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INDEX SHEET FOR SOURCE MATERIAL LICENSE AMENDMENTS OR REVISIONS

Date: 8-13-2008
Docket No. 040-09067
LICENSE NO.: ______

MINE COMPANY NAME: Uranerz Energy Corporation
MINE NAME: Nichols Ranch ISR Project

Statement: I, Michael P. Thomas, an authorized representative of Uranerz Energy Corporation declare that only the items listed on this and all consecutively numbered Index Sheets are intended as revisions to the current license document. In the event that other changes inadvertently occurred due to this revision, those unintentional alterations will not be considered approved. Please initial and date. MPT 8-13-2008

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Volume Number	Page, Map or other License Entry to be REMOVED	Page, Map or other License Entry to be ADDED	Description of Change
IV, Appendix A	Pages A3 and A19	Pages A-3 and A19, Mar 08	Mineral Ownership was changed from Franklin Brown to T-Chair Minerals.
IV, Appendix C	Pages C-4, C-10, and C-16	Pages C-4, C-10, and C-16, Mar 08	Page changed in response to Wyoming DEQ Technical Comment 22 and 23a of the WDEQ First Consolidated Review (February 2008).
IV, Appendix D1	D1-ii	D1-ii, March 08	Added "Land Use and" to Figure Caption
IV, Appendix D1	D1-1	D1-1, March 08	Added "Past (last 20 years)" to first sentence in paragraph one. Added reference to Exhibit D1-1 in paragraph one. All done in response to Wyoming DEQ Technical comment #25 of the WDEQ First Consolidated Review (February 2008).
IV, Appendix D1	Pages D1-3 and **D1-4**	Pages D1-3 and **D1-4**, March 08	Pages revised to include Figure D1-1 and some minor text changes
IV, Appendix D1	Figure D1-2, Map Pocket	Figure D1-2, March 08 (Map Pocket)	Replaced figure and revised to include past and current land use.
____	____	____	____
____	____	____	____
____	____	____	____

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Volume Number	Page, Map or other License Entry to be REMOVED	Page, Map or other License Entry to be ADDED	Description of Change
Volume V, Appendix D5	Table of Contents	Table of Contents, May 2008	Table of Contents updated
Volume V, Appendix D5	Page D5-1 through D5-10	Page D5-1 through D5-13	Text added in response to WDEQ First Consolidated Review Questions #28 and #29. Text added in response to WDEQ First Consolidated Review Question #31, #32, and #34. Text added in response to WDEQ First Consolidated Review Question #37
Volume V, Appendix D5	New	**Figure 5a**	Figure added in response to WDEQ First Consolidated Review Question #30.
Volume V, Appendix D5	New	**Figure 5b**	Figure added in response to WDEQ First Consolidated Review Question #30.
Volume V, Appendix D5	Exhibit D5-1 through Exhibit D5-5	Exhibit D5-1 through D5-5, April 2008	Cross Sections were revised in response to WDEQ First Consolidated Review Comments #31, #32, #34, and #36.
Volume Va, Appendix D5	New	**Volume Va, Exhibits D5-6 through D5-12, April 2008**	New cross sections provided in response to WDEQ First Consolidated Review Question #31, #32, #34, and #36.
Volume Va, Appendix D5	New	**Volume Va, Exhibits D5-13 through D5-22**	Isopach maps added in response to WDEQ First Consolidated Review Question #37
Volume V, Appendix D5	New	**Volume V, Exhibit 5a and Exhibit 5b**	Surface and Subsurface Geology Exhibits in response to WDEQ First Consolidated Review Question #27.
Volume Va, Appendix D5	Volume V, Appendix D5, Addendums 5a and 5b	Volume Va, Appendix D5, Addendums 5a and 5b	Addendums need to be moved from Volume V to Volume Va

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Volume Number	Page, Map or other License Entry to be REMOVED	Page, Map or other License Entry to be ADDED	Description of Change
VI, Appendix D6 Tab	Table of Contents, Pages D6-1 though D6-14	Same as removed plus, D6-2a, D6-3a, D6-4a, D6-6a, D6-7a, D6-9a, D6-9b, D6-9c, D6 9d, D6-12a, and D6-13a	Response to WDEQ Comments for Appendix D6 Hydrology from attached First Consolidated Completeness Review.
VI, Appendix D6 Tab	Table D6-2, page D6-16	Table D6-2, page D6-16	Table was revised because of error found by Uranerz in water elevation data for MN-2
VI, Addendum 6D Tab	Table D6D.1-1, page D6D.1-5	Table D6D.1-1, page D6D.1-5	Table information was revised to correct error found by Uranerz in water elevation data for MN-2
VI, Addendum 6D Tab	Table D6D.2-1, pages D6D.2-7 thru D6D.2-9	Table D6D.2-1, pages D6D.2-7 thru D6D.2-9	Table revised to correct errors found by Uranerz on water elevation levels.
VI	New	**Addendum D6K**	Added Addendum D6K in response to WDEQ comment #44 from attached First Consolidated Completeness Review.
VI	New	**Addendum D6L**	Added Addendum D6L in response to WDEQ #49 and #50 from attached First Consolidated Completeness Review.
VI, Appendix D6 Tab	Table D6-1	Table D6-1 (page D6-15 and D6-15a), July 2008	Table changed to incorporate surface drainage areas (draws) located in the Nichols Ranch and Hank license areas.
VI, Addendum 6A Tab	Table D6A.1-1	Table D6A.1-1 July 2008	Table was revised to incorporate newly collected surface water sampler data that was obtained in June 2008.
VI, Addendum 6D Tab	Figure D6D.2-4	Figure D6D.2-4, July 2008	Figure revised to include most recent water level data.
VI, Addendum 6D Tab	Figure D6D.3-1 through D6D.3-5, pages D6D.3-2 through D6D.3-6	Figure D6D.3-1 through D6D.3-5, pages D6D.3-2 through D6D.3-6, July 2008	Figures revised to incorporate most recent water level information.
VI, Addendum 6D Tab	New	**Figure D6D.3-6, page D6D.3-7, July 08**	Figure added for discussion on coal bed methane.

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VI, Addendum 6D Tab	Page D6D-i,	Page D6D-i, July 2008	Table of Contents updated.
VI, Addendum 6D Tab	Page D6D.2-1	Page D6D.2-1, July 2008	Text revised to include new information on water levels
VI, Addendum 6D Tab	Page D6D.3-1	Pages D6D.3-1 and D6D.3-1a, July 2008	Text revised to include new information on water levels
VI, Appendix D6	Pages D6-16 through D6-18	Pages D6-16 through D6-18, July 2008	Tables were revised to correct errors in the originals dated November 2008

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Volume Number	Page, Map or other License Entry to be REMOVED	Page, Map or other License Entry to be ADDED	Description of Change
VIa, Appendix D6	Figure D6-1	Figure D6-1, July 08 revision	Figure revised per WDEQ Technical comments #39-#41 from attached First Consolidated Completeness Review and from May 2008 meeting with NRC.
VIa, Appendix D6	Figure D6-5	Figure D6-5, Mar 08 revision	Figure revised up reflect correct MN-2 water elevation
VIa, Appendix D6	New	**Figure D6-5a**	Figure added per WDEQ Technical comment #47 and #48 from attached First Consolidated Completeness Review.
VIa, Appendix D6	Figure D6-6	Figure D6-6, Mar 08 revision	Figure updated per WDEQ Technical comment #47 and #48 from attached First Consolidated Completeness Review.
VIa, Appendix D6	New	**Figure D6-6a**	Figure added per WDEQ Technical comment #47 and #48 from attached First Consolidated Completeness Review.
VIa, Appendix D6	Figure D6-7	Figure D6-7, Mar 08 revision	Figure updated per WDEQ Technical comment #47 and #48 from attached First Consolidated Completeness Review.
VIa, Appendix D6	Figure D6-8	Figure D6-8, Mar 08 revision	Figure updated per WDEQ Technical comment #47 and #48 from attached First Consolidated Completeness Review.
VIa, Appendix D6	New	**Figure D6-8a, July 2008**	Figure added per discussion of coal bed methane in D6.2.3.3
VIa, Appendix D6	New	**Figure D6-8b, July 2008**	Figure added per discussion of coal bed methane in D6.2.3.3
VIa, Appendix D6	New	**Figure D6-8c, July 2008**	Figure added per discussion of coal bed methane in D6.2.3.3

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INDEX SHEET FOR SOURCE MATERIAL LICENSE AMENDMENTS OR REVISIONS

Page_6 of 6
Date 8-13-2008
Docket No: 040-09067
License No.: _______

MINE COMPANY NAME: ___Uranerz Energy Corporation___
MINE NAME: ___Nichols Ranch ISR Project___

Statement: I, ___Michael P. Thomas___, an authorized representative of ___Uranerz Energy Corporation___declare that only the items listed on this and all consecutively numbered Index Sheets are intended as revisions to the current license document. In the event that other changes inadvertently occurred due to this revision, those unintentional alterations will not be considered approved. Please initial and date. ___MPT 8-13-2008___

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Volume Number	Page, Map or other License Entry to be REMOVED	Page, Map or other License Entry to be ADDED	Description of Change
VII, Appendix D7	D7-1	D7-1, March 08	Changed Order 3 Soil Survey to Order 2 Soil Survey in paragraph one in response to WDEQ Technical comment #52 from the WDEQ First Consolidated Review (February 2008).
VII, Appendix D7	Exhibit D7-1	Exhibit D7-1, March 08	Exhibit revised to reflect correct soil sample locations and new legend per WDEQ Technical comments #53 and #54 from the WDEQ First Consolidated Review (February 2008).
VII, Appendix D7	Exhibit D7-2	Exhibit D7-2, March 08	Exhibit revised to reflect correct soil sample locations and new legend per WDEQ Technical comments #53 and #54 from the WDEQ First Consolidated Review (February 2008).
VII, Appendix D8	D8-7	D8-7, March 08	Corrected pre-mine acreages for the various vegetation types per WDEQ Technical comment #55 from the WDEQ First Consolidated Review (February 2008).
VII, Appendix D8	D8-8	D8-8, March 08	Corrected addendum reference in paragraph 3 per WDEQ Technical comment #56 from the WDEQ First Consolidated Review (February 2008).
VII, Appendix D8	D8-22	D8-22, March 08	Changed 1.0% shrubs to 1.0% subshrub in paragraph 3 per WDEQ Technical comment #58 from the WDEQ First Consolidated Review (February 2008).
____	____	____	____
____	____	____	____
____	____	____	____
____	____	____	____

MINERAL OWNER: **All Leasable Minerals, including Coal, Oil and Gas**	UNITED STATES OF AMERICA Bureau of Land Management P.O. Box 1828 Cheyenne, Wyoming 82003
All Locatable Minerals, including Uranium	URANERZ ENERGY CORP. 1701 East "E" Street Casper, Wyoming 82601
LEASE OWNER: **(oil & gas)**	NANCE PETROLEUM CORP. P.O. Box 7168 Billings, Montana 59103
Township 43 North, Range 76 West 6th PM **Section 8: S/2SE/4;** **Section 17: N/2NE/4, E/2SE/4;** **Section 20: N/2NW/4, N/2NE/4;**	
SURFACE OWNER:	T-CHAIR LAND COMPANY 1026 Brown Road Gillette, Wyoming 82718
MINERAL OWNER: **Minerals including coal, oil and gas**	T-CHAIR MINERALS 1026 Brown Road Gillette, Wyoming 82718
	KRISTY MANKIN No address available
	MARY LEHRER LIVING TRUST LAWRENCE LEHRER, TRUSTEE No address available
	PATRICIA CLARK 1026 Brown Road Gillette, Wyoming 82718
MINERAL OWNER: **(uranium)**	POWER RESOURCES, INC. P.O. Box 1210 Glenrock, Wyoming 82637
LEASE OWNER: **(oil & gas)**	TOM BROWN, INC P.O. Box 6526 Englewood, Colorado 80155
	A.A. ENERGY COMPANY 999-18th Street Denver, Colorado 80202
	ANADARKO PETROLEUM COMP. P.O. Box 1330 Houston, Texas 77251
	BARRETT RESOURCES, INC. 1515 Arapaho Street, Tower 3, #1000 Denver, Colorado 80202

LEASE OWNER: **(oil and gas)**	NANCE PETROLEUM CORP. P.O. Box 7168 Billings, Montana 59103 MOBIL EXPLORATION & PRODUCTION P.O. Box 650232 Dallas, Texas 75265 PENDRAGON RESOURCES II, L.P. 621-17th Street, #750 Denver, Colorado 80202
OVERRIDING ROYALTY INTEREST:	NANCE PETROLEUM CORP. P.O. Box 7168 Billings, Montana 59103 MOBIL EXPLORATION & PRODUCTION P.O. Box 650232 Dallas, Texas 75265 ANADARKO PETROLEUM COMP. 1201 Lake Robbins Drive The Woodlands, Texas 77380 WYOMING RESOURCES CORP. 1508 Mountain View Road, #105 Rapid City, South Dakota 57702 PENDRAGON RESOURCES II, L.P. 621-17th Street, #750 Denver, Colorado 80202
LEASE OWNER: **(coal bed methane gas)**	ANADARKO PETROLEUM COMP. P.O. Box 1330 Houston, Texas 77251
Township 43 North, Range 75 West 6th PM **Section 7: Lot 3 (NW/4SW/4);** **NE/4SW/4; NW/4SE/4;**	
SURFACE OWNER:	T-CHAIR LAND COMPANY, L.P. Attn: Patricia Clark 1026 Brown Road Gillette, Wyoming 82718
MINERAL OWNER: **Minerals including oil and gas**	T-CHAIR MINERALS 1026 Brown Road Gillette, Wyoming 827118 KRISTY MANKIN No address available MARY LEHRER LIVING TRUST Lawrence Lehrer, Trustee No address available

APPENDIX "C"
HANK UNIT

This appendix "C" represents the location of lands by legal subdivision, section, township, range, county, and municipal corporation, if any, (W.S. §35-11-406,(a),(vi)) and the number of acres in each description. No mining activity may take place on land for which there is not in effect a valid mining permit (W.S. §35-11-405). To include additional lands within a permit area it is necessary to amend the permit (W.S. §35-11-406,(a)(xii)), so care should be taken to include all lands necessary to the mining and reclamation operation as defined in W.S. §35-11-103,(e),(viii). All acreage figures should be obtained from official survey documents or recent surveys if available. An original U.S.G.S. topographic map with the permit area clearly outlined should accompany each permit application.

PERMIT BOUNDARY LEGAL DESCRIPTION:

SW/4, E/2SE/4	Section 30, T. 44., R. 75 W., Acres 256.03
All	Section 31, T. 44., R. 75 W., Acres 692.72
W/2SW/4	Section 5, T. 43., R. 75 W., Acres 80.00
All	Section 6, T. 43., R. 75 W., Acres 654.46
N/2, N/2S/2	Section 7, T. 43., R. 75 W., Acres 487.32
W/2NW/4	Section 8, T. 43., R. 75 W., Acres 80.00

COUNTY of Campbell — Subtotal Above Acres 2,250.53

Municipal Corporation — Total Permit (Amendment) Acres 3,370.53

Reviewed (compiled), DEQ/LQD — Applicant Signature

______________________ — [signature]

Date ______________________ — Date 30 MARCH 2008

Checked, DEQ/LQD — Permit No.______________________

____

Date ______________________ — TFN ______________________

APPENDIX C
NO RIGHT TO MINE
LANDS WITHIN THE PERMIT AREA
(NICHOLS RANCH UNIT)

Township 43 North, Range 76 West 6th PM **Section 8: S/2SE/4;** **Section 17: N/2NE/4, E/2SE/4;** **Section 20: N/2NW/4, N/2NE/4;**	
SURFACE OWNER:	T-CHAIR LAND COMPANY 1026 Brown Road Gillette, Wyoming 82718
MINERAL OWNER: **Minerals including coal, oil and gas**	T-CHAIR MINERALS 1026 Brown Road Gillette, Wyoming 82718
	KRISTY MANKIN No address available
	MARY LEHRER LIVING TRUST LAWRENCE LEHRER, TRUSTEE No address available
	PATRICIA CLARK 1026 Brown Road Gillette, Wyoming 82718
MINERAL OWNER: **Uranium**	POWER RESOURCES, INC. P.O. Box 1210 Glenrock, Wyoming 82637
TOTAL ACREAGE:	400.00 Acres
Township 43 North, Range 76 West 6th PM **Section 18: NE/4SE/4**	
SURFACE OWNER:	T-CHAIR LAND COMPANY 1026 Brown Road Gillette, Wyoming 82718
MINERAL OWNER: **All Leasable Minerals, including Coal, Oil and Gas**	UNITED STATES OF AMERICA Bureau of Land Management P.O. Box 1828 Cheyenne, Wyoming 82003
All Locatable Minerals, including Uranium	UNITED STATES OF AMERICA Bureau of Land Management P.O. Box 1828 Cheyenne, Wyoming 82003
TOTAL ACREAGE:	40.00 Acres

SURFACE OWNER:	T-CHAIR LAND COMPANY, L.P. Attn: Patricia Clark 1026 Brown Road Gillette, Wyoming 82718
MINERAL OWNER: **Minerals including, oil and gas, and Uranium**	ELLBOGEN PROPERTY MGT P.O. Box 1928 Casper, Wyoming 82602
TOTAL ACREAGE:	42.15 Acres
Township 43 North, Range 75 West 6th PM **Section 7: Lot 1 (NW/4NW/4);** **Lot 2 (SW/4NW/4);** **E/2NW/4,**	
SURFACE OWNER:	T-CHAIR LAND COMPANY, L.P. Attn: Patricia Clark 1026 Brown Road Gillette, Wyoming 82718
MINERAL OWNER: **All Leasable Minerals, including Coal, Oil and Gas,**	UNITED STATES OF AMERICA Bureau of Land Management P.O. Box 1828 Cheyenne, Wyoming 82003
Locatable Minerals including Uranium	UNITED STATES OF AMERICA Bureau of Land Management P.O. Box 1828 Cheyenne, Wyoming 82003
TOTAL ACREAGE:	165.24 Acres
Township 43 North, Range 75 West 6th PM **Section 7: Lot 3 (NW/4SW/4);** **NE/4SW/4; NW/4SE/4;**	
SURFACE OWNER:	T-CHAIR LAND COMPANY, L.P. Attn: Patricia Clark 1026 Brown Road Gillette, Wyoming 82718
MINERAL OWNER: **Minerals including, oil and gas**	T-CHAIR MINERALS 1026 Brown Road Gillette, Wyoming 827118
	KRISTY MANKIN No address available
	MARY LEHRER LIVING TRUST Lawrence Lehrer, Trustee No address available
	PATRICIA CLARK 1026 Brown Road Gillette, Wyoming 82718

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D1.1.0 LAND USE

D1.1.1 LAND RESOURCES

Past (last 20 years) and present land uses within the Nichols Ranch ISR Project area are livestock grazing, wildlife habitat, oil/gas development, and coal bed methane development (refer to Figure D1-2). There is no evidence of hay or other agricultural production currently occurring within the project area. Coal bed methane development has begun within the project area within the past three years, but Uranerz Energy Corporation does not anticipate that in situ recovery operations will interfere with ongoing coal bed methane production. In addition, there are no occupied dwellings, public buildings, schools, churches, institutional buildings, cemeteries, or public parks within the project area or within 300 ft of the project area.

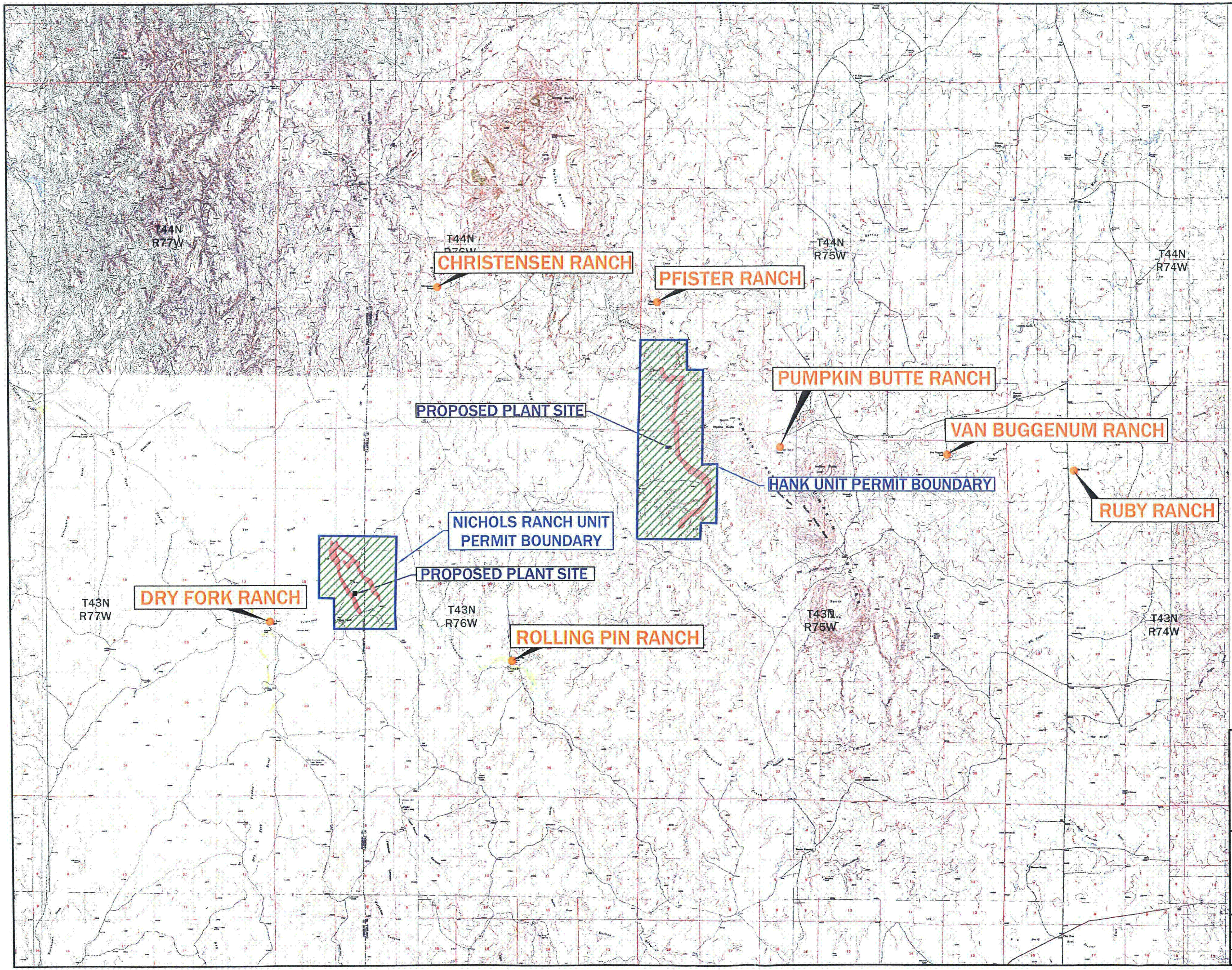
The project area and all lands that are disturbed and reclaimed by Uranerz Energy Corporation will be returned to their original land uses (livestock grazing, wildlife habitat, oil/gas development, and coal bed methane development) (refer to Figure D1-2).

D1.1.2 DEMOGRAPHY

D1.1.2.1 Campbell County

Land uses in Campbell County consist of agriculture, coal mines, developed areas such as the towns of Gillette and Wright, and other mineral extraction areas and pipelines that are scattered throughout the county. With the current and projected demand for energy, additional land use conversion from agriculture to mineral extraction is expected.

Campbell County covers approximately 3,066,880 acres, ranking it the seventh largest county in Wyoming. Land ownership within the county is a combination of private (individual and corporate), state, and federal. Federal ownership consists of 375,172 acres managed by the Bureau of Land Management and the U.S. Forest Service. State and local lands total



SCALE: 1"=8000'

0 4000 8000 feet

LEGEND

- GRAZING LAND AND WILDLIFE HABITAT
- PROJECTED WELL FIELD
- RESIDENCE

Uranerz ENERGY CORPORATION
1701 East "E" Street
P.O. Box 50850
Casper, Wyoming
USA 82605-0850

NICHOLS RANCH ISR PROJECT

FIGURE D1-2
LAND USE AND NEAREST RESIDENT LOCATIONS

By: S.M.F.	Date: APRIL 21, 2008
Contour Interval: 20 FEET	Revision Date:
Scale: 1"=8000'	Datum: NAD 27 UTM 13

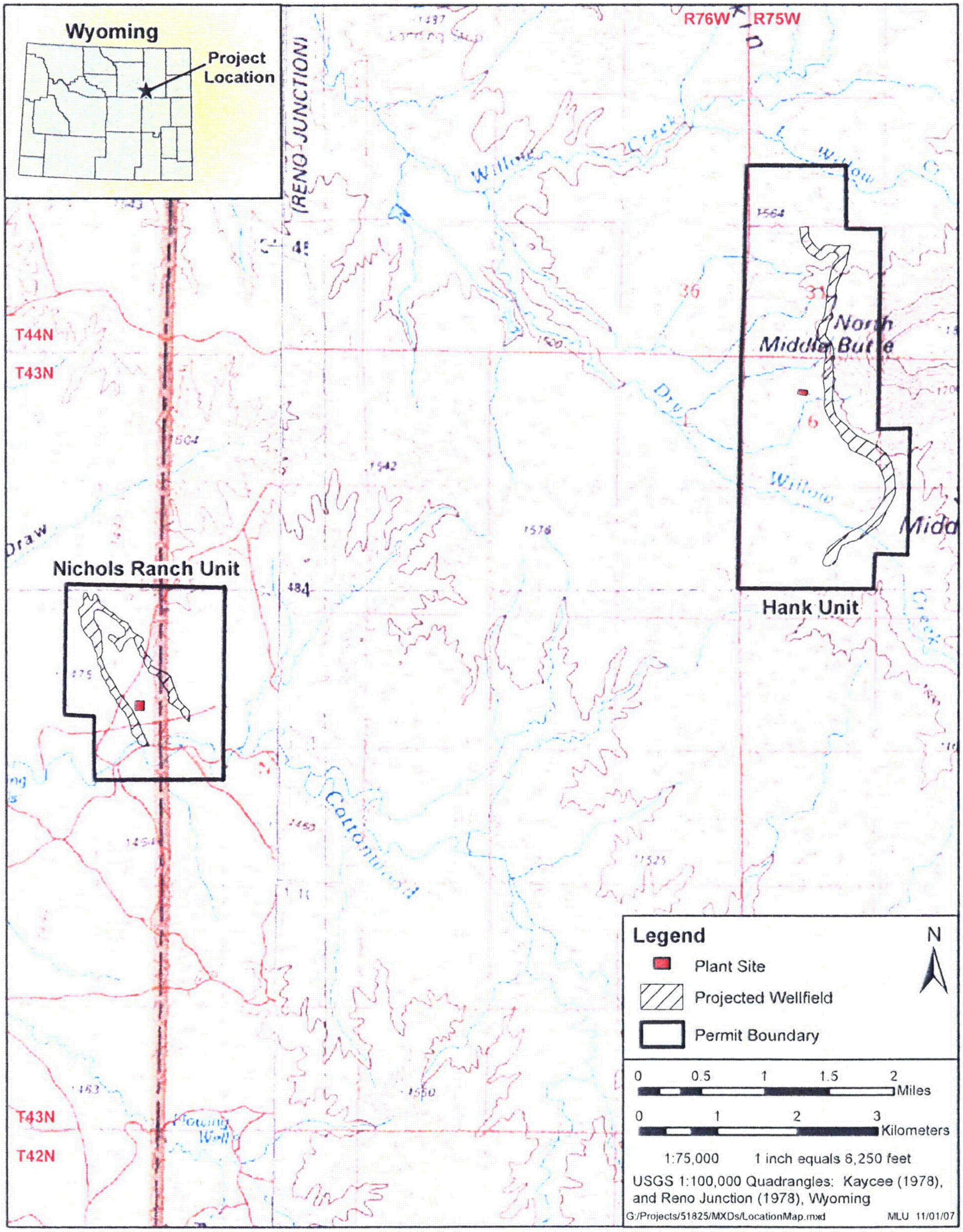


Figure D1-1 Map of the Area Surrounding the Nichols Ranch ISR Project.

Table D1-1 Residents Nearest to the Nichols Ranch ISR Project Area.

Nearest Residences	Number of Inhabitants	Nearest Permit Area	Distance From Permit Area (mi)	Direction
T-Chair (Rolling Pin) Ranch[1]	5	Nichols Ranch, Hank	1.9, 2.9	East, southwest
Pfister Ranch	3	Hank	0.6	North
Pumpkin Buttes Ranch	2	Hank	1.1	East
Van Buggenum Ranch	0	Hank	4	East
Ruby Ranch	2	Hank	6.1	East
Dry Fork Ranch	3	Nichols Ranch	0.9	West
Christensen Ranch	1	Hank	3.5	Northwest

[1] T-Chair Ranch sits between Nichols Ranch and Hank permit areas.

Table D1-2 Towns Within a 50-mi Radius of the Nichols Ranch ISR Project Area.

City	Population[1]	Distance From Permit Area (mi)	Direction
Gillette	22,685	46	Northeast
Buffalo[2]	4,290	57	Northwest
Kaycee	273	35	West
Midwest	431	25	Southwest
Edgerton	173	23	Southwest
Wright	1,425	22	East
Casper[2]	51,738	61	Southwest

[1] Source: U.S. Census Bureau Population Division (2006).
[2] Major Wyoming cities just beyond 50 mi.

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LIST OF EXHIBITS (Continued)

D5.0 GEOLOGY

D5.1 HISTORY

There are two lines of thought as to the origin of the uranium in the Powder River Basin and Pumpkin Buttes area. The first theory places the source of uranium from the weathering of the mountain cores which have also been cited as the source for the arkosic host sandstones. The basement rocks of the Granite Mountains for example, have been determined to have high concentrations of uranium (20 to 30 parts per million). It has also been estimated that the granites have lost 70% of their original uranium content. Emplacement of the uranium under this theory would have taken place beginning 40 to 45 million years ago, shortly after the host sands were deposited in the basins. The second theory places the source of uranium as overlaying Oligocene and Miocene volcanic tuffs which as they weathered down, the uranium leached out into the groundwater system. The rhyolite volcanic tuffs were the result of volcanic activity to the west. Emplacement of the uranium has been cited as 20 to 32 million years ago. Since both theories are very plausible, some geologists subscribe to a duel theory where each possible source contributed some percentage to the overall total uranium load.

Regardless of which source or if preferred, a duel source, the uranium came from, both would require a climate with active chemical weathering to breakdown the rock matrix and put the uranium into groundwater solution. One suggested environment for this to occur is the modern day savanna climate. Savanna climates are characterized by very wet, humid annual periods followed by hot and dry periods. This type of climate produces rapid chemical weathering and high oxidation potentials, which would have been needed to solublize the uranium and keep it in solution until the groundwater system encountered a reducing, oxygen deficient environment such as the carbon trash rich sands in the Powder River Basin. When the uranium charged groundwater flowed into the reduced sandstone environment, the oxidized uranium precipitated out of solution along the interface between the two chemical environments. The uranium was deposited in 'C' shaped rolls, which are 5 to 30 ft thick and in plan view may be a few feet to 500 ft wide and tens of miles in length. Along the length of the trace of the chemical roll, ore grade uranium may be found however, ore is not likely along ever mile of the front.

During the time that uranium was emplaced, as is true today, the groundwater in the Powder River Basin generally flowed to the north and northwest. As the original uranium charged groundwater flowed in the host sands, the chemical reductant was consumed and the roll fronts migrated down the hydrologic gradient leaving in their wake, a characteristic yellow to red to brown stain on the sandstone grains (see Figure D5-a in map pocket). As many as 11 separate roll front systems have been identified in different horizons of the Wasatch Formation in the Powder River Basin area. A demonstration of stacked roll fronts is depicted in Figure D5-b (map pocket).

D5.2 REGIONAL GEOLOGY

The Nichols Ranch ISR Project area is located in the Powder River Basin (PRB) which is a large structural and topographic depression parallel to the Rocky Mountain trend. The basin is bounded on the south by the Hartville Uplift and the Laramie Range, on the east by the Black Hills, and the Big Horn Mountains and the Casper Arch on the west. The Miles City Arch in southeastern Montana forms the northern boundary of the basin.

The PRB is an asymmetrical syncline with its axis closely paralleling the western basin margin. During sedimentary deposition, the structural axis (the line of greatest material accumulation) shifted westward resulting in the basin's asymmetrical shape. On the eastern flank of the PRB, sedimentary rock strata dip gently to the west at approximately 0.5 to 3.0 degrees. On the western flank, the strata dip more steeply, 0.5 to 15 degrees to the east with the dip increasing as distance increases westward from the axis. The Nichols Ranch ISR Project site location within the PRB is shown in Figure D5-1 (see map pocket).

The PRB hosts a sedimentary rock sequence that has a maximum thickness of about 15,000 ft along the synclinal axis. The sediments range in age from Recent (Holocene) to early Paleozoic (Cambrian - 500 million to 600 million years ago) and overlie a basement complex of Precambrian-age (more than a billion years old) igneous and metamorphic rocks. Geologically, the PRB is a closed depression in what was, for a long geologic time period, a large basin extending from the Arctic to the Gulf of Mexico. During Paleozoic and Mesozoic time, the configuration of this expansive basin changed as the result of uplift on its margins. By late Tertiary - Paleocene time, marked uplift of inland masses surrounding the Powder River Basin resulted in accelerated subsidence in the southern portion of the basin with thick sequences of arkosic (containing feldspar) sediments being deposited. Arkosic sediments were derived from the granitic cores of the Laramie and Granite Mountains exposed to weathering and erosion by the Laramide uplift. Near the end of Eocene time, northward tilting and deep weathering with minor erosion took place in the basin. Subsidence resumed in the late Oligocene and continued through the Miocene and into the Pliocene. A great thickness of tuffaceous sediments were deposited in the basin during at least a part of this period of subsidence. By the late Pliocene, regional uplift was taking place, leading to a general rise in elevation of several thousand feet. The massive erosional pattern that characterizes much of the PRB began with the Pliocene uplift and continues to the present. Of particular interest in the project area are the Tertiary-age formations:

Formation	Age (Million Years)
White River (Oligocene)	25-40
Wasatch (Eocene)	40-60
Fort Union (Paleocene)	60-70

The White River Formation is the youngest Tertiary unit that still exists in the PRB. Locally, it's only known remnants are found on top of the Pumpkin Buttes. Elsewhere the unit consists of thick sequences of buff colored tuffaceous sediments interspersed with lenses of fine sand and siltstone. A basal conglomerate forms the resistant cap rock on top of the buttes. This formation is not known to contain significant uranium resources in this area.

The Wasatch Formation is the next unit down and consists of interbedded mudstones, carbonaceous shales, silty sandstones, and relatively clean sandstones. In the vicinity of the Pumpkin Buttes, the Wasatch Formation is known to be 1,575 ft thick (Sharp and Gibbons, 1964). The interbedded mudstones, siltstones, and relatively clean sandstones in the Wasatch vary in degree of lithification from uncemented to moderately well-cemented sandstones, and from weakly compacted and cemented mudstones to fissile shales. The Wasatch contains significant uranium resources and hosts the ore bodies for which this permit application is subject to.

The next unit is the Fort Union Formation. In the PRB this unit is lithologically similar to the Wasatch Formation. The Fort Union includes interbedded silty claystones, sandy siltstones, relatively clean sandstones, claystones, and coal. The degree of lithification is quite variable, ranging from virtually uncemented sands to moderately well-cemented siltstones and sandstones. The total thickness of the Fort Union in this area is approximately 3,000 ft. The Fort Union contains significant uranium mineralization at various locations in the basin. The Fort Union is also the target formation for Coal Bed Methane (CBM) extraction activities. CBM target depths in the Nichols Ranch Unit are about 1,000 and 1,200 ft at the Hank Unit. A minimum of 300 ft of primarily mudstones and impermeable shales interspersed with fine and medium grained sands and siltstones separate the proposed uranium mining from CBM production horizons at both the Nichols Ranch and Hank Units. Since CBM wells have their casings cemented to the surface, no or little interference, water loss, or water invasion is anticipated other than for localized areas. Appendix D6 further discusses CBM.

Maps of the surface and sub-surface geology of the Powder River Basin are depicted in Exhibits 5a and 5b (see map pockets).

D5.3 SITE GEOLOGY

The Nichols Ranch ISR Project is located in the Eocene Wasatch Formation about eight miles west of the South Pumpkin Butte and straddles the Johnson and Campbell County lines. The mineralized sand horizons are in the lower part of the Wasatch, at an approximate average depth of 550 ft. The host sands are primarily arkosic in composition, friable, and contain trace amounts of carbonaceous material and organic debris. There are locally sandy mudstone/siltstone intervals within the sands and the sands may thicken or thin to the point of removal in areas remote to the permitted area.

The Hank Unit satellite solution mining site is also located in the Eocene Wasatch Formation approximately six miles east-northeast of the Nichols Ranch Unit central processing plant in Campbell County. The mineralized sand horizons are in the lower part of the Wasatch, at an approximate average depth of 365 ft. The host sands are similar in composition and material make-up to those found at the Nichols Ranch Unit.

The ore bodies at the Nichols Ranch and Hank Units are typical Powder River Basin roll front deposits. Uranium ore, where present, is found at the interface of a naturally occurring chemical boundary between reduced sandstone facies and oxidized sandstone facies. The ore body at the Nichols Ranch Unit forms two lateral sides, an east side and west side. The two sides come together at a point to the north called the nose. The interior area formed by the sides and nose is the chemically oxidized sandstone facies and the exterior of the area is the reduced sandstone facies. At the Hank Unit the reduced sandstone facies is to the east and oxidized facies to the west.

Due to the complex nature of fluvial sandstone deposition in the Wasatch formation, the uranium ore bearing sandstone at both the Nichols Ranch and Hank Units are composed of at least two vertically stacked subsidiary roll fronts. The roll fronts have been designated the upper and lower fronts at each of the two properties. Stacked roll fronts develop due to small differences in sandstone permeability or the occasional vertical contact between sand members. The lateral distance between stacked rolls range from 0 to over 200 ft and may result in complex overlapping patterns.

The Nichols Ranch Unit and Hank Unit ore bodies have uranium mineralization composed of amorphous uranium oxide, sooty pitchblende, and coffinite. The uranium is deposited upon individual detrital sand grains and within minor authigenic clays in the void spaces. The host sandstones are composed of quartz, feldspar, accessory biotite and muscovite mica, and locally occurring carbon fragments. Grain size ranges from very fine-grained sand to conglomerate. The sandstones are weakly to moderately cemented and friable. Pyrite and calcite are associated with the sands in the reduced facies. Hematite or limonite stain from pyrite, are common oxidation products in the oxidized facies. Montmorillonite and kaolinite clays from oxidized feldspars are also present in the oxidized facies.

There are four notable Wasatch Formation sand units in the Nichols Ranch Unit mining area. The sand members have been identified as F, B, A, and the 1 (one) sand unit. The F sand unit is the shallowest and the 1 sand unit is the deepest. The principle uranium ore bearing sand unit is the A sand. The B sand has been designated the overlaying aquifer and the 1 sand the underlying aquifer.

There are six notable Wasatch Formation sand units at the Hank Unit area. The sand units have been identified as the H, G, F, C, B, and A sands. The H sand unit is the shallowest and the A sand unit is the deepest. The principle uranium ore bearing sand member at the Hank Unit is the F. The G sand has been designated the overlaying aquifer and the C or B sand the underlying aquifer.

Both the Nichols Ranch Unit A sand ore body and the Hank Unit F sand ore body are bounded above and below by impermeable aquitardes. The upper and lower aquitardes are composed of shales or mudstones, silty shales and shaley (poor) coal horizons. Measured permeability of the mudstones and shales has been found to be less than 0.1 millidarcies whereas the permeability of the ore sands average between 250 and 2,000 millidarcies.

Site geology and stratigraphy are summarized in cross section Exhibits D5-1, D5-2, D5-10, D5-11, and D5-12 (see map pockets) for the Nichols Ranch Unit and Exhibits D5-3, D5-4, D5-6, D5-7, D5-8, and D5-9 (see map pockets) for the Hank Unit. These cross sections each run north/south and east/west through their respective ore bodies. Exhibit D5-5 shows an electric cross section running from the Nichols Ranch Unit to the Hank Unit, a distance of approximately six miles. This cross section provides for correlation of the sand units, aquitards, and the nomenclatures utilized for each in the project areas. It also illustrates the gentle 0.5 to 1.0° westward dip of the Wasatch formation. Figure D5-2 (see map pocket) details a typical stratigraphic column for the Nichols Ranch ISR Project.

Description of the Nichols Ranch Unit and Hank Unit aquifers and aquitards are as follows:

Beginning with the lower monitor aquifer sand at the Nichols Ranch Unit, this unit has been designated the 1 (one) Sand. This sand is variable ranging from 10 to 85 ft in thickness and occurs at depths of 560 to 710 ft below the ground surface. The sand is very fine to coarse grained and is gray in color throughout the Nichols Ranch Unit area. Available drill holes in the Hank Unit area have not been drilled deep enough to encounter this sand if it exists at that location.

The next unit up section is the Nichols Ranch Unit lower mining zone aquitard. It consists of dark and medium gray mudstones and carbonaceous shale with occasional thin lenses of poorly developed coal. This unit ranges in thickness from 20 to 35 ft thick.

The A sand is the next unit up section. This is the mining zone sand at the Nichols Ranch Unit. With in the Nichols Ranch Unit boundary the unit has a thickness between 55 and 110 ft. The A sand is thickest to the northeast and thins to the southwest. The A sand is fine to coarse grained and is gray or red in color depending on location relative to the ore body as discussed above. The body of the A sand is occasionally separated by lenses of mudstone and siltstone which rarely exceed 15 ft in thickness. The lenses are generally 50 to 100 ft wide and may extend for a few hundred feet in a north/south direction. The lenses are not expected to present any problem to mining or restoration. The A sand is extensive and has been correlated across the gap between the Nichols Ranch and Hank Units. The A sand at the Hank Unit occurs at a depth of 725 ft. It is over 300 ft below section from the F sand ore mining zone at this location.

The next up section unit is the Nichols Ranch Unit A sand upper aquitard. It varies from 25 to 90 ft thick, thickening to the northwest and thinning to the southeast. This unit consists of gray mudstones and thin discontinuous light gray siltstones. In the Hank Unit area this unit is at least 80 ft thick and is composed mainly of mudstones.

The next higher unit at the Nichols Ranch Unit is the B sand upper monitor aquifer. The B sand ranges in thickness from 100 to 160 ft. The B sand is fine to coarse grained and red or oxidized with in the permit boundary. Elsewhere in the Pumpkin Buttes area the B sand is host to some large known ore bodies including those at Christensen Ranch and North Butte. The body of the B sand is occasionally separated by lenses of mudstone, siltstone and carbonaceous shale.

Some of these mudstone splits exceed 25 ft in thickness and may extend for thousands of feet. The B sand is very extensive and has been correlated at one horizon or another across the gap between the Nichols Ranch and Hank Units. The B sand at the Hank Unit occurs at a depth of 500 to 545 ft and is 90 to 130 ft thick. In some locations at the Hank Unit the B sand is the lower monitor aquifer where the C sand is absent.

The next up section unit at the Nichols Ranch Unit is the upper B sand aquitard. It varies in thickness from 40 to 150 ft depending on presence of the C sand. This interval is characterized by dark and medium gray mudstones, discontinuous thin siltstones or fine grain gray sandstones and carbonaceous shales. At the Hank Unit, the upper B sand aquitard is 70 to 110 ft thick depending on the presence of the C sand. The unit at this location is mainly composed of gray mudstones.

The next unit at the Nichols Ranch Unit is the C Sand. This sand is discontinuous over most of the Unit area. There present, it has developed a thickness of 20 ft of mostly fine and very fine grained gray sand. This unit can not be tracked for large distances. Elsewhere in the Pumpkin Butte area the C sand is closely associated with the B sand. At the Hank Unit, the C sand is the lower monitor aquifer sand where present. At this location, the sand is 5 to 20 ft thick, discontinuous, and is composed of fine and very fine grained gray sand. The B sand substitutes as the lower monitor aquifer sand where the C sand is absent.

The next unit up section at the Nichols Ranch Unit is the lower F sand aquitard. This unit is composed of gray mudstones, siltstones, dark gray carbonaceous shales, and poor developed coal. It ranges in thickness from 45 to 110 ft depending on the presence of the C sand. At the Hank Unit, this aquitard is nearly identical to the one at Nichols Ranch Unit but ranges from 30 to 110 ft thick depending on the presence of the C sand.

The F sand is the next unit up section. At the Nichols Ranch Unit this unit is the shallow monitor zone sand. This sand is medium and fine grained, red or gray and is 15 to 50 ft thick. This unit splits into as many as three separate sands at Nichols Ranch but then to the north, the lower sand pinches out. In the Pumpkin Buttes area, this sand is host to numerous occurrences of uranium mineralization including the production mining sand at the Hank Unit. At the Hank Unit the sand is fairly uniform at 75 to 85 ft thick and is composed of fine to coarse grained sand, which is gray or red depending on the location within the geochemical front. The F sand mineralization occurs in two stacked roll fronts, the upper front and lower front. Depending on location at the Hank Unit, the two fronts may cross over each other or be separated laterally by several hundred feet.

The next up section unit is the Nichols Ranch Unit upper F sand aquitard. It varies in thickness from 20 to 75 ft thick where the lower G sand is present and up to 185 ft thick where only the upper G sand is present. This unit consists of gray mudstones, dark gray to black carbonaceous shales and thin discontinuous light gray siltstones. At the Hank Unit this unit is 30 to 55 ft thick and is composed mainly of gray mudstones. This unit is the upper confining layer for the Hank Unit F sand production horizon.

The next higher unit at the Nichols Ranch Unit is the G sand aquifer. The G sand is highly variable, discontinuous and lenticular. It is composed of fine to coarse grained red and gray sands that are up to 75 ft thick. This sand is discontinuous over the Nichols Ranch Unit area with the entire G sand sequence ranging in thickness from 20 to 130 ft. The G sand tops out at the surface at the Nichols Ranch Unit. The G sand at the Hank Unit is the upper monitor aquifer. The G sand is comprised of up to three individual sand units that are fine- to very fine-grained and red or gray in color and 10 to 25 ft thick. The entire G sand sequence is up to 75 ft thick with inter-sand zones comprised of gray mudstone. Else where in the Pumpkin Buttes area the Gsand and F sand are closely related.

The next higher unit at the Nichols Ranch Unit is the upper G sand aquitard. It is about 20 ft thick. This interval is characterized by brown mudstones. This unit tops out to the surface in the northern part of the Nichols Ranch Unit where the H sand is absent. At the Hank Unit, the upper G sand aquitard is 30 to 125 ft thick and composed of gray mudstones and thin siltstones.

The upper most unit at the Nichols Ranch Unit is the H Sand. This sand has a thickness of at least 20 ft and is composed mostly of fine to medium grained brown sand. This unit tops out at the surface in the northern part of the Nichols Ranch Unit. At the Hank Unit, the H sand is the shallow monitor aquifer sand. At this location, the H sand sequence is 50 to 170 ft thick, highly variable with numerous pinch-outs and composed of up to four individual sands. The H sand is fine- to coarse grained and brown, red or gray in color. This unit is known to contain minor occurrences of uranium mineralization and is closely related to the G sand.

The next unit up section at the Hank Unit is the upper H sand aquitard. This unit is composed of brown mudstones and ranges in thickness from 25 to 90 ft. The unit tops out at the surface over a portion of the Hank Unit.

The final surface unit at the Hank Unit is the J sand sequence. It is composed of at least two thin sands separated by mudstones and ranging in thickness from 10 to 30 ft thick. The sands are brown and occur only in the lower slopes of the middle Pumpkin Buttes. Else where in the mining district the J sand is thicker but is largely an erosion remnant in the immediate area.

Isopach maps depicting the B Sand, A-B Shale, A Sand, 1-A Shale, and 1 Sand for Nichols Ranch are found as Exhibits D5-13 through D5-17 (see map pockets). The Hank isopach maps for the G Sand, G-F Shale, f Sand, C-F shale, and B-C Sand are depicted in Exhibits D5-18 though D5-22 (see map pockets).

D5.3.1 BRINE DISPOSAL

A number of geological formations that may be used for brine disposal appear to be present. The best source of data is the old oil and gas electric logs. The Shannon formation currently produces oil and could not be used for disposal at this time. There are three sandstone units above the Shannon that may be suitable for brine injection. These would include, in ascending order, the Parkman, Teapot, and Teckla sandstones.

The main Parkman sandstone is found at approximately 8,450 feet deep and is over 90 ft thick (City Service Co.; State #1; NE NE Section 16, T43N R78W). The top 50 ft appears to be the most promising. It is described in samples as white, fine-grained, with siliceous cement. The maximum porosity of the sandstone is 19% and averages approximately 14%. No measured permeability data is available for this interval. A drill stem test (DST) of the Parkman interval (8,428-8,441') in the #1 North Butte Federal (SW NW Section 6, T43N R75W) recovered 6,289 ft of water. The shut in pressures indicate that the formation is normally to sub normally pressured. The Parkman sandstone is separated from the Teapot sandstone by 200 feet plus of shale and shaley sandstones and from the Shannon sandstone by over 1,000 ft of shale and shaley sandstone.

The Teapot sandstone is found at 8,150 ft and is over 80 ft thick. It is also described as white, very fine to fine-grained, with siliceous cement. The maximum measured porosity 14% and averages 12-13%. Not DST's are known to have been run in this interval at this location. The Teapot is isolated from the Teckla sandstone above by 150 ft of shale.

The Teckla sandstone is at approximately 7,800 ft and is up to 200 ft thick but only the upper 35 ft may be suitable for brine injection. The lower portion appears to be largely clay filled. The maximum porosity is 15% and averages 12%.

The ability of these sandstone units to be used as a brine disposal well is a function of thickness, porosity, and permeability. The Parkman, by virtue of the encouraging DST results, appears to be the most likely. The Teapot and Teckla have a little less measured porosity but may be satisfactory, depending on the amount of brine to be disposed of. Additional study will be necessary to ultimately decide which unit or combination of units would be best to use.

D5.4 ABANDONED DRILL HOLES

Section D6.5 of Appendix D6-Hydrology discusses all known abandoned exploration drill holes located in the area of the Nichols Ranch ISR Project.

D5.5 SEISMOLOGY

The area of central Wyoming where the Nichols Ranch Unit and Hank Unit sites are located lies in a relatively minor seismic region of the United States. Although distant earthquakes (such as the western Wyoming area) may produce shocks strong enough to be felt in the Powder River Basin, the region is ranked as a one (1) seismic risk as shown in Figure D5-3 (see map pocket). Few earthquakes capable of producing damage have originated in this region.

The seismically active region closest to the site is the Intermountain Seismic Belt of the Western United States, which extends in a northerly direction between Arizona and British Columbia. It is characterized by shallow earthquake foci between 10 and 25 mi in depth, and normal faulting. Part of this seismic belt extends along the Wyoming-Idaho border, more than 350 km (approximately 200 mi) west of the project area. More detailed information can be found in the report "Basic Seismological Characterization for Campbell County and Basic Seismological Characterization for Johnson County, Wyoming" by the Wyoming State Geological Survey, which is contained in Addendums D5A and D5B.

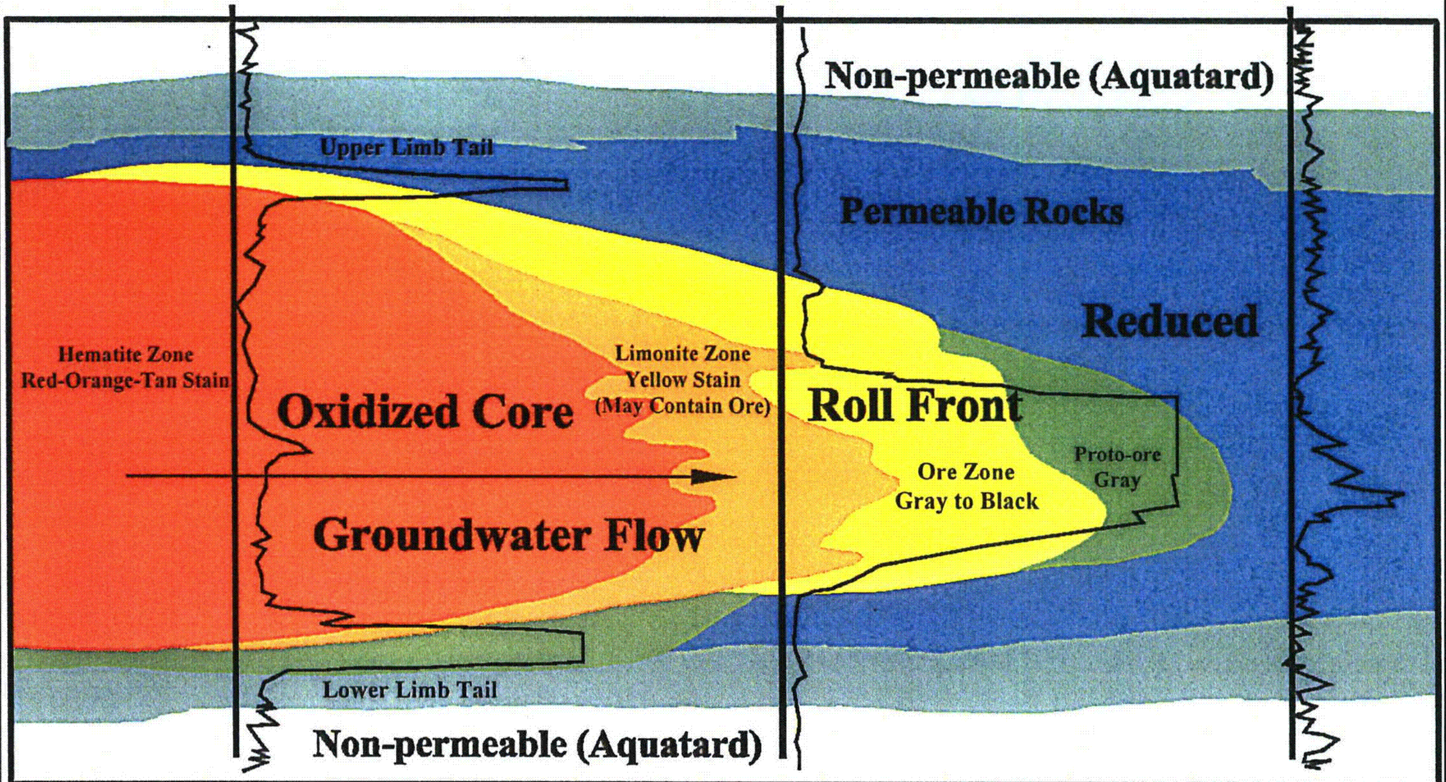
Table D5-1 lists the largest recorded earthquakes (greater than 4.0 magnitude on the Richter Scale) that have occurred within 200 km (120 mi) of the Nichols Ranch ISR Project site and gives the maximum ground acceleration that could be realized at the site as a result of these disturbances from the period 1873 through 2006 (Sources–Wyoming State Geological Survey, 2002 and USGS, 2007). The earthquake of highest intensity recorded during that time interval was the Casper, Wyoming earthquake of 1897. This earthquake has been assigned a probable maximum Mercalli shaking intensity of VI -VII (5.7 on the Richter scale) based on accounts of damage incurred.

No surface faulting or fault traces in the project area has been reported, nor is any faulting evident from geophysical log interpretations. Based on historic data, the ground accelerations reported in Table D5-1 (.01g to .04g) are not considered to be of a magnitude that would disturb the operations or facilities in the event that an earthquake occurred.

Table D5-1

MAXIMUM EXPECTED EARTHQUAKES INTENSITIES AND GROUND ACCELERATIONS AT THE NICHOLS RANCH ISR PROJECT SITE

Earthquake Location and Year	Epicenter Intensity (Mercalli)	Magnitude (Richter)	Distance From Nichols Ranch ISR Project	Ground Acceleration at Nichols Ranch ISR Project
Casper (1894)	V	4.5	65	0.01g
Casper (1897)	VI-VII	5.7	64	0.04g
Kaycee (1965)	V	4.7	30	0.02g
Pine Tree Jct. (1967)	V	4.8	10	0.04g
West of Gillette (1976)	IV-V	4.3	38	0.02g
SW of Gillette (1976)	V	4.8	18	0.03g
Bar Nunn (1978)	V	4.6	56	0.01g
West of Kaycee (1983)	V	4.8	65	0.01g
West of Gillette (1984)	V	5.1	30	0.03g
West of Gillette (1984)	V	5	28	0.03g
Laramie Mtns (1984)	VI	5.5	95	0.01g
Mayoworth (1992)	V-VI	5.2	52	0.02g
W Converse Co. (1996)	IV-V	4.2	54	0.01g



Barren Interior Strong Alteration	Ore Zone Altered/Unaltered Sandstone	Protore Zone Unaltered Sandstone
0 to +1.00%(Tails Only) eU3O8	0.03% to +1.00% eU3O8	0 to 0.03% e U3O8

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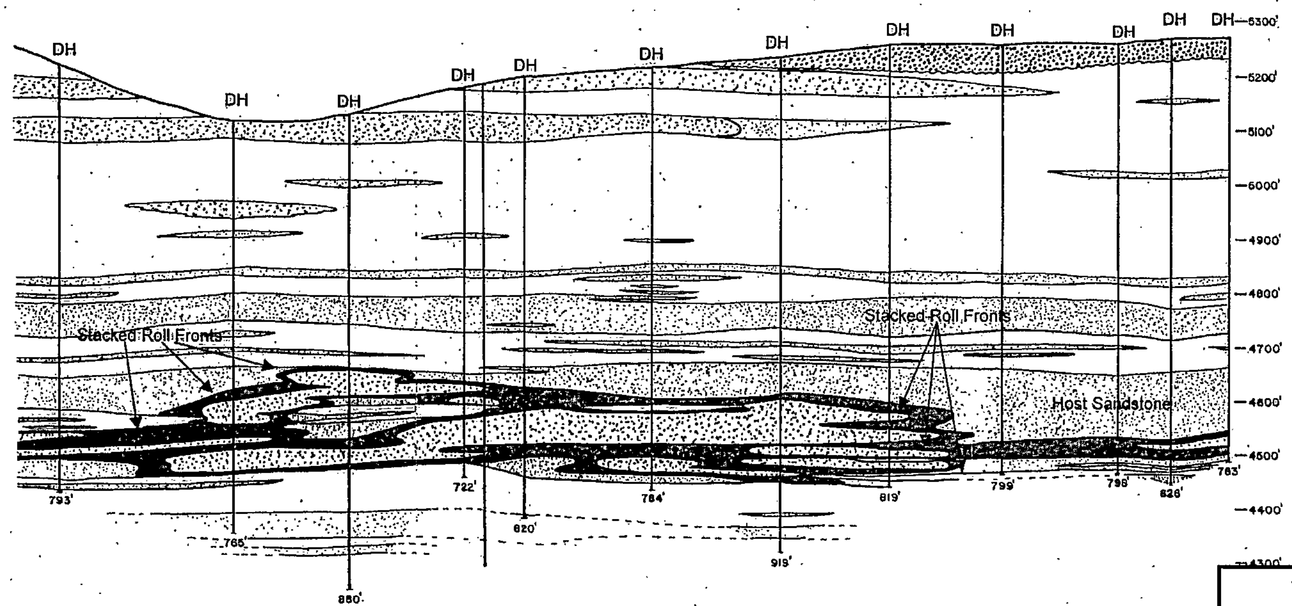
NICHOLS RANCH ISR PROJECT

FIGURE D5-a
POWDER RIVER BASIN URANIUM ROLL FRONT

By: S.M.F.	Date: 04-08-2008
Datum: NAD27 UTM13	Revision Date:
Scale: N.T.S.	Contour Interval: N/A
DWG#:	Exhibit Number:

Diagrammatic Cross Section - Stacked Roll Fronts
Powder River Basin



DH – Drill Hole

U-MINERALIZATION

OXIDIZED SANDSTONE

REDUCED SANDSTONE

INTERBEDDED SILTSTONE AND CLAYSTONE WITH MINOR SANDSTONE LENSES (Aquitards)

ALLUVIUM, LANDSLIDE DEBRIS, ETC.

Note: Migration of the roll fronts was perpendicular to the strike of the cross section

Horizontal scale 2X Vertical scale

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NICHOLS RANCH ISR PROJECT

FIGURE D5-b
STACKED ROLL FRONTS

By: S.M.F.	Date: 04–08–2008
Datum: NAD27 UTM13	Revision Date:
Scale: N.T.S.	Contour Interval: N/A
DWG#:	Exhibit Number: