ADDENDUM 3.5-J

LUDEMAN WETLAND DATA FORMS – GREAT PLAINS REGION

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Ludeman License Area Sampling Date: 6/5/2008
Applicant/Owner: Uranium One City/County: Converse County
Investigator(s): K. LaClair, W. Stansbury Section,Township,Range: Sec 14, T34N, R74W State: WY
Landform (hillslope, terrace, etc.): Depression in drainage Local relief (concave, convex, none) concave Slope (%) <2%
Subregion (LRR): LRR H Lat: -105.708 Long: 42.920 Datum: NAD-83
Soil Map Unit Name: 164-Haverdad Loam, 187-Kishona-Cambria loams, 189-Kishona-Cambria-Theedle loams
NWI classification na Sampling Point WL-1
Are climate/hydrologic conditions on the site typical for this time of year? Yes X No (If no, explain in Remarks.)
Are "Normal Circumstances" present? Yes X No

Are Vegetation____, Soil____, or Hydology____ significantly disturbed? Yes____ No X
Are Vegetation____, Soil____, or Hydrology____naturally problematic? Yes____ No X
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes X No____
Hydric Soil Present? Yes X No____ Is the Sampled Area
Wetland Hydrology Present? Yes X No____ within a Wetland? Yes X No____

Remarks:
This is a string of intermittent wetlands (17 wetlands, WL-1a through WL-1q) that are disconnected depressions along the same drainage. They range in size from 0.003 acres to 0.723 acres.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size:)	Absolute %Cover	Dominate Species?	Indicator Status
1			
2			
3			
4			
		=Total Cover	
Sapling/Shrub Stratum (Plot size:)			
1			
2			
3			
4			
5			
		=Total Cover	
Herb Stratum (Plot size: 20sf)			
1 *Eleocharis palustris*	40	Y	OBL
2			
3			
4			
5			
6			
7			
8			
9			
10			
	40%	=Total Cover	
Woody Vine Stratum (Plot size:)			
1			
2			
		=Total Cover	

% Bare Ground in Herb Stratum 60%

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That are OBL,FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet:

Total % Cover of:	Multiple by:	
OBL species	x 1 =	
FACW species	x 2 =	
FAC species	x 3 =	
FACU species	x 4 =	
UPL species	x 5 =	
Column Totals:	A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

X Dominance Test is >50%
____Prevalence Index is ≤ 3.0[1]
____Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
____Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present?
Yes X No____

Remarks:

SOIL Sampling Point WL-1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	
0-4"	10YR 3 /1		7.5YR 4/6	<2%	C	M	Loam w/organics	Mottles: Fine, few, prominent
4-10"	2.5YR 5/1		7.5YR 4/6	15%	C	M	Clay loam	Mottles: Fine to medium, many, prominent

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___Histosol (A1)
- ___Histic Epipedon (A2)
- ___Black Histic (A3)
- ___Hydrogen Sulfide (A4)
- ___Stratified Layers (A5) (LRR F)
- ___1 cm Muck (A9) (LRR F, G, H)
- ___Depleted Below Dark Surface (A12)
- ___Thick Dark Surface (A12)
- ___Sandy Mucky Mineral (S1)
- ___2.5 Mucky Peat or Peat (S2) (LRR G,H)
- ___5 cm Mucky Peat or Peat (S3) (LRR F)
- ___Sandy Gleyed Matrix (S4)
- ___Sandy Redox (S5)
- ___Striped Matrix (S6)
- _X_Loamy Mucky Mineral (F1)
- ___Loamy Gleyed Matrix (F2)
- ___Depleted Matrix (F3)
- ___Redox Dark Surface (F6)
- ___Depleted Dark Surface (F7)
- ___Redox Depressions (F8)
- ___High Plains Depressions (F16) (MLRA 72 & 73 of LRR H)

Indicators for Problematic Hydric Soils[3]:

- ___1 cm Muck (A9) (LRR I, J)
- ___Coast Prairie Redox (A16) (LRR F, G, H)
- ___Dark Surface (S7) (LRR G)
- ___High Plains Depressions (F16) (LRR H outside of MLRA 72 & 73)
- ___Reduced Vertic (F18)
- ___Red Parent Material (TF2)
- ___Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if present):

Type:_____

Depth (inches) :_____

Hydric Soil Present? Yes__X__ No_____

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___Surface Water (A1)
- ___Saturation (A3)
- ___Water Marks (B1)
- ___Sediment Deposits (B2)
- ___Drift Deposits (B3)
- ___Algal Mat or Crust (B4)
- ___Iron Deposits (B5)
- ___Inundation Visible on Aerial Imagery (B7)
- ___Water-Stained Leave (B9)
- ___Salt Crust (B11)
- _X_Hydrogen Sulfide Odor (C1)
- ___Dry Season Water Table (C2)
- ___Oxidized Rhizospheres on Living Roots (C3) (where not tilled)
- ___Presence of Reduced Iron (C4)
- ___Thin Muck Surface (C7)
- ___Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___Sparsely Vegetated Concave Surface (B8)
- ___Drainage Patterns (B10)
- ___Oxidized Rhizospheres on Living Roots (C3) (where tilled)
- ___Crayfish Burrows (C8)
- ___Saturation Visible of Aerial Imagery (C9)
- ___Geomorphic Position (D2)
- ___FAC-Neutral Test (D5)
- ___Frost-Heave Hummocks (D7) (LRR F)

Field Observations:

Surface Water Present? Yes ____ No__X__ Depth (inches)_____

Water Table Present? Yes_____No__X__ Depth (inches)_____

Saturation Present? Yes ____ No__X__ Depth (inches)_____

(includes capillary fringe)

Wetland Hydrology Present?

Yes__X__No_____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Ludeman License Area Sampling Date: 6/6/2008
Applicant/Owner: Uranium One City/County: Converse County
Investigator(s): K. LaClair Section,Township,Range: Sec 14, T34N, R74W State: WY
Landform (hillslope, terrace, etc.): Depression in drainage Local relief (concave, convex, none) concave Slope (%) <2%
Subregion (LRR): LRR H Lat: -105.699 Long: 42.917 Datum: NAD-83
Soil Map Unit Name: 250-Theedle Kishona loams NWI classification na Sampling Point WL-2
Are climate/hydrologic conditions on the site typical for this time of year? Yes X No (If no, explain in Remarks.)
Are "Normal Circumstances" present? Yes X No

Are Vegetation____, Soil____, or Hydology____ significantly disturbed? Yes____ No X
Are Vegetation____, Soil____, or Hydrology____naturally problematic? Yes____ No X
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes X No
Hydric Soil Present? Yes X No Is the Sampled Area
Wetland Hydrology Present? Yes X No within a Wetland? Yes X No

Remarks:
This is a depression in a drainage.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size:)	Absolute %Cover	Dominate Species?	Indicator Status
1			
2			
3			
4			
		=Total Cover	
Sapling/Shrub Stratum (Plot size:)			
1			
2			
3			
4			
5			
		=Total Cover	
Herb Stratum (Plot size: 20sf)			
1 *Juncus balticus*	20	Y	OBL
2 *Carex aquatilis*	20	Y	OBL
3 *Poa sp.*	2	N	
4			
5			
6			
7			
8			
9			
10			
	42	=Total Cover	
Woody Vine Stratum (Plot size:)			
1			
2			
		=Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That are OBL,FACW, or FAC: 100% (A/B)

Prevalence Index Worksheet:

Total % Cover of:	Multiply by:	
OBL species	x 1 =	
FACW species	x 2 =	
FAC species	x 3 =	
FACU species	x 4 =	
UPL species	x 5 =	
Column Totals: A)		(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

X Dominance Test is >50%
____ Prevalence Index is ≤ 3.0[1]
____ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
____ Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present?
Yes X No

% Bare Ground in Herb Stratum 58

Remarks:

SOIL Sampling Point WL-2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	
0-4"	5Y 4/2		7.5YR 4/4	25 %	C	M	Clay loam	Mottles: Fine, many, distinct
4-10"	2.5Y 4/2		7.5YR 5/8	25%	C	M	Clay loam	Mottles: Fine to medium, many, prominent

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___Histosol (A1)
- ___Histic Epipedon (A2)
- ___Black Histic (A3)
- ___Hydrogen Sulfide (A4)
- ___Stratified Layers (A5) (LRR F)
- ___1 cm Muck (A9) (LRR F, G, H)
- ___Depleted Below Dark Surface (A12)
- ___Thick Dark Surface (A12)
- ___Sandy Mucky Mineral (S1)
- ___2.5 Mucky Peat or Peat (S2) (LRR G,H)
- ___5 cm Mucky Peat or Peat (S3) (LRR F)
- ___Sandy Gleyed Matrix (S4)
- ___Sandy Redox (S5)
- ___Striped Matrix (S6)
- X Loamy Mucky Mineral (F1)
- ___Loamy Gleyed Matrix (F2)
- ___Depleted Matrix (F3)
- ___Redox Dark Surface (F6)
- ___Depleted Dark Surface (F7)
- ___Redox Depressions (F8)
- ___High Plains Depressions (F16) (MLRA 72 & 73 of LRR H)

Indicators for Problematic Hydric Soils[3]:

- ___1 cm Muck (A9) (LRR I, J)
- ___Coast Prairie Redox (A16) (LRR F, G, H)
- ___Dark Surface (S7) (LRR G)
- ___High Plains Depressions (F16) (LRR H outside of MLRA 72 & 73)
- ___Reduced Vertic (F18)
- ___Red Parent Material (TF2)
- ___Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if present):

Type:_____

Depth (inches) :_____

Hydric Soil Present? Yes X No_____

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- X Surface Water (A1)
- X Saturation (A3)
- ___Water Marks (B1)
- ___Sediment Deposits (B2)
- ___Drift Deposits (B3)
- ___Algal Mat or Crust (B4)
- ___Iron Deposits (B5)
- ___Inundation Visible on Aerial Imagery (B7)
- ___Water-Stained Leave (B9)
- ___Salt Crust (B11)
- ___Hydrogen Sulfide Odor (C1)
- ___Dry Season Water Table (C2)
- ___Oxidized Rhizospheres on Living Roots (C3) (where not tilled)
- ___Presence of Reduced Iron (C4)
- ___Thin Muck Surface (C7)
- ___Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___Sparsely Vegetated Concave Surface (B8)
- ___Drainage Patterns (B10)
- ___Oxidized Rhizospheres on Living Roots (C3) (where tilled)
- ___Crayfish Burrows (C8)
- ___Saturation Visible of Aerial Imagery (C9)
- ___Geomorphic Position (D2)
- ___FAC-Neutral Test (D5)
- ___Frost-Heave Hummocks (D7) (LRR F)

Field Observations:

Surface Water Present? Yes X No____ Depth (inches) 6 inches

Water Table Present? Yes____ No X Depth (inches)_____

Saturation Present? Yes X No____ Depth (inches) *

(includes capillary fringe)

* Saturated to the surface.

Wetland Hydrology Present?

Yes X No____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Ludeman License Area Sampling Date: 8/9/08
Applicant/Owner: Uranium One City/County: Converse County
Investigator(s): W. Stansbury Section,Township,Range: Sec 22, T34N, R74W State: WY
Landform (hillslope, terrace, etc.): Depression in drainage Local relief (concave, convex, none) concave Slope (%) <2%
Subregion (LRR): LRR H Lat: -105.715 Long: 42.903 Datum: NAD-83
Soil Map Unit Name: 164-Haverdad loam, 230-Shingle-Badland-Samday complex, 251-Theedle-Kishona-Shingle loams
NWI classification PEMC Sampling Point WL-3
Are climate/hydrologic conditions on the site typical for this time of year? Yes X No (If no, explain in Remarks.)
Are "Normal Circumstances" present? Yes X No

Are Vegetation____, Soil____, or Hydology____ significantly disturbed? Yes____ No X
Are Vegetation____, Soil____, or Hydrology____naturally problematic? Yes____ No X
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes X No
Hydric Soil Present? Yes X No
Wetland Hydrology Present? Yes X No
Is the Sampled Area within a Wetland? Yes X No

Remarks:
This is a string of intermittent wetlands (WL-3a through WL-3c) that are disconnected depressions along Little Sand Creek. They range in size from 1.96 acres to 4.97 acres.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size:)	Absolute %Cover	Dominate Species?	Indicator Status
1			
2			
3			
4			
		=Total Cover	
Sapling/Shrub Stratum (Plot size:)			
1			
2			
3			
4			
5			
		=Total Cover	
Herb Stratum (Plot size: 20sf)			
1 *Carex nebrascensis*	61	Y	OBL
2 *Hordeum jubatum*	5	N	FACW
3 *Juncus effusus*	5	N	OBL
4 *Calamagrostis neglecta*	4	N	OBL
5			
6			
7			
8			
9			
10			
	75%	=Total Cover	
Woody Vine Stratum (Plot size:)			
1			
2			
		=Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That are OBL,FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet:

Total % Cover of:	Multiple by:	
OBL species	x 1 =	
FACW species	x 2 =	
FAC species	x 3 =	
FACU species	x 4 =	
UPL species	x 5 =	
Column Totals: A)		(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

X Dominance Test is >50%
Prevalence Index is ≤ 3.0[1]
Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present?
Yes X No

% Bare Ground in Herb Stratum 25%

Remarks:

SOIL Sampling Point WL-3

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	
0-3"	10YR 4/2		7.5YR 5/6	<2%	C	M	Silty clay	Mottles: fine, few, prominent
3-12"	2.5Y 5/1		7.5YR 5/8	25%	C	M	Clay	Mottles: medium, many, prominent oxidized root channels in 3-12"

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___Histosol (A1)
- ___Histic Epipedon (A2)
- ___Black Histic (A3)
- ___Hydrogen Sulfide (A4)
- ___Stratified Layers (A5) (LRR F)
- ___1 cm Muck (A9) (LRR F, G, H)
- ___Depleted Below Dark Surface (A12)
- ___Thick Dark Surface (A12)
- ___Sandy Mucky Mineral (S1)
- ___2.5 Mucky Peat or Peat (S2) (LRR G,H)
- ___5 cm Mucky Peat or Peat (S3) (LRR F)
- ___Sandy Gleyed Matrix (S4)
- ___Sandy Redox (S5)
- ___Striped Matrix (S6)
- _X_Loamy Mucky Mineral (F1)
- ___Loamy Gleyed Matrix (F2)
- ___Depleted Matrix (F3)
- ___Redox Dark Surface (F6)
- ___Depleted Dark Surface (F7)
- ___Redox Depressions (F8)
- ___High Plains Depressions (F16) (MLRA 72 & 73 of LRR H)

Indicators for Problematic Hydric Soils[3]:

- ___1 cm Muck (A9) (LRR I, J)
- ___Coast Prairie Redox (A16) (LRR F, G, H)
- ___Dark Surface (S7) (LRR G)
- ___High Plains Depressions (F16) (LRR H outside of MLRA 72 & 73)
- ___Reduced Vertic (F18)
- ___Red Parent Material (TF2)
- ___Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if present):

Type:_____ Hydric Soil Present? Yes__X__ No_____

Depth (inches) :_____

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___Surface Water (A1)
- ___Saturation (A3)
- ___Water Marks (B1)
- ___Sediment Deposits (B2)
- ___Drift Deposits (B3)
- ___Algal Mat or Crust (B4)
- ___Iron Deposits (B5)
- ___Inundation Visible on Aerial Imagery (B7)
- ___Water-Stained Leave (B9)
- ___Salt Crust (B11)
- ___Hydrogen Sulfide Odor (C1)
- ___Dry Season Water Table (C2)
- _X_Oxidized Rhizospheres on Living Roots (C3) (where not tilled)
- ___Presence of Reduced Iron (C4)
- ___Thin Muck Surface (C7)
- ___Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___Sparsely Vegetated Concave Surface (B8)
- _X_Drainage Patterns (B10)
- ___Oxidized Rhizospheres on Living Roots (C3) ___ (where tilled)
- ___Crayfish Burrows (C8)
- ___Saturation Visible of Aerial Imagery (C9)
- ___Geomorphic Position (D2)
- _X_FAC-Neutral Test (D5)
- ___Frost-Heave Hummocks (D7) (LRR F)

Field Observations:

Surface Water Present? Yes_____No_X__ Depth (inches) _____

Water Table Present? Yes_____No_X__ Depth (inches)_____

Saturation Present? Yes_____No_X__ Depth (inches) _____

(includes capillary fringe)

Wetland Hydrology Present?

Yes__X__No_____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Ludeman License Area Sampling Date: 8/5/08
Applicant/Owner: Uranium One City/County: Converse County
Investigator(s): W. Stansbury Section,Township,Range: Sec 28, T34N, R73W State: WY
Landform (hillslope, terrace, etc.): Depression in drainage Local relief (concave, convex, none) concave Slope (%) <2%
Subregion (LRR): LRR H Lat: -105.614 Long: 42.903 Datum: NAD-83
Soil Map Unit Name: 187-Kishona-Cambria loams NWI classification PEMC Sampling Point WL-4
Are climate/hydrologic conditions on the site typical for this time of year? Yes X No (If no, explain in Remarks.)
Are "Normal Circumstances" present? Yes X No

Are Vegetation____, Soil____, or Hydology____ significantly disturbed? Yes____ No X
Are Vegetation____, Soil____, or Hydrology____naturally problematic? Yes____ No X
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes X No
Hydric Soil Present? Yes X No
Wetland Hydrology Present? Yes X No
Is the Sampled Area within a Wetland? Yes X No

Remarks:
This is wetland which has formed on the downstream side of a diked waterbody.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size:)	Absolute %Cover	Dominate Species?	Indicator Status
1			
2			
3			
4			
		=Total Cover	
Sapling/Shrub Stratum (Plot size:)			
1			
2			
3			
4			
5			
		=Total Cover	
Herb Stratum (Plot size: 20sf)			
1 *Hordeum Jubatum*	20	Y	FACW
2 *Scirpus americanus*	20	Y	OBL
3 *Rumex stenophyullus*	5	N	FACW+
4 *Agropyron spicatum*	2	N	FACU-
5 *Cirsium arvense*	2	N	FACU
6 Other	1	N	na
7			
8			
9			
10			
	50%	=Total Cover	
Woody Vine Stratum (Plot size:)			
1			
2			
		=Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That are OBL,FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet:

Total % Cover of:	Multiply by:	
OBL species	x 1 =	
FACW species	x 2 =	
FAC species	x 3 =	
FACU species	x 4 =	
UPL species	x 5 =	
Column Totals: A)		(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:
X Dominance Test is >50%
Prevalence Index is ≤ 3.0[1]
Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present?
Yes X No

% Bare Ground in Herb Stratum 50%

Remarks:

SOIL Sampling Point WL-4

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	
0-9"	2.5Y 5/2	60	7.5YR 4/6	20%	C	M	Silty loam	Mottles: medium to coarse, common, promi
0-9"	5Y 2.5/1	40						Blended matrix with fine texture
9-14"	2.5Y 5/2	60	7.5YR 4/6	20%	C	M	Silty loam	Mottles: medium to coarse, common, prominent
9-14"	5Y 2.5/1	40						Blended matrix with medium texture

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___Histosol (A1)
- ___Histic Epipedon (A2)
- ___Black Histic (A3)
- ___Hydrogen Sulfide (A4)
- ___Stratified Layers (A5) (LRR F)
- ___1 cm Muck (A9) (LRR F, G, H)
- ___Depleted Below Dark Surface (A12)
- ___Thick Dark Surface (A12)
- ___Sandy Mucky Mineral (S1)
- ___2.5 Mucky Peat or Peat (S2) (LRR G,H)
- ___5 cm Mucky Peat or Peat (S3) (LRR F)
- ___Sandy Gleyed Matrix (S4)
- ___Sandy Redox (S5)
- ___Striped Matrix (S6)
- X Loamy Mucky Mineral (F1)
- ___Loamy Gleyed Matrix (F2)
- ___Depleted Matrix (F3)
- ___Redox Dark Surface (F6)
- ___Depleted Dark Surface (F7)
- ___Redox Depressions (F8)
- ___High Plains Depressions (F16) (MLRA 72 & 73 of LRR H)

Indicators for Problematic Hydric Soils[3]:

- ___1 cm Muck (A9) (LRR I, J)
- ___Coast Prairie Redox (A16) (LRR F, G, H)
- ___Dark Surface (S7) (LRR G)
- ___High Plains Depressions (F16) (LRR H outside of MLRA 72 & 73)
- ___Reduced Vertic (F18)
- ___Red Parent Material (TF2)
- ___Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if present):

Type:_____ Hydric Soil Present? Yes X No_____

Depth (inches) :_____

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- X Surface Water (A1)
- X Saturation (A3)
- ___Water Marks (B1)
- ___Sediment Deposits (B2)
- ___Drift Deposits (B3)
- ___Algal Mat or Crust (B4)
- ___Iron Deposits (B5)
- ___Inundation Visible on Aerial Imagery (B7)
- ___Water-Stained Leave (B9)
- ___Salt Crust (B11)
- ___Hydrogen Sulfide Odor (C1)
- ___Dry Season Water Table (C2)
- ___Oxidized Rhizospheres on Living Roots (C3) (where not tilled)
- ___Presence of Reduced Iron (C4)
- ___Thin Muck Surface (C7)
- ___Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___Sparsely Vegetated Concave Surface (B8)
- ___Drainage Patterns (B10)
- ___Oxidized Rhizospheres on Living Roots (C3) (where tilled)
- ___Crayfish Burrows (C8)
- ___Saturation Visible of Aerial Imagery (C9)
- ___Geomorphic Position (D2)
- ___FAC-Neutral Test (D5)
- ___Frost-Heave Hummocks (D7) (LRR F)

Field Observations:

Surface Water Present? Yes X No_____ Depth (inches) 6 inches

Water Table Present? Yes_____ No X Depth (inches)_____

Saturation Present? Yes X No_____ Depth (inches) *

(includes capillary fringe)

* Saturated to the surface.

Wetland Hydrology Present?

Yes X No_____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Ludeman License Area Sampling Date: 6/9/2008
Applicant/Owner: Uranium One City/County: Converse County
Investigator(s): K. LaClair, W. Stansbury Section,Township,Range: Sec 35, T34N, R73W State: WY
Landform (hillslope, terrace, etc.): Depression in range land Local relief (concave, convex, none) concave Slope (%) NA
Subregion (LRR): LRR H Lat: -105.592 Long: 42.875 Datum: NAD-83
Soil Map Unit Name: 187-Kishona-Cambria loams NWI classification PEMA Sampling Point WL-5
Are climate/hydrologic conditions on the site typical for this time of year? Yes X No (If no, explain in Remarks.)
Are "Normal Circumstances" present? Yes X No

Are Vegetation____, Soil____, or Hydology____ significantly disturbed? Yes____ No X
Are Vegetation____, Soil____, or Hydrology____naturally problematic? Yes____ No X
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes X No
Hydric Soil Present? Yes X No Is the Sampled Area
Wetland Hydrology Present? Yes X No within a Wetland? Yes X No

Remarks:
This is an isolated depression in rolling rangeland.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size:)	Absolute %Cover	Dominate Species?	Indicator Status
1			
2			
3			
4			
		=Total Cover	
Sapling/Shrub Stratum (Plot size:)			
1			
2			
3			
4			
5			
		=Total Cover	
Herb Stratum (Plot size: 20sf)			
1 *Eleocharis palustris*	50	Y	OBL
2 *Agropyron smithii*	10	N	FACU
3			
4			
5			
6			
7			
8			
9			
10			
	60%	=Total Cover	
Woody Vine Stratum (Plot size:)			
1			
2			
		=Total Cover	

% Bare Ground in Herb Stratum 40%

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That are OBL,FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet:

Total % Cover of:	Multiple by:	
OBL species	x 1 =	
FACW species	x 2 =	
FAC species	x 3 =	
FACU species	x 4 =	
UPL species	x 5 =	
Column Totals: A)		(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

X Dominance Test is >50%
____ Prevalence Index is ≤ 3.0[1]
____ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
____ Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present?
Yes X No

Remarks:

SOIL Sampling Point WL-5

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	
0-6"	2.5Y 4/1		NA				Silty loam	Oxidized root channels
6-13"	2.5Y 5/2		2.5Y 5/6	15%	C	M	Sandy silt loam	Mottles: Fine to medium, common, distinct

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___Histosol (A1)
- ___Histic Epipedon (A2)
- ___Black Histic (A3)
- ___Hydrogen Sulfide (A4)
- ___Stratified Layers (A5) (LRR F)
- ___1 cm Muck (A9) (LRR F, G, H)
- ___Depleted Below Dark Surface (A12)
- ___Thick Dark Surface (A12)
- ___Sandy Mucky Mineral (S1)
- ___2.5 Mucky Peat or Peat (S2) (LRR G,H)
- ___5 cm Mucky Peat or Peat (S3) (LRR F)
- ___Sandy Gleyed Matrix (S4)
- ___Sandy Redox (S5)
- ___Striped Matrix (S6)
- X Loamy Mucky Mineral (F1)
- ___Loamy Gleyed Matrix (F2)
- ___Depleted Matrix (F3)
- ___Redox Dark Surface (F6)
- ___Depleted Dark Surface (F7)
- ___Redox Depressions (F8)
- ___High Plains Depressions (F16) (MLRA 72 & 73 of LRR H)

Indicators for Problematic Hydric Soils[3]:

- ___1 cm Muck (A9) (LRR I, J)
- ___Coast Prairie Redox (A16) (LRR F, G, H)
- ___Dark Surface (S7) (LRR G)
- ___High Plains Depressions (F16) (LRR H outside of MLRA 72 & 73)
- ___Reduced Vertic (F18)
- ___Red Parent Material (TF2)
- ___Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if present):

Type:_____ Hydric Soil Present? Yes X No_____

Depth (inches) :_____

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- X Surface Water (A1)
- X Saturation (A3)
- ___Water Marks (B1)
- ___Sediment Deposits (B2)
- ___Drift Deposits (B3)
- ___Algal Mat or Crust (B4)
- ___Iron Deposits (B5)
- ___Inundation Visible on Aerial Imagery (B7)
- ___Water-Stained Leave (B9)
- ___Salt Crust (B11)
- ___Hydrogen Sulfide Odor (C1)
- ___Dry Season Water Table (C2)
- X Oxidized Rhizospheres on Living Roots (C3) (where not tilled)
- ___Presence of Reduced Iron (C4)
- ___Thin Muck Surface (C7)
- ___Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___Sparsely Vegetated Concave Surface (B8)
- ___Drainage Patterns (B10)
- ___Oxidized Rhizospheres on Living Roots (C3) (where tilled)
- ___Crayfish Burrows (C8)
- ___Saturation Visible of Aerial Imagery (C9)
- ___Geomorphic Position (D2)
- ___FAC-Neutral Test (D5)
- ___Frost-Heave Hummocks (D7) (LRR F)

Field Observations:

Surface Water Present? Yes X No____ Depth (inches) 10"

Water Table Present? Yes ____ No____ Depth (inches)_____

Saturation Present? Yes X No____ Depth (inches)_____

(includes capillary fringe)

Saturated to the surface.

Wetland Hydrology Present?

Yes X No____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Ludeman License Area Sampling Date: 8/6/08
Applicant/Owner: Uranium One City/County: Converse County
Investigator(s): K. LaClair & W. Stansbury Section,Township,Range: Sec 2, T33N, R73W State: WY
Landform (hillslope, terrace, etc.): Diked drainage Local relief (concave, convex, none) concave Slope (%) <2%
Subregion (LRR): LRR H Lat: -105.591 Long: 42.866 Datum: NAD-83
Soil Map Unit Name: 244-Taluce-Turnercrest-Keeline fine sand loams NWI classification na Sampling Point WL-6
Are climate/hydrologic conditions on the site typical for this time of year? Yes X No (If no, explain in Remarks.)
Are "Normal Circumstances" present? Yes X No

Are Vegetation____, Soil____, or Hydology____ significantly disturbed? Yes____ No X
Are Vegetation____, Soil____, or Hydrology____naturally problematic? Yes____ No X
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes X No
Hydric Soil Present? Yes X No
Wetland Hydrology Present? Yes X No
Is the Sampled Area within a Wetland? Yes X No

Remarks:
This is a wetland which has formed behind a dike in a drainage.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size:)	Absolute %Cover	Dominate Species?	Indicator Status
1			
2			
3			
4			
		=Total Cover	
Sapling/Shrub Stratum (Plot size:)			
1			
2			
3			
4			
5			
		=Total Cover	
Herb Stratum (Plot size: 20sf)			
1 *Hordeum jubatum*	47	Y	FACW
2 *Eleocharis palustris*	1	N	OBL
3 *Bromus briziformis*	1	N	NL
4 *Grindelia squarrosa*	1	N	UPL
5			
6			
7			
8			
9			
10			
	50%	=Total Cover	
Woody Vine Stratum (Plot size:)			
1			
2			
		=Total Cover	

% Bare Ground in Herb Stratum 50%

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That are OBL,FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet:

Total % Cover of:	Multiple by:	
OBL species	x 1 =	
FACW species	x 2 =	
FAC species	x 3 =	
FACU species	x 4 =	
UPL species	x 5 =	
Column Totals:	A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

X Dominance Test is >50%
____Prevalence Index is ≤ 3.0[1]
____Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
____Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present?
Yes X No

Remarks:

SOIL Sampling Point WL-6

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	
0-4"	10YR 4/2		7.5YR 5/8	2%	C	M	Silty loam	Mottles: fine, few, prominent oxidized root channels in 0-4"
0-9"	10YR 4/2		7.5YR 5/8	30%	C	M	Silty loam	Mottles: fine, many, prominent

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___Histosol (A1)
- ___Histic Epipedon (A2)
- ___Black Histic (A3)
- ___Hydrogen Sulfide (A4)
- ___Stratified Layers (A5) (LRR F)
- ___1 cm Muck (A9) (LRR F, G, H)
- ___Depleted Below Dark Surface (A12)
- ___Thick Dark Surface (A12)
- ___Sandy Mucky Mineral (S1)
- ___2.5 Mucky Peat or Peat (S2) (LRR G,H)
- ___5 cm Mucky Peat or Peat (S3) (LRR F)
- ___Sandy Gleyed Matrix (S4)
- ___Sandy Redox (S5)
- ___Striped Matrix (S6)
- _X_Loamy Mucky Mineral (F1)
- ___Loamy Gleyed Matrix (F2)
- ___Depleted Matrix (F3)
- ___Redox Dark Surface (F6)
- ___Depleted Dark Surface (F7)
- ___Redox Depressions (F8)
- ___High Plains Depressions (F16) (MLRA 72 & 73 of LRR H)

Indicators for Problematic Hydric Soils[3]:

- ___1 cm Muck (A9) (LRR I, J)
- ___Coast Prairie Redox (A16) (LRR F, G, H)
- ___Dark Surface (S7) (LRR G)
- ___High Plains Depressions (F16) (LRR H outside of MLRA 72 & 73)
- ___Reduced Vertic (F18)
- ___Red Parent Material (TF2)
- ___Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if present):

Type:_____ Hydric Soil Present? Yes__X__ No_____

Depth (inches) :_____

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___Surface Water (A1)
- ___Saturation (A3)
- ___Water Marks (B1)
- ___Sediment Deposits (B2)
- ___Drift Deposits (B3)
- ___Algal Mat or Crust (B4)
- ___Iron Deposits (B5)
- ___Inundation Visible on Aerial Imagery (B7)
- ___Water-Stained Leave (B9)
- ___Salt Crust (B11)
- ___Hydrogen Sulfide Odor (C1)
- ___Dry Season Water Table (C2)
- _X_Oxidized Rhizospheres on Living Roots (C3) (where not tilled)
- ___Presence of Reduced Iron (C4)
- ___Thin Muck Surface (C7)
- ___Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___Sparsely Vegetated Concave Surface (B8)
- _X_Drainage Patterns (B10)
- ___Oxidized Rhizospheres on Living Roots (C3) (where tilled)
- ___Crayfish Burrows (C8)
- ___Saturation Visible of Aerial Imagery (C9)
- ___Geomorphic Position (D2)
- _X_FAC-Neutral Test (D5)
- ___Frost-Heave Hummocks (D7) (LRR F)

Field Observations:

Surface Water Present? Yes_____No_X__ Depth (inches) _____

Water Table Present? Yes_____No_X__ Depth (inches)_____

Saturation Present? (includes capillary fringe) Yes_____No_X__ Depth (inches) _____

Wetland Hydrology Present?

Yes__X__No_____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Ludeman License Area Sampling Date: 8/7/2008
Applicant/Owner: Uranium One City/County: Converse County
Investigator(s): W. Stansbury Section,Township,Range: Sec 5, T34NR73W State: WY
Landform (hillslope, terrace, etc.): Depression Local relief (concave, convex, none) concave Slope (%) <2%
Subregion (LRR): LRR H Lat: -105.641 Long: 42.953 Datum: NAD-83
Soil Map Unit Name: 175-Hiland-Bowbac complex NWI classification PEMA/PUSC Sampling Point WL-7
Are climate/hydrologic conditions on the site typical for this time of year? Yes X No (If no, explain in Remarks.)
Are "Normal Circumstances" present? Yes X No

Are Vegetation____, Soil____, or Hydology____ significantly disturbed? Yes____ No X
Are Vegetation____, Soil____, or Hydrology____naturally problematic? Yes____ No X
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes X No____
Hydric Soil Present? Yes X No____ Is the Sampled Area
Wetland Hydrology Present? Yes X No____ within a Wetland? Yes X No____

Remarks:
This is an isolated depression in rolling rangeland with some areas of shallow open water.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size:)	Absolute %Cover	Dominate Species?	Indicator Status
1			
2			
3			
4			
		=Total Cover	
Sapling/Shrub Stratum (Plot size:)			
1			
2			
3			
4			
5			
		=Total Cover	
Herb Stratum (Plot size: 20sf)			
1 *Eleocharis palustris*	23	Y	OBL
2 *Hordeum jubatum*	1	N	FACW
3 *Ambrosia tomentosa*	1	N	NL
4			
5			
6			
7			
8			
9			
10			
	25%	=Total Cover	
Woody Vine Stratum (Plot size:)			
1			
2			
		=Total Cover	

% Bare Ground in Herb Stratum 75%

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That are OBL,FACW, or FAC: 100 % (A/B)

Prevalence Index Worksheet:

Total % Cover of:	Multiple by:	
OBL species	x 1 =	
FACW species	x 2 =	
FAC species	x 3 =	
FACU species	x 4 =	
UPL species	x 5 =	
Column Totals: A)		(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

X Dominance Test is >50%
____Prevalence Index is ≤ 3.0[1]
____Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
____Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present?
Yes X No____

Remarks:

SOIL Sampling Point WL-7

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	
0-16"	10YR 5/1		NA				Silty clay loam	Oydized root channels present. More roots in 0-10"

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___Histosol (A1)
___Histic Epipedon (A2)
___Black Histic (A3)
___Hydrogen Sulfide (A4)
___Stratified Layers (A5) (LRR F)
___1 cm Muck (A9) (LRR F, G, H)
___Depleted Below Dark Surface (A12)
___Thick Dark Surface (A12)
___Sandy Mucky Mineral (S1)
___2.5 Mucky Peat or Peat (S2) (LRR G,H)
___5 cm Mucky Peat or Peat (S3) (LRR F)
___Sandy Gleyed Matrix (S4)
___Sandy Redox (S5)
___Striped Matrix (S6)
_X_Loamy Mucky Mineral (F1)
___Loamy Gleyed Matrix (F2)
___Depleted Matrix (F3)
___Redox Dark Surface (F6)
___Depleted Dark Surface (F7)
___Redox Depressions (F8)
___High Plains Depressions (F16) (MLRA 72 & 73 of LRR H)

Indicators for Problematic Hydric Soils[3]:

___1 cm Muck (A9) (LRR I, J)
___Coast Prairie Redox (A16) (LRR F, G, H)
___Dark Surface (S7) (LRR G)
___High Plains Depressions (F16) (LRR H outside of MLRA 72 & 73)
___Reduced Vertic (F18)
___Red Parent Material (TF2)
___Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if present):

Type:_____ Hydric Soil Present? Yes__X__ No_____

Depth (inches) :_____

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

_X_Surface Water (A1)
_X_Saturation (A3)
___Water Marks (B1)
___Sediment Deposits (B2)
___Drift Deposits (B3)
___Algal Mat or Crust (B4)
___Iron Deposits (B5)
___Inundation Visible on Aerial Imagery (B7)
___Water-Stained Leave (B9)
___Salt Crust (B11)
___Hydrogen Sulfide Odor (C1)
___Dry Season Water Table (C2)
_X_Oxidized Rhizospheres on Living Roots (C3) (where not tilled)
___Presence of Reduced Iron (C4)
___Thin Muck Surface (C7)
___Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

___Sparsely Vegetated Concave Surface (B8)
___Drainage Patterns (B10)
___Oxidized Rhizospheres on Living Roots (C3) (where tilled)
___Crayfish Burrows (C8)
___Saturation Visible of Aerial Imagery (C9)
___Geomorphic Position (D2)
___FAC-Neutral Test (D5)
___Frost-Heave Hummocks (D7) (LRR F)

Field Observations:

Surface Water Present? Yes_____No__X__ Depth (inches)_____
Water Table Present? Yes_____No__X__ Depth (inches)_____
Saturation Present? Yes_____No__X__ Depth (inches)__*__
(includes capillary fringe)

* Soil moist at depth of 10 inches.

Wetland Hydrology Present?

Yes__X__No_____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Ludeman License Area Sampling Date: 8/7/2008
Applicant/Owner: Uranium One City/County: Converse County
Investigator(s): W. Stansbury Section,Township,Range: Sec 5, T34NR73W State: WY
Landform (hillslope, terrace, etc.): Depression Local relief (concave, convex, none) concave Slope (%) <2%
Subregion (LRR): LRR H Lat: -105.645 Long: 42.953 Datum: NAD-83
Soil Map Unit Name: 141-Dwyer-Orpha loamy sands NWI classification na Sampling Point WL-8
Are climate/hydrologic conditions on the site typical for this time of year? Yes X No (If no, explain in Remarks.)
Are "Normal Circumstances" present? Yes X No

Are Vegetation____, Soil____, or Hydology____ significantly disturbed? Yes____ No X
Are Vegetation____, Soil____, or Hydrology____naturally problematic? Yes____ No X
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes X No
Hydric Soil Present? Yes X No
Wetland Hydrology Present? Yes X No
Is the Sampled Area within a Wetland? Yes X No

Remarks:
This is an isolated depression in rolling rangeland.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size:)	Absolute %Cover	Dominate Species?	Indicator Status
1			
2			
3			
4			
		=Total Cover	
Sapling/Shrub Stratum (Plot size:)			
1			
2			
3			
4			
5			
		=Total Cover	
Herb Stratum (Plot size: 20sf)			
1 *Eleocharis palustris*	36	Y	OBL
2 *Agropyron smithii*	2	N	UPL
3 *Hordeum jubatum*	1	N	FACW
4 *Ambrosia tomentosa*	1	N	NL
5			
6			
7			
8			
9			
10			
	40%	=Total Cover	
Woody Vine Stratum (Plot size:)			
1			
2			
		=Total Cover	

% Bare Ground in Herb Stratum 60%

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That are OBL,FACW, or FAC: 100 % (A/B)

Prevalence Index Worksheet:

Total % Cover of:	Multiple by:	
OBL species	x 1 =	
FACW species	x 2 =	
FAC species	x 3 =	
FACU species	x 4 =	
UPL species	x 5 =	
Column Totals:	A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

X Dominance Test is >50%
____Prevalence Index is ≤ 3.0[1]
____Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
____Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present?
Yes X No

Remarks:

SOIL Sampling Point WL-8

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	
0-16"	2.5Y 5/2		7.5YR 4/4	<2%			Silty clay loam	Oxidized root channels present. More roots in 0-8"

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___Histosol (A1)
___Histic Epipedon (A2)
___Black Histic (A3)
___Hydrogen Sulfide (A4)
___Stratified Layers (A5) (LRR F)
___1 cm Muck (A9) (LRR F, G, H)
___Depleted Below Dark Surface (A12)
___Thick Dark Surface (A12)
___Sandy Mucky Mineral (S1)
___2.5 Mucky Peat or Peat (S2) (LRR G,H)
___5 cm Mucky Peat or Peat (S3) (LRR F)
___Sandy Gleyed Matrix (S4)
___Sandy Redox (S5)
___Striped Matrix (S6)
_X_Loamy Mucky Mineral (F1)
___Loamy Gleyed Matrix (F2)
___Depleted Matrix (F3)
___Redox Dark Surface (F6)
___Depleted Dark Surface (F7)
___Redox Depressions (F8)
___High Plains Depressions (F16) (MLRA 72 & 73 of LRR H)

Indicators for Problematic Hydric Soils[3]:

___1 cm Muck (A9) (LRR I, J)
___Coast Prairie Redox (A16) (LRR F, G, H)
___Dark Surface (S7) (LRR G)
___High Plains Depressions (F16) (LRR H outside of MLRA 72 & 73)
___Reduced Vertic (F18)
___Red Parent Material (TF2)
___Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if present):

Type:_____
Depth (inches) :_____

Hydric Soil Present? Yes__X__ No_____

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

___Surface Water (A1)
___Saturation (A3)
___Water Marks (B1)
___Sediment Deposits (B2)
___Drift Deposits (B3)
___Algal Mat or Crust (B4)
___Iron Deposits (B5)
___Inundation Visible on Aerial Imagery (B7)
___Water-Stained Leave (B9)
___Salt Crust (B11)
___Hydrogen Sulfide Odor (C1)
___Dry Season Water Table (C2)
_X_Oxidized Rhizospheres on Living Roots (C3) (where not tilled)
___Presence of Reduced Iron (C4)
___Thin Muck Surface (C7)
___Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

___Sparsely Vegetated Concave Surface (B8)
___Drainage Patterns (B10)
___Oxidized Rhizospheres on Living Roots (C3) (where tilled)
___Crayfish Burrows (C8)
___Saturation Visible of Aerial Imagery (C9)
___Geomorphic Position (D2)
___FAC-Neutral Test (D5)
___Frost-Heave Hummocks (D7) (LRR F)

Field Observations:

Surface Water Present? Yes_____No__X__ Depth (inches)_____
Water Table Present? Yes_____No__X__ Depth (inches)_____
Saturation Present? (includes capillary fringe) Yes_____No__X__ Depth (inches)_____

Wetland Hydrology Present?
Yes__X__No_____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Ludeman License Area Sampling Date: 8/7&9/2008
Applicant/Owner: Uranium One City/County: Converse County
Investigator(s): K. LaClair & W. Stansbury Section,Township,Range: Sec 5 & 6, T34NR73W State: WY
Landform (hillslope, terrace, etc.): Depression Local relief (concave, convex, none) concave Slope (%) <2%
Subregion (LRR): LRR H Lat: -105.639 Long: 42.950 Datum: NAD-83
Soil Map Unit Name: 141-Dwyer-Orpha loamy sands, 175-Hiland-Bowbac complex, 258-Ulm-Forkwood loams
NWI classification PEMA Sampling Point WL-9
Are climate/hydrologic conditions on the site typical for this time of year? Yes X No (If no, explain in Remarks.)
Are "Normal Circumstances" present? Yes X No

Are Vegetation____, Soil____, or Hydology____ significantly disturbed? Yes____ No X
Are Vegetation____, Soil____, or Hydrology____naturally problematic? Yes____ No X
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes X No
Hydric Soil Present? Yes X No Is the Sampled Area
Wetland Hydrology Present? Yes X No within a Wetland? Yes X No

Remarks:
This is a string of intermittent wetlands (8 wetlands, WL-9a through WL-9h) that are disconnected depressions within the same drainage area. They range in size from 0.003 acres to 1.016 acres.

VEGETATION – Use scientific names of plants.

	Absolute %Cover	Dominate Species?	Indicator Status
Tree Stratum (Plot size:)			
1			
2			
3			
4			
		=Total Cover	
Sapling/Shrub Stratum (Plot size:)			
1			
2			
3			
4			
5			
		=Total Cover	
Herb Stratum (Plot size: 20sf)			
1 *Eleocharis palustris*	49	Y	OBL
2 *Agropyron smithii*	5	N	UPL
3 *Hordeum jubatum*	5	N	FACW
4 *Ambrosia tomentosa*	1	N	NL
5			
6			
7			
8			
9			
10			
	60%	=Total Cover	
Woody Vine Stratum (Plot size:)			
1			
2			
		=Total Cover	

% Bare Ground in Herb Stratum 40%

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That are OBL,FACW, or FAC: 100 % (A/B)

Prevalence Index Worksheet:

Total % Cover of:	Multiple by:	
OBL species	x 1 =	
FACW species	x 2 =	
FAC species	x 3 =	
FACU species	x 4 =	
UPL species	x 5 =	
Column Totals: A)		(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:
X Dominance Test is >50%
Prevalence Index is ≤ 3.0[1]
Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present?
Yes X No

Remarks:

SOIL Sampling Point WL-9

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	
0-8"	2.5Y 3/1	50%	7.5YR 5/6	<2%			Loamy sand	Mottles: fine, few, prominent
	10YR 5/2	50%						Blended matrix. More roots in 0-2"

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___Histosol (A1)
- ___Histic Epipedon (A2)
- ___Black Histic (A3)
- ___Hydrogen Sulfide (A4)
- ___Stratified Layers (A5) (LRR F)
- ___1 cm Muck (A9) (LRR F, G, H)
- ___Depleted Below Dark Surface (A12)
- ___Thick Dark Surface (A12)
- _X_ Sandy Mucky Mineral (S1)
- ___2.5 Mucky Peat or Peat (S2) (LRR G,H)
- ___5 cm Mucky Peat or Peat (S3) (LRR F)
- ___Sandy Gleyed Matrix (S4)
- ___Sandy Redox (S5)
- ___Striped Matrix (S6)
- ____Loamy Mucky Mineral (F1)
- ___Loamy Gleyed Matrix (F2)
- ___Depleted Matrix (F3)
- ___Redox Dark Surface (F6)
- ___Depleted Dark Surface (F7)
- ___Redox Depressions (F8)
- ___High Plains Depressions (F16) (MLRA 72 & 73 of LRR H)

Indicators for Problematic Hydric Soils[3]:

- ___1 cm Muck (A9) (LRR I, J)
- ___Coast Prairie Redox (A16) (LRR F, G, H)
- ___Dark Surface (S7) (LRR G)
- ___High Plains Depressions (F16) (LRR H outside of MLRA 72 & 73)
- ___Reduced Vertic (F18)
- ___Red Parent Material (TF2)
- ___Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if present):

Type:_____

Depth (inches) :_____

Hydric Soil Present? Yes_X_ No_____

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___Surface Water (A1)
- ___Saturation (A3)
- ___Water Marks (B1)
- ___Sediment Deposits (B2)
- ___Drift Deposits (B3)
- ___Algal Mat or Crust (B4)
- ___Iron Deposits (B5)
- ___Inundation Visible on Aerial Imagery (B7)
- ___Water-Stained Leave (B9)
- ___Salt Crust (B11)
- ___Hydrogen Sulfide Odor (C1)
- ___Dry Season Water Table (C2)
- ____Oxidized Rhizospheres on Living Roots (C3) (where not tilled)
- ___Presence of Reduced Iron (C4)
- ___Thin Muck Surface (C7)
- ___Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___Sparsely Vegetated Concave Surface (B8)
- _X_Drainage Patterns (B10)
- ___Oxidized Rhizospheres on Living Roots (C3) (where tilled)
- ___Crayfish Burrows (C8)
- ___Saturation Visible of Aerial Imagery (C9)
- ___Geomorphic Position (D2)
- _X_FAC-Neutral Test (D5)
- ___Frost-Heave Hummocks (D7) (LRR F)

Field Observations:

Surface Water Present? Yes_____No_X_ Depth (inches)_____

Water Table Present? Yes_____No_X_ Depth (inches)_____

Saturation Present? (includes capillary fringe) Yes_____No_X_ Depth (inches)_____

Wetland Hydrology Present?

Yes_X_No_____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Ludeman License Area Sampling Date: 8/7/2008
Applicant/Owner: Uranium One City/County: Converse County
Investigator(s): W. Stansbury Section,Township,Range: Sec 4, T34NR73W State: WY
Landform (hillslope, terrace, etc.): Depression Local relief (concave, convex, none) concave Slope (%) <2%
Subregion (LRR): LRR H Lat: -105.627 Long: 42.948 Datum: NAD-83
Soil Map Unit Name: 257-Ulm-Bidman complex NWI classification PEMA Sampling Point WL-10
Are climate/hydrologic conditions on the site typical for this time of year? Yes X No_____ (If no, explain in Remarks.)
Are "Normal Circumstances" present? Yes X No_____

Are Vegetation_____, Soil_____, or Hydology_____ significantly disturbed? Yes_____ No X
Are Vegetation_____, Soil_____, or Hydrology_____naturally problematic? Yes_____ No X
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes X No_____
Hydric Soil Present? Yes X No_____ Is the Sampled Area
Wetland Hydrology Present? Yes X No_____ within a Wetland? Yes X No_____

Remarks:
This is an isolated depression adjacent to a drainage.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size:)	Absolute %Cover	Dominate Species?	Indicator Status
1			
2			
3			
4			
		=Total Cover	
Sapling/Shrub Stratum (Plot size:)			
1			
2			
3			
4			
5			
		=Total Cover	
Herb Stratum (Plot size: 20sf)			
1 *Eleocharis palustris*	37	Y	OBL
2 *Agropyron smithii*	1	N	UPL
3 *Hordeum jubatum*	1	N	FACW
4 *Ambrosia tomentosa*	1	N	NL
5			
6			
7			
8			
9			
10			
	40%	=Total Cover	
Woody Vine Stratum (Plot size:)			
1			
2			
		=Total Cover	

% Bare Ground in Herb Stratum 60%

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That are OBL,FACW, or FAC: 100 % (A/B)

Prevalence Index Worksheet:

Total % Cover of:	Multiple by:	
OBL species	x 1 =	
FACW species	x 2 =	
FAC species	x 3 =	
FACU species	x 4 =	
UPL species	x 5 =	
Column Totals:	A)	(B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:
X Dominance Test is >50%
_____Prevalence Index is ≤ 3.0[1]
_____Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
_____Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present?
Yes X No_____

Remarks:

SOIL Sampling Point WL-10

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	
0-8"	10YR 6/1		7.5YR 5/6	<2%			Silty loam	Mottles: fine, few, prominent oxidized root channels in 0-4"

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___Histosol (A1)
___Histic Epipedon (A2)
___Black Histic (A3)
___Hydrogen Sulfide (A4)
___Stratified Layers (A5) (LRR F)
___1 cm Muck (A9) (LRR F, G, H)
___Depleted Below Dark Surface (A12)
___Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___2.5 Mucky Peat or Peat (S2) (LRR G,H)
___5 cm Mucky Peat or Peat (S3) (LRR F)
___Sandy Gleyed Matrix (S4)
___Sandy Redox (S5)
___Striped Matrix (S6)
_X_Loamy Mucky Mineral (F1)
___Loamy Gleyed Matrix (F2)
___Depleted Matrix (F3)
___Redox Dark Surface (F6)
___Depleted Dark Surface (F7)
___Redox Depressions (F8)
___High Plains Depressions (F16) (MLRA 72 & 73 of LRR H)

Indicators for Problematic Hydric Soils[3]:

___1 cm Muck (A9) (LRR I, J)
___Coast Prairie Redox (A16) (LRR F, G, H)
___Dark Surface (S7) (LRR G)
___High Plains Depressions (F16) (LRR H outside of MLRA 72 & 73)
___Reduced Vertic (F18)
___Red Parent Material (TF2)
___Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if present):

Type:_____ Hydric Soil Present? Yes__X__ No_____

Depth (inches) :_____

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

___Surface Water (A1)
___Saturation (A3)
___Water Marks (B1)
___Sediment Deposits (B2)
___Drift Deposits (B3)
___Algal Mat or Crust (B4)
___Iron Deposits (B5)
___Inundation Visible on Aerial Imagery (B7)
___Water-Stained Leave (B9)
___Salt Crust (B11)
___Hydrogen Sulfide Odor (C1)
___Dry Season Water Table (C2)
_X_Oxidized Rhizospheres on Living Roots (C3) (where not tilled)
___Presence of Reduced Iron (C4)
___Thin Muck Surface (C7)
___Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

___Sparsely Vegetated Concave Surface (B8)
___Drainage Patterns (B10)
___Oxidized Rhizospheres on Living Roots (C3) (where tilled)
___Crayfish Burrows (C8)
___Saturation Visible of Aerial Imagery (C9)
___Geomorphic Position (D2)
___FAC-Neutral Test (D5)
___Frost-Heave Hummocks (D7) (LRR F)

Field Observations:

Surface Water Present? Yes_____No__X__ Depth (inches)_____
Water Table Present? Yes_____No__X__ Depth (inches)_____
Saturation Present? (includes capillary fringe) Yes_____No__X__ Depth (inches)_____

Wetland Hydrology Present?

Yes__X__No_____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Ludeman License Area | Sampling Date: 8/7/2008
Applicant/Owner: Uranium One | City/County: Converse County
Investigator(s): W. Stansbury | Section,Township,Range: Sec 4, T34NR73W | State: WY
Landform (hillslope, terrace, etc.): Depression in drainage | Local relief (concave, convex, none) concave | Slope (%) <2%
Subregion (LRR): LRR H | Lat: -105.616 | Long: 42.943 | Datum: NAD-83
Soil Map Unit Name: 187-Kishona-Cambria loams, 269-Worf-Shingle-Taluce complex | NWI classification na | Sampling Point WL-11
Are climate/hydrologic conditions on the site typical for this time of year? Yes X No (If no, explain in Remarks.)
Are "Normal Circumstances" present? Yes X No

Are Vegetation ____, Soil ____, or Hydology ____ significantly disturbed? Yes ____ No X
Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? Yes ____ No X
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes X No
Hydric Soil Present? Yes X No
Wetland Hydrology Present? Yes X No
Is the Sampled Area within a Wetland? Yes X No

Remarks:
This is a series of two wetlands (WL-11a and b) that are disconnected depressions along the same drainage. They range in size from 0.002 acres to 0.011 acres.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size:)	Absolute %Cover	Dominate Species?	Indicator Status
1			
2			
3			
4			
		=Total Cover	
Sapling/Shrub Stratum (Plot size:)			
1			
2			
3			
4			
5			
		=Total Cover	
Herb Stratum (Plot size: 20sf)			
1 *Eleocharis palustris*	15	Y	OBL
2			
3			
4			
5			
6			
7			
8			
9			
10			
	40%	=Total Cover	
Woody Vine Stratum (Plot size:)			
1			
2			
		=Total Cover	

% Bare Ground in Herb Stratum 60%

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That are OBL,FACW, or FAC: 100 % (A/B)

Prevalence Index Worksheet:

Total % Cover of:	Multiple by:	
OBL species	x 1 =	
FACW species	x 2 =	
FAC species	x 3 =	
FACU species	x 4 =	
UPL species	x 5 =	
Column Totals:	A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

X Dominance Test is >50%
____ Prevalence Index is ≤ 3.0[1]
____ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
____ Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present?
Yes X No

Remarks: Area has been heavily grazed.

SOIL Sampling Point WL-11

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	
0-8"	2.5Y 5/1		7.5YR 5/6	<2%			Silty loam	Mottles: fine, few, prominent oxidized root channels in 0-4"

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___Histosol (A1)
- ___Histic Epipedon (A2)
- ___Black Histic (A3)
- ___Hydrogen Sulfide (A4)
- ___Stratified Layers (A5) (LRR F)
- ___1 cm Muck (A9) (LRR F, G, H)
- ___Depleted Below Dark Surface (A12)
- ___Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___2.5 Mucky Peat or Peat (S2) (LRR G,H)
- ___5 cm Mucky Peat or Peat (S3) (LRR F)
- ___Sandy Gleyed Matrix (S4)
- ___Sandy Redox (S5)
- ___Striped Matrix (S6)
- _X_Loamy Mucky Mineral (F1)
- ___Loamy Gleyed Matrix (F2)
- ___Depleted Matrix (F3)
- ___Redox Dark Surface (F6)
- ___Depleted Dark Surface (F7)
- ___Redox Depressions (F8)
- ___High Plains Depressions (F16) (MLRA 72 & 73 of LRR H)

Indicators for Problematic Hydric Soils[3]:

- ___1 cm Muck (A9) (LRR I, J)
- ___Coast Prairie Redox (A16) (LRR F, G, H)
- ___Dark Surface (S7) (LRR G)
- ___High Plains Depressions (F16) (LRR H outside of MLRA 72 & 73)
- ___Reduced Vertic (F18)
- ___Red Parent Material (TF2)
- ___Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if present):

Type:_____

Depth (inches) :_____

Hydric Soil Present? Yes__X__ No_____

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___Surface Water (A1)
- ___Saturation (A3)
- ___Water Marks (B1)
- ___Sediment Deposits (B2)
- ___Drift Deposits (B3)
- ___Algal Mat or Crust (B4)
- ___Iron Deposits (B5)
- ___Inundation Visible on Aerial Imagery (B7)
- ___Water-Stained Leave (B9)
- ___Salt Crust (B11)
- ___Hydrogen Sulfide Odor (C1)
- ___Dry Season Water Table (C2)
- _X_Oxidized Rhizospheres on Living Roots (C3) (where not tilled)
- ___Presence of Reduced Iron (C4)
- ___Thin Muck Surface (C7)
- ___Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___Sparsely Vegetated Concave Surface (B8)
- ___Drainage Patterns (B10)
- ___Oxidized Rhizospheres on Living Roots (C3) (where tilled)
- ___Crayfish Burrows (C8)
- ___Saturation Visible of Aerial Imagery (C9)
- ___Geomorphic Position (D2)
- ___FAC-Neutral Test (D5)
- ___Frost-Heave Hummocks (D7) (LRR F)

Field Observations:

Surface Water Present? Yes_____No__X__ Depth (inches)_____

Water Table Present? Yes_____No__X__ Depth (inches)_____

Saturation Present? (includes capillary fringe) Yes_____No__X__ Depth (inches)_____

Wetland Hydrology Present?

Yes__X__No_____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Ludeman License Area | Sampling Date: 6/10/2008
Applicant/Owner: Uranium One | City/County: Converse County
Investigator(s): W. Stansbury | Section,Township,Range: Sec 3, T34N, R73W | State: WY

Landform (hillslope, terrace, etc.): Depression in drainage | Local relief (concave, convex, none) concave | Slope (%) NA
Subregion (LRR): LRR H | Lat: -105.611 | Long: 42.950 | Datum: NAD-83
Soil Map Unit Name: 175-Hiland-Bowbac complex | NWI classification PABFh | Sampling Point WL-12
Are climate/hydrologic conditions on the site typical for this time of year? Yes X No (If no, explain in Remarks.)
Are "Normal Circumstances" present? Yes X No

Are Vegetation____, Soil____, or Hydology____ significantly disturbed? Yes____ No X
Are Vegetation____, Soil____, or Hydrology____naturally problematic? Yes____ No X
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes X No
Hydric Soil Present? Yes X No
Wetland Hydrology Present? Yes X No
Is the Sampled Area within a Wetland? Yes X No

Remarks:
This is a depression in a drainage.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size:)	Absolute %Cover	Dominate Species?	Indicator Status
1			
2			
3			
4			
		=Total Cover	
Sapling/Shrub Stratum (Plot size:)			
1			
2			
3			
4			
5			
		=Total Cover	
Herb Stratum (Plot size: 20sf)			
1 *Eleocharis palustris*	40	Y	OBL
2			
3			
4			
5			
6			
7			
8			
9			
10			
	40%	=Total Cover	
Woody Vine Stratum (Plot size:)			
1			
2			
		=Total Cover	

% Bare Ground in Herb Stratum 60%

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That are OBL,FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet:

Total % Cover of:	Multiply by:
OBL species	x 1 =
FACW species	x 2 =
FAC species	x 3 =
FACU species	x 4 =
UPL species	x 5 =
Column Totals: A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

X Dominance Test is >50%
Prevalence Index is ≤ 3.0[1]
Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present?
Yes X No

Remarks:

SOIL Sampling Point WL-12

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	
0-4"	10YR 3/2		7.5YR 5/8	<2%	C	M	silty loam w/organics	Mottles: Fine, few, prominent
								Oxidized root channels in 0-4"
4-12"	10YR 4/1		7.5YR 4/6	15%	C	M	silty loam	Mottles: Medium, common, prominent

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___Histosol (A1)
- ___Histic Epipedon (A2)
- ___Black Histic (A3)
- ___Hydrogen Sulfide (A4)
- ___Stratified Layers (A5) (LRR F)
- ___1 cm Muck (A9) (LRR F, G, H)
- ___Depleted Below Dark Surface (A12)
- ___Thick Dark Surface (A12)
- ___Sandy Mucky Mineral (S1)
- ___2.5 Mucky Peat or Peat (S2) (LRR G,H)
- ___5 cm Mucky Peat or Peat (S3) (LRR F)
- ___Sandy Gleyed Matrix (S4)
- ___Sandy Redox (S5)
- ___Striped Matrix (S6)
- _X_Loamy Mucky Mineral (F1)
- ___Loamy Gleyed Matrix (F2)
- ___Depleted Matrix (F3)
- ___Redox Dark Surface (F6)
- ___Depleted Dark Surface (F7)
- ___Redox Depressions (F8)
- ___High Plains Depressions (F16) (MLRA 72 & 73 of LRR H)

Indicators for Problematic Hydric Soils[3]:

- ___1 cm Muck (A9) (LRR I, J)
- ___Coast Prairie Redox (A16) (LRR F, G, H)
- ___Dark Surface (S7) (LRR G)
- ___High Plains Depressions (F16) (LRR H outside of MLRA 72 & 73)
- ___Reduced Vertic (F18)
- ___Red Parent Material (TF2)
- ___Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if present):

Type:_____

Depth (inches) :_____

Hydric Soil Present? Yes X No_____

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___Surface Water (A1)
- ___Saturation (A3)
- ___Water Marks (B1)
- ___Sediment Deposits (B2)
- ___Drift Deposits (B3)
- ___Algal Mat or Crust (B4)
- ___Iron Deposits (B5)
- ___Inundation Visible on Aerial Imagery (B7)
- ___Water-Stained Leave (B9)
- ___Salt Crust (B11)
- ___Hydrogen Sulfide Odor (C1)
- ___Dry Season Water Table (C2)
- X Oxidized Rhizospheres on Living Roots (C3) (where not tilled)
- ___Presence of Reduced Iron (C4)
- ___Thin Muck Surface (C7)
- ___Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- X Sparsely Vegetated Concave Surface (B8)
- X Drainage Patterns (B10)
- ___Oxidized Rhizospheres on Living Roots (C3) (where tilled)
- ___Crayfish Burrows (C8)
- ___Saturation Visible of Aerial Imagery (C9)
- ___Geomorphic Position (D2)
- X FAC-Neutral Test (D5)
- ___Frost-Heave Hummocks (D7) (LRR F)

Field Observations:

Surface Water Present? Yes ____ No X Depth (inches)_____

Water Table Present? Yes ____ No X Depth (inches)_____

Saturation Present? Yes____No X Depth (inches)_____

(includes capillary fringe)

Wetland Hydrology Present?

Yes X No_____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Ludeman License Area | Sampling Date: 6/10/2008
Applicant/Owner: Uranium One | City/County: Converse County
Investigator(s): W. Stansbury | Section,Township,Range: Sec 3, T34N, R73W | State: WY
Landform (hillslope, terrace, etc.): depression | Local relief (concave, convex, none) concave | Slope (%) NA
Subregion (LRR): LRR H | Lat: -105.611 | Long: 42.950 | Datum: NAD-83
Soil Map Unit Name: 175-Hiland-Bowbac complex | NWI classification na | Sampling Point WL-13
Are climate/hydrologic conditions on the site typical for this time of year? Yes X No_____ (If no, explain in Remarks.)
Are "Normal Circumstances" present? Yes X No_____

Are Vegetation_____, Soil_____, or Hydology_____ significantly disturbed? Yes_____ No X
Are Vegetation_____, Soil_____, or Hydrology_____naturally problematic? Yes_____ No X
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes X No_____
Hydric Soil Present? Yes X No_____
Wetland Hydrology Present? Yes X No_____
Is the Sampled Area within a Wetland? Yes X No_____

Remarks:
This is an excavated depression adjacent to a windmill.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size:)	Absolute %Cover	Dominate Species?	Indicator Status
1			
2			
3			
4			
		=Total Cover	
Sapling/Shrub Stratum (Plot size:)			
1			
2			
3			
4			
5			
		=Total Cover	
Herb Stratum (Plot size: 20sf)			
1 *Scirpus validus*	35	Y	OBL
2 *Eleocharis palustris*	20	Y	OBL
3 *Typhus angustifolia*	5	N	OBL
4			
5			
6			
7			
8			
9			
10			
	60%	=Total Cover	
Woody Vine Stratum (Plot size:)			
1			
2			
		=Total Cover	

% Bare Ground in Herb Stratum 40%

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That are OBL,FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet:

Total % Cover of:	Multiply by:	
OBL species	x 1 =	
FACW species	x 2 =	
FAC species	x 3 =	
FACU species	x 4 =	
UPL species	x 5 =	
Column Totals: A)		(B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:
X Dominance Test is >50%
_____Prevalence Index is ≤ 3.0[1]
_____Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
_____Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present?
Yes X No_____

Remarks:

SOIL Sampling Point WL-13

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	
0-6"	7.5YR 4/1		10 YR 2/1	<2%	C	M	silty loam w/ some sand	Mottles: Medium, few, distinct
			10YR 4/6	<2%	C	PL		Oxidized root channels in 0-6"
6-12"	10YR 4/3	50%	NA				sandy/silty loam	Blended matrix.
	10YR 4/2	50%						

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___Histosol (A1)
- ___Histic Epipedon (A2)
- ___Black Histic (A3)
- ___Hydrogen Sulfide (A4)
- ___Stratified Layers (A5) (LRR F)
- ___1 cm Muck (A9) (LRR F, G, H)
- ___Depleted Below Dark Surface (A12)
- ___Thick Dark Surface (A12)
- ___Sandy Mucky Mineral (S1)
- ___2.5 Mucky Peat or Peat (S2) (LRR G,H)
- ___5 cm Mucky Peat or Peat (S3) (LRR F)
- ___Sandy Gleyed Matrix (S4)
- ___Sandy Redox (S5)
- ___Striped Matrix (S6)
- _X_Loamy Mucky Mineral (F1)
- ___Loamy Gleyed Matrix (F2)
- ___Depleted Matrix (F3)
- ___Redox Dark Surface (F6)
- ___Depleted Dark Surface (F7)
- ___Redox Depressions (F8)
- ___High Plains Depressions (F16) (MLRA 72 & 73 of LRR H)

Indicators for Problematic Hydric Soils[3]:

- ___1 cm Muck (A9) (LRR I, J)
- ___Coast Prairie Redox (A16) (LRR F, G, H)
- ___Dark Surface (S7) (LRR G)
- ___High Plains Depressions (F16) (LRR H outside of MLRA 72 & 73)
- ___Reduced Vertic (F18)
- ___Red Parent Material (TF2)
- ___Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if present):

Type:_____ Hydric Soil Present? Yes__X__ No_____

Depth (inches) :_____

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___Surface Water (A1)
- _X_Saturation (A3)
- ___Water Marks (B1)
- ___Sediment Deposits (B2)
- ___Drift Deposits (B3)
- ___Algal Mat or Crust (B4)
- ___Iron Deposits (B5)
- ___Inundation Visible on Aerial Imagery (B7)
- ___Water-Stained Leave (B9)
- ___Salt Crust (B11)
- ___Hydrogen Sulfide Odor (C1)
- ___Dry Season Water Table (C2)
- _X_Oxidized Rhizospheres on Living Roots (C3) (where not tilled)
- ___Presence of Reduced Iron (C4)
- ___Thin Muck Surface (C7)
- ___Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___Sparsely Vegetated Concave Surface (B8)
- ___Drainage Patterns (B10)
- ___Oxidized Rhizospheres on Living Roots (C3) (where tilled)
- ___Crayfish Burrows (C8)
- ___Saturation Visible of Aerial Imagery (C9)
- ___Geomorphic Position (D2)
- ___FAC-Neutral Test (D5)
- ___Frost-Heave Hummocks (D7) (LRR F)

Field Observations:

Surface Water Present? Yes ____ No__X__ Depth (inches)_____

Water Table Present? Yes____ No__X__ Depth (inches)_____

Saturation Present? Yes_X_ No____ Depth (inches)__*__

(includes capillary fringe)

Saturated to the surface.

Wetland Hydrology Present?

Yes__X__ No____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Ludeman License Area Sampling Date: 8/9/08
Applicant/Owner: Uranium One City/County: Converse County
Investigator(s): W. Stansbury Section,Township,Range: Sec 2, T34N, R73W State: WY
Landform (hillslope, terrace, etc.): Depression in drainage Local relief (concave, convex, none) concave Slope (%) <2%
Subregion (LRR): LRR H Lat: -105.590 Long: 42.953 Datum: NAD-83
Soil Map Unit Name: 129-Clarkelen-Haverdad-Bigwinder complex, 246-Tassel-Tullock-Vonalee association
NWI classification na Sampling Point WL-14
Are climate/hydrologic conditions on the site typical for this time of year? Yes X No (If no, explain in Remarks.)
Are "Normal Circumstances" present? Yes X No

Are Vegetation ____, Soil ____, or Hydology ____ significantly disturbed? Yes ____ No X
Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? Yes ____ No X
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes X No
Hydric Soil Present? Yes X No
Wetland Hydrology Present? Yes X No
Is the Sampled Area within a Wetland? Yes X No

Remarks:
This is a depression within Sage Creek.
Soil unit 129 is listed as a Hydric soil by the NRCS.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size:)	Absolute %Cover	Dominate Species?	Indicator Status
1			
2			
3			
4			
		=Total Cover	
Sapling/Shrub Stratum (Plot size:)			
1			
2			
3			
4			
5			
		=Total Cover	
Herb Stratum (Plot size: 20sf)			
1 *Hordeum Jubatum*	40	Y	FACW
2 *Eleocharis palustris*	32	Y	OBL
3 *Scirpus validus*	5	N	OBL
4 *Spartina gracillis*	1	N	FACW
5 *Polypogon monspeliensis*	1	N	OBL
6 *Rumex stenophyllus*	1	N	FACW+
7			
8			
9			
10			
	80%	=Total Cover	
Woody Vine Stratum (Plot size:)			
1			
2			
		=Total Cover	

% Bare Ground in Herb Stratum 20%

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That are OBL,FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet:

Total % Cover of:	Multiple by:	
OBL species	x 1 =	
FACW species	x 2 =	
FAC species	x 3 =	
FACU species	x 4 =	
UPL species	x 5 =	
Column Totals: A)		(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

X Dominance Test is >50%
____ Prevalence Index is ≤ 3.0[1]
____ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
____ Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present?
Yes X No

Remarks:

SOIL Sampling Point WL-14

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	
0-8"	5Y 5/1		7.5YR 4/4	15%	C	M	Silty loam	Mottles: medium to coarse, common, promin oxidized root channels 0-8"

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___Histosol (A1)
- ___Histic Epipedon (A2)
- ___Black Histic (A3)
- ___Hydrogen Sulfide (A4)
- ___Stratified Layers (A5) (LRR F)
- ___1 cm Muck (A9) (LRR F, G, H)
- ___Depleted Below Dark Surface (A12)
- ___Thick Dark Surface (A12)
- ___Sandy Mucky Mineral (S1)
- ___2.5 Mucky Peat or Peat (S2) (LRR G,H)
- ___5 cm Mucky Peat or Peat (S3) (LRR F)
- ___Sandy Gleyed Matrix (S4)
- ___Sandy Redox (S5)
- ___Striped Matrix (S6)
- X Loamy Mucky Mineral (F1)
- ___Loamy Gleyed Matrix (F2)
- ___Depleted Matrix (F3)
- ___Redox Dark Surface (F6)
- ___Depleted Dark Surface (F7)
- ___Redox Depressions (F8)
- ___High Plains Depressions (F16) (MLRA 72 & 73 of LRR H)

Indicators for Problematic Hydric Soils[3]:

- ___1 cm Muck (A9) (LRR I, J)
- ___Coast Prairie Redox (A16) (LRR F, G, H)
- ___Dark Surface (S7) (LRR G)
- ___High Plains Depressions (F16) (LRR H outside of MLRA 72 & 73)
- ___Reduced Vertic (F18)
- ___Red Parent Material (TF2)
- ___Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if present):

Type:_____ Hydric Soil Present? Yes X No_____

Depth (inches) :_____

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- X Surface Water (A1)
- X Saturation (A3)
- ___Water Marks (B1)
- ___Sediment Deposits (B2)
- ___Drift Deposits (B3)
- ___Algal Mat or Crust (B4)
- ___Iron Deposits (B5)
- ___Inundation Visible on Aerial Imagery (B7)
- ___Water-Stained Leave (B9)
- ___Salt Crust (B11)
- ___Hydrogen Sulfide Odor (C1)
- ___Dry Season Water Table (C2)
- X Oxidized Rhizospheres on Living Roots (C3) (where not tilled)
- ___Presence of Reduced Iron (C4)
- ___Thin Muck Surface (C7)
- ___Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___Sparsely Vegetated Concave Surface (B8)
- ___Drainage Patterns (B10)
- ___Oxidized Rhizospheres on Living Roots (C3) (where tilled)
- ___Crayfish Burrows (C8)
- ___Saturation Visible of Aerial Imagery (C9)
- ___Geomorphic Position (D2)
- ___FAC-Neutral Test (D5)
- ___Frost-Heave Hummocks (D7) (LRR F)

Field Observations:

Surface Water Present? Yes X No_____ Depth (inches) 4 inches

Water Table Present? Yes_____ No X Depth (inches)_____

Saturation Present? Yes X No_____ Depth (inches) *

(includes capillary fringe)

* Saturated to the surface.

Wetland Hydrology Present?

Yes X No_____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Ludeman License Area — Sampling Date: 6/8/2008
Applicant/Owner: Uranium One — City/County: Converse County
Investigator(s): K. LaClair — Section,Township,Range: Sec 8 & 9, T34NR73W — State: WY
Landform (hillslope, terrace, etc.): Depression in drainage — Local relief (concave, convex, none) concave — Slope (%) <2%
Subregion (LRR): LRR H — Lat: -105.638 — Long: 42.937 — Datum: NAD-83
Soil Map Unit Name: 187-Kishona-Cambria loams, 189-Kishona-Cambria-Theedle loams, 263-Ustic Torriorthents, gullied.
NWI classification na — Sampling Point WL-15
Are climate/hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)
Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydology ____ significantly disturbed? Yes ____ No X
Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? Yes ____ No X
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes X No ____
Hydric Soil Present? Yes X No ____
Wetland Hydrology Present? Yes X No ____
Is the Sampled Area within a Wetland? Yes X No ____

Remarks:
This is a string of intermittent wetlands (18 wetlands, WL-15a through WL-15q) that are disconnected depressions along the same channel. They range in size from 0.001 acres to 0.014 acres. Soil unit 263 is listed as a Hydric soil by the NRCS.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: ____)	Absolute %Cover	Dominate Species?	Indicator Status
1			
2			
3			
4			
		=Total Cover	
Sapling/Shrub Stratum (Plot size: ____)			
1			
2			
3			
4			
5			
		=Total Cover	
Herb Stratum (Plot size: 20sf)			
1 *Eleocharis palustris*	30	Y	OBL
2 *Carex aquatilis*	10	Y	OBL
3 *Agropyron repens*	5	N	FAC
4 *Taraxacum officinale*	1	N	FACU
5			
6			
7			
8			
9			
10			
	46%	=Total Cover	
Woody Vine Stratum (Plot size: ____)			
1			
2			
		=Total Cover	

% Bare Ground in Herb Stratum 54%

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That are OBL,FACW, or FAC: 100 % (A/B)

Prevalence Index Worksheet:

Total % Cover of:	Multiple by:	
OBL species	x 1 =	
FACW species	x 2 =	
FAC species	x 3 =	
FACU species	x 4 =	
UPL species	x 5 =	
Column Totals:	A)	(B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

X Dominance Test is >50%
____ Prevalence Index is ≤ 3.0[1]
____ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
____ Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present?
Yes X No ____

Remarks:

SOIL Sampling Point WL-15

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	
0-4"	10YR 4/2		7.5YR 5/8	25%	C	M	Sandy silt loam	Mottles: Fine to large, many, prominent
4-7"	10YR 4/2		7.5YR 4/6	25%	C	M	Sandy loam	Mottles: Fine to medium, many, prominent
			10YR 2/1	25%	C	M		Organic mottles: Fine to medium, many, prominent
7-14"	10YR 4/3		7.5YR 4/6	25%	C	M	Loamy sand	Mottles: Fine, many, prominent

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___Histosol (A1)
- ___Histic Epipedon (A2)
- ___Black Histic (A3)
- ___Hydrogen Sulfide (A4)
- ___Stratified Layers (A5) (LRR F)
- ___1 cm Muck (A9) (LRR F, G, H)
- ___Depleted Below Dark Surface (A12)
- ___Thick Dark Surface (A12)
- ___Sandy Mucky Mineral (S1)
- ___2.5 Mucky Peat or Peat (S2) (LRR G,H)
- ___5 cm Mucky Peat or Peat (S3) (LRR F)
- ___Sandy Gleyed Matrix (S4)
- ___Sandy Redox (S5)
- ___Striped Matrix (S6)
- _X_Loamy Mucky Mineral (F1)
- ___Loamy Gleyed Matrix (F2)
- ___Depleted Matrix (F3)
- ___Redox Dark Surface (F6)
- ___Depleted Dark Surface (F7)
- ___Redox Depressions (F8)
- ___High Plains Depressions (F16) (MLRA 72 & 73 of LRR H)

Indicators for Problematic Hydric Soils[3]:

- ___1 cm Muck (A9) (LRR I, J)
- ___Coast Prairie Redox (A16) (LRR F, G, H)
- ___Dark Surface (S7) (LRR G)
- ___High Plains Depressions (F16) (LRR H outside of MLRA 72 & 73)
- ___Reduced Vertic (F18)
- ___Red Parent Material (TF2)
- ___Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if present):

Type:_____

Depth (inches) :_____

Hydric Soil Present? Yes__X__ No_____

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- _X_Surface Water (A1)
- _X_Saturation (A3)
- ___Water Marks (B1)
- ___Sediment Deposits (B2)
- ___Drift Deposits (B3)
- ___Algal Mat or Crust (B4)
- ___Iron Deposits (B5)
- ___Inundation Visible on Aerial Imagery (B7)
- ___Water-Stained Leave (B9)
- ___Salt Crust (B11)
- ___Hydrogen Sulfide Odor (C1)
- ___Dry Season Water Table (C2)
- _X_Oxidized Rhizospheres on Living Roots (C3) (where not tilled)
- ___Presence of Reduced Iron (C4)
- ___Thin Muck Surface (C7)
- ___Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___Sparsely Vegetated Concave Surface (B8)
- ___Drainage Patterns (B10)
- ___Oxidized Rhizospheres on Living Roots (C3) (where tilled)
- ___Crayfish Burrows (C8)
- ___Saturation Visible of Aerial Imagery (C9)
- ___Geomorphic Position (D2)
- ___FAC-Neutral Test (D5)
- ___Frost-Heave Hummocks (D7) (LRR F)

Field Observations:

Surface Water Present? Yes _X_ No____ Depth (inches) 6 inches

Water Table Present? Yes____ No_X_ Depth (inches)_____

Saturation Present? Yes_X_ No____ Depth (inches)_*_

(includes capillary fringe)

* Saturated to the surface.

Wetland Hydrology Present?

Yes__X__ No_____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Ludeman License Area | Sampling Date: 6/9/2008
Applicant/Owner: Uranium One | City/County: Converse County
Investigator(s): W. Stansbury | Section,Township,Range: Sec 9, T34NR73W | State: WY
Landform (hillslope, terrace, etc.): Depression | Local relief (concave, convex, none) concave | Slope (%) <2%
Subregion (LRR): LRR H | Lat: -105.638 | Long: 42.937 | Datum: NAD-83
Soil Map Unit Name: 187-Kishona-Cambria loams | NWI classification PUSC/PEMA | Sampling Point WL-16
Are climate/hydrologic conditions on the site typical for this time of year? Yes X No_____ (If no, explain in Remarks.)
Are "Normal Circumstances" present? Yes X No_____

Are Vegetation_____, Soil_____, or Hydology_____ significantly disturbed? Yes_____ No X
Are Vegetation_____, Soil_____, or Hydrology_____naturally problematic? Yes_____ No X
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes X No_____
Hydric Soil Present? Yes X No_____
Wetland Hydrology Present? Yes X No_____
Is the Sampled Area within a Wetland? Yes X No_____

Remarks:
This is an isolated depression in rolling rangeland.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size:_____)	Absolute %Cover	Dominate Species?	Indicator Status
1			
2			
3			
4			
		=Total Cover	
Sapling/Shrub Stratum (Plot size:_____)			
1			
2			
3			
4			
5			
		=Total Cover	
Herb Stratum (Plot size: 20sf)			
1 *Eleocharis palustris*	50	Y	OBL
2			
3			
4			
5			
6			
7			
8			
9			
10			
	50%	=Total Cover	
Woody Vine Stratum (Plot size:_____)			
1			
2			
		=Total Cover	

% Bare Ground in Herb Stratum 50%

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That are OBL,FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet:

Total % Cover of:	Multiple by:
OBL species _____	x 1 = _____
FACW species _____	x 2 = _____
FAC species _____	x 3 = _____
FACU species _____	x 4 = _____
UPL species _____	x 5 = _____
Column Totals: _____ (A)	_____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

X Dominance Test is >50%
_____Prevalence Index is ≤ 3.0[1]
_____Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
_____Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present?
Yes X No_____

Remarks:

SOIL Sampling Point WL-16

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	
0-12"	2.5Y 5/2		7.5YR 5/6	2%	C	M	Silty loam with clay	Mottles: Fine, few, promin
								Oxidized root channels

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___Histosol (A1)
- ___Histic Epipedon (A2)
- ___Black Histic (A3)
- ___Hydrogen Sulfide (A4)
- ___Stratified Layers (A5) (LRR F)
- ___1 cm Muck (A9) (LRR F, G, H)
- ___Depleted Below Dark Surface (A12)
- ___Thick Dark Surface (A12)
- ___Sandy Mucky Mineral (S1)
- ___2.5 Mucky Peat or Peat (S2) (LRR G,H)
- ___5 cm Mucky Peat or Peat (S3) (LRR F)
- ___Sandy Gleyed Matrix (S4)
- ___Sandy Redox (S5)
- ___Striped Matrix (S6)
- X Loamy Mucky Mineral (F1)
- ___Loamy Gleyed Matrix (F2)
- ___Depleted Matrix (F3)
- ___Redox Dark Surface (F6)
- ___Depleted Dark Surface (F7)
- ___Redox Depressions (F8)
- ___High Plains Depressions (F16) (MLRA 72 & 73 of LRR H)

Indicators for Problematic Hydric Soils[3]:

- ___1 cm Muck (A9) (LRR I, J)
- ___Coast Prairie Redox (A16) (LRR F, G, H)
- ___Dark Surface (S7) (LRR G)
- ___High Plains Depressions (F16) (LRR H outside of MLRA 72 & 73)
- ___Reduced Vertic (F18)
- ___Red Parent Material (TF2)
- ___Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if present):

Type:_____ Hydric Soil Present? Yes X No_____

Depth (inches) :_____

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- X Surface Water (A1)
- X Saturation (A3)
- ___Water Marks (B1)
- ___Sediment Deposits (B2)
- ___Drift Deposits (B3)
- ___Algal Mat or Crust (B4)
- ___Iron Deposits (B5)
- ___Inundation Visible on Aerial Imagery (B7)
- ___Water-Stained Leave (B9)
- ___Salt Crust (B11)
- ___Hydrogen Sulfide Odor (C1)
- ___Dry Season Water Table (C2)
- X Oxidized Rhizospheres on Living Roots (C3) (where not tilled)
- ___Presence of Reduced Iron (C4)
- ___Thin Muck Surface (C7)
- ___Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___Sparsely Vegetated Concave Surface (B8)
- ___Drainage Patterns (B10)
- ___Oxidized Rhizospheres on Living Roots (C3) (where tilled)
- ___Crayfish Burrows (C8)
- ___Saturation Visible of Aerial Imagery (C9)
- ___Geomorphic Position (D2)
- ___FAC-Neutral Test (D5)
- ___Frost-Heave Hummocks (D7) (LRR F)

Field Observations:

Surface Water Present? Yes X No___ Depth (inches) 4 "

Water Table Present? Yes___ No X Depth (inches)_____

Saturation Present? Yes X No___ Depth (inches) *

(includes capillary fringe)

* Saturated to the surface.

Wetland Hydrology Present?

Yes X No_____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Ludeman License Area | Sampling Date: 6/9/2008
Applicant/Owner: Uranium One | City/County: Converse County
Investigator(s): W. Stansbury | Section,Township,Range: Sec 16, T34NR73W | State: WY
Landform (hillslope, terrace, etc.): depression | Local relief (concave, convex, none) concave | Slope (%) <2%
Subregion (LRR): LRR H | Lat: -105.638 | Long: 42.937 | Datum: NAD-83
Soil Map Unit Name: 187-Kishona-Cambria loams | NWI classification na | Sampling Point WL-17
Are climate/hydrologic conditions on the site typical for this time of year? Yes X No (If no, explain in Remarks.)
Are "Normal Circumstances" present? Yes X No

Are Vegetation_____, Soil_____, or Hydology_____ significantly disturbed? Yes_____ No X
Are Vegetation_____, Soil_____, or Hydrology_____naturally problematic? Yes_____ No X
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes X No
Hydric Soil Present? Yes X No
Wetland Hydrology Present? Yes X No
Is the Sampled Area within a Wetland? Yes X No

Remarks:
This is a depression in a drainage.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size:)	Absolute %Cover	Dominate Species?	Indicator Status
1			
2			
3			
4			
		=Total Cover	
Sapling/Shrub Stratum (Plot size:)			
1			
2			
3			
4			
5			
		=Total Cover	
Herb Stratum (Plot size: 20sf)			
1 *Juncus balticus*	70	Y	OBL
2 *Taraxacum officinale*	5	N	FACU
3 *Equisetum laevigatum*	5	N	FAC
4 *Poa sp.*	5	N	
5			
6			
7			
8			
9			
10			
	85%	=Total Cover	
Woody Vine Stratum (Plot size:)			
1			
2			
		=Total Cover	

% Bare Ground in Herb Stratum 15%

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That are OBL,FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet:

Total % Cover of:	Multiply by:	
OBL species	x 1 =	
FACW species	x 2 =	
FAC species	x 3 =	
FACU species	x 4 =	
UPL species	x 5 =	
Column Totals: A)		(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

X Dominance Test is >50%
_____Prevalence Index is ≤ 3.0[1]
_____Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
_____Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present?
Yes X No

Remarks:

SOIL Sampling Point WL-17

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	
0-4"	10 YR 4/1	50%	NA				sandy loam	Blended matrix
	10 YR 2/1	50%						
4-12"	10 YR 5/1		10 YR 6/8	<2%	C	M	sandy clay	Mottles: Coarse, few, prominent
			2.5 Y 2.5/1	15%	C	M		Mottles: Medium, common, prominent
								Oxidized root channels in 4-12"

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___Histosol (A1)
___Histic Epipedon (A2)
___Black Histic (A3)
___Hydrogen Sulfide (A4)
___Stratified Layers (A5) (LRR F)
___1 cm Muck (A9) (LRR F, G, H)
___Depleted Below Dark Surface (A12)
___Thick Dark Surface (A12)
___Sandy Mucky Mineral (S1)
___2.5 Mucky Peat or Peat (S2) (LRR G,H)
___5 cm Mucky Peat or Peat (S3) (LRR F)
___Sandy Gleyed Matrix (S4)
___Sandy Redox (S5)
___Striped Matrix (S6)
_X_Loamy Mucky Mineral (F1)
___Loamy Gleyed Matrix (F2)
___Depleted Matrix (F3)
___Redox Dark Surface (F6)
___Depleted Dark Surface (F7)
___Redox Depressions (F8)
___High Plains Depressions (F16) (MLRA 72 & 73 of LRR H)

Indicators for Problematic Hydric Soils[3]:

___1 cm Muck (A9) (LRR I, J)
___Coast Prairie Redox (A16) (LRR F, G, H)
___Dark Surface (S7) (LRR G)
___High Plains Depressions (F16) (LRR H outside of MLRA 72 & 73)
___Reduced Vertic (F18)
___Red Parent Material (TF2)
___Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if present):

Type:_____
Depth (inches) :_____

Hydric Soil Present? Yes_X_ No_____

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

___Surface Water (A1)
_X_Saturation (A3)
___Water Marks (B1)
___Sediment Deposits (B2)
___Drift Deposits (B3)
___Algal Mat or Crust (B4)
___Iron Deposits (B5)
___Inundation Visible on Aerial Imagery (B7)
___Water-Stained Leave (B9)
___Salt Crust (B11)
___Hydrogen Sulfide Odor (C1)
___Dry Season Water Table (C2)
_X_Oxidized Rhizospheres on Living Roots (C3) (where not tilled)
___Presence of Reduced Iron (C4)
___Thin Muck Surface (C7)
___Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

___Sparsely Vegetated Concave Surface (B8)
___Drainage Patterns (B10)
___Oxidized Rhizospheres on Living Roots (C3) (where tilled)
___Crayfish Burrows (C8)
___Saturation Visible of Aerial Imagery (C9)
___Geomorphic Position (D2)
___FAC-Neutral Test (D5)
___Frost-Heave Hummocks (D7) (LRR F)

Field Observations:

Surface Water Present? Yes ____ No_X_ Depth (inches)_____
Water Table Present? Yes____ No_X_ Depth (inches)_____
Saturation Present? Yes_X_ No____ Depth (inches)__*_____
(includes capillary fringe)
* Saturated to the surface.

Wetland Hydrology Present?
Yes_X_ No____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Ludeman License Area Sampling Date: 6/8/2008
Applicant/Owner: Uranium One City/County: Converse County
Investigator(s): K. LaClair, W. Stansbury Section,Township,Range: Sec 16, 17, 20 & 21 T4NR73W State: WY
Landform (hillslope, terrace, etc.): Depression in channel Local relief (concave, convex, none) concave Slope (%) <2%
Subregion (LRR): LRR H Lat: -105.631 Long: 42.909 Datum: NAD-83
Soil Map Unit Name: 187-Kishona-Cambria loams, 189-Kishona-Cambria-Theedle loams, 251-Theedle-Kishona-Shingle loams
NWI classification na Sampling Point WL-18
Are climate/hydrologic conditions on the site typical for this time of year? Yes X No (If no, explain in Remarks.)
Are "Normal Circumstances" present? Yes X No

Are Vegetation____, Soil____, or Hydology____ significantly disturbed? Yes____ No X
Are Vegetation____, Soil____, or Hydrology____naturally problematic? Yes____ No X
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes X No
Hydric Soil Present? Yes X No Is the Sampled Area
Wetland Hydrology Present? Yes X No within a Wetland? Yes X No

Remarks:
This is a string of intermittent wetlands (20 wetlands, WL-18a through WL-18t) that are discontinuous depressions along the same channel. They range in size from 0.001 acres to 0.638 acres.

VEGETATION – Use scientific names of plants.

	Absolute %Cover	Dominate Species?	Indicator Status
Tree Stratum (Plot size:)			
1			
2			
3			
4			
		=Total Cover	
Sapling/Shrub Stratum (Plot size:)			
1			
2			
3			
4			
5			
		=Total Cover	
Herb Stratum (Plot size: 20sf)			
1 *Carex aquatilis*	65	Y	OBL
2 *Carex praegracilis*	5	N	FACW
3 *Juncus balticus*	5	N	OBL
4 *Equisetum arvense*	1	N	FAC
5 *Taraxacum officinale*	1	N	FACU
6			
7			
8			
9			
10			
	77%	=Total Cover	
Woody Vine Stratum (Plot size:)			
1			
2			
		=Total Cover	

% Bare Ground in Herb Stratum 23%

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That are OBL,FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet:

Total % Cover of:	Multiple by:	
OBL species	x 1 =	
FACW species	x 2 =	
FAC species	x 3 =	
FACU species	x 4 =	
UPL species	x 5 =	
Column Totals: A)		(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:
X Dominance Test is >50%
Prevalence Index is ≤ 3.0[1]
Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present?
Yes X No

Remarks:

SOIL Sampling Point WL-18

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	
0-4"	2.5Y 2.5/1		NA				Sandy silt loam w/ decomposing organics (black)	
4-8"	2.5Y 4/1		NA				Sandy silt loam w/ decomposing organics (black)	
8-16"	2.5Y 4/1		2.5Y 5/4	<2%	C	M	sandy loam	Mottles: Fine, few, distinct
			7.5YR 4/6	<2%	C	M		Mottles: Fine, few, prominent

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___Histosol (A1)
- ___Histic Epipedon (A2)
- ___Black Histic (A3)
- ___Hydrogen Sulfide (A4)
- ___Stratified Layers (A5) (LRR F)
- ___1 cm Muck (A9) (LRR F, G, H)
- ___Depleted Below Dark Surface (A12)
- ___Thick Dark Surface (A12)
- ___Sandy Mucky Mineral (S1)
- ___2.5 Mucky Peat or Peat (S2) (LRR G,H)
- ___5 cm Mucky Peat or Peat (S3) (LRR F)
- ___Sandy Gleyed Matrix (S4)
- ___Sandy Redox (S5)
- ___Striped Matrix (S6)
- _X_Loamy Mucky Mineral (F1)
- ___Loamy Gleyed Matrix (F2)
- ___Depleted Matrix (F3)
- ___Redox Dark Surface (F6)
- ___Depleted Dark Surface (F7)
- ___Redox Depressions (F8)
- ___High Plains Depressions (F16) (MLRA 72 & 73 of LRR H)

Indicators for Problematic Hydric Soils[3]:

- ___1 cm Muck (A9) (LRR I, J)
- ___Coast Prairie Redox (A16) (LRR F, G, H)
- ___Dark Surface (S7) (LRR G)
- ___High Plains Depressions (F16) (LRR H outside of MLRA 72 & 73)
- ___Reduced Vertic (F18)
- ___Red Parent Material (TF2)
- ___Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if present):

Type:_____

Depth (inches) :_____

Hydric Soil Present? Yes__X__ No_____

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- _X_Surface Water (A1)
- _X_Saturation (A3)
- ___Water Marks (B1)
- ___Sediment Deposits (B2)
- ___Drift Deposits (B3)
- ___Algal Mat or Crust (B4)
- ___Iron Deposits (B5)
- ___Inundation Visible on Aerial Imagery (B7)
- ___Water-Stained Leave (B9)
- ___Salt Crust (B11)
- ___Hydrogen Sulfide Odor (C1)
- ___Dry Season Water Table (C2)
- ___Oxidized Rhizospheres on Living Roots (C3) (where not tilled)
- ___Presence of Reduced Iron (C4)
- ___Thin Muck Surface (C7)
- ___Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___Sparsely Vegetated Concave Surface (B8)
- ___Drainage Patterns (B10)
- ___Oxidized Rhizospheres on Living Roots (C3) (where tilled)
- ___Crayfish Burrows (C8)
- ___Saturation Visible of Aerial Imagery (C9)
- ___Geomorphic Position (D2)
- ___FAC-Neutral Test (D5)
- ___Frost-Heave Hummocks (D7) (LRR F)

Field Observations:

Surface Water Present? Yes _X_ No____ Depth (inches)____<1"___

Water Table Present? Yes_X_No____ Depth (inches)____14"___

Saturation Present? Yes_X_No____ Depth (inches)___*_____

(includes capillary fringe)

* Saturated to the surface.

Wetland Hydrology Present?

Yes__X__No_____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Ludeman License Area | Sampling Date: 6/7/2008
Applicant/Owner: Uranium One | City/County: Converse County
Investigator(s): K. LaClair, W. Stansbury | Section,Township,Range: Sec 12, T34N, R74W | State: WY
Landform (hillslope, terrace, etc.): Depression | Local relief (concave, convex, none) concave | Slope (%) 2%
Subregion (LRR): LRR H | Lat: -105.64 | Long: 42.935 | Datum: NAD-83
Soil Map Unit Name: 189-Kishona-Cambria-Theedle loams | NWI classification na | Sampling Point WL-19
Are climate/hydrologic conditions on the site typical for this time of year? Yes X No (If no, explain in Remarks.)
Are "Normal Circumstances" present? Yes X No

Are Vegetation____, Soil____, or Hydology____ significantly disturbed? Yes____ No X
Are Vegetation____, Soil____, or Hydrology____naturally problematic? Yes____ No X
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes X No
Hydric Soil Present? Yes X No
Wetland Hydrology Present? Yes X No
Is the Sampled Area within a Wetland? Yes X No

Remarks:
This is a series of two wetlands (WL-19a and b) that are discontinuous depressions upgradient of a diked water body. They range in size from 0.03 acres to 0.07 acres.

VEGETATION – Use scientific names of plants.

	Absolute %Cover	Dominate Species?	Indicator Status
Tree Stratum (Plot size:)			
1			
2			
3			
4			
		=Total Cover	
Sapling/Shrub Stratum (Plot size:)			
1			
2			
3			
4			
5			
		=Total Cover	
Herb Stratum (Plot size: 20sf)			
1 *Eleocharis palustris*	15	Y	OBL
2			
3			
4			
5			
6			
7			
8			
9			
10			
	15%	=Total Cover	
Woody Vine Stratum (Plot size:)			
1			
2			
		=Total Cover	

% Bare Ground in Herb Stratum 85%

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That are OBL,FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet:

Total % Cover of:	Multiple by:	
OBL species	x 1 =	
FACW species	x 2 =	
FAC species	x 3 =	
FACU species	x 4 =	
UPL species	x 5 =	
Column Totals:	A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

X Dominance Test is >50%
_____Prevalence Index is ≤ 3.0[1]
_____Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
_____Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present?
Yes X No

Remarks:

SOIL Sampling Point WL-19

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	
0-2"	2.5Y 3/2		7.5 YR 3/4	25%	C	M	sandy/silty loam	Mottles: Coarse, many, promin
								Oxidized root channels in 0-2"
2-8"	5Y 2.5/1	50%	7.5YR 5/8	2%	C	M	sandy/silty loam	Mottles: Fine, few, prominent
	2.5Y 3/2	50%						Blended matrix. Oxidized root channels in 2-8"
8-16"	2.5Y 2.5/1	50%	10YR 4/6	15%	C	M	sandy/silty loam	Mottles: Fine, common, prominent
	2.5Y 4/1	50%						Blended matrix.

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___Histosol (A1)
- ___Histic Epipedon (A2)
- ___Black Histic (A3)
- ___Hydrogen Sulfide (A4)
- ___Stratified Layers (A5) (LRR F)
- ___1 cm Muck (A9) (LRR F, G, H)
- ___Depleted Below Dark Surface (A12)
- ___Thick Dark Surface (A12)
- ___Sandy Mucky Mineral (S1)
- ___2.5 Mucky Peat or Peat (S2) (LRR G,H)
- ___5 cm Mucky Peat or Peat (S3) (LRR F)
- ___Sandy Gleyed Matrix (S4)
- ___Sandy Redox (S5)
- ___Striped Matrix (S6)
- _X_Loamy Mucky Mineral (F1)
- ___Loamy Gleyed Matrix (F2)
- ___Depleted Matrix (F3)
- ___Redox Dark Surface (F6)
- ___Depleted Dark Surface (F7)
- ___Redox Depressions (F8)
- ___High Plains Depressions (F16) (MLRA 72 & 73 of LRR H)

Indicators for Problematic Hydric Soils[3]:

- ___1 cm Muck (A9) (LRR I, J)
- ___Coast Prairie Redox (A16) (LRR F, G, H)
- ___Dark Surface (S7) (LRR G)
- ___High Plains Depressions (F16) (LRR H outside of MLRA 72 & 73)
- ___Reduced Vertic (F18)
- ___Red Parent Material (TF2)
- ___Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if present):

Type:_____

Depth (inches) :_____

Hydric Soil Present? Yes__X__ No_____

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___Surface Water (A1)
- _X_Saturation (A3)
- ___Water Marks (B1)
- ___Sediment Deposits (B2)
- ___Drift Deposits (B3)
- ___Algal Mat or Crust (B4)
- ___Iron Deposits (B5)
- ___Inundation Visible on Aerial Imagery (B7)
- ___Water-Stained Leave (B9)
- ___Salt Crust (B11)
- ___Hydrogen Sulfide Odor (C1)
- ___Dry Season Water Table (C2)
- _X_Oxidized Rhizospheres on Living Roots (C3) (where not tilled)
- ___Presence of Reduced Iron (C4)
- ___Thin Muck Surface (C7)
- ___Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___Sparsely Vegetated Concave Surface (B8)
- ___Drainage Patterns (B10)
- ___Oxidized Rhizospheres on Living Roots (C3) (where tilled)
- ___Crayfish Burrows (C8)
- ___Saturation Visible on Aerial Imagery (C9)
- ___Geomorphic Position (D2)
- ___FAC-Neutral Test (D5)
- ___Frost-Heave Hummocks (D7) (LRR F)

Field Observations:

Surface Water Present? Yes ____ No__X__ Depth (inches)_____

Water Table Present? Yes____ No__X__ Depth (inches)_____

Saturation Present? Yes_X__ No____ Depth (inches)__*____

(includes capillary fringe)

* Saturated to the surface.

Wetland Hydrology Present?

Yes__X__ No____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Ludeman License Area | Sampling Date: 6/8/2008
Applicant/Owner: Uranium One | City/County: Converse County
Investigator(s): K. LaClair, W. Stansbury | Section,Township,Range: Sec 12, T34N, R74W | State: WY
Landform (hillslope, terrace, etc.): depression | Local relief (concave, convex, none) concave | Slope (%) NA
Subregion (LRR): LRR H | Lat: -105.708 | Long: 42.935 | Datum: NAD-83
Soil Map Unit Name: 189-Kishona-Cambria-Theedle loams | NWI classification na | Sampling Point WL-20
Are climate/hydrologic conditions on the site typical for this time of year? Yes X No_____ (If no, explain in Remarks.)
Are "Normal Circumstances" present? Yes X No_____

Are Vegetation_____, Soil_____, or Hydology_____ significantly disturbed? Yes_____ No X
Are Vegetation_____, Soil_____, or Hydrology_____naturally problematic? Yes_____ No X
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes X No_____
Hydric Soil Present? Yes X No_____
Wetland Hydrology Present? Yes X No_____
Is the Sampled Area within a Wetland? Yes X No_____

Remarks:
This is an isolated, excavated depression adjacent to a windmill.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size:)	Absolute %Cover	Dominate Species?	Indicator Status
1			
2			
3			
4			
		=Total Cover	
Sapling/Shrub Stratum (Plot size:)			
1			
2			
3			
4			
5			
		=Total Cover	
Herb Stratum (Plot size: 20sf)			
1 *Typhus angustifolia*	50	Y	OBL
2 *Scirpus validus*	20	Y	OBL
3 *Eleocharis palustris*	3	N	OBL
4 *Alopecurus pratensis*	2	N	FACW
5			
6			
7			
8			
9			
10			
	75%	=Total Cover	
Woody Vine Stratum (Plot size:)			
1			
2			
		=Total Cover	

% Bare Ground in Herb Stratum 25%

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That are OBL,FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet:

Total % Cover of:	Multiply by:	
OBL species	x 1 =	
FACW species	x 2 =	
FAC species	x 3 =	
FACU species	x 4 =	
UPL species	x 5 =	
Column Totals: A)		(B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

X Dominance Test is >50%
_____Prevalence Index is ≤ 3.0[1]
_____Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
_____Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present?
Yes X No_____

Remarks:

SOIL Sampling Point WL-20

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	
0-4"	2.5Y 4 /1		10YR 4/6	2%	C	M	sandy/silty loam w/organics	Mottles: Fine, few, promin Oxidized root channels in 0-4"
4-8"	10YR 3 /2		7.5YR 4/6	20%	C	M	sandy loam	Mottles: Fine to medium, many, prominent
8-16"	2.5Y 4 /2		10YR 4/6	20%	C	M	sandy loam	Mottles: Fine to medium, many, prominent

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___Histosol (A1)
- ___Histic Epipedon (A2)
- ___Black Histic (A3)
- ___Hydrogen Sulfide (A4)
- ___Stratified Layers (A5) (LRR F)
- ___1 cm Muck (A9) (LRR F, G, H)
- ___Depleted Below Dark Surface (A12)
- ___Thick Dark Surface (A12)
- ___Sandy Mucky Mineral (S1)
- ___2.5 Mucky Peat or Peat (S2) (LRR G,H)
- ___5 cm Mucky Peat or Peat (S3) (LRR F)
- ___Sandy Gleyed Matrix (S4)
- ___Sandy Redox (S5)
- ___Striped Matrix (S6)
- _X_Loamy Mucky Mineral (F1)
- ___Loamy Gleyed Matrix (F2)
- ___Depleted Matrix (F3)
- ___Redox Dark Surface (F6)
- ___Depleted Dark Surface (F7)
- ___Redox Depressions (F8)
- ___High Plains Depressions (F16) (MLRA 72 & 73 of LRR H)

Indicators for Problematic Hydric Soils[3]:

- ___1 cm Muck (A9) (LRR I, J)
- ___Coast Prairie Redox (A16) (LRR F, G, H)
- ___Dark Surface (S7) (LRR G)
- ___High Plains Depressions (F16) (LRR H outside of MLRA 72 & 73)
- ___Reduced Vertic (F18)
- ___Red Parent Material (TF2)
- ___Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if present):

Type:_____

Depth (inches) :_____

Hydric Soil Present? Yes__X__ No_____

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___Surface Water (A1)
- ___Saturation (A3)
- ___Water Marks (B1)
- ___Sediment Deposits (B2)
- ___Drift Deposits (B3)
- ___Algal Mat or Crust (B4)
- ___Iron Deposits (B5)
- ___Inundation Visible on Aerial Imagery (B7)
- ___Water-Stained Leave (B9)
- ___Salt Crust (B11)
- ___Hydrogen Sulfide Odor (C1)
- ___Dry Season Water Table (C2)
- _X_Oxidized Rhizospheres on Living Roots (C3) (where not tilled)
- ___Presence of Reduced Iron (C4)
- ___Thin Muck Surface (C7)
- ___Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___Sparsely Vegetated Concave Surface (B8)
- ___Drainage Patterns (B10)
- ___Oxidized Rhizospheres on Living Roots (C3) (where tilled)
- ___Crayfish Burrows (C8)
- ___Saturation Visible of Aerial Imagery (C9)
- ___Geomorphic Position (D2)
- ___FAC-Neutral Test (D5)
- ___Frost-Heave Hummocks (D7) (LRR F)

Field Observations:

Surface Water Present? Yes _X_ No_____ Depth (inches)__4"_____

Water Table Present? Yes_____ No__X__ Depth (inches)_____

Saturation Present? Yes_X_ No_____ Depth (inches)__*_____
(includes capillary fringe)

Saturated to the surface.

Wetland Hydrology Present?

Yes__X__ No_____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Ludeman License Area Sampling Date: 6/7/2008
Applicant/Owner: Uranium One City/County: Converse County
Investigator(s): K. LaClair Section,Township,Range: Sec 7, T34N, R73W State: WY
Landform (hillslope, terrace, etc.): Depression in drainage Local relief (concave, convex, none) concave Slope (%) <2%
Subregion (LRR): LRR H Lat: -105.665 Long: 42.929 Datum: NAD-83
Soil Map Unit Name: 189-Kishona-Cambria-Theedle loams NWI classification na Sampling Point WL-21
Are climate/hydrologic conditions on the site typical for this time of year? Yes X No (If no, explain in Remarks.)
Are "Normal Circumstances" present? Yes X No

Are Vegetation____, Soil____, or Hydology____ significantly disturbed? Yes____ No X
Are Vegetation____, Soil____, or Hydrology____naturally problematic? Yes____ No X
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes X No
Hydric Soil Present? Yes X No Is the Sampled Area
Wetland Hydrology Present? Yes X No within a Wetland? Yes X No

Remarks:
This is a string of intermittent wetlands (10 wetlands, WL-21a through WL-21j) that are discontinuous depressions along the same channel. They range in size from 19 sf to 0.035 acres.

VEGETATION – Use scientific names of plants.

	Tree Stratum (Plot size:)	Absolute %Cover	Dominate Species?	Indicator Status
1				
2				
3				
4				
			=Total Cover	
	Sapling/Shrub Stratum (Plot size:)			
1				
2				
3				
4				
5				
			=Total Cover	
	Herb Stratum (Plot size: 20sf)			
1	*Eleocharis palustris*	30	Y	OBL
2	*Agropyron smithii*	10	N	FACU
3	*Mustard sp.*	10	N	
4	*Unknown*	2	N	
5	*Thermopsis montana*	1	N	NL
6				
7				
8				
9				
10				
		53%	=Total Cover	
	Woody Vine Stratum (Plot size:)			
1				
2				
			=Total Cover	

% Bare Ground in Herb Stratum 47%

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That are OBL,FACW, or FAC: 100 % (A/B)

Prevalence Index Worksheet:

Total % Cover of:	Multiple by:	
OBL species	x 1 =	
FACW species	x 2 =	
FAC species	x 3 =	
FACU species	x 4 =	
UPL species	x 5 =	
Column Totals:	A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:
X Dominance Test is >50%
_____Prevalence Index is ≤ 3.0[1]
_____Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
_____Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present?
Yes X No

Remarks:

SOIL Sampling Point WL-21

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	
0-4"	2.5Y 4/1		7.5YR 4/6	25%	C	M	Sandy loam	Mottles: Fine, few, prominent
4-10"	10YR 4/2		7.5YR 4/6	25%	C	M	Sandy loam	Mottles: Fine to medium, many, prominent
10+"	10YR 4/3		7.5YR 4/6	25%	C	M	Sandy loam	Mottles: Fine to medium, many, prominent

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___Histosol (A1)
- ___Histic Epipedon (A2)
- ___Black Histic (A3)
- ___Hydrogen Sulfide (A4)
- ___Stratified Layers (A5) (LRR F)
- ___1 cm Muck (A9) (LRR F, G, H)
- ___Depleted Below Dark Surface (A12)
- ___Thick Dark Surface (A12)
- ___Sandy Mucky Mineral (S1)
- ___2.5 Mucky Peat or Peat (S2) (LRR G,H)
- ___5 cm Mucky Peat or Peat (S3) (LRR F)
- ___Sandy Gleyed Matrix (S4)
- ___Sandy Redox (S5)
- ___Striped Matrix (S6)
- _X_Loamy Mucky Mineral (F1)
- ___Loamy Gleyed Matrix (F2)
- ___Depleted Matrix (F3)
- ___Redox Dark Surface (F6)
- ___Depleted Dark Surface (F7)
- ___Redox Depressions (F8)
- ___High Plains Depressions (F16) (MLRA 72 & 73 of LRR H)

Indicators for Problematic Hydric Soils[3]:

- ___1 cm Muck (A9) (LRR I, J)
- ___Coast Prairie Redox (A16) (LRR F, G, H)
- ___Dark Surface (S7) (LRR G)
- ___High Plains Depressions (F16) (LRR H outside of MLRA 72 & 73)
- ___Reduced Vertic (F18)
- ___Red Parent Material (TF2)
- ___Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if present):

Type:_____

Depth (inches) :_____

Hydric Soil Present? Yes__X__ No_____

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- X Surface Water (A1)
- X Saturation (A3)
- ___Water Marks (B1)
- ___Sediment Deposits (B2)
- ___Drift Deposits (B3)
- ___Algal Mat or Crust (B4)
- ___Iron Deposits (B5)
- ___Inundation Visible on Aerial Imagery (B7)
- ___Water-Stained Leave (B9)
- ___Salt Crust (B11)
- ___Hydrogen Sulfide Odor (C1)
- ___Dry Season Water Table (C2)
- ___Oxidized Rhizospheres on Living Roots (C3) (where not tilled)
- ___Presence of Reduced Iron (C4)
- ___Thin Muck Surface (C7)
- ___Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___Sparsely Vegetated Concave Surface (B8)
- ___Drainage Patterns (B10)
- ___Oxidized Rhizospheres on Living Roots (C3) (where tilled)
- ___Crayfish Burrows (C8)
- ___Saturation Visible of Aerial Imagery (C9)
- ___Geomorphic Position (D2)
- ___FAC-Neutral Test (D5)
- ___Frost-Heave Hummocks (D7) (LRR F)

Field Observations:

Surface Water Present? Yes _X_ No____ Depth (inches)__4 inches__

Water Table Present? Yes____ No__X__ Depth (inches)_____

Saturation Present? Yes_X_ No____ Depth (inches)__*__

(includes capillary fringe)

* Saturated to the surface.

Wetland Hydrology Present?

Yes__X__ No_____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Ludeman License Area Sampling Date: 8/7/2008
Applicant/Owner: Uranium One City/County: Converse County
Investigator(s): W. Stansbury Section,Township,Range: Sec 17, T34N R73W State: WY
Landform (hillslope, terrace, etc.): Diked drainage Local relief (concave, convex, none) concave Slope (%) <2%
Subregion (LRR): LRR H Lat: -105.650 Long: 42.922 Datum: NAD-83
Soil Map Unit Name: 189-Kishona-Cambria-Theedle loams NWI classification PEMAh Sampling Point WL-22
Are climate/hydrologic conditions on the site typical for this time of year? Yes X No (If no, explain in Remarks.)
Are "Normal Circumstances" present? Yes X No

Are Vegetation____, Soil____, or Hydology____ significantly disturbed? Yes____ No X
Are Vegetation____, Soil____, or Hydrology____naturally problematic? Yes____ No X
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes X No
Hydric Soil Present? Yes X No
Wetland Hydrology Present? Yes X No
Is the Sampled Area within a Wetland? Yes X No

Remarks:
This is a wetland that has formed behind a dike in a drainage.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size:)	Absolute %Cover	Dominate Species?	Indicator Status
1			
2			
3			
4			
		=Total Cover	
Sapling/Shrub Stratum (Plot size:)			
1			
2			
3			
4			
5			
		=Total Cover	
Herb Stratum (Plot size: 20sf)			
1 *Hordeum jubatum*	40	Y	FACW
2			
3			
4			
5			
6			
7			
8			
9			
10			
	40%	=Total Cover	
Woody Vine Stratum (Plot size:)			
1			
2			
		=Total Cover	

% Bare Ground in Herb Stratum 60%

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That are OBL,FACW, or FAC: 100 % (A/B)

Prevalence Index Worksheet:

Total % Cover of:	Multiple by:	
OBL species	x 1 =	
FACW species	x 2 =	
FAC species	x 3 =	
FACU species	x 4 =	
UPL species	x 5 =	
Column Totals: A)		(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

X Dominance Test is >50%
____Prevalence Index is ≤ 3.0[1]
____Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
____Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present?
Yes X No

Remarks:

SOIL Sampling Point WL-22

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	
0-4"	10YR 4/2						Silty loam	Oxidized root channels present
4-8"	10YR 4/2		7.5YR 4/4	5%	C	M	Silty loam	Mottles: medium to coarse, common, distinct

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___Histosol (A1)
- ___Histic Epipedon (A2)
- ___Black Histic (A3)
- ___Hydrogen Sulfide (A4)
- ___Stratified Layers (A5) (LRR F)
- ___1 cm Muck (A9) (LRR F, G, H)
- ___Depleted Below Dark Surface (A12)
- ___Thick Dark Surface (A12)
- ___Sandy Mucky Mineral (S1)
- ___2.5 Mucky Peat or Peat (S2) (LRR G,H)
- ___5 cm Mucky Peat or Peat (S3) (LRR F)
- ___Sandy Gleyed Matrix (S4)
- ___Sandy Redox (S5)
- ___Striped Matrix (S6)
- _X_Loamy Mucky Mineral (F1)
- ___Loamy Gleyed Matrix (F2)
- ___Depleted Matrix (F3)
- ___Redox Dark Surface (F6)
- ___Depleted Dark Surface (F7)
- ___Redox Depressions (F8)
- ___High Plains Depressions (F16) (MLRA 72 & 73 of LRR H)

Indicators for Problematic Hydric Soils[3]:

- ___1 cm Muck (A9) (LRR I, J)
- ___Coast Prairie Redox (A16) (LRR F, G, H)
- ___Dark Surface (S7) (LRR G)
- ___High Plains Depressions (F16) (LRR H outside of MLRA 72 & 73)
- ___Reduced Vertic (F18)
- ___Red Parent Material (TF2)
- ___Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if present):

Type:_____ Hydric Soil Present? Yes__X__ No_____

Depth (inches) :_____

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___Surface Water (A1)
- ___Saturation (A3)
- ___Water Marks (B1)
- ___Sediment Deposits (B2)
- ___Drift Deposits (B3)
- ___Algal Mat or Crust (B4)
- ___Iron Deposits (B5)
- ___Inundation Visible on Aerial Imagery (B7)
- ___Water-Stained Leave (B9)
- ___Salt Crust (B11)
- ___Hydrogen Sulfide Odor (C1)
- ___Dry Season Water Table (C2)
- _X_Oxidized Rhizospheres on Living Roots (C3) (where not tilled)
- ___Presence of Reduced Iron (C4)
- ___Thin Muck Surface (C7)
- ___Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___Sparsely Vegetated Concave Surface (B8)
- ___Drainage Patterns (B10)
- ___Oxidized Rhizospheres on Living Roots (C3) (where tilled)
- ___Crayfish Burrows (C8)
- ___Saturation Visible of Aerial Imagery (C9)
- ___Geomorphic Position (D2)
- ___FAC-Neutral Test (D5)
- ___Frost-Heave Hummocks (D7) (LRR F)

Field Observations:

Surface Water Present? Yes_____No__X__ Depth (inches) _____

Water Table Present? Yes_____No__X__ Depth (inches)_____

Saturation Present? Yes_____No__X__ Depth (inches) _____
(includes capillary fringe)

Wetland Hydrology Present?

Yes__X__No_____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Ludeman License Area Sampling Date: 6/9/2008
Applicant/Owner: Uranium One City/County: Converse County
Investigator(s): K. LaClair Section,Township,Range: Sec 17, T34N R73W State: WY
Landform (hillslope, terrace, etc.): Depression Local relief (concave, convex, none) concave Slope (%) <2%
Subregion (LRR): LRR H Lat: -105.642 Long: 42.921 Datum: NAD-83
Soil Map Unit Name: 189-Kishona-Cambria-Theedle loams NWI classification na Sampling Point WL-23
Are climate/hydrologic conditions on the site typical for this time of year? Yes X No_____ (If no, explain in Remarks.)
Are "Normal Circumstances" present? Yes X No_____

Are Vegetation_____, Soil_____, or Hydology_____ significantly disturbed? Yes_____ No X
Are Vegetation_____, Soil_____, or Hydrology_____naturally problematic? Yes_____ No X
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes X No_____
Hydric Soil Present? Yes X No_____
Wetland Hydrology Present? Yes X No_____
Is the Sampled Area within a Wetland? Yes X No_____

Remarks:
This is a wetland that has formed behind a dike in a drainage.

VEGETATION – Use scientific names of plants.

	Absolute %Cover	Dominate Species?	Indicator Status
Tree Stratum (Plot size:)			
1			
2			
3			
4			
		=Total Cover	
Sapling/Shrub Stratum (Plot size:)			
1			
2			
3			
4			
5			
		=Total Cover	
Herb Stratum (Plot size: 20sf)			
1 *Eleocharis palustris*	30	Y	OBL
2 *Carex praegracilis*	10	Y	FACW
3 *Rotala ramosior*	5	N	NI
4 *Poa sp.*	5	N	
5			
6			
7			
8			
9			
10			
	50%	=Total Cover	
Woody Vine Stratum (Plot size:)			
1			
2			
		=Total Cover	

% Bare Ground in Herb Stratum 50%

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That are OBL,FACW, or FAC: 100 % (A/B)

Prevalence Index Worksheet:

Total % Cover of:	Multiple by:	
OBL species	x 1 =	
FACW species	x 2 =	
FAC species	x 3 =	
FACU species	x 4 =	
UPL species	x 5 =	
Column Totals: A)		(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

X Dominance Test is >50%
_____Prevalence Index is ≤ 3.0[1]
_____Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
_____Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present?
Yes X No_____

Remarks:

SOIL Sampling Point WL-23

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	
0-5"	10YR 4/1		7.5YR 5/8	25%	C	M	Sandy Silt loam	Mottles: fine, many, prominent
								Oxidized root channels present 0-5"
5-14"	10YR 4/2		7.5YR 5/8	<2%	C	M	Sandy loam	Mottles: fine, few, prominent
								Decomposed organic matter throughout profile

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___Histosol (A1)
___Histic Epipedon (A2)
___Black Histic (A3)
___Hydrogen Sulfide (A4)
___Stratified Layers (A5) (LRR F)
___1 cm Muck (A9) (LRR F, G, H)
___Depleted Below Dark Surface (A12)
___Thick Dark Surface (A12)
___Sandy Mucky Mineral (S1)
___2.5 Mucky Peat or Peat (S2) (LRR G,H)
___5 cm Mucky Peat or Peat (S3) (LRR F)
___Sandy Gleyed Matrix (S4)
___Sandy Redox (S5)
___Striped Matrix (S6)
_X_Loamy Mucky Mineral (F1)
___Loamy Gleyed Matrix (F2)
___Depleted Matrix (F3)
___Redox Dark Surface (F6)
___Depleted Dark Surface (F7)
___Redox Depressions (F8)
___High Plains Depressions (F16) (MLRA 72 & 73 of LRR H)

Indicators for Problematic Hydric Soils[3]:

___1 cm Muck (A9) (LRR I, J)
___Coast Prairie Redox (A16) (LRR F, G, H)
___Dark Surface (S7) (LRR G)
___High Plains Depressions (F16) (LRR H outside of MLRA 72 & 73)
___Reduced Vertic (F18)
___Red Parent Material (TF2)
___Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if present):

Type:_____ Hydric Soil Present? Yes__X__ No_____

Depth (inches) :_____

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

___Surface Water (A1)
___Saturation (A3)
___Water Marks (B1)
___Sediment Deposits (B2)
___Drift Deposits (B3)
___Algal Mat or Crust (B4)
___Iron Deposits (B5)
___Inundation Visible on Aerial Imagery (B7)
___Water-Stained Leave (B9)
___Salt Crust (B11)
___Hydrogen Sulfide Odor (C1)
___Dry Season Water Table (C2)
_X_Oxidized Rhizospheres on Living Roots (C3) (where not tilled)
___Presence of Reduced Iron (C4)
___Thin Muck Surface (C7)
___Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

___Sparsely Vegetated Concave Surface (B8)
___Drainage Patterns (B10)
___Oxidized Rhizospheres on Living Roots (C3) (where tilled)
___Crayfish Burrows (C8)
___Saturation Visible of Aerial Imagery (C9)
___Geomorphic Position (D2)
___FAC-Neutral Test (D5)
___Frost-Heave Hummocks (D7) (LRR F)

Field Observations:

Surface Water Present? Yes __X__ No___ Depth (inches) __1 inch*_____
Water Table Present? Yes_____ No__X__ Depth (inches)_____
Saturation Present? Yes__X__ No___ Depth (inches) _____
(includes capillary fringe)
*Small amount of ponded water present

Wetland Hydrology Present?
Yes__X__ No_____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Ludeman License Area — Sampling Date: 6/8/2008
Applicant/Owner: Uranium One — City/County: Converse County
Investigator(s): K. LaClair — Section,Township,Range: Sec 8, T34N, R73W — State: WY
Landform (hillslope, terrace, etc.): Depression in drainage — Local relief (concave, convex, none) concave — Slope (%) 2%
Subregion (LRR): LRR H — Lat: -105.644 — Long: 42.931 — Datum: NAD-83
Soil Map Unit Name: 233-Shingle-Taluce-Badland Complex — NWI classification na — Sampling Point WL-24
Are climate/hydrologic conditions on the site typical for this time of year? Yes X No (If no, explain in Remarks.)
Are "Normal Circumstances" present? Yes X No

Are Vegetation____, Soil____, or Hydology____ significantly disturbed? Yes____ No X
Are Vegetation____, Soil____, or Hydrology____naturally problematic? Yes____ No X
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes X No
Hydric Soil Present? Yes X No — Is the Sampled Area
Wetland Hydrology Present? Yes X No — within a Wetland? Yes X No

Remarks:
This is a depression in a drainage.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size:)	Absolute %Cover	Dominate Species?	Indicator Status
1			
2			
3			
4			
		=Total Cover	
Sapling/Shrub Stratum (Plot size:)			
1			
2			
3			
4			
5			
		=Total Cover	
Herb Stratum (Plot size: 20sf)			
1 *Carex praegracilis*	50	Y	OBL
2 *Poa sp-1*	15	N	
3 *Rosa woodsii*	10	N	FACU
4 *Thermopsis montana*	5	N	NL
5 *Poa sp-2*	1	N	
6			
7			
8			
9			
10			
	81%	=Total Cover	
Woody Vine Stratum (Plot size:)			
1			
2			
		=Total Cover	

% Bare Ground in Herb Stratum 19%

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That are OBL,FACW, or FAC: 100 % (A/B)

Prevalence Index Worksheet:

Total % Cover of:	Multiple by:	
OBL species	x 1 =	
FACW species	x 2 =	
FAC species	x 3 =	
FACU species	x 4 =	
UPL species	x 5 =	
Column Totals: A)		(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:
X Dominance Test is >50%
_____Prevalence Index is ≤ 3.0[1]
_____Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
_____Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present?
Yes X No

Remarks:

SOIL Sampling Point WL-24

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	
0-3"	10YR 4/2		5YR 4/6	<2%	C	M	Sandy silt loam	Mottles: Fine, few, prominent
3-7"	2.5Y 4+/2		7.5YR 5/8	<2%	C	M	Sandy silt loam w/ organics	Mottles: Fine, few, prominent
								Oxidized root channels
7-14"	5Y 5/2		7.5YR 5/8	<2%	C	M	Sandy silt loam with minor organics.	
								Mottles: Fine, few, prominent

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___Histosol (A1)
___Histic Epipedon (A2)
___Black Histic (A3)
___Hydrogen Sulfide (A4)
___Stratified Layers (A5) (LRR F)
___1 cm Muck (A9) (LRR F, G, H)
___Depleted Below Dark Surface (A12)
___Thick Dark Surface (A12)
___Sandy Mucky Mineral (S1)
___2.5 Mucky Peat or Peat (S2) (LRR G,H)
___5 cm Mucky Peat or Peat (S3) (LRR F)
___Sandy Gleyed Matrix (S4)
___Sandy Redox (S5)
___Striped Matrix (S6)
_X_Loamy Mucky Mineral (F1)
___Loamy Gleyed Matrix (F2)
___Depleted Matrix (F3)
___Redox Dark Surface (F6)
___Depleted Dark Surface (F7)
___Redox Depressions (F8)
___High Plains Depressions (F16) (MLRA 72 & 73 of LRR H)

Indicators for Problematic Hydric Soils[3]:

___1 cm Muck (A9) (LRR I, J)
___Coast Prairie Redox (A16) (LRR F, G, H)
___Dark Surface (S7) (LRR G)
___High Plains Depressions (F16) (LRR H outside of MLRA 72 & 73)
___Reduced Vertic (F18)
___Red Parent Material (TF2)
___Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if present):

Type:_____
Depth (inches) :_____

Hydric Soil Present? Yes__X__ No_____

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

___Surface Water (A1)
___Saturation (A3)
___Water Marks (B1)
___Sediment Deposits (B2)
___Drift Deposits (B3)
___Algal Mat or Crust (B4)
___Iron Deposits (B5)
___Inundation Visible on Aerial Imagery (B7)
___Water-Stained Leave (B9)
___Salt Crust (B11)
___Hydrogen Sulfide Odor (C1)
___Dry Season Water Table (C2)
_X_Oxidized Rhizospheres on Living Roots (C3) (where not tilled)
___Presence of Reduced Iron (C4)
___Thin Muck Surface (C7)
___Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

___Sparsely Vegetated Concave Surface (B8)
___Drainage Patterns (B10)
___Oxidized Rhizospheres on Living Roots (C3) (where tilled)
___Crayfish Burrows (C8)
___Saturation Visible of Aerial Imagery (C9)
___Geomorphic Position (D2)
___FAC-Neutral Test (D5)
___Frost-Heave Hummocks (D7) (LRR F)

Field Observations:

Surface Water Present? Yes ____ No_X_ Depth (inches)_____
Water Table Present? Yes_____No__X__ Depth (inches)_____
Saturation Present? Yes_____No__X__ Depth (inches)__*_____
(includes capillary fringe)

* Soil was moist to the surface.

Wetland Hydrology Present?

Yes__X__No_____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Ludeman License Area Sampling Date: 6/11/08
Applicant/Owner: Uranium One City/County: Converse County
Investigator(s): K. LaClair Section,Township,Range: Sec 20, T34N R73W State: WY
Landform (hillslope, terrace, etc.): Depression in drainage Local relief (concave, convex, none) concave Slope (%) <2%
Subregion (LRR): LRR H Lat: -105.648 Long: 42.906 Datum: NAD-83
Soil Map Unit Name: 263-Ustic Torriorthents, gullied NWI classification na Sampling Point WL-25
Are climate/hydrologic conditions on the site typical for this time of year? Yes X No (If no, explain in Remarks.)
Are "Normal Circumstances" present? Yes X No

Are Vegetation____, Soil____, or Hydology____ significantly disturbed? Yes____ No X
Are Vegetation____, Soil____, or Hydrology____naturally problematic? Yes____ No X
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes X No
Hydric Soil Present? Yes X No Is the Sampled Area
Wetland Hydrology Present? Yes X No within a Wetland? Yes X No

Remarks:
This is a string of two intermittent wetlands (WL-25a and b) that are disconnected depressions along the same drainage. They range in size from 0.002 acres to 0.012 acres. Soil Unit 263 is listed as hydric by the NRCS.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size:)	Absolute %Cover	Dominate Species?	Indicator Status
1			
2			
3			
4			
		=Total Cover	
Sapling/Shrub Stratum (Plot size:)			
1			
2			
3			
4			
5			
		=Total Cover	
Herb Stratum (Plot size: 20sf)			
1 *Juncus balticus*	60	Y	OBL
2 *Typha angustifolia*	5	N	OBL
3 *Melilotus sp.*	5	N	FACU-
4 *Poa compressa*	5	N	OBL
5 *Carex praegracilis*	2	N	FACW
6 *Bromus inermis*	2	N	NL
7 Unknown	1	N	
8			
9			
10			
	80%	=Total Cover	
Woody Vine Stratum (Plot size:)			
1			
2			
		=Total Cover	

% Bare Ground in Herb Stratum 20%

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That are OBL,FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet:

Total % Cover of:	Multiple by:	
OBL species	x 1 =	
FACW species	x 2 =	
FAC species	x 3 =	
FACU species	x 4 =	
UPL species	x 5 =	
Column Totals: A)		(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

X Dominance Test is >50%
Prevalence Index is ≤ 3.0[1]
Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present?
Yes X No

Remarks:

SOIL Sampling Point WL-25

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	
0-3"	5Y 5/2	80%					Mucky mineral/sand	
0-3"	Gley 1 2.5/5GY	20%					Blended matrix with very black organics	
3-6"	5Y 5/2		7.5YR 6/8	<2%	C	M	Sand	Mottles: few, fine, prominent

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___Histosol (A1)
- ___Histic Epipedon (A2)
- ___Black Histic (A3)
- ___Hydrogen Sulfide (A4)
- ___Stratified Layers (A5) (LRR F)
- ___1 cm Muck (A9) (LRR F, G, H)
- ___Depleted Below Dark Surface (A12)
- ___Thick Dark Surface (A12)
- _X_Sandy Mucky Mineral (S1)
- ___2.5 Mucky Peat or Peat (S2) (LRR G,H)
- ___5 cm Mucky Peat or Peat (S3) (LRR F)
- ___Sandy Gleyed Matrix (S4)
- ___Sandy Redox (S5)
- ___Striped Matrix (S6)
- ___Loamy Mucky Mineral (F1)
- ___Loamy Gleyed Matrix (F2)
- ___Depleted Matrix (F3)
- ___Redox Dark Surface (F6)
- ___Depleted Dark Surface (F7)
- ___Redox Depressions (F8)
- ___High Plains Depressions (F16) (MLRA 72 & 73 of LRR H)

Indicators for Problematic Hydric Soils[3]:

- ___1 cm Muck (A9) (LRR I, J)
- ___Coast Prairie Redox (A16) (LRR F, G, H)
- ___Dark Surface (S7) (LRR G)
- ___High Plains Depressions (F16) (LRR H outside of MLRA 72 & 73)
- ___Reduced Vertic (F18)
- ___Red Parent Material (TF2)
- ___Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if present):

Type:_____ Hydric Soil Present? Yes__X__ No_____

Depth (inches) :_____

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- _X_Surface Water (A1)
- ___Saturation (A3)
- ___Water Marks (B1)
- ___Sediment Deposits (B2)
- _X_Drift Deposits (B3)
- ___Algal Mat or Crust (B4)
- ___Iron Deposits (B5)
- ___Inundation Visible on Aerial Imagery (B7)
- ___Water-Stained Leave (B9)
- ___Salt Crust (B11)
- ___Hydrogen Sulfide Odor (C1)
- ___Dry Season Water Table (C2)
- ___Oxidized Rhizospheres on Living Roots (C3) (where not tilled)
- ___Presence of Reduced Iron (C4)
- ___Thin Muck Surface (C7)
- ___Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___Sparsely Vegetated Concave Surface (B8)
- ___Drainage Patterns (B10)
- ___Oxidized Rhizospheres on Living Roots (C3) (where tilled)
- ___Crayfish Burrows (C8)
- ___Saturation Visible of Aerial Imagery (C9)
- ___Geomorphic Position (D2)
- ___FAC-Neutral Test (D5)
- ___Frost-Heave Hummocks (D7) (LRR F)

Field Observations:

Surface Water Present? Yes__X*__No___ Depth (inches) _____

Water Table Present? Yes_____No_X__ Depth (inches)_____

Saturation Present? Yes_____No_X__ Depth (inches) _____

(includes capillary fringe)

*Ponded water at mid-point of wetland

Wetland Hydrology Present?

Yes__X__No_____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Ludeman License Area Sampling Date: 6/11/2008
Applicant/Owner: Uranium One City/County: Converse County
Investigator(s): W. Stansbury Section,Township,Range: Sec 21, T34NR73W State: WY
Landform (hillslope, terrace, etc.): Diked drainage Local relief (concave, convex, none) concave Slope (%) <2%
Subregion (LRR): LRR H Lat: -105.623 Long: 42.905 Datum: NAD-83
Soil Map Unit Name: 189-Kishona-Cambria-Theedle loams, 230-Shingle-Badland-Samdaya Complex
NWI classification PUSAh Sampling Point WL-26
Are climate/hydrologic conditions on the site typical for this time of year? Yes X No (If no, explain in Remarks.)
Are "Normal Circumstances" present? Yes X No

Are Vegetation____, Soil____, or Hydology____ significantly disturbed? Yes____ No X
Are Vegetation____, Soil____, or Hydrology____naturally problematic? Yes____ No X
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes X No
Hydric Soil Present? Yes X No Is the Sampled Area
Wetland Hydrology Present? Yes X No within a Wetland? Yes X No

Remarks:
This is a string of disconnected wetlands along the same diked drainage (9 wetlands, WL-26a through WL-26i). They range in size from 0.002 acres to 0.487 acres.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size:)	Absolute %Cover	Dominate Species?	Indicator Status
1			
2			
3			
4			
		=Total Cover	
Sapling/Shrub Stratum (Plot size:)			
1			
2			
3			
4			
5			
		=Total Cover	
Herb Stratum (Plot size: 20sf)			
1 *Eleocharis palustris*	49	Y	OBL
2 *Lappula redowskii*	10	N	NL
3 *Poa sp.*	1	N	
4			
5			
6			
7			
8			
9			
10			
	60%	=Total Cover	
Woody Vine Stratum (Plot size:)			
1			
2			
		=Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That are OBL,FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet:

Total % Cover of:	Multiple by:	
OBL species	x 1 =	
FACW species	x 2 =	
FAC species	x 3 =	
FACU species	x 4 =	
UPL species	x 5 =	
Column Totals: A)		(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:
X Dominance Test is >50%
Prevalence Index is ≤ 3.0[1]
Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present?
Yes X No

% Bare Ground in Herb Stratum 40%

Remarks:

SOIL Sampling Point WL-26

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	
0-2"	7.5YR 4/1		7.5YR 4/6	<2%	C	M	silty loam	Mottles: Fine, few, prominent; Oxidized root channels in 0-2"
2-8"	7.5YR 4/1		7.5YR 4/6	15%	C	M	silty clay loam	Mottles: Medium, common, prominent; Oxidized root channels in 2-8"
8-14"	7.5YR 4/1		7.5YR 4/6	25%	C	M	silty clay loam	Mottles: Medium to coarse, many, prominent

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___Histosol (A1)
- ___Histic Epipedon (A2)
- ___Black Histic (A3)
- ___Hydrogen Sulfide (A4)
- ___Stratified Layers (A5) (LRR F)
- ___1 cm Muck (A9) (LRR F, G, H)
- ___Depleted Below Dark Surface (A12)
- ___Thick Dark Surface (A12)
- ___Sandy Mucky Mineral (S1)
- ___2.5 Mucky Peat or Peat (S2) (LRR G,H)
- ___5 cm Mucky Peat or Peat (S3) (LRR F)
- ___Sandy Gleyed Matrix (S4)
- ___Sandy Redox (S5)
- ___Striped Matrix (S6)
- _X_Loamy Mucky Mineral (F1)
- ___Loamy Gleyed Matrix (F2)
- ___Depleted Matrix (F3)
- ___Redox Dark Surface (F6)
- ___Depleted Dark Surface (F7)
- ___Redox Depressions (F8)
- ___High Plains Depressions (F16) (MLRA 72 & 73 of LRR H)

Indicators for Problematic Hydric Soils[3]:

- ___1 cm Muck (A9) (LRR I, J)
- ___Coast Prairie Redox (A16) (LRR F, G, H)
- ___Dark Surface (S7) (LRR G)
- ___High Plains Depressions (F16) (LRR H outside of MLRA 72 & 73)
- ___Reduced Vertic (F18)
- ___Red Parent Material (TF2)
- ___Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if present):

Type:_____

Depth (inches) :_____

Hydric Soil Present? Yes__X__ No_____

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___Surface Water (A1)
- _X_Saturation (A3)
- ___Water Marks (B1)
- ___Sediment Deposits (B2)
- ___Drift Deposits (B3)
- ___Algal Mat or Crust (B4)
- ___Iron Deposits (B5)
- ___Inundation Visible on Aerial Imagery (B7)
- ___Water-Stained Leave (B9)
- ___Salt Crust (B11)
- ___Hydrogen Sulfide Odor (C1)
- ___Dry Season Water Table (C2)
- ___Oxidized Rhizospheres on Living Roots (C3) (where not tilled)
- ___Presence of Reduced Iron (C4)
- ___Thin Muck Surface (C7)
- ___Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___Sparsely Vegetated Concave Surface (B8)
- ___Drainage Patterns (B10)
- ___Oxidized Rhizospheres on Living Roots (C3) (where tilled)
- ___Crayfish Burrows (C8)
- ___Saturation Visible of Aerial Imagery (C9)
- ___Geomorphic Position (D2)
- ___FAC-Neutral Test (D5)
- ___Frost-Heave Hummocks (D7) (LRR F)

Field Observations:

Surface Water Present? Yes ____ No__X__ Depth (inches)_____

Water Table Present? Yes____ No__X__ Depth (inches)_____

Saturation Present? Yes_X__ No_____ Depth (inches)__*_____

(includes capillary fringe)

* Saturated to the surface.

Wetland Hydrology Present?

Yes__X__ No_____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Ludeman License Area — Sampling Date: 6/11/2008
Applicant/Owner: Uranium One — City/County: Converse County
Investigator(s): W. Stansbury — Section,Township,Range: Sec 21, T34NR73W — State: WY
Landform (hillslope, terrace, etc.): Depression — Local relief (concave, convex, none) concave — Slope (%) NA
Subregion (LRR): LRR H — Lat: -105.616 — Long: 42.907 — Datum: NAD-83
Soil Map Unit Name: 189-Kishona-Cambria-Theedle loams — NWI classification na — Sampling Point WL-27
Are climate/hydrologic conditions on the site typical for this time of year? Yes X No (If no, explain in Remarks.)
Are "Normal Circumstances" present? Yes X No

Are Vegetation____, Soil____, or Hydology____ significantly disturbed? Yes____ No X
Are Vegetation____, Soil____, or Hydrology____naturally problematic? Yes____ No X
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes X No
Hydric Soil Present? Yes X No — Is the Sampled Area
Wetland Hydrology Present? Yes X No — within a Wetland? Yes X No

Remarks:
This is a series of two intermittent wetlands (WL-27a and WL-27b) that are discontinuous depressions along the same channel. They range in size from 0.034 acres to 0.059 acres.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size:)	Absolute %Cover	Dominate Species?	Indicator Status
1			
2			
3			
4			
		=Total Cover	
Sapling/Shrub Stratum (Plot size:)			
1			
2			
3			
4			
5			
		=Total Cover	
Herb Stratum (Plot size: 20sf)			
1 *Eleocharis palustris*	40	Y	OBL
2			
3			
4			
5			
6			
7			
8			
9			
10			
	40%	=Total Cover	
Woody Vine Stratum (Plot size:)			
1			
2			
		=Total Cover	

% Bare Ground in Herb Stratum 60%

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That are OBL,FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet:

Total % Cover of:	Multiple by:	
OBL species	x 1 =	
FACW species	x 2 =	
FAC species	x 3 =	
FACU species	x 4 =	
UPL species	x 5 =	
Column Totals:	A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:
X Dominance Test is >50%
____ Prevalence Index is ≤ 3.0[1]
____ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
____ Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present?
Yes X No

Remarks:

SOIL Sampling Point WL-27

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	
0-2"	5Y 5/1		NA				Silty clay loam	
2-14"	2.5Y 5/2		5Y 4/1	2%	C	M	Silty clay loam	Mottles: Fine, few, faint

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___Histosol (A1)
___Histic Epipedon (A2)
___Black Histic (A3)
___Hydrogen Sulfide (A4)
___Stratified Layers (A5) (LRR F)
___1 cm Muck (A9) (LRR F, G, H)
___Depleted Below Dark Surface (A12)
___Thick Dark Surface (A12)
___Sandy Mucky Mineral (S1)
___2.5 Mucky Peat or Peat (S2) (LRR G,H)
___5 cm Mucky Peat or Peat (S3) (LRR F)
___Sandy Gleyed Matrix (S4)
___Sandy Redox (S5)
___Striped Matrix (S6)
_X_Loamy Mucky Mineral (F1)
___Loamy Gleyed Matrix (F2)
___Depleted Matrix (F3)
___Redox Dark Surface (F6)
___Depleted Dark Surface (F7)
___Redox Depressions (F8)
___High Plains Depressions (F16) (MLRA 72 & 73 of LRR H)

Indicators for Problematic Hydric Soils[3]:

___1 cm Muck (A9) (LRR I, J)
___Coast Prairie Redox (A16) (LRR F, G, H)
___Dark Surface (S7) (LRR G)
___High Plains Depressions (F16) (LRR H outside of MLRA 72 & 73)
___Reduced Vertic (F18)
___Red Parent Material (TF2)
___Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if present):

Type:_____ Hydric Soil Present? Yes__X__ No_____

Depth (inches) :_____

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

___Surface Water (A1)
_X_Saturation (A3)
___Water Marks (B1)
___Sediment Deposits (B2)
___Drift Deposits (B3)
___Algal Mat or Crust (B4)
___Iron Deposits (B5)
___Inundation Visible on Aerial Imagery (B7)
___Water-Stained Leave (B9)
___Salt Crust (B11)
___Hydrogen Sulfide Odor (C1)
___Dry Season Water Table (C2)
___Oxidized Rhizospheres on Living Roots (C3) (where not tilled)
___Presence of Reduced Iron (C4)
___Thin Muck Surface (C7)
___Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

___Sparsely Vegetated Concave Surface (B8)
___Drainage Patterns (B10)
___Oxidized Rhizospheres on Living Roots (C3) (where tilled)
___Crayfish Burrows (C8)
___Saturation Visible of Aerial Imagery (C9)
___Geomorphic Position (D2)
___FAC-Neutral Test (D5)
___Frost-Heave Hummocks (D7) (LRR F)

Field Observations:

Surface Water Present? Yes _____ No__X__ Depth (inches)_____
Water Table Present? Yes ____ No__X__ Depth (inches)_____
Saturation Present? Yes_X__No_____ Depth (inches)____*_____
(includes capillary fringe)
* Saturated to the surface.

Wetland Hydrology Present?
Yes__X__No_____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Ludeman License Area | Sampling Date: 6/10/2008
Applicant/Owner: Uranium One | City/County: Converse County
Investigator(s): K. LaClair | Section,Township,Range: Sec 15, T34N R73W | State: WY
Landform (hillslope, terrace, etc.): Depression in drainage | Local relief (concave, convex, none) concave | Slope (%) 2%
Subregion (LRR): LRR H | Lat: -105.596 | Long: 42.924 | Datum: NAD-83
Soil Map Unit Name: 263-Ustic Torriorthents, gullied | NWI classification na | Sampling Point: WL-28
Are climate/hydrologic conditions on the site typical for this time of year? Yes X No (If no, explain in Remarks.)
Are "Normal Circumstances" present? Yes X No

Are Vegetation____, Soil____, or Hydology____ significantly disturbed? Yes____ No X
Are Vegetation____, Soil____, or Hydrology____naturally problematic? Yes____ No X
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes X No
Hydric Soil Present? Yes X No — Is the Sampled Area within a Wetland? Yes X No
Wetland Hydrology Present? Yes X No

Remarks:
This is a depression in a drainage. Soil Unit 263 is listed as hydric by the NRCS.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size:)	Absolute %Cover	Dominate Species?	Indicator Status
1			
2			
3			
4			
		=Total Cover	
Sapling/Shrub Stratum (Plot size:)			
1			
2			
3			
4			
5			
		=Total Cover	
Herb Stratum (Plot size: 20sf)			
1 *Eleocharis palustris*	30	Y	OBL
2 *Agropyron smithii*	8	N	FACU
3 *Poa sp.*	2	N	
4			
5			
6			
7			
8			
9			
10			
	40%	=Total Cover	
Woody Vine Stratum (Plot size:)			
1			
2			
		=Total Cover	

% Bare Ground in Herb Stratum 60%

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That are OBL,FACW, or FAC: 100 % (A/B)

Prevalence Index Worksheet:

Total % Cover of:	Multiple by:	
OBL species	x 1 =	
FACW species	x 2 =	
FAC species	x 3 =	
FACU species	x 4 =	
UPL species	x 5 =	
Column Totals: A)		(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:
X Dominance Test is >50%
_____Prevalence Index is ≤ 3.0[1]
_____Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
_____Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present?
Yes X No

Remarks:

SOIL Sampling Point WL-28

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	
0-4"	10YR 4/2		10YR 5/8	<2%	C	M	Sandy loam	Mottles: Fine, few, prominent
3-14"	10YR 4/2		7.5YR 5/8	<2%	C	M	Sandy loam	Mottles: Fine, few, prominent
								Oxidized root channels 0-14"

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___Histosol (A1)
___Histic Epipedon (A2)
___Black Histic (A3)
___Hydrogen Sulfide (A4)
___Stratified Layers (A5) (LRR F)
___1 cm Muck (A9) (LRR F, G, H)
___Depleted Below Dark Surface (A12)
___Thick Dark Surface (A12)
___Sandy Mucky Mineral (S1)
___2.5 Mucky Peat or Peat (S2) (LRR G,H)
___5 cm Mucky Peat or Peat (S3) (LRR F)
___Sandy Gleyed Matrix (S4)
___Sandy Redox (S5)
___Striped Matrix (S6)
_X_Loamy Mucky Mineral (F1)
___Loamy Gleyed Matrix (F2)
___Depleted Matrix (F3)
___Redox Dark Surface (F6)
___Depleted Dark Surface (F7)
___Redox Depressions (F8)
___High Plains Depressions (F16) (MLRA 72 & 73 of LRR H)

Indicators for Problematic Hydric Soils[3]:

___1 cm Muck (A9) (LRR I, J)
___Coast Prairie Redox (A16) (LRR F, G, H)
___Dark Surface (S7) (LRR G)
___High Plains Depressions (F16) (LRR H outside of MLRA 72 & 73)
___Reduced Vertic (F18)
___Red Parent Material (TF2)
___Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if present):

Type:_____ Hydric Soil Present? Yes__X__ No_____

Depth (inches) :_____

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

___Surface Water (A1)
___Saturation (A3)
___Water Marks (B1)
___Sediment Deposits (B2)
___Drift Deposits (B3)
___Algal Mat or Crust (B4)
___Iron Deposits (B5)
___Inundation Visible on Aerial Imagery (B7)
___Water-Stained Leave (B9)
___Salt Crust (B11)
___Hydrogen Sulfide Odor (C1)
___Dry Season Water Table (C2)
_X_Oxidized Rhizospheres on Living Roots (C3) (where not tilled)
___Presence of Reduced Iron (C4)
___Thin Muck Surface (C7)
___Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

___Sparsely Vegetated Concave Surface (B8)
___Drainage Patterns (B10)
___Oxidized Rhizospheres on Living Roots (C3) (where tilled)
___Crayfish Burrows (C8)
___Saturation Visible of Aerial Imagery (C9)
___Geomorphic Position (D2)
___FAC-Neutral Test (D5)
___Frost-Heave Hummocks (D7) (LRR F)

Field Observations:

Surface Water Present? Yes ____ No_X_ Depth (inches)_____
Water Table Present? Yes____ No__X__ Depth (inches)_____
Saturation Present? Yes____ No__X__ Depth (inches)__*_____
(includes capillary fringe)

* Soil was moist at 14".

Wetland Hydrology Present?

Yes__X__ No_____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Ludeman License Area | Sampling Date: 6/12/2008
Applicant/Owner: Uranium One | City/County: Converse County
Investigator(s): W. Stansbury | Section,Township,Range: Sec 22, T34NR73W | State: WY
Landform (hillslope, terrace, etc.): Depression in drainage | Local relief (concave, convex, none) concave | Slope (%) <2%
Subregion (LRR): LRR H | Lat: -105.599 | Long: 42.904 | Datum: NAD-83
Soil Map Unit Name: 152-Forkwood-Cambria loams, 187-Kishona-Cambria loams, 189-Kishona-Cambria-Theedle loams
NWI classification PUSAh | Sampling Point WL-29
Are climate/hydrologic conditions on the site typical for this time of year? Yes X No (If no, explain in Remarks.)
Are "Normal Circumstances" present? Yes X No

Are Vegetation____, Soil____, or Hydology____ significantly disturbed? Yes____ No X
Are Vegetation____, Soil____, or Hydrology____naturally problematic? Yes____ No X
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes X No
Hydric Soil Present? Yes X No
Wetland Hydrology Present? Yes X No
Is the Sampled Area within a Wetland? Yes X No

Remarks:
This is a string of intermittent wetlands (30 wetlands, WL-29a through WL-29dd) that are discontinuous depressions along the same channel. They range in size from 0.001acres to 0.127 acres.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size:)	Absolute %Cover	Dominate Species?	Indicator Status
1			
2			
3			
4			
		=Total Cover	
Sapling/Shrub Stratum (Plot size:)			
1			
2			
3			
4			
5			
		=Total Cover	
Herb Stratum (Plot size: 20sf)			
1 *Eleocharis palustris*	40	Y	OBL
2			
3			
4			
5			
6			
7			
8			
9			
10			
	40%	=Total Cover	
Woody Vine Stratum (Plot size:)			
1			
2			
		=Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That are OBL,FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet:

Total % Cover of:	Multiple by:	
OBL species	x 1 =	
FACW species	x 2 =	
FAC species	x 3 =	
FACU species	x 4 =	
UPL species	x 5 =	
Column Totals: A)		(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:
X Dominance Test is >50%
____ Prevalence Index is ≤ 3.0[1]
____ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
____ Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No

% Bare Ground in Herb Stratum 60%

Remarks:

SOIL Sampling Point WL-29

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	
0-14"	2.5Y 5/1		7.5YR 5/6	15%	C	M	Silty clay loam	Mottles: Fine, common, prominent

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___Histosol (A1)
- ___Histic Epipedon (A2)
- ___Black Histic (A3)
- ___Hydrogen Sulfide (A4)
- ___Stratified Layers (A5) (LRR F)
- ___1 cm Muck (A9) (LRR F, G, H)
- ___Depleted Below Dark Surface (A12)
- ___Thick Dark Surface (A12)
- ___Sandy Mucky Mineral (S1)
- ___2.5 Mucky Peat or Peat (S2) (LRR G,H)
- ___5 cm Mucky Peat or Peat (S3) (LRR F)
- ___Sandy Gleyed Matrix (S4)
- ___Sandy Redox (S5)
- ___Striped Matrix (S6)
- X Loamy Mucky Mineral (F1)
- ___Loamy Gleyed Matrix (F2)
- ___Depleted Matrix (F3)
- ___Redox Dark Surface (F6)
- ___Depleted Dark Surface (F7)
- ___Redox Depressions (F8)
- ___High Plains Depressions (F16) (MLRA 72 & 73 of LRR H)

Indicators for Problematic Hydric Soils[3]:

- ___1 cm Muck (A9) (LRR I, J)
- ___Coast Prairie Redox (A16) (LRR F, G, H)
- ___Dark Surface (S7) (LRR G)
- ___High Plains Depressions (F16) (LRR H outside of MLRA 72 & 73)
- ___Reduced Vertic (F18)
- ___Red Parent Material (TF2)
- ___Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if present):

Type:_____ Hydric Soil Present? Yes X No_____

Depth (inches) :_____

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- X Surface Water (A1)
- X Saturation (A3)
- ___Water Marks (B1)
- ___Sediment Deposits (B2)
- ___Drift Deposits (B3)
- ___Algal Mat or Crust (B4)
- ___Iron Deposits (B5)
- ___Inundation Visible on Aerial Imagery (B7)
- ___Water-Stained Leave (B9)
- ___Salt Crust (B11)
- ___Hydrogen Sulfide Odor (C1)
- ___Dry Season Water Table (C2)
- ___Oxidized Rhizospheres on Living Roots (C3) (where not tilled)
- ___Presence of Reduced Iron (C4)
- ___Thin Muck Surface (C7)
- ___Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___Sparsely Vegetated Concave Surface (B8)
- ___Drainage Patterns (B10)
- ___Oxidized Rhizospheres on Living Roots (C3) (where tilled)
- ___Crayfish Burrows (C8)
- ___Saturation Visible of Aerial Imagery (C9)
- ___Geomorphic Position (D2)
- ___FAC-Neutral Test (D5)
- ___Frost-Heave Hummocks (D7) (LRR F)

Field Observations:

Surface Water Present? Yes X No_____ Depth (inches) 6 inches

Water Table Present? Yes_____ No X Depth (inches)_____

Saturation Present? Yes X No_____ Depth (inches) *

(includes capillary fringe)

* Saturated to the surface.

Wetland Hydrology Present?

Yes X No_____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Ludeman License Area Sampling Date: 6/11/2008
Applicant/Owner: Uranium One City/County: Converse County
Investigator(s): K. LaClair Section,Township,Range: Sec 22, T34N R73W State: WY
Landform (hillslope, terrace, etc.): Depression in drainage Local relief (concave, convex, none) concave Slope (%) <2%
Subregion (LRR): LRR H Lat: -105.601 Long: 42.900 Datum: NAD-83
Soil Map Unit Name: 152-Forkwood-Cambria loams NWI classification na Sampling Point WL-30
Are climate/hydrologic conditions on the site typical for this time of year? Yes X No (If no, explain in Remarks.)
Are "Normal Circumstances" present? Yes X No

Are Vegetation____, Soil____, or Hydology____ significantly disturbed? Yes____ No X
Are Vegetation____, Soil____, or Hydrology____naturally problematic? Yes____ No X
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes X No
Hydric Soil Present? Yes X No Is the Sampled Area
Wetland Hydrology Present? Yes X No within a Wetland? Yes X No

Remarks:
This is a string of intermittent wetlands (4 wetlands, WL-30a through WL-30d) that are disconnected depressions along the same drainage. They range in size from 0.002 acres to 0.007 acres.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size:)	Absolute %Cover	Dominate Species?	Indicator Status
1			
2			
3			
4			
		=Total Cover	
Sapling/Shrub Stratum (Plot size:)			
1			
2			
3			
4			
5			
		=Total Cover	
Herb Stratum (Plot size: 20sf)			
1 *Eleocharis palustris*	40	Y	OBL
2			
3			
4			
5			
6			
7			
8			
9			
10			
	40%	=Total Cover	
Woody Vine Stratum (Plot size:)			
1			
2			
		=Total Cover	

% Bare Ground in Herb Stratum 60%

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That are OBL,FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet:

Total % Cover of:	Multiple by:	
OBL species	x 1 =	
FACW species	x 2 =	
FAC species	x 3 =	
FACU species	x 4 =	
UPL species	x 5 =	
Column Totals: A)		(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

X Dominance Test is >50%
____Prevalence Index is ≤ 3.0[1]
____Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
____Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present?
Yes X No

Remarks:

SOIL Sampling Point WL-30

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	
0-4"	2.5Y 4/2		10YR 4/6	<2%	C	M	Loam	Mottles: Medium, few, prominent
4-14"	2.5Y 4/2						Sandy silt loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___Histosol (A1)
___Histic Epipedon (A2)
___Black Histic (A3)
___Hydrogen Sulfide (A4)
___Stratified Layers (A5) (LRR F)
___1 cm Muck (A9) (LRR F, G, H)
___Depleted Below Dark Surface (A12)
___Thick Dark Surface (A12)
___Sandy Mucky Mineral (S1)
___2.5 Mucky Peat or Peat (S2) (LRR G,H)
___5 cm Mucky Peat or Peat (S3) (LRR F)
___Sandy Gleyed Matrix (S4)
___Sandy Redox (S5)
___Striped Matrix (S6)
_X_Loamy Mucky Mineral (F1)
___Loamy Gleyed Matrix (F2)
___Depleted Matrix (F3)
___Redox Dark Surface (F6)
___Depleted Dark Surface (F7)
___Redox Depressions (F8)
___High Plains Depressions (F16) (MLRA 72 & 73 of LRR H)

Indicators for Problematic Hydric Soils[3]:

___1 cm Muck (A9) (LRR I, J)
___Coast Prairie Redox (A16) (LRR F, G, H)
___Dark Surface (S7) (LRR G)
___High Plains Depressions (F16) (LRR H outside of MLRA 72 & 73)
___Reduced Vertic (F18)
___Red Parent Material (TF2)
___Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if present):

Type:_____ Hydric Soil Present? Yes__X__ No_____

Depth (inches) :_____

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

___Surface Water (A1)
___Saturation (A3)
___Water Marks (B1)
___Sediment Deposits (B2)
___Drift Deposits (B3)
___Algal Mat or Crust (B4)
___Iron Deposits (B5)
___Inundation Visible on Aerial Imagery (B7)
___Water-Stained Leave (B9)
___Salt Crust (B11)
___Hydrogen Sulfide Odor (C1)
___Dry Season Water Table (C2)
___Oxidized Rhizospheres on Living Roots (C3) (where not tilled)
___Presence of Reduced Iron (C4)
___Thin Muck Surface (C7)
___Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

___Sparsely Vegetated Concave Surface (B8)
_X_Drainage Patterns (B10)
___Oxidized Rhizospheres on Living Roots (C3) (where tilled)
___Crayfish Burrows (C8)
___Saturation Visible of Aerial Imagery (C9)
___Geomorphic Position (D2)
_X_FAC-Neutral Test (D5)
___Frost-Heave Hummocks (D7) (LRR F)

Field Observations:

Surface Water Present? Yes ____ No__X__ Depth (inches)_____
Water Table Present? Yes_____No__X__ Depth (inches)_____
Saturation Present? Yes ____ No__X__ Depth (inches)_____
(includes capillary fringe)

Wetland Hydrology Present?

Yes__X__No_____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Ludeman License Area Sampling Date: 6/11/2008
Applicant/Owner: Uranium One City/County: Converse County
Investigator(s): W. Stansbury Section,Township,Range: Sec 22, T34NR73W State: WY
Landform (hillslope, terrace, etc.): Depression in drainage Local relief (concave, convex, none) concave Slope (%) <2%
Subregion (LRR): LRR H Lat: -105.595 Long: 42.901 Datum: NAD-83
Soil Map Unit Name: 152-Forkwood-Cambria loams, 189-Kishona-Cambria-Theedle loams, 251-Theedle-Kishona-Shingle loams
NWI classification PEMA Sampling Point WL-31
Are climate/hydrologic conditions on the site typical for this time of year? Yes X No (If no, explain in Remarks.)
Are "Normal Circumstances" present? Yes X No

Are Vegetation____, Soil____, or Hydology____ significantly disturbed? Yes____ No X
Are Vegetation____, Soil____, or Hydrology____naturally problematic? Yes____ No X
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes X No
Hydric Soil Present? Yes X No
Wetland Hydrology Present? Yes X No
Is the Sampled Area within a Wetland? Yes X No

Remarks:
This is a string of intermittent wetlands (25 wetlands, WL-31a through WL-31y) that are discontinuous depressions along the same channel. They range in size from 0.001acres to 0.289 acres.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size:)	Absolute %Cover	Dominate Species?	Indicator Status
1			
2			
3			
4			
		=Total Cover	
Sapling/Shrub Stratum (Plot size:)			
1			
2			
3			
4			
5			
		=Total Cover	
Herb Stratum (Plot size: 20sf)			
1 *Eleocharis palustris*	40	Y	OBL
2			
3			
4			
5			
6			
7			
8			
9			
10			
	40%	=Total Cover	
Woody Vine Stratum (Plot size:)			
1			
2			
		=Total Cover	

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That are OBL,FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet:

Total % Cover of:	Multiple by:	
OBL species	x 1 =	
FACW species	x 2 =	
FAC species	x 3 =	
FACU species	x 4 =	
UPL species	x 5 =	
Column Totals: A)		(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:
X Dominance Test is >50%
____Prevalence Index is ≤ 3.0[1]
____Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
____Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present?
Yes X No

% Bare Ground in Herb Stratum 60%

Remarks:

SOIL Sampling Point WL-31

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	
0-4"	2.5Y 4/1		2.5Y 5/3	<2%	C	M	Sandy loam	Mottles: Fine, few, distinct
4-14"	2.5Y 5/2		7.5YR 5/6	<2%	C	M	Sandy loam	Mottles: Fine, few, prominent

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___Histosol (A1)
- ___Histic Epipedon (A2)
- ___Black Histic (A3)
- ___Hydrogen Sulfide (A4)
- ___Stratified Layers (A5) (LRR F)
- ___1 cm Muck (A9) (LRR F, G, H)
- ___Depleted Below Dark Surface (A12)
- ___Thick Dark Surface (A12)
- ___Sandy Mucky Mineral (S1)
- ___2.5 Mucky Peat or Peat (S2) (LRR G,H)
- ___5 cm Mucky Peat or Peat (S3) (LRR F)
- ___Sandy Gleyed Matrix (S4)
- ___Sandy Redox (S5)
- ___Striped Matrix (S6)
- _X_Loamy Mucky Mineral (F1)
- ___Loamy Gleyed Matrix (F2)
- ___Depleted Matrix (F3)
- ___Redox Dark Surface (F6)
- ___Depleted Dark Surface (F7)
- ___Redox Depressions (F8)
- ___High Plains Depressions (F16) (MLRA 72 & 73 of LRR H)

Indicators for Problematic Hydric Soils[3]:

- ___1 cm Muck (A9) (LRR I, J)
- ___Coast Prairie Redox (A16) (LRR F, G, H)
- ___Dark Surface (S7) (LRR G)
- ___High Plains Depressions (F16) (LRR H outside of MLRA 72 & 73)
- ___Reduced Vertic (F18)
- ___Red Parent Material (TF2)
- ___Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if present):

Type:_____

Depth (inches) :_____

Hydric Soil Present? Yes__X__ No_____

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- X Surface Water (A1)
- X Saturation (A3)
- ___Water Marks (B1)
- ___Sediment Deposits (B2)
- ___Drift Deposits (B3)
- ___Algal Mat or Crust (B4)
- ___Iron Deposits (B5)
- ___Inundation Visible on Aerial Imagery (B7)
- ___Water-Stained Leave (B9)
- ___Salt Crust (B11)
- ___Hydrogen Sulfide Odor (C1)
- ___Dry Season Water Table (C2)
- ___Oxidized Rhizospheres on Living Roots (C3) (where not tilled)
- ___Presence of Reduced Iron (C4)
- ___Thin Muck Surface (C7)
- ___Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___Sparsely Vegetated Concave Surface (B8)
- ___Drainage Patterns (B10)
- ___Oxidized Rhizospheres on Living Roots (C3) (where tilled)
- ___Crayfish Burrows (C8)
- ___Saturation Visible of Aerial Imagery (C9)
- ___Geomorphic Position (D2)
- ___FAC-Neutral Test (D5)
- ___Frost-Heave Hummocks (D7) (LRR F)

Field Observations:

Surface Water Present? Yes _X_ No_____ Depth (inches)___4 inches_

Water Table Present? Yes_____ No_X_ Depth (inches)_____

Saturation Present? Yes_X_ No_____ Depth (inches)___*_____

(includes capillary fringe)

* Saturated to the surface.

Wetland Hydrology Present?

Yes__X__ No_____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Ludeman License Area Sampling Date: 6/12/2008
Applicant/Owner: Uranium One City/County: Converse County
Investigator(s): W. Stansbury Section,Township,Range: Sec 22 & 23, T34N R73W State: WY
Landform (hillslope, terrace, etc.): Depression in drainage Local relief (concave, convex, none) concave Slope (%) 2%
Subregion (LRR): LRR H Lat: -105.594 Long: 42.902 Datum: NAD-83
Soil Map Unit Name: 251-Theedle-Kishona-Shingle loams NWI classification na Sampling Point WL-32
Are climate/hydrologic conditions on the site typical for this time of year? Yes X No (If no, explain in Remarks.)
Are "Normal Circumstances" present? Yes X No

Are Vegetation ____, Soil ____, or Hydology ____ significantly disturbed? Yes ____ No X
Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? Yes ____ No X
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes X No
Hydric Soil Present? Yes X No
Wetland Hydrology Present? Yes X No
Is the Sampled Area within a Wetland? Yes X No

Remarks:
This is a string of intermittent wetlands (WL-32a through WL-32d) that are discontinuous depressions along the same channel. They range in size from 0.002 acres to 0.053 acres.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size:)	Absolute %Cover	Dominate Species?	Indicator Status
1			
2			
3			
4			
		=Total Cover	
Sapling/Shrub Stratum (Plot size:)			
1			
2			
3			
4			
5			
		=Total Cover	
Herb Stratum (Plot size: 20sf)			
1 *Eleocharis palustris*	40	Y	OBL
2			
3			
4			
5			
6			
7			
8			
9			
10			
	40%	=Total Cover	
Woody Vine Stratum (Plot size:)			
1			
2			
		=Total Cover	

% Bare Ground in Herb Stratum 60%

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That are OBL,FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet:

Total % Cover of:	Multiple by:	
OBL species	x 1 =	
FACW species	x 2 =	
FAC species	x 3 =	
FACU species	x 4 =	
UPL species	x 5 =	
Column Totals: A)		(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

X Dominance Test is >50%
____ Prevalence Index is ≤ 3.0[1]
____ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
____ Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present?
Yes X No

Remarks:

SOIL Sampling Point WL-32

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	
0-1"	2.5Y 6/1		10YR 5/4	<2%	C	M	Silty loam	Mottles: Medium, few, prominent
1-6"	2.5Y 6/1		10YR 5/4	15%	C	M	Silty clay loam w/sand	Mottles: Medium, common, prominent
6-14"	2.5Y 5/1	50%	10YR 5/4	<2%	C	M	Silty loam w/sand	Mottles: Medium, few, faint
	2.5Y 5/2	50%						Blended Matrix

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___Histosol (A1)
- ___Histic Epipedon (A2)
- ___Black Histic (A3)
- ___Hydrogen Sulfide (A4)
- ___Stratified Layers (A5) (LRR F)
- ___1 cm Muck (A9) (LRR F, G, H)
- ___Depleted Below Dark Surface (A12)
- ___Thick Dark Surface (A12)
- ___Sandy Mucky Mineral (S1)
- ___2.5 Mucky Peat or Peat (S2) (LRR G,H)
- ___5 cm Mucky Peat or Peat (S3) (LRR F)
- ___Sandy Gleyed Matrix (S4)
- ___Sandy Redox (S5)
- ___Striped Matrix (S6)
- _X_Loamy Mucky Mineral (F1)
- ___Loamy Gleyed Matrix (F2)
- ___Depleted Matrix (F3)
- ___Redox Dark Surface (F6)
- ___Depleted Dark Surface (F7)
- ___Redox Depressions (F8)
- ___High Plains Depressions (F16) (MLRA 72 & 73 of LRR H)

Indicators for Problematic Hydric Soils[3]:

- ___1 cm Muck (A9) (LRR I, J)
- ___Coast Prairie Redox (A16) (LRR F, G, H)
- ___Dark Surface (S7) (LRR G)
- ___High Plains Depressions (F16) (LRR H outside of MLRA 72 & 73)
- ___Reduced Vertic (F18)
- ___Red Parent Material (TF2)
- ___Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if present):

Type:_____ Hydric Soil Present? Yes__X__ No_____

Depth (inches) :_____

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- _X_Surface Water (A1)
- _X_Saturation (A3)
- ___Water Marks (B1)
- ___Sediment Deposits (B2)
- ___Drift Deposits (B3)
- ___Algal Mat or Crust (B4)
- ___Iron Deposits (B5)
- ___Inundation Visible on Aerial Imagery (B7)
- ___Water-Stained Leave (B9)
- ___Salt Crust (B11)
- ___Hydrogen Sulfide Odor (C1)
- ___Dry Season Water Table (C2)
- ___Oxidized Rhizospheres on Living Roots (C3) (where not tilled)
- ___Presence of Reduced Iron (C4)
- ___Thin Muck Surface (C7)
- ___Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___Sparsely Vegetated Concave Surface (B8)
- ___Drainage Patterns (B10)
- ___Oxidized Rhizospheres on Living Roots (C3) (where tilled)
- ___Crayfish Burrows (C8)
- ___Saturation Visible of Aerial Imagery (C9)
- ___Geomorphic Position (D2)
- ___FAC-Neutral Test (D5)
- ___Frost-Heave Hummocks (D7) (LRR F)

Field Observations:

Surface Water Present? Yes _X_ No_____ Depth (inches)__6 inches__

Water Table Present? Yes_____ No_X_ Depth (inches)_____

Saturation Present? Yes_X_ No_____ Depth (inches)__*__

(includes capillary fringe)

* Saturated to the surface.

Wetland Hydrology Present?

Yes__X__ No_____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Ludeman License Area Sampling Date: 8/8/2008
Applicant/Owner: Uranium One City/County: Converse County
Investigator(s): K. LaClair Section,Township,Range: Sec 23, T34N R73W State: WY
Landform (hillslope, terrace, etc.): Depression in drainage Local relief (concave, convex, none) concave Slope (%) <2%
Subregion (LRR): LRR H Lat: -105.592 Long: 42.902 Datum: NAD-83
Soil Map Unit Name: 152-Forkwood-Cambria loams, 189-Kishona-Cambria-Theedle loams, 251-Theedle-Kishona-Shingle loams
NWI classification na Sampling Point WL-33
Are climate/hydrologic conditions on the site typical for this time of year? Yes X No (If no, explain in Remarks.)
Are "Normal Circumstances" present? Yes X No

Are Vegetation_____, Soil_____, or Hydology_____ significantly disturbed? Yes_____ No X
Are Vegetation_____, Soil_____, or Hydrology_____naturally problematic? Yes_____ No X
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes X No
Hydric Soil Present? Yes X No
Wetland Hydrology Present? Yes X No
Is the Sampled Area within a Wetland? Yes X No

Remarks:
This is a string of intermittent wetlands (5 wetlands, WL-33a through WL-33e) that are disconnected depressions along the same drainage. They range in size from 0.002 acres to 0.185 acres.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size:)	Absolute %Cover	Dominate Species?	Indicator Status
1			
2			
3			
4			
		=Total Cover	
Sapling/Shrub Stratum (Plot size:)			
1			
2			
3			
4			
5			
		=Total Cover	
Herb Stratum (Plot size: 20sf)			
1 *Juncus effusus*	20	Y	OBL
2 *Carex praegracilis*	20	Y	FACW
3 *Distichlis stricta* (syn. *D. spicata*)*	20	Y	FAC+
4 *Hordeum jubatum*	5	N	FACW
5 *Poa sp.*	5	N	
6 *Triglochin concinnum*	1	N	OBL
7 *Equisetum laevigatum*	1	N	FAC
8 *Sporobolis airoides*	1	N	FAC
9 *Plantago maritima*	1	N	NL
10 *Muhlenbergia asperifolia*	1	N	FACW
	75%	=Total Cover	
Woody Vine Stratum (Plot size:)			
1			
2			
		=Total Cover	

% Bare Ground in Herb Stratum 25%

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That are OBL,FACW, or FAC: 100 % (A/B)

Prevalence Index Worksheet:

Total % Cover of:	Multiple by:	
OBL species	x 1 =	
FACW species	x 2 =	
FAC species	x 3 =	
FACU species	x 4 =	
UPL species	x 5 =	
Column Totals:	A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

X Dominance Test is >50%
_____Prevalence Index is ≤ 3.0[1]
_____Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
_____Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present ? **Yes**

Remarks:
* Distichlis spicata has an indicator status of NI in Region 4 therefore the indicator status of FAC+ in adjacent Region 9 was used.

(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	
0-4"	Gley 1 2.5/10Y		5Y4/4	<2%	C	M	Loam with inclusions of black organic matter, peat, sand,	
							& small calcareous concretions inconsistently within 0-4".	
4-8"	2.5Y 3/2		5YR 4/6	5%	C	M	Silt loam	Mottles: fine, common, prominent
			5YR 4/8	5%	C	M		Mottles: fine, common, prominent
				5%	C	M		fine calcium concretions
8-12"	2.5Y 5/2		5YR 3/4	<2%	C	M	Sandy loam	Mottles: coarse, few, distinct
	Gley 1 6/10Y			2%	D	M		
	Gley 1 5/10Y			2%	D	M		
	Gley 1 2.5/N			2%	C	M		large manganese concretions

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___Histosol (A1)
___Histic Epipedon (A2)
___Black Histic (A3)
___Hydrogen Sulfide (A4)
___Stratified Layers (A5) (LRR F)
___1 cm Muck (A9) (LRR F, G, H)
___Depleted Below Dark Surface (A12)
___Thick Dark Surface (A12)
___Sandy Mucky Mineral (S1)
___2.5 Mucky Peat or Peat (S2) (LRR G,H)
___5 cm Mucky Peat or Peat (S3) (LRR F)
___Sandy Gleyed Matrix (S4)
___Sandy Redox (S5)
___Striped Matrix (S6)
___Loamy Mucky Mineral (F1)
___Loamy Gleyed Matrix (F2)
___Depleted Matrix (F3)
___Redox Dark Surface (F6)
_X_Depleted Dark Surface (F7)
___Redox Depressions (F8)
___High Plains Depressions (F16) (MLRA 72 & 73 of LRR H)

Indicators for Problematic Hydric Soils[3]:

___1 cm Muck (A9) (LRR I, J)
___Coast Prairie Redox (A16) (LRR F, G, H)
___Dark Surface (S7) (LRR G)
___High Plains Depressions (F16) (LRR H outside of MLRA 72 & 73)
___Reduced Vertic (F18)
___Red Parent Material (TF2)
___Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if present):

Type:_____ Hydric Soil Present? Yes__X__ No_____
Depth (inches) :_____

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

___Surface Water (A1)
___Saturation (A3)
___Water Marks (B1)
___Sediment Deposits (B2)
___Drift Deposits (B3)
___Algal Mat or Crust (B4)
___Iron Deposits (B5)
___Inundation Visible on Aerial Imagery (B7)
___Water-Stained Leave (B9)
___Salt Crust (B11)
___Hydrogen Sulfide Odor (C1)
___Dry Season Water Table (C2)
_X_Oxidized Rhizospheres on Living Roots (C3) (where not tilled)
___Presence of Reduced Iron (C4)
___Thin Muck Surface (C7)
___Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

___Sparsely Vegetated Concave Surface (B8)
___Drainage Patterns (B10)
___Oxidized Rhizospheres on Living Roots (C3) (where tilled)
___Crayfish Burrows (C8)
___Saturation Visible of Aerial Imagery (C9)
___Geomorphic Position (D2)
___FAC-Neutral Test (D5)
___Frost-Heave Hummocks (D7) (LRR F)

Field Observations:

Surface Water Present? Yes _____No__X__ Depth (inches) _____
Water Table Present? Yes_____No__X__ Depth (inches)_____
Saturation Present? Yes_____No__X__ Depth (inches) _____
(includes capillary fringe)

Wetland Hydrology Present?
Yes__X__No_____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Ludeman License Area | Sampling Date: 8/8/2008
Applicant/Owner: Uranium One | City/County: Converse County
Investigator(s): W. Stansbury | Section,Township,Range: Sec 23, T34N, R73W | State: WY
Landform (hillslope, terrace, etc.): Depression in drainage | Local relief (concave, convex, none) concave | Slope (%) <2%
Subregion (LRR): LRR H | Lat: -105.578 | Long: 42.898 | Datum: NAD-83
Soil Map Unit Name: 251-Theedle-Kishona-Shingle loams, 263-Ustic Torriorthents, gullied
NWI classification na | Sampling Point WL-34
Are climate/hydrologic conditions on the site typical for this time of year? Yes X No (If no, explain in Remarks.)
Are "Normal Circumstances" present? Yes X No

Are Vegetation ____, Soil ____, or Hydology ____ significantly disturbed? Yes ____ No X
Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? Yes ____ No X
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes X No
Hydric Soil Present? Yes X No
Wetland Hydrology Present? Yes X No
Is the Sampled Area within a Wetland? Yes X No

Remarks:
This is a string of intermittent wetlands (WL-34a through WL-34d) that are disconnected depressions along the same drainage. They range in size from 0.006 acres to 0.612 acres. Soil Unit 263 is listed as hydric by the NRCS.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size:)	Absolute %Cover	Dominate Species?	Indicator Status
1			
2			
3			
4			
		=Total Cover	
Sapling/Shrub Stratum (Plot size:)			
1			
2			
3			
4			
5			
		=Total Cover	
Herb Stratum (Plot size: 20sf)			
1 *Scirpus americanus*	40	Y	OBL
2 *Hordeum jubatum*	5	N	FACW
3 *Carex nebrascensis*	5	N	OBL
4			
5			
6			
7			
8			
9			
10			
	50%	=Total Cover	
Woody Vine Stratum (Plot size:)			
1			
2			
		=Total Cover	

% Bare Ground in Herb Stratum 50%

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That are OBL,FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet:

Total % Cover of:	Multiple by:	
OBL species	x 1 =	
FACW species	x 2 =	
FAC species	x 3 =	
FACU species	x 4 =	
UPL species	x 5 =	
Column Totals: A)		(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

X Dominance Test is >50%
Prevalence Index is ≤ 3.0[1]
Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No

Remarks:

SOIL Sampling Point WL-34

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	
0-4"	10YR 5/1						Sand	Many roots
4-12"	10YR 4/1		7.5Y 5/6	15%	C	M	Sandy loam	Mottles: medium, common, prominent
								Oxidized root channels in 4-12"
								Black organic material streaked through 4-12"

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___Histosol (A1)
- ___Histic Epipedon (A2)
- ___Black Histic (A3)
- ___Hydrogen Sulfide (A4)
- ___Stratified Layers (A5) (LRR F)
- ___1 cm Muck (A9) (LRR F, G, H)
- ___Depleted Below Dark Surface (A12)
- ___Thick Dark Surface (A12)
- ___Sandy Mucky Mineral (S1)
- ___2.5 Mucky Peat or Peat (S2) (LRR G,H)
- ___5 cm Mucky Peat or Peat (S3) (LRR F)
- ___Sandy Gleyed Matrix (S4)
- ___Sandy Redox (S5)
- ___Striped Matrix (S6)
- _X_Loamy Mucky Mineral (F1)
- ___Loamy Gleyed Matrix (F2)
- ___Depleted Matrix (F3)
- ___Redox Dark Surface (F6)
- ___Depleted Dark Surface (F7)
- ___Redox Depressions (F8)
- ___High Plains Depressions (F16) (MLRA 72 & 73 of LRR H)

Indicators for Problematic Hydric Soils[3]:

- ___1 cm Muck (A9) (LRR I, J)
- ___Coast Prairie Redox (A16) (LRR F, G, H)
- ___Dark Surface (S7) (LRR G)
- ___High Plains Depressions (F16) (LRR H outside of MLRA 72 & 73)
- ___Reduced Vertic (F18)
- ___Red Parent Material (TF2)
- ___Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if present):

Type:_____ Hydric Soil Present? Yes__X__ No_____

Depth (inches) :_____

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___Surface Water (A1)
- ___Saturation (A3)
- ___Water Marks (B1)
- ___Sediment Deposits (B2)
- ___Drift Deposits (B3)
- ___Algal Mat or Crust (B4)
- ___Iron Deposits (B5)
- ___Inundation Visible on Aerial Imagery (B7)
- ___Water-Stained Leave (B9)
- ___Salt Crust (B11)
- ___Hydrogen Sulfide Odor (C1)
- ___Dry Season Water Table (C2)
- _X_Oxidized Rhizospheres on Living Roots (C3) (where not tilled)
- ___Presence of Reduced Iron (C4)
- ___Thin Muck Surface (C7)
- ___Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___Sparsely Vegetated Concave Surface (B8)
- ___Drainage Patterns (B10)
- ___Oxidized Rhizospheres on Living Roots (C3) (where tilled)
- ___Crayfish Burrows (C8)
- ___Saturation Visible of Aerial Imagery (C9)
- ___Geomorphic Position (D2)
- ___FAC-Neutral Test (D5)
- ___Frost-Heave Hummocks (D7) (LRR F)

Field Observations:

Surface Water Present? Yes ____ No__X__ Depth (inches)_____

Water Table Present? Yes_____No__X__ Depth (inches)_____

Saturation Present? (includes capillary fringe) Yes ____ No__X__ Depth (inches)___ _____

Wetland Hydrology Present?

Yes__X__No_____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Ludeman License Area Sampling Date: 6/4/2008
Applicant/Owner: Uranium One City/County: Converse County
Investigator(s): K. LaClair, W. Stansbury Section,Township,Range: Sec 14, T34NR73W State: WY
Landform (hillslope, terrace, etc.): Depression in drainage Local relief (concave, convex, none) concave Slope (%) 5%
Subregion (LRR): LRR H Lat: -105.579 Long: 42.923 Datum: NAD-83
Soil Map Unit Name: 187-Kishona-Cambria loams NWI classification na Sampling Point WL-35
Are climate/hydrologic conditions on the site typical for this time of year? Yes X No (If no, explain in Remarks.)
Are "Normal Circumstances" present? Yes X No

Are Vegetation ____, Soil ____, or Hydology ____ significantly disturbed? Yes ____ No X
Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? Yes ____ No X
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes X No
Hydric Soil Present? Yes X No
Wetland Hydrology Present? Yes X No
Is the Sampled Area within a Wetland? Yes X No

Remarks:
This is a string of intermittent wetlands (5 wetlands, WL-35a through WL-35e) that are discontinuous depressions along the same channel. They range in size from 0.001 acres to 0.042 acres.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size:)	Absolute %Cover	Dominate Species?	Indicator Status
1			
2			
3			
4			
		=Total Cover	
Sapling/Shrub Stratum (Plot size:)			
1			
2			
3			
4			
5			
		=Total Cover	
Herb Stratum (Plot size: 20sf)			
1 *Eleocharis palustris*	10	Y	OBL
2 *Lappula redowskii*	5	Y	NL
3			
4			
5			
6			
7			
8			
9			
10			
	15%	=Total Cover	
Woody Vine Stratum (Plot size:)			
1			
2			
		=Total Cover	

% Bare Ground in Herb Stratum 85%

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That are OBL,FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet:

Total % Cover of:	Multiple by:	
OBL species	x 1 =	
FACW species	x 2 =	
FAC species	x 3 =	
FACU species	x 4 =	
UPL species	x 5 =	
Column Totals: A)		(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

X Dominance Test is >50%
____ Prevalence Index is ≤ 3.0[1]
____ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
____ Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present?
Yes X No

Remarks:

SOIL Sampling Point WL-35

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	
0-12"	10YR 4 /2		5YR 4/4	2%	C	M	Sandy clay	Mottles: Fine, few, prominent

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___Histosol (A1)
___Histic Epipedon (A2)
___Black Histic (A3)
___Hydrogen Sulfide (A4)
___Stratified Layers (A5) (LRR F)
___1 cm Muck (A9) (LRR F, G, H)
___Depleted Below Dark Surface (A12)
___Thick Dark Surface (A12)
___Sandy Mucky Mineral (S1)
___2.5 Mucky Peat or Peat (S2) (LRR G,H)
___5 cm Mucky Peat or Peat (S3) (LRR F)
___Sandy Gleyed Matrix (S4)
___Sandy Redox (S5)
___Striped Matrix (S6)
_X_Loamy Mucky Mineral (F1)
___Loamy Gleyed Matrix (F2)
___Depleted Matrix (F3)
___Redox Dark Surface (F6)
___Depleted Dark Surface (F7)
___Redox Depressions (F8)
___High Plains Depressions (F16) (MLRA 72 & 73 of LRR H)

Indicators for Problematic Hydric Soils[3]:

___1 cm Muck (A9) (LRR I, J)
___Coast Prairie Redox (A16) (LRR F, G, H)
___Dark Surface (S7) (LRR G)
___High Plains Depressions (F16) (LRR H outside of MLRA 72 & 73)
___Reduced Vertic (F18)
___Red Parent Material (TF2)
___Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if present):

Type:_____ Hydric Soil Present? Yes__X__ No_____

Depth (inches) :_____

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

_X_Surface Water (A1)
_X_Saturation (A3)
___Water Marks (B1)
___Sediment Deposits (B2)
___Drift Deposits (B3)
___Algal Mat or Crust (B4)
___Iron Deposits (B5)
___Inundation Visible on Aerial Imagery (B7)
___Water-Stained Leave (B9)
___Salt Crust (B11)
___Hydrogen Sulfide Odor (C1)
___Dry Season Water Table (C2)
___Oxidized Rhizospheres on Living Roots (C3) (where not tilled)
___Presence of Reduced Iron (C4)
___Thin Muck Surface (C7)
___Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

___Sparsely Vegetated Concave Surface (B8)
___Drainage Patterns (B10)
___Oxidized Rhizospheres on Living Roots (C3) (where tilled)
___Crayfish Burrows (C8)
___Saturation Visible of Aerial Imagery (C9)
___Geomorphic Position (D2)
___FAC-Neutral Test (D5)
___Frost-Heave Hummocks (D7) (LRR F)

Field Observations:

Surface Water Present? Yes__X__ No_____ Depth (inches)___8_____
Water Table Present? Yes_____No__X__ Depth (inches)_____
Saturation Present? Yes____No__X__ Depth (inches)_____
(includes capillary fringe)

Wetland Hydrology Present?

Yes__X__No_____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Ludeman License Area Sampling Date: 6/10/2008
Applicant/Owner: Uranium One City/County: Converse County
Investigator(s): W. Stansbury Section,Township,Range: Sec 14, T34N R73W State: WY
Landform (hillslope, terrace, etc.): Depression in drainage Local relief (concave, convex, none) concave Slope (%) NA
Subregion (LRR): LRR H Lat: -105.584 Long: 42.912 Datum: NAD-83
Soil Map Unit Name: 263-Ustic Torriorthents, gullied NWI classification na Sampling Point WL-36
Are climate/hydrologic conditions on the site typical for this time of year? Yes X No (If no, explain in Remarks.)
Are "Normal Circumstances" present? Yes X No

Are Vegetation____, Soil____, or Hydology____ significantly disturbed? Yes____ No X
Are Vegetation____, Soil____, or Hydrology____naturally problematic? Yes____ No X
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes X No
Hydric Soil Present? Yes X No Is the Sampled Area
Wetland Hydrology Present? Yes X No within a Wetland? Yes X No

Remarks:
This is a series of two intermittent wetlands (WL-36a and WL-36b) that are discontinuous depressions along the same channel. They range in size from 0.002 acres to 0.005 acres. Soil Unit 263 is listed as hydric by the NRCS.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size:)	Absolute %Cover	Dominate Species?	Indicator Status
1			
2			
3			
4			
		=Total Cover	
Sapling/Shrub Stratum (Plot size:)			
1			
2			
3			
4			
5			
		=Total Cover	
Herb Stratum (Plot size: 20sf)			
1 *Eleocharis palustris*	25	Y	OBL
2			
3			
4			
5			
6			
7			
8			
9			
10			
	25%	=Total Cover	
Woody Vine Stratum (Plot size:)			
1			
2			
		=Total Cover	

% Bare Ground in Herb Stratum 75%

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That are OBL,FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet:

Total % Cover of:	Multiple by:	
OBL species	x 1 =	
FACW species	x 2 =	
FAC species	x 3 =	
FACU species	x 4 =	
UPL species	x 5 =	
Column Totals: A)		(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

X Dominance Test is >50%
____ Prevalence Index is ≤ 3.0[1]
____ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
____ Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present?
Yes X No

Remarks:

SOIL Sampling Point WL-36

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	
0-12"	2.5Y 5/2		7.5YR 5/6	25%	C	M	silty loam	Mottles: Fine, many, prominent
			10YR 2/1	<2%	C	M		Mottles: Medium, few, prominent

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___Histosol (A1)
- ___Histic Epipedon (A2)
- ___Black Histic (A3)
- ___Hydrogen Sulfide (A4)
- ___Stratified Layers (A5) (LRR F)
- ___1 cm Muck (A9) (LRR F, G, H)
- ___Depleted Below Dark Surface (A12)
- ___Thick Dark Surface (A12)
- ___Sandy Mucky Mineral (S1)
- ___2.5 Mucky Peat or Peat (S2) (LRR G,H)
- ___5 cm Mucky Peat or Peat (S3) (LRR F)
- ___Sandy Gleyed Matrix (S4)
- ___Sandy Redox (S5)
- ___Striped Matrix (S6)
- _X_Loamy Mucky Mineral (F1)
- ___Loamy Gleyed Matrix (F2)
- ___Depleted Matrix (F3)
- ___Redox Dark Surface (F6)
- ___Depleted Dark Surface (F7)
- ___Redox Depressions (F8)
- ___High Plains Depressions (F16) (MLRA 72 & 73 of LRR H)

Indicators for Problematic Hydric Soils[3]:

- ___1 cm Muck (A9) (LRR I, J)
- ___Coast Prairie Redox (A16) (LRR F, G, H)
- ___Dark Surface (S7) (LRR G)
- ___High Plains Depressions (F16) (LRR H outside of MLRA 72 & 73)
- ___Reduced Vertic (F18)
- ___Red Parent Material (TF2)
- ___Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if present):

Type:_____ Hydric Soil Present? Yes__X__ No_____

Depth (inches) :_____

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- _X_Surface Water (A1)
- _X_Saturation (A3)
- ___Water Marks (B1)
- ___Sediment Deposits (B2)
- ___Drift Deposits (B3)
- ___Algal Mat or Crust (B4)
- ___Iron Deposits (B5)
- ___Inundation Visible on Aerial Imagery (B7)
- ___Water-Stained Leave (B9)
- ___Salt Crust (B11)
- ___Hydrogen Sulfide Odor (C1)
- ___Dry Season Water Table (C2)
- ___Oxidized Rhizospheres on Living Roots (C3) (where not tilled)
- ___Presence of Reduced Iron (C4)
- ___Thin Muck Surface (C7)
- ___Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___Sparsely Vegetated Concave Surface (B8)
- ___Drainage Patterns (B10)
- ___Oxidized Rhizospheres on Living Roots (C3) (where tilled)
- ___Crayfish Burrows (C8)
- ___Saturation Visible of Aerial Imagery (C9)
- ___Geomorphic Position (D2)
- ___FAC-Neutral Test (D5)
- ___Frost-Heave Hummocks (D7) (LRR F)

Field Observations:

Surface Water Present? Yes _X_ No___ Depth (inches)__<1 inch__

Water Table Present? Yes ___ No___ Depth (inches)_____

Saturation Present? Yes_X_ No___ Depth (inches)___*_____

(includes capillary fringe)

* Saturated to the surface.

Wetland Hydrology Present?

Yes__X__No_____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Ludeman License Area Sampling Date: 8/7/2008
Applicant/Owner: Uranium One City/County: Converse County
Investigator(s): W. Stansbury Section,Township,Range: Sec 14, 23, 25, 26, 36, T34N, R73W State: WY
Landform (hillslope, terrace, etc.): Depression in drainage Local relief (concave, convex, none) concave Slope (%) <2%
Subregion (LRR): LRR H Lat: -105.579 Long: 42.911 Datum: NAD-83
Soil Map Unit Name: 127-Clarkelen-Draknab complex, 129-Clarkelen-Haverdad-Bigwinder complex, 172-Hiland-Bowbac fine sandy loams, 187-Kishona-Cambria loams, 189-Kishona-Cambria-Theedle loams, 251-Theedle-Kishona-Shingle loams, 263-Ustic Torriorthents, gullied
NWI classification PEMF/PEMC Sampling Point WL-37
Are climate/hydrologic conditions on the site typical for this time of year? Yes X No (If no, explain in Remarks.)
Are "Normal Circumstances" present? Yes X No

Are Vegetation____, Soil____, or Hydology____ significantly disturbed? Yes____ No X
Are Vegetation____, Soil____, or Hydrology____naturally problematic? Yes____ No X
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes X No
Hydric Soil Present? Yes X No Is the Sampled Area
Wetland Hydrology Present? Yes X No within a Wetland? Yes X No

Remarks:
This is a string of intermittent wetlands (30 wetlands, WL-37a through WL-37dd) that are disconnected depressions along Sage Creek. They range in size from 0.001 acres to 6.532 acres. Soil Units 129 and 263 are listed as hydric by the NRCS.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size:)	Absolute %Cover	Dominate Species?	Indicator Status
1			
2			
3			
4			
		=Total Cover	
Sapling/Shrub Stratum (Plot size:)			
1			
2			
3			
4			
5			
		=Total Cover	
Herb Stratum (Plot size: 20sf)			
1 *Hordeum jubatum*	19	Y	FACW
2 *Scirpus americanus*	2	N	OBL
3 *Eleocharis palustris*	2	N	OBL
4 *Muhlenbergia asperifolia*	1	N	FACW
5 *Taraxacum officinale*	1	N	FACU
6			
7			
8			
9			
10			
	25%	=Total Cover	
Woody Vine Stratum (Plot size:)			
1			
2			
		=Total Cover	

% Bare Ground in Herb Stratum 75%

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That are OBL,FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet:

Total % Cover of:	Multiple by:	
OBL species	x 1 =	
FACW species	x 2 =	
FAC species	x 3 =	
FACU species	x 4 =	
UPL species	x 5 =	
Column Totals: A)		(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

X Dominance Test is >50%
____ Prevalence Index is ≤ 3.0[1]
____ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
____ Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present?
Yes X No

Remarks:

SOIL Sampling Point WL-37

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	
0-4"	10YR 2/1	70%	7.5YR 5/6	<2%	C	M	Silty clay	Mottles: fine, few, prominent
0-4"	5Y 5/1	30%					Blended matrix.	Oxidized root channels in 0-4"
4-16"	5Y 4/1		7.5YR 5/8	15%	C	M	Sandy loam	Mottles: coarse, common, prominent
								Oxidized root channels in 4-12"
								Black steaks of organics in 4-12"

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___Histosol (A1)
___Histic Epipedon (A2)
___Black Histic (A3)
___Hydrogen Sulfide (A4)
___Stratified Layers (A5) (LRR F)
___1 cm Muck (A9) (LRR F, G, H)
___Depleted Below Dark Surface (A12)
___Thick Dark Surface (A12)
___Sandy Mucky Mineral (S1)
___2.5 Mucky Peat or Peat (S2) (LRR G,H)
___5 cm Mucky Peat or Peat (S3) (LRR F)
___Sandy Gleyed Matrix (S4)
___Sandy Redox (S5)
___Striped Matrix (S6)
_X_Loamy Mucky Mineral (F1)
___Loamy Gleyed Matrix (F2)
___Depleted Matrix (F3)
___Redox Dark Surface (F6)
___Depleted Dark Surface (F7)
___Redox Depressions (F8)
___High Plains Depressions (F16) (MLRA 72 & 73 of LRR H)

Indicators for Problematic Hydric Soils[3]:

___1 cm Muck (A9) (LRR I, J)
___Coast Prairie Redox (A16) (LRR F, G, H)
___Dark Surface (S7) (LRR G)
___High Plains Depressions (F16) (LRR H outside of MLRA 72 & 73)
___Reduced Vertic (F18)
___Red Parent Material (TF2)
___Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if present):

Type:_____ Hydric Soil Present? Yes__X__ No_____

Depth (inches) :_____

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

___Surface Water (A1)
___Saturation (A3)
___Water Marks (B1)
___Sediment Deposits (B2)
___Drift Deposits (B3)
___Algal Mat or Crust (B4)
___Iron Deposits (B5)
___Inundation Visible on Aerial Imagery (B7)
___Water-Stained Leave (B9)
___Salt Crust (B11)
___Hydrogen Sulfide Odor (C1)
___Dry Season Water Table (C2)
_X_Oxidized Rhizospheres on Living Roots (C3) (where not tilled)
___Presence of Reduced Iron (C4)
___Thin Muck Surface (C7)
___Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

___Sparsely Vegetated Concave Surface (B8)
___Drainage Patterns (B10)
___Oxidized Rhizospheres on Living Roots (C3) (where tilled)
___Crayfish Burrows (C8)
___Saturation Visible of Aerial Imagery (C9)
___Geomorphic Position (D2)
___FAC-Neutral Test (D5)
___Frost-Heave Hummocks (D7) (LRR F)

Field Observations:

Surface Water Present? Yes ____ No__X__ Depth (inches)_____
Water Table Present? Yes____No__X__ Depth (inches)_____
Saturation Present? Yes ____ No__X__ Depth (inches)_____
(includes capillary fringe)

Wetland Hydrology Present?

Yes__X__No_____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Ludeman License Area Sampling Date: 6/3/2008
Applicant/Owner: Uranium One City/County: Converse County
Investigator(s): K. LaClair, W. Stansbury Section,Township,Range: Sec 36, T34N R73W State: WY
Landform (hillslope, terrace, etc.): Hillslope Local relief (concave, convex, none) concave Slope (%) 17%
Subregion (LRR): LRR H Lat: -105.562 Long: 42.876 Datum: NAD-83
Soil Map Unit Name: 127-Clarkelen-Draknab complex NWI classification PEMC Sampling Point WL-38
Are climate/hydrologic conditions on the site typical for this time of year? Yes X No_____ (If no, explain in Remarks.)
Are "Normal Circumstances" present? Yes X No_____

Are Vegetation_____, Soil_____, or Hydology_____ significantly disturbed? Yes_____ No X
Are Vegetation_____, Soil_____, or Hydrology_____naturally problematic? Yes_____ No X
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes X No_____
Hydric Soil Present? Yes X No_____ Is the Sampled Area
Wetland Hydrology Present? Yes X No_____ within a Wetland? Yes X No_____

Remarks:
This is a slope wetland with a depressional component.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size:_____)	Absolute %Cover	Dominate Species?	Indicator Status
1			
2			
3			
4			
		=Total Cover	
Sapling/Shrub Stratum (Plot size:_____)			
1			
2			
3			
4			
5			
		=Total Cover	
Herb Stratum (Plot size: 20sf)			
1 *Carex aquatilis*	45	Y	OBL
2 *Eleocharis palustris*	20	Y	OBL
3 *Equisetum arvense*	4	N	FAC
4 *Potentilla anserina*	4	N	OBL
5 *Mentha arvensis*	2	N	FACW
6 *Scirpus americanus*	1	N	OBL
7			
8			
9			
10			
	76%	=Total Cover	
Woody Vine Stratum (Plot size:_____)			
1			
2			
		=Total Cover	

% Bare Ground in Herb Stratum 24%

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That are OBL,FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet:

Total % Cover of:	Multiply by:	
OBL species	x 1 =	
FACW species	x 2 =	
FAC species	x 3 =	
FACU species	x 4 =	
UPL species	x 5 =	
Column Totals: A)		(B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

X Dominance Test is >50%
_____Prevalence Index is ≤ 3.0[1]
_____Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
_____Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present?
Yes X No_____

Remarks:

SOIL Sampling Point WL-38

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	
0-5"	10YR 2 /1		5YR 4/6	<2%	C	M	Mucky Peat	Mottles: Fine to medium, few, promin
5-13"	2.5YR 4/1		NA				Mucky Sand	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___Histosol (A1)
___Histic Epipedon (A2)
___Black Histic (A3)
X_Hydrogen Sulfide (A4)
___Stratified Layers (A5) (LRR F)
___1 cm Muck (A9) (LRR F, G, H)
___Depleted Below Dark Surface (A12)
___Thick Dark Surface (A12)
___Sandy Mucky Mineral (S1)
___2.5 Mucky Peat or Peat (S2) (LRR G,H)
X_5 cm Mucky Peat or Peat (S3) (LRR F)
___Sandy Gleyed Matrix (S4)
___Sandy Redox (S5)
___Striped Matrix (s6)
___Loamy Mucky Mineral (F1)
___Loamy Gleyed Matrix (F2)
___Depleted Matrix (F3)
___Redox Dark Surface (F6)
___Depleted Dark Surface (F7)
___Redox Depressions (F8)
___High Plains Depressions (F16) (MLRA 72 & 73 of LRR H)

Indicators for Problematic Hydric Soils[3]:

___1 cm Muck (A9) (LRR I, J)
___Coast Prairie Redox (A16) (LRR F, G, H)
___Dark Surface (S7) (LRR G)
___High Plains Depressions (F16) (LRR H outside of MLRA 72 & 73)
___Reduced Vertic (F18)
___Red Parent Material (TF2)
___Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if present):

Type:_____ Hydric Soil Present? Yes__X__ No_____

Depth (inches) :_____

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

X_Surface Water (A1)
X_Saturation (A3)
___Water Marks (B1)
___Sediment Deposits (B2)
___Drift Deposits (B3)
___Algal Mat or Crust (B4)
___Iron Deposits (B5)
___Inundation Visible on Aerial Imagery (B7)
___Water-Stained Leave (B9)
___Salt Crust (B11)
X_Hydrogen Sulfide Odor (C1)
___Dry Season Water Table (C2)
___Oxidized Rhizospheres on Living Roots (C3) (where not tilled)
___Presence of Reduced Iron (C4)
___Thin Muck Surface (C7)
___Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

___Sparsely Vegetated Concave Surface (B8)
___Drainage Patterns (B10)
___Oxidized Rhizospheres on Living Roots (C3) (where tilled)
___Crayfish Burrows (C8)
___Saturation Visible of Aerial Imagery (C9)
___Geomorphic Position (D2)
___FAC-Neutral Test (D5)
___Frost-Heave Hummocks (D7) (LRR F)

Field Observations:

Surface Water Present? Yes_X_ No_____ Depth (inches)__<1"_____
Water Table Present? Yes_X_ No_____ Depth (inches)__13"_____
Saturation Present? Yes_X_ No_____ Depth (inches)__*_____
(includes capillary fringe)

* Saturated to the surface with some areas of surface water. Standing water in pit at depth of 13".

Wetland Hydrology Present?

Yes__X__ No_____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Ludeman License Area Sampling Date: 6/3/2008
Applicant/Owner: Uranium One City/County: Converse County
Investigator(s): K. LaClair, W. Stansbury Section,Township,Range: Sec 36, T34N R73W State: WY
Landform (hillslope, terrace, etc.): Hillslope Local relief (concave, convex, none) concave Slope (%) 17%
Subregion (LRR): LRR H Lat: -105.563 Long: 42.876 Datum: NAD-83
Soil Map Unit Name: 127-Clarkelen Draknab complex , 251-Theedle-Kishona-Shingle loams
NWI classification na Sampling Point WL-39
Are climate/hydrologic conditions on the site typical for this time of year? Yes X No (If no, explain in Remarks.)
Are "Normal Circumstances" present? Yes X No

Are Vegetation____, Soil____, or Hydology____ significantly disturbed? Yes____ No X
Are Vegetation____, Soil____, or Hydrology____naturally problematic? Yes____ No X
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes X No
Hydric Soil Present? Yes X No
Wetland Hydrology Present? Yes X No
Is the Sampled Area within a Wetland? Yes X No

Remarks:
This is a slope wetland with a depressional component.

VEGETATION – Use scientific names of plants.

	Absolute %Cover	Dominate Species?	Indicator Status
Tree Stratum (Plot size:)			
1			
2			
3			
4			
		=Total Cover	
Sapling/Shrub Stratum (Plot size:)			
1			
2			
3			
4			
5			
		=Total Cover	
Herb Stratum (Plot size: 20sf)			
1 *Scirpus validus*	40	Y	OBL
2 *Eleocharis palustris*	40	Y	OBL
3 *Carex lanuginosa*	5	N	OBL
4 *Potentilla anserina*	3	N	OBL
5 *Carex acuatilis*	1	N	OBL
6 *Mentha arvensis*	1	N	FACW
7			
8			
9			
10			
	90%	=Total Cover	
Woody Vine Stratum (Plot size:)			
1			
2			
		=Total Cover	

% Bare Ground in Herb Stratum 10%

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That are OBL,FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet:

Total % Cover of:	Multiple by:	
OBL species	x 1 =	
FACW species	x 2 =	
FAC species	x 3 =	
FACU species	x 4 =	
UPL species	x 5 =	
Column Totals: A)		(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

X Dominance Test is >50%
_____Prevalence Index is ≤ 3.0[1]
_____Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
_____Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present?
Yes X No

Remarks:

SOIL Sampling Point WL-39

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture
0-6"	10YR 2 /1		NA				Peat
6-20"	2.5Y 3/2		NA				Mucky Peat
20+"	2.5Y 4/2		NA				Peaty clay

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- _X_Histosol (A1)
- ___Histic Epipedon (A2)
- ___Black Histic (A3)
- ___Hydrogen Sulfide (A4)
- ___Stratified Layers (A5) (LRR F)
- ___1 cm Muck (A9) (LRR F, G, H)
- ___Depleted Below Dark Surface (A12)
- ___Thick Dark Surface (A12)
- ___Sandy Mucky Mineral (S1)
- ___2.5 Mucky Peat or Peat (S2) (LRR G,H)
- ___5 cm Mucky Peat or Peat (S3) (LRR F)
- ___Sandy Gleyed Matrix (S4)
- ___Sandy Redox (S5)
- ___Striped Matrix (s6)
- ___Loamy Mucky Mineral (F1)
- ___Loamy Gleyed Matrix (F2)
- ___Depleted Matrix (F3)
- ___Redox Dark Surface (F6)
- ___Depleted Dark Surface (F7)
- ___Redox Depressions (F8)
- ___High Plains Depressions (F16) (MLRA 72 & 73 of LRR H)

Indicators for Problematic Hydric Soils[3]:

- ___1 cm Muck (A9) (LRR I, J)
- ___Coast Prairie Redox (A16) (LRR F, G, H)
- ___Dark Surface (S7) (LRR G)
- ___High Plains Depressions (F16) (LRR H outside of MLRA 72 & 73)
- ___Reduced Vertic (F18)
- ___Red Parent Material (TF2)
- ___Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if present):

Type:_____

Depth (inches) :_____

Hydric Soil Present? Yes__X__ No_____

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- _X_ Surface Water (A1)
- _X_ Saturation (A3)
- ___Water Marks (B1)
- ___Sediment Deposits (B2)
- ___Drift Deposits (B3)
- ___Algal Mat or Crust (B4)
- ___Iron Deposits (B5)
- ___Inundation Visible on Aerial Imagery (B7)
- ___Water-Stained Leave (B9)
- ___Salt Crust (B11)
- ___Hydrogen Sulfide Odor (C1)
- ___Dry Season Water Table (C2)
- ___Oxidized Rhizospheres on Living Roots (C3) (where not tilled)
- ___Presence of Reduced Iron (C4)
- ___Thin Muck Surface (C7)
- ___Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___Sparsely Vegetated Concave Surface (B8)
- ___Drainage Patterns (B10)
- ___Oxidized Rhizospheres on Living Roots (C3) (where tilled)
- ___Crayfish Burrows (C8)
- ___Saturation Visible of Aerial Imagery (C9)
- ___Geomorphic Position (D2)
- ___FAC-Neutral Test (D5)
- ___Frost-Heave Hummocks (D7) (LRR F)

Field Observations:

Surface Water Present? Yes_X_ No_____ Depth (inches)__<1"_____

Water Table Present? Yes_X_ No_____ Depth (inches)__8"_____

Saturation Present? Yes_X_ No_____ Depth (inches)__*_____

(includes capillary fringe)

* Saturated to the surface with some areas of surface water. Standing water in pit at depth of 8".

Wetland Hydrology Present?

Yes__X__ No_____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Ludeman License Area Sampling Date: 6/3/2008
Applicant/Owner: Uranium One City/County: Converse County
Investigator(s): K. LaClair, W. Stansbury Section,Township,Range: Sec 36, T34N R73W State: WY
Landform (hillslope, terrace, etc.): Hillslope Local relief (concave, convex, none) concave Slope (%) 17%
Subregion (LRR): LRR H Lat: -105.561 Long: 42.873 Datum: NAD-83
Soil Map Unit Name: 127-Clarkelen Draknab complex NWI classification PEMF Sampling Point WL-40
Are climate/hydrologic conditions on the site typical for this time of year? Yes X No (If no, explain in Remarks.)
Are "Normal Circumstances" present? Yes X No

Are Vegetation____, Soil____, or Hydology____ significantly disturbed? Yes____ No X
Are Vegetation____, Soil____, or Hydrology____naturally problematic? Yes____ No X
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes X No
Hydric Soil Present? Yes X No Is the Sampled Area
Wetland Hydrology Present? Yes X No within a Wetland? Yes X No

Remarks:
This is a slope wetland with a depressional component.

VEGETATION – Use scientific names of plants.

	Absolute %Cover	Dominate Species?	Indicator Status
Tree Stratum (Plot size:)			
1			
2			
3			
4			
		=Total Cover	
Sapling/Shrub Stratum (Plot size:)			
1			
2			
3			
4			
5			
		=Total Cover	
Herb Stratum (Plot size: 20sf)			
1 *Potentilla anserina*	40	Y	OBL
2 *Carex aquatilis*	40	Y	OBL
3 *Eleocharis palustris*	5	N	OBL
4 *Scirpus americanus*	1	N	OBL
5 *Equisetum laevigatum*	1	N	FAC
6			
7			
8			
9			
10			
	87%	=Total Cover	
Woody Vine Stratum (Plot size:)			
1			
2			
		=Total Cover	

% Bare Ground in Herb Stratum 13%

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That are OBL,FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet:

Total % Cover of:	Multiple by:	
OBL species	x 1 =	
FACW species	x 2 =	
FAC species	x 3 =	
FACU species	x 4 =	
UPL species	x 5 =	
Column Totals: A)		(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

X Dominance Test is >50%
____Prevalence Index is ≤ 3.0[1]
____Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
____Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present?
Yes X No

Remarks: *Typhus angustifolia* is present in adjacent ponded area.

SOIL Sampling Point WL-40

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	
0-2"	7.5YR 2.5/1		7.5YR 4/6	<2%	C	M	Mucky Mineral	Mottles: fine, common & prominent
2-10"	7.5YR 3/1						Silt Loam with decomposing organics	
2-10"			2.5YR 4/6	10%	C	M		Mottles: fine to med., common & prominent
10+"	5Y 5/1		7.5YR 4/6	10%	C	M	Sand	Mottles: fine to med., common & prominent

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___Histosol (A1)
- ___Histic Epipedon (A2)
- ___Black Histic (A3)
- ___Hydrogen Sulfide (A4)
- ___Stratified Layers (A5) (LRR F)
- ___1 cm Muck (A9) (LRR F, G, H)
- ___Depleted Below Dark Surface (A12)
- ___Thick Dark Surface (A12)
- ___Sandy Mucky Mineral (S1)
- ___2.5 Mucky Peat or Peat (S2) (LRR G,H)
- ___5 cm Mucky Peat or Peat (S3) (LRR F)
- ___Sandy Gleyed Matrix (S4)
- ___Sandy Redox (S5)
- ___Striped Matrix (s6)
- _X_Loamy Mucky Mineral (F1)
- ___Loamy Gleyed Matrix (F2)
- ___Depleted Matrix (F3)
- ___Redox Dark Surface (F6)
- ___Depleted Dark Surface (F7)
- ___Redox Depressions (F8)
- ___High Plains Depressions (F16) (MLRA 72 & 73 of LRR H)

Indicators for Problematic Hydric Soils[3]:

- ___1 cm Muck (A9) (LRR I, J)
- ___Coast Prairie Redox (A16) (LRR F, G, H)
- ___Dark Surface (S7) (LRR G)
- ___High Plains Depressions (F16) (LRR H outside of MLRA 72 & 73)
- ___Reduced Vertic (F18)
- ___Red Parent Material (TF2)
- ___Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if present):

Type:_____ Hydric Soil Present? Yes__X__ No_____

Depth (inches) :_____

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- _X_ Surface Water (A1)
- _X_ Saturation (A3)
- ___Water Marks (B1)
- ___Sediment Deposits (B2)
- ___Drift Deposits (B3)
- ___Algal Mat or Crust (B4)
- ___Iron Deposits (B5)
- ___Inundation Visible on Aerial Imagery (B7)
- ___Water-Stained Leave (B9)
- ___Salt Crust (B11)
- ___Hydrogen Sulfide Odor (C1)
- ___Dry Season Water Table (C2)
- ___Oxidized Rhizospheres on Living Roots (C3) (where not tilled)
- ___Presence of Reduced Iron (C4)
- ___Thin Muck Surface (C7)
- ___Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___Sparsely Vegetated Concave Surface (B8)
- ___Drainage Patterns (B10)
- ___Oxidized Rhizospheres on Living Roots (C3) (where tilled)
- ___Crayfish Burrows (C8)
- ___Saturation Visible of Aerial Imagery (C9)
- ___Geomorphic Position (D2)
- ___FAC-Neutral Test (D5)
- ___Frost-Heave Hummocks (D7) (LRR F)

Field Observations:

Surface Water Present? Yes_X_ No_____ Depth (inches)__<1"_____

Water Table Present? Yes_X_ No_____ Depth (inches)__10"_____

Saturation Present? Yes_X_ No_____ Depth (inches)__*_____

(includes capillary fringe)

* Saturated to the surface with some areas of surface water. Standing water in pit at depth of 10".

Wetland Hydrology Present?

Yes__X__ No_____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Ludeman License Area Sampling Date: 8/6/2008
Applicant/Owner: Uranium One City/County: Converse County
Investigator(s): W. Stansbury Section,Township,Range: Sec 19 & 30, T34N, R72W State: WY
Landform (hillslope, terrace, etc.): diked drainage Local relief (concave, convex, none) concave Slope (%) <2%
Subregion (LRR): LRR H Lat: -105.552 Long: 42.895 Datum: NAD-83
Soil Map Unit Name: 172-Hiland-Bowbac fine sandy loams, 258-Ulm-Forkwood loams
NWI classification L2ABFh Sampling Point WL-41
Are climate/hydrologic conditions on the site typical for this time of year? Yes X No (If no, explain in Remarks.)
Are "Normal Circumstances" present? Yes X No

Are Vegetation____, Soil____, or Hydology____ significantly disturbed? Yes____ No X
Are Vegetation____, Soil____, or Hydrology____naturally problematic? Yes____ No X
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes X No____
Hydric Soil Present? Yes X No____ Is the Sampled Area
Wetland Hydrology Present? Yes X No____ within a Wetland? Yes X No____

Remarks:
This is a string of intermittent wetlands (WL-41a through WL-41f) that are disconnected depressions along the same drainage that lead to Gilbert Lake (WL-41f). Gilbert Lake is a diked drainage. They range in size from 0.001 acres to 16.011 acres.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size:)	Absolute %Cover	Dominate Species?	Indicator Status
1			
2			
3			
4			
		=Total Cover	
Sapling/Shrub Stratum (Plot size:)			
1			
2			
3			
4			
5			
		=Total Cover	
Herb Stratum (Plot size: 20sf)			
1 *Eleocharis palustris*	44	Y	OBL
2 *Lappula redowskii*	5	N	NL
3 *Hordeum jubatum*	1	N	FACW
4			
5			
6			
7			
8			
9			
10			
	40%	=Total Cover	
Woody Vine Stratum (Plot size:)			
1			
2			
		=Total Cover	

% Bare Ground in Herb Stratum 60%

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That are OBL,FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet:

Total % Cover of:	Multiple by:	
OBL species	x 1 =	
FACW species	x 2 =	
FAC species	x 3 =	
FACU species	x 4 =	
UPL species	x 5 =	
Column Totals: A)		(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:
X Dominance Test is >50%
____Prevalence Index is ≤ 3.0[1]
____Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
____Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present?
Yes X No____

Remarks:

SOIL Sampling Point WL-41

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	
0-5"	2.5Y 5/1		7.5YR 5/8	2%	C	M	Sandy loam	Mottles: fine, common, prominent
5-12"	2.5Y 5/2		7.5YR 5/8	40%	C	M	Sandy loam	Mottles: medium to coarse, many, prominent
								Oxidized root channels in 0-5"

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___Histosol (A1)
___Histic Epipedon (A2)
___Black Histic (A3)
___Hydrogen Sulfide (A4)
___Stratified Layers (A5) (LRR F)
___1 cm Muck (A9) (LRR F, G, H)
___Depleted Below Dark Surface (A12)
___Thick Dark Surface (A12)
_X_Sandy Mucky Mineral (S1)
___2.5 Mucky Peat or Peat (S2) (LRR G,H)
___5 cm Mucky Peat or Peat (S3) (LRR F)
___Sandy Gleyed Matrix (S4)
___Sandy Redox (S5)
___Striped Matrix (S6)
___Loamy Mucky Mineral (F1)
___Loamy Gleyed Matrix (F2)
___Depleted Matrix (F3)
___Redox Dark Surface (F6)
___Depleted Dark Surface (F7)
___Redox Depressions (F8)
___High Plains Depressions (F16) (MLRA 72 & 73 of LRR H)

Indicators for Problematic Hydric Soils[3]:

___1 cm Muck (A9) (LRR I, J)
___Coast Prairie Redox (A16) (LRR F, G, H)
___Dark Surface (S7) (LRR G)
___High Plains Depressions (F16) (LRR H outside of MLRA 72 & 73)
___Reduced Vertic (F18)
___Red Parent Material (TF2)
___Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if present):

Type:_____ Hydric Soil Present? Yes_X_ No_____

Depth (inches) :_____

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

___Surface Water (A1)
___Saturation (A3)
___Water Marks (B1)
___Sediment Deposits (B2)
___Drift Deposits (B3)
___Algal Mat or Crust (B4)
___Iron Deposits (B5)
___Inundation Visible on Aerial Imagery (B7)
___Water-Stained Leave (B9)
___Salt Crust (B11)
___Hydrogen Sulfide Odor (C1)
___Dry Season Water Table (C2)
_X_Oxidized Rhizospheres on Living Roots (C3) (where not tilled)
___Presence of Reduced Iron (C4)
___Thin Muck Surface (C7)
___Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

___Sparsely Vegetated Concave Surface (B8)
___Drainage Patterns (B10)
___Oxidized Rhizospheres on Living Roots (C3) (where tilled)
___Crayfish Burrows (C8)
___Saturation Visible of Aerial Imagery (C9)
___Geomorphic Position (D2)
___FAC-Neutral Test (D5)
___Frost-Heave Hummocks (D7) (LRR F)

Field Observations:

Surface Water Present? Yes _X_ No____ Depth (inches)__4 inches__
Water Table Present? Yes____ No_X_ Depth (inches)_____
Saturation Present? (includes capillary fringe) Yes ____ No_X_ Depth (inches)_____

Wetland Hydrology Present?

Yes_X_ No____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Ludeman License Area Sampling Date: 8/6/2008
Applicant/Owner: Uranium One City/County: Converse County
Investigator(s): W. Stansbury Section,Township,Range: Sec 19, T34N, R72W State: WY
Landform (hillslope, terrace, etc.): Depression Local relief (concave, convex, none) concave Slope (%) <2%
Subregion (LRR): LRR H Lat: -105.555 Long: 42.899 Datum: NAD-83
Soil Map Unit Name: 258-Ulm-Forkwood loams NWI classification PUSC Sampling Point WL-42
Are climate/hydrologic conditions on the site typical for this time of year? Yes X No (If no, explain in Remarks.)
Are "Normal Circumstances" present? Yes X No

Are Vegetation____, Soil____, or Hydology____ significantly disturbed? Yes____ No X
Are Vegetation____, Soil____, or Hydrology____naturally problematic? Yes____ No X
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes X No
Hydric Soil Present? Yes X No
Wetland Hydrology Present? Yes X No
Is the Sampled Area within a Wetland? Yes X No

Remarks:
This is an isolated depression in rolling rangeland.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size:)	Absolute %Cover	Dominate Species?	Indicator Status
1			
2			
3			
4			
		=Total Cover	
Sapling/Shrub Stratum (Plot size:)			
1			
2			
3			
4			
5			
		=Total Cover	
Herb Stratum (Plot size: 20sf)			
1 *Eleocharis palustris*	34	Y	OBL
2 *Ambrosia tomentosa*	5	N	NL
3 *Hordeum jubatum*	1	N	FACW
4			
5			
6			
7			
8			
9			
10			
	40%	=Total Cover	
Woody Vine Stratum (Plot size:)			
1			
2			
		=Total Cover	

% Bare Ground in Herb Stratum 60%

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That are OBL,FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet:

Total % Cover of:	Multiple by:
OBL species	x 1 =
FACW species	x 2 =
FAC species	x 3 =
FACU species	x 4 =
UPL species	x 5 =
Column Totals: A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

X Dominance Test is >50%
____Prevalence Index is ≤ 3.0[1]
____Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
____Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present?
Yes X No

Remarks:

SOIL Sampling Point WL-42

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture
0-8"	2.5Y 5/1						Clay loam

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___Histosol (A1)
___Histic Epipedon (A2)
___Black Histic (A3)
___Hydrogen Sulfide (A4)
___Stratified Layers (A5) (LRR F)
___1 cm Muck (A9) (LRR F, G, H)
___Depleted Below Dark Surface (A12)
___Thick Dark Surface (A12)
___Sandy Mucky Mineral (S1)
___2.5 Mucky Peat or Peat (S2) (LRR G,H)
___5 cm Mucky Peat or Peat (S3) (LRR F)
___Sandy Gleyed Matrix (S4)
___Sandy Redox (S5)
___Striped Matrix (S6)
_X_Loamy Mucky Mineral (F1)
___Loamy Gleyed Matrix (F2)
___Depleted Matrix (F3)
___Redox Dark Surface (F6)
___Depleted Dark Surface (F7)
___Redox Depressions (F8)
___High Plains Depressions (F16) (MLRA 72 & 73 of LRR H)

Indicators for Problematic Hydric Soils[3]:

___1 cm Muck (A9) (LRR I, J)
___Coast Prairie Redox (A16) (LRR F, G, H)
___Dark Surface (S7) (LRR G)
___High Plains Depressions (F16) (LRR H outside of MLRA 72 & 73)
___Reduced Vertic (F18)
___Red Parent Material (TF2)
___Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if present):

Type:_____ Hydric Soil Present? Yes__X__ No_____

Depth (inches) :_____

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

___Surface Water (A1)
___Saturation (A3)
___Water Marks (B1)
___Sediment Deposits (B2)
___Drift Deposits (B3)
___Algal Mat or Crust (B4)
___Iron Deposits (B5)
___Inundation Visible on Aerial Imagery (B7)
___Water-Stained Leave (B9)
___Salt Crust (B11)
___Hydrogen Sulfide Odor (C1)
___Dry Season Water Table (C2)
___Oxidized Rhizospheres on Living Roots (C3) (where not tilled)
___Presence of Reduced Iron (C4)
___Thin Muck Surface (C7)
___Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

___Sparsely Vegetated Concave Surface (B8)
_X_Drainage Patterns (B10)
___Oxidized Rhizospheres on Living Roots (C3) (where tilled)
___Crayfish Burrows (C8)
___Saturation Visible of Aerial Imagery (C9)
___Geomorphic Position (D2)
X FAC-Neutral Test (D5)
___Frost-Heave Hummocks (D7) (LRR F)

Field Observations:

Surface Water Present? Yes _____No__X__Depth (inches)__ _____
Water Table Present? Yes_____No__X__ Depth (inches)_____
Saturation Present? Yes ____ No__X__ Depth (inches)___ _____
(includes capillary fringe)

Wetland Hydrology Present?

Yes__X__No_____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: Ludeman License Area Sampling Date: 8/7/08
Applicant/Owner: Uranium One City/County: Converse County
Investigator(s): K. LaClair Section,Township,Range: Sec 23 & 26, T34N, R73W State: WY
Landform (hillslope, terrace, etc.): Depression in drainage Local relief (concave, convex, none) concave Slope (%) <2%
Subregion (LRR): LRR H Lat: -105.592 Long: 42.888 Datum: NAD-83
Soil Map Unit Name: 251-Theedle-Kishona-Shingle loams, 263-Ustic Torriorthents, gullied
NWI classification PUSCh Sampling Point WL-43
Are climate/hydrologic conditions on the site typical for this time of year? Yes X No (If no, explain in Remarks.)
Are "Normal Circumstances" present? Yes X No

Are Vegetation_____, Soil_____, or Hydology_____ significantly disturbed? Yes_____ No X
Are Vegetation_____, Soil_____, or Hydrology_____naturally problematic? Yes_____ No X
(If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes X No
Hydric Soil Present? Yes X No Is the Sampled Area
Wetland Hydrology Present? Yes X No within a Wetland? Yes X No

Remarks:
This is a string of intermittent wetlands (WL-43a through WL-43d) that are disconnected depressions within the same drainage. They range in size from 0.001 acres to 0.125 acres. Soil Unit 263 is listed as hydric by the NRCS.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size:)	Absolute %Cover	Dominate Species?	Indicator Status
1			
2			
3			
4			
		=Total Cover	
Sapling/Shrub Stratum (Plot size:)			
1			
2			
3			
4			
5			
		=Total Cover	
Herb Stratum (Plot size: 20sf)			
1 *Eleocharis palustris*	13	Y	OBL
1 *Ambrosia tomentosa*	10	Y	NL
2 *Hordeum jubatum*	10	Y	FACW
4 *Agropyron smithii*	1	N	FACU
5 *Poa compressa*	1	N	FACU
6			
7			
8			
9			
10			
	35%	=Total Cover	
Woody Vine Stratum (Plot size:)			
1			
2			
		=Total Cover	

% Bare Ground in Herb Stratum 65%

Dominance Test Worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC-): 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That are OBL,FACW, or FAC: 100 (A/B)

Prevalence Index Worksheet:

Total % Cover of:	Multiple by:	
OBL species	x 1 =	
FACW species	x 2 =	
FAC species	x 3 =	
FACU species	x 4 =	
UPL species	x 5 =	
Column Totals: A)		(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

X Dominance Test is >50%
_____Prevalence Index is ≤ 3.0[1]
_____Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
_____Problematic Hydrophytic Vegetation[1] (Explain)

[1] Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present?
Yes X No

Remarks:

SOIL Sampling Point WL-43

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	
0-6"	10YR 4/2		7.5YR 5/8	<2%	C	M	Silty loam	Mottles: fine, few, prominent oxidized root channels in 0-6"

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___Histosol (A1)
___Histic Epipedon (A2)
___Black Histic (A3)
___Hydrogen Sulfide (A4)
___Stratified Layers (A5) (LRR F)
___1 cm Muck (A9) (LRR F, G, H)
___Depleted Below Dark Surface (A12)
___Thick Dark Surface (A12)
___Sandy Mucky Mineral (S1)
___2.5 Mucky Peat or Peat (S2) (LRR G,H)
___5 cm Mucky Peat or Peat (S3) (LRR F)
___Sandy Gleyed Matrix (S4)
___Sandy Redox (S5)
___Striped Matrix (S6)
X Loamy Mucky Mineral (F1)
___Loamy Gleyed Matrix (F2)
___Depleted Matrix (F3)
___Redox Dark Surface (F6)
___Depleted Dark Surface (F7)
___Redox Depressions (F8)
___High Plains Depressions (F16) (MLRA 72 & 73 of LRR H)

Indicators for Problematic Hydric Soils[3]:

___1 cm Muck (A9) (LRR I, J)
___Coast Prairie Redox (A16) (LRR F, G, H)
___Dark Surface (S7) (LRR G)
___High Plains Depressions (F16) (LRR H outside of MLRA 72 & 73)
___Reduced Vertic (F18)
___Red Parent Material (TF2)
___Other (Explain in Remarks)

[3] Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic

Restrictive Layer (if present):

Type:_____
Depth (inches) :_____

Hydric Soil Present? Yes X No_____

Remarks:
Soils were dry and hard; unable to dig past 6 inches.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

___Surface Water (A1)
___Saturation (A3)
___Water Marks (B1)
___Sediment Deposits (B2)
___Drift Deposits (B3)
___Algal Mat or Crust (B4)
___Iron Deposits (B5)
___Inundation Visible on Aerial Imagery (B7)
___Water-Stained Leave (B9)
___Salt Crust (B11)
___Hydrogen Sulfide Odor (C1)
___Dry Season Water Table (C2)
X Oxidized Rhizospheres on Living Roots (C3) (where not tilled)
___Presence of Reduced Iron (C4)
___Thin Muck Surface (C7)
___Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

___Sparsely Vegetated Concave Surface (B8)
___Drainage Patterns (B10)
___Oxidized Rhizospheres on Living Roots (C3) (where tilled)
___Crayfish Burrows (C8)
___Saturation Visible of Aerial Imagery (C9)
___Geomorphic Position (D2)
___FAC-Neutral Test (D5)
___Frost-Heave Hummocks (D7) (LRR F)

Field Observations:

Surface Water Present? Yes_____No X Depth (inches) _____
Water Table Present? Yes_____No X Depth (inches)_____
Saturation Present? (includes capillary fringe) Yes_____No X Depth (inches) _____

Wetland Hydrology Present?
Yes X No_____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

ADDENDUM 3.5-K

WILDLIFE SPECIES LIST

Table 3.5-20 BLM Vertebrate Sensitive Species List[1] for the proposed Ludeman Project

Common Name *(scientific name)*	Primary Nesting Habitat(s)	Observed in Ludeman Permit Area	Observed in Ludeman Survey Area[2]
Mammals			
Long-eared Myotis *(Myotis evotis)*	Conifer and deciduous forest, caves and mines	No	No
Fringed Myotis *(Myotis thysanodes)*	Conifer forests, woodland chaparral, caves and mines	No	No
Spotted Bat *(Euderma maculatum)*	Cliffs over perennial water, basin-prairie shrub	No	No
Townsend's Big-eared Bat *(Corynorhinus townsendii)*	Forests, basin-prairie shrub, caves and mines	No	No
White-tailed Prairie Dog *(Cynomys leucurus)*	Basin-prairie shrub, grasslands	No	No
Black-tailed Prairie Dog *(Cynomys ludovicianus)*	Short-grass/mid-grass grasslands	Yes	Yes
Swift Fox *(Vulpes velox)*	Grasslands	No	Yes (road mortality)
Birds			
White-faced Ibis *(Plegadis chihi)*	Marshes, wet meadows	No	No
Trumpeter Swan *(Cygnus buccinator)*	Lakes, ponds, rivers	No	No
Bald Eagle *(Haliaeetus leucocephalus)*	Riparian	No	Yes
Northern Goshawk *(Accipiter gentilis)*	Conifer and deciduous forests	No	No
Ferruginous Hawk *(Buteo regalis)*	Basin-prairie shrub, grasslands, rock outcrops	Yes	Yes
Peregrine falcon *(Falco peregrinus)*	Tall cliffs	No	No
Greater Sage-grouse *(Centrocercus urophasianus)*	Basin-prairie shrub, mountain-foothill shrub	Yes	No
Long-billed Curlew *(Numenius americanus)*	Grasslands, plains, foothills, wet meadows	No	No
Mountain Plover *(Charadrius montanus)*	Short-grass/mid-grass grasslands, basin-prairie shrubs	No	No

Table 3.5-20 Continued

Common Name *(scientific name)*	Primary Nesting Habitat(s)	Observed in Ludeman Permit Area	Observed in Ludeman Survey Area
Birds - Continued			
Yellow-billed Cuckoo *(Coccyzus americanus)*	Open woodlands, streamside willow and alder groves	No	No
Sage Thrasher *(Oreoscoptes montanus)*	Basin-prairie shrub, mountain-foothill shrub	No	No
Loggerhead Shrike *(Lanius ludovicianus)*	Basin-prairie shrub, mountain-foothill shrub	Yes	Yes
Brewer's Sparrow *(Spizella breweri)*	Basin-prairie shrub	No	No
Sage Sparrow *(Amphispiza billneata)*	Basin-prairie shrub, mountain-foothill shrub	No	No
Baird's Sparrow *(Ammodramus bairdii)*	Grasslands, weedy fields	No	No
Amphibians			
Northern Leopard Frog *(Rana pipiens)*	Beaver ponds, permanent water in plains and foothills	No	No

[1] List for Casper Field Office obtained from BLM website (September 2002) with update from BLM biologists (June 2008).
[2] Survey Area = 1 mile beyond the project area for raptors and grouse; ½-mile for other species.
* Observations during wildlife surveys conducted between February and September 2008.

Table 3.5-21 USFWS Migratory Bird Species of Management Concern (Non-coal) for the proposed Ludeman Project

Common Name[1] *(scientific name)*	Primary Nesting Habitat(s)	Occurrence[2] in Ludeman Permit Area	Occurrence in Ludeman Survey Area[3]
Level I Species – Conservation Action Needed			
Mountain Plover *(Charadrius montanus)*	Short-grass prairie, shrub-steppe	Not observed	Not observed
Trumpeter Swan *(Cygnus buccinator)*	Wetlands	Not observed	Not observed
Greater Sage-grouse *(Centrocercus urophasianus)*	Shrub-steppe	Observed[4]	Not observed
McCown's Longspur *(Calcarius mccownii)*	Short-grass prairie, shrub-steppe	Not observed	Not observed
Baird's Sparrow *(Ammodramus bairdii)*	Short-grass prairie	Not observed	Not observed
Ferruginous Hawk *(Buteo regalis)*	Shrub-steppe, grasslands	Observed, breeder	Observed
Brewer's Sparrow *(Spizella breweri)*	Shrub-steppe, montane shrublands	Not observed	Not observed
Wilson's Phalarope *(Phalaropus tricolor)*	Wetlands	Not observed	Not observed
Franklin's Gull *(Larus pipixcan)*	Wetlands	Not observed	Not observed
Sage Sparrow *(Amphispiza belli)*	Shrub-steppe, montane shrublands	Not observed	Not observed
Swainson's Hawk *(Buteo swainsoni)*	Plains/Basin riparian, grasslands	Observed	Not observed
Long-billed Curlew *(Numenius americanus)*	Short-grass prairie	Not observed	Not observed
Short-eared Owl *(Asio flammeus)*	Short-grass prairie, shrub-steppe	Observed	Not observed
Northern Goshawk *(Accipiter gentiles)*	Conifer, aspen	Not observed	Not observed
Peregrine Falcon *(Falco peregrinus)*	Cliffs	Not observed	Not observed
Burrowing Owl *(Athene cunicularia)*	Grasslands, shrub-steppe	Observed	Not observed
Forster's Tern *(Sterna forsteri)*	Wetlands	Not observed	Not observed
Bald Eagle *(Haliaeetus leucocephalus)*	Riparian	Not observed	Observed
Upland Sandpiper *(Bartramia longicauda)*	Short-grass prairie, shrub-steppe	Not observed	Not observed

Table 3.5-21 Continued

Common Name[1] *(scientific name)*	Primary Nesting Habitat(s)	Occurrence[2] in Ludeman Permit Area	Occurrence in Ludeman Survey Area[3]
Level I Species – Continued			
Black Tern *(Chlidonia niger)*	Wetlands	Not observed	Not observed
Whooping Crane *(Grus americana)*	Wetlands	Not observed	Not observed
Piping Plover *(Charadrius melodus)*	Wetlands, aquatic	Not observed	Not observed
Level II Species – Continued Monitoring Recommended			
Calliope Humming bird *(Stellula calliope)*	Mid-elevation conifers, montane riparian	Not observed	Not observed
Lewis Woodpecker *(Melanerpes lewis)*	Low elevation conifer, plains/basin riparian	Not observed	Not observed
Cassin's Kingbird *(Tyrannus vociferans)*	Juniper Woodland Plain/basin riparian	Not observed	Not observed
Lark Bunting *(Calamospiza melanocorys)*	Shortgrass prairie, shrub steppe	Observed, presumed breeder	Observed
American White Pelican *(Pelecanus erythrorhynchos)*	Aquatic-rivers, lakes, ponds	Not observed	Not observed
William's Sapsucker *(Sphyrapicus thyroideus)*	Mid-elevation conifer	Not observed	Not observed
Black-backed Woodpecker *(Picoides arcticus)*	Mid-elevation conifer, High elevation conifer	Not observed	Not observed
Gray Flycatcher *(Empidonax wrightii)*	Juniper woodland, mountain-foothills shrub	Not observed	Not observed
Juniper Titmouse *(Baeolophus ridgwayi)*	Juniper woodlands	Not observed	Not observed
Dickcissel *(Spiza americana)*	Shortgrass prairie	Not observed	Not observed
Chestnut-collared Longspur *(Calcarius ornatus)*	Shortgrass prairie	Not observed	Not observed
Harlequin Duck *(Histrionicus histrionicus)*	Montane riparian	Not observed	Not observed
Snowy Plover *(Charadrius alexandrinus)*	Wetlands	Not observed	Not observed
Black-chinned Hummingbird *(Archilochus alexandri)*	Plains/basin riparian, shrub-steppe	Not observed	Not observed
Rufous Hummingbird *(Selasphorus rufus)*	Mid-elevation conifer	Not observed	Not observed

Table 3.5-21 Continued

Common Name[1] *(scientific name)*	Primary Nesting Habitat(s)	Occurrence[2] in Ludeman Permit Area	Occurrence in Ludeman Survey Area[3]
Level II Species – Continued			
Red-naped Sapsucker *(Sphyrapicus nuchalis)*	Aspen	Not observed	Not observed
American Three-toed Woodpecker *(Picoides dorsalis)*	Mid-elevation conifer, high elevation conifer	Not observed	Not observed
Willow Flycatcher *(Empidonax traillii)*	Montane riparian Plains/basin riparian	Not observed	Not observed
Hammond's Flycatcher *(Epidonax hammondii)*	Higher-elevation confer with aspen, montane riparian	Not observed	Not observed
Codilleran Flycatcher *(Empidonax occidentalis)*	Montane riparian, mid-elevation conifer	Not observed	Not observed
Pygmy Nuthatch *(Sitta pygmaea)*	Low-elevation conifer	Not observed	Not observed
Marsh Wren *(Cistothorus palustris)*	Wetlands	Not observed	Not observed
American Dipper *(Cinclus mexicanus)*	Montane riparian	Not observed	Not observed
Plumbeous Vireo *(Vireo plumbeus)*	Mid-elevation conifer, low-elevation conifer	Not observed	Not observed
Townsend's Warbler *(Dendroica townsendii)*	High-elevation conifer, mid-elevation conifer	Not observed	Not observed
Dusky Flycatcher *(Empidonax oberholseri)*	Low-elevation conifer, aspen, mountain-foothills shrub	Not observed	Not observed
Western Bluebird *(Sialia mexicana)*	Juniper woodlands, low-elevation conifer	Not observed	Not observed
Sage Thrasher *(Oreoscoptes montanus)*	Shrub-steppe	Not observed	Not observed
Grasshopper Sparrow *(Ammodramus savannarum)*	Short-grass prairie, shrub-steppe	Not observed	Observed
Bobolink *(Dolichonyx oryzivorus)*	Short-grass prairie, shrub-steppe	Not observed	Not observed
Common Loon *(Gavia immer)*	Lakes, wetlands	Not observed	Not observed
Black-billed Cuckoo *(Coccyzus erythropthalmus)*	Plains/basin riparian	Not observed	Not observed

Table 3.5-21 Continued

Common Name[1] *(scientific name)*	Primary Nesting Habitat(s)	Occurrence[2] in Ludeman Permit Area	Occurrence in Ludeman Survey Area[3]
Level II Species – Continued			
Red-headed Woodpecker *(Melanerpes erythrocephalus)*	Plains/basin riparian, low-elevation conifer	Not observed	Not observed
Yellow-billed Cuckoo *(Coccyzus americanus)*	Plains/basin riparian	Not observed	Not observed
Eastern Screech Owl *(Megascops asio)*	Plains/basin riparian	Not observed	Not observed
Western Screech Owl *(Megascops kennicottii)*	Plains/basin riparian	Not observed	Not observed
Great Gray Owl *(Strix nebulosa)*	Mid-elevation conifer, High-elevation conifer	Not observed	Not observed
Boreal Owl *(Aegolius funereus)*	High elevation conifer	Not observed	Not observed
Broad-tailed Hummingbird *(Selasphorus platycercus)*	Montane riparian, Plains/basin riparian mid-elevation conifer	Not observed	Not observed
Western Scrub-Jay *(Aphelocoma californica)*	Juniper woodlands	Not observed	Not observed
Loggerhead shrike *(Lanius ludovicianus)*	Shrub-steppe	Observed	Observed
Vesper Sparrow *(Pooecetes gramineus)*	Shrub-steppe	Observed, presumed breeder	Observed
Lark Sparrow *(Chondestes grammacus)*	Shrub-steppe	Observed	Not observed
Golden-crowned Kinglet *(Regulus satrapa)*	High-elevation conifer	Not observed	Not observed
McGillivray's Warbler *(Oporornis tolmiei)*	Montane riparian, Plains/basin riparian	Not observed	Not observed
Ash-throated Flycatcher *(Myiarchus cinerascens)*	Juniper woodlands	Not observed	Not observed
Bushtit *(Psaltriparus minimus)*	Juniper woodlands	Not observed	Not observed
Brown Creeper *(Certhia americana)*	Mid-elevation conifer, high-elevation conifer	Not observed	Not observed
Merlin *(Falco columbarius)*	Low-elevation conifer	Not observed	Not observed
Sprague's Pipit *(Anthus spragueii)*	Grassland, Plains/Basin riparian, short-grass prairie	Not observed	Not observed

Table 3.5-21 Continued

Common Name[1] *(scientific name)*	Primary Nesting Habitat(s)	Occurrence[2] in Ludeman Permit Area	Occurrence in Ludeman Survey Area[3]
Level II Species – Continued			
Barn Owl *(Tyto alba)*	Short-grass prairie, urban	Not observed	Not observed
White-faced Ibis *(Plegadis chihi)*	Wetland, aquatic	Not observed	Not observed
American Bittern *(Botaurus lentiginosus)*	Wetland, aquatic	Not observed	Not observed
Common Tern *(Sterna hirundo)*	Wetland, aquatic	Not observed	Not observed
Purple Martin *(Progne subis)*	Wetland, aquatic/Basin riparian, montane riparian	Not observed	Not observed

[1] Species are arranged in descending priority within each level, as assigned in the Wyoming Bird Conservation Plan (Cerovski et al. 2001). Level I species require "conservation action". Level II species require only monitoring.

[2] Observations during baseline wildlife surveys conducted between early February and early September 2008.

[3] Survey Area = 1 mile beyond the project area for raptors and grouse; ½-mile for all other species.

[4] No sage-grouse leks were found within the survey area (historically or during 2008 surveys). A few grouse were observed during summer and late autumn, but no breeding activity was documented in the area.

Table 3.5-22 Ludeman Project Wildlife Baseline Report - General Species Lists

POTENTIAL[1] AND OBSERVED MAMMALIAN SPECIES LIST

Common Name	Scientific Name	Observed In Ludeman Permit[2]	Recorded In Survey Area[3]
INSECTIVORES			
Masked shrew	*Sorex cinereus*	---	---
Merriam's shrew	*Sorex merriami*	---	---
Vagrant shrew	*Sorex vagrans*	---	---
BATS			
Small-footed myotis	*Myotis ciliolabrum*	---	---
Long-eared myotis	*Myotis evotis*	---	---
Northern myotis	*Myotis septentrionalis*	---	---
Little brown myotis	*Myotis lucifugus*	---	---
Long-legged myotis	*Myotis volans*	---	---
Hoary bat	*Lasiurus cinereus*	---	---
Silver-haired bat	*Lasionycteris noctivagans*	---	---
Big brown bat	*Eptesicus fuscus*	---	---
Townsend's big-eared bat	*Plecotus townsendii*	---	---
HARES AND RABBITS			
Desert cottontail	*Sylvilagus audubonii*	---	---
Mountain cottontail	*Sylvilagus nuttallii*	---	---
Cottontail species	*Sylvilagus* spp.	X	X
Black-tailed jackrabbit	*Lepus californicus*	---	---
White-tailed jackrabbit	*Lepus townsendii*	X	X
RODENTS			
Least chipmunk	*Tamias minimus*	---	---
Thirteen-lined ground squirrel	*Spermophilus tridecemlineatus*	X	X
Black-tailed prairie dog	*Cynomys ludovicianus*	X	X
Northern pocket gopher	*Thomomys talpoides*	---	---
Plains pocket gopher	*Geomys bursarius*	---	---
Olive-backed pocket mouse	*Perognathus fasciatus*	---	---
Silky pocket mouse	*Perognathus flavus*	---	---
Hispid pocket mouse	*Perognathus hispidus*	---	---
Ord's kangaroo rat	*Dipodomys ordii*	---	---
Beaver	*Castor canadensis*	---	---
Western harvest mouse	*Reithrodontomys megalotis*	---	---
Plains harvest mouse	*Reithrodontomys montanus*	---	---
White-footed mouse	*Peromyscus leucopus*	---	---
Deer mouse	*Peromyscus maniculatus*	X	---
Northern grasshopper mouse	*Onychomys leucogaster*	---	---
Bushy-tailed woodrat	*Neotoma cinerea*	---	---

Table 3.5-22 Continued

Long-tailed vole	*Microtus longicaudus*	---	---
Prairie vole	*Microtus ochrogaster*	---	---
Meadow vole	*Microtus pennsylvanicus*	---	---
Sagebrush vole	*Lemmiscus curtatus*	---	---

Table 3.5-22 Continued

POTENTIAL[1] AND OBSERVED MAMMALIAN SPECIES LIST (continued)

Common Name	Scientific Name	Observed In Ludeman Permit[2]	Recorded In Survey Area[3]
RODENTS, cont.			
Muskrat	*Ondatra zibethicus*	---	---
Norway rat	*Rattus norvegicus*	---	---
House mouse	*Mus musculus*	---	---
Meadow jumping mouse	*Zapus hudsonius*	---	---
Porcupine	*Erethizon dorsatum*	---	---
CARNIVORES			
Coyote	*Canis latrans*	X	---
Swift fox	*Vulpes velox*	---	X
Red fox	*Vulpes vulpes*	---	---
Gray fox	*Urocyon cinereoargenteus*	---	---
Raccoon	*Procyon lotor*	---	---
Ermine	*Mustela erminea*	---	---
Long-tailed weasel	*Mustela frenata*	---	---
Black-footed ferret	*Mustela nigripes*	---	---
Least weasel	*Mustela nivalis*	---	---
Weasel species	*Mustela spp.*	---	---
Mink	*Mustela vison*	---	---
Badger	*Taxidea taxus*	---	X
Eastern spotted skunk	*Spilogale putorius*	---	---
Striped skunk	*Mephitis mephitis*	---	---
Mountain lion	*Felis concolor*	---	---
Bobcat	*Felis rufus*	---	---
UNGULATES			
Mule deer	*Odocoileus hemionus*	X	X
White-tailed deer	*Odocoileus virginianus*	---	---
Pronghorn	*Antilocapra americana*	X	X

[1] POTENTIAL OCCURRENCE--List derived from range and habitat information in Jones et al. (1983), Clark and Stromberg (1987), and Cerovski et al. (2004).

[2] OBSERVED IN LUDEMAN PERMIT--Species recorded during wildlife baseline studies in 2008.

[3] RECORDED IN SURVEY AREA-- Species recorded in one-half mile survey perimeter in 2008.

Table 3.5-22 Continued

POTENTIAL[1] AND OBSERVED AVIAN SPECIES LIST

Common Name	Scientific Name	Observed In Ludeman Permit[2]	Recorded Survey	In Area[3]
LOONS				
Common loon	*Gavia immer*	---	---	
GREBES				
Horned grebe	*Podiceps auritus*	---	---	
Eared grebe	*Podiceps nigricollis*	---	---	
Western grebe	*Aechmorphorus occidentalis*	---	---	
Pied-billed grebe	*Podilymbus podiceps*	---	---	
PELICANS				
White pelican	*Pelecanus erythrorhynchos*	---	---	
CORMORANTS				
Double-crested cormorant	*Phalacrocorax auritus*	---	---	
HERONS				
American bittern	*Botaurus lentiginosus*	---	---	
Great blue heron	*Ardea herodias*	X	---	
Black-crowned night heron	*Nycticorax nycticorax*	---	---	
White-faced ibis	*Plegadis chihi*	---	---	
SWANS, GEESE, AND DUCKS				
Tundra swan	*Cygnus columbianus*	---	---	
Trumpeter swan	*Cygnus buccinator*	---	---	
Canada goose	*Branta canadensis*	---	---	
White-fronted goose	*Anser albifrons*	---	---	
Snow goose	*Chen caerulescens*	---	---	
Mallard	*Anas platyrhynchos*	X	---	
Gadwall	*Anas strepera*	X	---	
Pintail	*Anas acuta*	---	---	
Green-winged teal	*Anas crecca*	X	---	
Blue-winged teal	*Anas discors*	---	---	
Cinnamon teal	*Anas cyanoptera*	---	---	
American wigeon	*Anas americana*	X	---	
Northern shoveler	*Anas clypeata*	---	X	
Wood duck	*Aix sponsa*	---	---	
Redhead	*Aythya americana*	---	---	
Ring-necked duck	*Aythya collaris*	---	---	
Canvasback	*Aythya valisineria*	---	---	
Greater scaup	*Aythya marila*	---	---	
Lesser scaup	*Aythya affinis*	---	---	
Common goldeneye	*Bucephala clangula*	---	---	

Table 3.5-22 Continued

Barrow's goldeneye	*Bucephala islandica*	---	---
Bufflehead	*Bucephala albeola*	---	---
Ruddy duck	*Oxyura jamaicensis*	---	---

Table 3.5-22 Continued

POTENTIAL[1] AND OBSERVED AVIAN SPECIES LIST (continued)

Common Name	Scientific Name	Observed In Ludeman Permit[2]	Recorded In Survey Area[3]
SWANS, GEESE, AND DUCKS, cont.			
Hooded merganser	*Lophodytes cucullatus*	---	---
Common merganser	*Mergus merganser*	---	---
Red-breasted merganser	*Mergus serrator*	---	---
DIURNAL RAPTORS			
Turkey vulture	*Cathartes aura*	X	---
Osprey	*Pandion haliaetus*	---	---
Bald eagle	*Haliaeetus leucocephalus*	---	X
Northern harrier	*Circus cyaneus*	X	X
Sharp-shinned hawk	*Accipiter striatus*	---	---
Cooper's hawk	*Accipiter cooperii*	---	---
Northern goshawk	*Accipiter gentilis*	---	---
Red-tailed hawk	*Buteo jamaicensis*	X	X
Swainson's hawk	*Buteo swainsoni*	X	---
Ferruginous hawk	*Buteo regalis*	X	X
Rough-legged hawk	*Buteo lagopus*	---	X
Golden eagle	*Aquila chrysaetos*	X	X
American kestrel	*Falco sparverius*	---	X
Merlin	*Falco columbarius*	---	---
Peregrine falcon	*Falco peregrinus*	---	---
Gyrfalcon	*Falco rusticolus*	---	---
Prairie falcon	*Falco mexicanus*	---	---
GALLINACEOUS BIRDS			
Sharp-tailed grouse	*Pedioecetus phasianellus*	---	---
Sage-grouse	*Centrocercus urophasianus*	X	---
Ring-necked pheasant	*Phasianus colchicus*	---	---
Gray partridge	*Perdix perdix*	---	---
Wild turkey	*Meleagris gallopavo*	---	---
CRANES, RAILS, AND COOTS			
Sandhill crane	*Grus canadensis*	---	---
Virginia rail	*Rallus limicola*	---	---
Sora	*Porzana carolina*	---	---
Yellow rail	*Coturnicops noveboracensis*	---	---
American coot	*Fulica americana*	---	X
SHOREBIRDS, GULLS, AND TERNS			
American avocet	*Recurvirostra americana*	---	---
Semipalmated plover	*Charadrius semipalmatus*	---	---
Killdeer	*Charadrius vociferus*	X	X

Table 3.5-22 Continued

Mountain plover	*Charadrius montanus*	---	---
Lesser golden plover	*Pluvalis dominica*	---	---
Black-bellied plover	*Pluvalis squatarola*	---	---

Table 3.5-22 Continued

POTENTIAL[1] AND OBSERVED AVIAN SPECIES LIST (continued)

Common Name	Scientific Name	Observed In Ludeman Permit[2]	Recorded In Survey Area[3]
SHOREBIRDS, GULLS, AND TERNS, cont.			
Hudsonian godwit	*Limosa haemastica*	---	---
Marbled godwit	*Limosa fedoa*	---	---
Whimbrel	*Numenius phaeopus*	---	---
Long-billed curlew	*Numenius americanus*	---	---
Upland sandpiper	*Bartramia longicauda*	---	---
Greater yellowlegs	*Tringa melanoleuca*	---	---
Lesser yellowlegs	*Tringa flavipes*	---	---
Solitary sandpiper	*Tringa solitaria*	---	---
Willet	*Catoptrophorus semipalmatus*	---	---
Spotted sandpiper	*Actitis macularia*	---	---
Wilson's phalarope	*Steganopus tricolor*	X	---
Northern phalarope	*Lobipes lobatus*	---	---
Common snipe	*Gallinago gallinago*	---	---
Short-billed dowitcher	*Limnodromus griseus*	---	---
Long-billed dowitcher	*Limnodromus scolopaceus*	---	---
Red knot	*Calidris canutus*	---	---
Sanderling	*Calidris alba*	---	---
Semipalmated sandpiper	*Calidris pusilla*	---	---
Western sandpiper	*Calidris mauri*	---	---
Least sandpiper	*Calidris minutilla*	---	---
White-rumped sandpiper	*Calidris fuscicollis*	---	---
Baird's sandpiper	*Calidris bairdii*	---	---
Pectoral sandpiper	*Calidris melanotos*	---	---
Stilt sandpiper	*Micropalama himantopus*	---	---
Buff-breasted sandpiper	*Tryngites subruficollis*	---	---
Herring gull	*Larus argentatus*	---	---
California gull	*Larus californicus*	---	---
Ring-billed gull	*Larus delawarensis*	---	---
Franklin's gull	*Larus pipixcan*	---	---
Bonaparte's gull	*Larus philadelphia*	---	---
Forster's tern	*Sterna forsteri*	---	---
Caspian tern	*Sterna caspia*	---	---
Black tern	*Childonias niger*	---	---
PIGEONS AND DOVES			
Rock dove	*Columba livia*	---	---
Mourning dove	*Zenaida macroura*	X	X
CUCKOOS			
Black-billed cuckoo	*Coccyzus erythropthalmus*	---	---
Yellow-billed cuckoo	*Coccyzus americanus*	---	---

Table 3.5-22 Continued

POTENTIAL[1] AND OBSERVED AVIAN SPECIES LIST (continued)

Common Name	Scientific Name	Observed In Ludeman Permit[2]	Recorded In Survey Area[3]
OWLS			
Barn owl	*Tyto alba*	---	---
Eastern screech owl	*Otus asio*	---	---
Long-eared owl	*Asio otus*	---	---
Short-eared owl	*Asio flammeus*	X	---
Great horned owl	*Bubo virginianus*	X	---
Snowy owl	*Nyctea scandiaca*	---	---
Burrowing owl	*Athene cunicularia*	X	---
Barred owl	*Strix varia*	---	---
Northern saw-whet owl	*Aegolius acadicus*	---	---
GOATSUCKERS			
Common nighthawk	*Chordeiles minor*	X	X
Common poorwill	*Phalaenoptilus nuttallii*	---	---
SWIFTS			
Chimney swift	*Chaetura pelagica*	---	---
White-throated swift	*Aeronautes saxatalis*	---	---
HUMMINGBIRDS			
Broad-tailed hummingbird	*Selasphorus platycercus*	---	---
Rufous hummingbird	*Selasphorus rufus*	---	---
KINGFISHERS			
Belted kingfisher	*Megaceryle alcyon*	---	---
WOODPECKERS			
Lewis' woodpecker	*Melanerpes lewis*	---	---
Red-headed woodpecker	*Melanerpes erythrocephalus*	---	---
Yellow-bellied sapsucker	*Sphyripicus varius*	---	---
Williamson's sapsucker	*Sphyripicus thyroideus*	---	---
Hairy woodpecker	*Picoides villosus*	---	---
Downy woodpecker	*Picoides pubescens*	---	---
Black-backed woodpecker	*Picoides arcticus*	---	---
Northern flicker	*Colaptes auratus*	---	X
Three-toed woodpecker	*Picoides tridactylus*	---	---
FLYCATCHERS			
Western wood pewee	*Contopus sordidulus*	---	---
Willow flycatcher	*Empidonax traillii*	---	---

Table 3.5-22 Continued

Least flycatcher	*Empidonax minimus*	---	---
Dusky flycatcher	*Empidonax oberholseri*	---	---
Cordilleran flycatcher	*Empidonax occidentalis*	---	---
Eastern phoebe	*Sayornis phoebe*	---	---
Say's phoebe	*Sayornis saya*	X	---

Table 3.5-22 Continued

POTENTIAL[1] AND OBSERVED AVIAN SPECIES LIST (continued)

Common Name	Scientific Name	Observed In Ludeman Permit[2]	Recorded In Survey Area[3]
FLYCATCHERS, cont.			
Cassin's kingbird	*Tyrannus vociferans*	---	---
Western kingbird	*Tyrannus verticalis*	X	---
Eastern kingbird	*Tyrannus tyrannus*	---	X
LARKS			
Horned lark	*Eremophila alpestris*	X	X
SWALLOWS			
Tree swallow	*Tachycineta bicolor*	---	---
Violet-green swallow	*Tachycineta thalassina*	---	---
Bank swallow	*Riparia riparia*	---	---
Rough-winged swallow	*Stelgidopteryx ruficollis*	---	---
Cliff swallow	*Hirundo pyrrhonota*	---	---
Barn swallow	*Hirundo rustica*	X	---
Purple martin	*Progne subis*	---	---
JAYS, MAGPIES, AND CROWS			
Gray jay	*Perisoreus canadensis*	---	---
Blue jay	*Cyanocitta cristata*	---	---
Pinyon jay	*Gymnorhinus cyanocephalus*	---	---
Clark's nutcracker	*Nucifraga columbiana*	---	---
Black-billed magpie	*Pica pica*	---	---
Common raven	*Corvus corax*	---	---
American crow	*Corvus brachyrhynchos*	---	X
CHICKADEE			
Black-capped chickadee	*Parus atricapillus*	---	---
Mountain chickadee	*Parus gambeli*	---	---
NUTHATCHES			
Red-breasted nuthatch	*Sitta canadensis*	---	---
White-breasted nuthatch	*Sitta carolinensis*	---	---
Pygmy nuthatch	*Sitta pygmaea*	---	---
Brown creeper	*Certhia americana*	---	---
WRENS			
Rock wren	*Salpinctes obsoletus*	X	---
House wren	*Troglodytes aedon*	---	---
GNATCHATERS AND KINGLETS			
Golden-crowned kinglet	*Regulus satrapa*	---	---
Ruby-crowned kinglet	*Regulus calendula*	---	---

Table 3.5-22 Continued

POTENTIAL[1] AND OBSERVED AVIAN SPECIES LIST (continued)

Common Name	Scientific Name	Observed In Ludeman Permit[2]	Recorded In Survey Area[3]
THRUSHES			
Eastern bluebird	*Sialia sialis*	---	---
Western bluebird	*Sialia mexicana*	---	---
Mountain bluebird	*Sialia currucoides*	---	---
Townsend's solitaire	*Myadestes townsendi*	---	---
Veery	*Catharus fuscescens*	---	---
Swainson's thrush	*Catharus ustulatus*	---	---
Hermit thrush	*Catharus guttatus*	---	---
American robin	*Turdus migratorius*	---	---
MIMIC THRUSHES			
Mockingbird	*Mimus polyglottos*	---	---
Gray catbird	*Dumetella carolinensis*	---	---
Brown thrasher	*Toxostoma rufum*	---	---
Sage thrasher	*Oreoscoptes montanus*	---	---
PIPITS			
Water pipit	*Anthus spinoletta*	---	---
Sprague's pipit	*Anthus spragueii*	---	---
WAXWINGS			
Bohemian waxwing	*Bombycilla garrulus*	---	---
Cedar waxwing	*Bombycilla cedrorum*	---	---
SHRIKES			
Northern shrike	*Lanius excubitor*	---	---
Loggerhead shrike	*Lanius ludovicianus*	X	X
STARLINGS			
European starling	*Sturnus vulgaris*	---	---
VIREOS			
Solitary vireo	*Vireo solitarius*	---	---
Warbling vireo	*Vireo gilvus*	---	---
Red-eyed vireo	*Vireo olivaceus*	---	---
WARBLERS			
Tennessee warbler	*Vermivora peregrina*	---	---
Orange-crowned warbler	*Vermivora celata*	---	---
Nashville warbler	*Vermivora ruficapilla*	---	---

Table 3.5-22 Continued

Yellow warbler	*Dendroica petechia*	---	---
Magnolia warbler	*Dendroica magnolia*	---	---
Black-throated blue	*Dendroica caerulescens*	---	---
Yellow-rumped warbler	*Dendroica coronata*	---	---
Townsend's warbler	*Dendroica townsendi*	---	---

Table 3.5-22 Continued

POTENTIAL[1] AND OBSERVED AVIAN SPECIES LIST (continued)

Common Name	Scientific Name	Observed In Ludeman Permit[2]	Recorded In Survey Area[3]
WARBLERS, cont.			
Chestnut-sided warbler	*Dendroica pensylvanica*	---	---
Black-and-white warbler	*Mniotilta varia*	---	---
American redstart	*Setophaga ruticilla*	---	---
Ovenbird	*Seiurus aurocapillus*	---	---
Northern waterthrush	*Seiurus noveboracensis*	---	---
MacGillivray's warbler	*Oporornis tolmiei*	---	---
Common yellowthroat	*Geothlypis trichas*	---	---
Hooded warbler	*Wilsonia citrina*	---	---
Wilson's warbler	*Wilsonia pusilla*	---	---
Yellow-breasted chat	*Icteria virens*	---	---
TANAGERS			
Western Tanager	*Piranga ludoviciana*	---	---
GROSBEAKS AND BUNTINGS			
Rose-breasted grosbeak	*Pheucticus ludovicianus*	---	---
Black-headed grosbeak	*Pheucticus melanocephalus*	---	---
Lazuli bunting	*Passerina amoena*	---	---
Indigo bunting	*Passerina cyanea*	---	---
Dickcissel	*Spiza americana*	---	---
Evening grosbeak	*Hesperiphona vespertina*	---	---
TOWHEES, SPARROWS, JUNCOS, AND LONGSPURS			
Green-tailed towhee	*Papilo chlorurus*	---	---
Rufous-sided towhee	*Pipilo erythrophthalmus*	---	---
American tree sparrow	*Spizella arborea*	---	---
Chipping sparrow	*Spizella passerina*	---	---
Clay-colored sparrow	*Spizella pallida*	---	---
Brewer's sparrow	*Spizella breweri*	---	---
Field sparrow	*Spizella pusilla*	---	---
Vesper sparrow	*Pooecetes gramineus*	X	X
Lark sparrow	*Chondestes grammacus*	X	---
Sage sparrow	*Amphispiza belli*	---	---
Lark bunting	*Calamospiza melanocorys*	X	X
Savannah sparrow	*Passerculus sandwichensis*	---	---
Baird's sparrow	*Ammodramus bairdii*	---	---
Grasshopper sparrow	*Ammodramus savannarum*	---	X
Fox sparrow	*Passerela iliaca*	---	---
Song sparrow	*Melospiza melodia*	---	---
Lincoln's sparrow	*Melospiza lincolnii*	---	---
White-throated sparrow	*Zonotrichia albicollis*	---	---

Table 3.5-22 Continued

White-crowned sparrow	*Zonotrichia leucophrys*	---	---
Harris' sparrow	*Zonotrichia querula*	---	---
Dark-eyed junco	*Junco hyemalis*	---	---

Table 3.5-22 Continued

POTENTIAL[1] AND OBSERVED AVIAN SPECIES LIST (continued)

Common Name	Scientific Name	Observed In Ludeman Permit[2]	Recorded In Survey Area[3]
TOWHEES, SPARROWS, JUNCOS, AND LONGSPURS, cont.			
McCown's longspur	*Calcarius mccownii*	---	---
Lapland longspur	*Calcarius lapponicus*	---	---
Chestnut-collared longspur	*Calcarius ornatus*	---	---
Snow bunting	*Plectrophenax nivalis*	---	---
BLACKBIRDS, MEADOWLARKS, AND ORIOLES			
Bobolink	*Dolichonyx oryzivorus*	---	---
Red-winged blackbird	*Agelaius phoeniceus*	X	X
Western meadowlark	*Sturnella neglecta*	X	X
Yellow-headed blackbird	*Xanthocephalus xanthocephalus*	---	---
Rusty blackbird	*Euphagus carolinus*	---	---
Brewer's blackbird	*Euphagus cyanocephalus*	---	---
Common grackle	*Quiscalus quiscula*	---	---
Brown-headed cowbird	*Molothrus ater*	---	---
Northern oriole	*Icterus galbula*	---	---
FINCHES			
Rosy finch	*Leucosticte arctoa*	---	---
Pine grosbeak	*Pinicola enucleator*	---	---
Purple finch	*Carpodacus purpureus*	---	---
Cassin's finch	*Carpodacus cassinii*	---	---
House finch	*Carpodacus cassinii*	---	---
Red crossbill	*Loxia curvirostra*	---	---
White-winged crossbill	*Loxia leucoptera*	---	---
Common redpoll	*Carduelis flammea*	---	---
Pine siskin	*Carduelis pinus*	---	---
American goldfinch	*Carduelis tristis*	---	---
WEAVER FINCHES			
House sparrow	*Passer domesticus*	---	---

[1] POTENTIAL OCCURRENCE--List derived from range and habitat information in Petersen (1990), Stokes and Stokes (1996), and Cerovski et al. (2004). The species listed include those that might pass through the Ludeman Project area or survey area during migration.

[2] OBSERVED IN LUDEMAN PERMIT--Species recorded during wildlife baseline studies in 2008.

[3] RECORDED IN SURVEY AREA-- Species recorded in one-half or one-mile (raptors, grouse) survey perimeter in 2008.

Table 3.5-22 Continued

POTENTIAL[1] AND OBSERVED AMPHIBIAN AND REPTILE SPECIES LIST

Common Name	Scientific Name	Observed In Ludeman Permit[2]	Recorded In Survey Area[3]
SALAMANDERS			
Tiger salamander	*Ambystoma tigrinum*	---	---
FROGS AND TOADS			
Northern leopard frog	*Rana pipiens*	---	---
Boreal chorus frog	*Pseudacris triseriata*	X	X
Plains spadefoot	*Scaphiopus bombifrons*	---	---
Woodhouse's toad	*Bufo woodhousei*	---	---
Great plains toad	*Bufo cognatus*	---	---
TURTLES			
Common snapping turtle	*Chelydra serpentina*	---	---
Western painted turtle	*Chrysemys picta*	---	---
Western spiny softshell	*Trionyx spiniferus*	---	---
LIZARDS			
Northern sagebrush lizard	*Sceloporus graciosus*	---	---
Shorthorned lizard	*Phrymsoma douglassi*	---	---
SNAKES			
Plains hognose snake	*Heterodon nasicus*	---	---
Eastern yellowbelly racer	*Coluber constrictor*	---	---
Smooth green snake	*Opheodrys vernalis*	---	---
Pale milk snake	*Lampropeltis triangulum*	---	---
Bullsnake	*Pituophis melanoleucas*	---	X
Wandering garter snake	*Thamnophis elegans*	---	---
Western plains garter snake	*Thamnophis radix*	---	---
Common garter snake	*Thamnophis sirtalis*	---	---
Prairie rattlesnake	*Crotalus viridis*	---	---

[1] POTENTIAL OCCURRENCE--List derived from range and habitat information in Stebbins (1966) and Baxter and Stone (1980).

[2] OBSERVED IN LUDEMAN PERMIT--Species recorded during wildlife baseline studies in 2008.

[3] RECORDED IN SURVEY AREA-- Species recorded in one-half mile survey perimeter in 2008.

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3.6 METEOROLOGY

3.6.1 Introduction

Meteorological data has been compiled for 10 sites surrounding the proposed Ludeman Project (proposed project) area. Data was acquired through the Western Regional Climate Center (WRCC, 2007) for eight Cooperative Observer Program (COOP) and Automated Surface Observation Stations (ASOS) stations operated by the National Weather Service (NWS) including Casper Airport, Douglas AP (AP), 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). The latter two 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. Table 3.6-1 provides the station id, coordinates (UTM metric), and period of operation for each site.

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	1986-2007
Glenrock Coal Company	IML	431649	4767610	5674	1996-2007
Casper AP (112)	NWS	380229	4750539	5338	1948-2005
Douglas AP (118)	NWS	468655	4732910	4820	1909-2005
Dull Center 1SE (71)	NWS	503239	4806131	4420	1926-2005
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
Newcastle (67)	NWS	563497	4855516	4314	1952-2005
Reno (68)	NWS	458891	4836243	5080	1963-1983

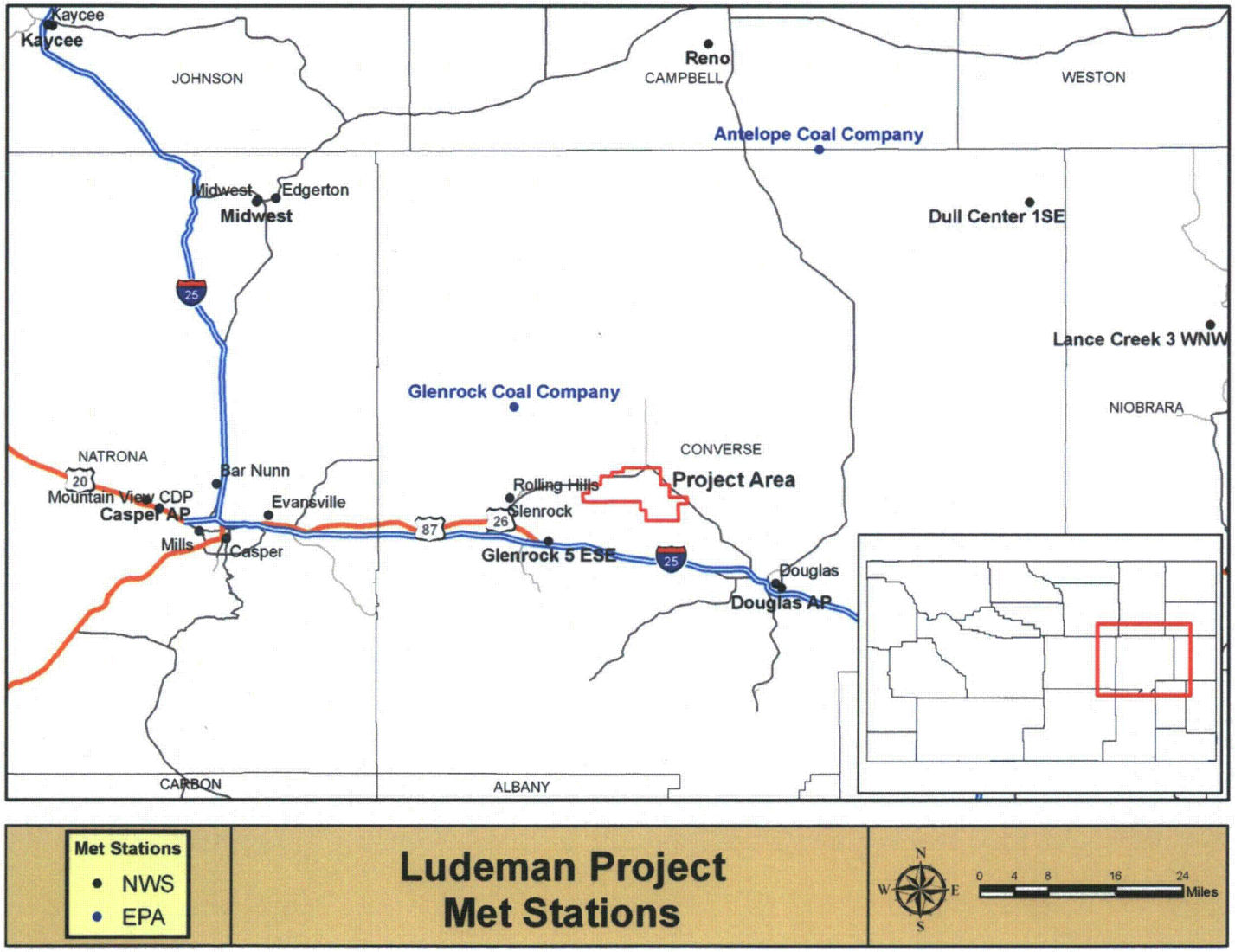
These 10 sites have been analyzed collectively to provide a regional climatic temperature and precipitation analysis that includes the proposed project area. Only the Douglas AP and GCC sites were analyzed for the regional wind summaries. The eight NWS sites have

been incorporated into the snowfall discussion as neither mine site records snowfall data. No on-site meteorological data is available for the proposed project site. Therefore, the combination of the Douglas AP and GCC sites will be substituted as the nearest representative data sets available for the site specific analysis. These two sites exhibit terrain similar to the project area and are located in the same region. Figure 3.6-1 shows the ten sites in relation to the proposed project boundary. As illustrated in the figure, Douglas AP and GCC are the closest available sites with wind data. The closest NWS operated station which continuously records all weather parameters is the Douglas AP site, some 15 miles to the southeast.

A regional overview is presented first. This section includes a discussion of the maximum and minimum temperature, relative humidity, annual precipitation including snowfall estimates, and a brief wind speed and direction summary. GCC and Douglas AP provide the closest wind data for the region. GCC is incorporated into the site specific analysis and a combination of Douglas AP and GCC is analyzed for the regional overview. The last portion of the regional analysis includes a general climate data summary from Casper. No such summary is available for Douglas AP.

A site specific analysis follows the regional overview. Much of this analysis is based on the Douglas AP and GCC meteorological data, with many of the same meteorological parameters listed previously. An in-depth wind analysis summarizes average wind speeds and directions, wind roses, wind speed frequency distributions, and a joint frequency distribution to characterize the wind data for the GCC site by stability class. A seasonal data discussion is included for the temperature and wind parameters. The seasonal classification does not coincide with official calendar seasons; rather, it uses three-month intervals as follows; January – March for winter, April-June for spring, July – September for summer, and October – December for fall. Beyond wind and temperature data, general climate data from the regional evaluation are deemed representative of the proposed project site.

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 47° F. Figure 3.6-2 shows monthly average temperatures for the GCC mine site and the Douglas AP site. As illustrated, the two sites exhibit very little difference in range of temperature. Douglas AP tends to be 2° to 4° warmer during the spring and summer months, nearly identical during the fall period, and slightly cooler for the winter months. July shows the highest average monthly temperatures followed by August. December records the lowest average temperatures for the year. Table 3.6-2 compares the monthly average temperatures for the sites. The slight differences in average temperatures are likely attributed to the proximity of the Douglas AP to the North Platte River. GCC lies in dry, rolling hills while Douglas AP is situated in a river valley.

Daily maximum temperatures in the proposed project region average approximately 59° F and daily minimum temperatures average approximately 34° 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 high altitude and low humidity. Figure 3.6-5 depicts the seasonal diurnal temperature variations for the two sites. The site-specific monthly values are shown in Figure 3.6-2 and in Table 3.6-2. Spring and summer daily variations of 15° to 25° F are common with maximum temperature variations of 30 to 40° F observed during extremely dry periods. Less daily variation is observed during the cooler portions of the year as fall and winter have average variations of 10° to 15° F.

This reduced variation in daily temperature can be attributed to the more stable atmospheric conditions in the region during the fall and winter months. Stable periods have much lower mixing heights and accompanying lapse rates allowing for less temperature variation. The graphs in Figure 3.6-5 also show larger diurnal variations at Douglas AP than at GCC. This may be attributed to the proximity of the site to the airport and the city of Douglas, which may provide an urban heat source which accentuates the daily maximum temperatures.

Table 3.6-2: Annual and Monthly Average Temperatures for GCC and Douglas AP

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann
Douglas AP	26.9	25.3	35.6	43.7	53.3	64.5	74.2	69.5	57.7	45.8	34.0	24.5	47.7
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

Figure 3.6-2: Regional Annual Average Minimum Temperatures

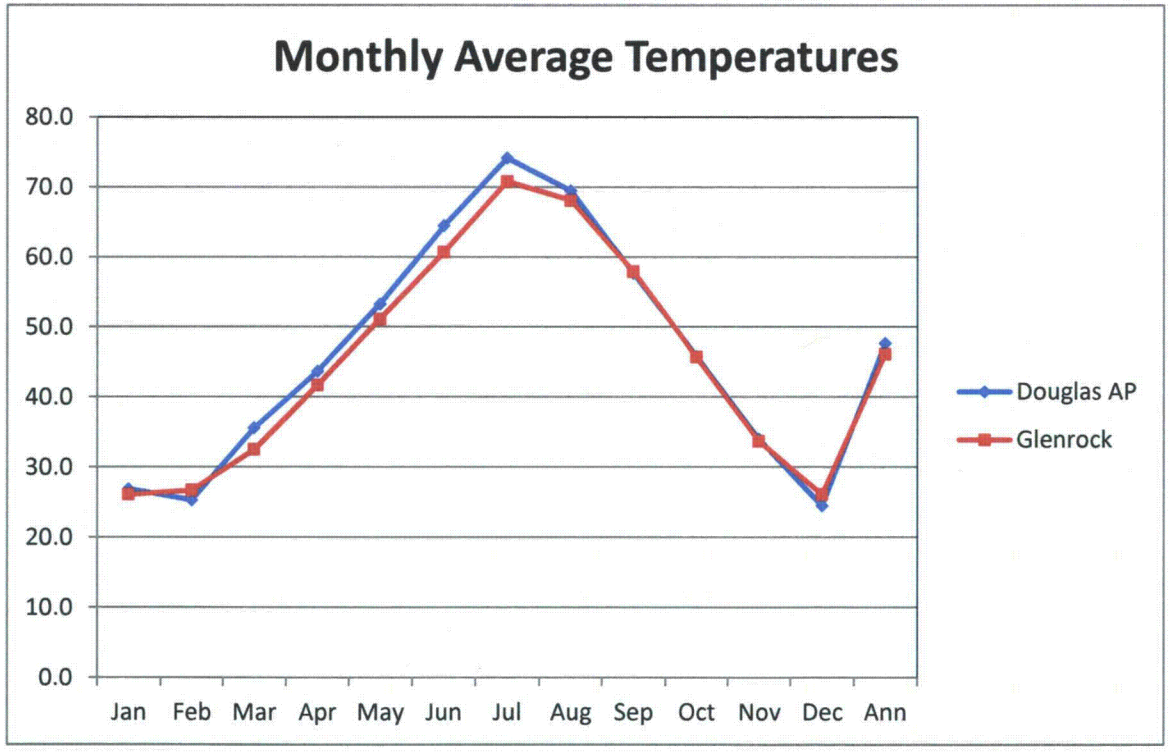


Figure 3.6-3: Regional Annual Average Minimum Temperatures

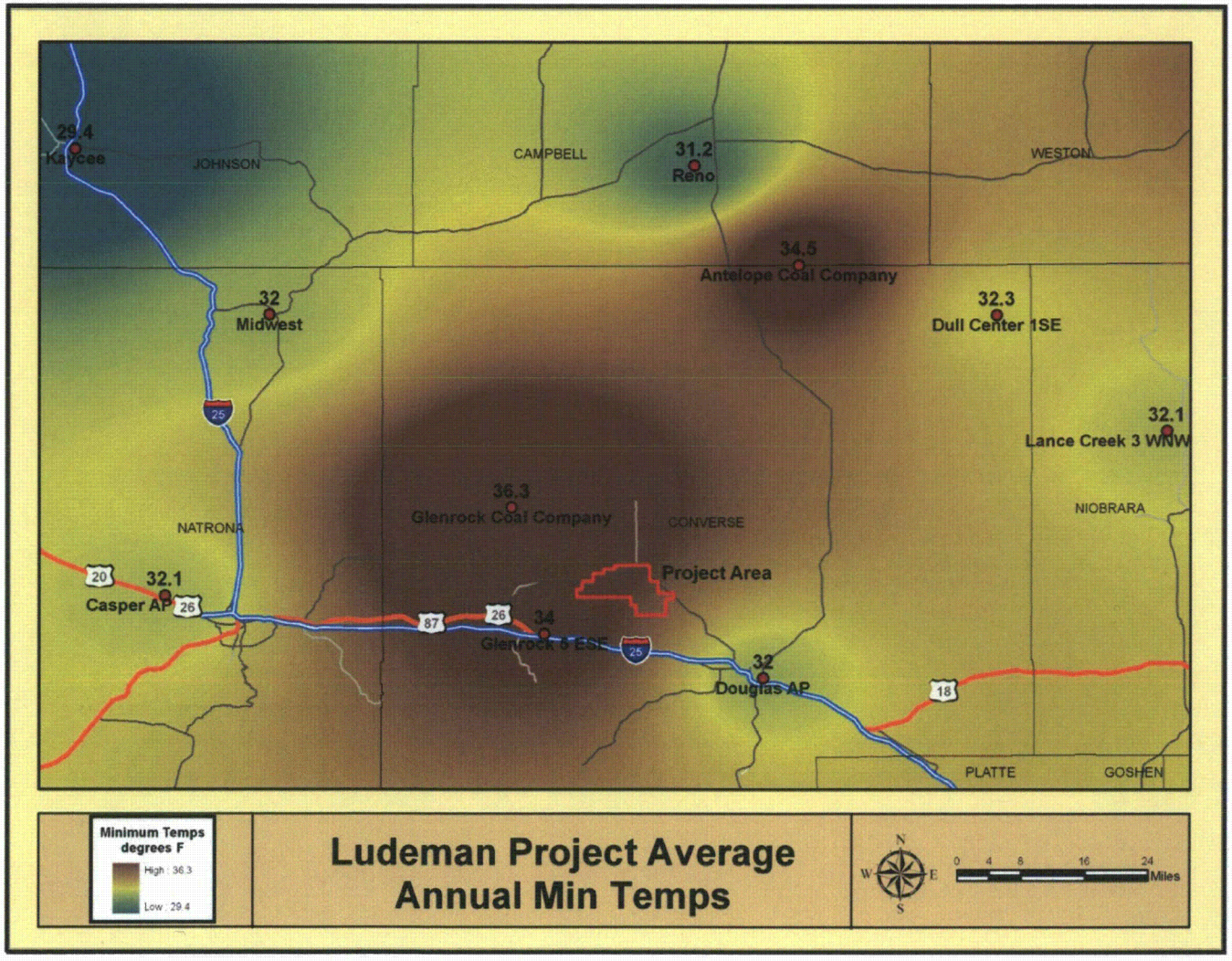


Figure 3.6-4: Regional Annual Average Maximum Temperature

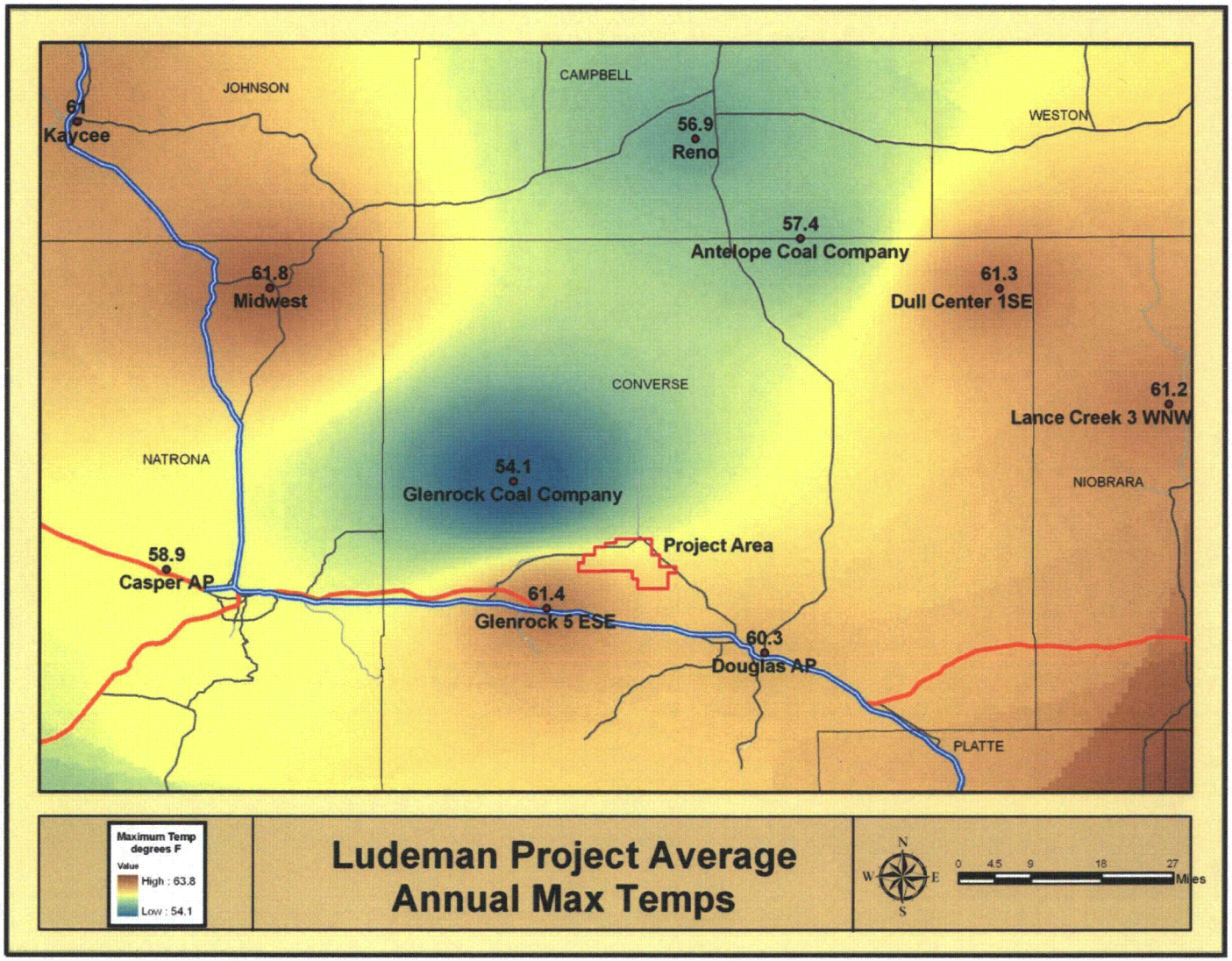
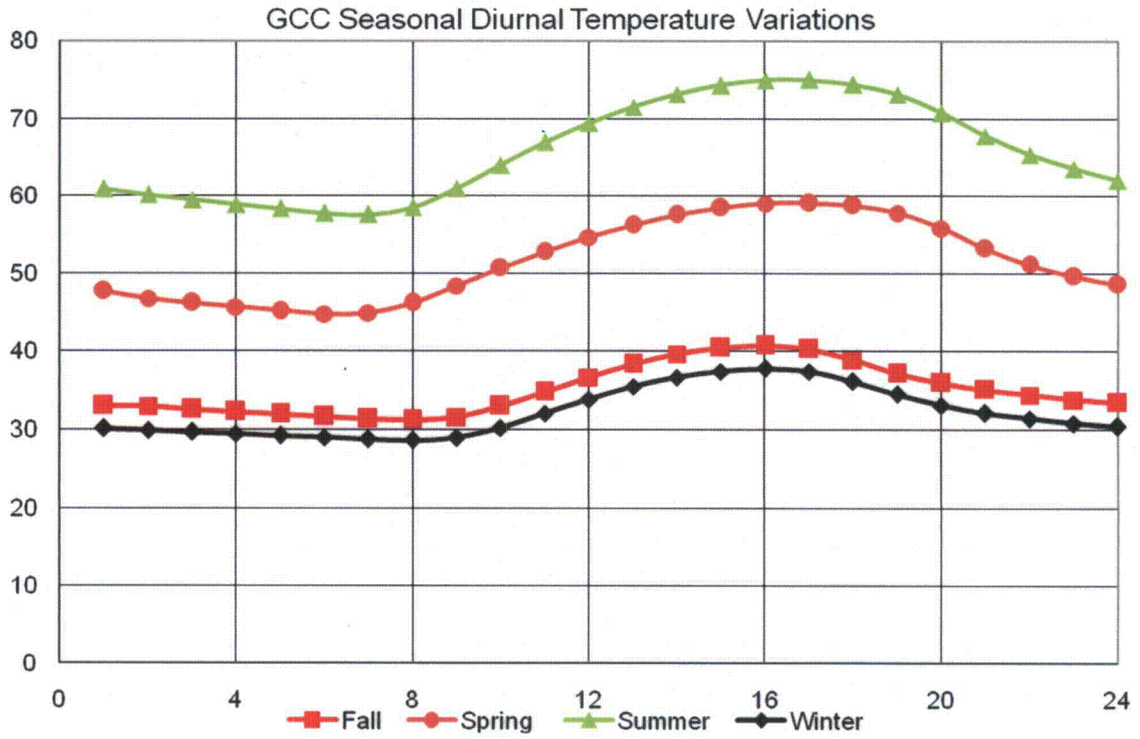
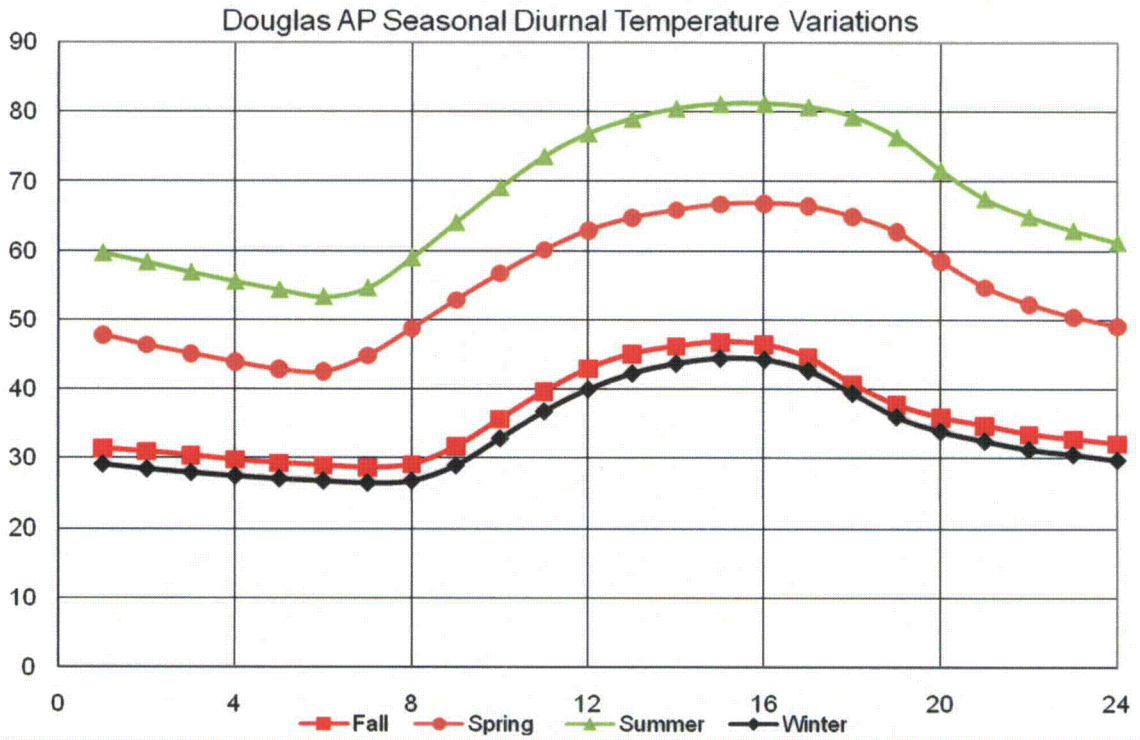


Figure 3.6-5: GCC (top) and Douglas AP (bottom) Seasonal Diurnal Temperature Variation

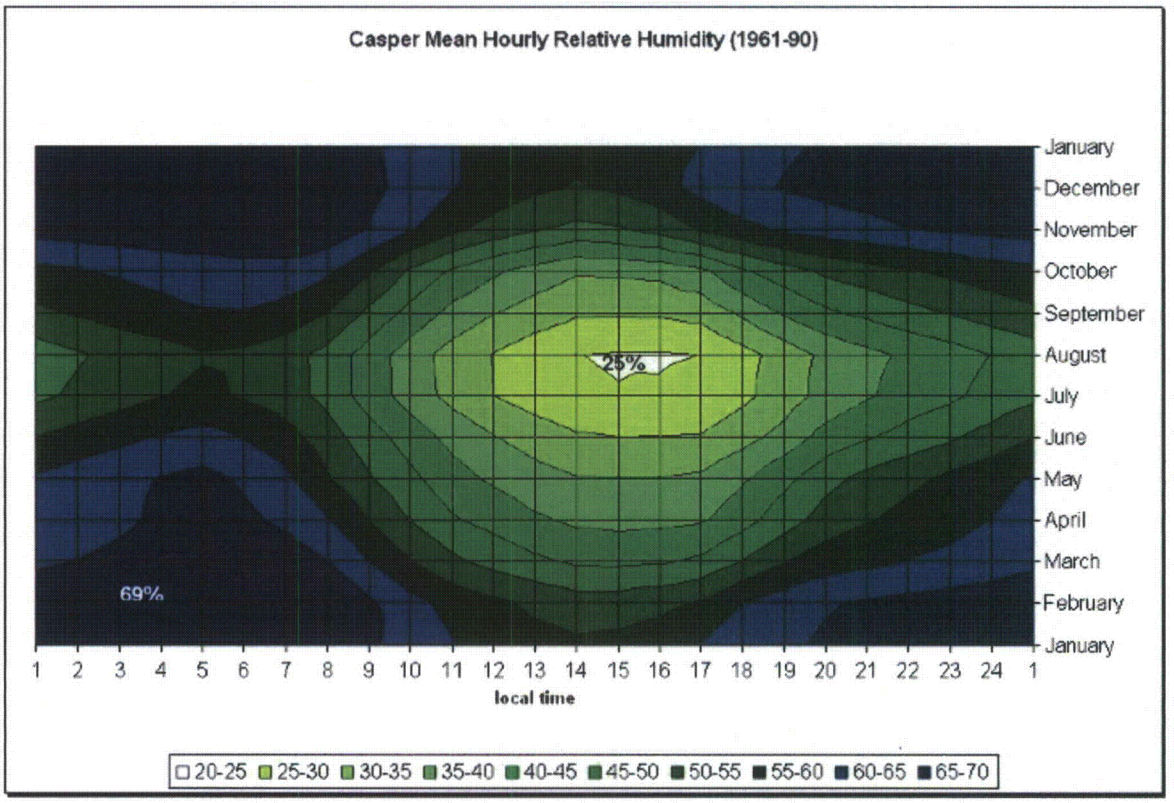




3.6.2.2 Relative Humidity

The Casper Airport is the only site included in the analysis that records relative humidity (dew point) data. The graph in Figure 3.6-6 presents data taken from the Wyoming Climate Atlas (WRDS, 2007). The graph shows the mean hourly relative humidity (percent) by time of day and month. The data show that July has the driest air, followed by August and June. It also shows the winter months of December and January make up the most humid part of the year. The extreme values are stenciled on the graph where 25 percent is the lowest mean hourly value and 69 percent is the highest mean hourly value.

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



Relative humidity is a temperature based calculation which reflects the fraction of moisture present relative to the amount of moisture for saturated air at that temperature. Relative humidity maximum values occur more frequently in mornings (5:00am) while minimum values typically occur during the afternoon (5:00pm). Average annual readings at the Casper Airport are 70 percent and 43 percent for mornings and afternoons, respectively. Mean monthly afternoon values range from 24 percent in August to 62

percent in December while morning mean values range from 66 percent in August to 77 percent in May. There is a much greater variation in the afternoon values which coincides with the greater temperature variations.

3.6.2.3 Precipitation

The region is characterized by extremely dry conditions. On average, the region experiences only about 40 to 60 days with measurable (>0.01 in) precipitation (WRCC, 2007). The region of the proposed Ludeman Project has an annual average in the 11- to 12.5-inch category based on interpolating regional values (Figure 3.6-7). Annual averages across the region range from 9 to 13 inches. Spring and early summer (May-July) thunderstorms produce 45 percent of the precipitation. As shown on Figure 3.6-8, which presents average monthly precipitation data from various stations in the region, May is typically the wettest month of the year; all stations average greater than two inches for that month. January, in contrast, is the driest month of the year with precipitation averaging generally one half inch or less. The winter months (Dec-Feb) typically account for only 10 percent of the yearly precipitation totals. A secondary minimum is also evident during August, when atmospheric conditions are more stable and the absence of convective activity limits thunderstorm development.

Figure 3.6-7: Regional Annual Average Precipitation

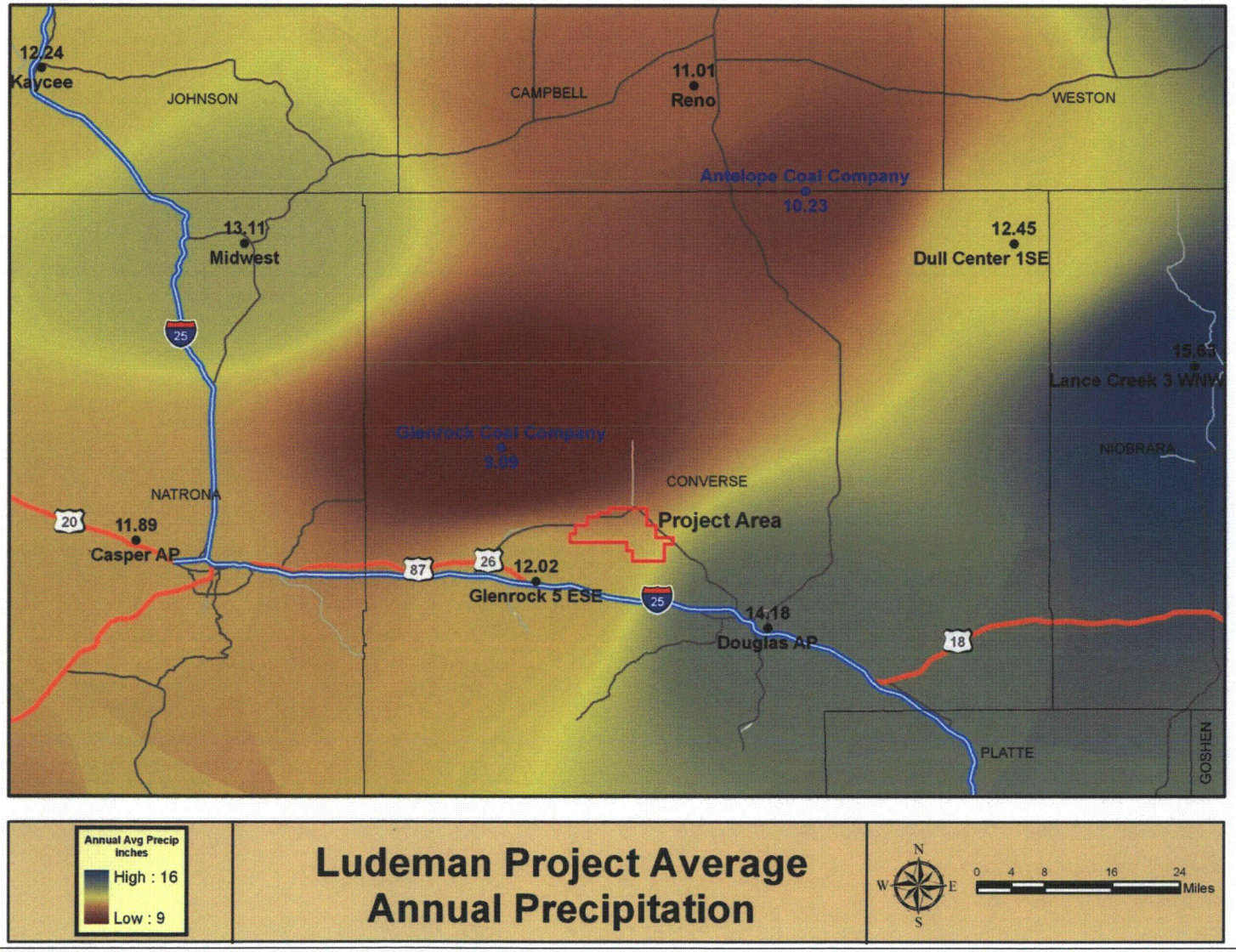
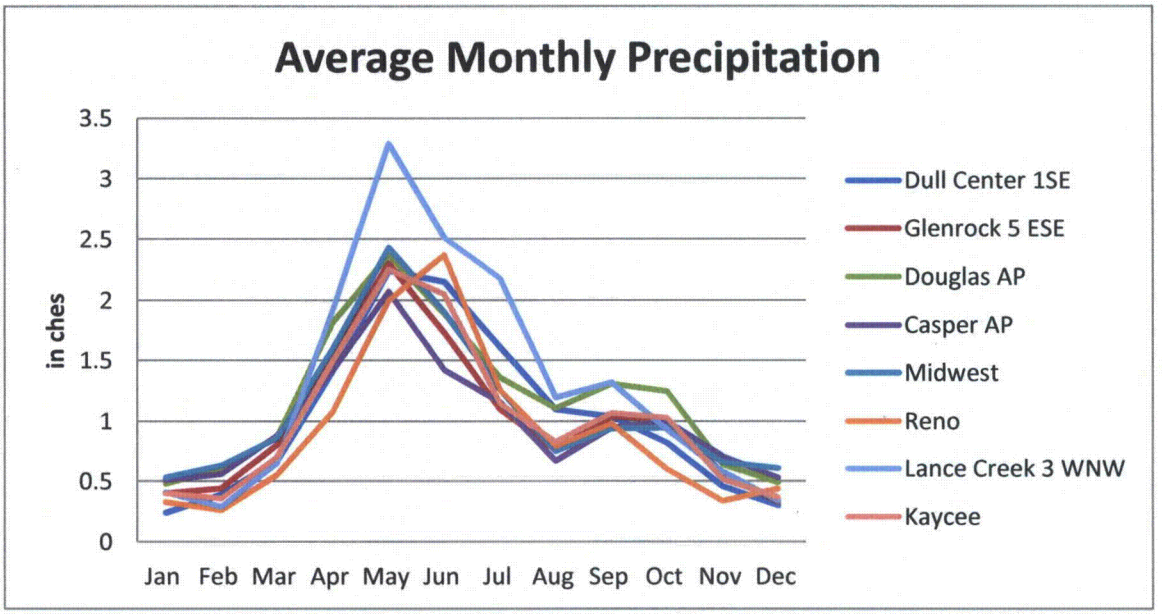


Figure 3.6-8: NWS Station Monthly Precipitation Averages (NCDC, 2007)



Severe weather can occur throughout the region, but is limited on average to four or five severe events per year. These severe weather events are generally associated with hail and damaging wind events. Tornadoes can occur, but have a frequency of less than one tornado per county per year (Martner, 1986).

Major snowstorms (more than five inches/day) are relatively infrequent in the region. The region experiences less than three major snowstorms per year. Casper Airport has the highest annual snowfall of all the sites with an average of nearly 80 inches. This value is in sharp contrast to three other sites having annual averages of 20 to 25 inches (Figure 3.6-9). The discrepancy between the sites can be attributed to Casper's proximity to Casper Mountain. Casper Airport is located at the base of the northern slopes of Casper Mountain and snow events are intensified as a result of orographic lifting. The interpolated values (Figure 3.6-10) show average snowfall of 25 to 40 inches per year in the project vicinity. This value is inconsistent with the Wyoming Climate Atlas (Martner, 1986), which lists snowfall averages for central Converse County at 50 to 60 inches. This difference results from extremely low snowfall values recorded at the Glenrock 5 ESE site, and less than half of the values recorded at the three closest sites. Substantial monthly averages (more than three inches/month) occur at Glenrock 5 ESE during five months of the year and "measurable" averages (greater than one inch/month) occur seven months of the year. Based on these limited data, the timing of snowfall events in the proposed project vicinity can be predicted more reliably than by snowfall amounts.

Figure 3.6-9: NWS Station Monthly Snowfall Averages (NCDC, 2007

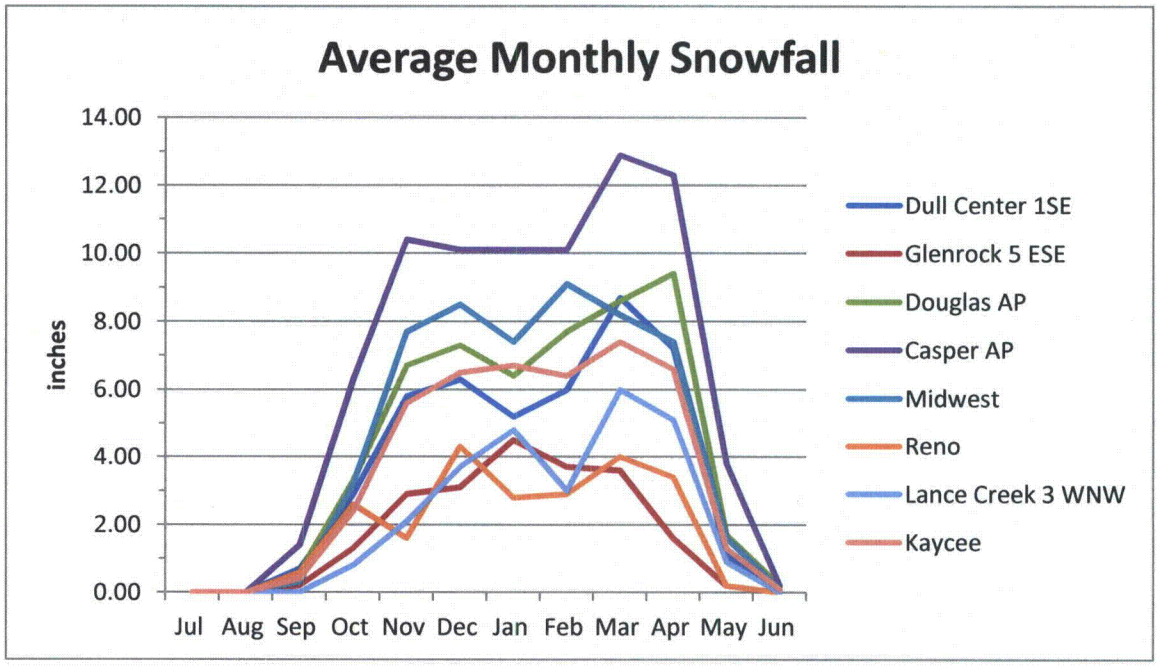
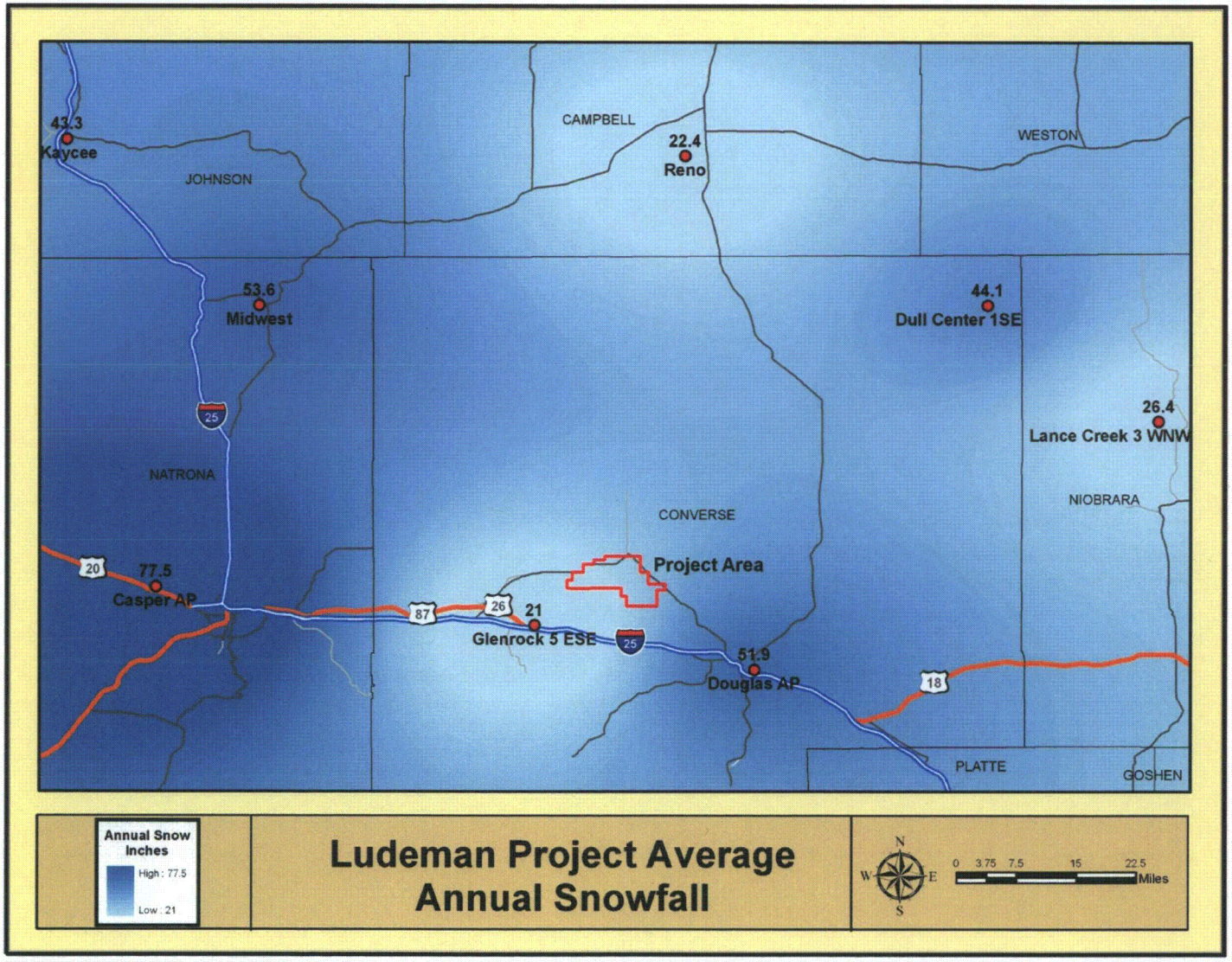


Figure 3.6-10: Regional Annual Average Snowfall



3.6.2.4 Wind Patterns

The Douglas AP site averaged wind speeds of 11.0 mph for the five years included in its climate database. More than 35 percent of the time, the wind direction is from the west to northwest, and accompanying wind speeds are generally fairly high with averages greater than 12 mph nearly 75 percent of the time. Mean monthly average wind speeds from the Douglas AP are lowest in September at 8.6 mph and highest in April at 12.2 mph. Table 3.6-3 shows the monthly average monthly wind speeds and directions along with monthly maximum wind gust speeds. NWS direction data are summarized to the nearest 10 degrees. High wind events are fairly common; gust data from the Douglas AP show every month recording wind gusts greater than 48 mph. The predominant seasonal wind directions are bimodal. Spring and summer show southeast as the predominant direction, with west/northwest winds dominating fall and winter.

Table 3.6-3: Douglas AP Monthly Wind Parameters Summary (NCDC, 2007)

Douglas AP Monthly Wind Averages			
	Wind Speed	**Wind Direction**	**Max Wind Gust**
JAN	10.0	NW	53
FEB	10.6	W	48
MAR	11.1	W	50
APR	12.2	SE	56
MAY	10.9	SE	49
JUN	10.7	W	49
JUL	9.5	SE	53
AUG	9.8	SE	54
SEP	8.6	ESE	55
OCT	9.4	SE	55
NOV	10.2	W	56
DEC	10.5	W	52
ANN	**11.0**	**W**	**56**

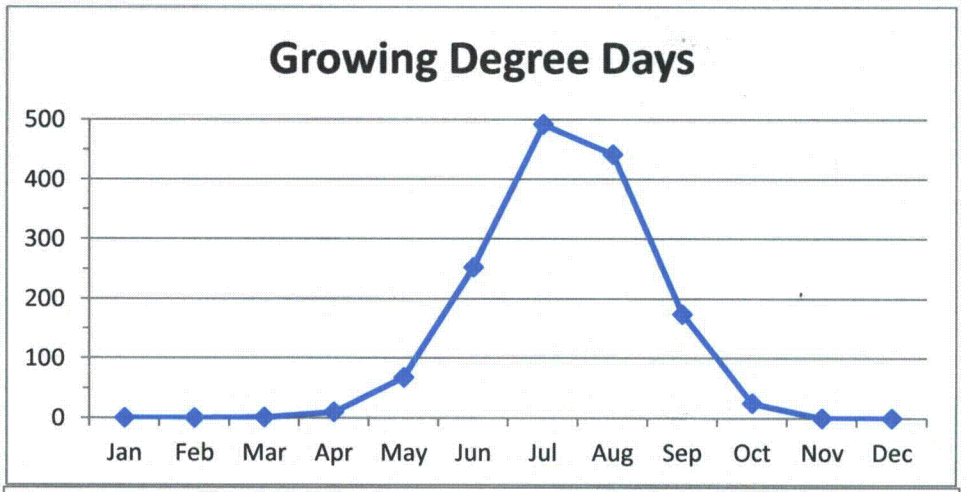
3.6.2.5 Cooling, Heating, and Growing Degree Days

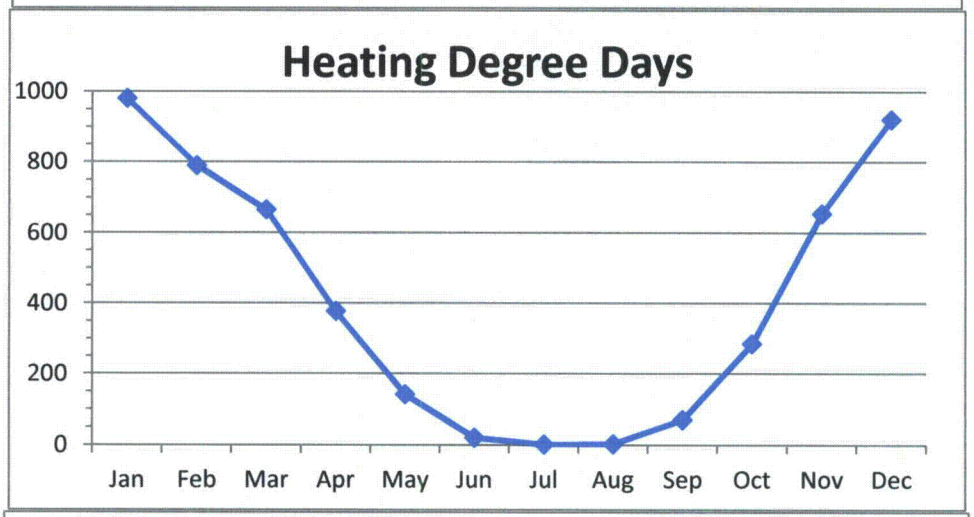
Figure 3.6-11 summarizes the monthly cooling, heating, and growing degree days for Casper, Wyoming. The data are assumed to be indicative of the region since the other meteorological parameters for the various sites within the region track closely to the Casper data.

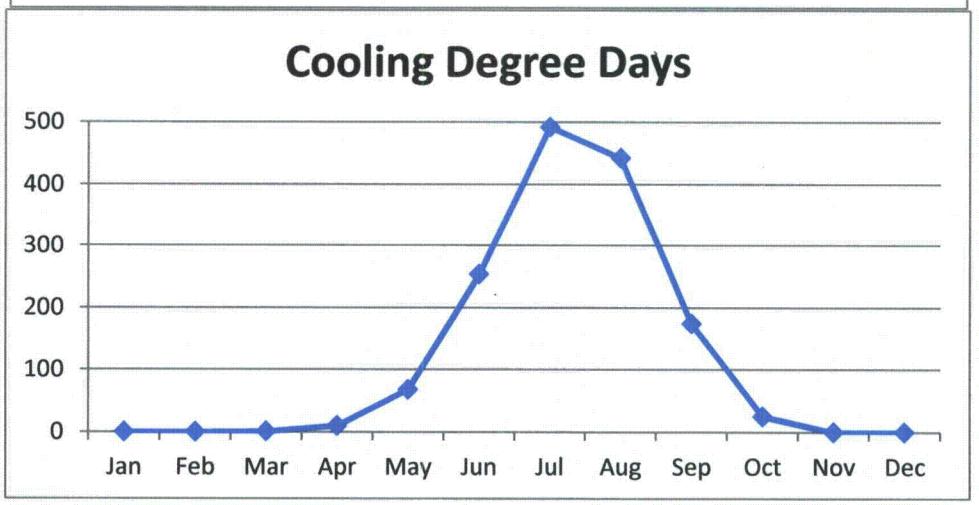
The heating and cooling degree days are included to show deviation of the average daily temperature from a predefined base temperature. In this case, 55° F has been selected as the base temperature. The number of heating degree days is computed by taking the average of the high and low temperature occurring that day and subtracting it from the base temperature. The calculation for growing and cooling degree days is the same, except that 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 graphs of heating degree days and cooling degree days are inversely related and the number of growing and cooling degree days per month is identical when the same base temperature is chosen. The maximum number of heating degree days occurs in January, at 980 degree days. This 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 Airport Cooling, Heating, and Growing Degree Days (WRCC 2007)







3.6.3 Site Specific Analysis

The site specific discussion is limited to the meteorological data from the Glenrock Coal (GCC) mine site and the Douglas AP. These two sites were chosen as surrogate sites based on their proximity and topographic similarity to the proposed project site. The area is characterized by high plains, rolling hills and minor ridges. Both sites are included to reflect small meteorological differences between the ridge tops and lower drainages. The vegetation types are mainly confined to native grasses with some sage brush and very sparse woody plants. Each meteorological station is surrounded by rolling hills covered with native grasses, although the Douglas AP site may experience some urban influence.

3.6.3.1 Temperature

Figure 3.6-12 shows the seasonal average temperatures for the Douglas AP and GCC sites, which are nearly identical. The accompanying Table 3.6-4 provides the maximum, minimum and average seasonal temperatures for both sites. Daily average temperatures range from 30° F in the winter to near 70° in the summer.

The annual average project site temperature is projected at 47° F, based on averages of 47.7° F at Douglas AP (Figure 3.6-13) and 46.1° F at GCC (Figure 3.6-14). Maximum temperatures for the two surrogate sites exceed 97° F and minimum temperatures fall below -25° F.

Figure 3.6-12: Douglas AP and GCC Seasonal Average Temperatures

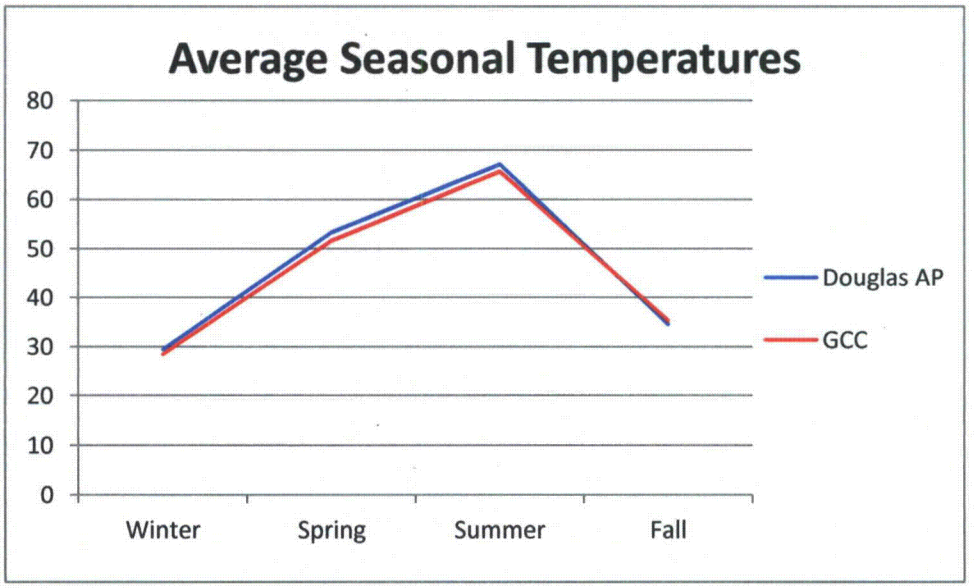


Figure 3.6-13 and Figure 3.6-14 provide meteorological summaries for the two surrogate sites. The averages, maximums, and minimums are specified for each parameter recorded at the site along with the data recovery rate for each. The recovery rates are greater than 90 percent for all parameters at both sites with the exception of sigma theta (standard deviation of wind direction) at GCC which had a recovery rate of 89 percent.

Table 3.6-4: Douglas AP and GCC Max, Min, and Average Seasonal Temps

	Douglas AP			GCC		
	Avg	Max	Min	Avg	Max	Min
Winter	29.5	77	-29	28.5	70	-25
Spring	53.4	101	10	51.6	92.7	0
Summer	67.2	104	28	65.7	97.4	21.7
Fall	34.6	86	-20	35.3	78.7	-18.9

Figure 3.6-13: Douglas AP Meteorological Summary for 2003 – 2007

Douglas AP

Meteorological Data Summary

1/1/2003 - 12/31/2007

Hourly Data

	Average/Total	Max	Min
Wind Speed (mph)	11.0	54.1	0.0
Temperature (F)	47.7	104.0	-29.0
Relative Humidity (%)	57.9	100.0	4.0
Precipitation (in)	46.3	2.27	0.0
Bar. Pressure (in Hg)	25.0	25.5	24.4

Predominant wind direction was from the N sector,
accounting for 18.2 percent of the possible winds

Data Recovery

Parameter	Possible (hours)	Reported (hours)	Recovery
Wind Speed	43824	43303	98.81%
Wind Direction	43824	43303	98.81%
Temperature	43824	42433	96.83%
Relative Humidity	43824	43118	98.39%
Precipitation	43824	43340	98.90%
Bar. Pressure	43824	43339	98.89%

Figure 3.6-14: GCC Meteorological Summary for 1997 – 2006

Glenrock Coal Company

Meteorological Data Summary

1/1/1997 - 12/31/2006

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	0.0

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

Figures 3.6-15 through 3.6-17 show the seasonal and annual wind roses for GCC and Douglas AP, respectively. The GCC predominant wind direction is west/southwest and the Douglas AP predominant wind direction is west with secondary northwest and southeast modes. It should be noted there is a northerly component evident in the Douglas AP wind rose. This component is an artifact of the wind sensor's high wind speed starting threshold (note the order of magnitude increase in "calm" winds in comparison to GCC). High pressure located over the southwestern United States produces 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 secondary southeast mode is more evident in the Douglas AP wind roses. 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 Figure 3.6-18. The graphs show a pronounced difference between the winter and summer averages. GCC experiences substantially higher wind speeds (3-5 mph), 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, these sites have differences of 3-4 mph from summer to winter months. The two averages provide a good view of the variation that can be experienced between the valley floor and the hilltops.

The average wind speed for GCC is 14.8 mph for the entire 10 year period analyzed and 11.0 mph for the 5 years of Douglas AP data. A closer look at the wind speed, summarized in the Douglas AP and GCC wind summaries (Figure 3.6-19 and Figure 3.6-20), shows the west/southwesterly component average wind speed is 19.4 mph for GCC. The westerly component average for Douglas AP is 17.2 mph. These values suggest that the predominant wind direction is comprised of high, sustained wind speeds. Maximum hourly averages of greater than 50 mph have been recorded at both sites. Figure 3.6-20 shows the cumulative frequency wind speed distributions for Douglas AP and GCC. The graphs provide visual evidence that light wind speeds are a rare occurrence.

The Joint Frequency Distribution is included for GCC (Table 3.6-5). The distribution shows the frequencies of hourly average wind speed for each direction based on stability class. Seventy percent of all winds at GCC 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 summary (stable), where GCC has no wind speed averages greater than 6 knots (6.9 mph).

Figure 3.6-15: GCC Seasonal Wind Roses.

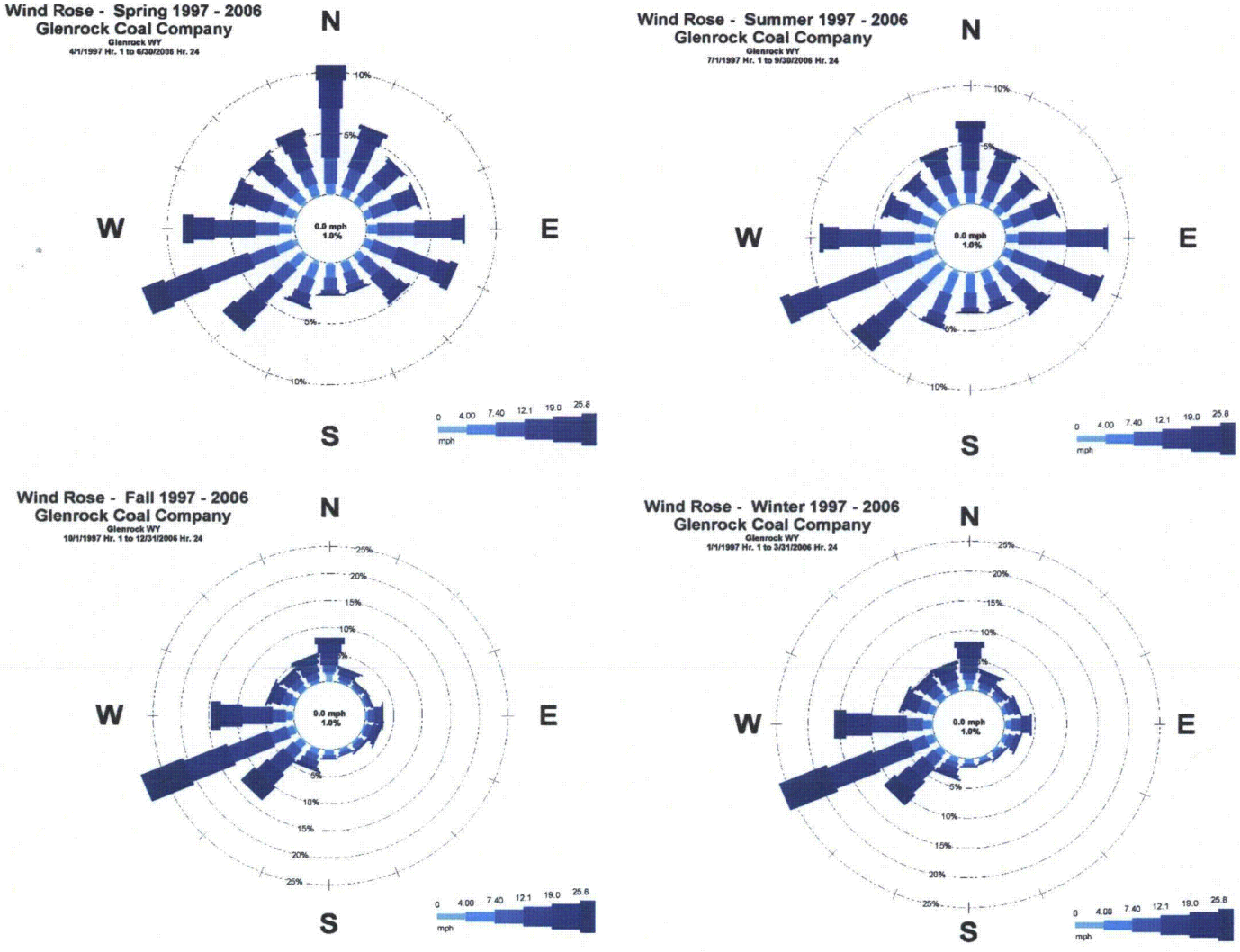


Figure 3.6-16: Douglas AP Seasonal Wind Rose

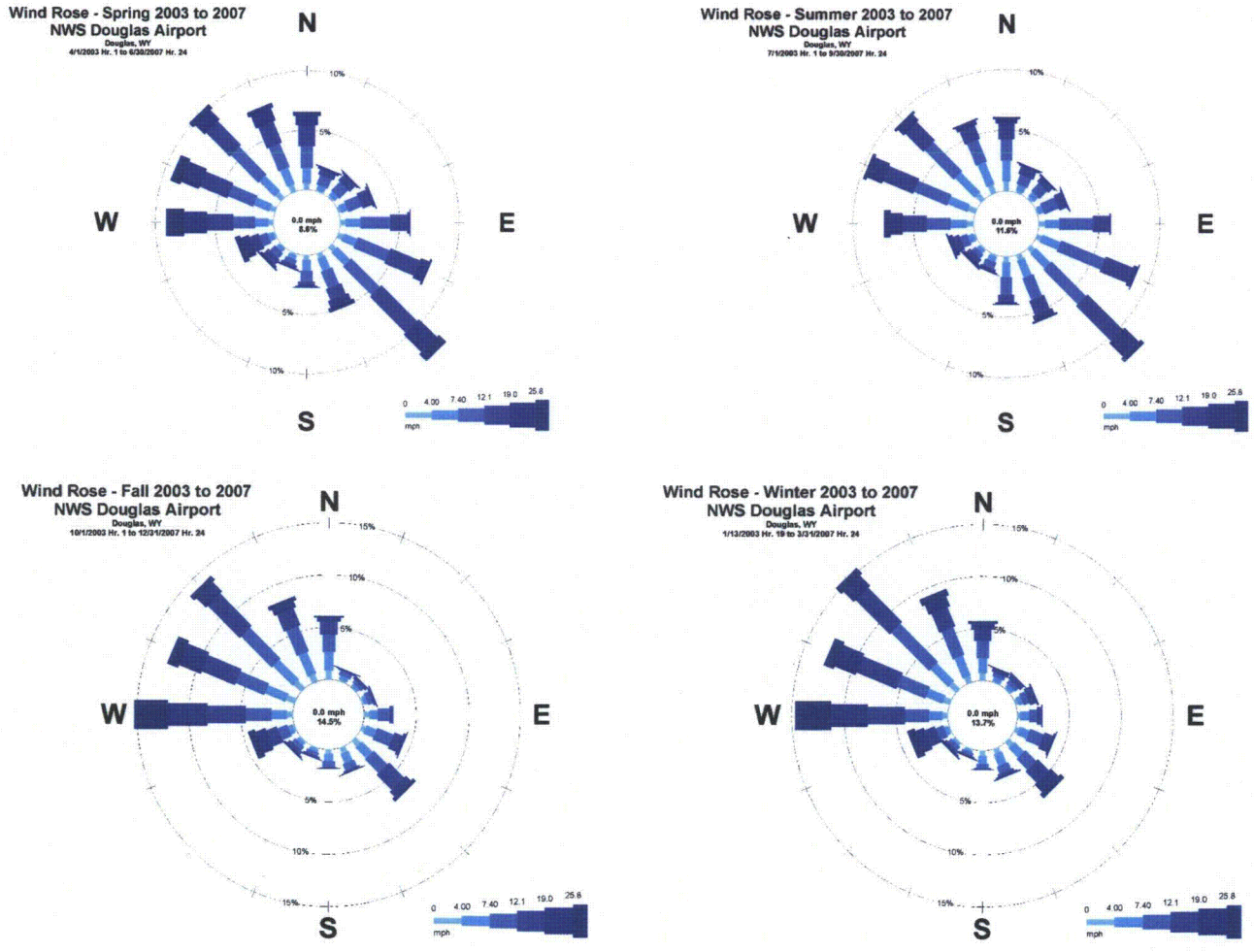


Figure 3.6-17: GCC and Douglas AP Annual Wind Rose

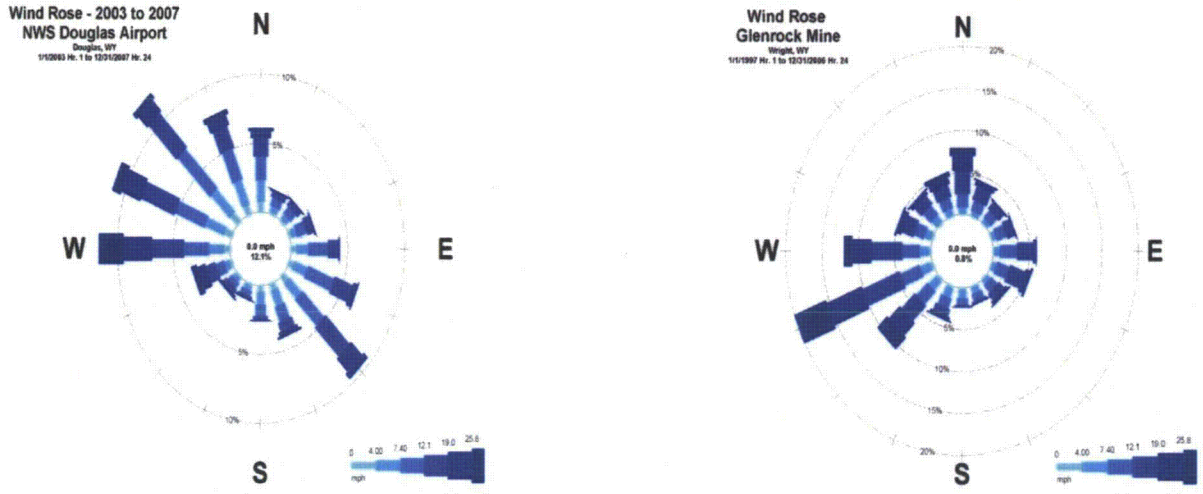
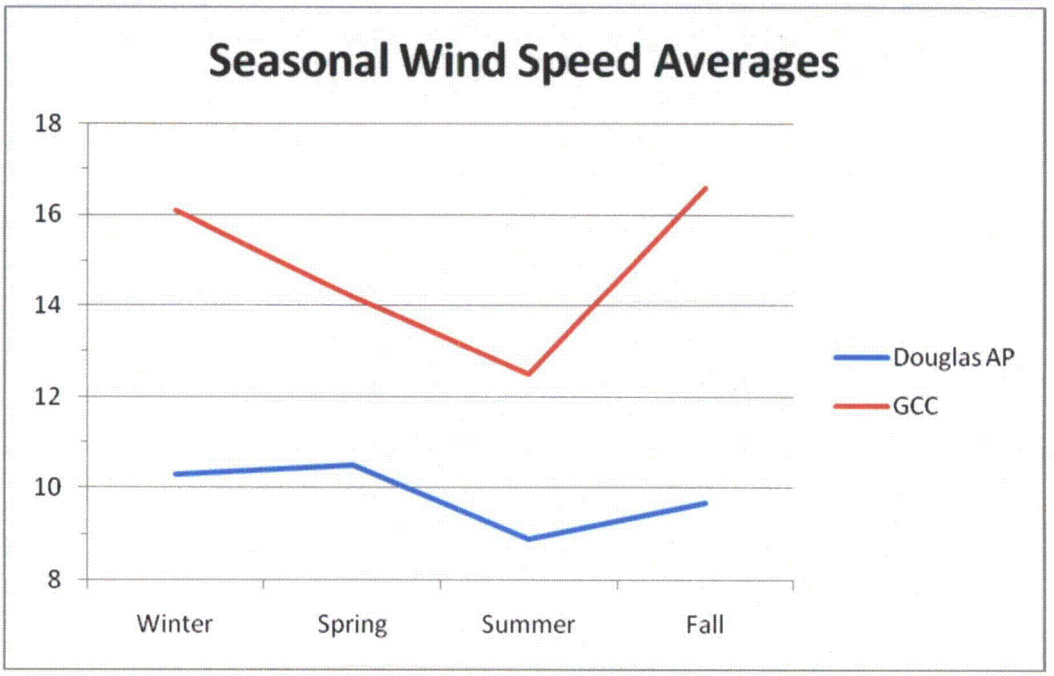


Figure 3.6-18: Monthly (top) and Seasonal (bottom) Wind Speed Averages for Douglas AP and GCC



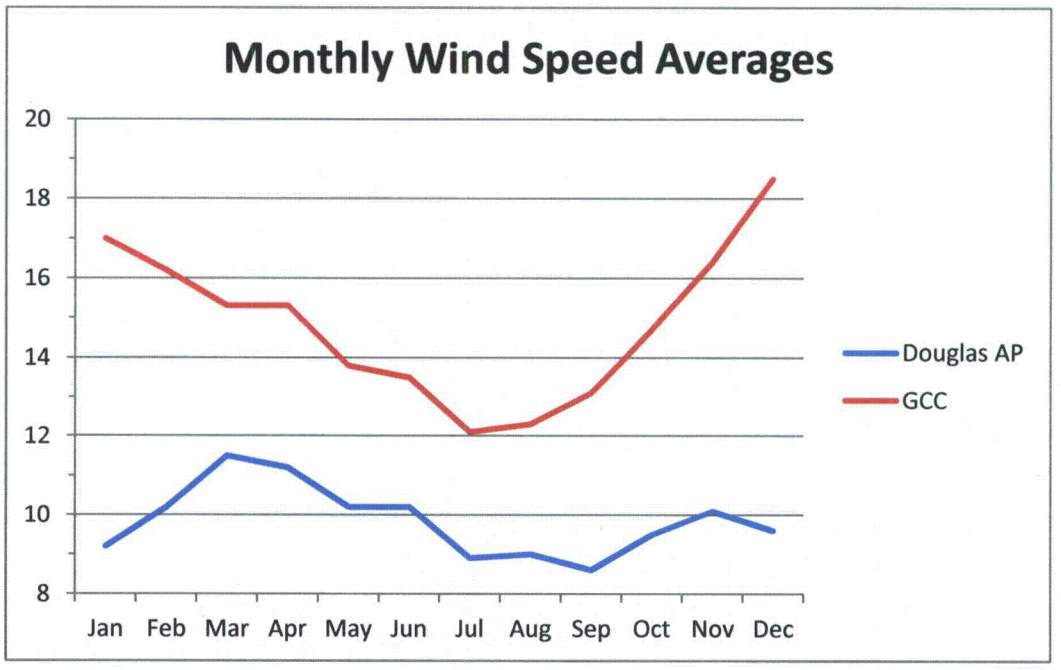


Figure 3.6-19: Douglas AP Wind Summary

Douglas Airport

Wind Data Summary

1/1/2003 - 12/31/2007

Hourly Data

	Average	Max	Min
Wind Speed (mph)	11.03	54.05	3.45
Sigma Theta (°)	-	-	-
Wind Direction			
N	3.63	39.10	3.45
NNE	10.41	40.25	3.45
NE	10.25	33.35	3.45
ENE	10.46	29.90	3.45
E	9.54	33.35	3.45
ESE	10.89	35.65	3.45
SE	13.18	37.95	3.45
SSE	10.20	43.70	3.45
S	8.10	29.90	3.45
SSW	9.63	31.05	3.45
SW	11.99	41.40	3.45
WSW	15.98	46.00	3.45
W	17.19	52.90	3.45
WNW	13.85	54.05	3.45
NW	12.01	41.40	3.45
NNW	11.52	44.85	3.45

Predominant wind direction was from the N sector, accounting for 18.2% of the winds, the average wind direction was 325°.

Data Recovery

	Possible (hours)	Reported (hours)	Recovery
Wind Speed	43824	43303	98.81%
Sigma Theta	43824	43340	98.90%
Wind Direction	43824	43303	98.81%

Figure 3.6-20: GCC Wind Summary

Glenrock Coal Company

Wind Data Summary

1/1/1997 - 12/31/2006

Hourly Data

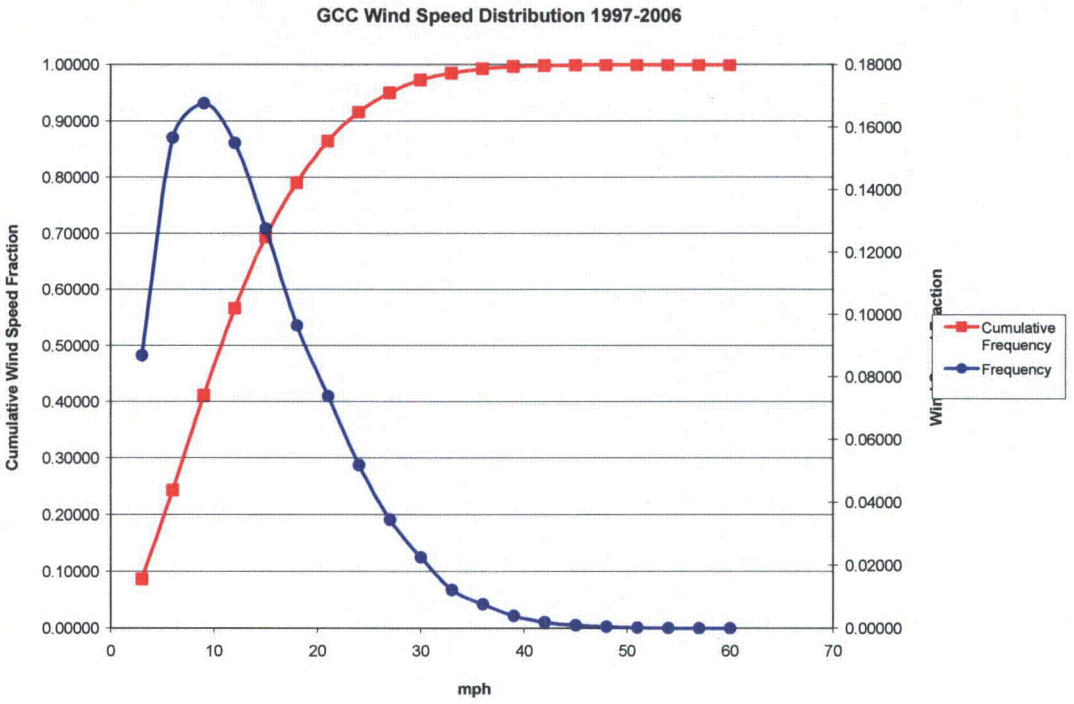
	Average	Max	Min
Wind Speed (mph)	14.82	57.60	0.10
Sigma Theta (°)	10.96	79.30	-
Wind Direction			
N	15.36	46.29	0.10
NNE	13.52	38.22	0.10
NE	11.32	30.90	0.10
ENE	11.14	29.80	0.10
E	11.92	37.15	0.10
ESE	13.52	38.80	0.10
SE	12.37	39.44	0.10
SSE	9.05	33.30	0.10
S	8.16	34.50	0.10
SSW	10.99	37.46	0.10
SW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

Predominant wind direction was from the WSW sector, accounting for 20% of the winds, the average wind direction was 266°.

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 3.6-21: Douglas AP and GCC Wind Speed Frequency Distributions



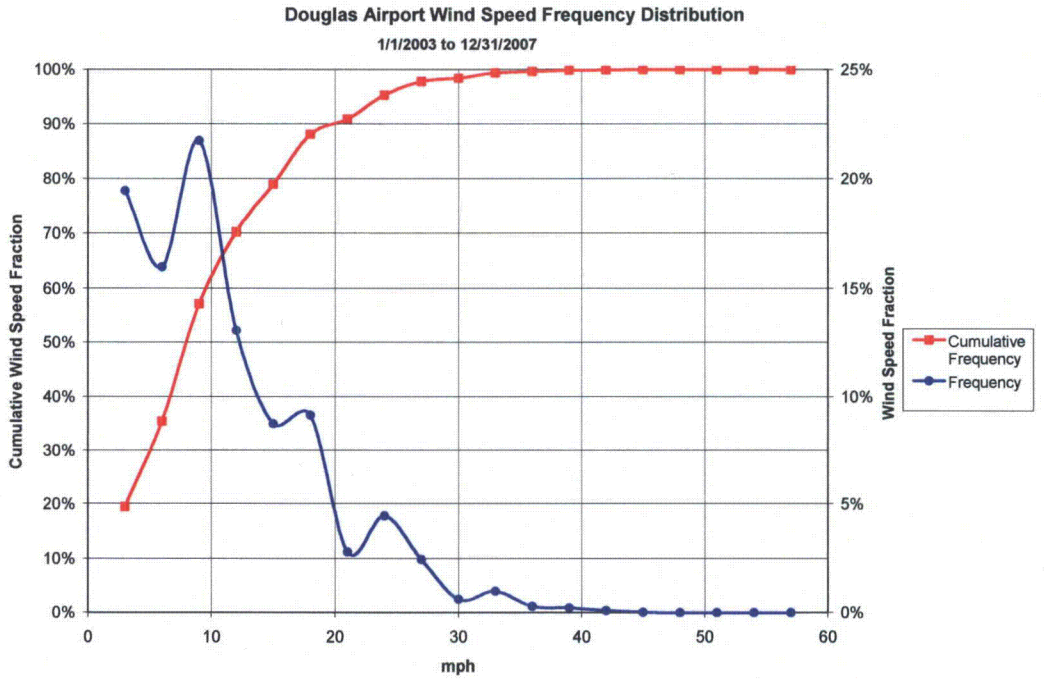


Table 3.6-5: GCC Joint Frequency Distribution for 1997 -2006

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 — **Wind Speed (Knots)**

Direction	0.6 - 3.0	4 - 6	7 - 10	11-16	17 - 21	> 21	Row Total
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

From 1/1/1997 To 12/31/2006

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

From 1/1/1997 To 12/31/2006

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

From 1/1/1997 To 12/31/2006

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

From 1/1/1997 To 12/31/2006

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

From 1/1/1997 To 12/31/2006

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

3.6.3.3 Surrogate Site Justification and Specifications

The proposed Ludeman facilities will specifically be operated as Satellite facilities and will not be actively performing final processing and drying of uranium. Therefore, airborne release of uranium particulates that could adversely affect on and off-site ambient air quality will not be a factor during the operation of these facilities. Given the operational parameters of these facilities, an on-site meteorological monitoring station is not required to gather baseline meteorological data prior to the start-up of these facilities. Additionally, an on-site meteorological monitoring station will not be required to monitor for possible future dispersion of any particulates of concern emanating from these facilities.

Of the available meteorological monitoring sites, the Glenrock Mine (GCC) meteorology most nearly represents that of the proposed Ludeman Project site. GCC is therefore proposed as the source of meteorological data to be substituted for on-site monitoring. Data from the Douglas AP supplements GCC data, with the intent of providing a lower bound for wind speeds and supporting the general conclusions regarding local meteorology. To illustrate the similarities between the proposed site and GCC, several images from Google Earth are presented. Figure 3.6-22 shows an aerial view of the general area along with the 14-mile distance between the GCC meteorological station and the center of the proposed project area. Figure 3.6-23 shows a closer view of the proposed Ludeman site, while Figure 3.6-24 shows a similar view of the GCC site. Both sites are characterized by rolling hills and drainages covered with grass and sparse shrubs. The nearest mountains are the Laramie Range, approximately 15 to 20 miles south of the proposed project and 25 miles south of the GCC site. The North Platte River runs just south of the southern boundary of the proposed Ludeman Project and 15 miles south of GCC. Effects of the river on the meteorology of these two sites are considered minor. The GCC site is a few hundred feet higher in elevation than the proposed Ludeman Project area.

Table 3.6-6 lists the meteorological instruments employed at the Glenrock Mine (GCC). The site coordinates and elevation are presented, along with instrument models, accuracy specifications, and instrument heights above the ground.

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 Inter Mountain Laboratory (IML) Air Science. Data recovery has typically exceeded 95 percent. 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 3.6-6: GCC Monitoring Details

Glenrock (GCC)	10m tower	CR10 Data Logger		Lat: 43° 03' 36" Elev. 5,674 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	Temp: -35°-50° C	±0.5° C @ given Range	--	2 meters
Precip	Met One 8" tip	0 - 8"	±0.5% @ 0.5 in/hr rate	--	1 meter

Figure 3.6-22: General Project Vicinity and Site Distance

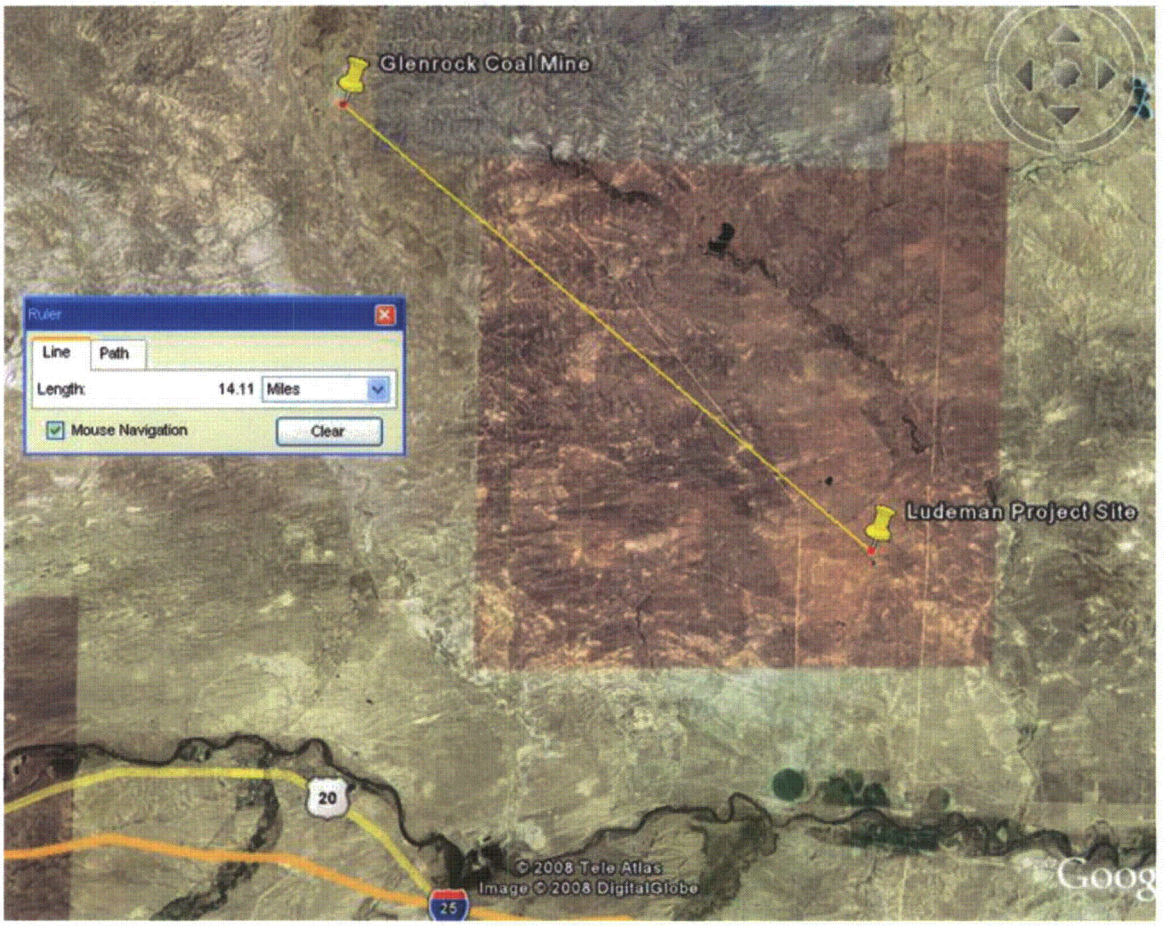


Figure 3.6-23: Proposed Ludeman Project Area

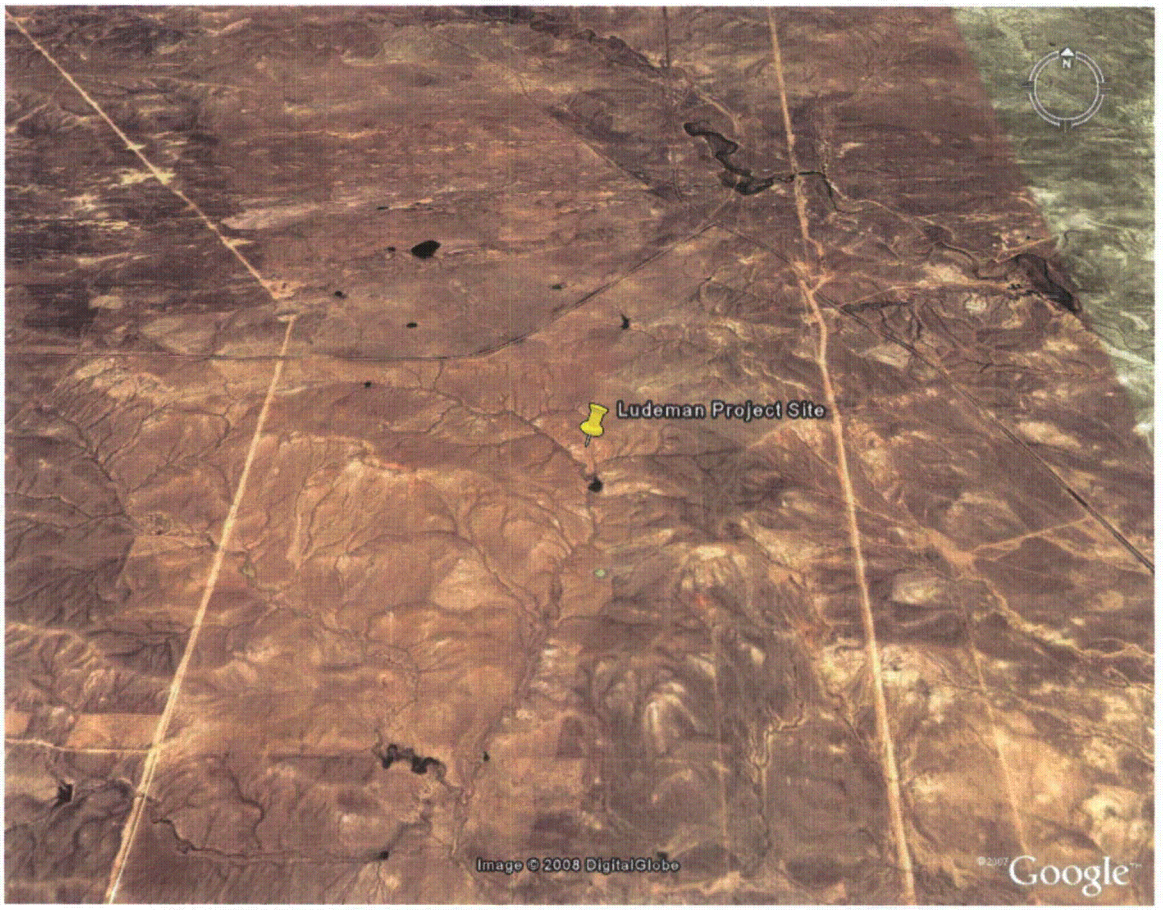
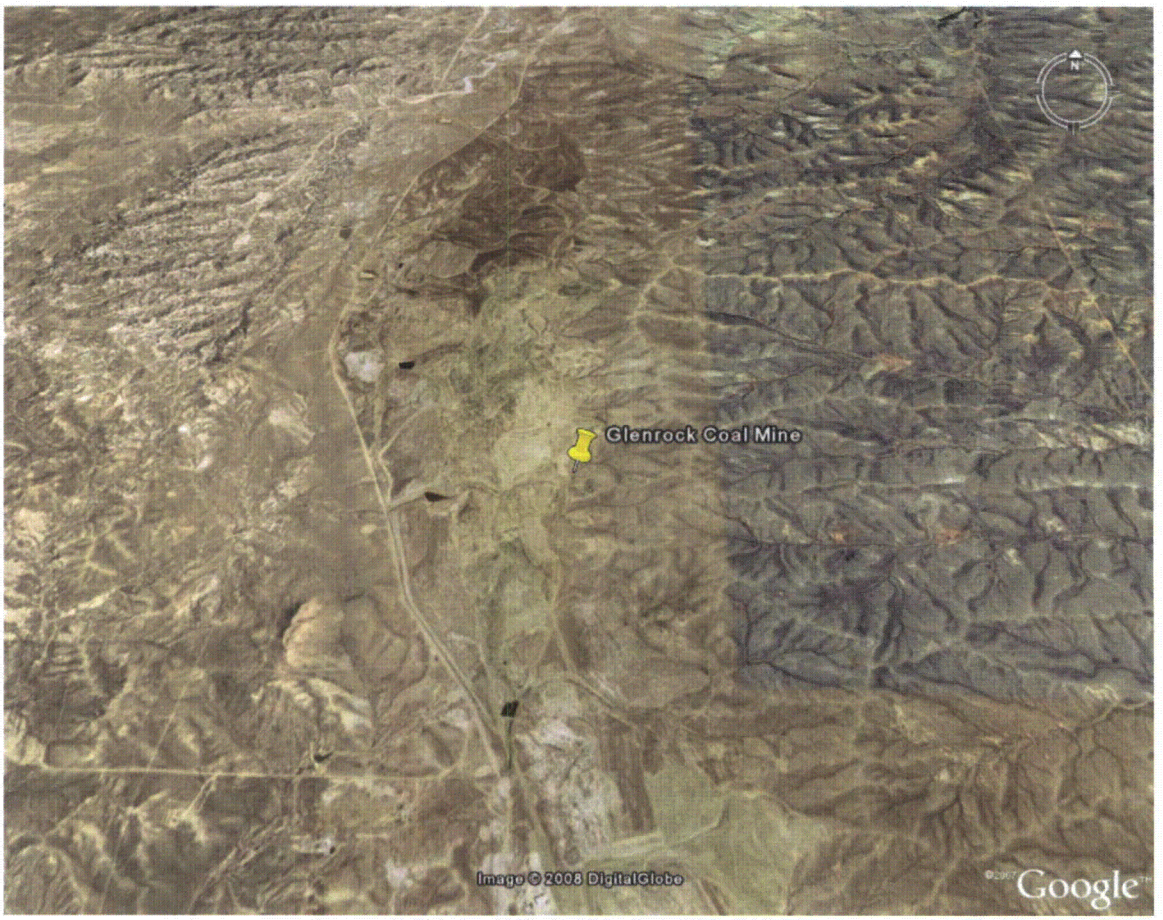


Figure 3.6-24: GCC Mine Area



3.6.3.4 Upper Atmosphere Characteristics

The nearest upper-air data available from the National Weather Service is 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 proposed 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. 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 the WDEQ-AQD.

In August of 2000, IML Air Science conducted Sound Detection and Ranging (SODAR) monitoring at the Black Thunder Mine, located approximately 40 miles north-northeast of the proposed Ludeman Project site. The purpose of this monitoring was to support a comprehensive study of NO_x dispersion characteristics following overburden removal 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). These mixing heights were downloaded into a database and queried, with results shown in Table 3.6-7. Morning and afternoon time intervals were taken from EPA modeling guidance.

Table 3.6-7: Black Thunder SODAR Results

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

The SODAR definition of mixing height appears somewhat ambiguous, and these measurements were all taken in August. Therefore, they are presented here as an additional data source, but not recommended as direct meteorological inputs to the MILDOS model.

3.6.3.5 Bodies of Water and Special Terrain Features

The North Platte River is the only significant body of water in the vicinity of the proposed project site. Most of the proposed Ludeman project activities would occur in the hills north of the river, minimizing the river's influence on the proposed project site's meteorology. There are no special terrain features that would alter the general

meteorological conditions at either the proposed Ludeman site or the GCC site. Nearby drainages support small, ephemeral streams. The maximum topographic relief throughout this area is a few hundred feet. The GCC site is near the top of a hydrologic divide, contributing to higher wind speeds than those expected at the proposed Ludeman site. This difference has been accounted for by averaging wind speeds at GCC with wind speeds at the Douglas AP.

3.6.3.6 Air Quality

National Ambient Air Quality Standards (NAAQS) exist for sulfur dioxide (SO_2), nitrogen dioxide (NO_2), carbon monoxide (CO), ozone (O_3), lead, and particulate matter small enough to move easily into the lower respiratory tract (particles less than 10 micrometers in aerodynamic diameter, designated Particulate Matter (PM_{10}). The NAAQS are expressed, as pollutant concentrations that are not to be exceeded in the ambient air, that is, in the outdoor air to which the general public has access (40 CFR Part 50.1(e)). Primary NAAQS are designated to protect human health; secondary NAAQS are designated to protect human welfare by safeguarding environmental resources (such as soils, water, plants, and animals) and manufactured materials. Primary and secondary NAAQS are presented in Table 3.6-8.

The air quality in the proposed project region is considered to be very good. The area is sparsely populated and is not heavily developed with major sources of industrial air pollution. The closest air quality monitoring station to the proposed project area is in Gillette, Wyoming at an approximate distance of 88 miles from the project area. This station shows that regional air quality is well within compliance with the NAAQS and Wyoming Ambient Air Quality Standards (WAAQS). In addition to ambient air quality standards, which represents an upper bound on allowable pollutant concentrations, there are also national standards for the Prevention of Significant Deterioration (PSD) of air quality (40 CFR § 51.166). The PSD standards differ from the NAAQS in that the NAAQS provide maximum allowable concentrations of pollutants, while PSD requirements provide maximum allowable increases in concentrations of pollutants for areas already in compliance with the NAAQS. PSD standards are therefore expressed as allowable increments in the atmospheric concentrations of specific pollutants. Allowable PSD increments currently exist for three pollutants: NO_2, SO_2, and PM 10. Increments that is particularly relevant when a major proposed action (involving either a new source or a major modification to an existing source) may degrade air quality without exceeding the NAAQS, as would be the case in an area where the ambient air is considered to be very clean. One set of allowable increments exists for Class II areas, which cover most of the continental United States. A much more stringent set of allowable increments exists for Class I areas, which are special designated areas where the degradation of ambient air quality is severely restricted. Class I areas include certain national parks and monuments, wilderness areas, and other areas as described in 40 CFR § 51.166(e) and 40 CFR Part

81:400-437. Maximum allowable PSD increments for Class I and Class II areas are given in Table 3.6-9 A Class I area that is in proximity to the proposed Ludeman facilities is the Thunder Basin National Grasslands. PSD Class I areas receive the highest degree of protection from air pollution. Only small amounts of particulate, consisting of SO_2, and NO_2 air pollutants, are allowed in Class I areas (BLM, 2004c).

The primary new emission source of non-radiological pollutants will be particulate matter with a diameter less than 10 micrometers (PM10) resulting from vehicle traffic within the proposed Ludeman Project Area. Projected activities impacting fugitive dust emissions included ongoing wellfield construction activities, routine site traffic related to operations and maintenance, heavy truck traffic delivering chemicals and material and product shipping, and employee traffic to and from the site. Based on these activities, the projected total PM10 emissions is 18.5 tons per year. This level of emissions is considered quite 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 PM10 emissions inventories in the thousands of tons per year. Sections of unpaved county roads can also exceed 18.5 tons per year emission rate by an order of magnitude or more. Atmospheric dispersion modeling typically shows that fugitive PM10 emissions on the order of 15 tons per year results in insignificant impacts to ambient air quality beyond a distance of a few hundred yards from the sources. Significant impact for PM10 is defined as 1.0 µg/m3 or more. The National Ambient Air Quality Standard (NAAQS) for annual average PM10 is 50 µg/m3. Since the estimated 18.5 tons per year of PM 10 fugitive dust emissions is well below the 250 tons per year threshold for PSD review, an analysis to further determine possible impacts to ambient air quality are considered unnecessary.

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.

Table 3.6-8: Primary and Secondary Standards for each Criteria of Pollutants

Pollutant	Primary Standard (Health-Based)		Secondary Standard (Welfare based)	
	Type of Average	Standard Level Concentration	Type of Average	Standard Level Concentration
PM_{10}	Annual Arithmetic mean	50 µg/m^3		Same as primary standard
	24-hr average not to be exceeded more than once per year on average over 3 years	150 µg/m^3		Same as primary standard
$PM_{2.5}$	Spatial and annual arithmetic mean in area	15 µg/m3		Same as primary standard
	98th percentile of the 24-hr average	65 µg/m3		Same as primary standard
O_3[a]	Maximum daily 1-hr average to be exceeded no more than once per year averaged over 3 consecutive years	0.12 ppm		Same as primary standard
	3-yr average of the annual fourth highest daily 8-hr average	0.08 ppm		Same as primary standard
NO_2	Annual arithmetic mean	0.053 ppm		Same as primary standard
SO_2	Annual arithmetic mean	0.03 ppm	3-hr	0.50 ppm
	24-hr average	0.14 ppm		
CO	8-hr (not to be exceeded more than once per year)	9 ppm		No secondary standard
	1-hr (not to be exceeded more than once per year)	35 ppm		No secondary standard
Lead	Maximum quarterly average	1.5 µg/m^3		Same as primary standard

[a] EPA is phasing out the 1-hr, 0.12-ppm standards (primary and secondary) and putting in place the 8-hr, 0.08 ppm standards. However, the 0.12-ppm standards will not be revoked in a given area until that area has achieved 3 consecutives years of air quality data meeting the 1-hr standard.

Table 3.6-9: Maximum allowable PSD increments for Class I and Class II Areas

Pollutant	Average Period	Standard	Basis	Standard Type
NO_2	Annual	25 µg/m3	--	PSD Increments for Class I Areas
PM_{10}	24-hr Annual	30 µg/m3	-1	
		17 µg/m3	-1	
SO_2	3-hr	512 µg/m3	-1	
	24-hr Annual	91 µg/m3	-1	
	Annual	20 µg/m3	--	
NO_2	Annual	2.5 µg/m3	--	PSD Increments for Class I Areas
PM_{10}	24-hr Annual	8 µg/m3	-1	
		4 µg/m3	-1	
SO_2	3-hr	25 µg/m3	-1	
	24-hr Annual	5 µg/m3	-1	
	Annual	2 µg/m3	--	

3.6.4 References

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3.7 NOISE

3.7.1 Affected Environment

This section describes the background noise sources within the proposed Ludeman Project (proposed project) area and presents the potential impacts of noise for the surrounding area. Existing noise sources within the proposed project area include county and local road traffic, livestock operations, and wind. Due to the remoteness of the proposed project, low population density of the surrounding area, and lack of noise generated from existing noise sources, the existing noise levels are generally low. As stated in GEIS Section 3.3.7, the estimated ambient noise levels in undeveloped rural and more urban areas of the Wyoming East Uranium Milling Region are 22 to 38 decibels (dBA) (NRC, 2009a). Table 3.7-1 presents noise levels associated with some commonly heard sounds.

Open rangeland is the primary land use within and in the surrounding two-mile area. Other land uses include natural gas transportation facilities. The existing ambient noise in the vicinity of the proposed project is dominated by the traffic noise from State Highways 95 and 93 and surrounding oil and gas operations.

The proposed Leuenberger Satellite facility site is approximately one half mile from the property boundary of the small residential subdivision and approximately one mile from the Leuenberger Ranch house. Assuming that the noise level produced by unshielded machinery at the facility site is 85dB at 50 feet, the sound pressure level attained at the property boundary will be below the level identified by the USEPA as suitable for outdoor areas where human activity takes place (approximately 55 dB). A level of 85 dB is the OSHA threshold at which a hearing conservation program at the plant would be required. Experience at operating ISR facilities verifies that this assumption is conservative and that the average sound pressure levels during construction will be less than 85 dB. After appropriate engineered controls (i.e. the protective enclosure for the equipment) are installed, noise levels will not impact the residences, and are unlikely to approach the levels attained by State Highway 95. Therefore, impact to noise or congestion above ambient background noise within the proposed project area or in the surrounding two-mile area is not anticipated.

Potential impacts from noise at the proposed site could occur during all phases of the ISR facility lifecycle. These impacts would be associated with the operation of equipment such as trucks, bulldozers, and compressors; from traffic due to commuting workers or material and waste shipments; and production unit and central processing plant activities and equipment. The GEIS concluded that the noise impact at an ISR facility could range from small to moderate during all phases four phases of an ISR project, depending on the distance between the nearest resident and the activities occurring at the Satellite facility

(NRC, 2009a). A more detailed discussion of potential noise impacts can be found in Section 4.7 and 5.7 of this ER.

3.7.1.1 Construction Phase

As discussed in Section 4.3.7.1 of the GEIS, potential noise impacts would be greatest during construction of the Satellite facilities because of the heavy equipment involved and given the likelihood that these facilities would be built in rural, previously undeveloped areas where background noises levels are lower. The use of drill rigs, heavy trucks, bulldozers, and other equipment used to construct and operate the production units, drill wells, construct access roads, and build the Satellite facilities would generate noise that would be audible above the undisturbed background noises. Noise would likely be higher during daylight hours when construction is more likely to occur and more noticeable in proximity to operating equipment. Administrative and engineering controls would maintain noise levels in work areas below OSHA regulatory limits and mitigated by use of personnel hearing protection. For individuals living in the vicinity of the site, ambient noise levels would return to background levels at a distance greater than 300m (1,000ft) from the construction activities. Wildlife would be expected to avoid areas where noise-generating activities were occurring.

Additionally, as stated in the GEIS, the traffic noise during construction would be localized, limited to highways in the vicinity of the proposed project and access roads within the proposed project area. Relative short-term increases in noise levels associated with passing traffic would be small for the larger roads, but could be moderate for lightly traveled rural roads. Uranium One will enforce site speed limits to further mitigate traffic noise impacts.

Overall, these types of activities would be small given the distance to the nearest residence is approximately 1.5 miles from the center of the proposed project area and the proposed construction activities.

3.7.1.2 Operation Phase

Section 4.3.7.2 of the GEIS discussed ISR activities that could generate noise. These activities will occur indoors; therefore, offsite noise from operations would be less than previously mentioned construction activities. Production unit equipment (e.g. pumps, compressors) will be contained within structures such as header houses and well head covers reducing the potential for noise to be heard by offsite individuals.

Traffic noise from commuting workers, truck shipments, and facility equipment will be localized, limited to highways in the vicinity of the site, access roads within the site and production unit roads. Relative short-term increases in noise levels associated with

passing traffic would be small for the larger roads, but could be moderate for lightly traveled rural roads. Taking into account the relatively small increase in traffic the potential noise impacts to the proposed project will be small.

Overall, these types of activities would be small given the distance to the nearest residence.

3.7.1.3 Groundwater Restoration Phase

Section 4.7.3.3 of the GEIS states that the general noise levels during aquifer restoration will be similar or less than noise levels during operations. Workplace noise exposure during groundwater restoration will use the same administrative and engineering controls used during operations. Existing operational infrastructure will be used and traffic levels are expected to be the less than during construction and operation phases of the proposed project. Vehicular traffic will be limited to delivery of supplies and staff travel to and from the site; therefore fewer trips will occur during groundwater restoration than operations. Taking into account the relatively small increase in traffic the potential noise impacts to the proposed project will be small.

Overall, these types of activities would be small given the distance to the nearest residence.

3.7.1.4 Decommissioning and Reclamation Phase

Section 4.7.3.4 of the GEIS discusses the potential noise impact from decommissioning activities. Noise levels generated during decommissioning and reclamation will be similar to or less than, noise levels during the construction phase. Decommissioning activities will result in a large but temporary noise impact onsite and potentially just beyond the proposed project boundary. Like the construction phase, noise levels will be higher during daylight hours when decommissioning and reclamation will more than likely occur and will be more noticeable in proximity to the operating equipment. Workplace exposure will be managed using the same administrative and engineering controls implemented for the construction phase. The increase in truck traffic associated with the transfer of solid waste to the Douglas landfill and of 11e.(2) byproduct to a licensed disposal facility will result in a small impact above background noise levels.

Overall, these types of activities would be small given the distance to the nearest residence.

Table 3.7-1: Relationship Between A-Scale dB Readings and Sounds of Daily Life

How It Feels	Equivalent Sounds	Decibels	Equivalent Sounds	How It Sounds
Near permanent damage level from short exposures	50 hp siren (100 ft)	130	Jackhammer	135 dB(A)
	Jet Engine (75 ft)		Chainsaw	*Appx 64 times as loud as 75 dB*
			Fire cracker (15 ft)	
Pain to ears	Turbo-fan jet at takeoff power (100 ft)	120	Rock and Roll Band	125 dB(A) *Appx 32 times as loud as 75 dB*
	Scraper loader	110	Unmuffled motor bike (2-3 ft)	115 dB(A) *Appx 16 times as loud as 75dB*
Uncomfortably loud	Jet flyover (1000 ft)			
			Car horn	*105 dB(A)*
Discomfort threshold		100	Unmuffled cycle (25 ft)	*Appx 8 times as loud as 75dB*
	Noisy newspaper press			
Very loud	Air compressor (20 ft)	90	Garbage trucks and city buses	95 dB(A) *Appx 4 times as loud as 75dB*
Conversation stops	Power lawnmower		Diesel truck (25 ft)	
	Steady flow of freeway traffic	80		85 dB(A) *Appx 2 times as loud as 75dB*
Intolerable for phone use	10-HP outboard motor		Garbage disposal Food blender	
	Automatic dishwasher	70	Muffled jet ski (50 ft)	75 dB(A)
Extra auditory physiological effects	Vacuum cleaner		Passenger car at 65 mph (25ft)	
	Window air conditioner outside (2ft)	60	Busy downtown area	
	Window air conditioner in room			
Quiet	Occasional private auto at 100 ft	50	Normal conversation	55 dB(A) *Appx 1/4 as loud as 75dB*
	Quiet home during evening	40		*45 dB(A) Appx 1/8 as loud as 75dB*
Sleep interference	Bird calls			
	Library	30		*35 dB(A) Appx 1/16 as loud as 75dB*
	Soft whisper (5 ft)			
		20	In a quiet house at midnight	
	Leaves rustling	10		

Adapted from the ABCs of Our Noise Codes published by Citizens Against Noise, Honolulu, Hawaii

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3.8 HISTORIC AND CULTURAL RESOURCES

3.8.1 Historic, Archeological, and Cultural Resources

Cultural resources, which are protected under the National Historic Preservation Act (NHPA) of 1966, are non-renewable remains of past human activity. As noted in NUREG-1910 (GEIS Sec. 3.2.8), the Wyoming State Historic Preservation Office (SHPO) administers and is responsible for oversight and compliance with National Register of Historic Places (NRHP or National Register), compliance and review for Section 106 of NHPA, traditional cultural properties review, enforcement of the Native American Graves Protection and Repatriation Act (NAGPRA), and compliance with other federal and state historic preservation laws, regulations and statutes.

This portion of Wyoming appears to have been inhabited by aboriginal hunting and gathering people for more than 13,000 years. Throughout the prehistoric past, the area was used by highly mobile hunters and gatherers who exploited a wide variety of resources. The proposed Ludeman Project (proposed project) is located in the prehistoric cultural sub-area known as the Northwestern Plains. The Northwestern Plains stretch from the central Alberta to southern Wyoming and from western North Dakota to western Montana

A Class III cultural resource inventory of the proposed project was conducted in 2008 (Appendix B) by Ethnoscience, Inc. of Billings Montana. The inventory incorporated 19,888 acres, of which 398 acres are under Bureau of Land Management jurisdiction, 1,485 acres are owned by the State of Wyoming, and 18,005 acres are privately owned. According to NUREG-1569 (Sec. 2.4.1), specific attention should be directed to properties included in or eligible for inclusion in the NRHP.

The investigation identified 47 sites and 59 isolated finds. Three previously recorded prehistoric sites within the proposed project were not found. It is assumed they no longer exist. Historic documents also note the possible presence of an historic telegraph line, but the inventory identified no evidence of this site.

Twenty-four of the sites are prehistoric. All of the existing sites are archaeological. Eighteen of the prehistoric sites contain stone features. Two sites are culture material scatters and six are lithic scatters. Lithic scatters contain evidence of chipped stone tools and/or the debris left behind during the manufacture of chipped stone tools. No other class of artifacts was found. Culture material scatters usually contain chipped stone artifacts, but also contain other types of artifacts (fire cracked rock, bone, manos, pottery). They may also have evidence of hearths or other features. Stone feature sites are defined by the presence of stone rings, cairns, effigies, and alignments. Although other artifacts may exist, the presence of the stone features categorizes this site type.

Twenty-three sites are historic. The historic sites consist of an historic trail, five windmills, five farmsteads, three foundations, three depressions, four culture material scatters, and two stone features. One of the stone features consists of a historically formed rock pile. Its function is unknown. Historic culture material scatters include the debris left behind from human occupation. In the absence of other features, they are often identified as trash scatters. Depressions are holes excavated in the ground. They may represent the remains of basements or other construction activities. Foundations mark the location of buildings. In the absence of culture material scatters, it can be difficult to ascertain whether the buildings were part of a domestic unit or an outbuilding associated with agriculture or ranching. Farmsteads represent the remains of the location where the majority of farming/ranching activities occurred. They often contain evidence of the house and barn. Windmills are structures used to pump water into containers for use by cattle. The Bozeman Trail was used by Euro-American immigrants between 1863 and 1866 in an attempt to avoid Sioux territory.

The Bozeman Trail is listed on the National Register. The ruts associated with this trail in the proposed project are shallow and difficult to see. The setting associated with the Bozeman trail within the proposed project is impacted by the construction of Highway 93, located between 0.5 to 0.25 mile to the east and northeast, a fence line along the highway, and the construction of a dam and stock pond immediately to the east of the trail. These did not exist during the trail's period of significance. As such, the portion of the trail located within the proposed project is no longer able to convey its original character as a frontier trail. Because of the lack of setting and feeling, the segments of the trail within the proposed project are recommended as not contributing to the site's eligibility for listing on the National Register.

The remaining sites were examined to ascertain their eligibility for listing on the National Register. The method used to provide recommendations regarding National Register eligibility closely follows the guidelines established by the Department of the Interior. Of particular importance are National Register Bulletins 15 and 16 (National Park Service [NPS] 1991a and 1991b). According to these bulletins, a property must possess historic significance and integrity to be listed on the National Register. With the exception of windmills, sites identified in the proposed project area consist of archaeological remains. This limits the potential eligibility of sites. Isolated Finds are rarely, if ever, recommended National Register eligible.

Based on the site's historic significance, and surface observations of integrity and soil deposition, 37 of the sites are recommended ineligible for listing on the National Register of Historic Places (National Register). Three additional sites are recommended ineligible based on the results of subsurface testing. The National Register status of the remaining six sites cannot be determined without further investigation.

The Class III Cultural Resource Inventory in Appendix B (Sec 2.4 of the TR) contains information that falls under the confidentiality requirement for archeological resources under the National Historic Preservation Act, Section 304 (16 U.S.C. 470w-3(a)). The report, including Wyoming Cultural Resource Forms, has also been submitted to Wyoming State Historic Preservation Office (WSHPO) for concurrence and the WDEQ-LQD under a separate cover from Ethnoscience. The Wyoming Cultural Resource Forms are not included in Appendix B (Sec. 2.4 of the TR) since these forms were not provided to the client due to disclosure restrictions in the NHPA Section 304. Accordingly, disclosure is specifically exempted by statute as specified in 10 CFR §2.390(a)(3). Therefore, Uranium One requests that all applicable portions of Appendix B remain "CONFIDENTIAL" for the purpose of Public Disclosure of this application. Each page of the protected cultural resource information has been marked as follows:

Confidential Information Submitted under 10 CFR 2.390

The cover page for Appendix B has been marked with a more detailed statement, as follows:

Confidential Information Submitted under 10 CFR 2.390
Disclosure is Limited Under the National Historic Preservation Act, Section 304 (16 U.S.C. 470w-3(a)).

3.8.2 Tribal Consultation

Cultural resources that are considered sensitive and potentially sacred to modern Native American tribes include burials, rock art, rock features and alignments (such as cairns, medicine wheels, and stone circles), Indian trails, and certain religiously significant natural landscapes and features. Some of these resources may be formally designated as traditional cultural places (TCPs) or Indian Sacred Sites. A TCP is a site considered eligible for inclusion on the NRHP because of its association with cultural practices or beliefs of a living community that are (a) rooted in that community's history and (b) important in maintaining the continuing cultural identity of the community (NRHP 2011). As noted in NUREG-1910 (GEIS, Section 3.3.8.4), there are no culturally significant places listed in either the NRHP or state registers within the Wyoming East Uranium Region. The proposed project area lies within this region.

No Native American Heritage sites have been formally identified and recorded to date directly associated with the proposed project area.

Uranium One commits to ongoing monitoring of historic and cultural resources as project development progresses. Mitigation measures proposed to avoid or reduce cultural resource impacts include:

- Consult with Native American governments early in the planning process to identify traditional cultural properties, sacred landscapes, and other issues and concerns regarding the proposed project;
- If resources eligible for listing on the NRHP are present, modify the development plan to avoid disturbance of significant cultural resources;
- Prepare an internal cultural resources management plan, if cultural resources are present in the area of potential effect or if areas with a high potential to contain cultural material have been identified;
- The discovery of cultural artifacts in an operational area shall result in a work stoppage in the vicinity of the find until the resources can be evaluated by a professional archaeologist; and
- The use of existing roads to the maximum extent feasible to avoid additional surface disturbance.

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3.9 VISUAL AND SCENIC RESOURCES

3.9.1 Introduction

The proposed Ludeman Project (proposed project) is located predominantly on privately owned land. However, a small portion of the proposed project area is on State owned land and public lands managed by the Bureau of Land Management (BLM). Privately owned land is not managed by any public agency to protect scenic quality. As noted in NUREG-1910 (GEIS Sec. 3.3.9), the BLM Visual Resource Handbook (BLM, 2007 a-c) is utilized the categorize visual/scenic resources. The BLM Casper Field Office is responsible for overseeing activities on public lands within the proposed project in accordance with the Approved Casper Resource Management Plan (BLM 2007). The BLM has inventoried the visual resources of all lands within the boundaries of the Casper Field Office, including private lands, with the Visual Resource Management (VRM) system.

3.9.2 Methods

The VRM system is the basic tool used by the BLM to inventory and manage visual resources on public lands. The VRM inventory process involves rating the visual appeal of a tract of land, measuring public concern for scenic quality, and determining whether the tract of land is visible from travel routes or observation points. The BLM has inventoried the landscape, including non-BLM owned land, within the proposed project area and the surrounding two mile land use review area.

3.9.3 Visual Resource Management Classes

The elements used to determine the visual resource inventory class are the scenic quality, sensitivity levels, variety classes, and distance zones. Each of the elements used to identify the VRM Class (BLM 2007) is defined below:

Scenic Quality - Scenic quality is a measure of the visual appeal of a tract of land. In the visual resource inventory process, public lands are assigned an A, B, or C rating based on the apparent scenic quality, which is determined using seven key factors: landform, vegetation, water, color, adjacent scenery, scarcity, and cultural modifications. During the rating process, each of these factors is ranked comparatively against similar features within the physiographic province.

Sensitivity Level – A degree or measure of viewer interest in the scenic qualities of the landscape. Factors to consider include 1) type of users; 2) amount of use; 3) public

interest; 4) adjacent land uses; and 5) special areas. Three levels of sensitivity have been defined:

- Sensitivity Level 1 – The highest sensitivity level, referring to areas seen from travel routes and use areas with moderate to high use.
- Sensitivity Level 2 – An average sensitivity level, referring to areas seen from travel routes and use areas with low to moderate use.
- Sensitivity Level 3 – The lowest sensitivity level, referring to areas seen from travel routes and use areas with low use.

Distance Zones – Landscapes are subdivided into three distance zones based on relative visibility from travel routes or observation points. The zones are based on specified distances from the observer, particularly on roads, trails, concentrated-use areas, rivers, etc. The three categories are foreground-middleground, background, and seldom seen.

- Foreground-Middleground – The area visible from a travel route, use area, or other observer position to a distance of 3 to 5 miles. The outer boundary of this zone is defined as the point where the texture and form of individual plants are no longer apparent in the landscape and vegetation is apparent only in pattern or outline.
- Background - The viewing area of a distance zone that lies beyond the foreground and middleground. This area usually measures from a minimum of 3 to 5 miles to a maximum of about 15 miles from a travel route, use area, or other observer position. Atmospheric conditions in some areas may limit the maximum to about 8 miles or increase it beyond 15 miles.
- Seldom Seen – The area is not seen as foreground-middleground or background and is hidden from view by landforms, buildings, other landscape elements, or distance.

The visual resource inventory classes, tabulated in Table 3.9-1, are used to develop visual resource management classes, which are generally assigned by the BLM through the resource management plan process. VRM objectives are developed to protect scenic public lands, especially those lands that receive the greatest amount of public viewing. The following VRM classes are objectives that outline the amount of disturbance an area can tolerate before it no longer meets the visual quality of that class.

- Class I Objective: To preserve the existing character of the landscape. The level of change to the characteristic landscape should be very low and must not attract attention.
- Class II Objective: To retain the existing character of the landscape. The level of change to the characteristic landscape should be low.

- Class III Objective: To partially retain the existing character of the landscape. The level of change to the characteristic landscape should be moderate.
- Class IV Objective: To provide for management activities which require major modification of the existing character of the landscape. The level of change to the characteristic landscape can be high.

The Scenic Quality, Sensitivity Level, and Distance Zone inventory levels are combined to assign the VRM Class to inventoried lands as shown in the following matrix:

Table 3.9-1: Determining BLM Visual Resource Inventory Classes

Visual Sensitivity		High			Medium			Low
Special Areas		I	I	I	I	I	I	I
Scenic Quality	A	II	II	II	II	II	II	II
	B	II	III	III/IV	III	IV	IV	IV
	C	III	IV	IV	IV	IV	IV	IV
Distance Zones		f/m	b	ss	f/m	b	ss	ss

f/m = foreground-middleground
b = background
ss – seldom seen

3.9.4 Ludeman Visual Resource Management Rating

The BLM has inventoried the landscape in the proposed project area and the surrounding two mile area and rated the areas as either VRM Class III or IV. According to NUREG-1910 (GEIS Sec. 3.3.9), the proposed project area does not contain any Class I resources. It goes on to state that the few Class II resources located within the Wyoming East Uranium Region are contained south of Interstate 25. The entire proposed project boundary lies north of Interstate 25.

The scenic quality inventory was based on methods provided in BLM Manual 8410 – Visual Resource Inventory as well as a review of the factors that contribute to the existing VRM Class III and IV inventory for the proposed project. The key factors of landform, vegetation, water, color, influence of adjacent scenery, scarcity and cultural modifications were evaluated and scored according to the rating criteria. The criteria for each key factor ranged from high to moderate to low quality based on the variety of line, form, color, texture and scale of the factor within the landscape. A score was associated with each rating criteria, with a higher score applied to greater complexity and variety for each factor in the landscape. The results of the inventory and the associated score for

each key factor are summarized in Table 3.9-2. Based on guidance provided in NUREG-1569 (NRC 2003), if the visual resource evaluation rating is 19 or less, no further evaluation is required. Based on field reconnaissance conducted in June and August 2008, the total score of the scenic quality inventory for the proposed project area is 11. Therefore, no further evaluation is required for existing scenic resources and any changes to scenic resources from proposed project facilities.

Table 3.9-2: Scenic Quality Inventory and Evaluation for the Proposed Project

Key Factor	Rating Criteria	Score
Landform	Flat to rolling terrain with some areas of steeper topography with large gullies cutting up to ridge lines. These areas are interesting but not dominant.	2
Vegetation	The majority of the site has very little variety in vegetation, which consists of grazed grassland with sage and other shrubs. There are a few large trees present on the site which offer some variety in form.	2
Water	Water is present and generally not evident as viewed from residences and roads except for Gilbert Lake which is visible from Hwy 93. The WYDOT 2007 traffic count for Hwy 93 at its intersection with HWY 95 was 50 vehicles per day, therefore exposure is minimal.	3
Color	Vegetation and soil colors have some subtle color variations but generally shift from green tones in the spring to tan tones throughout the remainder of the year.	2
Influence of adjacent scenery	Adjacent scenery is very similar to the proposed project area, and provides no variety in line, form, color, and texture.	0
Scarcity	Landscape is common for the region.	1
Cultural modifications	Existing modifications consist of oil and gas production facilities and infrastructure, windmills and solar powered pumps, and one residence. The Bozeman Trail is present on private land near Gilbert Lake but is not visible to the general public.	1
	Total Score	**11**

3.9.5 Environmental Consequences

The visible surface structures proposed for the proposed project include wellhead covers, header houses, electrical distribution lines, booster pump houses and three Satellite facilities. The proposed project will use existing and limited new roads to access the Satellite facilities and each header house.

Each wellhead cover typically consists of a weatherproof structure placed over the well. These covers are approximately three feet high and two feet in diameter. Each header house is a small metal building. A disturbance area around each header house is necessary to provide an adequate area for operations and maintenance vehicles to turn around. Each Satellite IX facility is anticipated to consist of an 80- x 160-foot processing building, associated parking and other infrastructure within an approximate 2-acre area enclosed with security fencing. Two surge ponds each approximately 1.2 acres each will be located near the facility also enclosed with wildlife exclusion fencing. Electric distribution lines will connect header houses and Satellite facilities to existing electric distribution lines. The electrical distribution poles will be approximately 20 feet high and will be wooden so that their natural color harmonizes with the landscape. Road disturbance acreage is calculated assuming approximately seven miles of 25-foot-wide main road and approximately 18 miles of eight-foot-wide, two-tracks for field roads.

Temporary and short-term visual effects during the construction period in each wellfield will result from header house construction, well drilling, and construction of access roads and electric distribution lines. Following completion of wellfield installation, temporarily disturbed areas will be reclaimed. Only long-term effects associated with operations and maintenance will remain following post-construction reclamation.

Long-term effects will result from the addition of structures to the landscape, such as the Satellite facilities and associated structures, header houses, wellhead covers, access roads, and electric distribution lines. Effects from long-term activities will occur over the life of the project. Current photographs of the site and a map of the photograph locations are provided in Addendum 2.4-A of the TR.

The most important visual resource areas include:

- Public views from Highways 93 and 95 and from County Roads 26 and 27 (Leuenberger Road and Tank Farm Road);
- Views from the subdivision adjacent to the northwest project boundary;
- Views from the Leuenberger ranch house;
- Views from the North Platte River; and
- Portions of the Bozeman Trail accessible to the general public.

Wellfields with associated wellheads and header houses will be visible from public roadways, the subdivision, and, potentially from limited portions of the Bozeman Trail. Wellhead covers will be approximately three-feet tall and header houses will be approximately ten-feet high at the eave; both will be painted to blend with the surrounding environment. Within the proposed project area, there are currently three industrial sites visible from the public roadways (Photos 1, 8 & 12 provided in Addendum 2.4-A of the TR). The portions of the industrial sites that are painted to blend with the surrounding environment are not as easily discerned as those painted white or dark brown.

The locations for the three Satellite facilities were chosen to minimize visual and environmental effects within existing topography. The Leuenberger Satellite facility will be the site most visible to the public of the three facilities. Its proposed location in Section 14 (T34N R74W) approximately one-half mile south of Highway 95 will be partially visible from portions of the highway. It will be only partially visible, or not visible at all from the subdivision adjacent to Highway 95. A small bluff is located between the subdivision and the proposed facility site which will partially block the view from the subdivision. Figure 3.9-1 presents a line-of-sight diagram from the subdivision to the proposed Leuenberger facility site. There is currently an industrial building with two outlying tanks within the same section of land (Photo 1) which are located closer, and are more visible to the subdivision than the proposed Satellite facility.

The proposed North Platte Satellite facility site is located in Section 10 (T34N R73W) at an elevation of 5320 feet. There is a hill to the east of the North Platte facility site with an approximate top elevation of 5372 feet. The hill will partially block the view of the facility from Highway 93 and the Bozeman Trail which is approximately one mile northeast of the facility site. There are hills to the northwest of the North Platte facility site with a maximum elevation of approximately 5340 feet which will limit the view of the facility from sections of Highway 95. Figure 3.9-2 presents a line-of-sight diagram from Highway 95 to the proposed North Platte facility site.

The proposed Peterson Satellite facility is located in Section 26 (T34N R73W) at an elevation of approximately 5110 feet. The facility site will be on top of a bluff and approximately two miles north of the North Platte River which is at an elevation of approximately 4900 feet. The distance combined with the elevation difference should effectively shield the facility from view. The facility is approximately 1.25 miles north of Tank Farm Road. Tank Farm Road is at an elevation of approximately 4910-feet. As with the river, the distance and the difference in elevation should blur the view of the facility. Figure 3.9-3 and 3.9-4 present line-of-sight diagrams from Highway 93 and from the North Platte River to the proposed Peterson Satellite facility site.

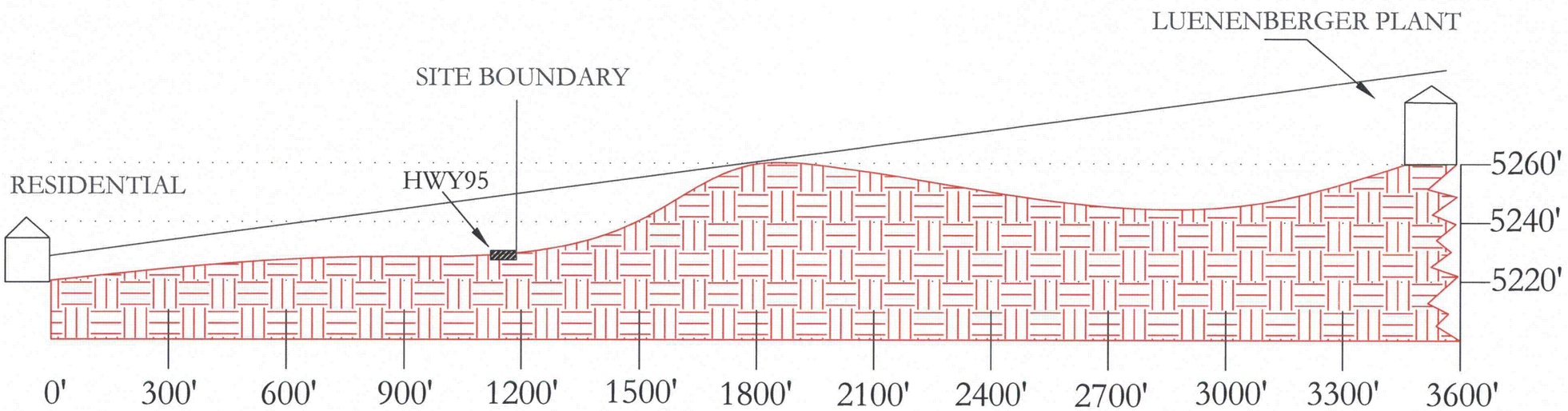
The views from the Leuenberger ranch house should not be affected. The closest wellfield will be just over one-half mile west of the ranch house. A hill exists between the

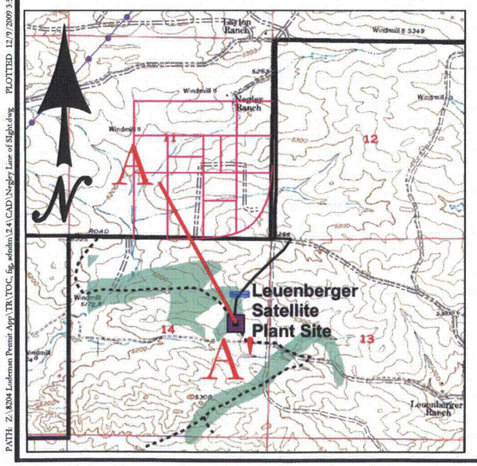
ranch house and the proposed wellfield which will shield the view of the wellfield. The next closest wellfield is approximately 1.5 miles to the southeast. The rolling topography between the wellfield and the ranch house will shield the view of the wellfield.

Despite the low scenic quality rating, minimal public lands within the proposed project area, and low traffic counts for existing roadways, Uranium One has and intends to continue to implement measures to lessen the visual impact from the proposed project. With the implementation of mitigative measures described below, effects to visual and scenic resources as a result of the construction and operation of the proposed project are expected to be negligible.

A
NW

A'
SE





20' 10' 0 40'

VERTICAL SCALE

SCALE 1": 40'

150' 75' 0 300'

HORIZONTAL SCALE

SCALE 1":300'

TREC, Inc.
Engineering & Environmental Management
951 Werner Court
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Casper, WY, 82601
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Fax (307)265-2498

DRAWN BY:	CHECKED BY:	APPROVED BY:
KLW	WS	

NEGLEY SUBDIVISION
LINE-OF-SIGHT DIAGRAM

PROPOSED LEUENBERGER PLANT SITE
CONVERSE COUNTY, WY

PREPARED FOR:
URANIUM ONE
CASPER, WY

REV. #	DESCRIPTION	BY	DATE
0	INITIAL	KLW	03/17/09

FIGURE 3.9-1

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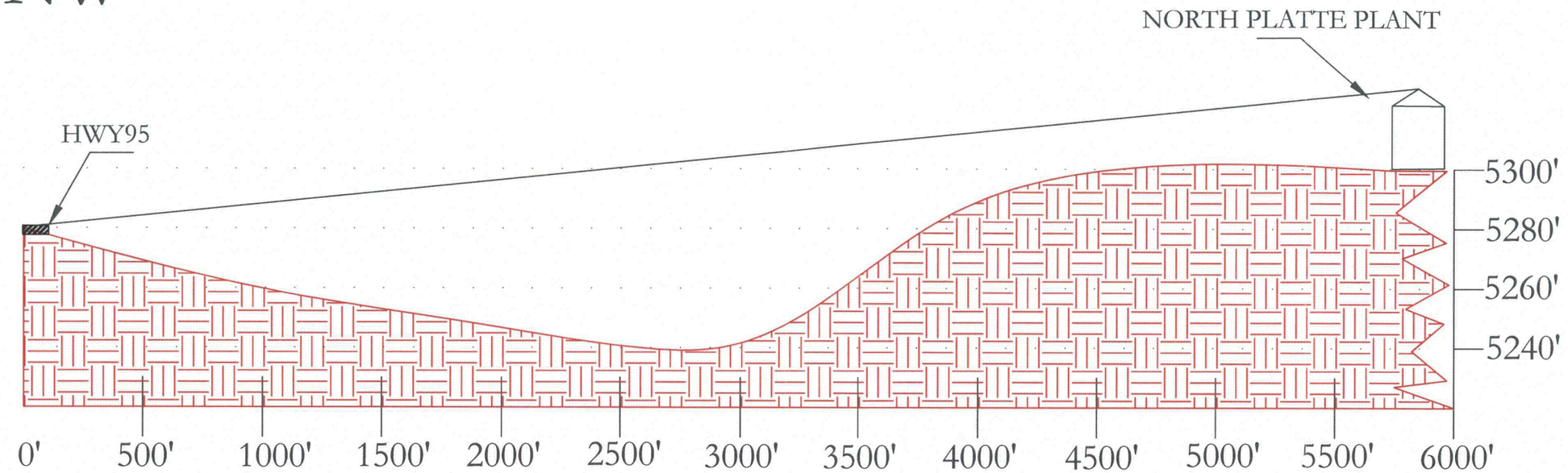
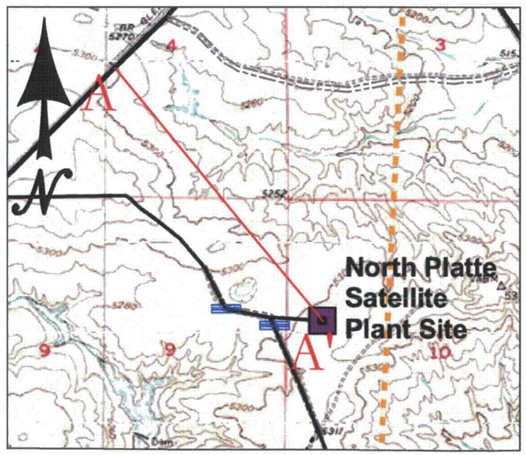
A
NW

A'
SE





20' 10' 0 40'

VERTICAL SCALE

SCALE 1": 40'

250' 75' 0 500'

HORIZONTAL SCALE

SCALE 1":500'

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KLW	WS	

HIGHWAY 95 NORTH PLATTE PLANT
LINE-OF-SIGHT DIAGRAM

PROPOSED NORTH PLATTE PLANT SITE
CONVERSE COUNTY, WY

PREPARED FOR:
URANIUM ONE
CASPER, WY

REV. #	DESCRIPTION	BY	DATE
0	INITIAL	KLW	03/17/09

FIGURE
3.9-2

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A'
W

A
E

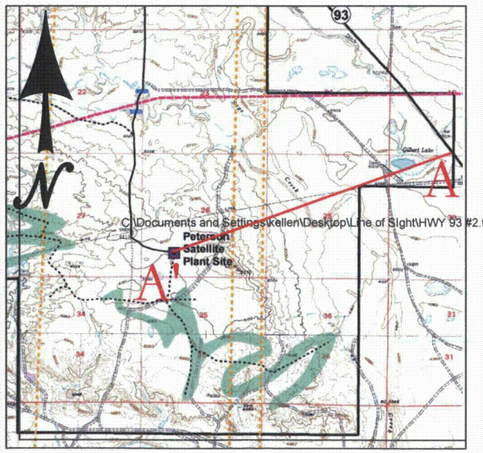
SITE BOUNDARY

PETERSON PLANT

HWY 93

5160'
5140'
5120'
5100'
5080'
5060'
5040'
5020'
5000'
4980'
4960'
4940'

14000' 13000' 12000' 11000' 10000' 9000' 8000' 7000' 6000' 5000' 4000' 3000 2000' 1000' 0'



40' 20' 0 80'

VERTICAL SCALE

SCALE 1": 80'

500' 250' 0 1000'

HORIZONTAL SCALE

SCALE 1":1000'

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DRAWN BY: KLW | CHECKED BY: WS | APPROVED BY:

HIGHWAY 93 PETERSON PLANT
LINE-OF-SIGHT DIAGRAM

PROPOSED PETERSON PLANT SITE
CONVERSE COUNTY, WY

PREPARED FOR:
URANIUM ONE
CASPER, WY

REV. #	DESCRIPTION	BY	DATE
0	INITIAL	KLW	03/17/09

FIGURE
3.9-3

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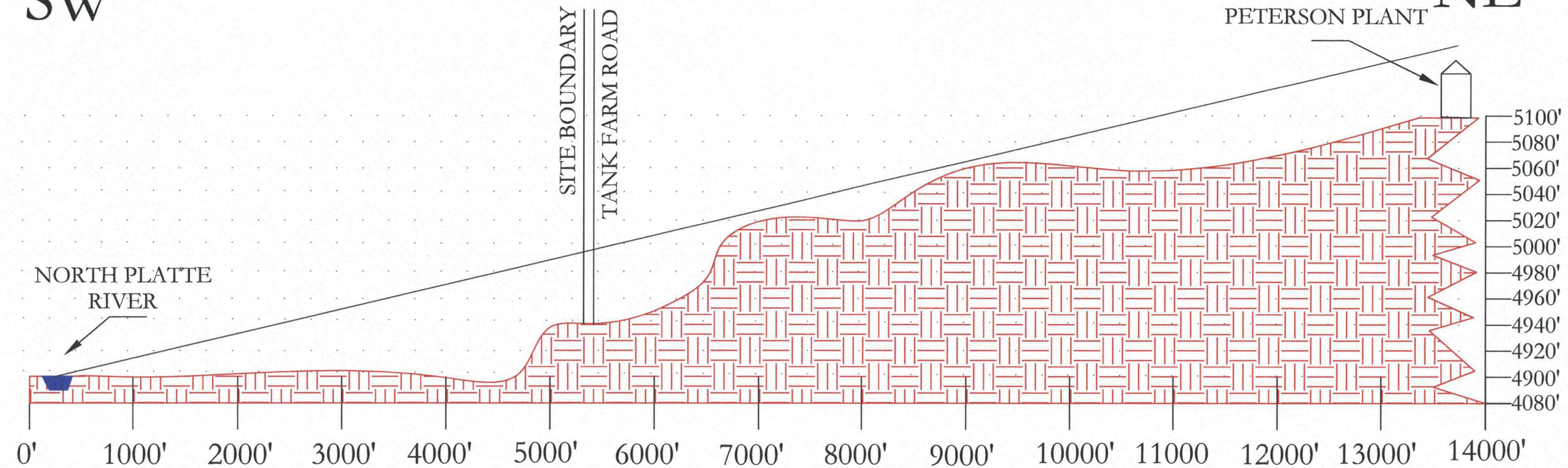
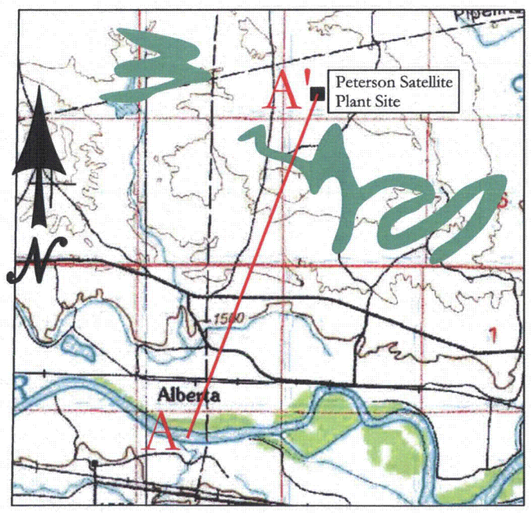
A
SW

A'
NE





40' 80' 500' 1000'
20' 0 250' 0

VERTICAL SCALE
SCALE 1": 80'

HORIZONTAL SCALE
SCALE 1":1000'

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KLW	WS	

NORTH PLATTE RIVER PETERSON PLANT
LINE-OF-SIGHT DIAGRAM

PROPOSED PETERSON PLANT SITE
CONVERSE COUNTY, WY

PREPARED FOR:
URANIUM ONE
CASPER, WY

REV. #	DESCRIPTION	BY	DATE
0	INITIAL	KLW	03/17/09

FIGURE
3.9-4

3.9.6 Mitigation

Mitigation measures are meant to minimize adverse contrasts of proposed project facilities with the existing landscape. The measures should be applied to all facilities, even those that meet VRM objectives. Mitigation would enable proposed project facilities to harmonize with the surrounding landscape to the extent feasible.

As discussed above, if the visual resource evaluation rating of a proposed project area is 19 or less, no further evaluation is required as noted in NUREG-1569. Based on field reconnaissance conducted in June and August 2008, the total score of the scenic quality inventory for the proposed project is 11. Therefore, no further evaluation of existing scenic resources and any changes to scenic resources from proposed project facilities are required. However, Uranium One intends to continue to adopt measures to lessen the visual impact of the proposed project.

Uranium One's additional measures are meant to minimize adverse contrasts of proposed facilities with the existing landscape. All installed above-ground wellheads and structures will be painted with low reflectivity paint in colors that harmonize with the surrounding landscape. In addition, several design techniques will be implemented to minimize the visual contrasts. Those methods include reducing unnecessary disturbance by using the same trench for multiple utilities, reducing the area of temporary disturbance by designating equipment parking areas during construction, and following areas of existing disturbance when considering utility placement. To the extent possible, topographic features will be used to screen plant facilities and roads from public view. Roads may be aligned with the contours of the topography, although this measure may result in a greater area of disturbance. Construction debris will be removed from new construction areas as soon as possible and temporarily disturbed areas will be reclaimed as soon as possible following construction.

In general, resource protection measures proposed for erosion control, road construction, rehabilitation and re-vegetation, and wildlife protection would mitigate effects to visual quality.

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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 Ludeman Project (proposed project).

NUREG-1569 obliges consideration of population data within a 50-mile (80-km) radius from the proposed project area's approximate center. The area within an 80-kilometer (km) (50-mile) radius of the proposed project includes portions of eight counties in northeastern Wyoming (Albany, Campbell, Carbon, Converse, Johnson, Natrona, Niobrara, and Platte Counties), as shown on Figure 3.10-1. The proposed project is located in central Converse County. The nearest communities are Rolling Hills, a small Converse County incorporated town located west on State Highway 95, Glenrock (west on State Highway 95) and Douglas (southeast on State Highway 93).

Historical and current population trends in counties and communities within an 80-km distance of the proposed project are shown in Table 3.10-1, which summarizes past growth trends in the counties relative to state population trends between 1980 and 2007. Between 1980 and 1990, all counties and towns in the area lost population, with the exception of Campbell and Albany Counties. In the 1990s, all places in the 80-km Survey Area increased in population with the exception of Carbon County, Niobrara County, and the towns of Lost Springs (in eastern Converse County) and Edgerton and Midwest (in Natrona County). The greatest percentage increase for counties between 2000 and 2007 occurred in Campbell County (20 percent increase) and Johnson County (15.1 percent increase), and during this time period Converse and Natrona Counties exceeded state growth. Among municipalities, Casper area towns had the highest percentage increases between 2000 and 2007. Bar Nunn grew by 81.6 percent and Mills grew by 20.9 percent. Rolling Hills, the community, closest to the proposed project, grew by 20 percent. Niobrara County, Platte County, and Carbon County lost population during this same time period, as did the town of Glendo.

Figure 3.10-1: Significant Population Centers within an 80-km Radius (50 miles) of the Proposed Project

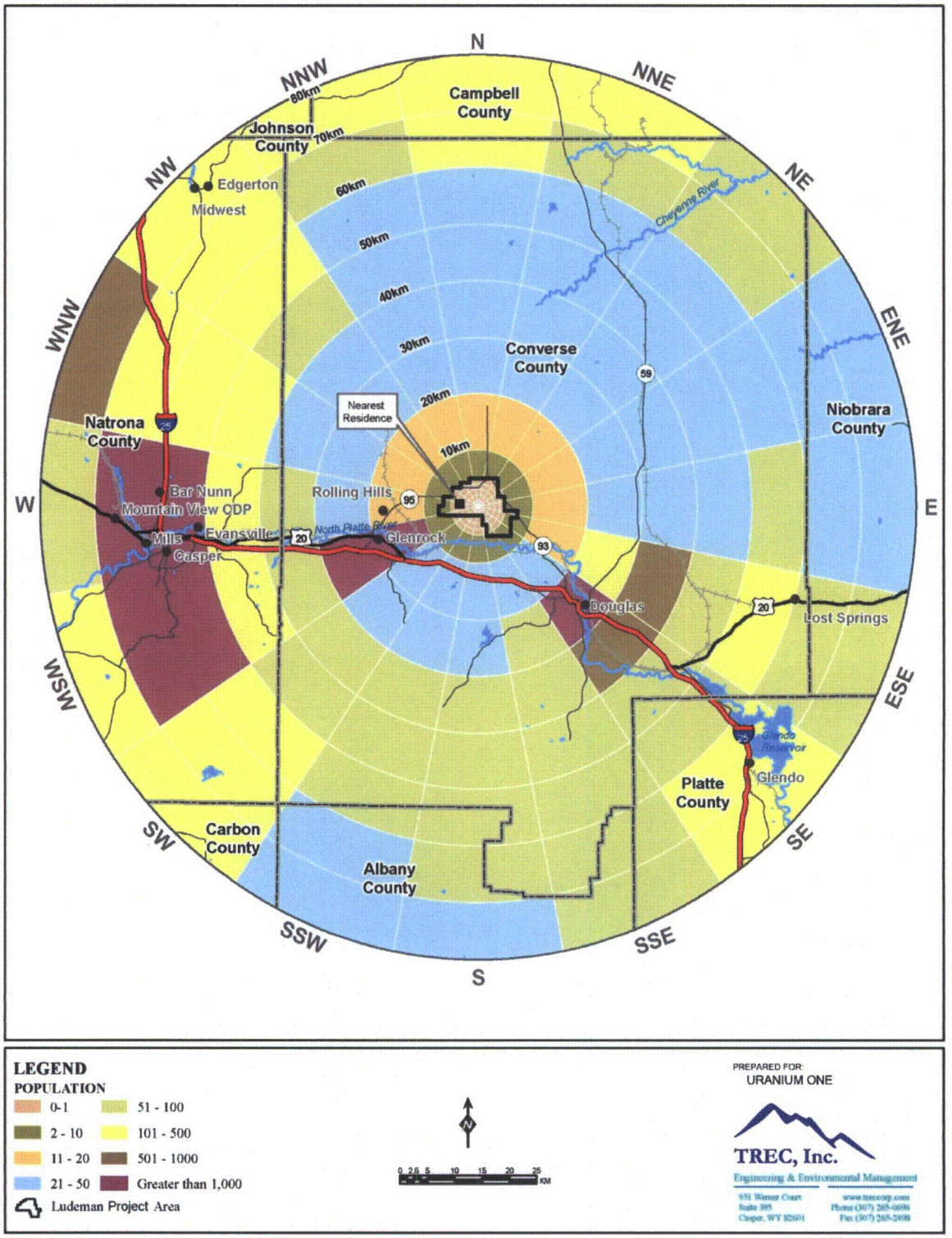


Table 3.10-1: 1980-2007 Historical and Current Population Change for Counties and Communities within the 80-km Radius of the Proposed Project

State/County/City	Year							Percent Change		
	1980	1990	2000	2002	2004	2006	2007	1980/ 1990	1990/ 2000	2000/ 2007
State of Wyoming	469,557	453,588	493,782	497,204	503,258	512,757	522,830	-3.4	8.9	5.9
Albany County	29,062	30,797	32,014	32,275	32,725	32,497	32,227	6.0	4.0	0.7
Campbell County	24,367	29,370	33,698	36,142	36,629	38,934	40,433	20.5	14.7	20.0
Carbon County	21,896	16,659	15,639	15,244	15,215	15,165	15,486	-23.9	-6.1	-1.0
Converse County	14,069	11,128	12,052	12,352	12,501	12,866	12,868	-20.9	8.3	6.8
Glenrock	2,736	2,153	2,231	2,254	2,253	2,331	2,371	-21.3	3.6	6.3
Douglas	6,030	5,076	5,288	5,340	5,375	5,541	5,675	-15.8	4.2	7.3
Lost Springs	9	4	1	1	1	1	1	-55.6	-75.0	0.0
Rolling Hills	-	330	449	452	450	492	498		36.1	10.9
Johnson County	6,700	6,145	7,075	7,354	7,525	7,820	8,142	-8.3	15.1	15.1
Natrona County	71,856	61,226	66,533	67,381	68,692	70,252	71,750	-14.8	8.7	7.8
Bar Nunn	-	835	936	953	1,133	1,523	1,700	-	12.1	81.6
Casper	51,016	46,742	49,644	50,121	50,994	51,965	53,003	-8.4	6.2	6.8
Edgerton	510	247	169	170	170	173	175	-51.6	-31.6	3.6
Evansville	2,335	1,403	2,255	2,280	2,294	2,308	2,329	-39.9	60.7	3.3
Midwest	638	495	408	410	424	427	432	-22.4	-17.6	5.9
Mills	2,139	1,574	2,591	3,036	3,071	3,095	3,133	-26.4	64.6	20.9
Niobrara County	2,924	2,499	2,407	2,247	2,248	2,212	2,262	-14.5	-3.7	-6.0
Platte County	11,975	8,145	8,807	8,706	8,581	8,454	8,396	-32.0	8.1	-4.7
Glendo	367	195	229	227	228	222	219	-46.9	17.4	-4.4

3.10.1.1 Population Characteristics

The 2007 population estimates by age and sex for counties within 80-km of the proposed project are shown in Table 3.10-2. With the exception of Albany County (which includes the University of Wyoming in Laramie), the 40- to 64-year age group (which includes the 'baby boom' cohort) comprises between 33 to 39 percent of the population in each of the counties. According to the Wyoming Economic and Demographic Forecast: 2005 to 2014 (Wyoming Department of Administration and Information, 2005), the early baby boom population in Wyoming is one of the highest in the nation as a result of the in-migration of workers during the oil boom years in the late 1970s and early 1980s. In contrast, the population in the 27- to 42-year age group is relatively low because there was a high net out-migration (outflow greater than inflow) in this age group between 1995 and 2000 as young adults left the state during a declining economy. The aging population is expected to affect the economy through changes in the labor supply as baby boomers reach retirement age and are replaced by fewer new workers. The older population would also require different types of goods and services, requiring a shift in local economic sectors to accommodate the changing demographics.

In 2007, 95.7 percent of the total eight-county population of 191,564 was classified as white. Persons of two or more races comprised 1.3 percent of the total population, Native American comprised 1.2 percent, and all other racial categories accounted for one percent or less of the total population. The racial characteristics of the eight-county area were similar to the racial characteristics of the state, with the exception that the state has a slightly higher Native American population (2.5 percent) (U.S. Census Bureau, Population Division, Release Date May 1, 2008).

Table 3.10-2: 2007 Population Estimates by Age and Sex for Wyoming and the Counties within the 80-km Radius of the Proposed Project

Area	Age	Male	Female	Total	Total Percent Breakdown
	Under 5	18,432	17,458	35,890	6.9
	5-19	53,985	50,034	104,019	19.9
	20 - 39	73,362	67,001	140,363	26.8
	40 - 64	90,279	88,378	178,657	34.2
	65+	28,987	34,914	63,901	12.2
State of Wyoming	Total	265,045	257,785	522,830	100.0
	Under 5	935	910	1,845	5.7
	5-19	3,412	2,943	6,355	19.7
	20 - 39	7,335	5,995	13,330	41.4
	40 - 64	3,937	4,032	7,969	24.7
	65+	1,296	1,432	2728	8.5
Albany County	Total	16,915	15,312	32,227	100.0
	Under 5	1,623	1,593	3,216	8.0
	5-19	4,516	4,139	8,655	21.4
	20 - 39	6,268	5,713	11,981	29.6
	40 - 64	7,383	6,886	14,269	35.3
	65+	1,069	1,243	2312	5.7
Campbell County	Total	20,859	19,574	40,433	100.0
	Under 5	525	482	1,007	6.5
	5-19	1,481	1,280	2,761	17.8
	20 - 39	2,169	1,638	3,807	24.6
	40 - 64	3,201	2,777	5,978	38.6
	65+	938	995	1933	12.5
Carbon County	Total	8,314	7,172	15,486	100.0
	Under 5	427	383	810	6.3
	5-19	1,346	1,192	2,538	19.7
	20 - 39	1,525	1,569	3,094	24.0
	40 - 64	2,428	2,381	4,809	37.4
	65+	744	873	1617	12.6
Converse County	Total	6,470	6,398	12,868	100.0
	Under 5	220	211	431	5.3
	5-19	720	729	1449	17.8
	20 - 39	998	932	1930	23.7
	40 - 64	1,392	1,467	2,859	35.1
	65+	700	773	1473	18.1
Johnson County	Total	4,030	4,112	8,142	100.0
	Under 5	2,549	2,504	5,053	7.0

Area	Age	Male	Female	Total	Total Percent Breakdown
Natrona County	5-19	7,510	7,037	14,547	20.3
	20 - 39	9,789	9,648	19,437	27.1
	40 - 64	11,931	11,874	23,805	33.2
	65+	3,852	5,056	8,908	12.4
	Total	35,631	36,119	71,750	100.0
	Under 5	45	52	97	4.3
	5-19	207	177	384	17.0
	20 - 39	224	265	489	21.6
	40 - 64	416	403	819	36.2
	65+	216	257	473	20.9
Niobrara County	Total	1,108	1,154	2,262	100.0
	Under 5	221	202	423	5.0
	5-19	764	722	1486	17.7
	20 - 39	942	907	1849	22.0
	40 - 64	1,550	1,549	3,099	36.9
	65+	715	824	1539	18.3
Platte County	Total	4,192	4,204	8,396	100.0

3.10.1.2 Population Projections

The projected populations for selected years by county within the 80-km radius of the proposed project are shown in Table 3.10-3. The population forecasts are developed by the Wyoming Department of Administration and Information, Economic Analysis Division, based on historic trends of demographic and economic variables. Those counties that have experienced growth in the recent past are projected to continue to increase and those that are in decline are projected to continue to decline for another few years and then will begin to stabilize. Campbell and Johnson counties are anticipated to continue significant population increases between 2000 and 2030. Campbell County (78 percent projected population increase) and Johnson County (59 percent) will outpace the overall growth of Wyoming (26 percent) between 2000 and 2030. Natrona County (29 percent) and Converse County (24 percent) are projected to have growth rates similar to the state. Albany and Carbon Counties are projected to increase by less than 10 percent between 2000 and 2030, and Niobrara and Platte Counties are projected to lose population.

Table 3.10-3: 2005-2025 Population Projections for Wyoming and the Counties within the 80-km Radius of the proposed Ludeman Project

Area	Census 2000	Projected 2005	Projected 2010	Projected 2015	Projected 2020	Projected 2025	Projected 2030
State of Wyoming	493,782	506,541	539,740	560,000	578,730	598,100	621,160
Albany County	32,014	32,556	32,250	32,040	31,880	32,300	32,870
Campbell County	33,698	37,053	43,440	47,800	52,130	55,800	59,990
Carbon County	15,639	15,051	16,160	16,810	17,230	17,140	17,120
Converse County	12,052	12,459	13,240	13,650	14,020	14,440	14,930
Johnson County	7,075	7,651	8,640	9,330	9,990	10,560	11,220
Natrona County	66,533	69,478	74,050	76,920	79,650	82,360	85,540
Niobrara County	2,407	2,228	2,310	2,340	2,330	2,330	2,340
Platte County	8,807	8,485	8,290	8,060	7,840	7,880	7,960

3.10.1.3 Seasonal Population and Visitors

The proposed project consists of private and public lands in central Converse County. The surrounding area within an 80-km (50-mile) radius contains mostly private land, as well as federal and state lands, which provide open space for a variety of dispersed outdoor recreation opportunities. There are a number of recreation sites on public lands within the 80-km radius. Recreation opportunities offered by the private sector consist of community facilities in urban areas and the infrastructure of tourist services and facilities.

The nearest site that would be a destination for tourists to the proposed project is the Bozeman Trail, which crosses the proposed project depicted in Figure 3.1-2. It is, however, located primarily on private lands within the proposed project area. The few public land parcels that it crosses within the proposed project area are not adjacent to public road rights-of-way. The next closest site is Fort Fetterman Historic Site, approximately 4.5 miles from the proposed project. The site is open only during the summer months (Memorial Day to Labor Day). In 2007, 11,441 people visited the site during that period. Glendo State Park (and reservoir), located approximately 40 miles south of the proposed project, is one of the most visited state park sites in Wyoming. In 2007, 64,326 persons used the Park in the month of June alone. The Edness Kimball Wilkins State Park (approximately five miles east of Casper) had a total of 14,705 visitors in June 2007 (Wyoming Department of State Parks 2007).

The most significant population variable in the area is neither seasonal nor related to visitors. Across Wyoming, the influx of workers has created local population increases that are difficult to track with traditional methods. Many workers are not local residents; they live somewhere else and commute to Wyoming in shifts (e.g., ten days on, ten days off). While working in Wyoming, they could be living in rental units, housing units owned by the company they work for, RV parks, on-site facilities (e.g., "workers camps" at the work site) and in hotels. Census population numbers for a place include only people who identify that place as their primary residence and do not include others who list their primary residence elsewhere (such as the "shift-labor" workers described above). As a result, the total of all permanent and part-time residents living in a place at any time could be significantly higher than the census count. Unfortunately, there is no standardized mechanism for counting part-time residents. To address this issue, the Wyoming Department of Employment Research and Planning has begun to track workers with a driver's license from another state. Quarterly information between 2001 and 2005 indicates that the number of these workers was on the rise in Converse County. The highest number during the 2001 to 2005 period was 759 workers in the second quarter of 2005. Natrona County's records show similar increases, but much larger numbers, with a peak of 6,352 workers with out-of-state drivers' licenses in the third quarter of 2005. Campbell County numbers have fluctuated, dipping to a low of 1,913 workers in the first quarter of 2003 and peaking at 4,721 in fourth quarter of 2005 (Wyoming Department of Employment 2008). In the ten-year economic forecast released in July 2007, the

Wyoming Economic Analysis mining workers to settle in Wyoming, and projected the trend to continue (Wyoming Department of Administration and Information, 2007). The multiplier effect of mining industry activity results in upward movement in job growth in other industries such as construction, wholesale trade, transportation, etc. and some non-resident workers in those sectors may also be moving to live in Wyoming. Statewide, however, net migration to Wyoming lags behind job growth in the state and many non-resident workers continue to commute in shifts to Wyoming.

3.10.1.4 Schools

The proposed project is located in Converse County, about halfway between the county's two school districts; District No. 1 in Douglas and District No. 2 in Glenrock. The closest community with a public school system is Glenrock, about 12 miles from the proposed project. Douglas schools are approximately 15 miles from the proposed project. Schools in the Casper area and in Glendo are located within 50 highway miles.

Fall 2008 enrollment in Converse School District No. 1 was 1,685 students. The schools in Douglas are slightly over capacity in grades K-2. The District is constructing a new facility and when completed, it will provide capacity for an additional 350 students in grades K-5. The Middle School and High School could accommodate a total of approximately 250 additional students. District No. 1 also includes four rural schools with a total of 30 students, and could accommodate up to 90 students total (Espeland 2008).

School District No. 2 has all of its K-12 facilities in Glenrock. Fall 2008 enrollment was 702 students. All of the existing facilities are under capacity and could collectively handle up to 200 additional students. The District is currently doing some remodeling, but no new construction is underway or planned (Stillwell 2008). The school district eliminated one older elementary school facility and replaced it with a new facility which opened in January 2008. The old elementary school building is being used as a recreational center and remains in school district ownership (Shore 2009).

Natrona County has one school district with a total of approximately 11,500 students. There are more than 30 public and private elementary and secondary schools (Office of Federal and State Materials 2008). The District is currently constructing a new elementary facility in Casper, which will increase total capacity by an additional 425 students (Antrim 2008).

3.10.1.5 Sectorial Population

Existing population within the 80-km radius centered on the proposed project was estimated for 16 compass sectors, by concentric circles of 1-, 2-, 3-, 4-, 5-, 10-, 20-, 30-, 40-, 50-, 60-, 70- and 80-km from the center of the proposed project, for a total of 208 sectors. Sectorial population was estimated using the U.S. Census 2000 boundary and demographic information for block groups within the United States, and population estimates for 2007 distributed by Environmental Systems Research Institute on the ESRI® Data & Maps 9.3 DVD. Subtotals by sector and compass points, as well as the total population, are shown in Table 3.10-4.

ArcGIS® Desktop Geographic Information System (GIS) was used to extract data from U.S. Census 2007 population estimates for Census Tract Block Groups located wholly or partially within the 80-km radius from the approximate center of the proposed project. To assign a population to each sector, a percentage area of each sector within one or more block groups was calculated for all of the block groups. The total 2007 population within the 80-km radius from the center of the proposed project estimated by this method was 81,230.

Table 3.10-4: 2000 Population within the 80-km Radius of the Proposed Ludeman Project

	Radius in Kilometers													
Sector	0-1	1-2	2-3	3-4	4-5	5-10	10-20	20-30	30-40	40-50	50-60	60-70	70-80	Total
N	0	0	0	0	0	3	13	22	32	40	49	123	223	505
NNE	0	0	0	0	0	3	13	22	32	40	49	68	144	371
NE	0	0	0	0	0	3	13	22	32	40	49	59	64	282
ENE	0	0	0	0	0	3	13	22	32	40	49	45	36	240
E	0	0	0	0	0	3	13	22	32	40	52	34	37	233
ESE	0	0	0	0	0	3	15	489	979	79	101	80	67	1,813
SE	0	0	0	0	0	4	23	4,899	667	82	96	113	130	6,014
SSE	0	0	0	0	0	6	23	52	57	82	99	94	90	503
S	0	0	0	0	0	5	23	38	57	80	66	69	41	379
SSW	0	0	0	0	0	6	23	38	53	67	67	37	38	329
SW	0	0	0	0	0	5	22	38	53	77	136	170	122	623
WSW	0	0	0	0	0	3	1,677	1,087	59	132	1,537	1,246	207	5,948
W	0	0	0	1[1]	0	3	13	28	73	174	45,129	15,800	75	61,295
WNW	0	0	0	0	0	3	13	22	46	161	210	433	545	1,433
NW	0	0	0	0	0	3	13	22	32	66	160	239	304	839
NNW	0	0	0	0	0	3	13	22	32	40	49	83	178	420
Total	0	0	0	0	0	59	1,923	6,845	2,268	1,240	47,898	18,693	2,301	81,227

[1] This number based on site reconnaissance. There is one person living at the one residence within the proposed Ludeman Project.

Notes: Current population living between the project boundary and 80-km of the mine site were estimated using 2007 census block data. Field reconnaissance was conducted in 2008 to verify data collected within the project boundary. See Section 3.10.1.6. for a detailed description of the methodology.

3.10.2 Local Socioeconomic Characteristics

3.10.2.1 Major Economic Sectors

The proposed project is located in Converse County. However, social and economic characteristics are also described for Natrona County because communities there, primarily the City of Casper, provide a relatively large resident labor force for mineral extraction and construction industries in northeast and central Wyoming. Table 3.10-5 summarizes unemployment rates and employment in Converse and Natrona Counties.

The economies of Converse County and Natrona County depend on the energy sector, primarily those that are mineral-based. The largest private sector employer in Converse County is mining, which includes uranium extraction, oil and gas extraction, crude, petroleum-natural gas, oil and gas field service, and nonmetallic minerals as defined by the U.S. Bureau of Labor Statistics.

A report prepared by the Wyoming Department of Employment, Research and Planning analyzes labor supply in Wyoming by place of residence. The analysis concluded that a portion of the available labor pool in Wyoming consists of non-residents. According to the report, the construction sector is one of the industries most dependent upon seasonal and short-term workers.

Table 3.10-5 also shows the labor force characteristics in Converse and Natrona Counties in 2006. In general, unemployment rates were highest in the early 1990s and have decreased overall by 2006 because of renewed energy development in northeastern Wyoming. Annual fluctuations in unemployment rates are driven primarily by short-term changes in production due to changing prices for energy resources (such as oil and gas, uranium, etc.).

Per capita personal income is the income that is received by persons from all sources, including wages and other income over the course of one year. In 2006, personal income in Converse County was $29,566, compared to state per capita income of $32,316. The county ranks 14th in per capita annual income out of 23 counties in the state. Natrona County had a higher per capita income of $35,599, and ranked second in the state. Most of the Wyoming counties with the highest per capita personal incomes have strong mineral development economic sectors (Wyoming Department of Employment Research and Planning, 2008).

Table 3.10-5: 2006 Annual Average Labor Force Characteristics and Employment in Economic Sectors for State of Wyoming for Converse and Natrona Counties

	State of Wyoming		Converse County		Natrona County	
Labor Force		-	7,195	-	41,103	-
Employment		-	6,943	-	39,760	-
Unemployment		-	252	-	1,343	-
Unemployment Rate	3.6%	-	3.1%	-	3.3%	-
Total employment	376,249	100.00%	7,516	100.00%	52,464	100.00%
Farm employment	11,970	3.18%	439	5.84%	429	0.82%
Non-farm employment	364,279	96.82%	7,077	94.16%	52,035	99.18%
Forestry, fishing, related activities, and other	2,695	0.72%	84	0.0111762	(D)	-
Mining (uranium extraction, oil and gas extraction, crude, petroleum-natural gas, oil and gas service, nonmetallic minerals)	29,359	7.80%	873	11.62%	5,348	10.19%
Utilities	2,390	0.64%	(D)	-	(D)	-
Construction	33,986	9.03%	633	8.42%	4,036	7.69%
Manufacturing	11,791	3.13%	128	1.70%	2,143	4.08%
Wholesale trade	9,338	2.48%	(D)	-	2,767	5.27%
Retail trade	41,074	10.92%	758	10.09%	6,482	12.36%
Transportation and warehousing	13,925	3.70%	498	6.63%	(D)	-
Information	5,037	1.34%	86	1.14%	664	1.27%
Finance and insurance	11,858	3.15%	204	2.71%	1,867	3.56%
Real estate and rental and leasing	15,219	4.04%	273	3.63%	2,416	4.61%
Professional and technical services	16,757	4.45%	217	2.89%	2,462	4.69%
Management of companies and enterprises	1045	0.28%	(D)	-	107	0.20%
Administrative and waste services	11,948	3.18%	(D)	-	2,229	4.25%
Educational services	3,117	0.83%	(D)	-	342	0.65%
Health care and social assistance	26,714	7.10%	(D)	-	5,744	10.95%
Arts, entertainment, and recreation	6,602	1.75%	110	1.46%	939	1.79%
Accommodation and food services	32,540	8.65%	576	7.66%	3,559	6.78%
Other services, except public administration	20,363	5.41%	406	5.40%	3,252	6.20%
Federal, civilian	7,321	1.95%	56	0.75%	659	1.26%
Military	6,113	1.62%	76	1.01%	420	0.80%
State and local	55,087	14.64%	1258	16.74%	4830	9.21%
State government	14,312	3.80%	128	1.70%	737	1.40%
Local government	40,775	10.84%	1130	15.03%	4093	7.80%
Total employment	376,249	100.00%	7,516	100.00%	52,464	100.00%

(D) = Not shown to avoid disclosure of confidential information, but the estimates for this item are included in the totals.
- = Not Available

3.10.2.2 Housing

The nearest communities are Rolling Hills, about eight miles from the proposed project, Glenrock (12 miles), and Douglas (15 miles). According to the U.S. Census 2000 (the most recent year for which housing data were available for communities), there were 142 housing units in Rolling Hills. Of these, 123 were owner-occupied, 12 were renter-occupied, and eight were vacant (5.6 percent) (U.S. Census Bureau, Census 2000).

Of 2,385 total housing units in Douglas in 2000, 1,433 were owner-occupied and 685 were renter-occupied. A total of 267 (11.2 percent) were vacant. The decennial census information does not track the condition of housing units, and some vacant housing may be unsuitable for habitation. Of 1,131 housing units in Glenrock in 2000, 645 were owner occupied and 280 were renter-occupied. A total of 206 (18.2 percent) were vacant (U.S. Census Bureau, Census 2000).

In Natrona County, there were 119 housing units in Edgerton, of which 74 units were occupied. The number of occupied rental units was 17. The vacancy rate was 37.8 percent. In nearby Midwest, 149 of the total 228 housing units were occupied. There were 32 renter-occupied and 79 vacant housing units.

It is likely that vacancy rates within 50 miles of the proposed project will decrease as a result of insufficient housing stock and increasing in-migration of workers for employment in ongoing mineral resource development. A rental vacancy survey summarized in the Wyoming Community Development Authority report (2008) shows that rental vacancy rates in Natrona County decreased to 1.07 percent in 2007 (Table 3.10-6) and in Converse County were at 0.47 percent. The influx of population in these counties as a result of economic growth stimulated by coal bed methane gas and coal production has outstripped the available housing supply.

Rural areas in the counties are sparsely populated, so that most of the housing units characterized in Table 3.10-6 are located within the communities of Douglas, Glenrock, Rolling Hills (Converse County), Casper and surrounding communities (Natrona County). Table 3.10-6 also includes the total number of housing units in the counties, but focuses on rental characteristics because most of the labor force that would originate from outside of Converse and Natrona Counties would likely reside in rental units and other temporary lodging.

The Wyoming Housing Database Partnership (composed of the Wyoming Community Development Authority and other public and private entities) forecasts an increase of 4,296 households in Converse County from 4,694 in 2000 to 8,990 in 2030. The number of renters in Converse County is projected to increase from 1,219 in 2000 to 1,996 in 2030. In Natrona County, the number of households is projected to increase by 19,567,

from 26,819 in 2000 to 46,386 by 2030. The number of renters is expected to increase from 8,079 in 2000 to 11,804 in 2030 (Wyoming Housing Database Partnership, 2008).

3.10.2.3 Temporary Housing

Temporary housing options in the vicinity of the proposed project include hotels, motels, and campgrounds. Vacancy rates are not currently available for temporary accommodations in Wyoming Counties. Available local motels/hotels/cabin establishments in the region generally have low vacancy rates during hunting seasons. There is also a high level of occupancy by the energy resource industry workers. Many motels and recreational vehicle (RV) campgrounds in the region provide accommodation for long-term visits by the week or month.

The temporary lodgings closest to the proposed project are in Glenrock and Douglas. Accommodations in Glenrock include an RV Park and one hotel. In Douglas, there are a total of 364 rooms in seven hotels/motels, and 107 sites at two RV/camping facilities. The Casper area has over 300 sites at five different RV/Camping facilities and over 2,000 rooms at 26 area hotels/motels. Glendo has three motels with a total of 24 rooms (State of Wyoming Tourism, 2008).

Table 3.10-6: 2007 Housing Characteristics for Converse and Natrona Counties

	Converse County	Natrona County
Type of Unit	Number of Units	Number of Units
Housing Unit Estimate[1]	5,894	31,047
Rental Housing Costs[2]		
Apartments	$474	$542
House	$596	$945
Mobile Home	$496	$525
Rental Vacancy[3]		
Total Units	424	4,117
Vacant Units	2	44
Vacancy Rate	0.47%	1.07%

1 – Intercensal estimate for July 2007
2 – Second half 2007
3 – Rental vacancy survey conducted in December 2007

3.10.3 Evaluation of Potential Socioeconomic Impacts of the Proposed Operation

3.10.3.1 Construction

Construction of Satellite facilities and wellfields are staggered over the life of the proposed project as is decommissioning. During most years there is concurrent construction and operations or decommissioning and operations and in some years all three activities (Refer to Figure 9-1 of the TR). Decommissioning activities will also employ workers from the construction trades because of the tear-down, earth-moving and other processes involving large equipment.

In the first year, project development will be construction only and will create approximately 65 jobs directly related to construction activities. There will be on-site construction work through the seventh year of the project (in 2018) with annual average direct employment fluctuating between 38 and 65 jobs, then a two-year period with no construction. Satellite facility decommissioning (also considered as construction for analysis purposes) occurs in the 10^{th}, 12^{th}, and 14^{th} years of the proposed project (in 2021, 2023, and 2025) with an estimated 25 annual average jobs.

Based on local experience, an estimated 50 percent of the peak year construction/decommissioning workforce would be persons already living in Converse County and Natrona County. Other workers may come from outside the local area and will either re-locate for the term of the project or will be long-distance commuters working for extended shifts (e.g., 10 days on, 10 days off).

Construction and decommissioning would cause a moderate impact to the local economy, resulting from the purchases of goods and services directly related to construction activities and increased demand for housing and other services. Impacts to community services such as roads, housing, schools and energy costs would be minor in the nearby towns of Rolling Hills (a small town located west of the proposed project on State Highway 95), Glenrock (west on State Highway 95), Douglas (southeast on State Highway 93), and Casper (the nearest regional economic hub).

3.10.3.2 Operations Workforce

The directly employed operations workforce will grow from approximately 14 persons in the second year of operations to approximately 48 during the peak work years. The peak includes a period when all three Satellite facilities and multiple wellfields would be actively operating the peak operations period is transient and not permanent (lasting approximately three years with average annual direct employment at 44-48 jobs). It is assumed that the majority of operations personnel would be generated from the Casper, Glenrock, and Douglas area or would be temporary personnel from outside the area. It is

not known how many of the permanent required operations workforce would be hired from outside of Converse and Natrona Counties.

3.10.3.3 Effects to Housing

At its peak levels of employment, the proposed project is estimated to produce approximately 164 total jobs in Wyoming. This includes jobs created directly or indirectly by the project or induced by related household expenditures. Many of the jobs will be ongoing over the life of the project (such as the number of persons directly employed by the operator or its contractors for ongoing construction). Others will be tied to specific phases, such as construction or decommissioning, and will be shorter-term rather than on-going. As a result, the total number of jobs is estimated to fluctuate from year to year.

Compared to the rest of the nation, unemployment rates are low in Converse and Natrona Counties, the area most likely to be affected by the increased number of jobs and associated housing demand. These counties are however beginning to feel the effects of the national recession. In June 2009, the unemployment rate in Converse County was 5.2 percent (compared to 2.8 percent in June 2008) and 6.1 percent in Natrona County (compared to 3.0 percent in June 2008). In June 2009, the national unemployment rate was 9.5 percent. The average unemployment rate between July 2008 and June 2009 was 7.6 percent in the nation, but it remained below 4 percent in Converse and Natrona Counties. It is anticipated that Converse and Natrona Counties will continue to have lower unemployment rates than the state and the nation. In part due to the relatively lower unemployment in the local area and the small population base, it is assumed that the supply of available workers is limited locally and that many (and possibly most) of the employees needed to fill the projected new local jobs will come from outside Converse and Natrona Counties.

At the peak of direct employment numbers (in 2016), the proposed project would account for approximately 96 new jobs. Assuming each new job resulted in a separate demand for housing, 96 housing units would be needed. Homeowner vacancy rates were 2.3 percent in Converse County and 1.5 percent in Natrona County, according to the 2000 census (the most recent for which such census data are available at the county level). In a multiple listing service (MLS) internet web search on March 26, 2009, there were 420 listings for houses priced at $300,000 or less in Glenrock (27), Douglas (36), and Casper (357). In July 2007, Converse County had an estimated two vacant units out of 424 total rental units (.47 percent rental vacancy rate) and Natrona County had 44 vacant rental units (1.07 percent rental vacancy rate). The lack of available rental units in Converse County was reported in the Douglas Budget on November 26, 2008. Many people who desire rental units have been staying in hotels/motels for weeks and months at a time.

Based on these data, there would be adequate supply of houses available for sale for needs associated with direct employment from the proposed project and a very limited supply of rental units. It is assumed that the supply of houses for sale that are in good "move-in" condition and in desirable areas may be less than the total number of houses for sale, but with more than 400 available (as of March 2009), there would be sufficient numbers for the estimated 96 new homes needed for direct employment numbers. Some of the employees will likely be hired from the existing local labor pool and therefore 96 homes may overestimate housing demand from direct employment. Based on current trends, it is anticipated that at least some workers will continue to have a residence outside of Converse and Natrona Counties and will be commuting long distance for shift work. While on site they would likely be staying in rentals or hotels/motels. Unless additional rental units are created, this will exacerbate the existing tight rental market.

The total of all new direct, indirect, and induced jobs estimated by the IMPLAN analysis (refer to Section 9.0 of the TR) are for the state of Wyoming, not just Converse and Natrona Counties. If all 164 new direct, indirect, and induced jobs (at the peak of total employment in 2016) were in Converse and Natrona Counties, there would be adequate housing stock to purchase (based on the March 2009 homes for sale), but rental housing would be inadequate and put additional strains on hotels and motels.

3.10.3.4 Effects to Services

The estimated total of 164 direct, indirect, and induced jobs of the peak employment year for the proposed project would result in a total population increase of 397 persons, based on average household size in Wyoming of 2.42 in 2006 (U.S. Census estimate) and assuming that all of the jobs are filled with persons not already living in Wyoming.

Although the IMPLAN analysis study area was for the entire state of Wyoming, for purposes of analyzing the impacts to schools and other public services, all 164 jobs were projected to result in population increases to Converse and Natrona Counties. This overestimates the likely potential for impacts for those two counties. The addition of 397 persons would be an increase of less than one percent to the total combined 2007 estimated population of 84,618 for Converse and Natrona Counties.

Children between the ages of five and 19 constituted approximately 20 percent of total estimated population in Converse and Natrona Counties in 2007. Using 20 percent as the ratio for school age children, there would be approximately 79 school age children anticipated from the projected increase in employment.

Converse School District No. 1 in Douglas was adding new facilities in 2008-2009 and was anticipating it could handle 350 additional students in grades K-5 and 250 additional students in Middle and High School. Converse School District #2 in Glenrock was under

capacity in 2008 and would be able to increase enrollment by another 200 students without additional expansion (other than what has already been planned or recently completed). The Natrona County School District (primarily in the Casper area) has approximately 11,500 students.

A total increase of less than one percent to the total population of Converse and Natrona County is not likely to create a significant impact on other public services such as fire, police, water, and utilities.

3.10.3.5 Effects to Traffic

The primary transportation route to the proposed project from nearby communities is on State Highway 95, which connects the project area to the community of Glenrock along Interstate 25 to the west and State Highway 93, which connects to Douglas to the east. The City of Casper is located approximately 36 miles west of the project area on State Highways 95 and Interstate 25. The Town of Douglas is approximately 18 miles southeast on State Highway 93, and also lies along the Interstate 25 corridor. In 2007 the Annual Average Daily Traffic counts along the 18-mile segment of State Highway 95 between Glenrock and the State Highway 93 junction is 50 vehicles (WYDOT, personal communication, October 23, 2008). Several private access roads extend south from State Highway 95 to access existing agricultural, residential, and oil and gas facilities in the proposed project area. The Annual Average Daily Traffic counts at the intersection of State Highway 95 and County Road 26 (Leuenberger Lane, used to access residential and ranch facilities) is 260.

The highest levels of project-related traffic would be from the operations workforce, and assuming there would be an average of one employee per vehicle, per one-way vehicle trip, there could be an increase of 5.4 percent in daily traffic along the highway. This 5.4 percent (10.8 percent for two trips per day) increase is well below the 25 percent threshold generally used for predicting significant effects to a transportation system.

Equipment needed for construction and installation of the proposed facility would include heavy equipment (cranes, bulldozers, graders, trackhoes, trenchers, and front-end loaders), and heavy-and light-duty trucks. It is anticipated that heavy equipment will be transported primarily to the site during off-peak traffic hours.

3.10.4 Environmental Justice

Executive Order 12898 directs each Federal agency to "*make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies and activities on minority populations and low-income populations in*

the United States..." (EO 12898, February 11, 1994). Historically, Environmental Justice grew out of a religion-based social movement in response to a documented disproportionate number of toxic waste dumps and other "*locally unwanted/unacceptable land use (LULU)*" placed disproportionally within minority and low-income neighborhoods, particularly in urban centers (Bullard 1999). Proponents of Environmental Justice characterize it as the search for geographic/distributive and social equity.

Geographic/distributive equity refers to the distribution of facilities on a non-discriminatory basis (i.e., equitable siting decisions). The basic tenet is that burdens and benefits would be fairly balanced. Although the location of uranium mines is geologically determined, this does not exclude agencies from considering distributive equity (Ali and Abhrendt 2001:6). The social and environmental costs of siting a facility in a particular location needs to be balanced by the inhabitants of that location receiving commensurate benefits from the facility (Bullard 1999; FIWG 2001; Harris and Harper 1999; Suagee 1999). From the perspective of distributive equity, the employment opportunities and infrastructure development should be distributed to all affected populations in direct proportion to the effects they will absorb.

Social equity refers to the influence of social factors such as ethnicity, class, culture, lifestyles and political power on environmental decision-making and implementing mitigation.

> *There is a racial divide in the way the U.S. government cleans up toxic waste sites and punishes polluters. White communities see faster action, better results and stiffer penalties than communities where blacks, Hispanics and other minorities live. This unequal protection often occurs whether the community is wealthy or poor* (Lavelle and Coyle 1992 in Bullard 1999)

Again, the main tenet of environmental justice is that burdens and benefits should be balanced. Executive Order 12898 requires regulators to take into consideration whether minority communities are sharing equally with the majority in the benefits and burdens associated with an undertaking.

Several factors can be used to measure Environmental Justice in terms of the characteristics of the populations that will be affected by the proposed action. Populations are described in terms of risk factors. Significant variables that can affect both benefits and burdens of particular actions include:

Population Location – Effects on communities vary with the distance from the project (EPA 1988d:8). Those communities located nearest a project may benefit from increased economic potential. However, they are also the most likely to feel the effects of the burdens associated with an undertaking.

Population Size/Density – Very small populations commonly have smaller resource and economic bases. Therefore, a change in either of these spheres is more likely to affect the communities when compared to the population at large. In very small populations, the proportion of the group affected compared to the populations at large tends to be much higher.

Population Income – Individuals living in poverty (defined in 2008 as $21,200 for a family of four) have fewer economic resources, often have less access to the political system, and less ability to move under hazardous conditions than their wealthier counterparts. If they are in poor health or have a poor nutritional status, they may be more sensitive to chemical or physical impacts as well (FIWG 2001:34).

Cultural Ties to the Land – In some communities, like "Oil Patch" communities, the need for mobility is the norm. People are routinely transferred from one oilfield to another. These technological nomads carry their community structure with them. Consequently, project effects that result in a change in residence are often not seen as a burden. In other communities, such as reservations, or where family farming and ranching is the major economic strategy, ties to a particular location extend over several generations and have intrinsic value. Study related effects that result in leaving the community might be viewed as a severe hardship.

Participation in Cultural Systems Sensitive to Environmental Change – Populations dependent on subsistence hunting, fishing and gathering may experience disproportionally high and adverse effects from projects related to natural resources (EPA 1988d:13, 49; CEQ 1997:28; Lapachin and Tano 2001). Natural resources such as minerals that are not predominantly used by the general population may be important source of consumption, economy, cultural use and/or recreation for minority and/or low-income communities (EPA 1988d:49; CEQ 1997:28).

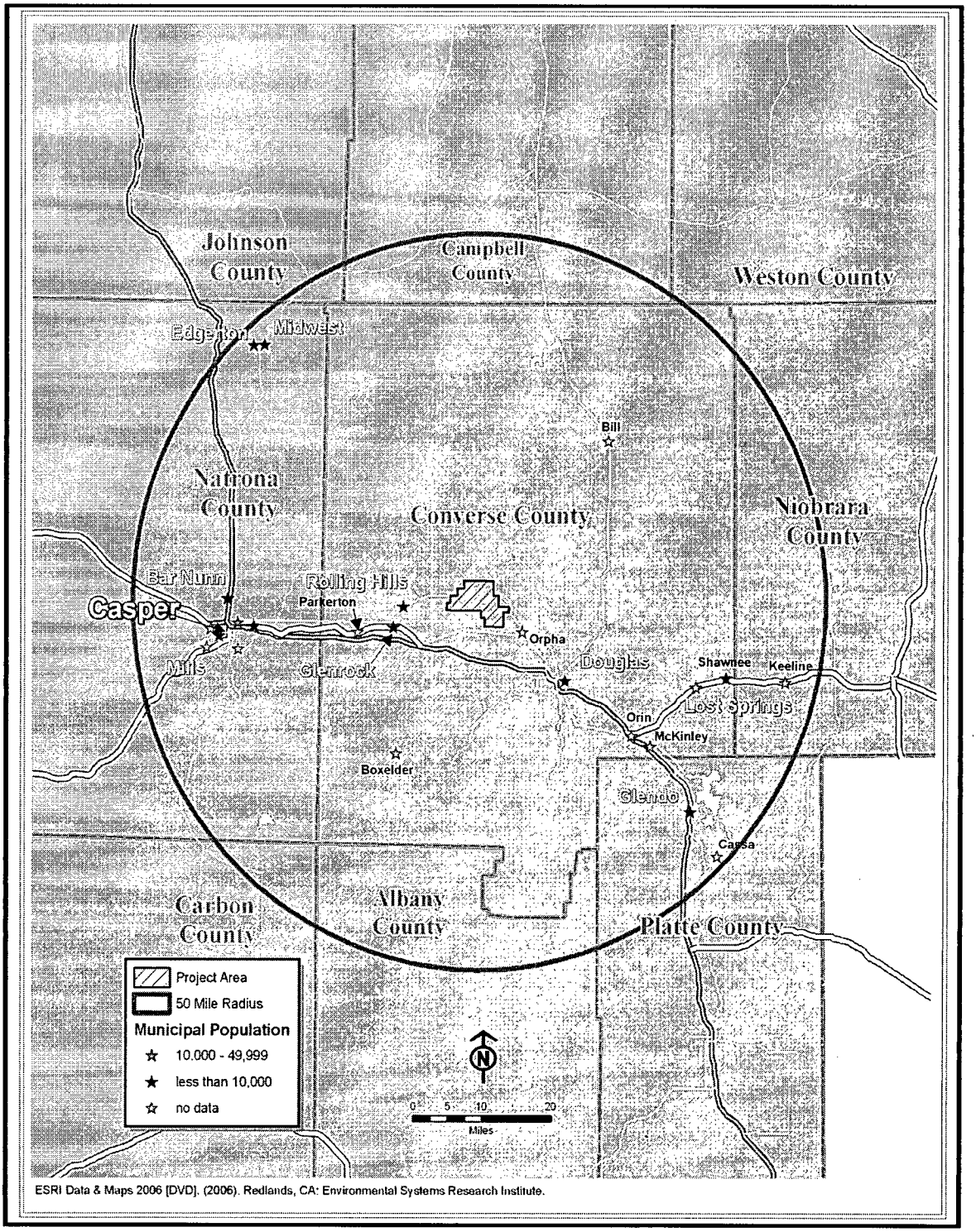
Age of Populations – Populations with a higher proportion of school age children will have different infrastructure needs than those with a higher proportion of senior citizens. Furthermore, children may suffer disproportionally from environmental health risks, and safety risks. Executive Order 13045, *Protection of Children from Environmental Health Risks and Safety Risks* (1997) emphasizes the importance of this factor. Because children may suffer disproportionately from environmental health and safety risks, the Executive Order is meant to ensure federal agencies take into consideration the effects of undertakings on children and that policies and programs address these risks.

3.10.4.1 Geographic Unit of Analysis

Based on Nuclear Regulatory Commission recommendations, an 80-km (50-mi) radius around the proposed project area in Converse County, Wyoming was selected as the

geographic unit of analysis for the Environmental Justice Study Area (EJ Study Area). It includes all of Converse County, the northern portion of Carbon, Albany and Platte Counties, a portion of western Niobrara County, a portion of eastern Natrona County including the city of Casper, the extreme southeastern corner of Johnson County and a portion of southern Campbell County (Figure 3.10-2). "*Because ISL well fields can cover large geographic areas, (the Nuclear Regulatory Commission) decided to evaluate demographic and socioeconomic data within at least an 80-km (50–mi) radius of existing or potential facilities*" (Nuclear Regulatory Commission 2008:2:6.3).

Figure 3.10-2: Environmental Justice Study Area for the Proposed Project



3.10.4.2 Minority Populations

The cultural history of Wyoming suggests three potential minority groups may exist within the EJ Study Area for the proposed project. They consist of Native Americans, Hispanics and Basques.

3.10.4.2.1 Native American Populations in Wyoming

Historically, several Indian populations occupied the subject EJ study Area, including the Arapaho, the Cheyenne, and the Teton Sioux. The earliest suspected occupants were the Eastern Shoshone. By the mid 1500s, the Shoshone occupied areas south and west of the Wind River Range in Wyoming (Hewes 1961:54; Trenhom and Carley 1965:17). In the 16th century, the Shoshone broke into separate groups. Those that ranged in Wyoming and Montana formed the Eastern Shoshone, while those who moved to the south into Colorado became known as the Comanche (Kehoe 1981:287). In the 1720s, the Eastern Shoshone received Spanish horses from the Comanche. With horses, the Shoshone dominated the High Plains and may have extended their territory as far east as South Dakota by the 1750s. There, people who had guns and horses of their own, stopped them. In the late 1700s, small pox and warfare devastated the Eastern Shoshone, forcing them to contract their territory to the west (Sturtevant 1986:517-518).

The Arapaho were the next tribe to dominate the area. The earliest records indicate the Arapaho were originally a sedentary people living in the Red River valley of northern Minnesota. In the 1600s, they moved westward into the High Plains, possibly because of pressure from the Cheyenne and Sioux (Wood and Liberty 1980:285). By the early 1700s, they split into two populations. The northern population became known as the Gros Ventre. The southern population is known as the Arapaho. They moved into the subject EJ Study Area in the mid-1700s, possibly filling the void caused by the contraction of the Shoshone (Deaver 1986: Fowler 1986:15-17).

In 1805, the Kiowa joined them. Based on Kiowa and Shoshone traditions, the Kiowa originated in the Yellowstone Park area (Kehoe 1981:288-289; Levy 2001; Mayhall 1971:6-10). In the 1700s, a group of Kiowa left, and, with the help of the Crow, became adept Plains hunters and gatherers. The Kiowa eventually made their way to the Black Hills, which they made their homeland, until the arrival of the Cheyenne and Sioux (Hyde 1959:152; Kehoe 1981:289). By 1805, the Kiowa were occupying the area near the North Platte River (Levi 2001).

In the 1700s, the Cheyenne began moving from the headwaters of the Mississippi River southwest toward the Dakotas (Weist 1977:14-16). By 1780, the Cheyenne had moved into the Black Hills area, which they occupied with the Arapaho in the early 1800s (Hewes 1961:52; Weist 1977:25). By 1806 the Cheyenne and Arapaho formed an

alliance (Bial 2004). In 1811, they lived as far north as the North Platte River, possibly including the proposed project study area.

In the early 1800s, the Teton Sioux also began moving into the region. Although Sioux presence in Montana and Wyoming occurred as early as 1801, they started making strong inroads by the 1820s. As they continued to move west, they encountered the combined forces of the Cheyenne and Arapaho, which kept them from moving into western Wyoming.

After the discovery of gold in California in 1848, gold seekers flooded the region on their way to the gold fields. In Wyoming, 20,000 immigrants followed the Oregon Trail, located just a few miles south of the subject EJ Study Area. As they traveled through the region, they depleted game and spread diseases. The Cheyenne withdrew from the Platte River region. They also gave up their animosities with the Sioux to form an alliance to attempt to repel the invaders. Through their long-standing alliance with the Cheyenne, the Arapaho also developed an uneasy truce with the Sioux. Conflict with the immigrants became routine.

In an effort to resolve the conflict, the U.S. government held a treaty conference at Horse Creek near Fort Laramie in 1851. Ten thousand Plains Indians, including Cheyenne, Arapaho, and Sioux, attended the meeting. After the meeting, the tribes agreed to honor established territorial boundaries and live in peace with one another (Malone and Roeder 1976:88). The treaty also established the legal basis of the Oregon Trail and provided for the establishment of Fort Laramie (DeMallie 2001:795). The subject EJ Study Area is located in what was defined to be part of Sioux territory.

The peace was tenuous at best and attacks on both immigrants and intertribal warfare continued. The battle nearest the project area occurred near present-day Casper, Wyoming, in 1856. Tensions increased in the 1860s when a new wave of gold seekers rushed through Indian Territory. Nearly all the tribes objected to these new incursions into their lands. The tribes viewed the new wave of immigrants as a pestilence that needed remedy. The tribes were determined to keep whites off their lands. As a result, skirmishes became more frequent, and became an increasing threat to commerce, travel, and settlement (Thompson 1968:101-102). The military was called upon to protect American interests. To support and protect Americans, the military began establishing forts across the west (Thompson 1968:107-108).

Indian anger and resolve soared as a result of two incidences. First, in 1862, the Santee, faced with a decreasing land base and starvation, rose against whites in Minnesota. After the uprising was quelled, 29 Sioux were hanged, and others either imprisoned or chased into the Dakotas (Carley 1976; Utley 1993:57). Second was November 29, 1864, the infamous Chivington, or Sand Creek Massacre. On that day, a force of Colorado Volunteers led by Colonel John Chivington attacked a camp of Cheyenne and Northern

Arapaho, despite their flying both an American flag and a white flag of peace. The attack ended with the torture, death, and mutilation of 137 (Weist 1977:53) to 500 (Trenholm and Carley 1964:277) people, the majority of which were women and children (Stands in Timber and Liberty 1972:168-170; Weist 1977:49-53).

Because of the events at Sand Creek, the alliance between the Sioux, Cheyenne, and Northern Arapaho was strengthened. By January they were on the attack in the Central Plains (Weist 1977:53). In the spring, bands of Cheyenne, Brule, and Northern Arapaho moved north, joining the Oglala under Red Cloud and Old Man Afraid of His Horse in the Tongue River area (Weist 1977:54). Further north, Sitting Bull took the offensive (Utley 1993:71).

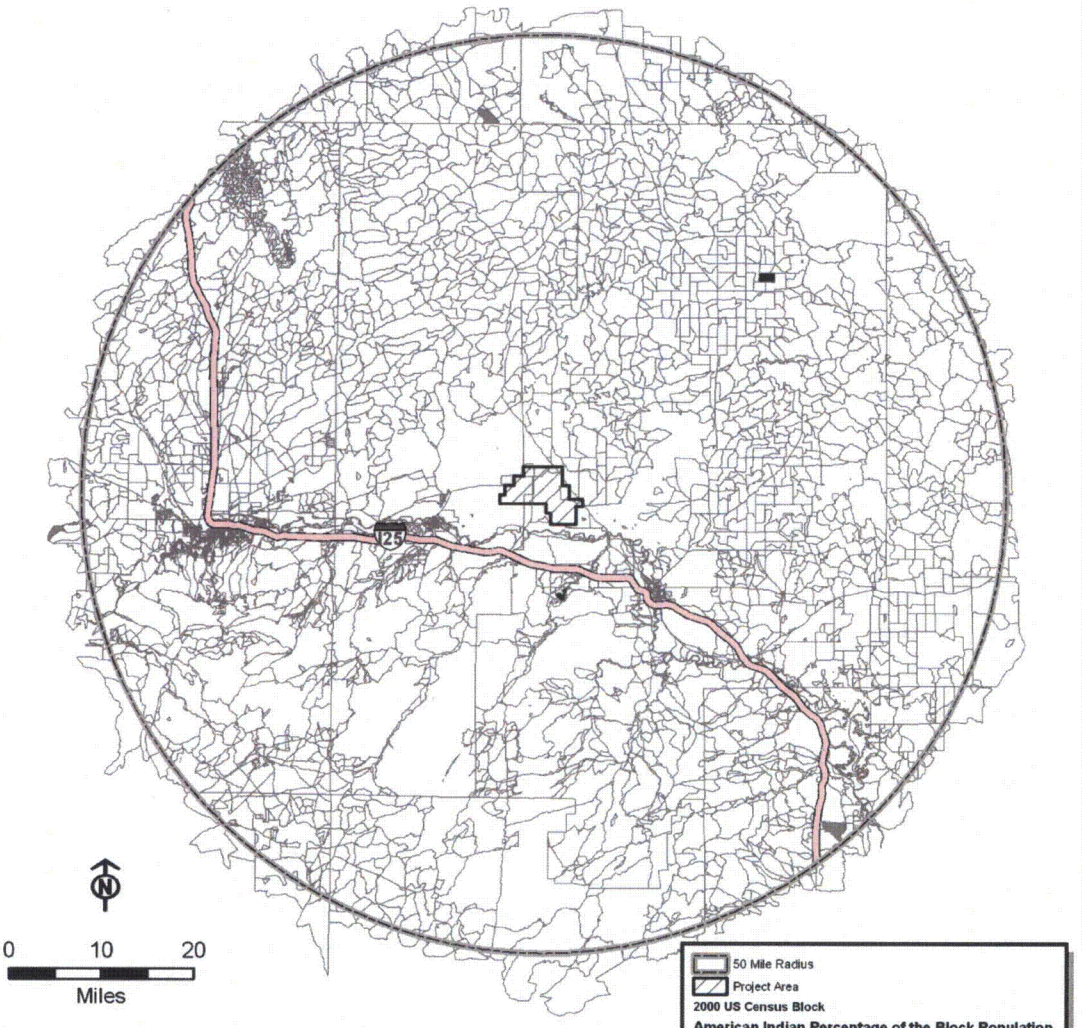
Although the U.S. government attempted to obtain peace via the 1868 Laramie Treaty, it too was unsuccessful. In the winter of 1875, the U.S. ordered all Indians to return to their reservations by January of 1876. If they did not, the government would consider them hostile and would use military force to send them back to their reservations (Bradley 1991:105; Grinnell 1985:328). As the military began moving in, battles ensued. On June 25, 1876, the combined forces of Northern Arapaho, Cheyenne and Sioux forces defeated the U.S. military at Little Big Horn. This would be the last Indian victory.

The military campaign continued into 1877. The Northern Arapaho agreed to act as scouts for the military in return for a promise that they could stay in Wyoming. Grant allowed the Northern Arapaho to stay at the Eastern Shoshone Wind River Reservation in 1878. The Northern Cheyenne were sent to the Southern Cheyenne reservation, but were eventually given their own reservation in Montana. The Sioux were deported to South Dakota. Once they were situated on the reservations, the government strictly regulated their movements, and the subject EJ Study Area was virtually abandoned. Native American access to the EJ Study Area was restricted until they were given U.S. citizen status in 1924.

Based on American Community Survey data of 2006, Native Americans comprise 2.5 percent of Wyoming's population. Native Americans are concentrated in Fremont County, particularly the Wind River Reservation, situated to the north and west of the subject EJ Study Area. The Wind River Reservation is home to approximately 7,400 Northern Arapaho Indians and 4,200 Eastern Shoshone Indians.

An examination of the 2000 census block records indicate Native Americans represent 20 percent or more of the population in 14 blocks, and 50 percent or more of the population in 8 blocks (Figure 3.10-3). Within census blocks where Native Americans represent 50 to 100 percent of the population, a maximum of 18 individuals are present. This appears to represent individuals, or a small number of families.

Figure 3.10-3: Percentage of Native Americans in the proposed project study area (Based on Census Records)



Range of Population within 50 Miles of the Project Area = 0 -828		
PERCENT RANGE	**NUMBER OF BLOCKS**	**POPULATION RANGE**
0 – 19%	**7,991**	**0 - 828**
20 – 49%	**14**	**3 – 26**
50 – 100%	**8**	**1 - 18**

ESRI Data & Maps 2006 [DVD]. (2006). Redlands, CA: Environmental Systems Research Institute.

Census 2000 Summary File 1 Wyoming/prepared by the U.S. Census Bureau, 2001.

3.10.4.2.2 Hispanic Populations in Wyoming

Hispanics have a long history in Wyoming, and may have been the earliest non-Native American population to enter the area now known as Wyoming. Between 1700 and 1821, the only record of Hispanic presence in Wyoming is local Indians' possession of Spanish trade items, such as armor and swords. However, Spanish buffalo hunters, known as *ciboleros*, probably entered the area during this period (Rios-Bustamente (2001).

Between 1821 and 1848, Spanish fur trappers and traders associated with the American Fur Company moved into the area. Spanish speaking entrepreneurs routinely interacted with the American and French Canadian trappers operating in the area. For example, Jim Bridger joined with Luis Vasquez to purchase the site of Fort Bridger as a Mexican land grant (Alter 1962; Rios-Bustamente 2001). In 1845 and 1846, Jim Bridger brought New Mexico sheep to his fort and hired Mexican sheepherders to take care of them. Thus began the historic influx of Mexican/Mexican-American sheepherders into southern Wyoming. Hispanic sheepherders living in the state tended to live in southern Wyoming, with the majority centered near Rawlins. Others were found in the area between Cokeville (Lincoln County) and Douglas (Converse County) [Arnold 1997].

From 1870 to 1890, several hundred Mexicans and Hispanics moved into Wyoming to work as cowboys and railroad track laborers. Mexican cowboys, called *vaqueros,* also entered the area with cattle drives from Texas and possibly from Oregon, and Idaho. Local ranchers also employed the *vaqueros* (Rios-Bustamente 2001). Hispanics also worked as muleskinners and teamsters, supplying the needs of American military posts, early towns, and mining camps. They also worked as sheepherders and may have been artisans and shop owners in Cheyenne and Laramie (Rio-Bustamente 2001).

Later Mexican immigration into Wyoming is tied to major political upheavals in Mexico and economic fluctuations in the U.S., as well as Mexico. Between 1900 and 1930 approximately one tenth of the population of Mexico immigrated to the U.S. (Grajeda 1998; McWilliams 1968, Rios-Bustamente 2001). Immigrants sought to remedy horrible living conditions in Mexico by moving north where the economy was growing and there was a ready market for cheap labor (Grajeda 1998). In addition to sheepherding, Hispanics worked as railroad workers, agricultural contract workers, coal miners, and oilfield hands (Arnold 1997). This flexible job strategy was highly adaptive to fluctuations in the lamb and wool market in the nineteenth century.

In 1897, the U.S. Congress passed a 75 percent import tax on sugar. This stimulated the U.S. sugar beet industry. Sugar beet acreage tripled between 1900 and 1906. By 1920, the Great Plains, including Wyoming, provided 64 percent of the sugar beets in the U.S. The labor needs generated by the rapid growth of the sugar beet industry "*were met by the regular and methodical recruiting of Mexican agricultural workers*" (Grajeda 1998:2;

Hewitt 1982; Redwine 1982). In 1915, the Great Western Sugar Company brought 500 workers into its Colorado, Wyoming, Montana, and Nebraska sugar beet operations. By 1920, they had brought in 13,000 Mexicans, and by 1926, the Mexican population was up to 14,500 (Grajeda 1998). In Lovell and other Wyoming towns, the Great Western Sugar Company built housing and camps for Mexican workers. This laid the pattern for future segregation of Mexican populations in Wyoming (Hewitt 1982; Redwine 1979). The primary sugar beet production acreages in 1939 included one area in southwestern Converse County that extended into Platte County and an area in Johnson County that extended northwest from Buffalo (Hewitt 1982:24).

The expanding railroad industry also heavily recruited Mexican workers in the early 1900s. These workers first lived in boxcars and tents, forming ethnic enclaves that eventually became the barrios, or Spanish-speaking neighborhoods, throughout the Southwest and Great Plains of the U.S. As early as 1906, some of these workers were moving into Wyoming (Grajeda 1998; McWilliams 1968). By the 1920s, Mexican railroad workers and their families lived in railroad camps across the railroad tracks from the Anglo communities in Cheyenne, Laramie, Casper, Evansville, Douglas, Rawlins, and Rock Springs. During this period, *de facto* segregation became the norm and Mexicans could usually only buy supplies from company or ranch stores. Businesses on the Anglo side of town were closed to them (Rios-Bustamente 2001:5-6).

This episode of Mexican immigration came to a halt with the depressions of 1921 and 1929. When jobs became scarce, they were no longer welcome. Over 400,000 of the Mexican immigrants were deported back to Mexico in the 1930s. In 1931, 138,519 were forcefully repatriated (Grajeda 1998; Hoffman 1974).

During WWII, Wyoming, along with the rest of the Great Plains, experienced a severe agricultural labor shortage. Once again, Mexican nationals were in high demand. Wyoming farmers and local draft boards supported the Farm Labor Transportation Program, commonly known as the *Bracero* Program. In August of 1942, the U.S. government agreed to ensure that temporary Mexican workers, *braceros*, had adequate pay, living conditions and full protection under federal law so that they were not subject to discriminatory practices. In return, the Mexican government agreed to support the U.S.'s war effort by facilitating the importation of temporary workers (Hewitt 1982; Hurt 2008; Yeung and Del Hart 2004). In Wyoming, *braceros* were employed primarily in the sugar beet fields where they were paid by the acre. Their wages were around $9.50-$11 for blocking and thinning, $3 for the first hoeing, and $2 for subsequent cultivation (Hurt 2008:220). Others worked for the railroad, particularly in Laramie (Hewitt 1982). By 1944, 990 *braceros* were working in Wyoming alongside thousands of Mexicans and Mexican-Americans (Hewitt 1982; Redwine 1979; Rios-Bustamente 2001:2).

Although the *braceros,* as well as the Mexicans and Mexican-Americans, were needed by the farmers in Wyoming, they were resented and routinely suffered discrimination.

Stores, barbershops, and restaurants regularly refused them entry. Movie theatres and churches that did allow entry were most often segregated. *Braceros* and other Hispanics including Mexican-Americans were paid less than Anglo workers for the same jobs. Complaints eventually reached the Mexican consulate and Mexico soon threatened to block the importation of *braceros* to Wyoming. As a result, the Farm Service Bureau pressured local merchants to provide the *braceros* services. The Governor of Wyoming lobbied the mayors of various towns to pressure merchants to change their policies (Hewitt 1982; Redwine 1979). The sugar companies began to provide segregated entertainment options for the *braceros* in Wyoming. (Hewitt 1982:21-22; Hurt 2008:121).

During the war, the Mexican-Americans lived in poverty and experienced segregation and hostility across the Great Plains, particularly in Wyoming (Hewitt 1982; Hurt 2008). Between 1930 and 1950, segregation was typical of Worland, Torrington, Rock Springs, Rawlins, and Laramie (Rios-Bustamente 2001). To all intents and purposes, segregation continued in Wyoming at least until the 1970s (Olden 2007).

In the 1960s social conditions began to slowly change. Segregation lessened and more Hispanics gained access to high school and university education. The Chicano (Mexican American civil rights) movement came into Wyoming via Colorado and was active in Cheyenne, Laramie, Casper, Rawlins, Lovell, and Rock Springs. A Chicano Studies Department was created at the University of Wyoming in 1998 (Coronado 2001; Olden 2007; Rios-Bustamente 2001).

Today, there are people of Mexican and other Hispanic descent scattered throughout Wyoming. Wyoming's total Hispanic population in 2007 was 39,477 or 8 percent of Wyoming's population. This is an increase from 6.9 percent in 2006 and 6.4 percent in 2000 (Kaiser 2007). Most of this population is of Mexican descent (72 percent) and is American born (78 percent) (Grieco 2003; PHC 2006). Historically, cohesive Mexican-American communities tend to be found in the southern half of the state where they are associated with the historic development of the sheep industry, the expanding railroads, and, to a lesser degree, the development of coal mining and oilfields. The Hispanic population of Wyoming is also geographically associated with sugar beet production. Sugar beet farming was widespread in Wyoming and includes one area at least partially covered by the subject EJ Study area. In 1939, an area in northern Platte County that extended into southeastern Converse County was a "primary sugar beet production area" (Hewitt (1982:24). This area continues to be important today (USDA NASS 2007:83-84). Currently, Hispanic populations are decreasing in southern and eastern Wyoming by ten to 11 percent, and increasing in northwestern Wyoming where expanding tourism is providing well-paying service jobs (USBC 2006b).

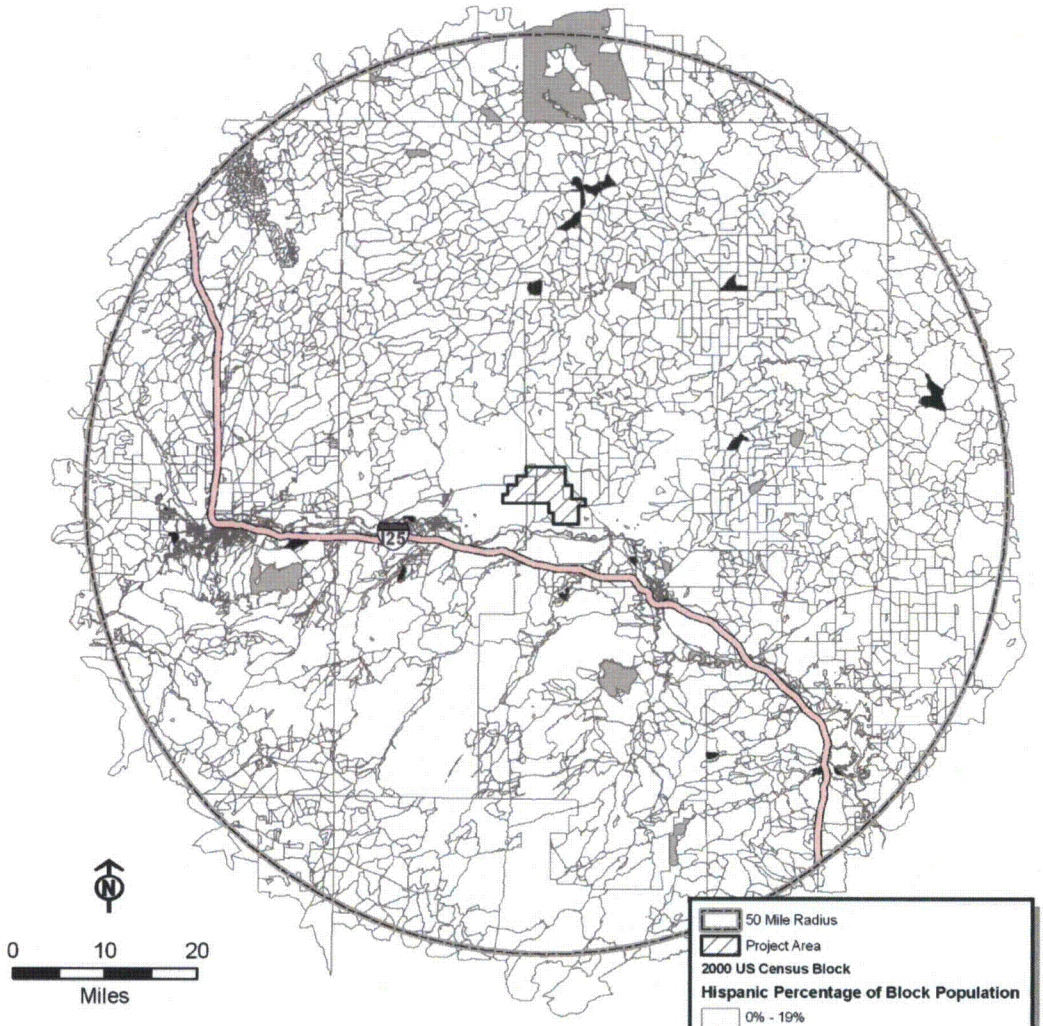
The slightly higher percentage of Hispanics in Douglas, the county seat of Converse County, is most likely tied to the historic and continuing importance of sheep production

in the county as well as sugar beet production in northern Platte County and southeastern Converse County. In addition, Douglas was created in the 1870s by the extension of the Fremont, Elkhorn and Missouri Valley Railroad through central Wyoming (http://www.cityofdouglaswy.com). With the railroad came Mexican and Mexican-American railroad workers.

The Hispanic populations of the U.S. in general and Wyoming in particular appear to be somewhat larger, younger, and tend to have lower incomes relative to the general population. Nationally, they are over-represented in farming, fishing and forestry, construction and maintenance, as well as production and transportation-related occupations (USBC 2006a). In Wyoming, based on 2000 census data, Hispanics, which made up 6.5 percent of Wyoming's population in 2000 (U.S. Census 2000), are over-represented in the service sector, where they make up 8.4 percent of the workers; the farming, fishing and forestry sector, where they make up 9.7 percent of the workers; and construction and maintenance, as well as transportation-related occupations, where they make up seven percent and 7.3 percent respectively of the workers (USBC 2000c).

An examination of the 2000 census block records indicates Hispanics represent 20 percent or more of the population in 157 census blocks, and 50 percent or more of the population in 35 blocks (Figure 3.10-4). Within census blocks where Hispanics represent 50 to 100 percent of the population, houses contain between one and 19 individuals. This appears to represent individuals or a small number of families.

Figure 3.10-4: Percentage of Hispanics Living in the Proposed Project Study Area (Based on Census Records)



Range of Population within 50 Miles of the Project Area = 0 -828		
PERCENT RANGE	NUMBER OF BLOCKS	POPULATION RANGE
0 – 19%	7,856	0 - 828
20 – 49%	122	3 – 93
50 – 100%	35	1 - 19

ESRI Data & Maps 2006 [DVD]. (2006). Redlands, CA: Environmental Systems Research Institute.

Census 2000 Summary File 1 Wyoming/prepared by the U.S. Census Bureau, 2001.

3.10.4.2.3 Basques in Wyoming

The Basques of Wyoming are descended from peoples who occupy parts of north-central Spain and southwestern France. The Esponda brothers are typically credited to be the first Basques to arrive in Wyoming. In 1902, the brothers arrived from California for work at the Healy and Patterson Sheep Ranch, the largest sheep operation in northern Wyoming at that time. Within four years, the Esponda brothers began buying their own land and recruited several fellow Basques from their old home village to work with them. However, most Basque sheepherders in Wyoming – like most sheep operators in the United States – did not own large ranches. Instead, they relied on open rangelands to support their herds (Castelli 1970; Iberlin 1981; Iberlin and Romtvedt 1995; Zubiri 2006).

This changed in the 1930s when the United States passed a series of laws that defined the national forest and national park systems and placed them under direct federal control. Within these newly defined lands, access to high-country pastures and summer ranges was prohibited in the national parks and restricted to U.S. citizens who owned ranch property in the National Forests. This excluded Basque sheep men from large sections of their former range. In 1934, Congress passed the Taylor Grazing Act, which brought the remaining rangeland under direct federal control and created what would become the Bureau of Land Management. As with earlier legislation, the Taylor Grazing Act excluded alien, landless grazers from using the public domain. This effectively "*banished the itinerant sheepman from the western scene and converted herding into a low-paid, dead-end occupation rather than an avenue of opportunity for an entrepreneur aspiring to build his own sheep outfit*" (Lane and Douglass 1985:2).

From the 1930s to the 1970s, most Basques in Wyoming were hired by Euro-American- and Basque-owned sheep operations. They eventually developed a reputation as being hard working, honest and reliable. During WWII, there was a shortage of herders in the American west. Western sheep operators successfully lobbied congress to change immigration quotas so more Basque herders could be recruited. They also sent representatives to the Basque homeland to recruit these workers. The number of Basque herders in the American west fluctuated with episodic changes in U.S. immigration policies, economic fluctuations in the sheep industry caused by overgrazing, changes in sheep and wool prices, and the slow economic recovery of Spain after World War II and the Spanish Civil War (Lane and Douglass 1985; Laxalt 1986; Zubiri 2006).

Currently, two of the largest Basque sheep operations in Wyoming are the John Iberlin operation in Buffalo and the widespread Warren Livestock operation. The CEO of Warren Livestock, and Director of the Wyoming Department of Agriculture, Paul Etchepare, is of Basque descent (Zubiri 2006:494). In the Rock Springs area, the same Basque families that controlled sheep operations in the early 1900s are still there. They

are members of the Rock Springs Grazing Association, which has a formal cooperative partnership with the Bureau of Land Management and the Union Pacific. This partnership gives them access to a 400 square mile range along both sides of the railroad to the east of Rock Springs (Zubiri 2006:496).

As with other farming and ranching communities in the region, the Basque have strong long-term ties to the region. Access to suitable water to support herds is critical to the maintenance of the agricultural population's continuing ties to the land. Further, maintaining these ties is an irrevocable and irreplaceable foundation of the lifestyle that their families have chosen and maintained over multiple generations (Nuclear Regulatory Commission 2007). In addition "*grazing also represents irreplaceable environmental and social values, contributing to the preservation of open spaces, the scenic vistas and visual beauty of the area and the traditional image of this historic landscape of Wyoming and the West*" (Etchepare 2008).

Although Basque descendents are scattered throughout Wyoming, Basque communities, who maintain a strong sense of group cohesion, tend to be found largely in southwestern Wyoming. One community is centered near Buffalo, where Basques are a well-recognized group and the other Buffalo residents are knowledgeable about the culture. Another center is in the Rock Springs/Green River area. However, these Basques are more isolated and struggle to maintain their traditions (Zubiri 2006: 494). There are no recognized Basque communities in the subject EJ study area.

Low Income Groups in the Study Area

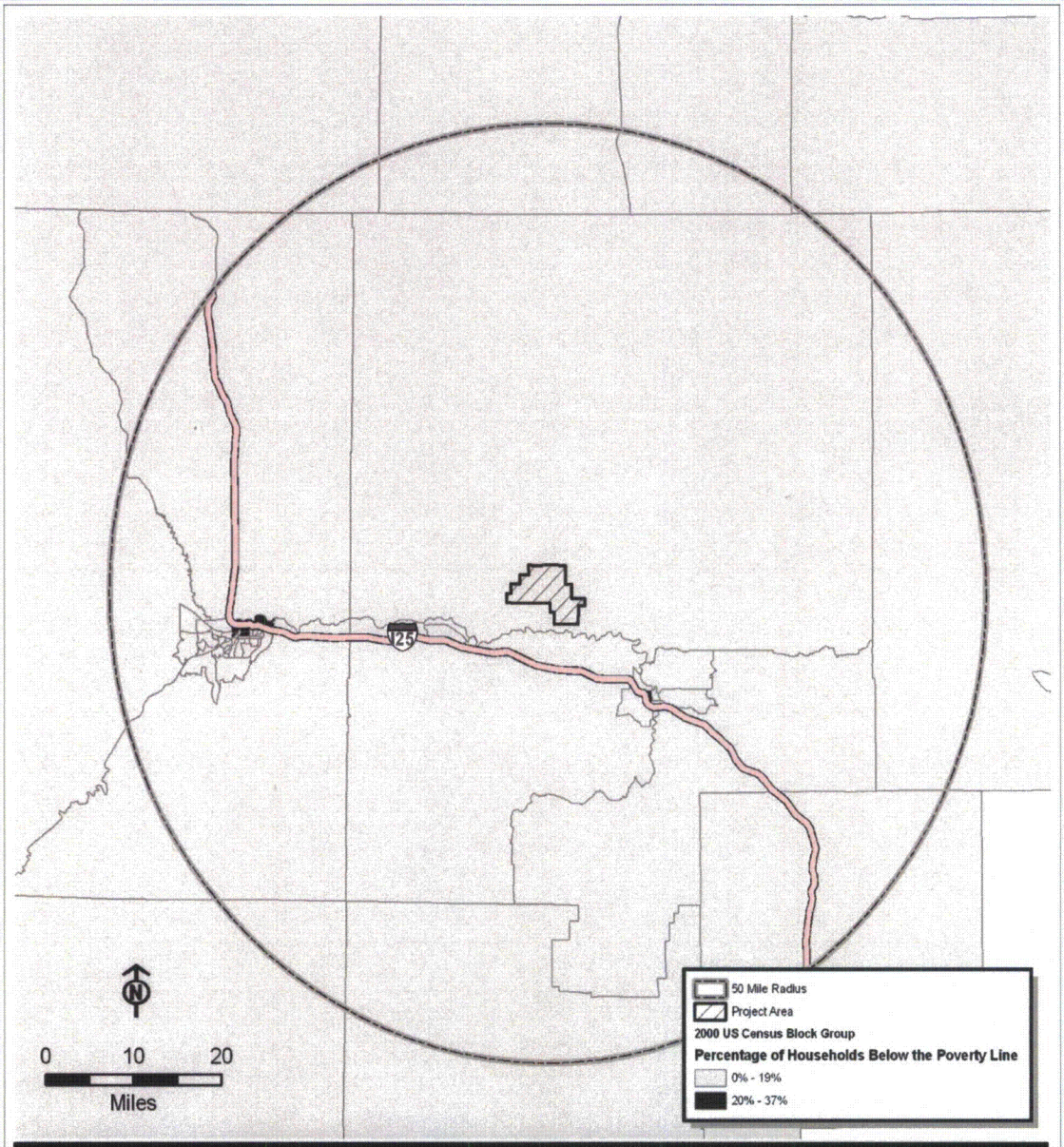
To assess the presence of low income groups in the proposed project area, the Nuclear Regulatory Commission examined U.S. Census-based income measures in the eight counties covered in part or whole by the area of potential effect (NRC 2008). The measures used included median household income, median family income, per capita income, families below poverty level, and individuals below poverty level. All data came from 1999 and 2000.

Only Albany County stands out as having an identifiable low-income population. Albany County had the highest percentage (21 percent) of individuals living below the poverty level in 2000, almost three times the state rate of eight percent. It is estimated that 18.2 percent (15.5 to 20.8 at the 90 percent confidence level) of Albany County's population lived below the poverty level in 2005 as compared to 10.6 percent for Wyoming as a whole. In 2007, the rate was estimated at 16.2 percent in Albany County, as compared to 9.5 percent for Wyoming as a whole (USBC 2008).

An examination of the 2000 census records indicates there are seven census blocks within the study area where low-income population is 20 percent or greater (Figure 3.10-5). Most of the blocks occur in Casper, located 30 miles from the subject EJ Study Area; one

block is located in Glendo, located 10 miles from the subject EJ Study Area. The percentage of low-income individuals never exceeds 37 percent within the study area.

Figure 3.10-5: Percentage of Households Living in Poverty in theProposed Project Study Area (Based on Census Records)



Range of the # of House Holds per Block Group within 50 Miles of the Project Area = 376 - 2508		
PERCENT RANGE	NUMBER OF BLOCK GROUPS	# of House Holds RANGE
0 – 19%	60	376 – 2508
20 – 37%	7	693 - 2246

ESRI Data & Maps 2006 [DVD]. (2006). Redlands, CA: Environmental Systems Research Institute.

U.S. Census Bureau. 2000 Census of Population and Housing, Summary File 3.

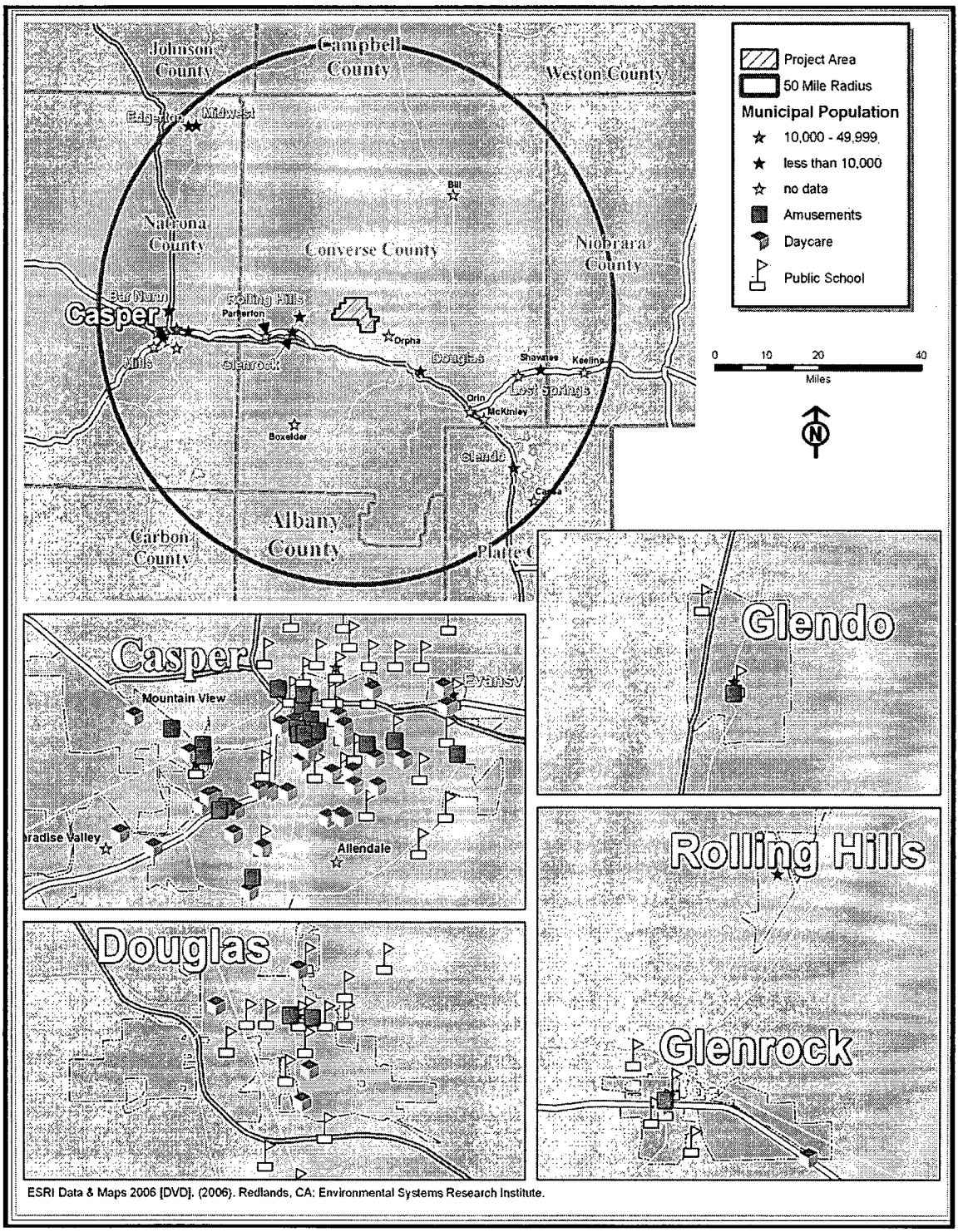
Children in the Study Area

To assess areas potentially affected by the implementation of the proposed actions, this section identifies those places where the numbers of children may be disproportionately high (e.g., schools, childcare centers, parks, amusement areas, etc).

There are 68 schools within 50 miles of the subject EJ Study Area (Figure 3.10-6). Of these, 39 are elementary schools, 22 are middle schools, and seven are high schools. Between August and May, a combined 16,285 students attend these schools. A smaller number of students attend schools in the summer. All of the schools are integrated within towns or communities. The nearest school to the subject EJ Study Area is located 7.8 miles away, in Glenrock Wyoming. There are also 41 preschools and/or day cares within 50 miles of the project area. As with the schools, they are located within towns. Again, the closest is located in Glenrock (http://www.sdvc.uwyo.edu/clearinghouse/society.html).

Other areas where children are likely to congregate are parks, swimming pools, theatres, movie theaters, bowling alleys, amusement centers, and arcades. There are three swimming pools (one in Casper and two in Douglas); nine theatres (one in Douglas and the rest in Casper), 44 parks (one in Glendo and the rest in Casper), one skating rink in Casper, and six bowling alleys (three in Casper, and one each in Douglas, Glenrock and Mountain View). There are also four identified amusement centers and arcades in Casper, 30 miles from the subject EJ study area.

Figure 3.10-6: Location of Day Cares, Schools and Amusement Areas where Children are Likely to Congregate in the Proposed Project Study Area



3.10.4.3 Environmental Justice Conclusions

In compliance with Executive Order 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*, ethnicity and poverty status in the vicinity of the proposed actions have been examined and compared to city, regional, state, and national data to determine if any minority or low-income communities could potentially be disproportionately affected by implementation of the proposed action. Similarly, in compliance with Executive Order 13045 – *Protection of Children from Environmental Health Risks and Safety Risks,* the distribution of children and locations where numbers of children may be disproportionately high in the vicinity of the proposed actions was determined to ensure that environmental risks and safety risks to children are addressed.

Three criteria must be met for impacts to minority/low income communities to be considered significant. First, there must be one or more populations within the region of influence. Second, there must be adverse (or significant) impacts from the proposed action. Finally, the population under investigation must bear a disproportionate burden of those adverse impacts. If any of these criteria are not met, then impacts with respect to environmental justice or protection of children are not significant.

According to the environmental justice guidance provided by the Nuclear Regulatory Commission, *"percentage differences greater than 20 percentage points may be considered significant, and if either the minority or low-income population percentage in the radius of influence exceeds 50 percent, environmental justice should be considered in greater detail"* (Nuclear Regulatory Commission 2008:6.3). An examination of census blocks indicates there are several areas within the EJ Study Area for the proposed Ludeman Uranium Project that contains a concentration of minority populations over 40 percent. However, these localities are scattered throughout the study area, and generally consist of only one or a few households. The EJ Study Area will not disproportionately affect minorities or low-income communities.

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Table 3.10-2 Source:
Population Division, U.S. Census Bureau, Release Date May 1, 2008

Table 3.10-3 Source:
Wyoming Department of Administration and Information, Economic Analysis Division , July 2008.

Table 3.10-5 Sources:
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3.11 PUBLIC AND OCCUPATIONAL HEALTH

This section describes existing public and occupational health conditions related to the proposed project area. A discussion of exposures to populations and individuals is presented with a focus on topics related to the intended use of the site.

3.11.1 Background Exposure to Ionizing Radiation

Everyone is exposed to a certain level of background radiation. As defined by 10 CFR part 20, *background radiation* means radiation from cosmic sources; naturally occurring radioactive material, including radon (except as a decay product of source or special nuclear material); and global fallout as it exists in the environment from the testing of nuclear explosive devices or from past nuclear accidents such as Chernobyl that contribute to background radiation and are not under the control of the licensee. *Background radiation* does not include radiation from source, byproduct, or special nuclear materials regulated by the commission. The largest individual natural source is ^{222}radon. These natural radiation sources are commonly referred to as natural background radiation.

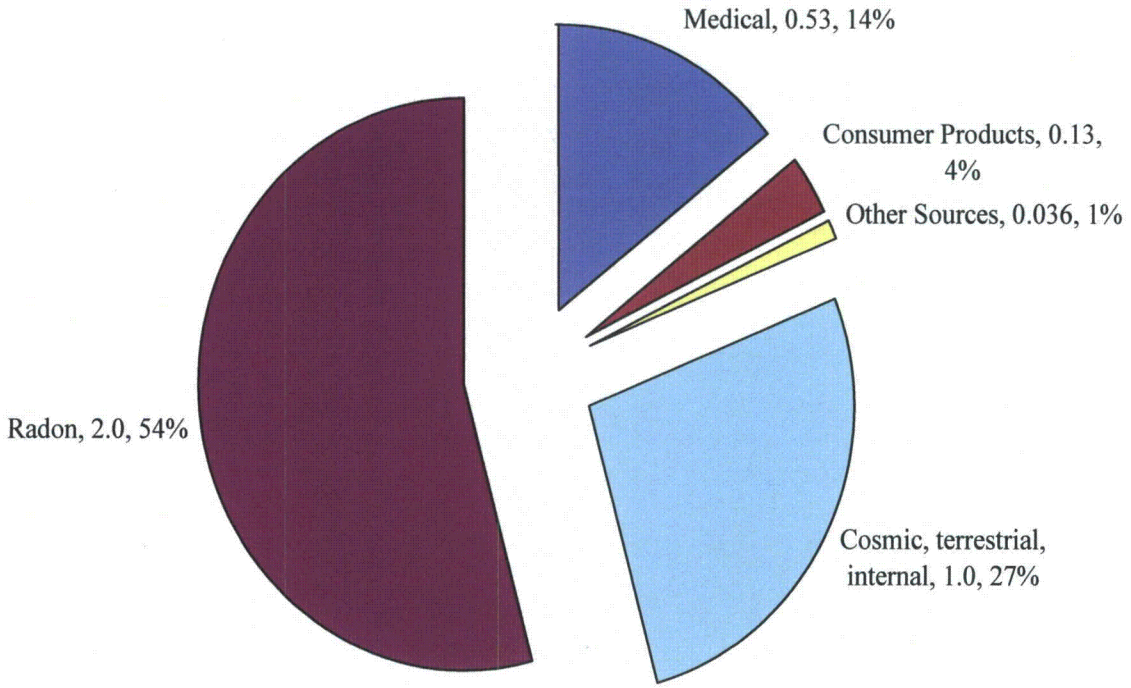
According to NUREG 1910, (GEIS Section 3.3-60), the average U.S. citizen receives 3 mSv per year from background radiation sources and 0.6 mSv per year from man-made sources for an annual total of 3.6 mSv/yr. Those manmade sources include radiation from medical procedures, consumer products and services (e.g., airline travel) and occupational sources

Levels of natural or background radiation can vary greatly from one location to the next. In general, people residing in Wyoming are exposed to more natural background radiation because of higher levels of cosmic radiation at higher altitudes and more terrestrial radiation from soils enriched in naturally occurring uranium. This naturally occurring uranium in the soil also results in a higher exposure to radon gas. Background sources of radiation at the proposed project site are extensively characterized in Section 6 of this ER

Man-made radiation consists of contributions from medical procedures (including nuclear medicine), occupational exposure, consumer products and industrial activities. Of the man-made sources, medical computed tomography accounts for 24 percent of the total exposure. Within the other categories, occupational exposure and industrial activities contribute less than 0.1%. The nuclear fuel cycle, which includes ISR, is among the lowest contributors to annual dose at less than 0.03%.

Shown in the Figure 3.11-1 are the average annual radiation doses received per capita in the United States from naturally occurring and manmade sources of radioactivity. The total yearly dose is approximately 0.0036 Sv (i.e., 3.6 mSv or 360 mrem).

Figure 3.11-1: Annual Background Radiation Doses in the United States (Source, mSv per year, Percent of Total)



The discussion so far has described average doses in the U.S. However, background radiation exposure can vary considerably from place to place within the U.S. and over areas within a region. Natural variation occurs due to effects from elevation (higher cosmic radiation exposure occurs at higher elevations), higher levels of naturally occurring radioactive elements in soil and water in mineralized areas (e.g., igneous formations in the Rocky Mountains) and other factors like local geology and chemistry. Because background radiation varies significantly across the U.S., it follows that population exposure varies accordingly

^{222}Radon and thoron are ubiquitous in nature and are found everywhere in outdoor and indoor air. Thoron is generally present in far lower levels than radon; the potential annual average dose in the U.S. from thoron is estimated to be 0.1 mSv, far below that of radon at about 2.0 mSv. (NCRP 2009) Because radon, albeit small may still be the largest source of *potential* radiological exposure at ISR sites, potential exposure to radon will be discussed in more detail.

In addition to variations in annual averages in a region, outdoor radon concentration varies regionally and in localized areas diurnally, temporally and geographically, depending upon its emanation rate from upwind soil and its transport through the atmosphere. The amount of radon in the soil or bedrock depends on the type, porosity, and moisture content. Areas exhibiting types of soils or bedrock such as granite and limestone have higher natural uranium levels which therefore result in higher radon levels than those with other types of soils or bedrock (NCRP 2009).

Outdoor radon concentrations, in fact, do not present a significant health hazard to workers or public; rather it is indoor concentrations and the daughters can grow into equilibrium that pose the potential threat. Doses from sources in the general environment (such as terrestrial radiation, cosmic radiation, and naturally occurring radon) are not included in the dose calculation for compliance with exposure limits in 10 CFR 20, even if these sources are from technologically enhanced naturally occurring radioactive material (TENORM), such as preexisting radioactive residues from prior uranium mining operations (ISR GEIS, pp. 3.2-81). As part of developing license application for a uranium recovery facility, NRC requires an applicant to conduct a radiological assessment to determine the impact from ISR uranium recovery.

As discussed in Section 4.12.2, the maximum total effective dose equivalent (TEDE) calculated by MILDOS-AREA for the proposed project is 0.8 mrem/yr. This dose is located at the northwest property boundary and is a 1.9 percent of the regulatory dose limit. The closest resident to the proposed project showed an estimated TEDE of 1.1 mrem/yr, which is 1.1 percent of the regulatory dose limit to the general public from NRC-licensed operations of 100 mrem/yr.

Expressed another way, the maximum radiological effect of the Ludeman operation would be to increase the TEDE of continental population by 0.000098 percent.

3.11.2 Occupational Health and Safety

Occupational health and safety risks to future ISR workers and members of the public allowed access to the control areas from exposure to radiation are regulated by the NRC, mainly through the Radiation Protection Standards contained in 10 CFR 20 (Subpart C, 20.1201 and Subpart D, 20.1301(b))). In addition to annual radiation dose limits, these

regulations incorporate the principal of maintaining doses as low as reasonably achievable (ALARA) such as through the use of proper worker safety training, using engineering and administrative controls to prevent or minimize radiation exposures and effluents, and the measurement and monitoring of radiation doses and effluents.
The ALARA principle takes into consideration the purpose of the licensed activity and its benefits, weighs the associated costs and benefits to reduce radiation doses as appropriate (including selecting the most cost-effective and efficient technology for reducing doses), and quantifies the net benefits for each considered option to reduce radiation doses or exposures to other non-threshold hazardous materials (e.g., chemicals) used at an ISR facility. Radiation safety measures are required for protecting workers and minimizing worker doses at uranium ISR facilities, ensuring that radiation doses are less than the occupational limits and are maintained ALARA. The proposed project will be required to conduct annual ALARA audits to ensure procedures in place have the maximum reasonably achievable effect on exposure reduction.

Also of concern with respect to occupational health and safety are industrial hazards and exposure to non-radioactive chemicals and other industrial hazards, which for an ISR operation can include normal industrial airborne emissions associated with service equipment (e.g., vehicles), fugitive dust from access roads and wellfield activities, electricity and power tools, slips/trips/falls and various chemicals used in the in-situ extraction process. Industrial safety and the use of chemicals at the proposed project site are regulated by the Wyoming Occupational Health and Safety Commission under the Wyoming Occupational Health and Safety Act, Title 27, Labor and Employment, Chapter 11, Occupational Health and Safety. More specific discussion regarding non-radioacdtive chemicals and accident impact is described in Sec. 4.12 of this ER.

Addendum 3.11-A contains the incident rates of nonfatal occupational injuries and illnesses by industry and case type in the State of Wyoming for 2006. The incident rate is calculated using the following formula:

$$\left(N/EH\right) \times 200{,}000$$

Where:

N	=	number of injuries and illnesses
EH	=	total hours worked by all employees during a calendar year
200,000	=	base for 100 equivalent full-time workers

The incident rates for mining are contained under NAICS code 21 and include mining, and support activities for mining. ISR operations would be included in metal/nonmetal mining Class since Wyoming defines ISR applications as "mining".

3.11.3 Summary of Health Effects Studies

Although there do not appear to be "health effects studies" in the open literature specifically related to ISR operations in Wyoming and no health effects studies reported in the literature specific to Converse County (likely due to the sparse population and generally low level of industrial development), there are numerous studies in the literature focusing on the potential health impacts to the public living near uranium recovery activities for many years.

These studies have generally concluded that no additional effects have been observed when compared to the health status of other similar populations not living nearby. A few sources providing the scientific evidence that supports this very important point include:

- U.S. Department of Health and Human Services, Public Health Services, Agency for Toxic Substance and Disease Registry, *Toxicological Profile for Uranium*, 1999. Chapter 1: Public Health Statement for Uranium, Section 1.5: How Can Uranium Effect My Health? – " No human cancer of any type has ever been seen as a result of exposure to natural or depleted uranium."
- *Cancer and Noncancer Mortality in Populations Living Near Uranium and Vanadium Mining and Milling Operations in Montrose County, Colorado, 1950 - 2000.* Boice, JD, Mumma, MT et al. Journal of Radiation Research, 167:711-726; 2007: " The absence of elevated mortality rates of cancer in Montrose County over a period of 51 years suggests that the historical milling and mining operations did not adversely affect the health of Montrose County residents"
- *Cancer Mortality in a Texas County with Prior Uranium Mining and Milling Activities, 1950 – 2001.* Boice, JD, Mumma, M et al. Journal of Radiological Protection, 23:247 – 262; 2003 – "No unusual patterns of cancer mortality could be seen in Karnes County over a period of 50 years suggesting that the uranium mining and milling operations had not increased cancer rates among residents."

3.11.4 References

National Council on Radiation Protection and Measurement, *Report No. 160: Ionizing Radiation Exposure of the Population of the Unites States*, ISBN 13: 978-0-929600-98-7, 2009.

ADDENDUM 3.11-A

INCIDENT RATES OF NONFATAL OCCUPATIONAL INJURIES AND ILLNESSES BY INDUSTRY

Table 10. Incidence rates[1] and numbers of nonfatal occupational injuries by industry, 2008

Wyoming

Industry[2]	NAICS code[3]	2008 Average annual employment[4] (000's)	Incidence rates	Numbers (000's)	Percent relative standard error	
					Incidence rates	Numbers
All industries including State and local government [5]		275.2	4.7	11.2	5	4
Private industry [5]		222.1	4.5	8.9	6	4
Goods-producing[5]		67.8	4.3	3.1	7	6
Natural resources and mining[5,6]		29.3	2.9	1.0	8	7
Agriculture, forestry, fishing and hunting[5]	11	1.1	6.0	([9])	23	9
Mining[6]	21	28.2	2.8	0.9	8	8
Oil and gas extraction	211	4.5	--	--	--	--
Oil and gas extraction	2111	4.5	--	--	--	--
Oil and gas extraction	21111	4.5	--	--	--	--
Mining (except oil and gas)[7]	212	9.5	2.0	([9])	([10])	([10])
Coal mining[7]	2121	6.6	0.9	([9])	([10])	([10])
Nonmetallic mineral mining and quarrying[7]	2123	2.7	4.2	([9])	([10])	([10])
Support activities for mining	213	14.2	3.0	0.5	8	8
Support activities for mining	2131	14.2	3.0	0.5	8	8
Support activities for mining	21311	14.2	3.0	0.5	8	8
Drilling oil and gas wells	213111	3.2	4.4	([9])	5	5
Support activities for oil and gas operations	213112	10.5	2.7	([9])	11	11
Construction		28.6	5.2	1.5	10	7
Construction	23	28.6	5.2	1.5	10	7
Construction of buildings	236	5.1	8.5	([9])	17	17
Residential building construction	2361	3.3	9.6	([9])	24	24
Nonresidential building construction	2362	1.8	6.6	([9])	12	13
Heavy and civil engineering construction	237	9.8	3.9	0.5	16	13
Specialty trade contractors	238	13.6	5.4	0.6	16	10

See footnotes at end of table.

Table 10. Incidence rates[1] and numbers of nonfatal occupational injuries by industry, 2008 – Continued

Wyoming

Industry[2]	NAICS code[3]	2008 Average annual employment[4] (000's)	Incidence rates	Numbers (000's)	Percent relative standard error	
					Incidence rates	Numbers
Foundation, structure, and building exterior contractors	2381	2.8	11.7	([9])	19	18
Building equipment contractors	2382	5.5	6.7	([9])	12	10
Electrical contractors	23821	2.8	6.0	([9])	14	14
Plumbing, heating, and air-conditioning contractors	23822	2.3	9.0	([9])	15	14
Building finishing contractors	2383	1.7	([9])	([9])	([11])	([11])
Manufacturing		10.0	6.7	0.6	20	21
Manufacturing	31-33	10.0	6.7	0.6	20	21
Food manufacturing	311	0.7	10.5	([9])	9	8
Wood product manufacturing	321	0.5	9.4	([9])	2	3
Printing and related support activities	323	--	--	--	--	--
Petroleum and coal products manufacturing	324	1.1	3.9	([9])	2	2
Plastics and rubber products manufacturing	326	0.5	11.1	([9])	17	14
Furniture and related product manufacturing	337	0.3	([9])	([9])	36	51
Service-providing		154.2	4.6	5.8	8	6
Trade, transportation, and utilities[8]		53.2	5.3	2.5	5	4
Wholesale trade	42	9.0	5.7	0.5	11	11
Merchant wholesalers, durable goods	423	5.7	5.8	([9])	12	12
Machinery, equipment, and supplies merchant wholesalers	4238	4.0	5.5	([9])	13	14
Merchant wholesalers, nondurable goods	424	2.8	6.2	([9])	22	23
Retail trade	44-45	32.3	5.1	1.3	5	4
Motor vehicle and parts dealers	441	4.7	5.7	([9])	12	12
Building material and garden equipment and supplies dealers	444	3.0	6.9	([9])	12	12
Food and beverage stores	445	4.6	4.2	([9])	16	17
Health and personal care stores	446	1.0	([9])	([9])	37	37
Gasoline stations	447	4.1	4.2	([9])	15	14

Clothing and clothing accessories stores	448	1.5	(9)	(9)	(11)	(11)
General merchandise stores	452	6.6	8.1	(9)	3	4

See footnotes at end of table.

Table 10. Incidence rates[1] and numbers of nonfatal occupational injuries by industry, 2008 -- Continued

Wyoming

Industry[2]	NAICS code[3]	2008 Average annual employment[4] (000's)	Incidence rates	Numbers (000's)	Percent relative standard error	
					Incidence rates	Numbers
Transportation and warehousing[8]	48-49	9.5	5.8	0.7	13	12
Rail transportation[8]	482	--	3.5	(9)	(10)	(10)
Couriers and messengers	492	0.7	17.5	(9)	16	15
Utilities	22	2.5	3.1	(9)	5	5
Utilities	221	2.5	3.1	(9)	5	5
Electric power generation, transmission and distribution	2211	2.1	2.8	(9)	6	6
Information		3.9	2.8	(9)	18	19
Information	51	3.9	2.8	(9)	18	19
Motion picture and sound recording industries	512	0.5	(9)	(9)	(11)	(11)
Telecommunications	517	1.4	3.7	(9)	18	18
Financial activities		11.6	--	--	--	--
Finance and insurance	52	7.2	--	--	--	--
Insurance carriers and related activities	524	2.0	(9)	(9)	23	24
Real estate and rental and leasing	53	4.4	3.0	(9)	25	26
Rental and leasing services	532	2.3	3.5	(9)	15	15
Professional and business services		19.0	2.1	(9)	25	25
Administrative and support and waste management and remediation services	56	8.2	3.8	(9)	30	31

Waste management and remediation services	562	0.8	5.5	(9)	26	25
Education and health services		23.2	5.7	1.0	7	7

See footnotes at end of table.

Table 10. Incidence rates[1] and numbers of nonfatal occupational injuries by industry, 2008 – Continued

Wyoming

Industry[2]	NAICS code[3]	2008 Average annual employment[4] (000's)	Incidence rates	Numbers (000's)	Percent relative standard error	
					Incidence rates	Numbers
Educational services	61	1.5	6.3	(9)	4	11
Health care and social assistance	62	21.7	5.6	1.0	8	7
Hospitals	622	3.1	9.6	(9)	(11)	(11)
Nursing and residential care facilities	623	4.5	11.0	(9)	7	7
Social assistance	624	6.0	3.9	(9)	13	12
Leisure and hospitality		--	--	--	--	--
Arts, entertainment, and recreation	71	3.6	1.3	(9)	31	25
Accommodation and food services	72	--	--	--	--	--
Accommodation	721	12.0	4.7	0.5	23	20
Traveler accommodation	7211	11.0	4.5	(9)	24	21
Drinking places (alcoholic beverages)	7224	2.1	(9)	(9)	(11)	(11)
Other services		--	--	--	--	--
Other services, except public administration	81	--	--	--	--	--
Commercial and industrial machinery and equipment (except automotive and electronic) repair and maintenance	8113	1.8	(9)	(9)	(11)	(11)
State and local government		53.2	5.4	2.4	5	4

State government		12.7	3.6	0.5	7	6
Service-providing		12.7	3.6	0.5	7	6
Professional and business services		–	(9)	(9)	(11)	(11)
Education and health services		–	4.9	(9)	1	1

See footnotes at end of table.

Table 10. Incidence rates[1] and numbers of nonfatal occupational injuries by industry, 2008 – Continued

Wyoming

Industry[2]	NAICS code[3]	2008 Average annual employment[4] (000's)	Incidence rates	Numbers (000's)	Percent relative standard error	
					Incidence rates	Numbers
Educational services	61	–	3.6	(9)	2	2
Educational services	611	–	3.6	(9)	2	2
Colleges, universities, and professional schools	6113	–	3.6	(9)	2	2
Health care and social assistance	62	–	9.8	(9)	(11)	(11)
Nursing and residential care facilities	623	–	9.8	(9)	(11)	(11)
Public administration		8.2	3.0	(9)	11	11
Public administration	92	8.2	3.0	(9)	11	11
Executive, legislative, and other general government support	921	0.8	3.6	(9)	8	9
Justice, public order, and safety activities	922	–	5.5	(9)	16	14
Justice, public order, and safety activities	9221	–	5.5	(9)	16	14
Courts	92211	0.3	(9)	(9)	(11)	(11)
Correctional institutions	92214	0.6	6.7	(9)	3	3
Parole offices and probation offices	92215	0.2	(9)	(9)	12	13
Administration of human resource programs	923	1.9	–	–	–	–
Administration of human resource programs	9231	1.9	–	–	–	–
Administration of education programs	92311	0.2	(9)	(9)	12	13
Administration of environmental quality programs	924	1.1	2.9	(9)	23	20
Administration of environmental quality programs	9241	1.1	2.9	(9)	23	20

Administration of air and water resource and solid waste management programs	92411	0.4	(9)	(9)	7	7
Administration of conservation programs	92412	0.6	4.4	(9)	22	22
Administration of general economic programs	92611	0.3	(9)	(9)	13	10
Regulation of agricultural marketing and commodities	92614	0.2	(9)	(9)	(11)	(11)
Local government		40.5	6.1	1.9	5	5
Goods-producing[5]		0.1	(9)	(9)	10	11
Natural resources and mining[5,6]		--	(9)	(9)	10	11

See footnotes at end of table.

Table 10. Incidence rates[1] and numbers of nonfatal occupational injuries by industry, 2008 -- Continued

Wyoming

Industry[2]	NAICS code[3]	2008 Average annual employment[4] (000's)	Incidence rates	Numbers (000's)	Percent relative standard error	
					Incidence rates	Numbers
Service-providing		40.4	6.1	1.9	5	5
Trade, transportation, and utilities[8]		0.4	9.2	(9)	17	13
Transportation and warehousing[8]	48-49	0.2	12.4	(9)	1	3
Utilities	22	0.1	(9)	(9)	30	31
Utilities	221	0.1	(9)	(9)	30	31
Information		0.7	(9)	(9)	60	59
Information	51	0.7	(9)	(9)	60	59
Other information services	519	0.7	(9)	(9)	60	59
Other information services	5191	0.7	(9)	(9)	60	59
Libraries and archives	51912	0.7	(9)	(9)	60	59
Financial activities		0.1	(9)	(9)	2	6
Professional and business services		0.1	(9)	(9)	37	40

Administrative and support and waste management and remediation services	56	–	[9]	[9]	37	40
Education and health services		28.2	5.2	1.1	5	6
Educational services	61	21.0	4.1	0.6	7	10
Educational services	611	21.0	4.1	0.6	7	10
Elementary and secondary schools	6111	18.3	4.5	0.5	8	10
Junior colleges	6112	2.7	2.4	[9]	[11]	[11]
Health care and social assistance	62	7.2	7.5	0.5	8	8
Hospitals	622	6.2	7.6	[9]	9	8

See footnotes at end of table.

Table 10. Incidence rates[1] and numbers of nonfatal occupational injuries by industry, 2008 -- Continued

Wyoming

Industry[2]	NAICS code[3]	2008 Average annual employment[4] (000's)	Incidence rates	Numbers (000's)	Percent relative standard error	
					Incidence rates	Numbers
Leisure and hospitality		0.2	[9]	[9]	12	[11]
Other services		0.3	[9]	[9]	20	14
Public administration		10.5	8.1	0.8	9	10
Public administration	92	10.5	8.1	0.8	9	10
Executive, legislative, and other general government support	921	9.1	8.3	0.7	10	10
Justice, public order, and safety activities	922	0.1	--	--	--	–
Justice, public order, and safety activities	9221	0.1	--	--	--	–
Fire protection	92216	0.1	--	--	--	–
Administration of environmental quality programs	924	0.5	[9]	[9]	14	21

See footnotes at end of table.

Table 10. Incidence rates[1] and numbers of nonfatal occupational injuries by industry, 2008 -- Continued

Wyoming

Industry[2]	NAICS code[3]	2008 Average annual employment[4] (000's)	Incidence rates	Numbers (000's)	Percent relative standard error	
					Incidence rates	Numbers
Administration of environmental quality programs	9241	0.5	([9])	([9])	14	21
Administration of conservation programs	92412	0.5	([9])	([9])	15	21
Administration of economic programs	926	0.4	–	--	--	–

[1] Incidence rates represent the number of injuries per 100 full-time workers and were calculated as: (N/EH) x 200,000 where

N = number of injuries
EH = total hours worked by all employees during the calendar year
200,000 = base for 100 equivalent full-time workers (working 40 hours per week, 50 weeks per year).

[2] Totals include data for industries not shown separately.

[3] *North American Industry Classification System* 2002 Edition

[4] Employment is expressed as an annual average and is derived primarily from the BLS-State Quarterly Census of Employment and Wages.

[5] Excludes farms with fewer than 11 employees.

[6] Data for mining (Sector 21 in the *North American Industry Classification System* – United States, 2002) include establishments not governed by the Mine Safety and Health Administration (MSHA) rules and reporting, such as those in oil and gas extraction and related support activities. Data for mining operators in coal, metal, and nonmetal mining are provided to BLS by the Mine Safety and Health Administration, U.S. Department of Labor. Independent mining contractors are excluded from the coal, metal, and nonmetal mining industries. These data do not reflect the changes the Occupational Safety and Health Administration made to its recordkeeping requirements effective January 1, 2002; therefore estimates for these industries are not comparable to estimates in other industries.

[7] Data for mining operators in this industry are provided to BLS by the Mine Safety and Health Administration, U.S. Department of Labor. Independent mining contractors are excluded. These data do not reflect the changes the Occupational Safety and Health Administration made to its recordkeeping requirements effective January 1, 2002; therefore estimates for these industries are not comparable to estimates in other industries.

[8] Data for employers in rail transportation are provided to BLS by the Federal Railroad Administration, U.S. Department of Transportation.

[9] Data too small to be displayed.

[10] Relative standard errors were not calculated for mining, except oil and gas (NAICS 212), and rail transportation (NAICS 482).

[11] Relative standard error less than 0.5.

NOTE: Because of rounding, components may not add to totals. Dash indicates data do not meet publication guidelines.

SOURCE: Bureau of Labor Statistics, U.S. Department of Labor, Survey of Occupational Injuries and Illnesses, in cooperation with participating State agencies.

Table 11. Incidence rates[1] of nonfatal occupational injuries and illnesses by industry sector and selected case types, 2006-2008

Wyoming

Industry Sector[2]	Total recordable cases			Cases with days away from work, job transfer, or restriction									Other recordable cases		
				Total			Cases with days away from work[6]			Cases with job transfer or restriction					
	2006	2007	2008	2006	2007	2008	2006	2007	2008	2006	2007	2008	2006	2007	2008
All industries including State and local government	--	--	4.8	--	--	2.2	--	--	1.7	--	--	0.5	--	--	2.6
Private industry[3]	4.8	4.6	4.6	2.4	2.3	2.2	1.9	1.8	1.6	0.5	0.5	0.5	2.4	2.3	2.4
Goods-producing[3]	4.8	4.6	4.4	2.7	2.5	2.5	2.1	2.1	1.8	0.6	0.5	0.6	2.1	2.1	1.9
Natural resources and mining[3,4]	3.5	3.1	3.0	2.2	1.8	1.7	1.5	1.3	1.0	0.7	0.5	0.7	1.3	1.3	1.3
Agriculture, forestry, fishing and hunting[3]	7.7	6.1	6.0	2.9	3.1	2.6	2.3	2.4	1.6	--	--	--	4.8	3.0	3.5
Mining[4]	3.3	3.0	2.9	2.2	1.7	1.7	1.4	1.2	1.0	0.7	0.5	0.7	1.2	1.3	1.2
Construction	6.1	5.1	5.3	3.5	2.7	3.0	3.1	2.4	2.5	0.4	0.3	0.4	2.6	2.5	2.3
Manufacturing	6.3	8.6	7.0	2.5	4.8	3.9	2.0	3.8	2.8	0.5	--	--	3.7	3.8	3.0
Service-providing	4.8	4.6	4.7	2.2	2.2	2.0	1.7	1.7	1.5	0.5	0.5	0.5	2.6	2.4	2.7
Trade, transportation, and utilities[5]	5.7	5.5	5.3	3.1	3.0	2.9	2.2	2.2	2.1	0.9	0.8	0.8	2.6	2.5	2.4
Wholesale trade	4.5	5.3	5.8	1.8	2.4	2.8	1.5	1.8	2.3	0.3	0.6	0.4	2.6	2.9	3.0
Retail trade	5.3	5.4	5.1	2.7	2.9	2.7	1.7	2.0	1.5	0.9	0.9	1.1	2.6	2.5	2.5
Transportation and Warehousing	8.0	6.2	5.9	5.5	3.9	4.1	4.2	3.3	3.5	1.3	0.6	0.6	2.5	2.3	1.8
Utilities	4.4	3.2	3.3	1.4	0.9	1.0	1.1	0.7	0.7	--	--	--	3.0	2.3	2.3
Information	2.7	2.6	2.8	1.5	0.9	1.2	1.2	0.8	0.8	--	--	--	1.2	1.7	1.6
Financial activities	1.4	--	--	0.7	--	0.5	0.6	--	0.3	--	--	0.2	0.8	--	--
Professional and business services	2.4	2.3	2.2	1.4	1.5	1.1	1.3	1.2	0.9	0.2	--	--	1.0	0.8	1.1
Education and health services	6.3	6.4	5.8	2.5	2.6	2.3	2.2	2.3	1.8	0.3	0.4	0.5	3.8	3.7	3.5
Educational services	4.6	3.7	6.8	3.1	1.4	--	2.8	1.4	--	--	--	--	--	2.3	5.7
Health care and social assistance	6.4	6.6	5.7	2.5	2.7	2.4	2.1	2.3	1.9	0.3	0.4	0.5	4.0	3.8	3.3
Leisure and hospitality	5.1	4.7	--	1.8	2.0	--	1.4	--	--	0.4	0.5	--	3.3	2.7	--
Other services, except public administration	4.7	--	--	0.9	--	--	0.7	--	--	--	--	--	3.8	--	--
State and local government	--	--	5.4	--	--	2.1	--	--	1.8	--	--	0.2	--	--	3.4
State government	--	--	3.7	--	--	1.8	--	--	1.5	--	--	0.2	--	--	1.9
Local government	--	--	6.2	--	--	2.2	--	--	1.9	--	--	0.2	--	--	4.0

[1] Incidence rates represent the number of injuries and illnesses per 100 full-time workers and were calculated as: (N/EH) x 200,000 where

N = number of injuries and illnesses

EH = total hours worked by all employees during the calendar year

200,000 = base for 100 equivalent full-time workers (working 40 hours per week, 50 weeks per year).

[2] *North American Industry Classification System*, 2002 Edition

[3] Excludes farms with fewer than 11 employees.

[4] Data for mining (Sector 21 in the North American Industry Classification System, 2002 edition) include establishments not governed by the Mine Safety and Health Administration (MSHA) rules and reporting, such as those in oil and gas extraction and related support activities. Data for mining operators in coal, metal, and nonmetal mining are provided to BLS by the Mine Safety and Health Administration, U.S. Department of Labor. Independent mining contractors are excluded from the coal, metal, and nonmetal mining industries. These data do not reflect the changes OSHA made to its recordkeeping requirements effective January 1, 2002; therefore estimates for these industries are not comparable to estimates in other industries.

[5] Data for employers in railroad transportation are provided to BLS by the Federal Railroad Administration, U.S. Department of Transportation.

[6] Days-away-from-work cases include those that result in days away from work with or without restricted work activity.

[7] Data too small to be displayed.

NOTE: Because of rounding, components may not add to totals. Dash indicates data do not meet publication guidelines.

SOURCE: Bureau of Labor Statistics, U.S. Department of Labor, Survey of Occupational Injuries and Illnesses, in cooperation with participating State agencies.

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3.12 WASTE MANAGEMENT

This section describes the existing sources of waste within the proposed project area and the current waste management practices. There is no discussion of wastes generated by the proposed Ludeman Project (proposed project) as these activities have not occurred pending licensing approval by the NRC. Proposed waste management practices and potential waste management impacts resulting from the proposed project operations are provided in Section 4.13 of this ER. As described in other sections of this ER, including 4.13 and 5.11, wastes are separated into two base categories with several subcategories under each base category. These base categories for the purposes of this document are 11e.(2) byproduct wastes, and non 11e.(2) wastes.

11e.(2) byproduct wastes are defined in NUREG 1910, Vol. 1., page 2-23 as "waste generated by extraction or concentration of uranium or thorium processed ores as defined under Section 11e.(2) of the Atomic Energy Act." Wastes classified as 11e.(2) may be either liquid or solid in nature.

As there are no licensed uranium recovery activities currently under way on the proposed project property, no wastes categorized as 11e.(2) are being generated or currently exist on site since this is a proposed action for a new facility. All materials classified as 11e.(2) generated by Leuenberger pilot production facility during their operation on the site have been properly removed as evidenced by the NRC's sign off on facility closure.

All wastes currently generated on site are classified as non 11e.(2) wastes. These wastes are both liquid and solid in nature. Waste categories that are generated on site currently are as follows:

- Liquid Wastes
  - Domestic Liquid Septic wastes from existing ranch facilities;
  - Wastes qualifying for the Conditionally Exempt Small Quantity Generator or Exploration and Production exemptions under WDEQ solid and hazardous waste regulations; and
- Solid Wastes
  - Municipal Solid Wastes generated from ranching, livestock, and oil & gas operations;
  - Wastes qualifying for the Conditionally Exempt Small Quantity Generator or Exploration and Production exemptions under WDEQ solid and hazardous waste regulations; and

Within the proposed project area, existing land uses include: transportation, livestock grazing, and wildlife habitat. The activities associated with these land uses generate little

waste. Management of this waste is governed by Converse County and WDEQ/SHWD. WDEQ/SHWD maintains a list of recognized hazardous wastes according to characteristics of ignitability, corrosivity, reactivity, and toxicity (WDEQ/SHWD 2008), in addition to regulating the disposal of non-hazardous solid wastes.

3.12.1 Non 11e.(2) Liquid Wastes

3.12.1.1 Domestic Liquid Septic Wastes

The overall generation of septic wastes by land use activities on the proposed project area is minimal due to the lack of occupied residences within the proposed project boundary. The overall impact of the past generation of this waste type should be nearly non-existent in regard to its potential impact to the activities of the proposed project.

3.12.1.2 Hazardous and CESQG Liquid Wastes

Small quantities of hazardous and Conditionally Exempt Small Quantity Generator (CESQG) liquid wastes are likely generated on or near the proposed project area. Hazardous wastes associated with ranching activities are likely to include used oils, spent solvents, herbicides, and pesticides and have the potential to be classified as hazardous wastes under WDEQ/SHWD and USEPA regulations. The actual quantity generated at the proposed project is likely to be minimal.

3.12.2 Non 11e.(2) Solid Wastes

3.12.2.1 Municipal Solid Wastes

Agricultural operations within the proposed project area produce very limited quantities of miscellaneous trash. Some of this may be disposed off-site in small landfills near the proposed project area. No such landfills have been identified within the proposed project area. According to the WDEQ Office of Outreach and Environmental Assistance (OOEA), small landfills are not subject to Wyoming rules and regulations for landfills as long as they are used only to dispose of wastes generated in association with an individual's farming or ranching operations (WDEQ/OOEA 2010). Other waste associated with farming and ranching operations is disposed in the nearest solid waste disposal facility, which is a landfill in Gillette approximately 52 road miles north.

3.12.2.2 Hazardous and CESQG Solid Wastes

Small quantities of hazardous and Conditionally Exempt Small Quantity Generator (CESQG) solid wastes are likely generated on or near the proposed project area. The actual quantity generated at the proposed project location by ranching activities is likely to be very small and likely to include oily rags and sludges.