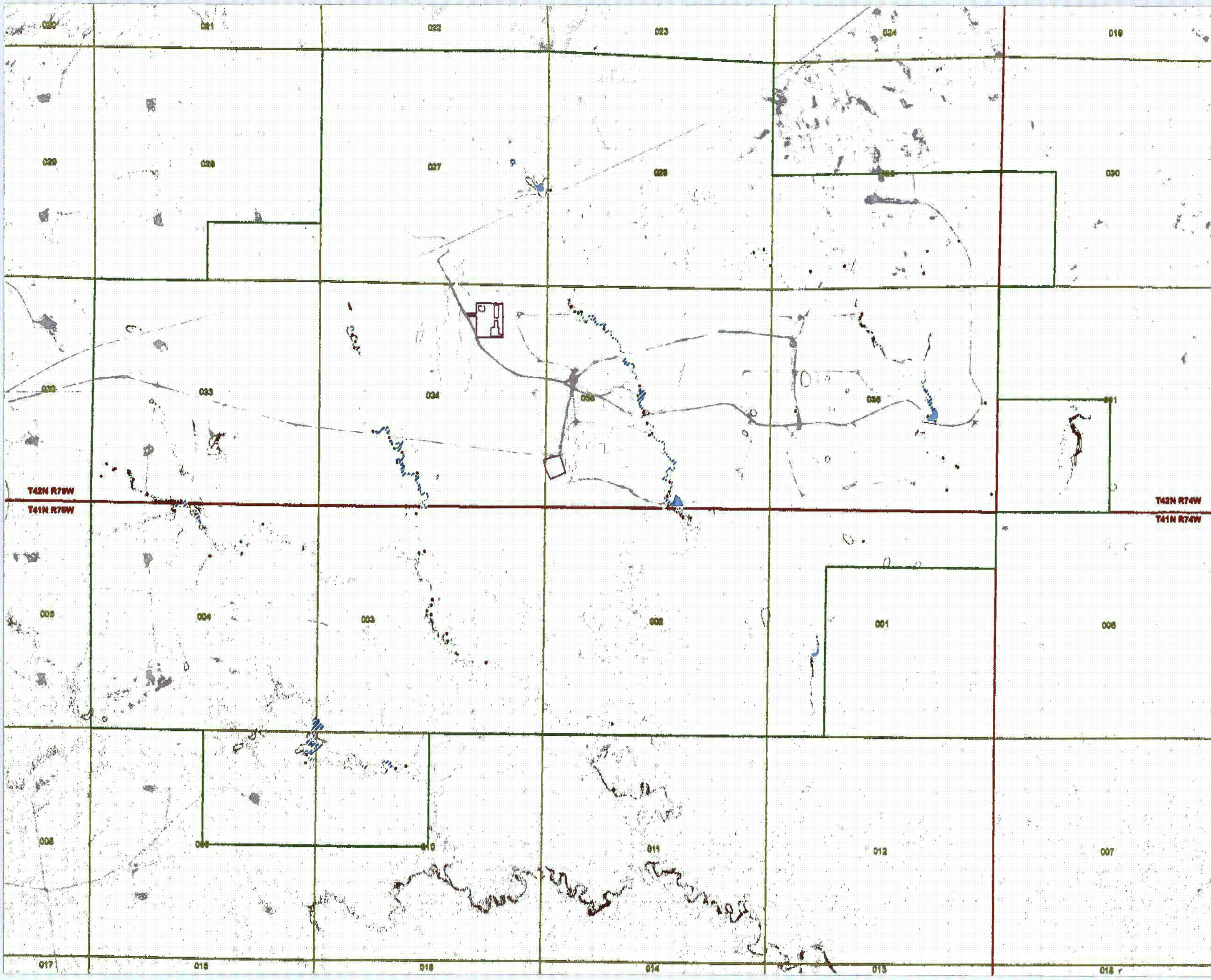
- Upland Grassland Sample Points
- Agricultural Grassland Sample Points
- Big Sagebrush Shrubland Sample Points
- Meadow Grassland Sample Points
- Permit Boundary
- Half Mile Buffer
- Well Field Areas
- Central Plant Facility and Compressor Station
- UG: Upland Grassland (5,008.51 acres)
- AG: Agricultural Grassland (931.61 acres)
- BSS: Big Sagebrush Shrubland (707.78 acres)
- MG: Meadow Grassland (323.90 acres)
- D: Disturbance (132.30 acres)
- BG: Breaks Grassland (0 acres)
- Township/Range Lines
- Section Lines

N W E S

*Acreages reflected in legend are found in Permit Boundary only

ADDENDUM 3.5-E

WETLAND LOCATION SUMMARY AND MAPS



ENERGYMETALS
CORPORATION US

Moore Ranch Wetland Map

Designed by: K. Halvorson
Drawn by: C. Robinson/LSI
Checked by: K. Halvorson
Date Drawn: 6/29/2007
Date Modified: 8/29/2007

Scale: 1"=1000'
Projection: NAD 1983, UTM Zone 13
Year of CIR photo: 2001
Sheet 1 of 1
File:C:\DATA\ArcGIS\BKS Environmental\072511MAP\Moore_Ranch_Wetland_Files.mxd

Legals

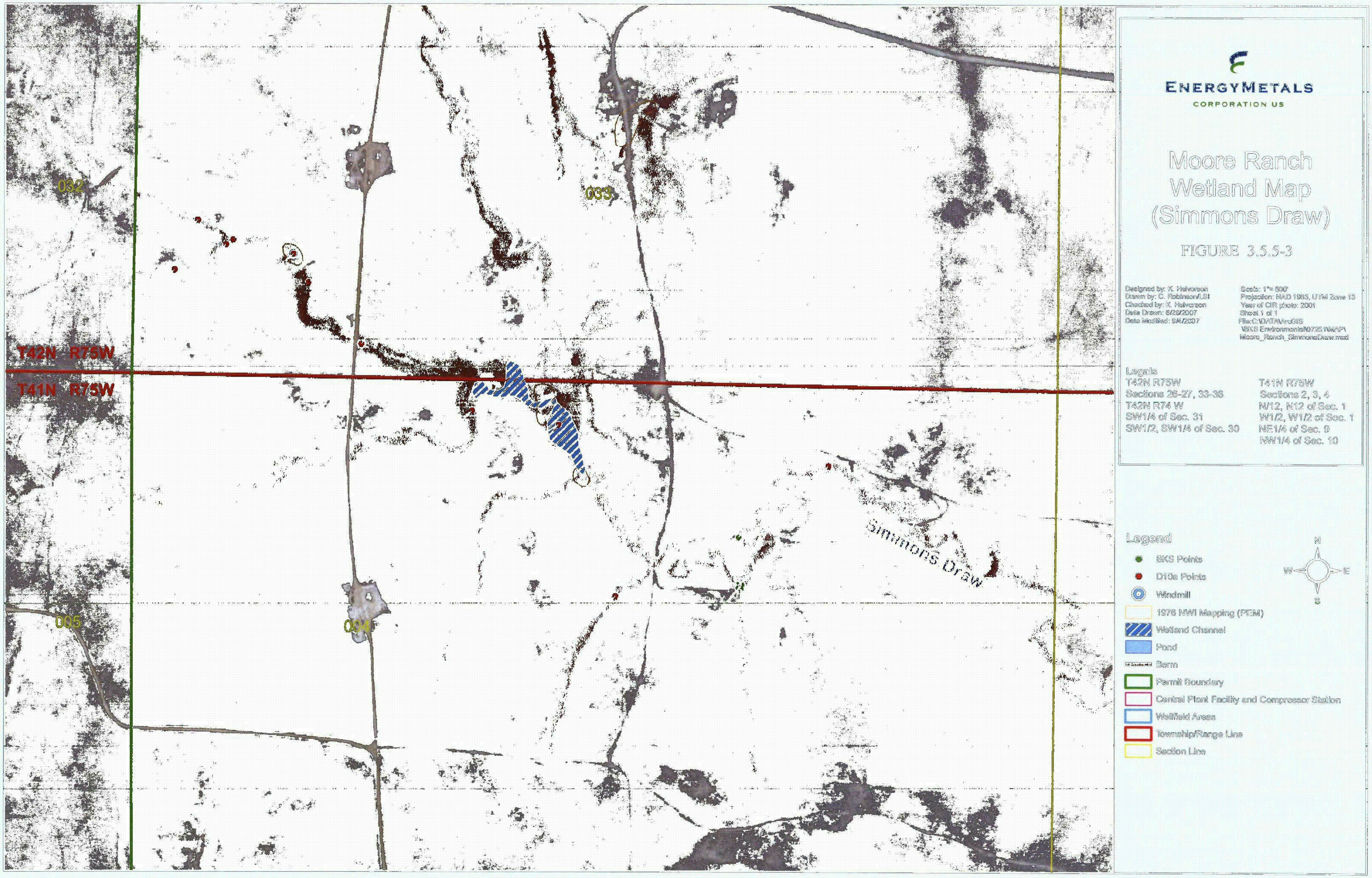
T42N R75W
Sections 26-27, 33-36
T42N R74 W
SW1/4 of Sec. 31
SW1/2, SW1/4 of Sec. 30

T41N R75W
Sections 2, 3, 4
N/12, N12 of Sec. 1
W1/2, W1/2 of Sec. 1
NE1/4 of Sec. 9
NW1/4 of Sec. 10

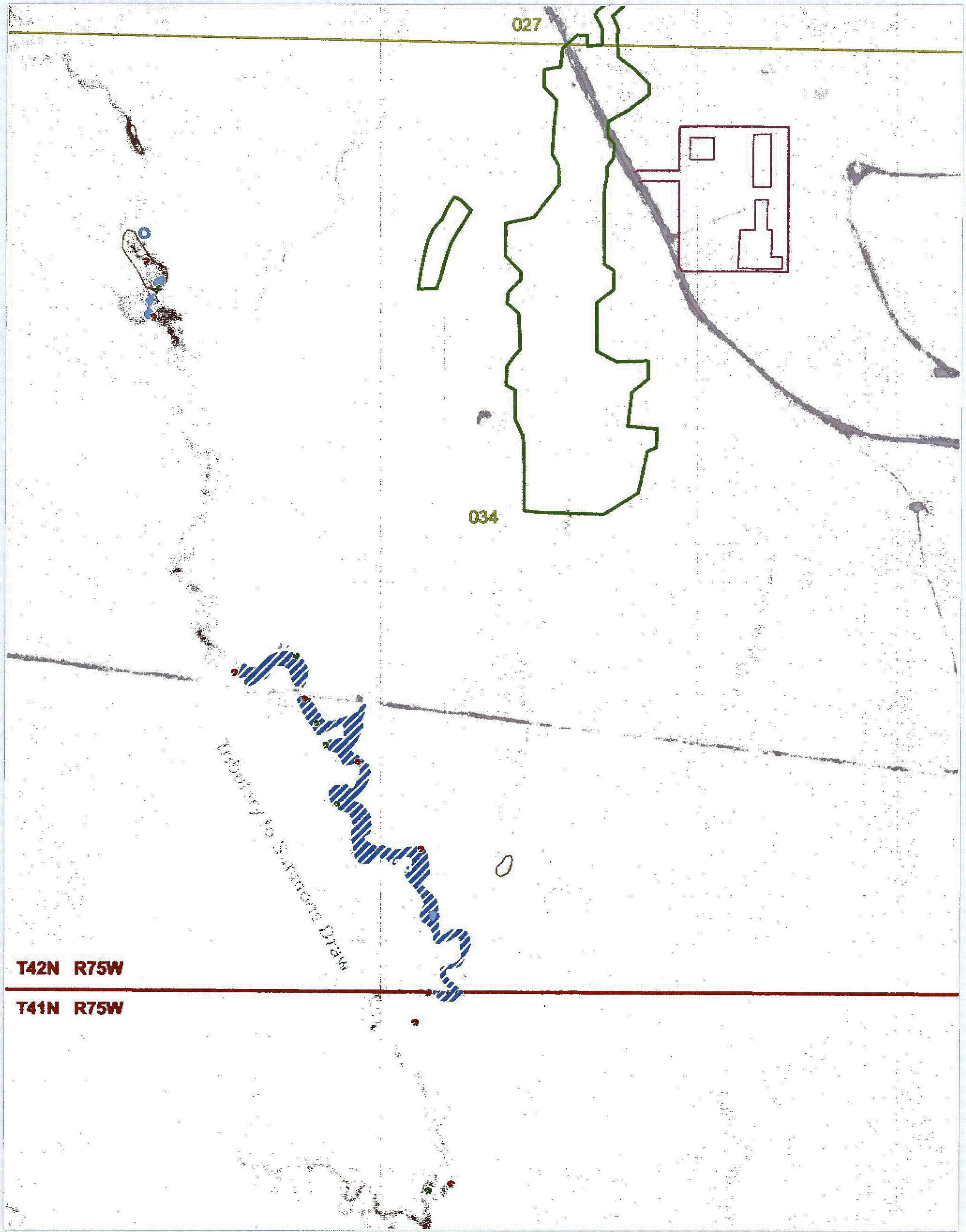
Legend

- BKS Points
- D10a Points
- Windmill
- 1978 NWI Mapping (PEM)
- Wetland Channel
- Pond
- Berm
- Permit Boundary
- Central Plant Facility and Compressor Station
- Wellfield Areas
- Township/Range Line
- Section Line

FIGURE 3.5.5-2



ENERGYMETALS
CORPORATION US
Moore Ranch
Wetland Map
(Simmons Draw)
FIGURE 3.5.5-3
Designed by: K. Halvorson
Drawn by: C. Robinson/LSI
Checked by: K. Halvorson
Date Drawn: 8/29/2007
Date Modified: 9/4/2007
Scale: 1"= 500'
Projection: NAD 1983, UTM Zone 13
Year of CIR photo: 2001
Sheet 1 of 1
File:C:\DATA\ArcGIS \BKS Environmental\07251\MAP\ Moore_Ranch_SimmonsDraw.mxd
Legals
T42N R75W
Sections 26-27, 33-36
T42N R74 W
SW1/4 of Sec. 31
SW1/2, SW1/4 of Sec. 30
T41N R75W
Sections 2, 3, 4
N/12, N12 of Sec. 1
W1/2, W1/2 of Sec. 1
NE1/4 of Sec. 9
NW1/4 of Sec. 10
Legend
BKS Points
D10s Points
Windmill
1976 NWI Mapping (PEM)
Wetland Channel
Pond
Berm
Permit Boundary
Central Plant Facility and Compressor Station
Wellfield Areas
Township/Range Line
Section Line
N
S
E
W
T42N R75W
T41N R75W
032
033
005
004
Simmons Draw



Legals

T42N R75W
Sections 26-27, 33-36
T42N R74 W
SW1/4 of Sec. 31
SW1/2, SW1/4 of Sec. 30

T41N R75W
Sections 2, 3, 4
N/12, N12 of Sec. 1
W1/2, W1/2 of Sec. 1
NE1/4 of Sec. 9
NW1/4 of Sec. 10

Designed by: K. Halvorson
Drawn by: C. Robinson/LSI
Checked by: K. Halvorson
Date Drawn: 6/29/2007
Date Modified: 9/4/2007

Scale: 1"= 500'
Projection: NAD 1983, UTM Zone 13
Year of CIR photo: 2001
Sheet 1 of 1
File:C:\DATA\ArcGIS\BKS Environmental\072511\MAP\Moore_Ranch_Tributary_SD2.mxd

FIGURE 3.5.5-4

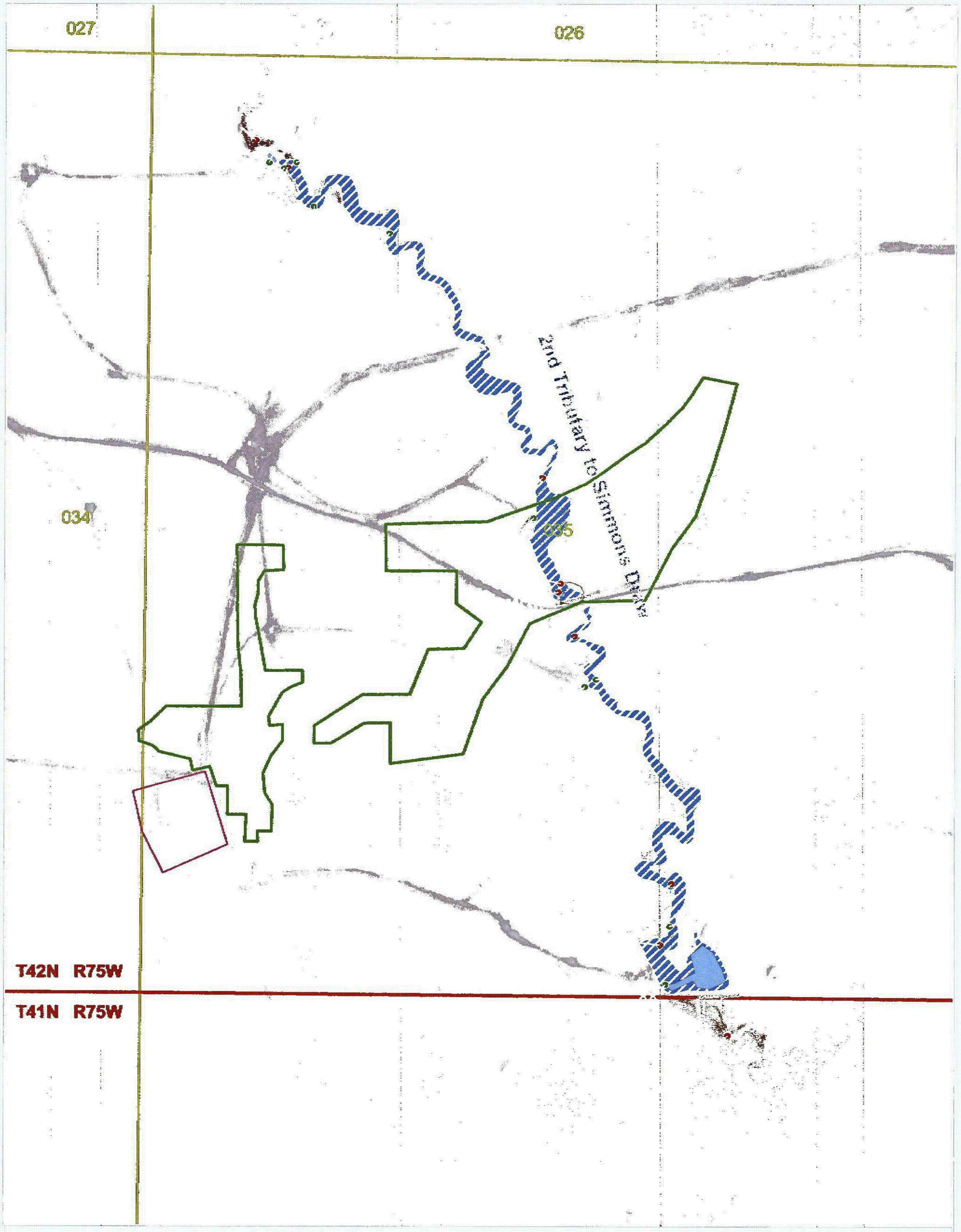
ENERGYMETALS
CORPORATION US

Moore Ranch Wetland Map (Tributary to Simmons Draw)

Legend

- BKS Points
- D10a Points
- Windmill
- 1976 NWI Mapping (PEM)
- Wetland Channel
- Pond
- Berm
- Permit Boundary
- Central Plant Facility and Compressor Station
- Wellfield Areas
- Township/Range Line
- Section Line

N
W E
S



Legals
T42N R75W
Sections 26-27, 33-36
T42N R74 W
SW1/4 of Sec. 31
SW1/2, SW1/4 of Sec. 30

T41N R75W
Sections 2, 3, 4
N/12, N12 of Sec. 1
W1/2, W1/2 of Sec. 1
NE1/4 of Sec. 9
NW1/4 of Sec. 10

ENERGYMETALS
CORPORATION US

Moore Ranch Wetland Map (Second Tributary to Simmons Draw)

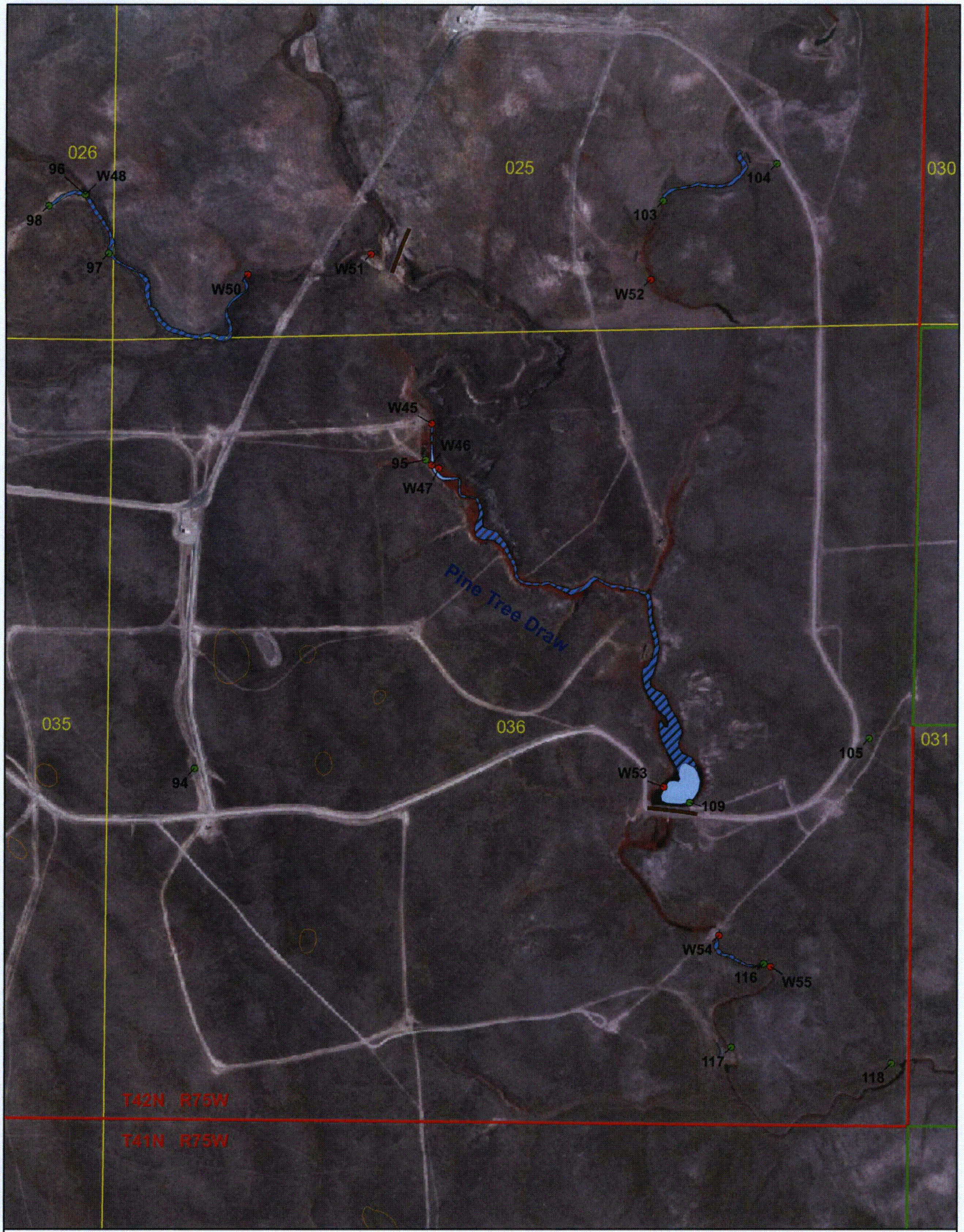
Designed by: K. Halvorson
Drawn by: C. Robinson/LSI
Checked by: K. Halvorson
Date Drawn: 6/29/2007
Date Modified: 9/4/2007

Scale: 1"= 800'
Projection: NAD 1983, UTM Zone 13
Year of CIR photo: 2001
Sheet 1 of 1
File:C:\DATA\ArcGIS
\BKS Environmental\07251\MAP\
Moore_Ranch_Tributary_SD2.mxd

FIGURE 3.5.5-5

Legend
- BKS Points
- D10a Points
- Windmill
- 1976 NWI Mapping (PEM)
- Wetland Channel
- Pond
- Berm
- Permit Boundary
- Central Plant Facility and Compressor Station
- Wellfield Areas
- Township/Range Line
- Section Line

N
W
E
S



Legals

T42N R75W
Sections 26-27, 33-36
T42N R74 W
SW1/4 of Sec. 31
SW1/2, SW1/4 of Sec. 30

T41N R75W
Sections 2, 3, 4
N/12, N12 of Sec. 1
W1/2, W1/2 of Sec. 1
NE1/4 of Sec. 9
NW1/4 of Sec. 10

Designed by: K. Halvorson
Drawn by: C. Robinson/LSI
Checked by: K. Halvorson
Date Drawn: 6/29/2007
Date Modified: 9/4/2007

Scale: 1"= 600'
Projection: NAD 1983, UTM Zone 13
Year of CIR photo: 2001
Sheet 1 of 1
File:C:\DATA\ArcGIS\BKS Environmental\07251\MAP\PineTreeDraw.mxd

FIGURE 3.5.5-6

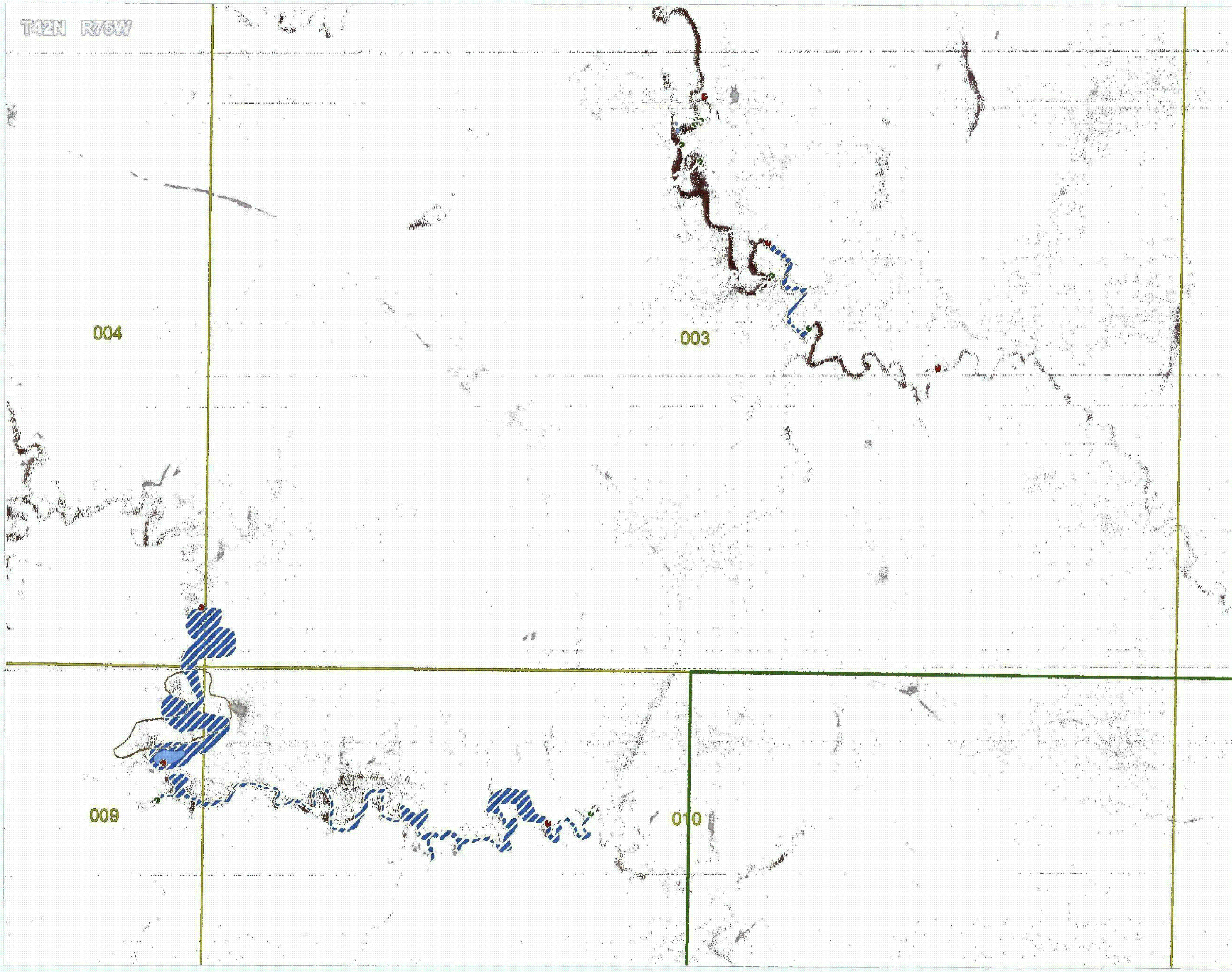
ENERGYMETALS
CORPORATION US

Moore Ranch Wetland Map (Pine Tree Draw)

Legend

- BKS Points
- D10a Points
- Windmill
- 1976 NWI Mapping (PEM)
- Wetland Channel
- Pond
- Berm
- Permit Boundary
- Central Plant Facility and Compressor Station
- Wellfield Areas
- Township/Range Line
- Section Line

N
W E
S



ENERGYMETALS
CORPORATION US

Moore Ranch Wetland Map (Nine Mile Creek)

FIGURE 3.3.5-7

Designed by: K. Halvorson
Drawn by: C. Robinson/LSI
Checked by: K. Halvorson
Date Drawn: 5/29/2007
Date Modified: 6/1/2007

Scale: 1"= 635'
Projection: NAD 1983, UTM Zone 13
Year of CIR photo: 2001
Sheet 1 of 1
File:C:\DATA\ArcGIS\BKS Environmental\07251\MAP\Moore_Ranch_Wetlands.mxd

Legals

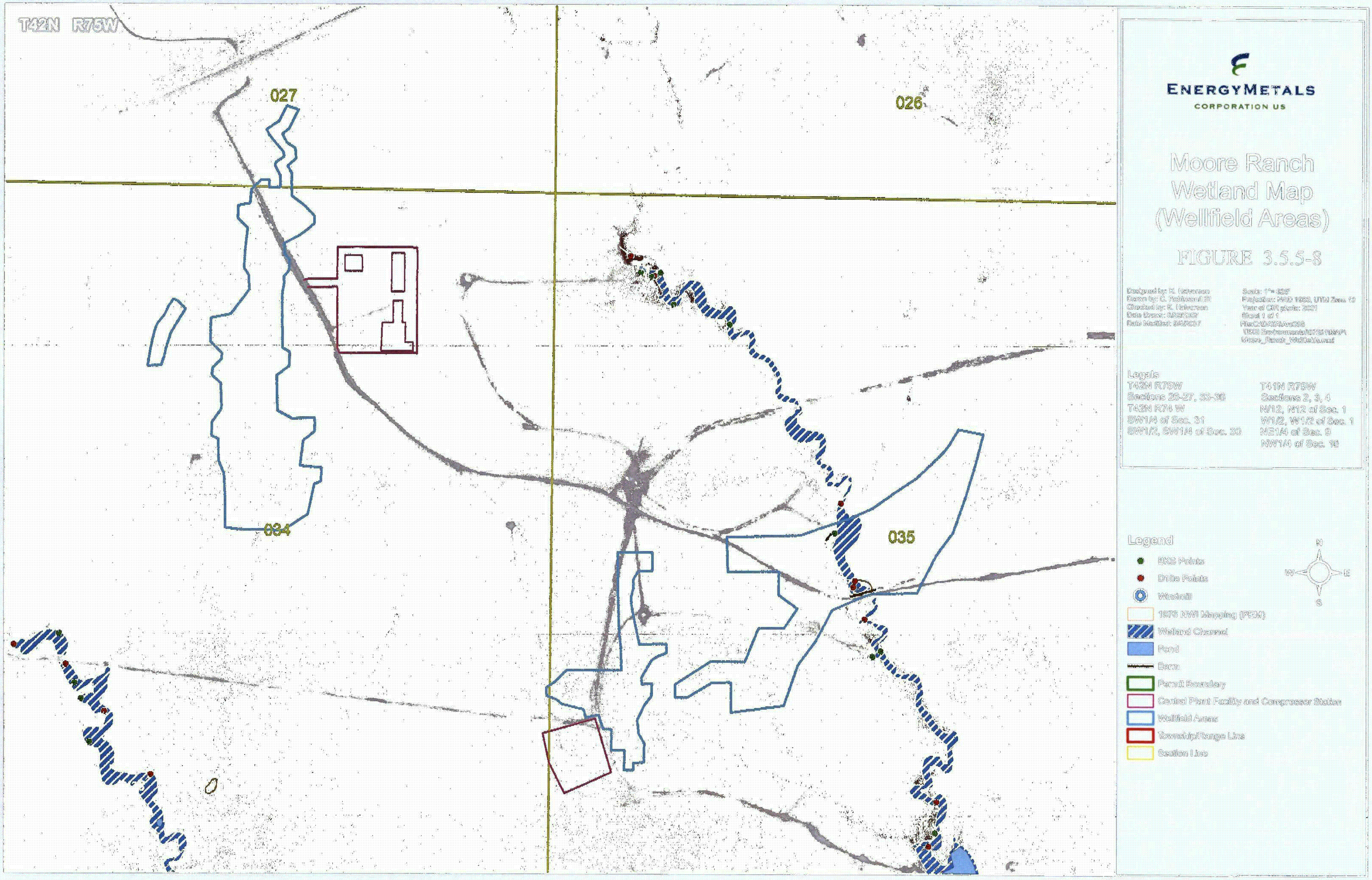
T42N R75W
Sections 26-27, 33-35
T42N R74 W
SW1/4 of Sec. 31
SW1/2, SW1/4 of Sec. 30

T41N R75W
Sections 2, 3, 4
N/12, N12 of Sec. 1
W1/2, W1/2 of Sec. 1
NE1/4 of Sec. 9
NW1/4 of Sec. 10

Legend

- BKS Points
- D10a Points
- Windmill
- 1978 NWI Mapping (PEM)
- Wetland Channel
- Pond
- Berm
- Permit Boundary
- Central Plant Facility and Compressor Station
- Wellfield Areas
- Township/Range Line
- Section Line

N S W E



T42N R75W
027
026
034
035
ENERGYMETALS
CORPORATION US
Moore Ranch
Wetland Map
(Wellfield Areas)
FIGURE 3.5.5-8
Designed by: K. Halverson
Drawn by: C. Robinson/LSI
Checked by: K. Halverson
Date Drawn: 6/29/2007
Date Modified: 9/4/2007
Scale: 1"= 625'
Projection: NAD 1983, UTM Zone 13
Year of CIR photo: 2001
Sheet 1 of 1
File:C:\DATA\ArcGIS
\BKS Environmental\072511\MAP\
Moore_Ranch_Wellfields.mxd
Legals
T42N R75W
Sections 26-27, 33-36
T42N R74 W
SW1/4 of Sec. 31
SW1/2, SW1/4 of Sec. 30
T41N R75W
Sections 2, 3, 4
N/12, N12 of Sec. 1
W1/2, W1/2 of Sec. 1
NE1/4 of Sec. 9
NW1/4 of Sec. 10
Legend
BKS Points
D10a Points
Windmill
1976 NWI Mapping (PEM)
Wetland Channel
Pond
Berm
Permit Boundary
Central Plant Facility and Compressor Station
Wellfield Areas
Township/Range Line
Section Line
N
W
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S

Table 3.5-14: Summary of Wetlands within the Project Area

Drainage	Map and Plot ID (no Data Form 1 if italicized)	Legal Description	Photo #	2007 Delineation Designation	Cowardin Classification	Acreage of Cowardin Classification	Geomorphic Setting	Comments	Jurisdictional Recommendation
Simmons Draw	W1	Sec. 4 T41N R75W	Roll 1 P4 & P5	Non-Wetland	--	--	Foot slope	Upland vegetation	--
Simmons Draw	W3	Sec. 4 T41N R75W	Roll 1 P6 & P7	Non-Wetland	--	--	Depression area	Depression area caused by berm	--
Simmons Draw	Wpt 4	Sec. 4 T41N R75W	Roll 1 P11 & P12	Non-wetland	--	--	Tributary to main drainage	Upland grass in tributary	--
Simmons Draw	W5	Sec. 4 T41N R75W	Roll 1 P17 & P18	Wetland	POW		Pond due to man made berm	--	Non-jurisdictional
Simmons Draw	W6	Sec. 33 T42N R75W	Roll 1 P19 & P20	Non-wetland	--	--	Drainage bottom	Upland vegetation	--
Simmons Draw	W7	Sec. 33 T42N R75W	Roll 1 P22 & P23	Non-wetland	--	--	Drainage bottom	Upland vegetation	--
Simmons Draw	W8	Sec. 33 T42N R75W	Roll 1 P24-P26	Non-wetland	--	--	Depression in drainage	Upland vegetation dominant	--
Simmons Draw	*W9*	Sec. 33 T42N R75W	No Photo	Non-wetland	--	--	Drainage bottom	Primarily upland vegetation	--
Simmons Draw	*W10*	Sec. 33 T42N R75W	Roll 1 P27 &	Wetland	PEM		Depression located in an	PEM identified	Non-jurisdictional

Drainage	Map and Plot ID (no Data Form 1 if italicized)	Legal Description	Photo #	2007 Delineation Designation	Cowardin Classification	Acreage of Cowardin Classification	Geomorphic Setting	Comments	Jurisdictional Recommendation
			P28				upland area	with NWI mapping	
Simmons Draw	W11	Sec. 33 T42N R75W	Roll 1 P29 & P30	Non-wetland	--	--	Drainage bottom	Primarily upland vegetation	--
Simmons Draw	W12	Sec. 33 T42N R75W	Roll 1 P31	Wetland	PEM		Drainage	--	Non-jurisdictional
Simmons Draw	*W13*	Sec. 4 T41N R75W	Roll 1 P32-P34	--	--	--	--	--	--
Simmons Draw	W14	Sec. 4 T41N R75W	No Photo	Non-wetland	--	--	Tributary of main drainage	Vegetation and hydrology is out	--
Simmons Draw	W15	Sec. 4 T41N R75W	Roll 1 P35 & P36	Non-wetland	--	--	Tributary of main drainage	Silver sage in bottom of drainage	--
Simmons Draw	W16	Sec. 4 T41N R75W	Roll 2 P1-P3	Stock Pond	PEM & POW		Stock pond	Vegetation in drainage is dominated by FACU & UPL plants	Non-jurisdictional
Simmons Draw	Wpt. 5	Sec. 4 T41N R75W	Roll 2 P4 & P5	Pond	PEM		--	Pond bermed on all sides	Non-jurisdictional

Drainage	Map and Plot ID (no Data Form 1 if italicized)	Legal Description	Photo #	2007 Delineation Designation	Cowardin Classification	Acreage of Cowardin Classification	Geomorphic Setting	Comments	Jurisdictional Recommendation
Simmons Draw	W17	Sec. 4 T41N R75W	Roll 2 P6 & P7	Non-wetland	--	--	Drainage bottom	Upland vegetation is same throughout	--
Simmons Draw	Wpt. 9	Sec. 4 T41N R75W	Roll 2 P8	Non-wetland	--	--	Stock pond area dammed	Vegetation dominated by upland	--
Simmons Draw	W18	Sec. 3 T41N R75W	Roll 2 P9 & P10	Non-wetland	--	--	Drainage bottom	--	--
Simmons Draw	W19	Sec. 3 T41N R75W	Roll 2 P11-P13	Wetland	PUB		Stock pond	--	Non-jurisdictional
Simmons Draw	Wpt. 16	Sec. 3 T41N R75W	Roll 2 P14 & P15	Wetland	PEM		Stock pond	Soils similar to W19	Non-jurisdictional
Simmons Draw	W20	Sec. 3 T41N R75W	Roll 2 P16 & P17	Wetland	PUB		Drainage bottom	--	Non-jurisdictional
Simmons Draw	W21	Sec. 3 T41N R75W	Roll 2 P18 & P19	Non-wetland	--	--	Drainage bottom	--	--
Simmons Draw	Wpt. 23	Sec. 3 T41N R75W	Roll 2 P20 & P21	Non-wetland	--	--	Drainage bottom	Dominated by UPL and FACU	--

Drainage	Map and Plot ID (no Data Form 1 if italicized)	Legal Description	Photo #	2007 Delineation Designation	Cowardin Classification	Acreage of Cowardin Classification	Geomorphic Setting	Comments	Jurisdictional Recommendation
								vegetation	
Simmons Draw	W22	Sec. 3 T41N R75W	Roll 2 P22 & P23	Non-wetland	--	--	Drainage bottom	--	--
Simmons Draw	Wpt. 24	Sec. 2 T41N R75W	Roll 2 P24 & P25	Non-wetland	--	--	Drainage bottom	Upland vegetation found in drainage bottom	--
Ninemile Creek	W23	Sec. 10 T41N R75W	Roll 2 P26 & P27	Wetland	PUB		Drainage bottom	--	Non-jurisdictional
Ninemile Creek	Wpt. 25	Sec. 10 T41N R75W	Roll 2 P28-P30	Wetland	PUB		--	End wetland channel, CBM outfall	Non-jurisdictional
Ninemile Creek	W24	Sec. 9 T41N R75W	Roll 2 P31 & R32	Wetland	PUB		Pond area	Secondary Indicator is water	Non-jurisdictional
Ninemile Creek	Wpt. 33	Sec. 9 T41N R75W	Roll 2 P33 & P34	Wetland	PUB		Pond and drainage bottom	Drainage vegetation same as W24	Non-jurisdictional
Ninemile Creek	W25	Sec. 4 T41N R75W	Roll 2 P35 & P36	Non-wetland	--	--	Drainage bottom	--	--

Drainage	Map and Plot ID (no Data Form 1 if italicized)	Legal Description	Photo #	2007 Delineation Designation	Cowardin Classification	Acreage of Cowardin Classification	Geomorphic Setting	Comments	Jurisdictional Recommendation
Ninemile Creek	Wpt. 34	Sec. 9 T41N R75W	Roll 2 P37 & P38	Non-wetland	--	--	Drainage bottom	Vegetation is dominated by UPL and FACU	--
Tributary to Simmons Draw	W26	Sec. 3 T41N R75W	Roll 2 P39	Non-wetland	--	--	Drainage bottom	--	--
Tributary to Simmons Draw	W27	Sec. 34 T42N R75W	Roll 2 P40 & P41	Wetland	PEM & POW		Edge of drainage	CBM Well	Non-jurisdictional
Tributary to Simmons Draw	W28	Sec. 34 T42N R75W	Roll 2 P42 & P43	Wetland	PUB		Drainage bottom	--	Non-jurisdictional
Tributary to Simmons Draw	Wpt. 36	Sec. 34 T42N R75W	Roll 2 P44 & P45	Wetland	PEM & POW		Drainage bottom	--	Non-jurisdictional
Tributary to Simmons Draw	W29	Sect. 34 T42N R75W	Roll 2 P46 & P47	Wetland	PUB		Floodplain	--	Non-jurisdictional
Tributary to	Wpt. 38	Sec. 34 T42N R75W	Roll 2 P48-P50	Wetland	PEM		Drainage by outfall	CBM Outfall	Non-jurisdictional

Drainage	Map and Plot ID (no Data Form 1 if italicized)	Legal Description	Photo #	2007 Delineation Designation	Cowardin Classification	Acreage of Cowardin Classification	Geomorphic Setting	Comments	Jurisdictional Recommendation
Simmons Draw									
Tributary to Simmons Draw	W30	Sec. 3 T41N R75W	Roll 3 P1 & P2	Non-wetland	--	--	Drainage bottom	--	--
Tributary to Simmons Draw	W31	Sec. 34 T42N R75W	Roll 3 P3 & P4	Wetland	PUB		Drainage bottom	Second hydrology indicators redox concentrations found in dead roots	Non-jurisdictional
Tributary to Simmons Draw	Wpt. 40	Sec. 34 T42N R75W	Roll 3 P5& P6	Wetland	PEM & POW		Pond	OBL vegetation present	Non-jurisdictional
Tributary to Simmons Draw	W32	Sec. 34 T42N R75W	Roll 3 P7-P9	Non-wetland	--	--	Outfall	--	--
Tributary to Simmons Draw	W33	Sec. 34 T42N R75W	Roll 3 P10 & P11	Non-wetland	--	--	Drainage bottom	End of wetland characteristics are dropping out	--

Drainage	Map and Plot ID (no Data Form 1 if italicized)	Legal Description	Photo #	2007 Delineation Designation	Cowardin Classification	Acreage of Cowardin Classification	Geomorphic Setting	Comments	Jurisdictional Recommendation
Tributary to Simmons Draw	W34	Sec. 34 T42N R75W	Roll 3 P12-P14	Wetland	PEM			Near windmill	Non-jurisdictional
Tributary to Simmons Draw	W35	Sec. 35 T42N R75W	Roll 3 P15-P17	Non-wetland	--	--	Drainage	Wetland boundary	--
Second Tributary to Simmons Draw	W36	Sec. 35 T42N R75W	Roll 3 P20 & P21	Wetland	POW		Stock pond	--	Non-jurisdictional
Second Tributary to Simmons Draw	W37	Sec. 35 T42N R75W	Roll 3 P24 & P25	Wetland	PUB		Drainage bottom	--	Non-jurisdictional
Second Tributary to Simmons Draw	W38	Sec. 35 T42N R75W	Roll 3 P26 & P27	Non-wetland	--	--	Drainage bottom	Swale in downstream photo (roll 3, photo 27)	--
Second Tributary to Simmons Draw	Wpt. 57	Sec. 34 T42N R75W	Roll 3 P28 & P29	Wetland	PEM		CBM outfall area	CBM outfall area and bermed area	Non-jurisdictional

Drainage	Map and Plot ID (no Data Form 1 if italicized)	Legal Description	Photo #	2007 Delineation Designation	Cowardin Classification	Acreage of Cowardin Classification	Geomorphic Setting	Comments	Jurisdictional Recommendation
Second Tributary to Simmons Draw	Wpt. 71	Sec. 35 T42N R75W	Roll 3 P30 & P31	Wetland	PEM & POW		CBM	OBL vegetation dominant in area, water from outfall present	Non-jurisdictional
Second Tributary to Simmons Draw	W39	Sec. 35 T42N R75W	Roll 3 P32-P35	Non-wetland	--	--	Flat floodplain	Near outfall area	--
Second Tributary to Simmons Draw	W40	Sec. 35 T42N R75W	Roll 3 P38-P41	Wetland	PEM		Drainage bottom	Open water in channel below	Non-jurisdictional
Second Tributary to Simmons Draw	Wpt. 72	Sec. 35 T42N R75W	Roll 3 P36 & P37	Non-wetland	--	--	Drainage bottom	Silver sage in drainage	--
Second Tributary to Simmons Draw	W41	Sec. 2 T41N R75W	Roll 3 P45 & P46	Non-wetland	--	--	Drainage bottom	Dead root channels	--

Drainage	Map and Plot ID (no Data Form 1 if italicized)	Legal Description	Photo #	2007 Delineation Designation	Cowardin Classification	Acreage of Cowardin Classification	Geomorphic Setting	Comments	Jurisdictional Recommendation
Second Tributary to Simmons Draw	Wpt. 77	Sec. 2 T41N R75W	Roll 3 P42-P44	Non-wetland	--	--	Culvert and berm	South side of vegetation similar to W39, berm area	--
Second Tributary to Simmons Draw	W42	Sec. 35 T42N R75W	Roll 3 P52 & P53	Wetland	PUB		--	--	Non-jurisdictional
Second Tributary to Simmons Draw	Wpt. 78	Sec. 35 T42N R75W	Roll 3 P47-P51	Wetland	POW		Pond near outfall	OBL vegetation present on fringe	Non-jurisdictional
Second Tributary to Simmons Draw	Wpt. 92	Sec. 35 T42N R75W	Roll 4 P4-P6	Wetland	PEM at Outfall		CBM outfall	--	Non-jurisdictional
Second Tributary to Simmons Draw	Wpt. 93	Sec. 36 T42N R75W	Roll 4 P7 & P8	Wetland	PEM		Drainage bottom	Drainage below outfall	Non-jurisdictional
Pine Tree	Wpt. 95	Sec. 36	Roll 4	Non-	--	--	Pond	Outfall	--

Drainage	Map and Plot ID (no Data Form 1 if italicized)	Legal Description	Photo #	2007 Delineation Designation	Cowardin Classification	Acreage of Cowardin Classification	Geomorphic Setting	Comments	Jurisdictional Recommendation
Draw		T42N R75W	P11	wetland				and surrounding pond are dry	
Pine Tree Draw	Wpt. 98	Sec. 26 T42N 75W	Roll 4 P23 & P24	Wetland	PEM		Wellhead and drainage	Water from well head, PEM from Wpt. 98-W48	Non-jurisdictional
Pine Tree Draw	Wpt. 102	Sec. 25 T42N R75W	No Photo	Non-wetland	--	--	CBM outfall	No water	--
Pine Tree Draw	Wpt. 103-104	Sec. 25 T42N R75W	Roll 4 P32-P35	Wetland	PEM		Drainage bottom	Upland encroaching on bottom of drainage to the west	--
Pine Tree Draw	Wpt. 115	Sec. 36 T42N R7W	Roll 4 P39 & P40	Wetland	PEM		Drainage bottom	Near culvert Upland area in middle	--
Pine Tree	Wpt. 117	Sec. 36	Roll 4	Non-wetland	--	--	CBM Outfall	--	--

Drainage	Map and Plot ID (no Data Form 1 if italicized)	Legal Description	Photo #	2007 Delineation Designation	Cowardin Classification	Acreage of Cowardin Classification	Geomorphic Setting	Comments	Jurisdictional Recommendation
Draw		T42N R75W	P46-P48						
Pine Tree Draw	Wpt. 119	Sec. 1 T41N R75W	--	--	--	--	--	--	--
Pine Tree Draw	Wpt. 128	Sec. 1 T41N R75W	Roll 4 P59 & P60	Wetland	PEM & POW		Stock pond	Similar characteristics to other large ponds	--
Second Tributary to Simmons Draw	Wpt. 129 (move point to the west to SC27)	Sec. 27 T42N R75W	Roll 4 P61-P63	Wetland	POW		Stock pond	Similar characteristics to other large ponds	--
Second Tributary to Simmons Draw	W43	Sec. 35 T42N R75W	Roll 3 P54 & P55	Wetland	PEM		Drainage bottom	Soils same as W42 No water source	Non-jurisdictional
Second Tributary to Simmons Draw	W44	Sec. 35 T42N R75W	Roll 4 P1-P3	Wetland	PEM		Drainage bottom	--	Non-jurisdictional

Drainage	Map and Plot ID (no Data Form 1 if italicized)	Legal Description	Photo #	2007 Delineation Designation	Cowardin Classification	Acreage of Cowardin Classification	Geomorphic Setting	Comments	Jurisdictional Recommendation
Pine Tree Draw	W45	Sec. 36 T42N R75W	Roll 4 P9 & P10	Non-Wetland	--	--	Drainage bottom	Edge of wetland boundary More upland vegetation and slight topological change	--
Pine Tree Draw	W46	Sec. 36 T42N R75W	Roll 4 P12-P14	Non-Wetland	--	--	Drainage bottom	Hydrophytic vegetation to east (W47) that abuts drainage	--
Pine Tree Draw	W47	Sec. 36 T42N R75W	Roll 4 P16-P18	Wetland	PEM		Swale that abuts drainage bottom	Upper portion of drainage east of W46	Non-jurisdictional
Pine Tree Draw	W48	Sec. 26 T42N R75W	Roll 4 P19-P21	Wetland	PEM and POW		Drainage bottom	Channel approx. 20-25 ft Water coming from outfall; more	Non-jurisdictional

Drainage	Map and Plot ID (no Data Form 1 if italicized)	Legal Description	Photo #	2007 Delineation Designation	Cowardin Classification	Acreage of Cowardin Classification	Geomorphic Setting	Comments	Jurisdictional Recommendation
								redox concentrations lower in depth	
Pine Tree Draw	W50	Sec. 25 T42N R75W	Roll 4 P24-P26	Non-wetland	--	--	Hillslope drainage	Wet boundary where tank water begins	--
Pine Tree Draw	W51	Sec. 25 T42N R75W	Roll 4 P27 & P28	Non-wetland	--	--	Drainage bottom	Oxidation in pore lining and matrix below 5 inches and above 5-8 inches	--
Pine Tree Draw	W52	Sec. 25 T42N R75W	Roll 4 P30 & P31	Non-wetland	--	--	Drainage bottom	Cattail remnants 15' upstream from point	--
Pine Tree Draw	W53	Sec. 36 T42N R75W	Roll 4 P36-P38	Wetland	POW		Pond	WPT 109 pipe with water running out	Non-jurisdictional

Drainage	Map and Plot ID (no Data Form 1 if italicized)	Legal Description	Photo #	2007 Delineation Designation	Cowardin Classification	Acreage of Cowardin Classification	Geomorphic Setting	Comments	Jurisdictional Recommendation
Pine Tree Draw	W54	Sec. 36 T42N R75W	Roll 4 P41-P43	Wetland	PUB		Drainage bottom	--	Non-jurisdictional
Pine Tree Draw	W55	Sec. 36 T42N R75W	Roll 4 P44 & P45	Non-wetland	--	--	Drainage bottom	Possible soil effects from CBM water; redox features from 3-7 inches; dead root channels	--

ADDENDUM 3.5-F

WETLAND SPECIES LIST

Scientific Name	Common Name	Indicator Status
Achillea millefolium	Common yarrow	FACU
Achnatherum hymendoides	Indian ricegrass	UPL
Agropyron cristatum	Crested wheatgrass	UPL
Alyssum alyssoides	Pale alyssum	UPL
Alyssum desertorum	Desert alyssum	UPL
Ambrosia tomentosa	Skeletonleaf bursage	UPL
Antennaria species	Pussytoes	UPL
Artemisia cana	Silver sagebrush	FACU
Astragulus miser	Timber milkvetch	UPL
Bromus inermis	Smooth brome	FACU
Bromus japiconus	Japanese brome	FACU
Bromus tectorum	Cheatgrass brome	UPL
Carex brevior	Sedge	FACU
Carex nebrascensis	Nebraska sedge	OBL
Carex praegracilis	Fieldclustered sedge	FACW
Carex species	Sedge	UPL
Cerastium arvense	Field cerastium	FACU
Cerastium vulgatum	Big chickweed	FACU
Cirsium arvense	Canada thistle	FACU
Danthonia species	Oatgrass	UPL
Descurainia sophia	Herb sophia	UPL
Eleocharis acicularis	Slender spikerush	OBL
Eleocharis palustris	Creeping spikerush	OBL
Elymus hispidus	Intermediate wheatgrass	UPL
Elymus smithii	Western wheatgrass	UPL
Equisetum arvense	Field horsetail	FAC
Helianthus species	Sunflower	UPL
Hordeum jubatum	Foxtail barley	FACW
Juncus balticus	Baltic rush	OBL
Juncus bufonius	Toad rush	OBL
Juncus gerardii	Saltmeadow rush	FAC
Koeleria macrantha	Prairie junegrass	UPL
Lappula redowski	Beggars tick	UPL
Medicago lupulina	Black medic	FACU
Medicago sativa	Alfalfa medic	NI
Microsteris gracilis	Slender phlox	UPL
Nassella viridula	Green needlegrass	UPL
Navarretia intertexta	Needleleaf navarretia	NI
Phleum pratense	Common timothy	FACU

Scientific Name	Common Name	Indicator Status
Poa pratensis	Kentucky bluegrass	FACU
Polygonum species	Knotweed	UPL
Polygonum aviculare	Prostrat knotweed	FACU
Potentilla species	Cinquefoil	UPL
Ratibida columnifera	Upright prairieconeflower	UPL
Rosa species	Rose	UPL
Rumex salicifolius	Willowleaf dock	NI
Rumex species	Dock	UPL
Ruppia cirrhosa	Spiral ditchgrass	OBL
Schoenoplectus pungens	Leafy bulrush	UPL
Sisyrinchium montanum	Strict blued-eyed grass	FAC
Solidago mollis	Velvety goldenrod	UPL
Solidago species	Goldenrod	UPL
Taraxacum officinale	Common dandelion	FACU
Thlaspi arvense	Field pennycress	FACU
Tragopogon dubius	Yellow salsify	UPL
Typha latifolia	Common cattail	OBL
Verbena bracteata	Bigbract verbena	FACU
Verbena hastate	Swamp verbena	UPL
Veronica anagallis-aquatica	Water speedwell	OBL
Veronica peregrina	Purslane speedwell	FACW
Vicia americana	American vetch	FAC
Polygonum aviculare	Devil's shoestring	FACU

ADDENDUM 3.5-G

U.S. Army Corps of Engineers

Verification of wetlands delineation based on a preliminary jurisdictional determination and authorization of construction activities within wetland areas at Wellfield 2.

DEPARTMENT OF THE ARMY
CORPS OF ENGINEERS, OMAHA DISTRICT
WYOMING REGULATORY OFFICE
2232 DELL RANGE BOULEVARD, SUITE 210
CHEYENNE WY 82009-4942

REPLY TO
ATTENTION OF

May 10, 2010

Wyoming Regulatory Office

Mr. Jon Winter
Uranium One Americas, Inc.
907 North Poplar Street, Suite 260
Casper, Wyoming 82601

Dear Mr. Winter:

This letter is in response to a pre-construction notification (PCN) we received on April 26, 2010, concerning Department of the Army authorization to construct utilities and other infrastructure within the Moore Ranch Uranium Project near Pine Tree. The project area includes 7,104 acres located in Sections 30 and 31, Township 42 North, Range 74 West; Sections 25-28 and 33-36, Township 42 North, Range 75 West; and Sections 1-4, 9, and 10, Township 41 North, Range 75 West, Campbell County, Wyoming.

The U.S. Army Corps of Engineers regulates the placement of dredged and fill material into waters of the United States under Section 404 of the Clean Water Act (33 U.S.C. 1344). The Corps' regulations are published in the *Code of Federal Regulations* as 33 CFR Parts 320 through 332. Detailed information on Section 404 requirements in Wyoming can be obtained from our web site at: https://www.nwo.usace.army.mil/html/od-rwy/Wyoming.htm

On February 4, 2010, we received the final version of a *2007 Wetland Assessment for Uranium One Americas-Moore Ranch Uranium Project* report prepared by BKS Environmental Associates, Inc. dated December 21, 2009 (Appendix D10a of the Large Mine Noncoal Permit Application submitted to the Wyoming Department of Environmental Quality). Based on documentation in the report and supporting information provided with your correspondence dated January 25, 2010, we agree that methods used to identify wetlands within the project area are consistent with the *Corps of Engineers Wetland Delineation Manual* and *Great Plains Region* supplement. Therefore, Wetland Map 1 and 2 in Addendum 1 of the report provide an accurate depiction of all wetland and other surface water boundaries within the entire Moore Ranch Uranium Project area. This verification of the wetland delineation is valid for a period of 5 years, until **May 10, 2015,** unless new information or policies warrant reconsideration.

Proposed uranium mining activities include installation of an In-Situ Recovery system consisting of well fields, header house buildings, and a Satellite Plant facility. Well fields include injection and production wells that circulate a recovery solution to a manifold in the header house through a pipeline network. The main pipeline (trunk line) transfers production fluid from the header house to the Satellite Plant. At the present time Uranium One Americas, Inc. (UOAI) is planning to construct two well fields and one Satellite Plant in Sections 27, 34, and 35, Township 42 North, Range 75 West as shown on Figure 2 in the PCN. Well Field 1 and the Satellite Plant are located entirely in upland where no wetlands or other surface waters would be affected. Well Field 2 includes approximately 14 wells, production pipelines, and a trunk line that would be located in wetland adjacent to a tributary of Simmons Draw.

Based on the information provided, we have determined that Department of the Army authorization is not required for any construction activities within Well Field 1 and at the Satellite Plant. Installation of wells and associated pipelines within wetland areas at Well Field 2 are authorized by Nationwide Permit (NP) 12 as defined in Part II of the *Federal Register* published on March 12, 2007 (Vol. 72, No. 47). A copy of NP 12 is enclosed. Please take time to carefully review the terms and general conditions of NP 12. In addition, this verification was based on a preliminary jurisdictional determination concerning wetlands within Well Field 2 that would be affected by undertaking activities authorized by NP 12 as documented on the enclosed form. Please review the form and if it is acceptable, sign and return it to our office acknowledging that UOAI agrees to rely on this procedure as a means of expediting the authorization.

UOAI is authorized to commence with the activities described above in accordance with NP 12. UOAI is responsible for ensuring that all activities undertaken in wetlands comply with terms and conditions of NP 12. If a contractor or other authorized representative will be accomplishing any activities on behalf of UOAI, it is recommended that they be provided a copy of this letter and the attached permit so that they are also aware of the terms and conditions. Any regulated activities that do not comply with NP 12 will be considered unauthorized and all responsible parties will be subject to appropriate enforcement action.

In a letter dated March 20, 2007, the Wyoming Department of Environmental Quality (WDEQ) certified that the use of NP 12 for activities such as those described above is acceptable provided that all terms and conditions of NP 12 are followed and that construction is conducted in a manner which does not result in a violation of any applicable water quality standard. A copy of the WDEQ's letter is enclosed. Please note that the WDEQ has added specific conditions to its certification and those conditions have been incorporated as regional conditions of NP 12.

Also enclosed is a Compliance Certification form. Please complete the form and return it to this office within 30 days after project completion as required by General Condition 26. The purpose of the form is to document which activities were actually completed and to certify that the activities were accomplished in compliance with terms and conditions of NP 12.

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Please be aware that authorization granted by a Department of the Army permit does not eliminate requirements to obtain any other applicable federal, state, tribal or local permits. In addition, any deviations from plans for Well Field 2, as provided in the PCN dated April 21, 2010, could require additional authorization.

This verification will be valid until the nationwide permits expire on **March 18, 2012**, unless NP 12 is modified, suspended, or revoked prior to that date. However, up to one year is allowed to complete authorized activities in accordance with current terms and conditions of NP 12 if an activity has commenced or is under contract to commence before the expiration date. Please contact Mr. Thomas Johnson at (307) 772-2300 if you have any questions concerning this verification and reference file NWO-2008-00503.

Sincerely,

Matthew A. Bilodeau
Program Manager
Wyoming Regulatory Office

Enclosures

Copy Furnished:

Jeremy Zumberge
Wyoming Department of Environmental Quality
Water Quality Division
1866 South Sheridan Avenue
Sheridan, Wyoming 82801

The Omaha District, Regulatory Branch, Wyoming Regulatory Office is committed to providing quality and timely service to our customers. In an effort to improve customer service, please take a moment to complete a Customer Service Survey found on our web site at https://www.nwo.usace.army.mil/html/od-rwy/survey.htm Paper copies of the survey are also available upon request for those without Internet access.

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PRELIMINARY JURISDICTIONAL DETERMINATION FORM

BACKGROUND INFORMATION

A. REPORT COMPLETION DATE FOR PRELIMINARY JURISDICTIONAL DETERMINATION (JD): 10 May 2010

B. NAME AND ADDRESS OF PERSON REQUESTING PRELIMINARY JD:

Uranium One Americas, Inc.
907 North Poplar Street, Suite 260
Casper, Wyoming 82601

C. DISTRICT OFFICE, FILE NAME, AND NUMBER: Omaha District, Wyoming Regulatory Office, Moore Ranch Uranium Project, NWO-2008-00503.

D. PROJECT LOCATION(S) AND BACKGROUND INFORMATION: (USE THE ATTACHED TABLE TO DOCUMENT MULTIPLE WATERBODIES AT DIFFERENT SITES) .

State: Wyoming County: Campbell City: n/a
Center coordinates of site (decimal format): Lat. 43.341283°, Long. -105.504972°.
Universal Transverse Mercator: n/a
Name of nearest waterbody: Ninemile Creek

Identify (estimate) amount of waters in the review area:
Non-wetland waters: n/a
Cowardin Class:
Stream Flow:
Wetlands: Approximately 4.3 acres adjacent to an unnamed tributary of Simmons Draw within Well Field 2.
Cowardin Class: Palustrine emergent

Name of any water bodies on the site that have been identified as Section 10 waters:
Tidal: n/a
Non-Tidal: none

E. REVIEW PERFORMED FOR SITE EVALUATION (CHECK ALL THAT APPLY):

☒ Office (Desk) Determination. Date: 10 May 2010
☐ Field Determination. Date(s):

1. The Corps of Engineers believes that there may be jurisdictional waters of the United States on the subject site, and the permit applicant or other affected party who requested this preliminary JD is hereby advised of his or her option to request and obtain an approved jurisdictional determination (JD) for that site. Nevertheless, the permit applicant or other person who requested this preliminary JD has declined to exercise the option to obtain an approved JD in this instance and at this time.

1

2. In any circumstance where a permit applicant obtains an individual permit, or a Nationwide General Permit (NWP) or other general permit verification requiring "pre-construction notification" (PCN), or requests verification for a non-reporting NWP or other general permit, and the permit applicant has not requested an approved JD for the activity, the permit applicant is hereby made aware of the following: (1) the permit applicant has elected to seek a permit authorization based on a preliminary JD, which does not make an official determination of jurisdictional waters; (2) that the applicant has the option to request an approved JD before accepting the terms and conditions of the permit authorization, and that basing a permit authorization on an approved JD could possibly result in less compensatory mitigation being required or different special conditions; (3) that the applicant has the right to request an individual permit rather than accepting the terms and conditions of the NWP or other general permit authorization; (4) that the applicant can accept a permit authorization and thereby agree to comply with all the terms and conditions of that permit, including whatever mitigation requirements the Corps has determined to be necessary; (5) that undertaking any activity in reliance upon the subject permit authorization without requesting an approved JD constitutes the applicant's acceptance of the use of the preliminary JD, but that either form of JD will be processed as soon as is practicable; (6) accepting a permit authorization (e.g., signing a proffered individual permit) or undertaking any activity in reliance on any form of Corps permit authorization based on a preliminary JD constitutes agreement that all wetlands and other water bodies on the site affected in any way by that activity are jurisdictional waters of the United States, and precludes any challenge to such jurisdiction in any administrative or judicial compliance or enforcement action, or in any administrative appeal or in any Federal court; and (7) whether the applicant elects to use either an approved JD or a preliminary JD, that JD will be processed as soon as is practicable. Further, an approved JD, a proffered individual permit (and all terms and conditions contained therein), or individual permit denial can be administratively appealed pursuant to 33 C.F.R. Part 331, and that in any administrative appeal, jurisdictional issues can be raised (see 33 C.F.R. 331.5(a)(2)). If, during that administrative appeal, it becomes necessary to make an official determination whether CWA jurisdiction exists over a site, or to provide an official delineation of jurisdictional waters on the site, the Corps will provide an approved JD to accomplish that result, as soon as is practicable.
This preliminary JD finds that there *"may be"* waters of the United States on the subject project site, and identifies all aquatic features on the site that could be affected by the proposed activity, based on the following information:

SUPPORTING DATA. Data reviewed for preliminary JD (check all that apply)

- ☒ Maps, plans, plots or plat submitted by or on behalf of the applicant/consultant:
- ☒ Data sheets prepared/submitted by or on behalf of the applicant/consultant.
  - ☒ Office concurs with data sheets/delineation report. *2007 Wetland Assessment for Uranium One Americas-Moore Ranch Uranium Project* report prepared by BKS Environmental Associates, Inc. dated December 21, 2009
  - ☐ Office does not concur with data sheets/delineation report.
- ☐ Data sheets prepared by the Corps:
- ☐ Corps navigable waters' study:
- ☐ U.S. Geological Survey Hydrologic Atlas:
  - ☐ USGS NHD data.
  - ☐ USGS 8 and 12 digit HUC maps.
- ☒ U.S. Geological Survey map(s). Cite scale & quad name: Pine Tree, Wyoming, 1:24,000.
- ☐ USDA Natural Resources Conservation Service Soil Survey. Citation:
- ☐ National wetlands inventory map(s). Cite name:
- ☐ State/Local wetland inventory map(s):
- ☐ FEMA/FIRM maps:

2

☐ 100-year Floodplain Elevation is: (National Geodectic Vertical Datum of 1929)
☒ Photographs: ☒ Aerial (Name & Date): Color infrared, 2001.
and ☒ Other (Name & Date): Various locations and dates.
☐ Previous determination(s). File no. and date of response letter:
☐ Other information (please specify):

IMPORTANT NOTE: The information recorded on this form has not necessarily been verified by the Corps and should not be relied upon for later jurisdictional determinations.

10 May 2010
Project Manager and Date

3 June 2010
Permittee and Date
Manager, Wyoming Environmental and Regulatory affairs.

3

3.6 METEOROLOGY

3.6.1 Introduction

The proposed Moore Ranch Project is located in a semi-arid or steppe climate. The region is characterized seasonally by cold harsh winters, hot dry summers, relatively warm moist springs and cool autumns. Temperature extremes range from roughly -25° F in the winter to 100° F in the summer. The "last freeze" occurs during late May and the "first freeze" mid-to-late September.

Yearly precipitation totals are typically near 10 inches. The region is prone to severe thunderstorm events throughout the spring and early summer months and much of the precipitation is attributed to these events. In a typical year, the area will see 4 or 5 severe thunderstorm events (as defined by the National Weather Service criteria) and 40 to 50 thunderstorm days. Autumn stratiform rain events also contribute to precipitation totals, but to a lesser degree than those before mentioned. Snow frequents the region throughout winter months (40-50 in / year), but provides much less moisture than rain events.

Windy conditions are fairly common to the area. Nearly 5% of the time hourly wind speed averages exceed 25 mph. The predominant wind direction is west/southwest with the wind blowing out of that direction 20% of the time. A north/northwest secondary mode is also present. Surface wind speeds are relatively high all year-round, with hourly averages 11 - 15 mph. Higher average wind speeds are encountered during the winter months while summer months experience lower average wind speeds.

Meteorological data has been compiled for ten sites surrounding the Moore Ranch project. Data has been acquired through the Western Regional Climate Center (WRCC, 2007) for eight COOP and ASOS stations operated by the National Weather Service (NWS) including Casper AP, Douglas, Dull Center 1SE, Glenrock 5 ESE, Kaycee, Lance Creek 3 WNW, Midwest, and Reno. In addition, Glenrock Coal Company (GCC) and Antelope Coal Company (ACC) meteorological data have been obtained through Inter-Mountain Laboratories (IML) located in Sheridan Wyoming. The latter two mentioned sites are operated in compliance with regulations set forth by the Wyoming Air Quality Division (AQD) for air quality monitoring. IML has maintained the sites and archived the data for nearly 20 years. Baseline meteorological information for the Moore Ranch Project was collected by IML and subsequently reported to EMC and is described in this Section. Table 3.6-1 provides the station identification, coordinates, and period of operation for each site.

The Antelope Coal (ACC) and Glenrock Coal (GCC) mines were both analyzed in the site specific analysis due to their proximity to the permitted region and to provide perspective from both a ridge top and drainage. The GCC site is located on the western slope just below the peak of a ridge and ACC is situated on the eastern slope of a small drainage. ACC data is chosen over GCC as most representative of the proposed project area, for several reasons. The ACC site, like the proposed project area, extends from the eastern slope of a ridge downward into a drainage. GCC lies slightly higher in elevation and is on the opposite facing slope. GCC's location leads to slightly higher wind speeds since ACC is slightly sheltered from the predominant winds. ACC experiences greater temperature extremes than GCC, which may also be related to terrain. Lastly, ACC is approximately 10 miles closer to the project area than GCC.

Table 3.6-1 Meteorological Stations Included in Climate Analysis.

Name	Agency	X	Y	Z(ft)	Years_Operation
Antelope Coal Company	IML	474179	4816180	4675	1986-2006
Glenrock Coal Company	IML	431649	4767610	4910	1996-2006
Casper AP (112)	NWS	380229	4750539	5338	1948-2005
Douglas (118)	NWS	468655	4732910	4820	1909-2005
Dull Center 1SE (71)	NWS	503239	4806131	4420	1926-2005
Glenrock 5 ESE (117)	NWS	436247	4742017	4950	1941-2005
Kaycee (58)	NWS	368677	4840739	4660	1900-2005
Lance Creek 3 WNW (77)	NWS	528436	4782869	4340	1962-1984
Midwest (59)	NWS	396362	4806926	4820	1939-2005
Reno (68)	NWS	458891	4836243	5080	1963-1983

The ten sites collectively have been analyzed to provide a regional climatic temperature and precipitation analysis of the proposed project area. Only the Casper AP, GCC, and ACC sites will be analyzed for the regional wind summaries. The eight NWS sites will be incorporated into the snowfall discussion as neither mine site records snowfall data. No on-site data is available for the proposed area and the combination of the ACC and GCC sites will be substituted as the nearest representative available data sets for the site specific analysis. GCC and ACC lie in similar terrain as that seen in the proposed project area. Figure 3.6-1 shows the ten sites in relation to the project license boundary. As can be seen in the figure, ACC and GCC are the closest available sites with wind data. The closest NWS operated station which continuously records all weather parameters is the Casper AP site which lies some 55-60 miles to the southwest.

A regional overview will be presented first. The section will include a discussion of the maximum and minimum temperature, relative humidity, annual precipitation including snowfall estimates, and a short wind speed and direction summary. ACC, GCC and the Casper AP provide the only wind data for the region. Casper AP will be incorporated into the regional overview and ACC and GCC will be analyzed for the site specific analysis. The last portion of the regional analysis will include a general climate data summary from Casper.

The site specific analysis will follow with much of the data based on the ACC, and GCC meteorological data with many of the same parameters listed previously. An in-depth wind analysis will be comprised of summaries including wind speed and direction averages, joint frequency distributions to characterize the wind data for the site by stability class, and wind speed distributions to provide insight into the wind speed relative frequencies. A seasonal data discussion is included for the temperature and wind parameters. The seasonal classification does not follow the general calendar dates. The seasons are classified in three month intervals as follows; January – March for winter, April-June for spring, July – September for summer, and October – December for fall. No site specific general climate data will be included as the regional evaluation is deemed adequate.

The ACC and GCC meteorological stations were also proposed to the NRC for use in baseline data collection for the Allemand-Ross Project by High Plains Uranium, Inc. (HPU) in August of 2006. Since that time, HPU was acquired by Energy Metals Corporation. In a letter from the NRC to HPU dated September 14, 2006, the NRC states that the meteorological stations at the Antelope and Glenrock mines meet the standards identified in NRC Regulatory Guide 3.63, *Onsite Meteorological Measurement Program for Uranium Recovery Programs- Data Acquisition and Reporting,* and can be recognized as "standard installations" per NUREG-1569. Therefore, data from these stations may be used in place of NWS Station Data. As described above, the ACC and GCC stations are closer to the Moore Ranch Project than the nearest NWS station and lie in very similar terrain. As a result, EMC believes that data from the ACC and GCC stations is representative of expected long term conditions at the Moore Ranch site. The ACC site has similar topographic features and is about 25 miles from the project site. Both sites are characterized by mildly rolling hills covered with grass and sparse shrubs. The nearest mountain ranges are:

- the Bighorn Mountains, approximately 50 miles from the Moore Ranch project site and 75 miles from ACC
- the Black Hills, approximately 60 miles from ACC and 85 miles from the Moore Ranch
- the northern Laramie Range, approximately 50 miles south of Moore Ranch and 65 miles southwest of ACC

Due to these large distances, neither the ACC site nor the Moore Ranch site experiences significant wind channeling or shielding from any of the three mountain ranges. Also, there are no major bodies of water affecting the meteorology of these two sites. The ACC site is several hundred feet lower in elevation than Moore Ranch. Both, however, are situated on the southeasterly side of the hydrologic divide with a similar vertical relationship to the divide.

Because of the extensive surface coal mining that has developed over the last 30 years, the Powder River Basin (PRB) airshed is one of the most heavily monitored in the country. Coal production in the PRB grew from a few million tons in 1973 to over 400 million tons in 2006. The Clean Air Act and the Surface Mining Control and Reclamation Act of the 1970's prompted a parallel growth in ambient air quality monitoring throughout the PRB. This has led to over 100 particulate monitoring samplers and more than 20 meteorological monitoring towers, all configured to support air quality permitting, compliance and research objectives.

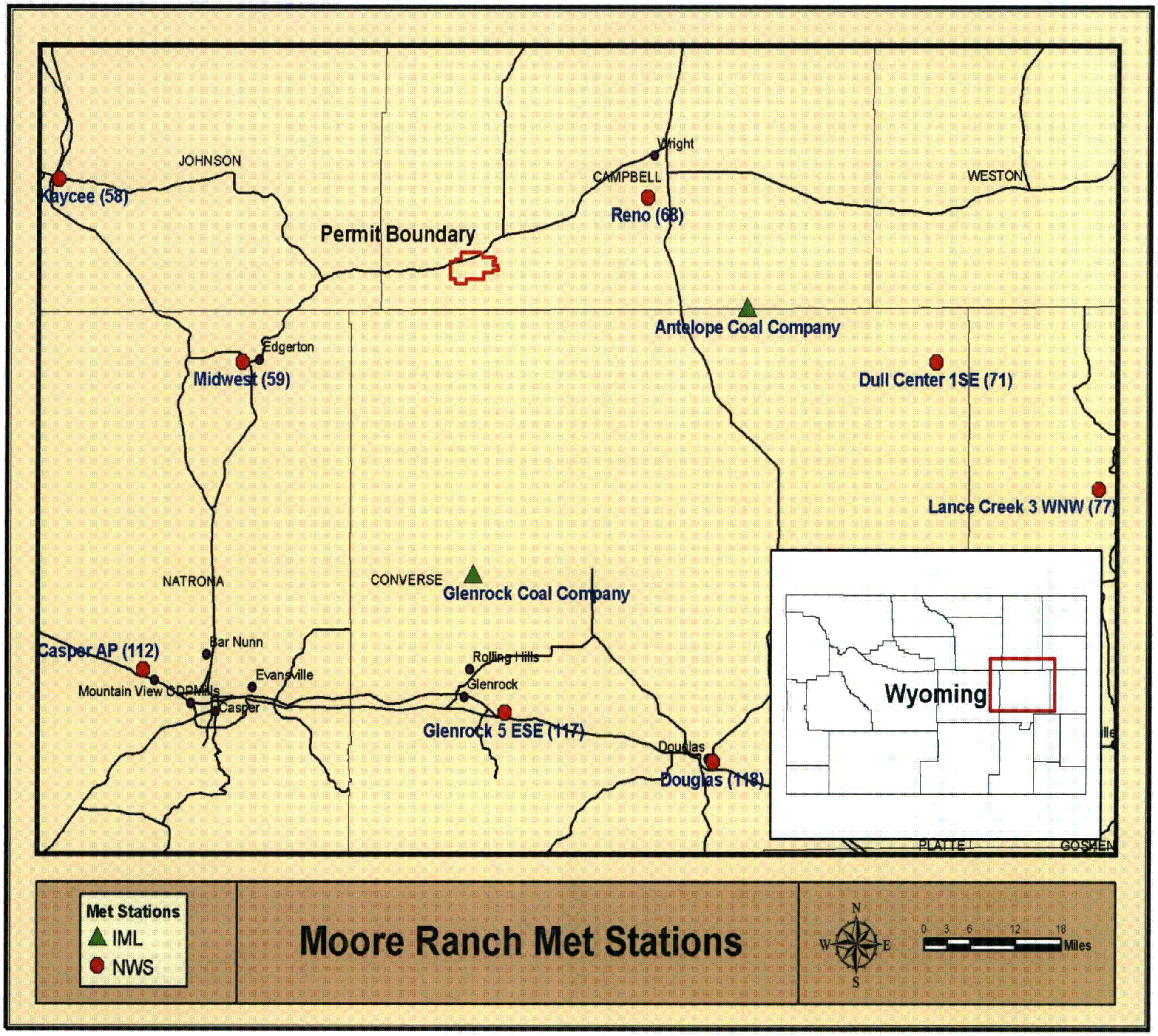
The monitoring programs at these sites meet the Wyoming Department of Environmental Quality requirements for land and air quality permit compliance. Methods used in collecting and validating these data adhere to EPA's "On-Site Meteorological Program Guidance For Regulatory Modeling Applications." Hourly average values for various parameters are generated by field instruments and recorded by continuous data loggers, all operated and maintained by IML Air Science. Data recovery has typically exceeded 95%. Depending on the mine, meteorological parameters logged include wind speed, wind direction, sigma theta, ambient temperature, barometric pressure, solar radiation and precipitation. All hourly data are downloaded to IML Air Science's relational database. The database software provides for quality assurance, invalidation of suspect or erroneous data, and various forms of data presentation.

Table 3.6-2 lists the meteorological instruments employed at the Antelope (ACC) and Glenrock (GCC) mines. The coordinates and elevations of both sites are presented, along with instrument models, accuracy specifications, and instrument heights above the ground.

Table 3.6-2 Meteorological Stations Included in Climate Analysis.

Antelope	10m tower	CR10X Data Logger		Lat: 43° 28' 08.92" Elev. 4,680 ft Long: -105° 20' 57.56"	
Parameter	**Instrument**	**Range**	**Accuracy**	**Threshold**	**Instrument Height**
Wind Speed	RM Young Wind Monitor AQ	0-112 mph	±0.4 mph or 1% of reading	0.9 mph	10 meters
Wind Dir	RM Young Wind Monitor AQ	0-360°	±3°	1.0 mph	10 meters
Temp	Fenwall Electronics Model 107	-35°- 50° C	±0.5° C @ given Range	--	2 meters
Precip	Met One 12" tip	Temp: -20° - 50° C	±0.5% @ 0.5 in/hr rate	--	1 meter
Bar Press	Vaisala PTB 101B	600 -1060 mb	±0.5 mb @ 20°C	--	2 meters
Glenrock	10m tower	CR10 Data Logger		Lat: 43° 03' 36" Elev. 4,910 ft Long: -105° 50' 24"	
Parameter	**Instrument**	**Range**	**Accuracy**	**Threshold**	**Instrument Height**
Wind Speed	RM Young Wind Monitor AQ	0-112 mph	±0.4 mph or 1% of reading	0.9 mph	10 meters
Wind Dir	RM Young Wind Monitor AQ	0-360°	±3°	1.0 mph	10 meters
Temp	Fenwall Electronics Model 107	-35°- 50° C	±0.5° C @ given Range	--	2 meters
Precip	Met One 8" tip	Temp: -20° - 50° C	±0.5% @ 0.5 in/hr rate	--	1 meter

Figure 3.6-1 NWS and Coal Mine Meteorological Stations.



3.6.2 Regional Overview

3.6.2.1 Temperature

The annual average temperature for the region is 46° F. The graph (Figure 3.6-2) shows monthly average temperatures for the two mine sites and the Casper AP. As illustrated, there is very little difference exhibited between the three sites. July shows the highest average monthly temperatures followed by August. January and December record the lowest average temperatures for the year. Table 3.6-3 below compares the monthly average temperatures for the three sites. The slight differences in average temperatures could be attributed to the small change in elevation between the stations. ACC has the highest average temperature of the three and the lowest elevation while Casper has the lowest average temperature and is the highest in elevation.

The proposed project region has annual average maximum temperatures of 58.5° F and average minimum temperatures of 33.6° F. July has the highest maximum temperatures with averages near 90° F while the lowest minimum temperatures are observed in January with averages near 10° F. Annual average minimum and maximum temperatures are shown in Figures 3.6-3 and 3.6-4, respectively.

Large diurnal temperature variations are found in the region due in large part to its altitude and low humidity. Figure 3.6-5 depicts the seasonal diurnal temperature variations for the two mine sites. The site specific monthly values are shown in Table 3.6-3 spring and summer daily variations of 15° - 25° F are common with maximum temperature variations of 30 - 40° F observed during extremely dry periods. Less daily variation is observed during the cooler portions of the year as fall and winter have variations of 10° - 15° F.

The lesser variation in daily temperature can be attributed to the more stable environment the region is exposed to during the fall and winter months. Stable periods have much lower mixing heights and accompanying lapse rates allowing for less temperature variation. The graphs also show ACC having larger diurnal variations than GCC. This may be attributed to the major soil type/surface each site is exposed too. ACC is an active coal mine with much bare soil (coal) exposed and little vegetation in the areas surrounding the meteorological station. GCC, on the other hand, has been in reclaim for an extended period with the meteorological station located in the middle of rolling prairie with native grasses and scattered scrub brush present. The vegetated region will "hold" more moisture and moderate temperatures to a greater extent as more energy is applied to latent heating rather than to sensible heating.

Table 3.6-3 Annual and Monthly Average Temperatures for ACC, GCC, and Casper AP

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
Casper	23.4	27.1	33.6	42.8	52.7	62.9	70.9	69.2	58.5	46.6	33.2	25.3	45.5
Glenrock	26.1	26.7	32.5	41.7	51.1	60.7	70.8	68.1	57.9	45.7	33.7	26.1	46.1
Antelope	26.0	27.2	34.4	43.7	53.4	63.9	71.5	69.9	58.7	45.4	33.5	26.1	47.8

Figure 3.6-2 Average Monthly Temperatures for ACC, GCC, and Casper AP

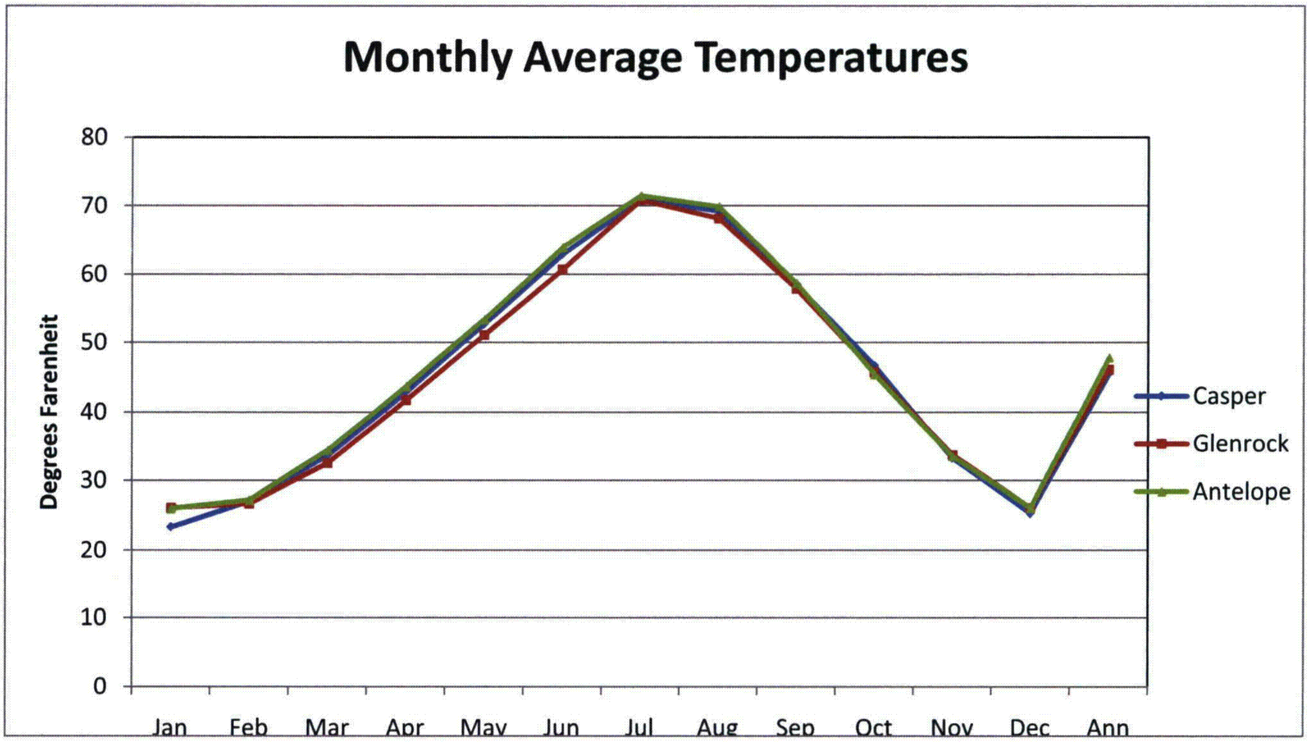


Figure 3.6-3 Regional Annual Average Minimum Temperatures.

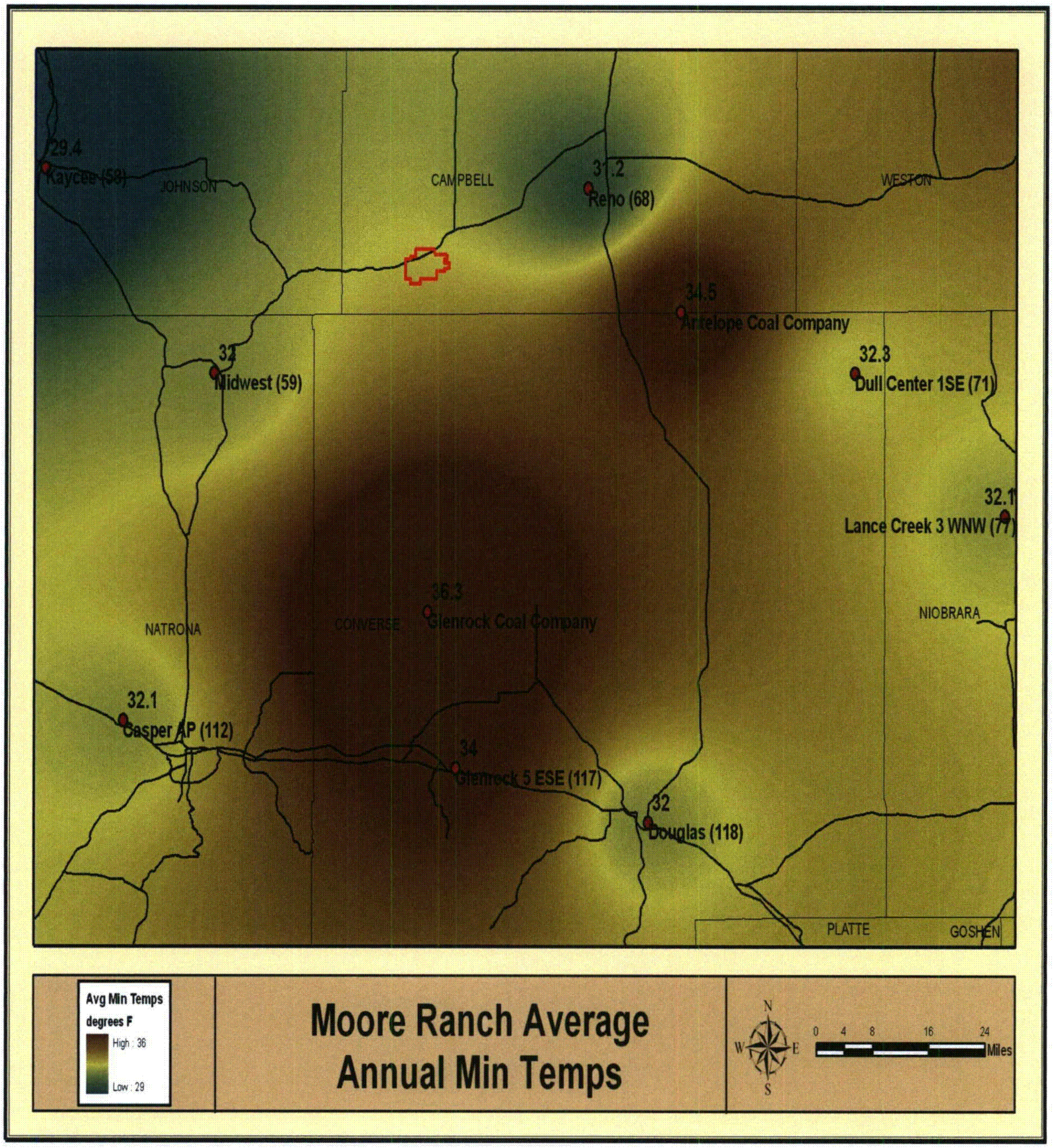


Figure 3.6-4 Regional Annual Average Maximum Temperatures.

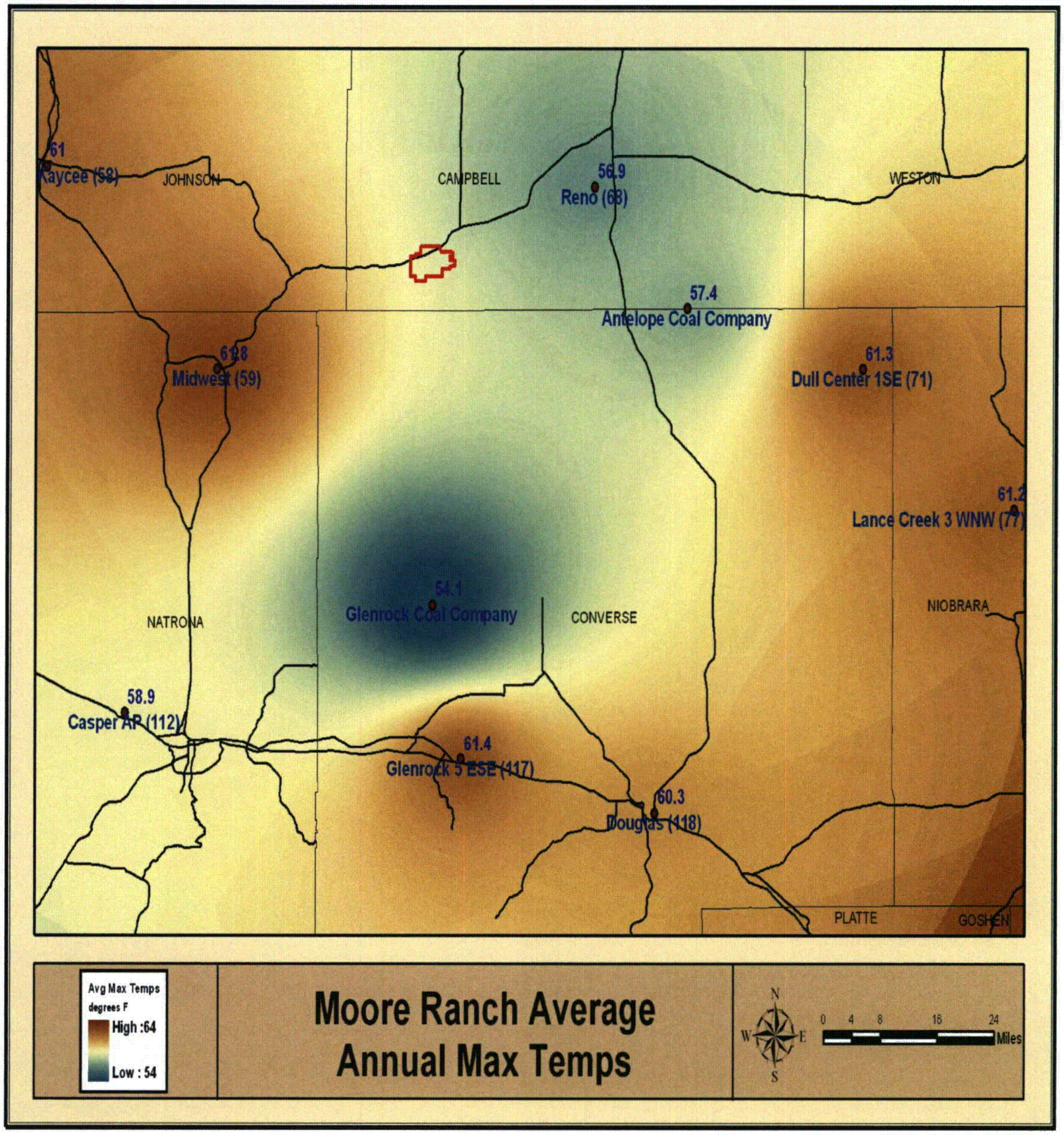
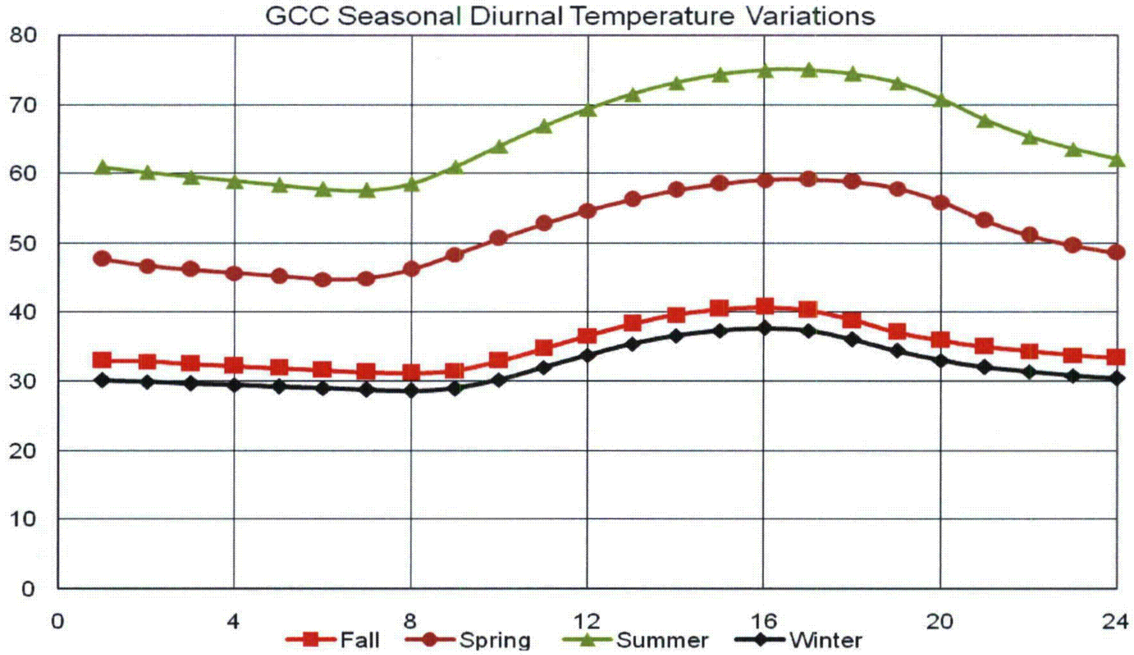
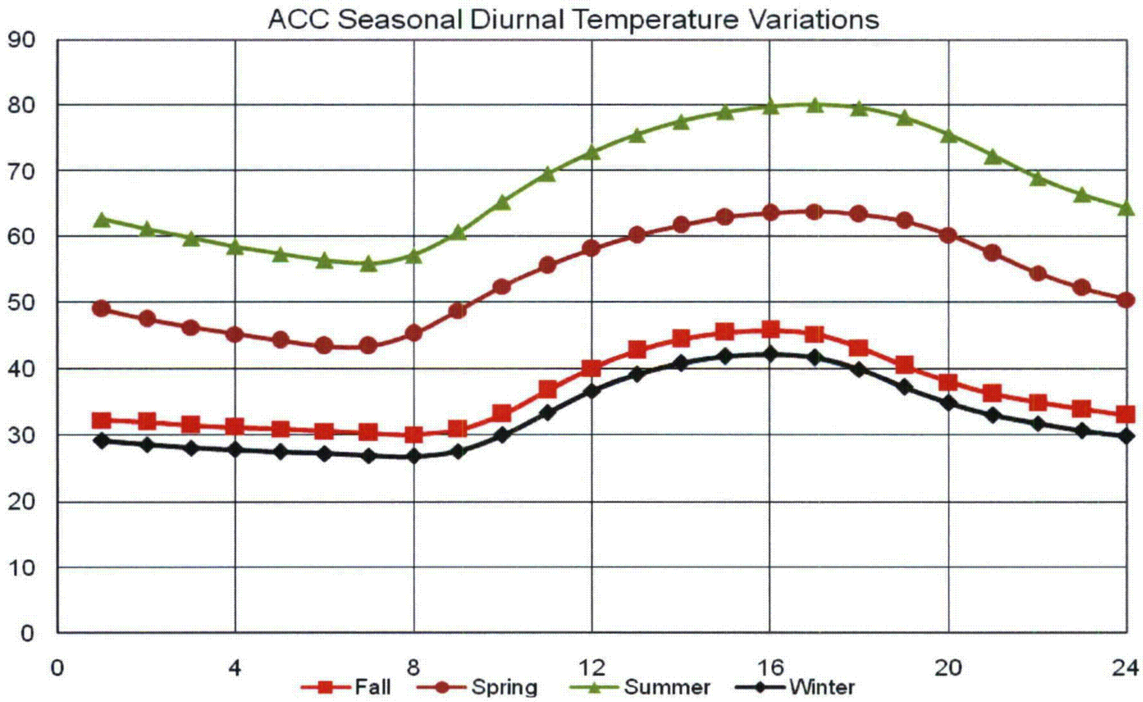


Figure 3.6-5 GCC (top) and ACC (bottom) Seasonal Diurnal Temperature Variations

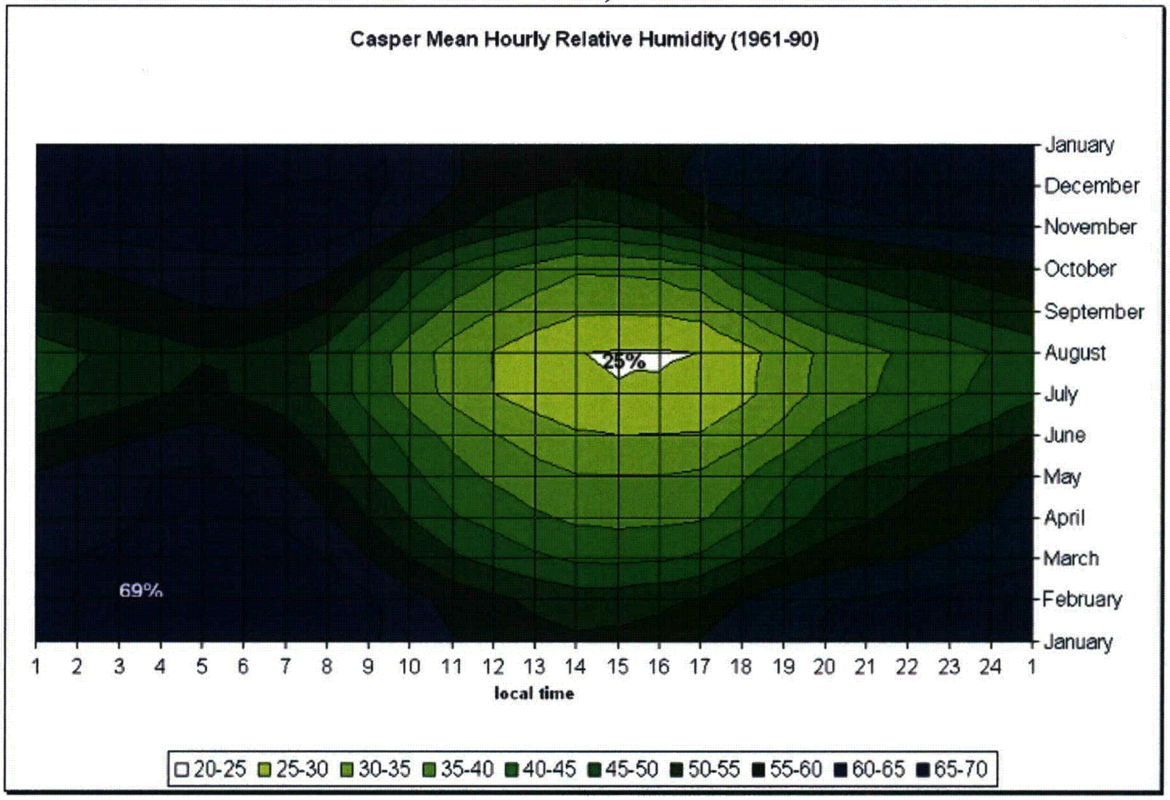




3.6.2.2 Relative Humidity

The Casper AP is the only site included in the analysis that records relative humidity (dew point) data. The graph shown in Figure 3.6-6 presents data taken from the Wyoming Climate Atlas (WRDS, 2007). The graph shows the mean hourly relative humidity (%) by time of day and month. It can be seen here that July is the "driest" month of the year followed by August and June. It also shows the winter months of December and January are the "wettest" portions of the year. The extreme values are stenciled on the graph where 25% is the lowest mean hourly value while 69% is the highest mean hourly value.

Figure 3.6-6 Mean Monthly and Hourly Relative Humidity for Casper AP (WRDS, 2007)



Relative humidity maximums occur more frequently in mornings (5:00 am) while minimums typically occur during the afternoon (5:00 pm). The average annual readings are 70% and 43% for mornings and afternoons, respectively. Mean monthly afternoon values range from 24% in August to 62% in December while morning mean values range from 66% in August to 77% in May. There is a much greater variation in the afternoon values which coincides with the greater temperature variations which occur during that time. Relative humidity is a temperature based calculation which shows the fraction of moisture present versus the amount of moisture for saturated air at that temperature.

3.6.2.3 Precipitation

The region is characterized by extremely dry conditions. On average, the region experiences only 40-60 days with measurable (>0.01 in) precipitation (WRCC, 2007). The proposed project region has an annual average in the 11 – 11.5 inch category based on the interpolated values (Figure 3.6-7). Annual averages across the region range from 9 – 13 inches. Spring and early summer (May-July) thunderstorms produce the majority of the precipitation, 45%. May is typically the wettest month of the year; all stations have monthly averages greater than 2 inches for that time as can be seen in Figure 3.6-8 below. January, on the contrary, is the driest month of the year as values are generally one half inch or less. The winter months (Dec-Feb) typically account for only 10% of the yearly totals. A secondary minimum is also evident during August as warm conditions have persisted over the course of the summer months. This promotes extremely stable conditions and light precipitation amounts as convective activity is limited.

Severe weather does arise throughout the region, but is limited to 4-5 severe events per year. These severe events are generally split between hail and damaging wind events. Tornadoes can occur but on rare occasions, with less than one tornado per county per year (Martner, 1986).

Major snowstorms (more than 6 in/day) also frequent the region. The region surrounding Casper experiences one to two snowstorms per year. Casper AP has the highest annual snowfall of all the sites with an average of nearly 80 inches. This value is sharply contrasted by three sites having annual averages of 20 – 25 inches. The great disparity between the sites can attributed to Casper's proximity to Casper Mountain. The site is located at the base of the northern slopes of the mountains and is influenced by snow events which occur as a result of orographic lifting. The interpolated values (Figure 3.6-9) show the project region having averages near 40 inches. This value agrees well with the Wyoming Climate Atlas (Martner, 1986) which lists averages for southwestern Campbell County at 40-50 inches. Substantial monthly averages (more than 3 in/month) occur for half the year and "measurable" averages (>1 in/month) for 2/3 of the year (Figure 3.6-10).

Figure 3.6-7 Regional Annual Average Precipitation

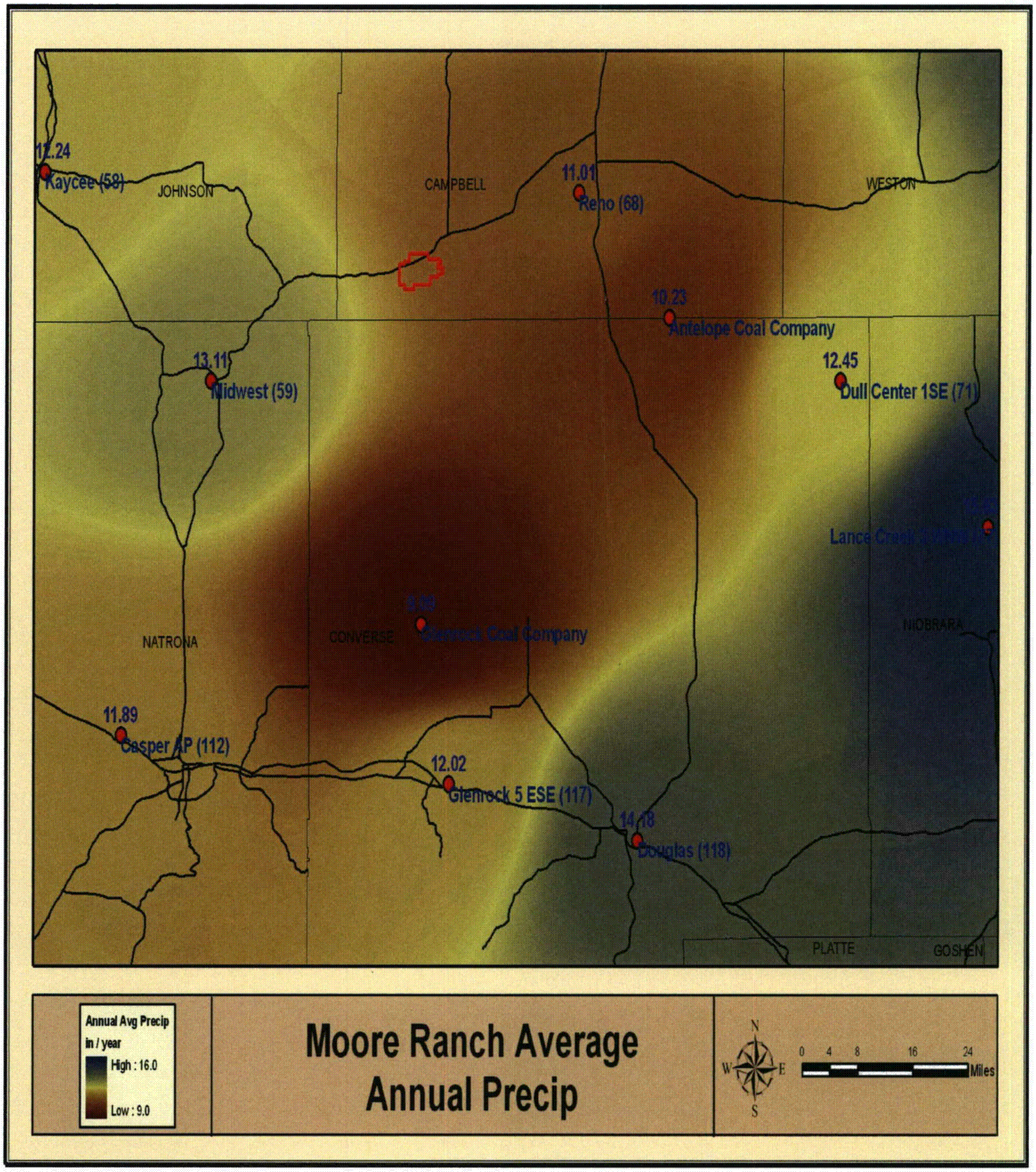


Figure 3.6-8 NWS Station Monthly Precipitation Averages (NCDC, 2007)

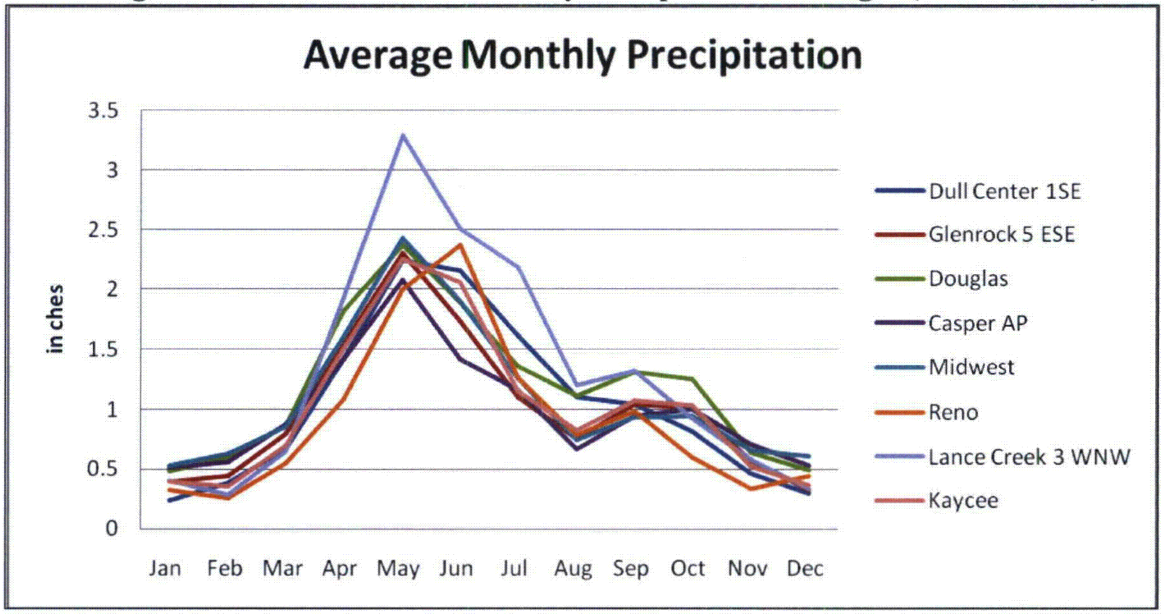


Figure 3.6-9 Regional Annual Average Snowfall

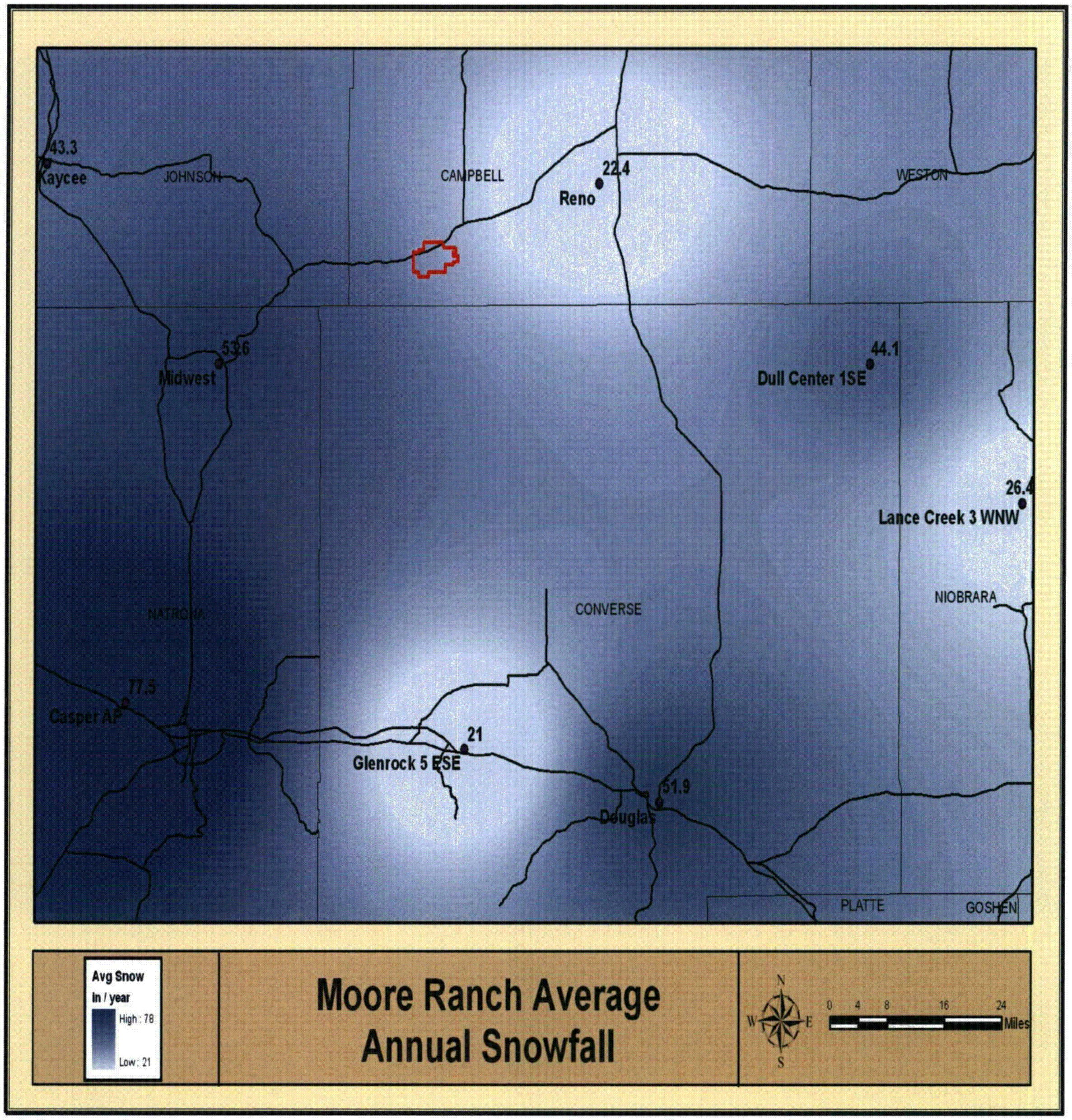
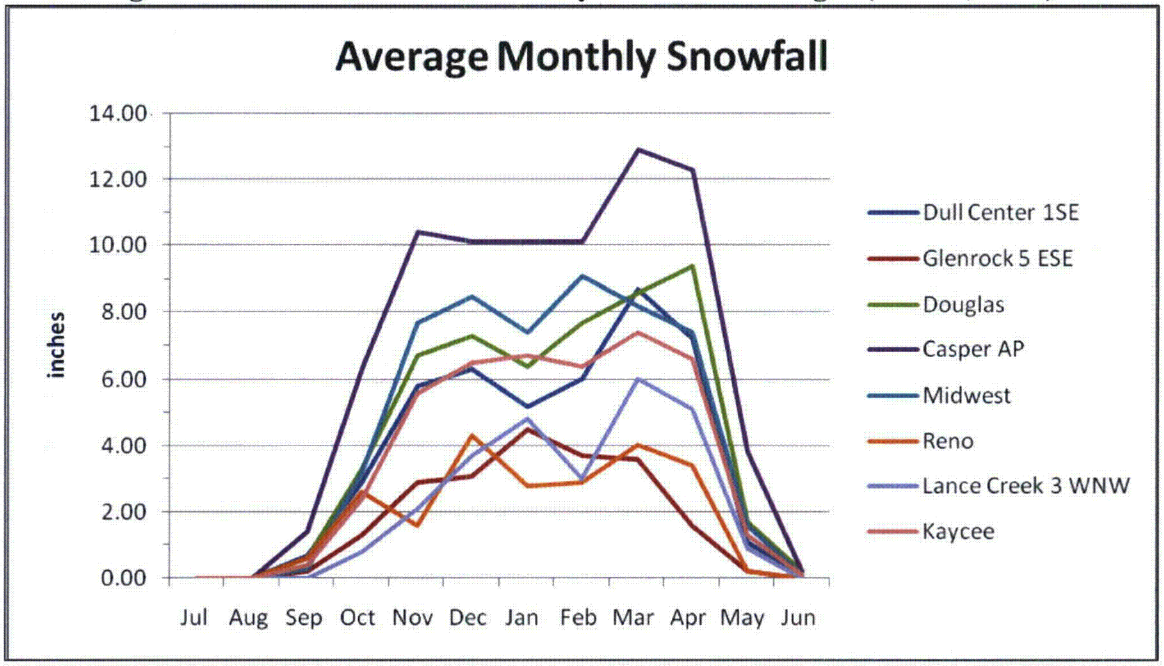


Figure 3.6-10 NWS Station Monthly Snowfall Averages (NCDC, 2007)



3.6.2.4 Wind Patterns

The Casper AP site averaged 12.8 mph for the 50+ years included in its climate database. The wind patterns throughout the region show very little variability. Strong west/southwesterly winds frequent the region. More than 40% of the time the wind direction is from the southwest to west sectors and accompanying wind speeds are generally fairly high with averages greater than 12 mph nearly 75% of the time. Mean monthly values from the Casper AP show July having the lowest value of 10.1 mph and January the highest at 16.3 mph. (Table 3.6-4) shows the monthly wind speed and direction averages along with monthly gust values. NWS direction data are summarized to the nearest 10 degrees. High wind events are a regular event as gust data from the Casper AP shows every month recording wind gusts greater than 60 mph. Little change is evident in the predominant seasonal wind directions. Spring and summer show west/southwest as the predominant direction, with southwest winds dominating fall and winter.

Table 3.6-4 Casper AP Monthly Wind Parameters Summary (WRCC, 2007)

	Wind Speed	Wind Direction	Wind Gust
JAN	16.3	SW	67
FEB	15.0	SW	64
MAR	13.8	SW	63
APR	12.6	WSW	60
MAY	12.6	WSW	64
JUN	11.0	WSW	64
JUL	10.1	WSW	60
AUG	10.3	SW	62
SEP	10.9	WSW	63
OCT	12.0	SW	62
NOV	14.4	SW	60
DEC	16.0	SW	66
ANN	**12.8**	**SW**	**67**

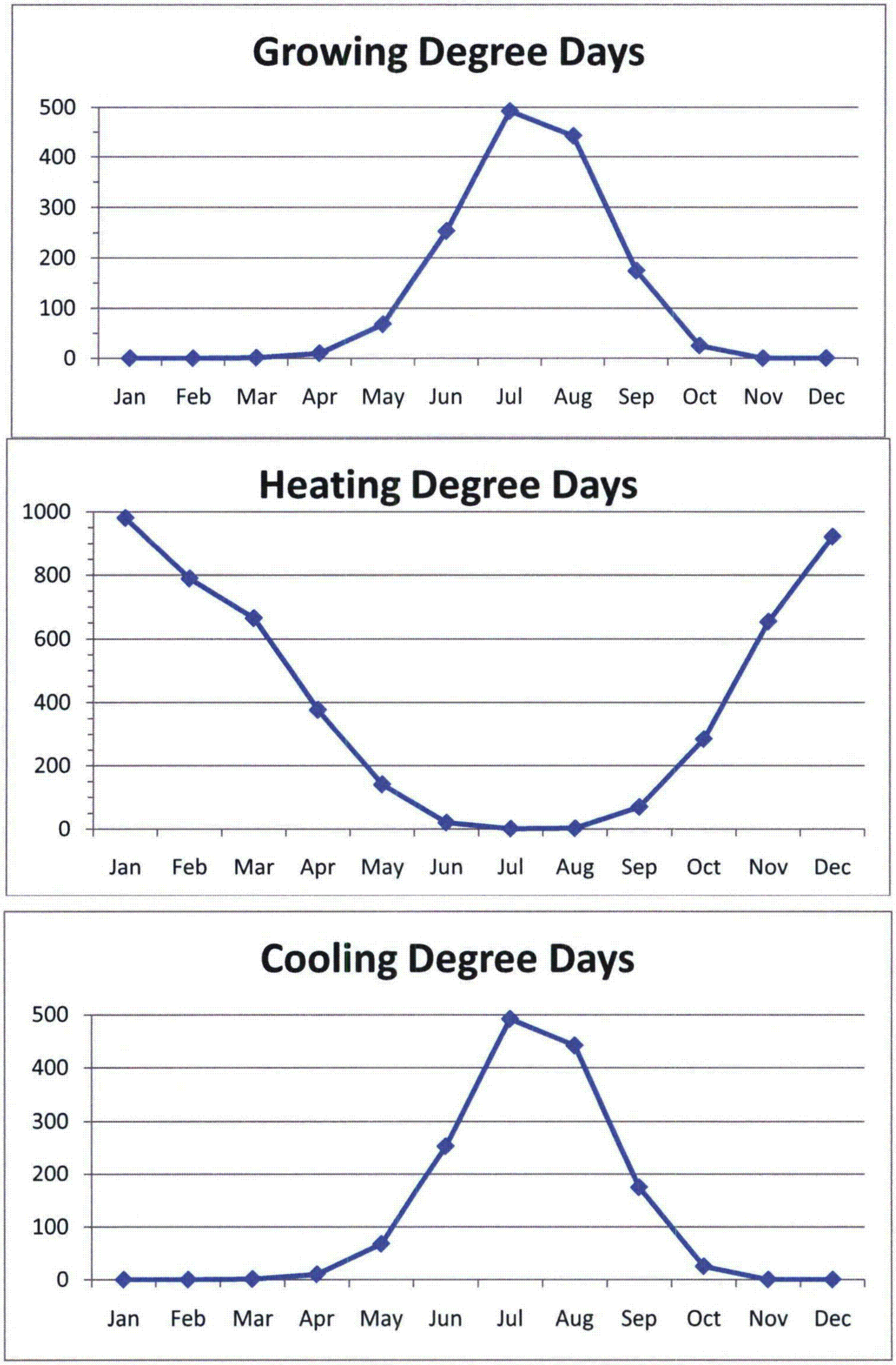
3.6.2.5 Cooling, Heating, and Growing Degree Days

The graphs shown on the next page (Figure 3.6-11) summarize the cooling, heating, and growing degree days for Casper. The data are assumed to be indicative of the region as the other meteorological parameters for the various sites track very closely.

The heating and cooling degree days are included to show deviation of the average daily temperature from a predefined base temperature. In this case, 55° F has been selected as the base temperature. The number of heating degree days is computed by taking the average of the high and low temperature occurring that day and subtracting it from the base temperature. The calculation for computing growing and cooling degree days is the same. The number of days is computed in the opposite fashion as the base temperature is subtracted from the average of the high and low temperature for the day. Negative values are disregarded for both calculations.

As expected, the heating degree days and cooling degree days are inversely proportional and the number of growing and cooling degree days are identical when the same base temperature is chosen. The maximum number of heating degree days occurs in January, 980 degree days, which coincides with January having the lowest minimum average temperature. Conversely, July registers the most cooling/growing degree days with 492, which also corresponds to July having the highest maximum average temperature.

Figure 3.6-11 Casper AP Cooling, Heating, and Growing Degree Days (WRCC, 2007).



3.6.3 Site Specific Analysis

The site specific discussion will be limited to the meteorological data from the two mine sites, Glenrock Coal (GCC) and Antelope Coal (ACC). These two sites were chosen as surrogate sites based on their proximity and similar topographic features to the permitted region. The region is characterized by high plains, rolling hills and minor ridges. Both sites are included to provide a depiction of the differences experienced between the ridge tops and lower drainages. The vegetation types are mainly confined to native grasses with some sage brush and very sparse woody coverage. Each mine's meteorological station is surrounded by rolling hills covered with native grasses.

3.6.3.1 Temperature

The annual average site temperature is 46.5 °F with temperatures for each site experiencing a maximum exceeding 98° F and minimum falling below -25° F. Figure 3.6-12 shows the seasonal average temperatures for both sites, which are nearly identical. The accompanying Table 3.6-5 provides the maximum, minimum and average seasonal temperatures for both mine sites. Average temperatures range from 30° F in the winter to 65° in the summer.

Tables 3.6-6 and 3.6-7 provide meteorological summaries for the two surrogate sites. The averages, maximums, and minimums are specified for each parameter recorded at the site along with the recovery rate for each. The recovery rates are greater than 90% for all parameters at both sites with the exception of sigma theta at GCC which had a recovery rate of 89%.

Table 3.6-5 ACC and GCC Max, Min, and Average Seasonal Temps (°F)

	ACC			GCC		
	Avg	**Max**	**Min**	**Avg**	**Max**	**Min**
Winter	29.2	76.2	-35.7	28.5	70	-25
Spring	53.4	98.5	3.6	51.6	92.7	0
Summer	66.7	102.1	21.7	65.7	97.4	21.7
Fall	34.9	84.4	-39.9	35.3	78.7	-18.9

Figure 3.6-12. ACC and GCC Seasonal Average Temperatures °F

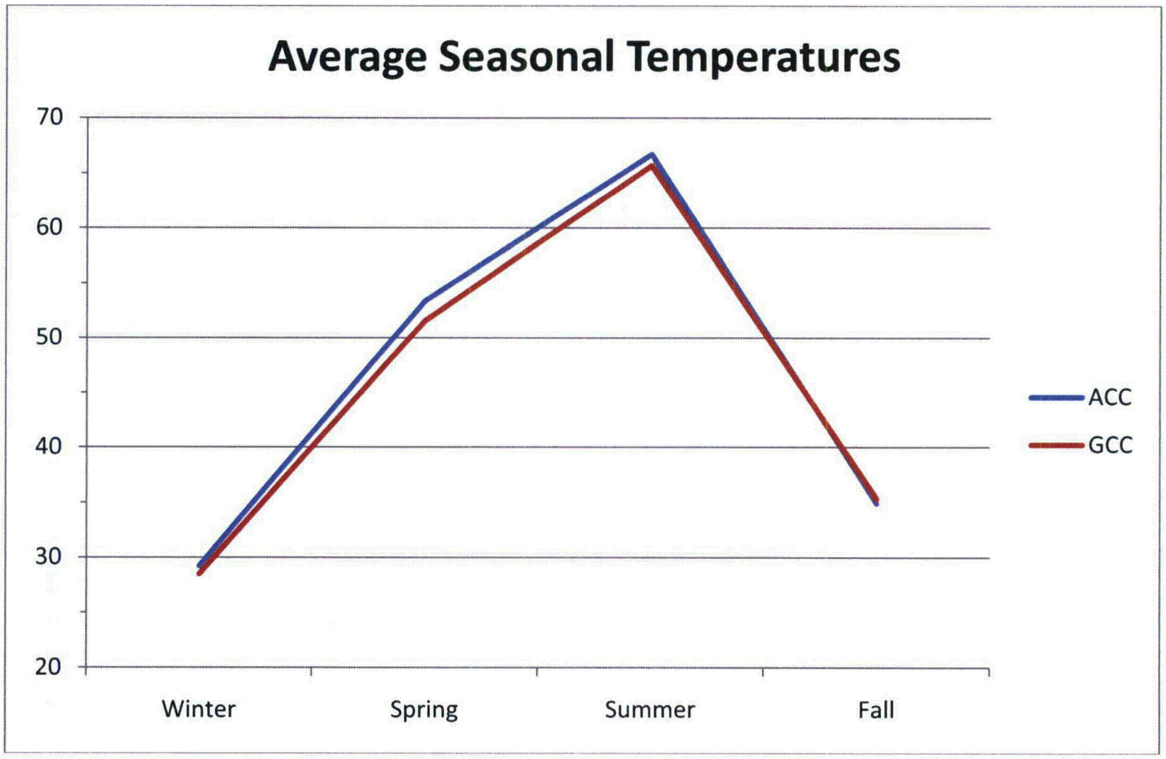


Table 3.6-6 ACC Meteorological Summary for January 1997-December 2006

Hourly Data

	Average/Total	Max	Min
Wind Speed (mph)	11.2	50.6	0.0
Sigma-Theta (°)	16.3	82.0	0.4
Temperature (F)	47.5	102.1	-33.8
Precipitation (in)	102.34	1.48	

Predominant wind direction was from the W sector, accounting for 15.2% of the possible winds

Data Recovery

Parameter	Possible (hours)	Reported (hours)	Recovery
Wind Speed	87648	81938	93.49%
Wind Direction	87648	81951	93.50%
Sigma-Theta	87648	81951	93.50%
Temperature	87648	83702	95.50%
Precipitation	87648	83705	95.50%

Table 3.6-7 GCC Meteorological Summary for January 1997-December 2006

Hourly Data

	Average/Total	**Max**	**Min**
Wind Speed (mph)	14.8	57.6	0.0
Sigma-Theta (°)	11.0	79.3	0.0
Temperature (F)	46.1	97.4	-25.0
Precipitation (in)	89.92	1.56	

Predominant wind direction was from the W/SW sector, accounting for 20.0% of the possible winds

Data Recovery

Parameter	**Possible** (hours)	**Reported** (hours)	**Recovery**
Wind Speed	87648	81406	92.88%
Wind Direction	87648	81406	92.88%
Sigma-Theta	87648	78171	89.19%
Temperature	87648	81376	92.84%
Precipitation	87648	82827	94.50%

3.6.3.2 Wind Patterns

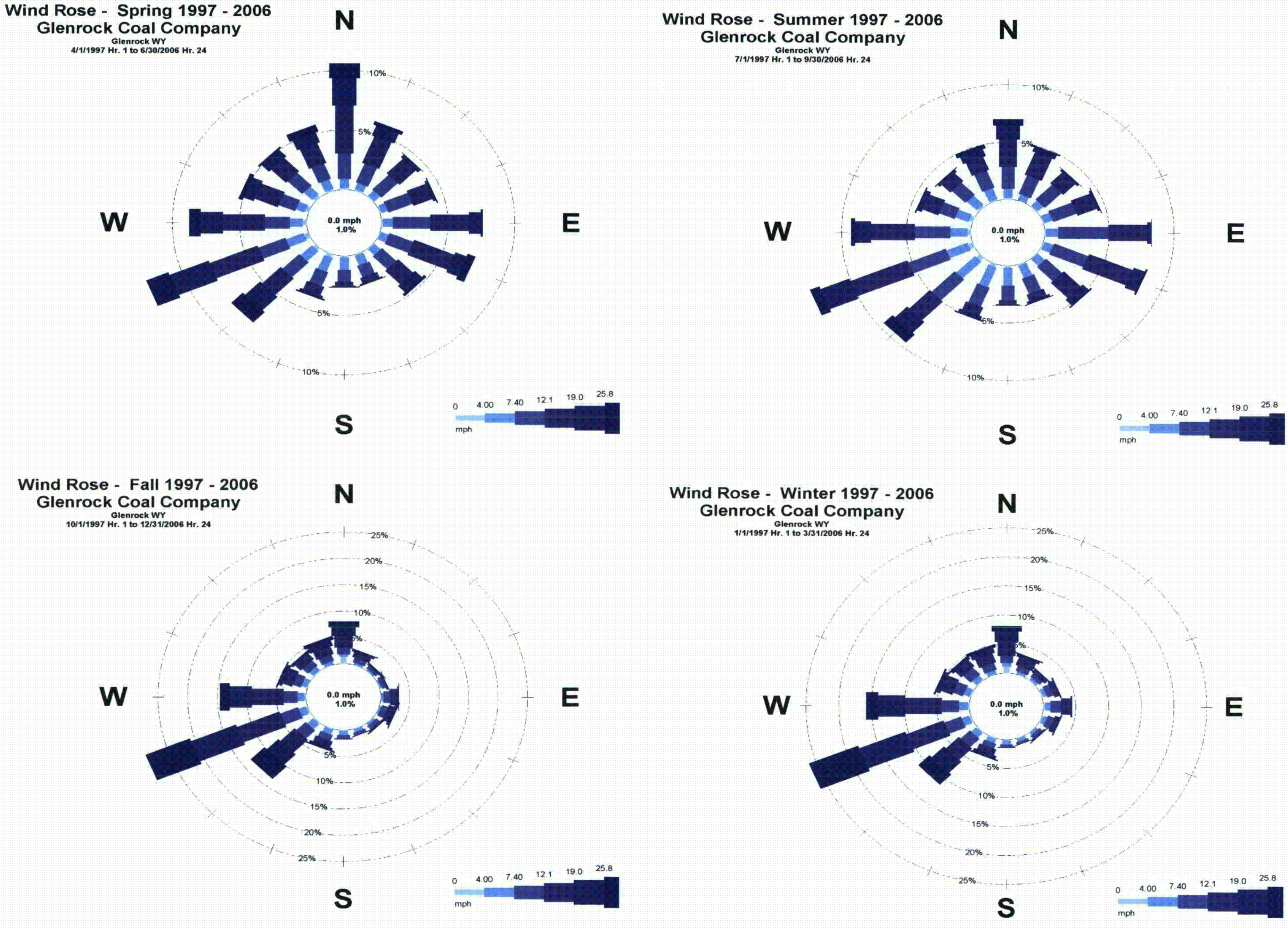
Figure 3.6-13 and Figure 3.6-14 show the seasonal wind roses for GCC and ACC, respectively. Figure 3.6-15 shows the annual wind rose for ACC. The GCC predominant wind direction is west/southwest and the ACC predominant wind direction is west with a secondary maximum of west/southwest. High pressure located over the southwestern United States is the culprit for the strong west/southwesterly winds which frequent the region. Spring experiences the greatest variability in wind direction with secondary modes from the southeast/east and northerly directions. The modes are a result of the synoptic scale transition period that occurs during this time. Low pressure regions develop on the lee side of the Rockies bringing southeast/easterly winds during development. As the low pressure systems form and move off with the general atmospheric flow, winds switch to a northerly direction.

The monthly and seasonal wind speeds are summarized in Figures 3.6-16 and 3.6-17. The graphs show a pronounced difference between the winter and summer averages. GCC experiences higher wind speeds, but the seasonal changes seem to mirror each other. Late fall and winter time averages are in the upper teens while summer time averages dip into the upper single digits to low teens. Overall, sites see differences of 3-4 mph from summer to winter months.

The site average for GCC is 14.8 mph for the entire ten year period analyzed and 11.1 mph for ACC. A closer look at the wind speed, summarized in the ACC and GCC wind summaries (Table 3.6-9 and Table 3.6-10), shows the west/southwesterly component average wind speed is 19.4 mph for GCC and 15.8 mph for ACC. The values suggest that the predominant wind direction is comprised of high, sustained wind speeds. Maximum hourly averages of greater 50 mph have been recorded at both mine sites. Figure 3.6-18 shows the cumulative frequency wind speed distributions for ACC and GCC. It is clearly evident from the graphs that light wind speeds are a rare occurrence.

The Joint Frequency Distributions are included for GCC (Table 3.6-11) and ACC (Table 3.6-12). The distributions show the frequencies of average wind speed for each direction based on stability class. Seventy percent of all winds at GCC and better than 56% at ACC fall into stability class D which represents near neutral to slightly unstable conditions. The light winds which accompany stable environments can be seen by the stability class F summaries (stable) as neither site has wind speed averages greater than 6 knots (6.9 mph).

Figure 3.6-13. GCC Seasonal Wind Roses



Revised May 2010

Figure 3.6-14. ACC Seasonal Wind Roses

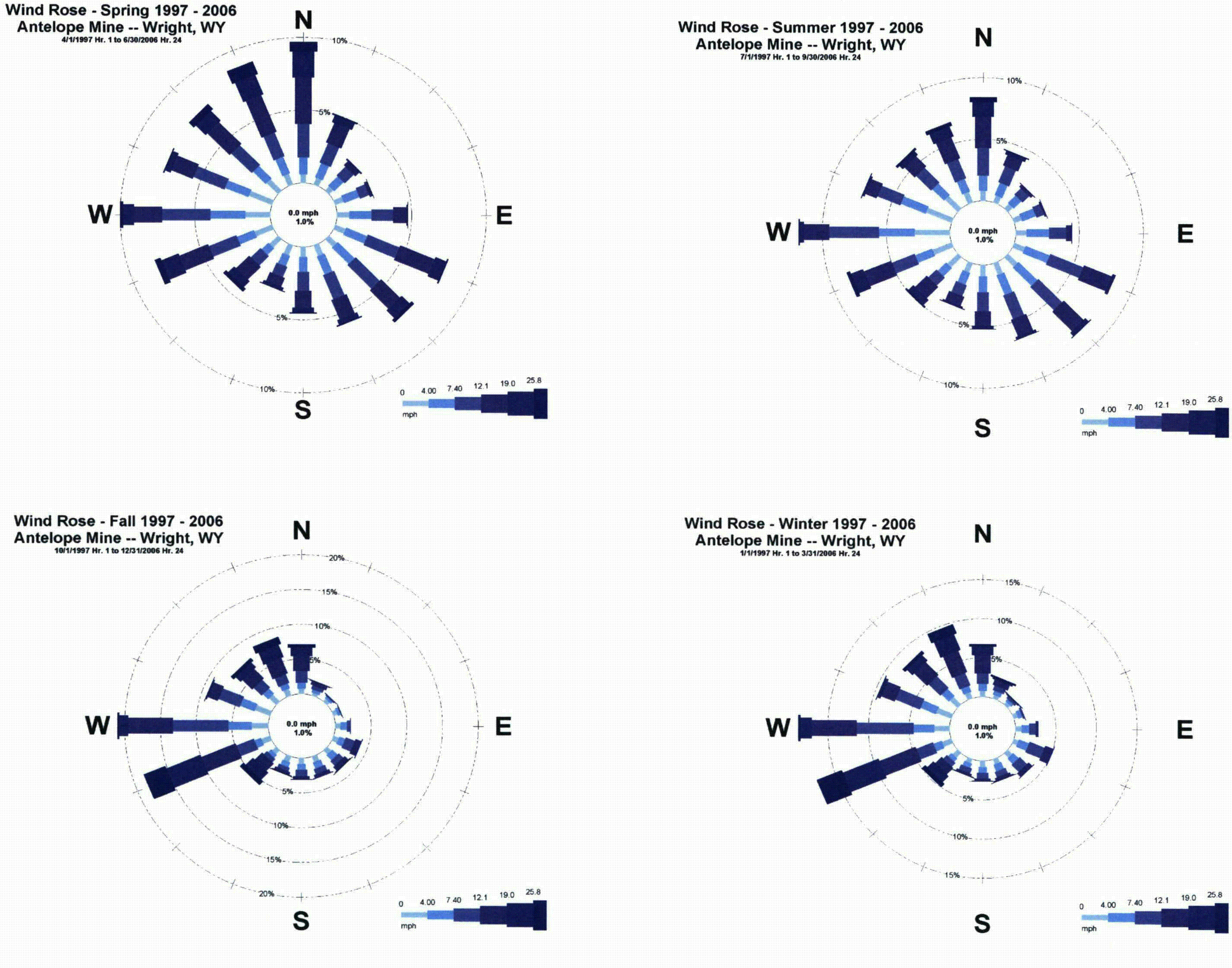


Figure 3.6-15 ACC Annual Wind Rose

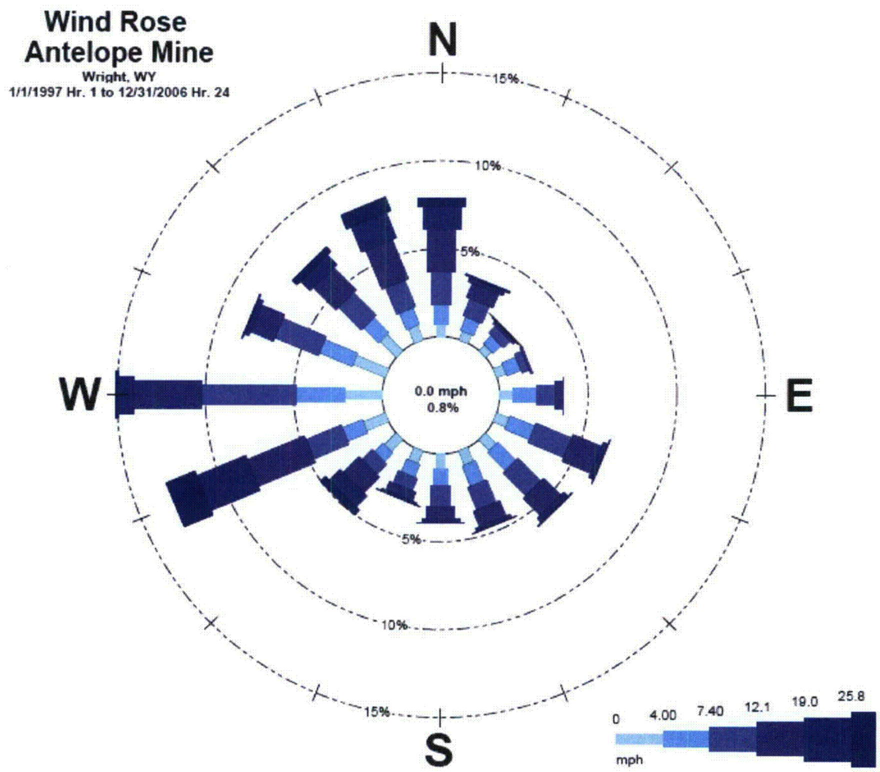


Figure 3.6-16 Monthly Wind Speed Averages for ACC and GCC.

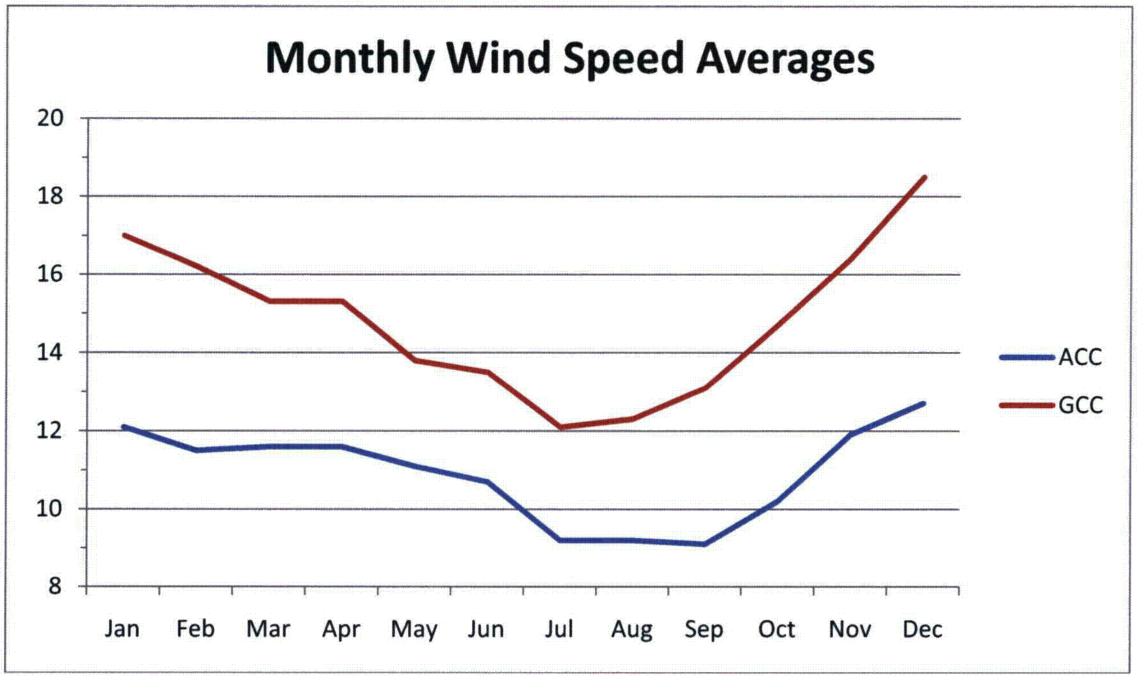


Figure 3.6-17 Seasonal Wind Speed Averages for ACC and GCC

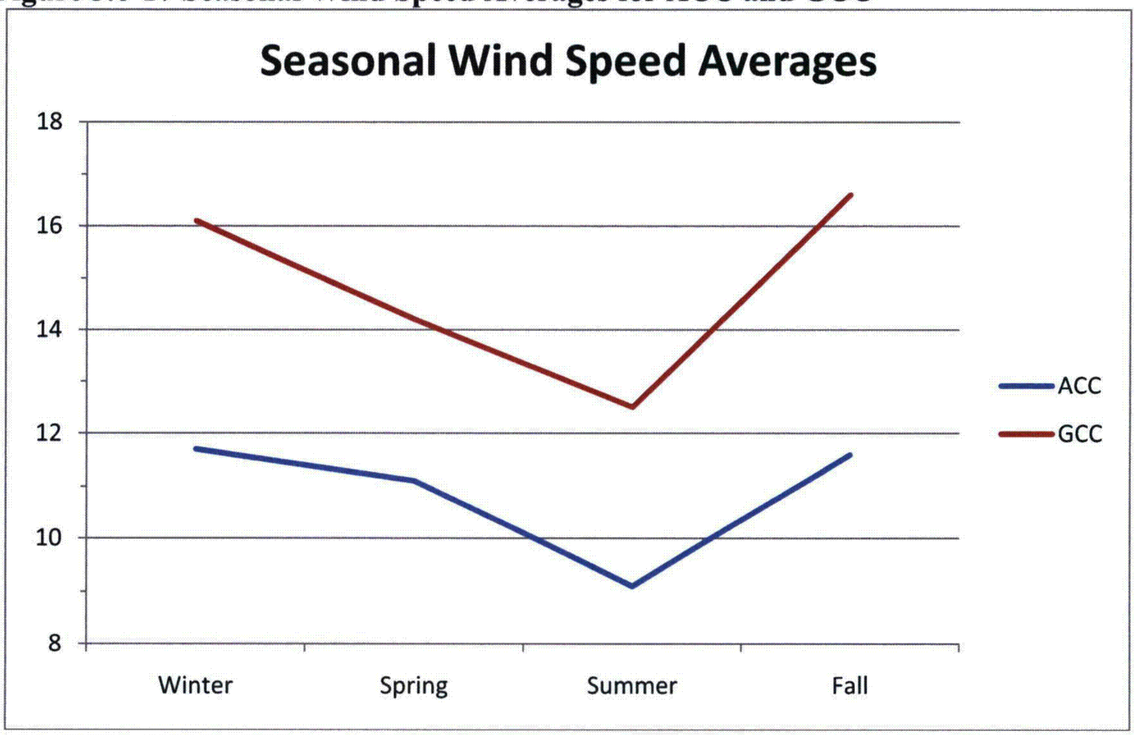


Table 3.6-9 ACC Wind Summary

Antelope Mine

Wind Data Summary

1/1/1997 - 12/31/2006

Hourly Data

	Average	Max	Min
Wind Speed (mph)	11.18	50.60	-
Sigma Theta (°)	16.35	82.00	0.35
Wind Direction			
N	13.33	47.32	0.30
NNE	10.53	39.25	0.58
NE	7.34	37.61	0.38
ENE	6.07	27.41	0.60
E	7.32	28.30	0.56
ESE	9.92	33.86	0.50
SE	9.76	35.52	0.50
SSE	8.99	33.57	0.40
S	8.88	32.30	0.69
SSW	8.38	36.90	0.57
SW	13.05	42.54	-
WSW	15.81	50.60	0.09
W	10.26	37.90	0.30
WNW	8.39	37.40	0.30
NW	11.50	45.10	0.30
NNW	14.49	43.50	-

Predominant wind direction was from the W sector, accounting for 15.2% of the winds, the average wind direction was 276°.

Data Recovery

	Possible (hours)	Reported (hours)	Recovery
Wind Speed	87648	81938	93.49%
Sigma Theta	87648	81951	93.50%
Wind Direction	87648	81951	93.50%

Table 3.6-10 GCC Wind Summary

Glenrock Coal Company

Wind Data Summary

1/1/1997 - 12/31/2006

Hourly Data

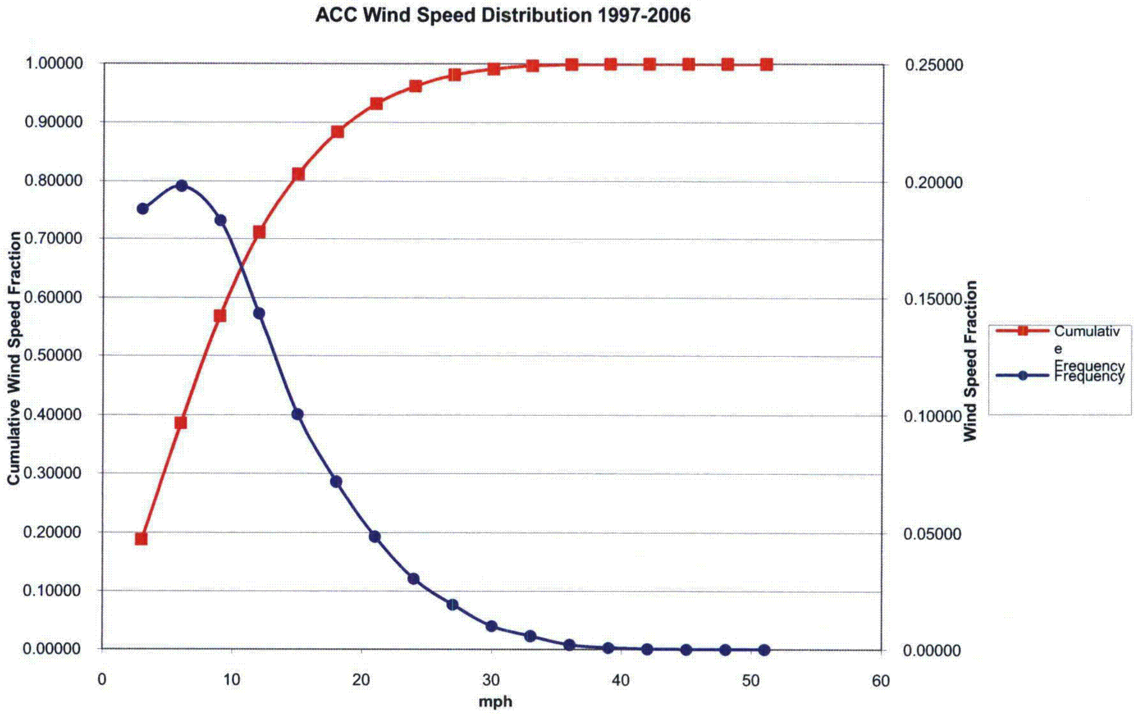
	Average	Max	Min
Wind Speed (mph)	14.82	57.60	-
Sigma Theta (°)	10.96	79.30	-
Wind Direction			
N	15.36	46.29	-
NNE	13.52	38.22	-
NE	11.32	30.90	-
ENE	11.14	29.80	-
E	11.92	37.15	0.10
ESE	13.52	38.80	-
SE	12.37	39.44	-
SSE	9.05	33.30	0.10
S	8.16	34.50	-
SSW	10.99	37.46	-
SW	17.09	55.58	-
WSW	19.36	57.60	-
W	15.89	48.21	-
WNW	12.69	39.44	0.10
NW	11.88	38.49	0.30
NNW	14.64	44.07	-

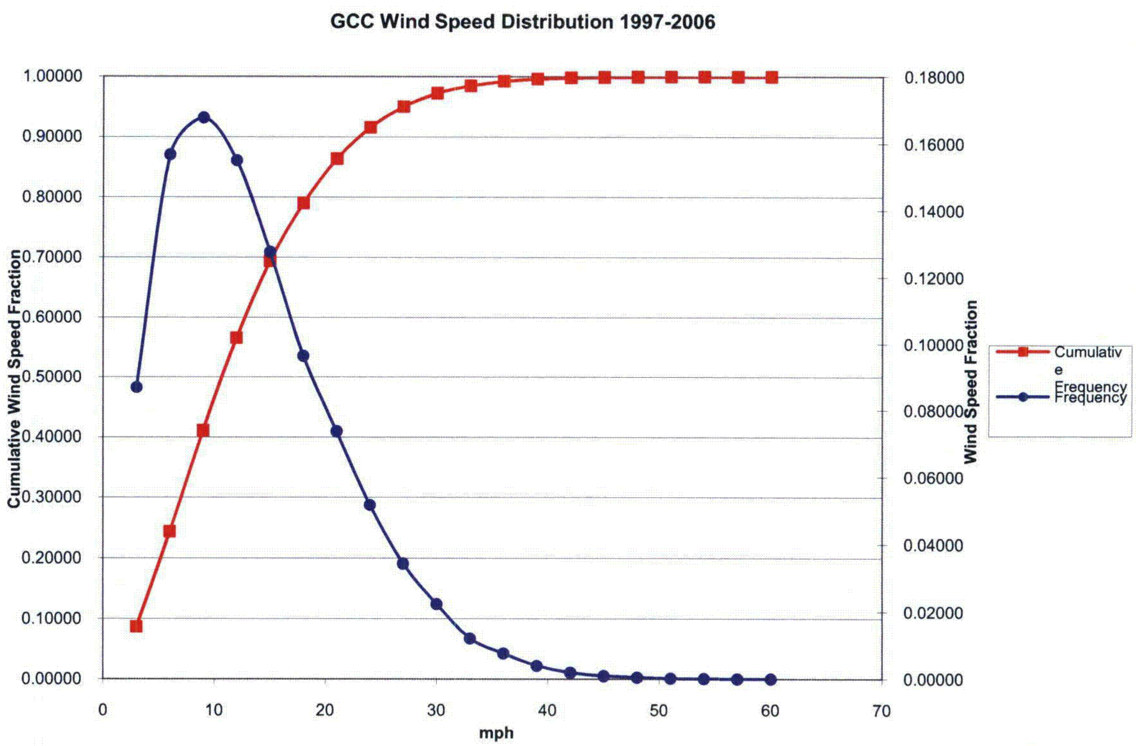
Predominant wind direction was from the WSW sector, accounting for 20% of the winds, the average wind direction was 205°.

Data Recovery

	Possible (hours)	Reported (hours)	Recovery
Wind Speed	87648	81406	92.88%
Sigma Theta	87648	78171	89.19%
Wind Direction	87648	81406	92.88%

Figure 3.6-18 ACC and GCC Wind Speed Frequency Distributions





3.6.3.3 Average Inversion and Mixing Layer Heights

The nearest upper-air data available from the National Weather Service are from Riverton, Wyoming or Rapid City, South Dakota. In both cases, the large distance from the southern PRB and the proximity to prominent mountain ranges make them ill suited to represent the Moore Ranch project site.

The Air Quality Division of the Wyoming Department of Environmental Quality (WDEQ-AQD) has provided statewide mixing heights to be used in dispersion modeling with the Industrial Source Complex (ISC3) model. These are based on the methods of Holsworth (1972) as applied to Lander, located in central Wyoming. For modeling purposes, the annual average mixing heights are assigned according to stability class as follows:

Class A	3,450 meters
Class B	2,300 meters
Class C	2,300 meters
Class D	2,300 meters
Class E	10,000 meters
Class F	10,000 meters

Stability classes E and F are given an arbitrarily high number to indicate the absence of a distinct boundary in the upper atmosphere. Based on the exclusive use of these numbers for air quality modeling by mines in the Powder River Basin, all dispersion modeling will use the mixing heights provided by WDEQ-AQD.

In August of 2000, IML Air Science conducted Sound Detection and Ranging (SODAR) monitoring at the Black Thunder Mine, located approximately 20 miles north of the Antelope Mine. The purpose of this monitoring was to support a comprehensive study of NO_x dispersion characteristics following overburden and coal blasting events. The SODAR instrument provided 3D wind speeds, wind directions, temperatures, temperature gradients, and other atmospheric parameters as a function of height above the ground. The vertical range of the SODAR was 1,500 meters, with a sounding performed every 15 minutes. Each sounding resulted in a calculated "inversion height / mixing height" (the two terms are used interchangeably by the SODAR system supplier). For purposes of response to NRC, these mixing heights were downloaded into a database and queried, with results shown in Table 3.6-13. Morning and afternoon time intervals were taken from EPA modeling guidance.

Table 3.6-13 Average Mixing/Inversion Heights from Black Thunder Mine SODAR Monitoring

Time Period (Filtered)	Number of Data Points	Average Mixing / Inversion Height
Morning (2 am – 6 am)	193	641 meters
Afternoon (12 pm – 4 pm)	152	1,052 meters

Since the SODAR definition of mixing height appears somewhat ambiguous, and these measurements were all from August, it is not known whether they would qualify as typical baseline conditions or meteorological inputs to the MILDOS model.

Table 3.6-11 GCC Joint Frequency Distribution for 1997 -2006

Glenrock Coal Company	Frequency Distribution	IML Air Science
Rolling Hills, Wyoming	Hourly Average Wind Speed, Wind Direction and Sigma	Sheridan, WY
Calm Readings 334	Total Readings 78171 Possible Readings 87648	Data Capture 89.2%
	From 1/1/1997 To 12/31/2006	

Stability Class A

Direction	0.6 - 3.0	4 - 6	7 - 10	11-16	17 - 21	> 21	Row Total
			Wind Speed (Knots)				
E	0.00023	0.00148	0.00127	0.00006	0.00001		0.00306
ENE	0.00030	0.00117	0.00069	0.00008	0.00001		0.00225
ESE	0.00031	0.00122	0.00101	0.00014			0.00269
N	0.00026	0.00166	0.00159	0.00017	0.00001		0.00369
NE	0.00026	0.00136	0.00109	0.00001		0.00001	0.00274
NNE	0.00015	0.00116	0.00128	0.00015			0.00275
NNW	0.00037	0.00222	0.00127	0.00017	0.00003	0.00001	0.00407
NW	0.00046	0.00216	0.00189	0.00040	0.00001	0.00001	0.00493
S	0.00026	0.00167	0.00089	0.00022	0.00003		0.00306
SE	0.00024	0.00105	0.00093	0.00014			0.00236
SSE	0.00027	0.00143	0.00110	0.00010			0.00290
SSW	0.00048	0.00207	0.00112	0.00024			0.00391
SW	0.00045	0.00230	0.00204	0.00045	0.00001		0.00525
W	0.00045	0.00170	0.00247	0.00069	0.00009	0.00003	0.00542
WNW	0.00055	0.00170	0.00182	0.00030	0.00001	0.00001	0.00439
WSW	0.00048	0.00216	0.00227	0.00060	0.00006		0.00558
Sum	0.00551	0.02649	0.02275	0.00393	0.00028	0.00008	0.05905

Table 3.6-11 GCC Joint Frequency Distribution for 1997 -2006 (Continued)

Stability Class B **Wind Speed (Knots)**

Direction	**0.6 - 3.0**	**4 - 6**	**7 - 10**	**11-16**	**17 - 21**	**> 21**	**Row Total**
E	0.00008	0.00026	0.00049	0.00024			0.00107
ENE	0.00005	0.00018	0.00057	0.00009			0.00089
ESE	0.00009	0.00018	0.00084	0.00024			0.00135
N	0.00003	0.00024	0.00095	0.00039	0.00003	0.00008	0.00171
NE	0.00006	0.00012	0.00049	0.00009			0.00076
NNE	0.00003	0.00026	0.00085	0.00019			0.00132
NNW	0.00004	0.00027	0.00110	0.00060	0.00005		0.00207
NW	0.00012	0.00044	0.00094	0.00072	0.00004		0.00225
S	0.00010	0.00037	0.00031	0.00021	0.00001	0.00001	0.00101
SE	0.00006	0.00026	0.00075	0.00030		0.00001	0.00137
SSE	0.00004	0.00039	0.00041	0.00023	0.00001		0.00108
SSW	0.00012	0.00048	0.00066	0.00058	0.00004		0.00186
SW	0.00023	0.00059	0.00116	0.00119	0.00019	0.00005	0.00342
W	0.00017	0.00054	0.00168	0.00177	0.00019	0.00008	0.00443
WNW	0.00014	0.00037	0.00096	0.00100	0.00010		0.00258
WSW	0.00022	0.00051	0.00130	0.00167	0.00021	0.00005	0.00396
Sum	0.00157	0.00545	0.01344	0.00952	0.00087	0.00028	0.03113

Table 3.6-11 GCC Joint Frequency Distribution for 1997 -2006 (Continued)

Stability Class C

Wind Speed (Knots)

Direction	**0.6 - 3.0**	**4 - 6**	**7 - 10**	**11-16**	**17 - 21**	**> 21**	**Row Total**
E	0.00008	0.00044	0.00087	0.00081			0.00220
ENE	0.00008	0.00028	0.00062	0.00040		0.00001	0.00139
ESE	0.00003	0.00045	0.00094	0.00132	0.00003		0.00276
N	0.00009	0.00032	0.00154	0.00297	0.00135	0.00099	0.00726
NE	0.00003	0.00015	0.00089	0.00044			0.00150
NNE	0.00003	0.00030	0.00099	0.00118	0.00001		0.00251
NNW	0.00006	0.00058	0.00140	0.00161	0.00037	0.00013	0.00415
NW	0.00013	0.00048	0.00131	0.00209	0.00049	0.00009	0.00459
S	0.00010	0.00066	0.00051	0.00042	0.00010	0.00001	0.00181
SE	0.00008	0.00054	0.00117	0.00131	0.00006	0.00001	0.00317
SSE	0.00009	0.00045	0.00062	0.00045	0.00003	0.00001	0.00164
SSW	0.00013	0.00075	0.00104	0.00091	0.00037	0.00006	0.00326
SW	0.00026	0.00091	0.00189	0.00297	0.00143	0.00027	0.00772
W	0.00022	0.00080	0.00164	0.00441	0.00159	0.00035	0.00901
WNW	0.00012	0.00050	0.00121	0.00276	0.00067	0.00015	0.00541
WSW	0.00026	0.00089	0.00247	0.00511	0.00226	0.00059	0.01158
Sum	0.00176	0.00848	0.01910	0.02916	0.00876	0.00269	0.06995

Table 3.6-11 GCC Joint Frequency Distribution for 1997 -2006 (Continued)

Stability Class D **Wind Speed (Knots)**

Direction	0.6 - 3.0	4 - 6	7 - 10	11-16	17 - 21	> 21	Row Total
E	0.00033	0.00190	0.00957	0.02189	0.00403	0.00075	0.03848
ENE	0.00033	0.00112	0.00550	0.01107	0.00141	0.00026	0.01970
ESE	0.00027	0.00202	0.00903	0.02149	0.00591	0.00281	0.04154
N	0.00032	0.00258	0.00951	0.02536	0.01484	0.01046	0.06307
NE	0.00014	0.00119	0.00497	0.01015	0.00161	0.00026	0.01832
NNE	0.00013	0.00134	0.00545	0.01611	0.00495	0.00203	0.03000
NNW	0.00040	0.00247	0.00641	0.01381	0.00714	0.00641	0.03664
NW	0.00067	0.00375	0.00723	0.01043	0.00365	0.00175	0.02748
S	0.00040	0.00335	0.00325	0.00166	0.00039	0.00008	0.00912
SE	0.00008	0.00238	0.00567	0.00879	0.00384	0.00119	0.02194
SSE	0.00035	0.00258	0.00353	0.00245	0.00076	0.00022	0.00989
SSW	0.00075	0.00445	0.00579	0.00523	0.00132	0.00078	0.01832
SW	0.00082	0.00561	0.00949	0.01742	0.01382	0.02167	0.06885
W	0.00068	0.00567	0.01377	0.03848	0.02288	0.01382	0.09530
WNW	0.00053	0.00412	0.00763	0.01314	0.00501	0.00244	0.03288
WSW	0.00107	0.00624	0.01566	0.05036	0.04394	0.05395	0.17122
Sum	0.00726	0.05077	0.12247	0.26785	0.13550	0.11888	0.70274

Table 3.6-11 GCC Joint Frequency Distribution for 1997 -2006 (Continued)

Stability Class E

Wind Speed (Knots)

Direction	**0.6 - 3.0**	**4 - 6**	**7 - 10**	**11-16**	**17 - 21**	**> 21**	**Row Total**
E	0.00049	0.00257	0.01188				0.01494
ENE	0.00019	0.00164	0.00686				0.00870
ESE	0.00037	0.00159	0.00609				0.00806
N	0.00030	0.00143	0.00313				0.00486
NE	0.00019	0.00153	0.00443				0.00615
NNE	0.00014	0.00141	0.00446				0.00601
NNW	0.00031	0.00184	0.00356				0.00570
NW	0.00028	0.00218	0.00373				0.00619
S	0.00055	0.00425	0.00376				0.00857
SE	0.00026	0.00140	0.00376				0.00542
SSE	0.00039	0.00283	0.00352				0.00673
SSW	0.00082	0.00433	0.00380				0.00895
SW	0.00072	0.00398	0.00420				0.00890
W	0.00060	0.00224	0.00424				0.00708
WNW	0.00046	0.00199	0.00265				0.00510
WSW	0.00089	0.00298	0.00403				0.00790
Sum	0.00696	0.03820	0.07412				0.11927

Table 3.6-11 GCC Joint Frequency Distribution for 1997 -2006 (Continued)

Stability Class F **Wind Speed (Knots)**

Direction	0.6 - 3.0	4 - 6	7 - 10	11-16	17 - 21	> 21	Row Total
E	0.00045	0.00077					0.00122
ENE	0.00050	0.00067					0.00117
ESE	0.00039	0.00054					0.00093
N	0.00033	0.00040					0.00073
NE	0.00036	0.00046					0.00082
NNE	0.00027	0.00050					0.00077
NNW	0.00031	0.00059					0.00090
NW	0.00051	0.00068					0.00119
S	0.00041	0.00067					0.00108
SE	0.00040	0.00053					0.00093
SSE	0.00042	0.00046					0.00089
SSW	0.00039	0.00054					0.00093
SW	0.00068	0.00060					0.00128
W	0.00072	0.00103					0.00175
WNW	0.00077	0.00077					0.00154
WSW	0.00071	0.00103					0.00173
Sum	0.00762	0.01024					0.01786

Table 3.6-12 ACC Joint Frequency Distribution for 1997-2006

Antelope Coal Company	Frequency Distribution		IML Air Science
Wright, Wyoming	Hourly Average Wind Speed, Wind Direction and Sigma		Sheridan, WY
Calm Readings 28	Total Readings 81938	Possible Readings 87648	Data Capture 93.5%
	From 1/1/1997 To 12/31/2006		

Stability Class A — **Wind Speed (Knots)**

Direction	**0.6 - 3.0**	**4 - 6**	**7 - 10**	**11-16**	**17 - 21**	**> 21**	**Row Total**
E	0.00226	0.00203	0.00076	0.00001			0.00505
ENE	0.00193	0.00214	0.00039	0.00006			0.00452
ESE	0.00192	0.00212	0.00088	0.00016			0.00508
N	0.00259	0.00260	0.00193	0.00013	0.00005		0.00730
NE	0.00175	0.00204	0.00070	0.00009			0.00457
NNE	0.00183	0.00264	0.00098	0.00005	0.00002		0.00552
NNW	0.00261	0.00278	0.00173	0.00021	0.00001		0.00735
NW	0.00316	0.00316	0.00217	0.00028			0.00878
S	0.00164	0.00273	0.00125	0.00016			0.00577
SE	0.00175	0.00295	0.00133	0.00009	0.00001		0.00613
SSE	0.00165	0.00289	0.00138	0.00012			0.00604
SSW	0.00134	0.00236	0.00111	0.00006	0.00002		0.00490
SW	0.00172	0.00205	0.00131	0.00031	0.00010	0.00011	0.00559
W	0.00271	0.00333	0.00206	0.00032	0.00002	0.00002	0.00847
WNW	0.00342	0.00360	0.00225	0.00032	0.00001		0.00960
WSW	0.00190	0.00282	0.00193	0.00031	0.00010	0.00001	0.00707
Sum	0.03417	0.04225	0.02215	0.00266	0.00035	0.00015	0.10173

Table 3.6-12 ACC Joint Frequency Distribution for 1997-2006 (Continued)

Stability Class B **Wind Speed (Knots)**

Direction	**0.6 - 3.0**	**4 - 6**	**7 - 10**	**11-16**	**17 - 21**	**> 21**	**Row Total**
E	0.00042	0.00048	0.00049	0.00004			0.00142
ENE	0.00027	0.00024	0.00038	0.00004			0.00093
ESE	0.00026	0.00039	0.00095	0.00018			0.00178
N	0.00023	0.00055	0.00164	0.00063	0.00002	0.00001	0.00309
NE	0.00021	0.00024	0.00055	0.00006			0.00106
NNE	0.00015	0.00049	0.00088	0.00017	0.00001		0.00170
NNW	0.00024	0.00057	0.00139	0.00077	0.00002	0.00004	0.00304
NW	0.00061	0.00070	0.00154	0.00082	0.00002	0.00002	0.00371
S	0.00024	0.00055	0.00089	0.00028	0.00002		0.00199
SE	0.00033	0.00079	0.00134	0.00033			0.00280
SSE	0.00023	0.00078	0.00120	0.00032	0.00001		0.00254
SSW	0.00020	0.00031	0.00059	0.00021	0.00001		0.00131
SW	0.00016	0.00039	0.00054	0.00048	0.00009	0.00005	0.00170
W	0.00066	0.00110	0.00183	0.00096	0.00004		0.00459
WNW	0.00087	0.00090	0.00166	0.00101	0.00006	0.00002	0.00453
WSW	0.00039	0.00054	0.00128	0.00127	0.00015	0.00010	0.00372
Sum	0.00546	0.00902	0.01714	0.00757	0.00046	0.00024	0.03990

Table 3.6-12 ACC Joint Frequency Distribution for 1997-2006 (Continued)

Stability Class C **Wind Speed (Knots)**

Direction	0.6 - 3.0	4 - 6	7 - 10	11-16	17 - 21	> 21	Row Total
E	0.00026	0.00063	0.00052	0.00043			0.00184
ENE	0.00017	0.00043	0.00037	0.00016			0.00112
ESE	0.00023	0.00093	0.00137	0.00096	0.00002		0.00352
N	0.00016	0.00051	0.00266	0.00454	0.00147	0.00084	0.01018
NE	0.00010	0.00042	0.00043	0.00022	0.00001		0.00117
NNE	0.00005	0.00054	0.00125	0.00096	0.00006	0.00002	0.00288
NNW	0.00012	0.00066	0.00226	0.00418	0.00101	0.00035	0.00858
NW	0.00037	0.00096	0.00226	0.00294	0.00060	0.00013	0.00726
S	0.00010	0.00073	0.00137	0.00099	0.00009	0.00001	0.00328
SE	0.00021	0.00089	0.00251	0.00198	0.00009		0.00568
SSE	0.00015	0.00100	0.00214	0.00183	0.00011		0.00523
SSW	0.00013	0.00034	0.00085	0.00085	0.00011		0.00230
SW	0.00017	0.00029	0.00076	0.00160	0.00054	0.00050	0.00386
W	0.00057	0.00232	0.00309	0.00396	0.00068	0.00016	0.01078
WNW	0.00052	0.00165	0.00236	0.00286	0.00048	0.00007	0.00794
WSW	0.00012	0.00073	0.00136	0.00365	0.00151	0.00077	0.00814
Sum	0.00343	0.01304	0.02554	0.03211	0.00678	0.00287	0.08376

Table 3.6-12 ACC Joint Frequency Distribution for 1997-2006 (Continued)

Stability Class D | **Wind Speed (Knots)**

Direction	**0.6 - 3.0**	**4 - 6**	**7 - 10**	**11-16**	**17 - 21**	**> 21**	**Row Total**
E	0.00074	0.00620	0.00678	0.00411	0.00032	0.00004	0.01819
ENE	0.00059	0.00354	0.00265	0.00087	0.00005	0.00001	0.00770
ESE	0.00077	0.00685	0.01279	0.01637	0.00275	0.00032	0.03985
N	0.00034	0.00421	0.01107	0.01977	0.01002	0.00448	0.04990
NE	0.00015	0.00227	0.00321	0.00171	0.00037	0.00011	0.00781
NNE	0.00022	0.00289	0.00608	0.00751	0.00241	0.00116	0.02027
NNW	0.00052	0.00380	0.00941	0.01935	0.01261	0.00955	0.05524
NW	0.00046	0.00438	0.01044	0.01425	0.00632	0.00420	0.04006
S	0.00052	0.00270	0.00504	0.00645	0.00170	0.00039	0.01680
SE	0.00063	0.00531	0.00905	0.01156	0.00287	0.00084	0.03026
SSE	0.00079	0.00352	0.00614	0.00752	0.00186	0.00033	0.02016
SSW	0.00052	0.00182	0.00364	0.00413	0.00109	0.00037	0.01156
SW	0.00043	0.00139	0.00424	0.01034	0.00708	0.00414	0.02762
W	0.00128	0.01170	0.03427	0.03327	0.00778	0.00226	0.09055
WNW	0.00096	0.00802	0.01688	0.01012	0.00215	0.00048	0.03862
WSW	0.00048	0.00360	0.01284	0.03002	0.02392	0.02084	0.09170
Sum	0.00942	0.07220	0.15454	0.19734	0.08327	0.04951	0.56628

Table 3.6-12 ACC Joint Frequency Distribution for 1997-2006 (Continued)

Stability Class E **Wind Speed (Knots)**

Direction	0.6 - 3.0	4 - 6	7 - 10	11-16	17 - 21	> 21	Row Total
E	0.00096	0.00250	0.00167				0.00514
ENE	0.00055	0.00142	0.00044				0.00241
ESE	0.00105	0.00328	0.00534				0.00967
N	0.00052	0.00162	0.00122				0.00337
NE	0.00042	0.00078	0.00027				0.00147
NNE	0.00042	0.00088	0.00118				0.00248
NNW	0.00088	0.00117	0.00112				0.00317
NW	0.00101	0.00149	0.00148				0.00398
S	0.00103	0.00167	0.00237				0.00507
SE	0.00121	0.00289	0.00370				0.00780
SSE	0.00100	0.00271	0.00276				0.00647
SSW	0.00077	0.00150	0.00133				0.00360
SW	0.00105	0.00095	0.00094				0.00294
W	0.00267	0.00523	0.01179				0.01969
WNW	0.00233	0.00315	0.00286				0.00834
WSW	0.00129	0.00206	0.00359				0.00695
Sum	0.01717	0.03332	0.04206				0.09254

Table 3.6-12 ACC Joint Frequency Distribution for 1997-2006 (Continued)

Stability Class F **Wind Speed (Knots)**

Direction	0.6 - 3.0	4 - 6	7 - 10	11-16	17 - 21	> 21	Row Total
E	0.00363	0.00131					0.00493
ENE	0.00244	0.00081					0.00325
ESE	0.00372	0.00151					0.00524
N	0.00346	0.00110					0.00455
NE	0.00220	0.00071					0.00291
NNE	0.00250	0.00079					0.00330
NNW	0.00446	0.00125					0.00570
NW	0.00750	0.00138					0.00888
S	0.00509	0.00156					0.00665
SE	0.00458	0.00162					0.00620
SSE	0.00481	0.00151					0.00632
SSW	0.00479	0.00153					0.00631
SW	0.00581	0.00190					0.00772
W	0.01356	0.00380					0.01736
WNW	0.01183	0.00272					0.01455
WSW	0.00939	0.00253					0.01192
Sum	0.08976	0.02603					0.11579

3.6.4 Air Quality

The primary new emission source of non-radiological pollutants will be particulate matter with a diameter less than ten micrometers (PM_{10}) resulting from vehicle traffic within the Moore Ranch Project Area. EMC estimated fugitive dust emissions from operation of the Moore Ranch Uranium Project based on projected activity levels and emission factors supplied by the WDEQ. Projected activities impacting dust emissions included ongoing wellfield construction activities, routine site traffic related to operations and maintenance, heavy truck traffic delivering chemicals and material and shipping product, and employee traffic to and from the site. Based on these activities, the projected total PM_{10} emissions is 18.5 tons per year. This level of emissions is small relative to surface mines and other industrial operations that generate dust from vehicles and disturbed areas. The larger surface mines in the Powder River Basin show PM_{10} emissions inventories in the thousands of tons per year. Sections of unpaved county roads can also exceed this 15 tons per year emission rate by an order of magnitude or more. Viewed another way, atmospheric dispersion modeling generally shows that fugitive PM_{10} emissions on the order of 15 tons per year result in insignificant impacts to ambient air beyond a distance of a few hundred yards from the sources. Significant impact for PM_{10} is defined as 1.0 µg/m3 or more. For reference purposes, the National Ambient Air Quality Standard (NAAQS) for annual average PM_{10} is 50 µg/m3. All area within the 80 km radius or the project are in attainment of NAAQS.

It is important to note that no control factors were assumed for the emission calculations. Periodic watering or chemical treatment of the unpaved roads will reduce emission factors by half or more.

3.10 SOCIOECONOMICS

Information presented in this section concerns those demographic and social characteristics of the counties and communities that may be affected by the proposed development of a uranium in-situ recovery facility at the Moore Ranch Project in Campbell County, Wyoming. Data were obtained through the 1980, 1990, and 2000 U.S. Census of Population, the 2005 and 2006 Census Population Estimates program, and various State of Wyoming government agencies.

3.10.1 Demography

3.10.1.1 Regional Population

The area within an 80-kilometer (km) (50-mile) radius of the Moore Ranch License Area (License Area) includes portions of six counties in northeastern Wyoming (Campbell, Converse, Johnson, Natrona, Weston Counties and a small portion of Niobrara County), as shown on Figure 3.10-1 (all Tables and Figures are included at end of this Section). The proposed Moore Ranch Project is located in southwest Campbell County. The nearest communities are Wright, a small Campbell County incorporated town located northeast on State Highway 387, and the Towns of Edgerton and Midwest, which are located in Natrona County southwest of the Moore Ranch Project on State Highway 387.

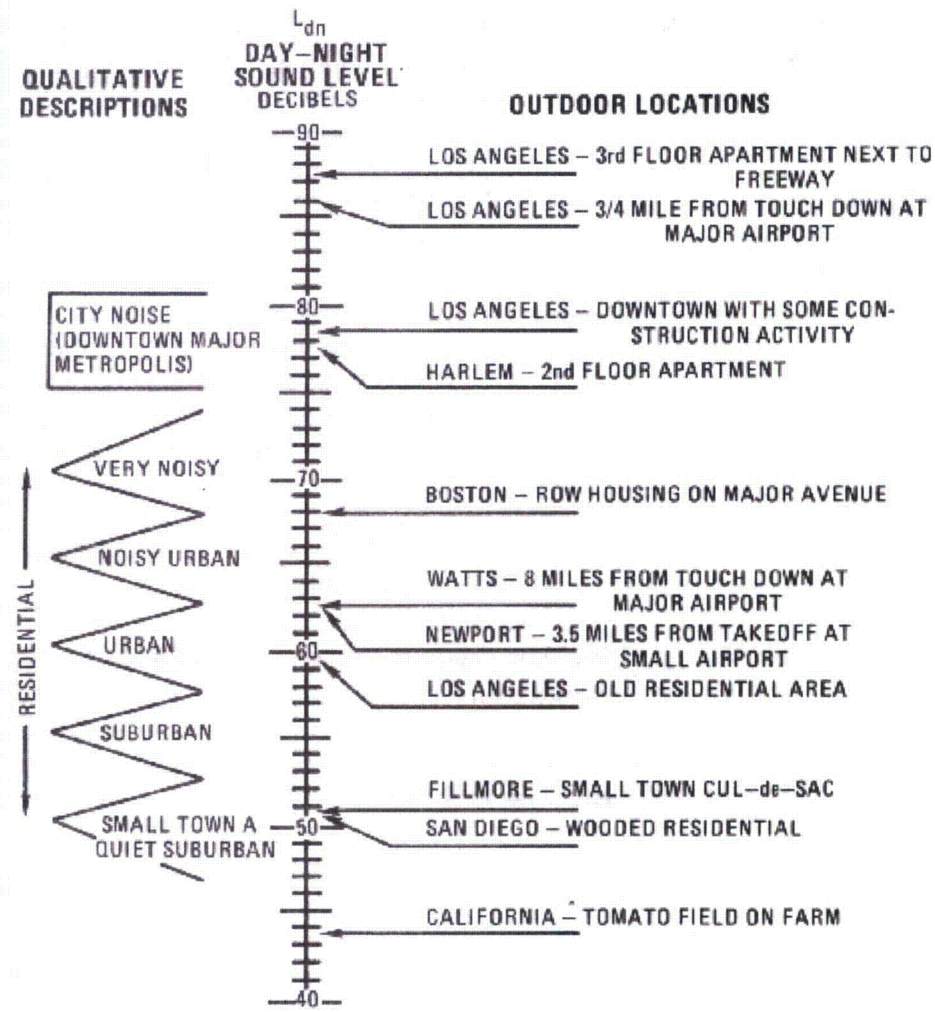
Historical and current population trends in counties and communities within an 80 km distance of the Project are shown in Table 3.10-1, which summarize past growth trends in the counties relative to state population trends between 1980 and 2006. The largest growth rates in the six-county region since 2000 occurred in Johnson, Natrona, and Campbell Counties, primarily because of ongoing mineral resource development in the Powder River Basin. Population growth in Campbell, Johnson, and Converse Counties has outpaced state population growth for most years since 1980, with the largest average annual growth rate of 13.7 percent occurring in Converse County during the 1980s. The state population declined during this period, primarily because of declines in historic agricultural economic sectors, while the high growth rates in Campbell, Johnson, and Converse Counties indicated boom years in oil, coal, and gas development. The population in Campbell County grew at a slower rate between 2000 and 2006 than in previous decades, so that growth rates are more in line with the state growth rates. The overall county and state economies are more diverse in the current decade than they were during the 1980s.

3.7 NOISE

Open rangeland is the primary land use within and in the surrounding 2.0-mile area. Other land uses include oil and gas and CBM production facilities, as well as pastureland located to the west of the Project area. The existing ambient noise in the vicinity of the Moore Ranch Project area is dominated by the traffic noise from State Highway 387, surrounding oil and gas operations, and on-site CBM operations.

Background noise surveys have not been conducted by EMC in the area. However, noise in rural areas away from industrial facilities and transportation corridors is generally 30 to 40 dBA when the wind speeds are low. Background noise levels for the EPA category "farm in valley" are: daytime, 29 dBA; evening, 39 dBA; and nighttime, 32 dBA. Local conditions, such as topography and frequent high winds, can alter background noise conditions. The measured range of values of day-night sound levels outside dwelling units extends from 44 dB on a farm to 88.8 dB outside an apartment located adjacent to a freeway. Some examples of these data are summarized in Figure 3.7-1 (EPA 1974, EPA 1973).

Figure 3.7-1 Outdoor Day-Night Sound Level in dB at Various Locations



(EPA 1973)

Levels of noise close to industrial facilities and transportation corridors in the Powder River Basin are likely to be in the range of 50 to 70 dBA, depending on the proximity to these sources (BLM, 2003). The most significant ambient noise in the Moore Ranch License Area is from traffic on State Highway 387, which transects the license area, and CBM operations that are located on site. In particular, two CBM compressor stations in the immediate vicinity use multiple engines to move natural gas from central gathering facilities and along high-pressure transmission pipelines. The location of these CBM compressor stations is shown on Figure 4.14-1. Noise from these existing compressor stations has been estimated to be 55 dBA at 600 feet from the compressor station (BLM 2000).

There are no occupied housing units in the vicinity of the proposed Moore Ranch Uranium Project. The nearest resident is approximately 4.3 miles to the east of the license area. As a result of the remote location of the Project and the low population density of the surrounding area, impact to noise or congestion above ambient background noise within the Project area or in the surrounding 2.0-mile area are not anticipated. Additionally, given the maximum increase in population due to migrant workers is insignificant, noise and congestion impacts are not anticipated in Campbell or other neighboring counties.